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REPORT OF THE 89TH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

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Report of the 89th National Conference on Weights and Measures

Pittsburgh, PA – July 11 through 15, 2004

as adopted by the 89th National Conference on Weights and Measures 2004

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NIST Special Publication 1028

The National Conference on Weights and Measures is supported by the National Institute of Standards and Technology and is attended by officials from various States, counties, cities, as well as representatives from U.S. Government, other nations, industry, and consumer organizations.

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Abstract

The 89th Annual Meeting of the National Conference on Weights and Measures (NCWM) was held July 11 through 15, 2004, at the Hilton Pittsburgh & Towers Hotel, Pittsburgh, PA. The theme of the meeting was, "Recognition through Transparency."

Reports by the NCWM Board of Directors, Standing Committees, and Special Purpose Committees constitute the major portion of this publication, along with the addresses delivered by Conference officials and other authorities from government and industry.

Special meetings included those of the Scale Manufacturers Association, Meter Manufacturers Association, Gasoline Pump Manufacturers Association, American Petroleum Institute, National Association of State Departments of Agriculture, the Industry Committee on Packaging and Labeling, and Associate Membership Committee.

Key words: laws and regulations; legal metrology; meters; scales; specifications and tolerances; training; type evaluation; uniform laws; weights and measures.

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Southern Weights and Measures Assn. (SWMA): Annual Meeting: October 24-27 - Gulfport, MS	Julie McLemore, MS (601) 359-1111 julie@mdac.state.ms.us
Central Weights and Measures Assn. (CWMA): Annual Meeting: May 2-6 - Omaha, NE	Don Onwiler, NE (402) 471-4292 donlo@agr.state.ne.us
Western Weights and Measures Assn. (WWMA): Annual Meeting: September 12-16 - Sacramento, CA	Dave Frieders, CA (415) 285-5010 dave.frieders@sfgov.org

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Executive Secretary's Address
National Conference on Weights and Measures
Pittsburgh, Pennsylvania
July 15, 2004

"Changes and Opportunities"

Henry Oppermann
National Institute of Standards and Technology

The NIST Weights and Measures Division recently sponsored Weights and Measures Administrators' Workshops, and I was extremely happy with the discussions and the many ideas that were presented.

One of the key topics of discussion was the future of weights and measures oversight. The marketplace has changed. We are in a global manufacturing and marketing environment, and consumers have changed as reflected by their tastes and priorities. Consumer demographics have changed, and retailers have changed their marketing techniques in response to changes in consumers. Consumer product manufacturers have changed their products, packaging, and marketing approaches, and scale and meter manufacturers have changed technology and the products they provide based upon the needs and wishes of their customers. Businesses must respond and adapt to their changing environment if they are to survive and prosper, and weights and measures programs must also change and adapt if we are to survive and prosper.

Weights and measures is one of the most fundamental and important components of the commercial measurement system. Many weights and measures programs have not done well on budget issues over the last 15 years. While some programs have done well and others expect a significant economic recovery, we have to learn from each other and improve our operations. We have to see how we can become more efficient and effective. The speakers and discussions at the Administrators' Workshops provided a variety of ideas and experiences on which we need to capitalize.

There were discussions regarding "risk-based inspections," that is, inspections focused on devices or businesses with higher levels of noncompliance, rather than performing inspections on 100 % of all devices. Statistical sampling may also be a component of risk-based inspections, rather than testing all of the devices. Several jurisdictions reported that they were forced into this course of action. A few programs have found ways to make this approach successful. However, the implementation of these types of programs must be done in the proper way and as part of the "bigger picture." Risk-based inspections in the narrow view are often an excuse to cut staffing. However, effective regulatory oversight of the marketplace can result from properly implementing a comprehensive combination of service company work, monitoring the performance of service companies, record keeping and analysis, conducting an adequate number of regulatory inspections, and the judicious use of penalties. Risk-based inspections can allow weights and measures programs to shift resources in order to expand regulatory oversight. However, improper implementation of risk-based inspections can weaken weights and measures regulatory oversight. We have to be proactive to change with our political and economic environment so we can be the major force in shaping our future.

A problem raised by the NIST focus groups is the lack of consistency in weights and measures interpretations, inspections, practices, and regulations. We have the opportunity to improve this situation both for the benefit of the regulatory community and for industry and the retailers. The effort of the Professional Development Committee and the idea of establishing a certification program for weights and measures inspectors present a great opportunity to improve uniformity across the country. Improving uniformity requires the <u>commitment</u> on the part of all in the regulatory community to make it happen. However, this is something that is under our control, and, therefore, it is something that we can achieve.

The marketplace is global. Business acquisitions, mergers, and bankruptcies have resulted in huge multi-national companies that market around the world. Weights and measures must look at how the marketplace has changed and explore how our approach to regulatory oversight should change to be more effective. One key opportunity that exists is for weights and measures officials to cooperate nationally rather than operate as independent and uncoordinated actions. The NCWM Board has had discussions this week that present opportunities for some coordinated national efforts through the conduct of national marketplace audits. This is an exciting possibility that may revitalize some of the most effective work weights and measures programs have done on a national basis. Opportunities for partnership among NCWM, NIST, and individual jurisdictions exist and we have to take advantage of them. We can be much stronger, more successful, and more efficient working together than by working separately.

NIST has undertaken the weights and measures benchmark study, in which many weights and measures directors participated. Individual companies participated in interviews that provided valuable insight into how their customers, their markets, their priorities, and their companies have changed in response to the changing markets and competition. The NCWM assisted NIST in this study by providing the data from their survey, which are extremely valuable to the benchmark study. Although the data are not “clean and pretty,” I believe the study will provide the basis to see where opportunities for improvement exist. However, this will take additional effort. To take advantage of the data that have been collected, we jointly have to look deeper into what is behind the data. One obvious difficulty in the collection and analysis of the data is that weights and measures jurisdictions are not consistent in how they categorize devices, package inspections, and price verifications, or in how they track violations. This may be an opportunity for the NCWM to develop a recommendation for defining device categories and the means for tracking violations so we can better compare results across the country.

To take advantage of the data collected for the benchmark study, WMD believes that small groups of experts should be assigned to each major weights and measures inspection discipline to analyze the inspections, the records, and the practices that are behind the numbers. We need to validate the data and then identify which programs have “best practices” that should be emulated by others. Overall, this follow-up work presents opportunities. We want to use the benchmark study and the subsequent follow-up work to develop “model” weights and measures programs so jurisdictions can compare themselves.

NIST also hopes to use the results of the Administrators’ Workshops, the discussions of the focus groups held in 2003, and the follow-up work on the benchmark study to update NIST Handbook 82, “Weights and Measures Administration.” We also want to develop a training course for new weights and measures directors to explain the responsibilities and complexities of managing weights and measures programs. We need to explain the ramifications of relying on fees to fund regulatory activities.

These are projects that we in weights and measures have talked about for years. I believe that we are in position to move forward on these projects to strengthen weights and measures programs and the operation of the commercial measurement system. In order to achieve this goal, we must work together. NIST looks forward to working with you on these projects. Thank you for your attention.

Chairman's Address
National Conference on Weights and Measures
Pittsburgh, Pennsylvania
July 15, 2004

Dennis E. Ehrhart
Arizona Department of Weights and Measures

Good Afternoon, I am indeed honored to have the opportunity to serve the National Conference on Weights and Measures.

Recognition Through Transparency was my slogan for my term. Transparency, above board, open, crystal clear, all the same. I wanted this body to be painfully aware of how important to due process transparency actually is. I hope you found the Board more transparent. The newsletters were full of the actions of the Board and NTEP. Our Board open hearings were longer and I hope not to the chagrin of the members. I hope our stakeholders found the NCWM more transparent. We asked more questions. We received more answers.

I hope you are not burned out on surveys because we need more. We do not as of yet have the information necessary to begin a National Media Campaign or identify a Model Weights and Measures Program.

I had the privilege to attend the International Society of Weighing and Measurement (ISWM) meeting in Covington, Kentucky last month. The meeting featured a keynote speaker by the name of Robert Stevenson the author of the book "How to Soar With Eagles While Working With Turkeys". I'd like to share just a few of the points he made because even though he was speaking to a private sector group, I found some appropriate for the public sector: 1. You can't make your organization better until you make your people better. 2. Create a FUBAR list. (Fouled up beyond all recognition) You need to make a list of all the things you do or try to do that don't work so when you hire someone new you can share that list and tell them we've tried these things they don't work, don't do them. 3. Success is never final. 4. Change is not a way of life; it is life. 5. It's not the big that eat the small; it's the fast that eat the slow. And, 6. Share the details.

Case in point. Boeing Aircraft made a cannon to fire processed chickens, NOT NECESSARILY ENHANCED, at the windshield of proto-type airplanes to ensure the windshield would not break if the plane hit a bird during takeoff or while in flight. The maker of a Bullet Train in France heard of the cannon and thought it would be a worthwhile venture to borrow the cannon and test the windshields of their trains. Boeing sent the cannon to France with a lengthy list of set up and operating instructions. The engineers that designed the train set up the cannon per the instructions and fired a chicken at the windshield. Not only did the chicken go through the windshield but also through the control panel, broke the engineers seat and imbedded into the rear wall of the engine.

The engineers were stunned. They carefully recorded all of their preliminary steps and the results and fired them off to Boeing. Why has our experiment gone so horribly wrong? The answer was one short sentence. Thaw the Chicken.

My focus at the ISWM conference was to reach out to another set of stakeholders. I believe we need to spend much more time identifying and contacting our stakeholders for more than one reason. First; we may find a source of membership, second; we may find a source of expertise to assist our standards writing efforts and finally, we may end up finding parties that are affected by our work.

President, Steve Kendra of the ISWM and I have started talks about joint activities in Orlando next year while we are staying at the same facility. I think this is an excellent opportunity to interact with an association with common interests and goals.

So, what are some of the areas that require the attention of the NCWM?

The NCWM while being active in the international arena needs to begin playing a bigger role in the OIML process and the National Working Groups.

I remember a time, not too long ago, when I was one that said this is the ***National*** Conference on Weights and Measures why must we concern ourselves with international standards? Spend some time with the associate members, and members of ISWM, and members of the SMA. They will tell you they want one stop shopping for type evaluation and one set of standards to adhere to so they do not have to make different devices or packages for different worldwide markets.

Exploring the possibilities of participating in the MAA with OIML countries for type evaluation data exchange and acceptance is under way and moving at a rapid pace.

In that 50 % or more of the membership of the NCWM is comprised of associate members, we owe our industry partners our support and dedication toward helping them to be a competitive force in the global marketplace. We can ensure this positioning by working toward harmonization with OIML standards and type evaluation. And, please don't construe that statement as a position of support for OIML criteria instead of or in place of NCWM standards and type evaluation checklists. The process of harmonization is not an abandonment of our standards but a process of having applicable standards incorporated into one-another's standards. Perhaps we must examine our "Yankee Pride" and not allow that to stand in the way of progress and artificially create technical or administrative barriers to trade.

The creation of a national training program for field personnel in order to ensure uniformity of field examinations as well as enforcement actions of weighing and measuring disciplines is still a priority at the Board level and I'm certain each of you feel the same sense of urgency to improve the training material available to regulators and industry alike.

Our partners at WMD brought a series of issues regarding the development of standards to the Board's attention. One of those issues was the concern that in order to write the best standards possible the proper experts must be involved. Why employ working groups? Each of the standing committees, while having dedicated hard working members, they are most likely not equipped to deal with some of the more technical issues put before them. I can see the need for a working group or groups to assist the PDC in their task to create the curriculum for the training program.

Wes Diggs and I visited all three standing committees and asked them to give us a 40 thousand foot view of how working groups would be utilized. How working groups would move a project through the system? Who might be on those groups? Would there be funding needed and how much?

The technological advances of the marketplace dictates to industry the time frame in which they must bring their products to market has placed a greater importance to the time a device can spend in the evaluation process and a manufacturer still be able to remain competitive. The NTEP staff and laboratories must remain sensitive to those needs and strive to be as efficient as possible to enable a manufacturer to receive a CoC in a reasonable time.

Internal issues of the Conference such as ensuring the Conference is financially stable must remain a high priority. One way to accomplish this goal is by pursuing the identification of non-dues revenue and enhancing membership levels. Bob McGrath's membership initiative should be memorialized along with his idea of dedicating a portion of each Board meeting to discussing membership issues and, not just pursuing new members but the retention of present members. We must find new member benefits and enhance the benefits already in place.

The Fair Measurement Act proposed by Aves Thompson in which legislation would be proposed at the Federal level to garner federal monies to assist Weights and Measures jurisdictions must be a continuing effort by the Conference. Each of us should make every effort to contact your Congressional Representative to keep the issue on their radar screen. Because at the end of the day the bills that can be considered a good piece of bi-partisan legislation that are being pushed from several directions can prevail.

There will be new parts of the NCWM strategic plan that should move to the forefront and be recognized. In order to really become transparent and to receive the recognition we deserve. We must find a way to meet the criteria set out in the National Media Campaign Plan and implement the campaign. I believe the media campaign is worthy of the allocation of resources to heighten public awareness of the Weights and Measures community and perhaps more specifically the NCWM.

Most of you are aware the State of Arizona has a very active media campaign and a very dynamic Public Information Officer. I hope to be able to infuse some of DeeAnn's ability and time to make a recognition program library. While some of the news media pieces are Arizona specific, most are of generic consumer oriented genera.

The real beauty of the media spots is while the consumer is being educated one or more members of the retail community are being highlighted as a good corporate citizen. One or more device manufacturers are receiving acknowledgment as a company that produces a product that a businessperson can rely upon in a commercial application.

Ensuring the existence of a strong Weights and Measures program is not only good for the consuming public but also for the retail and manufacturing community. Our industry partners have been and we hope will continue to be our greatest supporters. But an informed consuming public is necessary to be our eyes and ears in the marketplace.

In Arizona, 4 years into an active media program our consumer complaints have become more productive in finding violations than the efforts of our random inspection program. For instance, while Department finds a 41 % rejection rate for Price Verification, the rejection rate for complaints regarding Price Verification is almost 90 %. The consumers have been exposed to the requirements and take that knowledge into the marketplace with them.

The Department receives 700 to 800 gasoline volume complaints in the course of an average year. After several gasoline media spots, the percentage of valid complaints rose from 1 % to 9 % with a reduction of the old stand by "my car won't hold that much gas".

In closing: There is still much to do. There are still tight budgets and a shrinking volunteer force. But, we've seen budgets rebound. We will find new members and absent members will return. Weights and Measures programs are necessary to a stable and prosperous American marketplace.

I believe in the NCWM.

Thank you very much and May God Bless America.

NCWM 2004 Annual Meeting Honor Award Recipients

Name	Number of Years
Karl Angell	10
Mark Buccelli	10
Jerry Flanders	10
Darrell E. Floken	10
Gary Lameris	10
Stephen Langford	10
Anthony Lori	10
James A. Vanderwielen	10
Juana Williams	10
Christopher Guay	15
Mark. P. Coyne	15
Ronald G. Hayes	15
Ross J. Andersen	25
Daryl Tonini	30
Joseph Silvestro	35

Report of the Board of Directors

Dennis Ehrhart, CPM
Assistant Director, Compliance
Arizona Department of Weights & Measures

Introduction

The Board held its quarterly Board of Directors meeting on Saturday, July 10, 2004, and continued that meeting during work periods throughout the remainder of the Annual Meeting. The Board of Directors and NTEP Committee invited members to dialogue with the Board on issues that the Board and NTEP Committee have on the following issues: Conformity Assessment, NCWM Organizational Structure, the National Training Program, Voting Procedures, Public Relations campaign and participation internationally, i.e., OIML, CFTM, APLMF, and USNWG.

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Appendices

1. Conformity Assessment

The Conformity Assessment Work Group met immediately following the Central Weights and Measures Association meeting on May 6, 2004, in Omaha, Nebraska. The Work Group met as a whole and then divided into three separate working groups (Initial Verification, Administrative Review, and Verified Conformity Assessment) to address the details of the Conformity Assessment Program.

2. NCWM Organizational Structure

At its meeting in April 2004, the Board of Directors considered the use of National Working Groups to support the Standing Committees on an as-needed basis. The Professional Development Committee that was formed at the Annual Conference in 2003 has begun its work.

3. National Training Program Curriculum

Representatives from the Board of Directors met with the Professional Development Committee during the Interim Meeting. They shared their vision of how a curriculum could be designed. Dennis Ehrhart, NCWM Chairman, pledged financial support to the Committee so that they can accomplish their task.

4. (I) Voting Procedures

The Board discussed the feedback they had received on the current voting procedures. They will continue to take comments on the proposal put forth by the Central Weights and Measures Association (CWMA) in Pub 15, which is as follows:

Article X, Section 4 - Minimum Votes

A. House of State Representatives

When at least 35 delegates are in attendance in the House of Representatives, ~~A~~ **a minimum** of 27 votes in favor of, or 27 votes in opposition to, an issue must be cast for the vote to be considered official. If 54 or more votes are cast in the House of State Representatives, a simple majority of the total votes is required to pass (or defeat) the issue.

When fewer than 35 jurisdictions are in attendance in the House of Representatives, a two-thirds majority of those representatives in attendance at the Conference voting in favor of, or in opposition to, an issue must be cast for the vote to be considered official. The rules for a quorum still apply.

B. House of Delegates:

A minimum of 27 votes in favor of, or 27 votes in opposition to, an issue must be cast for the vote to be considered official. If more than 54 total votes are cast, then a simple majority rules. Should a tie vote occur, or if the minimum votes in support of or opposition to are not cast, the issue is decided by the vote of the House of State Representatives.

The Board also considered an alternate proposal made by Chris Guay that **when there are fewer than 35 jurisdictions in attendance in the House of Representatives, a three-fourths majority of those Representatives in attendance at the Conference voting in favor of, or in opposition to, an issue must be cast for the vote to be considered official. The rules for a Quorum still apply.**

In recent voting sessions of the NCWM, some items have failed to move because the mandatory 27 votes in favor of or opposed to were not attained. These proposals would allow action on items in years of low attendance, but only when a strong majority is reached in favor of or opposition to an item. The second option would strengthen the proposal from a two-thirds majority to a three-fourths majority in those years of low attendance. The intent being that such a strong majority would provide assurance that the same outcome would have been reached on voting items had the attendance been higher.

Some members contend that voting procedures should not be altered because of a temporary decrease in attendance of annual meetings.

5. Public Relations Campaign

The public relations plan drafted by Dee Ann Deaton, Public Information Officer, Arizona Department of Weights and Measures, is attached as Appendix A to the BOD report.

6. NCWM Participation in International Standards Setting Activities

The Board will continue to support NCWM participation in international standards setting activities. Ross Andersen is serving as the liaison between NCWM and OIML on this issue. Dave Frieders, NCWM Chair-Elect, will continue these efforts during his year as Chairman.

7. Financial

The Board reviewed the 2002/03 year-end audited financial report.

	Statement of Activities ending September 30, 2003	**2004 Budget**
Revenue & Support		
Dues-government	$76,800	$97,500
Dues-associate	$49,500	$61,750
Associate member fund	$14,835	$14,250
NTEP	$447,570	$432,025
Interim Meeting Fees	$19,380	$21,750
Annual Meeting Fees	$67,262	$80,900
Publication Sales	$22,380	$18,850
Interest	$12,528	$7,500
Advertising	$839	$975
Miscellaneous	$4,103	$0
Newsletter	$9,000	$0
Total Revenue & Support	$724,197	$735,500
Expenses		
Programs		
Membership	$11,030	$10,814
NTEP	$422,188	$431,662
Interim Meeting	$46,281	$51,056
Annual Meeting	$63,332	$95,545
Publications	$13,491	$15,601
Newsletter	$13,757	$15,315
Total Programs	$570,079	$619,993

Management and General		
Management Fees	$46,500	$48,655
Associate Fund	$24,694	$14,000
Board of Directors	$21,086	$25,000
Bank Fees	$9,729	$6,400
Website	$12,025	$11,635
Legal & Accounting	$5,228	$7,225
Telephone	$1,733	$2,000
Insurance	$1,940	$2,700
Office Supplies	$1,224	$1,200
Printing & Duplicating	$535	$1,000
Postage	$53	$100
Committee Travel	$715	$2,500
Miscellaneous	$2	$0
Storage Space Rental	$960	$960
Total Management and General	$126,424	$123,375
Total Expenses	$696,503	$743,368
Change in Net Assets	$27,694	($7,868)

National Conference on Weights & Measures, Inc. Balance Sheet as of September 30, 2003

Assets		
Current Assets		
Cash and cash equivalents		$202,365
Certificates of Deposit		$542,085
Accounts receivable		$470
Prepaid expenses		$2,329
Interest receivable		$6,703
	Total assets	$753,952
Liabilities and Net Assets		

Current Liabilities

Accounts payable	$508
Deferred revenue – other	-
Deferred dues revenue	$122,225
Total liabilities	$122,733

Net Assets

Unrestricted	$631,219
Total liabilities and net assets	$753,952

8. Nominating Committee

The Nominating Committee submitted the following report to the NCWM Board of Directors:

Chairman Elect: Don Onwiler, Nebraska
Treasurer (one-year term): Tom Geiler, Town of Barnstable, Massachusetts
Associate Membership (three-year term): Darrell Flocken, Mettler-Toledo
Active Membership/Northeastern (five-year term): Charles Carroll, Massachusetts

9. Future Meetings

NCWM Annual Meetings		
2005	July 10-14	Hilton in Walt Disney World, Orlando, FL
2006	July 9-13	Chicago Marriott, Chicago, IL

NCWM Interim Meetings		
2005	January 23-26	Fairmont Miramar, Los Angeles, CA
2006	January 22-25	Omni Jacksonville, Jacksonville, FL
2007	January 21-24	Omni Jacksonville, Jacksonville, FL

NTEP Lab and Sector Meetings	
GMM/NIR Sector Meeting	August 26-27, 2004, Kansas City, MO
Weighing Sector Meeting	August 29-31, 2004, Ottawa, Canada
Measuring Sector Meeting	October 22-23, 2004, Biloxi, MS

10. Membership Report

The total NCWM membership as of June 2004 is 2,517. The membership breakdown by category is:

State Government	828
Local Government	527
U.S. Government	36
Foreign Government	21
Associate Members	837
Foreign Associate	42
Retirees	226

D. Ehrhart, Arizona, Chairman

R. Andersen, New York, Chairman of the NTEP Committee
D. Frieders, San Francisco, California, Chairman-Elect
T. Geiler, Barnstable, Massachusetts, Treasurer
K. Angell, West Virginia
M. Cleary, California
B. McGrath, Boston, Massachusetts
D. Onwiler, Nebraska
S. Pahl, Texas
C. Guay, Procter & Gamble Co.
D. Quinn, Fairbanks Scales

Executive Secretary: H. Oppermann (NIST)

Advisors: B. Palys, Executive Director, NCWM Headquarters
G. Vinet, Canada

Board of Directors

Appendix A

National Conference on Weights and Measures

"Recognition through Transparency"

15245 Shady Grove Rd., Suite 130, Rockville, MD 20850
(240) 632-9454 FAX (301) 990-9771
Email: ncwm@mgmtsol.com

Strategic Planning for an NCWM National Media Campaign

Prepared on October 27, 2003
By Dee Ann Deaton, Public Information Officer,
Arizona Department of Weights & Measures

Mission

To develop a public relations-based committee that will assist the NCWM, state, county and city weights and measures agencies develop a national media campaign. The committee's mission is to increase public support, agency communication, industry compliance and funding of weights and measures programs by developing, coordinating and promoting an internal and national awareness campaign that increases public and industry support of the NCWM services and weights and measures programs.

Objectives

1. Increase overall awareness of the NCWM.
2. Increase the total number of citizens who act as the "eyes" of weights and measures agencies.
3. Increase industry compliance.
4. Increase funding support of both legislators and voters for weights and measures programs.

Method

1. Identify services and challenges that weights and measures agencies are currently facing through detailed research so that a proactive media campaign can be developed that will benefit NCWM members.
2. Develop an internal media campaign that targets members with and without public relations (PR) personnel.
3. Increase awareness of the NCWM through targeted print, radio and television media, public service announcements (PSAs), movie theater pre-show ads and events.
4. Develop and promote national investigative stories (determined by members' participation, needs and services) for all media outlets that include regulatory agencies' inspection results and the monetary impact the results have on both consumers and industry.
5. Capitalize on the need for increased funding and weights and measures presence in the marketplace through TV talk shows including: Primetime, Good Morning America, Dateline, CNN, Oprah, Larry King Live, The Today Show, 20/20 and local networks and cable stations for each member's area.
6. Promote and implement Arizona's 12-month television story schedule entitled "Weights & Measures Tip of the Month." The NCWM should encourage all regulatory members to locally promote the same consumer awareness stories at the same time, which will assist with the national recognition efforts.
7. Develop, promote and distribute two PSAs titled "Plan Before You Scan" and "Who You Gonna Call?" in both audio and visual formats. PSAs should be in English and Spanish. Budget, PSA time-lines, story boards, scripts, casting, shooting location, video production, needed props, beta and video duplication and distribution will be developed by the committee with the NCWM Board's approval. Industry members may be asked to assist or support the production of the PSAs. Retail members may be asked to run the audio versions in their stores throughout the country.

Challenges

Challenge #1: A national campaign is not recommended until: 1) member participation is increased; 2) uniformity is established for inspection procedures; and 3) the monetary impact of weights and measures programs is determined.

Solution: It is recommended that before the NCWM considers promoting itself on a national basis, an in-depth survey of weights and measures programs needs to be conducted as part of the strategic planning process. The survey should include the following topics:

1. Detailed description of each program including:
   - types of inspections;
   - procedures used;
   - inspection results including names of companies;
   - licensing fees;
   - agency staff and budget;

- current outreach programs; and
- Agency needs, successes and challenges.

Benefit to NCWM: Results will enable NCWM to better understand how to improve uniformity and will provide the committee with the ability to develop relevant stories and identify possible challenges.

2. The monetary impact each type of inspection has on both consumers and industry.

   Benefit to NCWM: Results will enable the committee to include the "so what" (financial impact) aspect of the stories. This information is critical if the NCWM desires to increase the support of legislators, industry and the public.

   - Weights and measures PR/outreach programs each state, county and city plans to pursue for the FY 2004.

   Benefit to NCWM: NCWM will be able to assess member's needs and identify member's resources to assist in promoting a national campaign.

3. Agencies' current financial and regulatory challenges.

   Benefit to NCWM: The information will help determine types of stories and assess possible opposition NCWM and members may encounter.

4. Media outlets and working relationships.

   Benefit to NCWM: NCWM can develop a media contact list for each area.

Industry Survey Topics

Profile of the organization such as:

- Directory of locations including cities and states;
- Types of weights and measures requirements and programs; and
- The view of weights and measures regulatory efforts.

Benefit to NCWM: Provides the NCWM with industry's current view of weights and measures and the types of challenges NCWM needs to address prior to promoting a national PR campaign.

Once the survey(s) are complete and results are determined, the direction, available resources and vehicles that will be used for a national outreach program can be determined.

Challenge #2: DeeAnn Deaton has contacted weights and measures state and county agencies including: New York, California, Seattle Washington, Montana, Alaska, Texas, Washington DC, Florida and Pennsylvania. Only Kelley Chapman from Montana and Mike Cleary from California have stated they would like to be members of the committee. All other states contacted either did not have a Public Relations person currently promoting their agency or their PR person was part of a larger agency that currently does very little to promote weights and measures issues. *Note: Some agencies that currently have websites did not have sections for their weights and measure departments.*

Solutions: Internal Awareness Campaign: An internal awareness campaign that focuses on educating members with and without PR personnel about the NCWM and weights and measures issues is needed.

Agencies without PR personnel would greatly benefit from training that includes: strategic media planning, writing press releases, handling interviews, promoting stories, developing sound bites and developing interview scripts. NCWM should consider hosting PR-training workshops during conferences for those agencies without PR personnel.

With the scope of the work involved in developing, promoting and coordinating a national campaign, the NCWM may want to consider hiring a National PR firm to assist and also hire a full-time Public Information Officer to coordinate the campaigns.

Challenge #3: Determining NCWM's media budget and available support: NCWM's media budget needs to be determined in order for the committee to establish the types of outreach programs that can be developed. The committee can research different avenues of promotion such as public service announcements, print advertising, television and radio commercials, public service announcements, movie theater ads, B-roll for talk show segments, NCWM television or cable show, a movie, etc.

Solution: The committee requests that an approximation of campaign funding be determined. NCWM may want to explore corporate sponsorship opportunities that may be available as they determine the media/outreach budget. The committee looks forward to meeting the above challenges and awaits both Board guidance and approval for the proposed direction.

Appendix B

Report on the Activities of the International Organization of Legal Metrology (OIML) and Regional Legal Metrology Organizations

Weights and Measures Division, NIST

The Weights and Measures Division (WMD) of the National Institute of Standards and Technology (NIST) is responsible for coordinating U.S. participation in OIML and other international legal metrology organizations. Learn more about OIML at the OIML website at http://www.oiml.org on the Internet. Dr. Charles Ehrlich, Group Leader of the ILMG, can be contacted at charles.ehrlich@nist.gov or at 301-975-4834 or by fax at 301-926-0647.

Table of Contents

I. Report on the Activities of the OIML Technical Committees

This section provides a report on the status of work in OIML Technical Committees (TCs) and Technical Subcommittees (SCs) of specific interest to members of the NCWM. Also included are reports on recent activities of those groups and schedules of future activities of Secretariats, the U.S. National Working Groups (USNWGs), and the International Working Groups (IWGs) of committees and subcommittees.

TC 3 Metrological Control (United States of America)
A joint working group of the OIML, the International Bureau of Weights and Measures (BIPM), and the International Laboratory Accreditation Cooperation (ILAC) developed a draft revision of OIML D1 "Elements for a Law on Metrology." In early 2004, the document was reviewed for consistency with HB-130 by the members of TC3, by the NCWM Laws and Regulations Committee, and by the NIST Weights and Measures Division. The revision of D1 presents the various elements that should be considered when preparing laws related to metrology. This document gives advice on general laws covering all the aspects of legal metrology, as well as specific laws related to some distinct aspects of metrology, such as legal units and traceability. It can also be used to evaluate provisions related to legal metrology in more general laws such as those on consumer protection and conformity assessment. When completed in 2004, the document will be a tool that individuals can use in preparing such laws. They can select appropriate elements and adopt them into their legislation.

TC3/SC1 "Pattern Approval and Evaluation" (United States)
The International Documents dealing with metrological control of measuring instruments using the processes of type approval and verification have not been revised in over fifteen years. The existing OIML documents are D19 "Pattern evaluation and pattern approval" and D20 "Initial and subsequent verification of measuring instruments and processes." The subcommittee has approved the U.S. proposal for a combined revision of OIML D19 and D20 into a single document "Principles of Metrological Control of Measuring Instruments: Type Approval and Verification." Key elements of three other OIML documents will also be incorporated into the combined revision of OIML D19 and D20. These documents are D3 "Legal Qualification of Measuring Instruments," R34 "Accuracy Classes of Measuring Instruments," and R42 "Metal Stamps for Verification Officers."

The existing documents are out of date since they do not include developments such as the OIML certificate system, D27 "Initial Verification of Measuring Instruments Utilizing the Manufacturer's Quality Management System," and the “Framework for a Mutual Acceptance Arrangement (MAA) on OIML Type Evaluations.” Consideration needs to be given to the appropriate conformity assessment options developed by the ISO Council Committee on Conformity Assessment (ISO CASCO). This includes quality systems, product certification, and accreditation. Consideration needs to be given as well to information technology and statistical methods to increase or decrease verification intervals based upon proven instrument performance. For more information on this activity, contact Dr. Ambler Thompson at 301-975-2333 or at ambler@nist.gov.

TC 5/SC 1 Electronic Instruments (Netherlands)
A meeting was held in the Netherlands in October 2002 to discuss comments received on the 2nd committee draft (2nd CD) of a revision of D11 "General Requirements for Electronic Measuring Instruments." There were a number of new proposed tests to be added to D11. Based on meeting discussions and other comments received on the 2nd CD, a 3rd CD was circulated by the Secretariat in May 2003. The United States voted “yes” and provided comments on the 3rd CD in September 2003. In February 2004, the final Draft Document was circulated for comment by the BIML. The document was approved by CIML postal ballot in May 2004. This is an especially important document in the OIML system because its testing requirements will become general guidance for all OIML Recommendations for electronic measuring instruments.

TC 5/SC2 Software (Germany and France)
There was a meeting of the co-Secretariats, Germany and France, Mr. Tanasko Tasić from MIRS, Slovenia, as the representative of the TC5 chairman, and Mr. Attila Szilvássy as the representative of BIML in December 2003 in Paris. The goal of the meeting was to reach agreement on the appropriate next steps for this project. It was agreed to distribute the collated results from the software questionnaire circulated in 2002. All TCs and SCs that are currently revising an OIML Recommendation will be contacted to ensure that software aspects are considered in revised Recommendations. TCs and SCs will be asked to nominate a contact person for exchanging information with TC5/SC2. MIRS and LNE have already started to review all OIML Documents and Recommendations published since 1990 for terms related to software. It is expected that information from these activities will be made available for distribution to the subcommittee in 2004 with a Working Draft document to follow. Please contact Wayne Stiefel at 301-975-4011 or by email at stiefel@nist.gov if you would like to participate in this project.

TC 8/SC 3 “Measuring Instruments for Liquids other than Water.” (Germany) and TC 8/SC 4 “Dynamic Mass Measurements (Liquids other than Water)” (United States)
OIML R117 “Measuring Instruments for Liquids other than Water” is undergoing an extensive revision, incorporating new instrument technologies and merging the document with OIML recommendations R86 “Drum Meters” and R105 “Mass Flowmeters.” This is a high priority project for OIML, and ILMG is working with the U.S. National Working Group on flowmeters, Germany, and the Netherlands (convener of the work group tasked with revising R117) on this effort. Meetings of the U.S. National Working Group on flowmeters were held during the NCWM Interim Meeting in January 2004 and the NCWM Annual Meeting in July 2004. Measurement Canada has been a strong contributor to this effort. An aggressive timetable is being followed for TC8/SC3 and SC4 to complete this major project.

An extremely productive joint meeting of OIML TC8/SC3 and SC4 was held in October 2003 in Paris, France. Forty-five participants, including official representatives from 17 countries, attended the meeting. Several representatives of major U.S. manufacturers of these systems actively participated in the meeting. These technical experts provided a depth of experience and technical expertise that proved highly valuable during the meeting. Working from the first committee draft of R117 (1st CD, August 2003), participants at the 4-day Paris meeting successfully completed a hefty and detailed agenda designed to resolve several key issues on the document’s revision. Some of these key issues included: conversion devices, electronic sealing, significant faults, endurance testing, and required documentation. Based largely on the consensus decisions reached by meeting participants, the second committee draft (2nd CD) of R117 was circulated to the two subcommittees in April 2004. Because the 2nd CD received over 90 % “yes” votes, the next phase of the project will be the development of a Draft Recommendation (DR). If you have questions or would like to become involved in this effort, please contact Mr. Ralph Richter by email at ralph.richter@nist.gov or at 301-975-4025.

TC8/SC5 "Water Meters" (United Kingdom)
The amended R49-1 "Water Meters Intended for the Metering of Cold Potable Water: Metrological Requirements" was republished and placed on the OIML web site in April 2002. Amended versions of both R49-2 "Test Methods" and R49-3 "Test Report Format" were approved for publication at the November 2003 CIML meeting in Kyoto, Japan.

TC8/SC7 "Gas Metering" (Belgium and France)
The Secretariat circulated a 3rd CD of the Recommendation "*Measuring Systems for Compressed Natural Gas (CNG) for Vehicles*" and annexes covering performance tests for electronic devices and basic test procedures. In April 2003, the United States cast a negative ballot on the 3rd CD because the testing requirements were unrealistic. A 4th CD is being prepared by the Secretariat.

A ballot was circulated on the 3rd CD "*Measuring Systems for Gaseous Fuel*" in March 2004. This Recommendation is intended for large pipelines with large flowrates and operating pressures, or systems not fitted with diaphragm gas meters. Different types of measuring systems are considered: measuring systems providing indications of volume at base conditions or mass converted from a volume of gas determined at metering conditions, measuring systems providing directly the mass of gas, and measuring systems providing indication of energy corresponding to a volume at base conditions or a mass of gas. The US voted "no" on the 3rd CD in June 2004. Please contact Wayne Stiefel at 301-975-4011 or at stiefel@nist.gov if you would like to obtain a copy of the 3rd CD or to participate in these projects.

TC 8/SC 8 "Gas Meters" (Netherlands)
The Secretariat sent the members of the subcommittee a letter with the results of a questionnaire asking for comments to guide the initiation of a work program to revise R6 "General Provisions for Gas Volume Meters," R31 "Diaphragm Gas Meters", and R32 "Rotary Piston Gas Meters and Turbine Gas Meters." A small majority of members voted to produce one new recommendation for gas meters that will replace R6, R31, and R32. The Secretariat reported that they would develop an initial draft. The new document, according to the Secretariat, may consist of a general chapter mainly consisting of R6 and those aspects in common with R31 and R32 and separate chapters on household and industrial gas meters. The USNWG provided comments and will participate in the development of the new Recommendation. Please contact Wayne Stiefel at 301-975-4011 or at stiefel@nist.gov if you would like to participate in this project.

TC 9/SC 1 "Nonautomatic Weighing Instruments" (Germany and France)
In May of 2002, Germany and France, the co-secretariats of OIML TC 9/SC 1 "Non-automatic Weighing Instruments" (NAWI), announced that they had initiated the first review of OIML Recommendation 76 "Non-automatic Weighing Instruments" since 1994. This review cycle is of major importance to U.S. interests because R76 serves as the foundation for a majority of the laws and regulations that governs weighing instruments around the world. This review is significant for U.S. weighing instrument manufacturers because international harmonization of requirements would eliminate technical barriers to trade and reduce the delays and the cost of getting new weighing instruments into the global marketplace. It is also important for legal metrology officials since it is taking place when the NCWM is considering entering into the OIML Mutual Acceptance Arrangement for type evaluations with other countries (e.g., Germany). This effort supports one of the Conference's long-range strategies to "work toward the harmonization of U.S. (e.g., NIST Handbook 44 "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices") and international standards." The United States received the first working draft of the revised R76 in December 2003. This draft includes new language addressing metrological controls for type evaluations, conformity, and initial and subsequent inspections. This draft was circulated to the USNWG for comment, and a U.S. response was submitted to the Secretariat in April 2004. The USNWG will also be consulted concerning proposals to modify Handbook 44 to harmonize with R76. If you would like to participate in this effort, please contact Steve Cook at 301-975-4003 or steven.cook@nist.gov.

TC 9/SC 2 "Automatic Weighing Instruments" (United Kingdom)
In July of 2003, the United States voted "no" on a third committee draft of a proposed new Recommendation "Automatic Instruments for Weighing Road Vehicles in Motion - Part B - Axle Loads" that was prepared by the OIML Secretariat in the United Kingdom. Several technical and clarification items were forwarded to the Secretariat as justification for this negative vote. If you would like to receive a copy of the latest draft of this document or participate in this work please contact Richard Harshman at 301-975-8107 or harshman@nist.gov.

TC17/SC1 “Humidity” (China)
In February 2001, the 1st Committee Draft Revision of OIML R59 "Moisture Meters for Cereal Grains and Oilseeds" was received from the TC17/SC1 Secretariat, the Peoples Republic of China. The current edition of R59 was developed in the 1980s and includes technical and metrological requirements for both automatic and manual meters. A U.S. National Working Group reviewed the draft revision of R59 and sent comments to the Secretariat in the spring of 2001. Because of substantial problems with this draft, the Secretariat asked the United States to prepare a new OIML draft based on the National Conference on Weights and Measures National Type Evaluation Program (NTEP) requirements. A working draft of the Recommendation was prepared based upon requirements for moisture meters in Handbook 44 and Publication 14. After preparation by the United States, this working draft was distributed by China to the IWG in February 2003 for comment. Based on comments received on the working draft, a first committee draft was distributed to the IWG in May 2003. Both drafts had been distributed to the U.S. National Working Group, which for the most part is a subset of the NTEP Grain Sector. In October 2003, China hosted a meeting of the TC17/SC1 subcommittee in Beijing to review and discuss this revised document. A second committee draft that incorporated US comments was circulated in May 2004 by the Secretariat. Please contact Diane Lee at 301-975-4405 or at diane.lee@nist.gov if you would like to participate in this working group.

TC17/SC8 “Quality Analysis of Agricultural Products” (Australia)
A new subcommittee has been formed to study the issues and write a working draft document “Measuring Instruments for Protein Determination in Grains.” The Secretariat for this new subcommittee is Australia and a meeting was held in May 2004 in Sydney. Please contact Diane Lee at 301-975-4405 or at diane.lee@nist.gov if you would like to participate in this working group.

II. Mutual Acceptance Arrangement (MAA) on OIML Type Evaluations

The MAA document and its associated document “Checklists for Issuing Authorities and Testing Laboratories Carrying Out OIML Type Evaluations” were both adopted at the 38th CIML meeting in November 2003 in Kyoto, Japan, after presentations given by the International Bureau of Legal Metrology (BIML) Director and Dr. Charles Ehrlich, the Secretariat of TC3. The CIML agreed to set up a working group in order to address the financial aspects of the implementation of the MAA and to come up with a financial plan for implementing the MAA before the 2004 CIML Meeting.

The Working Group on “Implementation of the MAA” met in Paris in February 2004. Further discussions on MAA Implementation were held at the OIML Presidential Council meeting in March 2004. The following proposals will be included in a document submitted for the approval of the 2004 CIML Meeting in Berlin:

- The implementation of the MAA will have consequences on the existing OIML Certificate System. When a Declaration of Mutual Confidence (DoMC) is signed for a given category, the following rules shall apply:
  - The Issuing Authorities who participate in this DoMC will issue all their Certificates and Test Reports under the conditions of the OIML Certificate System plus the specific conditions of this DoMC;
  - Issuing Authorities that do not sign this DoMC will be allowed to continue issuing OIML Certificates in this category for a limited period (e.g., one year) after the signature of the DoMC (in order to be able to complete work in progress). After this period, they will either have to join the DoMC or to stop issuing OIML Certificates for this category; and
  - OIML Certificates and Test Reports issued under the conditions of a DoMC will bear a specific OIML logo. The individual registration fee due by the manufacturer in application of the OIML Certificate System will be replaced by a contribution payable to the Bureau by the participating Issuing Authority. These Certificates will be recorded by the Bureau on a specific database, which will be published on the OIML web site.

- The participation of an Issuing Authority in a particular DoMC will generate fees to the BIML, comprising two complementary parts:
  - A fixed annual amount for each participation in a DoMC (□1200 euros);
  - An additional amount for each Certificate issued under the DoMCs in which the Issuing Authority participates (□150 euros), which will bear the specific OIML logo above mentioned.

- An additional staff member will be recruited by the Bureau to undertake the new tasks resulting from the implementation of the MAA. This additional staff member should start work at the BIML on January 1, 2005, for a 4-year period.

- Implementation of the MAA will start with two categories: R60 (Load Cells) and R76 (Nonautomatic Weighing Instruments). These two categories will be addressed in parallel, as it may save costs for visits and assessments by experts, since the experts for these categories generally being the same people. Work on the implementation of the MAA for these two categories will start immediately, so that the two corresponding DoMCs can be expected early in 2005. The following events will be organized at the end of 2004:
  - A workshop for all OIML Issuing Authorities to inform them of the provisions related to the implementation of the MAA that have been approved at the 39th CIML Meeting, and on the planned schedule; and
  - Two one-day meetings for potential participants of the first two DoMCs.

- The Bureau will soon invite all parties interested in taking part in DoMCs on R60 and R76 to start preparing their application documents, so that these two one-day meetings can focus on more practical issues. A more formal meeting of the Committees on Participation Review for these two Declarations of Mutual Confidence will be scheduled shortly after the two one-day meetings.

For further information on the MAA and its implementation, please contact Dr. Charles Ehrlich, at charles.ehrlich@nist.gov or at 301-975-4834 or by fax at 301- 975-5414.

III. Report on the OIML Presidential Council

OIML Presidential Council Meeting – March 1-2, 2004

Dr. Charles Ehrlich attended a meeting of the OIML Presidential Council at the OIML Headquarters (International Bureau of Legal Metrology (BIML) in Paris) on March 1-2, 2004. The following are some highlights of this meeting:

- The OIML Long-Term Action Plan will not be revised immediately; the existing version will continue to be followed.
- Approved Recommendations, Documents, and other publications will be printed and distributed as soon as possible, priority being given to those Recommendations applicable under the Certificate System and the MAA.
- New financial regulations are being prepared for implementation in 2005.
- Work will be initiated on the newly established permanent Working Group on Developing Countries, which will be chaired by Dr. Seiler (PTB, Germany) for the next two years.
- The revision of the Directives for Technical Work will be started. A Working Group is being established for that purpose with the main goals of accelerating the technical work and further developing the OIML web site.

The draft budget for the next financial period (2005 to 2008) was reviewed in light of the decisions of the 38th CIML Meeting.

Upcoming OIML Meetings

The 2004 CIML meeting will be held in conjunction with the next quadrennial OIML Conference in Berlin, Germany, from October 25 - 29, 2004. Anyone wishing to be a member of the U.S. delegation in Berlin is requested to contact Dr. Charles Ehrlich at charles.ehrlich@nist.gov or at 301-975-4834.

The 2005 CIML meeting will be held June 17-20, 2005, in Lyon, France to coincide with the 50th Anniversary of the establishment of OIML.

IV. Report on the 38th Meeting of the International Committee of Legal Metrology (CIML)

Representatives from 49 of the 60 member nations participated in the 38th Annual Meeting of CIML from November 5 - 8, 2003, in Kyoto, Japan. The CIML President welcomed two new member countries, New Zealand and

Vietnam. Meetings of the OIML Presidential and Development Councils were also held. Dr. Charles Ehrlich is the CIML Member for the United States. Dr. Ehrlich was accompanied in Kyoto by Mr. Ross Andersen (NTEP Chair) and Mr. Wayne Stiefel of ILMG.

The CIML approved the following draft Recommendations and Documents in Kyoto:

- Revision of R 48
  Tungsten ribbon lamps for calibration of radiation thermometers;
- Amended version of R 49-2
  Water meters intended for metering cold potable water. Part 2: Test methods;
- Draft Recommendation R 49-3
  Water meters intended for metering cold potable water. Part 3: Test report format;
- Revision of R 52
  Hexagonal weights, ordinary accuracy class from 100 g to 50 kg;
- Revision of R 61-1
  Automatic gravimetric filling instruments, Part 1: Metrological and technical requirements - Tests;
- Draft Revision of R 61-2
  Automatic gravimetric filling instruments. Part 2: Test report format;
- Revision of R 87
  Quantity of products in prepackages;
- Draft amendment to OIML R 99/ISO 3930
  Instruments for measuring vehicle exhaust emissions;
- Draft Recommendation R 134
  Automatic instruments for weighing road vehicles in motion - Test Report Format; and
- New Recommendation (R 135)
  Spectrophotometers for medical laboratories.

Budget
The BIML Director gave a presentation on a preliminary proposal for the 2005-2008 OIML budget. The Committee approved the guidelines set out in this document and instructed the BIML Director to prepare a proposal for the 2004 Conference, highlighting the distinction between (1) the normal budget, financed by Member State Contributions, and other usual income of the Organization; and (2) the optional, additional budget, corresponding to the implementation of the MAA and changes in the way in which publications will be distributed, and whose charges and income shall be specific. The Committee also noted information given by the BIML Director concerning the revision of the OIML Financial Regulations. The Committee instructed the Bureau to complete this Draft Revision and to submit it to Member States in time for approval at the 39th CIML Meeting and 12th OIML Conference in 2004.

Work of the TCs/SCs
Concerning the OIML technical activities, the CIML expressed its satisfaction with the increased volume of work accomplished during the last 12 months (compared with the previous one-year period). The CIML requested OIML TCs and SCs continue to accelerate their work, especially in the fields listed as high priority and priority projects.

The Committee approved the project as proposed by TC 18 on *Ophthalmic Instruments - Impression and Applanation Tonometer.*

The Committee noted a proposal submitted by France to develop 'interpretation documents' pertaining to the accreditation of legal metrology Issuing Authorities and Testing Laboratories. Noting an agreement between the TC3/SC5 Secretariat (U.S.) and the BIML, the Committee instructed TC3/SC5 to set up a Working Group (convened jointly by France and the BIML) to develop the first drafts of these documents.

OIML Certificate System
The CIML decided that the following Recommendations would be applicable within the OIML Certificate System when published:

- Revision of R 48, *Tungsten ribbon lamps for calibration of radiation thermometers*;

- New Recommendation - R 135, *Spectrophotometers for medical laboratories*.

The CIML noted several proposed actions for implementing the revised P1 “OIML Certificate System for Measuring Instruments:”

- The responsible TCs/SCs should include new provisions for modules and families of measuring instruments (as far as the definition of families, identification of modules and/or families together with their metrological requirements, test methods, and test report forms are concerned) when developing new or revising existing Recommendations intended for application within the OIML Certificate System, in order that Certificates may be issued accordingly;

- The TCs/SCs concerned should accelerate the development of horizontal type OIML Documents (e.g., on software, uncertainty, etc.) to be implemented when drawing up new and revised Recommendations;

- The BIML should assist TCs/SCs and Issuing Authorities in the implementation (realization of new and additional tasks) of the revised P1; and

- CIML Members and the BIML should pursue further general actions in promoting the OIML Certificate System at national, international and regional levels, and keep international and regional organizations in liaison with the OIML informed of the advantages of the OIML Certificate System with special regard to its new features.

The Committee instructed the BIML to carry out inquiries among OIML members and among manufacturers and applicants who already possessed OIML certificates as to their experience in the voluntary acceptance and use of OIML certificates for national or regional type approvals, as well as to their views on the functioning of the OIML Certificate System with a special view to the new provisions of P1. The outcome of these inquiries shall be included in the report on the OIML Certificate System to be presented in 2004.

Study on the benefits of legal metrology
Mr. John Birch gave a presentation on his report *The Benefits of Legal Metrology for the Economy and Society*. The Committee expressed its great appreciation of this report and instructed the BIML to distribute it as an expert report. A summary report compiled by Mr. Birch will also be published in the OIML Bulletin. The Committee instructed the CIML President and the BIML to consider any complementary actions or studies, which would be helpful in raising the awareness of metrology and legal metrology.

Liaisons with international and regional institutions
The CIML President gave a report on the good cooperation OIML enjoys with the Metre Convention (BIPM/CIPM) and with ILAC.

The Committee approved a policy paper on OIML liaisons with other organizations.

The Committee noted a progress report given by the BIML Director on a paper formalizing OIML relations and cooperation with Regional Legal Metrology Organizations (RLMOs); this paper is being submitted for comments to the RLMOs. The Committee instructed the BIML to continue progress with this paper so as to establish a formal framework for OIML cooperation with the RLMOs.

V. 10th Annual Asia-Pacific Legal Metrology Forum (APLMF)

The 10th Annual Meeting and Working Group meetings of the Asia-Pacific Legal Metrology Forum (APLMF) were held from November 2-4, 2003, in Kyoto, Japan. Dr. Charles Ehrlich served as Head of Delegation and was accompanied by Mr. Ross Andersen representing the National Conference on Weights and Measures (NCWM) and Mr. Wayne Stiefel (ILMG). The meetings were attended by more than 70 delegates from 17 member countries and invited guests from international and regional organizations.

The President of APLMF is Dr. Akira Ooiwa who is Director of the Mechanical Metrology Division at the National Metrology Institute of Japan. Dr. Ooiwa stated that one of the main objectives of the APLMF is to harmonize measurement legislative systems in the Asia-Pacific region. The Forum is making efforts to achieve confidence in metrological control, reduce transaction costs in trade, and promote technical training. He also emphasized that APLMF should support mutual recognition arrangements among regional economies to accept each other's data of trade measurements and test results concerning utilities metering and regulatory standards.

The Forum currently has six active Working Groups: (1) Training chaired by Australia, (2) Prepackaged Goods chaired by New Zealand, (3) Mutual Acceptance Arrangements chaired by USA, (4) Utility Meters chaired by Canada, (5) Medical Measurements chaired by Chinese Taipei, and (6) Rice Moisture Measurements chaired by Japan. All of these working groups held meetings in Kyoto.

Mr. Gilles Vinet of Canada presented the 2003 Report of the Utility Meters Working Group. He discussed the responses to the utility meters survey; 15 economies of the Asia-Pacific region had responded, and the response summary tables were distributed. He also discussed the work of OIML TC12 on electricity meters. An APLMF training seminar or workshop on electricity meters is being organized.

Dr. Ehrlich, serving as Chairman of the WG on Mutual Recognition Arrangements, presented a report on the status of the OIML Mutual Acceptance Arrangement (see separate section in this report). Dr. Ehrlich confirmed that the WG would continue to support the work of the OIML and would not attempt to develop a regional MRA. The WG also plans to continue encouraging the revision by OIML of D1 "Law on Metrology."

There are presently 26 member economies, 20 full members and 6 corresponding members, in the Forum. Japan is now serving the second year of a two-year term as Secretariat of the APLMF. Because a new president for 2004-2005 was not selected in Kyoto, the current president would remain in the office for one more term.

The United States will host the 2004 APLMF meeting in San Diego, October 6-7, 2004. Sponsorship and attendance by all interested U.S. parties is encouraged; please contact Dr. Ehrlich for details at charles.ehrlich@nist.gov or at 301-975-4834 or by fax at 301- 926-0647.

VI. Inter-American Metrology System (SIM) Legal Metrology Working Group (LMWG) Meeting

A meeting of the SIM Legal Metrology Working Group took place September 18, 2003, in Panama City, Republic of Panama in conjunction with the SIM General Assembly. Mr. Wayne Stiefel served as Head of the U.S. Delegation. Cesar Luiz da Silva of INMETRO in Brazil served as the LMWG Chair. Attending the meeting were representatives from eighteen member countries: Antigua & Barbuda, Argentina, Bolivia, Brazil, Chile, Grenada, Guatemala, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Santa Lucia, St. Vincent, Uruguay, USA, and Venezuela.

OIML - Law on Metrology
A draft revision of OIML D1 "Law on Metrology" was distributed to the attendees for comment at the meeting last year in Chile. The Chair indicated that no comments had been received on D1 for transmittal to the U.S. Secretariat.

SIM Web Site
The legal metrology portion of the SIM web site http://www.science.oas.org/SIM/organization/twg/smt_twg_11.htm has improved, and now has more information and links to other sites. The Chair sent a questionnaire to all countries asking for links to country web sites. The intent is to present legal metrology information by means of links rather

than country submissions that have to be regularly updated. The Chair decided to encourage response by sending another survey similar to the APLMF Directory of Legal Metrology and encourage structuring this with web links.

Packaging and Labeling Survey

Mr. W. Stiefel led this discussion. Twenty (20) countries responded to a survey on packaging and labeling in 2001. Responses are posted on the SIM LM site http://www.science.oas.org/SIM/organization/twg/smt_twg_11news.htm. The survey will be sent to members a second time to obtain updated and more complete information on requirements.

Appendix C

Associate Member Committee
Annual Meeting Minutes and Summary Report

Pittsburgh, PA July 12, 2004

Chairman:	Bill Sveum, Kraft Foods North America
Vice Chair:	Mark Galletta, Nestlé-USA
Secretary/ Treasurer:	Gary Lameris, Hobart Corp.
Meeting Attendees:	27 (see Appendix A for list of attendees)

1. Call to Order

The meeting was called to order at 5:04 pm by the chairman. The previous meeting's minutes were distributed, reviewed and approved.

2. Financial Condition

Financial reports were reviewed. The fund balance as of June 30, 2004, is $21,647 of which $10,000 is reserved for the outing on July 14 and $8,282 remains in the fund for website development. To date, the only expense this fiscal year has been $550 for the Associate Member listserve and webpage.

A motion was made by Richard Davis and seconded. The motion reads:

> "The AMC committee respectfully requests that, due to the present direction of the NCWM Board in developing a new website over updating the old NCWM website, no further AMC funds be spent on the present website and that the remaining balance of $8,232 be returned to the AMC fund."

The motion was approved.

3. NCWM Board of Director's Report

Dave Quinn

<u>After studying methods to update the website have proved unsuccessful to date, the NCWM Board's intent is to replace the current NCWM website with a more modern interface to better serve the members and make it easier to get documentation. This resulted in the motion during the financial report to request that further funds not be spent on the present website until a new website business plan is available.</u>

<u>There still is some opportunity to improve the communication and working relationship between the NCWM and NIST. The NCWM believed some financial support was going to be provided by NIST and are to date disappointed at the support given.</u>

There is some concern between the OIML relationship and mutual recognition with other countries. At the present time, there needs to be some investment in the U.S. labs to enable them to be qualified to test devices to the international specifications. At the present time, the NCWM appears to be ready to sign an agreement to become a Class B country and accept OIML R 60 test data from other test labs and countries for load cells.

Chris Guay

The board is developing a process for workgroups and attempting to determine where they will be most productive.

There is some interest in surveys in weights and measures again. Chris has requested to be on the committee and has presented the committee with the AMC and NCWM procedures on conducting surveys.

Chris is attending the Asian Pacific Legal metrology forum in San Diego October 6 and 7 and is making a presentation on international labeling issues. He may have some time in his presentation to share with others, so contact Chris Guay for more information.

4. AMC Website

An initial AMC website area has been developed and some documents are already being archived there. Additional documents are now being prepared for placement and archiving on the website.

The website can be found by going to www.ncwm.net,
Then activating the **NCWM Members Only Section** link,
Then activating the **NCWM Associate Members** page link.

5. AMC Fund Disbursement Requests

AMC training – last year the AMC did not provide funds for training and there is some confusion on whether a letter asking for training fund requests was actually sent to the state directors. The AMC Committee will advise the Chair of the NCWM of the availability of funds and request that a business plan be presented for funds disbursement at the 2005 Interim meeting.

6. Bylaw Updates

Updated bylaws were presented by Mark Gallenta. The updates were reviewed, a motion was made and seconded to approve the updates, and the Bylaws were unanimously approved. See Appendix B for the separate bylaws document:

7. Elections

There were 4 openings on the standing committee. Volunteering for being on the committee and terms are:

Bill Sveum	3 year term, expiring July 2007 replacing John Baker
Vince Orr	5 year term, expiring July 2009
Paul Lewis	5 year term, expiring July 2009
Mike Gaspers	5 year term, expiring July 2009

The new members were elected to the above terms.

Steve Langford was elected to replace Gary Lameris as Secretary/Treasurer.
Gary Lameris was promoted to Vice-Chairman.
Mark Gallenta was promoted to Chairman.

The new officers were approved by the committee.

8. New Business

Darrell Flocken asked the AMC attendees to consider a petition in support of the Fair Measurement Act. The consensus after discussion was that the attending members are far fewer than the number of Associate members in the Conference, and the members attending may not have the corporate authority to sign such a petition.

9. Adjourn

With no further new or old business, a motion to adjourn was recognized by the Chair. The meeting adjourned at 6:20 pm.

Respectfully submitted,
Gary Lameris, AMC Secretary/Treasurer
July 12, 2004

Appendix A. AMC Attendee list

July 12, 2004 Pittsburgh, PA

Name		Company	Email
Nathan	Crowder	Wal-Mart Stores Inc.	nathan.crowder@wal-mart.com
Scott	Davidson	Mettler Toledo	scott.davidson@mt.com
Richard	Davis	Georgia Pacific	richard.davis@gapac.com
*Darrell	Flocken	Metter Toledo	darrell.flocken@mt.com
*Mark	Galletta	Nestle USA	mark.galletta@us.nestle.com
Michael P.	Gaspers	Farmland Foods, Inc.	mpgaspers@farmland.com
*Chris	Guay	Proctor & Gamble	guay.cb@pg.com
Zina	Juroch	Pier1 Import	zmjuroch@pier1.com
Steve	Kendra	Precision Solutions Inc.	sak@precisionsolutionsinc.com
Chip	Kloos	Colgate Palmolive Co	chip.kloos@colpal.com
Dennis	Kolsun	H.J. Heinz	dennis.kolsun@hjheinz.com
*Stephen	Langford	Cardinal Scale Mfg.	slangford@cardet.com
*Gary	Lameris	Hobart Corp.	gary.lameris@hobartcorp.com
Paul	Lewis	Rice Lake Weighing Sys.	paulew@rlws.com
John	Moore	Lore Consulting	lorejm@msn.com
Tracy	Morgan	Sam's Club	tracy.morgan@wal-mart.com
*Bob	Murnane	Seraphin	rmurnane@pemfab.com
O. R. "Pete"	O'Bryan	Foster Farms	obryanp@fosterfarms.com
*Vince	Orr	ConAgra Foods	vince.orr@conagrafoods.com
Gale	Prince	Kroger	gale.prince@kroger.com
Dave	Quinn	Fairbanks Scale	dave.w.quinn@mindspring.com
Frank	Rusk	COTI	frankjrusk50@hotmail.com
Jeffrey M.	Santarpio	Dunbar Mfg, LLC	jeff.santarpio@dunbarusa.com
Alex	Schuettenberg	Conoco Phillips Co.	alex.schuettenberg@conocophillips.com
David	Sefcik	Whole Foods Market	david.sefcik@wholefoods.com
*Bill	Sveum	Kraft Foods	wsveum@kraft.com
Merrill	Thompson	Balcer & Daniels	Fax 765-548-2214

* Denotes Committee Member

Appendix B: Revised Bylaws

Bylaws of the Associate Membership Committee
Of the National Conference on Weights and Measures

Revised: 07-12-2004

ARTICLE I: Name and Relationship to the National Conference on Weights and Measures

The name of this Committee is the Associate Membership Committee (Committee), an unincorporated committee representing the associate membership of the National Conference on Weights and Measures (NCWM) organized and existing pursuant to the Constitution and Bylaws of the NCWM (NCWM Publication 1). The associate membership of the NCWM comprises representatives of manufacturers, industry, business, consumers, and other persons who are interested in the objectives and activities of the NCWM.

ARTICLE II: Members of Committee

The Committee shall consist of not less than 5 nor more than 10 associate members of the NCWM nominated and elected by the associate members in attendance at the Annual Meeting of the associate membership and appointed by the NCWM Chairman. The Committee shall strive to be representative of the cross-section of interests within the associate membership. The Associate Membership Committee Chairman shall provide the list of elected members to the NCWM Chairman for appointment.

ARTICLE III: Objectives and Responsibilities

The following are, without limitation, the objectives and responsibilities of the Committee:

(a) to explain, advocate and coordinate associate membership positions, recommendations, concerns and needs as they relate to issues of interest before NCWM;
(b) to serve as a mechanism for dissemination of general and administrative information of interest to the associate membership, including advising associate members with respect to the programs for meetings of the NCWM and its Committees;
(c) to encourage the associate membership to participate in and otherwise assist in weights and measures conferences, meetings, seminars, training programs;
(d) to recommend one or more associate members as representatives to the standing committees of the NCWM and, when deemed appropriate, such other committees of the NCWM consistent with any policies, procedures and/or guidelines adopted by the NCWM or the Committee regarding such representatives;
(e) to convene during the Annual and Interim Meetings of the NCWM, and at such other time as may be called by the Committee Chairman or a majority of the members of the Committee;
(f) to approve and present to the Board of Directors of the NCWM, the Associate Membership Committee's Annual Report for inclusion in the annual report of the NCWM;
(g) to assist in planning and coordinating associate membership events at the NCWM;
(h) to adopt those procedures and policies the Committee deems appropriate to further the objectives and responsibilities set forth herein;
(i) to create special committees as it deems necessary to promote the objectives and carry on the work of the Committee and the associate membership, and to appoint the members of those special committees.
(j) to promote weights and measures principles and techniques amongst the associate members of the NCWM and the general public in conjunction with the efforts of the NCWM.

ARTICLE IV: Meetings

Section 1. Annual Meeting: The Annual Meeting of the associate membership and Associate Membership Committee shall be conducted as one joint meeting to be held during the Annual Meeting of the NCWM and shall be open to all members of the NCWM. Only associate members have voting rights on issues before the associate membership. The time and place of the Annual Meeting shall be published in the NCWM Annual Meeting Program and shall be coordinated with the Board of Directors of the NCWM so as to avoid, as much as is possible, program and logistical conflicts with associate members.

The agenda for this Meeting shall include the election of officers, reports from the Committee Chairman and Secretary/Treasurer, and other items pertinent to the activities of the associate membership in the NCWM.

Section 2. Interim Meeting: The Interim Meeting of the associate membership and Associate Membership Committee shall be conducted as one joint meeting to be held during the Interim Meeting of the NCWM and shall be open to all members of the NCWM. Only associate members have voting rights on issues before the associate membership. The time and place of the Interim Meeting shall be published in the NCWM Interim Meeting Program and shall be coordinated with the Board of Directors of the NCWM so as to avoid, as much as possible, program and logistical conflicts with associate members.

The agenda for this meeting shall include any items pertinent to the activities of the associate membership in the NCWM.

Section 3. Special Meetings: Special meetings of the Committee may be called at any other time deemed necessary by the Committee Chairman or by a majority of the Committee. Such special meetings may be held by means of conference telephone or similar communications equipment enabling all members in the meeting to hear one another, and participation in a meeting pursuant to such means shall constitute presence in person at such meetings. Written or oral notice of the date, time and place of all special meetings of the Committee shall be given to each member personally or mailed to his/her usual place of business at least five (5) days prior to the date of the meeting, provided that any one or more Committee members, may waive such notice in writing or by attendance without protest at such meeting.

Section 4. Quorum and Rules of Order: A quorum necessary for a meeting shall consist of a majority of the members of the Committee. The rules contained in Robert's Rules of Order shall govern the Committee in all cases to which they are applicable, and provided that they are not inconsistent with the Constitution or Bylaws or the Special Rules of the NCWM.

Section 5. Voting: Each member of the Committee shall be entitled to one vote on each matter submitted to the Committee for action during special meetings as defined in Article IV, Section 3.

ARTICLE V: Term

Section 1. Term: The term of the individual members of the Committee shall be for a period of five (5) years and shall run from the adjournment of the Annual Meeting of the Committee at which a member is elected through the fifth Annual Meeting thereafter. Individual members completing their term are eligible for renomination and reappointment subject to concurrence of the associate membership at the duly scheduled meeting.

Section 2: Vacancies: In the event a Committee member is unable, for any reason, to fulfill his/her appointed term, a successor to serve the remainder of that term shall be nominated by the Associate Membership Committee for appointment by the NCWM Chairman at the next regularly scheduled meeting.

ARTICLE VI: Officers

The associate members shall, at their Annual Meeting, elect a Committee Chairman, Vice Chairman, and Secretary/Treasurer from their membership each to serve for a term of 1 year, which term shall run from the adjournment of the Annual Meeting at which the officers are elected through the succeeding Annual Meeting of the NCWM.

ARTICLE VII: Duties of Officers

Section 1. Chairman: The Chairman shall:

(a) preside at all meetings of the Committee;
(b) coordinate participation by the associate membership in NCWM program activities;

(c) plan activities and events sponsored by the Committee cooperatively with the NCWM Board of Directors and NCWM Chairman;
(d) request and obtain concurrence by the Associate Membership Committee relative to NCWM plans for involvement of the associate membership;
(e) report informally to the associate members on the plans and activities of the committee;
(f) perform such other duties as may be prescribed in this Charter or assigned by the Committee;
(g) submit annually to the NCWM Board of Directors a report concerning the program of the Committee, which report is intended to be included in the final report of the Board of Directors to the NCWM;
(h) formally authorize or concur with all checks written on behalf of the Committee; and
(i) appoint, as necessary, associate members to assist in the planning and coordination of functions to assure the highest level of support to the NCWM.

Section 2. Vice Chairman: The Vice Chairman shall:
(a) assist the Committee Chairman in the planning and implementation of Committee programs;
(b) act and serve on behalf of the Committee Chairman in the event that the Chairman is unable to carry out the duties of that office;
(c) audit annually the Committee Treasurer's report;
(d) perform other duties as are assigned by the Committee Chairman.

Section 3. Secretary/Treasurer: The Secretary/Treasurer shall:
(a) record all proceedings of the meetings of the Committee in a book to be kept for that purpose;
(b) be custodian of the records of the Committee and see that the books, reports, statements, and all other documents and records of the Committee are properly kept and filed;
(c) communicate with the NCWM Treasurer regarding monies collected and distributed on behalf of the associate membership including authorizing, when necessary, checks written on behalf of the associate membership;
(d) submit an annual report at the time of the Annual Meeting of the Committee;

ARTICLE VIII: Committees

The Committee, by resolution adopted by a majority of the Committee members at a meeting at which a quorum is present, may designate two (2) or more associate members to constitute a Subcommittee, which Subcommittee shall have and may exercise all such authority as may be provided in the resolution adopted by the Committee.

ARTICLE IX: Amendments

The Bylaws of the Committee may be amended, added to, or repealed at any Annual Meeting of the membership provided that any proposed changes must be included in the agenda of the Committee and discussed at the Annual Meeting of the Committee at which said changes will be voted on. Amendments to the Bylaws must be approved by a minimum of 2/3 vote of all associate members in attendance at said meeting.

Report of the Committee on Laws and Regulations

Dennis Johannes, Chairman
California Division of Measurement Standards

Reference
Key Number

200 INTRODUCTION

This is the report of the Laws and Regulations Committee for the 89th Annual Meeting of the National Conference on Weights and Measures (NCWM). It is based on the Interim Report offered in NCWM Publication 16, testimony heard at public hearings, comments received from the Regional Weights and Measures Associations and other parties, the Addendum Sheets issued at the Annual Meeting, and actions taken by the membership at the Voting Session of the Annual Meeting. The informational items presented below were adopted as presented when the Committee's report was approved.

Table A identifies agenda items by Reference Key Number, title, and page number. The first three digits of the Reference Key Numbers of the items are assigned from the subject series listed below. Voting items are indicated with a "**V**" after the item number. Consent calendar items are marked with a "**VC**." Items marked with an "**I**" after the item number are informational. Items marked with a "**D**" after the key numbers are developing issues. The developing designation indicates an item has merit; however, the item is returned to the submitter for further development before any action is taken at the national level. Items marked "**W**" have been withdrawn from consideration. Table B lists the appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in entirety.

This report contains recommendations to amend National Institute of Standards and Technology (NIST) Handbook 130, 2002 Edition, "Uniform Laws and Regulations," or NIST Handbook 133, "Checking the Net Contents of Packaged Goods," Fourth Edition. Proposed revisions to the handbook(s) are shown in **bold face print** by ~~striking out~~ information to be deleted and **underlining** information to be added. New items proposed for the handbooks are designated as such and shown in **bold face print**. Text presented for information only is shown in *italic* print. When used in this report, the term "weight" means "mass."

Subject Series

Table A
Index to Reference Key Items

Table B
Appendices

Appendix	Title	Page
A	Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation	A1
B	Handbook 133 Appendix A. Tables	B1
C	Summary of Written Comments Received Regarding the Log Scaling Proposal	C1
D	L&R Committee Recommendation on Workgroups	D1

Table C
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
236-1	36	0	25	0	Item Passed
237-2	36	0	31	0	Item Passed
237-3A	35	0	31	0	Item Passed
200 - Entire Committee Report	36	0	31	0	Report Accepted

Details of all Items
(In Order by Reference Key Number)

231 PACKAGING AND LABELING REGULATION

(This item was adopted as part of the report.)

231-1 I Amend § 6.5.1. Symbols

Source: NIST Weights and Measures Division.

Recommendation: The Committee will grant NIST editorial privileges to amend the list of allowed symbols for the quantity statement on a package or commodity by adding the following:

6.5.1. Symbols. - Any of the following symbols for SI units, and none other, may be employed in the quantity statement on a package or commodity:

centimeter	cm	cubic meter	m^3
cubic centimeter	cm^3	kilogram	kg
meter	m	gram	g
milligram	mg	millimeter	mm
liter	L or l	square meter	m^2
milliliter	mL or ml	cubic decimeter	dm^3
square centimeter	cm^2	square decimeter	dm^2
micrometer	µm	**<u>microgram</u>**	**<u>µg or mcg</u>**

Discussion: The Food and Drug Administration (FDA) has permitted the use of the symbol "mc" for "micro," in addition to the traditional symbol "µ," on packages labeled by weight. This practice is allowed because the pharmaceutical industry is having difficulty fitting the symbol "µ" on their labels. The symbol "µ" requires additional height that the extremely small labels found on some prescription drugs cannot accommodate. The symbol "mc" is intended to give manufacturers another option for their quantity declaration. Although there will be very few commodities regulated by the weights and measures community affected by this change, this revision is being made so that state and local weights and measures regulations remain consistent with federal packaging and labeling practices. The Committee considers this an editorial change.

The Committee's Canadian Technical Advisors informed the Committee that the symbol "mc" for microgram is not recognized in Canada.

232 METHOD OF SALE REGULATION

(This item was adopted as part of the report.)

232-1 I Amend § 1.12. Ready-to-Eat Food

Source: Southern Weights and Measures Association (SWMA).

Recommendation: The Committee will grant NIST editorial privileges to amend the definition of "Ready-to-Eat Food" found in Section 1.12.1. of the Method of Sale Regulation in Handbook 130 by adding the following note:

<u>NOTE: The sale of an individual piece of fresh fruit (like a banana, apple, or orange) is allowed by count.</u>

Discussion: One State department of weights and measures had expressed concern about whether the definition of "Ready-to-Eat Food" permitted individual bananas to be sold by the each at establishments like cafeterias and convenience stores. At these locations sales of individual pieces of fresh fruit, like bananas, apples, and oranges, are commonplace. Amending the "Ready-to-Eat Food" definition to specifically state that individual servings of fresh fruit are to be considered ready-to-eat will assist states in properly interpreting the guideline. This change in the "Ready-to-Eat" definition does not, and should not be interpreted to, change the method of sale laws and regulations as they apply to sales of multiple pieces of fresh fruit, or to sales of individual or multiple items of other produce.

The Committee feels that this change is warranted because: (1) The sale of individual pieces of fresh fruit in establishments should be an acceptable practice. Individual pieces of fresh fruit are commonly sold in cafeterias, convenience stores, and delis as part of ready-to-eat meals. This practice does not mislead consumers because the consumer can see, evaluate, and compare a single banana, apple, orange, etc., and determine its acceptability prior to purchase. (2) According to U.S. government statistics, over half of the adults in America are overweight or obese, and today obesity in children is rapidly becoming a major health crisis. State governments should be promoting the consumption of nutritious products like fresh fruit, and weights and measures can ensure that such healthy food choices are available to consumers by making them readily and conveniently available. The Committee believes this practice is already allowed in most states. The Committee considers this an editorial change.

232-2 W Stored Tare Weights

(This item was withdrawn.)

Source: Southern Weights and Measures Association (SWMA). (See item 232-3 on page L&R-9 in the Report of the 85th NCWM Annual Meeting in 2000)

Discussion: The Committee reviewed the following proposal to add language to the Handbook 130, Method of Sale Regulation:

> **3.5. Vehicle Tare Weights - Whenever stored vehicle tare weights are employed, the following conditions and requirements shall apply:**
>
> **3.5.1. All stored vehicle scale tare weights shall be determined to the nearest scale division. When stored tare weights are used, issued weight certificates shall identify that fact by placing words such as "stored tare" next to the tare weight. Abbreviations or symbols may be used, provided the terminology is defined elsewhere on the printed ticket.**
>
> **3.5.2. Stored vehicle scale tare weights shall be verified at regular intervals at a frequency to be determined by the jurisdiction with statutory authority for the device, unless preempted by a more stringent guideline/requirement or modification of the vehicle.**

This item was first introduced because stored vehicle tare weights have often been found to be incorrect. Errors found in initial vehicle tare weight surveys ranged from 8,900 pounds under, to 2,680 pounds over. A load of sand or gravel priced at $5.50 per ton with a tare error of 750 pounds would result in a monetary error of $2.06 per weighment. If this error were to occur on four transactions each day for 240 working days, the result would be a monetary error of more than $1,977 for the year. Since the practice of using stored tare is common in other types of businesses (e.g., landfills and asphalt plants) where prices per ton may be as high as $70, a tare error of 750 pounds could equal a monetary error of $26 per weighment, or $24,960 per year.

Since 1999 the Committee has reworked and reworded this item several times. The proposal was voted on by the NCWM in 2002 and 2003, and failed to pass on both occasions. Objections raised against this proposal focused on two concerns: (1) how to enforce it (most jurisdictions do not have resources to spend checking stored tare weights for accuracy); and (2) the appropriateness of the "nearest scale division" requirement in 3.5.1. (Is this a tolerance above and beyond the tolerance for the device? Is one scale division sufficient to allow for changes in the amount of fuel in the gas tank of the vehicle, or for a change in drivers?) While the Committee acknowledges that incorrect stored tare weights can be a problem, the Committee believes that these problems can be adequately addressed through the enforcement of net weight. The Committee has withdrawn this item.

NIST will be hosting a Public Forum on September 28, 2004, titled "Weighing Requirements and Practices for the Weighing of Trucks for Commercial Purposes." The issue of stored tare weights will be on the Forum agenda. Anyone interested in additional information about this forum may contact NIST for details.

232-3 W Scaling Methods for Trees, Sawlogs & Veneer Logs

(This item was withdrawn.)

Source: Central Weights and Measures Association (CWMA).

Discussion: The Committee reviewed the following proposal to amend the Method of Sale Regulation in Handbook 130 by adding:

> **2.xx. Trees, Sawlogs & Veneer Logs – Scaling Methods. The requirements of this section provide for unbiased and consistent estimates of timber volumes offered for sale across regions and for different timber types.**
>
> **2.xx.1. Definitions**
>
> **Tree: Woody plant having one erect perennial stem or trunk at least 3 inches (7.5 cm) in diameter at breast height (dbh).**
>
> **Sawlog: A roundwood product of a tree, usually 8 feet (2.4 m) in length or longer, processed into a variety of sawn products such as lumber, ties, cants, and timbers.**
>
> **Veneer Log: A roundwood product of a tree, usually 8 feet (2.4 m) in length or longer, either rotary cut, sliced, or sawn into a variety of veneer products such as plywood, panels, and veneer.**
>
> **Firmwood: The content of a tree or log that is sound.**
>
> **2.xx.2. Quantity. Representations for trees and logs shall be in terms of cubic foot (or cubic meter) representing the net firmwood content of a saw or veneer log. It is obtained from such a log's two end diameters (inside the bark) and its gross length using Smalian's formula (with appropriate deductions for rot, holes, char, and missing wood):**

$$\textbf{Volume} = \frac{\textbf{Length(Area of small end + Area of large end)}}{\textbf{2}}$$

The Committee contacted the USDA Forest Service, State Foresters around the country, as well as several lumber and timber industry associations asking for comments and feedback on this item. The comments received were overwhelmingly opposed to this proposal. Letters and e-mails received by the Committee were tallied, and over 170 industry members, the USDA Forest Service, and numerous State Foresters opposed the proposal. The Committee received only 5 letters in support of this item. The Committee feels that, while method of sale issues generally fall within the realm of weights and measures enforcement, this proposal would mandate a method of sale in an industry where other state and federal agencies have primary jurisdiction. Consultation with the experts in the field of timber and logging convinced the Committee that this regulation is not advisable (a summary of the written comments received on this item can be found in Appendix C). The Committee has withdrawn this item.

Background: The following information was provided to the Committee by the original proponent of this item: The U.S. generally uses traditional product yield-based board-foot scales to measure trees. These scales were developed in the 19th century according to practices, technologies, and tree sizes prevalent at that time. These scales have not been changed or updated to reflect changes in technology and resource size, making them outdated and inaccurate in the contemporary context. Since the 19th century our forests have transitioned to a 2nd growth (smaller diameter) resource, and these antiquated scales have become inaccurate in estimating true yield potential. To compound the matter, different States and regions of the country use different board-foot scales to estimate yield. Making volume and value comparisons across regions is extremely difficult without a standard tree/log scaling system. The various current scales based on board feet contain biases for longer length and smaller diameter logs that distort volume estimates of such logs.

232-4 D Temperature Compensation for Petroleum Products

Source: Southern Weights and Measures Association (SWMA).

Recommendation: Amend the Method of Sale Regulation in Handbook 130 by adding the following:

> **2.20.X. Petroleum Products – Where not in conflict with other statutes or regulations, petroleum products delivered through a vehicle-tank meter or stationary meter shall be sold with the volume adjusted to compensate for temperature. When petroleum products are sold temperature compensated:**
>
> **(1) All sales shall be in terms of liters or U.S. gallons at 15 °C (60 °F);**
>
> **(2) The temperature compensation shall be accomplished through adjustable automatic means.**
>
> **(3) The primary indicating elements, recording elements, and all recorded representations (receipts, invoices, bills of lading, etc) shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C (60 °F);**
>
> **(4) All sales by the same company over at least a consecutive 12-month period must be sold temperature compensated (i.e., a company cannot choose to operate some devices with automatic temperature compensators and others without; nor can a company choose to engage a device's temperature compensator only during certain times of the year).**

Discussion: Selling fuel by adjusting the volume to 15 °C (60 °F) throughout the distribution system is the most equitable way that fuel can be sold without the buyer or seller gaining a competitive advantage. By allowing a distributor to buy product on gross volume at the wholesale level and sell it by net gallons retail, where he can manipulate the method of sale depending on the time of year, is not equitable. A single method of sale should be required so that a prospective customer can make a value comparison. There is no practical way the average customer can make a value comparison when some locations sell product temperature compensated and other locations sell without temperature compensation.

This item is considered in conjunction with a temperature compensation item that is before the Specifications and Tolerances (S&T) Committee (Item 331-1), although it is important to note that the S&T Committee's item is limited to Vehicle Tank Meters. The Committee believes that this is an important issue that should be given careful consideration, and that this item needs to be discussed with parties that may be affected by its adoption. Therefore, the Committee has decided to make this item developmental.

A similar proposal was made by the NEWMA in 2000 that mirrored a temperature compensation item that was before the S&T Committee at the time. In 2000 the NEWMA noted that Pennsylvania, New Hampshire, Maine and Canada permit temperature compensation in sales of products like home heating fuel and retail gasoline. In 2001 the Committee withdrew this item after hearing testimony from several jurisdictions that opposed it.

232-5 W Cooking Oils

(This item was withdrawn.)

Source: Central Weights and Measures Association (CWMA).

Discussion: The Committee reviewed the following proposal to add language to the Handbook 130, Method of Sale Regulation:

> **1.xx. Cooking Oils. All cooking oils shall be sold by liquid measure.**

Large packages of cooking oil are intended primarily for institutional use and are labeled by weight. Smaller packages of cooking oil are intended for consumer use and are labeled by liquid volume. However, with the recent increase in the popularity of turkey fryers (devices designed to fry whole turkeys in cooking oil), large packages of cooking oil have begun appearing in the retail market. Some manufacturers label these packages by weight (e.g., 35 lb [15.8 kg] or 50 lb [22.6 kg]), while others label them by volume (e.g., 3 gal [11.3 L] or 5 gal [18.9 L]). These conflicting methods of sale frustrate consumers' ability to make value and price comparisons when shopping for these large packages of cooking oil.

The Committee heard oral, and received written, testimony from industry members who opposed this item. Industry members testified that while historically smaller volumes of cooking oil have been sold by liquid measure, larger volumes have always been sold by weight. Industry members asserted that requiring liquid measure as the method of sale for all cooking oils would place a tremendous burden on industrial and institutional users who expect and need this product to be sold by weight.

The Committee believes that changes in the marketplace, not changes in industry practices, have brought this issue to the forefront. Prior to the proliferation of turkey fryers there was little, if any, demand for large quantities of cooking oil in the consumer marketplace. Due to new consumer demands, products that were historically intended for institutional or industrial use have found their way into the retail market. The Committee notes that the traditional method of sale for large volumes of cooking oil is by weight.

Research into the turkey fryer market revealed that most fryers have a capacity of 7 gallons (26.4 L) or less, which means that it would be unlikely for much more than 5 gallons (18.9 L) of oil to be required for cooking. The Committee considered whether or not it would be feasible to require liquid measure as the method of sale for smaller quantities (e.g., 5 gallons [18.9 L] or less). The problem with requiring packages of "5 gallons (18.9 L) or less" to be sold by liquid volume, however, is that it includes the 35 lb (15.8 kg) and 50 lb (22.6 kg) packages of oil, two very popular sizes for institutional use. Institutions need cooking oil to be sold by weight because they have no means by which to measure out large quantities of oil by volume for their recipes. While a hospital, nursing home, or food service agency can easily place a container on a scale to measure a quantity, they cannot easily measure that same quantity volumetrically.

The Committee also considered requiring combination declarations (i.e., both weight and volume) on cooking oils. Handbook 130 allows combination declarations on packages when a single declaration alone is not fully informative. The Committee rejected this idea because: (1) the issue here is not whether or not the quantity declaration is fully informative; both weight and volume are fully informative on their own, (2) there was no reason to require a weight declaration on the smaller, retail-sized packages of cooking oil; to implement such a requirement would place an undue burden on manufacturers and packers, and (3) if a combination declaration is required a manufacturer or packer must meet both declarations; again, to implement such a requirement would place an additional burden on manufacturers and packers.

Finally, the Committee considered requiring "packaged cooking oils sold at retail" to be sold by volume. The Committee rejected this idea because it did not believe that a manufacturer or packer would necessarily know, at the time of packaging the product, whether it would be destined for retail or institutional sale.

The Committee believes that the consumer market for large quantities of cooking oil is relatively small, and is not convinced that most consumers will be doing cost comparisons between large containers of oil sold by weight at a membership club, and small packages of oil sold by volume at a grocery store. The Committee does not consider it appropriate to change an entire, established industry practice for the convenience of a very small number of specialized retail customers. The Committee recommends that cooking oil manufacturers and packers include supplemental quantity declarations in liquid volume on any package of cooking oil that may end up in the retail marketplace. The Committee has withdrawn this item.

236 UNIFORM NATIONAL TYPE EVALUATION REGULATION

236-1 V Amend §§ 2.1. Active Certificate of Conformance, 2.2. Device, and 3. Certificate of Conformance

(This item was adopted.)

Source: Northeast Weights and Measures Association (NEWMA).

Recommendation: Amend §§ 2.1 Active Certificate of Conformance, 2.2 Device, and 3. Certificate of Conformance, of the Uniform National Type Evaluation Regulation as follows:

2.1. Active Certificate of Conformance. - A document issued based on testing by a Participating Laboratory, which the certificate ~~owner~~ **holder** maintains in active status under the National Type Evaluation Program (NTEP). The document constitutes evidence of conformance of a type with the requirements of this document**,** ~~and the~~ NIST Handbook**s** 44~~, 105-1, 105-2, or 105-3~~ **(Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices), and the test procedures contained in NCWM Publication 14.** By maintaining the Certificate in active status, the Certificate ~~owner~~ **holder** declares the intent to continue to manufacture or remanufacture the device consistent with the type and in conformance with the applicable requirements. **A device is traceable to a Certificate of Conformance if: (a) it is of the same type identified on the Certificate; and (b) it was manufactured during the period that the Certificate was maintained in active status.** For manufacturers of grain moisture meters, maintenance of active status also involves annual participation in the NTEP Laboratory On-going Calibration Program, OCP (Phase II). ~~**A device is traceabke to an active Certificate of Conformance if it was manufactured during the period that the Certificate was maintained in active status.**~~

(Amended 2000, 2001**, and 200x**)

2.2. Device. - ~~Device means any weighing and measuring equipment as defined in § 2.15., Commercial and Law Enforcement Equipment.~~ **A piece of commercial or law enforcement equipment as defined in § 2.15., Commercial and Law Enforcement Equipment. A device may be a single unit or a combination of separate and compatible main elements. A device shall include, at a minimum, those main elements that: (a) perform the measurement; and (b) process the measurement signals up to the first indicated or recorded value of the final quantity upon which the transaction is based. (Amended 200x)**

Section 3. Certificate of Conformance

The Director shall require a device to be traceable to a Certificate of Conformance prior to its installation or use for commercial or law enforcement purposes. **If the device consists of separate and compatible main elements, each main element shall be traceable to a Certificate of Conformance. A device is traceable to a Certificate of Conformance if: (a) it is of the same type identified on the Certificate, and (b) it was manufactured during the period that the Certificate was maintained in active status. (Amended 2001 and 200X)**

Discussion: The NTEP Board of Directors believes that the term "holder" more accurately reflects the rights of a company that possesses an NTEP Certificate of Conformance than the term "owner". First, NTEP retains many of the rights traditionally associated with "ownership": NTEP issues Certificates, and may withdraw or make them inactive if a company fails to meet certain obligations under the Administrative Policy. Second, the nature of the incorporation of the NCWM prevents the NCWM from transferring things of material value. The term "owner" implies that in issuing a Certificate of Conformance, the NCWM had transferred something of value to the manufacturer. Finally, Certificates of Conformance may be thought of as being in the public domain since their use is not restricted, and state and local jurisdictions freely copy and distribute them. The term "holder" still conveys certain important rights and privileges, such as the ability to transfer the Certificate and the authority to determine if a device is traceable. The Committee believes that changing the term "owner" to "holder" in section 2.1. is consistent with other changes implemented by NTEP.

A State has noted that the language in the NTEP Regulation may not permit the mating of separate main elements, each of which has a Certificate, unless the combination has a separate Certificate of its own. The current language in Section 3 uses the singular form (i.e., "a" Certificate of Conformance), which could be interpreted to mean that every device must have "one" Certificate. The U.S. has permitted the mixing and matching compatible main elements since before the NTEP program began. The amendment to the definition of "device" clarifies that a device (i.e., an entire weighing or measuring instrument) may be a single unit or a combination of separate main elements. The final amendment clarifies that devices or elements must have Certificates consistent with current NTEP policies. This is clearly stated in the NTEP Administrative Policy but does not have a parallel statement in the regulation. The Committee believes that the addition of language addressing devices that are composed of separate and compatible main elements is helpful for correctly interpreting and applying this section. The Committee has not received any comments opposing these changes.

237 ENGINE FUELS, PETROLEUM PRODUCTS, AND AUTOMOTIVE LUBRICANTS REGULATION

237-1 W Petroleum Subcommittee Agenda Items

(This item was withdrawn.)

Source: The Petroleum Subcommittee. (See item 237-3 on page L&R-14 in the Report of the 84th NCWM Annual Meeting in 1999.)

Discussion: The Petroleum Subcommittee Agenda has remained on the Committee's agenda since 1999 as a reminder of what the Subcommittee is working on. However, the Committee has decided that the work of the Subcommittee can be more easily and effectively maintained on the internet and has asked NIST to post this information on the NIST website. NIST has established a website for posting and updating the work of the Petroleum Subcommittee. The URL for this site is: http://ts.nist.gov/ts/htdocs/230/235/petroleum.htm. Alternatively, this site can be accessed through the NIST WMD website: (1) Go to www.nist.gov/owm, (2) Under the "Related Links" section click on "NCWM Petroleum Subcommittee." The Committee has withdrawn this item.

237-2 V Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA). (See item 237-2 on page L&R-6 in the Report of the 87th NCWM Annual Meeting in 2002.

Recommendation: Modify the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation as shown in Appendix A.

Discussion: The title "Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation," (or EFR) implies that the document covers lubricants. When the regulation was developed, the Petroleum Subcommittee made developing engine fuel requirements a priority, with the understanding that in the future they would address lubricants. This proposal provides new specifications and regulations for lubricants.

This item was originally part of the Petroleum Subcommittee's agenda, and was broken out as a separate item after the Subcommittee prepared a new draft of the regulation. The Committee has heard testimony from representatives of the American Petroleum Institute (API) supporting this item. The Committee has neither heard nor received any comments opposing this item.

The Committee wishes to recognize the work done on this issue by the Automotive Lubricants Workgroup, and to thank the members of the Workgroup for their time and contributions. The members of the Automotive Lubricants Workgroup are: D. Johannes, California; M. Belue, Belue Associates; D. Clark, Citgo; L. Gibbs, Chevron/Texaco; C. Gordon, American Petroleum Institute; R. Hayes, Missouri; D. Heck, Chevron/Texaco; A. Herbert, California; R. Jennings, Tennessee; D. Lazier, California; and A. Schuettenberg, ConocoPhillips.

237-3A V Biodiesel Fuel Definitions and Specifications

(This item was adopted.)

(At the 2004 annual conference, Item 237-3 was separated into two parts - A and B - to allow for the NCWM to move forward to a vote on the definitions and specifications portions of the proposal, while providing time for additional consideration of the identification and labeling portions of the proposal.)

Source: Central Weights and Measures Association (CWMA). (See item 237-4 on page L&R-6 in the Report of the 88th NCWM Annual Meeting in 2003)

Recommendation: Amend the Handbook 130 Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation as follows:

1. Strike § 1.8. Biodiesel:

    ~~**1.8. Biodiesel. – means a blend consisting of diesel fuel and a substantial amount of esterfied animal fats and/or vegetable oil(s).**~~

    And replace it with the definition from the American Society for Testing and Materials (ASTM) D 6751, Standard Specification for Biodiesel Fuel (B100) Blend Stock for Distillate Fuels:

    <u>**1.8. Biodiesel. - a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100.**</u>

2. Add the following to the definitions section and renumber that section as appropriate:

    <u>**1.X. Biodiesel Blend. - a fuel comprised of a blend of biodiesel fuel with petroleum-based diesel fuel, designated BXX. In the abbreviation BXX, the XX represents the volume percentage of biodiesel fuel in the blend.**</u>

3. Adopt specifications for Biodiesel and Biodiesel Blends by adding:

    <u>**2.15 Biodiesel - B100 biodiesel intended for blending with diesel fuel shall meet the most recent version of ASTM D 6751, Standard Specification for Biodiesel Fuel (B100) Blend Stock for Distillate Fuels.**</u>

    <u>**2.16 Biodiesel Blends – blends of biodiesel and diesel fuels shall meet the following requirements: (a) the base diesel fuel shall meet the most current requirements of ASTM D 975, Standard Specification for Diesel Fuel Oils; and (b) the biodiesel blend stock shall meet the most current requirements of ASTM D 6751, Standard Specification for Biodiesel Fuel (B100) Blend Stock for Distillate Fuels.**</u>

    <u>**2.16.1. Exception - biodiesel may be blended with diesel fuel whose sulfur or aromatic levels are outside Specification ASTM D 975, Standard Specification for Diesel Fuel Oils, Grades 1-D, low sulfur 1-D, 2-D, or low sulfur 2-D provided the finished mixture meets pertinent national and local specifications and requirements for these properties.**</u>

Discussion: The Committee has been working on this item since 2002, and has been monitoring the activities of ASTM with regard to biodiesel fuels. The Committee feels that it is absolutely necessary to change the definition of biodiesel contained in § 1.8; what is there is incorrect. By incorporating and adopting ASTM specifications D 975 and D 6751 the Committee hopes to avoid continuous updating of the Handbook in an attempt to keep up with future developments in this area. Comments the Committee received from the biodiesel industry indicate that, while they were not entirely happy with this proposal, they feel it is important to move forward with some sort of specification for these products.

Items 237-3A and 237-3B were originally proposed as a single item, 237-3. The Committee believes that there is no opposition to the definition sections proposed, or to the specification sections after slight modification. However, the National Biodiesel Board (NBB) has expressed concern over the identification and labeling sections proposed, and has submitted alternative language for the Committee to consider. The Committee believes that it needs more time to consider the identification and labeling sections and the NBB proposal. Therefore, the Committee has decided to split Item 237-3 into two parts: the definition and specification sections will move forward for a Vote as Item 237-3A, while the identification and labeling sections will be carried forward as Informational Item 237-3B.

Background: Laws and regulations require that accurate and adequate information be placed on commodities allowing consumers to make price and quantity comparisons. For our economy to function properly consumers must also be able to rely on manufacturers' product "claims." Products must meet manufacturer specifications and claims.

When ASTM first developed the biodiesel specification in 1993, it proposed a specification for biodiesel use as a pure fuel, called B100. However, several engine manufacturers had reservations about B100 biodiesel because they had no experience using blends over 20 % (B20). Engine manufacturers recommend that users consult with their engine manufacturer before using biodiesel blends above 5 % (B5) as concerns related to costs, rubber and gasket compatibility, and cold flow properties exist with these blends. While experience over the last 10 years and 40 million on-road miles has shown that biodiesel blends of up to 20 % (B20) do not require modifications to the fuel systems of conventional diesel engines, the manufacturers of these engines still promote caution when using biodiesel blends over 5 % (B5).

The fact of the matter is that the higher cost of biodiesel results in few customers using blends higher than B20. Therefore, neither the biodiesel industry nor the engine industry was interested in investing the money and resources necessary to meet a B100 standard. Since B20 was the highest-level product envisioned with commercial potential, and since the engine community would not support the inclusion of more than 20 % without further testing, ASTM decided to develop a blend stock standard. The ASTM Biodiesel Task Force developed D 6751 as the set of properties that B100 must meet before being blended into diesel fuel for an up to 20 % biodiesel by volume.

As a blend-stock standard, the ASTM Biodiesel Standard was developed in a manner similar to that of 1-D and 2-D diesel fuel, which are also frequently blended in the commercial marketplace as a means to improve the cold flow properties of 2-D in winter months. If the parent fuels meet their respective specifications, they can be blended and there is no separate set of specifications for the blended mixture. The current requirement of the biodiesel specification is as follows: if biodiesel meets D 6751 and diesel meets D 975 (either 1-D or 2-D), then the two can be blended up to 20 % biodiesel and there is no separate set of properties required for the B20 mixture. For example, as with 2-D, blends of B20 can contain higher levels of 1-D for improved cold flow properties in winter. This method has served industry and consumers well, especially in the formative stages of biodiesel development.

237-3B I Biodiesel Fuel Identification and Labeling Requirements

(At the 2004 annual conference, Item 237-3 was separated into two parts - A and B - to allow the NCWM to move forward to a vote on the definitions and specifications portions of the proposal, while providing time for additional consideration of the identification and labeling portions of the proposal.)

Source: Central Weights and Measures Association (CWMA). (See item 237-4 on page L&R-6 in the Report of the 88th NCWM Annual Meeting in 2003)

Recommendation: Amend the Handbook 130 Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation as follows:

Adopt identification and labeling requirements by adding:

3.15 Biodiesel

3.15.1. Identification of Product. – Biodiesel and biodiesel blends shall be identified by the capital letter B followed by the numerical value representing the volume percentage of biodiesel fuel. (Examples: B100; B20)

3.15.2. Labeling of Retail Dispensers of Biodiesel and Biodiesel Blends - Each retail dispenser of biodiesel or biodiesel blend shall be labeled with the capital letter B followed by the numerical value representing the volume percentage of biodiesel fuel and ending with the word 'biodiesel'. (Examples: B100 biodiesel; B20 biodiesel)

3.15.3. Documentation for Dispenser Labeling Purposes. – The retailer shall be provided, at the time of delivery of the fuel, with a declaration of the volume percent biodiesel on an invoice, bill of lading, shipping paper, or other document. This documentation is for dispenser labeling purposes only; it is the responsibility of any potential blender to determine the amount of biodiesel in the diesel fuel prior to blending.

<u>3.15.4. Exemption. – Biodiesel blends containing 5 % or less biodiesel by volume are exempted from requirements 3.15.1., 3.15.2., and 3.15.3.</u>

Discussion: The Committee has been working on this item since 2002, and has been monitoring the activities of ASTM with regard to biodiesel fuels. The Committee has decided to continue moving forward with identification and labeling requirements for biodiesel blends containing more than 5 % biodiesel by volume despite ASTM's indecision on this topic. The Committee feels that it was important for consumers to be properly informed about what is being offered for sale so that they can make informed purchases. The Committee has been informed that ASTM is considering changing the "Fill and Go" specifications in D 975 to include biodiesel blends of 20 % or less. If this is the direction ASTM decides to go, then the Committee may need to re-evaluate the requirements for those fuels between 5 % and 20 % biodiesel.

Items 237-3A and 237-3B were originally proposed as a single item, 237-3. The Committee believes that there is no opposition to the definition sections proposed, or to the specification sections after slight modification. However, the National Biodiesel Board (NBB) has expressed concern over the identification and labeling sections proposed, and has submitted alternative language for the Committee to consider. The Committee believes that it needs more time to consider the identification and labeling sections and the NBB proposal. Therefore, the Committee has decided to split Item 237-3 into two parts: the definition and specification sections will move forward for a Vote as Item 237-3A, while the identification and labeling sections will be carried forward as Informational Item 237-3B.

Background: Laws and regulations require that accurate and adequate information be placed on commodities allowing consumers to make price and quantity comparisons. For our economy to function properly consumers must also be able to rely on manufacturers product "claims." Products must meet manufacturer specifications and claims.

When ASTM first developed the biodiesel specification in 1993, it proposed a specification for biodiesel use as a pure fuel, called B100. However, several engine manufacturers had reservations about B100 biodiesel because they had no experience using blends over 20 % (B20). Engine manufacturers recommend that users consult with their engine manufacturer before using biodiesel blends above 5 % (B5) as concerns related to costs, rubber and gasket compatibility, and cold flow properties exist with these blends. While experience over the last 10 years and 40 million on-road miles has shown that biodiesel blends of up to 20 % (B20) do not require modifications to the fuel systems of conventional diesel engines, the manufacturers of these engines still promote caution when using biodiesel blends over 5 % (B5).

ASTM considers biodiesel blends between B5 and B20 "Fill and Go" since they do not generally require changes to the engine or fuel system. However, biodiesel levels higher than B20 may need to have different gaskets and hoses. While blending biodiesel greater than 20 % does not readily occur in today's market place, it may in the not too distant future. Therefore, the biodiesel industry supports accurate labeling for all fuel dispensers and encourages the NCWM to adopt these recommendations.

An issue that remains, however, is the opportunity for facilitation of fraud by claiming inaccurate percentages of biodiesel. Biodiesel blends cost significantly more than conventional diesel fuels. As such, there is the possibility that unscrupulous fuel distributors may advertise a higher concentration of biodiesel than they are delivering, and thus derive undue profits. If a distributor claims that they are selling B20 and they are putting in only 1 %, the distributor is misrepresenting the product. The biodiesel industry claims that this is not a pump labeling issue but an enforcement issue.

Part of the problem with a strict percentage labeling requirement is that as biodiesel blends become more "mainstream," the percentage biodiesel added may vary from day-to-day depending on the needs of the distributor. Currently this practice is discouraged by the relatively high cost of biodiesel. However, as the price of biodiesel moves closer to the price of diesel fuel it becomes just one of the myriad compounds which could make up conventional diesel fuel. Refiners could blend in biodiesel to reduce the sulfur content or aromatic content of the finished blend. They could use it to replace their existing lubricity additives. If the price of biodiesel was more equal to diesel, they may add 1 % today, 5 % the next day, and 20 % the next day. As long as the finished blend meets the D 975 "Fill and Go" specification, the level of biodiesel could range as high as 20 % without consequence. Labeling requirements that are too restrictive would eliminate the flexibility of the "Fill and Go" concept, and could significantly reduce the amount of biodiesel that is eventually used.

ASTM is currently developing a Biodiesel "Fill and Go" specification for D 975 that is not based on the parent fuels, but on the finished fuel and what is satisfactory for operation in a diesel engine. This may also mean changes to D 6751, which is a stand-alone specification. The current thinking is that the upper biodiesel concentration limit for the D 975 "Fill and Go" specification will be 20 %, although it is possible that it could ultimately be higher or lower. Whatever the concentration of biodiesel, if the finished blend meets the D 975 "Fill and Go" specification, the fuel is D 975-grade diesel fuel and would have to be labeled such. Some industry members believe that existing labeling requirements in Handbook 130 are sufficient to address this situation.

237-4 W E diesel

(This item was withdrawn.)

Source: Central Weights and Measures Association (CWMA). (See item 237-5 on page L&R-10 in the Report of the 88th NCWM Annual Meeting in 2003.)

Discussion: E diesel is a blend of Standard Number 2 diesel fuel containing up to 15 % ethanol by volume. The blend may also contain proprietary additives from 0.2 % to 5.0 % by volume to maintain certain fuel properties and blend stability. E diesel is being sold commercially for off-road applications and is being used in several on-road demonstration fleets. Currently there is no consensus on specifications that E diesel must meet. There are also no labeling requirements for retail dispensers selling E diesel.

A group of E diesel stakeholders have formed the E Diesel Consortium to address the technical and regulatory issues surrounding this fuel. The Consortium has also approached ASTM about developing an E diesel specification. The Consortium is concerned that, without a detailed minimum specification, it could be possible to sell diesel ethanol blends that are of insufficient quality for their intended use.

The Committee originally placed this item on its agenda pending a recommendation from ASTM. It is the Committee's understanding that ASTM is moving very slowly in this area, and that it may be several years before there is a proposal for the Committee to consider. The Committee has decided to place this item on the Petroleum Subcommittee's agenda until there is more specific information for it to act upon. The Committee has withdrawn this item.

237-5 W Nozzle Requirements for Diesel Fuel

(This item was withdrawn.)

Source: Central Weights and Measures Association (CWMA). (See item 237-2 on page 198 in the Report of the 82nd NCWM Annual Meeting in 1997.)

Discussion: The Committee reviewed the following proposal to amend the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation in Handbook 130 by adding:

> **<u>3.3.X. Nozzle Requirements for Diesel Fuel. - Each dispensing device from which diesel fuel is sold shall be equipped with a nozzle spout having a terminal end with an outside diameter of not less than 23.63 mm (0.930 in).</u>**

Consumers are dispensing diesel fuel into non-diesel vehicles despite the proper labeling of retail motor fuel dispensers. The American Automobile Manufacturer's Association (AAMA) reported that the recommended 23.63 mm fill pipe diameter is compatible with current diesel-powered vehicles and those on the drawing board for the future.

This proposal has been on and off the Committee's agenda for 7 years, and was unsuccessfully voted on in both 1997 and 2003. This year the Committee heard testimony from one State jurisdiction that not all diesel-powered vehicles on the road can accommodate the larger nozzle size. The Committee does not believe that this item has enough support within the NCWM to move forward. The Committee has withdrawn this item.

240 EXAMINATION PROCEDURE FOR PRICE VERIFICATION

240-1 W Amend § 6.2 Other

(This item was withdrawn.)

Source: Western Weights and Measures Association (WWMA). (See item 239-1 on page L&R-14 in the Report of the 88th NCWM Annual Meeting in 2003.)

Discussion: The Committee reviewed a proposal to add the following to § 6.2 of the Examination Procedure for Price Verification in Handbook 130:

> **(x) A cash register or computer monitor used to list and total customer purchases must be positioned so that its indications may be observed from a reasonable customer location and/or have a remote indicator display so that its indications may be observed from a reasonable customer location.**

The Committee was concerned that this item oversteps the authority of many weights and measures programs. Not all programs have the statutory authority to regulate point-of-sale systems that are not attached to a weighing or measuring device. In addition, the Committee thought it inappropriate to place a requirement of this nature in an examination procedure. The Committee questioned under what authority any enforcement action could be taken if this requirement only appeared as part of the examination procedure. Although the Committee heard testimony that this item was only intended to apply to retail stores, the proposal is written so broadly that it also captures businesses like restaurants, movie theaters, and street vendors. The Committee heard and received testimony from several industry members, all of whom are opposed to this item. The Committee decided that this was not a proper addition to the examination procedure for price verification. The Committee has withdrawn this item.

Background: The following information was provided to the Committee by the original proponent of this item: A point-of-sale system that is attached to a weighing or measuring device is required to have its indications positioned so that they are visible to the customer in a direct sale (NIST Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, G-UR.3.3.). Cash registers and computer monitors that do not incorporate a weighing or measuring device are not subject to this requirement. Regardless of whether or not a point-of-sale system is attached to a weighing or measuring device, consumers should be able to instantly confirm prices, and businesses correct pricing errors, during the transaction. The benefit of correct prices and time saved would help everyone involved.

260 NIST HANDBOOK 133, CHECKING THE NET CONTENT OF PACKAGED GOODS

260-1 I Edit MAV Tables 2-5, 2-6, 2-8, and 2-10

(This item was adopted with the report.)

Source: Central Weights and Measures Association (CWMA).

Recommendation: The Committee will grant NIST editorial privileges to amend MAV Tables 2-5, 2-6, 2-8, and 2-10 in Handbook 130 so that the metric values are more closely aligned with the corresponding inch-pound unit values. The newly proposed tables can be found in Appendix B.

Discussion: The inch-pound units and metric units in parts of tables 2-5, 2-6, 2-8, and 2-10 do not match. This creates instances where it is unclear what MAV to apply to a given package. Handbook 133 documents must be mathematically correct on issues of weight and mass. The Committee considers this an editorial change.

Background: NIST informed the Committee that these tables were developed in the 1970's with the inch-pound units as the original values. The metric counterparts were subsequently calculated based on what was then believed to be "reasonable" package sizes. Over the course of the ensuing 30 years, the "rational" metric package sizes envisioned in the 1970's never developed in the marketplace. Instead products are sold in a wide variety of sizes, which makes the 1970's metric conversions in this chart inaccurate and obsolete.

260-2 W Amend § 1.2, Package Requirements

(This item was withdrawn.)

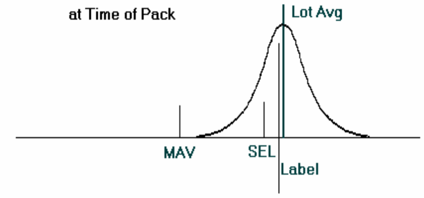
Source: Northeastern Weights and Measures Association (NEWMA). (See item 250-3 on page L&R-18 in the Report of the 88th NCWM Annual Meeting in 2003.)

Recommendation: The Committee reviewed the following proposal to amend the section "Why do we allow for moisture loss or gain?" in Handbook 133, Section 1.2, Package Requirements (page 4) as follows:

Why do we allow for moisture loss or gain?

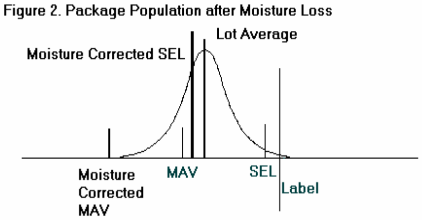
Some packaged products may lose or gain moisture and, therefore, lose or gain weight or volume after packaging. The amount of lost moisture depends upon the nature of the product, the packaging material, the length of time it is in distribution, environmental conditions, and other factors. Moisture loss may occur even when manufacturers follow good distribution practices. Loss of weight "due to exposure" may include solvent evaporation, not just loss of water. **Note that allowances for loss or gain of moisture only apply to packages of commodities where the moisture has no value to the consumer (See Jones vs. Rath).**

Figure 1. Package Population at Time of Pack



For loss or gain of moisture, **you** apply the moisture allowances to the maximum allowable variations permitted for individual packages and to the average net quantity of contents before determining the conformance of a lot. **You may apply the allowance before measuring the package errors or after. When applying the allowance before the measurements, you essentially correct each package back to theoretical weight at time of pack, see Figure 1 at right. When applying the allowance after measuring the package errors, you correct the MAV and SEL to recognize the moisture loss as in Figure 2 at right. You can find specific directions for applying the allowances in tests in Section 2.3.**

Figure 2. Package Population after Moisture Loss



This handbook provides "moisture allowances" for some meat and poultry products, flour, and dry pet food (see "Moisture Allowances" in Chapter 2). These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or more information must be collected before deciding lot compliance or non compliance.

Discussion: One State believes that the explanations provided in Handbook 133 pertaining to moisture loss are inadequate. In considering this proposal, however, the Committee concluded that the reference to the Jones vs. Rath court case is inappropriate and inaccurate. The Committee considers the additional language provided regarding the application of moisture loss unnecessary and confusing. NIST has agreed, however, to review the moisture loss section of Handbook 133 to see if it can be written more clearly. The Committee has withdrawn this item.

Background: The original proponent of this item provided the following written issues and justification. These apply to both this item and the next item (260-3: Amend § 2.3 Basic Test Procedure):

What products are covered by the requirement to recognize loss/gain of moisture in distribution? The reference to the Rath vs. Jones case in Chapter 1 attempts to find an answer. NEWMA believes this may be premature and should be removed from the item for the short term to help develop a solution. However, this is a battle that will have to be fought somewhere in the future, since regulators get claims of moisture loss from diverse packers as an excuse for packages that fail to have labeled net weight. The claims have ranged from windshield washer fluid in plastic jugs to canned tomato sauce. Where can the official turn to get an answer if not to this Handbook? If the committee believes there is a better way, NEWMA would like some guidance.

When do you apply the moisture allowance in the test process? Within the Handbook itself, the method is either not clear or some of the text is wrong. In Chapter 1 the text indicates that you must apply the allowance before the test (i.e., adjusting by using box 13a and thus lowering the NGW in box 14). In Chapter 2, the text appears otherwise. You are directed to add the moisture allowance to the MAV on Page 18. You are further directed to compare the difference between sample average and SEL to the moisture allowance on Page 19. Both of these instructions can only make sense if the value in box 13a was not included in the nominal gross weight calculation in box 14. At the very least these sections fail to provide clear guidance. The proposal attempts to clarify that you can make the correction either before or after and attempts to provide procedures to do that in each case. Before works great for products with established moisture allowances, but it is not possible to apply a correction before the test when dealing with other products. For these other products, you must do additional investigation to determine the magnitude of the loss and you must apply it after the field official has completed the testing. It may also be beneficial to do the adjustment afterwards for products with established moisture loss allowances. Since both before and after methods can provide equivalent results, they should both be recognized in the Handbook. The proposal does this in changes for both Chapters 1 and 2.

Shouldn't all the established moisture allowances be listed in one place, rather than being listed as separate items? The proposal changes the question from one of how you apply the allowance for a specific product to one of what products have established allowances. This brings these all together in one section that is easily found by an inspector.

How do you establish moisture allowances for products not in the list in 3 above? The Handbook provides no guidance whatsoever! In the last line at the bottom of page 17, the text directs the inspector to follow steps if the product is listed, but says nothing about products not listed. This is a huge omission that has many officials wondering what to do? The result is that some packers bluff by playing the moisture loss card even when not entitled to a loss (e.g., canned goods) and many officials back away from these products for lack of direction. The proposal included the provision for comparing time of pack data with actual field data for moisture content that was in the 3rd Edition. It also would permit using data from a scientific study provided by the manufacturer in support of any claim of moisture loss.

Why do we have a different method of evaluating the test results for products with moisture loss than for other products? The basic procedure for evaluating test results calls for evaluating the individual packages against the MAV, and evaluating the sample average against the SEL. On page 19, that procedure is no longer used and instead you have to look at a difference between the sample average and the SEL and not compare it to the moisture allowance. Recently we changed the method of calculating the R_c for tare variability to avoid having different methods for different types of packages. Consistency helps inspectors apply the standard uniformly. NEWMA believes that we should always compare sample average to the SEL and this can be accomplished easily be adjusting the SEL rather than looking at differences. Thus we would follow the same process in evaluating the results in all cases. The only difference is in how we arrive at the SEL and MAV when applying the moisture loss allowance after the test. If you use box 13a before the test, this is done automatically. If you follow the proposed procedure after the test, you calculate a moisture-corrected MAV and a moisture-corrected SEL and simply reevaluate the original test data. While you might get the same result using the procedure on page 19, it uses a different evaluation process and is difficult to understand particularly in how box 13a is or is not used in the calculation of NGW.

260-3 W Amend § 2.3 Basic Test Procedure

(This item was withdrawn.)

Source: Northeastern Weights and Measures Association (NEWMA). (See item 250-4 on page L&R-19 in the Report of the 88th NCWM Annual Meeting in 2003.)

Recommendation: The Committee reviewed the following proposal to delete the current "**Moisture Allowances"** discussion in Handbook 133, Section 2.3, Basic Test Procedure (pages 17 through 19), and replace it as follows:

Moisture Allowances
What products have an established moisture allowance?

Flour and dry pet food have a moisture allowance of 3 % of the labeled net weight. Note: Dry pet food means all extruded dog and cat foods and baked treat products packaged in kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at the time of pack.

Meat and poultry products from a USDA-inspected plant are permitted no moisture allowance when tested under a Category A sampling plan with Used Dry Tare.

Meat and poultry products from a USDA-inspected plant are permitted the following moisture allowances when tested under a Category A sampling plan with Wet Tare. Note: When there is free flowing liquid or absorbent packaging materials in contact with the product, all free liquid is part of the wet tare.

For packages of fresh poultry that bear a USDA seal of inspection, the moisture allowance is 3 % of the labeled net weight. For net weight determinations only, fresh poultry is defined as poultry above 3 ºC (26 ºF). This is a product that yields or gives when pushed with the thumb.

For packages of franks or hotdogs that bear an USDA seal of inspection, the moisture allowance is 2.5 % of the labeled net weight.

For packages of bacon, fresh sausage, and luncheon meats that bear a USDA seal of inspection, there is no moisture allowance if there is no free-flowing liquid or absorbent materials in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Dried Used Tare are equivalent.

These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance, or more information must be collected before deciding lot compliance or noncompliance.

How do you determine the allowance for products without an established moisture allowance?

For any product subject to moisture loss/gain, you may determine the appropriate moisture loss allowance based on a valid, scientific study. You may not use arbitrarily chosen allowances for moisture loss/gain. Many packers have conducted studies that they can provide in support of any claim that the product lost/gained moisture. Any such study should have included a variety of environments that simulate the potential distribution chains that could be encountered. You may use the moisture loss limits found in such study as an allowance in a compliance test.

What is the accepted method to determine the actual moisture loss for a lot?

Where the packer measures and records the moisture content of product in each lot, you may request a copy of that data to be compared to the moisture content of the product offered for sale. You must select a random sample of the product offered for sale and have it tested for moisture content using a scientifically verified test procedure e.g. like those in the Official Methods of Analysis of the Association of Official Analytical Chemists (See Appendix D). The actual moisture loss is calculated as the moisture content (percent) at time of pack minus moisture content (percent) at time of sale. Use the difference obtained to calculate the actual moisture loss for the lot by multiplying it times the label quantity. Use this as the moisture allowance in the official test. In the case of moisture gain, this value will be a negative number.

Calculations

How do you apply a moisture allowance when conducting a test?

Moisture allowances may be applied either prior to testing or after testing. These two methods are mathematically equivalent means of adjusting both the individual package errors and the sample average. It is common practice to apply the moisture correction prior to the test for those products with established moisture allowances like flour and dry pet food. In most other cases the correction is made after the test since moisture loss data will probably be obtained as part of the follow-up investigation after the initial test has failed.

To compute the moisture loss allowance prior to testing, you correct the nominal gross weight in box 14 for moisture loss. Find the value of the allowance by multiplying the labeled quantity by the decimal percent value of the allowance. Enter this value in box 13a on the form. The nominal gross weight is found by adding the average tare (box 13) to the label quantity (box 1) and subtracting the moisture allowance (box 13a). Lot compliance is evaluated in the normal way using decision criteria in boxes 16 and 24 on the report form.

Example: Labeled quantity of a bag of flour is 2 lb and average tare is 0.04 lb (box 13)
Moisture Allowance is 3 % (0.03) of 2 lb = 0.06 lb
Nominal Gross Wt. = 2 lb + 0.04 lb – 0.06 lb = 1.98 lb record this value in box 14.

To compute the moisture loss allowance after testing, you correct only the MAV and SEL for moisture loss. Perform your initial test with no moisture allowance in box 13a. When moisture loss data becomes available, find the value of the allowance by multiplying the labeled quantity by the decimal percent value of the moisture loss or allowance. Lot compliance is evaluated using decision criteria in boxes 16 and 24 on the report form and the moisture corrected MAV and SEL respectively.

Example: Labeled quantity of a package of rice is 2 lb, average tare is 0.04 lb (box 13), MAV (box 3) is 0.07 lb, and SEL (box 23) is 0.023 lb.
Moisture content at time of pack was 13.4 % (packer data)
Moisture content at time of sale is 10.6 % (lab data)
Moisture loss is (13.4 % to 10.6 %) = 2.8 %
Moisture allowance is 0.028 x 2 lb = 0.056 lb
Moisture Corrected MAV is 0.07 lb + 0.056 lb = 0.126 lb – Compare each package error measured in the initial test to this moisture corrected MAV using criteria in box 16.
Moisture Corrected SEL is 0.023 lb + 0.056 lb = 0.079 lb – Compare the sample average error in the initial test to this moisture corrected SEL using criteria in box 24.

Discussion: One State believes that the explanations provided in Handbook 133 pertaining to moisture loss are inadequate. In reviewing this proposal the Committee considered the proposed additional language confusing, and inaccurate. The Committee does agree that the "Calculations" section on page 18 needs to do a better job of distinguishing between moisture allowances applied before testing and those applied after testing. The Committee believes that there are extensive problems with this proposal as submitted. NIST has agreed to review the moisture loss section of Handbook 133 to see if it can be written more clearly. The Committee has withdrawn this item.

Background: The following information was provided by the original proponent of this item: The products that have established moisture allowances are not clearly stated. Currently the Handbook only poses the question "What is the moisture allowance for flour and dry pet food?" It does not state if any other products have moisture allowances. In addition, the Handbook gives no guidance on what to do for products that do not have an established moisture allowance.

The "Calculations" section on page 18 is confusing and does not distinguish between applying a moisture allowance before or after testing. The current method of comparing the moisture allowance to the difference between the average error and the SEL is confusing. The current Handbook does not address commodities that are packed in sealed containers or how to treat commodities packed on the premises.

260-4 I Amend § 2.3 Basic Test Procedure, and Table 2-5

(This item was returned to the Committee for further study.)

Source: Central Weights and Measures Association (CWMA).

Recommendation: The Committee will grant NIST editorial privileges to amend Handbook 133 § 2.3 as follows:

Where are Maximum Allowable Variations found?

Find the MAV values for packages labeled by weight, volume, count, and measure in the tables listed below in Appendix A.

Packages labeled by weight	See Table 2-5
Packages labeled by volume liquid or dry	See Table 2-6
Packages labeled by count	See Table 2-7
Packages labeled by length (width), or area	See Table 2-8
Packages ~~**labeled with**~~ <u>**bearing a**</u> USDA seal of inspection - Meat and Poultry <u>**when labeled weight is provided by the USDA inspected facility**</u>	See Table 2-9
Textiles, polyethylene sheeting and film, mulch and soil labeled by volume, packaged firewood, and packages labeled by count with less than 50 items	See Table 2-10

Amend the Header of Table 2-5 as follows:

Table 2-5. Maximum Allowable Variations (MAVs) for Packages Labeled by Weight
~~**Do Not Use This Table f**~~<u>**F**</u>or Meat and Poulty Products ~~**subject to USDA Regulations**~~ <u>**When Labeled Weight is Provided By USDA Inspected Facility**</u> **–** Use Table 2-9
For Polyethylene Sheeting and Film, see Table 2-10. Exceptions to the MAVs.

Discussion: **The committee believes that w**hen packages of meat and poultry are labeled with net weights by USDA inspected facilities, they are subject to the MAVs found in Table 2-9 as established by the USDA. When packages from USDA inspected facilities are labeled with net weights after they leave the inspected facility (e.g., at the meat department of a supermarket), they are subject to the MAVs found in Table 2-5. This proposal is intended to clarify under which circumstances the Table 2-9 MAVs apply. The Committee considers this an editorial change.

260-5 I Amend § 3.2 Gravimetric Test Procedure for Liquids

(This item adopted with report.)

Source: Central Weights and Measures Association (CWMA).

Recommendation: The Committee will grant NIST editorial privileges to amend Handbook 133 § 3.2 Gravimetric Test Procedure for Liquids as follows:

3. For milk, select a volumetric measure equal to**, or one size smaller than** the label declaration. For all other products, select a volumetric measure that is one size smaller than the label declaration. For example, if testing a 1 L bottle of juice or soft drink, select a 500 mL volumetric measure.

Discussion: Currently, Handbook 133 can be interpreted to state that you must use a volumetric measure equal to the label declaration when testing milk. The previous 3rd Edition Section 4.7. allowed for the use of a smaller sized measure. Changes made between the 3rd and 4th editions of Handbook 133 regarding the selection of a volumetric measure for testing milk were unintentional; testing milk with a measure one size smaller than the label declaration has always been an acceptable option. The Committee considers this an editorial change.

260-6 I Amend § 3.11 and MAV Table 2-10

Source: Western Weights and Measures Association (WWMA).

Recommendation: Amend the application and header of Handbook 133 Table 2-10 as follows to allow the MAVs that apply to Mulch and Soil to also apply to similar products, such as Wood Shavings and Animal Bedding:

Table 2-10. Exceptions to the Maximum Allowable Variations for
Textiles, Polyethylene Sheeting and Film, Mulch ~~**and**~~**,** Soil**, and Other Similar Products** Labeled by Volume,
Packaged Firewood, and
Packages Labeled by Count with Less than 50 Items

Amend Handbook 133 § 3.11 to read:

3.11. Mulch ~~**and**~~**,** Soil**, and Other Similar Products** Labeled by Volume

Discussion: A manufacturer of wood fiber products feels that their wood shavings, labeled by volume, should receive the same MAVs as "Mulch and Soils," or possibly Peat Moss. The wood fiber product in question could conceivably be used in as many different applications as "Animal Bedding," "Insulation," "Mulch" (A Horticultural Above Ground Dressing), etc. The reasons for establishing expanded MAVs for Mulch and Soil may also apply to other similar products. Item 250-10, which was adopted at the 83rd National Conference on Weights and Measures in 1998, and was entitled "Bark Mulch, and Other Organic Products – Maximum Allowable Variations" discussed the reasoning and the necessity for expanded MAVs in certain circumstances.

The Committee is concerned, however, that the manufacturer who is seeking this additional allowance has not provided sufficient objective data to support their position. There is an established procedure for evaluating MAVs for products, and the procedure has not been followed by the manufacturer. The Committee feels this item needs to be further developed in conjunction with a regulatory agency so that the Committee will have reliable information upon which to base any decision.

In addition, concerns have been raised about the expansion of the mulch, soil and peat moss sections to “Other Similar Products.” What are “Other Similar Products?” Products that are used in similar applications? If so, and “Other Similar Products” is intended to extend to pet beddings made of wood shavings, should it also then be extended to pet beddings made of paper (also a wood product)? What about pet beddings made from other substances (clay, straw, etc)? It is believed that the language proposed is overly broad and needs to be better defined to capture the product under consideration without including products that should not have the larger MAV.

270 OTHER ITEMS

270-1 W Enhanced Product – USDA/FSIS Meat and Poultry Products

(This item was withdrawn.)

Source: Central Weights and Measures Association (CWMA). (See item 260-1 on page L&R-13 in the Report of the 86th NCWM Annual Meeting in 2001.)

Recommendation: The Committee reviewed the following proposal to have the NCWM:

(1) Establish a Working Group to study current market conditions for enhanced versus non-enhanced meat and poultry products, to determine the extent to which water and/or other added solutions are no longer retained in the product at the time of sale (i.e., are lost into the packaging material or are otherwise free-flowing) recognizing Federal regulations that are in place which govern labeling of such products; and

(2) Direct the Working Group to make recommendations to the Committee based on findings of the study concerning what is to be considered "reasonable moisture allowances" when conducting Handbook 133 inspections of enhanced meat and poultry products.

Discussion: This item was adopted in 2001, but has remained on the Committee's agenda pending the appointment of the Working Group by the NCWM Board of Directors. The NCWM Board of Directors decided to hold a Rountable session ont his issue instead of appointing a Working Group. The Committee has withdrawn this item.

D. Johannes, California, Chairman
J. Gomez, New Mexico
M. Gray, Florida
J. Cassidy, Cambridge, Massachusetts
V. Dempsey, Montgomery County, Ohio

V. Orr, ConAgra Foods, Associate Committee Representative

B. Lemon, Industry Canada, Technical Advisor
D. Hutchinson, Measurement Canada, Technical Advisor
K. Dresser, NIST, Technical Advisor

Committee on Laws and Regulations

Appendix A

Recommendation for 237-2
NIST Handbook 130: Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation

Uniform Engine Fuels, Petroleum Products,
and Automotive Lubricants Regulation

as adopted by
The National Conference on Weights and Measures*

1. Background

In 1984, the National Conference on Weights and Measures adopted section 2.20. in the Uniform Regulation for the Method of Sale of Commodities requiring motor fuel containing alcohol be labeled as such to disclose that information to the retail purchaser. The delegates deemed this action necessary since motor vehicle manufacturers were qualifying their warranties with respect to some gasoline-alcohol blends, motor fuel users were complaining to weights and measures officials about fuel quality and vehicle performance, and the American Society for Testing and Materials (ASTM) had not yet finalized quality standards for oxygenated (which includes alcohol-containing) fuels. While many argued that weights and measures officials should not cross the line from quantity assurance programs to programs regulating quality, the delegates were persuaded that the issue needed immediate attention.

A Motor Fuels Task Force was appointed in 1984 to develop mechanisms for achieving uniformity in the evaluation and regulation of motor fuels. The Task Force developed the Uniform Motor Fuel Inspection Law (see the Uniform Laws section of this Handbook) and the Uniform Motor Fuel Regulation to accompany the Law. The recommended Law required registration and certification of motor fuel as meeting ASTM standards. The regulation defined the ASTM standards to be applied to motor fuel.

In 1992 the NCWM established the Petroleum Subcommittee under the Laws and Regulations Committee. The subcommittee recommended major revisions to the Regulation that was adopted at the 80th NCWM in 1995. The scope of the regulation was expanded to include all engine fuels, petroleum products, and automotive lubricants; its title was changed accordingly; and the fuel specifications and method of sale sections were revised to address the additional products. Other changes included expansion of the definitions section and addition of sections on retail storage tanks, condemned product, registration of engine fuels designed for special use, and test methods and reproducibility limits.

2. Status of Promulgation

The Uniform Regulation for Engine Fuels, Petroleum Products, and Automotive Lubricants was adopted by the Conference in 1995. The status of State actions with respect to this Regulation is shown in the table beginning on page 8.

* *The National Conference on Weights and Measures is supported by the National Institute of Standards and Technology in partial implementation of its statutory responsibility for "cooperation with the States in securing uniformity in weights and measures laws and methods of inspection."*

Table of Contents

Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation

Section 1. Definitions

1.1. ASTM. - ~~**The American Society for Testing and Materials**~~ **ASTM International** means the **inter**national voluntary consensus standards organization formed for the development of standards on characteristics and performance of materials, products, systems, and services, and the promotion of related knowledge.

1.2. Antiknock Index (AKI). - AKI means the arithmetic average of the Research Octane Number (RON) and Motor Octane Number (MON): AKI = (RON+MON)/2. This value is called by a variety of names, in addition to antiknock index, including: octane rating, posted octane, (R+M)/2 octane.

1.3. Automatic Transmission Fluid. - Automatic Transmission Fluid means a product intended for use in a passenger vehicle, other than a bus, as either a lubricant, coolant, or liquid medium in any type of fluid automatic transmission, that contains a torque converter. For the purposes of this regulation, fluids intended for use in continuously variable transmissions are not considered "Automatic Transmission Fluid."

~~**1.3.**~~**1.4. Automotive Fuel Rating.** - Automotive Fuel Rating means the automotive fuel rating required under the amended Octane Certification and Posting Rule (or as amended, the Fuel Rating Rule), 16 CFR Part 306. Under this rule, sellers of liquid automotive fuels, including alternative fuels, must determine, certify, and post an appropriate automotive fuel rating. The automotive fuel rating for gasoline is the antiknock index (octane rating). The automotive fuel rating for alternative liquid fuels consists of the common name of the fuel, along with a disclosure of the amount, expressed as a minimum percentage by volume of the principal component of the fuel. For alternative liquid automotive fuels, a disclosure of other components, expressed as a minimum percentage by volume, may be included, if desired.

~~**1.4.**~~**1.5. Automotive Gasoline, Automotive Gasoline-Oxygenate Blend.** - Automotive Gasoline, Automotive Gasoline-Oxygenate Blend means a type of fuel suitable for use in spark-ignition automobile engines and also commonly used in marine and non-automotive applications.

~~**1.5.**~~**1.6. Aviation Gasoline.** - Aviation Gasoline means a type of gasoline suitable for use as a fuel in an aviation spark-ignition internal combustion engine.

~~**1.6.**~~**1.7. Aviation Turbine Fuel.** - Aviation Turbine Fuel means a refined middle distillate suitable for use as a fuel in an aviation gas turbine internal combustion engine.

~~**1.7.**~~**1.8. Base Gasoline.** - Base Gasoline means all components other than ethanol in a blend of gasoline and ethanol.

~~**1.8.**~~**1.9. Biodiesel.** - Biodiesel means a blend consisting of diesel fuel and a substantial amount of esterified animal fats and/or vegetable oil(s).

~~**1.9.**~~**1.10. Cetane Index.** - Cetane Index means an approximation of the cetane number of distillate diesel fuel, which does not contain a cetane improver additive, calculated from the density and distillation measurements.

~~**1.10.**~~**1.11. Cetane Number.** - Cetane Number means a numerical measure of the ignition performance of a diesel fuel obtained by comparing it to reference fuels in a standardized engine test.

~~**1.11.**~~**1.12. Compressed Natural Gas (CNG).** - CNG means natural gas which has been compressed and dispensed into fuel storage containers and is suitable for use as an engine fuel.

~~**1.12.**~~**1.13. Denatured Fuel Ethanol.** - Denatured Fuel Ethanol means "ethanol" as defined in § 1.19. below.

~~1.13.~~1.14. Diesel Fuel. - Diesel Fuel means a refined middle distillate suitable for use as a fuel in a compression-ignition (diesel) internal combustion engine.

~~1.14.~~1.15. Distillate. - Distillate means any product obtained by condensing the vapors given off by boiling petroleum or its products.

~~1.15.~~1.16. EPA. - EPA means the United States Environmental Protection Agency.

~~1.16.~~1.17. E85 Fuel Ethanol. - E85 Fuel Ethanol means a blend of ethanol and hydrocarbons of which the ethanol portion is nominally 85 to 75 volume percent denatured fuel ethanol.

~~1.17.~~1.18. Engine Fuel. - Engine Fuel means any liquid or gaseous matter used for the generation of power in an internal combustion engine.

~~1.18.~~1.19. Engine Fuels Designed for Special Use. - Engine Fuels Designed for Special Use means engine fuels designated by the Director as requiring registration. These fuels normally do not have ASTM or other national consensus standards applying to their quality or usability; common special fuels are racing fuels and those intended for agricultural and other off-road applications.

~~1.19.~~1.20. Ethanol. - Ethanol also known as "Denatured Fuel Ethanol," means nominally anhydrous ethyl alcohol meeting ASTM D 4806 standards. It is intended to be blended with gasoline for use as a fuel in a spark-ignition internal combustion engine. The denatured fuel ethanol is first made unfit for drinking by the addition of Bureau of Alcohol, Tobacco, and Firearms (BATF) approved substances before blending with gasoline.

~~1.20.~~1.21. Fuel Oil. - Fuel Oil means a refined oil middle distillates, heavy distillates, or residues of refining, or blends of these, suitable for use as a fuel for heating or power generation, the classification of which shall be defined by ASTM D 396.

~~1.21.~~1.22. Gasoline. - Gasoline means a volatile mixture of liquid hydrocarbons generally containing small amounts of additives suitable for use as a fuel in a spark-ignition internal combustion engine.

~~1.22.~~1.23. Gasoline-Alcohol Blend. - Gasoline-Alcohol Blend means a fuel consisting primarily of gasoline and a substantial amount (more than 0.35 mass percent of oxygen, or more than 0.15 mass percent of oxygen if methanol is the only oxygenate) of one or more alcohols.

~~1.23.~~1.24. Gasoline Gallon Equivalent (GGE). - GGE means 2.567 kg (5.660 lb) of natural gas.

~~1.24.~~1.25. Gasoline Liter Equivalent (GLE). - GLE means 0.678 kg (1.495 lb) of natural gas.

~~1.25.~~1.26. Gasoline-Oxygenate Blend. - Gasoline-Oxygenate Blend means a fuel consisting primarily of gasoline along with a substantial amount (more than 0.35 mass percent of oxygen, or more than 0.15 mass of oxygen if methanol is the only oxygenate) of one or more oxygenates.

1.27. Gear Oil. - Gear Oil means an oil used to lubricate gears, axles, or some manual transmissions.

~~1.26.~~1.28. Kerosene. - Kerosene (or "Kerosine") means a refined middle distillate suitable for use as a fuel for heating or illuminating, the classification of which shall be defined by ASTM D 3699.

~~1.27.~~1.29. Lead Substitute. - Lead Substitute means an EPA-registered gasoline additive suitable, when added in small amounts to fuel, to reduce or prevent exhaust valve recession (or seat wear) in automotive spark-ignition internal combustion engines designed to operate on leaded fuel.

~~1.28.~~1.30. Lead Substitute Engine Fuel. - Lead Substitute Engine Fuel means, for labeling purposes, a gasoline or gasoline-oxygenate blend that contains a "lead substitute."

~~1.29.~~1.31. Leaded. - Leaded means, for labeling purposes, any gasoline or gasoline-oxygenate blend which contains more than 0.013 g of lead per liter (0.05 g lead per U.S. gal). NOTE: EPA defines leaded fuel as one which contains more than 0.0013 g of phosphorus per liter (0.005 g per U.S. gal), or any fuel to which lead or phosphorus is intentionally added.

~~1.30.~~1.32. Liquefied Natural Gas (LNG). - LNG means natural gas that has been liquefied at -126.1 EC (-259 EF) and stored in insulated cryogenic tanks for use as an engine fuel.

~~1.31.~~1.33. Liquefied Petroleum Gas (LPG). - LPG means a mixture of normally gaseous hydrocarbons, predominantly propane, or butane, or both, that has been liquefied by compression or cooling, or both to facilitate storage, transport, and handling.

~~1.32.~~1.34. Low Sulfur. - Low Sulfur means low sulfur diesel fuel that meets ASTM D 975 (e.g., Grade Low Sulfur No. 1-D or Grade Low Sulfur No. 2-D) standards. Diesel fuel containing higher amounts of sulfur for off-road use is defined by EPA regulations.

~~1.33.~~1.35. Low Temperature Operability. - Low Temperature Operability means a condition which allows the uninterrupted operation of a diesel engine through the continuous flow of fuel throughout its fuel delivery system at low temperatures. Fuels with adequate low temperature operability characteristics have the ability to avoid wax precipitation and clogging in fuel filters.
(Added 1998)(Amended 1999)

~~1.34.~~1.36. Lubricity. - Lubricity a qualitative term describing the ability of a fluid to affect friction between, and wear to, surfaces in relative motion under load. (Added 2003)

~~1.35.~~1.37. M100 Fuel Methanol. - M100 Fuel Methanol means nominally anhydrous methyl alcohol, generally containing small amounts of additives, suitable for use as a fuel in a compression-ignition internal combustion engine.

~~1.36.~~1.38. M85 Fuel Methanol. - M85 Fuel Methanol means a blend of methanol and hydrocarbons of which the methanol portion is nominally 70 to 85 volume percent.

~~1.37.~~1.39. Motor Octane Number. - Motor Octane Number means a numerical indication of a spark-ignition engine fuel's resistance to knock obtained by comparison with reference fuels in a standardized ASTM D 2700 Motor Method engine test.

1.40. Motor Oil. - Motor Oil is an oil that reduces friction and wear between the moving parts within a reciprocating internal combustion engine and also serves as a coolant. For the purposes of this regulation, “vehicle motor oil” refers to a motor oil which is intended for use in light-to-heavy duty vehicles comprising cars, sport utility vehicles, vans, trucks, buses, and off-road farming and construction equipment. For the purposes of this regulation, “recreational motor oil” refers to a motor oil which is intended for use in four-stroke cycle engines used in motorcycles, ATVs, and lawn and garden equipment. For the purposes of this regulation motor oil also means engine oil.

1.41. Oil. - Oil means motor oil, engine oil, and/or gear oil.

~~1.38.~~1.42. Oxygen Content of Gasoline. - Oxygen Content of Gasoline means the percentage of oxygen by mass contained in a gasoline.

~~1.39.~~1.43. Oxygenate. - Oxygenate means an oxygen-containing, ashless, organic compound, such as an alcohol or ether, which can be used as a fuel or fuel supplement.

~~1.40.~~1.44. Reformulated Gasoline. - Reformulated Gasoline means a volatile mixture of liquid hydrocarbons and oxygenates meeting the reformulated gasoline requirements of the Clean Air Act Amendments of 1990 and suitable for use as a fuel in a spark-ignition internal combustion engine.

~~1.41.~~1.45. **Research Octane Number.** - Research Octane Number means a numerical indication of a spark-ignition engine fuel's resistance to knock obtained by comparison with reference fuels in a standardized ASTM D 2699 Research Method Engine Test.

~~1.42.~~1.46. **SAE.** - **SAE** means the Society of Automotive Engineers, a technical organization for engineers, scientists, technicians, and others in positions that cooperate closely in the engineering, design, manufacture, use, and maintainability of self-propelled vehicles.

~~1.43.~~1.47. **Substantially Similar.** - Substantially Similar means the EPA's "Substantially Similar" rule, Section 211 (f) (1) of the Clean Air Act [42 U.S.C. 7545 (f) (1)].

~~1.44.~~1.48. **Thermal Stability.** - Thermal Stability means the ability of a fuel to resist the thermal stress which is experienced by the fuel when exposed to high temperatures in a fuel delivery system. Such stress can lead to formation of insoluble gums or organic particulates. Insolubles (e.g., gums or organic particulates) can clog fuel filters and contribute to injector deposits.
(Added 1998)(Amended 1999)

~~1.45.~~1.49. **Total Alcohol.** - Total Alcohol means the aggregate total in volume percent of all alcohol contained in any fuel defined in this Chapter.

~~1.46.~~1.50. **Total Oxygenate.** - Total Oxygenate means the aggregate total in volume percent of all oxygenates contained in any fuel defined in this Chapter.

~~1.47.~~1.51. **Unleaded.** - Unleaded in conjunction with "engine fuel" or "gasoline" means any gasoline or gasoline-oxygenate blend to which no lead or phosphorus compounds have been intentionally added and which contains not more than 0.013 gram of lead per liter (0.05 g lead per U.S. gal) and not more than 0.0013 gram of phosphorus per liter (0.005 g phosphorus per U.S. gal).

~~1.48.~~1.52. **Wholesale Purchaser Consumer.** - Wholesale Purchaser Consumer means any person who is an ultimate gasoline consumer of fuel methanol, fuel ethanol, diesel fuel, biodiesel, fuel oil, kerosene, aviation turbine fuels, natural gas, compressed natural gas, or liquefied petroleum gas and who purchases or obtains the product from a supplier and receives delivery of that product into a storage tank.
(Added 1998)(Amended 1999)

Section 2. Standard Specifications

2.1. Gasoline and Gasoline-Oxygenate Blends (as defined in this regulation) shall meet the following requirements:

2.1.1. The most recent version of ASTM D 4814, "Standard Specification for Automotive Spark-Ignition Engine Fuel," except that volatility standards for unleaded gasoline blended with ethanol shall not be more restrictive than those adopted under the rules, regulations, and Clean Air Act waivers of the U.S. Environmental Protection Agency (which includes rules promulgated by the State). Gasoline blended with ethanol shall be blended under any of the following three options:

2.1.1.1. The base gasoline used in such blends shall meet the requirements of ASTM D 4814, or

2.1.1.2. The blend shall meet the requirements of ASTM D 4814, or

2.1.1.3. The base gasoline used in such blends shall meet all the requirements of ASTM D 4814 except distillation, and the blend shall meet the distillation requirements of the ASTM specification.

2.1.2. Blends of gasoline and ethanol shall not exceed the ASTM D 4814 vapor pressure standard by more than 1.0 psi.

2.1.3. Minimum Antiknock Index (AKI). - The AKI shall not be less than the AKI posted on the product dispenser or as certified on the invoice, bill of lading, shipping paper, or other documentation;

2.1.4. Minimum Motor Octane Number. - The minimum motor octane number shall not be less than 82 for gasoline with an AKI of 87 or greater;

2.1.5. Minimum Lead Content to Be Termed "Leaded". - Gasoline and gasoline-oxygenate blends sold as "leaded" shall contain a minimum of 0.013 gram of lead per liter (0.05 g per U.S. gal);

2.1.6. Lead Substitute Gasoline. - Gasoline and gasoline-oxygenate blends sold as "lead substitute" gasoline shall contain a lead substitute which provides protection against exhaust valve seat recession equivalent to at least 0.026 gram of lead per liter (0.10 g per U.S. gal).

2.1.6.1. Documentation of Exhaust Valve Seat Protection. - Upon the request of the director, the lead substitute additive manufacturer shall provide documentation to the director that demonstrates that the treatment level recommended by the additive manufacturer provides protection against exhaust valve seat recession equivalent to or better than 0.026 gram per liter (0.1 g/gal) lead. The director may review the documentation and approve the lead substitute additive before such additive is blended into gasoline. This documentation shall consist of:

2.1.6.1.1. Test results as published in the Federal Register by the EPA Administrator as required in Section 211(f)(2) of the Clean Air Act; or

2.1.6.1.2. Until such time as the EPA Administrator develops and publishes a test procedure to determine the additive's effectiveness in reducing valve seat wear, test results and description of the test procedures used in comparing the effectiveness of 0.026 gram per liter lead and the recommended treatment level of the lead substitute additive shall be provided.

2.1.7. Blending. - Leaded, lead substitute, and unleaded gasoline-oxygenate blends shall be blended according to the EPA "substantially similar" rule or an EPA waiver for unleaded fuel.

2.2. Diesel Fuel shall meet the most recent version of ASTM D 975, "Standard Specification for Diesel Fuel Oils."

2.2.1. Premium Diesel Fuel. - All diesel fuels identified on retail dispensers, bills of lading, invoices, shipping papers, or other documentation with terms such as premium, super, supreme, plus, or premier must conform to the following requirements:

(a) Cetane Number. - A minimum cetane number of 47.0 as determined by ASTM Standard Test Method D 613.

(b) Low Temperature Operability. - A cold flow performance measurement which meets the ASTM D 975 tenth percentile minimum ambient air temperature charts and maps by either ASTM Standard Test Method D 2500 (Cloud Point) or ASTM Standard Test Method D 4539 (Low Temperature Flow Test, LTFT). Low temperature operability is only applicable October 1 - March 31 of each year.

(c) Thermal Stability. - A minimum reflectance measurement of 80 % as determined by ASTM Standard Test Method D 6468 (180 minutes, 150 °C).

(d) Lubricity. - A maximum wear scar diameter of 520 microns as determined by ASTM D 6079. If an enforcement jurisdiction’s single test of more than 560 microns is determined, a second test shall be conducted. If the average of the two tests is more than 560 microns, the sample does not conform to the requirements of this part.

(Amended 2003)

2.3. Aviation Turbine Fuels shall meet the most recent version of ASTM D 1655, "Standard Specification for Aviation Turbine Fuels."

2.4. Aviation Gasoline shall meet the most recent version of ASTM D 910, "Standard Specification for Aviation Gasoline."

2.5. Fuel Oils shall meet the most recent version of ASTM D 396, "Standard Specification for Fuel Oils."

2.6. Kerosene (Kerosine) shall meet the most recent version of ASTM D 3699, "Standard Specification for Kerosine."

2.7. Ethanol intended for blending with gasoline shall meet the most recent version of ASTM D 4806, "Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel."

2.8. Liquefied Petroleum (LP) Gases shall meet ASTM D 1835, "Standard Specification for Liquefied Petroleum (LP) Gases."

Note: Also reference Gas Processors Association 2140, "Liquefied Petroleum Gas Specification and Test Methods."

2.9. Compressed Natural Gas (CNG) shall meet the most recent version of SAE J 1616, "Recommended Practice for Compressed Natural Gas Vehicle Fuel."

2.10. E85 Fuel Ethanol shall meet the most recent version of ASTM D 5798, "Standard Specification for Fuel Ethanol (Ed75-Ed85) for Automotive Spark-Ignition Engines."
(Added 1997)

2.11. M85 Fuel Methanol shall meet the most recent version of ASTM D 5797, "Standard Specification for Fuel Methanol M70-M85 for Automotive Spark Ignition Engines."
(Added 1997)

2.12. Motor Oil shall not be sold or distributed for use unless the product conforms to the following specifications:

(a) Performance claims listed on the label shall be evaluated against SAE J183, API 1509 Engine Oil Licensing and Certification System, or other industry standards as applicable.

(b) It shall meet its labeled viscosity grade specification as specified in the latest published version of SAE J300.

(c) Any engine oil that is represented as "energy conserving" shall meet the requirements established by the latest revision of SAE J1423.

2.13. Products for Use in Lubricating Manual Transmission, Gears, or Axles shall not be sold or distributed for use in lubricating manual transmissions, gears, or axles unless the product conforms to the following specifications:

(a) It is labeled with one or more of the service designations found in the latest revision of the SAE Information Report on axle and manual transmission lubricants SAE J308 and API Publication 1560, or other industry standards as appropriate, and meets all applicable requirements of those designations.

(b) The product shall meet its labeled viscosity grade classification as specified in the latest published version of SAE J306 or SAE J300, as applicable.

(c) It shall be free from water and suspended matter when tested by means of centrifuge, in accordance with the standard test ASTM D 2273.

2.14. Products for Use in Lubricating Automatic Transmissions. - Any automatic transmission fluid sold without limitation as to type of transmission for which it is intended, shall meet all automotive manufacturers' recommended requirements for transmissions in general use in the state. Automatic transmission fluids that are intended for use only in certain transmissions, as disclosed on the label of its container, shall meet the latest automotive manufacturers' recommended requirements for those transmissions. Adherence to automotive manufacturers recommended requirements shall be based on test currently available to the lubricants industry and the state regulatory agency.

Any material offered for sale or sold as an additive to automatic transmission fluids shall be compatible with the automatic transmission fluid to which it is added, and shall meet all performance claims as stated on the label. Any manufacturer of any such product sold in this state shall provide, upon request by a duly authorized representative of the Director, documentation of any claims made on their product label.

Section 3. Classification and Method of Sale of Petroleum Products

3.1. General Considerations.

3.1.1. Documentation. - When gasoline, gasoline-oxygenate blends, reformulated gasoline, M85 and M100 fuel methanol, E85 and E100 fuel ethanol, liquefied petroleum (LP) gases, compressed natural gas, liquefied natural gas, biodiesel, diesel fuel, kerosene, aviation gasoline, aviation turbine fuels, or fuel oils are sold, an invoice, bill of lading, shipping paper or other documentation must accompany each delivery other than a retail sale. This document must identify the quantity, the name of the product, the particular grade of the product, the applicable automotive fuel rating, and oxygenate type and content (if applicable), the name and address of the seller and buyer, and the date and time of the sale. Documentation must be retained at the retail establishment for a period not less than one year.

3.1.2. Retail Dispenser Labeling. - All retail dispensing devices must identify conspicuously the type of product, the particular grade of the product, and the applicable automotive fuel rating.

3.1.3. Grade Name. - The sale of any product under any grade name that indicates to the purchaser that it is of a certain automotive fuel rating or ASTM grade shall not be permitted unless the automotive fuel rating or grade indicated in the grade name is consistent with the value and meets the requirements of Section 2, Standard Fuel Specifications.

3.2. Automotive Gasoline and Automotive Gasoline-Oxygenate Blends.

3.2.1. Posting of Antiknock Index Required. - All automotive gasoline and automotive gasoline-oxygenate blends shall post the antiknock index in accordance with applicable regulations, 16 CFR Part 306 issued pursuant to the Petroleum Marketing Practices Act, as amended.

3.2.2. When the Term "Leaded" may be Used. - The term "leaded" shall only be used when the fuel meets specification requirements of paragraph 2.1.5.

3.2.3. Use of Lead Substitute must be Disclosed. - Each dispensing device from which gasoline or gasoline-oxygenate blends containing a lead substitute is dispensed shall display the following legend: "Contains Lead Substitute." The lettering of this legend shall not be less than 12 mm (1/2 in) in height and the color of the lettering shall be in definite contrast to the background color to which it is applied.

3.2.4. Nozzle Requirements for Leaded Fuel. - Each dispensing device from which gasoline or gasoline-oxygenate blends that contain lead in amounts sufficient to be considered "leaded" gasoline, or lead substitute engine fuel, is sold shall be equipped with a nozzle spout having a terminal end with an outside diameter of not less than 23.63 mm (0.930 in).

3.2.5. Prohibition of Terms. - It is prohibited to use specific terms to describe a grade of gasoline or gasoline-oxygenate blend unless it meets the minimum antiknock index requirement shown in Table 1.

3.2.6. Method of Retail Sale - Type of Oxygenate must be Disclosed. - All automotive gasoline or automotive gasoline-oxygenate blends kept, offered, or exposed for sale, or sold at retail containing at least 1.5 mass percent oxygen shall be identified as "with" or "containing" (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read "contains ethanol" or "with MTBE." The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains MTBE or other ethers." In addition, gasoline-methanol blend fuels containing more than 0.15 mass percent oxygen from methanol shall be identified as "with" or "containing" methanol. This information shall be posted on the upper 50 % of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (½ in) in height, 1.5 mm (1/16 in) stroke (width of type).
(Amended 1996)

3.2.7. Documentation for Dispenser Labeling Purposes. - The retailer shall be provided, at the time of delivery of the fuel, on an invoice, bill of lading, shipping paper, or other documentation, a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygen content of at least 1.5 mass percent in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or, alternatively, use the phrase "contains MTBE or other ethers." In addition, any gasoline containing more than 0.15 mass percent oxygen from methanol shall be identified as "with" or "containing" methanol. This documentation is only for dispenser labeling purposes; it is the responsibility of any potential blender to determine the total oxygen content of the engine fuel before blending. (Amended 1996)

3.3. Diesel Fuel.

3.3.1. Labeling of Grade Required. - Diesel Fuel shall be identified by grades No. 1-D, No. 1-D (low sulfur), No. 2-D, No. 2-D (low sulfur), or No. 4-D. Each retail dispenser of diesel fuel shall be labeled according to the grade being dispensed except the words "low sulfur" are not required.

3.3.2. Location of Label. - These labels shall be located on the upper 50 % of the dispenser front panel in a position clear and conspicuous from the driver's position, in a type at least 12 mm (1/2 in) in height, 1.5 mm (1/16 in) stroke (width of type).

3.3.3. Delivery Documentation. - Before or at the time of delivery of premium diesel fuel, the retailer or the wholesale purchaser-consumer shall be provided on an invoice, bill of lading, shipping paper, or other documentation a declaration of all performance properties that qualifies the fuel as premium diesel fuel as required in § 2.2.1.
(Added 1998; Amended 1999)

Table 1. Minimum Antiknock Index Requirements

Term	Minimum Antiknock Index	
	ASTM D 4814 Altitude Reduction Areas IV and V	All Other ASTM D 4814 Areas
Premium, Super, Supreme, High Test	90	91
Midgrade, Plus	87	89
Regular Leaded	86	88
Regular, Unleaded (alone)	85	87
Economy	--	86

(Table Amended 1997)

3.4. Aviation Turbine Fuels.

3.4.1. Labeling of Grade Required. - Aviation turbine fuels shall be identified by Jet A, Jet A-1, or Jet B.

3.4.2. NFPA Labeling Requirements also Apply. - Each dispenser or airport fuel truck dispensing aviation turbine fuels shall be labeled in accordance with the most recent edition of National Fire Protection Association NFPA 407, "Standard for Aircraft Fuel Servicing." NFPA 407, 1990 Edition: Section 2-3.18 Product Identification Signs. Each aircraft fuel servicing vehicle shall have a sign on each side and the rear to indicate the product. The sign shall have letters at least 3 inches (75 mm) high of color sharply contrasting with its background for visibility. It shall show the word "FLAMMABLE" and the name of the product carried, such as "JET A," "JET B," "GASOLINE," or "AVGAS." (NOTE: Refer to the most recent edition.)

3.5. Aviation Gasoline.

3.5.1. Labeling of Grade Required. - Aviation gasoline shall be identified by Grade 80, Grade 100, or Grade 100LL.

3.5.2. NFPA Labeling Requirements also Apply. - Each dispenser or airport fuel truck dispensing aviation gasoline shall be labeled in accordance with the most recent edition of National Fire Protection Association (NFPA) 407, "Standard for Aircraft Fuel Servicing." NFPA 407, 1990 Edition: Section 2-3.18 Product Identification Signs. Each aircraft fuel servicing vehicle shall have a sign on each side and the rear to indicate the product. The sign shall have letters at least 3 inches (75 mm) high of color sharply contrasting with its background for visibility. It shall show the word "FLAMMABLE" and the name of the product carried, such as "JET A," "JET B," "GASOLINE," or "AVGAS." (NOTE: Refer to the most recent edition.)

3.6. Fuel Oils.

3.6.1. Labeling of Grade Required. - Fuel Oil shall be identified by the grades of No. 1, No. 2, No. 4 (Light), No. 4, No. 5 (Light), No. 5 (Heavy), or No. 6.

3.7. Kerosene (Kerosine).

3.7.1. Labeling of Grade Required. - Kerosene shall be identified by the grades No. 1-K or No. 2-K.

3.7.2. Additional Labeling Requirements. - Each retail dispenser of kerosene shall be labeled as 1-K Kerosene or 2-K. In addition, No. 2-K dispensers shall display the following legend:

"Warning - Not Suitable For Use In Unvented Heaters Requiring No. 1-K."

The lettering of this legend shall not be less than 12 mm (1/16 in) in height by 1.5 mm (1/16 in) stroke; block style letters and the color of lettering shall be in definite contrast to the background color to which it is applied.

3.8. Fuel Ethanol.

3.8.1. How to Identify Fuel Ethanol. - Fuel ethanol shall be identified by the capital letter E followed by the numerical value volume percentage. (Example: E85)

3.8.2. Retail Dispenser Labeling. - Each retail dispenser of fuel ethanol shall be labeled with the capital letter E followed by the numerical value volume percent denatured ethanol and ending with the word "ethanol." (Example: E85 Ethanol)

3.8.3. Additional Labeling Requirements. - Fuel ethanol shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.9. Fuel Methanol.

3.9.1. How Fuel Methanol is to be Identified. - Fuel methanol shall be identified by the capital letter M followed by the numerical value volume percentage of methanol. (Example: M85)

3.9.2. Retail Dispenser Labeling. - Each retail dispenser of fuel methanol shall be labeled by the capital letter M followed by the numerical value volume percent and ending with the word "methanol." (Example: M85 Methanol)

3.9.3. Additional Labeling Requirements. - Fuel methanol shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.10. Liquefied Petroleum (LP) Gas.

3.10.1. How LPG is to be Identified. - Liquefied petroleum gases shall be identified by grades Commercial Propane, Commercial Butane, Commercial PB Mixtures or Special-Duty Propane (HD5).

3.10.2. Retail Dispenser Labeling. - Each retail dispenser of liquefied petroleum gases shall be labeled as "Commercial Propane," "Commercial Butane," "Commercial PB Mixtures," or "Special-Duty Propane (HD5)."

3.10.3. Additional Labeling Requirements. - Liquefied petroleum gas shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.10.4. NFPA Labeling Requirements also apply. (Refer to the most recent edition of NFPA 58.)

3.11. Compressed Natural Gas.

3.11.1. How Compressed Natural Gas is to be Identified. - For the purposes of this regulation, compressed natural gas shall be identified by the term "Compressed Natural Gas" or "CNG."

3.11.2. Retail Sales of Compressed Natural Gas Sold as a Vehicle Fuel.

3.11.2.1. Method of Retail Sale. - All compressed natural gas kept, offered, or exposed for sale or sold at retail as a vehicle fuel shall be in terms of the gasoline liter equivalent (GLE) or gasoline gallon equivalent (GGE).

3.11.2.2. Retail Dispenser Labeling.

3.11.2.2.1. Identification of Product. - Each retail dispenser of compressed natural gas shall be labeled as "Compressed Natural Gas."

3.11.2.2.2. Conversion Factor. - All retail compressed natural gas dispensers shall be labeled with the conversion factor in terms of kilograms or pounds. The label shall be permanently and conspicuously displayed on the face of the dispenser and shall have either the statement "1 Gasoline Liter Equivalent (GLE) is equal to 0.678 kg of Natural Gas" or "1 Gasoline Gallon Equivalent (GGE) is equal to 5.660 lb of Natural Gas" consistent with the method of sale used.

3.11.2.2.3. Pressure. - CNG is dispensed into vehicle fuel containers with working pressures of 16 574 kPa, 20 684 kPa, or 24 821 kPa. The dispenser shall be labeled 16 574 kPa, 20 684 kPa, or 24 821 kPa corresponding to the pressure of the CNG dispensed by each fueling hose.

3.11.2.2.4. NFPA Labeling. - NFPA Labeling requirements also apply. (Refer to NFPA 52.)

3.11.3. Nozzle Requirements for CNG. - CNG fueling nozzles shall comply with ANSI/AGA/CGA NGV 1.

3.12. Liquefied Natural Gas.

3.12.1. How Liquefied Natural Gas is to be Identified. - For the purposes of this regulation, liquefied natural gas shall be identified by the term "Liquefied Natural Gas" or "LNG."

3.12.2. Labeling of Retail Dispensers of Liquefied Natural Gas Sold as a Vehicle Fuel.

3.12.2.1. Identification of Product. - Each retail dispenser of liquefied natural gas shall be labeled as "Liquefied Natural Gas."

3.12.2.2. Automotive Fuel Rating. - LNG automotive fuel shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.12.2.3. NFPA Labeling. - NFPA Labeling requirements also apply. (Refer to NFPA 57.)

<u>3.13. Oil. - Each label for recreational motor oil and vehicle motor oil shall contain the viscosity grade classification preceded by the letters “SAE” in accordance with the SAE International’s latest version of SAE J300, and its intended use.</u>

Each label for gear oil shall contain the viscosity grade classification preceded by the letters “SAE” in accordance with the SAE International’s latest version of SAE J306 or SAE J300. (Exception: Some automotive equipment manufacturers may not necessarily specify an “SAE” viscosity grade requirement for some applications. Gear oils intended to be used only in such applications are not required to contain an “SAE Viscosity Grade” on their labels.)

<u>The label on each container of vehicle motor oil shall contain the engine service categories met in letters not less than one-eighth inch (3.18 mm) in height, as defined by the latest version of SAE J183 or API Publication 1509, Engine Oil Licensing and Certification System.</u>

<u>The label on each container of gear oil shall contain the service categories met in letters not less than one-eighth inch (3.18 mm) in height, as defined by the latest version of SAE J308.</u>

<u>Each container of engine vehicle motor oil with a volume of one gallon or less that does not meet an active service category, as defined by the latest version of SAE J183, shall bear a plainly visible cautionary statement in compliance with SAE J183, Appendix A, for obsolete API oil categories.</u>

<u>3.14. Automatic Transmission Fluid. - Automatic transmission fluid shall be deemed to be mislabeled if any of the following occurs:</u>

<u>(a) The container does not bear a label on which is printed the brand name, the name and place of business of the manufacturer, packer, seller, or distributor, the words “Automatic Transmission Fluid,” and the duty type of classification.</u>

<u>(b) The container does not bear a label on which is printed an accurate statement of the quantity of the contents in terms of liquid measure.</u>

<u>(c) The labeling on the container is false or misleading.</u>

3.14.1. Documentation of Claims Made Upon Products’ Label. - Any manufacturer or packager of any product subject to this article and sold in this State shall provide, upon request to duly authorized representatives of the Director, documentation of any claim made upon their products’ label.

Section 4. Retail Storage Tanks

4.1. Water in Gasoline-Alcohol Blends, Aviation Gas, and Aviation Turbine Fuel. - No water phase greater than 6 mm (1/4 in) as determined by an appropriate detection paste, is allowed to accumulate in any tank utilized in the storage of gasoline-alcohol blend, aviation gasoline, and aviation turbine fuel.

4.2. Water in Gasoline, Diesel, Gasoline-Ether, and Other Fuels. - Water shall not exceed 50 mm (2 in) in depth when measured with water indicating paste in any tank utilized in the storage of biodiesel, diesel, gasoline, gasoline-ether blends, and kerosene sold at retail except as required in § 4.1.

4.3. Product Storage Identification.

4.3.1. Fill Connection Labeling. - The fill connection for any petroleum product storage tank or vessel supplying engine-fuel devices shall be permanently, plainly, and visibly marked as to the product contained.

4.3.2. Declaration of Meaning of Color Code. - When the fill connection device is marked by means of a color code, the color code shall be conspicuously displayed at the place of business.

4.4. Volume of Product Information. - Each retail location shall maintain on file a calibration chart or other means of determining the volume of each regulated product in each storage tank and the total capacity of such storage tank(s). This information shall be supplied immediately to the Director.

Section 5. Condemned Product

5.1. Stop-Sale Order at Retail. - A stop-sale order may be issued to retail establishment dealers for fuels failing to meet specifications or when a condition exists that causes product degradation. A release from a stop-sale order will be awarded only after final disposition has been agreed upon by the Director. Confirmation of disposition shall be submitted in writing on form(s) provided by the Director and contain an explanation for the fuel's failure to meet specifications. Upon discovery of fuels failing to meet specifications, meter readings and physical inventory shall be taken and reported in confirmation for disposition. Specific variations or exemptions may be made for fuels designed for special equipment or services and for which it can be demonstrated that the distribution will be restricted to those uses.

5.2. Stop-Sale Order at Terminal or Bulk Plant Facility. - A stop-sale order may be issued when products maintained at terminals or bulk plant facilities fail to meet specifications or when a condition exists that may cause product degradation. The terminal or bulk storage plant shall immediately notify all customers that received those product(s) and make any arrangements necessary to replace or adjust to specifications those product(s). A release from a stop-sale order will be awarded only after final disposition has been agreed upon by the Director. Confirmation of disposition of products shall be made available in writing to the Director. Specific variations or exemptions may be made for fuels used for blending purposes or designed for special equipment or services and for which it can be demonstrated that the distribution will be restricted to those uses.

Section 6. Product Registration

6.1. Engine Fuels Designed for Special Use. - All engine fuels designed for special use that do not meet ASTM specifications or standards addressed in Section 2 shall be registered with the Director on forms prescribed by the Director 30 days prior to when the registrant wishes to engage in sales. The registration form shall include all of the following information:

6.1.1. Identity. - Business name and address(es).

6.1.2. Address. - Mailing address if different than business address.

6.1.3. Business Type. - Type of ownership of the distributor or retail dealer, such as an individual, partnership, association, trust, corporation, or any other legal entity or combination thereof.

6.1.4. Signature. - An authorized signature, title, and date for each registration.

6.1.5. Product Description. - Product brand name and product description.

6.1.6. Product Specification. - A product specification sheet shall be attached.

6.2. Renewal. - Registration is subject to annual renewal.

6.3. Re-registration. - Re-registration is required 30 days prior to any changes in Section 6.1.

6.4. Authority to Deny Registration. - The Director may decline to register any product that actually or by implication would deceive or tend to deceive a purchaser as to the identity or the quality of the engine fuel.

6.5. Transferability. - The registration is not transferable.

Section 7. Test Methods and Reproducibility Limits

7.1. ASTM Standard Test Methods. - ASTM Standard Test Methods referenced for use within the applicable Standard Specification shall be used to determine the specification values for enforcement purposes.

7.1.1. Premium Diesel. - The following test methods shall be used to determine compliance with the premium diesel parameters:

(a) Cetane Number - ASTM D 613

(b) Low Temperature Operability - ASTM D 4539 or ASTM D 2500 (according to marketing claim)

(c) Thermal Stability - ASTM D 6468 (180 minutes, 150 °C)

(d) Lubricity - ASTM D 6079

(Amended 2003)

7.2. Reproducibility Limits.

7.2.1. AKI Limits. - When determining the antiknock index (AKI) acceptance or rejection of a gasoline sample, the AKI reproducibility limits as outlined in ASTM D 4814 Appendix X1 shall be acknowledged for enforcement purposes.

7.2.2. Reproducibility. - The reproducibility limits of the ASTM standard test method used for each test performed shall be acknowledged for enforcement purposes, except as indicated in § 7.2.1.

7.2.3. Dispute Resolution. - In the event of a dispute over a reported test value, the guidelines presented in the most recent version of ASTM D 3244, "Standard Practice for Utilization of Test Data to Determine Conformance with Specifications," shall be used to determine the acceptance or rejection of the sample.

Appendix B

Recommendation for 260-1
NIST Handbook 133: Edit Appendix A. Tables 2-5, 2-6, 2-8, and 2-10

Table 2-5. Maximum Allowable Variations (MAVs) for Packages Labeled by Weight Do Not Use This Table for Meat and Poultry Products Subject to USDA Regulations – Use Table 2-9. For Polyethylene Sheeting and Film, see Table 2-10. Exceptions to the MAVs	
Labeled Quantity	**Maximum Allowable Variations**
Less than 36 g, 0.08 lb, or 1.28 oz	10 % of labeled quantity
36 g or more to 54 g **0.08 lb or more to 0.12 lb** 1.28 oz or more to 1.92 oz	3.6 g **0.008 lb** 1/8 oz
More than 54 g to 81 g **More than 0.12 lb to 0.18 lb** More than 1.92 oz to 2.88 oz	5.4 g **0.012 lb** 3/16 oz
More than 81 g to 117 g **More than 0.18 lb to 0.26 lb** More than 2.88 oz to 4.16 oz	7.2 g **0.016 lb** 1/4 oz
More than 117 g to 154 g **More than 0.26 lb to 0.34 lb** More than 4.16 oz to 5.44 oz	9.0 g **0.020 lb** 5/16 oz
More than 154 g to 208 g **More than 0.34 lb to 0.46 lb** More than 5.44 oz to 7.36 oz	10.8 g **0.024 lb** 3/8 oz
More than 208 g to 263 g **More than 0.46 lb to 0.58 lb** More than 7.36 oz to 9.28 oz	12.7 g **0.028 lb** 7/16 oz
More than 263 g to 317 g **More than 0.58 lb to 0.70 lb** More than 9.28 oz to 11.20 oz	14.5 g **0.032 lb** ½ oz
More than 318 g to 381 g **More than 0.70 lb to 0.84 lb** More than 11.20 oz to 13.44 oz	16.3 g **0.036 lb** 9/16 oz
More than 381 g to 426 g **More than 0.84 lb to 0.94 lb** More than 13.44 oz to 15.04 oz	18.1 g **0.040 lb** 5/8 oz
More than 426 g to 489 g **More than 0.94 lb to 1.08 lb** More than 15.04 oz to 17.28 oz	19.9 g **0.044 lb** 11/16 oz
More than 489 g to 571 g More than 1.08 lb to 1.26 lb	21.7 g 0.048 lb
More than 571 g to 635 g More than 1.26 lb to 1.40 lb	23.5 g 0.052 lb
More than 635 g to 698 g More than 1.40 lb to 1.54 lb	25.4 g 0.056 lb
More than 698 g to 771 g More than 1.54 lb to 1.70 lb	27.2 g 0.060 lb
More than 771 g to 852 g More than 1.7 lb to 1.88 lb	29.0 g 0.064 lb
More than 852 g to 970 g More than 1.88 lb to 2.14 lb	31.7 g 0.070 lb

Table 2-5. Maximum Allowable Variations (MAVs) for Packages Labeled by Weight
Do Not Use This Table for Meat and Poultry Products Subject to USDA Regulations – Use Table 2-9.
For Polyethylene Sheeting and Film, see Table 2-10. Exceptions to the MAVs

Labeled Quantity	Maximum Allowable Variations
More than 970 g to 1.12 kg More than 2.14 lb to 2.48 lb	35.3 g 0.078 lb
More than 1.12 kg to 1.25 kg More than 2.48 lb to 2.76 lb	39.0 g 0.086 lb
More than 1.25 kg to 1.45 kg More than 2.76 lb to 3.20 lb	42.6 g 0.094 lb
More than 1.45 kg to 1.76 kg More than 3.20 lb to 3.90 lb	49 g 0.11 lb
More than 1.76 kg to 2.13 kg More than 3.90 lb to 4.70 lb	54 g 0.12 lb
More than 2.13 kg to 2.63 kg More than 4.70 lb to 5.80 lb	63 g 0.14 lb
More than 2.63 kg to 3.08 kg More than 5.80 lb to 6.80 lb	68 g 0.15 lb
More than 3.08 kg to 3.58 kg More than 6.80 lb to 7.90 lb	77 g 0.17 lb
More than 3.58 kg to 4.26 kg More than 7.90 lb to 9.40 lb	86 g 0.19 lb
More than 4.26 kg to 5.30 kg More than 9.40 lb to 11.70 lb	99 g 0.22 lb
More than 5.30 kg to 6.48 kg More than 11.70 lb to 14.30 lb	113 g 0.25 lb
More than 6.48 kg to 8.02 kg More than 14.30 lb to 17.70 lb	127 g 0.28 lb
More than 8.02 kg to 10.52 kg More than 17.70 lb to 23.20 lb	140 g 0.31 lb
More than 10.52 kg to 14.33 kg More than 23.20 lb to 31.60 lb	167 g 0.37 lb
More than 14.33 kg to 19.23 kg More than 31.60 lb to 42.40 lb	199 g 0.44 lb
More than 19.23 kg to 24.67 kg More than 42.40 lb to 54.40 lb	226 g 0.50 lb
More than 24.67 kg More than 54.40 lb	2 % of labeled quantity

Table 2-6. Maximum Allowable Variations for Packages Labeled by Liquid and Dry Volume Do Not Use This Table for Meat and Poultry Products Subject to USDA Regulations - Use Table 2-9. For Mulch, see Table 2-10. Exceptions to the Maximum Allowable Variations	
Labeled Quantity	**Maximum Allowable Variations (MAVs)**
3 mL or less **0.5 fl oz or less** 0.18 in^3 or less	0.5 mL **0.02 fl oz** 0.03 in^3
More than 3 mL to 8 mL More than 0.18 in^3 to 0.49 in^3	1.0 mL 0.06 in^3
More than 8 mL to 14 mL More than 0.49 in^3 to 0.92 in^3	1.5 mL 0.09 in^3
More than 14 mL to 22 mL **More than 0.5 fl oz to 0.75 fl oz** More than 0.92 in^3 to 1.35 in^3	1.7 mL **0.06 fl oz** 0.10 in^3
More than 22 mL to 66 mL **More than 0.75 fl oz to 2.25 fl oz** More than 1.35 in^3 to 4.06 in^3	3.8 mL **0.13 fl oz** 0.23 in^3
More than 66 mL to 125 mL **More than 2.25 fl oz to 4.25 fl oz** More than 4.06 in^3 to 7.66 in^3	5.6 mL **0.19 fl oz** 0.34 in^3
More than 125 mL to 170 mL **More than 4.25 fl oz to 5.75 fl oz** More than 7.66 in^3 to 10.37 in^3	7.3 mL **0.25 fl oz** 0.45 in^3
More than 170 mL to 221 mL **More than 5.75 fl oz to 7.50 fl oz** More than 10.37 in^3 to 13.53 in^3	9.1 mL **0.31 fl oz** 0.55 in^3
More than 221 mL to 347 mL **More than 7.50 fl oz to 11.75 fl oz** More than 13.53 in^3 to 21.20 in^3	11.2 mL **0.38 fl oz** 0.68 in^3
More than 347 mL to 502 mL **More than 11.75 fl oz to 17 fl oz** More than 21.20 in^3 to 30.67 in^3	14.7 mL **0.5 fl oz** 0.90 in^3
More than 502 mL to 621 mL **More than 17 fl oz to 21 fl oz** More than 30.67 in^3 to 37.89 in^3	18.6 mL **0.63 fl oz** 1.13 in^3
More than 621 mL to 798 mL **More than 21 fl oz to 27 fl oz** More than 37.89 in^3 to 48.72 in^3	22.1 mL **0.75 fl oz** 1.35 in^3
More than 798 mL to 916 mL **More than 27 fl oz to 31 fl oz** More than 48.72 in^3 to 55.94 in^3	26.0 mL **0.88 fl oz** 1.58 in^3
More than 916 mL to 1.15 L **More than 31 fl oz to 39 fl oz** More than 55.94 in^3 to 70.38 in^3	29 mL **1 fl oz** 1.80 in^3
More than 1.15 L to 1.62 L **More than 39 fl oz to 55 fl oz** 70.38 in^3 or more to 99.25 in^3	36 mL **1.25 fl oz** 2.25 in^3
More than 1.62 L to 2.04 L **More than 55 fl oz to 69 fl oz** More than 99.25 in^3 to 124.5 in^3	44 mL **1.5 fl oz** 2.70 in^3

Table 2-6. Maximum Allowable Variations for Packages Labeled by Liquid and Dry Volume Do Not Use This Table for Meat and Poultry Products Subject to USDA Regulations - Use Table 2-9. For Mulch, see Table 2-10. Exceptions to the Maximum Allowable Variations	
Labeled Quantity	**Maximum Allowable Variations (MAVs)**
More than 2.04 L to 2.51 L **More than 69 fl oz to 85 fl oz** More than 124.5 in^3 to 153.3 in^3	51 mL **1.75 fl oz** 3.1 in^3
More than 2.51 L to 3.04 L **More than 85 fl oz to 103 fl oz** More than 153.3 in^3 to 185.8 in^3.	59 mL **2 fl oz** 3.6 in^3
More than 3.04 L to 4.73 L **More than 103 fl oz to 160 fl oz** More than 185.8 in^3 to 288.7 in^3	73 mL **2.5 fl oz** 4.5 in^3
More than 4.73 L to 5.48 L **More than 160 fl oz to 185.6 fl oz** More than 288.7 in^3 to 334.9 in^3.	88 mL **3 fl oz** 5.4 in^3
More than 5.48 L to 7.09 L **More than 185.6 fl oz to 240 fl oz** More than 334.9 in^3 to 443.1 in^3	103 mL **3.5 fl oz** 6.3 in^3
More than 7.09 L to 8.04 L **More than 240 fl oz to 272 fl oz** More than 443.1 in^3 to 490.8 in^3.	118 mL **4 fl oz** 7.2 in^3
More than 8.04 L to 10.17 L **More than 272 fl oz to 344 fl oz** More than 490.8 in^3 to 620.8 in^3	133 mL **4.5 fl oz** 8.1 in^3
More than 10.17 L to 11.59 L **More than 344 fl oz to 392 fl oz** More than 620.8 in^3 to 707.4 in^3	147 mL **5 fl oz** 9.0 in^3
More than 11.59 L to 16.56 L *More than 392 fl oz to 560 fl oz* More than 707.4 in^3 to 1,010 in^3	177 mL **6 fl oz** 10.8 in^3
More than 16.56 L to 18.92 L **More than 560 fl oz to 640 fl oz (5 gal)** More than 1,010 in^3 into 1,155 in^3	207 mL **7 fl oz** 12.6 in^3
More than 18.92 L to 23.65 L **More than 640 fl oz to 800 fl oz** More than 1,155 in^3 to 1,443 in^3	236 mL **8 fl oz** 14.4 in^3
More than 23.65 L to 26.73 L **More than 800 fl oz to 904 fl oz** More than 1,443 in^3 to 1 631 in^3	266 mL **9 fl oz** 16.2 in^3
More than 26.73 L **More than 904 fl oz** More than 1 631 in^3	**1 % of labeled quantity**

Table 2-8. Maximum Allowable Variations for Packages Labeled by Length, (Width), or Area For Textiles, Polyethylene Sheeting and Film, see Table 2-10. Exceptions to the MAVs	
Labeled Quantity	**Maximum Allowable Variations (MAVs)**
1 m or less 1 yd or less	3 % of labeled quantity
More than 1 m to 43 m More than 1 yd to 48 yd	1.5 % of labeled quantity
More than 43 m to 87 m More than 48 yd to 96 yd	2 % of labeled quantity
More than 87 m to 140 m More than 96 yd to 154 yd	2.5 % of labeled quantity
More than 140 m to 301 m More than 154 yd to 330 yd	3 % of labeled quantity
More than 301 m to 1,005 m More than 330 yd to 1,100 yd	4 % of labeled quantity
More than 1,005 m or 1,100 yd	5 % of labeled quantity
Maximum Allowable Variations for Packages Labeled by Area.	
The MAV for packages labeled by area is 3 % of labeled quantity	
For Textiles, Polyethylene Sheeting and Film, see Table 2-10. Exceptions to the MAVs	

Table 2-10. Exceptions to the Maximum Allowable Variations for Textiles, Polyethylene Sheeting and Film, Mulch and Soil Labeled by Volume, Packaged Firewood, and Packages Labeled by Count with Less than 50 Items.

Product	Maximum Allowable Variations (MAVs)
Polyethylene Sheeting and Film	**Thickness** When the labeled thickness is 25 :m (1 mil or 0.001 in) or less, any individual thickness measurement of polyethylene film may be up to 35 % below the labeled thickness. When the labeled thickness is greater than 25 :m (1 mil or 0.001 in), individual thickness measurements of polyethylene sheeting may be up to 20 % less than the labeled thickness. The average thickness of a single package of polyethylene sheeting may be up to 4 % less than the labeled thickness. **Weight** The MAV for individual packages of polyethylene sheeting and film shall be 4 % of the labeled quantity.
Textiles	The MAVs are: For packages labeled with dimensions of 60 cm (24 in) or more: Three percent of the labeled quantity for negative errors and 6 % of the labeled quantity for plus errors. For packages labeled with dimensions less than 60 cm (24 in): Six percent of the labeled quantity for negative errors and 12 % for plus errors.
Mulch and Soil Labeled by Volume	The MAVs are: For individual packages: 5 % of the labeled volume. For samples: one package may exceed the MAV for every 12 packages in the sample (e.g., when the sample size is 12 or less, 1 package may exceed the MAV and when the sample size is 48 packages, 4 packages may exceed the MAV).
Packaged Firewood and Packages Labeled By Count with Less Than 50 Items	MAVs are not applied to these packages.

Appendix C

Summary of Written Comments Received for 232-3: Scaling Methods for Trees, Sawlogs & Veneer Logs

	Comments Received Opposing the Proposal	Number of times[1]
1	The proposed change will be costly for all members of the private forestry community. It will require mills to revise their accounting, inventory, and software systems, the costs of which will be passed on to landowners and consumers.	133
2	Different log measurement methods exist to accommodate regional and species-specific differences.	104
3	This is inappropriate/unwarranted/unwanted government intervention in private industry.	89
4	The market (which considers many characteristics other than volume) determines the value of logs, not the measurement method.	70
5	There has been inadequate notice provided to interested parties.	68
6	There is no demonstrated need for this change.	65
7	All scaling methods, when properly applied, provide unbiased and consistent estimates of timber volumes.	62
8	Most transactions are done on a weight scale basis, which is the most accurate method available.	46
9	This proposal appears to be designed primarily to make reporting easier for the Forest Service and contains little, if any, value for the industry.	41
10	The people who use the different scales recognize their variability and have experience using them properly.	29
11	The people who use the current systems are not interested in changing them.	27
12	There is no one scaling method that can accurately capture the value of all types of lumber.	24
13	This proposal requires that scalers measure both ends of every log. This is time-consuming, costly, and often poses a significant safety hazard.	23
14	This proposal simply replaces one archaic measurement method with another equally unreliable method.	17
15	The timber industry in the U.S. is in a financial crisis. The cost of implementing this proposal would bankrupt many mills and other parties in the timber industry.	17
16	Oppose the proposal (no reasons given).	17
17	Changing to a cubic scale will create confusion and uncertainty within the marketplace.	16
18	The value of an unrefined forest product has more to do with its quality than its volume measurement.	14
19	Implementing this change will require the entire forest community to be educated. This will place a tremendous burden on the industry.	12
20	Because it is difficult to convert from weight and board feet to cubic volume, this proposal will only make it more difficult for the people who are selling timber (logging contractors and landowners) to understand how they are getting paid, which leaves them susceptible to being taken advantage of during the transaction.	10
21	Cubic scaling will require mills to rely upon the skill and honesty of the person doing the scaling.	8
22	The proposal would require imposition of a dual measurement system for the industry as they would be forced to purchase by cubic volume, and then turn around and sell by the board foot since the board foot is what the end user requires.	7
23	The proposed changes are meaningless and cumbersome.	5
24	State agencies that manage timberland will incur costs to convert their operations to a cubic scaling system, something they cannot afford with the current budget deficits.	4
25	This proposal uses the Smalian's formula for estimating log volume. Smalian's formula is useful only if diameters are measured every 8-16 feet in length, and overestimates volume for trees with butt swell.	3

	Comments Received Opposing the Proposal	Number of times[1]
26	For those government operations that require cubic volume measurements (e.g., severance tax systems, or U.S. Forest Service surveys), industry uses a conversion factor from the weight scale, rather than a cubic scaling method.	3
27	This proposal is contrary to the Healthy Forest Initiative recently passed by Congress.	3
28	States should have the authority and responsibility to oversee timber commerce with their borders.	3
29	Lumber is sold to the public based on board feet because they can relate that to its square foot coverage.	2
30	The proposal will require numerous statutory changes to existing state law.	2
31	The method proposed does not take into account thinning sales of small stems, the salvage of dead or dying timber, or any loss of volume or quality during the life of a sale.	2
32	The proposed definitions are inadequate and do not take into account multi-stem (clump-growth) trees or trees which fork below breast height.	1
33	Since 1960 almost all of the major "diagrammatic" log rules have been updated or modified to meet modern processing technology and resource sizes.	1
34	Implementation in 2005 is too soon. Many 2005 timber contract sales have already been negotiated with appraisals based upon current standards.	1
35	Federal regulation will create a need for enforcement. Enforcement will cost money, which many States cannot afford.	1
36	This proposal is contrary to the Federal Timber Purchasers Committee's efforts to promote regional discretion for Forest Service sales.	1

[1] *The "Number of times" column does not represent the number of letters received. It represents the number of times this reason was cited by letter writers. Many letters contained more than one reason for the writer's position.*

	Comments Received Supporting the Proposal	**Number of times**[1]
1	Conversions from weight to board feet are very inaccurate, while conversions from weight to cubic volume are very precise when the conversion factors are based on accurate regional data.	2
2	This proposal is an improvement over the board foot measures because the board foot systems invariably under-estimate the volume of small diameter logs.	2
3	This proposal uses a formula that is taught around the world, is a global measure that everyone can understand and would make our log volume data comparable with other countries.	2
4	Without a consistent method of sale across the country, it is impossible to determine whether or not our forests are more or less productive than forests in foreign countries, or whether or not our sawmills are more or less efficient in converting logs into lumber.	1
5	This proposal would provide a more accurate measure of log volume for both buyers and sellers.	1
6	There are uniform weight and measure standards for other products, so why not for forest products?	1
7	Second-growth being harvested today is smaller with a greater taper. It is generally miscalled by the Doyle system.	1
8	Because most modern day scaling is done by weight and then converted to board feet using a conversion factor, there is no reason why the same process cannot be used to convert to cubic volume.	1
9	While cruising timber will be a challenge under this proposal, mills and foresters will, through experience, learn the appropriate factors to use.	1
10	A uniform measure will create parity between the producing regions and help determine efficiencies, profitability, and the best forest management techniques for the benefit of society.	1
11	The growth measurement of trees is most accurately represented at any point in their life cycle using cubic volume.	1
12	This proposal is flexible enough to be adaptable to local log market practices.	1
13	Scaling by weight, while appropriate for large volumes of chipwood, does not easily allow credit for high quality logs.	1
14	Small private landowners typically sell their timber only one or two times in their lifetimes. Having different scaling methods can cause confusion.	1
15	The log buyer invariably understands the scaling methods better than the landowner, leaving the landowner vulnerable to price or scale manipulation.	1
16	Support the proposal (no reasons given).	1

[1] *The "Number of times" column does not represent the number of letters received. It represents the number of times this reason was cited by letter writers. Many letters contained multiple reasons for the writer's position.*

Comments Received From		
Name	**Representing**	**State**
Adams, J.	Self	Unknown
Anthony, John	Anthony Timberlands Inc	AR
Anthony, Steven	Anthony Timberlands Inc	AR
Argow, Keith	National Woodland Owners Association	VA
Armstrong, James	Portac Inc	WA
Arnold, Jerry	Weyerhaeuser	AR
Ashby, Jerry	Pacific Rim Log Scaling Bureau Inc	WA
Askew, Joe	Self	Unknown
Baker, Ronald	Miller Shingle Company	WA
Barras, Steve	ORRM	Unknown
Bartlett, Michael	Hull Forest Products Inc	Unknown
Bauer, Robert	Kentucky Forest Industries Association	KY
Beddingfield, Ben	Floragon Forest Products Inc	OR
Belken, Ed	Self	WV
Bellman, Mickey	MSB Consulting Inc	OR
Benson, Mark	Potlatch Corporation	ID/AR/MN
Billman, Mike	Malheur Lumber Company	OR
Blachly, Andy	Hampton Tree Farms Inc	OR
Black, Robert III	Timberland Resources Inc	Unknown
Bland, John & Bobbie	Self	AR
Bolland, Jud	Potlatch Corporation	ID/AR/MN
Bradetich, Doug	Riley Creek Lumber Company	ID
Braswell, Max	Domtar Industries Inc	AR
Brenneisen, Dave	Federal Timber Purchasers Committee	SD
Brigance, A.J.	USFS Womble/Caddo Ranger Districts	AR
Brodie, T. Furman	Charles Ingram Lumber Company Inc	SC
Brown, Keith	Texas Logging Council	TX
Burgess, Steven	Self	AR
Burns, Debbie	Southeastern Lumber Manufacturers Association Inc	GA
Burton, Larry	Tru-Wood Cabinets Inc	AL
Bush, J.R.	Virginia Forest Products Association	VA
Camp, Wade	SFPA	LA
Caroll, Mark	Appalachian Forest Products Inc	WV
Casey, Don	Self	AL
Cathey, Joel	Ontario Hardwood Company Inc	VA
Chang, Sun Joseph	Louisiana State University	LA
Cochran, Carrol	Self	Unknown
Colegrove, Nolan Sr.	Intertribal Timber Council	OR
Cooper, Karl	Georgia-Pacific Corporation	GA
Craig, Keith	Pennsylvania Hardwoods Development Council	PA
Crawford, Sloane	New York State Forest Products Utility Program	NY
Crites, John	Allegheny Wood Products Inc	WV
Crouse, Richard	Bryant & Young Lumber Company Inc	NC
Crowell, James	Northern California Log Scaling & Grading Bureau	CA
Curtis, Gary	Columbia River Log Scaling & Grading Bureau	OR
Dale, Don	Weyerhaeuser	AR
Dicke, Stephen	Self	MS
Dinwiddle, Candace	Tennessee Forestry Association	TN
Dismukes, Mr.	Vaiden Timber Company	MS
Dructor, Daniel	American Loggers Council	TX

Comments Received From		
Name	**Representing**	**State**
Dye, Charles	West Virginia Division of Forestry	WV
East, Vicki	Tru-Wood Cabinets Inc	AL
Ellis, Richard	Ellis & Holmes LLC	NC
Farrell, Jay	American Forest & Paper Association	DC
Fischer, Burnell	National Association of State Foresters	DC
Fishering, Nancy	Colorado Timber Industry Association	CO
Foil, Dave	Forest Resource Consultants Inc	GA
Ford, Doug	Minnesota DNR Division of Forestry	MN
Foster, James	Kingwood Forestry Service Inc	AR
Francisco, Gene	Wisconsin Professional Loggers Association	WI
Freeman, Kenneth	Self	AL
Freres, Robert Jr.	Freres Lumber Company Inc	OR
Geisinger, James	Associated Oregon Loggers Inc	OR
Gelbert, Robin	Self	Unknown
Gentis, Walt	Ochoco Lumber Company	OR
Gibbs, Kenneth	Self	WV
Giustina, Larry	Giustina Land & Timber Company	Unknown
Goergen, Michael Jr.	Society of American Foresters	MD
Graham, Owen	Alaska Forest Association Inc	AK
Griffith, Bruce	Griffith Lumber Company Inc	VA
Haines, Gary	TreeSource Industries Inc	Unknown
Hale, Paul	Texas Logging Council	TX
Hamel, Ralph	Ralph Hamel Forest Products Inc	WI
Hamilton, Will	Hamilton Resource Management	WA
Hampton, David	Hampton Tree Farms Inc	OR
Hayes, Vernon Jr.	Forest Landowners Association	MD
Heissenbuttel, John	American Forest & Paper Association	DC
Henderson, Bud	Hampton Tree Farms Inc	OR
Hicks, Ed	Self	Unknown
Hogan, Jane	Ontario Hardwood Company Inc	VA
Hogan, R. Holt	Ontario Hardwood Company Inc	VA
Horn, Clinton	Bradley Lumber Company	AR
Houghland, Paul Jr.	National Hardwood Lumber Association	TN
Howe, Paul	Virginia Forestry Association	VA
Hufford, Ron	Texas Forestry Association	TX
Hurst, James	Owens & Hurst	MT
Ivanoff, David	Hampton Tree Farms Inc	OR
Jaynes, Crad	South Carolina Timber Producers Association	SC
Johnson, Roy	Self	Unknown
Johnston, George	Self	AR
Jones, William	Alabama Loggers Council	AL
Jordan, Jonell	Tru-Wood Cabinets Inc	AL
Keep, Scott	Self	OR
Keider, Michael	Self	Unknown
Keighley, Tom	Self	LA
Kelly, Boyd	Alabama Loggers Council	AL
Kendrick, Gordon	Self	AL
Kennell, David	Self	WV
King, Kevin	Empire State Forest Products Association	NY
Kirkmire, George	Washington Contract Loggers Association	WA
Kostovick, Matthew	Self	WV

Comments Received From		
Name	**Representing**	**State**
Koulianos, Nick Jr.	Self	Unknown
Kriegel, Paul	Goodyear Nelson Hardwood Lumber Company Inc	Unknown
Levins, Bob	State of Arkansas	AR
Lewis, Richard	Forest Resources Association	MD
Linn, Danny & Linda	Self	AR
Livingston, Phillip	Kingwood Forestry Service Inc	AR
Lockhart, Chuck	K Ply Inc	WA
Lynn, Jerry	Self	AR
Lyskava, Paul	Pennsylvania Forest Products Association	PA
Mackey, R. Bruce	Washington State Dept. of Natural Resources	WA
Mansius, Donald	Maine Forest Service	ME
McGuire, Greg	Boise Cascade Corporation	WA
McKinney, Gary	Green Bay Packaging	AR
McLaughlin, Bruce	Robbins Lumber Inc	ME
Mitchell, Lylyn	AR/OK Timberlands Finance & Planning	AR/OK
Moran, Milton Jr.	Columbia River Log Scaling & Grading Bureau	OR
Morgan, Allen	Self	Unknown
Nutt, James	Timber Services Inc	TX
Oates, Rick	Alabama Loggers Council	AL
Padgett, Preston	Packaging Corporation of America	TN
Partin, Tom	American Forest Resource Council	OR
Pickell, Bill	Washington Contract Loggers Association	WA
Pomeroy, Ed	Georgia-Pacific Corporation	GA
Porter, Edwin	Maine Department of Agriculture	ME
Pullin, Steve	SV Pullin Inc	WA
Randall, Mike	Swanson Bros Lumber Co	OR
Ranick, Jim	Black Hills Forest Resource Association	SD
Re, Richard	Seneca Sawmill Company	OR
Reckart, Donna	Public Lands Committee, WV Forestry Association	WV
Regan, Edward	RY Timber Inc	MT
Reynolds, Teddy	Reynolds Forestry Consulting-RFC Inc	AR
Richbourg, David	Self	NC
Ridenhour, Cory	Missouri Forest Products Association	MO
Riley, James	Intermountain Forest Association	ID
Robbins, J. Kelley	Arkansas Forestry Association	AR
Roberts, Karen	Self	AL
Robinson, Foster	Starfire	OR
Rodgers, Kirk	Maryland Forests Association Inc	MD
Roesch, Teresa	Self	AL
Rossi, Theodore	Rossi American Hardwoods Inc	Unknown
Rush, David	Tru-Wood Cabinets Inc	AL
Rush, Kenneth	Tru-Wood Cabinets Inc	AL
Schatz, Fred	Columbia Vista Corporation	Unknown
Schmidt, Ernie	Wyoming Timber Industry Association	WY
Schroeder, Gary	C&D Lumber Company	OR
Scott, Robert	South Carolina Forestry Association	SC
Shannon, Rosemond	Self	AL
Shaw, Randy	Forest Resource Consultants Inc	GA
Shofner, Tara	Arkansas Farm Bureau	AR
Simpson, Montgomery	Georgia Forestry Association	GA
Slocum, Robert Jr.	North Carolina Forestry Association	NC

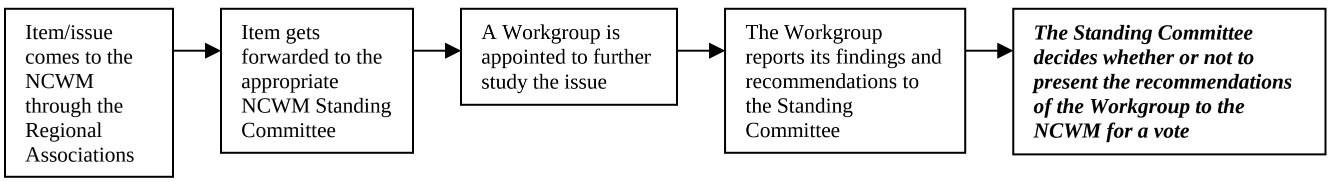
Comments Received From		
Name	**Representing**	**State**
Smith, Douglas	Self	Unknown
Smith, Ed	Self	LA
Smythe, Stuart	Self	Unknown
Spadaro, Jason	SDS Lumber Company	WA
St. Laurent, Tom	Yamhill Log Scaling & Grading Bureau	OR
Stephens, Melanie	Linden Lumber Company LTD	AL
Stock, Jasen	New Hampshire Timberland Owners Association	NH
Storm, Rex	Associated Oregon Loggers Inc.	OR
Swanson, Susan	Allegheny Hardwood Utilization Group	PA
Tennyson, Carolyn	Self	AR
Thayer, Laurel	Freres Lumber Company Inc	OR
Thompson, Lynn	University of Arkansas	AR
Thompson, Tom	USDA Forest Service, National Forest System	DC
Thornbury, Larry	Tru-Wood Cabinets Inc	AL
Vroman, S. Mark	Hampton Tree Farms Inc	OR
Waybright, Dick	West Virginia Forestry Association	WV
Westmark, Russ	Portac Inc.	WA
Whistler, Alex	Bureau of Indian Affairs	OR
Wilson, Frank	Self	Unknown
Woodbury, George	Alaska Forest Association Inc	AK
Wright, J. Tobey	Association of Consulting Foresters of America	VA
Yansick, James	State of Connecticut Dept of Envir. Prot.	CT

Appendix D

The L&R Committee Recommendation to the Board of Directors on Workgroups

The Committee believes that the current structure, whereby NIST establishes and coordinates Workgroups when it feels that they are warranted, works well and should be encouraged to continue. If, however, the NCWM Board feels that establishing and coordinating their own Workgroups would be beneficial, then the Committee would like to make the following recommendations:

Placement of Workgroups within the NCWM process:



Setting up Workgroups

- Workgroups should be established to address complex or controversial issues that come before the NCWM. The intent of these workgroups should be to bring all effected and interested parties (federal, state and local regulators; manufacturers; distributors; retailers; consumers; etc.) together to discuss and develop proposals to resolve these issues in a way that all parties can agree upon (or at least live with).

- Workgroups should be established at the discretion of the Standing Committees.

- If the Standing Committee believes that the Workgroup can perform its work without funding (e.g., through e-mail), then the Standing Committee would merely provide the Board with notice that the Standing Committee has established a Workgroup through a copy of the Workgroup's Charter.

- If the Standing Committee believes that the Workgroup will need funds to perform its tasks, then the Standing Committee should submit to the Board a budget along with a request for funds and a copy of the Workgroup's Charter. The Board should be required to approve, deny, or modify the Standing Committee's request for funds by the end of the Board meeting that immediately follows the request of the Standing Committee (e.g., if the Standing Committee requested funds for a Workgroup at the NCWM Annual meeting, the Board should be required to act on this request by the end of the Board's fall meeting).

The Workgroup's Charter

- To provide the Workgroup with clear direction and to help it understand what the Standing Committee expects as a product, the Standing Committee should be required to draft a Charter for each Workgroup it establishes. (For example: This Workgroup is established to study temperature compensated sales of petroleum products other than LPG. As part of this study, the Workgroup is expected to determine: (1) How common is the practice of temperature compensation with different devices (VTMs, RMFDs, etc.) and different petroleum products (gasoline, home heating fuel, etc.) both inside and outside the U.S.; and (2) What jurisdictions within the U.S. currently have laws regulating the temperature compensation of petroleum products (both requiring and prohibiting), and what do those laws say. Ultimately, the Workgroup is expected to make recommendations to the Standing Committee: (1) About whether or not the temperature compensation of petroleum products should be permissible, prohibited, or mandated; and (2) Suggesting language for a new law or regulation that the Standing Committee can take to the NCWM for a vote.)

- As part of the Charter, the Standing Committee should establish intermediary goals with timelines for the Workgroup to report progress to the Standing Committee.

- As part of the Charter, the Standing Committee should designate a Workgroup Chairperson. The Workgroup Chairperson will be responsible for contacting the participants, coordinating the meetings, and making reports to the Standing Committee.

- As part of the Charter, the Standing Committee should identify key regulatory, industry, and consumer stakeholders that the Workgroup Chairperson is expected to contact and invite to participate in the Workgroup. These stakeholders should not be required to be, or become, members of the NCWM.

Workgroup Membership

- Workgroups should be comprised of interested volunteers. No one who is interested in an issue should be prohibited from participating in the Workgroup.

- Workgroup participants should not need to be NCWM members. (If participants in the Workgroup see the NCWM as having value, they should be encouraged to join. However, it is in the best interest of the NCWM to have input from all sides of an issue from those individuals who are the most knowledgeable, and therefore the L&R Committee believes that it is not advisable to exclude non-NCWM members from participating in the Workgroups.)

- The Workgroup Chairperson should have the discretion to expand the Workgroup participants beyond the stakeholders identified by the Standing Committee.

- All agencies/companies/organizations/associations that participate in the Workgroup should have an equal voice in the final product of the Workgroup.

Communications Outside the Workgroup

- The NCWM should establish a webpage for each Workgroup so the Workgroup can post its reports, meeting schedules, and contact information.

- The Standing Committee's Charter establishing the Workgroup should be published in NIST Publication 15 or 16 as part of the Standing Committee's Report.

- The progress reports that the Workgroup submits to the Standing Committee per the Workgroup's Charter should be published in NIST Publication 15 or 16 as part of the Standing Committee's Report.

- Workgroup participants should be encouraged to write articles for trade association and consumer newsletters about the work of the Workgroup and to solicit input from non-participants.

Funding Workgroup Participation

- If travel and other expenses are anticipated, state and local jurisdictions will need funding to participate in the Workgroups. The Standing Committee, when drafting the Workgroup budget and request for funds from the Board, should specify how many jurisdictions the Standing Committee believes should be funded to participate.

- If travel and other expenses are anticipated, consumer groups and other parties may need funding to participate in the Workgroups. The Standing Committee, when drafting the Workgroup budget and request for funds from the Board, should specify how many other members the Standing Committee believes should be funded to participate.

- Federal agencies and industry members should be expected to fund their own participation.

- If there are more parties interested in participating in the Workgroup than there is money to fund them, then the Workgroup Chairman should have the discretion to decide whose participation shall be funded. Such decision shall be made based upon the needs of the Workgroup, and be made to ensure adequate representation of all sides of the issue. The decision of the Workgroup Chairman may be appealed to the Standing Committee, if necessary.

Dennis Johannes, California, Chairman
Joe Gomez, New Mexico
Max Gray, Florida
James Cassidy, Cambridge, Massachusetts
Vicky Dempsey, Montgomery County, Ohio

Vincent Orr, ConAgra Foods, Associate Member Representative

Doug Hutchinson, Canada, Technical Advisor
Brian Lemon, Canada, Technical Advisor
Kathryn Dresser, NIST, Technical Advisor

Committee on Laws and Regulations

Report of the Committee on Specifications and Tolerances

Jack Kane, Chairman
Bureau of Weights and Measures
Department of Labor and Industry
Montana

Reference
Key Number

300 INTRODUCTION

This is the final report of the Committee on Specifications and Tolerances (S&T) (Committee) for the 89th Annual Meeting of the National Conference on Weights and Measures (NCWM). The report is based on the 89th Interim Report offered in NCWM Publication 16, "Committee Reports," the Addendum Sheets issued at the Annual Meeting, and actions taken by the membership at the Voting Session of the Annual Meeting.

Table A identifies the agenda items in the report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Interim Meeting Agenda. Voting items are indicated with a **"V,"** or if the item was part of the consent calendar by the suffix **"VC"** after the item number. Items marked with an **"I"** after the reference key numbers are information items. Items marked with a **"D"** after the key numbers are developing issues. The developing designation indicates an item that while it has merit, it may not be adequately developed for action at the national level. Developing items inform parties about issues that are developing in different localities or in the regional associations. A developing item is returned to the submitter to develop further before any action is taken at the national level. The Committee withdrew items marked with a **"W."** Items marked with a **"W"** generally will be referred to the regional weights and measures associations because they either need additional development, analysis, and input, or did not have sufficient Committee support to bring them before the NCWM. Table B lists the Appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in entirety.

This Report contains many recommendations to revise or amend National Institute of Standards and Technology (NIST) Handbook 44 (HB-44), 2004 Edition, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." Proposed revisions to the handbook(s) are shown in **bold face print** by **~~striking out~~** information to be deleted and **<u>underlining</u>** information to be added. Requirements that are proposed to be nonretroactive are printed in **bold-faced *italics.***

Note: The policy of NIST is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as they were submitted and may, therefore, contain references to inch-pound units.

Table A
Index to Reference Key Items

Table B
Appendices

Table C
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
300 (Consent Calendar)	All Yeas	No Nays	All Yeas	No Nays	Passed
320-1	35	1	34	1	Passed
324-1	36	0	35	0	Passed
331-1	19	15	19	14	Returned to Committee
300 (Report in its Entirety Voice Vote)	All Yeas	No Nays	All Yeas	No Nays	Passed

Details of all Items
(In order by Reference Key Number)

310 GENERAL CODE

310-1 I G-S.1. Identification; Built-for-Purpose Software Based Devices, Table G-S.1. Identification, G-S.1.1. Location of Marking Information for Not Built For Purpose Software Based Devices, and Appendix D; Definition of Not-Built-for-Purpose Device

Source: Carryover Item 310-1B.

Recommendation: Modify General Code paragraph G-S.1., delete paragraph G-S.1.1., renumber paragraph G-S.1.2., add new Table G-S.1., and add a new definition for "not-built-for-purpose device" to Appendix D as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process, but not having any metrological effect, shall be clearly marked **<u>in accordance with Table G-S.1</u>.** for the purposes of identification, with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern or design of the device;

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod."
[Nonretroactive January 1, 2003]
(Added 2000) (Amended 2001)

[Note: Prefix lettering may be initial capitals, all capitals or all lower case.]

*(d) except for equipment with no moving or electronic component parts and not-built-for-purpose, ~~**software**~~ **<u>microprocessor</u>**-based devices, a nonrepetitive serial number;*
[Nonretroactive as of January 1, 1968]

(e) for ~~**not built-for-purpose, software**~~ **<u>microprocessor</u>**-based devices the current software version designation **<u>or revision number</u>**;
(Added 2003)

(f) the serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number; and
[Nonretroactive as of January 1, 1986]

(g) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

*(h) for devices that have an NTEP Certificate of Conformance (CC), the CC Number or a corresponding CC addendum number ~~**shall be**~~ prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).*
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, 1999, 2000, 2001, 2003, <u>and 200X</u>)

~~***G-S.1.1. Location of Marking Information for Not Built-For-Purpose, Software-Based Devices. - For not built-for-purpose, software-based devices, the following shall apply:***~~

~~***(a) the manufacturer or distributor and the model designation shall be continuously displayed or marked on the device (see note below), or***~~

~~***(b) the Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device (see note below), or***~~

~~***(c) all required information in G-S.1. Identification. (a), (b), (c), (e), and (h) shall be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.***~~

~~***Note: Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.***~~
~~***[Nonretroactive as of January 1, 2004]***~~
~~**(Added 2003)**~~

G-S.1.~~2~~1. Remanufactured Devices and Remanufactured Main Elements. - *All remanufactured devices and remanufactured main elements shall be clearly and permanently marked for the purposes of identification with the following information:*

(a) The name, initials, or trademark of the last remanufacturer or distributor;

(b) The remanufacturer's or distributor's model designation if different than the original model designation.

[Nonretroactive as of January 1, 2002]
(Added 2001)

Note: Definitions for "manufactured device," "repaired device," and "repaired element" are also included (along with definitions for "remanufactured device" and "remanufactured element") in Appendix D, Definitions.

Table G-S.1. Identification		
	Built-for-Purpose Instruments, Elements, or Systems	**Not Built-for-Purpose Instruments, Elements, or Systems**
Name, initials, or trademark of the manufacturer or distributor	**M**	**D[2]**
Model designation	**M[1]**	**D[2]**
Specific model designation	**M[1] or D**	
Serial number	**M**	**Not required**
Revision number or Software Version number	**M or D**	**D**
Certificate of Conformance (CC) number	**M or D**	**D[2]**

M: **Physically and permanently marked**

D: ***Either: (1) displayed by accessing a clearly identified view only System Identification, G-S.1. Identification, or Weights and Measures Identification accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated, or (2) continuously displayed. Note: For revision or software version number, clear instructions for accessing this information shall be listed on the CC in lieu of the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same or subsequent type that was evaluated.***
(Nonretroactive as of January 200X)

Note 1: ***As a minimum, the model designation (positively identifying the pattern, design, type, series, generic, or trademark designation) must be marked on the device. If the model designation changes with differing parameters such as size, features, options, intended application, not Handbook 44 compliant, construction, etc., the specific model designation shall be physically marked or continuously displayed or be capable of being displayed.***
(Nonretroactive as of January 200X)

Note 2: ***As a minimum, either the manufacturer or distributor and the model designation, or the CC Number shall be continuously displayed. Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC, which may be available as an unaltered copy of the CC printed by the device or through another on-site device.***
(Nonretroactive as of January 200X)

(Table Added 200X)

Definition: Not-built-for-purpose device. Any main device or element which was not originally manufactured with the intent that it be used as, or part of, a weighing or measuring device or system.

Background/Discussion: During the 2003 NCWM Annual Meeting, the Committee agreed to split Item 310-1, a proposal to modify paragraph G-S.1. Identification to address software based devices, into two parts: Item 310-1A and 310-1B. Voting Item 310-1A, a proposal to define "built-for-purpose" software-based devices and to require the marking of specific identification information on "not-built-for-purpose" software based devices, was proposed for a vote and adopted.

The Committee believed that Item 310-1B, a proposal to include "built-for-purpose" devices and to define "not-built for-purpose" devices was not sufficiently prepared and should remain an information item to allow for additional development. This proposal appears in the recommendation above. Industry representatives indicated there was a need to address both "not-built-for-purpose" software based devices and "built-for-purpose" software based devices equally and provided the Committee with proposed language as shown in the recommendation. Based on the comments, regarding inequity, received the Committee kept the proposal to modify G-S.1. to include "built-for-purpose" software based devices an information item to allow for further review and development by the NTETC Technical Sectors and the regional weights and measures associations.

At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) had no opposition to allowing alternate methods for providing required identification information marking on "built-for-purpose" software-based devices. The WWMA supported the concept of allowing "built-for-purpose" software-based devices to display G-S.1. Identification information provided that the physical identification information contains the following minimum information: (1) manufacturer or distributor, (2) model designation, and (3) serial number. The WWMA recommended this item remain informational until it can be further developed.

Prior to the October 2003 NTETC Measuring Sector Meeting, the NIST NTETC Technical Advisors developed an alternate proposal to modify G.S.1. and add a new Table G.S.1. that provides alternate methods other than physical markings for meeting some of the requirements of G-S.1. for both "not-built-for-purpose" and "built-for-purpose" devices. The alternate proposal was presented to the NTETC Measuring Sector for consideration.

At its October 2003 Meeting, the NTETC Measuring Sector reviewed an alternate proposal developed by the NIST Weights and Measures Division (WMD) which presents the G-S.1. information in tabular format. The Sector agreed with the WMD proposal in principle, but recommended some small changes to simplify the table. The Sector forwarded the alternate WMD proposal for G-S.1. as modified to the Southern Weights and Measures Association (SWMA) as well as the NCWM S&T Committee.

At its October 2003 Meeting, the SWMA reviewed the proposal from the NTETC Measuring Sector and agreed that the proposal should be forwarded to the NCWM S&T Committee for consideration as a voting item.

At the 2004 NCWM Interim Meeting, the S&T Committee heard both support and opposition to the proposal developed by the NTETC Measuring Sector at its October 2003 Meeting. There was general support for the table developed by WMD and modified by the NTETC Measuring Sector. There was also general support for the definition of "not-built-for-purpose" device. The SMA opposed the NTETC Measuring Sector's proposal because of the difference in requirements for "built-for-purpose" devices and "not-built-for-purpose" devices. The primary SMA opposition was that, in the proposal, "built-for-purpose" devices are required to have the name of the manufacturer, the model designation, and a nonrepetitive serial number physically marked on the device. "Not-built-for-purpose" devices are allowed to either physically mark or display those three pieces of basic information. The SMA believes that the built-for-purpose devices should have the same option of marking or displaying the make, model, and serial number. One weights and measures official stated that the revision number or software version number should be marked or displayed on "built-for-purpose" devices as is required on "not-built-for-purpose" devices. The official believes that changes can be made to the programming of some "built-for-purpose" devices that is not readily apparent to field officials. Marking or displaying a new version number will assist the field official in determining whether or not the metrological functions of the device are the same as the model submitted for NTEP evaluation. The Committee agreed that the revision number or software version numbers should be readily available to field officials and modified Table G-S.1. to include the requirement that a "built-for-purpose" device have the current revision number or software version number displayed or permanently marked. The Committee also recognized that currently Handbook 44, OIML R-76 Nonautomatic weighing instruments, and OIML R-117 Measuring systems for liquids other than water all require the name of the manufacturer, a model designation, and serial number information to be marked on a "built-for-purpose" devices. The Committee believes that, at this time, continuing the requirement for marking basic identification information does not place an additional burden on "built-for-purpose" device manufacturer's. The 2003 Weighing Sector Meeting, was held prior to the 2003 NTETC Measuring Sector Meeting; therefore, the Weighing Sector did not review and discuss the current proposal. The Weighing Sector was not scheduled to meet again until the fall of 2004. The Weighing Sector's Technical advisor advised the Committee of the plan to distribute the current proposal along with a ballot requesting support from the membership prior to the 2004 NCWM Annual Meeting. The Committee agreed that if the Weighing Sector supported the proposal the item should be ready for a vote of the Conference at that NCWM Annual Meeting.

At its April 2004 Meeting the SMA determined that based on the results of the S&T Committee's request to poll the Weighing Sector Members, there appears to be no clear consensus that the proposal is ready to be a voting item. The SMA opposed this item and recommended that it be removed from the voting calendar.

At its May 2004 meeting, NEWMA received comments from the SMA opposing 310-1 because there was no clear consensus among the Weighing Sector members. Gilbarco requested the item be made informational. Gilbarco believed that G-S.1.(e) requiring a software revision number would be overly burdensome to both industry and NTEP since there are frequent software changes and that the non-retroactive date of January 2004 in proposed new Table G-S.1. has already passed. Belue Associates also recommended making this item informational. NEWMA agreed to recommend that item 310-1 be changed to an Information Item.

At the 2004 NCWM Annual Meeting, during the open hearing the SMA stated that item 310-1 should not go forward for a vote because the ballot of the Weighing Sector failed to provide clear support for the item. A manufacturer stated that the term microprocessor is not appropriate because their devices contain numerous microprocessors. Another manufacturer stated that the requirement for marking the current software version number would place an unrealistic burden on their company. The Committee agreed that sufficient opposition and questions were raised during the open hearing to demonstrate that the item is not sufficiently developed to be a voting item at this meeting. The Committee agreed to make item 310-1 an information item to be returned to the NTETC Weighing and Measuring Sectors for further development.

For more background information, refer to the 2003 S&T Final Report.

310-2 W G-N.3. Compatibility of Indicators and Weighing or Measuring Elements

(This item was withdrawn.)

Source: National Type Evaluation Technical Committee Measuring Sector

Recommendation: Add a new paragraph G-N.3. Compatibility of Indicators and Weighing or Measuring Elements to Handbook 44 to clarify what requirements must be met to interface an indicating element and a weighing or measuring element that have not been previously evaluated together on a single NTEP Certificate of Conformance (CC), but which have their own NTEP CC listing compatible communication specifications.

G-N.3. Compatibility of Indicators and Weighing or Measuring Elements. - To be considered compatible, all of the following conditions shall be met:

(a) The communication means to be used for the input to the electronic indicator (analog, digital, pulse, frequency, serial, etc.) has been previously evaluated with a weighing and measuring element;

(b) The communication means to be used for the output of the weighing or measuring element (analog, digital, pulse, frequency, serial, etc.) has been previously evaluated with an electronic indicator;

(c) The communication means to be used for the electronic indicator input is the same as the communication means to be used for the weighing and measuring element output (analog-analog, digital-digital, pulse-pulse, frequency-frequency, serial-serial, etc.);

(d) The devices are communicating with each other and the system into which they are installed can be accurately calibrated; and

(e) If required, Handbook 44 compliant tickets can be printed.

Background/Discussion: At the May 2001 NTEP Laboratory Meeting, one of the participating laboratories asked for input regarding what testing should be required if the manufacturer of an indicator wanted a CC to recognize an indicator for use with different types of measuring devices, such as positive displacement (pd) meters, turbine meters, and mass flow meters. The California NTEP Laboratory agreed to provide a draft of changes to the Liquid-Measuring Devices Checklist and Procedures that included requirements for indicators intended for use with more than one device type.

At its October 2003 Meeting, the NTETC Measuring Sector reviewed a proposal submitted by the work group to add a new paragraph N.X. only to Handbook 44 Section 3.30., 3.31., 3.32., and 3.37. The NTETC Measuring Sector modified the proposal as shown above to be a General Code Test Note to provide guidance to field officials for determining the compatibility of indicators and weighing and measuring elements. The Sector agreed to forward the modified proposal to the NCWM S&T Committee through the SWMA.

At its October 2003 Meeting, the SWMA recommended that the proposal be forward to the NCWM S&T Committee as an information item.

At its November 2003 Meeting, the Scale Manufacturers Association agreed that the proposed new paragraph G-N.3. was not sufficiently developed for weighing applications and recommended that the proposal be referred to the NTETC Weighing Sector for further development.

At the 2004 NCWM Interim Meeting, the S&T Committee heard several comments indicating that this item is not sufficiently developed to move forward. However, one manufacturer stated that his company manufactures measuring and indicating elements or components that can be interfaced to provide a complete measuring system. He believed this item needed to be in Handbook 44 for the use of the field official and that the proposal as written provided at least some guidance on compatibility of components. The NIST WMD stated that there may be better alternatives, such as the Examination Procedure Outlines, to placing these guidelines in Handbook 44. The Committee agreed that the item is not sufficiently developed to move forward. The Committee decided to withdraw Item 310-2 from the S&T Committee Agenda until it is further developed and resubmitted with the support of the NTETC Weighing and Measuring Sectors.

For more background information, refer to the 2003 S&T Final Report.

320 SCALES

320-1 V S.1.12. Manual Gross Weight Entries and UR.3.9. Use of Manual Gross Weight Entries

(This item was adopted.)

Source: Carryover Item 320-1. (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 2002 agenda.)

Recommendation: Modify paragraphs S.1.12. and UR.3.9. as follows:

S.1.12. Manual ~~Gross~~ Weight Entries. - *A device* ***when being used for direct sale*** *shall accept an entry of a manual gross* ***or net*** *weight value only when the scale* ***~~is at gross load zero and the scale~~*** ***gross or net* weight*** *indication is* ***at*** *zero* ***~~in the gross weights display mode~~.*** *Recorded manual weight entries, except those on labels generated for packages of standard weights, shall identify the weight value as a manual weight entry by one of the following terms: "Manual Weight," "Manual Wt," or "MAN WT." The use of a symbol to identify multiple manual weight entries on a single document is permitted, provided that the symbol is defined on the same page on which the manual weight entries appear and the definition of the symbol is automatically printed by the recording element as part of the document.*
[Nonretroactive as of January 1, 1993]
[*Nonretroactive as of January 1, 2005]
(Added 1992) **(Amended 2004)**

UR.3.9. Use of Manual Gross or Net Weight Entries. - Manual gross or net weight entries are permitted **~~for use~~** in the following applications only:

(1) When **a point-of-sale system interfaced with a scale gives** credit **~~is given~~** for a weighed item **~~on point-of-sale systems interfaced with scales~~;**
(2) When an item is pre-weighed on a legal for trade scale and marked with the correct net weight;
(3) When a device or system **is** generat~~es~~**ing** labels for standard weight packages;
(~~3~~4) When postal scales or weight classifiers **are** generat~~e~~**ing** manifests for packages to be picked up at a later time; or
(~~4~~5) When livestock and vehicle scale systems **are** generat~~e~~**ing** weight tickets to correct erroneous tickets.

(Added 1992) (Amended 2000 **and 2004)**

Discussion: Since 2002, the Committee considered multiple proposals to recognize applications where manual weight entries are conducted on point-of-sale systems (POS). Specific instances include transactions where items exceed the POS nominal capacity or the Universal Product Code is illegible, but the weight and unit price information are available on the item's label and can be entered in the POS to calculate a price.

Handbook 44 includes provisions to deter fraudulent use of the manual weight entry feature. Paragraph S.1.12. describes when a scale can accept such an entry and how it must be identified. Paragraph UR.3.9. specifies only four applications where the use of manual weight entries are permitted. Handbook 44 also requires that a scale shall be suitable for use, which includes its weighing capacity. The feature is not intended as a substitute for a system with insufficient weighing capacity.

The Committee acknowledged that manual weight entries are used in gross and net weight transactions. The Committee considered several proposals to address this practice. These proposals were either limited in the applications they covered, unclear on what tare information must be recorded, or appeared to prohibit manual tare entries. After lengthy discussion at the 2003 NCWM Annual Meeting, the Committee agreed to keep the following proposal an information item to allow sufficient time for these deficiencies to be addressed:

> *S.1.12. Manual ~~Gross~~ Weight Entries. - A device shall accept an entry of a manual ~~gross~~ weight value only when the scale is at gross load zero and the scale gross or net* weight indication is at zero ~~in the gross weights display mode~~. Recorded manual weight entries, except those on labels generated for packages of standard weights, shall identify the weight value as a manual weight entry by one of the following terms: "Manual Weight," "Manual Wt," or "MAN WT." The use of a symbol to identify multiple manual weight entries on a single document is permitted, provided that the symbol is defined on the same page on which the manual weight entries appear and the definition of the symbol is automatically printed by the recording element as part of the document.*
> *[Nonretroactive as of January 1, 1993]*
> *[*Nonretroactive as of January 1, 2004.]*
>
> UR.3.9. Use of Manual ~~Gross~~ Weight Entries. - Manual ~~gross~~ weight entries are permitted for use in the following applications only: (1) on a point-of-sale system interfaced with scales when credit is given for a weighed item ~~on point-of-sale systems interfaced with scales~~, or when an item is pre-weighed and marked with the correct net weight; (2) when a device or system is generat~~e~~ing labels for standard weight packages; (3) when postal scales or weight classifiers are generat~~e~~ing manifests for packages to be picked up at a later time; ~~or~~ and (4) ~~when~~ on livestock scale and vehicle scale systems generate weight tickets to correct erroneous tickets.

During its September 2003 Annual Technical Conference, the WWMA examined the recommendation developed by the 2003 S&T Committee and an alternate proposal that limited use of the manual weight entry feature to point-of-sale (POS) systems. The WWMA agreed that limiting the use of the feature to POS systems was too restrictive. The WWMA also agreed that the S&T Committee's recommendation would make the current practice of entering preset tare values with a load on the scale during direct sale transactions very difficult. Consequently, the WWMA recommended an alternate proposal for paragraph S.1.12. and modified paragraph U.3.9. to limit manual weight entries to either gross or net weighed items as follows:

> *S.1.12. Manual ~~Gross~~ Weight Entries. - A device shall accept an entry of a manual gross or net weight value only when the scale is at gross load zero and the scale gross or net* weight indication is at zero ~~in the gross weights display mode~~. Recorded manual weight entries, except those on labels generated for packages of standard weights, shall identify the weight value as a manual weight entry by one of the following terms: "Manual Weight," "Manual Wt," or "MAN WT." The use of a symbol to identify multiple manual weight entries on a single document is permitted, provided that the symbol is defined on the same page on which the manual weight entries appear and the definition of the symbol is automatically printed by the recording element as part of the document.*
> *[Nonretroactive as of January 1, 1993]*
> *[*Nonretroactive as of January 1, 2005]*
> (Added 1992) (Amended 2004)

> UR.3.9. Use of Manual ~~Gross~~ Weight Entries. - Manual gross or net weight entries are permitted for use in the following applications only: (1) on a point-of-sale system interfaced with scales when credit is given for a weighed item ~~on point-of-sale systems interfaced with scales~~, or when an item is pre-weighed and marked with the correct net weight; (2) when a device or system is generat~~e~~ing labels for standard weight packages; (3) when postal scales or weight classifiers are generat~~e~~ing manifests for packages to be picked up at a later time; and (4) on livestock scale and vehicle scale systems that generate weight tickets to correct erroneous tickets.

One scale manufacturer noted that prepackaged standard weight commodities require nutritional labeling; therefore, paragraph S.1.12. should specify use of the feature only in direct sales applications. The Committee considered a recommendation to modify paragraph S.1.12. to permit a device to accept a manual weight entry when the scale is at gross or net load zero. The Committee concluded that this practice would mislead the customer in direct sales applications to believe that the indicated or printed weight information on the receipt represents the object on the scale.

The Northeastern Weights and Measures Association recommended modifying the proposal to require manual weight entries only when a device is used for direct sale, removing the term "gross" from paragraph UR.3.9. and making the proposal an information item.

The Scale Manufacturers Association (SMA) recommended an alternate proposal to modify paragraphs S.1.12. and UR.3.9. shown in the recommendation above. The Committee agreed with SMA's recommendation to modify paragraph S.1.12. as shown in the recommendation above to include the text "when being used for direct sale." The text was added to paragraph S.1.12. to eliminate any conflict that might arise when using the manual weight entry feature to label standard weight packages on scales approved for direct sale applications. The Committee modified the proposal to permit use of scales to prepack items without requiring the scale to return to zero between each weighment. Other modifications were made to the proposal to ensure that the text was grammatically correct.

The Committee acknowledged the importance of using a "legal for trade" scale to obtain weight values for preweighed items and modified the SMA proposal accordingly.

For more background information, refer to the 2002 and 2003 S&T Final Reports.

320-2 W S.6.4. Railway Track Scales

(This item was withdrawn.)

Source: Carryover Item 320-3. (This item originated from the Central Weights and Measures Association (CWMA) and first appeared on the Committee's 2003 agenda.)

Discussion: The Committee considered a proposal to modify paragraph S.6.4. in the Scales Code as follows:

> S.6.4. Railway Track Scales. - A railway track scale shall be marked with the maximum capacity of each section of the load-receiving element of the scale. Such marking shall be accurately and conspicuously presented on, or adjacent to, the identification or nomenclature plate that is attached to the indicating element of the scale. ~~*The nominal capacity of a scale with more than two sections shall not exceed twice its rated section capacity. The nominal capacity of a two-section scale shall not exceed its rated section capacity*.*~~ *The marked nominal capacity shall not exceed the sectional capacity (SC) multiplied by the number of sections (N) of the scale minus 0.5 sections. The formula is stated as Nominal Capacity #SC x (N - 0.5)*.*
> *[*Nonretroactive as of January 1, 200~~2~~4]*

This proposal was intended to increase the allowable nominal capacity of railway track scales by modifying the formula in paragraph S.6.4. Most manufacturers acknowledge that modular systems designed to railroad engineering specifications are able to withstand loads greater than those permitted in paragraph S.6.4. However, one manufacturer found that the length of modular systems is limited by the ratio of the nominal capacity to the section capacity allowed in paragraph S.6.4.

Any requirement that addresses scale capacity must not conflict with the requirement that prohibits scales from operating outside of the allowable limits of their marked capacity. Movement of locomotives across railway track scale systems results in loads that exceed the marked scale capacity. Properly designed systems can withstand the overload and indicate an accurate weight once the total load is no longer in excess of 105 % of the marked scale capacity.

The Committee reviewed examples of railway track scale loading where the movement of rail cars across modular systems resulted in loads that exceeded the nominal capacity limit specified in paragraph S.6.4. During each weighment, cars are uncoupled to prevent coupler interaction or weight transfer. The design load capacity (per railroad requirements) was not exceeded.

In July 2003, the Committee acknowledged that the proposed change to the formula permits nominal capacities that may exceed the system's safe load. Additionally, weights and measures jurisdictions may not have sufficient weights to test systems that exceed 640 000 lb capacity. Consequently, the Committee recommended further review of the proposal by manufacturers and the NTETC Weighing Sector.

The CWMA recommended the proposal move forward as written pending additional input from the Weighing Sector and the Association of American Railroads (AAR). The CWMA also noted that if any abbreviations for section capacity were adopted as outlined in S&T Item 320-3 then those abbreviations should be used in the formula.

The Western Weights and Measures Association heard testimony from the AAR indicating they did not support the proposal because the proposed formula allows systems with capacities that would exceed a scale's structural capacity. The AAR was satisfied with the current language in paragraph S.6.4., but was willing to work with the submitter of the proposal to address the submitter's concerns. Based upon the testimony from the AAR, the WWMA recommended the proposal be withdrawn.

The Southern Weights and Measures Association recommended the NCWM S&T Committee withdraw this proposal, but did not provide its rationale for reaching this position.

The AAR also noted that the proposal sets no limits on nominal capacity, thus permitting systems with capacities far above the typical weight loads. The AAR indicated that it has not received any requests for changes to capacities or input on problems with existing capacity limits from railway track scale users or manufacturers. The AAR found that the heaviest gross load for existing four axle cars is 315 000 lb, yet a two-section railway track scale equipped with 100 000 lb load cells can accommodate a load of 340 000 lb.

One representative from the railroad industry noted that there are limits to the amount of test weight that can be concentrated on a 70-foot railway track scale. For example, only 100 000 lb can be concentrated in a 7-foot span. Furthermore meeting both the current Handbook 44 minimum requirement for a test to 12.5 % scale capacity with test weights and then 25 % of scale capacity is difficult, if the proposal allows scales that exceed 500 000 lb capacity.

The Committee later considered an alternate proposal developed by Systems Associates, Inc., the submitter of the original proposal as follows:

Modify paragraph S.6.4. as follows:

S.6.4. Railway Track Scales.

<u>(a)</u> A railway track scale shall be marked with the maximum capacity of each section of the load-receiving element of the scale. Such marking shall be accurately and conspicuously presented on, or adjacent to the identification or nomenclature plate that is attached to the indicating element of the scale.

<u>(b)</u> *The nominal capacity of a <u>railway track</u> scale ~~with more than two sections~~ shall not exceed ~~twice its rated section capacity~~* <u>the lesser of; 640 000 lb or 80 000 lb for each 5 feet of weigh rail length or portion thereof and; the section capacity (SC) multiplied by the number of sections (N) of the scale minus 0.5. The</u>

formula is stated as Nominal Capacity = SC x (N - 0.5). ~~*The nominal capacity of a two-section scale shall not exceed its rated section capacity.*~~
*[*Nonretroactive as of January 1, 2002]*

Add new paragraph UR.X. as follows:

UR.X. Railcars weighed statically shall be uncoupled and alone on the load-receiving element as the weight is recorded.

The Committee has not heard sufficient technical grounds for modifying the formula to permit unlimited nominal capacities for railway track scales. The proposal appears to have little support from parties that would be most affected by the changes to paragraph S.6.4., if the proposal were adopted. Additionally, there remains some concern about the difficulty of locating sufficient test weights and the ability to concentrate a test load on scales with capacities that exceed 640 000 lb. Consequently, the Committee withdrew the proposal from the agenda and asked the AAR and Systems Associates, Inc. to find an alternate proposal that is amenable to both parties and the industries they represent.

Editorial Note: The Northeastern Weights and Measures Association (NEWMA) proposal to modify Table 4, Minimum Test Weights and Test Loads begins to address the maximum test load on all large capacity scales. erroneously appeared in Interim Agenda Item 320-2. The Committee agreed that it has merit, but is insufficiently developed for Committee action. Consequently, NEWMA's proposal now appears in Appendix A as developing item Part 2, Scales Code in the 2004 Committee's Final Report.

320-3 VC Table S.6.3.a. Marking Requirements and Table S.6.3.b. Notes for Table S.6.3.a; Note 24 Section Capacity Prefix

(This item was adopted.)

Source: Central Weights and Measures Association (CWMA)

Recommendation: Modify Table S.6.3.a. Marking Requirements as follows:

Table S.6.3.a.
Marking Requirements

	Weighing Equipment				
To Be Marked With ⇓	**Weighing, load-receiving, and indicating element in same housing or covered on the same CC[1]**	**Indicating element not permanently attached to weighing and load-receiving element or covered by a separate CC**	**Weighing and load-receiving element not permanently attached to indicating element or covered by a separate CC**	**Load cell with CC (11)**	**Other equipment or device (10)**
Manufacturer's ID (1)	**X**	**X**	**X**	**X**	**X**
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.		.
Section Capacity <u>**and Prefix**</u> (14)(20)(22)<u>**(24)**</u>		**X**	**X**		

Note: For applicable notes, see Table S.6.3.b.

[1]Weighing/load-receiving elements and indicators which are in the same housing or which are permanently attached will generally appear on the same CC. If not in the same housing, elements shall be hard wired together or sealed with a physical seal or an electronic link. This requirement does not apply to peripheral equipment that has no input or effect on device calibrations or configurations.

(Added 1990) (Amended 1992, 1999, 2000, 2001 ~~and~~ 2002<u>**, and 2004**</u>**)** (Footnote 1 Added 2001)

Add new Note 24. to Table S.6.3.b. Notes for Table S.6.3.a. as follows:

> <u>**24. The section capacity shall be prefaced by the words "Section Capacity" or an abbreviation of that term. Abbreviations shall be "Sec Cap" or "Sec C" All capital letters and periods may be used.**</u>
> <u>**(Added 2004)**</u>

Discussion: The CWMA believes that current NIST Handbook 44 may be interpreted to prohibit the abbreviation of section capacity. Manufacturers abbreviate marking information because some device identification badges are limited in space. The CWMA recommended adding a new paragraph S.6.4.3. that requires identification of section capacity information with a prefix and defines acceptable abbreviations for that prefix. The CWMA did not submit specific language for addressing the abbreviation of section capacity in Table S.6.3.a. Marking Requirements and Table S.6.3.b. Notes For Table S.6.3.a.

The Western Weights and Measures Association (WWMA) heard that the NTETC Weighing Sector and manufacturers supported the intent of the proposal. However, the WWMA believed the CWMA proposal should be simplified and modified for clarity. The WWMA agreed that use of the abbreviations "SC" and "S Cap" to identify section capacity are not acceptable because they might be interpreted to represent scale capacity. The WWMA considered a recommendation to include identification requirements for section capacity in General Code paragraph G-S.1. Identification since that requirement specifies other marking information and prefixes. Ultimately, the WWMA decided to address the abbreviation of "section capacity" as a Scales Code requirement. The WWMA worked with the NTETC Weighing Sector Technical Advisor to develop the alternate proposal to modify Table S.6.3.a. and Table S.6.3.b., which is shown in the recommendation above.

The Scale Manufacturers Association supported the proposal for including in Table S.6.3.a. and Table S.6.3.b. language that requires a prefix to identify the scale's section capacity and specifies how the prefix must be abbreviated.

The Committee agreed that the best approach for designating a prefix that identifies the scale's section capacity is the WWMA alternate proposal which is outlined in the recommendation above. This proposal is consistent with the current practice of listing other scale marking requirements in one table. The Committee modified the proposed new Note 24. by removing the word "Acceptable." The Committee did not believe it was necessary to include this term since acceptable abbreviations are adequately defined in the note's text.

320-4 VC N.3.2. Field Standard Weight Carts

(This item was adopted.)

Source: Carryover Item 320-11. (This item originated from the Northeastern Weights and Measures Association (NEWMA) and first appeared on the Committee's 2003 agenda.)

Recommendation: Add new paragraph N.3.2.

> <u>**N.3.2. Field Standard Weight Carts. - Field Standard Weight Carts that comply with the tolerances expressed in Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied) may be included as part of the minimum required test load for shift tests and other test procedures.**</u>
> <u>**(Added 2004)**</u>

Discussion: Originally, NEWMA submitted a proposal which was intended to modify the NIST Handbook 44 Scales Code to recognize the use of weight carts during a shift test. During its October 2003 Interim Meeting, NEWMA indicated that its original proposal was not ready for adoption by the NCWM. New York noted that NEWMA's proposal shown below should include a reference to the Handbook 44 Fundamental Considerations 3.2 Tolerances for Standards. New York also recommended modifying NEWMA's proposal to eliminate any requirements that specify a particular type of information that must be included in the weight cart's calibration report as follows:

> N.1.3.4.1. Weight Carts. - Weight carts may be included as part of the minimum required test load required in N.1.3.4. provided that the mass value of the weight cart has been determined by weights and measures and is clearly marked thereon. Further, a certificate of calibration issued by the weights and measures jurisdiction that issued the weight certificate must be available at all times. ~~Said certificate shall contain at a minimum the following information: the date of calibration, name, model, and serial number of the weight cart; the minimum graduation of the scale used in the calibration of the weight cart; and the name of the jurisdiction and inspector or metrologist who determined the mass value~~.

At the 2004 NCWM Interim Meeting, the Committee heard that the NEWMA proposal was unclear as to how the mass value is determined by a weights and measures jurisdiction. The Committee agreed that the portions of the proposed language intended to address the reference standard should include information about the uncertainty of the scale used as the reference standard rather than the scale's minimum graduation size. The uncertainty of the reference scale is essential in the calibration report for the weight cart to establish the accuracy of measurements made with the field standard.

The Central Weights and Measures Association (CWMA) developed an alternate proposal that specified weight carts may be used as part of the minimum load for shift tests on vehicle scales. The CWMA believed that an additional proposal was needed to permit the use of weight carts in tests other than shift tests. The CWMA also recommended that the proposal make reference to weight carts meeting the Fundamental Considerations Tolerance for Standards when a weight cart is used as the testing apparatus in accordance with the requirements for calibration of a field test standard in NIST Handbook 105-8, Specification and Tolerances for Field Standard Weight Carts.

The Committee agreed that the test note should include language that permits use of weight carts for shift tests and other tests as well as specify a standard for the weight cart. The Fundamental Considerations prescribe the allowable error in a field test standard used by weights and measures officials. The Committee also noted that the proposed paragraph designation of "N.1.3.4.1." is already in use. Consequently, the Committee modified the

CWMA proposal as shown in the recommendation above to include a new paragraph designation and to require that field standard weight carts comply with the guidelines for test apparatus in the Fundamental Considerations.

The Committee acknowledged that it is general knowledge that NIST Handbook 105-8 is available through the NIST Weights and Measures Division web site at www.nist.gov/owm and Handbook 105-8 was published in December 2003.

320-5 VC N.1.5. Discrimination Test

(This item was adopted.)

Source: Central Weights and Measures Association (CWMA)

Recommendation: Modify paragraph N.1.5. as follows:

> ***N.1.5. Discrimination Test. -*** *A discrimination test shall be conducted on all automatic indicating scales with the weighing device in equilibrium at* ***or near*** *zero load and at* ***or near*** *maximum test load, and under controlled conditions in which environmental factors are reduced to the extent that they will not affect the results obtained.* ***For scales equipped with the Automatic Zero-Setting Mechanism (AZSM), the discrimination test may be conducted at a range outside of the AZSM range.***
> *[Nonretroactive as of January 1, 1986]*
> (Added 1985) **(Amended 2004)**

Discussion: The CWMA agreed that it is impossible to conduct a discrimination test and verify the zone of uncertainty *at* zero if the Automatic Zero-Setting Mechanism (AZSM) is operational. The CWMA believed the test should be conducted *near* zero without the weights and measures official having to disable AZSM. The CWMA did not want officials having to access the inside of scales to disable and then make operational AZSM or any other feature.

The Scale Manufacturers Association supported this item.

The Committee recognized that there are environmental and scale design factors that can affect the results of a discrimination test. The Committee also acknowledged that it is acceptable to perform a discrimination test at zero load just above the zero tracking range for scales that are equipped with AZSM. The test is also acceptable when performed just below the scale's maximum capacity, in the event that a scale is set up to display an indication of over capacity when that maximum total load is in excess of the capacity established in paragraph S.1.7. Capacity Indication, Weight Ranges, and Unit Weights.

The Committee believes it is important for weights and measures officials to understand how to conduct the discrimination test on scales equipped with or not equipped with AZSM. The Committee agreed that the test shall be conducted either "at or near" the zero load and "at or near" the maximum test load and modified the proposal accordingly. The modified language also allows officials to use their discretion in conducting the discrimination test on scales equipped with AZSM. In this case, the official may elect to disable the feature or conduct the discrimination test near the zero load and near the maximum test load when an operational AZSM makes the test difficult.

320-6 VC Table 3 Parameters for Accuracy Classes; Footnote 5 Grain Hopper Scales

(This item was adopted.)

Source: Central Weights and Measures Association (CWMA)

Recommendation: Add a new footnote to Table 3 as follows:

Table 3
Parameters for Accuracy Classes

Class	*Value of the verification scale division (d or e[1])*	*Number of scale[4] divisions (n)*	
		Minimum	*Maximum*
SI Units			
.	.	.	.
.	.	.	.
.	.	.	.
III[2,] <u>[5]</u>	*0.1 to 2 g, inclusive*	*100*	*10 000*
.	.	.	.
.	.	.	.
.	.	.	.
INCH-POUND Units			
III[2,] <u>[5]</u>	*0.0002 lb to 0.005 lb, inclusive*	*100*	*10 000*
.	.	.	.
.	.	.	.
.	.	.	.

[1]For Class I and II devices equipped with auxiliary reading means (i.e., a rider, a vernier, or a least significant decimal differentiated by size, shape, or color), the value of the verification scale division"e" is the value of the scale division immediately preceding the auxiliary means.

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<u>[5]The minimum number of scale divisions for a Class III Hopper Scale used for weighing grain shall be 2000.</u>

[Nonretroactive as of January 1, 1986]

(Amended 1986, 1987, 1997, 1998, 1999, ~~**and**~~ 2003, **<u>and 2004</u>)** (Footnote 4 Added 1997) **<u>(Footnote 5 Added 2004)</u>**

Discussion: Requirements for the minimum and maximum number of scale divisions are listed in Table 3 Parameters for Accuracy Classes; however, the table presently does not recognize a limitation to the minimum and maximum number of scale divisions included in user requirement, paragraph UR.1.2. Grain Hopper Scales. To ensure both manufacturer and users are aware of this limitation, the CWMA recommended adding a new footnote 5 to Table 3 making the information about grain hopper scales available in paragraphs intended for device manufacturers. The CWMA believes that paragraph UR.1.2. requirements for the minimum number of scale divisions for a Class III Hopper Scale used for grain weighing is overlooked.

The Scale Manufacturers Association (SMA) opposed this proposal because it introduces a new application into Table 3. SMA prefers that Table 3 not include any application requirements.

The Committee believes that adding a new note to Table 3 helps to clarify for the manufacturer and official the allowable minimum number of scale divisions for a Class III Hopper Scale used in grain weighing applications. Adding the text from the user requirement into Table 3 is consistent with current Table 3 requirements for hopper scales and further explains the parameters that apply for this device type.

The Committee acknowledged that there are instances where a long laundry list of exceptions can make a requirement unwieldy; however, the proposal does not fall into that category. The Committee remains convinced that Table 3 is the appropriate location for the proposed footnote and the proposal as written provides needed information to parties that must design and inspect devices for compliance with accuracy class requirements.

320-7 W Appendix D; Definition of Counter Scale, S.2.1.3. Scales Equipped with an Automatic Zero-Setting Mechanism, N.1.3.1. Bench or Counter Scales, and N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers

(This item was withdrawn.)

Source: Carryover Item 320-4. (This item originated from the National Type Evaluation Technical Committee (NTETC) Weighing Sector and first appeared on the Committee's 2003 agenda.)

Discussion: The Committee was asked to consider several proposals to clarify the definition, shift test, and other requirements for "counter scale" as follows:

> Counter Scale. ~~One~~ A scale that, by reason of its size, arrangement of parts, and ~~moderate~~ with a nominal capacity no greater than 100 kg (220 lb), is adapted for use on a counter or bench. Sometimes called "bench scale." [2.20]

The Western Weights and Measures Association (WWMA) recommended an alternate proposal to amend paragraph S.2.1.3. as follows:

> *S.2.1.3. Scales Equipped with an Automatic Zero-Setting Mechanism. - Under normal operating conditions the maximum load that can be "rezeroed," when either placed on or removed from the platform all at once, shall be:*
>
> *(a) For bench~~,~~ and counter~~, and livestock~~ scales installed prior to January 1, 200X: 0.6 scale division;*
>
> *(b) For livestock scales: 0.6 scale division*
>
> *(~~b~~c) For vehicle, axle-load, and railway track scales: 3.0 scale divisions; ~~and~~*
>
> *(~~c~~d) For all other scales installed prior to January 1, 200X: 1.0 scale division~~.~~; and*
>
> *(e) For all scales other than livestock, vehicle, axle-load, and railway track scales: 0.5 scale division.*
> *[Nonretroactive ~~and enforceable~~ as of January 1, ~~1981~~200X]*

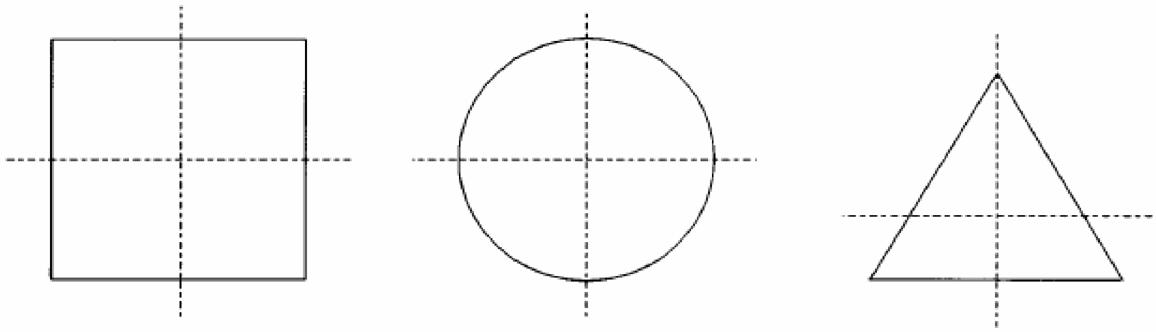
Delete paragraph N.1.3.1. as follows:

> ~~N.1.3.1. Bench or Counter Scales. A shift test shall be conducted with a half-capacity test load centered successively at four points equidistant between the center and the front, left, back, and right edges of the load-receiving element.~~

Renumber paragraphs N.1.3.2. Dairy-Product-Test Scale through N.1.3.7. Vehicle On-board Weighing Systems.

Amend paragraph N.1.3.8. as follows:

> N.1.3.7~~8~~. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. - When testing a scale with a load receiving element having no more than four load supports, a ~~A~~ shift test shall be conducted with a one-third ~~half-~~capacity test load centered, as nearly as possible, successively at the center of each quarter of the load-receiving element as shown in the figures below.~~, or~~ For scales with a capacity greater than 151 kg (301 lb) and having more than one load support, a shift test may be conducted with a quarter capacity test load centered, as nearly as possible, successively over each main load support.



In 2003, the Committee examined a 2002 NTETC Weighing Sector proposal to modify paragraphs N.1.3.1. and N.1.3.8. that prescribed test procedures based on the number of platform supports. The proposal also revised the definition of "counter scale" to include a nominal capacity limit that distinguishes bench/counter scales from floor scales. A capacity limit of 100 kg for bench/counter scales was recommended for consistency with Measurement Canada requirements.

The Weighing Sector also noted that NIST Handbook 44 paragraph S.2.1.3. Scales Equipped with an Automatic Zero-Setting Mechanism specifies a different maximum load that can be rezeroed for bench/counter scales (0.6 scale division) from that prescribed for all other scales (1.0 scale division).

Industry and weights and measures officials opposed the proposed changes to paragraphs N.1.3.1. and N.1.3.8. because they were too confusing, but they did support modifications to the definition of "counter scale" as shown above.

During its discussions at the 2003 NCWM Annual Meeting, the Committee acknowledged there are benefits to harmonizing requirements. However, the Committee concluded that modifying the definition of counter scale alone did not clarify which shift test procedure is appropriate for a given scale design and did not provide field officials with sufficient information to conduct an appropriate shift test. The Committee recommended that the Weighing Sector consider developing a policy where scale design information must be included on all NTEP Certificates of Conformance to assist officials in the determination of the appropriate shift test for a particular scale design.

The Central Weights and Measures Association (CWMA) believes that the current Handbook 44 definition of "counter scale" was adequate for the official to determine whether or not a scale is classified as a counter scale and to conduct the appropriate shift test. Therefore, the CWMA recommended the proposal to modify the definition of "counter scale" be withdrawn.

The Western Weights and Measure Association (WWMA) heard opposition to the proposed definition as written. The WWMA also reviewed several alternate proposals from NIST. Scale manufacturers commented that language in OIML R 76 Non-Automatic Weighing Instruments is less ambiguous and requires a one-third capacity shift test load centered in the quadrants of a scale. In addition, the test procedure results in a load that has the equivalent effect of a shift test load at one-half capacity that is currently prescribed in paragraph N.1.3.1. Industry indicated that this approach is appropriate since a majority of scales they manufacture meet both U.S. and international performance requirements. Consequently, the WWMA recommended an alternate proposal shown above to address the Weighing Sector's concerns about how to align Handbook 44 with OIML R 76 paragraphs 4.5.7. (Zero-tracking device) and A.4.7. (Eccentricity tests).

The Northeastern Weights and Measures Association (NEWMA) opposed the proposed definition as written, but did not provide an explanation for its opposition. NEWMA also indicated it would need additional time to review the WWMA alternate proposal.

The Southern Weights and Measures Association reviewed the WWMA alternate proposal and recommended that the NCWM S&T Committee keep this proposal an information item until the Weighing Sector has the opportunity to provide input.

The Scale Manufacturers Association (SMA) opposed the proposed definition and recommended that it be withdrawn and returned to the Weighing Sector where it should be considered for harmonization with OIML requirements. The SMA also believed that if modifications are made to paragraph S.2.1.3. then the requirement should specify that the 0.5 division is the maximum load that can be rezeroed for new scales equipped with an AZSM.

NIST WMD noted that the WWMA alternate proposal, as written, appears to include a nonretroactive enforcement date which may eliminate AZSM requirements entirely for existing scales.

The Committee agreed that the proposal needed additional work. The proposals before the Committee have attempted to address three different issues: (1) refining the definition of a device type, (2) reducing the limits for automatic zero setting mechanisms on Class III scales, and (3) prescribing the appropriate shift test procedures for a device type, that seem to have the counter/bench scale as a common thread. The WWMA proposal should be reviewed against current paragraph N.1.3.8. in the 2004 Edition of NIST Handbook 44 to determine what is the most appropriate test load and test pattern. One resounding theme in many comments about the WWMA proposal is that the Weighing Sector should be in agreement that the language harmonizes with OIML requirements. The OIML requirements appear to be based on load support design rather than a specific device nomenclature. Consequently, the Committee is withdrawing this item until the Weighing Sector can develop the issue further and resolve the concerns expressed by industry and weights and measures officials.

320-8 I S.1.1. (c) Zero Indication; Requirements for Markings or Indications for Other than Digital Zero Indications

Source: NCWM S&T Committee

Discussion: In response to a request for an interpretation of paragraph S.1.1.(c), the Committee included on its agenda a proposal to amend the paragraph to clarify the original intent of the requirement as follows:

S.1.1. Zero Indication.

(a) On a scale equipped with indicating or recording elements, provision shall be made to either indicate or record a zero-balance condition.

(b) On an automatic-indicating scale or balance indicator, provision shall be made to indicate or record an out-of-balance condition on both sides of zero.

(c) A zero-balance condition may be indicated by other than a continuous digital zero indication, provided that an effective automatic means is provided to inhibit a weighing operation or to return to a continuous digital indication when the scale is in an out-of-balance condition <u>**and is marked or includes supplemental indications or markings to indicate that the "other than digital zero indication" represents a no-load zero-balance condition of the scale**</u>**.**

The NTETC Weighing Sector requested clarification from the S&T Committee regarding scales and point-of-sale systems where the device's zero-balance condition is represented by other than digital zero indications such as scrolling messages (advertisements), dashes, or other means. The Weighing Sector requested clarification on whether scales with this feature require additional markings or indications that inform customers that the scales are at a zero-balance condition and are being used properly according to General Code paragraph G-S.6. Marking Operational Controls, Indications, and Features.

The reason for the Weighing Sector's request is that there is disagreement among NIST Weights and Measures Division (WMD), the NTEP laboratories, and manufacturers over the interpretation of NIST Handbook 44 General Code paragraph G-S.6. Marking Operational Controls, Indications, and Features, Scales Code paragraph S.1.1. Zero

Indication, and the interpretation of the discussion included in the 78th (1993) NCWM Specifications and Tolerances Committee Item 320-1 S.1.1. Zero Indication. This has resulted in inconsistent type evaluations and weights and measures code enforcement for scales and point-of-sale systems interfaced with scales that use methods such as screen savers, power savers, scrolling displays, and modes of operation to indicate that a device is at a zero-balance condition when no load is on the scale.

NIST and some of the participating laboratories have stated that General Code paragraph G-S.6 requires weighing devices to be marked or an indication provided that states that zero-balance is represented by other than a digital zero indication and that this interpretation is supported by the Report of the 78th of the NCWM Annual Meeting, S&T Committee Item 320-1. Additionally, NCWM Publication 14 was amended in 2003 to include checklist procedures to verify that digital electronic scales equipped with other than a continuous digital zero indication comply. Other participating laboratories and some manufacturers state that the markings are not necessary because Handbook 44 paragraph S.1.1. (c) does not specifically state that the additional markings are required and that the actions of the 78th NCWM to amend paragraph S.1.1.(c) provided sufficient customer protection for devices that use this feature.

As stated earlier, NIST WMD believes that paragraph G-S.6. requires that a weighing device must be marked or an indication provided that states that zero-balance is represented by other than a digital zero indication (e.g., a zero enunciator is provided or the scale is marked with statements such as “scale at zero” or “scrolling message indicates the scale is at zero”). Handbook 44 code paragraphs have also been adopted for the purpose of providing customers with sufficient information to make an informed decision during a direct sale weighing transaction as follows:

1.10. General Code
- G-S.5.2.2.(d) Digital Indication and Representation
- G-S.5.2.4. Values.
- G-S.5.3.1. On Devices That Indicate or Record in More Than One Unit
- G-S.6. Marking Operational Controls, Indications, and Features
- G-UR.3.3. Position of Equipment

2.20. Scales
- S.1. Design of Indicating and Recording Elements and of Recorded Representations
- S.1.4. Indicators
- S.1.5.4. Readability
- S.1.8.3. Customer’s Indications
- S.1.12. Manual Gross Weight Entries
- S.4.3. Multiple Load-Receiving Elements
- Table S.6.3.b.Notes for Table S.6.3.a.; Note 13 – A scale designed for a special application . . . features.”

NIST WMD also believed that changes were required to Scales Code paragraph S.1.1.(c) to clarify the intent of the past S&T Committee and to prevent further misinterpretation. The S&T Committee concurred with this position and consequently proposed changes to paragraph S.1.1.(c) as outlined above.

During the 2004 NCWM Interim Meeting, the Committee was briefed on some ongoing discussions about zero indications within the Weighing Sector for the past several years. The Weighing Sector was presented with a retail scale using a touch screen with a screen saver that extends the screen’s life. The scale screen saver changes to display the indications when the scale is off zero. In this example, the Weighing Sector agreed there was no fraud, but the scale should display a zero indication prior to a subsequent weighment. Because discussions are still ongoing, some Weighing Sector members believe the proposal may be premature.

Weights and measures officials indicate there may be “not-built-for-purpose” devices which do not comply with the proposed interpretation. The “not-built-for-purpose” devices are interfaced with approved devices; however, they continue weighing when off of zero. Consequently, officials question whether the proposed changes to paragraph S.1.1.(c) are intended to be nonretroactive requirements.

The Committee agreed that its interpretation of paragraph S.1.1.(c) is consistent with the original intent. After hearing comments about how some systems are designed to operate, the Committee recommended that additional language is needed to clarify that no marking is required if operator intervention is necessary to verify a zero condition before the start of a transaction. The Committee made the proposal an information item to provide sufficient time for input from the Weighing Sector, which did not have the proposal available at its 2003 meeting and for the development of suggested language to address operator intervention.

After the Weighing Sector reviews the proposal at its August 2004 meeting, the Committee plans to move the proposal forward as a voting item on its 2005 agenda. The Committee believes this will provide a record of how the requirement should be applied. The Committee intended that all primary indicators must comply with paragraph S.1.1., therefore, the proposal should be a retroactive requirement.

321 BELT-CONVEYOR SCALE SYSTEMS

321-1 VC S.1.5. Rate of Flow Indicators and Recorders and UR.1. Use Requirements; Operated Capacity

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Amend paragraphs S.1.5. and UR.1. as follows:

> ***S.1.5. Rate of Flow Indicators and Recorders.*** *- A belt-conveyor scale shall be equipped with a rate of flow indicator and an analog or digital recorder. Permanent means shall be provided to produce an audio or visual signal when the rate of flow is equal to or less than* ~~***35***~~ ***20 %*** *and when the rate of flow is equal to or greater than* ~~***98***~~ ***100*** *% of the rated capacity of the scale. The type of alarm (audio or visual) shall be determined by the individual installation.*
> *[Nonretroactive as of January 1,1986]*
> (Amended 1989 **and 2004**)
>
> **UR.1. Use Requirements. -** A belt-conveyor scale system shall be operated between ~~**35**~~**20** % and ~~**98**~~ **100** % of its rated capacity.
> **(Amended 2004)**

Discussions: During the 2002 Belt-Conveyor Scale Technical Seminar, there was considerable discussion about harmonization of the NIST Handbook 44 Belt-Conveyor Scale Systems Code with OIML R 50 Continuous Totalizing Automatic Weighing Instruments. Preliminary data was presented to provide evidence that belt-conveyor scales tested only at zero and a single flow rate as specified by Handbook 44 may have excessive errors at other flow rates.

Occasionally, there are periods of varying duration, when a scale operates at different flow rates even though most belt-conveyor scales tend to operate a majority of the time at relatively the same flow rate. Other devices in Handbook 44 are tested throughout their rated operating range; therefore, belt-conveyor scales should be subject to similar testing to ensure accuracy at all ranges.

The WWMA heard comments in support of the proposal from a manufacturer and user. The WWMA recommended that the NCWM S&T Committee move the proposal forward as a voting item.

The Southern Weights and Measures Association supported this proposal as written.

The Committee received additional industry support for the proposal as written. The Committee recognized that the proposal was the result of work by the Belt-Conveyor Scale Technical Seminar representatives, the NIST Technical Advisor to the Seminar, and the WWMA.

The original proposal included a proposal to change the nonretroactive date from 1986 to 2004. The Committee discussed the impact of changing the nonretroactive enforcement date from 1986 to 2004. The Committee agreed with NIST that such a change would make the requirement in paragraph S.1.5. less restrictive than the current requirements. The Committee agreed that systems installed prior to 2005 would already meet the less restrictive requirement for a signal to indicate a rate of flow outside of the 20 % to 100 % range of scale capacity. The Committee acknowledged that it is acceptable for systems to operate within a range that is narrower than the proposed 20 % to 100 % of the scale's capacity as long as it complies with other Handbook 44 requirements. Consequently, the Committee maintained the 1986 nonretroactive enforcement date in paragraph S.1.5. and removed the proposed requirement for different enforcement dates based on an installation before or after January 1, 2005, from the proposal to modify paragraph UR.1. The Committee agreed that the proposal with modifications was ready for a vote as shown in the recommendation above.

321-2 VC N.2. Conditions of Test, N.2.1. Initial Verification, N.2.2. Subsequent Verification, and N.2.3. Minimum Test Load

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify paragraph N.2. as follows:

N.2. Conditions of Test. - A belt-conveyor scale shall be tested after it is installed on the conveyor system with which it is to be used and under such environmental conditions as may normally be expected. ~~**It shall be tested at normal use capacity and may also be tested at any other rate of flow that may be used at the installation.**~~ Each test shall be conducted ~~**for**~~ **<u>with test loads no less than the minimum test load.</u>**

~~**(a) not less than 1000 scale divisions**~~
~~**(b) at least three revolutions of the belt, and**~~
~~**(c) at least 10 minutes of operation, or for a normal weighment.**~~
(Amended 1986 **<u>and 2004</u>**)

Add new paragraphs N.2.1., N.2.2., and N.2.3., as follows:

<u>N.2.1. Initial Verification. - A belt-conveyor scale system shall be tested at an intermediate flow rate, near 35 % flow rates and normal use capacity. The system may also be tested at any other rate of flow that may be used at the installation.</u>
<u>(Added 2004)</u>

<u>N.2.2. Subsequent Verification. - Subsequent testing shall include testing at the normal flow rate and other flow rates used at the installation. The official with statutory authority may determine that testing only at the normal flow rate is necessary for subsequent verifications if evidence is provided that the system is used to operate no less than 70 % of the maximum flow rate at least 80 % of the time, or that the range of the normal operational flow rate does not vary by more that 10 %, inclusive of the normal operational flow rate, (e.g. If the normal flow rate is 70 % an acceptable range can be 63 % to 73 %).</u>
<u>(Added 2004)</u>

<u>N.2.3. Minimum Test Load. - The minimum test load shall not be less than the largest of the following values.</u>

<u>(a) 800 scale divisions,</u>
<u>(b) The load obtained at maximum flow rate in one revolution of the belt, or</u>
<u>(c) At least 10 minutes of operation.</u>

<u>The official with statutory authority may determine that a shorter time down to 2 % of the load totalized in one hour at the maximum flow rate may be used, provided that:</u>

<u>2 % of the load totalized in one hour at the maximum flow rate is greater than the time to achieve (a) and (b) and testing is performed that demonstrates that the system can perform within tolerances with both the shorter test time and with minimum totalized loads described in N.2.3. (a), (b), or (c).</u>
<u>(Added 2004)</u>

Discussion: Participants at the 2002 NIST Belt Conveyor Scale Systems Technical Seminar, developed a proposal that requires testing a belt-conveyor scale at several flow rates to verify that it maintains accuracy over a range of flow rates for a specific installation. The seminar participants also developed guidelines for an appropriate minimum test load.

Current NIST Handbook 44 test procedures do not clearly require tests at flow rates other than the normal operating flow rate. Belt-conveyor scales often operate at other flow rates for varying time periods and thus need to provide accurate weighing at all flow rates.

The WWMA heard comments in support of this item from a manufacturer and user. There was also a comment that a corresponding definition for "minimum test load" would be redundant and may not be necessary. The WWMA believes the proposal provides additional clarification of the "minimum test load" thus eliminating the need to amend Appendix D Definitions.

The Southern Weights and Measures Association supported the proposal as written.

The Committee modified the proposal for paragraph N.2.3. to clarify the amount of testing necessary when performing a shorter test so the time period is sufficient in length and does not contribute to scale error. The Committee concluded that defining terms such as "minimum test load," "initial verification," and "subsequent verification" is not necessary since those terms are commonly used in reference to tests on many other types of weighing devices and are thought to be well understood.

321-3 VC N.3.1.2. Initial Stable Zero, N.3.1.3. Test of Zero Stability, and T.1.1. Tolerance Values-Test of Zero Stability

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Amend paragraphs N.3.1.2. and N.3.1.3 as follows:

> **N.3.1.2. Initial Stable Zero. -** The conveyor system shall be operated to warm up the belt and the belt scale shall be zero adjusted as required. A series of zero-load tests shall be carried out until three consecutive zero-load tests each indicate an error which does not exceed ± 0.06 % **~~of the full-scale capacity~~** **of the totalized load at full scale capacity for the duration of the test~~, or ± 1 division, whichever is less~~.** No adjustments can be made during the three consecutive zero-load test readings.
> (Added 2002) **(Amended 2004)**
>
> **N.3.1.3. Test of Zero Stability. -** The conveyor system shall be **~~run~~** **operated** to warm up the belt and the belt scale shall be zero adjusted as required. A series of zero-load tests shall be carried out immediately before the simulated or materials test until the three consecutive zero-load tests each indicate an error which does not exceed ± 0.06 % **~~of the full-scale capacity~~** **of the totalized load at full scale capacity for the duration of the test~~, or ± 1 division, whichever is less~~.** No adjustments can be made during the three consecutive zero-load test readings.
>
> **~~Immediately after material has been weighed over the belt-conveyor scale during the conduct of the materials test, the zero-load test shall be repeated. The zero error from this test shall not exceed ± 0.12 % of the full-scale capacity or ± 2 divisions, whichever is less.~~**
> (Added 2002) **(Amended 2004)**

Add a new paragraph T.1.1. Tolerance Values – Test of Zero Stability as follows:

> **T.1.1. Tolerance Values – Test of Zero Stability. – Immediately after material has been weighed over the belt-conveyor scale during the conduct of the materials test, the zero-load test shall be repeated. The**

change in the accumulated or subtracted weight on the Master Weight Totalizer during the zero test shall not exceed 0.12 % of the totalized load at full scale capacity for the duration of the test.
(Added 2004)

Discussion: In 2002, paragraphs N.3.1.2. and N.3.1.3. were added to the Belt-Conveyor Scale Systems Code to define a stable zero and establish an acceptable variation in zero (zero error), when the system is operated at a no load condition. The change was made, in part, to make the code consistent with requirements in OIML R 50 Continuous Totalizing Automatic Weighing Instrument. R 50 defines the allowable zero error in terms of a percent of the totalized load at the system's maximum flow-rate only for the time-period it takes to complete the test. Current paragraphs N.3.1.2. and N.3.1.3. specify the allowable zero error only as a percent of full scale capacity which can be a rather large value and usually results in an error stated in scale divisions since that value is the lesser of the two values. Some comparisons of the allowable zero error in terms of scale divisions, percent of full scale capacity, and percent of capacity for the test duration are shown in the table below:

Comparison of 0.06 % of Scale Capacity to 0.06 % of Test Load (TL)											
Full Scale Capacity (ton/ hour)	**Belt Speed (ft/ min)**	**Belt Load (lb/ft)**	**Belt Length (ft)**	**Belt Rev Time (rev/ min)**	**Time Per 3 Rev (min)**	**3 Rev Load (ton)**	**10 Min Load (ton)**	**"d" Size (ton)**	**Min Test Load (ton)**	**0.06 % of Capacity (ton)**	**0.06 % of TL (ton)**
250	250	33.33	200	0.8	2.40	10.00	41.67	0.02	41.67	0.15	0.025
500	300	55.56	250	0.83	2.50	20.83	83.33	0.05	83.33	0.3	0.05
650	300	72.22	225	0.75	2.25	24.38	108.33	0.1	108.33	0.39	0.065
1000	650	51.28	1500	2.31	6.92	115.38	166.67	0.1	166.67	0.6	0.1
3000	700	142.86	1800	2.57	7.71	385.71	500.00	0.5	500.00	1.8	0.3
5000	500	333.33	1800	3.6	10.8	900.00	833.33	0.5	900.00	3.0	0.57
Rev= revolution min= minimum											

The proposal modifies current Handbook 44 language to redefine the maximum allowable change of zero that is more appropriate for the master weight totalizer.

The Southern Weights and Measures Association supported the WWMA proposal as written.

The Committee recognized that the proposal was the result of work by the Belt-Conveyor Scale Technical Seminar representatives, the NIST Technical Advisor to the Seminar, and the WWMA. The Committee made the proposal a voting item.

The Belt-Conveyor Scale Technical Seminar participants originally recommended use of tolerances expressed in scale divisions because it was consistent with practices in the NIST Handbook 44 Scales Code and possibly less confusing for officials and service agents. However, industry noted that use of a tolerance that is based on a specific number of divisions is not appropriate, and all references to tolerances expressed in scale divisions should be removed from the proposal. NIST WMD agreed with this position and believes that tolerances in terms of a relative percentage error are correct and consistent with OIML recommendations for belt-conveyor scales and similar instruments that weigh dynamically.

The Committee agreed with comments from industry and concluded that the use of a tolerance that is based on a specific number of divisions results in a value that does not correspond to variances in the test duration. A percentage tolerance value can be calculated regardless of the test duration. Consequently, the proposal was modified to remove all references to tolerance values in scale divisions.

321-4 VC N.3.1.4. Check For Consistency of the Conveyor Belt Along Its Entire Length

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify paragraph N.3.1.4. as follows:

> **N.3.1.4. Check For Consistency of the Conveyor Belt Along Its Entire Length. -** After a zero-load test with flow rate filtering disabled, the totalizer shall not change more than **±** three scale divisions from its initial indication during one complete belt revolution.
> (Added 2002) **(Amended 2004)**

Discussion: The intent of paragraph N.3.1.4. is to ensure that the conveyor belt is consistent in weight throughout its entire length. To meet this requirement, a belt must be the same size and thickness throughout its entire length. The types of splices, belt material, and construction are a major contributing factor to maintaining uniform belt weight. During the stability tests, adjustments are made to the scale totalizer to average the entire belt weight to provide a zero reading over complete revolutions of the belt. The belt should not have variances large enough to affect the tolerance of the weighed load because a material test load seldom fully captures a complete revolution of the belt and is not able to use the same averaging process that occurs during the stability tests.

Different interpretations exist over the true value of three scale divisions. The addition of the "±" (plus or minus) symbol will ensure that all officials and commercial operators are reading, interpreting, and applying the requirement consistently.

The Southern and Western Weights and Measures Associations supported the proposal as written.

The Committee received additional industry support for the proposal as written. The Committee recognized that the proposal was the result of work by the NIST Belt-Conveyor Scale Technical Seminar representatives, the NIST Technical Advisor to the Seminar, and the WWMA. Based on its review of the issue and after hearing only favorable comments, the Committee recommended the proposal for a vote.

321-5 VC T.3.1.1. Effect on Zero-Load Balance

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify paragraph T.3.1.1. as follows:

> **T.3.1.1. Effect on Zero-Load Balance. -** The zero-load indication shall not change by more than ~~**0.07**~~ **0.035** % of the rated capacity of the scale (without the belt) for a change in temperature of 10 °C (18 °F) at a rate not to exceed 5 °C (9 °F) per hour.
> **(Amended 2004)**

Discussion: The current 0.07 % tolerance for change in the zero-load indication was originally added to paragraph T.3.1.1. in 1986 to ensure consistency between NIST Handbook 44 and R 76 Non-Automatic Weighing Instruments. The 0.07 % value was recognized prior to the 1994 edition of R 50 Continuous Totalizing Automatic Weighing Instrument, which unlike the 1980 edition of R 50 it superseded, includes influence factor testing.

The proposal amends paragraph T.3.1.1. to reduce the allowable variation because of temperature effect on zero-load balance to harmonize the requirements with the most current edition of OIML R 50. The appropriate tolerance value for the effect of temperature on zero-load balance for a belt-conveyor scale is 0.035 %. Modification of the tolerance would require reevaluation of existing data for devices with "Active" NTEP Certificates of Conformance to ensure those scales meet the more stringent tolerance. Manufacturers contacted about the possibility of the proposal requiring NTEP to reevaluate existing test data agreed that aligning requirements with international standards held a higher priority and also indicated the proposed tolerances can easily be met.

The WWMA and Southern Weights and Measures Association supported the proposal as written. The WWMA acknowledged the proposal is a retroactive requirement. The WWMA agreed that the proposal may require a reevaluation of existing data for devices with "Active" Certificates of Conformance.

The Committee received additional industry support for the proposal as written. The Committee recognized that the proposal was the result of work by the NIST Belt-Conveyor Scale Technical Seminar representatives, the NIST Technical Advisor to the Seminar, and the WWMA. Based on its review of the issue and after hearing only favorable comments, the Committee recommended the proposal for a vote.

321-6 VC UR.2.2.(b) Conveyor Installation; Live Portions of Scale

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify paragraph UR.2.2.(b) as follows:

UR.2.2. Conveyor Installation

(b) Live Portions of Scale. - All live portions of the scale shall be protected ~~by~~**<u>with</u>** appropriate guard devices **<u>and clearances, as recommended by the scale manufacturer,</u>** to prevent accidental interference with the weighing operation. **<u>Also, see UR. 3.2.</u>**
<u>(Amended 2004)</u>

Discussion: Existing installation requirements only provide guidelines for using guards to prevent objects from obstructing the live portions of the scale. Adequate clearance for live portions of the scale is equally important to prevent materials or other objects from jamming or impeding the free motion of moving components of metrological criticality.

In the period following a routine installation, it may become evident that scale components and/or the scale structure may need more clearance due to the physical properties of materials or other environmental factors at the site. A user requirement is necessary since installers may not anticipate the future influence of these factors on the device's performance.

The WWMA heard comments in support of this item from a manufacturer and user. The WWMA further modified the proposal to reduce any ambiguity and emphasize compliance with corresponding installation and operation requirements in General Code paragraphs G-UR.2.1. Installation and G-UR.3.1. Method of Operation.

The Southern Weights and Measures Association supported the proposal as written.

The Committee received additional industry support for the proposal as written. The Committee recognized that the proposal was the result of work by the Belt-Conveyor Scale Technical Seminar representatives, the NIST Technical Advisor to the Seminar, and the WWMA. Hearing no opposition, the Committee made the proposal a voting item.

321-7 VC UR.3.2.(b) Maintenance

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Add a new paragraph UR.3.2.(b) as follows:

UR.3.2. Maintenance. - Belt-conveyor scales and idlers shall be maintained and serviced in accordance with manufacturer's instructions and the following:

(a) The scale and area surrounding the scale shall be kept clean of debris or other foreign material that can detrimentally affect the performance of the system.

<u>(b) There shall be provisions to ensure that weighed material does not adhere to the belt and return to the weighing area.</u>
<u>(Added 2004)</u>

Renumber existing paragraphs UR.3.2.(b) through UR.3.2.(e) to become UR.3.2.(c) through UR.3.2.(f).

Discussion: This proposal is intended to prevent the re-circulation of previously weighed material that has accumulated on the belt. The existing user requirements for belt maintenance only require clean up or removal of debris or foreign material. When the material that is being weighed as a saleable commodity is allowed to stick or freeze to a conveyor belt, then the true weight of delivered product determined by the scale can be affected since the weighed material adhering to the belt may continue to be reweighed by the scale. Current requirements do not include specific language to address this concern. Some possible examples of mechanisms that can be used to prevent material from adhering to the belt are a belt scraper installed at the head-pulley and/or a secondary scraper elsewhere on the conveyor belt system.

The WWMA agreed with comments it heard in support of this item from a manufacturer and user.

The Committee received additional industry support for the proposal as written. The Committee recognized that the proposal was the result of work by the NIST Belt-Conveyor Scale Technical Seminar representatives, the NIST Technical Advisor to the Seminar, and the WWMA. Based on its review of the issue and after hearing only favorable comments, the Committee recommended the proposal for a vote.

322 AUTOMATIC BULK WEIGHING SYSTEMS

322-1 I Tolerances

Source: Carryover Item 322-1. This item originated from the Northeastern Weights and Measures Association (NEWMA) and first appeared on the Committee's 2002 agenda.

Recommendation: Delete paragraphs T.1.4., T.2., T.2.1, T.3.2. and T.3.3. as follows:

> **~~T.1.4. To Tests Involving Digital Indications or Representations. - To the tolerances that would otherwise be applied, there shall be added an amount equal to one-half the value of the scale division. This does not apply to digital indications or recorded representations that have been corrected for rounding using error weights.~~**
>
> **~~T.2. Minimum Tolerance Values. - The minimum tolerance value shall not be less than half the value of the scale division.~~**
>
> **~~T.2.1. For Systems used to Weigh Construction Materials. - The minimum maintenance and acceptance tolerance shall be 0.1 % of the weighing capacity of the system, or the value of the scale division, whichever is less.~~**
>
> **~~T.3.2. For Systems used to Weigh Grain. - The basic maintenance tolerance shall be 0.1 % of test load.~~**
>
> **~~T.3.3. For all Other Systems. - The basic maintenance tolerance shall be 0.2 % of test load.~~**

Renumber paragraph T.3. and renumber and modify T.3.1. as follows:

> **T.~~3~~.2. Basic Tolerance Values.**
>
> **T.~~3~~.2.1. Acceptance Tolerance. -** The basic acceptance tolerance shall be one-half the basic maintenance tolerance**, but never less than 1 division.**

Add new paragraphs T.2.2., T.2.3., and T.2.3.1. and Table 1. and Table 2. as follows:

> **T.2.2. General. - The tolerance applicable to devices not marked with an accuracy class shall have the tolerances applied as specified in Table 1. below.**

Table 1. Tolerance for Unmarked Scales

Type of Device	**Tolerance**	**Decreasing Load Multiplier**	**Other applicable Requirements**
Grain Hoppers	**Class III, T.2.3 (table 2)**	**1.0**	**T.2.1., T.2.3.1**
Other Systems	**Class III L, T.2.3 (table 2)**	**1.0**	**T.2.1., T.2.3.1**

T.2.3. Tolerances Applicable to Devices Marked III or III L.

T.2.3.1. Maintenance Tolerance Values - The maintenance tolerance values are specified in Table 2 below.

Table 2. Maintenance Tolerance for Marked Scales
(All values in this table are in scale divisions)
Tolerance in scale divisions

	1	**2**	**3**	**5**
Class	**Test Load**			
III	**0 – 500**	**501 - 2000**	**2001 - 4000**	**4001 +**
III L	**0 – 500**	**501 - 1000**	**(Add 1d for each additional 500 d or fraction thereof)**	

Add a new footnote to Section 2.20 Scales Code Table 1.1. Tolerances for Unmarked Scales as follows:

[x]**Automatic bulk weighing systems see Section 2.22 for specifications and tolerances.**

Discussion: Since 2002, the Committee has considered a proposal to change the automatic bulk weighing systems tolerances from a percentage basis to division values, which are based on the device's accuracy class. The proposal was intended to align tolerances in the Automatic Bulk Weighing Systems (ABWS) Code and the Scales Code.

The Committee has kept the proposal as an information item to allow interested parties sufficient time to work through issues surrounding the permissible system errors and other concerns. The U.S. Grain Inspection, Packers and Stockyard Administration (GIPSA) indicated opposition to the proposed tolerances because of concerns about the allowable cumulative error in a system's performance. GIPSA also noted that NEWMA indicated that some asphalt and cement plants use hopper scales that are considered ABWS by officials because these devices are capable of weighing single and multiple drafts, while other jurisdictions classify these devices as hopper scales, which are held to different tolerances. During past discussions, the Committee questioned whether training would help clarify any confusion that exists over which systems fall under the ABWS Code. The Committee noted that a hopper modified to include a controller and is only capable of weighing several drafts is an automated hopper, not an ABWS.

Grain Inspection, Packers and Stockyard Administration (GIPSA) Position

GIPSA submitted the following position to the Committee for consideration. In 1986 when the ABWS Code was established those systems were recognized as a special type and design. The tolerances for grain scales in this code were kept as a percentage so they would be proportional throughout the entire test load. The proposed step tolerance structure is not proportional throughout the system's entire weighing range and would double the allowable tolerance for test loads in some scale configurations. GIPSA believes the proposed structure might encourage scale owners to inappropriately select a scale configuration that permits the greater tolerance. Furthermore under the proposed step tolerance structure, if some weights and measures jurisdictions do not apply the tolerance to the grain and test weights (test load) when conducting substitution tests, then the allowable error doubles up through the entire system's capacity.

Since 1986, the ABWS Code percentage tolerance for grain scales has served the grain industry well and there has not been any interest in changing the tolerance structure. In view of GIPSA's 17-year history of successful implementation of the ABWS Code in grain scale applications and the high level of understanding and acceptance of the code, GIPSA believes that the rationale behind NEWMA's proposal does not warrant a change to grain scale tolerances. GIPSA provided three comparison tables to demonstrate its position. The tables are intended to show a comparison of a 0.1 % tolerance and Table 6 Class III tolerance applied to a 120 000 lb x 20 lb and 50 000 lb x 10 lb device, given a specific amount of test weights and using the substitution test method during the increasing load test.

GIPSA Comparison of 0.1 % Tolerance to Accuracy Class III Tolerances
120 000 lb x 20 lb ABWS

Indicated Grain Weight (lb)	Error In Grain Weight (lb)	Actual Grain Weight (lb)	Test Weight (lb)	Indicated Weight (lb)	Error for Indicated Weigh-ment (lb)	0.1 % Tolerance on Test Weights (lb)	Error on Accum-ulated Test Load (lb)	0.1 % Tolerance on Accumu-lated Test Load (lb)	**n**	Class III Tolerance On Test Weights (lb)	Class III Tolerance on Accumulated Test Load (lb)
0	0	0	12000	11980	-20	20	-20	20	600	40[b]	40[b]
11980	-20	12000	12000	23960	-20	20	-40[a]	24	1200	40[b]	40[b]
23960	-40	24000	12000	35960	0	20	-40[a]	36	1800	40[b]	40[b]
35960	-40	36000	12000	47980	+20	20	-20	48	2400	40[b]	60[b]
47980	-20	48000	12000	60000	+20	20	0	60	3000	40[b]	60
60000	0	60000	12000	72000	0	20	0	72	3600	40[b]	60[c]
72000	0	72000	12000	84020	+20	20	+20	84	4200	40[b]	100[b]
84000	+20	83980	12000	96000	0	20	+20	96	4800	40[b]	100[b]
96020	+20	96000	12000	108040	+20	20	+40	108	5400	40[b]	100[c]
107900	+40	107860	12000	119920	+20	20	+60	120	6000	40[b]	100[c]

[a] Error exceeds the current allowable 0.1 % tolerance
[b] Value expressed as an Accuracy Class III tolerance is greater than the current ABWS Code 0.1 % tolerance
[c] Value expressed as an Accuracy Class III tolerance is less than the current ABWS Code 0.1 % tolerance

GIPSA Comparison of 0.1 % Tolerance to Accuracy Class III Tolerances
50 000 lb x 10 lb ABWS

Indicated Grain Weight (lb)	Error In Grain Weight (lb)	Actual Grain Weight (lb)	Test Weight (lb)	Indicated Weight (lb)	Error for Indicated Weigh-ment (lb)	0.1 % Tolerance on Test Weights (lb)	Error on Accum-ulated Test Load (lb)	0.1 % Tolerance on Accumu-lated Test Load (lb)	**n**	Class III Tolerance On Test Weights (lb)	Class III Tolerance on Accumulated Test Load (lb)
0	0	0	5000	5010	+10	10	+10	10	500	10	10
5010	+10	5000	5000	10010	0	10	+10	10	1000	10	20[b]
10020	+10	10010	5000	15000	-20[a]	10	-10	15	1500	10	20[b]
15020	-10	15030	5000	20020	0	10	-10	20	2000	10	20
20020	-10	20030	5000	25010	-10	10	-20	25	2500	10	30[b]
25030	-20	25050	5000	30010	-20[a]	10	-40[a]	30	3000	10	30
30030	-40	30070	5000	35030	0	10	-40[a]	35	3500	10	30[c]
35030	-40	35070	5000	40030	0	10	-40	40	4000	10	30[c]
40040	-40	40080	5000	45040	0	10	-40	45	4500	10	50[b]
45040	-40	45080	5000	50030	-10	10	-50	50	5000	10	50

[a] Error exceeds the current allowable 0.1 % tolerance
[b] Value expressed as an Accuracy Class III tolerance is greater than the current ABWS Code 0.1 % tolerance
[c] Value expressed as an Accuracy Class III tolerance is less than the current ABWS Code 0.1 % tolerance

GIPSA Comparison of 0.1 % Tolerance to Accuracy Class III Tolerances For Typical ABWS Used in Grain Weighing			
Scale Capacity x division	Test Load (lb)	Current Handbook 44 Tolerance (lb)	Proposed Accuracy Class III Tolerances [accumulated test load tolerance] (lb)
5,000 lb x 0.5 lb	500	0.5	1
	5,000	5	2.5 [10]
5,000 lb x 1 lb	500	1	1
	5,000	5	5 [10]
5,000 lb x 2 lb	500	2	2
	5,000	5	6 [20]
10,000 lb x 1 lb	1,000	1	2
	10,000	10	5 [20]
10,000 lb x 2 lb	1,000	2	2
	10,000	10	10 [20]
10,000 lb x 5 lb	1,000	5	5
	10,000	10	10 [50]
20,000 lb x 2 lb	2,000	2	4
	20,000	20	5 [40]
20,000 lb x 5 lb	2,000	5	5
	20,000	20	15 [50]
30,000 lb x 5 lb	3,000	5	10
	30,000	30	25 [100]
30,000 lb x 10 lb	3,000	10	10
	30,000	30	30 [100]
50,000 lb x 5 lb	5,000	5	10
	50,000	50	25 [100]
50,000 lb x 10 lb	5,000	10	10
	50,000	50	50 [100]
50,000 lb x 20 lb	5,000	20	20
	50,000	50	60 [200]
75,000 lb x 10 lb	7,500	10	20
	75,000	75	50 [200]
75,000 lb x 20 lb	7,500	20	20
	75,000	75	60 [200]
100,000 lb x 10 lb	10,000	10	20
	100,000	100	50 [200]
100,000 lb x 20 lb	10,000	20	20
	100,000	100	100 [200]
100,000 lb x 50 lb	10,000	50	50
	100,000	100	100 [500]
120,000 lb x 20 lb	12,000	20	40
	120,000	120	100 [400]
120,000 lb x 50 lb	12,000	50	50
	120,000	120	150 [500]

Western Weights and Measures Association (WWMA) Position

The WWMA remains concerned about the potential effects of the cumulative errors associated with the proposed step tolerances and continues to recommend that this item be withdrawn.

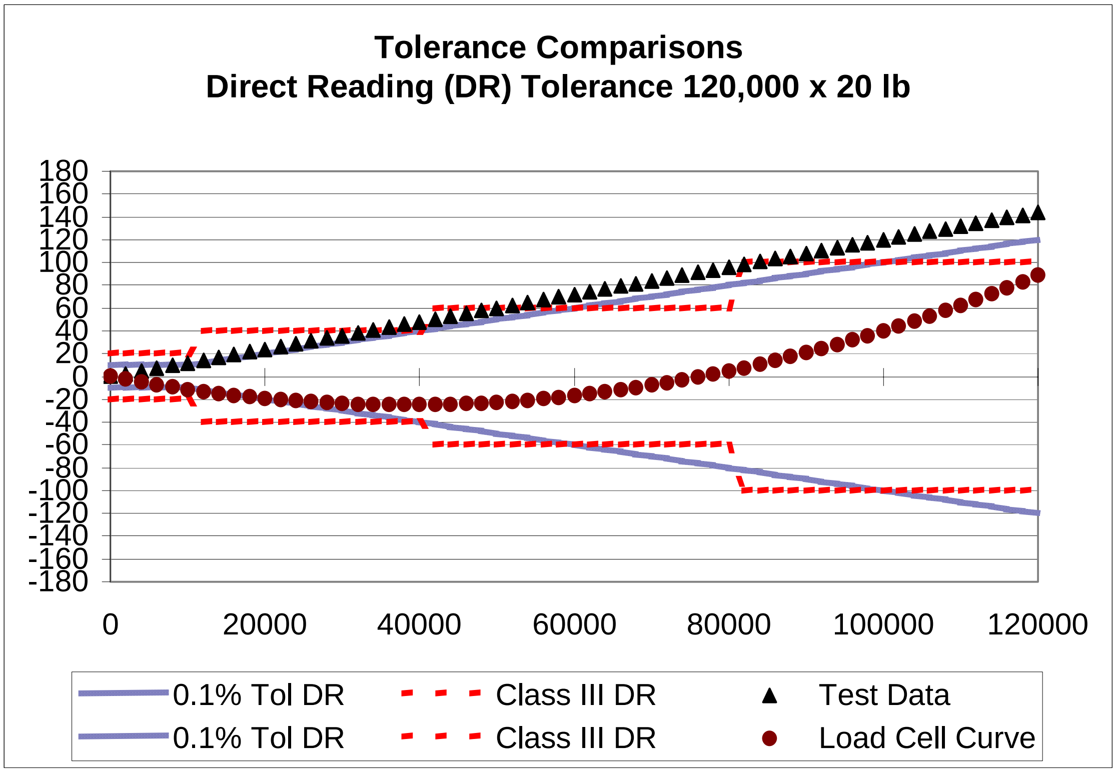
Northeastern Weights and Measures Association (NEWMA) Position

NEWMA does not intend the proposal to require that operators of grain hopper scales replace their scales. NEWMA indicated there are apparent similarities between a 0.1 % and Accuracy Class III tolerance structures. NEWMA finds the tolerance structures are closely aligned, yet slightly different at various points. Consequently, it will always be possible to cite borderline examples where the test results at selective test loads may produce differing "pass" or "fail" results on a particular scale. This difference can work both ways where application of percent tolerances may pass a scale when Class III tolerances would fail that same device and vice versa.

NEWMA believes the 0.1 % tolerance structure in the current ABWS Code emphasizes accuracy primarily at the device's lower capacity ranges. Manufacturers may indicate they are only concerned with a device's performance at 500 d because if the device can pass at that point then it will pass throughout its entire capacity range. In contrast, the Class III tolerance structure places an emphasis on accuracy at the higher scale capacities, which is typically where the scale will be used. For example, at 4000 d the Class III tolerance is actually 1 d tighter than the 0.1 % tolerance. NEWMA finds these differences to be minor.

The concerns heard in 1986 about a less stringent tolerance for loads slightly above 500 d are not the same today because officials know how to properly conduct a substitution test. This is due, in part, to work in 2003 to clarify the definition for substitution test.

NEWMA provided the graph shown below to demonstrate the slight differences in the scale tolerance structures. The graph includes a plotted scale error of 0.12 %. NEWMA notes that it is unlikely that either tolerance structure would result in a failure rate until the test load exceeds 50 000 lb. The graph also includes a "load cell curve" that often appears on high resolution electronic scales like those in the GIPSA examples. NEWMA contends that, if you examine the population rather than the individual scale, the overall outcome of a test will be the same in the long run for both tolerance structures. It also is unlikely that device users could take advantage of the tolerance if adjustments are made as close as practicable to zero error.



NEWMA also contends that there is no significant difference in the design of a manual hopper scale or a hopper scale used in an ABWS. NEWMA does not see manufacturers offer two different models of hopper or use different load cells based on whether or not a device is evaluated under the Scales Code or ABWS Code. History seems to indicate that the 0.1 % tolerance was retained in the ABWS Code in 1986 not because these were unique devices, but primarily because it was too great of a change for many at that time. History also indicates that the 5 d tolerance step for Accuracy Class III was a compromise to those who did not want to lose the 0.1 % tolerance structure and the use of scales with small division sizes. NEWMA believes that in 1986 a majority of ABWSs were mechanical analog devices, whereas today they are predominantly electronic.

NEWMA noted that the change in applicable tolerances from 0.1 % tolerance to an Accuracy Class tolerance structure did not seem to pose a significant problem for a large number of other weighing devices. Between 1990 and 1993, the NCWM made a number of changes to the Scales Code Table T.1.1. Tolerances for Unmarked Scales. These changes brought most of the unmarked scales, initially grandfathered in 1986 at a 0.1 % tolerance, under the Class III tolerance structure. As part of those changes the old decreasing load multiplier was reduced from 1.5 to 1.0. NEWMA does not remember significant increase in device rejections following these transition periods.

NEWMA cites the major reason for its proposal is to make the application of tolerances easier for the inspector. NEWMA finds that applying a percent tolerance is difficult and somewhat subjective, since the official is faced with the difficulty in understanding and correctly applying the minimum tolerance and in dealing with rounding errors at intermediate test loads. NEWMA believes that, if polled any group of officials and asked them to make a tolerance chart for any given ABWS device, you will probably get many different answers. NEWMA notes that in GIPSA's first example there is a tolerance of 40 lb for a 24 000 lb test load. However, the actual tolerance is 34 lb, if using direct reading. Should one round up or round down? What if the test load is 20 000 lb with a 30 lb tolerance, which is right at the break point between graduations? In this instance is the tolerance 20 lb or 40 lb? Any confusion is eliminated under the proposed Accuracy Class tolerance structure.

NEWMA offers what it believes is one more compelling reason to move to Class III tolerance and that is international trade. The NCWM is embarking on a careful effort to consider harmonizing U.S. requirements with OIML requirements. NEWMA believes that all U.S. regulatory agencies should be part of this process to get the United States aligned with the rest of the world. If the U.S. system is better, then we should work together to change OIML standards. If OIML requirements are as good as U.S. requirements, then there is compelling reason under the OIML Treaty to be part of the world community. Adopting Class III Tolerances would bring the United States closer to international standards. Harmonization not only affects the sale of measuring devices, but also their use. The United States exports a great deal of grain to the world. Why shouldn't the United States and the rest of the world have a single standard to verify the measurement of grain at all levels of commerce.

NEWMA welcomes the opportunity for more discussion with the S&T Committee and GIPSA. NEWMA strongly believes that the very minor differences in tolerance applications on a few borderline cases does not justify having a unique code for a device that is identical in design and performance to devices evaluated under the Scales Code. Anyone wishing to discuss this proposal with NEWMA should contact Bill Wilson (Clinton County, New York) at 518-565-4681, by fax at 518-565-4694, or by e-mail at wilsonperu@aol.com or Ross Andersen (New York) at 518-457-3146, by fax at 518-457-5693, or by e-mail at ross.andersen@agmkt.state.ny.us.

NCWM S&T Committee Position

The Committee wants to stress that a system must meet all ABWS Code specifications such as interlocks and overfill sensors as well as performance requirements. There is ongoing work to harmonize many U.S. requirements with OIML standards; however, R 107 Discontinuous Totalizing Automatic Weighing Instruments (Totalizing Hopper Weighers), unlike the ABWS Code, requires a material test. The U.S. and OIML procedures for substitution tests consider the use of error weights to determine the scale's true performance and to avoid introducing uncertainties in the test process. If error weights are not used, the potential does exist for introducing additional error when the known test load falls between tolerance break points in the accuracy class structure.

The Committee heard testimony from GIPSA that all issues that might arise from the proposal have not been examined, especially those affecting the grain industry. GIPSA understands the need to harmonize U.S. and OIML requirements, but recommended a closer examination of the grain industry's concerns. The Committee believes that a U.S. National Work Group (USNWG) should be given serious consideration as a possible forum to work on suitable ABWS tolerances. USNWGs bring public and private sector representatives together that have experience and expertise in a particular device area to work to resolve items on a limited and device specific agenda. NIST USNWGs have made great strides and had multiple successes in tackling many device specific issues. The Committee decided to keep the proposal an information item to allow GIPSA, NEWMA, the grain industry, and all other parties affected by the proposed changes to the ABWS tolerances additional time to compare data and come to an amendable and appropriate solution for ABWS tolerances.

For more background information, refer to the 2002 and 2003 S&T Final Reports.

324 AUTOMATIC WEIGHING SYSTEMS

324-1 V Tentative Status of the Automatic Weighing Systems Code

(This item was adopted.)

Source: Carryover Item 324-1. (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's 2002 agenda.)

Recommendation: Modify the Automatic Weighing Systems Code as shown in Appendix B and change the status of the code from "tentative" to "permanent".

Discussion: Since 2002, the Committee has considered a proposal to change the status of the Automatic Weighing Systems (AWS) Code from "tentative" to "permanent" to provide up-to-date appropriate requirements that can be enforced by weights and measures officials. The item was maintained as an information item on the Committee's agenda to provide time for the AWS Working Group to resolve issues with the limits on units of measurement, inconsistencies in the text, and laboratory tests. The Committee recognized that, although the AWS Working Group addressed many issues, industry still had concerns about devices that comply with NIST Handbook 44, but generate packages that do not meet NIST Handbook 133 requirements for net content.

At its September 2003 Annual Technical Conference, the WWMA heard comments from manufacturers that continue to oppose changing the current status of the tentative code because of allowable device errors permitted in Handbook 44 that may present inconsistencies with package lot requirements in Handbooks 130 and 133. A scale that complies with Handbook 44 accuracy requirements, when used for packaging, may produce package lots that do not meet allowable variance restrictions on net contents under Handbook 133. The manufacturers recommended further work by the AWS Working Group to resolve the remaining issues. The WWMA considered a proposal to amend the application of the AWS code exclusively to automatic weigh-labelers used in USDA facilities, but concluded that this proposed solution would not eliminate the concerns about packages checked at the point-of-pack. The WWMA recommended that this item remain informational.

During the January 2004 NCWM Interim Meeting, the Committee reviewed a proposal to amend the AWS Code that included modifications recommended by the AWS Working Group as well as language that addressed manufacturers" concerns expressed at the WWMA Annual Technical Conference. Manufacturers indicated that with minor changes to this alternate proposal the AWS Code is ready for permanent status. The Committee agreed that the alternate proposal should be included as part of this proposal to change the code status to permanent. The alternate proposal to modify the AWS Code is included in Appendix B. The Committee recognized that the AWS Working Group must be balloted on modifications recommended by manufacturers. The Committee asked that the NIST Technical Advisor to the AWS Working Group report on the results of the work group's ballot and any further modifications beyond editorial changes become separate voting items at the July 2004 NCWM Annual Meeting.

During the 2004 NCWM Annual Meeting, the Committee heard that the AWS Working Group ballot result was 8 in favor to 1 against the alternate proposal. The Scale Manufacturers Association (SMA) supported the proposal as modified by the AWS Working Group. The Committee agreed that it was acceptable to remove NTEP procedures from Handbook 44 and make that information available to the type evaluation laboratories in the upcoming 2005 edition of NCWM Publication 14.

For more background information, refer to the 2002 and 2003 S&T Final Report.

330 LIQUID-MEASURING DEVICES

330-1 VC S.2.2.1. Multiple Measuring Elements With a Single Provision for Sealing

(This item was adopted.)

Source: Carryover Item 330-1. (This item originated from the National Type Evaluation Technical Committee (NTETC) Measuring Sector and first appeared on the Committee's 2003 agenda.)

Recommendation: Add a new paragraph to NIST Handbook 44, Section 3.30. Liquid-Measuring Devices S.2.2.1. Multiple Measuring Elements With a Single Provision for Sealing as follows:

<u>*S.2.2.1. Multiple Measuring Elements with a Single Provision for Sealing. - A change to the adjustment of any measuring element shall be individually identified.*</u>
<u>*[Nonretroactive as of January 1, 2005]*</u>

<u>**Note: Examples of acceptable identification of a change to the adjustment of a measuring element include but are not limited to:**</u>

(a) <u>**a broken, missing, or replaced physical seal on an individual measuring element,**</u>

(b) a change in a calibration factor for each measuring element,
(c) display of the date of or the number of days since the last calibration event for each measuring element, or
(d) a counter indicating the number of calibration events per measuring element.

Background/Discussion: At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) expressed concern that the integrity of all adjustments protected by the security means is lost when a physical security seal is removed, replaced, broken, or damaged. The WWMA recommended that this item remain informational until the NTETC Measuring Sector addressed the WWMA concerns.

At its October 2003 Meeting, the NTETC Measuring Sector modified the proposed language as shown above and agreed to forward it to the NCWM S&T Committee for consideration at the 2004 NCWM Interim Meeting.

At its October 2003 Meeting, the SWMA supported the proposal as modified by the 2003 NTETC Measuring Sector and agreed to recommend to the NCWM S&T Committee that it consider the proposal as a voting item for the 2004 NCWM Annual Meeting.

At the 2004 NCWM Interim Meeting, the Committee received comments from two weights and measures officials regarding the situation in which performance tests are conducted on a retail motor-fuel dispenser (RMFD) with multiple measuring elements and only a single sealing mechanism for all the measuring elements. [This, extra time and effort is required to perform a reinspection of the dispenser.] If one or more of the measuring elements fails the initial test and requires adjustment, at the time of reinspection, the field official has no way of knowing which measuring elements were actually adjusted and must perform at least an audit test on all of the measuring elements to verify that only those elements rejected on the initial inspection have been adjusted. The manufacturer of RMFDs that presently utilize this sealing option informed the Committee that his company has developed a means to indicate to field officials which measuring elements have been adjusted between an initial inspection and the reinspection of a rejected dispenser based on the requirements in the proposal. The Committee agreed to move the item forward, with a nonretroactive enforcement date of January 1, 2005, for a vote at the 2004 NCWM Annual Meeting.

At their May 2004 meetings, the CWMA & NEWMA supported this item as presented.

At the 2004 NCWM Annual Meeting the Committee heard no opposition to this item and agreed to recommend the item for a vote.

For more background information, refer to the 2003 S&T Final Report.

330-2 VC S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers

(This item was adopted.)

Source: NIST Weights and Measures Division

Recommendation: Modify NIST Handbook 44, Section 3.30. Liquid-Measuring Devices S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers (RMFD) as follows:

S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers. - *The required marking information in the General Code, Paragraph G-S.1. shall appear as follows:*

(a) ~~Placement of this information shall not be on a portion of the device that can be readily removed or interchanged without the use of a tool separate from the device.~~
shall be within 24 to 60 inches from the base of the dispenser;

(b) ~~The information shall appear 24 to 60 inches from the base of the dispenser when placed on the outside of the device.~~
may be internal and/or external provided the information is permanent and easily read;

(c) ***~~When placed behind an access door or panel the information shall appear 24 inches to 60 inches from the base of the dispenser in a readily legible position. The use of a dispenser key shall not be considered a tool separate from the device.~~***
shall be on a portion of the device that cannot be readily removed or interchanged (i.e., not on a service access panel).
Note: the use of a dispenser key or tool to access internal marking information is permitted.

[Nonretroactive as of January 1, 2003]
(Added 2002) **(Amended 2004)**

Background/Discussion: The language in the 2004 edition of NIST Handbook 44, paragraph S.4.4.2.(c) would allow the placement of G-S.1. Identification markings on a door or panel that is removable. Additionally, the wording allowed placement of marking information behind a panel that could be removed and easily exchanged through the use of a key (e.g., lower meter access panels), but did not permit the information to be located behind a panel that could be removed using other means such as a removing a screw or moving a lever. The proposed modifications to paragraph S.4.4.2. clarified the original intent, whereby it is acceptable to place G-S.1. information on permanent components located 24 inches to 60 inches above the base of the dispenser within the dispenser cabinet; however, those components could only be accessed by opening a door or panel that required the use of a key or other tool separate from the device. Scales Code paragraph S.6.2. Location of Marking Information included similar language that had allowed for access of required marking information through the use of a tool since 1989. The proposed changes make the access to marking information requirement in both codes more consistent.

At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) was notified that this item would be considered at the 2003 meeting of the National Type Evaluation Committee (NTETC) Measuring Sector and heard no other comments on this item. The WWMA believed that there was insufficient justification to allow additional tools separate from the device, other than a dispenser key, to be used to access identification information and recommended that this item remain developmental.

At its October 2003 Meeting, the NTETC Measuring Sector developed an alternate proposal which clarified S.4.4.2. by reorganizing the format of the paragraph. The proposal also recommended changing the maximum height restriction for placement of the required marking information from 60 inches to 72 inches from the base of the dispenser.

At its October 2003 Meeting, the SWMA concurred with the alternate NTETC Measuring Sector proposal and agreed to forward it to the NCWM S&T Committee for consideration with the recommendation that it be a voting item on the 2004 NCWM S&T Committee's Agenda.

At the 2004 NCWM Interim Meeting, the S&T Committee received several comments indicating that changing the maximum height restriction for placement of the required marking information from 60 inches to 72 inches is unreasonable because many field officials would have difficulty reading the required information if it were placed at a height greater than 60 inches. There was general support for the language submitted by the NTETC Measuring Sector provided the current maximum height restriction at 60 inches is retained. The S&T Committee modified the proposal and agreed to present the item for a vote at the 2004 NCWM Annual Meeting in July.

At its May 2004 meeting, the Northeastern Weights and Measures Association developed an alternate proposal to the NCWM S&T to simplify and clarify the language in S.4.4.2. and submitted it to the NCWM S&T Committee with the recommendation that it be a voting item at the NCWM Annual Meeting.

At the 2004 NCWM Annual Meeting, the Committee reviewed the alternate NEWMA proposal. The Committee agreed it included the essential marking information in a more clear and concise format and recommended it as a voting item.

330-3 W Table T.2. Accuracy Classes for Liquid Measuring Devices Table T.2. Accuracy Classes for Liquid Measuring Devices Covered in Section 3.30

(This item was withdrawn.)

Source: NIST Weights and Measures Division

Recommendation: Modify Accuracy Class 0.3 in NIST Handbook 44, Section 3.30. Liquid-Measuring Devices Table T.2. as follows:

Table T.2. Accuracy Classes for Liquid Measuring Devices Covered in NIST Handbook 44 Section 3.30				
Accuracy Class	**Application**	**Acceptance Tolerance**	**Maintenance Tolerance**	**Special Test Tolerance**
0.3	Petroleum products including large capacity motor fuel devices (flow rates over 115 L/min (30 gpm))**, heated products at or greater than 50 °C asphalt at or below temperatures 50 °C, all other liquids not shown where the typical delivery is over 200 L (50 gal)	0.~~2~~15 %	0.3 %	0.45 %

Background/Discussion: Currently NIST Handbook 44 Liquid-Measuring Devices (LMD), Vehicle Tank-Meters (VTM), and Mass Flow Meters (MFM) Codes include different tolerances for 0.3 Accuracy Class meters. This creates a technical inconsistency among the codes. Tighter tolerances are applied to vehicle-mounted meters than stationary meters even though the same model of meter may be used to measure the same product in both applications. There is no technical justification for this difference. A similar inconsistency in tolerances is found between the MFM, LMD, and VTM Codes. The proposed changes would result in the application of slightly tighter acceptance tolerances to LMDs than are in the current code. An alternate approach would be to broaden the tolerances in the VTM code to correspond with the LMD and MFM codes and to provide equal benefit to all applications of the same meter.

At its September 2003 Meeting, the Central Weights and Measures Association (CWMA) concluded that further input is needed from manufacturers of the effected devices to determine whether or not they can meet tighter tolerances. The CWMA recommended that the National Type Evaluation Technical Committee (NTETC) Measuring Sector review this item and provide input.

At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) was notified that this item was to be considered at the 2003 meeting of the NTETC Measuring Sector and heard no other comments on this item. The WWMA S&T Committee supports the concept that the applicable tolerance should be equivalent with respect to products measured through the same type and class of device regardless of its installation (stationary or vehicle-mounted).

At its October 2003 Meeting, the Northeastern Weights and Measures Association (NEWMA) did not support this proposal because it does not promote harmonization with OIML R 117 Measuring Systems for Liquids other than Water.

At its October 2003 Meeting, the NTETC Measuring Sector reviewed the proposed change to Table T.2. The Sector agreed with the manufacturers of turbine meters and mass flow meters attending the meeting that tightening the tolerances for those meter types was inappropriate because it would be not possible, or at least very difficult for those meter types to comply. Uniformity across the codes is not sufficient justification for changing the tolerances. Consequently, the Sector voted to oppose the proposed changes to the tolerances.

At its September 2003 Meeting, the Southern Weights and Measures Association (SWMA) S&T Committee agreed with the NTETC Measuring Sector and withdrew this item from its agenda.

At the 2004 NCWM Interim Meeting, the S&T Committee heard considerable opposition to changing the tolerances in the LMD Code. The suggestion was made that the S&T Committee begin to investigate harmonizing the Handbook 44 tolerances for liquid-measuring devices with those of Measurement Canada and those in OIML R 117 Measuring Systems for Liquids other than Water. The Committee agreed to withdraw item 330-3 from the S&T Committee Agenda for the 2004 NCWM Annual Meeting and recommended that the NCWM consider harmonizing Handbook 44 tolerances for liquid-measuring devices with Measurement Canada and OIML requirements and recommendations.

330-4 W UR.2.5. Product Identification

(This item was withdrawn.)

Source: Carryover Item 330-4. (This item originated from the National Type Evaluation Technical Committee (NTETC) Measuring Sector and first appeared on the Committee's 2003 agenda.)

Recommendation: Modify NIST Handbook 44, Section 3.30. Liquid-Measuring Devices UR.2.5. Product Storage Identification as follows:

UR.2.5. Product ~~Storage~~ Identification.

<u>UR.2.5.1. Measuring Element Identification.</u>

(a) <u>The measuring elements of any multi-product dispenser shall be permanently, plainly, and visibly identified as to product being measured.</u>

(b) <u>When the measuring elements of any multi-product dispenser are marked by means of a color code, the color code key shall be conspicuously displayed at the place of business and be consistent with the color code used for product storage.</u>
<u>(Added 200X)</u>

<u>**UR.2.5.2. Product Storage Identification.**</u>

(a) The fill connection for any petroleum product storage tank or vessel supplying motor-fuel devices shall be permanently, plainly, and visibly marked as to product contained.

(b) When the fill connection device is marked by means of a color code, the color code key shall be conspicuously displayed at the place of business.
(Added 1975 and Amended 1976 <u>and renumbered 200X</u>**)**

Background/Discussion: At the June 2002 NTEP Laboratory Meeting, the laboratories discussed the scenario in which field officials are sometimes not able to determine which measuring element is associated with a particular grade or blend of fuel on multi-product dispensers. In this situation, the official does not know which measuring element to mark or tag as rejected if only one grade or blend is rejected for not meeting performance requirements, since many meters no longer have visible external moving parts which indicate product flow. During the performance of a subsequent inspection following adjustment or repair of the device, the field official may be required to test all grades and blends offered through the rejected dispenser to determine that only the correct measuring element was adjusted.

At its September 2003 Meeting, the Central Weights and Measures Association (CWMA) recommended that the NCWM S&T Committee withdraw this item from its agenda because it will put an undue burden on current retailers and will ultimately not help enforcement officials.

At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) heard comments that the NTETC Measuring Sector would be reviewing this item at their October 2003 meeting. The WWMA supported the concept of the proposal and recommended that it remain an information item until the NTETC Measuring Sector provides a specific proposal to the NCWM S&T for consideration

At its October 2003 Meeting, the Northeastern Weights and Measures Association (NEWMA) recommended that this proposal should remain an information item.

At its October 2003 Meeting, the NTETC Measuring Sector determined that it no longer supports this item because it addresses an enforcement concern of only a limited number of jurisdictions and as such, does not warrant a new Handbook 44 requirement. The NTETC Measuring Sector voted to recommend that the NCWM S&T Committee withdraw this item from its agenda.

At its October 2003 Meeting, the SWMA agreed to forward a recommendation to the NCWM S&T Committee that this item be withdrawn from its agenda.

At the 2004 NCWM Interim Meeting, the Meter Manufacturers Association indicated support for this item. A large manufacturer of retail motor-fuel dispensers agreed with the CWMA and SWMA that this item would place an extra burden on device owners without providing substantial benefit to weights and measures official and should be withdrawn. The S&T Committee also agreed with the CWMA and SWMA and decided to withdraw Item 330-4 from its agenda.

For more background information, refer to the 2003 S&T Final Report.

330-5 VC Appendix D; Definition of Retail Device

(This item was adopted.)

Source: Carryover Item 330-6. (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 1999 agenda.)

Recommendation: Modify the definition of retail devices as follows:

> **retail device.** A **<u>measuring</u>** device ~~used for~~ **<u>primarily utilized to measure product for the purpose of sale to the end user.</u>**
>
> ~~**1. single deliveries of less than 378 L (100 gal),**~~
>
> ~~**2. retail deliveries of motor fuels to individual highway vehicles, or**~~
>
> ~~**3. single deliveries of liquefied petroleum gas for domestic use and liquefied petroleum gas or liquefied anhydrous ammonia for nonresale use.**~~
>
> (Amended 1987 **and 2004**) **[<u>3.30 and</u>** 3.32]

Background/Discussion: Between 1999 and 2003, the Committee considered several proposals that define retail devices as those that deliver product to the final user. The Committee agreed that these proposals change the classification of some devices, previously classified as wholesale devices, to retail devices that are held to a lesser tolerance.

At the Fall 2003 regional meetings, the CWMA, SWMA, and WWMA all agreed to forward alternate proposals for definitions of the term "retail device," that defined a retail device as a device primarily used for non-resale use.

At its October 2003 Meeting, NEWMA did not support the proposal as written. NEWMA believes that the definition of a retail device should be based on quantity rather than application.

At the 2004 NCWM Interim Meeting one weights and measures official and a retail motor-fuel dispenser manufacturer's representative indicated support for the alternate proposal submitted by the SWMA. A representative from the WWMA indicated that the WWMA believes that if a device is used for any "retail" sales, even for a single delivery, it should be considered a retail device and the applicable tolerances used. The Committee disagreed with this position. The Committee believes that weights and measures jurisdictions need some latitude in determining when a device should be classified as wholesale or retail; therefore, the Committee supported the alternative language submitted by the SWMA and agreed to present Item 330-5 for a vote at the NCWM Annual Meeting in July.

At the 2004 NCWM Annual Meeting, a railroad industry representative expressed concern that references to retail devices are currently found in only the LMD, LPG and Anhydrous Ammonia, and Mass Flow Meters Codes. The individual believed that the term could also be applied to railway track scales. A weights and measures official indicated that the definition should be applicable to only liquid measuring devices. While there may be merit to considering the use of the term for weighing devices, the term is presently used only in Handbook 44 Sections 3.30, 3.32, and 3.37; consequently the Committee presented the item for a vote as written.

For more background information, refer to the 1999 through 2003 S&T Final Reports.

331 VEHICLE-TANK METERS

331-1 V Recognition of Temperature Compensation

(This item did not pass or fail; therefore, it returns to the Committee.)

Source: Carryover Item 331-1 (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 2000 agenda.)

Recommendation: Modify NIST Handbook 44, Section 3.31. Vehicle-Tank Meters Code (VTM) by adding the following new paragraphs to recognize temperature compensation as follows:

S.2.4. Automatic Temperature Compensation for Refined Petroleum Products.

S.2.4.1. Automatic Temperature Compensation for Refined Petroleum Products. - A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to the volume at 15 °C (60 °F), where not prohibited by State Law.

S.2.4.2. Provision for Deactivating. - On a device equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of liters (gallons) compensated to 15 °C (60 °F), provision shall be made for deactivating the automatic temperature-compensating mechanism so that the meter can indicate and record, if it is equipped to record, in terms of the uncompensated volume.

S.2.4.2.1. Gross and Net Indications - A device equipped with automatic temperature compensation shall indicate and record, if equipped to record, both the gross (uncompensated) and net (compensated) volume for testing purposes. If both values cannot be displayed or recorded for the same test draft, means shall be provided to select either the gross or net indication for each test draft.

S.2.4.3. Provision for Sealing Automatic Temperature-Compensating Systems. - Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that an automatic temperature-compensating system cannot be disconnected and that no adjustment may be made to the system.

S.2.4.4. Temperature Determination with Automatic Temperature Compensation. - For test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:

(a) In the liquid chamber of the meter, or

(b) Immediately adjacent to the meter in the meter inlet or discharge line.

(Added 200X)

S.5.6. Temperature Compensation for Refined Petroleum Products. - If a device is equipped with an automatic temperature compensator, the primary indicating elements, recording elements, and recording representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).
(Added 200X)

N.4. Testing Procedures

N.4.1.3. Automatic Temperature-Compensating Systems for Refined Petroleum Products. - On devices equipped with automatic temperature-compensating systems, normal tests shall be conducted:

(a) by comparing the compensated volume indicated or recorded to the actual delivered volume corrected to 15 °C (60 °F); and

(b) with the temperature-compensating system deactivated, comparing the uncompensated volume indicated or recorded to the actual delivered volume.

The first test shall be performed with the automatic temperature-compensating system operating in the "as found" condition. On devices that indicate or record both the compensated and uncompensated volume for each delivery, the tests in (a) and (b) may be performed as a single test.
(Added 200X)

N.5. Temperature Correction for Refined Petroleum Products. - Corrections shall be made for any changes in volume resulting from the differences in liquid temperatures between the time of passage through the meter and time of volumetric determination in the prover. When adjustments are necessary, appropriate petroleum measurement tables should be used.
(Added 200X)

T.2.1. Automatic Temperature-Compensating Systems. - The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature-compensating system activated shall not exceed:

(a) 0.4 % for mechanical automatic temperature-compensating systems; and

(b) 0.2 % for electronic automatic temperature-compensating systems.

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.
(Added 200X)

UR.2.5. Temperature Compensation for Refined Petroleum Products.

UR.2.5.1. Automatic.

UR.2.5.1.1. When to be Used. - In a State that does not prohibit, by law or regulation, the sale of temperature-compensated product a device equipped with an operable automatic temperature compensator shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature-compensating system may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the responsible weights and measures jurisdiction.

[Note: This requirement does not specify the method of sale for product measured through a meter.]

UR.2.5.1.2. Invoices. - An invoice based on a reading of a device that is equipped with an automatic temperature compensator shall show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).
(Added 200X)

Discussion/Background: When this item was originally submitted, weights and measures officials indicated confusion about the specific meter applications that are covered by an NTEP Certificate of Conformance for a meter that includes the temperature-compensation feature. The WWMA acknowledged that there are jurisdictions that permit temperature compensated deliveries in applications that are not addressed by NIST Handbook 44. Other states do not allow the use of automatic temperature compensation for the delivery of products using a VTM.

At the 2003 NCWM Annual Meeting the Committee again heard comments both in favor of and opposition to the item. The vote on the item did not yield a sufficient number of aye or nay votes for the item to be accepted or defeated and therefore it returned to the Committee for further action.

At its September 2003 Meeting, the WWMA continued its strong support of this item as proposed and agreed to recommend that the NCWM S&T Committee move it forward as a voting item.

The NIST Weights and Measures Division (WMD) believes that, for consistency with the requirements for liquified petroleum gas and for uniformity throughout the industry, there should be a method of sale requirement in Handbook 130 for refined petroleum products sold using VTMs. Such a requirement would apply in states that adopt the Handbook 130 Method of Sale Regulation, provided it is not in conflict with other existing state statutes.

At the 2004 NCWM Interim Meeting, the Meter Manufacturers Association (MMA) indicated support for the proposal. One official indicated that the item should remain an information item until the Method of Sale Regulation in Handbook 130 requires the sale of petroleum products to utilize temperature correction to the standard reference temperature of 60 ºF. Another official stated that not having standards and test methods in the VTM Code of Handbook 44 creates a hardship for officials in jurisdictions where temperature compensation is allowed and utilized on VTMs delivering petroleum products and urged the NCWM to adopt this proposal. The Committee agreed to present Item 331-1 for a vote at the 2004 NCWM Annual Meeting in July.

At their May 2004, meetings the CWMA & NEWMA supported item 331-1 as proposed.

At the 2004 NCWM Annual Meeting, the MMA continued to support the proposal. Several weights and measures official indicated that a corresponding Handbook 130 requirement specifying the use of temperature compensated meters for deliveries of petroleum products using a VTM needs to be in place before this proposal moves forward.

The Committee stated its belief that the Specifications, Test Notes, Tolerances, and User Requirements contained in the proposal are technically correct and provide both the weights and measures inspector and the NTEP laboratories with the proper criteria to use when evaluating a VTM with temperature compensation capability.

The addition of this language to the VTM Code would not require, approve, nor solicit any jurisdiction to either prohibit or accept the use of temperature compensation in that jurisdiction.

The Committee further noted that the adoption of a nationally accepted method of sale for temperature compensation by all jurisdictions would not be obtainable in the foreseeable future and, thus, encouraged each jurisdiction to adopt by either statute, rule, or regulation requirements that state prohibit, permit or require temperature compensation in their jurisdiction.

The Committee agreed that there were a sufficient number of states that needed the proposal as an inspection tool to warrant adding the proposal to NIST Handbook 44 at this time without waiting for method of sale requirements to be added to NIST Handbook 130. Therefore the Committee agreed to recommend the proposal for a vote.

For additional background on this item see the 2000 through 2003 NCWM S&T Final Reports.

331-2 I N.4.2. Special Tests (Except Milk-Measuring Systems), N.4.5. Product Depletion Test, and T.5. Product Depletion Test

Source: Carryover Item 331-6. (This item originated from the Northeastern Weights and Measures Association (NEWMA) and first appeared on the Committee's 2003 agenda.)

Recommendation: Modify NIST Handbook 44, Section 3.31. Vehicle-Tank Meters (VTM) Code, paragraph N.4.2. Special Tests (Except Milk-Measuring Systems) and add new paragraphs N.4.5. Product Depletion Test and T.5. Product Depletion Test to the Vehicle-Tank Meters Code as follows:

N.4.2. Special Tests (Except Milk-Measuring Systems). - "Special" tests shall be made to develop the operating characteristics of a measuring system and any special elements and accessories attached to or associated with the device. Any test except as set forth in N.4.1. **<u>or N.4.5.</u>** shall be considered a special test. Special test of a measuring system shall be made ~~as follows:~~

~~(a) A~~<u>a</u>t a minimum discharge rate of 20 % of the marked maximum discharge rate or at the minimum discharge rate marked on the device whichever is less~~;~~<u>.</u>

~~(b) To develop operating characteristics of the measuring system during a split-compartment delivery~~.

<u>N.4.5. Product Depletion Test. - The effectiveness of the vapor eliminator shall be tested by depleting the product supply and continuing until the lack of fluid causes the meter register to stop completely. The test shall be completed by switching to another compartment with sufficient product on a multi-compartment vehicle, or by adding sufficient product to a single compartment vehicle. When adding product to a single compartment vehicle, allow appropriate time for any entrapped vapor to disperse before continuing the test.</u>
<u>(Added 200X)</u>

<u>T.5. Product Depletion Test. - The difference in the delivered volumes for the normal test and the product depletion test shall not exceed 0.5 % of the equivalent of one minute of flow at the maximum rated flow rate for the system</u>.
<u>(Added 200X)</u>

Alternate Recommendation: The National Type Evaluation Technical Committee (NTETC) Measuring Sector recommended modifying NIST Handbook 44, Section 3.31. Vehicle-Tank Meters paragraph N.4.2. Special Tests (Except Milk-Measuring Systems) and adding new paragraphs N.4.5. Product Depletion Test and T.5. Product Depletion Test and Table T.5. Tolerances for Product Depletion Tests to the Vehicle-Tank Meters Code as follows:

N.4.2. Special Tests (Except Milk-Measuring Systems). - "Special" tests shall be made to develop the operating characteristics of a measuring system and any special elements and accessories attached to or associated with the device. Any test except as set forth in N.4.1. **<u>or N.4.5.</u>** shall be considered a special test. Special tests of a measuring system shall be made ~~as follows:~~

~~(a)~~ **~~A~~**<u>a</u>t a minimum discharge rate of 20 % of the marked maximum discharge rate or at the minimum discharge rate marked on the device whichever is less~~;~~<u>.</u>

~~(b) To develop operating characteristics of the measuring system during a split compartment delivery.~~

<u>N.4.5. Product Depletion Test. - The effectiveness of the vapor eliminator shall be tested by depleting the product supply and continuing until the lack of fluid causes the meter indication to stop completely for at least 10 seconds. If the meter indication fails to stop completely for at least 10 seconds, continue to operate the system for 3 minutes. The test shall be completed by switching to another compartment with sufficient product on a multi-compartment vehicle, or by adding sufficient product to a single compartment vehicle. When adding product to a single compartment vehicle, allow appropriate time for any entrapped vapor to disperse before continuing the test.</u>

(Added 200X)

T.5. Product Depletion Test. - The difference in the delivered volumes for the normal test and the product depletion test shall not exceed the tolerance shown in Table T.5. and all test results shall be within applicable tolerances.

Table T.5. Tolerances For Vehicle Tank Meters (Except Milk Meters) On Product Depletion Tests	
Manufacturer's rated capacity (Maximum gpm)	**Maintenance and acceptance tolerances**
Up to 125	**125 in^3**
126-250	**200 in^3**
251-500	**300 in^3**
501 - 750	**400 in^3**
Over 751	**600 in^3**

Background/Discussion: The proposal intends to recognize that the measurement of vapor when product is depleted during the vehicle-tank meter (VTM) split compartment test (product depletion test) is a system problem and the amount of vapor measured is not related to the prover size. The proposal also requires a split-compartment test (product depletion test) for single compartment vehicles to verify the performance of the air elimination mechanism. Currently paragraph N.4.2.(b) refers only to a split-compartment delivery. The proposed tolerance structure is based on the meter's flow rate such that the tolerance for a given meter remains constant regardless of the size of the test draft.

At the 2003 NCWM Interim Meeting, NEWMA noted concerns with the current tolerances for a split compartment test (product depletion test) because VTMs that fail tests completed in a jurisdiction using 100-gallon provers are passing tests in neighboring jurisdictions that use larger provers (i.e., 200-gallon). The Committee agreed the proposal has merit because the product depletion test is necessary for vehicle-tank meters, and the proposal provides guidelines on the appropriate test conditions. Therefore, the Committee changed the status of this item from developing to an information item.

The Committee is uncertain that all sizes of vehicle-tank meters can attain the 0.5 % tolerance proposed for the difference in the test results between the normal and product depletion tests. The Committee asks for data that demonstrates the ability of VTMs to meet the proposed tolerance. The Committee recommended that NEWMA consult with Measurement Canada on its test procedures. Because tanks of different sizes drain at different rates the Committee asked NEWMA to develop guidelines for switching tanks when all tanks are not the same size.

At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) heard no comments on this item. The WWMA is concerned that the proposed tolerance for product depletion tests would allow errors exceeding current applicable tolerances. Additionally, the WWMA agreed with the NCWM S&T Committee that data is needed to demonstrate that VTMs can attain the proposed tolerances. The WWMA recommended that the item remain informational pending further development by New York and the NTETC Measuring Sector.

At the October 2003 NEWMA Meeting, New York expressed concern that, in the NEWMA proposal, the product depletion test would not be considered a "special test" and that tolerances based on the agreement between the normal tests and the product depletion tests might result in accepting values outside the "special test" tolerances. Therefore, NEWMA proposed that the exemption in paragraph N.4.2. stating "that the testing set forth in paragraph N.4.5. shall not be considered a 'special test' " be removed. NEWMA also submitted the following examples of product depletion test results to further show the need for a product depletion test tolerance that is not dependent on prover size. The table assumes that error in the meter under normal test conditions is relatively linear between a 100 gal and a 200 gal test and that the actual amount of vapor passed for either test would remain approximately the same.

Examples: Product Depletion Test - Proposed

Meter Marked: 100 gpm Max/20 gpm Min				Proposed Product
Tolerances:	Acceptance	Maintenance	Special Test	Depletion Agreement
100 gal prover	0.15 gal	0.3 gal	0.45 gal	0.5 gal
200 gal prover	0.30 gal	0.6 gal	0.90 gal	0.5 gal

Sample Test Results (Maintenance Tol.): Assume linear error in normal tests and fixed passage of vapor

Error for Normal Test at 100 gal	Expected Error for Normal Test at 200 gal	Error PD Test 100 gal	Expected Error PD Test 200 gal	PD Agreement	Normal Test P/F		Special Test P/F		Proposed Prod Depletion Agreement P/F	
(gal)	(gal)	(gal)	(gal)	gal	100 gal	200 gal	100 gal	200 gal	100 gal	200 gal
0.25	0.50	-0.25	1.00	-0.50	Pass	Pass	Pass	Pass	Pass	Pass
0.00	0.00	-0.50	0.50	-0.50	Pass	Pass	Fail	Pass*	Pass	Pass
-0.25	-0.50	-0.75	0.00	-0.50	Pass	Pass	Fail	Fail	Pass	Pass
0.25	0.50	-0.45	1.20	-0.70	Pass	Pass	Pass	Pass	Fail	Fail
0.00	0.00	-0.70	0.70	-0.70	Pass	Pass	Fail	Pass*	Fail	Fail
-0.25	-0.50	-0.95	0.20	-0.70	Pass	Pass	Fail	Fail	Fail	Fail
0.25	0.50	-0.10	0.85	-0.35	Pass	Pass	Pass	Pass	Pass	Pass
0.00	0.00	-0.35	0.35	-0.35	Pass	Pass	Pass	Pass	Pass	Pass
-0.25	-0.50	-0.60	-0.15	-0.35	Pass	Pass	Fail	Fail	Pass	Pass

Sample Test Results (Acceptance Tol.): Assume linear error in normal tests and fixed passage of vapor

Error for Normal Test at 100 gal	Expected Error for Normal Test at 200 gal	Error PD Test 100 gal	Expected Error PD Test 200 gal	PD Agreement	Normal Test P/F		Special Test P/F		Proposed Prod Depletion Agreement P/F	
(gal)	(gal)	(gal)	(gal)	gal	100 gal	200 gal	100 gal	200 gal	100 gal	200 gal
0.12	0.24	-0.38	0.74	-0.50	Pass	Pass	Pass	Pass	Pass	Pass
0.00	0.00	-0.50	0.50	-0.50	Pass	Pass	Fail	Pass*	Pass	Pass
-0.12	-0.24	-0.62	0.26	-0.50	Pass	Pass	Fail	Pass*	Pass	Pass
0.12	0.24	-0.58	0.94	-0.70	Pass	Pass	Pass	Pass*	Fail	Fail
0.00	0.00	-0.70	0.70	-0.70	Pass	Pass	Fail	Pass*	Fail	Fail
-0.12	-0.24	-0.82	0.46	-0.70	Pass	Pass	Fail	Pass*	Fail	Fail
0.12	0.24	-0.23	0.59	-0.35	Pass	Pass	Pass	Pass	Pass	Pass
0.00	0.00	-0.35	0.35	-0.35	Pass	Pass	Pass	Pass	Pass	Pass
-0.12	-0.24	-0.47	0.11	-0.35	Pass	Pass	Fail	Pass*	Pass	Pass

* Provides different result from 100 gal test.

At its October 2003 Meeting, the NTETC Measuring Sector reviewed a change to Handbook 44 adopted at the 1974 NCWM which added Table 2. – Tolerances For Vehicle Tank Meters on Supply Exhaustion Tests Except Milk Meters to Section 3.31. Vehicle-Tank Meters code. The Sector agreed that an additional flow rate designation should be added to the table to recognize larger meter sizes currently manufactured, and to forward an alternate proposal to modify NIST Handbook 44, Section 3.31 Vehicle-Tank Meters to address Product Depletion Tests to the NCWM S&T Committee through the SWMA.

At its October 2003 Meeting, the SWMA concurred with the NTETC Measuring Sector's alternate proposal. The SWMA agreed to forward the proposal to the NCWM S&T Committee for consideration with the recommendation that it be a voting item on the NCWM S&T Committee's 2004 Agenda.

At the 2004 NCWM Interim Meeting, the Meter Manufacturers Association (MMA) voiced support for the intent of the alternative proposal submitted by the NTETC Measuring Sector provided T.4. is modified by removing the words "and all test results shall be within applicable tolerances." A Maryland Weights and Measures Official noted that the proposal if modified as the MMA recommends, provides a substantial change in tolerance; however, Maryland is in favor of the concept because the tolerance for a given meter is not linked to the size of the prover used for testing. A New York Official stated that a product depletion test should be viewed as the test in which a "disturbance" is introduced, similar to a test for the effect of radio frequency interference (RFI) on a scale. New York preferred a tolerance expressed as a flat percentage and suggested a tolerance of 0.5 % of the meter's marked maximum flow rate rather than the step tolerances in the proposed Table T.5. A representative from Measurement Canada indicated that there is an opportunity for the United States and Canada to harmonize the requirement for a product depletion test. Canada is currently using a tolerance of 0.25 % of the meter's marked maximum flow rate applied to the product depletion test results; however, Measurement Canada is still conducting a study to determine if the 0.25 % tolerance is appropriate. The Committee agreed that item 331-2 should remain an information item and is returning the item to the NTETC Measuring Sector for further development.

331-3 I S.2.4. Zero Set-Back Interlock

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Add a new paragraph S.2.4. to Handbook 44, Section 3.31. Vehicle-Tank Meters as follows:

> ***S.2.4. Zero Set-Back Interlock, Vehicle-Tank Meters. – A device shall be so constructed that after a delivery cycle has been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating and, if equipped, recording elements have been returned to their zero position.***
> ***[Nonretroactive as of January 1, 200X]***

Background/Discussion: At its October 2003 Meeting, the SWMA reviewed a proposal to add a specification requiring a zero set-back interlock on vehicle-tank meters as shown above. The submitter commented that this specification has been in place for retail motor-fuel dispensers for many years. Its purpose is to prevent a second party from being charged for product delivered to the first party. However, there is no requirement for interlocks on Vehicle-Tank Meters. Currently the only protection is provided by two User Requirements paragraphs, UR.2.3. Ticket in Printing Device, which prohibits the "riding of tickets" (having a ticket in the printer while the vehicle is moving from one location to another) and UR.2.1. Return of Indication Element to Zero, which requires the indications to be set to zero before a delivery. Both of these requirements are extremely difficult, if not impossible to enforce with the newer technology where printers are frequently mounted in the cab of the vehicle and are not visible to an observer outside the vehicle. The SWMA agreed to forward the proposal to the NCWM S&T Committee for consideration with the recommendation that it be a nonretroactive requirement.

At the 2004 NCWM Interim Meeting, the Meter Manufacturers Association (MMA) stated that there was a need to have the ability to make multiple deliveries at a single location or to one buyer without having to remove a delivery ticket. The MMA supported the concept of the proposal provided it was limited to devices with electronic indicators that have the ability to print more than one delivery on a single delivery ticket. Maryland Weights and Measures agreed with the MMA. The Committee agreed that the proposal should remain an information item on the S&T Agenda to allow the NTETC Measuring Sector and other interested parties time to further develop the proposal.

At the 2004 NCWM Annual Meeting, the MMA stated that a zero set-back interlock would be a desirable feature on systems with an electronic indicator; however, it is not practical to add the feature to a system with a mechanical indicator. While the proposal has merit and there appears to be some support for the concept, the Committee recognized from the comments that there are still a number of issues which need to be resolved before the proposal is ready for a vote. Consequently, the Committee referred the proposal back to the NTETC Measuring Sector for further development.

332 LPG AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES

332-1 W UR.2.3. Vapor-Return Line

(This item was withdrawn.)

Source: Carryover Item 332-2. (This item was developed by the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's 2002 agenda.)

Recommendation: Modify NIST Handbook 44, Section 3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices paragraph UR.2.3. as follows:

> **UR.2.3. Vapor Return Line -** During any metered delivery of liquefied petroleum gas from a supplier's tank to a receiving container, there shall be no vapor-return line from the receiving container to the supplier's tank **<u>except</u>:**
>
> (a) in the case of any receiving container to which normal deliveries can**<u>not</u>** be made without the use of such vapor-return line, or
>
> (b) in the case of any new receiving container when the ambient temperature is ~~**below**~~ **<u>above</u>** 90 °F~~.~~**<u>, or</u>**
>
> **<u>(c) in the case of wholesale terminal deliveries.</u>**

Background/Discussion: At its September 2001 Annual Meeting, the SWMA heard a concern from Tennessee that vapor-return lines are commonly used at LPG loading rack terminals where large capacity transports are loaded for distribution to bulk LPG dealers. At least some of the operating terminals are applying industry-derived factors that are used to credit customers for metered product that is returned as vapor to the sellers' storage tanks. Paragraph U.R.2.3.(a) provides an exception that allows the use of a vapor return line when abnormal conditions exist, such as high pressure in the receiving tank, which would prevent delivery without the use of a vapor return line. The SWMA questions whether or not bulk terminal locations fall under this exemption. The terminals where vapor-return lines are being used have insufficient pumping ability to fill the large vessels that are used to distribute LPG to bulk dealer facilities. When pumping capacity becomes an issue the condition can be remedied by installing new pumping and metering equipment which is capable of filling the large pressure vessels without a vapor-return line. Additionally, the terminals have the option of weighing the product rather than metering it. These conditions exist at LPG terminals in all regions of the United States, thus, this is not a unique situation only affecting the State of Tennessee.

SWMA agreed with Tennessee that the following options should be reviewed and the appropriateness of using vapor return lines in these LPG filling operations should be addressed:

1. Allow loading rack terminals to use vapor-return lines and review a proposal from industry on applying the vapor factor to credit the purchaser. A mean credit value may be adequate, although it has been determined that the vapor returned is not always consistent from delivery to delivery.

2. Allow a vapor meter to be installed between the receiving vessel and the seller's tanks, then convert the vapor measurements to liquid quantities and credit the purchaser.

3. Provide a consensus opinion that bulk terminal loading-rack installations meet the exception contained in paragraph UR.2.3. (a) and no action is needed by weights and measures officials.

4. Provide a consensus opinion that the conditions do not meet the exception noted in paragraph UR.2.3. and weights and measures officials should require terminals currently unable to load without vapor-return lines to take corrective action to comply with NIST Handbook 44.

Following the 2003 NCWM Interim Meeting, the Committee received recommended changes to UR.2.3. from the State of Tennessee to address the use of vapor return lines in wholesale terminal applications. The Committee agreed the proposal should remain an information item to provide the regional associations an opportunity to review and discuss Tennessee's proposal. For clarity, the Committee modified Tennessee's proposal to make the last sentence in the proposal a separate paragraph (c) as shown in the recommendation above.

At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) heard no comments on this item during its open hearings. The WWMA S&T Committee expressed concerned that the proposal does not include a means for compensating for product in a vapor state that returns to the facilities' storage tank. The WWMA agreed with SWMA option number 4, in which weights and measures officials should require terminals currently unable to load without vapor-return lines to take corrective action to comply with NIST Handbook 44. The WWMA agreed to recommend that the NCWM S&T Committee withdraw this item from its agenda.

At its October 2003 Meeting, the NEWMA recommended that this proposal should remain an information item.

At its October 2003 Meeting, the SWMA did not include this item on its agenda.

At the 2004 NCWM Interim Meeting, the NIST Weights and Measures Division shared a concern with the Committee that allowing terminals to selectively use or not use a vapor return line during tank filling promotes non-uniformity in deliveries from one facility to another. The Committee expressed a belief that all parties involved in the loading of tank-trucks at the wholesale level understand the ramifications of using a vapor return line and are willing to accept transactions that require the use of a vapor return line. The Committee agreed to present Item 332-1 for a vote at the 2004 NCWM Annual Meeting in July.

At the 2004 NCWM Annual Meeting a weights and measures official expressed concern with the amount of product that can potentially be transferred from the receiving tank to the supply tank when using a vapor return line. Information provided from several sources indicated a range of potential product transfer from 2.5 % to 2.8 % of the delivered volume. The information provided during the open hearing regarding the amount of vapor displaced during the filling process convinced the Committee that selectively allowing the use of a vapor-return line during a wholesale delivery may create considerable inequity in the market place. The Committee agreed to withdraw Item 332-1 from its agenda.

358 MULTIPLE DIMENSION MEASURING DEVICES

358-1 VC S.1.6. Customer Indications and Recorded Representations, Table S.1.6. Required Information to be Provided by Multiple Dimension Measuring Systems, UR.5. Customer Information Provided, and Table UR.5. Customer Information to be Provided

(This item was adopted.)

Source: Multiple Dimension Measuring Devices Working Group

Recommendation: Modify Handbook 44 Section 5.58. Multiple Dimension Measuring Devices, paragraph S.1.6., delete the current Table S.1.6. and replace it with a new Table S.1.6., and add new paragraph UR.5. and new Table UR.5. as follows:

S.1.6. Customer Indications and Recorded Representations. - Multiple dimension measuring **devices or** systems must provide information as specified in Table S.1.6. **As a minimum, all devices or systems must be able to meet either column I or column II in Table S.1.6.** ~~**(See Table Appendix at the end of this code.)**~~ **(Amended 2004)**

~~Table S.1.6. Information to be Provided on Multiple Dimension Measuring Systems~~				
~~Scenarios Ψ~~ ~~Information ∴~~	~~Scenario 1.1~~ ~~Customer present (printer only)~~	~~Scenario 1.2~~ ~~Customer present (display only)~~	~~Scenario 1.3~~ ~~Customer present (printer and display)~~	~~Scenarios 2, 3, 4~~ ~~Customer is not present.~~
~~System ID~~	~~P (only in multi-system applications)~~	~~D (only in multi-system applications)~~	~~D or P (only in multi-system applications)~~	~~P or A~~
~~Object ID~~	~~N/A~~	~~N/A~~	~~N/A~~	~~P or A~~
~~Dimensions and/or volume, units~~	~~P~~	~~D~~	~~D and P~~	~~P or A~~
~~Error indicator~~	~~P~~	~~D~~	~~D and P~~	~~N/A~~
~~Billing method~~	~~P~~	~~D~~	~~D or P~~	~~N/A~~
~~Billed weight~~	~~P~~	~~D~~	~~D or P~~	~~N/A~~
~~Total price~~	~~P~~	~~D~~	~~D or P~~	~~N/A~~
~~Dim weight (if applicable)~~	~~P~~	~~D~~	~~D or P~~	~~P or A~~
~~Scale weight (if applicable)~~	~~P~~	~~D~~	~~D or P~~	~~P or A~~
~~Tare (if applicable)~~	~~P~~	~~D~~	~~D or P~~	~~P or A~~
~~Oversized indicator~~	~~P~~	~~D~~	~~D or P~~	~~P or A~~
~~Dimensions are of smallest box~~	~~P or M~~	~~D or M~~	~~D or P or M~~	~~P or A~~
~~Billing rate or rate chart, conversion factors~~	~~A~~	~~A~~	~~A~~	~~P or A~~
~~D = DISPLAYED~~ ~~A = AVAILABLE UPON REQUEST (retained for at least 30 days after invoice)~~ ~~N/A: NOT APPLICABLE~~ ~~P = PRINTED~~ ~~M = MARKED ON THE DEVICE~~				

Table S.1.6. Required Information to be Provided by Multiple Dimension Measuring Systems

Information	Column I*	Column II*		Column III
	Provided by device	Provided by invoice or other means		Provided by invoice or other means as specified in contractual agreement
		Customer present	Customer not present	
1 Device identification [1]	D or P	P	P	P or A
2 Error message (when applicable)	D or P	P	N/A	N/A
3 Hexahedron dimensions[2]	D or P	P	P	P or A
4 Hexahedron volume (if used)[2]	D or P	P	P	P or A
5 Actual weight (if used)[2]	D or P	P	P	P or A
6 Tare (if used)[2]	D or P	N/A	N/A	N/A
7 Hexahedron measurement statement [3]	D or P or M	P	P	P or G

D = DISPLAYED, P = PRINTED or RECORDED IN A MEMORY DEVICE and AVAILABLE UPON REQUEST BY CUSTOMER [4], M = MARKED, G = PUBLISHED GUIDELINES OR CONTRACTS, A = AVAILABLE UPON REQUEST BY CUSTOMER [4], N/A = NOT APPLICABLE

Notes:

1 This is only required in systems where more than one device or measuring element is being used.

2 Some devices or systems may not utilize all of these values; however as a minimum either hexahedron dimensions or hexahedron volume must be displayed or printed.

3 This is an explanation that the dimensions and/or volume shown are those of the smallest hexahedron in which the object that was measured may be enclosed rather than those of the object itself.

4 The information "available upon request by customer" shall be retained by the party having issued the invoice for at least 30 calendar days after the date of invoicing.

* As a minimum all devices or systems must be able to meet either column I or column II.

Hexahedron = An object with six rectangular, plane surfaces (sides).

(Amended 2004)

UR.5. Customer Information Provided. - The user of a multiple dimension measuring device or system shall provide transaction information to the customer as specified in Table UR.5.
(Added 2004)

Table UR.5. Customer Information Provided			
Information	**No contractual agreement**		**Contractual agreement**
	Customer present	**Customer not present**	
1 Object identification	**N/A**	**P**	**P or A**
2 Billing method (Scale or Dimensional weight if used)	**D or P**	**P**	**P or A**
3 Billing rate or rate chart	**D or P or A**	**P or G or A**	**P or A**
4 Dimensional weight (if used)	**P**	**P**	**P or A**
5 Conversion factor (if dimensional weight is used)	**D or P or A**	**P**	**P or G**
6 Dimensional weight statement[1] (if dimensional weight is used)	**D or P**	**P**	**P or G**
7 Total price	**P**	**P**	**P or A**

A = AVAILABLE UPON REQUEST BY CUSTOMER [2],
D = DISPLAYED,
G = PUBLISHED GUIDELINES OR CONTRACTS,
M = MARKED,
N/A = NOT APPLICABLE,
P = PRINTED

[1] **This is an explanation that the dimensional weight is not a true weight but is a calculated value obtained by applying a conversion factor to the hexahedron dimensions or volume of the object.**

[2] **The information "available upon request by customer" shall be retained by the party having issued the invoice for at least 30 calendar days after the date of invoicing.**

Hexahedron = An object with six rectangular, plane surfaces (sides).

(Table added 2004)

Background/Discussion: This proposal was developed by the NIST Weights and Measures Division at the request of the MDMD Working Group following its meeting in July 2003. The Work Group approved the proposal and agreed to forward it to the NCWM S&T Committee for consideration. The current Table S.1.6. contains not only specifications for devices or systems but also includes user requirements. The manufacturer of a device or system is responsible for assuring compliance with NIST Handbook 44 specifications. The owner or operator of a device or system is responsible for assuring that the device or system is used in a manner consistent with user requirements of Handbook 44. Separating the requirements into two separate tables would aid manufacturers, users, and weights and measures officials in determining responsibility for complying with a particular requirement. NCWM adoption of this item would aid in the effort to change the status of the Multiple Dimension Measuring Devices Code from "tentative" to "permanent."

At their Fall 2003 Meetings, the Western, and Southern Weights and Measures Associations agreed with the proposal as written. In addition, the Western Weights and Measures Association commended the MDMD Working Group for its work on this issue.

At the 2004 NCWM Interim Meeting, the Committee heard support for all items relating to the MDMD Code. The Committee also heard a suggestion to move a proposal to change the status of the code from "tentative" to "permanent" to the end of the 358 items. This change in the order of the items would insure that the status of the code would be decided after all other proposed changes to the code had been considered. The Committee agreed and reordered the items accordingly and proposed the items for a vote.

At their May 2004, meetings the CWMA & NEWMA supported this item as presented.

At the 2004 NCWM Annual Meeting, a manufacturer of multiple dimension measuring devices indicated support for agenda items 358-1 through 358-7, noting that the proposals represented sound technical requirements developed by the work group with representation from manufacturers, users, and weights and measures officials.

358-2 VC S.1.8. Indications Below Minimum and Above Maximum and Table S.4.1.b. Notes for Table S.4.1.a.; Note 7

(This item was adopted.)

Source: Multiple Dimension Measuring Devices Working (MDMD) Group

Recommendation: Modify Handbook 44 Section 5.58. Multiple Dimension Measuring Devices paragraph S.1.8. and Note 7 of Table S.4.1.b. as follows:

S.1.8. Indications Below Minimum and Above Maximum. - Except for entries of tare, when objects are smaller than the minimum dimensions identified in paragraph S.1.7. or larger than ~~105 %~~ **any** of the maximum dimensions **plus 9 d,** and/or **maximum** volume marked on the device **plus 9 d, or when a combination of dimensions for the object being measured exceeds the measurement capability of the device**, the indicating or recording element shall either:

(a) not display or record any usable values, or

(b) identify the displayed or recorded representation with an error indication.

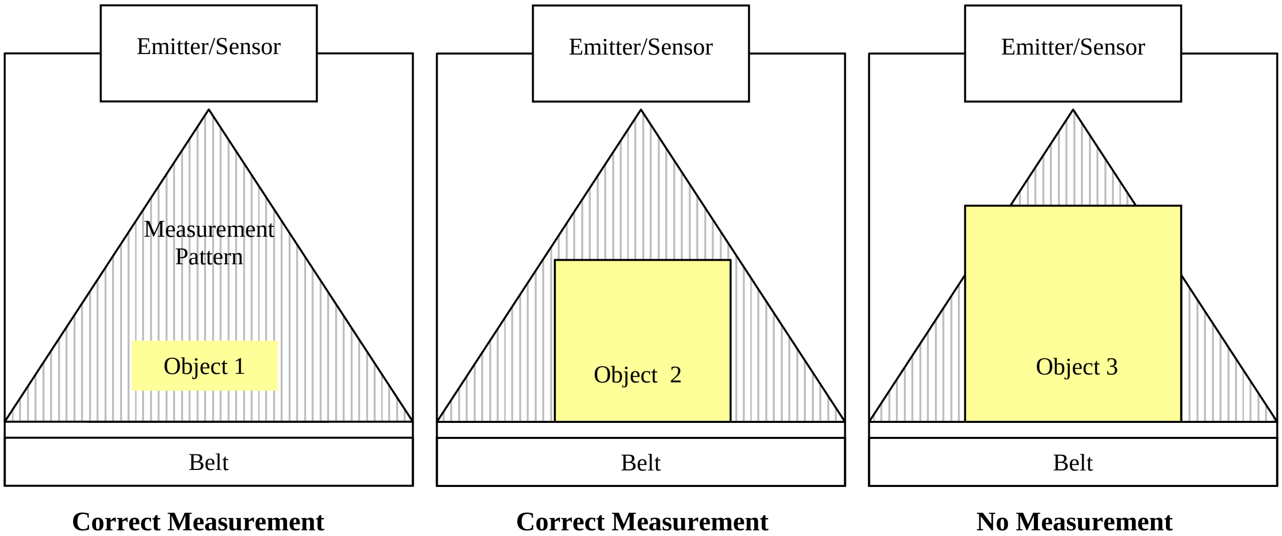
(Amended 2004)

Multiple Dimension Measuring Systems Table S.4.1.b. Notes for Table S.4.1.a.
. . . 7. Materials, shapes, structures, **combination of object dimensions,** or object orientations that are inappropriate for the device or those that are appropriate. . . .

(Amended 2004)

Background/Discussion: This proposal was developed by the NIST Weights and Measures Division prior to MDMD Working Group's July 2003 Meeting, to address a request to clarify the requirements in Paragraph S.1.8 and the marking requirement in Note 7 in Table S.4.1.b. for limitation of use. Some device designs use a measurement pattern (as shown in example below) that may not allow the device to measure to both the marked maximum height limit and the marked maximum width limit on the same object. The marked maximum height and width are individually correct with respect to the device capability. The minimum and maximum dimension requirements in NIST Handbook 44 did not adequately address this scenario. Handbook 44 stated that if an object exceeded the marked measuring limitation for any axis by 105 % it must not display or record a value or it must provide an error message. In the example below, the shape, structure, or orientation of the largest object (object 3) in the example below does not exceed the manufacturers marked capacity for height or width individually; however, the system is not capable of providing an accurate measurement for this object because this combination of dimensions is beyond the device's capability. Note 7 in Table S.4.1.b., did not specifically address this situation.

Example:



At its July 2003 Meeting, the MDMD Working Group agreed that the current 105 % limit on overcapacity indication should be changed to the marked maximum plus 9 d for each dimension and/or total volume indicated. This change is consistent with Measurement Canada's requirements and other Handbook 44 Codes that have an overcapacity limit. The Working Group also agreed that the other proposed modifications to paragraph S.1.8. and Note 7 in Table S.4.1.a. are appropriate to recognize new measurement technologies that have been developed since the Tentative Code was adopted. The Work Group agreed to forward the proposals shown above to the S&T Committee for consideration. NCWM adoption of this item would aid in the effort to change the status of the Multiple Dimension Measuring Devices Code from "tentative" to "permanent."

At their Fall 2003 Meetings, the Western and Southern Weights and Measures Associations agreed with the proposal as written. In addition, the Western commended the MDMD Working Group for its work on this issue.

At the 2004 NCWM Interim Meeting, the Committee heard support for all items relating to the MDMD Code. The Committee also heard a suggestion to move a proposal to change the status of the code from "tentative" to "permanent" to the end of the 358 items. This change the in order of the items would insure that the status of the code would be decided after all other proposed changes to the code had been considered. The Committee agreed and reordered the items accordingly and proposed the items for a vote.

At their May 2004, meetings the CWMA & NEWMA supported this item 358-2 as presented.

At the 2004 NCWM Annual Meeting, a manufacturer of multiple dimension measuring devices indicated support for agenda items 358-1 through 358-7, noting that the proposals represented sound technical requirements developed by the work group with representation from manufacturers, users, and weights and measures officials.

358-3 VC S.3. Systems with Two or More Measuring Elements and Definition of Measurement Field

(This item was adopted.)

Source: Multiple Dimension Measuring Devices Working Group

Recommendation: Modify Handbook 44 5.58. Multiple Dimension Measuring Devices, paragraph S.3. as follows, and add a definition for the term "Measurement Field."

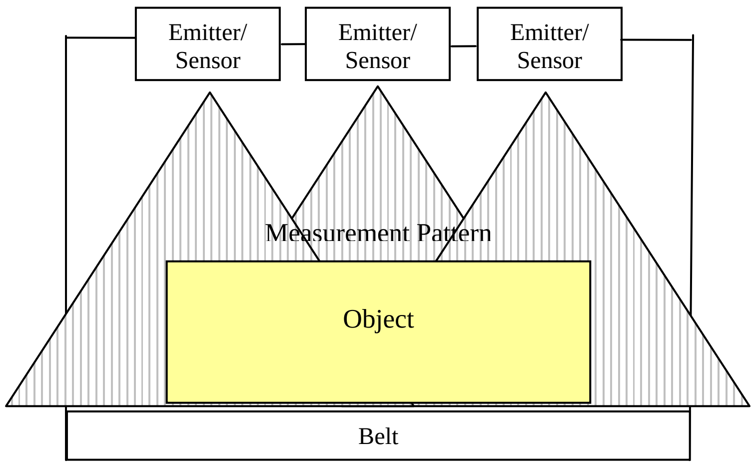
> **S.3. System with Two or More Measuring Elements. -** A multiple dimension measuring system with a single indicating or recording element, or a combination indicating-recording element, that is coupled to two or more measuring elements with independent measuring systems, shall be provided with a means to prohibit the

activation of any measuring element (or elements) not in use, and shall be provided with automatic means to indicate clearly and definitely which measuring element is in use.

Note: This requirement does not apply to individual devices that use multiple emitters/sensors within a device in combination to measure objects in the same measurement field.

measurement field. – A region of space or the measurement pattern produced by the measuring instrument in which objects are placed or passed through, either singly or in groups, when being measured by a single device. [5.58.]
(Amended 2004)

Example:



Background/Discussion: This proposal was developed by the NIST Weights and Measures Division prior to MDMD Working Group's July 2003 Meeting to clarify the requirements in paragraph S.3. The original intent of this paragraph was to address more than one measuring element in separate locations within a single facility that are all coupled to a single indicator. For example, in a shipping hub there may be multiple lines each measuring different objects to increase the shipping capacity of the facility. All the measuring lines may be connected to a single indicator. At least one manufacturer believes that some interpret the term "measuring element" as applying to a device with multiple measuring elements (emitters/sensors) as shown in the example above. A problem arises with the existing language if a relatively narrow box is placed on the belt such that only one or two of the measuring elements shown makes measurements. The manufacturer is concerned that some may interpret paragraph S.3. to require the device in the example to identify the measuring element or elements involved in the measurement of a single object. The recommended changes should clarify the intent and application of this section. The Working Group supported the proposal as developed by WMD. NCWM adoption of this proposal would aid in the effort to change the status of the Multiple Dimension Measuring Devices Code from "tentative" to "permanent."

At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) heard comments from a manufacturer supporting the proposal. The WWMA recommended alternate language for the proposed note to paragraph S.3. to clarify the intent of the proposal and editorial corrections to the language in the definition of "measurement field."

At its October 2003 Meeting, the Southern Weights and Measures Association (SWMA) supported the proposal as submitted by the MDMD Working Group. The SWMA was not necessarily opposed to the language submitted by WWMA, but it did not think the language was significantly different.

At the 2004 NCWM Interim Meeting, the Committee heard support for all items relating to the MDMD Code. The Committee also heard a suggestion to move a proposal to change the status of the code from "tentative" to "permanent" to the end of the 358 items. This change in the order of the items would insure that the status of the code would be decided after all other proposed changes to the code had been considered. Measurement Canada indicated that the "note" in the original proposal and the WWMA alternate definition for "measurement field" were the most technically correct of the alternate language options proposed. Measurement Canada also recommended that the term "measuring element" in the example drawing be replaced with the term "emitter/sensor." The Committee agreed with Measurement Canada's recommendation and amended the proposal as presented above. The Committee agreed and reordered the items accordingly and proposed the item for a vote.

At their May 2004, meetings the CWMA & NEWMA supported this item as presented.

At the 2004 NCWM Annual Meeting, a manufacturer of multiple dimension measuring devices indicated support for agenda items 358-1 through 358-7, noting that the proposals represented sound technical requirements developed by the work group with representation from manufacturers, users, and weights and measures officials.

358-4 VC N.1.4.1. Test Objects and Definition of Test Objects

(This item was adopted.)

Source: Multiple Dimension Measuring Devices Working Group

Recommendation: Modify Handbook 44 Section 5.58. Multiple Dimension Measuring Devices, by adding a new paragraph N.1.4.1. Test Objects and a new definition of the term "test object" as follows:

> **N.1.4.1 Test Object. - Verification of devices may be conducted using appropriate test objects of various sizes and of stable dimensions. Test object dimensions must be known to an expanded uncertainty (coverage factor k = 2) of not more than one-third of the applicable device tolerance. The dimensions shall also be checked to the same uncertainty when used at the extreme values of the influence factors.**
>
> **The dimensions of all test objects shall be verified using a reference standard that is traceable to NIST (or equivalent national laboratory) and meet the tolerances expressed in NIST Handbook 44 Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied to the device).**
> **(Added 2004)**
>
> **test object. - An object whose dimensions are verified by appropriate reference standards and intended to verify compliance of the device under test with certain metrological requirements. [5.58]**
> **(Added 2004)**

Background/Discussion: This proposal originated from the July 2003 MDMD Working Group Meeting. Test standards similar to those developed by Canada for type approval are not currently available in the United States. Without available standards or standards specifications, it is difficult to ensure consistent test results from field inspections. Some state and local inspectors have conducted tests of multiple dimension measuring devices using packages that were available at the test site. If field officials choose to use on-site packages, great care must be taken in the selection of objects that are in a very stable condition and can be compared to a certified length standard with an appropriate degree of uncertainty. Cardboard boxes are particularly subject to damage and deformity. Due to the relative uncertainty of the measurement process, multiple dimension measuring devices with a division size of less than 1 cm (0.5 inch) should only be tested with verified test standards. Uncertainty can be stated as the range of values within which the true value to the "standard" is estimated to lie and defines the limits of error about a measured value between which the true value will lie with the confidence level stated. A coverage factor of k = 2 provides a confidence level of 95 %. The Multiple Dimension Measuring Devices Code provides guidance regarding the appropriate size of test objects, but it does not provide any other criteria for what constitutes an appropriate test object. The term "test object" is also not defined in Handbook 44. OIML R 129 Multi-dimensional measuring instruments, provides a definition for a test object and criteria for using test objects to verify the performance of multiple dimension measuring devices. Proposed paragraph N.1.4.1. provides field officials who do not have specifically designed standards for testing multiple dimension measuring devices with a mechanism for testing these devices, provided care is taken in developing proper reference standards. The approach can be compared to the testing of in-motion-monorail scales with carcasses. In both cases, care must be taken to verify that the standards are appropriate at the beginning of a test and remain stable throughout the entire test of the device. The Working Group agreed to submit the proposal as written to the NCWM S&T Committee for consideration at the

NCWM Interim Meeting. NCWM adoption of this item would aid in the effort to change the status of the Multiple Dimension Measuring Devices Code from "tentative" to "permanent."

At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) heard comments from a manufacturer supporting the proposal. The WWMA S&T Committee was concerned about an apparent conflict between the language in the first proposed paragraph, which states that the expanded uncertainty of the test object must be known to one-fifth of the applicable device tolerance in field testing and to language in the second paragraph, which states that the test object be verified using standards with an uncertainty less than one-third of the smallest tolerance applied to the device. The WWMA recommended removing the expanded uncertainty language in the first paragraph of the original proposal since the language may be more appropriate for standards used for type evaluation tests.

At is October 2003 Meeting, the Southern Weights and Measures Association (SWMA) reviewed and supported the change to N.1.4.1 submitted by the WWMA.

After further review of the MDMD Working Group's proposal presented at the 2004 NCWM Interim Meeting, Measurement Canada submitted alternate language to simplify paragraph N.1.4.1. as shown above.

At the 2004 NCWM Interim Meeting, the Committee heard support for all items relating to the MDMD Code. The Committee also heard a suggestion to move a proposal to change the status of the code from "tentative" to "permanent" to the end of the 358 items. This change in the order of the items would insure that the status of the code would be decided after all other proposed changes to the code had been considered. The Committee agreed and reordered the items accordingly and proposed the items for a vote.

At their May 2004, meetings the CWMA & NEWMA supported this item as presented.

At the 2004 NCWM Annual Meeting, a manufacturer of multiple dimension measuring devices indicated support for agenda items 358-1 through 358-7, noting that the proposals represented sound technical requirements developed by the work group with representation from manufacturers, users, and weights and measures officials.

358-5 VC T.3. Tolerance Values

(This item was adopted.)

Source: Multiple Dimension Measuring Devices (MDMD) Working Group
Recommendation: Modify Handbook 44 Section 5.58. Multiple Dimension Measuring Devices, paragraph T.3. Tolerance Values as follows:

> **T.3. Tolerance Values. -** The maintenance and acceptance tolerance values shall be ±1 division. **~~These tolerances apply regardless of the shape or material of the object being measured unless otherwise marked on the device.~~**
> **(Amended 2004)**

Background/Discussion: This proposal originated from the July 2003 MDMD Working Group Meeting. One member of the group indicated that his company believes that paragraph T.3. should be clarified and that the entire second sentence in the paragraph is unnecessary and could be misleading. The present wording of this section seems to imply that multiple tolerances are permitted on a system if they are marked on the device. Tolerances applicable to devices performing similar or duplicative functions should be equivalent. The work group agreed to submit the proposal as written to the NCWM S&T Committee for consideration at the NCWM Interim Meeting. NCWM adoption of this item would aid in the effort to change the status of the Multiple Dimension Measuring Devices Code from "tentative" to "permanent."

At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) heard comments from a manufacturer supporting the proposal. The WWMA supported the proposal as submitted and recommended that the NCWM S&T Committee move the proposal forward as a voting item.

At its October 2003 Meeting, the Southern Weights and Measures Association (SWMA) supported the proposal as written.

At the 2004 NCWM Interim Meeting, the Committee heard support for all items relating to the MDMD Code. The Committee also heard a suggestion to move a proposal to change the status of the code from "tentative" to "permanent" to the end of the 358 items. This change in the order of the items would insure that the status of the code would be decided after all other proposed changes to the code had been considered. The Committee agreed and reordered the items accordingly and proposed the items for a vote.

At their May 2004, meetings the CWMA & NEWMA supported this item as presented.

At the 2004 NCWM Annual Meeting, a manufacturer of multiple dimension measuring devices indicated support for agenda items 358-1 through 358-7, noting that the proposals represented sound technical requirements developed by the work group with representation from manufacturers, users, and weights and measures officials.

358-6 VC T.5.2. Power Supply Voltage, T.5.2.1. Alternating Current Power Supply, and T.5.2.2. Direct Current Power Supply

(This item was adopted.)

Source: Multiple Dimension Measuring Devices (MDMD)Working Group

Recommendation: Modify Handbook 44 Section 5.58. Multiple Dimension Measuring Devices, paragraph T.5.2. Power Supply Voltage, add new paragraphs T.5.2.1. Alternating Current Power Supply and T.5.2.2. Direct Current Power Supply, as follows and remove paragraph T.7. Electric Power Supply.

T.5.2. Power Supply Voltage. - ~~Devices shall satisfy the applicable tolerances when subjected to power supply voltage variation of -15 % to +10 % of the voltage rating specified by the manufacturer.~~

<u>T.5.2.1. Alternating Current Power Supply. - Devices that operate using alternating current must perform within the conditions defined in paragraphs T.3. through T.6., inclusive, from –15 % to +10 % of the marked nominal line voltage(s) at 60 Hz, or the voltage range marked by the manufacturer, at 60 Hz.</u>
<u>(Added 2004)</u>

<u>T.5.2.2. Direct Current Power Supply. - Devices that operate using direct current shall operate and perform within the applicable tolerance at any voltage level at which the device is capable of displaying metrological registrations.</u>
<u>(Added 2004)</u>
<u>(Amended 2004)</u>

~~T.7. Electric Power Supply. - Battery-operated instruments shall not indicate nor record values outside the applicable tolerance limits when battery power output is excessive or deficient.~~
~~(Added 1999)~~

Background/Discussion: This proposal originated from the July 2003 MDMD Working Group Meeting. The requirements currently in paragraphs T.5.2. and T.7. do not clearly distinguish between alternating current and direct current power supplies. The language was also not consistent with similar requirements in other Handbook 44 Codes, such as paragraph T.N.8.3. Electric Power Supply in the Scales Code or paragraph T.N.7.3. Electric Power Supply in the Automatic Weighing Systems Code. All codes should be consistent and, where possible, should harmonize with international requirements. The Work Group agreed to submit the proposal as written to the NCWM S&T Committee for consideration at the NCWM Interim Meeting. NCWM adoption of this item would aid in the effort to change the status of the Multiple Dimension Measuring Devices Code from "tentative" to "permanent."

At its September 2003 Meeting, the Western Weights and Measures Association (WWMA) heard comments from a manufacturer supporting the proposal. The WWMA supported the proposal as submitted and recommended that the NCWM S&T Committee move the proposal forward as a voting item.

At its October 2003 Meeting, the Southern Weights and Measures Association (SWMA) supported the proposal as written.

At the 2004 NCWM Interim Meeting, the Committee heard support for all items relating to the MDMD Code. The Committee also heard a suggestion to move a proposal to change the status of the code from "tentative" to "permanent" to the end of the 358 items. This change in the order of the items would insure that the status of the code would be decided after all other proposed changes to the code had been considered. The Committee agreed and reordered the items accordingly and proposed the items for a vote.

At their May 2004, meetings the CWMA & NEWMA supported this item as presented.

At the 2004 NCWM Annual Meeting, a manufacturer of multiple dimension measuring devices indicated support for agenda items 358-1 through 358-7, noting that the proposals represented sound technical requirements developed by the work group with representation from manufacturers, users, and weights and measures officials.

358-7 VC Tentative Status of the Multiple Dimension Measuring Devices Code

(This item was adopted.)

Source: Carryover Item 358-1. (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's 2002 agenda.)

Recommendation: Change the status of the Multiple Dimension Measuring Devices Code (MDMD) from tentative to permanent.

Discussion: In response to comments from weights and measures officials and industry representatives, the Multiple Dimension Measuring Devices Code was considered in 2002 for permanent status. The Committee heard that the code should be harmonized with the more stringent Canadian requirements. Industry representatives cautioned that other issues may exist because the code was developed prior to some of the latest electronic technology. Therefore, in July 2002 the proposal was changed from a voting item to an information item pending further review.

During the 2003 NCWM Interim Meeting, the Committee heard that Canada is considering a number of proposals to modify Canadian requirements for Multiple Dimension Measuring Devices (MDMD) devices. Consequently, in the interest of aligning U.S. and Canadian requirements, the Committee agreed that the proposal should remain an information item to allow time for review and comparison of U.S. and pending Canadian requirements.

The MDMD Working Group met July 17-18, 2003, to discuss outstanding issues in the MDMD Code. The Work Group submitted proposals (358-1 through 358-6 in this report) for changes to NIST Handbook 44 to the NCWM S&T Committee for consideration at the January 2004 NCWM Interim Meeting.

At the 2004 NCWM Interim Meeting, the Committee heard support for all items relating to the MDMD Code. The Committee also heard a suggestion to move a proposal to change the status of the code from "tentative" to "permanent" to the end of the 358 items. This change in the order of the items would insure that the status of the code would be decided after all other proposed changes to the code had been considered. The Committee agreed and reordered the items accordingly and proposed the items for a vote.

At their May 2004, meetings the CWMA & NEWMA supported this item as presented.

At the 2004 NCWM Annual Meeting, a manufacturer of multiple dimension measuring devices indicated support for agenda items 358-1 through 358-7, noting that the proposals represented sound technical requirements developed by the work group with representation from manufacturers, users, and weights and measures officials.

For background information, refer to the 2002 and 2003 S&T Final Report.

360 OTHER ITEMS

360-1 W Revise NIST Handbook 44

(This item was withdrawn.)

Source: Carryover Item 360-1 (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's 1999 agenda.)

Discussion: Work on revising NIST Handbook 44 has not resumed since 2000 when there were unanticipated changes to key members on the Handbook 44 Working Group. The Committee continues in its support of the BOD's efforts to eventually revise Handbook 44 to create a more user-friendly document.

The Western Weights and Measures Association recommended that this item remain informational and encouraged the NCWM Board of Directors (BOD) to support the revision project.

The Committee acknowledged that there is a need to create a more user-friendly document for the field official. An inspector's field manual that provides the "basic" information necessary to perform both an initial and subsequent field tests was one suggested publication. However, there has not been any work to revise Handbook 44 for almost five years. Consequently, the Committee withdrew this item from its agenda with plans to revisit the issue whenever the BOD is able to resume its work plan and can provide resources for the project.

360-2 I International Organization of Legal Metrology (OIML) Report

The complete OIML Report is included as part Appendix B of the NCWM OIML Board of Director's 2004 Final Report.

Many issues before the OIML, the Asian-Pacific Legal Metrology Forum (APLMF), and other international groups are within the purview of the S&T Committee. Additional information on OIML activities is available on the OIML web site at http://www.oiml.org/.

For more information on specific device activities see the Weights and Measures Division staff listed in the table below:

NIST Weights and Measures Division Contact List				
Staff	**Telephone**	**Email**	**Device Type**	**Postal Mail or Fax**
Steven Cook (LMDG)	301-975-4003	steven.cook@nist.gov	Weighing Devices	NIST WMD 100 Bureau Dr MS 2600 Gaithersburg, MD 20899-2600 Fax: 301-926-0647
Richard Harshman (LMDG)	301-975-8107	richard.harshman@nist.gov	R 134 - Weighing Road Vehicles In-Motion R 60 - Load Cells	
Diane Lee (LMDG)	301-975-4405	diane.lee@nist.gov	R 59 Moisture Meters for Cereal Grains and Oilseeds	
Ralph Richter (ILMG)	301-975-4025	ralph.richter@nist.gov	R 117 - Measuring Systems for Liquids Other Than Water R 105 - Direct Mass Flow Measuring Systems for Quantities of Liquids, and Gas Meters	
Wayne Stiefel (ILMG)	301-975-4011	s.stiefel@nist.gov	Measuring Devices	
Ambler Thompson (ILMG)	301-975-2333	ambler@nist.gov	Electronic Measuring Devices	
Juana Williams (LMDG)	301-975-3989	juana.williams@nist.gov	R 21 Taximeters	
LMDG - Legal Metrology Devices Group ILMG - International Legal Metrology Group				

The Committee encourages the BOD to implement a plan to address U.S./OIML harmonization.

360-3 D Developing Issues

The NCWM established a mechanism to disseminate information about emerging issues which have merit and are of national interest. Developing issues have not received sufficient review by all parties affected by the proposal or may be insufficiently developed to warrant review by the NCWM S&T Committee. The developing issues listed below are currently under review by at least one regional association or technical committee.

The developing issues are listed in Appendix A according to the specific NIST Handbook 44 Code Section under which they fall.

The S&T Committee encourages interested parties to examine the proposals included in Appendix A and send their comments to the contact listed in each item.

The Committee asks that the regional weights and measures associations and National Type Evaluation Technical Committee Sectors continue their work to fully develop each proposal. Should an association or Sector decide to discontinue work on a developmental item, the Committee asks that it be notified.

360-4 I Add International Terms that are Synonyms to NIST Handbook 44 Terms to Appendix D; Definitions

Source: Northeastern Weights and Measures Association (NEWMA)

Discussion: Many Handbook 44 and OIML technical concepts and procedures are in harmony, yet, there are significant differences in the terminology used. The harmonization of language is not necessary to harmonize requirements provided a state of equivalence exists; however, improvements should be promoted where the language is confusing or has the potential for misinterpretation. Currently, the U.S. National Working Group (USNWG) on R 76 Non-Automatic Weighing Instruments is working on a proposal to amend NIST Handbook 44 Appendix D, Definitions to include international terminology that is synonymous with Handbook 44 definitions. The USNWG will identify Handbook 44 terms or definitions that are equivalent to international vocabulary in a format that is similar to the example shown below:

> **automatic zero-setting mechanism <u>(OIML R 76: zero-tracking device)</u>.** Automatic means provided to maintain zero . . . operation. [2.20]

The work to amend Appendix D will also clarify terminology for international participants in the proposed Mutual Acceptance Arrangement (MAA)(see BOD Agenda, Appendix A for more information), where it is imperative that all affected parties are aware and understand each other's requirements. For example, the Handbook 44 term "automatic zero setting" has an entirely different meaning in R 76. Handbook 44 is also inconsistent in the use of many terms such as "division," "increment," and "interval." The addition of international terminology to existing Handbook 44 language may also help to eliminate any confusion about the use of other frequently used terms such as: device, element, mechanism, scale, weigher, and balance.

A subcommittee made up of USNWG members has volunteered to review and suggest recommendations on Handbook 44 General Code and Scales Code definitions where there is equivalent international terminology. The group plans to ballot the USNWG and submit a completed proposal to the NCWM S&T Committee. This item is intended to familiarize the public and private sectors with the proposed approach to modify Appendix D.

NEWMA supports this item and views it as a first step toward educating weights and measures officials. Future steps should include making proposed changes to incorporate international terms in the text of Handbook 44 with the ultimate goal of having one mutually acceptable set of terms. The Committee concurred with NEWMA's assessment that the proposal is a necessary step to harmonize U.S. and international terminology to ultimately harmonize U.S. and International Standards. The Committee decided to make this an information item to allow the work group sufficient time to complete its work.

Chairman Jack Kane, Montana

Clark Cooney, Oregon
Carol P. Fulmer, South Carolina
Michael J. Sikula, New York

Ted Kingsbury, Canada, Technical Advisor
Richard Suiter, NIST, Technical Advisor
Juana Williams, NIST, Technical Advisor

Committee on Specifications and Tolerances

Appendix A

Item 360-3: Developing Issues

D Part 1, General Code;G-S.5.6.1. Recorded Representation of Metric Units on Equipment with Limited Character Sets

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify paragraph G-S.5.6.1. as follows:

> **G-S.5.6.1. ~~Recorded Representation of Metric Units on Equipment with Limited Character Sets~~ Acceptable Abbreviations for Recorded and Indicated Representation of Units on Equipment. -** The appropriate defining symbols are shown in Table 1.

Add the following new abbreviations to existing Table 1 Representation of Units in the General Code:

Name of Unit	Common Use Symbol	Representation			Name of Unit	Common Use Symbol	Representation		
		Form I	Form II				Form I	Form II	
		(double case)	(single lower case)	(single case upper)			(double case)	(single lower case)	(single case upper)
inch	**in**	**in**	**in**	**IN**	**deciliter**	**dL**	**dL**		
foot	**ft**	**ft**	**ft**	**FT**	**kiloliter**	**kL**	**kL**		
yard	**yd**	**yd**	**yd**	**YD**	**cubic meter**	$\mathbf{M^3}$	$\mathbf{m^3}$	$\mathbf{m^3}$	$\mathbf{M^3}$
milligram	**mg**	**mg**	**mg**		**cubic inch**	$\mathbf{in^3}$	$\mathbf{in^3}$	$\mathbf{in^3}$	$\mathbf{IN^3}$
megagram	**Mg**	**Mg**			**cubic foot**	$\mathbf{ft^3}$	$\mathbf{ft^3}$	$\mathbf{ft^3}$	$\mathbf{FT^3}$
grain	**gr**	**gr**	**gr**		**cubic yard**	$\mathbf{yd^3}$	$\mathbf{yd^3}$	$\mathbf{yd^3}$	$\mathbf{YD^3}$
dram	**dr**	**dr**	**dr**		**gills**	**gi**	**gi**	**Gi**	**GI**
ounce	**oz**	**oz**	**oz**	**OZ**	**pint**	**pt**	**pt**	**pt**	**PT**
pound	**lb**	**lb**	**lb**	**LB**	**quart**	**qt**	**qt**	**qt**	**QT**
hundredweight	**cwt**	**cwt**	**cwt**	**CWT**	**gallon**	**gal**	**gal**	**gal**	**GAL**
pennyweight	**dwt**	**dwt**	**dwt**	**DWT**	**ampere**	**A, I**	**A, I**		**A, I**
ounce troy	**oz t**	**oz t**	**oz t**	**OZ T**	**resistance**	**ohm**	**ohm**	**ohm**	**OHM**
milliliter	**mL**	**mL**							
centiliter	**cL**	**cL**							

Discussion: The WWMA notes that the current Table 1 does not include many units that are in common use today.

To provide input on this proposal contact Gary Castro, California Division of Measurement Standards by telephone at 916-229-3018, by fax at 916-229-3015, or by e-mail at gcastro@cdfa.ca.gov.

D Part 2, Scales; Table 4. Minimum Test Weights and Test Loads; Device Capacity 500 000 lb

Source: Northeastern Weights and Measures Association (NEWMA)

Recommendation: Modify Table 4. Minimum Test Weights and Test Loads as follows:

Table 4.
Minimum Test Weights and Test Loads[1]

Device capacity	**Minimums (in terms of device capacity)**		**(where practicable)**
	Test weights (greater of)	**Test loads[2]**	
0 to 150 kg (0 to 300 lb)	100 %		
151 to 1 500 kg (301 to 3 000 lb)	25 % or 150 kg (300 lb)	75 %	Test weights to dial face capacity, 1 000 d, or test load to used capacity, if greater than minimums specified
1 501 to 20 000 kg (3 001 to 40 000 lb)	12.5 % or 500 kg (1 000 lb)	50 %	
20 001 kg~~+~~ **to 250 000 kg** (40 001 lb~~+~~ **to 500 000 lb**)	**12.5 % or 5 000 kg (10 000 lb)**	25 %[3]	During initial verification, a scale should be tested to capacity.

[1] If the amount of test weight in Table 4 combined with the load on the scale would result in an unsafe condition, then the appropriate load will be determined by the official with statutory authority.

[2] The term "test load" means the sum of the combination of field standard test weights and any other applied load used in the conduct of a test using substitution test methods. Not more than three substitutions shall be used during substitution testing, after which the tolerances for strain load tests shall be applied to each set of test loads.

[3] The scale shall be tested from zero to at least 12.5 % of scale capacity using known test weights, and then to at least 25 % of scale capacity using either a substitution or strain load test that utilizes known test weights of at least 12.5 % of scale capacity. Whenever practical, a strain load test should be conducted to the used capacity of the scale. When a strain load test is conducted, the tolerances apply only to the test weights or substitution test loads.
(Amended 1988, 1989, 1994, and 2003)

Discussion: The Committee acknowledged that the NEWMA proposal to modify Table 4, Minimum Test Weights and Test Loads begins to address the minimum test load required for all large capacity scales. However, the proposal erroneously appeared in 2004 S&T Interim Agenda Item 320-2 when it is a separate issue that has merit, but is insufficiently developed for Committee action. Consequently, NEWMA's proposal now appears as a developing item in Appendix A Part 2, Scales Code as shown in the recommendation above.

NEWMA submitted the proposal because jurisdictions encounter scales with 1 000 000 lb nominal capacity and must determine the minimum test load. NEWMA finds that NIST Handbook 44 is flexible, but does not provide any definitive guidelines on test loads for large capacity scales. NEWMA recognized the problems jurisdictions face when testing scales with very large capacities; therefore, it submitted a proposal to modify Table 4. NEWMA modified its proposal by reducing the maximum scale capacity from 1 000 000 lb to 500 000 lb. NEWMA also removed from the proposal a new footnote that permitted the official with statutory authority to determine the minimum test load for scales that exceeded 500 000 lb nominal capacity. NEWMA believes the proposal is very relevant, but is not ready for adoption, until it receives thorough discussion at the regional level.

The Scale Manufacturers Association reviewed the proposal, but did not take a position on the modifications to Table 4.

The Committee agreed that Table 4 is the appropriate place in Handbook 44 to provide some guidance on the appropriate minimum test load for subsequent tests on scales that exceed capacities of 400 000 lb. The Committee believes that the issue warrants a high priority, but requires further review and input from both the public and private sectors.

To provide input on this proposal contact Michael Sikula, New York Bureau of Weights and Measures, by telephone at 518-457-3452, by fax at 518-457-2552, or by e-mail at mike.sikula@agmkt.state.ny.us.

Appendix B

Item 324-1: Tentative Status of the Automatic Weighing Systems Code

Section 2.24. Automatic Weighing Systems ~~- Tentative Code~~

~~**This tentative code has only a trial or experimental status and is not intended to be enforced by weights and measures officials. The requirements are designed for study prior to the development and adoption of a final Code for Automatic Weighing Systems. The tentative code is intended to be used by the National Type Evaluation Program for type evaluation of automatic weighing systems. If upgraded to become a permanent code, all requirements, except those for tolerances, will be nonretroactive as of the effective date of the permanent code; tolerance requirements will apply retroactively as of the effective date of the permanent code.**~~
~~**(Tentative Code Added 1995) (Amended 1998)**~~

The status of Section 2.24. Automatic Weighing Systems was changed from tentative to permanent in July 2004 and will go into effect on January 1, 2005.

NTEP has been evaluating devices under the provisions of this code since it was added to Handbook 44 in 1995. In addition, a number of weights and measures jurisdictions as well as organizations such as USDA have implemented this code using the provisions of General Code Paragraph G-A.3. - Special and Unclassified Equipment. It is recommended that the jurisdictions who have not implemented this code, work with industry to expedite implementation of its use.

A. Application

A.1. - This code applies to devices used to **automatically** weigh **pre-assembled discrete loads or single loads of loose materials in applications where automatic weighing systems[1] are used or employed in the determination of quantities, things, produce, or articles for distribution, purchase, offered or submitted for sale, or in computing any basic charge or payment for services rendered on the basis of weight, and in packaging plants subject to regulation by the United States Department of Agriculture (USDA).** ~~**or fill packages while the object is in motion**~~ Some weigh-labelers **and check-weighers** may also include a scale that is incorporated in a conveyor system that weighs packages in a static **or non-automatic** weighing mode[2].

This includes:

(a) **Automatic** ~~**W**~~**w**eigh-labelers~~**, static and dynamic**~~

(b) Combination automatic and non-automatic weigh-lablers

(c) Automatic checkweighers

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[1] **An automatic weighing system does not require the intervention of an operator during the weighing process. The necessity to give instructions to start a process or to release a load, or the function of the instrument (static, dynamic, set-up, etc.) are not relevant in deciding the category of automatic or non-automatic instruments.**

[2] **Prepackaging scales (and other commercial devices) used for putting up packages in advance of sale are acceptable for use in commerce if all appropriate provisions of Handbook 44 are met. Users of such devices must be alert to the legal requirements relating to the declaration of quantity on a package. Such requirements are to the effect that, on the average, the contents of the individual packages of a particular commodity comprising a lot, shipment, or delivery must contain at least the quantity declared on the label. The fact that a scale or other commercial device may overregister, but within established tolerances, and is approved for commercial service is not a legal justification for packages to contain, on the average, less than the labeled quantity.**

~~**(Amended 1997)**~~

(d) **Combination automatic and non-automatic checkweighers**

(e) **Automatic gravimetric filling machines that weigh discrete loads or single loads of loose materials and determine package and production lot compliance with net weight representations**.

(Amended 1997 **and 2004**)

A.2. - This code does not apply to:

(a) Belt-Conveyor Scale Systems

(b) Railway Track Scales

(c) Monorail Scales

(d) Automatic Bulk-Weighing Systems

(e) Devices that measure quantity on a time basis

(f) Controllers or other auxiliary devices except as they may affect the weighing performance

(g) **Automatic gravimetric filling machines and other automatic weighing systems employed in determining the weight of a commodity in a plant or business with a quantity control program (e.g., a system of statistical process control) using suitable weighing instruments and measurement standards traceable to national standards to determine production lot compliance with net weight representations[3].**
(Added 2004)

A.3. - Also see General Code requirements.

~~**A.4. Type Evaluation. - The National Type Evaluation Program will accept for type evaluation only those devices that comply with all requirements of this code.**~~
~~**(Added 1998)**~~

S. Specifications

S.1. Design of Indicating and Recording Elements and of Recorded Representations.

S.1.1. Zero Indication.

(a) A weigh-labeler shall be equipped with an indicating or recording element. ~~It~~ **Additionally, a weigh-labeler equipped with an indicating or recording element** shall either indicate or record a zero-balance condition and an out-of-balance condition on both sides of zero.
(Amended 2004)

(b) An automatic checkweigher may be equipped with an indicating or recording element.

(c) A zero-balance condition may be indicated by other than a continuous digital zero indication, provided that effective automatic means is provided to inhibit a weighing operation or to return to a continuous digital indication when the device is in an out-of-balance condition.

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[3] **See NIST Handbook 130, Uniform Laws and Regulations In the Area of Legal Metrology and Engine Fuel Quality, Interpretations and Guidelines paragraph 2.6.11. Good Quantity Control Practices.**

S.1.1.1. Digital Indicating Elements.

(a) A digital zero indication shall represent a balance condition that is within ± ½ scale division.

(b) A digital indicating device shall either automatically maintain a "center of zero" condition to ± ¼ scale division or less, or have an auxiliary or supplemental "center-of-zero" indicator that defines a zero-balance condition to ± ¼ scale division or less.

(c) Verification of the accuracy of the center of zero indication to ± ¼ scale division or less during ~~**dynamic**~~ **<u>automatic</u>** operation is not required on automatic checkweighers.
<u>(Amended 2004)</u>

S.1.2. Value of Division Units. - The value of a division "d" expressed in a unit of weight shall be equal to:

(a) 1, 2, or 5; or

(b) a decimal multiple or submultiple of 1, 2, or 5.

S.1.2.1. Weight Units. – <u>Except for postal scales, indicating and recording elements for shipping and postal applications, and scales used to print standard pack labels,</u> ~~**A**~~ <u>a</u> device shall indicate weight values using only a single unit of measure.
<u>(Amended 2004)</u>

S.1.3. Provision for Sealing.

(a) **Automatic Weighing Systems, Except Automatic Checkweighers. -** A device shall be designed with provision(s) as specified in Table S.1.3., "Categories of Device and Methods of Sealing," for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.

(b) **For Automatic Checkweighers. -** Security seals are not required in ~~**field**~~ applications where it would prohibit an authorized user from having access to the calibration functions of a device.

Table S.1.3.
Categories of Device and Methods of Sealing

Categories of Device	Method of Sealing
Category 1: No Remote configuration capability.	Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.
Category 2: Remote configuration capability, but access is controlled by physical hardware. The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode.	The hardware enabling access for remote communication must be at the device and sealed using a physical seal or two event counters: one for calibration parameters and one for configuration parameters.
Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).	An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to ten times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

S.1.4. Automatic Calibration. - A device may be fitted with an automatic or a semi-automatic calibration mechanism. This mechanism shall be incorporated inside the device. After sealing, neither the mechanism nor the calibration process shall facilitate fraud.

S.1.5. Adjustable Components. - Adjustable components shall be held securely in adjustment and, except for a zero-load balance mechanism, shall be located within the housing of the element.

S.2. Design of Zero and Tare Mechanisms.

S.2.1. Zero Load Adjustment.

S.2.1.1. Automatic Zero-Setting Mechanism (Zero-tracking). - Except for automatic checkweighers, under normal operating conditions the maximum load that can be "rezeroed," when either placed on or removed from the platform all at once, shall be 1.0 scale division.
(Amended 2004)

S.2.1.2. Initial Zero-Setting Mechanism. - Except for automatic checkweighers, an initial zero-setting mechanism shall not zero a load in excess of 20 % of the maximum capacity of the automatic weighing system unless tests show that the scale meets all applicable tolerances for any amount of initial load compensated by this device within the specified range.

S.2.2. Tare. - On any automatic weighing system the value of the tare division shall be equal to the value of the scale division. The tare mechanism shall operate only in a backward direction (i.e., in a direction of underregistration) with respect to the zero-load balance condition of the automatic weighing system. A device designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.

Note: On a computing automatic weighing system, this requires the input of a unit price, the display of the unit price, and a computed positive total price at a readable equilibrium. Other devices require a ~~**complete**~~ **.** ~~**weighing operation, including tare, net, and gross weight determination**~~ **transaction or lot run** ~~**has been**~~ **be completed**
(Amended 2004)

S.3.1. Multiple Range and Multi-Interval Automatic Weighing System. The value of "e" shall be equal to the value of "d."

S.3.2. Load Cell Verification Interval Value. - The relationship of the value for the load cell verification scale interval, v_{min}, to the scale division "d" for a specific scale installation shall be:

$$v_{\min} \le \frac{d}{\sqrt{N}}$$, where N is the number of load cells in the scale.

Note: When the value of the scale division "d" differs from the verification scale division "e" for the scale, the value of "e" must be used in the formula above.

S.3.3. - For automatic checkweighers, the value of "e" shall be specified by the manufacturer and may be larger than "d," but in no case can "e" be more than 10 times the value of "d."

S.4. Weight Indicators, Weight Displays, Reports, and Labels.

~~**S.4.1. Weight Units. - An indicating or recording element shall indicate weight values using only a single unit of measure.**~~

S.4.~~2~~1. Additional Digits in Displays. - Auxiliary digital displays that provide additional digits for use during performance evaluation may be included on automatic checkweighers. However, in cases where these indications are not valid for determining the actual weight of a package (e.g., only appropriate for use in statistical process control programs by users) they shall be clearly and distinctly differentiated from valid weight displays by indicating them to the user.

For example, the additional digits may be differentiated by color, partially covered by placing crosshatch overlays on the display, or made visible only after the operator presses a button or turns a key to set the device in a mode which enables the additional digits.

S.4.~~3~~2. Damping. - An indicating element equipped with other than automatic recording elements shall be equipped with effective means to permit the recording of weight values only when the indication is stable within plus or minus one scale division. The values recorded shall be within applicable tolerances.

S.4.~~4~~3. Over Capacity Indication. - An indicating or recording element shall not display nor record any values when the scale capacity is exceeded by nine scale divisions.

S.4.~~5~~4. Label Printer. - A device that produces a printed ticket to be used as the label for a package shall print all values digitally and of such size, style of type, and color as to be clear and conspicuous on the label.

S.4.~~5.~~41. Label Printing. - If an automatic checkweigher prints a label containing weight information that will be used in a commercial transaction, it must conform to all of the requirements specified for weigh-labelers so that the printed ticket meets appropriate requirements.

S.5. Accuracy Class.

S.5.1. Marking. - Weigh-labelers and automatic checkweighers shall be Class III devices and shall be marked accordingly, except that a weigh-labeler marked Class IIIS may be used in package shipping applications.
(Amended 1997)

S.6. Parameters for Accuracy Classes. - The number of divisions for device capacity is designated by the manufacturer and shall comply with parameters shown in Table S.6.

Table S.6.
Parameters for Accuracy Classes

		Number of divisions (n)	
Class	**Value of the verification division (~~d or~~ e)**	**Minimum**	**Maximum**
SI Units			
III	0.1 to 2g inclusive	100	10 000
	equal to or greater than 5g	500	10 000
INCH-POUND Units			
III	0.0002 lb to 0.005 lb, inclusive	100	10 000
	0.005 oz to 0.125 oz, inclusive	100	10 000
	equal to or greater than 0.01 lb	500	10 000
	equal to or greater than 0.25 oz	500	10 000
IIIS	greater than 0.01 lb	100	1000
	greater than 0.25 oz	100	1000
For Class III devices, the value of "e" is specified by the manufacturer as marked on the device; "d" shall not be smaller than 0.1 "e." "e" shall be differentiated from "d" by size, shape, or color. **(Amended 2004)**			

S.7. Marking Requirements. [See also G-S.1., G-S.4., G-S.6., G-S.7., G-U.2.1.1., and UR.3.3.]

S.7.1. Location of Marking Information. - Automatic weighing systems which are not permanently attached to an indicating element, and for which the load-receiving element is the only part of the weighing/load-receiving element visible after installation, may have the marking information required in G-S.1. of the General Code and Table S.7.a. and S.7.b. of the Automatic Weighing Systems Code located in an area that is accessible only through the use of a tool; provided that the information is easily accessible (e.g., the information may appear on the junction box under an access plate). The identification information for these automatic weighing systems shall be located on the weighbridge (load-receiving element) near the point where the signal leaves the weighing element or beneath the nearest access cover.

S.7.2. Marking Required on Components of Automatic Weighing Systems. - The following components of automatic weighing systems shall be marked as specified in Tables S.7.a. and S.7.b.:

(a) Main elements and components when not contained in a single enclosure for the entire automatic weighing system;

(b) Load cells for which Certificates of Conformance (CC) have been issued under the National Type Evaluation Program; and

(c) Other equipment necessary to a weighing system but having no metrological effect on the weighing system.

Table S.7.a. Marking Requirements

To Be Marked With ⇓	**Weighing Equipment**				
	Weighing, load-receiving, and indicating element in same housing	**Indicating element not permanently attached to weighing and load-receiving element**	**Weighing and load-receiving element not permanently attached to indicating element**	**Load cell with CC (10)**	**Other equipment or device (9)**
Manufacturer's ID (1)	x	x	x	x	x
Model Designation (1)	x	x	x	x	x
Serial Number and Prefix (2)	x	x	x	x	x (13)
Certificate of Conformance Number (16)	x	x	x	x	x (16)
Accuracy Class (14)	x	x (8)	x	x	
Nominal Capacity (3)(15)	x	x	x		
Value of Division, d (3)	x	x			
Value of "e" (4)	x	x			
Temperature Limits (5)	x	x	x	x	
Special Application (11)	x	x	x		
Maximum Number of Scale Divisions, n_{max} (6)		x (8)	x	x	
Minimum Verification Division, (e_{min})			x		
"S" or "M" (7)				x	
Direction of Loading (12)				x	
Minimum Dead Load				x	
Maximum Capacity (Max)	x			x	
Minimum Capacity (Min)	x				

Table S.7.a. Marking Requirements					
To Be Marked With ⇓	**Weighing Equipment**				
	Weighing, load-receiving, and indicating element in same housing	**Indicating element not permanently attached to weighing and load-receiving element**	**Weighing and load-receiving element not permanently attached to indicating element**	**Load cell with CC (10)**	**Other equipment or device (9)**
Safe Load Limit				x	
Load Cell Verification Interval (v_{min})				x	
Maximum Belt Speed (m/sec or m/min)	x		x		

Note: See Table S.7.b. for applicable parenthetical notes.
(Amended 1999)

Table S.7.b.
Notes for Table S.7.a.

1. Manufacturer's identification and model designation. (See G-S.1.)

2. Serial number and prefix. (See G-S.1.)

3. The nominal capacity and value of the automatic weighing system division shall be shown together (e.g., 50 000 x 5 kg, or 30 x 0.01 lb) adjacent to the weight display when the nominal capacity and value of the automatic weighing system division are not immediately apparent. Each division value or weight unit shall be marked on variable-division value or division-unit automatic weighing systems.

4. Required only if different from "d."

5. Required only on automatic weighing systems if the range is other than -10 °C to 40 °C (14 °F to 104 °F).

6. This value may be stated on load cells in units of 1000; (e.g., n: 10 is 10 000 divisions.)

7. Denotes compliance for single or multiple load cell applications.

8. An indicating element not permanently attached to a weighing element shall be clearly and permanently marked with the accuracy Class III, or IIIS and the maximum number of divisions, n_{max}.

9. Necessary to the weighing system but having no metrological effect, e.g., auxiliary remote display, keyboard, etc.

10. The markings may be either on the load cell or in an accompanying document; except that, if an accompanying document is provided, the serial number shall appear both on the load cell and in the document. The manufacturer's name or trademark, the model designation, and identifying symbol for the serial number shall also be marked both on the load cell and in any accompanying document.

11. An automatic weighing system designed for a special application rather than general use shall be conspicuously marked with suitable words visible to the operator and customer restricting its use to that application.

12. Required if the direction of loading the load cell is not obvious.

13. Serial number and prefix (See G-S.1) Modules without "intelligence" on a modular system (e.g., printer, keyboard module, cash drawer, and secondary display in a point-of-sale system) are not required to have serial numbers.

14. The accuracy Class of a device shall be marked on the device with the appropriate designation.

Table S.7.b. Notes for Table S.7.a.
15. The nominal capacity shall be conspicuously marked on any automatic-indicating or recording automatic weighing system so constructed that the capacity of the indicating or recording element, or elements, is not immediately apparent. 16. Required only if a CC has been issued for the equipment.

N. Notes

N.1. Test Requirements for Automatic Weighing Systems.

N.1.1. Test Pucks and Packages.

(a) Test pucks and packages shall be:

(i) representative of the type, size, and weight ranges to be weighed on a device, and

(ii) stable while in motion, hence the length and width of a puck or package should be greater than its height.

(b) For type evaluation the manufacturer shall supply the test pucks or packages for each range of test loads.

(Amended 1997)

N.1.2. Accuracy of Test Pucks or Packages. - The error in any test puck or package shall not exceed one-fourth (1/4) of the acceptance tolerance. If packages are used to conduct field tests on automatic weighing systems, the package weights shall be determined on a reference scale or balance with an inaccuracy that does not exceed one-fifth (1/5) of the smallest tolerance that can be applied to the device under test.

N.1.3. Verification (Testing) Standards. - Field standard weights shall comply with requirements of NIST Handbook 105-1 (Class F) or the tolerances expressed in Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied).

N.1.4. Radio Frequency Interference (RFI) and Other Electromagnetic Interference Susceptibility, Field Evaluation. - An RFI test shall be conducted at a given installation when the presence of RFI has been verified and characterized if those conditions are considered "usual and customary."
(Added 2004)

~~**N.2. Test Requirements for Automatic Weighing Systems.**~~

N.~~2.~~1.5. Tests Loads. - A performance test shall consist of four separate test runs conducted at different test loads according to Table N**.~~3.2~~1.5.**

Table N.~~3.2~~1.5. Test Loads
At or near minimum capacity
At or near maximum capacity
At two (2) critical points between minimum and maximum capacity
Test may be conducted at other loads if the device is intended for use at other specific capacities

N.~~2.2~~1.6. Influence Factor Testing. - Influence factor testing shall be conducted statically.

N.~~3~~2. Test Procedures - Weigh-Labelers. - If the device is designed for use in ~~**static**~~ **a non-automatic** weighing **mode,** it shall be tested ~~**statically using mass standards**~~ **in the non-automatic mode according to Handbook 44 Section 2.20 Scales Code.**

Note: If the device is designed for only ~~dynamic~~ **automatic** weighing, it shall only be tested ~~dynamically~~ **in the automatic mode.**
(Amended 2004)

N.~~3~~2.1. ~~Laboratory Static~~ Non-automatic Tests.

N.~~3~~2.1.1. Increasing-Load Test. - The increasing-load test shall be conducted with the test loads approximately centered on the load-receiving element of the scale.

N.~~3~~2.1.2. Decreasing-Load Test. - The decreasing-load test shall be conducted with the test loads approximately centered on the load-receiving element of the scale.

N.~~3~~2.1.3. Shift Test. - To determine the effect of off-center loading, a test load equal to one-half (½) maximum capacity shall be placed in the center of each of the four points equidistant between the center and front, left, back, and right edges of the load receiver.

N.~~3~~2.1.4. Discrimination Test. - A discrimination test shall be conducted with the weighing device in equilibrium at zero load and at maximum test load, and under controlled conditions in which environmental factors are reduced to the extent that they will not affect the results obtained. This test is conducted from just below the lower edge of the zone of uncertainty for increasing load tests, or from just above the upper edge of the zone of uncertainty for decreasing-load tests.

N.~~3~~2.1.5. Zero-Load Balance Change. - A zero-load balance change test shall be conducted on all automatic weighing systems after the removal of any test load. The zero-load balance should not change by more than the minimum tolerance applicable. (Also see G-UR.4.2.)

~~**N.3.1.6. Influence Factor Testing. - Influence factor testing shall be conducted.**~~
(Amended 2004)

~~**N.3.2. Laboratory - Dynamic Tests. - The device shall be tested at the highest speed for each weight range using standardized test pucks or packages. Test runs shall be conducted using four test loads as described in Table N.3.2. Each test load shall be run a minimum of 10 consecutive times.**~~

~~**N.3.2.1. Shift Test. - To determine the effect of eccentric loading, for devices without a means to align packages, a test load equal to one-third (1/3) maximum capacity shall be passed over the load receiver or transport belt (1) halfway between the center and front edge, and (2) halfway between the center and back edge.**~~

N.~~3.3~~2.2.~~.~~ ~~Field~~ Automatic Test Procedures.

N.~~3.3.~~ 2.2.1. Tests Non-automatic ~~Static~~. - If the automatic weighing system is designed to operate **non-automatically**~~**statically**~~**,** and used in that manner, during normal use operation, it shall be tested **non-automatically**~~statically~~ using mass standards. The device shall not be tested ~~statically~~ **non-automatically** if it is used only ~~**dynamically**~~**in the automatic mode.**

N.~~3.3~~2.2.2. ~~Dynamic~~Automatic Tests. - The device shall be tested at the normal operating speed using packages. Test runs should be conducted using at least two test loads distributed over its normal weighing range (e.g., ~~**at**~~ **near** the lowest and highest ranges in which the device is typically operated.) Each test load should be run a minimum of 10 consecutive times.
(Amended 2004)

N.~~4~~ 3. Test Procedures - Automatic Checkweigher.

N.~~4~~ 3.1. ~~Laboratory - Static~~ Tests Non-Automatic. - If the scale is designed to operate **non-**~~**statically**~~ **automatically** during normal user operation, it shall be tested ~~statically~~ **non-automatically** **according to**

paragraphs N.2.1.1. Increasing Load Tests through N.2.1.5. Zero-Balance Change ~~**using the applicable weigh-labeler requirements**~~**.**
(Amended 2004)

N.~~4~~.3.2. ~~Laboratory - Dynamic~~ Automatic Tests. - The device shall be tested at the highest speed in each weight range using standardized test pucks or packages. Test runs shall be conducted using **two**~~**four**~~ test loads. The number of consecutive test weighments shall **one-half (1/2) of those specified** ~~**be as described**~~ in Table N.**3.**~~4~~.2. **but not less than 10.**
(Amended 2004)

Table N.~~4~~.3.2. Number of Sample Weights per Test for Automatic Checkweighers	
Weighing Range **m = mass of test load**	**Number of sample weights per test**
20 divisions ≤ m ≤ 10 kg 20 divisions ≤ m ≤ 22 lb	60
10 kg <m ≤ 25 kg 22 lb <m ≤ 55 lb	32
25 kg <m ≤ 100 kg 55 lb <m ≤ 220 lb	20
100 kg (220 lb) < m	10

~~**N.4.3. Field Test Procedures.**~~

~~**N.4.3.1. Static Tests. - If the scale is designed to operate statically during normal user operation, it shall be tested statically according to Sections N.3.1.1. through N.3.1.5.**~~

~~**N.4.3.2. Dynamic Tests. - The device shall be tested dynamically at the highest normal operating speed using packages at two test loads distributed over its normal weighing range. The number of consecutive weighments shall be one-half (½) of those specified in Table N.4.2., but not less than 10.**~~

T. Tolerances

T.1. Principles.

T.1.1. Design. - The tolerance for a weighing device is a performance requirement independent of the design principle used.

T.1.2. Scale Division. - The tolerance for a weighing device is related to the value of the scale division (d) or the value of the verification scale division (e) and is generally expressed in terms of d or e. The random tolerance for automatic checkweighers is expressed in terms of Maximum Allowable Variance (MAV).

T.2. Tolerance Application.

T.2.1. General. - The tolerance values are positive (+) and negative (-) with the weighing device adjusted to zero at no load. When tare is in use, the tolerance values are applied from the tare zero reference; the tolerance values apply to certified test loads only.

T.2.2. Type Evaluation Examinations. - For type evaluation examinations, the tolerance values apply to increasing and decreasing load tests within the temperature~~,~~ **and** power supply~~,~~ ~~and barometric pressure~~ limits specified in T.7. **Influence Factors.**
(Amended 2004)

T.2.3. Multiple Range and Multi-Interval Automatic Weighing System. - For multiple range and multi-interval devices, the tolerance values are based on the value of the scale division of the range in use.

T.3. Tolerance Values.

T.3.1. Tolerance Values - Class III Weigh-Labeler. (See Section T.3.2. Class IIIS Weigh-Labelers)

T.3.1.1. ~~Static~~ Non-automatic Tests. - Tolerance values shall be as specified in Table T.3. Class III - Tolerances in Divisions.
(Amended 2004)

T.3.1.2. ~~Dynamic~~Automatic Tests. - Acceptance tolerance values shall be the same as maintenance tolerance values specified in Table T.3., Class III - Tolerances in Divisions.
(Amended 2004)

Table T.3. Class III - Tolerance in Divisions (~~d~~e)		
Test Load in Divisions	**Tolerance in Divisions**	
Class III	**Acceptance**	**Maintenance**
0 - 500	± 0.5	± 1
501 - 2000	± 1	± 2
2001 - 4000	± 1.5	± 3
4001 +	± 2.5	± 5

T.3.2. Tolerance Values - Class IIIS Weigh-labelers in Package Shipping Applications.
(Added 1997)

T.3.2.1. ~~Static~~ Non-automatic Tests. - Tolerance values shall be as specified in Table T.3.2.1. ~~Static~~ Non-automatic Tolerances for Class IIIS Weigh-labelers.
(Amended 2004)

T.3.2.2. ~~Dynamic~~Automatic Tests. - Tolerance values specified in Table T.3.2.2. ~~Dynamic~~ Automatic Tolerances for Class IIIS Weigh-labelers shall be applied.
(Amended 2004)

Table T.3.2.1. ~~Static~~ Non-automatic Tolerance for Class IIIS Weigh-labelers		
Test Load in Divisions	**Tolerance in Divisions**	
Class IIIS	**Acceptance**	**Maintenance**
0 - 50	± 0.5	± 1
51 - 200	± 1	± 2
201 - 1000	± 1.5	± 3

(Added 1997) **(Amended 2004)**

Table T.3.2.2. ~~Dynamic~~Automatic Tolerance for Class IIIS Weigh-labelers		
Test Load in Divisions	**Tolerance in Divisions**	
Class IIIS	**Acceptance**	**Maintenance**
0 - 50	± 1.5	± 2
51 - 20	± 2	± 3
201 - 1000	± 2.5	± 4

(Added 1997) **(Amended 2004)**

T.3.3. Tolerance Values. - Automatic Checkweighers.

T.3.3.1. Laboratory Tests for Automatic Checkweighers.

T.3.3.1.1. ~~Static~~Non-automatic Tests. - The acceptance tolerance values specified in Table T.3., Class III-Tolerances in Divisions, shall be applied.
(Amended 2004)

T.3.3.1.2. ~~Dynamic~~Automatic Tests.

(a) The systematic error for each test run must be within the acceptance tolerances for the test loads as specified in Table N. ~~3.2.~~ **1.5.**

(b) The standard deviation of the results shall not exceed one-ninth (1/9) of the Maximum Allowable Variation (MAV) for specific package weights (3 standard deviations cannot exceed one-third (1/3) of the MAV value) as required in the ~~**4th**~~ **current** Edition of NIST Handbook 133. This value does not change regardless of whether acceptance, or maintenance tolerances are being applied to the device under test.
(Amended 2004)

(i) For U.S. Department of Agriculture (USDA) inspected meat and poultry products packaged at a plant subject to inspection by the USDA Food Safety and Inspection Service, use Handbook 133 Table 2-9, U.S. Department of Agriculture, Meat and Poultry, Groups and Lower Limits for Individual Packages, or

(ii) for all other packages with a labeled net quantity in terms of weight use Handbook 133 Table 2-5, Maximum Allowable Variations for Packages Labeled by Weight.

(iii) For all packages with a labeled net quantity in terms of liquid or dry volume use Handbook 133 Table 2-6, Maximum Allowable Variations for Packages Labeled by Liquid or Dry Volume.

(Amended 2004)

T.3.3.2. Field Tests for Automatic Checkweighers.

T.3.3.2.1. ~~Static~~Non-automatic Test Tolerances. - The tolerance values shall be as specified in Table T.3., Class III-Tolerances in Divisions.

T.3.3.2.2. ~~Dynamic~~Automatic Test Tolerances. -

(a) The systematic error requirement is not applied in a field test.

(b) The standard deviation of the test results shall not exceed one-ninth (1/9) of the Maximum Allowable Variation (MAV) for specific package weights (3 standard deviations cannot exceed one-third (1/3) of the MAV value) as required in the ~~**4th**~~ **current** Edition of NIST Handbook 133.

This value does not change regardless of whether acceptance or maintenance tolerances are being applied to the device under test.

(i) For U.S. Department of Agriculture (USDA) inspected meat and poultry products packaged at a plant subject to inspection by the USDA Food Safety and Inspection Service, use Handbook 133 Table 2-9, U.S. Department of Agriculture, Meat and Poultry, Groups and Lower Limits for Individual Packages, or

(ii) For all other packages with a labeled net quantity in terms of weight use Handbook 133 Table 2-5, Maximum Allowable Variations for Packages Labeled by Weight.

(iii) For all packages with a labeled net quantity in terms of liquid or dry volume use Handbook 133 Table 2-6. Maximum Allowable Variations for Packages Labeled by Liquid or Dry Volume.

(Amended 2004)

T.4. Agreement of Indications. - In the case of a weighing system equipped with more than one indicating element or indicating element and recording element combination, the difference in the weight value indications of any load shall not be greater than the absolute value of the applicable tolerance for that load, and shall be within tolerance limits.

T.5. Repeatability. - The results obtained from several weighings of the same load under reasonably ~~**static**~~ **constant** test conditions shall agree within the absolute value of the maintenance tolerance for that load, and shall be within applicable tolerances.
(Amended 2004)

T.6. Discrimination. - A test load equivalent to 1.4 d shall cause a change in the indicated or recorded value of at least 2.0 d. This requires the zone of uncertainty to be not greater than 0.3 d (See N. ~~**3**~~**2**.1.4.)

T.7. Influence Factors. - The following factors are applicable to tests conducted under controlled conditions only.

T.7.1. Temperature. - Devices shall satisfy the tolerance requirements under the following temperature conditions:

T.7.1.1. - If not specified in the operating instructions or if not marked on the device, the temperature limits shall be: -10 °C to 40 °C (14 °F to 104 °F).

T.7.1.2. - If temperature limits are specified for the device, the range shall be at least 30 °C (54 °F).

T.7.1.3. Temperature Effect on Zero-Load Balance. - The zero-load indication shall not vary by more than one division per 5 °C (9 °F) change in temperature.

T.7.1.4. Operating Temperature. - The indicating or recording element shall not display nor record any usable values until the operating temperature necessary for accurate weighing and a stable zero balance condition have been attained.

~~**T.7.2. Barometric Pressure. - The zero indication shall not vary by more than one division for a change in barometric pressure of 1 kPa over the total barometric pressure range of 95 kPa to 105 kPa (28 in to 31 in of Hg).**~~

T.7. ~~3~~2. Electric Power Supply.

~~**T.7.**~~2~~**3.1. Power Supply, Voltage and Frequency.**~~

(a) ~~**Alternating Current.**~~ **Automatic weighing systems that operate using alternating current must perform within the conditions defined in paragraphs T3. through T.7., inclusive, from –15 % to +10 % of the marked nominal line voltage(s) at 60 Hz, or the voltage range marked by the manufacturer, at 60 Hz.**~~**Weighing devices that operate using alternating current must perform within the conditions defined in paragraphs T.3. through T.7., inclusive, over the line voltage range of 100 V to 130 V or 200 V to 250 V rms as appropriate, and over the frequency range of 59.5 Hz to 60.5 Hz.**~~

(b) Automatic weighing systems that operate using DC current must perform within the conditions defined in paragraphs T3. through T.7., inclusive, from minimum operating voltage to + 20 % of the voltage marked on the instrument (nominal voltage).

(c) Battery-operated electronic automatic weighing systems with external or plug-in power supply (AC or DC) shall either continue to function correctly or not indicate any weight values if the voltage is below the manufacturer's specified value, the latter being larger or equal to the minimum operating voltage.

Note: The minimum operating voltage is defined as the lowest possible operating voltage before the automatic weighing no longer indicates or records weight values.

Note: This requirement applies only to metrologically significant voltage supplies.
(Amended 2001)

~~**Battery. - Battery operated instruments shall not indicate nor record values outside the applicable tolerance limits when battery power output is excessive or deficient.**~~
(Amended 2004)

T.7.~~3.~~2.1. Power Interruption. - A power interruption shall not cause an indicating or recording element to display or record any values outside the applicable tolerance limits.

T.8. Radio Frequency Interference (RFI) and Other Electromagnetic Interference Susceptibility. - The difference between the weight indication with the disturbance and the weight indication without the disturbance **(see also N.1.4.)** shall not exceed one scale division (d) or the equipment shall:

(a) blank the indication, or

(b) provide an error message, or

(c) the indication shall be so completely unstable that it could not be interpreted, or transmitted into memory or to a recording element, as a correct measurement value.

(Amended 2004)

UR. User Requirements

UR.1. Selection Requirements. - Equipment shall be suitable for the service in which it is used with respect to elements of its design, including but not limited to, its capacity, number of scale divisions, value of the scale division or verification scale division, minimum capacity, and computing capability.

UR.1.1. General. - Automatic Weighing Systems shall be designated by the manufacturer for that service.

UR.1.2. Value of the Indicated and Recorded Scale Division. - The value of the division as recorded shall be the same as the division value indicated.

UR.2. Installation Requirements.

UR.2.1. Protection From Environmental Factors. - The indicating elements, the lever system or load cells, and the load-receiving element of a permanently installed scale, and the indicating elements of a scale not intended to be permanently installed, shall be adequately protected from environmental factors such as wind, weather, and RFI that may adversely affect the operation or performance of the device.

UR.2.2. Foundation, Supports, and Clearance. - The foundation and supports of any scale installed in a fixed location shall be such as to provide strength, rigidity, and permanence of all components, and clearance shall be provided around all live parts to the extent that no contacts may result when the load-receiving element is empty, nor throughout the weighing range of the scale.

UR.2.3. Entry and Departure From Weighing Area. - The belt or other conveyance that introduces the weighed load to the weighing zone and that carries the weighed load away from the weighing zone shall be maintained per the manufacturers recommendations.

UR.3. Use Requirements.

UR.3.1. Minimum Load. - The minimum load shall be as specified by the manufacturer, but not less than 20 divisions since the use of a device to weigh light loads is likely to result in relatively large errors.

UR.3.1.1. Minimum Load for Class IIIS Weigh-labelers. - The minimum load shall be as specified by the manufacturer, but not less than 10 divisions since the use of a device to weigh light loads is likely to result in relatively large errors.
(Added 1997)

UR.3.2. Maximum Load. - An automatic weighing system shall not be used to weigh a load of more than ~~the~~its maximum capacity ~~**of the automatic weighing system**~~.
(Amended 2004)

UR.3.3. Special Designs. - An automatic weighing system designed and marked for a special application shall not be used for other than its intended purpose.

UR.3.4. Use of Manual Gross Weight Entries. - Manual entries are permitted only when a device or system is generating labels for standard weight packages.

UR.4. Maintenance Requirements.

UR.4.1. Balance Condition. - If an automatic weighing system is equipped with a zero-load display, the zero-load adjustment of an automatic weighing system shall be maintained so that the device indicates or records a zerobalance condition.

UR.4.2. Level Condition. - If an automatic weighing system is equipped with a level-condition indicator, the automatic weighing system shall be maintained in level.

UR.4.3. Automatic Weighing System Modification. - The length or the width of the load-receiving element of an automatic weighing system shall not be increased beyond the manufacturer's design dimension, nor shall the capacity of an automatic weighing system be increased beyond its design capacity by replacing or modifying the original primary indicating or recording element with one of a higher capacity, except when the modification has been approved by competent engineering authority, preferably that of the engineering department of the manufacturer of the automatic weighing system, and by the weights and measures authority having jurisdiction over the automatic weighing system.

D. Definitions

automatic gravimetric filling machine (instrument). - A filling machine or instrument that fills containers or packages with predetermined and virtually constant mass of product from bulk by automatic weighing, and which comprises essentially an automatic feeding device or devices associates with one or more weighing units and the appropriate discharge devices.
(Added 2004)

automatic checkweigher. - A**n** ~~**dynamic**~~ automatic weighing system **that does not require the intervention of an operator during the weighing process** used to subdivide items of different weights into one or more subgroups, such as identifying packages that have acceptable or unacceptable fill levels **according to the value of the difference between their weight and a pre-determined set point**. These systems may be used to fill standard packages for compliance with net weight requirements.
(Amended 2004)

automatic weighing system (AWS). - An automatic weighing system is a weighing device that, in combination with other hardware and/or software components, automatically weighs discrete items **and that does not require the intervention of an operator during the weighing process.** Examples include, but are not limited to, weigh-labelers and checkweighers.
(Amended 2004)

non-automatic checkweigher. - A weighing instrument, that requires the intervention of an operator during the weighing process, used to subdivide items of different weights into one or more subgroups, such as identifying packages that have acceptable or unacceptable fill levels according to the value of the difference between their weight and a pre-determined set point.

Notes: Determining the weighing result includes any intelligent action of the operator that affects the result, such as deciding and taking an action when an indication is stable or adjusting the weight of the weighed load.

Deciding that the weighing result is acceptable means - making a decision regarding the acceptance of each weighing result on observing the indication or releasing a print out. The weighing process allows the operator to take an action which influences the weighing result in the case where the weighing result is not acceptable.
(Added 2004)

non-automatic weighing system. A weighing instrument or system that requires the intervention of an operator during the weighing process to determine the weighing result or to decide that it is acceptable.

Notes: Determining the weighing result includes any intelligent action of the operator that affects the result, such as deciding and taking an action when an indication is stable or adjusting the weight of the weighed load.

Deciding that the weighing result is acceptable means - making a decision regarding the acceptance of each weighing result on observing the indication or releasing a print out. The weighing process allows the operator to take an action which influences the weighing result in the case where the weighing result is not acceptable.
(Added 2004)

package rate. - PPM - Packages per minute.

random error(s). - The sample standard deviation of the error (indicated values) for a number of consecutive automatic weighings of a load, or loads, passed over the load receptor, shall be expressed mathematically as:

$$s=\sqrt{\frac{1}{n-1}\sum\left(x_i-\overline{X}\right)^2} \text{ or } s=\sqrt{\frac{1}{n-1}\left(\sum x_i^{2}-\frac{\left(\sum X_i\right)^2}{n}\right)}$$

where: x = error of a load indication
n = the number of loads

systematic (average) error $(\overline{X})$ **. -** The mean value of the error (of indication) for a number of consecutive automatic weighings of a load, or loads, passed over the load receiving element (e.g., weigh-table), shall be expressed mathematically as:

$$\overline{X}=\frac{\sum x}{n}$$

where: x = error of a load indication
n = the number of loads

test puck. – A metal**,** ~~or~~ plastic**, or other suitable** object **that remains stable for the duration of the test,** ~~**object**~~ used **as a test load** to simulate a package. Pucks can be made in a variety of dimensions and have different weights to represent a wide range of package sizes. Metal versions may be covered with rubber cushions to eliminate the possibility of damage to weighing and handling equipment. The puck mass is adjusted to ~~**specific**~~ **an** accuracy **specified in N.1.2.Accuracy of Test Pucks or Packages** ~~**so that pucks can be used to conduct performance tests**~~.
(Amended 2004)

weigh-labeler. - An automatic weighing system that determines the weight of a package and prints a label or other document bearing a weight declaration for each discrete item (usually a label also includes unit and total price declarations). ~~**Typically, this type of weighing system determines the weight of packages dynamically, but may also include a scale that is incorporated in a conveyor system that weighs packages in a static weighing mode**~~. Weigh-labelers are sometimes used to weigh and label standard and random packages (also called "Prepackaging Scales").
(Amended 2004)

Report of the Professional Development Committee

Kenneth Deitzler, Chairman
Pennsylvania Department of Agriculture Bureau of Ride and Measurement Standards
Harrisburg, Pennsylvania

Reference
Key Number

400 INTRODUCTION

The Professional Development Committee (hereinafter referred to as "Committee" or PDC) submits its Final Report for consideration by the National Conference on Weights and Measures (NCWM). This report contains the items discussed and actions proposed by the Committee during its Annual Meeting in Pittsburgh, Pennsylvania, July 11 - 14, 2004.

Table A identifies the agenda items in the Report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Interim Meeting Agenda. A voting item is indicated with a **"V"** after the item number. An item marked with an **"I"** after the reference key number is an information item. An item marked with a **"D"** after the reference key number is a developing issue. The developing designation indicates an item has merit; however, the item was returned to the submitter for further development before any action can be taken at the national level. An item marked with a **"W"** was withdrawn by the Committee and generally will be referred to the regional weights and measures associations because it either needs additional development, analysis, and input or does not have sufficient Committee support to bring it before the NCWM.

Table A
Index to Reference Key Items

Table B
Appendix

Details of All Items
(In Order by Reference Key Number)

401 EDUCATION

401-1 I National Training Program

Source: NCWM Board of Directors

The NCWM Board of Directors established the Professional Development Committee (PDC) at the 2003 NCWM Annual Meeting in Sparks, Nevada. The first critical charge to the Committee was to represent the NCWM in the development of a national weights and measures professional development program in cooperation with our partners:

- State and local weights and measures departments;
- Private industry at all levels from manufacturer to repair service; and
- Technical advisors from NIST Weights and Measures Division and Measurement Canada

Its scope embraces all matters dealing with, but in priority:

1. The education and professional development of weights and measures officials and the promotion of uniformity and consistency in the application of weights and measures laws and regulations;

2. The education of industry personnel with regard to weights and measures laws and regulations, including all areas from device manufacturer to service technician;

3. Quality standards for weights and measures activities and programs; and

4. Safety awareness for weights and measures-related activities.

Another charge was to develop a firm partnership with the state and local weights and measures departments, private industry at all levels from manufacturer to repair service, and the National Conference on Weights and Measures. It is critical that NIST Weights and Measures Division and Measurement Canada be full partners and that they provide more than technical advisors and support to the PDC.

Background: In 2002 the Professional Development Committee (PDC) (formerly the Committee on Administration and Public Affairs) met with then Chairman Ross Andersen, who explained his vision for revising the National Training Program. Mr. Andersen's vision included a horizontal, hierarchical approach to training, filtering out the common elements of general information applicable to a wide range of devices and including the most detailed information in courses for specific devices. The Committee developed an outline for this new training approach and provided the NCWM membership with its draft at the 88th NCWM Annual Meeting in July 2003.

The PDC strongly supports the decision of the NCWM's efforts to develop a National Training Program that will lead to a National Certification Program for weights and measures officials. We recommend the end product (National Certification Program) be determined first, so the curriculum can be developed to meet the needs of a certification program. To achieve this goal, the PDC must be allowed to do its work for the NCWM and maintain its focus to produce a National Certification Program. At the 2004 Annual Meeting the NCWM voted in support of the development of shorter courses. (see Appendix A)

Discussion: The training responsibility should fall directly on state and local jurisdictions. Administrator training should also be added to the curriculum. The PDC should consider looking outside the NCWM for training and structure.

401-2 I Professional Development

Source: NCWM Board of Directors

Develop a consensus on the necessary and uniform steps in an educational process to raise the professional status of weights and measures and related industry officials throughout the United States.

Discussion: California offered its support and the training material used in that state. The PDC is using materials developed by W&M jurisdictions and private industries. Jurisdictions are encouraged to share training materials with the PDC. The PDC created and distributed an informational survey to collect data to help identify the needs of jurisdictions and to create a consensus position on the uniform steps to follow in the development of a National Training Program.

401-3 I Identify Partners

Source: NCWM Board of Directors

Identify appropriate roles for each of the partners (e.g., NCWM, state and local weights and measures departments, private industry at all levels from manufacturer to repair service, NIST, and Measurement Canada) in implementing an educational process.

Discussion: The development of a training program should follow the steps below:

1. Study training programs of outside agencies, as well as those of state and local jurisdictions.
2. Establish knowledge goals for weights and measures officials and administrators.
3. Develop exams or tests.
4. Develop curriculum based upon the findings and results of the steps 1 - 3 above.

The PDC is in the process of gathering and studying training programs from outside agencies as well as those of state and local jurisdictions. Members and Associate members of the NCWM and some outside agencies have offered their assistance.

401-4 I Create a Curriculum Plan

Source: NCWM Board of Directors

(a) Develop and maintain a curriculum plan in cooperation with our partners that establishes uniform and consistent training objectives for weights and measures professionals in all fields and at all levels from novice to seasoned veteran.

(b) The objectives should represent a consensus of our partners and should be organized by scope, sequence, and level of complexity to assist those developing the curriculum materials.

Discussion: The PDC will begin using working groups to develop courses that could be used for both self-study in classroom settings. The initial priority may be high profile devices (e.g., motor fuel dispensers and retail scales). Survey results may alter the Committee’s priorities and plans.

401-5 I Curriculum Coordination

Source: NCWM Board of Directors

(a) Coordinate the development of curriculum materials to be used in the delivery of training (i.e., testing guides, digital presentations, slide shows, lesson plans, etc.) using a variety of formats (e.g., from self-study to traditional instruction).

(b) Consider creating a network of interested parties to establish priorities, share training resources, foster cooperation to reduce redundancy, and promote uniformity and consistency.

The PDC will use curriculums from other sources in developing an effective National Training Program.

401-6 I Training Innovations

Source: NCWM Board of Directors

Gather and share information from trainers on highly effective techniques, visual aids, etc., that have been used to facilitate learning. The PDC will use as many resources as possible. The Committee reviewed the notes from the NIST sponsored administrators' workshops held in Denver and Baltimore and plans to explore many of these ideas at future meetings.

401-7 I Instructor Improvement

Source: NCWM Board of Directors

Coordinate activities to improve the competence of instructors and the uniformity of delivery of the curriculum. The PDC agrees that an integral part of instructor improvement includes training on effective methods of instruction. The PDC thinks classroom training should be used for preparing instructors to teach others. Outside courses will be considered. To be effective in training assistance the PDC recommends the NCWM should maintain a list of certified trainers.

401-8 I Certification

Source: NCWM Board of Directors

Develop an NCWM certification program based on the curriculum plan with measurable levels of competency.

Discussion: The PDC is exploring certification of weights and measures officials as a means to demonstrate competency. Weights and measure officials must pass written examinations to receive certification. Certificates should be presented at the NCWM Annual Conference to administrators and weights and measures officials who have completed and passed prescribed examinations. Chairman Dennis Ehrhart expressed his support for certification and indicated that NCWM Board of Directors would consider requests to fund training related to this effort.

401-9 I NCWM Training

Source: Western Weights and Measures Association (WWMA)

Recommendation: The WWMA recommended that the NCWM should establish and maintain a database of classroom training programs completed by individual weights and measures officials where the training used NCWM courses (or equivalent) and certified trainers. The NCWM should also issue certificates to individual weights and measures officials for course completion.

Background: The WWMA A&P Committee recognized the value of formal training for inspection staff and the credibility these programs provide. Some jurisdictions have licensing programs for weights and measures inspectors while others rely on informal and less formal programs. The WWMA A&P Committee recognized that NCWM is a logical entity to provide standardized training and accreditation programs.

Discussion: The Professional Development Committee acknowledges the comments from WWMA. They will be taken under advisement during the formulation of this committee. Professional Development Committee members would like to know if NIST will participate in the NCWM training and certification program and would like to see a NIST liaison added to the committee. The PDC would like to maintain NIST involvement with the National Training Program and NIST reported they have and will continue to develop training materials that will be made available for use in a variety of classes. The PDC will also solicit partnerships with other interested parties.

402 PROGRAM MANAGEMENT

402-1 I Voluntary Quality Assurance Assessment

Source: NCWM Board of Directors

The Committee will continue to promote the development of quality programs through the Voluntary Quality Assurance Assessments (VQAA). The Committee would like to see more participation in the VQAA. The Committee discussed the use of the ISO/IEC/EN 17025 "*General Requirements for the Competence of Calibration and Testing Laboratories*" for state and local field enforcement programs. The Committee concluded that the ISO 17025 standard does not apply to state and local field enforcement programs and recommends that the National Conference on Weights and Measures develop its own certification standards for state and local field enforcement programs. The PDC encourages all member states to utilize the VQAA and provide information to the PDC. The assessments can be a valuable tool in determining training needs. The PDC noted that in 2003 several certificates were presented at the annual meeting but that no requests for review were received in 2004. The PDC would like to remind the membership that the VQAA forms and other information are available on the NCWM web site and that the results are confidential.

402-2 I NCWM Associate Membership Scholarships

Source: NCWM Board of Directors

If funding is available, oversee a system to evaluate applications and award scholarships. Provide a report on the scholarships awarded each year. No funds were made available for scholarships for the calendar year 2003. Continued interest in scholarships has been expressed by state and local jurisdictions. Guidelines for the Associate Membership Scholarships can be found in NIST Special Publication 992 of 2003, "Report of the 87th National Conference on Weights and Measures."

402-3 I Safety Awareness

Source: NCWM Board of Directors

Continue work to identify safety issues in the weights and measure field. Coordinate activities to increase safety awareness.

Recommendation: This is an area where activities should be increased to promote safety awareness.

Discussion: Chairman Dennis Ehrhart explained that the Voluntary Quality Assurance Assessment program, the NCWM Associate Membership Scholarships, and Safety Awareness efforts were carryover items from the Committee on Administration and Public Affairs but recommended that the PDC make training its highest priority.

The PDC continues to encourage jurisdictions to send their safety reports and issues to their regional Safety liaison, who in turn sends reports to Charles Gardner, the NCWM Safety Coordinator. The PDC would like to see safety reports published in the NCWM newsletter. Two safety reports were received from the Central Region.

Kenneth Deitzler, Pennsylvania, Chairman

Celeste Bennett, Michigan
Jerry Buendel, Washington
Steve Hadder, Florida
Agatha Shields, Franklin County, Ohio
Stuart Strnad, Texas

C. Gardner, Suffolk County, New York, Safety Liaison
John Moore, Lore Consulting, Associate Membership Committee Representative

Professional Development Committee

Appendix A

National Training Curriculum Outline

Weights & Measures General/State Policies	Market Practices Laws and Regulations NIST Handbook 130	General Devices NIST Handbook 44	Weights & Measures Administration	Laboratory Metrology

Weights & Measures General/State Policies

- State Administrative Issues
  - Completion of administrative forms
  - Review of rules and policies
- History
- Roles in Society
- Need for W&M
- System of W&M
- W&M in U.S. & Your State
- Metrology
- State Laws
- Relationship to National & International W&M
- Associations
  - Regional, State, Federal
- Federal Agencies

Price Verification

- Terminology
- NIST H-130 Specifications & Requirements
- Safety
- Support Equipment
- General Enforcement Guidelines

Test Purchases

- Examination Specifications
- EPO
- Purchasing Process
- Check for Validity of Purchase
- Field/Practical Exercises

E-Commerce

- Terminology
- NIST H-130 Requirements & Specifications
- Packaging & Labeling Regulations
- Exemptions
- Indirect Sale of Random Packages

Fuel Quality

- Terminology
- NIST H-130 Specifications & Requirements
- Uncertainty
- Safety
- Support Equipment
- Sampling
- General Enforcement Guidelines

Commodities General

- Terminology
- Wet/Dry Tare
- NIST H-133 Specifications & Requirements
- Uncertainty
- Safety
- Support Equipment
- General Enforcement Guidelines

Standard Pack (WT)

- Examination Specifications
- Contents of EPO
  - Test Equipment
  - Examination
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Random Pack (WT)

- Examination Specifications
- Contents of EPO
  - Test Equipment
  - Examination
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Sale by Volume

- Examination Specifications
- Contents of EPO
  - Test Equipment
  - Examination
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Sale by Count

- Examination Specifications
- Contents of EPO
  - Test Equipment
  - Examination
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

General Devices NIST Handbook 44

- Terminology
- NIST Handbook 44
- Fundamental Consideration
- Uncertainty
- Safety
- Support Equipment
- Seals
- Supports
- General Enforcement Guidelines

Weighing Devices
- Terminology
- Scale Types
- Technology
- Suitability
- User Requirements
- Operation/Markings
- Scale Classes & Tolerances
- Basic Scale Test Procedures
- Basic Inspection

Measuring Devices
- Terminology
- Measuring Device Types
- Technology
- Suitability
- User Requirements
- Operation & Markings
- Tolerances for LMDs
- Basic LMD Test
- Basic LMD Inspections

Other Devices
- Terminology
- Other Device Types
- Technology
- Suitability
- User Requirements
- Operation & Markings
- Tolerances for LMDs
- Basic Test
- Basic Inspections

Retail Computing Scales
- Common traits
- Examination Specifications
- Test Equipment
- Examination, Installation, & Maintenance
- Test Specifications
- Evaluation
- Field/Practical Exercises

Platform Scales
- Common traits
- EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation, & Maintenance
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Vehicle Scales
- Common traits
- Contents of EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation, & Maintenance
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Vehicle Scales Advanced
- Initial Verification.

Railroad Track
- Common traits
- Contents of EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation, & Maintenance
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Hopper
- Common traits
- Contents of EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation, & Maintenance
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Point-of-Sale Scales
- Common traits
- Examination Specifications
- User Requirements
- Suitability
- Test Equipment
- Examination, Installation, & Maintenance
- Test Specifications
- Evaluation
- Field/Practical Exercises

Precision Scales Class I/II
- Common traits
- Examination Specifications
- User Requirements
- Suitability
- Test Equipment
- Examination, Installation, & Maintenance
- Test Specifications
- Evaluation
- Field/Practical Exercises

Measuring Devices

Retail Motor-Fuel Dispensers
- Common Traits
- Examination Specifications
- Test Equipment
- Examination, Installation & Maintenance
- Test Specifications
- Evaluation
- Field/Practical Exercises

Liquid Propane Gas Meters – Basic
- Common Traits
- EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation & Maintenance
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Vehicle-Tank Meters
- Common Traits
- Contents of EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation & Maintenance
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Loading-Rack Meters – Basic
- Common Traits
- Contents of EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation & Maintenance
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Liquid Propane Gas Meters – Advanced
- Initial Verification

Vehicle-Tank Meters – Advanced
- Initial Verification

Loading-Rack Meters – Advanced
- Initial Verification

Water Meters
- Common Traits
- Contents of EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation & Maintenance
  - Test Specifications
  - Evaluation,
- Field/Practical Exercises

Mass Flow Meters
- Common Traits
- Contents of EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation & Maintenance
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Others
- Common Traits
- Contents of EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation & Maintenance
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

Weights & Measures Administration

Weights & Measures Administration

- Understanding the Commercial Measurement System
- Responsibilities of W&M Regulatory Official
  - Consumer Protection
  - Fair Competition
  - Facilitating Value Comparisons
- Funding Considerations
  - Licensing of W&M Devices
  - Licensing of Service Agencies
  - Conflicts of Interest
- Roles of Stakeholders
  - Manufacturers
  - Packagers
  - Retailers
  - Service Agencies
- Powers & Duties of Officials
  - Weighmaster Considerations
- Type Evaluation, Initial Verification & Subsequent Inspection
  - Economic Impact
- Complete Scope of Weights & Measures Inspections
- Concurrent Federal & State Jurisdiction
- Federal Pre-emption
- Organizational Structure
- Budget
- Personnel
  - Knowledge, Skills & Abilities
  - Training
- Strategic Planning & Goals
- Education
  - Officials
  - Administrative Staff
  - Public
- Publicity
- Public Relations
- Communication
- Record Keeping
- Forms
- Legal Considerations
  - Due Process
  - Stop Orders
  - Standards Development
  - Prosecution
  - Court

Laboratory Metrology Administration

- Purpose of the Laboratory
- Responsibilities of the Metrologist
- NIST Expectations of the Laboratory
- Rationale for the Requirements for Recognition of the Laboratory
- Important Considerations for Laboratory Operation
- Factors Driving Changes in Laboratory Requirements
- Quality System
- NVLAP Accreditation
- Hierarchy of Laboratory Standards
- Calibration Intervals for All Standards
- Annual RMAP Round Robins & Training
- Laboratory Facility Requirements
- Uncertainty Analysis
- Management Review of Laboratory Operations

Laboratory Metrology

Concepts – Basic

- Introduction
- Statistics
- Uncertainty
- Measurement Assurance
- Standard Operating Procedures
  - Mass
  - Volume
- Calibration
- Calculations
- Traceability

Concepts – Advanced

- Program Philosophy
- New Technology
- Calibration Design Concepts
- Computerized Workshops
- Statistics for Quality
  - t-tests
  - F-tests
- Workshop on Errors
- Advanced Uncertainties
- Software Workshop
- Integration of Advanced Concepts

Report of the
National Type Evaluation Program (NTEP) Committee

Ross Andersen
Director
New York Bureau of Weights and Measures

Reference
Key Number

500 INTRODUCTION

The National Type Evaluation Program (NTEP) Committee ("Committee") submits its Report for consideration by the 89th National Conference on Weights and Measures (NCWM). This consists of the Interim Report presented in NCWM Publication 16 as amended in the Addendum Sheets issued during the Annual Meeting that was held July 11-15, 2004, in Pittsburgh, Pennsylvania. The Committee considered communications received prior to and during the 89th Annual Meeting that are noted in this report

Table A identifies the agenda items in the Report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Committee's Interim Meeting Agenda. A voting item is indicated with a **"V"** after the item number or, if the item was part of the consent calendar, by the suffix "**VC**". An item marked with an **"I"** after the reference key number is an information item. An item marked with a **"W"** was withdrawn by the Committee and generally will be referred to the regional weights and measures associations because it either needs additional development, analysis, and input or does not have sufficient Committee support to bring it before the NCWM. Table B lists the appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in entirety.

This Report contains many recommendations to revise or amend National Conference on Weights and Measures (NCWM) Publication 14, Administrative Procedures, Technical Policy, Checklists, and Test Procedures or other documents. Proposed revisions to the publication(s) are shown in **bold face print** by **~~striking out~~** information to be deleted, and **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in *italics.*

Note: The policy of NIST is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as they were submitted and may, therefore, contain references to inch-pound units.

Table A
Index to Reference Key Items

Reference Key Number | **Title of Item** | **Page**

Table B
Appendices

Table C
Voting Results

Reference Key Number	House of Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
500 (Report in Its Entirety) Voice Vote	All Yeas	No Nays	All Yeas	No Nays	Passed

Details of All Items
(In Order by Reference Key Number)

1. International Organization of Legal Metrology (OIML) Certificate Project

Background: This item is included on the Committee's agenda to provide an update on NTEP's work to issue OIML R 60, "Metrological Regulation for Load Cells" and R 76, "Non-Automatic Weighing Instruments" Certificates.

OIML Certificate System: No new OIML Certificates have been issued by NTEP. The Committee agreed to withdraw this item from future agendas, preferring to consider the issue in the future as part of the Test Data Exchange Arrangements.

2. Test Data Exchange Agreements

Background/Discussion: This item was included on the Committee's agenda in 1998 to provide an update on NTEP's work to establish bilateral and multilateral agreements. Under such agreements and arrangements, manufacturers would be able to submit their equipment to any of the participating countries for testing to OIML-recommended requirements. The resulting test data would be accepted by other participants, as a basis for issuing each country's own type approval certificate.

Mutual Acceptance Arrangement (MAA): The OIML MAA document was adopted at the recent International Committee on Legal Metrology (CIML) meeting in Kyoto, Japan, in November 2003. Dr. Charles Ehrlich from the NIST Weights and Measures Division provided the NTEP Committee an update on the latest developments with the MAA. Refer to Appendix C of the Board of Directors report for additional information.

Mutual Acceptance Arrangement (MAA) The discussion of the MAA took place under item 1. of the Board of Directors' open hearing.

The Board reported:

1. Stephen Patoray, NTEP Director, will be attending an MAA workshop on the Declaration of Mutual Confidence (DoMC) in Berlin, Germany on October 25-29, 2004 in conjunction with a meeting of the CIML.

2. The Board reported the NCWM response to a questionnaire from BIML regarding the acceptance of OIML Certificates and test reports (data) along with short and medium intentions to participate in the MAA.

   One of the responses included the intention for NTEP to <u>consider</u> accepting R 60 OIML test reports for load cells, in the short term, and the intention to accept R 76 for Non-automatic Weighing Instruments and R 117 Measuring Instruments for Liquids other than Water test reports in the medium term.

   See Dr. Charles Ehrlich's letter in BOD Report Appendix B, section II, report on the Mutual Acceptance Arrangement on OIML Type Evaluations for additional information on the DoMC, testing laboratories, and Issuing Authority responsibilities.

   The acceptance of an OIML test report to issue an NTEP CC does not affect NCWM Conformity Assessment Program and the NTEP CC holder's responsibility regarding production meets type.

The Board asked the membership to consider the following questions:

1. Is participating in the DoMC as a participating testing laboratory under the MAA a core value for U.S.

2. Can the U.S. NTEP laboratories commit to the investment of time and resources to meet the requirements of a DoMC testing laboratory and participate in international assessments?

Bilateral Agreements: No additional discussions have been held on this topic, pending the outcome of the MAA discussions.

NTEP-Canada Mutual Recognition Program: The NTEP Laboratories met with Measurement Canada during the April 2004 Laboratory meeting to review and finalize the updated checklist for Weighing Devices.

At the 2004 NCWM Annual Meeting, NCWM Chairman Dennis Ehrhart and President of Measurement Canada Alan Johnston signed a two-year extension of the Retail Motor Fuel Dispenser Mutual Recognition Arrangement.

Additional related items

Participation in International Standards: During the 2004 NCWM Interim Meeting, Ross Andersen presented a PowerPoint presentation describing the current activity of NTEP and NCWM in International Standards. He gave an update on the participation at the recent US National Working Group R76/R60 meeting sponsored by NIST. Mr. Andersen also asked several questions for the group to consider. These included: What are the obligations of NCWM regarding harmonization of standards? What makes harmonization so difficult? He then proceeded to provide a possible method to make harmonization happen. There were also a series of questions regarding the specific actions that may be needed to actually participate in the MAA. Mr. Andersen left the group to ponder the question: Is the ability to issue OIML Certificates under the MAA a "Core Value" to the U.S.?

Report on 2004 Canadian Forum on Trade Measurement: During the 2004 NCWM Interim Meeting, Vice President, Measurement Canada Program Development Directorate Gilles Vinet provided an overview of the approach that Canada has chosen to pursue to improve their level of service to all of their stakeholders in Canada.

Report on the Asia Pacific Legal Metrology Forum (APLMF) and CIML Meeting: During the 2004 NCWM Interim Meeting, the NTEP Committee was given an update on the activities of attendees to these meetings.

3. Adoption of Uniform Regulation for National Type Evaluation by States

Background/Discussion: The Scale Manufacturers Association (SMA) has hosted NTEP adoption and implementation meetings for state directors at each regional weights and measures association conference. These meetings enable jurisdictions to share information about adopting and implementing NTEP in their respective jurisdictions, encourage non-NTEP jurisdictions to adopt the regulation, and allow current NTEP jurisdictions to share ideas on how to make enforcement more effective and uniform among the States. The meetings also provide NTEP management with information related to areas in which the operation and implementation of the program can be improved. Several questions have been posed at these meetings about issues associated with NTEP interpretation or practice. Comments from 1997 to 2003 have been summarized, without attribution, and are available for review and download on the SMA web site at http://www.scalemanufacturers.org.

At the 2004 Annual Meeting Dave Quinn, SMA reported there have been no changes to the map depicting the URNTE and VRR. Forty-seven (47) of the fifty-three (53) US states and Territories have adopted the URNTE. A copy of the map depicting adoption of the URNTE and VRR is included in Appendix F.

4. NTEP Participating Laboratories and Evaluations Reports

NTEP Director Stephen Patoray updated the Committee on NTEP laboratory and administrative activities since October 1, 2003, to June 2004. A report of the Activities was distributed to the NTEP Committee as the 2004 NCWM Annual Meeting and is included in the Final Report of the NTEP Committee in Appendix A.

The laboratory meeting was held April 25 through 28, 2004, in Ottawa, Canada.

5. NTETC Sectors Reports

The Committee heard an update on the activities of the 2003 meetings of the National Type Evaluation Technical Committee (NTETC) Sectors at the 2004 NCWM Interim Meeting. The Committee reviewed the recommendations from the various sectors on updates to NCWM Publication 14. The NTEP Committee accepted all of the recommendations and instructed the NTEP staff to make the necessary changes to NCWM Publication 14 for 2004.

The Committee also heard that an Ad Hoc procedure had been developed and was now being used to evaluate Class I and II scales for a counting feature per the recent changes made to NIST Handbook 44.

Grain Moisture Meter and NIR Protein Analyzer Sectors: The next meeting of the Grain Moisture Meter and NIR Protein Analyzer Sectors is scheduled for August 26 and 27, 2004, in Kansas City, MO. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisors:

Diane Lee
NIST WMD
100 Bureau Drive – Stop 2600
Gaithersburg, MD 20899-2600
Phone: 301-975-4405
Fax: 301-926-0647
e-mail: diane.lee@nist.gov

Jack Barber
J.B. Associates
10349 Old Indian Trail
Glenarm, IL 62536
Phone: 217-483-4232
e-mail: jbarber@motion.net

Measuring Sector: The next meeting of the Measuring Sector is scheduled for October 22-23, 2004, in Gulfport, MS, in conjunction with the Southern Weights and Measures Association's Annual Meeting. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor:

Richard Suiter
NIST WMD
100 Bureau Drive – Stop 2600
Gaithersburg, MD 20899-2600
Phone: 301-975-4406
Fax: 301-926-0647
e-mail: rsuiter@nist.gov

Weighing Sector: The next Weighing Sector meeting is scheduled for August 29-31, 2004, in Ottawa, Ontario, Canada. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor:

Steven Cook
NIST WMD
100 Bureau Drive – Stop 2600
Gaithersburg, MD 20899-2600
Phone: 301-975-4003
Fax: 301-926-0647
e-mail: stevenc@nist.gov

Electronic copies of the NTETC Sector summaries are included in the Final Report of the NTEP Committee in Appendixes B through D. Electronic or hard copies of the NTETC Sector summaries are available upon request from:

NCWM Inc.
Phone: 240-632-9454
Email: ncwm@mgmtsol.com

or

NIST WMD Technical Advisor, Steve Cook
(See contact info above)

6. NTEP Participation in US National Working Group on Harmonization of NIST HB 44, NCWM Publication 14 and OIML R76 and R60.

In August 2003, Ross Andersen, NTEP Committee Chair, Steve Patoray, NTEP Director, and other representatives from various NTEP laboratories and States accepted an invitation from NIST to attend a US National Working Group meeting on OIML TC9/SC1. Ross Andersen updated the NTEP Committee on the activities of the U.S. National Working Group and progress and recommendations made up to this point.

7. Mix and Match Elements

During the 2004 NCWM Interim Meeting, Ross Andersen provided the group with an update on this item. He indicated that some U.S. manufacturers had questioned him about the possibility of using the OIML system of apportionment of errors in the evaluation of separate main elements (OIML calls them modules). The U.S. system applies a 0.7 fraction of the tolerance to any weighing/measuring or indicating element. In contrast, the OIML system recognizes that there may be more than two elements, in the system that contribute error. The OIML allows the manufacturer to apply different fractions of error to each element (module), from 0.3 to 0.8, provided the sum of the squares is less than or equal to 1 for the combined system. OIML also has specific criteria for evaluating compatibility of elements. At present NTEP Certificates specify that the separate main elements must be interfaced with compatible equipment but provide no guidance on how to evaluate compatibility. It appears that this issue will become more important over time. He advised that the U.S. should be looking closely at the issues involved and the changes that might be required in NIST Handbook 44 to allow the OIML system to be used here.

8. NCWM Publication 14, Administrative Policy on Pre-NTEP Certificates of Conformance

Proposal: Amend NCWM Publication 14, Administrative Policy The following language was proposed and discussed by the NTEP Committee and interested parties to be included in NCWM Publication 14 Administrative Policy. Further discussion and final decisions on this item will take place at the NCWM Annual meeting in July 2004.

Background: Current Policy from Section J.4. of NCWM Publication 14 Administrative Policy:

> Certificates of Conformance (CCs) issued as a result of type evaluation testing performed prior to the establishment of NTEP, that is Certificates that were originally issued as "pre-NTEP" CCs, may cover ranges of parameters within those included on the original pre-NTEP type approval certificates. The parameters covered must be within those allowed by the technical policy for the individual device type; parameters include elements such as device capacity, platform size, nmax, product type, etc. Pre-NTEP CCs cannot be expanded to cover parameters beyond those listed on the pre-NTEP type approval certificates without additional testing.

Recently NTEP was asked to amend a pre-NTEP CC for a Weighing/Load Receiving element that is used in Vehicle weighing. The original pre-NTEP CC listed the length of this device as 70 ft. According to current NTEP technical policy for this type of device, it is possible to have lengths up to 150 % of the device evaluated covered by an NTEP CC.

In discussion with the CC holder, data was submitted that showed the test that was conducted on the device. The testing was thorough and very similar to the testing that NTEP currently conducts on these types of devices. However, since this was a pre-NTEP CC, the administrative policy does not allow for the parameters to be expanded. The only alternative currently for the CC holder is to have the same 70 ft device evaluated again by NTEP. In this case, the rigid administrative policy did not seem fair.

Based on this information, the following proposal was presented to the NTEP Committee for consideration.

Proposed Language change to NCWM Publication 14, Administrative Policy

J. Variations in Type Evaluation

J.4. Expansion of Pre-NTEP Certificates of Conformance

Certificates of Conformance (CCs) issued as a result of type evaluation testing performed prior to the establishment of NTEP, that is Certificates that were originally issued as "pre-NTEP" CCs, may cover ranges of parameters within those included on the original pre-NTEP type approval certificates. The parameters covered must be within those allowed by the technical policy for the individual device type; parameters include elements such as device capacity, platform size, n_{max}, product type, etc. Pre-NTEP CCs cannot be expanded to cover parameters beyond those listed on the pre-NTEP type approval certificates without additional testing.

Upon written application filed with NTEP by the applicant, NTEP may grant exceptions to the provisions of this section when the applicant on such application provides evidence acceptable to NTEP that such exceptions are appropriate and maintain the integrity of the NTEP Certificate of Conformance. The decision to grant exceptions shall be based on information including, but not limited to, actual test data, test methods used, and current NTEP policy on evaluation and results.

At the 2004 NCWM Annual meeting, there was a discussion on the equivalence and quality of test data used to expand pre-NTEP Certificates of Conformance (CC) under the current administrative policy.

The Committee expressed that the intent of this change is to ensure that equivalent data from a public sector test organization is required and must exist in order to expand the device parameters of a pre-NTEP CC beyond the parameters of the original pre-NTEP CC. For example, pre-NTEP CCs for vehicle scales were based on data, including section test data, from public sector test organizations. Test loads and test patterns under the current NTEP Evaluation criteria would *not* permit acceptance of section test data conducted prior to the establishment of NTEP and CLC requirements.

9. Consolidating NTEP Device Types

At the 2004 NCWM Interim Meeting, Stephen Patoray, NTEP Director updated the Committee on the current status of device types. A list of suggested device types, which were reviewed by the NTEP Laboratories and the Weighing Sector, was discussed. Based on this information, the NTEP database has been updated and improvements were also completed on the NTEP Certificate search page on the NCWM website.

10. NTEP Laboratory Round Robin

A Computing scale is currently being randomly circulated among the five NTEP Laboratories. All of the laboratories are using the same checklist and procedures to evaluate the device. Once all five laboratories have evaluated the device, the final results from all five of the laboratories will be anonymously compared. We currently believe there is consistency in testing among the five laboratories. This round robin evaluation will add data and substance to that belief. However, if any inconsistencies are discovered, necessary actions will be taken by NTEP to properly address any deficiencies.

11. NTEP Technical Advisor

During the 2004 NCWM Interim Meeting, NTEP Committee Chairman Ross Andersen announced that the NTEP Director, will serve as the primary Technical Advisor to the NTEP Committee for all administrative duties and support. Steve Cook (NIST) will continue as Technical Advisor to the NTEP Committee for technical matters.

R. Andersen, New York, Chairman
D. Ehrhart, Arizona, NCWM Chairman
W. Diggs, Virginia
D. Onwiler, Nebraska
S. Pahl, Texas

NTEP Technical Advisor: S. Patoray, NTEP Director
NIST Technical Advisor: S. Cook, NIST WMD

National Type Program Evaluation Committee

Appendix A

NTEP Participating Laboratories and Evaluations Report

NTEP Application Statistics			
	Previous Quarter	**Current Quarter**	**Total To Date**
	10/1/2002-6/16/2003	10/1/2003-6/16/2004	10/1/00-6/16/2004
Applications Processed (Reactivations)	(4) 183	(2) 175	(44) 945
Applications Completed	151	67	687
New Certificates Issued	152	165	875
Certificates Distributed to State Directors	160	158	854
Certificates Posted To Web Site	158	157	3387
Active NTEP Certificates			1539

	Average	**Median**
Time For NCWM To Assign An Evaluation	10 days	8 days
Time For NCWM To Review A Draft Certificate	6 days	6 days
Time For Complete Evaluation	158 days	113 days

Appendix B

GMM and NIR Grain Analyzer Sectors

August 20-21, 2003
Kansas City, Missouri

Agenda Items

1. United States Department of Agriculture (USDA), Grain Inspection Packers and Stockyards Administration (GIPSA)/National Institute of Standards and Technology (NIST) Interagency Agreement Renewal
2. Update on NTEP Type Evaluation and Ongoing Calibration Program (OCP) (Phase II) Testing
3. Type Evaluation and OCP Issues
   a. Proposed Change to Publication 14 – Phase II Bias Tolerances
   b. Proposed Change to Publication 14 – Moisture Range for Hard White Wheat
   c. Correction to Grains Table in NTEP Application for Type Evaluation
4. Report on OIML IR 59 "Moisture Meters for Cereal Grains and Oilseeds"
5. Proposed Addition to OIML IR 59 to Address Influence of External Disturbances
6. Report on the 2003 NCWM Annual Meeting – GMM Issues
7. Proposed Changes and Additions to Publication 14 for Meters with Test Weight per Bushel Capability
   a. Additions to the "Type Evaluation Test Procedures and Tolerances" Section
   b. Changes/Additions to the Checklist Section

★ 8. NTEP Committee Authorizes "Dual Certification"
★ 9. Proposed Changes to Publication 14 to Improve Consistency between GMM and NIR Checklists
★ 10. NTETC GMM/NIR Sector Support - Response to Sector's Letter to NCWM Chairman
★ 11. Time and Place for Next Meeting

★ **Note**: Because of common interest, items marked with a star (★) were considered in a joint session of the NIR Grain Analyzer and the Grain Moisture Meter Sectors

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1. GIPSA/NIST Interagency Agreement Renewal

The current five-year Interagency Agreement between GIPSA and NIST that provides funding for the Grain Moisture Meter On-going Calibration Program (OCP) will expire at the end of the Federal Government's Fiscal Year 2004 (September 30, 2004). Renewal of the Agreement is subject to an annual review to determine if changes should be made. Under the terms of the present agreement NIST and GIPSA each contribute one-third the cost of the program subject to an annual maximum of $18,000 each. The balance of costs is borne by manufacturers and depends on the number of meter models in the NTEP "pool" according to a fee schedule. The fee schedule has remained fixed since October 1, 1999. NIST and GIPSA have reviewed costs associated with the program and a revised fee schedule has been proposed. Implementation of the proposed fee schedule, which would become effective at the start of FY2005 (October 1, 2004), is subject to approval by both agencies. Rich Pierce, GIPSA, briefed the Sector on the proposed fee schedule, a draft of which is shown below.

Proposed NTEP On-Going Calibration Program Fee Schedule For Fiscal Year 2005 to 2009							
				Funding Contribution from Participants			
(1) Total Meters (including official meter)	(2) Meters in NTEP Pool	(3) Cost per NTEP Pool Meter	(4) Total Program Cost	(5) NIST	(6) GIPSA	(7) Manufacturers (total funding from mfg's)	(8) Cost per Meter Type
2	1	19,875	19,875	6,625	6,625	6,625	3,315
3	2	19,875	39,750	13,250	13,250	13,250	4,415
4	3	19,875	59,625	19,875	19,875	19,875	4,970
5	4	19,875	79,500	26,500	26,500	26,500	5,300
6	5	19,875	99,375	26,500	26,500	46,375	7,730
7	6	19,875	119,250	26,500	26,500	66,250	9,465
8	7	19,875	139,125	26,500	26,500	86,125	10,765
9	8	19,875	159,000	26,500	26,500	106,000	11,775

Explanation of columns in the Fee Schedule table:

Column	**Explanation (or formula for calculating)**
(1) Total Meters	The number of meter types (including the Official GIPSA meter) that will share in the NTEP calibration costs.
(2) Meters in NTEP Pool	The number of meter types other than the Official meter that will share in the NTEP calibration costs.
(3) Cost per NTEP Pool Meter	The cost associated with each pool meter in the program.
(4) Total Program Cost	A per meter type cost of $19,875 times the number of NTEP "pool" meters.
(5) NIST Contribution	One-third the total program cost up to a maximum of $26,500.
(6) GIPSA Contribution	One-third the total program cost up to a maximum of $26,500.
(7) Manufacturers Contributions (total funding from manufacturers)	Total Program Cost minus NIST Contribution minus GIPSA Contribution.
(8) Cost per Meter Type	Manufacturers' Contributions divided by Total Meters (including the Official meter.

Thus, if the current number of five meter types in the program (including the Official meter) remains constant, the annual cost per meter type under the proposed fee schedule will be $5,300 compared to the present annual fee of $3,600.

2. Update on NTEP Type Evaluation and OCP (Phase II) Testing

Cathy Brenner, GIPSA, the NTEP Participating Laboratory for Grain Moisture Meters, reported that no new grain moisture meters have been submitted for Type Evaluation in 2003. For the 2003 harvest, the following models will be enrolled in the OCP:
[**Note**: Models listed on a single line are considered to be of the same "type".]

DICKEY-john Corporation	GAC2000, GAC2100, GAC2100a
Foss North America	Infratec 1241
Foss North America	Infratec 1227, Infratec 1229
Seedburo Equipment Company	1200A [Change in ownership - formerly listed as Motomco 919ES]
The Steinlite Corporation	SL95

Since the inception of the OCP almost 10 years ago, results for each grain and each meter have been compiled using SAS software and returned to manufacturers in voluminous paper reports. Rich Pierce, GIPSA, reported that GIPSA has set a goal for next year to distribute these reports electronically, most likely as PDF files. This change is expected to require a number of minor changes in format, especially in those portions of the report where several graphs now appear on a single page.

3. Type Evaluation and OCP Issues

3.a. Proposed Change to Publication 14 – Phase II Bias Tolerances

Background: The NTEP Phase I program provides for calibration testing and approval of three or more grain types over a 6 % moisture range determined by the Sector to be the most economically significant for each grain. Basic 6 % moisture ranges are identified in the NTEP Application for Grain Moisture Meters. At the completion of Phase I testing, meters are typically biased close to the GIPSA, and NTEP laboratory, air oven reference. In the Phase II OCP, calibration performance is tested over a wider range of grain moisture content. Calibration performance is checked against both "Approved" (one-half of the Handbook 44 Acceptance and Maintenance Tolerance) and "Pending" tolerances ("Approved" tolerance plus a 95 % confidence interval). The "Pending" classification is used to identify the operating moisture range for each grain for field instruments.

Proper application of "Pending" tolerances can prevent requiring calibration changes based on insufficient data. Conversely, these wider tolerances allow field use of calibrations that are biased as much as 0.4 % to 0.6 % moisture content away from the reference air oven and other NTEP meters. Situations currently exist where calibrations do not meet NTEP Approval Tolerances for a single 2 % moisture interval, but do meet the wider tolerances of the "Pending" classification. These calibrations are still included on the NTEP Certificate of Conformance and are still being used in commercial transactions. In these instances, the calibrations no longer meet the criteria for NTEP Phase I calibration approval over the required basic 6 % moisture range.

Discussion: The Sector considered a proposed change to Publication 14 that would require calibrations to meet Phase I tolerances (without the application of a confidence interval) over the basic 6 % moisture range. A number of Sector members were concerned that different meter types were not as closely aligned as they could be. In the absence of a mandated change, some manufacturers haven't kept up with aligning their calibrations with the air oven.

Charles Hurburgh, Jr., Iowa State University, pointed out that if there is a statistically significant bias between two meters and both meet “Approved” tolerances, then the tolerance is too broad. It was suggested that statistics are needed to show that meters as a cluster are aligned with each other in addition to aligning with the air oven. Rich Pierce, GIPSA, reported that even though data from the most recent 3 years is considered in analyzing OCP results, the confidence intervals have not been greatly reduced. The problem is especially acute in the moisture regions outside the basic 6 % moisture range. With only the most recent 3 year data available, many of the 2% moisture intervals at the moisture extremes have an insufficient number of samples to support continued use at these moisture levels unless the manufacturer supplies supporting historical data. Any interval supported by manufacturer-supplied data (even if it is historical OCP data) is automatically classified as "Pending" approval under NTEP. In more than one instance this has caused previously "Approved" moisture ranges to be reclassified as "Pending" ranges. Steve Patoray, NTEP Director, questioned the intent of the first sentence of the definition of "Pending" which states, "A new calibration will automatically be placed in this category." Sector members agreed that, as presently worded, this sentence confused the definition. It was intended to apply to calibrations that had not been validated in the OCP. It was also suggested that once a calibration range has been classified as "Approved" it should not be reclassified as "Pending" in the absence of data. The need to distinguish between "Approved" and "Pending" approval ranges was questioned. While all agreed that in practical day-to-day use the distinction between "Approved" and "Pending" had no significance, several members believed the distinction was important to prospective GMM buyers who could use this information in making informed comparisons between different GMM models.

Conclusion: The Sector reached the following conclusions on the issues raised in connection with this agenda item:

1. The Sector agreed to recommend the following change to Publication 14 to require calibrations to meet Phase I tolerances over the basic 6 % moisture range (without the application of a confidence interval).

In the GMM Checklist of Publication 14, section "IV. Tolerances for Calibration Performance:" revise paragraph three, and modify the definitions of "Approved" and "Pending" to read:

In order for a calibration to remain on the certificate of conformance, the calibration must continue to meet "Approved" tolerances for all 2 % moisture intervals in the basic 6 % moisture range. This requirement is waived if a 2 % moisture interval contains fewer than five samples. For 2 % moisture intervals outside the basic moisture range, tolerances used to require a change in calibrations will include the application of a 95 % confidence interval to the maximum tolerance for each 2 % moisture interval. The intent of applying the confidence interval is to avoid forcing a calibration change based upon insufficient data. After only one year of data collection, the number of samples in some intervals will be small, and the confidence interval may be as large as the tolerance limit. In this instance, the calibration would have to be extremely poor before a calibration change would be mandated. After the instrument has been in the calibration program for several years, the confidence interval should be reduced to approximately 0.05 and recommendations can be made with greater certainty. The latest three years of data will be used to make decisions regarding the need to make a calibration update.

Approved: Corn, HRW wheat, and soybean calibrations will be approved based upon performance over the 6 % type evaluation moisture range and manufacturer supplied data. Continued approval requires acceptable performance as part of the ongoing national calibration effort.

Calibration data, collected as part of the national calibration program, must indicate that calibration performance meets the tolerances for each 2 % moisture interval before additional grains will be approved. Continued approval again requires acceptable performance as part of the national calibration effort, (i.e., none of the average differences between predicted and reference values for the respective 2 % moisture intervals exceed one-half the Handbook 44 acceptance tolerance within the basic 6 % moisture range and one-half the Handbook 44 acceptance tolerance plus a 95 % confidence interval outside the basic 6 % moisture range).

Pending: A new calibration that has not been validated by ongoing calibration data collected as part of the national calibration program will automatically be placed in this category. This category also includes calibrations that have not yet met the criteria for approval, but that also have not performed badly enough to be listed as not approved. Such calibrations may be used on NTEP-approved meters.

2. The Sector agreed to recommend revising the first sentence of the definition of "Pending" to clarify its intent.

3. Although first agreeing to recommend changes that, in the absence of data, would not cause a calibration range originally classified as "Approved" to be reclassified as "Pending," the Sector subsequently rescinded their recommendation. Among the reasons for taking this action was the fact that it would not be applicable to a calibration that had been changed after the original approval if NTEP lab data were no longer available for the range in question. The Sector was in general agreement that ranges supported by manufacturer supplied data (even if it is historical OCP data) should automatically be classified as "pending" approval, because the NTEP lab had no way to validate the integrity of such data. Additionally, because Part V of the GMM checklist, which lists a set of well-developed rules for dealing with inadequately represented moisture intervals and for handling manufacturer supplied data, would require extensive revision if extended moisture ranges were granted permanent approval in the absence of data indicating otherwise, the Sector decided to defer action on this proposal until the issues of approval tolerances and uniformity among meters could be studied more thoroughly.

A subcommittee was formed to look at approval tolerances and uniformity among meters. Dr. Charles Hurburgh, Jr., Iowa State University, agreed to act as chair. Other subcommittee members include:

Jack Barber	JB Associates
Cassie Eigenmann-Pierson	DICKEY-john, Corp.
Andrew Gell	Foss North America

G. Diane Lee	NIST-WMD
Tom O'Connor	National Grain & Feed Association
Richard Pierce	GIPSA [NTEP Participating Laboratory]

3.b. Proposed Change to Publication 14 – Moisture Range for Hard White Wheat

Discussion: The NTEP Application for Grain Moisture Meter evaluation and the Table of Moisture Ranges and Tolerance for Sample Temperature Sensitivity in Appendix D of the GMM Checklist in Publication 14 specify a moisture range of 10 % to 16 % for Hard White Wheat. The NTEP required moisture ranges were initially selected to represent typical market ranges. In the last 3 years, however, GIPSA has not received any 14 – 16% moisture samples of Hard White Wheat for the Phase II ongoing calibration program. It appears that a moisture range of 8 – 14% would be more appropriate for Hard White Wheat.

Conclusion and Recommendation: The Sector agreed to recommend changing the "NTEP Required Moisture Range" for Hard White Wheat from "10 % to 16 %" to "8-14%" in the table on page 4 of NTEP Application form for Grain Moisture Meters (Issue - January 2003). The Sector also recommended changing the Hard White Wheat moisture range from "10 % to 16 %" to "8 % to 14 %" in the table in Appendix D of the GMM Checklist of Publication 14 as shown below. [**Note**: Missing quotation marks also need to be added in the table's heading. In addition, Medium Grain Rough Rice with a moisture range of 10 % to 16 % and tolerance limit of 0.45 as approved at the Sector's September 1997 meeting needs to be added; this entry to the table was inadvertently omitted from the 2001 and 2002 editions of Publication 14.]

Moisture Ranges and Tolerance for Sample Temperature Sensitivity (for the "Other 12" NTEP Grains)		
Grain Type	**Moisture Range for Test**	**Tolerance Limit (Bias at Temperature Extremes)**
Durum Wheat	10-16 %	0.35
Soft White Wheat	10-16 %	0.35
Hard Red Spring Wheat	10-16 %	0.35
Soft Red Winter Wheat	10-16 %	0.35
Hard White Wheat	8-14 %	0.35
Sunflower seed (Oil)	6-12 %	0.45
Grain Sorghum	10-16 %	0.45
Two-rowed Barley	10-16 %	0.35
Six-rowed Barley	10-16 %	0.45
Oats	10-16 %	0.45
Long Grain Rough Rice	10-16 %	0.45
Medium Grain Rough Rice	10-16 %	0.45

3.c. Editorial Correction to Grains Table in NTEP Application for Type Evaluation

Discussion: Note 2 following the Table of Grain Types on page 4 of the NTEP Application for Type Evaluation states:

Similar grain types are grouped within double lines above; testing of a meter with any grain in a given grouping will enable the evaluation to cover all grains in the grouping. For example, successful testing of a meter with two-row barley will result in the issuance of a Certificate which lists all of the other types of grain within the grouping, that is six-row barley and oats.

The "double lines" referred to in Note 2 are missing in the current edition of the Application.

Conclusion and Recommendation: The Sector recommended restoring double lines to the Table of Grain Types on page 4 of the NTEP Application for Type Evaluation to separate the grain types into seven groups as shown below:

group 1:	Corn
group 2:	Soybeans
group 3:	Hard Red Winter Wheat
	Durum Wheat
	Soft White Wheat
	Hard Red Spring Wheat
	Soft Red Winter Wheat
	Hard White Wheat
group 4:	Two-Row Barley
	Six-Row Barley
	Oats
group 5:	Sunflower Seed
group 6:	Long Grain Rough Rice
	Medium Grain Rough Rice
group 7:	Grain Sorghum or Milo

[**Editor's Note:** Recent modification of Section 5.56(a) Grain Moisture Meter Code in NIST Handbook 44 to recognize indications and recorded representations of test weight per bushel will require modification of Note 2 to stipulate that the groupings apply only to testing for moisture and NOT to testing for test weight per bushel. The Sector has not taken action on this issue, but suggested changes to Note 2 are shown below with the expectation that the change can be considered an editorial change not requiring a formal Sector ballot.]

Similar grain types are grouped within double lines above; testing of a meter with any grain in a given grouping will enable the evaluation to cover the moisture calibrations for all grains in the grouping. For example, successful testing of a meter with two-row barley will result in the issuance of a Certificate which lists moisture calibrations for all of the other types of grain within the grouping, that is six-row barley and oats, provided supporting calibration data has been provided for six-row barley and oats.

4. Report on OIML IR 59 "Moisture Meters for Cereal Grains and Oilseeds"

Background: At an OIML TC17/SC1 meeting in Berlin, Germany on June 22, 2001, the U.S. Delegation put forth a series of proposals to revise OIML IR 59 "Moisture Meters for Cereal Grains and Oilseeds." These proposals were well received and it was requested that the U.S. prepare a draft based on the U.S. NTEP program. A rough draft of this document was reviewed at the August 2002 GMM Sector meeting. NIST, Weights and Measures Division (WMD) prepared a working draft, incorporating changes suggested by the Sector, and the draft was submitted to U.S. and International Working Groups in February 2003 for comment. NIST WMD, which is responsible for U.S. participation and representation in the technical activities of the OIML, compiled comments to the working draft for review by representatives of the U.S. National Working Group (USNWG). The working draft was modified to address comments where it was judged appropriate. The modified working draft and a table of responses to the comments received to the working draft were distributed to USNWG members May 28, 2003. Subsequently, the Secretariat (the Peoples Republic of China) distributed the revised working draft as the "First Committee Draft" to OIML TC17/SC1 for review and comment by the member states of the subcommittee. China has requested that any additional comments be submitted no later than August 31, 2003. To comply with this request, Diane Lee, WMD, asked USNWG members to submit their comments to her by August 18, 2003. The next OIML TC17/SC1 meeting is October 15-16, 2003 in Beijing, China.

Discussion: Diane Lee, WMD, reported that, as of August 19, she had not received any comments from the USNWG other than the recommendation covered by GMM Sector Agenda item 5. Sector members who are on the USNWG were urged to submit comments by an extended deadline of August 27 so they could be included in her submission to the Secretariat. One Sector member suggested removing the acidity index requirement of clause 5.4. The acidity index is a measure of fatty acids in oil seeds. The test is expensive and should not be necessary if care is taken to avoid using rancid/spoiled samples. Richard Cantrill, American Oil Chemists' Society (AOCS), noted that ISO TC-34/SC2, Oleaginous Seeds and Fruits, is working on a revision of ISO Standard 7700-2 *Checking the performance of moisture meters in use -- Part 2: Moisture meters for oilseed*, and that ISO 7700-2 makes reference to the previous version of OIML IR-59. He suggested that the Secretariat of OIML TC71/SC1 contact the

Secretariat of ISO TC-34/SC2 to make them aware that IR-59 was being revised. Diane Lee agreed to pass this suggestion on to the Secretariat of OIML TC71/SC1.

5. Proposed Addition to OIML IR 59 to Address Influence of External Disturbances

Discussion: OIML R59 (1984) includes the following requirement without specifying the details of the tests to be performed:

Influence of external disturbances – Additional tests are carried out on moisture meters containing electrical and electronic parts, to evaluate the disturbances caused by the external magnetic fields, electro-magnetic radiations, electrostatic discharges failures of the electric power supply (interruptions of short duration, transient over-voltages, etc.)

The First Committee Draft (May 2003) of OIML IR 59 includes no requirement covering the influence of external disturbances. At present, Grain Moisture Meters sold in the Europe must comply with the European Union's harmonized standard EN 61326 (incorporating amendments A1: 1998 and A2: 2001), *Electrical Equipment For Measurement, Control And Laboratory Use – EMC Requirements,* which specifies radio frequency emission limits as well as test requirements for immunity to external disturbances caused by external magnetic fields, electro-magnetic radiations, electrostatic discharges, surges, and failures of the electric power supply (interruptions of short duration, transient over-voltages, etc.). Including a reference to the influence tests of IEC 61326 (the equivalent of EN 61326) and specifying what constitutes a significant fault is suggested to correct this oversight.

Conclusion and Recommendation: The Sector agreed to submit recommendations for additions to sections of R59 as shown below to address the influence of external disturbances.

Add to the Metrological Requirements section:

5.9 Influence of external disturbances

5.9.1 When subjected individually to the disturbances specified in the immunity tests of IEC 61326 (latest revision) the meter shall not exhibit a significant fault as defined in 3.2.1.

Add to the Terminology section:

3.2.1 Significant fault
A fault the magnitude of which is greater than the magnitude of the maximum permissible errors in 5.3.1.

NOTE: The following faults are considered not to be significant.

a) Faults implying the impossibility to perform any measurement;
b) Transitory faults being momentary variations in the indication, which cannot be interpreted, recorded or transmitted as a measurement result; and
c) Faults giving rise to variations in the measurement results that are so large as to be noticed by all users of the instruments.

6. Report on the 2003 NCWM Annual Meeting

Background: Two items of interest to the GMM Sector were addressed as voting items by the Committee on Specifications and Tolerances (S&T) at the NCWM Annual Meeting on July 13-18, 2003.

356(a)-1 Recognize Indications and Recorded Representations of Test Weight Per Bushel
Source: GMM Sector
Recommendation: Modify Section 5.56(a) Grain Moisture Meter Code in NIST Handbook 44 to recognize indications and recorded representations of test weight per bushel.

356(b)-1 T.3. For Test Weight Per Bushel Indications or Recorded Representations
Source: Central Weights and Measures Association (CWMA)
Recommendation: Modify paragraph T.3. of Section 5.56(b) Grain Moisture Meter Code Section in NIST Handbook 44 to clarify that it applies to separate accessory devices (such as a beam balance test weight apparatus) used to determine test weight per bushel of grain samples for the purpose of making density corrections in moisture determinations.

For additional background refer to Committee Reports for the 88th Annual Meeting, NCWM Publication 16, April 2003.

Discussion: At the 88th NCWM Annual Meeting held July 13 – 18, 2003 the NCWM voted to adopt changes to NIST Handbook 44 proposed under **Agenda Item 356(a)-1** and **Agenda Item 356(b)-1**. The NIST Weights and Measures Division recommended that the proposal, Item 356(a)-1, include SI (metric) units of measurement. The S&T committee heard one comment that different methods are used for test weight measurements. The S&T committee made no decision to include the metric units and the original proposal from the Sector was accepted. In the U.S. the bulk density of grain is expressed in pounds per bushel and is based on a specific USDA test method. In Europe (and other countries using the metric system) bulk density is expressed in kilograms per hectoliter and is based on a specific ISO test method. A straight units conversion of lb/bu test weight to kg/hL using the USDA method does not equal the kg/hL result of the ISO test method. A slope and bias must be applied to the units conversion to account for the differences caused by using two different test methods. When export contracts for wheat require that bulk density be certified in kg/hL, GIPSA currently uses a special adjustment from a U.S. test weight (lb/bu) to an "ISO standard" test weight (kg/hL). For all other grains, a simple units conversion is used to obtain values in kg/hL test weight. Some Sector members thought that the inclusion of a metric tolerance was potentially confusing in the U.S. marketplace. Others were of the opinion that this was not an issue in the U.S., because U.S. grain standards are based on the USDA test method for bulk density and are expressed in lb/bu. Several GMM manufacturers indicated that their devices had the capability of expressing bulk density in either U.S. Customary or metric units based on a straight units conversion. However, they stated that a different bulk density calibration was used for devices sold in countries where bulk density was based on the ISO test method. The Sector took no formal action on this matter.

7. Proposed Changes and Additions to Publication 14 for Meters with Test Weight per Bushel Capability

7.a. Additions to the "Type Evaluation Test Procedures and Tolerances" Section

Background: A subcommittee prepared a draft of additions to the "Type Evaluation Test Procedures and Tolerances" Section of NCWM Publication 14 to cover the evaluation of GMMs incorporating test weight per bushel (TW) capability. In developing the draft, which was presented to the Sector at its August 2000 meeting, the subcommittee considered the following:

1. To minimize the cost of type evaluation testing and provide an existing database for manufacturers to use in evaluating the proposed procedures, the subcommittee initially considered structuring tests to parallel the tests already established for GMMs. While this approach was determined to be feasible for most of the basic instrument tests, the subcommittee felt that test procedures and sample set selection should be modified for some tests to place the emphasis on test weight effects rather than on moisture effects. This was a particular concern for the accuracy, precision, and reproducibility tests in Phase I.

   A related concern is that Phase II samples are the primary source of Phase I accuracy samples. By the time air oven portions (200 g) have been cut out of the samples, only one-half to two-thirds of the samples are large enough to obtain a test weight reference value for Phase I tests using the procedures specified by the standard quart kettle method; the standard method requires a 1000 gram to 1050 gram sample for all grains except oats and sunflower seed. Also, the TW values currently being supplied to participants in the GMM Phase II on-going calibration Program (OCP) cannot be considered "official" test weight results. Some of these TW values are obtained using samples just large enough to fill the TW kettle with very little overflow. Sample packing and TW results are typically reduced for these samples.

Because TW readings are influenced by test conditions that affect grain surface characteristics, for some tests it is not desirable to use the same procedures for GMM and TW evaluations. For example, it seems desirable to reduce the number of repetitions per sample to avoid "polishing" grain samples. Also, it may be necessary to conduct all TW testing in an environmental chamber in which relative humidity can be controlled.

For the above reasons (and for the reasons given in item 3, below), TW evaluations were not incorporated into the existing Phase I GMM tests; instead, addition of a new subsection containing only TW test procedures and tolerances was proposed.

2. The subcommittee proposed that display and printout of TW be confined to moisture measurements within the 6% minimum NTEP required moisture range specified in the Application for NTEP testing for the following reasons: 1) measurement of TW beyond the upper limit of the 6 % range is going to be of questionable accuracy/precision; 2) the moisture region of greatest importance for TW is at or near normal moistures associated with storage or no-dockage-for-moisture levels which are included in the minimum NTEP required moisture range. The subcommittee's decision to limit TW to the "standard" 6 % moisture ranges was not unanimous. Tom Runyon, Seedburo, favored using the same moisture range for both TW measurements and moisture measurements, because grains coming into the initial receiving stations at harvest exhibit moistures that are at the upper levels of the approved moisture ranges. When there is an issue of low test weight due to poor weather conditions or stress during maturation stages, grain elevators need to identify a Low Test Weight condition at first receipt, not just after the grain has been dried to the lower moisture levels.

3. The matter of sample selection for TW was given serious consideration. Samples currently selected for moisture testing may not be suitable for TW testing. Because of existing criteria for selecting samples for Phase I moisture accuracy tests, it is already difficult to assemble a set of test samples. Imposing additional selection criteria for TW may make it impossible. The following criteria were included in the initial draft proposal submitted to the Sector:
   a) a total of 12 samples will be used per grain type.
   b) no less than 8 samples should come from the lowest two-thirds of the 6 % moisture range.
   c) no less than 2 samples should come from the highest one-third of the 6 % moisture range.
   d) samples should represent a distribution of TWs (ranges to be determined).
   e) for the entire population of 12 samples, the correlation (R2) between moisture and reference TW is to be less than 0.20.

4. The reference value for TW will be the average of 3 replicates on GIPSA's quart kettle apparatus. Samples will be dropped three times through each of two meters. The average of the initial and final reference values shall be used as the reference value in calculations of meter performance.

5. To have a sufficient number of measurements to determine TW accuracy, the subcommittee proposes that bias and Standard Deviation of the Differences (SDD) be calculated for each instrument using the entire sample set of 12 samples. In addition, a tolerance will be applied to the slope between measured TW (the average of the 3 TW measurements of a sample) and the reference TW (the average of 3 determinations as described above). Slope limits between 0.99 and 1.01 were proposed.

6. TW accuracy, repeatability, and reproducibility tests should be performed on all NTEP grains.

Discussion: In addition to reviewing the performance tests and tolerances in the Subcommittee's draft proposal, the Sector considered the following questions:

1. What TW range should be specified for Hard Red Winter wheat samples used in the instrument stability and instrument temperature sensitivity tests?
2. What TW range should be specified for samples used in accuracy, precision, and reproducibility tests?
3. Should the moisture range for TW measurements be restricted to a 6 % range? If not, how should the moisture range be determined, and should tolerances be different at higher moistures?

4. Should Phase II testing be required for TW? If so, how should tolerances be applied and over what range of moistures?

The questions related to limiting moisture ranges for TW measurements were the subject of lengthy discussion. The Sector acknowledged that for practical reasons samples used in NTEP testing would have to be of a restricted moisture range. Sample stability and availability were the major limitations to expanding the moisture range of samples used in Phase I testing. On the other hand, it seemed equally impractical to have different upper limits on grain moisture for TW than for moisture measurements, because grains coming into the initial receiving stations at harvest exhibit moistures that are at the upper levels of the approved moisture ranges. When there is an issue of low test weight due to poor weather conditions or stress during maturation stages, grain elevators need to identify a Low Test Weight condition at first receipt, not just after the grain has been dried to the lower moisture levels. In addition, restricting the display and print out of TW information at higher moistures would unnecessarily prevent measurement of TW for operational use (such as binning and drying) as opposed to commercial use.

The suggestion to allow display and print out of TW beyond the 6 % moisture interval provided the device gave a clear warning that the TW was "outside limits" was deemed impractical by device manufacturers who indicated that major firmware changes would be required to apply different moisture limits to moisture measurements and TW measurements for different grains. Other members expressed the opinion that different moisture limits would be confusing to producer and grain handlers alike.

One Sector member suggested that the issue should be viewed from the perspective of how TW affects the money paid for grain:

Corn - TW becomes important only if TW is very low. Low TW occurs only infrequently. In years when it does, it is typically common to an entire growing region. There is a big difference between typical TW and unusually low TW. Even if accuracy and precision of the TW measurement is reduced at higher moistures, it is still possible to identify a low TW condition.

Wheat - TW is important on wheat every day, but the proposed 10 % to 16 % moisture range is where most wheat is harvested.

Soybeans - TW is somewhat important, but the proposed 6 % moisture range includes normally harvested moistures.

This sector member concluded that allowing display of TW beyond the proposed limits was not a problem as there was no significant economic impact on TW accuracy beyond the proposed limits. Another member disagreed, citing the common harvesting of double-cropped soft red winter wheat in his area at moistures above 16 %. He questioned how field-testing should be handled if TW results are allowed to be displayed on higher moisture grains. Would the same tolerances apply to TW at higher moistures? If so, should a device be failed if it passes tests using samples within the 6 % interval but is out of tolerance on higher moisture samples? It was suggested that field-testing should be limited to moistures within the 6 % range. Refrigeration of TW transfer samples is not recommended, and the ability to maintain the integrity of test samples at higher moistures without refrigeration is questionable. Also, the precision of the device under test and the precision of the standard method begin to suffer at higher moistures. The Sector concluded that field-testing at higher moistures did not seem practical.

To satisfy both the need to limit moistures for NTEP Phase I testing and the need to provide TW indications at moistures beyond those used in Phase I tests, it was decided that grain moisture meters would be allowed to use the same moisture range for both TW measurements and moisture measurements. On CCs, TW calibrations would be shown as "approved" over a 6 % moisture range and "pending" over the remainder of the meter's moisture range. Participation in the Grain Moisture Meter Phase II calibration monitoring program would be required to verify performance over the TW "pending" range. Although the TW data available from the Phase II program may not be suitable for use in the basic instrument tests of Phase I, it was thought that the data would be acceptable for determining the degree to which TW measurements are a function of moisture over the device's operating moisture range. The Sector unanimously agreed to recommend that the following criteria be included in the checklist to address this concern:

- The slope of TW error with respect to TW shall not be significant at a 95 % confidence level over the 6 % moisture range.
- The slope of TW error with respect to percent moisture content shall not be significant at a 95 % confidence level over the "Approved" and "Pending" moisture range of the device.

For all the proposed Publication 14 tests, the Sector was in full agreement that the range of sample TWs should be no less than the range that is grade determining. For example, for yellow dent corn the minimum test weight per bushel is: 56 pounds per bushel for grade #1; 54 pounds per bushel for grade #2; and 52 pounds per bushel for grade #3. Thus, the minimum range specified for corn will be 52 to 56 pounds per bushel. The Sector did not specifically address the cases of rice for which TW is not a grade factor, and sunflower, which uses a single minimum TW (25 pounds per bushel) for all three grades.

The Sector reviewed a proposed addition to Publication 14 that reflected changes made to the subcommittee's draft by the Sector at its August 2000 meeting. The Sector also considered the following three items that had not been fully resolved at that meeting.

1) Sample Volume Test. The angle of repose of wet corn (22 %) is different than that of dry hard red winter wheat. If the device uses a sensor in the hopper to detect adequate sample size, it could conceivably pass the test on wheat but not detect insufficient volume when used with wet corn. Naturally moist wet corn may not be available at the time of year when a device is submitted for testing. It hasn't been determined that artificially moistened corn could be used for this test.

2) It was suggested that tolerances on some of the basic instrument tests were too tight. The subcommittee acknowledged that the tolerances were based on preliminary data and suggested that manufacturers be given the opportunity to see if they are appropriate. The Sector has received no comments from manufacturers to indicate that the tolerances are too restrictive. These limits remain in the draft as originally proposed.

3) What TW ranges should be specified for rice and sunflowers? TW is not a grade-determining factor for rice, and only a minimum TW of 25 lb/bu is specified for sunflower seed.

It was pointed out that the minimum TW ranges proposed for several of the grain types do not cover all the grades specified for those grains in the current U.S. Grain Standards. For example, the specified minimum TW for corn is 52 – 56 lb/bu. This covers only grades 1, 2, and 3. U.S. Grain Standards show requirements for 5 numbered grades with 46 lb/bu the minimum TW for corn. There was concern that expanding the ranges to cover the full range of TWs for all grades of a grain would make it difficult to obtain samples for testing. In many years very low TW samples are not available. The Sector agreed that the recommended ranges address the areas of economic significance.

Conclusions and Recommendation: The Sector decided to leave the Sample Volume Test as originally proposed. Corn will not be used for this test. The Sector has received no comments from manufacturers to indicate that the proposed tolerances are too restrictive, so the tolerances remain as originally proposed. Manufacturers are not required to have a TW calibration for rice, but the Sector agreed to a range of 42 lb/bu to 46 lb/bu for Long Grain Rough Rice and 44 lb/bu to 48 lb/bu for Medium Grain Rough Rice for testing purposes if a calibration is provided for those grains. A TW calibration for sunflower seed will be tested over a range of range of 24 lb/bu to 27 lb/bu. TW ranges were left as originally proposed. The Sector also decided that it would not be necessary to monitor TW calibrations in the OCP. Because TW depends on the direct measurement of mass and volume, TW calibrations are not expected to be subject to the same variations that affect moisture calibrations. It was reasoned that field inspection was adequate to verify TW. Consequently, the requirement for monitoring TW calibrations in the OCP was dropped from the proposed recommendation. TW data will still be collected routinely in the OCP and will be reported to manufacturers.

The Sector agreed to recommend adding the following new section (VII.) to the "Type Evaluation Test Procedures and Tolerances" section of the Grain Moisture Meter portion of NCWM Publication 14. [Editor's Note:

Changes/additions involving equations have NOT been highlighted or underlined. The MS change-tracking feature does not mark changes or additions made using MS Equation Editor.]

VII. Additional Type Evaluation Test Procedures and Tolerances for Grain Moisture Meters Incorporating an Automatic Test Weight per Bushel Measuring Feature

A. Basic Instrument Tests

Basic instrument tests will be conducted using a stable moisture (12 % to 14 %) HRW wheat sample to check the effect of sample volume variations, power supply fluctuations, storage temperature, leveling, and warm-up time. Instrument stability tests will be conducted using HRW wheat samples selected from all three 2 % moisture intervals in the 10 % to 16 % moisture range. All instrument tests will be conducted on each of the two instruments submitted by a manufacturer. For purposes of these tests, room temperature will be defined as 22 ºC ±2 ºC.

Sample Volume. A single HRW wheat sample with a moisture content between 12 % and 14 % will be used for this test. A quantity of 500 grams (or the maximum amount that can be loaded into the instrument's sample hopper) will be measured 3 times. This quantity will be reduced by 10 grams and then measured 3 times. The sample will continue to be reduced by 10 grams for each set of 3 measurements until the instrument no longer displays and records a test weight per bushel result. The average of each set of 3 measurements will be calculated.

The maximum difference between any of the calculated averages shall not exceed 0.30 pounds per bushel.

Initial Precision. A single HRW wheat sample with a moisture content between 12 % and 14 % will be analyzed 10 times at room temperature and nominal line voltage.

Precision will be checked.

The maximum allowable standard deviation of 10 analyses (precision) is 0.20 pounds per bushel.

Power Supply. (**Note**: This test may be waived for instruments that have met the grain moisture meter test requirements provided that the instruments use the same volume and weight determining means for both moisture and test weight per bushel measurements.) A single HRW wheat sample with a moisture content between 12 % and 14 % will be analyzed 10 times with the meter operating at a voltage of 100 V. The voltage will be adjusted to 117 V. After 30 minutes, the HRW sample will be analyzed 10 times. The voltage level will then be increased to 130 V. After 30 minutes, the sample will be analyzed 10 more times.

Changes in bias and precision will be checked. Bias is defined as the change in the average test weight per bushel for 10 analyses made at both the reference and the respective test voltages.

The maximum allowable bias change from the reference voltage (117 V) is ± 0.20 pounds per bushel. The maximum allowable standard deviation of 10 analyses (precision), at any of the three voltage levels, is 0.20 pounds per bushel.

Storage Temperature. A single HRW wheat sample (12 %-14 % moisture content) is analyzed 10 times at room temperature prior to temperature cycling. The instrument is then powered down and placed in the environmental chamber. The chamber temperature is then increased to 55 ºC over a 1-hour period, and maintained at that temperature for 3 hours. Chamber temperature is then decreased to -20 ºC over a 1-hour period, and maintained at that temperature for 3 hours. The temperature cycle is then repeated. After letting the instrument equilibrate to room temperature for at least 12 hours, the instrument is turned on for the specified warm-up period and the test sample analyzed 10 more times.

The maximum bias shift allowed for the average of 10 drops before and after temperature cycling is 0.20 pounds per bushel.

Leveling. (Note: This test will be waived for instruments that have met the grain moisture meter test requirements provided that the instruments are equipped with leveling indicators and use the same volume and weight determining means for both moisture and test weight per bushel measurements.) Tests for leveling will be conducted using a single HRW wheat sample (12 % to 14 % moisture content). The leveling test will be conducted for a minimum of 2 orientations, front-to-back and left-to-right, at a tilt of 5 %. Additional orientations will be tested as deemed appropriate.

The maximum allowable bias shift is 0.20 pounds per bushel for the average of 5 readings.

Warm-up Time. (**Note**: This test will be waived for instruments that have met the grain moisture meter test requirements provided that the instruments use the same volume and weight determining means for both moisture and test weight per bushel measurements.) The following test procedures will be used to check warm-up times recommended by the manufacturer. If the manufacturer does not recommend a warm-up time, assume that accurate results will be provided immediately after turning the instrument power on.

The instrument will be powered off and stabilized at room temperature. The instrument will be powered on and after waiting the specified warm-up time a single wheat sample (12 % to 14 % moisture content) will be analyzed 5 times. After waiting for a period of time equal to two times the manufacturer suggested warm-up time, the sample will again be analyzed 5 times. The minimum waiting period before retesting the sample is one hour. Thus, for an instrument where no warm-up time is specified, the sample would be tested immediately upon the instrument being powered up and then again after 1 hour.

The maximum allowable bias shift is 0.20 pounds per bushel for the average of 5 readings.

Instrument Stability. HRW wheat samples will be used to test instrument stability over a minimum 4 to 6 week period. A set of three samples, representative of the test weight per bushel range of 56 to 60 pounds per bushel, will be selected for testing. These samples may be a subset of the HRW test set for accuracy, repeatability, and reproducibility tests. Each of the 3 samples will be dropped 5 times through each of the two meters prior to running any other type evaluation tests, particularly before running the storage temperature test. The average test weight per bushel obtained for the 15 observations (3 samples x 5 replicates) will be recorded. The 3 samples will be retested once all other type evaluation testing has been completed (within 4 to 6 weeks).

The maximum allowable bias shift over the 4 to 6 week period is 0.20 pounds per bushel.

B. Accuracy, Precision, And Reproducibility Requirements Accuracy, Precision, And Reproducibility Requirements:

The automatic test weight per bushel measuring feature of grain moisture meters will be tested for accuracy, repeatability (precision), and reproducibility with 12 samples of each grain type for which the meter has a pending or higher moisture calibration. Samples will be chosen to represent the moistures and test weights per bushel shown in the following table. The reference method for test weight per bushel is the quart kettle test weight per bushel apparatus as specified by the USDA GIPSA. The reference value will be the average of 3 replicates. Samples will be dropped three times through each of two meters. The reference value will be re-checked after the meters have been tested. The average of the initial and final reference values shall be used as the reference value in calculations of meter performance.

Three replicates will be run on each instrument for each sample, resulting in a total of 72 observations of test weight per bushel per grain type (2 instruments x 12 samples x 3 replicates).

Type of Grain	Moisture Range	Minimum Test Weight per Bushel Range lb/bu	Criteria for Sample Selection
Corn	12 - 18 %	52 - 56	a) No less than 8 samples should come from the lowest two-thirds of the 6 % moisture range. b) No less than 2 samples should come from the highest one-third of the 6 % moisture range. c) Samples should represent a distribution of Test Weights per Bushel (TW) that minimizes the correlation between TW and moisture.
Soybeans	10 - 16 %	52 - 56	
Hard Red Winter Wheat	10 - 16 %	56 - 60	
Durum Wheat	10 - 16 %	56 - 60	
Soft White Wheat (except White Club)	10 - 16 %	56 - 60	
Hard Red Spring Wheat (and White Club)	10 - 16 %	55 - 58	
Soft Red Winter Wheat	10 - 16 %	56 - 60	
Hard White Wheat	8 - 14 %	56 - 60	
Two-Row Barley	10 - 16 %	43 - 47	
Six-Row Barley	10 - 16 %	43 - 47	
Oats	10 - 16 %	30 - 36	
Sunflower Seed (Oil Type)	6 - 12 %	24 - 27	
Long Grain Rough Rice	10 - 16 %	42 - 46	
Medium Grain Rough Rice	10 - 16 %	44 - 48	
Grain Sorghum or Milo	10 - 16 %	53 - 57	

Accuracy. The two tests for accuracy are bias (meter versus the standard reference method) and the Standard Deviation of the Differences (SDD) between the meter and the standard reference method. Each instrument will be tested individually.

$$Bias = \frac{\sum_{i=1}^{n} (\overline{x}_i - r_i)}{n}$$

where,

$\overline{x}_i$ = average predicted test weight per bushel for sample *i* (3 replicates)

r_i = reference test weight per bushel for sample *i*

n = number of samples (n=12)

$$SDD = \sqrt{\frac{\sum_{i=1}^{n} (y_i - \overline{y})^2}{n-1}}$$

where,

y_i = $\overline{x}_i - r_i$ (see above)

$\bar{y}$ = average of the y_i

n = number of samples (n=12)

Tolerances for bias and SDD tests are one-half the absolute value of the NIST Handbook 44 acceptance tolerance. Specific tolerances are:

Grain Type	Tolerance
Corn, oats	0.4 pounds per bushel
All wheat classes	0.25 pounds per bushel
Soybeans, barley, rice, sunflower, sorghum	0.35 pounds per bushel

The manufacturer may adjust the calibration bias to compensate for differences from the type evaluation laboratory in reference methods or sample sets.

Repeatability. The Standard Deviation (SD) of the three test weight per bushel replicates will be calculated for each sample and pooled across samples. Each instrument will be tested individually. The equation used to calculate SD is:

$$SD = \sqrt{\frac{\sum_{i=1}^{n}\sum_{j=1}^{3}(P_{ij} - \bar{P}_i)^2}{2n}}$$

where,

P_{ij} = predicted test weight per bushel for sample i and replicate j

$\bar{P}_i$ = average of the three predicted test weight per bushel values for sample i

n = number of samples (n=12)

Tolerances for repeatability are 0.4 x the absolute value of the Handbook 44 acceptance tolerance. Specific tolerances are:

Grain Type	Tolerance
Corn, oats	0.32 pounds per bushel
All wheat classes	0.20 pounds per bushel
Soybeans, barley, rice, sunflower, sorghum	0.28 pounds per bushel

Reproducibility. The results for each of the three test weight per bushel replicates will be averaged for each instrument, and the Standard Deviation of the Differences (SDD) between instruments will be calculated using the following equation:

$$SDD = \sqrt{\frac{\sum_{i=1}^{n}(d_i - \bar{d})^2}{n-1}}$$

where,

$d_i = \overline{P}_{1i} - \overline{P}_{2i}$

$\overline{P}_{1i}$ = average of three replicates for sample i on instrument 1

$\overline{P}_{2i}$ = average of three replicates for sample i on instrument 2

$\overline{d}$ = average of the d_i

n = number of samples (n=12)

Tolerances for reproducibility are 0.5 x the absolute value of the Handbook 44 acceptance tolerance. Specific tolerances are:

Grain Type	Tolerance
Corn, oats	0.40 pounds per bushel
All wheat classes	0.25 pounds per bushel
Soybeans, barley, rice, sunflower, sorghum	0.35 pounds per bushel

7.b. Proposed Changes/Additions to the Checklist Section

Conclusions and Recommendation: The Sector agreed to the following changes to the checklist section of the Grain Moisture Meter portion of NCWM Publication 14 to reflect recent additions/changes to NIST Handbook 44, Section 5.56(a) Grain Moisture Meter Code that recognize indications and recorded representations of test weight per bushel.

3. Indicating Elements, Recording Elements, and Recorded Representations

Code Reference: S.1.1. Digital Indications and Recording Elements

Note: Requirements cited for "test weight per bushel" indications or recorded representations are applicable only to devices incorporating an automatic test weight per bushel measuring feature.

3.1	The meter shall be equipped with a digital indicating element.	Yes ☐ No ☐ NA ☐
3.2.	The minimum height for digits used to display moisture is 10 mm.	Yes ☐ No ☐ NA ☐
3.3.	The meter is equipped with a communications interface and can transmit the date, grain types, grain moisture results, test weight per bushel results, and calibration version identification.	Yes ☐ No ☐ NA ☐
3.4.	A digital indicating element or recording element shall not display any moisture content values or test weight per bushel values before the end of the measurement cycle.	Yes ☐ No ☐ NA ☐
3.5.	The meter shall indicate and/or record in terms of percent moisture content wet basis. <u>Test weight per bushel results shall be displayed and recorded as pounds per bushel.</u> Subdivisions of these units shall be in terms of decimal subdivisions (not fractions).	Yes ☐ No ☐ NA ☐

3.6.	Digital indicating and recording elements shall not display or record any values when the grain moisture content is beyond the operating range specified by the manufacturer, unless the moisture <u>and test weight</u> representations include a clear error indication.	Yes ☐ No ☐ NA ☐
3.7.	On multi-constituent meters (e.g., meters which also measure grain protein, starch and/or oil) provision shall be made for displaying and recording the constituent label (such as moist, prot., etc.) so as to make it clear which constituent is associated with each of the displayed and recorded values.	Yes ☐ No ☐ NA ☐

Code Reference: S.1.3. Operating Range

3.9	A meter shall automatically and clearly indicate when the moisture content operating range has been exceeded. Meters shall not display a moisture result when operating temperature ranges are exceeded. In both instances, a clear error indication is required. A 5 °C tolerance is applied to temperature ranges when testing to verify that moisture results are not displayed or printed when the temperature range is exceeded.	Yes ☐ No ☐ NA ☐
3.10.	The operating range shall specify the following:	Yes ☐ No ☐ NA ☐
3.10.1.	The ambient temperature range over which the meter may be used is specified and moisture results are neither displayed nor printed outside this range.	Yes ☐ No ☐ NA ☐
3.10.2.	The temperature range for each grain or seed for which the meter is to be used is specified and moisture results are neither displayed nor printed outside this range.	Yes ☐ No ☐ NA ☐
3.10.3.	The moisture range for each grain or seed for which the meter is to be used is specified. Moisture and test weight per bushel values may be displayed when the moisture range is exceeded and an error message is displayed when values are outside the moisture and test weight range.	Yes ☐ No ☐ NA ☐
3.10.4.	The maximum allowable difference in temperature between the meter environment (ambient temperature) and the sample for which an accurate moisture determination can be made is specified. Moisture results are neither displayed nor printed outside this range.	Yes ☐ No ☐ NA ☐

Code Reference: S.1.4. Value of Smallest Unit

3.11.	The value of the minimum moisture increment indicated or recorded shall not exceed 0.1 %.	Yes ☐ No ☐ NA ☐
3.12.	Test weight per bushel values are determined to the nearest 0.1 pound per bushel	Yes ☐ No ☐ NA ☐
3.13.	A meter shall not record any usable values until the operating temperature necessary for accurate determination has been attained, **OR**	Yes ☐ No ☐ NA ☐

3.14. The meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use. Yes ☐ No ☐ NA ☐

A meter shall meet all applicable tolerances when:

3.15. Operated in the temperature range of 10 °C to 30 °C (50 °F to 86 °F), or within the range specified by the meter manufacturer. Yes ☐ No ☐ NA ☐

3.16. If the manufacturer specifies a temperature range, the range shall be at least 20 °C (36 °F). Yes ☐ No ☐ NA ☐

Code Reference: S.2.6. Determination of Quantity and Temperature

4.7. The meter does not require the operator to judge the precise volume or weight and temperature to make accurate moisture determinations. Yes ☐ No ☐ NA ☐

4.8. For meters that measure test weight, the determination of sample volume and weight are fully automatic. Yes ☐ No ☐ NA ☐

4.9. Means are available to determine that a sufficient sample size is available and there is no display of test weight per bushel when there is insufficient sample to provide accurate measurements. Yes ☐ No ☐ NA ☐

4.10. External grinding, weighing and temperature measurements are not required for accurate moisture measurements. Yes ☐ No ☐ NA ☐

Code Reference: S.3. Accessory Equipment

4.11. If accessory equipment separate from and external to the moisture meter is required, it is appropriate and complete for the measurement. Yes ☐ No ☐ NA ☐

Code Reference: S.4. Operating Instructions and Use Limitations

4.12. Operating instructions shall be furnished by the manufacturer with each device. Complete information concerning the accuracy, sensitivity, and use of accessory equipment necessary in obtaining moisture content shall be included. Yes ☐ No ☐ NA ☐

In addition, operating instructions shall include the following information:

4.12.1. Name and address or trademark of the manufacturer. Yes ☐ No ☐ NA ☐

4.12.2. The type or design of the device with which it is intended to be used. Yes ☐ No ☐ NA ☐

4.12.3. Date of issue. Yes ☐ No ☐ NA ☐

4.12.4. The kind or classes of grain or seed for which the device is designed to measure moisture content and test weight per bushel. Yes ☐ No ☐ NA ☐

4.12.5. The limitations of use (e.g., moisture measurement range, grain or seed temperature, kind or class of grain or seed, instrument temperature, voltage and frequency ranges, electromagnetic interferences, and necessary accessory equipment). Yes ☐ No ☐ NA ☐

8. NTEP Committee Authorizes "Dual Certification"

Discussion: The NTEP Committee reviewed the following recommendation during the 2003 NCWM Interim Meeting in Jacksonville, FL and accepted the Sector recommendation to issue a single Certificate of Conformance to a device that has been evaluated using two inter-related codes.

> 501-7 Grain Moisture Meter (GMM) and Near Infrared (NIR) Instruments Dual Certification
> **Source**: GMM and NIR Sectors
> **Recommendation**: The Sectors recommended that NCWM, Inc. authorize issuing a single CC for devices successfully type evaluated using two inter-related codes (e.g., a "Grain Moisture Meter CC with Near Infrared Grain Analyzer Certification" or, simply, "NIR Grain Analyzer with Dual Certification").

Steve Patoray, NTEP Director, outlined changes being considered for improvements in the database that NCWM maintains for CC's. In the improved database, devices would be classified first by a generic name and then by a secondary name or descriptor. For example, devices used to measure an attribute of grain, whether moisture or protein, would be classified generically as "grain analyzers." Proposed subclassifications under "grain analyzers" are: moisture only, moisture plus test weight, and multi-feature. A grain moisture meter successfully evaluated under both GMM and NIR Analyzer codes would be classified as Grain Analyzer/Multi-Feature.

9. Proposed Changes to Publication 14 to Improve Consistency between GMM and NIR Checklists

Discussion: The NTEP Laboratory has pointed out discrepancies between the Near Infrared Grain Analyzer (NIR) and Grain Moisture Meter (GMM) checklists in Publication 14 for several similar tests. The following changes are suggested to improve consistency between the two checklists, to remove ambiguity, and to correct errors.

Conclusion: The Sector agreed to all of the following recommendations.

9.a. Power Supply Tests

Recommendation: Modify the Power Supply paragraphs of the "Type Evaluation Test Procedures and Tolerances" sections of the checklists for Near Infrared Grain Analyzers (NIR) and Grain Moisture Meters (GMM) respectively as shown below to improve consistency and to explicitly define the reference voltage:

NIR Checklist:
Power Supply. A single HRW wheat sample will be analyzed 10 times with the instrument operating at a voltage of 100 V. The voltage will be adjusted to 117 V. After 30 minutes, the HRW sample will be analyzed 10 times. The voltage level will then be increased to 130 V. After 30 minutes, the sample will be analyzed 10 more times.

Changes in bias and precision will be checked. Bias is defined as the change in the average protein for 10 analyses made at both the reference and the respective test voltages.

The maximum allowable bias change from the reference voltage (117 V) is ± 0.10. The maximum allowable standard deviation of 10 analyses (precision), at any of the three voltage levels, is 0.10.

GMM Checklist:
Power Supply. A single HRW wheat sample with a moisture content between 12 % and 14 % will be analyzed 10 times with the meter operating at a voltage of 100 V. The voltage will be adjusted to 117 V. After 30 minutes, the HRW sample will be analyzed 10 times. The voltage level will then be increased to 130 V. After 30 minutes, the sample will be analyzed 10 more times.

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9.b. Leveling Tests

Recommendation: Remove the redundant first sentence of the Leveling Test of the NIR Checklist, and modify the wording of the tolerance sentence to specify that bias is calculated from the average of 5 readings. The proposed changes are shown below. [**Note**: the Leveling Test from the GMM Checklist is shown below for reference.]

NIR Checklist:
Leveling. The leveling test will be conducted for a minimum of 2 orientations, front-to-back and left-to-right, at a tilt of 5 %. Devices equipped with leveling indicators will be tested at the indicated limits of the level indicator rather than at a tilt of 5 %. Additional orientations will be tested as deemed appropriate.

The maximum allowable bias shift is ± 0.10 % for the average of 5 readings.

GMM Checklist:
Leveling. Tests for leveling will be conducted using a single HRW wheat sample with a moisture content between 12 % and 14 %. The leveling test will be conducted for a minimum of 2 orientations, front-to-back and left-to-right, at a tilt of 5 %. Meters equipped with leveling indicators will be tested at the indicated limits of the level indicator rather than at a tilt of 5 %. Additional orientations will be tested as deemed appropriate.

The maximum allowable bias shift is ± 0.20 % for the average of 5 readings.

9.c. Warm-up Time Tests

Recommendation: Modify the Warm-up Time tests of the NIR and GMM Checklists respectively as shown below to improve consistency:

NIR Checklist:
Warm-up Time. The following test procedures will be used to check warm-up times recommended by the manufacturer. If the manufacturer does not recommend a warm-up time, assume that accurate results will be provided immediately after turning the instrument power on.

The instrument will be powered off and stabilized at room temperature. The instrument will be powered on and after waiting the specified warm-up time a single wheat sample will be analyzed 5 times. After waiting for a period of time equal to two times the manufacturer's suggested warm-up time, the sample will be analyzed 5 more times. The minimum waiting period before retesting the sample is one hour. Thus, for an instrument where no warm-up time is specified, the sample would be tested immediately upon the instrument being powered on and then again after 1 hour.

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The instrument will be powered off and stabilized at room temperature. The instrument will be powered on and after waiting the specified warm-up time, a single wheat sample (12% to 14% moisture content) will be analyzed 5 times. After waiting for a period of time equal to two times the manufacturer's suggested warm-up time, the sample will be analyzed 5 more times. The minimum waiting period before retesting the sample is one hour. Thus, for an instrument where no warm-up time is specified, the sample would be tested immediately upon the instrument being powered on and then again after 1 hour.

The maximum allowable bias shift is ± 0.20 % for the average of 5 readings.

9.d. Sample Temperature Sensitivity Test

Recommendation: Modify the first paragraph of the Sample Temperature Sensitivity Tests of the NIR and GMM Checklists respectively, as shown below, to improve consistency, to clarify the meaning, and to correct an error in the GMM checklist:

NIR Checklist:
II. Sample Temperature Sensitivity.

Testing is required to verify that accurate results are provided when the sample and instrument are at different temperatures. This will be referred to as the sample temperature sensitivity test. Tests will be conducted with the instrument at room temperature and the sample temperature varying from room temperature plus ΔT_H to room temperature minus ΔT_C, where ΔT_H is the magnitude of the manufacturer-specified maximum difference for grain above room temperature, and ΔT_C is the magnitude of the manufacturer-specified maximum difference for grain below room temperature. In no case will room temperature plus ΔT_H be allowed to exceed 45 °C, but ΔT_H need not equal ΔT_C. For purposes of these tests, room temperature will be defined as 22 °C ± 2 °C.

GMM Checklist:
II. Sample Temperature Sensitivity:

Testing is required to verify that accurate results are provided when the sample and instrument are at different temperatures. This will be referred to as the sample temperature sensitivity test. The sample temperature sensitivity test will be conducted using corn, HRW wheat, and soybean samples. Tests will be conducted with the instrument at room temperature and the sample temperature varying from room temperature plus ΔTH to room temperature minus ΔTC, where ΔTH is the magnitude of the manufacturer specified maximum difference for grain above room temperature and ΔTC is the magnitude of the manufacturer specified maximum difference for grain below room temperature. In no case will room temperature plus ΔTH be allowed to exceed 45 °C, but ΔTH need not equal ΔTC. For purposes of these tests, room temperature will be defined as 22 °C ± 2 °C

10. NTETC GMM/NIR Sector Support – Response to Sector's Letter to NCWM Chairman

Background: At the August 2002 meeting of the GMM and NIR Sectors, Don Onwiler, Nebraska Department of Agriculture, Division of Weights & Measures, representing the NCWM Board of Directors (BOD), informed the Sectors that the BOD believes that the major work of the GMM & NIR Sectors has been completed. The BOD questioned whether annual Sector meetings would be required in the future. Don pointed out that the GMM Sector contributes only $500 annually to NTEP. The BOD calculates the total staff costs associated with the GMM/NIR Sector is about $15,000. In an effort to reduce costs, the BOD has decided that public members will no longer receive funding for travel to attend the GMM/NIR Sector meetings.

The information that Don presented at the Sector meeting raised concerns among the sector members with the direction that NCWM, Inc. seems to be taking with regard to the GMM and NIR Sectors. Because of these concerns, Sector Chairman, Cassie Eigenmann-Pierson, DICKEY-john Corp., was urged to send a letter to Ross Andersen, NCWM BOD Chairman, to express the Sector's concerns, to request a breakdown of actual recent GMM/NIR Sector meeting costs, and to seek continued NCWM, Inc. support of future meetings. The letter was drafted and sent to Mr. Andersen in October 2002.

Discussion: Ross Andersen, NCWM Chairman, appeared at the Sector's August 2003 meeting to respond in person to the Sector's letter and to obtain feedback for the BOD to use in future planning. Ross said that the board understands the importance to commerce and the complexity of issues related to grain moisture meters and NIR grain analyzers. Equity in the system is a concern. He noted that the Sector's discussions relating to lack of alignment among meters seemed to indicate that the system was not resulting in the kind of equity expected. He recognized the importance of the Sector's work on standards, stating that when proper standards are met, the system will have uniformity. Unfortunately, the costs of supporting the Sector's activities exceed the income provided by the Sector. According to Ross, GMM/NIR Income and Expenses for the past 12 months resulted in a net loss of $9,831 as detailed below:

Income		
Based on five active CC's		**$1,425.00**
Expenses		
Meeting Costs include: Planning, Copies, Faxes, FedEx, refreshments, etc.	$715.00	
NCWM Publication 14 updates	$4,425.00	
Staff and Admin costs to support Sector	$5,703.00	
NCWM Funding (2002) for Travel to Sector Meeting	$413.00	
Total Expenses (past 12 months)		**$11,256.00**
Net Income (loss)		**($9,831.00)**

In the BOD's view, assignment of a single official moisture meter dampens competition, so it is unlikely that the number of CC's would ever increase to the point where Sector expenses are fully funded by CC fees.

The BOD suggested three options to make up the GMM/NIR Sectors' budget shortfall:

- **Option 1:** Determine the actual cost for NCWM to support this program annually and request funds from GIPSA, NIST, and the active NTEP Certificate holders to fund the difference between annual revenues and annual costs.

- **Option 2:** Determine the actual cost, divide this equally among the active NTEP Certificate holders, and increase the annual renewal fee to cover these costs.

- **Option 3:** Discontinue the administrative support of this device type under NTEP.

Options 1 and 2 received little or no support from the Sector. One manufacturer reported that their annual costs to participate in the program are approximately $25,000. Citing the proposed increase in manufacturers' costs for the on-going calibration program (from $3,600 to $5,300 per meter type per year), manufacturers were generally opposed to further increases. GIPSA and NIST representatives were skeptical that their agencies would be receptive to providing additional monetary support to NCWM. There was general agreement that the Sectors were within one to three meetings of being essentially "through" with changes to Publication 14. As an alternative to Sector meetings, it was suggested that NIST might host "technical sessions" where manufacturers, W&M personnel, and grain industry representatives could develop issues and recommendations to forward to the NCWM. One Sector member questioned the costs associated with the maintenance and printing of the GMM/NIR portion of Publication 14 noting that the material was developed and written by the Sector. The revenue received from the sale of this publication is less than $500 annually. It was suggested that it would be more economical to make the publication available at no charge on the Internet. Ross noted that the costs of updating NCWM Publication 14 should decrease as things become smoother in the system. In closing, Ross stated that NCWM's budget for next year includes an allowance for a GMM/NIR Sector meeting in August 2004.

11. Time and Place for Next Meeting

The next meeting is tentatively planned for the week of August 23, 2004, in the Kansas City, MO area. Meetings will be held in one of the meeting rooms at the National Weather Service Training Center if available. A tentative schedule is shown below.

Wednesday, August 25	10:00 am - 5:00 pm	GMM Sector Meeting
Thursday, August 26	8:00 am - 4:00 pm	NIR Grain Analyzer Sector Meeting

Items of interest to both Sectors will be considered in joint session either at the end of the first day or at the beginning of the second day depending on the final agenda.

National Type Evaluation Technical Committee (NTETC)
Near Infrared (NIR) Grain Analyzer Sector
August 21, 2002 - Kansas City, Missouri

Meeting Summary

Agenda:

★ 1. NTEP Committee Authorizes "Dual Certification"
★ 2. Recommended Changes to Publication 14 to Improve Consistency between GMM and NIR Checklists
★ 3. NTETC GMM/NIR Sector Support - Response to Sector's Letter to NCWM Chairman
★ 4. Time and Place for Next Meeting NIST/Office of Weights and Measures Reorganization
5. Report on the 2003 NCWM Annual Meeting – NIR Grain Analyzer Issues
6. NTEP Status Report - Recommended Change to Publication 14, Table 1
7. Recommended Change to Publication 14 – Accuracy
8. Recommended Changes and Additions to Publication 14
   a. Additional Printed Ticket Requirements
   b. Add Requirement for Calibrations to Be Clearly Distinguished from One Another
   c. Miscellaneous Editorial Changes
9. Forward-looking Issues

★ **Note**: Because of common interest, items marked with a star (★) were considered in a joint session of the NIR Grain Analyzer and the Grain Moisture Meter Sectors

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1. NTEP Committee Authorizes "Dual Certification"

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2. Recommended Changes to Publication 14 to Improve Consistency between GMM and NIR Checklists

Discussion: The NTEP Laboratory has pointed out discrepancies between the Near Infrared Grain Analyzer (NIR) and Grain Moisture Meter (GMM) checklists in Publication 14 for several similar tests. The following changes are suggested to improve consistency between the two checklists, to remove ambiguity, and to correct errors.

Conclusion: The Sector agreed to all of the following recommendations.

2.a. Power Supply Tests

Recommendation: Modify the Power Supply paragraphs of the "Type Evaluation Test Procedures and Tolerances" sections of the checklists for Near Infrared Grain Analyzers (NIR) and Grain Moisture Meters (GMM) respectively as shown below to improve consistency and to explicitly define the reference voltage:

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Recommendation: Remove the redundant first sentence of the Leveling Test of the NIR Checklist, and modify the wording of the tolerance sentence to specify that bias is calculated from the average of 5 readings. The proposed changes are shown below. [**Note**: the Leveling Test from the GMM Checklist is shown below for reference.]

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5. Report on the 2003 NCWM Interim and Annual Meetings

Background: Two items of interest to the NIR Sector were reviewed by the Committee on Specifications and Tolerances (S&T) at the NCWM Interim Meeting January 12-15, 2003:

357-1 S.1.1. Digital Indications and Recording Elements
Source: NIR Sector
Recommendation: Amend paragraph S.1.1. (c) of the NIR Analyzer Code to include specifications for recording the "native" constituent value and moisture value along with the converted results and the manually entered moisture basis; amend paragraph S.1.1.(e) to recognize the need for moisture basis in determining the constituent mass; and add new paragraph S.1.1. (h) to include a specification that requires the printed information be arranged in a consistent and unambiguous manner.

357-2 S.1.2. Selecting Grain Class and Constituent
Source: Carryover Item 357-1B (This item originated from the National Type Evaluation Technical Committee (NTETC) Near Infrared Grain Analyzer (NIR) Sector and first appeared on the Committee's 2002 agenda.)
Recommendation: Add new text to paragraph S.1.2. of the NIR Analyzer Code to address specialty crop transactions where industry is concerned about the proprietary nature of calibration information. This is the same wording recommended by the S&T Committee in the 2002 NCWM S&T Agenda Item 357-1B.

The S&T Committee forwarded these items as voting items for the 2003 Annual Meeting. For additional background refer to *Committee Reports for the 88th Annual Meeting,* NCWM Publication 16, April 2003.

Discussion: At the 88th Annual Meeting held July 13 – 18, 2003 the Conference voted to accept **Agenda Item 357-1** and **Agenda Item 357-2**. In a comment on Agenda Item 357-1, the NIST Weights and Measures Division recommended adding a definition for "native moisture basis." The Sector noted that a definition for "native moisture basis" already appears in §A.3 of the NIR Code:

> **A.3. Calibrations. -** The National Type Evaluation Program Certificate of Conformance (CC) shall indicate the native moisture basis of each calibration. The "native" moisture basis is the default moisture basis of the sealable constituent calibration (or constituent calibration pair when a non-displayed moisture calibration is also involved).

6. NTEP Status Report - Recommended Change to Publication 14, Table 1

Background: At the 87th Annual Meeting held July 14 – 18, 2002 the Conference voted to accept **Agenda Item 357-1A**, elevating the Near Infrared Grain Analyzer Code to permanent status, effective January 1, 2003. At its August 2002 meeting, the NIR Grain Analyzer Sector recommended significant changes to the NIR checklist of Publication 14, agreeing on tolerance values for sample temperature sensitivity, accuracy, precision, and reproducibility tests for barley protein; corn protein, oil, and starch; and soybean protein and oil [wheat protein tolerances had been approved at an earlier meeting]. A number of editorial changes were also agreed upon. The NTEP Committee, at the January 2003 NCWM Interim Meeting in Jacksonville, FL, accepted the Sector's recommendations. The recommendations were published in the 2003 Edition of Publication 14 paving the way for the NTEP laboratory to accept NIR Grain Analyzer instruments for type evaluation testing.

Discussion: Cathy Brenner, Grain Inspection, Processors and Stockyards Administration (GIPSA), NTEP Participating Laboratory for NIR Grain Analyzers, reported that one application had been received for type evaluation testing. She also reported that restrictive sample set requirements have made it difficult to assemble the necessary samples for testing, even where sample re-wetting is allowed. Sample selection has been especially difficult where multiple constituents are involved for a single product. Of particular concern is the Sample Temperature Sensitivity Test, which requires two sample sets for each grain type representing the low and high moisture ranges shown in Table 1 - Constituent Ranges for Type Evaluation. Each moisture set, in turn, consists of three samples, one from each of three constituent concentration ranges (the upper third, the middle third, and the lower third of the constituent concentration range for the grain type). Cathy suggested that the moisture ranges in Table 1 be expanded.

Conclusion/Recommendation: To facilitate sample selection for testing, the Sector accepted, by consensus, the recommended changes widening the low and high moisture ranges in Table 1 of the NIR Checklist in Publication 14 as shown below:

Table 1. Constituent Ranges for Type Evaluation

Grain Type	Constituent	Constituent Range (%) at Moisture Basis (M.B.) Shown	Low Moisture Range	High Moisture Range
Durum Wheat	Protein	10 - 18 at 12 % M.B.	10 % - 12 %	13 % - 15 %
Hard Red Spring Wheat	Protein	10 - 19 at 12 % M.B.		
Hard Red Winter Wheat	Protein	8 - 18 at 12 % M.B.		
Hard White Wheat	Protein	9 - 16 at 12 % M.B.		
Soft Red Winter Wheat	Protein	9 - 12 at 12 % M.B.		
Soft White Wheat	Protein	8 - 15 at 12 % M.B.		
"All Class" Wheat Calibration	Protein	8 - 19 at 12 % M.B.		
Two-rowed Barley	Protein	8 - 17 at 0 % M.B.	10 % - 12 %	13 % - 15 %
Six-rowed Barley	Protein	8 - 17 at 0 % M.B.		

Table 1. Constituent Ranges for Type Evaluation

Grain Type	Constituent	Constituent Range (%) at Moisture Basis (M.B.) Shown	Low Moisture Range	High Moisture Range
"All Class" Barley Calibration	Protein	8 - 17 at 0 % M.B.	10 % - 12 %	13 % - 15 %
Corn	Protein	8 - 12 at 0 % M.B.	11 % - 13 %	14 % - 16 %
	Oil	3 - 9 at 0 % M.B.		
	Starch	67 - 73 at 0 % M.B		
Soybeans	Protein	30 - 40% at 13 % M.B.	10 % - 12 %	13 % - 15 %
	Oil	16 - 21% at 13 % M.B.		

7. Recommended Change to Publication 14 - Accuracy

Discussion: In the NIR Checklist in the 2003 Edition of Publication 14 there is a discrepancy between the text describing how accuracy is to be computed and the definitions for the parameters used in calculating accuracy. The text states, "The first replicate for each sample will be used to calculate the Standard Error of Performance (SEP) for each instrument with respect to the reference method." In contrast, the parameter x_i used in the calculation of SEP is defined as the *average* predicted concentration of the three replicates of each sample. In the June 2000 issue of Publication 14, both text and equations for calculating SEP are in agreement. The definitions of x_i and y_i in the NIR Checklist were mistakenly changed to agree with the definitions used in the GMM Checklist during editing of other changes in the NIR Checklist in preparation for the Sector's previous meeting.

Recommendation: The Sector recommended changing the Accuracy equations of the NIR Checklist of Publication 14 as shown below to agree with the text, which specifies that the SEP is calculated using only the first replicate of each sample. [Editor's Note: Changes/additions to the equations have NOT been highlighted or underlined. The MS change-tracking feature does not mark changes or additions made using MS Equation Editor.]

Accuracy. The first replicate for each sample will be used to calculate the Standard Error of Performance (SEP) for each instrument with respect to the reference method. Each instrument will be tested individually.

where, $$SEP = \sqrt{\frac{\sum_{i=1}^{n}(y_i - \bar{y})^2}{n-1}}$$

$\cancel{\bar{x}_i}$ x_i = predicted constituent concentration for the first replicate of sample *i*

r_i = reference constituent concentration for sample *i*

$\cancel{y_i = \bar{x}_i - r_i}$ $y_i = x_i - r_i$

$\bar{y}$ = average of y_i

n = number of samples in the test set for the constituent calibration being evaluated
(n = 50, see Note 1 below regarding "all class" calibrations.)

8. Recommended Changes and Additions to Publication 14

Conclusions: The Sector agreed to the following changes to the checklist section of the NIR Grain Analyzer portion of NCWM Publication 14 to reflect recent additions/changes to NIST Handbook 44, Section 5.57. Near-Infrared Gain Analyzers. The Sector also agreed to the editorial changes discussed in Agenda Item 8.c.

8.a. Additional Printed Ticket Requirements

Recommendation: Change the NIR Grain Analyzer Checklist section of Publication 14 as shown below to reflect changes to NIST Handbook 44, Code Section S.1.1. (e) and the addition of Code Section S.1.1. (h). adopted at the 2003 NCWM Annual Meeting.

Code Reference: S.1.1. Digital Indications and Recording Elements

3.1. The analyzer shall be equipped with a digital indicating element. Yes ☐ No ☐ NA ☐

3.2. The minimum height for digits used to display moisture is 10 mm. Yes ☐ No ☐ NA ☐

3.3. The analyzer is equipped with a communications interface that permits interfacing with a recording element and can transmit the date, grain type or class, constituent values, the moisture basis for each constituent value (except moisture), and calibration version identification. The printed ticket includes the "native" concentration and moisture basis in addition to the converted results and the manually entered moisture basis, if the analyzer is able to convert constituent results to a manually entered moisture basis. Yes ☐ No ☐ NA ☐

3.4. A digital indicating element shall not display, and recording element shall not record, any constituent value before the end of the measurement cycle. Yes ☐ No ☐ NA ☐

3.5. Constituent content is recorded and displayed as a percent of total mass at the specified moisture basis. The moisture basis is also displayed and recorded for each constituent content result (except moisture). Yes ☐ No ☐ NA ☐

3.5.1. If a whole grain analyzer that is calibrated to display results on an "as is" moisture basis does NOT display or record a moisture value, it clearly indicates that results are expressed on an "as is" moisture basis.

3.5.2. Ground grain analyzers must ALWAYS display and record a moisture measurement for "as is" content results (except moisture).

3.6. Digital and recording elements shall not display or record any constituent values beyond the operating range of the device unless the constituent value representation includes a clear error indication (and recorded error message with the recorded representation). Yes ☐ No ☐ NA ☐

3.7 If an NIR analyzer is used to determine a moisture value, either to determine the moisture of an "as is" constituent content measurement or to convert from one moisture basis to another, the moisture measurement must be concurrent with the measurement of other constituents. Yes ☐ No ☐ NA ☐

3.8 The information appearing on printouts of analyzers with built–in printers or accessory printers is arranged in a consistent and unambiguous manner. Yes ☐ No ☐ NA ☐

8.b. Add Requirement for Calibrations to Be Clearly Distinguished from One Another

Recommendation: Add wording to the NIR Grain Analyzer Checklist section of Publication 14 as shown below to reflect changes to NIST Handbook 44, Code Section S.1.2. adopted at the NCWM 2003 Annual Meeting.

Code Reference: S.1.2. Selecting Grain Class and Constituent

3.9. The means to select the kind and class of grain type or class and constituent(s) shall be readily visible and the type or class of grain and constituents selected shall be clearly and definitely identified in letters (such as HRWW, HRWS, SWW, etc. or PROT, etc.) or with symbols clearly defined adjacent to the display. The device shall be capable of indicating grain type using a minimum of four characters. Calibrations are clearly distinguished from one another, if more than one calibration is included for a given grain type. Yes ☐ No ☐ NA ☐

8.c. Miscellaneous Editorial Changes

Discussion: Much of the NIR Grain Analyzer Checklist was developed by editing and modifying portions of the GMM Checklist. A review of the 2003 edition of the NIR Grain Analyzer Checklist revealed several instances where the word “moisture” was either not replaced by “protein” or “constituent” or “constituent value” or was not deleted. The changes proposed below are to correct this oversight.

Recommendations:

8.c.1. Replace “moisture” with “protein” in the last sentence of the Instrument Temperature Sensitivity Test as shown:

The maximum allowable protein bias will be ± 0.35 from the average protein measured at 22 °C.

8.c.2. Delete the word “moisture” from the paragraph referring to remote displays in Section 1. General.

1. General

Code Reference: G-S.1. Identification

As a practical matter, remote displays are not required to have serial numbers because they typically only repeat the information received from the measuring element. Similarly, external printers are not required to have serial numbers because they do not alter the information received from the measuring element.

8.c.3. Replace “moisture” with “constituent values” in NIR Checklist item 3.2. as shown:

3.2. The minimum height for digits used to display constituent values is 10 mm. Yes ☐ No ☐ NA ☐

8.c.4. Replace “moisture” with “constituent” in NIR Checklist item 3.9. as shown:

3.9 An analyzer shall automatically and clearly indicate when the constituent content operating range has been exceeded. Analyzers shall not display a constituent result when operating temperature ranges are exceeded. In both instances, a clear error indication is required. A 5 °C tolerance is applied to temperature ranges when testing to verify that constituent results are not displayed or printed when the temperature range is exceeded. Yes ☐ No ☐ NA ☐

8.c.5. Replace "moisture" with "constituent" and re-number items under **Code Reference: S.4. Operating Instructions and Use Limitations** as shown below:

Code Reference: S.4. Operating Instructions and Use Limitations

4.13.	Operating instructions shall be furnished by the manufacturer with each device. Complete information concerning the accuracy, sensitivity, and use of accessory equipment necessary in obtaining a constituent content shall be included.	Yes ☐ No ☐ NA ☐
	In addition, operating instructions shall include the following information:	
4.13.1.	Name and address or trademark of the manufacturer.	Yes ☐ No ☐ NA ☐
4.13.2.	The type or design of the device with which it is intended to be used.	Yes ☐ No ☐ NA ☐
4.13.3.	Date of issue.	Yes ☐ No ☐ NA ☐
4.13.4.	The kind or classes of grain or seed for which the device is designed to measure constituent content.	Yes ☐ No ☐ NA ☐
4.13.5.	The limitations of use (e.g., constituent measurement range, grain or seed temperature, kind or class of grain or seed, instrument temperature, voltage and frequency ranges, electromagnetic interferences, and necessary accessory equipment).	Yes ☐ No ☐ NA ☐
4.13.6.	The appropriate user selectable options or settings for each calibration installed in the device.	Yes ☐ No ☐ NA ☐

9. Forward-looking Issues

Discussion: Grain handling companies with multiple operating locations are increasingly interested in networking their NIR instruments to monitor performance, to ensure uniformity, and to facilitate simultaneous updating of calibration changes. The simplest networked systems utilize conventional NIR Grain Analyzer instruments with remote communication capability. When the CC holder issues new calibrations, they are transmitted simultaneously to all networked instruments. Type evaluation and field inspection of such devices can be identical to non-networked analyzers. Dr. Charles Hurburgh, Jr., Agricultural & Biosystems Engineering, Iowa State University, briefed the Sector on several emerging technologies with system configurations that may require new approaches to type evaluation and field inspection.

No resident calibration – For each sample measured, the instrument performs a local regression and develops a one-time-use calibration utilizing a "live" calibration database maintained off-site by an independent data service company. New calibration samples are added to the calibration database from time to time to make it more universally applicable.

All calculations performed off-site – The local instrument obtains optical data on the sample to be measured. Optical data is transmitted to an off-site computer that calculates the result and transmits the result back to the local instrument for display and print out. The off-site computer may use either a standard calibration or may develop a one-time-use calibration for each measurement as described above.

In both of the examples cited, the off-site data bank and computer may or may not be in the same jurisdiction as the local instrument.

On the surface, field inspection using standard samples would seem to be straightforward. However, with no fixed calibration on the local instrument and a changing database, the inspector has no way to insure that the instrument will give the same result the next day, the next month, or at any time in the future. As a partial solution, the instrument could be required to have the ability to query the remote computer and display the version number of the calibration algorithm and perhaps a database issue date. Similarly, type evaluation accuracy tests and sample temperature sensitivity tests, which are calibration dependent, could be verified at only one point in time with no assurance that acceptable results would be obtained at any future time. Type evaluation would seem to require not only a test of the instrument's hardware, but also an evaluation of the calibration algorithm. If a "live" database is involved, evaluation becomes even more problematic. If the database can affect the indicated value, it would seem that the database is a metrologically significant element in the system. Even if the integrity of the database could be assured by an audited quality system, determining the effect of the introduction of new samples on the performance of the instrument under type evaluation conditions would seem to require re-testing every time new calibration samples are added to the database.

Conclusion: The Sector took no action on this issue

Appendix C

Measuring Sector Summary

October 3-4, 2003
Charlotte, North Carolina

1. Recommendations to Update to NCWM Publication 14 to Reflect Changes to NIST Handbook 44

Source: NIST/WMD

Background: The 88th National Conference on Weights and Measures (NCWM) adopted the following items that will be reflected in the 2004 Edition of NIST Handbook 44 and NCWM Publication 14. These agenda items are to inform the Measuring Sector of the NCWM actions and recommend changes to NCWM Publication 14.

Recommendation: The Sector reviewed the following recommended changes to Publication 14 based on changes to NIST Handbook 44:

A. G-S.1. Identification

During its 2003 Annual Meeting, the NCWM agreed to amend Handbook 44 General Code paragraph G-S.1. Identification as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process, but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern or design of the device;

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod."
[Nonretroactive as of January 1, 2003]
(Added 2000) (Amended 2001)

[Note: Prefix lettering may be initial capitals, all capitals or all lower case.]

(d) except for equipment with no moving or electronic component parts <u>and not- built-for-purpose, software-based devices</u>, a nonrepetitive serial number;
[Nonretroactive as of January 1, 1968]

(e) <u>for not-built-for-purpose, software-based devices the current software version designation;</u>

<u>(f)</u>~~(e)~~ the serial number shall be prefaced by words, an abbreviation, or a symbol that clearly identifies the number as the required serial number; and
[Nonretroactive as of January 1, 1986]

<u>(g)</u>~~(f)~~ the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

<u>(h)</u>~~(g)~~ For devices that have an NTEP Certificate of Conformance (CC) Number or a corresponding CC addendum number, the NTEP CC shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, 1999 and 2000)

Add new paragraph G-S.1.1. and renumber existing paragraph G-S.1.1. as follows:

G-S.1.1. Not-Built–For–Purpose Devices, Software-Based. **-** ***For not-built–for–purpose, software-based devices, the following shall apply:***

(a) the manufacturer or distributor and the model designation shall be continuously displayed or marked on the device (see note below), or

(b) the Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device (see note below), or

(c) all required information in G-S.1. Identification. (a), (b), (c), (e), and (h) be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.

Note: Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.
[Nonretroactive as of January 1, 2004]

Amend Code Reference G-S.1. and add Code Reference G-S.1.1. in Section 1 on page LMD-9 of the Liquid-Measuring Devices Checklist and Test Procedures and Section 1 on page CLMD-2 of the Cryogenic Liquid-Measuring Devices Checklist and Test Procedures of NCWM Pulication14, Measuring Devices, 2003 edition as follows:

All equipment shall be clearly and permanently marked on an exterior surface that is visible after installation with the following information (prefix lettering may be initial capitals, all capitals, or all lower case):

1.1.	**Name, initials, or trademark of the manufacturer.**		**Yes ☐ No ☐ NA ☐**
	1.1.1.	**The manufacturer's designation that positively identifies the pattern or design.**	**Yes ☐ No ☐ NA ☐**
	1.1.2.	**The Model designation shall be prefaced by the word "Model", "Type", or "Pattern". These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, at a minimum, begin with the letter "N" (e.g., No or No.) The abbreviation for the word "Model" shall be "Mod" or "Mod.". Effective January 1, 2003).**	**Yes ☐ No ☐ NA ☐**
	1.1.3.	**A unique serial number <u>(except for not built-for-purpose, software-based devices.</u>**	**Yes ☐ No ☐ NA ☐**
	<u>1.1.3.1</u>	**<u>The current software version number for not built-for-purpose, software-based devices</u>**	**Yes ☐ No ☐ NA ☐**
	1.1.4.	**The serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).**	**Yes ☐ No ☐ NA ☐**

Code Reference G-S.1. (g). Effective January 1, 2003

1.1.5. The NTEP Certificate of Conformance (CC) Number or a corresponding CC addendum number for devices that have a CC. The number shall be prefaced by the terms "NTEP CC", "CC", or "Approval". These terms may be followed by the word "Number" or an abbreviation for the Word "Number". The abbreviation shall as a minimum begin with the letter "N" (e.g., No or No.). **Yes ☐ No ☐ NA ☐**

The device must have an area, either on the identification plate or on the device itself, suitable for the application of the Certificate of Conformance Number. If the area for the CC Number is not part of an identification plate, note its intended location and how it will be applied.

Location of CC Number if not located with the identification:

Code Reference: G-S.1.1. Not Built-for-Purpose Devices, Software-Based

1.2. For not built-for-purpose, software-based devices the following shall apply:

1.2.1. the manufacturer or distributor and the model designation shall be continuously displayed or marked on the device (see note below), or **Yes ☐ No ☐ NA ☐**

1.2.2. the Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device (see note below), or **Yes ☐ No ☐ NA ☐**

1.2.3. **all required information in G-S.1. Identification. (a), (b), (c), (e), and (h) be continuously displayed. Alternatively, a clearly identified view only System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the “Help” menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.** **Yes ☐ No ☐ NA ☐**

Note: Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.

1.~~2~~3. **The identification badge must be visible after installation.** **Yes ☐ No ☐ NA ☐**

1.~~3~~4. The identification badge must be permanent. **Yes ☐ No ☐ NA ☐**

Renumber succeeding paragraphs accordingly.

Amend Code Reference G-S.1. and add Code Reference G-S.1.1. in Section 1 on page ECRD-3 of the Electronic Cash Registers Interface with Retail Motor-Fuel Dispensers Checklist and Test Procedures of NCWM Pulication14, Measuring Devices, 2003 edition as follows:

B. Checklist and Test Procedure

1. Identification

Code Reference: G-S.1. General - **Each cash register must comply with the appropriate Handbook 44 identification requirements. All equipment, except weights and separate parts necessary to the**

measurement process but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information. (prefix lettering may be initial capitals, all capitals, or all lower case)

Location of the information:

1.1.	**The name, initials, or trademark of the manufacturer or distributor.**	**Yes ☐ No ☐ NA ☐**
1.2.	**A model designation that positively identifies the pattern or design of the device.**	**Yes ☐ No ☐ NA ☐**
1.3.	**The Model designation shall be prefaced by the word "Model", "Type", or "Pattern". These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, at a minimum, begin with the letter "N" (e.g., No or No.) The abbreviation for the word "Model" shall be "Mod" or "Mod.". (Effective January 1, 2003).**	**Yes ☐ No ☐ NA ☐**
1.4.	**Except for equipment with no moving or electronic component parts and not built-for-purpose, software-based devices, a nonrepetitive serial number.**	**Yes ☐ No ☐ NA ☐**
1.5.	**The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.**	**Yes ☐ No ☐ NA ☐**
1.6.	**The serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).**	**Yes ☐ No ☐ NA ☐**
1.7	**The current software designation for not built-for-purpose, software-based devices.**	**Yes ☐ No ☐ NA ☐**
1.~~7~~8.	**The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.**	**Yes ☐ No ☐ NA ☐**
1.~~8~~9.	**The device must be marked with a unique serial number to identify the electronic element that controls the system. A remote display is not required to have a serial number because it usually does not have any electronics to analyze the signal received from the measuring element. Similarly, other elements of a system, (e.g., a printer, keyboard, cash drawer etc.) which cannot be operated as stand-alone units or are not intended to interface in a system of other models are not required to have a serial number.**	**Yes ☐ No ☐ NA ☐**

Code Reference G-S.1. (g). Effective January 1, 2003

1.~~9~~10.	**The NTEP Certificate of Conformance (CC) Number or a corresponding CC addendum number for devices that have (or will have) a CC. The number shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the word "Number" or an abbreviation for the word "Number." The abbreviation shall as a minimum begin with the letter "N" (e.g., No or No.).**	**Yes ☐ No ☐ NA ☐**

The device must have an area, either on the identification plate or on the device itself, suitable for the application of the Certificate of Conformance Number. If the area for the CC number is not part of an identification plate, note its intended location and how it will be applied.

Location of CC Number if not located with the identification information:

____

____

The marking must be visible after installation.

~~**1.10.**~~	~~**The serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).**~~	~~**Yes ☐ No ☐ NA ☐**~~
1.11.	**Equipment is to be marked on a surface that is an integral part of the chassis, which is visible after installation. If the required information is located on the back of the device, the same information must also appear on the side, front, or top. It may be installed on the housing only if the housing can be fitted with a security seal. The bottom of a device is not an acceptable surface.**	**Yes ☐ No ☐ NA ☐**
1.12.	**The marking must be permanent. It may be a metal or plastic plate attached with pop rivets, adhesive, or other means. Removable bolts or screws are not permitted. A foil plate may be used provided it is destroyed in any attempt to remove it. Additionally, the printing on a foil plate must be easily read and not easily obliterated by rubbing with a relatively soft object (e.g., the wood of a pencil).**	**Yes ☐ No ☐ NA ☐**

<u>Code Reference: G-S.1.1. Not Built-for-Purpose Devices, Software-Based</u>

<u>**1.13.**</u>	<u>**For not built-for-purpose, software-based devices the following shall apply:**</u>		
	<u>**1.1.3.1.**</u>	<u>**the manufacturer or distributor and the model designation shall be continuously displayed or marked on the device (see note below), or**</u>	<u>**Yes ☐ No ☐ NA ☐**</u>
	<u>**1.13.2.**</u>	<u>**the Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device (see note below), or**</u>	<u>**Yes ☐ No ☐ NA ☐**</u>
	<u>**1.13.3.**</u>	<u>**all required information in G-S.1. Identification. (a), (b), (c), (e), and (h) be continuously displayed. Alternatively, a clearly identified view only System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the “Help” menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.**</u>	<u>**Yes ☐ No ☐ NA ☐**</u>
	<u>**Note:**</u>	<u>**Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.**</u>	

B. S.4.4.1. Discharge Rates

Background: During its 2003 Annual Meeting, the NCWM agreed to amend Handbook 44 General Code paragraph S.4.4.1. Discharge Rates as follows:

S.4.4.1. Discharge Rates. - On a retail device with a designed maximum discharge rate of 115 L (30 gal) per minute or greater, the maximum and minimum discharge rates shall be <u>marked</u> ~~on an exterior surface of the device and shall be visible after installation~~ <u>in accordance with S.4.4.2</u>. The <u>marked</u> minimum discharge rate shall not exceed 20 % of the marked maximum discharge rate.

<u>Example: With a marked maximum discharge rate of 230 L/min (60 gpm), the marked minimum discharge rate shall be 45 L/min (12 gpm) or less (e.g., 40 L/min (10 gpm) is acceptable). A marked minimum discharge rate greater than 45 L/min (12 gpm) (e.g., 60 L/min (15 gpm)) is not acceptable.</u>

Recommendation: Modify Section 11, paragraph 11.2. of the Liquid-Measuring Devices Checklist and Test Procedures of NCWM Pulication14, Measuring Devices, 2003 edition as follows:

Code Reference: S.4.4. Marking Requirements For Retail Devices Only

11.2.	**On a retail device with a designed maximum discharge rate of 115 L/min (30 gpm) or greater, the maximum and minimum discharge rates shall be marked ~~on an exterior surface of the device and be visible after installation~~ <u>in accordance with S.4.4.2.</u> The minimum rate shall not exceed 20 % of the maximum discharge rate.**	**Yes ☐ No ☐ NA ☐**

<u>Example: With a marked maximum discharge rate of 230 L/min (60 gpm), the marked minimum discharge rate shall be 45 L/min (12 gpm) or less (e.g., 40 L/min (10 gpm) is acceptable). A marked minimum discharge rate greater than 45 L/min (12 gpm) (e.g., 60 L/min (15 gpm)) is not acceptable.</u>

Discussion/Conclusion: At the October 2003 NTETC Measuring Sector Meeting, there was no discussion on these items. The Sector recommends that the NTEP Committee amend Publication 14, as shown above.

2. Testing Required for an Electronic Indicator with a CC Interfaced with a Measuring Element with a CC not Previously Evaluated Together (Carry-Over Item)

Source: NTEP Measuring Laboratories

Background: At the May 2001 NTEP Laboratory Meeting, one of the participating laboratories asked for input regarding what testing should be required if the manufacturer of an indicator wanted the CC to recognize the indicator for use with different types of measuring devices, such as PD meters, turbine meters, and mass flow meters. Dan Reiswig (CA NTEP Laboratory) agreed to provide a draft of changes to the Liquid-Measuring Devices Checklist and Procedures that included requirements for indicators intended to be used with more than one device type.

Dan Reiswig was not able to attend the September 2001 Measuring Sector Meeting. The Sector agreed to carry this item forward on next meeting's agenda. The following groups and individuals agreed to provide input: the NTEP Measuring Laboratories, Measurement Canada, Rich Tucker (Tokhiem representing GPMA), John Skuce (FMC – Smith Meter representing MMA), Mike Keilty (Micro Motion), and David Hoffman (Toptech).

At the June 2002 NTEP Laboratory Meeting, the laboratories agreed that an initial performance test conducted by an approved NTEP Laboratory is required. The testing criteria applied should be the same as that applied to a new metering system. Subsequent permanence testing should be at the discretion of NTEP based on the initial performance and could be conducted by a local weights and measures official under the direction and control of the NTEP evaluator performing the initial test.

Prior to the 2002 NTEP Laboratory Meeting Rich Tucker (Tokhiem representing GPMA) submitted the following for consideration by the labs:

- **Testing Required for an Electronic Indicator with a CC Interfaced with a Measuring Element with a CC not previously Evaluated Together.**

- **Significant Assumptions**

The metering element has been through NTEP so all the accuracy, permanence, and flow rate information has been tested and meets all requirements of Handbook 44.

The Electronic Indicator has been through NTEP and all electronic functions and other requirements have been tested and meet all requirements of Handbook 44.

For the Dispenser, the manufacturer can only request flow rates that fall within the meter approval flow limits and products.

In the above scenario, the only open issue is the electronic interface to the pulser and the electronic calculator. The electronic calculator receives pulses directly from the pulser. The calculator converts the pulses into a volume by knowing how many pulses make up a gallon of delivery. For example, Tokheim uses, almost exclusively1000 pulses per gallon of delivery. This is not a standard. Other manufacturers use other pulse counts. The only verification is to make sure the manufacturer has setup the software correctly to match the pulser output and meter delivery.

Test
Run calibration test drafts to verify compatibility

Testing Options (The manufacturer at its option should do the following)
Have a representative from the NTEP go to a test site or the manufacturer's lab to verify compatibility. The manufacturer shall submit data from its lab testing and follow-up test data from an initial verification at one of the first installed sites. Data supplied would be a copy of the weights and measures calibration tests performed at the time the equipment was placed in service.

At the 2002 Sector Meeting a work group was formed to address this issue. The Sector agreed to consider the recommendations of that work group at its 2003 Meeting.

Randy Byrtus provided a summary of the Canadian policy to the work group as follows:

Section 10.(1) of the Canadian Weights and Measures Regulations prescribes that a device or class, type or design of device is exempt from paragraph 8(a) of the Weights and Measures Act if every part of the device that can have an effect on the accuracy of the device or class, type or design of device is approved pursuant to section 3 of the Act. Section 8(a) of the W&M Act simply states "that no trader shall use, or have in his possession for use, in trade, any device unless that device or class, type or design of device has been approved for use in trade pursuant to section 3." And section 3 prescribes that "the Minister shall, in accordance with the regulations, approve devices or classes, types or designs of devices for use in trade." In other words, if a register has its own approval and a meter has its own approval, it is possible to connect the two for trade use without having to approve the combination as a system.

Employing section 10.1is still at the discretion of the W&M inspector and the ASL. If there is any doubt that two or more approved devices when connected together are not compatible, the system can be subjected to an approval evaluation.

The aspect of assessing compatibility is usually performed at the initial field inspection. This is a post approval process. Before each and every device can be placed in service, it must undergo an initial inspection against requirements for installation and use of the device. It is frequently at this stage that approved registers and meters are connected to one another and presented for inspection. Compatibility is judged by whether or not the two devices perform accurately together within prescribed tolerances when subjected to the inspection process. If there is any doubt or evidence that the combination of approved devices is not compatible, they would not receive the initial inspection that is necessary to permit use-in-trade applications.

If the approval applicant at the time of approval requests that a certain individual device such as an electronic register can be used with approved volumetric meters that have different types of output signals, then the register is evaluated for each type of signal input. This is typically done by simulating the type of input to the register. It is not necessary for the approval applicant to provide all the different meters unless the output signal from the meter cannot be simulated in the laboratory or there is some mechanical interface between the register and meter that could produce wear, cause alignment, and torque problems, etc.

In most instances when a volumetric meter is matched with an electronic register, they are connected electrically using wiring, buses or other digital interfaces. The main types of signal communication between meters and registers are square wave pulse form, high frequency pulse form, digital signal (i.e., bits and bytes) and current loop (i.e., 4mA to 20 mA). Current loop, although previously very prevalent, is seldom used today. The ASL can evaluate square wave pulse and high frequency forms using "built in-house" pulse generators. These are custom made to accommodate testing against the requirements for pulsers prescribed by *SVM-1, Ministerial Specifications for Electronic Registers.* These requirements were developed around the type of pulse generators that were prevalent before digital communication became popular. The SVM-1 applies to pulsers of the reed switch, hall-effect and photo-electric types. There are currently no requirements for digital-type outputs and there is presently no consideration for developing any because of the reliability of this form of communication over pulse-generated signals and their ability to check and monitor for complete data transfer and perform diagnostics. If digital communication is available for input to a register, the ASL will request a sample of an approved meter with digital capability in order to connect the register and meter together. This will determine if the register can accept and function properly with this type of communication. If, in the event the approval applicant cannot supply a meter, a means to simulate the input would be requested. Typically the compatibility of the system is flow tested at various flow rates over the range of the meter's rated capacity, the 4 mA to 20 mA signal is verified using a current supply and multimeter and checking the accuracy at different points between 4 mA and 20 mA. Naturally, certified and traceable measurement standards are used. Regardless of the type of signal generation, each type is evaluated at reference conditions as well as at ambient temperatures of -30 °C and +40°C. Under each of these conditions, the devices are exposed to radio frequency interference of 25 Mhz and 460 Mhz using 4-watt radio transceivers.

In all cases, regardless of the type of signal being used, many of the problems that affect the compatibility of devices are installation related due to incorrect wiring, lack of shielding, vibration, electromagnetic and radio frequency interference, incorrect configuration or selection of parameters when setting the device up, mismatched communication protocols and interfaces, and other installation effects that can cause compatibility problems.

Because there are no moving parts as there are in many type of volumetric metering devices that are subject to wear resulting in the degradation of accuracy, the ASL does not perform any permanency testing on registers. Our position is that electronic components either work or they don't work. There are rare instances that show noticeable degradation of accuracy over time due to electrically generated signals or aging electronic components.

When a Notice of Approval is issued for a volumetric meter or electronic register, the approval will identify which meter outputs are approved and which types of inputs are approved for the electronic register. The approval will also state that volumetric meters can be used with any approved and compatible electronic register and vice versa. Again, the compatibility aspect is judged at the installation during the initial inspection. If the approval for the meter and register identify like outputs/inputs, then the system proceeds with an inspection and is subject to subsequent re-inspections at later time intervals. The advantage of subsequent re-inspections is that they ensure continued compliance with applicable requirements as well as maintaining the compatibility aspect.

The work group submitted the following proposal to add a new paragraph N.X. only to Handbook 44 Section 3.30.. 3.31., 3.32. and 3.37. and an alternate proposal to add a new Section T. to Publication 14, for consideration at the 2003 Measuring Sector Meeting. The work group proposal included a new section 44 to be added to the Liquid-Measuring Devices Checklist and Test Procedures of Publication 14, 2003 Edition.

Recommendation: Add a new paragraph N.X. to Handbook 44 Sections 3.30. Liquid-Measuring Devices, 3.31. Vehicle-Tank Meters, 3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices, and 3.37. Mass Flow Meters as follows:

N.X. Testing Required for an Electronic Indicator with a CC Interfaced with a Measuring Element with a CC not Previously Evaluated Together.

Additional testing by an NTEP authorized laboratory is not required if an electronic indicator with a CC is interfaced to a measuring element with a CC provided all of the following conditions are determined during the initial field verification:

(a) each device is used within the application limits noted on its CC;
(b) the devices are communicating with each other, and the system into which they are installed can be accurately calibrated;
(c) NTEP-compliant tickets (if required) can be printed from the system; and
(d) If a measuring device uses a 4 mA to 20 mA or frequency interface to transmit a fault signal, this interface is only interchangeable as defined by the measuring device CC.

Alternatively, add a new Section T to Publication 14, Technical Policy for Liquid-Measuring Devices and revise the Compatibility Test, 2003 edition as follows:

T. Testing Required for an Electronic Indicator with a CC Interfaced with a Measuring Element with a CC not Previously Evaluated Together.

Additional testing by an NTEP-authorized laboratory is not required if an electronic indicator with a CC is interfaced to a measuring element with a CC provided all of the following are true:

(a) each device is used within the application limits noted on its CC;
(b) the devices are communicating with each other, and the system into which they are installed can be accurately calibrated;
(c) NTEP-compliant tickets (if required) can be printed from the system, and
(d) If a measuring device uses a 4 mA to 20 mA or frequency interface to transmit a fault signal, this interface is only interchangeable as defined by the measuring device CC.

Compatibility Test:

~~Similar d~~Devices that were individually tested ~~for a similar application~~ can be "mixed and matched" without additional testing if the system functions properly during the initial routine field test as required by Section T of the Technical Policy for Liquid-Measuring Devices. For example, inspectors can determine the compatibility of an approved console interfaced with an approved retail motor-fuel dispenser during a field evaluation when both components are previously approved ~~in~~ ~~like~~ for the applications*. If devices are to be used in ~~dissimilar~~ new applications, then additional NTEP testing is required.

*Where "application" is as defined on the individual CC (e.g., stationary use only).

Add the following Additional Checklist and Test Procedures for Interfacing Components to Publication 14, 2003 edition.

44. Additional Checklist and Test Procedures for Interfacing Components

When examining the interface between Electronic Indicator and a Measuring Element, the following must be considered:

44.1	**Does the electronic indicator have a CC?**	**Yes** ☐	**No** ☐
44.2	**Is the electronic indicator being used within the application limits of the CC?**	**Yes** ☐	**No** ☐
44.3	**Does the measuring element have a CC?**	**Yes** ☐	**No** ☐
44.4	**Is the measuring element being used within the application limits of the CC?**	**Yes** ☐	**No** ☐
44.5	**Can the system into which both devices are installed be accurately calibrated?**	**Yes** ☐	**No** ☐

44.6	**Can a ticket (if required) be properly printed?**	**Yes** ☐	**No** ☐
44.7	**Are interfaces, other than mechanical or pulse interfaces (e.g., 4 mA to 20 mA or frequency interfaces), being used as defined by the appropriate CC?**	**Yes** ☐	**No** ☐

Discussion/Conclusion At the October 2003 Meeting, Richard Miller (FMC Measurement solutions) stated that his company has always been able to connect a loading- rack controller to a variety of measuring elements without NTEP having tested them for compatibility and/or listing them on the CC for the controller. Charlene Numrych (Liquid Controls) asked Randy Byrtus (Measurement Canada) if he was aware of a case where two components were interfaced and initially communicated correctly, then later failed to work correctly due to communication problems. Randy indicated that he was not aware of any such situation. One of the NTEP laboratories indicated that the reference to "NTEP compliant" in requirement (c), of the proposed language for addition to Handbook 44 tickets, was incorrect. Printed tickets or receipts need to comply with requirements in Handbook 44. The lab suggested that the "application limits" in requirement (a) of the proposed language for addition to Handbook 44 be specified. Charlene agreed to develop revised language for the proposal and forward it to the technical advisor for completion in time for the group to consider the revisions. The item was re-visited and the Sector agreed to forward the following Proposal 1 for addition to Publication 14 to the NCWM NTEP Committee for consideration, and the following Proposal 2 to the NCWM S&T Committee for consideration. The Sector strongly believes that, for the benefit of weights and measures officials, the proposed test notes for determining the compatibility of the various components of a weighing or measuring system need to be added to the General Code Section of Handbook 44.

Proposal 1. Add a new section "T" to Publication 14 to guide NTEP inspectors as to when additional testing is necessary to determine compatibility between components as follows:

Testing Required to Interface Components with Individual CC's that were Not Previously Tested Together.

Additional testing by an NTEP participating laboratory is not required if an electronic indicator is interfaced to a measuring element provided all of the following are true:

- **a) The communication means for the input to the electronic indicator (pulse, frequency, serial, etc.) has been previously tested with a measuring element listed on a CC;**
- **b) The communication means for the output of the measuring element (pulse, frequency, serial, etc.) has been previously tested with an electronic indicator listed on a CC;**
- **c) The communication means to be used for the electronic indicator input is the same as the communication means to be used for the measuring element output (pulse-pulse, frequency-frequency, serial-serial, etc.) and both devices are being used within the current parameters listed on their respective CCs;**
- **d) The devices are communicating with each other, and the system into which they are installed can be accurately calibrated; and**
- **e) If required, Handbook 44 compliant tickets can be printed.**

Note: NTEP may require initial or complete evaluation of new technologies or applications.

Add additional checklist section 44 to Publication 14 as follows:

44. Additional Checklist and Test Procedures for Interfacing Components

When examining the interface between Electronic Indicator and a Measuring Element, the following must be considered:

44.1	**Does the electronic indicator have a CC?**	**Yes** ☐	**No** ☐
44.2	**Is the electronic indicator being used within the application limits of the CC?**	**Yes** ☐	**No** ☐

44.3	**Does the measuring element have a CC?**	**Yes** ☐	**No** ☐
44.4	**Is the measuring element being used within the application limits of the CC?**	**Yes** ☐	**No** ☐
44.5	**Can the system into which both devices are installed be accurately calibrated?**	**Yes** ☐	**No** ☐
44.6	**Can a ticket (if required) be properly printed?**	**Yes** ☐	**No** ☐
44.7	**Are interfaces, other than mechanical or pulse interfaces (e.g., 4 mA to 20 mA or frequency interfaces), being used as defined by the appropriate CC?**	**Yes** ☐	**No** ☐

Proposal 2. Add a new paragraph G-N.3. Compatibility of Indicators and Weighing or Measuring Elements to Handbook 44 to clarify what requirements must be met to interface an indicating element and a weighing or measuring element that have not been previously evaluated together on a single NTEP Certificate of Conformance (CC), but each have its own NTEP CC listing compatible communication specifications.

G-N.3. Compatibility of Indicators and Weighing or Measuring Elements. – To be considered compatible, the following conditions shall be met:

(a) The communication means used for the input to the electronic indicator (analog, digital, pulse, frequency, serial, etc.) has been previously evaluated with a weighing or measuring element;

(b) The communication means used for the output of the weighing or measuring element (analog, digital, pulse, frequency, serial, etc.) has been previously evaluated with an electronic indicator;

(c) The communication means used for the electronic indicator input is the same as the communication means used for the weighing and measuring element output (analog-analog, digital-digital, pulse-pulse, frequency-frequency, serial-serial, etc.);

(d) The elements are communicating with each other, and the device or system into which they are installed can be accurately calibrated; and

(e) If required, Handbook 44-compliant tickets can be printed.

3. On-Screen Display of G.S.1. Requirements for Software-Based Built-for-Purpose Devices (New Item)

Source: NCWM S&T Committee

Background: At its 2003 Annual Meeting, the NCWM adopted a proposal that provides alternate methods other than physical marking for meeting some of the requirements in Handbook 44 G-S.1. for "not-built-for-purpose" devices. At that meeting the NCWM S&T Committee also reviewed an SMA proposal that provides similar alternate marking methods for "built-for-purpose" devices. The S&T Committee concluded that the proposal for "built-for-purpose" devices required further review and development by the NTETC Technical Sectors and the regional weights and measures associations.

Prior to the October 2003 NTETC Measuring Sector Meeting, the WMD NTETC technical advisors developed the alternate proposal shown above to modify G.S.1. and add a Table G.S.1. that provides alternate methods other than physical markings for meeting some of the requirements of G-S.1. for both "not-built-for-purpose" and "built-for-purpose" devices.

Recommendation: Modify Handbook 44 Section 1.10 General Code paragraph G-S.1. Identification, deleting paragraph G-S.1.1., renumbering paragraph G-S.1.2., and adding Table G-S.1. as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly marked in accordance with Table G-S.1. for the purposes of identification, with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern or design of the device;

(c) *the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod."*
[Nonretroactive January 1, 2003]
(Added 2000) (Amended 2001)

[Note: Prefix lettering may be initial capitals, all capitals or all lower case.]

(d) except for equipment with no moving or electronic component parts and not built-for-purpose, <u>microprocessor</u>-based devices, a nonrepetitive serial number;
[Nonretroactive as of January 1, 1968]

(e) for <u>microprocessor</u>-based devices the current software <u>designation or revision number</u>;

(f) the serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number; and
[Nonretroactive as of January 1, 1986]

(g) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

(h) For devices that have an NTEP Certificate of Conformance (CC) Number or a corresponding CC addendum number, the NTEP CC shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, 1999, 2000 and 200X)

Table G-S.1. Identification		
	Built-for-Purpose Instruments, Elements, or Systems	**Not Built-for-Purpose Instruments, Elements, or Systems**
Name, initials, or trademark of the manufacture or distributor	**M**	**DC[2] or DA**
Model designation[1]	**M[1]**	**DC[2] or DA**
Specific model designation[1]	**M, DC, or DA**	
Serial number	**M**	**Not required**
Revision number or Software Version number	**DC or DA**	**DC or DA**
Certificate of Conformance (CC) number	**M, DC, or DA**	**DC[2], DA,**

M: **Physically and permanently marked**

DC: **Continuously displayed**

DA: **Displayed by accessing a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.**

Note 1: **As a minimum, the model designation (positively identifying the pattern, design, type, series, generic, or trademark designation) must be marked on the device. If the model designation changes with differing parameters such as size, features, options, intended application, not Handbook 44 compliant, construction, etc., the specific model designation shall be physically marked or continuously displayed or be capable of being displayed.**

Note 2: **As a minimum, either the manufacturer or distributor and the model designation, or the CC Number shall be continuously displayed ~~or marked on the device~~. Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC, which may be available as an unaltered copy of the CC printed by the device or through another on-site device.**

Discussion/Conclusion: The Sector agreed with the WMD proposal in principle, but recommended some small changes to simplify the table. The Sector agreed to forward the following proposal for G-S.1. in tabular format as modified at the meeting to the NCWM S&T Committee for consideration.

Modify Handbook 44 Section 1.10 General Code paragraph G-S.1. Identification and add Table G-S.1. as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly marked <u>in accordance with Table G-S.1</u>. for the purposes of identification, with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern or design of the device;

(c) *the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod."*
[Nonretroactive January 1, 2003]
(Added 2000) (Amended 2001)

[Note: Prefix lettering may be initial capitals, all capitals or all lower case.]

(d) except for equipment with no moving or electronic component parts and not-built-for-purpose, <u>microprocessor</u>-based devices, a nonrepetitive serial number;
[Nonretroactive as of January 1, 1968]

(e) for microprocessor-based devices the current software designation or revision number;

(f) the serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number; and
[Nonretroactive as of January 1, 1986]

(g) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

(h) For devices that have an NTEP Certificate of Conformance (CC) Number or a corresponding CC addendum number, the NTEP CC shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, 1999, 2000 and 200X)

4. Tolerance for Product Depletion Test (Carry-Over Item)

Table G-S.1. Identification

	Built-for-Purpose Instruments, Elements, or Systems	Not Built-for-Purpose Instruments, Elements, or Systems
Name, initials, or trademark of the manufacturer or distributor	M	D[2]
Model designation	M[1]	D[2]
Specific model designation	M[1] or D	
Serial number	M	Not required
Revision number or software version number	Not Required	D
Certificate of Conformance (CC) number	M or D	D[2]

M: Physically and permanently marked

D: Either: (1) displayed by accessing a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated, or (2) continuously displayed. Note: ***For revision or software version number, clear instructions for accessing this information shall be listed on the CC in lieu of the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same or subsequent type that was evaluated.***

Note 1: As a minimum, the model designation (positively identifying the pattern, design, type, series, generic, or trademark designation) must be marked on the device. If the model designation changes with differing parameters such as size, features, options, intended application, not Handbook 44 compliant, construction, etc., the specific model designation shall be physically marked or continuously displayed or be capable of being displayed.

Note 2: As a minimum, either the manufacturer or distributor and the model designation, or the CC Number shall be continuously displayed. Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC, which may be available as an unaltered copy of the CC printed by the device or through another on-site device.

(Nonretroactive and effective 2005)

Source: Carry-Over Item

Background: At the September 2001 Measuring Sector Meeting there was a discussion of agenda item 5 comparing single-compartment testing to split-compartment testing. A member suggested that it would be appropriate to have separate tolerances for a product depletion test. The Sector agreed to discuss that as a separate agenda item if time permitted. During further discussion of the need for specific tolerances for a product depletion test, a member pointed out that the present criteria is affected by the test draft size. It is possible for a meter to fail at particular draft size; and by sufficiently increasing the draft size for a subsequent test, the same meter could pass without any repairs or adjustments being made. Ross Andersen (NY) indicated that NEWMA had developed a proposal to the tolerance for a product depletion test on the rated maximum flow rate for the meter. That proposal was not available for review. The Sector agreed to include the discussion of a product depletion test tolerance on the agenda for the next Sector meeting. Ross Andersen agreed to prepare a proposal for Sector consideration at that meeting.

Since the 2001 meeting New York has begun a study to compare the results of a product depletion test conducted on the same meter using different size provers. Mr. Andersen was to update the Sector at its 2002 Meeting on the progress of the study and to provide guidance to the Sector on how to proceed.

Mr. Andersen was unable to attend the 2002 Sector meeting. The Sector did review the proposal from NEWMA to modify N.4.2. and to add new paragraphs N.4.5. and T.5. shown below. Several Sector members disagreed with the NEWMA proposal for a tolerance based on a one minute flow at the maximum flow rate for the device under test. The Sector believes that the allowable error for a product depletion test should not be dependent on the size of the test draft. The Sector agreed that the item should be carried over to the agenda for the next Sector meeting to allow time for completion of the study being conducted by New York.

Discussion: The following proposal to modify N.4.2. Special Tests (except Milk Metering Systems) and add a new paragraph N.2.5. Product Depletion Test was forwarded to the NCWM S&T from the Northeastern Weights and Measures Association (NEWMA).

> **N.4.2. - Special Tests (except Milk Metering Systems). "Special" tests shall be made to develop the operating characteristics of a measuring system and any special elements and accessories attached to or associated with the device. Any test except as set forth in N.4.1. or N.4.5. shall be considered a special test. Special test of a measuring system shall be made as follows:**
>
> **(a) at a minimum discharge rate of 20 % of the marked maximum discharge rate or at the minimum rate marked on the device whichever is less,**
>
> **(b) to develop operating characteristics of the measuring system ~~during a split-compartment delivery~~.**
> **(Amended 1978)**
>
> <u>**N.4.5. Product Depletion Test - The effectiveness of the vapor eliminator shall be tested by depleting the product supply and continuing the test until the lack of fluid causes the meter register to stop absolutely. The test shall be completed by switching to another compartment with sufficient product on a multi-compartment vehicle or by adding sufficient product to a single-compartment vehicle. When adding product to a single-compartment vehicle, allow appropriate time for any entrapped vapor to disperse before continuing the test.**</u>
>
> <u>**T.5. Product Depletion Test – The difference between the results of the normal test and the product depletion test shall not exceed 0.5 % of the equivalent of one minute of flow at the maximum rated flow rate for the system.**</u>

WMD provided information to the Sector showing that in 1974 the NCWM S&T Committee developed a proposal to amend the split-compartment test tolerance to be based on the manufacturer's maximum flow rate rather than on the size of the prover used during the test. The item was adopted by the NCWM but apparently Handbook 44 was never amended to reflect the change. The following was excerpted from the 1974 Final Report of the NCWM S&T Committee:

CODE FOR VEHICLE TANK METERS

1. Split-Compartment Test Tolerances. - Over the last several years, the committee has received numerous comments that the tolerances applicable when conducting a split-compartment test on a vehicle-tank meter are impractical. The existing tolerances are based on the capacity of the prover used in the test; however, the error resulting from this test is not a function of prover capacity but rather it is related to the rate of flow and the system itself. The committee agrees with these comments and recommends changing these tolerances by amending the Vehicle-Tank Meter Code as follows:

   Add the following new table T.2.:

TABLE 2.-TOLERANCES FOR VEHICLE TANK METERS ON SUPPLY EXHAUSTION TESTS EXCEPT MILK METERS	
Manufacturer's rated capacity (Maximum gpm)	**Maintenance and acceptance tolerances**
Up to 125	**125** in^3
126-250	**200** in^3
251-500	**300 in^3**
Over 500	**400** in^3

   Amend T.2. to include Table 3 and renumber present Table 2 to Table 3.
   To further clarify this table, the tolerances listed are applied from "0" (zero)—not added to the error found during a normal test.

   Since these requirements are applicable to wholesale devices in the LMD Code, appropriate amendments are recommended to be made to that code.

(The foregoing item was adopted by voice vote.)

Measurement Canada provided its split-compartment or out-of-product test procedure as follows.

Module 6b: Standard Test Procedures

7. Split-Compartment Or Out-of-Product

Purpose

A split-compartment test verifies the proper operation of air elimination means when the storage tank for the product being measured is pumped dry. This test is only necessary for meters that normally drain a tank completely, such as vehicle-mounted meters and milk-receiving systems.

Procedure

For a multi-compartment tank:

- At the normal operating rate of the meter, start the test from a compartment containing less test liquid than the capacity of the prover.
- Continue the pumping until the lack of liquid supply causes the register to stop or until a maximum of 30 seconds has elapsed.

- Without shutting off the pump, open the valve from a compartment with sufficient liquid to complete the test and then shut the valve from the empty compartment.
- Continue the delivery until the liquid level is in the readable portion of the prover neck.
- Compare the meter registration to the volume actually delivered into the prover. The difference (minus any meter error previously identified at the same rate of flow) is the error in the system under compartment switching conditions.

Rationale 8: Interpretation of Results

Rule 1: The limit of error (LOE) between a fast test and a split test is the absolute value of the limit of error applicable to the meter.

In the case of a meter of a size of 65 mm (2.5 in) or smaller, the absolute value of the limit of error for the split test only is based on a test volume of 900 liters (2.25 liters).

In the case of a meter of a size 75 mm (3 in) or larger, the absolute value of the limit of error for the split test only is based on a test volume of 1500 liters (3.75 liters)

NOTE: These LOEs were agreed to at the Specialists meeting in February 1990.

Example: 2-inch Truck-Mounted Meter		
Prover Size	500 liters	900 liters
Rule 1: LOE	± 1.25 liters	± 2.25 liters
Maximum difference between the split test and the fast test if the split test error exceeds the 0.25 % LOE	± 2.25 liters	± 2.25 liters

For a single-compartment tank, this test can only be performed where there is a quick-connect hose coupling upstream of the meter:

- Make a partial delivery from a flooded, primed system.
- During the delivery, close the outlet valve from the tank.
- Break the hose connection, if possible, and let the pump drain the line.
- Continue the test until the lack of liquid supply causes the register to stop or until a maximum of 30 seconds has elapsed.
- Reconnect the sully line, open the valve, and complete the filling of the prover.
- Compare the meter register to the volume actually delivered into the prover. The difference (minus any meter error previously identified at the same rate of flow) is the error in the system under compartment switching conditions.

See interpretation of Results in Rationale 8.

Variation

- Gravity discharge meter.
- The split-compartment test is the same for gravity discharge meters except there is no pump in the system.

At its October 2003 Meeting, the Sector reviewed and discussed the various procedures above. The Sector agreed that the change to Handbook 44 adopted at the 1974 NCWM which recommended that Table 2. – Tolerances For Vehicle-Tank Meters on Supply Exhaustion Tests Except Milk Meters be added to 3.31. Vehicle-Tank Meters code appeared to be technically correct and would be a good solution for addressing the concerns of tolerances that vary based on the size of the test draft. Charlene Numrych (Liquid Controls) stated that the maximum tolerance of 400 in^3 in the 1974 Table is not realistic for some of the larger meter sizes Liquid Controls currently produces. Charlene recommended that additional ranges of 500 gallons to 750 gallons per minute and over 750 gallons per minute be added to the table.

Conclusion: The Sector agreed that an additional flow rate designation should be added to the table and to forward the following amended proposal to modify NIST Handbook 44, Section 3.31 Vehicle-Tank Meters to the NCWM S&T Committee for consideration.

N.4.2. Special Tests (Except Milk-Measuring Systems). "Special" tests shall be made to develop the operating characteristics of a measuring system and any special elements and accessories attached to or associated with the device. Any test except as set forth in N4.4.1. <u>or N.4.5.</u> shall be considered a special test. Special tests of a measuring system shall be made as follows:

(a) at a minimum discharge rate of 20 % of the marked maximum discharge rate or at the minimum discharge rate marked on the device, whichever is less;

(b) to develop operating characteristics of the measuring system ~~during a split compartment delivery.~~

Add new paragraphs N.4.5. Product Depletion Test, T.5. Product Depletion Test, and Table T.5. Tolerances for Vehicle-Tank Meters on Product Depletion Tests Except Milk Meters

N.4.5. Product Depletion Test. - The effectiveness of the vapor eliminator shall be tested by depleting the product supply and continuing until the lack of fluid causes the meter register to stop completely. The test shall be completed by switching to another compartment with sufficient product on a multi-compartment vehicle, or by adding sufficient product to a single-compartment vehicle. When adding product to a single-compartment vehicle, allow appropriate time for any entrapped vapor to disperse before continuing the test.

T.5. Product Depletion Test. - The difference in the delivered volumes for the normal test and the product depletion test shall not exceed the tolerance shown in Table T.5., and all test results shall be within applicable tolerances.

TABLE T.5. TOLERANCES FOR VEHICLE-TANK METERS ON PRODUCT DEPLETION TESTS EXCEPT MILK METERS	
Manufacturer's rated capacity (Maximum gpm)	**Maintenance and acceptance tolerances**
Up to 125	**125** in^3
126 to 250	**200** in^3
25 to 500	**300** in^3
501 to 750	**400** in^3
Over 751	**600** in^3

5. Marking of Meters that have no External Moving Parts - UR.2.5. Product Identification (Carry-Over Item)

Source: Returned from NCWM S&T Committee

Background: At the June 2002 NTEP Laboratory Meeting, one of the participating laboratories indicated that field officials in their jurisdiction are sometimes not able to determine which measuring element is associated with a particular grade or blend of fuel on multi-product dispensers. During a field examination of a multi-product dispenser, one grade or blend is rejected for not meeting performance requirements. The official does not know which measuring element to mark or tag as rejected. During the performance of a subsequent inspection following adjustment or repair of the device, the field official may be required to test all grades and blends offered through the rejected dispenser to determine that the correct measuring element and only that element was adjusted. At the 2002 Sector Meeting the Sector developed a proposal that was forwarded to the S&T Committee for consideration.

Recommendation: Modify NIST Handbook 44, Section 3.30. Liquid-Measuring Devices UR.2.5.

UR.2.5. Product ~~Storage~~ Identification

UR.2.5.1. Measuring Element Identification

(a) For multi-product dispensers, any measuring element with no external part(s) that move during delivery shall be plainly and visibly identified as to the grade, blend, or mixture of product being dispensed through the element.

(b) When the measuring elements of any multi-product dispenser are marked by means of a color code, the color key shall be conspicuously displayed at the place of business and be consistent with any color code used for product storage.

UR.2.5.2. Product Storage Identification

(a) The fill connection for any petroleum product storage tank or vessel supplying motor-fuel devices shall be permanently, plainly, and visibly marked as to product contained.

(b) When the fill connection device is marked by means of a color code, the color code key shall be conspicuously displayed at the place of business.
(Added 1975 and Amended 1976 and renumbered 200X)

Discussion/Conclusion: Mike Belue (Belue Associates) reported that at its September 2003 Interim Meeting, the Central Weights and Measures Association (CWMA) recommended that the NCWM S&T Committee withdraw this item from its agenda because it places an extra burden on users without benefit to regulators unless there is only one seal that protects multiple measuring elements. The CWMA further believes that this is an enforcement issue in only a few jurisdictions. The Sector voted to recommend that the NCWM S&T Committee withdraw this item from its agenda. The voting results were as follows: in favor of the recommendation to withdraw – 8; opposed to the recommendation to withdraw – 0; abstaining on the issue – 7.

6. Multiple Measuring Elements with a Single Provision for Sealing (Carry-Over Item)

Source: Mike Belue (Belue Associates), NCWM S&T Committee

Background: At the June 2002 NTEP Laboratory Meeting, one of the participating laboratories indicated that field officials in their jurisdiction are having difficulty with multi-product dispensers that have only one sealing mechanism for two or more measuring elements. If a field official rejects a meter for not meeting performance requirements, the field official has no way of determining which measuring elements have been recalibrated when returning to re-inspect the dispenser after a service agency has made adjustments or repairs on the rejected device. During the performance of a subsequent inspection following adjustment or repair of the device, the field official may be required to test all grades and blends offered through the rejected dispenser to determine that only the correct measuring element was adjusted.

At its October 2002 meeting, the NTETC Measuring Sector developed the following proposal to address the concern with retail motor-fuel dispensers that have only one sealing mechanism that provides the adjustment security for multiple measuring elements. The Sector agreed to forward the proposal to the S&T Committee for consideration.

At its October 2002 Annual Meeting, the SWMA recommended the proposal to add a new paragraph to NIST Handbook 44, Section 3.30. Liquid-Measuring Devices paragraph S.2.2.1. be forwarded to the NCWM S&T Committee as an information item.

Recommendation: Add new paragraph to NIST Handbook 44, Section 3.30. Liquid-Measuring Devices S.2.2.1. Multiple Measuring Elements with a Single Provision for Sealing as follows:

S.2.2.1. Multiple Measuring Elements with a Single Provision for Sealing. - A change to the adjustment of any measuring element within any multi-product dispenser with a single provision for sealing multiple measuring elements must be identified.

Discussion: At the 2003 NCWM Interim Meeting, the S&T Committee heard support for identifying, in a manner that is readily available to the field official, any measuring element that is adjusted and agreed that the item has merit. Device manufacturers present at the meeting stated that identifying any measuring element that is adjusted is possible on dispensers that have only one sealing mechanism for two or more measuring elements. The manufacturers requested time to develop an appropriate mechanism for providing that information. The Committee gave the item informational status to provide device manufacturers the opportunity to study the issue and develop means for meeting the proposed requirements.

At the 2003 NCWM Annual Meeting, the Committee heard from one of the major RMFD manufacturers that his company is investigating ways to address this problem and provide the necessary calibration information to field officials. The Committee agreed to continue the item's information status to provide the manufacturers additional time to develop a mechanism for making calibration information for each measuring element within a multi-product dispenser with a single provision for sealing available to the field official.

At its October 2003 Meeting, the Sector reviewed its original proposal. Mike Belue (Belue Associates) reported that the CWMA recommended that the NCWM S&T Committee withdraw this item from its agenda as it will place an undue burden on current retailers and not significantly help enforcement officials. Mike further reported that the Western Weights and Measures Association (WWMA) referred the item to the Measuring Sector for further development. The Sector agreed that on a dispenser with a separate sealing mechanism for each measuring element it is normally apparent when a seal is broken. The Sector further agreed that it should be equally apparent when an adjustment is made to any of the measuring elements when only a single mechanism provides security for more than one measuring element.

Conclusion: The Sector modified S.2.2.1. at the meeting and agreed to forward the following recommendation to the NCWM S&T Committee for consideration.:

Add a new paragraph to NIST Handbook 44, Section 3.30. Liquid-Measuring Devices S.2.2.1. Multiple Measuring Elements with a Single Provision for Sealing as follows:

> ~~S.2.2.1. Multiple Measuring Elements with a Single Provision for Sealing. – A change to the adjustment of any measuring element~~ within any multi-product dispenser with a single provision for sealing multiple measuring elements must ~~<u>shall</u> be identified.~~

7. Update LMD Section of Publication 14, NTEP Laboratory Recommendations for Changes to NCWM Publication 14 (New Item)

Source: NTEP Laboratories

Background: At the June 2002 NTEP Laboratory Meeting, the laboratories reviewed the Field Evaluation and Permanence Tests for Metering Systems Section "A" through "J" of the 2003 Edition of Publication 14 for Measuring Devices. The labs agreed that the same testing criteria should apply regardless of meter technology. There was consensus that for all meters, except retail motor-fuel dispensers, where possible (if temperature can be varied) a test criteria that is in harmony with the Measurement Canada criteria should be adopted. Where the temperature cannot be varied, all meters except retail motor-fuel dispensers should be tested with 4 drafts at each of 5 flow rates. The labs agreed to submit a recommendation for modifying Publication 14 for consideration at this Measuring Sector Meeting.

Recommendation: Modify NCWM Publication 14 as shown in the following items:

Permanence Test Procedures for Meters

A. Field Evaluation and Permanence Test of New Design Meters in Retail Motor-Fuel Dispensers

All new design meters are subject to a permanence test. If a meter is the same as one in a previously tested dispenser, a permanence test is not required ~~unless a problem has been detected~~. <u>NTEP reserves the right to require a permanence test based on the result of the initial examination.</u>

Initial Examination

1. **All meters of the new type installed at the type evaluation location are subject to examination. At least two meters must be tested.**

2. **At least one meter will be chosen for throughput testing on each of two major products (e.g., unleaded gasoline and diesel fuel). The minimum number of tests for each of these two meters will include the following:**

   - **Five tests at the fast flow rate**
   - **~~Two~~ Three tests at a midrange flow rate**
   - **Five tests at the slow flow rate**

   At least five tests at both the fast and slow flow rates and ~~two~~ three midrange flow rate tests will be run on each of these two meters. Only one test at each flow rate need be run on any remaining meters. If both products are not available for the type evaluation, the test may be performed using one product and a Provisional Certificate of Conformance may be issued for the one product. The test using the other product may be performed at a later date to result in a full Certificate of Conformance.

3. **All meters must perform within acceptance tolerance.**

4. **Repeatability - When consecutive multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance.**

Subsequent Examination

1. **All meters of the new type installed at the type evaluation location must perform within acceptance tolerance throughout the time and volume period specified below.**

2. **The examination will be conducted no sooner than 20 days after the initial examination and not before the previously chosen meters have measured at least 20 000 gallons for throughput testing.**

3. **Five tests at both fast and slow flow rates and ~~two~~ three midrange flow rate tests will be made on the throughput meters. Only one test at each flow rate needs to be performed on any remaining meters.**

4. **Repeatability - When consecutive multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance.**

B. Field Evaluation and Permanence Test of Retail Motor-Fuel Dispensers Using Previously Evaluated Meters

Dispensers using a previously type-evaluated meter will be subject to a permanence test. This will not be an extensive test of the meter, but the meter must remain within acceptance tolerance throughout the permanence test of 20 to 30 days' duration. The meter will receive significant use during this test, but it will not be required to deliver 20 000 gallons. At least one dispenser will be subjected to the permanence test. The accuracy tests are the same as those for new design meters in retail motor-fuel dispensers.

C. Field Evaluation and Permanence Test for Vehicle-Tank Meters, ~~and Wholesale Meters~~ Except for LPG, Cryogenic, and CO^2 Meters

The following tests are considered to be appropriate for vehicle-tank metering systems and except for the vapor or air eliminator test are considered appropriate for wholesale meters:

- **~~Three tests at the maximum discharge rate.~~ Four test drafts at each of five flow rates.**
- ~~**Three intermediate flow tests.**~~
- ~~**Three slow-flow tests.**~~
- **One vapor or air eliminator (product depletion) test.**

Note: The normal test of a measuring system shall be made at the maximum discharge rate that may be anticipated under the conditions of the installation. Any additional tests conducted at flow rates down to and including one-half the sum of the maximum discharge flow rate and the rated minimum discharge flow rate shall be considered normal tests. (Code Reference N.4.1.)

Only one meter is required for the initial test, and after the test the meter will be placed into service for the permanence test. The ~~following~~ minimum throughput criterion ~~is recommended~~ for these meters~~:~~ is the ~~M~~maximum rated flow ~~rate~~ in units per minute x 2000. (Canada requires maximum flow rate x 6000.)

Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

Repeatability on Vehicle-Tank Meters (Code Reference T.4.)

When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance.

Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained.

~~Split Compartment~~ Product Depletion Test

Before vehicle-mounted applications are listed on an NTEP Certificate of Conformance, the meter must pass a ~~split compartment~~ product deletion test. This policy applies to all meter technologies (e.g., Coriolis mass flow meters, turbine meters, positive displacement meters) even if the meter will never be installed on trucks with more than a single compartment. The permanence test still applies to include the throughput with a duration of a least 20 days. Ideally, this test should be performed with a multiple-compartment vehicle; however, a single-compartment vehicle may be used to simulate the ~~split-compartment~~ product depletion test by running the tank empty; if a multiple-compartment vehicle is unavailable, a single-compartment vehicle may be used to simulate the product depletion test by running the tank empty.

Purpose: A product depletion test verifies the proper operation of air elimination means when the storage tank for the product being measured is pumped dry. This test is necessary for meters that may drain a tank completely, such as a vehicle-tank meter.

Test Procedure: (no change)

D. Wholesale Meters

Tests of Automatic Temperature-Compensating Systems on Wholesale Meters (Code Reference T.2.3.4.)

The difference between the meter error for results determined with and without the automatic temperature-compensating system activated shall not exceed:

1. 0.2 % of the test draft for mechanical automatic temperature-compensating systems; and

2. 0.1 % of the test draft for electronic automatic temperature-compensating systems.

The results of each test shall be within the applicable "acceptance" or maintenance tolerance.

~~E.~~ Repeatability on Wholesale Meters (Code Reference T.2.3.3.)

When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance. This tolerance does not apply to the test of the automatic temperature-compensating system.

Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained.

~~F. Repeatability on Vehicle-Tank Meters (Code Reference T.4.)~~

~~When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance.~~

~~Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained.~~

~~G.~~ E. Field Evaluation and Permanence Test For LPG and Cryogenic Meters

~~As adopted at the 1985 NCWM, the~~ The following tests are considered to be appropriate for metering systems on LPG and cryogenic meters:

~~1. Three tests at the maximum discharge rate.~~ Four test drafts at each of five flow rates.
~~2. Three intermediate flow tests.~~
~~3. Three slow-flow tests.~~

Only one meter is required for the initial test, after which the meter will be placed into service for the permanence test. The ~~following~~ minimum throughput criterion ~~is recommended~~ for these meters~~:~~ is the maximum rated flow in units per minute x 2000. (Canada requires maximum flow rate x 6000.)

~~1. Maximum rated flow rate x 1500 for meters rated at 227 Lpm (60 gpm) or greater.~~

~~2. Maximum rated flow rate x 500 for meters rated less than 227 Lpm (60 gpm).~~

~~3. Based upon California weights and measures experience, this corresponds to 30-60 days. The time period is considered appropriate because these meters have a history of becoming inaccurate more frequently than meters for other fuels.~~

Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

~~H.~~ Repeatability on LPG & NH3 Meters (Code Reference T.3.)

When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance and the results of each test shall be within acceptance tolerance. This tolerance does not apply to the test of the automatic temperature-compensating system.

Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained.

Note: Stable temperature and pressure indications are necessary during the entire repeatability test to achieve good test results. For multiple drafts to determine repeatability, the following conditions shall be maintained;

1. **The range of flow rates shall not exceed 5 % of the first test draft.**
2. **The range of temperatures at the meter shall not exceed 1 °C (2 °F).**
3. **The range of pressure shall not exceed 68.95 Kpa, or 10 PSI.**
4. **The temperature difference between the meter and the prover shall not exceed 1 °C (2 °F).**

If these conditions cannot be met, repeatability tolerances shall not be applied. Repeatability tests must include at least three consecutive test drafts.

~~I.~~ Tests of Automatic Temperature-Compensating Systems - LPG & NH3 Meters

The difference between the meter error for results determined with and without the automatic temperature-compensating system activated shall not exceed:

1. **0.5 % of the test draft for mechanical automatic temperature-compensating systems; and**

2. **0.25 % of the test draft for electronic automatic temperature-compensating systems.**

The results of each test shall be within the applicable "acceptance" or maintenance tolerance.

~~J.~~ F. Field Evaluation and Permanence Test for LPG Vapor Meters

The following tests are to be run on an LPG vapor meter as part of the permanence test:

1. **Three tests at the maximum discharge rate.**
2. **Three slow-flow tests.**
3. **One low-flame test.**

Only one meter will be required for the initial test, after which the meter must have air or product passed through it as part of the permanence test. The amount of air or product shall be at least the maximum flow rate times 1000. California Weights and Measures performs this test in approximately 60 days. Although it is longer than the usual 30-day test, this is considered appropriate because these meters are usually tested only every ten years.

Following the period of accelerated use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

~~K.~~ G. Repeatability on Milk Meters (Code References N.4.1.1. and T.3.)

When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance.

Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

~~L.~~ H. Field Evaluation and Permanence Test For Turbine Meters

The following tests are considered to be appropriate for turbine meters:

1. **Meters tested in a laboratory environment will be tested five times at each of four different flow rates, using varsol or water for both the initial and the follow-up evaluation to establish "baseline" data for the meter's performance. A Certificate of Conformance may be issued for the product(s) tested in the laboratory; however, additional products will not be included until testing is completed with these products. After a "baseline" is obtained, products can be included on the Certificate of Conformance by performing three tests at each of four different flow rates in the field for both the initial and follow-up evaluation. If a meter is tested in the field without first determining a "baseline," the meter must undergo ~~five~~ four tests at each of ~~four~~ five different flow rates; this criteria applies for both the initial and follow-up test."**

2. **At least one meter is required for each product type for the initial test.**

3. **If the meter is to be used with products other than gasoline and diesel fuel, the manufacturer must also submit data to indicate meter performance over the range of viscosity of products to be used with the meter.**

4. **To indicate meter performance over the temperature range in which the meter is anticipated to be used, data must also be submitted.**

5. **Following the initial test, the meters will be placed into service for the permanence test. The ~~following~~ minimum throughput criterion ~~is recommended~~ for these meters is the maximum rated flow ~~rate~~ in units per minute x 2000. (Canada requires maximum flow rate x 6000.)**

6. **Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances. Following evaluation of test data and analysis of the data presented by the manufacturer for meter performance over temperature and viscosity ranges, the evaluating laboratory may require additional testing prior to issuing a Certificate of Conformance for the meter.**

~~M.~~ I. Permanence Tests for Mass Flow Meters

The following tests are considered to be appropriate for mass flow meters:

Type evaluation. The gravimetric test method shall be used for type evaluation for meters indicating only in units of mass and may be used for meters indicating in units of volume. Meters indicating in only units of volume may be tested using a volumetric standard.

Gravimetric Standard. (no change)

Test Drafts. (no change)

Test Data. Meters tested in a laboratory environment will be tested ~~five~~ four times at each of ~~four~~five different flow rates. Use the product available in the laboratory for both the initial and the follow-up evaluation to establish "baseline" data for the meter's performance. A Certificate of Conformance may be issued for the product(s) tested in the laboratory; however, additional products will not be included on the Certificate until testing is completed with those products. After a "baseline" is obtained, products can be included on the Certificate of Conformance by performing three tests at each of four different flow rates in the field for both the initial and follow-up evaluation. If a meter is tested in the field without first determining a "baseline," the meter must undergo ~~five~~ four tests at each of ~~four~~ five different flow rates; this criteria applies for both the initial and follow-up test.

Following the initial test, the meters will be placed into service for the permanence test. The minimum throughput criterion recommended for these meters ~~are 60 days, or~~ is 2000 x the maximum rated flow ~~rate~~ in units per minute ~~achieved in the installation, whichever comes first~~. Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

Testing for Volume Units Only or to Add Volume Units to Existing Certificates.

In order to add volumetric indications to an existing NTEP Certificate of Conformance (CC) for a meter that already covers mass indications, the following criteria relative to meter sizes to be covered on the CC must be met:

- **At least one meter size must be tested in the volumetric mode.**
- **If the meter size(s) selected for testing is not already covered on the existing CC, then the request is treated as a submission to add a new meter size (i.e., a permanence test is required and testing must be performed in both the mass and the volume modes of operation).**

Note: During an evaluation of a meter to add volume unit to an existing certificate, the ~~The~~ tolerance specified in the mass flow meters code is to be applied to both the initial and the final tests. No adjustments may be made to the meter during this period. This tolerance is to be applied even if different liquid temperatures and pressures exist between the initial and final tests. During the evaluation of a meter for volume units only for a product- specific application where a separate product-specific Handbook 44 code exists (i.e., LPG, cryogenic liquids, CO^2, etc.), the appropriate Handbook 44 section for the intended application will be applied.

Determination of performance relative to repeatability, accuracy, and linearity should be performed using accepted statistical methodology. Reference documents include: 1) SAMA Standard PMC 20.1-1973, Process Measurement and Control Terminology; 2) ANSI/ASME MFC-2M-1983, Measurement Uncertainty for Fluid Flow in Closed Conduits; and 3) ANSI/ASME MFC-1M-1979, Glossary of Terms Used in the Measurement of Fluid Flow in Pipes.

Repeatability for Mass Flow Meters (Mass Flow Meters Code Reference T.3.). (no change)

Additional Considerations for Testing Mass Flow Meters Dispensing Compressed Natural Gas (CNG). (no change)

~~N.~~ J. Testing of Lubricating Oil Meters. (no change)

Discussion/Conclusion: Only one manufacturer of mass flow meters was represented at the October 2003 NTETC Measuring Sector Meeting. The Sector agreed the proposed change to the time and use requirements in Section I Permanence Test for Mass Flow Meters in Publication 14 should not be changed without input from other manufacturers of mass flow meters. The Sector agreed with the balance of the recommended Publication 14 changes proposed by the NTEP laboratories. A member noted that the tolerances For Tests of Automatic Temperature-Compensating Systems – LPG and NH3 Meters were incorrect. The tolerances in Handbook 44 3.32 LPG and Anhydrous Ammonia Liquid-Measuring Devices T.4. were changed in 1997; however, Publication 14 was never updated to reflect the change. The

Sector agreed to submit the following recommendation to modify Publication 14 to the NTEP Committee for consideration:

A. Field Evaluation and Permanence Test of New-Design Meters in Retail Motor Fuel Dispensers

All new design meters are subject to a permanence test. If a meter is the same as one in a previously tested dispenser, a permanence test is not required ~~unless a problem has been detected~~. NTEP reserves the right to require a permanence test based on the result of the initial examination.

Initial Examination

1. **All meters of the new type installed at the type evaluation location are subject to examination. At least two meters must be tested.**

2. **At least one meter will be chosen for throughput testing on each of two major products (e.g., unleaded gasoline and diesel fuel). The minimum number of tests for each of these two meters will include the following:**

   - **Five tests at the fast flow rate**
   - **~~Two~~ Three tests at a midrange flow rate**
   - **Five tests at the slow flow rate**

   At least five tests at both the fast and slow flow rates and ~~two~~ three midrange flow rate tests will be run on each of these two meters. Only one test at each flow rate need be run on any remaining meters. If both products are not available for the type evaluation, the test may be performed using one product and a Provisional Certificate of Conformance may be issued for the one product. The test using the other product may be performed at a later date to result in a full Certificate of Conformance.

3. **All meters must perform within acceptance tolerance.**

4. **Repeatability - When consecutive multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance.**

Subsequent Examination

1. **All meters of the new type installed at the type evaluation location must perform within acceptance tolerance throughout the time and volume period specified below.**

2. **The examination will be conducted no sooner than 20 days after the initial examination and not before the previously chosen meters have measured at least 20 000 gallons for throughput testing.**

3. **Five tests at both fast and slow flow rates, and ~~two~~ three midrange flow rate tests will be made on the throughput meters. Only one test at each flow rate needs to be performed on any remaining meters.**

4. **Repeatability - When consecutive multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance.**

B. Field Evaluation ~~and Permanence~~ Test of Previously Evaluated Retail Motor-Fuel Dispensers Using Different Previously Evaluated Meters

Previously evaluated d~~D~~ispensers using a previously type-evaluated meter and indicator will be subject to an initial ~~permanence~~ test. ~~This will not be an extensive test of the meter, but the meter~~

~~must remain within acceptance tolerance throughout the permanence test of 20-30 day duration. The meter will receive significant use during this test, but it will not be required to deliver 20 000 gallons. At least one dispenser will be subjected to the permanence test. The accuracy tests are the same as those for new-design meters in retail motor fuel dispensers.~~ Based on the test results of the initial test, NTEP may require a permanence test.

C. Field Evaluation and Permanence Test for Vehicle-Tank Meters, ~~and Wholesale Meters~~ Except for LPG, Cryogenic, and CO_2 Meters

The following tests are considered to be appropriate for vehicle-tank metering systems ~~and except for the vapor or air eliminator tests, are considered appropriate for wholesale meters~~:

- **~~Three tests at the maximum discharge rate.~~ Four test drafts at each of five flow rates.**
- **~~Three intermediate flow tests.~~**
- **~~Three slow-flow tests.~~**
- **One vapor or air eliminator (product depletion) test.**

Note: The normal test of a measuring system shall be made at the maximum discharge rate that may be anticipated under the conditions of the installation. Any additional tests conducted at flow rates down to and including one-half the sum of the maximum discharge flow rate and the rated minimum discharge flow rate shall be considered normal tests. (Code reference N.4.1.)

Only one meter is required for the initial test, and after the test the meter will be placed into service for the permanence test. The ~~following~~ minimum throughput criterion ~~is recommended~~ for these meters~~:~~ is the ~~M~~maximum rated flow ~~rate~~ in units per minute x 2000. (Canada requires maximum flow rate x 6000.)

Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

Repeatability on Vehicle-Tank Meters *(Code Reference T.4.)*

When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance.

Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained.

~~Split Compartment~~ Product Depletion Test

Before vehicle-mounted applications are listed on an NTEP Certificate of Conformance, the meter must pass a ~~split compartment~~ product deletion test. This policy applies to all meter technologies (e.g., Coriolis mass flow meters, turbine meters, positive displacement meters) even if the meter will never be installed on trucks with more than a single compartment. The permanence test still applies to include the throughput and with a duration of a least 20 days. Ideally, this test should be performed with a multiple-compartment vehicle; however, if a multiple-compartment vehicle is unavailable, a single-compartment vehicle may be used to simulate the ~~split-compartment~~ product depletion test by running the tank empty.

Purpose: A product depletion test verifies the proper operation of air elimination means when the storage tank for the product being measured is pumped dry. This test is necessary for meters that may drain a tank completely, such as a vehicle-tank meter.

Test Procedure: (no change)

D. Field Evaluation and Permanence Test for Wholesale Meters

Tests of Automatic Temperature-Compensating Systems on Wholesale Meters (Code Reference T.2.3.4.)

The difference between the meter error for results determined with and without the automatic temperature-compensating system activated shall not exceed:

1. **0.2 % of the test draft for mechanical automatic temperature-compensating systems; and**

2. **0.1 % of the test draft for electronic automatic temperature-compensating systems.**

The results of each test shall be within the applicable "acceptance" or maintenance tolerance.

~~E.~~ Repeatability on Wholesale Meters (Code Reference T.2.3.3.)

When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance. This tolerance does not apply to the test of the automatic temperature-compensating system.

Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

~~F. Repeatability on Vehicle-Tank Meters (Code Reference T.4.)~~

~~When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance.~~

~~Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained.~~

~~G.~~ <u>E.</u> Field Evaluation and Permanence Test for LPG and Cryogenic Meters

~~As adopted at the 1985 NCWM, the~~ <u>The</u> following tests are considered to be appropriate for metering systems on LPG and cryogenic meters:

~~1. Three tests at the maximum discharge rate.~~ <u>Four test drafts at each of five flow rates.</u>
~~2. Three intermediate flow tests.~~
~~3. Three slow-flow tests.~~

Only one meter is required for the initial test, after which the meter will be placed into service for the permanence test. The ~~following~~ minimum throughput criterion ~~is recommended~~ for these meters~~:~~ <u>is the maximum rated flow in units per minute x 2000. (Canada requires maximum flow rate x 6000.)</u>

~~1. Maximum rated flow rate x 1500 for meters rated at 227 Lpm (60 gpm) or greater.~~

~~2. Maximum rated flow rate x 500 for meters rated less than 227 Lpm (60 gpm).~~

~~**3. Based upon California weights and measures experience, this corresponds to 30-60 days. The time period is considered appropriate because these meters have a history of becoming inaccurate more frequently than meters for other fuels.**~~

Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

~~H.~~ Repeatability on LPG & NH3 Meters (Code Reference T.3.)

When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance and the results of each test shall be within acceptance tolerance. This tolerance does not apply to the test of the automatic temperature-compensating system.

Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Note: Stable temperature and pressure indications are necessary during the entire repeatability test to achieve good test results. For multiple drafts to determine repeatability, the following conditions shall be maintained;

1. **The range of flow rates shall not exceed 5 % of the first test draft.**
2. **The range of temperatures at the meter shall not exceed 1 °C (2 °F).**
3. **The range of pressure shall not exceed 68.95 Kpa, or 10 PSI.**
4. **The temperature difference between the meter and the prover shall not exceed 1 °C (2 °F)**

If these conditions cannot be met, repeatability tolerances shall not be applied. Repeatability tests must include at least three consecutive test drafts.

~~I.~~ Tests of Automatic Temperature-Compensating Systems - LPG & NH3 Meters

The difference between the meter error for results determined with and without the automatic temperature-compensating system activated shall not exceed:

1. **~~0.5~~ 1.0 % of the test draft for mechanical automatic temperature-compensating systems; and**

2. **~~0.25~~ 0.5 % of the test draft for electronic automatic temperature- compensating systems.**

The results of each test shall be within the applicable "acceptance" or maintenance tolerance.

~~J.~~ F. Field Evaluation and Permanence Test for LPG Vapor Meters

The following tests are to be run on an LPG vapor meter as part of the permanence test:

1. **Three tests at the maximum discharge rate.**
2. **Three slow-flow tests.**
3. **One low-flame test.**

Only one meter will be required for the initial test, after which the meter must have air or product passed through it as part of the permanence test. The amount of air or product shall be at least the maximum flow rate times 1000. California Weights and Measures performs this test in approximately 60 days. Although it is longer than the usual 30-day test, this is considered appropriate because these meters are usually tested only every ten years.

Following the period of accelerated use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

~~K.~~ G. Repeatability on Milk Meters (Code Reference N.4.1.1. and T.3.)

When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance.

Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

~~L.~~ H. Field Evaluation and Permanence Test for Turbine Meters

The following tests are considered to be appropriate for turbine meters:

1. **Meters tested in a laboratory environment will be tested five times at each of four different flow rates, using varsol or water for both the initial and the follow-up evaluation to establish "baseline" data for the meter's performance. A Certificate of Conformance may be issued for the product(s) tested in the laboratory; however, additional products will not be included until testing is completed with these products. After a "baseline" is obtained, products can be included on the Certificate of Conformance by performing three tests at each of four different flow rates in the field for both the initial and follow-up evaluation. If a meter is tested in the field without first determining a "baseline," the meter must undergo ~~five~~ four tests at each of ~~four~~ five different flow rates; this criteria applies for both the initial and follow-up test."**

2. **At least one meter is required for each product type for the initial test.**

3. **If the meter is to be used with products other than gasoline and diesel fuel, the manufacturer must also submit data to indicate meter performance over the range of viscosity of products to be used with the meter.**

4. **To indicate meter performance over the temperature range in which the meter is anticipated to be used, data must also be submitted.**

5. **Following the initial test, the meters will be placed into service for the permanence test. The ~~following~~ minimum throughput criterion ~~is recommended~~ for these meters is the maximum rated flow ~~rate~~ in units per minute x 2000. (Canada requires maximum flow rate x 6000.)**

6. **Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances. Following evaluation of test data and analysis of the data presented by the manufacturer for meter performance over temperature and viscosity ranges, the evaluating laboratory may require additional testing prior to issuing a Certificate of Conformance for the meter.**

~~M.~~ I. Permanence Tests for Mass Flow Meters

The following tests are considered to be appropriate for mass flow meters:

Type evaluation. The gravimetric test method shall be used for type evaluation for meters indicating only in units of mass and may be used for meters indicating in units of volume. Meters indicating in only units of volume may be tested using a volumetric standard.

Gravimetric Standard. (no change)

Test Drafts. (no change)

Test Data. Meters tested in a laboratory environment will be tested ~~five~~ four times at each of ~~four~~ five different flow rates. Use the product available in the laboratory for both the initial and the follow-up evaluation to establish "baseline" data for the meter's performance. A Certificate of Conformance may be issued for the product(s) tested in the laboratory; however, additional products will not be included on the Certificate until testing is completed with these products. After a "baseline" is obtained, products can be included on the Certificate of Conformance by performing three tests at each of four different flow rates in the field for both the initial and follow-up evaluation. If a meter is tested in the field without first determining a "baseline," the meter must undergo ~~five~~ four tests at each of ~~four~~ five different flow rates; this criteria applies for both the initial and follow-up test.

Following the initial test, the meters will be placed into service for the permanence test. The minimum throughput criterion recommended for these meters is 60 days, or 2000 x the maximum rated flow ~~rate~~ in units per minute ~~achieved in the installation, whichever comes first~~. Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

Testing for Volume Units Only or to Add Volume Units to Existing Certificates.

In order to add volumetric indications to an existing NTEP Certificate of Conformance (CC) for a meter that already covers mass indications, the following criteria relative to meter sizes to be covered on the CC must be met:

- **At least one meter size must be tested in the volumetric mode.**
- **If the meter size(s) selected for testing is not already covered on the existing CC, then the request is treated as a submission to add a new meter size (i.e., a permanence test is required and testing must be performed in both the mass and the volume modes of operation).**

Note: During an evaluation of a meter to add volume units to an existing certificate, the ~~The~~ tolerance specified in the mass flow meters code is to be applied to both the initial and the final tests. No adjustments may be made to the meter during this period. This tolerance is to be applied even if different liquid temperatures and pressures exist between the initial and final tests. During the evaluation of a meter for volume units only for a product-specific application where a separate product-specific Handbook 44 code exists (i.e., LPG, cryogenic liquids, CO_2, etc.), the appropriate Handbook 44 section for the intended application will be applied.

Determination of performance relative to repeatability, accuracy, and linearity should be performed using accepted statistical methodology. Reference documents include: 1) SAMA Standard PMC 20.1-1973, Process Measurement and Control Terminology; 2) ANSI/ASME MFC-2M-1983, Measurement Uncertainty for Fluid Flow in Closed Conduits; and 3) ANSI/ASME MFC-1M-1979, Glossary of Terms Used in the Measurement of Fluid Flow in Pipes.

Repeatability for Mass Flow Meters (Mass Flow Meters Code Reference T.3.) (no change)

Additional Considerations for Testing Mass Flow Meters Dispensing Compressed Natural Gas (CNG). (no change)

~~N.~~ J. Testing of Lubricating Oil Meters. (no change)

8. Uniform Tolerances for the Same Accuracy Class Device in all LMD Codes (New Item)

Source: NIST/WMD

Background: Currently NIST Handbook 44 Liquid Measuring Devices (LMD), Vehicle Tank-Meters (VTM), and Mass Flow Meters (MFM) Codes include different tolerances for 0.3 Accuracy Class meters. This creates a technical inconsistency among the codes. Tighter tolerances are applied to vehicle-mounted positive displacement (PD) meters than stationary PD meters even though the same model of meter may be used in both applications. There is no technical justification for this difference. A similar inconsistency in tolerances is found between the MFM and VTM Codes. The Mass Flow Meters Code was developed with the understanding that all liquid-measuring devices used in similar applications would be held to similar tolerances. The proposed changes will result in the application of slightly tighter tolerances to LMDs and MFMs than are in the current codes.

PROPOSAL: Align the acceptance tolerance and special test tolerance in the Liquid Measuring Devices and Mass Flow Meters Codes for 0.3 Accuracy Class meter with corresponding tolerances in the Vehicle-Tank Meters Code.

Modify Liquid Measuring Devices Code Table T.2. Accuracy Classes for Liquid Measuring Devices Covered in NIST Handbook 44 Section 3.30 as follows:

Table T.2. Accuracy Classes for Liquid-Measuring Devices Covered in NIST Handbook 44 Section 3.30

Accuracy Class	Application	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance
0.3	Petroleum products including large capacity motor-fuel devices (flow rates over 115 L/min (30 gpm))**, heated products at or greater than 50 °C asphalt at or below temperatures 50 °C, all other liquids not shown where the typical delivery is over 200 L (50 gal)	0.~~2~~15 %	0.3 %	0.45 %
0.3A	Asphalt at temperatures greater than 50 °C	0.3 %	0.3 %	0.5 %
0.5*	Petroleum products delivered from small capacity (at 4 L/min (1 gpm) through 115 L/min (30 gpm))** motor-fuel devices, agri-chemical liquids, and all other applications not shown.	0.3 %	0.5 %	0.5 %
1.1	Petroleum products and other normal liquids from devices with flow rates** less than 1 gpm and devices designed to deliver less than one gallon.	0.75 %	1.0 %	1.25 %

*The maintenance tolerances on normal and special tests for 5-gallon and 10-gallon test drafts are 6 cubic inches and 11 cubic inches, respectively. Acceptance tolerances on normal and special tests are 3 cubic inches and 5.5 cubic inches.

** Flow rate refers to designed or marked maximum flow rate.

Modify Mass Flow Meters Code Table T.2. Accuracy Classes for Mass Flow Meter Applications as follows:

Table T.2. Accuracy Classes for Mass Flow Meter Applications				
Accuracy Class	**Application or Commodity Being Measured**	**Acceptance Tolerance**	**Maintenance Tolerance**	**Special Tolerance**
0.3	**Loading-rack meters, vehicle-tank meters, home heating oil, heated products (except asphalt above 50 EC), asphalt 50 EC or below, milk and other food products, large capacity motor-fuel dispensers (maximum discharge flow rates greater than 100 L or 25 gallon per minute), all other liquid applications not shown in the table where the minimum delivery is at least 700 kg (1500 lb)**	**0.~~2~~15 %**	**0.3 %**	**0.45 %**
0.3A	**Asphalt above 50 EC**	**0.3 %**	**0.3 %**	**0.5 %**
0.5	**Small capacity (retail) motor-fuel dispensers, agri-chemical liquids, all other liquid applications not shown in the table**	**0.3 %**	**0.5 %**	**0.5 %**
1.0	**Anhydrous ammonia, LP Gas (including vehicle tank meters)**	**0.6 %**	**1.0 %**	**1.0 %**
2.0	**Compressed natural gas as a motor fuel**	**1.5 %**	**2.0 %**	**2.0 %**
2.5	**Cryogenic liquid meters, liquefied compressed gases other than LP Gas**	**1.5 %**	**2.5 %**	**2.5 %**

Discussion/Conclusion: The Sector agreed with the manufacturers of turbine meters and mass flow meters represented at the meeting that decreasing the tolerances for those meter types was inappropriate because it would be very difficult, if not impossible for those meter types to comply. Uniformity across the codes is not sufficient justification for changing the tolerances. The Sector voted to oppose the proposed changes to the tolerances in the Liquid-Measuring Devices and the Mass Flow Meters Codes as follows: members opposed to the change – 9; members in support of the change – 0. WMD abstained and will recommend that the tolerances in Handbook 44 Section 3.31. Vehicle-Tank Meters be changed to be consistent with the tolerances in Section 3.30. Liquid-Measuring Devices.

9. S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers (New Item)

Source: NIST/WMD

Background: The current language in paragraph S.4.4.2.(c) as written can be interpreted to allow the placement of G-S.1. Identification markings on a door or panel that is removable. Additionally, this wording might be interpreted to allow placement of marking information on a panel that can be easily removed through the use of a key (e.g., lower meter access panels). This interpretation would be in conflict with paragraph S.4.4.2.(a). The proposed modifications to paragraph S.4.4.2.(c) clarifies the original intent, where it is acceptable to place G-S.1. information on permanent components located 24 inches to 60 inches above the base of the dispenser within the dispenser cabinet. However, in some cases those components can only be accessed by opening a door or panel that requires the use of a key or other tool separate from the device. For comparison, Paragraph S.6.2. Location of Marking Information, in the Scales Code, includes similar language that provides acceptable means for accessing the required marking information.

Recommendation: Modify Liquid-Measuring Devices Code paragraph S.4.4.2 Location of Marking Information; Retail Motor-Fuel Dispensers as follows:

> **S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers. - The required marking information in the General Code, Paragraph G-S.1. shall appear as follows:**
>
> **Placement of this information shall not be on a portion of the device that can be readily removed or interchanged without the use of a tool separate from the device.**

The information shall appear 24 inches to 60 inches from the base of the dispenser when placed on the outside of the device.

~~When~~ This information may be placed behind a~~n access~~ door or panel which may require the use of a key or other tool separate from the device for access. In this case the information shall appear 24 inches to 60 inches from the base of the dispenser in a readily legible position. ~~The use of a dispenser key shall not be considered a tool separate from the device.~~
[Nonretroactive as of January 1, 2003]

Discussion/Conclusion: The Sector generally supported the proposal to modify S.4.4.2. Gordon Johnson (Gilbarco) recommended that the upper height limit be raised to 72 inches. Gilbarco manufactures dispensers that have the general form of an "H." Gilbarco, in the past placed the identification information on the inner surface of an upper panel immediately above the main dispenser cabinet. That location is slightly higher than 60 inches. In 2002 when the NCWM adopted the current language in S.4.4.2., it forced Gilbarco to move the required identification information to a location inside the dispenser. Mike Belue (Bleue Associates) reported that the WWMA reviewed the above proposal and recommended it be made a developing item on the NCWM S&T Committee agenda. The CWMA recommended that the item be withdrawn from the NCWM S&T Committee agenda.

During its 2003 Meeting, the Sector developed a new proposal to amend Handbook 44 Paragraph S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers and agreed to forward the proposal to the NCWM S&T Committee for consideration as follows:

S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers. – The required marking information in the General Code, Paragraph G-S.1. shall appear as follows:

~~Placement of this information shall not be on a portion of the device that can be readily removed or interchanged without the use of a tool separate from the device.~~

~~The information shall appear 24 inches to 60 inches from the base of the dispenser when placed on the outside of the device.~~

~~When placed behind an access door or panel the information shall appear 24 inches to 60 inches from the base of the dispenser in a readily legible position. The use of a dispenser key shall not be considered a tool separate from the device.~~

Placement of the marking information:

(a) shall be within 24 to 72 inches of the base of the dispenser;
(b) may be internal and/or external
(c) may require a key or tool for access; and
(d) shall be on a portion of the device that cannot be readily removed or interchanged.

[Nonretroactive as of January 1, 200~~3~~X]

10. Product Family Tables for MAG Meters (Carry-Over Item)

Source: Liquid Controls LLC

Background: At present no product family criteria exist for Mag Meters. If a manufacturer wants a CC which covers multiple products, testing must be conducted on each product. Liquid Controls is asking the Sector to consider the adoption of a product family of liquids criteria for MAG Meters and will provide a specific proposal for Sector consideration at the September 2002 Meeting.

At the 2002 Sector Meeting a work group was formed to address this issue. The Sector will consider the recommendations of that work group.

Discussion: Prior to the 2003 Sector Meeting the technical advisor was informed that this work group is not ready to present a recommendation. The work group requests that the item remain on the agenda for further development.

Conclusion: The Sector agreed that a new work group should be formed to develop family product tables, for Mag Meters, Ultrasonic Meters, and Turbine Meters for consideration by the Sector at its next meeting. The members of the new work group are: Charlene Numrych (Liquid Controls) Chair, Richard Miller (FMC), Joe Buxton (Daniel Measurement & Control), Randy Byrtus (Measurement Canada). Charlene volunteered to contact other manufacturers to invite them to participate in the work group.

11. Use of Discount and Loyalty Cards and Discounts for Actions After the Completion of a Retail Motor-Fuel Delivery (Carry-Over Item)

Source: NTEP Laboratories

Background: At the June 2002 NTEP Laboratory Meeting, the laboratories agreed there is a need for guidance to determine whether or not a specific discount program or application is appropriate and meets NTEP requirements.

Examples include: The change to a discount prices when a club card is inserted and the automatic return to the nonmember price at the completion of the delivery; a change in the posted price to include a discount for the purchase of a car wash or other item when a credit card is used at the pump but is not available at the pump in a post pay situation; a discount to the unit price for the purchases of certain items after the delivery has been completed.

Recommendation:

The laboratories did not have a specific recommendation at this time but asked the Sector to organize a work group to identify the issues and develop consistent guidelines and requirements for the use of various discount programs.

At the 2002 Sector Meeting a work group was formed to address this issue. The Sector agreed to consider the recommendations of that work group at the 2003 Sector Meeting.

Discussion/Conclusion: No input has been received from the work group assigned to develop this issue. The Sector agreed that the work requested by the NTEP laboratories pertaining to this issue is outside of scope of the Sector. The Sector also agreed to forward a recommendation through the NTEP Committee that the NCWM form a work group to consider the issues and develop appropriate recommendations regarding legal and equitable trade practices for consideration by all NCWM members.

12. Test Criteria for CNG Dispensers in Publication 14 (New Item)

Source: NIST/WMD

Background: Publication 14 currently contains a note that states test procedures are being developed and a draft of the procedures is available from NIST/WMD. The test procedures were finalized and published in NIST Handbook 112, EPO 28 in 2002.

Recommendation: The Sector reviewed the recommendation that the NTEP Committee add the following test criteria from EPO 28 Compressed Natural Gas Retail Motor-Fuel Dispensers to Publication 14 Additional Considerations for Testing Mass Flow Meters Dispensing Compressed Natural Gas (CNG) beginning on page LMD-77 of the 2003 edition.

Additional Considerations for Testing Mass Flow Meters Dispensing Compressed Natural Gas (CNG):

~~Note: The NCWM is currently work with the Natural Gas Vehicle Coalition to develop field test procedures for CNG dispensers. Copies of draft procedures submitted to date are available from the NIST Office of Weights and Measures.~~

1. Ideally, the device should be tested over a temperature range. Because this is not possible to easily regulate in the field to observe any effects of temperature changes test early in the day and then again later in the day.

Note: The evaluating laboratory should attempt to test at as wide a temperature range as possible; however, it is recognized that this may not always be possible and, in some cases, little or no variation in temperature will be experienced.

2. The magnitude of the draft (and, therefore, the time required for delivery) may impact upon the test results. For very small drafts, the start and stop effects can become significant and may result in large variability. Because CNG stations are presently few and far between in some areas, it is anticipated that these devices will be heavily used to "top off" tanks. Consequently, the minimum measured quantity declared for the device can be significant. It is desirable to have at least some tests run at or near the minimum measured quantity.

3. In setting up the arrangements for testing, the resolution of the scale relative to the test draft must be considered, and "rounding error" of the scale must be kept to an acceptably small level. As a general guideline, the value of the scale division should not exceed one-tenth of the tolerance applied to the device. A high-resolution scale is needed; error weights should be used; or a larger test draft selected. A combination of these approaches may be used. The total error of the transfer standard must be limited to less than one-third of the tolerance. Therefore, the scale must be thoroughly tested, the repeatability of the scale verified, and corrections made to the results of the meter test to correct for any errors determined during the scale test.

4. The repeatability of the test results must be within 40 % of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerances.

Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

5. Repeat tests should be run over a range of flows or, because the device may operate at only one flow in the field installation, over a range of quantities.

6. The typical tank size being filled by the device will be 7 kg to 10 kg (16 lb to 20 lb). A very large tank size may be 20 kg (40 lb) if a vehicle is equipped with two tanks. The average amount dispensed will probably be around 4 kg (8 lb).

7. Because the zero changes with temperature, the zero must be sealable as noted in the Mass Flow Meters Code in H44. CNG meters must indicate on the basis of mass, with the computation of total sale based on mass units. Supplemental units may be used in addition to the mass units, but these must be clearly identified as supplementary units. It is suggested that conversion charts be provided to explain to the consumer how the conversion factor for the supplemental units is derived.

<u>The following tests are considered appropriate for CNG Dispensers:</u>

1. Normal test .... S.3.7.,N.4., N.6.1, T.2., T.3.
   <u>Computer jump:</u>
   - <u>Remove nozzle from dispenser and connect to test cylinder. (Test cylinder pressure should not be greater than 200 psi to simulate an actual delivery.)</u>
   - <u>Turn nozzle valve from "OFF" position to "FILL" position.</u>
   - <u>Empty discharge hose.</u>
   - <u>Turn nozzle valve to "OFF" position.</u>
   - <u>Activate dispenser.</u>
   - <u>Observe dispenser indications, if computer jump occurs take appropriate action.</u>

<u>NOTE: A test cylinder is not necessary for the computer jump test on dispensers equipped with an autovent system. To test, turn dispenser on and observe the indication display for computer jump when the dispenser shuts off.</u>

Minimum test drafts are as follows:
Place empty test cylinder on the scale.
Access mass display of the dispenser.
Tare the weight of the test cylinder, chocks, and stand.
Connect the nozzle to the test cylinder.
Fill the test cylinder to 1/3 capacity full at maximum flow rate.

Disconnect the nozzle from the test cylinder.
Compare mass display to scale indication.
Determine dispenser error.. T.2.
Leave product in test cylinder.
Tare the weight of the test cylinder, chocks and stand.
Connect the nozzle to the test cylinder.
Begin the fill operation with product in the cylinder; fill cylinder to 2/3 capacity at maximum flow rate.

Disconnect the nozzle from the test cylinder.
Compare mass display to scale indication.
Determine dispenser error.. T.2.
Tare the weight of the test cylinder, chocks, and stand.
Connect the nozzle to the test cylinder.
Begin the fill operation with product in the cylinder; fill cylinder to capacity at maximum flow rate.

Disconnect the nozzle from the test cylinder.
Compare mass display to scale indication.
Determine dispenser error.. T.2.
Return product to owner/operator of dispenser .... UR.3.8.
Place empty test cylinder on scale (scale may be supported by chocks and stand.)
Tare the weight of the test cylinder, chocks, and stand.
Connect the nozzle to the test cylinder.
Fill test cylinder to capacity at maximum flow rate.

Disconnect the nozzle from the test cylinder.
Compare mass display to scale indication.
Determine dispenser error.. T.2.
Return product to owner/operator of dispenser.
Repeating previous tests ....T.3.(a)
Applicable tolerance for multiple tests at the same flow rate
Return product to owner/operator of dispenser.
If the meter's minimum measured quantity (MMQ) is less than the smallest test draft, conduct a test at the MMQ value...N.4.

NOTE: If 300 divisions (d) or 2.27 kilograms (5 pounds) is greater than 1/3 of the test cylinder capacity, then the test cylinder should be emptied to accommodate a delivery of at least 300 d or 2.27 kilograms (5 pounds); otherwise a larger tank is necessary.

2. Check effectiveness of zero-setback interlock ....S.3.8., UR3.6., UR.3.7.
No subsequent delivery made until indicating and recording element returned to zero.
After delivery is complete, the dispenser starting lever (mechanism) is shutoff, interlock engaged, and discharge nozzle is placed in the designed hanging position. (Note: This does not apply to nozzle control.)

Remove nozzle from hanging position.

Reset computer to zero and turn on dispenser.

Attempt to return the nozzle to its designed hanging position, carefully remove nozzle and connect it to the test tank and open valve. Move the dispenser starting lever (mechanism) to "ON" position and attempt to dispense product. (Note: This does not apply to nozzle control.)

Product should not flow without resetting the indications to zero.

3. Check operation of low-flow cut-off valve .... UR.2.3.
   Valve shall not be set lower than the minimum flow rate.
   Valve stops registration when flow is below the low-flow cut-off value.

   Connect nozzle to empty test tank and dispense product. Slowly throttle down on the valve on the test tank to the minimum attainable flow rate. Product delivery should not occur below the mass flow meter minimum flow rate.

4. Power loss test .... S.2.4.1., S.2.4.2.
   If transaction is in progress at power loss, information shall be retainable for 15 minutes.
   Device memory shall retain quantity of product and sales price during power loss.

5. Security seal--apply wire security seal to secure adjusting mechanism (if applicable) ....G-UR.4.5., S.3.5.

Note on the official report the number of gasoline gallon equivalents of product dispensed during the test.

After all equipment at a location has been tested, review results to determine compliance with
equipment maintenance and use of adjustments .... G-UR.4.1., G-UR.4.3.

Discussion/Conclusion: The Sector reviewed the procedures and generally concurred with the proposal. One member questioned if the references to user requirements in EPO 28 should be added to Publication 14. The Sector agreed that the test criteria presented should be added to Publication 14 after an editorial review to determine if all the references to User Requirements are appropriate.

13. Acceptable Symbols or Wording to Identify Unit Price, Total Price, and Quantity on a Retail Motor-Fuel Dispenser (Carry-Over Item)

Source: Maryland NTEP Laboratory

Background: At the June 2002 NTEP Laboratory Meeting, one of the participating laboratories requested guidance on what are acceptable symbols or words to identify the unit price, total sale, and quantity delivered on a retail motor-fuel dispenser. The laboratories recommended that the question be added to the 2002 Measuring Sector Agenda.

At the 2002 Sector Meeting a work group was formed to address this issue. The Sector agreed to consider the recommendations of that work group at the 2003 Sector Meeting

Discussion/Conclusion: No input was received from the work group assigned to develop this issue. The Sector noted that a proposal by the WWMA in September 2003 to amend G-S.5.6. Recorded Representations and expand Table 1. Representation of Units to include additional units of measure was submitted as a developing issue to the NCWM S&T Committee. The Sector agreed that Item 13 should be removed from the Sector agenda. The Sector also agreed to review the developing issue if and when the NCWM S&T requests Sector input.

14. Remove Section 3.37. Mass Flow Meters from Handbook 44 and Assimilate Relevant Sections into Other Codes (New Item)

Source: California NTEP Laboratory

Background: Many of the requirements in the Mass Flow Meters Code are the same as the requirements in the codes for other meter types. The submitter estimates that 80 % of the Mass Flow Meters Code duplicate requirements that exist in other codes. Handbook 44 could be simplified by assimilating the Mass Flow Meters Code into other existing codes. For type evaluation it could also eliminate some questions as to what could apply when a mass flow meter is being evaluated in an application that typically is covered by another code, such as a mass flow meter installed on a truck for dispensing liquefied petroleum gas.

Recommendation: Assimilate relevant subsections of Section 3.37, Mass Flow Meters Code of Handbook 44 into the following Sections:

3.30. Liquid-Measuring Devices;
3.31. Vehicle-Tank Meters;
3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices;
  a. Hydrocarbon Gas Vapor-Measuring Devices;
  b. Cryogenic Liquid-Measuring Devices;
  c. Milk Meters;
  d. Water Meters.

For Example:

Section 3.30. Liquid Measuring Devices

A.1. - This code applies to:

(a) devices used for the measurement of liquids, including liquid fuels and lubricants, ~~and~~
(b) wholesale devices used for the measurement and delivery of agri-chemical liquids such as fertilizers, feeds, herbicides, pesticides, insecticides, fungicides, and defoliants~~.~~<u>, and</u>
(c) <u>devices that are designed to dynamically measure the mass, or the mass and density of liquids.</u>

Section 3.31. Vehicle-Tank Meters

A.1. - This code applies to:

(a) meters mounted on vehicle tanks including those used for the measurement and delivery of petroleum products or agri-chemicals such as fertilizers, feeds, pesticides, defoliants, and bulk delivery of water.
(b) <u>devices mounted on vehicle tanks that are designed to dynamically measure the mass, or the mass and density of liquids.</u>

The Sector was asked to consider forming a work group to analyze this proposal and develop a recommendation for consideration at the next Sector meeting.

Discussion/Conclusion: The Sector reviewed the proposal and noted that there is already an item on the agenda of the NCWM S&T Committee proposing that the entire Handbook 44 be reviewed for possible reorganization. The Sector agreed to recommend to the NCWM through the NTEP Committee that the entire Liquid Measuring Devices Section of Handbook 44 should be reorganized and combined wherever possible.

15. Reports of Work Groups (New Item)

Source: Mike Keilty (Endress+Hauser)

Background: Work groups are effective tools that allow agenda items to be developed between meetings. However, some items fail to be developed because there is such a long span between the yearly meetings and there is not always a good commitment to work on the item.

Recommendation: Require that a work group team leader provide a status reports to Steve Patoray (NTEP Director), Richard Suiter (NIST Technical Advisor), and the Measuring Sector Chairman. Reports must be forwarded on January 15th and April 15th following the October Measuring Sector meeting.

Discussion/Conclusion: The Acting Chairman, Mike Belue (Belue Associates) recommended that an additional reporting date of August 15th be added. There were no additional comments on this item. The Sector agreed with the item as amended.

16. Next Meeting

The Sector discussed the time and location for its next meeting.

Discussion/Conclusion: The Sector agreed to recommend that the next Sector Meeting be held in conjunction with the SWMA Annual Meeting tentatively scheduled to be held in Mississippi in October 2004.

Appendix D

Weighing Sector Summary

Fresno, California
September 11-13, 2003

Carryover Items

1. Policy for Initial Test Only vs. Full Evaluation when a Modification is made which Requires Testing

Source: 2002 Weighing Sector Item 6

Background: See 2002 Sector Summary Agenda (Appendix F, Item 6, of the 2003 NTEP Committee Annual Report) for additional background information.

The NTEP director reported that NTEP has been implementing the 2001 Sector recommendation that the applicant for a modification of a CC agree in advance with the NTEP director and, if possible, the Participating Laboratory that performed the original evaluation on the device(s), that said device(s) be submitted for testing. The Sector agreed that a documented policy would promote uniformity among the labs and provide advanced notification to NTEP applicants if the policy were published in Pub 14.

The draft guidelines SMA is developing could be used to assist the NTEP director and labs on the extent of re-evaluation needed for modification.

It was also suggested that a minimum list of metrologically significant components (MSCs) be developed with a statement relating to a minimum amount of re-evaluation associated with each component. A consensus could be gathered using information from the NTEP director, participating laboratories, original equipment manufacturers (OEMs).

Recommendation: The NTEP Committee should consider the following underlined amendments for Publication 14, NTEP Administrative Policy, paragraph D.2.:

> **D.2 Responsibility for Reporting Occurrence of Modification**
>
> **b. NTEP Options**
>
> On the basis of the manufacturer's notification, NTEP will decide whether or not to require an evaluation for approving the modification or issuance of a new Certificate of Conformance <u>(CC)</u>. <u>When a metrologically significant modification is to be made to a device with an existing CC, the manufacturer and NTEP shall attempt to agree upon the extent of reevaluation that might be required before such modification is made. In the event of a disagreement, a full reevaluation shall take place.</u> NTEP will notify the manufacturer accordingly.
>
> <u>NTEP's decision can be appealed to the NCWM Board of Directors according to NCWM Publication 14 Administrative Policies, Section T. Appeal and Review Process.</u>

Additionally, SMA Guidelines were to be to be submitted to the Sector by the middle of May 2003 for consideration at the next Sector meeting.

Discussion: **T**he Sector was updated on the NTEP Committee's position on the above recommendation. The NTEP Committee rejected the above proposal because the statements "shall attempt to agree" and "in the event of a disagreement, a full evaluation shall take place" were too negative and did not leave NTEP with the flexibility to make alternate decisions if an agreement could not be reached with the applicant.

Many SMA members believe there is no problem with the recommendation of the 2001 Weighing Sector and the language being developed by the SMA is intended to be used as a guideline and should not be construed as a policy.

Other Sector members noted that a policy is needed for requiring additional permanence testing for devices submitted for amending a certificate. The manufacturers want to know the kinds of modifications to the type that will require additional permanence testing and what parts of previous evaluations can be used to demonstrate compliance of the modified type. The Sector reaffirmed the belief that a documented guideline or policy, along with a list of MSCs, would help NTEP treat all applicants equitably and allow applicants to correctly anticipate the time and expense of a reevaluation. The list of

MSCs will also be required as an element of the NCWM/NTEP Conformity Assessment Program. Such a list would also be helpful for applicants of other device types.

Conclusion: The Sector concluded that a policy guideline is needed to determine the necessity of a partial or full evaluation to amend an existing certificate. The Sector further agreed that the policy being developed by SMA should be part a technical policy in Publication 14 and not an NTEP Administrative policy. The SMA technical committee will continue to develop its DRAFT guidelines for ultimate review by the Sector and NTEP Committee. The Sector chairman volunteered to be the lead person on this item. The Sector also agreed that the document will not be all-inclusive and will be amended when clarifications are needed to recognize additional examples of modifications to MSCs.

2. Vehicle Scale Testing Procedures

Source: 2002 Weighing Sector Summary Agenda Item 16

Background: See 2002 Weighing Sector Summary (Appendix F, Item 16 of the 2003 NTEP Committee Annual Report) for complete background details. Based on the 2002 discussion, the participating laboratories amended the vehicle scale test procedures to provide additional clarity and promote the uniform application of test weights and test loads.

Questions remained, however, on the amended procedures including questions on strain-load test procedures. Manufacturers were concerned about conducting a 5-point increasing-load test in conjunction with the shift test. For scales with a large concentrated load capacity (CLC) rating, this represents a lot of weight on the scale for a long time and increases the possibility of a zero change due to creep. Publication 14, Chapter 1, Section 65a.4.5. *Strain-Load Test* recognizes that consideration must be given for the length of time the load is on the scale and possible temperature changes that may occur during the test. The same notation will be added to Section 65a.3. *Shift Tests* in the 2003 Edition of Publication 14. This item was carried over to the next meeting of the NTEP Participating Laboratories and the NTETC Weighing Sector for further clarification.

The 2002 Weighing Sector agreed to support the proposal developed by the participating laboratories with clarification and recommended amendments to Publication 14, Chapter 1, Section 65(a) 3.1. through 65(a). 3.3.

This item was further discussed at the April 2003 NTEP weighing laboratories' meeting. A problem continues with interpreting the information contained in the sections regarding vehicle scale testing. It is not clear how many load sequences need to be completed and what increments are needed. Also, it is not clear how to conduct the strain test. There also appears to be some question about the amount of weight and testing sequence for permanence testing.

Manufacturers are concerned about the cost in both time and money for device evaluations. Also, NTEP labs need to interpret the requirements consistently. To achieve this goal, the labs agreed to develop a final test data sheet. Bill West, Gary Castro, Don Onwiler, and Steve Cook were assigned to develop test reports.

Steve Cook drafted amendments to the "shift and strain-load test language" for Publication 14 as shown in the attachment for Item 2. The labs considered amending the number of steps for the increasing/decreasing-load tests but could not agree on a specific number and requested technical input from vehicle scale manufacturers on the value of the information gathered in the number of test loads.

Discussion: Many manufacturers expressed concern that the term "creep recovery" is not defined. It was explained by the NTEP director and confirmed by the manufacturers that problems with returning to a zero-balance condition after a load has been on the scale for a period of time is more likely due to temperature changes rather than "creep." It was suggested that the term "creep recovery" be removed from the proposed language. If there was a problem returning to zero that exceeded the amount allowed over a change in ambient temperature, it was suggested that a more specific test be conducted by placing a load on the scale for 30 minutes. After that time, remove the load and the scale should return to zero within 30 minutes. There was also a recommendation that certified thermometers with a 1 ºF (0.5 ºC) resolution be used to verify and record ambient temperatures near the middle of the scale where the load cell cable leaves the load-receiving element.

Significant discussion centered on the number of steps to be performed while conducting the strain-load test. Some laboratories stated there have been problems revealed with non-linearity by conducting the shift test with five test loads and that shift tests conducted with five test loads are appropriate. Another laboratory agreed with the manufacturers that non-linearity is predictable and would have already been demonstrated during the shift tests. A straw poll of the voting members indicated that the majority of the sector members were against conducting the strain-load test with five test loads.

A request was made for clarification regarding the test pattern for the test weights used for the strain-load test. Publication 14 states that the test weights used to conduct the shift test are to be used for the strain-load test. Some of the labs apply the weights in the same test pattern and test load used to verify the CLC rating. Concern was expressed about overloading the weighbridge of the scale when a test load of 90 % CLC is added in the prescribed test pattern and located close to the unknown load. The Sector agreed that the test weights used for the strain-load test could be distributed over the available area on the end of the scale not occupied by the object used for the unknown load.

The Sector decided that additional clarification was needed to specify the specific tests that would be repeated for the permanence test, and that it would take place after 20 days' use with minimum use requirements having been met.

Discussion also ensued regarding a proposal to increase the amount of test weights needed for the permanence test to that used for the initial test. The lab that proposed this justified its position by stating that the existing test procedures did not test the permanence of the CLC rating. Furthermore, the initial testing could be immediately restarted if the scale failed permanence tests. The Sector discussed this issue previously and established the current policy at its June 1988 meeting. The current laboratory proposal did not include sufficient justification for changing the policy. The manufacturers stated there was no benefit that justified the expense of bringing in the additional weights. Additionally, they stated that there is a design or repair problem that must be addressed before the tests can be restarted after a permanence test failure. They further stated that permanence tests demonstrate that the scale can maintain tolerances and do not consider an amount in shift between tests an error as long as it maintains tolerances.

Conclusion: The Sector recommended the following:

1. Include temperature-recording procedures and guidelines in the proposed amendments to the “shift and strain-load test language” in this item.
2. Remove the term “creep-recovery” in the proposed amendments to the “shift and strain-load test language” in this item.
3. Add: “If the device does not return to zero and the temperature has not changed, the scale must indicate zero within tolerance within 30 minutes” in the proposed amendments to the “shift and strain-load test language” in this item.
4. Amend the NOTE in section 65.a.2.1 that clarifies that the shift test with a test load of 90 % to 100 % CLC located at the mid-section between spans only has to be conducted one time.
5. Ballot the Sector on the amended strain-test language that removes the requirement that test weights have to be applied in five steps.
6. Amend the language in the proposed strain-load test procedures to state that test weights do not have to be concentrated in the shift test prescribed test pattern as described in Handbook 44 paragraph N.1.3.4. (a).
7. Amend the proposed strain-load test language into individual steps.
8. Retain current test weight requirements for the subsequent permanence tests.
9. Amend section 65a.5 that weights should be applied and recorded at a minimum of three steps for subsequent tests.

The Sector further recommends the following <u>underlined</u> language replace the existing language in Publication 14, Checklist for Digital Electronic Scales, Sections 65a.2 through 65a.5:

(NOTE to the Editor – Add the following language from paragraph 65a.6. to the end of paragraph 65a.)

<u>Caution Regarding Load Concentration</u>

<u>Concentrating large loads on scale platforms by using weight carts or test equipment using hydraulic jacks may exceed the maximum pound-per-square inch load specification for the deck. This condition may arise because the small tire area of the weight cart in contact with the deck surface could result in a very large load concentration over an unusually small area. This could cause damage to the scale deck.</u>

This situation may occur with a weight cart having a very narrow or short wheelbase and small solid rubber tires. This may cause a problem on steel plate decks and could also result in damage to manhole covers. If the load capacities of weight carts increase beyond 25 000 lb, while maintaining solid tread wheels, it is possible that some concrete decks could be damaged.

65a.2. Shift and Section Tests (Initial Performance Testing)

(Note To Editor: Delete existing Pub 14 language and replace with the following language.)

A **shift test** is defined in Handbook 44 as a test intended to disclose the weighing performance of a scale under off-center loading. [2.20]

A **section test** is defined in Handbook 44 as a **shift test** in which the test load is applied over individual sections of the scale. This test is conducted to disclose the weighing performance of individual sections, since scale-capacity test loads are not always available and loads weighed are not always distributed evenly over all main load supports. [2.20]

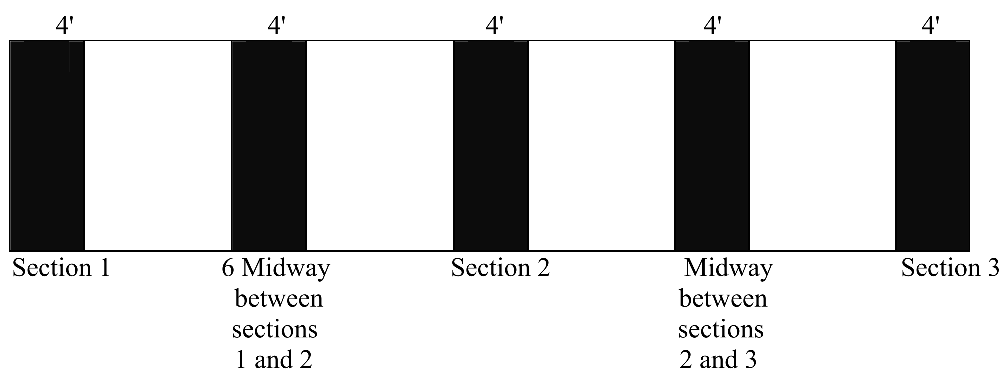
The minimum amount of *test weights* to conduct the shift and section tests 90 % of the CLC.

Record the time and temperature at the beginning and end of each complete shift test. The location of the temperature probe should be at a point near where the load cell cable leaves the load-receiving element. The temperature probe shall have a resolution no greater than 1 ºC, (2 ºF) and shall comply with NIST Handbook 105-6 or equivalent internationally recognized standards.

The scale shall be capable of returning to a no-load indication within prescribed limits (3d per 5 °C change in temperature) and within 15 minutes after shift and section test loads are removed.

Unless otherwise stated in the following procedure, the increasing and decreasing load tests (using known test weights) shall be conducted with at least five test loads (e.g. 500, 1000, 2000e...). (NOTE) If possible, the test first load should equal 500e. If weights cannot be conveniently applied that equal 500e, the first load should equal just below 500e as nearly as possible. The other tolerance breakpoints should be tested if possible.

An example of a three-section scale:



65a.2.1. Conduct at least two complete sets of shift tests over each section to at least 90 % of the concentrated load capacity (CLC) of the scale. When analyzing the return to zero, consideration must be given for the length of time the load was on the scale and possible temperature changes that may have occurred during the test.

(a) Begin the shift test by loading one end section to the first of at least five test loads and record the error.

(b) Move the test load to the next section and record the error. Repeat this step at each section until the opposite end of the scale is reached.

(c) Repeat steps (a) and (b) for each test load until at least 90 % of the CLC is reached. A minimum of five test loads is required.

(d) While at the maximum test load (90 % of the CLC) and during one of the shift tests, place the test weights at mid-span between sections and record the error.

On modular scales, conduct the shift test on the center (C), right (R), and left (L) side of each module connection line.

Section 1		Section 2 C			Section 3
1R	Mid-Span	2L	2R	Mid-Span	3L

(e) When steps (a) through (d) are complete, conduct a decreasing load test at the end of the scale where the weights can be removed. Record the error and section where this test was performed.

(NOTE to Editor: Delete Existing 65.a.3. Shift Test and renumber subsequent paragraphs.)

65a.3. Strain-Load Test (Initial Performance Testing)

(NOTE to Editor: Delete existing language and replace with the following)

The minimum amount of ***test weights*** used shall be the same loads used to conduct the shift tests.

Record the time and temperature at the beginning and end of each complete strain-load test. The location of the temperature probe should be at a point near where the load cell cable leaves the load-receiving element. The temperature probe shall have a resolution no greater than 1 ºC, (2 ºF) and shall comply with NIST Handbook 105-6 or equivalent internationally recognized standards.

The scale shall be capable of returning to a no-load indication within prescribed limits (3d per 5 °C change in temperature) and within 15 minutes after the load was removed.

Unless otherwise stated in the following procedure, increasing and decreasing loads (using test weights) shall be at a minimum of five test loads. *(NOTE) If possible, the first increment of test weights should equal 500e. If weights cannot be conveniently applied that equal 500e, the first load should equal just below 500e as nearly as possible. The other tolerance breakpoints should be tested if possible.*

The target strain-load test indication is the sum of the indication of the unknown weight and the amount of test weights.

The strain-load error is the difference between the actual strain-load test indication and the target strain-load test indication.

Acceptance tolerances are applied and are based on known test weights.

(NOTE: The test weights do not have to be concentrated in the test pattern prescribed in Handbook 44 Scales Code paragraph N.1.3.4.).

65a.3.1. Conduct at least one strain-load test at each end of the scale. The maximum load applied during the strain-load test shall be in the range of 80 % to 100 % of scale capacity. Distribute the load over the load-receiving element.

65a.3.2. For the first test:

(a) Load the scale with a vehicle or vehicles so the addition of test weights will provide a gross load of 80 % to 100 % of scale capacity.

(b) Record the "reference point" for the start of the strain-load test.

(c) Add the test weights to one of the ends of the scale. The target strain-load indication is the sum of the unknown weight and the test weights.

(d) Record the indicated strain-load value and calculate the strain-load test error. The scale shall perform within prescribed tolerances based upon the tolerance for the known test weights.

(e) Remove the test weights from the end of the scale without conducting a decreasing-load test.

(f) Record the new strain-load reference value and re-apply the test weights.

(g) Record the indicated strain-load value and calculate the strain-load test error. The scale shall perform within prescribed tolerances based upon tolerance for the known test weights.

Note: To verify that the strain-load values repeat the initial value, the strain-load test indication in step (g) shall agree with the strain-load test indication in step (d) within the absolute value of maintenance tolerances (repeatability).

(h) Conduct a decreasing-load test and return to the strain-load reference value as the weights are removed as part of this test cycle. Record the results of the decreasing-load test at 5 different test loads.

(i) Record the return to the strain-load reference value. This value shall be within one-half of a scale division of the values recorded in (b) considering any temperature changes that may have occurred during this last test cycle.

(j) Remove the strain-load. Do not apply zero-return tolerances at this time.

65a.3.3. For the second test:

(a) Rezero the scale.

(b) Place the strain-load (vehicles or material of unknown weight) on the other end of the scale.

(c) Record the strain-load reference value. The semi-automatic tare mechanism may be used to tare out the strain-load value (Net weight indications can be used for the increasing-load test.) Do not use the zero-setting mechanism to set the strain-load to zero.

(d) Add the test weights the other end of the scale. The target strain-load indication is the sum of the unknown weight and the test weights.

(e) Record the indicated strain-load value and calculate the strain-load test error. The scale shall perform within prescribed tolerances based upon tolerance for the known test weights.

(f) Remove the strain-load (vehicles or material of unknown weight) but leave the known test weights on the scale and set the indicator to display "gross weights."

The gross weight indication of the test weights shall be within acceptance tolerances.

(g) Use the "gross weight" indications to conduct a decreasing-load test. Record the decreasing-load test in 5 different test loads.

(h) When all the weights are removed, record the return to zero. The scale must return to zero within one-half of a scale division considering any temperature changes during this test cycle.

65.a.4. Minimum Use Requirements prior to Subsequent Test for Permanence

- A minimum of 300 weighing operations are required during the test period. If the test site is at the applicant's or manufacturer's location, the applicant or manufacturer is to log the date, time, and weight. The person conducting the weighing is to initial each testing.
- Only loads that reflect "normal" use will be counted during the permanence-testing period.[1]
- For vehicle scales with a nominal capacity over 75 000 lb:
  - 50 % of the loads must be above 50 000 lb or 80 % of the CLC, whichever is greater; and
  - 100 % of the loads must be above 20 000 lb or 50 % of the CLC, whichever is greater.
- For all other scales:
  - 50 % of the loads must be above 50 % of the scale capacity; and
  - 100 % of the loads must be above 20 % of the scale capacity.
- Substitution or strain-test loads for the minimum use requirements are acceptable as long as all above conditions are met.
- The minimum number of days that a device is required to be in use is 20. A minimum number of weighing operations to be conducted each day for the test period is not specified; however, the weighments should represent the scale's normal in-service use.

(NOTE to Editor: Replace existing 65a.5. Subsequent Type Evaluation (Field) Permanence Tests and replace with the following language.)

65.a.5 Subsequent Type Evaluation Tests for Permanence

The minimum amount of ***test weights*** for the shift and strain-load tests shall be a minimum of 40 000 lb or 50 % of the CLC, whichever is greater.

Record the time and temperature at the beginning and end of each complete shift test. The location of the temperature probe should be at a point near where the load cell cable leaves the load-receiving element. The temperature probe shall have a resolution no greater than 1 ºC, (2 ºF) and shall comply with NIST Handbook 105-6 or equivalent internationally recognized standards.

The scale shall be capable of returning to a no-load indication within prescribed limits (3d per 5 °C change in temperature) and within 15 minutes after the load was removed.

Unless otherwise stated in the following procedure, increasing and decreasing-load test results (using test weights) shall be recorded at a minimum of three test loads (zero, approx. ½ maximum test weights, and at maximum test weights).

[1] The scale may be used to weigh other loads, but only the loads identified are counted as part of the permanence test.

The strain-load error is the difference between the actual strain-load indication and the target strain-load indication.

Acceptance tolerances are applied and are based on known test weight.

(NOTE: The test weights do not have to be concentrated in the test pattern prescribed in Handbook 44 Scales Code paragraph N.1.3.4.).

65a.5.1. Conduct at least one complete set of **shift** tests over each **section**, at mid-span between each **section** Increasing and decreasing tests (using known test weights) shall be conducted with at least three different test loads (near 500e, and at one-half and at maximum available test weights).

While at the maximum test load, place the test weights at mid-span between sections and record the error.

On modular scales, conduct the shift test on the center (C), right (R), and left (L) side of each module connection line.

Section 1		Section 2 C			Section 3
1R	Mid-Span	2L	2R	Mid Span	3L

65a.5.2. Conduct at least one complete set of strain-load tests using the "Strain-Load Test" procedures in steps 65a.3 through 65a.3.3. The maximum applied load shall be in the range of 65 % to 100 % of scale capacity.

65a.5.3. If the device does not meet these tolerance limits during the subsequent test for permanence (unless otherwise stated in Handbook 44, any type evaluation tests must be within acceptance tolerances), all tests described in sections 65a.1 through 65.a.5 shall be repeated.

(NOTE to Editor - Delete paragraph 65a.6 - Caution Regarding Load Concentration. Language was moved to paragraph 65a.)

(NOTE to Editor – Delete paragraph 65a.7 - Permanence Test Use Requirements. The language was moved to paragraph 65a.4 - Minimum Use Requirements prior to Subsequent Test for Permanence.)

3. Definitions of Hanging and Crane Scales

Source: 2002 Weighing Sector Agenda Item 19

Background: See 2002 NTETC Weighing Sector Meeting Summary (Appendix F) of the NTEP Committee 2003 Final Report for complete details and proposals. Due to similarities in crane and hanging scales and the fact that structure of the scale support seemed to be the main variable in the classification of the type of device, the Sector proposed consolidating the definitions of crane and hanging scales and labeling the resulting scale type "hanging" scale, deleting the definition of crane scale, removing the reference to crane scale from Table 7a. and paragraph N.1.3.8, and change remaining crane scales references to hanging scale in NIST Handbook 44

At the 2003 NCWM Interim Meeting the S&T Committee discussed the Weighing Sector's concern about the large list of terms (see Tables 7a. and 7b. of the 2002 Weighing Sector Summary in the 2003 NCWM Annual Report) used to identify various scale types and designs. The Committee questioned the existence of Class II hanging scales that may not be included in the proposed definition for hanging scale.

hanging scale. A scale designed to weigh loads while they are suspended from a hook on the scale or loads resting on a platter or platform that is suspended from the scale. Hanging scales may be any capacity and may be Class III or III L, whichever is appropriate for the intended use, as long as all parameters for the intended class are met. Sometimes called "crane scale."

The Committee believed the Weighing Sector should explore other options to consolidate the terminology used to describe scale types and designs. The Committee withdrew the proposal and referred the item back to the Weighing Sector for further development.

Discussion/Conclusion: The Sector recommended no further action on this item. The issues stated in the above background information may be resolved with changes to the procedures for the listing of device types on CCs and was further discussed during on the Sector's agenda item 13.

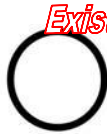
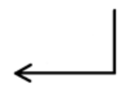
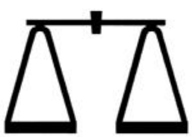
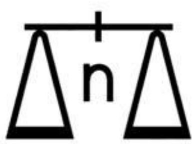
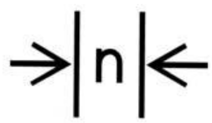
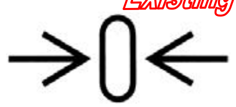
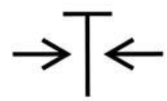
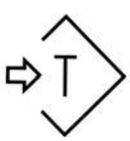
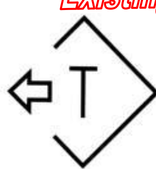
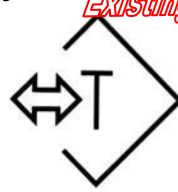
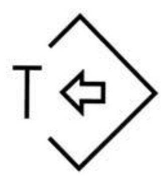
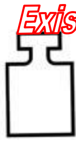
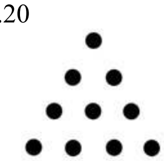
4. List of Acceptable Abbreviations and Symbols

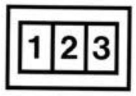
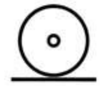
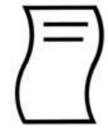
Source: 2002 Weighing Sector Agenda Item 20

Background: See 2002 Weighing Sector Summary in the NTEP Committee's 2003 Annual Report (Appendix F, Item 20) for complete background information.

Recommendation: The SMA has submitted the following symbols for discussion. The Sector was asked to review and consider the proposed table as an addition to paragraph 74 of Publication 14.

Table 1, Operational Controls, Indications, Features:

1.1 Existing  On (power)	1.2 Existing  Off (power)	1.3  On/Off (power)	1.4 Existing  Enter
1.5  Weighing	1.6  Scale n (n = 1,2, ...)	1.7  Range n (n = 1,2, …)	1.8  High resolution
1.9  Not for direct sales to the public	1.10 Existing  Zero setting	1.11  Combined zero/tare - See S.2.1.6. for additional required markings	1.12  Taring
1.13 Existing  Enter tare	1.14 Existing  Verify tare	1.15 Existing  Combined tare/clear	1.16  Clear tare
1.17 Existing  Mass/Weight	1.18  Money	1.19  Price per weight unit	1.20  Piece count

1.21  Counter	1.22  Read counter	1.23 Existing  Print	1.24  Print certificate
1.25  Information			

Discussion: The symbols are internationally accepted weighing symbols and registered with the DIN (Deutsches Institut FÜr Normung) (Germany) and IEC (International Electrotechnical Commission). There was general agreement that NTEP should recognize international symbols whenever possible. The majority of the symbols are intended to be used in the operation of the devices and would likely be defined in the operator's manuals. There were additional concerns regarding the increased number of customer-operated devices and the use of many of these symbols without additional markings or descriptions.

The Sector discussed symbols that would be available to the customer. More specifically, the symbols for indirect sales (1.9), money (1.18), and price per unit weight (1.19), are not well known in the U.S. and should not be used without additional information for the customer.

The Sector also discussed the list's lack of availability to weights and measure officials who do not have access to Publication 14 and other international documents. It was suggested that the list of symbols be made available on the NCWM and NIST web sites and that they be incorporated into weights and measures bulletins, examination procedure outlines, and inspector training modules.

Conclusion: The Sector recommends these symbols be incorporated into NCWM Publication 14. The symbols intended for the customer (including customer-operated devices) cannot be used without additional descriptions or markings on the device. Additionally, the list will include a note that the symbols should be used as a guide and that style differences are acceptable (e.g., shapes of arrows). The Sector also requests that NCWM and NIST explore the possibility of distributing the list of symbols through the use of weights and measures bulletins, web sites, examination procedures, and training information. The Sector further recommends that the list of acceptable symbols can be removed from Publication 14 upon greater customer familiarity and acceptance of the symbols.

5. Shift Testing on Multi-Interval Scales

Source: Ohio Participating NTEP Laboratory

Background: See 2002 Weighing Sector Summary (Appendix F, Item 21 of the 2003 NTEP Committee Annual Report) for complete background information.

Bill West and Darrell Flocken submitted the following proposed language for Publication 14 DES Checklist Section 31 Multi-Interval Scales. The Sector was asked to review and comment on the proposed language and provide the NTEP Committee with recommendations to amend Publication 14.

31. Multi-Interval Scales

A multi-interval scale is an instrument having one weighing range that is divided into partial weighing segments. Each weighing segment is defined by its division size, its minimum capacity, and its maximum capacity. The selection of the appropriate weighing segment is determined automatically according to the load applied, both on increasing and decreasing loads. The shift test shall be conducted at one-half the capacity of the scale. Corner tests, if appropriate, shall be run at one-quarter of the scale capacity. The number of scale divisions, *n*, for each weighing segment is determined by dividing the maximum capacity of the weighing segment by *e* of the same weighing segment. In the case of multi-interval scales, *e* must be equal to *d* (see S.5.3.).

Example:

Weighing segment				
Minimum Capacity	Maximum Capacity	*e*	*n*	
0 kg	3 kg	1 g	3000	(3000/1)
3 kg	6 kg	2 g	3000	(6000/2)
6 kg	15 kg	5 g	3000	(15000/5)

The number of divisions for each weighing segment must meet Table 3 of the Scales Code. The capacity and verification scale division must be conspicuously marked near the weight display.

Since weighing segments on a multi-interval scale may not overlap, the capacity statement for each weighing segment and the weight in the weight display is a sufficient indication of the weighing segment in use.

A multi-interval scale shall operate as follows:

- The motion detection requirement must be satisfied for each scale division (see S.2.1.5.).
- The division size for the first weighing segment applies to the tests to determine the width of zero and the amount of the automatic-zero setting mechanism.
- The scale division must change when a lower weighing segment reaches its maximum value so that rounding occurs properly and the number of displayed decimal places does not change within the same weight indication.

  Example: Suppose a scale has the following weighing segments:

  Capacity: 0 lb. to 10 lb x 0.005 lb
  10 lb. to 30 lb x 0.01 lb

  The scale indication for a 10-lb load must be 10.00 lb, not 10.000 lb. Once the scale has exceeded an internal weight indication of 9.9975 lb, it must round to the next higher weight indication. If 10.000 lb were to be indicated, a load perceived internally as 10.003 lb would result in the scale indicating in some manner that it is no longer sensing 10.000 lb $\pm$ 0.0025 lb; hence, it would then indicate 10.00 lb. This round-off problem is avoided by causing the scale to indicate 10.00 when sensing a load in excess of 9.9975 lb (based upon its internal resolution). The scale will continue to indicate 10.00 lb until its internal resolution senses a load in excess of 10.005 lb, whereupon the weight display will update to 10.01 lb.

- There are several considerations regarding the proper operation of tare on multi-interval scales.

  - All tares must be taken in the minimum increment. Therefore, the maximum tare allowed is the maximum capacity of the smallest weighing segment.
  - Whenever gross and tare weights fall in different weighing segments, (hence the scale divisions for the gross and tare weights differ), the net weight must be in mathematical agreement with the gross and tare weights that are indicated and recorded (i.e., net = gross - tare).
  - Manually entered keyboard, thumb-wheel, and digital tare values must be entered to the displayed scale division.

  In applying these principles, it is acceptable to:

  - round the tare value (in the upward direction) to the appropriate net weight scale division.

  - or display net weight values in scale divisions other than the scale division used in the display of gross weight, as when the gross and tare weights are in different segments of the device. For example, a scale indicating in 2-lb divisions in the lower segment and 5-lb divisions in the next higher segment may result in net values ending in three or eight in the higher segment.

In every case, it is required to maintain the mathematically correct equation:

net + tare = gross.

31.1. The requirements specific to multi-interval scales, such as the displayed scale division, the operation of tare, and the mathematical agreement of gross, tare, and net values, depend on the information that can be displayed or recorded by the weighing system and may be summarized as follows:

31.1.1	The number of scale divisions in each weighing segment must meet Table 3 of the Scales Code.	Yes ☐ No ☐ NA ☐
31.1.2	For all weighing segments, *e* must equal *d*.	Yes ☐ No ☐ NA ☐
31.1.3	The scale division for gross and positive or negative net weights for both increasing and decreasing loads must be displayed in scale divisions consistent with the weighing segment in which the weight falls.	Yes ☐ No ☐ NA ☐
31.1.4	Weight indications at the break-over point of weighing segments must be displayed properly.	Yes ☐ No ☐ NA ☐
31.1.5	Tare may be taken to the maximum capacity of the smallest weighing segment of the scale.	Yes ☐ No ☐ NA ☐
31.1.6	Keyboard tare entries must be consistent with the displayed division size. Incorrect entries may be rounded to the displayed scale division or rejected.	Yes ☐ No ☐ NA ☐
31.1.7	Devices equipped with a tare capability must at all times indicate and record values that satisfy the equation net = gross - tare.	Yes ☐ No ☐ NA ☐
31.1.8	Devices equipped with push-button tare must meet the tolerances for net loads for any tare value.	Yes ☐ No ☐ NA ☐
31.1.9	Scales that display or record only net weight values (e.g., most computing scales)	
	▪ may take tare values to either the internal resolution or the displayed scale division.	Yes ☐ No ☐ NA ☐
	▪ must always begin with the lowest weighing segment on the device regardless of the amount of tare that is taken.	Yes ☐ No ☐ NA ☐

Discussion: The Sector reviewed the languages submitted by Bill West and Darrell Flocken and generally agreed that the proposed language should be incorporated into Publication 14. The Sector was concerned with the definition of multi-interval scale in Handbook 44 and believed the definition was a possible source of the current confusion surrounding the application of shift test loads on multi-interval and multiple-range scales. NIST Handbook 44 Appendix D, Definition, states that a multi-interval scale is "a scale that has one range divided into partial ranges with different intervals for each partial weighing range". This is frequently confused with a multiple-range scale, which is a scale that has more than one range with different intervals for each range. The language submitted by Darrell Flocken and Bill West recommended replacing the term "partial weighing range" with "partial weighing segment" in order to further highlight the differences between the two type of scales.

Conclusion: The Sector agreed to recommend the above language for incorporation into Publication 14. The Sector also recommends that the definition of multi-interval scale be amended to highlight the differences between multi-interval and multiple-range scales. The Sector asked the NIST technical advisor to develop amended language for the definition of multi-interval scale that can be submitted to the NCWM Specifications &Tolerance Committee.

Note: After the meeting, NIST technical advisor to the Weighing Sector (WS) discussed the above recommendation with the NIST technical advisors to the NCWM Specifications and Tolerance Committee (S&T). They could not support replacing the term "partial weighing range" with "partial weighing segment" in Handbook 44 since there was insufficient justification to amend the original definition that is based upon international terminology. However, the technical advisors (WS and S&T) agreed that the definition could be amended editorially by inserting the term "segment" as a parenthetical equivalent for "partial weighing range" as follows:

> **multi-interval scale.** A scale having one weighing range which is divided into partial weighing ranges <u>(segments)</u>, each with different scale intervals, with the weighing range <u>(segment)</u> determined automatically according to the load applied, both on increasing and decreasing loads.

6. Inconsistent Information on a CC

Source: 2002 Weighing Sector Item 23

Background: See 2002 Weighing Sector Summary (Appendix F, Item 23, of the 2003 NTEP Committee Annual Report) for complete background information. This subject of including peripheral equipment in the test condition section of a CC was addressed during the 1992 Weighing Sector meeting, but the recommendation was never incorporated into the Pub 14. Section "Models". (See June 1992 Weighing Sector Summary [Item 6] for additional information.)

The June 1992 Sector Summary was reviewed, and the 2002 Sector reconfirmed that non-metrological accessories and peripheral equipment (printing elements, video displays, etc.) used as part of the evaluation should be listed in the "Test Conditions" paragraph as verification that metrological features such as indicated and recorded representations have been evaluated. Additionally, the Sector reconfirmed that the CC does not limit the use of non-metrological peripheral equipment to those listed.

The Sector recommended that the following underlined language be added to the NTEP Publication 14 Administrative Procedures in paragraph P. Certificate of Conformance to facilitate consistent information included on the Certificate of Conformance.

> <u>P.6. CCs should detail the main elements, load cells, and auxiliary devices used during an evaluation, including model designation and other significant parameters, under the "Test Conditions" portion of the CC. Only the standard features and options that have been evaluated will be included on the CC.</u>

At the January 2003 NCWM Interim Meeting, the NTEP Committee considered the above recommendation. The Committee did not agree with the Weighing Sector and stated that the recommended policy does not affect the administration of NTEP and should be considered as a technical policy. The Committee recommended the participating laboratories and Weighing Sector reconsider the item during the 2003 meeting of the NTETC Weighing Sector. As a response to the NTEP Committee decision, the NIST technical advisor submitted the following addition to Publication 14, Chapter 1, NTEP Technical Policy for Scales for consideration by the Sector ***(Note:** Similar language should be submitted to the other Sectors for consideration.)*:

> **B. Certificate of Conformance Parameters**
>
> **<u>Certificates of Conformance (CC) should detail the main elements, load cells, and auxiliary devices used during an evaluation, including model designation and other significant parameters, under the "Test Conditions" portion of the CC. Only the standard features and options that have been evaluated will be included on the CC.</u>**

The following guidelines apply . . .

Discussion: The Sector supported that language developed by the technical advisor and recommended that the proposed language should ***require*** that CCs detail the main elements by using the term "shall detail" instead of "should detail." Additionally, the Sector recommended that the first paragraph in Section A. Models to be Submitted for Evaluation should be amended to state that the non-metrological features may be listed on the certificate provided they have been "evaluated" to operate as intended since the use of the term "tested" implies that specific tests were conducted. One of the Sector members stated that non-metrological functions should not be listed on a CC and stated that is should be considered during a future meeting of the NTETC Weighing Sector.

The Sector also addressed how to handle existing CCs that listed unnecessary or inadequate information on the certificate. The NTEP director noted that eventually all active certificates would be updated as the NTEP Conformity Assessment Program evolves.

Conclusion: The Sector recommends that NCWM Publication 14, NTEP Policy for Scales, Section A be amended as follows:

A. Models to be Submitted for Evaluation

A type is a model or models of the same design, as defined in the NTEP Policy and Procedures. A complete list and description of all models of a type to be included on the Certificate of Conformance (CC) shall be submitted with the request for type evaluation. All options and features to be included on the CC must be submitted for evaluation. Non-metrological features may be listed on a CC, but only if the feature has been <u>evaluated</u> ~~tested~~ and operates as intended. If the CC is to include more than one model of the same type, the applicant shall contact the evaluation agency to determine which model or models will be evaluated. A CC will be amended when <u>the manufacturer adds new models of the same type meeting the specified criteria</u> ~~new models of the same type meeting the specified criteria are added by the manufacturer~~.

Applicants of remanufactured weighing devices and load cells are reminded that any device submitted for evaluation shall comply with all applicable requirements in Handbook 44, including non-retroactive requirements, as if it were a newly manufactured device. All references to "device(s)" are considered to include remanufactured device(s).

B. Certificate of Conformance Parameters

<u>A Certificate of Conformance (CC) shall detail the main elements, load cells, and auxiliary devices used during an evaluation, including model designation and other significant parameters, under the "Test Conditions" portion of the CC. Only the standard features and options that have been evaluated will be included on the CC.</u>

The following guidelines apply . . ..

7. Submission of Scales with Nominal Voltages of 85 to 240 VAC to NTEP

Source: 2002 Weighing Sector Agenda Item 24

See agenda item 14d for specific language and suggested Publication 14 test procedures.

Discussion/Conclusion: The Sector agreed to discuss this item in conjunction with 2003 Weighing Sector Agenda Item 14d.

8. Audit Trail Information during Power Failure

Source: 2002 Weighing Sector Agenda Item 25

Background: See 2002 Weighing Sector Summary (Appendix F, Item 25 of the 2003 NTEP Committee Annual Report). Based on the agreement at the 2002 Weighing Sector meeting, Bill West (OH) and Joe Raspino (CA) developed the following proposed changes to Publication 14 for digital electronic scales (text with the double underline have been added by the NIST technical advisor):

10. Provisions for Sealing of Adjustable Components or Audit Trail

Code Reference S.1.11.

Audit Trails – General (page DES-27)

10.5 After changes have been made to configuration and/or calibration, while still in the configuration or calibration mode, interrupt the power to the device. The event counters should not increment unless the changes are accepted by the device.	Yes ☐ No ☐ NA ☐

Renumber remaining paragraphs.

19. Facilitation of Fraud - Appropriate Design (page DES-43)

Code References: G-S.2 and G-S.5.1.

Power Interruptions

After a momentary (up to ten seconds) power interruption, an indicating element shall either return to zero, display an accurate weight value (gross or net) that is within one division of the value that was displayed before the power failure (relative to the gross load zero reference that existed prior to the power interruption and assuming no change in load), display an error signal, or display meaningless information that cannot be interpreted as a weight value and which requires operator intervention to return the scale to operation. Examples of meaningless information are ----, EEE, 6CE1, etc. Information stored in non-volatile memory (e.g., inbound weights and uncompleted transactions) shall not be lost during a power failure or when system is restarted.

The audit trail event counters should not increment after a power interruption if changes have been made to the calibration and/or configuration parameters but not accepted **by the device. Alternatively, the counters shall increment after a power interruption if the** device accepts **the changes. It has been found in some devices the changes are stored temporarily but the audit trail counters do not increment until the operator exits from the set-up mode. In this case the audit trail counters possibly may increment but the changes may not be applied or accepted by the device after a power interruption.**

Discussion: The Sector agreed with the problems identified by the participating laboratories and reviewed the language above-submitted language and agreed the term "should" be replaced by "shall" in the proposed paragraph 10.5, the statement should be consistent with Publication 14 "General Requirements for Metrological Audit Trails, and the statement should also be rephrased so that it is a positive statement.

Conclusion: The Sector recommends that NCWM Publication 14, NTEP Policy for Scales, Section K, paragraphs 10.5 and 19 be amended as follows:

10. Provisions for Sealing of Adjustable Components or Audit Trail

Code Reference S.1.11.

Audit Trails – General – Add a new paragraph 10.5 and renumber remaining paragraphs.

10.5 After changes have been made to configuration and/or calibration, while still in the configuration or calibration mode, interrupt the power to the device and exit the calibration or configuration mode.

Verify that the device has accepted the changes and that the event counter shall incremented. Yes☐ No☐ NA☐

19. Facilitation of Fraud - Appropriate Design

Code References: G-S.2 and G-S.5.1.

Power Interruptions

After a momentary (up to ten seconds) power interruption, an indicating element shall either return to zero, display an accurate weight value (gross or net) that is within one division of the value that was displayed before the power failure (relative to the gross load zero reference that existed prior to the power interruption and assuming no change in load), display an error signal, or display meaningless information that cannot be interpreted as a weight value and which requires operator intervention to return the scale to operation. Examples of meaningless information are ----, EEE, 6CE1, etc. Information stored in non-volatile memory (e.g., inbound weights and uncompleted transactions) shall not be lost during a power failure or when system is restarted.

The audit trail event counters should not increment after a power interruption if changes have been made to the calibration and/or configuration parameters but not accepted **by the device. Alternatively, the counters shall increment after a power interruption if the** device accepts **the changes. It has been found in some devices the changes are stored temporarily but the audit trail counters do not increment until the operator exits from the set-up mode. In this case the audit trail counters possibly may increment but the changes may not be applied or accepted by the device after a power interruption.**

9. Performance and Permanence Testing

Source: 2002 Weighing Sector Agenda Item 26

Background: See 2002 Weighing Sector Summary (Appendix F, Item 26 of the 2003 NTEP Committee Annual Report). As directed, Editorial corrections were made as agreed and directed and submitted to the NTEP Committee for its acceptance prior to publishing the 2003 edition of Publication 14.

Discussion/Conclusion: The Sector agreed no further action was required.

10. Range of IZSM on Indicating Elements

Source: 2002 Weighing Sector Agenda Item 29

Background: This item was carried over from the 2002 meeting of the Weighing Sector due to lack of time to complete the review and discussion. See the 2002 Weighing Sector Summary (2003 NTEP Committee Report, Appendix F, Item 29) for complete background information.

Discussion: At the 2002 Weighing Sector meeting, some manufacturers stated that IZSM on separable indicating elements is just an electronic starting point and there should be no performance difference settings up to 100 %. The manufacturer of the load-receiving element has the responsibility to make its device perform with the maximum live and dead load (i.e., a 100-lb load-receiving element with a 500-lb load cell).

At the 2003 Weighing Sector meeting, the Sector reviewed Measurement Canada's requirements and OIML R76. Measurement Canada limits IZSM on separable indicating elements to 20 % of the configured scale capacity. Discussions included the difference between scale adjustments to configure the initial dead-load calibrations and changes to the dead load that involve temporary additions to the load-receiving element. For example, changing the dead load on a vehicle scale due to an accumulation of mud or debris can be balanced off by the IZSM. Another manufacturer stated that adding a conveyor system to a scale that exceeds 20 % of the scale capacity should be allowed. The manufacturer can choose to either have the load-receiving element evaluated to handle the additional dead load or reduce its weighing capacity by the weight of the added conveyor system.

Some of the manufacturers stated that they need to set dead-load values with limits greater that 20 % of the scale capacity. The manufacturers did not want the limitations because a restriction would limit their flexibility to mix and match compatible elements. Other Sector members stated that using IZSM above that 20 % limitation could metrologically affect the performance of a scale that has not been designed for large dead loads. Other manufacturers stated the dead load offset greater than 20 % scale capacity are rare and could be part of the "coarse zero" adjustments in the configuration of a scale.

The NTEP director stated this feature should be considered a sealable parameter according to the guidelines set out in the discussion of sealable parameters in Publication 14 "Philosophy for Sealing." The incompatible use of the feature may result in fraud (inaccurate measurements) not easily detected or affecting the device's compatibility with load-receiving elements that may or may not be designed to handle additional dead load above 20 % capacity. Other Sector members stated that additions to a load-receiving element that exceeds 20 % of the scale capacity should be considered a modification of type unless the net capacity is reduced by the amount of the added dead load or the load-receiving element has been type evaluated to accommodate initial zero load that exceeds 20 % of the maximum capacity.

Conclusion: The Sector recommends that Publication 14, Part K, Section 10, Table of Scale Features and Parameters be amended as follows to include language that IZSM separable indicating elements with IZSM adjustments above 20 % of the configured scale capacity be considered a sealable parameter:

Scale Features and Parameters	
Typical Scale Features to be Sealed	**Typical Scale Features and Parameters Not Required to be Sealed**
Coarse zero <u>Initial Zero-Setting Mechanism (IZSM) on separable indicating elements with limits that **can** be adjusted more than 20 % beyond the maximum capacity of the load-receiving element</u> Span Linearity correction values Motion detection (on/off) Motion detection (number of divisions and speed of operation) Number of samples averaged for weight readings Averaging time for weight indications Selection of measurement units (if internally switched and not automatically displayed on the indicator) Division value, d Number of scale divisions, n Range of over capacity indications (if it can be set to extend beyond regulatory limits) Automatic zero-setting mechanism (on/off) for bulk-weighers hopper scales and all Class III L devices Automatic zero-setting mechanism (range of a single step) 1/4 and 1/2 lb pricing capability or multiplier keys Weight Classifier mode (enabled/disabled) Manual Gross Weight Entries (enabled/disabled) for applications where this feature is not permitted in Handbook 44	Automatic zero-setting mechanism (Selection of total range, e.g., 4 % or 100 % of capacity) <u>IZSM on separable indicating elements with limits that **cannot** be adjusted more than 20 % beyond the maximum capacity of the load-receiving element</u> Display update rate Weigh-in/weigh-out operation (on/off) Stored tare weight capability (e.g., computing scales and vehicle weight by information number) Selection of tare feature operation, e.g., keyboard or push-button tare (on/off) Product codes Commodity unit prices Discounts Baud rate for electronic data transfer Manual Gross Weight Entries for application where this feature is permitted in Handbook 44

11. IZSM Test Procedures

Source: 2002 Weighing Sector Agenda Item 30

Background: This item carried was carried over from the 2002 Weighing Sector meeting due to lack of time to complete review of the subject at that meeting. See 2002 Weighing Sector Summary (2003 NTEP Committee Annual Report, Appendix F, Item 30) for complete background details.

At the 1998 Weighing Sector meeting, the NTEP laboratories agreed to adopt and implement a procedure for testing the initial zero-setting mechanism (IZSM) of a scale in the field. The procedure was modified and was to be included in the next edition of Publication 14. Such procedure was also proposed to amend Handbook 44. The item was placed on the 2002 agenda because the 1998 recommendations were never added to the publications.

Discussion/Conclusion for Changes to Handbook 44 Scales Code: The 2003 Sector agreed with the 1998 Weighing Sector proposal to amend Scales Code paragraph S.2.1.5. The 2003 Weighing Sector, however, recommended that the language for "complete scales" and "separable indicating elements" should be consistent with the language used in Scales Code Table S.6.3.a. and amended the proposal as follows:

> **S.2.1.5. Initial Zero-Setting Mechanism. -**
>
> (a) Scales of accuracy classes I, II, and III may be equipped with an initial zero-setting device.
>
> (b**) Weighing, load-receiving, and indicating element in the same housing or covered on the same CC.** An initial zero-setting mechanism shall not zero a load in excess of 20 % of the maximum capacity of the scale unless tests show that the scale meets all applicable tolerances for any amount of initial load compensated by this device within the specified range.
>
> (c) ***<u>Indicating element not permanently attached to weighing and load-receiving elements be covered on a separate CC</u>****<u>. The maximum Initial Zero-Setting Mechanism range of electronic indicators must be limited to 20 % of the ~~scale~~ ~~capacity~~ configured capacity.</u>*

Discussion/Conclusion for Changes to Publication 14 (2003 edition): There were no major discussions on this item or significant updates to the proposed language. The Sector recommends that the <u>underlined</u> language in the proposal be incorporated into NCWM Publication 14, Weighing Devices Technical Policy, Checklist, and Test Procedures.

> **40. Zero Indication**
>
> **Code References: S.1.1., S.1.1.1., <u>S.2.1.5,</u> and G-S.5.1.**
>
> A digital electronic scale must indicate or record a zero-balance condition. An out-of-zero-balance indication on both sides of zero is required. The zero-balance indication may be a continuous digital-zero indication or indicated by some other means, provided the scale either automatically inhibits the scale operation or returns to a digital-weight indication when an out-of-zero-balance condition exists. The alternative zero indication must be defined on the front of the device.
>
> A digital zero-balance indication shall represent zero within ± 0.5 scale division (± 0.5 d). A digital indicating scale shall either automatically maintain a "center-of-zero" condition to ± 0.25 d or less (through AZSM) or have a supplemental center-of-zero indicator that defines the zero-balance condition to ± 0.25 d or less. The center-of-zero requirement applies to the gross load zero, but the center-of-zero indication may also be operational at the net load zero.
>
> Neither a + or - sign may appear with the zero indication. Appropriate indications for the zero balance and out-of-zero balance conditions are specified.

If the scale is equipped with an initial zero-setting mechanism (IZSM), then the scale must be tested for compliance with the influence factors with the maximum load zeroed through the IZSM. This is mandatory if the range of the IZSM exceeds 20 % of the scale capacity.

<u>When the IZSM range (absolute value of the maximum load that can be removed from the dead load plus the maximum load that can be added to the dead load) exceeds 20 % of the scale capacity, performance tests are conducted at the maximum setting of the range.</u>

<u>The IZSM range of a complete electronic scale may exceed 20 % of the scale capacity if the device performs within tolerances.</u>

<u>When the IZSM range is # 20 % of the scale capacity, performance tests are conducted once at the maximum IZSM setting.</u>

Is the scale equipped with an IZSM? **Yes** □ **No** □ **N/A** □

If yes, then what is the range of the IZSM? ______________________________

40.1. The scale defines zero within ± 0.5 d by a continuous zero indication. Record the type of weight unit selection (e.g., lb/kg). **Yes** □ **No** □ **N/A** □

□ EXTERNAL
□ INTERNAL
□ N/A

Record the actual zero width in d (note whether avoirdupois, metric, or other unit).

□ AVOIRDUPOIS__________d
□ METRIC__________d
□ OTHER UNITS: Specify unit ____________________d

40.2 <u>The maximum IZSM range of an indicating element (not permanently attached to weighing and load-receiving elements) and intended to be covered on a separate CC:</u>

<u>40.2.1 does not exceed 20 % of the scale capacity, or</u> <u>**Yes** □ **No** □ **N/A** □</u>

<u>40.2.2 can be set and sealed (see table of sealable parameters) to a maximum of 20 % of the scale capacity</u> <u>**Yes** □ **No** □ **N/A** □</u>

40.3~~2~~. ***Renumber subsequent paragraphs in Section 41***

12. Weight Accumulators

Source: 2002 Weighing Sector Agenda Item 31

Background: This item was carried over from the 2002 meeting of the Weighing Sector due to lack of time to review the subject. See the 2002 Weighing Sector Summary (2003 NTEP Committee Annual Report, Appendix F, Item 31) for complete background details.

At the 1997 Weighing Sector, the proposal to address the addition of weight accumulation features was approved but never added to Publication 14.

Discussion: The Sector was asked to review the proposal from the Maryland participating laboratory to see if any corrections/updates were required.

Conclusion: There were no major discussions on this item or significant updates to the proposed language. The Sector recommends that the proposal be incorporated into NCWM Publication 14, Weighing Devices Technical Policy, Checklist, and Test Procedures.

13: Listing of Weighing Device Types

Source: 2002 Weighing Sector Agenda Item 4

Background: At the 2001 NTEP Participating Laboratories meeting, the participating labs and the NIST technical advisor were asked to create an outline of device types based upon accuracy class, special use (e.g., vehicle, livestock, etc.), and physical design. Refer to Attachment to Item 4 for a complete draft copy of the outline. See the 2002 Weighing Sector Summary (2003 NTEP Committee Report, Appendix F, Item 4) for complete background information.

Discussion: During the 2003 NTEP Participating Laboratory meeting, the labs discussed an outline format. The labs also reviewed a draft CC template with five drop-down menus that would be used to select the device type in the "For" box on the CC. The labs did not favor the use of the outline format since it did not reduce the number of device types. (Note: The labs did not address the issue of application vs. design device types because there has been no consensus of the Sector or direction from the NCWM membership and regulators.) Therefore, the labs compared the list of device types listed in the Section 2 (Weighing Devices) of Handbook 44, the device types listed on the CCs, and the database search list.

The labs believed the list of device types could be shortened to a manageable level that could be used in the draft CC template and CC search database through either the search selections or possibly a keyword search. The DRAFT template offered a selection from five fields:

Field 1 - Main Type (vehicle, bench, etc.)
Field 2 - System, Instrument (complete device), controller, or element (separable) (load cell technology in the case of load cell CCs)
Field 3 - Main feature or application (load cell design for load cell CCs)
Field 4 - Technology
Field 5 - Accuracy Class

The labs significantly shortened the list and identified device types that would be more appropriately listed as a "feature" in the "Standard Features and Options" (SFO) box in the CC. The Maryland and Ohio participating labs volunteered to continue working on the template using the device types from the shortened list as many of the remaining device types can be considered as design, technology, and features or options that could be located in the SFO box.

Additionally, Steve Patoray indicated that there are approximately 3000 existing CCs that would need to be reclassified according to any future list of device types to facilitate searching the CC database. It was suggested that the CCs be divided among the labs and the lab personnel could code or classify the CCs according to the list of "main" device types. Inactive CCs would not have to be republished but would be recoded or reclassified for the NTEP searchable database. "Active" CCs would have the CC updated to the draft CC template using the list of selections in the different fields.

The Sector was asked to review the approach suggested by the participating laboratories and provide support, comments, and/or suggestions to improve this approach. The Sector was also asked to review the two examples of the CC template fields and selection lists developed by Steve Patoray and Steve Cook and forward comments to them on the preferable CC template approach along with additions or deletions of the template field selections.

Field 1 (Main Type)	Field 2	Field 3	Field 4	SFO
Animal*	Scale	General Application	Mechanical	Automatic hopper scale hopper scale with controlling electronics
Automatic Bulk Weighing	Element	Coupled in motion	Electronic	Axle load weighing**
Automatic Weighing	System	Uncoupled in motion	Electromechanical	Livestock weighing**
Belt conveyor scale system	Load-receiving element	Automatic		Multi-interval* *
Checkweighing *	Controller	Dynamic	Single (LC CC)	Multiple range* *
Computing	Scanner Scale *	Static	Multiple (LC CC)	Postal scale**
Counter/Bench		Grain*		**Scanner Scale****
Crane	Analog (LC CC)	Weight classifier*		Self- checkout
Grain test	Digital (LC CC)	Postal scale*		Single animal weighing**
Hanging	Hydraulic (LC CC)	Multiple range		Weighbeams**
Hopper		Multi-interval		Weight classifier**
Indicator				Pre Packaging**
Livestock*		**S- Type (LC CC)**		
Load cell		**Shear Beam (LC CC)**		
Monorail		Double Ended (LC CC)		
Platform scale (other than bench/counter, vehicle, and etc.)		Canister (LC CC)		
Point-of–Sale*		(Other load cell designs)		
Portable axle load *				
Prepackaging *				
Prescription *				
Railway *				
Vehicle *				
Vehicle onboard weighing *				
Wheel load weighers*				
Others-Berry Basket Customer operated bulk weighing systems Equal arm scale				

Field 1 = Main Type (vehicle, bench, etc.)
Field 2 = System, Scale, or Instrument (complete device), or separable; controller or element (or load cell technology in the case of load cell CCs)
Field 3 = Main feature or application (or load cell design for load cell CCs)
Field 4 = Technology (see Field 2 for load cells)
Field 5 = Accuracy Class
SFO = Standard Features and Option
* If a Handbook 44 ***application-***based type device is selected, it can only be used for that application unless additional applications are listed as options in the SFO
** This type of scale is to be listed as an option if either the technology is an optional feature of a family or the scale is part of a family that can be used in for two or more Handbook 44 "Application-Based Device Types." For example, vehicles scales that have racks and gates in order to weigh livestock or single animals, a short vehicle scale that can be used to weigh axles, railroad scales that can weigh highway vehicles, and etc., must have the capability listed as an option in the SFO box.

An Alternative Approach by Steve Patoray.			
Field 1 (Main Type)	**Field 2**	**Field 3**	**SFO/Application**
Automatic Bulk Weighing	Scale	Electronic	**Animal**
Automatic Weighing	**Element**	Electromechanical	Axle load weighing
Belt conveyor Scale	**System**	**Mechanical**	**Checkweighing**
Computing			Counter/Bench
Crane	Analog (LC CC)	Coupled in motion	Grain
Grain test	Digital (LC CC)	Uncoupled in motion	Livestock
Hanging	Hydraulic (LC CC)		Platform
Hopper		Controller	Portable
Indicating			Portable axle load
Load cell		Dynamic	Postal scale
Monorail		Static	Pre Packaging
Non-Computing			Prescription
Point-of–Sale		Multiple range	**Railway**
Vehicle onboard weighing		Multi-interval	Scanner Scale
Weighing/Load Receiving			Self- checkout
		Compression (LC CC)	Vehicle
		Tension- Type (LC CC)	Weighbeams
		Shear Beam (LC CC)	Weight classifier
		Bending Beam (LC CC)	Wheel load weighers
		Double Ended (LC CC)	
Others- Berry Basket Equal arm scale			

Conclusion: The Sector supports the concept of listing a limited number of device types on Certificate of Conformance template and preferred the list of device types in the table suggested by the NTEP director since it has fewer device types. Additionally, the Sector encourages the NTEP Committee and the NCWM Board of Directors to incorporate a "keyword" search engine in the Certificate of Conformance database.

New Items

14. Recommended Changes to Publication 14 based on Actions at the 2003 NCWM Annual Meeting

Background: The NTEP technical advisor has typically attempted to provide the Sector with specific recommendations for incorporating test procedures and checklist language based upon actions of the previous Annual Meeting of the NCWM. Due to the close proximity of the Annual Meeting and the Sector Meeting, there has not been sufficient time for the NIST technical advisor to develop and vet recommended language for Publication 14 for all items adopted by the NCWM. The Sector was asked to discuss each item and provide general input on the technical aspects of the issues.

Discussion/Conclusion: The Sector chairman discussed alternatives to developing proposed language for recommended changes to Publication 14 during the Sector meeting.

The Sector considered and agreed with the following approaches for developing specific proposed language:

1. The NTEP director, technical advisor, and/or Sector chairman might develop changes to Publication 14 jointly.
2. Additionally, the Sector chairman can appoint small work groups to work with the technical advisor to develop recommended language.

For either alternative, the Sector would then be balloted for approval of the proposed language prior to the NCWM Interim Meeting.

14a. G-S.1. Identification and G-S.1.1. Not-Built-for-Purpose Devices, Software-Based; Software-Based Devices

Background: During its 2003 Annual Meeting, the NCWM agreed to modify Handbook 44 paragraphs G-S.1. and G-S.1.1. The approved language will be incorporated into the 2004 Edition of NIST Handbook 44. See the 2003 S&T Committee Annual Report Item 310-1 for language adopted by the NCWM at that meeting.

Discussion: The Sector reviewed the new language for Handbook 44 and Publication 14 DES Section 3. Marking – Software. The Sector discussed the possibility of a small work group to amend Publication 14, Section 3 and recommended that the language be kept brief and straightforward. The NTEP director stated that all sections of Publication 14 are affected by the new language in Handbook 44 and suggested the work group limit the review to digital electronic scales for completion by November 2003. The NIST technical advisor to the Weighing Sector was asked to incorporate the language, as appropriate, into the checklists for the following devices:

ABWS Section 17. Marking – General, BCS Section 8 Marking Requirements,
ECRS Section 5. Identification,
AWS Section 1. General Code Requirements, Identification, and
MDMD Section 1. Marking – Complete Devices (and main elements).

Conclusion: The Ohio and Maryland participating laboratories and Bob Hamilton (Mettler-Toledo) volunteered to develop language that can be recommended for incorporation into Publication 14. The NIST technical advisor will ballot the Sector members for their approval.

14b. Counting Feature on Class I or II Scales Used in Prescription-Filling Applications.

Background: During its 2003 Annual Meeting, the NCWM agreed to modify paragraph S.1.2.3. of NIST Handbook 44. The approved language will be incorporated in the 2004 Edition of NIST Handbook 44. See the 2003 S&T Committee Annual Report Item 320-2 for language adopted by the NCWM at that meeting.

Discussion: The Sector reviewed the language adopted by the 88th NCWM at their annual meeting and discussed a draft checklist developed by Brian Christopher (McKesson) that was distributed to the Sector. The Sector discussed the need to verify that minimum piece weight and piece count limits required by the new language in Handbook 44 are effective. Additionally, NTEP tests should be conducted with counts and load that are less than the minimums in new paragraph S.1.2.3. that verify the scale is prevented from displaying a total piece count (e.g., 29 e and/or 9 pieces for samples to determine piece weights). There was also a discussion that the scale cannot be recalibrated while evaluating the counting feature. The manufacturers explained that it is possible to have inaccurate weight measurements and still have correct count indications. Additionally, the recommended checklist should include verification of new marking requirements.

Conclusion: The Sector recommends that the Publication 14 evaluation checklist submitted by Brian Christopher be further developed with the assistance of the participating laboratories, the NTEP director, and the NIST technical advisor. Since applicants are waiting for the new requirements in Handbook 44 to become effective, the Sector recommends that the checklist be used on an ***ad hoc*** basis until the procedure can be fully evaluated and accepted by the Sector.

14c. Section and Shift Test Procedures for Livestock Scales.

Background: During its 2003 Annual Meeting, the NCWM agreed to modify Section N.1.3.4. of NIST Handbook 44. The approved language will be incorporated in the 2004 Edition of NIST Handbook 44. See the 2003 S&T Committee Annual Report Item 320-2 for language adopted by the NCWM at that meeting.

Discussion/Conclusion: The Sector reviewed the language adopted by the 88th NCWM at their Annual Meeting and Publication 14 Section DES 64. The Sector reviewed and recommended the following proposal submitted by Don Onwiler (NE) to amend Publication 14.

64.1.2. Performance Tests for Livestock Scales with More than 2 Sections:

At least two complete sets of shift tests shall be conducted over each ~~section~~ main load support. This is to determine the repeatability of the scale. ~~Each set must include determination of error~~ Record increasing/decreasing load indications as you add weights to or remove weights from the platform at a minimum of five intervals of test loads up to, but not exceeding, ~~90~~ 50 % of the section capacity repeated over each ~~section~~ main load support. For the first set, perform this test on each ~~section~~ main load support, unloading the weights and checking zero balance before going on to the next ~~section~~ main load support. For the second set, complete the increasing load build-up on one ~~section~~ main load support and move the weights to the next ~~section~~ main load support without unloading the scale. If a scale consists of modules connected together to comprise the weighbridge, conduct shift tests by placing the load to the left, right and center of the connection between the modules. Take several readings as the weights are being removed. When all the weights have been removed, record the return to zero. The scale must return to zero within one-half of a scale division. ~~When analyzing the return to zero, consider the length of time the load was on the scale and for possible temperature changes that may have occurred during the test.~~ ~~Determine scale errors at more points if desired. Avoid decreasing load tests when testing a section.~~ Next, conduct an increasing load test to the scale nominal capacity ~~or at least to the used capacity~~ by distributing the test load over the platform in at least five intervals and record the error for each interval. Be careful not to exceed the SECTION CAPACITY of a section when loading the weights and distributing loads across the section. Record decreasing load indications as you remove weights from the platform in at least five intervals. The scale must return to zero within one-half of a scale division.

~~Conduct decreasing load tests after the sections have been tested to their maximum load and the weights are from the scale.~~

NOTE: *Decreasing-load tests only apply to automatic indicating devices.*

~~64.1.3.~~ ~~At least one complete set of shift tests to at least 90 % of the section capacity shall be conducted at mid span between sections.~~

~~64.1.4.~~ ~~If a scale consists of modules that are connected together to comprise the weighbridge, conduct shift tests by placing the load so that it straddles the connection between the modules. Later, conduct at least one shift test on the scale with the test load placed first on one side of the connection line of the module, then on the other side of the connection line.~~

64.1.~~5~~3. The results of shift tests must agree within the absolute value of the applicable maintenance tolerances and must be within acceptance tolerances.

14d. Power Supply, Voltage and Frequency

Background: During its 2003 Annual Meeting, the NCWM agreed to the following amended language for the 2004 Edition of NIST Handbook 44:

T.N.8.3.1. Power Supply, Voltage and Frequency.

(a) Weighing devices that operate using alternating current must perform within the conditions defined in paragraphs T.N.3. through T.N.7., inclusive, from -15 % to +10 % of the marked nominal line voltage(s) at 60 Hz or the voltage range marked by the manufacturer at 60 Hz (range takes precedence).

The NIST technical advisor modified language from OIML R76-1 for Non-Automatic Weighing Instruments and the OIML R76-2 test form for voltage tests to amend existing Publication 14 voltage power supply language and tests in Section 60.7. Test.

Discussion: The Sector reviewed the proposed amendments to Publication 14 and the new test form. The proposed procedure requires the evaluator to conduct increasing and decreasing load tests. The earlier procedure only tested the device under test at one test load. The additional performance test more closely aligns the tests and report form with OIML R76. Some participating laboratories indicated that the additional test should be conducted. The manufacturers stated that the additional tests are unnecessary and suggested that the labs perform both tests over the next year and report the difference in test results at the 2004 meeting of the Weighing Sector. If there are no differences, the information could be submitted to the Secretariats for the revision of R76 to justify amending the international procedures and test forms.

Manufacturers recommended deletion of the language that the test shall be performed at V_{min} -15 % and V_{max} +10 %. The justification is that the range marked on the device includes the most common range of nominal voltages in addition to the V_{min} -15 % and V_{max} +10 %. One manufacturer stated that is it only necessary to test the device at -15 % +10 % of $V_{nominal}$, or in case a range is marked on the scale, V_{min}, V_{max}, and $V_{nominal}$.

Conclusion: The Sector agreed with the recommendation to perform voltage variation tests at -15 % and +10 % of $V_{nominal}$, or in case a range is marked on the scale, V_{min}, V_{max}, and $V_{nominal}$. The laboratories agreed to perform type evaluation tests for voltage variations at a single test load and during an increasing/decreasing load test and report the results to the technical advisor prior to the next meeting of the Sector.

The Sector further recommends that the following be included in Publication 14:

60. Power Voltage Variations

Code References: T.N.8.1.3.

The power supply is varied to determine the performance and operating characteristics of the equipment under test at different voltage levels required by T.N.8.3.1.~~found in the field under normal operating conditions.~~

Note: Where an instrument is powered by a three-phase supply, the voltage variations shall apply for each phase successively.

If the instrument is provided with an automatic zero-tracking device, it may be in operation during the test, in which case the error at zero point shall be determined by determining the error at a test load several intervals above the zero tracking limits.

(Delete paragraph 60.3.4.)

~~60.3.4. AZSM operable if so equipped and appropriate for the intended use.~~

13. VARIATION OF VOLTAGE
(T.N.8.3.1. DES Section 53.3)

Control No.: ________________________
Pattern designation: ___________________

Date: ____________________________
....

Observer: __________________________
Verification scale interval e: ___________

	At start	At max	At end
Temp °C:			
Rel. h %:			
Time:			
Bar. Pres (hPa): (Class I Only)			

Automatic zero-setting and zero-tracking device is:

☐ Non-existent ☐ Not in operation ☐ Out of working range ☐ In operation

Marked nominal voltage or voltage range AC or DC (from main):	
Marked nominal DC voltage battery operated instruments:	

………………………

E = I + 1/2 e -) L - L

E_c = E - E_0 with E_0 = error calculated at or near zero (*)

Voltage (**)	U (V)	Load L		Indication I	Add. Load) L	Error E	Corrected error E_c	mpe
Reference value		10 e						
		½ max						
		max						
Reference value – 15 % (or lower limit of battery voltage)		10 e						
		½ max						
		max						
Reference value + 10 % (or upper limit of battery voltage)		10 e						
		½ max						
		max						
Reference value		10 e						
		½ max						
		max						

** In case a voltage range (V_{min}, V_{max}) is marked, then the test shall be performed at $V_{min,}$ V_{max} and at the nominal line voltage of the laboratory.

☐ Passed ☐ Failed

Remarks:

14e. Concentrated Load Capacity - Definition.

Background: During its 2003 Annual Meeting, the NCWM adopted the following language for the 2004 Edition of NIST Handbook 44:

> **concentrated load capacity (CLC)** **(also referred to as Dual-Tandem Axle Capacity (DTAC).** A capacity rating of a vehicle or axle-load scale specified by the manufacturer, defining the maximum load applied by a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet for which the weighbridge is designed. The concentrated load capacity rating is for both test and use.[2.20]

Discussion/Conclusion: The Sector compared the definition of "CLC" as adopted by the 88th NCWM at its Annual Meeting to that in Publication 14 Section DES 65 – Vehicle Scales. The Sector recommends no further action on this item since changes in the definition of CLC in Handbook 44 do not affect the test procedures in Publication 14.

14f. Substitution and Strain Load Definitions, Test Notes and Tolerances.

Background: During its 2003 Annual Meeting, the NCWM adopted the following language for the 2004 Edition of NIST Handbook 44:

> **T.7. Tolerances for Strain-Load Test. -** The tolerances apply only to the test weights or substitution test load.
>
> **<u>substitution test. A scale testing process used to quantify the weight of material or objects for use as a known test load.</u>**
>
> **<u>substitution test load. The sum of the combination of field standard test weights and any other applied load used in the conduct of a test using substitution test methods.</u>**

Discussion and Recommendation: The Sector compared the new definitions for "substitution test" and "substitution test load" as adopted by the 88th NCWM at its Annual Meeting and to those in Publication 14 Section DES 65 – Vehicle Scales, 68 – Railroad Track Scales, and 71 – Hopper Scales. In 1997 Richard Suiter (NIST) developed substitution test procedures for hopper scales that were incorporated into the 1998 Edition of Publication 14. Gary Castro (CA) agreed to modify those procedures to produce a generic procedure suitable for use on all scales. The Sector reviewed and approved the following addition for inclusion in Publication 14:

Add new Publication 14 Section 74 and refer existing references in Sections 64.3, 65a, 65b, and 65c to this section.

<u>74 Guidelines for Substitution Test Procedures</u> (Locate along with guideline documents at end of Pub 14 DES)

Code References<u>: N.1.11., and N.1.12.</u>

<u>In the substitution test process, material or objects are substituted for known test weights, or a combination of known test weights, and previously quantified material or objects, using the scale under test as a comparator. Additional test weights or other known test loads may be added to the known test load to evaluate higher weight ranges on the scale.</u>

<u>Tolerances are applied to the scale based on the substitution test load.</u>

Sections 74.1. through 74.2.14 of Publication 14 remain unchanged.

15. Policy on Converting CLC on Section Capacity for Active Livestock Scale CCs.

Source: NIST WMD

Background: NIST became aware that a livestock scale manufacturer and Montana Weights and Measures identified a problem in Handbook 44 paragraph S.6.5 for 2-section livestock scales with CLCs greater than 1/2 times the nominal capacity. Prior to defining CLC, there was no Handbook 44 relationship of the rated section capacity to the nominal capacity. The section capacity requirement added to Handbook 44 in 2002 now has a relationship with the nominal capacity, depending on the number of sections. When CLC requirements were added to Handbook 44 in 1989, the NTETC Weighing Sector established a policy that allowed existing section capacities be reclassified with CLCs determined by the manufacturer. See the January 1989 Sector Summary in the 1990 NTEP Committee Annual Report for complete background information.

Discussion: The Sector discussed language to establish a technical policy for livestock scale CCs issued between 1999 and 2003. One manufacturer stated that the company increased its nominal capacities when their CCs were amended to change section capacity ratings to CLC ratings and that their nominal capacities should be lowered to comply with the new requirements. Not all livestock scale CC holders requested this increase in nominal capacity. A Sector member noted evaluations conducted during this period complied with all Handbook 44 requirements at the time of the evaluation, and forcing these companies to reduce the nominal capacity or resubmit the device for reevaluation is unreasonable.

The Sector reviewed and discussed a proposal from the State of Montana that would remove the apparent "design criteria" in the recently adopted language in Handbook 44 paragraph S.6.5. It was also reported that the Central Weights and Measures Association Specifications and Tolerances (S&T) Committee forwarded this proposal to the NCWM S&T Committee. The Nebraska and Oregon participating laboratories supported the Montana proposal since it removes "design criteria" from Handbook 44 and would not penalize manufacturers that have complied with earlier type evaluation requirements. One manufacturer stated that the proposal would permit under-engineered scales and possibly make manufacturers liable in the event of damage should a scale collapse under concentrated loads. Other manufacturers made no additional comments in support of or opposition to this statement.

Conclusion: The Sector did not reach consensus on a technical policy for livestock scale CCs with CLC ratings. Additionally, the Sector did not develop a position on Montana's proposal to the NCWM S&T Committee.

16. Not-Built-For-Purpose (Software) System Evaluations.

Source: Maryland NTEP Laboratory

Background: The NTEP labs receive a large number of assignments for software-based systems. The laboratories have been informed to evaluate these systems using the requirements for hardware-specific devices, but it is a difficult task to do. Not-built-for-purpose software, i.e., software installed on an off-the-shelf personal computer (PC), appears to provide the end user with greater access to change metrologically significant parameters than the software placed on an EPROM within a hardware-specific device.

In 1998 the NCWM voted that NTEP would not evaluate and issue NTEP certificates for software. Evaluations would be conducted on <u>complete</u> systems and would receive device or system NTEP certificates. The NTEP laboratories and the manufacturers were not given any documented guidance on how to address the following issues on the complete software-based systems:

-What hardware/software could be substituted in the system and what is the basis for determining the compatibility?
-What must be listed on the Certificate if verification of the software used in the system is necessary (operating system, memory size, processor speed)?

The thoroughness of all evaluations relates directly to the evaluator's experience as a field inspector and knowledge of PCs, programming languages and basic scale designs. Without clear guidelines and proper training in software, the NTEP laboratories may not apply the appropriate requirements uniformly.

The last Software Work Group was assigned the task of developing guidelines. This task was never completed. All laboratories should utilize the interim policy described in the October 8, 1997, NTEP memo. Alternatively the labs could develop a supplemental checklist for the evaluation of software.

The interim policy has not been updated or replaced and is not being consistently applied among the NTEP labs. Software-generated primary weight displays are not consistently checked for compatibility with various combinations of hardware interfaced to the software.

At their 2003 meeting, the weighing devices participating laboratories recommended that the NTETC Weighing Sector and NTEP Committee consider incorporating an updated version of the interim policy (October 8, 1997) into Publication 14, "Administration Policy Section C, Devices to be Submitted," or Publication 14 Technical Policy for Scales.

The labs agreed that an evaluation of a software-based system does not need to include a field evaluation if it can be demonstrated that the system complies with Publication 14 procedures when interfaced with weighing-elements or load-cell simulators, indicator(s), recording elements and representative computer hardware and operating systems. The evaluation can take place at the NTEP laboratory, manufacturer's facility, a field test site, or a combination of locations.

Additionally, some of the labs requested clarification about the interim policy listing compatible hardware and whether the list was applicable to combinations of weighing and measuring device elements or not-built-for-purpose hardware such as computer monitors, microprocessors, and computer operating systems. NIST confirmed the statement **"that compatibility list will be included on the Certificate of Conformance"** was intended to apply to the computer (PC compatible, Mac, or other) using the application software. It was not intended that the CC list compatible weighing, measuring, indicating, and recording elements.

Discussion: Since this item was inadvertently not discussed during the 2003 Weighing Sector meeting, the NIST technical advisor balloted the Sector on the following policy for software-based not-built-for-purpose devices and accessories to weighing systems and asked the Sector to consider a recommendation to add the following policy to Publication 14 NTEP Technical Policy for Scales Section A. Models to be Submitted for Evaluation.

> **Software-based, not-built-for-purpose devices.** Software-based not-built-for-purpose weighing equipment or accessories used in conjunction with weighing equipment or systems submitted for evaluation must be evaluated with a complete weighing system and will be evaluated using the same Publication 14 criteria applicable to built-for-purpose weighing equipment or accessories. The applicant will provide the NTEP participating laboratory a representative weighing system including indicating, printing, and load-receiving elements (or load-cell simulators) along with representative not-built-for-purpose hardware such as a computer running the application software, keyboard, and computer display (the applicant's software will not be installed in computers used by the NTEP laboratories). The evaluation will include all potential use applications (weigh-in/out, livestock, postal/parcel shipping, automatic bulk weighing, etc.) identified on the NTEP application. The evaluated use applications will be listed on the Certificate of Conformance.
>
> Typically, the entire evaluation can be accomplished at the NTEP participating laboratory or at a manufacturer's or applicant's facility. It is up to the applicant and the assigned laboratory to conduct the evaluation at the participating laboratory, manufacturer's facility, field test site, or a combination of test sites where data can be collected and evaluated to complete the evaluation.
>
> The NTEP application must specify the minimum operating requirements for which software used in the system is designed to be compatible, and that list will be included on the Certificate of Conformance. For example, the CC may state, "The software used in not-built-for-purpose weighing devices or used in connection with weighing devices or systems must be used with any generic, IBM-compatible (or MAC) computer, with a XXX or higher operating system, 4XX or higher processor."

The results of the vote were as follows:

> 9 – Affirmative (3 labs, 5 manufacturers, and 1 manufacturer with comments)
> 1 – Opposed with comments (lab)
> 4 – Abstained (3 were not present at the meeting)

Conclusion: The Sector recommends the following technical policy, as edited by the NIST technical advisor, based upon comments received in the responses to the ballot, for software-based not-built-for-purpose devices be added to Publication 14 NTEP Technical Policy for Scales Section A. Models to be Submitted for Evaluation.

> Software-based, not-built-for-purpose devices. Software-based, not-built-for-purpose weighing equipment or accessories used in conjunction with weighing equipment or systems submitted for evaluation must be evaluated with a complete weighing system and will be evaluated using the same Publication 14 criteria applicable to built-for-purpose weighing equipment or accessories.
>
> The applicant will provide the NTEP participating laboratory with a complete and representative weighing system, and shall include the hardware necessary for the normal metrological operation and NTEP evaluation of the device.
>
> The following is a list of hardware that may be necessary to complete the NTEP evaluation. The applicant and assigned laboratory should agree on additional pieces of hardware necessary for the normal metrological operation and NTEP evaluation of the system.

Complete scale(s) or Separable (Primary) Indicating Element with a Load-receiving element(s) and/or load-cell simulator(s); and

Printing/recording element	Mouse
Minimum computer technology and memory to be covered on the CC	Operator keyboard
Application and associated software	Monitor
Type and minimum Operating System (OS) to be covered on the CC	

The applicant's software will not be installed in computers used by the NTEP laboratories. The evaluation will include all use applications (weigh-in/out, livestock, postal/parcel shipping, automatic bulk weighing, etc.) identified on the NTEP application. Only the evaluated use applications will be listed on the Certificate of Conformance.

The entire evaluation can be accomplished at the NTEP participating laboratory or at a manufacturer's or applicant's facility. The applicant and the assigned laboratory shall agree where to conduct the evaluation, either at the participating laboratory, manufacturer's facility, field test site, or a combination of test sites where data can be collected and evaluated to complete the evaluation.

The NTEP application shall specify the minimum operating requirements for which software used in the system is designed to be compatible. That list will be included on the Certificate of Conformance. For example, the CC may state, "The software used in not-built-for-purpose weighing devices or used in connection with weighing devices or systems must be used with any generic IBM-compatible (or MAC) computer, with an XXX (ex: DOS X.X, Windows XX.X, IBM PS2, MAC OS X.X, and etc.) or higher operating system, and an XX or higher processor ."

The CC must include the following information:

- Application(s) (ex. POS, livestock, parcel, automatic bulk-weighing, and etc.)
- Manufacturer or applicant of the software-based, not-built-for-purpose device
- Application software model(s) evaluated
- Application software version XXXXX evaluated and higher
- (MAC, PC or XXX) compatible "software-based, not-built-for-purpose device (hardware)"
- (DOS X.X, MAC OS X.X, Windows XX, IBM PS2, or . . .) or higher operating system
- XXX or higher microprocessor with a speed of XXX or higher
- Additional hardware necessary for the normal "metrological" operation of the device (e.g. UPS, PLC controller, and etc.
- A statement such as "The ***software-based, not-built-for-purpose device or system*** may be interfaced with compatible weighing equipment that has a CC (ex. complete scale(s) or separable indicating and load-receiving elements)."

17. Section E. Modification of Type – Replacing Lever Systems with Load Cells.

Source: NTEP Participating Laboratories

Background: (See the 1999 NCWM NTEP Committee Report, Appendix J, Item 29 for complete background information.)

This subject was addressed at the November 1998 meeting of the NTETC Weighing Sector, and, at that time, the "Sector agreed that replacing **any** levers of a mechanical weighing element with load cells is a modification of type requiring NTEP evaluation . . .." Part 1 states, "Total replacement of any levers . . ." is a modification of type. Publication 14, Section E, Part 1, however, is unclear with respect to the replacement of levers with load cells.

As an example: the transverse lever and main levers have been removed on a three-section scale. All support levers are still in place, but there are now three load cells. Is this type modification ***acceptable*** without **a**dditional NTEP evaluation? The Sector is asked to consider the following proposal. If the modification ***is not acceptable,*** Section E should be amended to clarify the use of the words "**total**" and "**any**" since they may be considered conflicting terms or may be responsible for inconsistent application of this technical policy.

Additionally, part 2 of Section E requires that the modification option for placing a load cell in the steelyard rod be listed on the CC. The NTEP laboratories question if this policy is necessary. While this is not a broad-based problem, NTEP should be specific on the regarding the various types of levers that can or cannot be replaced without additional NTEP evaluation.

Discussion: At the 2003 participating laboratory meeting, the labs supported the change that the placement of a load cell in the steelyard rod does not have to be listed on the Certificate of Conformance. Field inspectors are not aware of this NTEP requirement, and this type of option or feature has not consistently been listed on CCs. There was also discussion about whether or not the replacement of different types (functions) of levers or partial replacement of levers with load cells should be allowed without additional NTEP evaluation. The labs were concerned that individual states might apply different policies without a specific NTEP policy.

The Kansas lab related its experiences with lever replacement as a service agent and presented the following justifications that the partial replacement of levers should be considered a modification of type that requires additional NTEP evaluation.

1. Center extension levers are typically replaced if the entire scale has deteriorated and should be replaced.
2. Main levers (sections) ratios and lever multiples change with mechanical adjustments. This would be a problem with selecting the proper load cell depending upon which lever the load cell was replacing. There are compatibility problems unless mechanic knows what he is doing.
3. Independent power supplies may be required which affect the load cell sensitivity to influence factors.
4. There are too many combinations of lever types and load cells to make a "one size" fits all policy regarding partial lever replacement.
5. The different mechanical (multiple) ratios and the amount of lever movement or travel have an impact on compatibility that requires a well-trained service agent.

While the participating laboratories agreed the placement of a load cell in the steelyard rod does not have to be listed on the CC, they believe that any replacement or modification of any lever (knife/bearing size, material, etc.) is considered a modification of type that should be evaluated and listed on the CC.

Conclusion: There was general support to amend Section E as recommended by the NTEP participating laboratories. A scale manufacturer asked if the recommended policy would apply to replacing the levers on mechanical scales and replacing them with load cells if the mechanical scales had an identical weighbridge and a full electronic scale. The response from the Sector indicated that the policy *would not apply if* the original manufacturer or its authorized representative modified the mechanical scales consistent with a full electronic scale with the same weighbridge design. The proposed policy would apply if the original manufacturer were not involved with the modification or the weighbridges were not identical. Further, the NTEP technical policy on retrofitting scales would apply if a manufacturer performed this modification to another manufacturer's scale and relabeled it as its own. Additionally, the Sector considered cutting levers and removing parts of a lever system (e.g., pipe lever) as a modification to the type that would require additional NTEP evaluation to be covered on an NTEP CC.

Recommendation: The Sector recommends the following amendments to Publication 14 Section E. Modification of Type – Replacing Lever Systems with Load Cells and Conversion of Mechanical Scale to Electro-Mechanical:

E. Modification of Type

Note: *Drawings should be submitted for all applications for a modification of type (except paragraph 2). Any NTEP application for a modification of type must be a completed NTEP Scales Application. (not an NTEP non-technical, editorial change application)*

1. **Replacing a Lever System with Load Cells**. ~~Changing a scale from a lever system scale to a full electronic scale, is considered a modification of type. Total~~ Replacement or modification of any levers in a mechanical scale for the purpose of installing load cells is a modification of type that is not covered by the original CC ~~without additional testing~~.

2. **Conversion of Mechanical Scale to Electro-Mechanical.** The placement of a load cell in the steelyard rod to change from a mechanical to an electronic indicator is an acceptable modification of type that does not require evaluation for an existing CC to apply~~; however, the modification option must be listed on the NTEP CC~~.

(There are no recommendations to amend the remaining paragraphs in Section E.)

18. Physical Security Seals on Scales with External Calibration Capability.

Source: NTEP Participating Laboratories

Background: At the 2003 NTEP Participating Laboratory Meeting, the participating labs reported they have come across examples where a device could be sealed with a physical security seal while the device had been configured with access to external means to change calibration and configuration parameters. The labs have been using Handbook 44 General Code paragraph G-S.2. Facilitation of Fraud to require the applicant to correct this problem.

One laboratory reported that it had to accept this because the applicant stated that "if the operator had followed the operating instructions, this would not happen." Furthermore, the applicant cited Handbook 44 General Code paragraph G-UR.3.1 Method of Operation that states:

> **G-UR.3.1 Method of Operation.** - Equipment shall be operated in the manner that is obviously indicated by its construction or that is indicated by instructions on the equipment.

It was pointed out that Handbook 44 General Code paragraph G-S.8. Provision for Sealing Adjustable Components. and Scale Code paragraph S.1.11. Provision for Sealing. state that provisions shall be made for applying a security seal in a manner that requires **the security seal to be broken before an adjustment can be made to any component affecting the performance of an electronic device**. The participating laboratories believe that external access to the calibration or configuration parameters without breaking a security seal or advancing the event counters does not comply with Handbook 44 regardless of the operator instruction manuals.

Some labs stated that there should be something in Publication 14 that tells the evaluator to look for ways to access the calibration or configuration parameters without breaking a security seal or advancing the event counters. Alternatively, Handbook 44 could be amended to make it clear that the device provide an indication that it is in the calibration mode.

This was considered an appropriate subject for the joint LMD and Weighing Sectors discussion since it involves all devices.

It was also noted that Publication 14, Section 10.10 - Category 1 Devices does not go into detail regarding compliance with Handbook 44 references. Existing language only asks if the device is sealable with a physical seal (Y/N/NA) or equipped with two event counters. Publication 14 does not ask the evaluator to verify if the physical seal is effective (reference G.S.8. and S.1.11.a.).

The NTEP weighing laboratories recommended a proposal be developed and submitted to the NCWM S&T Committee to amend the language for Category 1 devices to require a device to clearly indicate it is in the calibration mode and record such message if capable of printing in this mode (similar to the requirement for Category 2 devices). The language should be consistent with the language used for Category 2 devices. Additionally, the laboratories developed language changing the "notes" on physical seals into a checklist format and suggested additional language requiring the physical seal be "effective." The laboratories further recommended the Sector review and recommended the checklist language be added to Publication 14, paragraphs 10.10 to assure NTEP evaluators physical seals are verifiably effective.

Discussion: The Weighing Sector discussed the amendments to Publication 14 recommended by the participating laboratories. The manufacturers present were concerned the term "effective" in proposed paragraph 10.14 is vague and should be more definitive. There was also discussion that the new language in proposed paragraph 10.14 be effective one year after its incorporation into Publication 14. There was also a suggestion to amend Handbook 44 Method of Sealing for Category 1 weighing devices to require the device to clearly indicate when it is in the "set-up mode." It was reported that there was a commitment from Will Wotthlie (Maryland Measuring Sector laboratory) to submit a proposal to the Southern Weights and Measures Association at its 2003 annual meeting.

Conclusion: The Sector supports the interpretation of Handbook 44 General Code paragraphs G-S.2 Facilitation of Fraud, G-S.8. Provision for Sealing Adjustable Components, and Scale Code paragraph S.1.11. Provision for Sealing that provisions shall be made for applying a security seal in a manner that requires the security seal to be broken before an adjustment can be made to any component affecting the performance of an electronic device regardless of instructions provided in the instruction/service manual for the device. The Sector further agreed to support the concept of the proposal to amend Handbook 44 Category 1 Method of Sealing to require a device clearly indicate that it is in the set-up mode.

The Sector also recommended the following amendments to Publication 14, section 10. The language proposed by the laboratories and amended by the Sector was given a 2005 effective date to allow NTEP applicants not in attendance sufficient time to comply with the new checklist requirements.

Physical Seals – General (*Note: Single underlined text was copied from the "Notes on Physical Seals." Double underlined text is language recommended by the weighing laboratories.* ***Bold single underlined and italics text*** *represents language added to the laboratory proposed language by the Sector.*)

10.11	The provision for sealing must be located such that a security seal can be applied without disassembly that exposes electronics. Any disassembly must be simple and not require excessive effort; for example, removing a protective cover plate to seal a junction box is acceptable. In general, it is desirable to be able to seal a device without the need for disassembly.	**Yes □ No □ N/A □**
10.12	A scale shall be sealed in a manner that prevents disassembly of the device by removing a cover or cabinet to gain access to the adjustments.	**Yes □ No □ N/A □**
10.13	The bottom of a device is an acceptable location for a security seal only if the scale is designed so that it is not damaged when turned on its side or upside down to remove and apply security seals.	**Yes □ No □ N/A □**
~~10.14~~	~~The physical (wire and lock or self-destructive pressure sensitive) security seal shall be effective to prevent external access to calibration means without breaking or damaging the security seal.~~	~~**Yes □ No □ N/A □**~~
10.14	***Access to the sealable parameters is prevented without destroying the physical seal (for devices that incorporate a physical seal to protect adjustments of sealable parameters) (Effective January 1, 2005).***	***Yes □ No □ N/A □***
10.15	When two bolts are used for a lock and wire security seal, the bolts must be such that the lock and wire security seal will be broken when an attempt is made to unscrew the bolts. The use of a "free-standing bolt" to serve as a second screw for threading a lock and wire security seal is not acceptable. A "free-standing bolt" is one that simply passes through a panel and is held in place by a nut on the opposite side of the panel but is not holding any parts together. Because the free-standing screw may be loosened to the extent that the bolt will rotate in its position, this permits the other bolt to be turned and the wire of the seal maneuvered over the top of the bolt while turning the free-standing bolt to keep the wire from twisting. In this case, the security seal can be removed to gain access to the adjustments without breaking the seal.	**Yes □ No □ N/A □**
10.16	In lieu of the second fixed bolt, a metal tab fixed to the case or a plastic tab molded into the case may be used. The fixed nature of the tab usually causes in the wire to twist and break before the bolt can be removed.	**Yes □ No □ N/A □**
10.17	If the lock and wire security seal is located under the platform of a scale, then there must be ample clearance to eliminate the possibility of interference between the seal and the platform.	**Yes □ No □ N/A □**

10.18	An indicating element that uses a NEMA 4 enclosure shall be sealed in a manner that prevents the seal from being circumvented. This may be achieved by threading a lock and wire security seal through the head of the bolt through one of the hinges and the lip of the cover of the indicator. It is not sufficient for a lock and wire security seal to be threaded through the head of the bolt and the opening in the hinge because it can be circumvented by loosening the screw slightly and pressing down on the cover to compress the sealing material and slipping the hinge off the cover.	**Yes □ No □ N/A □**
10.19	***The scale must clearly indicate it is in the set-up (calibration or configuration) mode, such as indicators, error message, or other means of indication that cannot be interpreted as legal weight values (Effective January 1, 2005).***	***Yes □ No □ N/A □***

Renumber remaining paragraphs and delete the "Notes on Physical Seals."

19. Screen Savers on Electronic Cash Registers and Point-of-Sale Systems.

Source: Mettler Toledo

Background: **See Item 11 of the 2002 Weighing Sector Meeting Summary (Screen Savers on Electronic Cash Registers and Point-of-Sale Systems) for additional background information.**

During the 2002 Sector meeting, a vote was taken to decide if labeling is required on a weighing device (scale), independent of an ECR, that defines the "other than continuous zero indication" when the scale uses a scrolling message to indicate gross zero. The vote was in favor of adding the labeling requirement and the additional wording was subsequently added to Publication 14 2003 Edition in the Digital Electronic Scales section and associated checklist.

Mettler Toledo recommended the labeling requirement in Publication 14 2003 Edition be deleted, claiming that Handbook 44 Scales Code paragraph S.1.1.c. Zero Indication. permits a zero-balance indication "by other than a continuous digital zero indication, provided that an effective automatic means is provided to inhibit a weighing operation or return to a continuous digital indication when the scale is in an out-of-balance condition." There is no labeling requirement in the Scales Code section of Handbook 44.

Mettler Toledo also maintains there is no risk to the consumer if the approved device meets the performance requirements of Publication 14, 2002 Edition, Section 11.12. Specifically, it should be considered acceptable if the device automatically displays weight values when the device goes into an out-of-balance condition. A device that is properly designed by the manufacturer and properly evaluated during the type evaluation process will inherently provide protection to the consumer.

Further, Mettler Toledo claimed the labeling requirement adds cost to the device manufacturer but adds no benefit to the consumer. As a manufacturer, Mettler Toledo opposed additional labeling requirements since the goal is to meet the requirements by design, not by adding labels.

Mettler Toledo proposed the wording in Publication 14:2003 be changed as follows:

1. Section 11.8.4: delete the fifth paragraph, including the reference to G-S.6. Reference to G-S.6 is not appropriate since "the specific code requirements supercede General Code requirements in all cases of conflict" per G-A.2.

2. Section 11.8.4, box #4

- ❑ Activation of the sleep or battery/power save mode only turns off the primary weight display or the primary weight display is replaced by scrolling messages or dashes. ~~The method of indicating a zero balance condition must be clearly defined as the zero indication as required by General Code paragraph G.S.6 Marking Operational Controls, Indications, and Features. The legend must state, "Scrolling messages indicate scale is at zero" or similar statement.~~

3. Section 11.8.4.2.
~~If the primary weight display disappears in the screen saver/sleep mode with the scale at zero and the power to the scale is not automatically shut off, the display must comply with (a) or (b) below:~~

~~(a) The zero indication or zero annunciator must be displayed, or defined if zero is indicated by other than a digital zero indication or annunciator.~~ ~~Yes □ No □ N/A □~~

~~If a legend is used to define zero, it must be included adjacent to the display to indicate that the information (dashes, scrolling messages, and etc.) indicate the scale is on zero.~~ ~~Yes □ No □ N/A □~~

There were no changes to the remainder of Section 11.8.4.2.

Add 11.8.4.3

11.8.4.3. Put the device into a net-zero mode by placing a small weight on the platform and taking a tare (push button tare) or by entering a keyboard tare and then placing an equivalent load on the platform. Confirm that the device will not go into a screen saver mode. Yes □ No □ N/A □

There is still a disagreement among NIST, regulators, and manufacturers concerning Handbook 44 Scales Code paragraph S.1.1. Zero Indication. and the interpretation of the discussion included in the 78th NCWM Specifications and Tolerances (S&T) Committee Item 320-1. This has resulted in inconsistent evaluations and weights and measures enforcement of scales and point-of-sale systems interfaces with scales that use methods such as screen saver, power saver, scrolling display, and modes of operation to indicate that a device is at a no-load condition.

In 1976, the 61st NCWM adopted paragraph G-S.6. Marking Operational Controls, Indications, and Features. In addition to a discussion on the marking of operator instructions, the discussion of the subject included a statement that there was "also a problem for customers to determine that those devices used in direct sales are being properly operated, and for weights and measures officials when encountering this equipment in the field for the first time."

NIST and some of the participating laboratories have stated that a weighing device shall be marked or an indication provided that states zero is represented by other than a digital zero (e.g., if a zero annunciator is provided, scale is marked with statements such as "scale at zero" or "scrolling" message indicates the scale is at zero). The customer must be provided adequate information (zero, net weight, unit price, and price to pay) to determine the validity of the transaction and make a determination to accept the transaction. (Note: The NIST technical advisor is not aware of customer complaints or concerns about a lack of a "digital zero" indication on scales and is interested if there have been issues raised from field officials and the public.)

The Report of the 78th of the NCWM Annual Meeting, S&T Committee Item 320-1 S.1.1. Zero Indication reported that there was early concern regarding alternative indications for indicating the zero balance condition of a scale. Comments submitted to the Committee, however, indicated that weights and measures officials were willing to accept alternative forms for indicating the zero balance condition if clearly defined.

Discussion: The Weighing Sector reviewed the above discussion. Manufacturers provided additional input that there have been no customer complaints on scales with "other than digital zero indications" without additional markings or annunciators and further state additional markings are not needed because customers are adequately protected by existing language in Handbook 44. It was also noted that customer-operated devices where the "automated" process helps ensure proper operation protect the customer more than additional markings.

The Sector discussed asking the NCWM S&T Committee for clarification regarding the applicability of marking requirements in General Code paragraph G-S.6. Marking Operational Controls, Indications and Features to "other than digital zero indication" in Scales Code paragraph S.1.1.(c). The Sector considered recommending amended language in S.1.1.(c) to specifically state the intent of the 78th NCWM S&T Committee. The Sector also considered the following language to amend Handbook 44 drafted by the NIST technical advisor:

S.1.1. Zero Indication.

(b) A zero-balance condition may be indicated by other than a continuous digital zero indication, provided that an effective automatic means is provided to inhibit a weighing operation or to return to a continuous digital indication when the scale is in an out-of-balance condition <u>and is marked or includes supplemental indications or markings to indicate that the "other than digital zero indication" represents a no-load condition of the scale</u>.

OR

(c) A zero-balance condition may be indicated by other than a continuous digital zero indication <u>without additional marking or indications</u>, provided that an effective automatic means is provided to inhibit a weighing operation.

Conclusion: The Sector agreed that NTEP can evaluate the requirements in Handbook 44 Scales Code paragraph S.1.1.(c) and verify that the "other than digital zero indication" prevents the weighing operation if the scale is in an out-of-balance condition. No consensus was reached on additional marking requirements and interpretation of past S&T Committee reports. The Sector requested that the NIST technical advisor ask for a clarification of the past S&T Committee reports and that Handbook 44 be amended to clearly state the intention of the Committee through the NIST S&T Committee technical advisors. The Sector also requested the NIST technical advisor provide the S&T Committee the above- suggested language for Handbook 44 Scales Code paragraph S.1.1.(c) that is consistent with their interpretation of the past S&T Committee reports.

After the 2003 Sector meeting, the NIST technical advisor to the Weighing Sector submitted the request to the S&T Committee for clarification and requested the S&T Committee technical advisors amend NIST Handbook 44 Scales Code paragraph S.1.1.(c) to include the above-suggested language.

The NIST S&T Committee technical advisors balloted the Committee to: (1) confirm the intent of the past NCWM S&T discussions that additional markings or indications are required for weighing devices that indicate a zero balance other than by digital indication; and (2) amend S.1.1.(c) by adding language consistent with the NIST interpretation of General Code paragraph G-S.6 and Scales Code paragraph S.1.1.(c). The Committee agreed additional markings or indications are required for weighing devices that indicate a zero balance other than by digital indication, and the S&T Committee agreed to add a proposal to amend Scales Code paragraph S.1.1.(c) to its 2004 NCWM Interim Agenda.

20. Clarification of G-S.1. Identification (software)

The item was incorrectly identified in the agenda as an editorial recommendation on language adopted by the Conference at the 88th NCWM Annual Meeting, in July 2003. It was intended to amend 2003 NCWM S&T Agenda Item 310-1b. Additionally, this item was combined with the discussion of the following Weighing Sector Agenda Item 21.

21. G-S.1. Identification; Built-for-Purpose Software-Based Devices

Source: SMA and NCWM Specifications and Tolerance Committee

Background/Discussion: At the 2003 NCWM Annual Meeting, the Conference voted to adopt alternate methods of compliance with identification requirements for "not-built-for-purpose devices. The Committee received comments that similar alternate methods of identification be developed for "built-for-purpose" devices. The Committee agreed there appears to be no opposition to allowing the same alternate methods for providing required identification markings on Built-for-Purpose Software-Based Devices in a manner similar to that proposed for Not-Built-for-Purpose devices. The Committee believes the SMA proposal needs to be an information item to allow for further review and development by the NTETC Weighing and Measuring Sectors and the Regional Associations.

The Weighing Sector was asked to review, comment, or make recommendations to further develop language submitted by the Scale Manufacturers Association to the NTETC Measuring Sector and the NCWM Specifications and Tolerances Committee. The Sector also reviewed suggested proposals by a scale manufacturer and NIST S&T technical advisors.

Discussion/Conclusion: There were comments from several Sector members that the NCWM S&T Committee should address this item. It was pointed out to the Sector that the concept of allowing the display of G-S.1. Identification information originated from both the NTETC Weighing and Measuring Device Sectors and that the 2003 NCWM S&T Committee requested input from the both Sectors. Members of the SMA technical committee noted that they are continuing to develop language that applies equally to built-for and not-built-for-purpose devices and no longer support the language originally submitted at the 2003 NCWM Interim meeting. The Sector did not discuss the alternate proposal from NIST/WMD because they did not have sufficient time to review and discuss the new proposal.

The Sector agreed to make no recommendations on this item.

22. Publication 14 DES Section 8, Family Definition and Selection Criteria for Vehicle Scales, Railway-Track Scales, Combination Vehicle/Railway-Track Scales, and Other Platform Scales over 30 000 lb and up to and including 200 000 lb.

Source: Nebraska

Background: The Nebraska NTEP participating laboratory reported the parameters for large scales have been a source of confusion and misinterpretation. Additionally, the lower limits for size and capacity are not based on technical and design considerations. Nebraska submitted a proposal for consideration by the Sector. Briefly, the proposal eliminates the minimums for some of the parameters and the parameters for length and width. Nebraska believes the limits on the span between sections, combined with parameters on minimum platform area (similar to modular scale parameters), should be sufficient.

Also, there is a proposed limit on the number of sections if the device uses a lever system in the weighing element. If, for example, a 5-section scale is evaluated, it is not a given that a 6-section scale would perform adequately. With each section added, the "signal" must be transmitted through more levers to reach the indicating element, increasing the potential for a loss of sensitivity. This concern may also apply to fully electronic designs if the power supply is inadequate for the number of load cells in use, but an auxiliary power supply may overcome that concern. Nebraska would be interested in a response to the comment on auxiliary power supplies.

The final result would be a more uniform presentation of the parameters in the various portions of Section 8. For example, an 18' x 10' scale (180 sq. ft.) would be acceptable based on the evaluated device with sections of 20' x 14' (240 sq. ft.).

Discussion/Conclusion: The Sector reviewed and discussed the proposed changes to Publication 14 and agreed with the submitter's justification for amending the publication technical policy. The Sector agreed with the proposal as submitted except that the number of sections should not be limited to the device evaluated since any problem could be discovered during initial tests and by mechanical and load cell sensitivities. Additionally, the maximum length limitations in paragraphs 8.1.c and 8.2.c were reinstated.

Recommendation: The Sector recommends Publication 14 for Digital Electronic Scales, Sections 8.1, 8.2, and 8.3 be amended as follows:

8.1 Additional criteria for vehicle scales, railway-track scales, combination vehicle/railway-track scales, and other platform scales over 30 000 lb and up to and including 200 000 lb.

A CC will apply to all models having:

a. **nominal capacities** ~~from 50 %~~ <u>up</u> to 135 % of evaluated capacity;

<u>b.</u> <u>**platform area** for any two-section portion no less than 50 % of the smallest two-section portion incorporated in the device evaluated.</u>

~~b~~c. **widths** ~~from 70 %~~ up to 120 % of the width of the platform tested;[2]

~~c~~. **lengths** ~~from 50 % to~~ 150 % of the length of the platform tested~~;~~

d. ~~weighing elements in which the~~ a **span** between sections of ~~is~~ not more than 20 % greater than the equipment evaluated;

e. ~~a **number of sections** for weighing (SC? load-receiving) elements which incorporate a lever system up to the number of sections evaluated.~~

8.2 Additional criteria for vehicle scales, railway-track scales, combination vehicle/railway-track scales, and other platform scales greater than 200 000 lb.

A CC will apply to all models having:

a. **nominal capacities** ~~from 50 % to 100 % of~~ no greater than the evaluated capacity;

b. **platform area** for any two-section portion no less than 50 % of the smallest two-section portion incorporated in the device evaluated.

~~b~~c. **widths** ~~from 70 % to 100 % of~~ no greater than the width of the platform tested;[3]

~~c.~~ **lengths** ~~from 50 %~~ to 100 % of the length of the platform tested;

d. ~~weighing elements in which the~~ **spans** between sections of ~~is~~ not more than 20 % greater than the equipment evaluated;

e. ~~a **number of sections** for mechanical weighing (SC? load-receiving) elements up to the number of sections evaluated.~~

8.3 Modular Load-Cell Vehicle, Livestock, or Railroad Track Scales

*Not**e:** These criteria apply if the vehicle scale is fully electronic (i.e., load cells comprise the sensors of the weighing element) and is of a modular design.*

Modular scale. *A vehicle livestock or railroad track scale made up of individual load-receiving elements of like design which can be joined together to form a larger integral load receiving element and can be separated at any time without structurally change the individual load-receiving elements. This definition is to be applied for all new type evaluations and for applications to add new devices to an existing Certificate of Conformance (see figure 3). (Effective January 2001)*

8.3.1. Modular Scale to be Tested

The following criteria must be satisfied in the scale design and the scale to be tested:

a. Load cells of the same design and capacity that consists of simply attaching modules together must be used throughout the family. If load cells of different capacities are used for scales of different structural strength and capacity in the family, then the module using the higher capacity load cells must be evaluated.

[2] For scales with widths greater than 12 feet, this policy on range of widths may not be applied retroactively. Additional testing is required for devices with widths greater than 12 feet. NTEP management and the NTEP laboratories on a case-by-case basis will address test procedures for scales wider than 12 feet.

b. The CLC in the family must be not less than 40 % of the sum of the capacity of two load cells or 80 % of the capacity of one cell.

c. A scale with at least two modules must be tested. The module with the largest CLC is to be tested. If the longest span between sections is not tested, the Certificate of Conformance will include up to 120 % of the span between sections that was tested. Arrangements regarding the specific scale in the family to be tested will be established in consultation with NTEP representatives.

8.3.2. Range of Parameters for Modular Scales

The following range of parameters will be used to establish the sizes and capacities of modular load-cell vehicle scales that will be covered on a Certificate of Conformance based upon the test of a single scale.

a. **Nominal capacities** not more than 1.5 times CLC for a two-section scale to 135 % of capacity of the device evaluated. The nominal capacity for the railroad track scale in a modular vehicle/railroad combination will be no greater than the capacity of the device submitted for evaluation.

b. **Platform area** not less than 50 % of smallest two-section (four-cell) module incorporated in the device evaluated. Increased lengths for scales with two or more modules are not restricted as long as the width complies with 6(e) and the load cells meet the v_{min} formula (i.e., $v_{min} \leq d / \sqrt{n}$.) Additional modules to increase length must be of the same type as those used in the device submitted for evaluation (i.e., 4-cell, 2- cell, 0-cell.)

c. **CLCs** complying with the minimum CLC rating (i.e., not less than 80 % of the capacity of one cell) but not exceeding twice the capacity of one load cell.[2]

d. ~~**Modules** in which the~~ ~~span~~ **span(s)** between sections which is (are) not more than 20 % greater than the span of the largest two-section, four load-cell module ~~in the scale~~ evaluated.

e. **Widths** ~~from 70 %~~ up to 120 % of the width of the platform tested.[3]

f. **Nominal capacity** equal to or less than CLC times the number of sections minus one-half.

g. **Platform construction and material** similar to that of the device evaluated. (see section 8.e.)

h. **Scale division values** equal to or greater than the value of the scale division used in the scale that was evaluated.

i. **number of divisions (n_{max})** the number of scale divisions that would exist for scales included in the range of capacities provided it does not exceed the n_{max} of the load cells and indicator for the installed system.

   a. ~~module connection type~~ **module connection type** will be limited to the original type evaluated. The manufacturer may choose to submit a special hybrid design including more than one type of module connection. For example, one module can he connected using welded connections and another can be connected using bolted connections. The resulting CC will cover all the types submitted if the evaluation is successful.

23. Acceptable Abbreviations for Indicated and Recorded Representations.

Source: California NTEP Laboratory

Background: Handbook 44 General Code Section 1.10, Table 1. Representation of Unit does not include many abbreviations for units and symbols that are in use today in the U.S. Modern weighing and measuring devices are able to print more common and not-so-common units of measure. During an NTEP evaluation, the lack of a complete list of acceptable abbreviations for units such as gallons, inches, ounces, and tons made it difficult to make a decision that a specific abbreviation was sufficient and will be uniformly accepted by other NTEP evaluators and field officials. A list of acceptable abbreviations in Handbook 44 would promote uniformity in type evaluation and field enforcement in addition to NTEP applicants.

This item was discussed at the April 2003 meeting of the participating laboratories. The original problem dealt with an evaluation of a vehicle-tank meter (VTM) controller used to deliver gasoline. In Publication 14 ECR checklist, “G” is permitted for the printed receipt but “GAL” was marked on the VTM controller. Publication 14 refers to recorded representations in that it allows “GAL” “G” “Gallon”. Liter can be represented by “L” or “l’ on a printed ticket. Information is supposed to match on indicated and recorded representations

Historically, the “G” was a compromise for the receipts issued by point-of sale systems and space limitations on the receipt tape. This is still an issue today, however, the primary concern remains that representation of units must be clearly defined. At the April 2003 NTEP participating laboratory meeting, it was noted in the discussion that Handbook 44 Code is somewhat specific. The letter “G” without product identity can lead to some interpretation issues. It was also discussed that Publication 14 Checklist for Electronic Cash Registers interfaced with Retail Motor-Fuel Dispensers could be amended to remove “G” as an acceptable solution in paragraph 3.1. It was also suggested that a note could be added to Publication 14 (Scales and LMD?) with a list of acceptable abbreviations that instructs the evaluator to refer to Handbook 44 Appendix C, Handbook-130 FPLA section 6.7.1., and NIST Publication 811 Guide for the Use of the International System of Units (SI) for additional and acceptable abbreviations.

The participating laboratories concluded that California should develop a list of acceptable abbreviations and submit it to the 2003 Western Weights and Measures Association Technical Conference and to both NTETC Weighing and Measuring Device Sectors for consideration.

California proposed to add the following abbreviations to Handbook 44 General Code Table 1.

<u>Add the following abbreviations to Table 1:</u>

Name of Unit	Common Use Symbol	Representation Form I (double case)	Representation Form II (single lower case)	Representation Form II (single case upper)	Name of Unit	Common Use Symbol	Representation Form I (double case)	Representation Form II (single lower case)	Representation Form II (single case upper)
inches	In	In	in	IN	centiliter	CL	cL		
foot	Ft	ft	ft	FT	deciliter	dL	dL		
yard	Yd	yd	yd	YD	kiloliter	kL	kL		
milligram	Mg	mg	mg		cubic meter	M^3	m^3	m^3	M^3
megagram	Mg	Mg			cubic inches	in^3	in^3	in^3	IN^3
grain	Gr	gr	gr		cubic foot	ft^3	ft^3	ft^3	FT^3
dram	Dr	dr	dr		cubic yard	yd^3	yd^3	yd^3	YD^3
ounce	Oz	oz	oz	OZ	gills	gi	gi	Gi	GI
pound	Lb	lb	lb	LB	pint	pt	pt	pt	PT
hundredweight	Cwt	cwt	cwt	CWT	quart	qt	qt	qt	QT
pennyweight	Dwt	dwt	dwt	DWT	gallon	gal	gal	gal	GAL
ounce troy	oz t	oz t	oz t	OZ T	ampere	A, I	A, I		A, I
milliliters	ML	mL			resistance	ohms	ohms	ohms	OHMS

Discussion/Conclusion: The Sector reviewed the proposed table and noted there were some omitted and incorrect abbreviations. One of the manufacturers suggested that national and international documents be referenced instead of continually updating the table. Several other Sector members responded that the referenced documents might not be available to field officials. Additionally, there are no suggested abbreviations for “ton” and the abbreviations for mega gram and milligram are the same in “Common Use Symbol” column. The Sector recognizes the concern of the NTEP laboratories and supports the concept of expanding Handbook 44 General Code Table 1. However, the Sector is concerned that there might be additional omissions and conflicting abbreviations and suggests that the proposal to expand Table 1 be thoroughly checked for accuracy by the California NTEP lab and other interested parties.

24. Acceptable Abbreviations for "Section Capacity."

Source: Rice Lake Weighing Systems (RLWS)

Background: RLWS reported that some field officials are not accepting abbreviations for "Section Capacity" on livestock and railway-track scales. Additionally, there is not enough room to spell out "Section Capacity" on some manufacturers' ID badges. Rice Lake, for example, only allows five characters for an identifier. RLWS submitted to the Western and Central Weights and Measures Association S&T Committee for consideration at its annual meeting in September 2003 a proposal to renumber Handbook 44 Scale Code paragraphs S.6.4. and S.6.5., add S.6.4.3., and modify Table S.6.3.a.

Discussion: The Sector reviewed and discussed RLWS's proposal and also considered alternatives such as recommending that the proposed acceptable abbreviations need only be included in Publication 14, incorporating the recommended abbreviations for "section capacity" in Handbook 44 definition of "section capacity", to be consistent with other code definitions such as e, $e_{min,}$ CLC, GGE, NBP, n_{max}, etc.), and adding a new note to Handbook 44 Scales Code Table S.6.3.b. The Sector also noted that the abbreviations "SC," "S Cap," and "sec" should not be used since they could be confused with the abbreviations for "scale capacity" and "second."

Conclusion: The Sector agrees with the problem identified by RLWS except for the proposed "SC" abbreviation. The Sector recommends the following alternative language that amends Table S.6.3.a. and adds a new note to Table S.6.3.b. as follows:

Table S.6.3.a.
Marking Requirements

	Weighing Equipment				
To Be Marked With ⇓	Weighing, load-receiving, and indicating element in same housing or covered on the same CC[1]	Indicating element not permanently attached to weighing and load-receiving element or covered by a separate CC	Weighing and load-receiving element not permanently attached to indicating element or covered by a separate CC	Load cell with CC (11)	Other equipment or device (10)
Manufacturer's ID (1)	x	x	x	x	x
Section Capacity and Prefix (14)(20)(22)(24)		x	x		

Table S.6.3.b.
Notes For Table S.6.3.a.

23. *Required only if a CC has been issued for the device or equipment. [Nonretroactive as of January 1, 2003]*
(G-S.1. Identification (h) Added 2001)

24. The section capacity shall be prefaced by the words "Section Capacity" or an abbreviation of that term. Acceptable abbreviations shall be "Sec Cap" or Sec C" and may be initial capitals, all capitals, or all lower case, and with or without periods

25. Additional Items

25a. Permanence Test of Floor Scales

Submitted by: Bob Hamilton (Mettler Toledo)

Background: The 2003 Edition of the Publication 14 checklist for digital electronic scales section 62 is titled "Performance and Permanence Test for Counter (Bench) Scales (including Computing Scales)." However, paragraph 62.5 applies to "instruments up to and including 2000 lb." Paragraph 62.6.4.1 specifies 100 000 cycles for the permanence test. Section 63 is titled "Performance and Permanence Test for Floor Scales" and Section 63.1.1 specifies 300 weighing operations. There appears to be a conflict with the terminology used in Sections 62 and 63 where scales that do not fit the definition of bench/counter scales are tested differently based upon their capacity. The submitter proposed that the language in Publication 14 be changed as follows:

> 62.5. Laboratory Permanence tests for <u>Bench, Counter, and Computing Scales</u> ~~(Applicable only to instruments up to and including 2000 lb capacity).~~
>
> Add new paragraph:
>
> <u>63.1.3.1. As an alternative test for floor scales up to and including 2000 lb (1000 kg) conduct a laboratory permanence test at one-half capacity, (300) weighing operations</u>.

Discussion: The submitter reported that permanence testing is only conducted on scales up to 220 lb (100 kg) for OIML evaluations. The NIST technical adviser stated that the original Publication 14 language was based upon the capacities of scales that could be tested at an NTEP laboratory. The field permanence test for scales greater that 2000 lb was a compromise with the states that conducted 90-day field permanence tests on all scales, regardless of the capacity. The type evaluation states felt that time should be a factor influencing permanence in lieu of 100 000 cycles of load application. The NTEP Director questioned the need for permanence testing and requested that the participating laboratories compile pass/fail data from permanence tests. Some of the participating laboratories suggested that the titles for the permanence testing section be updated and be based upon scale capacity. It was also noted that Publication 14, Section 61 is titled "Performance and Permanence Tests for Scales and Electronic Cash Registers" (ECRs). A different chapter in Publication 14 already covers ECRs.

Conclusion: The NTEP Director will request permanence test compliance data from the participating laboratories and make editorial corrections the Publication 14 sections 61, 62, and 63.

25b. Series and Model Designations that Clearly Identify Pattern and Design of the Device

Submitted by: Bill Fishman, New York

Background: The New York participating laboratory reported on applications where the "Series" designation for the family had no relation to the specific device model designation. This does not present a problem for type evaluation. However, it does create a problem for field inspections when an inspector tries to look up a Certificate of Conformance (CC) based upon the model designation marked on the device. An inspector would have trouble using the NTEP CC database if the Series designation listed in the CC is "Fish" and the model designation marked on the device is 500 to verify that an NTEP CC covers the model 500.

Discussion/Conclusion: The participating laboratories agreed that this might be a concern when conducting field inspections when an inspector tries to look up a CC based upon the model designation marked on the device. In order to compel an applicant to establish and mark a device with a designation that clearly identifies the pattern or design of the device and that the specific model designation be based on the series designation, the Sector considered recommending that NTEP cite Handbook 44 General Code paragraph G-S.1-Identification. It was also noted that all devices manufactured after January 1, 2003, that have an NTEP CC shall be marked with the CC Number making it easier for the field inspector to associate the model designation with its associated CC.

The Sector concluded that the NTEP Director and participating laboratories work to determine if a standard process needs to be developed to provide additional guidance in the uniformity of model, type, and pattern designations, and information on the CC.

26. Next Meeting

The next Weighing Sector meeting is scheduled for September 2004 in Canada. Please contact the Sector Technical Advisor Steven Cook, NIST WMD to propose items for future meetings. Mr. Cook can be reached by telephone at 301-975-4003, by fax at 301-926-0647, by e-mail at stevenc@nist.gov, or in writing at NIST, 100 Bureau Drive – Stop 2600, Gaithersburg, MD 20899-2600.

ATTACHMENTS

Attachment for Item 2

65a.2. Shift and Section Tests (Initial Performance Testing)

A **shift test** is defined in Handbook 44 as a test intended to disclose the weighing performance of a scale under off-center loading. [2.20]

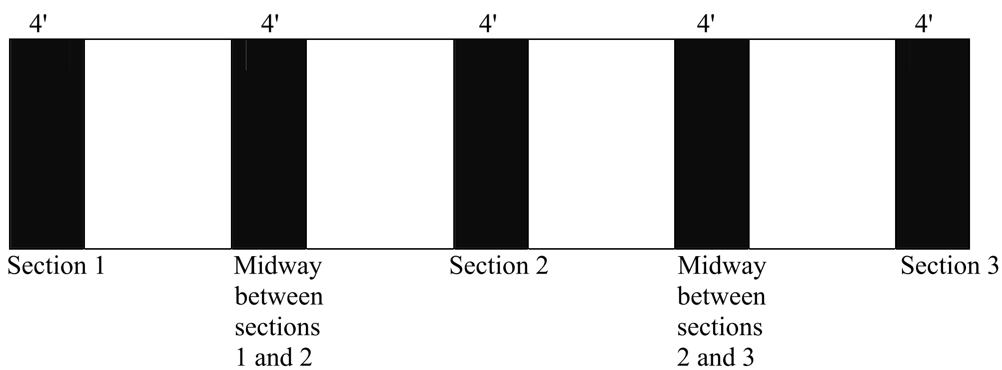
A section test is defined in Handbook 44 as a **shift test** in which the test load is applied over individual sections of the scale. This test is conducted to disclose the weighing performance of individual sections, since scale capacity test loads are not always available and loads weighed are not always distributed evenly over all main load supports. [2.20]

The minimum amount of ***test weights*** to conduct the **shift and section tests** ~~shall be at least~~ 90 % **of the** CLC.

Record the time and temperature at the beginning and end of each complete **shift** test load test. The scale shall be capable of returning to zero within prescribed limits if the temperature has not changed more than 5 ºC (9 ºF) (T.N.8.1.3.) or within 15 minutes after the load was removed (creep recovery).

*Unless otherwise stated in the following procedure**, the** increasing and decreasing loads (using **known** test weights) shall be conducted with at least **five test loads (e.g. 500, 1000, 2000e...).** ~~steps.~~ (NOTE) If possible, the first ~~increment of test weights~~ **test load** should equal 500e. If weights cannot be conveniently applied that equal 500e, the first load should equal just below 500e as nearly as possible. The other tolerance breakpoints should be tested if possible.*

An example of a three-section scale:



65a.2.1. Conduct at least two complete sets of **shift** ~~section~~ tests over each **section** to at least 90 % of the concentrated load capacity (CLC) of the scale. When analyzing the return to zero, consideration must be given for the length of time the load was on the scale and possible temperature changes that may have occurred during the test.

(a). Begin ~~T~~the ~~section~~ **shift** test ~~will be conducted~~ by loading one end **section** to the first of at least five test loads, and record the error ~~moving the load to each **section**~~.

(b) Move ~~Record the error moving~~ the **test** load to **the next** ~~each~~ **section and record the error. Repeat these steps** at each **section** until the opposite end of the scale is reached. Record ~~recording~~ the error at each **section** ~~and at each load~~.

(c) Repeat ~~the section~~ ~~**shift**~~ ~~test procedure above in~~ steps a, and b ~~above~~ for each test load ~~at increasing weight increments~~ until at least 90 % of the CLC is reached. A minimum of five test loads is required.

NOTE: While at the maximum test load **(90 % of the CLC) and** during ***one of the shift tests*****, place** ~~locate~~ the test weights ~~and record the errors~~ at mid-span between **sections and record the error**~~., and on~~

On modular scales, **place the test weights on one side of and across the weighing element where the modules connect. Repeat this procedure on the other side of the module connection line and at each section.** ~~each on the center, right and left side of the module connection line located at each section.~~

(d) **When steps a to c are complete** conduct a decreasing load test ~~on the **section**~~ at the end of the scale where the weights can be reloaded. **Record the error and section where this test was performed.**

~~*(NOTE) If possible, the first increment of test weights should equal 500e. If weights cannot be conveniently applied that equal 500e, the first load should equal just below 500e as nearly as possible. The other tolerance breakpoints should be tested if possible.*~~

~~65a.3 Shift Test~~

~~While at the maximum test load, locate the test weights and record the errors at mid-span between sections, and on modular scales, each on the right and left side of the module connection line located at each section. This can be done in conjunction with one of the section tests.~~

65a.4. Strain Load Test (Initial Performance Testing)

The minimum amount of ***test weights*** used shall be the same loads used to conduct the shift tests.

Acceptance tolerances are applied only to the known test load in the strain load test.

Record the time and temperature at the beginning and end of each complete strain load test. The scale shall be capable of returning to zero within prescribed limits if the temperature has not changed more than 5 ºC (9 ºF) (T.N.8.1.3.) or within 15 minutes after the load was removed (creep recovery).

Unless otherwise stated in the following procedure, increasing and decreasing loads (using test weights) shall be conducted with at least five steps. (NOTE) If possible, the first increment of test weights should equal 500e. If weights cannot be conveniently applied that equal 500e, the first load should equal just below 500e as nearly as possible. The other tolerance breakpoints should be tested if possible.

65a.4.1. Conduct at least one strain load test at each end of the scale. The maximum load applied during the strain load shall be in the range of 80 % to 100 % of scale capacity. Distribute the load over the load-receiving element.

65a.4.2. For the first test, ~~L~~load the scale with a vehicle or vehicles so the addition of test weights will provide a gross load of 80 % to 100 % of scale capacity. Determine the "reference point" for the start of the strain load test. Add the test weights to one of the ends of the scale without exceeding the CLC in the prescribed test pattern. (*The test weights do not have to be in a prescribed test pattern and may be distributed over the available area of the platform or on the vehicle(s).)*

Different text for this section: Need to clarify

For the first test, ~~L~~load the scale with a vehicle or vehicles so the addition of test weights will provide a gross load of 80 % to 100 % of scale capacity. Determine the "reference point" for the start of the strain load test. Add the test weights to one of the ends of the scale without exceeding the CLC prescribed test pattern and record the strain load value. (***The test weights ~~do not have to~~ will be in a prescribed test pattern for the section at the end of the scale. ~~and may be distributed over the available area of the platform or on the vehicle(s).)~~.*** ***(SC recommends that the weights be distributed since the section and shift tests have already been conducted and the section may be overloaded when test weight are added in a concentrated load pattern to the unknown load is already on the scale.)***

65a.4.3. ~~Do not conduct a decreasing load test or a return to the strain load reference weight as part of this particular strain load test.~~ ~~After removing~~ Remove the test weights from the end of the scale without conducting a decreasing load test, re-establish the strain load reference value and re-apply the test weights to verify that the strain load values repeat the initial values. The scale shall perform within prescribed tolerances based upon tolerance for the known test load (The actual strain load indication after the application of the known test load shall agree within the target strain load test indication within prescribed limits. [Question: What limits are prescribed? Acceptance tolerance? Maintenance tolerance since this is somewhat of a repeatability test? Other? Don't know?(WW)] Conduct a decreasing load test and return to the strain load reference value as the weights are removed as part of this test cycle. [Another question: Is the increasing/decreasing load test done in 5 steps or is the weight placed on the scale all at once and removed all at once? There was considerable discussion on this at the Lab meeting, but I don't recall that we reached a consensus. I believe the intent of the procedure was that an increasing/decreasing load test be done in steps, not all at once. (WW)] The return to the strain load reference value shall be within one-half of a scale division considering creep and any temperature changes that may have occurred during this last test cycle. Remove the ~~known test weights and the~~ strain load. Do not apply zero return tolerances at this time.

65a.4.4. ~~Remove the known test weights and the strain load.~~ For the second test, ~~Z~~zero the scale; place the strain load (vehicles or material of unknown weight) on the other end of the scale; establish the strain load reference value. During the second test, the semi-automatic tare mechanism may be used to tare out the strain load value (Net weight indications used for the increasing load test.) Do not use the zero-setting mechanism to set the strain load to zero~~; use the tare mechanism to tare out the strain load. Use the gross load zero value to conduct a decreasing load test when removing the strain load in the next test~~.

65a.4.5. ~~Repeat the strain load test on the other end of the scale~~ Add the test weights the other end of the scale without exceeding the CLC in the prescribed test pattern. (*The test weights do not have to be in a prescribed test pattern and may be distributed over the available area on the platform or on the vehicle(s).)* The scale shall perform within prescribed tolerances based upon tolerance for the known test load (The actual strain load indication after the application of the known test load shall agree with the target strain load test indication within prescribed limits). After reaching the maximum test load for the strain load test, remove the strain load (vehicles or material of unknown weight) but leave the known test weights on the scale. Use the "gross weight" indications to conduct a decreasing load test after removing the strain load in the next test. The weight indication for the decreasing load test must be within tolerance for the known test load. Continue the decreasing load test by removing the known test weights. ~~Take several readings as the weights are being removed.~~ ***(Should the previous strikeout language should be left in?)*** When all the weights are removed, record the return to zero. The scale must return to zero within one-half of a scale division. ~~When analyzing the return to zero, consideration must be given for the length of time the load was on the scale and possible temperature changes that may have occurred during the test.~~

~~65a.4.6. Acceptance tolerances are applied only to the known test load in the strain load test.~~

65a.5. Subsequent Type Evaluation (Field) Permanence Tests

The minimum amount of ***test weights*** for the shift and strain load tests shall be:
a minimum of 40 000 lb, or
50 % of the CLC whichever is greater,
(one of the labs recommends that this should be 90 %) ~~5~~90 % of the CLC whichever is greater,

Acceptance tolerances are applied only to the known test load in the strain load test.

Record the time and temperature at the beginning and end of each complete strain load test. The scale shall be capable of returning to zero within prescribed limits if the temperature has not changed more than 5 ^{o}C (9 ^{o}F) (T.N.8.1.3.) or within 15 minutes after the load was removed (creep recovery).

Unless otherwise stated in the following procedure, increasing and decreasing load test results (using test weights) shall be recorded at a minimum of three test loads (zero, approx. ½ maximum test weights, and at maximum test weights).

65a.5.1. The minimum number of days that a device is required to be in use is 20. It is not required that a certain number of weighing operations be conducted each day for the test period. Performance during both tests must be within acceptance tolerances. ***(Should This Section Be Moved To Section 65a.7.?)***

65a.5.2. Conduct at least one complete set of ~~section~~ **shift** tests over each **section**, at mid-span between each **section** and on modular scales, each on the center, right and left side of the module connection line ~~located at each section, using minimum of 40 000 lb of known test weights or 50 % of the CLC whichever is greater~~.

65a.5.3. Conduct at least one complete set of strain load tests ~~at each end of the scale~~ using the "Strain Load Test" procedures above. The maximum applied load shall be in the range of 65 % to 100 % of scale capacity. (or should this be?) of ~~65~~ 80 % to 100 % of scale capacity.

65a.5.4. If the device does not meet these tolerance limits, the entire test must be repeated, including successful initial performance testing and a subsequent test after a minimum of 20 days.

Attachment for Items 10 and 11

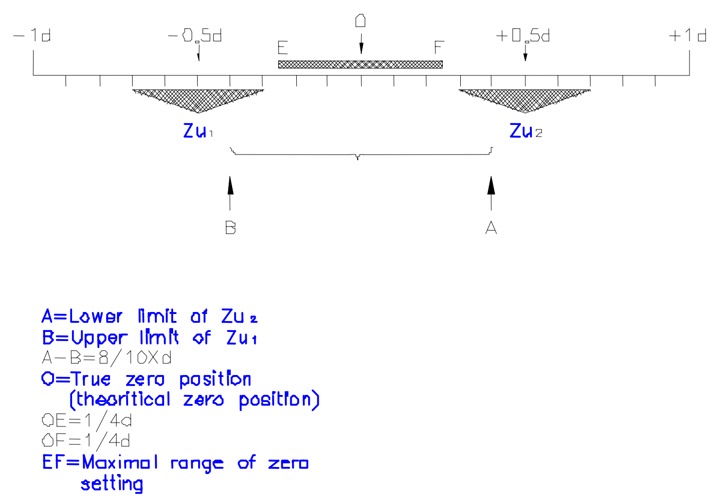
LG-15.01 Center-of-zero indication and setting zero within ± 1/4 e

APPLICATION: Applicable to complete electronic scales and separate electronic indicators having SAZSM or IZSM or equipped with a "center-of-zero" indicator.

PURPOSE: This test is to verify that the SAZSM and IZSM automatically set the device to zero within ± 1/4 of **e**, and to verify that the device range of center-of-zero indication is equal to or less than ± 1/4 **e**. Note that the range of center-of-zero indication of Class I or II devices equipped with auxiliary reading means is ± 1/2 of **d**. This must be taken into consideration when performing the following tests and interpreting the results. **Take into account that the ZU of weight classifiers is adjacent to the graduation**.

PROCEDURE: Setting zero to within ± 1/4 **e.**

A) Switch the AZSM off or set its value to zero effect; zero the DUT.
B) Place a load of at least **e** (made of 1/10 e weights) on the platter and RE-ZERO the device.
C) Successively remove small denomination weights in 1/10 x **e** steps until the low end of the interval is reached (the indication begins to alternate between 0 and -1 **e**). Record the weights removed as being the negative portion of the interval.
D) Successively add small denomination weights in 1/10 x **e** steps until the high end of the interval is reached (the indication begins to alternate between 0 and +1 **e**). Record the value of the weights added and subtract the value of the weights recorded in C. The difference is the positive portion of the interval.
E) Determine if the zero position as set by the SAZSM does not deviate from the true zero reference point by more than 1/4 **e**. Generally, the zero position, as automatically set by the SAZSM, should coincide with the zero reference point; in such a case, the negative range would equal the positive range. See illustration.



F) Repeat the test by zeroing the device using the IZSM.

Width of the centre-of-zero indication (Annunciator)

G). Switch the AZSM off or set its value to ZERO effect.
H) Set the device to zero.
I) Place a load of at least **e** (made of 1/10 **e** weights) on the platter; zero the DUT.
J) Successively remove small denomination weights in 1/10 x **e** steps until the visual confirmation of zero goes off. Record the value of the weights removed as being the negative portion of the center of zero indication.

K) Successively add small denomination weights in 1/10 x **e** steps until the center-of-zero indicator goes off (positive limit). Record the difference between the value of the weights remaining on the platter and the value of the weight recorded in **J** as being the positive portion of the center-of-zero indication.

INTERPRETATION OF RESULTS: The DUT is deemed to comply with the requirements if the zero setting mechanisms automatically set the device to zero within ± 1/4 of **e** from the true zero reference point, and if the centre-of-zero annunciator indicate a zero balance condition within ± 1/4 **e** of the true zero reference point.

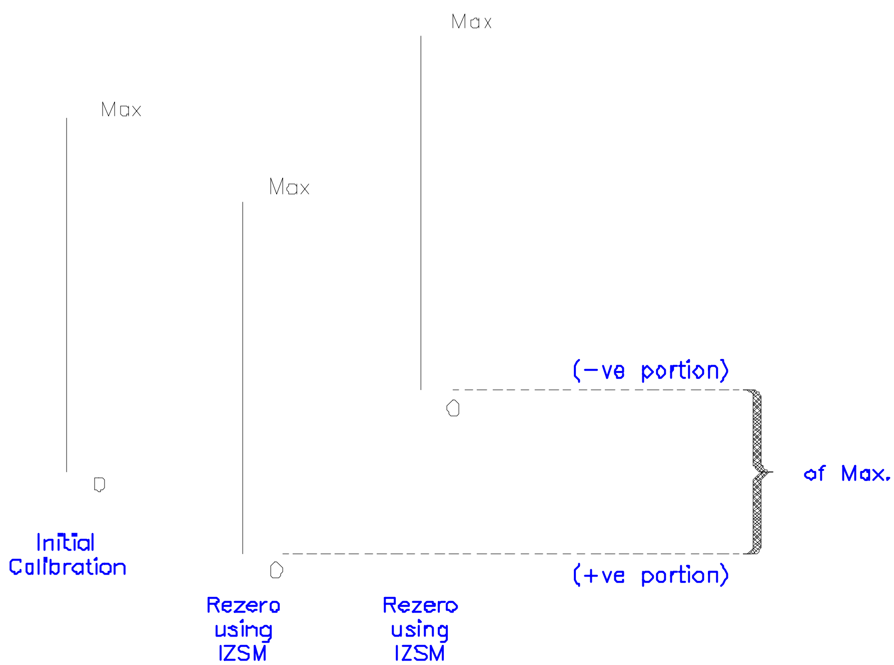
Note that for Class I or II devices with auxiliary reading means, the range is ± 0.5 d.

LG-15.04 IZSM Range (Maximum Range of Initial Zero Setting Mechanism)

APPLICATION: This test is applicable to electronic indicators and to complete electronic devices.

PURPOSE: The purpose of this test is to determine whether or not the total range of the initial zero setting mechanism exceeds 20 %. The initial zero setting mechanism is the mechanism that sets the scale to zero upon power up.

CLARIFICATION
Electronic indicators tested and approved separately: The load-receiving element to which an electronic indicator tested and approved separately will be interfaced will not have been tested up to 200 % of Max. Consequently, the maximum Initial Zero Setting Mechanism range of electronic indicators must be limited to 20 * of Max.



TEST PROCEDURE

Electronic indicators

Note: The following explanation of the test procedure is based upon the use of a load-receiving element connected to the electronic indicator because it is easier to explain the procedure this way. However, the actual test can be performed using a load cell simulator or a rheostat provided that the basic principles are maintained. The procedure consists of calibrating the electronic indicator so that it only uses a small portion of the total capacity of the LRE.

A) Connect the indicator to a LRE and calibrate the indicator so that it is at a zero balance condition when the LRE is loaded at 50 % of its maximum capacity and that it displays the number of intervals "n" (as requested by the applicant) when the LRE is fully loaded (Cap).

B) By trial and error, find the -ve portion of the electronic indicator's IZSM range by removing a load(s) from the LRE and by trying to zero it using the electronic indicator's IZSM. The IZSM is triggered by unplugging and replugging the power cord (Note: on some devices, it is sufficient to switch it off and on).

a) Similarly, by trial and error, find the +ve portion of the electronic indicator's IZSM range by adding a load(s) to the LRE and by trying to zero it using the electronic indicator's IZSM.

Complete electronic scale

Note: Whenever possible, perform the procedure described above for electronic indicators tested separately; or.

D) Remove the platter in order to reach the lowest point of the IZSM range.

E) By trial and error, find the +ve portion of the electronic indicator's IZSM range by adding a load(s) to the LRE and by trying to zero it using the electronic indicator's IZSM. The IZSM is triggered by unplugging and re-plugging the power cord (Note: on some devices, it is sufficient to switch it off and on).

INTERPRETATION OF RESULTS

An electronic indicator tested and approved separately is deemed to comply with the requirements when the total range of the Initial Zero Setting Mechanism (absolute value of -ve portion of the range plus the +ve portion of the range) does not exceed 20 % (or can be set to a maximum of 20 % and sealed) of the DUT's maximum capacity (Max);

The IZSM range of a complete electronic device may exceed 20 % of Max if the device performs within tolerances when the IZSM is set at the minimum and maximum points of its range.

When the IZSM range is limited to 20 %, performance tests are conducted once: at the maximum IZSM setting. When the IZSM range exceeds 20 %, certain performance tests are conducted twice: at the minimum and at the maximum setting of the range. See description of the performance tests in Part 3.

WELMEC 2.1
(Issue 3)

WELMEC

European cooperation in legal metrology

Guide for Testing Indicators
(Non-automatic Weighing Instruments)

February 2

From WELMEC 2-1

ANNEX 2
SPECIFICATION OF SENSITIVITY

The value of the verification scale interval is expressed in µV per verification scale interval in the case of strain gauge measurement.

The reasons for fixing this value are the following:

- It specifies the maximum sensitivity of the indicator, which is a very important parameter, in the correct way.
- By specifying the maximum sensitivity of the indicator the maximum amplification is fixed, which is very important for the signal/noise ratio.
- The drift in offset-voltage of the amplifier can be seen as zero-drift. The smaller the input voltage per VSI, the larger the influence of that drift. For a certain small value of the input signal per VSI, the indicator will no longer comply with 3.9.2.3 of EN 45501.
- The VSI cannot be expressed in units of mass because generally it is not known what capacity load cell will be connected to the indicator.

Furthermore it is an easy parameter to evaluate the proper combination with a load cell. The following example elucidates this.

The indicator is tested under the following conditions with a load cell:

1 the sensitivity of the load cell is 2 mV/V;
2 the excitation power supply is 10 V;
3 the load cell weighing range is 3 % of maximum capacity;
4 the number of verification scale intervals is 6000 VSI;
5 therefore the unit per verification scale interval expressed in microvolts is:

(2 [mV/V] 10 [V] 30%) / 6000 VSI = 1 µV/VSI.

The test is carried out and, if the indicator performs within the MPE allowance with respect to the value calculated under 5, a test certificate is issued.

If the manufacturer of a weighing instrument combines the indicator with a tested load cell that does not have a sensitivity of 2 mV/V but 1 mV/V while the other parameters described above remain the same, then the indicator will have a unit per verification scale interval of 0.5 µV/VSI instead of 1 µV/VSI. In this case the instrument will possibly not comply with the requirements for the temperature effect on no load indication (3.9.2.3 of EN 45501).

From OIML R-76-1:

Annex A. Test Procedures

A.4.4.2 Supplementary weighing test (4.5.1)

For instruments with an initial zero-setting device with a range greater than 20 % of Max, a supplementary weighing test shall be performed using the upper limit of the range as zero point.

A.4.2.1.1 Initial zero-setting

With the load receptor empty, set the instrument to zero. Place a test load on the load receptor and switch the instrument off and then back on. Continue this process until, after placing a load on the load receptor and switching the instrument on and off, it does not re-zero. The maximum load that can be re-zeroed is the positive portion of the initial zero-setting range.

Remove any load from the load receptor and set the instrument to zero. Then remove the load receptor (platform) from the instrument. If, at this point, the instrument can be reset to zero by switching it off and back on, the mass of the load receptor is used as the negative portion of the initial zero-setting range.

If the instrument cannot be reset to zero with the load receptor removed, add weights to any live part of the scale (e.g. on the parts where the load receptor rests) until the instrument indicates zero again.

Then remove weights and, after each weight is removed, switch the instrument off and back on. The maximum load that can be removed while the instrument can still be reset to zero by switching it off and on is the negative portion of the initial zero-setting range.

The initial zero-setting range is the sum of the positive and negative portions. If the load receptor cannot readily be removed, only the positive part of the initial zero setting range need be considered.

From R76-2 Test Form

Automatic zero-setting and zero-tracking device is:

☐ Non-existent ☐ Not in operation ☐ Out of working range ☐ In operation

Initial zero-setting > 20 % of Max: ☐ Yes ☐ No (see R 76-1, A.4.4.2)

E = I + 1/2 e))L) L
E_c = E) E_0 with E_0 = error calculated at or near zero(*)

Load L	Indication I		Add. load)L		Error E		Corrected error E_c		mpe
	9	8	9	8	9	8	9	8	
(*)					(*)				

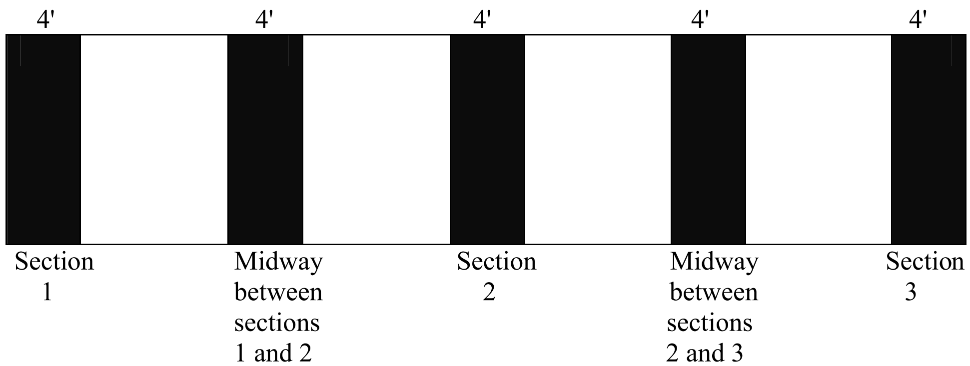
☐ Passed ☐ Failed

Remarks:

65(a.). Performance and Permanence Tests for "Single Load Receiving Element" Legal for Highway Vehicle Scales and Permanently-Installed Axle-Load Scale Weighing Elements

65a.2. Section Tests

An example of a three-section scale:



65a.2.1. Conduct at least two complete sets of section tests over each section to at least 90 % of the concentrated load capacity (CLC) of the scale. A single complete shift test is defined in steps a through d. When analyzing the return to zero, consideration must be given for the length of time the load was on the scale and possible temperature changes that may have occurred during the test.

(a) The section test will be conducted by loading one end section to the first of at least five test loads, moving the load to each section.

(b) Record the error moving the load to each section until the opposite end of the scale is reached, recording the error at each section and at each load.

(c) Repeat the section test procedure above in steps a, and b above for each weight increment until at least 90 % of the CLC is reached.

(d) Conduct a decreasing load lest on the section at the end of the scale where the weights can be reloaded.

(NOTE) If possible, the first increment of test weights should equal 500e. If weights cannot be conveniently applied that equal 500e, the first load should equal just below 500e as nearly as possible. The other tolerance breakpoints should be tested if possible.

65a.3 Shift Test

While at the maximum test load, locate the test weights and record the errors at mid-span between sections, and on modular scales, each on the right and left side of the module connection line located at each section. This can be done in conjunction with one of the section tests.

65a.4. Strain-load Test

65a.4.1. Conduct at least one strain-load test at each end of the scale. The maximum load applied during the strain-load shall be in the range of 80 % to 100 % of scale capacity. Distribute the load over the load receiving element.

65a.4.2. Load the scale with a vehicle or vehicles so the addition of test weights will provide a gross load of 80 % to 100 % of scale capacity. Determine the "reference point" for the start of the strain-load test. Add the test weights to one of the ends of the scale without exceeding the CLC.

65a.4.3. Do not conduct a decreasing load test or a return to the strain-load reference weight as part of this particular strain-load test. After removing the test weights from the end of the scale, re-establish the strain-load reference value and re-apply the test weights to verify that the strain-load values repeat the initial values. Conduct a decreasing load test and return to the strain-load reference value as the weights are removed as part of this test cycle. The return to the strain-load reference value shall be within one-half of a scale division considering creep and any temperature changes that may have occurred during this last test cycle.

65a.4.4. Remove the known test weights and the strain-load. Zero the scale; place the strain-load on the other end of the scale; establish the strain-load reference value. Do not use the zero-setting mechanism to set the strain-load to zero; use the tare mechanism to tare out the strain-load. Use the gross load zero value to conduct a decreasing load test when removing the strain-load in the next test.

65a.4.5. Repeat the strain-load test on the other end of the scale. After reaching the maximum test load for the strain-load test, remove the strain-load but leave the known test weights on the scale. The weight indication for the decreasing load test must be within tolerance for the known test load. Continue the decreasing load test by removing the known test weights. Take several readings as the weights are being removed. When all the weights are removed, record the return to zero. The scale must return to zero within one-half of a scale division. When analyzing the return to zero, consideration must be given for the length of time the load was on the scale and possible temperature changes that may have occurred during the test.

65a.4.6. Acceptance tolerances are applied only to the known test load in the strain-load test.

65a.5. Subsequent Type Evaluation (Field) Permanence Tests

65a.5.1. The minimum number of days that a device is required to be in use is 20. It is not required that a certain number of weighing operations be conducted each day for the test period. Performance during both tests must be within acceptance tolerances.

65a.5.2. Conduct at least one complete set of section tests over each section, at mid-span between each section and on modular scales, each on the right and left side of the module connection line located at each section, using minimum of 40 000 lb of known test weights or 50 % of the CLC whichever is greater.

65a.5.3. Conduct at least one strain-load test at each end of the scale. The maximum applied load shall be in the range of 65 % to 100 % of scale capacity.

65a.5.4. If the device does not meet these tolerance limits, the entire test must be repeated, including successful initial performance testing and a subsequent test after a minimum of 20 days.

65a.6. Caution Regarding Load Concentration

Concentrating large loads on scale platforms by using weight carts or test equipment using hydraulic jacks may exceed the maximum pound per square inch load specification for the deck. This condition may arise because the small tire area of the weight cart in contact with the deck surface could result in a very large load concentration over an unusually small area. This could cause damage to the scale deck.

This situation may occur with a weight cart having a very narrow or short wheelbase and small solid rubber tires. This is causes a problem on steel plate decks and could also result in damage to manhole covers. If the load capacities of weight carts increases beyond 25 000 lb, while maintaining solid tread wheels, it is possible that some concrete decks could be damaged.

65a.7. Permanence Test Use Requirements for Vehicle Scales

65a.7.1. A minimum of 300 weighing operations are required during the test period. The manufacturer is to log the date, time, and weight. The person conducting the weighing is to initial each testing.

65a.7.2. Only loads which reflect "normal" use, will be counted during the permanence-testing period.[3]

65a.7.3. For vehicle scales with a nominal capacity over 75 000 lb:

65a.7.3.1. 50 % of the loads must be above 50 000 lb or 80 % of the CLC, whichever is greater; and

65a.7.3.2. 100 % of the loads must be above 20 000 lb or 50 % of the CLC, whichever is greater.

65a.7.4. For all other scales:

65a.7.4.1. 50 % of the loads must be above 50 % of the scale capacity; and

65a.7.4.2. 100 % of the loads must be above 20 % of the scale capacity.

65a.7.5. The minimum number of days that a device is required to be in use is 20. A minimum number of weighing operations to be conducted each day for the test period is not specified; however, the weighments should represent the scale's normal in-service use.

65a.7.6. The device will be tested to at least the CLC on the second test.

NOTE: *Substitution or strain test methods are acceptable as long as all conditions are met.*

[3] The scale may be used to weigh other loads, but only the loads identified are counted as part of the permanence test.

Appendix E

NTEP Committee Hearings

Interim Meetings
January 15-18, 2004

Committee Members

- Ross Andersen, NY, NTEP Chairman
- Dennis Ehrhart, AZ, NCWM Chairman
- Dave Frieders, San Francisco, CA, Chairman Elect
- Don Onwiler, NE
- Stephen Pahl, TX
- Stephen Patoray, NTEP Director, Technical Advisor
- Steven Cook, NIST Technical Advisor

NTEP Program Operation

- Consolidating Device Types
  - Helps Labs appropriately classify devices
  - Makes searches of database more meaningful
- Laboratory Training/Authorization
- Round Robin Update
- 2003 Sector Meetings

NTEP Meetings for 2004

- Laboratory Meeting - Ottawa, Canada April 23-28
- Grain Analyzer - Kansas City, MO August 18-20
- Weighing Sector - Ottawa, Canada August 29-31
- Measuring Sector - Gulfport, MS October 22-23

NTEP Adoption by States

- Report of Scale Manufacturer's Association efforts

Amendment of Pre-NTEP Certificates

- Not all pre-NTEP Certificates are equal
  - Most had little or no test data
  - Some had virtually complete data
- Blanket restriction on update of pre-NTEP certificate may be too restrictive

NTEP 2 - Test Data Exchanges

- US/Canada Mutual Recognition
- Bilateral Arrangements with other countries and Impact of MAA
- Can and will NCWM Issue R76 and R60 Certificates under the MAA?

Participation in International Standards

- Report on US participation in OIML Technical Committee work
- Report on 2004 Canadian Forum on Trade Measurement
- Report on 2004 APLMF and CIML Meetings
- Report on US National Working Group R76/R60

What is Harmonization?

- What are our obligations?
- Removal of technical trade barriers
- Harmonization does not require that standards be identical, but it helps

What makes harmonization difficult?

- Regulatory Documents not aligned
  - US standards directed toward the field
  - OIML directed toward type approval
- Unique US standards set us apart from the rest of the world, examples
  - Customary units
  - Class III and IIIL scales and LMD's
  - Mix and Match

Making it Happen

- Identify technical barriers to trade
- Decide what to change, OIML, NCWM, or NTEP
- Set priorities for change
- Educate on needs and benefits
- Promote action at appropriate level with assurance of due process

Three-Pronged Approach

- NIST ILG to take US proposals to OIML technical work
- NCWM S&T and L&R Committees to consider changes to NCWM standards
- NTEP Sectors and Committee to consider changes to NTEP

NTEP 6 - NCWM & US NWG

- Bring together experts in the field to review OIML standards activities
- Needs a mix of industry experts, regulatory officials, NIST ILG staff
- R76/R60 meeting in August just the first of many to come
- Shouldn't this group be part of NCWM process of Harmonization?

NTEP 7 - Mix and Match

- Enforcement problem - L&R item covers changes to NTEP regulation
- Is US mix-match system outdated?
  - Can we really assess compatibility?
  - Do we consider all necessary issues?
  - Should we consider the OIML Apportionment of Errors?

What is the US going to Do?

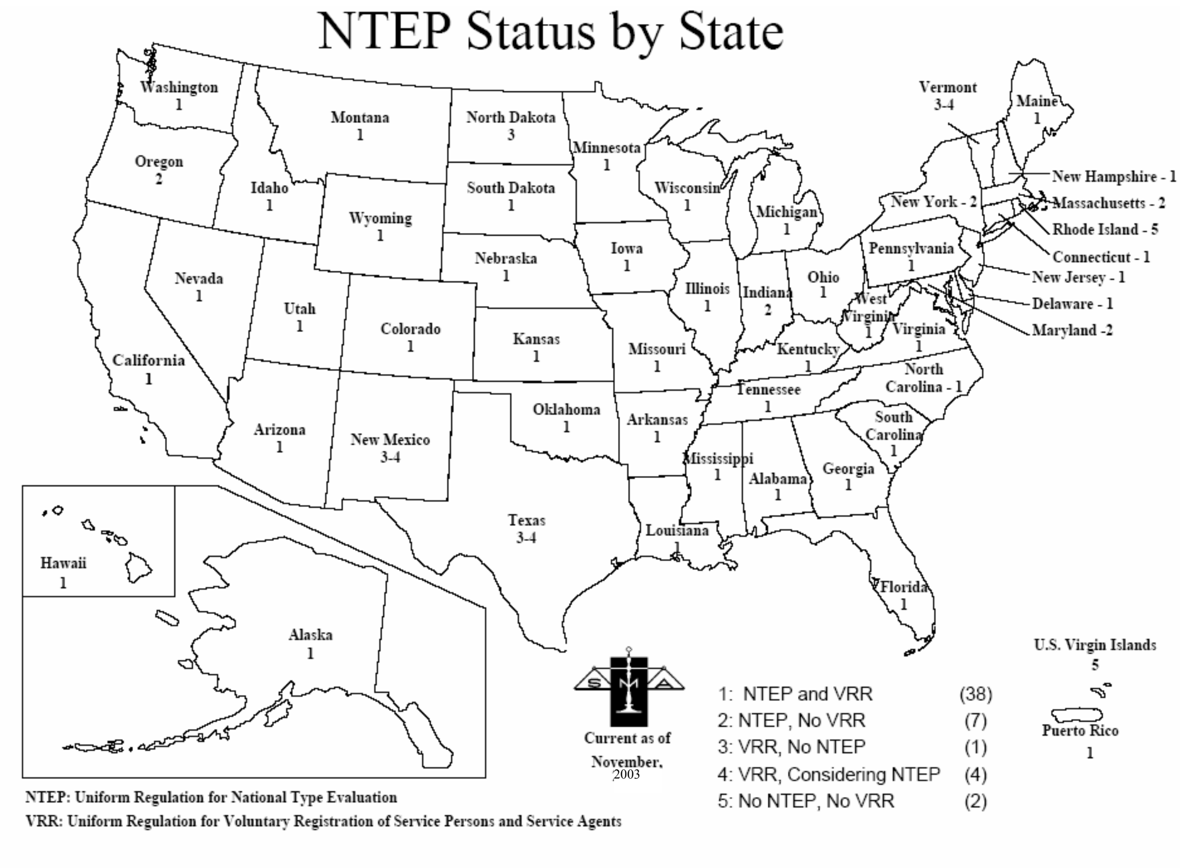
- Can we even participate in MAA when we have so many differences?
- Are we prepared to accept test results from other labs under MAA?
- Can the NTEP labs afford to meet international scrutiny?
- Can NTEP labs compete with national labs that are subsidized?

Critical Question

- How important is it for the US to be part of the international market in trade devices?
- Is the ability to issue OIML Certificates under the MAA a CORE VALUE to the US?

Appendix F

NTEP Status by State



New Chairman's Address

G. Weston Diggs
Virginia Product & Industry Standards

First, I want to take this opportunity and thank in advance my family, staff in Richmond, as well as the Conference Staff for the support they will be giving me over the next twelve months. Until you have served as Chairman, you have no comprehension as to the amount of time the position requires. I believe this is the first time in recent history anyone has served two terms as Chairman of the National Conference on Weights and Measures. I consider it an honor and I look forward to working with the NCWM Board of Directors, Henry Oppermann, his staff at NIST, and the members of this conference.

I believe the NCWM is a strong organization and serves an important purpose, but its real importance is not truly appreciated by anyone but the members of our own organization. One of the problems of being involved in Weights and Measures as long as I have been (37 years) is I have seen a lot. Over the last decade and a half, I have seen weights and measures programs deteriorate or in some cases, cease to exist as they compete for funding. This is true at all levels of weights and measures -- local, state, and federal government -- and I believe some foreign programs fall into this category. I am not pointing fingers; the program in my state has suffered like many other jurisdictions. I believe one of the problems we have when seeking funding for our programs is there is no national standard for weights and measures programs. Other professions like teachers, firemen, and police can point to recommendations by federal agencies. For example, the Departments of Education and Justice have specific recommendations on pupil-teacher ratios or police officer to citizen ratios. These recommendations include organizational structures. Weights and measures organizations do not have anything they can point to as being a national standard.

Developing a standard is not something the Conference can or should do. I do not believe we can be objective. All of us have our personal biases and priorities that are most often established by our legislatures or other governing bodies. This is the responsibility of the Department of Commerce and some may argue not necessarily that of NIST. As a first step, the Department of Commerce should re-examine its decision, made over a hundred years ago, to use the NCWM to ensure the uniformity in weights and measures in the United States. I question if this commitment is still valid based on the NIST paper "Proposed Changes to the Development of Legal Metrology Issues". However, if it is still valid, the next step should be to establish what constitutes an ideal weights and measures program in terms of personnel and activities. Once the "standard" is in place, we will have something to point to when seeking to justify the funding for our programs. Most of us know where we are relative to our weights and measures programs. What we do not have is a standard showing us where we need to be. It would seem to me a national standard for weights and measures programs would aid in securing federal money if we could demonstrate where weights and measures is nationally against where we need to be.

My second issue is the revision of NIST Handbook 44. This is the same issue I brought to the conference four years ago and I believe revision is even more critical now. More of the conference members use Handbook-44 than any of the model laws developed by the NCWM. I see it as outdated, contradictory, confusing and not reflective of today's technology. I would like to make some suggestions as to how this could be best accomplished but I cannot. However, I believe if the NCWM does not do something about bringing Handbook 44 up to date, DWM/NIST will have to. The question is, do we want to lead or follow?

From an organizational standpoint I have some issues I believe we need to consider. First, should the past Chairman of the Conference automatically become Chairman to the NTEP Committee? We have been lucky so far but we may find the Chairman of the NCWM will not have the technical background or interest to be Chairman of the NTEP Committee. Many NTEP issues require several years to develop thereby requiring each new chairman to be brought up to speed. Take for example, the issue of Conformity Assessment, which has been in development since 2000. I believe the Conference would be better served if the NTEP Chairman were appointed for a term of several years and had the technical background necessary to best serve NTEP.

Second, we need to expand our use of work groups to support our Standing Committees. Besides the number of issues submitted to the committees each year, the issues are becoming more complex. There is no way to staff a Standing Committees with "experts" that can cover the wide range of issues before the Conference. We need to utilize work groups to develop some of these issues. We have used work groups in the past very effectively and we need to expand their use in order to more fully develop issues through the conference process in a timely manner.

Third, the locations of our Annual and Interim Meetings are largely influenced by the availability of federal per diem rates. A second consideration is our tradition of rotating the meetings through the Regions. As a result, we find ourselves meeting in Chicago in 2006 at a hotel with a room rate of $155.00. I might add, the locations for these meetings are selected by the NCWM Board. I realize many states cannot exceed the federal per diem, but I suggest, in order to keep meetings affordable, we need more flexibility in determining meeting locations. This may mean breaking with the tradition of rotating our Annual and Interim Meetings. Would a meeting at a hotel in Kansas City at $95.00 ($7.00 over per diem) be better than Chicago at $155.00?

These are some of the issues I think are worthy of discussion. I would appreciate feedback from you as individuals or from your Regional Associations as they meet throughout the year.

This is not exactly the way I envisioned phasing out my career in weights and measures. I thought I would be more like the old soldier and just fade away. Serving as Chairman is a true honor and I will serve to the best of my ability. With your support this will be a successful year.

NCWM 89th Annual Meeting

July 11-15, 2004 – Pittsburgh, PA

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NCWM 89th Annual Meeting

July 11-15, 2004 – Pittsburgh, PA

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NCWM 89th Annual Meeting
July 11-15, 2004 – Pittsburgh, PA

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NCWM 89th Annual Meeting
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