

# NBS SPECIAL PUBLICATION 734

U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards

## Report of the 72nd National Conference on Weights and Measures 1987





The National Bureau of Standards<sup>1</sup> was established by an act of Congress on March 3, 1901. The Bureau's overall goal is to strengthen and advance the nation's science and technology and facilitate their effective application for public benefit. To this end, the Bureau conducts research to assure international competitiveness and leadership of U.S. industry, science and technology. NBS work involves development and transfer of measurements, standards and related science and technology, in support of continually improving U.S. productivity, product quality and reliability, innovation and underlying science and engineering. The Bureau's technical work is performed by the National Measurement Laboratory, the National Engineering Laboratory, the Institute for Computer Sciences and Technology, and the Institute for Materials Science and Engineering.

### *The National Measurement Laboratory*

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Provides the national system of physical and chemical measurement; coordinates the system with measurement systems of other nations and furnishes essential services leading to accurate and uniform physical and chemical measurement throughout the Nation's scientific community, industry, and commerce; provides advisory and research services to other Government agencies; conducts physical and chemical research; develops, produces, and distributes Standard Reference Materials; provides calibration services; and manages the National Standard Reference Data System. The Laboratory consists of the following centers:

- Basic Standards<sup>2</sup>
- Radiation Research
- Chemical Physics
- Analytical Chemistry

### *The National Engineering Laboratory*

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Provides technology and technical services to the public and private sectors to address national needs and to solve national problems; conducts research in engineering and applied science in support of these efforts; builds and maintains competence in the necessary disciplines required to carry out this research and technical service; develops engineering data and measurement capabilities; provides engineering measurement traceability services; develops test methods and proposes engineering standards and code changes; develops and proposes new engineering practices; and develops and improves mechanisms to transfer results of its research to the ultimate user. The Laboratory consists of the following centers:

- Applied Mathematics
- Electronics and Electrical Engineering<sup>2</sup>
- Manufacturing Engineering
- Building Technology
- Fire Research
- Chemical Engineering<sup>3</sup>

### *The Institute for Computer Sciences and Technology*

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Conducts research and provides scientific and technical services to aid Federal agencies in the selection, acquisition, application, and use of computer technology to improve effectiveness and economy in Government operations in accordance with Public Law 89-306 (40 U.S.C. 759), relevant Executive Orders, and other directives; carries out this mission by managing the Federal Information Processing Standards Program, developing Federal ADP standards guidelines, and managing Federal participation in ADP voluntary standardization activities; provides scientific and technological advisory services and assistance to Federal agencies; and provides the technical foundation for computer-related policies of the Federal Government. The Institute consists of the following divisions:

- Information Systems Engineering
- Systems and Software Technology
- Computer Security
- System and Network Architecture
- Advanced Systems

### *The Institute for Materials Science and Engineering*

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Conducts research and provides measurements, data, standards, reference materials, quantitative understanding and other technical information fundamental to the processing, structure, properties and performance of materials; addresses the scientific basis for new advanced materials technologies; plans research around cross-cutting scientific themes such as nondestructive evaluation and phase diagram development; oversees Bureau-wide technical programs in nuclear reactor radiation research and nondestructive evaluation; and broadly disseminates generic technical information resulting from its programs. The Institute consists of the following Divisions:

- Ceramics
- Fracture and Deformation<sup>3</sup>
- Polymers
- Metallurgy
- Reactor Radiation

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<sup>1</sup>Headquarters and Laboratories at Gaithersburg, MD, unless otherwise noted; mailing address Gaithersburg, MD 20899.

<sup>2</sup>Some divisions within the center are located at Boulder, CO 80303.

<sup>3</sup>Located at Boulder, CO, with some elements at Gaithersburg, MD

Report of the

## **72nd National Conference on Weights and Measures 1987**

*Sponsored by the National Bureau of Standards  
Attended by Officials from the Various  
States, Counties, and Cities, and  
Representatives from U.S. Government,  
Industry, and Consumer Organizations  
Little Rock, AR July 19-24, 1987*

Report Editors: Albert D. Tholen  
Carroll S. Brickenkamp  
Ann P. Heffernan



*United States Department of Commerce  
Clarence J. Brown, Acting Secretary  
National Bureau of Standards  
Ernest Ambler, Director*

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## ABSTRACT

The 72nd Annual Meeting of the National Conference on Weights and Measures was held at the Excelsior Hotel in Little Rock, Arkansas during the week of July 19 through 24, 1987. The theme of the meeting was "Consumer Involvement Fosters More Efficient Weights and Measures Enforcement."

Chairman Frank Nagele of Michigan set this year's theme to encourage weights and measures officials to inform and educate the consuming public in order to make them more aware of commercial weighing and measurement in their daily lives. Triggering public awareness will multiply the effectiveness of weights and measures enforcement by putting self-help resources and information on local government enforcement contact points into the hands of the average shopper.

Significant progress was made in the development and application of the standards that are represented by key Conference products, including NBS Handbooks 44, 130, 133, the National Type Evaluation Program (NTEP), the National Training program (NTP), and the newly recommended "Uniform Motor Fuel Inspection Law" and "Uniform Regulation for Motor Fuel." New policy and procedures were adopted for checking products subject to moisture loss.

Special meetings included those of the Task Force on Commodity Requirements, the Task Force on Prevention of Fraud, the Task Force on Information Systems, Metrologists' Workshops, the Associate Membership Committee, the Retired Officials Committee, the Scale Manufacturers' Association, the Industry Committee on Packaging and Labeling, the state regional weights and measures associations, NASDA Weights and Measures Division, and OIML Pilot Secretariat 20 (Prepackaged Products).

Reports by the standing and annual committees of the Conference comprise the major portion of this publication, along with the addresses delivered by Conference officials and other authorities from government and industry.

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

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Note: Opinions expressed in non-NBS papers are those of the authors and not necessarily those of the National Bureau of Standards. Non-NBS speakers are solely responsible for the content and quality of their material.



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# PAST CHAIRMEN OF THE CONFERENCE

<u>CONFERENCE</u>	<u>YEAR</u>	<u>CHAIRMAN</u>
43rd	1958	J. P. McBride, MA
44th	1959	C. M. Fuller, CA
45th	1960	H. E. Crawford, FL
46th	1961	R. E. Meek, IN
47th	1962	Robert Williams, NY
48th	1963	C. H. Stender, SC
49th	1964	D. M. Turnbull, WA
50th	1965	V. D. Campbell, OH
51st	1966	J. F. True, KS
52nd	1967	J. E. Bowen, MA
53rd	1968	C. C. Morgan, IN
54th	1969	S. H. Christie, NJ
55th	1970	R. W. Searles, OH
56th	1971	M. Jennings, TN
57th	1972	E. H. Black, CA
58th	1973	George L. Johnson, KY
59th	1974	John H. Lewis, WA
60th	1975	Sydney D. Andrews, FL
61st	1976	Richard L. Thompson, MD
62nd	1977	Earl Prideaux, CO
63rd	1978	James F. Lyles, VA
64th	1979	Kendrick J. Simila, OR
65th	1980	Charles H. Vincent, TX
66th	1981	Edward H. Stadolnik, MA
67th	1982	Edward C. Heffron, MI
68th	1983	Charles H. Greene, NM
69th	1984	Sam F. Hindsman, AR
70th	1985	Ezio F. Delfino, CA
71st	1986	George E. Mattimoe, HI



## **OFFICERS, OFFICIALS, AND COMMITTEES OF THE CONFERENCE**

### **OFFICERS OF THE CONFERENCE**

July 1986 to July 1987

#### **ELECTED**

<b>Chairman:</b>	Frank Nagele, Michigan*
<b>Chairman Elect:</b>	Darrell Guensler, California*
<b>Past Chairman:</b>	George Mattimoe, Hawaii*
<b>Vice-Chairmen:</b>	Peggy Adams, Bucks County, PA Fred Gerk, New Mexico Don Stagg, Alabama Robert Walker, Indiana
<b>Executive Committee:</b>	Bruce Niebergall, North Dakota James O'Connor, Iowa James Lyles, Virginia Joseph Swanson, Alaska John Bartfai, New York Louis Draghetti, Agawam, MA
<b>Treasurer:</b>	Charles Gardner, Suffolk County, NY*
<b>Chaplain:</b>	Martin Coile, Georgia
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<b>Executive Secretary:</b>	Albert Tholen, Chief* Office of Weights and Measures National Bureau of Standards

#### **APPOINTED OFFICIALS**

<b>Sergeants-at-Arms:</b>	Michael Hile, Arkansas Catherine Pittman, Tennessee
<b>Parliamentarian:</b>	James Melgaard, South Dakota
<b>Assistant Treasurer:</b>	Gerald Hanson, San Bernardino County, CA
<b>Representatives to OIML:</b>	
Pilot Secretariat 20:	Allan Nelson, Connecticut
Pilot Secretariat 7/RS 4:	Ross Andersen, New York

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\*Ex-officio members of the Executive Committee

**STANDING COMMITTEES  
(Appointed)**

**Laws and Regulations**

Allan Nelson, Connecticut, Chairman  
Trafford Brink, Vermont  
Sidney Colbrook, Illinois  
Kendrick Simila, Oregon  
N. David Smith, North Carolina  
Technical Advisor: Carroll Brickenkamp, NBS

**Specifications and Tolerances**

Fred Gerk, New Mexico, Chairman  
Ross Andersen, New York  
Kenneth Butcher, Maryland  
David Watson, Texas  
James Truex, Ohio  
Technical Advisor: Henry Oppermann, NBS

**Education, Administration, and Consumer Affairs**

Thomas Geiler, Barnstable, MA, Chairman  
Charles Greene, New Mexico  
Steve Malone, Nebraska  
Thomas Scott, North Carolina  
Philip Staggs, Louisiana  
Technical Advisor: Joan Koenig, NBS

**Liaison**

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James Akey, Kansas  
Paul Engler, Los Angeles County, CA  
Chip Kloos, Beatrice/Hunt Wesson Foods  
John McCutcheon, U.S. Department of Agriculture  
Technical Advisor: Karl Newell, NBS

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(Appointed)

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Donald Lynch, Kansas City, KS  
Allan Nelson, Connecticut  
Kendrick Simila, Oregon  
Richard Thompson, Maryland

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Fred Clem, Ohio  
James Rardin, West Virginia

**Budget Review Committee**

Frank Nagele, Michigan, Chairman  
Paul Engler, Los Angeles County, CA  
Charles Gardner, Suffolk County, NY  
Richard Davis, James River-Dixie Northern Corporation  
Robert Walker, Indiana  
Albert Tholen, National Bureau of Standards

**Credentials Committee\***

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Eugene Keeley, Delaware  
James Vanderwielen, Tippecanoe County, IN

**Resolutions Committee\***

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Charles Carroll, Massachusetts  
O. Ray Elliott, Oklahoma  
Maxwell Gray, Florida  
Donald Lynch, Kansas City, KS  
George MacDonald, Minnesota  
Stephen Meloy, Montana

\*Technical Advisor: Richard Smith, National Bureau of Standards

### **ASSOCIATE MEMBERSHIP COMMITTEE**

Walter Kupper, Mettler Instrument, Chairman  
Kenneth Appell, Colgate-Palmolive, Vice-Chairman  
Richard Davis, James River-Dixie Northern, Inc. Treasurer  
Max Casanova, Ramsey Engineering  
Anthony Ladd, A.J. Ladd Weighing & Packaging  
Harvey Lodge, Dunbar Manufacturing, Inc.  
Robert Nelson, General Mills, Inc.  
J. Edward Thompson, Kraft, Inc.  
Thomas Topalis, The Quaker Oats Co.  
Raymond Wells, Sensitive Measurements, Inc.

### **TASK FORCES AND SPECIAL COMMITTEES**

#### **Technical Committee on National Type Evaluation**

John Elengo, Jr. Revere Corp., Chairman

##### Public Members

Ross Andersen, New York  
Lacy DeGrange, Maryland  
John Lacy, U.S. Department of Agriculture, P&S  
Dennis Mahoney, U.S. Department of Agriculture, FGIS  
Henry Oppermann, National Bureau of Standards  
Clifton Smith, California  
James Truex, Ohio  
Otto Warnlof, National Bureau of Standards  
Simone Yaniv, National Bureau of Standards

##### Weighing Industry Sector

John Elengo, Jr., Revere Corp., Chairman  
Edward Bratle, National Cash Register  
William Goodpaster, Cardinal Scale Co.  
Joe Gianinna, Grain Elevator and Processing Society  
Richard Hurley, Fairbanks Weighing Div., Colt Industries  
Fred Katterheinrich, Hobart Corp.  
Harry Lockery, Hottinger Baldwin Measurements  
John MacDonald, Streeter Richardson  
Peter Perino, Transducers, Inc.  
John Robinson, Association of American Railroads  
Thomas Stabler, Toledo Scale Co.  
Daryl Tonini, Scale Manufacturers Association



### Measuring Industry Sector

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Michael Belue, Southwest Pump  
Edward Brattle, National Cash Register  
Alfred Evans, Veeder-Root Co.  
Robert Fonger, Bennett Pump Co.  
Walter Gerdorn, Tokheim Corp.  
Melvin Hankel, Liquid Controls  
William Key, Tokheim Corp.  
Larry Murray, Dresser Industries, Inc.  
Willem Roelofsen III, Koppens Automatic  
Douglas Smith, William M. Wilson's Sons, Inc.  
Richard Whipple, Gilbarco, Inc.

### **Task Force on Motor Fuels**

N. David Smith, North Carolina, Chairman  
Sydney Andrews, Florida, Retired  
Barbara Bloch, California  
David Karlsh, Arkansas  
John O'Neill, Kansas  
Harwood Owings, Maryland, Retired  
Curtis Williams, Georgia  
Technical Advisor: Carroll Brickenkamp, NBS

### **Task Force on Commodity Requirements**

Richard Thompson, Maryland, Chairman  
Peggy Adams, Bucks County, PA  
Robert Bruce, Canada  
Kenneth Butcher, Maryland  
Paul Engler, Los Angeles County, CA  
Edward Heffron, Michigan  
Tom Klevay, Millers' National Federation  
John McCutcheon, U.S. Department of Agriculture  
Allan Nelson, Connecticut  
Howard Pippin, Food and Drug Administration  
Stephen Pretanik, National Broiler Council  
George Wilson, American Meat Institute  
Technical Advisor: Carroll Brickenkamp, NBS

### **Task Force on Prevention of Fraud**

Steven Malone, Nebraska, Chairman  
Ross Andersen, New York  
Peter Perino, Transducers, Inc.  
Kathleen Thuner, California  
Richard Tucker, Tokheim Corp.  
Richard Whipple, Gilbarco, Inc.  
Technical Advisor: Joan Koenig, NBS

### **Task Force on Information Systems**

Kendrick Simila, Oregon, Chairman  
Robert Bruce, Canada  
James Lyles, Virginia  
Joseph Rothleder, California  
Gerald Hanson, California  
Technical Advisor: Karl Newell, NBS

### **STATE REPRESENTATIVES**

The following designated State representatives were present and voted on reports presented by the Conference standing and annual committees:

<u>STATE</u>	<u>REPRESENTATIVE</u>	<u>ALTERNATE</u>
Alabama	John Rabb	None
Alaska	Aves Thompson	None
Arizona	Raymond Helmick	None
Arkansas	Sam Hindsman	James Hile
California	Darrell Guensler	Barbara Bloch
Colorado	David Wallace	None
Connecticut	Allan Nelson	Raymond Kalentkowski
Delaware	Eugene Keeley	None
District of Columbia	None	None
Florida	Maxwell Gray	Jack Jeffries
Georgia	Martin Coile	Curtis Williams
Hawaii	None	None
Idaho	Lane Jolliffe	Tom Schafer
Illinois	Sid Colbrook	Steve McGuire
Indiana	Robert Walker	None
Iowa	James O'Connor	Jerry Bane
Kansas	Archie Hurst	DeVern Phillips
Kentucky	Carl Dills	None
Louisiana	Melvin Lyons	None
Maine	Clayton Davis	None
Maryland	Lacy DeGrange	Kenneth Butcher
Massachusetts	Charles Carroll	None
Michigan	Edward Heffron	Frank Nagele
Minnesota	Edward Skluzacek	George MacDonald
Mississippi	None	None

STATE	REPRESENTATIVE	ALTERNATE
Missouri	Lester Barrows	David James
Montana	None	None
Nebraska	Steven Malone	Michael Diesley
Nevada	None	None
New Hampshire	Michael Grenier	None
New Jersey	Thomas Kelly	Carl Conrad, Jr.
New Mexico	Fred Gerk	Charles Greene
New York	John Bartfai	Delores Davis
North Carolina	N. David Smith	Thomas Scott
North Dakota	Bruce Niebergall	None
Ohio	James Truex	Bruce Litzenberg
Oklahoma	O. Ray Elliott	Charles Carter
Oregon	Kendrick Simila	George Shefcheck
Pennsylvania	G. Edward Carpenter	None
Puerto Rico	Samual Nieves	None
Rhode Island	James Allen	Lynda Maurer
South Carolina	Carol Fulmer	John Pugh
South Dakota	Jim Melgaard	Leonard Bies
Tennessee	Robert Williams	None
Texas	Ed Price	Herb Eskew
Utah	Robert Smoot	Edison Stephens
Vermont	Trafford Brink	None
Virgin Islands	Louis Penn	None
Virginia	James Lyles	G. W. Diggs
Washington	Sterling McFarlane	James Cammel
West Virginia	James Rardin	Karl Angel
Wisconsin	Donald Soberg	None
Wyoming	Victor Gerber	William Hovey

# SCHEDULED EVENTS

	SUNDAY	MONDAY	TUESDAY
8 a.m.		ORIENTATION SESSION FOR MEMBERS	LIAISON COMMITTEE SESSION
9 a.m.			
10 a.m.		SPECIFICATION AND TOLERANCES COMMITTEE SESSION	EXECUTIVE COMMITTEE SESSION
11 a.m.		ICPL/ OIML PS20 USNWW	
Noon			
1 p.m.		LUNCH (OPEN)	LUNCH (OPEN)
2 p.m.	STANDING COMMITTEES AGENDA REVIEWS		GENERAL SESSION — CEREMONIAL — OPENING CEREMONY ADDRESSES HONOR AWARDS PRESENTATION
3 p.m.	EXECUTIVE COMMITTEE EDUCATION COMMITTEE LAWS/REGULATIONS COMMITTEE LIAISON COMMITTEE SPECIFICATIONS AND TOLERANCES COMMITTEE	LAWS AND REGULATIONS COMMITTEE SESSION	
4 p.m.	NASDA WEIGHTS AND MEASURES DIVISION		ASSOCIATE MEMBERSHIP COMMITTEE COMMODITY REQUIREMENTS FRAUD INFORMATION SYSTEMS
5 p.m.		EDUCATION COMMITTEE SESSION	
6 p.m.			OPEN
7 p.m.	CHAIRMAN'S RECEPTION	OPEN	
8 p.m.			
9 p.m.			



## 72nd ANNUAL MEETING

WEDNESDAY		THURSDAY	FRIDAY	
METROLOGY WORKSHOP	MOISTURE LOSS, FLOUR	<u>VOTING SESSION*</u> (CONTINUED)  NOMINATING COMMITTEE LAWS & REGULATIONS COMMITTEE LIAISON COMMITTEE RESOLUTIONS COMMITTEE AUDITING COMMITTEE TREASURER'S REPORT CLOSING CEREMONY	BREAKFAST MEETING EXECUTIVE COMMITTEE AND OFFICERS	8 a.m.
	REGIONAL ASSOCIATION SESSIONS		STANDING COMMITTEES, SPECIAL COMMITTEES, AND TASK FORCES— PLANNING	9 a.m.
	NORTHEAST			10 a.m.
	CENTRAL			11 a.m.
	SOUTHERN			
	WESTERN			
LUNCH (OPEN)		LUNCH (OPEN)		Noon
<u>VOTING SESSION*</u>  VOTING PROCEDURE EDUCATION COMMITTEE EXECUTIVE COMMITTEE SPECIFICATIONS AND TOLERANCES COMMITTEE		STANDING COMMITTEES WRAP-UP		1 p.m.
				2 p.m.
				3 p.m.
				4 p.m.
ASSOCIATE MEMBERSHIP RECEPTION		CONFERENCE OUTING	ABBREVIATIONS KEY:  NASDA = National Association of State Departments of Agriculture  ICPL = Industry Committee on Packaging and Labeling  OIML = International Organization of Legal Metrology  USNWG = United States National Working Group	5 p.m.
				6 p.m.
				7 p.m.
				8 p.m.
			*At the two voting sessions the listed items will be voted in the order shown.	9 p.m.

## 72nd NATIONAL CONFERENCE

### OPERATING COMMITTEES TECH ADVISOR: R. SMITH, NBS

AUDITING COMMITTEE	
CHAIRMAN:	E. ROMANO, CA (1)
MEMBERS:	F. CLEM, OH (2) J. RARDIN, WV (3)

CREDENTIALS COMMITTEE	
CHAIRMAN:	G. ALLEN, WA (1)
MEMBERS:	E. KEELEY, DE (2) J. VANDERWEILEN, IN (3)

RESOLUTIONS COMMITTEE	
CHAIRMAN:	W. ELDRIDGE, MS (1)
MEMBERS:	C. CARROLL, MA (2) O.R. ELLIOTT, OK (3) M. GRAY, FL (3) D. LYNCH, KS (1) G. MacDonald, MN (2) S. MELOY, MT (3)

NOMINATING COMMITTEE	
CHAIRMAN:	G. MATTHEOE, HI
MEMBERS:	P. ADAMS, PA E. HEFFRON, MI D. LYNCH, KS A. NELSON, CT K. SIMILA, OR R. THOMPSON, MD

BUDGET REVIEW COMMITTEE	
CHAIRMAN:	F. NAGELE, MI <sup>a</sup>
MEMBERS:	P. ENGLER, CA (1) C. GARDNER, NY <sup>a</sup> R. DAVIS, JAMES RIVER CORP (1) R. WALKER, IN (2) A. THOLEN, NBS <sup>a</sup>

### NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

#### ELECTED OFFICERS

CHAIRMAN <sup>a</sup> :	F. NAGELE, MI
CHAIRMAN-ELECT <sup>a</sup> :	D. GUENSLER, CA
PAST-CHAIRMAN <sup>a</sup> :	G. MATTHEOE, HI
TREASURER <sup>a</sup> :	C. GARDNER, NY
ONE YEAR:	B. NIESBERGALL, ND J. O'CONNOR, IA
TWO YEAR:	J. LYLES, VA J. SWANSON, AK
THREE YEAR:	J. BARTFAI, NY L. DRAGETTI, MA

#### OTHER ELECTED OFFICERS

VICE-CHAIRMAN:	P. ADAMS, PA F. GERK, NM D. STAGG, AL R. WALKER, IN
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#### OIML REPRESENTATIVES

PS 20:	R. THOMPSON, MD
PS7/RS4:	R. ANDERSEN, NY

### STANDING COMMITTEES

SPECIFICATIONS & TOLERANCES COMMITTEE	
CHAIRMAN:	F. GERK, NM (1)
MEMBERS:	R. ANDERSEN, NY (3) K. BUTCHER, MD (2) D. WATSON, TX (4) J. TRUEX, OH (5)
TECH ADVISOR:	H. OPPERMAN, NBS

LAWS AND REGULATIONS COMMITTEE	
CHAIRMAN:	A. NELSON, CT (1)
MEMBERS:	T. BRINK, VT (2) S. GOLDBROOK, IL (4) K. SIMILA, OR (3) N. DAVID SMITH, NC (5)
TECH ADVISOR:	C. BRICKENKAMP, NBS

LIAISON COMMITTEE	
CHAIRMAN:	P. ADAMS, PA (2)
MEMBERS:	J. AKEY, KS (4) P. ENGLER, CA (5) C. KLOOS, BEATRICE (1) J. MCCUTCHEON, USDA (3)
TECH ADVISOR:	K. NEWELL, NBS

TASK FORCE ON MOTOR FUELS	
CHAIRMAN:	N.D. SMITH, NC
MEMBERS:	S. ANDREWS, FL, RET. B. BLOCH, CA D. KARLISH, AR J. O'NEILL, KS H. OWINGS, MD, RET. C. WILLIAMS, GA
TECH ADVISOR:	C. BRICKENKAMP, NBS

TASK FORCE ON INFORMATION SYSTEMS	
CHAIRMAN:	K. SIMILA, OR
MEMBERS:	R. BRUCE, CANADA J. LYLES, VA J. ROTHLEDER, CA G. HANSON, CA
TECH ADVISOR:	K. NEWELL, NBS

#### LEGEND:

n - NON-VOTING MEMBERS

a - EX-OFFICIO MEMBERS

NUMBERS IN PARENTHESES  
REFER TO YEARS REMAINING  
TO SERVE ON COMMITTEES

OIML - INTERNATIONAL  
ORGANIZATION  
OF LEGAL METROLOGY

REVISED: MARCH 1987

### WEIGHTS & MEASURES WEEK SUBCOMMITTEE

CHAIRMAN:	P. ADAMS, PA
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## ON WEIGHTS AND MEASURES

### EXECUTIVE COMMITTEE NTEP BOARD OF GOVERNORS

**PRESIDENT<sup>1,2</sup>** E. AMBLER, NBS  
**EXECUTIVE SECRETARY<sup>1,2</sup>** A. THOLEN, NBS

### APPOINTED OFFICIALS

**CHAPLAIN:** M. COILE, GA  
**PARLIAMENTARIAN:** J. MELGAARD, SD  
**ASSISTANT TREASURER:** F. THOMAS, PA  
**SERGEANTS-AT-ARMS:** M. HILE, AR  
C. PITTMAN, TN

### COORDINATORS

**REGIONAL COORDINATOR** R. SMITH, NBS  
**CONFERENCE COORDINATOR** A. HEFFERNAN, NBS

### EDUCATION, ADMINISTRATION, AND CONSUMER AFFAIRS COMMITTEE

**CHAIRMAN:** T. GEILER, MA (2)  
**MEMBERS:** C. GREENE, NM (3)  
S. MALONE, NE (5)  
T. SCOTT, NC (4)  
P. STAGG, LA (1)  
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## GENERAL SESSION

**GENERAL SESSION AGENDA**

FRANK NAGELE  
Conference Chairman, Presiding

**CALL TO ORDER**

**PRESENTATION OF COLORS AND NATIONAL ANTHEM**

**INVOCATION AND PLEDGE OF ALLEGIANCE**

REV. MARTIN T. COILE  
Conference Chaplain  
Director, Weights and Measures Laboratory  
State of Georgia

**NET WEIGHT - A CONTINUING DILEMMA**

KENNETH GILLES  
Assistant Secretary for Marketing and Inspection Services  
U. S. Department of Agriculture

**TO PROMOTE THE GENERAL WELFARE**

ERNEST AMBLER  
Conference President  
Director, National Bureau of Standards

**CONSUMER INVOLVEMENT FOSTERS  
MORE EFFICIENT WEIGHTS AND MEASURES ENFORCEMENT**

FRANK NAGELE  
Conference Chairman  
Weights and Measures Specialist  
State of Michigan

**HONOR AWARD PRESENTATIONS**

ERNEST AMBLER  
Conference President

## NET WEIGHT - A CONTINUING DILEMMA

DR. KENNETH GILLES

Assistant Secretary, U.S. Department of Agriculture  
Marketing and Inspection Services

I welcome this invitation to represent the U.S. Department of Agriculture (USDA) at the 72nd Annual Meeting of the National Conference on Weights and Measures, and I want to thank the Liaison Committee for sponsoring this address. I also welcome the opportunity to participate in your discussion of the timely issues relating to the administration and technology of weights and measures. We at USDA are well aware of the importance of these issues. We are aware, too, of the importance of a major objective of the National Conference, as stated in your program - to foster understanding and cooperation among weights and measures officials and industrial, business, and consumer interests. USDA is committed to such an objective, and I would like to discuss net weight compliance from that perspective.

For those of you who may not be fully aware of USDA's regulatory role in net weight compliance, it might be useful to provide some background. As an Assistant Secretary at USDA, I head up the Department's Marketing and Inspection Services, which include four agencies with a particular involvement and interest in weights and measures issues. These are the Food Safety and Inspection Service, Federal Grain Inspection Service, Packers and Stockyards Administration and Agricultural Marketing Service.

The Food Safety and Inspection Service (FSIS) administers the Federal Meat and Poultry Inspection Program to assure safety, wholesomeness, and truthful labeling of these products. The commitment of FSIS to public protection extends throughout the food distribution chain, and includes the administering of fair and enforceable net weight regulations for meat and poultry products. The Federal Grain Inspection Service is responsible for the inspection and weighing of grain and commodities, the supervision of official, private, and state grain inspection agencies, and the maintenance of U.S. grade standards for grain and grain products. The Packers and Stockyards Administration is designed to maintain integrity in the marketing of livestock, poultry, and meat, and is responsible for enforcing the Packers and Stockyards Act, an antitrust, fair trade practice, and payment protection law. And, finally, the Agricultural Marketing Service administers marketing regulatory programs, develops quality grade standards, and provides voluntary grading services for meat, poultry, eggs, dairy products, fruits and vegetables, cotton, tobacco, and livestock. The Agency also purchases food for USDA food assistance programs and is responsible for federal-state marketing improvement programs.

USDA's responsibility for net weight inspection of meat and poultry was extended and reinforced by the Wholesome Meat Act of 1967 and the Wholesome Poultry Products Act of 1968, both administered by the FSIS. Congressional intent

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was to protect the public from, among other things, improperly labeled and packaged meat and poultry. Regulations allowed for reasonable variations from the labeled net weight that are due to (1) moisture loss or gain occurring despite good distribution practices, and (2) unavoidable deviations occurring despite good manufacturing practices.

USDA is committed to uniform procedures for net weight at the federal, state, and local levels. I should point out that, under the laws I mentioned, the states may not impose any marking or labeling requirements on federally inspected products in addition to or different from those made under the Federal Meat and Poultry Inspection Acts. With respect to state-inspected products, the states must impose inspection requirements that are at least equal to federal requirements.

As many of you know, the Department's net weight policy efforts for meat and poultry, which date back several years, have run into opposition from various quarters. A major reason is that some state or local jurisdictions did not provide for reasonable variation in net weight caused by moisture loss or gain during good distribution practices. A local California order in 1972 to remove the federally inspected Rath Packing Company's bacon from stores for shortweighing was overturned by a Federal District court, but that court also held that USDA's regulations were so vague as to be void. What followed was a lengthy period of proposal development, public hearings, court appeals, and petitions, and I would like to review them briefly.

USDA developed a proposal in 1973 that would more precisely define the weight variations allowed at the plant and at the time of retail sale, with free liquid in containers remaining part of the net weight. Five public hearings were held around the country, but the proposal was not widely supported.

California appealed the District Court decision on the Rath Packing Company all the way to the Supreme Court, but the decision that federal law preempted state law was upheld. Then the states petitioned USDA, the Food and Drug Administration, and the Federal Trade Commission that undefined shortages in weight for moisture loss were not enforceable by either federal or state officials, and that existing regulations were unfair to consumers who do not receive full measure as presented on the package.

The USDA response was a new proposal in 1978 to provide information on the usable weight of the meat and poultry contents in the package. Among the changes proposed were the adoption of weight definitions, a new definition of reasonable variation, a mandatory net weight quality control program, and a tightened inspection sampling procedure. Two thirds of those who commented on that proposal opposed it.

In the development of another proposal in 1980, USDA sought additional data from such sources as the Grocery Manufacturers of America, the Consumer Federation of America, and the General Accounting Office. The new proposal would ensure accurate information about the contents of containers, and provide specific net weight standards that state and local authorities could enforce at the retail level. It would replace reasonable variations due to loss or gain of

in good manufacturing practices, with maximum allowable variations which appear to be reasonable when determined by specific procedures.

The proposal also provided sampling procedures for enforcement purposes that reflected consultations with the National Bureau of Standards on appropriate, statistically sound sampling theory. Again, comments on the proposal showed significant opposition to it on the grounds that the changes could have adverse economic impacts on industry that would outweigh benefits to the public. USDA has not formally withdrawn the proposal, nor has any further action been taken on it, but the Department is working with a task force organized by the Conference to study the issues further.

If the work of the Task Force on Commodity Requirements is successful, and I sincerely hope that it is, we should be able to put forth changes in our net weight regulations that should go a long way toward providing the framework in which federal, state, and local jurisdictions, and industry can work together for an efficient and equitable system. We are especially interested in strengthening federal-state cooperation and in exploring the ways in which we can more effectively use concurrent jurisdiction rather than having to rely, on occasion, on federal preemption.

I should add that federal preemption has not led us to any workable system of solving problems such as the one I have already mentioned - defining more precisely the term "reasonable variations." On the other hand, the concept of "concurrent jurisdiction," to which we subscribe, appears to offer much more promise. Our work with your Task Force on Commodity Requirements, along with the preparation of Memoranda of Understanding on certain issues, are steps in the right direction. For example, the recommendation of your task force to adopt the three-percent gray area approach as National Conference policy in checking packages of flour, is one in which we concur. We are pleased to note that the task force will continue to study the matter to ensure that the three-percent gray area is neither too large nor too small, and that the moisture content values, as determined by the manufacturers and the weights and measures laboratories, are reliable.

Also, we concur on the task force proposal for determining moisture loss in meat and poultry products that would rely on "used dry tare," wherein the state inspector removes the wrapping of the product and lets it dry out before weighing it. We also agree on the need to continue field testing "used dry tare" to determine its equivalency to "unused dry tare," and we look forward to further concurrent actions in other areas.

Moving on to the Federal Grain Inspection Service (FGIS), that agency would also like to see a uniform, national program on grain moisture determination. In the interest of achieving national uniformity, FGIS adopted many of the specifications, tolerances, and other technical requirements for commercial weighing and measuring devices published in Handbook 44. In fact, the agency's revised regulations on weights and measures, which became final just last year, were based largely on Handbook 44. FGIS did not adopt the handbook's moisture meter code because it did not meet the existing need for official moisture determinations, but the agency is continuing to work with the Office of Weights and Measures of NBS to arrive at uniform requirements.



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I should add that, because technical requirements for commercial weighing and measuring devices are important to FSIS as well, that agency has also indicated it would adopt Handbook 44, although it would have to be done through an amendment to the regulations. FSIS does not really have a formal, explicit tool to determine the efficacy of scales, and there is a need for one.

FGIS, in conjunction with the National Bureau of Standards and the National Conference on Weights and Measures, added a new code to Handbook 44 covering technical requirements for automatic grain bulk weighing scales. Last year alone, the agency conducted 82 scale tests on 41 railroad track scales used for the official weighing of grain. Along with other agencies and the National Bureau of Standards, FGIS participated in the rewriting of the scale code of Handbook 44, and the development of a new tolerance structure that is closer to the internationally recognized tolerances of the International Organization of Legal Metrology (OIML).

The Packers and Stockyards Administration (P & S) works hard at maintaining cooperative relationships and, in fact, has agreements with 45 state weights and measures offices. As you know, weights and measures offices are under a statutory requirement to test scales, and P & S requires proof that they are being maintained properly. P & S relies on state weights and measures officials to test scales that are subject to the Packers and Stockyards Act. Some of the monitoring is done by private testing companies. I should mention, too, that P & S works with the National Conference Education Committee on the development of training modules for the National Training Program, and last year conducted 16 formal regional training sessions for state weights and measures officials.

One of the responsibilities of the Agricultural Marketing Service (AMS) is verifying the accuracy of weights received at dairy plants from dairy farmers. The amount of milk marketed by each producer must be determined for each shipment based on measurement by a measuring device approved by appropriate weights and measures officials. Such measurement can only be accomplished at the farm of the producer before that producer's milk is commingled with milk from other producers in a bulk milk tank. The pounds of milk pooled as regulated producer milk must be verifiable back to the pounds shipped to market by each producer. AMS will accept weights determined by any approved measuring and weighing device, as long as such weights are verifiable by the agency. Most producers market their milk based on weights determined by farm tank measurements. If farm tanks are properly installed and calibration is maintained, they are capable of yielding accurate results. If individual farm tank calibration is abandoned and milk measurements for individual farms are determined by a meter on farm pickup trucks, such milk will be treated as producer milk only if such measurements are verifiable.

Returning to another FSIS matter for a moment, some of you may recall that last year Washington State enforcement officials notified poultry processors and retailers that it will take action against sellers of products that include gravy packets with raw poultry but do not prominently label the inclusion of the gravy packet and provide separate net weight declarations for both the poultry and the gravy. The USDA position is that the manufacturer must show the total net weight of all the edible components and may, although this is not a requirement, show the weights of individual components. USDA agrees with



the state that the labeling of such products must clearly show that the consumer is paying not only for a meat or poultry product, but also for a packet or container of another component. The wording must be in print no smaller than one third the size of the largest letter in the rest of the product name, and of such color that it will not be overlooked. The issue is before the Liaison Committee, which is taking a survey of state and local officials to determine if there have been complaints or other indications of concern on this matter. As I understand it, the committee will study results of the survey to decide if it wants to recommend that the Conference petition USDA for a regulatory change.

I would like to mention, also, that we were petitioned by the Conference to permit net weight declarations beyond two decimal places. Our regulations stipulate that on random weight packages of less than four pounds but over one pound, the net weight statement shall be expressed in terms of pounds and decimal fractions of the pound carried out to not more than two decimal places. We are now proposing regulations to allow net weight declarations beyond two decimal places.

And, finally, I would like to mention our response to a request from the Liaison Committee that FSIS adopt Handbook 133 as the statistical basis for determining the accuracy of net content labeling of federally inspected meat and poultry products. In order for the agency to change its statistical approach to net content control procedures in the plants, it would have to change its regulations. We believe the material in Handbook 133 could easily form the basis for a statistical approach to be followed in any regulation we would write; however, we don't want to change the regulations until the Task Force on Commodity Requirements has finished its work. In the meantime, if states use the statistical procedures in Handbook 133 appropriately, and find products that are not in compliance, then USDA will take the position that the states have used a reasonable statistical approach.

That concludes my remarks and, again, I want to thank you for this opportunity to address the Conference.

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### TO PROMOTE THE GENERAL WELFARE

DR. ERNEST AMBLER  
Director, National Bureau of Standards

I am pleased to be with you again at this, our 72nd annual meeting. This year is of special significance. We are celebrating the bicentennial of the Constitution of the United States. On September 17, 1787, the Constitution was adopted. Perhaps you had an opportunity to see the video tape I was asked to make for CBS on the relationship of weights and measures to the Constitution. This presentation has been televised twice in prime time, and is giving our activities some well-deserved publicity.

As you know, the NBS has played a central role for over 85 years in the evolution and application of measurement science in this country. That role, including the weights and measures program, must be continually reviewed and adjusted to keep us at the "cutting edge" of measurement technology. In fact, the weights and measures program dates from 1836 when Ferdinand Hassler set out "to form an establishment which had never even been attempted in this country."<sup>1</sup> That establishment was the Office of Weights and Measures.

I want to call your attention to another fact of history which is very significant to all of us in this hall today. Did you know that the State of Arkansas and the Office of Weights and Measures are the same age? Arkansas became a state in 1836. The Office of Weights and Measures was established within the Coast Survey of the Treasury Department in 1836.

Both of these events more than 150 years ago, together with the 200th anniversary of the Constitution, suggest that we review some of the history and philosophy of weights and measures which still prevails today.

That philosophy involves two key elements:

The first element is the concept of "states' rights." Amendment 10 to the Constitution further clarified this concept and stated, "the powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people."

The second element of the philosophy is the concept of federal/state co-operation in the form of federal support of the states - federal support that is, in the case of weights and measures, technical, not regulatory.

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<sup>1</sup> Measures for Progress, A History of the National Bureau of Standards, Appendix A, Page 523

The combination of the federalism and states rights concepts as applied to commerce has worked with considerable success. The technical role of the Office of Weights and Measures complements the regulatory role of the states, effectively maintaining the basis for a commerce that grows larger, as well as technically and legally more complex, every year.

The attention paid to commerce and weights and measures in the deliberations surrounding the Articles of Confederation and the Constitution indicates there were problems in commerce which the authors of those documents were intent on correcting. As you know, the subject of weights and measures was studied, and many recommendations were made, by prominent Americans, including George Washington, Thomas Jefferson, and John Quincy Adams. However, to this day, the regulation of weights and measures has remained, for the most part, the responsibility of state and local governments.

An act was passed by the Congress in 1799 that "from time to time, and particularly on the first Mondays in January and July in each year, the surveyor shall examine and try the weights, measures, and other instruments, used in ascertaining the duties on imports." However, since no standards had been adopted, the act was not put into operation.

In 1832, the Treasury finally adopted standards; the yard of 36 inches, the avoirdupois pound of 7000 grains, and the bushel of 2,150.42 cubic inches. This set the stage for the construction of sets of weights and measures as standards to be delivered to the governor of each state. In almost every case, the state legislatures adopted these standards soon after they were delivered.

By 1850, practically all of the states admitted to the union had been supplied with complete sets of weights and measures. As additional states were admitted, they were also supplied with sets of standards. The last two states to be supplied standards were Alaska and Hawaii. All states were issued a new generation of standards and balances, under the state standards program established in the 1960's. This provision was made within a period of 15 years -quite an improvement over the first program, which extended over a period of 125 years.

Although the provision of physical standards was essential to establish the measurement basis for uniformity in commerce, the laws and regulations of the states had been established by each state independent of any other state. Commerce was plagued by this lack of uniformity in regulation. In recognition of this problem, Dr. Stratton, the first director of the National Bureau of Standards invited the "various state custodians, inspectors, and sealers of weights and measures to meet with the officials of the NBS" in 1905. Out of that meeting emerged the National Conference on Weights and Measures. Over the years, this Conference has been the forum for the discussion of weights and measures needs in the states and industry, and the coordinating body for addressing those needs in the form of "uniform" laws and regulations, device codes, commodity packaging and labeling standards, and the testing and evaluation methods for the standards developed.

Until recently, measurement technology used in the marketplace was based on mechanical devices, which did not change much over time. However, this situation has changed rapidly in the past ten years. The application of electronics

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to weighing and measuring devices has changed the technology involved in making commercial transactions. Inspectors are confronted with load cells, scanners, computers, and checkout "systems." Now, more than in the days of mechanical devices, the performance of devices is affected by environmental factors of temperature, humidity, and electronic interference. The state officials have felt strongly the necessity to be trained and equipped to deal with the new technology.

The Conference and the National Bureau of Standards have been confronted with a major challenge, how to cope with these technical changes. As you will recall, we shifted gears and tackled the problems head-on. We have worked together more closely than ever. We have brought more and more talented people into the work of the Conference to find new methods and procedures. I took steps to increase the resources of the Office of Weights and Measures, including the awarding of a grant to this Conference to develop a national training program.

This Conference can take great pride in its accomplishments; accomplishments which, in the area of weights and measures and fair play in the marketplace, are clear to everyone. But they go beyond that, in setting a model for how industry and different branches of government can work together for the common good; something we shall have to learn to do in all areas of technology to enhance economic development and international competitiveness. Many of us have begun working with states on these problems and Senator Ernest Hollings has introduced a bill that would formalize that.

Let me go back again to the beginning of the history of the Office of Weights and Measures. Perhaps the role model for our achievements in these recent years is Dr. Ferdinand Hassler. He set the stage for weights and measures as the first superintendent of the office. Dr. Stratton called him

"not only the first and foremost man in the scientific work of our country at that time, but one of the leading metrologists of his day." <sup>2</sup>

Dr. Stratton went on to say,

"I doubt if there were more than half a dozen people in the world at that time who possessed the scientific knowledge and the deftness necessary to undertake his work. His greatest gift to America was his reverence for sound thinking, integrity, and accuracy, which have endured."

Hassler left us a legacy, which the staff of the Bureau of Standards, including the Office of Weights and Measures, and (I believe) the members of this Conference try to duplicate: sound thinking, integrity, and accuracy. These have been, and must continue to be, our goals. In the past few years we have all worked together effectively applying sound thinking, integrity, and accuracy. Out of that collaboration, and the combination of federalism and states rights, we have strengthened ongoing programs and developed major new programs in the past ten years at a rate that, I believe, has been remarkable.

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<sup>2</sup> Measures for Progress, A History of the National Bureau of Standards, Appendix A, page 525.



A brief review of those accomplishments attests to that soundness of thought, integrity, and accuracy to which we subscribe.

Activities that have been strengthened include the National Conference itself. In the past ten years we have worked together and:

- adopted a constitution and bylaws;

- reorganized as a membership association, which has provided funds to support expanded committee activities;

- formalized policies and programs with a series of 14 Conference publications, ranging from two membership directories (one for weights and measures officials and one for associate members) to a comprehensive manual of policies and guidelines;

- established a series of task forces and special committees to study and develop plans to deal with complex issues, such as type evaluation of devices, moisture loss in commodities, and motor fuel quality;

- expanded the involvement of the associate members in the work of these task forces and special committees; and

- established a computerized weights and measures bulletin board to keep the membership current on recent activities and issues.

In the state laboratory program, we have worked to build the integrity of the commercial measurement system by:

- replacing a general certification system with a formalized program, which specifies those areas for which a state laboratory qualifies;

- documenting the program with the printing of three new publications:

  - NBS Handbook 143 "State Laboratory Program Handbook",

  - NBS Handbook 145 "Handbook for the Quality Assurance of Metrological Measurements", and

  - NBS Special Publication 686 "State Laboratory Program Description and Directory"; and

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establishing five regional measurement assurance programs administered by the states, including the management of round robins within each region and between the regions and the NBS.

Perhaps our greatest accomplishments have been in the development of two new programs, the National Type Evaluation Program and the National Training Program. Both of these new programs have resulted from sound thinking, and by many of you working in concert with the Bureau to ensure the future integrity of the state regulatory programs. In the National Type Evaluation Program, we were able to go from a concept in 1978 to an operational program in 1984.

Major steps along this road included:

- the establishment of a pilot program, through a contractual arrangement between the NBS and the State of California;

- the structuring of a national program based on the experience gained in the pilot program;

- the development of uniform test criteria and procedures involving the participation of state and industry representatives;

- the establishment of a data base of NTEP activities and Certificates of Conformance issued, which is printed in an NCWM publication and kept current on the NCWM bulletin board; and

- special arrangements with the NBS Force Division to support the load cell evaluation activities of the program.

The progress made in the development of the National Training Program has been outstanding. I am impressed with the numbers of modules published and with the quality of each of these modules. It is gratifying to see the program used throughout the country as the primary basis for training of state and industry staffs. Significant has been the:

- publication of ten modules;

- participation of 32 states in the certification plan of the National Training Program; and

- the training of over 1000 state officials in these modules including the awarding of nearly 3000 continuing education units.

On this the 200th anniversary of the Constitution, we can be proud of our part in the progress to which we have contributed, and in facing the challenges to the maintenance and growth of the weights and measures system at the federal and state levels.



We have carried on the traditions established by Dr. Hassler, traditions based on sound thinking, integrity, and accuracy.

We have contributed our time and talents toward the goals defined by the founding fathers in the preamble of the Constitution, "to form a more perfect union, establish justice, - - and promote the general welfare".

Congratulations on a job well done;

a job done with sound thinking, integrity, and accuracy;

a job contributing to the general welfare.

Thank you.

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**CONSUMER INVOLVEMENT FOSTERS MORE EFFICIENT  
WEIGHTS AND MEASURES ENFORCEMENT**

FRANK NAGELE

Chairman, National Conference on Weights and Measures

Fellow members of the National Conference, honored guests:

over the past 10 years, the Conference has seen some progress and some setbacks, some proud moments and some disappointments; however, overall we are moving ahead and our future is bright.

A simple glance at the Conference's accomplishments shows the progress that has been made in the last 10 years. In my judgement, the major accomplishments are:

the National Training Program,

the new scales code, and

the National Type Evaluation Program.

These and the many other accomplishments of the Conference were not completed in one year.

The term of office of the Conference Chairman is one year. The successful chairmen are those who plant seeds that grow and bloom into meaningful programs. A review of several Reports of the National Conference reveal some program seeds that did not germinate and bloom.

The Report on the 31st National Conference recommended that every effort be made to change from trading by dry measure to trading by weight. Some recent conference actions, for example on bark mulch and peat moss, are contrary to this recommendation.

The Report on the 36th Conference recommended that novelty items of ice cream and ices frozen on sticks and sold in package form shall have the quantity of contents declared in terms of avoirdupois net weight. This issue was revisited by the Conference recently, as we know, and after 36 years this recommendation has still not been implemented.

Some seeds need to be planted:

- 1) We need a delivery system for the National Training Program material. We must develop a more efficient system to get the material from the Modules to the inspectors. I feel we should utilize video taping as an efficient and uniform system of instruction.
- 2) Every state should adopt the Uniform Regulation for National Type Evaluation or pass a law that will give the National Type Evaluation Program a legal basis.
- 3) A speaker's bureau should be established to communicate to regional and state weights and measures associations and to industry groups what the issues are at the national level.
- 4) We should change Weights and Measures Week from a one-week, once-a-year observance to a full-time, 52-weeks-a-year awareness campaign, to inform all citizens of the important function of weights and measures in our daily lives. I do not mean we should drop Weights and Measures Week, but we should increase our efforts to promote and increase the knowledge of weights and measures throughout the year.

This leads me to the theme of this Conference, "Consumer Involvement Fosters More Efficient Weights and Measures Enforcement."

In my judgment, the most difficult part of a weights and measures inspector's job is determining if devices are being used correctly. Was tare taken for the wrapping material? Was the correct unit price entered? Did the pump start on zero? Was the unit price set to the cash price for a cash sale?

I have a habit of observing weighing and measuring devices whenever and wherever I see them. Sometimes I see them on television news programs. If consumers could be made aware of some requirements for these devices, they could act as a large army of inspectors. I have asked many consumers about the use of weighing and measuring devices and discovered that only a few know what takes place at the time of weighing and measuring.

If consumers could only be taught for example, that the tare light should be lit, for tare to be taken, or that "weight" must be net weight. Consumers are involved in billions of transactions involving weights and measures. A small nucleus of consumers who are knowledgeable in weights and measures device use requirements could make our enforcement job more efficient. We should get consumers involved and, to do this, we will have to spend a good deal more time than we do now, one week a year.

My children learned about being "consumers" somewhere in the 9th or 10th grade of public school. I was impressed when they came home and told me what is required to be on the label of a prepackaged item. If consumer education could be expanded to include the use of weights and measures devices, we could make great progress.

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This year serving as your Conference Chairman has been a rewarding experience for me. I attended the following conferences and meetings:

- in October, the Southern W/M Association meeting, in Greensboro, NC;
- in November, an NTEP and Board of Governors meeting, in Alexandria, VA, and the Scale Manufacturers Association meeting in Itasca, IL;
- in December, a Task Force on Fraud meeting in Lansing, MI;
- in January, the Interim Meetings in Gaithersburg, MD;
- in April, the Indiana Association of Weights and Measures Officials meeting in Warsaw, IN;
- in May, the Central Weights and Measures Association meeting in Schamburg, IL and the Northeastern Weights and Measures Association meeting in Hyannis, MA; and
- in June, another NTEP meeting in Alexandria, VA.

In addition, I attended a Scale Manufacturers Association meeting in Florida and a workshop on Net Weight of Bulk Food in Washington D.C. while I was Chairman-elect. Darrell Guensler attended the Western Weights and Measures Association meeting held in Colorado, and a Scale Manufacturers Association meeting held in California during this current year. Sharing meeting assignments based on location and travel costs has helped to reduce the expenses for the chairman.

During the past conference year the following was accomplished:

### NATIONAL TRAINING PROGRAM

- I) Nine Modules were published.
- II) State and local jurisdiction participation expanded.
  - A) 37 states plus Washington, D.C. and USDA Packers and Stockyards participated in the National Registry Program.
  - B) 33 states plus Washington, D.C. participated in the National Certification Program.
  - C) 30 states participated in both of these programs.
  - D) 1475 participants have been awarded 3173 CEU'S.
  - E) 201 National Training Program Certificates have been awarded to 113 individuals in 13 states.

### NATIONAL TYPE EVALUATION PROGRAM

- I) Handbook 44-T.N.8 - Environmental Factors.
  - A) Policy was established for determining which devices to examine for influence factors.
  - B) Load Cells
    - 1) Policy, criteria, and test procedures were developed, including issuing Provisional Certificates of Conformance. The NBS "Force Group" will now participate as the evaluation laboratory for load cells under NTEP.
    - 2) Policy, criteria and test procedures were instituted, and a series of provisional Certificates of Conformance were issued. The initial evaluation of load cells was completed so that full Certificates of Conformance could be issued.
  - C) Acceptance of NTEP
    - 1) NTEP has been adopted or de facto accepted in all but a few states.
    - 2) The first training seminar for the type evaluation of digital scales has been conducted.
    - 3) NTEP Board of Governors successfully dealt with its first appeal.
  - D) We are preparing for full implementation of the New Scale Code in January, 1988.

### FLOUR MOISTURE LOSS

- I) A successful pilot study was conducted, with 18 jurisdictions participating in testing over 650 lots of flour between August 1986 and April 1987.
- II) A Round Robin was completed to ensure that reported moisture results are consistent between all participating laboratories. Ten flour millers, 11 states and Canada participated in the Round Robin.

### INFORMATION SYSTEM

- I) We established a computerized Weights and Measures Bulletin Board (WAMIS).

General Session

**PREVENTION OF FRAUD**

- I) A task force was established and held an information-gathering meeting and conducted a survey.

I have not listed the many issues dealt with and the accomplishments of the standing committees. However, I do want to express my gratitude for the very important accomplishments and hard work every member of each of the standing committees has contributed.

In closing, I thank all those who have contributed to make this Conference the success that it is.

Thank you.



### HONOR AWARDS PRESENTATIONS

Dr. Ernest Ambler, President of the Conference, presented Honor Awards to members of the Conference who, by attending the 72nd Annual Meeting this year, reached one of the attendance categories for which recognition is made—attendance at 10, 15, 20, 25, and 30 years.

#### 10 YEARS

Peggy Adams, Bucks County, Pennsylvania  
Ross Andersen, State of New York  
Michael Belue, Southwest Pump Company  
Harold Bradshaw, Clark County, Indiana  
Herb Eskew, State of Texas  
Thomas Geiler, Town of Barnstable, Massachusetts  
Wayne Handy, Johnson County, Indiana  
Ann Heffernan, National Bureau of Standards  
James O'Connor, State of Iowa  
Henry Oppermann, National Bureau of Standards  
Richard Pforr, U.S. Department of Agriculture  
Edward Skluzacek, State of Minnesota

#### 15 YEARS

William Goodpaster, Cardinal Scale Company

#### 20 YEARS

John Chohamin, Middlesex County, New Jersey  
Anthony Ladd, A. J. Ladd Weighing & Packaging Systems

General Session

**CERTIFICATES OF APPRECIATION**

Frank Nagele, Conference Chairman, presented Certificates of Appreciation to members of Standing Committees and Task Forces who had completed their tenure on the committees and task forces.

Committee on Specifications and Tolerances

Fred Gerk, State of New Mexico

Committee on Liaison

Chip Kloos, Beatrice/Hunt-Wesson Foods

Laws and Regulations

Allan Nelson, State of Connecticut

Committee on Education, Administration, and Consumer Affairs

Philip Stagg, State of Louisiana

Executive Committee

Bruce Niebergall, State of North Dakota

James O'Connor, State of Iowa

Joseph Swanson, State of Alaska

Parliamentarian

Kendrick Simila, State of Oregon

Associate Membership Committee

Walter Kupper, Mettler Instruments

Harvey Lodge, Dunbar Manufacturing

Legislative Liaison Committee

Don Stagg, State of Alabama, Chairman

Darrell Guensler, State of California

N. David Smith, State of North Carolina

Joseph Swanson, State of Alaska

Subcommittee on Commodity Standards

Don Stagg, State of Alabama, Chairman  
Peggy Adams, Bucks County, Pennsylvania  
Robert Belliveau, Procter and Gamble  
Chip Kloos, Beatrice/Hunt-Wesson  
Bruce Litzenburg, Ohio

Task Force on Information Systems

Kendrick Simila, State of Oregon, Chairman  
James Lyles, State of Virginia  
Joseph Rothleder, State of California  
Gerald Hanson, San Bernardino County, California  
Robert Bruce, Canada

Task Force on Motor Fuels

N. David Smith, State of North Carolina, Chairman  
Sydney Andrews, Retired, State of Florida  
Barbara Bloch, State of California  
David Karlsh, State of Arkansas  
John O'Neill, State of Kansas  
Harwood Owings, State of Maryland  
Curtis Williams, State of Georgia

Budget Review Committee

Frank Nagele, State of Michigan, Chairman  
Paul Engler, Los Angeles County, California

Auditing Committee

Ed Romano, Glenn County, California

Credentials Committee

Gilbert Allen, City of Spokane, Washington

Resolutions Committee

William Eldridge, State of Mississippi

## General Session

### PRESIDENT'S AWARD

This award is a banner presented to the State Director of each state having 100% of weights and measures officials as members of the National Conference on Weights and Measures.

#### First Year Awards

State of Alaska	Director, Aves Thompson
State of Delaware	Director, Eugene Keeley
State of Idaho	Director, Dale Hurd
State of Kansas	Metrologist, James Akey
State of New Mexico	Director, Fred Gerk
State of South Dakota	Director, James Melgaard

#### Second Year Awards

This award is a streamer indicating 100% membership for the second year.

State of Arkansas	Director, Sam Hindsman
State of Nebraska	Director, Steven Malone

## STANDING COMMITTEE REPORTS

## Executive Committee

### REPORT OF THE EXECUTIVE COMMITTEE

Frank Nagele, Chairman  
Weights and Measures Specialist  
Michigan Department of Agriculture

#### REFERENCE KEY NO.

#### 100 INTRODUCTION

The Executive Committee submits its Final Report to the 72nd Annual Meeting of the National Conference on Weights and Measures (NCWM).

The Report consists of the Interim Report offered in the Conference "Program and Committee Reports" as amended by Addendum Sheets issued during the Annual Meeting.

Items are grouped into two parts: Part I - Executive Committee business; and Part II - National Type Evaluation Program, Board of Governors business.

The Parts are grouped into the following series for ease of reference:

#### PART I

ADMINISTRATION AND POLICY	101 Series
MEMBERSHIP	102 Series
OPERATIONS	103 Series
PROGRAM	104 Series

#### PART II

ADMINISTRATION AND POLICY	110 Series
OPERATIONS	111 Series
PROGRAM	112 Series

Table A identifies all of the items contained in the Report by Reference Key Number, Item Title, and Page Number. Table B lists the appendices to the Report. Table C contains the voting results.

Voting items are identified in **bold face type** as well as by a suffix "**V**" (e.g., **101-1 V**). The voting items considered to have consensus support are grouped into a "consent calendar," which is presented for vote as a single block; these items are marked with a "**VC**".



## Executive Committee

The item identified by a suffix "W" was on the agenda for the Interim Meeting as a voting item but was withdrawn. The reason for withdrawing the item is stated in the report. Items without a suffix are informational. Following Table C, each item is described in detail in numerical sequence of the Reference Key Number.

Table A  
INDEX TO REFERENCE KEY ITEMS

Reference Key No.	Title of Item	Page
<b>PART I</b>		
<b>ADMINISTRATION AND POLICY</b>		
<b>101-1 VC</b>	<b>Coordination with OIML</b>	<b>46</b>
101-2	National Training Program, Funding	46
101-3A	NCWM/NBS Publications	51
101-3B	Procurement of Documents	51
101-3C	NCWM Publication 3	52
101-4	Energy Allocation System	52
101-5A	Issues Roundtable	52
101-5B W	Submission of Agenda Items	53
101-6A	Committee on Liaison, Role	53
<b>101-6B VC</b>	<b>Committee on Liaison, Role, Retirees</b>	<b>54</b>
101-7	Audit Procedure	54
101-8	Enforcement of Polyethylene Standards	54
<b>MEMBERSHIP</b>		
102-1	Status and Trends	55
102-2	Promotional Activities	56
<b>102-3 V</b>	<b>Associate Members, Retirees, Waiving Registration Fee</b>	<b>56</b>
<b>OPERATIONS</b>		
103-1	Organizational Reassignments	57
103-2	Task Force on Fraud	57
103-3	Appointments and Assignments	57
103-4	Treasurer's Report	59
103-5	Draft Operating Budget	59
103-6	Draft Grant Budget	59
<b>PROGRAM</b>		
104-1	Critique of Past Meetings	59
104-2	Planning for 72nd Annual Meeting	59
104-3	Future Meetings	60
104-4	OIML Program Update	63
104-5	OWM Program Update	63

Executive Committee

Table A, continued

Reference Key No.	Title of Item	Page
<b>104-6A VC</b>	<b>Task Force on Commodity Requirements, Flour</b>	<b>63</b>
104-6B	Task Force on Commodity Requirements, Meat and Poultry	64
104-7	Task Force on Information Systems	65
PART II - BOARD OF GOVERNORS		
ADMINISTRATION AND POLICY		
110-1	Policies and Procedures	65
110-2	Load Cell Testing (See 111-2)	
110-3	Environmental Factors (See 111-2)	
OPERATIONS		
111-1	Technical Committee, Update (See 111-2)	
111-2	Checklists and Test Procedures	66
PROGRAM		
112-1	Status of Program Acceptance	66
112-2	Participating Laboratories	67
112-3	Evaluation Activities	68

The Report contains five appendices which are related to specific Reference Key Numbers as follows:

Table B  
APPENDICES

Appendix	Reference Key No.	Title of Appendix	Page
A	101-1	Proposed Revised Policy, International Organization of Legal Metrology, NCWM Participation	70
B	101-5A	Agenda, Issues Roundtable	74
C	103-5	Draft Operating Budget	76
D	104-4	OIML Update	80

Table B (continued)  
APPENDICES

Appendix	Reference Key No.	Title of Appendix	Page
E	104-6A	Report of the Task Force on Commodity Requirements	83
F	110-1	National Type Evaluation Program, Policy and Procedures	91
G	111-2	Meeting Summary, Technical Committee on National Type Evaluation, Weighing Industry Sector	109

**ORDER OF PRESENTATION**

The Report was presented for vote as follows:

1. a vote was taken on the Consent Calendar;
2. a vote was taken on Item 102-3 V;
3. a vote was taken on the entire Report with editorial privileges to the Executive Secretary.

The results of the voting are shown in Table C.

Table C  
VOTING RESULTS

Reference Key No. or Subject	House of State Representatives		House of Delegates	
	Yes	No	Yes	No
Consent Calendar	47	0	75	0
102-3V	48	0	76	0
Report in its entirety	46	0	77	0

## Executive Committee

### DETAILS OF ALL ITEMS (In order by Reference Key Number)

Throughout the Report, recommended changes to NCWM or NBS publications are shown as follows: wording to be deleted is shown ~~lined out~~; wording to be added is underlined; sections being changed are indented and printed in **bold face type**.

#### REFERENCE KEY NO.

#### PART I

#### ADMINISTRATION AND POLICY

#### 101-1 VC COORDINATION WITH OIML

(This item was adopted as part of the Consent Calendar)

Adoption of a new comprehensive policy, International Organization of Legal Metrology (OIML), NCWM Participation (see Appendix A), is recommended to replace the three current policies. (The numbers below correspond to the numbering system in the draft NCWM Publication 3, "National Conference on Weights and Measures Policy, Interpretations and Guidelines.")

- 1.5.1. International Organization of Legal Metrology, NCWM Review of Recommendations (adopted by the Conference as part of the Committee on Liaison Report; see Report of the 60th NCWM 1975, p. 218);
- 1.5.2. International Organization of Legal Metrology, NCWM Participation (adopted by the Conference as part of the National Measurement Policy and Coordination Committee Report; see Report of the 64th NCWM 1979, p. 160); and
- 1.5.3. International Organization of Legal Metrology, Review of Papers (adopted by the Conference as part of the Committee on Liaison Report; see Report of the 60th NCWM 1975, p. 218).

The existing NCWM policies regarding the work of OIML are several years old and need revision in at least two areas -- NCWM involvement in the work of the OIML committees, and the policy for NCWM review of OIML standards so that the NCWM can decide on acceptance, nonacceptance, or abstention.

#### 101-2 NATIONAL TRAINING PROGRAM FUNDING

- A. Recommendations of the Committee on Education, Administration, and Consumer Affairs.

In a letter to past Chairman Mattimoe, dated March 3, 1986, Mr. Tom Geiler (MA), Chairman, Committee on Education, Administration, and Consumer Affairs,

## Executive Committee

made recommendations regarding the future funding of the National Training Program. The letter offered seven suggestions for the future funding.

1. Request an additional \$50,000 under the NBS Grant;
2. request that NBS (OWM) support the module maintenance program;
3. increase the Conference membership fee by \$15.00 per member;
4. solicit funding from industry groups;
5. solicit funds from groups such as the National Science Foundation and the Council of State Governments;
6. seek funding from Federal agencies; and/or
7. seek one-time contributions from regional weights and measures associations.

The Executive Committee agreed to consider all of the recommendations except #3, increasing NCWM membership fees.

### B. Status of the National Training Program.

Mr. Geiler briefed the Executive Committee at the Interim Meeting. A summary of his comments is reported below.

Draft Budget. The draft Grant Budget (Table D) for the year beginning July 1, 1987 was reviewed and approved.

Total Grant Funding to Date. The Grant funding summary since Feb. 1, 1983, the beginning of the NBS Grant, is shown in Table E.

Seven modules have been completed and distributed. Five additional modules are under development with the funding of \$394,877.57 committed.

An unobligated amount of approximately \$70,000 remains of approved funding through the NBS Grant. The Committee expects an additional \$50,000 for a total unobligated grant funding of approximately \$120,000. This will provide for the development of four additional modules, for a total of fourteen modules. The Education Committee will poll the weights and measures jurisdictions for guidance in determining which four modules should have the highest priority for development.

Module Development Cost Analysis. An analysis of the costs of developing the modules for the first seven modules is shown in Table F.



Executive Committee

Table D  
GRANT BUDGET  
July 1, 1987 to June 30, 1988

---

<u>Receipts</u>	
Payments on the Grant by NBS	\$65,000
Monies carried forward	3,000
<u>Total Receipts</u>	\$ 68,000
<u>Disbursements</u>	
Contract 69-2 (1984)1	\$ 6,000
Other contracts	45,500
Travel	1,000
Administrative	1,000
Printing	6,000
Miscellaneous	8,500
<u>Total Disbursements</u>	\$ 68,000

1 Contract with Landvater Associates for Module #4.

---

Table E  
GRANT FUNDING SUMMARY  
As of 12/31/86

---

Total funding authorized	\$465,189.00
Net Expenditures to date	362,876.22
Unliquidated obligations	32,001.35
Expenditures plus obligations	394,877.57
Unobligated funds as of 12/31/86	70,311.43
Additional NBS funding requested	50,000.00
Projected balance of funds	120,311.43

---

Table F  
COST PER MODULE

Contractor's cost for a single module:	Highest	\$ 37,295.69
	Lowest	19,000.00
	Average	27,237.00
Publication cost for a single module:	Highest	\$ 1,976.80
	Lowest	779.62
	Average	1,367.24
Miscellaneous Costs		2,000.00

Based on the analysis, the anticipated cost of developing a single module is:

Contract costs	\$ 30,000
Publication costs	2,000
Miscellaneous costs	2,000
Total	\$ 34,000

Module Sales Summary. The policy of the NCWM regarding the distribution of the modules is to provide one copy of each module to each state (one Inspector's Manual and one Instructor's Manual, including visuals) at no cost to the state.

The original expectation was that the states would purchase multiple copies of the modules for use in their training programs. This expectation has proven to be incorrect. The states are requesting permission to reproduce copies themselves. Consequently, sales and income from sales are insignificant compared to the total costs of funding development of new modules. Sales to date are shown in Table G.

Regarding future funding of the Program, the Education Committee accepts the advice of the Executive Secretary that funding future module development through an increase in support from the Office of Weights and Measures is not a viable option at this time. If this remains true, the Executive Committee recommends that the OWM support the National Training Program in the following priority order:

1. assist the jurisdictions to use the existing modules by training trainers;
2. update the existing modules to incorporate changes in the various handbooks which are adopted by the NCWM, then
3. develop new modules.

## Executive Committee

Table G  
SALES AND INCOME BY MODULE

Module No.	Manuals Sold		Income
	Inspector	Instructor	
1	6	4	\$ 360
2	17	8	1,020
5	5	2	290
8	7	4	490
10	14	9	890
20	4	2	260
27	92	49	2,016
Total Income			\$ 5,326

### C. Executive Committee Position

The Executive Committee concluded that training by the OWM should increase, if possible, in order to assist the state or local jurisdictions to use the existing modules on their own by developing qualified instructors. The Executive Secretary was asked to provide the Executive Committee with recommendations for future development of the training program for discussion at the 72nd Annual Meeting.

The Executive Committee asked the Executive Secretary to prepare specialized "packets of promotional materials" which Executive Committee members will use in a pilot project in their states to:

1. contact their local industry and trade association groups (such as food merchants associations, service stations' dealers groups, scale dealers, and other related associations) in an effort to expand present NCWM membership;
2. contact their budget offices to explore the possibility that the state fund continuation of module development or purchase of modules; and
3. promote increased membership among state weights and measures officials.

If the experimental phase is successful, the Executive Committee plans to recommend the same approach to all of the weights and measures jurisdictions. Additional memberships will provide a source of funding for NCWM activities, including the National Training Program. While these means for funding are

## Executive Committee

being explored, the Executive Committee emphasizes the need to get the existing modules into use in state training programs, including developing qualified instructors at the state level.

### D. Current Funding Status

There has been no significant improvement in the prospects for major funding for continued development of additional modules beyond the end of the grant funding.

During the review on the Treasurer's Report, the possibility of funding additional module development from the operating budget of the NCWM was discussed. It appeared that \$10,000 to \$15,000 could be budgeted for this purpose. A decision in this regard will be made following the settlement for the expenses of the Annual Meeting.

The Executive Secretary was requested to prepare packets of promotional material for use by the members of the Executive Committee in a pilot project in their states. Packets have not been developed yet; the NCWM Brochure was revised to represent recent organizational changes in the NCWM. Each state was provided 50 copies of the revised Brochure in June. Without a "packet of materials," and because of the lateness in the year that the Brochure was updated, the pilot project did not get under way.

Regarding the second item of the pilot project, funding of module development or purchase of modules, one state (New York) has purchased several thousand dollars of modules.

Several more states have promoted increased membership in the NCWM; eight states now qualify for the "Presidents Award" for states having 100% of their weights and measures officials as members of the NCWM.

### 101-3A NCWM/NBS PUBLICATIONS

The Committee reviewed: (1) the status of NCWM publications (see Report of the 71st NCWM 1986, p. 58); (2) the status of NCWM adoption of NBS publications (see Report of the 70th NCWM 1985, p. 48); (3) the methods of distribution and sale; and (4) recommendations regarding formats and procedures for their updating. No recommendations were made to change current practices.

### 101-3B PROCUREMENT OF DOCUMENTS

Several jurisdictions have reported difficulties in timely procurement of documents from the Government Printing Office. A letter was sent to each state to determine its preference for procurement of NBS Handbook 44.

Twenty-nine states, Puerto Rico, and the Virgin Islands responded with results as listed below.

1. In five states, all weights and measures officials are members of the NCWM and, therefore, get their handbooks from the NCWM shortly after publication.

## Executive Committee

2. Five other states would prefer to purchase their handbooks from the NCWM and are willing to buy them by the box (rather than in smaller quantities).
3. Nineteen states (the remainder of the twenty-nine jurisdictions that responded) prefer to buy their handbooks from the NCWM, but not in box-size quantities.

The Executive Secretary has not obtained the additional information needed to make decisions regarding the procurement of documents, but hopes to do so prior to the January, 1988 Interim Meeting. The Executive Secretary will follow up by:

1. contacting the twenty-one jurisdictions that did not respond;
2. confirming that responding states are willing to procure specified quantities of Handbook 44 from the NCWM.

The Executive Committee wants to avoid carrying an inventory of handbooks which might not be purchased.

### 101-3C NCWM PUBLICATION 3

NCWM Publication 3, "National Conference on Weights and Measures Policy, Interpretations, and Guidelines," was completed in draft and a copy was given to each member of the Standing Committees. The publication consists of four sections: (1) NCWM Management; (2) Laws, Regulations, and Commodity Control; (3) Specifications, Tolerances, and Device Inspection; and (4) Education.

The Standing Committees have been asked to review the draft and recommend changes necessary to ensure that the contents are up-to-date.

### 101-4 ENERGY ALLOCATION SYSTEMS

The Western Weights and Measures Association recommended that the NCWM establish a task force to study this issue and make appropriate recommendations. (See Report of the 71st NCWM 1986, p. 160.)

The Northeastern Weights and Measures Association requested that the scope of this issue be broadened to include the submetering of utilities.

The Executive Committee decided not to establish a task force at this time. (See Item 103-1.)

### 101-5A ISSUES ROUNDTABLE

During the past two years, the Regional Associations have incorporated an "Issues Roundtable" into their meeting agenda. This part of their proceedings has been very popular and valuable. The Interim Meeting agenda included an "Issues Roundtable" on Monday Morning, January 12. Five items were selected for the



## Executive Committee

program to provide background and tutorial information for the attendees on some of the key issues being addressed by the Standing Committees. (See Appendix B for the Issues Roundtable agenda and summaries of the five items covered.)

### 101-5B W SUBMISSION OF AGENDA ITEMS

In the Interim Report, the Executive Committee recommended establishing a revised deadline date of November 1 for the submission of items for inclusion in the agenda of the Interim Meeting.

Item 1.1.1. of NCWM Publication 3 establishes a deadline 60 days prior to the Interim Meeting (P&C 1977; Executive 1980; Executive 1981). That does not provide enough time to meet the printing deadlines and permit Conference members to receive the Interim Meeting agenda by December 20. Inadequate time prior to the January 1987 Interim Meeting forced the NCWM to incur additional expenses for special printing services. Discussion at the Annual Meeting led to the conclusion that a November 1 deadline appears to be unachievable at this time because of industry and regional weights and measures 1987 meeting schedules. The deadline therefore remains 60 days prior to the Interim Meetings.

This item is withdrawn as a voting item.

### 101-6A COMMITTEE OF LIAISON, ROLE, GENERAL

The Executive Committee requests that a past oversight be rectified by substituting the following wording, already approved by the membership at the Annual Meeting in 1982, in Section 5E of the Bylaws for the wording that currently describes the role of the Committee on Liaison. No action is required by the membership.

The Committee on Liaison annually presents a report for Conference action. Its mission is divided into two categories as follows:

#### I. Liaison with Federal Agencies

Intergovernmental (with NBS/USDA/FDA/FTC/DOD/Postal Service, etc.) contacts and relations on behalf of the Conference. This role involves explaining, advocating, and coordinating Conference positions, recommendations, and needs before Federal Government agencies and promoting uniformity among those agencies and with NCWM.

#### II. Liaison with Other Groups or Organizations and Agencies

This role involves public liaison with consumer groups, the NCWM Associate membership, domestic and international standards organizations, industry, trade associations, and others.

The goals are to provide and solicit information, develop a spirit of cooperation, and promote uniformity with the activities of the NCWM.



## Executive Committee

At the Interim Meeting, Chairman Adams reported to the Executive Committee on the activities of the Committee on Liaison, including its plans regarding: (1) recognition of the 150th Anniversary (in 1988) of the issuance of the first state standards; (2) the 200th Anniversary (1987) of the Constitution of the United States; and correspondence with various Federal Agencies. (See the Report of the Committee on Liaison for details.)

### 101-6B VC

### COMMITTEE ON LIAISON, ROLE, RETIREES

(This item was adopted as part of the Consent Calendar)

The relationship of retirees with the NCWM was discussed. As a result of the change to the Constitution and Bylaws last year, the Annual Meeting registration fee for retirees was waived. In addition, a formal retirees group was established. The Committee on Liaison now coordinates with the Associate membership. The Executive Committee recommends that the role of the Committee on Liaison be expanded to include the retirees by amending Section 5E of the Bylaws (see Item 101-6A) to read as follows:

#### II. Liaison with other Groups or Organizations and Agencies

**This role involves public liaison with consumer groups, the NCWM Associate NCWM membership, the retiree membership, domestic and international standards organizations, industry and trade associations, and others.**

**The goals are to provide and solicit information, develop a spirit of cooperation, and promote uniformity with the activities of the NCWM.**

(See also Item 509 of the report of the Committee on Liaison.)

### 101-7

### AUDIT PROCEDURE

The accounts of the NCWM are audited by the Auditing Committee at each Annual Meeting. This procedure has been questioned on the grounds that the members of the Auditing Committee do not always have accounting expertise nor continuing involvement with the finances of the NCWM. Alternative auditing procedures will be explored by the Executive Secretary.

### 101-8

### ENFORCEMENT OF POLYETHYLENE STANDARDS

The Southern Weights and Measures Association recommended that a task force be established to examine the problems encountered with the enforcement of the standards for the sale of this product. (See Item 103-1 of this report and Item 214-5 of the L&R Committee report.)

## MEMBERSHIP

## 102-1 STATUS AND TRENDS

The current status of NCWM membership, including trends in total membership and its composition, were reviewed. The membership of the NCWM remains steady around 1300. (See Table H for membership by state and Table I for the composition of the NCWM mailing list by category.)

Forty percent of the 1313 members are active (weights and measures officials) and 60 percent are associate (industry). Fewer than 18 percent of the weights and measures officials nationwide belong to the NCWM.

Table H  
NCWM MEMBERSHIP BY STATE

Jurisdiction	Members	Jurisdiction	Members
Alabama	16	Alaska	3
American Samoa	1	Arizona	8
Arkansas	21	California	96
Colorado	18	Connecticut	23
Delaware	7	Washington, DC	36
Florida	20	Georgia	21
Guam	1	Hawaii	3
Idaho	14	Illinois	56
Indiana	50	Iowa	10
Kansas	32	Kentucky	3
Louisiana	4	Maine	5
Maryland	39	Massachusetts	54
Michigan	22	Minnesota	30
Mississippi	7	Missouri	53
Montana	1	Nebraska	26
Nevada	1	New Hampshire	4
New Jersey	74	New Mexico	27
New York	72	North Carolina	25
North Dakota	2	Ohio	106
Oklahoma	19	Oregon	12
Pennsylvania	64	Puerto Rico	6
Rhode Island	2	South Carolina	4
South Dakota	13	Tennessee	11
Texas	46	Utah	4
Vermont	11	Virginia	33
Virgin Islands	1	Washington	19
West Virginia	9	Wisconsin	34
Wyoming	7		
TOTAL			1313

## Executive Committee

The Executive Committee decided on actions to address the need for funding the National Training Program. (See Item 101-2.) If the basic goal of increasing the membership of the NCWM can be met, increased funds for the National Training Program will become available.

Table I  
COMPOSITION OF NCWM MAILING LIST

Category	NCWM Members	Non- Members	Total
State	241	862	1103
County	158	672	830
City	126	436	562
Subtotal	525	1970	2495
Federal	31	18	49
Industry	749	2456	3205
Retirees	8	5	13
Total	1313	4449	5762

### 102-2 PROMOTIONAL ACTIVITIES

Past, current, and potential promotional activities were discussed. The Executive Secretary was encouraged to identify new promotional items for sale by the NCWM, and to report his recommendations to the Executive Committee prior to the 72nd Annual Meeting.

### 102-3 V ASSOCIATE MEMBERS, RETIRED, WAIVING OF REGISTRATION FEE

(This item was adopted)

The Executive Committee decided that Article II, Section 5, of the Bylaws should be changed to clarify its intent and to waive the payment of the registration and membership fees for retired associate members to attend the Annual Meeting. The following rewording of Section 5 is proposed:

#### SECTION 5 - WAIVER OF REGISTRATION AND MEMBERSHIP FEES.

Individuals who have retired after ten or more years of weights and measures employment in either the public or private sector, and having attended

## Executive Committee

**at least one Annual meeting, shall not be subject to the payment of the registration and membership fees.**

Additionally, the Executive Committee recommends the adoption of the following as policy to be published in NCWM Publication #3 "National Conference on Weights and Measures Policy, Interpretations, and Guidelines":

**The spouses of retired members shall enjoy the same privileges as spouses of Active Members.**

### 103-1 ORGANIZATIONAL REASSIGNMENTS

The Chairman reassigned the Task Force on Information Systems from the Executive Committee to the Committee on Liaison.

The Executive Committee received requests to establish new task forces: Energy Allocation Systems (Item 101-4) and Enforcement of Polyethylene Standards (Item 101-8). They concluded that the NCWM could not manage or fund the activities of additional groups at this time without cutting back the activities of existing groups. They also concluded that none of the existing groups have completed their work, and that all should be continued. Consequently, no action was taken on the requests.

### 103-2 TASK FORCE ON FRAUD

The Chairman established the Task Force on Fraud with the following members: Steve Malone, NE, Chairman; Ross Andersen, NY; Pete Perino, Transducers, Inc.; Kathleen Thuner, San Diego, CA; Richard Tucker, Tokheim Corp.; and Richard Whipple, Gilbarco, Inc.

The Task Force has been asked to: (1) identify devices that can be "easily" modified to play "dirty tricks" on consumers and (2) submit proposals to the Executive Committee and the Committee on Specifications and Tolerances for design requirements that would eliminate the potential for fraud in those devices where problems are found to exist. The Task Force will report to the Executive Committee.

### 103-3 APPOINTMENTS AND ASSIGNMENTS

The Chairman reported on the following assignments made to the committees and task forces.

#### EXECUTIVE COMMITTEE

Bruce Niebergall replaces Charles Forester who resigned.

Fred A. Gerk, New Mexico, replaces Joe Swanson, Alaska, who resigned.

#### COMMITTEE ON LAWS AND REGULATIONS

Ken Simila replaces Leo Letey who has retired.

## Executive Committee

### PARLIAMENTARIAN

James Melgaard, South Dakota replaces Ken Simila, Oregon, who resigned to accept appointment to the Committee on Laws and Regulations.

### AUDITING COMMITTEE

James Rardin, West Virginia

### BUDGET REVIEW COMMITTEE

Robert Walker, Indiana

### CREDENTIALS COMMITTEE

James Vanderwielen, Tippecanoe County, Indiana

Sterling McFarlane, Seattle, Washington replaces Gilbert Allen, Spokane, Washington, who retired.

### RESOLUTIONS COMMITTEE

O. Ray Elliott, Oklahoma  
Max Gray, Florida  
Stephen Meloy, Montana

### TASK FORCE ON PREVENTION OF FRAUD

Stephen Malone, Nebraska, Chairman  
Ross Andersen, New York  
Peter Perino, Transducers, Inc.  
Kathleen Thuner, San Diego, California  
Richard Tucker, Tokheim Corporation  
Richard Whipple, Gilbarco, Inc.

### TECHNICAL COMMITTEE ON NATIONAL TYPE EVALUATION - MEASURING INDUSTRY SECTOR

Willem Roelofsen, Koppens Automatic  
Otto Warnlof and Simone L. Yaniv, National Bureau of Standards

### TASK FORCE ON COMMODITY REQUIREMENTS

George Wilson, American Meat Institute, replaces  
Mahlon Burnette.

### ASSISTANT TREASURER

Gerald Hanson, San Bernardino County, California replaces Fred Thomas, Pennsylvania who resigned.



SERGEANTS-AT-ARMS FOR 72nd NCWM

James Hile, Arizona  
Cathryn Pittman, Tennessee

103-4                   TREASURER'S REPORT

At the Interim Meeting, the Treasurer reported on the financial status of the NCWM, including the income and expenses to date for the current fiscal year and the overall asset position. He also described a planned realignment of accounts designed to provide the Executive Committee and the membership with a clearer understanding of the use of the NCWM funds.

At the Annual Meeting, the Treasurer reported on the financial status of the NCWM as of the close of the fiscal year (June 30, 1987); see Treasurer's Report for details.

103-5                   DRAFT OPERATING BUDGET

At the Interim Meeting, details of the draft operating budget were reviewed. After some modifications, the Executive Committee approved the draft as the operating budget of the NCWM for the year beginning July 1, 1987. (See Appendix C for the budget and its explanation.) See Item 101-2, National Training Program, Funding, regarding possible change in the Operating Budget to provide for funding of training module development.

103-6                   DRAFT GRANT BUDGET

See Item 101-2, National Training Program, Funding.

104-1                   CRITIQUE OF PAST MEETINGS, SITE SELECTION  
AND FORMAT

The Executive Committee decided that no changes should be made in regard to the planning and conduct of the Annual Meeting.

104-2                   PLANNING FOR 72ND ANNUAL MEETING

At the Interim Meeting it was reported that a contract was signed with the Excelsior Hotel in Little Rock, Arkansas for the Annual Meeting during the week of July 20-24, 1987.



## Executive Committee

Address: Excelsior Hotel  
Three Statehouse Plaza  
Little Rock, Arkansas 72201

Telephone: 501/375-5000

Rate: \$66.00 single or double

Cut-off date: June 19, 1987

Only 10 minutes from the airport, the Excelsior is conveniently located in the Statehouse Plaza in downtown Little Rock and overlooks the Arkansas River. Situated above the Statehouse Center, the Excelsior provides weather-protected complimentary parking for guests and complimentary limousine service to and from the airport.

The Excelsior has an 18-story atrium crowned by a 40-foot chandelier providing an open but comfortable public area. The hotel has several restaurants providing gourmet cuisine at La Petite Roche; imported ale at the English Pub; cocktails at the Edgewater; relaxed dining at the Apple Blossom; and, high above the city, music and dancing at the Pinnacle rooftop lounge.

A variety of activities are planned for guests and delegates. Among them are Sunday afternoon golf; tours of the Old Statehouse and Territorial Restoration area; and an outing for all at Marlsgate Plantation -- a real southern experience.

## 104-3 FUTURE MEETINGS

### The 73rd Annual Meeting, July 1988

The Executive Committee decided to hold the 73rd Annual Meeting in Grand Rapids, Michigan at the Amway Grand Hotel. No commitment has been made with the hotel. The Executive Secretary has requested a firm proposal from the hotel.

### Hotel

The Grand Plaza Hotel has traditional and contemporary rooms. There are 682 guest rooms; 385 are in the original renovated building; the rest are in the attached 29-story glass tower overlooking the Grand River. There is 24-hour room service, concierge assistance, and nightly turn-down service. There are 12 restaurants and lounges throughout the hotel. It has been recognized for its excellence with the AAA 5-Diamond Award and the Mobil Four-Star Award. The lobby and concourse levels of the hotel contain a dozen shops. The hotel has a fitness center on its fourth floor with a workout room, a glass enclosed swimming pool, two outdoor tennis courts, one racquetball court with gallery viewing, a sauna, and a tanning booth.

The hotel is located in a downtown complex in the heart of Grand Rapids. A sky-walk connects the hotel with the Gerald Ford Museum.

### Location and Transportation

The hotel is less than 20 minutes from the Kent County International Airport. Eight major carriers, including American, Northwest, Piedmont, United, and USAir provide more than 100 arrivals daily with direct service to more than 50 cities. The hotel operates shuttles between the hotel and the airport.

The hotel is only two blocks from U.S. 131 and Interstate 96 highways. The hotel has its own 750-car parking lot.

### The 74th Annual Meeting, July 1989

The Executive Committee selected Seattle, Washington as the site of the 74th Annual Meeting the latest sequence of meeting sites has been Boston, Massachusetts, Washington, D. C., Albuquerque, New Mexico, Little Rock, Arkansas, and Grand Rapids, Michigan. The Executive Secretary visited several candidate cities to be considered for future Annual Meetings, and has recommended Seattle, Washington because of its west coast location, combination of attractive downtown hotels, convenient shopping and entertainment, and moderate weather.

### Local Tours and Attractions

Seattle offers a wide spectrum of unique and enjoyable activities. Radiating from the immediate downtown are several distinct areas of interest.

To the north, 90 seconds from downtown by monorail, is the Space Needle, a 600-foot high revolving restaurant. The Space Needle is within the grounds of the Seattle Center, a 74-acre urban park. The Center features the Food Circus Court and International Bazaar, the Pacific Northwest Arts and Craft Gallery, the Seattle Art Museum Pavilion, and the Pacific Science Center.

Pioneer Square is Seattle's historic "old area." Its red brick buildings have been restored and house shops, art galleries, restaurants, sidewalk cafes, and boutiques. An aboveground tour, as well as an underground tour, can be arranged with lunch in one of the area's many restaurants.

Between the Seattle Center and Pioneer Square stretches Seattle's waterfront with import shops and good seafood restaurants. The newest attraction at the waterfront is the Marine Aquarium which ranks as one of the best in the entire country. Tours of the harbor by sightseeing boats originate at the waterfront.

Up the hill from the waterfront is one of the last remaining public markets in the country -- the Pike Place Market. Locally grown produce and fresh seafood are sold in open stalls along with the works of local artists and craftsmen. Visitors can arrange to have a fresh salmon or other seafood packed to accompany them home.

### Restaurants

There are over 300 restaurants in downtown Seattle and 500 throughout the metropolitan district. Although the city's eating establishments offer a full spectrum of international cuisines, Seattle is best known for its seafood delicacies. Its unique waterfront location in the midst of some of the finest fishing

## Executive Committee

and clamming in the world insure a daily fare that is almost invariably fresh. Seattle's large mixed oriental community is also well represented on the local dining scene, with restaurants featuring Japanese, Vietnamese, Filipino, Korean, and East Indian dishes.

## Entertainment

In the performing arts, Seattle and the Puget Sound area support over 35 dance, 120 musical, and 45 theatre groups or companies. The First Chamber Dance Company, consisting of seven soloists and principals from the American Ballet Theatre, City Center, Joffrey Ballet, New York City Ballet, and San Francisco Ballet, offers performances year round, as does the Pacific Northwest Ballet. A Contemporary Theatre produces six plays a year, which are held from May through October. Seattle also has a live professional children's theatre, the Poncho Theatre, as well as plays direct from Broadway performed at the exquisite oriental-style 5th Avenue Theatre and the Paramount Theatre.

At the Annual Meeting, the Executive Secretary reported that he had received proposals from two hotels (the Westin and the Sheraton) but has not been able to negotiate an acceptable rate. Mr. Sterling McFarlane, Seattle, Washington, offered his assistance to find acceptable rates in Seattle.

Mr. Ray Helmick, Arizona, announced that the Governor of Arizona invited the NCWM to hold its 1989 Annual Meeting in Arizona. The Executive Secretary received telegrams inviting the NCWM to Arizona from the Governor, the Tourist Bureau, and the Mayor of Phoenix.

The Committee reviewed a video tape regarding a proposal to hold the Annual Meeting in Palm Beach, Florida.

The Executive Committee prefers to stay with the Seattle location and requested that it be pursued further.

### The 75th Annual Meeting, July 1990

The Executive Committee selected Albany, New York as the site of the 75th Annual Meeting. The Executive Secretary reported on the status of planning for this Annual Meeting. Only one hotel, the Albany Hilton appears to meet the needs of the NCWM, is very interested in signing the NCWM.

Traditionally, the NCWM has returned to Washington, D. C. every fifth year, hence 1990 would be the next year for a Washington, D. C. meeting. The continued use of Washington, D. C. tends to deter selection of other east coast jurisdictions as hosts of the Annual Meeting. The Committee decided to break with the precedent of returning to Washington, D.C. every fifth year because of the increasing cost of holding a major meeting there, plus the desire to provide additional opportunities for the east coast jurisdictions to host the Annual Meeting.

Beyond 1990

The NCWM has received invitations from the following jurisdictions to host the Annual Meeting: Hawaii (various locations), Indiana (Indianapolis), and Ohio (Columbus).

104-4 OIML PROGRAM UPDATE

Mr. David Edgerly described the OIML work program activities related to the interests of the NCWM. Although reporting on the overall OIML program, he emphasized those activities of most interest to the NCWM. An outline of Mr. Edgerly's presentation is contained in Appendix D as the "OIML Pilot and Reporting Secretariats of Possible Interest to NCWM." The Summary is annotated to indicate Mr. Edgerly's recommendations for NCWM member representation. In May, 1987, Mr. Sam Chappell replaced Mr. Edgerly as manager of the OIML Program at NBS.

104-5 OWM PROGRAM UPDATE

Mr. Albert Tholen described changes in the OWM program and staffing. (See the report of the Committee on Liaison, Item 504, for details.)

104-6A VC TASK FORCE ON COMMODITY REQUIREMENTS, FLOUR

(This item was adopted as part of the Consent Calendar)

At the Interim Meeting, Chairman Richard Thompson reported on the progress of the Task Force and proposed actions by the NCWM regarding compliance testing of packaged flour.

As part of the Report of the Committee on Laws and Regulations, the Conference will be asked to adopt specific procedures delineated for flour during the Pilot Study and incorporate them in NBS Handbook 133. (See Item 230-2 of the L&R Committee Report.) In addition, the Task Force recommended, and the Executive Committee approved, two actions:

1. Continue the Pilot Study from December 1986 to February 1987 to cover the season that was not in the original study in order to assure that the three-percent gray area is neither too large nor too small.
2. Conduct a round robin during this same time to ensure that the moisture content values, as determined by manufacturers and weights and measures laboratories, are reliable.



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Subsequent to the Interim Meetings, the Task Force met in Gaithersburg, MD on May 20 and 21, 1987. The report of that meeting is contained in Appendix E. In essence, the meeting led to:

1. confirmation of the recommendations related to flour (**Item 104-6A VC**, Executive Committee, and **Item 230-2 V**, Committee on Laws and Regulations);
2. preliminary recommendations regarding processed meat; and
3. focus of the work of the Task Force on poultry.

At the Annual Meeting, Dr. Heffron conducted a briefing on the subject on Wednesday morning.

The Task Force and the Executive Committee recommend the following for National Conference on Weights and Measures action:

**Adopt the three percent gray area approach as NCWM policy for weights and measures officials to use in checking packages of flour.**

### 104-6B            TASK FORCE ON COMMODITY REQUIREMENTS,                          MEAT AND POULTRY

At the Interim Meeting, Chairman Richard Thompson reported on the progress of the Task Force regarding meat and poultry.

Tentative agreement within the Task Force was reached on the following:

1. Processed or "prepared" products, such as hot dogs or bologna, whether made of chicken or meat, should be treated as a distinct category from raw "fresh" products, such as whole chicken, cut-up, breast "nuggets," etc.
2. Category A sampling plans from H-133 are suitable for use in testing these products.

The additional data listed below are needed in both the poultry and meat areas:

1. The Task Force must determine whether used dry tare is equivalent to unused dry tare for field test purposes.
2. The Task Force must determine the size of the gray area that makes wet tare tests equivalent to dry tare tests in the field.
3. The Task Force must determine whether the procedures for determining dry tare by the packager follow the rounding recommendations given in the proposed USDA Memorandum of Agreement.

In order to accomplish the above, the Task Force plans to request Pilot Study participants to change their approach slightly and continue to take data following the guidance listed below:

## Executive Committee

1. Wet tare, dry tare values (as supplied by the packager), and used dry tare will be requested on every lot tested under the pilot study. Therefore, results on fewer lots will be requested from each participating jurisdiction.
2. A questionnaire has been designed and will be circulated to members of the National Broiler Council and American Meat Institute (AMI) to determine the procedures currently used to obtain a dry tare average value in the plant.
3. A small study will be conducted by the State of Maryland Weights and Measures to determine the range of and average dry tare at the plant and, following a prescribed procedure, how closely the used dry tare values can match the unused dry tare.
4. Since fresh meats with net weights applied at Federally-inspected plants are available only in a few test markets, AMI will determine whether their members want to supply data on these products. Otherwise, the pilot study participants will be requested to focus on:

### Fresh Category

- o whole cut-up chickens
- o sausage (fresh chubbs)

### Prepared Category

- o franks and bologna made from poultry or meat.

New summary sheets, provided for meat and poultry, incorporate the data requested for both wet tare and dry tare tests.

See Appendix E for a report of the May 20 meeting.

## 104-7 TASK FORCE ON INFORMATION SYSTEMS

Chairman Ken Simila reported on the progress and plans of the Task Force. (See Item 507 in the report of the Committee on Liaison for details.)

## PART II

### NATIONAL TYPE EVALUATION PROGRAM (Board of Governors)

#### ADMINISTRATION AND POLICY

## 110-1 POLICY AND PROCEDURES

NCWM Publication #4, "NTEP Policies and Procedures" (planned to be incorporated into the NCWM Publication #14), has been reviewed by the Executive



## Executive Committee

Committee (letter ballot) and revised editorially and for clarity of presentation. Appendix F is a copy of the current version.

The NTEP Policy and Procedures, first published as NTEP Publication 4, was adopted at the 69th Annual Meeting. A new section (Q) was added to define the policy to be followed by the states and industry when referring to NTEP. This new section was adopted at the 70th Annual Meeting.

Significant proposed changes in policy and procedures were contained in the Executive Committee Interim Report for the 71st Annual Meeting (Item 105-2). The Executive Committee withdrew this item in its entirety, referring the proposed changes to the Committee on Specifications and Tolerances and to the NTEP Technical Committee.

Subsequent to the 71st Annual Meeting, Publication 4 was again reviewed by the Executive Committee. Major changes were made in formatting and sections were rearranged to present the policy in a more understandable sequence. Additionally, editing was done to reduce ambiguities and to improve clarity.

The Executive Committee believes that all changes were editorial in nature to improve the format, clarity, and use. This item is therefore presented as an information item with no proposal for adoption.

### 111-2 CHECKLISTS AND TEST PROCEDURES

The Executive Committee (Board of Governors) and the Committee on Specifications and Tolerances (S&T) met in joint session. (The equivalent S&T Items are shown in parentheses and the details of each are contained in the S&T Committee report.) Mr. Oppermann reported on the following items:

- 110-2 LOAD CELL TESTING (S&T Items 320-10, 320-19, 320-27)
- 110-3 ENVIRONMENTAL FACTORS (S&T Items 320-27, 320-8)
- 111-1 TECHNICAL COMMITTEES UPDATE (S&T Item 320-27)
- 111-2 CHECKLISTS AND TEST PROCEDURES (S&T Item 320-27)

These are S&T Committee voting items, not Executive Committee voting items. The Executive Committee recommends adoption of the items as reported by the Committee on Specifications and Tolerances.

See Appendix G for a summary of a June 24 meeting of the Technical Committee on National Type Evaluation, Weighing Industry Sector, with the Board of Governors.

## PROGRAM

### 112-1 STATUS OF PROGRAM ACCEPTANCE

The implementation of the NTEP and the subsequent acceptance of the program by the states was reviewed. The Scale Manufacturers Association (SMA) com-

## Executive Committee

municated its concern about a seeming lack of urgency in some jurisdictions with respect to adoption of NTEP. They requested that the Executive Committee encourage adoption.

Most states participate in the NTEP program by accepting the Certificates of Conformance as evidence that the device meets the requirements of NBS Handbook 44.

In some cases, states which have type evaluation requirements on their books have taken legislative and/or administrative action to participate in NTEP. A few jurisdictions still have requirements to do their own testing and do not participate fully in NTEP. Illinois and New York report that they are actively moving toward full recognition of NTEP Certificates of Conformance. New Jersey and Massachusetts report that they are faced with other considerations before full participation. The Executive Committee asked the Executive Secretary to work with the remaining states that are not full participants to determine what steps are necessary to accommodate their requirements.

The Scale Manufacturers Association wrote to the State Directors to encourage their full acceptance of the NTEP. The Conference Chairman will send a letter to each State director endorsing the recommendations of the Scale Manufacturers Association.

## 112-2 PARTICIPATING LABORATORIES

The Executive Secretary reported on the authorized Participating Laboratories and their evaluation capabilities and activities. In addition to the NBS, California, Ohio, and the Federal Grain Inspection Service are Participating Laboratories. NBS, California, and Ohio have operating environmental chambers for testing scales under 2000 pounds capacity. The NBS has limited capability for testing load cells. California is arranging with the Navy Department for facilities to test load cells.

NBS is working with New York so that it can become a Participating Laboratory.

A training seminar was held at the National Bureau of Standards on May 18-22, 1987. The instructor was Henry Oppermann, NBS. Attendees were:

New York - William Fishman and Ross Andersen;  
Federal Grain Inspection Service - Dennis Mahoney and John Manis;  
Alabama - John Rabb  
Maryland - Ken Butcher  
National Bureau of Standards - Karl Newell

The subjects included in the Seminar were: (1) type evaluation of digital scales; (2) the permanence test procedures; (3) the influence factors test procedures; (4) test procedures for vehicle scales; (5) the type evaluation checklist for electronic cash registers.

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112-3 EVALUATION ACTIVITIES

The Executive Secretary reported on the evaluation activities, including the testing completed by each participating laboratory and Certificates of Conformance issued. Tables J and K summarize the report.

Table J

CERTIFICATES OF CONFORMANCE ISSUED

Year Issued		Number Issued
Full Certificates		
1985		75
1986		80
(1985 Criteria)	43	
(1986 Criteria)	371	
Provisional Certificates		
1986 (Load Cells)		9

<sup>1</sup> 25 Certificates were issued based on testing for conformance to the requirements of the Influence Factors.

Table K

## EVALUATIONS CONDUCTED BY JURISDICTION

Evaluations performed by	In 1985	In 1986 using	
		1985 criteria	1986 criteria
California	28	20	101
Ohio	2	4	3
Kansas		5	
(for NBS)			
FGIS	2	1	
NBS (Full)	43	13	241
NBS (Provisional)			9
Total	75	43	46

<sup>1</sup> Only NBS and California had an environmental chamber.

F. Nagele, Michigan, Chairman

D. Guensler, California, Chairman-Elect

L. Draghetti, Town of Agawam, MA

J. Lyles, Virginia

G. Mattimoe, Hawaii, Past Chairman

B. Niebergall, North Dakota

J. O'Connor, Iowa

J. Swanson, Alaska

C. Gardner, Suffolk County, NY, Treasurer

A. Tholen, NBS, Executive Secretary

## EXECUTIVE COMMITTEE

APPENDIX A

PROPOSED REVISED POLICY

INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY, NCWM PARTICIPATION

1.5.1. International Organization of Legal Metrology

(Exec, 1987, Proposed; will supersede 1.5.1, 1.5.2., and 1.5.3. in draft NCWM Publication 3, "Policy, Interpretations, and Guidelines".)

PART I - GENERAL

- A. It is the policy of the National Conference on Weights and Measures (NCWM) to participate in U.S. activities related to the International Organization of Legal Metrology (OIML).
- B. NCWM participation in U.S. activities is viewed as an opportunity to introduce U.S. practices into international weights and measures requirements and also to enrich the U.S. system through adoption of international weights and measures practices.
- C. The NCWM is the principal organization through which the recommendations of the OIML can be introduced into state weights and measures laws and regulations in the United States.
- D. The Executive Committee will review the OIML Working Program and decide which Pilot and Reporting Secretariats are of interest to the NCWM, and will promote participation of its members on the various U.S. National Working Groups (USNWG) overseeing these Secretariats.

PART II

NCWM REVIEW OF OIML RECOMMENDATIONS AND DOCUMENTS

- A. The NCWM Chairman and Executive Secretary shall jointly receive and coordinate invitations or requests for NCWM participation in OIML activities.
- B. Members selected for participation as NCWM representatives to USNWG or as delegates to meetings of the OIML should be

## Executive Committee

qualified to represent the NCWM to ensure close coordination of the work and scope of the NCWM committees and of the OIML organizations.

- C. Selection of NCWM members for participation will be determined as follows:
  - 1. Requests will normally be referred to the appropriate NCWM Committee, in which case the Committee will recommend to the NCWM Chairman by letter an NCWM member believed to be fully qualified. The NCWM Chairman may exercise the right to make the selection without reference to a Committee if the subject matter is not covered by the standing committee.
  - 2. The NCWM Chairman, in consultation with the Executive Secretary, shall make the final NCWM selection and forward the name of the nominee to the NBS Office of Standards Management.
- D. The role of the NCWM representative is of special significance in that he or she may be the first NCWM member having knowledge of the recommendations being developed. As the NCWM representative, the member:
  - 1. shall keep the sponsoring standing committee current on the progress of the OIML activity;
  - 2. shall promote the policies of the NCWM and seek guidance if a question arises regarding the policy and/or position of the NCWM; such issues shall be reviewed within the Committee structure of the NCWM.

## PART III

### DEVELOPMENT OF NCWM POSITIONS

- A. Formal processes are followed by the NCWM to review OIML Recommendations and Documents, leading to and including the development of official NCWM positions on these papers and the forwarding of these positions to the U.S. Representative to OIML.
- B. Recommendations and documents will be reviewed to determine if the draft material is equivalent to existing NCWM codes, uniform laws and regulations.
- C. The NCWM Chairman and Executive Secretary shall jointly receive and coordinate requests for review of draft OIML International Recommendations and Documents which are to come before the International Committee of Legal Metrology (CIML) and the International Conference as follows:



## Executive Committee

1. The requests will be referred to the appropriate NCWM Committee for review and development of recommended NCWM position for submission to the Executive Committee. (The Executive Committee may decide to solicit comments from other members of the NCWM through use of the mail ballot.)
2. The Executive Committee will review the comments received and will formulate a recommended NCWM position on the OIML draft.
3. An affirmative position shall be taken if the reviewers agree that the OIML draft is sufficiently beneficial and one of the following circumstances is met (otherwise, a negative position shall be taken):
  - a. The proposed OIML requirements are considered to be equivalent to existing or proposed NCWM codes, and uniform regulations and/or laws;
  - b. Conflicts with existing or proposed NCWM codes, uniform regulations, and/or laws can be resolved without difficulty or losing equivalence; or
  - c. No NCWM codes or uniform regulations exist and the draft OIML requirements could be considered as the basis for such codes or regulations.
4. The NCWM will consider abstaining if the draft is considered to be outside the scope of the NCWM interests or if a NCWM position on the draft cannot be achieved.

## PART IV

### ADOPTION OF OIML RECOMMENDATIONS

- A. Any OIML recommendation under consideration for adoption may be considered in whole or in part, or rejected. (NOTE: NCWM requirements may be less stringent and/or different from OIML requirements as long as they do not present a technical obstacle to the marketing of equipment in the United States.)
- B. The OIML recommendation, or part thereof, may be proposed for adoption by the NCWM provided that:
  1. it was not opposed by the NCWM;
  2. a need exists;
  3. the OIML recommendation satisfies the need; and
  4. it is considered beneficial to the U.S. marketplace.

PART V - FUNDING

- A. The NCWM will annually budget to support OIML activities. The amount of funding will be determined within the context of overall NCWM activities and will likely vary from year to year.
- B. The representatives will be encouraged to arrange funding, for their participation, either in full or partially, by their employer.

## Executive Committee

### APPENDIX B

#### AGENDA, ISSUES ROUNDTABLE

Monday, January 12, 1987

This session will provide background or introductory material on selected topics. It is a new part of the Interim Meeting agenda designed to cover the technical aspects of more complex issues before specific committees deliberate on related proposals during the week. The background information to be presented is intended to prepare attendees to participate in the week's meetings with a fuller understanding of the issues in questions.

#### APPLICATION OF NTEP TO STATE ENFORCEMENT PROGRAMS

Albert D. Tholen, Executive Secretary  
National Conference on Weights and Measures  
(Chief, Office of Weights and Measures, NBS)

The following topics will be discussed:

- Evolution of NTEP  
    Need, NBS/NCWM Actions
- Status  
    Adoption/recognition by states
- Accomplishments  
    Participating laboratories, evaluations completed
- Benefits  
    Economy, field inspection
- Issues  
    Remove obstacles to adoption/recognition,  
    improve procedures to deal with innovation

#### TESTING PROCEDURES FOR LOADING-RACK METERS

Henry V. Oppermann, Technical Advisor  
Specifications and Tolerances Committee  
(Office of Weights and Measures, NBS)

Several Specifications and Tolerances agenda items are related to this issue and will be explained. These include the following: (1) whether or not corrections for the change in product temperature should be included in the test

## Executive Committee

procedure; (2) whether a separate tolerance for temperature probes should be included in Handbook 44; (3) the use of remote temperature probes; (4) the tolerances proposed by the S&T Committee in 1986; and (5) the variability in test results based upon prover design and product vaporization.

### MASS FLOW METERS

Brian Hoover  
Product Market Manager  
Micro Motion, Inc.

A brief description of the technology used in mass flow meters will be given. The test procedures to be used to test mass flow meters will be discussed. The changes proposed for Handbook 44 to recognize these devices will be reviewed.

### TESTING FLOUR AND HOW TO DEAL WITH MOISTURE LOSS

Richard L. Thompson, Chief  
Weights and Measures Section  
Maryland Department of Agriculture

The Task Force on Commodity Requirements is ready to propose: (1) NCWM policy to the Executive Committee; and (2) test procedures to be incorporated into Handbook 133 for checking flour packages to the Laws and Regulations Committee. Details of the test method will be described, including:

- Potential moisture loss and the loss actually found
- "Gray area" vs. "tolerance"
- Equipment and personnel administration
- Traceability at the plant, laboratory, and in the field

### CHECKING POLYETHYLENE SHEETING

Carroll S. Brickenkamp, Technical Advisor  
Laws and Regulations Committee  
(Office of Weights and Measures, NBS)

Polyethylene sheeting is labeled by length, width, thickness, and weight. Until recently, many jurisdictions were reluctant to check the product because it was believed that the field inspector had to have a dead-weight-dial micro-meter. A review of the steps involved in testing polyethylene sheeting and film will be presented, including:

- Checking the label declaration for consistency
- Checking the net weight
- Checking the thickness

Executive Committee

APPENDIX C

DRAFT OPERATING BUDGET

(July 1, 1987 to June 30, 1988)

The entries in columns (c) and (d) are the proposed amounts budgeted for the operating year July 1, 1987 to June 30, 1988.

The entries in column (f) are the amounts budgeted for the current operating year July 1, 1986 to June 30, 1987; these numbers are provided as a basis for comparison between the two years.

INCOME

Account		Budget Amount		Prior Year	
Number	Name	Subaccount	Account	Footnotes	Budget
(a)	(b)	(c)	(d)	(e)	(f)
1.1	Registration Fees		\$30,000	1	\$34,000
1.2	Membership Fees		45,500	2	45,500
1.3	Training Modules		3,500	3	8,000
1.4	Interest		2,000	4	1,600
1.5	Promotion		1,000	5	0
1.6	Special Events		5,000	6	6,000
1.9	Miscellaneous		200	7	0
	Total		\$87,200	8	\$95,100



## Executive Committee

## EXPENSES

Account		Budget Amount		Prior Year	
Number (a)	Name (b)	Subaccount (c)	Account (d)	Footnotes (e)	Budget (f)
2.0	Annual Meeting		\$10,000	9	\$12,000
3.0	Interim Meeting		4,000	10	5,100
4.0	Committee Meetings		19,400	11	24,500
4.1	Executive	\$6,000			
4.2	Education	4,900			
4.3	Laws and Regs	2,500			
4.4	Liaison	2,000			
4.5	Specs & Tol	2,500			
4.9	Miscellaneous	1,500			
5.0	Special Meetings		20,500	12	20,500
5.1	TF on Comm Req	3,500			
5.2	TF on Info Sys	3,500			
5.3	TF on Fraud	5,500			
5.4	OIML	4,000			
5.5	NTEP Tech Cte	3,000			
5.9	Miscellaneous	1,000			
6.0	Chairman/Chairman Elect		8,500	13	7,500
7.0	Membership Program		5,000	14	6,000
8.0	Printing/Pubs		3,500	15	3,000
9.0	Administration		6,500	16	7,000
10.0	Special Events		5,000	17	6,000
11.0	Promotion		800	18	0
12.0	Training Modules		4,000	19	3,500
	Total Disbursements		\$87,200	20	\$95,100

## Footnotes (Income).

1. Account 1.1. Recent experience is that registration is leveling at 300. The estimate is based on 300 registrations at \$ 100.00 each = \$30,000.
2. Account 1.2. No change from previous year. Estimate is based on 1300 members at \$ 35.00 each = \$ 45,500.
3. Account 1.3. Module sales have not reached expectations. States are reproducing the modules rather than purchasing them from the NCWM; therefore, this budget item has been reduced.

## Executive Committee

4. Account 1.4. A slight increase based on the expectation that the average bank balance will be larger.
5. Account 1.5. The sales (and inventory) of ties, tie-tacks, etc. is down. Sales in the prior year were approximately \$ 1,700.00.
6. Account 1.6. This account represents the income from the various elective activities of the guest program and the social activities of the membership at the Annual Meeting.
7. Account 1.9. This is a miscellaneous account.
8. Total Income. There is a significant reduction in the budgeted income due primarily to a reduction in the estimate of registrations at the Annual Meeting and a reduced expectation in the sale of training modules.

## Footnotes (Expenses).

9. Account 2.0. A reduction to reflect experience.
10. Account 3.0. A reduction to reflect experience.
11. Account 4.0. A reduction to reflect experience.
12. Account 5.0. No change.
13. Account 6.0. An increase to support added travel.
14. Account 7.0. A slight decrease because of plans which will add efficiencies to the operation of this activity.
15. Account 8.0. These are the expenses of preparation and printing of NCWM publications (other than the training modules) and for other incidentals, such as the NCWM stationery, and for part-time typing assistance. A small increase reflects added printing activity.
16. Account 9.0. These are the expenses for the procurement of supplies for general operations including the post office box, membership dues of the Conference Coordinator in the Society of meeting planners, magazine subscription, etc. Included in the budgeted amount is \$2,000 for the purchase of a second IBM-compatible or clone computer and printer to broaden the capability of the Bulletin Board operation. Note: the NCWM currently owns two computers, a CompuCorp system (used for the preparation of camera-ready copy for Handbooks, and publications, as well as for correspondence) and an IBM (purchased for the use of the Chairman for preparation of official correspondence and communications with the NCWM office). Both computers have dedicated printers. A third computer and printer belong to the OWM and are dedicated full time to the operation of the Bulletin Board.
17. Account 10.0. Offset by Income Account 1.6.

Executive Committee

18. Account 11.0. The cost of purchase of promotional items such as ties, tie-tacks, etc.
19. Account 12.0. The cost of printing, assembling and mailing training modules.
20. Total Expenses. The total of \$87,200 is reduced from last year because of economies planned in the operation of the meetings under Accounts 2.0, 3.0, and 4.0.

Executive Committee

APPENDIX D

OIML UPDATE

1. OIML Pilot and Reporting Secretariats of Possible Interest to the NCWM

	<u>Pilot and Reporting Secretariats</u>	<u>Recommend that NCWM Rep be member of US National Working Group</u>
PS1	Terminology - Revision of the OIML Vocabulary (RS1)	
PS2	General Legal Metrology - Control of measuring instruments by sampling (RS5) - General requirements for electronically equipped measuring instruments (RS6)	X
PS4	Measurement of Length, Area, Angle	
PS5S	Dynamic Measurement of Liquid Volume - Laboratory volume measures (RS3)	
PS5D	Dynamic Measurement of Liquid Volume - Requirements for metering systems (RS1) - Cryogenic meters (RS2) - Electronic devices applied to flow (RS6) - Provers and verification devices (RS7)	X

Executive Committee

Recommend that NCWM Rep  
be member of US  
National Working Group

	<u>Pilot and Reporting Secretariats</u>
PS7	Measurement of Mass <ul style="list-style-type: none"> <li>- Electronic weighing instruments (RS2)</li> <li>- Verification weighing instruments (RS3)</li> <li>- Non-automatic weighing instruments (RS4)</li> <li>- Automatic weighing instruments (RS5)</li> <li>- In-service EPOs (RS7)</li> <li>- Load cells (RS8)</li> </ul>
PS8	Weights <ul style="list-style-type: none"> <li>- Weights used in trade and industry (RS5)</li> <li>- Precision weights (RS6)</li> </ul>
PS10	Measuring Instruments for Vehicles <ul style="list-style-type: none"> <li>- Taximeters (RS3)</li> </ul>
PS12	Measurement of Temperature and Heat <ul style="list-style-type: none"> <li>- Heat meters (RS8)</li> </ul>
PS18	Measurement of the Characteristics of Food Products <ul style="list-style-type: none"> <li>- Grain moisture meters (RS1)</li> </ul>
PS20	Prepackaged Products <ul style="list-style-type: none"> <li>- General packaging problems (RS1)</li> <li>- Verification of net contents declarations (RS2)</li> </ul>
PS22	Principles of Metrological Control
PS31	Teaching of Metrology

X

X

X

X



## Executive Committee

### 2. 1987 OIML Meetings of Possible Interest to NCWM

#### Scheduled

11-15 May	Seminar on Calibration of Large Volume Liquid Measuring Installations	Arles, France
1-5 June	PS7/RS4 Non-automatic Weighing Instruments	Braunschweig, FRG
15-19 June	PS20 Prepackaged Products	Falkenberg, Sweden

#### Provisional

April/May	PS5D/RS6 Electronic Flow Devices
October/ November	PS7/RS5 Automatic Weighing Instruments

## APPENDIX E

## REPORT OF THE TASK FORCE ON COMMODITY REQUIREMENTS

The Task Force on Commodity Requirements met in Gaithersburg, MD on May 20 and 21, 1987.

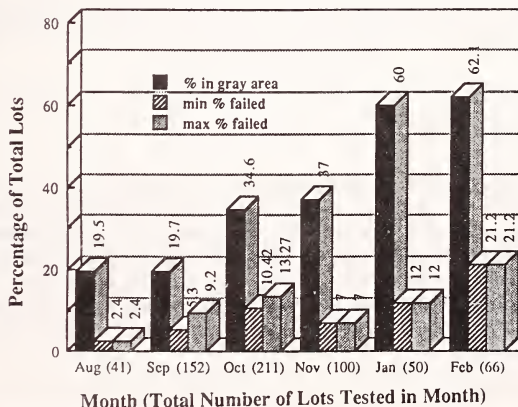
Flour

## 1. The Gray Area

The Pilot Study for flour had been extended into the fall and winter months of 1986-87 in order to validate the gray area approach and the specific test methods developed by the Task Force. The Task Force wishes to thank those jurisdictions that provided specific assistance in this regard, namely: Connecticut, Colorado, California (including several counties), Canada, Illinois, Kansas, Maryland, Minnesota, Michigan, Pennsylvania (including Bucks County), Ohio, North Carolina, New Mexico, and Virginia.

The results are summarized in Figure 1. As expected, the percentage of lots that were found in the gray area rose as the winter progressed (because flour will dry out in the winter months), and then began to drop off again in the spring (flour will pick up some moisture as the humidity rises).

Figure 1  
Flour Pilot Study Results



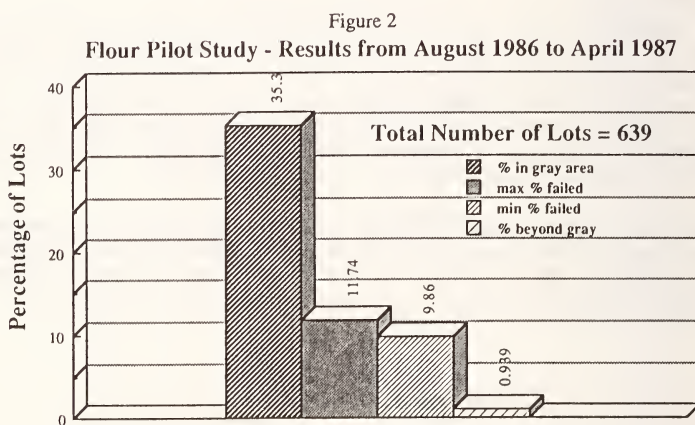
Data on lots falling into the gray area were incomplete in September and October. Compliance of lots was figured on whether all such lots passed (min % failed) or all lots failed (max % failed)

## Executive Committee

Although the percentage of lots that failed in the winter months, even when moisture loss was accounted for, also rose, the actual number of lots that failed was small (from 2 to 12 each month from November on). The total number of lots tested in March and April was so small that the confidence interval is very large (predictive value is very poor), therefore the results for these months are not shown in Figure 1.

The overall failure rate for 639 lots tested between August 1986 and April 1987 ranged from 9.86 to 11.74%<sup>1</sup>. Thirty-five percent of the 639 lots were in the gray area. See Figure 2.

**As a result of the Pilot Study, the Task Force is confident that the gray area approach works.**



Data on lots falling into the gray area were incomplete in September and October. Compliance of lots was figured on whether all such lots passed (min % failed) or all lots failed (max % failed)

## 2. Laboratory Intercomparisons

The American Association of Cereal Chemists is conducting an intercomparison of laboratory oven results. Eleven state weights and measures labs, 10 millers' labs, and Canada Weights and Measures have agreed to participate. The Millers' National Federation is underwriting the cost of the intercomparison. Two sets of samples had been sent to participants by the end of June 1987. The objective of the intercomparison is to make certain that all laboratories can determine flour moisture contents on identical samples within the interlaboratory precision of the oven-dry method.

<sup>1</sup> Data on lots falling into the gray area were incomplete in September and October. Compliance of lots was based on whether all lots passed ("min % failed") or all lots failed ("max % failed").

### Poultry

#### 1. Used Dry Tare

The State of Maryland Weights and Measures conducted tests to determine how close "used dry tare" was to unused dry tare. Data on the range and average weight of a large sample of several styles of unused dry tare packages were collected at two poultry plants. Weights obtained using the used dry tare procedures given in the Pilot Study protocol on equivalent (but not identical) packages were recorded by several inspectors in the field. Those data indicate that in most instances that used dry tare differs from unused dry tare by 0.001 lb to 0.005 lb.

**In those jurisdictions that use dry tare to check packages put up in the retail store, because of the reluctance to accept unverified printed tare values on poultry shipping containers, the used dry tare procedure appears to provide the most acceptable tare values for pre-packed poultry coming from a Federally-inspected plant.**

#### 2. Moisture Loss

Data on 95 lots of fresh poultry from Federally-inspected plants (consumer packages labeled at the plant) were collected during the Pilot Study from August 1986 to April 1987. Participating jurisdictions were: Oregon; Nebraska; Ohio; New Mexico; Bucks County, Pennsylvania; Maryland, Michigan; and Connecticut. Again, the Task Force wishes to thank the participants for their extremely important contributions of time and effort.

Both wet tare (free liquid is part of tare) and used dry tare (the tare is dried out) data were collected on every lot. The difference between the net weight using dry tare and the net weight using wet tare was defined as the moisture loss. Expressed as a percentage of the average labeled weight, moisture loss was plotted against the elapsed time from the time of pack to the time of test. Moisture loss as a function of elapsed time of all the poultry lots for which elapsed time was available is shown in Figure 3.

Although moisture loss as high as 12% was found in the Pilot Study, the figure shows the moisture loss only for those lots for which the elapsed time (from time of pack to time of test) was also known.

The following observations were made from the data and task force discussions:

1. The used dry tare method given in the Pilot Study protocol for jurisdictions using dry tare was a workable method for field use.
2. A rejection rate of over 20% was experienced for lots tested using used dry tare.
3. There was no correlation between elapsed time and moisture lost.
4. Based on surveys of their member companies conducted by the American Meat Institute and the National Broiler Council, it is apparent that procedures for tare determination by plants vary greatly:

## Executive Committee

- (a) Many of the procedures used to determine what tare to print on the shipping container or to provide to the retailer do not conform to (nor are they equivalent to) the USDA-State Memorandum of Understanding rounding procedures.
  - (b) Many of the procedures do not account for the range in tare weights of packaging materials.
  - (c) There may be a lack of understanding of what to include as tare when providing a retailer with a tare weight on prepackaged consumer packages.
5. In the Pilot Study, it was very difficult to get the date of pack information on the lots that were tested. Other net weight information on the specific lot in question was also very difficult to obtain.
6. There were indications that some moisture is lost at the time of pack. This was seen in work done by California and Maryland weights and measures officials. Their measurements in the plant indicated a difference between the weight of the poultry at the time it was placed in the package and the weight after it was further processed and shipped from the plant.

First, the Task Force stresses that the situation with poultry packages is somewhat different from flour. With flour, the weights and measures agency (in cooperation with the flour mill) can determine the amount of moisture loss and weight loss. If the flour lot is found in the gray area, additional information can be obtained to determine lot compliance or noncompliance.

Jurisdictions using wet tare for poultry from Federally-inspected plants must do one of two things if a poultry lot is found in the gray area:

- 1. Dry out the tare and find out if the net weight is adequate using used dry tare, or
- 2. apply the gray area as a tolerance.

Contacting the plant to gather additional data, although commendable in principle and which the Task Force continues to recommend, has two flaws:

- 1. Poultry is extremely perishable, hence any lot's disposition must be determined almost immediately.
- 2. Those jurisdictions that have been able to obtain information concerning a particular lot in question have not been convinced that the retail lot being checked is really in compliance. For example, product from one hourly net weight check that averages less than the label may go to a single retail location and indeed be short weight.

Wet tare jurisdictions, however, do not agree that used dry tare is exactly correct. Moreover, these jurisdictions contend that excessive free flowing liquid in the package is a good indication of poor manufacturing or distribution practices. They contend that moisture loss need only be given for good distribution practice. After the poultry is placed in a package, wrapped, and dry tare sub-



tracted, the packages continue moving on an assembly line and undergo subsequent processing (blast chilling, storage before palletizing). Moisture loss is not a permitted variation during manufacturing, only during distribution. Therefore, the amount of moisture absorbed by the tare materials during the processing and manufacturing operations should be considered part of the tare.

Therefore, the responsibilities and roles the individual representatives on the Task Force will now consider are as follows:

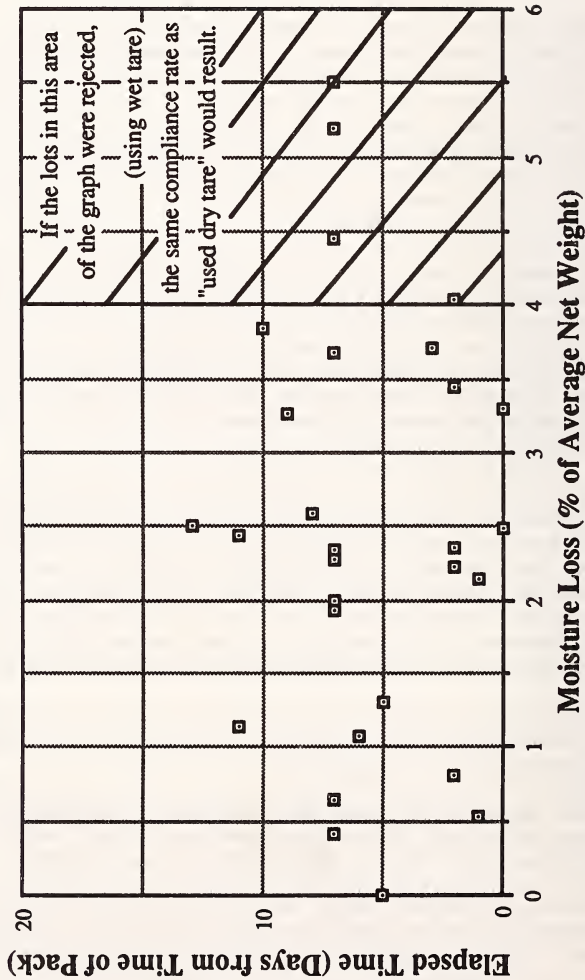
- o USDA will investigate overseeing in-plant data collection to determine a fixed figure (preliminary information from California shows this may range from 1/2 to 2 1/2%) to be added to the dry tare to accommodate the moisture lost in the plant. This will provide the necessary control to more accurately measure tare at the point when the packages enter distribution. There are only about 200 poultry plants under USDA inspection, and the fixed figure need only be determined and monitored whenever the composition of tare materials (mainly the absorbent pad) changes.
- o Jurisdictions using wet tare will investigate accepting a fixed gray area to accommodate the moisture loss during distribution. (As a first approximation for what this might be, the Task Force applied the failure rate obtained with used dry tare--about 20%--to the wet tare data. If a moisture loss of 4% were chosen, 20% of the lots tested using wet tare would fail. (See Figure 3.) If 1 1/2% of the 4% moisture loss were determined to occur in the plant, a gray area of 2 1/2% would result.)
- o The poultry industry will investigate the acceptability of determining the moisture loss at the plant before distribution (defined as when the product is placed on a truck), and the acceptability of a fixed gray area in wet tare jurisdictions. This approach would (a) provide consistent weights and measures test results on any package lot, whether the jurisdiction uses wet tare or dry tare in its testing procedures; and (b) remove competitive inequities caused by different packaging line and processing designs inside the plant.

If the Task Force proposal were accepted by all parties, the weights and measures procedures would be as follows:

**"Dry Tare" jurisdictions would use "used dry tare" and Category A sampling plans from Handbook 133 and as described in the Memorandum of Understanding (published in the 1986 NCWM Annual Report).**

**"Wet Tare" jurisdictions would use wet tare and a fixed gray area (yet to be determined, but of the order of 1 1/2 to 3%). They would contact plant and USDA personnel as detailed in the Memorandum of Understanding for additional information to determine disposition on a case-by-case basis.**

Figure 3  
**Moisture Loss for Poultry - Summary**



This includes the moisture loss that occurs in the plant.

### Processed Meat

The Task Force collected data on 120 lots of franks (both poultry and meat in origin), bologna, and sausage.

#### 1. Bacon

Bacon was excluded from the pilot study because it was agreed that there should be no free-flowing liquid in packages of bacon, and that used dry tare would be equivalent to wet tare for these packages.

#### 2. Ham

Hams, including water-added hams, were excluded because the net weights are, in the main, applied at the retail store.

#### 3. Sausage

Figure 4 shows the moisture loss (net weight using used dry tare minus net weight using wet tare) plotted against elapsed time (date of test minus date of pack) for sausage. Although a few packages exhibited significant moisture loss, moisture loss for 75% of the lots tested was less than 1/4% for a 1 lb package. This is of the order of magnitude of the scale division on the inspector's scale (0.002 lb). Therefore, the Task Force proposes no moisture loss is needed for these products, only a careful cleaning/wiping of the tare materials. Used tare is acceptable. Drying is not necessary; wiping is.

#### 4. Bologna (Luncheon Meats)

Figure 5 shows the moisture loss plotted against elapsed time (see sausage for further explanation of these terms) for bologna. Again, greater than 75% of the lots exhibited a moisture loss of less than 1/2% up to nearly two months in distribution. As in the case for sausage, the Task Force proposes that no moisture loss is needed for these products, only a careful wiping/cleaning of the tare materials. Used tare is acceptable. Drying is not necessary.

#### 5. Franks/Hot Dogs

Although the formulation of many franks and hot dogs is identical to bologna, Figure 6 shows a consistent loss of moisture as a function of elapsed time. This may be due to the shape of the franks and the mechanical loading that these packages undergo in shipping and distribution.

The Task Force proposes a 1% moisture loss allowance for franks for every 15 days, with a maximum of 2%. This allowance only applies in jurisdictions using wet tare. If free-flowing liquid is included as product (i.e., used dry tare), no moisture loss allowance is to be given.

Figure 4  
Moisture Loss for Sausage

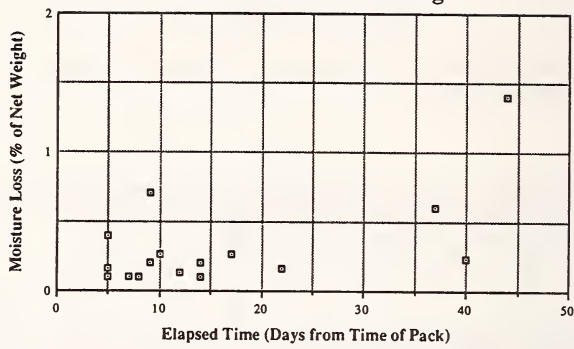


Figure 5  
Moisture Loss for Bologna

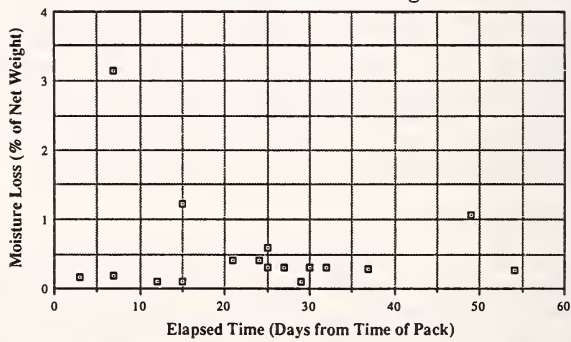
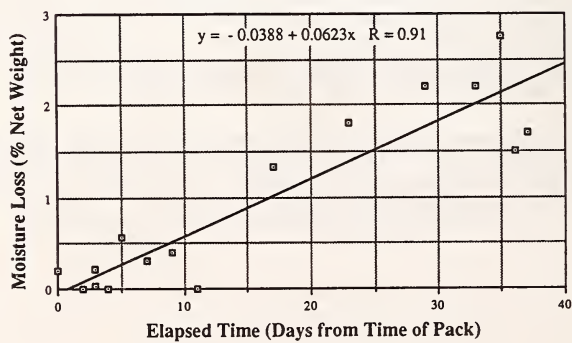


Figure 6  
Moisture Loss for Franks



APPENDIX F  
NATIONAL TYPE EVALUATION PROGRAM  
Policy and Procedures

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**NATIONAL TYPE EVALUATION PROGRAM**  
**ADMINISTRATIVE PROCEDURES**

**A. DEFINITIONS**

**1. "NATIONAL TYPE EVALUATION PROGRAM"**

A program of cooperation between the National Bureau of Standards, the National Conference on Weights and Measures, the states, and the private sector for determining, on a uniform basis, conformance of a "type" (q.v.) with the relevant provisions of:

National Bureau of Standards Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices";

National Bureau of Standards Handbook 105-1, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, Specifications and Tolerances for Field Standard Weights (NBS Class F)";

National Bureau of Standards Handbook 105-2, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, Specifications and Tolerances for Field Standard Measuring Flasks"; or

National Bureau of Standards Handbook 105-3, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, Specifications and Tolerances for Graduated Neck Type Volumetric Field Standards".

**2. "TYPE EVALUATION"**

A process for the testing, examination, and/or evaluation of a "type" (q.v.) by a "Participating Laboratory" (q.v.) under the National Type Evaluation Program.

**3. "TYPE"**

A model or models of a particular measurement system, instrument, element, or a field standard that positively identifies the design. A specific type may vary in its measurement ranges, size, performance, and operating characteristics as specified in the "Certificate of Conformance" (q.v.).

**4. "PARTICIPATING LABORATORY"**

A Federal or a State Measurement Laboratory authorized by the National Bureau of Standards, in accordance with its program for the Certification of Capability of State Measurement Laboratories, to conduct a type evaluation under the National Type Evaluation Program. The National Bureau of Standards is a Participating Laboratory.

5. "CERTIFICATE OF CONFORMANCE"

A document issued by the National Bureau of Standards based on testing by a Participating Laboratory, said document constituting evidence of conformance of a type with the requirements of this document and the National Bureau of Standards Handbooks 44, 105-1, 105-2, or 105-3.

**B. ADMINISTRATION OF THE PROGRAM**

The National Type Evaluation Program is operated by the following organizations.

1. BOARD OF GOVERNORS

The Executive Committee operates as the NTEP Board of Governors and is responsible for the operation of the program, including the establishment of policy and procedures and the resolution of policy, technical and appeals issues. (See Bylaws, Article V, Section 5.)

2. NTEP ADVISORY COMMITTEE

The NTEP Advisory Committee is composed of Associate Members of the NCWM appointed by the NCWM Chairman to represent the interests of industry in advising the Board of Governors. (See Bylaws, Article V, Section 5.)

3. TECHNICAL COMMITTEE ON NATIONAL TYPE EVALUATION

The Technical Committee on National Type Evaluation includes the NTEP Advisory Committee plus Active Members of the NCWM appointed by the NCWM Chairman. It is responsible for the development of test criteria and procedures for use in the evaluation process by the Participating Laboratories.

4. THE NATIONAL BUREAU OF STANDARDS

The NBS Office of Weights and Measures (OWM) provides:

- a. technical and administrative support to the National Type Evaluation Program (see NBS SP 250 Appendix, November 1985, page 37); and
- b. the Secretariat for the National Conference on Weights and Measures (see NBS SP 250, 1982 Edition, Chapter X.H.).

In these roles, the OWM:

- a. administers the Program, including the receipt, review, and recording of requests for evaluation;
- b. assigns responsibility for evaluation to a Participating Laboratory and maintains records to provide knowledge of the progress of evaluations;

## Executive Committee

- c. evaluates the qualifications of potential Participating Laboratories and issues Certificate of Authorization to those that comply (see NBS Handbook 143, Part II for criteria);
- d. functions as a Participating Laboratory;
- e. reviews Reports of Test prepared by Participating Laboratories, makes decisions regarding compliance of the tested types with NBS Handbooks, and issues the Certificates of Conformance or Reports of Test; and
- f. maintains records of Certificates of Conformance and Reports of Test that have been issued and updates the composite record annually.

## C. TYPE EVALUATION PROCESS

The type evaluation process follows a sequence of major steps (further explained in Sections D and E):

- Request for type evaluation (usually by the manufacturer)
- Decision by NBS to accept or reject the request to conduct evaluation
- Assignment by NBS of Participating Laboratory
- Decision by NBS on extent of evaluation necessary
- Conduct of the type evaluation by the Participating Laboratory
- Report of deficiencies, if any, by the Participating Laboratory to manufacturer, who must correct the deficiencies before the process can continue
- Decision on conformance or nonconformance by the Participating Laboratory; if non-conformance, the manufacturer must correct deficiencies before the process can continue
- Evaluation of the type evaluation results by NBS
- Preparation of the type evaluation report by NBS
- Issuance of the Certificate of Conformance by NBS

## D. REQUEST FOR TYPE EVALUATION

Examples of potential applicants for evaluation are:

1. the manufacturer, including assemblers of systems comprised of sub-systems produced by various manufacturers; and
2. manufacturer's sales representatives

To obtain a type evaluation, the applicant shall:

1. address a letter requesting the evaluation to:

National Type Evaluation Program  
c/o National Conference on Weights and Measures,  
P.O. Box 3137, Gaithersburg, MD 20878;

2. attach the appropriate Application Form (see Part II of this publication), describing the type (include drawings with dimensions and specifications of large capacity scales), its operating characteristics and instructions, intended application, model number, capacity, size, and shipping weight; and
3. authorize the billing of all associated costs incurred by the Participating Laboratory conducting the evaluation.
4. Following acknowledgement of a request by OWM, ship the type, intact and ready for evaluation, to the assigned testing location. (If special installation arrangements are required, they must be made by the requestor prior to the time of evaluation.)

The physical and metrological characteristics of copies of a type submitted for evaluation under NTEP are expected to be representative of production devices.

#### **E. STEPS IN THE TYPE EVALUATION PROCESS**

The type evaluation process is the first step of regulatory involvement in the legal metrology control system.

##### **1. CONDITIONS FOR EVALUATION**

- a. Test criteria and procedures are contained in Part III of this publication.
- b. Facilities are available to conduct the evaluation. (See options available to Participating Laboratories, paragraph 4 below.)

##### **2. INITIATION OF EVALUATION PROCESS**

In general, one or more copies of the type will be submitted with a request for device evaluation. Submission of engineering specifications and operating descriptions that characterize the type are required.

##### **3. CHOICE OF PARTICIPATING LABORATORIES**

The manufacturer may request a particular Participating Laboratory for the conduct of the evaluation, probably based on location. Cooperation between the manufacturer and NTEP is considered to be advantageous.

NTEP will try to honor the request. If another Participating Laboratory could conduct the evaluation sooner, the manufacturer will be given an opportunity to withdraw his request, but NTEP has the final authority to assign the Participating Laboratory.

## Executive Committee

### 4. PARTICIPATING LABORATORIES - OPTIONS

The type evaluation process normally will be conducted in Participating Laboratories.

#### a. Minimizing Program Cost

A policy of the NTEP is to minimize the cost of the Program to all parties. In some circumstances, testing in laboratories other than Participating Laboratories might be warranted, but only if the testing is supervised by representative(s) of a Participating Laboratory. Participating Laboratories may consider using other facilities to augment their own capability, including those belonging to:

- (1) manufacturers;
- (2) independent testing organizations; and
- (3) Federal or state government agencies.

#### b. Considerations

NTEP should consider the following before proceeding with full evaluation:

- (1) Is the availability and credibility of test data provided by the manufacturer as evidence of conformity of the type to NBS Handbooks equivalent to that which would be produced by a Participating Laboratory?
- (2) Does the type apply new technology with which NTEP has not dealt before, and/or does the Participating Laboratory have the facilities or knowledge necessary to carry out the required evaluations?
- (3) In the absence of adequate test facilities in the Participating Laboratory, are manufacturer or third party test facilities available to augment the facilities of the Participating Laboratory?
- (4) Must the testing be done in situ because the type is not portable and must be assembled at a user site? Different aspects of a given evaluation may be carried out at different sites for convenience, such as at the factory, in a laboratory, and at a user location.

### 5. SAFEGUARDING PROPRIETARY INFORMATION

In the course of the process, the NTEP (and Participating Laboratories) often become privy to proprietary information related to the device, manufacturing techniques, etc. These agencies are bound to protect this information and must carefully limit access to it, or to data developed during the NTEP process, to properly authorized organizations or individuals,



e.g., only the applicant or the manufacturer.

## **F. FULL OR PROVISIONAL CERTIFICATE OF CONFORMANCE**

Normally, the NTEP will conduct a complete evaluation of a type which, if the type meets the requirements, will result in the issuance of a Full Certificate of Conformance. Under certain circumstances, the NTEP will issue a Provisional Certificate of Conformance.

### **1. FULL CERTIFICATE OF CONFORMANCE**

- a. Various conditions may justify limiting the scope of the evaluation but still result in the issuance of a Full Certificate of Conformance. These conditions include:

- (1) restricted application of the type, and
- (2) requirements concerning installation, safeguarding, maintenance, and/or recalibration. These conditions may be inclusive or exclusive, as in "...for use in measuring the volume of water only..." or "...not for use in measuring corrosive liquids..."

- b. Permanence Test

In those cases where a permanence field test is required under NTEP, it is a part of the "full" type evaluation.

### **2. PROVISIONAL CERTIFICATE OF CONFORMANCE**

Under some circumstances, a Certificate of Conformance may be issued without a full evaluation. Such a Certificate of Conformance is referred to as Provisional.

In accepting a Provisional Certificate of Conformance, the manufacturer shall agree in writing that:

- a. the Provisional Certificate of Conformance is granted only with the understanding that further evaluation will take place before a Full Certificate of Conformance can be issued; and
- b. existing copies of the type will be modified or retrofitted if required.

A Provisional Certificate of Conformance will be issued infrequently, and only after authorization by the Board of Governors.

A Provisional Certificate of Conformance may, for example, be issued after partial or limited evaluation if there is an urgent need for use of the type and the NTEP is temporarily unable to carry out a complete evaluation. (See also Section H.)



## **G. VARIATIONS IN TYPE EVALUATION**

Variations in the type evaluation process result from considerations of the history of the type.

### **1. INITIAL EVALUATION**

An Initial Evaluation is conducted on a type not previously submitted to the NTEP. In most cases, the Initial Evaluation will comprise full testing of the type. However, previous experience with the manufacturer and/or with similar types may suggest that some tests can be waived.

### **2. REEVALUATION**

NTEP may decide to reevaluate a type that it has previously evaluated, whether or not a Certificate of Conformance was issued. Reevaluation of a type must be justified. Some considerations are listed below.

- a. Devices manufactured after the effective date of any new non-retroactive regulations must meet the new requirements; devices manufactured prior to the effective date of such regulations must meet retroactive requirements only.
- b. The devices in use fail to meet the requirements.

Reevaluation may result in reconfirmation of the Certificate of Conformance, amendment to the Certificate of Conformance, or withdrawal of the Certificate of Conformance.

### **3. EXPANSION OF THE CERTIFICATE OF CONFORMANCE**

A type with a valid Certificate of Conformance may be reevaluated in order to consider additional features, such as the range of the measured quantity, or the kinds of commodities that may be measured.

In most such cases, evaluation to determine the validity of the added features will be sufficient; that is, the evaluation(s) will not go through the entire check list, but will test the new features through the entire range of performance.

### **4. EVALUATION OF A TYPE PREVIOUSLY APPROVED BY PRE-NTEP JURISDICTION**

A type already approved in one or more jurisdictions may be submitted for evaluation under NTEP.

Discussions with the approving jurisdiction(s) may lead to the conclusion that the type meets all requirements of NTEP, in which case a Certificate of Conformance will be issued without formal testing.

The NTEP may accept data obtained in or conclusions drawn from prior evaluation.

The NTEP may conclude that limited evaluation will suffice to check for differences in the requirements of the testing jurisdiction and NTEP.

Prior to an NTEP evaluation, OWM will examine the report of the previous evaluation and regulations under which the prior evaluation was made and will determine the extent to which the former evaluation can be accepted. This decision may be based in part on the similarity of requirements in the two cases and on the policies and reputation for competence of the pre-NTEP jurisdiction.

#### 5. EVALUATION OF A TYPE IN USE BUT NOT PREVIOUSLY APPROVED

Many types in use have never undergone type evaluation, neither at the NBS nor by a state. A manufacturer may choose to request evaluation under NTEP or, if the device is to be installed in a particular jurisdiction, that jurisdiction may require that the type be evaluated.

Some such devices might not meet the requirements of the NTEP; however, it is assumed that all types in use meet the requirements of Handbook 44 since they have undergone testing in the state(s) in which they are installed. The NTEP has no authority to change the status quo in these instances. However, for the continued sales of these types, they must be evaluated and a Certificate of Conformance issued.

### H. EVALUATION OF NEW TECHNOLOGY

Type evaluation must deal with innovation and the application of new technology. It is anticipated that the NTEP will encounter features for which test criteria or procedures have not yet been developed.

In such cases:

1. the necessary criteria and/or procedures will be developed, ad hoc, by the NBS and participating laboratory representatives as expeditiously as possible;
2. these criteria and/or procedures will be submitted to the NTEP Technical Subcommittee, either by letter ballot, regularly scheduled meeting, or at a specially called meeting, depending on the complexity or sensitivity of the material; and
3. material accepted by the Technical Committee will be introduced into the normal NCWM process.
4. Pending completion of the normal NCWM administrative process, the NTEP will issue a Provisional Certificate of Conformance, provided the device meets the requirements of the proposed criteria and/or test procedures.

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Normal NCWM administrative process follows the steps described below.

1. If no changes are required to NBS Handbook 44, proposed criteria and/or procedures will be submitted through the Executive Committee (Board of Governors) and the NCWM membership in sequence. Adopted test criteria and procedures will appear as part of this Handbook.
2. Any changes required in NBS Handbook 44 will be submitted through the S&T Committee, the Executive Committee (Board of Governors), and the NCWM membership in sequence. Adopted changes will appear in NBS Handbook 44. As before, test criteria and procedures will appear as part of this Handbook.

A new feature or technology incorporated in the type being evaluated may not meet current NTEP requirements, but is nonetheless appropriate for its intended commercial use. In such a case, the NTEP can WAIVE or ALTER current practice and issue a Provisional Certificate of Conformance pending adoption of the change(s) by the NCWM process.

If there is an NTEP consensus on the recommended criteria and procedures AND the type meets the new requirements, the follow-up process is administrative. If no consensus can be reached on the criteria or procedures, but the type meets the requirements as proposed by the NBS and Participating Laboratories, a Provisional Certificate of Conformance will be issued. If more demanding criteria or procedures are subsequently proposed and adopted, the type will be tested under these criteria or procedures.

### I. WHAT CONSTITUTES A "DIFFERENT" TYPE?

When there are two very similar types (from a single manufacturer), a decision must be made whether one or two separate evaluation processes must be followed. The following guidelines apply.

#### 1. SUPERFICIAL DIFFERENCES BETWEEN DEVICES

Types that are identical in design, materials and components used, and measurement ranges, but that differ superficially in their enclosures, details, size, color, or location of non-metrological appointments (function lights, display location, operational key locations, etc.) can normally be covered by a single evaluation.

#### 2. COMPONENT VARIATIONS

Types produced by the same manufacturer with nominally identical components or materials procured from different suppliers can usually be regarded as the same type. They will be covered by a single evaluation if the different components or materials are not likely to affect the regulated metrological characteristics, reliability, or life of the types.

If changes in components or materials are likely to affect the performance or operational characteristics of a device, separate evaluations may be

required. A type is considered MODIFIED if a change alters a metrological or technical characteristic.

#### **J. CONSIDERATIONS PRECEDING EVALUATION**

Certain considerations that precede the type evaluation process itself are discussed in the following paragraphs.

##### **1. REASONS FOR INITIATING PROCESS**

Reasons for initiating evaluation are listed below:

- a. new type;
- b. existing type not previously evaluated for legal use or not evaluated by NTEP;
- c. new application of an evaluated type;
- d. modification of an approved type; or
- e. previous rejection or withdrawal of Certificate of Conformance coupled with newly presented facts concerning the type, improvements to the type, or a change in regulations.

##### **2. RESPONSIBILITY FOR REPORTING OCCURRENCE OF MODIFICATIONS**

When a manufacturer makes changes related to an approved type, evaluation of the modification may be necessary.

The manufacturer is responsible for reporting changes that might require the attention of the NTEP; the decision to report is dictated by the significance of the modification.

##### **a. Notification of Change.**

The manufacturer notifies the NTEP that a change has been made or is contemplated for an approved device. The manufacturer may make judgments concerning the modification and request issuance of an approval of a modification by citing the existing Certificate of Conformance, detailing the changes and giving any data, analysis, and conclusions concerning the technical or metrological consequences of the changes.

##### **b. NTEP Options**

On the basis of the notification, the NTEP will decide whether or not to require an evaluation which may result in an approval of a modification, or a new Certificate of Conformance. NTEP will inform the manufacturer accordingly.

#### **K. PERIOD OF VALIDITY OF CERTIFICATE OF CONFORMANCE**

The Certificate of Conformance remains valid unless withdrawn as the result of



## **Executive Committee**

a specific determination by the NTEP. (See paragraphs 1 and 2, below.)

### **1. WITHDRAWAL OF CERTIFICATE OF CONFORMANCE**

Approval may be withdrawn for deficiencies in the type. Withdrawal will, however, be an action of last resort.

The decision to withdraw must be clearly established on the basis of evidence provided to the Board of Governors. A manufacturer has the option of appealing the withdrawal before notice of the action is sent to the State directors.

### **2. FEEDBACK**

The evaluation process under NTEP can generate only limited data. The data gathered during the initial and subsequent verifications of a larger number of devices of a given type will, when systematically analyzed, often yield information not available from the type evaluation. Such feedback can be used as the basis for revising the conditions of approval when the situation so warrants.

Depending on circumstances, the experience gained during verifications may justify later changes in the Certificate of Conformance; in extreme cases, it might result in a reevaluation of the type.

## **L. RESULTS OF EVALUATION**

The results of evaluation include both a report of objective findings and a report of conclusions and recommendations concerning approval. These may be given in a single document or in two separate documents, as indicated below. Separate documents are especially appropriate when evaluation and a Certificate of Conformance are the responsibilities of different officials (for example, when testing of the type is carried out in a state laboratory and a Certificate of Conformance is issued by NBS). These reports will be retained permanently by the NCWM.

### **1. REPORT OF OBJECTIVE FINDINGS**

The report will be a permanent, objective record of the evaluation process and its results, with which future evaluations can be compared. It will identify the type, components and salient documents examined, personnel and laboratories that carried out the evaluation, and any special procedures, standards, and equipment used in the process. It will contain important data, ambient conditions, and the time data were taken, or identify the repositories of such data and the values of measured metrological characteristics and the associated uncertainties.

These characteristics will include all those subject to requirements in regulations and those that will form the basis for the definition of the type. To the extent that findings are based not on measurement, but on visual inspection, they will in each instance be as objective as possible.

## 2. REPORT OF CONCLUSIONS AND RECOMMENDATIONS RESULTING FROM EVALUATION

The report giving conclusions and recommendations will be based on the findings of the Participating Laboratory and will provide the basis for a decision by NBS regarding issuance of a Certificate of Conformance. Examples of the recommendation can include the following:

- a. Certificate of Conformance,
- b. Provisional Certificate of Conformance,
- c. unqualified rejection (the main reasons for rejection should be given),
- d. qualified rejection (recommendation that the type be rejected, but that it be approved in the future if specified modifications are made to the satisfaction of the Participating Laboratory, as may be demonstrated by a partial reevaluation), or
- e. recommendation that the type be rejected, that the applicant be adequately informed about its deficiencies, and that the type be accepted for a complete reevaluation in the future, provided the applicant declares that the deficiencies have been corrected.

## 3. DEFICIENT EVALUATION

If a significant area of non-compliance was overlooked by a Participating Laboratory in evaluating a type, costs of re-evaluation will be borne by the Participating Laboratory. In such cases every effort will be made to provide the manufacturer with adequate time to meet the requirements, including time to modify and/or retrofit the devices in use.

If a type for which a Certificate of Conformance was issued is found in use to have a feature that was not operational or present during the evaluation, costs of re-evaluation will be borne by the manufacturer. If the manufacturer requests a re-evaluation with the new feature, and the type is approved, an amendment to the Certificate of Conformance will be issued. If the type does not meet approval as a result of the new feature, the Certificate of Conformance will be withdrawn.

## M. CERTIFICATE OF CONFORMANCE

The Certificate of Conformance (see below) may include the following information:

### 1. APPLICATION OF THE TYPE

- a. approved ranges
- b. maximum capacity
- c. reference conditions
- d. normal conditions of use



## Executive Committee

### 2. ACCURACY

- a. accuracy class
- b. nominal error(s); maximum permissible error(s)
- c. required use of calibration charts, corrections, or instrument constants

### 3. REQUIREMENT OF MANUFACTURER

- required name plate information and stamps, marks, and seals affixed at the factory

### 4. REQUIREMENTS FOR USE

- a. installation requirements
- b. legally required auxiliary equipment and its minimum characteristics
- c. in the case of approval of auxiliary equipment, identification of the measuring instruments in conjunction with which it may be legally used
- d. operating instructions

### 5. SUMMARY OF FINDINGS

The summary lists the characteristics, attributes, and conditions of the type that are subject to regulation.

## N. REPORT OF DEFICIENCIES

A report of deficiencies will include the following information:

1. applicant, manufacturer, and type for which application was made;
2. applicable regulations;
3. specific components and salient documents examined;
4. characteristics and the values of their parameters found to be deficient, as well as the corresponding acceptable values; and
5. other unfulfilled conditions (when there are many reasons for rejection, only the major reasons will be given).

When reasons for non-conformance are based on relatively small deficiencies or when deficiencies can be easily corrected, the report may list changes that would make it acceptable.

Executive Committee

U.S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS  
GAITHERSBURG, MARYLAND 20899

CERTIFICATE NO. \_\_\_\_\_

Page      of

# Certificate of Conformance

For Weighing and Measuring Devices

For:

Submitted by:

Accuracy Class: \_\_\_\_\_

Standard Features and Options

This device was evaluated under the **NATIONAL TYPE EVALUATION PROGRAM (NTEP)** and found to comply with the applicable technical requirements of **NBS HANDBOOK 44**, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices".

Evaluation results and device characteristics necessary for inspection and use in commerce are on the following pages. For further information, contact the National Bureau of Standards, address above, or telephone (301) 975-4004.

Date:

\_\_\_\_\_  
Chief, Office of Weights and Measures

**NOTE:** The National Bureau of Standards does not "approve", "recommend", or "endorse" any proprietary product or material, either as a single item or as a class or group. Results shall not be used in advertising or sales promotion to indicate explicit or implicit endorsement of the product or material by the Bureau. (See NTEP Policies and Procedures).

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### **O. APPEALS PROCESS**

At any stage in the evaluation process, especially concerning a decision NOT to issue a Certificate of Conformance or to WITHDRAW a previously issued Certificate of Conformance, a manufacturer may appeal to the NTEP Board of Governors. A state or other party may also appeal a decision of the NTEP, including the issuance of a Certificate of Conformance.

Upon request, the NTEP Board of Governors will review the case and issue its decision, which may result in withdrawal of a Certificate of Conformance. In its evaluation, the Board may request the advice of the Advisory Committee.

The second level of review will be the NBS, the issuer of the NTEP Certificates of Conformance. If the NBS confirms the recommendation of the NTEP and the appellant disagrees at this stage, he may appeal the decision through the Federal Government process to the Federal Trade Commission.

### **P. DISTRIBUTION OF OUTPUTS OF EVALUATION**

A Certificate of Conformance, a report of deficiencies, an amendment to an existing certificate, or a similar document reflecting the approval decision will always be sent to the applicant at the earliest possible time. NTEP will send to the applicant copies of, or excerpts from, the reports of evaluation and of conclusions and recommendations.

The Certificate of Conformance will be sent to all the states and major jurisdictions. NCWM Publication #5 will be updated annually to incorporate all Certificates of Conformance issued during the previous calendar year. The Publication includes the information listed below. (The publication is on the Weights and Measures Information System (WAMIS) Bulletin Board, updated monthly on the first of each month.)

1. Number assigned to the Certificate of Conformance
2. Date Certificate of Conformance was issued
3. Company name
4. Model designation
5. Brief description of model
6. Capacity, flow rate, or size

### **Q. REFERENCES TO NTEP**

The use and effectiveness of the NTEP system depends on the extent to which knowledge of its operation and the results of its evaluations are known and requested.

## 1. RESTRICTION

Recipients must avoid any implication that the Certificate of Conformance carries with it an endorsement or approval of the product by the National Bureau of Standards.

Issuance of the Certificate of Conformance by the National Bureau of Standards only "constitutes evidence of the conformance of a type with the requirements of this publication and NBS Handbooks 44, 105-1, 105-2, and 105-3." (See Paragraph A.5 of this document.)

## 2. PERMISSIBLE USE OF STATEMENTS AND NTEP LOGO

### a. The Manufacturer

The manufacturer may communicate to clients and the public the fact that a Certificate of Conformance was issued for a type. State officials will automatically receive copies of all Certificates of Conformance issued and need not be advised of this fact by the manufacturer.

#### (1) Statement

The following statement may be used in company correspondence, brochures, and professional, technical, and trade publications;

"Certificate of Conformance (insert Certificate number) was issued under the National Type Evaluation Program of the National Conference on Weights and Measures."

#### (2) Logo

The NTEP logo (see next page) may be:

- (a) used in conjunction with the above statement as well as in advertising materials for the device for which the Certificate of Conformance was issued; and
- (b) affixed to any device manufactured as being the same as the NTEP approved device. However, sale and use of individual devices manufactured are subject to acceptance testing by state and local jurisdictions.

### b. The States

States participating in the NTEP (permitting the sale of devices in their states based on the NTEP Certificate of Conformance) and/or states operating NTEP Participating Laboratories are encouraged to communicate their activities to potential clients and the public. NTEP authorization means that a laboratory is competent to perform standard tests of specific weighing or measuring devices.

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A statement about the states' participation and/or authorization and the NTEP logo may be used in correspondence, brochures, and test reports and data sheets (provided the tests or services are performed in accordance with the terms of its authorization).

### (1) Statement

A state whose laboratory is authorized may use the following statement:

"Authorized by the National Bureau of Standards under the National Type Evaluation Program (NTEP) for testing --(identify device types covered by the Authorization Certificate)."

A state accepting Certificates of Conformance may use the following statement:

"(Name of State) -- permits the sale of weighing or measuring devices for use based on the issuance of the NTEP Certificate of Conformance".

### (2) Logo

The NTEP Logo (see below) may be used in conjunction with the above statements as well as alone in materials dealing with the NTEP.



Figure 2 - NTEP Logo

### c. Questions About Use of Statements or Logo

Any questions regarding the use of the statements or logo not specifically covered above, or any questions concerning the propriety or acceptability of their use in a particular situation, should be brought to the attention of the NTEP Board of Governors through the NCWM Executive Secretary.

### d. The NTEP Logo

Glossy black and white positives and adhesive backed copies of the logo are available from the NCWM office.



## APPENDIX G

### MEETING SUMMARY TECHNICAL COMMITTEE ON NATIONAL TYPE EVALUATION WEIGHING INDUSTRY SECTOR June 24, 1987

#### I. Range of Load Cell Capacities Covered by a Certificate of Conformance

Appendix A to the 1987 Final Report of the Specifications and Tolerances Committee provides guidelines concerning load cells to be submitted for test to demonstrate compliance with the influence factors requirements. It was concluded that an additional guideline is needed to clearly indicate that for NTEP, the tested load cell capacity is to be approximately mid-range in the typical 10:1 ratio of the range of load cell capacities covered by a Certificate of Conformance. Judgement must still be used in selecting the appropriate capacities and the number of load cells to be tested based on capacities, number of scale divisions being tested, and availability of test facilities, among other factors. The objective is to prevent testing load cells at the extremes of the range in an effort to cover a 10:1 range of capacities.

#### II. Manufacturer Access to Test Equipment

Testing for compliance of load cells with the influence factors requirements is practical only in a laboratory, hence a manufacturer must be able to test production cells on a regular basis. It was concluded that a manufacturer must have regular access to appropriate equipment to verify that the manufactured load cells are in compliance with applicable specifications. The equipment does not have to be within the manufacturer's plant, but may be in a private laboratory or in an NTEP laboratory. If it can be shown through test data that control on dimensions of a load cell is sufficient to control the performance of the cell, then the test equipment need only monitor the dimensions of the load cell, as may pertain to hydraulic load cells.

Having reached consensus that each manufacturer must have access to test equipment for all cells tested under NTEP and covered by a Certificate of Conformance, the committee discussed the following related questions:

1. Given access to test equipment, how does one assure that load cells are tested on a regular basis?

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2. How frequently should a manufacturer test production load cells to verify compliance with the influence factors requirements?
3. Who determines if the manufacturer's test program is adequate and sufficient to verify compliance of production load cells with the requirements?
4. Since electronic scales of all capacities are subject to the same considerations as load cells, is it logical to conclude that production scales should be tested periodically to verify compliance with the influence factors requirements?

It was mentioned that the adequacy of a test program would be determined in discussions between a manufacturer and NTEP (participating laboratories). This would require that an enforcement agency judge what is adequate equipment and a sufficient test program, but the enforcement agency may not have the expertise to do so. There is also a concern that government would be placed in the position of evaluating a manufacturer's quality control program, which may not be an appropriate role. The consensus appeared to be that the manufacturer should have the right to decide what constitutes adequate controls on manufacturing, but that it is the responsibility of weights and measures officials to verify that load cells and, ultimately, the final assembled scales meet the requirements of Handbook 44.

As part of this issue is the verification that devices installed in the field comply with the original type and that the load cells in a scale have been tested and are being used within their prescribed performance parameters. Some of the load cell parameters must be checked in the field to verify that the scale and its major components are correct. For example:

1. the scale or the load cells used in large-capacity scales must have been tested for influence factors and received a Certificate of Conformance;
2. the load cells must be the correct accuracy class for the application, and the number of scale divisions for the scale must be consistent with the Certificate of Conformance for the original scale or its major components;
3. the equipment must be properly marked with the accuracy class and number of divisions;
4. the scale division must be such that the scale operates at a value not less than  $V_{min}$  for the load cell (for example, for a multiple-load cell vehicle scale, the value of the scale division divided by the number of load cells in the scale must be greater than or equal to  $V_{min}$  for the load cells); and
5. the scale must perform within the tolerances for the specified application.

One difficulty in verifying that a correct load cell is being used in a scale is that only those load cells tested separately for compliance with the influence factors are required to be marked with prescribed information. The load cell in a small capacity scale may not be marked, so the scale may have to be disassembled to identify its load cell.

The importance of field verification should be emphasized. The influence factors requirements in the U.S. market are implemented on three primary steps for weights and measures enforcement:

1. adoption of the influence factors requirements in Handbook 44;
2. establishment of a type evaluation process to test new types of scales and load cells for compliance with the influence factors, and to all other appropriate requirements; and
3. development and implementation of a verification process to assure that load cells used in scales and the scales installed in the field comply with the influence factors requirements.

Without an effective verification process (step 3), the first two steps are almost meaningless. An effective verification process is critical to assuring fair competition in the marketplace.

The Technical Committee was unable in the time available to develop a complete and unified solution to the issue of verifying the compliance of production load cells and scales with the influence factors requirements or the issue of verifying that field devices are consistent with the original type. These issues are ultimately policy issues (based upon technical information) and referred to the NTEP Board of Governors or resolution.

### III. Test of a Load Cell to Partial Capacity

The question is whether or not a Certificate of Conformance can be issued for a load cell or a family of load cells based upon the test of a load cell to only a part of its capacity, which might occur if test equipment is not capable of testing a load cell to full capacity.

The consensus of the Committee is that a full Certificate of Conformance cannot be issued for a family of load cells or even a single load cell if it cannot be tested to capacity over the specified temperature range.

#### Note to Committee Members:

During the period when NTEP lacks facilities to test load cells, NTEP may (and intends to) issue provisional Certificates of Conformance for a family of load cells if it concludes that the data submitted are verifiable and justify issuing a provisional certificate. A full Certificate of Conformance may be issued for a particular model cell tested to partial capacity for use up to the maximum applied test load, but that full certificate would not apply to the rated capacity of the load cell. These guidelines are in addition to the NTEP policy of issuing full Certificates of Conformance for load cells based upon a review of test

## Executive Committee

data (to capacity), an evaluation of test facilities, and witnessing some tests to verify load cell performance. Load cells receiving provisional Certificates of Conformance are subject to retest once NTEP has facilities to test load cells to capacity.

### IV Load Cell Test Procedures and Data Analysis

Several aspects of test procedures and data analysis were discussed. The conclusions are stated below.

1. Load cells are to be exercised at each test temperature before test data as collected.
2. It is not necessary to test a load cell over its minimum utilization range ( $V_{\min}$  times  $n$ ). The test of a load cell to its rated capacity is the worst case condition. If a load cell is used over only a part of its range, its performance will improve.
3. It is recommended that class III L load cells be tested at least near the following test loads: 500 v, 1000 v, 4000 v, near 75 percent of capacity, and near capacity. The upper limit currently specified in the test of a load cell will be deleted.
4. A return-to-zero test may be used in place of a creep test to evaluate the time dependence (creep) characteristics of a load cell. The return to zero test will be based upon IR60 section 15.3, but 60 minutes will be used instead of 30 minutes. The first reading is to be taken 20 seconds after the load is removed.
5. The times specified in the load cell test procedures for loading or unloading test weights are to be treated in the following manner:

The time to load or unload test weights and read the indicator shall be as short as possible and shall not exceed the time specified in the table. The reading may be taken as soon as it is stable.

6. A high resolution indicator is recommended when testing class III L load cells so that the repeatability at the return to zero for a test run can be better analyzed.
7. The data analysis for load cells will continue to be normalized around 75 percent of capacity for the initial ascending-load tests at room temperature.
8. The tolerances for the repeatability error stated in the tables in the NTEP procedures are incorrect and will be changed. The tables are based upon the absolute value of acceptance tolerance, but Handbook 44 specifies that the repeatability tolerance is based upon the absolute value of maintenance tolerance. This has the effect of doubling the tolerances currently stated in the tables.
9. The tolerance specified in Handbook 44 for class III L load cells is unacceptably large due to an oversight. The Technical Committee recommends that Handbook 44 be changed in 1988 to correct the oversight. The recom-



mended creep test tolerance for class III L load cells is twice that for class III load cells. The smaller tolerances will be used immediately in data analysis.

10. Note to Committee members: As a result of the discussion of IR60 at the meeting on June 25, NTEP will require that all data values for individual runs at various temperatures be within the error band to be acceptable. Average values for runs at a specified temperature will still be used for interpolation or extrapolation.

#### V. Marking of Load Cells

Because NTEP has specified different tolerances for load cells depending upon whether the load cells are to be used in single-(S) or multiple-(M) cell applications, the number of divisions for which the load cell may be used will vary with the application. Additionally, the same type load cell may be used in both class III and III L scales. The load cell will probably have a different number of scale divisions for the different accuracy classes. Consequently, the Technical Committee recommends that the Specifications and Tolerances Committee amend its final report to require that load cells also be marked with an S or M in conjunction with the accuracy class and number of scale divisions for each application in which the load cell may be used.

#### VI Testing Wheel-Load Weighers

The method of testing wheel-load weighers for compliance with the influence factors requirements was briefly discussed. The conclusion was that a test stand using a load cell as a reference standard may be used to test wheel-load weighers because of the large tolerance applicable to them. However, the considerations listed below must be satisfied.

1. A load cell used as the force standard will be calibrated by dead-weights.
2. The force standard load cell will be recalibrated at specified intervals.
3. The stability of the force standard load cell will be demonstrated by inter-comparing it, over its full test range, with one or more other load cell force standards. Control data will be maintained on these intercomparisons.
4. The temperature sensitivity of the load-conducting system consisting of the load cell force standard, the readout instrument, and connecting cables will be determined and test data will be corrected accordingly.
5. The creep characteristics of the force standard load cells at the test temperatures will also be determined and test data will be corrected accordingly.

Guidelines for the frequency of calibrations and load cell intercomparison along with test procedures will be documented. The NBS will draft a recommendation for review.



## Executive Committee

### VII Additional Board of Governors' Issue

In the June 5, 1987 letter, Mr. Peter Perino, Transducers, Inc., suggests that improved control of production load cells can be improved by requiring that the manufacturer certify that all parts produced as the stated model number will meet the required specifications. The Board of Governors will review the proposal to determine if NTEP should require manufacturers to provide such a statement.

NTEP Policy and Procedures, Section I, Applicants for Evaluation, states that devices will be manufactured to replicate the device that has been evaluated. Requiring the manufacturer to certify that production units will conform to evaluated types emphasizes a point that is critical for fair competition. It is conceivable that manufacturers would provide such a certification statement if asked regardless of the level of quality control on production. The significance and benefit of requesting a certification statement should be explored.

**REPORT OF THE  
COMMITTEE ON LAWS AND REGULATIONS**

Allan M. Nelson, Chairman  
Chief, Weights and Measures  
State of Connecticut

**REFERENCE**

**KEY NO.**

**200 INTRODUCTION**

The Committee on Laws and Regulations submits its Final Report to the 72nd Annual Meeting of the National Conference on Weights and Measures (NCWM). The report consists of the Interim Report printed in the NCWM "Program and Committee Reports" as amended by Addendum Sheets issued during the Annual Meeting.

Items are grouped into the following series for ease of reference:

HANDBOOK 130	210 Series
Uniform Weights and Measures Law	211 Series
Uniform Weighmaster Law	212 Series
Uniform Packaging and Labeling Regulation	213 Series
Uniform Regulation for the Method of Sale of Commodities	214 Series
Uniform Unit Pricing Regulation	215 Series
Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices	216 Series
Uniform Open Dating Regulation	217 Series
Uniform Regulation for National Type Evaluation	218 Series
HANDBOOK 133	230 Series
OTHER ITEMS	250 Series

This year's Report contains no items in the 215, 216, or 218 series.

Table A on the following two pages identifies items contained in the Report by Reference Key Number, Item Title, and Page Number. Table B lists the Appendices to the Report. Table C contains the results of voting.

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The item numbers are those assigned in the Interim Agenda; in cases where the Committee changed the order of presentation of items, the listing in Table A may not be in numerical order. Item numbers followed by a "W" were listed in the Interim Agenda, but were withdrawn from the Committee's consideration. The reasons for withdrawal are given in the text of the Report. The titles of voting items are identified in **bold face print** followed by a "V" after the item number. In the Report, the key text upon which a vote is to be taken is also highlighted by **bold face print**. All other listed items are information items.

Before voting, the Committee grouped the less controversial voting items into a "consent calendar," which was voted on as a block. These items are marked after the item with a "VC."

Table A  
INDEX TO REFERENCE KEY ITEMS

Reference Key No.	Title of Item	Page
	HANDBOOK 130	
210-1	Proposed Uniform Motor Fuel Law and Regulation	119
<b>210-1A V</b>	<b>Uniform Motor Fuel Inspection Law</b>	<b>121</b>
<b>210-1B V</b>	<b>Uniform Regulation for Motor Fuel</b>	121
	UNIFORM WEIGHTS AND MEASURES LAW	
211-1	Proposed Section 1.10. Net Weight	122
<b>211-2 V</b>	<b>Section 22. Offenses and Penalties</b>	123
212	UNIFORM WEIGHMASTER LAW	125
	UNIFORM PACKAGING AND LABELING REGULATION	
<b>213-1 VC</b>	<b>Proposed Section 2.9. Definition of "Petroleum Products"</b>	126
<b>213-3 VC</b>	<b>Section 10.9.2. Textiles</b>	127
<b>213-2 V</b>	<b>Proposed Section 11.4. Small Packages of Meat or Meat Products</b>	<b>128</b>
213-4 W	Labeling of Nonalcoholic Malt Beverages	129
213-5	Editorial Review of the Uniform Regulation	129
	UNIFORM REGULATION FOR THE METHOD OF SALE OF COMMODITIES	
<b>214-1 V</b>	<b>Section 1.2. Bread</b>	129
<b>214-2 VC</b>	<b>Section 1.7. Other Milk Products</b>	131
<b>214-3 VC</b>	<b>Section 1.9. Pricing of Bulk Food Commodities</b>	131

Table A (Continued)

Reference Key No.	Title of Item	Page
UNIFORM REGULATION FOR THE METHOD OF SALE OF COMMODITIES		
214-4	Section 2.3.3. Quantity (of Fireplace and Stove Wood/Wood Chips or like Products Used for Seasoning)	132
214-5 VC	<b>Section 2.12. Polyethylene Products</b>	132
214-6	Proposed Section 2.15. Compressed or Liquefied Gases in Cylinders	134
214-7 VC	<b>Section 2.17. Bark Mulch</b>	136
214-8	Section 2.20. Liquefied Petroleum Gas	137
214-9 W	Miscellaneous Items: Soups Sold by Volume, Roofing	139
UNIFORM OPEN DATING REGULATION		
217-1 VC	<b>Section 3.4.4. Expression of Month and Day</b>	139
HANDBOOK 133		
230-1	Sampling Plans and MAV's	140
230-2 V	<b>Section 1.9. Allowances for Variations Due to Moisture Loss or Gain</b>	141
	<b>Section 2.14. Moisture Allowance</b>	
	<b>Proposed Section 3.17. Flour</b>	
230-3 VC	<b>Section 5.4. Polyethylene Sheeting</b>	142
OTHER ITEMS		
250-1	Task Force on Commodity Requirements	143
250-2	Task Force on Motor Fuels	143

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Table B  
APPENDICES

Appendix	Reference Key No.	Title of Appendix	Page
A	210-1	Uniform Motor Fuel Inspection Law and Uniform Regulation for Motor Fuel	144
B	210-2	Recommended Test Method for Packages of Flour	148
C	250-2	A Basic Motor Fuels Testing Laboratory	158

ORDER OF PRESENTATION

The consent calendar was first presented and adopted. Separate votes of the NCWM were requested on Items 210-1A, 210-1B, 211-2, 213-2, 214-1, and 230-2. The results of voting are summarized in Table C. The details of the voting on Item 210-1B are described at the end of that Item.

Table C  
VOTING RESULTS

Reference Key No. or Subject	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
Consent calendar	46	0	68	0	Passed
210-1A	48	0	68	0	Passed
210-1B, To con- sider amendment	11	31	15	46	Failed
210-1B, To end debate	45	1	67	3	Passed
210-1B, As pre- sented by Committee	46	1	63	10	Passed



Table C (Continued)  
VOTING RESULTS

Reference Key No. or Subject	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
211-2	40	4	74	0	Passed
213-2	48	0	74	2	Passed
214-1	44	2	61	12	Passed
230-2	45	0	69	2	Passed
Report in its entirety	48	0	68	0	Passed

Much of the report contains recommendations to revise or amend National Bureau of Standards (NBS) Handbook 130, 1987 edition, "Uniform Laws and Regulations", or NBS Handbook 133, Second Edition, "Checking the Net Contents of Packaged Goods." Proposed revisions to the handbooks are shown in **bold face print** by ~~crossing out~~ what is to be deleted, and underlining what is to be added. Entirely new sections proposed for the handbooks are designated as such and shown in **bold face print**.

DETAILS OF ALL ITEMS  
(in the order they appear in Table A)

HANDBOOK 130

210-1                    PROPOSED UNIFORM MOTOR FUEL LAW AND REGULATION

(This introduction is an information item.)  
(See also Item 250-2 on the Task Force on Motor Fuels)

During the 71st National Conference Interim Meeting of January 1986, the Task Force on Motor Fuels provided the Laws and Regulations (L&R) Committee with a draft of a Uniform Motor Fuel Inspection Law and a draft Uniform Regulation for Motor Fuel. The Task Force recommended a year's delay in Conference action to allow:

- (1) the American Society for Testing and Materials (ASTM), upon whose standards the drafts are based, to confirm new test methods for oxygenated fuels, and

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- (2) the ethanol industry to evaluate the impact of ASTM P176 "Proposed Specification for Automotive Spark-Ignition Engine Fuel."

The L&R Committee therefore published the proposed law and regulation as an information item in its report at the 71st Annual Meeting, July 1986. (See pages 135-139 of the Report of the 71st NCWM 1986.) The following discussion is based on that version, and the final Committee recommendation is printed in Appendix A.

At the Interim Meeting in January 1987, it was reported to the L&R Committee that ASTM P176 will be letter-balloted this spring by ASTM Subcommittee D02.A on Gasoline. ASTM members generally agree that, if the negative votes on this ballot can be resolved at their June 1987 Meeting, further ballots by higher levels within ASTM (Committee D02 and the Society) can be handled expeditiously.

Most of the oral discussion and written testimony provided at the Interim Meeting centered on Section 2.1. of the Proposed Uniform Regulation for Motor Fuel, which would require gasoline and gasoline-alcohol blends to meet ASTM P176 "Proposed Specification for Automotive Spark-Ignition Engine Fuel." Although ASTM P176 cites Clean Air Act waivers of the U.S. Environmental Protection Agency (EPA), it also states in paragraph 1.3 (of P176), "With regard to fuel properties, including volatility, this specification may be more or less restrictive than the EPA rules, regulations, and waivers."

In fact, EPA waives ASTM volatility limits for blends of unleaded gasoline and ethanol at the present time. The agricultural industry, the ethanol industry, gasoline-alcohol manufacturers, and marketers requested specific language in the Uniform Regulation to recognize the EPA volatility exemption. The Motor Vehicle Manufacturers Association (MVMA) argued that volatility standards should apply uniformly to all gasoline and gasoline-alcohol blends for the benefit of the motoring public. While the Committee is sympathetic to the concerns of the MVMA, it cannot recommend adoption of a national standard in direct conflict with EPA requirements. In January, the Committee therefore drafted the following text to add to the end of the first sentence in Section 2.1.: "except that volatility standards for unleaded gasoline blends containing up to 10% ethanol shall not be more restrictive than those adopted under the EPA Clean Air Act waivers." This wording would alert states to the existence of the EPA waivers. It would also permit those states that adopt the regulation to track the EPA waivers as they change over time. For this reason, the Committee also recommends deleting the second sentence in Section 2.1. (concerning a maximum oxygen content of 3.7% by weight) because EPA waivers for gasoline-alcohol blends beyond this amount have been withdrawn.

The following editorial corrections were also made to the regulation:

- (1) A definition for "diesel fuel" was added.
- (2) Section 2.3. on kerosene was deleted since such motor fuel would be sold as diesel fuel, covered under Section 2.2. of the regulation.

- (3) Section 3. of the regulation is identical to Section 2.19. of the Uniform Regulation for the Method of Sale of Commodities. Changes were to Sec. 2.19. at the 71st NCWM are reflected in Section 3.

**210-1A V PROPOSED UNIFORM MOTOR FUEL INSPECTION LAW**

(This item was adopted.)

The Committee recommends adoption of the Uniform Motor Fuel Law as printed on pages 144 through 146.

**210-1B V PROPOSED UNIFORM REGULATION FOR MOTOR FUEL**

(This item was adopted; further information concerning the vote follows the text.)

The Committee is pleased to report that ASTM standard P176 was favorably balloted by Subcommittee D02.A at its June meeting, and that P176 will go forward to full committee ballot (Committee D02) this fall. P176 will be assigned an ASTM number when it goes to full membership ballot, but that is not expected until early spring of 1988. However, the Committee has heard from several states that are anxiously awaiting NCWM recommendations in order to begin legislative work. The Committee believes that ASTM P176 will eventually be the proper standard for states to adopt, but because of the timing of the NCWM vote as relative to the final ASTM vote, the proposed uniform regulation can reference only the "most recently adopted ASTM standard" (currently ASTM D439). The explicit intent of the Committee is that this reference will be editorially changed in the next edition of H-130 following full ASTM adoption of P176. This approach ensures that the regulation will, from the outset, incorporate a fully adopted and recognized ASTM standard.

The Committee believes that a broader reference to the Clean Air Act needs to be made in the proposed regulation since EPA rule-making may take the form of new rules and regulations promulgated by EPA (not just Clean Air Act waivers). The Committee is also convinced that standards must be imposed on any base gasoline used in blending with ethanol. Therefore, for the above reasons, the Committee recommends the following revision to the Uniform Regulation for Motor Fuel, Section 2.1. as proposed at the Interim Meeting:

- 2.1. Spark-ignition motor fuel (as defined in this regulation) shall meet ~~ASTM-P176-Proposed Specification for Automotive Spark-Ignition Engine-Fuel<sup>1</sup>~~, the most recently adopted ASTM standard<sup>1</sup> for spark ignition motor fuel, except that volatility standards for unleaded gasoline blends containing up to 10% 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, EPA Clean Air Act-waivers provided that the gasoline used in the blend meets the volatility specifications of ASTM for the area and season in which the blend is sold.

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<sup>1</sup>This language will be revised editorially when ASTM P176 is adopted and assigned an ASTM number.

**With this revision, the Committee recommends the Uniform Regulation for Motor Fuel printed on page 147.**

An amendment was offered from the floor to delete all text after "the most recently adopted ASTM standard for spark ignition motor fuel." The motion to hear the amendment was defeated. Discussion resumed on the item as offered by the Committee. After considerable discussion, a motion was made to end the debate. The motion carried. Then the vote was taken on the item as presented by the Committee. The item was adopted.

#### UNIFORM WEIGHTS AND MEASURES LAW

##### 211-1 PROPOSED SECTION 1.10. NET WEIGHT

(This is an information item.)

Section 1.2. of the Uniform Weights and Measures Law defines "weight":

"The term 'weight' as used in connection with any commodity means net weight..."

The term "net weight" is not defined.

The State of North Carolina found the definition<sup>1</sup> in Black's Law Dictionary<sup>2</sup> not entirely satisfactory for a particular problem they faced. For retailers selling wrapped candy from bulk displays, merely deducting the tare weight of the poly bag filled by the consumer does not satisfy the requirement to sell by net weight: a deduction for the individual piece coverings must also be made. The Committee deliberated on a draft definition as follows:

- 1.10. Net Weight. -- The term "net weight" means the weight of a commodity or collection of commodities, excluding any material(s) or substance(s) not considered to be part of the commodity, including, but not limited to containers, bags, wrappers, packaging materials, labels, individual piece coverings, decorative accoutrements, coupons, etc.

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<sup>1</sup>Net Weight. The weight of an article or collection of articles, after deducting from the gross weight the weight of the boxes, coverings, casks, etc., containing the same. The weight of an animal dressed for sale, after rejecting hide, offal, etc.

<sup>2</sup>Black, H. C., Black's Law Dictionary, Fifth Edition, West Publishing Co., St. Paul, MN, 1979.



This proposal was discussed within the context of several issues.

1. It is the intent of this proposed definition to include truck loads of commodities, not just packages ("containers").
2. It is not the intent to define the net weight of packaged goods as requiring dry tare. ("...excluding... substance(s) not considered to be part of the commodity" could just as well be interpreted as excluding liquids not considered part of the commodity at the time of sale.)
3. It is also the intent to permit more specific definitions as the occasion warrants. ("...material(s)...not considered... part of the commodity" might include dirt or "foreign material" in a commodity.)

Although it is inconvenient to go elsewhere to define net weight, the Committee is not prepared to carrying this definition forward for Conference action without serious review. The Committee does not want to create unnecessary problems.

Therefore, the Committee would like comments on:

- (1) the relative need to include the definition of net weight in the law; and
- (2) potential misinterpretations to which the draft definition above might be subject.

## 211-2 V SECTION 22. OFFENSES AND PENALTIES

(This item was adopted.)

Section 22.(a) of the Uniform Weights and Measures Law specifies that no person shall use or have in possession for use in commerce any incorrect weight or measure. The Committee recommends that this subsection be expanded to prohibit the sale of incorrect weights or measures.

Enforcement problems occur when companies, upon occasion, have been found routinely selling and installing incorrect devices. When the weights and measures official finds such devices, the law allows citation only against the user, not against the seller: the law prohibits the use of incorrect devices, but not their sale. The Committee members believe that businesses should be protected from purchasing equipment that ought not to be offered for sale. Representatives of scale manufacturers expressed some concern with the recommendation because they have no control over the application of a scale (which could make the scale "incorrect"). The Committee believes that the addition to the law would be a useful tool against repeated intentional sales of incorrect devices, but (as always) it will require careful application of the law to avoid problems suggested by the scale manufacturers. This recommendation would permit a jurisdiction to take appropriate action against the seller of an incorrect device and would strengthen type evaluation requirements in the law.



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The Scale Manufacturers Association (SMA) asked whether the recommendation proposed by the Committee is legal. A careful review of the question posed by the SMA leads the Committee to conclude that its recommendation is legally sound based on the following rationale:

Section 12 of the Uniform Weights and Measures Law sets out the powers and duties of the director of the department of weights and measures of a state or other governmental unit. In particular, Section 12.9. authorizes the director to inspect and test weights and measures "offered or exposed for sale." Further, under Section 13 of the Uniform Law, the director has certain special police powers, including those which authorize the seizure, for use as evidence, of any incorrect or unapproved weight or measure "offered, or exposed for sale or sold in violation of the provisions of this Act or regulations promulgated pursuant thereto." (Section 13.3.). In addition, the director is authorized under Section 13.5. to "arrest ... any violator of this Act."

The Uniform Weights and Measures Law specifies powers and duties and special police powers of the director in Sections 12 and 13 as indicated above. NBS Handbook 44 delineates requirements in the form of specifications and tolerances that weighing and measuring devices must meet. However, the sale, or offer for sale, for use in commerce of incorrect weighing and measuring devices is not specifically listed as a prohibited act in Section 22 "Offenses and Penalties" in the Uniform Weights and Measures Law. Accordingly, the Committee recommends that Section 22 be expanded to prohibit the sale of incorrect weights or measures as a logical and appropriate step to improve the Uniform Law. In that connection, it should be noted that this addition to the "Offenses and Penalties" section is similar to provisions in the laws of a number of states, including Maryland, West Virginia, Wisconsin, California, and Illinois.

As a criminal statute, this would be strictly interpreted. A jurisdiction seeking to enforce this provision would have to show that the seller knowingly sold or offered for sale for use in commerce an incorrect weight or measure. Under this addition to Section 22, a seller would not be responsible, for actions taken by the purchaser or distributor, in which the seller did not participate or have prior knowledge. Thus, the seller would not be liable:

- (1) if a purchaser or distributor modified a scale obtained from a seller; or,
- (2) if a scale were used in trade after the seller informed the purchaser that the scale was not appropriate for that use.

In cases such as those noted above, the Committee feels that the seller would be protected from prosecution. Only sellers who knowingly violate the provision would be subject to prosecution. The Committee therefore recommends the following revision to Section 22:

**Any person who violates the following enumerated provisions or any provision of the Act or regulations promulgated pursuant thereto, for which a specific penalty has not been prescribed, shall be guilty of a misdemeanor,**

and upon a first conviction thereof shall be punished by a fine of not less than \$50 or more than \$500, or by imprisonment for not more than three months, or both. Upon a subsequent conviction thereof, he shall be punished by a fine of not less than \$100 or more than \$1,000 or by imprisonment for up to one year, or both. No person shall:

- (a) Use or have in possession for use in commerce any incorrect weight or measure.
- (b) Sell or offer for sale for use in commerce any incorrect weight or measure.
- (c)~~(b)~~ Remove any tag, seal, or mark from any weight or measure without specific written authorization from the proper authority.
- (d)~~(c)~~ Hinder or obstruct any weights and measures official in the performance of his duties.

#### UNIFORM WEIGHMASTER LAW

212

#### UNIFORM WEIGHMASTER LAW

(This is an information item.)

The Committee sent out a questionnaire to state directors concerning the status of adoption of the NCWM Uniform Weighmaster Law by each state and asked for recommendations for necessary amendments to the law.

Forty-eight responses (out of fifty-three) were received. The Committee thanks all those who assisted in this data collection.

The Committee plans to present a full report of its survey at the 1988 Interim Meeting, together with recommendations for Conference action.

Recommendations for revision that have been received to date include those listed below.

1. Require all users of large capacity devices (not just weighing devices) to be licensed.
2. Require all weighing to be done by licensee (grocery stores, etc.).
3. Require those who "certify correct quantities" (for example, calibrate a vehicle tank) to be licensed.
4. Add civil penalties for minor infractions, rather than making every offense a criminal offense.
5. Add appeal rights.
6. Better define when a public weighmaster is required.

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7. Require that all bulk commodities intended for sale and loaded into a vehicle must be weighed by a licensed public weighmaster before delivery and that the original weight certificate must be presented to the purchaser at the time of delivery.
8. Require that a tare be determined for every weighment.
9. Eliminate requirements that a public weighmaster:
  - a. be or intend to become a U.S. citizen (Section 3);
  - b. be a state resident (Section 3);
  - c. be a minimum of 21 years of age (Section 3); and
  - d. take an oath (Section 9).
10. Eliminate requirements that:
  - a. the license have a rigid date of expiration (Section 8); and
  - b. the scale be inspected annually by a weights and measures officer (Section 12).
11. Require the seal to be applied over the weighmaster's signature (Section 9).
12. Change "carbon" copy to "duplicate" copy (Section 14).

Preliminary results show that more than 30% of the respondents do not have weighmaster requirements. Only 20% of those who reported having requirements, reported any suspensions or revocations of a license in the last 10 years, with only 4 convictions. Perhaps of greater significance, the responses from 20% of the jurisdictions indicate inadequate staff to enforce a law that is perceived to be of low priority or only a revenue-generating requirement.

The Committee recommends that this item be carried over.

## UNIFORM PACKAGING AND LABELING REGULATION

### 213-1 VC      **PROPOSED SECTION 2.9. DEFINITION OF "PETROLEUM PRODUCTS"**

(This item was adopted as part of the consent calendar.)

(This was a carry-over item and was Item 213-1 in the 71st NCWM.)

The Committee was asked to define packaged "petroleum products", which would be subject to the reference temperature of 60 °F in the Uniform Packaging

and Labeling Regulation, Section 6.5.(b), 6.6.(b), 7.4.(b), and 7.5.(b). Products that have been questioned include: brake fluid, copier machine dispersant, antifreeze, cleaning solvents, sewing machine lubricant, camping fuel, alcohol, and synthetic motor oil. Certain companies noted that some cleaning solvents are referenced to 68 °F when sold at retail to consumers, but that the reference temperature is 60 °F when the same product is sold in 55-gallon drums. The State of California noted that some camping fuels were intended to power "pressurized" camping equipment, such as lights and stoves, should also be subject to the 60 °F reference temperature.

The Committee therefore recommends that the following definition be added to the Uniform Packaging and Labeling Regulation:

- 2.9. PETROLEUM PRODUCTS.** - The term "petroleum products" shall be construed to mean gasoline, diesel fuel, kerosene, or any product (whether or not such a product is actually derived from naturally occurring hydrocarbon mixtures known as "petroleum") commonly used in powering, lubricating, or idling engines or other devices, or is labeled as fuel to power camping stoves or lights. Therefore, sewing machine lubricant, camping fuels, and synthetic motor oil are "petroleum products" for the purposes of this regulation. Brake fluid, copier machine dispersant, antifreeze, cleaning solvents, and alcohol are not "petroleum products."

**213-3 VC SECTION 10.9.2. TEXTILES**

(This item was adopted as part of the consent calendar.)

A consumer products firm that manufactures furniture in European standard sizes also supplies packaged bed sheets for its beds. The dimensions of its mattresses differ from U.S. sizes customarily known as "twin," "double," etc. Since the dimensions of the mattresses for which the sheeting and blankets have been designed are not equivalent to U.S. dimensions, it had been recommended to the Committee that a specific exemption for this type of product be added.

The American Textile Manufacturers Institute, Inc. and the International Sleep Products Association requested retention of the NCWM recommended requirement to provide the name designation for bed sheets and pillowcases that now exists in subparagraphs (a), (b), and (c). The Committee is convinced that the consumer uses and needs these name designations ("twin", "king", etc.) in identifying these products, that consumers do not bring the exact measurements of their mattresses with them when they shop for sheets, and that consumer confusion would result if these name designations were not required wherever appropriate. (Sheeting designed for mattress sizes different from ASTM standard sizes would not need to bear such name designations.) The Committee also recommends editorial changes to reverse the order of recommended units from "centimeters or inches" to "inches or centimeters," and changing the examples to inches. Therefore, the following revision to Section 10.9.2. is recommended:



- (a) The quantity statement for fitted sheets and mattress covers shall state, in inches or centimeters ~~or-inches~~, the length and width of the mattress for which the item is designed, and the size designation of the mattress if the item is intended to fit a mattress identified such as "twin," "double," "queen," "king," "California king," etc. (Example: "Double Sheet for 54 inch x 75 inch 135-centimeter ~~x 190 centimeter~~ mattress.")
- (b) The quantity statement for flat sheets shall state, ~~the size designation of the mattress for which the sheet is designed, such as "twin," "double," "king," etc.--~~ The quantity statement also shall state in inches or centimeters or-inches, the length and width of the mattress for which the sheet is designed, followed in parentheses by a statement, in inches or centimeters or-inches, of the length and width of the finished sheet. The quantity statement shall also state the size designation of the mattress for which the sheet is designed, such as "twin," "double," "queen," "king," "California King", if the item is so designed. (Example: "Twin Flat Sheet for 39 inch x 75 inch ~~100-centimeter x 190-centimeter~~ mattress (66 inch x 96 inch finished size).")
- (c) The quantity statement for pillowcases shall state ~~the size designation of the pillow for which the pillowcase is designed, such as "youth," "standard," and "queen," etc.--~~ The quantity statement also shall state in inches or centimeters or-inches, the length and width of the pillow for which the pillowcase is designed, followed in parentheses by a statement, in inches or centimeters or-inches, of the length and width of the finished pillowcase. The quantity statement for pillowcases shall also state the size designation of the pillow for which the pillowcase is designed, i.e., "youth," "standard," "queen," etc., if the item is so designated. Example: "Standard Pillowcase for ~~20 inch x 26 inch 50-centimeter x 66-centimeter~~ pillow (20 inch x 30 inch ~~53-centimeter x 75-centimeter~~ finished size).")

213-2 V      PROPOSED SECTION 11.4. SMALL PACKAGES OF MEAT OR MEAT PRODUCTS

(This item was adopted.)

United States Department of Agriculture (USDA) regulations for meat do not require individually wrapped and labeled packages of less than 1/2 ounce to bear a net weight statement if the shipping container bears a net weight statement. 9CFR 317.2(9)(i) states:

Individually wrapped and labeled packages of less than 1/2-ounce net weight which are in a shipping container, need not bear a statement of net quantity of contents as specified in this paragraph (h) when the statement of net quantity of contents of the shipping container meets the requirements of this paragraph (h):



The Uniform Packaging and Labeling Regulation only exempts confectionery and foods not intended for sale at retail. It is recommended that the Regulation specifically acknowledge the exemption for meat packages of less than 1/2 ounce as well.

The Committee therefore recommends that the following subsection be added to the Uniform Packaging and Labeling Regulation, and that all subsequent subsections in Section 11 be renumbered:

- 11.4.        **SMALL PACKAGES OF MEAT OR MEAT PRODUCTS.** - Individually wrapped and labeled packages of meat or meat products of less than 1/2-ounce net weight, which are in a shipping container, need not bear a statement of the net quantity of contents when the statement of the net quantity of contents on the shipping container is in conformance with the labeling requirements of this regulation.

213-4    W        LABELING OF NONALCOHOLIC MALT BEVERAGES

This item was referred to the Liaison Committee for action. See Item 515 in their report.

213-5        EDITORIAL REVIEW OF THE UNIFORM REGULATION

(This is an information item.)

The State of Virginia had its packaging and labeling regulation reviewed by an expert in the use of the English language. Several recommendations for rewording for clarity were made as a result of this review. Since Virginia's packaging and labeling regulation is identical to the Uniform Packaging and Labeling Regulation, Virginia Weights and Measures has passed the results of this review along to the Committee. The Committee will study the recommendations during the coming year. Editorial revisions based on this review will be proposed next year. This item will be carried over.

UNIFORM REGULATION FOR THE METHOD OF SALE OF COMMODITIES

214-1    V        SECTION 1.2.    BREAD

(This item was adopted.)

A 12-oz size for bread has been proposed to be added to Section 1.2. of the Uniform Regulation for the Method of Sale of Commodities. The reasons given for this proposal are:

- (1) because U.S. household size is declining, and the total number of meals consumed at home per week is declining, consumers want smaller portioned bread; and

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- (2) weights and measures jurisdictions have not enforced bread weight restrictions on in-store bakeries producing unwrapped breads, leading to an unfair competitive advantage for in-store bakeries that are allowed to respond to consumer needs for smaller portion bread sizes.

At the Interim Meetings, two other suggestions were discussed:

- (1) eliminating bread sizes altogether; or
- (2) eliminating the terminology of "loaf" because specialty breads consisting of segments of much larger loaves are better termed "units," rather than "loaves."

The Committee heard strong opposition from several weights and measures jurisdictions to the suggestion of dropping all bread sizes. It was argued that bread is a basic commodity, and the food shopper has strong expectations for standardized sizes in staples such as milk, butter, flour, and bread. On the other hand, several weights and measures officials contended that the method of sale restrictions in their states were a result of direct requests of the bakery industry.

The Committee is committed to retaining the size restrictions because there is no jurisdiction with unit pricing requirements that extend to small stores, where much bread is sold.

When the Committee examined the suggestion of eliminating the term "loaf" and "twin or multiple loaf," it was faced with defining "bread." For example, bread sticks are not ordinarily considered "bread." The Committee decided to include wording so that portions of loaves which are prepackaged as a "unit" are covered under this method of sale.

The Committee reminds weights and measures officials that Section 1.2. pertains to both packaged and unpackaged bread ("..whether or not wrapped...").

The Committee recommends the following change to Section 1.2:

- 1.2. **BREAD.** - Each loaf and each unit of a twin or multiple loaf made or procured for sale, kept, offered, exposed for sale, or sold, whether or not wrapped or sliced, and each portion of a loaf that is prepackaged, shall have a weight per subsection 1.2.(a) or subsection 1.2.(b); provided, that the provisions of this section shall not apply to biscuits, buns, or rolls of inch-pound sizes 4 ounces or less or of metric sizes 100 grams or less, or to "stale bread" sold and expressly represented at the time of sale as such, and when so sold, the wrappers shall be deemed not to be packages for labeling purposes.
  - (a) **Inch-Pound Weights.** - 1/2 pound, 3/4 pound, 1 pound, 1-1/2 pounds, or a multiple of 1 pound.
  - (b) **Metric Weights.** - 250 grams, 375 grams, 500 grams, 750 grams, or a multiple of 500 grams.

**214-2 VC SECTION 1.7. OTHER MILK PRODUCTS**

(This item was adopted as part of the consent calendar.)

Editorial corrections are proposed to clarify the meaning of this section. The term "multipack" is not defined; the term "multi-unit package" as defined in Section 2.8. of the Uniform Packaging and Labeling Regulation, is recommended to replace the term "multipack". In addition, the question arises from time to time of whether the proviso of 6 ounces or less applies to the total net weight of the multi-unit package or only to the net weight of single servings in the multi-unit package. It is clear from study of past Conference reports that the requirement is to apply to the single servings.

Therefore, the Committee recommends the following revision to this section:

- 1.7. OTHER MILK PRODUCTS.** - Cottage cheese, cottage cheese products, and other milk products that are solid, semi-solid, viscous, or a mixture of solid and liquid, as defined in the Pasteurized Milk Ordinance of the U.S. Public Health Service, as amended in 1965, shall be sold in terms of weight; provided, that cottage cheese, cottage cheese products, sour cream, and yogurt shall be packaged for retail sale only in weights per subsection 1.7(a) or subsection 1.7(b), and provided further, that the total net weight of multi-unit packages need not comply with subsections 1.7(a) or (b) if their individual units comply. ~~Multipack or single serving inch-pound sizes of 6 ounces or less shall be sold only in whole ounce increments, and that metric sizes of 200 grams or less shall be sold only in 25 gram increments.~~

- (a) Inch-Pound Weights - 1, 2, 3, 4, 5, 6, 8, 12, 16, 24, 32, 64, 80, and 128 ounces avoirdupois.
- (b) Metric Weights - 25, 50, 75, 100, 125, 150, 175, 200, 250, 375, 500, 750 grams; 1, 2, and 4 kilograms.

**214-3 VC SECTION 1.9. PRICING OF BULK FOOD COMMODITIES**

(This item was adopted as part of the consent calendar.)

It has been recommended that this section be clarified so that display price signs, window ads, and newspaper ads also be required to indicate the price in whole units and not in common or decimal fractions. The additional wording would make unambiguous the Conference position adopted at the 60th and 61st Annual Meetings that advertising only a price per quarter pound, as is still practiced at many delicatessen counters, needs to be changed to advertising per whole pound. It is thought that the term "pricing" in this section has been interpreted as merely requiring a device that computes per pound. The Committee recommends the following revision:

**1.9. ADVERTISING AND PRICING PRICE COMPUTING OF BULK FOOD COMMODITIES. -**

- 1.9.1. PRICE COMPUTING.** - The price of b-Bulk food commodities or food commodities not in package form and sold by weight shall be priced computed in terms

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of whole units of weight( i.e., pounds, ounces, grams, kilograms, etc.) and not in common or decimal fractions.

- 1.9.2. PRICE ADVERTISING. - The price of bulk food commodities or food commodities not in package form and sold by weight shall be advertised or displayed in terms of whole weight units of pounds or kilograms only, not in common or decimal fractions or in ounces. A supplemental declaration in common or decimal fractions, or in ounces in print no larger than the whole unit price, is permitted.**

214-4 SECTION 2.3.3. QUANTITY (OF FIREPLACE AND STOVE WOOD-  
WOOD CHIPS OR LIKE PRODUCTS USED FOR SEASONING)

(This is an information item.)

The Committee has been asked to include the proper method of sale of packaged wood chips, such as hickory or mesquite, used for barbecue seasoning or flavoring in Section 2.3.3. of the Uniform Regulation for the Method of Sale of Commodities. Section 2.3.3. does not now cover wood chips; it only covers logs.

The Committee members agree that Section 2.3.3. needs editorial work. It now covers fuel wood sold from bulk, single logs, and packaged logs. Several new products, including pelletized wood chips used for stove fuel and wood shavings, were brought to the attention of the Committee. In addition to a method of sale by weight or volume, the Committee will also address test methods and appropriate units to be declared on the label. The Committee will carry this item over until next year.

**214-5 VC SECTION 2.12. POLYETHYLENE PRODUCTS**

(This item was adopted as part of the consent calendar.)

See also Item 230-3 on polyethylene sheeting.

Different labeling requirements currently apply to sheeting and film depending upon whether they are consumer or nonconsumer products. For consumer sheeting and film, declaration of the area in square feet or square meters is required. The area statement is not required for nonconsumer sheeting and film products. Because nonconsumer polyethylene products are commonly found in retail consumer outlets, the Committee recommends that an area declaration be required, whether or not the sheeting or film is intended as a consumer product.

The Committee also recommends adding the requirement to label the thickness in terms of mils (0.001 in) since this is the longstanding trade custom that should be continued in order to avoid confusion on the part of the purchaser. Finally, the Committee recommends requiring the declaration of the capacity of bags, since this is already contained in Section 10.8.2. of the Uniform Packaging and Labeling Regulation. The proposed revision to Section 2.12. is as follows:



2.12. POLYETHYLENE PRODUCTS. -

2.12.1. Consumer and nonconsumer products offered and exposed for sale at retail shall be sold in terms of as given in subsection 2.12.1.1.

2.12.1.1. SHEETING AND FILM. -

- (a) length and width
- (b) area in square feet or square meters
- (c) thickness in mils
- (d) weight

2.12.2. Consumer products offered and exposed for sale at retail shall be sold in terms as given in subsections 2.12.2.1., 2.12.2.2., and 2.12.2.3.

2.12.2.1. FOOD WRAP. -

- (a) length and width
- (b) area in square feet or square meters

2.12.32.2. LAWN AND TRASH BAGS. -

- (a) count
- (b) dimensions
- (c) thickness in mils
- (d) capacity<sup>1</sup>

2.12.42.3. FOOD AND SANDWICH BAGS. -

- (a) count
- (b) dimensions
- (c) capacity<sup>1</sup>

The capacity statement does not apply to fold-over sandwich bags.

2.12.3. Products not intended for to be offered or exposed for sale at the retail consumer shall be offered and-exposed-for-sale sold in terms of as given in subsection 2.12.3.1.:

~~2.12.5.-- SHEETING-AND-FILM: -~~

- ~~(a)--length~~
- ~~(b)--width~~
- ~~(c)--thickness~~
- ~~(d)--weight~~

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<sup>1</sup>See Section 10.8.2. of the Uniform Packaging and Labeling Regulation.



**2.12.6.3.1. BAGS. -**

- (a) count
- (b) dimensions
- (c) thickness in mils
- (d) weight
- (e) capacity<sup>1</sup>

**2.12.7.4. DECLARATION OF WEIGHT. -** The labeled statement of weight for polyethylene products under sections 2.12.1.1., ~~2.12.5.~~, and ~~2.12.6.~~ 2.12.3.1. shall be not less than the weight calculated by using the following formula:

$W = T \times A \times 0.03613 \times D$ , where

W = net weight in pounds

T = nominal thickness in inches

A = nominal length in inches times nominal width<sup>2</sup> in inches

D = density in grams per cubic centimeter as determined by ASTM Standard D1505-68 "Standard Method of Test for Density of Plastics by the Density Gradient Technique" (or latest issue)

0.03613 is a factor for converting g/cm<sup>3</sup> to lb/in<sup>3</sup>.

214-6                      PROPOSED SECTION 2.15. COMPRESSED OR LIQUEFIED GASES  
IN CYLINDERS.

(This is an information item.)

The Thermophysics Group of the National Bureau of Standards has worked closely with the Compressed Gas Association to produce a set of tables (published in NBS Technical Note 1079) that the bottled gas industry uses when declaring the net contents of products such as acetylene, oxygen, argon, helium, etc. In order to get these tables uniformly recognized as the national standard, the Compressed Gas Association has asked that these tables be referenced in NBS Handbook 130, "Uniform Laws and Regulations," and in NBS Handbook 133, "Checking the Net Contents of Packaged Goods." The NBS Office of Weights and Measures also receives frequent requests for information on testing gas cylinders safely and with respect to accuracy of labeling. OWM generally references State of California procedures for use in the testing of gas cylinders.

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<sup>1</sup>See Section 10.8.2. of the Uniform Packaging and Labeling Regulation.

<sup>2</sup>The nominal width for bags in this calculation is twice the labeled width.

Section 2.15. addresses only LP Gas cylinders. It is proposed to expand the language in the section to include all compressed or liquefied gases in cylinders, including products such as liquefied petroleum gases, acetylene, oxygen, argon, nitrogen, helium, and hydrogen. The proposal has been patterned after California's requirements.

Several related issues were discussed at the Interim Meeting. California Weights and Measures recommended reducing the current allowable difference (1%) between the actual tare weight and the stamped tare weight of cylinders (section 2.15.) to 1/4%, and to apply this to all cylinders of compressed gases. The Committee believes that the allowable difference should be retained at 1% because the U.S. Department of Transportation uses that level. It also needs to be clarified that this proposal is intended to apply only to refillable cylinders, and specifically exempts disposable cylinders. California Weights and Measures also recommended that Gas be sold only by weight because, as a mixture of substances, it cannot be tested by weight and converted to volume. Industry representatives pointed out that filling by volume is the only feasible means for permanently installed cylinders and very large cylinders. Therefore, the Committee recommends at this time that LP Gas sales be permitted both by weight and volume.

The Committee is ready to recommend the substantial changes to Section 2.15. printed below, but feels that a complete test procedure must be incorporated into Handbook 133 to permit safe testing of cylinders. The Compressed Gas Association has volunteered to review the test procedures used in California, to propose additional precautions and procedures to protect the less experienced testing official, and to address the full range of product cylinder sizes. The Committee intends to propose this revision plus testing procedures to be incorporated into H-133 next year. The Committee provides the following proposed revision of Section 2.15. for information only:

2.15.        COMPRESSED OR LIQUEFIED GASES IN REFILLABLE CYLINDERS

This Section does not apply to disposable cylinders of compressed or liquefied gases.

2.15.1.    NET CONTENTS. - The net contents shall be expressed in terms of cubic feet or cubic meters; pounds and ounces; or kilograms. A standard cubic foot of gas is defined as a cubic foot at a temperature of 70 °F and a pressure of 14.696 psia (or metric equivalent) except for liquefied petroleum gas as stated in Section 2.20.

2.15.2.    CYLINDER LABELING. - Whenever cylinders are used for the sale of compressed or liquefied gases by weight, or are filled by weight and converted to volume, the following shall apply:

2.15.2.1.    LIQUEFIED-PETROLEUM-GAS-CYLINDER-TARE-WEIGHTS-Whenever stamped tare weights on cylinders are employed in the sale of liquefied petroleum gas, the following shall apply: The tare weight shall be legibly and permanently stamped or stenciled on the cylinder. All tare weight values shall be preceded by the letters "TW" or the words "tare weight". The tare weight shall include the weight of the cylinder (including paint), valve, and other permanent

attachments. The weight of a protective cap shall not be included in tare or gross weights.

- 2.15.1.(a) ALLOWABLE DIFFERENCE. - The allowable difference between the actual tare weight and the stamped (or stenciled) tare weight for a new or used cylinder shall be one percent of the actual tare weight. The tare weight shall include the weight of the cylinder (including paint), valve, and other permanent attachments. The weight of a protective cap shall not be included in tare or gross weights.
- 2.15.2.(b) AVERAGE REQUIREMENT. - The tare weights of cylinders at a single place of business found to be in error predominantly in a direction favorable to the seller and near the allowable difference limit shall be considered to be not in conformance with these requirements.
- 2.15.2.2. ACETYLENE GAS CYLINDER TARE WEIGHTS. - Acetone in the cylinder shall be included as part of the tare weight.
- 2.15.2.3. ACETYLENE GAS CYLINDER VOLUMES. - The volumes of acetylene shall be determined from the product weight using approved tables such as those published in NBS Handbook 133 or those developed using 70 OF and 14.7 cu ft per pound at one atmosphere as conversion factors.
- 2.15.2.4. COMPRESSED GASES SUCH AS OXYGEN, ARGON, NITROGEN, HELIUM, AND HYDROGEN. - The volumes of compressed gases such as oxygen, argon, nitrogen, helium, and hydrogen shall be determined using the tables and procedures given in NBS Technical Note 1079, Tables of Industrial Gas Container Contents and Density for Oxygen, Argon, Nitrogen, Helium, and Hydrogen supplemented by additional procedures and tables in NBS Handbook 133.

**214-7 VC SECTION 2.17. BARK MULCH**

(This item was adopted as part of the consent calendar)

The Committee discussed broadening the scope of this section from bark mulch only to all mulch. The present section requires that bark mulch be sold in terms of volume measure. Many competing types of mulch, two examples being "hardwood mulch" and "cypress mulch," are now labeled by weight. The consumer is unable to make a value comparison between these similar, competing items and bark mulch.

At the Interim Meeting, the National Bark Producers Association supported the inclusion of all mulch in this section and recommended a definition to clarify

which products are to be considered as mulch and therefore subject to a volumetric declaration.

The Committee recommends the following revision to Section 2.17:

**2.17. BARK MULCH**

**2.17.1. DEFINITION**

**2.17.1.1. MULCH. -- Any product or material except peat or peat moss (see Section 2.4.) that is advertised, offered for sale, or sold for primary use as a horticultural, above-ground dressing, for decoration, moisture control, weed control, erosion control, temperature control, or other similar purposes.**

**2.17.2. QUANTITY. -- All bark mulch shall be sold, offered, or exposed for sale in terms of volume measure: in inch-pound units in terms of the cubic yard or cubic foot; in metric units in terms of the cubic meter or liter.**

214-8                      **SECTION 2.20. LIQUEFIED PETROLEUM GAS**

(This is an information item.)

At the 71st Annual Meeting, 1986, the Conference adopted a new section (2.20) to the Uniform Regulation for the Method of Sale of Commodities requiring that LP Gas be sold on a temperature-compensated basis. The original proposal for the sale of LP Gas vapor would have required both temperature and altitude compensation (using the definition for the standard cubic foot of vapor taken from Section 3.33. LPG VAPOR-MEASURING DEVICES of NBS Handbook 44). However, at the 71st Annual Meeting, industry representatives indicated that atmospheric pressure corrections are not applied in every state. The Committee therefore recommended and the Conference adopted a "metered cubic foot" standard corrected to 60 °F for vapor. The purpose of that Committee recommendation was to move ahead with temperature compensation requirements while providing industry an opportunity to make recommendations concerning requirements for atmospheric pressure corrections. The National LP Gas Association has conducted a survey on the practice and the need for altitude corrections, and has reported the results of its findings to the Committee.

Only four states were identified as enforcing requirements to make altitude adjustments (California, Hawaii, Idaho, and New Mexico).

Although the use of vapor meters for LP Gas sales is not widespread (mainly in mobile home parks), the Committee believes that weights and measures officials should be reminded that paragraph UR.2.3. of Section 3.33. in Handbook 44 requires altitude correction in billing. To emphasize the relative importance of



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this correction, Table 1 from NBS Handbook 117, "Examination of Vapor-Measuring Devices for Liquefied Petroleum Gas," is reprinted below. This table shows that a change in elevation of as little as 500 feet may affect the resulting product delivery by 2%, and that altitude corrections as large as 20% would be commonplace in many Western States.

The Committee will not recommend additions to Handbook 130, but recommends that weights and measures officials enforce existing requirements in H-44.

TABLE 1. *Altitude corrections factors (customary) [8, 9]*

Elevation	Altitude correction factor	Barometric pressure	Product pressure (11 in WC)
<i>feet</i>		<i>psi</i>	<i>psi</i>
— 150 to 400	1.02	14.64	15.04
above 400 to 950	1.00	14.35	14.74
above 950 to 1550	0.98	14.05	14.45
above 1550 to 2100	.96	13.76	14.15
above 2100 to 2700	.94	13.46	13.86
above 2700 to 3300	.92	13.17	13.56
above 3300 to 3950	.90	12.87	13.27
above 3950 to 4550	.88	12.58	12.97
above 4550 to 5200	.86	12.28	12.68
above 5200 to 5850	.84	11.99	12.38
above 5850 to 6500	.82	11.69	12.09
above 6500 to 7200	.80	11.40	11.79
above 7200 to 7900	.78	11.10	11.50
above 7900 to 8600	.76	10.81	11.20
above 8600 to 9350	.74	10.51	10.91
above 9350 to 10100	.72	10.22	10.61
above 10100 to 10850	.70	9.92	10.32
above 10850 to 11650	.68	9.63	10.03
above 11650 to 12450	.66	9.33	9.73
above 12450 to 13250	.64	9.04	9.44
above 13250 to 14100	.62	8.75	9.14
above 14100 to 14950	.60	8.45	8.85



214-9 W MISCELLANEOUS ITEMS: SOUPS SOLD BY VOLUME, ROOFING SHINGLES

(This is an information item.)

Two items were brought to the attention of the Committee, not as specific proposals but as problems that need further clarification and exploration.

(1) Soup is often sold by volume in the salad bar or delicatessen area of supermarkets. Problems cited were: the stores may not provide measure containers for the soup; the purchaser may not be able to fill the container to brim-full even if a measure container is provided; and soup in the salad bar area may be perceived as competing with canned soup that is sold by weight. The Committee did not have time to explore this item in any depth but recommends that regional weights and measures associations consider it, if they feel it has merit. The Committee was of the initial opinion that hot, ready-to-eat soup sold by volume in the delicatessen does not compete with canned or boxed soups sold in other parts of the supermarket.

(2) Roofing shingles have labeled designations that lead purchasers to believe that they are buying by weight, for example "90-pound shingles." It was asked whether this designation refers to an actual weight, a weight per square, or whether "90-pound" reflects quality. Section 2.6.2.2. of the Uniform Method of Sale of Commodities Regulation prohibits the use of weight in the quantity statement or in supplementary quantity declarations. The Committee will communicate directly with the weights and measures official who brought this question to its attention. In the opinion of the Committee, this is an enforcement problem, and does not dictate new or revised wording to NCWM recommendations.

UNIFORM OPEN DATING REGULATION

217-1 VC SECTION 3.4.4. EXPRESSION OF MONTH AND DAY

(This item was adopted as part of the consent calendar.)

When the month is indicated by the first three letters of the month in the "sell by" date, Section 3.4.4. of the Uniform Open Dating Regulation requires the day of the month expressed as a numeral to follow the month designation. It has been suggested that the regulation permit the numeral indicating the calendar day to precede the month when the month is designated by its first three letters. There would be no confusion on the part of the purchaser whether the date were given as "Jan 20" or "20 Jan". Furthermore Section 4.3. of the Open Dating Regulation requires that the day of the month, if used in the "best if used by" date, appear prior to the month, for example "30 Jan 81".

The Committee recommends the following revision:

3.4.4. EXPRESSION OF MONTH AND DAY. - Except as provided for in Section 3.4.1., the date shall be designated by:

(a) the first three letters of the month preceded or followed by a numeral indicating the calendar day, or designated by

- (b) the month represented numerically followed by a numeral designation of the calendar day.**

**The month and day designation shall be separated by a period, slash, dash, or spacing. When a numeral designation of the first nine days of the month is used, the number shall include a zero as the first digit; for example, 01 or 03.**

The Association of Food and Drug Officials (AFDO) has placed this item on its agenda for action at its next annual meeting, so that both the NCWM and AFDO make identical recommendations to states in regard to open dating regulations.

#### HANDBOOK 133

230-1

#### SAMPLING PLANS AND MAVs

(This is an information item.)

The State of New York proposed smaller MAV's and a change to the sampling plans (both Categories A and B) to permit a larger number of short weight packages in any sample to exceed the MAV. The reason given for this proposal is that the MAV's in the present Handbook (Second Edition) are too large. Last year, at the 71st Annual Meeting, the Committee set forth two criteria which the members felt were needed to evaluate proposals to modify the MAV's. These are quoted below from last year's report.

1. The MAV's must be evaluated within the context of the average requirement and the sampling plans they are intended to be used with. The proposed MAV's must be compatible with the sampling plans of Handbook 133. They cannot, for example, be compared directly with the smaller "unreasonable minus errors" of Handbook 67. The Handbook 67 sampling plan permitted one unreasonable minus error in a sample of 10 before the lot was judged out of compliance; Handbook 133 (Category B) permits no package in a sample of 10 to exceed the MAV.
2. The data supporting recommendations for changing the MAV's must:
  - (a) be based on package data that also meet the average requirement; and
  - (b) include hard-to-pack as well as easy-to-pack packages, and standard pack as well as random pack.

Although this year's proposal from New York is framed within the sampling plans in Handbook 133, no actual package lot data was submitted to support the proposal. Therefore, the Committee is not recommending any action on this item, nor is it carrying the item over. Some Committee members expressed the

belief that the average requirement is such a powerful tool in package testing that they cannot understand the need for tightening the MAV's. Easy-to-pack products, such as sugar, may not need as large limits to reasonable variations (MAV's) as hard-to-pack products, such as grapefruit, but the administrative ease of having one set of limits apply to all products far outweighs the benefits of setting tighter limits that apply only to a limited set of products.

**230-2 V      SECTION 1.9. ALLOWANCES FOR VARIATIONS DUE TO MOIS-  
TURE LOSS OR GAIN  
SECTION 2.14. MOISTURE ALLOWANCE  
PROPOSED SECTION 3.17. FLOUR**

(This item was adopted)

Based on the work of the Task Force on Commodity Requirements (see Item 104-6A of the Executive Committee Report), the Executive Committee recommend that the NCWM (1) adopt a policy for weights and measures officials to use in checking packages of flour subject to moisture loss; and (2) incorporate the specific procedures that were used during the Pilot Study conducted in the fall of 1986 into Handbook 133.

Appendix B is provided as a stand-alone document that will be modified slightly to fit the format of H-133.

**The Committee recommends that Appendix B be added to Chapter 3, "Methods of Test for Packages Labeled by Weight," as "Section 3.17. Flour".**

The following additional revisions are proposed:

**Revise Section 1.9. ALLOWANCES FOR VARIATIONS DUE TO MOISTURE LOSS OR GAIN, second paragraph page 1-11 as follows:**

On the basis of technical and regulatory information presently available, the handbook cannot provide definitive moisture allowances; however, it does provide ~~or one~~ procedures (for flour, see Section 3.17.) for determining compliance with those regulations that allow for quantity variations due to moisture loss or gain. (The agencies responsible for such regulations are listed in Table 1-1, page B-1.)

**Revise Section 2.14. Moisture Allowance, by deleting the last sentence on page 2-29. Replace with:**

**See also the procedure given for flour in Section 3.17.**

**230-3 VC SECTION 5.43. POLYETHYLENE SHEETING**

(This item was adopted as part of the consent calendar.)

Polyethylene sheeting is labeled by length and width, area, thickness, and weight. The relationship between the three dimensions (length, width and thickness) and weight is given in Section 2.12.7. of the Uniform Regulation for the Method of Sale of Commodities. It is:

Weight (W) = Thickness (in) x area (in<sup>2</sup>) x density (g/cm<sup>3</sup>) x 0.03613  
where 0.03613 is a factor to convert g/cm<sup>3</sup> to lb/in<sup>3</sup>.

Weights and measures officials' first check of the label is usually for the consistency of the labeled declarations, making sure that the declared net weight is the weight calculated by the formula given above. The question arises as to the density of polyethylene to use in this calculation. The nominal density of polyethylene sheeting and film is 0.92 g/cm<sup>3</sup> for clear product or 0.93 g/cm<sup>3</sup> for black product. These are the most common densities for of these products. The State of California uses a minimum value of 0.915 g/cm<sup>3</sup> and Handbook 133 (page 5-12) recommends a minimum of 0.914 g/cm<sup>3</sup>.

At the Interim Meeting, several polyethylene film packagers showed letters and product literature from their resin suppliers that indicated densities of 0.91 g/cm<sup>3</sup>, (or lower) for the resins used as the basic materials for the film. At that meeting, the packagers did not state the density for the final polyethylene film coming from their packaging lines. Later, data from a private laboratory was submitted to the Committee. Using the ASTM standard method, densities were determined for 15 different clear polyethylene products from four manufacturers; the lowest measured density was 0.9198 g/cm<sup>3</sup>.

The Committee has collected further data on 44 samples of sheeting and film and finds that 0.92 g/cm<sup>3</sup> is the correct minimum density for product marketed at the present time. The Committee realizes that manufacturers may incorporate lower density resins in sheeting and film in the future and stands ready to modify H-133 if necessary.

The Committee believes that this issue is not significant and may cause confusion among weights and measures officials, perhaps making them reluctant to check this product. Every jurisdiction that has tested film finds weight shortages of 10 and 20%, not minor variations in weight that might be attributable to using 0.92 g/cm<sup>3</sup> for a film that is actually 0.915 g/cm<sup>3</sup> in density.

**Therefore, the Committee continues to encourage weights and measures officials to test polyethylene products and use a density of 0.92 g/cm<sup>3</sup> when calculating product weight. The Committee recommends changing the minimum density value for sheeting and film in Handbook 133 to 0.92 g/cm<sup>3</sup>, on page 5-12, last line on the page, as follows:**

**Assume a minimum density (D) of 0.92 ~~0.914~~ g/cm<sup>3</sup>.**



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OTHER ITEMS

250-1 TASK FORCE ON COMMODITY REQUIREMENTS

(This is an information item.)

See Item 230-2 and Appendix B. Also see Item 104-6A of the Executive Committee Report.

250-2 TASK FORCE ON MOTOR FUELS

(This is an information item.)

As part of the Liaison Committee Report at the 71st Annual Meeting (see Report of the 71st NCWM 1986, p. 235), the Task Force on Motor Fuels announced plans to provide specifications for a basic fuels testing laboratory. Appendix C provides these specifications, including types of tests, equipment, number of personnel, building size, and estimated costs.

A. Nelson, Connecticut, Chairman

T. Brink, Vermont

S. Colbrook, Illinois

K. Simila, Oregon

N. D. Smith, North Carolina

C. S. Brickenkamp, NBS, Technical Advisor

COMMITTEE ON LAWS AND REGULATIONS



## APPENDIX A

### UNIFORM MOTOR FUEL INSPECTION LAW

#### SECTION 1. PURPOSE

There should be uniformity among the requirements for motor fuels of the several States. This Act provides for the establishment of quality specifications for all liquid motor fuels, except aviation fuel and liquefied petroleum gases.

#### SECTION 2. SCOPE

The Act establishes a sampling, testing, and enforcement program, provides authority for fee collection, requires registration of motor fuels, and empowers the State to promulgate regulations as needed to carry out the provisions of the Act. It also provides for penalties.

#### SECTION 3. DEFINITIONS

As used in this Act:

- 3.1. MOTOR FUEL.** -- The term "motor fuel" means any liquid product used for the generation of power in an internal combustion engine, except aviation fuel and liquefied petroleum gases.
- 3.2. DIRECTOR.** -- The term "Director" means the \_\_\_\_ of the Department of \_\_\_\_.
- 3.3. PERSON.** -- The term "person" means either plural or singular, as the case demands, and includes individuals, partnerships, corporations, companies, societies, and associations.

#### SECTION 4. ADMINISTRATION, ADOPTION OF STANDARDS, AND RULES

The provisions of the Act shall be administered by the Director or his authorized agent. For the purpose of administering and giving effect to the provisions of this Act, the standards set forth in the Annual Book of ASTM Standards and supplements thereto, and revisions thereof, are adopted except as amended or modified by the Director. The Director is empowered to write rules and regulations on the advertising, posting of prices, labeling, standards for, and identity of motor fuels and is authorized to establish a testing laboratory.

## **SECTION 5. GENERAL DUTIES AND POWERS**

The Director shall have the authority to:

- 5.1. Enforce and administer all the provisions of this Act by inspections, analyses, and other appropriate actions.
- 5.2. Have access during normal business hours to all places where motor fuels are marketed for the purpose of examination, inspection, taking of samples, and investigation. If such access shall be refused by the owner or agent or other persons leasing the same, the Director or his agent may obtain an administrative search warrant from a court of competent jurisdiction.
- 5.3. Collect, or cause to be collected, samples of motor fuels marketed in this State, and cause such samples to be tested or analyzed for compliance with the provisions of this Act.
- 5.4. Issue a stop-sale order for any motor fuel found not to be in compliance and remand said stop-sale order if the motor fuel is brought into full compliance with this Act.
- 5.5. Refuse, revoke, or suspend the registration of a motor fuel.
- 5.6. Delegate to authorized agents any of the responsibilities for the proper administration of this Act.

## **SECTION 6. REGISTRATION AND CERTIFICATION OF MOTOR FUELS**

All motor fuel must be registered by the name, brand, or trademark under which it will be sold. Such registration shall include:

- (1) Name and address of person registering the motor fuel.
- (2) Antiknock index or Cetane number, as appropriate, at which the motor fuel is to be marketed.
- (3) Certification, declaration, or affidavit that each individual grade or type of motor fuel shall conform to the provisions of this Act.

## **SECTION 7. INSPECTION FEE**

There shall be paid a fee of \$ \_\_\_ per gallon on all motor fuels marketed within this State for the purposes of administering and effectively enforcing the provisions of this Act.

## **SECTION 8. PROHIBITED ACTS**

It shall be unlawful to:

- (1) Market motor fuels in any manner that may deceive or tend to deceive the purchaser as to the nature, price, quantity and/or quality of a motor fuel.

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- (2) Fail to register a motor fuel.
- (3) Submit incorrect, misleading, or false information regarding the registration of a motor fuel.
- (4) Hinder or obstruct the Director, or his authorized agent, in the performance of his duties.
- (5) Market a motor fuel that is contrary to the provisions of this Act.

### SECTION 9. PENALTIES

Any person who violates any provision of this Act or regulations promulgated pursuant thereto shall be guilty of a misdemeanor, and upon conviction, shall be punished by a fine of not more than \$ \_\_\_, or imprisonment for not more than \_\_\_ years, or both.

### SECTION 10. INJUNCTION

The Director is authorized to apply to any court of competent jurisdiction for a temporary or permanent injunction restraining any person from violating any provision of this Act.

### SECTION 11. SEPARABILITY PROVISION

If any word, phrase, provision, or portion of this Act shall be held in a court of competent jurisdiction to be unconstitutional or invalid, the unconstitutionality or invalidity shall apply only to such word, phrase, provision, or portion, and for this purpose the provisions of this Act are declared to be severable.

### SECTION 12. REPEAL OF CONFLICTING LAWS

All laws and parts of laws contrary to or inconsistent with the provisions of this Act are repealed except as to offense committed, liabilities incurred, and claims made thereunder prior to the effective date of this Act.

### SECTION 13. CITATION

This Act may be cited as "The Motor Fuel Inspection Act of \_\_\_\_."

### SECTION 14. EFFECTIVE DATE

This Act shall become effective on \_\_\_\_.

## UNIFORM REGULATION FOR MOTOR FUEL

### SECTION 1. DEFINITIONS

- 1.1. **SPARK-IGNITION MOTOR FUEL.** -- The term "Spark-ignition motor fuel" means gasoline and its blends with oxygenates such as alcohols and ethers.
- 1.2. **GASOLINE-ALCOHOL BLEND.** -- For labeling purposes, the term "gasoline-alcohol blend" means any spark-ignition motor fuel containing one percent or more by volume, of ethanol, methanol, or any combination of ethanol and methanol.
- 1.3. **DIESEL FUEL.** -- The term "diesel fuel" means any petroleum liquid suitable for the generation of power by combustion in compression ignition (diesel) engines.

### SECTION 2. FUEL SPECIFICATIONS

- 2.1. Spark-ignition motor fuel (as defined in this regulation) shall meet the most recently adopted ASTM standard<sup>1</sup> for spark-ignition motor fuel except that, volatility standards for unleaded gasoline blends containing up to 10% 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, and provided that the gasoline used in the blend meets the volatility specifications of ASTM for the area and season in which the blend is sold.
- 2.2. Diesel fuel shall meet current ASTM D975, "Standard Specification for Diesel Fuel Oils."

### SECTION 3. GASOLINE-ALCOHOL BLENDS

- 3.1. **METHOD OF RETAIL SALE.** - All motor fuel kept, offered, or exposed for sale, or sold, at retail containing at least one percent by volume of ethanol, methanol, or a combination shall be identified as "with" or "containing" (or similar wording) "ethanol," "methanol," or "ethanol/methanol" on the upper fifty percent of the dispenser front panel in a position clear and conspicuous from the driver's position, in a type at least 1/2 inch in height, 1/16 inch stroke (width of type).
- 3.2. **DOCUMENTATION FOR DISPENSER LABELING PURPOSES.** -- The retailer must be provided, at the time of delivery of the fuel, on an invoice, bill of lading, shipping paper, or other documentation, the presence and maximum amount of ethanol, methanol, or any combination of ethanol/methanol (in terms of percent by volume) contained in the fuel. This documentation is only for dispenser labeling purposes; it is the responsibility of any potential blender to determine the total oxygen content of the motor fuel before blending.

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<sup>1</sup>This language will be revised editorially when ASTM P176 is adopted and assigned an ASTM number.

## APPENDIX B

### RECOMMENDED TEST METHOD FOR PACKAGES OF FLOUR

#### 3.17. FLOUR

##### 3.17.1. Background for Administrator and Inspector

The test procedure for flour is based on the concept of a "gray area" that extends down from the labeled weight to 97% of the labeled weight. It applies only to package lots checked at retail or wholesale, but not to those checked in the plant. The gray area does not represent a tolerance, nor do lots in the gray area automatically pass or automatically fail. If the average weight of a package lot is in the gray area, the moisture content at time of test and a time of pack must be determined in order to judge whether the lot is in compliance.

##### 3.17.1.1. Enforcement action, inside and outside the gray area

The overall objective is to test packages as ordinarily as possible, If package lots are short weight, but fall in the gray area, additional information must be obtained in order to decide whether or not the lots are in compliance. Ordinary enforcement action is to be taken on packages found short weight and outside the gray area.

For package lots found short weight, but inside the gray area, a decision must be made as to what to do with the packages while additional information is being collected. It is recommended that a hold or stop sale order be put on these packages until their final status can be determined. If the product cannot be held and subsequent tests or information indicate that the lot is out of compliance, seek the strongest legal remedy.

##### 3.17.1.2. Which packages to consider as part of the lot being tested

When taking a sample from retail, an inspector will ordinarily record lot codes but will not select the lot for test by sorting the packages by lot code. The sample is selected from all packages of the same brand, style, and size on the shelf or in the stock room. If short weight is found and the results are in the gray area, a followup test will now require sorting out the lot codes in order to ascertain the moisture content at the time of pack (which varies from lot code to lot code).



### 3.17.1.3. Package Errors

The discussion below is based on recording the package weights as "package errors" -- how much and in what direction the actual package weight differs from the labeled weight. Thus, if a package labeled 2 lb actually weighs 2.10 lb, it is assigned a package error of +0.10 lb. The same situation holds for average package weights. If the average of 10 package weights is 1.994 lb, the average package error is (1.994 lb - 2.000 lb =) -0.006 lb.

### 3.17.1.4. Package lots have to meet the average requirement and the individual requirement

Using H-133 Category B sampling plans<sup>1</sup> for packages **not** subject to possible moisture loss, packages must meet two requirements:

- (1) The average net weight of a sample of 10 or 30 packages must equal or exceed the labeled net weight. Thus, the average package error (for the 10 or 30 packages) must be zero or plus.
- (2) No single package among the 10 or 30 packages in the sample can be short weight by more than the MAV.

For flour, these two requirements become the upper boundary for the gray area. 97% of the labeled net weight defines the lower boundary of the gray area. (See Figure 3-13.)

#### Example: The Gray Area for 5 lb Flour Packages

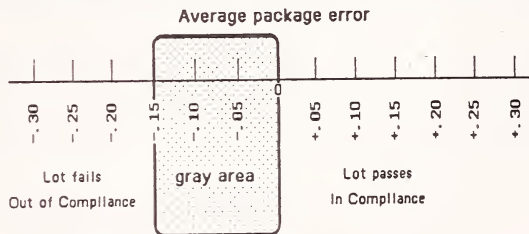


Figure 3-13. An example of the gray area.

For example, for 5-lb packages of flour, 3% of the labeled weight is 0.15 lb. Therefore, if an average package error for a lot of 5 lb packages is minus but between zero and -0.15 lb, the lot is in the gray area. The lot should not be passed or failed: more information will be needed to decide its disposition.

If the official is following a Category B sampling plan, a package that is short weight by more than the MAV may put the lot in the

<sup>1</sup>For simplicity only, this background discussion presupposes a Category B sampling plan test.

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gray area. The official will have to add the 3% gray area to the MAV to find the limits of the gray area for an individual package. Table 3-3 is provided to help the inspector determine whether or not the lot is in the gray area for all the common sizes of flour. This Table is under Section 3.17.3.7.

### **3.17.1.5. How many lots will be in the gray area**

The flour survey conducted by the NCWM Task Force on Commodity Requirements, printed in the Report of the 71st National Conference on Weights and Measures, 1986, page 70, is the source from which the estimates are predicted. If all flour samples are drawn from retail, an estimated 5 or 6 out of 10 lots will have a minus average error and will be in the gray area. This will vary according to the time of year of testing. Probably only one out of 100 lots found at retail would be rejected outright because of being outside the gray area.

### **3.17.2. Field Equipment**

Use Scales and Weights recommended in Section 3.1. (H-133) and glass canning jars (1/2 pint or larger) and lids.

### **3.17.3. Procedure**

#### **3.17.3.1. Summary Sheet**

A Flour Summary Sheet is provided at the end of 3.17. for use with the standard pack report form, page A-1. The following information can be entered on the Flour Summary Sheet when setting up a test:

<u>Type of</u> <u>Information</u>	<u>Examples</u>	<u>Item No. on</u> <u>Summary Sheet</u>
Brands	Name of brand	Item 1

<u>Type of Information</u>	<u>Examples</u>	<u>Item No. on Summary Sheet</u>
Type of flour	all purpose self rising whole wheat, rye, graham, etc. DO NOT USE THIS TEST FOR CORN MEAL OR MIXES	Item 2
Labeled weight (lb)	2 lb 5 lb 10 lb up to 100 lb	Item 3
Location of test	R, W, P, L	Item 4 R for retail, W for wholesale, P for packager's storage area, or L for on-line at the packaging plant.

### 3.17.3.2. Selection of Lots

When an inspection lot composed of packages bearing different lot codes is found in the gray area, sort the inspection lot by lot code. Redefine the inspection lot to be those packages bearing the same lot code. Record the lot code in Item 5 on the Summary Sheet. The lot code is the packer's own identifying marks, not the universal product code (UPC). The size of the inspection lot, Item 6 on the Summary Sheet and box 5 on the Standard Pack Report Form, page A-1, is the number of packages with a single lot code available for inspection at one location.

When there is no lot code, note this on the summary sheet. Contact the packager to determine if there is any identifying lot code information. (See Section 3.16.3.9. for how to contact the packager.)

### 3.17.3.3. Sample Size

Record the sample size in Item 7 on the Summary Sheet and in box 6 on the Standard Pack Report Form, page A-1.

### 3.17.3.4. Tare

Open the number of packages indicated in the sampling plan to get an average tare weight of the bag or other packaging material. (These packages can be in addition to the sample selected for net weight determination, if you prefer.) Record the average tare weight in Item 8 on the Summary Sheet and in box 13 on the Standard Pack Report Form.

**3.17.3.5. What a Package Should Weigh**

Add the average tare weight to the labeled net weight to get the weight that the package is supposed to weigh, "nominal gross weight."

average tare weight + labeled weight = nominal gross weight

Record this value on the Standard Pack Report Form (page A-1, box 14).

**3.17.3.6. Package Errors**

Use the package checking scale to compare the packages in the sample with the nominal gross weight. A package that weighs more than the nominal gross weight is overweight and has a "plus package error." A package that weighs less than this is underweight and has a "minus package error."

package error = package gross weight - nominal gross weight

Record these values on the Standard Pack Report Form (page A-1, checkerboard area.)

**3.17.3.7. The Average Requirement**

The explanation below follows a Category B sampling plan. When following a Category A plan, compute T before determining whether the lot in question falls in the gray area.

Compute the average error for the package lot under test. Sum all individual package errors and divide by the number of packages in the sample. Do not delete any individual package errors from the calculation. Record the average error on the Standard Pack Report Form in box 18, and in Item 9 on the Summary Sheet.

If the average error is zero or plus, the lot passes the average requirement.

Consult Table 3-3 to find the limits of the gray area for the average net weight. (According to the labeled weight in column 1, look up the limits of the gray area in column 2.) Note that the gray area only applies if testing is at retail or wholesale. **If the test is being conducted at the packaging plant, there is no gray area.**

If the average error is minus by more than 3% of the labeled weight (assuming a category B test), the lot does not comply; it fails the test. Reject the lot and take the usual enforcement action. (Circle "no" in Item 11 on the Summary Sheet.)

If the average error is minus, but by less than 3% of the labeled weight, the lot is in the gray area. Go to that part of the procedure headed "What to do when the lot is in the gray area," Section 3.17.3.9. (Circle "yes" in Item 11 on the Summary Sheet.)

For example, if the average package error for a lot of 2 lb packages is -0.05 lb, the lot is in the gray area (the average error is between zero and -0.06 lb).

**TABLE 3-3**

**Boundaries of the Gray Area for Different Sizes of Flour Packages**

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The retail or wholesale lot is in the gray area if:

<u>Column 1</u>	<u>Column 2</u>	<u>Column 3</u>	<u>Column 4</u>
the labeled weight is	the average package error is minus and between zero and 3% of label weight	and any individual package error is minus and is between the MAV	and MAV + 3%
2 lb	-0.06 lb	-0.07 lb	-0.13 lb
5 lb	-0.15 lb	-0.14 lb	-0.29 lb
10 lb	-0.30 lb	-0.22 lb	-0.52 lb
20 lb	-0.60 lb	-0.31 lb	-0.91 lb
25 lb	-0.75 lb	-0.37 lb	-1.12 lb
50 lb	-1.50 lb	-0.50 lb	-2.00 lb
100 lb	-3.00 lb	-2.00 lb	-5.00 lb

---

**3.17.3.8. The individual package requirement**

Compare the largest individual minus package error on the standard pack report form with Table 3-3 (columns 3 and 4) to see if the lot is in the gray area. The Flour Summary Sheet provides spaces for recording the largest minus package error (Item 10), and recording whether or not the lot is in the gray area (Item 11).

For example, if the package size is 2 lb, the MAV is 0.07 lb (column of Table 3-3). For package sizes not listed there, see pages B-9 and B-10, and pages 41 and 42 of the H-133 Field Manual.

The size of the gray area is 3% of the package net weight; for 2 lb this is 0.06 lb. Therefore, an individual short weight package with a



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package error less than zero but not as much as 0.07 lb would not fail the lot. If the package error is larger than -0.13 lb (-0.07 lb + -0.06 lb), the lot should be automatically rejected and enforcement action taken. But if the largest individual minus package error is between -0.07 lb and -0.13 lb, the lot is in the gray area (Table 3-3 columns 3 and 4).

### **3.17.3.9. What to do when the lot is in the gray area**

The only way to determine whether flour found short weight at retail or wholesale is short because of underpacking or because of moisture loss is to test for moisture content.

Fill a canning jar with flour from one package<sup>1</sup> from the lot in question. Seal it with a canning lid, label it, and send it to the laboratory to run a moisture test. The results will be provided in terms of percent moisture content (for example, 10.3%). Record this in Item 12 on the Summary Sheet.

Contact the packager<sup>2</sup> to obtain from the contact person the moisture content value at the time of pack for the lot code in question. Record this in Item 13 on the Summary Sheet. The moisture content at time of pack will normally be between 13.5 and 14.0% for all-purpose and most types of whole-wheat, graham, etc., flours. Self-rising flour will be about 0.7% lower in moisture content (between 12.8 and 13.3%). If there is no lot code, assume a moisture content of 13.75% at the time of pack for all-purpose and all types of whole-wheat flour; 13% for self-rising flour.

Subtract the moisture content value at the time of test from the moisture content at time of pack:

Moisture loss =	moisture content at pack	-	moisture content at time of test
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This is the amount of moisture lost by the flour during distribution. Record the moisture loss in Item 14 on the Summary Sheet.

For example, if the moisture content at time of pack was reported to be 14% and the moisture content at time of test is 11%, the moisture loss is 14% - 11%, or 3%. A moisture loss of 1% translates directly

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<sup>1</sup>Both packages opened for tare may be sampled for moisture determination, if desired.

<sup>2</sup>Each State has been sent this information and the Milling Directory as further sources for packager contacts. Available from NBS, OWM or the Millers' National Federation (600 Maryland Ave., Suite 305 W., Washington, DC 20024; Tele: (202)484-2200).

into a weight loss of 1%. If you are testing 2-lb packages of flour, a 3% moisture loss is a weight loss of  $2 \text{ lb} \times 0.03$  or 0.06 lb. Calculate the weight loss for the lot under test by multiplying the percentage moisture loss by 0.01 (to convert it to a fraction) and then by the labeled weight (to convert it to pounds.) See Summary Sheet for calculation. Record the weight loss in Item 15 on the Summary Sheet.

For example, if a moisture loss of 3% is found for a 2-lb lot of flour, this is a weight loss of 0.06 lb ( $2 \text{ lb} \times 3 \times 0.01$ ).

If the moisture loss (in item 15) is equal to or larger than the amount of shortage found for the average error (in item 9), then the lot can be accepted. If the moisture loss is less than the average shortage, then the lot should be rejected and further enforcement action taken.

For example, assume the average package error for a 2 lb lot of packages is 0.05 lb. If a moisture loss of 3% is found, the weight loss of 0.06 lb ( $2 \text{ lb} \times 0.03$ ) is more than the amount of shortage (0.05 lb), therefore the lot would be accepted. Record this in Item 16.

Similarly, if there are any individual minus package errors that exceed the MAV and place the lot into the gray area, add the amount of weight lost due to moisture loss (Item 15) to the largest individual minus package error (recorded in Item 10). If the resulting package error is still larger than the MAV (see Table 3-3, third column), the lot should be rejected. If the resulting package error is smaller than the MAV, the lot should be accepted. Record this in Item 17.

For example, if the largest individual package error for a lot of 2-lb packages is -0.08 lb, this puts the lot into the gray area, even if the average package error is zero or plus. If a moisture loss of 3% is found, the weight loss of 0.06 lb added to the individual package error makes the package error -0.02 lb ( $-0.08 \text{ lb} + 0.06 \text{ lb}$ ). The MAV for 2 lb package lots is -0.07 lb, so this lot passes if the average is zero or plus.

### **3.17.4. Moisture Content Laboratory Test**

#### **3.17.4.1. Equipment**

Forced-air (or equipment) laboratory convection oven  
desiccator and drying agent  
analytical balance  
drying dishes with covers  
calibrated thermometer  
tongs or insulated gloves

**3.17.4.2. Procedure**

1. Set oven to 130 + or - 3 oC. Let temperature stabilize.
2. Weigh at least three empty drying dishes and covers for each lot of flour being tested (that is, run a triplicate).
3. Weigh covered dishes with about 2 g flour in each one.
4. Uncover dishes, place them in the oven.
5. Start timing for one hour from the time the temperature returns to 130 oC.
6. Cover the dishes, transfer them to a desiccator, and weigh after the dishes return to room temperature.
7. Compute the moisture content (%) =

$$\frac{\text{flour weight before drying} - \text{flour weight after drying}}{\text{flour weight before drying}} \times 100$$

8. Average the results on three dishes for each lot.

# FLOUR SUMMARY SHEET

Date Tested

1.	Brand	
2.	Type of Flour	
3.	Labeled Weight (lb)	
4.	Location of Test (RWPL)	
5.	Lot Code	
	5a. Location packed	
	5b. Date packed	
6.	Lot size	
7.	Sample size	
8.	Tare weight (lb)	
9.	Average package error (lb)	
10.	Largest minus package error (lb)	
11.	Is lot in gray area? (see Table 3-3)	Yes No
12.	Moisture content at time of test (%)	
13.	Moisture content at time of pack (%)	
14.	Moisture loss (%) (= item 13. - item 12.)	
15.	Weight loss (lbs) (= item 14. x .01 x item 3.)	
16.	Is weight loss (15.) at least as large as average package error (9.)?	Yes No

## **APPENDIX C**

### **A BASIC MOTOR FUELS TESTING LABORATORY**

Developed by the  
Task Force on Motor Fuels

#### **Introduction**

During the 68th National Conference on Weights and Measures, delegates to the Conference voted to establish labeling guidelines for motor fuels containing at least one percent alcohol. The delegates deemed this action necessary because motor vehicle manufacturers were qualifying their warranties with respect to some gasoline-alcohol blends (oxygenated fuels), motorists were complaining to weights and measures officials about fuel quality and vehicle performance, and ASTM was encountering delays regarding the development of quality standards for oxygenated 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.

#### **Need for Uniformity**

State directors of the several motor fuels testing programs have long recognized the need for a uniform approach to fuel inspection and regulation. With the introduction of gasoline-alcohol blends and the rush to promulgate regulations governing them, this need became even more apparent. Also, many states without an inspection program were being urged by citizens to do something about poor fuel quality. However, states seeking information on fuels testing found that such information was not readily available nor was there a single organization capable of providing guidance from a regulatory perspective. In an attempt to fill a regulatory and information void, the Chairman of the 69th National Conference on Weights and Measures appointed a Task Force on Motor Fuels. The task force was given the mission of identifying information and resources that were available from standards development organizations, professional organizations, private companies, trade associations, and state fuels testing programs which could be used by states and other organizations interested in developing a fuels testing program.

A fuels testing program is of little value unless fuels are tested for compliance with recognized standards. ASTM standards are universally recognized and designed to serve most of the current vehicle population. Membership in ASTM is highly recommended: it is an invaluable means of establishing contacts with experts. Whether or not a state decides to fund membership in ASTM, every



state motor fuel laboratory should participate in the National Exchange Group, a quality assurance round robin administered by ASTM Subcommittee D02.01 on Combustion Characteristics of Committee D02.

#### State Operated or Contract

The value of a motor fuels testing program to a state's citizens can be enormous. However, a program is expensive, even if a state chooses to contract fuel testing to a private laboratory. The question is often asked: "Is there a point at which it is cheaper for a state to operate its own fuels-testing laboratory?" The task force concluded that a program testing 6,000 samples per year (500 per month) is the minimum level to justify building and equipping a fuels-testing laboratory. For programs expecting to test less than 6,000 samples, contracting the laboratory analysis may prove to be more economical. However, consideration must be given to the time required for a private laboratory to complete the analysis. The value of any inspection program is diminished if laboratory turnaround time is so great that the product under inspection is consumed before the results of an analysis are known.

There is no better way to understand the complexities of testing than to visit a state with an active program. Arkansas, California, Florida, Georgia, Maryland, North Carolina, and South Carolina all have active programs and are willing to host tours of their facilities. Interested parties are encouraged to make such a visit.

#### Minimum Program

This document outlines a minimal inspection program. Information is given on facility needs, recommended ASTM test procedures, approximate cost for equipment, and the number of personnel required for staffing. Many questions and details remain to be resolved.

The following individuals have served on task forces and are available to answer questions and provide comprehensive information:

N. David Smith, North Carolina, Chairman  
Sydney Andrews, Retired, Florida  
Barbara Bloch, California  
David Karlish, Arkansas  
George Mattimoe, Hawaii  
Frank Nagele, Michigan  
John O'Neill, Kansas  
Harwood Owings, Retired, Maryland  
Curtis Williams, Georgia  
Steven Hasko, NBS, Technical Advisor

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### Laboratory Facility

A fuels testing laboratory requires a unique building, designed to accommodate laboratory instruments ranging from very sophisticated atomic absorption spectrophotometers to octane engines capable of producing severe vibrations. In addition, extremely flammable liquids will be stored and tested throughout the facility. Obviously, the facility design must minimize the chances of explosion and fire, and also withstand the forces in the event of an explosion with the aid of special pressure hatches and explosion panels. To minimize the exposure to other personnel and facilities, a fuels testing laboratory should be in a separate building not connected to other structures.

Special consideration should be given to the following:

1. Sufficient ventilation to ensure that workers are not unduly exposed to gasoline fumes or other toxic vapors.
2. Fume hoods and exhaust systems in laboratory areas.
3. Drain lines resistant to acid and petroleum products.
4. Traps to prevent petroleum products from entering the sewer system.
5. Special foundations for American Society for Testing and Materials and the Cooperative Fuel Research Committee (CFR) engines. It is recommended that sufficient foundations for future expansion be installed during initial construction.
6. Necessary safety equipment, such as fire blankets, fire extinguishers, eye baths, etc.
7. Automatic fire extinguisher system for laboratory areas. The system's design should recognize that some types of laboratory instruments can be damaged by water or by dry chemical extinguishing systems.
8. An adequate heating, ventilation, and air conditioning (HVAC) system since many of the testing procedures, particularly octane testing, generate significant amounts of heat.
9. A properly designed and sized electrical system.
10. The laboratory's design must ensure that all fuels testing can be performed in accordance with ASTM requirements. This consideration is especially important for the CFR engines. Volume 05.04 of ASTM Annual Book of Standards contains valuable information regarding the design of a knock-testing laboratory.
11. Automatic hydrocarbon monitors to warn of critical accumulation of explosive vapors.

Several fixed equipment items are necessary for the laboratory's operation, including:

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1. Air compressor and piping of sufficient size to supply the entire laboratory's needs.
2. Vacuum system for the entire laboratory.
3. Gas and water piped to all areas of the laboratory.
4. Three 500-gallon tanks for storage of leftover fuels. (Larger tanks may be needed if they are also used to supplement the program's vehicle needs.)

The size of the laboratory will depend on the needs of the agency and the scope of the fuels testing program. As previously mentioned, a fuels-testing laboratory is unique, hence it may be very difficult to justify the conversion of an existing structure. The following space listing is for a small laboratory capable of testing 6,000 samples per year. Some space requirements, such as octane testing, may seem large, but it is strongly recommended that 2 additional engine foundations be installed during initial construction.

1. offices, toilet facilities, etc. (as required)

No space requirements are listed for offices, conference room, and personnel requirements (toilets, break room, etc.) as this must be determined by the user based on program needs and local building codes.

2. octane room - designed for 4 engines (800 sq. ft.)
3. general lab (750 sq. ft.)
4. distillation lab (400 sq. ft.)
5. shipping and receiving (includes preparation area for empty sample containers) (400 sq. ft.)
6. flash point lab (200 sq. ft.)
7. shop area (225 sq. ft.)
8. storage for supplies (225 sq. ft.)
9. flammable storage (may be a separate building) (225 sq. ft.)

Total square footage (exclusive of Item 1) -- 3225 sq. ft.

Including offices, toilet facilities, hallways, etc., the total building size may well exceed 4000 square feet.

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### Tests and ASTM Test Procedures\*

#### Spark Ignition Engine Fuel-D439/P176

1. Distillation D 86
2. Octane (Anti-knock Index)  
Research D 2699  
Motor D 2700
3. Reid Vapor Pressure D 323
4. Alcohol Content and Type (ASTM P 176 contains analytical procedures under consideration)
5. Lead Content D 3237
6. Workmanship Section 6, P176

#### Diesel Fuel-D975

1. Flash Point D 93 is the preferred method but D 56 may be used in certain circumstances.
2. Distillation D 86
3. API Gravity D 1298
4. Sulfur Content D 1266 (lamp), D 2622 (X-ray spectrograph), or D 4294 (X-ray fluorescence)
5. Water and Sediment D 1796

NOTE: The API gravity and distillation results can be used to calculate the cetane index per ASTM D 976.

#### Kerosene-D3699

1. Flash Point D 56
2. Distillation D 86
3. Sulfur Content D 1266 (lamp), D 2622 (X-ray spectrograph), or D 4294 (X-ray fluorescence)
4. Color D 156
5. Water and Sediment D 1796

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\*General Note: ASTM test methods listed here and/or test methods listed in ASTM standard specifications do not necessarily exclude other ASTM procedures that are designed for the purpose and that give comparable accuracy.

### Measurement Assurance and Quality Control

ASTM Subcommittee D02.01, Combustion Characteristics, of Committee D02 operates a National Exchange Group (NEG). There are three subgroups of the NEG: the Motor Fuel Exchange Group, the Diesel Fuel Exchange Group, and the Aviation Gasoline Exchange Group. Of three types of participation, only two will concern a state laboratory: a "member" laboratory receives monthly samples and agrees to participate in special methods research; and, a "quarterly participant" receives two sets of samples every three months but is not bound to run special tests. The fee for members or for quarterly participants is currently \$150 per year.

Values for the API Gravity (ASTM D287), Reid Vapor Pressure (ASTM D323), Distillation (ASTM D86), lead content (ASTM D3237), and Hydrocarbon Type (ASTM D1319) will be reported for all participants along with the research and motor octane values for spark ignition fuel (D2699 and D2700 methods). API Gravity (ASTM D287), Distillation (ASTM D86), Flash Point (ASTM D93), Aniline Point (D611), Kinematic Viscosity (ASTM D445), and Sulfur Content (ASTM D129) are reported with cetane values for diesel fuel.

Operating as a member or quarterly participant in the NEG is the only means at the national level for assessment of quality in the motor fuel laboratory. (There are also regional groups operating under the NEG.) Since motor fuel and diesel fuel samples are somewhat perishable, participation in the NEG is recommended for internal quality control and quality assessment. NBS Standard Reference Materials (SRM) 1636a and 1637a (lead in reference fuels) and 1616 (sulfur in kerosene) should be used to maintain internal quality control for these constituents. In 1987 these SRMs cost approximately \$120 apiece.

Further information on these programs are available from:

ASTM - NEG Program  
1916 Race Street  
Philadelphia, PA 19103  
215-299-5400

Office of Standard Reference Materials  
Bldg 222, Room B-311  
Gaithersburg, MD 20899  
301-975-6776



## Laws and Regulations Committee

### Laboratory Equipment and Supplies

<u>Octane Testing</u>		<u>Cost</u>
1	CFR Research Method Engine with automatic compression ratio changer	\$80,000
1	CFR Motor Method Engine with automatic compression ratio changer	80,000
1	Fuel blending system	4,000
	Humidity controller for CFR engines (either mechanical or ice tower)	2,000
	Reference fuels (Iso Octane, N-Heptane, 80/20 blend, Toluene)	3,600
	Complete set of mechanic tools and other special tools	5,000
	Lift for removing cylinders from engines	2,000
	Supplies, spare parts, etc. (see attached list)	24,150
Total		\$200,750

#### Distillation Testing

2	Explosion proof refrigerators (18 cu. ft.)	\$ 5,000
1	Mercury barometer (will also be used for other tests)	250
2	Mechanically refrigerated 4 unit distillation apparatus	30,000
	Supplies, thermometers, distilling flasks, graduated cylinders, spare parts, etc.	4,500
Total		\$39,750

Note: Because of greater accuracy, automatic distillation units, at \$22,500 each, should be considered.

#### RVP Testing

1	5 unit RVP bath	\$ 2,500
6	RVP bombs	4,200
6	RVP gauges	1,200
1	Mercury manometer for calibrating RVP gauges	700

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	<u>Cost</u>
1 Small explosion proof freezer	1,900
Supplies, thermometers, etc.	<u>500</u>
Total	\$11,000

### Sulfur Testing

1 X-ray fluorescence analyzer	\$25,000
Supplies, test cups, etc.	<u>2,000</u>
Total	\$27,500

Note: Low sulfur testing will require another instrument such as a lamp method apparatus.

### Alcohol Testing

1 Gas chromatograph	\$26,000
Supplies, compressed gases, etc.	<u>1,800</u>
Total	\$27,800

### Lead Testing

1 Atomic absorption apparatus	\$20,000
Supplies, flasks, accessories, etc.	<u>1,500</u>
Total	\$21,500

### Kerosene-Diesel Testing

2 Tag closed cup flash testers	3,000
2 Pensky-Martens flash testers	5,000
10 Hydrometers for API gravity	200
1 Saybolt chromometer (color test)	1,500
Supplies, spare parts, thermometers, etc.	<u>800</u>
Total	\$10,500

Note: To calculate cetane index, a separate diesel-kerosene distillation unit is desirable (\$2,500)

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		<u>Cost</u>
<u>Miscellaneous Items</u>		
100	Sample cases to transport samples (construction must be acceptable for transport via commercial carrier)	\$10,000
1200	Sample containers (either one qt. flint glass (amber since some gasoline additives are light sensitive) or metal containers with caps)	3,500
1	Oven for drying bottles	3,000
1	7.6 liter/hour water still	4,000
1	Copy machine	3,000
1	Analytical balance	2,000
	Miscellaneous supplies	1,500
	Books including ASTM Standards	500
Total		<u>\$27,500</u>

## Office Equipment and Supplies

No listing is given since needs are determined by the program's scope. However, the cost of items such as desks, filing cabinets, typewriters, forms, and miscellaneous office supplies must be considered when planning an initial budget.

## Summary

Octane Testing	\$200,750
Distillation Testing	39,750
RVP Testing	11,000
Sulfur Testing	27,000
Alcohol Testing	27,800
Lead Testing	21,500
Kerosene-Diesel Testing	10,500
Miscellaneous Items	27,500
Office Equipment and Supplies	(as needed)
Total Start Up Needs	<u>\$365,800</u>

Note: Prices based on 1986 information.

## **Personnel**

Fuels testing must be done in strict conformance with ASTM testing procedures, and competent laboratory personnel is a necessity. Octane testing in particular requires individuals with highly specialized talents. These individuals must

## Laws and Regulations Committee

exhibit good judgement and exceptional laboratory skills, and possess the talents of a first class mechanic since all engine maintenance and repair is usually the responsibility of the engine operator. Obviously, experienced octane engine operators are difficult to find, and industry generally considers it takes 2 to 5 years to properly train an operator. Other laboratory tests are either not as highly specialized or follow more closely those analytical procedures familiar to those with an educational background in the physical sciences.

For a small laboratory, the following personnel are recommended:

- laboratory supervisor	1
- CFR engine operators	2
- chemist	1
- technicians	2
- clerk	1
Total	<u>7</u>

No allowances have been made for sample collection since the number of required personnel depends on the size of the jurisdiction and the availability of other personnel, such as weights and measures inspectors, to obtain samples.

### Parts and Supplies for CFR Engines

<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
1	Carbon blaster (Waukesha AA110900)	\$1,320.00
1	Cylinder overhaul stand assembly complete (Waukesha 818-1)	1,615.00
1	Valve seat insert tool (Special made by machinist)	100.00
1	Compressor, piston ring (Waukesha 0106965)	101.00
1	Expander, piston ring (Waukesha 106893)	170.00
1	Gauge, cylinder depth assembly (Waukesha A109268-B)	275.00
1	Valve lifter (Waukesha 0106777)	102.25
1	Valve grinding tool with suction cup (Waukesha 075644)	10.00
1	Gauge, cylinder height (Waukesha A 110546-A)	22.30
1	Handle, wrench (Waukesha 105450)	11.90
	Wrench, crank gear nut (Waukesha 24088)	32.30

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<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
1	Valve seat grinding equipment complete with 3/8 and 7/16 pilots (115V) (Waukesha 106254-A)	934.00
1	Screw Driver, Allen (Waukesha A109802-A)	8.26
1	Pliers, piston pin retaining ring (Waukesha 109885)	12.20
1	Valve retainer block (Waukesha 106821)	26.40
1	Valve retainer block with cylinder overhaul stand (Waukesha 106821-A)	32.10
1	Wrench, spark plug, 7/8 hex (Waukesha 24088-S)	5.90
1	Tap, spark plug hole, 18 mm (Waukesha 110904)	58.50
1	Tap, pickup hole, 7/8 - 18 (Waukesha 110905)	74.80
1	Piston pin remover (Waukesha 109023)	15.70
1	Wrench, spring loaded for TDC (Waukesha AA24088-U)	65.00
1	Button die 11/16 - 24 for pickup connector (Waukesha 110902)	116.00
1	Valve depressor assembly (Waukesha A110538)	32.60
1	Burette (Waukesha 109221)	215.00
1	Wrench, flywheel nut (Waukesha 24088-T)	37.00
1	Gauge, feeler (Waukesha 109284)	16.84
1	Remover, valve seat insert (Waukesha 0109405)	295.00
1	Piston ring groove cleaner (Waukesha 106950)	14.00
1	Tool, valve guide alignment (Waukesha 110653)	13.60
1	Venturi, remover (Waukesha 111367)	6.69
1	Adapter, cylinder sleeve torque wrench (Waukesha 56372)	44.50



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<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
1	0"-1" Micrometer (outside) with ratchet stop and lock nut; carbide faces, graduation .0001" (Starrett T436RLX-1)	50.05
1	1"-2" Micrometer (outside) with ratchet stop and lock nut; carbide faces, graduation: .0001" (Starrett T436RLX-2)	59.65
1	2"-3" Micrometer (outside) with ratchet stop and lock nut; carbide faces, graduation .0001" (Starrett T436RLX-3)	66.50
1	3"-4" Micrometer (outside) with ratchet stop and lock nut; carbide faces, graduation: .0001" (Starrett T436RLX-4)	72.25
1	2"-8" Micrometer (inside) graduation: .001" (Starrett 124AZ)	83.25
1	0"-6" Micrometer (depth gauge) with ratchet stop and lock nut, in case graduation: .001" (Starrett 440Z-6RL)	94.45
1	Magnetic base indicator holder (Starrett 657AA)	60.70
1	0"-1.000" Dial Micrometer (dial gauge) .001"; One rev.: .100"; dial reading 0-50-0 (Starrett 25-341J)	58.50
1	0"-1.000" Dial Micrometer (dial gauge) graduation: .001"; One rev.: .100"; dial reading 0-100 (Starrett 25-441J)	58.50
1	Crankshaft Distortion, dial gauge 2-3/8" to 18" (Starrett 696Z)	200.00
1 set	Set of (6) No. 579A, 579B, 579C, 579D, 579E, 579F in case (Starrett S579HZ)	82.30
1	Standard Amplifier, Range: + .006"; minimum graduation: .0001" (Comtorgage CM2)	145.00
1	Size range: .344"-.534", ground to nominal at .3750" with 6" total in-reach Comtorgage Expansion Plug)	172.00
1	Size range: .365"-.510" (Comtorgage Reference Ring)	64.50

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<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
27	Ring, piston compression, straight (Waukesha 106222-A)	73.71
9	Ring, piston compression, chrome, straight, top (Waukesha 106222-B)	47.70
9	Ring, piston, oil, straight (Waukesha 23505)	27.00
2	Cylinder, assembled with valve guides, valve seat inserts, pipe plugs, valves, valve springs, studs, tray, piston, piston pin and piston rings + valve rotator (Waukesha FA 109355)	4,660.00
4	Valve, intake (Waukesha 23436-A)	658.00
4	Valve, exhaust (Waukesha 106625)	210.00
4	Pin, intake valve (Waukesha 26800)	.24
4	Insert, cylinder valve seat (Waukesha 105987-A)	91.20
2	Guide, intake valve (Waukesha 23109-B)	25.80
2	Guide, exhaust valve (Waukesha 23109-A)	20.60
20	Felt, valve stem (Waukesha B-4680)	39.00
1	Sleeve, cylinder assembly (Waukesha 830-3)	510.00
50	Plug, spark (Waukesha 111460)	170.00
1	Carrier, support and rocker arm assembly (Waukesha 00110159)	570.00
4	Rod, push, assembly (Waukesha OB-5264)	142.00
6	Gasket, valve spring tray (Waukesha 106424)	2.70
20	Gasket, cylinder guide plate, lower (Waukesha 106721)	14.00
20	Gasket, cylinder guide plate, upper (Waukesha B-2544)	14.00
6	Shim, cylinder worm shaft (Waukesha 105041)	4.20
2	Ignition trigger (Waukesha 111417T)	182.00

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<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
1	Valve, oil relief, assembly (Waukesha A109538-A)	135.00
2	Pickup Detonation, assembly (Waukesha W-109927)	1,625.00
2	Plunger, oil relief valve (Waukesha 106827)	16.52
2	Spring, oil relief valve (Waukesha B-9107-A)	15.02
2	Screw, oil relief valve adjusting (Waukesha 105593)	14.34
5	Gasket, oil relief valve (Waukesha 109561-A)	7.60
1	Screen, oil assembly (Waukesha 0109552)	97.60
10	Gasket, oil screen (Waukesha 109553)	5.80
1	Pump, oil assembly (Waukesha 0110150)	244.00
10	Gasket, oil pump body (Waukesha 109559-B)	29.10
10	Gasket, breather body (Waukesha B-1956-A)	6.20
5	O-ring (Waukesha 157497-M)	4.70
2	Cup, breather valve (Waukesha 110670)	21.60
30	Filter, spin-on (Waukesha 111346)	406.00
5	Gasket, condenser gauge (Waukesha 75552-A)	1.25
2	Glass, condenser gauge (Waukesha B-5094)	7.44
1	Tube, carburetor jet assembly (Waukesha 0-75985-B)	54.30
1	Tube, air bleed carburetor (Waukesha 75983-B)	55.30
6	Gasket, bleed tube (Waukesha 109778)	2.58
12	Gasket, valve body (Waukesha 75982-A)	5.40
16	Gasket, fiber (Waukesha B-3207)	10.72
2	Glass (Waukesha 75974)	40.60
2	Glass, tank gauge (Waukesha B-5094)	7.44

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<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
16	Gasket, gauge assembly (Waukesha 75552-A)	4.00
16	Gasket, carburetor float (Waukesha 105061)	10.56
50 ft.	50 ft. Tygon tubing 3/8 D X 1/4 ID (Waukesha 441011)	152.00
1	Crankcase drawing (Waukesha L46841C)	7.80
12	Exhaust carbon blaster bags (Waukesha 110901)	70.20
50	Gasket, pickup (Waukesha 11342)	20.00
12	Gasket, carburetor, thick, two-bolt (Waukesha 75748)	24.00
24	Gasket, carburetor, thick, four-bolt (Waukesha 109346)	31.68
24	Gasket, exhaust manifold (Waukesha B 2557)	51.84
12	Gasket, carburetor, thin, four-bolt (Waukesha 109345)	13.44
12	Gasket, coolant condenser body (Waukesha 75690)	7.92
24	Gasket, water pipe (Waukesha B5096A)	12.24
12	Gasket, mixture heater housing (Waukesha 105991)	40.44
1	Heater, manifold, flanged, 110 volt (Waukesha H-106748-C)	321.00
16	Gasket, carburetor, valve body (Waukesha 75982-A)	7.20
12	Washer, carburetor horizontal fuel jet hole (Waukesha B-3207)	8.04
12	Washer, carburetor tank gauge, lower (Waukesha B-5052)	3.36
12	Washer, carburetor tank gauge, upper (Waukesha B-5068)	3.60
12	Washer, coolant condenser gauge, lower (Waukesha B-5052-A)	3.36

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<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
24	Gasket, removable spacer (Waukesha 110523)	41.28
1	Manifold, exhaust, hot (Waukesha 023242-A)	130.20
3	Thermometer, air intake (60 - 160 °F), 1/8" pipe thread (Waukesha 0106317-A)	159.00
3	Thermometer, intake manifold (200 - 350 °F), gland type (Waukesha 0110351)	121.30
1 set	Belt, induction motor to engine (50 + 60 cycle), set of 2, research (Waukesha OB-5500)	55.40
1 set	Belt, induction motor to engine (60 cycle), set of 2, motor (Waukesha 027970)	64.40
1	Controller, temperature with inter-connecting cables for use with console panel (Waukesha AA111412)	1,203.00
1	Probe, thermistor (125 °F) (Waukesha 110386)	210.00
2	Bead, glass (replacement 125 °F) (Waukesha 110386A)	115.00
12	Gasket, thermistor probe (Waukesha BD-190)	6.48
1	Generator, signal, assembly, 120 volt (Waukesha 111605)	860.00
1	Meter, detonation for console panel (Waukesha A 111263-B)	2,600.00
12	Filter bag carbon blaster (Waukesha 110958)	67.32
1	Pipe, water, assembly (Waukesha 0109131B)	66.40
1	Probe, thermistor (300 °F) (Waukesha 110389)	210.00
2	Bead, glass (Replacement 300 °F) (Waukesha 110389A)	115.00



## Specifications and Tolerances Committee

### REPORT OF THE COMMITTEE ON SPECIFICATIONS AND TOLERANCES

Fred A. Gerk, Chairman  
Director, Division of Standards and Consumer Services  
State of New Mexico

#### REFERENCE KEY NO.

#### 300 INTRODUCTION

The Committee on Specifications and Tolerances submits its Final Report to the 72nd Annual Meeting of the National Conference on Weights and Measures (NCWM).

The Report consists of the Interim Report offered in the Conference "Program and Committee Reports" as amended by Addendum Sheets issued during the Annual Meeting.

Items are grouped into the following series for ease of reference:

Sec. 1.14.	General Code	310 Series
Sec. 2.20.	Scales	320 Series
Sec. 2.21.	Belt-Conveyor Scale Systems	321 Series
Sec. 2.22.	Automatic Bulk Weighing Systems	322 Series
Sec. 3.30.	Liquid-Measuring Devices	330 Series
Sec. 3.31.	Vehicle-Tank Meters	331 Series
Sec. 3.32.	Liquified Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices	332 Series
Sec. 5.51.	Wire and Cordage Measuring Devices	351 Series
Sec. 5.53.	Odometers	353 Series
Sec. 5.56.	Grain Moisture Meters	356 Series
Other Items		360 Series

Table A identifies all of the items contained in the Report by Reference Key Number, Item Title, and Page Number. Table B lists the appendices to the Report. Table C contains the results of voting.

The items identified by a suffix "W" were on the Interim Meeting agenda for the Interim Meeting as voting items but were withdrawn for future reconsideration. The reasons for withdrawing these items are stated in the report. Items without a suffix are informational.

## Specifications and Tolerances Committee

Voting items are identified in **bold face type** as well as by a suffix "**V**" (i.e., **320-1 V**).

Before voting, the Committee grouped items they believed to have consensus support into a "consent calendar" that was offered for voting as a single item. These items are identified with a suffix "**VC**".

Following Table C, each item is described in detail in numerical sequence of the Reference Key Number.

Table A  
INDEX TO REFERENCE KEY ITEMS

Reference Key No.		Title of Item	Page
<b>SECTION 1.10. GENERAL CODE</b>			
310-1	W	G-S.5.2.2. Digital Indication and Representation	180
310-2		G-S.8. Provision for Sealing Electronic Adjustable Components	180
310-3	W	G-S.5.1. Indicating Elements - General	182
310-4	W	Definitions: Analog Type and Digital Type	183
310-5		Definition of Security Seal	183
310-6		Editorial Changes	183
<b>SECTION 2.20. SCALES</b>			
<b>320-1</b>	<b>V</b>	<b>S.1.1. Zero Indication</b>	183
320-2	W	S.1.9. Prepackaging Scales	184
320-3	W	S.1.11. Provision for Sealing Adjustable Components on Electronic Devices	185
<b>320-4</b>	<b>V</b>	<b>S.2.4.1. Level-Indicating Means: Class II and III Scales with a Capacity Less than 2000 lb</b>	185
<b>320-5A</b>	<b>V</b>	<b>Marking Requirements for Indicating and Weighing Elements</b>	186
<b>320-5B</b>	<b>V</b>	<b>Marking Requirements for Load Cells</b>	187
320-6		S.6.7. Vehicle Scale Section Capacity	189
		N.1.3.4. Vehicle Scale Shift Test	
<b>320-7</b>	<b>VC</b>	<b>N.1.3. Shift Test</b>	190
320-8		N.1.6. Electromagnetic Interference (EMI): Scales Code	190
320-9		N.3. Recommended Minimum Test Weights and Test Loads	191
320-10	W	N.5. Influence Factors Test	191
<b>320-11</b>	<b>VC</b>	<b>T.1.11. Tolerance Values - Grain Test Scales</b>	192
320-12	W	Scales Code T.1.2., Table 5	192

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320-13	VC	<b>T.2.6. Sensitivity Requirement - Grain Test Scales</b>	192
320-14A	V	<b>UR.1.1. Design Criteria and Tolerances for Crane and Hopper Scales (Other than Grain Hopper)</b>	193
320-14B	VC	<b>T.1.3. Tolerance Values for Crane Scales</b>	194
320-15	VC	<b>T.N.3.6.2. In-Motion Weighing Other Than Monorail Scales</b>	194
320-16	VC	<b>T.1.1. and T.1.2. Tolerance Values - Range of Errors for Shift or Section Tests</b>	195
320-17	W	<b>T.N.4.5. Time Dependence Test</b>	195
320-18	VC	<b>T.N.6. Sensitivity as Applicable to Vehicle, Axle-Load, Livestock, and Animal Scales</b>	196
320-19	VC	<b>T.N.8.2. Humidity</b>	197
320-20	W	<b>UR.1. Selection Requirement</b>	198
320-21	VC	<b>UR.1.1. Definition of Animal Scales</b>	198
320-22	W	<b>UR.2. Installation Requirements</b>	198
320-23	W	<b>UR.3.1. Recommended Minimum Load</b>	198
320-24	V	<b>UR.3.7. Minimum Load on a Vehicle Scale</b>	199
320-25	VC	<b>Definition of Decreasing-Load Test</b>	199
320-26		<b>Report of the Railroad Advisory Committee</b>	199
320-27	VC	<b>Report of the Technical Committee on National Type Evaluation - Weighing Industry Sector</b>	200
320-28	V	<b>S.1.2.1. Weight Units</b>	201
SECTION 2.21. BELT-CONVEYOR SCALE SYSTEMS			
321-1	VC	<b>T.4.3. Influence Factors - Radiated Interference</b>	202
321-2	VC	<b>UR.3.2. Maintenance</b>	203
SECTION 2.22. AUTOMATIC BULK WEIGHING SYSTEMS			
322	VC	<b>Editorial Changes</b>	204
SECTION 3.30. LIQUID-MEASURING DEVICES			
330-1		<b>Combined LMD Code</b>	205
330-2	V	<b>Recognize Mass Units for Metering</b>	205
330-3	W	<b>S.1. Design of Indicating Elements - Provision for Sealing</b>	209
		<b>G-S.2. Facilitation of Fraud</b>	
330-4	W	<b>S.1.4. Design of Indicating and Recording Elements for Retail Devices</b>	209

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INDEX TO REFERENCE KEY ITEMS

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330-6	W	S.1.4.4.2. Money Value Divisions, Digital	209
330-7	VC	<b>S.1.4.5. Agreement Between Indications</b>	209
330-8		Wholesale Meters - Product Vaporization and Test Procedure	210
330-9	VC	<b>S.2.7.4. Design of Measuring Elements, for Wholesale Devices Only</b>	211
330-10	W	S.2.7.1. For Wholesale Devices Equipped with Automatic Temperature Compensation	211
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330-14B	V	<b>T.2.3.3. Tolerance for Automatic Temperature-Compensating Systems</b>	214
330-15	VC	UR.1.1. Length of Discharge Hose	216
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SECTION 3.31. VEHICLE-TANK METERS			
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332-3	VC	<b>S.2.5. Thermometer Well</b>	220
332-4	W	S.2.6. Automatic Temperature Compensation	221
332-5	VC	<b>S.4.2. Discharge Rates</b>	221
332-6	VC	<b>UR.2.4. Temperature Compensation</b>	221

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The Report contains four appendices which are related to specific Reference Key Numbers as follows:

Table B  
APPENDICES

Appendix	Reference Key No.	Title of Appendix	Page
A.	320-27	Report of the Technical Committee on National Type Evaluation - Weighing Industry Sector	233
B.	330-20	Report of the Technical Committee on National Type Evaluation - Measuring Industry Sector	243



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Table B (Continued)  
APPENDICES

Appendix	Reference Key No.	Title of Appendix	Page
C.	360-2	Draft Electric Watt-Hour Meters Code	248
D.	360-3	Draft Carbon Dioxide Liquid-Measuring Devices Code	254

**ORDER OF PRESENTATION**

The report was presented to the membership as follows.

1. The Consent Calendar was presented.
2. Two items, 320-24 and 330-2, were removed from the Consent Calendar on request. These were added to those items to be voted on individually.

Table C  
VOTING RESULTS

Reference Key No.		House of State Representatives		House of Delegates		Results
		Yes	No	Yes	No	
Consent Calendar		50	0	75	0	Passed
320-1	V	41	5	49	25	Passed
320-4	V	19	27	42	23	Returned to Committee
320-5A	V	47	1	77	1	Passed
320-5B	V	34	8	58	10	Passed
320-14A	V	47	0	72	0	Passed
320-24	V	21	24	39	30	Returned to Committee
320-28	V	48	0	65	4	Passed
330-2	V	45	2	53	15	Passed
330-13	V	45	0	68	2	Passed

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Table C  
VOTING RESULTS

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
<b>330-14A</b> <b>V</b>	30	7	49	22	Passed
<b>330-14B</b> <b>V</b>	40	3	60	8	Passed
<b>332-8</b> <b>V</b>	47	0	68	0	Passed
The Report in its Entirety	49	0	73	1	Passed

### DETAILS OF ALL ITEMS (in the order they appear in Table A)

Much of the following material contains recommendations to revise or amend National Bureau of Standards (NBS) Handbook 44, 1987 Edition, "Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices." Proposed revisions to the handbook are shown in **bold face print** by ~~crossing out~~ what is to be deleted, and underlining what is to be added. Entirely new paragraphs or sections proposed for addition to the handbook are designated as such and shown in **bold face print**.

### SECTION 1.10. GENERAL CODE

#### 310-1    W        G-S.5.2.2. DIGITAL INDICATION AND REPRESENTATION

A proposal was made to change G-S.5.2.2.(e) to prohibit the use of mixed measurement units in the digital display of any device. Exemptions would have been given to some devices in the specific device codes. The Committee decided not to change the General Code, but to change the Scales Code instead. (See Item 320-28.)

#### 310-2            G-S.8.PROVISION FOR SEALING ELECTRONIC ADJUSTABLE COMPONENTS

The Committee received four proposals related to sealing electronic component, addressing the following three items:

1. the potential for adjusting the accuracy of a device from a computer that may be in a location other than at the site of the measuring device;

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2. the sealing of the operating features of a device selected at the time of installation, in addition to sealing any adjustment affecting the accuracy of the device; and
3. the sealing of an automatic temperature compensator that may be part of a computerized system in loading rack facilities.

The Committee agrees with the concept that access to switches or software that affect the metrological characteristics of a device should be sealable. Metrological characteristics are those indications, features, or operations of a device that fall under the regulatory authority of weights and measures enforcement. Handbook 44 already requires provisions for sealing the electronic and mechanical adjustments that affect the accuracy or performance of a device. Requirements that manufacturers provide for sealing all access to switches or software that might affect metrological characteristics have extensive ramifications, perhaps even redesign of equipment to comply.

Industry representatives have cautioned the Committee that such a requirement is premature and could stifle new technology. Some devices have their operating features controlled by computer software stored on floppy disks creating special problems for sealing. The automatic temperature-compensation system in a wholesale metering device is required to have a provision for sealing, but if the compensation is performed in a computer, it may be impossible to seal access to the software.

The objectives of sealing are to prevent:

1. the fraudulent use of a device by manipulating the metrological characteristics; or
2. changing the operational features after installation or inspection to features that are either incorrect or not suitable for a particular application.

The facilitation of fraud pertains only if the operational features can be changed without being obvious to the other party in the transaction. For example, a gallons-to-liters conversion switch that can be manipulated by a service station attendant might facilitate fraud. If the switch is located inside a dispenser, the panels of which must be removed to gain access to the switch, does not facilitate fraud because such an action would be apparent to the customer.

Examples of the types of features that would be affected by a provision for sealing are:

1. the gallon-to-liters conversion switch on retail motor fuel dispensers when the switch is located outside the dispenser;
2. the means for setting the values of pulses sent from a dispenser to a service station console for processing;
3. the selection of the operating range of the automatic zero-setting mechanism for scales;
4. the selection of the value for a scale or meter quantity division;

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5. the update time for a weight display; and
6. the setting of the sensitivity of the motion detection capability.

The sealing requirement is not intended to restrict operator access to stored data that must be maintained as part of normal operation, such as tare values, unit prices, department totals, or cash/credit unit-price selection. The requirement is not intended to restrict the selection of weight units by means of an external switch or key on a scale provided the weight unit in use is automatically and clearly displayed.

Because of the ramifications of the proposed requirement and the difficulty in phrasing it precisely with respect to all possible applications, no action on this issue is planned for the 1987 NCWM. Instead, the Committee recommends that the issue be addressed by the regional weights and measures associations with the objective of adopting a requirement or requirements in 1988.

Although the language is very broad, the Committee suggests that the following be reviewed by the regional weights and measures associations as a starting point for discussion.

Consider adding a new paragraph to the General Code to read:

G-S.9. Provision for Sealing Metrological Characteristics. - A device shall be designed with provision(s) for applying a security seal that must be broken, mutilated, or destroyed before any change can be made to any electronic mechanism that affects the metrological characteristics of the device. (Effective and nonretroactive as of January 1, 19\_\_.)

Consider adding the following definition:

Metrological characteristics. Those indications, features, operations or device design that fall under the jurisdiction of weights and measures regulation, such as motion detection parameters, the range of the automatic zero-setting mechanism, the selection of quantity-value divisions, and the setting of pulse values.

The regional associations are requested to develop more precise language to narrow the scope of such a requirement. The practicality from a manufacturing aspect and potential for inhibiting product design must also be considered.

### 310-3 W G-S.5.1. INDICATING ELEMENTS - GENERAL

The Committee was requested to study whether or not a test capability of digital displays ("segment check") should be required on scales and metering devices. This item was dropped because it was not sufficiently developed.

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### 310-4 W DEFINITIONS: ANALOG TYPE AND DIGITAL TYPE

The Committee was requested to clarify the definitions for analog type and digital type. The Committee concluded that the definitions were adequate and that a direct communication from the Office of Weights and Measures to the jurisdiction submitting the request would resolve the issue.

### 310-5 DEFINITION OF SECURITY SEAL

A request has been received to change the definition of security seal by deleting the phrase "a pressure-sensitive seal sufficiently permanent to indicate its removal, or a similar device." This would have the effect of requiring a lead and wire seal to be used as a security seal.

During the Interim Meeting, support was expressed by both industry and weights and measures officials for the continued use of the pressure-sensitive seal. Pressure-sensitive seals have been extremely useful and have performed well in a wide variety of applications. The Committee supports the use of both pressure-sensitive and lead and wire seals. Consequently, no change is proposed to the definition of security seal.

### 310-6 EDITORIAL CHANGES

The effective and nonretroactive statements will be editorially changed to achieve uniformity in the next printing.

## SECTION 2.20. SCALES

### 320-1 V S.1.1. ZERO INDICATION

(This item was adopted.)

At the 1986 NCWM, the vote was split on the S&T Committee recommendation to amend paragraph S.1.1. Zero Indication. Some confusion may have existed regarding the proposal, and that there was a lack of understanding of the technology used to automatically monitor the zero balance condition on a point-of-sale scale.

The Committee has examined point-of-sale equipment utilizing automatic monitoring of zero balance. The Committee concluded that the system complies with both S.1.1. Zero Balance and G-S.5.2.2. Digital Indication and Representation as these paragraphs are written. The system complies with S.1.1. because it provides an indication of "Scale Ready" when the scale is at zero balance within its sensitivity parameters to automatically monitor zero, and it provides an out-of-balance indication on both sides of zero.



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S.1.1. requires an indication of zero balance, but it does not specify continuous indication of the digital zero balance condition. A continuous (dedicated) weight display was needed formerly because the operator had to see the weight display to detect an out-of-zero balance condition. A dedicated weight display is no longer mandated provided that:

1. there are adequate safeguards in an automatic zero monitoring system to maintain a zero balance condition; and
2. the system inhibits operation whenever an out-of-zero balance condition is detected.

The point-of-sale system is judged to satisfy these requirements. Compliance with G-S.5.2.2.(d) is achieved since display of the digital zero balance indication complies with the requirements. Consequently, no change to these paragraphs is necessary to allow this technology to be used.

The Committee believes that the automatic monitoring of zero can be beneficial in other applications, but that implementation of this technology must be controlled. The appropriateness of an automatic means to monitor zero balance depends upon the checks and safeguards incorporated into the system. Since the automatic monitoring of zero balance is permitted under the present wording of S.1.1., the Committee proposes that S.1.1. be changed to limit its use. The intent is to require that each new method of implementation be reviewed by weights and measures officials before being placed into service.

To limit the use of this technology to point-of-sale systems at this time, the Committee recommends that S.1.1. be amended to read:

### **S.1.1. ZERO INDICATION. -**

- (a) ~~Provision shall be made~~ On a scale equipped with indicating or recording elements, provision shall be made to either indicate or record a zero-balance condition. and
- (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) On point-of-sale systems, 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 when the scale is in an out-of-balance condition.

### 320-2 W S.1.9. PREPACKAGING SCALES

A proposal would have required prepackaging scales to take tare to 0.001 lb. This issue requires more development before it can be considered. Factors to be considered include:

1. the impact on scales now in use;

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2. whether or not the tare value division would constitute a verification scale division and cause prepackaging scales to become Class II devices;
3. the ability of scales to store tare weights to the internal resolution of the scale in price look-up files;
4. the availability of existing prepack scales to take semiautomatic tare to the internal resolution of the scale; and
5. the benefit of such a requirement considering the variation of tare within a lot of containers.

320-3 W S.1.11. PROVISION FOR SEALING ADJUSTABLE COMPONENTS  
ON ELECTRONIC DEVICES.

This issue has been combined with Item 310-2.

320-4 V S.2.4.1. LEVEL-INDICATING MEANS: CLASS II AND III SCALES  
WITH A CAPACITY LESS THAN 2000 LB

(This item failed in the House of State Representatives  
and passed in the House of Delegates; therefore, it  
returns to the Committee)

Bubbles levels are the most common level-indicating means used on portable scales. The bubble levels have not always been installed so that the level condition of the scale is accurately reflected. In some instances, the bubble level has been mounted on a bracket that is easily bent, or the bubble level is installed in a location that does not facilitate its use when the scale is routinely moved. Additionally, not all scales have adjustable legs to establish a level condition in the event that the bench or counter is not level. Occasionally, shims have to be used to level a scale, but they tend to shift and nullify the level condition of the scale.

Consequently, the Committee recommends more specific requirements for the level-indicating means, its location, and methods for adjusting the level of the scale. The Committee recommends that a section heading S.2.4. LEVEL-INDICATING MEANS be added, and that the current text of S.2.4. appear in a paragraph S.2.4.2. ALL OTHER PORTABLE SCALES. The Committee recommends that a new paragraph S.2.4.1. be added to read:

**S.2.4.1. CLASS II AND III PORTABLE SCALES WITH A CAPACITY LESS  
THAN 2000 LB. -**

- (a) If the weighing performance of a portable scale is changed by an amount greater than the appropriate acceptance tolerance when the scale is moved from a level position and rebalanced in a position that is out of level in an upright direction by five percent (approximately three degrees), the scale shall be equipped with a rigidly mounted level - indicating means referenced to the base of the scale.
- (b) The level-indicating means must show a displacement of at least two

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millimeters when the scale is tilted five percent.

- (c) The level-indicating means on scales with a capacity more than 500 pounds shall be readable without removing any scale parts.
- (d) For all other scales, the level-indicating means shall be readable without requiring a tool to remove any scale parts.
- (e) Scales without wheels and with a capacity of 500 pounds or less shall have self-contained adjustable leveling means (e.g., adjustable legs).

**320-5A V MARKING REQUIREMENTS FOR INDICATING AND WEIGHING ELEMENTS**

(This item was adopted.)

It is a common practice in the United States for manufacturers to produce indicating elements that can interface with many different weighing elements and, conversely, for weighing elements to be marketed independent of a particular indicating element. Indicating and weighing elements may be evaluated separately in type evaluation and each element may receive a separate Certificate of Conformance. Upon installation, a complete scale must be marked with an accuracy class as required by S.6.1., but this does not apply to the separate indicating and weighing elements when they are not permanently attached to each other.

To facilitate the proper interfacing of equipment and to inform service representatives and weights and measures officials of the accuracy class of separate indicating and weighing elements, the Committee recommends that S.6.8. be amended and a new paragraph S.6.9. be added to require that the accuracy class and the maximum number of scale divisions be marked on indicating and weighing elements that are not permanently attached to each other.

Weighing elements not permanently attached to an indicating element shall also be marked with the smallest scale division at which it may be used.

The Committee recommends that the following changes be made.

Amend S.6.8. to read:

**S.6.8. WEIGHING ELEMENTS.** - A weighing element not permanently attached to an indicating element shall be clearly and permanently marked with the following:

- (a) name, initials, or trademark of the manufacturer;
- (b) the manufacturer's designation that positively identifies the pattern or design; and
- (c) the nominal capacity;
- (d) the accuracy class of I, II, III, III L, or IIII, as appropriate:\*

- (e) the maximum number of scale divisions;\*
- (f) and the minimum verification scale division for which the device complies with the applicable requirements.\*

(\*Nonretroactive as of January 1, 1988.)

Add a new paragraph S.6.9. to read:

**S.6.9. INDICATING ELEMENTS.** - In addition to the G-S.1. Identification requirement of the General Code, an indicating element not permanently attached to a weighing element shall be clearly and permanently marked with the accuracy class of I, II, III, III L, III/III L, or IIII, as appropriate and the maximum number of scale divisions, n, for which the indicator complies with the applicable requirements.

Indicating elements that qualify for use in both class III and III L applications may be marked III/III L and shall be marked with the maximum number of scale divisions for which the device complies with the applicable requirements.

(Nonretroactive as of January 1, 1988.)

### **320-5B V MARKING REQUIREMENTS FOR LOAD CELLS**

(This item was adopted.)

To determine the compliance of larger load-cell-based scales (capacities greater than 2000 lb) with the influence factor requirements, the load cells are tested separately under NTEP since the entire scale cannot be placed in an environmental chamber. The OIML International Recommendation (IR) 60 recommends that load cells be marked with specific information. The Technical Committee on National Type Evaluation has recommended that load cells tested separately for compliance with the influence factors should be marked in a manner similar to the requirements of IR 60.

The IR 60 markings requirements track IR 3 class designations and tolerances. Due to the differences between IR 3 "Metrological Regulations For Non-Automatic Weighing Instruments" and Handbook 44 class designations and tolerances, it is recommended that cells tested separately under NTEP be marked Class I, II, III, III L, and IIII to correspond with the scale classifications under Handbook 44. This is not intended to prevent a lower accuracy cell from being used in a higher accuracy scale if the scale corrects the cell performance to meet the requirements of the higher accuracy class. Similarly, a scale is not limited to the number of scale divisions for which the cell has been evaluated if the scale corrects the cell performance to meet the requirements imposed by a higher number of scale divisions. Whenever a scale "upgrades" the load cell class or increases the number of scale divisions in a scale above the number of divisions for which the load cell was evaluated, the scale must undergo a complete type evaluation.



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In addition, it was concluded that load cells that are not evaluated separately are not required to carry an accuracy class marking. It is intended that a manufacturer not be limited to using only the load cell type that was in the scale at the time of the evaluation. The manufacturer may use any load cell that is equivalent or "better" in terms of its metrological characteristics.

Since the same load cell may be evaluated for both Class III and III L scales and for both single and multiple cell applications, the load cell may have a different maximum number of scale divisions for each application. It is recommended that load cells be marked with an "S" or "M" for single and multiple cell applications, respectively, in conjunction with the maximum number of scale divisions for which the load cell may be used in each application to clearly indicate maximum number of scale divisions for which the load cell may be used.

The Committee recommends that a new paragraph S.6.10. LOAD CELLS be added to require that specific information be marked on load cells that are tested separately under the National Type Evaluation Program (NTEP), to read:

**S.6.10. LOAD CELLS. - Load cells for which Certificates of Conformance have been issued under the National Type Evaluation Program shall be marked with the following:**

- (a) the accuracy class of I, II, III, III L, or IIII corresponding to the scale accuracy class for which its use is intended;
- (b) the maximum number of scale divisions (stated in units of 1000) for which the accuracy class requirements are met;
- (c) an "S" or "M" for single or multiple cell applications, respectively, in conjunction with the maximum number of scale divisions for each accuracy class and application in which the load cell may be used;
- (d) the direction of loading, if not obvious;
- (e) special limits of working temperature, if other than 14 °F to 104 °F (-10 °C to 40 °C); and
- (f) the name and address of the manufacturer or his trademark, model designation, minimum dead load, maximum capacity, safe load limit, and load cell verification interval ( $V_{min}$ ).

The required information may be given on a data plate attached to the load cell or, alternatively, in an accompanying document. If the document is the source of the information, the serial number of the load cell shall be marked on the load cell plate and also given in the document. (Nonretroactive as of January 1, 1988.)



320-6

S.6.7. VEHICLE SCALE SECTION CAPACITY

N.1.3.4. VEHICLE SCALE SHIFT TEST

Reports have been received that some vehicle scales have been rated at high nominal and section capacities, but that the user has been told to limit loading to legal highway load limits. In effect, some stated nominal and section capacities may not reflect the actual amounts that can be accurately weighed on the scale.

To unify the methods used to rate nominal and section capacities within the weighing industry and promote accurate ratings, the Committee was asked to consider that:

1. the nominal capacity of a vehicle scale be a function of the stated sectional capacity and number of sections;
2. the sectional capacity be stated on the weighing element as well as on the indicating element;
3. section tests should be required at "mid-span" between sections as well as over each section;
4. a minimum test load based upon the section capacity should be specified for the mid-span section test; and
5. definitions should be provided for terminology related to this issue.

An industry task force reviewed this request, then submitted a specific proposal. It recommends that scales be marked with the nominal capacity, section capacity, and a "mid-span" (between sections) capacity. The basis of this recommendation is that the actual section capacity of a scale is greater than the mid-span capacity since the load-bearing points can take larger loads than the unsupported mid-span areas.

The Committee disagrees with this approach to rating nominal and section capacities of vehicle scales. It is the Committee's view that there should be a single section capacity for a scale. The section capacity should reflect the maximum load that can be weighed accurately no matter where it is placed on the scale platform over the typical area for conducting a section test. The Committee believes that a scale must be within applicable tolerances when tested to its section capacity with the load placed over each section and at "mid-span" between sections.

The Scale Manufacturers Association has developed a proposal that addresses all five items stated above. Weights and measures officials are encouraged to review the proposal and submit comments through their regional weights and measures associations to the Committee for consideration at the interim meeting in 1988.

Industry representatives are continuing discussions to develop a recommendation to the NCWM on this issue. The S&T Committee encourages industry to establish consensus, but wishes to advise interested parties of its views. The Committee believes that:

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1. the stated nominal capacity of large capacity, multi-section scales should be a function of the stated section capacity;
2. the stated section capacity and the "mid-span" capacity should be the same; and
3. a scale must be accurate when a test load equal to the section capacity is placed anywhere on the scale platform in a manner simulating a section test, including at "mid-span" between sections. The scale must also be accurate when a load equal to nominal capacity of the scale is distributed over the entire scale platform.

The Scale Manufacturers Association is discussing appropriate equipment and procedures for testing vehicle scales. If possible, the S&T Committee would like a recommendation on test equipment before the 1987 Annual Meeting.

The Committee plans to recommend specific changes to the Scales Code in 1988 to address this issue. Until that time, the Committee recommends that scales be tested as described above up to the nominal and section capacities of the scale.

Add a new paragraph at the bottom of page 3-15 to read:

**The Scale Manufacturers Association has developed a proposal that addresses all five item stated above. Weights and measures officials are encouraged to review the proposal and to submit comments through their regional weights and measures associations to the Committee for consideration at the interim meeting in 1988.**

### 320-7 VC N.1.3. SHIFT TEST

(This item was adopted as part of the consent calendar.)

As paragraph N.1.3. is written, the shift test applies to hopper scales. Since hopper scales are not generally subject to significant off-center loads, a shift test is not appropriate for hopper scales. Consequently, the Committee recommends that hopper scales be excluded from the shift test by changing the heading of N.1.3.7. to read:

**N.1.3.7. ALL OTHER SCALES EXCEPT CRANE SCALES, HANGING - SCALES, HOPPER SCALES, WHEEL-LOAD WEIGHERS, AND PORTABLE AXLE-LOAD SCALES.**

### 320-8 N.1.6. ELECTROMAGNETIC INTERFERENCE (EMI): SCALES CODE

A recommendation was received that a task force be established to work with the EMI experts at NBS Boulder to explore the possibility of establishing an acceptable and affordable NTEP laboratory test procedure to evaluate the susceptibility of a device to EMI. The NBS Boulder staff is willing to assist in the development of test procedures; however, outside funding to support this project would facilitate the research.

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NBS Boulder has provided a two-page summary on this issue. The key points are listed below.

1. EMI is a complex problem.
2. Different requirements may be needed for different devices; consequently, there is a need to characterize the EMI environment for weighing and measuring devices.
3. Different equipment and techniques are needed for different frequencies, field-strength levels, and sizes of equipment.
4. The test of a single element is a necessary but not sufficient evaluation for a weighing or measuring system.
5. The ANSI standard C63.12, "Recommended Practice on Procedures for Control of System Electromagnetic Capability," should be referenced for EMI considerations.

The issue was discussed by the Technical Committee on National Type Evaluation for scales in November 1986, without a clear course of action being apparent. Unless further recommendations are received, no further action is anticipated due to the expense involved for both research and test equipment.

The EMI requirements of Handbook 44 are still applicable to devices installed in the field. A field test for effects of EMI should be conducted by operating equipment and other possible EMI sources that are normally present at the field installation. Hand-held transceivers (walkie-talkies) should not be brought onto the premises of the device installation unless hand-held transceivers are normally used in the vicinity of the device. Even if transceivers are used on the site, efforts should be made to perform the EMI tests using the transceivers normally operated at the site.

320-9

### N.3. RECOMMENDED MINIMUM TEST WEIGHTS AND TEST LOADS

A proposal was received to remove the word "recommended" from N.3. This would have required private industry and enforcement officials to have the amount of weight specified in N.3. The Committee considered the fact that several states and service companies do not have the minimum amount of weight recommended in this paragraph. It is the Committee's view that, based upon economic and other factors, it is inappropriate at this time to mandate the amount of test weights specified in this paragraph. The Committee encourages comments on this item for future consideration.

320-10 W

### N.5. INFLUENCE FACTORS TEST

The Committee believes the table indicating the devices to be tested for specific influence factors is more appropriately dealt with as part of the technical policy in the type evaluation handbook. Consequently, see Item 320-27.

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**320-11 VC T.1.11. TOLERANCE VALUES - GRAIN TEST SCALES**

(This item was adopted as part of the consent calendar.)

With the adoption of the new Scales Code, the previous Scales Code tolerances for unmarked grain test scales were combined into Tables 3 and 6. To avoid the possibility of incorrectly applying the tolerances stated in T.1.2.1. to these scales, the Committee recommends that a new paragraph T.1.11. be added to read:

**T.1.11. GRAIN TEST SCALES.** - Class III tolerances shall apply to unmarked grain test scales with not more than 10,000 scale divisions. Class II tolerances shall apply to unmarked grain test scales with more than 10,000 scale divisions. The maintenance and acceptance tolerances shall be as stated in T.N.3.1. and T.N.3.2.

Paragraphs T.1.1. and T.1.2. will be changed editorially to reflect the new paragraph number of T.1.11. as follows:

**T.1.1. GENERAL.**- Except for equipment specified in paragraphs T.1.2. through ~~T.1.10.~~ T.1.11., the . . . .

**T.1.2. SCALES WITH LESS THAN 2000 SCALE DIVISIONS OR MORE THAN 5000 SCALE DIVISIONS.**- Except for scales specified in paragraphs T.1.3. through ~~T.1.9.~~ T.1.11., . . . .

**320-12 W SCALES CODE T.1.2., TABLE 5**

A proposal was received to clarify the tolerances for unmarked devices by expanding Table 5. The Committee concluded that it would be difficult to expand Table 5 in a manner that would address the many different values of scale divisions on devices to which Table 5 applies. Expanded tables may be beneficial to officials, but a simple and general revision of Table 5 was not apparent and not pursued.

**320-13 VC T.2.6. SENSITIVITY REQUIREMENT - GRAIN TEST SCALES**

(This item was adopted as part of the consent calendar.)

The Committee was asked to review the sensitivity requirements for grain test scales as stated in T.2.6. and T.N.6. The sensitivity requirement for unmarked grain test scales is more stringent than for marked grain test scales. It seems logical that these requirements should be the same, so the Committee recommends that T.2.6. be changed to read:

**T.2.6. GRAIN TEST SCALES:** ~~1-d-or-0.05-percent-of-the-scale-capacity, whichever-is-less.~~ The sensitivity shall be as stated in T.N.6.



**320-14A V      UR.1.1. DESIGN CRITERIA AND TOLERANCES FOR CRANE AND HOPPER SCALES (OTHER THAN GRAIN HOPPER)**

(This item was adopted.)

At the 71st NCWM, 1986, the S&T Committee stated that all crane and hopper scales shall be designed to meet all criteria of Class III devices with the exception that Class III L tolerances should apply. Design criteria of Class III are necessary because some hopper scales have scale divisions smaller than five pounds and have less than 2000 scale divisions. (See Table 3 for design limits of Class III L.) Paragraph T.N.3.4. was amended last year to allow Class III L tolerances to apply to all hopper scales except grain hopper scales. (Class III tolerances and design criteria apply to grain hopper scales.)

A proposal was received to amend T.N.3.4. to express the tolerances in a manner consistent with Class III and III L tolerances. The objective was to maintain the principle and distinction of the accuracy classes. However, the proposal deviated from the details of the tolerances for the accuracy classes, so the Committee was not convinced that a change to T.N.3.4. was necessary or beneficial.

For simplicity, the Committee believes that the requirements for only one accuracy class should apply to any one device. However, while hopper scales (other than grain hopper scales) have had the same tolerances as other large-capacity scales, the scales do not meet the specifications of Table 3 for the value of the verification scale division or the minimum number of scale divisions.

The Committee recommends that crane and hopper (other than grain hopper) scales be given an exemption to the Table 3 requirements for the value of the verification scale division and the minimum number of scale divisions. The minimum number of scale divisions is recommended to be 1000. If a crane or hopper scale application would have less than 1000 scale divisions, the scale would have to be marked Class III and meet Class III requirements. This would not be a problem because the tolerances for Class III and III L scales are the same up to 1000 divisions. The minimum value of the scale division is recommended to be 0.5 lb (0.2 kg), which is believed to be small enough to include small capacity hoppers.

Consequently, the Committee recommends that the two entries for Class III L scales in Table 3 be marked for a footnote and a footnote added to read:

**3The value of a scale division for crane and hopper (other than grain hopper) scales shall be not less than 0.5 lb (0.2 kg). The minimum number of scale divisions shall be not less than 1000.**

The Committee also recommends that the entry for Class III L scales in Table 7a under UR.1.1. be amended to read:

**III L      Vehicle, axle-load, livestock, railway track, crane, and hopper (other than grain hopper) scales.**



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**320-14B VC      T.1.3. TOLERANCE VALUES FOR CRANE SCALES**

(This item was adopted as part of the consent calendar.)

Crane scales are not referenced in the Tolerance Section T.1. for unmarked devices; consequently, the tolerances specified in T.1.2. apply. Before the revision of the Scales Code, the tolerances for crane scales were the same as for vehicle scales and other large-capacity scales. The tolerances for unmarked crane scales should be the same as for other large-capacity scales, hence the Committee recommends that the heading of T.1.3. be amended to read:

**T.1.3.      VEHICLE, AXLE-LOAD, LIVESTOCK, RAILWAY TRACK (WEIGHING STATICALLY), CRANE, AND HOPPER (OTHER THAN GRAIN HOPPER SCALES)**

**320-15 VC      T.N.3.6.2. IN-MOTION WEIGHING, OTHER THAN MONORAIL SCALES**

(This item was adopted as part of the consent calendar.)

A request has been received to clarify the application of these tolerance values and to allow a slightly different distribution of errors.

The Committee agrees and recommends that T.N.3.6.2. be amended to read:

**T.N.3.6.2. For any ~~single weighment within a group of weighments~~, the weighment errors shall not exceed the limits given below:**

<b>Percentage of Group</b>	<b>Maintenance Static Tolerance Multiplier</b>
<b>65</b>	<b>1</b>
<b>30</b>	<b>2</b>
<b>5</b>	<b>3</b>

- (a) No error may exceed three times the maintenance tolerance.**
- (b) No more than 5 percent of the errors may exceed twice the maintenance tolerance.**
- (c) No more than 35 percent of the errors may exceed the maintenance tolerance.**

320-16 VC

**T.1.1. AND T.1.2. TOLERANCE VALUES - RANGE OF ERRORS FOR SHIFT OR SECTION TESTS**

(This item was adopted as part of the consent calendar.)

The Committee received a request to amend T.N.4.4. Agreement of Indications - Shift or Section Tests to limit this requirement to multiple-section scales (i.e., to exempt bench, counter, and floor scales). The basis for the request was that:

1. the intent of the requirement is to preclude a user's taking advantage of section errors to weigh vehicles to the benefit of the scale operator;
2. the "small" platform size and method of use of bench, counter, and floor scales are such that the scale user cannot realistically use shift errors to his or her benefit; and
3. the requirement is an unnecessary tightening of the tolerances that will result in more scale maintenance and higher costs for scale adjustment.

The Committee believes the principle expressed in T.N.4.4. to limit the range of errors in the shift and section tests is a good one and should be maintained. One purpose of this requirement is to prevent a scale from having shift test errors at the extreme limits of the tolerance. The tolerance on the range of shift errors would allow the scale accuracy to deteriorate somewhat without the scale going out of tolerance. Although this is a more stringent requirement than has been applied to bench, counter, and floor scales in the past, the Committee believes it is an appropriate requirement for scales with an accuracy class marking, and consequently does not recommend any change to T.N.4.4. However, the Committee did not intend for this requirement to apply to unmarked bench, floor, and counter scales. To limit the application of this requirement to unmarked multiple-section scales and all marked scales, the Committee recommends that the references to T.N.4.4. in paragraphs T.1.1. and T.1.2. be deleted. The reference to T.N.4.4. in paragraph T.1.3. would still apply to vehicle, axle-load, livestock, and railway track scales (weighing statically), as it has in the past.

Under Item 320-11, modification was made to both T.1.1. and T.1.2. Those changes are already in the two quoted paragraphs below. The Committee recommends that T.1.1. and T.1.2. be further amended to read:

**T.1.1. GENERAL. - Except for equipment specified in paragraphs T.1.2. through ~~T.1.10.~~ T.1.11., the maintenance and acceptance tolerances shall be as set forth in T.N.2., T.N.3., T.N.4.1., T.N.4.2., T.N.4.3., ~~T.N.4.4.~~, T.N.5., and T.N.7.2., for Class III devices.**

**T.1.2. SCALES WITH LESS THAN 2000 SCALE DIVISIONS OR MORE THAN 5000 SCALE DIVISIONS. - Except for scales specified in paragraphs T.1.3. through ~~T.1.9.~~ T.1.11., the maintenance and acceptance tolerance shall be as shown in Table 5 (next page). Paragraphs T.N.2.5., T.N.4.1., T.N.4.2., T.N.4.3., ~~T.N.4.4.~~, T.N.5., and T.N.7.2. also apply.**

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320-17 W T.N.4.5. TIME DEPENDENCE TEST

A proposal was received to exempt Class I and II scales from the time dependence requirement. There was insufficient justification provided to the Committee for this proposal.

320-18 VC T.N.6. SENSITIVITY AS APPLICABLE TO VEHICLE, AXLE-LOAD, LIVESTOCK, AND ANIMAL SCALES

(This item was adopted as part of the consent calendar.)

The Committee had received requests to amend T.N.6. to change the sensitivity requirement for livestock and animal scales back to the requirements that existed before the revision of the Scales Code. The USDA Packers and Stockyards Administration (P&S) submitted data indicating that scales were being rejected at zero load under the current requirement. The P&S believes these scales were performing satisfactorily and would have passed under the previous requirements. Additionally, they believe that the higher sensitivity under load facilitates accurate livestock weighing and can be achieved routinely, especially when an auxiliary balance indicator is used. Although it was stated that the sensitivity of a scale will usually change as a load is applied, and that there are different types of balance indicators, there was significant support to return to the previous sensitivity requirements.

The Committee recommends that T.N.6. be amended so that the sensitivity requirement for both marked and unmarked vehicle, axle-load, livestock, and animal scales be consistent with the requirement that existed before revision of the Scales Code. The Committee recommends that T.N.6. be amended to read:

**T.N.6. SENSITIVITY.** - This section is applicable to all nonautomatic indicating scales marked I, II, III, III L or IIII.

**T.N.6.1. TEST LOAD.**

- (a) The test load for sensitivity for nonautomatic-indicating vehicle, axle-load, livestock, and animal scales shall be 1d for scales equipped with balance indicators, and 2d or 0.2 percent of the scale capacity, whichever is less, for scales not equipped with balance indicators.**
- (b) ~~A test load equivalent to~~ For all other nonautomatic-indicating scales, the test load for sensitivity shall be 1d at zero and 2d at maximum test load.**

**T.N.6.2. MINIMUM CHANGE OF INDICATIONS.** The addition or removal of the test load for sensitivity shall cause a minimum permanent change as follows:

- (a) for a scale with trig loop, but without a balance indicator, the position of the weighbeam shall change from the center to the outer limit of the trig loop;**

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- (b) for a scale with balance indicator, the position of the indicator shall change one division on the graduated scale, the width of the central target area, or the applicable value as shown below, whichever is greater:

Scale of Class I or II: 0.04 inch (1 mm),

Scale of Class II or III with a maximum capacity of 70 pounds (30 kg) or less: 0.08 inch (2 mm),

Scale of Class III, III L, or III with a maximum capacity or more than 70 pounds (30 kg): 0.20 inch (5 mm);

- (c) for a scale without a trig loop or balance indicator, the position of rest of the weighbeam or lever system shall change from the horizontal or midway between limiting stops to either limit of motion.

320-19 VC T.N.8.2. HUMIDITY

(This item was adopted as part of the consent calendar.)

The Committee was asked to review this requirement with respect to appropriateness, scope, cost, and benefit. There are persuasive arguments for retaining, modifying, or deleting the requirement. The Committee considered extensive information and comments. Some of the main points are reported below.

1. Humidity can affect the performance of electronics and load cells.
2. The humidity test reflects the principle of accelerated testing for environmental influence, which is a well-recognized and accepted principle.
3. It is generally accepted that test conditions are not real-world environments, either natural or induced.
4. Failures under severe test conditions may differ from these that occur under normal conditions of use.
5. All load cells must be tested for the humidity requirement because hermetically-sealed construction does not assure a hermetically-sealed load cell.
6. The humidity test is not uniformly applied in OIML member countries. Some countries perform the test on scales as prescribed, others do not perform the test at all; some test only load cells; and some run a durability-type of humidity test on load cells.

The Committee concluded that the humidity test does not reflect "real-world" conditions; that the requirement is not appropriate for the entire spectrum of scale designs and applications; and that there is a lack of evidence of measurement problems to support the need for the requirement.

**The Committee recommends that the paragraph T.N.8.2. Humidity be deleted.**



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### 320-20 W UR.1. SELECTION REQUIREMENT

The Committee received a proposal intended to prevent the values of a scale division from being changed to correct for an out-of-tolerance condition. The Committee concluded that it would be virtually impossible to determine that the scale division was changed solely for this reason. If a scale division is appropriate for an application, its use cannot be prevented. Additional justification and clarification is needed before a change to Handbook 44 can be considered.

### 320-21 VC UR.1.1. DEFINITION OF ANIMAL SCALE

(This item was adopted as part of the consent calendar.)

Animal scales are intended to be Class III devices, but are now defined as livestock scales designed for weighing single heads of livestock. In Table 7a, under UR.1.1., livestock scales are listed as Class III L devices, implying that animal scales are Class III L. This, in turn, requires animal scales to have scale divisions equal to or greater than five pounds (Table 3), which is inappropriate for the application.

To indicate clearly that animal scales are Class III devices, the Committee recommends that both the definition and Table 7a be changed. The Committee recommends that the definition of animal scale be amended to read:

**animal scale. A ~~H~~vestock scale designed for weighing single heads of livestock.**

The Committee recommends that animal scales be listed under Class III devices in Table 7a so it will read:

**III All commercial weighing, not otherwise specified, grain test scales, retail precious metals and semi-precious gem weighing, and animal scales.**

### 320-22 W UR.2. INSTALLATION REQUIREMENTS

A request to add a user requirement to the Scales Code indicating that it is illegal to sell an incorrect device was considered by the Committee. The Committee concluded that this was an issue falling under the purview of the L&R Committee. (See L&R Item 211-2.)

### 320-23 W UR.3.1. RECOMMENDED MINIMUM LOAD

The proposal to delete the word "recommended" from UR.3.1. was not adequately developed to be considered.



320-24 V UR.3.7. MINIMUM LOAD ON A VEHICLE SCALE

(This item failed in the House of State Representatives and passed in the House of Delegates; therefore, it returns to the Committee.)

Two regional weights and measures associations have recommended that UR.3.7. be amended to apply to net loads as well as gross loads. The basis for U.R.3.7. is that the load weighed on a scale should be sufficiently large that the resolution of the scale (rounded to the nearest scale division) does not result in an excessively large error as a percentage of the weighed load. This principle is even more important when determining net loads because the rounding to the nearest scale division occurs for both the gross and tare weight.

The Committee supports this principle, as it has in the past, and recommends that UR.3.7. be amended to read:

**UR.3.7. MINIMUM LOAD ON A VEHICLE SCALE. - A vehicle scale shall not be used for weighing a net load smaller than 1000 pounds.**

320-25 VC DEFINITION OF DECREASING-LOAD TEST

(This item was adopted as part of the consent calendar.)

Paragraphs N.1.2.1. and N.1.2.2. provide specific instructions for the minimum test loads to be used as part of the decreasing-load test. Some of the instructions conflict with the definition of decreasing-load test. The Committee recommends that the last sentence of the definition be deleted:

**decreasing-load test. A ~~special-supplementary~~ test for automatic-indicating scales only, during which the performance of the scale is tested as the load is reduced. ~~In this test, an observation is made with a test load equal to one half of the maximum applied test load.~~**

320-26 REPORT OF THE RAILROAD ADVISORY COMMITTEE

The Railroad Advisory Committee has performed coupled-in-motion tests on several railway track scales, and is analyzing the effects on the data of the profile of approach and exit tracks. A preliminary report of the Railroad Advisory Committee was presented at the Interim Meeting, and copies of the test data were given to the S&T Committee. By mutual agreement, the Railroad Advisory Committee will continue the data analysis and provide a final report and recommendations for consideration by the S&T Committee before the 1988 Interim Meeting.

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**REPORT OF THE TECHNICAL COMMITTEE ON NATIONAL  
TYPE EVALUATION - WEIGHING INDUSTRY SECTOR**

(This item was adopted as part of the consent calendar.)

The Technical Committee on National Type Evaluation - Weighing Industry Sector met on June 25-26, 1986, November 5-6, 1986, and June 24, 1987. The priority issues were to develop the program and procedures to test load cells for the influence factors in Handbook 44. Additionally, the technical committee established a table indicating which devices are to be tested for specific influence factors based upon which devices are susceptible to the influence factors. The technical committee also reviewed the type evaluation test procedure for railroad track scales, discussed the EMI and humidity issues, recommended marking requirements for load cells, and is currently reviewing an updated draft of the type evaluation checklist for digital scales.

The recommendations of the technical committee regarding the NTEP operation of testing load cells have been implemented.

The S&T Committee recommends that the following proposals of the Weighing Industry Sector, as detailed in Appendix A, be adopted by the NCWM for inclusion in the type evaluation handbook.

1. Incorporate the table of "Devices to be Tested for Influence Factors" as technical policy. (The table will be modified if necessary to reflect NCWM action on the humidity requirement.)
2. Incorporate as technical policy the following items under the heading of "NTEP Load Cell Testing," that is:
  - a. load cells to be submitted for test,
  - b. multiple load cell system tolerance, and
  - c. barometric pressure tests.
3. Incorporate the "NTEP Load Cell Test Procedures" as part of the criteria and test procedures of the type evaluation handbook.
4. Remove the tentative status of the test procedures for railroad track scales (used to weigh statically) adopted at the 1986 NCWM, but change the reference to "composite test cars" under the permanence test to "self-propelled test cars" to be consistent with the terminology of the Association of American Railroads and to properly identify the type of test car to be used.

NTEP Load Cell Test Procedures

The error values for the repeatability error stated in the table for Class III L load cells in Appendix A of the Interim Report have been corrected to be consistent with T.N.5.; the error values were based upon the absolute value of acceptance tolerance, but T.N.5. specifies that the tolerance for the creep test be based on the absolute value of maintenance tolerance. The Technical Committee concluded that the tolerance values specified for Class III L load cells in T.N.4.5. for the creep test are unacceptably large. They recommend that T.N.4.5. be

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amended in 1988 to reduce the tolerance. The Technical Committee therefore recommends that smaller tolerances be used immediately to analyze load cell data submitted to NTEP.

The recommendations of the Technical Committee have been accepted, but the suggested tolerance has been modified to be, in essence, 0.05 percent of the number of scale divisions for which the load cells meets the applicable requirements of Handbook 44. The Specifications and Tolerances Committee plans to recommend in 1988 that the tolerance for the creep test be one-half the acceptance tolerance for the capacity load applied to Class III L load cells. The table of tolerance values for Class III L load cells has been updated accordingly. The Committee recommends that the smaller tolerances be used immediately for the evaluation of test data for Class III L load cells.

Additionally, the Technical Committee recommends that observing the return to zero after loading a cell to capacity for 60 minutes could be used as an alternative to the creep test specified in Appendix A. Consequently, step 4 in the creep test procedure has been modified to indicate that either of the two test procedures may be used.

### 320-28 V S.1.2.1. WEIGHT UNITS

(This item was adopted.)

A digital electronic scale presenting weight values in a combination of units of pounds, ounces, and common fractions of an ounce, has been introduced into commercial measurement. Although pounds, ounces, and common fractions of an ounce are used in analog scales, the Committee feels that the digital representation in different weight units is unnecessary and confusing. The analog scale is permitted because most consumers are familiar with the scale, and the combination of the dial face and indicator provide an additional reference that aids understanding. The only application with a perceived need for digital indication of pounds and ounces is for postal scales. In this application, fractions of an ounce are represented as decimal fractions, not as common fractions.

The Committee concluded that the simultaneous use of both pounds and decimal ounces is appropriate in postal scale applications, but not other applications. The term "postal scale" is interpreted in the broad sense to include digital computing scales used to determine shipping rates for the U.S. Postal Service (USPS) and private delivery companies. There is some support in the Committee to limit this exemption to scales used exclusively by the USPS and scales combining USPS rate-computing with those of private delivery companies. This would limit scales used exclusively to compute rates for private delivery companies to indications in a single unit of weight (e.g., decimal pounds). The justification for this limitation is the belief that the break points in shipping rates for private companies are based on whole pound increments. Comments are requested on this point.

The Committee recommends that digital weight indications be limited to a single weight unit for all applications other than postal scales, and that digital representations of common fractions be prohibited. Selection of different weight units from an external key or switch would still be permitted.

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The effective date of this requirement is proposed to be January 1, 1989. This will provide the manufacturer of the first scale mentioned above to modify its design to meet the new requirement. This requirement would apply to commercial devices and would not affect those used in noncommercial applications.

The Committee recommends adding a definition for postal scale to clearly indicate which scales may have digital indication of both pounds and ounces. Additionally, a definition of weight classifier is recommended to describe the design and operation of those scales that round weight indications up to the next scale division, rather than rounding the weight to the nearest scale division. Because weight classifiers round weight values up to the next scale division, weight classifiers must be marked with a statement that limits their application to determining shipping rates. This marking is required under S.6.6. Weight classifiers normally compute shipping rates; have relatively large scale divisions; and, consequently, declare a verification scale division, *e*, that is smaller than the displayed scale division. Digital postal scales that indicate in pounds and ounces must be marked consistent with S.6.6. Postal Scales that indicate in a single weight unit and that round weight values to the nearest scale division are not required to be marked with the special application statement required by S.6.6. for weight classifiers.

Consequently, the Committee recommends adding a new paragraph S.1.2.1. to the Scales Code to read:

**S.1.2.1. WEIGHT UNITS.** - Except for postal scales, a digital-indicating scale shall indicate weight values using only a single unit of measure. Weight values shall be presented in a decimal format with the value of the scale division expressed as 1, 2, or 5, or a decimal multiple or submultiple of 1, 2, or 5.

(Nonretroactive and enforceable as of January 1, 1989.)

The Committee recommends the addition of the following definitions:

**postal scale.** A scale (usually a computing scale) designed for use to determine shipping weight or delivery charges for letters or parcels delivered by the U.S. Postal Service or private shipping companies. A weight classifier may be used as a postal scale.

**weight classifier.** A digital scale that rounds weight values up to the next scale division. These scales usually have a verification scale division, *e*, that is smaller than the displayed scale division.

## SECTION 2.21. BELT-CONVEYOR SCALE SYSTEMS

### 321-1 VC T.4.3. INFLUENCE FACTORS - RADIATED INTERFERENCE

(This item was adopted as part of the consent calendar.)

As reported in Item 320-8, EMI is a complicated issue. A field test should be performed using only that equipment normally on the site of the scale installation. Hand-held transceivers should not be brought onto the scale site for an EMI test unless similar transceivers are normally used in that vicinity. Since T.4.3.



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specifies that hand-held communicators be used for the EMI test, the Committee believes that T.4.3. should be deleted. The field test of the EMI effects would still be covered by G-UR.1.2. Environment. Consequently, the EMI test should be conducted at the test site by operating equipment that is normally used near the scale.

The Committee recommends that T.4.3. be deleted.

### 321-2 VC UR.3.2. MAINTENANCE

(This item was adopted as part of the consent calendar.)

The Committee received a request to reconsider the number of materials tests to be conducted as part of an official test of a belt-conveyor scale. The Committee concluded that it did not have sufficient information at this time to recommend a change in the number of materials tests to be performed.

Related to this issue, paragraph UR.3.2. was discussed: when may a belt-conveyor scale be adjusted based on the results of a simulated test? Currently, a belt-conveyor scale is not to be adjusted based on a simulated load test unless the error is greater than 0.4 percent. The restriction is intended to discourage frequent adjustment to a belt-conveyor scale to "correct" small errors indicated by the simulated load test. Frequent adjustments may result in a loss of the original materials test calibration value.

According to several comments, it is too restrictive to prohibit scale adjustment for errors up to 0.4 percent. The concept of prohibiting frequent adjustments to avoid "correcting" for what may be normal variations in belt-conveyor scale performance was endorsed, but it was suggested that the limit should be lowered to 0.25 percent. Considering the volume of material that passes over a belt-conveyor scale, permitting an error of 0.4 percent on the simulated test before adjustment results in unacceptably large measurement errors.

The Committee concurs with these comments and recommends that UR.3.2. be amended by changing the number 0.4 percent to 0.25 percent. The Committee recommends that UR.3.2.(b) be amended to read:

(b) Simulated load tests shall be conducted at periodic intervals between official tests to provide reasonable assurance that the device is performing correctly. The action to be taken as a result of simulated load test is as follows:

- if the error is less than ~~0.4~~ 0.25 percent, no adjustment is to be made;
- if the error is ~~0.4~~ 0.25 percent, up to and including 0.6 percent, adjustment may be made if the certifying authority is notified;
- if the error is greater than 0.6 percent, up to and including 0.75 percent, adjustments shall be made by a competent service person and the certifying authority notified. After such an adjustment, if the results of a subsequent test require adjustment in the same direction, an official test shall be conducted; and



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**if the error is greater than 0.75 percent, an official test is required.**

SECTION 2.22. AUTOMATIC BULK WEIGHING SYSTEMS

322 VC EDITORIAL CHANGES

(This item was adopted as part of the consent calendar.)

1. At the 1986 NCWM, the Automatic Bulk-Weighing Systems Code was changed to apply to all automatic bulk-weighing systems. Unfortunately, the reference to grain in the application paragraph A.1. was not deleted. Paragraph A.1. will be editorially changed for the 1988 edition of Handbook 44 to read:

**A.1. GENERAL. - This code applies to automatic bulk-weighing systems for grain; that is, a weighing system adapted to the automatic weighing of grain a commodity in successive drafts of predetermined amounts, automatically recording the no-load and loaded weight values and accumulating the net weight of each draft.**

2. At the 1985 NCWM, paragraph S.1.2. was changed as part of a rewrite of the code. The value of a scale division was restricted to be one of several specific values. This change should have been nonretroactive. Hence, S.1.2. will be editorially changed to be:

**Nonretroactive as of January 1, 1986.**

3. Paragraph N.1.1. addresses the minimum amount of test weights to be used to test automatic bulk-weighing scales. Because many of the test weights for automatic bulk-weighing systems are built into the facility, it is not practical to apply the minimum test weight requirement to all of these scales on a retroactive basis. Hence, the minimum test weight consideration of this paragraph is to be applied to those scales installed after January 1, 1984. Additionally, the term "buildup test" is intended to reference a combination of substitution and strain load tests.

The Committee recommends that N.1.1. be replaced with the revised N.1.1. and N.1.2. shown below, and that the current N.1.2. and N.1.3. be renumbered as N.1.3. and N.1.4., respectively.

**N.1.1. TEST WEIGHTS. - The increasing-load test shall be conducted using test weights equal to at least 10 percent of the capacity of the system:**

- (a) on automatic grain bulk-weighing systems installed after January 1, 1984, and
- (b) on other automatic bulk-weighing systems installed after January 1, 1986.

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**N.1.2. INCREASING-LOAD TEST.** - An increasing-load test consisting of substitution and strain-load tests shall be conducted up to the used capacity of the weighing system.

Add the definition:

**strain-load test.** The test of a scale beginning with the scale under load and applying known test weights to determine the accuracy of the scale over a portion of the weighing range of the scale. The scale errors for a strain-load test are the errors observed for the known test-weight loads only. The tolerances to be applied are based upon the known test-weight load used for each error that is determined.

### SECTION 3.30. LIQUID MEASURING DEVICES

#### 330-1 COMBINED LMD CODE

The Committee received comments on the draft Combined LMD Code. Based upon these comments, the Committee concluded that another draft of the Combined LMD Code is necessary before it is presented to the NCWM for adoption. A new draft based on the last edited draft is expected by the next Annual Meeting of the NCWM. All comments for the new draft are to be submitted to OWM by June 1, 1987. The Committee plans to present the Combined LMD Code for adoption at the 73rd Annual Meeting (1988). (Copies of the current draft are available from OWM.)

#### 330-2 V RECOGNIZE MASS UNITS FOR METERING

(This item was adopted.)

Mass flow meters are used to measure commodities in a variety of applications. It has been proposed that the use of mass flow meters be recognized in Handbook 44. New technologies should be accepted if they meet the required accuracy and specifications for a given application. The Committee is recommending changes to the LMD Code for wholesale meters and to the LPG and Anhydrous Ammonia Liquid-Measuring Devices Code to recognize mass flow meters. As experience is gained, the Committee may recommend that mass flow meters be allowed for other applications.

Two areas must be addressed to recognize mass flow meters.

1. Changes must be made to the code (HB-44) to recognize mass units. In addition, some states may have to change their laws or regulations to permit mass measurement of some commodities in liquid form.
2. Test procedures are necessary so weights and measures officials can adequately test a mass flow metering device to determine compliance with Handbook 44.

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Since air has a significant (approximately 0.1 percent) buoyant effect when weighing commodities with densities of  $1 \text{ g/cm}^3$ , a decision must be made whether or not to correct for that buoyant effect. When a flow meter determines mass for a commercial transaction, the quantity indication should logically be consistent with the results of weighing on a scale, hence the mass shall be indicated as the (uncorrected) apparent mass versus  $8.0 \text{ g/cm}^3$ . (See "Units and Systems, Section 3.2.)

The changes to Handbook 44 are relatively simple, changing references to units to allow pounds and changing "volume" to "quantity". The tolerances for mass flow meters are expressed in percent and are based upon existing tolerances for a particular size of test draft. The S&T Committee is recommending, in Item 330-14A, a change to the LMD Code to increase the tolerances for wholesale meters. If the tolerance change is accepted, the larger tolerances will also apply to mass flow meters.

Some states may have to review their laws and regulations to determine if some liquid commodities may be sold only by weight. For example, some states may require that gasoline and fuel oil be sold by liquid measure. Enforcement officials should be aware that weight is unaffected by temperature. Hence, the weighed quantity delivered to a customer will not vary from summer to winter, in contrast to the variations when using volume meters that do not compensate for temperature. The Committee believes that the sale of liquids by weight (subject to state laws and regulations) is appropriate.

Mass flow meters may be tested either by weighing the product measured by the meter or by measuring the product volumetrically, determining the specific gravity and temperature, and converting the volume to apparent mass versus  $8.0 \text{ g/cm}^3$ . To weigh the product, a receiving container is required, along with a scale with adequate capacity and resolution. The container may range from a 50-gallon drum to a tank truck, depending on the maximum flow rate of the meter. The accuracy of the scale must be determined since it is the primary limitation on the accuracy of the test of mass flow meters. A meter can be adjusted to agree with the results obtained from a particular scale, but the overall accuracy of the test process may have a "large" uncertainty.

### Test to be Run

It is recommended that a mass flow meter be tested at three flow rates: capacity, one-half capacity, and minimum flow rate. At least two tests (three are preferred) should be run at each flow rate. All results must be within tolerance.

### Selection of a Scale and Size of the Test Draft

A scale must be tested at least twice before it is used as a transfer standard. The scale should be tested to the maximum load to be applied during the test of the meter. The scale errors should be recorded so that corrections for scale errors can be made when testing the meter. Particular attention should be given to loads near the empty and loaded weights of the test container. Shift or section tests should be performed. The smaller the range in the shift errors, the less the shift errors will affect the test results. The container should always be placed in the same position on the scale so that the combination

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of shift test errors will not vary during the meter test. The test results on the scale must be repeatable.

The size of the scale division relative to the net load has a significant effect on the accuracy to which a meter can be tested. It will also affect the size of the test draft required to evaluate the meter. To keep the "rounding error" (caused by reading a scale to the nearest scale division) to an acceptably small level for a single weighing, the value of the scale division should not exceed one-tenth of the tolerance applied to the device. The rounding error occurs in both the gross and tare weights, so it could represent as much as two-tenths of the tolerance. Either 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.

For example, suppose a large-capacity (7000 lb/min) meter is to be tested using a vehicle scale with a 20-lb scale division as a transfer standard. Error weights should be used to increase readability to the nearest 5 lb for the gross and tare weights. Each weight value is  $\pm 2.5$  lb (reading to the nearest 5 lb), but since there are two weighings, gross and tare, the potential rounding error is 5 lb. The present acceptance tolerance for a wholesale loading-rack meter is approximately 0.11 percent. To limit the rounding error for each weighing to one-tenth of the tolerance, the test draft must be

$$\frac{2.5 \text{ lb} \times 10}{(.0011)} = 23,000 \text{ lb}$$

It is necessary to limit the total error in the transfer standard to less than one-third of the tolerance of the device under test. Consequently, it is necessary to thoroughly test the vehicle scale used as a transfer standard, verify that its results repeat very well, and correct for any errors determined during the scale test. This takes considerable time and care under field conditions. For devices with larger tolerances, the requirements for the test are not as severe. A description of the test procedure is given below to advise officials of the testing necessary for mass flow meters.

### Test Procedure for Field Testing Mass Flow Meters Using a Vehicle Scale as a Transfer Standard

1. Use error weights to test the scale to the nearest 5 lb.
2. Test each section of the scale to the maximum load to be applied over the section.
3. Distribute the test load over the portion of scale used to weigh the vehicles. Distribute the load in a manner that approximates the load distribution of the empty and loaded vehicles. Record the scale errors.
4. Position each truck, empty and loaded, in the same place on the vehicle scale. Use error weights to improve readability.
5. Make corrections to the vehicle weights based upon the distributed load test results.
6. Run several tests at different flow rates.



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The Committee recommends the following changes to the LMD Code to recognize mass units for wholesale devices:

**S.1.1.2. UNITS.** - A liquid-measuring device shall indicate, and record if the device is equipped to record, its delivery in terms of gallons, quarts, pints, pounds, or binary-submultiples or decimal subdivisions of the gallon or pound. The mass shall be expressed as apparent mass versus a density of 8.0 g/cm<sup>3</sup>.

**S.1.5.1. TRAVEL OF INDICATOR.** - A wholesale device shall be readily operable to deliver accurately any quantity from 50 gallons or 500 pounds to the capacity of the device. If the most sensitive element of the indicating system utilizes an indicator and graduations, the relative movement of these parts corresponding to a delivery of 1 gallon or 10 pounds shall be not less than 0.20 inch.

**N.3.5. FOR WHOLESALE DEVICES.** - Test drafts should be equal to at least the amount delivered by the device in one minute at its maximum discharge rate, and shall in no case be less than 50 gallons or 500 pounds.

The Committee recommends adding a new paragraph to read:

**S.2.9. FOR MASS FLOW METERS ONLY.** - An automatic means to determine and correct for changes in product density shall be incorporated in any mass flow metering system that is affected by changes in the density of the product being measured.

Add the tolerances for mass flow meters to Table 3 under T.2.3. as shown below.

**TABLE 3 - MAINTENANCE AND ACCEPTANCE TOLERANCES ON WHOLESALE DEVICES, AND MASS FLOW METERS, EXCEPT THOSE DEVICES USED FOR THE MEASUREMENT OF AGRI-CHEMICAL LIQUIDS**

Indication	<u>On normal tests</u>		<u>On special tests</u>
	Maintenance tolerance	Acceptance tolerance	Maintenance and acceptance tolerance
For Mass Flow Meters			
<u>pounds</u>	<u>0.3% of indicated quantity</u>	<u>0.2% of indicated quantity</u>	<u>0.5% of indicated quantity</u>

(The values in the table have been updated based upon the adoption of item 330-14A.)



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Add the following definition:

**mass flow meter.** - A device that measures the mass of a product flowing through the system. The mass measurement may be determined directly from the effects of mass on the sensing unit or may be inferred by measuring the properties of the product, such as the volume, density, temperature, or pressure, and displaying the quantity in mass units.

330-3 W S.1. DESIGN OF INDICATING ELEMENTS - PROVISION FOR SEALING G-S.2. FACILITATION OF FRAUD

This item has been combined with Item 310-2.

330-4 W S.1.4. DESIGN OF INDICATING AND RECORDING ELEMENTS FOR RETAIL DEVICES

The proposal to require customer displays at service station consoles needs further development and more support before being considered. The impact of such a requirement is significant and the benefit of such a requirement must be considered.

330-5 W S.1.4.3. DISPLAY OF UNIT PRICE AND PRODUCT IDENTITY

The request to specify how and where unit price and product information may appear on a dispenser needs more development before it can be considered.

330-6 W S.1.4.4.2. MONEY VALUE DIVISIONS, DIGITAL

The request to require quantity indications of 0.001 gallons or 0.005 liters, its impact, and benefits needs more development before it can be considered.

330-7 VC S.1.4.5. AGREEMENT BETWEEN INDICATIONS

(This item was adopted as part of the consent calendar.)

This paragraph was adopted in 1985, but the wording extends this requirement beyond the original intent. The purpose was to recognize that when a console receives only the sales price information from a dispenser and divides by the unit price, the computed quantity may deviate slightly from the digital quantity displayed on the dispenser. If a printed receipt is issued to a customer, the printed receipt must be mathematically correct with respect to quantity, unit price, and sales price. (See Report of the 70th NCWM 1985, pp. 124-125.)

As S.1.4.5. is currently written, all console indications and recorded values must be mathematically correct on a retroactive basis. This was not the original intent. The General Code paragraph G-S.5.5. was amended in 1973 so that a service station console did not have to be in mathematical agreement, provided it was an auxiliary indication; i.e., the indications are for the operator's use

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only. (See Report of the 58th NCWM 1973, p. 164.) This allowed the operator to write a credit card receipt from the console, typically recording the quantity to 0.1 gallon, without leaving the kiosk to check the quantity on the dispenser. If the console issues a printed receipt to be given to the customer, the console is no longer an auxiliary device, hence the recorded value must be in mathematical agreement.

There was significant support for the position that all consoles (auxiliary elements) interfaced with dispensers must have indications that are in mathematical agreement, although on a nonretroactive basis. Consequently, the Committee recommends that S.1.4.5. be amended by adding the words:

**(Nonretroactive as of January 1, 1988.)**

### 330-8                      WHOLESALE METERS - PRODUCT VAPORIZATION AND TEST PROCEDURE

The Office of Weights and Measures has consulted the American Petroleum Institute (API) and worked with several oil companies to investigate the problem of vaporization of gasoline during the test of a meter. Test results indicate that the design of a prover is a primary factor determining the amount of gasoline vaporized during a test. Different designs for the bottom loading inlet were equally effective in reducing the amount of gasoline vaporized.

The Office of Weights and Measures will continue to work with API, oil companies, and weights and measures officials to develop a final recommendation. OWM is considering a performance specification to limit the amount of gasoline that can be vaporized during a test rather than specify a specific prover design. The final recommendation will result in a change to NBS Handbook 105-3.

The API has a task force for developing a test procedure for testing loading-rack meters. The objective is to establish a detailed procedure that may be used by both industry and enforcement officials when testing loading-rack meters. The draft procedure is explicit and addresses aspects of the standard and test procedure not contained in the present Examination Procedure Outline for Loading-Rack Meters (NBS Handbook 112, EPO No. 25). The draft procedure includes corrections to the prover capacity and the change in product volume due to temperature. A check of the temperature probe is part of the procedure. Data sheets and reference tables are included.

The draft test procedure is being considered as a new EPO. The inspection and test criteria from the present EPO will have to be incorporated into the test procedure. (Copies of the current API draft are available from OWM for review.)

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**330-9 VC S.2.7.4. DESIGN OF MEASURING ELEMENTS, FOR WHOLESALE DEVICES ONLY**

(This item was adopted as part of the consent calendar.)

A proposal has been made to allow the use of electronic and liquid-in-glass thermometers in addition to mercury-in-glass thermometers by deleting the reference to the mercury-in-glass thermometer in S.2.7.4. It was also suggested that S.2.7.4. be combined with S.2.6., but this cannot be done because of the nonretroactive status of S.2.6.

Consequently, the Committee recommends that S.2.7.4. be changed to read:

**S.2.7.4. THERMOMETER WELL WITH AUTOMATIC TEMPERATURE COMPENSATION. - Means shall be provided for inserting, for test purposes, a mercury-in-glass thermometer. For test purposes, means shall be provided to determine the temperature of the liquid either:**

- (a) in the liquid chamber of the meter, or
- (b) in the meter inlet or discharge line and immediately adjacent to the meter.

**330-10 W S.2.7.1. FOR WHOLESALE DEVICES EQUIPPED WITH AUTOMATIC TEMPERATURE COMPENSATION**

See Item 330-18.

**330-11 W S.2.7.3. PROVISION FOR SEALING AUTOMATIC TEMPERATURE COMPENSATORS**

This issue has been combined with Item 310-2.

**330-12 W S.2.7.4. AND UR.3.5. LOCATION OF THE TEMPERATURE PROBE**

This issue is addressed in Item 330-14.

**330-13 V N.4.1. NORMAL TESTS**

(This item was adopted.)

The Committee has been asked to rewrite paragraphs N.4.1. and N.4.1.1. to clarify that:

- (1) the first test to be performed on a meter equipped with an automatic temperature-compensating (ATC) system is in the "as found" condition; and
- (2) tests run at normal flow with and without the ATC system are normal tests.

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A comment was received stating that the tolerances for a normal test are too stringent for a metering system equipped with a mechanical ATC system, hence the special test tolerances should apply. The Committee believes that, when an ATC system is provided, it reflects a normal operating condition of the metering system; therefore, normal test tolerances should apply. However, the Committee believes that the tolerances for wholesale meters should be increased to recognize variables that limit the repeatability of testing meters over time using different provers. The proposed increase in meter tolerances (see Item 330-14) should resolve the difficulty of metering systems utilizing mechanical ATCs to meet the tolerances for normal tests.

If a metering system is equipped with a means of indicating or recording both the gross (uncompensated) and net (temperature compensated) volumes, only one test is required to test the system with and without the ATC. Examples of these installations are computerized ATC Systems recording both the compensated and uncompensated volumes, and a meter with two registers, one compensated and the other uncompensated. In the case of a single register and a mechanical ATC, it is necessary to run the first full flow test with the ATC operating, then run a second full flow test with the ATC deactivated. Both of these are normal tests and must be within the applicable tolerances.

The Committee recommends that paragraphs N.4.1. and N.4.1.1. be rewritten to read:

**N.4.1. NORMAL TESTS.** - The "normal" test of a device shall be made at the maximum discharge rate that may be anticipated under the conditions of installation. ~~If a wholesale device is equipped with an automatic temperature compensator, this test should be conducted with the temperature compensator deactivated.~~

**N.4.1.1. AUTOMATIC-TEMPERATURE-COMPENSATION-ON WHOLESALE DEVICES EQUIPPED WITH AUTOMATIC TEMPERATURE-COMPENSATING SYSTEMS.** - ~~If a~~ On wholesale devices is equipped with an automatic temperature compensator compensating systems, the compensator normal tests shall be conducted tested:

(a) by comparing the compensated volume indicated or recorded by ~~the device, with the compensator connected and operating, with to~~ the actual delivered volume corrected to 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.



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### 330-14A V T.2.3. TOLERANCE VALUES ON WHOLESALE DEVICES

(This item was adopted.)

Industry representatives and enforcement officials have reported a lack of agreement between meter test results when different provers have been used to test the same meter. The Office of Weights and Measures has worked with several oil companies and found that the quantity of gasoline vaporized during a meter test may vary greatly from one prover to another. In some cases, this difference could represent more than one gallon of gasoline on a 1500-gallon test. In those tests, the amount of gasoline that vaporized varied from day to day, probably due to temperature variations and other factors.

In 1986, the S&T Committee suggested new tolerances for metering devices. For wholesale devices, the suggested acceptance and maintenance tolerances would be larger when test drafts are greater than 59 and 130 gallons, respectively. The Committee believes that larger tolerances for wholesale meters should be adopted this year, with the others to be addressed in 1988. Although the larger tolerances may be viewed as permitting more "errors" in the measurement system, the increase in tolerances actually reflects a realization of the limitations of repeating measurements over time using different provers. Variables affecting meter test results include the uncertainty in prover calibrations, day to day variations in meter accuracy, variation in the vaporization of gasoline, and the accuracy of the temperature measurement. Based upon repeated measurements using the same prover or prover design, oil companies may wish to limit meter errors to a range smaller than the meter tolerances. The larger tolerances will reduce the potential for disagreement in test results when different provers are used.

The Committee recommends that Table 3, under T.2.3.1., be deleted and that T.2.3.1. be changed to read:

#### T.2.3. WHOLESALE DEVICES AND MASS FLOW METERS

**T.2.3.1. EXCEPT THOSE USED FOR THE MEASUREMENT OF AGRICULTURAL CHEMICAL LIQUIDS. -Maintenance tolerances and acceptance tolerances shall be as shown in Table 3:**

##### On normal tests

<u>Acceptance tolerance</u>	<u>0.2%</u>
<u>Maintenance tolerance</u>	<u>0.3%</u>

##### On special tests

<u>Acceptance and maintenance tolerance</u>	<u>0.5%</u>
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If this change is adopted, the tolerances for mass flow meters would increase to the values stated above and the change to Table 3 proposed in Item 330-2 would no longer apply.

### **330-14B V      T.2.3. TOLERANCE FOR AUTOMATIC TEMPERATURE-COMPENSATING SYSTEMS**

(This item was adopted.)

The Committee has received a proposal to establish a tolerance on the temperature probe of electronic temperature-compensating systems. Although there is a significant amount of support for this proposal, the Committee is reluctant to establish a tolerance for a component of a measuring system. The Committee supports the establishment of a tolerance on the performance of the temperature-compensating system that, in effect, recognizes that an error may be present in the temperature probe. This tolerance would set a limit on the difference in meter errors when tested with and without the temperature-compensating system. (See Item 330-13.) The results of tests with and without the temperature-compensating system would still have to be within the applicable acceptance and maintenance tolerances but, in addition, the meter errors could not differ by more than 0.2 percent of the test draft, which is proposed as the tolerance.

The advantages of a performance approach to the accuracy of the temperature-compensating system are that:

1. it tests the entire temperature-compensating system;
2. in some cases compliance can be determined from the data obtained from the meter test, so no additional testing is required;
3. it eliminates the need to establish a separate tolerance for a component (i.e., the temperature probe) in the measuring system;
4. the location of the temperature probe does not have to be specified since the performance determines the suitability of the system; and
5. it is not necessary to require a thermometer well adjacent to the temperature probe to determine its accuracy.

If the difference between the meter errors for the tests with and without the temperature-compensating system exceeds the tolerance, the metering system should be rejected. It is the user's responsibility to determine whether or not the error is in the temperature probe or some other part of the system and correct it. (See G-UR.4.1. and G-UR.4.2.)

To illustrate the application of this tolerance for loading-rack meters, consider a system that provides the net and gross gallons for each delivery. If the system has a mechanical automatic temperature compensation system, two tests have to be run: one with and one without the temperature compensator activated.

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### Example

Product: #2 fuel oil                      API Gravity:                      35.5

#### Test Data

1.	Flow rate (GPM)	600
2.	Registered gross meter volume (gal)	798.7
3.	Registered or recorded net meter volume (gal)	796
4.	Product temperature at meter (oF)	67
5.	Table 6B* correction factor (item 4)	0.9967
6.	Prover reading (gal)	799.0
7.	Product temperature in prover (oF)	67
8.	Table 6B* correction factor (item 4)	0.9967
9.	Correction factor for prover temperature	1.00013
10.	Gross volume in prover (gal) (item 6 x item 9)	799.1
11.	Gross meter error (gal) (item 2 - item 10)	-0.4
12.	Net volume in prover (gal) (item 8 x item 10)	796.5
13.	Net meter error (gal) (item 3 - item 12)	-0.5

\*API Standard 2540 (ASTM Standard D1250)

The difference between the gross and net meter error is 0.1 gallon. The tolerance is 0.2 percent of the test draft of approximately 800 gallons or 1.6 gallon. The automatic temperature-compensating system would pass.

The tolerance of 0.2 percent is an indirect tolerance on the temperature probe, but checks the entire automatic temperature-compensating system. The temperature probe error permitted by this tolerance depends upon the coefficient of expansion for each product. If the entire error is assumed to be in the temperature probe, the temperature error permitted by this tolerance can be computed.

Based upon a 1000-gallon test draft and using approximate values for coefficients of expansion, the temperature probe errors for a tolerance of 0.2 percent of the test draft is:

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<u>Product</u>	<u>Permitted Probe Error in °F</u>
Gasoline	3.4
#2 Fuel Oil	4.0

The temperature errors permitted by a performance tolerance are slightly larger than suggested in the original proposal to the Committee since results will generally do not repeat exactly in consecutive tests, so a slightly larger tolerance is reasonable.

The Committee recommends that a performance tolerance for automatic temperature-compensating systems be added for wholesale meters. The Committee recommends that a new paragraph T.2.3.3. be added to read:

**T.2.3.3. AUTOMATIC TEMPERATURE COMPENSATING SYSTEMS. - The difference between the meter error for results determined with and without the automatic temperature-compensating system activated shall not exceed 0.2 percent of the test draft. The results of each test shall be within the applicable acceptance or maintenance tolerance.**

**(Nonretroactive as of January 1, 1988.)**

### **330-15 VC UR.1.1. LENGTH OF DISCHARGE HOSE**

(This item was adopted as part of the consent calendar)

Dispensers used to fill trucks are permitted to have two delivery outlets provided that flow cannot readily be diverted (UR.2.4.). Paragraph UR.1.1. specifies that the discharge hose shall not exceed 18 feet when measured from the dispenser housing to the inlet of the discharge nozzle. The "satellite" delivery outlet at a truck dispenser will probably violate UR.1.1. if the piping is included as part of the discharge hose. Similarly, some marinas place dispensers on the shore and have piping from the dispenser to the remote location of the delivery hose.

The major problem anticipated in such installations now in use is "computer jump" due to expansion of the pipe between the dispenser and the delivery hose. One jurisdiction with numerous installations of the type described above reports no unusual problems with "computer jump." If "computer jump" occurs, then the installation must be modified to correct the problem.

To recognize dispensers currently in use at truck stops and marinas, the Committee recommends the following:

Amend UR.1.1. to read:

**UR.1.1. LENGTH OF DISCHARGE HOSE. - The length of the discharge hose on a retail motor fuel device shall not exceed 18 feet, measured from the outside of the housing of the device its housing or outlet of the discharge line to the inlet of the discharge nozzle, unless it can be demonstrated that a longer hose is essential to permit deliveries to be**

made to receiving vehicles or vessels. (On a hose that may be coiled or otherwise retained or connected inside the housing, the measurement shall be made with the hose fully extended.) Unnecessarily remote location of a device shall not be accepted as justification for an abnormally long hose.

Add the following two definitions:

**Discharge line.** A rigid pipe connected to the outlet of a measuring device.

**Discharge hose.** A flexible hose connected to the discharge outlet of a measuring device or its discharge line.

**330-16 VC UR.2.1. PLUMB AND LEVEL CONDITION**

(This item was adopted as part of the consent calendar.)

This requirement was apparently directed to gravity-fill dispensers. According to device manufacturers, a plumb and level condition is not crucial to the accuracy of devices currently in use. It is important, however, that a device be secured to a foundation to avoid adverse effects on its performance.

The Committee recommends that the present paragraph, UR.2.1. Plumb and Level Condition, be deleted and replaced with a new paragraph to read:

**UR.2.1. INSTALLATION.** - A device shall be installed in accordance with the manufacturer's instructions, and the installation shall be sufficiently secure and rigid to maintain this condition.

**330-17 VC UR.2.5. PRODUCT STORAGE IDENTIFICATION**

(This item was adopted as part of the consent calendar.)

The American Petroleum Institute has developed two standards recommending particular colors and symbols to be used to mark equipment and vehicles for the product being handled or stored. These standards are:

1. API Bulletin No. 1542, Fourth Edition, April 1986, entitled "Airport Equipment Marking for Fuel Identification," and
2. API Recommended Practice 1637, First Edition, October 1986, entitled "Using the API Color-Symbol System to Mark Equipment and Vehicles for Product Identification at Service Stations and Distribution Terminals."

A standardized marking system would help prevent the contamination of a product when returning it to storage after testing a meter. The Committee considered adding these standards to UR.2.5. or referencing these standards in the paragraph. Because the standards address equipment not normally under the jurisdiction of weights and measures enforcement, the Committee believes that it would exceed the authority of weights and measures officials include these standards as part of Handbook 44. Additionally, requiring specific symbols for identification may be inappropriate since UR.2.5. has required product storage identification for



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some time, and it may create enforcement problems if equipment is clearly marked with a different code system.

The Committee supports the use of a single system of color-symbol coding and recommends that any jurisdiction considering regulations in this area should adopt the standards developed by the API. Industry is encouraged to utilize the API-recommended color-symbol coding. Although no change is recommended to UR.2.5., the Committee believes that the API documents should be adopted as NCWM recommendations to promote their use.

**The Committee recommends that API Bulletin No. 1542 and API Recommended Practice 1637 be adopted as recommendations of the NCWM.**

**330-18 VC**

### **UR.3.5.2. WRITTEN INVOICE**

(This item was adopted as part of the consent calendar.)

The Committee received a proposal to change the term "automatic temperature compensator" to "automatic temperature-compensating system" so that it clearly applies to computerized (electronic) systems as well as to mechanical compensators. The Committee concurs, and believes that both mechanical and electronic systems are covered by the term "automatic temperature compensator." Any reference in the code to automatic temperature compensators will be editorially changed to automatic temperature-compensating systems.

The Committee also addressed the information that should be required on an invoice and considered whether written invoices applied to both handwritten tickets and printed tickets. The Committee believes the requirement should apply to handwritten and to printed tickets. Additionally, the Committee believes that an invoice should also state the API gravity, product temperature at the time of delivery, and the gross meter reading. In the case of handwritten tickets, the headings and entry spaces can be preprinted and completed at the time of delivery.

The Committee recommends that UR.3.5.2. be amended to read:

**UR.3.5.2. WRITTEN INVOICES. - Any written invoice based on a reading of a wholesale device that is equipped with an automatic temperature-compensator compensating system shall have shown thereon that the volume delivered has been adjusted to the volume at 60 oF. The invoice issued from an electronic wholesale device equipped with an automatic temperature compensating system shall also indicate the API specific gravity or coefficient of expansion, product temperature, and gross reading.**

**330-19 VC**

### **UR.3.2. DEFINITIONS: FACE AND SIDE**

(This item was adopted as part of the consent calendar.)

The terms "face" and "side" are used in several places in the LMD code. To clarify these paragraphs, definitions of these terms would be helpful. The Committee is considering changing the "face" and "side" in the code to other



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terminology, such as "display area" and "customer side". Pending further review, the Committee recommends the addition of the following definitions to the code:

**face.** That portion of a computing-type pump or dispenser which displays the actual computation of price per unit, delivered quantity, and total sale price. In the case of some electronic displays, this may not be an integral part of the pump or dispenser.

**side.** That portion of a pump or dispenser which faces the consumer during the normal delivery of product.

There is inconsistency in the use of the terms "face" and "side" in S.1.4.3. and UR.3.2. with respect to marking the identity of the product. To be consistent, the Committee recommends that UR.3.2. be changed editorially to read:

**UR.3.2. UNIT PRICE AND PRODUCT IDENTITY.** - On a retail device, there shall be displayed on each face of the device the price at which the product is offered for sale and, in the case of a computing-type or moneyoperated type, the unit price at which the device is set to compute and deliver. There shall also be conspicuously displayed on each face side of the device, in the most descriptive terms commercially practicable, the identity of the product that is being dispensed. If a device is designed to dispense more than one grade, brand, blend, or mixture of product, the identity of the grade, brand, blend, or mixture which the device is set to dispense shall be displayed on each face side of the device at any time the device is in service.

Change the word "face" in the last sentence of S.1.4.3. to "side".

### 330-20 REPORT OF THE TECHNICAL COMMITTEE ON NATIONAL TYPE EVALUATION - MEASURING INDUSTRY SECTOR

The Technical Committee on National Type Evaluation - Measuring Industry Sector met during the Interim Meeting. The Advisory Committee reviewed permanence test procedures for different types of meters and discussed the acceptable operation of card-activated systems, particularly related to the use of bank cards, power loss during a transaction, and the potential for fraud.

The Advisory Committee is not recommending any changes to the type evaluation criteria at this time. Instead, the topics discussed are reported for comment and further study. It was agreed that the permanence test procedures could be implemented immediately by NTEP Participating Laboratories, but adoption by the NCWM will be delayed until experience has been gained with these procedures.

Agreement was not obtained on new checklist criteria and test procedures regarding power loss on card-activated systems. The concern is that, while the criteria and tests may be appropriate, there may be conflicts with requirements for the banking systems. Additionally, time will be required to incorporate some of these safeguards into the design of current equipment. The

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objective of providing these criteria as an information item is to allow comment, permit inquiries to explore whether or not there are conflicts with banking systems, and to use the criteria as guidelines in type evaluation to determine whether or not problems exist, but not to use the guidelines as "pass/fail" criteria.

The Advisory Committee will review the issues over the next year with the plan of submitting specific recommendations in time for the 1988 Annual Meeting.

### SECTION 3.31. VEHICLE TANK METERS

#### 331 W TICKET PRINTERS

The proposal to clarify the times during which a ticket may be inserted or removed from the ticket printer needs further development before it can be considered.

### SECTION 3.32. LIQUEFIED PETROLEUM GAS AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES.

#### 332-1 W S.1.1.5. MONEY VALUES - MATHEMATICAL AGREEMENT

The proposal to amend the code for stationary devices was developed before the 1987 edition of Handbook 44 was available. The action taken last year has addressed and resolved this issue.

#### 332-2 W S.1.5.2.2. MONEY-VALUE DIVISIONS, DIGITAL

Although the maximum division value for quantity is not specified, a problem does not appear to exist. Consequently, due to the many items on the agenda, this item was dropped.

#### 332-3 VC S.2.5. THERMOMETER WELL

(This item was adopted as part of the consent calendar.)

See also Item 330-9.

To allow the use of electronic and liquid-in-glass thermometers, the Committee recommends that S.2.5. be amended to read:

**S.2.5. THERMOMETER WELL. - ~~Means shall be provided for inserting, for test purposes, a mercury-in-glass thermometer~~ For test purposes, means shall be provided to determine the temperature of the liquid either:**

(a) in the liquid chamber of the meter, or

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- (b) in the meter inlet or discharge line and immediately adjacent to the meter.

332-4 W S.2.6. AUTOMATIC TEMPERATURE COMPENSATION

The Committee was requested to propose requiring automatic temperature-compensation systems on devices with a discharge rate greater than 20 gallons per minute. Due to the different views on automatic temperature compensation held by weights and measures officials, the majority of the Committee believed this issue should be addressed in the regulations of each jurisdiction, and that it has been addressed in Handbook 130 by the Conference and the Laws and Regulations Committee.

332-5 VC S.4.2. DISCHARGE RATES

(This item was adopted as part of the consent calendar.)

Some stationary LPG dispensers are used exclusively to deliver product to containers and not to motor vehicles. The dispensers are identical to motor fuel devices, so the requirement for marking should apply to all stationary LPG dispensers.

The Committee recommends that S.4.2. be amended to read:

**S.4.2. DISCHARGE RATES.** - A device shall be marked to show its designed maximum and minimum discharge rates. The marked minimum discharge rate shall not exceed:

- (a) 5 gallons per minute for ~~motor-fuel~~ stationary retail devices, or
- (b) 20 percent of the marked maximum discharge rate for other retail devices and for wholesale devices.

332-6 VC UR.2.4. TEMPERATURE COMPENSATION

(This item was adopted as part of the consent calendar.)

To permit the owner/user discretion over the placement of temperature-sensing equipment for the purpose of temperature compensation, the Committee recommends adding a new user requirement to read:

**UR.2.4.4. AUTOMATIC TEMPERATURE-COMPENSATING SYSTEMS.** - Means for determining the temperature of measured liquid in an automatic temperature-compensating system shall be so designed and located that, in any "usual and customary" use of the system, the resulting indications and/or recorded representations are within applicable tolerances.

Specifications and Tolerances Committee

**332-7 VC WEIGHT INDICATIONS FOR ANHYDROUS AMMONIA**

(This item was adopted as part of the consent calendar.)

Anhydrous ammonia is used primarily as a fertilizer and many state laws require fertilizer to be sold by weight. The LPG and Anhydrous Ammonia Liquid-Measuring Devices Code specifies only units of fluid volume to be used on these devices. Mass-flow meters are available that measure products directly in mass units and would be suitable for the measurement of anhydrous ammonia and LPG. The discussion of mass-flow meters in Item 330-2 is applicable here as well.

The Committee recommends that this code be amended to allow mass units to be used for devices falling under this code. The changes consist primarily of including appropriate references to weight, and weight values roughly corresponding to the volume quantities specified in the code. To permit the tolerances to apply to both volume and mass flow meters, the tolerances are expressed in percent and are a direct conversion of the existing tolerances. As a result, these values are not "convenient" percentage numbers. The Report of the 71st NCWM 1986, page 197, discusses new tolerances for these devices. The Committee plans to recommend changing these tolerances in 1988 to:

	Underregistration	Overregistration
Normal tests		
Acceptance tolerance	0.75%	0.5%
Maintenance tolerance	1.5%	1.0%
Special tests		
Acceptance and maintenance tolerance	1.5%	1.0%

The Committee recommends adding a new paragraph S.2.7. and amending the following paragraphs to read:

**S.1.1.2. UNITS.** - A device shall indicate and record, if the device is equipped to record, its deliveries in term of gallons, quarts, pints, pounds, or binary-submultiple or decimal subdivisions of the gallon or pound. The mass shall be expressed as apparent mass versus a density of 8.0 g/cm<sup>3</sup>.

**S.1.1.3. VALUE OF SMALLEST UNIT.** - The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed the equivalent of:

- (a) one pint or one pound on retail devices, or
- (b) one gallon or ten pounds on wholesale devices.



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S.1.1.6. PRINTED TICKET. - Any printed ticket issued by a device of the computing type on which there is printed the total computed price, shall have printed clearly thereon the total volume of the delivery in terms of gallons or pounds and the appropriate fraction of the gallon or pound and the price per gallon or pound.

S.1.6.1. TRAVEL OF INDICATOR. - A wholesale device shall be readily operable to deliver accurately any quantity from 50 gallons or 500 pounds to the capacity of the device. If the most sensitive element of the indicating system utilizes an indicator and graduations, the relative amount of these parts corresponding to a delivery of 1 gallon or 10 pounds shall be not less than 0.20 inch.

S.2.5. THERMOMETER WELL, EXCEPT FOR DIRECT MASS FLOW DEVICES.

S.2.7. FOR MASS FLOW METERS ONLY. - An automatic means to determine and correct for changes in product density shall be incorporated in any mass flow metering system that is affected by changes in the density of the product being measured.

N.4.2.3. FOR WHOLESALE DEVICES. - A wholesale device shall be so tested at a minimum discharge rate of:

- (a) 10 gallons per minute or 100 pounds per minute for a device with a rated maximum discharge less than 50 gallons per minute or 500 pounds per minute.
- (b) 20 percent of the marked maximum discharge rate for a device with a rated maximum discharge of 50 gallons per minute or 500 pounds per minute or more, or

T.2.1. ON NORMAL TESTS. - The maintenance tolerance on "normal" tests shall be ~~4 cubic inches per indicated gallon~~ 1.7 percent of indicated quantity on underregistration and ~~2 cubic inches per indicated gallon~~ 0.87 percent of indicated quantity on overregistration. The acceptance tolerance on "normal" tests shall be 2 cubic inches per indicated gallon 0.87 percent of indicated quantity on underregistration and ~~1 cubic inch per indicated gallon~~ 0.43 percent of indicated quantity on overregistration.

T.2.2. ON SPECIAL TESTS. - The maintenance and acceptance tolerances shall be ~~4 cubic inches per indicated gallon~~ 1.7 percent of indicated quantity on underregistration and ~~2 cubic inches per indicated gallon~~ 0.87 percent of indicated quantity on overregistration.

Amend the definition of retail device to read:

retail device. A device used for single deliveries of liquified petroleum gas for domestic use and liquefied petroleum gas or liquid anhydrous ammonia for or non-resale use.



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Amend the following definition to read:

liquefied petroleum gas liquid-measuring device. A system including a mechanism or machine of the meter type designed to measure and deliver liquefied petroleum gas in the liquid state by a definite volume quantity, whether installed in a permanent location or mounted on a vehicle. Means may or may not be provided to indicate automatically, for one of a series of unit prices, the total money value of the liquid measured.

Add the following definition:

mass flow meter. - A device that measures the mass of a product flowing through the system. The mass measurement may be determined directly from the effects of mass on the sensing unit or may be inferred by measuring the properties of the product, such as the volume, density, temperature, or pressure, and displaying the quantity in mass units.

332-8 V N.4.1. NORMAL TESTS

(This item was adopted.)

The discussion in Item 330-13 regarding the normal tests for a meter with an automatic temperature-compensating system applies to LPG and anhydrous ammonia liquid meters as well. The Committee recommends that paragraphs N.4.1. and N.4.1.1. be changed to be consistent with the changes recommended in Item 330-13. The tolerance for the automatic temperature compensator is not included in this change to the LPG/Anhydrous Ammonia Device Code but is being considered for 1988.

The Committee recommends that paragraphs N.4.1. and N.4.1.1. be amended to read:

N.4.1. NORMAL TESTS. - The "normal" test of a device shall be made at the maximum discharge rate that may be anticipated under the conditions of installation. ~~If the device is equipped with an automatic temperature compensator, this test should be conducted with the temperature compensator deactivated.~~

N.4.1.1. AUTOMATIC TEMPERATURE COMPENSATION. - ~~If a~~ On devices is equipped with an automatic temperature compensating systems, normal tests shall be conducted as follows: the compensator shall be tested

- (a) by comparing the compensated volume indicated or recorded by the device with the compensator connected and operating, with the actual delivered volume corrected to 60 °F; and,
- (b) with the temperature compensating system deactivated, comparing the uncompensated volume indicated or recorded to the actual delivered volume.

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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.

SECTION 5.51. WIRE- AND CORDAGE-MEASURING DEVICES

350 W DRAFT COMBINED FABRIC-MEASURING AND WIRE AND CORDAGE-MEASURING DEVICE CODE

Due to the number of items on the agenda, this item was not considered.

SECTION 5.53. ODOMETERS

353 VC N.1.3.3. VEHICLE LADING T.2. TOLERANCE VALUES

(This item was adopted as part of the consent calendar.)

When checking the odometers of rental trucks, it is not always practical to test with the customer's load or by placing standard test weights in the truck bed, which may create a safety hazard. A tolerance for checking unladen trucks is needed. Test data were provided to the Committee supporting the proposed tolerance for unladen trucks.

The Committee recommends amending N.1.3.3. and T.2., and adding a new paragraph T.2.1. as follows:

N.1.3.3. VEHICLE LADING. -

- (a) Passenger Load - During the distance test of an odometer, the vehicle may carry two persons.
- (b) Truck Cargo Load - Truck odometers shall be tested by one of the following methods:

1. when the truck is loaded with one-half of the maximum cargo load; or

2. unladen if unladen test tolerances are applied.

T.2. TOLERANCE VALUES. - Except for unladen trucks, maintenance and acceptance tolerances on odometers shall be four percent of the interval under test.

T.2.1. TOLERANCES FOR UNLADEN TRUCKS. - Maintenance and acceptance tolerances on truck odometers shall be five percent for underregistration and three percent for overregistration of the interval under test.

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### SECTION 5.56. GRAIN MOISTURE METERS

#### 356-1 S.1.6.2. OPERATING RANGE

This paragraph was addressed at the 1986 NCWM, and the effective date was delayed until January 1, 1990. The purpose of the delay was to give device manufacturers sufficient time to incorporate design changes into models continuing to be manufactured. These devices have a long product life. The appropriateness of the S.1.6.2. requirement was again questioned this year.

The Committee also reviewed the USDA/Federal Grain Inspection Service (FGIS) Grain Moisture Handbook. Based upon a meeting between FGIS, Maryland, and NBS representatives, a number of changes to the Grain Moisture Meters Code will be proposed in 1988 and will require significant changes to the design of grain moisture meters. These changes include a minimum temperature operating range, a "warm-up" requirement, a level indicator, a minimum moisture division not greater than 0.1 percent, and several other criteria. Because the changes are major, it is reasonable that the new requirements should apply only to new meter models, but not to those currently in production. Because of the long production life of models of grain moisture meters and a desire to incorporate new requirements into the code without unduly disrupting the manufacture of current models, the Committee is considering a proposal that would exempt current models of grain moisture meters by type. This would make the new requirements nonretroactive on the basis of type, rather than nonretroactive for all devices after a specified date.

This approach to nonretroactivity is significantly different from that periodically used in Handbook 44. It has been discouraged due to the difficulty in applying nonretroactive status to a large number of devices in use over a wide range of applications. There are relatively few manufacturers of grain moisture meters, and the number of models used commercially is also relatively small. It may be noted that Scales Code paragraph T.N.8. exempts by type to phase in the influence factors requirements on a practical basis.

The Committee requests comments on the proposal to adopt a new set of criteria for grain moisture meters on the basis of nonretroactivity by device type. Alternatives to this approach are also requested.

The Committee does not recommend any change to S.1.6.2. this year since, if the concept of nonretroactivity by device type is considered appropriate for grain moisture meters, it may then be appropriate to make S.1.6.1. nonretroactive by device type, along with the new requirements that will be proposed in 1988.

For the purposes of information and review, the Committee reports the results of the meeting of FGIS, Maryland, and NBS representatives. The Committee is reviewing the recommendations from this meeting as a basis for proposing new requirements for grain moisture meters (GMMs) for adoption at the 1988 NCWM.

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The Committee requests that comments be submitted before the Interim Meeting in January, 1988.

### Report of the FGIS, Maryland, NBS Meeting of January 6-7, 1987

It was unanimously agreed that the following items be recommended for consideration for adoption into the Handbook 44 Grain Moisture Meters Code for GMMs of new design.

#### 1. Minimum Temperature Operating Range

GMMs shall comply with all the appropriate requirements of this code under the following temperature conditions:

If not specifically marked to the contrary on the device, the temperature limits shall be 40 °F to 104 °F (10 °C to 40 °C).

#### 2. Sample Temperature Requirements

Moisture content values shall not be determined if the difference in temperature between the grain sample, moisture meter, and ambient air temperature exceed 20 °F. Grain sample temperature cannot be less than 10 °C or more than 40 °C.

#### 3. Display Resolution

On moisture meters indicating moisture content values in percent of moisture content, the maximum value of the moisture content division shall not exceed 0.1 percent moisture.

#### 4. Electric Power Supply

- A. Grain moisture meters that operate using alternating current shall comply with all appropriate requirements of this code over the line voltage range of 100-130 volts or 200-250 volts, as appropriate.
- B. Battery operated instruments shall comply with appropriate requirements of this code when battery power output is excessive or deficient.

#### 5. Operating Temperature

A grain moisture meter indicating or recording element shall not display or record any usable values until the operating temperature necessary for accurate moisture determination has been attained.

#### 6. Level Condition

If the moisture measurement is affected by the level condition of the GMM, then a level indicator must be provided.



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### 7. Humidity (Type Evaluation Test)

If not specifically marked to the contrary on the device, the GMM shall comply with all appropriate requirements of this code within 10-93 percent relative humidity, noncondensing. (Action taken at the 1987 Annual Meeting may determine if the requirement will be proposed.)

#### Summary

All attendees of the meeting felt the above listed recommendations should be nonretroactive for existing models of GMM and consideration should be given to making the existing Section S.1.6.2. nonretroactive also.

We realize the timing is inappropriate to request action on the recommendations at the 1987 Annual Meeting. However, we believe these recommendations should be considered and published for information and comment in this year's S&T annual report.

The following is a list of proposed changes which FGIS still has under consideration. The intent is to finalize these and forward recommendations prior to the next Interim Meeting.

1. Review FGIS, OIML, and Handbook 44 tolerances and recommend tolerances acceptable to all parties concerned.
2. Establish guidelines for obtaining grain samples that can be used by both FGIS and state weights and measures programs.
3. Consider developing a specification stating that charts must be reviewed annually and updated as required for any meter currently being used, and a user requirement stating that the current calibration chart be used.
4. Establish a minimum operating range for grain moisture. Consider including graphs of percent moisture versus temperature as a basis for describing the minimum temperature and grain moisture operating ranges.

### 356-2 S.3. ACCESSORY EQUIPMENT

Requests have been received that specifications and tolerances are needed for accessory equipment addressed in Section S.3. of the Grain Moisture Meters Code. Specifically, the following topics have been raised.

1. A tolerance is needed on the dry measures used to determine the test weight per bushel. The tolerance given in the dry measure code are too large when the measure is used to determine the weight per bushel of grain.
2. The funnel mechanism and drop height from the dry measure used to determine the weight per bushel should be specified.



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3. Specific tolerances should be stated for scales used to determine weight per bushel if the indications are in pounds per bushel. It is suggested that a maximum verification scale division should be established for scales using one pint or one quart sample sizes for determining the weight per bushel.
4. Develop specifications for the readability of weight per bushel scales. In particular, this issue addresses the ability of a user to determine the balance condition of a beam scale when the scales does not have a trig loop or a balance indicator. This proposal continues with the suggestion that the hand-held bushel weight scales should be prohibited. In 1986, the S&T Committee reported that paragraph UR.2.2. prohibits the use of hand-held scales because they must be freely suspended from a fixed support when in use. (See the Report of the 71st NCWM 1986, page 184.)
5. A tolerance should be specified for thermometers used in grain moisture testing. A tolerance of  $\pm 2$  °F has been suggested.

The USDA has requirements for weight per bushel equipment, such as design of the one-quart dry measure (they only allow a one-quart sample to be used for weight per bushel determinations), the funnel, test stand, and scale. The USDA requirements will be the starting point for developing Handbook 44 criteria for this equipment. The Scales Code will be the basis for any specific scale criteria, if necessary. Comments are requested regarding the criteria needed and specific recommendations for language. If criteria are adequately developed, the Committee may propose specific criteria for adoption at the 1988 Annual Meeting.

### 356-3 W USDA MOISTURE HANDBOOK

This item was combined with Item 356-1.

### 356-4 W COORDINATION OF NEW METER CALIBRATIONS

A letter was received indicating a need for improved communication among the USDA/FGIS, the NCWM, and state departments of agriculture in advance of the USDA/FGIS release of calibrations of grain moisture meters. The USDA/FGIS took action immediately upon receipt of the original letter and has taken steps to address the problem.

## OTHER ITEMS

### 360-1 ENERGY ALLOCATION SYSTEMS

Energy allocation systems are appearing in the marketplace and their use is increasing. Courts in Maryland and the City of Seattle, Washington have ruled that these devices are a weights and measures responsibility. The S&T Committee believes that a task force should be formed to study energy allocation systems and make appropriate recommendations. The position of the S&T Committee has been communicated to the Executive Committee. See Item 101-4 in the Executive Committee Report.

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### 360-2 ELECTRIC WATT-HOUR METER CODE

Interest has been expressed for a code for electric watt-hour meters. Although few states test these meters, the need appears to be expanding. The State of California has had a code for a number of years. It is based upon requirements for utility meters and is well established. They have advised the Committee that changes may now be necessary to recognize electronic versions of electric-watt hour meters.

Appendix C, included for review and comment reproduces the California requirements for electric watt-hour meters. This is an information item, not a tentative code. Comments are requested before the Interim Meeting in 1988.

### 360-3 CARBON DIOXIDE LIQUID MEASURING DEVICES

Liquid carbon dioxide is measured and sold as a refrigerant to various segments of the food industry, particularly processing plants and fast food outlets. Cryogenic metering systems and on-board weighing systems can be used to measure the commodity, but standards, test methods, and user requirements are needed.

The Committee received a proposal to add a code for carbon dioxide meters in Handbook 44. A draft code, developed by the State of California, is included as Appendix D. This is an information item, not a tentative code. Comments are requested before the Interim Meeting in 1988.

### 360-4 OIML ACTIVITIES

OIML Membership has increased significantly in the last several years there are now 51 member and 28 corresponding nations. Output includes 74 International Recommendations and 16 International Documents. It is generally agreed that OIML is becoming truly international in scope, and that it is fostering international uniformity in technical requirements and test methods. Most participants have expressed the view that their participation has proven to be most beneficial.

Members of the Committee participated in a number of OIML activities during the past year and will continue to participate in the future. The meetings attended, those scheduled for the near future, and the documents reviewed are as follows:

#### Meetings:

U.S. National Working Group (USNWG) PS7, August 12-13, 1986, NBS, Gaithersburg, MD. Reason: Review and develop U.S. position on two second Pre-draft International Recommendations (IR), Totalizing Automatic Weighing Instruments (automatic hopper scales) and Automatic Rail Weighbridges (weighing-in-motion).

International Working Group (IWG) PS7/RS5, September 15-19, 1986, London, England. Reason: To discuss two second pre-drafts referenced in above paragraph.

## Specifications and Tolerances Committee

USNWG PS7, October 14-15, 1986, NBS, Gaithersburg, MD. Reason: Review and develop U.S. position on a proposed pre-draft International Recommendation combining IRs 3, 28, 74, and other etc. This effort would result in a single document containing all the requirements for nonautomatic scales.

IWG PS7/RS4, November 2-6, 1986, Paris. Reason: Discuss documents referenced in paragraph above.

USNWG PS7, March 3-4, 1987, NBS, Gaithersburg, MD. Reason: Review and develop U. S. position on two documents -- second pre-draft combined scales document and third pre-draft on automatic hopper scales.

IV'G PS7/RS4, June 1-5, 1987, Braunschweig, Germany. Reason: To discuss second pre-draft combined document on scales.

### Documents Reviewed:

Second pre-draft IR on Automatic Rail Weighbridges

Second pre-draft IR on Discontinuous Totalizing Automatic Weighing Instruments

Third pre-draft IR on Discontinuous Totalizing Automatic Weighing Instruments

First pre-draft IR combined document on scales

Second pre-draft IR combined document on scales

Third pre-draft document on test procedures and report forms

### Future Work

The pre-drafts on the IR's dealing with automatic rail weighbridges and automatic hopper scales were submitted for vote to the participating members of PS7 & PS7/RS5 both were defeated. Thus, subsequent pre-drafts will be developed by the responsible RS (UK) and circulated for review by the end of the year, and will be the subject of a meeting of the International Working Group of PS7/RS5 in April 1988, in London.

At the meeting of the International Working Groups for PS7/RS4, held in June 1987 in Braunschweig, Germany, a draft revised IR applicable to non-automatic weighing instrument that incorporates all of the requirements of IR #3, #28, #74, and includes some additional requirements applicable to certain electronic scales and test procedures and report forms, was accepted. However, there were several issues on specific requirements that were not resolved at the meeting and will be circulated for balloting prior to September, 1987. The results of this ballot will be reflected in the final revised IR to be submitted to the next International Conference in 1988.

Work will begin on the revision of IR #50 Belt-Conveyor Scales and a draft will be circulated to the participating member Nations for review and comments by the end of 1987.

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A first pre-draft IR applicable to electronic volumetric measuring devices has been circulated for review and comments and will be the subject of a meeting of the International Working Group for PS5/RS6 Electronics, in November, 1987.

A pre-draft IR has been developed and circulated on symbols for use with measuring instruments. It is expected that this work will continue over the next several years and subsequent drafts will be distributed for further comment.

F. Gerk, New Mexico, Chairman

R. Andersen, New York

K. Butcher, Maryland

J. Truex, Ohio

D. Watson, Texas

H. Oppermann, NBS, Technical Advisor

COMMITTEE ON SPECIFICATIONS AND TOLERANCES

APPENDIX A

REPORT OF THE TECHNICAL COMMITTEE  
ON NATIONAL TYPE EVALUATION  
WEIGHING INDUSTRY SECTOR

This Appendix has three sections:

1. Devices to be Tested for Influence Factors (page 234)
2. NTEP Load Cell Testing (page 235)
3. NTEP Load Cell Test Procedures (page 236)



Specifications and Tolerances Committee

Devices To Be Tested For Influence Factors

Device	Temperature (Accuracy)	Temp. Zero Drift	Barometric Pressure	Warm-up Time	Voltage	Power Interruption	Time Dependence
Scales $\leq$ 2000 lb	X	X	X <sup>1</sup>	X	X	X	X
Scales > 2000 lb	X <sup>2</sup>	X <sup>2</sup>	X <sup>2</sup>	X	X	X	X <sup>2</sup>
ECRs, computers, bulk-weighter controllers (w/o A/D) Printers						X	
Dials (spring)	X	X				X	
Lever/beam scales & pendulum dials							
Weighting elements	X	X	X <sup>1</sup>				X
Indicating elements	X	X		X	X	X	
Class II scales	X	X		X <sup>3</sup>	X	X	X
Load Cells							
Canister-type	X	X	X <sup>1</sup>				X
Hydraulic	X	X					X
All others	X	X					X

<sup>1</sup> Testing is limited to canister load cells.  
<sup>2</sup> Compliance with influence factors requirements will be determined according to existing NTEP policy.  
<sup>3</sup> Test limited to power switch only, not to initial plug-in of the device.  
Voltage test is 130 and 100 VAC and low battery test on DC.  
Power interruption is pulling the plug for 10 seconds.

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### NTEP Load Cell Testing

#### Load Cells to be Submitted for Test

Load cells with essentially the same design will be considered to be part of the same family. Typically, a ratio of 10:1 in cell capacities will be covered, based upon the test of a single cell. To determine which cell(s) should be submitted for testing, the manufacturer should submit a drawing of each capacity load cell to substantiate that they are of the same basic design. The manufacturer must provide the following information with a request for evaluation.

1. Load cell capacities
2. Quality or accuracy class
3. Number of scale divisions requested
4. Minimum verification scale division
5. Drawings for each cell
6. A complete set of test data on the load cells submitted for evaluation. (Test data is required only for the cells submitted for type evaluation; test data is not required for each cell capacity in the family)

The following factors will be considered when determining which cells and the number of cells that will be tested.

1. Which cell can be conveniently tested
2. Which cell is expected to be the most popular
3. What the manufacturer or importer has available for test
4. The range of capacities
5. Differences in the cell design within a family
6. The number of scale divisions for which the cell is to be tested

General guidelines will be used to determine the number and the capacities of cells to be tested. These are given below:

1. Single- and multiple-cell applications.

One cell at one capacity will usually be tested for single-cell applications. For multiple cell applications, two load cells at the same capacity will be tested.

2. Range of capacities.

If the range of capacities is relatively small (e.g., the range of capacities does not exceed 10:1), then cells at only one capacity will usually be tested. If the range of cell capacities significantly exceeds a 10:1 ratio, an additional capacity load cell will be tested. The guideline in (1) for single-and multiple-cell applications applies to each capacity cell that is tested.

3. If a large number of scale divisions is requested, one more cell capacity or more cells at the same capacity will be tested.

The actual number of load cells and load cell capacities to be tested will be decided by NTEP in discussions with the manufacturer.

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Companies desiring an OIML test on a load cell must specify this in the letter of request because the OIML criteria are more stringent than the NTEP criteria. Test data collected for an OIML test may be used to satisfy NTEP criteria, but the reverse is not true. The additional scale classification (III L), the extra tolerance step in the Class III tolerances, and the tolerances for single and multiple load cell system (0.7 and 1.0 times the scale tolerance) require additional data analysis. This will result in additional costs for NTEP load cell tests over OIML tests.

### Multiple Load Cell System Tolerances

The scale tolerance will be allowed for load cells tested for multiple-cell scales. This is justified by random errors of the load cells resulting in some cancellation, so that multiple load cells do not contribute more than 0.7 of the scale tolerance when in actual use.

### Barometric Pressure Tests

Barometric pressure testing will be limited to one-diaphragm canister load cells (or scales utilizing those cells). If the barometric pressure test is run, it is not necessary to vary the pressure over the range specified in Handbook 44, but only over a relatively small range to see if the cell is affected. The test may be very short in time duration.

The barometric pressure test will not be run on hydraulic load cells because the effects of barometric pressure cancel. A weighing system using hydraulic load cells will always have a pressure sensor. Both the cell and the sensor will be vented to the atmosphere so the effect of barometric pressure cancels.

## NTEP Load Cell Test Procedures

### Test Conditions

1. **Measurement Standards:** The combined measurement uncertainty of the load generating system and the indicating instrument used to observe the output of the load cell under test shall be less than 0.3 times the maximum permissible errors for the load cell under test (IR 60 section 8).
2. Before adequate testing and evaluation of load cells can be performed, careful attention shall be given to the environmental and test conditions under which such evaluations are to be made. Significant discrepancies frequently result from insufficient recognition of such details. The following shall be thoroughly considered prior to any type evaluation testing program.
3. **Acceleration of gravity** - The acceleration of gravity varies by as much as 0.55% over the surface of the earth. Gravity corrections shall be introduced when standard masses are used for load generation. The value of  $g$  at the test site should be noted in the test results.
4. **Environmental conditions** - Tests shall be performed under stable environmental conditions. With regard to stable ambient temperature, the temperature is deemed to be stable when the difference between extreme temper-

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atures noted during the test does not exceed one fifth of the temperature range of the considered cell, without being greater than 5 °C.

5. Loading conditions - Particular attention shall be given to loading conditions to prevent the introduction of errors not inherent to the load cell. Factors such as surface roughness, flatness, corrosion, scratches, eccentricity, etc., should be taken into consideration. Loading conditions shall be in accordance with the requirements of the load cell manufacturer. The loads shall be applied and removed along the sensitive axis of the cell without introducing shock to the load cell.
6. Reference standards - Periodic (depending on use) verification of standards should be made.
7. Stabilization - A stabilization period for the load cell under test and the readout instrumentation shall be provided, as recommended by the manufacturer of the equipment used.
8. Temperature conditions - It is important to allow sufficient time for temperature stabilization of the load cell to be achieved. Particular attention shall be devoted to this requirement for large load cells. The loading system shall be of a design which will not introduce significant thermal gradients within the load cell. The load cell and its connecting means (cables, tubes, etc.) which are integral or contiguous shall be at the same test temperature. The indicating instrument shall be maintained at room temperature. The temperature effect on auxiliary connecting means shall be considered in determining results.
9. Barometric pressure effects - Where changes in barometric pressure may significantly affect minimum dead load output, such changes shall be considered.
10. Stability - An indicating instrument and a loading means shall be used which will provide sufficient stability to permit readings within the limits specified in point 1.
11. Instrument checking - Some indicating instruments are provided with a convenient means for checking of the instrument itself. When such features are provided, they shall be utilized frequently to ensure that the indicating instrument is within the accuracy required by the test being performed. Periodic verification of the instrument calibration shall also be performed.
12. Other conditions - Other conditions specified by the manufacturer such as input/output voltage, electrical sensitivity, etc., shall be taken into consideration during the test.

### Tests to be Performed

- 1a. Load cell error with respect to temperature
- 1b. Repeatability based on results of test 1a
2. Temperature effect on minimum dead load output

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3. Creep (One-hour test per H-44)
4. Barometric pressure effect if the cell is sensitive to barometric pressure changes as determined by guidelines discussed in the section titled "Barometric Pressure Tests"

### Tolerances

The tolerances are expressed in load cell verification intervals,  $v$ , and the minimum load cell verification interval,  $v_{\min}$  specified by the manufacturer. See pages 239 and 240 for these tolerances.

### Test Procedures

All tests are to be performed according to the test conditions specified earlier.

#### I. Determination of:

Load cell error  
Repeatability error  
Temperature effect on minimum dead load output

1. At room temperature, insert the load cell into the force generating system and exercise by applying a load to maximum capacity three times, returning to minimum dead load after each load application.
2. If the indicating element for the load cell is provided with a convenient means of checking itself, conduct the self-test at this time.
3. Monitor minimum dead load output until stable. Record instrument indication at minimum dead load.
4. All test load points in a loading and unloading sequence shall be spaced at approximately equal time intervals. The readings shall be taken at a time which is as far as possible in agreement with the following table. These two time intervals shall be recorded in seconds.

The initial reading shall be taken at a time interval after the initiation of load applications or removal, whichever is applicable, as specified in the following Table:

Load		Time
Greater than	To and including	
0 kg	10 kg	10 seconds
10 kg	100 kg	15 seconds
100 kg	1 000 kg	20 seconds
1 000 kg	10 000 kg	30 seconds
10 000 kg	100 000 kg	50 seconds
100 000 kg	----	60 seconds



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## Class III Load Cells

	<u>H44 Reference</u>	<u>Single Cell Requirement</u>	<u>Multiple Cell Requirement</u>
Load Cell Error	Table 6, Class III T.N.3.2. T.N.8.1.1.	0.7 Factor Applied  <u>Load</u> <u>Tolerance</u> 0-500v      0.35v 501-2000v      0.70v 2001-4000v      1.05v 4001-10000v      1.75v	1.0 Factor Applied  <u>Load</u> <u>Tolerance</u> 0-500v      0.50v 501-2000v      1.00v 2001-4000v      1.50v 4001-10000v      2.50v
Repeatability Error	T.N.5. T.N.8.1.1.	0.7 Factor Applied  <u>Load</u> <u>Error</u> 0-500v      0.70v 501-2000v      1.40v 2001-4000v      2.10v 4001-10000v      3.50v	1.0 Factor Applied  <u>Load</u> <u>Error</u> 0-500v      1.00v 501-2000v      2.00v 2001-4000v      3.00v 4001-10000v      5.00v
Temperature Effect on Minimum Dead Load Output	T.N.8.1.3. T.N.8.1.1.	0.7 V <sub>min</sub> /5 °C	1.0 v <sub>min</sub> /5 °C
Creep (test at 90-100% of load Cell Capacity)	T.N.4.5. T.N.8.1.1.	1.0 Factor Applied  <u>Load</u> <u>Error</u> 0-500v      0.50 501-2000v      1.00v 2001-4000v      1.50v 4001-10000v      2.50v in 1 hour	1.0 Factor Applied  <u>Load</u> <u>Error</u> 0-500v      0.50v 501-2000v      1.00v 2001-4000v      1.50v 4001-10000v      2.50v in 1 hour
Effects of Barometric Pressure	T.N.8.4.	Applicable to only specified load cells. 1v <sub>min</sub> 1kPa	Applicable to only specified load cells. 1v <sub>min</sub> 1kPa

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## Class III L Load Cells

	<u>H44 Reference</u>	<u>Single Cell Requirement</u>	<u>Multiple Cell Requirement</u>
Load Cell Error	Table 6, Class III L T.N.3.2. T.N.8.1.1.	0.7 Factor Applied  <div> <div>Load</div> <div>Tolerance</div> <div>0-500v 0.35v</div> <div>501-1000v 0.70v</div> <div>(add 0.35v for each 500v or fraction of)</div> <div>9001-9500 6.65v</div> <div>9501-10000v 7.00v</div> </div>	1.0 Factor Applied  <div> <div>Load</div> <div>Tolerance</div> <div>0-500v 0.50v</div> <div>501-1000v 1.00v</div> <div>(add 0.50v for each 500v or fraction of)</div> <div>9001-9500v 9.50v</div> <div>9501-10000v 10.00v</div> </div>
Repeatability Error	T.N.5. T.N.8.1.1.	0.7 Factor Applied  <div> <div>Load</div> <div>Error</div> <div>0-500v 0.70v</div> <div>501-1000v 1.40v</div> <div>(add 0.70v for each 500v or fraction of)</div> <div>9001-9500v 13.30v</div> <div>9501-10000v 14.00v</div> </div>	1.0 Factor Applied  <div> <div>Load</div> <div>Error</div> <div>0-500v 1.00v</div> <div>501-1000v 2.00v</div> <div>(add 1.00v for each 500v or fraction of)</div> <div>9001-9500v 19.00v</div> <div>9501-10000v 20.00v</div> </div>
Temperature Effect on Minimum Dead Load Output	T.N.8.1.3. T.N.8.1.1.	0.7 $V_{\min}/5^{\circ}\text{C}$	1.0 $v_{\min}/5^{\circ}\text{C}$
Creep (test at 90-100% of load Cell Capacity)	T.N.4.5. T.N.8.1.1.	1.0 Factor Applied  <div> <div>Load</div> <div>Error</div> <div>0-500v 0.25</div> <div>501-1000v 0.50v</div> <div>(add 0.25v for each 500v or fraction of)</div> <div>9001-9500v 4.75v</div> <div>9501-10000v 5.00v</div> <div>in 1 hour</div> </div>	1.0 Factor Applied  <div> <div>Load</div> <div>Error</div> <div>0-500v 0.25v</div> <div>501-1000v 0.50v</div> <div>(add 0.25v for each 500v or fraction of)</div> <div>9001-9500v 4.75v</div> <div>9501-10000v 5.00v</div> <div>in 1 hour</div> </div>
Effects of Barometric Pressure	T.N.8.4.	Applicable to only specified load cells. 1vmin 1kPa	Applicable to only specified load cells. 1vmin 1kPa

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The loading or unloading time, whichever is applicable, shall be approximately one half of the specified time. The remaining time shall be utilized for stabilization. The test shall be conducted under constant conditions.

5. Apply increasing loads to maximum capacity. Increasing load points shall be at least 5 in number and shall include loads at approximately the highest values in the applicable steps of the tolerances.
6. Record the instrument indications.
7. Remove the test loads to the minimum dead load in a similar manner.
8. Record the instrument indications for the minimum dead load.
9. Repeat the operations described in steps 4 through 8 four more times for accuracy classes I and II or two more times for accuracy classes III, IIIL and IIIL.
10. Repeat the operations described in steps 2 through 9 at the high and low temperature limits for the accuracy class or, if the manufacturer has specified a smaller or larger range, at the limits marked on the cell, provided the temperature range is at least the range required for the accuracy class.
11. Repeat the operations described in steps 2 through 9 at room temperature.
12. At each data point the magnitude of load cell error shall be determined and compared with the tolerances.
13. From the resulting data the repeatability error may be determined and compared with the tolerances.
14. From the resulting data, the temperature effects on minimum dead load output may be determined and compared to the tolerances.

### II. Determination of Creep

1. At room temperature, insert the load cell into the force generating system and load to the minimum dead load.
2. If the indicating element for the load cell is provided with a convenient means for checking itself, conduct the self-test at this time.
3. Monitor minimum dead load output until stable.
4. (a) Apply a load equal to 90 to 100% of the maximum capacity of the load cell and record the indication after 20 seconds. Continue to record indications periodically thereafter at regular time intervals over a 1 hour period; or  
(b) Remove a load equal to 90 to 100% of the maximum capacity of the load cell that has been applied for 1 hour and record the indication after 20 seconds. Continue to record indications periodically thereafter at regular time intervals over a 1 hour period.

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5. Repeat the operations described in steps 2 through 4 at the high and low temperature limits for the accuracy class or, if the manufacturer has specified a smaller or a larger range, at the limits marked on the cell, provided the temperature range is at least the range required for the accuracy class.
6. With the resulting data, and taking into account the effect of barometric pressure changes, the magnitude of the creep can be determined and compared to the tolerance.

### III. Determination of effects of barometric pressure.

1. At room temperature and minimum dead load insert load cell into pressure chamber at atmospheric pressure.
2. If the indicating element for the load cell is provided with a convenient means for checking itself, conduct the self-test at this time.
3. Monitor minimum dead load output until stable. Record instrument indication at minimum dead load.
4. Change barometric pressure to a value of approximately 1 kPa lower or higher than atmospheric pressure and record instrument indication at minimum dead load. If it is convenient, the change in barometric pressure may be significantly more than 1 kPa but cannot exceed 95 and 105 kPa as specified in HB44.
5. With the resulting data, determine the magnitude of the barometric pressure influence and compare this with the tolerance.

APPENDIX B

REPORT OF THE  
TECHNICAL COMMITTEE ON NATIONAL TYPE EVALUATION  
MEASURING INDUSTRY SECTOR

Permanence Test Procedures for Meters

The Technical Committee on National Type Evaluation Program - Measuring Industry Sector is requested to reexamine the test procedure for the permanence test of retail motor fuel dispensers. This review included the number of meters to be tested, the number of tests to be run, and to further define when the subsequent examination (see below) may be performed. It is believed that the number of 5- and 10-gallon tests specified in the present test procedure can be reduced. Additionally, clarification of the number of meters that should be tested is needed to establish uniformity.

The following is proposed for consideration.

Permanence Test of New-Design Meters  
in Retail Motor Fuel Dispensers

All new-design meters are subject to a permanence test. If a meter in a dispenser is the same as a previously tested dispenser, a permanence test is not required on the meter unless a problem is detected.

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 tested on each of two major products (e.g., gasoline and diesel fuel). At least two tests at both the fast and slow flow rates 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. 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.



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### 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 at least 20 000 gallons have been measured by at least one meter on each of the two products. These may be different dispensers than those that had the two sets of tests run as part of the initial evaluation.
3. Two tests at both fast and slow rates will be made on meters that deliver more than 20 000 gallons. Only one test at each flow rate need be run on any remaining meters.

### Permanence Test of Retail Motor Fuel Dispensers Utilizing Previously Evaluated Meters

Dispensers utilizing a meter that has been type evaluated will be subject to a permanence test. This test will not involve an extensive test of the meter, although the meter must remain within acceptance tolerance during the permanence test. A 20-30 day permanence test will be performed. The meter will not be required to deliver 20 000 gallons during the permanence test, but the dispenser must receive significant use during the 20-30 day test. Only one dispenser is required for the permanence test although all dispensers of the new type installed at the station may be tested. The accuracy tests to be performed on the dispenser are the same as those for new-design meters in retail motor fuel dispensers.

### Permanence Test for LPG and Cryogenic Meters

The tests to be run on metering systems as adopted at the 1985 NCWM are considered appropriate for LPG and cryogenic meters. These are:

- o three tests at the maximum discharge rate
- o three intermediate flow tests
- o three slow flow tests
- o three vapor or air eliminator tests

Only one meter will be required for the test. After the initial test, the meter is to be placed into service for the permanence test. A minimum throughput criterion is needed for these meters. The following is recommended.

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For LPG and cryogenic meters:

Maximum rated flow rate x 1500 for meters rated equal to or greater than 60 gal/min.

Maximum rated flow rate x 500 for meters rated less than 60 gal/min.

This corresponds to 30-60 days based upon California weights and measures experience. 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.

### Permanence Test for LPG Vapor Meters

The tests to be run on an LPG vapor meter as part of the permanence test are:

- o three tests at the maximum discharge rate
- o three slow flow tests
- o one low flame test

Only one meter will be required for the test. After the initial test, the meter must have air or product passed through the meter as part of the permanence test. The amount of air or product to be passed through the meter shall be at least the maximum flow rate times 1000. California weights and measures performs this test in approximately 60 days. Although this is longer than the usual 30-day test, this is considered appropriate because these meters are usually installed for up to ten years between tests.

Following the period of accelerated use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

### Card-Activated Retail Motor Fuel Dispensers

There is great concern regarding the potential for accidental or intentional fraud when card-activated systems are used in service stations, especially since bank-card-activated systems give direct access to bank accounts. The following criteria and test procedures are under review for possible additions to the type evaluation handbook in 1988.

### Card-Activated Systems

A card-activated system shall have an upper limit on the authorization time before dispensing product and properly record transactions on the appropriate card account.

When a card-activated system is subject to power loss, the dispenser shall not remain authorized indefinitely. Because systems may be installed with separate power lines to the console, card reader, and dispenser, tests should be run with power failures to different parts of the system to evaluate the potential for

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accidental or intentional errors. The appropriate device response depends upon when the power loss occurs during the delivery sequence.

- a. The dispenser must deauthorize in not more than three minutes if the pump "handle" is not turned on.

Complies?      ☐ Yes      ☐ No      ☐ N/A

- b. When a power loss occurs after the pump "handle" is on, the dispenser must deauthorize immediately.

Complies?      ☐ Yes      ☐ No      ☐ N/A

- c. When there is a loss of power, but the pump "handle" is not on, the dispenser must deauthorize in not more than three minutes.

Complies?      ☐ Yes      ☐ No      ☐ N/A

- d. If the time limit to deactivate a dispenser is programmable, it shall not accept an entry greater than three minutes.

Complies?      ☐ Yes      ☐ No      ☐ N/A

### Test Methods

1. Authorize the dispenser and, with the pump "handle" on, interrupt power to any part (or all) of the system. The pump should deauthorize immediately. Specifically,

a. Authorize with a card and turn the "handle" on.

b. Power down briefly and restore power.

c. Try to dispense product. The dispenser must not dispense since the power failure should have deauthorized the dispenser.

2. Authorize the dispenser using a card (leave handle off), wait more than three minutes, and try to start the dispenser. It should not start because the authorization should have timed out. Specifically,

a. Authorize with a card but do not turn the "handle" on.

b. Power down for more than three minutes and then restore power.

c. Try to dispense product. The dispenser should have "timed-out" and not dispense.

3. a. Authorize and dispense with card #1.

b. Allow the system to time out and deauthorize.

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- c. Authorize and dispense with card #2.
- d. The transactions shall be properly recorded for each card.

Note: A mechanical register may accumulate the two deliveries, but the printed record must not have accumulated values.

- 4.
  - a. Authorize with card #1. Turn the handle on and then off.
  - b. Authorize with card #2. Dispense product and complete the delivery.
  - c. Check the printed receipt to verify that the delivery has been properly charged to card #2.
- 5.
  - a. Turn the dispenser "handle" on and then authorize the dispenser using a card.
  - b. Turn the "handle" off and then on.
  - c. Try to deliver product. The dispenser must not dispense.
- 6.
  - a. Authorize with card #1, turn the "handle" on, and interrupt power. This should deauthorize the dispenser.
  - b. Resupply power and authorize the dispenser with card #2 and complete a delivery.
  - c. Verify that the transaction is charged to card #2.
- 7.
  - a. Authorize a dispenser with card #1 but do not turn the dispenser "handle" on.
  - b. Try to authorize the same dispenser with card #2. It should not be accepted until after the three minute time-out.
- 8. Attempt to override or confuse the card system by
  - a. varying the length of time the card is in the slot, i.e., vary the "swipe" times; and
  - b. pushing all other keys on the keypad during each step of the authorization process.

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APPENDIX C

DRAFT ELECTRIC WATT-HOUR METERS CODE

A. APPLICATION

A.1. - This code applies to electrical energy sub-meters used as commercial measuring devices. Sub-meters are installed in mobile home parks, apartment houses, shopping centers and similar establishments which purchase electric service from a serving utility by a master meter and distribute the service to tenants through a sub-metered service system.

A.2. - See also General Code requirements.

S. SPECIFICATIONS

S.1. CONSTRUCTION AND WORKMANSHIP. - The meter shall be substantially constructed of good material in a workmanlike manner. Each meter shall conform to all applicable standards of the National Electrical Manufacturers Association and the Edison Electric Institute.

S.2. COVER. - The cover of the meter shall be sufficiently strong to withstand ordinary usage. It shall be dustproof, waterproof, and prevent access to the interior without destroying the security seal.

S.3. TERMINALS. - The terminals of the meter shall be arranged so that the possibility of short circuits in removing or replacing the cover, making connections and adjusting the meter is minimized.

S.4. EQUIPMENT GROUNDING. - Exposed non-current-carrying metal parts of fixed equipment, metal boxes, cabinets and fittings which are not electrically connected to grounded equipment, shall be grounded as required by the National Electrical Code, Article 250.

S.5. PROVISION FOR SEALING.

S.5.1. SEALING. - Provisions shall be made for applying a security seal to the meter cover, meter sealing ring, and terminal block cover.

S.5.2. METER ENCLOSURE. - Meter enclosures shall be so designed that the cover may be sealed. Provision shall be made for reading the meter without destroying the seal.



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S.5.3. OVERLOAD PROTECTOR ENCLOSURE. - Thermal overload protector enclosures shall be designed to facilitate sealing. A provision shall be made fore resetting circuit breakers or replacing fuses without destroying the seal.

S.6. METER IDENTIFICATION. - Each meter shall have the following information legibly marked on the front of the nameplate or register:

- (a) manufacturer's name, type designation, and serial number,
- (b) voltage rating,
- (c) test amperes (TA),
- (d) maximum amperes (CL),
- (e) watt-hour or disk constant ( $k_h$ ),
- (f) register ratio ( $R_r$ ) and multiplier (if 10 or larger),
- (g) frequency rating ( $H_z$ ),
- (h) number of meter elements (polyphase), and
- (i) ratio or rating of auxiliary devices.

### N. NOTES

N.1. STARTING WATTS. - The rotor for a meter shall rotate continuously when a load is applied equal to 0.5 amperes.

N.2. METER TESTS. - Meters shall be tested at full load and light load:

- (a) Full load test shall not be less than the test amperes (TA) of the meter.
- (b) Light load test amperes (TA) shall be 5 to 10 percent of the meter TA.

However, it may be 20 percent or 5 amps, whichever is less, of the TA when testing a 240-volt, 3-wire, single phase meter with an unbalanced load (energizing a single current coil).

N.3. TEST REVOLUTIONS. - Full and light load tests shall require 8 or more revolutions of the test standard and at least 1 revolution of the meter under test.

N.4. CREEP TEST. - A meter disk that creeps more than one revolution shall be removed from service.

N.5. METER REGISTER. - A meter register shall clearly indicate the number of kilowatt-hours measured by the meter. The register ratio must be indicated on the front of registers that are not integral parts of the meter nameplate.

### T. TOLERANCES

T.1. APPLICATION TO UNDERREGISTRATION AND TO OVERREGISTRATION. - The following prescribed tolerances shall be applied to errors of underregistration and errors of underregistration.

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T.2. TOLERANCE VALUES. - Acceptance tolerance shall be applied to new and rebuilt meters before they have been placed in service. Maintenance and acceptance tolerances for electric watt-hour meters shall be as follows for full and light load tests:

- (a) Maintenance tolerance shall not exceed 2 percent for full and light loads.
- (b) Acceptance tolerance shall not exceed 1 percent for full and light loads.

T.3. METERS WITH INSTRUMENT TRANSFORMERS. - Where instrument transformers are used, the provisions of this section shall apply to the metering equipment as a whole.

## UR. USER REQUIREMENTS

### UR.1. SELECTION REQUIREMENTS. -

UR.1.1. METER CLASS. - The meter class shall equal or exceed the total capacity in amperes of the thermal overload protectors.

UR.1.2. SUITABILITY OF EQUIPMENT. - A meter shall be suitable for use on its electrical system. A 3-wire single phase load which is connected to a 120-208 volt network service shall be metered by a two-stator meter.

### UR.2. INSTALLATION REQUIREMENTS. -

UR.2.1. NONDOMESTIC METER TEST FACILITIES. - All nondomestic meters shall be provided with the same test facilities that are required of a similar meter by the serving utility.

UR.2.2. TEST BLOCKS. - All three-phase self contained meter installations shall be equipped with test blocks, that are approved by the serving utility, for safe meter testing.

UR.2.3. TEST SWITCHES. - All meter installations that are equipped with current or potential transformers, or both, shall have test switches installed that are approved by the serving utility, for safe meter testing.

UR.2.4. CIRCUIT-CLOSING DEVICE. - All self-contained meter installations that cannot accept a short interruption of the electrical service, for the purpose of the testing meter, shall be equipped with a manual circuit-closing device as approved by the serving utility. Automatic circuit-closing devices shall not be used on any meter installation.

**UR.3. USE REQUIREMENTS. -**

**UR.3.1. LOCATION OF METER. -** Each meter shall be accessible by an unobstructed entrance or passageway not less than two feet in width and six and one-half feet high. A suitable unobstructed standing space of a least 30 inches wide, 36 inches deep and six and one-half feet high shall be maintained in front of the meter to allow for installation, testing, and reading.

**UR.3.2. METER HEIGHTS. -** Meters shall be located not more than 75 inches and not less than 30 inches above the ground or standing surface. The meter height shall be measured to its axis.

**UR.3.3. METERED CIRCUITS (LOAD SERVICE). -** All electricity used by a tenant shall be taken exclusively from the load service of one meter. All electrical circuits from the meter shall serve only one space, lot, building, room, suite, stall or premise occupies by the tenant and shall be capable of being used at the discretion of the tenant.

**UR.3.4. UNMETERED CIRCUITS (LINE SERVICE). -** The tenants' electrical circuit shall not be taken from the line terminals of the meter, meter socket, or line service. The landlord may utilize this service.

**D. DEFINITIONS**

The terms defined here have a special and technical meaning when used in the Electric Watt-hour Meter Code.

**ampere.** The ampere is the practical unit of electric current. It is the quantity of current caused to flow by a difference of potential of one volt through a resistance of one ohm. One ampere is one coulomb of charge per second.

**creep.** Creep is when the meter disk rotates continuously with potential applied and load terminals open circuited.

**current.** Current is the intensity of the electron flow past any one point the circuit. Its measurement is in coulombs per second or amperes.

**kilowatt.** A kilowatt is 1,000 watts.

**kilowatt-hour (kwhr).** A kilowatt-hour is 1,000 watt-hours.

**landlord.** A corporation and/or the person or persons who own the electrical energy sub-meters and line service.

**line service.** The service conductors connecting the master meter to the tenant's meter and owned by the landlord.

**load service.** The service conductors connecting the tenant's meter to their electrical loads.

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**master meter.** An electric watt-hour meter owned, maintained, and read for billing purposes by the serving utility. All the electrical energy served to a sub-metered service system is recorded by the master meter.

**maximum amperes (class or CL).** The manufacturer's designated maximum amperes that a meter can measure continuously without damage or exceeding limits of accuracy. Class or the designation CL associated with its numerical value indicates maximum amperes.

**meter.** An electric watt-hour meter designed to measure and register the integral of an electrical quantity with respect to time.

**modern meter.** A meter whose disk has a magnetic bearing system.

**ohm.** The ohm is a practical unit of electrical resistance. It is the resistance which allows one ampere to flow when the impressed potential is one volt.

**percent registration.** Percent registration is calculated as follows:

$$\text{Percent Registration} = \frac{\text{Kwhr measured by METER}}{\text{Kwhr measured by STANDARD}} \times 100$$

**power factor.** Cosine of the angle of lag or lead of the voltage and current.

**register ratio.** The number of revolutions of the gear meshing with the worm or pinion on the rotating element for one revolution of the first dial pointer.

**serving utility.** Serving utility, as used in this code, means the utility or company who sells electrical energy to landlords for resale.

**sub-meter.** An electric watt-hour meter owned, maintained, and read for billing purposes by the landlord. All the electrical energy registered is used by the tenant.

**tenant.** The person or persons served electrical energy from a sub-metered service system.

**test amperes (TA).** The manufacturer's recommended full load test amperage.

**test block.** The test block facilitates safe meter testing by disconnecting the meter from the circuit without interrupting the service to the tenant.

**thermal overload protector.** A circuit breaker or fuse which establishes and limits automatically the maximum current that can be conducted in a circuit.

**unity power factor.** Unity power factor exists in alternating-current circuits when the voltage and current reverse at the same instance.

**volt.** A volt is the practical unit of electromotive force. One volt will cause one ampere to flow when impressed across a resistance of one ohm.

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**watt.** A watt is the practical unit of active power and is defined as the rate at which energy is delivered to a circuit. It is the power expended when a direct current of one ampere flows through a resistance of one ohm. In an alternating-current circuit, the power in watts is volts times amperes multiplied by the circuit power factor.

**watt-hour.** The watt-hour is the total or integrated amount of energy delivered in one hour to a circuit in which the steady or average rate at which energy is expended is one watt.

**watt-hour constant (disk constant).** The watt-hour constant of a meter is the registration of one revolution of its disk expressed in watt-hours. The constant is usually identified by the symbol  $K_h$ .



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APPENDIX D  
DRAFT CARBON DIOXIDE LIQUID-MEASURING DEVICES CODE

A. APPLICATION

A.1.- This code applies to carbon dioxide liquid measuring devices used for the measurement of liquid carbon dioxide.

A.2. - This code does not apply to devices used solely for dispensing a product in connection with operations in which the amount dispensed does not affect customer charges.

A.3.- See also General Code Requirements.

S. SPECIFICATIONS

S.1. DESIGN OF INDICATING AND RECORDING ELEMENTS AND OF RECORDED REPRESENTATIONS.

S.1.1. PRIMARY ELEMENTS.

S.1.1.1. GENERAL. - A device shall be equipped with a primary indicating element and may also be equipped with a primary recording element.

S.1.1.2. UNITS. - A device shall indicate and record, if equipped to record, its deliveries in terms of pounds or kilograms; gallons or liters of liquid; or decimal subdivisions or multiples thereof.

S.1.1.3. VALUE OF SMALLEST UNIT. - The value of the smallest unit of indicated delivery, and recorded delivery, if the device is equipped to record, shall not exceed the equivalent of:

(a) for small delivery devices:

- (1) one-tenth gallon,
- (2) one liter,
- (3) one pound, or
- (4) one kilogram.

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(b) for Large delivery devices:

- (1) one gallon,
- (2) ten liters,
- (3) ten pounds, or
- (4) ten kilograms.

S.1.1.4. ADVANCEMENT OF INDICATING AND RECORDING ELEMENTS. - Primary indicating and recording elements shall be susceptible of advancement only by the normal operation of the device. However, a device may be cleared by advancing its elements to zero, but only if:

- (a) the advancing movement, once started, cannot be stopped until zero is reached, or
- (b) in the case of indicating elements only, such elements are automatically obscured until the elements reach the correct zero position.

S.1.1.5. RETURN TO ZERO. - Primary indicating and recording elements shall be readily returnable to a definite zero indication. Means shall be provided to prevent the return of primary indicating elements and of primary recording elements beyond their correct zero position.

### S.1.2. GRADUATIONS. -

S.1.2.1. LENGTH. - Graduations shall be so varied in length that they may be conveniently read.

S.1.2.2. WIDTH. - In any series of graduations, the width of a graduation shall in no case be greater than the width of the clear interval between graduations. The width of main graduations shall be not more than 50 percent greater than the width of subordinate graduations. Graduations shall in no case be less than 0.008 inch in width.

S.1.2.3. CLEAR INTERVAL BETWEEN GRADUATIONS. - The clear interval shall be not less than 0.04 inch. If the graduations are not parallel, the measurement shall be made:

- (a) along the line of relative movement between the graduations at the end of the indicator, or
- (b) if the indicator is continuous, at the point of widest separation of the graduations.

(See also S.1.3.6.)

## Specifications and Tolerances Committee

### S.1.3. INDICATORS. -

S.1.3.1. SYMMETRY. - The index of an indicator shall be of the same shape as the graduations at least throughout that portion of its length associated with the graduations.

S.1.3.2. LENGTH. - The index of an indicator shall reach to the finest graduations with which it is used, unless the indicator and the graduations are in the same plane, in which case the distance between the end of the indicator and the ends of the graduations, measured along the line of the graduations, shall be not more than 0.04 inch.

S.1.3.3. WIDTH. - The width of the index of an indicator in relation to the series of graduations with which it is used shall be not greater than

(a) the width of the widest graduation, and

(b) the width of the minimum clear interval between graduations.

When the index of an indicator extends along the entire length of a graduation, that portion of the index of the indicator that may be brought into coincidence with the graduation shall be of the same width throughout the length of the index that coincides with the graduation.

S.1.3.4. CLEARANCE. - The clearance between the index of an indicator and the graduations shall in no case be more than 0.06 inch.

S.1.3.5. PARALLAX. - Parallax effects shall be reduced to the practicable minimum.

S.1.3.6. TRAVEL OF INDICATOR. - If the most sensitive element of the primary indicating element utilizes an indicator and graduations, the relative movement of these parts corresponding to the smallest indicated value shall be no less than 0.20 inch.

### S.1.4. COMPUTING-TYPE DEVICES.

S.1.4.1. PRINTED TICKET. - Any printed ticket issued by a device of the computing type on which there is printed the total computed price shall have printed clearly thereon also the total quantity of the delivery and the price per unit.

S.1.4.2. MONEY-VALUE COMPUTATIONS. - Money-value computations shall be of the full-computing type in which the money value at a single unit price, or at each of a series of unit prices, shall be computed for every delivery within either the range of measurement of the device or the range of the computing elements, whichever is less. Value graduations shall be supplied and shall be accurately positioned.

The total price shall be computed on the basis of the quantity indicated when the value of the smallest division indicated is equal to or less than the value specified in S.1.1.3.

## Specifications and Tolerances Committee

S.1.4.3. MONEY VALUES, MATHEMATICAL AGREEMENT. - Any digital money-value indication and any recorded money value on a computing-type device shall be in mathematical agreement with its associated quantity indication or representation to within one cent of money value.

### S.2. DESIGN OF MEASURING ELEMENTS.

S.2.1. VAPOR ELIMINATION. - A measuring system shall be equipped with an effective vapor eliminator or other effective means to prevent the measurement of vapor that will cause errors in excess of the applicable tolerances.

S.2.2. DIRECTIONAL FLOW VALVES. - A valve, valves, or other effective means, automatic in operation, to prevent the reversal of flow shall be installed in or adjacent to the measuring device.

S.2.3. MAINTENANCE OF LIQUID STATE. A device shall be so designed that the product being measured will remain in a liquid state during passage through the device.

S.2.4. All liquid carbon dioxide measuring devices of the meter type shall be equipped with automatic means to correct the volume delivered to mass units of measure or to volume at 2 degrees Fahrenheit. Nonretroactive. To become retroactive January 1, 1993.

S.2.5. PROVISION FOR SEALING. - Adequate provision shall be made for applying security seals in such a manner that no adjustment or interchange may be made of:

- (a) any measurement element,
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries, and
- (c) any automatic temperature or density compensating system.

Any adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

### S.3. DESIGN OF DISCHARGE LINES AND DISCHARGE LINE VALVES.

S.3.1. DIVERSION OF MEASURED LIQUID. - No means shall be provided by which any measured liquid can be diverted from the measuring chamber of the device or the discharge line therefrom, except that a manually controlled outlet that may be opened for purging or draining the measuring system shall be permitted. Effective means shall be provided to prevent the passage of liquid through any such outlet during normal operation of the device and to indicate clearly and unmistakably when the valve controls are so set as to permit passage of liquid through such outlet.

S.3.2. DISCHARGE HOSE. - The discharge hose of a measuring system shall be of a wet hose type with a shut-off valve at its outlet end.

## Specifications and Tolerances Committee

### S.4. MARKING REQUIREMENTS.

S.4.1. LIMITATION OF USE. - If a measuring system is intended to measure accurately only liquids having particular properties, or to measure accurately only under specific installation or operating conditions, or to measure accurately only when used in conjunction with specific accessory equipment, these limitations shall be clearly and permanently marked on the device.

S.4.2. DISCHARGE RATES. - A meter shall be marked to show its designed maximum and minimum discharge rates.

S.4.3. TEMPERATURE OR DENSITY COMPENSATION. - If a device is equipped with an automatic temperature or density compensator, the primary indicating elements, recording elements, and recorded representations shall be clearly and conspicuously marked to show that the quantity delivered has been adjusted to the conditions specified in S.2.4.

S.5. TEMPERATURE DETERMINATION. - For test purposes, means shall be provided to determine the temperature of the liquid:

- (a) in the liquid chamber of the meter, or
- (b) in the meter inlet or discharge line and immediately adjacent to the meter.

S.6. LEVEL CONDITION, ON-BOARD WEIGHING SYSTEMS. - Provision shall be made for automatically inhibiting the delivery of liquid carbon dioxide when the vehicle is out of level beyond the limit required for the performance to be within the applicable tolerances.

### N. NOTES

N.1. TEST LIQUID. - A meter shall be tested with the liquid to be commercially measured.

N.2. VAPORIZATION AND VOLUME CHANGE. - Care shall be exercised to reduce vaporization and volume changes to a minimum. When testing by weight, the weight tank and transfer systems shall be precooled to liquid temperature prior to the start of the test to avoid the venting of vapor from the vessel being weighed.

N.3. TEST DRAFTS. -

N.3.1. GRAVIMETRIC TEST. - Weight test drafts shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate.



## Specifications and Tolerances Committee

N.3.2. TRANSFER STANDARD TEST. - When comparing a meter with a calibrated transfer standard, the test draft shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate, and shall in no case be less than 50 gallons or equivalent thereof. When testing uncompensated volumetric meters in a continuous recycle mode, appropriate corrections shall be applied if product conditions are abnormally affected by this test mode.

N.3.3. VOLUMETRIC PROVER TEST DRAFTS. - Test drafts should be equal to at least the amount delivered in one minute at its normal discharge rate.

N.4. DENSITY. - Temperature and pressure of the metered test liquid shall be measured during the test for the determination of density or volume correction when applicable. Table 1 shall apply.

N.5. TESTING PROCEDURES. -

N.5.1. NORMAL TESTS. - The "normal" test of a device shall be made at the maximum discharge rate that may be anticipated under the conditions of installation.

N.5.2. SPECIAL TESTS. - Any test except as set forth in N.5.1. shall be considered a special test. Tests shall be conducted, if possible, to evaluate any special elements or accessories attached to or associated with the device. A device shall be tested at a minimum discharge rate of:

- (a) 50 percent of the maximum discharge rate developed under the conditions of installation, or the minimum discharge rate marked on the device, whichever is less, or
- (b) the lowest discharge rate practicable under conditions of installation.

"Special" tests may be conducted to develop any characteristics of the device which are not normally anticipated under the conditions of installation as circumstances require.

N.6. TEMPERATURE CORRECTION. - Corrections shall be made for any changes in volume resulting from the differences in liquid temperature between time of passage through the meter and time of volumetric determination of test draft.

N.7. AUTOMATIC TEMPERATURE OR DENSITY COMPENSATION. - If a device is equipped with an automatic temperature or density compensator, the compensator shall be tested by comparing the quantity indicated or recorded by the device (with the compensator connected and operating) with the actual delivered quantity corrected to the volume at 2 degrees Fahrenheit or to the mass units of measure. Table 1 shall apply.

## Specifications and Tolerances Committee

### T. TOLERANCES

#### T.1. APPLICATION.

T.1.1. TO UNDERREGISTRATION AND TO OVERREGISTRATION. - The tolerances hereinafter prescribed shall be applied to errors of underregistration and error of overregistration.

#### T.2. TOLERANCE VALUES.

T.2.1. ON NORMAL TESTS. - The maintenance tolerance on "normal" tests shall be two and one-half percent (2-1/2%) of the indicated quantity. The acceptance tolerances shall be one and one-half percent (1-1/2%) of the indicated quantity.

T.2.2. ON SPECIAL TESTS. - The maintenance and acceptance tolerance on "special" tests shall be two and one-half percent (2-1/2%) of the indicted quantity.

T.3. ON TESTS USING TRANSFER STANDARDS. - To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.

### UR. USER REQUIREMENTS

#### UR.1. INSTALLATION REQUIREMENTS.

UR.1.1. DISCHARGE RATE. - A device shall be so installed that the actual maximum discharge rate will not exceed the rated maximum discharge rate. If necessary, means for flow regulation shall be incorporated in the installation.

UR.1.2. LENGTH OF DISCHARGE HOSE. - The discharge hose shall be of such a length and design as to keep vaporization of the liquid to a minimum.

UR.1.3. MAINTENANCE OF LIQUID STATE. - A device shall be so installed and operated that the product being measured shall remain in the liquid state during passage through the meter.

#### UR.2. USE REQUIREMENTS.

UR.2.1. RETURN OF INDICATING AND RECORDING ELEMENTS TO ZERO. - The primary indicating elements (visual) and the primary recording elements shall be returned to zero immediately before each delivery.

UR.2.2. CONDITION OF DISCHARGE SYSTEM. - The discharge system, up to the valve at the end of the discharge hose, shall be precooled to liquid temperatures before a "zero" condition is established prior to the start of a commercial delivery.

## Specifications and Tolerances Committee

UR.2.3. VAPOR RETURN LINE. - A vapor return line shall not be used during a metered delivery unless the quantity of vapor displaced from the buyer's tank to the seller's tank is deducted from the metered quantity. Table 2 shall apply.

### UR.2.4. TEMPERATURE OR DENSITY COMPENSATION

UR.2.4.1. USE OF AUTOMATIC TEMPERATURE OR DENSITY COMPENSATORS. - Devices equipped with an automatic temperature or density compensator shall be connected, operable, and in use at all times. Such automatic temperature or density compensator may not be removed.

UR.2.4.2. TICKETS OR INVOICES. - Any written invoice or printed ticket based on a reading of a device that is equipped with an automatic temperature or density compensator shall have shown thereon that the quantity delivered has been adjusted to the volume at 2 degrees Fahrenheit or to pounds.

UR.2.4.3. PRINTED TICKET. - Any printed ticket issued by a device of the computing type on which there is printed the total computed price, the total quantity of the delivery, or the price per unit, shall have shown thereon also the other two values (either printed or in clear hand script).

UR.2.4.4. TICKET IN PRINTING DEVICE. - A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare.

UR.2.5. SALE BY WEIGHT OR VOLUME. - A quantity determination of weight or volume by means of an approved and sealed weighing or measuring device shall be made on all sales.

## D. DEFINITIONS OF TERMS

The terms defined here have a special and technical meaning when used in the Code for Carbon Dioxide Liquid-Measuring Devices.

**automatic temperature or density compensation.** The use of integrated or ancillary equipment to obtain, from the output of a volumetric meter, an equivalent mass, or an equivalent liquid volume at 2 degrees Fahrenheit, or an equivalent gas volume at a normal temperature and absolute pressure.

**carbon dioxide liquid measuring device.** A system including a mechanism or machine of (a) the meter or mass-flow type, or (b) a weighing type of device mounted on a vehicle designed to measure and deliver liquid carbon dioxide. Means may be provided to indicate automatically, for one of a series of unit prices, the total money value of the quantity measured.

## Specifications and Tolerances Committee

**wet-hose type.** A type of device in which it is intended that the discharge hose be completely filled prior to each commercial delivery.

**large-delivery devices.** Devices used primarily for single deliveries greater than 200 gallons, 2,000 pounds, 2,000 liters, or 2,000 kilograms.

**liquid volume correction factor.** A correction factor used to adjust the liquid volume of carbon dioxide at the time of measurement to the liquid volume at 2 degrees Fahrenheit.

**small-delivery device.** Any device other than a large-delivery device.

**transfer standard.** A measurement system designed for use in proving and testing carbon dioxide liquid-measuring devices.

Specifications and Tolerances Committee

TABLE 1  
LIQUID CARBON DIOXIDE DENSITIES

oF	lb/gal	lb-oz/gal	Vapor Pressure PSIG
-30	9.117	9 - 1.9	163.3
-29	9.100	9 - 1.6	166.8
-28	9.080	9 - 1.3	170.2
-27	9.061	9 - 1.0	173.8
-26	9.042	9 - 0.7	177.4
-25	9.023	9 - 0.4	181.2
-24	9.003	9 - 0	184.9
-23	8.984	8 - 15.7	188.7
-22	8.965	8 - 15.4	192.5
-21	8.946	8 - 15.1	196.4
-20	8.926	8 - 14.8	200.3
-19	8.906	8 - 14.5	204.5
-18	8.886	8 - 14.2	208.4
-17	8.866	8 - 13.9	212.5
-16	8.846	8 - 13.5	216.6
-15	8.826	8 - 13.2	219.4
-14	8.806	8 - 12.9	225.1
-13	8.785	8 - 12.6	229.5
-12	8.764	8 - 12.2	234.0
-11	8.744	8 - 11.9	238.5
-10	8.723	8 - 11.6	242.9
- 9	8.702	8 - 11.2	247.6
- 8	8.680	8 - 10.9	252.2
- 7	8.659	8 - 10.5	256.9
- 6	8.638	8 - 10.2	261.6
- 5	8.616	8 - 9.9	266.4
- 4	8.594	8 - 9.5	271.1
- 3	8.572	8 - 9.2	276.1
- 2	8.550	8 - 8.8	281.0
- 1	8.528	8 - 8.4	286.1
0	8.506	8 - 8.1	291.1
1	8.484	8 - 7.7	296.4
2	8.462	8 - 7.4	301.6
3	8.440	8 - 7.0	307.0
4	8.418	8 - 6.7	312.3
5	8.396	8 - 6.3	317.8
6	8.374	8 - 6.0	323.2
7	8.351	8 - 5.6	328.8
8	8.328	8 - 5.2	334.3
9	8.308	8 - 4.9	340.1
10	8.287	8 - 4.6	345.8
11	8.267	8 - 4.3	351.7
12	8.247	8 - 3.6	357.5
13	8.222	8 - 3.6	363.6
14	8.197	8 - 3.2	369.6
15	8.177	8 - 2.8	375.7
16	8.157	8 - 2.5	381.8



Specifications and Tolerances Committee

TABLE 2  
CARBON DIOXIDE VAPOR DENSITIES AND PERCENT OF VAPOR DISPLACEMENT  
ON METERED DELIVERIES UTILIZING A VAPOR EQUALIZING LINE

Temp _oF	Vapor Pressure PSIG	CO <sub>2</sub> Vapor Density <u>lb/cu ft</u>	CO <sub>2</sub> Vapor Density <u>lb/gal</u>	Percent Vapor Dis- placement
-30	163.3	1.988	.266	2.9
-29	166.8	2.026	.271	3.0
-28	170.2	2.064	.276	3.0
-27	173.8	2.104	.281	3.1
-26	177.4	2.144	.287	3.2
-25	181.2	2.185	.292	3.2
-24	184.9	2.226	.298	3.3
-23	188.7	2.269	.303	3.4
-22	192.5	2.312	.309	3.4
-21	196.4	2.356	.315	3.5
-20	200.3	2.400	.321	3.6
-19	204.5	2.446	.327	3.7
-18	208.4	2.491	.333	3.7
-17	212.5	2.538	.339	3.8
-16	216.6	2.585	.346	3.9
-15	219.4	2.633	.352	4.0
-14	225.1	2.680	.358	4.1
-13	229.6	2.730	.365	4.2
-12	234.0	2.779	.371	4.2
-11	238.5	2.830	.365	4.3
-10	242.9	2.880	.385	4.4
-9	247.6	2.932	.392	4.5
-8	252.2	2.984	.399	4.6
-7	256.9	3.039	.406	4.7
-6	261.6	3.093	.413	4.8
-5	266.4	3.150	.421	4.9
-4	271.1	3.206	.429	5.0
-3	276.1	3.263	.436	5.1
-2	281.0	3.320	.444	5.2
-1	286.1	3.310	.442	5.3
0	291.1	3.441	.460	5.4
1	296.4	3.503	.468	5.5
2	301.6	3.565	.477	5.6
3	307.0	3.630	.485	5.7
4	312.3	3.694	.494	5.8
5	317.8	3.761	.503	6.0
6	323.2	3.827	.512	6.1
7	328.7	3.900	.521	6.2
8	334.3	3.964	.530	6.3
9	340.1	4.035	.539	6.5
10	345.8	4.105	.549	6.6
11	351.7	4.178	.559	6.8
12	357.5	4.250	.568	6.9
13	363.6	4.325	.578	7.0
14	369.6	4.399	.588	7.2
15	375.7	4.477	.598	7.3
16	381.8	4.554	.609	7.5

**REPORT OF THE  
COMMITTEE ON EDUCATION, ADMINISTRATION,  
AND CONSUMER AFFAIRS**

Thomas F. Geiler, Chairman  
Sealer of Weights and Measures  
Town of Barnstable, Massachusetts

REFERENCE  
KEY NO.

400 INTRODUCTION

The Committee on Education, Administration, and Consumer Affairs submits its Final Report to the 72nd Annual Meeting of the National Conference on Weights and Measures. The Report consists of the Interim Report offered in the Conference "Program and Committee Reports" as amended by the Addendum Sheets issued during the Annual Meeting.

REFERENCE KEY ITEMS CONTAINED IN THE REPORT

Table A identifies all of the items contained in the Report by Reference Key Number, Item Title, and Page Number. The Committee's one voting item is identified in bold face print as well as by the letter "V" following the reference key number. All other items are informational and required no formal action by the membership. One of the informational items was withdrawn; it is identified by a "W" following the reference key number.

Table A  
INDEX TO REFERENCE KEY ITEMS

Reference Key No.	Title of Item	Page
401	REGIONAL WEIGHTS AND MEASURES ACTIVITIES	266

Education Committee

Table A (Continued)

Reference Key No.	Title of Item	Page
402	NATIONAL TRAINING PROGRAM (NTP)	267
402-1	NTP Status Report	267
402-2	Future Funding for the NTP	267
402-3	Certification Program Implementation	269
402-4	Registry Summary	269
402-5 V	<b>Criteria for NTP Instructors</b>	269
402-6	Module Revisions	270
402-7 W	Review of LPG Module	270
402-8	Review of NTP Production Schedule	270
402-9	NTP Implementation	271

In addition, the Report contains three appendices that are related to specific Reference Key Numbers as follows:

Appendix	Reference Key No.	Title of Appendix	Page
A.	402-4	NTP Registry Summary of Activity	273
B.	402-5	NTP Criteria for Instructors	275
C.	402-8	Education Survey Results	277

DETAILS OF ALL ITEMS  
(in order of Reference Key Number)

401 REGIONAL WEIGHTS AND MEASURES ACTIVITIES

The Committee reviewed and discussed the following reports.

1. The Final Report of the Education and Consumer Affairs Committee to the 29th Annual Technical Conference of the Western Weights and Measures Association (August 1986).
2. The Final Report of the Education Committee to the 41st Annual Conference of the Southern Weights and Measures Association (October 1986).
3. The Final Report of the Committee on Education, Administration, and Consumer Affairs to the 15th Annual Conference of the Northeastern Weights and Measures Association (May 1987).

The Committee thanks the regional weights and measures associations for their expressions of support for the National Training Program and the input they provided on the criteria for NTP instructors.

402 NATIONAL TRAINING PROGRAM (NTP)

402-1 NTP STATUS REPORT

The status of all training modules published or under development as of June 15, 1987, is given in Table B on the next page.

402-2 FUTURE FUNDING FOR THE NTP

It was reported that the status of the National Training Program grant from the National Bureau of Standards was as follows (as of June 15, 1987):

Total Amount of Funds Authorized:	\$515,189.00
Net Outlays to Date:	\$380,086.68
Total Unliquidated Obligations:	\$16,620.95
Outlays Plus Unliquidated Obligations:	\$396,707.63
Unobligated Balance of Funds:	\$118,481.37

NBS approved the NCWM's request for a funded extension of the grant in the amount of \$50,000 for 1987. NBS has informed the Conference this extension will be the last one awarded.

The Education Committee estimates that the unobligated balance of funds (\$118,481.37) will be enough to develop up to four more training modules. To date, nine modules have been published, one is close to publication, and two are scheduled for publication at a later date. Consequently, the maximum number of modules expected to be developed with grant funds is 16. The number of modules originally proposed for development under the National Training Program was 37.

During a joint session with the Executive Committee on Wednesday, January 14, the Education Committee summarized the status of the National Training Program and expressed concern over the need for future funding for the development of new modules and implementation of published modules. See the Report of the Executive Committee, Item 101-2, for actions planned.

Education Committee

Table B  
TRAINING MODULE STATUS REPORT

Module No.	Subject	Status
1	Mechanical Computing Scales	Project completed.
2	Electronic Computing Scales	Project completed.
4	Medium-Capacity Scales	Field tests of this module will be conducted at two regional schools in September 1987.
5	Vehicle and Axle-Load Scales	Project completed.
6	Monorail Scales	Project completed.
7	Livestock and Animal Scales	Project completed.
8	Retail Motor-Fuel Dispensers	Project completed.
10	Package Checking	Project completed.
13	Hopper Scales	The working group draft is being reviewed by the Federal Grain Inspection Service.
19	Loading-Rack Meters	The working group is preparing the first draft of the module.
20	Vehicle-Tank Meters	Project completed.
21	LPG Liquid Meters	The final copy of the module is being prepared for distribution to the states.
23	Weights and Measures Admin.	OWM is rewriting portions of this draft module.
27	Electronic Weighing and Measuring Systems	Project completed.



402-3 CERTIFICATION PROGRAM IMPLEMENTATION

As of June 15, 1987, the following 34 states and the District of Columbia had signed Letters of Agreement with the NCWM and had been accepted as participants in the NTP Certification Program:

Alabama	Missouri
Alaska	Montana
Arizona	Nebraska
Arkansas	New Hampshire
Connecticut	New Mexico
Florida	North Carolina
Georgia	North Dakota
Hawaii	Ohio
Idaho	Oklahoma
Illinois	Oregon
Indiana	Pennsylvania
Kansas	South Dakota
Louisiana	Utah
Maine	Vermont
Massachusetts	Virginia
Michigan	Washington
Minnesota	Wyoming

States that have not signed a Letter of Agreement form are encouraged to do so. The forms are available from the NBS Office of Weights and Measures. States participating in the Certification Program were sent annual report forms and asked to complete them for calendar year 1986 and return them to the Education Committee prior to the Interim Meeting. The Committee's review of responses received prior to and during the Interim Meeting indicated that there were some misunderstandings concerning the certification process. The Education Committee plans to revise portions of NCWM Publication No. 11, National Training Program, to clarify the process.

402-4 REGISTRY SUMMARY

A summary of the information in the NTP Registry as of June 15, 1987, is provided in Appendix A. The Registry serves as a permanent record of NCWM courses successfully completed and Continuing Education Units (CEUs) earned under the NTP. As of June 15, 1987, NTP participants had been awarded 3,173.1 CEUs (one CEU is defined as 10 contact hours of participation in an organized continuing education experience).

402-5 V CRITERIA FOR NTP INSTRUCTORS

(This item was adopted.)

As part of its study of the need for certification of NTP instructors, the Education Committee requested recommendations from the regional weights and measures associations on minimum qualifications for instructors. Many states

## Education Committee

indicated that they do not want a mandatory certification program for instructors at this time; however, they would appreciate guidance regarding selection of instructors. The Committee therefore developed the criteria contained in Appendix B.

**The Committee proposes that the Conference adopt the criteria contained in Appendix B as a guideline for voluntary use by individuals responsible for selecting or preparing instructors to teach NCWM training modules.**

The Committee will continue to evaluate the need for more stringent, mandatory requirements.

### 402-6 MODULE REVISIONS

Revisions to Module 27, Introduction to Electronic Weighing and Measuring Systems, and Module 1, Retail Computing Scales - Mechanical, have been completed and distributed to the states and all purchasers of the modules. Revisions to Module 2, Retail Computing Scales - Electronic, are in process.

As part of the revision process, all Examination Procedure Outlines (EPOs) currently published in the training modules have been updated. The Committee recently published the revised EPOs in a separate NCWM publication: No. 12, Examination Procedure Outlines for Weighing and Measuring Devices. A copy of NCWM #12 was distributed to all NCWM members.

The Committee reaffirmed the importance of annual module revisions to the success of the National Training Program and expressed its appreciation for the NBS Office of Weights and Measures' support of the revision process.

### 402-7 W REVIEW OF LPG MODULE

This item was withdrawn because the module had been completed.

### 402-8 REVIEW OF PRODUCTION SCHEDULE

The selection of the four additional modules to be developed with grant funds (see Item 402-2) was discussed. Because of the uncertainty over the source of future funding for module development, the Committee felt it was particularly important that the remaining funds be used to develop those modules that are most needed and will serve the largest number of people. The Committee decided to seek the assistance of the states in setting priorities for future modules. A survey was prepared and distributed to state weights and measures offices.

The results of the survey with respect to the priority ranking of modules, suggestions for new modules, and suggestions to delete modules from the proposed list of projects are summarized in Appendix C. This information will be used by the Committee to set priorities for future projects as funding permits. Based on survey results, the Committee has already decided to proceed with plans to develop two highly-ranked modules: Loading-Rack Meters and Labeling of Packaged Products.

According to survey respondents, the module that should be considered the highest priority is on Handbook 44. The Committee had intended that this module provide an introduction to the Handbook and describe how to use it. A number of respondents have assumed that the module would interpret requirements in the Handbook. The Committee had rejected the idea of including interpretations in the Handbook 44 module since that many requirements probably cannot be satisfactorily explained in general terms -- they must be discussed in relation to specific devices, it has already been done in individual device modules. The Committee suggests that the device modules be used as a source of interpretations of the intent of Handbook 44 requirements. If the discussions in a module do not adequately explain Handbook requirements, this should be brought to the Committee's attention and be corrected in future module revisions.

#### 402-9 NTP IMPLEMENTATION

(This item was not listed in the Interim Meeting Agenda, but was added at the meeting.) Since the initiation of the NTP, Education Committee members have had many discussions with state weights and measures directors about implementation of the program in their states. It became clear to the Committee that some states desiring to use the NTP were having problems with program implementation. It also became apparent that, in cases where the program had been implemented, the NBS Office of Weights and Measures had played a significant role. Specifically, an analysis of NTP Registry records, as of December 31, 1986, indicated that 46 percent (436) of the 940 entries were the result of classes conducted by OWM staff. Over 90 percent of the entries for Module 10, Checking the Net Contents of Packaged Goods, and over 80 percent of the entries for Module 8, Retail Motor Fuel Devices and Consoles, resulted from classes taught by OWM staff.

The Committee commends OWM for the important part it has played in implementing the National Training Program. The Committee believes that OWM's continued participation in training is vital to the long-term success of the NTP; consequently, it is hoped that OWM will at least maintain the current level of training and, if possible, expand its role to include more training for course instructors. The Committee feels that OWM's policy of providing training on a regional basis is good and should be continued. Since the Interim Meeting, the Committee has been assured that OWM intends to continue its training efforts in support of the National Training Program at least at the current level over the next five-year period.

It is recognized that OWM does not have the resources to provide continued training on all modules that are published, hence priorities must be established. To assist in this effort, the Committee has developed the following system of categorizing modules according to level of assistance needed from OWM in order to implement them.

Category 1 - Includes modules that the states should be able to implement without assistance from OWM due to relative simplicity and the fact that the devices they cover are examined by most states on a regular basis, making it more likely that good instructors can be found within the states. Examples are modules 1 and 2 on retail computing scales and Module 8 on retail motor-

Education Committee

fuel dispensers. OWM's only role with regard to modules in this category should be to provide train-the-trainer courses for state instructors.

Category 2 - Includes more complex modules thus more difficult to teach, and those that cover devices that are examined less frequently by a smaller number of people, making it more difficult to find instructors. Examples are modules 5, 6, and 7 on large-capacity scales and module 10 on checking the net contents of packaged goods. OWM should conduct training on these modules on a regional basis until the states are familiar with how the modules should be taught.

Category 3 - Includes those modules that should be taught by OWM on a continuing basis either because of safety considerations or unique expertise within the office. Examples are module 21 on liquefied petroleum gas liquid meters and module 23 on weights and measures administration.

The training that OWM provides in support of the National Training Program (as outlined above) should be in addition to the training it provides for state metrologists and in areas of new technology.

To ensure that the resources contributed to the development of the National Training Program by NBS and the states are not wasted, all concerned parties must work together to fully implement the program.

T. Geiler, Town of Barnstable, MA, Chairman

C. Greene, New Mexico

S. Malone, Nebraska

T. Scott, North Carolina

P. Stagg, Louisiana

J. Koenig, NBS, Technical Advisor

COMMITTEE ON EDUCATION, ADMINISTRATION, AND  
CONSUMER AFFAIRS

## APPENDIX A

NATIONAL TRAINING PROGRAM REGISTRY  
 Summary of Activity  
 (As of June 15, 1987)

No. of Individuals Trained:

State	Module No.						Totals
	1	2	5	8	10	20	
AK				1			1
AL				14		25	39
AR	20	20		30	12		82
CT		3		16	18		37
DC	4	4					8
FL	9	6			7	41	63
GA						7	7
HI					14	4	18
ID				10			10
IL				7			7
IN		43		56		48	147
IA				4			4
KS	9	9	5	3	8	8	42
KY				19			19
LA					1		1
MA					3	23	26
ME				8		4	12
MI				2	29	52	83
MO				28	2	22	52
MT				6		8	14
NE		3				1	4
NH	6	5		6		6	23
NJ						114	114
NM					13		13
ND				3		12	15
NY					8		8
OH					7	58	65
OK					19	2	21
OR				12	16		28
P&S						3	3
PA				56	32	82	170
SD				7		10	17
TN						5	5
UT	15	14				14	43
VA					38		38
VT	5			7	1	5	18
WA				16		16	32
WI	56	48				63	167
WY				16		3	19
Totals	124	155	5	327	228	23	1475



Education Committee

APPENDIX A (Continued)

Courses Listed:

Module 1, Retail Computing Scales - Mechanical  
Module 2, Retail Computing Scales - Electronic  
Module 5, Vehicle and Axle-Load Scales  
Module 6, Meat Beams and Monorail Scales  
Module 8, Retail Motor Fuel Dispensers and Consoles  
Module 10, Checking the Net Contents of Packaged Goods  
Module 20, Vehicle-Tank Meters  
Module 27, Introduction to Electronic Weighing and Measuring Systems  
OWM 0201, Basic Metrology I  
OWM 0202, Basic Metrology II  
OWM 0203, Intermediate Metrology

## APPENDIX B

NATIONAL TRAINING PROGRAM  
CRITERIA FOR INSTRUCTORS

The following criteria were developed by the National Conference on Weights and Measures Committee on Education, Administration, and Consumer Affairs as a guideline for individuals responsible for selecting instructors to teach NCWM Training Modules. It is recognized that it might be difficult for an individual to meet all listed criteria; consequently, the list should be viewed as a model or goal -- not as a set of requirements. Also, it should be noted that this is not intended to be an exhaustive list of the knowledge, skills, or personal characteristics needed to be a good instructor; rather, it is the Committee's attempt to identify key characteristics that should be considered in selecting or training instructors.

<u>Knowledge Required</u>	<u>Source</u>
Knowledge of the subject matter	Experience in the field, device manufacture, or servicing
Knowledge of the module to be taught	Participation in a course on the module or thorough review of the module
Knowledge of NCWM requirements	Thorough review of NCWM-approved handbooks such as H-44 and H-130
Knowledge of state requirements	Thorough review of state laws and regulations
Knowledge of the mechanical and electronic concepts embodied in weighing and measuring systems	Experience and study of manufacturers' literature
Knowledge of National Training	Participation in a Train-the-Trainer session or review of NCWM No. 11, National Training Program
Knowledge of instructional techniques	A degree in education or participation in at least 16 hours of instructional techniques training provided by an educational group

Appendix B (Continued)

Skills

Ability to communicate orally in a logical manner

Ability to focus on significant information

Ability to select and use various types of training aids

Ability to demonstrate the examination procedures described in the module

Ability to handle problem participants

Ability to motivate

Ability to create an atmosphere of trust and respect

Ability to assess the level of knowledge of the participants and adjust the content and pace of the course accordingly

Personal Characteristics

Patient

Calm even in stressful situations

Enthusiastic

Strong, pleasant voice

Neat appearance

Organized

Friendly

Positive attitude

Sensitive

No annoying mannerisms

Sincere

APPENDIX C

EDUCATION SURVEY

Final Results

June 26, 1987

Total Number of Forms Returned: 34

Number of States Responding: 30

Education Committee

EDUCATION SURVEY

Number of Top 10 Rankings Each Module Received

<u>Module Title</u>	<u>Total No. of Rankings In Top 10</u>
NBS Handbook 44	27
Communications	25
Labeling of Pkg Products	24
Loading-Rack Meters	23
Test Equipment, Use & Cal	20
Hopper Scales	19
Linear Measuring Devices	17
Application of Computer Sys	16
Prescription Scales & Jewelers Bal	14
Belt Conveyor Scales	12
Dairy-Product & Grain-Test Scales	11
NTEP	11
Theory of Scale Tolerances	10
Laboratory Administration	10
W & M Statistics	08
Weights	08
Wheel-Load Weighers	07
Load Cells	06
EMI/RFI	06
Hand-Crank Fuel Pumps	05
Solid State Circuits & Appl	05
Variable Frequency Insp	04
Environmental Testing	02
Lub Devices & Motor Oil Bottles	02



## EDUCATION SURVEY

Recommendations to Delete Modules  
From List of Proposed Modules

<u>Module Title</u>	<u>No. of Votes to Delete</u>
Lub Devices & Motor Oil Bottles	15
Hand-Crank Fuel Pumps	15
Load Cells	11
Laboratory Administration	11
Solid State Circuits & Appl	11
Variable Frequency Insp	10
Theory of Scale Tolerances	10
Environmental Testing	09
W & M Statistics	08
NTEP	08
EMI/RFI	08
Dairy-Product & Grain-Test Scales	08
Weights	08
Prescription Scales & Jewelers Bal	07
Wheel-Load Weighers	05
Test Equipment, Use & Cal	04
Communications	03
Linear Measuring Devices	03
Application of Computer Sys	03
Belt Conveyor Scales	03
Loading-Rack Meters	02
NBS Handbook 44	02
Labeling of Pkg Products	00
Hopper Scales	00

## Education Committee

### EDUCATION SURVEY

#### Suggested Subjects for Additional Modules\*

Interpersonal Skills - Meeting and dealing with the public by personal contact, phone, letter etc. May already be covered by #10 "Communications"

Preparing Evidence and Court Appearances

Module for Instructors (Save repeating in each module)

Train the Trainer

Complaint and Fraud Investigation

Supervisor Training

How to promote weights and measures not only dealing with public relations but more so with Legislators, Budget Analysts, and Department Heads such as Commissioners and or Secretaries in order for us to obtain our fair share of the State, County or Municipal budgets.

Timing Devices

A module dealing with ways devices could be or have been tampered with to deliberately defraud the consumer, i.e., the gasoline dispensers in the State of Michigan.

Scanners Used in Retail Trade

Investigation of W & M Fraud - what to look for

1. History of W & M which can be used to give to radio, TV, organization (civic) talks, school talks. This would be brought up to present which would be dealt with most. 2. Something to be used for W & M Week. Some of the above might help. We need something easy for our inspectors to feel comfortable using to toot our horns and protect our profession from disappearing.

Subject: 1. How to get support for program from "upstairs" or legislature. 2. How to get public support. 3. How to make our presence known. 4. How to get business-industry support.

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\*Direct quotations from the survey forms

**INTERIM REPORT OF THE  
COMMITTEE ON LIAISON**

Peggy H. Adams, Chairman  
Chief Sealer, Bucks County, PA  
Department of Consumer Protection

**REFERENCE  
KEY NO.**

**500 INTRODUCTION**

The Committee on Liaison submits its Final Report for consideration by the National Conference on Weights and Measures. This report results from consideration of all communications received by the Committee prior to and during its Interim Meeting at the National Bureau of Standards, January 12-16, 1987 and discussions at the Annual Meeting.

Reference Key Number, Item Title, and Page Number are identified in Table A. All items are informational. The Report contains one appendix: Appendix A is related to Item 514.

(The report was adopted in its entirety by a hand vote of the membership.)

Table A  
INDEX TO REFERENCE KEY ITEMS

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501-1	Federal Grain Inspection Service	283
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Liaison Committee

Table A (Continued)

Reference Key No.	Title of Item	Page
501-7	Labeling of Turkey with Gravy	286
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513	INTERACTION WITH PRIVATE SHIPPERS SUCH AS UPS, FEDERAL EXPRESS, ETC.	294
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In addition, the Report contains one appendix related to Item 514.

DETAILS OF ALL ITEMS  
(in order of Reference Key Number)

FEDERAL AGENCY ACTIVITIES

501-1 FEDERAL GRAIN INSPECTION SERVICE

Richard R. Pforr, Acting Chief, Equipment Branch, Field Management Division, Federal Grain Inspection Service (FGIS), U.S. Department of Agriculture, reported the following activities for 1986.

1. All 14 master railroad track scales were tested. Weights and Measures jurisdictions at all locations were cooperative. FGIS provided a copy of the test to the concerned state.
2. An estimate has been received to repair the Los Angeles master scale, which is still out of service. The prohibitive cost probably means that it will not be repaired. FGIS will review this matter.
3. FGIS conducted 82 scale tests on 41 railroad track scales used for the official weighing of grain. In addition, four railroad-owned track scales and four railroad track scales owned by industry were tested.
4. In 1986, FGIS adopted the 1985 edition of Handbook 44. As the Federal process is long and includes a 60-day hearing period, Handbook 44 will be approved only every few years.

FGIS will participate with NTEP in the evaluation of railroad track scales and bulk weighing systems.

A description of the Railroad Track Scale Testing Program, including scale locations, has been put on the "WAMIS" Bulletin Board. It is also available from the NBS Office of Weights and Measures.

FGIS is working toward uniformity with NCWM recommendations. It is working with NBS and the NCWM S&T Committee on the development of a code for moisture meters and grain test scales.

501-2 AEROSOL NET WEIGHT LABELING

Mr. Howard Pippin of the Food and Drug Administration reported that the NCWM petition for aerosol labeling on a net-weight-only basis was in his office in preparation to going to the Office of the Associate Commissioner for Regulatory Affairs.



## Liaison Committee

501-3

### MILK METERS

The Liaison Committee received a letter from Tanks, Inc. of Kansas, concerning the use of a truck-based milk metering system that has received a Certificate of Conformance from NBS/NTEP. Mr. Noble Metz, president of Tanks, Inc. of Kansas, believed that the Market Administrator for the Texas Milk Marketing Area would not let the meter be used for milk pooled under Federal Order 1126. He quoted an article in Dairyman's Digest, dated December 1985, in which the administrator, Mr. Dunham, is quoted as saying, "I would like to see a lot more testing and experience before we move too far toward depending on meters mounted on trucks with the jolting and vibrating caused by rural roads." In addition, Mr. Metz felt that a November 8, 1985 memo from Mr. Dunham, subject "Verification of Individual Producer Weight," was unclear in indicating if a truck-mounted metering system could be used to measure milk.

The Committee contacted Mr. Dunham in Texas to obtain his views on the issue. He replied to the Committee through a letter dated December 31, 1986, stating that his office is not responsible for meter approval, but for the verification of the accuracy of weights received at dairy plants from dairy farmers. Mr. Dunham cited the following paragraph from the November 8, 1985 letter as stating his position.

"We will accept weights determined by any approved measuring and weighing device so long as such weights are verifiable by our office. If individual farm tank calibration is abandoned and milk measurements for individual farms are determined via a meter on farm pickup trucks, such milk will only be treated as producer milk if such measurements are verifiable as to the amount of milk marketed by each individual producer. If the meter fails or otherwise fails to properly measure marketings from each individual farmer, such milk would not be treated as producer milk."

Mr. Metz and other members of the Tanks, Inc. of Kansas firm addressed the Committee. A videotape of the operation of the meter was presented, along with a discussion of the approval system that the meter has already been through. Mr. Metz presented information on the interest in using a truck-based metering system and the confusion over what exactly is meant by "verification."

After discussing Mr. Metz's presentation and Mr. Dunham's letter to the Committee, the Committee decided to write to Mr. Dunham and ask him if the Tanks, Inc. of Kansas meter is accepted by his office as an "approved measuring and weighing device" as defined in his letter of November 8, 1985. Also, it was decided that the issue could be clarified if Mr. Dunham would define "verifiable by our office." In this regard, Mr. Metz proposed that the current on-farm, dipstick measuring system be maintained as a backup.

501-4 CREDIT CARD SURCHARGE

California, Colorado, Connecticut, Florida, Kansas, Maine, Massachusetts, Minnesota, New York, Oklahoma, Texas, Washington, and Wisconsin have imposed state bans on credit card surcharges. Five additional states may pass bans this year: Illinois, Michigan, New Jersey, Ohio, and Pennsylvania.

No action is contemplated at the national level at this time.

In Kansas, which passed their law in 1986, the Attorney General stated that the law which prohibits companies from charging extra money on card purchases credit does not preclude offering a cash discount on gas purchases. According to the Attorney General, cash discounts for the purchase of gasoline are not the same as a surcharge for credit card use.

501-5 FEDERAL ROLE IN NET CONTENT COMPLIANCE

The Liaison Committee has, in the past, invited the Federal Trade Commission (FTC) and the National Marine Fisheries Service (NMFS) to present their net content compliance programs to the Committee. At those times, the FTC indicated that their staff has conducted studies in the net weight area when there was concern about particular products, that compliance is achieved in cooperation with state weights and measures agencies, and that the procedures in NBS Handbook 133, Second Edition, are consistent with the FTC's requirements.

In a letter to the Committee, the U.S. Borax Company requested NCWM assistance in obtaining the FTC's position on reasonable net content variations. U.S. Borax has continued to receive citations from the state of New Jersey after obtaining endorsement from the NCWM on the use of alternative volumetric compliance testing procedures. U.S. Borax asked the Committee to send its letter to the FTC substantiating the need for clarification of the reasonable allowances.

The NMFS has started a study to determine whether Maximum Allowable Variations (MAVs) can be established and used in its Seafood Inspection Program for determining the net weight of shrimp material in raw breaded shrimp and the net weight of fish flesh in breaded fish sticks and fish portions. This will probably be a long-term effort because of the data which need to be collected to evaluate the reliability and feasibility of establishing MAVs. At such time as the Federal Food and Drug Administration adopts MAVs for this purpose, NMFS will probably do likewise.

The U.S. Department of Agriculture (USDA) affirmed its position that it would not adopt the procedures and compliance requirements contained in Handbook 133 without going through rule-making procedures for its in-plant inspection program. (See also Item 514 and Appendix A.) However, when the Task Force on Commodity Requirements completes its proposal on moisture loss allowances for red meat and poultry (the gray zone approach), the USDA may be willing to amend its program.

## Liaison Committee

501-6

### INTERACTION WITH FEDERAL AGENCIES

The Liaison Committee's procedures for maintaining an ongoing Conference relationship with appropriate Federal agencies were reviewed. Representatives from the Federal Trade Commission, U.S. Postal Service, Food and Drug Administration, U.S. Department of Agriculture, National Marine Fisheries Service, and Department of Defense were invited to meet with the Committee and discuss their programs pertaining to net weight labeling and other responsibilities interfacing with those of state and local weights and measures officials.

The Department of Defense was represented by Lt. Col. Jungus Jordan, who coordinates the Department's military commissary, base service station, and department store-type programs service-wide. Lt. Col. Jordan was concerned that prior technical memorandum agreements available to military base and installation commanders were no longer in place. He requested that NBS provide him with current NBS Handbooks and Conference information for dissemination to the officers responsible. The Committee will improve on DOD contacts during the next year.

Steve Eckland, Bureau of Consumer Protection, Federal Trade Commission, has provided a list of FTC field offices. The list is available from the NBS Office of Weights and Measures.

Committee attempts to involve appropriate U.S. Postal Service representatives responsible for maintenance and calibration of that agency's scales will continue.

John Lacy, Chief, Scales and Weighing Branch, Packers and Stockyards (P&S) of the U.S. Department of Agriculture, presented a complete overview of P&S responsibilities, including those dealing with weight fraud investigation. P&S now has agreements with 40 states to share information, 20 of which have provisions which authorize for the state to test livestock scales.

Lists of Regional offices of FDA, FTC, and Milk Marketing Administrators of the USDA are available from the NBS Office of Weights and Measures.

In response to a petition from the NCWM, the U.S. Dept. of Agriculture published a proposed regulation that would voluntarily permit meat and poultry firms to use net weight declarations accurate to three decimal places. This proposal was published July 1, 1987 and a public comment period is open until August 31, 1987. The Committee will comment on the proposal. Comments from individual state and local jurisdictions are appropriate and should be sent to: Policy Office, Attn: Linda Carry, FSIS Hearing Clerk, Room 3168, South Agriculture Building, Food Safety and Inspection Service, USDA, Washington, DC 20250.

501-7

### LABELING OF TURKEY WITH GRAVY

Kristie Anderson, a weights and measures inspector in Everett, Washington, wrote to the National Conference to request that the Liaison Committee petition the Food Safety and Inspection Service, USDA, to require that consumer packages of turkey with gravy packets be labeled with a joint net weight declaration - one for the total net weight of the combination package with a separate net

weight for the turkey alone; or the packer may separately declare the net weight of the turkey and the gravy packet.

A presentation was made by Kristie Anderson via telephone and a discussion was held with the Committee. Some weights and measures officials of Washington and California pointed out that the turkey gravy packet may not be visible in some combination packages. Therefore, the consumer has no way of determining how much turkey is being purchased relative to the amount of gravy. Others indicated that there is no evidence that the consumer is being deceived, since the package indicates that the product is a combination product, although the buyer is not able to determine how much turkey is actually in the package. The Committee feels that uniform labeling will enable the consumer to comparison shop.

The Committee invited all weights and measures officials and consumer groups to furnish any evidence that consumers are being deceived by these packages. If warranted, the Committee will petition the USDA to amend its regulations to require a joint net weight declaration. In the meantime, the Committee will notify the National Turkey Federation and the National Broiler Council that concern has been voiced over labeling of combination products. These organizations will be asked to notify their members of this concern; more firms may then voluntarily label the packet with both weights. The current regulations permit separate net weight labeling of turkey and of the gravy packet, but do not require it.

All weights and measures officials and consumer organizations are requested to send complaints and data to the Liaison Committee.

#### 502 PUBLIC LIAISON

The Committee continues to support an effort to improve awareness and understanding of weights and measures problems and issues by directing weights and measures announcements and issues of concern to consumer leaders, trade associations, and other agencies. A member of the Committee and the Executive Secretary of the National Conference on Weights and Measures will select and send information and publications to these groups.

Articles promoting awareness have been printed in several of publications, including "The National Food Processor's Association News Letter", "Food Chemical News", and "ASTM Standardization News." Articles have also appeared in publications of the following organizations: National Association of Consumer Agency Administrators, American Petroleum Institute, and the U.S. Metric Association.

#### 503 OIML ACTIVITIES

Mr. David Edgerly, U.S. representative to the International Organization of Legal Metrology (OIML), reviewed activities of possible interest to the NCWM. See Item 104-4 and Appendices of the Executive Committee Report.



Mr. Albert Tholen, Chief, Office of Weights and Measures (OWM), reported on the status of the program in terms of staffing and program changes.

Staffing Changes. Three personnel changes present temporary difficulties in completing all of the work scheduled for the next few months.

Mr. Louis Barbrow, who was on contract to the NCWM, died suddenly last November. He did much of the editorial review of publications and coordinated the printing of most Conference documents. Additionally, he did much of the detailed record maintenance of the membership files, including the updating of mailing lists and recording of mailings to the members. Rather than replace him with a full-time contractor, we have made arrangements to hire temporary help to assume most of the work formerly performed by Mr. Barbrow. These temporary hires will work as needed.

Mr. Stephen Hasko retired at the end of December after a 34-year government career, much of it in the Office of Weights and Measures. OWM has contracted for his services to formally document some of his training seminars and to train current OWM staff members as trainers.

Mr. Otto Warnlof transferred from OWM to the Standards Management Program, where he will work on OIML activities full-time rather than part-time (as he did as a member of the OWM staff). Mr. Henry Oppermann has assumed Mr. Warnlof's former assignment as technical advisor to the Committee on Specifications and Tolerances. Mr. Karl Newell has been assigned to assist Mr. Oppermann in selected NTEP tasks, computerizing much of the NTEP record-keeping and conducting evaluations. Mr. Paul Krupenie works with Mr. Oppermann in carrying out various tasks of the State Laboratory Program, including conducting training seminars, supporting the Regional Measurement Assurance Programs, and management of the laboratory certification activities.

OWM plans to replace Mr. Hasko and Mr. Warnlof through national recruiting in the next few months.

Program. OWM will continue to carry out its plan to provide all of the staff with the latest computer capability. The current CompuCorp system will be replaced with IBM-compatible equipment. During calendar year 1987, the new IBM-compatible equipment will be procured, staff trained, and records transferred from the CompuCorp system. All files will then be compatible with the Bulletin Board.

The Bulletin Board will be improved and its use promoted.



505 RAILROAD FREIGHT CAR STENCILED TARE WEIGHTS

John J. Robinson, Senior Assistant Vice President, Association of American Railroads (AAR), reported the following to the Committee.

1. Due to the drop-off of smokestack industries, the railroad business has dropped. Railroad cars not in use for an extended time have been stored, and it is impractical and expensive to restencil them. Approximately 10 percent of the fleet is out of service due to repairs.
2. A total of 87,610 non-exempt cars, or about 12.1 percent of the serviceable fleet of general service freight cars, were restenciled in 1986.
3. There were 53,491 so-called "exempt" cars (not subject to the basic 60-month reweighing rule), or 6.5 percent of the serviceable specially-equipped car fleet. There were 20,684 covered hoppers reweighed.
4. AAR is continuing to explore procedures for streamlining the weighing/re-stenciling process.
5. The current trend in railroad industry freight rates is for more quotations per car based upon weight agreements.
6. AAR has a computerized data base of virtually all railroad track scales in the United States, providing capacity, manufacturer, type, location, etc. In the interest of promoting accurate weights and maintaining a workable liaison with the members of the NCWM, AAR will furnish a computer printout of railroad track scales located in their respective jurisdictions to any state officials upon written request.

The Committee has sent a letter to AAR urging it to continue to determine tare weights.

506 THE 150TH ANNIVERSARY OF THE OFFICE OF WEIGHTS AND MEASURES

The Committee urges NCWM to focus on the 150th anniversary of the amendment in 1838 of the Joint Congressional Resolution of 1836 which directed the Secretary of the Treasury to make and deliver one standard balance to the governor of each state. This direction concluded the first attempt at national uniformity in weights and measures.

The planned celebration includes a special commemorative membership certificate for each member attending the 73rd Conference in Grand Rapids; a dinner featuring a speaker interest to the Conference; articles in various publications; and, possibly, historic exhibits and videotapes.

## Liaison Committee

The Committee urges members to continue to support the effort for a commemorative stamp in 1989 since each custom house received a set of standards in 1839. Letters should be sent to Belmont Faries, Citizens' Stamp Advisory Committee, 475 L'Enfant Plaza Southwest, Washington, D. C. 20260-6300, and to Dickey B. Rustin, Manager, Stamp Information Branch, Marketing Department, United States Postal Service.

A weights and measures commemorative stamp in 1988 appears unlikely. The Committee therefore suggests that the NCWM issue a special weights and measures stamp in conjunction with the 150th anniversary celebration in 1988.

### 507 TASK FORCE ON INFORMATION SYSTEMS

At its interim meeting in Sacramento, California on February 19, 1987, the Task Force continued its discussions on the use of computerized information systems in field, office, and laboratory applications. Specific recommendations and conclusions of the Task Force to the Conference follow.

#### Item 1 - Funding alternatives for the NCWM's WAMIS (Weights And Measures Information System) Electronic Bulletin Board

Task Force discussions on this item revolved around the various ways that the costs (e.g., telephone link connection charges) to user jurisdictions might be equalized across the country: computer users most geographically remote from Gaithersburg, Maryland now pay up to 10 times as much to receive the same service as those within 350 miles of the National Bureau of Standards. Possibilities range from NCWM-subsidized (by an annual user fee or addition to the NCWM membership fee) 800 (toll free) or 900 (50 cents per call) leased lines to an FTS incoming Federal tie line. As a first step, however, the Task Force requested that the possibility of a National Bureau of Standards Western United States link be explored by means of a Boulder, Colorado (area code 303) connection directly through to Gaithersburg. Such a link would substantially reduce WAMIS access costs to those jurisdictions west of the Mississippi.

#### Item 2 - Regional weights and measures association "user groups" -- a Task Force recommendation

The Task Force recommends that each of the four regional weights and measures associations (SWMA, WWMA, NEWMA, and CWMA) provide time (and space) for convening a computer users group meeting in conjunction with their annual conferences. It has been amply demonstrated that computer users groups provide the most effective way to share information about computer applications, answer technical questions, educate new users, obtain new programs, pass on successful approaches, and otherwise get information from "those who have it" to "those who want it". Within regions, program similarities among jurisdictions are usually greatest, travel costs and approval difficulties are usually lower, and the likelihood of participation by the smaller jurisdictions (or users) usually greater. This activity might lead to a formal committee arrangement; however, initial "bull-session" type meetings among interested individuals will be sufficient now.

As interest and the need to organize grows, agendas, officers, and subgroups (by hardware type and/or operating system, etc.) can evolve as desired.

### Item 3 - WAMIS security and accessibility considerations

The WAMIS Bulletin Board is currently open to all computer users interested in the activities of the National Conference on Weights and Measures. As an "open" bulletin board, WAMIS information (except protected messages sent between specific identified users) can be accessed and used by anyone who logs onto the system. The system has the capability of being redefined in up to 10 different security levels in the future if it becomes desirable. All users are currently at the "level five" security category and can transmit protected messages to authorized users by keying in the "P" command and a password when the message is posted. Such messages can be read and subsequently deleted by either the SYSOP (System Operator, Karl Newell) or others who can give the password.

General information posted for the use of weights and measures jurisdictions, such as results of inspections, listings of shortmeasure products, etc., is accessible to all who log onto the system. Users who post (or use) such information are reminded to heed the WAMIS disclaimer and listing of user responsibility as published in the WAMIS User's Guide Book and as also flashed onto the screen at log-on, which declares:

- "1. Actively encourage and promote the free exchange and discussion of information, ideas and opinions, except when the content would compromise the national security of the United States; violate proprietary rights, personal privacy, or applicable state/federal/local laws and regulations affecting telecommunications; or constitute a crime or libel.
2. Use your real name and fully disclose any personal, financial, or commercial interest when evaluating any specific product or service.
3. Adhere to these rules and notify me immediately when you discover any violations of the rules.

FURTHER every user explicitly acknowledges that all information obtained from this RABBS-PC is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to the implied warranties of merchantability and fitness for a particular purpose and that the entire risk of acting on information obtained from this RBBS-PC, including the entire costs of all necessary remedies, is with those who choose to act on such information and not the operator of this RBBS-PC."

### Item 4 - Recommendations for Conference handling of information systems issues, the WAMIS Bulletin Board, and related subjects in the future

Recommendation 4.A. - The Task Force recommends that NCWM supervision over the WAMIS Bulletin Board and all related subjects be assigned to the NCWM Committee on Liaison. The Liaison Committee technical advisor is the WAMIS SYSOP, so this is a logical, appropriate place for these subjects to be considered.

## Liaison Committee

Recommendation 4.B. - The Task Force recommends that the Committee on Liaison either appoint or itself function on an interim basis as a WAMIS Advisory Committee for interested users of the system. Where possible, WAMIS Advisory Committee members should come from the ranks of regional computer users groups (see ITEM 2 of this report). The purpose of the WAMIS Advisory Committee should be to advise and consult with the NCWM and OWM/NBS on operational issues and concerns relating to the bulletin board on an ongoing basis, including areas such as system capacity, security, access needs, changes in ground rules, etc.

Recommendation 4.C. - The Task Force recommends that it go out of existence with the presentation of this final report. While much remains to be done with respect to computer-based information systems in the weights and measures community, those tasks and functions can and will be addressed outside the NCWM Task Force format.

## In Conclusion -

The Task Force members believe that the era of the computer in weights and measures is just beginning. Furthermore, it is felt that use of computers in the weights and measures system offers more opportunity for improving the productivity of the limited resources available (of equipment, personnel, and time) in the jurisdictions than anything else now available.

Members of the NCWM Task Force on Information Systems are Kendrick Simila (Oregon), Chairman; James Lyles (Virginia); Joseph Rothleder (California); Jerry Hanson (San Bernadino County, California); Robert Bruce (Canada); and Karl Newell (National Bureau of Standards), Technical Advisor.

## 508 THE ROLE OF THE WEIGHING AND INSPECTION BUREAUS IN WEIGHTS AND MEASURES

Mr. Jimmy Willis, regional manager of the Western Weighing and Inspection Bureau (WWIB), Kansas City Service Center, reported on WWIB activities. WWIB originated in 1881 as a small railroad carload weighing bureau and now provides transportation services to carriers and shippers in all sections of the country. WWIB is a private national organization providing transportation auditing, contract compliance, and inspection services to the rail freight transportation industry. They help to establish, maintain, and update weight agreements between carriers and shippers. This includes compliance audits and certifications of rail traffic moving subject to weight agreements, and investigation and adjustment of shippers' weight or classification claims. WWIB offers inspection of scale facilities and bulk weighing system material tests. Testing of platform and hopper scales up to 5000 pounds capacity is available in Kansas, Missouri, and Oklahoma, and hopper scale testing of any scale capacity is available in Colorado.

In grain weight inspection and supervision, the railroads have charged WWIB with the surveillance as to scale performance, accuracy of weights, and related procedures. AAR is responsible for the overall administration of their grain market classification program.



Weight agreements involve, among other things, the use of shipper's weight for shipping costs, rather than the railroads taking the time to weigh the cars. approximately 6300 weight agreements are in effect, of which about 1000 are in-bound shipments to cosignees who have proper facilities for weighing.

WWIB inspectors work with states weights and measures departments when necessary, and those WWIB inspectors testing scales are familiar with NBS Handbook 44.

#### 509 LIAISON WITH REGIONAL ASSOCIATIONS

Dick Smith, NCWM regional coordinator, met with the NCWM Committee on Liaison for the purpose of updating the Committee on activity with the four regional associations during the past year.

Mr. Smith reported that he has continued the practice of exchanging the NCWM Interim Reports and the regional association reports of the S&T, L&R, and Education Committees. In addition, he has attended each of the regional conferences and worked with their respective committees in an effort to bring to them items of national significance and to provide background information from the NCWM to aid in their deliberations of the various items.

He also reported that the regional associations now promptly supply him with current lists of officers and committee members, which are made part of WAMIS for ready reference. He will continue to be alert to areas where the assistance of the NCWM Committee on Liaison would be beneficial.

#### 510 PROMOTION OF TRAINING MODULE PROGRAM (NTP)

The Committee supports promotion of the National Training Program (NTP) Training Module Program for use by industry and Federal agencies in addition to weights and measures officials. The Committee will write an article for industry trade journals informing them of the availability of the training modules and how they might be used to train industry personnel.

#### 511 WEIGHTS AND MEASURES WEEK

The Weights and Measures Week theme for 1987 was "Consumer Involvement for Progress." An informational packet, including the logo, ideas, news articles, NBS Publication 447, "Weights and Measures Standards in the United States," and a pamphlet for consumers, "The Weights and Measures Inspector," were mailed to all coordinators. VHS videotapes of "Equity in the Marketplace" were made available for \$10.

The emphasis for the 1987 Weights and Measures Week activities was the 200th anniversary of the celebration of the Constitution. The power to "fix the standards," part of Article 9, Paragraph 4, is found in the Articles of Confederation. Article 8 of the Constitution gives Congress the power to "fix the standards."



## Liaison Committee

Weights and measures coordinators are requested to include Weights and Measures Week activities during National Consumer Week -- "Consumers Celebrate the Constitution." (April 19-25, 1987)

NCWM Publication #7, "Weights and Measures Week Guide," is available on a very limited basis. In 1987, the guide will be reprinted and revised. The Committee reminds weights and measures officials to use the guide for year-round publicity. Weights and Measures Week articles and activities and year-round information and brochures should be mailed to Peggy Adams, Bucks County Consumer Protection and Weights and Measures, Broad and Union Streets, Doylestown, Pennsylvania 18901.

### 512 WEIGHTS AND MEASURES LEGAL CASES

A survey form was mailed to all weights and measures jurisdictions and was included in the 71st National Conference Report. Some jurisdictions responded. The Committee will request each jurisdiction to send information about one interesting case. Information will also be requested through the WAMIS Bulletin Board.

John Lacy of the Packers and Stockyards offered to send information on cases concerning weights and measures problems. It is noted that state and Federal decisions are available through a commercial computerized information system called LEXIS. There is still a need to receive information on hearings at the administrative and local court level.

### 513 INTERACTION WITH PRIVATE SHIPPERS SUCH AS UPS, FEDERAL EXPRESS, ETC.

In recent years, both the volume of shipments and the number of private shipping companies that charge for services on the basis of package weight have grown significantly. The Committee contacted representatives of the Interstate Commerce Commission (ICC) and private shipping companies to determine what ongoing role the Liaison Committee should play in interacting with the private shipping industry.

The ICC responsibility for regulating interstate commerce, by way of tariff approval and certificate of authority, raises a question of concurrent jurisdiction. John Fristoe, ICC compliance officer, indicated that his agency would probably back weights and measures officials' decisions pertaining to weighing devices. Air freight firms apparently do not now fall under ICC jurisdiction; the Committee will determine where oversight responsibility falls in future contacts with Federal certifying agencies such as ICC.

The proliferation of so-called "commercial counters," i.e., private enterprises providing pick-up points for private shippers such as UPS, was also reviewed. The Committee will explore and recommend means for advising individuals contemplating entering the "commercial counter" business as to requirements for use of type-approved scales.

Mr. Robert Potter, National Customer Relations Representative, United Parcel Service, reviewed his company's procedures for assuring compliance with type approval and NBS Handbook 44 requirements. UPS checks its own equipment in-house. However, UPS does not have scales for their agents or commercial counters. Mr. Potter stated that commercial counters are independent small businesses and are under state and local weights and measures jurisdiction. He stated that they are not agents of UPS. The Committee will continue to communicate with UPS in an effort to set some guidelines for UPS to distribute to commercial counters on a voluntary basis so that scales purchased are appropriate and approved for their use.

514                    PROMOTION OF NBS HANDBOOK 133

The Committee on Liaison recommends the adoption of NBS Handbook 133 by all state and local weights and measures agencies. The Committee expresses its willingness to work with each state that has not already adopted Handbook 133. The Committee will help to identify steps necessary for adoption within a given state and aid in the adoption procedure. Appendix A contains a letter from the Department of Agriculture, Food Safety and Inspection Service, explaining its position concerning Handbook 133. This should reassure weights and measures agencies that package lots called off sale using NBS Handbook 133 Category A will not be challenged by USDA.

515                    LABELING OF NONALCOHOLIC MALT BEVERAGES

Sections 8.1.1. and 8.1.5. of the Uniform Packaging and Labeling Regulation require the quantity declaration to appear within the bottom 30 percent of the principal display panel(s) and generally parallel to the base on which the package rests as it is designed to be displayed. Nonalcoholic malt beverages, under the Federal requirements of the Bureau of Alcohol, Tobacco, and Firearms (BATF) are not required to show the quantity declaration parallel to the base or in the lower 30 percent of the principal display panel. When registering these products for the required BATF permit, the agency has allowed these nonalcoholic beverages to be labeled in accordance with BATF regulations, resulting in violative labeling in every state that has adopted the Uniform Packaging and Labeling Regulation. The Committee has responded to a Federal Register announcement for comments to these BATF regulations. The response requested that BATF (1) recognize that state requirements also cover nonalcoholic malt beverages and (2) require these declarations to be placed in accordance with the Uniform Packaging and Labeling Regulation.

## Liaison Committee

The Committee has received a response from the BATF saying that the committees' comments will not be acted upon at this time because they did not relate to the specific proposals of the notice. The Committee will continue to pursue the matter.

P. Adams, Bucks County, Pennsylvania, Chairman

J. Akey, Kansas

P. Engler, Los Angeles County, California

C. Kloos, Beatrice

J. McCutcheon, USDA

K. Newell, NBS, Technical Advisor

COMMITTEE ON LIAISON

APPENDIX A

Liaison Committee



United States  
Department of  
Agriculture

Food Safety  
and Inspection  
Service

Washington, D. C.  
20250

NOV 25 1986

RECEIVED

NOV 24 1986

Consumer Protection Weights & Measures

Ms. Peggy H. Adams  
Bucks County Consumer Protection/  
Weights and Measures  
Broad and Union Streets  
Doylestown, PA 18901

Dear Ms. Adams:

This is in response to the request made at the National Conference on Weights and Measures in Albuquerque concerning endorsement of NBS Handbook 133.

The Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture is restricted from adopting Handbook 133 as the statistical basis for determining accuracy of net content labeling of federally inspected meat and poultry products. To adopt provisions of Handbook 133 would require FSIS to revise existing net content regulations in accordance with the Administrative Procedures Act prior to implementation of revised regulatory requirements.

FSIS presently enforces procedures for net content control in federally inspected meat and poultry plants that are very similar to those detailed as Category B in Handbook 133. These procedures are used to determine if a production lot is correctly labeled for net content.

If a State or jurisdiction elect to implement Handbook 133 and use the sampling plan Category A to determine accuracy of the net content statement of federally inspected meat and poultry products, FSIS would not object and should the results of applying Category A sampling plan reveal underweight product, FSIS would assume that the product is truly mislabeled as to the net content statement.

If additional information is needed, feel free to contact me at Area Code (202) 447-3521.

Sincerely,

John W. McCutcheon  
Deputy Administrator  
Meat and Poultry Inspection  
Technical Services

## Nominating Committee

### REPORT OF THE NOMINATING COMMITTEE

George Mattimoe, Chairman  
State of Hawaii

#### REFERENCE KEY

800

The Nominating Committee met during the Interim Meeting at the National Bureau of Standards, Gaithersburg, Maryland, and nominated the listed persons to be officers of the Conference. In the selection of nominees from active membership, consideration was given to professional experience, qualification of individuals, Conference attendance and participation, regional representation, and other factors considered to be important.

Each of the persons named has been contacted and has agreed to serve if elected.

CHAIRMAN-ELECT: John Bartfai, New York

VICE-CHAIRMEN: James Vanderwielen, Tippecanoe County, IN  
Stuart Rosenthal, City of New York, NY  
Sterling McFarlane, City of Seattle, WA  
Tom Scott, North Carolina

EXECUTIVE COMMITTEE:  
(3-year terms) Bruce Niebergall, North Dakota  
Sam Hindsman, Arkansas

TREASURER: Charles A. Gardner, Jr., Suffolk County, NY

CHAPLAIN: Martin Coile, Georgia

Respectfully submitted:

George Mattimoe, Chairman

Peggy Adams, Bucks County, PA  
Edward Heffron, Michigan  
Donald Lynch, Kansas City, KS  
Allan Nelson, Connecticut  
Richard Thompson, Maryland  
Kendrick Simila, Oregon

#### NOMINATING COMMITTEE

On motion of Mr. Simila, Acting Chairman, the report of the Nominating Committee, voting key item 800, was adopted in its entirety by the Conference.



**REPORT OF THE RESOLUTIONS COMMITTEE**

Donald L. Lynch, Chairman  
Standards Administrator  
City of Kansas City, Kansas

**REFERENCE  
KEY NO.**

701

**GENERAL**

The Resolutions Committee wishes to express the appreciation of the members of the National Conference on Weights and Measures to those who contributed their time and talents toward the arrangements for, the conduct of, and the success of this 72nd Annual Meeting. Special votes of thanks are extended:

- (1) to Kenneth Gilles, Assistant Secretary of Agriculture, USDA, for his description of the several roles of the U.S. Department of Agriculture, including the Federal Grain Inspection Service and the Food Safety and Inspection Service in the growing National commerce, and for his continuing interest in the coordination of Federal and State activities in support of the marketplace and the myriad complexities of commodity processing and selling;
- (2) to Ernest Ambler, Director, National Bureau of Standards, for his insightful description of the roots of weights and measures in the Constitution of the United States; his stimulating recounting of the evolution of commercial measurement and the parallel cooperation of the NBS and States through the National Conference on Weights and Measures; and his encouraging summary of recent achievements was encouraging as the National Conference on Weights and Measures membership plans for the future;
- (3) to officers and appointed officials of the National Conference on Weights and Measures for their assistance and service toward progress on national issues;
- (4) to committee members for their efforts throughout the past year preparing and presenting their reports, to the subcommittees and task forces for their discerning and appropriate recommendations;
- (5) to governing officials of state and local jurisdictions for their advice, interest, and support in weights and measures administration in the United States;
- (6) to representatives of business and industry for their cooperation and assistance in committee and Conference work, to the associate membership organization for its hosting functions;
- (7) to the staff of the Excelsior Hotel for their assistance and courtesies,

## Resolutions Committee

- (7) to the staff of the Excelsior Hotel for their assistance and courtesies, which contributed to the enjoyment and comfort of the delegates in their fine facilities;
- (8) to the National Bureau of Standards and the Office of Weights and Measures for their outstanding assistance in planning and conducting the work and program of the National Conference on Weights and Measures;
- (9) to the Office of Weights and Measures staff:

Ann Heffernan,  
Karen Barkley, and  
Terry Grimes, for their expert and hospitable operation of the administrative operations of the meeting; and

- (10) to the Arkansas Bureau of Standards for their tireless and essential support to the Conference, its committees, and our guests throughout the meeting week.
- (11) to the family of Mack Rapp

whereas Mack spent 50 years of his life in the weighing industry and was known and highly respected by all who knew him, and

whereas hundreds of members, both past and present, of the National Conference on Weights and Measures have benefitted from his dedication to the objectives of this organization, and

whereas Mack was a strong and enthusiastic formulator of means to obtain national recognition for the weighing industry through establishment of "Weights and Measures Week" and the issuance of a commemorative postage stamp, and

whereas Mack's was a voice often heard, speaking with authority and conviction on matters of great importance to the National Conference on Weights and Measures, therefore be it resolved that

The National Conference on Weights and Measures extends its condolences and sympathy to you in marking the passing of this great and good friend from our midst.

D. Lynch, Kansas City, Kansas, Chairman

C. Carroll, Massachusetts  
G. MacDonald, Minnesota  
M. Gray, Florida  
O. R. Elliott, Oklahoma  
S. Meloy, Montana  
R. Smith, NBS, Technical Advisor

(On motion of Mr. Carroll, Acting Chairman, the report of the Resolutions Committee, Reference Key Item 700, was adopted by the Conference.)

**REPORT OF THE AUDITING COMMITTEE**

Ed Romano, Sealer  
Department of Weights and Measures  
Glenn County  
Willows, California

REFERENCE

KEY NO.

900

The Auditing Committee met on Tuesday afternoon, July 21, for the purpose of reviewing the financial reports of the Conference Treasurer, Charles A. Gardner, Jr. The Committee finds these records to be in accordance with Conference procedure and correct.

E. Romano, Glenn County, CA, Chairman

F. Clem, City of Columbus, OH

J. Rardin, WV

R. Smith, NBS, Regional Coordinator

(On motion of Mr. Romano, the Report of the Auditing Committee, Reference Key Item 900, was adopted by the Conference.)

## Treasurer's Report

### REPORT OF THE CONFERENCE TREASURER

Charles A. Gardner, Director  
Weights and Measures  
Suffolk County, New York

#### REFERENCE KEY

1000

It is my pleasure to report to you on the financial status of the Conference Treasury as follows:

CASH ON HAND - JUNE 30, 1987 \$ 41,065.80

#### RECEIPTS

##### Account Number

1.1	Registrations	\$31,500.00	
1.2	Membership	47,565.00	
1.3	Training Modules	9,371.04	
1.4	Interest	2,113.53	
1.5	Promotions	2,325.65	
1.6	Special Events	3,413.00	
1.9	Miscellaneous	-0-	
	TOTAL RECEIPTS		<u>\$ 96,288.22</u>

TOTAL CASH BALANCE AND RECEIPTS \$137,354.02

#### DISBURSEMENTS

##### Account Number

2.0	Annual Meeting	\$12,194.23
3.0	Interim Meeting	1,554.83
4.0	Committee Operations	18,724.19
5.0	Special Programs	13,401.12
6.0	Chairman's Expenses	3,601.13
7.0	Membership Expenses	8,016.28
8.0	Printing & Publications	10,108.32
9.0	Administration	3,113.08
10.0	Special Events	1,691.75
11.0	Promotions	124.42
12.0	Training Modules	9,124.40

# Treasurer's Report

TOTAL DISBURSEMENTS	\$ 81,653.75	
BALANCE - Income/Disbursements		\$55,700.27

Cash on Hand - June 30, 1987

Super NOW Account	
European American Bank, Hauppauge, NY	\$ 55,386.03

Signet Bank Account	
Gaithersburg, MD	\$ 314.24

TOTAL ASSETS		\$55,700.27
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## FISCAL YEAR 71 (1986-87) NATIONAL CONFERENCE ON WEIGHTS AND MEASURES GRANT ACCOUNT

CASH ON HAND - June 30, 1986	\$ 2,143.17
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RECEIPTS	43,863.74
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<u>TOTAL CASH BALANCE AND RECEIPTS</u>	<u>\$46,006.91</u>
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DISBURSEMENTS	36,484.45
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Cash Balance - June 30, 1987	
Super N.O.W. Account -	
European American Bank	
Hauppauge, New York	\$ 9522.46

<u>TOTAL DISBURSEMENTS AND CASH BALANCE</u>	<u>\$46,006.91</u>
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Charles A. Gardner, Treasurer

(On motion of Mr. Gardner, the Report of the Conference Treasurer, Reference Key Item 1000, was adopted by the Conference.)



## REPORT ON STATE METROLOGY WORKSHOPS

Paul H. Krupenie  
National Bureau of Standards

Workshop sessions were held on Monday, July 20 and Wednesday, July 22, 1987. The morning of July 20 was devoted to a tour of the Arkansas laboratory and the afternoon to a tour of the National Center for Toxicological Research(NCTR), a little-known branch of the Food and Drug Administration. A technical session was held on Wednesday morning.

Billy Sullivant and Charles Kirspel, of Arkansas, ushered visitors through the Arkansas mass, volume, length, and grain moisture laboratories. Their length bench is used less and less, since the primary clients of length measurement, the state's Highway Department and industry, make increased use of laser devices. The large volume lab includes a rack of provers, 50 gal to 1000 gal, permanently mounted high enough, for tank trucks to pull in one door and exit through another. The lab computer is programmed for double substitutions, LAP problem 27, and the Z-60 calculation. Word processing software prepares certificates of calibration, worksheets, and reports.

David Karlsh of Arkansas guided the tour through the petroleum testing lab and mobile lab, where fuels and possible contaminants are analyzed. Outside the lab are various truck-mounted provers and a truck, fitted with three 5-gal test measures and dump tanks, for use at truck stops.

The primary weights of the lab facilities of the NCTR are calibrated by the Arkansas lab. The visitors observed their working standards, used to weigh feed; chemical additives in the study of toxicity; animals (mice and rats); and organs. The working standards are used to calibrate balances that are interfaced with computers.

The technical session opened with detailed accounts by L.F.Eason, North Carolina, and Herb Eskew, Texas, of their labs' experience with electronic microbalances of 3- or 4-g capacity. Attendees were informed that the standard deviation claimed by the manufacturer may be based on a different calculation procedure than that used by metrologists. Electrostatic effects are commonly encountered in the use of these small-capacity balances; therefore, static ground straps on shoes, anti-static brushes, lab coats, and wrist straps are recommended. Static electricity problems may also be caused by chairs, lint, or the material in boxed-weight containers.

For the small-capacity balances as well as the larger-capacity mass comparators (e.g., in the 50-lb regime), the latter discussed by Ken Fraley, Oklahoma, the general advice was to keep them on at all times.

Joe Rothleder, California, summarized how, in California, statistical analysis of computerized records on the stability of field weights and volume measures enable the lab to adjust the time interval for each jurisdiction to send its standards for retesting. This has added flexibility to both the State lab and the various jurisdictions.

Paul Krupenie, National Bureau of Standards, spoke on errors made in reporting masses in round robins, and presented guidelines for analysis of data on control charts, an early warning system of possible sources of trouble before the measurements reveal failure of a statistical test.

## Registration List

### REGISTRATION LIST - 72ND ANNUAL MEETING

Adams, Peggy H.  
PA Bureau of Weights  
& Measures  
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Barnett, Tom  
Fred Stein Labs. Inc.  
121 North Fourth  
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Barrows, Lester H.  
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Jefferson City, MO 65102  
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Bell, Irving  
The Coca-Cola Co.  
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203/622-7710

Belue, F. Michael  
Southwest Pump Co.  
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SD Div. Commercial  
Inspec. & Reg.  
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Sioux Falls, SD 57106  
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Bird, James R.  
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Bowen, Donice  
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804/580-4305

Bradshaw, Harold  
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Measures  
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