

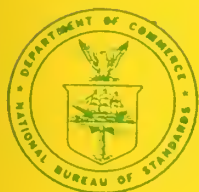
NBS 1277-
1322



TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM
FOR PAPER

REPORT NO. 49G



U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

NBS COLLABORATIVE REFERENCE PROGRAMS

TAPPI Paper and Board (6 times per year)

Bursting strength	Smoothness
Tearing strength	Surface pick strength
Tensile breaking strength	K & N ink absorption
Elongation to break	pH
Tensile energy absorption	Opacity
Folding endurance	Blue reflectance (brightness)
Stiffness	Specular gloss, 75°
Air resistance	Thickness
Grammage	Concora (flat crush)
	Ring crush

FKBG-API Containerboard (48 times per year)

Mullen burst of linerboard
Concora test of medium

MCCA Color and Appearance (4 times per year)

Gloss at 60°
Color and color difference
Retroreflectivity

Rubber (4 times per year)

Tensile strength, ultimate elongation and tensile stress
Hardness
Mooney viscosity
Vulcanization properties

ASTM Textiles (3 times per year)

Flammability (FF3-71 and FF5-74)

ASTM Cement (2 times per year)

Chemical (11 chemical components)
Physical (8 characteristics)

AASHTO Bituminous

Asphalt cement (2 times per year)
Cutbacks (once a year)



Collaborative Reference Programs
B360 Polymer Building
National Bureau of Standards
Washington, D.C. 20234

TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM
FOR PAPER

Report No. 49G

R. G. Powell
TAPPI-NBS Research Associate
Collaborative Testing Services, Inc.

E. B. Randall, Jr., J. Horlick
Laboratory Evaluation Technology Section
Standards Application and Analysis Division
Institute for Applied Technology

U. S. DEPARTMENT OF COMMERCE
National Bureau of Standards

NBSIR 77-1322

Introduction

Reports 49S and 49G comprise the first set of reports for the 77-78 program year. Both reports will no longer be sent automatically to all participants. Participants in tests which involve strength properties of paper will receive only the S report; those in tests which measure other properties will receive only the G report.

Notes and comments for individual laboratories and "Best Values" applicable to a particular method are given following Table 1 for each method. See page 4 of this report for an explanation of "Best Values." Please do not confuse these best values with provisional values included with the samples to detect serious discrepancies at the time of test. NBS results, identified as L502 in the optical tests are included in some of the tables.

If there are any questions on the notes, the analyses, or the reports in general, contact Edwin B. Randall, Robert G. Powell, or Jeffrey Horlick on 301/921-2946.

Edwin B. Randall, Jr., Administrator
TAPPI Collaborative Reference Program
Laboratory Evaluation Technology Section

December 1, 1977

TAPPI-NBS COLLABORATIVE REFERENCE PROGRAM

BACKGROUND AND PURPOSE

In 1969, the National Bureau of Standards and the Technical Association of the Pulp and Paper Industry established a collaborative reference program to provide a participating laboratory with a means to check periodically the level and uniformity of its testing in comparison with that of other laboratories.

The interchange of paper and board products and of the raw materials for these products requires agreement among raw material suppliers, paper and board producers, converters, distributors, retailers, commercial testing laboratories, user organizations and the ultimate consumer as to the meaning of test results, an agreement that cannot be achieved without accurate and precise testing. This program is designed to help assure agreement.

HOW THE PROGRAM WORKS

Participants Select the Tests in which they wish to participate. This choice is made on joining the program, but additional tests may be added at any time. Also new participants may enter the program at any time.

Test Samples are Distributed Bimonthly; i.e. every 2 months.

Provisional Values are Provided with the Samples for one or both of the test levels, depending on method. The provisional values permit serious discrepancies to be detected without delay. (It is left to the discretion of the laboratory supervisor as to whether these values should be known to the operator.)

Each Participant Tests the Samples, following instructions provided for each test method. The full check on a single instrument should normally take no more than 30 minutes. The test results are then sent to NBS for analysis. The participant is also asked to report other information relevant to an accurate analysis, such as test conditions and the instruments used.

Industry Means, Best Values and Other Statistics are developed from the data by NBS. The best values are estimates based on a careful examination of all data, both current and past, with special attention to results obtained by the National Bureau of Standards and other recognized reference laboratories in this and other countries.

A Quick Report is Prepared for each participating laboratory reporting data on time. This report shows the industry mean values, and the deviations of the laboratory's results from these values for each test method.

A Longer Summary Report, Showing the Data from all Participants, is also prepared. In the summary report, of which this report is an example, each laboratory is identified by a code number so that the information is maintained on a confidential basis. However, instruments are identified by type so participants can compare their results with those obtained on similar instruments of different manufacture. This report includes test averages, best values and standard deviations for individual participants and for the group as a whole. A participant should be able to readily determine the level and variability of his results in comparison with those of the other laboratories.

Repeatability and Reproducibility Statements such as Contained in ASTM, TAPPI and ISO Standards are included at the end of the report. Participants can check their performance level against the precision statement given in the test method or specification.

TABLE OF CONTENTS

Analyses In This Report

PAGE

i	Introduction
ii	Description of Program
iv	Metric Conversion Table
1	Key to tables and graphs
5	40-1 Air Resistance, Gurley Oil type
8	40-2 Air Resistance, Sheffield type
11	41-1 Air Resistance, Gurley Mercury type
13	44-1 Smoothness, Parker Printsurf
14	45-1 Smoothness, Sheffield type
19	45-2 Smoothness, Bekk type
21	47-1 Smoothness, Bendtsen type
23	56-1 K & N Ink Absorption
24	57-1 pH, Cold Extraction
25	57-2 pH, Hot Extraction
26	60-1 Opacity, White (89%) Backing
31	60-2 Opacity, Paper Backing, B & L type
33	60-3 Opacity, Paper Backing, Elrepho type
35	65-1 Blue Reflectance (Brightness), Directional
38	65-2 Blue Reflectance, Diffuse, Elrepho (Gloss Trap)
41	65-3 Blue Reflectance, Diffuse, Elrepho (No Gloss Trap)
43	75-1 Specular Gloss, 75°
46	90-1 Thickness (Caliper)
51	95-1 Grammage (Basis Weight)
53	Summary

Analyses In The S Report

10-1	Bursting Strength - Up to 45 psi
10-2	Bursting Strength - Up to 45 psi, Air Clamps
11-1	Bursting Strength - Up to 100 psi
15-1	Tearing Strength - Deep Cutout
17-1	Tearing Strength - No Cutout
19-1	Tensile Breaking Strength - Packaging Papers
20-1	Tensile Breaking Strength - Printing Papers, CRE
20-2	Tensile Breaking Strength - Printing Papers, Pendulum
25-1	Tensile Energy Absorption - Packaging Papers
26-1	Tensile Energy Absorption - Printing Papers
28-1	Elongation to Break - Packaging Papers
29-1	Elongation to Break - Printing Papers
30-1	Folding endurance, MIT type
35-1	Stiffness, Gurley
36-1	Stiffness, Taber
49-1	Surface Pick Strength, IGT
50-1	Surface Pick Strength, Wax
91-1	Concora (Flat Crush)
96-1	Ring Crush

TABLE OF CONVERSION FACTORS TO METRIC (SI) UNITS

<u>Physical Quantity</u>	<u>To Convert From</u>	<u>To</u>	<u>Multiply by</u>
Bursting strength	psi	kPa	6.895
	kg/cm ²	kPa	98.07
	bar	kPa	100.00
Tearing strength	g	mN	9.807
Tensile strength	lb/in.	kN/m	.1751
	lb/0.5 in.	kN/m	.3502
	lb/15 mm	kN/m	.2965
	kg/15 mm	kN/m	.6538
	kg/25 mm	kN/m	.3923
	kg/mm	kN/m	9.807
Tensile energy absorption	ft-lb/ft ²	J/m ²	14.59
	in.-lb/in. ²	J/m ²	175.1
	kg-m/m ²	J/m ²	9.807
Bending stiffness	g·cm	μN·m	98.07
Flat-crush strength (Concora)	lb	N	4.448
Ring-crush (TAPPI)	lb	N	4.448
	(ISO)	lb/6.00 in.	kN/m
Thickness	mil	μm	25.40

KEY TO TABLES AND GRAPHS

- MEAN - The average of individual TEST DETERMINATIONS. The number of TEST DETERMINATIONS in the mean is given in the upper right corner of the first table (TEST D.) and again at the bottom of this table.
- GRAND MEAN - (GR. MEAN) The average of the individual laboratory MEANS, excluding laboratories flagged (see column F) with an X, #, or +. The GRAND MEAN is given in US customary units and, where applicable, in SI metric units.
- SD OF MEANS - (SD MEANS) The standard deviation of the laboratory MEANS about the GRAND MEAN; an index of the among-laboratory precision.
- DEV - The deviation or difference of the laboratory MEAN from the GRAND MEAN.
- N. DEV - The normal deviate or ratio of the DEV to the SD OF MEANS; an indication of the degree of divergence of the laboratory MEAN from the GRAND MEAN. A N. DEV of more than 2 or less than -2 may indicate that the participant is not following the procedure considered standard for this analysis.
- SDR - The standard deviation of repeated measurements; that is, of individual test determinations about their MEAN.
- AVERAGE SDR - The average of the individual laboratory SDR's; an index of the within-laboratory precision of repeated measurements.
- R. SDR - The relative standard deviation of repeated measurements; that is, the ratio of the SDR to the AVERAGE SDR; an indication of the ability of a participant to repeat his measurements relative to the average ability. The greater the number of TEST DETERMINATIONS the closer the R. SDR should be to unity. If R. SDR is outside the limits given below, the participant may not be following the procedure considered standard for this analysis:

<u>No. of test Determinations</u>	<u>Lower limit for R. SDR</u>	<u>Upper limit for R. SDR</u>
3	0.09	2.58
5	0.27	2.06
8	0.40	1.77
10	0.46	1.67
15	0.56	1.53
20	0.61	1.45
25	0.65	1.39

- VAR - Code for instrument type or variation in condition, see second table.
- F - Flag, with following meaning:
- + - Excluded from grand means because VAR non-standard for this analysis.
 - # - Excluded because data were not understood or because of a non-coded variation reported by the laboratory. (See NOTES following Table 1 for each method).
 - M - Excluded because data for one sample are missing.
 - X - Excluded because plotted point would fall outside of the 99% error ellipse, (see below for explanation of Graph).
 - * - Included in grand means but plotted point falls outside of the 95% error ellipse. The participants should take this as a warning to reexamine his testing procedure.
 - S - Included in grand mean but only after omission of one or more 'wild' values; that is, test determinations more than 3 times AVERAGE SDR from the laboratory's MEAN. Not more than 20% of the test determination may be excluded in this manner without rejecting the laboratory.
 - O - Included in grand mean and inside 95% error ellipse.
- COORDINATES - Distances along major and minor axes of error ellipse. If special additive or concurrent model of the measuring process applies to this method, the distance along the minor axis represents the random error within a laboratory while that along the major axis also includes a systematic laboratory component of error.

95% ELLIPSE - Lengths of the major and minor axes of the ellipse and the angle that the major axis makes with the horizontal axis.

AVG R. SDR - Average of the R. SDR for the two samples; an indication of the laboratory's precision of repeated measurements.

Graph - For each laboratory the MEAN for the second sample is plotted against the MEAN for the first sample, with each point representing a laboratory. The horizontal and vertical lines are the GRAND MEANS. The dashed line is drawn at 45°. The solid sloping line, which may or may not lie close to the 45° line, is along the major axis of the error ellipse. The ellipse is drawn so that, on the average, it will include 95% of the points representing the laboratories.

Plotted symbols are as explained above (under F), except that an 'S' is plotted as an 'O'. A participant whose plotted point falls outside of the ellipse should carefully reexamine the testing procedure he is following.

(GRAPH NOTE) The graph is plotted with an ellipse when there are 20 or more laboratories in the analysis. When there are 10 through 19 laboratories in the analysis the graph is plotted but the ellipse is omitted. When there are fewer than 10 laboratories retained in the analysis the graph is not plotted.

Summary - In addition to several quantities already defined above, the summary shows the following values for each test method:
(At end of report)

REPL CRP - The number of replicate test determinations used in this Collaborative Reference Program.

REPL TAPPI - The number of replicate test determinations in a test result required by the applicable TAPPI Standard or assumed here if there is no TAPPI Standard. This quantity is needed in the computation of TAPPI repeatability and reproducibility from the SD OF MEANS and the AVER SDR. See TAPPI Standard T1206 for definitions and computations.

REPEAT - TAPPI repeatability, a measure of the within-laboratory precision of a test result.

REPROD - TAPPI reproducibility, a measure of the between-laboratory precision of a test result.

Best values - Given at the end of Table 1 for each method for which sufficient information is available. These best values are estimates based on a careful examination of all data, both current and past, with special attention to results obtained by the National Bureau of Standards and other recognized reference laboratories in this and other countries. All participants using equipment that is standard for the analysis should be able to achieve results within the plus-minus (+) limits, when these are shown along with the best values.

ANALYSIS T40-1 TABLE 1
AIR RESISTANCE, GURLEY UNITS (SECONDS/100 CC)
TAPPI STANDARD T460 CS-75, AIR RESISTANCE OF PAPER

LAB CODE	SAMPLE H48 109 GRAMS PRINTING PER SQUARE METER					SAMPLE H37 106 GRAMS PRINTING PER SQUARE METER					TEST D. = 10			
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB	
L100	26.0	-3.9	-2.46	1.6	.98	16.3	-2.7	-2.21	.8	.49	40D	*	L100	
L107	25.5	-4.4	-2.78	1.2	.76	17.2	-1.8	-1.51	1.4	.85	40D	*	L107	
L121	29.4	-.5	-.32	2.1	1.26	18.2	-.8	-.65	1.8	1.08	40D	Ø	L121	
L122	30.7	.8	.51	2.0	1.22	18.2	-.8	-.68	1.8	1.12	40D	Ø	L122	
L123	28.3	-1.6	-1.02	1.1	.66	19.8	.9	.72	1.8	1.11	40D	Ø	L123	
L124G	29.1	-.8	-.51	1.4	.89	18.6	-.3	-.28	1.3	.81	40D	Ø	L124G	
L125	31.1	1.2	.74	1.1	.68	20.6	1.6	1.35	3.0	1.86	40D	Ø	L125	
L127	29.8	-.1	-.06	2.0	1.20	17.2	-1.8	-1.46	2.4	1.48	40D	Ø	L127	
L128	30.9	1.0	.62	1.4	.89	19.8	.8	.68	1.2	.76	40D	Ø	L128	
L141	30.8	.9	.56	2.1	1.31	20.7	1.7	1.43	2.1	1.32	40D	Ø	L141	
L148	31.5	1.5	.97	2.0	1.24	18.8	-.2	-.14	2.0	1.26	40D	Ø	L148	
L153	29.8	-.1	-.07	1.1	.69	19.5	.5	.40	1.4	.87	40D	Ø	L153	
L158	29.0	-.9	-.57	2.4	1.44	19.0	.0	.01	1.8	1.09	40D	Ø	L158	
L159	30.1	.2	.12	1.7	1.06	18.8	-.2	-.18	1.8	1.10	40D	Ø	L159	
L163	31.6	1.9	1.16	1.9	1.14	21.4	2.4	2.03	1.8	1.10	40D	Ø	L163	
L166	31.8	1.9	1.18	1.4	.88	19.7	.7	.58	1.7	1.08	40D	Ø	L166	
L174	29.8	-.1	-.05	1.8	1.10	19.6	.6	.51	1.6	1.00	40D	Ø	L174	
L176	30.0	.1	.05	2.0	1.21	19.5	.5	.44	1.3	.80	40D	Ø	L176	
L182G	31.2	1.3	.81	1.5	.95	19.2	.2	.18	2.4	1.50	40D	Ø	L182G	
L183	31.9	2.0	1.25	1.3	.79	19.8	.8	.64	1.2	.75	40D	Ø	L183	
L190C	31.3	1.4	.87	3.1	1.89	20.4	1.4	1.19	1.7	1.07	40D	Ø	L190C	
L190R	30.1	.2	.12	1.9	1.17	19.1	.2	.13	1.8	1.13	40D	Ø	L190R	
L223	31.5	1.6	1.00	2.0	1.20	20.6	1.6	1.34	2.1	1.31	40D	Ø	L223	
L224	31.6	1.7	1.05	3.1	1.88	18.0	-1.0	-.82	1.3	.77	40D	Ø	L224	
L230G	30.8	.9	.56	1.8	1.07	19.8	.8	.68	1.9	1.16	40D	Ø	L230G	
L232	30.9	1.0	.62	1.4	.84	19.1	.2	.13	1.8	1.11	40D	Ø	L232	
L238A	31.2	1.3	.81	1.1	.69	19.0	.0	.04	1.1	.65	40D	Ø	L238A	
L241	28.1	-1.8	-1.14	1.4	.84	17.2	-1.8	-1.48	1.5	.91	40D	Ø	L241	
L242	31.7	1.8	1.10	1.7	1.03	19.4	.4	.31	1.5	.92	40D	Ø	L242	
L243G	29.5	-.4	-.26	1.1	.66	18.4	-.6	-.48	1.0	.61	40D	Ø	L243G	
L259	27.6	-2.3	-1.45	2.2	1.33	17.9	-1.1	-.89	1.0	.65	40D	Ø	L259	
L261	30.4	.5	.31	1.6	.99	19.6	.6	.49	1.5	.95	40D	Ø	L261	
L262G	28.6	-1.3	-.81	.9	.53	20.3	1.3	1.11	.8	.47	40D	Ø	L262G	
L265	28.2	-1.7	-1.09	1.3	.77	19.0	.0	.03	1.7	1.04	40D	Ø	L265	
L274	29.9	-.1	-.03	1.2	.76	20.1	1.2	.96	.6	.35	40D	Ø	L274	
L278	32.1	2.1	1.35	1.5	.94	20.6	1.6	1.34	1.1	.70	40D	Ø	L278	
L285	22.2	-7.7	-4.82	.6	.38	15.6	-3.4	-2.84	1.4	.85	40D	X	L285	
L308	30.1	.2	.12	1.3	.79	18.4	-.5	-.45	2.1	1.30	40D	Ø	L308	
L312	30.3	.4	.23	1.2	.71	20.1	1.1	.92	2.2	1.33	40D	Ø	L312	
L321	27.9	-2.0	-1.28	2.3	1.41	16.2	-2.8	-2.34	1.5	.91	40D	Ø	L321	
L324	29.1	-.8	-.49	1.5	.94	19.5	.5	.44	1.5	.93	40D	Ø	L324	
L326	32.6	2.7	1.69	1.8	1.09	19.5	.5	.44	2.1	1.28	40D	Ø	L326	
L328	29.6	-.3	-.17	1.8	1.09	18.9	-.1	-.07	2.3	1.39	40D	Ø	L328	
L341	29.8	-.1	-.09	1.3	.79	19.4	.5	.38	1.2	.75	40D	Ø	L341	
L344	29.0	-.9	-.57	1.4	.88	18.5	-.5	-.39	1.3	.82	40D	Ø	L344	
L376	25.7	-4.2	-2.65	1.6	1.01	16.0	-3.0	-2.48	1.0	.62	40D	*	L376	
L378	28.2	-1.7	-1.04	1.8	1.11	18.0	-1.0	-.81	1.8	1.12	40D	Ø	L378	
L380	30.0	.1	.05	.8	.50	19.2	.2	.18	1.0	.64	40D	Ø	L380	
L392	30.6	.7	.45	2.6	1.58	18.4	-.6	-.51	2.0	1.26	40D	Ø	L392	
L396M	31.5	1.6	1.00	1.1	.69	20.6	1.6	1.31	1.4	.88	40D	Ø	L396M	
L567	28.5	-1.4	-.89	1.2	.72	17.7	-1.3	-1.09	1.4	.87	40D	Ø	L567	
L576	30.3	.4	.24	1.6	1.00	17.7	-1.3	-1.04	1.6	.99	40D	Ø	L576	
L599	30.4	.5	.30	.8	.49	18.5	-.5	-.42	1.0	.63	40D	Ø	L599	
GR. MEAN =	29.9	GURLEY UNITS				GRAND MEAN =	19.0	GURLEY UNITS				TEST DETERMINATIONS = 10		
SD MEANS =	1.6	GURLEY UNITS				SD OF MEANS =	1.2	GURLEY UNITS				52 LABS IN GRAND MEANS		
		AVERAGE SDR =						AVERAGE SDR =				1.6 GURLEY UNITS		
L155	25.6	-4.3	-2.71	1.2	.72	17.2	-1.8	-1.48	1.0	.64	40U	*	L155	
L236	32.0	2.1	1.32	2.1	1.31	20.0	1.1	.87	1.7	1.03	40E	*	L236	
L291	32.3	2.4	1.50	2.3	1.41	20.3	1.3	1.09	1.2	.72	40U	*	L291	
L484	25.8	-4.1	-2.58	.7	.41	17.1	-1.9	-1.57	.9	.55	40H	*	L484	

TOTAL NUMBER OF LABORATORIES REPORTING = 57

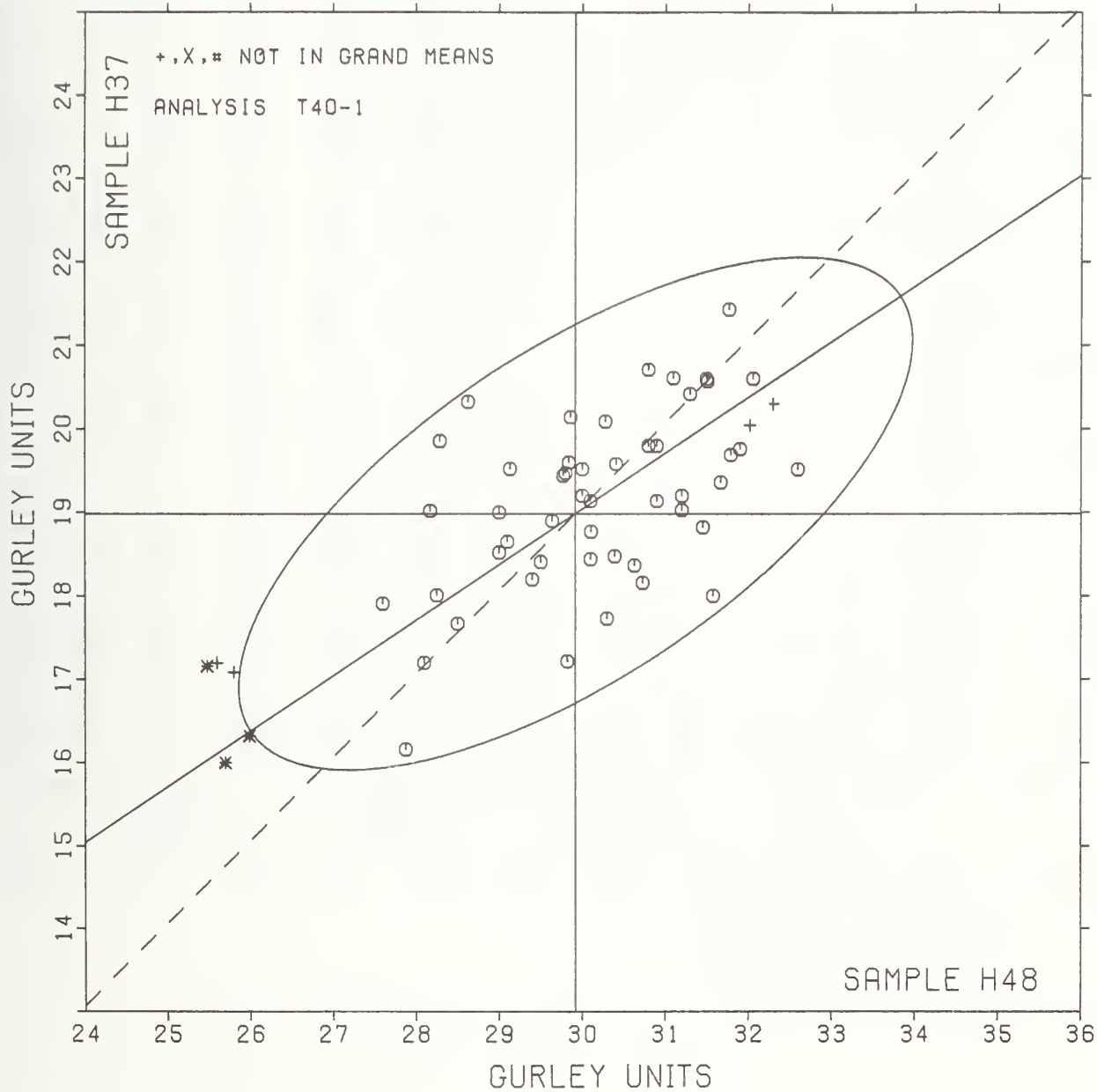
Best Values: H48 30.4 ± 2.2 Gurley Units
H37 19.0 ± 1.9 Gurley Units

TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T40-1 TABLE 2
 AIR RESISTANCE, GURLEY UNITS (SECONDS/100 CC)
 TAPPI STANDARD T460 GS-75, AIR RESISTANCE OF PAPER

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS		
		H48	H37	MAJOR	MINOR	R.SDR	VAR			
L285	X	22.2	15.6	-8.3	1.4	.62	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L107	*	25.5	17.2	-4.7	.9	.81	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L155	+	25.6	17.2	-4.6	.9	.68	40U	AIR RESISTANCE,	SHEFFIELD IN GURLEY UNITS	
L376	*	25.7	16.0	-5.2	-.1	.82	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L484	+	25.8	17.1	-4.5	.7	.48	40H	AIR RESISTANCE,	REGMED-TYPE GURLEY DENSOMETER -	OIL FLOTATION
L100	*	26.0	16.3	-4.7	-.0	.73	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L259	θ	27.6	17.9	-2.5	.4	.99	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L321	θ	27.9	16.2	-3.3	-1.2	1.16	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L241	θ	28.1	17.2	-2.5	-.5	.87	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L265	θ	28.2	19.0	-1.4	1.0	.90	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L378	θ	28.2	18.0	-1.9	.1	1.12	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L123	θ	28.3	19.8	-.9	1.6	.89	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L567	θ	28.5	17.7	-1.9	-.3	.79	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L262G	θ	28.6	20.3	-.3	1.8	.50	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L344	θ	29.0	18.5	-1.0	.1	.85	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L158	θ	29.0	19.0	-.8	.5	1.27	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L124G	θ	29.1	18.6	-.9	.2	.85	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L324	θ	29.1	19.5	-.4	.9	.93	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L121	θ	29.4	18.2	-.9	-.4	1.17	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L243G	θ	29.5	18.4	-.7	-.2	.63	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L328	θ	29.6	18.9	-.3	.1	1.24	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L341	θ	29.8	19.4	.1	.5	.77	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L153	θ	29.8	19.5	.2	.5	.78	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L127	θ	29.8	17.2	-1.1	-1.4	1.34	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L174	θ	29.8	19.6	.3	.6	1.05	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L274	θ	29.9	20.1	.6	1.0	.56	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L176	θ	30.0	19.5	.4	.4	1.00	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L380	θ	30.0	19.2	.2	.1	.57	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L190R	θ	30.1	19.1	.2	.0	1.15	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L308	θ	30.1	18.4	-.1	-.6	1.04	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L159	θ	30.1	18.8	.0	-.3	1.08	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L312	θ	30.3	20.1	.9	.7	1.02	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L576	θ	30.3	17.7	-.4	-1.3	.99	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L595	θ	30.4	18.5	.1	-.7	.56	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L261	θ	30.4	19.6	.7	.2	.57	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L392	θ	30.6	18.4	.3	-.9	1.42	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L122	θ	30.7	18.2	.2	-1.1	1.17	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L141	θ	30.8	20.7	1.7	.9	1.32	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L230G	θ	30.8	19.8	1.2	.2	1.11	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L128	θ	30.9	19.8	1.3	.1	.82	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L232	θ	30.9	19.1	.9	-.4	.97	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L125	θ	31.1	20.6	1.9	.7	1.27	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L182G	θ	31.2	19.2	1.2	-.5	1.22	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L238A	θ	31.2	19.0	1.1	-.7	.67	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L190C	θ	31.3	20.4	1.9	.4	1.48	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L148	θ	31.5	18.8	1.2	-1.0	1.25	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L223	θ	31.5	20.6	2.2	.5	1.26	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L396M	θ	31.5	20.6	2.2	.4	.79	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L224	θ	31.6	18.0	.8	-1.7	1.33	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L242	θ	31.7	19.4	1.7	-.7	.98	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L163	θ	31.8	21.4	2.9	1.0	1.12	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L166	θ	31.8	19.7	2.0	-.5	.98	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L183	θ	31.9	19.8	2.1	-.5	.77	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L236	+	32.0	20.0	2.3	-.3	1.17	40E	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION, 20C, 65%RH
L278	θ	32.1	20.6	2.7	.2	.82	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
L291	+	32.3	20.3	2.7	-.2	1.06	40U	AIR RESISTANCE,	SHEFFIELD IN GURLEY UNITS	
L326	θ	32.6	19.5	2.5	-1.1	1.18	40D	AIR RESISTANCE,	GURLEY DENSOMETER -	OIL FLOTATION
GMEANS:		29.9	19.0			1.00				
		95% ELLIPSE:		4.7	2.0	WITH GAMMA = 33 DEGREES				

AIR RESISTANCE, GURLEY

SAMPLE H48 = 29.9 GURLEY UNITS SAMPLE H37 = 19.0 GURLEY UNITS



ANALYSIS T40-2 TABLE 1
 AIR RESISTANCE, SHEFFIELD UNITS (CC/MIN) FOR 0.442 SQ. IN (3/4 IN. DIA) ORIFICE
 SHEFFIELD TESTER IS STANDARD FOR THIS ANALYSIS

LAB CODE	SAMPLE H48 109 GRAMS PER SQUARE METER					SAMPLE H37 106 GRAMS PER SQUARE METER					TEST D. = 10		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L114	108.3	3.5	.82	3.1	.68	149.4	-1.0	-.15	12.9	1.42	40S	Ø	L114
L121	108.6	3.8	.89	3.3	.73	155.4	5.0	.71	7.1	.77	40S	Ø	L121
L122S	102.3	-2.5	-.60	3.2	.72	149.0	-1.4	-.21	11.3	1.24	40S	Ø	L122S
L124S	107.9	3.1	.73	4.2	.93	159.6	9.2	1.32	6.7	.73	40S	Ø	L124S
L127	110.1	5.3	1.25	5.0	1.12	166.8	16.4	2.35	19.6	2.15	40S	Ø	L127
L132	102.2	-2.6	-.62	6.0	1.33	142.2	-8.2	-1.18	8.5	.94	40S	Ø	L132
L148	107.0	2.2	.52	4.7	1.05	144.2	-6.2	-.90	7.3	.81	40S	Ø	L148
L150	105.0	.2	.04	8.5	1.90	162.0	11.6	1.66	12.1	1.32	40S	Ø	L150
L157	116.1	11.3	2.67	8.3	1.84	155.8	5.4	.77	8.1	.89	40S	*	L157
L158	106.5	1.7	.40	6.3	1.40	140.0	-10.4	-1.50	10.0	1.10	40S	Ø	L158
L173B	110.5	5.7	1.34	3.7	.82	146.5	-3.9	-.57	9.1	1.00	40S	Ø	L173B
L190C	102.9	-1.9	-.45	5.9	1.31	152.6	2.2	.31	7.5	.82	40S	Ø	L190C
L213	105.9	1.1	.26	3.8	.84	154.3	3.9	.55	7.3	.80	40S	Ø	L213
L223	97.2	-7.6	-1.80	4.5	1.00	145.4	-5.0	-.72	7.3	.80	40S	Ø	L223
L228	125.5	20.7	4.89	5.5	1.23	175.0	24.6	3.53	10.5	1.16	40S	X	L228
L230S	103.5	-1.3	-.31	3.2	.72	152.9	2.5	.35	6.8	.74	40S	Ø	L230S
L241	105.7	.9	.21	4.4	.99	161.1	10.7	1.53	6.4	.70	40S	Ø	L241
L249	101.6	-3.2	-.76	4.5	1.01	146.4	-4.0	-.58	9.1	1.00	40S	Ø	L249
L255	103.6	-1.2	-.29	3.6	.80	154.1	3.7	.53	8.5	.94	40S	Ø	L255
L257A	108.6	3.8	.89	3.9	.87	150.9	.5	.07	10.0	1.10	40S	Ø	L257A
L257B	101.9	-2.9	-.69	6.8	1.53	146.2	-4.2	-.61	14.0	1.54	40S	Ø	L257B
L257C	109.4	4.6	1.08	7.6	1.69	151.9	1.5	.21	7.3	.80	40S	Ø	L257C
L260	103.7	-1.1	-.26	2.9	.64	158.9	8.5	1.21	5.4	.60	40S	Ø	L260
L262S	107.4	2.6	.61	3.9	.88	151.4	1.0	.14	4.2	.47	40S	Ø	L262S
L288	107.4	2.6	.61	5.5	1.23	154.8	4.4	.63	9.4	1.03	40S	Ø	L288
L305	103.1	-1.7	-.41	3.8	.85	139.9	-10.5	-1.51	7.9	.87	40S	Ø	L305
L312	88.1	-16.7	-3.95	4.8	1.08	125.1	-25.3	-3.64	9.3	1.02	40S	X	L312
L318	100.3	-4.5	-1.07	5.1	1.14	147.3	-3.1	-.45	11.4	1.25	40S	Ø	L318
L349	99.6	-5.2	-1.23	4.5	1.01	143.4	-7.0	-1.01	8.7	.95	40S	Ø	L349
L352	95.1	-5.7	-1.35	3.9	.87	144.2	-6.2	-.90	10.1	1.11	40S	Ø	L352
L354	109.9	5.1	1.20	3.7	.83	154.6	4.2	.60	10.1	1.11	40S	Ø	L354
L360	100.0	-4.8	-1.14	2.4	.53	142.3	-8.1	-1.17	11.3	1.24	40S	Ø	L360
L370	103.6	-1.2	-.29	4.2	.93	143.5	-6.9	-1.00	5.8	.63	40S	Ø	L370
L390	108.4	3.6	.85	5.1	1.14	156.4	6.0	.86	6.4	.71	40S	Ø	L390
L562	367.5	262.7	62.13	8.6	1.92	407.0	256.6	36.84	27.5	3.02	40S	#	L562
L575	104.0	-.8	-.19	3.9	.88	153.8	3.4	.48	7.0	.77	40S	Ø	L575
L587	97.0	-7.8	-1.85	5.4	1.20	137.0	-13.4	-1.93	12.5	1.37	40S	Ø	L587
L597	100.4	-4.4	-1.05	2.0	.45	151.3	.9	.12	10.5	1.15	40S	Ø	L597

GR. MEAN = 104.8 SHEFF. UNITS GRAND MEAN = 150.4 SHEFF. UNITS TEST DETERMINATIONS = 10
 SD MEANS = 4.2 SHEFF. UNITS SD OF MEANS = 7.0 SHEFF. UNITS 35 LABS IN GRAND MEANS
 AVERAGE SDR = 4.5 SHEFF. UNITS AVERAGE SDR = 5.1 SHEFF. UNITS

L182B	422.5	317.7	75.14	21.9	4.89	685.0	534.6	76.77	81.0	8.89	40B	*	L182B
L243B	451.4	346.6	81.97	16.4	3.67	694.4	544.0	78.12	33.7	3.69	40B	*	L243B
L484	391.0	286.2	67.69	22.3	4.99	620.0	469.6	67.43	35.0	3.84	40B	*	L484

TOTAL NUMBER OF LABORATORIES REPORTING = 41

Best Values: H48 104 ± 6 Sheffield units
 H37 150 ± 11 Sheffield units

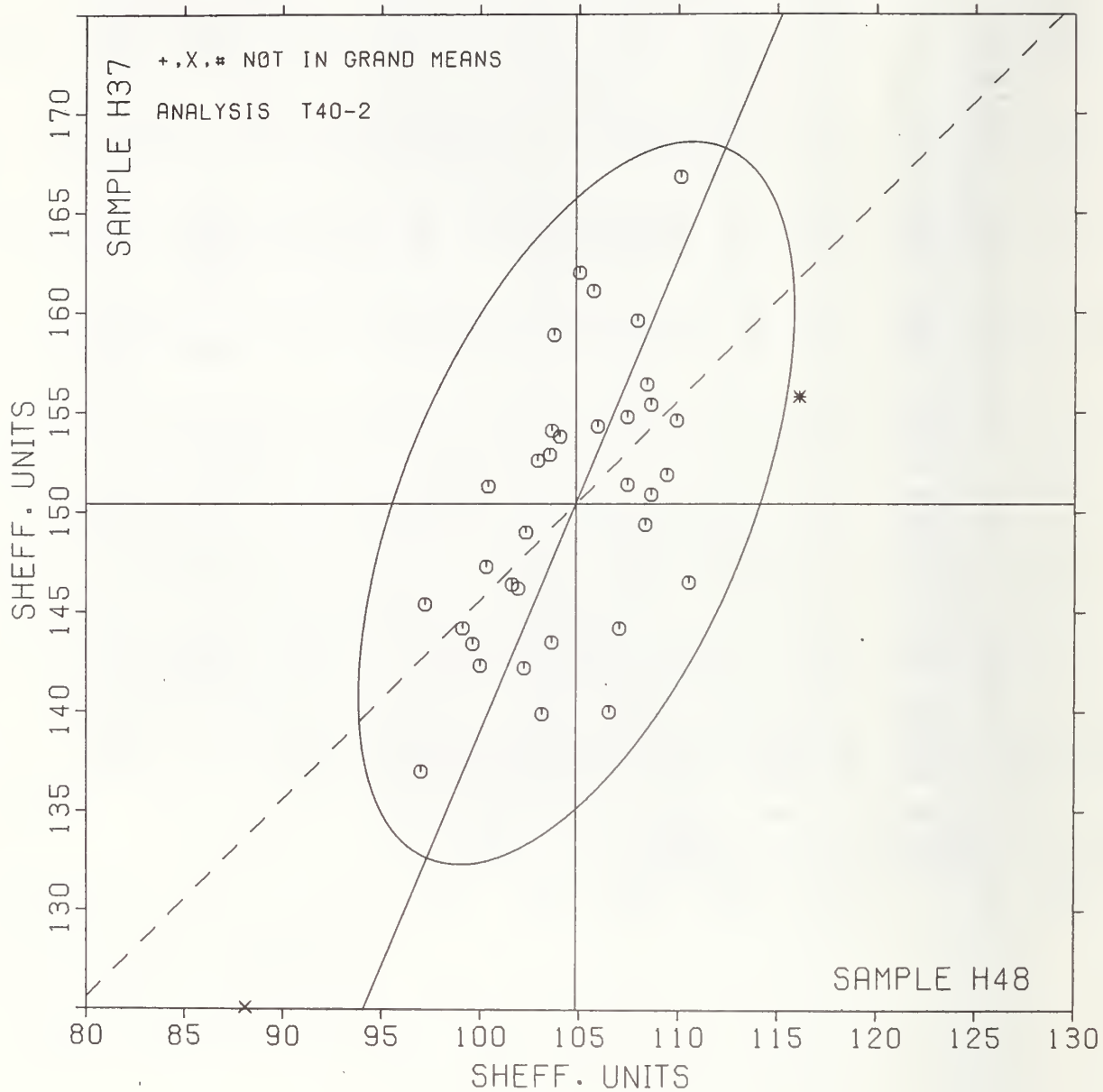
Data from the following laboratories appear to be off by a multiplicative factor: 562.

ANALYSIS T40-2 TABLE 2
 AIR RESISTANCE, SHEFFIELD UNITS (CC/MIN) FOR 0.442 SQ. IN (3/4 IN. DIA) ORIFICE
 SHEFFIELD TESTER IS STANDARD FOR THIS ANALYSIS

LAH CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		H48	H37	MAJOR	MINOR	R.SDR	VAR	
L312	X	88.1	125.1	-29.9	5.5	1.05	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L587	Ø	97.0	137.0	-15.4	2.0	1.29	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L223	Ø	97.2	145.4	-7.6	5.1	.90	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L352	Ø	99.1	144.2	-8.0	2.8	.99	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L349	Ø	99.6	143.4	-8.5	2.1	.98	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L360	Ø	100.0	142.3	-9.4	1.3	.89	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L318	Ø	100.3	147.3	-4.7	2.9	1.19	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L597	Ø	100.4	151.3	-.9	4.4	.80	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L249	Ø	101.6	146.4	-5.0	1.4	1.00	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257H	Ø	101.9	146.2	-5.0	1.0	1.53	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L132	Ø	102.2	142.2	-8.6	-.8	1.14	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L122S	Ø	102.3	149.0	-2.3	1.8	.98	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L190C	Ø	102.9	152.6	1.2	2.6	1.06	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L305	Ø	103.1	139.9	-10.4	-2.5	.86	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L230S	Ø	103.5	152.9	1.7	2.2	.73	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L370	Ø	103.6	143.5	-6.9	-1.6	.78	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L255	Ø	103.6	154.1	2.9	2.5	.87	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L260	Ø	103.7	158.9	7.4	4.3	.62	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L575	Ø	104.0	153.8	2.8	2.1	.82	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L150	Ø	105.0	162.0	10.7	4.3	1.61	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L241	Ø	105.7	161.1	10.2	3.3	.84	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L213	Ø	105.9	154.3	4.0	.5	.82	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L158	Ø	106.5	140.0	-9.0	-5.6	1.25	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L148	Ø	107.0	144.2	-4.9	-4.4	.93	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L262S	Ø	107.4	151.4	1.9	-2.0	.67	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L288	Ø	107.4	154.8	5.0	-.7	1.13	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L124S	Ø	107.9	159.6	9.6	.7	.83	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L114	Ø	108.3	149.4	.4	-3.6	1.05	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L390	Ø	108.4	156.4	6.9	-1.0	.92	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257A	Ø	108.6	150.9	1.9	-3.3	.99	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L121	Ø	108.6	155.4	6.0	-1.6	.75	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257C	Ø	109.4	151.9	3.1	-3.7	1.25	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L354	Ø	109.9	154.6	5.8	-3.1	.97	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L127	Ø	110.1	166.8	17.1	1.5	1.64	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L173H	Ø	110.5	146.5	-1.4	-6.8	.91	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L157	*	116.1	155.8	9.3	-8.3	1.37	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L228	X	125.5	175.0	30.7	-9.5	1.19	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L562	#	367.5	407.0	338.6	-142.1	2.47	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L484	+	391.0	620.0	543.9	-80.8	4.42	40H	AIR RESISTANCE, HENDTSEN, WG 150
L182H	+	422.5	685.0	616.1	-84.5	6.89	40H	AIR RESISTANCE, HENDTSEN, WG 150
L243H	+	451.4	694.4	636.0	-107.5	3.68	40H	AIR RESISTANCE, HENDTSEN, WG 150
GMEANS:		104.8	150.4			1.00		
		95% ELLIPSE:		19.3	8.7	WITH GAMMA = 67 DEGREES		

AIR RESISTANCE, SHEFFIELD

SAMPLE H48 = 105. SHEFF. UNITS SAMPLE H37 = 150. SHEFF. UNITS



ANALYSIS T41-1 TABLE 1
 AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION
 DIRECT READING, SEC/10 CC, MERCURY DENSITY

LAB CODE	SAMPLE B10 MEAN	RELEASE 70 GRAMS PER SQUARE METER				SAMPLE B47 MEAN	RELEASE BASE 82 GRAMS PER SQUARE METER				TEST D. = 10		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L122	1038.	380.	1.80	412.	2.22	2035.	778.	1.64	427.	1.74	41G	Ø	L122
L128	504.	-154.	-.73	153.	.82	1398.	141.	.30	145.	.59	41G	Ø	L128
L134	449.	-209.	-.99	153.	.82	550.	-707.	-1.49	186.	.75	41G	Ø	L134
L166M	567.	-91.	-.43	190.	1.02	1544.	287.	.60	254.	1.03	41G	Ø	L166M
L195	305.	-353.	-1.67	104.	.56	555.	-702.	-1.48	175.	.71	41G	Ø	L195
L202	637.	-21.	-.10	147.	.79	1278.	21.	.04	173.	.71	41G	Ø	L202
L224	1003.	345.	1.63	247.	1.33	1783.	526.	1.11	254.	1.03	41G	Ø	L224
L230	726.	.68.	.32	216.	1.17	1645.	388.	.82	347.	1.41	41G	Ø	L230
L259	749.	91.	.43	183.	.98	1041.	-216.	-.46	267.	1.09	41G	Ø	L259
L358	692.	34.	.16	220.	1.19	1379.	122.	.26	337.	1.37	41G	Ø	L358
L396T	673.	15.	.07	156.	.84	1138.	-119.	-.25	319.	1.30	41G	Ø	L396T
L576	554.	-104.	-.49	48.	.26	738.	-519.	-1.09	65.	.27	41G	Ø	L576

GR. MEAN = 658. SEC/10 CC GRAND MEAN = 1257. SEC/10 CC TEST DETERMINATIONS = 10
 SD MEANS = 211. SEC/10 CC SD ØP MEANS = 474. SEC/10 CC 12 LABS IN GRAND MEANS
 AVERAGE SDR = 186. SEC/10 CC AVERAGE SDR = 246. SEC/10 CC
 TOTAL NUMBER OF LABORATORIES REPORTING = 12

Best Values: B10 640 seconds per 10 cc mercury
 B47 1300 density (direct reading)

The values reported here are the time in seconds required for the displacement of 10 ml of air through an area of 1.0 in² of the specimen. The values are not converted to 100 ml of air nor to oil density.

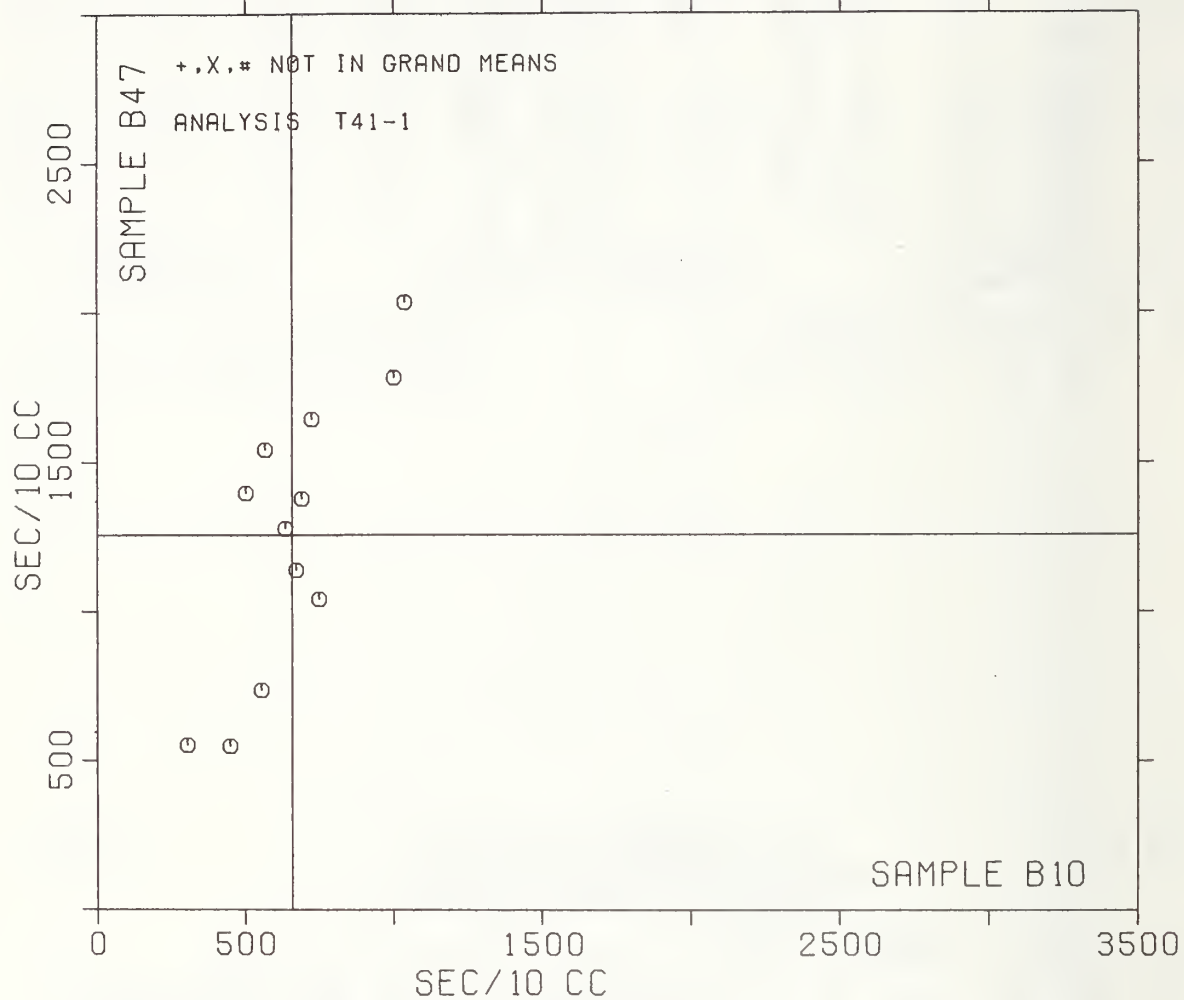
ANALYSIS T41-1 TABLE 2
 AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION
 DIRECT READING, SEC/10 CC, MERCURY DENSITY

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		B10	B47	MAJOR	MINOR	R.SDR	VAR			
L195	Ø	305.	555.	-782.	79.	.64	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L134	Ø	449.	550.	-735.	-57.	.79	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L128	Ø	504.	1398.	76.	195.	.71	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L576	Ø	554.	738.	-522.	-88.	.26	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L166M	Ø	567.	1544.	236.	187.	1.03	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L202	Ø	637.	1278.	12.	27.	.75	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L396T	Ø	673.	1138.	-105.	-57.	1.07	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L358	Ø	692.	1379.	126.	12.	1.28	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L230	Ø	726.	1645.	387.	75.	1.29	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L259	Ø	749.	1041.	-169.	-163.	1.03	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L224	Ø	1003.	1783.	614.	-134.	1.18	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
L122	Ø	1038.	2035.	863.	-77.	1.98	41G	AIR RESISTANCE,	HIGH RANGE,	GURLEY MERCURY FLOTATION
GMEANS:		658.	1257.			1.00				
		95% ELLIPSE:	1519.	351.				WITB GAMMA =	69 DEGREES	

AIR RESISTANCE, GURLEY HG FLOTATION

SAMPLE B10 = 658. SEC/10 CC

SAMPLE B47 = 1257. SEC/10 CC



LAB CODE	SAMPLE B91					SAMPLE B44					TEST D. = 10		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	P	LAB
L122	4.93	.60	1.72	.25	1.30	5.84	.28	.82	.08	.81	44P	Ø	L122
L182	4.43	.10	.29	.19	1.01	5.86	.31	.89	.15	1.41	44P	Ø	L182
L183	3.89	-.44	-1.26	.11	.58	4.99	-.57	-1.65	.11	1.05	44P	Ø	L183
L223	4.31	-.02	-.06	.09	.46	5.80	.24	.70	.08	.79	44P	Ø	L223
L288	4.95	.62	1.78	.24	1.25	6.93	1.37	3.99	.17	1.63	44P	#	L288
L317	4.12	-.21	-.60	.26	1.38	5.40	-.16	-.46	.09	.90	44P	Ø	L317
L588	4.30	-.03	-.09	.24	1.27	5.45	-.11	-.31	.11	1.03	44P	Ø	L588
GR. MEAN = 4.33 MICRONS					GRAND MEAN = 5.56 MICRONS					TEST DETERMINATIONS = 10			
SD MEANS = .35 MICRONS					SD OF MEANS = .34 MICRONS					6 LABS IN GRAND MEANS			
AVERAGE SDR = .19 MICRONS					AVERAGE SDR = .10 MICRONS								
TOTAL NUMBER OF LABORATORIES REPORTING = 7													

The following laboratories were omitted from the grand means because of extreme test results: 288.

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		B91	B44	MAJOR	MINOR	R.SDR	VAR			
L183	Ø	3.89	4.99	-.71	-.10	.82	44P	SMOOTHNESS,	PARKER PRINTSURF	
L317	Ø	4.12	5.40	-.26	.03	1.14	44P	SMOOTHNESS,	PARKER PRINTSURF	
L588	Ø	4.30	5.45	-.10	-.06	1.15	44P	SMOOTHNESS,	PARKER PRINTSURF	
L223	Ø	4.31	5.80	.16	.19	.63	44P	SMOOTHNESS,	PARKER PRINTSURF	
L182	Ø	4.43	5.86	.29	.15	1.21	44P	SMOOTHNESS,	PARKER PRINTSURF	
L122	Ø	4.93	5.84	.63	-.22	1.05	44P	SMOOTHNESS,	PARKER PRINTSURF	
L288	#	4.95	6.93	1.40	.54	1.44	44P	SMOOTHNESS,	PARKER PRINTSURF	
GMEANS:		4.33	5.56			1.00				
		95% ELLIPSE:		1.94	.64	WITH GAMMA = 44 DEGREES				

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T45-1 TABLE 1
SMOOTHNESS, SHEFFIELD UNITS
SHEFFIELD TESTER IS STANDARD FOR THIS ANALYSIS

LAB CODE	SAMPLE B91 MEAN	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER				SAMPLE H44 MEAN	PRINTING 84 GRAMS PER SQUARE METER				TEST D.* 15		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	131.7	5.4	.68	10.8	1.08	272.3	13.6	1.14	11.1	1.20	45S	Ø	L100
L107	135.0	8.7	1.08	11.5	1.14	275.7	17.0	1.43	9.4	1.02	45S	Ø	L107
L108	128.7	2.4	.30	14.3	1.43	269.5	10.9	.91	6.4	.69	45S	Ø	L108
L114	131.5	5.2	.65	12.2	1.21	268.0	9.3	.78	9.2	1.00	45S	Ø	L114
L115	113.3	-13.0	-1.61	4.1	.41	239.0	-19.7	-1.65	10.0	1.09	45S	Ø	L115
L121	122.4	-3.9	-.48	9.6	.95	260.3	1.7	.14	10.6	1.15	45S	Ø	L121
L122	127.1	.8	.10	7.9	.79	259.9	1.2	.10	9.9	1.08	45S	Ø	L122
L123	119.5	-6.8	-.85	11.3	1.12	251.7	-7.0	-.59	12.8	1.39	45S	Ø	L123
L124	125.4	-.9	-.11	11.7	1.16	231.0	-27.7	-2.32	8.2	.89	45S	*	L124
L125	131.7	5.4	.67	9.2	.91	254.0	-4.7	-.39	12.0	1.30	45S	Ø	L125
L126	125.2	-1.1	-.14	10.0	.99	291.4	32.7	2.75	8.6	.94	45S	*	L126
L128	132.3	6.0	.75	11.0	1.09	254.3	-4.3	-.36	5.3	.58	45S	Ø	L128
L132	128.4	2.1	.26	10.1	1.00	260.1	1.5	.12	10.5	1.14	45S	Ø	L132
L134	129.3	3.0	.38	11.8	1.18	267.3	8.6	.72	10.3	1.11	45S	Ø	L134
L139S	139.5	13.2	1.65	7.8	.78	264.7	6.0	.50	9.0	.97	45S	Ø	L139S
L148	140.8	14.5	1.81	9.9	.98	257.9	-.8	-.07	7.3	.79	45S	Ø	L148
L150	133.3	7.0	.88	17.9	1.78	271.3	12.7	1.06	9.2	.99	45S	Ø	L150
L152	131.0	4.7	.59	10.7	1.07	254.0	-4.7	-.39	8.3	.90	45S	Ø	L152
L153	140.8	14.5	1.81	10.9	1.08	283.7	25.0	2.10	10.6	1.15	45S	Ø	L153
L157	143.1	16.8	2.10	11.0	1.10	269.1	10.4	.87	8.1	.88	45S	Ø	L157
L158	120.7	-5.6	-.70	7.3	.72	248.0	-10.7	-.89	10.8	1.17	45S	Ø	L158
L159	134.1	7.8	.98	15.4	1.53	250.7	-8.0	-.67	9.3	1.01	45S	Ø	L159
L162	120.3	-6.0	-.74	6.7	.66	255.3	-3.3	-.28	6.7	.72	45S	Ø	L162
L166	124.7	-1.6	-.20	9.3	.93	249.0	-9.7	-.81	7.4	.80	45S	Ø	L166
L167	118.5	-7.8	-.97	3.7	.36	251.3	-7.4	-.62	3.5	.38	45S	Ø	L167
L173B	120.3	-6.0	-.74	7.4	.74	249.7	-9.0	-.75	6.9	.75	45S	Ø	L173B
L176S	128.4	2.1	.26	6.8	.68	320.5	61.8	5.19	5.4	.58	45S	#	L176S
L183S	119.6	-6.7	-.83	9.3	.92	263.0	4.3	.36	8.9	.97	45S	Ø	L183S
L190C	127.5	1.2	.15	11.5	1.14	249.9	-8.8	-.74	8.0	.86	45S	Ø	L190C
L190R	132.4	6.1	.76	11.0	1.10	258.5	-.1	-.01	8.0	.87	45S	Ø	L190R
L195	118.5	-7.4	-.92	10.7	1.06	242.4	-16.3	-1.36	10.3	1.12	45S	Ø	L195
L203	127.0	.7	.09	7.7	.77	247.7	-11.0	-.92	8.4	.91	45S	Ø	L203
L211	121.7	-4.6	-.57	10.6	1.05	249.1	-9.6	-.81	8.5	.92	45S	Ø	L211
L213	122.3	-4.0	-.50	12.0	1.19	240.5	-18.1	-1.52	11.3	1.23	45S	Ø	L213
L223	113.7	-12.6	-1.56	6.5	.64	240.4	-18.3	-1.53	10.3	1.12	45S	Ø	L223
L224	138.1	11.8	1.47	10.6	1.05	261.7	3.0	.25	15.2	1.65	45S	Ø	L224
L226B	130.9	4.6	.57	15.4	1.54	264.6	5.9	.50	7.8	.85	45S	Ø	L226B
L228	134.3	8.0	1.00	11.6	1.16	262.0	3.3	.28	10.7	1.16	45S	Ø	L228
L230S	127.9	1.6	.20	9.3	.92	260.0	1.3	.11	10.0	1.09	45S	Ø	L230S
L231	138.1	11.8	1.48	8.8	.87	264.5	5.8	.49	11.2	1.22	45S	Ø	L231
L232S	119.0	-7.3	-.91	9.7	.96	267.7	9.0	.76	6.2	.68	45S	Ø	L232S
L241	133.5	7.2	.89	10.9	1.08	274.5	15.8	1.33	14.1	1.53	45S	Ø	L241
L245	116.9	-9.4	-1.16	7.5	.75	249.9	-8.7	-.73	4.1	.44	45S	Ø	L245
L254	129.9	3.6	.45	8.6	.85	245.7	-13.0	-1.09	6.0	.65	45S	Ø	L254
L255	114.9	-11.4	-1.41	4.7	.46	248.5	-10.2	-.86	6.4	.70	45S	Ø	L255
L257A	109.3	-17.0	-2.11	12.2	1.21	250.7	-8.0	-.67	10.5	1.13	45S	Ø	L257A
L257B	108.0	-18.3	-2.28	9.5	.95	266.0	7.3	.62	13.5	1.47	45S	*	L257B
L257C	109.0	-17.3	-2.15	12.2	1.22	247.5	-11.1	-.93	8.8	.95	45S	Ø	L257C
L259	133.6	7.3	.91	15.2	1.51	274.3	15.7	1.32	8.6	.94	45S	Ø	L259
L260	117.6	-8.7	-1.08	4.8	.47	248.3	-10.3	-.87	4.5	.49	45S	Ø	L260
L261	124.7	-1.6	-.20	9.1	.90	264.9	6.2	.52	9.7	1.05	45S	Ø	L261
L262	128.5	2.2	.28	6.8	.68	266.5	7.8	.66	8.7	.94	45S	Ø	L262
L275	130.6	4.3	.54	12.5	1.24	270.0	11.3	.95	7.8	.85	45S	Ø	L275
L277	143.5	17.2	2.15	8.4	.84	275.3	16.7	1.40	11.5	1.25	45S	Ø	L277
L279	126.9	.6	.07	9.2	.92	258.0	-.7	-.06	10.1	1.10	45S	Ø	L279
L281	125.5	-.4	-.04	11.0	1.10	253.7	-5.0	-.42	8.2	.89	45S	Ø	L281
L285	127.0	.7	.09	7.7	.77	258.3	-.3	-.03	12.8	1.39	45S	Ø	L285
L288	129.3	3.0	.37	10.5	1.05	NO DATA REPORTED FOR SAMPLE H44					45S	M	L288
L290	144.2	17.5	2.23	9.4	.93	236.3	-22.3	-1.87	9.3	1.01	45S	X	L290
L291S	125.1	-1.2	-.15	14.5	1.44	268.1	9.5	.80	7.1	.77	45S	Ø	L291S
L297	126.3	.0	.01	12.3	1.22	252.0	-6.7	-.56	11.3	1.23	45S	Ø	L297
L305	124.3	-2.0	-.25	5.4	.54	244.8	-13.9	-1.16	8.8	.95	45S	Ø	L305
L308	124.7	-1.6	-.20	10.5	1.04	253.9	-4.8	-.40	10.7	1.16	45S	Ø	L308
L312	121.5	-4.8	-.59	10.3	1.02	287.5	28.8	2.42	3.9	.42	45S	*	L312
L317	116.1	-10.2	-1.26	11.0	1.09	260.9	2.2	.19	6.4	.70	45S	Ø	L317

TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T45-1 TABLE 1
 SMOOTHNESS, SHEFFIELD UNITS
 SHEFFIELD TESTER IS STANDARD FOR THIS ANALYSIS

LAB CODE	SAMPLE B91 MEAN	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER				SAMPLE B44 MEAN	PRINTING 84 GRAMS PER SQUARE METER				TEST D. = 15		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L318	126.0	-.3	-.04	11.5	1.15	267.1	8.4	.71	11.1	1.21	45S	Ø	L318
L321	114.3	-12.0	-1.49	8.8	.88	260.7	2.0	.17	8.0	.87	45S	Ø	L321
L323	133.6	7.3	.91	7.0	.70	246.7	-12.0	-1.01	14.2	1.54	45S	Ø	L323
L326	124.9	-1.4	-.17	7.9	.78	236.1	-22.5	-1.89	7.8	.85	45S	Ø	L326
L328	122.1	-4.2	-.52	10.8	1.07	251.5	-7.2	-.60	8.9	.97	45S	Ø	L328
L341	131.9	5.6	.69	10.8	1.08	257.5	-.7	-.06	9.1	.99	45S	Ø	L341
L342	129.4	3.1	.39	9.0	.89	271.7	13.0	1.09	9.0	.98	45S	Ø	L342
L349	123.8	-2.5	-.31	11.8	1.17	260.3	1.6	.13	13.8	1.50	45S	Ø	L349
L352	139.7	13.4	1.67	10.1	1.00	267.7	9.0	.76	8.4	.91	45S	Ø	L352
L360	119.5	-6.8	-.85	12.8	1.27	261.9	3.2	.27	8.9	.96	45S	Ø	L360
L366	136.8	10.5	1.31	13.1	1.30	266.3	7.7	.64	12.3	1.34	45S	Ø	L366
L370	129.1	2.8	.35	9.5	.94	257.2	-1.5	-.12	8.8	.96	45S	Ø	L370
L376	131.1	4.8	.60	9.6	.96	255.7	-3.0	-.25	8.0	.87	45S	Ø	L376
L378	118.1	-8.2	-1.02	9.8	.97	235.9	-22.8	-1.91	12.6	1.37	45S	Ø	L378
L380	121.3	-5.0	-.62	10.1	1.00	250.4	-8.3	-.69	7.8	.85	45S	Ø	L380
L382	125.9	-.4	-.04	11.9	1.19	267.9	9.3	.78	9.1	.99	45S	Ø	L382
L390	127.1	.8	.10	10.6	1.06	260.9	2.2	.19	8.9	.96	45S	Ø	L390
L575	132.8	6.5	.81	9.8	.97	282.9	24.3	2.04	8.9	.97	45S	Ø	L575
L587	111.0	-15.3	-1.90	6.3	.63	240.0	-18.7	-1.57	9.3	1.00	45S	Ø	L587
L597	119.0	-7.3	-.91	12.2	1.21	261.4	2.7	.23	8.4	.91	45S	Ø	L597

GR. MEAN = 126.3 SHEFF. UNITS GRAND MEAN = 258.7 SHEFF. UNITS TEST DETERMINATIONS = 15
 SD MEANS = 8.0 SHEFF. UNITS SD OF MEANS = 11.9 SHEFF. UNITS 82 LABS IN GRAND MEANS
 AVERAGE SDR = 10.1 SHEFF. UNITS AVERAGE SDR = 9.2 SHEFF. UNITS

L174 230.7 104.4 13.01 7.7 .77 310.0 51.3 4.31 8.8 .96 45R * L174
 TOTAL NUMBER OF LABORATORIES REPORTING = 86

Best Values: B91 127 + 13 Sheffield Units
 H44 258 ± 17 Sheffield Units

The following laboratories were omitted from the grand means because of extreme test results: 176S.

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T45-1 TABLE 2
SMOOTHNESS, SHEFFIELD UNITS
SHEFFIELD TESTER IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY--	TEST INSTRUMENT--	CONDITIONS
		B91	H44	MAJOR	MINOR	R.SDR	VAR			
L257B	*	108.0	266.0	-0.8	19.7	1.21	45S	SMOOTHNESS,	SHEFFIELD	
L257C	Ø	109.0	247.5	-17.3	11.2	1.08	45S	SMOOTHNESS,	SHEFFIELD	
L257A	Ø	109.3	250.7	-14.3	12.2	1.17	45S	SMOOTHNESS,	SHEFFIELD	
L587	Ø	111.0	240.0	-23.3	6.3	.82	45S	SMOOTHNESS,	SHEFFIELD	
L115	Ø	113.3	239.0	-23.2	3.7	.75	45S	SMOOTHNESS,	SHEFFIELD	
L223	Ø	113.7	240.4	-21.8	3.9	.88	45S	SMOOTHNESS,	SHEFFIELD	
L321	Ø	114.3	260.7	-3.1	11.7	.87	45S	SMOOTHNESS,	SHEFFIELD	
L255	Ø	114.9	248.5	-14.0	6.2	.58	45S	SMOOTHNESS,	SHEFFIELD	
L317	Ø	116.1	260.9	-2.2	10.2	.90	45S	SMOOTHNESS,	SHEFFIELD	
L249	Ø	116.9	249.9	-11.8	4.9	.59	45S	SMOOTHNESS,	SHEFFIELD	
L260	Ø	117.6	248.3	-13.0	3.7	.48	45S	SMOOTHNESS,	SHEFFIELD	
L378	Ø	118.1	235.9	-24.1	-1.9	1.17	45S	SMOOTHNESS,	SHEFFIELD	
L167	Ø	118.5	251.3	-10.0	4.1	.37	45S	SMOOTHNESS,	SHEFFIELD	
L195	Ø	118.9	242.4	-17.8	.0	1.09	45S	SMOOTHNESS,	SHEFFIELD	
L597	Ø	119.0	261.4	-0.5	7.8	1.06	45S	SMOOTHNESS,	SHEFFIELD	
L232S	Ø	119.0	267.7	5.2	10.3	.82	45S	SMOOTHNESS,	SHEFFIELD	
L360	Ø	119.5	261.9	.1	7.5	1.12	45S	SMOOTHNESS,	SHEFFIELD	
L123	Ø	119.5	251.7	-9.2	3.3	1.25	45S	SMOOTHNESS,	SHEFFIELD	
L183S	Ø	119.6	263.0	1.2	7.9	.94	45S	SMOOTHNESS,	SHEFFIELD	
L173B	Ø	120.3	249.7	-10.6	1.7	.75	45S	SMOOTHNESS,	SHEFFIELD	
L162	Ø	120.3	255.3	-5.5	4.1	.69	45S	SMOOTHNESS,	SHEFFIELD	
L158	Ø	120.7	248.0	-12.0	.7	.95	45S	SMOOTHNESS,	SHEFFIELD	
L380	Ø	121.3	250.4	-9.6	1.1	.93	45S	SMOOTHNESS,	SHEFFIELD	
L312	*	121.5	287.5	24.3	16.2	.72	45S	SMOOTHNESS,	SHEFFIELD	
L211	Ø	121.7	249.1	-10.6	.2	.99	45S	SMOOTHNESS,	SHEFFIELD	
L328	Ø	122.1	251.5	-8.3	.8	1.02	45S	SMOOTHNESS,	SHEFFIELD	
L213	Ø	122.3	240.5	-18.2	-3.8	1.21	45S	SMOOTHNESS,	SHEFFIELD	
L121	Ø	122.4	260.3	-1.1	4.2	1.05	45S	SMOOTHNESS,	SHEFFIELD	
L349	Ø	123.8	260.3	.4	2.9	1.34	45S	SMOOTHNESS,	SHEFFIELD	
L305	Ø	124.3	244.8	-13.5	-3.9	.75	45S	SMOOTHNESS,	SHEFFIELD	
L166	Ø	124.7	249.0	-9.5	-2.5	.86	45S	SMOOTHNESS,	SHEFFIELD	
L308	Ø	124.7	253.9	-5.0	-0.5	1.10	45S	SMOOTHNESS,	SHEFFIELD	
L261	Ø	124.7	264.9	5.0	4.0	.98	45S	SMOOTHNESS,	SHEFFIELD	
L326	Ø	124.9	236.1	-21.1	-8.0	.81	45S	SMOOTHNESS,	SHEFFIELD	
L291S	Ø	125.1	268.1	8.1	5.0	1.11	45S	SMOOTHNESS,	SHEFFIELD	
L126	*	125.2	291.4	29.4	14.5	.96	45S	SMOOTHNESS,	SHEFFIELD	
L124	*	125.4	231.0	-25.6	-10.6	1.03	45S	SMOOTHNESS,	SHEFFIELD	
L382	Ø	125.9	267.9	8.3	4.1	1.09	45S	SMOOTHNESS,	SHEFFIELD	
L281	Ø	125.9	253.7	-4.7	-1.7	.59	45S	SMOOTHNESS,	SHEFFIELD	
L318	Ø	126.0	267.1	7.5	3.7	1.18	45S	SMOOTHNESS,	SHEFFIELD	
L297	Ø	126.3	252.0	-6.1	-2.8	1.23	45S	SMOOTHNESS,	SHEFFIELD	
L278	Ø	126.9	258.0	-0.4	-0.8	1.01	45S	SMOOTHNESS,	SHEFFIELD	
L203	Ø	127.0	247.7	-9.7	-5.2	.84	45S	SMOOTHNESS,	SHEFFIELD	
L285	Ø	127.0	258.3	-0.0	-0.8	1.08	45S	SMOOTHNESS,	SHEFFIELD	
L390	Ø	127.1	260.9	2.3	.2	1.01	45S	SMOOTHNESS,	SHEFFIELD	
L122	Ø	127.1	259.9	1.4	-0.2	.93	45S	SMOOTHNESS,	SHEFFIELD	
L190C	Ø	127.5	249.9	-7.5	-4.7	1.00	45S	SMOOTHNESS,	SHEFFIELD	
L230S	Ø	127.9	260.0	1.9	-0.9	1.00	45S	SMOOTHNESS,	SHEFFIELD	
L176S	#	128.4	320.5	57.2	23.5	.63	45S	SMOOTHNESS,	SHEFFIELD	
L132	Ø	128.4	260.1	2.2	-1.3	1.07	45S	SMOOTHNESS,	SHEFFIELD	
L262	Ø	128.5	266.5	8.0	1.2	.81	45S	SMOOTHNESS,	SHEFFIELD	
L108	Ø	128.7	269.5	10.9	2.2	1.06	45S	SMOOTHNESS,	SHEFFIELD	
L370	Ø	129.1	257.2	-0.2	-3.1	.95	45S	SMOOTHNESS,	SHEFFIELD	
L288	M	129.3				1.05	45S	SMOOTHNESS,	SHEFFIELD	
L134	Ø	129.3	267.3	9.1	.8	1.15	45S	SMOOTHNESS,	SHEFFIELD	
L342	Ø	129.4	271.7	13.1	2.5	.93	45S	SMOOTHNESS,	SHEFFIELD	
L254	Ø	129.9	245.7	-10.3	-8.7	.75	45S	SMOOTHNESS,	SHEFFIELD	
L275	Ø	130.6	270.0	12.1	.7	1.04	45S	SMOOTHNESS,	SHEFFIELD	
L226B	Ø	130.9	264.6	7.3	-1.7	1.19	45S	SMOOTHNESS,	SHEFFIELD	
L152	Ø	131.0	254.0	-2.3	-6.2	.98	45S	SMOOTHNESS,	SHEFFIELD	
L376	Ø	131.1	255.7	-0.8	-5.6	.91	45S	SMOOTHNESS,	SHEFFIELD	
L114	Ø	131.5	268.0	10.7	-0.9	1.11	45S	SMOOTHNESS,	SHEFFIELD	
L125	Ø	131.7	254.0	-2.0	-6.8	1.11	45S	SMOOTHNESS,	SHEFFIELD	
L100	Ø	131.7	272.3	14.6	.6	1.14	45S	SMOOTHNESS,	SHEFFIELD	
L341	Ø	131.9	257.9	1.6	-5.4	1.03	45S	SMOOTHNESS,	SHEFFIELD	

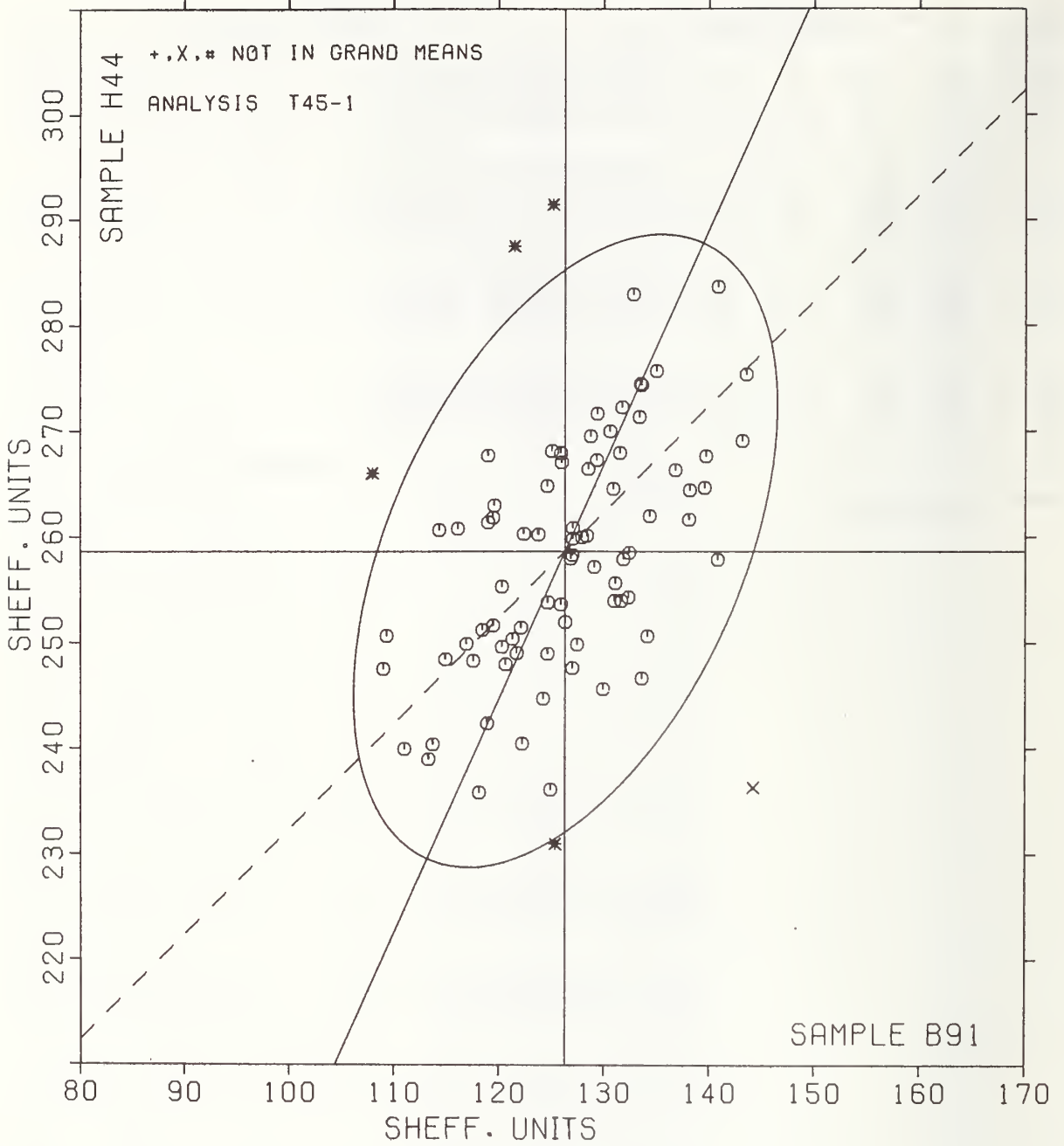
TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T45-1 TABLE 2
 SMOOTHNESS, SHEFFIELD UNITS
 SHEFFIELD TESTER IS STANDARD FOR THIS ANALYSIS

SEPTEMBER 1977

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		H91	H44	MAJOR	MINOR	R.SDR	VAR	
L128	Ø	132.3	254.3	-1.5	-7.3	.83	45S	SMOOTHNESS, SHEFFIELD
L190R	Ø	132.4	258.5	2.4	-5.6	.98	45S	SMOOTHNESS, SHEFFIELD
L575	Ø	132.8	282.9	24.8	4.0	.97	45S	SMOOTHNESS, SHEFFIELD
L150	Ø	133.3	271.3	14.5	-1.2	1.39	45S	SMOOTHNESS, SHEFFIELD
L241	Ø	133.5	274.5	17.4	-.0	1.31	45S	SMOOTHNESS, SHEFFIELD
L323	Ø	133.6	246.7	-7.9	-11.6	1.12	45S	SMOOTHNESS, SHEFFIELD
L259	Ø	133.6	274.3	17.3	-.2	1.22	45S	SMOOTHNESS, SHEFFIELD
L159	Ø	134.1	250.7	-4.1	-10.4	1.27	45S	SMOOTHNESS, SHEFFIELD
L228	Ø	134.3	262.0	6.4	-6.0	1.16	45S	SMOOTHNESS, SHEFFIELD
L107	Ø	135.0	275.7	19.1	-.9	1.08	45S	SMOOTHNESS, SHEFFIELD
L366	Ø	136.8	266.3	11.3	-6.4	1.32	45S	SMOOTHNESS, SHEFFIELD
L224	Ø	138.1	261.7	7.6	-9.5	1.35	45S	SMOOTHNESS, SHEFFIELD
L231	Ø	138.1	264.5	10.2	-8.4	1.04	45S	SMOOTHNESS, SHEFFIELD
L139S	Ø	139.5	264.7	10.9	-9.6	.87	45S	SMOOTHNESS, SHEFFIELD
L352	Ø	139.7	267.7	13.7	-8.5	.96	45S	SMOOTHNESS, SHEFFIELD
L148	Ø	140.8	257.9	5.2	-13.6	.89	45S	SMOOTHNESS, SHEFFIELD
L153	Ø	140.8	283.7	28.8	-2.9	1.12	45S	SMOOTHNESS, SHEFFIELD
L157	Ø	143.1	269.1	16.4	-11.1	.99	45S	SMOOTHNESS, SHEFFIELD
L277	Ø	143.5	275.3	22.3	-8.9	1.04	45S	SMOOTHNESS, SHEFFIELD
L290	X	144.2	236.3	-13.0	-25.5	.97	45S	SMOOTHNESS, SHEFFIELD
L174	*	230.7	310.0	89.7	-74.1	.86	45R	SMOOTHNESS, SHEFFIELD, NON-STANDARD INSTRUMENT
GMEANS:		126.3	258.7			1.00		
		95% ELLIPSE:		31.9	16.8	WITH GAMMA = 65 DEGREES		

SMOOTHNESS, SHEFFIELD

SAMPLE B91 = 126. SHEFF. UNITS SAMPLE H44 = 259. SHEFF. UNITS



ANALYSIS T45-2 TABLE 1
SMOOTHNESS, BEKK SECONDS
TAPPI SUGGESTED METHOD T479 SU-71, SMOOTHNESS OF PAPER (BEKK METHOD)

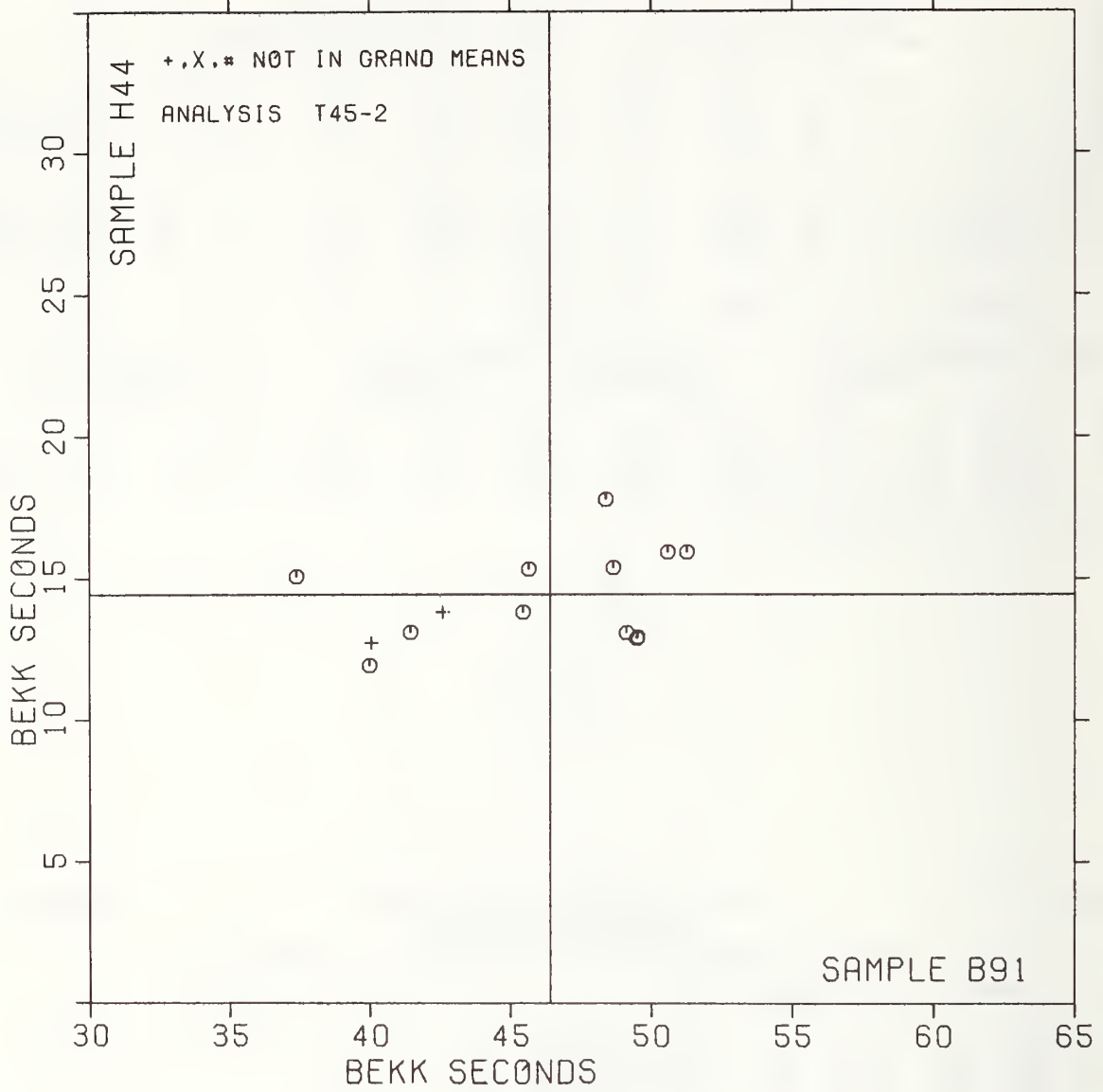
LAB CODE	SAMPLE B91 MEAN	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER				SAMPLE H44 MEAN	PRINTING 84 GRAMS PER SQUARE METER				TEST D. = 15		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L139B	48.40	1.57	.44	8.58	1.32	17.77	3.34	1.94	1.27	1.56	45K	0	L139B
L162	45.67	-0.76	-0.17	7.60	1.17	15.33	.90	.52	1.11	1.37	45K	0	L162
L176	49.13	2.71	.60	5.18	.80	13.08	-1.35	-0.78	.42	.51	45K	0	L176
L182K	49.53	3.11	.69	5.91	.91	12.92	-1.51	-0.87	.50	.61	45K	0	L182K
L190C	40.00	-6.42	-1.42	8.82	1.35	11.93	-2.50	-1.45	.69	.85	45K	0	L190C
L230B	45.47	-0.96	-0.21	6.86	1.05	13.80	-0.63	-0.36	1.01	1.25	45K	0	L230B
L232B	41.47	-4.96	-1.10	5.24	.80	13.09	-1.34	-0.77	.57	.70	45K	0	L232B
L243K	50.60	4.18	.92	6.95	1.07	15.93	1.50	.87	.61	.75	45K	0	L243K
L274	49.50	3.07	.68	4.05	.62	12.88	-1.55	-0.90	.66	.82	45K	0	L274
L291K	51.27	4.84	1.07	7.94	1.22	15.93	1.50	.87	1.58	1.94	45K	0	L291K
L581	48.67	2.24	.50	6.37	.98	15.40	.97	.56	.74	.91	45K	0	L581
L676	37.40	-9.03	-2.00	4.63	.71	15.07	.64	.37	.59	.73	45K	0	L676
GR. MEAN = 46.42 BEKK SECONDS		GRAND MEAN = 14.43 BEKK SECONDS				TEST DETERMINATIONS = 15							
SD MEANS = 4.52 BEKK SECONDS		SD OF MEANS = 1.73 BEKK SECONDS				12 LABS IN GRAND MEANS							
AVERAGE SDR = 6.51 BEKK SECONDS		AVERAGE SDR = .81 BEKK SECONDS											
L182G	107.50	61.08	13.50	11.38	1.75	35.50	21.07	12.21	.84	1.03	45H	+	L182G
L250M	40.07	-6.36	-1.41	9.05	1.39	12.72	-1.71	-0.99	1.45	1.78	45L	+	L250M
L251	42.60	-3.82	-.85	7.73	1.19	13.81	-.62	-.36	.75	.92	45L	+	L251
L388	206.27	159.85	35.34	30.48	4.68	43.29	28.86	16.72	5.38	6.62	45H	+	L388
TOTAL NUMBER OF LABORATORIES REPORTING = 16													
Best Values: B91 47 + 8 Bekk seconds													
H44 14 + 3 Bekk seconds													

ANALYSIS T45-2 TABLE 2
SMOOTHNESS, BEKK SECONDS
TAPPI SUGGESTED METHOD T479 SU-71, SMOOTHNESS OF PAPER (BEKK METHOD)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY--TEST INSTRUMENT--CONDITIONS
		B91	H44	MAJOR	MINOR	R.SDR	VAR	
L676	0	37.40	15.07	-8.86	1.82	.72	45K	SMOOTHNESS, BEKK
L190C	0	40.00	11.93	-6.70	-1.63	1.10	45K	SMOOTHNESS, BEKK
L250M	+	40.07	12.72	-6.53	-.85	1.59	45L	SMOOTHNESS, BEKK, 20 C, 65% RH
L232B	0	41.47	13.09	-5.09	-.67	.75	45K	SMOOTHNESS, BEKK
L251	+	42.60	13.81	-3.87	-.11	1.06	45L	SMOOTHNESS, BEKK, 20 C, 65% RH
L230B	0	45.47	13.80	-1.03	-.50	1.15	45K	SMOOTHNESS, BEKK
L162	0	45.67	15.33	-.63	1.00	1.27	45K	SMOOTHNESS, BEKK
L139B	0	48.40	17.77	2.40	3.05	1.44	45K	SMOOTHNESS, BEKK
L581	0	48.67	15.40	2.35	.67	.94	45K	SMOOTHNESS, BEKK
L176	0	49.13	13.08	2.51	-1.69	.66	45K	SMOOTHNESS, BEKK
L274	0	49.50	12.88	2.84	-1.94	.72	45K	SMOOTHNESS, BEKK
L182K	0	49.53	12.92	2.88	-1.91	.76	45K	SMOOTHNESS, BEKK
L243K	0	50.60	15.93	4.34	.94	.91	45K	SMOOTHNESS, BEKK
L291K	0	51.27	15.93	5.00	.85	1.58	45K	SMOOTHNESS, BEKK
L182G	+	107.50	35.50	63.32	12.83	1.39	45H	SMOOTHNESS, GURLEY OIL FLOTATION
L388	+	206.27	43.29	162.26	7.51	5.65	45H	SMOOTHNESS, GURLEY OIL FLOTATION
GMEANS:		46.42	14.43			1.00		
		95% ELLIPSE:		13.65	4.90	WITH GAMMA = 7 DEGREES		

SMOOTHNESS, BEKK

SAMPLE B91 = 46.4 BEKK SECONDS SAMPLe H44 = 14.4 BEKK SECONDS



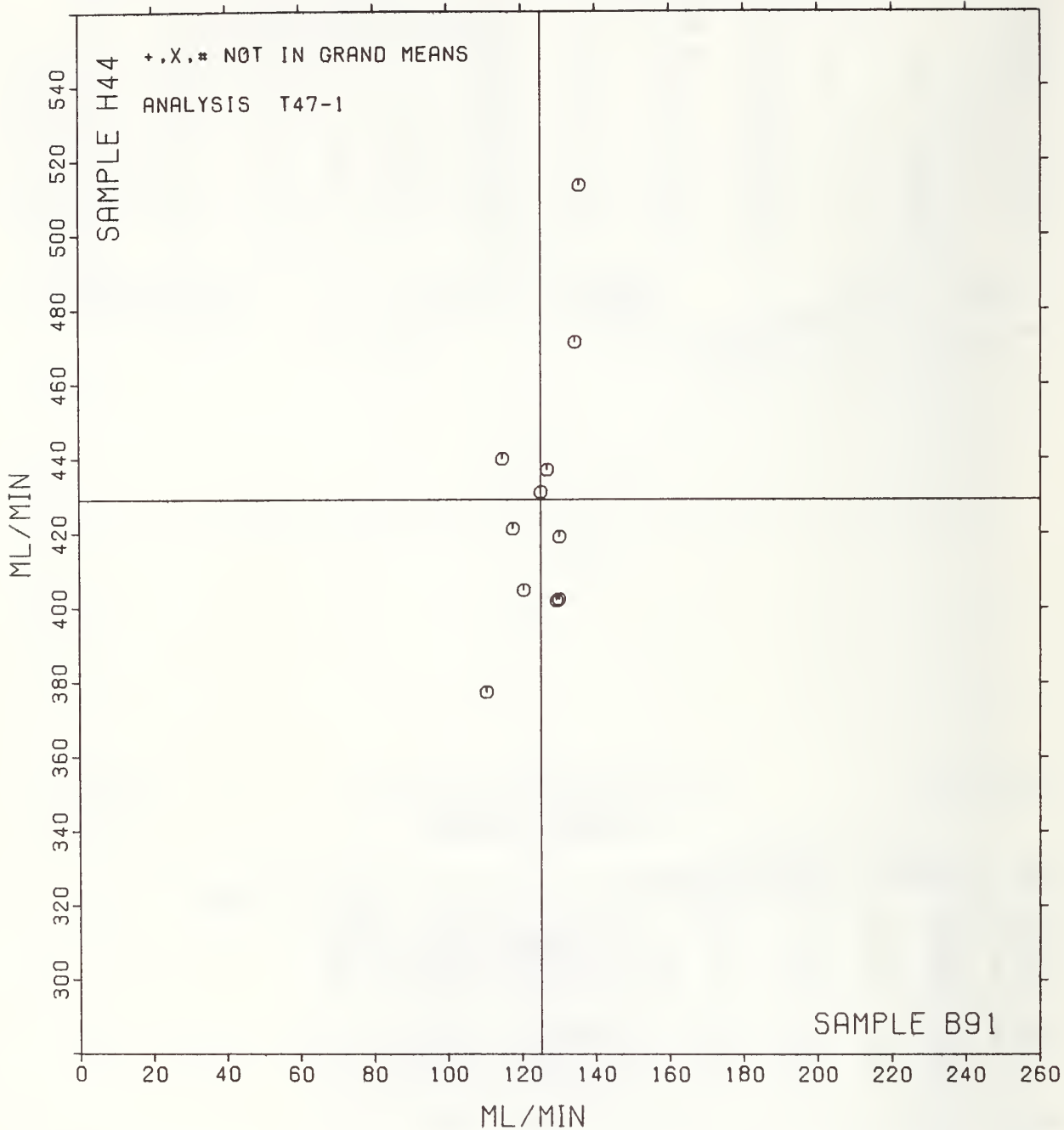
LAB CODE	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER					PRINTING 84 GRAMS PER SQUARE METER					TEST D. = 10		
	SAMPLE B91 MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE H44 MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	127.	2.	.23	13.	.80	437.	8.	.21	31.	.90	47B	Ø	L100
L176	130.	5.	.62	14.	.89	402.	-27.	-.72	17.	.49	47B	Ø	L176
L182B	125.	0.	.02	11.	.67	431.	2.	.05	36.	1.06	47B	Ø	L182B
L236	121.	-4.	-.54	10.	.64	405.	-24.	-.65	21.	.63	47B	Ø	L236
L242	115.	-10.	-1.25	14.	.85	440.	11.	.29	42.	1.24	47B	Ø	L242
L243B	136.	11.	1.30	28.	1.73	513.	84.	2.26	32.	.94	47B	Ø	L243B
L244	118.	-7.	-.91	12.	.73	421.	-8.	-.21	52.	1.52	47B	Ø	L244
L248	130.	5.	.63	15.	.96	419.	-10.	-.27	43.	1.26	47B	Ø	L248
L280	135.	9.	1.15	33.	2.08	471.	42.	1.13	47.	1.40	47B	Ø	L280
L333	110.	-15.	-1.79	10.	.61	377.	-52.	-1.38	32.	.93	47B	Ø	L333
L484	129.	4.	.53	17.	1.05	402.	-27.	-.72	21.	.62	47B	Ø	L484
GR. MEAN = 125. ML/MIN					GRAND MEAN = 429. ML/MIN					TEST DETERMINATIONS = 10			
SD MEANS = 8. ML/MIN					SD OF MEANS = 37. ML/MIN					11 LABS IN GRAND MEANS			
AVERAGE SDR = 16. ML/MIN					AVERAGE SDR = 34. ML/MIN								
TOTAL NUMBER OF LABORATORIES REPORTING = 11													
Best Values: B91 125 milliliter per minute													
H44 430 milliliter per minute													

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS					
		B91	H44	MAJOR	MINOR	R.SDR	VAR						
L333	Ø	110.	377.	-53.	8.	.77	47B	SMOOTHNESS, BENDTSEN, WG 150					
L242	Ø	115.	440.	10.	12.	1.05	47B	SMOOTHNESS, BENDTSEN, WG 150					
L244	Ø	118.	421.	-9.	6.	1.13	47B	SMOOTHNESS, BENDTSEN, WG 150					
L236	Ø	121.	405.	-25.	1.	.64	47B	SMOOTHNESS, BENDTSEN, WG 150					
L182B	Ø	125.	431.	2.	0.	.86	47B	SMOOTHNESS, BENDTSEN, WG 150					
L100	Ø	127.	437.	8.	-1.	.85	47B	SMOOTHNESS, BENDTSEN, WG 150					
L484	Ø	129.	402.	-26.	-8.	.83	47B	SMOOTHNESS, BENDTSEN, WG 150					
L176	Ø	130.	402.	-26.	-9.	.69	47B	SMOOTHNESS, BENDTSEN, WG 150					
L248	Ø	130.	419.	-9.	-6.	1.11	47B	SMOOTHNESS, BENDTSEN, WG 150					
L280	Ø	135.	471.	43.	-4.	1.74	47B	SMOOTHNESS, BENDTSEN, WG 150					
L243B	Ø	136.	513.	85.	1.	1.33	47B	SMOOTHNESS, BENDTSEN, WG 150					
GMEANS:		125.	429.			1.00							
95% ELLIPSE:		116.	20.	WITH GAMMA = 82 DEGREES									

SMOOTHNESS, BENDTSEN

SAMPLE B91 = 125. ML/MIN

SAMPLE H44 = 429. ML/MIN



LAB CODE	PRINTING					COATED OFFSET BOOK					TEST D. = 4		
	SAMPLE B58 MEAN	106 GRAMS DEV	PER SQUARE N.DEV	METER SDR	R.SDR	SAMPLE B80 MEAN	75 GRAMS DEV	PER SQUARE N.DEV	METER SDR	R.SDR	VAR	P	LAE
L126	60.0	-6.7	-1.33	.4	.49	21.3	-4.7	-1.20	.7	.75	56K	Ø	L126
L149	56.7	-10.0	-1.97	1.0	1.10	21.7	-4.2	-1.08	.5	.51	56K	Ø	L149
L182	72.0	5.3	1.04	.3	.30	32.5	6.6	1.67	.2	.18	56K	Ø	L182
L213	68.7	2.0	.40	.3	.32	25.8	-.2	-.05	1.2	1.21	56K	Ø	L213
L277	68.0	1.3	.26	1.4	1.62	24.0	-2.0	-.51	1.8	1.85	56K	Ø	L277
L278	70.4	3.7	.73	.2	.29	30.6	4.6	1.18	1.0	1.04	56K	Ø	L278
L291	66.7	.0	-.01	.7	.79	22.8	-3.1	-.80	2.2	2.23	56K	Ø	L291
L339	70.2	3.5	.70	1.0	1.10	28.1	2.1	.54	.2	.25	56K	Ø	L339
L388	67.5	.8	.17	2.6	3.00	26.9	.9	.24	1.0	.99	56K	Ø	L388

GR. MEAN = 66.7 K & N UNITS GRAND MEAN = 26.0 K & N UNITS TEST DETERMINATIONS = 4
 SD MEANS = 5.1 K & N UNITS SD OP MEANS = 3.9 K & N UNITS 9 LABS IN GRAND MEANS
 AVERAGE SDR = .9 K & N UNITS AVERAGE SDR = 1.0 K & N UNITS
 TOTAL NUMBER OF LABORATORIES REPORTING = 9

Best Values: H58 70 K & N Units
 B80 26 K & N Units

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		B58	B80	MAJOR	MINOR	R.SDR	VAR	
L149	Ø	56.7	21.7	-10.5	2.5	.80	56K INK ABSORPTION, K&N INK TEST	
L126	Ø	60.0	21.3	-8.2	.2	.62	56K INK ABSORPTION, K&N INK TEST	
L291	Ø	66.7	22.8	-1.8	-2.5	1.51	56K INK ABSORPTION, K&N INK TEST	
L388	Ø	67.5	26.9	1.2	.3	1.99	56K INK ABSORPTION, K&N INK TEST	
L277	Ø	68.0	24.0	-.1	-2.4	1.74	56K INK ABSORPTION, K&N INK TEST	
L213	Ø	68.7	25.8	1.5	-1.4	.76	56K INK ABSORPTION, K&N INK TEST	
L339	Ø	70.2	28.1	4.1	-.4	.68	56K INK ABSORPTION, K&N INK TEST	
L278	Ø	70.4	30.6	5.7	1.6	.67	56K INK ABSORPTION, K&N INK TEST	
L182	Ø	72.0	32.5	8.1	2.1	.24	56K INK ABSORPTION, K&N INK TEST	

GMEANS: 66.7 26.0 1.00
 95% ELLIPSE: 20.2 6.1 WITH GAMMA = 36 DEGREES

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T57-1 TABLE 1
HYDROGEN ION CONCENTRATION (PH), COLD
TAPPI STANDARD T509 SU-68

LAB CODE	SAMPLE B01		RAG BOND 75 GRAMS PER SQUARE METER			SAMPLE E47		COATED GLOSS 105 GRAMS PER SQUARE METER			TEST D. ° 5		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L174C	6.720	1.048	4.67	.084	1.66	7.580	-.774	-5.36	.110	2.32	57F	#	L174C
L182C	5.680	.008	.04	.045	.89	8.240	-.114	-.79	.089	1.90	57D	#	L182C
L251C	5.602	-.070	-.31	.065	1.29	8.354	-.000	-.00	.043	.92	57F	#	L251C
L274	5.600	-.072	-.32	.000	.00	8.600	.246	1.70	.000	.00	57V	#	L274
L328	6.040	.368	1.64	.114	2.26	8.260	-.094	-.65	.055	1.16	57M	#	L328
L356	5.436	-.236	-1.05	.029	.57	8.318	-.036	-.25	.048	1.02	57V	#	L356

GR. MEAN = 5.672 PH UNITS GRAND MEAN = 8.354 PH UNITS TEST DETERMINATIONS = 5
SD MEANS = .224 PH UNITS SD OF MEANS = .145 PH UNITS 5 LABS IN GRAND MEANS
TOTAL NUMBER OF LABORATORIES REPORTING = 6 AVERAGE SDR = .051 PH UNITS AVERAGE SDR = .047 PH UNITS

Best Values: B01 5.6 pH units
E47 8.3 pH units

The following laboratories were omitted from the grand means because of extreme test results: L74C.

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T57-1 TABLE 2
HYDROGEN ION CONCENTRATION (PH), COLD
TAPPI STANDARD T509 SU-68

LAB CODE	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
	F	B01	E47	MAJOR	MINOR	E.SDR			
L356 #	5.436	8.318	-.212	-.110	.80	57V PH, COLD,	BECKMAN EXPANDOMATIC		
L274 #	5.600	8.600	-.146	.210	.00	57V PH, COLD,	BECKMAN EXPANDOMATIC		
L251C #	5.602	8.354	-.066	-.023	1.10	57F PH, COLD,	RADIOMETER TYPE PH M64		
L182C #	5.680	8.240	.044	-.106	1.39	57D PH, COLD,	RADIOMETER TYPE PH M 28		
L328 #	6.040	8.260	.379	.028	1.71	57M PH, COLD,	BECKMAN ZEROMATIC		
L174C #	6.720	7.580	1.241	-.359	1.99	57F PH, COLD,	FISHER ACCUMET MODEL 220		
GMEANS:	5.672	8.354			1.00				
	95% ELLIPSE:		1.174	.661	WITH GAMMA = -18 DEGREES				

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T57-2 TABLE 1
HYDROGEN ION CONCENTRATION (PH), BGT
TAPPI STANDARD T435 SU-68

LAB CODE	SAMPLE B01 MEAN	RAG BOND 75 GRAMS PER SQUARE METER					SAMPLE E47 MEAN	COATED GLASS 105 GRAMS PER SQUARE METER					TEST D, = 5		
		DEV	N.DEV	SDR	R.SDR	DEV		N.DEV	SDR	R.SDR	VAR	F	LAB		
L128	5.140	-.190	-1.16	.022	.44	8.890	.024	.09	.042	.84	57L	Ø	L128		
L131	5.560	.230	1.41	.089	1.77	8.480	-.386	-1.42	.045	.89	57L	Ø	L131		
L162	5.288	-.042	-.25	.041	.81	9.190	.324	1.19	.029	.58	57C	Ø	L162		
L182E	5.240	-.090	-.55	.055	1.09	9.030	.164	.60	.045	.89	57E	Ø	L182E		
L315	5.420	.090	.55	.045	.89	8.740	-.126	-.46	.089	1.79	57W	Ø	L315		
GR. MEAN = 5.330 PH UNITS		AVERAGE SDR = .050 PE UNITS					GRAND MEAN = 8.866 PE UNITS					TEST DETERMINATIONS = 5			
SD MEANS = .164 PH UNITS							SD OF MEANS = .273 PE UNITS					5 LABS IN GRAND MEANS			
TOTAL NUMBER OF LABORATORIES REPORTING = 5															
Best Values: B01 5.3 pH units															
E47 8.9 pH units															

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T57-2 TABLE 2
HYDROGEN ION CONCENTRATION (PH), BGT
TAPPI STANDARD T435 SU-68

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		B01	E47	MAJOR	MINOR	R.SDR	VAR			
L128	Ø	5.140	8.890	-.108	-.158	.64	57L PH, BGT, L*N			
L182E	Ø	5.240	9.030	-.187	-.005	.99	57E PH, BGT, RADIOMETER TYPE PE M 28			
L162	Ø	5.288	9.190	-.307	.111	.70	57C PE, BGT, CORNING MODEL 12 RESEARCH METER			
L315	Ø	5.420	8.740	.153	.023	1.34	57W PH, BGT, METROM			
L131	Ø	5.560	8.480	.449	.028	1.33	57L PE, BGT, L*N			
GMEANS:		5.330	8.866			1.00				
		95% ELLIPSE:		1.526	.495	WIDE GAMMA °-62 DEGREES				

ANALYSIS T60-1 TABLE 1

OPACITY (89% REFLECTANCE BACKING) IN PERCENT

TAPPI STANDARD T425 GS-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - BAL TYPE

LAB CODE	SAMPLE B50 MEAN	PRINTING 91 GRAMS PER SQUARE METER				SAMPLE E40 MEAN	COATED DULL 117 GRAMS PER SQUARE METER				TEST D. = 10		
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L108	90.77	.81	1.60	.27	.65	96.62	.45	1.34	.15	.75	60B	Ø	L108
L115	90.28	.32	.64	.47	1.16	96.58	.41	1.22	.18	.85	60B	Ø	L115
L118	89.95	-.01	-.02	.49	1.21	96.26	.09	.27	.13	.61	60B	Ø	L118
L121	90.76	.80	1.58	.35	.85	96.65	.48	1.43	.17	.83	60B	Ø	L121
L122	89.76	-.20	-.39	.47	1.14	96.14	-.03	-.09	.13	.61	60D	Ø	L122
L123	89.89	-.07	-.14	.49	1.21	96.19	.02	.06	.14	.70	60W	Ø	L123
L124	89.84	-.12	-.23	.43	1.06	95.97	-.20	-.60	.09	.46	60B	Ø	L124
L125	88.88	-1.08	-2.13	.69	1.69	95.79	-.38	-1.13	.12	.58	60H	Ø	L125
L131	89.30	-.66	-1.30	.48	1.18	96.00	-.17	-.51	.00	.00	60K	Ø	L131
L132	89.72	-.24	-.47	.39	.94	96.17	-.00	-.00	.15	.73	60B	Ø	L132
L134	90.39	.43	.85	.63	1.55	96.48	.31	.92	.29	1.42	60B	Ø	L134
L139	90.32	.36	.71	.35	.86	96.55	.38	1.13	.16	.77	60B	Ø	L139
L148H	89.69	-.27	-.53	.39	.96	95.95	-.22	-.66	.16	.80	60B	Ø	L148H
L150	89.35	-.61	-1.20	.41	1.01	96.80	.63	1.87	.82	3.99	60B	X	L150
L152	88.90	-1.06	-2.09	.39	.97	95.60	-.57	-1.70	.32	1.53	60B	Ø	L152
L153	90.05	.09	.18	.37	.90	96.05	-.12	-.36	.28	1.38	60B	Ø	L153
L157	90.35	.39	.77	.53	1.30	96.45	.28	.83	.28	1.38	60B	Ø	L157
L158	89.95	-.01	-.02	.18	.45	96.10	-.07	-.21	.21	1.02	60D	Ø	L158
L159	89.97	.01	.02	.34	.83	96.27	.10	.30	.09	.46	60R	Ø	L159
L162	90.06	.10	.20	.44	1.08	96.31	.14	.41	.23	1.13	60W	Ø	L162
L166	88.75	-1.21	-2.39	.51	1.26	96.16	-.01	-.03	.18	.89	60B	X	L166
L172	89.78	-.18	-.35	.39	.96	96.26	.09	.27	.39	1.89	60B	Ø	L172
L173A	90.14	.18	.36	.27	.66	96.18	.01	.03	.09	.45	60B	Ø	L173A
L182	90.15	.19	.38	.34	.83	96.35	.18	.53	.34	1.64	60B	Ø	L182
L183	90.61	.65	1.29	.53	1.29	96.43	.26	.77	.16	.79	60B	Ø	L183
L190C	90.06	.10	.20	.28	.68	96.31	.14	.41	.11	.53	60B	Ø	L190C
L190R	89.94	-.02	-.04	.29	.71	96.23	.06	.18	.12	.56	60B	Ø	L190R
L206	89.96	.00	.00	.37	.90	95.83	-.34	-1.01	.15	.73	60B	Ø	L206
L210B	90.23	.27	.54	.30	.74	96.09	-.08	-.24	.13	.62	60B	Ø	L210B
L211S	89.44	-.52	-1.03	.25	.60	95.99	-.18	-.54	.07	.36	60R	Ø	L211S
L213	89.97	.01	.02	.28	.69	96.16	-.01	-.03	.41	2.00	60B	Ø	L213
L223B	89.88	-.08	-.16	.32	.79	96.32	.15	.44	.18	.85	60B	Ø	L223B
L225	90.40	.44	.87	.34	.84	96.45	.28	.83	.29	1.40	60B	Ø	L225
L226B	90.48	.52	1.03	.55	1.35	96.42	.25	.74	.18	.85	60B	Ø	L226B
L228	90.62	.66	1.31	.43	1.05	96.52	.35	1.04	.27	1.31	60B	Ø	L228
L230	89.88	-.08	-.16	.27	.65	96.17	-.00	-.00	.13	.61	60B	Ø	L230
L236B	89.62	-.34	-.67	.57	1.39	95.71	-.46	-1.37	.55	2.65	60B	Ø	L236B
L238A	88.71	-1.25	-2.47	.32	.78	95.44	-.73	-2.18	.18	.86	60R	Ø	L238A
L241	89.70	-.26	-.51	.76	1.86	95.47	-.70	-2.09	.54	2.64	60B	*	L241
L243	90.27	.31	.62	.55	1.34	96.25	.08	.24	.11	.52	60B	Ø	L243
L254	90.05	.09	.18	.16	.40	96.26	.09	.27	.08	.41	60B	Ø	L254
L255	89.80	-.16	-.31	.46	1.12	96.19	.02	.06	.23	1.11	60B	Ø	L255
L259	90.44	.48	.95	.39	.95	96.18	.01	.03	.18	.88	60B	Ø	L259
L261	90.91	.95	1.88	.09	.21	96.93	.76	2.26	.07	.33	60B	Ø	L261
L262	90.29	.33	.66	.36	.89	96.10	-.07	-.21	.12	.61	60R	Ø	L262
L275	89.91	-.05	-.10	.29	.71	96.18	.01	.03	.14	.68	60R	Ø	L275
L278	91.75	1.79	3.54	.14	.35	97.05	.88	2.62	.11	.52	60B	X	L278
L285B	89.80	-.16	-.31	.42	1.03	95.85	-.32	-.95	.34	1.64	60B	Ø	L285B
L285R	91.09	1.13	2.24	.33	.81	96.85	.68	2.02	.35	1.70	60R	Ø	L285R
L288	90.50	.54	1.07	.57	1.39	96.16	-.01	-.03	.14	.69	60D	Ø	L288
L301	89.10	-.86	-1.70	.52	1.27	95.95	-.22	-.66	.16	.77	60B	Ø	L301
L305	89.75	-.21	-.41	.42	1.02	96.32	.15	.44	.18	.88	60R	Ø	L305
L308	90.56	.60	1.19	.31	.76	96.67	.50	1.49	.11	.51	60H	Ø	L308
L315	89.70	-.26	-.51	.45	1.11	96.02	-.15	-.45	.09	.45	60D	Ø	L315
L317	89.82	-.14	-.27	.67	1.64	96.28	.11	.32	.36	1.75	60B	Ø	L317
L318	89.80	-.16	-.31	.54	1.32	96.30	.13	.38	.35	1.70	60B	Ø	L318
L323	90.37	.41	.81	.32	.78	96.21	.04	.12	.38	1.86	60W	Ø	L323
L326	90.84	.88	1.74	.57	1.39	96.73	.56	1.66	.25	1.23	60B	Ø	L326
L328	88.88	-1.08	-2.13	.49	1.20	95.50	-.67	-2.00	.51	2.46	60B	Ø	L328
L333	89.80	-.16	-.31	.63	1.55	96.10	-.07	-.21	.32	1.53	60B	Ø	L333
L339	89.80	-.16	-.31	.59	1.44	95.85	-.32	-.95	.58	2.81	60B	Ø	L339
L341	89.01	-.95	-1.88	.52	1.28	95.25	-.92	-2.74	.34	1.67	60R	*	L341
L352	90.05	.09	.18	.28	.69	96.47	.30	.89	.24	1.14	60R	Ø	L352
L354	89.30	-.66	-1.30	.48	1.18	95.90	-.27	-.81	.32	1.53	60B	Ø	L354
L366	89.60	-.36	-.71	.52	1.29	95.70	-.47	-1.40	.40	1.95	60B	Ø	L366

OPACITY (89% REFLECTANCE BACKING) IN PERCENT
TAPPI STANDARD T425 GS-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	PRINTING					COATED DULL					TEST D. = 10		
	SAMPLE H50 MEAN	91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E40 MEAN	117 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAE
L378	90.69	.73	1.45	.38	.92	96.73	.56	1.66	.09	.46	60D	Ø	L378
L390	89.45	-.51	-1.01	.46	1.12	95.60	-.57	-1.70	.18	.86	60B	Ø	L390
L502B	89.68	-.28	-.55	.30	.75	95.82	-.35	-1.04	.17	.82	60D	Ø	L502B
L502B	89.17	-.79	-1.56	.45	1.10	96.01	-.16	-.48	.02	.10	60B	Ø	L502B
L502R	89.78	-.18	-.35	.33	.80	96.32	.15	.44	.08	.38	60R	Ø	L502R
L523	89.80	-.16	-.31	.35	.86	96.12	-.05	-.15	.10	.50	60R	Ø	L523
L543	89.46	-.50	-.99	.33	.80	95.95	-.22	-.66	.05	.26	60D	Ø	L543
L573	90.33	.37	.73	.39	.95	96.28	.11	.32	.12	.60	60B	Ø	L573
L581	90.23	.27	.54	.48	1.17	96.26	.09	.27	.12	.57	60B	Ø	L581
L587	90.30	.34	.68	.32	.79	96.07	-.10	-.30	.13	.61	60B	Ø	L587
L597	88.50	-1.46	-2.88	.41	1.00	95.90	-.27	-.81	.77	3.76	60B	X	L597
L599	90.25	.29	.58	.54	1.32	96.65	.48	1.43	.53	2.57	60B	Ø	L599
GR. MEAN = 89.56 PERCENT GRAND MEAN = 96.17 PERCENT TEST DETERMINATIONS = 10													
SD MEANS = .51 PERCENT SD OF MEANS = .34 PERCENT 73 LABS IN GRAND MEANS													
AVERAGE SDR = .41 PERCENT AVERAGE SDR = .21 PERCENT													
L100	90.30	.34	.68	.35	.85	96.34	.17	.50	.14	.69	60E	*	L100
L105	89.79	-.17	-.33	.25	.62	96.42	.25	.74	.13	.64	60E	*	L105
L224	89.88	-.08	-.16	.29	.72	96.49	.32	.95	.23	1.11	60P	*	L224
L232	89.40	-.56	-1.10	.39	.97	95.95	-.22	-.66	.16	.77	60P	*	L232
L236E	91.72	1.76	3.48	.45	1.09	97.05	.88	2.62	.14	.70	60E	*	L236E
L249	90.01	.05	.10	.26	.63	96.09	-.08	-.24	.28	1.34	60P	*	L249
L256	90.35	.39	.77	.34	.84	96.49	.32	.95	.11	.53	60N	*	L256
L260	89.50	-.46	-.91	.30	.73	96.10	-.07	-.21	.21	1.02	60P	*	L260
L274P	93.35	3.39	6.71	.24	.59	96.60	.43	1.28	.70	3.39	60P	*	L274P
L309	88.54	-1.42	-2.81	.33	.82	95.24	-.93	-2.77	.22	1.08	60A	*	L309
L312	88.75	-1.21	-2.39	.35	.87	95.60	-.57	-1.70	.21	1.02	60P	*	L312
L380	90.00	.04	.08	.00	.00	96.00	-.17	-.51	.00	.00	60P	*	L380
L388	88.90	-1.06	-2.09	.39	.97	95.60	-.57	-1.70	.21	1.02	60P	*	L388
TOTAL NUMBER OF LABORATORIES REPORTING = 90													
Best Values: H50 89.9 ± 0.9 percent													
E40 96.1 ± 0.6 percent													

OPACITY (89% REFLECTANCE BACKING) IN PERCENT
TAPPI STANDARD T425 65-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	F	MEANS		COORDINATES		AVG E.SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		B50	E40	MAJOR	MINOR					
L597	X	88.50	95.90	-1.38	.53	2.38	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L309	*	88.54	95.24	-1.70	-.05	.95	60A	OPACITY (WHITE BACKING),	ZEISS ELREPHO, FILTER 4, 86% BACKING	
L238A	Ø	88.71	95.44	-1.45	.03	.82	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L312	*	88.75	95.60	-1.33	.15	.94	60P	OPACITY (WHITE BACKING),	PHOTOVOLT	
L166	X	88.75	96.16	-1.03	-.62	1.08	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L328	Ø	88.88	95.50	-1.27	-.01	1.83	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L125	Ø	88.88	95.75	-1.12	.24	1.14	60B	OPACITY (WHITE BACKING),	HUYGEN	
L388	*	88.90	95.60	-1.20	.07	.99	60P	OPACITY (WHITE BACKING),	PHOTOVOLT	
L152	Ø	88.90	95.60	-1.20	.07	1.25	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L341	*	89.01	95.25	-1.29	-.29	1.47	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L301	Ø	89.10	95.95	-.85	.26	1.02	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L502H	Ø	89.17	96.01	-.76	.28	.60	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L354	Ø	89.30	95.90	-.70	.11	1.36	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L131	Ø	89.30	96.00	-.65	.20	.59	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L150	X	89.35	96.80	-.15	.85	2.50	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L232	*	89.40	95.95	-.59	.11	.87	60P	OPACITY (WHITE BACKING),	PHOTOVOLT	
L211S	Ø	89.44	95.95	-.54	.12	.48	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L390	Ø	89.45	95.60	-.73	-.22	.99	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L543	Ø	89.46	95.95	-.54	.07	.53	60D	OPACITY (WHITE BACKING),	DIANØ/BNL	
L260	*	89.50	96.10	-.43	.18	.88	60P	OPACITY (WHITE BACKING),	PHOTOVOLT	
L366	Ø	89.60	95.70	-.55	-.21	1.62	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L236B	Ø	89.62	95.71	-.53	-.21	2.02	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L502D	Ø	89.68	95.82	-.42	-.15	.78	60D	OPACITY (WHITE BACKING),	DIANØ/BNL	
L148H	Ø	89.65	95.95	-.34	-.05	.88	60H	OPACITY (WHITE BACKING),	HUYGEN	
L315	Ø	89.70	96.02	-.30	.01	.78	60D	OPACITY (WHITE BACKING),	DIANØ/BNL	
L241	*	89.70	95.47	-.59	-.46	2.25	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L132	Ø	89.72	96.17	-.20	.12	.83	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L305	Ø	89.75	96.32	-.10	.24	.95	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L122	Ø	89.76	96.14	-.19	.08	.88	60D	OPACITY (WHITE BACKING),	DIANØ/BNL	
L502R	Ø	89.78	96.32	-.07	.22	.59	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L172	Ø	89.78	96.26	-.11	.17	1.42	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L105	*	89.79	96.42	-.01	.30	.63	60E	OPACITY (WHITE BACKING),	ZEISS ELREPHO, PMY-C(10) FILTER	
L523	Ø	89.80	96.12	-.16	.04	.68	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L339	Ø	89.80	95.85	-.30	-.19	2.13	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L333	Ø	89.80	96.10	-.17	.02	1.54	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L318	Ø	89.80	96.30	-.07	.19	1.51	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L285B	Ø	89.80	95.85	-.30	-.19	1.34	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L255	Ø	89.80	96.19	-.12	.10	1.11	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L317	Ø	89.82	96.28	-.06	.17	1.70	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L124	Ø	89.84	95.57	-.21	-.11	.76	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L224	*	89.88	96.49	.10	.31	.91	60P	OPACITY (WHITE BACKING),	PHOTOVOLT	
L223B	Ø	89.88	96.32	.01	.17	.82	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L230	Ø	89.88	96.17	-.07	.04	.63	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L123	Ø	89.89	96.19	-.05	.05	.96	60W	OPACITY (WHITE BACKING),	HUYGEN, DIGITAL	
L275	Ø	89.91	96.18	-.04	.03	.69	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L190R	Ø	89.94	96.23	.02	.06	.64	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L118	Ø	89.95	96.26	.04	.08	.91	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L158	Ø	89.95	96.10	-.04	-.06	.74	60D	OPACITY (WHITE BACKING),	DIANØ/BNL	
L206	Ø	89.96	95.83	-.18	-.29	.81	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L155	Ø	89.97	96.27	.06	.08	.65	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L213	Ø	89.97	96.16	.00	-.02	1.35	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L380	*	90.00	96.00	-.05	-.17	.00	60P	OPACITY (WHITE BACKING),	PHOTOVOLT	
L249	*	90.01	96.09	.00	-.10	.98	60P	OPACITY (WHITE BACKING),	PHOTOVOLT	
L153	Ø	90.05	96.05	.01	-.15	1.14	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L254	Ø	90.05	96.26	.12	.03	.41	60B	OPACITY (WHITE BACKING),	HUYGEN	
L352	Ø	90.05	96.47	.23	.21	.92	60B	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L162	Ø	90.06	96.31	.16	.07	1.11	60W	OPACITY (WHITE BACKING),	HUYGEN, DIGITAL	
L190C	Ø	90.06	96.31	.16	.07	.60	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L173A	Ø	90.14	96.18	.16	-.09	.55	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L182	Ø	90.15	96.35	.26	.05	1.23	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L581	Ø	90.23	96.26	.28	-.07	.87	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L210B	Ø	90.23	96.05	.19	-.21	.68	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L599	Ø	90.25	96.65	.50	.26	1.95	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L243	Ø	90.27	96.25	.31	-.10	.93	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	
L115	Ø	90.28	96.58	.49	.18	1.00	60B	OPACITY (WHITE BACKING),	BAUSCH * LOMB	

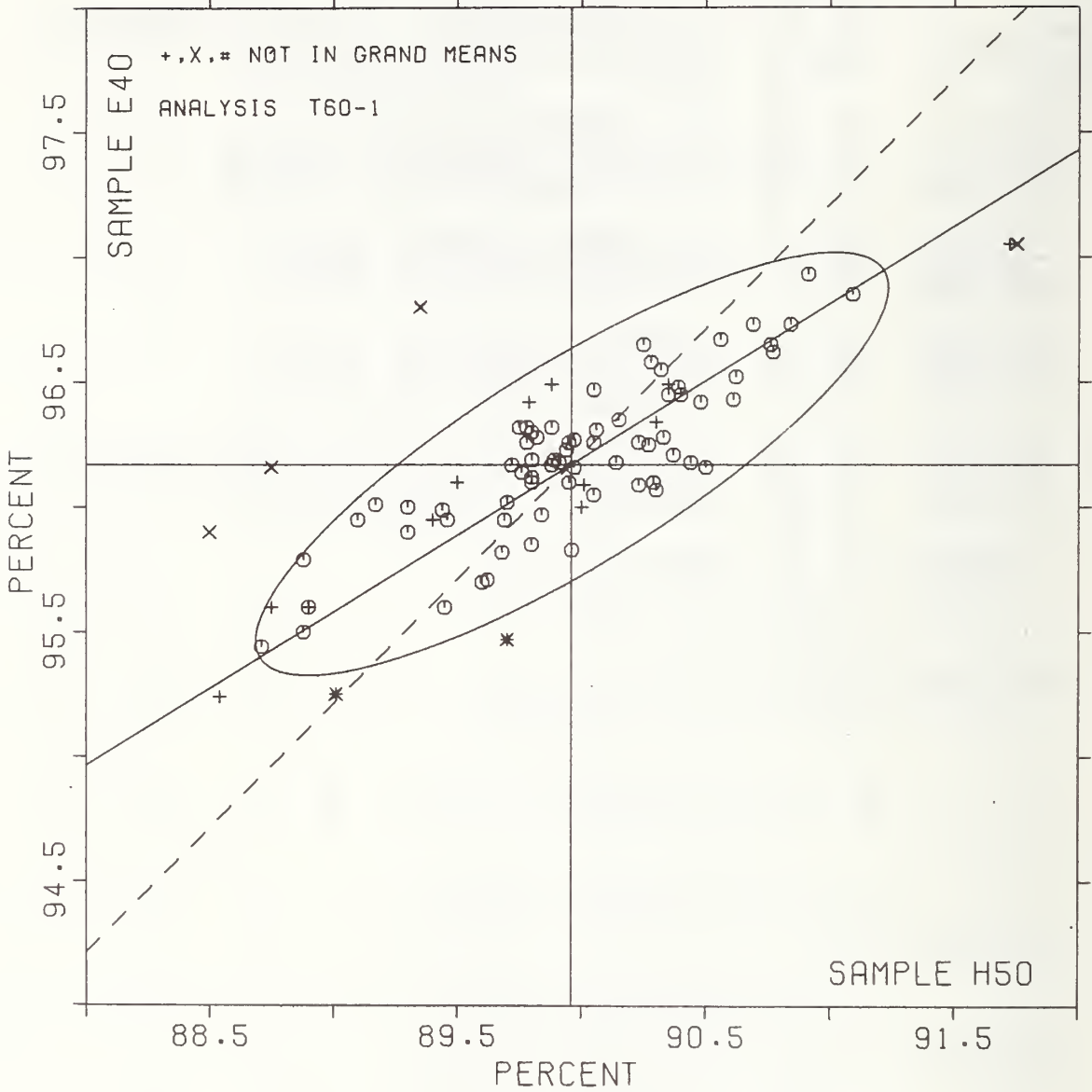
ANALYSIS T60-1 TABLE 2
 OPACITY (89% REFLECTANCE BACKING) IN PERCENT
 TAPPI STANDARD T425 68-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	P	MEANS		COORDINATES		AVG R.SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		H50	E40	MAJOR	MINOR					
L262	Ø	90.29	96.10	.24	-.23	.75	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L100	*	90.30	96.34	.38	-.04	.77	60E	OPACITY (WHITE BACKING),	ZEISS ELREPBØ, PMY-C(10) FILTER	
L587	Ø	90.30	96.07	.24	-.26	.70	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L139	Ø	90.32	96.55	.51	.13	.82	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L573	Ø	90.33	96.28	.37	-.10	.77	60H	OPACITY (WHITE BACKING),	BUYGEN	
L256	*	90.35	96.49	.50	.07	.69	60N	OPACITY (WHITE BACKING),	HUNTER	
L157	Ø	90.35	96.45	.48	.03	1.34	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L323	Ø	90.37	96.21	.37	-.18	1.32	60W	OPACITY (WHITE BACKING),	BUYGEN, DIGITAL	
L134	Ø	90.39	96.48	.53	.04	1.49	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L225	Ø	90.40	96.45	.52	.01	1.12	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L259	Ø	90.44	96.18	.41	-.24	.91	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L228B	Ø	90.48	96.42	.57	-.06	1.10	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L288	Ø	90.50	96.16	.46	-.29	1.04	60D	OPACITY (WHITE BACKING),	DIANØ/BNL	
L308	Ø	90.56	96.67	.77	.11	.64	60B	OPACITY (WHITE BACKING),	BUYGEN	
L183	Ø	90.61	96.43	.69	-.12	1.04	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L228	Ø	90.62	96.52	.75	-.05	1.18	60H	OPACITY (WHITE BACKING),	HUYGEN	
L378	Ø	90.69	96.73	.92	.09	.65	60D	OPACITY (WHITE BACKING),	DIANØ/BNL	
L121	Ø	90.76	96.65	.93	-.01	.84	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L108	Ø	90.77	96.62	.93	-.04	.70	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L326	Ø	90.84	96.73	1.04	.01	1.31	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L261	Ø	90.91	96.93	1.21	.15	.27	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L285R	Ø	91.09	96.85	1.32	-.02	1.26	60R	OPACITY (WHITE BACKING),	THWING-ALBERT (FORMERLY SRL)	
L236E	*	91.72	97.05	1.96	-.18	.90	60E	OPACITY (WHITE BACKING),	ZEISS ELREPBØ, PMY-C(10) FILTER	
L278	X	91.75	97.05	1.99	-.19	.44	60B	OPACITY (WHITE BACKING),	BAUSCH * LØMB	
L274P	*	93.35	96.60	3.11	-1.41	1.99	60P	OPACITY (WHITE BACKING),	PROTEVØLT	
GMEANS:		89.96	96.17			1.00				
		95% ELLIPSE:		1.47	.40			WITH GAMMA = 31 DEGREES		

OPACITY, B&L TYPE, 89% BACKING

SAMPLE H50 = 90.0 PERCENT

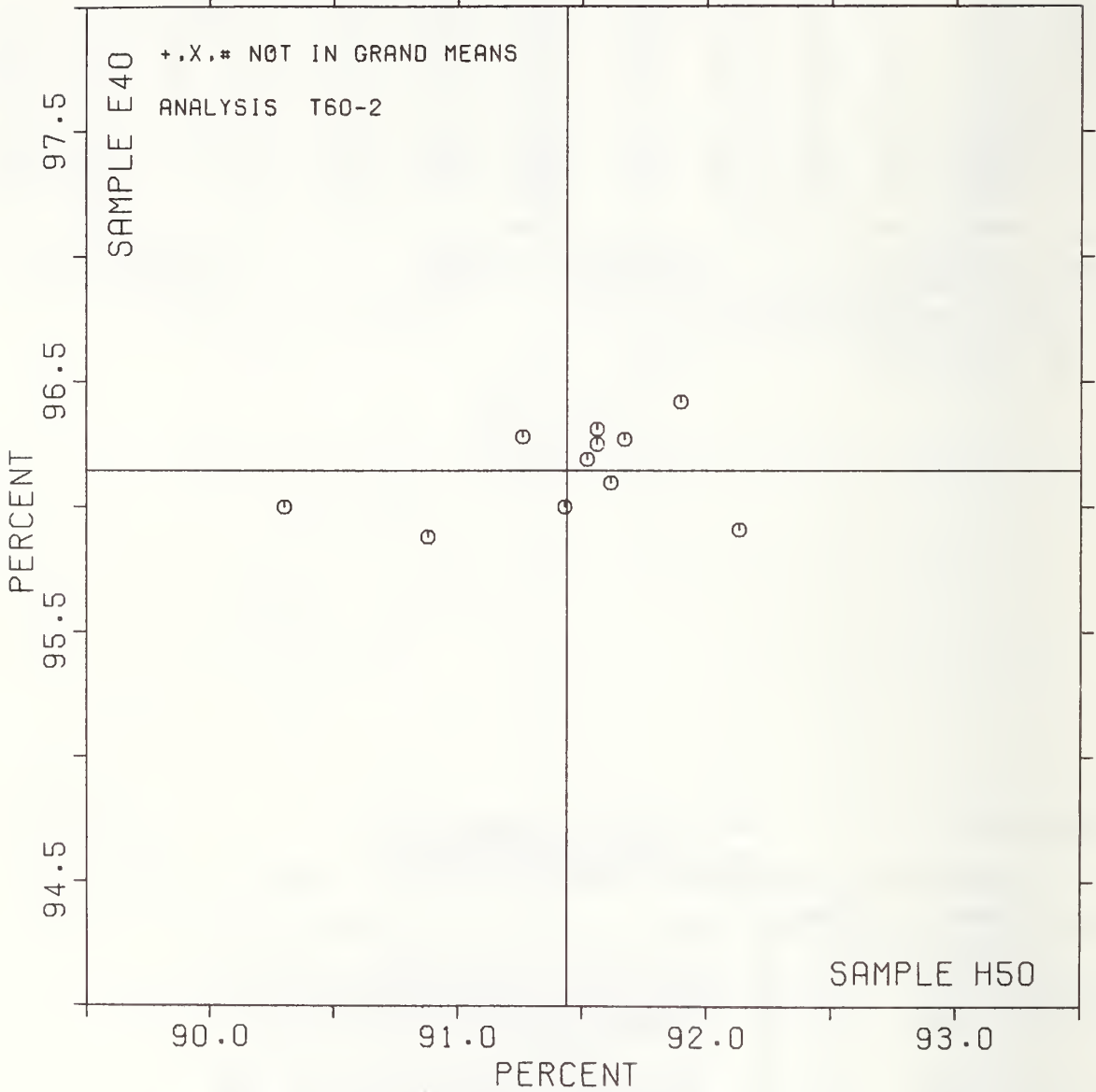
SAMPLE E40 = 96.2 PERCENT



OPACITY, B&L TYPE, PAPER BACKING

SAMPLE H50 = 91.44 PERCENT

SAMPLE E40 = 96.15 PERCENT



OPACITY (PAPER BACKING) IN PERCENT
TAPPI SUGGESTED METHOD T519 SU-70, DIFFUSE OPACITY OF PAPER - ILLUMINANT C, ELREPHO TYPE

LAH CODE	PRINTING					COATED DULL					TEST D. = 10		
	H50 MEAN	91 GRAMS DEV	PER SQUARE METER N.DEV	SDR	R.SDR	E40 MEAN	117 GRAMS DEV	PER SQUARE METER N.DEV	SDR	R.SDR	VAR	F	LAB
L100	92.62	.02	.08	.27	1.06	96.78	.04	.27	.12	1.03	60J	Ø	L100
L150	92.34	-.25	-.83	.20	.79	96.61	-.12	-.79	.11	.93	60J	Ø	L150
L182E	92.59	-.01	-.02	.40	1.55	96.71	-.03	-.18	.10	.84	60J	Ø	L182E
L242	93.02	.43	1.41	.17	.65	96.91	.17	1.08	.16	1.38	60J	Ø	L242
L244	92.08	-.52	-1.70	.28	1.09	96.38	-.36	-2.29	.10	.87	60P	Ø	L244
L250T	92.78	.18	.60	.27	1.06	96.70	-.04	-.25	.16	1.37	60J	Ø	L250T
L251	92.73	.13	.43	.18	.72	96.82	.08	.50	.13	1.06	60F	Ø	L251
L360	93.28	.68	2.25	.14	.55	82.70	-14.04	-89.77	.24	2.02	60P	#	L360
L446	92.37	-.23	-.75	.26	1.02	96.70	-.04	-.27	.10	.85	60J	Ø	L446
L484	93.11	.52	1.70	.28	1.12	96.98	.24	1.54	.09	.80	60P	Ø	L484
L502	92.46	-.14	-.45	.27	1.05	96.77	.03	.19	.11	.89	60J	Ø	L502
L575	92.46	-.14	-.46	.23	.90	96.77	.03	.20	.12	.97	60J	Ø	L575
GR. MEAN = 92.60 PERCENT		GRAND MEAN = 96.74 PERCENT					TEST DETERMINATIONS = 10						
SD MEANS = .30 PERCENT		SD OF MEANS = .16 PERCENT					11 LAHS IN GRAND MEANS						
AVERAGE SDR = .25 PERCENT		AVERAGE SDR = .12 PERCENT											
L176	95.82	3.22	10.62	.40	1.56	99.01	2.27	14.52	.26	2.22	60Z	*	L176
L253C	91.71	-.89	-2.92	.31	1.22	96.31	-.43	-2.74	.14	1.22	60G	*	L253C

TOTAL NUMBER OF LABORATORIES REPORTING = 14
Best Values: H50 92.6 percent
E40 96.8 percent

The following laboratories were omitted from the grand means because of extreme test results: 360.

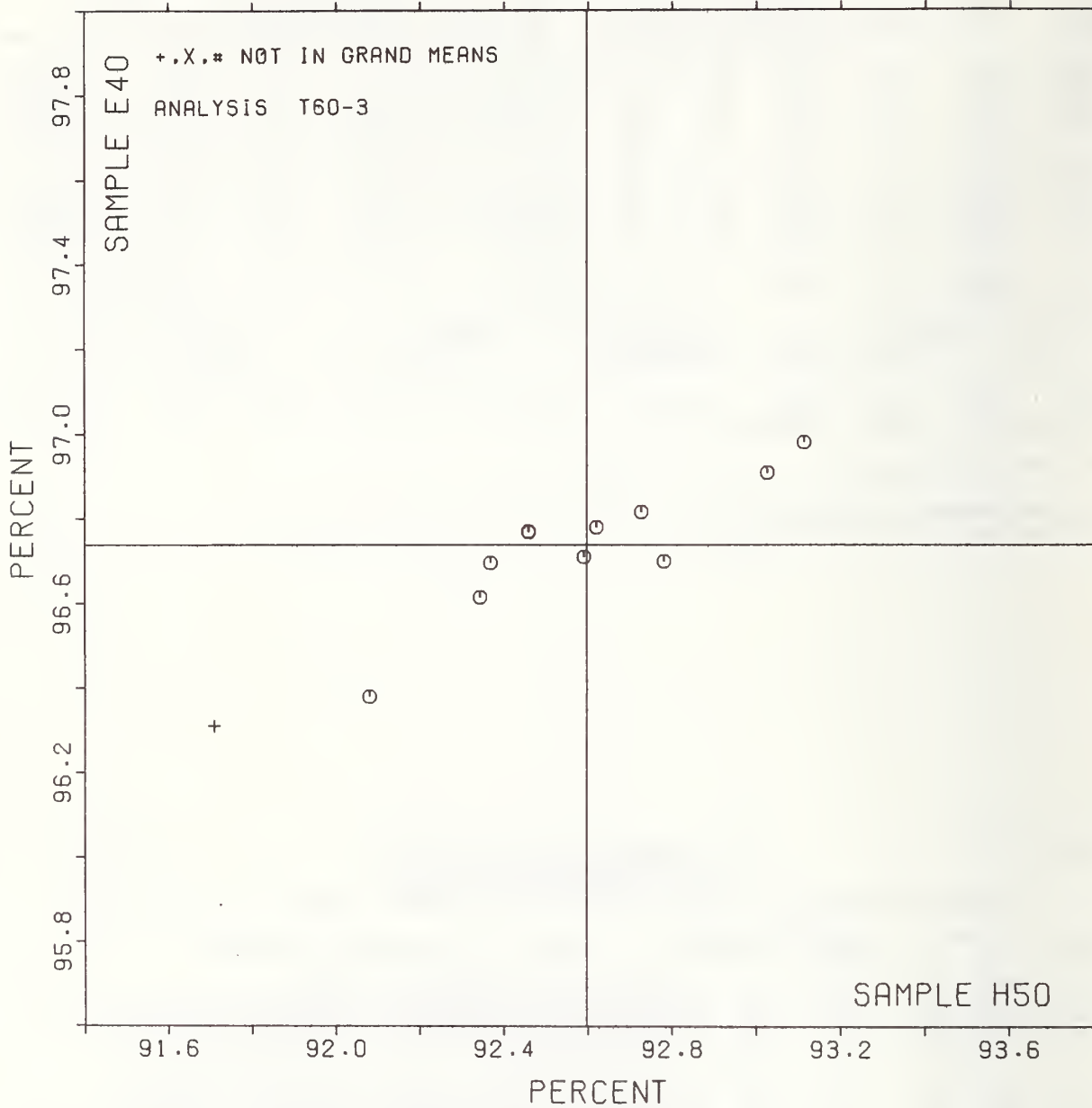
OPACITY (PAPER BACKING) IN PERCENT
TAPPI SUGGESTED METHOD T519 SU-70, DIFFUSE OPACITY OF PAPER - ILLUMINANT C, ELREPHO TYPE

LAH CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		B50	E40	MAJOR	MINOR	R.SDR	VAR	
L253C	*	91.71	96.31	-.98	-.00	1.22	60G	OPACITY (PAPER BACKING), GARDNEM
L244	Ø	92.08	96.38	-.62	-.10	.98	60P	OPACITY (PAPER BACKING), ZEISS ELREPHØ, FMY-C(10) NO TRAP
L150	Ø	92.34	96.61	-.28	-.00	.86	60J	OPACITY (PAPER BACKING), Z.ELREPHØ,FMY-C,GLOSS TRAP
L446	Ø	92.37	96.70	-.22	.06	.93	60J	OPACITY (PAPER BACKING),Z.ELREPHØ,FMY-C,GLOSS TRAP
L575	Ø	92.46	96.77	-.11	.09	.94	60J	OPACITY (PAPER BACKING),Z.ELREPHØ,FMY-C,GLOSS TRAP
L502	Ø	92.46	96.77	-.11	.09	.97	60J	OPACITY (PAPER BACKING),Z.ELREPHØ,FMY-C,GLOSS TRAP
L182E	Ø	92.59	96.71	-.02	-.02	1.19	60J	OPACITY (PAPER BACKING), Z.ELREPHØ,FMY-C,GLOSS TRAP
L100	Ø	92.62	96.78	.04	.03	1.05	60J	OPACITY (PAPER BACKING),Z.ELREPHØ,FMY-C,GLOSS TRAP
L251	Ø	92.73	96.82	.15	.01	.89	60P	OPACITY (PAPER BACKING), ZEISS ELREPHØ, FMY-C(10) NO TRAP
L250T	Ø	92.78	96.70	.15	-.11	1.22	60J	OPACITY (PAPER BACKING),Z.ELREPHØ,FMY-C,GLOSS TRAP
L242	Ø	93.02	96.91	.46	-.03	1.02	60J	OPACITY (PAPER BACKING),Z.ELREPHØ,FMY-C,GLOSS TRAP
L484	Ø	93.11	96.98	.57	-.00	.96	60F	OPACITY (PAPER BACKING), ZEISS ELREPHØ, FMY-C(10) NO TRAP
L360	#	93.28	82.70	-5.43	-12.96	1.25	60F	OPACITY (PAPER BACKING), ZEISS ELREPHØ, FMY-C(10) NO TRAP
L176	*	95.82	99.01	3.89	.66	1.89	60Z	OPACITY (PAPER BACKING), MARTIN SWEETS
GMEANS:		92.60	96.74			1.00		
95% ELLIPSE:		1.03	.21			WITH GAMMA = 25 DEGREES		

OPACITY, ELREPHO TYPE, PAPER BACKING

SAMPLE H50 = 92.60 PERCENT

SAMPLE E40 = 96.74 PERCENT



DIRECTIONAL BLUE REFLECTANCE IN PERCENT
TAPPI STANDARD T452 M-58, 'BRIGHTNESS'; MARTIN SWEETS (ACBT & GE) IS STANDARD FOR THIS ANALYSIS

LAB CODE	SAMPLE H52		PRINTING 74 GRAMS PER SQUARE METER				SAMPLE E41		COATED GLOSS 151 GRAMS PER SQUARE METER				TEST D. = 8				
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB				
L108	68.79	.03	.11	.17	.62	82.72	-.16	-.59	.32	1.00	65M	Ø	L108				
L122	68.56	-.20	-.75	.13	.47	82.47	-.41	-1.51	.38	1.20	65N	Ø	L122				
L132	69.20	.44	1.68	.34	1.24	83.42	.54	1.98	.34	1.06	65N	Ø	L132				
L158	69.24	.48	1.83	.13	.47	83.20	.31	1.15	.25	.78	65N	Ø	L158				
L172	68.82	.07	.25	.16	.57	83.01	.13	.46	.22	.68	65A	Ø	L172				
L176	69.19	.43	1.64	.25	.90	83.07	.19	.69	.25	.78	65A	Ø	L176				
L190C	68.80	.04	.16	.19	.70	82.64	-.25	-.92	.41	1.29	65A	Ø	L190C				
L210M	68.59	-.17	-.65	.11	.41	82.90	.01	.05	.32	.99	65M	Ø	L210M				
L210N	68.96	.20	.78	.20	.72	82.92	.04	.14	.29	.89	65N	Ø	L210N				
L211	68.95	.19	.73	.35	1.27	82.91	.03	.10	.19	.59	65N	Ø	L211				
L225	68.70	-.06	-.22	.23	.82	82.90	.01	.05	.09	.29	65N	Ø	L225				
L243	68.51	-.25	-.94	.16	.59	82.56	-.32	-1.19	.15	.47	65A	Ø	L243				
L259	68.36	-.40	-1.51	.90	3.25	83.01	.13	.46	.63	1.96	65M	Ø	L259				
L275	68.55	-.21	-.80	.28	1.00	82.65	-.24	-.87	.23	.71	65M	Ø	L275				
L288	68.65	-.11	-.41	.29	1.04	82.72	-.16	-.59	.19	.59	65N	Ø	L288				
L308	68.77	.02	.06	.33	1.20	82.96	.08	.28	.53	1.67	65N	Ø	L308				
L315	68.46	-.30	-1.13	.25	.91	83.01	.13	.46	.48	1.49	65N	Ø	L315				
L317	69.07	.32	1.21	.13	.46	82.54	-.35	-1.28	.29	.90	65M	Ø	L317				
L502	68.73	-.03	-.10	.31	1.11	82.86	-.03	-.11	.42	1.31	65A	Ø	L502				
L523	68.40	-.36	-1.37	.22	.80	82.62	-.26	-.96	.33	1.02	65N	Ø	L523				
L598	68.61	-.15	-.56	.67	2.44	83.49	.60	2.21	.43	1.35	65M	Ø	L598				
GR. MEAN = 68.76 PERCENT												GRAND MEAN = 82.89 PERCENT			TEST DETERMINATIONS = 8		
SD MEANS = .26 PERCENT												SD OF MEANS = .27 PERCENT			21 LABS IN GRAND MEANS		
AVERAGE SDR = .28 PERCENT												AVERAGE SDR = .32 PERCENT					
L105	67.85	-.91	-3.46	.23	.82	83.52	.64	2.35	.33	1.02	65T	*	L105				
L213	68.45	-.31	-1.18	.14	.51	83.74	.85	3.13	.33	1.04	65T	*	L213				
L223	68.62	-.13	-.51	.18	.63	81.96	-.92	-3.40	.18	.55	65G	*	L223				
L224	69.57	.82	3.11	.20	.72	82.75	-.14	-.50	.52	1.61	65H	*	L224				
L232	69.12	.37	1.40	.23	.84	84.12	1.24	4.56	.23	.72	65P	*	L232				
L249	69.04	.28	1.06	.36	1.30	82.51	-.37	-1.38	.29	.92	65P	*	L249				
L256	68.70	-.06	-.22	.20	.72	83.99	1.10	4.05	.31	.98	65H	*	L256				
L260	69.04	.28	1.06	.09	.33	82.66	-.22	-.82	.23	.72	65P	*	L260				
L278	71.12	2.37	9.02	.35	1.28	84.81	1.93	7.09	.26	.81	65P	*	L278				
L312	71.62	2.87	10.93	.35	1.28	84.00	1.11	4.10	.00	.00	65P	*	L312				
L321	70.37	1.62	6.16	.35	1.28	85.06	2.18	8.01	.18	.55	65P	*	L321				
L328	71.66	2.90	11.07	.23	.84	85.75	2.86	10.54	.53	1.67	65P	*	L328				
L339	71.00	2.24	8.55	.27	.97	85.94	3.05	11.23	.18	.55	65P	*	L339				
L380	71.56	2.80	10.69	.42	1.51	84.00	1.11	4.10	.00	.00	65P	*	L380				
L388	68.50	-.26	-.59	.00	.00	82.44	-.45	-1.65	.42	1.30	65P	*	L388				
L543	68.51	-.25	-.94	.17	.62	83.66	.78	2.86	.31	.97	65H	*	L543				
L562	71.06	2.30	8.78	.32	1.16	84.37	1.49	5.48	.23	.72	65P	*	L562				
L587	68.25	-.51	-1.94	.21	.77	82.16	-.72	-2.67	.36	1.12	65I	*	L587				
L591	67.34	-1.42	-5.42	.09	.33	84.07	1.18	4.34	.58	1.80	65H	*	L591				

TOTAL NUMBER OF LABORATORIES REPORTING = 40

Best Values: H52 68.6 ± 0.5 percent
E41 82.6 ± 0.6 percent

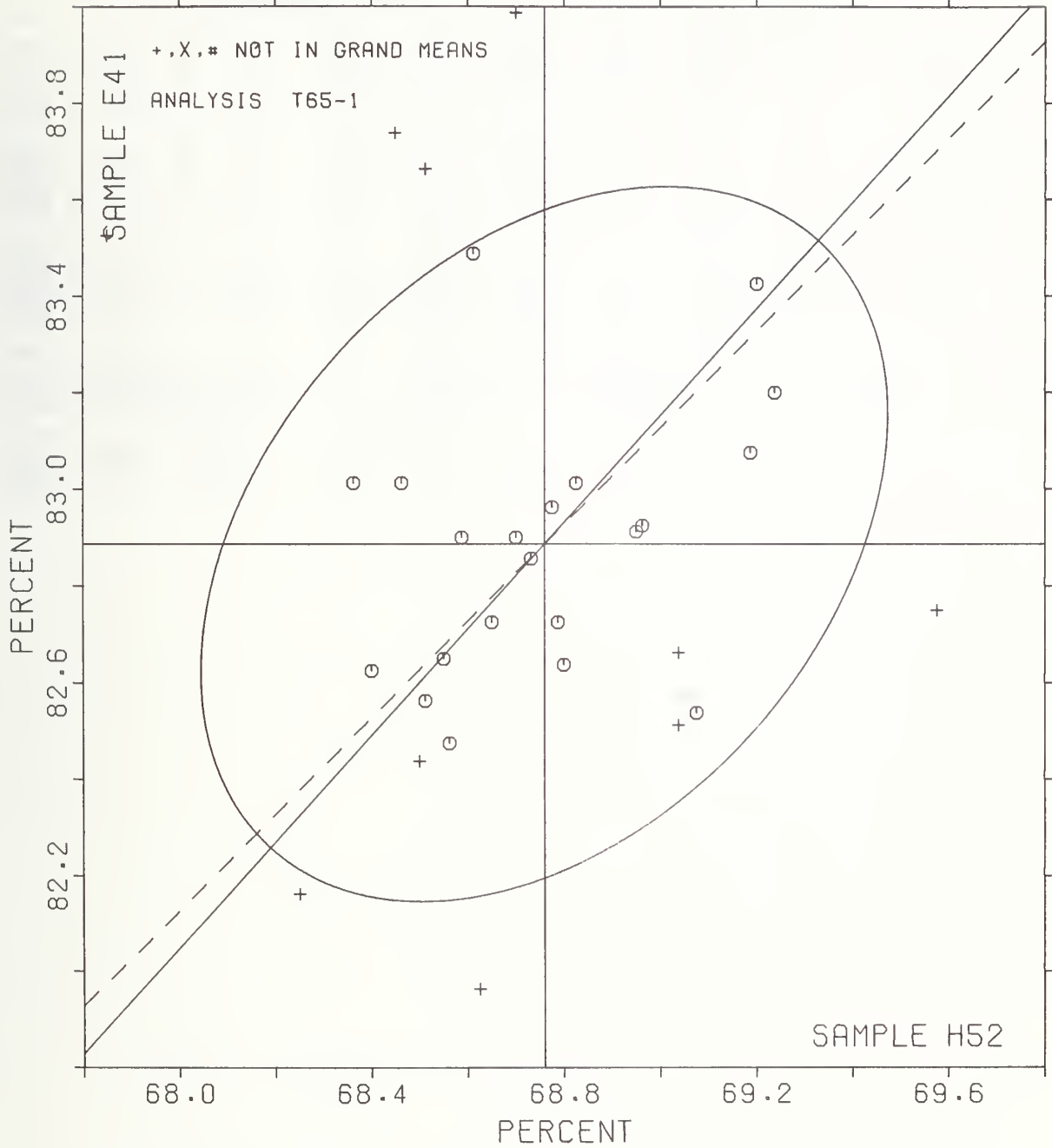
DIRECTIONAL BLUE REFLECTANCE IN PERCENT
TAPPI STANDARD T452 M-58, 'BRIGHTNESS'; MARTIN SWEETS (ACBT & GE) IS STANDARD FOR THIS ANALYSIS

LAB CODE	P	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		B52	E41	MAJOR	MINOR	R.SDR	VAR			
L591	*	67.34	84.07	-0.08	1.85	1.07	65B	BLUE REFLECTANCE (DIRECTIONAL),	BUNTER	
L105	*	67.85	83.52	-0.14	1.10	.92	65T	BLUE REFLECTANCE (DIRECTIONAL),	BUNTER D25D2M	
L587	*	68.25	82.16	-0.88	-0.11	.95	65I	BLUE REFLECTANCE (DIRECTIONAL),	BUNTER D25D2A	
L259	Ø	68.36	83.01	-0.17	.38	2.61	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GE), S-1	
L523	Ø	68.40	82.62	-0.43	.09	.91	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4	
L213	*	68.45	83.74	.42	.80	.78	65T	BLUE REFLECTANCE (DIRECTIONAL),	BUNTER D25D2M	
L315	Ø	68.46	83.01	-0.11	.30	1.20	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4	
L388	*	68.50	82.44	-0.51	-0.11	.65	65F	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
L543	*	68.51	83.66	.41	.70	.80	65B	BLUE REFLECTANCE (DIRECTIONAL),	BUNTER	
L243	Ø	68.51	82.56	-0.41	-0.04	.53	65A	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (ACBT), S-2	
L275	Ø	68.55	82.65	-0.32	-0.00	.86	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GE), S-1	
L122	Ø	68.56	82.47	-0.44	-0.13	.83	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4	
L210M	Ø	68.59	82.90	-0.10	.14	.70	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GE), S-1	
L598	Ø	68.61	83.49	.35	.51	1.89	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GE), S-1	
L223	*	68.62	81.96	-0.77	-0.52	.59	65G	BLUE REFLECTANCE (DIRECTIONAL),	GARDNER	
L288	Ø	68.65	82.72	-0.19	-0.03	.82	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4	
L256	*	68.70	83.99	.78	.78	.85	65B	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER	
L225	Ø	68.70	82.90	-0.03	.05	.55	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4	
L502	Ø	68.73	82.86	-0.04	-0.00	1.21	65A	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (ACBT), S-2	
L308	Ø	68.77	82.96	.07	.04	1.43	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4	
L108	Ø	68.79	82.72	-0.10	-0.13	.81	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GE), S-1	
L190C	Ø	68.80	82.64	-0.16	-0.20	.99	65A	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (ACBT), S-2	
L172	Ø	68.82	83.01	.14	.04	.62	65A	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (ACBT), S-2	
L211	Ø	68.95	82.91	.15	-0.12	.93	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4	
L210N	Ø	68.96	82.92	.17	-0.13	.81	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4	
L260	*	69.04	82.66	.02	-0.36	.53	65F	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
L249	*	69.04	82.51	-0.09	-0.46	1.11	65F	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
L317	Ø	69.07	82.54	-0.05	-0.47	.68	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GE), S-1	
L232	*	69.12	84.12	1.16	.56	.78	65F	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
L176	Ø	69.19	83.07	.43	-0.19	.84	65A	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (ACBT), S-2	
L132	Ø	69.20	83.42	.70	.03	1.15	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4	
L158	Ø	69.24	83.20	.55	-0.14	.63	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4	
L224	*	69.57	82.75	.45	-0.70	1.16	65B	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER	
L321	*	70.37	85.06	2.70	.26	.92	65F	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
L339	*	71.00	85.94	3.77	.39	.76	65P	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
L562	*	71.06	84.37	2.65	-0.71	.94	65P	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
L278	*	71.12	84.81	3.02	-0.46	1.04	65P	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
L380	*	71.56	84.00	2.71	-1.33	.75	65F	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
L312	*	71.62	84.00	2.75	-1.38	.64	65F	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
L328	*	71.66	85.75	4.07	-0.23	1.25	65P	BLUE REFLECTANCE (DIRECTIONAL),	PBØTØVØLT	
GMEANS:		68.76	82.89			1.00				
		95% ELLIPSE:		.85	.58	WITH GAMMA = 47 DEGREES				

BLUE REFLECTANCE, DIRECTIONAL

SAMPLE H52 = 68.76 PERCENT

SAMPLE E41 = 82.89 PERCENT



ANALYSIS T65=2 TABLE 1

DIFFUSE BLUE REFLECTANCE IN PERCENT (GLOSS TRAP)

TAPPI SUGGESTED METHOD T525 SU-72, BRIGHTNESS OF PULP (DIFFUSE ILLUMINATION AND 0 DEG. OBSERVATION)

LAB CODE	SAMPLE B52		PRINTING 74 GRAMS PER SQUARE METER				SAMPLE E41		COATED GLOSS 151 GRAMS PER SQUARE METER				TEST D. # 8		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB		
L100	68.02	-.18	-.21	.13	.70	82.23	.46	.64	.27	1.16	65F	Ø	L100		
L121	67.96	-.24	-.28	.29	1.54	81.07	-.71	-.98	.38	1.63	65K	Ø	L121		
L150	67.58	-.62	-.72	.28	1.49	81.63	-.15	-.20	.21	.90	65Q	Ø	L150		
L170	68.46	.26	.31	.05	.28	81.54	-.24	-.33	.07	.32	65B	Ø	L170		
L182	68.33	.13	.15	.17	.94	81.76	-.01	-.01	.19	.83	65F	Ø	L182		
L210K	69.58	1.38	1.61	.18	.98	82.72	.95	1.32	.20	.86	65K	Ø	L210K		
L242	66.45	-1.75	-2.04	.12	.64	80.89	-.88	-1.23	.31	1.32	65F	Ø	L242		
L250T	68.66	.46	.54	.28	1.50	82.00	.23	.32	.23	.99	65F	Ø	L250T		
L280	68.67	.47	.55	.15	.81	82.13	.36	.50	.32	1.35	65Q	Ø	L280		
L325	69.53	1.33	1.55	.23	1.23	82.79	1.01	1.42	.18	.78	65F	Ø	L325		
L349	67.48	-.72	-.84	.15	.79	81.08	-.69	-.97	.24	1.03	65K	Ø	L349		
L362	67.89	-.31	-.36	.32	1.75	81.22	-.56	-.77	.11	.45	65K	Ø	L362		
L446	67.80	-.40	-.46	.14	.77	81.22	-.55	-.77	.26	1.10	65F	Ø	L446		
L502A	67.07	-1.13	-1.31	.22	1.18	81.19	-.58	-.81	.34	1.45	65B	Ø	L502A		
L573	69.33	1.13	1.31	.14	.76	83.37	1.60	2.23	.18	.77	65F	Ø	L573		
L575	68.37	.17	.19	.12	.64	81.52	-.25	-.35	.25	1.07	65F	Ø	L575		
GR. MEAN = 68.20 PERCENT			GRAND MEAN = 81.77 PERCENT					TEST DETERMINATIONS = 8							
SD MEANS = .86 PERCENT			SD OF MEANS = .72 PERCENT					16 LABS IN GRAND MEANS							
AVERAGE SDR =			.19 PERCENT					AVERAGE SDR = .23 PERCENT							
L289	69.80	1.60	1.86	.32	1.73	82.11	.34	.47	.31	1.34	65Ø	*	L289		
L502B	67.82	-.38	-.44	.21	1.15	82.08	.31	.43	.35	1.51	65L	*	L502B		
L502C	67.22	-.98	-1.14	.12	.67	82.21	.44	.61	.31	1.34	65Y	*	L502C		
TOTAL NUMBER OF LABORATORIES REPORTING = 19															
Best Values: H52 68.0 ± 1.5 percent															
E41 81.5 ± 1.3 percent															

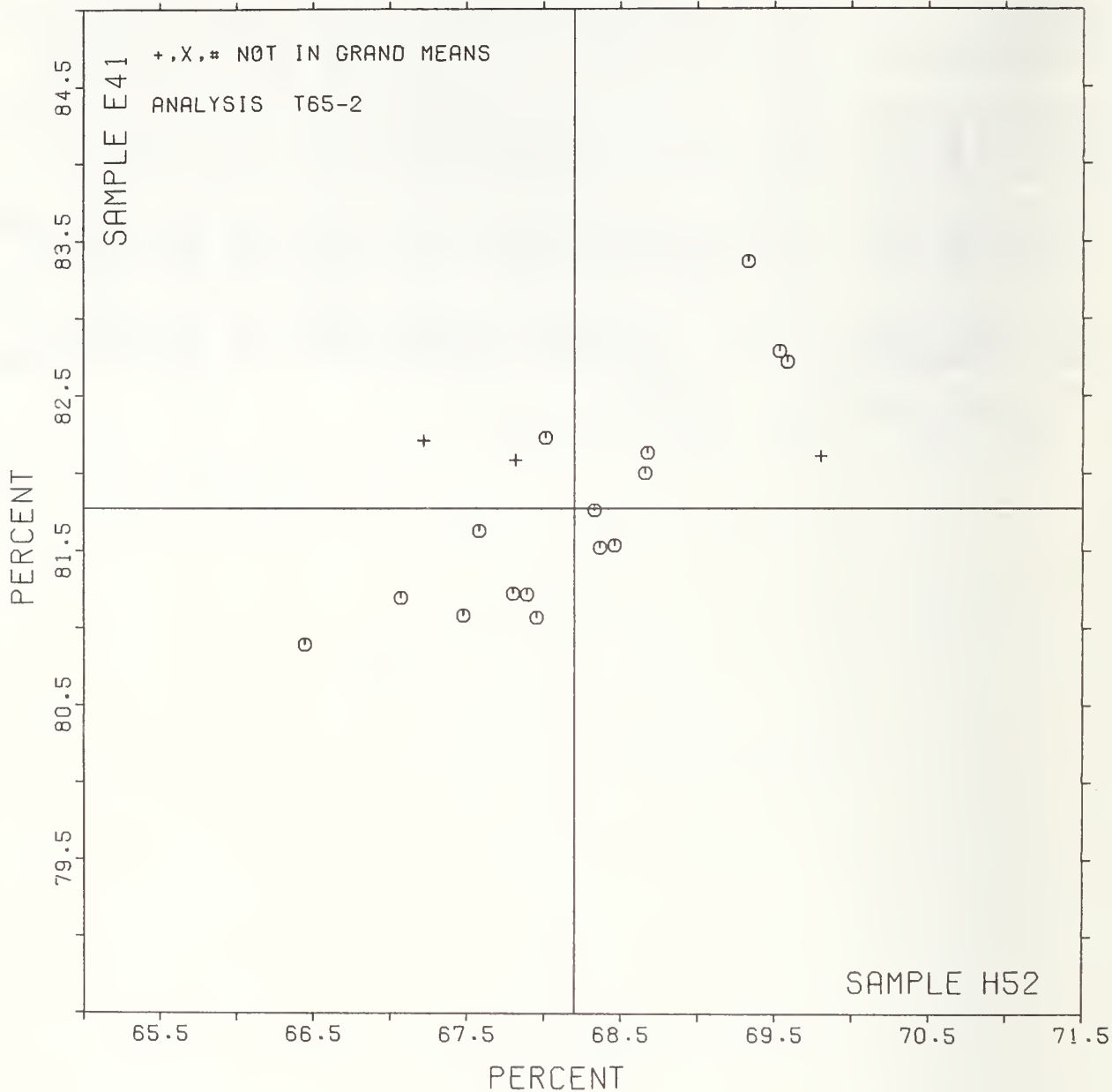
ANALYSIS T65-2 TABLE 2
 DIFFUSE BLUE REFLECTANCE IN PERCENT (GLASS TRAP)
 TAPPI SUGGESTED METHOD T525 SU-72, BRIGHTNESS OP PULP (DIFFUSE ILLUMINATION AND 0 DEG. OBSERVATION)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS				
		B52	E41	MAJOR	MINOR	R.SDR	VAR					
L242	Ø	66.45	80.89	-1.92	.42	.98	65F	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	NRC-PTB ABSOLUTE BASE
L502A	Ø	67.07	81.19	-1.24	.26	1.31	65B	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	NBS ABSOLUTE BASE
L502C	*	67.22	82.21	-.49	.95	1.01	65Y	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	NBS ABSOLUTE, PMZC
L349	Ø	67.48	81.08	-.99	-.09	.91	65K	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	MØØ (ZEISS) BASE
L150	Ø	67.58	81.63	-.57	.27	1.20	65Q	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	ZEISS ABSOLUTE BASE
L446	Ø	67.80	81.22	-.65	-.18	.94	65P	DIPPUSE	REFLECTANCE,	BLREFBØ,	GL.TRAP,	NRC-PTB ABSOLUTE BASE
L502B	*	67.82	82.08	-.10	.48	1.33	65L	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	NBS ABSOLUTE, PMZA
L362	Ø	67.89	81.22	-.55	-.24	1.10	65K	DIPPUSE	REFLECTANCE,	BLREFBØ,	GL.TRAP,	MØØ (ZEISS) BASE
L121	Ø	67.96	81.07	-.63	-.40	1.58	65K	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	MØØ (ZEISS) BASE
L100	Ø	68.02	82.23	.15	.47	.93	65P	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	NRC-PTB ABSOLUTE BASE
L182	Ø	68.33	81.76	.10	-.09	.88	65P	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	NRC-PTB ABSOLUTE BASE
L575	Ø	68.37	81.52	-.03	-.30	.85	65P	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	NRC-PTB ABSOLUTE BASE
L170	Ø	68.46	81.54	.06	-.35	.30	65B	DIPPUSE	REFLECTANCE,	ELREFBØ,	GL.TRAP,	NBS ABSOLUTE BASE
L250T	Ø	68.66	82.00	.50	-.11	1.25	65F	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	NRC-PTB ABSOLUTE BASE
L280	Ø	68.67	82.13	.60	-.02	1.08	65Q	DIPPUSE	REFLECTANCE,	ELREFBØ,	GL.TRAP,	ZEISS ABSOLUTE BASE
L573	Ø	69.33	83.37	1.88	.53	.76	65F	DIPPUSE	REFLECTANCE,	ELREFBØ,	GL.TRAP,	NRC-PTB ABSOLUTE BASE
L325	Ø	69.53	82.79	1.67	-.05	1.01	65F	DIPPUSE	REFLECTANCE,	ELREFBØ,	GL.TRAP,	NRC-PTB ABSOLUTE BASE
L210K	Ø	69.58	82.72	1.67	-.13	.92	65K	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	MØØ (ZEISS) BASE
L289	*	69.80	82.11	1.46	-.74	1.54	65Ø	DIPPUSE	REFLECTANCE,	ELREPHØ,	GL.TRAP,	SPECIFIC CALIBRATION
GMBANS:		68.20	81.77			1.00						
		95% ELLIPSE:		3.05	.84			WITH GAMMA = 38 DEGREES				

BLUE REFLECTANCE, DIFFUSE, WITH TRAP

SAMPLE H52 = 68.2 PERCENT

SAMPLE E41 = 81.8 PERCENT



DIFFUSE BLUE REFLECTANCE IN PERCENT (NO GLOSS TRAP)
TAPPI SUGGESTED METHOD T525 SU-72, BRIGHTNESS OF PULP (DIFFUSE ILLUMINATION AND 0 DEG. OBSERVATION)

LAB CODE	SAMPLE B52		PRINTING 74 GRAMS PER SQUARE METER			SAMPLE E41		COATED GLOSS 151 GRAMS PER SQUARE METER			TEST D. # 8		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L115	68.41	-0.69	-0.98	.44	2.13	80.35	-1.61	-1.91	.20	.81	65E	Ø	L115
L152	68.58	-0.52	-0.73	.10	.48	81.44	-0.51	-0.61	.19	.78	65E	Ø	L152
L157	70.26	1.16	1.63	.13	.62	81.77	-0.19	-0.22	.31	1.30	65E	Ø	L157
L161	68.43	-0.68	-0.95	.88	4.29	81.91	-0.04	-0.05	.26	1.10	65E	Ø	L161
L173A	69.94	.84	1.18	.05	.26	81.41	-0.55	-0.65	.21	.88	65E	Ø	L173A
L194	69.01	-0.09	-0.13	.14	.67	81.26	-0.69	-0.82	.23	.97	65E	Ø	L194
L236	68.67	-0.43	-0.61	.15	.72	81.89	-0.06	-0.08	.23	.96	65E	Ø	L236
L238A	69.49	.39	.55	.12	.58	81.53	-0.42	-0.50	.29	1.21	65E	Ø	L238A
L241	69.10	.00	.00	.20	.95	82.94	.98	1.17	.41	1.71	65E	Ø	L241
L244	69.09	-0.01	-0.02	.14	.70	81.57	.01	.01	.26	1.08	65D	Ø	L244
L251	68.72	-0.38	-0.54	.14	.67	82.09	.14	.16	.23	.96	65E	Ø	L251
L255	70.73	1.63	2.29	.09	.41	84.22	2.27	2.69	.24	.99	65D	*	L255
L360	69.57	.46	.65	.14	.67	82.70	.75	.89	.16	.66	65E	Ø	L360
L384	68.36	-0.74	-1.04	.14	.68	81.97	.02	.02	.23	.96	65S	Ø	L384
L484	70.92	1.82	2.55	.19	.92	81.27	-0.68	-0.81	.32	1.34	65E	#	L484
L502D	68.60	-0.50	-0.70	.14	.67	82.17	.21	.25	.18	.76	65W	Ø	L502D
L565	68.66	-0.44	-0.62	.18	.90	81.66	-0.29	-0.35	.21	.86	65W	Ø	L565

GR. MEAN = 69.10 PERCENT GRAND MEAN = 81.95 PERCENT TEST DETERMINATIONS = 8
SD MEANS = .71 PERCENT SD OF MEANS = .84 PERCENT 16 LABS IN GRAND MEANS
AVERAGE SDR = .21 PERCENT AVERAGE SDR = .24 PERCENT
TOTAL NUMBER OF LABORATORIES REPORTING = 17
Best Values: H52 68.8 ± 1.2 percent
E41 82.5 ± 1.1 percent

The following laboratories were omitted from the grand means because of extreme test results: 484.

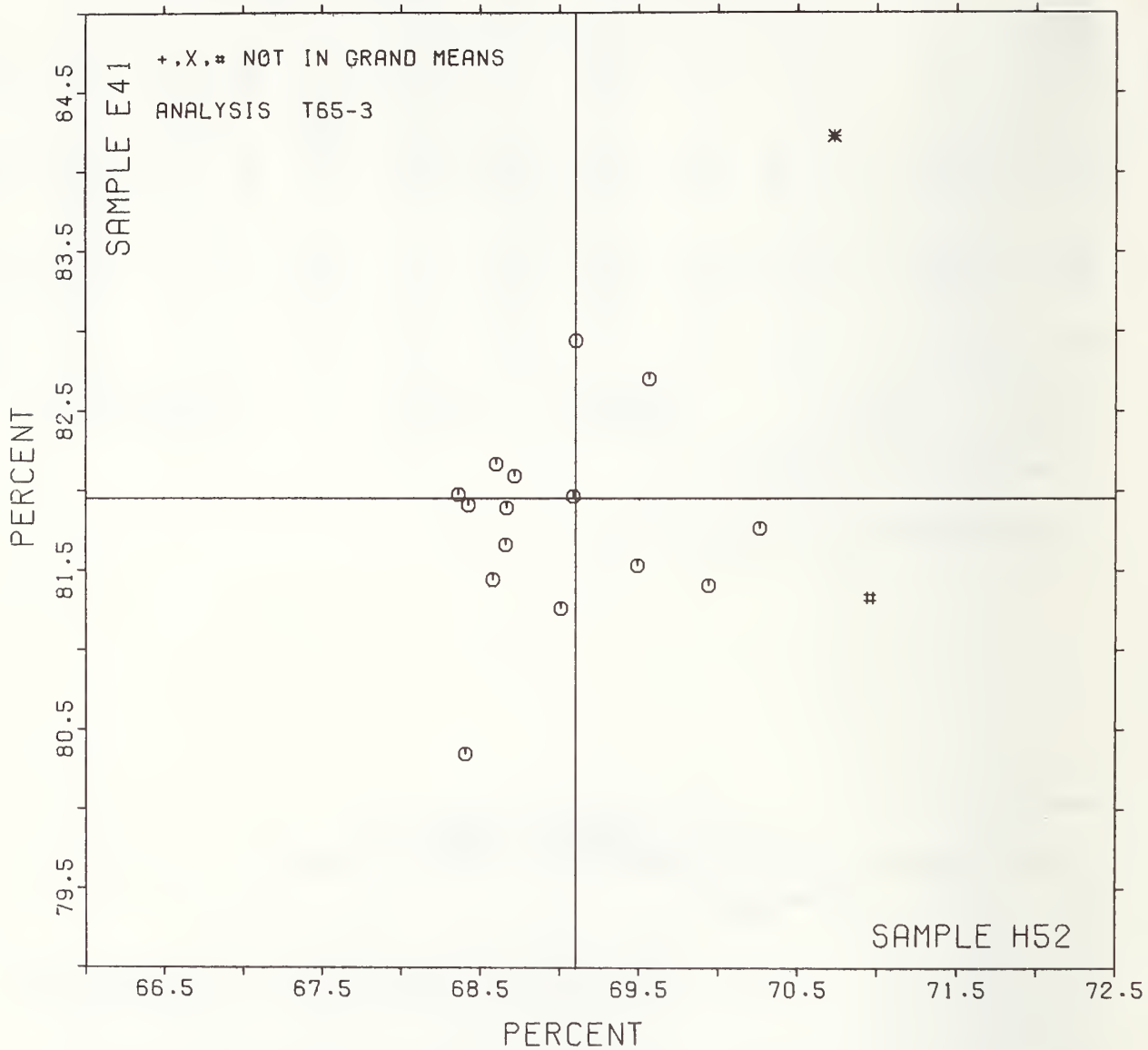
DIFFUSE BLUE REFLECTANCE IN PERCENT (NO GLOSS TRAP)
TAPPI SUGGESTED METHOD T525 SU-72, BRIGHTNESS OF PULP (DIFFUSE ILLUMINATION AND 0 DEG. OBSERVATION)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		H52	E41	MAJOR	MINOR	R.SDR	VAR	
L384	Ø	68.36	81.97	-0.42	.61	.82	65S	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, ABSOLUTE-UNKNOWN BASE
L115	Ø	68.41	80.35	-1.71	-0.38	1.47	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L161	Ø	68.43	81.91	-0.43	.52	2.70	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L152	Ø	68.58	81.44	-0.72	.12	.63	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L502D	Ø	68.60	82.17	-0.12	.53	.71	65W	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, NBS MGØ BASE
L565	Ø	68.66	81.66	-0.49	.18	.88	65W	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, NBS MGØ BASE
L236	Ø	68.67	81.89	-0.31	.31	.84	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L251	Ø	68.72	82.09	-0.11	.39	.82	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L194	Ø	69.01	81.26	-0.61	-0.33	.82	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L244	Ø	69.09	81.97	.00	.02	.89	65D	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, NRC-PTH ABSOLUTE
L241	Ø	69.10	82.94	.80	.57	1.33	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L238A	Ø	69.49	81.53	-0.12	-0.56	.89	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L360	Ø	69.57	82.70	.88	.06	.67	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L173A	Ø	69.94	81.41	.05	-1.00	.57	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L157	Ø	70.26	81.77	.53	-1.05	.96	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
L255	*	70.73	84.22	2.79	.01	.70	65D	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, NRC-PTH ABSOLUTE
L484	#	70.92	81.27	.52	-1.87	1.13	65E	DIFFUSE REFLECTANCE, ELREPHØ, NO TRAP, MGØ (ZEISS) BASE
GMEANS:		69.10	81.95			1.00		
		95% ELLIPSE:	2.74	1.50		WITH GAMMA = 54 DEGREES		

BLUE REFLECTANCE, DIFFUSE, NO TRAP

SAMPLE H52 = 69.1 PERCENT

SAMPLE E41 = 82.0 PERCENT



ANALYSIS T75-1 TABLE 1
 SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS
 TAPPI STANDARD T480 6S-72, SPECULAR GLOSS OF PAPER AND PAPERBOARD AT 75 DEGREES

LAB CODE	PRINTING					CAST COATED					TEST D. = 10		
	854 MEAN	91 GRAMS PER SQUARE DEV	PER SQUARE METER N.DEV	SDR	R.SDR	ES7 MEAN	211 GRAMS PER SQUARE DEV	PER SQUARE METER N.DEV	SDR	R.SDR	VAR	F	LAB
L108	58.4	-.2	-.10	.9	.58	82.5	-1.8	-1.15	1.1	1.06	75H	0	L108
L121	62.1	3.5	1.53	1.3	.86	87.0	2.7	1.66	.9	.88	75B	0	L121
L122	58.6	-.0	-.01	1.5	.97	83.4	-.9	-.57	1.1	1.02	75B	0	L122
L128	57.2	-1.4	-.61	1.8	1.20	85.6	1.3	.81	1.1	1.04	75G	0	L128
L134	61.5	2.9	1.27	3.1	2.03	99.9	15.6	9.71	2.1	2.00	75H	#	L134
L149	58.3	-.3	-.13	2.2	1.47	84.4	.1	.06	.8	.82	75G	0	L149
L153	61.5	2.9	1.27	1.3	.86	84.5	.2	.15	1.4	1.36	75G	0	L153
L162	61.8	3.2	1.41	.9	.62	85.7	1.4	.86	1.0	.96	75G	0	L162
L166	59.7	1.1	.48	1.1	.70	87.1	2.8	1.74	1.0	.96	75H	0	L166
L172	56.8	-1.8	-.81	1.2	.80	83.8	-.5	-.34	1.1	1.08	75H	0	L172
L173A	56.4	-2.2	-.96	2.0	1.33	87.1	2.8	1.74	2.2	2.11	75G	*	L173A
L182	58.7	.1	.05	1.9	1.25	83.9	-.4	-.23	1.3	1.23	75H	0	L182
L189	57.9	-.7	-.31	.9	.60	87.6	3.3	2.09	1.0	.99	75P	*	L189
L190C	56.9	-1.7	-.75	2.1	1.37	83.3	-1.0	-.62	1.0	.96	75G	0	L190C
L190R	59.8	1.2	.54	1.6	1.03	82.7	-1.6	-1.00	1.1	1.10	75G	0	L190R
L206	59.5	1.3	.55	1.5	.96	83.5	-.8	-.53	1.0	1.00	75H	0	L206
L210	59.7	1.1	.49	1.9	1.29	85.9	1.6	1.01	1.0	.97	75H	0	L210
L211	54.6	-4.0	-1.77	1.5	.99	83.1	-1.2	-.75	1.0	1.01	75H	0	L211
L213	60.2	1.6	.70	1.5	.98	85.5	1.2	.73	1.0	.94	75H	0	L213
L223	59.5	.5	.41	1.2	.78	84.6	.3	.21	.3	.31	75B	0	L223
L224	56.6	-2.0	-.89	1.3	.88	83.8	-.5	-.30	.7	.63	75H	0	L224
L230	55.8	-2.8	-1.23	1.5	.98	83.4	-.9	-.57	1.3	1.22	75H	0	L230
L243	62.5	3.9	1.71	2.3	1.51	83.9	-.4	-.25	1.2	1.16	75H	0	L243
L251	58.1	-.5	-.22	1.5	1.01	84.0	-.3	-.19	1.2	1.12	75G	0	L251
L253P	57.9	-.7	-.30	1.4	.90	83.2	-1.1	-.70	.7	.70	75G	0	L253P
L255	60.1	1.5	.65	2.6	1.75	83.8	-.5	-.34	1.2	1.14	75B	0	L255
L256	59.1	.5	.24	1.5	1.01	83.7	-.6	-.40	.7	.67	75H	0	L256
L259	60.3	1.7	.73	1.9	1.24	84.9	.6	.40	1.1	1.11	75B	0	L259
L262	59.5	.9	.39	1.1	.72	85.4	1.1	.68	.8	.82	75K	0	L262
L274	62.2	3.6	1.57	2.0	1.32	87.3	3.0	1.87	1.0	.95	75P	0	L274
L278	63.0	4.4	1.94	1.2	.80	88.1	3.8	2.34	.7	.66	75G	0	L278
L279	57.5	-1.1	-.48	.5	.35	82.7	-1.6	-1.00	1.1	1.02	75G	0	L279
L291	54.4	-4.2	-1.84	1.3	.89	84.0	-.3	-.22	1.0	.95	75H	0	L291
L317	58.3	-.3	-.15	1.6	1.08	85.7	1.4	.85	1.3	1.24	75B	0	L317
L321	57.7	-.9	-.39	.8	.52	85.2	.9	.59	.8	.80	75G	0	L321
L323	57.3	-1.3	-.56	1.1	.75	82.5	-1.8	-1.13	.6	.58	75H	0	L323
L328	56.6	-2.0	-.85	1.7	1.16	82.3	-2.0	-1.26	1.1	1.07	75H	0	L328
L339	61.6	3.0	1.31	1.8	1.22	86.7	2.4	1.50	1.8	1.74	75P	0	L339
L349	57.2	-1.4	-.62	1.1	.76	84.3	.0	.01	1.0	.93	75H	0	L349
L388	52.1	-6.5	-2.84	.8	.54	82.6	-1.7	-1.06	.9	.91	75P	*	L388
L396	60.5	1.9	.83	1.0	.64	85.1	.8	.50	1.1	1.06	75G	0	L396
L456	58.7	.1	.03	1.3	.87	83.6	-.7	-.41	1.1	1.10	75B	0	L456
L483	57.3	-1.3	-.55	1.4	.94	83.6	-.7	-.46	1.0	.99	75H	0	L483
L502G	59.3	.7	.30	1.8	1.16	83.2	-1.1	-.68	1.0	.94	75G	0	L502G
L502H	59.7	1.1	.48	1.6	1.08	83.4	-.9	-.57	1.1	1.09	75H	0	L502H
L573	54.4	-4.2	-1.84	1.7	1.14	81.5	-2.8	-1.75	1.1	1.04	75G	0	L573
L574	56.4	-2.2	-.97	2.4	1.56	81.5	-2.8	-1.74	1.2	1.14	75G	0	L574
L583	58.5	.3	.14	1.8	1.20	83.7	-.6	-.37	1.4	1.37	75B	0	L583
L587	59.7	1.1	.48	2.1	1.36	83.0	-1.3	-.81	.9	.91	75K	0	L587
L592	60.8	2.2	.96	.7	.49	83.7	-.6	-.40	1.2	1.14	75G	0	L592

GR. MEAN = 58.6 GLOSS UNITS GRAND MEAN = 84.3 GLOSS UNITS TEST DETERMINATIONS = 10
 SD MEANS = 2.3 GLOSS UNITS SD OF MEANS = 1.6 GLOSS UNITS 49 LABS IN GRAND MEANS
 AVERAGE SDR = 1.5 GLOSS UNITS AVERAGE SDR = 1.0 GLOSS UNITS

L250	49.0	-9.6	-4.20	1.6	1.04	88.3	4.0	2.49	1.4	1.37	75Q	*	L250
L288	58.6	-.0	-.01	1.3	.84	84.7	.4	.23	.7	.68	75I	*	L288

TOTAL NUMBER OF LABORATORIES REPORTING = 52

Best Values: H54 59 ± 3 gloss units
 E57 84 ± 3 gloss units

The following laboratories were omitted from the grand means because of extreme test results: 134.

SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS
TAPPI STANDARD T480 68-72, SPECULAR GLOSS OF PAPER AND PAPERBOARD AT 75 DEGREES

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		H54	B57	MAJOR	MINOR	R.SDR	VAR	
L250	*	49.0	88.3	-6.7	7.9	1.20	75Q	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT, 20 C, 65% RH
L388	*	52.1	82.6	-6.6	1.5	.72	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L573	Ø	54.4	81.5	-5.0	-0.6	1.09	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L291	Ø	54.4	84.0	-3.9	1.6	.92	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L211	Ø	54.6	83.1	-4.1	.8	1.00	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L230	Ø	55.8	83.4	-2.9	.5	1.10	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L574	Ø	56.4	81.5	-3.2	-1.5	1.35	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L173A	*	56.4	87.1	-.7	3.5	1.72	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L224	Ø	56.6	83.8	-2.0	.5	.76	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L328	Ø	56.6	82.3	-2.7	-.9	1.11	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L172	Ø	56.8	83.8	-1.9	.4	.94	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L190C	Ø	56.9	83.3	-2.0	-.1	1.17	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L349	Ø	57.2	84.3	-1.3	.7	.84	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L128	Ø	57.2	85.6	-.7	1.8	1.12	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L323	Ø	57.3	82.5	-2.0	-1.0	.67	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L483	Ø	57.3	83.6	-1.5	-.1	.97	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L279	Ø	57.5	82.7	-1.7	-.9	.69	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L321	Ø	57.7	85.2	-.4	1.3	.66	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L189	*	57.9	87.6	.9	3.3	.80	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L253P	Ø	57.9	83.2	-1.1	-.7	.80	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L251	Ø	58.1	84.0	-.6	-.0	1.06	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L317	Ø	58.3	85.7	.3	1.4	1.16	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L149	Ø	58.3	84.4	-.2	.2	1.14	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L108	Ø	58.4	82.5	-1.0	-1.5	.82	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L288	*	58.6	84.7	.1	.3	.76	75I	SPECULAR GLOSS (75 DEGREE), HUNTER, 20 C, 65% RH
L122	Ø	58.6	83.4	-.4	-.8	.99	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L456	Ø	58.7	83.6	-.2	-.6	.99	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L182	Ø	58.7	83.9	-.1	-.4	1.24	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L583	Ø	58.9	83.7	.0	-.7	1.28	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L256	Ø	59.1	83.7	.2	-.8	.84	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L502G	Ø	59.3	83.2	.1	-1.3	1.05	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L262	Ø	59.5	85.4	1.3	.6	.77	75K	SPECULAR GLOSS (75 DEGREE), GAERTNER (K-C TYPE)
L223	Ø	59.5	84.6	1.0	-.1	.55	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L502H	Ø	59.7	83.4	.6	-1.3	1.09	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L166	Ø	59.7	87.1	2.3	2.0	.83	75H	SPECULAR GLOSS (75 DEGREE), HAUSCH + LOMB
L587	Ø	59.7	83.0	.4	-1.7	1.14	75K	SPECULAR GLOSS (75 DEGREE), GAERTNER (K-C TYPE)
L210	Ø	59.7	85.9	1.7	.9	1.13	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L190R	Ø	59.8	82.7	.4	-2.0	1.07	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L206	Ø	59.9	83.5	.7	-1.3	.98	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L255	Ø	60.1	83.8	1.1	-1.2	1.45	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L213	Ø	60.2	85.5	2.0	.3	.96	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L259	Ø	60.3	84.9	1.8	-.2	1.18	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L396	Ø	60.5	85.1	2.1	-.2	.85	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L592	Ø	60.8	83.7	1.7	-1.6	.82	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L134	#	61.5	99.9	9.7	12.5	2.01	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L153	Ø	61.5	84.5	2.7	-1.1	1.11	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L339	Ø	61.6	86.7	3.8	.8	1.48	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L162	Ø	61.8	85.7	3.5	-.2	.79	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L121	Ø	62.1	87.0	4.3	.8	.87	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L274	Ø	62.2	87.3	4.6	1.0	1.13	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L243	Ø	62.5	83.9	3.3	-2.1	1.33	75H	SPECULAR GLOSS (75 DEGREE), HAUSCH + LOMB
L278	Ø	63.0	88.1	5.7	1.3	.73	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
GMEANS:		58.6	84.3			1.00		
95% ELLIPSE:				6.4	3.2			WITH GAMMA = 27 DEGREES

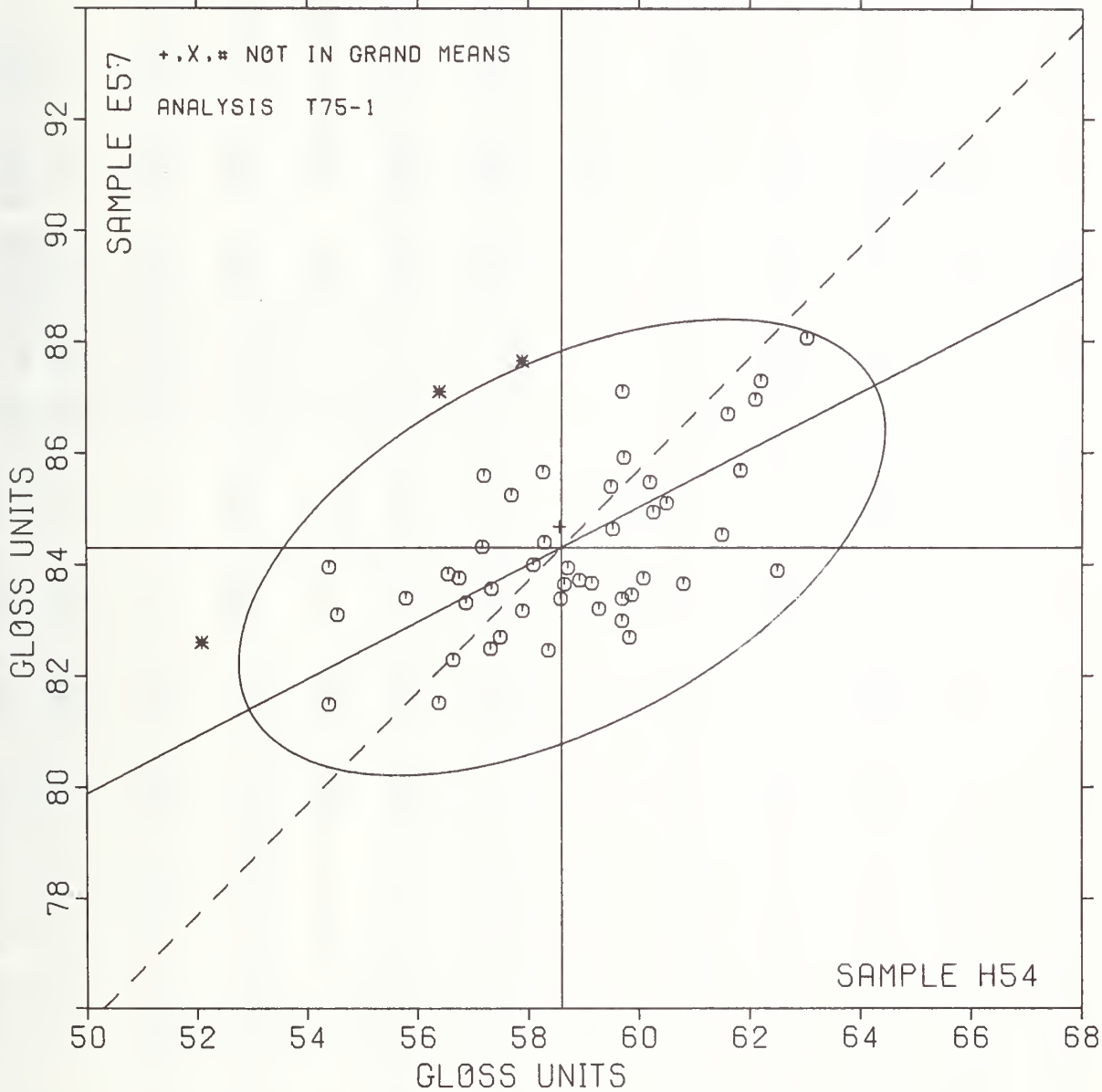
SPECULAR GLOSS, 75 DEGREE

SAMPLE H54 = 58.6

GLOSS UNITS

SAMPLE E57 = 84.3

GLOSS UNITS



TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T90-1 TABLE 1
 THICKNESS (CALIPER), THOUSANDTHS OF AN INCH
 TAPPI STANDARD T411 GS-76

LAB CODE	SAMPLE E52 MEAN	S C BLEACHED BACKING 70 GRAMS PER SQUARE METER					SAMPLE B12 MEAN	PRINTING 89 GRAMS PER SQUARE METER					TEST D.* 10		
		DEV	N.DEV	SDR	R.SDR	DEV		N.DEV	SDR	R.SDR	VAR	F	LAB		
L100	2.417	.009	.12	.072	1.22	2.957	.044	.56	.069	1.17	90V	6	L100		
L105	2.322	-.086	-1.18	.037	.62	2.822	-.091	-1.14	.061	1.04	90T	6	L105		
L118	2.327	-.081	-1.11	.045	.75	2.895	-.018	-.22	.046	.78	90V	6	L118		
L122	2.456	.048	.66	.051	.85	2.923	.010	.13	.071	1.20	90V	6	L122		
L125	2.400	-.008	-.11	.067	1.12	2.900	-.013	-.16	.071	1.19	90T	6	L125		
L128	2.385	-.019	-.26	.044	.74	2.894	-.019	-.24	.046	.78	90T	6	L128		
L131	2.510	.102	1.40	.057	.95	3.030	.117	1.48	.067	1.14	90T	6	L131		
L139	2.415	.007	.10	.024	.41	2.890	-.023	-.29	.039	.67	90T	6	L139		
L141	2.306	-.102	-1.40	.051	.86	2.918	.005	.07	.050	.84	90T	6	L141		
L153	2.309	-.099	-1.36	.043	.72	2.839	-.074	-.93	.046	.78	90T	6	L153		
L158	2.510	.102	1.40	.070	1.18	3.000	.087	1.10	.062	1.05	90T	6	L158		
L159	2.462	.054	.74	.057	.95	3.009	.096	1.21	.044	.74	90T	6	L159		
L162	2.414	.006	.08	.061	1.02	2.874	-.039	-.49	.068	1.15	90D	6	L162		
L166	2.380	-.028	-.39	.123	2.07	2.850	-.063	-.79	.071	1.19	90T	6	L166		
L173B	2.520	.112	1.54	.092	1.55	3.060	.147	1.85	.097	1.63	90F	6	L173B		
L174	2.225	-.183	-2.52	.109	1.83	2.760	-.153	-1.92	.097	1.63	90T	6	L174		
L182	2.364	-.044	-.61	.032	.54	2.849	-.064	-.81	.053	.89	90L	6	L182		
L183	2.325	-.083	-1.14	.040	.67	2.743	-.170	-2.14	.034	.58	90T	6	L183		
L190C	2.370	-.038	-.52	.048	.81	2.880	-.033	-.41	.042	.71	90T	6	L190C		
L203A	2.445	.037	.51	.090	1.51	2.925	.012	.15	.054	.91	90T	6	L203A		
L203C	2.475	.067	.92	.054	.91	2.980	.067	.85	.042	.71	90T	6	L203C		
L213	2.560	.152	2.09	.084	1.42	3.040	.127	1.60	.052	.87	90T	6	L213		
L223	2.438	.030	.41	.052	.88	2.998	.085	1.07	.048	.82	90V	6	L223		
L228	2.380	-.028	-.39	.063	1.06	2.790	-.123	-1.54	.152	2.57	90T	6	L228		
L238A	2.502	.094	1.29	.053	.89	3.028	.115	1.45	.038	.64	90T	6	L238A		
L241	2.535	.127	1.75	.116	1.94	4.860	1.947	24.50	.052	.87	90T	#	L241		
L249	2.383	-.025	-.34	.056	.94	2.893	-.020	-.25	.053	.90	90T	6	L249		
L259	2.468	.060	.83	.070	1.18	2.966	.053	.67	.053	.90	90T	6	L259		
L260	2.406	-.002	-.03	.022	.37	2.885	-.028	-.35	.020	.33	90T	6	L260		
L261	2.454	.086	1.18	.043	.72	2.955	.042	.53	.063	1.07	90T	6	L261		
L262	2.375	-.033	-.45	.042	.71	2.880	-.033	-.41	.026	.44	90T	6	L262		
L285	4.230	1.822	25.08	.116	1.95	5.520	2.607	32.81	.162	2.73	90T	#	L285		
L291	2.440	.032	.44	.061	1.03	2.992	.079	1.00	.071	1.20	90T	6	L291		
L297	2.430	.022	.30	.048	.81	2.900	-.013	-.16	.067	1.12	90T	6	L297		
L305	2.395	-.013	-.18	.128	2.15	2.885	-.028	-.35	.058	.98	90T	6	L305		
L309	2.310	-.098	-1.35	.057	.95	2.770	-.143	-1.80	.082	1.39	90T	6	L309		
L318	2.380	-.028	-.39	.132	2.21	2.815	-.098	-1.23	.063	1.06	90T	6	L318		
L323	2.330	-.078	-1.07	.067	1.14	2.800	-.113	-1.42	.067	1.12	90T	6	L323		
L324	2.410	.002	.03	.074	1.24	2.950	.037	.47	.053	.89	90T	6	L324		
L326	2.535	.127	1.75	.047	.80	2.970	.057	.72	.035	.59	90T	6	L326		
L328	2.430	.022	.30	.054	.90	2.930	.017	.22	.059	.99	90T	6	L328		
L331	2.360	-.048	-.66	.070	1.18	3.002	.089	1.12	.061	1.03	90T	*	L331		
L339	2.360	-.048	-.66	.052	.87	2.910	-.003	-.03	.074	1.25	90T	6	L339		
L341	2.502	.094	1.29	.026	.43	2.981	.068	.86	.049	.83	90T	6	L341		
L352	2.315	-.093	-1.28	.063	1.05	2.805	-.108	-1.36	.072	1.22	90D	6	L352		
L356	2.346	-.060	-.83	.053	.90	2.851	-.062	-.78	.076	1.28	90T	6	L356		
L358	2.315	-.093	-1.28	.029	.48	2.905	-.008	-.10	.032	.54	90T	6	L358		
L376	2.410	.002	.03	.074	1.24	2.890	-.023	-.29	.057	.96	90T	6	L376		
L378	2.150	-.258	-3.55	.085	1.43	2.640	-.273	-3.43	.084	1.42	90T	X	L378		
L380	2.510	.102	1.40	.074	1.24	2.950	.037	.47	.053	.89	90T	6	L380		
L382	2.540	.132	1.82	.052	.87	3.100	.187	2.36	.067	1.12	90T	6	L382		
L390	2.431	.023	.32	.043	.72	2.973	.060	.76	.057	.96	90T	6	L390		
L567	2.433	.025	.34	.041	.68	2.933	.020	.26	.071	1.20	90V	6	L567		
L574	2.384	-.024	-.33	.057	.97	2.837	-.076	-.95	.061	1.03	90V	6	L574		
L575	2.349	-.059	-.81	.040	.67	2.933	.020	.26	.071	1.20	90T	6	L575		
L587	2.360	-.048	-.66	.070	1.18	2.860	-.053	-.66	.052	.87	90T	6	L587		

GR. MEAN = 2.408 MILS
 SD MEANS = .073 MILS

GRAND MEAN = 2.913 MILS
 SD OF MEANS = .079 MILS

TEST DETERMINATIONS = 10
 53 LABS IN GRAND MEANS

AVERAGE SDR = .059 MILS

AVERAGE SDR = .059 MILS

GR. MEAN = 61.16 MICROMETER

GRAND MEAN = 73.98 MICROMETER

TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T90-1 TABLE 1
 THICKNESS (CALIPER), THOUSANDTHS OF AN INCH
 TAPPI STANDARD T411 68-76

LAB CODE	SAMPLE E52 MBAN	S C BLEACHED BACKING 70 GRAMS PER SQUARE METER				SAMPLE H12 MEAN	PRINTING 89 GRAMS PER SQUARE METER				TBST D. = 10		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L185	2.469	.061	.84	.184	3.10	2.842	-.071	-.89	.055	.93	90B	*	L185
L203B	2.150	-.258	-3.55	.151	2.54	2.770	-.143	-1.80	.106	1.79	90C	*	L203B
L2420	2.459	.051	.70	.059	1.00	2.939	.027	.33	.070	1.18	900	*	L2420
L242P	2.401	-.007	-.10	.038	.64	2.972	.060	.75	.076	1.28	90P	*	L242P
L243	2.345	-.063	-.87	.093	1.56	2.895	-.018	-.22	.055	.93	90S	*	L243
L251	2.368	-.040	-.55	.039	.66	2.809	-.104	-1.30	.059	.99	90W	*	L251
L274C	2.090	-.318	-4.38	.057	.95	2.850	-.063	-.79	.053	.89	90C	*	L274C
L322	2.440	.032	.44	.126	2.13	2.940	.027	.34	.097	1.63	90U	*	L322
L330	2.450	.042	.58	.292	4.90	2.980	.067	.85	.042	.71	90U	*	L330
L344	2.420	.012	.17	.042	.71	2.980	.067	.85	.063	1.07	90U	*	L344
L396M	2.365	-.043	-.59	.047	.80	2.830	-.083	-1.04	.054	.91	90S	*	L396M
L484	2.468	.060	.83	.042	.70	2.921	.009	.11	.076	1.28	90E	*	L484
L562	2.400	-.008	-.11	.082	1.37	2.990	.077	.97	.032	.53	90C	*	L562
L563	2.169	-.239	-3.29	.094	1.58	2.884	-.029	-.36	.117	1.97	90U	*	L563
L576	2.330	-.078	-1.07	.080	1.34	2.822	-.091	-1.14	.063	1.06	90C	*	L576

TOTAL NUMBER OF LABORATORIES REPORTING = 71

Best Values: E52 2.42 ± 0.11 mils
 H12 2.92 ± 0.13 mils

The following laboratories were omitted from the grand means because of extreme test results: 241, 285.

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T90-1 TABLE 2
THICKNESS (CALIPER), THOUSANDTHS OF AN INCH
TAPPI STANDARD T411 CS-76

LAH CODE	F	MEANS		COORDINATES		AVG R.SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		E52	H12	MAJOR	MINOR					
L274C	*	2.090	2.850	-.259	.195	.92	90C	THICKNESS (CALIPER)	CADY,	HAND DRIVEN
L203B	*	2.150	2.770	-.278	.097	2.16	90C	THICKNESS (CALIPER)	CADY,	HAND DRIVEN
L378	X	2.150	2.640	-.375	.010	1.43	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L563	*	2.169	2.884	-.181	.159	1.78	90U	THICKNESS (CALIPER)	TMI,	HAND DRIVEN
L174	Ø	2.225	2.760	-.236	.034	1.73	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L141	Ø	2.306	2.918	-.064	.080	.85	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L153	Ø	2.309	2.839	-.121	.025	.75	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L309	Ø	2.310	2.770	-.172	-.022	1.17	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L358	Ø	2.315	2.905	-.068	.064	.51	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L352	Ø	2.315	2.805	-.142	-.003	1.14	90D	THICKNESS (CALIPER)	CADY,	MOTOR DRIVEN
L105	Ø	2.322	2.822	-.125	.004	.83	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L183	Ø	2.325	2.743	-.182	-.051	.63	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L118	Ø	2.327	2.895	-.067	.049	.76	90V	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN, DIGITIZED
L576	*	2.330	2.822	-.120	-.002	1.20	90C	THICKNESS (CALIPER)	CADY,	HAND DRIVEN
L323	Ø	2.330	2.800	-.136	-.017	1.13	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L243	*	2.345	2.895	-.055	.035	1.24	90S	THICKNESS (CALIPER)	SCHÖPPER,	HAND DRIVEN
L356	Ø	2.348	2.851	-.086	.004	1.09	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L575	Ø	2.349	2.933	-.024	.057	.94	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L587	Ø	2.360	2.860	-.071	.001	1.02	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L339	Ø	2.360	2.910	-.034	.034	1.06	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L331	*	2.360	3.002	.034	.095	1.10	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L182	Ø	2.364	2.849	-.077	-.010	.72	90L	THICKNESS (CALIPER)	L * W,	MOTOR DRIVEN
L396M	*	2.365	2.830	-.090	-.023	.85	90S	THICKNESS (CALIPER)	SCHÖPPER,	HAND DRIVEN
L251	*	2.368	2.809	-.104	-.039	.83	90W	THICKNESS (CALIPER)	L * W,	MOTOR DRIVEN, 20 C, 65% RH
L190C	Ø	2.370	2.880	-.050	.006	.76	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L262	Ø	2.375	2.880	-.046	.003	.58	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L166	Ø	2.380	2.850	-.065	-.021	1.63	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L228	Ø	2.380	2.790	-.110	-.061	1.82	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L318	Ø	2.380	2.815	-.091	-.044	1.64	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L249	Ø	2.383	2.893	-.031	.005	.92	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L574	Ø	2.384	2.837	-.072	-.033	1.00	90V	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN, DIGITIZED
L128	Ø	2.389	2.894	-.027	.002	.76	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L305	Ø	2.395	2.885	-.029	-.009	1.56	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L562	*	2.400	2.990	.052	.058	.95	90C	THICKNESS (CALIPER)	CADY,	HAND DRIVEN
L125	Ø	2.400	2.900	-.015	-.003	1.16	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L242P	*	2.401	2.972	.040	.045	.96	90P	THICKNESS (CALIPER)	MESSMER,	MOTOR DRIVEN, ISO R534
L260	Ø	2.406	2.885	-.022	-.017	.35	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L376	Ø	2.410	2.890	-.016	-.017	1.10	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L324	Ø	2.410	2.950	.029	.023	1.07	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L162	Ø	2.414	2.874	-.025	-.030	1.08	90D	THICKNESS (CALIPER)	CADY,	MOTOR DRIVEN
L139	Ø	2.415	2.890	-.012	-.020	.54	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L100	Ø	2.417	2.957	.039	.023	1.19	90V	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN, DIGITIZED
L344	*	2.420	2.980	.058	.036	.89	90U	THICKNESS (CALIPER)	TMI,	HAND DRIVEN
L297	Ø	2.430	2.900	.005	-.025	.97	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L328	Ø	2.430	2.930	.028	-.005	.95	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L390	Ø	2.431	2.973	.060	.023	.84	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L567	Ø	2.433	2.933	.032	-.005	.94	90V	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN, DIGITIZED
L223	Ø	2.438	2.998	.084	.035	.85	90V	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN, DIGITIZED
L291	Ø	2.440	2.992	.080	.029	1.12	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L322	*	2.440	2.940	.042	-.006	1.88	90U	THICKNESS (CALIPER)	TMI,	HAND DRIVEN
L203A	Ø	2.445	2.925	.034	-.019	1.21	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L330	*	2.450	2.980	.078	.014	2.81	90U	THICKNESS (CALIPER)	TMI,	HAND DRIVEN
L122	Ø	2.456	2.923	.040	-.029	1.03	90V	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN, DIGITIZED
L242Ø	*	2.459	2.939	.053	-.020	1.09	90Ø	THICKNESS (CALIPER)	MESSMER,	MOTOR DRIVEN, HS3983
L159	Ø	2.462	3.009	.108	.024	.85	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L259	Ø	2.468	2.966	.080	-.009	1.04	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L484	*	2.468	2.921	.047	-.039	.99	90E	THICKNESS (CALIPER)	SCHÖPPER,	HAND DRIVEN
L185	*	2.469	2.842	-.012	-.093	2.02	90H	THICKNESS (CALIPER)	ANTHØR,	HAND DRIVEN
L203C	Ø	2.475	2.980	.095	-.005	.81	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L261	Ø	2.494	2.955	.089	-.036	.90	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L341	Ø	2.502	2.981	.114	-.024	.63	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L238A	Ø	2.502	3.028	.149	.007	.76	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L131	Ø	2.510	3.030	.155	.002	1.05	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L158	Ø	2.510	3.000	.133	-.018	1.11	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN
L380	Ø	2.510	2.950	.096	-.051	1.07	90T	THICKNESS (CALIPER)	TMI,	MOTOR DRIVEN

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T90-1 TABLE 2
THICKNESS (CALIPER), TBGUSANDTES OP AN INCH
TAPPI STANDARD T411 68-76

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		E52	E12	MAJOR	MINOR	R.SDR	VAR	
L173B	6	2.520	3.060	.184	.015	1.59	90F	THICKNESS (CALIPER), FEDERAL, MOTOR DRIVEN
L241	#	2.535	4.860	1.536	1.204	1.41	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L326	6	2.636	2.970	.127	-.056	.69	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L382	6	2.540	3.100	.228	.027	1.00	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L213	6	2.560	3.040	.196	-.028	1.14	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L285	#	4.230	5.520	3.158	.382	2.34	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
GMEANS:		2.408	2.913			1.00		
		95% ELLIPSE:		.261	.084	WITE GAMMA = 48 DEGREES		

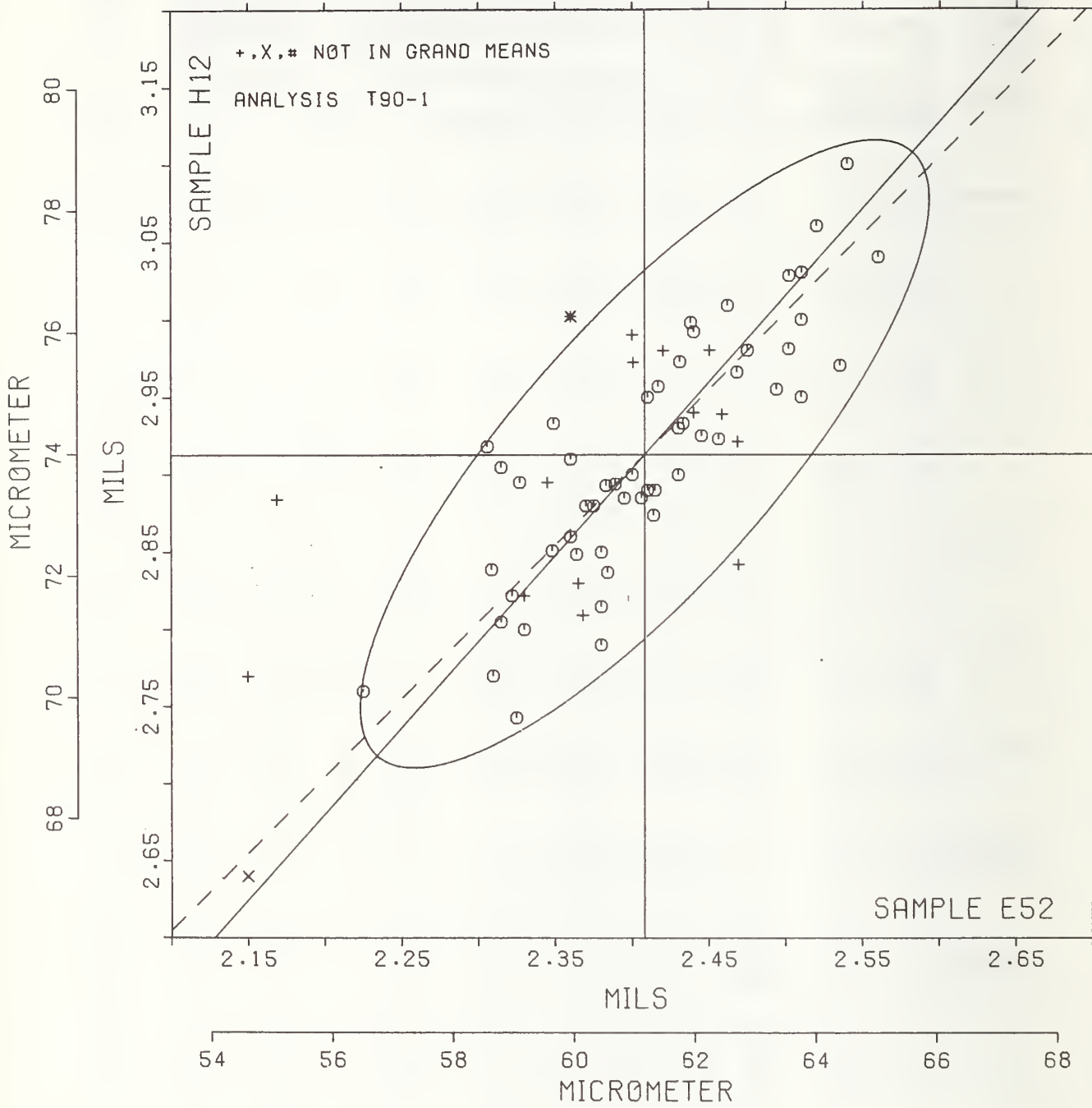
THICKNESS (CALIPER)

SAMPLE E52 = 2.41 MILS

SAMPLE H12 = 2.91 MILS

SAMPLE E52 = 61.2 MICRØMETER

SAMPLE H12 = 74.0 MICRØMETER



TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T95-1 TABLE 1
GRAMMAGE (MASS PER UNIT AREA)
TAPPI STANDARD T410 GS-68

LAB CODE	SAMPLE D23 MEAN	KRAFT ENVELOPE 124 GRAMS PER SQUARE METER				R.SDR	SAMPLE D24 MEAN	BROWN KRAFT 76 GRAMS PER SQUARE METER				TEST D. = 10		
		DEV	N.DEV	SDR	R.SDR			DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	123.40	.04	.08	.70	.95	74.92	.09	.17	.38	.59	95C	Ø	L100	
L121	124.03	.67	1.21	.62	.85	75.60	.77	1.39	.51	.79	95B	Ø	L121	
L162	122.10	-1.26	-2.26	.74	1.01	73.67	-1.16	-2.08	.77	1.19	95K	Ø	L162	
L213	122.77	-.59	-1.05	.96	1.31	74.13	-.69	-1.25	.34	.52	95P	Ø	L213	
L249	123.70	.34	.62	.67	.92	75.35	.52	.94	.35	.54	95I	Ø	L249	
L274	122.10	-1.26	-2.26	.74	1.01	76.00	1.17	2.11	.82	1.26	95B	#	L274	
L280	123.44	.08	.15	.78	1.06	74.95	.12	.22	.78	1.21	95T	Ø	L280	
L297	123.67	.31	.56	.58	.79	75.03	.21	.37	.31	.47	95C	Ø	L297	
L305	120.82	-2.54	-4.56	.78	1.06	74.38	-.45	-.80	.47	.73	95T	#	L305	
L344	123.72	.36	.65	.28	.39	74.95	.12	.22	.24	.38	95T	Ø	L344	
L378	123.54	.18	.33	.68	.92	74.76	-.06	-.11	.76	1.18	95E	Ø	L378	
L392	123.20	-.16	-.28	1.32	1.80	74.90	.07	.13	2.02	3.13	95T	Ø	L392	
L597	118.90	-4.46	-8.00	1.14	1.55	72.85	-1.98	-3.56	1.11	1.71	95C	#	L597	

GR. MEAN = 123.36 G/SQ.METER GRAND MEAN = 74.83 G/SQ.METER TEST DETERMINATIONS = 10
SD MEANS = .56 G/SQ.METER SD OF MEANS = .56 G/SQ.METER 10 LABS IN GRAND MEANS
AVERAGE SDR = .73 G/SQ.METER AVERAGE SDR = .65 G/SQ.METER
TOTAL NUMBER OF LABORATORIES REPORTING = 13

Best Values: D23 123.4 grams per square meter
D24 74.9 grams per square meter

The following laboratories were omitted from the grand means because of extreme test results: 274, 305, 597.

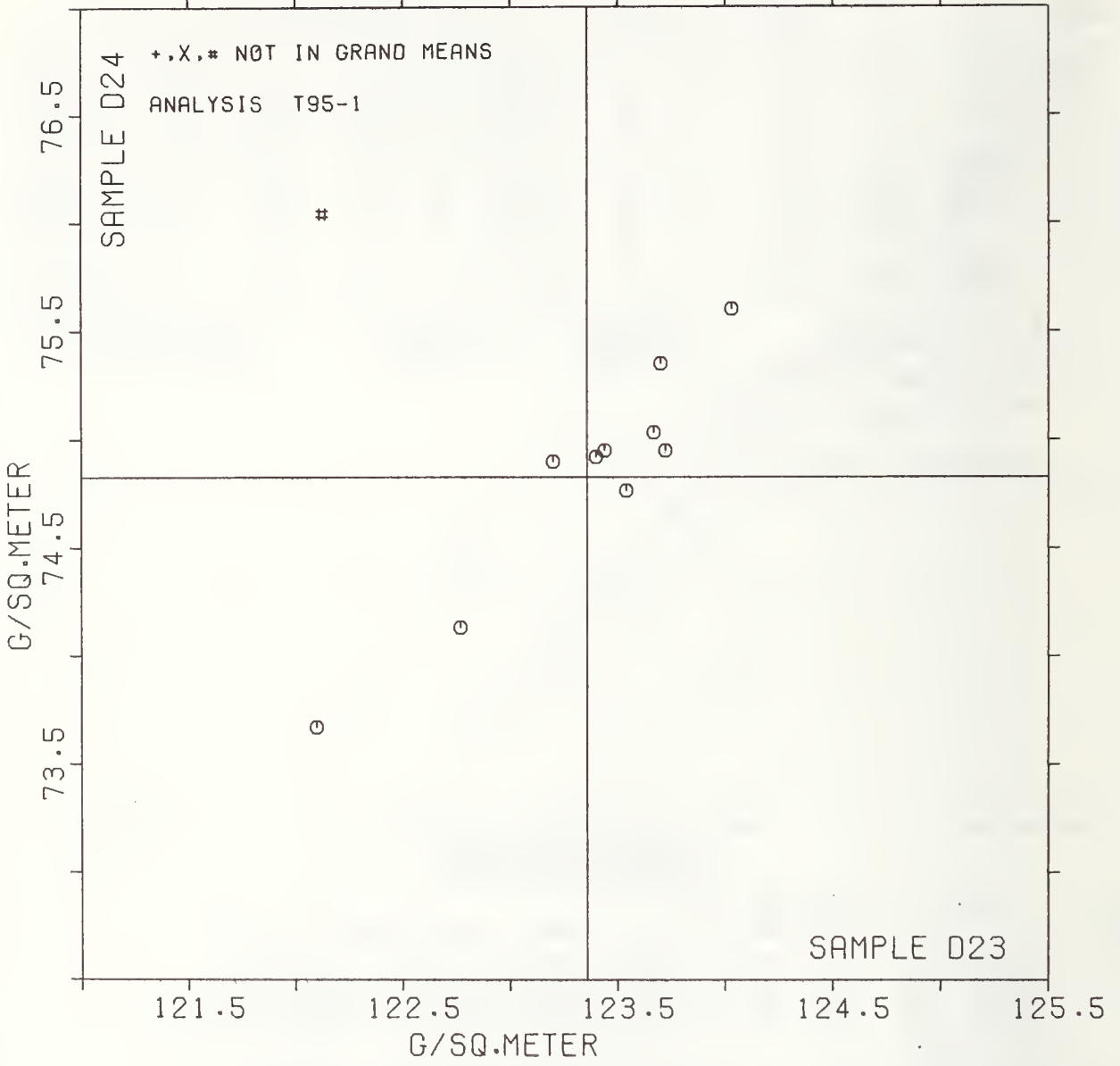
TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T95-1 TABLE 2
GRAMMAGE (MASS PER UNIT AREA)
TAPPI STANDARD T410 GS-68

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		D23	D24	MAJOR	MINOR	R.SDR	VAR	
L597	#	118.90	72.85	-4.55	1.75	1.63	95C	BASIS WEIGHT (GRAMMAGE), CUTTING BOARD
L305	#	120.82	74.38	-2.11	1.48	.89	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L274	#	122.10	76.00	-.06	1.72	1.14	95B	BASIS WEIGHT (GRAMMAGE), CONCRETA CUTTER
L162	Ø	122.10	73.67	-1.71	.07	1.10	95K	BASIS WEIGHT (GRAMMAGE), WEIGHED AS RECEIVED
L213	Ø	122.77	74.13	-.91	-.08	.92	95F	BASIS WEIGHT (GRAMMAGE), FOUR-SQUARE CUTTER
L392	Ø	123.20	74.90	-.06	.16	2.47	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L100	Ø	123.40	74.92	.10	.04	.77	95C	BASIS WEIGHT (GRAMMAGE), CUTTING BOARD
L280	Ø	123.44	74.95	.15	.03	1.13	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L378	Ø	123.54	74.76	.09	-.17	1.05	95E	BASIS WEIGHT (GRAMMAGE), GUILLIOTINE TYPE CUTTER
L297	Ø	123.67	75.03	.37	-.07	.63	95C	BASIS WEIGHT (GRAMMAGE), CUTTING BOARD
L249	Ø	123.70	75.35	.61	.13	.73	95I	BASIS WEIGHT (GRAMMAGE), INGENTØ PAPER CUTTER
L344	Ø	123.72	74.95	.34	-.17	.38	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L121	Ø	124.03	75.60	1.02	.07	.82	95B	BASIS WEIGHT (GRAMMAGE), CONCRETA CUTTER
GMEANS:		123.36	74.83			1.00		
		95% ELLIPSE:		2.46	.37	WITH GAMMA = 44 DEGREES		

GRAMMAGE (MASS PER UNIT AREA)

SAMPLE D23 = 123.4 G/SQ.METER

SAMPLE D24 = 74.8 G/SQ.METER



SUMMARY TABLE

TEST METHOD	SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDR	REPL CRP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPROD
AIR RESISTANCE, GURLEY T40-1 GURLEY UNITS	H48	29.9	1.6	1.6	10	52	57	10	1.4	4.4
	H37	19.0	1.2	1.6					1.4	3.3
AIR RESISTANCE, SHEFFIELD T40-2 SHEFF. UNITS	H48	104.8	4.2	4.5	10	35	41	10	3.9	11.7
	H37	150.4	7.0	9.1					8.0	19.3
AIR RESISTANCE, GURLEY HG FLOTATION T41-1 SEC/10 CC	H10	658.	211.	186.	10	12	12	10	163.	584.
	H47	1257.	474.	246.					215.	1314.
SMOOTHNESS, PARKER PRINISURF T44-1 MICRONS	H91	4.33	.35	.19	10	6	7	10	.17	.97
	H44	5.56	.34	.10					.09	.95
SMOOTHNESS, SHEFFIELD T45-1 SHEFF. UNITS	H91	126.3	8.0	10.1	15	82	86	10	8.8	22.8
	H44	258.7	11.9	9.2					8.1	33.3
SMOOTHNESS, HEKK T45-2 BEKK SECONDS	H91	46.42	4.52	6.51	15	12	16	10	5.70	12.95
	H44	14.43	1.73	.81					.71	4.80
SMOOTHNESS, HENDTSEN T47-1 ML/MIN	H91	125.	8.	16.	10	11	11	10	14.	23.
	H44	429.	37.	34.					30.	103.
K & N INK ABSORPTION T56-1 K & N UNITS	H58	66.7	5.1	.9	4	9	9	4	1.2	14.0
	H80	26.0	3.9	1.0					1.4	10.9
PH, COLD T57-1 PH UNITS	H01	5.672	.224	.051	5	5	6	2	.099	.626
	E47	8.354	.145	.047					.092	.407
PH, HOT T57-2 PH UNITS	H01	5.330	.164	.050	5	5	5	2	.099	.459
	E47	8.866	.273	.050					.098	.759
OPACITY, B&L TYPE, 89% BACKING T60-1 PERCENT	H50	89.96	.51	.41	10	73	90	5	.51	1.45
	E40	96.17	.34	.21					.26	.95
OPACITY, B&L TYPE, PAPER BACKING T60-2 PERCENT	H50	91.44	.49	.46	10	11	11	5	.57	1.43
	E40	96.15	.18	.27					.33	.55
OPACITY, ELREPHO TYPE, PAPER BACKING T60-3 PERCENT	H50	92.60	.30	.25	10	11	14	5	.32	.87
	E40	96.74	.16	.12					.15	.45
BLUE REFLECTANCE, DIRECTIONAL T65-1 PERCENT	H52	68.76	.26	.28	8	21	40	6	.31	.74
	E41	82.89	.27	.32					.36	.77
BLUE REFLECTANCE, DIFFUSE, WITH TRAP T65-2 PERCENT	H52	68.20	.86	.19	8	16	19	6	.21	2.38
	E41	81.77	.72	.23					.26	1.99
BLUE REFLECTANCE, DIFFUSE, NO TRAP T65-3 PERCENT	H52	69.10	.71	.21	8	16	17	6	.23	1.98
	H41	81.95	.84	.24					.27	2.34
SPECULAR GLOSS, 75 DEGREE T75-1 GLOSS UNITS	H54	58.6	2.3	1.5	10	49	52	5	1.9	6.5
	E57	84.3	1.6	1.0					1.3	4.5
THICKNESS (CALIPER) T90-1 MILS	E52	2.408	.073	.059	10	53	71	10	.052	.201
	H12	2.913	.079	.059					.052	.220
GRAMMAGE (MASS PER UNIT AREA) T95-1 G/SQ.METER	D23	123.36	.56	.73	10	10	13	3	1.17	1.83
	D24	74.83	.56	.65					1.03	1.77

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET	1. PUBLICATION OR REPORT NO. TAPPI CRP 49G	2. Gov't Accession No.	3. Recipient's Accession No.
4. TITLE AND SUBTITLE Technical Association of the Pulp and Paper Industry COLLABORATIVE REFERENCE PROGRAM FOR PAPER Report #49G		5. Publication Date 12/1/77	6. Performing Organization Code
7. AUTHOR(S) R. G. Powell, E. B. Randall, Jr., J. Horlick	8. Performing Organ. Report No. NBSIR 77-1322		
9. PERFORMING ORGANIZATION NAME AND ADDRESS NATIONAL BUREAU OF STANDARDS DEPARTMENT OF COMMERCE WASHINGTON, D.C. 20234	10. Project/Task/Work Unit No. 4015578		
	11. Contract/Grant No.		
12. Sponsoring Organization Name and Complete Address (Street, City, State, ZIP) Collaborative Testing Services, Inc., 9241 Wood Glade Dr., Great Falls, VA 22066; and Technical Association of the Pulp and Paper Industry	13. Type of Report & Period Covered Final		
	14. Sponsoring Agency Code		
15. SUPPLEMENTARY NOTES			
<p>16. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)</p> <p>Collaborative Reference Programs provide participating laboratories with the means for checking periodically the level and uniformity of their testing in comparison with that of other participating laboratories. An important by-product of the programs is the provision of realistic pictures of the state of the testing art. This is one of the periodic reports showing averages for each participant, within and between laboratory variability, and other information for participants and standards committees.</p>			
<p>17. KEY WORDS (six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons)</p> <p>Collaborative reference program; Laboratory evaluation; Paper; Precision; Reference samples; Testing calibration.</p>			
<p>18. AVAILABILITY <input type="checkbox"/> Unlimited</p> <p><input checked="" type="checkbox"/> For Official Distribution. Do Not Release to NTIS</p> <p><input type="checkbox"/> Order From Sup. of Doc., U.S. Government Printing Office Washington, D.C. 20402, SD Cat. No. C13</p> <p><input type="checkbox"/> Order From National Technical Information Service (NTIS) Springfield, Virginia 22151</p>	<p>19. SECURITY CLASS (THIS REPORT)</p> <p>UNCLASSIFIED</p>	<p>21. NO. OF PAGES</p> <p>59</p>	
<p>20. SECURITY CLASS (THIS PAGE)</p> <p>UNCLASSIFIED</p>		<p>22. Price</p>	