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

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TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM FOR PAPER

Report No. 49G

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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

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

Analyses In The S Report

TABLE OF CONVERSION FACTORS TO METRIC (SI) UNITS

Physical Quantity	To Convert From	To	Multiply by
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	$ft\text{-}lb/ft^2$	J/m^2	14.59
	$in.\text{-}lb/in.^2$	J/m^2	175.1
	$kg\text{-}m/m^2$	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	0.0292
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:

No. of test Determinations	Lower limit for R. SDR	Upper limit for R. SDR
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 '0'. 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 - (At end of report) In addition to several quantities already defined above,the summary shows the following values for each test method:

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 OS-75, AIR RESISTANCE OF PAPER

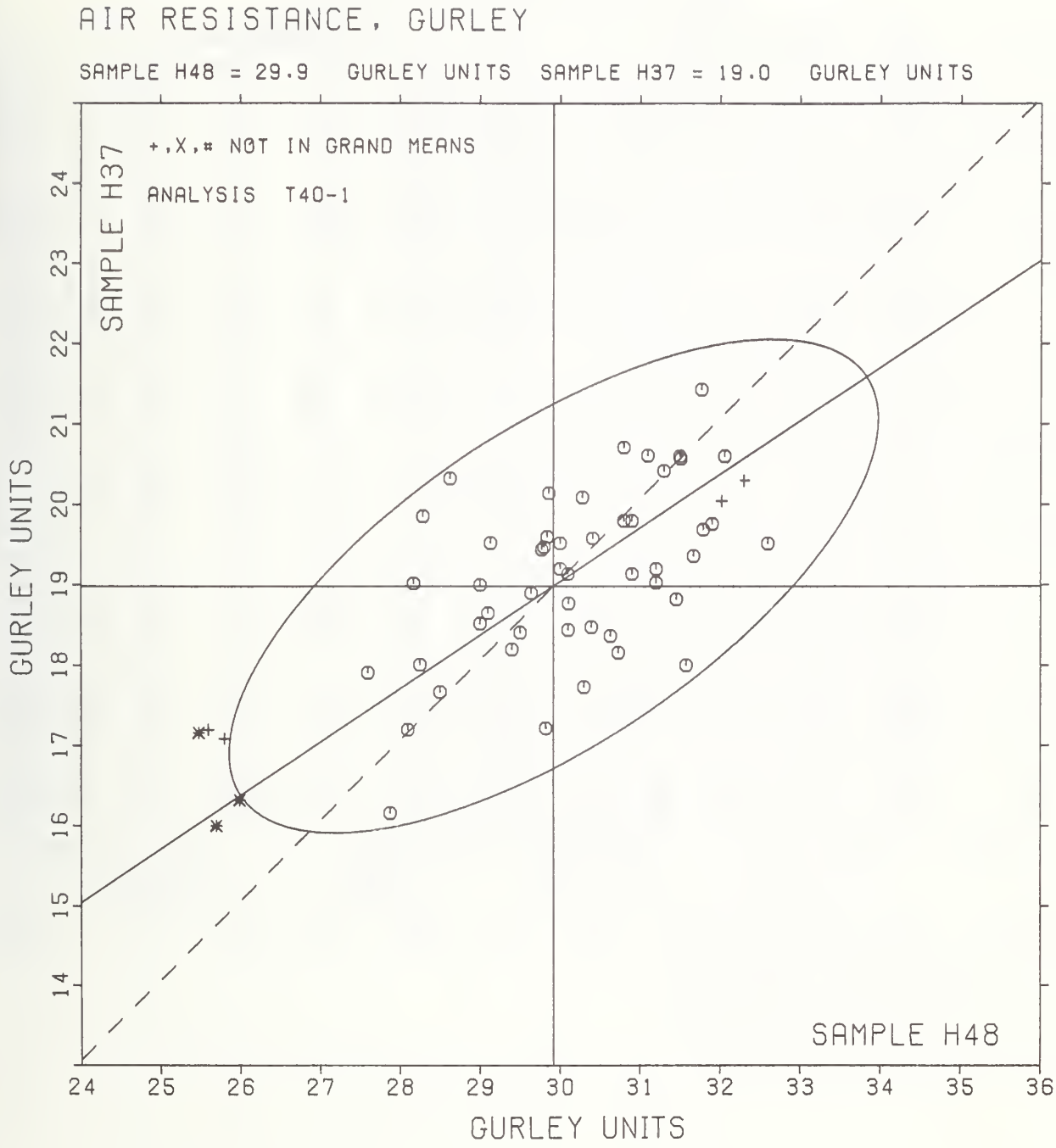
LAB CODE	SAMPLE H48 MEAN	PRINTING 109 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H37 MEAN	PRINTING 106 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L100	26.0	-3.9	-2.46	1.6	.98	16.3	-2.7	-2.21	.8	.49	40D	*	L100
L107	25.5	-4.4	-2.78	1.2	.76	17.2	-1.8	-1.51	1.4	.86	40D	*	L107
L121	29.4	-.5	-.32	2.1	1.26	18.2	-.8	-.65	1.8	1.08	40D	G	L121
L122	30.7	.8	.51	2.0	1.22	18.2	-.8	-.68	1.8	1.12	40D	G	L122
L123	28.3	-1.6	-1.02	1.1	.66	19.8	.9	.72	1.8	1.11	40D	G	L123
L124G	29.1	-.8	-.51	1.4	.89	18.6	-.3	-.28	1.3	.81	40D	G	L124G
L125	31.1	1.2	.74	1.1	.68	20.6	1.6	1.35	3.0	1.86	40D	G	L125
L127	29.8	-.1	-.06	2.0	1.20	17.2	-1.8	-1.46	2.4	1.48	40D	G	L127
L128	30.9	1.0	.62	1.4	.89	19.8	.8	.68	1.2	.76	40D	G	L128
L141	30.8	.9	.56	2.1	1.31	20.7	1.7	1.43	2.1	1.32	40D	G	L141
L148	31.5	1.5	.97	2.0	1.24	18.8	-.2	-.14	2.0	1.26	40D	G	L148
L153	29.8	-.1	-.07	1.1	.69	19.5	.5	.40	1.4	.87	40D	G	L153
L158	29.0	-.9	-.57	2.4	1.44	19.0	.0	.01	1.8	1.09	40D	G	L158
L159	30.1	.2	.12	1.7	1.06	18.8	-.2	-.18	1.8	1.10	40D	G	L159
L163	31.8	1.9	1.16	1.9	1.14	21.4	2.4	2.03	1.8	1.10	40D	G	L163
L166	31.8	1.9	1.18	1.4	.88	19.7	.7	.58	1.7	1.08	40D	G	L166
L174	29.8	-.1	-.05	1.8	1.10	19.6	.6	.51	1.6	1.00	40D	G	L174
L176	30.0	.1	.05	2.0	1.21	19.5	.5	.44	1.3	.80	40D	G	L176
L182G	31.2	1.3	.81	1.5	.95	19.2	.2	.18	2.4	1.50	40D	G	L182G
L183	31.9	2.0	1.25	1.3	.79	19.8	.8	.64	1.2	.75	40D	G	L183
L190C	31.3	1.4	.87	3.1	1.89	20.4	1.4	1.19	1.7	1.07	40D	G	L190C
L190R	30.1	.2	.12	1.9	1.17	19.1	.2	.13	1.8	1.13	40D	G	L190R
L223	31.5	1.6	1.00	2.0	1.20	20.6	1.6	1.34	2.1	1.31	40D	G	L223
L224	31.6	1.7	1.05	3.1	1.88	18.0	-1.0	-.82	1.3	.77	40D	G	L224
L230G	30.8	.9	.56	1.8	1.07	19.8	.8	.68	1.9	1.16	40D	G	L230G
L232	30.9	1.0	.62	1.4	.84	19.1	.2	.13	1.8	1.11	40D	G	L232
L238A	31.2	1.3	.81	1.1	.69	19.0	.0	.04	1.1	.65	40D	G	L238A
L241	28.1	-1.8	-1.14	1.4	.84	17.2	-1.8	-1.48	1.5	.91	40D	G	L241
L242	31.7	1.8	1.10	1.7	1.03	19.4	.4	.31	1.5	.92	40D	G	L242
L243G	29.5	-.4	-.26	1.1	.66	18.4	-.6	-.48	1.0	.61	40D	G	L243G
L259	27.6	-2.3	-1.45	2.2	1.33	17.9	-1.1	-.89	1.0	.65	40D	G	L259
L261	30.4	.5	.31	1.6	.99	19.6	.6	.49	1.5	.95	40D	G	L261
L262G	28.6	-1.3	-.81	.9	.53	20.3	1.3	1.11	.8	.47	40D	G	L262G
L265	28.2	-1.7	-1.09	1.3	.77	19.0	.0	.03	1.7	1.04	40D	G	L265
L274	29.9	-.1	-.03	1.2	.76	20.1	1.2	.96	.6	.35	40D	G	L274
L278	32.1	2.1	1.35	1.5	.94	20.6	1.6	1.34	1.1	.70	40D	G	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	G	L308
L312	30.3	.4	.23	1.2	.71	20.1	1.1	.92	2.2	1.33	40D	G	L312
L321	27.9	-2.0	-1.28	2.3	1.41	16.2	-2.8	-2.34	1.5	.91	40D	G	L321
L324	29.1	-.8	-.49	1.5	.94	19.5	.5	.44	1.5	.93	40D	G	L324
L326	32.6	2.7	1.69	1.8	1.09	19.5	.5	.44	2.1	1.28	40D	G	L326
L328	29.6	-.3	-.17	1.8	1.09	18.9	-.1	-.07	2.3	1.39	40D	G	L328
L341	29.8	-.1	-.09	1.3	.79	19.4	.5	.38	1.2	.75	40D	G	L341
L344	29.0	-.9	-.57	1.4	.88	18.5	-.5	-.39	1.3	.82	40D	G	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	G	L378
L380	30.0	.1	.05	.8	.50	19.2	.2	.18	1.0	.64	40D	G	L380
L392	30.6	.7	.45	2.6	1.58	18.4	-.6	-.51	2.0	1.26	40D	G	L392
L396M	31.5	1.6	1.00	1.1	.69	20.6	1.6	1.31	1.4	.88	40D	G	L396M
L567	28.5	-1.4	-.89	1.2	.72	17.7	-1.3	-1.09	1.4	.87	40D	G	L567
L576	30.3	.4	.24	1.6	1.00	17.7	-1.3	-1.04	1.6	.99	40D	G	L576
L599	30.4	.5	.30	.8	.49	18.5	-.5	-.42	1.0	.63	40D	G	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 =	1.6 GURLEY UNITS				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

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

LAB CODE	F	MEANS B48	MEANS B37	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
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	O	27.6	17.9	-2.5	.4	.99	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L321	O	27.9	16.2	-3.3	-1.2	1.16	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L241	O	28.1	17.2	-2.5	-.5	.87	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L265	O	28.2	19.0	-1.4	1.0	.90	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L378	O	28.2	18.0	-1.9	.1	1.12	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L123	O	28.3	19.8	-.9	1.6	.89	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L567	O	28.5	17.7	-1.9	-.3	.79	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L262G	O	28.6	20.3	-.3	1.8	.50	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L344	O	29.0	18.5	-1.0	.1	.85	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L158	O	29.0	19.0	-.8	.5	1.27	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L124G	O	29.1	18.6	-.9	.2	.85	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L324	O	29.1	19.5	-.4	.9	.93	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L121	O	29.4	18.2	-.9	-.4	1.17	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L243G	O	29.5	18.4	-.7	-.2	.63	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L328	O	29.6	18.9	-.3	.1	1.24	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L341	O	29.8	19.4	.1	.5	.77	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L153	O	29.8	19.5	.2	.5	.78	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L127	O	29.8	17.2	-1.1	-1.4	1.34	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L174	O	29.8	19.6	.3	.6	1.05	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L274	O	29.9	20.1	.6	1.0	.56	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L176	O	30.0	19.5	.4	.4	1.00	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L380	O	30.0	19.2	.2	.1	.57	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L190R	O	30.1	19.1	.2	.0	1.15	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L308	O	30.1	18.4	-.1	-.6	1.04	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L159	O	30.1	18.8	.0	-.3	1.08	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L312	O	30.3	20.1	.9	.7	1.02	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L576	O	30.3	17.7	-.4	-1.3	.99	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L595	O	30.4	18.5	.1	-.7	.56	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L261	O	30.4	19.6	.7	.2	.97	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L392	O	30.6	18.4	.3	-.9	1.42	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L122	O	30.7	18.2	.2	-1.1	1.17	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L141	O	30.8	20.7	1.7	.9	1.32	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L230G	O	30.8	19.8	1.2	.2	1.11	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L128	O	30.9	19.8	1.3	.1	.82	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L232	O	30.9	19.1	.9	-.4	.97	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L125	O	31.1	20.6	1.9	.7	1.27	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L182G	O	31.2	19.2	1.2	-.5	1.22	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L238A	O	31.2	19.0	1.1	-.7	.67	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L190C	O	31.3	20.4	1.9	.4	1.48	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L148	O	31.5	18.8	1.2	-1.0	1.25	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L223	O	31.5	20.6	2.2	.5	1.26	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L396M	O	31.5	20.6	2.2	.4	.79	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L224	O	31.6	18.0	.8	-1.7	1.33	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L242	O	31.7	19.4	1.7	-.7	.98	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L163	O	31.8	21.4	2.9	1.0	1.12	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L166	O	31.8	19.7	2.0	-.5	.98	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L183	O	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	O	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	O	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
+,X,* NOT IN GRAND MEANS
ANALYSIS T40-1
SAMPLE H37
GURLEY UNITS
14
15
16
17
18
19
20
21
22
23
24
SAMPLE H48
24
25
26
27
28
29
30
31
32
33
34
35
36
GURLEY UNITS

TAPPI COLLABORATIVE REFERENCE PROGRAM
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 MEAN	PRINTING 109 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H37 MEAN	PRINTING 106 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L114	108.3	3.5	.82	3.1	.68	149.4	-1.0	-.15	12.9	1.42	40S	6	L114
L121	108.6	3.8	.89	3.3	.73	155.4	5.0	.71	7.1	.77	40S	6	L121
L122S	102.3	-2.5	-.60	3.2	.72	149.0	-1.4	-.21	11.3	1.24	40S	6	L122S
L124S	107.9	3.1	.73	4.2	.93	159.6	9.2	1.32	6.7	.73	40S	6	L124S
L127	110.1	5.3	1.25	5.0	1.12	166.8	16.4	2.35	19.6	2.15	40S	6	L127
L132	102.2	-2.6	-.62	6.0	1.33	142.2	-8.2	-1.18	8.5	.94	40S	6	L132
L148	107.0	2.2	.52	4.7	1.05	144.2	-6.2	-.90	7.3	.81	40S	6	L148
L150	105.0	.2	.04	8.5	1.90	162.0	11.6	1.66	12.1	1.32	40S	6	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	6	L158
L173B	110.5	5.7	1.34	3.7	.82	146.5	-3.9	-.57	9.1	1.00	40S	6	L173B
L190C	102.9	-1.9	-.45	5.9	1.31	152.6	2.2	.31	7.5	.82	40S	6	L190C
L213	105.9	1.1	.26	3.8	.84	154.3	3.9	.55	7.3	.80	40S	6	L213
L223	97.2	-7.6	-1.80	4.5	1.00	145.4	-5.0	-.72	7.3	.80	40S	6	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	6	L230S
L241	105.7	.9	.21	4.4	.99	161.1	10.7	1.53	6.4	.70	40S	6	L241
L249	101.6	-3.2	-.76	4.5	1.01	146.4	-4.0	-.58	9.1	1.00	40S	6	L249
L255	103.6	-1.2	-.29	3.6	.80	154.1	3.7	.53	8.5	.94	40S	6	L255
L257A	108.6	3.8	.89	3.9	.87	150.9	.5	.07	10.0	1.10	40S	6	L257A
L257B	101.9	-2.9	-.69	6.8	1.53	146.2	-4.2	-.61	14.0	1.54	40S	6	L257B
L257C	109.4	4.6	1.08	7.6	1.69	151.9	1.5	.21	7.3	.80	40S	6	L257C
L260	103.7	-1.1	-.26	2.9	.64	158.9	8.5	1.21	5.4	.60	40S	6	L260
L262S	107.4	2.6	.61	3.9	.88	151.4	1.0	.14	4.2	.47	40S	6	L262S
L288	107.4	2.6	.61	5.5	1.23	154.8	4.4	.63	9.4	1.03	40S	6	L288
L305	103.1	-1.7	-.41	3.8	.85	139.9	-10.5	-1.51	7.9	.87	40S	6	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	6	L318
L349	99.6	-5.2	-1.23	4.5	1.01	143.4	-7.0	-1.01	8.7	.95	40S	6	L349
L352	99.1	-5.7	-1.35	3.9	.87	144.2	-6.2	-.90	10.1	1.11	40S	6	L352
L354	109.9	5.1	1.20	3.7	.83	154.6	4.2	.60	10.1	1.11	40S	6	L354
L360	100.0	-4.8	-1.14	2.4	.53	142.3	-8.1	-1.17	11.3	1.24	40S	6	L360
L370	103.6	-1.2	-.29	4.2	.93	143.5	-6.9	-1.00	5.8	.63	40S	6	L370
L390	108.4	3.6	.85	5.1	1.14	156.4	6.0	.86	6.4	.71	40S	6	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	6	L575
L587	97.0	-7.8	-1.85	5.4	1.20	137.0	-13.4	-1.93	12.5	1.37	40S	6	L587
L597	100.4	-4.4	-1.05	2.0	.45	151.3	.9	.12	10.5	1.15	40S	6	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 =	9.1 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

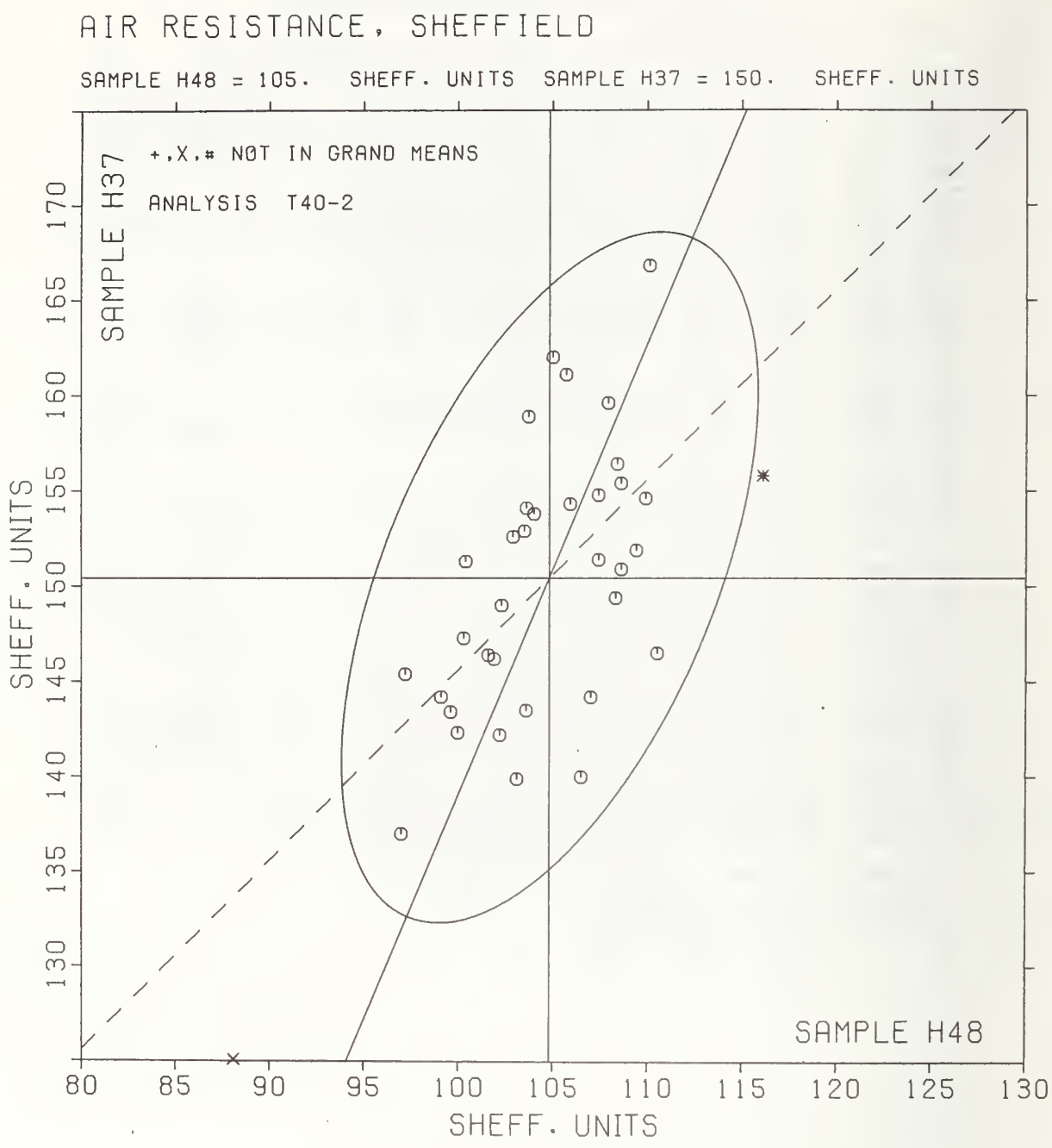
Data from the following laboratories appear to be off by a multiplicative factor: 562.

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

LAB CODE	F	MEANS H48	MEANS H37	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L312	X	88.1	125.1	-29.9	5.5	1.05	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L587	O	97.0	137.0	-15.4	2.0	1.29	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L223	O	97.2	145.4	-7.6	5.1	.90	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L352	O	99.1	144.2	-8.0	2.8	.99	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L349	O	99.6	143.4	-8.5	2.1	.98	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L360	O	100.0	142.3	-9.4	1.3	.89	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L318	O	100.3	147.3	-4.7	2.9	1.19	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L597	O	100.4	151.3	-.9	4.4	.80	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L249	O	101.6	146.4	-5.0	1.4	1.00	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257H	O	101.9	146.2	-5.0	1.0	1.53	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L132	O	102.2	142.2	-8.6	-.8	1.14	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L122S	O	102.3	149.0	-2.3	1.8	.98	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L190C	O	102.9	152.6	1.2	2.6	1.06	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L305	O	103.1	139.9	-10.4	-2.5	.86	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L230S	O	103.5	152.9	1.7	2.2	.73	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L370	O	103.6	143.5	-6.9	-1.6	.78	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L255	O	103.6	154.1	2.9	2.5	.87	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L260	O	103.7	158.9	7.4	4.3	.62	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L575	O	104.0	153.8	2.8	2.1	.82	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L150	O	105.0	162.0	10.7	4.3	1.61	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L241	O	105.7	161.1	10.2	3.3	.84	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L213	O	105.9	154.3	4.0	.5	.82	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L158	O	106.5	140.0	-9.0	-5.6	1.25	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L148	O	107.0	144.2	-4.9	-4.4	.93	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L262S	O	107.4	151.4	1.9	-2.0	.67	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L288	O	107.4	154.8	5.0	-.7	1.13	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L124S	O	107.9	159.6	9.6	.7	.83	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L114	O	108.3	149.4	.4	-3.6	1.05	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L390	O	108.4	156.4	6.9	-1.0	.92	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257A	O	108.6	150.9	1.9	-3.3	.99	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L121	O	108.6	155.4	6.0	-1.6	.75	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257C	O	109.4	151.9	3.1	-3.7	1.25	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L354	O	109.9	154.6	5.8	-3.1	.97	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L127	O	110.1	166.8	17.1	1.5	1.64	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L173H	O	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
+,X,* NOT IN GRAND MEANS
ANALYSIS T40-2
SAMPLE H37
SHEFF. UNITS
130 135 140 145 150 155 160 165 170
SAMPLE H48
80 85 90 95 100 105 110 115 120 125 130
SHEFF. UNITS

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

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

GR. MEAN = 658. SEC/10 CC GRAND MEAN = 1257. SEC/10 CC TEST DETERMINATIONS = 10
SD MEANS = 211. SEC/10 CC SD OF 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

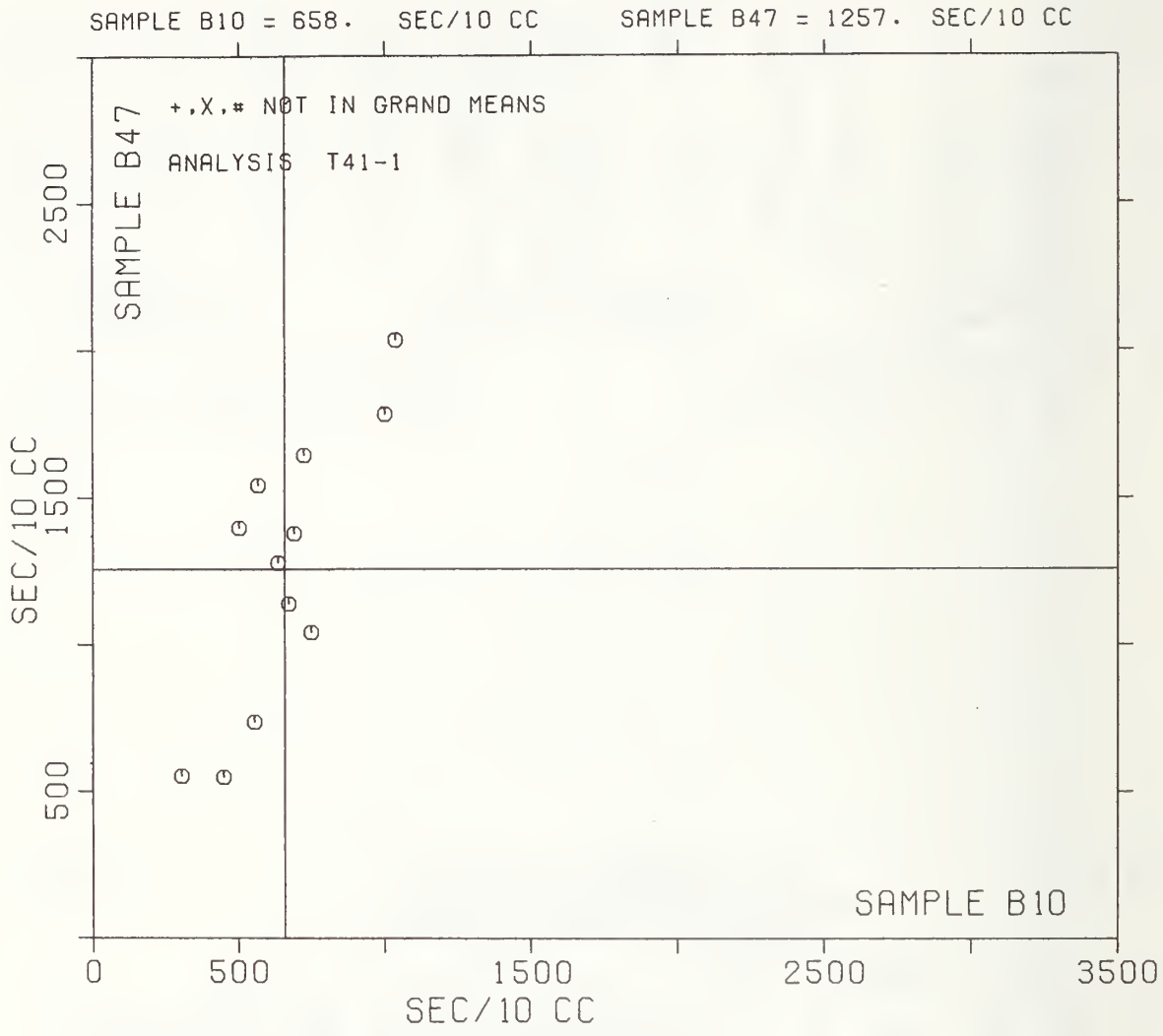
Best Values: B10 640 seconds per 10 cc mercury
B47 1300 density (direct reading)

The values reported here are the time in seconds required for the displacement of 10 ml of air through an area of 1.0 in^2 of the specimen. The values are not converted to 100 ml of air nor to oil density.

REPORT NO. 49G TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977

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

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


AIR RESISTANCE, GURLEY HG FLOTATION
SAMPLE B10 = 658. SEC/10 CC
SAMPLE B47 = 1257. SEC/10 CC
+,X,# NOT IN GRAND MEANS
ANALYSIS T41-1
SAMPLE B47
SEC/10 CC
2500
1500
500
SAMPLE B10
0
500
1500
2500
3500
SEC/10 CC

REPORT NO. 490 TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977
ANALYSIS T44-1 TABLE 1
SMOOTHNESS, PARKER PRINTSURF

LAB CODE	SAMPLE B91 MEAN	BEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE B44 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 10 VAR	P	LAB
L122	4.93	.60	1.72	.25	1.30	5.84	.28	.82	.08	.81	44P	O	L122
L182	4.43	.10	.29	.19	1.01	5.86	.31	.89	.15	1.41	44P	O	L182
L183	3.89	-.44	-1.26	.11	.58	4.99	-.57	-1.65	.11	1.05	44P	O	L183
L223	4.31	-.02	-.06	.09	.46	5.80	.24	.70	.08	.79	44P	O	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	O	L317
L588	4.30	-.03	-.09	.24	1.27	5.45	-.11	-.31	.11	1.03	44P	O	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.

REPORT NO. 490 TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977
ANALYSIS T44-1 TABLE 2
SMOOTHNESS, PARKER PRINTSURF

LAB CODE	F	MEANS B91	B44	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L183	O	3.89	4.99	-.71	-.10	.82	44P	SMOOTHNESS, PARKER PRINTSURF
L317	O	4.12	5.40	-.26	.03	1.14	44P	SMOOTHNESS, PARKER PRINTSURF
L588	O	4.30	5.45	-.10	-.06	1.15	44P	SMOOTHNESS, PARKER PRINTSURF
L223	O	4.31	5.80	.16	.19	.63	44P	SMOOTHNESS, PARKER PRINTSURF
L182	O	4.43	5.86	.29	.15	1.21	44P	SMOOTHNESS, PARKER PRINTSURF
L122	O	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 DEV	N.DEV	SDR	R.SDR	SAMPLE H44 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 15 VAR	F	LAB
L100	131.7	5.4	.68	10.8	1.08	272.3	13.6	1.14	11.1	1.20	45S	O	L100
L107	135.0	8.7	1.08	11.5	1.14	275.7	17.0	1.43	9.4	1.02	45S	O	L107
L108	128.7	2.4	.30	14.3	1.43	269.5	10.9	.91	6.4	.69	45S	O	L108
L114	131.5	5.2	.65	12.2	1.21	268.0	9.3	.78	9.2	1.00	45S	O	L114
L115	113.3	-13.0	-1.61	4.1	.41	239.0	-19.7	-1.65	10.0	1.09	45S	O	L115
L121	122.4	-3.9	-.48	9.6	.95	260.3	1.7	.14	10.6	1.15	45S	O	L121
L122	127.1	.8	.10	7.9	.79	259.9	1.2	.10	9.9	1.08	45S	O	L122
L123	119.5	-6.8	-.85	11.3	1.12	251.7	-7.0	-.59	12.8	1.39	45S	O	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	O	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	O	L128
L132	128.4	2.1	.26	10.1	1.00	260.1	1.5	.12	10.5	1.14	45S	O	L132
L134	129.3	3.0	.38	11.8	1.18	267.3	8.6	.72	10.3	1.11	45S	O	L134
L139S	139.5	13.2	1.65	7.8	.78	264.7	6.0	.50	9.0	.97	45S	O	L139S
L148	140.8	14.5	1.81	9.9	.98	257.9	-.8	-.07	7.3	.79	45S	O	L148
L150	133.3	7.0	.88	17.9	1.78	271.3	12.7	1.06	9.2	.99	45S	O	L150
L152	131.0	4.7	.59	10.7	1.07	254.0	-4.7	-.39	8.3	.90	45S	O	L152
L153	140.8	14.5	1.81	10.9	1.08	283.7	25.0	2.10	10.6	1.15	45S	O	L153
L157	143.1	16.8	2.10	11.0	1.10	269.1	10.4	.87	8.1	.88	45S	O	L157
L158	120.7	-5.6	-.70	7.3	.72	248.0	-10.7	-.89	10.8	1.17	45S	O	L158
L159	134.1	7.8	.98	15.4	1.53	250.7	-8.0	-.67	9.3	1.01	45S	O	L159
L162	120.3	-6.0	-.74	6.7	.66	255.3	-3.3	-.28	6.7	.72	45S	O	L162
L166	124.7	-1.6	-.20	9.3	.93	249.0	-9.7	-.81	7.4	.80	45S	O	L166
L167	118.5	-7.8	-.97	3.7	.36	251.3	-7.4	-.62	3.5	.38	45S	O	L167
L173B	120.3	-6.0	-.74	7.4	.74	249.7	-9.0	-.75	6.9	.75	45S	O	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	O	L183S
L190C	127.5	1.2	.15	11.5	1.14	249.9	-8.8	-.74	8.0	.86	45S	O	L190C
L190R	132.4	6.1	.76	11.0	1.10	258.5	-.1	-.01	8.0	.87	45S	O	L190R
L195	118.9	-7.4	-.92	10.7	1.06	242.4	-16.3	-1.36	10.3	1.12	45S	O	L195
L203	127.0	.7	.09	7.7	.77	247.7	-11.0	-.92	8.4	.91	45S	O	L203
L211	121.7	-4.6	-.57	10.6	1.05	249.1	-9.6	-.81	8.5	.92	45S	O	L211
L213	122.3	-4.0	-.50	12.0	1.19	240.5	-18.1	-1.52	11.3	1.23	45S	O	L213
L223	113.7	-12.6	-1.56	6.5	.64	240.4	-18.3	-1.53	10.3	1.12	45S	O	L223
L224	138.1	11.8	1.47	10.6	1.05	261.7	3.0	.25	15.2	1.65	45S	O	L224
L226B	130.9	4.6	.57	15.4	1.54	264.6	5.9	.50	7.8	.85	45S	O	L226B
L228	134.3	8.0	1.00	11.6	1.16	262.0	3.3	.28	10.7	1.16	45S	O	L228
L230S	127.9	1.6	.20	9.3	.92	260.0	1.3	.11	10.0	1.09	45S	O	L230S
L231	138.1	11.8	1.48	8.8	.87	264.5	5.8	.49	11.2	1.22	45S	O	L231
L232S	119.0	-7.3	-.91	9.7	.96	267.7	9.0	.76	6.2	.68	45S	O	L232S
L241	133.5	7.2	.89	10.9	1.08	274.5	15.8	1.33	14.1	1.53	45S	O	L241
L249	116.9	-9.4	-1.16	7.5	.75	249.9	-8.7	-.73	4.1	.44	45S	O	L249
L254	129.9	3.6	.45	8.6	.85	245.7	-13.0	-1.09	6.0	.65	45S	O	L254
L255	114.9	-11.4	-1.41	4.7	.46	248.5	-10.2	-.86	6.4	.70	45S	O	L255
L257A	109.3	-17.0	-2.11	12.2	1.21	250.7	-8.0	-.67	10.5	1.13	45S	O	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	O	L257C
L259	133.6	7.3	.91	15.2	1.51	274.3	15.7	1.32	8.6	.94	45S	O	L259
L260	117.6	-8.7	-1.08	4.8	.47	248.3	-10.3	-.87	4.5	.49	45S	O	L260
L261	124.7	-1.6	-.20	9.1	.90	264.9	6.2	.52	9.7	1.05	45S	O	L261
L262	128.5	2.2	.28	6.8	.68	266.5	7.8	.66	8.7	.94	45S	O	L262
L275	130.6	4.3	.54	12.5	1.24	270.0	11.3	.95	7.8	.85	45S	O	L275
L277	143.5	17.2	2.15	8.4	.84	275.3	16.7	1.40	11.5	1.25	45S	O	L277
L278	126.9	.6	.07	9.2	.92	258.0	-.7	-.06	10.1	1.10	45S	O	L278
L281	125.9	-.4	-.04	11.0	1.10	253.7	-5.0	-.42	8.2	.89	45S	O	L281
L285	127.0	.7	.09	7.7	.77	258.3	-.3	-.03	12.8	1.39	45S	O	L285
L288	129.3	3.0	.37	10.5	1.05	NO DATA REPORTED FOR SAMPLE H44					45S	N	L288
L290	144.2	17.9	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	O	L291S
L297	126.3	.0	.01	12.3	1.22	252.0	-6.7	-.56	11.3	1.23	45S	O	L297
L305	124.3	-2.0	-.25	5.4	.54	244.8	-13.9	-1.16	8.8	.95	45S	O	L305
L308	124.7	-1.6	-.20	10.5	1.04	253.9	-4.8	-.40	10.7	1.16	45S	O	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	O	L317

ANALYSIS T45-1 TABLE 1
SMOOTHNESS, SHEFFIELD UNITS
SHEFFIELD TESTER IS STANDARD FOR THIS ANALYSIS

LAB CODE	SAMPLE B91 HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE H44 PRINTING 84 GRAMS PER SQUARE METER MEAN	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	0	L318
L321	114.3	-12.0	-1.49	8.8	.88	260.7	2.0	.17	8.0	.87	45S	0	L321
L323	133.6	7.3	.91	7.0	.70	246.7	-12.0	-1.01	14.2	1.54	45S	0	L323
L326	124.9	-1.4	-.17	7.9	.78	236.1	-22.5	-1.89	7.8	.85	45S	0	L326
L328	122.1	-4.2	-.52	10.8	1.07	251.5	-7.2	-.60	8.9	.97	45S	0	L328
L341	131.9	5.6	.69	10.8	1.08	257.9	-.7	-.06	9.1	.99	45S	0	L341
L342	129.4	3.1	.39	9.0	.89	271.7	13.0	1.09	9.0	.98	45S	0	L342
L349	123.8	-2.5	-.31	11.8	1.17	260.3	1.6	.13	13.8	1.50	45S	0	L349
L352	139.7	13.4	1.67	10.1	1.00	267.7	9.0	.76	8.4	.91	45S	0	L352
L360	119.5	-6.8	-.85	12.8	1.27	261.9	3.2	.27	8.9	.96	45S	0	L360
L366	136.8	10.5	1.31	13.1	1.30	266.3	7.7	.64	12.3	1.34	45S	0	L366
L370	129.1	2.8	.35	9.5	.94	257.2	-1.5	-.12	8.8	.96	45S	0	L370
L376	131.1	4.8	.60	9.6	.96	255.7	-3.0	-.25	8.0	.87	45S	0	L376
L378	118.1	-8.2	-1.02	9.8	.97	235.9	-22.8	-1.91	12.6	1.37	45S	0	L378
L380	121.3	-5.0	-.62	10.1	1.00	250.4	-8.3	-.69	7.8	.85	45S	0	L380
L382	125.9	-.4	-.04	11.9	1.19	267.9	9.3	.78	9.1	.99	45S	0	L382
L390	127.1	.8	.10	10.6	1.06	260.9	2.2	.19	8.9	.96	45S	0	L390
L575	132.8	6.5	.81	9.8	.97	282.9	24.3	2.04	8.9	.97	45S	0	L575
L587	111.0	-15.3	-1.90	6.3	.63	240.0	-18.7	-1.57	9.3	1.00	45S	0	L587
L597	119.0	-7.3	-.91	12.2	1.21	261.4	2.7	.23	8.4	.91	45S	0	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

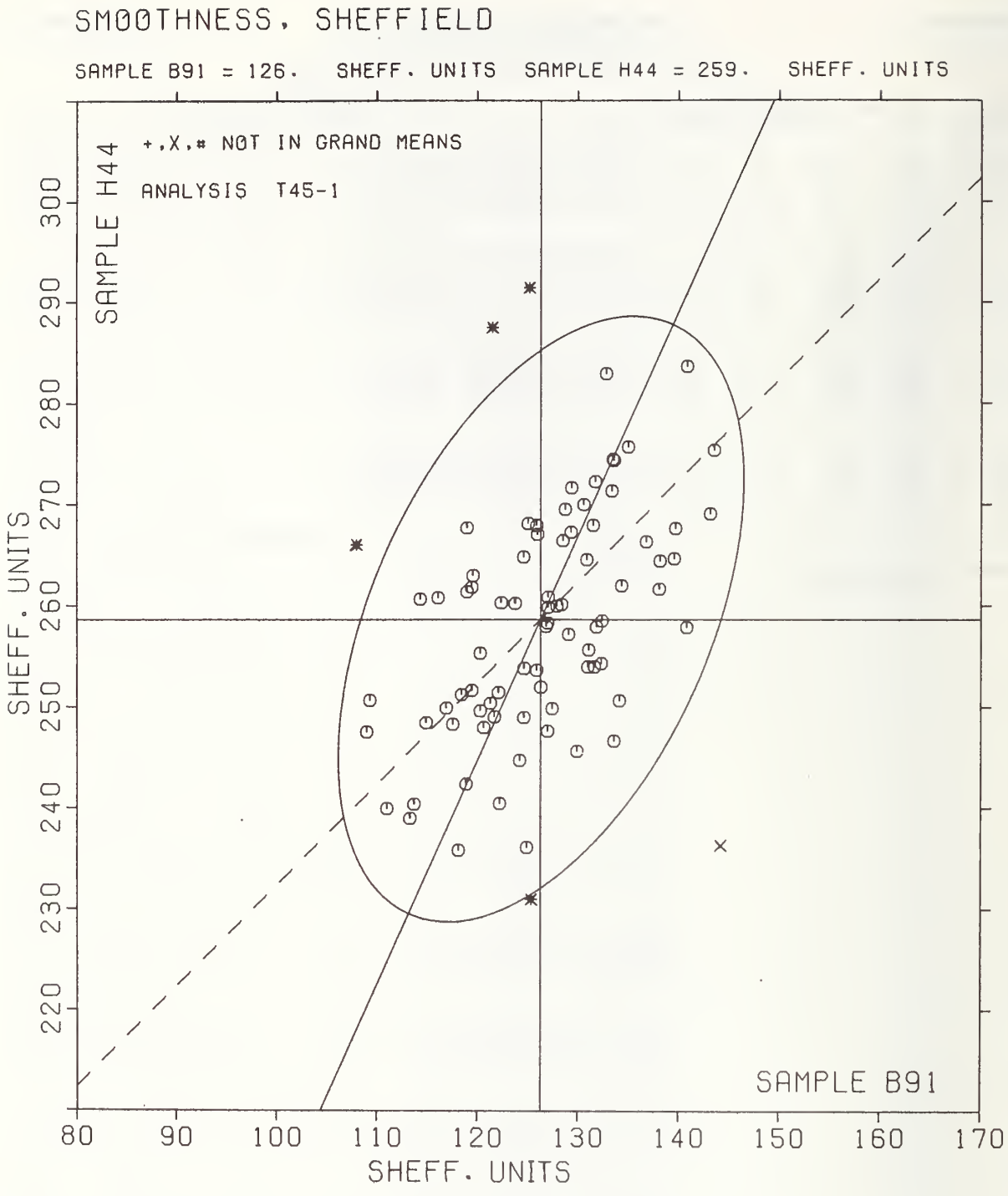
The following laboratories were omitted from the grand means because of extreme test results: 176S.

ANALYSIS T45-1 TABLE 2
SMOOTHNESS, SHEFFIELD UNITS
SHEFFIELD TESTER IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS B91	MEANS H44	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L257B	*	108.0	266.0	-.8	19.7	1.21	45S	SMOOTHNESS, SHEFFIELD
L257C	6	109.0	247.5	-17.3	11.2	1.08	45S	SMOOTHNESS, SHEFFIELD
L257A	6	109.3	250.7	-14.3	12.2	1.17	45S	SMOOTHNESS, SHEFFIELD
L587	6	111.0	240.0	-23.3	6.3	.82	45S	SMOOTHNESS, SHEFFIELD
L115	6	113.3	239.0	-23.2	3.7	.75	45S	SMOOTHNESS, SHEFFIELD
L223	6	113.7	240.4	-21.8	3.9	.88	45S	SMOOTHNESS, SHEFFIELD
L321	6	114.3	260.7	-3.1	11.7	.87	45S	SMOOTHNESS, SHEFFIELD
L255	6	114.9	248.5	-14.0	6.2	.58	45S	SMOOTHNESS, SHEFFIELD
L317	6	116.1	260.9	-2.2	10.2	.90	45S	SMOOTHNESS, SHEFFIELD
L249	6	116.9	249.9	-11.8	4.9	.59	45S	SMOOTHNESS, SHEFFIELD
L260	6	117.6	248.3	-13.0	3.7	.48	45S	SMOOTHNESS, SHEFFIELD
L378	6	118.1	235.9	-24.1	-1.9	1.17	45S	SMOOTHNESS, SHEFFIELD
L167	6	118.5	251.3	-10.0	4.1	.37	45S	SMOOTHNESS, SHEFFIELD
L195	6	118.9	242.4	-17.8	.0	1.09	45S	SMOOTHNESS, SHEFFIELD
L597	6	119.0	261.4	-.5	7.8	1.06	45S	SMOOTHNESS, SHEFFIELD
L232S	6	119.0	267.7	5.2	10.3	.82	45S	SMOOTHNESS, SHEFFIELD
L360	6	119.5	261.9	.1	7.5	1.12	45S	SMOOTHNESS, SHEFFIELD
L123	6	119.5	251.7	-9.2	3.3	1.25	45S	SMOOTHNESS, SHEFFIELD
L183S	6	119.6	263.0	1.2	7.9	.94	45S	SMOOTHNESS, SHEFFIELD
L173B	6	120.3	249.7	-10.6	1.7	.75	45S	SMOOTHNESS, SHEFFIELD
L162	6	120.3	255.3	-5.5	4.1	.69	45S	SMOOTHNESS, SHEFFIELD
L158	6	120.7	248.0	-12.0	.7	.95	45S	SMOOTHNESS, SHEFFIELD
L380	6	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	6	121.7	249.1	-10.6	.2	.99	45S	SMOOTHNESS, SHEFFIELD
L328	6	122.1	251.5	-8.3	.8	1.02	45S	SMOOTHNESS, SHEFFIELD
L213	6	122.3	240.5	-18.2	-3.8	1.21	45S	SMOOTHNESS, SHEFFIELD
L121	6	122.4	260.3	-.1	4.2	1.05	45S	SMOOTHNESS, SHEFFIELD
L349	6	123.8	260.3	.4	2.9	1.34	45S	SMOOTHNESS, SHEFFIELD
L305	6	124.3	244.8	-13.5	-3.9	.75	45S	SMOOTHNESS, SHEFFIELD
L166	6	124.7	249.0	-9.5	-2.5	.86	45S	SMOOTHNESS, SHEFFIELD
L308	6	124.7	253.9	-5.0	-.5	1.10	45S	SMOOTHNESS, SHEFFIELD
L261	6	124.7	264.9	5.0	4.0	.98	45S	SMOOTHNESS, SHEFFIELD
L326	6	124.9	236.1	-21.1	-8.0	.81	45S	SMOOTHNESS, SHEFFIELD
L291S	6	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	6	125.9	267.9	8.3	4.1	1.09	45S	SMOOTHNESS, SHEFFIELD
L281	6	125.9	253.7	-4.7	-1.7	.99	45S	SMOOTHNESS, SHEFFIELD
L318	6	126.0	267.1	7.5	3.7	1.18	45S	SMOOTHNESS, SHEFFIELD
L297	6	126.3	252.0	-6.1	-2.8	1.23	45S	SMOOTHNESS, SHEFFIELD
L278	6	126.9	258.0	-.4	-.8	1.01	45S	SMOOTHNESS, SHEFFIELD
L203	6	127.0	247.7	-9.7	-5.2	.84	45S	SMOOTHNESS, SHEFFIELD
L285	6	127.0	258.3	-.0	-.8	1.08	45S	SMOOTHNESS, SHEFFIELD
L390	6	127.1	260.9	2.3	.2	1.01	45S	SMOOTHNESS, SHEFFIELD
L122	6	127.1	259.9	1.4	-.2	.93	45S	SMOOTHNESS, SHEFFIELD
L190C	6	127.5	249.9	-7.5	-4.7	1.00	45S	SMOOTHNESS, SHEFFIELD
L230S	6	127.9	260.0	1.9	-.9	1.00	45S	SMOOTHNESS, SHEFFIELD
L176S	#	128.4	320.5	57.2	23.5	.63	45S	SMOOTHNESS, SHEFFIELD
L132	6	128.4	260.1	2.2	-1.3	1.07	45S	SMOOTHNESS, SHEFFIELD
L262	6	128.5	266.5	8.0	1.2	.81	45S	SMOOTHNESS, SHEFFIELD
L108	6	128.7	269.5	10.9	2.2	1.06	45S	SMOOTHNESS, SHEFFIELD
L370	6	129.1	257.2	-.2	-3.1	.95	45S	SMOOTHNESS, SHEFFIELD
L288	M	129.3				1.05	45S	SMOOTHNESS, SHEFFIELD
L134	6	129.3	267.3	9.1	.8	1.15	45S	SMOOTHNESS, SHEFFIELD
L342	6	129.4	271.7	13.1	2.5	.93	45S	SMOOTHNESS, SHEFFIELD
L254	6	129.9	245.7	-10.3	-8.7	.75	45S	SMOOTHNESS, SHEFFIELD
L275	6	130.6	270.0	12.1	.7	1.04	45S	SMOOTHNESS, SHEFFIELD
L226B	6	130.9	264.6	7.3	-1.7	1.19	45S	SMOOTHNESS, SHEFFIELD
L152	6	131.0	254.0	-2.3	-6.2	.98	45S	SMOOTHNESS, SHEFFIELD
L376	6	131.1	255.7	-.8	-5.6	.91	45S	SMOOTHNESS, SHEFFIELD
L114	6	131.5	268.0	10.7	-.9	1.11	45S	SMOOTHNESS, SHEFFIELD
L125	6	131.7	254.0	-2.0	-6.8	1.11	45S	SMOOTHNESS, SHEFFIELD
L100	6	131.7	272.3	14.6	.6	1.14	45S	SMOOTHNESS, SHEFFIELD
L341	6	131.9	257.9	1.6	-5.4	1.03	45S	SMOOTHNESS, SHEFFIELD

ANALYSIS T45-1 TABLE 2
SMOOTHNESS, SHEFFIELD UNITS
SHEFFIELD TESTER IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS H91	MEANS H44	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L128	G	132.3	254.3	-1.5	-7.3	.83	45S	SMOOTHNESS, SHEFFIELD
L190R	G	132.4	258.5	2.4	-5.6	.98	45S	SMOOTHNESS, SHEFFIELD
L575	G	132.8	282.9	24.8	4.0	.97	45S	SMOOTHNESS, SHEFFIELD
L150	G	133.3	271.3	14.5	-1.2	1.39	45S	SMOOTHNESS, SHEFFIELD
L241	G	133.5	274.5	17.4	-.0	1.31	45S	SMOOTHNESS, SHEFFIELD
L323	G	133.6	246.7	-7.9	-11.6	1.12	45S	SMOOTHNESS, SHEFFIELD
L259	G	133.6	274.3	17.3	-.2	1.22	45S	SMOOTHNESS, SHEFFIELD
L159	G	134.1	250.7	-4.1	-10.4	1.27	45S	SMOOTHNESS, SHEFFIELD
L228	G	134.3	262.0	6.4	-6.0	1.16	45S	SMOOTHNESS, SHEFFIELD
L107	G	135.0	275.7	19.1	-.9	1.08	45S	SMOOTHNESS, SHEFFIELD
L366	G	136.8	266.3	11.3	-6.4	1.32	45S	SMOOTHNESS, SHEFFIELD
L224	G	138.1	261.7	7.6	-9.5	1.35	45S	SMOOTHNESS, SHEFFIELD
L231	G	138.1	264.5	10.2	-8.4	1.04	45S	SMOOTHNESS, SHEFFIELD
L139S	G	139.5	264.7	10.9	-9.6	.87	45S	SMOOTHNESS, SHEFFIELD
L352	G	139.7	267.7	13.7	-8.5	.96	45S	SMOOTHNESS, SHEFFIELD
L148	G	140.8	257.9	5.2	-13.6	.89	45S	SMOOTHNESS, SHEFFIELD
L153	G	140.8	283.7	28.8	-2.9	1.12	45S	SMOOTHNESS, SHEFFIELD
L157	G	143.1	269.1	16.4	-11.1	.99	45S	SMOOTHNESS, SHEFFIELD
L277	G	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
+,X,* NOT IN GRAND MEANS
ANALYSIS T45-1
SAMPLE H44
SHEFF. UNITS
220
230
240
250
260
270
280
290
300
SAMPLE B91
80
90
100
110
120
130
140
150
160
170
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 DEV	N.DEV	SDR	R.SDR	SAMPLE H44 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L139B	48.40	1.57	.44	8.58	1.32	17.77	3.34	1.94	1.27	1.56	45K	O	L139B
L162	45.67	-.76	-.17	7.60	1.17	15.33	.90	.52	1.11	1.37	45K	O	L162
L176	49.13	2.71	.60	5.18	.80	13.08	-1.35	-.78	.42	.51	45K	O	L176
L182K	49.53	3.11	.69	5.91	.91	12.92	-1.51	-.87	.50	.61	45K	O	L182K
L190C	40.00	-6.42	-1.42	8.82	1.35	11.93	-2.50	-1.45	.69	.85	45K	O	L190C
L230B	45.47	-.96	-.21	6.86	1.05	13.80	-.63	-.36	1.01	1.25	45K	O	L230B
L232B	41.47	-4.96	-1.10	5.24	.80	13.09	-1.34	-.77	.57	.70	45K	O	L232B
L243K	50.60	4.18	.92	6.95	1.07	15.93	1.50	.87	.61	.75	45K	O	L243K
L274	49.50	3.07	.68	4.05	.62	12.88	-1.55	-.90	.66	.82	45K	O	L274
L291K	51.27	4.84	1.07	7.94	1.22	15.93	1.50	.87	1.58	1.94	45K	O	L291K
L581	48.67	2.24	.50	6.37	.98	15.40	.97	.56	.74	.91	45K	O	L581
L676	37.40	-9.03	-2.00	4.63	.71	15.07	.64	.37	.59	.73	45K	O	L676
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	-.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

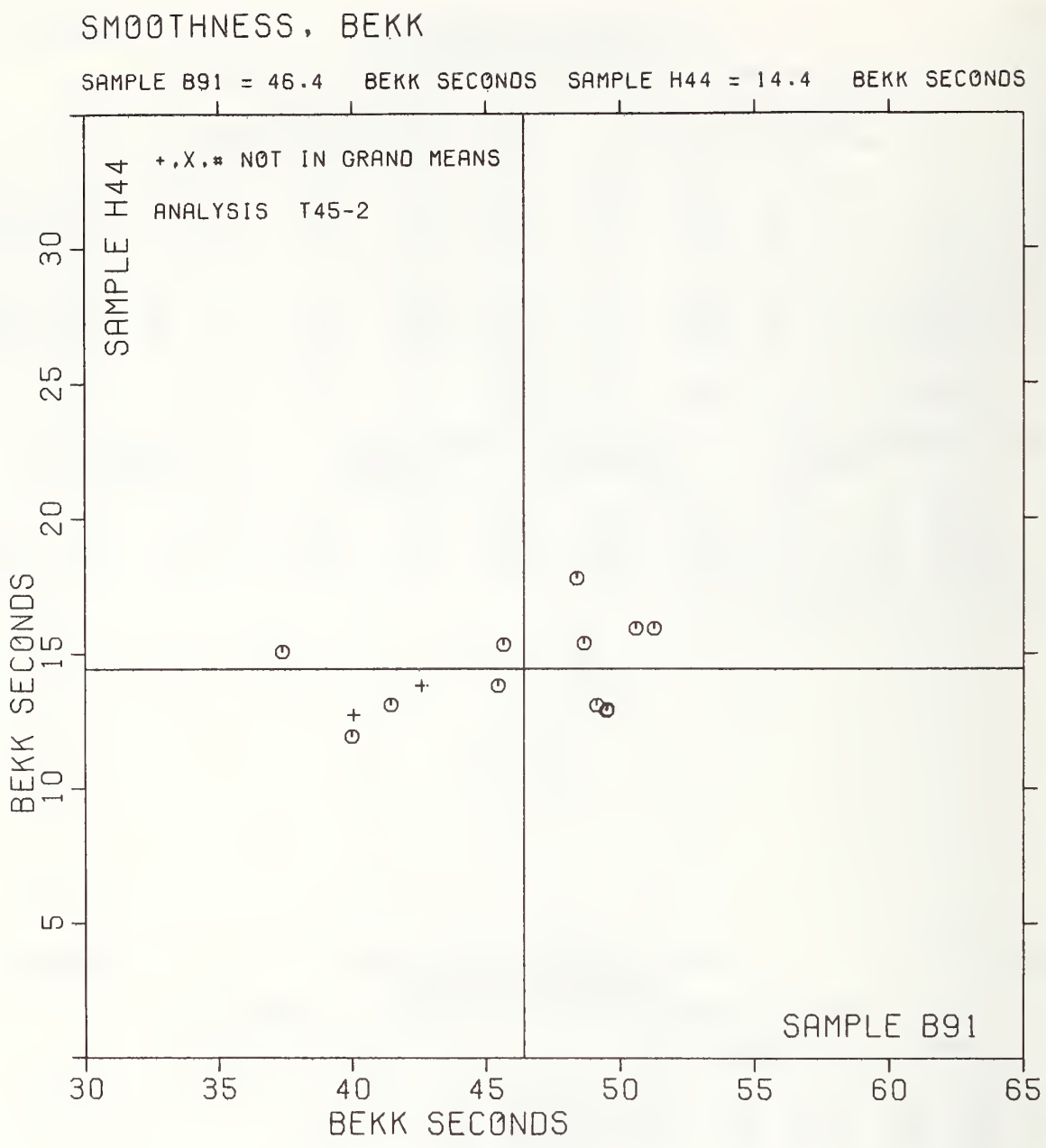
GR. MEAN = 46.42 BEKK SECONDS — GRAND MEAN = 14.43 BEKK SECONDS — TEST DETERMINATIONS = 15
SD MEANS = 4.52 BEKK SECONDS — SD OF MEANS = 1.73 BEKK SECONDS — 12 LABS IN GRAND MEANS
AVERAGE SDR = 6.51 BEKK SECONDS — AVERAGE SDR = .81 BEKK SECONDS

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 B91	H44	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L676	O	37.40	15.07	-8.86	1.82	.72	45K	SMOOTHNESS, BEKK
L190C	O	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	O	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	O	45.47	13.80	-1.03	-.50	1.15	45K	SMOOTHNESS, BEKK
L162	O	45.67	15.33	-.63	1.00	1.27	45K	SMOOTHNESS, BEKK
L139B	O	48.40	17.77	2.40	3.05	1.44	45K	SMOOTHNESS, BEKK
L581	O	48.67	15.40	2.35	.67	.94	45K	SMOOTHNESS, BEKK
L176	O	49.13	13.08	2.51	-1.69	.66	45K	SMOOTHNESS, BEKK
L274	O	49.50	12.88	2.84	-1.94	.72	45K	SMOOTHNESS, BEKK
L182K	O	49.53	12.92	2.88	-1.91	.76	45K	SMOOTHNESS, BEKK
L243K	O	50.60	15.93	4.34	.94	.91	45K	SMOOTHNESS, BEKK
L291K	O	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:				13.69	4.90	WITH GAMMA = 7 DEGREES		


SMOOTHNESS, BEKK
SAMPLE B91 = 46.4 BEKK SECONDS
SAMPLE H44 = 14.4 BEKK SECONDS
+,X,* NOT IN GRAND MEANS
ANALYSIS T45-2
SAMPLE H44
SAMPLE B91
BEKK SECONDS
BEKK SECONDS
5
10
15
20
25
30
35
40
45
50
55
60
65

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ANALYSIS T47-1 TABLE 1

SMOOTHNESS, BENDTSEN

LAB CODE	SAMPLE B91 MEAN	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H44 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F= 10 VAR	F	LAB
L100	127.	2.	.23	13.	.80	437.	8.	.21	31.	.90	47B	6	L100
L176	130.	5.	.62	14.	.89	402.	-27.	-.72	17.	.49	47B	6	L176
L182B	125.	0.	.02	11.	.67	431.	2.	.05	36.	1.06	47B	6	L182B
L236	121.	-4.	-.54	10.	.64	405.	-24.	-.65	21.	.63	47B	6	L236
L242	115.	-10.	-1.25	14.	.85	440.	11.	.29	42.	1.24	47B	6	L242
L243B	136.	11.	1.30	28.	1.73	513.	84.	2.26	32.	.94	47B	6	L243B
L244	118.	-7.	-.91	12.	.73	421.	-8.	-.21	52.	1.52	47B	6	L244
L248	130.	5.	.63	15.	.96	419.	-10.	-.27	43.	1.26	47B	6	L248
L280	135.	9.	1.15	33.	2.08	471.	42.	1.13	47.	1.40	47B	6	L280
L333	110.	-15.	-1.79	10.	.61	377.	-52.	-1.38	32.	.93	47B	6	L333
L484	129.	4.	.53	17.	1.05	402.	-27.	-.72	21.	.62	47B	6	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

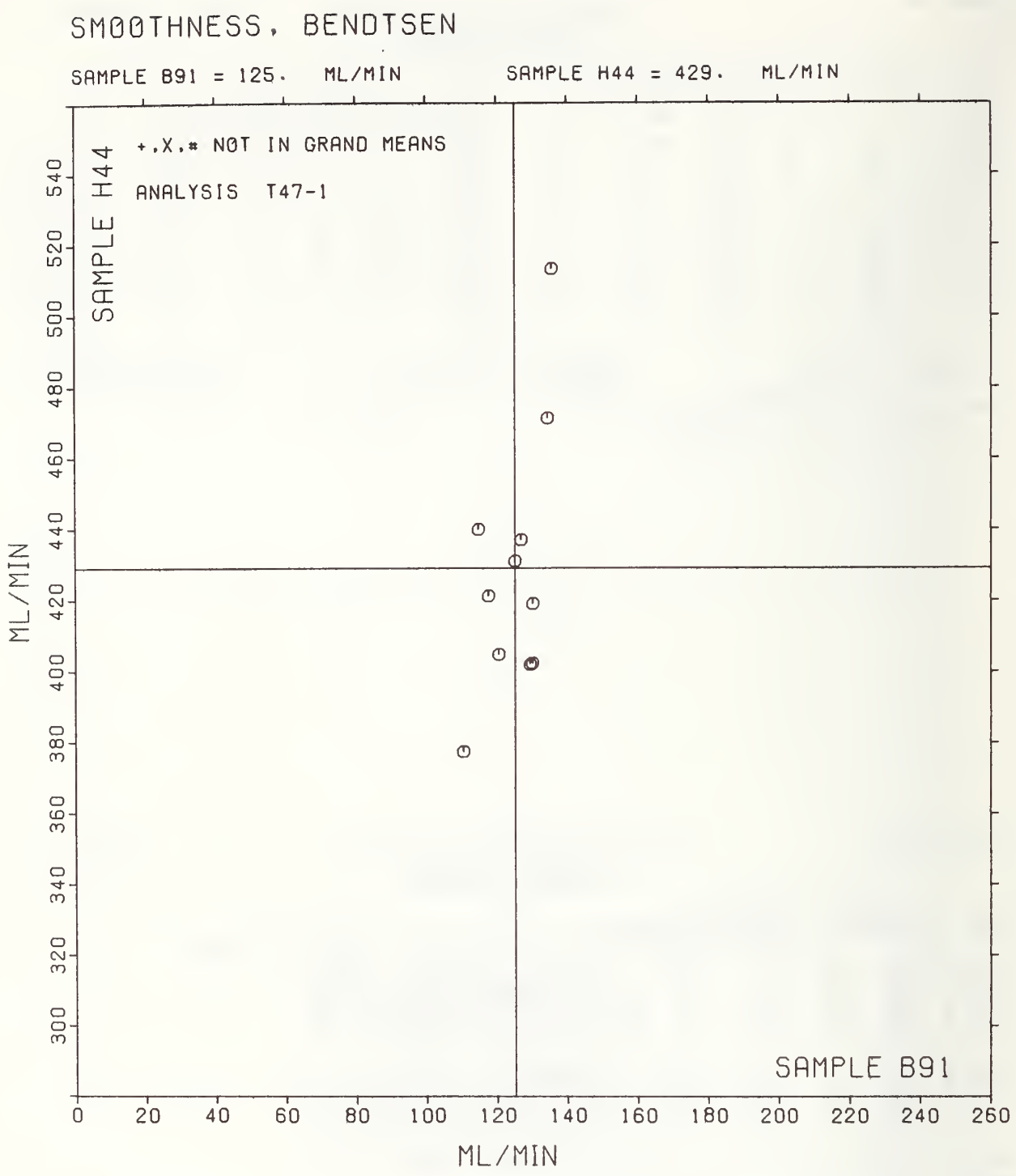
Best Values: B91 125 milliliter per minute
H44 430 milliliter per minute

REPORT NO. 49G TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977

ANALYSIS T47-1 TABLE 2

SMOOTHNESS, BENDTSEN

LAB CODE	F	MEANS B91	H44	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L333	6	110.	377.	-53.	8.	.77	47B	SMOOTHNESS, BENDTSEN, WG 150
L242	6	115.	440.	10.	12.	1.05	47B	SMOOTHNESS, BENDTSEN, WG 150
L244	6	118.	421.	-9.	6.	1.13	47B	SMOOTHNESS, BENDTSEN, WG 150
L236	6	121.	405.	-25.	1.	.64	47B	SMOOTHNESS, BENDTSEN, WG 150
L182B	6	125.	431.	2.	0.	.86	47B	SMOOTHNESS, BENDTSEN, WG 150
L100	6	127.	437.	8.	-1.	.85	47B	SMOOTHNESS, BENDTSEN, WG 150
L484	6	129.	402.	-26.	-8.	.83	47B	SMOOTHNESS, BENDTSEN, WG 150
L176	6	130.	402.	-26.	-9.	.69	47B	SMOOTHNESS, BENDTSEN, WG 150
L248	6	130.	419.	-9.	-6.	1.11	47B	SMOOTHNESS, BENDTSEN, WG 150
L280	6	135.	471.	43.	-4.	1.74	47B	SMOOTHNESS, BENDTSEN, WG 150
L243B	6	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
+,X,* NOT IN GRAND MEANS
ANALYSIS T47-1
SAMPLE H44
ML/MIN
300
320
340
360
380
400
420
440
460
480
500
520
540
SAMPLE B91
0
20
40
60
80
100
120
140
160
180
200
220
240
260
ML/MIN

REPORT NO. 490 TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977
ANALYSIS T56-1 TABLE 1
K & N INK ABSORPTION

LAB CODE	SAMPLE H58 MEAN	PRINTING 106 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E80 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F. = 4 VAR	P	LAB
L126	60.0	-6.7	-1.33	.4	.49	21.3	-4.7	-1.20	.7	.75	56K	6	L126
L149	56.7	-10.0	-1.97	1.0	1.10	21.7	-4.2	-1.08	.5	.51	56K	6	L149
L182	72.0	5.3	1.04	.3	.30	32.5	6.6	1.67	.2	.18	56K	6	L182
L213	68.7	2.0	.40	.3	.32	25.8	-.2	-.05	1.2	1.21	56K	6	L213
L277	68.0	1.3	.26	1.4	1.62	24.0	-2.0	-.51	1.8	1.85	56K	6	L277
L278	70.4	3.7	.73	.2	.29	30.6	4.6	1.18	1.0	1.04	56K	6	L278
L291	66.7	.0	.01	.7	.79	22.8	-3.1	-.80	2.2	2.23	56K	6	L291
L339	70.2	3.5	.70	1.0	1.10	28.1	2.1	.54	.2	.25	56K	6	L339
L388	67.5	.8	.17	2.6	3.00	26.9	.9	.24	1.0	.99	56K	6	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 OF 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

REPORT NO. 490 TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977
ANALYSIS T56-1 TABLE 2
K & N INK ABSORPTION

LAB CODE	F	MEANS H58	B80	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L149	6	56.7	21.7	-10.5	2.5	.80	56K	INK ABSORPTION, K&N INK TEST
L126	6	60.0	21.3	-8.2	.2	.62	56K	INK ABSORPTION, K&N INK TEST
L291	6	66.7	22.8	-1.8	-2.5	1.51	56K	INK ABSORPTION, K&N INK TEST
L388	6	67.5	26.9	1.2	.3	1.99	56K	INK ABSORPTION, K&N INK TEST
L277	6	68.0	24.0	-.1	-2.4	1.74	56K	INK ABSORPTION, K&N INK TEST
L213	6	68.7	25.8	1.5	-1.4	.76	56K	INK ABSORPTION, K&N INK TEST
L339	6	70.2	28.1	4.1	-.4	.68	56K	INK ABSORPTION, K&N INK TEST
L278	6	70.4	30.6	5.7	1.6	.67	56K	INK ABSORPTION, K&N INK TEST
L182	6	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		

REPORT NO. 49G TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977
ANALYSIS T57-1 TABLE 1
HYDROGEN ION CONCENTRATION (PH), COLD
TAPPI STANDARD T509 SU-68

LAB CODE	SAMPLE B01 MEAN	BAG BOND 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E47 MEAN	COATED GLOSS 105 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 5 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	0	L182C
L251C	5.602	-.070	-.31	.065	1.29	8.354	-.000	-.00	.043	.92	57P	0	L251C
L274	5.600	-.072	-.32	.000	.00	8.600	.246	1.70	.000	.00	57V	0	L274
L328	6.040	.368	1.64	.114	2.26	8.260	-.094	-.65	.055	1.16	57M	0	L328
L356	5.436	-.236	-1.05	.029	.57	8.318	-.036	-.25	.048	1.02	57V	0	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
AVERAGE SDR * .051 PH UNITS AVERAGE SDR * .047 PH UNITS
TOTAL NUMBER OF LABORATORIES REPORTING * 6

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: 174C.

REPORT NO. 49G TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977
ANALYSIS T57-1 TABLE 2
HYDROGEN ION CONCENTRATION (PH), COLD
TAPPI STANDARD T509 SU-68

LAB CODE	F	MEANS B01	E47	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L356	0	5.436	8.318	-.212	-.110	.80	57V	PH, COLD, BECKMAN EXPANDOMATIC
L274	0	5.600	8.600	-.146	.210	.00	57V	PH, COLD, BECKMAN EXPANDOMATIC
L251C	0	5.602	8.354	-.066	-.023	1.10	57P	PH, COLD, RADIOMETER TYPE PH M64
L182C	0	5.680	8.240	.044	-.106	1.39	57D	PH, COLD, RADIOMETER TYPE PH M 28
L328	0	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		

REPORT NO. 490 TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977
ANALYSIS T57-2 TABLE 1
HYDROGEN ION CONCENTRATION (PH), HOT
TAPPI STANDARD T435 SU-68

LAB CODE	SAMPLE B01 MEAN	RAG BOND 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E47 MEAN	COATED GLOSS 105 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L128	5.140	-.190	-1.16	.022	.44	8.890	.024	.09	.042	.84	57L	6	L128
L131	5.560	.230	1.41	.089	1.77	8.480	-.386	-1.42	.045	.89	57L	6	L131
L162	5.288	-.042	-.25	.041	.81	9.190	.324	1.19	.029	.58	57C	6	L162
L182E	5.240	-.090	-.55	.055	1.09	9.030	.164	.60	.045	.89	57E	6	L182E
L315	5.420	.090	.55	.045	.89	8.740	-.126	-.46	.089	1.79	57W	6	L315

TEST D.= 5

GR. MEAN = 5.330 PH UNITS GRAND MEAN = 8.866 PE UNITS TEST DETERMINATIONS = 5
SD MEANS = .164 PB UNITS SD OF MEANS = .273 PE UNITS 5 LABS IN GRAND MEANS
AVERAGE SDR = .050 PE UNITS AVERAGE SDR = .050 PE UNITS
TOTAL NUMBER OF LABORATORIES REPORTING = 5

Best Values: B01 5.3 pH units
E47 8.9 pH units

REPORT NO. 490 TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977
ANALYSIS T57-2 TABLE 2
HYDROGEN ION CONCENTRATION (PH), HOT
TAPPI STANDARD T435 SU-68

LAB CODE	F	MEANS B01	E47	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L128	6	5.140	8.890	-.108	-.158	.64	57L	PH, HOT, L*N
L182H	6	5.240	9.030	-.187	-.005	.99	57E	PH, HOT, RADIOMETER TYPE PE M 28
L162	6	5.288	9.190	-.307	.111	.70	57C	PE, HOT, CORNING MODEL 12 RESEARCH METER
L315	6	5.420	8.740	.153	.023	1.34	57W	PH, HOT, METROHM
L131	6	5.560	8.480	.449	.028	1.33	57L	PE, HOT, L*N
GMEANS:		5.330	8.866			1.00		
95% ELLIPSE:				1.526	.495	WITE GAMMA =-62 DEGREES		

ANALYSIS T60-1 TABLE 1

OPACITY (89% REFLECTANCE BACKING) IN PERCENT

TAPPI STANDARD T425 OS-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

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

ANALYSIS T60-1 TABLE 1

OPACITY (89% REFLECTANCE BACKING) IN PERCENT

TAPPI STANDARD T425 OS-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	SAMPLE H50 MEAN	PRINTING 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E40 MEAN	COATED DULL 117 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.- 10 VAR	F	LAB
L378	90.69	.73	1.45	.38	.92	96.73	.56	1.66	.09	.46	60D	O	L378
L390	89.45	-.51	-1.01	.46	1.12	95.60	-.57	-1.70	.18	.86	60B	O	L390
L502D	89.68	-.28	-.55	.30	.75	95.82	-.35	-1.04	.17	.82	60D	O	L502D
L502B	89.17	-.79	-1.56	.45	1.10	96.01	-.16	-.48	.02	.10	60B	O	L502B
L502R	89.78	-.18	-.35	.33	.80	96.32	.15	.44	.08	.38	60R	O	L502R
L523	89.80	-.16	-.31	.35	.86	96.12	-.05	-.15	.10	.50	60R	O	L523
L543	89.46	-.50	-.99	.33	.80	95.95	-.22	-.66	.05	.26	60D	O	L543
L573	90.33	.37	.73	.39	.95	96.28	.11	.32	.12	.60	60B	O	L573
L581	90.23	.27	.54	.48	1.17	96.26	.09	.27	.12	.57	60B	O	L581
L587	90.30	.34	.68	.32	.79	96.07	-.10	-.30	.13	.61	60B	O	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	O	L599
GR. MEAN - 89.96 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

ANALYSIS T60-1 TABLE 2

OPACITY (89% REFLECTANCE BACKING) IN PERCENT

TAPPI STANDARD T425 OS-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

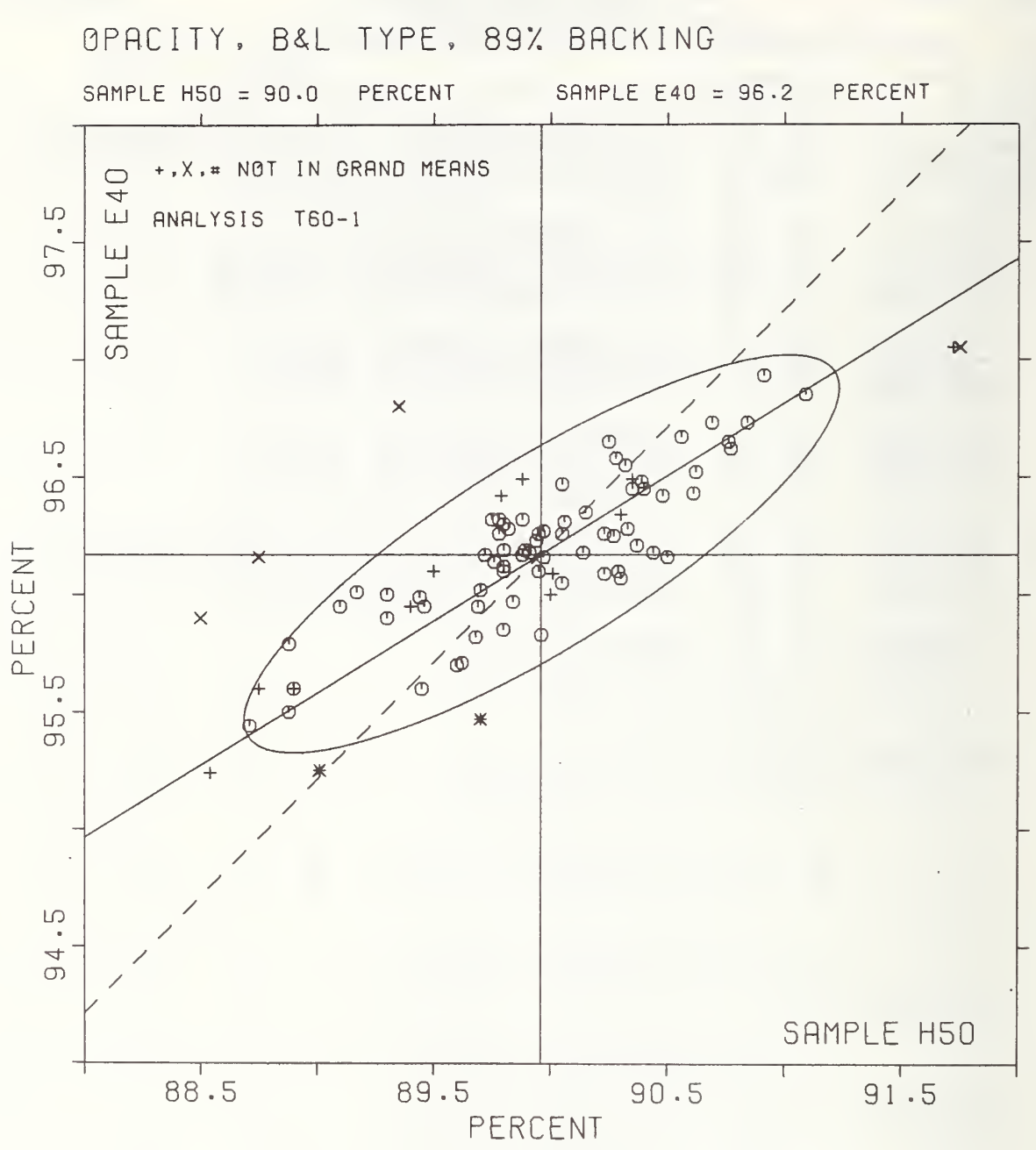
LAB CODE	F	MEANS B50	E40	COORDINATES MAJOR	MINOR	AVG E.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L597	X	88.50	95.90	-1.38	.53	2.38	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L309	*	88.54	95.24	-1.70	-.05	.95	60A	OPACITY (WHITE BACKING), ZEISS ELREPHO, FILTER 4,86% BACKING
L238A	O	88.71	95.44	-1.45	.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	O	88.88	95.50	-1.27	-.01	1.83	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L125	O	88.88	95.79	-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	O	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	O	89.10	95.95	-.85	.26	1.02	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L502H	O	89.17	96.01	-.76	.28	.60	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L354	O	89.30	95.90	-.70	.11	1.36	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L131	O	89.30	96.00	-.65	.20	.59	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L150	X	89.35	96.80	-.19	.85	2.50	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L232	*	89.40	95.95	-.59	.11	.87	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L211S	O	89.44	95.99	-.54	.12	.48	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L390	O	89.45	95.60	-.73	-.22	.99	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L543	O	89.46	95.95	-.54	.07	.53	60D	OPACITY (WHITE BACKING), DIANO/BNL
L260	*	89.50	96.10	-.43	.18	.88	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L366	O	89.60	95.70	-.55	-.21	1.62	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L236B	O	89.62	95.71	-.53	-.21	2.02	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L502D	O	89.68	95.82	-.42	-.15	.78	60D	OPACITY (WHITE BACKING), DIANO/BNL
L148H	O	89.69	95.95	-.34	-.05	.88	60H	OPACITY (WHITE BACKING), HUYGEN
L315	O	89.70	96.02	-.30	.01	.78	60D	OPACITY (WHITE BACKING), DIANO/BNL
L241	*	89.70	95.47	-.59	-.46	2.25	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L132	O	89.72	96.17	-.20	.12	.83	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L305	O	89.75	96.32	-.10	.24	.95	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L122	O	89.76	96.14	-.19	.08	.88	60D	OPACITY (WHITE BACKING), DIANO/BNL
L502R	O	89.78	96.32	-.07	.22	.59	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L172	O	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	O	89.80	96.12	-.16	.04	.68	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L339	O	89.80	95.85	-.30	-.19	2.13	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L333	O	89.80	96.10	-.17	.02	1.54	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L318	O	89.80	96.30	-.07	.19	1.51	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L285B	O	89.80	95.85	-.30	-.19	1.34	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L255	O	89.80	96.19	-.12	.10	1.11	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L317	O	89.82	96.28	-.06	.17	1.70	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L124	O	89.84	95.97	-.21	-.11	.76	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L224	*	89.88	96.49	.10	.31	.91	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L223B	O	89.88	96.32	.01	.17	.82	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L230	O	89.88	96.17	-.07	.04	.63	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L123	O	89.89	96.19	-.05	.05	.96	60W	OPACITY (WHITE BACKING), BUYGEN,DIGITAL
L275	O	89.91	96.18	-.04	.03	.69	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L190R	O	89.94	96.23	.02	.06	.64	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L118	O	89.95	96.26	.04	.08	.91	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L158	O	89.95	96.10	-.04	-.06	.74	60D	OPACITY (WHITE BACKING), DIANO/BNL
L206	O	89.96	95.83	-.18	-.29	.81	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L159	O	89.97	96.27	.06	.08	.65	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L213	O	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	O	90.05	96.05	.01	-.15	1.14	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L254	O	90.05	96.26	.12	.03	.41	60H	OPACITY (WHITE BACKING), HUYGEN
L352	O	90.05	96.47	.23	.21	.92	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L162	O	90.06	96.31	.16	.07	1.11	60W	OPACITY (WHITE BACKING), HUYGEN,DIGITAL
L190C	O	90.06	96.31	.16	.07	.60	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L173A	O	90.14	96.18	.16	-.09	.55	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L182	O	90.15	96.35	.26	.05	1.23	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L581	O	90.23	96.26	.28	-.07	.87	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L210B	O	90.23	96.09	.19	-.21	.68	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L599	O	90.25	96.65	.50	.26	1.95	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L243	O	90.27	96.25	.31	-.10	.93	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L115	O	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 OS-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	P	MEANS R50	MEANS E40	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L262	O	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 ELREPHO, PMY-C(10) FILTER
L587	O	90.30	96.07	.24	-.26	.70	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L139	O	90.32	96.55	.51	.13	.82	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L573	O	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	O	90.35	96.45	.48	.03	1.34	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L323	O	90.37	96.21	.37	-.18	1.32	60W	OPACITY (WHITE BACKING), BUYGEN,DIGITAL
L134	O	90.39	96.48	.53	.04	1.49	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L225	O	90.40	96.45	.52	.01	1.12	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L259	O	90.44	96.18	.41	-.24	.91	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L225B	O	90.48	96.42	.57	-.06	1.10	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L288	O	90.50	96.16	.46	-.29	1.04	60D	OPACITY (WHITE BACKING), DIANO/BNL
L308	O	90.56	96.67	.77	.11	.64	60B	OPACITY (WHITE BACKING), BUYGEN
L183	O	90.61	96.43	.69	-.12	1.04	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L228	O	90.62	96.52	.75	-.05	1.18	60H	OPACITY (WHITE BACKING), HUYGEN
L378	O	90.69	96.73	.92	.09	.69	60D	OPACITY (WHITE BACKING), DIANO/BNL
L121	O	90.76	96.65	.93	-.01	.84	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L108	O	90.77	96.62	.93	-.04	.70	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L326	O	90.84	96.73	1.04	.01	1.31	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L261	O	90.91	96.93	1.21	.15	.27	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L285R	O	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 ELREPHO, PMY-C(10) FILTER
L278	X	91.75	97.05	1.99	-.19	.44	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L274P	*	93.35	96.60	3.11	-1.41	1.99	60P	OPACITY (WHITE BACKING), PHOTOVOLT
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
+,X,* NOT IN GRAND MEANS
ANALYSIS T60-1
SAMPLE E40
PERCENT
97.5
96.5
95.5
94.5
SAMPLE H50
88.5
89.5
90.5
91.5
PERCENT

REPORT NO. 49G TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977

ANALYSIS T60-2 TABLE 1

OPACITY (PAPER BACKING) IN PERCENT

TAPPI STANDARD T425 OS-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	SAMPLE B50 MEAN	PRINTING 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E40 MEAN	COATED DULL 117 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	P	LAB	TEST D.= 10
L115	91.56	.12	.25	.32	.70	96.31	.16	.92	.31	1.16	60C	O	L115	
L118	91.52	.08	.17	.46	1.00	96.19	.04	.25	.17	.65	60C	O	L118	
L182B	92.13	.69	1.40	.45	.98	95.91	-.24	-1.32	.26	.98	60C	O	L182B	
L190C	91.43	-.01	-.02	.29	.64	96.00	-.15	-.82	.09	.35	60C	O	L190C	
L190R	91.56	.12	.25	.27	.58	96.25	.10	.58	.13	.48	60C	O	L190R	
L236B	91.26	-.18	-.36	.55	1.20	96.28	.13	.75	.38	1.43	60C	O	L236B	
L243	91.67	.23	.47	.45	.99	96.27	.12	.69	.15	.56	60C	O	L243	
L274	90.30	-1.14	-2.30	1.32	2.87	96.00	-.15	-.82	1.05	3.97	60C	O	L274	
L502D	91.89	.46	.92	.30	.66	96.42	.27	1.53	.10	.39	60V	O	L502D	
L502E	91.61	.18	.36	.32	.70	96.09	-.05	-.28	.14	.54	60C	O	L502H	
L543	90.88	-.56	-1.13	.31	.67	95.88	-.27	-1.49	.13	.50	60V	O	L543	

GR. MEAN = 91.44 PERCENT GRAND MEAN = 96.15 PERCENT TEST DETERMINATIONS = 10

SD MEANS = .49 PERCENT SD OF MEANS = .18 PERCENT 11 LABS IN GRAND MEANS

AVERAGE SDR = .46 PERCENT AVERAGE SDR = .27 PERCENT

TOTAL NUMBER OF LABORATORIES REPORTING = 11

Best Values: H50 91.7 percent
E40 96.2 percent

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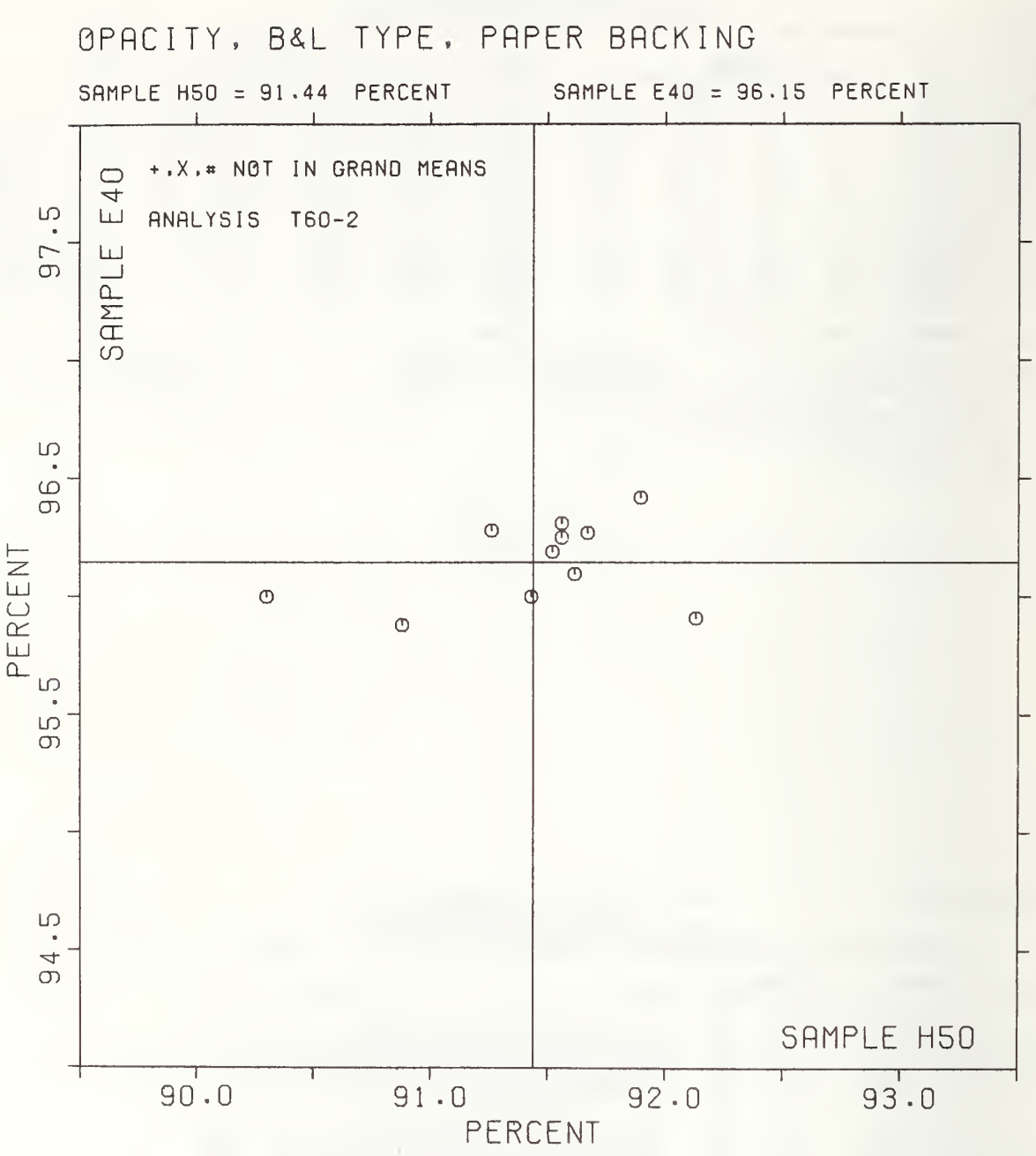
ANALYSIS T60-2 TABLE 2

OPACITY (PAPER BACKING) IN PERCENT

TAPPI STANDARD T425 OS-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	F	MEANS B50	E40	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L274	O	90.30	96.00	-1.15	.02	3.42	60C	OPACITY (PAPER BACKING), BAUSCH + LOMB
L543	O	90.88	95.88	-.59	-.18	.58	60V	OPACITY (PAPER BACKING), DIANO/BNL
L236B	O	91.26	96.28	-.16	.16	1.31	60C	OPACITY (PAPER BACKING), BAUSCH + LOMB
L190C	O	91.43	96.00	-.03	-.14	.50	60C	OPACITY (PAPER BACKING), BAUSCH + LOMB
L118	O	91.52	96.19	.09	.03	.82	60C	OPACITY (PAPER BACKING), BAUSCH + LOMB
L190R	O	91.56	96.25	.14	.09	.53	60C	OPACITY (PAPER BACKING), BAUSCH + LOMB
L115	O	91.56	96.31	.14	.15	.93	60C	OPACITY (PAPER BACKING), BAUSCH + LOMB
L502H	O	91.61	96.09	.17	-.08	.62	60C	OPACITY (PAPER BACKING), BAUSCH + LOMB
L243	O	91.67	96.27	.25	.09	.77	60C	OPACITY (PAPER BACKING), BAUSCH + LOMB
L502D	O	91.89	96.42	.49	.21	.53	60V	OPACITY (PAPER BACKING), DIANO/BNL
L182R	O	92.13	95.91	.65	-.33	.98	60C	OPACITY (PAPER BACKING), BAUSCH + LOMB
GMEANS:		91.44	96.15			1.00		
		95% ELLIPSE:		1.54	.51	WITH GAMMA = 8 DEGREES		


OPACITY, B&L TYPE, PAPER BACKING
SAMPLE H50 = 91.44 PERCENT
SAMPLE E40 = 96.15 PERCENT
+,X,* NOT IN GRAND MEANS
ANALYSIS T60-2
SAMPLE E40
SAMPLE H50
PERCENT
PERCENT
97.5
96.5
95.5
94.5
90.0
91.0
92.0
93.0

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ANALYSIS T60-3 TABLE 1

OPACITY (PAPER BACKING) IN PERCENT

TAPPI SUGGESTED METHOD T519 SU-70, DIFFUSE OPACITY OF PAPER - ILLUMINANT C, HEREPHO TYPE

LAB CODE	SAMPLE H50 MEAN	PRINTING 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E40 MEAN	COATED DULL 117 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L100	92.62	.02	.08	.27	1.06	96.78	.04	.27	.12	1.03	60J	O	L100
L150	92.34	-.25	-.83	.20	.79	96.61	-.12	-.79	.11	.93	60J	O	L150
L182E	92.59	-.01	-.02	.40	1.55	96.71	-.03	-.18	.10	.84	60J	O	L182E
L242	93.02	.43	1.41	.17	.65	96.91	.17	1.08	.16	1.38	60J	O	L242
L244	92.08	-.52	-1.70	.28	1.09	96.38	-.36	-2.29	.10	.87	60P	O	L244
L250T	92.78	.18	.60	.27	1.06	96.70	-.04	-.25	.16	1.37	60J	O	L250T
L251	92.73	.13	.43	.18	.72	96.82	.08	.50	.13	1.06	60F	O	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	O	L446
L484	93.11	.52	1.70	.28	1.12	96.98	.24	1.54	.09	.80	60P	O	L484
L502	92.46	-.14	-.45	.27	1.05	96.77	.03	.19	.11	.89	60J	O	L502
L575	92.46	-.14	-.46	.23	.90	96.77	.03	.20	.12	.97	60J	O	L575
GR. MEAN = 92.60 PERCENT						GRAND MEAN = 96.74 PERCENT					TEST DETERMINATIONS = 10		
SD MEANS = .30 PERCENT						SD OF MEANS = .16 PERCENT					11 LABS 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.

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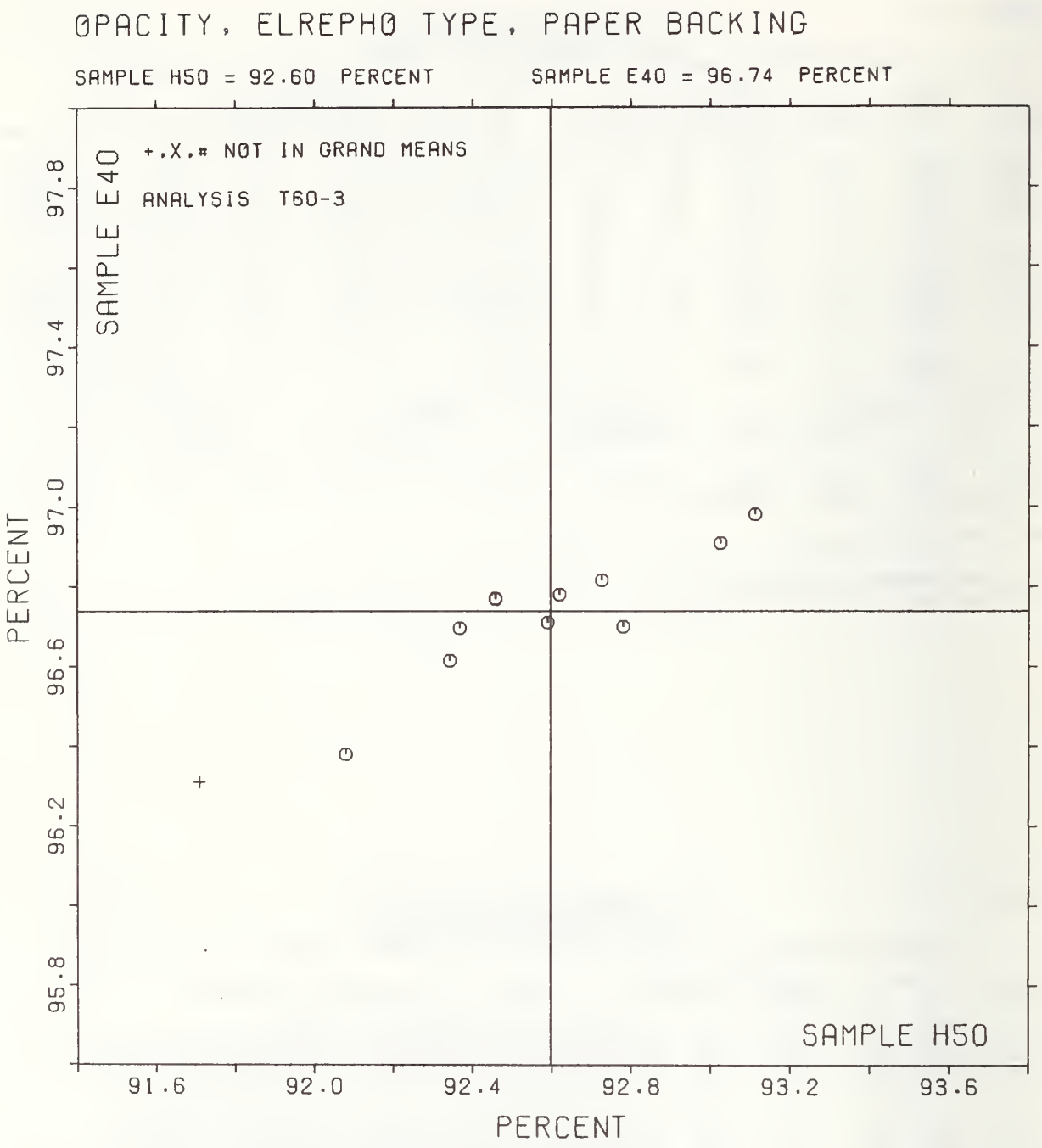
ANALYSIS T60-3 TABLE 2

OPACITY (PAPER BACKING) IN PERCENT

TAPPI SUGGESTED METHOD T519 SU-70, DIFFUSE OPACITY OF PAPER - ILLUMINANT C, ELREPHO TYPE

LAB CODE	F	MEANS H50	E40	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L253C	*	91.71	96.31	-.98	-.00	1.22	60G	OPACITY (PAPER BACKING), GARDNER
L244	O	92.08	96.38	-.62	-.10	.98	60P	OPACITY (PAPER BACKING), ZEISS ELREPHO, PMY-C(10) NO TRAP
L150	O	92.34	96.61	-.28	-.00	.86	60J	OPACITY (PAPER BACKING),Z.ELREPHO,PMY-C,GLOSS TRAP
L446	O	92.37	96.70	-.22	.06	.93	60J	OPACITY (PAPER BACKING),Z.ELREPHO,PMY-C,GLOSS TRAP
L575	O	92.46	96.77	-.11	.09	.94	60J	OPACITY (PAPER BACKING),Z.ELREPHO,PMY-C,GLOSS TRAP
L502	O	92.46	96.77	-.11	.09	.97	60J	OPACITY (PAPER BACKING),Z.ELREPHO,PMY-C,GLOSS TRAP
L182E	O	92.59	96.71	-.02	-.02	1.19	60J	OPACITY (PAPER BACKING),Z.ELREPHO,PMY-C,GLOSS TRAP
L100	O	92.62	96.78	.04	.03	1.05	60J	OPACITY (PAPER BACKING),Z.ELREPHO,PMY-C,GLOSS TRAP
L251	O	92.73	96.82	.15	.01	.89	60P	OPACITY (PAPER BACKING), ZEISS ELREPHO, PMY-C(10) NO TRAP
L250T	O	92.78	96.70	.15	-.11	1.22	60J	OPACITY (PAPER BACKING),Z.ELREPHO,PMY-C,GLOSS TRAP
L242	O	93.02	96.91	.46	-.03	1.02	60J	OPACITY (PAPER BACKING),Z.ELREPHO,PMY-C,GLOSS TRAP
L484	O	93.11	96.98	.57	-.00	.96	60F	OPACITY (PAPER BACKING), ZEISS ELREPHO, PMY-C(10) NO TRAP
L360	#	93.28	82.70	-5.43	-12.96	1.29	60F	OPACITY (PAPER BACKING), ZEISS ELREPHO, PMY-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
+,X,* NOT IN GRAND MEANS
ANALYSIS T60-3
SAMPLE E40
PERCENT
97.8
97.4
97.0
96.6
96.2
95.8
SAMPLE H50
91.6
92.0
92.4
92.8
93.2
93.6
PERCENT

ANALYSIS T65-1 TABLE 1

DIRECTIONAL BLUE REFLECTANCE IN PERCENT

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

LAB CODE	SAMPLE H52 MEAN	PRINTING 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E41 MEAN	COATED GLOSS 151 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 8 VAR	F	LAB
L108	68.79	.03	.11	.17	.62	82.72	-.16	-.59	.32	1.00	65M	G	L108
L122	68.56	-.20	-.75	.13	.47	82.47	-.41	-1.51	.38	1.20	65N	G	L122
L132	69.20	.44	1.68	.34	1.24	83.42	.54	1.98	.34	1.06	65N	G	L132
L158	69.24	.48	1.83	.13	.47	83.20	.31	1.15	.25	.78	65N	G	L158
L172	68.82	.07	.25	.16	.57	83.01	.13	.46	.22	.68	65A	G	L172
L176	69.19	.43	1.64	.25	.90	83.07	.19	.69	.25	.78	65A	G	L176
L190C	68.80	.04	.16	.19	.70	82.64	-.25	-.92	.41	1.29	65A	G	L190C
L210M	68.59	-.17	-.65	.11	.41	82.90	.01	.05	.32	.99	65M	G	L210M
L210N	68.96	.20	.78	.20	.72	82.92	.04	.14	.29	.89	65N	G	L210N
L211	68.95	.19	.73	.35	1.27	82.91	.03	.10	.19	.59	65N	G	L211
L225	68.70	-.06	-.22	.23	.82	82.90	.01	.05	.09	.29	65N	G	L225
L243	68.51	-.25	-.94	.16	.59	82.56	-.32	-1.19	.15	.47	65A	G	L243
L259	68.36	-.40	-1.51	.90	3.25	83.01	.13	.46	.63	1.96	65M	G	L259
L275	68.55	-.21	-.80	.28	1.00	82.65	-.24	-.87	.23	.71	65M	G	L275
L288	68.65	-.11	-.41	.29	1.04	82.72	-.16	-.59	.19	.59	65N	G	L288
L308	68.77	.02	.06	.33	1.20	82.96	.08	.28	.53	1.67	65N	G	L308
L315	68.46	-.30	-1.13	.25	.91	83.01	.13	.46	.48	1.49	65N	G	L315
L317	69.07	.32	1.21	.13	.46	82.54	-.35	-1.28	.29	.90	65M	G	L317
L502	68.73	-.03	-.10	.31	1.11	82.86	-.03	-.11	.42	1.31	65A	G	L502
L523	68.40	-.36	-1.37	.22	.80	82.62	-.26	-.96	.33	1.02	65N	G	L523
L598	68.61	-.15	-.56	.67	2.44	83.49	.60	2.21	.43	1.35	65M	G	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

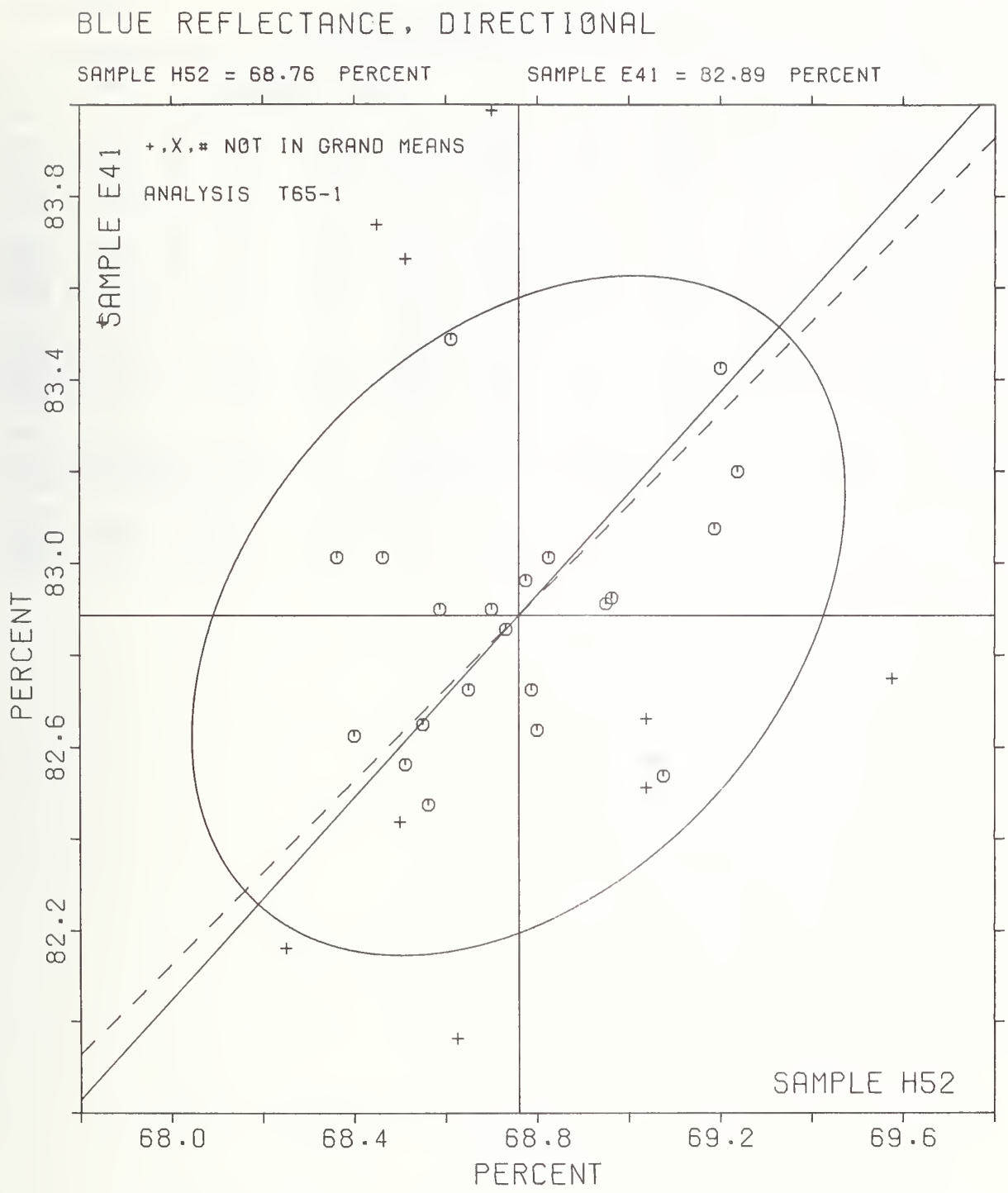
L105	67.85	-.91	-3.46	.23	.82	83.52	.64	2.35	.33	1.02	65T	*	L105
L213	68.45	-.31	-1.18	.14	.51	83.74	.85	3.13	.33	1.04	65T	*	L213
L223	68.62	-.13	-.51	.18	.63	81.96	-.92	-3.40	.18	.55	65G	*	L223
L224	69.57	.82	3.11	.20	.72	82.75	-.14	-.50	.52	1.61	65H	*	L224
L232	69.12	.37	1.40	.23	.84	84.12	1.24	4.56	.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	-.99	.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

ANALYSIS T65-1 TABLE 2
DIRECTIONAL BLUE REFLECTANCE IN PERCENT
TAPPI STANDARD T452 M-58, 'BRIGHTNESS'; MARTIN SWEETS (ACBT & GE) IS STANDARD FOR THIS ANALYSIS

LAB CODE	P	MEANS B52	MEANS E41	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L591	*	67.34	84.07	-.08	1.85	1.07 65B	BLUE REFLECTANCE (DIRECTIONAL), BUNTER
L105	*	67.85	83.52	-.14	1.10	.92 65T	BLUE REFLECTANCE (DIRECTIONAL), BUNTER D25D2M
L587	*	68.25	82.16	-.88	-.11	.95 65I	BLUE REFLECTANCE (DIRECTIONAL), BUNTER D25D2A
L259	O	68.36	83.01	-.17	.38	2.61 65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L523	O	68.40	82.62	-.43	.09	.91 65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L213	*	68.45	83.74	.42	.80	.78 65T	BLUE REFLECTANCE (DIRECTIONAL), BUNTER D25D2M
L315	O	68.46	83.01	-.11	.30	1.20 65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L388	*	68.50	82.44	-.51	-.11	.65 65F	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L543	*	68.51	83.66	.41	.70	.80 65B	BLUE REFLECTANCE (DIRECTIONAL), BUNTER
L243	O	68.51	82.56	-.41	-.04	.53 65A	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (ACBT),S-2
L275	O	68.55	82.65	-.32	-.00	.86 65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L122	O	68.56	82.47	-.44	-.13	.83 65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L210M	O	68.59	82.90	-.10	.14	.70 65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L598	O	68.61	83.49	.35	.51	1.89 65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L223	*	68.62	81.96	-.77	-.52	.59 65G	BLUE REFLECTANCE (DIRECTIONAL), GARDNER
L288	O	68.65	82.72	-.19	-.03	.82 65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L256	*	68.70	83.99	.78	.78	.85 65B	BLUE REFLECTANCE (DIRECTIONAL), HUNTER
L225	O	68.70	82.90	-.03	.05	.55 65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L502	O	68.73	82.86	-.04	-.00	1.21 65A	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (ACBT),S-2
L308	O	68.77	82.96	.07	.04	1.43 65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L108	O	68.79	82.72	-.10	-.13	.81 65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L190C	O	68.80	82.64	-.16	-.20	.99 65A	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (ACBT),S-2
L172	O	68.82	83.01	.14	.04	.62 65A	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (ACBT),S-2
L211	O	68.95	82.91	.15	-.12	.93 65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L210N	O	68.96	82.92	.17	-.13	.81 65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L260	*	69.04	82.66	.02	-.36	.53 65F	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L249	*	69.04	82.51	-.09	-.46	1.11 65F	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L317	O	69.07	82.54	-.05	-.47	.68 65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L232	*	69.12	84.12	1.16	.56	.78 65F	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L176	O	69.19	83.07	.43	-.19	.84 65A	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (ACBT),S-2
L132	O	69.20	83.42	.70	.03	1.15 65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L158	O	69.24	83.20	.55	-.14	.63 65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L224	*	69.57	82.75	.45	-.70	1.16 65B	BLUE REFLECTANCE (DIRECTIONAL), HUNTER
L321	*	70.37	85.06	2.70	.26	.92 65F	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L339	*	71.00	85.94	3.77	.39	.76 65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L562	*	71.06	84.37	2.65	-.71	.94 65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L278	*	71.12	84.81	3.02	-.46	1.04 65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L380	*	71.56	84.00	2.71	-1.33	.75 65F	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L312	*	71.62	84.00	2.75	-1.38	.64 65F	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L328	*	71.66	85.75	4.07	-.23	1.25 65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
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
+,X,* NOT IN GRAND MEANS
ANALYSIS T65-1
SAMPLE E41
PERCENT
83.8
83.4
83.0
82.6
82.2
SAMPLE H52
68.0
68.4
68.8
69.2
69.6
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)

	SAMPLE	PRINTING				SAMPLE	COATED GLOSS				TEST D.* 8	
LAB	B52	74 GRAMS PER SQUARE METER				E41	151 GRAMS PER SQUARE METER					
CODE	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 @	L100
L121	67.96	-.24	-.28	.29	1.54	81.07	-.71	-.98	.38	1.63	65K @	L121
L150	67.58	-.62	-.72	.28	1.49	81.63	-.15	-.20	.21	.90	65Q @	L150
L170	68.46	.26	.31	.05	.28	81.54	-.24	-.33	.07	.32	65B @	L170
L182	68.33	.13	.15	.17	.94	81.76	-.01	-.01	.19	.83	65F @	L182
L210K	69.58	1.38	1.61	.18	.98	82.72	.95	1.32	.20	.86	65K @	L210K
L242	66.45	-1.75	-2.04	.12	.64	80.89	-.88	-1.23	.31	1.32	65F @	L242
L250T	68.66	.46	.54	.28	1.50	82.00	.23	.32	.23	.99	65F @	L250T
L280	68.67	.47	.55	.15	.81	82.13	.36	.50	.32	1.35	65Q @	L280
L325	69.53	1.33	1.55	.23	1.23	82.79	1.01	1.42	.18	.78	65F @	L325
L349	67.48	-.72	-.84	.15	.79	81.08	-.69	-.97	.24	1.03	65K @	L349
L362	67.89	-.31	-.36	.32	1.75	81.22	-.56	-.77	.11	.45	65K @	L362
L446	67.80	-.40	-.46	.14	.77	81.22	-.55	-.77	.26	1.10	65F @	L446
L502A	67.07	-1.13	-1.31	.22	1.18	81.19	-.58	-.81	.34	1.45	65B @	L502A
L573	69.33	1.13	1.31	.14	.76	83.37	1.60	2.23	.18	.77	65F @	L573
L575	68.37	.17	.19	.12	.64	81.52	-.25	-.35	.25	1.07	65F @	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	65G *	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

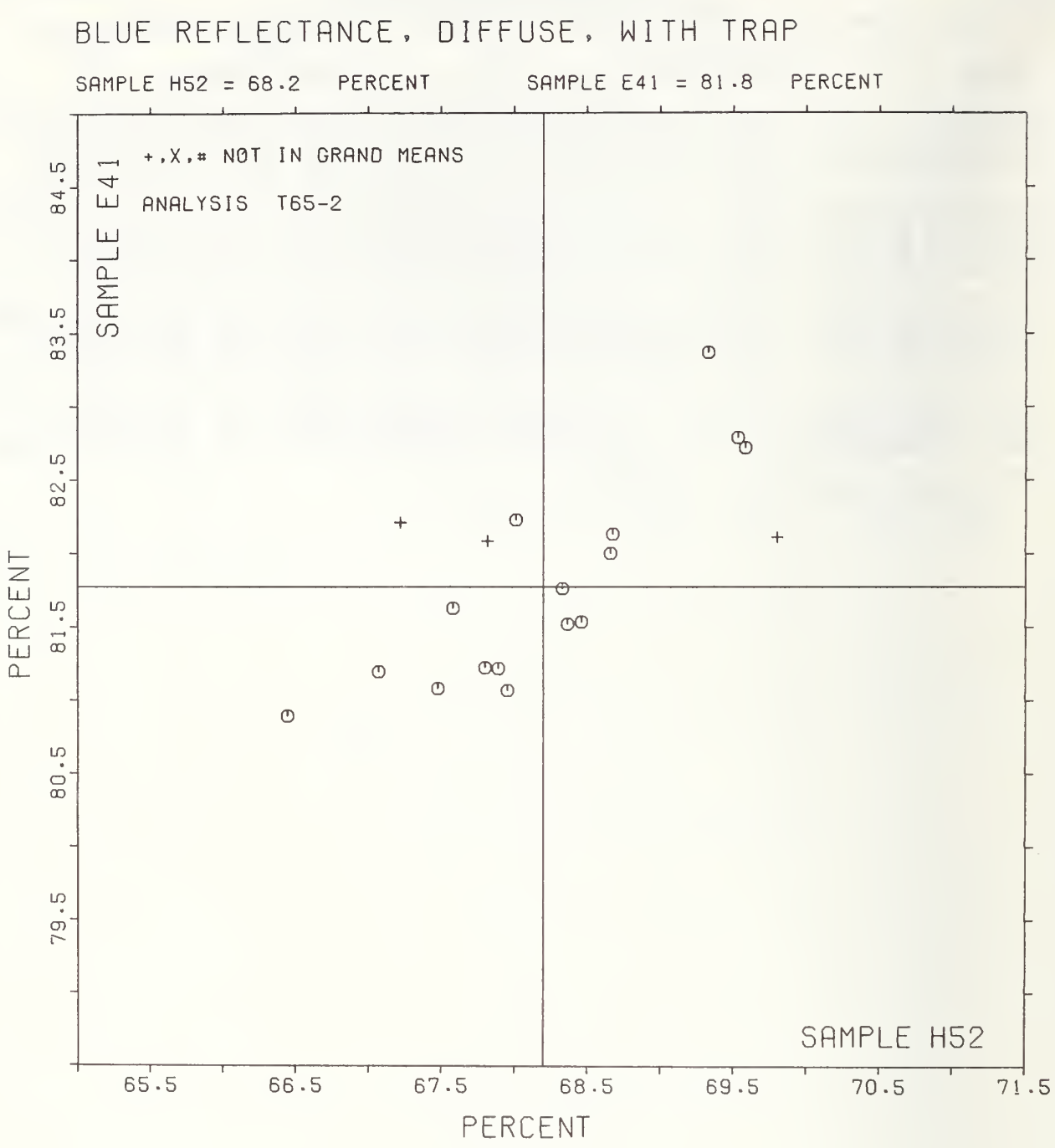
Best Values: H52 68.0 ± 1.5 percent
E41 81.5 ± 1.3 percent

ANALYSIS T65-2 TABLE 2

DIFFUSE BLUE REFLECTANCE IN PERCENT (GLOSS TRAP)

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

LAB CODE	F	MEANS B52	MEANS E41	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L242	O	66.45	80.89	-1.92	.42	.98	65F	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L502A	O	67.07	81.19	-1.24	.26	1.31	65B	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NBS ABSOLUTE BASE
L502C	*	67.22	82.21	-.49	.95	1.01	65Y	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NBS ABSOLUTE, PMZC
L349	O	67.48	81.08	-.99	-.09	.91	65K	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, MGO (ZEISS) BASE
L150	O	67.58	81.63	-.57	.27	1.20	65Q	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, ZEISS ABSOLUTE BASE
L446	O	67.80	81.22	-.65	-.18	.94	65P	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L502B	*	67.82	82.08	-.10	.48	1.33	65L	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NBS ABSOLUTE, PMZA
L362	O	67.89	81.22	-.59	-.24	1.10	65K	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, MGO (ZEISS) BASE
L121	O	67.96	81.07	-.63	-.40	1.58	65K	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, MGO (ZEISS) BASE
L100	O	68.02	82.23	.15	.47	.93	65P	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L182	O	68.33	81.76	.10	-.09	.88	65P	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L575	O	68.37	81.52	-.03	-.30	.85	65P	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-FTB ABSOLUTE BASE
L170	O	68.46	81.54	.06	-.35	.30	65B	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NBS ABSOLUTE BASE
L250T	O	68.66	82.00	.50	-.11	1.25	65F	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L280	O	68.67	82.13	.60	-.02	1.08	65Q	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, ZEISS ABSOLUTE BASE
L573	O	69.33	83.37	1.88	.53	.76	65F	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L325	O	69.53	82.79	1.67	-.05	1.01	65P	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-FTB ABSOLUTE BASE
L210K	O	69.58	82.72	1.67	-.13	.92	65K	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, MGO (ZEISS) BASE
L289	*	69.80	82.11	1.46	-.74	1.54	65O	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, SPECIFIC CALIBRATION
GMEANS:		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
+,X,# NOT IN GRAND MEANS
ANALYSIS T65-2
SAMPLE E41
SAMPLE H52
PERCENT
PERCENT
84.5
83.5
82.5
81.5
80.5
79.5
65.5
66.5
67.5
68.5
69.5
70.5
71.5

ANALYSIS I65-3 TABLE 1

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 MEAN	PRINTING 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E41 MEAN	COATED GLOSS 151 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L115	68.41	-.69	-.98	.44	2.13	80.35	-1.61	-1.91	.20	.81	65E	O	L115
L152	68.58	-.52	-.73	.10	.48	81.44	-.51	-.61	.19	.78	65E	O	L152
L157	70.26	1.16	1.63	.13	.62	81.77	-.19	-.22	.31	1.30	65E	O	L157
L161	68.43	-.68	-.95	.88	4.29	81.91	-.04	-.05	.26	1.10	65E	O	L161
L173A	69.94	.84	1.18	.05	.26	81.41	-.55	-.65	.21	.88	65E	O	L173A
L194	69.01	-.09	-.13	.14	.67	81.26	-.69	-.82	.23	.97	65E	O	L194
L236	68.67	-.43	-.61	.15	.72	81.89	-.06	-.08	.23	.96	65E	O	L236
L238A	69.49	.39	.55	.12	.58	81.53	-.42	-.50	.29	1.21	65E	O	L238A
L241	69.10	.00	.00	.20	.95	82.94	.98	1.17	.41	1.71	65E	O	L241
L244	69.09	-.01	-.02	.14	.70	81.97	.01	.01	.26	1.08	65D	O	L244
L251	68.72	-.38	-.54	.14	.67	82.09	.14	.16	.23	.96	65E	O	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	O	L360
L384	68.36	-.74	-1.04	.14	.68	81.97	.02	.02	.23	.96	65S	O	L384
L484	70.92	1.82	2.55	.19	.92	81.27	-.68	-.81	.32	1.34	65E	#	L484
L502D	68.60	-.50	-.70	.14	.67	82.17	.21	.25	.18	.76	65W	O	L502D
L565	68.66	-.44	-.62	.18	.90	81.66	-.29	-.35	.21	.86	65W	O	L565

TEST D.* 8

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

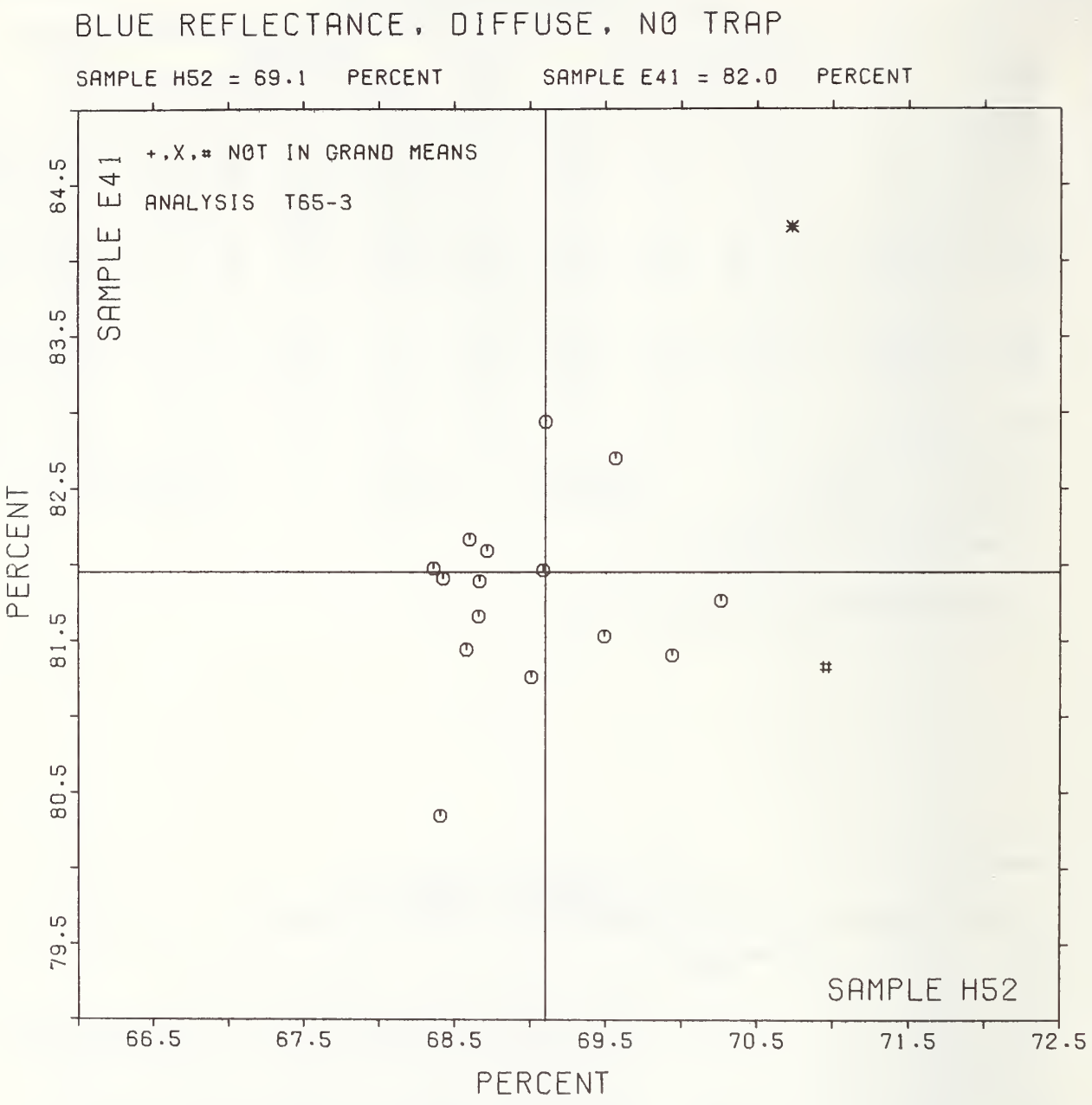
The following laboratories were omitted from the grand means because of extreme test results: 484.

ANALYSIS I65-3 TABLE 2

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 H52	E41	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L384	O	68.36	81.97	-.42	.61	.82	65S	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, ABSOLUTE-UNKNOWN BASE
L115	O	68.41	80.35	-1.71	-.38	1.47	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L161	O	68.43	81.91	-.43	.52	2.70	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L152	O	68.58	81.44	-.72	.12	.63	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L502D	O	68.60	82.17	-.12	.53	.71	65W	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, NBS MGO BASE
L565	O	68.66	81.66	-.49	.18	.88	65W	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, NBS MGO BASE
L236	O	68.67	81.89	-.31	.31	.84	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L251	O	68.72	82.09	-.11	.39	.82	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L194	O	69.01	81.26	-.61	-.33	.82	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L244	O	69.09	81.97	.00	.02	.89	65D	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, NBS-PTB ABSOLUTE
L241	O	69.10	82.94	.80	.57	1.33	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L238A	O	69.49	81.53	-.12	-.56	.89	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L360	O	69.57	82.70	.88	.06	.67	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L173A	O	69.94	81.41	.05	-1.00	.57	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L157	O	70.26	81.77	.53	-1.05	.96	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (ZEISS) BASE
L255	*	70.73	84.22	2.79	.01	.70	65D	DIFFUSE REFLECTANCE, ELREPBO, NO TRAP, NBS-PTB ABSOLUTE
L484	#	70.92	81.27	.52	-1.87	1.13	65E	DIFFUSE REFLECTANCE, ELREPHO, NO TRAP, MGO (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
+,X,* NOT IN GRAND MEANS
ANALYSIS T65-3
SAMPLE E41
PERCENT
84.5
83.5
82.5
81.5
80.5
79.5
SAMPLE H52
66.5
67.5
68.5
69.5
70.5
71.5
72.5
PERCENT

ANALYSIS T75-1 TABLE 1

SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS

TAPPI STANDARD T480 OS-72, SPECULAR GLOSS OF PAPER AND PAPERBOARD AT 75 DEGREES

	SAMPLE	PRINTING				SAMPLE	CAST COATED				TEST D.= 10	
LAB	H54	91 GRAMS PER SQUARE METER				E57	211 GRAMS PER SQUARE METER					
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	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	O L108
L121	62.1	3.5	1.53	1.3	.86	87.0	2.7	1.66	.9	.88	75B	O L121
L122	58.6	-.0	-.01	1.5	.97	83.4	-.9	-.57	1.1	1.02	75B	O L122
L128	57.2	-1.4	-.61	1.8	1.20	85.6	1.3	.81	1.1	1.04	75G	O 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	O L149
L153	61.5	2.9	1.27	1.3	.86	84.5	.2	.15	1.4	1.36	75G	O L153
L162	61.8	3.2	1.41	.9	.62	85.7	1.4	.86	1.0	.96	75G	O L162
L166	59.7	1.1	.48	1.1	.70	87.1	2.8	1.74	1.0	.96	75H	O L166
L172	56.8	-1.8	-.81	1.2	.80	83.8	-.5	-.34	1.1	1.08	75H	O 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	O 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	O L190C
L190R	59.8	1.2	.54	1.6	1.03	82.7	-1.6	-1.00	1.1	1.10	75G	O L190R
L206	59.9	1.3	.55	1.5	.96	83.5	-.8	-.53	1.0	1.00	75H	O L206
L210	59.7	1.1	.49	1.9	1.29	85.9	1.6	1.01	1.0	.97	75H	O L210
L211	54.6	-4.0	-1.77	1.5	.99	83.1	-1.2	-.75	1.0	1.01	75H	O L211
L213	60.2	1.6	.70	1.5	.98	85.5	1.2	.73	1.0	.94	75H	O L213
L223	59.5	.9	.41	1.2	.78	84.6	.3	.21	.3	.31	75B	O L223
L224	56.6	-2.0	-.89	1.3	.88	83.8	-.5	-.30	.7	.63	75H	O L224
L230	55.8	-2.8	-1.23	1.5	.98	83.4	-.9	-.57	1.3	1.22	75H	O L230
L243	62.5	3.9	1.71	2.3	1.51	83.9	-.4	-.25	1.2	1.16	75H	O L243
L251	58.1	-.5	-.22	1.5	1.01	84.0	-.3	-.19	1.2	1.12	75G	O L251
L253P	57.9	-.7	-.30	1.4	.90	83.2	-1.1	-.70	.7	.70	75G	O L253P
L255	60.1	1.5	.65	2.6	1.75	83.8	-.5	-.34	1.2	1.14	75B	O L255
L256	59.1	.5	.24	1.5	1.01	83.7	-.6	-.40	.7	.67	75H	O L256
L259	60.3	1.7	.73	1.9	1.24	84.9	.6	.40	1.1	1.11	75B	O L259
L262	59.5	.9	.39	1.1	.72	85.4	1.1	.68	.8	.82	75K	O L262
L274	62.2	3.6	1.57	2.0	1.32	87.3	3.0	1.87	1.0	.95	75P	O L274
L278	63.0	4.4	1.94	1.2	.80	88.1	3.8	2.34	.7	.66	75G	O L278
L279	57.5	-1.1	-.48	.5	.35	82.7	-1.6	-1.00	1.1	1.02	75G	O L279
L291	54.4	-4.2	-1.84	1.3	.89	84.0	-.3	-.22	1.0	.95	75H	O L291
L317	58.3	-.3	-.15	1.6	1.08	85.7	1.4	.85	1.3	1.24	75B	O L317
L321	57.7	-.9	-.39	.8	.52	85.2	.9	.59	.8	.80	75G	O L321
L323	57.3	-1.3	-.56	1.1	.75	82.5	-1.8	-1.13	.6	.58	75H	O L323
L328	56.6	-2.0	-.85	1.7	1.16	82.3	-2.0	-1.26	1.1	1.07	75H	O L328
L339	61.6	3.0	1.31	1.8	1.22	86.7	2.4	1.50	1.8	1.74	75P	O L339
L349	57.2	-1.4	-.62	1.1	.76	84.3	.0	.01	1.0	.93	75H	O 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	O L396
L456	58.7	.1	.03	1.3	.87	83.6	-.7	-.41	1.1	1.10	75B	O L456
L483	57.3	-1.3	-.55	1.4	.94	83.6	-.7	-.46	1.0	.99	75H	O L483
L502G	59.3	.7	.30	1.8	1.16	83.2	-1.1	-.68	1.0	.94	75G	O L502G
L502H	59.7	1.1	.48	1.6	1.08	83.4	-.9	-.57	1.1	1.09	75H	O L502B
L573	54.4	-4.2	-1.84	1.7	1.14	81.5	-2.8	-1.75	1.1	1.04	75G	O L573
L574	56.4	-2.2	-.97	2.4	1.56	81.5	-2.8	-1.74	1.2	1.14	75G	O L574
L583	58.9	.3	.14	1.8	1.20	83.7	-.6	-.37	1.4	1.37	75B	O L583
L587	59.7	1.1	.48	2.1	1.36	83.0	-1.3	-.81	.9	.91	75K	O L587
L592	60.8	2.2	.96	.7	.49	83.7	-.6	-.40	1.2	1.14	75G	O 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

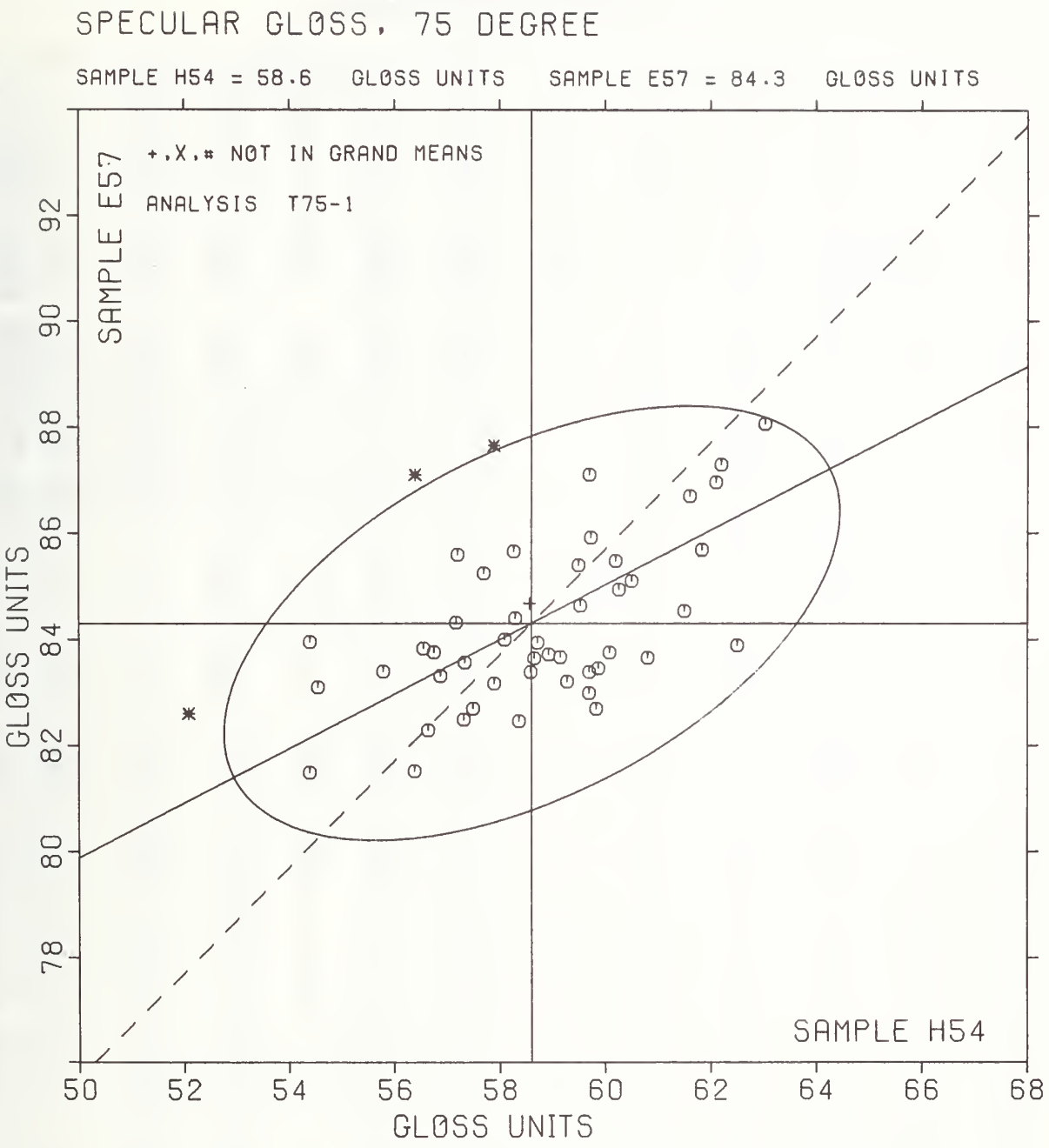
The following laboratories were omitted from the grand means because of extreme test results: 134.

ANALYSIS T75-1 TABLE 2

SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS

TAPPI STANDARD T480 OS-72, SPECULAR GLOSS OF PAPER AND PAPERBOARD AT 75 DEGREES

LAB CODE	F	MEANS H54	MEANS E57	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
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	O	54.4	81.5	-5.0	-.6	1.09	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L291	O	54.4	84.0	-3.9	1.6	.92	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L211	O	54.6	83.1	-4.1	.8	1.00	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L230	O	55.8	83.4	-2.9	.5	1.10	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L574	O	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	O	56.6	83.8	-2.0	.5	.76	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L328	O	56.6	82.3	-2.7	-.9	1.11	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L172	O	56.8	83.8	-1.9	.4	.94	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L190C	O	56.9	83.3	-2.0	-.1	1.17	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L349	O	57.2	84.3	-1.3	.7	.84	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L128	O	57.2	85.6	-.7	1.8	1.12	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L323	O	57.3	82.5	-2.0	-1.0	.67	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L483	O	57.3	83.6	-1.5	-.1	.97	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L279	O	57.5	82.7	-1.7	-.9	.69	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L321	O	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	O	57.9	83.2	-1.1	-.7	.80	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L251	O	58.1	84.0	-.6	-.0	1.06	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L317	O	58.3	85.7	.3	1.4	1.16	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L149	O	58.3	84.4	-.2	.2	1.14	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L108	O	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	O	58.6	83.4	-.4	-.8	.99	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L456	O	58.7	83.6	-.2	-.6	.99	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L182	O	58.7	83.9	-.1	-.4	1.24	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L583	O	58.9	83.7	.0	-.7	1.28	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L256	O	59.1	83.7	.2	-.8	.84	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L502G	O	59.3	83.2	.1	-1.3	1.05	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L262	O	59.5	85.4	1.3	.6	.77	75K	SPECULAR GLOSS (75 DEGREE), GAERTNER (K-C TYPE)
L223	O	59.5	84.6	1.0	-.1	.55	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L502H	O	59.7	83.4	.6	-1.3	1.09	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L166	O	59.7	87.1	2.3	2.0	.83	75H	SPECULAR GLOSS (75 DEGREE), HAUSCH + LOMB
L587	O	59.7	83.0	.4	-1.7	1.14	75K	SPECULAR GLOSS (75 DEGREE), GAERTNER (K-C TYPE)
L210	O	59.7	85.9	1.7	.9	1.13	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L190R	O	59.8	82.7	.4	-2.0	1.07	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L206	O	59.9	83.5	.7	-1.3	.98	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L255	O	60.1	83.8	1.1	-1.2	1.45	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L213	O	60.2	85.5	2.0	.3	.96	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L259	O	60.3	84.9	1.8	-.2	1.18	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L396	O	60.5	85.1	2.1	-.2	.85	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L592	O	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	O	61.5	84.5	2.7	-1.1	1.11	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L339	O	61.6	86.7	3.8	.8	1.48	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L162	O	61.8	85.7	3.5	-.2	.79	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L121	O	62.1	87.0	4.3	.8	.87	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L274	O	62.2	87.3	4.6	1.0	1.13	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L243	O	62.5	83.9	3.3	-2.1	1.33	75H	SPECULAR GLOSS (75 DEGREE), HAUSCH + LOMB
L278	O	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
+,X,* NOT IN GRAND MEANS
ANALYSIS T75-1
SAMPLE E57
GLOSS UNITS
78
80
82
84
86
88
90
92
SAMPLE H54
50
52
54
56
58
60
62
64
66
68
GLOSS UNITS

ANALYSIS T90-1 TABLE 1
THICKNESS (CALIPER), THOUSANDTHS OF AN INCH
TAPPI STANDARD T411 OS-76

LAB CODE	SAMPLE E52 S C BLEACHED BACKING 70 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE B12 PRINTING 89 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.* 10 VAR	F	LAB
L100	2.417	.009	.12	.072	1.22	2.957	.044	.56	.069	1.17	90V	G	L100
L105	2.322	-.086	-1.18	.037	.62	2.822	-.091	-1.14	.061	1.04	90T	G	L105
L118	2.327	-.081	-1.11	.045	.75	2.895	-.018	-.22	.046	.78	90V	G	L118
L122	2.456	.048	.66	.051	.85	2.923	.010	.13	.071	1.20	90V	G	L122
L125	2.400	-.008	-.11	.067	1.12	2.900	-.013	-.16	.071	1.19	90T	G	L125
L128	2.389	-.019	-.26	.044	.74	2.894	-.019	-.24	.046	.78	90T	G	L128
L131	2.510	.102	1.40	.057	.95	3.030	.117	1.48	.067	1.14	90T	G	L131
L139	2.415	.007	.10	.024	.41	2.890	-.023	-.29	.039	.67	90T	G	L139
L141	2.306	-.102	-1.40	.051	.86	2.918	.005	.07	.050	.84	90T	G	L141
L153	2.309	-.099	-1.36	.043	.72	2.839	-.074	-.93	.046	.78	90T	G	L153
L158	2.510	.102	1.40	.070	1.18	3.000	.087	1.10	.062	1.05	90T	G	L158
L159	2.462	.054	.74	.057	.95	3.009	.096	1.21	.044	.74	90T	G	L159
L162	2.414	.006	.08	.061	1.02	2.874	-.039	-.49	.068	1.15	90D	G	L162
L166	2.380	-.028	-.39	.123	2.07	2.850	-.063	-.79	.071	1.19	90T	G	L166
L173B	2.520	.112	1.54	.092	1.55	3.060	.147	1.85	.097	1.63	90F	G	L173B
L174	2.225	-.183	-2.52	.109	1.83	2.760	-.153	-1.92	.097	1.63	90T	G	L174
L182	2.364	-.044	-.61	.032	.54	2.849	-.064	-.81	.053	.89	90L	G	L182
L183	2.325	-.083	-1.14	.040	.67	2.743	-.170	-2.14	.034	.58	90T	G	L183
L190C	2.370	-.038	-.52	.048	.81	2.880	-.033	-.41	.042	.71	90T	G	L190C
L203A	2.445	.037	.51	.090	1.51	2.925	.012	.15	.054	.91	90T	G	L203A
L203C	2.475	.067	.92	.054	.91	2.980	.067	.85	.042	.71	90T	G	L203C
L213	2.560	.152	2.09	.084	1.42	3.040	.127	1.60	.052	.87	90T	G	L213
L223	2.438	.030	.41	.052	.88	2.998	.085	1.07	.048	.82	90V	G	L223
L228	2.380	-.028	-.39	.063	1.06	2.790	-.123	-1.54	.152	2.57	90T	G	L228
L238A	2.502	.094	1.29	.053	.89	3.028	.115	1.45	.038	.64	90T	G	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	G	L249
L259	2.468	.060	.83	.070	1.18	2.966	.053	.67	.053	.90	90T	G	L259
L260	2.406	-.002	-.03	.022	.37	2.885	-.028	-.35	.020	.33	90T	G	L260
L261	2.494	.086	1.18	.043	.72	2.955	.042	.53	.063	1.07	90T	G	L261
L262	2.375	-.033	-.45	.042	.71	2.880	-.033	-.41	.026	.44	90T	G	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	G	L291
L297	2.430	.022	.30	.048	.81	2.900	-.013	-.16	.067	1.12	90T	G	L297
L305	2.395	-.013	-.18	.128	2.15	2.885	-.028	-.35	.058	.98	90T	G	L305
L309	2.310	-.098	-1.35	.057	.95	2.770	-.143	-1.80	.082	1.39	90T	G	L309
L318	2.380	-.028	-.39	.132	2.21	2.815	-.098	-1.23	.063	1.06	90T	G	L318
L323	2.330	-.078	-1.07	.067	1.14	2.800	-.113	-1.42	.067	1.12	90T	G	L323
L324	2.410	.002	.03	.074	1.24	2.950	.037	.47	.053	.89	90T	G	L324
L326	2.535	.127	1.75	.047	.80	2.970	.057	.72	.035	.59	90T	G	L326
L328	2.430	.022	.30	.054	.90	2.930	.017	.22	.059	.99	90T	G	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	G	L339
L341	2.502	.094	1.29	.026	.43	2.981	.068	.86	.049	.83	90T	G	L341
L352	2.315	-.093	-1.28	.063	1.05	2.805	-.108	-1.36	.072	1.22	90D	G	L352
L356	2.346	-.060	-.83	.053	.90	2.851	-.062	-.78	.076	1.28	90T	G	L356
L358	2.315	-.093	-1.28	.029	.48	2.905	-.008	-.10	.032	.54	90T	G	L358
L376	2.410	.002	.03	.074	1.24	2.890	-.023	-.29	.057	.96	90T	G	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	G	L380
L382	2.540	.132	1.82	.052	.87	3.100	.187	2.36	.067	1.12	90T	G	L382
L390	2.431	.023	.32	.043	.72	2.973	.060	.76	.057	.96	90T	G	L390
L567	2.433	.025	.34	.041	.68	2.933	.020	.26	.071	1.20	90V	G	L567
L574	2.384	-.024	-.33	.057	.97	2.837	-.076	-.95	.061	1.03	90V	G	L574
L575	2.349	-.059	-.81	.040	.67	2.933	.020	.26	.071	1.20	90T	G	L575
L587	2.360	-.048	-.66	.070	1.18	2.860	-.053	-.66	.052	.87	90T	G	L587

GR. MEAN = 2.408 MILS GRAND MEAN = 2.913 MILS TEST DETERMINATIONS = 10
SD MEANS = .073 MILS SD OF MEANS = .079 MILS 53 LABS IN GRAND MEANS
AVERAGE SDR = .059 MILS AVERAGE SDR = .059 MILS
GR. MEAN = 61.16 MICROMETER GRAND MEAN = 73.98 MICROMETER

ANALYSIS T90-1 TABLE 1
THICKNESS (CALIPER), THOUSANDTHS OF AN INCH
TAPPI STANDARD T411 OS-76

LAB CODE	SAMPLE E52 MEAN	S C BLEACHED BACKING 70 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H12 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 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
L242O	2.459	.051	.70	.059	1.00	2.939	.027	.33	.070	1.18	90O	*	L242O
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

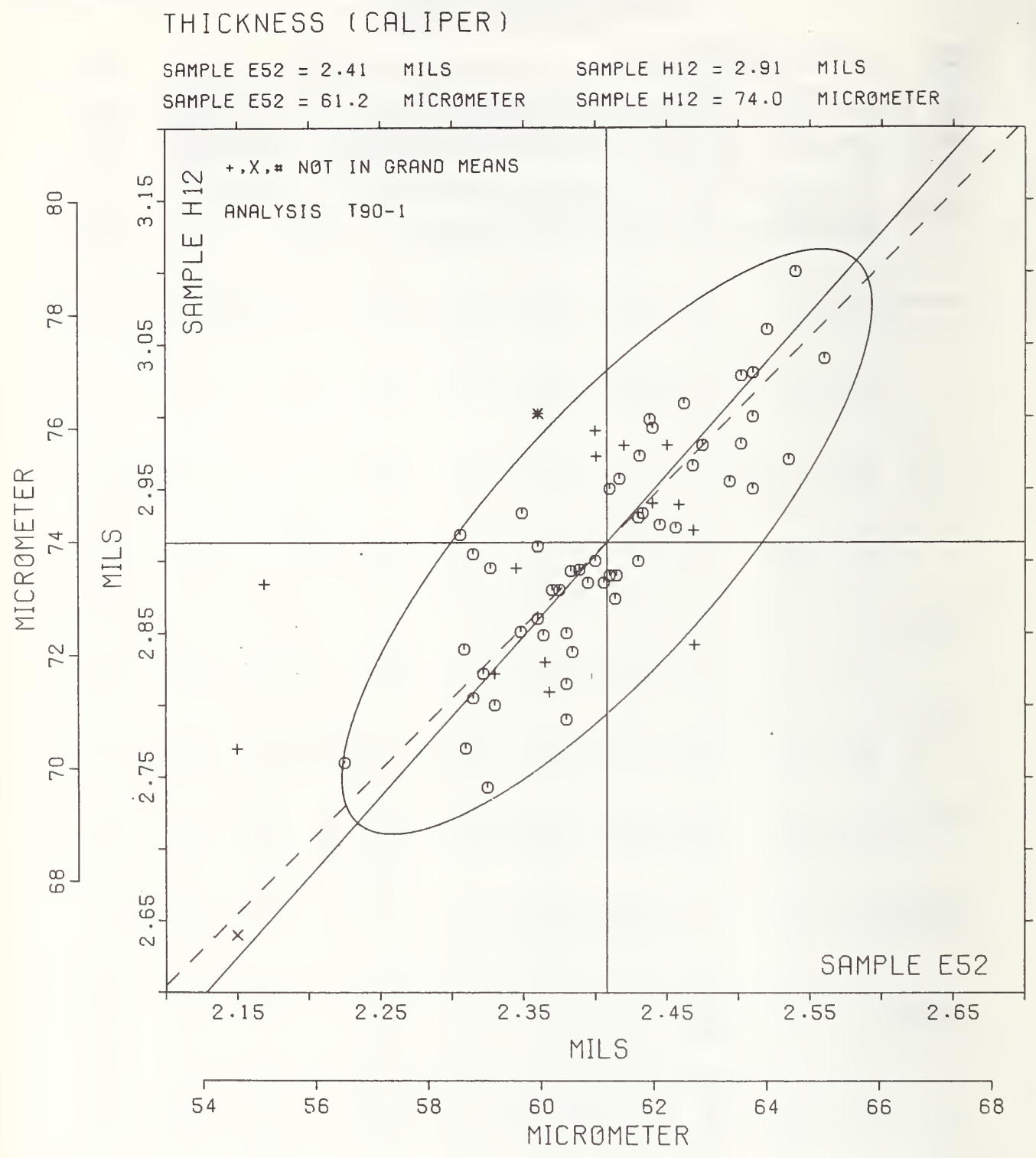
The following laboratories were omitted from the grand means because of extreme test results: 241, 285.

ANALYSIS T90-1 TABLE 2
THICKNESS (CALIPER), THOUSANDTHS OF AN INCH
TAPPI STANDARD T411 OS-76

LAB CODE	F	MEANS E52	MEANS H12	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
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 (CALIPHR), TMI, HAND DRIVEN
L174	O	2.225	2.760	-.236	.034	1.73	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L141	O	2.306	2.918	-.064	.080	.85	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L153	O	2.309	2.839	-.121	.025	.75	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L309	O	2.310	2.770	-.172	-.022	1.17	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVHN
L358	O	2.315	2.905	-.068	.064	.51	90T	THICKNESS (CALIPHR), TMI, MOTOR DRIVEN
L352	O	2.315	2.805	-.142	-.003	1.14	90D	THICKNESS (CALIPER), CADY, MOTOR DRIVEN
L105	O	2.322	2.822	-.125	.004	.83	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L183	O	2.325	2.743	-.182	-.051	.63	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L118	O	2.327	2.895	-.067	.049	.76	90V	THICKNHSS (CALIPER), TMI, MOTOR DRIVEN,DIGITIZED
L576	*	2.330	2.822	-.120	-.002	1.20	90C	THICKNESS (CALIPER), CADY, HAND DRIVEN
L323	O	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), SCHOPPER, HAND DRIVEN
L356	O	2.348	2.851	-.086	.004	1.09	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L575	O	2.349	2.933	-.024	.057	.94	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L587	O	2.360	2.860	-.071	.001	1.02	90T	THICKNHSS (CALIPER), TMI, MOTOR DRIVEN
L339	O	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	O	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), SCHOPPER, HAND DRIVEN
L251	*	2.368	2.809	-.104	-.039	.83	90W	THICKNESS (CALIPER), L + W, MOTOR DRIVEN, 20 C, 65% RH
L190C	O	2.370	2.880	-.050	.006	.76	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L262	O	2.375	2.880	-.046	.003	.58	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L166	O	2.380	2.850	-.065	-.021	1.63	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L228	O	2.380	2.790	-.110	-.061	1.82	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L318	O	2.380	2.815	-.091	-.044	1.64	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L249	O	2.383	2.893	-.031	.005	.92	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVHN
L574	O	2.384	2.837	-.072	-.033	1.00	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN,DIGITIZHD
L128	O	2.389	2.894	-.027	.002	.76	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L305	O	2.395	2.885	-.029	-.009	1.56	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVHN
L562	*	2.400	2.990	.052	.058	.95	90C	THICKNESS (CALIPER), CADY, HAND DRIVHN
L125	O	2.400	2.900	-.015	-.003	1.16	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVHN
L242P	*	2.401	2.972	.040	.045	.96	90P	THICKNESS (CALIPER), MESSMER, MOTOR DRIVEN, ISO R534
L260	O	2.406	2.885	-.022	-.017	.35	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L376	O	2.410	2.890	-.016	-.017	1.10	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L324	O	2.410	2.950	.029	.023	1.07	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L162	O	2.414	2.874	-.025	-.030	1.08	90D	THICKNESS (CALIPER), CADY, MOTOR DRIVEN
L139	O	2.415	2.890	-.012	-.020	.54	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L100	O	2.417	2.957	.039	.023	1.19	90V	THICKNHSS (CALIPER), TMI, MOTOR DRIVEN,DIGITIZED
L344	*	2.420	2.980	.058	.036	.89	90U	THICKNESS (CALIPER), TMI, HAND DRIVEN
L297	O	2.430	2.900	.005	-.025	.97	90T	THICKNESS (CALIPHR), TMI, MOTOR DRIVEN
L328	O	2.430	2.930	.028	-.005	.95	90T	THICKNESS (CALIPHR), TMI, MOTOR DRIVEN
L390	O	2.431	2.973	.060	.023	.84	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L567	O	2.433	2.933	.032	-.005	.94	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN,DIGITIZED
L223	O	2.438	2.998	.084	.035	.85	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN,DIGITIZED
L291	O	2.440	2.992	.080	.029	1.12	90T	THICKNESS (CALIPHR), TMI, MOTOR DRIVEN
L322	*	2.440	2.940	.042	-.006	1.88	90U	THICKNESS (CALIPER), TMI, HAND DRIVHN
L203A	O	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	O	2.456	2.923	.040	-.029	1.03	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN,DIGITIZED
L242O	*	2.459	2.939	.053	-.020	1.09	90O	THICKNESS (CALIPER), MESSMER, MOTOR DRIVHN, HS3983
L159	O	2.462	3.009	.108	.024	.85	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L259	O	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), SCHOPPER, HAND DRIVHN
L185	*	2.469	2.842	-.012	-.093	2.02	90H	THICKNESS (CALIPER), AMTHOR, HAND DRIVEN
L203C	O	2.475	2.980	.095	-.005	.81	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L261	O	2.494	2.955	.089	-.036	.90	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVHN
L341	O	2.502	2.981	.114	-.024	.63	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVHN
L238A	O	2.502	3.028	.149	.007	.76	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L131	O	2.510	3.030	.155	.002	1.05	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L158	O	2.510	3.000	.133	-.018	1.11	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L380	O	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), THOUSANDTHS OF AN INCH
TAPPI STANDARD T411 OS-76

LAB CODE	F	MEANS E52	MEANS E12	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L173B	O	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	O	2.535	2.970	.127	-.056	.69	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L382	O	2.540	3.100	.228	.027	1.00	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L213	O	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	WITH GAMMA = 48 DEGREES		


THICKNESS (CALIPER)
SAMPLE E52 = 2.41 MILS
SAMPLE E52 = 61.2 MICROMETER
SAMPLE H12 = 2.91 MILS
SAMPLE H12 = 74.0 MICROMETER
+,X,* NOT IN GRAND MEANS
ANALYSIS T90-1
SAMPLE H12
SAMPLE E52
MILS
MICROMETER
2.65
2.75
2.85
2.95
3.05
3.15
68
70
72
74
76
78
80
2.15
2.25
2.35
2.45
2.55
2.65
54
56
58
60
62
64
66
68

REPORT NO. 49G TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977

ANALYSIS TS5-1 TABLE 1

GRAMMAGE (MASS PER UNIT AREA)

TAPPI STANDARD T410 OS-68

LAB CODE	SAMPLE D23 MEAN	KRAFT ENVELOPE 124 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE D24 MEAN	BROWN KRAFT 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	123.40	.04	.08	.70	.95	74.92	.09	.17	.38	.59	95C	O	L100
L121	124.03	.67	1.21	.62	.85	75.60	.77	1.39	.51	.79	95B	O	L121
L162	122.10	-1.26	-2.26	.74	1.01	73.67	-1.16	-2.08	.77	1.19	95K	O	L162
L213	122.77	-.59	-1.05	.96	1.31	74.13	-.69	-1.25	.34	.52	95P	O	L213
L249	123.70	.34	.62	.67	.92	75.35	.52	.94	.35	.54	95I	O	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	O	L280
L297	123.67	.31	.56	.58	.79	75.03	.21	.37	.31	.47	95C	O	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	O	L344
L378	123.54	.18	.33	.68	.92	74.76	-.06	-.11	.76	1.18	95E	O	L378
L392	123.20	-.16	-.28	1.32	1.80	74.90	.07	.13	2.02	3.13	95T	O	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.

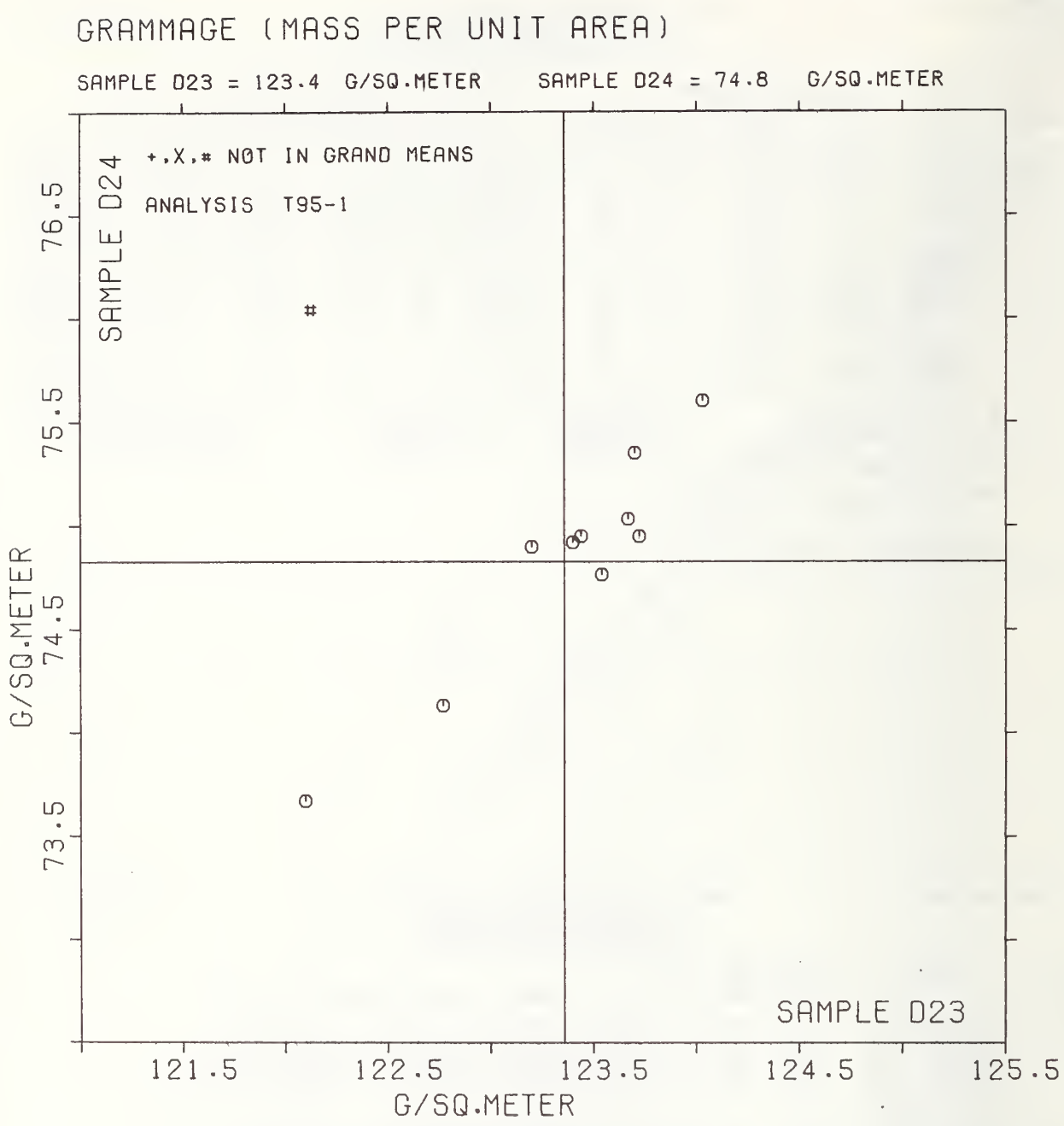
REPORT NO. 49G TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977

ANALYSIS TS5-1 TABLE 2

GRAMMAGE (MASS PER UNIT AREA)

TAPPI STANDARD T410 OS-68

LAB CODE	F	MEANS D23	D24	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
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), CONCORA CUTTER
L162	O	122.10	73.67	-1.71	.07	1.10	95K	BASIS WEIGHT (GRAMMAGE), WEIGHED AS RECEIVED
L213	O	122.77	74.13	-.91	-.08	.92	95F	BASIS WEIGHT (GRAMMAGE), FOUR-SQUARE CUTTER
L392	O	123.20	74.90	-.06	.16	2.47	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L100	O	123.40	74.92	.10	.04	.77	95C	BASIS WEIGHT (GRAMMAGE), CUTTING BOARD
L280	O	123.44	74.95	.15	.03	1.13	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L378	O	123.54	74.76	.09	-.17	1.05	95E	BASIS WEIGHT (GRAMMAGE), GUILLOTINE TYPE CUTTER
L297	O	123.67	75.03	.37	-.07	.63	95C	BASIS WEIGHT (GRAMMAGE), CUTTING BOARD
L249	O	123.70	75.35	.61	.13	.73	95I	BASIS WEIGHT (GRAMMAGE), INGENTO PAPER CUTTER
L344	O	123.72	74.95	.34	-.17	.38	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L121	O	124.03	75.60	1.02	.07	.82	95B	BASIS WEIGHT (GRAMMAGE), CONCORA 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
+,X,* NOT IN GRAND MEANS
ANALYSIS T95-1
SAMPLE D24
76.5
75.5
74.5
73.5
G/SQ.METER
SAMPLE D23
121.5
122.5
123.5
124.5
125.5
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	H48	29.9	1.6	1.6	10	52	57	10	1.4	4.4
T40-1 GURLEY UNITS	H37	19.0	1.2	1.6					1.4	3.3
AIR RESISTANCE, SHEFFIELD	H48	104.8	4.2	4.5	10	35	41	10	3.9	11.7
T40-2 SHEFF. UNITS	H37	150.4	7.0	9.1					8.0	19.3
AIR RESISTANCE, GURLEY HG FLOTATION	H10	658.	211.	186.	10	12	12	10	163.	584.
T41-1 SEC/10 CC	H47	1257.	474.	246.					215.	1314.
SMOOTHNESS, PARKER PRINTSURF	H91	4.33	.35	.19	10	6	7	10	.17	.97
T44-1 MICRONS	H44	5.56	.34	.10					.09	.95
SMOOTHNESS, SHEFFIELD	H91	126.3	8.0	10.1	15	82	86	10	8.8	22.8
T45-1 SHEFF. UNITS	H44	258.7	11.9	9.2					8.1	33.3
SMOOTHNESS, BEKK	H91	46.42	4.52	6.51	15	12	16	10	5.70	12.95
T45-2 BEKK SECONDS	H44	14.43	1.73	.81					.71	4.80
SMOOTHNESS, BENDTSEN	H91	125.	8.	16.	10	11	11	10	14.	23.
T47-1 ML/MIN	H44	429.	37.	34.					30.	103.
K & N INK ABSORPTION	H58	66.7	5.1	.9	4	9	9	4	1.2	14.0
T56-1 K & N UNITS	H80	26.0	3.9	1.0					1.4	10.9
PH, COLD	H01	5.672	.224	.051	5	5	6	2	.099	.626
T57-1 PH UNITS	E47	8.354	.145	.047					.092	.407
PH, HOT	H01	5.330	.164	.050	5	5	5	2	.099	.459
T57-2 PH UNITS	E47	8.866	.273	.050					.098	.759
OPACITY, B&L TYPE, 89% BACKING	H50	89.96	.51	.41	10	73	90	5	.51	1.45
T60-1 PERCENT	E40	96.17	.34	.21					.26	.95
OPACITY, B&L TYPE, PAPER BACKING	H50	91.44	.49	.46	10	11	11	5	.57	1.43
T60-2 PERCENT	E40	96.15	.18	.27					.33	.55
OPACITY, ELREPHO TYPE, PAPER BACKING	H50	92.60	.30	.25	10	11	14	5	.32	.87
T60-3 PERCENT	E40	96.74	.16	.12					.15	.45
BLUE REFLECTANCE, DIRECTIONAL	H52	68.76	.26	.28	8	21	40	6	.31	.74
T65-1 PERCENT	E41	82.89	.27	.32					.36	.77
BLUE REFLECTANCE, DIFFUSE, WITH TRAP	H52	68.20	.86	.19	8	16	19	6	.21	2.38
T65-2 PERCENT	E41	81.77	.72	.23					.26	1.99
BLUE REFLECTANCE, DIFFUSE, NO TRAP	H52	69.10	.71	.21	8	16	17	6	.23	1.98
T65-3 PERCENT	H41	81.95	.84	.24					.27	2.34
SPECULAR GLOSS, 75 DEGREE	H54	58.6	2.3	1.5	10	49	52	5	1.9	6.5
T75-1 GLOSS UNITS	E57	84.3	1.6	1.0					1.3	4.5
THICKNESS (CALIPER)	E52	2.408	.073	.059	10	53	71	10	.052	.201
T90-1 MILS	H12	2.913	.079	.059					.052	.220
GRAMMAGE (MASS PER UNIT AREA)	D23	123.36	.56	.73	10	10	13	3	1.17	1.83
T95-1 G/SQ.METER	D24	74.83	.56	.65					1.03	1.77

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14. Sponsoring Agency Code

15. SUPPLEMENTARY NOTES

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.)*

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.

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)*

Collaborative reference program; Laboratory evalution; Paper; Precision; Reference samples; Testing calibration.

18. AVAILABILITY

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