NBSIR 78-1345



TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM FOR PAPER

REPORT NO. 53G



U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

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

Rev. 4/77

TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM FOR PAPER

Report No. 53G

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National Engineering Laboratory

U. S. DEPARTMENT OF COMMERCE
National Bureau of Standards

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INTRODUCTION

Reports 53S and 53G comprise the fifth set of reports for the 77-78 program year. 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.

Please note that some changes have been made in the computer-generated plots. These changes should aid participants in familiarizing themselves with the International System of Units (SI) as it applies to TAPPI test methods. Wherever possible, Grand Means in SI units have been added at the top of the plots, and scales in SI units have been added to the axes allowing the reader to compare means and variability in common units and SI units for the same data. On all plots, sample codes and unit of test have been shifted to new positions.

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

July 13, 1978

TAPPI-NBS COLLABORATIVE REFERENCE PROGRAM

BACKGROUND AND PURPOSE

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

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

HOW THE PROGRAM WORKS

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

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

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

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

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

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

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

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

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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 'O'. A participant whose plotted point falls outside of the ellipse should carefully reexamine the testing procedure he is following.

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.

The International System of Units (SI) is used on the plots wherever possible to aid participants in familiarizing themselves with SI. Grand means in SI units are given at the top of the plot, and supplementary scales in SI units are drawn along the axes allowing the reader to compare means and variability in common units and SI units for the same data.

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 ($\pm$) 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 J45 MEAN	PRINTING 86 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J47 MEAN	PRINTING 106 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L100	12.02	-.33	-.74	.73	.94	29.10	-.83	-.51	1.85	1.13	40D	O	L100
L106	12.00	-.35	-.78	.47	.60	31.00	1.07	.65	1.70	1.04	40D	O	L106
L107	13.30	.95	2.13	.48	.62	31.40	1.47	.90	1.71	1.04	40D	O	L107
L121	11.80	-.55	-1.23	.92	1.17	27.50	-2.43	-1.49	1.58	.96	40D	O	L121
L122	12.13	-.22	-.49	.69	.87	29.01	-.92	-.56	2.01	1.23	40D	O	L122
L123	12.47	.12	.27	.76	.96	30.14	.21	.13	1.48	.90	40D	O	L123
L124G	12.20	-.15	-.33	.75	.95	29.83	-.10	-.06	1.53	.93	40D	O	L124G
L125	12.77	.42	.95	.89	1.14	30.47	.54	.33	1.50	.91	40D	O	L125
L127	12.14	-.21	-.47	.68	.87	28.76	-1.17	-.72	1.20	.73	40D	O	L127
L128	12.00	-.35	-.78	.82	1.04	26.30	-3.63	-2.22	2.21	1.35	40D	O	L128
L141	12.32	-.03	-.06	.97	1.23	30.90	.97	.59	1.66	1.01	40D	O	L141
L148	12.28	-.07	-.15	.65	.83	30.92	.99	.60	.87	.53	40D	O	L148
L153	12.09	-.26	-.58	.79	1.00	29.70	-.23	-.14	1.34	.82	40D	O	L153
L158	12.30	-.05	-.11	1.25	1.59	28.80	-1.13	-.69	1.14	.69	40D	O	L158
L159	12.28	-.07	-.15	1.03	1.31	29.46	-.47	-.29	1.81	1.11	40D	O	L159
L163	13.25	.90	2.02	.81	1.03	32.35	2.42	1.48	.97	.59	40D	O	L163
L166	12.64	.29	.65	1.04	1.33	30.96	1.03	.63	2.31	1.41	40D	O	L166
L176	13.45	1.10	2.47	.71	.91	31.80	1.87	1.14	2.71	1.65	40D	*	L176
L182G	12.22	-.13	-.29	.66	.85	28.83	-1.10	-.67	1.98	1.21	40D	O	L182G
L183	13.20	.85	1.91	1.04	1.32	31.50	1.57	.96	1.51	.92	40D	O	L183
L190C	12.65	.30	.68	.87	1.10	30.90	.97	.59	1.29	.78	40D	O	L190C
L190R	12.07	-.28	-.62	.86	1.10	30.10	.17	.10	1.60	.97	40D	O	L190R
L223	12.50	.15	.34	.79	1.01	31.70	1.77	1.08	1.42	.86	40D	O	L223
L224	11.55	-.79	-1.77	.97	1.23	27.92	-2.01	-1.23	2.84	1.73	40D	O	L224
L230G	12.80	.45	1.01	.63	.81	30.20	.27	.16	.92	.56	40D	O	L230G
L232	12.14	-.21	-.47	.31	.40	23.94	-5.99	-3.67	3.36	2.05	40D	#	L232
L238A	12.62	.27	.61	.55	.69	32.30	2.37	1.45	1.42	.86	40D	O	L238A
L241	11.80	-.55	-1.23	.92	1.17	27.10	-2.83	-1.73	2.02	1.23	40D	O	L241
L242	11.65	-.70	-1.57	1.19	1.52	28.91	-1.02	-.63	1.59	.97	40D	O	L242
L243G	12.03	-.32	-.71	.87	1.11	28.00	-1.93	-1.18	2.31	1.41	40D	O	L243G
L259	11.75	-.60	-1.34	.39	.50	29.72	-.21	-.13	2.18	1.33	40D	O	L259
L261	12.43	.08	.18	.73	.93	29.95	.02	.01	1.83	1.12	40D	O	L261
L262G	12.18	-.17	-.38	.50	.64	27.77	-2.16	-1.32	.97	.59	40D	O	L262G
L265	12.44	.09	.21	.59	.75	30.47	.54	.33	2.45	1.50	40D	O	L265
L274	12.28	-.07	-.15	.67	.86	30.16	.23	.14	.67	.41	40D	O	L274
L278	12.75	.40	.90	1.32	1.68	30.65	.72	.44	1.87	1.14	40D	O	L278
L285	12.43	.08	.18	.77	.98	31.45	1.52	.93	1.44	.88	40D	O	L285
L301	11.60	-.75	-1.68	.84	1.07	29.50	-.43	-.26	1.58	.96	40D	O	L301
L308	12.42	.07	.16	1.30	1.65	31.80	1.87	1.14	2.35	1.43	40D	O	L308
L312	12.30	-.05	-.11	.54	.68	28.25	-1.68	-1.03	1.06	.65	40D	O	L312
L321	11.24	-1.11	-2.48	1.22	1.55	31.56	1.63	1.00	1.52	.93	40D	X	L321
L324	12.15	-.20	-.44	.76	.97	26.94	-2.99	-1.83	1.06	.65	40D	O	L324
L326	12.87	.52	1.17	.86	1.09	32.60	2.67	1.63	1.65	1.00	40D	O	L326
L328	11.94	-.41	-.92	1.12	1.42	25.56	-4.37	-2.68	1.86	1.14	40D	*	L328
L341	12.91	.56	1.26	.73	.93	30.87	.94	.57	1.17	.71	40D	O	L341
L344	12.16	-.19	-.42	.88	1.12	28.96	-.97	-.60	1.33	.81	40D	O	L344
L376	13.22	.87	1.95	.75	.96	33.37	3.44	2.10	1.51	.92	40D	O	L376
L378	12.32	-.03	-.06	.93	1.19	30.55	.62	.38	2.43	1.48	40D	O	L378
L380	12.40	.05	.12	.52	.66	29.50	-.43	-.26	.71	.43	40D	O	L380
L396M	13.04	.69	1.55	.72	.92	31.35	1.42	.87	1.35	.82	40D	O	L396M
L561	11.89	-.46	-1.03	.76	.97	29.26	-.67	-.41	1.36	.83	40D	O	L561
L567	12.08	-.27	-.60	.84	1.07	30.00	.07	.04	1.70	1.04	40D	O	L567
L576	11.78	-.57	-1.27	.66	.84	28.63	-1.30	-.80	1.30	.79	40D	O	L576
L599	12.26	-.09	-.20	.54	.69	30.49	.56	.34	1.40	.85	40D	O	L599
L604	12.05	-.30	-.67	.64	.82	29.50	-.43	-.26	3.92	2.39	40D	O	L604
L616	12.59	.24	.54	.96	1.22	31.00	1.07	.65	1.72	1.05	40D	O	L616
L676	12.38	.03	.07	.32	.41	32.11	2.18	1.33	2.16	1.32	40D	O	L676

GR. MEAN = 12.35 GURLEY UNITS — GRAND MEAN = 29.93 GURLEY UNITS — TEST DETERMINATIONS = 10

SD MEANS = .45 GURLEY UNITS — SD OF MEANS = 1.63 GURLEY UNITS — 55 LABS IN GRAND MEANS

AVERAGE SDR = .79 GURLEY UNITS — AVERAGE SDR = 1.64 GURLEY UNITS

TAPPI COLLABORATIVE REFERENCE PROGRAM

ANALYSIS T40-1 TABLE 1

AIR RESISTANCE, GURLEY UNITS (SECONDS/100 CC)

TAPPI STANDARD T460 OS-75, AIR RESISTANCE OF PAPER

LAB CODE	SAMPLE J45 MEAN	PRINTING 86 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J47 MEAN	PRINTING 106 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L236	12.56	.21	.47	1.12	1.43	31.20	1.27	.78	2.49	1.52	40E	•	L236
L291	206.40	194.05	434.93	12.65	16.11	104.70	74.77	45.76	2.31	1.41	40U	•	L291
L484	11.80	-.55	-1.23	.50	.64	27.84	-2.09	-1.28	.65	.40	40H	•	L484
L564	2.58	-9.77	-21.89	.15	.19	5.48	-24.45	-14.97	.10	.06	40K	•	L564

TOTAL NUMBER OF LABORATORIES REPORTING = 61

Best values: J45 12.3 ± 0.8 Gurley units
J47 29.5 ± 2.7 Gurley units

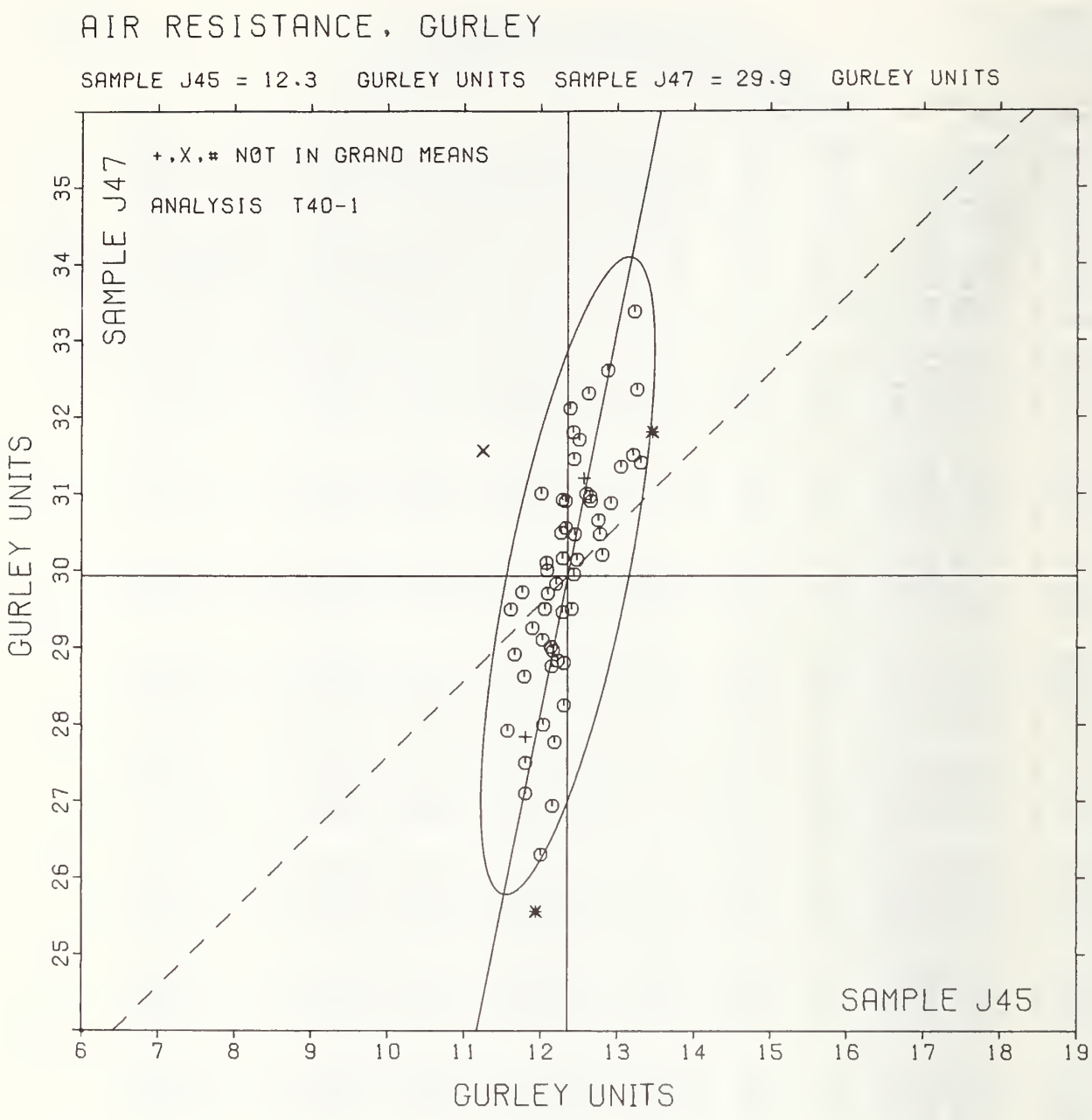
The following laboratories were omitted from the grand means because of extreme test results: 232.

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 J45	MEANS J47	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L564	*	2.58	5.48	-25.89	4.79	.13	40E	AIR RESISTANCE, BEKK
L321	X	11.24	31.56	1.38	1.41	1.24	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L224	O	11.56	27.92	-2.13	.38	1.48	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L301	O	11.60	29.50	-.57	.65	1.02	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L242	O	11.65	28.91	-1.14	.48	1.24	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L259	O	11.75	29.72	-.33	.55	.91	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L576	O	11.78	28.63	-1.39	.30	.82	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L484	*	11.80	27.84	-2.16	.13	.52	40E	AIR RESISTANCE, REGMED-TYPE GURLEY DENSOMETER -OIL FLOTATION
L121	O	11.80	27.50	-2.49	.06	1.07	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L241	O	11.80	27.10	-2.88	-.02	1.20	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L561	O	11.89	29.26	-.75	.32	.90	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L328	*	11.94	25.56	-4.37	-.46	1.28	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L106	O	12.00	31.00	.98	.55	.82	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L128	O	12.00	26.30	-3.63	-.37	1.19	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L100	O	12.02	29.10	-.88	.16	1.03	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L243G	O	12.03	28.00	-1.96	-.07	1.26	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L604	O	12.05	29.50	-.48	.21	1.61	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L190R	O	12.07	30.10	.11	.31	1.04	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L567	O	12.08	30.00	.01	.28	1.05	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L153	O	12.09	29.70	-.28	.21	.91	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L122	O	12.13	29.01	-.95	.03	1.05	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L127	O	12.14	28.76	-1.19	-.03	.80	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L232	#	12.14	23.94	-5.92	-.97	1.22	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L324	O	12.15	26.94	-2.97	-.39	.81	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L344	O	12.16	28.96	-.99	-.01	.96	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L262G	O	12.18	27.77	-2.15	-.26	.62	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L124G	O	12.20	29.83	-.13	.13	.94	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L182G	O	12.22	28.83	-1.11	-.09	1.03	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L599	O	12.26	30.49	.53	.20	.77	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L148	O	12.28	30.92	.96	.26	.68	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L274	O	12.28	30.16	.21	.11	.63	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L159	O	12.28	29.46	-.48	-.03	1.21	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L312	O	12.30	28.25	-1.66	-.28	.67	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L158	O	12.30	28.80	-1.12	-.17	1.14	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L141	O	12.32	30.90	.94	.22	1.12	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L378	O	12.32	30.55	.60	.15	1.33	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L676	O	12.38	32.11	2.14	.40	.87	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L380	O	12.40	29.50	-.41	-.14	.54	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L308	O	12.42	31.80	1.85	.30	1.54	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L261	O	12.43	29.95	.03	-.08	1.03	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L285	O	12.43	31.45	1.50	.22	.93	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L265	O	12.44	30.47	.55	.02	1.12	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L123	O	12.47	30.14	.23	-.08	.93	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L223	O	12.50	31.70	1.76	.20	.94	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L236	*	12.56	31.20	1.28	.04	1.47	40E	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION, 20C,65%RH
L616	O	12.59	31.00	1.09	-.03	1.13	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L238A	O	12.62	32.30	2.38	.20	.78	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L166	O	12.64	30.96	1.07	-.08	1.37	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L190C	O	12.65	30.90	1.01	-.11	.94	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L278	O	12.75	30.65	.78	-.25	1.41	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L125	O	12.77	30.47	.61	-.31	1.03	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L230G	O	12.80	30.20	.35	-.39	.68	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L326	O	12.87	32.60	2.72	.01	1.05	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L341	O	12.91	30.87	1.03	-.37	.82	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L396M	O	13.04	31.35	1.53	-.40	.87	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L183	O	13.20	31.50	1.70	-.53	1.12	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L376	O	13.22	33.37	3.54	-.18	.94	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L163	O	13.25	32.35	2.55	-.41	.81	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L107	O	13.30	31.40	1.63	-.65	.83	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L176	*	13.45	31.80	2.05	-.71	1.28	40D	AIR RESISTANCE, GURLEY DENSOMETER - OIL FLOTATION
L291	*	206.40	104.70	111.33	-175.65	8.76	40U	AIR RESISTANCE, SHEFFIELD IN GURLEY UNITS
GMEANS:		12.35	29.93			1.00		
		95% ELLIPSE:		4.23	.79	WITH GAMMA = 78 DEGREES		


AIR RESISTANCE, GURLEY
SAMPLE J45 = 12.3 GURLEY UNITS SAMPLE J47 = 29.9 GURLEY UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T40-1
SAMPLE J47
GURLEY UNITS
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SAMPLE J45
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GURLEY UNITS

ANALYSIS T40-2 TABLE 1

AIR RESISTANCE, SHEFFIELD UNITS (CC/MIN) FOR 0.442 SQ. IN (3/4 IN. DIA) ORIFICE

SHEFFIELD TESTER IS STANDARD FOR THIS ANALYSIS

LAB	SAMPLE	PRINTING				SAMPLE	PRINTING				TEST D.F. 10		
	J45	86 GRAMS PER SQUARE METER				J47	106 GRAMS PER SQUARE METER						
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	P	LAB
L114	227.4	5.7	.52	16.9	1.45	112.4	5.3	1.09	5.4	1.22	40S	O	L114
L121	235.5	13.8	1.27	14.2	1.21	107.4	.3	.07	3.6	.82	40S	O	L121
L122S	215.1	-6.6	-.61	11.1	.94	111.6	4.5	.93	3.5	.79	40S	O	L122S
L124S	211.5	-10.2	-.95	11.5	.98	104.9	-2.2	-.44	3.3	.75	40S	O	L124S
L127	246.5	24.8	2.29	10.0	.85	115.5	8.4	1.72	4.4	.99	40S	O	L127
L132	220.3	-1.4	-.13	10.7	.91	106.0	-1.1	-.21	2.1	.46	40S	O	L132
L148	229.8	8.1	.74	10.1	.86	110.9	3.8	.78	4.4	.99	40S	O	L148
L150	234.3	12.6	1.16	17.4	1.48	104.9	-2.2	-.44	3.2	.72	40S	O	L150
L157	216.9	-4.8	-.45	19.6	1.67	105.1	-2.0	-.40	5.2	1.18	40S	O	L157
L158	215.0	-6.7	-.62	17.3	1.48	112.5	5.4	1.11	4.2	.96	40S	O	L158
L173B	218.5	-3.2	-.30	11.3	.97	103.5	-3.6	-.72	4.1	.93	40S	O	L173B
L190C	229.2	7.5	.69	11.1	.95	109.5	2.4	.50	4.7	1.07	40S	O	L190C
L213	208.4	-13.3	-1.23	7.8	.67	104.7	-2.4	-.48	3.9	.88	40S	O	L213
L223	213.6	-8.1	-.75	16.0	1.37	99.3	-7.8	-1.58	3.8	.85	40S	O	L223
L228	228.0	6.3	.58	7.6	.65	118.3	11.2	2.29	4.1	.92	40S	O	L228
L230S	206.0	-15.7	-1.45	14.9	1.27	101.7	-5.4	-1.09	5.5	1.24	40S	O	L230S
L233	228.0	6.3	.58	15.8	1.35	110.0	2.9	.60	4.3	.98	40S	O	L233
L241	237.5	15.8	1.46	11.4	.97	111.5	4.4	.91	4.7	1.07	40S	O	L241
L249	212.2	-9.5	-.88	12.1	1.04	105.3	-1.8	-.36	6.1	1.36	40S	O	L249
L255	228.0	6.3	.58	12.0	1.03	134.1	27.0	5.51	5.5	1.25	40S	#	L255
L257A	227.9	6.2	.57	12.1	1.03	107.4	.3	.07	5.3	1.18	40S	O	L257A
L257B	225.9	4.2	.38	13.7	1.17	113.3	6.2	1.27	5.1	1.15	40S	O	L257B
L257C	218.8	-2.9	-.27	8.7	.74	112.1	5.0	1.03	5.5	1.25	40S	O	L257C
L262S	228.2	6.5	.60	4.2	.36	108.2	1.1	.23	3.7	.83	40S	O	L262S
L288	224.8	3.1	.28	9.0	.76	112.9	5.8	1.19	5.0	1.13	40S	O	L288
L301	NO DATA REPORTED FOR SAMPLE J45					113.2	6.2	1.26	4.8	1.09	40S	M	L301
L305	209.0	-12.7	-1.18	9.4	.80	100.5	-6.6	-1.33	5.0	1.12	40S	O	L305
L312	145.0	-76.7	-7.09	4.9	.41	100.7	-6.3	-1.28	2.1	.46	40S	#	L312
L318	243.4	21.7	2.00	12.0	1.03	108.4	1.3	.27	6.6	1.49	40S	O	L318
L349	195.5	-26.2	-2.42	8.4	.72	101.8	-5.3	-1.07	3.3	.74	40S	O	L349
L352	219.5	-2.2	-.21	7.2	.61	104.3	-2.8	-.56	4.5	1.02	40S	O	L352
L354	225.3	3.6	.33	14.0	1.20	108.7	1.6	.33	4.0	.90	40S	O	L354
L360	217.8	-3.9	-.36	3.6	.30	103.5	-3.6	-.72	3.9	.88	40S	O	L360
L370	211.5	-10.2	-.95	12.9	1.10	98.7	-8.4	-1.70	2.1	.46	40S	O	L370
L390	223.2	1.5	.14	12.7	1.09	101.2	-5.9	-1.19	5.6	1.26	40S	O	L390
L562	466.0	244.3	22.56	31.7	2.70	306.0	198.9	40.51	21.2	4.76	40S	#	L562
L575	230.7	9.0	.83	13.3	1.13	102.9	-4.2	-.85	3.4	.77	40S	O	L575
L587	216.5	-5.2	-.48	10.3	.88	111.5	4.4	.91	5.3	1.19	40S	O	L587
L597	222.0	.3	.02	15.5	1.32	102.8	-4.3	-.87	4.1	.93	40S	O	L597
L600	208.8	-12.9	-1.19	8.0	.68	100.8	-6.3	-1.27	6.8	1.53	40S	O	L600
GR. MEAN = 221.7 SHEFF. UNITS				GRAND MEAN = 107.1 SHEFF. UNITS						TEST DETERMINATIONS = 10			
SD MEANS = 10.8 SHEFF. UNITS				SD OF MEANS = 4.9 SHEFF. UNITS						36 LABS IN GRAND MEANS			
AVERAGE SDR = 11.7 SHEFF. UNITS						AVERAGE SDR = 4.4 SHEFF. UNITS							
L182B	1047.5	825.8	76.26	82.0	7.00	404.0	296.9	60.47	22.2	4.99	40B	*	L182B
L243B	1009.8	788.1	72.78	30.0	2.56	440.0	332.9	67.80	24.5	5.51	40B	*	L243B
L484	935.0	713.3	65.87	58.0	4.95	435.0	327.9	66.78	24.2	5.43	40B	*	L484

TOTAL NUMBER OF LABORATORIES REPORTING = 43

Best values: J45 221 $\pm$ 17 Sheffield units
J47 107 $\pm$ 7 Sheffield units

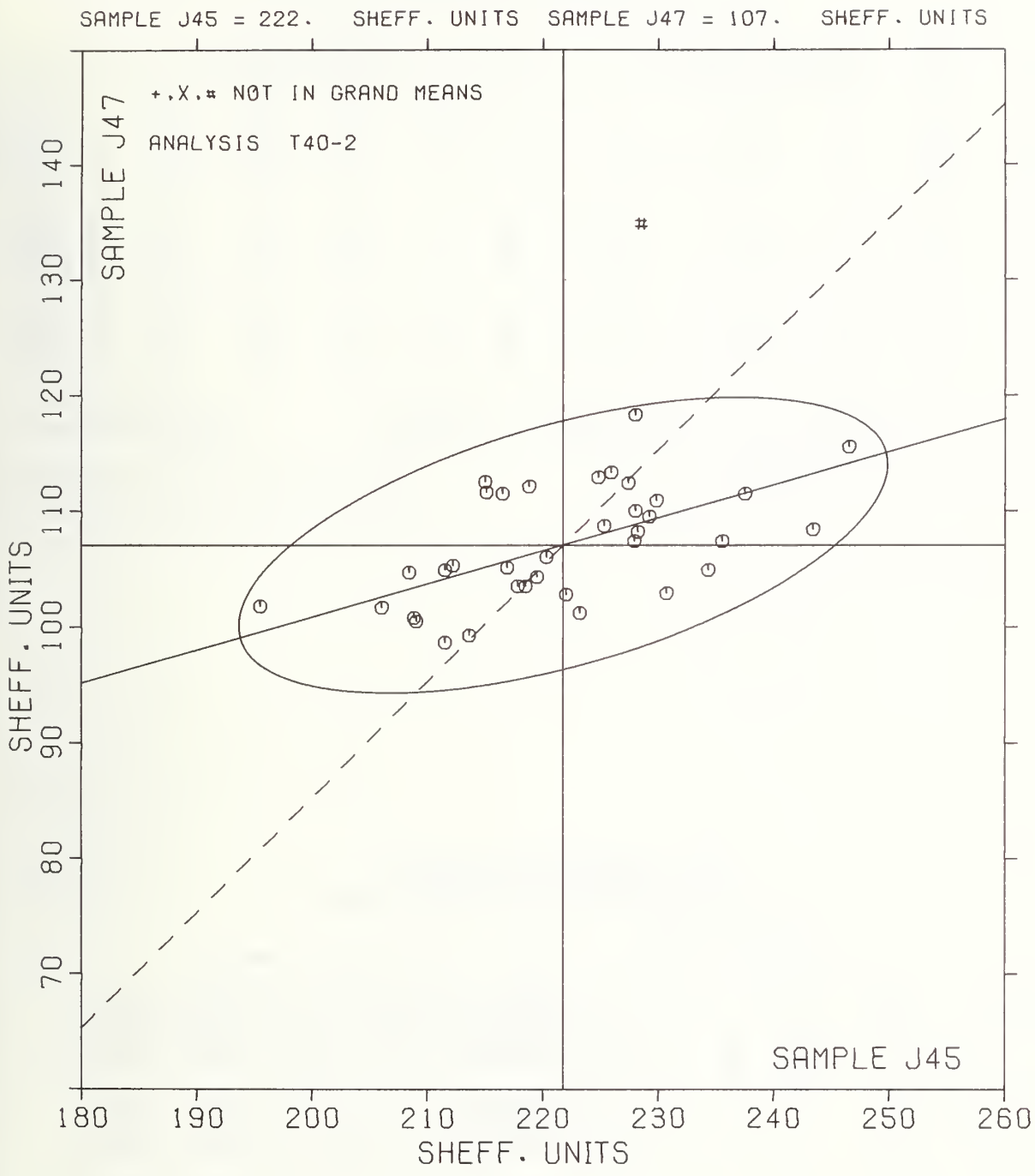
The following laboratories were omitted from the grand means because of extreme test results: 255, 312.

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 J45	MEANS J47	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L301	M		113.2			1.09	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L312	#	145.0	100.7	-75.5	14.9	.44	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L349	O	195.5	101.8	-26.7	2.1	.73	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L230S	O	206.0	101.7	-16.6	-.8	1.26	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L213	O	208.4	104.7	-13.5	1.4	.77	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L600	O	208.8	100.8	-14.2	-2.5	1.11	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L305	O	209.0	100.5	-14.0	-2.8	.96	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L370	O	211.5	98.7	-12.1	-5.2	.78	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L124S	O	211.5	104.9	-10.4	.7	.87	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L249	O	212.2	105.3	-9.7	.9	1.20	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L223	O	213.6	99.3	-9.9	-5.2	1.11	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L158	O	215.0	112.5	-5.0	7.1	1.22	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L122S	O	215.1	111.6	-5.1	6.2	.87	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L587	O	216.5	111.5	-3.8	5.7	1.03	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L157	O	216.9	105.1	-5.2	-.6	1.43	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L360	O	217.8	103.5	-4.8	-2.3	.59	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L173B	O	218.5	103.5	-4.1	-2.5	.95	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257C	O	218.8	112.1	-1.4	5.7	.99	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L352	O	219.5	104.3	-2.9	-2.0	.81	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L132	O	220.3	106.0	-1.7	-.6	.69	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L597	O	222.0	102.8	-.9	-4.2	1.13	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L390	O	223.2	101.2	-.2	-6.0	1.17	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L288	O	224.8	112.9	4.5	4.8	.95	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L354	O	225.3	108.7	3.9	.6	1.05	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257B	O	225.9	113.3	5.7	4.9	1.16	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L114	O	227.4	112.4	6.9	3.6	1.33	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257A	O	227.9	107.4	6.0	-1.4	1.11	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L255	#	228.0	134.1	13.4	24.3	1.14	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L233	O	228.0	110.0	6.8	1.1	1.16	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L228	O	228.0	118.3	9.1	9.1	.79	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L262S	O	228.2	108.2	6.5	-.7	.60	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L190C	O	229.2	109.5	7.8	.3	1.01	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L148	O	229.8	110.9	8.8	1.5	.93	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L575	O	230.7	102.9	7.5	-6.5	.95	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L150	O	234.3	104.9	11.5	-5.5	1.10	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L121	O	235.5	107.4	13.3	-3.4	1.01	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L241	O	237.5	111.5	16.4	-.0	1.02	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L318	O	243.4	108.4	21.2	-4.6	1.26	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L127	O	246.5	115.5	26.1	1.3	.92	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L552	#	466.0	306.0	289.4	124.5	3.73	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L484	*	935.0	435.0	775.8	120.1	5.19	40B	AIR RESISTANCE, BENDTSEN, WG 150
L243B	*	1009.8	440.0	849.1	104.4	4.03	40B	AIR RESISTANCE, BENDTSEN, WG 150
L182B	*	1047.5	404.0	875.5	59.5	6.00	40B	AIR RESISTANCE, BENDTSEN, WG 150
GMEANS:		221.7	107.1			1.00		
		95% ELLIPSE:		29.1	10.4	WITH GAMMA = 15 DEGREES		


AIR RESISTANCE, SHEFFIELD
SAMPLE J45 = 222. SHEFF. UNITS
SAMPLE J47 = 107. SHEFF. UNITS
+,X,# NOT IN GRAND MEANS
ANALYSIS T40-2
SAMPLE J47
SHEFF. UNITS
70
80
90
100
110
120
130
140
180
190
200
210
220
230
240
250
260
SHEFF. UNITS
SAMPLE J45

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

LAB CODE	SAMPLE E69 MEAN	RELEASE 95 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E37 MEAN	BLEACHED BACKING 69 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L122	988.	189.	2.33	121.	1.33	783.	41.	.75	77.	.95	41G	ó	L122
L128	790.	-9.	-.11	69.	.76	686.	-56.	-1.02	51.	.63	41G	ó	L128
L134	842.	43.	.53	69.	.76	732.	-10.	-.18	52.	.64	41G	ó	L134
L166M	804.	5.	.06	83.	.91	789.	48.	.87	131.	1.61	41G	ó	L166M
L195	745.	-54.	-.67	137.	1.51	682.	-60.	-1.10	59.	.73	41G	ó	L195
L224	920.	121.	1.49	85.	.93	793.	51.	.94	116.	1.43	41G	ó	L224
L230	813.	14.	.18	106.	1.17	816.	74.	1.36	76.	.93	41G	ó	L230
L259	706.	-93.	-1.15	59.	.64	761.	19.	.35	66.	.81	41G	ó	L259
L358	778.	-21.	-.26	95.	1.04	724.	-17.	-.32	146.	1.80	41G	ó	L358
L396T	676.	-123.	-1.52	107.	1.17	611.	-131.	-2.41	80.	.99	41G	ó	L396T
L557	751.	-48.	-.60	166.	1.81	784.	42.	.77	105.	1.30	41G	ó	L557
L558	847.	48.	.59	87.	.96	789.	47.	.86	78.	.96	41G	ó	L558
L559	713.	-86.	-1.07	58.	.64	722.	-19.	-.36	62.	.76	41G	ó	L559
L561	800.	1.	.01	80.	.87	722.	-20.	-.36	55.	.68	41G	ó	L561
L576	813.	14.	.18	46.	.50	733.	-9.	-.17	63.	.78	41G	ó	L576

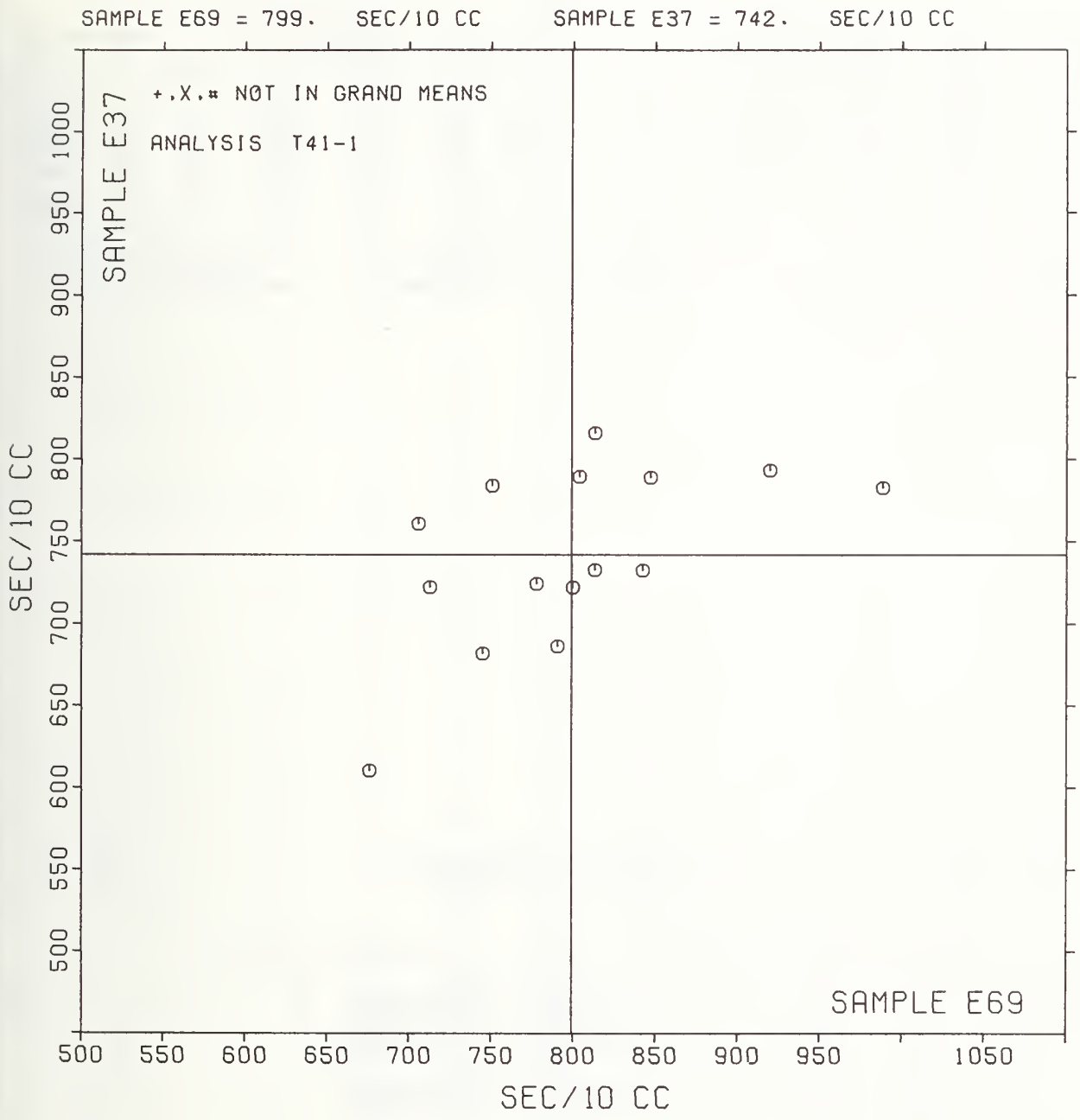
GR. MEAN = 799. SEC/10 CC GRAND MEAN = 742. SEC/10 CC TEST DETERMINATIONS = 10
SD MEANS = 81. SEC/10 CC SD OF MEANS = 54. SEC/10 CC 15 LABS IN GRAND MEANS
AVERAGE SDR = 91. SEC/10 CC AVERAGE SDR = 81. SEC/10 CC
TOTAL NUMBER OF LABORATORIES REPORTING = 15

Best values: E69 800 ± 120 second per 10 cc, mercury density (direct reading)
E37 750 ± 70

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 coverted to 100 ml of air nor to oil density.

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

LAB CODE	F	MEANS E69	E37	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L396T	ó	676.	611.	-169.	-61.	1.08	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L259	ó	706.	761.	-74.	59.	.73	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L559	ó	713.	722.	-86.	22.	.70	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION
L195	ó	745.	682.	-76.	-29.	1.12	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION
L557	ó	751.	784.	-24.	59.	1.56	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L358	ó	778.	724.	-27.	-6.	1.42	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L128	ó	790.	686.	-33.	-46.	.69	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L561	ó	800.	722.	-8.	-18.	.78	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L166M	ó	804.	789.	26.	40.	1.26	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L576	ó	813.	733.	8.	-15.	.64	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION
L230	ó	813.	816.	46.	59.	1.05	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L134	ó	842.	732.	34.	-28.	.70	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L558	ó	847.	789.	64.	20.	.96	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L224	ó	920.	793.	131.	-9.	1.18	41G	AIR RESISTANCE, HIGE RANGE, GURLEY MERCURY FLOTATION
L122	ó	988.	783.	187.	-50.	1.14	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION
GMEANS:		799.	742.			1.00		
95% ELLIPSE:				254.	118.	WITH GAMMA = 27 DEGREES		


AIR RESISTANCE, GURLEY HG FLØTATIØN
SAMPLE E69 = 799. SEC/10 CC
SAMPLE E37 = 742. SEC/10 CC
+,X,* NØT IN GRAND MEANS
ANALYSIS T41-1
SAMPLE E37
SAMPLE E69
SEC/10 CC
SEC/10 CC
500 550 600 650 700 750 800 850 900 950 1000
500 550 600 650 700 750 800 850 900 950 1050

REPORT NO. 53G

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T44-1 TABLE 1
SMOOTHNESS, PARKER PRINTSURF

APRIL 1978

LAB CODE	SAMPLE B91 MEAN	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H45 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	P	LAB
L122	4.565	.508	2.84	.190	1.14	7.115	1.326	3.09	.156	1.64	44P	#	L122
L182	3.985	-.072	-.40	.226	1.36	5.870	.081	.19	.109	1.14	44P	O	L182
L183	4.210	.153	.86	.099	.60	5.100	-.689	-1.61	.067	.70	44P	O	L183
L223	3.956	-.101	-.56	.194	1.17	5.806	.017	.04	.059	.61	44P	O	L223
L288	4.190	.133	.74	.213	1.28	6.100	.311	.72	.115	1.21	44P	O	L288
L317	4.220	.163	.91	.092	.55	6.320	.531	1.24	.140	1.46	44P	O	L317
L588	3.780	-.277	-1.55	.175	1.05	5.540	-.249	-.58	.084	.88	44P	O	L588

TEST D.= 10

GR. MEAN = 4.057 MICRONS — GRAND MEAN = 5.789 MICRONS — TEST DETERMINATIONS = 10
SD MEANS = .179 MICRONS — SD OF MEANS = .429 MICRONS — 6 LABS IN GRAND MEANS
AVERAGE SDR = .167 MICRONS — AVERAGE SDR = .096 MICRONS
TOTAL NUMBER OF LABORATORIES REPORTING = 7

Best values: B91 4.0 microns
H45 5.8 microns

The following laboratories were omitted from the grand means because of extreme test results: 122.

REPORT NO. 53G

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T44-1 TABLE 2
SMOOTHNESS, PARKER PRINTSURF

APRIL 1978

LAB CODS	F	MEANS B91	H45	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L598	O	3.780	5.540	-.278	.248	.97	44P	SMOOTHNESS, PARKER PRINTSURF
L223	O	3.956	5.806	.006	.102	.89	44P	SMOOTHNESS, PARKER PRINTSURF
L182	O	3.985	5.870	.072	.080	1.25	44P	SMOOTHNESS, PARKER PRINTSURF
L288	O	4.190	6.100	.323	-.099	1.24	44P	SMOOTHNESS, PARKER PRINTSURF
L183	O	4.210	5.100	-.669	-.227	.65	44P	SMOOTHNESS, PARKER PRINTSURF
L317	O	4.220	6.320	.545	-.105	1.01	44P	SMOOTHNESS, PARKER PRINTSURF
L122	#	4.565	7.115	1.373	-.362	1.39	44P	SMOOTHNESS, PARKER PRINTSURF
GMEANS:		4.057	5.789			1.00		
		95% ELLIPSE:		1.798	.723	WITH GAMMA = 83 DEGREES		

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 H45 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L100	108.2	6.7	.70	9.8	1.04	272.2	7.8	.59	11.0	1.11	45S	O	L100
L107	110.7	9.1	.96	11.6	1.23	282.3	17.9	1.36	18.9	1.90	45S	O	L107
L108	89.7	-11.8	-1.25	7.2	.76	257.0	-7.5	-.57	7.8	.79	45S	O	L108
L114	99.5	-2.1	-.22	10.8	1.14	275.9	11.5	.88	12.8	1.29	45S	O	L114
L121	97.4	-4.1	-.44	11.9	1.26	276.0	11.6	.88	9.9	.99	45S	O	L121
L122	91.3	-10.2	-1.08	3.0	.32	266.5	2.1	.16	9.4	.95	45S	O	L122
L123	94.9	-6.6	-.70	10.6	1.13	248.3	-16.2	-1.23	6.4	.65	45S	O	L123
L124	94.1	-7.5	-.79	8.1	.86	211.3	-53.1	-4.05	8.2	.82	45S	X	L124
L125	99.3	-2.2	-.23	7.8	.82	241.3	-23.1	-1.76	10.9	1.10	45S	O	L125
L128	101.7	.1	.01	5.9	.62	263.3	-1.1	-.08	7.0	.70	45S	O	L128
L132	97.7	-3.9	-.41	9.2	.98	270.5	6.0	.46	8.5	.85	45S	O	L132
L134	85.3	-16.2	-1.71	10.6	1.12	275.3	10.9	.83	6.7	.67	45S	O	L134
L139S	100.7	-.9	-.09	11.5	1.22	259.3	-5.1	-.39	8.8	.89	45S	O	L139S
L148	105.9	4.4	.46	7.8	.83	264.6	.2	.01	9.4	.94	45S	O	L148
L150	95.3	-6.2	-.66	8.8	.94	274.9	10.4	.80	14.1	1.42	45S	O	L150
L152	113.0	11.5	1.21	9.0	.96	250.3	-14.1	-1.08	8.8	.88	45S	O	L152
L153	113.7	12.2	1.29	5.9	.62	282.9	18.5	1.41	11.1	1.12	45S	O	L153
L157	97.8	-3.7	-.40	9.7	1.03	269.5	5.0	.38	8.0	.80	45S	O	L157
L158	109.3	7.8	.82	11.3	1.20	289.7	25.2	1.92	12.6	1.27	45S	O	L158
L159	99.7	-1.9	-.20	8.1	.86	253.3	-11.1	-.85	14.1	1.42	45S	O	L159
L162	100.0	-1.5	-.16	11.5	1.22	267.7	3.2	.25	12.8	1.29	45S	O	L162
L166	95.1	-6.4	-.68	9.0	.95	250.3	-14.1	-1.08	11.5	1.16	45S	O	L166
L167	90.0	-11.5	-1.22	4.6	.49	268.7	4.2	.32	4.0	.40	45S	O	L167
L173B	98.0	-3.5	-.37	9.0	.96	268.0	3.6	.27	10.1	1.02	45S	O	L173B
L176S	98.6	-2.9	-.31	6.9	.73	266.1	1.6	.12	8.4	.85	45S	O	L176S
L183S	105.7	4.1	.44	10.8	1.15	261.3	-3.2	-.24	8.4	.85	45S	O	L183S
L190C	94.0	-7.5	-.80	9.4	1.00	255.3	-9.1	-.69	5.6	.56	45S	O	L190C
L190R	96.7	-4.9	-.51	8.8	.93	285.9	21.5	1.64	12.7	1.28	45S	O	L190R
L195	102.1	.6	.06	13.2	1.40	299.2	34.8	2.65	9.5	.95	45S	*	L195
L203	102.6	1.1	.11	12.5	1.33	245.4	-19.0	-1.45	9.8	.99	45S	O	L203
L211	95.1	-6.5	-.68	7.8	.83	259.7	-4.8	-.36	13.3	1.34	45S	O	L211
L213	93.5	-8.0	-.85	11.1	1.17	240.7	-23.8	-1.81	10.5	1.06	45S	O	L213
L221	96.2	-5.3	-.56	9.4	1.00	253.9	-10.6	-.81	9.2	.93	45S	O	L221
L223	87.9	-13.6	-1.44	9.1	.97	255.5	-9.0	-.68	11.6	1.17	45S	O	L223
L224	106.1	4.6	.48	8.3	.88	274.7	10.2	.78	11.6	1.17	45S	O	L224
L226B	91.3	-10.3	-1.09	7.1	.76	253.9	-10.5	-.80	8.2	.83	45S	O	L226B
L228	99.1	-2.4	-.25	12.0	1.27	272.7	8.2	.63	12.4	1.25	45S	O	L228
L230S	101.4	-.1	-.02	9.6	1.02	266.3	1.9	.14	8.8	.88	45S	O	L230S
L231	114.5	12.9	1.36	14.1	1.50	284.9	20.5	1.56	16.8	1.69	45S	O	L231
L232S	131.0	29.5	3.11	7.6	.81	324.7	60.2	4.59	8.3	.84	45S	#	L232S
L233	94.8	-6.7	-.71	9.7	1.03	266.9	2.4	.19	14.8	1.49	45S	O	L233
L241	140.0	38.5	4.06	16.6	1.76	321.3	56.9	4.34	9.9	1.00	45S	#	L241
L249	92.7	-8.9	-.94	8.2	.87	266.0	1.6	.12	13.2	1.33	45S	O	L249
L254	104.4	2.9	.30	8.6	.91	256.1	-8.3	-.63	8.9	.89	45S	O	L254
L255	91.4	-10.1	-1.07	6.8	.72	243.3	-21.2	-1.61	8.4	.85	45S	O	L255
L257A	119.7	18.1	1.91	8.6	.91	259.6	-4.8	-.37	8.9	.90	45S	O	L257A
L257B	124.9	23.3	2.46	8.7	.92	269.1	4.7	.36	6.7	.68	45S	O	L257B
L257C	116.3	14.7	1.55	9.7	1.03	265.0	.6	.04	10.3	1.03	45S	O	L257C
L259	98.7	-2.9	-.30	9.5	1.00	263.0	-1.4	-.11	4.6	.46	45S	O	L259
L261	95.5	-6.1	-.64	9.8	1.04	274.3	9.9	.75	12.1	1.22	45S	O	L261
L262	102.5	.9	.10	5.9	.62	248.0	-16.4	-1.25	7.8	.78	45S	O	L262
L275	101.3	-.3	-.03	14.9	1.58	257.1	-7.3	-.56	14.3	1.44	45S	O	L275
L277	104.1	2.6	.27	10.0	1.06	287.0	22.6	1.72	18.1	1.82	45S	O	L277
L278	103.7	2.1	.22	11.9	1.26	269.3	4.9	.37	10.8	1.09	45S	O	L278
L281	100.3	-1.3	-.13	9.3	.98	257.4	-7.0	-.54	5.6	.56	45S	O	L281
L285	101.1	-.4	-.04	10.0	1.06	253.7	-10.8	-.82	11.0	1.11	45S	O	L285
L288	100.2	-1.3	-.14	10.3	1.09	268.8	4.4	.33	10.1	1.02	45S	O	L288
L290	93.9	-7.7	-.81	6.7	.71	224.1	-40.4	-3.08	9.5	.96	45S	*	L290
L291S	97.3	-4.3	-.45	9.8	1.04	270.0	5.6	.42	9.1	.92	45S	O	L291S
L297	94.0	-7.5	-.80	13.4	1.42	259.7	-4.8	-.36	10.3	1.03	45S	O	L297
L301	104.2	2.7	.28	7.8	.83	NO DATA REPORTED FOR SAMPLE H45					45S	M	L301
L305	102.0	.5	.05	8.8	.93	257.7	-6.8	-.52	10.0	1.01	45S	O	L305
L308	97.9	-3.7	-.39	11.3	1.20	254.8	-9.6	-.73	7.8	.79	45S	O	L308
L312	95.0	-6.5	-.69	2.1	.22	169.3	-95.1	-7.25	3.8	.39	45S	#	L312
L317	105.1	3.6	.38	14.2	1.51	274.0	9.6	.73	13.7	1.38	45S	O	L317

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

LAB CODE	SAMPLE B91 MEAN	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H45 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 15 VAR	F	LAB
L318	100.8	-.7	-.08	6.2	.66	275.5	11.0	.84	9.0	.91	45S	6	L318
L321	86.7	-14.9	-1.57	6.5	.68	243.0	-21.4	-1.63	7.7	.78	45S	6	L321
L323	88.3	-13.2	-1.39	11.0	1.16	253.0	-11.4	-.87	4.1	.42	45S	6	L323
L326	97.5	-4.1	-.43	4.7	.50	293.9	29.5	2.25	4.0	.41	45S	6	L326
L328	135.3	33.8	3.57	13.3	1.41	282.9	18.5	1.41	13.9	1.40	45S	X	L328
L341	98.9	-2.7	-.28	8.6	.91	256.5	-7.9	-.60	6.8	.69	45S	6	L341
L342	127.5	26.0	2.74	9.4	1.00	277.3	12.9	.98	9.0	.91	45S	*	L342
L349	97.1	-4.4	-.47	16.7	1.77	248.2	-16.2	-1.24	10.3	1.03	45S	6	L349
L352	102.1	.5	.06	12.0	1.27	270.3	5.8	.44	12.7	1.28	45S	6	L352
L360	125.0	23.5	2.48	7.5	.79	263.9	-.5	-.04	13.0	1.31	45S	*	L360
L370	108.3	6.8	.72	8.4	.89	261.4	-3.0	-.23	11.7	1.18	45S	6	L370
L372	98.7	-2.8	-.30	9.9	1.05	262.7	-1.7	-.13	13.7	1.38	45S	6	L372
L376	107.7	6.1	.65	9.6	1.01	259.3	-5.1	-.39	11.0	1.11	45S	6	L376
L378	131.5	30.0	3.17	6.2	.65	267.0	2.6	.20	11.0	1.11	45S	*	L378
L380	120.9	19.3	2.04	7.4	.78	266.7	2.2	.17	11.6	1.17	45S	6	L380
L382	91.0	-10.5	-1.11	8.5	.90	259.7	-4.8	-.36	8.8	.88	45S	6	L382
L390	90.8	-10.7	-1.13	12.4	1.31	258.5	-5.9	-.45	9.6	.97	45S	6	L390
L396M	102.5	.9	.10	10.9	1.15	252.0	-12.4	-.95	9.4	.95	45S	6	L396M
L554	101.2	-.3	-.04	10.4	1.10	255.3	-9.1	-.69	11.6	1.17	45S	6	L554
L561	95.3	-6.2	-.66	11.7	1.24	263.3	-1.1	-.08	7.7	.78	45S	6	L561
L575	101.3	-.3	-.03	6.9	.73	281.6	17.2	1.31	9.7	.98	45S	6	L575
L587	107.7	6.1	.65	9.7	1.03	262.0	-2.4	-.19	5.9	.60	45S	6	L587
L597	92.3	-9.2	-.97	8.0	.85	268.0	3.6	.27	11.4	1.15	45S	6	L597
L600	104.7	3.1	.33	9.7	1.03	282.5	18.0	1.37	10.3	1.03	45S	6	L600
L602	110.7	9.1	.96	7.5	.80	290.7	26.2	2.00	2.6	.26	45S	6	L602
L607	122.1	20.6	2.17	7.3	.78	256.6	-7.8	-.60	6.2	.63	45S	6	L607

GR. MEAN = 101.5 SHEFF. UNITS GRAND MEAN = 264.4 SHEFF. UNITS TEST DETERMINATIONS = 15
SD MEANS = 9.5 SHEFF. UNITS SD OF MEANS = 13.1 SHEFF. UNITS 85 LABS IN GRAND MEANS
AVERAGE SDR = 9.4 SHEFF. UNITS AVERAGE SDR = 9.9 SHEFF. UNITS
TOTAL NUMBER OF LABORATORIES REPORTING = 91

Best values: B91 102 ± 15 Sheffield units
H45 265 ± 20 Sheffield units

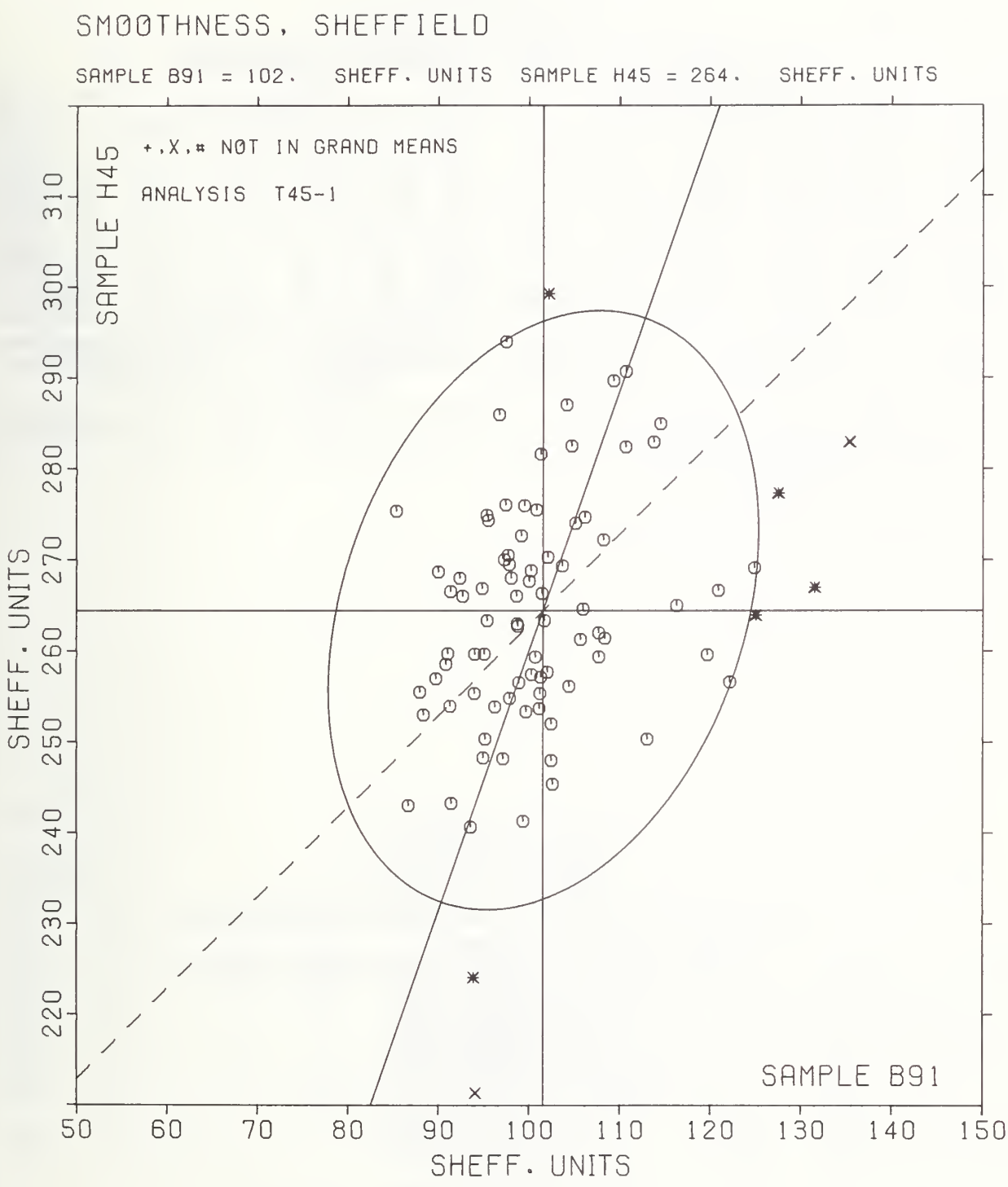
The following laboratories were omitted from the grand means because of extreme test results: 232S, 241, 312.

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

LAB CODE	F	MEANS B91	H45	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L134	O	85.3	275.3	4.9	18.9	.90	45S	SMOOTHNESS, SHEFFIELD
L321	O	86.7	243.0	-25.1	7.0	.73	45S	SMOOTHNESS, SHEFFIELD
L223	O	87.9	255.5	-13.0	9.9	1.07	45S	SMOOTHNESS, SHEFFIELD
L323	O	88.3	253.0	-15.2	8.7	.79	45S	SMOOTHNESS, SHEFFIELD
L108	O	89.7	257.0	-11.0	8.7	.77	45S	SMOOTHNESS, SHEFFIELD
L167	O	90.0	268.7	.2	12.3	.45	45S	SMOOTHNESS, SHEFFIELD
L390	O	90.8	258.5	-9.1	8.2	1.14	45S	SMOOTHNESS, SHEFFIELD
L382	O	91.0	259.7	-8.0	8.4	.89	45S	SMOOTHNESS, SHEFFIELD
L226B	O	91.3	253.9	-13.3	6.2	.79	45S	SMOOTHNESS, SHEFFIELD
L122	O	91.3	266.5	-1.4	10.3	.63	45S	SMOOTHNESS, SHEFFIELD
L255	O	91.4	243.3	-23.3	2.6	.78	45S	SMOOTHNESS, SHEFFIELD
L597	O	92.3	268.0	.3	9.9	1.00	45S	SMOOTHNESS, SHEFFIELD
L249	O	92.7	266.0	-1.5	8.9	1.10	45S	SMOOTHNESS, SHEFFIELD
L213	O	93.5	240.7	-25.1	-.3	1.12	45S	SMOOTHNESS, SHEFFIELD
L290	*	93.9	224.1	-40.6	-6.1	.83	45S	SMOOTHNESS, SHEFFIELD
L297	O	94.0	259.7	-7.0	5.5	1.23	45S	SMOOTHNESS, SHEFFIELD
L190C	O	94.0	255.3	-11.1	4.1	.78	45S	SMOOTHNESS, SHEFFIELD
L124	X	94.1	211.3	-52.6	-10.5	.84	45S	SMOOTHNESS, SHEFFIELD
L233	O	94.8	266.9	.1	7.2	1.26	45S	SMOOTHNESS, SHEFFIELD
L123	O	94.9	248.3	-17.4	.9	.89	45S	SMOOTHNESS, SHEFFIELD
L312	#	95.0	169.3	-91.9	-25.2	.31	45S	SMOOTHNESS, SHEFFIELD
L211	O	95.1	259.7	-6.6	4.5	1.08	45S	SMOOTHNESS, SHEFFIELD
L166	O	95.1	250.3	-15.4	1.4	1.06	45S	SMOOTHNESS, SHEFFIELD
L561	O	95.3	263.3	-3.1	5.5	1.01	45S	SMOOTHNESS, SHEFFIELD
L150	O	95.3	274.9	7.8	9.3	1.18	45S	SMOOTHNESS, SHEFFIELD
L261	O	95.5	274.3	7.3	9.0	1.13	45S	SMOOTHNESS, SHEFFIELD
L221	O	96.2	253.9	-11.7	1.6	.96	45S	SMOOTHNESS, SHEFFIELD
L190R	O	96.7	285.9	18.7	11.7	1.10	45S	SMOOTHNESS, SHEFFIELD
L349	O	97.1	248.2	-16.8	-1.2	1.40	45S	SMOOTHNESS, SHEFFIELD
L291S	O	97.3	270.0	3.8	5.9	.98	45S	SMOOTHNESS, SHEFFIELD
L121	O	97.4	276.0	9.5	7.7	1.13	45S	SMOOTHNESS, SHEFFIELD
L326	O	97.5	293.9	26.5	13.6	.46	45S	SMOOTHNESS, SHEFFIELD
L132	O	97.7	270.5	4.4	5.7	.91	45S	SMOOTHNESS, SHEFFIELD
L157	O	97.8	269.5	3.5	5.2	.92	45S	SMOOTHNESS, SHEFFIELD
L308	O	97.9	254.8	-10.3	.3	.99	45S	SMOOTHNESS, SHEFFIELD
L173B	O	98.0	268.0	2.2	4.5	.99	45S	SMOOTHNESS, SHEFFIELD
L176S	O	98.6	266.1	.6	3.3	.79	45S	SMOOTHNESS, SHEFFIELD
L259	O	98.7	263.0	-2.3	2.2	.73	45S	SMOOTHNESS, SHEFFIELD
L372	O	98.7	262.7	-2.5	2.1	1.21	45S	SMOOTHNESS, SHEFFIELD
L341	O	98.9	256.5	-8.3	-.1	.80	45S	SMOOTHNESS, SHEFFIELD
L228	O	99.1	272.7	7.0	5.0	1.26	45S	SMOOTHNESS, SHEFFIELD
L125	O	99.3	241.3	-22.5	-5.5	.96	45S	SMOOTHNESS, SHEFFIELD
L114	O	99.5	275.9	10.2	5.8	1.22	45S	SMOOTHNESS, SHEFFIELD
L159	O	99.7	253.3	-11.1	-1.9	1.14	45S	SMOOTHNESS, SHEFFIELD
L162	O	100.0	267.7	2.5	2.5	1.25	45S	SMOOTHNESS, SHEFFIELD
L288	O	100.2	268.8	3.7	2.7	1.05	45S	SMOOTHNESS, SHEFFIELD
L281	O	100.3	257.4	-7.1	-1.1	.77	45S	SMOOTHNESS, SHEFFIELD
L139S	O	100.7	259.3	-5.1	-.9	1.05	45S	SMOOTHNESS, SHEFFIELD
L318	O	100.8	275.5	10.2	4.3	.78	45S	SMOOTHNESS, SHEFFIELD
L285	O	101.1	253.7	-10.3	-3.2	1.09	45S	SMOOTHNESS, SHEFFIELD
L554	O	101.2	255.3	-8.7	-2.7	1.13	45S	SMOOTHNESS, SHEFFIELD
L575	O	101.3	281.6	16.1	5.9	.85	45S	SMOOTHNESS, SHEFFIELD
L275	O	101.3	257.1	-7.0	-2.2	1.51	45S	SMOOTHNESS, SHEFFIELD
L230S	O	101.4	266.3	1.7	.8	.95	45S	SMOOTHNESS, SHEFFIELD
L128	O	101.7	263.3	-1.0	-.5	.66	45S	SMOOTHNESS, SHEFFIELD
L305	O	102.0	257.7	-6.2	-2.7	.97	45S	SMOOTHNESS, SHEFFIELD
L352	O	102.1	270.3	5.7	1.4	1.28	45S	SMOOTHNESS, SHEFFIELD
L195	*	102.1	299.2	33.0	10.9	1.18	45S	SMOOTHNESS, SHEFFIELD
L252	O	102.5	248.0	-15.2	-6.3	.70	45S	SMOOTHNESS, SHEFFIELD
L396M	O	102.5	252.0	-11.4	-5.0	1.05	45S	SMOOTHNESS, SHEFFIELD
L203	O	102.6	245.4	-17.6	-7.3	1.16	45S	SMOOTHNESS, SHEFFIELD
L278	O	103.7	269.3	5.3	-.4	1.17	45S	SMOOTHNESS, SHEFFIELD
L277	O	104.1	287.0	22.2	5.0	1.44	45S	SMOOTHNESS, SHEFFIELD
L301	M	104.2				.83	45S	SMOOTHNESS, SHEFFIELD
L254	O	104.4	256.1	-6.9	-5.4	.90	45S	SMOOTHNESS, SHEFFIELD

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

LAB CODE	F	MEANS B91	H45	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L500	G	104.7	282.5	18.0	3.0	1.03	45S	SMOOTHNESS, SHEFFIELD
L317	G	105.1	274.0	10.2	-.2	1.44	45S	SMOOTHNESS, SHEFFIELD
L183S	G	105.7	261.3	-1.6	-4.9	1.00	45S	SMOOTHNESS, SHEFFIELD
L148	G	105.9	264.6	1.6	-4.1	.89	45S	SMOOTHNESS, SHEFFIELD
L224	G	106.1	274.7	11.2	-1.0	1.02	45S	SMOOTHNESS, SHEFFIELD
L587	G	107.7	262.0	-.3	-6.6	.81	45S	SMOOTHNESS, SHEFFIELD
L376	G	107.7	259.3	-2.8	-7.5	1.06	45S	SMOOTHNESS, SHEFFIELD
L100	G	108.2	272.2	9.5	-3.7	1.07	45S	SMOOTHNESS, SHEFFIELD
L370	G	108.3	261.4	-.6	-7.4	1.03	45S	SMOOTHNESS, SHEFFIELD
L158	G	109.3	289.7	26.4	1.0	1.23	45S	SMOOTHNESS, SHEFFIELD
L502	G	110.7	290.7	27.8	.1	.53	45S	SMOOTHNESS, SHEFFIELD
L107	G	110.7	282.3	19.9	-2.7	1.57	45S	SMOOTHNESS, SHEFFIELD
L152	G	113.0	250.3	-9.5	-15.5	.92	45S	SMOOTHNESS, SHEFFIELD
L153	G	113.7	282.9	21.5	-5.4	.87	45S	SMOOTHNESS, SHEFFIELD
L231	G	114.5	284.9	23.6	-5.4	1.59	45S	SMOOTHNESS, SHEFFIELD
L257C	G	116.3	265.0	5.4	-13.7	1.03	45S	SMOOTHNESS, SHEFFIELD
L257A	G	119.7	259.6	1.4	-18.7	.90	45S	SMOOTHNESS, SHEFFIELD
L380	G	120.9	266.7	8.5	-17.5	.98	45S	SMOOTHNESS, SHEFFIELD
L507	G	122.1	256.6	-.6	-22.0	.70	45S	SMOOTHNESS, SHEFFIELD
L257B	G	124.9	269.1	12.1	-20.5	.80	45S	SMOOTHNESS, SHEFFIELD
L350	*	125.0	263.9	7.3	-22.3	1.05	45S	SMOOTHNESS, SHEFFIELD
L342	*	127.5	277.3	20.8	-20.3	.95	45S	SMOOTHNESS, SHEFFIELD
L232S	#	131.0	324.7	66.6	-7.9	.82	45S	SMOOTHNESS, SHEFFIELD
L378	*	131.5	267.0	12.3	-27.5	.88	45S	SMOOTHNESS, SHEFFIELD
L328	X	135.3	282.9	28.6	-25.8	1.40	45S	SMOOTHNESS, SHEFFIELD
L241	#	140.0	321.3	66.4	-17.5	1.38	45S	SMOOTHNESS, SHEFFIELD
GMEANS:		101.5	264.4			1.00		
		95% ELLIPSE:		34.0	22.2	WITH GAMMA = 70 DEGREES		


SMOOTHNESS, SHEFFIELD
SAMPLE B91 = 102. SHEFF. UNITS SAMPLE H45 = 264. SHEFF. UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T45-1
SAMPLE H45
SHEFF. UNITS
220 230 240 250 260 270 280 290 300 310
SAMPLE B91
50 60 70 80 90 100 110 120 130 140 150
SHEFF. UNITS

REPORT NO. 536 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978

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 H45 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 15 VAR	P	LAB
L139B	62.87	-1.70	-.18	8.91	1.15	14.80	-.31	-.22	1.15	1.34	45K	O	L139B
L162	33.43	-31.14	-3.23	3.41	.44	5.99	-9.11	-6.41	.41	.48	45K	#	L162
L176	37.99	-26.58	-2.76	4.20	.54	12.14	-2.97	-2.09	.40	.47	45K	#	L176
L182K	53.00	-11.57	-1.20	5.14	.66	13.71	-1.40	-.99	.56	.66	45K	O	L182K
L190C	70.67	6.10	.63	8.02	1.03	15.20	.09	.07	.77	.91	45K	O	L190C
L230B	72.40	7.83	.81	7.19	.93	14.47	-.64	-.45	.92	1.07	45K	O	L230B
L232B	55.03	-9.54	-.99	5.17	.67	14.55	-.56	-.39	.68	.80	45K	O	L232B
L243K	57.47	-7.10	-.74	5.04	.65	15.18	.07	.05	.48	.56	45K	O	L243K
L291K	81.07	16.50	1.71	14.60	1.88	18.43	3.32	2.34	1.53	1.79	45K	O	L291K
L581	64.07	-.50	-.05	8.06	1.04	14.53	-.57	-.40	.74	.87	45K	O	L581
GR. MEAN * 64.57 BEKK SECONDS						GRAND MEAN * 15.11 BEKK SECONDS					TEST DETERMINATIONS * 15		
SD MEANS * 9.63 BEKK SECONDS						SD OF MEANS * 1.42 BEKK SECONDS					8 LABS IN GRAND MEANS		
AVERAGE SDR * 7.77 BEKK SECONDS						AVERAGE SDR * .85 BEKK SECONDS							
L182G	145.33	80.76	8.39	18.36	2.36	33.00	17.89	12.59	1.10	1.28	45H	*	L182G
L251	63.80	-.77	-.08	8.26	1.06	15.37	.26	.18	.83	.98	45L	*	L251
L388	679.81	615.24	63.88	100.97	13.00	80.23	65.12	45.81	11.32	13.26	45H	*	L388

TOTAL NUMBER OF LABORATORIES REPORTING * 13

Best values: B91 63 Bekk seconds
H45 15 Bekk seconds

The following laboratories were omitted from the grand means because of extreme test results: 162, 176.

REPORT NO. 536 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978

ANALYSIS T45-2 TABLE 2

SMOOTHNESS , BEKK SECONDS

TAPPI SUGGESTED METHOD T479 SU-71, SMOOTHNESS OF PAPER (BEKK METHOD)

LAB CODE	F	MEANS B91	H45	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L162	#	33.43	5.99	-31.96	-5.59	.46	45K	SMOOTHNESS, BEKK
L176	#	37.99	12.14	-26.74	.01	.51	45K	SMOOTHNESS, BEKK
L182K	O	53.00	13.71	-11.65	-.10	.66	45K	SMOOTHNESS, BEKK
L232B	O	55.03	14.55	-9.55	.51	.73	45K	SMOOTHNESS, BEKK
L243K	O	57.47	15.18	-7.05	.86	.60	45K	SMOOTHNESS, BEKK
L139B	O	62.87	14.80	-1.73	-.12	1.25	45K	SMOOTHNESS, BEKK
L251	*	63.80	15.37	-.74	.34	1.02	45L	SMOOTHNESS, BEKK, 20 C, 65% RH
L581	O	64.07	14.53	-.57	-.51	.95	45K	SMOOTHNESS, BEKK
L190C	O	70.67	15.20	6.07	-.59	.97	45K	SMOOTHNESS, BEKK
L230B	O	72.40	14.47	7.71	-1.51	1.00	45K	SMOOTHNESS, BEKK
L291K	O	81.07	18.43	16.77	1.46	1.84	45K	SMOOTHNESS, BEKK
L182G	*	145.33	33.00	82.25	8.78	1.82	45B	SMOOTHNESS, GURLEY OIL PLOTATION
L388	*	679.81	80.23	618.67	-3.88	13.13	45H	SMOOTHNESS, GURLEY OIL PLOTATION
GMEANS:		64.57	15.11			1.00		
95% ELLIPSE:				33.58	3.22	WITH GAMMA = 6 DEGREES		

REPORT NO. 53G TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978
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 H45 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L10C	88.	-8.	-.78	11.	.87	535.	43.	.90	30.	.77	47B	O	L100
L176	101.	4.	.43	10.	.75	449.	-43.	-.90	22.	.55	47B	O	L176
L182B	97.	1.	.06	17.	1.30	474.	-18.	-.37	58.	1.49	47B	O	L182B
L236	79.	-17.	-1.62	8.	.60	451.	-41.	-.86	19.	.49	47B	O	L236
L242	94.	-2.	-.19	15.	1.17	451.	-41.	-.86	29.	.74	47B	O	L242
L243B	89.	-7.	-.65	9.	.70	537.	45.	.94	20.	.51	47B	O	L243B
L244	88.	-8.	-.76	12.	.97	466.	-26.	-.55	35.	.90	47B	#	L244
L280	99.	3.	.25	16.	1.16	579.	87.	1.83	107.	2.72	47B	O	L280
L333	102.	6.	.59	22.	1.72	457.	-35.	-.73	42.	1.07	47B	O	L333
L484	116.	20.	1.92	9.	.73	494.	2.	.05	26.	.66	47B	O	L484

GR. MEAN = 96. ML/MIN GRAND MEAN = 492. ML/MIN TEST DETERMINATIONS = 10
SD MEANS = 10. ML/MIN SD OF MEANS = 48. ML/MIN 9 LABS IN GRAND MEANS
AVERAGE SDR = 13. ML/MIN AVERAGE SDR = 39. ML/MIN
TOTAL NUMBER OF LABORATORIES REPORTING = 10

Best values: B91 96 milliliter per minute
H45 490 milliliter per minute

The following laboratories were omitted from the grand means because of extreme test results: 244.

REPORT NO. 53G TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978
ANALYSIS T47-1 TABLE 2
SMOOTHNESS, BENDTSEN

LAB CODE	F	MEANS B91	H45	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L236	O	79.	451.	41.	-17.	.54	47B	SMOOTHNESS, BENDTSEN, WG 150
L100	O	88.	535.	-43.	-8.	.82	47B	SMOOTHNESS, BENDTSEN, WG 150
L244	#	88.	466.	26.	-8.	.94	47B	SMOOTHNESS, BENDTSEN, WG 150
L243B	O	89.	537.	-45.	-7.	.60	47B	SMOOTHNESS, BENDTSEN, WG 150
L242	O	94.	451.	41.	-2.	.96	47B	SMOOTHNESS, BENDTSEN, WG 150
L182B	O	97.	474.	18.	1.	1.40	47B	SMOOTHNESS, BENDTSEN, WG 150
L280	O	99.	579.	-87.	3.	1.94	47B	SMOOTHNESS, BENDTSEN, WG 150
L176	O	101.	449.	43.	4.	.65	47B	SMOOTHNESS, BENDTSEN, WG 150
L333	O	102.	457.	35.	6.	1.40	47B	SMOOTHNESS, BENDTSEN, WG 150
L484	O	116.	494.	-2.	20.	.70	47B	SMOOTHNESS, BENDTSEN, WG 150
GMEANS:		96.	492.			1.00		
95% ELLIPSE:				157.	34.	WITH GAMMA = -89 DEGREES		

REPORT NO. 530 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978
ANALYSIS T56-1 TABLE 1
K & N INK ABSORPTION

LAB CODE	SAMPLE H58 PRINTING 106 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE B80 COATED OFFSET BOOK 75 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	VAR	P	LAB
L149	62.75	-3.14	-.77	.50	.68	21.00	-3.92	-1.25	.82	1.49	56K	ó	L149
L182	64.05	-1.84	-.45	.19	.26	25.42	.51	.16	.49	.89	56K	ó	L182
L213	70.95	5.06	1.24	.79	1.07	29.32	4.41	1.41	.50	.91	56K	ó	L213
L277	67.75	1.86	.45	.96	1.29	26.50	1.58	.51	.58	1.05	56K	ó	L277
L278	69.97	4.08	1.00	.98	1.33	26.52	1.61	.51	.42	.77	56K	ó	L278
L291	66.30	.41	.10	.86	1.16	20.60	-4.32	-1.38	.18	.33	56K	ó	L291
L339	25.15	-40.74	-9.96	.51	.68	69.75	44.83	14.32	.96	1.75	56K	#	L339
L388	59.47	-6.42	-1.57	.90	1.21	25.05	.13	.04	.85	1.56	56K	ó	L388
L564	66.00	.11	.03	.00	.00	41.75	16.83	5.38	.50	.91	56K	#	L564
L616	100.00	34.11	8.34	.00	.00	63.15	38.23	12.22	.40	.74	56K	#	L616

GR. MEAN = 65.89 K & N UNITS GRAND MEAN = 24.92 K & N UNITS TEST DETERMINATIONS = 4
SD MEANS = 4.09 K & N UNITS SD OF MEANS = 3.13 K & N UNITS 7 LABS IN GRAND MEANS
AVERAGE SDR = .74 K & N UNITS AVERAGE SDR = .55 K & N UNITS
TOTAL NUMBER OF LABORATORIES REPORTING = 10

Best values: H58 66 K & N units
B80 25 K & N units

The following laboratories were omitted from the grand means because of extreme test results: 564, 616.

The following laboratories appear to have interchanged samples: 339.

REPORT NO. 530 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978
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
L339	#	25.15	69.75	-11.37	59.50	1.22	56K	INK ABSORPTION, K&N INK TEST
L388	ó	59.47	25.05	-5.41	3.46	1.39	56K	INK ABSORPTION, K&N INK TEST
L149	ó	62.75	21.00	-4.73	-1.70	1.08	56K	INK ABSORPTION, K&N INK TEST
L182	ó	64.05	25.42	-1.31	1.39	.57	56K	INK ABSORPTION, K&N INK TEST
L564	#	66.00	41.75	8.87	14.30	.46	56K	INK ABSORPTION, K&N INK TEST
L291	ó	66.30	20.60	-1.90	-3.90	.75	56K	INK ABSORPTION, K&N INK TEST
L277	ó	67.75	26.50	2.41	.38	1.17	56K	INK ABSORPTION, K&N INK TEST
L278	ó	69.97	26.52	4.32	-.76	1.05	56K	INK ABSORPTION, K&N INK TEST
L213	ó	70.95	29.32	6.61	1.12	.99	56K	INK ABSORPTION, K&N INK TEST
L616	#	100.00	63.15	49.04	14.83	.37	56K	INK ABSORPTION, K&N INK TEST
GMEANS:		65.89	24.92			1.00		
		95% ELLIPSE:		17.02	8.87	WITH GAMMA = 31 DEGREES		

REPORT NO. 53G — TAPPI COLLABORATIVE REFERENCE PROGRAM — APRIL 1978

ANALYSIS T57-1 TABLE 1

HYDROGEN ION CONCENTRATION (PE), COLD

TAPPI STANDARD T509 OS-77

LAB CODE	SAMPLE J61 PRINTING 86 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE J77 PRINTING 89 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.* 5 VAR	F	LAB
L182C	5.662	-.118	-.77	.016	.22	7.478	.088	.34	.018	.39	57D	O	L182C
L251C	5.718	-.062	-.41	.020	.28	7.310	-.080	-.31	.020	.43	57P	O	L251C
L274	5.740	-.040	-.26	.167	2.28	7.800	.410	1.59	.000	.00	57V	O	L274
L328	5.700	-.080	-.52	.071	.96	7.280	-.110	-.42	.045	.97	57M	O	L328
L356	5.778	-.002	-.01	.035	.48	7.450	.060	.23	.085	1.83	57V	O	L356
L484A	6.080	.300	1.97	.130	1.78	7.020	-.370	-1.43	.110	2.38	57Y	O	L484A

GR. MEAN = 5.780 PH UNITS — GRAND MEAN = 7.390 PH UNITS — TEST DETERMINATIONS = 5

SD MEANS = .152 PH UNITS — SD OF MEANS = .259 PH UNITS — 6 LABS IN GRAND MEANS

AVERAGE SDR = .073 PH UNITS — AVERAGE SDR = .046 PE UNITS

L442	5.403	-.376	-2.47	.077	1.05	7.492	.102	.39	.062	1.35	57Q	*	L442

TOTAL NUMBER OF LABORATORIES REPORTING = 7

Best values: J61 5.7 pH units
J77 7.4 pH units

REPORT NO. 53G — TAPPI COLLABORATIVE REFERENCE PROGRAM — APRIL 1978

ANALYSIS T57-1 TABLE 2

HYDROGEN ION CONCENTRATION (PE), COLD

TAPPI STANDARD T509 OS-77

LAB CODE	F	MEANS J61	J77	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L442	*	5.403	7.492	-.248	-.301	1.20	57Q	PH, HOT, W.G.PYE
L182C	O	5.662	7.478	-.129	-.071	.31	57D	PH, COLD, RADIOMETER TYPE PH M 28
L328	O	5.700	7.280	.067	-.118	.97	57M	PH, COLD, BECKMAN ZEROMATIC
L251C	O	5.718	7.310	.047	-.089	.36	57P	PH, COLD, RADIOMETER TYPE PE M64
L274	O	5.740	7.800	-.390	.133	1.14	57V	PH, COLD, BECKMAN EXPANDOMATIC
L356	O	5.778	7.450	-.056	.023	1.15	57V	PH, COLD, BECKMAN EXPANDOMATIC
L484A	O	6.080	7.020	.460	.122	2.08	57Y	PH, COLD, BECKMAN MODEL H2
GMEANS:		5.780	7.390			1.00		
95% ELLIPSE:		1.165	.455			WITH GAMMA =-65 DEGREES		

REPORT NO. 53G

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T57-2 TABLE 1
HYDROGEN ION CONCENTRATION (PH), HOT
TAPPI STANDARD T435 OS-77

APRIL 1978

LAB CODE	SAMPLE J61 MEAN	PRINTING 86 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J77 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 5 VAR	P	LAB
L128	4.780	-.347	-1.59	.027	.42	7.890	-.245	-.44	.074	1.19	57L	6	L128
L131	5.060	-.067	-.31	.114	1.77	5.200	-2.935	-5.32	.212	3.41	57L	#	L131
L162	5.166	.039	.18	.032	.50	8.538	.403	.73	.053	.85	57C	6	L162
L182E	5.187	.061	.28	.025	.39	7.830	-.305	-.55	.057	.92	57E	6	L182E
L334	5.120	-.007	-.03	.021	.33	8.876	.741	1.34	.072	1.16	57C	6	L334
L4848	5.380	.253	1.16	.217	3.36	7.540	-.595	-1.08	.055	.88	57Z	6	L4848

GR. MEAN = 5.127 PH UNITS — GRAND MEAN = 8.135 PH UNITS — TEST DETERMINATIONS = 5
SD MEANS = .218 PH UNITS — SD OF MEANS = .552 PH UNITS — 5 LABS IN GRAND MEANS
AVERAGE SDR = .064 PH UNITS — AVERAGE SDR = .062 PH UNITS
TOTAL NUMBER OF LABORATORIES REPORTING = 6

Best values: J61 5.2 pH units
J77 8.0 pH units

The following laboratories were omitted from the grand means because of extreme test results: 131.

REPORT NO. 53G

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T57-2 TABLE 2
HYDROGEN ION CONCENTRATION (PH), HOT
TAPPI STANDARD T435 OS-77

APRIL 1978

LAB CODE	F	MEANS J61	J77	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L128	6	4.780	7.890	.220	-.363	.81	57L	PH, HOT, L*N
L131	#	5.060	5.200	2.923	-.274	2.59	57L	PH, HOT, L*N
L334	6	5.120	8.876	-.740	.046	.75	57C	PH, HOT, CORNING MODEL 12 RESEARCH METER
L162	6	5.166	8.538	-.399	.068	.67	57C	PH, HOT, CORNING MODEL 12 RESEARCH METER
L182E	6	5.187	7.830	.308	.039	.65	57E	PH, HOT, RADIOMETER TYPE PH M 28
L4848	6	5.380	7.540	.611	.211	2.12	57Z	PH, HOT, BECKMAN MODEL H2
GMEANS:		5.127	8.135			1.00		
		95% ELLIPSE:		2.792	1.084	WITH GAMMA =-85 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) - 84L TYPE

	SAMPLE	PRINTING				SAMPLE	COATED DULL				TEST D.- 10		
LAB	H51	91 GRAMS PER SQUARE METER				E40	117 GRAMS PER SQUARE METER						
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L105	90.58	.45	1.06	1.14	3.21	96.73	.56	1.84	.21	1.06	60H	O	L105
L108	90.01	-.12	-.28	.45	1.26	96.05	-.12	-.38	.19	.97	60B	O	L108
L118	89.99	-.14	-.33	.20	.57	96.14	-.03	-.08	.16	.84	60B	O	L118
L121	89.80	-.33	-.78	.50	1.42	96.14	-.03	-.08	.23	1.19	60B	O	L121
L122	90.23	.10	.24	.31	.87	96.13	-.04	-.12	.12	.59	60D	O	L122
L123	90.15	.02	.05	.37	1.03	96.21	.04	.14	.11	.56	60W	O	L123
L124	89.78	-.35	-.82	.43	1.21	95.53	-.64	-2.07	.14	.73	60B	*	L124
L125	89.48	-.65	-1.53	.36	1.00	89.48	-6.69	-21.74	.33	1.69	60H	#	L125
L131	89.77	-.36	-.85	.34	.97	95.99	-.18	-.57	.10	.51	60R	O	L131
L132	89.84	-.29	-.68	.41	1.17	95.84	-.33	-1.06	.16	.81	60B	O	L132
L134	91.06	.93	2.20	.33	.93	96.75	.58	1.90	.14	.74	60B	O	L134
L139	90.03	-.10	-.23	.39	1.10	95.67	-.50	-1.61	.29	1.51	60B	O	L139
L148H	90.21	.08	.19	.36	1.02	96.13	-.04	-.12	.22	1.11	60H	O	L148H
L150	89.50	-.63	-1.48	.24	.66	96.50	.33	1.09	.00	.00	60B	X	L150
L152	90.33	.20	.47	.30	.85	96.22	.05	.18	.17	.87	60B	O	L152
L153	90.50	.37	.88	.47	1.33	96.25	.08	.27	.26	1.35	60B	O	L153
L157	90.70	.57	1.35	.59	1.65	96.45	.28	.92	.28	1.46	60B	O	L157
L158	90.49	.36	.85	.33	.93	96.31	.14	.47	.17	.85	60D	O	L158
L159	90.36	.23	.54	.38	1.08	96.41	.24	.79	.22	1.15	60R	O	L159
L162	90.35	.22	.52	.34	.96	96.33	.16	.53	.07	.35	60W	O	L162
L166	89.45	-.68	-1.60	.50	1.40	95.72	-.45	-1.45	.18	.93	60B	O	L166
L172	90.55	.42	.99	.42	1.20	96.39	.22	.73	.26	1.35	60B	O	L172
L173A	90.10	-.03	-.07	.32	.89	95.99	-.18	-.57	.09	.45	60B	O	L173A
L182	90.45	.32	.76	.16	.45	96.50	.33	1.09	.24	1.21	60B	O	L182
L183	90.65	.52	1.23	.30	.83	96.50	.33	1.09	.12	.64	60B	O	L183
L190C	90.11	-.02	-.05	.37	1.03	96.24	.07	.24	.11	.55	60B	O	L190C
L190R	90.45	.32	.76	.28	.79	96.20	.03	.11	.11	.54	60B	O	L190R
L206	90.21	.08	.19	.30	.85	96.34	.17	.57	.13	.65	60B	O	L206
L2108	90.36	.23	.54	.38	1.08	96.05	-.12	-.38	.12	.60	60B	O	L2108
L210D	90.24	.11	.26	.39	1.11	96.23	.06	.21	.14	.73	60D	O	L210D
L211S	89.96	-.17	-.40	.18	.50	96.09	-.08	-.25	.12	.61	60R	O	L211S
L213	90.32	.19	.45	.36	1.00	96.18	.01	.05	.14	.72	60B	O	L213
L2238	90.16	.03	.07	.45	1.28	96.35	.18	.60	.10	.50	60B	O	L2238
L225	90.33	.20	.47	.31	.86	96.19	.02	.08	.23	1.17	60B	O	L225
L226B	90.44	.31	.73	.15	.42	96.25	.08	.27	.10	.50	60B	O	L2268
L228	89.92	-.21	-.49	.37	1.05	96.31	.14	.47	.14	.70	60H	O	L228
L230	90.07	-.06	-.14	.31	.86	96.22	.05	.18	.15	.79	60B	O	L230
L2338	89.90	-.23	-.54	.32	.89	96.00	-.17	-.54	.24	1.21	60B	O	L233B
L236B	90.35	.22	.52	.24	.68	95.00	-1.17	-3.79	.24	1.21	60B	X	L236B
L238A	89.38	-.75	-1.77	.22	.62	95.55	-.62	-2.00	.10	.50	60R	O	L238A
L241	90.22	.09	.21	.50	1.40	96.21	.04	.14	.28	1.42	60B	O	L241
L243	90.22	.09	.21	.43	1.20	96.08	-.09	-.28	.12	.63	60B	O	L243
L254	90.36	.23	.54	.20	.57	96.26	.09	.31	.14	.73	60H	O	L254
L255	90.16	.03	.07	.35	.98	95.72	-.45	-1.45	.14	.72	60B	*	L255
L259	90.45	.32	.76	.44	1.23	96.10	-.07	-.21	.21	1.08	60B	O	L259
L261	90.70	.57	1.35	.35	.99	96.75	.58	1.90	.26	1.35	60B	O	L261
L262	90.44	.31	.73	.33	.94	96.38	.21	.70	.18	.93	60R	O	L262
L275	90.39	.26	.62	.19	.52	96.25	.08	.27	.16	.85	60R	O	L275
L278	90.87	.74	1.75	.20	.56	96.56	.39	1.28	.10	.50	60B	O	L278
L281	90.19	.06	.14	.36	1.01	96.26	.09	.31	.20	1.00	60D	O	L281
L285B	86.21	-3.92	-9.25	.44	1.24	95.72	-.45	-1.45	.40	2.05	60B	#	L2858
L285R	90.18	.05	.12	.44	1.25	95.55	-.62	-2.00	.34	1.73	60R	X	L285R
L288	89.82	-.31	-.73	.25	.71	96.21	.04	.14	.16	.82	60D	O	L288
L301	89.45	-.68	-1.60	.23	.64	95.74	-.43	-1.38	.15	.77	60B	O	L301
L305	89.98	-.15	-.35	.28	.80	96.26	.09	.31	.10	.50	60R	O	L305
L308	90.82	.69	1.63	.35	.98	96.75	.58	1.90	.28	1.46	60H	O	L308
L315	90.08	-.05	-.12	.31	.88	95.98	-.19	-.60	.14	.72	60D	O	L315
L317	90.09	-.04	-.09	.21	.59	96.37	.20	.66	.25	1.30	60B	O	L317
L318	89.85	-.28	-.66	.34	.95	96.25	.08	.27	.26	1.35	60B	O	L318
L323	90.71	.58	1.37	.46	1.28	96.42	.25	.83	.24	1.23	60W	O	L323
L326	90.61	.48	1.13	.48	1.36	96.49	.32	1.05	.35	1.78	60B	O	L326
L328	90.00	-.13	-.30	.00	.00	96.00	-.17	-.54	.00	.00	60B	O	L328
L333	89.78	-.35	-.82	.37	1.04	96.01	-.16	-.51	.11	.56	60B	O	L333
L339	89.60	-.53	-1.25	.84	2.38	95.60	-.57	-1.84	1.43	7.34	60B	O	L339
L341	89.01	-1.12	-2.64	.24	.67	95.57	-.60	-1.94	.14	.73	60R	*	L341

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 H51 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	F	LAB	TEST D.= 10
L349	90.30	.17	.40	.17	.48	96.20	.03	.11	.15	.76	60D	O	L349	
L352	89.58	-.55	-1.30	.08	.22	96.05	-.12	-.38	.07	.36	60R	O	L352	
L354	89.70	-.43	-1.01	.48	1.36	96.00	-.17	-.54	.00	.00	60B	O	L354	
L378	90.46	.33	.78	.34	.96	96.66	.49	1.61	.21	1.06	60D	O	L378	
L390	89.21	-.92	-2.17	3.70	10.43	96.30	.13	.44	.42	2.15	60B	X	L390	
L523	89.83	-.30	-.71	.31	.86	96.06	-.11	-.34	.11	.55	60R	O	L523	
L543	89.85	-.28	-.66	.20	.55	95.80	-.37	-1.19	.13	.68	60D	O	L543	
L561	89.20	-.93	-2.19	.92	2.59	95.80	-.37	-1.19	.92	4.71	60B	O	L561	
L581	90.68	.55	1.30	.23	.66	96.40	.23	.76	.12	.64	60B	O	L581	
L587	90.12	-.01	-.02	.28	.78	96.31	.14	.47	.12	.61	60B	O	L587	
L592	89.13	-1.00	-2.36	.27	.76	95.78	-.39	-1.25	.08	.40	60W	*	L592	
L597	8.89	-81.24	-191.74	.07	.21	9.45	-86.72	-281.92	.05	.27	60B	#	L597	
L599	90.20	.07	.17	.63	1.78	96.70	.53	1.74	.89	4.56	60B	*	L599	
L602	89.22	-.91	-2.15	.27	.77	95.36	-.81	-2.62	.20	1.03	60B	*	L602	
GR. MEAN = 90.13 PERCENT						GRAND MEAN = 96.17 PERCENT					TEST DETERMINATIONS = 10			
SD MEANS = .42 PERCENT						SD OF MEANS = .31 PERCENT					72 LABS IN GRAND MEANS			
		AVERAGE SDR = .35 PERCENT					AVERAGE SDR = .19 PERCENT							
L100	90.66	.53	1.25	.38	1.06	96.44	.27	.89	.12	.60	60E	*	L100	
L224	90.45	.32	.76	.44	1.23	96.64	.47	1.54	.34	1.73	60P	*	L224	
L232	90.00	-.13	-.30	.00	.00	95.70	-.47	-1.51	.26	1.32	60P	*	L232	
L236E	92.40	2.27	5.36	.25	.70	96.55	.38	1.25	.13	.65	60B	*	L236E	
L249	90.45	.32	.76	.36	1.02	96.29	.12	.40	.11	.56	60P	*	L249	
L256	90.20	.07	.17	.40	1.12	96.18	.02	.06	.12	.60	60N	*	L256	
L260	89.80	-.33	-.78	.42	1.19	96.07	-.10	-.31	.16	.84	60P	*	L260	
L274P	89.90	-.23	-.54	.74	2.08	95.70	-.47	-1.51	.48	2.48	60P	*	L274P	
L277	10.20	-79.93	-188.65	.79	2.22	3.90	-92.27	-299.96	.74	3.79	60P	*	L277	
L309	88.92	-1.21	-2.85	.43	1.22	95.44	-.73	-2.36	.20	1.03	60A	*	L309	
L312	88.85	-1.28	-3.02	.34	.95	95.65	-.52	-1.68	.34	1.73	60P	*	L312	
L314	90.77	.64	1.51	.39	1.10	96.51	.34	1.12	.15	.78	60T	*	L314	
L380	89.80	-.33	-.78	.35	.99	96.00	-.17	-.54	.00	.00	60P	*	L380	
L388	88.90	-1.23	-2.90	.39	1.11	95.75	-.42	-1.35	.26	1.35	60P	*	L388	

TOTAL NUMBER OF LABORATORIES REPORTING = 93

Best values: H51 90.2 ± 0.7 percent
E40 96.2 ± 0.5 percent

The following laboratories were omitted from the grand means because of extreme test results: 125, 285B, 597.

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

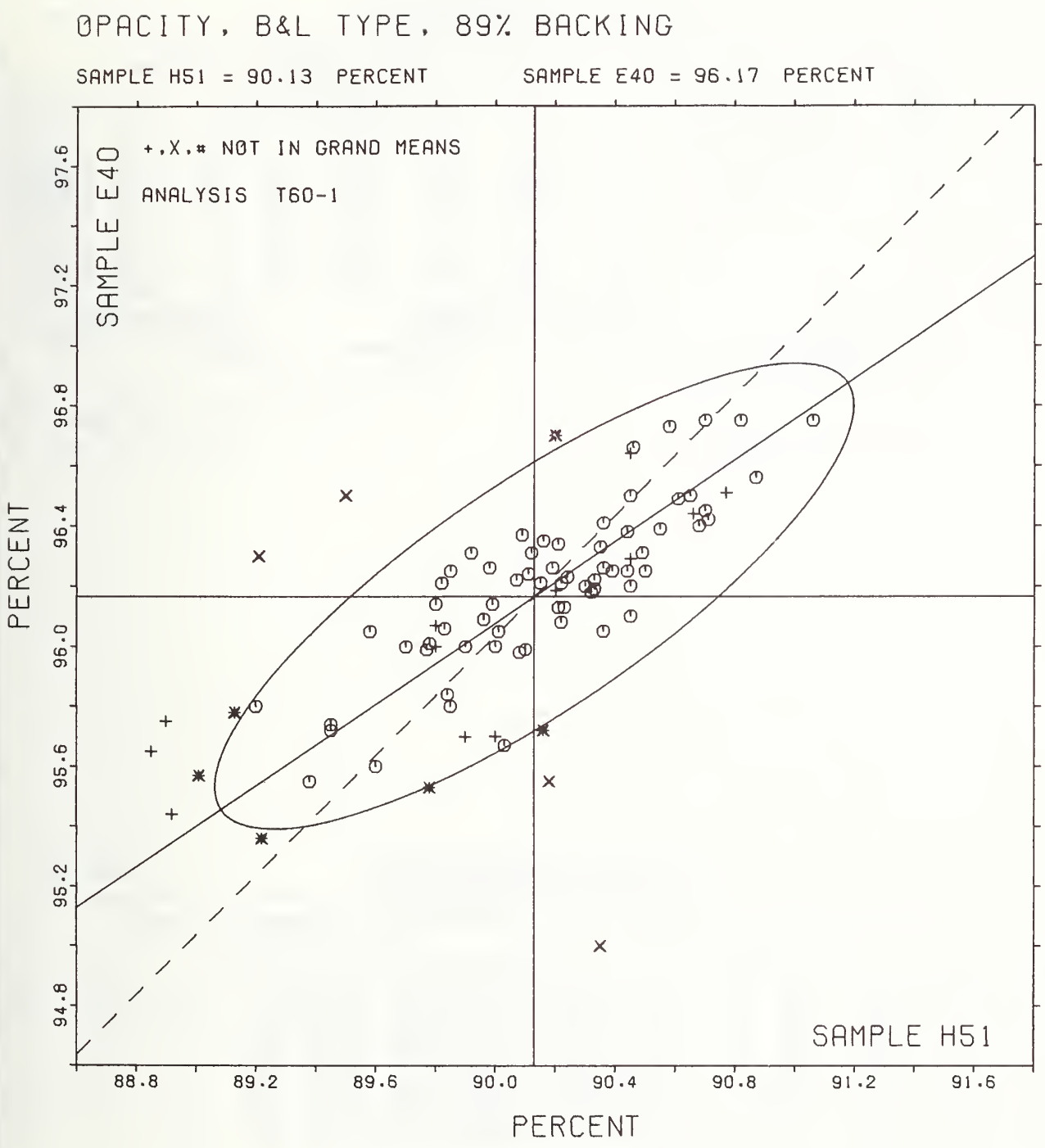
LAB CODE	P	MEANS B51	B40	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L597	#	8.89	9.45	-115.90	-26.21	.24	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L277	+	10.20	3.90	-117.93	-31.54	3.00	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L2B5B	#	86.21	95.72	-3.49	1.83	1.65	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L312	+	88.85	95.65	-1.35	.29	1.34	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L3BB	+	88.90	95.75	-1.25	.35	1.23	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L309	+	88.92	95.44	-1.41	.0B	1.13	60A	OPACITY (WHITE BACKING), ZEISS ELREPHO, FILTER 4,86% BACKING
L341	*	89.01	95.57	-1.26	.13	.70	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L592	*	89.13	95.7B	-1.04	.24	.5B	60W	OPACITY (WHITE BACKING), HUYGEN,DIGITAL
L561	O	89.20	95.B0	-.97	.22	3.65	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L390	X	89.21	96.30	-.69	.63	6.29	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L502	*	89.22	95.36	-1.20	-.16	.90	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L23BA	O	89.3B	95.55	-.97	-.09	.56	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L301	O	89.45	95.74	-.80	.03	.71	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L166	O	89.45	95.72	-.81	.01	1.17	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L125	#	89.4B	B9.4B	-4.29	-5.17	1.35	60H	OPACITY (WHITE BACKING), HUYGEN
L150	X	89.50	96.50	-.33	.63	.33	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L352	O	89.5B	96.05	-.52	.21	.29	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L339	O	B9.60	95.60	-.76	-.17	4.86	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L354	O	B9.70	96.00	-.45	.10	.6B	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L131	O	89.77	95.99	-.40	.06	.74	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L124	*	89.78	95.53	-.65	-.33	.97	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L333	O	89.78	96.01	-.3B	.07	.B0	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L380	+	B9.B0	96.00	-.37	.05	.49	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L121	O	B9.80	96.14	-.29	.16	1.30	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L260	+	B9.B0	96.07	-.33	.11	1.01	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L2B8	O	89.B2	96.21	-.23	.21	.77	60D	OPACITY (WHITE BACKING), DIANO/BNL
L523	O	B9.83	96.06	-.31	.0B	.71	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L132	O	B9.B4	95.B4	-.42	-.11	.99	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L543	O	B9.85	95.B0	-.44	-.15	.62	60D	OPACITY (WHITE BACKING), DIANO/BNL
L31B	O	89.85	96.25	-.18	.23	1.15	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L274P	+	B9.90	95.70	-.45	-.26	2.28	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L233B	O	B9.90	96.00	-.2B	-.01	1.05	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L22B	O	B9.92	96.31	-.09	.24	.B8	60H	OPACITY (WHITE BACKING), HUYGEN
L211S	O	B9.96	96.09	-.18	.03	.56	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L305	O	89.9B	96.26	-.07	.16	.65	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L11B	O	B9.99	96.14	-.13	.06	.71	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L232	+	90.00	95.70	-.37	-.31	.66	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L32B	O	90.00	96.00	-.20	-.06	.00	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L10B	O	90.01	96.05	-.16	-.03	1.12	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L139	O	90.03	95.67	-.36	-.35	1.31	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L230	O	90.07	96.22	-.02	.0B	.B3	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L315	O	90.0B	95.9B	-.14	-.13	.B0	60D	OPACITY (WHITE BACKING), DIANO/BNL
L317	O	90.09	96.37	.08	.19	.94	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L173A	O	90.10	95.99	-.12	-.13	.67	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L190C	O	90.11	96.24	.03	.07	.79	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L5B7	O	90.12	96.31	.07	.12	.70	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L123	O	90.15	96.21	.04	.03	.80	60W	OPACITY (WHITE BACKING), HUYGEN,DIGITAL
L255	*	90.16	95.72	-.22	-.39	.B5	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L223B	O	90.16	96.35	.13	.14	.B9	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L285R	X	90.1B	95.55	-.30	-.54	1.49	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L2B1	O	90.19	96.26	.10	.04	1.01	60D	OPACITY (WHITE BACKING), DIANO/BNL
L599	*	90.20	96.70	.36	.40	3.17	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L256	+	90.20	96.1B	.07	-.02	.86	60N	OPACITY (WHITE BACKING), HUNTER
L206	O	90.21	96.34	.16	.10	.75	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L14BH	O	90.21	96.13	.05	-.07	1.07	60H	OPACITY (WHITE BACKING), HUYGEN
L241	O	90.22	96.21	.10	-.01	1.41	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L243	O	90.22	96.0B	.03	-.12	.92	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L122	O	90.23	96.13	.06	-.09	.73	60D	OPACITY (WHITE BACKING), DIANO/BNL
L2100	O	90.24	96.23	.13	-.01	.92	60D	OPACITY (WHITE BACKING), DIANO/BNL
L349	O	90.30	96.20	.16	-.07	.62	60D	OPACITY (WHITE BACKING), DIANO/BNL
L213	O	90.32	96,18	.17	-.10	.B6	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L225	O	90.33	96.19	.18	-.09	1.02	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L152	O	90.33	96.22	.20	-.07	.B6	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L236B	X	90.35	95.00	-.47	-1.09	.95	60B	OPACITY (WHITE BACKING), BAUSCH + LOMB
L162	O	90.35	96.33	.2B	.01	.65	60W	OPACITY (WHITE BACKING), HUYGEN,DIGITAL

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 H51	MEANS E40	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L254	O	90.36	96.26	.24	-.05	.65	60H	OPACITY (WHITE BACKING), HUYGEN
L159	O	90.36	96.41	.33	.07	1.11	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L2108	O	90.36	96.05	.13	-.23	.84	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L275	O	90.39	96.25	.26	-.08	.68	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L262	O	90.44	96.38	.38	.00	.94	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L226B	O	90.44	96.25	.30	-.10	.46	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L182	O	90.45	96.50	.45	.10	.83	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L190R	O	90.45	96.20	.28	-.15	.66	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L259	O	90.45	96.10	.23	-.23	1.16	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L249	*	90.45	96.29	.34	-.08	.79	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L224	*	90.45	96.64	.53	.21	1.48	60P	OPACITY (WHITE BACKING), PHOTOVOLT
L378	O	90.46	96.66	.55	.22	1.01	60D	OPACITY (WHITE BACKING), DIANO/BNL
L158	O	90.49	96.31	.38	-.08	.89	60D	OPACITY (WHITE BACKING), DIANO/BNL
L153	O	90.50	96.25	.35	-.14	1.34	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L172	O	90.55	96.39	.47	-.05	1.28	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L105	O	90.58	96.73	.69	.21	2.13	60H	OPACITY (WHITE BACKING), HUYGEN
L326	O	90.61	96.49	.58	-.00	1.57	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L183	O	90.65	96.50	.62	-.02	.74	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L100	*	90.66	96.44	.59	-.07	.83	60E	OPACITY (WHITE BACKING), ZEISS ELREPHO, FMY-C(10) FILTER
L581	O	90.68	96.40	.59	-.11	.65	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L261	O	90.70	96.75	.80	.16	1.17	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L157	O	90.70	96.45	.63	-.08	1.56	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L323	O	90.71	96.42	.62	-.12	1.26	60W	OPACITY (WHITE BACKING), HUYGEN,DIGITAL
L314	*	90.77	96.51	.72	-.07	.94	60T	OPACITY (WHITE BACKING), SMALL SPHERE COLOR EYE
L308	O	90.82	96.75	.90	.10	1.22	60H	OPACITY (WHITE BACKING), HUYGEN
L278	O	90.87	96.56	.83	-.09	.53	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L134	O	91.06	96.75	1.10	-.04	.83	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L236E	*	92.40	96.55	2.10	-.96	.68	60E	OPACITY (WHITE BACKING), ZEISS ELREPHO, FMY-C(10) FILTER
GMEANS:		90.13	96.17			1.00		
		95% ELLIPSE:		1.26	.38	WITH GAMMA = 34 DEGREES		


OPACITY, B&L TYPE, 89% BACKING
SAMPLE H51 = 90.13 PERCENT
SAMPLE E40 = 96.17 PERCENT
+,X,* NOT IN GRAND MEANS
ANALYSIS T60-1
SAMPLE E40
PERCENT
97.6
97.2
96.8
96.4
96.0
95.6
95.2
94.8
88.8
89.2
89.6
90.0
90.4
90.8
91.2
91.6
SAMPLE H51
PERCENT

REPORT NO. 53G TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978

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 H51 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
L118	91.68	-.05	-.25	.20	.53	96.20	.08	.49	.17	.90	60C	O	L118	
L182B	92.55	.82	4.26	.36	.94	96.67	.55	3.31	.61	3.20	60C	#	L182B	
L190C	91.71	-.02	-.09	.42	1.10	96.11	-.01	-.05	.06	.30	60C	O	L190C	
L190R	91.89	.16	.84	.45	1.17	96.32	.20	1.21	.10	.54	60C	O	L190R	
L236B	91.70	-.03	-.15	.31	.79	96.82	.70	4.22	.29	1.53	60C	#	L236B	
L243	91.81	.08	.42	.36	.93	96.16	.04	.25	.13	.67	60C	O	L243	
L274	91.90	.17	.89	.57	1.48	96.10	-.02	-.11	.57	2.99	60C	O	L274	
L543	91.38	-.35	-1.80	.31	.80	95.82	-.30	-1.79	.11	.60	60V	O	L543	

GR. MEAN = 91.73 PERCENT GRAND MEAN = 96.12 PERCENT TEST DETERMINATIONS = 10

SD MEANS = .19 PERCENT SD OF MEANS = .17 PERCENT 6 LABS IN GRAND MEANS

AVERAGE SDR = .38 PERCENT AVERAGE SDR = .19 PERCENT

TOTAL NUMBER OF LABORATORIES REPORTING = 8

Best values: H51 91.8 percent
E40 96.1 percent

The following laboratories were omitted from the grand means because of extreme test results: 182B, 236B.

REPORT NO. 53G TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978

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	P	MEANS H51	E40	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L543	O	91.38	95.82	-.46	-.01	.70	60V	OPACITY (PAPER BACKING), DIANO/BNL
L118	O	91.68	96.20	.02	.09	.71	60C	OPACITY (PAPER BACKING), BAUSCB + LOMB
L236B	#	91.70	96.82	.43	.56	1.16	60C	OPACITY (PAPER BACKING), BAUSCB + LOMB
L190C	O	91.71	96.11	-.02	.01	.70	60C	OPACITY (PAPER BACKING), BAUSCB + LOMB
L243	O	91.81	96.16	.09	-.02	.80	60C	OPACITY (PAPER BACKING), BAUSCB + LOMB
L190R	O	91.89	96.32	.25	.05	.85	60C	OPACITY (PAPER BACKING), BAUSCB + LOMB
L274	O	91.90	96.10	.12	-.12	2.23	60C	OPACITY (PAPER BACKING), BAUSCB + LOMB
L182B	#	92.55	96.67	.98	-.10	2.07	60C	OPACITY (PAPER BACKING), BAUSCB + LOMB
GMEANS:		91.73	96.12			1.00		
95% ELLIPSE:				1.02	.31	WITH GAMMA = 39 DEGREES		

REPORT NO. 530 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978

ANALYSIS T60-3 TABLE 1

OPACITY (PAPER BACKING) IN PERCENT

TAPPI SUGGESTED METHOD T519 SU-76, DIFFUSE OPACITY OF PAPER - ILLUMINANT C, ELREPHO TYPE

LAB CODE	SAMPLE H51 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	92.96	.20	.63	.25	1.09	96.46	-.25	-1.57	.97	4.97	60J	ó	L100
L150	92.62	-.24	-.77	.18	.79	96.61	-.10	-.65	.09	.46	60J	ó	L150
L162E	92.70	-.06	-.20	.25	1.11	96.77	.06	.37	.09	.48	60J	ó	L182E
L233P	92.72	-.04	-.13	.29	1.27	96.69	-.02	-.13	.12	.61	60F	ó	L233F
L242	92.98	.22	.70	.27	1.22	96.97	.26	1.62	.23	1.16	60J	ó	L242
L244	92.19	-.57	-1.82	.22	.99	96.50	-.21	-1.32	.09	.48	60F	ó	L244
L360	92.70	-.06	-.20	.17	.76	96.69	-.02	-.13	.10	.51	60F	ó	L360
L446	92.55	-.21	-.66	.25	1.09	96.73	.01	.09	.11	.54	60J	ó	L446
L484	93.33	.57	1.61	.17	.76	96.82	.11	.67	.05	.24	60P	ó	L484
L575	92.96	.20	.63	.21	.92	96.86	.17	1.06	.10	.53	60J	ó	L575
GR. MEAN = 92.76 PERCENT						GRAND MEAN = 96.71 PERCENT					TEST DETERMINATIONS = 10		
SD MEANS = .31 PERCENT						SD OF MEANS = .16 PERCENT					10 LABS IN GRAND MEANS		
AVERAGE SDR = .22 PERCENT						AVERAGE SDR = .20 PERCENT							
L176	83.62	-9.14	-29.14	.09	.41	75.58	-21.13	-132.18	.15	.79	60Z	*	L176
L564	89.00	-3.76	-11.99	.00	.00	96.00	-.71	-4.45	.00	.00	60Q	*	L564

TOTAL NUMBER OF LABORATORIES REPORTING = 12

Best values: H51 92.8 percent
E40 96.7 percent

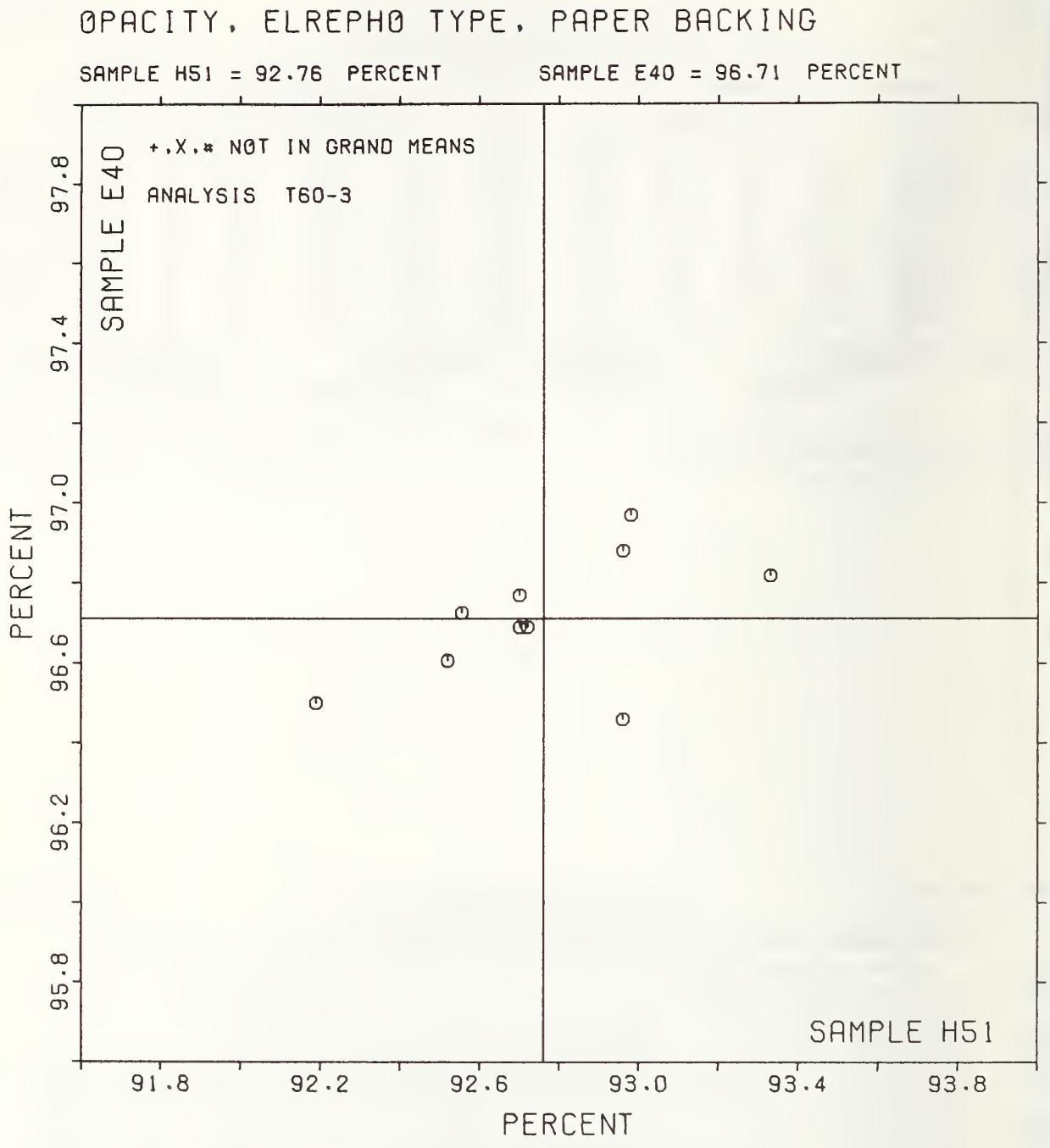
REPORT NO. 530 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978

ANALYSIS T60-3 TABLE 2

OPACITY (PAPER BACKING) IN PERCENT

TAPPI SUGGESTED METHOD T519 SU-76, DIFFUSE OPACITY OF PAPER - ILLUMINANT C, ELREPHO TYPE

LAB CODE	F	MEANS H51	E40	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L176	*	83.62	75.58	-15.29	-17.21	.60	60Z	OPACITY (PAPER BACKING), MARTIN SWEETS
L564	*	89.00	96.00	-3.79	.50	.00	60Q	OPACITY (PAPER BACKING), PHOTOVOLT
L244	ó	92.19	96.50	-.61	-.02	.74	60P	OPACITY (PAPER BACKING), ZEISS ELREPHO, FMY-C(10) NO TRAP
L150	ó	92.52	96.61	-.26	-.02	.63	60J	OPACITY (PAPER BACKING), ZEISS ELREPHO, FMY-C(10) FILTER
L446	ó	92.55	96.73	-.19	.08	.82	60J	OPACITY (PAPER BACKING), ZEISS ELREPHO, FMY-C(10) FILTER
L350	ó	92.70	96.69	-.06	-.00	.63	60F	OPACITY (PAPER BACKING), ZEISS ELREPHO, FMY-C(10) NO TRAP
L182E	ó	92.70	96.77	-.04	.08	.80	60J	OPACITY (PAPER BACKING), ZEISS ELREPHO, FMY-C(10) FILTER
L233P	ó	92.72	96.69	-.05	-.01	.94	60P	OPACITY (PAPER BACKING), ZEISS ELREPHO, FMY-C(10) NO TRAP
L100	ó	92.96	96.46	.11	-.30	3.03	60J	OPACITY (PAPER BACKING), ZEISS ELREPEO, FMY-C(10) FILTER
L575	ó	92.96	96.88	.24	.10	.72	60J	OPACITY (PAPER BACKING), ZEISS ELREPEO, FMY-C(10) FILTER
L242	ó	92.98	96.97	.29	.18	1.19	60J	OPACITY (PAPER BACKING), ZEISS ELREPHO, FMY-C(10) FILTER
L484	ó	93.33	96.82	.57	-.08	.50	60F	OPACITY (PAPER BACKING), ZEISS ELREPEO, FMY-C(10) NO TRAP
GMEANS:		92.76	96.71			1.00		
95% ELLIPSE:				1.04	.41	WITE GAMMA = 18 DEGREES		


OPACITY, ELREPHO TYPE, PAPER BACKING
SAMPLE H51 = 92.76 PERCENT
SAMPLE E40 = 96.71 PERCENT
+,X,* NOT IN GRAND MEANS
ANALYSIS T60-3
SAMPLE E40
SAMPLE H51
PERCENT
PERCENT
97.8
97.4
97.0
96.6
96.2
95.8
91.8
92.2
92.6
93.0
93.4
93.8

ANALYSIS T65-1 TABLE 1

DIRECTIONAL BLUE REFLECTANCE IN PERCENT

TAPPI STANDARD T452 OS-77, 'BRIGHTNESS'; MARTIN SWEETS (ACST & GE) IS STANDARD FOR THIS ANALYSIS

LAB CODE	SAMPLE H53 MEAN	PRINTING 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J37 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.- VAR	P	LAB
L108	68.11	-.01	-.03	.16	.57	75.52	-.27	-.69	.13	.70	65M	@	L108
L122	68.25	.12	.29	.19	.71	76.14	.34	.88	.12	.65	65N	@	L122
L132	67.36	-.76	-1.77	.98	3.61	75.82	.03	.08	.09	.49	65N	@	L132
L158	68.22	.10	.23	.18	.67	75.22	-.57	-1.46	.18	.96	65N	@	L158
L172	68.30	.17	.41	.43	1.60	76.19	.39	1.01	.38	.46	65A	@	L172
L176A	67.34	-.79	-1.83	.42	1.56	73.19	-2.61	-6.69	.27	1.48	65A	#	L176A
L190C	67.81	-.31	-.73	.11	.41	75.31	-.48	-1.24	.16	.90	65A	@	L190C
L210M	68.32	.20	.46	.10	.38	75.47	-.32	-.82	.05	.25	65M	@	L210M
L210N	68.29	.16	.38	.17	.64	75.71	-.08	-.21	.57	3.10	65N	@	L210N
L211	68.64	.51	1.19	.21	.76	75.51	-.28	-.72	.31	1.72	65N	@	L211
L225	68.27	.15	.35	.18	.65	76.06	.27	.69	.20	1.09	65N	@	L225
L243	67.92	-.20	-.47	.14	.51	75.25	-.54	-1.40	.22	1.21	65A	@	L243
L259	67.64	-.49	-1.14	.34	1.26	75.52	-.27	-.69	.09	.49	65M	@	L259
L275	68.09	-.04	-.09	.31	1.14	76.19	.39	1.01	.16	.85	65M	@	L275
L288	66.92	-1.20	-2.79	.63	2.32	75.56	-.23	-.59	.18	1.01	65N	*	L288
L308	68.50	.37	.87	.23	.83	75.76	-.03	-.08	.18	1.01	65N	@	L308
L315	68.19	.06	.14	.25	.91	75.37	-.42	-1.08	.22	1.20	65N	@	L315
L317	67.96	-.16	-.38	.32	1.16	75.96	.17	.43	.12	.65	65M	@	L317
L523	68.30	.17	.41	.12	.44	76.35	.56	1.43	.14	.77	65N	@	L523
L543	68.79	.66	1.54	.22	.80	76.55	.76	1.94	.14	.77	65M	@	L543
L565	68.11	-.01	-.03	.27	1.01	75.94	.14	.37	.16	.88	65A	@	L565
L598	68.62	.50	1.16	.53	1.94	76.22	.43	1.11	.34	1.85	65M	@	L598
GR. MEAN = 68.13 PERCENT						GRAND MEAN = 75.79 PERCENT					TEST DETERMINATIONS =		8
SD MEANS = .43 PERCENT						SD OF MEANS = .39 PERCENT					21 LABS IN GRAND MEANS		
		AVERAGE SDR = .27 PERCENT					AVERAGE SDR = .18 PERCENT						
L105	67.16	-.96	-2.24	.20	.73	75.47	-.32	-.82	.12	.64	65T	*	L105
L176I	68.10	-.03	-.06	.20	.74	75.92	.13	.34	.09	.49	65I	*	L176I
L213	67.54	-.59	-1.37	.25	.92	76.37	.58	1.49	.32	1.73	65T	*	L213
L223	68.67	.55	1.28	.17	.61	75.66	-.13	-.34	3.50	19.19	65G	*	L223
L224	68.52	.40	.93	.14	.51	76.66	.87	2.23	.17	.92	65H	*	L224
L232	69.06	.94	2.18	.18	.65	72.69	-3.11	-7.98	.37	2.04	65P	*	L232
L241	68.15	.02	.06	.34	1.24	76.51	.72	1.85	.21	1.15	65T	*	L241
L249	69.29	1.16	2.70	.22	.82	77.05	1.26	3.23	.08	.41	65P	*	L249
L256	68.11	-.01	-.03	.34	1.24	76.30	.51	1.30	.22	1.21	65H	*	L256
L260	68.52	.40	.93	.12	.43	77.07	1.28	3.29	.07	.39	65P	*	L260
L277	74.50	6.37	14.83	.53	1.97	79.75	3.96	10.16	.46	2.54	65P	*	L277
L278	71.12	3.00	6.98	.23	.85	78.62	2.83	7.27	.23	1.27	65P	*	L278
L301	68.42	.30	.70	.21	.76	76.25	.46	1.17	.12	.65	65G	*	L301
L312	69.94	1.81	4.21	.18	.65	78.06	2.27	5.83	.18	.97	65P	*	L312
L321	71.19	3.06	7.12	.59	2.19	79.19	3.39	8.72	.26	1.42	65P	*	L321
L328	69.32	1.20	2.79	.39	1.43	77.17	1.38	3.55	.18	.96	65P	*	L328
L339	69.24	1.11	2.59	.44	1.62	76.29	.49	1.27	.36	2.00	65P	*	L339
L380	71.75	3.62	8.43	.46	1.70	78.25	2.46	6.31	.46	2.54	65P	*	L380
L388	67.69	-.44	-1.02	.37	1.37	75.56	-.23	-.59	.32	1.76	65P	*	L388
L442	68.01	-.11	-.26	.45	1.67	77.57	1.78	4.58	.72	3.97	65I	*	L442
L562	73.00	4.87	11.34	.00	.00	80.50	4.71	12.09	.00	.00	65P	*	L562
L564	69.37	1.25	2.91	.52	1.91	77.87	2.08	5.35	.35	1.94	65P	*	L564
L587	67.47	-.65	-1.51	.14	.51	75.56	-.23	-.59	.12	.65	65I	*	L587
L591	66.91	-1.22	-2.83	.10	.35	74.70	-1.10	-2.82	.05	.29	65H	*	L591
L617	69.75	1.62	3.78	.38	1.39	77.31	1.52	3.90	.26	1.42	65P	*	L617

TOTAL NUMBER OF LABORATORIES REPORTING = 47

Best values: H53 68.0 ± 0.7 percent
J37 75.4 ± 0.9 percent

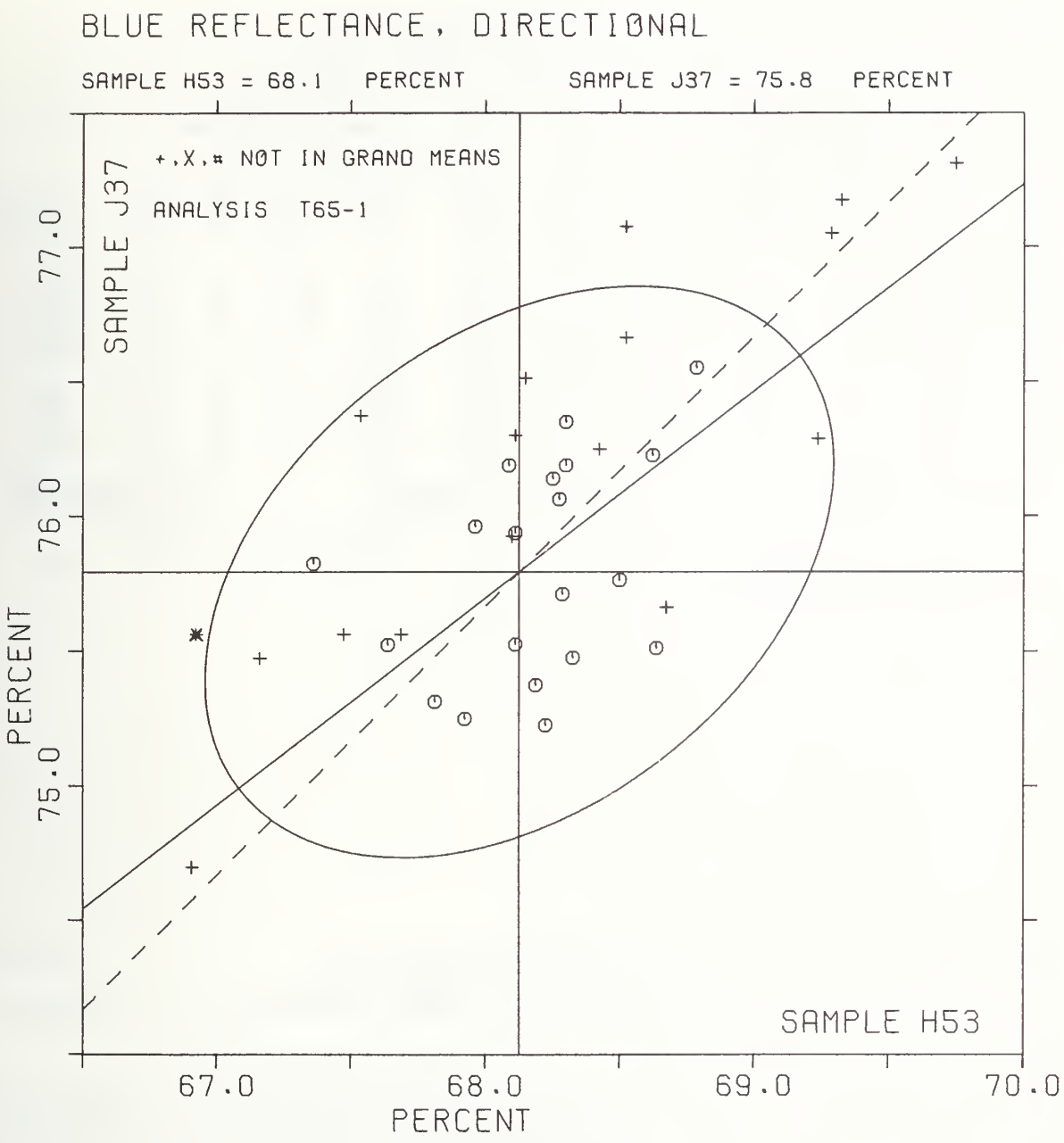
The following laboratories were omitted from the grand means because of extreme test results: 176A.

ANALYSIS T65-1 TABLE 2

DIRECTIONAL BLUE REFLECTANCE IN PERCENT

TAPPI STANDARD T452 OS-77, 'BRIGHTNESS'; MARTIN SWEETS (ACBT & GE) IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS H53	MEANS J37	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L591	*	66.91	74.70	-1.63	-.13	.32	65E	BLUE REFLECTANCE (DIRECTIONAL), BUNTER
L288	*	66.92	75.56	-1.09	.55	1.66	65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L105	*	67.16	75.47	-.96	.33	.69	65T	BLUE REFLECTANCE (DIRECTIONAL), HUNTER D25D2M
L176A	#	67.34	73.19	-2.21	-1.59	1.52	65A	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (ACBT),S-2
L132	O	67.36	75.82	-.59	.49	2.05	65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L597	*	67.47	75.56	-.66	.21	.58	65I	BLUE REFLECTANCE (DIRECTIONAL), BUNTER D25D2A
L213	*	67.54	76.37	-.11	.82	1.32	65T	BLUE REFLECTANCE (DIRECTIONAL), HUNTER D25D2M
L259	O	67.64	75.52	-.55	.08	.87	65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L388	*	67.69	75.56	-.49	.08	1.56	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L190C	O	67.81	75.31	-.54	-.19	.66	65A	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (ACBT),S-2
L243	O	67.92	75.25	-.49	-.31	.86	65A	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (ACBT),S-2
L317	O	67.96	75.96	-.03	.23	.91	65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L442	*	68.01	77.57	1.00	1.48	2.82	65I	BLUE REFLECTANCE (DIRECTIONAL), BUNTER D25D2A
L275	O	68.09	76.19	.21	.34	.99	65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L176I	*	68.10	75.92	.06	.12	.61	65I	BLUE REFLECTANCE (DIRECTIONAL), HUNTER D25D2A
L108	O	68.11	75.52	-.17	-.20	.64	65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L256	*	68.11	76.30	.30	.41	1.22	65B	BLUE REFLECTANCE (DIRECTIONAL), BUNTER
L565	O	68.11	75.94	.08	.12	.94	65A	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (ACBT),S-2
L241	*	68.15	76.51	.46	.56	1.20	65T	BLUE REFLECTANCE (DIRECTIONAL), HUNTER D25D2M
L315	O	68.19	75.37	-.21	-.37	1.05	65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L158	O	68.22	75.22	-.27	-.51	.82	65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L122	O	68.25	76.14	.31	.20	.68	65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L225	O	68.27	76.06	.28	.12	.87	65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L210N	O	68.29	75.71	.08	-.16	1.87	65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L172	O	68.30	76.19	.38	.21	1.03	65A	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (ACBT),S-2
L523	O	68.30	76.35	.48	.33	.61	65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L210M	O	68.32	75.47	-.04	-.37	.32	65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L301	*	68.42	76.25	.52	.18	.71	65G	BLUE REFLECTANCE (DIRECTIONAL), GARDNER
L308	O	68.50	75.76	.28	-.25	.92	65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L224	*	68.52	76.66	.85	.45	.72	65B	BLUE REFLECTANCE (DIRECTIONAL), BUNTER
L260	*	68.52	77.07	1.10	.77	.41	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L598	O	68.62	76.22	.66	.04	1.89	65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L211	O	68.64	75.51	.23	-.53	1.24	65N	BLUE REFLECTANCE (DIRECTIONAL), DIANO/MARTIN SWEETS, S-4
L223	*	68.67	75.66	.36	-.44	9.90	65G	BLUE REFLECTANCE (DIRECTIONAL), GARDNER
L543	O	68.79	76.55	.99	.20	.79	65M	BLUE REFLECTANCE (DIRECTIONAL), MARTIN SWEETS (GE), S-1
L232	*	69.06	72.69	-1.15	-3.03	1.34	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L339	*	69.24	76.29	1.18	-.29	1.81	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L249	*	69.29	77.05	1.69	.29	.62	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L328	*	69.32	77.17	1.79	.36	1.19	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L564	*	69.37	77.87	2.26	.89	1.92	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L617	*	69.75	77.31	2.21	.21	1.40	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L312	*	69.94	78.06	2.82	.69	.81	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L278	*	71.12	78.62	4.10	.42	1.06	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L321	*	71.19	79.19	4.50	.82	1.80	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L380	*	71.75	78.25	4.37	-.26	2.12	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L562	*	73.00	80.50	6.73	.76	.00	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
L277	*	74.50	79.75	7.47	-.75	2.25	65P	BLUE REFLECTANCE (DIRECTIONAL), PHOTOVOLT
GMEANS:		68.13	75.79			1.00		
		95% ELLIPSE:		1.31	.88	WITH GAMMA = 37 DEGREES		


BLUE REFLECTANCE, DIRECTIONAL
SAMPLE H53 = 68.1 PERCENT
SAMPLE J37 = 75.8 PERCENT
+,X,¤ NOT IN GRAND MEANS
ANALYSIS T65-1
SAMPLE J37
77.0
76.0
75.0
PERCENT
SAMPLE H53
67.0
68.0
69.0
70.0
PERCENT

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ANALYSIS T65-2 TABLE 1

DIFFUSE BLUE REFLECTANCE IN PERCENT (GLOSS TRAP)

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

LAB CODE	SAMPLE H53 MEAN	PRINTING 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J37 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.- VAR	F	LAB
L100	67.53	-.05	-.14	.22	1.07	75.48	.19	.57	.12	.74	65P	O	L100
L121	67.87	.28	.79	.23	1.12	75.29	-.01	-.03	.08	.51	65K	O	L121
L150	67.06	-.52	-1.47	.21	1.03	74.85	-.45	-1.36	.21	1.31	65Q	O	L150
L170	68.00	.41	1.16	.14	.70	75.57	.28	.84	.07	.43	65B	O	L170
L182	67.90	.32	.89	.20	1.00	75.37	.07	.22	.19	1.20	65F	O	L182
L210K	69.50	1.91	5.38	.18	.90	76.78	1.48	4.47	.13	.81	65K	#	L210K
L236	67.07	-.52	-1.46	.24	1.18	75.33	.03	.09	.39	2.42	65K	O	L236
L242	67.36	-.23	-.64	.15	.74	75.10	-.19	-.58	.13	.78	65F	O	L242
L280	67.95	.36	1.02	.27	1.32	75.76	.46	1.40	.21	1.27	65Q	O	L280
L325	68.09	.50	1.42	.18	.88	75.91	.62	1.85	.18	1.12	65F	O	L325
L349	67.47	-.12	-.33	.21	1.02	75.31	.02	.05	.13	.80	65K	O	L349
L352	67.13	-.46	-1.28	.18	.91	74.65	-.65	-1.95	.05	.29	65K	O	L362
L446	67.42	-.17	-.48	.22	1.10	75.19	-.10	-.31	.08	.48	65P	O	L446
L575	67.83	.24	.67	.22	1.08	75.23	-.07	-.20	.22	1.35	65P	O	L575
L635	67.53	-.06	-.16	.17	.83	75.10	-.20	-.59	.21	1.31	65K	O	L636
GR. MEAN =	67.59 PERCENT					GRAND MEAN =	75.30 PERCENT				TEST DETERMINATIONS =		8
SD MEANS =	.36 PERCENT					SD OF MEANS =	.33 PERCENT				14 LABS IN GRAND MEANS		
	AVERAGE SDR =	.20 PERCENT					AVERAGE SDR =	.16 PERCENT					
L289	68.09	.50	1.41	.16	.81	75.56	.27	.80	.13	.80	65O	*	L289

TOTAL NUMBER OF LABORATORIES REPORTING = 16

Best values: H53 67.6 ± 0.5 percent
J37 75.3 ± 0.6 percent

The following laboratories were omitted from the grand means because of extreme test results: 210K.

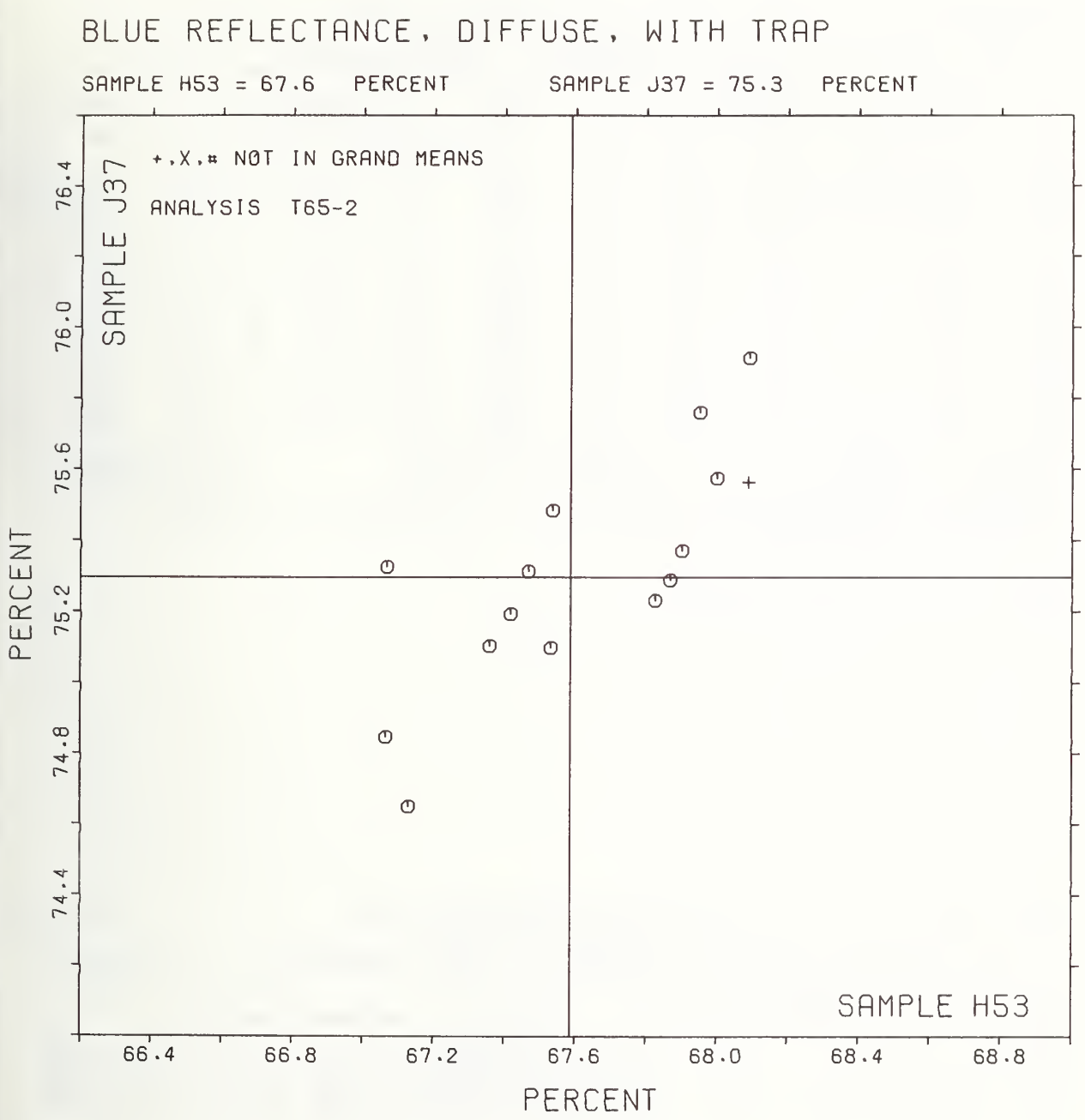
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ANALYSIS T65-2 TABLE 2

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 H53	J37	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L150	O	67.06	74.85	-.69	.02	1.17	65Q	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, ZEISS ABSOLUTE BASE
L236	O	67.07	75.33	-.36	.37	1.80	65K	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, MGO (ZEISS) BASE
L352	O	67.13	74.65	-.77	-.17	.60	65K	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, MGO (ZEISS) BASE
L242	O	67.36	75.10	-.30	.01	.76	65F	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L446	O	67.42	75.19	-.20	.04	.79	65P	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L349	O	67.47	75.31	-.08	.09	.91	65K	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, MGO (ZEISS) BASE
L636	O	67.53	75.10	-.17	-.11	1.07	65K	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, MGO (ZEISS) BASE
L100	O	67.53	75.48	.09	.17	.90	65P	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L575	O	67.83	75.23	.13	-.21	1.21	65P	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L121	O	67.87	75.29	.20	-.20	.82	65K	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, MGO (ZEISS) BASE
L182	O	67.90	75.37	.28	-.16	1.10	65P	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L280	O	67.95	75.76	.58	.10	1.29	65Q	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, ZEISS ABSOLUTE BASE
L170	O	68.00	75.57	.49	-.07	.57	65B	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NBS ABSOLUTE BASE
L289	*	68.09	75.56	.55	-.14	.81	65O	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, SPECIFIC CALIBRATION
L325	O	68.09	75.91	.79	.12	1.00	65F	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, NRC-PTB ABSOLUTE BASE
L210K	#	69.50	76.78	2.41	-.19	.86	65K	DIFFUSE REFLECTANCE, ELREPHO, GL.TRAP, MGO (ZEISS) BASE
GMEANS:		67.59	75.30			1.00		
95% ELLIPSE:		1.33	.48	WITE GAMMA = 42 DEGREES				


BLUE REFLECTANCE, DIFFUSE, WITH TRAP
SAMPLE H53 = 67.6 PERCENT
SAMPLE J37 = 75.3 PERCENT
+,X,* NOT IN GRAND MEANS
ANALYSIS T65-2
SAMPLE J37
SAMPLE H53
PERCENT
PERCENT
76.4
76.0
75.6
75.2
74.8
74.4
66.4
66.8
67.2
67.6
68.0
68.4
68.8

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ANALYSIS T65-3 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 H53 MEAN	PRINTING 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J37 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 8 VAR	F	LAB
L152	68.48	-.12	-.28	.21	1.21	76.69	.30	.69	.12	1.08	65E	O	L152
L157	68.72	.11	.26	.10	.60	76.49	.10	.23	.10	.96	65E	O	L157
L161	69.27	.67	1.51	.12	.69	76.68	.29	.66	.06	.59	65E	O	L161
L173A	NO DATA REPORTED FOR SAMPLE H53					75.96	-.43	-1.00	.04	.33	65E	M	L173
L194	68.56	-.04	-.09	.29	1.68	75.92	-.47	-1.08	.10	.92	65E	O	L194
L238A	69.08	.48	1.07	.15	.90	76.84	.45	1.04	.05	.43	65E	O	L238A
L244	68.91	.31	.69	.12	.69	76.90	.50	1.16	.09	.86	65D	O	L244
L251	68.33	-.27	-.61	.12	.69	76.31	-.08	-.19	.13	1.20	65E	O	L251
L255	70.02	1.41	3.19	.10	.59	77.99	1.60	3.67	.09	.86	65D	#	L255
L285	67.63	-.97	-2.18	.37	2.14	76.03	-.36	-.82	.15	1.39	65E	O	L285
L305	69.08	.47	1.06	.10	.59	75.46	-.94	-2.15	.16	1.51	65D	O	L305
L360	68.37	-.23	-.53	.21	1.23	76.81	.41	.95	.12	1.10	65E	O	L360
L384	68.42	-.18	-.40	.10	.60	76.39	-.01	-.01	.11	1.04	65S	O	L384
L484	70.67	2.06	4.65	.11	.62	77.88	1.49	3.41	.36	3.37	65E	#	L484
L565	68.39	-.22	-.49	.17	1.00	76.19	-.21	-.47	.10	.92	65W	O	L565

GR. MEAN = 68.60 PERCENT GRAND MEAN = 76.39 PERCENT TEST DETERMINATIONS = 8

SD MEANS = .44 PERCENT SD OF MEANS = .44 PERCENT 12 LABS IN GRAND MEANS

AVERAGE SDR = .17 PERCENT AVERAGE SDR = .11 PERCENT

TOTAL NUMBER OF LABORATORIES REPORTING = 15

Best values: H53 68.5 $\pm$ 0.8 percent

J37 76.4 $\pm$ 0.7 percent

The following laboratories were omitted from the grand means because of extreme test results: 255, 484.

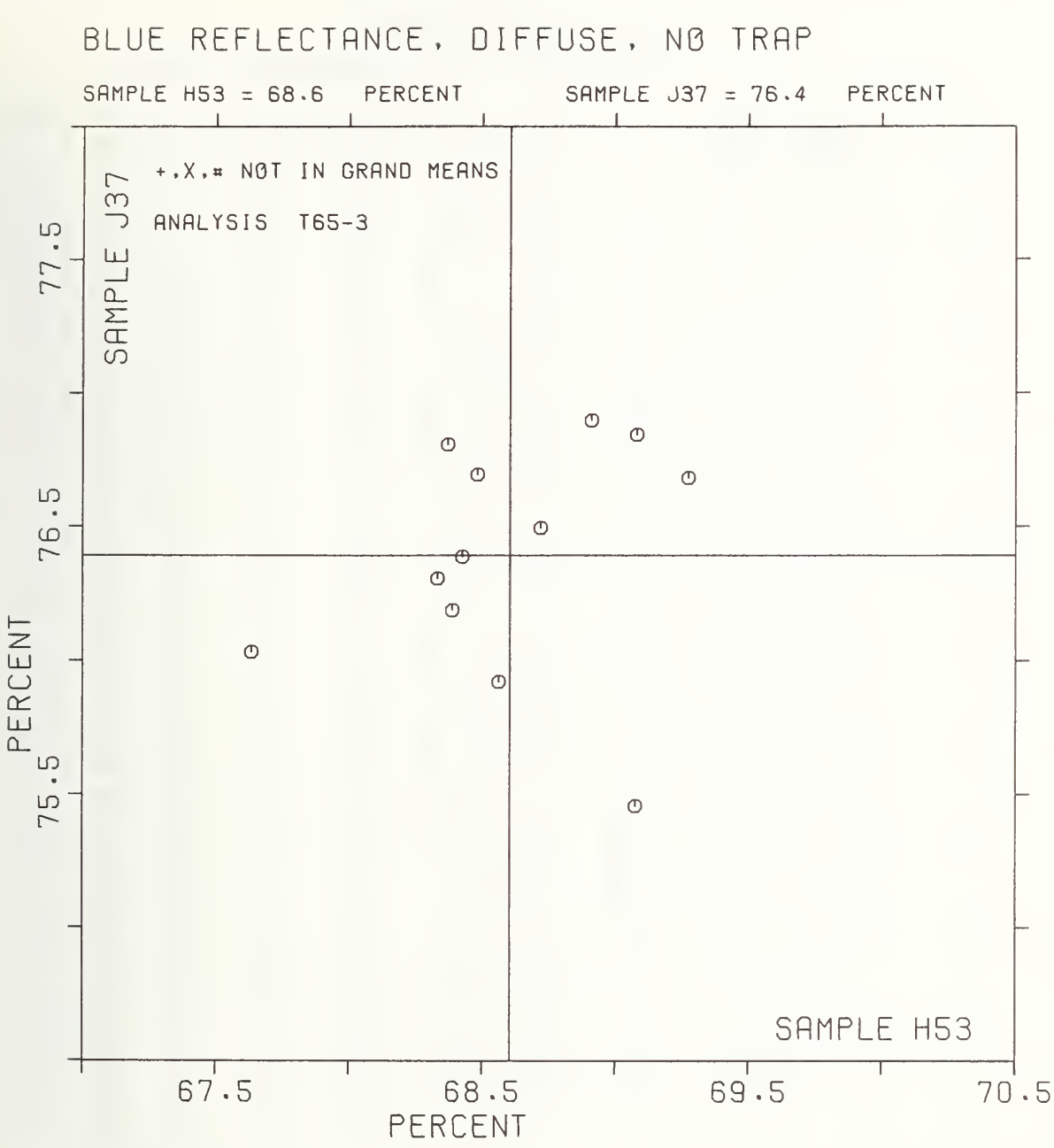
REPORT NO. 53G TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1978

ANALYSIS T65-3 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 H53	J37	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L173A	M		75.96			.33	65E	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, MGO (ZEISS) BASE
L285	O	67.63	76.03	-.96	.39	1.76	65E	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, MGO (ZEISS) BASE
L251	O	68.33	76.31	-.26	.12	.94	65E	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, MGO (ZEISS) BASE
L360	O	68.37	76.81	.11	.46	1.16	65E	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, MGO (ZEISS) BASE
L565	O	68.39	76.19	-.30	-.01	.96	65W	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, NBS MGO BASE
L384	O	68.42	76.39	-.14	.12	.82	65S	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, ABSOLUTE-UNKNOWN BASE
L152	O	68.48	76.69	.11	.31	1.14	65E	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, MGO (ZEISS) BASE
L194	O	68.56	75.92	-.35	-.32	1.30	65E	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, MGO (ZEISS) BASE
L157	O	68.72	76.49	.15	-.00	.78	65E	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, MGO (ZEISS) BASE
L244	O	68.91	76.90	.57	.17	.78	65D	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, NRC-PTB ABSOLUTE
L305	O	69.08	75.46	-.28	-1.01	1.05	65D	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, NRC-PTB ABSOLUTE
L238A	O	69.08	76.84	.66	.01	.66	65E	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, MGO (ZEISS) BASE
L161	O	69.27	76.68	.69	-.24	.64	65E	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, MGO (ZEISS) BASE
L255	#	70.02	77.99	2.12	.23	.72	65D	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, NRC-PTB ABSOLUTE
L484	#	70.67	77.88	2.53	-.30	1.99	65E	DIFFUSE REFLECTANCE, BLREFHO, NO TRAP, MGO (ZEISS) BASE
GMEANS:		68.60	76.39			1.00		
95% ELLIPSE:				1.45	1.18	WITH GAMMA = 42 DEGREES		


BLUE REFLECTANCE, DIFFUSE, NØ TRAP
SAMPLE H53 = 68.6 PERCENT
SAMPLE J37 = 76.4 PERCENT
+,X,* NØT IN GRAND MEANS
ANALYSIS T65-3
SAMPLE J37
77.5
76.5
75.5
PERCENT
SAMPLE H53
67.5
68.5
69.5
70.5
PERCENT

ANALYSIS T75-1 TABLE 1

SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS

TAPPI STANDARD T480 OS-78, SPECULAR GLOSS OF PAPER AND PAPERBOARD AT 75 DEGREES

LAB CODE	SAMPLE H55 MEAN	PRINTING 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E58 MEAN	CAST COATED 211 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.- 10 VAR	P	LAB
L108	56.65	1.07	.46	1.12	.72	84.74	.02	.01	.24	.55	75H	O	L108
L121	55.26	-.32	-.14	1.60	1.03	84.71	-.01	-.01	.35	.81	75H	O	L121
L122	56.06	.48	.21	1.36	.87	84.80	.08	.05	.34	.78	75H	O	L122
L128	53.40	-2.18	-.94	1.65	1.05	84.30	-.42	-.30	.48	1.10	75G	O	L128
L134	54.75	-.83	-.36	1.55	.99	83.60	-1.12	-.79	.15	.34	75H	O	L134
L149	55.70	.12	.05	2.11	1.35	84.20	-.52	-.37	.42	.96	75G	O	L149
L153	59.90	4.32	1.86	1.97	1.26	87.55	2.83	1.99	.83	1.90	75G	O	L153
L162	61.50	5.92	2.55	1.30	.83	86.33	1.61	1.13	.32	.73	75G	*	L162
L166	60.00	4.42	1.90	1.41	.90	88.80	4.08	2.86	.79	1.80	75B	*	L166
L172	52.49	-3.09	-1.33	1.41	.90	84.16	-.56	-.40	.28	.63	75H	O	L172
L173A	58.38	2.80	1.21	1.67	1.07	90.14	5.42	3.80	.52	1.19	75G	X	L173A
L182	53.72	-1.86	-.80	1.75	1.12	84.70	-.02	-.02	.34	.78	75H	O	L182
L189	56.00	.42	.18	1.05	.67	86.50	1.78	1.25	.91	2.08	75P	O	L189
L190R	55.17	-.41	-.18	1.35	.87	82.20	-2.52	-1.77	.29	.66	75G	O	L190R
L206	55.42	-.16	-.07	1.67	1.07	84.27	-.45	-.32	.34	.77	75H	O	L206
L210	57.97	2.39	1.03	1.35	.86	86.20	1.48	1.04	.22	.49	75H	O	L210
L211	55.13	-.45	-.20	.82	.53	84.96	.24	.17	.42	.97	75H	O	L211
L213	55.57	-.01	-.01	1.78	1.14	83.20	-1.52	-1.07	.48	1.10	75H	O	L213
L223	55.85	.27	.11	2.50	1.60	84.51	-.21	-.15	.29	.66	75H	O	L223
L224	52.88	-2.70	-1.16	1.91	1.22	84.05	-.67	-.47	.42	.96	75H	O	L224
L230	55.70	.12	.05	1.42	.91	84.60	-.12	-.09	.52	1.18	75H	O	L230
L243	56.20	.62	.27	1.62	1.04	84.60	-.12	-.09	.52	1.18	75B	O	L243
L251	56.95	1.37	.59	1.40	.90	85.10	.38	.26	.39	.90	75G	O	L251
L255	56.00	.42	.18	.94	.60	85.10	.38	.26	.57	1.30	75H	O	L255
L256	55.85	.27	.11	1.74	1.11	84.06	-.66	-.47	.29	.67	75H	O	L256
L259	59.63	4.05	1.74	.98	.63	87.51	2.79	1.96	.28	.63	75H	O	L259
L262	57.10	1.52	.65	1.10	.70	83.50	-1.22	-.86	.53	1.20	75K	O	L262
L274	57.55	1.97	.85	.37	.24	84.30	-.42	-.30	.42	.96	75P	O	L274
L277A	55.59	.01	.00	1.65	1.06	84.29	-.43	-.30	.36	.82	75H	O	L277A
L277B	55.33	-.25	-.11	1.68	1.08	84.30	-.42	-.30	.30	.69	75H	O	L277B
L278	59.19	3.61	1.55	1.22	.78	86.54	1.82	1.28	.21	.47	75G	O	L278
L279	49.90	-5.68	-2.45	1.66	1.06	81.10	-3.62	-2.54	.74	1.68	75G	*	L279
L291	54.91	-.67	-.29	1.22	.78	83.51	-1.21	-.85	.34	.77	75H	O	L291
L315	53.40	-2.18	-.94	1.17	.75	84.40	-.32	-.23	.52	1.18	75G	O	L315
L317	54.50	-1.08	-.47	1.18	.75	85.60	.88	.62	.52	1.18	75H	O	L317
L321	55.80	.22	.09	.92	.59	86.40	1.68	1.18	.52	1.18	75G	O	L321
L328	58.30	2.72	1.17	1.05	.67	91.43	6.71	4.71	.28	.64	75H	X	L328
L339	55.20	-.38	-.17	4.16	2.66	86.39	1.67	1.17	1.36	3.11	75P	O	L339
L349	55.70	.12	.05	1.68	1.08	84.91	.19	.13	.45	1.02	75H	O	L349
L388	49.95	-5.63	-2.43	1.55	.99	84.30	-.42	-.30	2.65	6.05	75P	*	L388
L396	55.20	-.38	-.17	2.30	1.47	82.40	-2.32	-1.63	.84	1.93	75G	O	L396
L456	54.98	-.60	-.26	1.63	1.04	84.39	-.33	-.23	.27	.62	75H	O	L456
L483	49.42	-6.16	-2.66	.71	.46	75.54	-9.18	-6.45	.37	.84	75H	#	L483
L564	49.10	-6.48	-2.79	1.97	1.26	84.70	-.02	-.02	1.16	2.65	75P	X	L564
L574	52.80	-2.78	-1.20	1.87	1.20	83.50	-1.22	-.86	.71	1.61	75G	O	L574
L583	55.50	-.08	-.04	1.80	1.15	84.17	-.55	-.39	.27	.61	75H	O	L583
L587	56.40	.82	.35	1.35	.86	85.10	.38	.26	.32	.72	75H	O	L587
L592	52.92	-2.66	-1.15	2.13	1.36	83.96	-.76	-.54	.22	.51	75H	O	L592
GR. MEAN - 55.58 GLOSS UNITS						GRAND MEAN - 84.72 GLOSS UNITS					TEST DETERMINATIONS - 10		
SD MEANS - 2.32 GLOSS UNITS						SD OF MEANS - 1.42 GLOSS UNITS					44 LABS IN GRAND MEANS		
AVERAGE SDR - 1.56 GLOSS UNITS						AVERAGE SDR - .44 GLOSS UNITS							
L288	56.63	1.05	.45	.97	.62	85.26	.54	.38	.14	.33	75I	*	L288

TOTAL NUMBER OF LABORATORIES REPORTING - 49

Best values: H55 56 ± 4 gloss units
E58 85 ± 2 gloss units

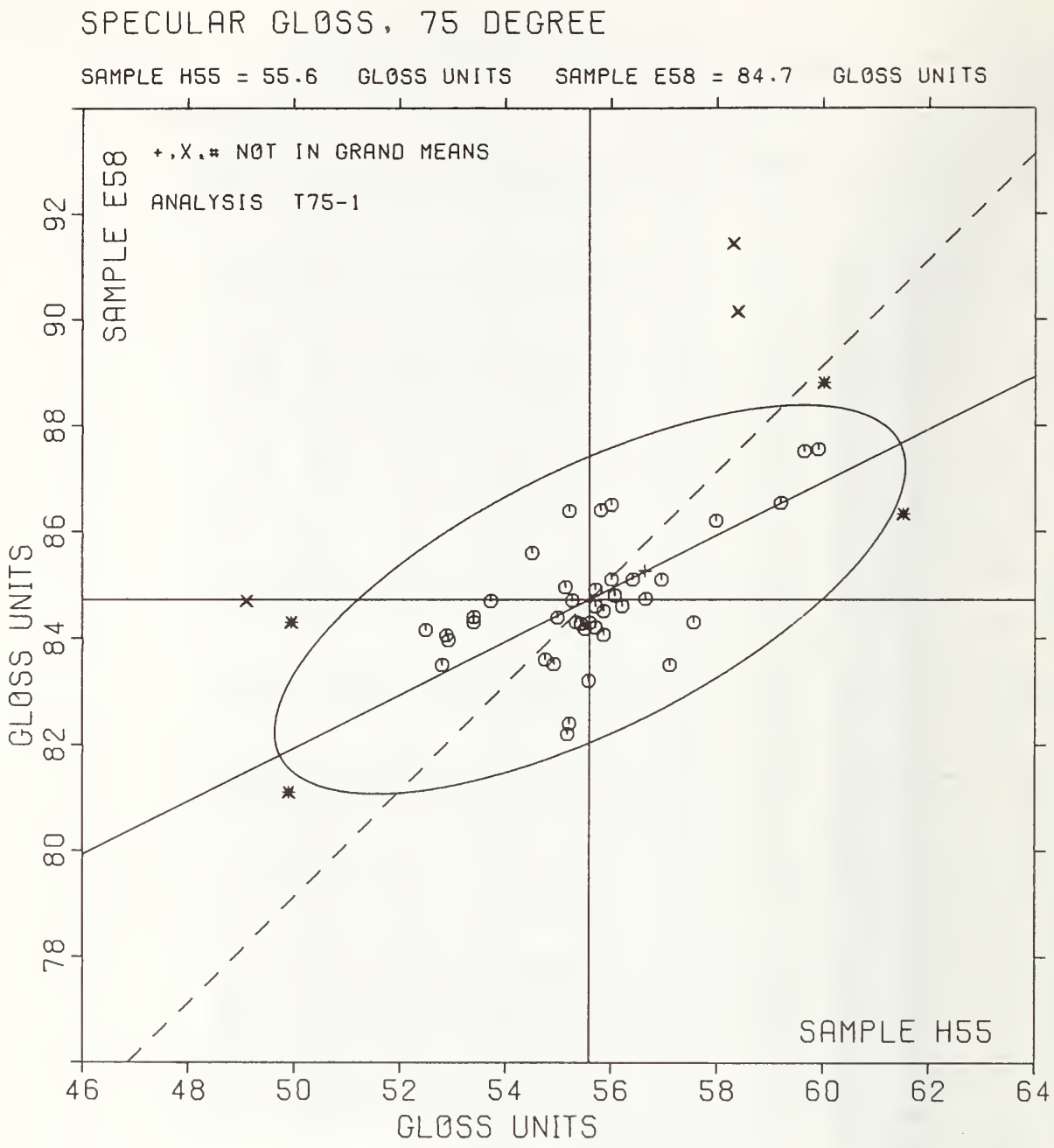
The following laboratories were omitted from the grand means because of extreme test results: 483.

ANALYSIS T75-1 TABLE 2

SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS

TAPPI STANDARD T480 OS-78, SPECULAR GLOSS OF PAPER AND PAPERBOARD AT 75 DEGREES

LAB CODE	P	MEANS E55	E58	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L564	X	49.10	84.70	-5.81	2.88	1.95	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L483	#	49.42	75.54	-9.62	-5.46	.65	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L279	*	49.90	81.10	-6.70	-.70	1.37	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L388	*	49.95	84.30	-5.23	2.14	3.52	75P	SPECULAR GLOSS (75 DEGREE), PEGTOVOLT
L172	O	52.49	84.16	-3.02	.88	.77	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L574	O	52.80	83.50	-3.04	.15	1.41	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L224	O	52.88	84.05	-2.72	.61	1.09	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L592	O	52.92	83.96	-2.72	.51	.94	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L128	O	53.40	84.30	-2.14	.60	1.08	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L315	O	53.40	84.40	-2.10	.69	.97	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L182	O	53.72	84.70	-1.68	.81	.95	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L317	O	54.50	85.60	-.58	1.27	.97	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L134	O	54.75	83.60	-1.25	-.63	.67	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L291	O	54.91	83.51	-1.14	-.78	.77	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L456	O	54.98	84.39	-.69	-.03	.83	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L211	O	55.13	84.96	-.30	.41	.75	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L190R	O	55.17	82.20	-1.50	-2.07	.76	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L396	O	55.20	82.40	-1.38	-1.91	1.70	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L339	O	55.20	86.39	.40	1.66	2.89	75P	SPECULAR GLOSS (75 DEGREE), PEGTOVOLT
L121	O	55.26	84.71	-.30	.13	.92	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L277B	O	55.33	84.30	-.42	-.26	.88	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L206	O	55.42	84.27	-.35	-.33	.92	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L583	O	55.50	84.17	-.32	-.46	.88	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L213	O	55.57	83.20	-.69	-1.36	1.12	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L277A	O	55.59	84.29	-.19	-.39	.94	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L349	O	55.70	84.91	.19	.12	1.05	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L149	O	55.70	84.20	-.13	-.52	1.16	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L230	O	55.70	84.60	.05	-.16	1.04	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L321	O	55.80	86.40	.94	1.40	.88	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L223	O	55.85	84.51	.14	-.31	1.13	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L256	O	55.85	84.06	-.06	-.71	.89	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L189	O	56.00	86.50	1.17	1.40	1.38	75P	SPECULAR GLOSS (75 DEGREE), PEGTOVOLT
L255	O	56.00	85.10	.54	.15	.95	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L122	O	56.06	84.80	.46	-.14	.82	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L243	O	56.20	84.60	.50	-.39	1.11	75B	SPECULAR GLOSS (75 DEGREE), BAUSCH * LOMB
L587	O	56.40	85.10	.90	-.03	.79	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L288	•	56.63	85.26	1.18	.01	.47	75I	SPECULAR GLOSS (75 DEGREE), HUNTER, 20 C, 65% RH
L108	O	56.65	84.74	.96	-.46	.63	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L251	O	56.95	85.10	1.39	-.27	.90	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L262	O	57.10	83.50	.81	-1.77	.95	75K	SPECULAR GLOSS (75 DEGREE), GAERTNER (K-C TYPE)
L274	O	57.55	84.30	1.57	-1.26	.60	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L210	O	57.97	86.20	2.80	.25	.68	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L328	X	58.30	91.43	5.43	4.78	.65	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L173A	X	58.38	90.14	4.92	3.59	1.13	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L278	O	59.19	86.54	4.04	.01	.63	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L259	O	59.63	87.51	4.87	.68	.63	75E	SPECULAR GLOSS (75 DEGREE), HUNTER
L153	O	59.90	87.55	5.13	.60	1.58	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L156	*	60.00	88.80	5.77	1.67	1.35	75B	SPECULAR GLOSS (75 DEGREE), BAUSCH * LOMB
L162	*	61.50	86.33	6.01	-1.21	.78	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
GMEANS:		55.58	84.72			1.00		
		95% ELLIPSE:		6.55	2.45	WITH GAMMA = 26 DEGREES		


SPECULAR GLOSS, 75 DEGREE
SAMPLE H55 = 55.6 GLOSS UNITS
SAMPLE E58 = 84.7 GLOSS UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T75-1
SAMPLE E58
GLOSS UNITS
78
80
82
84
86
88
90
92
46
48
50
52
54
56
58
60
62
64
SAMPLE H55
GLOSS UNITS

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

LAB	SAMPLE J21	PRINTING 89 GRAMS PER SQUARE METER				SAMPLE J63	PRINTING 102 GRAMS PER SQUARE METER				TEST D.= 10		
C903	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	2.942	-.041	-.56	.039	.63	5.243	-.028	-.32	.040	.83	90V	0	L100
L105	2.999	.016	.22	.035	.58	5.271	-.000	-.00	.057	1.18	90Q	0	L105
L118	3.076	.093	1.28	.047	.78	5.394	.123	1.39	.041	.85	90V	0	L118
L122	2.968	-.015	-.20	.065	1.07	5.241	-.030	-.35	.056	1.16	90V	0	L122
L123F	3.164	.181	2.48	.068	1.12	5.453	.182	2.07	.048	.99	90F	0	L123F
L128	2.992	.009	.13	.040	.66	5.268	-.003	-.04	.032	.65	90T	0	L128
L131	3.080	.097	1.33	.092	1.51	5.400	.129	1.46	.047	.98	90T	0	L131
L139	3.010	.027	.37	.046	.76	5.275	.004	.04	.035	.73	90T	0	L139
L141	2.930	-.053	-.72	.185	3.04	5.218	-.053	-.61	.038	.79	90T	0	L141
L158	2.980	-.003	-.04	.063	1.04	5.280	.009	.10	.026	.53	90T	0	L158
L159	3.030	.047	.65	.066	1.08	5.286	.015	.17	.036	.75	90T	0	L159
L162	3.008	.025	.35	.043	.71	5.198	-.073	-.84	.055	1.13	90D	0	L162
L166	2.997	.014	.20	.052	.85	5.300	.029	.33	.047	.98	90T	0	L166
L173B	3.030	.047	.65	.048	.80	5.340	.069	.78	.052	1.07	90F	0	L173B
L182	2.951	-.032	-.43	.034	.57	5.240	-.031	-.36	.032	.67	90L	0	L182
L183	3.005	.022	.31	.041	.67	5.307	.036	.40	.047	.97	90T	0	L183
L190C	2.930	-.053	-.72	.067	1.11	5.250	-.021	-.24	.053	1.09	90T	0	L190C
L203A	2.965	-.018	-.24	.063	1.03	5.385	.114	1.29	.063	1.29	90T	*	L203A
L203C	2.990	.007	.10	.077	1.27	5.360	.089	1.01	.057	1.17	90T	0	L203C
L221	3.005	.022	.31	.050	.82	5.310	.039	.44	.032	.65	90T	0	L221
L228	3.000	.017	.24	.094	1.55	5.340	.069	.78	.052	1.07	90T	0	L228
L233	3.059	.076	1.05	.087	1.43	5.312	.041	.46	.042	.87	90Q	0	L233
L241	3.005	.022	.31	.044	.72	5.175	-.096	-1.10	.072	1.48	90T	0	L241
L249	2.985	.002	.03	.053	.88	5.240	-.031	-.36	.042	.88	90T	0	L249
L259	3.050	.067	.92	.047	.78	5.315	.044	.50	.034	.70	90T	0	L259
L260	2.985	.002	.03	.041	.68	5.237	-.034	-.39	.030	.62	90T	0	L260
L262	2.960	-.023	-.31	.052	.85	5.240	-.031	-.36	.052	1.07	90T	0	L262
L285	2.840	-.143	-1.95	.084	1.39	5.170	-.101	-1.15	.048	1.00	90T	0	L285
L291	2.975	-.008	-.10	.059	.97	5.160	-.111	-1.27	.046	.95	90T	0	L291
L297	3.025	.042	.58	.049	.80	5.250	-.021	-.24	.041	.84	90T	0	L297
L305	2.955	-.028	-.38	.072	1.19	5.240	-.031	-.36	.066	1.35	90T	0	L305
L309	2.790	-.193	-2.64	.032	.52	5.080	-.191	-2.18	.042	.87	90T	*	L309
L318	2.870	-.113	-1.54	.054	.88	5.190	-.081	-.93	.057	1.17	90T	0	L318
L324	2.990	.007	.10	.088	1.44	5.220	-.051	-.59	.042	.87	90T	0	L324
L326	2.970	-.013	-.17	.035	.58	5.475	.204	2.32	.134	2.77	90T	X	L326
L328	3.000	.017	.24	.047	.78	5.300	.029	.33	.047	.98	90T	0	L328
L331	29.600	26.617	364.24	.485	7.99	5.397	.126	1.43	.056	1.15	90T	#	L331
L339	2.962	-.021	-.28	.077	1.27	5.265	-.006	-.07	.071	1.47	90T	0	L339
L341	3.087	.104	1.43	.067	1.10	5.386	.115	1.30	.040	.83	90T	0	L341
L352	2.959	-.024	-.32	.067	1.10	5.256	-.015	-.18	.042	.87	90Q	0	L352
L356	2.891	-.092	-1.25	.041	.67	5.171	-.100	-1.14	.039	.81	90T	0	L356
L358	2.897	-.086	-1.17	.075	1.23	5.149	-.122	-1.39	.037	.76	90T	0	L358
L378	3.030	.047	.65	.142	2.33	5.250	-.021	-.24	.196	4.05	90T	0	L378
L382	3.020	.037	.51	.042	.69	5.380	.109	1.24	.063	1.31	90T	0	L382
L390	3.010	.027	.37	.054	.88	5.292	.021	.23	.040	.83	90T	0	L390
L442	3.102	.119	1.63	.041	.67	5.473	.202	2.29	.024	.50	90T	0	L442
L556	2.836	-.147	-2.01	.066	1.08	5.076	-.195	-2.22	.034	.70	90T	0	L556
L557	2.800	-.183	-2.50	.067	1.10	5.090	-.181	-2.06	.074	1.53	90T	0	L557
L558	3.010	.027	.37	.057	.93	5.380	.109	1.24	.063	1.31	90T	0	L558
L559	2.943	-.040	-.54	.038	.63	5.317	.046	.52	.037	.76	90T	0	L559
L561	2.950	-.033	-.45	.071	1.16	5.300	.029	.33	.047	.98	90T	0	L561
L567	3.041	.058	.80	.049	.81	5.358	.087	.99	.034	.71	90V	0	L567
L574	2.954	-.029	-.39	.042	.70	5.225	-.046	-.53	.037	.78	90V	0	L574
L575	2.953	-.030	-.41	.040	.65	5.186	-.085	-.97	.035	.72	90T	0	L575
L581	3.125	.142	1.95	.042	.70	5.395	.124	1.41	.037	.76	90T	0	L581
L587	2.950	-.033	-.45	.053	.87	5.220	-.051	-.59	.063	1.31	90T	0	L587

GR. MEAN = 2.983 MILS GRAND MEAN = 5.271 MILS TEST DETERMINATIONS = 10
SD MEANS = .073 MILS SD OF MEANS = .088 MILS 54 LABS IN GRAND MEANS
AVERAGE SDR = .061 MILS AVERAGE SDR = .048 MILS
GR. MEAN = 75.76 MICROMETER GRAND MEAN =133.89 MICROMETER

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

TEST D.= 10

LAB CODE	SAMPLE J21 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J63 MEAN	PRINTING 102 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L106	3.000	.017	.24	.000	.00	5.000	-.271	-3.09	.000	.00	90C	*	L106
L185	2.916	-.067	-.91	.049	.80	5.196	-.075	-.86	.069	1.43	90B	*	L185
L203B	2.790	-.193	-2.64	.137	2.26	5.090	-.181	-2.06	.088	1.81	90C	*	L203B
L243	3.040	.057	.79	.039	.65	5.315	.044	.50	.034	.70	90S	*	L243
L251	2.916	-.067	-.92	.042	.68	5.193	-.079	-.89	.041	.84	90W	*	L251
L274C	3.030	.047	.65	.048	.80	5.320	.049	.55	.103	2.14	90C	*	L274C
L322	3.000	.017	.24	.000	.00	5.000	-.271	-3.09	.000	.00	90U	*	L322
L344	3.100	.117	1.61	.082	1.34	5.290	.019	.21	.074	1.53	90U	*	L344
L396M	2.934	-.049	-.67	.087	1.43	5.277	.006	.06	.065	1.35	90S	*	L396M
L484	3.007	.025	.34	.032	.53	5.256	-.016	-.18	.072	1.49	90E	*	L484
L562	2.915	-.068	-.93	.047	.78	5.344	.073	.83	.044	.91	90C	*	L562
L563	3.100	.117	1.61	.129	2.12	5.275	.004	.04	.219	4.53	90U	*	L563
L564	3.030	.047	.65	.048	.80	5.230	-.041	-.47	.048	1.00	90Y	*	L564
L576	3.011	.028	.39	.064	1.05	5.143	-.128	-1.46	.037	.77	90C	*	L576
L616	3.000	.017	.24	.000	.00	5.070	-.201	-2.29	.164	3.39	90C	*	L616

TOTAL NUMBER OF LABORATORIES REPORTING = 71

Best values: J21 2.99 ± 0.14 mils
J63 5.27 ± 0.13 mils

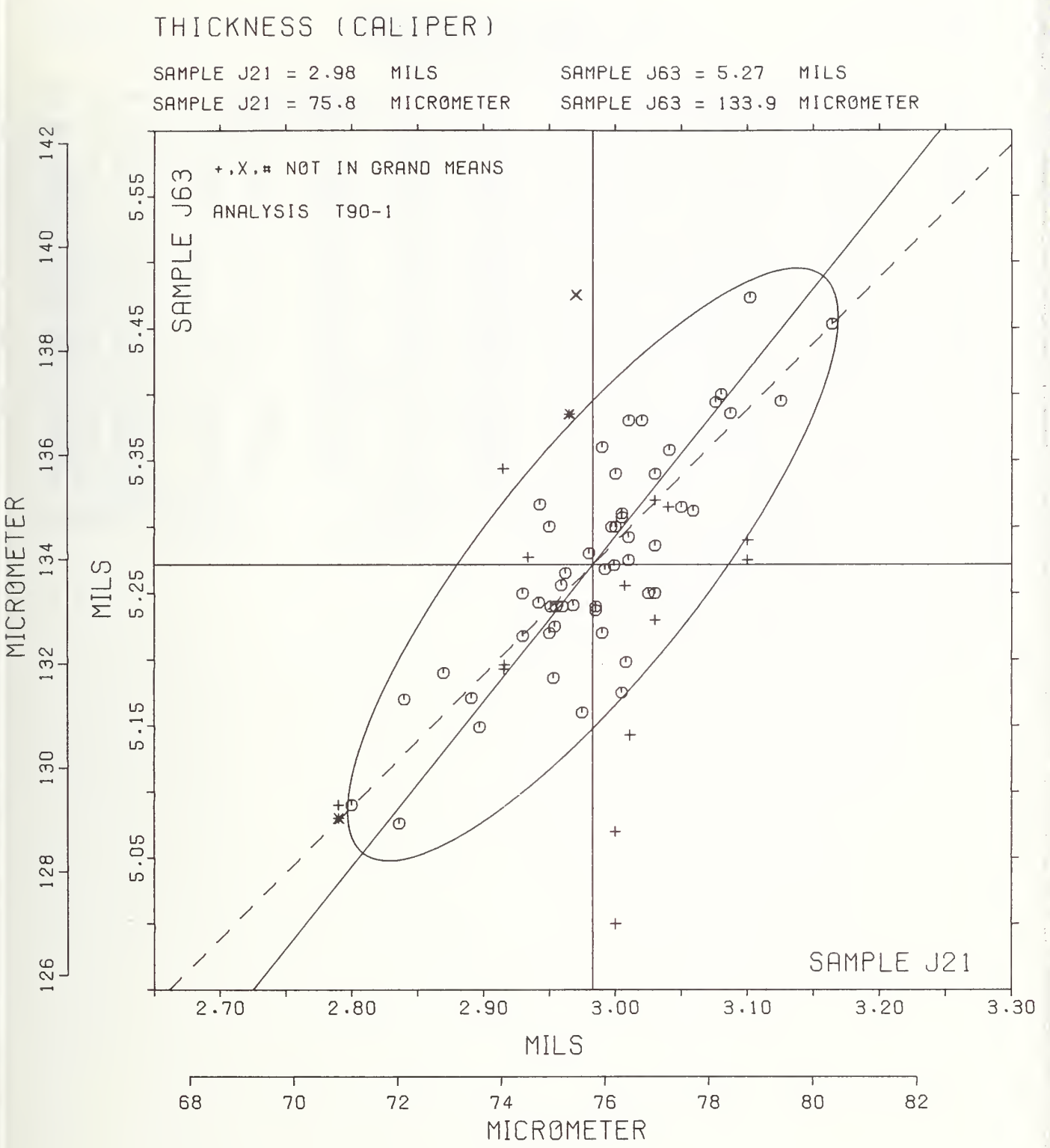
The following laboratories were omitted from the grand means because of extreme test results: 331.

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

LAB CODE	F	MEANS J21	MEANS J63	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L203B	*	2.790	5.090	-.262	.037	2.03	90C	THICKNESS (CALIPER), CADY, HAND DRIVEN
L309	*	2.790	5.080	-.270	.031	.70	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L557	O	2.800	5.090	-.256	.029	1.31	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L556	O	2.836	5.076	-.244	-.008	.89	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L285	O	2.840	5.170	-.168	.048	1.19	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L318	O	2.870	5.190	-.134	.037	1.03	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L356	O	2.891	5.171	-.136	.009	.74	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L358	O	2.897	5.149	-.149	-.010	.99	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L552	*	2.915	5.344	.014	.098	.84	90C	THICKNESS (CALIPER), CADY, HAND DRIVEN
L251	*	2.916	5.193	-.103	.003	.76	90W	THICKNESS (CALIPER), L + W, MOTOR DRIVEN, 20 C, 65% RH
L185	*	2.916	5.196	-.101	.005	1.12	90B	THICKNESS (CALIPER), AMTHOR, HAND DRIVEN
L141	O	2.930	5.218	-.075	.008	1.91	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L190C	O	2.930	5.250	-.050	.028	1.10	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L396M	*	2.934	5.277	-.026	.041	1.39	90S	THICKNESS (CALIPER), SCHOPPER, HAND DRIVEN
L100	O	2.942	5.243	-.048	.014	.73	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN, DIGITIZED
L559	O	2.943	5.317	.011	.059	.69	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L561	O	2.950	5.300	.002	.043	1.07	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L587	O	2.950	5.220	-.061	-.007	1.09	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L182	O	2.951	5.240	-.044	.005	.62	90L	THICKNESS (CALIPER), L + W, MOTOR DRIVEN
L575	O	2.953	5.186	-.085	-.030	.69	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L574	O	2.954	5.225	-.054	-.007	.74	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN, DIGITIZED
L305	O	2.955	5.240	-.042	.002	1.28	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L352	O	2.959	5.256	-.027	.009	.99	90Q	THICKNESS (CALIPER), EMVECO, MOTOR DRIVEN
L262	O	2.960	5.240	-.039	-.002	.96	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L339	O	2.962	5.265	-.018	.012	1.37	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L203A	*	2.965	5.385	.078	.085	1.15	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L122	O	2.968	5.241	-.033	-.008	1.11	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN, DIGITIZED
L326	X	2.970	5.475	.151	.137	1.67	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L291	O	2.975	5.160	-.092	-.064	.96	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L158	O	2.980	5.280	.005	.007	.79	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L260	O	2.985	5.237	-.025	-.023	.65	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L249	O	2.985	5.240	-.023	-.022	.88	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L203C	O	2.990	5.360	.074	.050	1.22	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L324	O	2.990	5.220	-.036	-.038	1.16	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L128	O	2.992	5.268	.003	-.009	.66	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L166	O	2.997	5.300	.031	.007	.92	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L105	O	2.999	5.271	.010	-.013	.88	90Q	THICKNESS (CALIPER), EMVECO, MOTOR DRIVEN
L228	O	3.000	5.340	.064	.029	1.31	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L328	O	3.000	5.300	.033	.004	.88	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L616	*	3.000	5.070	-.146	-.140	1.69	90C	THICKNESS (CALIPER), CADY, HAND DRIVEN
L322	*	3.000	5.000	-.201	-.183	.00	90U	THICKNESS (CALIPER), TMI, HAND DRIVEN
L106	*	3.000	5.000	-.201	-.183	.00	90C	THICKNESS (CALIPER), CADY, HAND DRIVEN
L241	O	3.005	5.175	-.061	-.078	1.10	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L221	O	3.005	5.310	.044	.007	.74	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L183	O	3.005	5.307	.042	.005	.82	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L484	*	3.007	5.256	.003	-.029	1.01	90E	THICKNESS (CALIPER), SCHOPPER, HAND DRIVEN
L162	O	3.008	5.198	-.041	-.066	.92	90D	THICKNESS (CALIPER), CADY, MOTOR DRIVEN
L139	O	3.010	5.275	.020	-.019	.74	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L390	O	3.010	5.292	.033	-.009	.86	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L558	O	3.010	5.380	.102	.047	1.12	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L576	*	3.011	5.143	-.082	-.102	.91	90C	THICKNESS (CALIPER), CADY, HAND DRIVEN
L382	O	3.020	5.380	.108	.039	1.00	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L297	O	3.025	5.250	.010	-.046	.82	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L379	O	3.030	5.250	.013	-.050	3.19	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L564	*	3.030	5.230	-.003	-.063	.90	90Y	THICKNESS (CALIPER), WEAP, HAND DRIVEN
L1738	O	3.030	5.340	.083	.006	.93	90F	THICKNESS (CALIPER), FEDERAL, MOTOR DRIVEN
L274C	*	3.030	5.320	.068	-.007	1.47	90C	THICKNESS (CALIPER), CADY, HAND DRIVEN
L159	O	3.030	5.286	.041	-.028	.92	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L243	*	3.040	5.315	.070	-.018	.67	90S	THICKNESS (CALIPER), SCHOPPER, HAND DRIVEN
L557	O	3.041	5.358	.104	.009	.76	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN, DIGITIZED
L259	O	3.050	5.315	.076	-.025	.74	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L233	O	3.059	5.312	.079	-.034	1.15	90Q	THICKNESS (CALIPER), EMVECO, MOTOR DRIVEN
L118	O	3.076	5.394	.154	.004	.82	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN, DIGITIZED
L131	O	3.080	5.400	.161	.004	1.24	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L341	O	3.087	5.386	.155	-.010	.96	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 J21	MEANS J63	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L563	*	3.100	5.275	.076	-.089	3.33	90U	THICKNESS (CALIPER), TMI, HAND DRIVEN
L344	*	3.100	5.290	.088	-.080	1.44	90U	THICKNESS (CALIPER), TMI, HAND DRIVEN
L442	O	3.102	5.473	.232	.033	.58	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L591	O	3.125	5.395	.185	-.034	.73	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L123F	O	3.164	5.453	.255	-.028	1.06	90F	THICKNESS (CALIPER), FEDERAL, MOTOR DRIVEN
L331	#	29.600	5.397	16.747	-20.689	4.57	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
GMEANS:		2.983	5.271			1.00		
95% ELLIPSE:				.279	.083	WITH GAMMA = 51 DEGREES		


THICKNESS (CALIPER)
SAMPLE J21 = 2.98 MILS
SAMPLE J21 = 75.8 MICROMETER
SAMPLE J63 = 5.27 MILS
SAMPLE J63 = 133.9 MICROMETER
+,X,* NOT IN GRAND MEANS
ANALYSIS T90-1
SAMPLE J63
MILS
MICROMETER
SAMPLE J21
MILS
MICROMETER
5.55
5.45
5.35
5.25
5.15
5.05
142
140
138
136
134
132
130
128
126
2.70
2.80
2.90
3.00
3.10
3.20
3.30
68
70
72
74
76
78
80
82

ANALYSIS T95-1 TABLE 1
GRAMMAGE (MASS PER UNIT AREA)
TAPPI STANDARD T410 OS-68

LAB CODE	SAMPLE D27 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE D28 MEAN	KRAFT 96 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L100	76.58	-.24	-.37	.50	1.59	96.14	.31	.42	.48	.80	95C	O	L100
L121	76.98	.17	.26	.54	1.71	95.27	-.56	-.76	.63	1.04	95B	O	L121
L162	75.80	-1.02	-1.59	.00	.00	94.62	-1.21	-1.65	.70	1.15	95K	O	L162
L233	77.58	.76	1.19	.47	1.51	94.98	-.85	-1.16	.86	1.42	95T	O	L233
L249	77.08	.26	.41	.18	.56	96.17	.34	.46	.55	.90	95I	O	L249
L274	77.30	.48	.75	.48	1.54	95.70	-.13	-.18	.48	.80	95B	O	L274
L280	76.68	-.14	-.22	.36	1.16	96.07	.24	.32	.59	.98	95T	O	L280
L297	76.23	-.59	-.92	.12	.37	95.63	-.20	-.27	.31	.51	95C	O	L297
L305	77.12	.30	.47	.23	.75	96.39	.56	.76	.32	.53	95T	O	L305
L339	77.65	.83	1.30	.25	.80	96.60	.77	1.04	.21	.35	95T	O	L339
L344	76.84	.02	.03	.08	.25	95.69	-.14	-.19	.19	.32	95T	O	L344
L378	77.27	.45	.71	.26	.84	96.51	.68	.92	.72	1.19	95B	O	L378
L442	77.77	.95	1.49	.22	.71	96.62	.79	1.07	.27	.45	95K	O	L442
L557	75.45	-1.37	-2.14	.36	1.16	94.07	-1.76	-2.39	.95	1.57	95A	O	L557
L558	7.65	-69.17	-108.25	.05	.17	9.58	-86.25	-117.12	.06	.10	95A	#	L558
L551	76.02	-.80	-1.25	.67	2.15	96.82	.99	1.34	1.26	2.08	95T	O	L561
L564	77.00	.18	.28	.24	.77	95.95	.12	.16	.92	1.52	95B	O	L564
L597	78.10	1.28	2.00	.00	.00	48.80	-47.03	-63.87	.00	.00	95C	#	L597
L616	76.92	.10	.16	.49	1.56	96.25	.42	.57	.87	1.45	95T	O	L616
L626	76.46	-.36	-.56	.18	.59	95.50	-.33	-.45	.59	.97	95B	O	L626

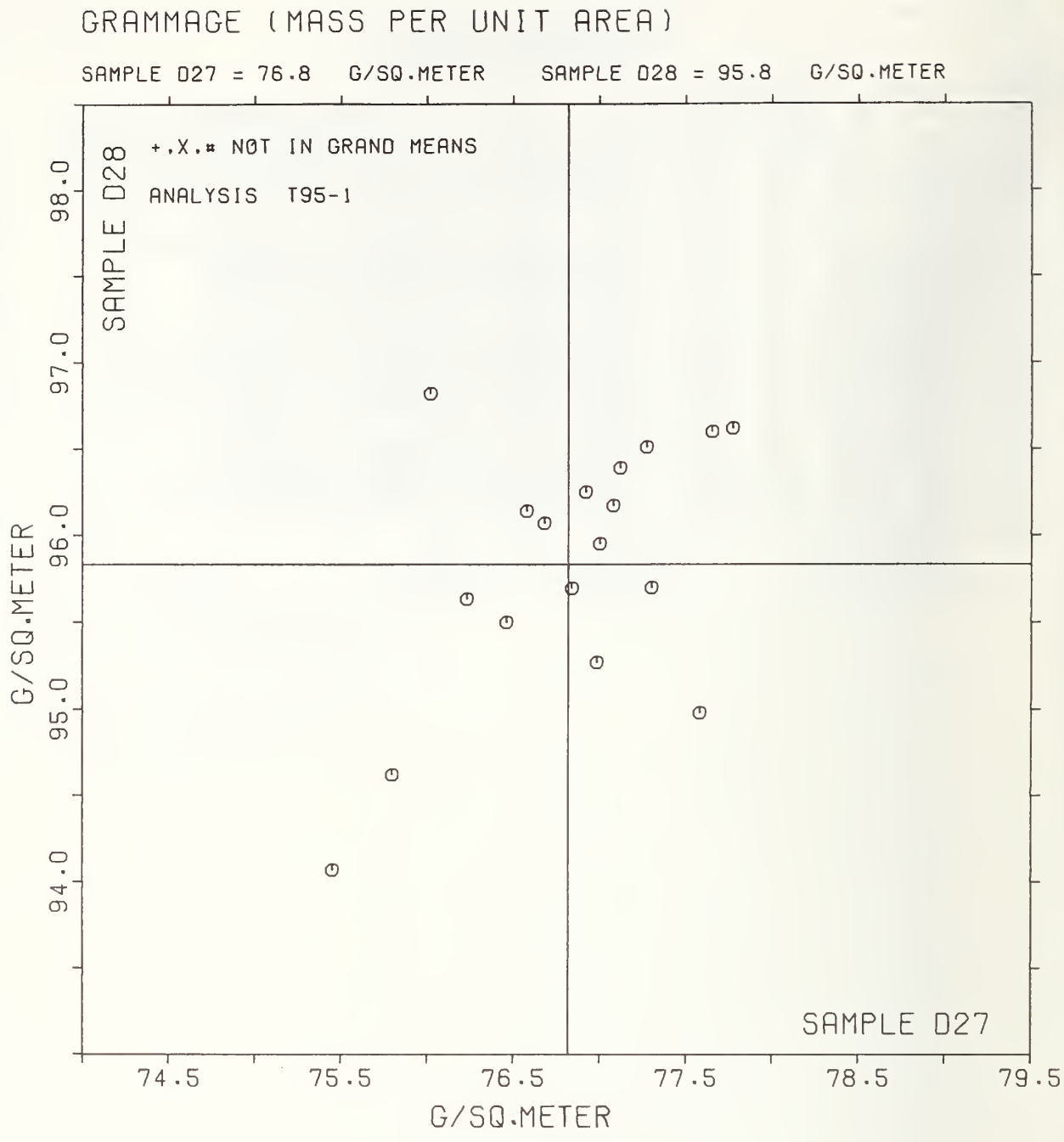
GR. MEAN = 76.82 G/SQ.METER GRAND MEAN = 95.83 G/SQ.METER TEST DETERMINATIONS = 10
SD MEANS = .64 G/SQ.METER SD OF MEANS = .74 G/SQ.METER 18 LABS IN GRAND MEANS
AVERAGE SDR = .31 G/SQ.METER AVERAGE SDR = .60 G/SQ.METER
TOTAL NUMBER OF LABORATORIES REPORTING = 20
Best values: D27 76.9 ± 1.0 grams per square meter
D28 96.0 ± 1.2 grams per square meter

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

Data from the following laboratories appear to be off by a multiplicative factor: 558.

ANALYSIS T95-1 TABLE 2
GRAMMAGE (MASS PER UNIT AREA)
TAPPI STANDARD T410 OS-68

LAB CODE	F	MEANS D27	MEANS D28	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L558	#	7.65	9.58	-110.53	2.57	.14	95A	BASIS WEIGHT (GRAMMAGE), CHANDLER * PRICE PAPER CUTTER
L557	O	75.45	94.07	-2.23	.02	1.36	95A	BASIS WEIGHT (GRAMMAGE), CHANDLER * PRICE PAPER CUTTER
L162	O	75.80	94.62	-1.58	.07	.58	95K	BASIS WEIGHT (GRAMMAGE), WEIGHED AS RECEIVED
L561	O	76.02	96.82	.30	1.23	2.11	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L297	O	76.23	95.63	-.51	.34	.44	95C	BASIS WEIGHT (GRAMMAGE), CUTTING BOARD
L626	O	76.46	95.50	-.48	.08	.78	95E	BASIS WEIGHT (GRAMMAGE), GUILLOTINE TYPE CUTTER
L100	O	76.58	96.14	.10	.38	1.19	95C	BASIS WEIGHT (GRAMMAGE), CUTTING BOARD
L280	O	76.68	96.07	.10	.25	1.07	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L344	O	76.84	95.69	-.10	-.10	.28	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L616	O	76.92	96.25	.39	.17	1.50	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L121	O	76.98	95.27	-.35	-.47	1.37	95B	BASIS WEIGHT (GRAMMAGE), CONCORA CUTTER
L564	O	77.00	95.95	.20	-.07	1.14	95E	BASIS WEIGHT (GRAMMAGE), GUILLOTINE TYPE CUTTER
L249	O	77.08	96.17	.43	-.00	.73	95I	BASIS WEIGHT (GRAMMAGE), INGENTO PAPER CUTTER
L305	O	77.12	96.39	.63	.10	.64	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L378	O	77.27	96.51	.82	.05	1.01	95E	BASIS WEIGHT (GRAMMAGE), GUILLOTINE TYPE CUTTER
L274	O	77.30	95.70	.19	-.46	1.17	95B	BASIS WEIGHT (GRAMMAGE), CONCORA CUTTER
L233	O	77.58	94.98	-.22	-1.12	1.46	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L339	O	77.65	96.60	1.11	-.19	.57	95T	BASIS WEIGHT (GRAMMAGE), TEMPLATE CUT
L442	O	77.77	96.62	1.20	-.28	.58	95K	BASIS WEIGHT (GRAMMAGE), WEIGHED AS RECEIVED
L597	#	78.10	48.80	-36.59	-29.58	.00	95C	BASIS WEIGHT (GRAMMAGE), CUTTING BOARD
GMEANS:		76.82	95.83			1.00		
		95% ELLIPSE:		2.38	1.30	WITH GAMMA = 52 DEGREES		


GRAMMAGE (MASS PER UNIT AREA)
SAMPLE D27 = 76.8 G/SQ.METER
SAMPLE D28 = 95.8 G/SQ.METER
+,X,* NOT IN GRAND MEANS
ANALYSIS T95-1
SAMPLE D28
SAMPLE D27
G/SQ.METER
G/SQ.METER
98.0
97.0
96.0
95.0
94.0
74.5
75.5
76.5
77.5
78.5
79.5

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		J45	12.35	.45	.79	10	55	61	10	.69	1.24
T40-1	GURLEY UNITS	J47	29.93	1.63	1.64					1.44	4.53
AIR RESISTANCE, SHEFFIELD		J45	221.7	10.8	11.7	10	36	43	10	10.3	30.0
T40-2	SHEFF. UNITS	J47	107.1	4.9	4.4					3.9	13.6
AIR RESISTANCE, GURLEY HG PLOTATION		B69	799.	81.	91.	10	15	15	10	80.	225.
T41-1	SEC/10 CC	B37	742.	54.	81.					71.	151.
SMOOTHNESS, PARKER PRINTSURF		B91	4.057	.179	.167	10	6	7	10	.146	.495
T44-1	MICRONS	H45	5.789	.429	.096					.084	1.190
SMOOTHNESS, SHEFFIELD		B91	101.5	9.5	9.4	15	85	91	10	8.3	26.7
T45-1	SHEFF. UNITS	H45	264.4	13.1	9.9					8.7	36.7
SMOOTHNESS, BEKK		B91	64.57	9.63	7.77	15	8	13	10	6.80	26.97
T45-2	BEKK SECONDS	H45	15.11	1.42	.85					.75	3.96
SMOOTHNESS, BENDTSEN		B91	96.	10.	13.	10	9	10	10	11.	29.
T47-1	ML/MIN	H45	492.	48.	39.					34.	133.
K & N INK ABSORPTION		H58	65.89	4.09	.74	4	7	10	4	1.03	11.33
T56-1	K & N UNITS	B80	24.92	3.13	.55					.76	8.67
PH, COLD		J61	5.780	.152	.073	5	6	7	2	.144	.436
T57-1	PH UNITS	J77	7.390	.259	.046					.090	.720
PH, HOT		J61	5.127	.218	.064	5	5	6	2	.126	.611
T57-2	PH UNITS	J77	8.135	.552	.062					.122	1.532
OPACITY, B&L TYPE, 89% BACKING		H51	90.13	.42	.35	10	72	93	5	.44	1.21
T60-1	PERCENT	E40	96.17	.31	.19					.24	.87
OPACITY, B&L TYPE, PAPER BACKING		H51	91.73	.19	.38	10	6	8	5	.48	.63
T60-2	PERCENT	E40	96.12	.17	.19					.23	.49
OPACITY, ELREPHO TYPE, PAPER BACKING		H51	92.76	.31	.22	10	10	12	5	.28	.89
T60-3	PERCENT	E40	96.71	.16	.20					.24	.47
BLUE REFLECTANCE, DIRECTIONAL		H53	68.13	.43	.27	8	21	47	6	.31	1.20
T65-1	PERCENT	J37	75.79	.39	.18					.21	1.08
BLUE REFLECTANCE, DIFFUSE, WITH TRAP		H53	67.59	.36	.20	8	14	16	6	.23	.99
T65-2	PERCENT	J37	75.30	.33	.16					.18	.92
BLUE REFLECTANCE, DIFFUSE, NO TRAP		H53	68.60	.44	.17	8	12	15	6	.20	1.23
T65-3	PERCENT	J37	76.39	.44	.11					.12	1.21
SPECULAR GLOSS, 75 DEGREE		H55	55.58	2.32	1.56	10	44	49	5	1.94	6.57
T75-1	GLOSS UNITS	E58	84.72	1.42	.44					.54	3.96
THICKNESS (CALIPER)		J21	2.983	.073	.061	10	54	71	10	.053	.202
T90-1	MILS	J63	5.271	.088	.048					.042	.243
GRAMMAGE (MASS PER UNIT AREA)		D27	76.82	.64	.31	10	18	20	3	.50	1.82
T95-1	G/SQ.METER	D28	95.83	.74	.60					.97	2.19

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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.

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