

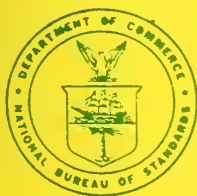
NBS 1278-
1335



TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM
FOR PAPER

REPORT NO. 51G



U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

NBS COLLABORATIVE REFERENCE PROGRAMS

TAPPI Paper and Board (6 times per year)

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

FKBG-API Containerboard (48 times per year)

Mullen burst of linerboard
Concora test of medium

MCCA Color and Appearance (4 times per year)

Gloss at 60°
Color and color difference
Retroreflectivity

Rubber (4 times per year)

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

ASTM Textiles (3 times per year)

Flammability (FF3-71 and FF5-74)

ASTM Cement (2 times per year)

Chemical (11 chemical components)
Physical (8 characteristics)

AASHTO Bituminous

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



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

TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

**COLLABORATIVE REFERENCE PROGRAM
FOR PAPER**

Report No. 51G

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U. S. DEPARTMENT OF COMMERCE
National Bureau of Standards

NBSIR 78-1335

INTRODUCTION

Reports 51S and 51G comprise the third 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

March 28, 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

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

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

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

95% ELLIPSE -

Lengths of the major and minor axes of the ellipse and the angle that the major axis makes with the horizontal axis.

AVG R. SDR -

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

Graph --

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

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

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.

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

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

LAB CODE	SAMPLE H27 108 GRAMS PER SQUARE METER PRINTING					SAMPLE H49 109 GRAMS PER SQUARE METER PRINTING					TEST D. = 10		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	28.6	-.7	-.53	1.6	1.02	30.1	-.8	-.50	1.6	.88	40D	θ	L100
L107	22.6	-6.6	-5.27	1.1	.66	23.9	-6.9	-4.43	4.0	2.23	40D	#	L107
L121	28.5	-.7	-.59	1.4	.84	31.0	.1	.07	2.3	1.27	40D	θ	L121
L122	28.9	-.4	-.30	1.3	.80	30.9	-.0	-.02	1.3	.76	40D	θ	L122
L123	29.6	.4	.32	2.3	1.45	30.6	-.3	-.20	2.3	1.31	40D	θ	L123
L124G	28.5	-.7	-.56	1.5	.90	31.7	.8	.49	1.9	1.06	40D	θ	L124G
L125	30.5	1.2	.98	1.2	.76	31.6	.8	.48	1.4	.78	40D	θ	L125
L127	30.0	.8	.60	1.4	.86	32.6	1.8	1.12	1.6	.91	40D	θ	L127
L128	29.1	-.1	-.12	2.1	1.29	30.5	-.4	-.25	1.6	.93	40D	θ	L128
L141	30.5	1.3	1.00	1.7	1.06	32.3	1.4	.90	1.4	.80	40D	θ	L141
L148	28.6	-.6	-.51	1.5	.91	30.9	.0	.01	1.5	.86	40D	θ	L148
L153	28.3	-.9	-.71	1.4	.86	29.5	-1.4	-.89	1.9	1.07	40D	θ	L153
L158	23.1	-6.1	-4.89	.9	.54	24.8	-6.1	-3.89	1.3	.74	40D	X	L158
L159	30.4	1.2	.96	1.7	1.04	32.4	1.5	.95	1.9	1.05	40D	θ	L159
L163	31.2	1.9	1.54	1.5	.90	32.9	2.0	1.28	2.2	1.23	40D	θ	L163
L166	31.2	2.0	1.60	2.1	1.32	32.9	2.0	1.28	2.1	1.16	40D	θ	L166
L174	29.4	.2	.12	1.6	1.02	32.4	1.5	.94	2.6	1.48	40D	θ	L174
L176	39.3	10.0	7.98	3.7	2.28	47.7	16.8	10.75	2.4	1.35	40D	#	L176
L182G	27.9	-1.3	-1.07	1.2	.74	28.0	-2.9	-1.84	3.3	1.87	40D	θ	L182G
L183	31.1	1.9	1.48	1.1	.68	34.1	3.2	2.05	1.9	1.04	40D	θ	L183
L190C	30.4	1.2	.92	2.7	1.68	32.3	1.4	.90	2.3	1.30	40D	θ	L190C
L190R	30.0	.8	.60	1.8	1.13	31.4	.5	.33	2.2	1.25	40D	θ	L190R
L212	28.4	-.8	-.66	1.8	1.14	28.8	-2.1	-1.33	1.7	.97	40D	θ	L212
L223	30.5	1.3	1.00	1.6	.58	31.8	.9	.58	1.7	.95	40D	θ	L223
L224	29.8	.6	.46	2.2	1.38	29.6	-1.3	-.83	3.0	1.70	40D	*	L224
L230G	29.6	.4	.28	2.0	1.21	30.4	-.5	-.31	1.6	.89	40D	θ	L230G
L232	28.3	-.9	-.72	1.1	.67	30.5	-.4	-.25	.9	.49	40D	θ	L232
L236	30.3	1.1	.84	1.3	.82	32.4	1.5	.96	1.7	.94	40D	θ	L236
L238A	28.3	-.9	-.74	1.5	.95	31.3	.4	.26	1.7	.95	40D	θ	L238A
L241	27.5	-1.7	-1.39	1.8	1.14	28.7	-2.2	-1.40	1.3	.70	40D	θ	L241
L242	28.0	-1.3	-1.01	1.4	.85	29.3	-1.6	-1.02	1.7	.98	40D	θ	L242
L243G	29.1	-.2	-.15	1.9	1.18	31.1	.2	.14	1.5	.86	40D	θ	L243G
L259	28.0	-1.2	-.99	1.7	1.05	29.8	-1.1	-.69	1.4	.79	40D	θ	L259
L261	29.6	.3	.27	1.1	.67	31.1	.2	.11	1.7	.98	40D	θ	L261
L262G	28.3	-.9	-.73	1.8	1.11	28.1	-2.8	-1.77	1.7	.98	40D	θ	L262G
L265	29.4	.2	.16	1.4	.88	30.5	-.4	-.26	1.8	.99	40D	θ	L265
L278	30.0	.7	.59	.7	.45	31.0	.2	.10	2.0	1.13	40D	θ	L278
L285	24.0	-5.3	-4.19	1.1	.71	25.2	-5.7	-3.63	1.2	.66	40D	X	L285
L301	32.9	3.7	2.91	1.4	.90	35.1	4.2	2.69	1.4	.81	40D	*	L301
L308	30.8	1.6	1.24	1.5	.96	33.0	2.1	1.35	1.6	.92	40D	θ	L308
L312	28.2	-1.0	-.83	1.6	1.00	30.2	-.7	-.44	1.3	.74	40D	θ	L312
L321	29.0	-.2	-.18	1.4	.89	31.4	.5	.30	2.4	1.35	40D	θ	L321
L324	27.3	-1.9	-1.51	2.3	1.44	28.0	-2.9	-1.83	1.8	1.00	40D	θ	L324
L326	29.8	.6	.44	1.8	1.12	31.2	.3	.20	2.3	1.29	40D	θ	L326
L328	28.7	-.6	-.44	1.5	.95	30.2	-.6	-.41	.9	.52	40D	θ	L328
L341	30.2	1.0	.76	1.5	.91	32.4	1.5	.98	1.7	.97	40D	θ	L341
L344	28.4	-.8	-.67	1.5	.92	30.2	-.7	-.43	1.2	.70	40D	θ	L344
L376	25.9	-3.3	-2.66	1.0	.60	27.5	-3.4	-2.16	1.8	1.00	40D	*	L376
L378	29.8	.6	.48	2.1	1.31	31.9	1.0	.66	2.6	1.48	40D	θ	L378
L380	29.0	-.2	-.20	.8	.51	31.3	.4	.26	1.7	.96	40D	θ	L380
L392	27.1	-2.2	-1.72	1.9	1.20	28.9	-2.0	-1.29	1.9	1.05	40D	θ	L392
L396M	30.9	1.7	1.36	2.0	1.22	32.5	1.6	1.01	1.7	.97	40D	θ	L396M
L561	29.0	-.2	-.20	1.1	.65	30.0	-.9	-.57	2.3	1.27	40D	θ	L561
L567	27.5	-1.7	-1.39	1.4	.84	29.1	-1.8	-1.14	1.4	.77	40D	θ	L567
L576	28.5	-.7	-.55	1.0	.60	29.8	-1.1	-.69	.7	.42	40D	θ	L576
L599	29.5	.2	.18	1.4	.84	31.3	.4	.24	2.1	1.17	40D	θ	L599
L604	29.3	.1	.04	3.7	2.26	30.7	-.2	-.13	1.4	.81	40D	θ	L604

GR. MEAN = 29.2 GURLEY UNITS GRAND MEAN = 30.9 GURLEY UNITS TEST DETERMINATIONS = 10
SD MEANS = 1.3 GURLEY UNITS SD OF MEANS = 1.6 GURLEY UNITS 53 LABS IN GRAND MEANS
AVERAGE SDR = 1.6 GURLEY UNITS AVERAGE SDR = 1.8 GURLEY UNITS

L115	27.0	-2.2	-1.79	1.1	.65	26.2	-4.7	-2.99	1.9	1.09	40U	*	L115
L291	31.0	1.8	1.40	1.6	1.01	33.0	2.1	1.35	3.0	1.70	40U	*	L291
L484	26.7	-2.6	-2.03	1.5	.90	28.9	-1.9	-1.24	1.6	.91	40H	*	L484

TOTAL NUMBER OF LABORATORIES REPORTING = 60

Best Values: H27 29.0 ± 2.0 Gurley units
H49 30.9 ± 2.2 Gurley units

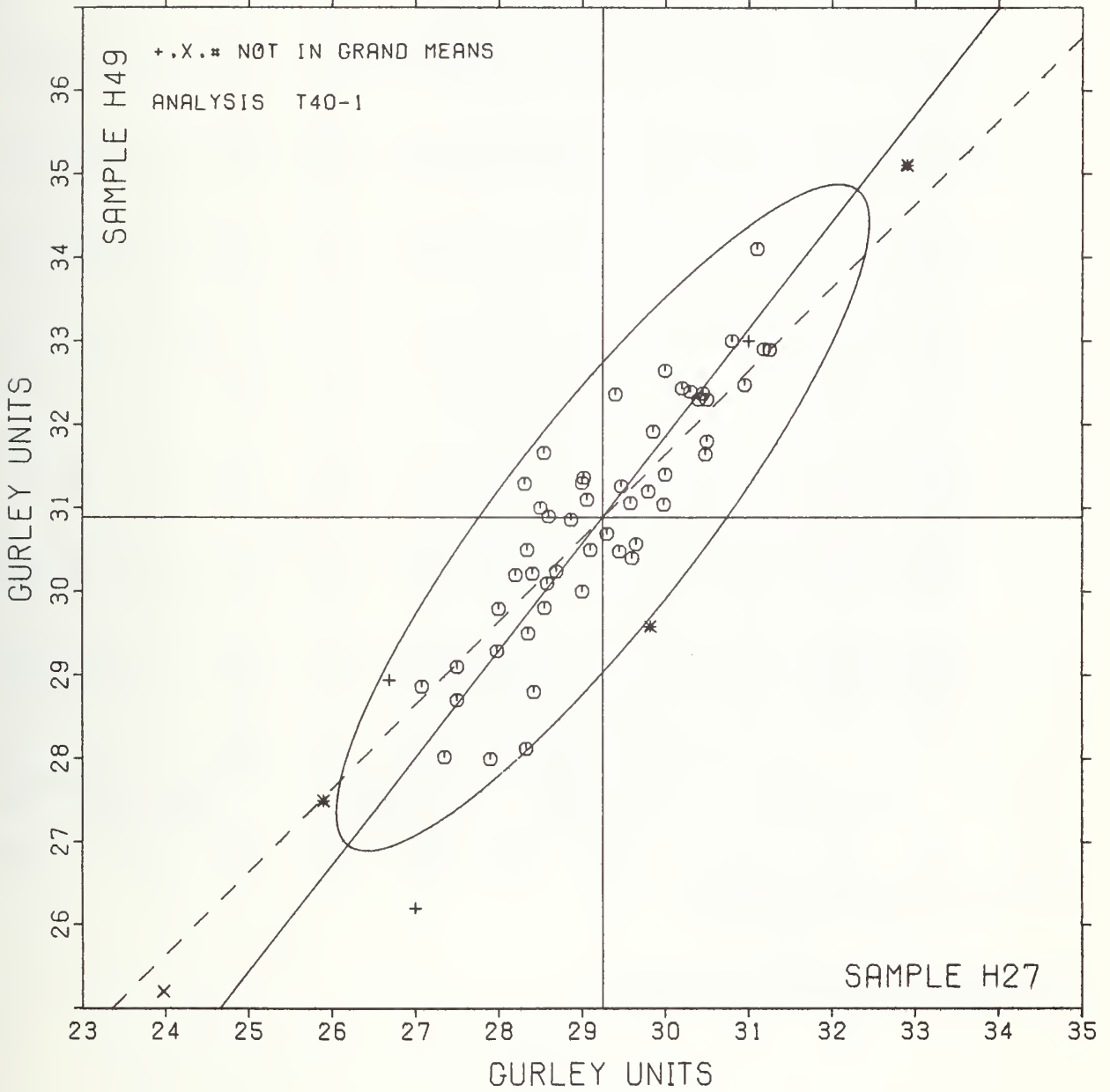
The following laboratories were omitted from the grand means because of extreme test results: 107, 176.

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

LAB CODE	F	MEANS		COORDINATES		AVG R,SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS		
		H27	H49	MAJOR	MINOR					
L107	#	22.6	23.9	-9.5	.9	1.44	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L158	X	23.1	24.8	-8.6	1.1	.64	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L285	X	24.0	25.2	-7.7	.7	.69	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L376	*	25.9	27.5	-4.7	.6	.80	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L484	*	26.7	28.9	-3.1	.8	.91	40H	AIR RESISTANCE,	REGMFD-TYPE GURLEY DENSOMETER	-OIL FLOTATION
L115	*	27.0	26.2	-5.1	-1.1	.87	40U	AIR RESISTANCE,	SHEPPIELD IN GURLEY UNITS	
L392	Ø	27.1	28.9	-2.9	.5	1.12	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L324	Ø	27.3	28.0	-3.4	-.3	1.22	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L567	Ø	27.5	29.1	-2.5	.3	.80	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L241	Ø	27.5	28.7	-2.8	.0	.92	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L182G	Ø	27.9	28.0	-3.1	-.7	1.31	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L242	Ø	28.0	29.3	-2.0	.0	.91	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L259	Ø	28.0	29.8	-1.6	.3	.92	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L312	Ø	28.2	30.2	-1.2	.4	.87	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L238A	Ø	28.3	31.3	-.3	1.0	.95	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L262G	Ø	28.3	28.1	-2.7	-1.0	1.04	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L232	Ø	28.3	30.5	-.9	.5	.58	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L153	Ø	28.3	29.5	-1.6	-.1	.97	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L344	Ø	28.4	30.2	-1.0	.3	.81	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L212	Ø	28.4	28.8	-2.2	-.6	1.05	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L121	Ø	28.5	31.0	-.4	.7	1.05	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L124G	Ø	28.5	31.7	.2	1.0	.98	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L576	Ø	28.5	29.8	-1.3	-.1	.51	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L100	Ø	28.6	30.1	-1.0	.0	.95	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L148	Ø	28.6	30.9	-.4	.5	.88	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L328	Ø	28.7	30.2	-.9	.0	.74	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L122	Ø	28.9	30.9	-.3	.3	.78	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L561	Ø	29.0	30.0	-.9	-.4	.96	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L380	Ø	29.0	31.3	.2	.4	.73	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L321	Ø	29.0	31.4	.2	.5	1.12	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L243G	Ø	29.1	31.1	.1	.3	1.02	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L128	Ø	29.1	30.5	-.4	-.1	1.11	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L604	Ø	29.3	30.7	-.1	-.2	1.54	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L174	Ø	29.4	32.4	1.3	.8	1.25	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L265	Ø	29.4	30.5	-.2	-.4	.94	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L599	Ø	29.5	31.3	.4	.1	1.01	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L261	Ø	29.6	31.1	.3	-.2	.82	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L230G	Ø	29.6	30.4	-.2	-.6	1.05	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L123	Ø	29.6	30.6	-.0	-.5	1.38	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L326	Ø	29.8	31.2	.6	-.2	1.21	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L224	*	29.8	29.6	-.7	-1.3	1.54	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L378	Ø	29.8	31.9	1.2	.2	1.39	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L278	Ø	30.0	31.0	.6	-.5	.79	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L127	Ø	30.0	32.6	1.8	.5	.89	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L190R	Ø	30.0	31.4	.9	-.3	1.19	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L341	Ø	30.2	32.4	1.8	.2	.94	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L236	Ø	30.3	32.4	1.8	.1	.88	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L190C	Ø	30.4	32.3	1.8	-.0	1.45	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L159	Ø	30.4	32.4	1.9	-.0	1.05	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L125	Ø	30.5	31.6	1.4	-.5	.77	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L223	Ø	30.5	31.8	1.5	-.4	.96	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L141	Ø	30.5	32.3	1.9	-.1	.93	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L308	Ø	30.8	33.0	2.6	.1	.94	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L396M	Ø	30.9	32.5	2.3	-.4	1.10	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L291	*	31.0	33.0	2.7	-.1	1.35	40U	AIR RESISTANCE,	SHEPPIELD IN GURLEY UNITS	
L183	Ø	31.1	34.1	3.7	.5	.86	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L163	Ø	31.2	32.9	2.8	-.3	1.07	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L166	Ø	31.2	32.9	2.8	-.4	1.24	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L301	*	32.9	35.1	5.6	-.3	.86	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
L176	#	39.3	47.7	19.4	2.4	1.82	40D	AIR RESISTANCE,	GURLEY DENSOMETER	- OIL FLOTATION
GMEANS:		29.2	30.9			1.00				
		95% ELLIPSE:		5.0	1.2			WITH GAMMA = 52 DEGREES		

AIR RESISTANCE, GURLEY

SAMPLE H27 = 29.2 GURLEY UNITS SAMPLE H49 = 30.9 GURLEY UNITS



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

LAB CODE	SAMPLE H27 MEAN	PRINTING 108 GRAMS PER SQUARE METER				SAMPLE H49 MEAN	PRINTING 109 GRAMS PER SQUARE METER				TEST D. # 10		
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L114	110.5	2.8	.55	3.0	.71	106.9	3.0	.57	4.2	.95	40S	6	L114
L121	111.6	3.9	.77	4.1	.98	105.2	1.3	.25	3.4	.76	40S	6	L121
L122S	114.9	7.2	1.43	6.4	1.53	114.0	10.1	1.93	5.5	1.25	40S	6	L122S
L124S	105.0	-2.7	-.55	3.7	.88	99.1	-4.8	-.92	5.6	1.27	40S	6	L124S
L127	114.0	6.3	1.25	5.2	1.25	111.4	7.5	1.43	3.9	.88	40S	6	L127
L132	99.7	-8.0	-1.61	4.2	1.02	98.7	-5.2	-1.00	5.3	1.20	40S	6	L132
L148	113.9	6.2	1.23	4.1	.98	107.5	3.6	.69	5.2	1.17	40S	6	L148
L150	110.2	2.5	.49	7.4	1.78	102.0	-1.9	-.37	4.1	.92	40S	6	L150
L157	108.1	.4	.07	4.0	.96	102.6	-1.3	-.25	5.5	1.24	40S	6	L157
L158	106.0	-1.7	-.35	4.6	1.10	103.5	-.4	-.08	3.4	.76	40S	6	L158
L173B	110.0	2.3	.45	4.1	.98	106.5	2.6	.49	3.4	.76	40S	6	L173B
L190C	99.7	-8.0	-1.61	4.4	1.06	94.3	-9.6	-1.84	5.8	1.30	40S	6	L190C
L213	106.7	-1.0	-.21	4.1	.99	100.8	-3.1	-.60	2.5	.56	40S	6	L213
L223	97.5	-10.2	-2.05	4.5	1.07	94.1	-9.8	-1.88	5.9	1.32	40S	6	L223
L228	111.7	4.0	.79	4.6	1.11	111.0	7.1	1.36	3.9	.88	40S	6	L228
L230S	103.3	-4.4	-.89	5.4	1.29	101.8	-2.1	-.40	4.5	1.01	40S	6	L230S
L233	102.0	-5.7	-1.15	3.2	.77	93.4	-10.5	-2.01	4.0	.90	40S	6	L233
L241	114.0	6.3	1.25	3.9	.95	107.7	3.8	.72	2.5	.56	40S	6	L241
L249	106.8	-.9	-.19	5.0	1.21	102.9	-1.0	-.19	4.3	.98	40S	6	L249
L255	108.9	1.2	.23	4.4	1.06	103.8	-.1	-.02	3.9	.88	40S	6	L255
L257A	109.0	1.3	.25	3.2	.78	104.9	1.0	.19	4.3	.97	40S	6	L257A
L257B	107.9	.2	.03	5.7	1.37	102.6	-1.3	-.25	6.1	1.37	40S	6	L257B
L257C	113.1	5.4	1.07	4.0	.97	108.4	4.5	.86	2.7	.60	40S	6	L257C
L260	110.2	2.5	.49	3.3	.80	108.9	5.0	.95	5.6	1.26	40S	6	L260
L262S	111.1	3.4	.67	3.7	.89	111.4	7.5	1.43	4.1	.92	40S	6	L262S
L288	116.5	8.8	1.75	3.5	.84	110.7	6.8	1.30	5.6	1.27	40S	6	L288
L301	118.3	10.6	2.11	3.9	.93	115.1	11.2	2.14	2.8	.62	40S	6	L301
L305	108.2	.5	.09	3.7	.89	107.1	3.2	.61	2.9	.66	40S	6	L305
L312	101.5	-6.2	-1.25	3.4	.81	99.0	-4.9	-.94	3.9	.89	40S	6	L312
L318	104.0	-3.7	-.75	2.5	.61	100.7	-3.2	-.61	5.5	1.25	40S	6	L318
L349	102.4	-5.3	-1.07	4.3	1.03	97.8	-6.1	-1.17	4.4	.98	40S	6	L349
L352	106.5	-1.2	-.25	3.0	.71	105.7	1.8	.34	3.4	.77	40S	6	L352
L354	109.3	1.6	.31	4.4	1.05	102.0	-1.9	-.37	4.2	.96	40S	6	L354
L360	105.2	-2.5	-.51	3.7	.88	100.6	-3.3	-.63	4.6	1.03	40S	6	L360
L370	104.3	-3.4	-.69	2.8	.66	100.7	-3.2	-.61	3.2	.73	40S	6	L370
L390	104.5	-3.2	-.65	4.4	1.05	102.0	-1.9	-.37	5.4	1.21	40S	6	L390
L562	372.5	264.8	53.01	13.4	3.21	371.5	267.6	51.18	11.6	2.61	40S	#	L562
L575	109.2	1.5	.29	4.6	1.11	104.5	.6	.11	6.3	1.42	40S	6	L575
L587	111.5	3.8	.75	2.4	.58	108.0	4.1	.78	5.9	1.32	40S	6	L587
L597	99.5	-8.2	-1.65	4.5	1.08	99.3	-4.6	-.88	6.7	1.51	40S	6	L597
L600	103.2	-4.5	-.91	5.5	1.32	99.9	-4.0	-.77	3.1	.71	40S	6	L600

GR. MEAN = 107.7 SHEFF. UNITS GRAND MEAN = 103.9 SHEFF. UNITS TEST DETERMINATIONS = 10
SD MEANS = 5.0 SHEFF. UNITS SD OF MEANS = 5.2 SHEFF. UNITS 40 LABS IN GRAND MEANS
AVERAGE SDR = 4.2 SHEFF. UNITS AVERAGE SDR = 4.4 SHEFF. UNITS

L182B	434.5	326.8	65.42	28.2	6.77	420.0	316.1	60.46	16.0	3.60	40B	*	L182B
L243B	437.4	329.7	66.00	17.9	4.28	421.7	317.8	60.78	20.5	4.63	40B	*	L243B
L484	391.0	283.3	56.71	19.7	4.72	374.0	270.1	51.66	15.1	3.39	40B	*	L484

TOTAL NUMBER OF LABORATORIES REPORTING = 44

Best Values: H27 108 ± 8 Sheffield units
H49 104 ± 8 Sheffield units

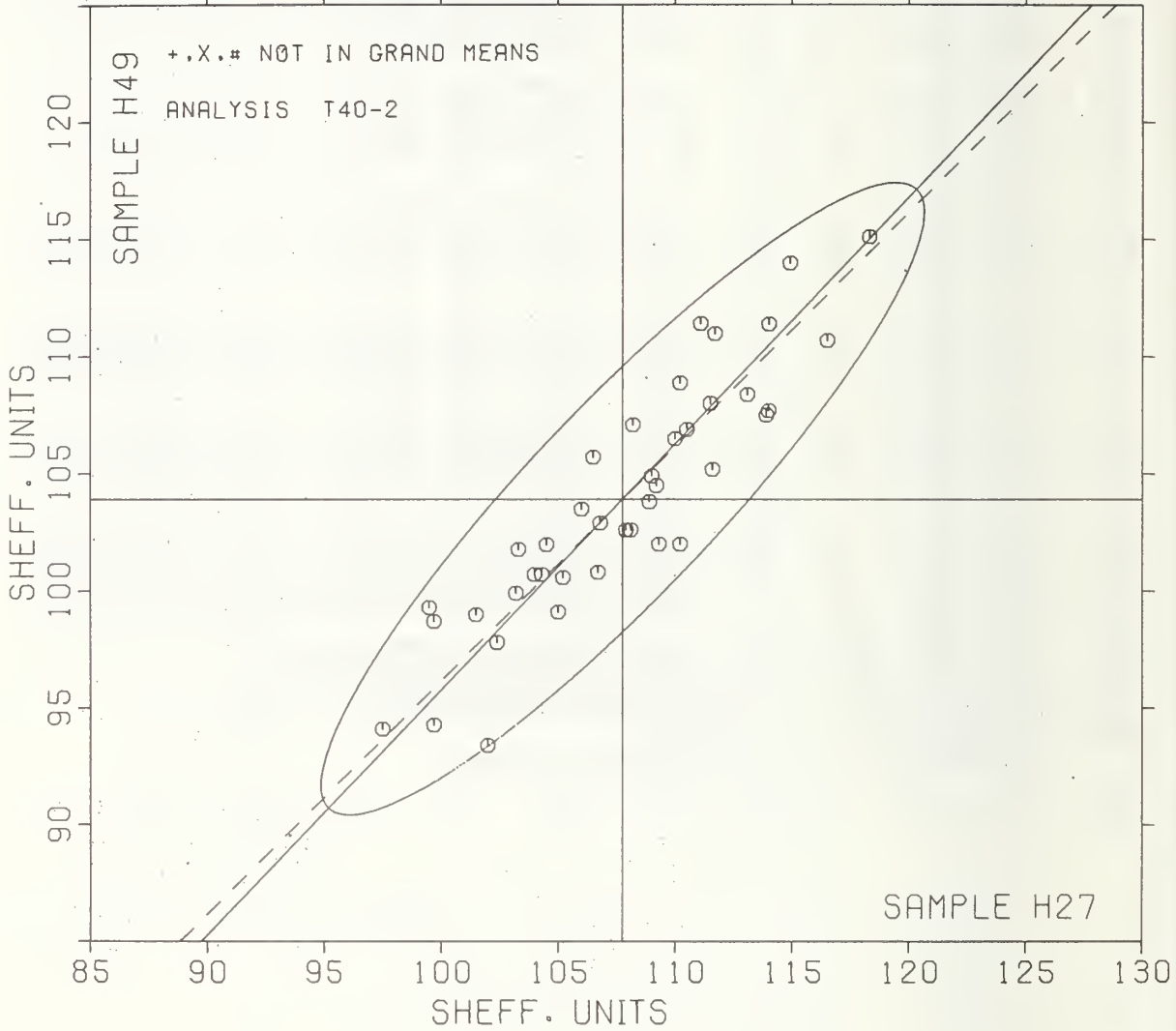
Data from the following laboratories were omitted from the grand means because a non-standard test procedure was used: 562.

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		COORDINATES		AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS				
		H27	H49	MAJOR	MINOR			AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L223	Ø	97.5	94.1	-14.2	.7	1.19	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L597	Ø	99.5	99.3	-9.0	2.8	1.30	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L190C	Ø	99.7	94.3	-12.5	-.8	1.18	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L132	Ø	99.7	98.7	-9.3	2.2	1.11	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L312	Ø	101.5	99.0	-7.9	1.1	.85	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L233	Ø	102.0	93.4	-11.6	-3.1	.83	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L34C	Ø	102.4	97.8	-8.1	-.3	1.00	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L600	Ø	103.2	99.9	-6.0	.5	1.01	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L230S	Ø	103.3	101.8	-4.6	1.8	1.15	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L318	Ø	104.0	100.7	-4.9	.5	.93	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L370	Ø	104.3	100.7	-4.7	.3	.69	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L390	Ø	104.5	102.0	-3.6	1.0	1.13	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L124S	Ø	105.0	99.1	-5.4	-1.3	1.07	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L360	Ø	105.2	100.6	-4.2	-.4	.96	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L158	Ø	106.0	103.5	-1.5	1.0	.93	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L352	Ø	106.5	105.7	.4	2.1	.74	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L213	Ø	106.7	100.8	-3.0	-1.4	.77	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L249	Ø	106.8	102.9	-1.4	-.0	1.09	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L257B	Ø	107.9	102.6	-.8	-1.0	1.37	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L157	Ø	108.1	102.6	-.7	-1.2	1.10	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L305	Ø	108.2	107.1	2.6	1.9	.77	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L255	Ø	108.9	103.8	.7	-.9	.97	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L257A	Ø	109.0	104.9	1.6	-.2	.87	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L575	Ø	109.2	104.5	1.4	-.6	1.26	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L354	Ø	109.3	102.0	-.3	-2.4	1.00	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L173B	Ø	110.0	106.5	3.4	.2	.87	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L150	Ø	110.2	102.0	.3	-3.1	1.35	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L260	Ø	110.2	108.9	5.3	1.7	1.03	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L114	Ø	110.5	106.9	4.1	.1	.83	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L262S	Ø	111.1	111.4	7.7	2.7	.90	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L587	Ø	111.5	108.0	5.5	.1	.95	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L121	Ø	111.6	105.2	3.6	-1.9	.87	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L228	Ø	111.7	111.0	7.9	2.0	1.00	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L257C	Ø	113.1	108.4	6.9	-.8	.79	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L148	Ø	113.9	107.5	6.8	-2.0	1.07	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L241	Ø	114.0	107.7	7.1	-1.9	.75	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L127	Ø	114.0	111.4	9.7	.6	1.07	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L122S	Ø	114.9	114.0	12.2	1.8	1.39	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L288	Ø	116.5	110.7	10.9	-1.7	1.05	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L301	Ø	118.3	115.1	15.4	.1	.78	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L562	#	372.5	371.5	376.4	-7.5	2.91	40S	AIR RESISTANCE,	SHEFFIELD	(3/4 INCH DIAMETER ORIFICE)		
L484	*	391.0	374.0	390.9	-19.2	4.06	40B	AIR RESISTANCE,	BENDTSEN,	WG 150		
L182B	*	434.5	420.0	454.2	-19.0	5.19	40B	AIR RESISTANCE,	BENDTSEN,	WG 150		
L243B	*	437.4	421.7	457.5	-19.9	4.46	40B	AIR RESISTANCE,	BENDTSEN,	WG 150		
GMEANS:		107.7	103.9			1.00						
		55% ELLIPSE:		18.2	4.0			WITH GAMMA = 46 DEGREES				

AIR RESISTANCE, SHEFFIELD

SAMPLE H27 = 108. SHEFF. UNITS SAMPLE H49 = 104. SHEFF. UNITS



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

LAB CODE	SAMPLE B73		RELEASE BASE 116 GRAMS PER SQUARE METER			SAMPLE E64		BACKING 98 GRAMS PER SQUARE METER			TEST D. = 10		
	MEAN	DEV	N, DEV	SDR	R. SDR	MEAN	DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L122	1089.	-140.	-.81	276.	.53	597.	82.	.97	115.	1.04	41G	Ø	L122
L128	1258.	28.	.16	364.	.70	501.	-15.	-.18	89.	.80	41G	Ø	L128
L134	1031.	-198.	-1.14	296.	.57	460.	-55.	-.66	63.	.57	41G	Ø	L134
L166M	1267.	38.	.22	546.	1.05	575.	60.	.71	113.	1.02	41G	Ø	L166M
L195	1307.	77.	.45	773.	1.49	513.	-3.	-.03	170.	1.53	41G	Ø	L195
L224	1408.	179.	1.03	715.	1.37	657.	141.	1.68	98.	.88	41G	Ø	L224
L230	1466.	237.	1.37	846.	1.63	512.	-4.	-.05	72.	.65	41G	Ø	L230
L259	1261.	32.	.19	549.	1.06	528.	13.	.15	132.	1.19	41G	Ø	L259
L358	979.	-250.	-1.44	393.	.76	428.	-87.	-1.04	67.	.61	41G	Ø	L358
L396T	923.	-306.	-1.76	604.	1.16	356.	-160.	-1.90	124.	1.11	41G	Ø	L396T
L557	1293.	63.	.37	413.	.79	556.	40.	.48	141.	1.27	41G	Ø	L557
L559	1137.	-93.	-.53	538.	1.03	460.	-56.	-.67	145.	1.31	41G	Ø	L559
L560	1316.	87.	.50	604.	1.16	398.	-117.	-1.40	64.	.58	41G	Ø	L560
L561	1179.	-50.	-.29	302.	.58	612.	97.	1.15	155.	1.43	41G	Ø	L561
L576	1524.	294.	1.70	587.	1.13	579.	64.	.76	111.	1.00	41G	Ø	L576

GR. MEAN = 1229. SEC/10 CC GRAND MEAN = 515. SEC/10 CC TEST DETERMINATIONS = 10
 SD MFANS = 174. SEC/10 CC SD ØF MEANS = 84. SEC/10 CC 15 LABS IN GRAND MEANS
 AVERAGE SDR = 520. SEC/10 CC AVERAGE SDR = 111. SEC/10 CC
 TOTAL NUMBER OF LABORATORIES REPORTING = 15

Best Values: B73 1250 ± 270 second per 100 cc,
 E64 600. ± 180 mercury density
 (direct reading)

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

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

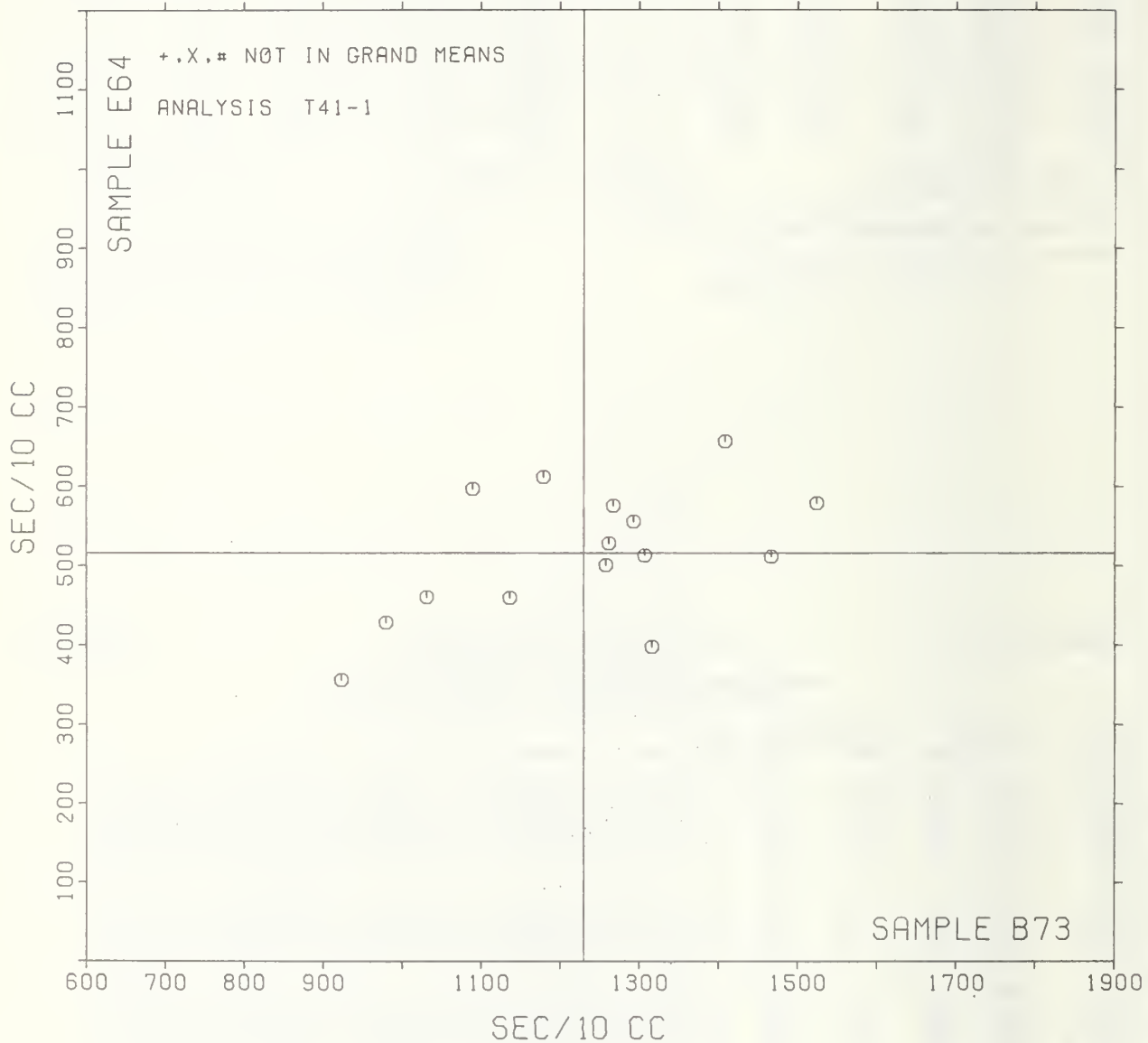
LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS				
		B73	E64	MAJOR	MINOR	R.SDR	VAR					
L396T	Ø	923.	356.	-339.	-64.	1.14	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L358	Ø	979.	428.	-264.	-11.	.68	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L134	Ø	1031.	460.	-205.	5.	.57	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L122	Ø	1089.	597.	-110.	119.	.78	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L559	Ø	1137.	460.	-105.	-27.	1.17	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L561	Ø	1179.	612.	-20.	107.	1.01	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L128	Ø	1258.	501.	23.	-22.	.75	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L259	Ø	1261.	528.	35.	3.	1.12	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L166M	Ø	1267.	575.	53.	46.	1.03	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L557	Ø	1293.	556.	72.	20.	1.03	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L195	Ø	1307.	513.	73.	-25.	1.51	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L560	Ø	1316.	398.	45.	-138.	.87	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L224	Ø	1408.	657.	212.	83.	1.13	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L230	Ø	1466.	512.	226.	-73.	1.14	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				
L576	Ø	1524.	579.	300.	-24.	1.07	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION				

GMEANS: 1229. 515. 1.00
 95% ELLIPSE: 516. 197. WITH GAMMA = 16 DEGREES

AIR RESISTANCE, GURLEY HG FLOTATION

SAMPLE B73 = 1229. SEC/10 CC

SAMPLE E64 = 515. SEC/10 CC



LAB CODE	SAMPLE J11 102 GRAMS PER SQUARE METER PRINTING					SAMPLE E36 72 GRAMS PER SQUARE METER WRITING					TEST D. = 10		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L122	5.71	.84	2.12	.21	1.18	4.87	.79	2.16	.23	1.57	44P	Ø	L122
L136	4.88	.00	.00	.23	1.30	4.02	-.06	-.18	.15	1.02	44P	Ø	L136
L182	4.88	.01	.02	.22	1.27	4.12	.04	.11	.10	.67	44P	Ø	L182
L183	4.32	-.56	-1.42	.09	.52	3.70	-.38	-1.06	.07	.46	44P	Ø	L183
L223	4.88	.00	.01	.17	.95	3.98	-.10	-.28	.17	1.19	44P	Ø	L223
L288	4.93	.05	.13	.11	.63	4.27	.19	.51	.17	1.14	44P	Ø	L288
L317	4.79	-.09	-.23	.16	.90	3.89	-.19	-.54	.14	.94	44P	Ø	L317
L588	4.63	-.25	-.63	.22	1.25	3.82	-.26	-.73	.15	1.02	44P	Ø	L588
GR. MEAN = 4.88 MICRONS					GRAND MEAN = 4.08 MICRONS					TEST DETERMINATIONS = 10			
SD MEANS = .39 MICRONS					SD OF MEANS = .36 MICRONS					8 LABS IN GRAND MEANS			
AVERAGE SDR = .18 MICRONS					AVERAGE SDR = .15 MICRONS								
TOTAL NUMBER OF LABORATORIES REPORTING = 8													
Best Values: J11 4.8 microns													
E36 4.0 microns													

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		J11	E36	MAJOR	MINOR	R.SDR	VAR	
L183	Ø	4.32	3.70	-.67	.10	.49	44P	SMOOTHNESS, PARKER PRINTSURF
L588	Ø	4.63	3.82	-.36	-.03	1.13	44P	SMOOTHNESS, PARKER PRINTSURF
L317	Ø	4.79	3.89	-.20	-.08	.92	44P	SMOOTHNESS, PARKER PRINTSURF
L136	Ø	4.88	4.02	-.04	-.05	1.16	44P	SMOOTHNESS, PARKER PRINTSURF
L223	Ø	4.88	3.98	-.07	-.08	1.07	44P	SMOOTHNESS, PARKER PRINTSURF
L182	Ø	4.88	4.12	.03	.03	.97	44P	SMOOTHNESS, PARKER PRINTSURF
L288	Ø	4.93	4.27	.16	.10	.88	44P	SMOOTHNESS, PARKER PRINTSURF
L122	Ø	5.71	4.87	1.15	.01	1.37	44P	SMOOTHNESS, PARKER PRINTSURF
GMEANS:		4.88	4.08			1.00		
95% ELLIPSE:				1.84	.25	WITH GAMMA = 42 DEGREES		

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

LAB CODE	SAMPLE J11 102 GRAMS PER SQUARE METER					SAMPLE E36 72 GRAMS PER SQUARE METER					TEST D. # 15		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	145.3	7.1	1.11	12.5	1.25	107.8	2.0	.44	4.7	.75	45S	θ	L100
L107	153.7	15.5	2.42	10.6	1.06	116.3	10.6	2.25	9.2	1.47	45S	*	L107
L108	131.3	-6.9	-1.08	8.8	.88	105.3	-5	-.10	5.1	.82	45S	θ	L108
L114	144.6	6.4	1.00	11.4	1.13	107.0	1.2	.27	8.4	1.35	45S	θ	L114
L115	136.3	-1.9	-.29	9.5	.95	109.0	3.2	.69	6.3	1.02	45S	θ	L115
L121	141.6	3.4	.53	9.6	.95	109.1	3.3	.71	6.0	.97	45S	θ	L121
L122	135.8	-2.4	-.37	10.4	1.04	107.2	1.4	.31	11.9	1.92	45S	θ	L122
L123	137.4	-.8	-.12	12.3	1.23	99.9	-5.9	-1.25	8.7	1.39	45S	θ	L123
L124	126.5	-11.7	-1.82	7.6	.76	95.9	-9.8	-2.09	7.4	1.19	45S	θ	L124
L125	129.3	-8.9	-1.38	6.2	.62	102.7	-3.1	-.66	7.0	1.13	45S	θ	L125
L126	141.8	3.6	.57	14.1	1.41	110.1	4.3	.92	5.0	.81	45S	θ	L126
L128	145.0	6.8	1.07	8.9	.89	108.7	3.0	.64	6.4	1.03	45S	θ	L128
L132	131.6	-6.6	-1.03	8.3	.83	103.5	-2.2	-.47	5.7	.91	45S	θ	L132
L134	139.9	1.7	.27	11.7	1.17	101.2	-4.6	-.97	5.6	.90	45S	θ	L134
L139S	143.1	4.9	.76	9.6	.96	109.5	3.7	.79	4.6	.74	45S	θ	L139S
L148	145.7	7.5	1.17	11.8	1.18	110.2	4.4	.95	6.0	.96	45S	θ	L148
L150	131.5	-6.7	-1.04	9.5	.95	103.2	-2.6	-.54	6.3	1.01	45S	θ	L150
L152	145.7	7.5	1.17	11.0	1.10	112.0	6.2	1.33	4.1	.67	45S	θ	L152
L153	150.5	12.3	1.92	10.3	1.03	118.3	12.5	2.67	5.6	.90	45S	*	L153
L157	145.3	7.1	1.11	11.6	1.16	104.9	-.9	-.19	7.4	1.18	45S	θ	L157
L158	134.0	-4.2	-.65	6.9	.69	104.0	-1.8	-.37	3.4	.54	45S	θ	L158
L159	140.3	2.1	.33	9.8	.98	103.3	-2.5	-.53	4.5	.72	45S	θ	L159
L162	137.0	-1.2	-.19	8.0	.80	105.3	-.4	-.09	5.2	.83	45S	θ	L162
L166	134.9	-3.3	-.51	14.5	1.44	104.1	-1.7	-.36	4.9	.90	45S	θ	L166
L167	134.3	-3.9	-.60	8.8	.88	104.3	-1.4	-.30	2.6	.42	45S	θ	L167
L173B	139.0	.8	.13	9.9	.99	105.7	-.1	-.02	3.7	.60	45S	θ	L173B
L176S	140.3	2.1	.34	9.0	.90	107.1	1.3	.28	4.7	.76	45S	θ	L176S
L183S	140.5	2.3	.37	9.0	.89	109.5	3.8	.81	10.1	1.63	45S	θ	L183S
L190C	137.0	-1.2	-.19	11.7	1.17	105.8	.0	.01	7.7	1.24	45S	θ	L190C
L190R	145.9	7.7	1.21	12.5	1.25	115.9	10.2	2.17	9.1	1.46	45S	θ	L190R
L195	134.9	-3.3	-.51	11.0	1.10	106.3	.5	.11	7.4	1.19	45S	θ	L195
L203	134.5	-3.7	-.58	9.7	.97	105.5	-.3	-.06	8.6	1.38	45S	θ	L203
L211	133.1	-5.1	-.79	8.2	.82	106.9	1.2	.25	6.2	1.00	45S	θ	L211
L213	126.7	-11.5	-1.80	8.6	.86	102.7	-3.0	-.64	8.7	1.39	45S	θ	L213
L223	129.8	-8.4	-1.31	10.6	1.06	97.5	-8.3	-1.77	7.4	1.16	45S	θ	L223
L224	147.7	9.5	1.48	11.8	1.18	117.1	11.4	2.43	4.6	.74	45S	θ	L224
L226B	125.5	-12.7	-1.98	9.3	.93	98.4	-7.4	-1.57	6.5	1.05	45S	θ	L226B
L228	136.7	-1.5	-.23	9.1	.91	105.1	-.6	-.13	4.6	.74	45S	θ	L228
L230S	138.7	.5	.08	12.6	1.26	107.2	1.4	.31	5.8	.93	45S	θ	L230S
L231	146.7	8.5	1.34	12.2	1.22	106.3	.6	.12	8.7	1.40	45S	θ	L231
L232S	130.3	-7.9	-1.23	9.7	.97	105.3	-.4	-.09	7.4	1.19	45S	θ	L232S
L233	141.4	3.2	.50	13.3	1.33	100.7	-5.1	-1.08	7.8	1.25	45S	θ	L233
L241	139.3	1.1	.18	11.3	1.13	107.3	1.6	.34	7.3	1.17	45S	θ	L241
L249	141.0	2.8	.44	10.0	1.00	104.7	-1.0	-.22	5.2	.83	45S	θ	L249
L254	141.5	3.3	.51	10.7	1.07	105.1	-.7	-.15	7.0	1.12	45S	θ	L254
L255	134.3	-3.9	-.61	8.4	.84	98.4	-7.4	-1.57	5.2	.84	45S	θ	L255
L257A	136.1	-2.1	-.33	5.4	.54	102.7	-3.0	-.64	5.9	.94	45S	θ	L257A
L257B	137.7	-.5	-.08	8.9	.89	100.0	-5.8	-1.23	6.0	.96	45S	θ	L257B
L257C	140.7	2.5	.39	11.2	1.12	109.8	4.0	.86	4.5	.73	45S	θ	L257C
L259	148.0	9.8	1.53	10.5	1.05	110.4	4.6	.99	6.9	1.10	45S	θ	L259
L260	141.8	3.6	.57	6.0	.60	108.1	2.3	.49	3.8	.61	45S	θ	L260
L261	137.1	-1.1	-.16	11.0	1.10	100.2	-5.6	-1.18	4.4	.70	45S	θ	L261
L262	137.4	-.8	-.12	5.1	.51	155.9	50.2	10.69	7.9	1.28	45S	#	L262
L275	145.3	7.1	1.12	9.3	.93	122.7	16.9	3.60	7.5	1.21	45S	X	L275
L277	140.7	2.5	.39	11.4	1.14	110.9	5.2	1.10	7.9	1.27	45S	θ	L277
L278	128.9	-9.3	-1.46	9.4	.94	100.5	-5.2	-1.11	6.7	1.07	45S	θ	L278
L281	142.5	4.3	.68	12.3	1.23	106.4	.6	.14	5.0	.80	45S	θ	L281
L285	130.7	-7.5	-1.16	13.9	1.39	103.3	-2.5	-.53	7.8	1.25	45S	θ	L285
L288	132.1	-6.1	-.96	9.1	.90	103.5	-2.3	-.49	3.8	.62	45S	θ	L288
L291S	134.7	-3.5	-.54	9.8	.98	101.8	-4.0	-.84	6.9	1.11	45S	θ	L291S
L297	137.3	-.9	-.13	10.0	1.00	106.3	.6	.12	4.4	.71	45S	θ	L297
L301	135.5	-2.7	-.41	7.9	.79	110.1	4.3	.92	5.2	.83	45S	θ	L301
L305	137.9	-.3	-.04	5.9	.59	106.8	1.0	.22	4.5	.72	45S	#	L305
L308	134.7	-3.5	-.55	9.8	.98	103.4	-2.4	-.50	4.5	.72	45S	θ	L308
L312	129.7	-8.5	-1.33	8.8	.88	105.0	-.8	-.16	3.3	.53	45S	θ	L312

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

LAB CODE	PRINTING					WRITING					TEST D. # 15	
	SAMPLE J11 MEAN	102 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E36 MEAN	72 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F-LAB
L317	133.9	-4.3	-.66	8.9	.89	104.3	-1.4	-.30	6.8	1.09	45S	Ø L317
L318	135.3	-2.9	-.45	14.5	1.45	105.5	-.3	-.06	5.6	.90	45S	Ø L318
L321	117.7	-20.5	-3.21	7.0	.70	95.7	-10.1	-2.15	6.2	1.00	45S	* L321
L323	137.5	-.7	-.10	8.8	.88	100.1	-5.7	-1.21	7.7	1.24	45S	Ø L323
L326	133.6	-4.6	-.72	7.8	.78	106.9	1.2	.25	4.9	.78	45S	Ø L326
L328	143.0	4.8	.75	11.8	1.18	110.5	4.7	1.00	6.4	1.03	45S	Ø L328
L341	132.8	-5.4	-.84	5.4	.54	99.5	-6.3	-1.34	6.0	.97	45S	Ø L341
L342	144.7	6.5	1.01	8.8	.88	110.3	4.6	.98	7.2	1.16	45S	Ø L342
L349	134.9	-3.3	-.51	12.1	1.21	103.8	-2.0	-.42	6.7	1.08	45S	Ø L349
L352	145.0	6.8	1.07	13.1	1.31	107.1	1.3	.28	6.8	1.09	45S	Ø L352
L360	139.9	1.7	.27	11.9	1.19	104.9	-.8	-.17	4.4	.71	45S	Ø L360
L366	139.8	1.6	.25	16.0	1.60	104.6	-1.2	-.25	5.3	.85	45S	Ø L366
L370	139.0	.8	.13	10.2	1.02	101.6	-4.2	-.88	6.8	1.09	45S	# L370
L372	139.8	1.6	.25	6.3	.63	109.9	4.1	.88	7.1	1.15	45S	Ø L372
L376	141.9	3.7	.58	8.9	.89	111.1	5.3	1.13	5.7	.92	45S	Ø L376
L378	140.1	1.9	.29	7.7	.77	102.3	-3.5	-.74	8.4	1.36	45S	Ø L378
L380	130.9	-7.3	-1.13	10.0	1.00	101.3	-4.4	-.94	6.7	1.07	45S	Ø L380
L382	135.4	-2.8	-.44	7.1	.71	100.5	-5.2	-1.11	5.1	.83	45S	Ø L382
L390	132.3	-5.9	-.91	10.8	1.08	99.0	-6.8	-1.44	7.1	1.14	45S	Ø L390
L396M	141.7	3.5	.54	5.6	.56	109.3	3.6	.76	7.5	1.21	45S	Ø L396M
L554	144.9	6.7	1.05	8.6	.86	111.3	5.5	1.18	7.2	1.16	45S	Ø L554
L561	146.0	7.8	1.22	8.1	.81	105.7	-.1	-.02	6.2	1.00	45S	Ø L561
L571	143.3	5.1	.80	10.3	1.03	111.3	5.6	1.19	6.9	1.11	45S	Ø L571
L575	150.3	12.1	1.90	13.1	1.31	107.8	2.0	.44	6.5	1.04	45S	Ø L575
L587	142.3	4.1	.65	8.0	.80	109.3	3.6	.76	5.9	.95	45S	# L587
L597	129.5	-8.7	-1.35	9.5	.95	96.1	-9.6	-2.05	8.0	1.29	45S	Ø L597
L600	148.1	9.9	1.54	10.4	1.04	114.5	8.7	1.86	4.6	.73	45S	Ø L600
GR. MEAN = 138.2 SHEFF. UNITS GRAND MEAN = 105.8 SHEFF. UNITS TEST DETERMINATIONS = 15												
SD MEANS = 6.4 SHEFF. UNITS SD OF MEANS = 4.7 SHEFF. UNITS 88 LABS IN GRAND MEANS												
AVERAGE SDR = 10.0 SHEFF. UNITS AVERAGE SDR = 6.2 SHEFF. UNITS												
L174	236.7	98.5	15.39	7.0	.70	215.1	109.3	23.29	3.2	.51	45R	* L174
TOTAL NUMBER OF LABORATORIES REPORTING = 93												
Best Values: J11 140 ± 10 Sheffield units												
E36 106 ± 7 Sheffield units												

The following laboratories were omitted from the grand means because of extreme test results: 262.

Data from the following laboratories were received too late for proper processing and inclusion in the grand means: 305, 370.

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

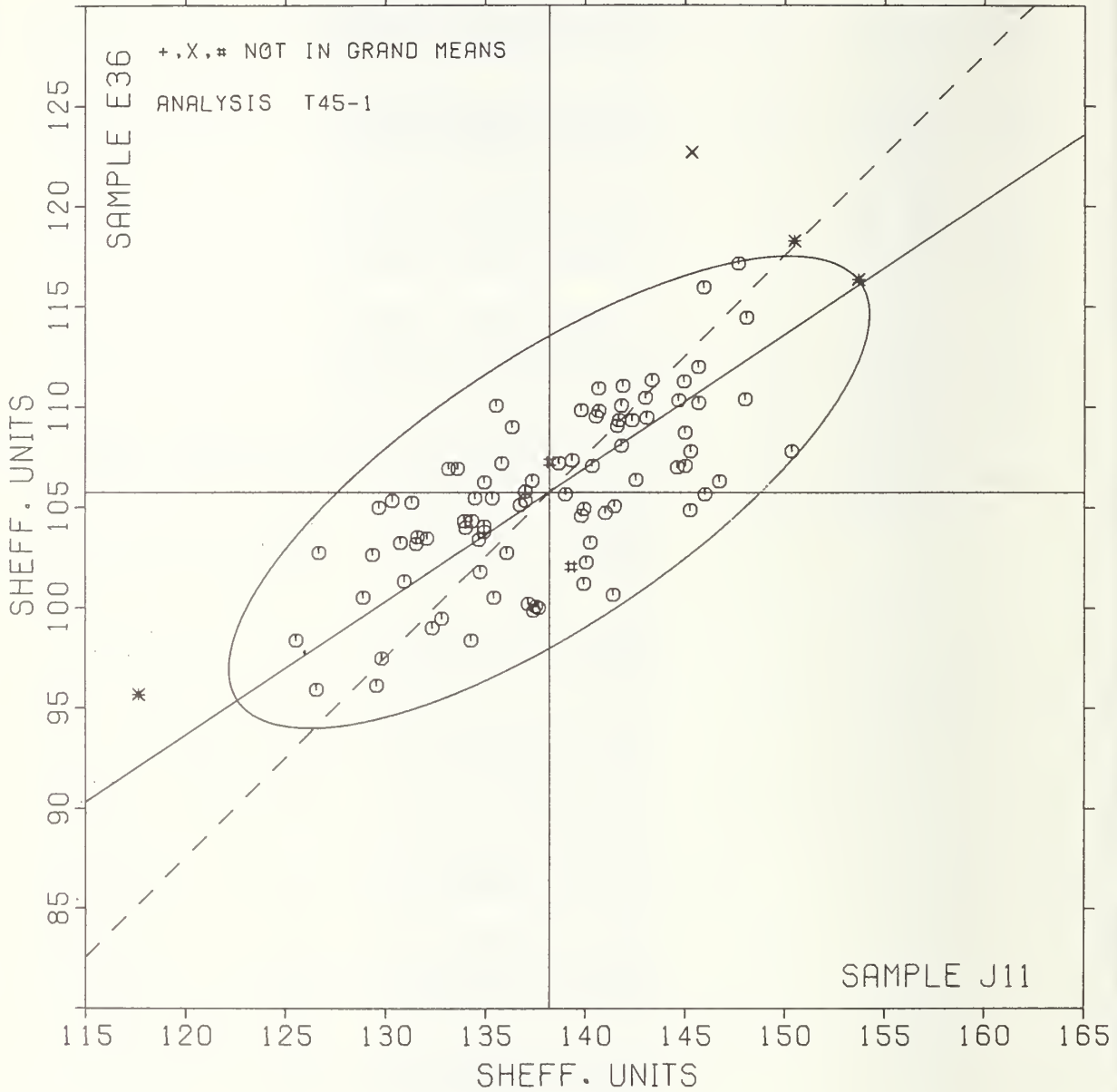
LAB CODE	F	MEANS		COORDINATES		AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS		
		J11	E36	MAJOR	MINOR			SMOOTHNESS,	SHEFFIELD	
L321	*	117.7	95.7	-22.7	3.0	.85	45S	SMOOTHNESS,	SHEFFIELD	
L226B	Ø	125.5	98.4	-14.6	.9	.99	45S	SMOOTHNESS,	SHEFFIELD	
L124	Ø	126.5	95.9	-15.1	-1.7	.98	45S	SMOOTHNESS,	SHEFFIELD	
L213	Ø	126.7	102.7	-11.3	3.9	1.13	45S	SMOOTHNESS,	SHEFFIELD	
L278	Ø	128.9	100.5	-10.6	.8	1.01	45S	SMOOTHNESS,	SHEFFIELD	
L125	Ø	129.3	102.7	-9.1	2.3	.88	45S	SMOOTHNESS,	SHEFFIELD	
L597	Ø	129.5	96.1	-12.5	-3.2	1.12	45S	SMOOTHNESS,	SHEFFIELD	
L312	Ø	129.7	105.0	-7.5	4.1	.70	45S	SMOOTHNESS,	SHEFFIELD	
L223	Ø	129.8	97.5	-11.6	-2.3	1.12	45S	SMOOTHNESS,	SHEFFIELD	
L232S	Ø	130.3	105.3	-6.8	4.0	1.08	45S	SMOOTHNESS,	SHEFFIELD	
L285	Ø	130.7	103.3	-7.6	2.1	1.32	45S	SMOOTHNESS,	SHEFFIELD	
L380	Ø	130.9	101.3	-8.5	.3	1.03	45S	SMOOTHNESS,	SHEFFIELD	
L108	Ø	131.3	105.3	-6.0	3.4	.85	45S	SMOOTHNESS,	SHEFFIELD	
L150	Ø	131.5	103.2	-7.0	1.6	.98	45S	SMOOTHNESS,	SHEFFIELD	
L132	Ø	131.6	103.5	-6.7	1.8	.87	45S	SMOOTHNESS,	SHEFFIELD	
L288	Ø	132.1	103.5	-6.4	1.5	.76	45S	SMOOTHNESS,	SHEFFIELD	
L350	Ø	132.3	99.0	-8.6	-2.4	1.11	45S	SMOOTHNESS,	SHEFFIELD	
L341	Ø	132.8	99.5	-8.0	-2.3	.75	45S	SMOOTHNESS,	SHEFFIELD	
L211	Ø	133.1	106.9	-3.6	3.8	.91	45S	SMOOTHNESS,	SHEFFIELD	
L326	Ø	133.6	106.9	-3.2	3.5	.78	45S	SMOOTHNESS,	SHEFFIELD	
L317	Ø	133.9	104.3	-4.3	1.2	.99	45S	SMOOTHNESS,	SHEFFIELD	
L158	Ø	134.0	104.0	-4.5	.9	.61	45S	SMOOTHNESS,	SHEFFIELD	
L255	Ø	134.3	98.4	-7.3	-4.0	.84	45S	SMOOTHNESS,	SHEFFIELD	
L167	Ø	134.3	104.3	-4.0	1.0	.65	45S	SMOOTHNESS,	SHEFFIELD	
L203	Ø	134.5	105.5	-3.3	1.8	1.18	45S	SMOOTHNESS,	SHEFFIELD	
L308	Ø	134.7	103.4	-4.2	-.0	.85	45S	SMOOTHNESS,	SHEFFIELD	
L291S	Ø	134.7	101.8	-5.1	-1.4	1.05	45S	SMOOTHNESS,	SHEFFIELD	
L349	Ø	134.9	103.8	-3.8	.2	1.14	45S	SMOOTHNESS,	SHEFFIELD	
L166	Ø	134.9	104.1	-3.6	.4	1.12	45S	SMOOTHNESS,	SHEFFIELD	
L195	Ø	134.9	106.3	-2.4	2.2	1.14	45S	SMOOTHNESS,	SHEFFIELD	
L318	Ø	135.3	105.5	-2.5	1.3	1.17	45S	SMOOTHNESS,	SHEFFIELD	
L382	Ø	135.4	100.5	-5.2	-2.8	.77	45S	SMOOTHNESS,	SHEFFIELD	
L301	Ø	135.5	110.1	.2	5.1	.81	45S	SMOOTHNESS,	SHEFFIELD	
L122	Ø	135.8	107.2	-1.2	2.5	1.48	45S	SMOOTHNESS,	SHEFFIELD	
L257A	Ø	136.1	102.7	-3.4	-1.3	.74	45S	SMOOTHNESS,	SHEFFIELD	
L115	Ø	136.3	109.0	.3	3.7	.99	45S	SMOOTHNESS,	SHEFFIELD	
L228	Ø	136.7	105.1	-1.6	.3	.83	45S	SMOOTHNESS,	SHEFFIELD	
L190C	Ø	137.0	105.8	-1.0	.7	1.21	45S	SMOOTHNESS,	SHEFFIELD	
L162	Ø	137.0	105.3	-1.2	.3	.81	45S	SMOOTHNESS,	SHEFFIELD	
L261	Ø	137.1	100.2	-3.5	-4.0	.90	45S	SMOOTHNESS,	SHEFFIELD	
L297	Ø	137.3	106.3	-.4	1.0	.85	45S	SMOOTHNESS,	SHEFFIELD	
L123	Ø	137.4	99.9	-3.9	-4.5	1.31	45S	SMOOTHNESS,	SHEFFIELD	
L262	#	137.4	155.9	27.1	42.2	.89	45S	SMOOTHNESS,	SHEFFIELD	
L323	Ø	137.5	100.1	-3.7	-4.4	1.06	45S	SMOOTHNESS,	SHEFFIELD	
L257B	Ø	137.7	100.0	-3.6	-4.5	.92	45S	SMOOTHNESS,	SHEFFIELD	
L305	#	137.9	106.8	.4	1.0	.65	45S	SMOOTHNESS,	SHEFFIELD	
L230S	Ø	138.7	107.2	1.2	.9	1.10	45S	SMOOTHNESS,	SHEFFIELD	
L370	#	139.0	101.6	-1.6	-3.9	1.05	45S	SMOOTHNESS,	SHEFFIELD	
L173B	Ø	139.0	105.7	.6	-.5	.79	45S	SMOOTHNESS,	SHEFFIELD	
L241	Ø	139.3	107.3	1.8	.7	1.15	45S	SMOOTHNESS,	SHEFFIELD	
L372	Ø	139.8	109.9	3.6	2.5	.89	45S	SMOOTHNESS,	SHEFFIELD	
L366	Ø	139.8	104.6	.7	-1.9	1.23	45S	SMOOTHNESS,	SHEFFIELD	
L134	Ø	139.9	101.2	-1.1	-4.8	1.03	45S	SMOOTHNESS,	SHEFFIELD	
L360	Ø	139.9	104.9	1.0	-1.7	.95	45S	SMOOTHNESS,	SHEFFIELD	
L378	Ø	140.1	102.3	-.4	-3.9	1.06	45S	SMOOTHNESS,	SHEFFIELD	
L159	Ø	140.3	103.3	.4	-3.2	.85	45S	SMOOTHNESS,	SHEFFIELD	
L176S	Ø	140.3	107.1	2.5	-.1	.83	45S	SMOOTHNESS,	SHEFFIELD	
L183S	Ø	140.5	109.5	4.0	1.8	1.26	45S	SMOOTHNESS,	SHEFFIELD	
L277	Ø	140.7	110.9	4.9	2.9	1.21	45S	SMOOTHNESS,	SHEFFIELD	
L257C	Ø	140.7	109.8	4.3	2.0	.93	45S	SMOOTHNESS,	SHEFFIELD	
L249	Ø	141.0	104.7	1.8	-2.4	.52	45S	SMOOTHNESS,	SHEFFIELD	
L233	Ø	141.4	100.7	-.1	-6.0	1.29	45S	SMOOTHNESS,	SHEFFIELD	
L254	Ø	141.5	105.1	2.4	-2.4	1.10	45S	SMOOTHNESS,	SHEFFIELD	
L121	Ø	141.6	109.1	4.7	.9	.96	45S	SMOOTHNESS,	SHEFFIELD	
L396M	Ø	141.7	105.3	4.9	1.1	.88	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		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J11	F36	MAJOR	MINOR	R.SDR	VAR			
L260	Ø	141.8	108.1	4.3	-.1	.60	45S	SMOOTHNESS,	SHEFFIELD	
L126	Ø	141.8	110.1	5.4	1.6	1.11	45S	SMOOTHNESS,	SHEFFIELD	
L376	Ø	141.9	111.1	6.0	2.4	.90	45S	SMOOTHNESS,	SHEFFIELD	
L587	Ø	142.3	109.3	5.4	.7	.88	45S	SMOOTHNESS,	SHEFFIELD	
L281	Ø	142.5	106.4	4.0	-1.9	1.01	45S	SMOOTHNESS,	SHEFFIELD	
L328	Ø	143.0	110.5	6.6	1.3	1.10	45S	SMOOTHNESS,	SHEFFIELD	
L139S	Ø	143.1	109.5	6.1	.4	.85	45S	SMOOTHNESS,	SHEFFIELD	
L571	Ø	143.3	111.3	7.4	1.8	1.07	45S	SMOOTHNESS,	SHEFFIELD	
L114	Ø	144.6	107.0	6.0	-2.5	1.24	45S	SMOOTHNESS,	SHEFFIELD	
L342	Ø	144.7	110.3	7.9	.2	1.02	45S	SMOOTHNESS,	SHEFFIELD	
L554	Ø	144.9	111.3	8.7	.9	1.01	45S	SMOOTHNESS,	SHEFFIELD	
L352	Ø	145.0	107.1	6.4	-2.7	1.20	45S	SMOOTHNESS,	SHEFFIELD	
L128	Ø	145.0	108.7	7.3	-1.3	.96	45S	SMOOTHNESS,	SHEFFIELD	
L157	Ø	145.3	104.9	5.4	-4.7	1.17	45S	SMOOTHNESS,	SHEFFIELD	
L100	Ø	145.3	107.8	7.0	-2.2	1.00	45S	SMOOTHNESS,	SHEFFIELD	
L275	X	145.3	122.7	15.3	10.1	1.07	45S	SMOOTHNESS,	SHEFFIELD	
L148	Ø	145.7	110.2	8.7	-.4	1.07	45S	SMOOTHNESS,	SHEFFIELD	
L152	Ø	145.7	112.0	9.7	1.1	.88	45S	SMOOTHNESS,	SHEFFIELD	
L190R	Ø	145.9	115.9	12.1	4.2	1.36	45S	SMOOTHNESS,	SHEFFIELD	
L561	Ø	146.0	105.7	6.5	-4.4	.90	45S	SMOOTHNESS,	SHEFFIELD	
L231	Ø	146.7	106.3	7.4	-4.2	1.31	45S	SMOOTHNESS,	SHEFFIELD	
L224	Ø	147.7	117.1	14.2	4.2	.96	45S	SMOOTHNESS,	SHEFFIELD	
L259	Ø	148.0	110.4	10.7	-1.6	1.08	45S	SMOOTHNESS,	SHEFFIELD	
L600	Ø	148.1	114.5	13.1	1.8	.88	45S	SMOOTHNESS,	SHEFFIELD	
L575	Ø	150.3	107.8	11.3	-5.0	1.18	45S	SMOOTHNESS,	SHEFFIELD	
L153	*	150.5	118.3	17.2	3.6	.96	45S	SMOOTHNESS,	SHEFFIELD	
L107	*	153.7	116.3	18.8	.2	1.27	45S	SMOOTHNESS,	SHEFFIELD	
L174	*	236.7	215.1	142.5	36.5	.60	45R	SMOOTHNESS,	SHEFFIELD,	NON-STANDARD INSTRUMENT
GMEANS:		138.2	105.8			1.00				
		95% ELLIPSE:		18.7	6.7			WITH GAMMA = 33 DEGREES		

SMOOTHNESS, SHEFFIELD

SAMPLE J11 = 138. SHEFF. UNITS SAMPLE E36 = 106. SHEFF. UNITS



TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T45-2 TABLE 1
SMOOTHNESS, BEKK SECONDS

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

LAB CODE	PRINTING					WRITING					TEST D. = 15			
	J11 MEAN	102 GRAMS PER SQUARE METER		E36 72 GRAMS PER SQUARE METER		MEAN		DEV		N.DEV		VAR	F	LAB
		DEV	N.DEV	SDR	R.SDR									
L139B	37.4	6.5	2.04	4.8	1.01	52.3	9.3	1.54	5.2	.97	45K	Ø	L139B	
L162	27.9	-3.0	-.95	3.1	.65	38.0	-5.0	-.84	2.9	.55	45K	Ø	L162	
L176	32.8	1.9	.59	8.9	1.89	34.5	-8.6	-1.42	10.1	1.89	45K	Ø	L176	
L182K	28.0	-2.9	-.91	3.6	.77	46.0	3.0	.49	5.0	.94	45K	Ø	L182K	
L190C	32.3	1.4	.43	4.0	.84	44.8	1.7	.29	4.0	.75	45K	Ø	L190C	
L230B	33.3	2.4	.74	5.5	1.17	51.9	8.9	1.47	6.7	1.26	45K	Ø	L230B	
L232B	27.1	-3.8	-1.20	2.2	.46	37.2	-5.8	-.97	4.9	.91	45K	Ø	L232B	
L243K	29.1	-1.8	-.56	5.2	1.11	41.9	-1.2	-.20	6.4	1.19	45K	Ø	L243K	
L291K	31.7	.8	.24	5.6	1.19	44.5	1.5	.25	4.7	.88	45K	Ø	L291K	
L581	29.5	-1.4	-.43	4.3	.91	39.3	-3.7	-.62	3.6	.66	45K	Ø	L581	

GR. MEAN = 30.9 BEKK SECONDS GRAND MEAN = 43.0 BEKK SECONDS TEST DETERMINATIONS = 15
SD MEANS = 3.2 BEKK SECONDS SD OF MEANS = 6.0 BEKK SECONDS 10 LABS IN GRAND MEANS
AVERAGE SDR = 4.7 BEKK SECONDS AVERAGE SDR = 5.4 BEKK SECONDS

L182G	61.7	30.8	9.67	4.4	.94	96.3	53.3	8.84	5.5	1.02	45H	Ø	L182G
L251	29.7	-1.2	-.37	3.8	.82	38.6	-4.4	-.74	5.0	.93	45L	Ø	L251
L388	330.9	300.0	94.28	32.5	6.93	417.4	374.3	62.09	43.1	8.05	45H	Ø	L388

TOTAL NUMBER OF LABORATORIES REPORTING = 13

Best Values: J11 30 Bekk seconds
E36 43 Bekk seconds

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T45-2 TABLE 2
SMOOTHNESS, BEKK SECONDS

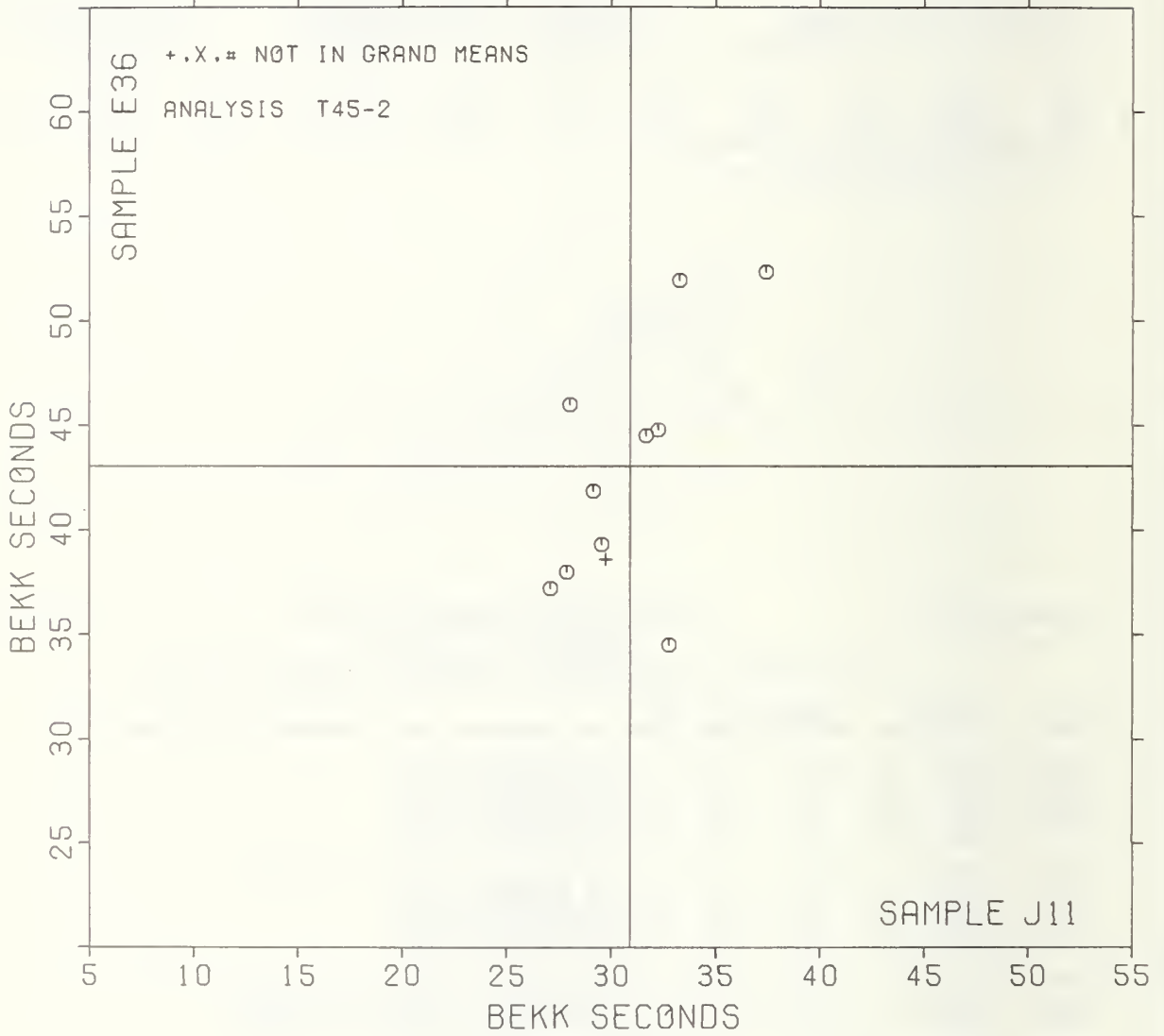
TAPPI SUGGESTED METHOD T479 SU-71, SMOOTHNESS OF PAPER (BEKK METHOD)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		J11	E36	MAJOR	MINOR	R.SDR	VAR	
L232B	Ø	27.1	37.2	-6.8	1.5	.69	45K SMOOTHNESS, BEKK	
L162	Ø	27.9	38.0	-5.8	1.0	.60	45K SMOOTHNESS, BEKK	
L182K	Ø	28.0	46.0	1.7	3.8	.85	45K SMOOTHNESS, BEKK	
L243K	Ø	29.1	41.9	-1.7	1.2	1.15	45K SMOOTHNESS, BEKK	
L581	Ø	29.5	39.3	-4.0	-0.0	.79	45K SMOOTHNESS, BEKK	
L251	*	29.7	38.6	-4.6	-0.5	.87	45L SMOOTHNESS, BEKK, 20 C, 65% RH	
L291K	Ø	31.7	44.5	1.7	-0.2	1.03	45K SMOOTHNESS, BEKK	
L190C	Ø	32.3	44.8	2.1	-0.7	.79	45K SMOOTHNESS, BEKK	
L176	Ø	32.8	34.5	-7.3	-4.8	1.89	45K SMOOTHNESS, BEKK	
L230B	Ø	33.3	51.9	9.1	.9	1.21	45K SMOOTHNESS, BEKK	
L139B	Ø	37.4	52.3	11.0	-2.8	.99	45K SMOOTHNESS, BEKK	
L182G	*	61.7	96.3	60.7	-9.8	.98	45H SMOOTHNESS, GURLEY OIL FLOTATION	
L388	*	330.9	417.4	456.6	-147.0	7.49	45H SMOOTHNESS, GURLEY OIL FLOTATION	

GMEANS: 30.9 43.0 1.00
95% ELLIPSE: 20.2 7.5 WITH GAMMA = 69 DEGREES

SMOOTHNESS, BEKK

SAMPLE J11 = 31. BEKK SECONDS SAMPLE E36 = 43. BEKK SECONDS



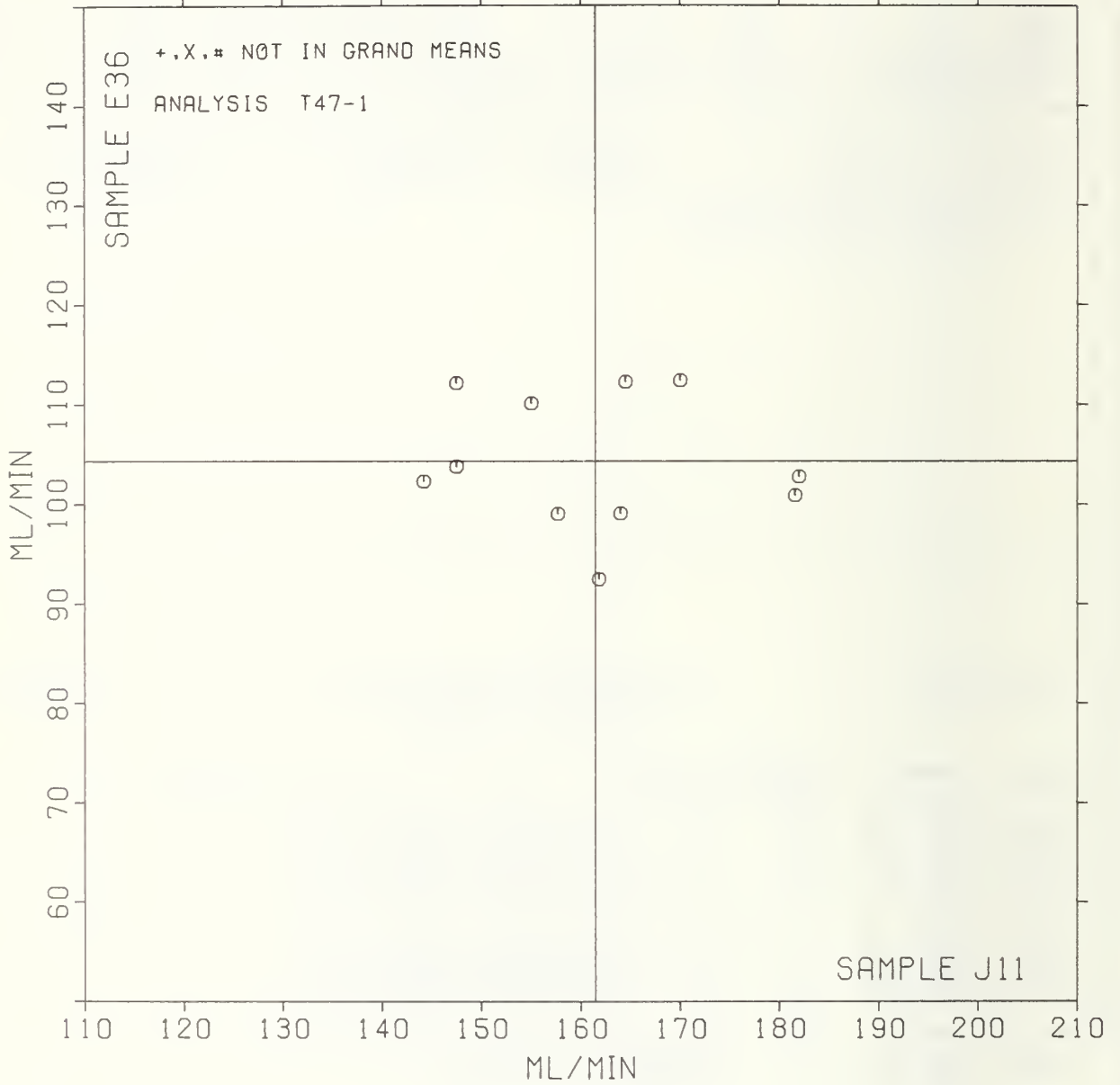
LAB CODE	PRINTING					WRITING					TEST D. = 10		
	SAMPLE J11 MEAN	102 GRAMS DEV	PER SQUARE N. DEV	METER SDR	R. SDR	SAMPLE E36 MEAN	72 GRAMS DEV	PER SQUARE N. DEV	METER SDR	R. SDR	VAR	F	LAB
L100	164.	3.	.20	15.	.87	99.	-5.	-.79	9.	.89	47B	Ø	L100
L176	164.	3.	.24	14.	.78	112.	8.	1.20	8.	.76	47B	Ø	L176
L182B	147.	-14.	-1.08	11.	.62	112.	8.	1.19	10.	1.00	47B	Ø	L182B
L236	144.	-17.	-1.34	9.	.53	102.	-2.	-.31	8.	.80	47B	Ø	L236
L242	147.	-14.	-1.08	9.	.49	104.	-1.	-.08	9.	.89	47B	Ø	L242
L243B	182.	20.	1.57	25.	1.44	101.	-3.	-.52	8.	.78	47B	Ø	L243B
L244	158.	-4.	-.29	25.	1.46	99.	-5.	-.79	12.	1.15	47B	Ø	L244
L248	162.	0.	.03	22.	1.27	92.	-12.	-1.78	15.	1.44	47B	Ø	L248
L280	182.	21.	1.60	32.	1.84	103.	-2.	-.23	16.	1.56	47B	Ø	L280
L333	155.	-6.	-.50	18.	1.03	110.	6.	.88	11.	1.07	47B	Ø	L333
L484	170.	9.	.66	12.	.66	112.	8.	1.23	7.	.65	47B	Ø	L484
GR. MEAN =		161. ML/MIN			GRAND MEAN =		104. ML/MIN			TEST DETERMINATIONS = 10			
SD MEANS =		13. ML/MIN			SD OF MEANS =		7. ML/MIN			11 LABS IN GRAND MEANS			
		AVERAGE SDR =			17. ML/MIN				AVERAGE SDR =		10. ML/MIN		
TOTAL NUMBER OF LABORATORIES REPORTING = 11													
Best Values: J11 160 milliliter per minute													
E36 100 milliliter per minute													

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		J11	E36	MAJOR	MINOR	R. SDR	VAR	
L236	Ø	144.	102.	-17.	-4.	.66	47B SMOOTHNESS, BENDTSEN, WG 150	
L242	Ø	147.	104.	-14.	-2.	.69	47B SMOOTHNESS, BENDTSEN, WG 150	
L182B	Ø	147.	112.	-15.	7.	.81	47B SMOOTHNESS, BENDTSEN, WG 150	
L333	Ø	155.	110.	-7.	5.	1.05	47B SMOOTHNESS, BENDTSEN, WG 150	
L244	Ø	158.	99.	-3.	-6.	1.30	47B SMOOTHNESS, BENDTSEN, WG 150	
L248	Ø	162.	92.	1.	-12.	1.36	47B SMOOTHNESS, BENDTSEN, WG 150	
L100	Ø	164.	99.	3.	-5.	.88	47B SMOOTHNESS, BENDTSEN, WG 150	
L176	Ø	164.	112.	2.	8.	.77	47B SMOOTHNESS, BENDTSEN, WG 150	
L484	Ø	170.	112.	8.	9.	.66	47B SMOOTHNESS, BENDTSEN, WG 150	
L243B	Ø	182.	101.	20.	-2.	1.11	47B SMOOTHNESS, BENDTSEN, WG 150	
L280	Ø	182.	103.	21.	0.	1.70	47B SMOOTHNESS, BENDTSEN, WG 150	
GMFANS:		161.	104.			1.00		
		95% ELLIPSE:		40.	20.	WITH GAMMA = -5 DEGREES		

SMOOTHNESS, BENDTSEN

SAMPLE J11 = 161. ML/MIN

SAMPLE E36 = 104. ML/MIN



LAB CODE	SAMPLE E50 MEAN	PRINTING 91 GRAMS PER SQUARE METER				SAMPLE H80 MEAN	PRINTING 84 GRAMS PER SQUARE METER				TEST D. # 4		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	P	I AP
L126	59.5	-4.9	-1.14	.3	.53	61.8	-3.2	-.81	.1	.21	56K	Ø	L126
L149	58.7	-5.6	-1.31	1.0	1.54	60.2	-4.8	-1.22	.5	.80	56K	Ø	L149
L182	67.2	2.9	.67	.2	.28	67.6	2.6	.66	.2	.29	56K	Ø	L182
L213	68.2	3.9	.90	.9	1.49	70.8	5.8	1.49	.8	1.25	56K	Ø	L213
L277	67.5	3.1	.72	.6	.93	66.7	1.7	.45	.5	.80	56K	Ø	L277
L278	68.4	4.1	.95	.5	.73	66.6	1.6	.40	2.3	3.70	56K	Ø	L278
L291	65.7	1.4	.32	1.1	1.69	66.3	1.3	.34	.3	.46	56K	Ø	L291
L339	26.2	-38.1	-8.87	.3	.47	25.9	-39.1	-10.04	.9	1.37	56K	#	L339
L388	59.7	-4.7	-1.10	.5	.80	59.9	-5.1	-1.31	.3	.48	56K	Ø	L388

GR. MEAN = 64.4 K & N UNITS GRAND MEAN = 65.0 K & N UNITS TPST DETERMINATIONS = 4
SD MEANS = 4.3 K & N UNITS SD OF MEANS = 3.9 K & N UNITS 8 LABS IN GRAND MEANS
AVERAGE SDR = .6 K & N UNITS AVERAGE SDR = .6 K & N UNITS

TOTAL NUMBER OF LABORATORIES REPORTING = 9

Best Values: E50 65 K & N units
H80 65 K & N units

The following laboratories were omitted from the grand means because of extreme test results: 339.

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		E50	H80	MAJOR	MINOR	R.SDR	VAR	
L339	#	26.2	25.9	-54.5	-3.6	.92	56K INK ABSORPTION, K&N INK TEST	
L149	Ø	58.7	60.2	-7.4	.2	1.17	56K INK ABSORPTION, K&N INK TEST	
L126	Ø	59.5	61.8	-5.8	.9	.37	56K INK ABSORPTION, K&N INK TEST	
L388	Ø	59.7	59.9	-6.9	-.6	.64	56K INK ABSORPTION, K&N INK TEST	
L291	Ø	65.7	66.3	1.9	.1	1.08	56K INK ABSORPTION, K&N INK TEST	
L182	Ø	67.2	67.6	3.9	.0	.29	56K INK ABSORPTION, K&N INK TEST	
L277	Ø	67.5	66.7	3.5	-.8	.87	56K INK ABSORPTION, K&N INK TEST	
L213	Ø	68.2	70.8	6.8	1.7	1.37	56K INK ABSORPTION, K&N INK TEST	
L278	Ø	68.4	66.6	4.1	-1.6	2.21	56K INK ABSORPTION, K&N INK TEST	
GMEANS:		64.4	65.0			1.00		
		95% ELLIPSE:		19.8	3.6	WITH GAMMA = 42 DEGREES		

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T57-1 TABLE 1
HYDROGEN ION CONCENTRATION (PH), COLD
TAPPI STANDARD T509 OS-77

LAB CODE	SAMP F J13 MEAN	PRINTING				SAMPLE H17 MEAN	PRINTING				TEST D. = 5			
		89 GRAMS PER SQUARE METER					89 GRAMS PER SQUARE METER				VAR	F	LAB	
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR				
L174C	8.180	.909	1.45	.084	1.06	5.040	.362	1.36	.055	.94	57F	Ø	L174C	
L182C	7.456	.185	.30	.087	1.10	4.800	.122	.46	.000	.00	57D	Ø	L182C	
L251C	6.192	-1.079	-1.72	.050	.63	4.828	.150	.56	.019	.33	57P	Ø	L251C	
L328	7.320	.049	.08	.057	.72	4.270	-.408	-1.54	.045	.77	57M	Ø	L328	
L356	7.306	.035	.06	.148	1.87	4.488	-.190	-.72	.177	3.03	57V	Ø	L356	
L442	7.621	.351	.56	.083	1.05	4.502	-.176	-.67	.069	1.18	57Ø	Ø	L442	
L484A	6.820	-.451	-.72	.045	.57	4.820	.142	.53	.045	.77	57Y	Ø	L484A	
GR. MEAN = 7.271 PH UNITS					GRAND MEAN = 4.678 PH UNITS					TEST DETERMINATIONS = 5				
SD MEANS = .626 PH UNITS					SD OF MEANS = .265 PH UNITS					7 LABS IN GRAND MEANS				
AVERAGE SDR = .079 PH UNITS					AVERAGE SDR = .058 PH UNITS									
TOTAL NUMBER OF LABORATORIES REPORTING = 7														
Best Values: J13 7.3 pH units														
J17 4.7 pH units														

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T57-1 TABLE 2
HYDROGEN ION CONCENTRATION (PH), COLD
TAPPI STANDARD T509 OS-77

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J13	H17	MAJOR	MINOR	R.SDR	VAR			
L251C	Ø	6.192	4.828	-1.076	.171	.48	57P	PH, COLD, RADIOMETER TYPE PH M64		
L484A	Ø	6.820	4.820	-.448	.150	.67	57Y	PH, COLD, BECKMAN MODEL H2		
L356	Ø	7.306	4.488	.032	-.191	2.45	57V	PH, COLD, BECKMAN EXPANDOMATIC		
L328	Ø	7.320	4.270	.041	-.409	.74	57M	PH, COLD, BECKMAN ZEROMATIC		
L182C	Ø	7.456	4.800	.188	.118	.55	57D	PH, COLD, RADIOMETER TYPE PH M 28		
L442	Ø	7.621	4.502	.347	-.183	1.12	57Ø	PH, COLD, ORION DIGITAL IONANALYZER		
L174C	Ø	8.180	5.040	.916	.344	1.00	57F	PH, COLD, FISHER ACCUMFT MODEL 220		
GMEANS:		7.271	4.678			1.00				
		95% ELLIPSE:		2.335	.988	WITH GAMMA = 1 DEGREES				

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

LAB CODE	SAMPLE J13 89 GRAMS PER SQUARE METER					SAMPLE H17 89 GRAMS PER SQUARE METER					TEST D. = 5		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAR
L128	7.780	.008	.02	.027	.31	4.200	-.280	-1.17	.000	.00	57L	Ø	L128
L131	7.060	-.712	-1.59	.207	2.38	4.500	.020	.08	.071	1.32	57L	Ø	L131
L162	8.404	.632	1.41	.061	.70	4.480	.000	.00	.079	1.48	57C	Ø	L162
L174H	8.040	.268	.60	.055	.63	4.900	.420	1.75	.071	1.32	57G	Ø	L174H
L182H	7.710	-.062	-.14	.082	.94	4.300	-.180	-.75	.000	.00	57E	Ø	L182H
L334	8.902	1.130	2.53	.648	7.45	5.966	1.486	6.19	.304	5.69	57C	#	L334
L484B	7.640	-.132	-.30	.089	1.03	4.500	.020	.08	.100	1.87	57Z	Ø	L484B

GR. MEAN = 7.772 PH UNITS GRAND MEAN = 4.480 PH UNITS TEST DETERMINATIONS = 5
 SD MEANS = .447 PH UNITS SD OP MEANS = .240 PH UNITS 6 LABS IN GRAND MEANS
 AVERAGE SDR = .087 PH UNITS AVERAGE SDR = .053 PH UNITS
 TOTAL NUMBER OF LABORATORIES REPORTING = 7
 Best Values: J13 7.8 pH units
 J17 4.4 pH units

The following laboratories were omitted from the grand means because of extreme test results: 334.

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		J13	H17	MAJOR	MINOR	R.SDR	VAR	
L131	Ø	7.060	4.500	-.702	.121	1.85	57L PH, HGT, L*N	
L484B	Ø	7.640	4.500	-.128	.039	1.45	57Z PH, HGT, BECKMAN MODEL H2	
L182H	Ø	7.710	4.300	-.087	-.169	.47	57E PH, HGT, RADIOMETER TYPE PH M 28	
L128	Ø	7.780	4.200	-.032	-.278	.16	57L PH, HGT, L*N	
L174H	Ø	8.040	4.900	.325	.378	.98	57G PH, HGT, FISHER ACCUMET MODEL 220	
L162	Ø	8.404	4.480	.625	-.090	1.09	57C PH, HGT, CORNING MODEL 12 RESEARCH METER	
L334	#	8.902	5.966	1.330	1.310	6.57	57C PH, HGT, CORNING MODEL 12 RESEARCH METER	

GMEANS: 7.772 4.480 1.00
 95% ELLIPSE: 1.877 ,973 WITH GAMMA = 8 DEGREES

OPACITY (89% REFLECTANCE BACKING) IN PERCENT
TAPPI STANDARD T425 GS-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - 84L TYPF

LAB CODE	PRINTING H29 77 GRAMS PER SQUARE METER					PRINTING E50 91 GRAMS PER SQUARE METER					TEST P. - 10	
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F IAB
L105	93.99	-.66	-1.50	.14	.51	92.54	.19	.26	.40	.76	60W	Ø L105
L108	94.26	-.39	-.88	.93	3.46	92.47	.12	.17	.32	.60	60B	Ø L108
L115	94.86	.21	.48	.30	1.12	91.92	-.43	-.60	.52	1.00	60B	Ø L115
L118	94.84	.19	.43	.23	.84	92.76	.41	.55	.43	.82	60B	Ø L118
L121	94.81	.16	.36	.15	.57	92.80	.45	.62	.45	.86	60B	Ø L121
L122	94.53	-.12	-.27	.21	.76	92.62	.27	.37	.41	.78	60D	Ø L122
L123	94.31	-.34	-.77	.28	1.03	92.70	.35	.48	.65	1.23	60W	Ø L123
L124	94.16	-.49	-1.12	.21	.77	92.41	.06	.08	.58	1.10	60B	Ø L124
L125	93.25	-1.40	-3.19	.29	1.07	91.90	-.45	-.62	.65	1.23	60H	X L125
L131	94.00	-.65	-1.48	.00	.00	92.10	-.25	-.35	.32	.60	60K	Ø L131
L132	94.13	-.52	-1.18	.18	.66	91.85	-.50	-.69	.42	.81	60B	Ø L132
L134	94.72	.07	.16	.25	.94	93.37	1.02	1.41	.38	.73	60B	Ø L134
L136	94.66	.01	.02	.15	.56	92.64	.29	.40	.48	.92	60B	Ø L136
L139	94.38	-.27	-.61	.23	.85	92.63	.28	.38	.57	1.09	60B	Ø L139
L148H	93.94	-.71	-1.62	.18	.66	91.76	-.59	-.82	.40	.76	60B	Ø L148H
L150	95.00	.35	.80	.24	.87	92.80	.45	.62	.63	1.20	60B	Ø L150
L152	94.68	.03	.07	.20	.74	92.86	.51	.70	.32	.62	60B	Ø L152
L153	93.45	-1.20	-2.73	.44	1.62	91.30	-1.05	-1.45	.54	1.02	60B	Ø L153
L158	95.30	.65	1.48	.33	1.22	93.75	1.40	1.93	.49	.92	60D	Ø L158
L159	94.91	.26	.59	.10	.37	92.55	.60	.83	.35	.67	60B	Ø L159
L162	94.89	.24	.55	.31	1.14	92.90	.55	.76	.41	.78	60W	Ø L162
L166	94.28	-.37	-.84	.43	1.60	92.42	.07	.09	.37	.71	60B	Ø L166
L173A	93.91	-.74	-1.68	.17	.64	91.17	-1.18	-1.63	.19	.37	60B	Ø L173A
L182	95.05	.40	.91	.28	1.05	91.80	-.55	-.76	.95	1.80	60B	Ø L182
L183	95.35	.70	1.59	.23	.84	93.03	.68	.94	.78	.72	60B	Ø L183
L190C	94.89	.24	.55	.15	.57	92.64	.29	.40	.60	1.15	60B	Ø L190C
L190R	94.82	.17	.39	.17	.63	92.18	-.17	-.24	.66	1.26	60B	Ø L190R
L206	94.57	.32	.73	.32	1.20	91.91	-.44	-.61	.64	1.22	60B	Ø L206
L210B	94.75	.10	.23	.18	.68	93.20	.85	1.17	.33	.52	60B	Ø L210B
L210D	94.86	.21	.48	.21	.79	93.31	.96	1.32	.40	.76	60D	Ø L210D
L211S	95.08	.43	.98	.19	.69	92.09	-.26	-.36	.43	.82	60B	Ø L211S
L212	94.70	.05	.11	.26	.96	92.40	.05	.07	.70	1.33	60B	Ø L212
L213	95.00	.35	.80	.28	1.05	92.89	.54	.74	.46	.87	60B	Ø L213
L223B	94.72	.07	.16	.23	.87	92.99	.64	.88	.63	1.19	60B	Ø L223B
L225	95.40	.75	1.71	.61	2.28	92.75	.40	.55	.35	.67	60B	Ø L225
L226B	95.16	.51	1.16	.45	1.68	93.10	.75	1.03	.43	.83	60B	Ø L226B
L228	94.72	.07	.16	.27	1.00	92.70	.35	.48	.47	.90	60B	Ø L228
L233B	94.10	-.55	-1.25	.32	1.17	92.25	-.10	-.14	.63	1.21	60B	Ø L233B
L236B	94.27	-.38	-.87	.35	1.28	90.52	-1.84	-2.54	.79	1.50	60B	Ø L236B
L238A	94.10	-.55	-1.25	.07	.25	91.22	-1.13	-1.56	.51	.98	60B	Ø L238A
L241	95.02	.37	.84	.29	1.06	92.23	-.12	-.17	.71	1.26	60B	Ø L241
L243	94.58	-.07	-.16	.14	.52	91.85	-.50	-.69	.66	1.25	60B	Ø L243
L254	94.94	.29	.66	.17	.64	91.97	-.38	-.53	.72	1.36	60B	Ø L254
L255	94.41	-.24	-.55	.35	1.31	91.29	-1.06	-1.47	.65	1.23	60B	Ø L255
L259	94.64	-.01	-.02	.45	1.68	91.20	-1.15	-1.59	.70	1.33	60B	Ø L259
L261	94.95	.30	.68	.18	.68	92.60	.25	.34	.56	1.06	60B	Ø L261
L262	94.80	.15	.34	.14	.52	91.97	-.38	-.53	.25	.47	60B	Ø L262
L275	94.62	-.03	-.07	.13	.49	92.00	-.35	-.49	.17	.32	60B	Ø L275
L278	94.50	-.15	-.34	.23	.86	91.91	-.44	-.61	.85	1.62	60B	Ø L278
L281	94.71	.06	.14	.15	.57	92.12	-.23	-.32	.58	1.11	60D	Ø L281
L285B	94.01	-.64	-1.46	.30	1.11	90.74	-1.61	-2.23	.53	1.01	60B	Ø L285B
L285R	94.09	-.56	-1.27	.38	1.43	90.69	-1.66	-2.30	.67	1.27	60B	Ø L285R
L288	94.63	-.02	-.05	.22	.80	91.57	-.78	-1.08	.69	1.31	60D	Ø L288
L301	94.53	-.12	-.27	.19	.70	91.17	-1.18	-1.63	.81	1.54	60B	Ø L301
L305	94.81	.16	.36	.16	.59	91.51	-.44	-.61	.39	.75	60B	Ø L305
L308	94.93	.28	.64	.27	1.01	92.42	.07	.09	.66	1.25	60B	Ø L308
L315	94.92	.27	.61	.22	.82	92.02	-.33	-.46	.61	1.16	60D	Ø L315
L317	94.93	.28	.64	.36	1.34	92.09	-.26	-.36	.62	1.17	60B	Ø L317
L318	94.45	-.20	-.46	.44	1.62	92.00	-.35	-.49	.75	1.42	60B	Ø L318
L323	95.53	.88	2.00	.19	.70	93.26	.91	1.26	.76	1.45	60W	Ø L323
L326	95.48	.82	1.89	.28	1.03	92.84	.49	.67	.64	1.23	60B	Ø L326
L328	94.80	.15	.34	.92	3.41	93.40	1.05	1.45	.97	1.84	60B	Ø L328
L333	94.90	.25	.57	.32	1.17	92.50	.15	.20	.53	1.00	60B	Ø L333
L339	94.60	-.05	-.11	.52	1.92	92.05	-.30	-.42	.50	.95	60B	Ø L339
L341	93.68	-.97	-2.21	.18	.67	91.49	-.86	-1.19	.39	.74	60B	Ø L341

ANALYSIS T60-1 TABLE 1

OPACITY (89% REPLECTANCE BACKING) IN PERCENT

TAPPI STANDARD T425 @S-75, @PACITY @P PAPER (15 DEG./DIPPUSE, ILLUMINANT A) - B4L TYPE

LAB CODE	PRINTING					PRINTING					TEST D. # 10		
	SAMPLE H29 MEAN	77 GRAMS PER SQUARE METER				SAMPLE E50 MEAN	91 GRAMS PER SQUARE METER				VAR	F	LAR
	DEV	N.DEV	SDR	R.SDR	DEV	N.DEV	SDR	R.SDR					
L352	93.93	-.72	-1.64	.11	.39	92.25	-.10	-.14	.22	.41	60R	@ L352	
L354	94.00	-.65	-1.48	.00	.00	91.50	-.85	-1.18	.53	1.00	60B	@ L354	
L366	95.16	.51	1.16	.36	1.35	93.54	1.19	1.64	.74	1.40	60B	@ L366	
L378	94.97	.32	.73	.31	1.13	92.91	.56	.77	.60	1.15	60D	@ L378	
L390	94.57	-.08	-.18	.30	1.12	92.32	-.03	-.04	.60	1.14	60B	@ L390	
L523	94.67	.02	.05	.13	.46	92.45	.10	.14	.18	.34	60R	@ L523	
L543	94.06	-.59	-1.34	.13	.47	92.19	-.16	-.22	.51	.97	60D	@ L543	
L561	94.50	-.15	-.34	.53	1.95	92.00	-.35	-.49	.47	.90	60B	@ L561	
L573	94.98	.33	.75	.26	.97	93.26	.91	1.26	.47	.85	60H	@ L573	
L581	94.84	.19	.43	.22	.81	93.01	.66	.91	.48	.91	60B	@ L581	
L587	94.83	.18	.41	.20	.74	92.09	-.26	-.36	.57	1.09	60B	@ L587	
L594	94.46	-.19	-.43	.22	.81	92.21	-.14	-.20	.31	.59	60D	@ L594	
L597	94.90	.25	.57	.74	2.74	92.90	.55	.76	.57	1.08	60B	@ L597	
L599	94.55	-.10	-.23	.44	1.62	93.70	1.35	1.86	.79	1.50	60B	@ L599	
L608	95.68	1.03	2.34	.19	.72	94.04	1.69	2.33	.39	.75	60D	@ L608	

GR. MEAN * 94.65 PERCENT GRAND MEAN * 92.35 PERCENT TEST DETERMINATIONS * 10
 SD MEANS * .44 PERCENT SD @P MEANS * .72 PERCENT 78 LABS IN GRAND MEANS
 AVERAGE SDR * .27 PERCENT AVERAGE SDR * .53 PERCENT

L100	94.92	.27	.61	.15	.55	92.47	.12	.16	.45	.85	60E	@ L100
L224	94.88	.23	.52	.76	2.80	92.32	-.03	-.04	.51	.96	60P	@ L224
L232	95.35	.70	1.59	.41	1.53	92.40	.05	.07	.46	.87	60P	@ L232
L236E	96.37	1.72	3.93	.10	.38	93.72	1.37	1.89	.29	.55	60F	@ L236E
L249	94.91	.26	.59	.23	.86	92.12	-.23	-.32	.36	.69	60P	@ L249
L256	97.71	3.06	6.96	.10	.38	95.23	2.88	3.99	.55	1.11	60N	@ L256
L260	95.00	.35	.80	.12	.46	91.63	-.72	-1.00	.71	1.35	60P	@ L260
L309	94.59	-.06	-.14	.14	.54	90.72	-1.63	-2.26	.38	.73	60A	@ L309
L312	94.35	-.30	-.68	.34	1.25	90.35	-2.00	-2.77	.41	.78	60P	@ L312
L314	95.32	.67	1.52	.15	.57	92.86	.51	.70	.54	1.02	60T	@ L314
L380	94.90	.25	.57	.21	.78	92.00	-.35	-.49	.00	.00	60P	@ L380
L388	94.45	-.20	-.46	.37	1.37	92.10	-.25	-.35	.61	1.17	60P	@ L388

TOTAL NUMBER @P LABORATORIES REPORTING * 92

Best Values: H29 94.6 ± 0.7 percent
 E50 92.3 ± 1.0 percent

Data from the following laboratories were received too late for proper processing and inclusion in the grand means: 305.

OPACITY (89% REFLECTANCE BACKING) IN PERCENT
TAPPI STANDARD T425 6S-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		B29	E50	MAJOR	MINOR	R.SDR	VAR	
L125	X	93.25	91.90	-1.00	1.08	1.15	60B	OPACITY (WHITE BACKING), HUYGEN
L153	*	93.45	91.30	-1.46	.65	1.32	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L341	Ø	93.68	91.49	-1.19	.52	.71	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
LI73A	Ø	93.91	91.17	-1.38	.18	.51	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L352	Ø	93.53	92.25	-.39	.61	.40	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
LI48H	Ø	93.94	91.76	-.83	.40	.71	60H	OPACITY (WHITE BACKING), HUYGEN
L105	Ø	93.99	92.54	-.11	.68	.64	60W	OPACITY (WHITE BACKING), HUYGEN, DIGITAL
L354	Ø	94.00	91.50	-1.05	.23	.50	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L131	Ø	94.00	92.10	-.50	.48	.30	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L285B	Ø	94.01	90.74	-1.73	-.09	1.06	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L543	Ø	94.06	92.19	-.39	.47	.72	60D	OPACITY (WHITE BACKING), DIANØ/BNL
L285R	Ø	94.09	90.69	-1.74	-.19	1.35	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L238A	Ø	94.10	91.22	-1.26	.03	.61	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L233B	Ø	94.10	92.25	-.32	.46	1.19	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L132	Ø	94.13	91.85	-.67	.26	.73	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L124	Ø	94.16	92.41	-.15	.47	.93	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L108	Ø	94.26	92.47	-.05	.40	2.03	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L236B	*	94.27	90.52	-1.83	-.42	1.39	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L166	Ø	94.28	92.42	-.09	.36	1.15	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L123	Ø	94.31	92.70	.17	.45	1.13	60W	OPACITY (WHITE BACKING), HUYGEN, DIGITAL
L312	*	94.35	90.35	-1.94	-.57	1.02	60P	OPACITY (WHITE BACKING), PHOTØVOLT
L139	Ø	94.38	92.63	.14	.36	.97	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L255	Ø	94.41	91.29	-1.06	-.23	1.27	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L388	*	94.45	92.10	-.31	.08	1.27	60P	OPACITY (WHITE BACKING), PHOTØVOLT
L318	Ø	94.45	92.00	-.40	.03	1.52	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L594	Ø	94.46	92.21	-.21	.11	.70	60D	OPACITY (WHITE BACKING), DIANØ/BNL
L278	Ø	94.50	91.91	-.46	-.05	1.24	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L561	Ø	94.50	92.00	-.38	-.01	1.43	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L122	Ø	94.53	92.62	.19	.22	.77	60D	OPACITY (WHITE BACKING), DIANØ/BNL
L301	Ø	94.53	91.17	-1.12	-.39	1.12	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L599	*	94.55	93.70	1.18	.66	1.56	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L350	Ø	94.57	92.32	-.06	.06	1.13	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L243	Ø	94.58	91.85	-.49	-.15	.89	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L309	*	94.59	90.72	-1.51	-.63	.63	60A	OPACITY (WHITE BACKING), ZEISS ELREPBØ, FILTER 4, 86% BACKING
L339	Ø	94.60	92.05	-.30	-.08	1.43	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L275	Ø	94.62	92.00	-.33	-.12	.41	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L288	Ø	94.63	91.57	-.72	-.31	1.06	60D	OPACITY (WHITE BACKING), DIANØ/BNL
L259	Ø	94.64	91.20	-1.05	-.47	1.50	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L136	Ø	94.66	92.64	.27	.11	.74	60R	OPACITY (WHITE BACKING), HUYGEN
L523	Ø	94.67	92.45	.10	.02	.40	60H	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L152	Ø	94.68	92.86	.47	.19	.68	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L212	Ø	94.70	92.40	.06	-.03	1.14	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L281	Ø	94.71	92.12	-.19	-.15	.84	60D	OPACITY (WHITE BACKING), DIANØ/BNL
L223B	Ø	94.72	92.99	.61	.20	1.03	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L228	Ø	94.72	92.70	.35	.08	.95	60H	OPACITY (WHITE BACKING), HUYGEN
L134	Ø	94.72	93.37	.95	.36	.83	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L210B	Ø	94.75	93.20	.81	.26	.65	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L262	Ø	94.80	91.97	-.28	-.30	.50	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
L328	Ø	94.80	93.40	1.01	.30	2.62	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L121	Ø	94.81	92.80	.47	.04	.72	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L305	#	94.81	91.91	-.33	-.33	.67	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)
LI90R	Ø	94.82	92.18	-.08	-.23	.95	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L587	Ø	94.83	92.09	-.16	-.27	.92	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L118	Ø	94.84	92.76	.45	-.00	.83	60H	OPACITY (WHITE BACKING), BAUSCH * LOMB
L581	Ø	94.84	93.01	.68	.10	.86	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L210D	Ø	94.86	93.31	.96	.21	.77	60D	OPACITY (WHITE BACKING), DIANØ/BNL
L115	Ø	94.86	91.92	-.30	-.37	1.06	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L224	*	94.88	92.32	.07	-.22	1.88	60P	OPACITY (WHITE BACKING), PHOTØVOLT
L162	Ø	94.89	92.90	.60	.01	.96	60W	OPACITY (WHITE BACKING), HUYGEN, DIGITAL
L190C	Ø	94.89	92.64	.36	-.10	.86	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L380	*	94.90	92.00	-.21	-.37	.39	60P	OPACITY (WHITE BACKING), PHOTØVOLT
L597	Ø	94.90	92.90	.60	.00	1.91	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L333	Ø	94.90	92.50	.24	-.16	1.09	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L249	*	94.91	92.12	-.10	-.33	.78	60P	OPACITY (WHITE BACKING), PHOTØVOLT
L159	Ø	94.91	92.95	.65	.01	.52	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SRL)

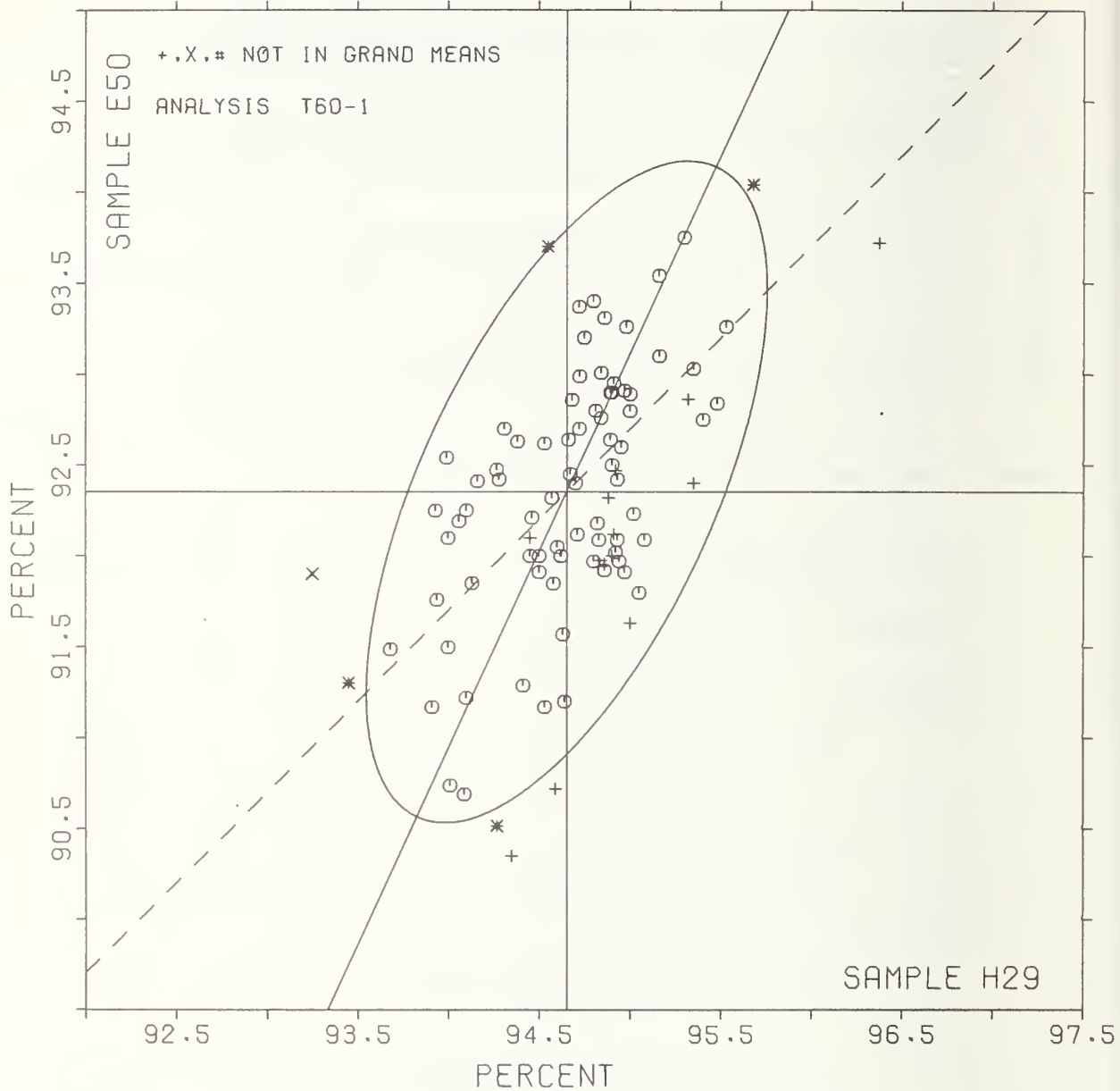
OPACITY (89% REFLECTANCE BACKING) IN PERCENT
TAPPI STANDARD T425 OS-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPF

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		H2S	ES0	MAJOR	MINOR	R.SDR	VAR	
L100	*	94.92	92.47	.22	-.20	.70	60E	OPACITY (WHITE BACKING), ZEISS ELREPHO, FMY-C(10) FILTER
L315	Ø	94.92	92.02	-.19	-.38	.99	60D	OPACITY (WHITE BACKING), DIANO/RNL
L308	Ø	94.93	92.42	.18	-.23	1.13	60H	OPACITY (WHITE BACKING), HUYGEN
L317	Ø	94.93	92.09	-.12	-.36	1.26	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L254	Ø	94.94	91.97	-.23	-.42	1.00	60H	OPACITY (WHITE BACKING), HUYGEN
L261	Ø	94.95	92.60	.35	-.17	.87	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L378	Ø	94.97	92.91	.64	-.06	1.14	60D	OPACITY (WHITE BACKING), DIANO/RNL
L206	Ø	94.97	91.91	-.27	-.48	1.21	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L573	Ø	94.98	93.26	.96	.08	.93	60H	OPACITY (WHITE BACKING), HUYGEN
L260	*	95.00	91.63	-.51	-.62	.91	60P	OPACITY (WHITE BACKING), PROTØVOLT
L150	Ø	95.00	92.80	.55	-.13	1.04	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L213	Ø	95.00	92.85	.64	-.09	.96	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L241	Ø	95.02	92.23	.04	-.39	1.21	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L182	Ø	95.05	91.80	-.33	-.59	1.43	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L211S	Ø	95.08	92.09	-.06	-.50	.76	60R	OPACITY (WHITE BACKING), THWING-ALBERT (FORMERLY SKL)
L226B	Ø	95.16	93.10	.89	-.15	1.25	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L366	Ø	95.16	93.54	1.29	.03	1.37	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L158	Ø	95.30	93.75	1.54	-.00	1.07	60D	OPACITY (WHITE BACKING), DIANO/RNL
L314	*	95.32	92.86	.74	-.40	.80	60T	OPACITY (WHITE BACKING), SMALL SPHERE COLOR EYE
L183	Ø	95.35	93.03	.91	-.35	.78	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L232	*	95.35	92.40	.34	-.62	1.20	60P	OPACITY (WHITE BACKING), PROTØVOLT
L225	Ø	95.40	92.75	.68	-.51	1.48	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L326	Ø	95.48	92.84	.79	-.55	1.13	60B	OPACITY (WHITE BACKING), BAUSCH * LOMB
L323	Ø	95.53	93.26	1.19	-.42	1.08	60W	OPACITY (WHITE BACKING), HUYGEN, DIGITAL
L608	*	95.68	94.04	1.96	-.23	.73	60D	OPACITY (WHITE BACKING), DIANO/RNL
L236F	*	96.37	93.72	1.96	-.59	.46	60E	OPACITY (WHITE BACKING), ZEISS ELREPHO, FMY-C(10) FILTER
L256	*	97.71	95.23	3.90	-1.57	.75	60N	OPACITY (WHITE BACKING), HUNTER
GMFANS:		94.65	92.35			1.00		
		95% ELLIPSE:		1.97	.81			WITH GAMMA = 65 DEGRFES

OPACITY, B&L TYPE, 89% BACKING

SAMPLE H29 = 94.7 PERCENT

SAMPLE E50 = 92.4 PERCENT



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

LAB CODE	SAMPLE H29 MEAN	PRINTING 77 GRAMS PER SQUARE METER				R.SDR	SAMPLE E50 MEAN	PRINTING 91 GRAMS PER SQUARE METER				TEST D. = 10		
		DEV	N.DEV	SDR	R.SDR			DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	96.650	-.067	-.34	.135	1.38	94.160	.212	.67	.363	1.03	60J	0	L100	
L150	96.594	-.123	-.63	.071	.72	93.933	-.015	-.05	.510	1.45	60J	0	L150	
L176	73.900	-22.817	-116.48	.133	1.36	78.450	-15.498	-49.13	.143	.41	60Z	#	L176	
L182E	96.610	-.107	-.55	.088	.89	93.660	-.288	-.91	.303	.86	60J	0	L182E	
L233E	96.700	-.017	-.09	.047	.48	94.140	.192	.61	.386	1.10	60F	0	L233E	
L242	97.230	.513	2.62	.116	1.18	93.760	-.188	-.60	.334	.95	60J	0	L242	
L244	96.770	.053	.27	.095	.97	93.580	-.368	-1.17	.301	.86	60F	0	L244	
L251	96.654	-.063	-.32	.103	1.05	93.400	-.548	-1.74	.397	1.13	60F	0	L251	
L360	96.510	-.207	-1.06	.110	1.12	93.950	.002	.01	.453	1.29	60F	0	L360	
L446	96.570	-.147	-.75	.047	.48	94.175	.227	.72	.214	.61	60J	0	L446	
L484	96.844	.127	.65	.116	1.19	94.392	.444	1.41	.275	.78	60F	0	L484	
L575	96.760	.043	.22	.151	1.54	94.280	.332	1.05	.329	.94	60J	0	L575	
GR. MEAN	96.717 PERCENT					GRAND MEAN	93.948 PERCENT					TEST DETERMINATIONS = 10		
SD MEANS	.196 PERCENT					SD OF MEANS	.315 PERCENT					11 LABS IN GRAND MEANS		
	AVERAGE SDR = .098 PERCENT						AVERAGE SDR = .351 PERCENT							
L253C	96.060	-.657	-3.36	.117	1.20	93.250	-.698	-2.21	.310	.88	60G	+	L253C	
TOTAL NUMBER OF LABORATORIES REPORTING = 13														
Best Values: H29 96.7 percent														
E50 93.9 percent														

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

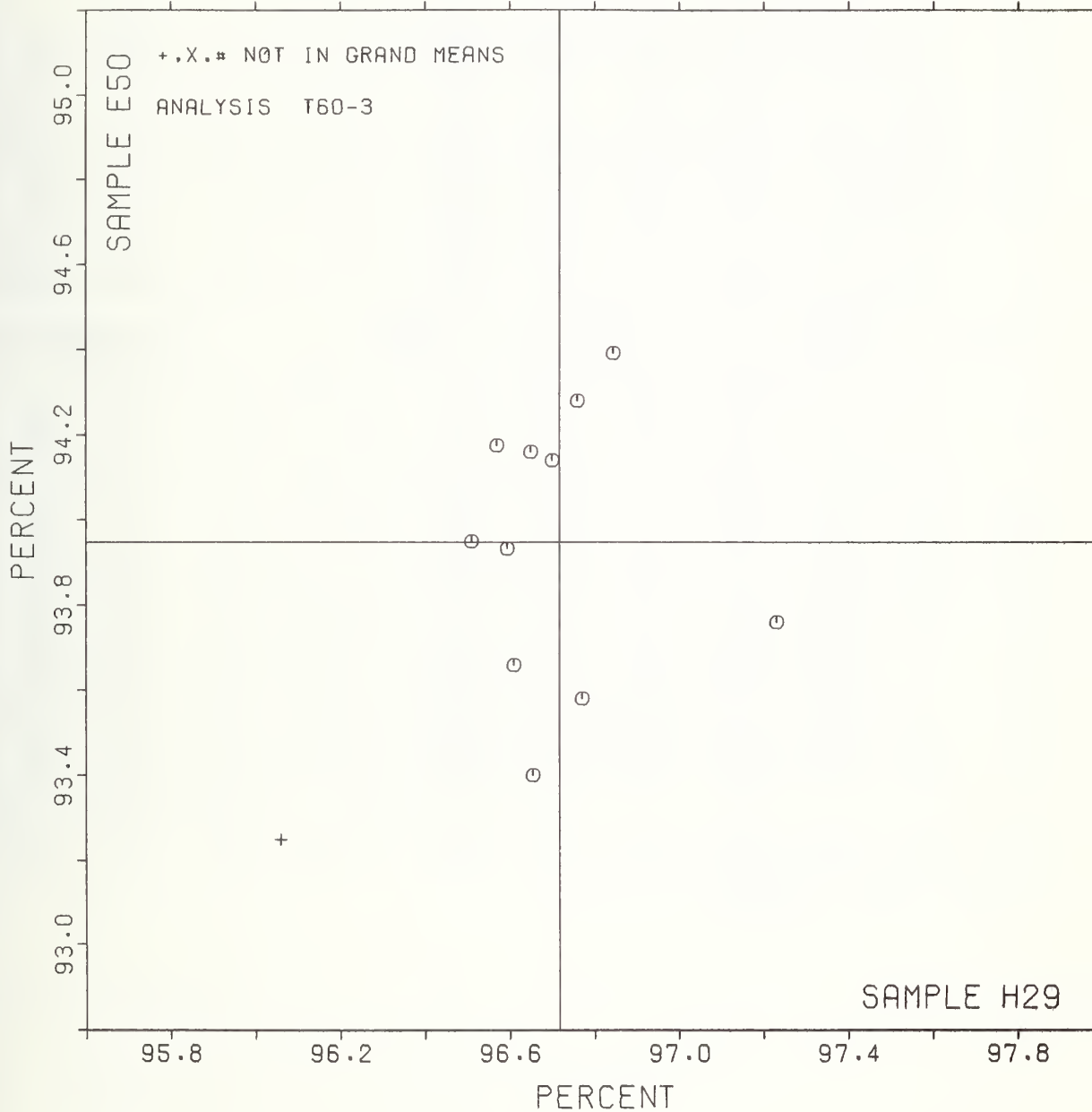
OPACITY (PAPER BACKING) IN PERCENT
TAPPI SUGGESTED METHOD T519 SU-70, DIFFUSE OPACITY OF PAPER - ILLUMINANT C, ELREPHO TYPE

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		H29	E50	MAJOR	MINOR	R.SDR	VAR			
L176	#	73.900	78.450	14.388	-23.533	.88	60Z	OPACITY (PAPER BACKING),	MARTIN SWEETS	
L253C	*	96.060	93.250	.666	-.690	1.04	60G	OPACITY (PAPER BACKING),	GARDNER	
L360	0	96.510	93.950	-.012	-.207	1.21	60P	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) N1 TRAP
L446	0	96.570	94.175	-.234	-.136	.54	60J	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) FILTER
L150	0	96.594	93.933	.009	-.124	1.09	60J	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) FILTER
L182E	0	96.610	93.660	.283	-.121	.88	60J	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) FILTER
L100	0	96.650	94.160	-.215	-.057	1.21	60J	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) FILTER
L251	0	96.654	93.400	.545	-.090	1.09	60F	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) N0 TRAP
L233E	0	96.700	94.140	-.192	-.008	.79	60F	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) N0 TRAP
L575	0	96.760	94.280	-.329	.058	1.24	60J	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) FILTER
L244	0	96.770	93.580	.370	.035	.91	60F	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) N0 TRAP
L484	0	96.844	94.392	-.437	.148	.98	60F	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) N0 TRAP
L242	0	97.230	93.760	.212	.503	1.07	60J	OPACITY (PAPER BACKING),	ZEISS ELREPHO,	FMY-C(10) FILTER
GMEANS:		96.717	93.948			1.00				
		95% ELLIPSE:		.971	.601	WITH GAMMA = -87 DEGREES				

OPACITY, ELREPHO TYPE, PAPER BACKING

SAMPLE H29 = 96.72 PERCENT

SAMPLE E50 = 93.95 PERCENT



DIRECTIONAL BLUE REFLECTANCE IN PERCENT
TAPPI STANDARD T452 (S-77, 'BRIGHTNESS'; MARTIN SWEETS (ACBT & GF) IS STANDARD FOR THIS ANALYSIS

LAB CODE	SAMPLE J33 MEAN	PRINTING 73 GRAMS PER SQUARE METER				R. SDR	SAMPLE H31 MEAN	PRINTING 84 GRAMS PER SQUARE METER				TEST D. # 8		
		DEV	N.DEV	SDR	R. SDR			DEV	N.DEV	SDR	R. SDR	VAR	F	LAB
L108	68.20	.21	.53	.12	.51	81.57	.49	.68	.14	.81	65M	0	L108	
L122	67.92	-.06	-.15	.17	.72	81.09	.01	.01	.12	.73	65N	0	L122	
L132	67.67	-.31	-.77	.76	3.28	81.06	-.02	-.03	.07	.44	65N	0	L132	
L158	68.25	.26	.65	.18	.76	80.21	-.87	-1.54	.12	.73	65N	0	L158	
L176A	66.95	-1.04	-2.55	.29	1.26	81.14	.06	.10	.21	1.21	65A	0	L176A	
L190C	67.81	-.17	-.43	.08	.36	81.16	.08	.15	.15	.88	65A	0	L190C	
L210M	67.86	-.12	-.30	.13	.56	80.90	-.18	-.32	.21	1.21	65M	0	L210M	
L210N	68.19	.20	.50	.16	.71	80.95	-.13	-.23	.22	1.29	65N	0	L210N	
L211	68.10	.11	.28	.09	.40	79.81	-1.27	-2.25	.07	.40	65N	0	L211	
L225	68.47	.49	1.20	.22	.94	81.74	.66	1.17	.13	.76	65N	0	L225	
L243	67.59	-.40	-.98	.34	1.48	80.74	-.34	-.61	.16	.94	65A	0	L243	
L275	68.12	.14	.34	.13	.55	80.96	-.12	-.21	.20	1.17	65M	0	L275	
L288	68.85	.86	2.13	.26	1.10	80.60	-.48	-.85	.25	1.47	65N	0	L288	
L308	67.74	-.25	-.61	.36	1.56	82.15	1.07	1.90	.37	2.15	65N	0	L308	
L315	67.70	-.29	-.70	.11	.46	81.36	.28	.50	.11	.62	65N	0	L315	
L317	67.89	-.10	-.24	.12	.54	80.77	-.31	-.54	.10	.61	65M	0	L317	
L523	68.24	.25	.62	.17	.72	81.45	.37	.66	.14	.83	65N	0	L523	
L565	67.20	-.75	-1.93	.20	.86	76.92	-4.16	-7.38	.24	1.39	65A	X	L565	
L598	68.19	.20	.50	.49	2.11	81.77	.69	1.23	.30	1.74	65M	0	L598	

GR. MEAN = 67.99 PERCENT GRAND MEAN = 81.08 PERCENT TEST DETERMINATIONS = 8
SD MEANS = .41 PERCENT ST OF MEANS = .56 PERCENT 18 LABS IN GRAND MEANS
AVERAGE SDR = .23 PERCENT AVERAGE SDR = .17 PERCENT

L105	67.22	-.76	-1.87	.20	.85	81.22	.14	.26	.09	.52	65T	*	L105
L176I	67.96	-.02	-.06	.18	.79	82.20	1.12	1.99	.09	.54	65I	*	L176I
L213	67.59	-.40	-.98	.29	1.27	81.57	.49	.88	.07	.41	65T	*	L213
L223	68.02	.04	.10	.07	.30	81.75	.67	1.19	.09	.54	65G	*	L223
L224	68.19	.20	.50	.08	.36	82.26	1.18	2.10	.05	.30	65H	*	L224
L232	68.19	.20	.50	.37	1.60	82.00	.92	1.63	.00	.00	65P	*	L232
L241	69.29	1.30	3.20	.08	.36	83.56	2.48	4.41	.07	.44	65I	*	L241
L249	69.02	1.04	2.56	.14	.60	81.45	.37	.66	.26	1.54	65P	*	L249
L256	67.42	-.56	-1.38	.51	2.20	81.11	.03	.06	.11	.66	65H	*	L256
L260	68.37	.39	.96	.17	.72	81.42	.34	.61	.09	.52	65P	*	L260
L278	70.37	2.39	5.88	.23	.99	83.05	1.98	3.52	.18	1.04	65P	*	L278
L301	67.36	-.62	-1.53	.31	1.32	80.35	-.73	-1.30	.21	1.25	65G	*	L301
L312	69.06	1.08	2.65	.18	.76	80.00	-1.08	-1.92	.00	.00	65P	*	L312
L321	59.94	1.95	4.80	.18	.76	83.50	2.42	4.70	.00	.00	65P	*	L321
L328	67.94	-.05	-.12	.32	1.28	79.25	-1.83	-3.25	.27	1.57	65P	*	L328
L339	69.09	1.10	2.71	.18	.78	79.94	-1.14	-2.03	.18	1.04	65P	*	L339
L380	72.00	4.01	9.87	.00	.00	83.00	1.92	3.41	.00	.00	65P	*	L380
L388	68.00	.01	.03	.27	1.15	80.94	-.14	-.25	.32	1.88	65P	*	L388
L442	67.46	-.52	-1.29	.15	.65	80.96	-.12	-.21	.13	.76	65I	*	L442
L543	68.17	.19	.46	.33	1.41	82.19	1.11	1.97	.06	.38	65H	*	L543
L562	72.37	4.39	10.80	.44	1.90	83.37	2.29	4.07	1.46	8.55	65P	*	L562
L587	67.96	-.02	-.06	.18	.76	82.35	1.27	2.25	.05	.31	65I	*	L587
L591	66.67	-1.31	-3.23	.23	1.00	80.30	-.78	-1.39	.06	.35	65H	*	L591

TOTAL NUMBER OF LABORATORIES REPORTING = 42

Best Values: J33 68.0 ± 0.6 percent
H31 81.1 ± 0.9 percent

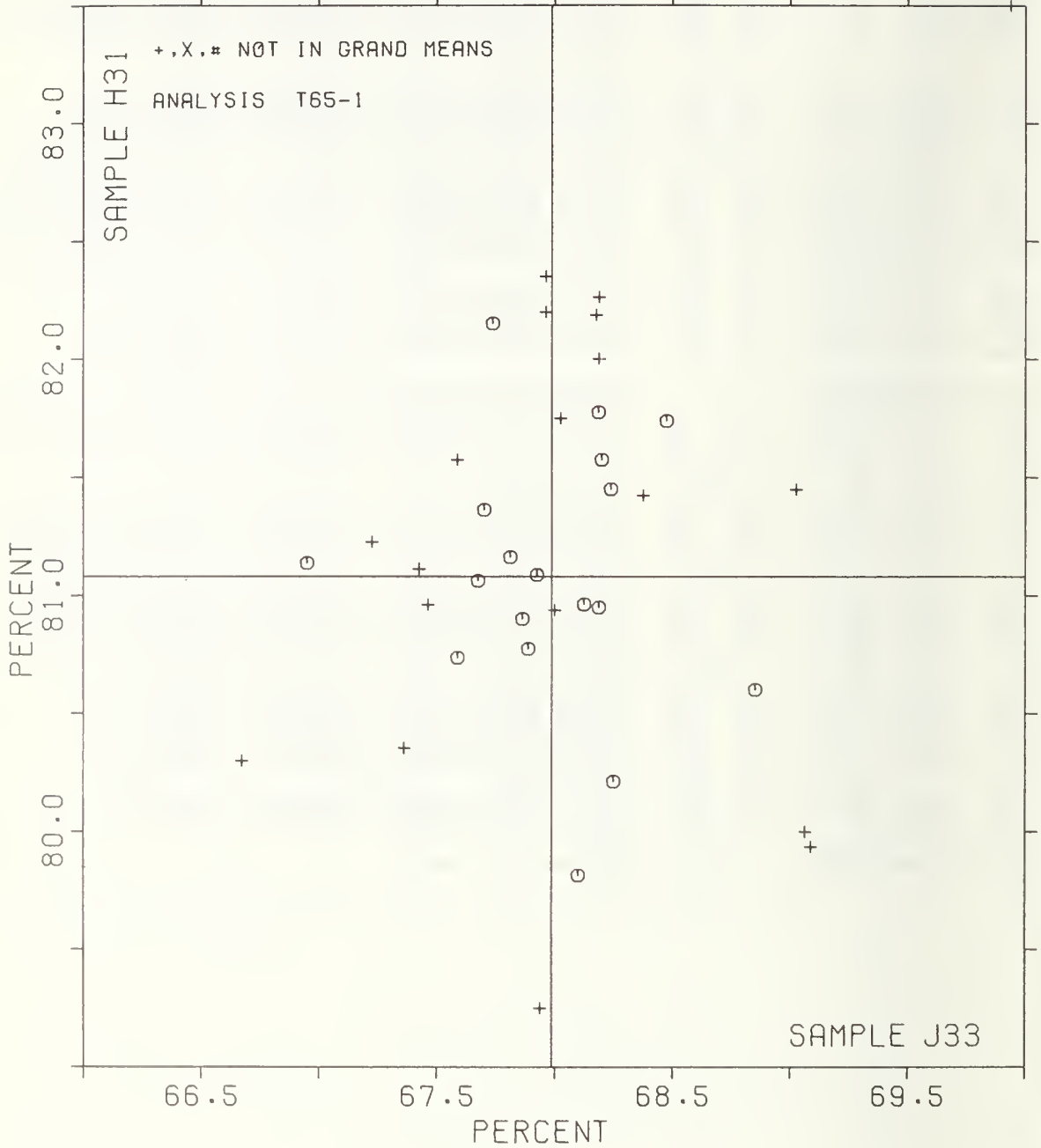
DIRECTIONAL BLUE REFLECTANCE IN PERCENT
TAPPI STANDARD T452 0S-77, 'BRIGHTNESS'; MARTIN SWEETS (ACBT & GE) IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TFST	INSTRUMENT---CONDITIONS
		J33	H31	MAJOR	MINOR	R. SDR	VAR		
L591	*	66.67	80.30	.58	-1.42	.68	65H	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER
L176A	Ø	66.95	81.14	-.21	-1.02	1.23	65A	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (ACBT), S-2
L565	X	67.20	76.92	3.95	-1.39	1.13	65A	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (ACBT), S-2
L105	*	67.22	81.22	-.26	-.73	.69	65T	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER D25D2M
L301	*	67.36	80.35	.63	-.73	1.29	65G	BLUE REFLECTANCE (DIRECTIONAL),	GARDNER
L256	*	67.42	81.11	-.11	-.55	1.43	65H	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER
L442	*	67.46	80.96	.04	-.54	.71	65I	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER D25D2A
L213	*	67.59	81.57	-.55	-.32	.84	65T	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER D25D2M
L243	Ø	67.59	80.74	.28	-.45	1.21	65A	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (ACBT), S-2
L132	Ø	67.67	81.06	-.03	-.31	1.86	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4
L315	Ø	67.70	81.36	-.32	-.24	.54	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4
L308	Ø	67.74	82.15	-1.09	-.09	1.85	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4
L190C	Ø	67.81	81.16	-.11	-.16	.62	65A	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (ACBT), S-2
L210M	Ø	67.86	80.90	.16	-.15	.89	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GE), S-1
L317	Ø	67.89	80.77	.29	-.14	.57	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GE), S-1
L122	Ø	67.92	81.09	-.02	-.06	.72	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4
L328	*	67.94	79.25	1.80	-.32	1.47	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
L176I	*	67.96	82.20	-1.11	.14	.67	65I	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER D25D2A
L587	*	67.96	82.35	-1.26	.17	.54	65I	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER D25D2A
L388	*	68.00	80.94	.14	-.01	1.51	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
L223	*	68.02	81.75	-.66	.14	.42	65G	BLUE REFLECTANCE (DIRECTIONAL),	GARDNER
L211	Ø	68.10	79.81	1.27	-.08	.40	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4
L275	Ø	68.12	80.96	.14	.12	.86	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GF), S-1
L543	*	68.17	82.19	-1.07	.35	.89	65B	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER
L598	Ø	68.19	81.77	-.66	.30	1.92	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GF), S-1
L232	*	68.19	82.00	-.88	.34	.80	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
L224	*	68.19	82.26	-1.14	.37	.33	65H	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER
L210N	Ø	68.19	80.95	.16	.18	1.00	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4
L108	Ø	68.20	81.57	-.46	.28	.66	65M	BLUE REFLECTANCE (DIRECTIONAL),	MARTIN SWEETS (GE), S-1
L523	Ø	68.24	81.45	-.33	.30	.78	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4
L158	Ø	68.25	80.21	.90	.13	.75	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4
L260	*	68.37	81.42	-.28	.44	.62	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
L225	Ø	68.47	81.74	-.58	.58	.85	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4
L288	Ø	68.85	80.60	.60	.78	1.29	65N	BLUE REFLECTANCE (DIRECTIONAL),	DIANØ/MARTIN SWEETS, S-4
L249	*	69.02	81.45	-.21	1.08	1.07	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
L312	*	69.06	80.00	1.23	.50	.38	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
L339	*	69.09	79.94	1.29	.92	.91	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
L241	*	69.29	83.56	-2.26	1.66	.40	65I	BLUE REFLECTANCE (DIRECTIONAL),	HUNTER D25D2A
L321	*	69.94	83.50	-2.10	2.29	.38	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
L278	*	70.37	83.06	-1.60	2.66	1.02	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
L380	*	72.00	83.00	-1.30	4.25	.00	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
L562	*	72.37	83.37	-1.62	4.68	5.22	65P	BLUE REFLECTANCE (DIRECTIONAL),	PHØTØVØLT
GMEANS:		67.99	81.08			1.00			
		95% ELLIPSE:		1.57	1.12	WITH GAMMA	81	DEGREES	

BLUE REFLECTANCE, DIRECTIONAL

SAMPLE J33 = 68.0 PERCENT

SAMPLE H31 = 81.1 PERCENT



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 J33		PRINTING 73 GRAMS PER SQUARE METER				SAMPLE H31		PRINTING 84 GRAMS PER SQUARE METER				TEST D. # 8		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	P	LAB		
L100	67.26	-.38	-.55	.12	.94	81.68	.12	.18	.06	.91	65F	Ø	L100		
L121	67.73	.09	.13	.12	.95	81.46	-.10	-.16	.12	1.63	65K	Ø	L121		
L136	68.77	1.13	1.62	.12	.94	82.98	1.42	2.18	.05	.65	65P	Ø	L136		
L150	66.87	-.77	-1.10	.15	1.23	81.04	-.52	-.79	.05	.66	65Q	Ø	L150		
L170	67.81	.17	.25	.12	1.00	81.49	-.07	-.11	.04	.49	65B	Ø	L170		
L182	67.74	.10	.14	.13	1.06	81.69	.13	.20	.00	.00	65F	Ø	L182		
L210K	69.26	1.62	2.31	.10	.79	82.41	.35	1.30	.05	.65	65K	Ø	L210K		
L236	67.15	-.49	-.70	.16	1.32	81.07	-.49	-.76	.16	2.30	65K	Ø	L236		
L242	66.99	-.65	-.93	.08	.60	81.28	-.28	-.43	.00	.00	65F	Ø	L242		
L280	67.66	.02	.03	.14	1.13	81.51	-.05	-.07	.13	1.77	65Q	Ø	L280		
L325	69.78	2.14	3.07	.32	2.59	84.56	3.00	4.61	.08	1.05	65F	#	L325		
L349	66.87	-.77	-1.11	.08	.61	80.89	-.67	-1.03	.06	.90	65K	Ø	L349		
L362	66.98	-.66	-.95	.08	.67	80.33	-1.23	-1.89	.19	2.70	65K	Ø	L362		
L446	67.48	-.16	-.23	.14	1.15	81.44	-.12	-.19	.04	.54	65F	Ø	L446		
L573	68.29	.65	.93	.18	1.43	82.26	.70	1.07	.08	1.05	65F	Ø	L573		
L575	67.75	.11	.16	.15	1.18	81.89	.33	.51	.05	.76	65F	Ø	L575		
GR. MEAN	= 67.64 PERCENT					GRAND MEAN	= 81.56 PERCENT					TEST DETERMINATIONS = 8			
SD MEANS	= .70 PERCENT					SD OF MEANS	= .65 PERCENT					15 LABS IN GRAND MEANS			
	AVERAGE SDR = .12 PERCENT						AVERAGE SDR = .07 PERCENT								

L289 68.95 1.31 1.87 .12 .96 83.27 1.71 2.63 .05 .65 65Ø * L289
 TOTAL NUMBER OF LABORATORIES REPORTING = 17
 Best Values: J33 67.7 ± 0.9 percent
 H31 81.5 ± 1.1 percent

The following laboratories were omitted from the grand means because of extreme test results: 325.

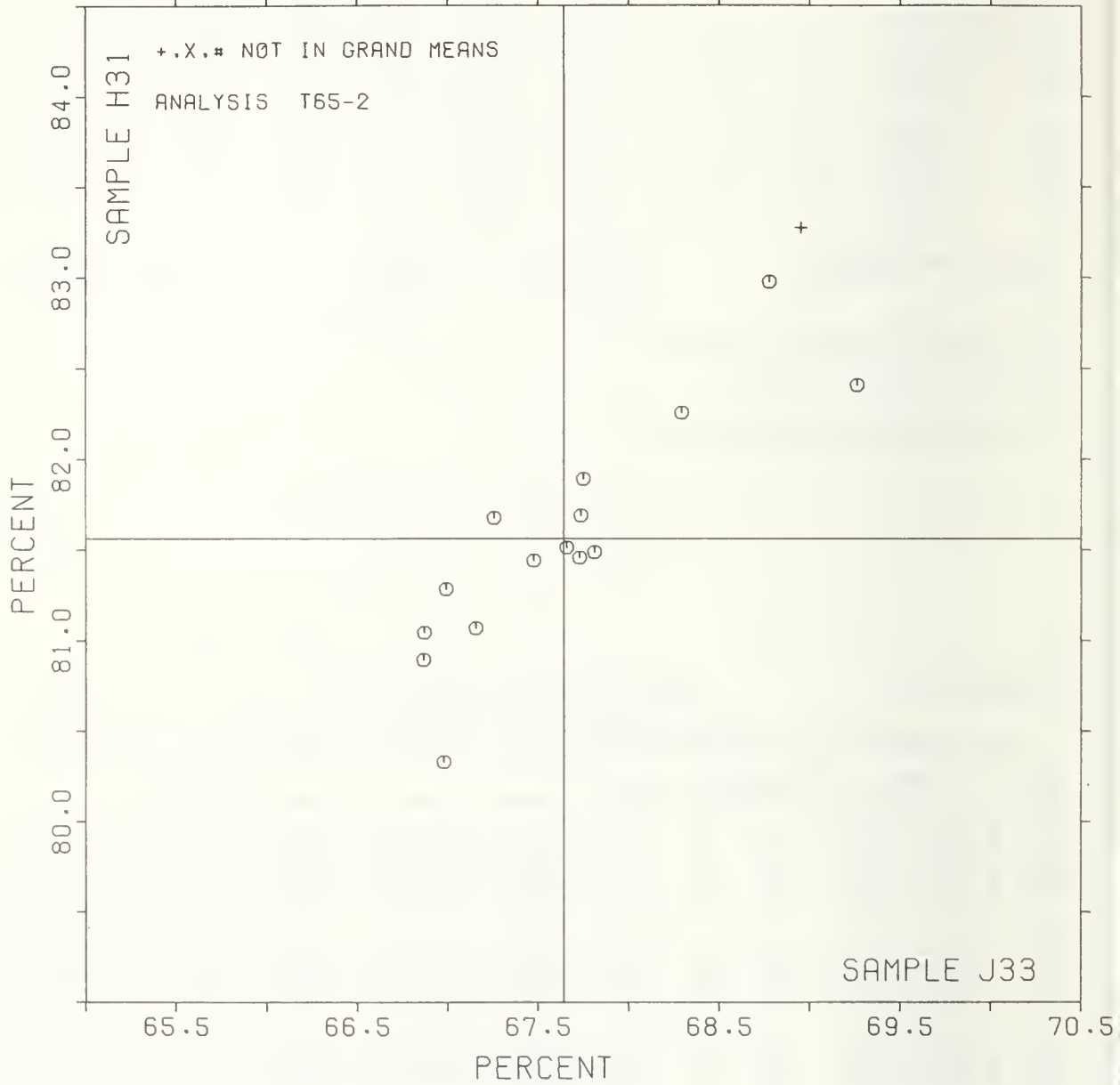
DIFFUSE BLUE REFLECTANCE IN PERCENT (GLOSS TRAP)
TAPPI SUGGESTED METHOD T525 SU-72, BRIGHTNESS OF PULP (DIFFUSE ILLUMINATION AND 0 DEG. OBSERVATION)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		J33	H31	MAJOR	MINOR	R.SDR	VAR	
L349	Ø	66.87	80.89	-1.02	.03	.75	65K	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, MØØ (ZEISS) BASE
L150	Ø	66.87	81.04	-.91	.14	.94	65Q	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, ZEISS ABSOLUTE BASE
L362	Ø	66.98	80.33	-1.32	-.46	1.68	65K	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, MØØ (ZEISS) BASE
L242	Ø	66.99	81.28	-.66	.24	.30	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE
L236	Ø	67.15	81.07	-.69	-.03	1.81	65K	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, MØØ (ZEISS) BASE
L100	Ø	67.26	81.68	-.20	.34	.92	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE
L446	Ø	67.48	81.44	-.20	.02	.85	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE
L280	Ø	67.66	81.51	-.02	-.05	1.45	65Q	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, ZEISS ABSOLUTE BASE
L121	Ø	67.73	81.46	-.01	-.14	1.29	65K	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, MØØ (ZEISS) BASE
L182	Ø	67.74	81.69	.16	.03	.53	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE
L575	Ø	67.75	81.89	.30	.17	.97	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE
L170	Ø	67.81	81.49	.08	-.17	.75	65B	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NBS ABSOLUTE BASE
L573	Ø	68.29	82.26	.95	.07	1.24	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE
L136	Ø	68.77	82.98	1.79	.27	.80	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE
L289	*	68.95	83.27	2.12	.37	.80	65Ø	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, SPECIFIC CALIBRATION
L210K	Ø	69.26	82.41	1.76	-.47	.72	65K	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, MØØ (ZEISS) BASE
L325	#	69.78	84.56	3.61	.75	1.82	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE
GMEANS:		67.64	81.56			1.00		
		95% ELLIPSE:		2.65	.68	WITH GAMMA = 42 DEGREES		

BLUE REFLECTANCE, DIFFUSE, WITH TRAP

SAMPLE J33 = 67.6 PERCENT

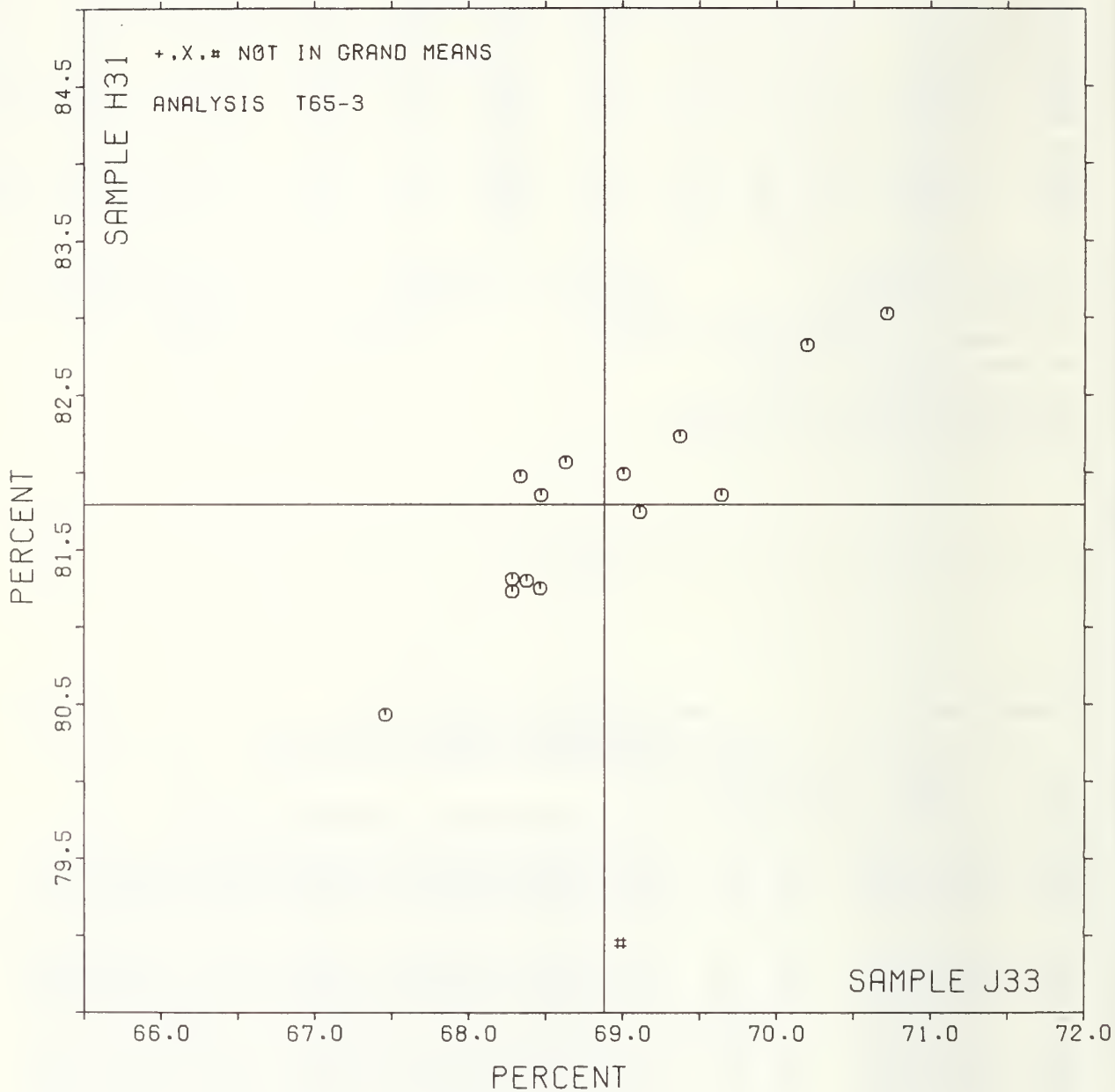
SAMPLE H31 = 81.6 PERCENT



BLUE REFLECTANCE, DIFFUSE, NO TRAP

SAMPLE J33 = 68.9 PERCENT

SAMPLE H31 = 81.8 PERCENT



ANALYSIS T75-1 TABLE 1

SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS

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

LAB CODE	SAMPLE J19 149 GRAMS PER SQUARE METER PRINTING					SAMPLE J23 116 GRAMS PER SQUARE METER PRINTING					TEST D. # 10		
	MEAN	DEV	N. DEV	SDR	R. SDR	MEAN	DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L108	49.0	-.2	-.14	.5	.70	67.2	.4	.18	.8	.73	75H	Ø	L108
L121	49.2	-.0	-.01	1.3	1.00	66.6	-.3	-.15	.8	.71	75H	Ø	L121
L122	48.0	-1.2	-.70	.8	.62	66.1	-.7	-.38	.8	.71	75H	Ø	L122
L128	49.7	.4	.26	1.3	.97	65.5	-1.4	-.71	1.8	1.62	75G	Ø	L128
L134	46.4	-2.9	-1.65	1.3	.98	66.5	-.4	-.20	1.0	.85	75H	Ø	L134
L136	52.1	2.9	1.66	1.1	.84	70.2	3.3	1.69	1.3	1.18	75G	Ø	L136
L149	50.1	.8	.49	1.6	1.24	67.5	.6	.31	.8	.75	75G	Ø	L149
L153	53.2	4.0	2.32	1.4	1.06	71.0	4.2	2.13	1.4	1.27	75G	Ø	L153
L162	51.8	2.6	1.49	.9	.72	67.5	.6	.32	.7	.65	75G	Ø	L162
L166	51.4	2.1	1.24	1.8	1.43	67.6	.7	.37	.7	.61	75B	Ø	L166
L173A	51.8	2.5	1.48	1.6	1.26	70.9	4.0	2.06	.6	.50	75G	Ø	L173A
L182	49.8	-.5	-.27	1.2	.92	67.1	.2	.12	1.0	.88	75H	Ø	L182
L189	50.2	1.0	.58	.5	.42	64.5	-2.4	-1.22	1.2	1.01	75P	*	L189
L190R	49.0	-.2	-.14	1.1	.88	65.8	-1.1	-.56	1.0	.85	75G	Ø	L190R
L206	49.4	.2	.10	1.7	1.35	66.4	-.5	-.24	.7	.62	75H	Ø	L206
L210	49.9	.7	.40	1.3	.99	69.5	2.6	1.34	1.0	.90	75H	Ø	L210
L211	47.6	-1.7	-.96	1.0	.76	64.9	-2.0	-1.02	1.3	1.14	75H	Ø	L211
L212	51.4	2.2	1.27	1.1	.83	67.6	.8	.39	1.7	1.49	75P	Ø	L212
L213	47.6	-1.6	-.95	1.4	1.13	66.7	-.2	-.09	.7	.63	75H	Ø	L213
L223	49.1	-.2	-.10	1.7	1.33	67.0	.2	.08	.8	.74	75H	Ø	L223
L224	45.6	-3.7	-2.14	1.2	.92	62.4	-4.5	-2.31	1.0	.89	75H	Ø	L224
L230	42.4	-6.9	-3.97	1.6	1.23	59.9	-7.0	-3.58	.7	.65	75H	X	L230
L243	47.9	-1.4	-.78	.9	.68	67.7	.8	.42	.8	.72	75B	Ø	L243
L251	50.2	1.0	.58	1.3	.97	68.0	1.2	.60	1.1	.98	75G	Ø	L251
L253P	49.3	.0	.01	1.3	1.02	66.3	-.6	-.32	.7	.64	75G	Ø	L253P
L255	49.6	.3	.20	1.0	.75	66.5	-.4	-.20	1.1	.95	75H	Ø	L255
L256	49.2	-.1	-.04	1.3	.98	67.1	.2	.11	.7	.61	75H	Ø	L256
L259	48.5	-.7	-.42	.9	.72	66.0	-.9	-.46	1.1	1.01	75H	Ø	L259
L262	49.3	.1	.06	.9	.71	66.9	.1	.03	.8	.73	75K	Ø	L262
L278	50.1	.9	.47	1.2	.92	70.2	3.3	1.68	1.1	1.00	75G	Ø	L278
L279	48.3	-1.0	-.55	1.6	1.22	65.9	-1.0	-.51	.9	.77	75G	Ø	L279
L291	45.2	-4.0	-2.34	.9	.69	61.9	-4.9	-2.63	1.2	1.08	75H	*	L291
L301	49.4	.2	.09	1.2	.91	66.5	-.4	-.20	.6	.56	75H	Ø	L301
L315	53.7	4.4	2.58	.9	.74	71.2	4.3	2.21	1.3	1.16	75G	*	L315
L317	48.7	-.5	-.31	1.0	.79	67.0	.2	.08	.8	.72	75H	Ø	L317
L321	48.7	-.6	-.32	1.5	1.16	66.1	-.7	-.38	.7	.59	75G	Ø	L321
L323	47.6	-1.6	-.95	1.2	.90	65.9	-1.0	-.49	.7	.58	75H	Ø	L323
L328	50.4	1.2	.69	1.6	1.28	70.0	3.1	1.60	1.3	1.15	75H	Ø	L328
L339	48.7	-.5	-.31	1.8	1.38	65.2	-1.6	-.84	7.8	6.83	75P	Ø	L339
L349	47.7	-1.5	-.88	1.9	1.50	65.7	-1.2	-.60	1.5	1.30	75H	Ø	L349
L388	50.8	1.5	.90	1.0	.80	59.4	-7.4	-3.81	.8	.67	75P	#	L388
L396	50.9	1.6	.94	1.0	.74	62.9	-4.0	-2.06	1.7	1.46	75G	X	L396
L456	47.9	-1.3	-.78	1.3	.98	66.3	-.6	-.32	.8	.70	75H	Ø	L456
L483	49.7	.4	.25	1.4	1.12	64.8	-2.0	-1.05	1.1	.96	75H	Ø	L483
L573	48.8	-.5	-.29	.5	.36	67.8	.9	.46	1.5	1.28	75G	Ø	L573
L574	48.1	-1.1	-.65	1.4	1.06	65.6	-1.3	-.68	.8	.74	75G	Ø	L574
L583	48.7	-.6	-.33	1.8	1.36	65.7	-1.2	-.59	.6	.56	75H	Ø	L583
L587	50.4	1.1	.66	1.8	1.43	67.7	.8	.42	1.4	1.24	75H	Ø	L587
L592	47.7	-1.5	-.88	1.1	.86	65.8	-1.1	-.56	.7	.65	75G	Ø	L592

GR. MEAN = 49.3 GLOSS UNITS GRAND MEAN = 66.9 GLOSS UNITS TEST DETERMINATIONS = 10
 SD MEANS = 1.7 GLOSS UNITS SD OF MEANS = 2.0 GLOSS UNITS 46 LABS IN GRAND MEANS
 AVERAGE SDR = 1.3 GLOSS UNITS AVERAGE SDR = 1.1 GLOSS UNITS

L288 49.0 -.3 -.17 1.8 1.39 61.6 -5.2 -2.69 1.9 1.66 75I * L288
 TOTAL NUMBER OF LABORATORIES REPORTING = 50

Best Values: J19 49 ± 3 gloss units
 J23 67 ± 4 gloss units

The following laboratories were omitted from the grand means because of extreme test results: NADLIVR LONR 388.

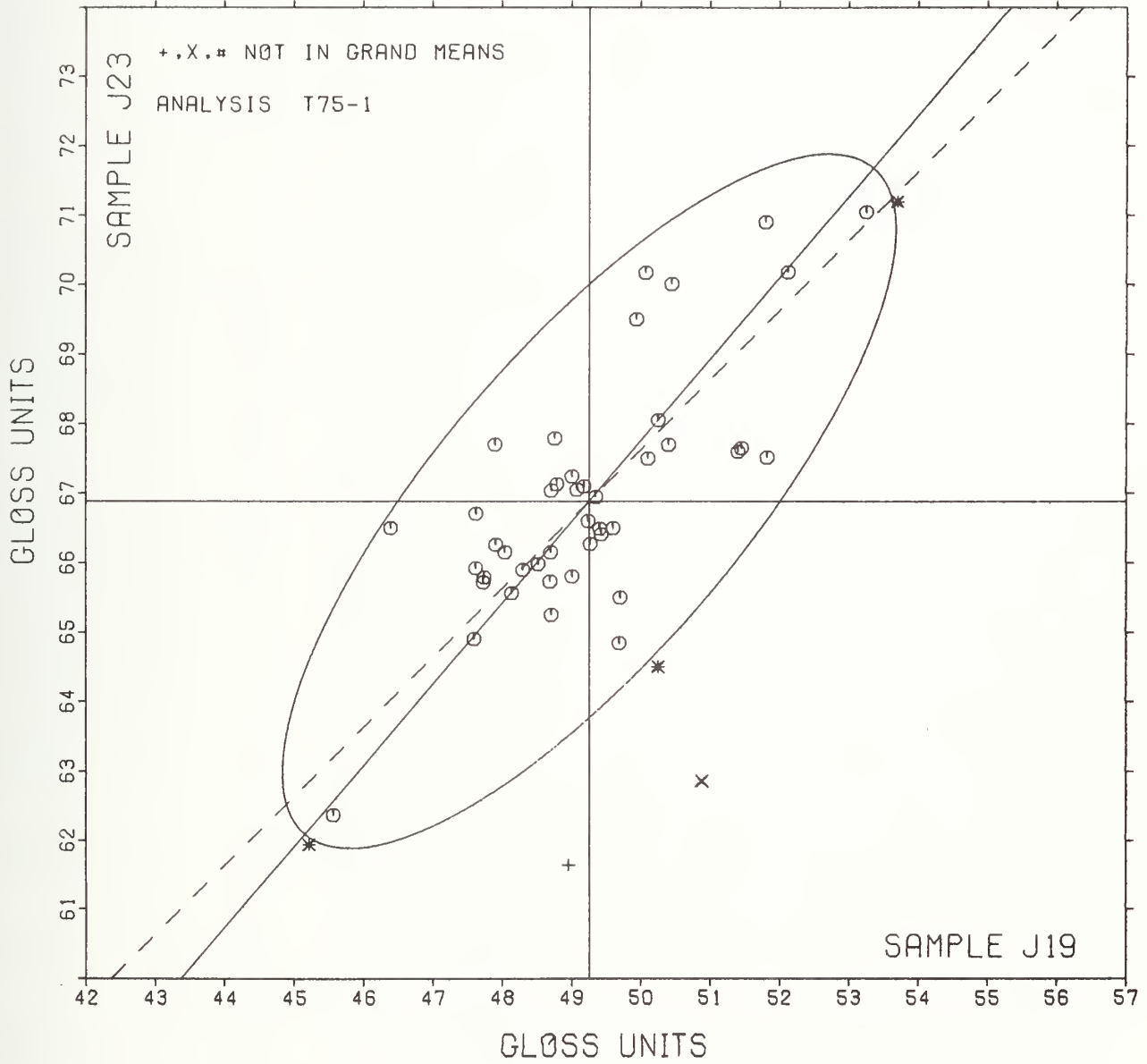
ANALYSIS T75-1 TABLE 2
 SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		J19	J23	MAJOR	MINOR	R.SDR	VAR	
L230	X	42.4	59.9	-9.8	.7	.94	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L291	*	45.2	61.9	-6.4	-.1	.88	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L224	Ø	45.6	62.4	-5.8	-.1	.91	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L134	Ø	46.4	66.5	-2.1	1.9	.92	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L211	Ø	47.6	64.9	-2.6	-.0	.95	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L323	Ø	47.6	65.9	-1.8	.6	.74	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L213	Ø	47.6	66.7	-1.2	1.1	.88	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L349	Ø	47.7	65.7	-1.9	.4	1.40	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L592	Ø	47.7	65.8	-1.8	.4	.76	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L243	Ø	47.9	67.7	-.3	1.6	.70	75B	SPECULAR GLOSS (75 DEGREE), BAUSCH * LAMB
L456	Ø	47.9	66.3	-1.3	.6	.84	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L122	Ø	48.0	66.1	-1.3	.4	.67	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L574	Ø	48.1	65.6	-1.7	-.0	.90	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L279	Ø	48.3	65.9	-1.4	.1	.99	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L259	Ø	48.5	66.0	-1.2	-.0	.86	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L583	Ø	48.7	65.7	-1.2	-.3	.96	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L321	Ø	48.7	66.1	-.9	-.1	.87	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L339	Ø	48.7	65.2	-1.6	-.6	4.11	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L317	Ø	48.7	67.0	-.2	.5	.76	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L573	Ø	48.8	67.8	.4	1.0	.82	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L182	Ø	48.8	67.1	-.1	.5	.90	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L288	*	49.0	61.6	-4.2	-3.2	1.53	75I	SPECULAR GLOSS (75 DEGREE), HUNTER, 20 C, 65% RH
L108	Ø	49.0	67.2	.1	.4	.72	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L190R	Ø	49.0	65.8	-1.0	-.5	.87	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L223	Ø	49.1	67.0	.0	.2	1.03	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L256	Ø	49.2	67.1	.1	.2	.79	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L121	Ø	49.2	66.6	-.2	-.2	.85	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L253P	Ø	49.3	66.3	-.5	-.4	.83	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L262	Ø	49.3	66.9	.1	-.0	.72	75K	SPECULAR GLOSS (75 DEGREE), GARTNER (K-C TYPF)
L301	Ø	49.4	66.5	-.2	-.4	.74	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L206	Ø	49.4	66.4	-.2	-.4	.98	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L255	Ø	49.6	66.5	-.1	-.5	.85	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L483	Ø	49.7	64.8	-1.3	-1.7	1.04	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L128	Ø	49.7	65.5	-.8	-1.2	1.29	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L210	Ø	49.9	69.5	2.4	1.2	.94	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L278	Ø	50.1	70.2	3.0	1.5	.96	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L149	Ø	50.1	67.5	1.0	-.2	.99	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L189	*	50.2	64.5	-1.2	-2.3	.72	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L251	Ø	50.2	68.0	1.5	-.0	.98	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L587	Ø	50.4	67.7	1.4	-.3	1.34	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L328	Ø	50.4	70.0	3.2	1.1	1.22	75H	SPECULAR GLOSS (75 DEGREE), HUNTER
L388	#	50.8	59.4	-4.6	-6.0	.74	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L396	X	50.9	62.9	-2.0	-3.9	1.10	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L166	Ø	51.4	67.6	1.9	-1.2	1.02	75B	SPECULAR GLOSS (75 DEGREE), BAUSCH * LAMB
L212	Ø	51.4	67.6	2.0	-1.2	1.16	75P	SPECULAR GLOSS (75 DEGREE), PHOTOVOLT
L173A	Ø	51.8	70.9	4.7	.7	.88	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L162	Ø	51.8	67.5	2.1	-1.5	.69	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L136	Ø	52.1	70.2	4.4	-.0	1.01	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L153	Ø	53.2	71.0	5.8	-.3	1.16	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
L315	*	53.7	71.2	6.2	-.6	.95	75G	SPECULAR GLOSS (75 DEGREE), GARDNER
GMEANS:		49.3	66.9			1.00		
		95% ELLIPSE:		6.3	2.2	WITH GAMMA = 49 DEGREES		

SPECULAR GLOSS, 75 DEGREE

SAMPLE J19 = 49.3 GLOSS UNITS SAMPLE J23 = 66.9 GLOSS UNITS



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

LAB CODE	SAMPLE B28 MEAN	BAG 83 GRAMS PER SQUARE METER				SAMPLE H33 MEAN	PRINTING 96 GRAMS PER SQUARE METER				TEST D. # 10		
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L100	5.447	-.052	-.50	.086	.83	6.221	-.080	-.75	.110	1.31	9CV	#	L100
L105	5.316	-.183	-1.75	.105	1.01	6.034	-.267	-2.51	.063	.74	9OT	#	L105
L118	5.497	-.002	-.02	.064	.62	6.379	-.078	.73	.062	.74	9OV	#	L118
L122	5.474	-.025	-.24	.228	2.19	6.280	-.021	-.20	.160	1.90	9OV	#	L122
L123F	5.720	.221	2.11	.155	1.49	6.450	.189	1.77	.084	1.00	9OF	#	L123F
L125	5.474	-.025	-.24	.165	1.58	6.413	.112	1.05	.151	1.79	9OT	#	L125
L128	5.412	-.087	-.83	.067	.65	6.276	-.025	-.24	.095	1.13	9OT	#	L128
L131	5.630	.131	1.25	.106	1.02	6.370	.069	.64	.067	.80	9OT	#	L131
L139	5.625	.126	1.20	.109	1.04	6.475	.174	1.63	.123	1.46	9OT	#	L139
L141	5.311	-.188	-1.79	.071	.68	6.166	-.135	-1.27	.104	1.23	9OT	#	L141
L153	5.571	.072	.69	.053	.51	6.327	.026	.24	.070	.83	9OT	#	L153
L158	5.600	.101	.96	.125	1.20	6.340	.039	.36	.070	.83	9OT	#	L158
L159	5.490	-.009	-.08	.145	1.39	6.340	.039	.36	.084	1.00	9OT	#	L159
L162	5.474	-.025	-.24	.087	.84	6.267	-.034	-.32	.047	.56	9OD	#	L162
L166	5.493	-.006	-.06	.197	1.89	6.290	-.011	-.11	.075	.90	9OT	#	L166
L173B	5.500	.001	.01	.082	.78	6.360	.059	.55	.052	.61	9OF	#	L173B
L174	5.180	-.319	-3.04	.103	.99	6.010	-.291	-2.73	.057	.67	9OT	#	L174
L182	5.351	-.148	-1.42	.078	.75	6.229	-.072	-.68	.075	.89	9CL	#	L182
L183	5.315	-.184	-1.75	.115	1.11	6.195	-.106	-1.00	.063	.75	9OT	#	L183
L190C	5.370	-.129	-1.23	.095	.91	6.130	-.171	-1.61	.106	1.26	9OT	#	L190C
L203A	5.580	.081	.77	.123	1.18	6.370	.069	.64	.095	1.13	9OT	#	L203A
L203C	5.560	.061	.58	.117	1.13	6.290	-.011	-.11	.099	1.18	9OT	#	L203C
L212	5.585	.086	.82	.078	.75	6.399	.098	.91	.072	.86	9OT	#	L212
L213	5.630	.131	1.25	.082	.79	6.420	.119	1.11	.079	.94	9OT	#	L213
L223	5.522	.023	.22	.092	.88	6.330	.029	.27	.060	.71	9OV	#	L223
L228	5.510	.011	.11	.074	.71	6.280	-.021	-.20	.079	.94	9OT	#	L228
L233	5.611	.112	1.07	.218	2.09	6.366	.065	.60	.125	1.49	9OO	#	L233
L233A	5.640	.141	1.35	.099	.96	6.465	.164	1.53	.091	1.09	9OT	#	L233A
L241	5.510	.011	.11	.105	1.01	6.206	-.095	-.89	.095	1.12	9CT	#	L241
L249	5.510	.011	.11	.052	.50	6.390	.089	.83	.112	1.33	9OT	#	L249
L259	5.677	.178	1.70	.066	.63	6.475	.174	1.63	.066	.79	9OT	#	L259
L260	5.480	-.019	-.18	.092	.88	6.220	-.081	-.76	.092	1.09	9OT	#	L260
L261	5.544	.045	.43	.084	.81	6.400	.099	.92	.062	.74	9OT	#	L261
L262	5.460	-.039	-.37	.070	.67	6.230	-.071	-.67	.048	.57	9OT	#	L262
L285	4.940	-.559	-5.33	.143	1.37	6.040	-.261	-2.45	.117	1.39	9OT	#	L285
L291	5.390	-.109	-1.04	.110	1.06	6.170	-.131	-1.23	.106	1.26	9OT	#	L291
L297	5.530	.031	.30	.125	1.20	6.385	.084	.78	.091	1.09	9OT	#	L297
L305	5.410	-.089	-.85	.070	.67	6.355	.054	.50	.096	1.14	9OT	#	L305
L309	5.448	-.051	-.49	.065	.63	6.258	-.043	-.41	.064	.76	9OT	#	L309
L318	5.505	.006	.06	.277	2.67	6.290	-.011	-.11	.143	1.70	9OT	#	L318
L323	5.360	-.139	-1.33	.190	1.82	5.940	-.361	-3.39	.171	2.03	9OT	#	L323
L324	5.530	.031	.30	.082	.79	6.310	.009	.08	.057	.67	9OT	#	L324
L326	5.615	.116	1.11	.106	1.01	6.400	.099	.92	.071	.84	9OT	#	L326
L328	5.470	-.029	-.28	.067	.65	6.240	-.061	-.58	.070	.83	9OT	#	L328
L331	5.567	.068	.65	.082	.79	6.245	-.056	-.53	.060	.71	9OT	#	L331
L339	5.510	.011	.11	.166	1.60	6.240	-.061	-.58	.135	1.60	9OT	#	L339
L341	5.652	.153	1.46	.057	.55	6.466	.165	1.54	.087	1.03	9OT	#	L341
L352	5.565	.066	.63	.108	1.04	6.260	-.041	-.39	.107	1.28	9OD	#	L352
L356	5.514	.015	.14	.088	.85	6.306	.005	.04	.071	.84	9OT	#	L356
L358	5.415	-.084	-.80	.055	.53	6.213	-.088	-.83	.060	.71	9OT	#	L358
L372	5.530	.031	.30	.082	.79	6.370	.069	.64	.067	.80	9OT	#	L372
L376	5.530	.031	.30	.082	.79	6.320	.019	.17	.092	1.09	9OT	#	L376
L378	5.520	.021	.20	.169	1.62	6.350	.049	.45	.085	1.01	9OT	#	L378
L380	5.480	-.019	-.18	.079	.76	6.100	-.201	-1.89	.000	.00	9OT	#	L380
L382	5.672	.173	1.65	.139	1.34	6.468	.167	1.56	.088	1.05	9OT	#	L382
L390	5.510	.011	.11	.088	.84	6.320	.019	.17	.063	.75	9OT	#	L390
L556	5.282	-.217	-2.07	.108	1.04	6.095	-.206	-1.93	.062	.73	9OT	#	L556
L557	5.435	-.064	-.61	.102	.98	6.305	.004	.03	.062	.73	9OT	#	L557
L559	5.520	.021	.20	.097	.93	6.291	-.010	-.10	.059	.70	9OT	#	L559
L560	5.534	.035	.34	.045	.44	6.362	.061	.57	.057	.68	9OT	#	L560
L561	5.390	-.109	-1.04	.168	1.61	6.305	.004	.03	.128	1.52	9OT	#	L561
L567	5.571	.072	.69	.084	.80	6.387	.086	.80	.060	.71	9OV	#	L567
L574	5.334	-.165	-1.57	.101	.97	6.198	-.104	-.97	.053	.63	9OV	#	L574
L575	5.466	-.033	-.31	.103	.99	6.227	-.074	-.70	.046	.55	9OT	#	L575
L581	5.595	.096	.92	.072	.70	6.435	.134	1.25	.131	1.56	9OT	#	L581

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

LAB CODE	BAG 83 GRAMS PER SQUARE METER					SAMPLE H33 96 GRAMS PER SQUARE METER					PRINTING			TEST D. * 10		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB	VAR	F	LAB
L587	5.370	-.129	-1.23	.067	.65	6.190	-.111	-1.04	.088	1.04	90T	6	L587			
GR. MEAN = 5.499 MILS					GRAND MEAN = 6.301 MILS					TEST DETERMINATIONS * 10						
SD MEANS = .105 MILS					SD OF MEANS = .107 MILS					64 LABS IN GRAND MEANS						
AVERAGE SDR = .104 MILS					AVERAGE SDR = .084 MILS											
GR. MEAN = 139.67 MICROMETER					GRAND MEAN = 160.06 MICROMETER											
L185	5.324	-.175	-1.67	.100	.96	6.260	-.041	-.39	.093	1.10	90B	6	L185			
L203B	5.260	-.239	-2.28	.190	1.82	6.040	-.261	-2.45	.117	1.39	90C	6	L203B			
L2420	5.461	-.038	-.36	.113	1.09	6.233	-.068	-.64	.076	.90	900	6	L2420			
L242P	5.417	-.081	-.78	.133	1.28	6.332	.030	.28	.067	.80	90P	6	L242P			
L243	5.286	-.213	-2.03	.104	1.00	6.232	-.069	-.65	.076	.90	90S	6	L243			
L251	5.224	-.274	-2.62	.091	.88	6.103	-.198	-1.86	.080	.95	90W	6	L251			
L322	5.530	.031	.30	.236	2.27	6.090	-.211	-1.98	.166	1.98	90U	6	L322			
L330	5.690	.191	1.82	.197	1.89	6.160	-.141	-1.33	.143	1.70	90V	6	L330			
L344	5.610	.111	1.06	.110	1.06	6.270	-.031	-.29	.095	1.13	90U	6	L344			
L396M	5.205	-.294	-2.80	.112	1.07	6.190	-.111	-1.04	.066	.78	90S	6	L396M			
L484	5.203	-.296	-2.83	.068	.65	6.154	-.148	-1.39	.068	.80	90E	6	L484			
L562	5.160	-.339	-3.23	.158	1.52	6.000	-.301	-2.83	.000	.00	90C	6	L562			
L563	5.250	-.249	-2.38	.292	2.80	6.240	-.061	-.58	.126	1.50	90U	6	L563			
L576	5.459	-.040	-.38	.107	1.03	6.127	-.174	-1.64	.071	.85	90C	6	L576			
TOTAL NUMBER OF LABORATORIES REPORTING = 80																
Best Values: B28 5.50 ± 0.18 mils																
H33 6.30 ± 0.18 mils																

The following laboratories were omitted from the grand means because of extreme test results: 285, 323.

TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T90-1 TABLE 2
 THICKNESS (CALIPER), THOUSANDTHS OF AN INCH
 TAPPI STANDARD T411 6S-76

LAB CODE	F	MEANS		COORDINATES		AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---	CONDITIONS
		B28	H33	MAJOR	MINOR				
L285	#	4.940	6.040	-.578	.217	1.38	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L562	*	5.160	6.000	-.452	.031	.76	90C	THICKNESS (CALIPER), CADY,	HAND DRIVEN
L174	*	5.180	6.010	-.431	.024	.83	90U	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L484	*	5.203	6.154	-.313	.108	.73	90E	THICKNESS (CALIPER), SCHOPPER,	HAND DRIVEN
L396M	*	5.205	6.190	-.285	.132	.93	90S	THICKNESS (CALIPER), SCHOPPER,	HAND DRIVEN
L251	*	5.224	6.103	-.334	.057	.91	90W	THICKNESS (CALIPER), L + W,	MOTOR DRIVEN, 20 C, 65% RH
L563	*	5.250	6.240	-.218	.135	2.15	90U	THICKNESS (CALIPER), TMI,	HAND DRIVEN
L203B	*	5.260	6.040	-.354	-.012	1.61	90C	THICKNESS (CALIPER), CADY,	HAND DRIVEN
L556	Ø	5.282	6.095	-.299	.011	.89	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L243	*	5.286	6.232	-.199	.104	.95	90S	THICKNESS (CALIPER), SCHOPPER,	HAND DRIVEN
L141	Ø	5.311	6.166	-.228	.040	.96	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L183	Ø	5.315	6.195	-.205	.057	.93	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L105	*	5.316	6.034	-.319	-.056	.88	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L185	*	5.324	6.260	-.152	.096	1.03	90B	THICKNESS (CALIPER), AMTHER,	HAND DRIVEN
L574	Ø	5.334	6.198	-.189	.045	.80	90V	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN, DIGITIZED
L182	Ø	5.351	6.229	-.155	.055	.82	90L	THICKNESS (CALIPER), L + W,	MOTOR DRIVEN
L323	#	5.360	5.940	-.355	-.154	1.93	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L587	Ø	5.370	6.190	-.170	.014	.84	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L190C	Ø	5.370	6.130	-.213	-.028	1.09	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L561	Ø	5.390	6.305	-.074	.080	1.57	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L291	Ø	5.390	6.170	-.170	-.014	1.16	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L305	Ø	5.410	6.355	-.024	.101	.90	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L128	Ø	5.412	6.276	-.079	.044	.89	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L358	Ø	5.415	6.213	-.122	-.002	.62	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L242P	*	5.417	6.332	-.035	.079	1.04	90P	THICKNESS (CALIPER), MESSMER,	MOTOR DRIVEN, ISO R534
L557	Ø	5.435	6.305	-.042	.048	.86	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L100	Ø	5.447	6.221	-.094	-.019	1.07	90V	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN, DIGITIZED
L309	Ø	5.448	6.258	-.067	.006	.70	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L576	*	5.459	6.127	-.153	-.094	.94	90C	THICKNESS (CALIPER), CADY,	HAND DRIVEN
L262	Ø	5.460	6.230	-.078	-.022	.62	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L242G	*	5.461	6.233	-.075	-.021	1.00	90G	THICKNESS (CALIPER), MESSMER,	MOTOR DRIVEN, BS3983
L575	Ø	5.466	6.227	-.076	-.029	.77	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L328	Ø	5.470	6.240	-.064	-.022	.74	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L122	Ø	5.474	6.280	-.033	.003	2.05	90V	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN, DIGITIZED
L125	Ø	5.474	6.413	.062	.096	1.69	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L162	Ø	5.474	6.267	-.042	-.006	.70	90D	THICKNESS (CALIPER), CADY,	MOTOR DRIVEN
L260	Ø	5.480	6.220	-.071	-.043	.99	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L380	*	5.480	6.100	-.157	-.127	.38	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L159	Ø	5.490	6.340	.021	.033	1.20	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L166	Ø	5.493	6.290	-.012	-.004	1.39	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L118	Ø	5.497	6.379	.054	.056	.68	90V	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN, DIGITIZED
L173B	Ø	5.500	6.360	.043	.040	.70	90F	THICKNESS (CALIPER), FEDERAL,	MOTOR DRIVEN
L318	Ø	5.505	6.290	-.004	-.012	2.18	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L249	Ø	5.510	6.390	.071	.054	.92	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L241	Ø	5.510	6.206	-.060	-.075	1.07	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L228	Ø	5.510	6.280	-.008	-.023	.82	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L339	Ø	5.510	6.240	-.036	-.051	1.60	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L390	Ø	5.510	6.320	.021	.005	.80	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L356	Ø	5.514	6.306	.014	-.008	.84	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L559	Ø	5.520	6.291	.007	-.022	.82	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L378	Ø	5.520	6.350	.049	.019	1.32	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L223	Ø	5.522	6.330	.037	.003	.80	90V	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN, DIGITIZED
L322	*	5.530	6.090	-.129	-.170	2.12	90U	THICKNESS (CALIPER), TMI,	HAND DRIVEN
L372	Ø	5.530	6.370	.071	.026	.80	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L376	Ø	5.530	6.320	.035	-.009	.94	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L324	Ø	5.530	6.310	.028	-.016	.73	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L297	Ø	5.530	6.385	.081	.036	1.14	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L560	Ø	5.534	6.362	.068	.017	.56	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L261	Ø	5.544	6.400	.102	.037	.77	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L203C	Ø	5.560	6.290	.035	-.052	1.15	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L352	Ø	5.565	6.260	.017	-.076	1.16	90D	THICKNESS (CALIPER), CADY,	MOTOR DRIVEN
L331	Ø	5.567	6.245	.007	-.088	.75	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L567	Ø	5.571	6.387	.112	.008	.76	90V	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN, DIGITIZED
L153	Ø	5.571	6.327	.069	-.034	.67	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN
L203A	Ø	5.580	6.370	.106	-.010	1.15	90T	THICKNESS (CALIPER), TMI,	MOTOR DRIVEN

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

LAB CODE	F	MEANS		COORDINATES		AVG R.SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
		B28	H33	MAJOR	MINOR		
L212	Ø	5.585	6.399	.130	.007	.81 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L581	Ø	5.595	6.435	.163	.025	1.13 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L158	Ø	5.600	6.340	.098	-.045	1.01 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L344	*	5.610	6.270	.055	-.101	1.09 90U	THICKNESS (CALIPER), TMI, HAND DRIVEN
L233	Ø	5.611	6.366	.125	-.035	1.79 90Q	THICKNESS (CALIPER), EMVECO, MOTOR DRIVEN
L326	Ø	5.615	6.400	.152	-.014	.93 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L139	Ø	5.625	6.475	.212	.031	1.25 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L131	Ø	5.630	6.370	.141	-.046	.91 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L213	Ø	5.630	6.420	.176	-.011	.86 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L238A	Ø	5.640	6.465	.216	.014	1.02 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L341	Ø	5.652	6.466	.225	.006	.79 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L382	Ø	5.672	6.468	.240	-.007	1.19 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L259	Ø	5.677	6.475	.249	-.006	.71 90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L330	*	5.690	6.160	.033	-.236	1.80 90U	THICKNESS (CALIPER), TMI, HAND DRIVEN
L123F	Ø	5.720	6.490	.289	-.026	1.25 90F	THICKNESS (CALIPER), FEDERAL, MOTOR DRIVEN
GMEANS:		5.499	6.301			1.00	
		95% ELLIPSE:		.363	.107	WITH GAMMA = 45 DEGREES	

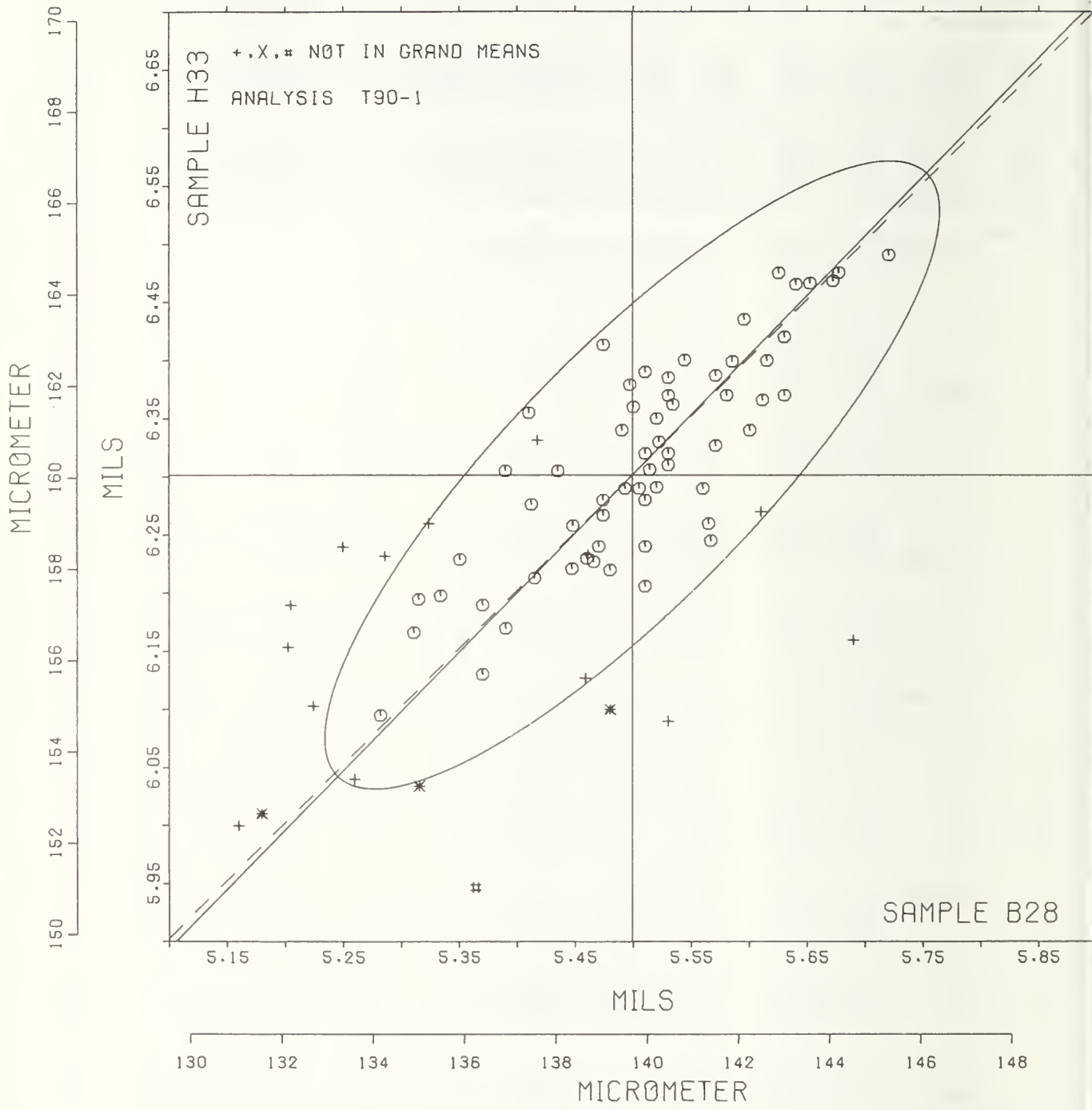
THICKNESS (CALIPER)

SAMPLE B28 = 5.50 MILS

SAMPLE H33 = 6.30 MILS

SAMPLE B28 = 139.7 MICROMETER

SAMPLE H33 = 160.1 MICROMETER



TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T95-1 TABLE 1
 GRAMMAGE (MASS PER UNIT AREA)
 TAPPI STANDARD T410 0S-68

LAB CODE	SAMPLE D25 MEAN	PRINTING 93 GRAMS PER SQUARE METER				SAMPLE D26 123 GRAMS PER SQUARE METER					KRAFT TEST D. # 10		
		DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	93.45	.21	.20	.58	.88	124.40	1.23	1.15	1.07	1.41	95C	0	L100
L121	94.98	1.74	1.66	.43	.65	123.11	-0.06	-0.06	.69	.90	95B	0	L121
L162	91.41	-1.83	-1.74	.54	.82	121.70	-1.47	-1.37	.48	.63	95K	0	L162
L213	94.55	1.31	1.25	.69	1.04	124.49	1.33	1.23	.67	.88	95F	0	L213
L233	18.39	-74.85	-71.26	.24	.36	24.22	-58.95	-92.19	.20	.27	95X	#	L233
L249	93.51	.27	.26	.36	.55	123.90	.73	.68	.74	.97	95I	0	L249
L280	93.64	.40	.39	.77	1.16	123.78	.61	.57	.87	1.14	95T	0	L280
L297	93.67	.43	.41	.12	.17	123.00	-.17	-.16	.00	.00	95C	0	L297
L305	92.60	-.64	-.60	.57	.85	122.04	-1.13	-1.05	.11	.14	95T	#	L305
L339	58.42	5.18	4.94	.00	.00	126.54	3.37	3.14	.00	.00	95T	#	L339
L344	93.05	-.19	-.18	.33	.49	123.40	.23	.22	.42	.54	95T	0	L344
L378	93.09	-.15	-.14	.54	.81	123.88	.71	.66	.59	.77	95E	0	L378
L392	92.74	-.50	-.47	.00	.00	122.30	-.87	-.81	.00	.00	95T	0	L392
L442	93.07	-.17	-.16	.33	.50	124.38	1.21	1.13	.59	.77	95K	0	L442
L484	92.56	-.68	-.64	.84	1.27	122.51	-.66	-.61	.84	1.10	95H	0	L484
L557	89.22	-4.02	-3.82	1.30	1.96	118.17	-5.00	-4.66	1.09	1.42	95A	#	L557
L559	17.85	-75.39	-71.77	.26	.40	23.47	-99.70	-92.89	.16	.21	95A	#	L559
L560	91.68	-1.56	-1.48	.77	1.17	121.76	-1.41	-1.31	1.02	1.34	95A	0	L560
L561	92.26	-.98	-.93	1.21	1.82	121.13	-2.04	-1.90	2.16	2.84	95T	0	L561
L597	94.88	1.64	1.57	2.42	3.66	123.80	.63	.59	1.30	1.70	95C	0	L597

GR. MEAN = 93.24 G/SQ.METER GRAND MEAN = 123.17 G/SQ.METER TEST DETERMINATIONS = 10
 SD MEANS = 1.05 G/SQ.METER SD OF MEANS = 1.07 G/SQ.METER 15 LABS IN GRAND MEANS
 AVERAGE SDR = .66 G/SQ.METER AVERAGE SDR = .76 G/SQ.METER

TOTAL NUMBER OF LABORATORIES REPORTING = 20
 Best Values: D25 93.1 ± 1.0 grams per square meter
 D26 123.2 ± 1.7 grams per square meter

The following laboratories were omitted from the grand means because of extreme test results: 339, 557.

Data from the following laboratories were received too late for proper processing and inclusion in the grand means: 305.

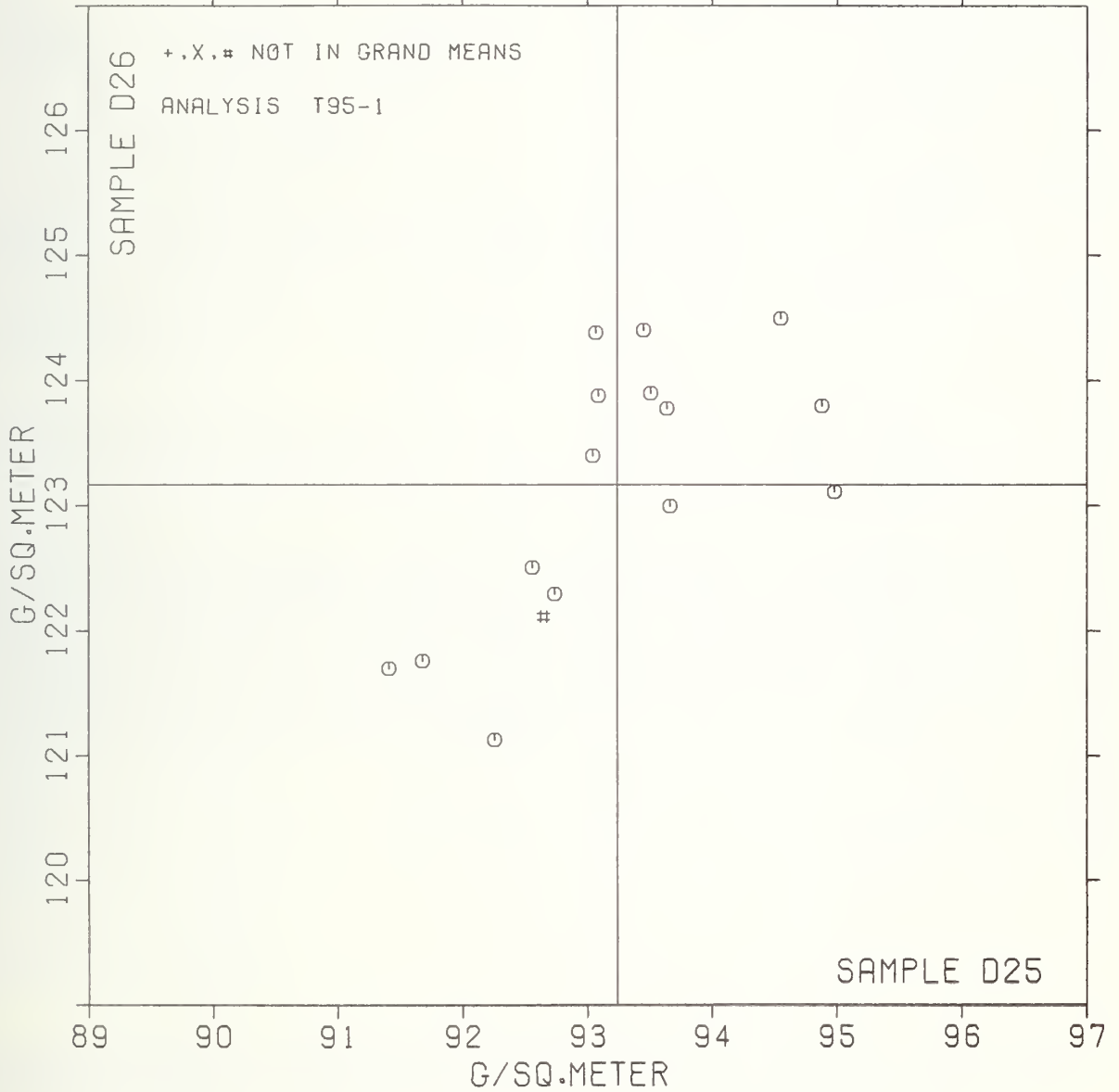
Data from the following laboratories appear to have been reported in incorrect units: 233, 559.

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS					
		D25	D26	MAJOR	MINOR	R.SDR	VAR						
L559	#	17.85	23.47	-124.06	-15.22	.31	95A	BASIS WEIGHT (GRAMMAGE),	CHANDLER	*	PRICE PAPER CUTTER		
L233	#	18.39	24.22	-123.15	-15.08	.31	95X	BASIS WEIGHT (GRAMMAGE):	SHEET CUT BY	WHAT DEVICE?			
L557	#	89.22	118.17	-6.38	-5.59	1.69	95A	BASIS WEIGHT (GRAMMAGE),	CHANDLER	*	PRICE PAPER CUTTER		
L162	Ø	91.41	121.70	-2.33	.29	.73	95K	BASIS WEIGHT (GRAMMAGE),	WEIGHED AS	RECEIVED			
L560	Ø	91.68	121.76	-2.09	.14	1.25	95A	BASIS WEIGHT (GRAMMAGE),	CHANDLER	*	PRICE PAPER CUTTER		
L561	Ø	92.26	121.13	-2.15	-.72	2.33	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT				
L484	Ø	92.56	122.51	-.94	.03	1.19	95H	BASIS WEIGHT (GRAMMAGE),	SQUARE AND	BLADE			
L305	#	92.60	122.04	-1.25	-.33	.50	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT				
L392	Ø	92.74	122.30	-.97	-.25	.00	55T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT				
L344	Ø	93.05	123.40	.04	.30	.52	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT				
L442	Ø	93.07	124.38	.75	.96	.63	95K	BASIS WEIGHT (GRAMMAGE),	WEIGHED AS	RECEIVED			
L378	Ø	93.09	123.88	.41	.60	.79	95E	BASIS WEIGHT (GRAMMAGE),	GUILLOTINE	TYPE CUTTER			
L100	Ø	93.45	124.40	1.03	.70	1.14	95C	BASIS WEIGHT (GRAMMAGE),	CUTTING BOARD				
L249	Ø	93.51	123.90	.72	.31	.76	95I	BASIS WEIGHT (GRAMMAGE),	INGENTØ	PAPER CUTTER			
L280	Ø	93.64	123.78	.72	.13	1.15	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT				
L297	Ø	93.67	123.00	.18	-.43	.09	95C	BASIS WEIGHT (GRAMMAGE),	CUTTING BOARD				
L213	Ø	94.55	124.49	1.87	-.02	.96	95F	BASIS WEIGHT (GRAMMAGE),	FOUR-SQUARE	CUTTER			
L557	Ø	94.88	123.80	1.60	-.74	2.68	95C	BASIS WEIGHT (GRAMMAGE),	CUTTING BOARD				
L121	Ø	94.98	123.11	1.17	-1.29	.78	95B	BASIS WEIGHT (GRAMMAGE),	CØNCØRA	CUTTER			
L339	#	98.42	126.54	6.03	-1.38	.00	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT				
GMEANS:		93.24	123.17			1.00							
		95% ELLIPSE:		3.94	1.72			WITH GAMMA =	45 DEGREES				

GRAMMAGE (MASS PER UNIT AREA)

SAMPLE D25 = 93.2 G/SQ.METER

SAMPLE D26 = 123.2 G/SQ.METER



SUMMARY TABLE

TEST METHOD	SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDR	REPL CRP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPRD
AIR RESISTANCE, GURLEY	H27	29.2	1.3	1.6	10	53	60	10	1.4	3.5
T40-1	H49	30.9	1.6	1.8					1.6	4.3
AIR RESISTANCE, SHEFFIELD	H27	107.7	5.0	4.2	10	40	44	10	3.7	13.8
T40-2	H49	103.9	5.2	4.4					3.9	14.5
AIR RESISTANCE, GURLEY HG FLOTATION	B73	1229.	174.	520.	10	15	15	10	456.	481.
T41-1	E64	515.	84.	111.					97.	233.
SMOOTHNESS, PARKER PRINTSURF	J11	4.88	.39	.18	10	8	8	10	.15	1.09
T44-1	E36	4.08	.36	.15					.13	1.01
SMOOTHNESS, SHEFFIELD	J11	138.2	6.4	10.0	15	88	93	10	8.8	18.4
T45-1	E36	105.8	4.7	6.2					5.4	13.4
SMOOTHNESS, BEKK	J11	30.9	3.2	4.7	15	10	13	10	4.1	9.1
T45-2	E36	43.0	6.0	5.4					4.7	16.9
SMOOTHNESS, BENDTSEN	J11	161.	13.	17.	10	11	11	10	15.	36.
T47-1	E36	104.	7.	10.					9.	18.
K & N INK ABSORPTION	E50	64.4	4.3	.6	4	8	9	4	.9	11.9
T56-1	H80	65.0	3.9	.6					.9	10.8
PH, COLD	J13	7.271	.626	.079	5	7	7	2	.155	1.735
T57-1	H17	4.678	.265	.058					.114	.740
PH, HOT	J13	7.772	.447	.087	5	6	7	2	.170	1.245
T57-2	H17	4.480	.240	.053					.105	.670
OPACITY, B&L TYPE, 89% BACKING	H29	94.65	.44	.27	10	78	92	5	.33	1.24
T60-1	E50	92.35	.72	.53					.65	2.06
OPACITY, B&L TYPE, PAPER BACKING	H29	96.14	.55	.21	10	8	8	5	.26	1.52
T60-2	E50	93.26	.39	.59					.73	1.20
OPACITY, ELREPHO TYPE, PAPER BACKING	H29	96.717	.196	.098	10	11	13	5	.121	.549
T60-3	E50	93.948	.315	.351					.435	.926
BLUE REFLECTANCE, DIRECTIONAL	J33	67.99	.41	.23	8	18	42	6	.26	1.13
T65-1	H31	81.08	.56	.17					.19	1.56
BLUE REFLECTANCE, DIFFUSE, WITH TRAP	J33	67.64	.70	.12	8	15	17	6	.14	1.94
T65-2	H31	81.56	.65	.07					.08	1.80
BLUE REFLECTANCE, DIFFUSE, NO TRAP	J33	68.88	.86	.16	8	14	16	6	.16	2.39
T65-3	H31	81.79	.67	.06					.07	1.86
SPECULAR GLOSS, 75 DEGREE	J19	49.3	1.7	1.3	10	46	50	5	1.6	4.9
T75-1	J23	66.9	2.0	1.1					1.4	5.5
THICKNESS (CALIPER)	B28	5.499	.105	.104	10	64	80	10	.091	.299
T90-1	H33	6.301	.107	.084					.074	.256
GRAMMAGE (MASS PER UNIT AREA)	D25	93.24	1.05	.66	10	15	20	3	1.06	3.04
T95-1	D26	123.17	1.07	.76					1.22	3.14

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