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TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM
FOR PAPER

REPORT NO. 64G



U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

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1980

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	Moisture content
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

CTS Rubber (4 times per year)

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

ASTM Cement (2 times per year)

Chemical (11 chemical components)
Physical (15 characteristics)

AASHTO Bituminous

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

NBS Collaborative Reference Programs
A05 Technology Building
National Bureau of Standards
Washington, DC 20234

SEP 19 1980

TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

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COLLABORATIVE REFERENCE PROGRAM
FOR PAPER

Report No. 64G

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

NBSIR 80-1837

J. Horlick
Office of Testing Laboratory Evaluation Technology
Office of Engineering Standards
National Engineering Laboratory

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

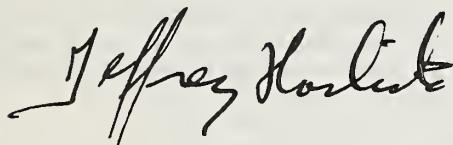
INTRODUCTION

Reports 64S and 64G comprise the fourth set of reports for the 79-80 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.

Notes and comments to individual laboratories and "Best Values" applicable to a particular method are given following Table 1 for each method. See page 1 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.

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

Jeffrey Horlick, Administrator
NBS-TAPPI Collaborative Reference Program
Office of Testing Laboratory Evaluation Technology



July 8, 1980

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
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 analyte.
- 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 or her 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 analyte:

No. of test Determinations	Lower limit for R. SDR	Upper limit for R. SDR
3	0.09	2.58
4	0.18	2.25
5	0.26	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:
- Ø - Included in grand mean and inside 95% error ellipse.
 - * - Included in grand mean but plotted point falls outside of the 95% error ellipse. The participant should take this as a warning to reexamine his or her testing procedure.
 - X - Excluded because plotted point would fall outside of the 99% error ellipse, (see page 2 for explanation of Graph).
 - # - Excluded because data were not understood or because of a non-coded variation reported by the laboratory. (See the notes following Table 1 for each method).
 - - Excluded from grand mean because VAR was non-standard for the analyte.
 - M - Excluded because data for one sample are missing.
 - 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.
- Best values - Given at the end of Table 1 for each method for which sufficient information is available. These best values are estimates based on a careful examination of all data, both current and past, with special attention to results obtained by the National Bureau of Standards and other recognized reference laboratories in this and other countries. All participants using equipment that is standard for the analysis should be able to achieve results within the plus-minus (+/-) limits, when these are shown along with the best values.
- 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 P. 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 degrees. The solid sloping line, which may or may not lie close to the 45 degree 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 'G'. A participant whose plotted point falls outside of the ellipse should carefully reexamine the testing procedure he or she is following.

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

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

SUMMARY -
(At end of report)

In addition to several quantities already defined above, the summary shows the following values for each test method:

REPL CRP -

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

REPL TAPPI -

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

PEPEAT -

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

REPR0D -

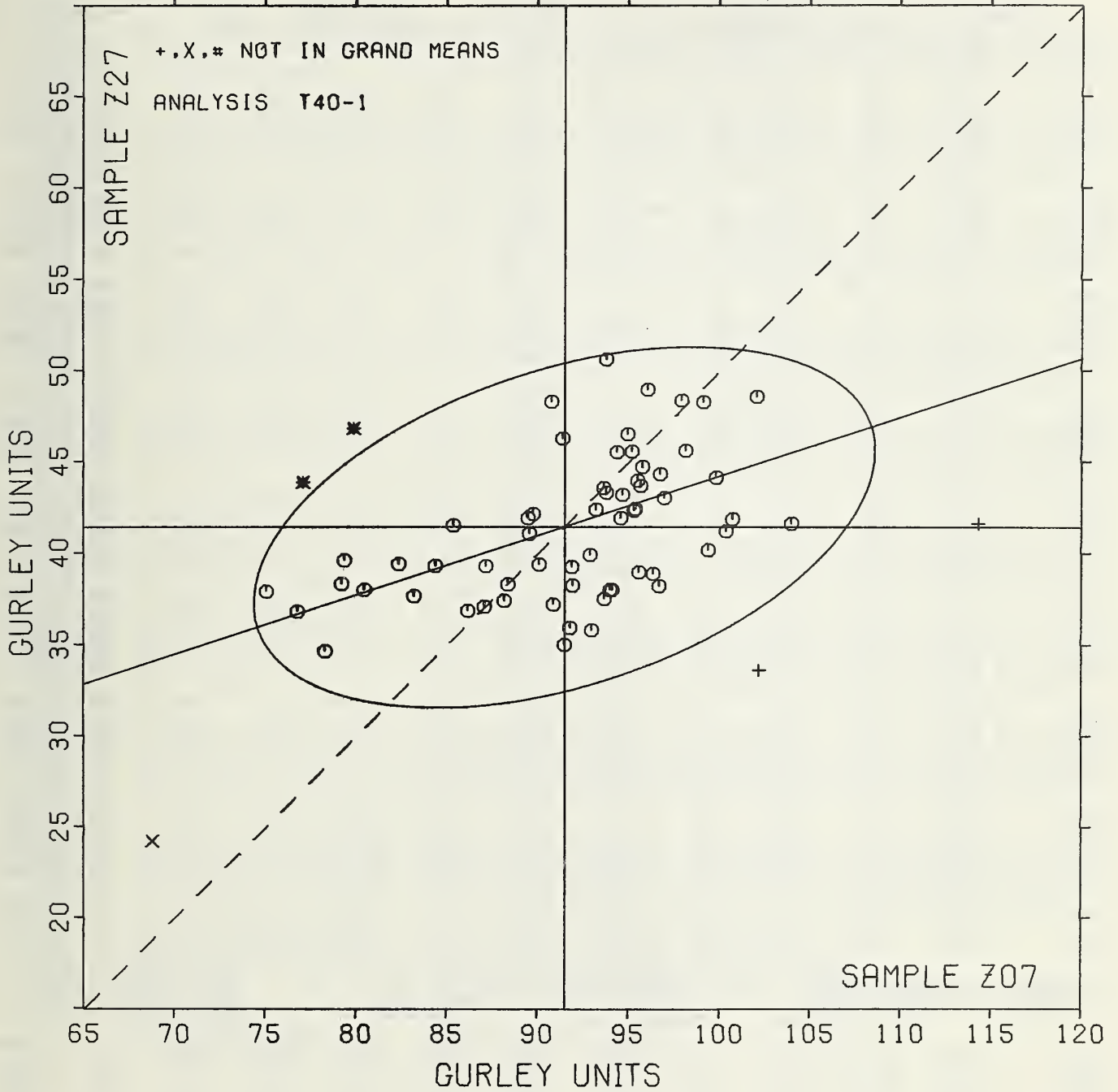
TAPPI reproducibility; a measure of the between-laboratory precision of a test result.

AIR RESISTANCE, GURLEY UNITS (SECONDS/100 CC)
TAPPI OFFICIAL TEST METHOD T460 GS-75, AIR RESISTANCE OF PAPER

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS			
		Z07	Z27	MAJOR	MINOR	R.SDR	VAR				
L262G	#	53.2	34.2	-38.7	4.9	.66	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L651	X	68.8	24.2	-26.9	-9.4	.64	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L339	Ø	75.1	37.9	-16.7	1.7	1.22	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L320	Ø	76.8	36.8	-15.4	.1	.65	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L337	*	77.1	43.9	-12.9	6.8	1.96	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L344	Ø	78.3	34.6	-14.6	-2.4	1.31	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L107	Ø	79.2	38.3	-12.6	.8	.94	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L106	Ø	79.4	39.6	-12.1	2.0	.88	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L158	*	79.9	46.8	-9.4	8.7	1.20	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L241	Ø	80.5	38.0	-11.5	.1	.91	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L238A	Ø	82.4	35.4	-9.3	.9	.63	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L159	Ø	83.2	37.7	-9.0	-1.0	.93	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L259	Ø	84.4	39.3	-7.4	.2	.98	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L153	Ø	85.4	41.5	-5.8	2.0	.87	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L737	Ø	86.2	36.8	-6.5	-2.7	1.06	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L585	Ø	87.1	37.1	-5.5	-2.8	.89	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L190C	Ø	87.2	39.3	-4.7	-.7	.79	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L219	Ø	88.2	37.4	-4.4	-2.8	.54	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L182G	Ø	88.4	38.3	-3.9	-2.0	.72	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L308	Ø	89.5	41.9	-1.7	1.1	1.44	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L125	Ø	89.6	41.1	-1.9	.2	.95	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L278	Ø	89.8	42.1	-1.4	1.2	.96	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L122	Ø	90.1	39.4	-1.9	-1.5	1.01	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L380	Ø	90.8	48.3	1.5	6.8	.41	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L100	Ø	90.9	37.2	-1.9	-3.8	.93	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L567	Ø	91.4	46.3	1.4	4.6	1.32	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L190R	Ø	91.5	35.0	-2.0	-6.1	.76	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L176	Ø	91.8	35.9	-1.4	-5.3	.93	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L285	Ø	91.9	39.2	-.3	-2.2	.90	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L124G	Ø	91.9	38.2	-.6	-3.2	.62	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L123	Ø	92.9	39.9	.9	-1.9	1.20	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L163	Ø	93.0	35.8	-.3	-5.8	1.04	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L265	Ø	93.2	42.4	2.0	.4	1.09	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L174	Ø	93.7	43.5	2.7	1.4	1.40	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L212	Ø	93.7	37.5	.9	-4.4	.86	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L128	Ø	93.8	43.3	2.8	1.1	.93	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L141	Ø	93.8	50.6	5.0	8.0	1.16	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L230G	Ø	94.0	38.0	1.3	-4.0	.88	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L396M	Ø	94.1	38.0	1.4	-4.1	.87	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L676	Ø	94.4	45.5	4.0	3.0	1.19	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L121	Ø	94.6	41.9	3.1	-.5	1.05	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L326	Ø	94.7	43.2	3.6	.7	1.54	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L616	Ø	95.0	46.5	4.5	3.8	1.38	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L274	Ø	95.2	45.5	4.8	2.8	.45	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L697	Ø	95.3	42.3	3.9	-.3	1.62	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L702	Ø	95.4	42.4	4.0	-.3	.84	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L576	Ø	95.5	43.9	4.6	1.2	.86	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L261	Ø	95.6	38.9	3.1	-3.6	1.18	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L313	Ø	95.7	43.7	4.7	.8	1.08	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L183	Ø	95.8	44.7	5.1	1.8	.86	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L324	Ø	96.1	49.0	6.7	5.8	1.12	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L321	Ø	96.4	38.9	3.9	-3.9	1.23	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L228	Ø	96.7	38.2	4.0	-4.7	.18	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L301	Ø	96.8	44.3	5.9	1.1	1.22	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L223	Ø	97.0	43.0	5.7	-.2	1.26	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L328	Ø	98.0	48.3	6.3	4.6	1.20	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L388	Ø	98.2	45.6	7.7	1.9	1.41	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L148	Ø	99.2	48.3	9.4	4.1	1.15	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L166	Ø	99.4	40.2	7.2	-3.6	.88	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L376	Ø	99.9	44.1	8.8	-.0	1.02	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L254	Ø	100.4	41.2	8.4	-3.0	.81	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L715	Ø	100.7	41.8	8.9	-2.5	.98	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L348	Ø	102.1	48.6	12.3	3.5	1.13	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L115	*	102.2	33.6	7.8	-10.7	.76	40U	AIR RESISTANCE,	SHEFFIELD IN GURLEY UNITS		
L554	Ø	104.0	41.6	12.0	-3.7	1.39	40D	AIR RESISTANCE,	GURLEY	DENSOMETER	- 011 FLOTATION
L291	*	114.3	41.6	21.8	-6.9	1.27	40U	AIR RESISTANCE,	SHEFFIELD IN GURLEY UNITS		
GMEANS:		91.5	41.4			1.00					
		95% ELLIPSE:		17.8	8.6	WITH GAMMA = 17 DEGREES					

AIR RESISTANCE, GURLEY

SAMPLE Z07 = 91. GURLEY UNITS SAMPLE Z27 = 41. GURLEY UNITS



AIR RESISTANCE, SHEFFIELD UNITS (CC/MIN) FOR 0.442 SQ. IN (3/4 IN. DIA) ORIFICE
TAPPI USEFUL TEST METHOD UM 524, POROSITY BY RESISTANCE TO AIRFLOW

LAB CODE	SAMPLE Z07 MEAN	M.F. SULFITE 36 GRAMS PER SQUARE METER				SAMPLE Z27 MEAN	NEWSPRINT 58 GRAMS PER SQUARE METER				TEST D. = 10		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L114	39.0	1.8	.54	3.7	1.31	92.6	5.4	.69	9.6	.52	40S	Ø	L114
L121	40.5	3.3	.99	4.7	1.65	94.0	6.8	.87	13.3	.71	40S	Ø	L121
L122S	38.1	.9	.27	1.9	.67	79.5	-7.7	-.97	20.0	1.08	40S	Ø	L122S
L124S	34.4	-2.8	-.85	6.4	2.25	82.0	-5.2	-.65	17.9	.96	40S	Ø	L124S
L132	36.9	-.3	-.10	4.4	1.54	81.0	-6.2	-.78	9.5	.51	40S	Ø	L132
L148	36.6	-.6	-.19	3.1	1.10	92.9	5.7	.73	17.7	.95	40S	Ø	L148
L150	37.6	.4	.12	2.4	.84	86.5	-.7	-.08	14.9	.80	40S	Ø	L150
L157	36.8	-.4	-.13	1.9	.68	88.5	1.3	.17	22.0	1.18	40S	Ø	L157
L158	36.8	-.4	-.13	3.3	1.16	94.0	6.8	.87	19.3	1.04	40S	Ø	L158
L173B	33.2	-4.0	-1.22	2.1	.73	81.5	-5.7	-.72	11.6	.62	40S	Ø	L173B
L190C	36.1	-1.1	-.34	2.0	.69	91.5	4.3	.55	35.0	1.88	40S	Ø	L190C
L213	40.4	3.2	.96	3.4	1.20	91.0	3.8	.49	12.8	.69	40S	Ø	L213
L223	34.1	-3.1	-.94	2.2	.78	85.1	-2.1	-.26	26.4	1.42	40S	Ø	L223
L230S	44.0	6.8	2.05	6.3	2.21	98.6	11.4	1.45	20.3	1.09	40S	Ø	L230S
L233	37.4	.2	.06	2.2	.76	88.0	.8	.11	19.3	1.04	40S	Ø	L233
L241	55.1	17.9	5.42	4.6	1.62	104.3	17.1	2.17	15.1	.81	40S	X	L241
L249	37.6	.4	.12	2.3	.81	87.5	.3	.04	17.1	.92	40S	Ø	L249
L257A	48.0	10.8	3.27	3.0	1.06	94.4	7.2	.92	24.2	1.30	40S	*	L257A
L257B	37.3	.1	.03	2.9	1.03	94.8	7.6	.97	25.8	1.39	40S	Ø	L257B
L257C	68.0	30.8	9.32	4.0	1.40	102.6	15.4	1.96	11.2	.60	40S	X	L257C
L260	35.4	-1.8	-.55	2.3	.81	96.6	9.4	1.20	21.2	1.14	40S	Ø	L260
L262S	35.1	-2.1	-.64	2.3	.80	84.0	-3.2	-.40	23.4	1.26	40S	Ø	L262S
L288	34.7	-2.5	-.76	2.7	.95	112.4	25.2	3.20	19.0	1.02	40S	X	L288
L301	37.9	.7	.21	2.3	.81	90.3	3.1	.40	18.8	1.01	40S	Ø	L301
L305	36.5	-.7	-.22	2.4	.83	83.5	-3.7	-.46	19.0	1.02	40S	Ø	L305
L315	31.1	-6.1	-1.85	1.0	.35	81.0	-6.2	-.78	18.8	1.01	40S	Ø	L315
L318	33.5	-3.7	-1.12	3.0	1.03	75.5	-11.7	-1.48	18.6	1.00	40S	Ø	L318
L352	41.9	4.7	1.42	2.9	1.02	107.0	19.8	2.52	32.4	1.74	40S	Ø	L352
L354	38.8	1.6	.48	3.0	1.07	91.2	4.0	.51	18.5	.99	40S	Ø	L354
L360	32.5	-4.7	-1.43	2.3	.79	94.0	6.8	.87	17.3	.93	40S	Ø	L360
L390	35.7	-1.5	-.46	3.0	1.04	84.0	-3.2	-.40	14.1	.76	40S	Ø	L390
L562	52.1	14.9	4.51	2.0	.69	110.7	23.5	2.99	28.1	1.51	40S	X	L562
L575	37.7	.5	.15	2.1	.74	82.4	-4.8	-.60	16.6	.89	40S	Ø	L575
L585	37.0	-.2	-.07	3.1	1.09	76.8	-10.4	-1.31	19.0	1.02	40S	Ø	L585
L600	42.2	5.0	1.51	2.3	.79	83.3	-3.9	-.49	17.4	.93	40S	Ø	L600
L684	35.9	-1.3	-.40	2.0	.69	89.9	2.7	.35	13.3	.71	40S	Ø	L684
L687	40.6	3.4	1.04	2.6	.91	99.3	12.1	1.54	16.7	.90	40S	Ø	L687
L698	37.6	.4	.12	2.2	.76	80.7	-6.5	-.82	16.3	.88	40S	Ø	L698
L704	34.5	-2.7	-.81	1.4	.50	65.0	-22.2	-2.81	12.5	.67	40S	*	L704
L729	32.0	-5.2	-1.58	2.5	.87	78.7	-8.5	-1.07	16.5	.89	40S	Ø	L729
L738	36.2	-1.0	-.31	2.5	.88	78.6	-8.6	-1.08	16.5	.89	40S	Ø	L738
L740	35.2	-2.0	-.61	2.6	.91	83.1	-4.1	-.51	20.9	1.12	40S	Ø	L740
L755	39.2	2.0	.60	4.0	1.39	90.6	3.4	.44	20.9	1.12	40S	Ø	L755

GR. MEAN = 37.2 SHEFF. UNITS GRAND MEAN = 87.2 SHEFF. UNITS TEST DETERMINATIONS = 10
SD MEANS = 3.3 SHEFF. UNITS SD OF MEANS = 7.9 SHEFF. UNITS 39 LABS IN GRAND MEANS
AVERAGE SDR = 2.9 SHEFF. UNITS AVERAGE SDR = 18.6 SHEFF. UNITS

L182B	133.0	95.8	29.00	7.9	2.76	255.5	168.3	21.35	46.9	2.52	40E	*	L182B
L280	80.5	43.3	13.11	10.3	3.61	168.2	81.0	10.28	55.6	2.99	40B	*	L280
L312	36.1	-1.1	-.34	2.0	.71	103.9	16.7	2.12	8.0	.43	40T	*	L312
L333	126.5	89.3	27.03	11.1	3.87	294.0	206.8	26.23	75.1	4.04	40B	*	L333
L587	36.3	-.9	-.28	3.8	1.32	94.5	7.3	.93	17.7	.95	40T	*	L587
L753	166.4	129.2	39.12	27.4	9.58	470.4	383.2	48.60	93.1	5.00	40N	*	L753

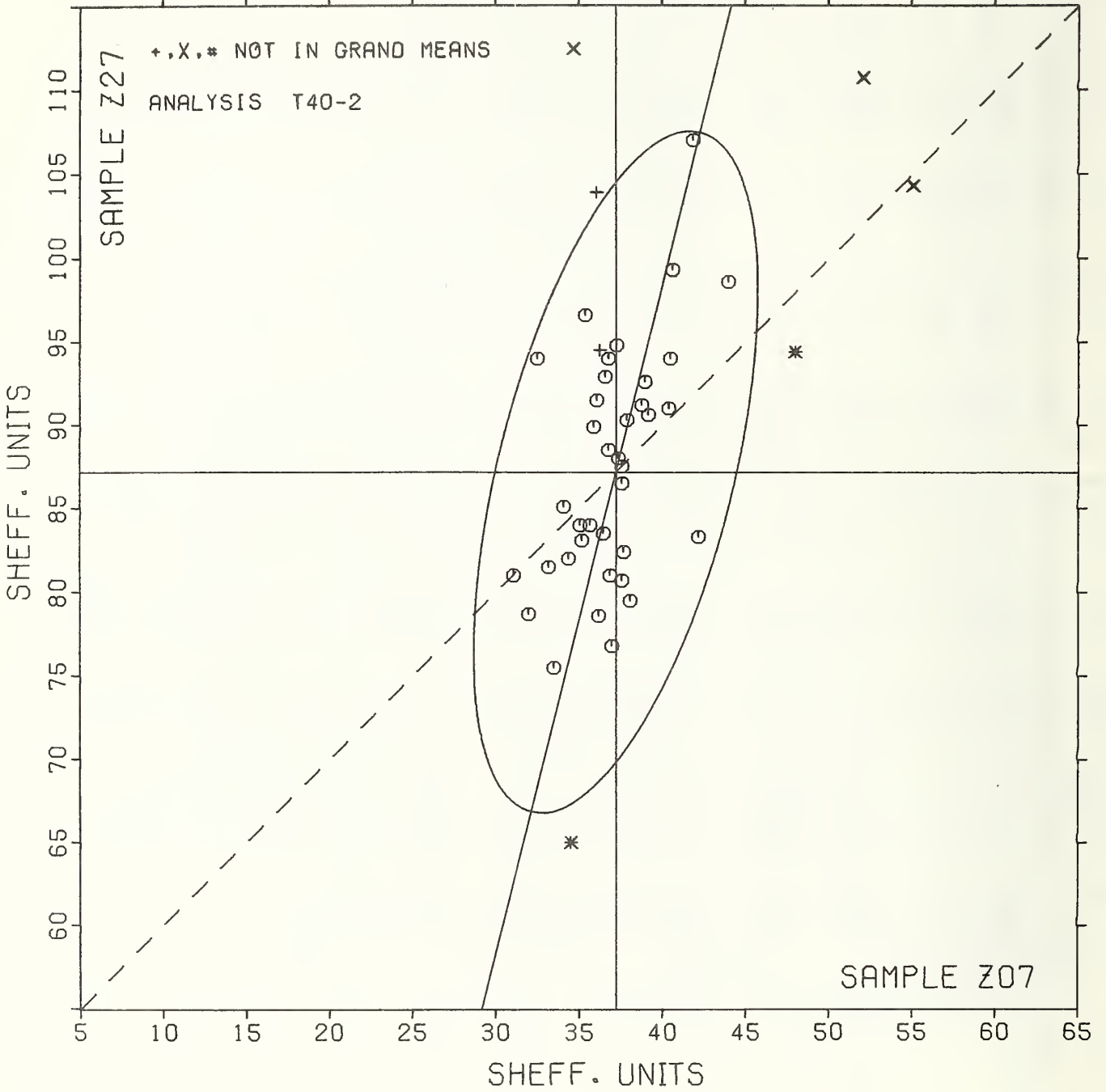
TOTAL NUMBER OF LABORATORIES REPORTING = 49
Best values: Z07 37 ± 6 Sheffield units
Z27 87 ± 13 Sheffield units

AIR RESISTANCE, SHEFFIELD UNITS (CC/MIN) FOR 0.442 SQ. IN (3/4 IN. DIA) ORIFICE
TAPPI USEFUL TEST METHOD UM 524, POROSITY BY RESISTANCE TO AIRFLOW

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		Z07	Z27	MAJOR	MINOR	R.SDR	VAR	
L315	Ø	31.1	81.0	-7.4	4.4	.68	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L729	Ø	32.0	78.7	-9.5	3.0	.88	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L360	Ø	32.5	94.0	5.5	6.2	.86	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L173B	Ø	33.2	81.5	-6.5	2.5	.68	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L318	Ø	33.5	75.5	-12.2	.8	1.02	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L223	Ø	34.1	85.1	-2.7	2.5	1.10	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L124S	Ø	34.4	82.0	-5.7	1.5	1.61	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L704	*	34.5	65.0	-22.1	-2.8	.58	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L288	X	34.7	112.4	23.9	8.6	.98	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L262S	Ø	35.1	84.0	-3.6	1.3	1.03	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L740	Ø	35.2	83.1	-4.4	1.0	1.02	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L260	Ø	35.4	96.6	8.7	4.0	.97	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L390	Ø	35.7	84.0	-3.4	.7	.90	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L684	Ø	35.9	89.9	2.3	1.9	.70	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L312	*	36.1	103.9	16.0	5.1	.57	40T	AIR RESISTANCE, SHEFFIELD (3 INCH DIAMETER ORIFICE)
L190C	Ø	36.1	91.5	3.9	2.1	1.28	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L738	Ø	36.2	78.6	-8.5	-1.1	.89	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L587	*	36.3	94.5	6.9	2.7	1.14	40T	AIR RESISTANCE, SHEFFIELD (3 INCH DIAMETER ORIFICE)
L305	Ø	36.5	83.5	-3.7	-.2	.92	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L148	Ø	36.6	92.9	5.4	2.0	1.02	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L157	Ø	36.8	88.5	1.2	.7	.93	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L158	Ø	36.8	94.0	6.5	2.1	1.10	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L132	Ø	36.9	81.0	-6.0	-1.2	1.03	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L585	Ø	37.0	76.8	-10.1	-2.3	1.06	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257B	Ø	37.3	94.8	7.4	1.8	1.21	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L233	Ø	37.4	88.0	.9	.0	.90	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L249	Ø	37.6	87.5	.4	-.3	.86	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L150	Ø	37.6	86.5	-.5	-.5	.82	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L698	Ø	37.6	80.7	-6.2	-1.9	.82	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L575	Ø	37.7	82.4	-4.5	-1.6	.82	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L301	Ø	37.9	90.3	3.2	.1	.91	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L122S	Ø	38.1	79.5	-7.2	-2.7	.87	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L354	Ø	38.8	91.2	4.3	-.6	1.03	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L114	Ø	39.0	92.6	5.7	-.4	.91	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L755	Ø	39.2	90.6	3.8	-1.1	1.25	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L213	Ø	40.4	91.0	4.5	-2.2	.94	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L121	Ø	40.5	94.0	7.4	-1.5	1.18	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L687	Ø	40.6	99.3	12.6	-.4	.90	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L352	Ø	41.9	107.0	20.4	.3	1.38	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L600	Ø	42.2	83.3	-2.5	-5.8	.86	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L230S	Ø	44.0	98.6	12.8	-3.8	1.65	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257A	*	48.0	94.4	9.6	-8.7	1.18	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L562	X	52.1	110.7	26.5	-8.7	1.10	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L241	X	55.1	104.3	21.0	-13.2	1.21	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L257C	X	68.0	102.6	22.4	-26.1	1.00	40S	AIR RESISTANCE, SHEFFIELD (3/4 INCH DIAMETER ORIFICE)
L280	*	80.5	168.2	89.1	-22.4	3.30	40B	AIR RESISTANCE, BENDTSEN, WG 150
L333	*	126.5	294.0	222.3	-36.6	3.95	40B	AIR RESISTANCE, BENDTSEN, WG 150
L182B	*	133.0	255.5	186.5	-52.2	2.64	40B	AIR RESISTANCE, BENDTSEN, WG 150
L753	*	166.4	470.4	403.1	-32.6	7.29	40N	AIR RESISTANCE, SHEFFIELD (3/8 INCH DIAMETER ORIFICE)
GMEANS:		37.2	87.2			1.00		
		95% ELLIPSE:	20.9	7.1		WITH GAMMA = 75 DEGREES		

AIR RESISTANCE, SHEFFIELD

SAMPLE Z07 = 37. SHEFF. UNITS SAMPLE Z27 = 87. SHEFF. UNITS



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

LAB CODE	SAMPLE B73 116 GRAMS PER SQUARE METER					SAMPLE B47 82 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	1029.	-314.	-1.76	328.	.58	1538.	-77.	-.37	396.	.89	41G	Ø	L122
L128	1280.	-63.	-.36	584.	1.04	1396.	-219.	-1.04	375.	.84	41G	Ø	L128
L134	1291.	-52.	-.29	374.	.66	1397.	-218.	-1.03	370.	.83	41G	Ø	L134
L166M	1615.	272.	1.52	601.	1.07	1967.	352.	1.66	490.	1.10	41G	Ø	L166M
L195	1245.	-98.	-.55	504.	.90	1830.	215.	1.02	487.	1.09	41G	Ø	L195
L224	NO DATA REPORTED FOR SAMPLE B73					1331.	-284.	-1.34	160.	.36	41G	M	L224
L259	1527.	184.	1.03	864.	1.54	1564.	-51.	-.24	430.	.96	41G	Ø	L259
L312	1450.	107.	.60	567.	1.01	1853.	238.	1.13	410.	.92	41G	Ø	L312
L358	1608.	265.	1.48	873.	1.55	1843.	228.	1.08	510.	1.14	41G	Ø	L358
L554	1123.	-220.	-1.23	484.	.86	1390.	-225.	-1.06	594.	1.33	41G	Ø	L554
L558	1207.	-136.	-.76	464.	.82	1299.	-315.	-1.49	206.	.46	41G	Ø	L558
L574	1389.	46.	.26	552.	.98	1627.	12.	.06	716.	1.60	41G	Ø	L574
L576	1282.	-61.	-.34	390.	.69	1674.	59.	.28	507.	1.14	41G	Ø	L576
L697	1414.	71.	.40	733.	1.30	1616.	1.	.01	309.	.69	41G	Ø	L697
GR. MEAN = 1343. SEC/10 CC					GRAND MEAN = 1615. SEC/10 CC					TEST DETERMINATIONS = 10			
SD MEANS = 178. SEC/10 CC					SD OF MEANS = 211. SEC/10 CC					13 LABS IN GRAND MEANS			
AVERAGE SDR = 563. SEC/10 CC					AVERAGE SDR = 446. SEC/10 CC								
TOTAL NUMBER OF LABORATORIES REPORTING = 14													

Best values: B73 1300 seconds per 10 cc,
 B47 1600 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 sq. in. of the specimen. The values are not converted to 100ml of air nor to oil density.

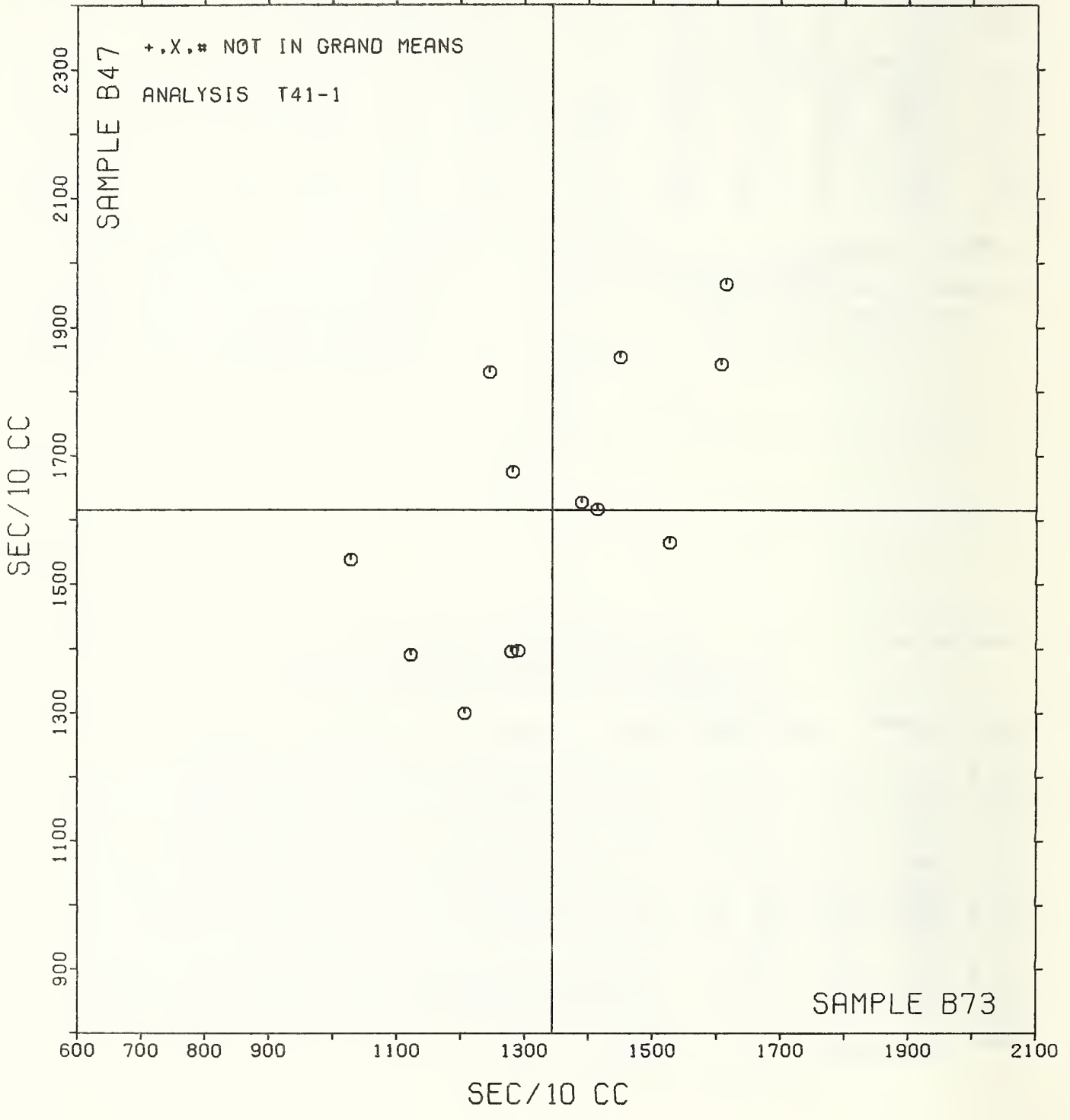
TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T41-1 TABLE 2
 AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION
 DIRECT READING, SEC/10 CC, MERCURY DENSITY

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY	TEST INSTRUMENT	CONDITIONS
		B73	B47	MAJOR	MINOR	R.SDR	VAR			
L224	M		1331.			.36	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L122	Ø	1029.	1538.	-253.	202.	.73	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L554	Ø	1123.	1390.	-312.	38.	1.10	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L558	Ø	1207.	1299.	-333.	-84.	.64	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L195	Ø	1245.	1830.	111.	209.	.99	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L128	Ø	1280.	1396.	-213.	-83.	.94	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L576	Ø	1282.	1674.	10.	85.	.91	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L134	Ø	1291.	1397.	-205.	-91.	.75	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L574	Ø	1389.	1627.	38.	-29.	1.29	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L697	Ø	1414.	1616.	44.	-56.	1.00	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L312	Ø	1450.	1853.	254.	61.	.96	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L259	Ø	1527.	1564.	72.	-177.	1.25	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L358	Ø	1608.	1843.	342.	-71.	1.35	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
L166M	Ø	1615.	1967.	445.	-1.	1.08	41G	AIR RESISTANCE, HIGH RANGE, GURLEY MERCURY FLOTATION		
GMEANS:		1343.	1615.			1.00				
		95% ELLIPSE:		742.	339.	WITH GAMMA = 52 DEGREES				

AIR RESISTANCE, GURLEY HG FLOTATION

SAMPLE B73 = 1343. SEC/10 CC

SAMPLE B47 = 1615. SEC/10 CC



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

LAB CODE	SAMPLE A83 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER				SAMPLE G09 MEAN	PRINTING 75 GRAMS PER SQUARE METER				TEST D. ° 10			
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB	
L122	4.80	.19	1.08	.17	.75	5.31	.16	.75	.19	.95	44P	Ø	L122	
L182	4.74	.13	.73	.28	1.24	5.49	.33	1.58	.08	.43	44P	Ø	L182	
L288	4.62	.01	.07	.16	.72	5.07	-.09	-.40	.23	1.15	44P	Ø	L288	
L317	4.63	.02	.13	.29	1.30	5.18	.02	.12	.30	1.53	44P	Ø	L317	
L588	4.25	-.36	-2.03	.16	.70	4.82	-.34	-1.59	.11	.58	44P	Ø	L588	
L669	4.66	.05	.29	.23	1.00	5.16	.01	.05	.14	.72	44P	Ø	L669	
L745	4.56	-.05	-.27	.29	1.29	5.05	-.11	-.50	.32	1.63	44P	Ø	L745	
GR. MEAN °		4.61 MICRONS				GRAND MEAN °		5.16 MICRONS				TEST DETERMINATIONS °		
SD MEANS °		.18 MICRONS				SD OF MEANS °		.21 MICRONS				7 LABS IN GRAND MEANS		
AVERAGE SDR °						.23 MICRONS						AVERAGE SDR °		
												.20 MICRONS		
TOTAL NUMBER OF LABORATORIES REPORTING °													7	
Best values: A83 4.6 microns														
G09 5.2 microns														

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		A83	G09	MAJOR	MINOR	R.SDR	VAR			
L588	Ø	4.25	4.82	-.49	.07	.64	44P	SMOOTHNESS,	PARKER PRINTSURF	
L745	Ø	4.56	5.05	-.11	-.03	1.46	44P	SMOOTHNESS,	PARKER PRINTSURF	
L288	Ø	4.62	5.07	-.06	-.06	.93	44P	SMOOTHNESS,	PARKER PRINTSURF	
L317	Ø	4.63	5.18	.03	-.00	1.42	44P	SMOOTHNESS,	PARKER PRINTSURF	
L669	Ø	4.66	5.16	.04	-.03	.86	44P	SMOOTHNESS,	PARKER PRINTSURF	
L182	Ø	4.74	5.49	.34	.11	.84	44P	SMOOTHNESS,	PARKER PRINTSURF	
L122	Ø	4.80	5.31	.24	-.05	.85	44P	SMOOTHNESS,	PARKER PRINTSURF	
GMEANS:		4.61	5.16			1.00				
		95% ELLIPSE:		1.00	.24	WITH GAMMA ° 50 DEGREES				

TAPPI USEFUL TEST METHOD UM 518, SMOOTHNESS OF PAPER (SHEFFIELD)

LAB CODE	SAMPLE A83 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER				SAMPLE G09 MEAN	PRINTING 75 GRAMS PER SQUARE METER				TEST D. • 15		
		DEV	N,DEV	SDR	R,SDR		DEV	N,DEV	SDR	R,SDR	VAR	F	LAB
L100	114.5	6.1	.69	10.3	.92	165.7	3.9	.41	21.6	1.39	45S	Ø	L100
L107	114.7	6.2	.71	15.1	1.35	167.7	5.9	.63	14.7	.95	45S	Ø	L107
L108	104.7	-3.8	-.44	5.9	.53	135.1	-26.7	-2.86	3.7	.24	45S	*	L108
L114	124.3	15.9	1.82	13.0	1.16	158.3	-3.5	-.37	15.9	1.02	45S	Ø	L114
L115	99.7	-8.8	-1.01	5.8	.52	161.6	-.2	-1.02	10.9	.70	45S	Ø	L115
L121	104.3	-4.1	-.48	13.3	1.20	159.3	-2.5	-.27	16.2	1.04	45S	Ø	L121
L122	110.5	2.1	.24	13.8	1.24	159.1	-2.7	-.29	17.3	1.11	45S	Ø	L122
L123	124.1	15.7	1.79	17.3	1.55	162.8	1.0	.11	11.6	.75	45S	Ø	L123
L124	104.9	-3.5	-.41	7.8	.70	164.4	2.6	.28	21.1	1.36	45S	Ø	L124
L125	122.3	13.9	1.59	12.9	1.16	162.7	.9	.09	20.6	1.32	45S	Ø	L125
L126	103.3	-5.1	-.59	13.0	1.16	164.5	2.7	.29	10.1	.65	45S	Ø	L126
L128	106.7	-1.8	-.21	11.6	1.04	162.0	.2	.02	14.4	.92	45S	Ø	L128
L132	116.9	8.4	.96	9.6	.86	171.6	9.8	1.05	18.7	1.20	45S	Ø	L132
L134	114.8	6.3	.72	8.3	.74	191.7	29.9	3.20	17.7	1.14	45S	*	L134
L139S	107.9	-.5	-.06	4.9	.44	167.0	5.2	.56	5.6	.36	45S	Ø	L139S
L148	109.8	1.3	.15	11.8	1.06	165.5	3.7	.40	16.0	1.03	45S	Ø	L148
L150	95.1	-13.4	-1.54	13.8	1.24	166.9	5.1	.55	22.2	1.42	45S	Ø	L150
L152	106.5	-1.9	-.22	5.2	.46	195.2	33.4	3.58	13.4	.86	45S	X	L152
L153	123.5	15.1	1.73	12.2	1.10	162.6	20.8	2.23	31.5	2.02	45S	Ø	L153
L157	117.4	8.9	1.02	9.7	.87	179.0	17.2	1.84	25.0	1.61	45S	Ø	L157
L158	93.3	-15.1	-1.74	12.6	1.13	160.0	-1.8	-.19	18.7	1.20	45S	Ø	L158
L159	108.9	.5	.05	8.7	.78	160.7	-1.1	-.12	10.2	.65	45S	Ø	L159
L162	103.3	-5.2	-.60	16.1	1.45	154.1	-7.7	-.82	15.1	.97	45S	Ø	L162
L166	100.9	-7.6	-.87	9.6	.86	146.2	-15.6	-1.67	9.7	.62	45S	Ø	L166
L167	121.0	12.5	1.43	10.9	.98	167.3	5.5	.59	9.4	.60	45S	Ø	L167
L173B	112.3	3.9	.44	11.0	.99	173.7	11.9	1.27	24.1	1.55	45S	Ø	L173B
L183S	96.9	-11.6	-1.33	8.2	.73	171.7	9.9	1.06	21.4	1.38	45S	Ø	L183S
L190C	99.7	-8.8	-1.01	12.1	1.09	159.9	-1.9	-.21	16.6	1.06	45S	Ø	L190C
L190R	124.8	16.3	1.87	14.8	1.33	168.3	6.5	.70	15.0	.96	45S	Ø	L190R
L195	103.8	-4.7	-.54	16.0	1.43	155.8	-6.0	-.64	10.8	.69	45S	Ø	L195
L206	100.3	-8.2	-.94	12.9	1.15	163.1	1.3	.14	16.6	1.06	45S	Ø	L206
L211	112.5	4.0	.46	15.8	1.42	160.5	-1.3	-.14	21.7	1.39	45S	Ø	L211
L213	94.9	-13.6	-1.56	10.4	.94	145.5	-16.3	-1.75	15.1	.97	45S	Ø	L213
L219	106.6	-1.9	-.22	7.5	.67	153.7	-8.1	-.87	7.9	.51	45S	Ø	L219
L223	109.6	1.1	.13	13.9	1.25	160.0	-1.8	-.19	17.9	1.15	45S	Ø	L223
L224	110.9	2.4	.27	11.3	1.01	160.9	-.9	-.10	17.3	1.11	45S	Ø	L224
L226B	100.9	-7.5	-.86	11.6	1.04	157.6	-4.2	-.45	16.9	1.08	45S	Ø	L226B
L228	102.5	-6.0	-.69	3.2	.29	149.4	-12.4	-1.33	9.1	.58	45S	Ø	L228
L230S	117.3	8.9	1.01	14.6	1.31	172.3	10.5	1.13	14.6	.94	45S	Ø	L230S
L231	122.0	13.5	1.55	14.5	1.30	167.4	5.6	.60	10.6	.68	45S	Ø	L231
L233	114.9	6.5	.74	12.4	1.11	158.9	-2.9	-.31	17.5	1.13	45S	Ø	L233
L237	106.3	-2.1	-.25	9.0	.80	154.0	-7.8	-.84	8.1	.52	45S	Ø	L237
L241	112.7	4.2	.48	10.7	.96	150.3	-11.5	-1.24	10.6	.68	45S	Ø	L241
L249	117.1	8.7	.99	14.9	1.33	173.7	11.9	1.27	21.0	1.35	45S	Ø	L249
L254	109.3	.9	.10	16.1	1.45	161.7	-.1	-.01	12.1	.77	45S	Ø	L254
L255	106.0	-2.5	-.28	11.1	.99	152.0	-9.8	-1.05	12.5	.80	45S	Ø	L255
L257A	88.4	-20.1	-2.30	6.2	.56	176.6	14.8	1.59	14.4	.93	45S	X	L257A
L257B	134.5	26.1	2.99	9.2	.83	187.8	26.0	2.79	17.0	1.09	45S	X	L257B
L257C	134.6	26.1	2.99	11.3	1.01	170.5	8.7	.94	11.4	.73	45S	*	L257C
L259	110.1	1.6	.18	11.0	.99	175.6	13.8	1.48	19.5	1.25	45S	Ø	L259
L260	99.2	-9.3	-1.06	4.5	.40	154.7	-7.1	-.76	10.1	.65	45S	Ø	L260
L261	104.7	-3.8	-.44	12.6	1.12	165.9	4.1	.44	20.2	1.30	45S	Ø	L261
L262	109.7	1.2	.14	8.8	.78	163.7	1.9	.20	16.6	1.07	45S	Ø	L262
L275	112.3	3.9	.44	11.5	1.03	164.0	2.2	.24	14.4	.93	45S	Ø	L275
L278	111.7	3.2	.37	9.5	.85	170.0	8.2	.88	18.4	1.18	45S	Ø	L278
L281	100.9	-7.5	-.86	13.9	1.24	164.3	2.5	.26	12.4	.80	45S	Ø	L281
L285	101.0	-7.5	-.86	6.6	.59	155.3	-6.5	-.69	15.3	.98	45S	Ø	L285
L288	131.2	22.7	2.60	11.0	.98	167.5	5.7	.61	5.7	.37	45S	*	L288
L290	109.9	1.5	.17	8.1	.73	157.3	-4.5	-.48	6.0	.39	45S	Ø	L290
L291S	107.9	-.6	-.07	11.3	1.02	161.7	-.1	-.01	15.5	1.00	45S	Ø	L291S
L301	100.4	-8.1	-.93	14.1	1.27	159.7	-2.1	-.23	18.9	1.21	45S	Ø	L301
L305	98.7	-9.7	-1.12	9.3	.84	180.0	18.2	1.95	27.1	1.74	45S	*	L305
L308	108.9	.5	.05	14.1	1.26	157.4	-4.4	-.47	15.4	.99	45S	Ø	L308
L312	124.2	15.7	1.80	8.2	.74	158.0	-3.8	-.41	11.8	.76	45S	Ø	L312
L317	108.3	-.1	-.02	12.1	1.08	161.3	-.5	-.05	25.9	1.66	45S	Ø	L317

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T45-1 TABLE 1
SMOOTHNESS, SHEFFIELD UNITS

TAPPI USEFUL TEST METHOD UM 518, SMOOTHNESS OF PAPER (SHEFFIELD)

LAB CODE	SAMPLE A83 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER				SAMPLE G09 MEAN	PRINTING 75 GRAMS PER SQUARE METER				TEST D. = 15		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L318	102.7	-5.7	-.66	12.4	1.11	160.0	-1.8	-.19	17.4	1.11	45S	Ø	L318
L321	98.1	-10.4	-1.19	11.4	1.02	151.1	-10.7	-1.15	13.0	.84	45S	Ø	L321
L323	102.4	-6.1	-.70	8.2	.73	164.0	2.2	.24	15.0	.96	45S	Ø	L323
L326	115.5	7.1	.81	7.0	.62	166.5	4.7	.51	13.7	.88	45S	Ø	L326
L328	104.9	-3.5	-.41	6.9	.62	156.8	-5.0	-.54	14.8	.95	45S	Ø	L328
L333	102.0	-6.5	-.74	11.7	1.05	150.4	-11.4	-1.22	10.5	.67	45S	Ø	L333
L348	115.1	6.7	.76	12.1	1.08	164.3	2.5	.27	16.1	1.03	45S	Ø	L348
L349	104.1	-4.4	-.51	13.8	1.24	147.1	-14.7	-1.57	12.8	.82	45S	Ø	L349
L352	115.0	6.5	.75	5.3	.48	166.7	4.9	.52	20.8	1.34	45S	Ø	L352
L360	111.8	3.3	.38	9.5	.85	157.2	-4.6	-.49	11.9	.76	45S	Ø	L360
L366	107.3	-1.2	-.14	9.9	.89	160.7	-1.1	-.12	26.7	1.71	45S	Ø	L366
L376	120.9	12.5	1.43	11.0	.98	173.4	11.6	1.24	20.6	1.32	45S	Ø	L376
L380	107.0	-1.5	-.17	5.5	.50	163.3	1.5	.16	27.4	1.76	45S	Ø	L380
L382	99.0	-9.5	-1.09	3.9	.35	162.5	.7	.07	9.6	.61	45S	Ø	L382
L390	106.0	-2.5	-.28	15.8	1.42	156.3	-5.5	-.59	13.4	.86	45S	Ø	L390
L554	110.6	2.1	.24	14.8	1.32	162.6	.8	.09	21.3	1.37	45S	Ø	L554
L562	100.1	-8.3	-.96	12.4	1.11	175.0	13.2	1.42	19.0	1.22	45S	Ø	L562
L567	99.3	-9.1	-1.05	8.8	.79	155.7	-6.1	-.65	11.2	.72	45S	Ø	L567
L571	108.0	-.5	-.06	5.7	.51	176.0	14.2	1.52	10.4	.67	45S	Ø	L571
L575	110.0	1.5	.17	10.9	.98	167.4	5.6	.60	17.9	1.15	45S	Ø	L575
L585	101.5	-7.0	-.80	9.0	.80	156.8	-5.0	-.54	22.1	1.42	45S	Ø	L585
L587	114.7	6.2	.71	11.3	1.01	NO DATA REPORTED FOR SAMPLE G09					45S	M	L587
L600	127.6	19.1	2.19	10.1	.91	169.8	8.0	.86	10.5	.67	45S	Ø	L600
L604	97.7	-10.8	-1.24	16.8	1.50	162.7	.9	.09	20.8	1.33	45S	Ø	L604
L651	105.8	-2.7	-.31	16.8	1.51	152.8	-9.0	-.97	11.6	.74	45S	Ø	L651
L670	98.3	-10.1	-1.16	5.2	.46	182.4	20.6	2.21	21.6	1.38	45S	*	L670
L685	99.4	-9.1	-1.04	11.2	1.00	151.2	-10.6	-1.14	12.7	.81	45S	Ø	L685
L698	108.9	.4	.04	11.1	.99	157.8	-4.0	-.43	13.2	.85	45S	Ø	L698
L702	91.3	-17.1	-1.97	13.0	1.17	155.0	-6.8	-.73	16.0	1.03	45S	Ø	L702
L704	106.3	-2.1	-.25	6.1	.55	146.3	-15.5	-1.66	5.5	.35	45S	Ø	L704
L729	102.9	-5.6	-.64	11.0	.98	147.1	-14.7	-1.58	12.8	.82	45S	Ø	L729
L738	101.7	-6.8	-.78	10.5	.94	141.0	-20.8	-2.23	15.1	.97	45S	Ø	L738
L753	114.0	5.5	.63	17.3	1.55	156.7	-5.1	-.55	13.0	.84	45S	Ø	L753

GR. MEAN = 108.5 SHEFF. UNITS
SD MEANS = 8.7 SHEFF. UNITS

GRAND MEAN = 161.8 SHEFF. UNITS
SD OF MEANS = 9.3 SHEFF. UNITS

TEST DETERMINATIONS = 15
94 LABS IN GRAND MEANS

AVERAGE SDR = 11.2 SHEFF. UNITS

AVERAGE SDR = 15.6 SHEFF. UNITS

TOTAL NUMBER OF LABORATORIES REPORTING = 98

Best values: A83 108 ± 14 Sheffield units
G09 161 ± 15 Sheffield units

TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T45-1 TABLE 2
 SMOOTHNESS, SHEFFIELD UNITS
 TAPPI USEFUL TEST METHOD UM 518, SMOOTHNESS OF PAPER (SHEFFIELD)

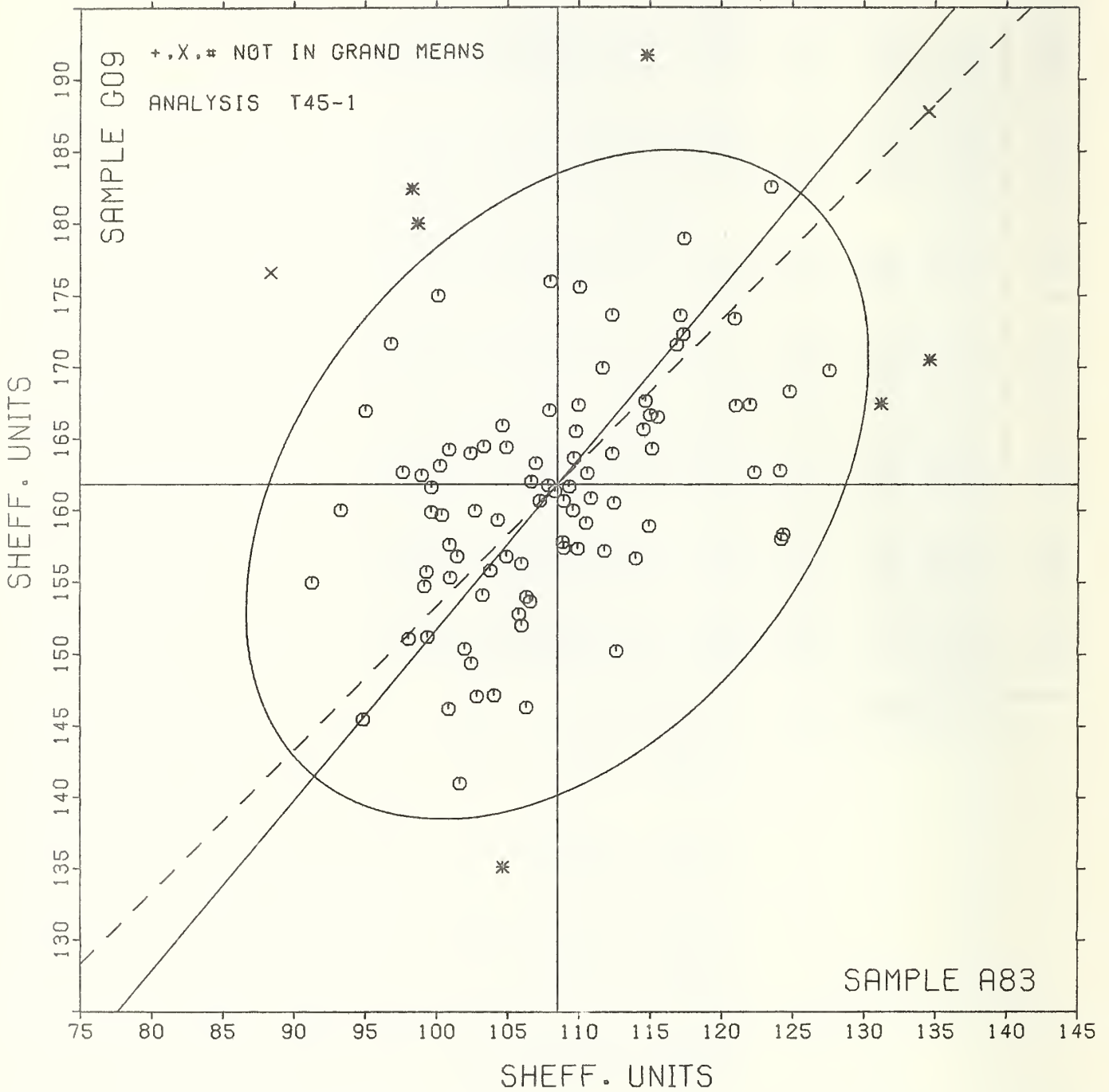
LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS		
		A83	009	MAJOR	MINOR	R.SDR	VAR			
L257A	X	88.4	170.6	-1.6	24.9	.74	45S	SMOOTHNESS,	SHEFFIELD	
L702	Ø	91.3	155.0	-16.2	8.8	1.10	45S	SMOOTHNESS,	SHEFFIELD	
L158	Ø	93.3	160.0	-11.1	10.4	1.17	45S	SMOOTHNESS,	SHEFFIELD	
L213	Ø	94.9	145.5	-21.3	-1	.95	45S	SMOOTHNESS,	SHEFFIELD	
L150	Ø	95.1	166.9	-4.7	13.6	1.33	45S	SMOOTHNESS,	SHEFFIELD	
L183S	Ø	96.9	171.7	.1	15.2	1.05	45S	SMOOTHNESS,	SHEFFIELD	
L604	Ø	97.7	162.7	-6.3	8.8	1.42	45S	SMOOTHNESS,	SHEFFIELD	
L321	Ø	96.1	151.1	-14.9	1.1	.93	45S	SMOOTHNESS,	SHEFFIELD	
L670	*	98.3	182.4	9.3	21.0	.92	45S	SMOOTHNESS,	SHEFFIELD	
L305	*	98.7	180.0	7.7	19.2	1.29	45S	SMOOTHNESS,	SHEFFIELD	
L382	Ø	99.0	162.5	-5.6	7.7	.48	45S	SMOOTHNESS,	SHEFFIELD	
L260	Ø	99.2	154.7	-11.4	2.6	.53	45S	SMOOTHNESS,	SHEFFIELD	
L567	Ø	99.3	155.7	-10.5	3.1	.76	45S	SMOOTHNESS,	SHEFFIELD	
L685	Ø	99.4	151.2	-14.0	.1	.91	45S	SMOOTHNESS,	SHEFFIELD	
L190C	Ø	99.7	159.9	-7.2	5.5	1.08	45S	SMOOTHNESS,	SHEFFIELD	
L115	Ø	99.7	161.6	-5.8	6.6	.61	45S	SMOOTHNESS,	SHEFFIELD	
L562	Ø	100.1	175.0	4.7	14.9	1.16	45S	SMOOTHNESS,	SHEFFIELD	
L206	Ø	100.3	163.1	-4.3	7.1	1.11	45S	SMOOTHNESS,	SHEFFIELD	
L301	Ø	100.4	159.7	-6.8	4.8	1.24	45S	SMOOTHNESS,	SHEFFIELD	
L166	Ø	100.9	146.2	-16.8	-4.2	.74	45S	SMOOTHNESS,	SHEFFIELD	
L281	Ø	100.9	164.3	-3.0	7.4	1.02	45S	SMOOTHNESS,	SHEFFIELD	
L226B	Ø	100.9	157.6	-8.1	3.1	1.06	45S	SMOOTHNESS,	SHEFFIELD	
L285	Ø	101.0	155.3	-9.8	1.6	.79	45S	SMOOTHNESS,	SHEFFIELD	
L585	Ø	101.5	156.8	-8.3	2.2	1.11	45S	SMOOTHNESS,	SHEFFIELD	
L738	Ø	101.7	141.0	-20.3	-8.2	.95	45S	SMOOTHNESS,	SHEFFIELD	
L333	Ø	102.0	150.4	-12.9	-2.4	.86	45S	SMOOTHNESS,	SHEFFIELD	
L323	Ø	102.4	164.0	-2.2	6.1	.85	45S	SMOOTHNESS,	SHEFFIELD	
L228	Ø	102.5	149.4	-13.4	-3.4	.44	45S	SMOOTHNESS,	SHEFFIELD	
L318	Ø	102.7	160.0	-5.1	3.2	1.11	45S	SMOOTHNESS,	SHEFFIELD	
L729	Ø	102.9	147.1	-14.9	-5.2	.90	45S	SMOOTHNESS,	SHEFFIELD	
L162	Ø	103.3	154.1	-9.2	-.9	1.21	45S	SMOOTHNESS,	SHEFFIELD	
L126	Ø	103.3	164.5	-1.3	5.7	.91	45S	SMOOTHNESS,	SHEFFIELD	
L195	Ø	103.8	155.8	-7.6	-.3	1.06	45S	SMOOTHNESS,	SHEFFIELD	
L349	Ø	104.1	147.1	-14.1	-6.0	1.03	45S	SMOOTHNESS,	SHEFFIELD	
L121	Ø	104.3	159.3	-4.6	1.6	1.12	45S	SMOOTHNESS,	SHEFFIELD	
L108	*	104.7	135.1	-22.9	-14.2	.38	45S	SMOOTHNESS,	SHEFFIELD	
L261	Ø	104.7	165.9	.7	5.6	1.21	45S	SMOOTHNESS,	SHEFFIELD	
L124	Ø	104.9	164.4	-.3	4.4	1.03	45S	SMOOTHNESS,	SHEFFIELD	
L328	Ø	104.9	156.8	-6.1	-.5	.78	45S	SMOOTHNESS,	SHEFFIELD	
L651	Ø	105.8	152.8	-8.6	-3.7	1.13	45S	SMOOTHNESS,	SHEFFIELD	
L390	Ø	106.0	156.3	-5.8	-1.6	1.14	45S	SMOOTHNESS,	SHEFFIELD	
L255	Ø	106.0	152.0	-9.1	-4.4	.90	45S	SMOOTHNESS,	SHEFFIELD	
L704	Ø	106.3	146.3	-13.2	-8.3	.45	45S	SMOOTHNESS,	SHEFFIELD	
L237	Ø	106.3	154.0	-7.4	-3.4	.66	45S	SMOOTHNESS,	SHEFFIELD	
L152	X	106.5	195.2	24.3	23.0	.66	45S	SMOOTHNESS,	SHEFFIELD	
L219	Ø	106.6	153.7	-7.4	-3.8	.59	45S	SMOOTHNESS,	SHEFFIELD	
L128	Ø	106.7	162.0	-1.0	1.5	.98	45S	SMOOTHNESS,	SHEFFIELD	
L380	Ø	107.0	163.3	.2	2.1	1.13	45S	SMOOTHNESS,	SHEFFIELD	
L366	Ø	107.3	160.7	-1.7	.2	1.30	45S	SMOOTHNESS,	SHEFFIELD	
L291S	Ø	107.9	161.7	-.5	.4	1.01	45S	SMOOTHNESS,	SHEFFIELD	
L139S	Ø	107.9	167.0	3.6	3.8	.40	45S	SMOOTHNESS,	SHEFFIELD	
L571	Ø	108.0	176.0	10.6	9.5	.59	45S	SMOOTHNESS,	SHEFFIELD	
L317	Ø	108.3	161.3	-.5	-.2	1.37	45S	SMOOTHNESS,	SHEFFIELD	
L698	Ø	108.9	157.8	-2.8	-2.9	.92	45S	SMOOTHNESS,	SHEFFIELD	
L159	Ø	108.9	160.7	-.6	-1.1	.72	45S	SMOOTHNESS,	SHEFFIELD	
L308	Ø	108.9	157.4	-3.1	-3.2	1.13	45S	SMOOTHNESS,	SHEFFIELD	
L254	Ø	109.3	161.7	.4	-.7	1.11	45S	SMOOTHNESS,	SHEFFIELD	
L223	Ø	109.6	160.0	-.7	-2.0	1.20	45S	SMOOTHNESS,	SHEFFIELD	
L262	Ø	109.7	163.7	2.2	.3	.93	45S	SMOOTHNESS,	SHEFFIELD	
L148	Ø	109.8	165.5	3.7	1.4	1.04	45S	SMOOTHNESS,	SHEFFIELD	
L290	Ø	109.9	157.3	-2.5	-4.0	.56	45S	SMOOTHNESS,	SHEFFIELD	
L575	Ø	110.0	167.4	5.3	2.4	1.07	45S	SMOOTHNESS,	SHEFFIELD	
L259	Ø	110.1	175.6	11.6	7.7	1.12	45S	SMOOTHNESS,	SHEFFIELD	
L122	Ø	110.5	159.1	-.7	-3.3	1.17	45S	SMOOTHNESS,	SHEFFIELD	
L554	Ø	110.6	162.6	2.0	-1.1	1.35	45S	SMOOTHNESS,	SHEFFIELD	

SMOOTHNESS, SHEFFIELD UNITS
TAPPI USEFUL TEST METHOD UM 518, SMOOTHNESS OF PAPER (SHEFFIELD)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		A83	G09	MAJOR	MINOR	R.SDR	VAR			
L224	Ø	110.9	160.9	.8	-2.4	1.06	45S	SMOOTHNESS,	SHEFFIELD	
L278	Ø	111.7	170.0	8.3	2.8	1.01	45S	SMOOTHNESS,	SHEFFIELD	
L360	Ø	111.8	157.2	-1.4	-5.5	.81	45S	SMOOTHNESS,	SHEFFIELD	
L275	Ø	112.3	164.0	4.2	-1.5	.98	45S	SMOOTHNESS,	SHEFFIELD	
L173B	Ø	112.3	173.7	11.6	4.7	1.27	45S	SMOOTHNESS,	SHEFFIELD	
L211	Ø	112.5	160.5	1.6	-3.9	1.41	45S	SMOOTHNESS,	SHEFFIELD	
L241	Ø	112.7	150.3	-6.2	-10.6	.82	45S	SMOOTHNESS,	SHEFFIELD	
L753	Ø	114.0	156.7	-.4	-7.5	1.20	45S	SMOOTHNESS,	SHEFFIELD	
L100	Ø	114.5	165.7	6.8	-2.2	1.15	45S	SMOOTHNESS,	SHEFFIELD	
L107	Ø	114.7	167.7	8.5	-1.0	1.15	45S	SMOOTHNESS,	SHEFFIELD	
L587	M	114.7				1.01	45S	SMOOTHNESS,	SHEFFIELD	
L134	*	114.8	191.7	26.9	14.3	.94	45S	SMOOTHNESS,	SHEFFIELD	
L233	Ø	114.9	158.9	1.9	-6.8	1.12	45S	SMOOTHNESS,	SHEFFIELD	
L352	Ø	115.0	166.7	7.9	-1.9	.91	45S	SMOOTHNESS,	SHEFFIELD	
L348	Ø	115.1	164.3	6.2	-3.5	1.06	45S	SMOOTHNESS,	SHEFFIELD	
L326	Ø	115.5	166.5	8.2	-2.4	.75	45S	SMOOTHNESS,	SHEFFIELD	
L132	Ø	116.9	171.6	12.9	-.1	1.03	45S	SMOOTHNESS,	SHEFFIELD	
L249	Ø	117.1	173.7	14.6	1.0	1.34	45S	SMOOTHNESS,	SHEFFIELD	
L230S	Ø	117.3	172.3	13.8	-.0	1.12	45S	SMOOTHNESS,	SHEFFIELD	
L157	Ø	117.4	179.0	18.9	4.2	1.24	45S	SMOOTHNESS,	SHEFFIELD	
L376	Ø	120.9	173.4	16.9	-2.1	1.15	45S	SMOOTHNESS,	SHEFFIELD	
L167	Ø	121.0	167.3	12.3	-6.0	.79	45S	SMOOTHNESS,	SHEFFIELD	
L231	Ø	122.0	167.4	13.0	-6.8	.99	45S	SMOOTHNESS,	SHEFFIELD	
L125	Ø	122.3	162.7	9.6	-10.1	1.24	45S	SMOOTHNESS,	SHEFFIELD	
L153	Ø	123.5	182.6	25.6	1.8	1.56	45S	SMOOTHNESS,	SHEFFIELD	
L123	Ø	124.1	162.8	10.8	-11.4	1.15	45S	SMOOTHNESS,	SHEFFIELD	
L312	Ø	124.2	158.0	7.2	-14.5	.75	45S	SMOOTHNESS,	SHEFFIELD	
L114	Ø	124.3	158.3	7.5	-14.4	1.09	45S	SMOOTHNESS,	SHEFFIELD	
L190R	Ø	124.8	168.3	15.5	-8.3	1.15	45S	SMOOTHNESS,	SHEFFIELD	
L600	Ø	127.6	169.8	18.4	-9.5	.79	45S	SMOOTHNESS,	SHEFFIELD	
L288	*	131.2	167.5	18.9	-13.8	.67	45S	SMOOTHNESS,	SHEFFIELD	
L257B	X	134.5	187.8	36.7	-3.3	.96	45S	SMOOTHNESS,	SHEFFIELD	
L257C	*	134.6	170.5	23.5	-14.4	.87	45S	SMOOTHNESS,	SHEFFIELD	
GMEANS:		108.5	161.8			1.00				
		95% ELLIPSE:		26.5	17.8	WITH GAMMA = 50 DEGREES				

SMOOTHNESS, SHEFFIELD

SAMPLE A83 = 108. SHEFF. UNITS SAMPLE G09 = 162. 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	SAMPLE A83 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER				SAMPLE G09 MEAN	PRINTING 75 GRAMS PER SQUARE METER				TEST D. = 15			
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB	
L139B	52.1	-1.6	-.18	7.5	.69	29.6	1.8	.68	2.7	.92	45K	Ø	L139B	
L162	53.5	-.2	-.02	13.3	1.23	28.7	.9	.33	3.0	1.00	45K	Ø	L162	
L182K	42.3	-11.4	-1.33	10.7	.99	24.6	-3.2	-1.20	3.0	1.00	45K	Ø	L182K	
L190C	71.6	17.9	2.07	18.6	1.73	31.1	3.3	1.26	4.9	1.62	45K	Ø	L190C	
L230B	56.7	3.0	.35	11.9	1.10	23.9	-3.9	-1.45	1.7	.57	45K	Ø	L230B	
L274K	50.9	-2.8	-.33	5.6	.52	28.6	.8	.29	1.8	.59	45K	Ø	L274K	
L291K	63.9	10.2	1.18	9.7	.90	31.9	4.2	1.56	4.6	1.53	45K	Ø	L291K	
L564	46.9	-6.8	-.78	8.8	.82	26.3	-1.5	-.57	3.0	1.01	45K	Ø	L564	
L581	52.5	-1.2	-.14	12.9	1.20	26.2	-1.6	-.60	1.8	.61	45K	Ø	L581	
L697	46.7	-7.0	-.82	8.8	.81	27.0	-.8	-.29	3.4	1.15	45K	Ø	L697	
GR. MEAN =		53.7 BEKK SECONDS				GRAND MEAN =		27.8 BEKK SECONDS				TEST DETERMINATIONS =		
SD MEANS =		8.6 BEKK SECONDS				SD OF MEANS =		2.7 BEKK SECONDS				10 LABS IN GRAND MEANS		
		AVERAGE SDR =						10.8 BEKK SECONDS				AVERAGE SDR =		
								3.0 BEKK SECONDS						
L250M	47.5	-6.2	-.72	7.0	.65	26.3	-1.5	-.55	4.1	1.37	45L	*	L250M	
L251	52.5	-1.2	-.14	5.5	.51	28.1	.3	.10	3.1	1.04	45L	*	L251	
TOTAL NUMBER OF LABORATORIES REPORTING = 12														
Best values: A83 52 Bekk seconds														
G09 28 Bekk seconds														

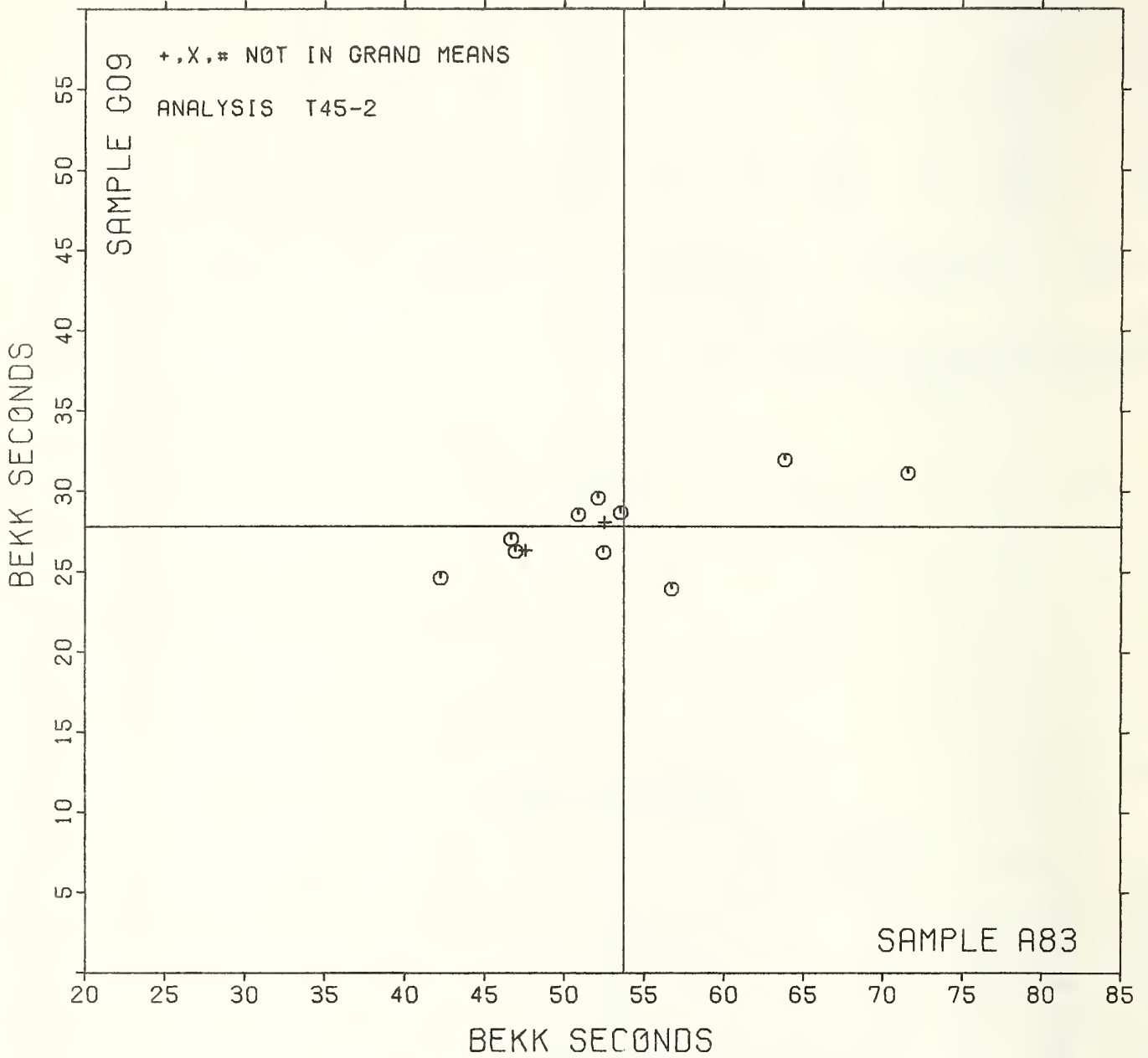
TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T45-2 TABLE 2
SMOOTHNESS, BEKK SECONDS

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		A83	G09	MAJOR	MINOR	R.SDR	VAR			
L182K	Ø	42.3	24.6	-11.9	-.7	1.00	45K	SMOOTHNESS,	BEKK	
L697	Ø	46.7	27.0	-7.1	-.8	.98	45K	SMOOTHNESS,	BEKK	
L564	Ø	46.9	26.3	-6.9	-.0	.91	45K	SMOOTHNESS,	BEKK	
L250M	*	47.5	26.3	-6.3	-.1	1.01	45L	SMOOTHNESS,	BEKK,	20 C. 65% RH
L274K	Ø	50.9	28.6	-2.6	1.3	.56	45K	SMOOTHNESS,	BEKK	
L139B	Ø	52.1	29.6	-1.2	2.1	.81	45K	SMOOTHNESS,	BEKK	
L581	Ø	52.5	26.2	-1.6	-1.3	.90	45K	SMOOTHNESS,	BEKK	
L251	*	52.5	28.1	-1.1	.5	.77	45L	SMOOTHNESS,	BEKK,	20 C. 65% RH
L162	Ø	53.5	28.7	.0	.9	1.12	45K	SMOOTHNESS,	BEKK	
L230B	Ø	56.7	23.9	2.1	-4.4	.84	45K	SMOOTHNESS,	BEKK	
L291K	Ø	63.9	31.9	10.8	1.9	1.22	45K	SMOOTHNESS,	BEKK	
L190C	Ø	71.6	31.1	18.2	-.6	1.67	45K	SMOOTHNESS,	BEKK	
GMEANS:		53.7	27.8			1.00				
		95% ELLIPSE:		28.0	6.1	WITH GAMMA = 12 DEGREES				

SMOOTHNESS, BEKK

SAMPLE A83 = 53.7 BEKK SECONDS SAMPLe G09 = 27.8 BEKK SECONDS



SMOOTHNESS, BENDTSEN (MILLILITERS/MINUTE)
TAPPI USEFUL TEST METHOD UM 535, SMOOTHNESS OF PAPER AND PAPERBOARD (BENDTSEN TESTER)

LAB CODE	OFFSET PRINTING A83 94 GRAMS PER SQUARE METER					PRINTING G09 75 GRAMS PER SQUARE METER					TEST D. = 10		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	118.	-9.	-.25	15.	.61	207.	-7.	-.42	33.	1.00	47B	6	L100
L182B	159.	32.	.93	30.	1.28	223.	8.	.46	36.	1.10	47B	6	L182B
L242	87.	-40.	-1.15	11.	.45	202.	-13.	-.71	34.	1.04	47B	6	L242
L244	114.	-13.	-.38	26.	1.08	193.	-22.	-1.22	35.	1.08	47B	6	L244
L280	178.	51.	1.48	49.	2.07	243.	28.	1.59	28.	.86	47B	6	L280
L313	104.	-22.	-.64	12.	.51	220.	5.	.30	30.	.92	47B	6	L313
GR. MEAN = 127. ML/MIN					GRAND MEAN = 215. ML/MIN					TEST DETERMINATIONS = 10			
SD MEANS = 35. ML/MIN					SD OF MEANS = 18. ML/MIN					6 LABS IN GRAND MEANS			
AVERAGE SDR = 24. ML/MIN					AVERAGE SDR = 33. ML/MIN								
TOTAL NUMBER OF LABORATORIES REPORTING = 6													

SMOOTHNESS, BENDTSEN (MILLILITERS/MINUTE)
TAPPI USEFUL TEST METHOD UM 535, SMOOTHNESS OF PAPER AND PAPERBOARD (BENDTSEN TESTER)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		A83	G09	MAJOR	MINOR	R.SDR	VAR			
L242	6	87.	202.	-42.	5.	.74	47B	SMOOTHNESS,	BENDTSEN,	WG 150
L313	6	104.	220.	-18.	14.	.72	47B	SMOOTHNESS,	BENDTSEN,	WG 150
L244	6	114.	193.	-21.	-15.	1.08	47B	SMOOTHNESS,	BENDTSEN,	WG 150
L100	6	118.	207.	-11.	-3.	.81	47B	SMOOTHNESS,	BENDTSEN,	WG 150
L182B	6	159.	223.	33.	-6.	1.19	47B	SMOOTHNESS,	BENDTSEN,	WG 150
L280	6	178.	243.	59.	5.	1.46	47B	SMOOTHNESS,	BENDTSEN,	WG 150
GMEANS:		127.	215.			1.00				
		95% ELLIPSE:		157.	41.	WITH GAMMA = 24 DEGREES				

TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T53-1 TABLE 1
 MOISTURE IN PAPER, PERCENT
 TAPPI SUGGESTED METHOD T412 SU-69

LAB CODE	SAMPLE G32 BLEACHED KRAFT ENVELOPE 106 GRAMS PER SQUARE METER					SAMPLE G41 WEB GLOSS 89 GRAMS PER SQUARE METER					TEST D. 10		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L134	5.540	.103	.36	.052	.34	3.690	.201	.84	.088	.88	53M	Ø	L134
L141	5.920	.483	1.67	.128	.83	3.912	.423	1.78	.008	.08	53D	Ø	L141
L162	NO DATA REPORTED FOR SAMPLE G32					3.160	-.329	-1.38	.084	.85	53M	M	L162
L213	5.280	-.157	-.54	.092	.60	3.430	-.059	-.25	.095	.95	53M	Ø	L213
L244	5.547	.110	.38	.106	.69	3.621	.132	.55	.085	.86	53D	Ø	L244
L291	5.500	.063	.22	.173	1.12	3.600	.111	.47	.000	.00	53D	Ø	L291
L376	5.600	.163	.56	.199	1.29	3.547	.058	.25	.171	1.71	53D	Ø	L376
L442	5.330	-.107	-.37	.183	1.19	3.070	-.419	-1.76	.134	1.34	53D	Ø	L442
L570	5.129	-.308	-1.06	.271	1.76	3.300	-.189	-.79	.150	1.50	53D	Ø	L570
L571	5.630	.193	.67	.082	.53	3.430	-.059	-.25	.048	.48	53M	Ø	L571
L592	6.190	.753	2.60	.032	.21	NO DATA REPORTED FOR SAMPLE G41					53M	M	L592
L729	4.890	-.547	-1.89	.256	1.66	3.290	-.199	-.84	.218	2.19	53D	Ø	L729
L753	5.760	.323	1.12	.084	.55	4.540	1.051	4.41	.052	.52	53M	#	L753

GR. MEAN = 5.437 PERCENT GRAND MEAN = 3.489 PERCENT TEST DETERMINATIONS = 10
 SD MEANS = .289 PERCENT SD OF MEANS = .238 PERCENT 10 LABS IN GRAND MEANS
 AVERAGE SDR = .154 PERCENT AVERAGE SDR = .100 PERCENT

L100	5.920	.483	1.67	.042	.27	3.810	.321	1.35	.032	.32	53X	*	L100
TOTAL NUMBER OF LABORATORIES REPORTING = 14													

Best values: G32 5.5 percent
 G41 3.5 percent

The following laboratories were omitted from the grand means because of extreme test results: 753

TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T53-1 TABLE 2
 MOISTURE IN PAPER, PERCENT
 TAPPI SUGGESTED METHOD T412 SU-69

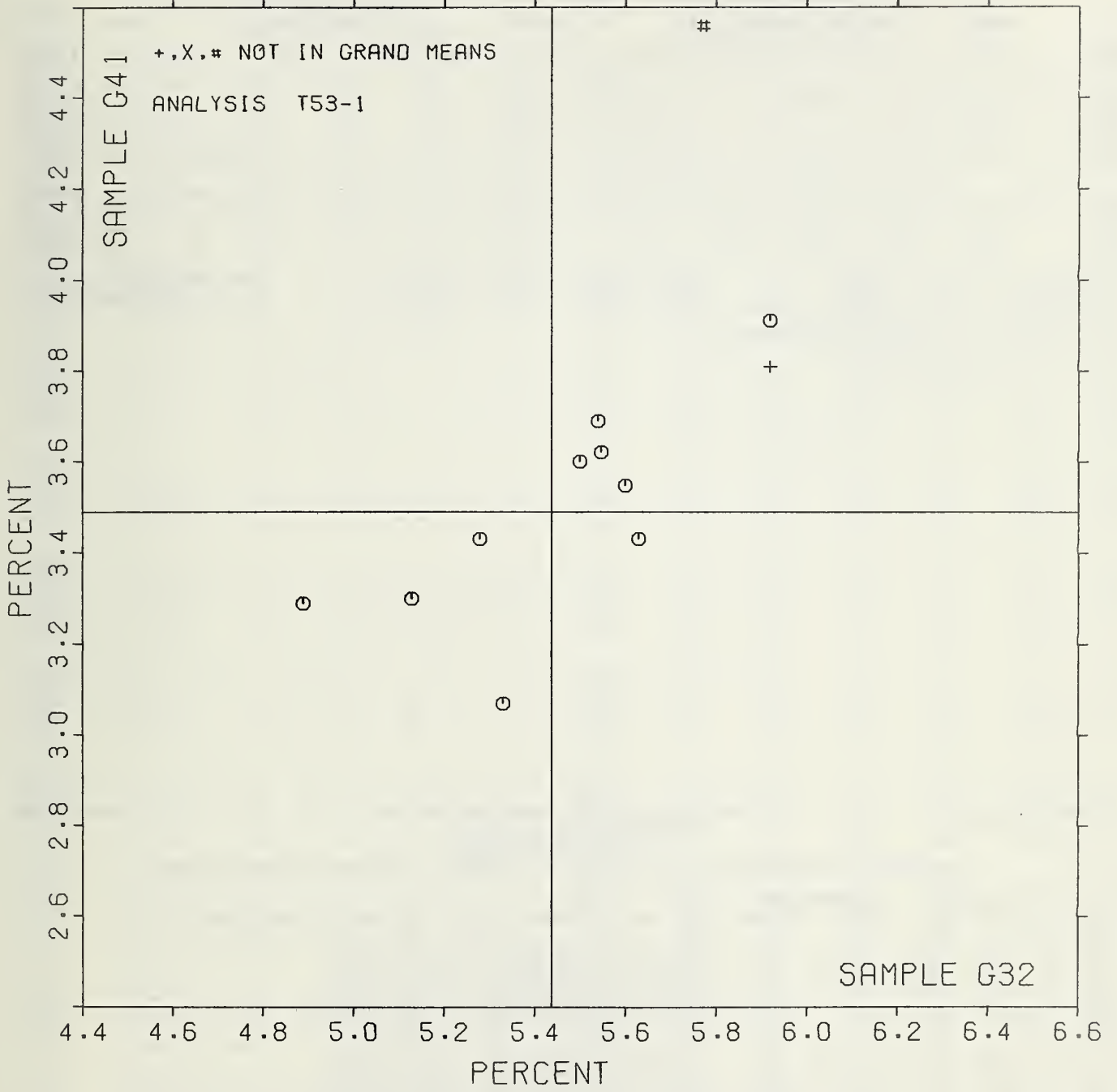
LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		G32	G41	MAJOR	MINOR	R.SDR	VAR	
L162	M		3.160			.85	53M	MOISTURE CONTENT, MOISTREX
L729	Ø	4.890	3.290	-.554	.177	1.92	53D	MOISTURE CONTENT, OVEN DRYING METHOD
L570	Ø	5.129	3.300	-.359	.038	1.63	53D	MOISTURE CONTENT, OVEN DRYING METHOD
L213	Ø	5.280	3.430	-.160	.049	.77	53M	MOISTURE CONTENT, MOISTREX
L442	Ø	5.330	3.070	-.340	-.267	1.26	53D	MOISTURE CONTENT, OVEN DRYING METHOD
L291	Ø	5.500	3.600	.118	.049	.56	53D	MOISTURE CONTENT, OVEN DRYING METHOD
L134	Ø	5.540	3.690	.205	.096	.61	53M	MOISTURE CONTENT, MOISTREX
L244	Ø	5.547	3.621	.168	.037	.77	53D	MOISTURE CONTENT, OVEN DRYING METHOD
L376	Ø	5.600	3.547	.165	-.054	1.50	53D	MOISTURE CONTENT, OVEN DRYING METHOD
L571	Ø	5.630	3.430	.117	-.165	.51	53M	MOISTURE CONTENT, MOISTREX
L753	#	5.760	4.540	.898	.634	.53	53M	MOISTURE CONTENT, MOISTREX
L100	*	5.920	3.810	.579	-.041	.30	53X	MOISTURE CONTENT; DESCRIBE METHOD
L141	Ø	5.520	3.912	.641	.039	.46	53D	MOISTURE CONTENT, OVEN DRYING METHOD
L592	M	6.190				.21	53M	MOISTURE CONTENT, MOISTREX

GMEANS: 5.437 3.489 1.00
 95% ELLIPSE: 1.114 .410 WITH GAMMA = 37 DEGREES

MOISTURE

SAMPLE G32 = 5.44 PERCENT

SAMPLE G41 = 3.49 PERCENT



TAPPI USEFUL TEST METHOD UM 553, PRINTING INK METHOD AND BRITISH STANDARD 4574-70

LAB CODE	HEAT SET OFFSET BOOK G04 76 GRAMS PER SQUARE METER					M.F. RELEASE PAPER G21 73 GRAMS PER SQUARE METER					TEST D. 4		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L126	55.1	-2.5	-.38	.7	.94	54.9	1.8	.28	2.0	.89	56K	Ø	L126
L149	54.2	-3.3	-.50	.5	.70	54.2	1.2	.18	1.0	.43	56K	Ø	L149
L182	60.4	2.8	.43	.3	.47	56.1	3.1	.47	.9	.41	56K	Ø	L182
L291	67.2	9.7	1.46	.5	.70	59.7	6.7	1.03	2.8	1.25	56K	Ø	L291
L333	55.0	-2.6	-.39	.9	1.31	51.9	-1.2	-.19	3.4	1.55	56K	Ø	L333
L337	47.0	-10.6	-1.61	1.1	1.48	42.5	-10.6	-1.63	5.0	2.28	56K	Ø	L337
L339	67.7	10.2	1.54	1.0	1.35	62.7	9.7	1.49	2.5	1.13	56K	Ø	L339
L616	56.7	-.8	-.13	1.0	1.35	45.0	-8.1	-1.25	1.2	.52	56K	Ø	L616
L643	54.8	-2.8	-.42	.5	.70	50.6	-2.5	-.38	1.2	.54	56K	Ø	L643

GR. MEAN • 57.6 K & N UNITS GRAND MEAN = 53.1 K & N UNITS TEST DETERMINATIONS = 4
SD MEANS • 6.6 K & N UNITS SD OF MEANS = 6.5 K & N UNITS 9 LABS IN GRAND MEANS
AVERAGE SDR = .7 K & N UNITS AVERAGE SDR = 2.2 K & N UNITS
TOTAL NUMBER OF LABORATORIES REPORTING • 9
Best values: G04 56 K&N units
 G21 54 K&N units

TAPPI USEFUL TEST METHOD UM 553, PRINTING INK METHOD AND BRITISH STANDARD 4574-70

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		G04	G21	MAJOR	MINOR	R.SDR	VAR	
L337	Ø	47.0	42.5	-15.0	-.1	1.88	56K	INK ABSORPTION, K&N INK TEST
L149	Ø	54.2	54.2	-1.6	3.2	.57	56K	INK ABSORPTION, K&N INK TEST
L643	Ø	54.8	50.6	-3.7	.2	.62	56K	INK ABSORPTION, K&N INK TEST
L333	Ø	55.0	51.9	-2.7	.9	1.43	56K	INK ABSORPTION, K&N INK TEST
L126	Ø	55.1	54.9	-.5	3.1	.91	56K	INK ABSORPTION, K&N INK TEST
L616	Ø	56.7	45.0	-6.3	-5.2	.94	56K	INK ABSORPTION, K&N INK TEST
L182	Ø	60.4	56.1	4.2	.2	.44	56K	INK ABSORPTION, K&N INK TEST
L291	Ø	67.2	59.7	11.6	-2.0	.98	56K	INK ABSORPTION, K&N INK TEST
L339	Ø	67.7	62.7	14.0	-.2	1.24	56K	INK ABSORPTION, K&N INK TEST
GMEANS:		57.6	53.1			1.00		
		95% ELLIPSE:		29.3	8.3	WITH GAMMA = 44 DEGREES		

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

LAB CODE	OFFSET WHITE BOOK					REPROCOPY					TEST D. 10		
	G27 MEAN	72 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	A99 MEAN	78 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L105	88.46	.85	1.38	.79	.78	90.56	1.00	1.57	.56	.67	60B	Ø	L105
L108	87.49	-.12	-.19	1.05	1.04	89.95	.39	.61	.70	.84	60B	Ø	L108
L115	88.40	.79	1.28	.95	.93	89.83	.27	.42	.76	.91	60B	Ø	L115
L118	87.91	.30	.49	.66	.65	89.34	-.22	-.35	.75	.90	60B	Ø	L118
L122	87.63	.02	.03	.79	.78	89.32	-.24	-.39	.89	1.06	60D	Ø	L122
L123	87.02	-.59	-.95	1.01	.99	89.60	.04	.06	1.01	1.21	60W	Ø	L123
L124	86.84	-.77	-1.24	1.26	1.24	89.82	.26	.40	1.13	1.36	60B	Ø	L124
L125	87.02	-.59	-.95	1.05	1.03	88.93	-.63	-1.00	.97	1.17	60B	Ø	L125
L132	87.47	-.14	-.22	1.04	1.02	89.54	-.02	-.04	.79	.94	60B	Ø	L132
L139	87.33	-.28	-.45	1.04	1.02	89.24	-.32	-.51	1.20	1.44	60B	Ø	L139
L148B	87.36	-.25	-.40	1.43	1.40	88.84	-.72	-1.14	.69	.83	60B	Ø	L148B
L152	87.71	.10	.16	.32	.32	89.48	-.08	-.13	.60	.72	60B	Ø	L152
L157	88.10	.49	.79	.88	.86	89.25	-.31	-.50	1.03	1.24	60B	Ø	L157
L158	86.42	-1.19	-1.92	1.72	1.69	88.51	-1.05	-1.66	1.11	1.33	60D	Ø	L158
L162	87.87	.26	.42	1.23	1.21	90.11	.55	.86	.97	1.17	60W	Ø	L162
L166	87.18	-.43	-.69	1.17	1.15	89.89	.33	.51	.81	.98	60B	Ø	L166
L173A	86.98	-.63	-1.02	1.40	1.38	88.90	-.66	-1.05	1.03	1.24	60B	Ø	L173A
L190C	87.23	-.38	-.61	.99	.97	89.26	-.30	-.48	1.17	1.40	60B	Ø	L190C
L190R	87.15	-.46	-.74	1.47	1.44	89.54	-.02	-.04	1.01	1.21	60B	Ø	L190R
L206	87.27	-.34	-.55	1.07	1.05	89.29	-.27	-.43	1.07	1.28	60B	Ø	L206
L210B	87.71	.10	.16	.82	.81	89.96	.40	.62	.93	1.12	60B	Ø	L210B
L210D	87.86	.25	.41	1.40	1.38	89.36	-.20	-.32	.85	1.01	60D	Ø	L210D
L211S	88.26	.65	1.05	1.00	.98	89.50	-.06	-.10	.29	.35	60R	Ø	L211S
L212	88.12	.51	.83	1.43	1.40	90.15	.59	.92	.89	1.07	60R	Ø	L212
L213	89.94	2.33	3.77	1.12	1.10	90.24	.68	1.06	.84	1.01	60B	X	L213
L223B	87.85	.24	.39	1.26	1.24	89.67	.11	.17	.53	.64	60B	Ø	L223B
L225	87.28	-.33	-.53	.54	.53	90.05	.49	.76	.48	.57	60B	Ø	L225
L226B	86.87	-.74	-1.19	1.02	1.00	89.03	-.53	-.84	.99	1.18	60B	Ø	L226B
L228	87.29	-.32	-.52	1.22	1.20	88.72	-.84	-1.33	1.10	1.32	60B	Ø	L228
L230	88.00	.39	.63	.70	.69	89.37	-.19	-.31	.57	.68	60B	Ø	L230
L238A	86.10	-1.51	-2.44	.66	.65	88.05	-1.51	-2.39	.58	.69	60R	*	L238A
L241	88.10	.49	.79	.97	.95	89.39	-.17	-.28	.43	.51	60B	Ø	L241
L254	87.60	-.01	-.01	1.31	1.29	89.43	-.13	-.21	.57	.68	60B	Ø	L254
L259	87.68	.07	.11	.92	.91	89.35	-.21	-.34	.67	.80	60B	Ø	L259
L262	88.87	1.26	2.04	.87	.85	90.45	.89	1.39	.61	.73	60R	Ø	L262
L275	87.55	-.06	-.10	.57	.56	89.62	.06	.09	1.16	1.39	60R	Ø	L275
L278	87.51	-.10	-.16	.96	.95	89.46	-.10	-.17	.43	.51	60B	Ø	L278
L285D	87.52	-.09	-.14	.71	.69	89.21	-.35	-.56	.64	.77	60D	Ø	L285D
L285R	87.69	.08	.13	.70	.69	88.96	-.60	-.95	.39	.46	60R	Ø	L285R
L288	87.87	.26	.42	1.01	1.00	89.74	.18	.28	1.20	1.44	60D	Ø	L288
L301	87.42	-.19	-.31	1.09	1.07	89.00	-.56	-.89	1.09	1.30	60B	Ø	L301
L308	87.88	.27	.44	.93	.91	90.10	.54	.84	.71	.86	60H	Ø	L308
L317	88.07	.46	.75	.56	.55	89.50	-.06	-.10	.58	.69	60B	Ø	L317
L323	88.23	.62	1.00	1.26	1.24	90.14	.58	.91	.76	.91	60W	Ø	L323
L339	87.90	.29	.47	1.10	1.08	89.00	-.56	-.89	.94	1.13	60B	Ø	L339
L341	87.35	-.26	-.42	.78	.77	89.23	-.33	-.53	.50	.60	60R	Ø	L341
L348	87.89	.28	.45	.96	.94	88.88	-.68	-1.08	.73	.88	60D	Ø	L348
L349	86.69	-.92	-1.49	1.04	1.03	88.79	-.77	-1.22	.67	.80	60D	Ø	L349
L354	87.10	-.51	-.82	1.52	1.50	89.30	-.26	-.42	1.25	1.50	60B	Ø	L354
L366	88.20	.59	.96	.79	.78	89.60	.04	.06	1.07	1.29	60B	Ø	L366
L390	87.05	-.56	-.90	1.15	1.13	89.04	-.52	-.83	.78	.94	60B	Ø	L390
L554	89.25	1.64	2.65	.83	.82	91.15	1.59	2.50	.51	.61	60B	*	L554
L567	86.97	-.64	-1.03	.68	.67	88.21	-1.35	-2.13	.92	1.11	60D	Ø	L567
L571	87.90	.29	.47	1.64	1.61	89.62	.06	.09	1.26	1.51	60D	Ø	L571
L573	87.58	-.03	-.05	.93	.92	89.97	.41	.64	.75	.89	60B	Ø	L573
L581	87.92	.31	.50	.81	.80	89.91	.35	.54	1.22	1.46	60B	Ø	L581
L587	87.74	.13	.21	1.12	1.10	89.76	.20	.31	1.01	1.22	60B	Ø	L587
L592	86.02	-1.59	-2.57	1.20	1.18	88.89	-.67	-1.06	.82	.98	60W	*	L592
L594	87.99	.38	.62	.96	.95	90.49	.93	1.46	.64	.77	60D	Ø	L594
L608	89.84	2.23	3.61	.61	.60	91.25	1.69	2.66	1.04	1.25	60D	X	L608
L654	88.02	.41	.66	.89	.87	90.05	.49	.76	.96	1.15	60B	Ø	L654
L673P	87.83	.22	.36	.71	.70	89.93	.37	.58	1.08	1.29	60B	Ø	L673P
L673T	86.85	-.76	-1.23	1.24	1.21	90.15	.59	.92	.69	.82	60B	*	L673T
L692	89.16	1.55	2.51	1.02	1.00	87.24	-2.32	-3.66	1.03	1.23	60D	X	L692
L698	84.87	-2.74	-4.43	1.29	1.27	87.10	-2.46	-3.88	1.07	1.29	60D	*	L698

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

LAB CODE	OFFSET WHITE BOOK 72 GRAMS PER SQUARE METER					REPROCOPY 78 GRAMS PER SQUARE METER					TEST D. = 10		
	SAMPLE G27 MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE A99 MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L712	89.43	1.82	2.94	.96	.95	91.37	1.81	2.84	1.12	1.34	60B	*	L712
L738	87.43	-.18	-.29	.90	.88	90.78	1.22	1.91	.97	1.16	60D	*	L738
L753	87.79	.18	.29	1.27	1.25	90.73	1.17	1.84	.64	.77	60D	Ø	L753
L755	87.51	-.10	-.16	1.07	1.05	89.46	-.10	-.17	.65	.78	60R	Ø	L755
GR. MEAN = 87.61 PERCENT					GRAND MEAN = 89.56 PERCENT					TEST DETERMINATIONS = 10			
SD MEANS = .62 PERCENT					SD OF MEANS = .63 PERCENT					65 LABS IN GRAND MEANS			
AVERAGE SDR = 1.02 PERCENT					AVERAGE SDR = .83 PERCENT								
L100	87.92	.31	.50	.66	.65	90.04	.48	.75	.88	1.06	60E	+	L100
L224	87.40	-.21	-.34	.81	.80	89.30	-.26	-.42	1.03	1.24	60P	+	L224
L249	86.00	-1.61	-2.60	1.08	1.06	87.82	-1.74	-2.75	.55	.65	60P	+	L249
L256	85.88	-1.73	-2.80	.76	.74	88.56	-1.00	-1.58	.89	1.06	60N	+	L256
L274P	87.90	.29	.47	1.05	1.03	89.10	-.46	-.73	.66	.79	60P	+	L274P
L312	85.55	-2.06	-3.33	.80	.78	87.65	-1.91	-3.02	.78	.94	60P	+	L312
L380	87.20	-.41	-.66	.42	.41	88.60	-.96	-1.52	.52	.62	60P	+	L380
L564	86.80	-.81	-1.31	.79	.78	88.80	-.76	-1.21	1.14	1.36	60P	+	L564
L685B	88.45	.84	1.36	.80	.78	89.35	-.21	-.34	.97	1.17	60P	+	L685B
L702	87.10	-.51	-.82	.74	.73	88.15	-1.41	-2.23	.88	1.06	60P	+	L702
L704	87.25	-.36	-.58	.54	.53	88.30	-1.26	-1.99	.35	.42	60P	+	L704
L706	85.38	-2.23	-3.60	1.44	1.42	88.09	-1.47	-2.32	.98	1.17	60X	+	L706
TOTAL NUMBER OF LABORATORIES REPORTING = 81													
Best values: G27 87.6 ± 1.0 percent													
A99 89.5 ± 1.1 percent													

The following laboratories were omitted from the grand means because of extreme test results: 698

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		G27	A99	MAJOR	MINOR	R.SDR	VAR	
L698	#	84.87	87.10	-3.68	.27	1.28	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L706	*	85.38	88.09	-2.61	.58	1.30	60X	OPACITY, 82 T0 95%: GIVE INSTRUMENT MAKE, MODEL, BACKING
L312	*	85.55	87.65	-2.81	.16	.86	60P	OPACITY (WHITE BACKING)82 T0 95%, PHOTOVOLT
L256	*	85.88	88.56	-1.92	.55	.90	60N	OPACITY (WHITE BACKING)82 T0 95%, HUNTER
L249	*	86.00	87.82	-2.37	-.05	.86	60P	OPACITY (WHITE BACKING)82 T0 95%, PHOTOVOLT
L592	*	86.02	88.89	-1.59	.68	1.08	60W	OPACITY (WHITE BACKING)82 T0 95%, HUYGEN,DIGITAL
L238A	*	86.10	88.05	-2.14	.04	.67	60R	OPACITY (WHITE BACKING)82 T0 95%, THWING-ALBERT (WAS SRL)
L158	0	86.42	88.51	-1.58	.13	1.51	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L349	0	86.69	88.79	-1.20	.13	.91	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L564	*	86.80	88.80	-1.11	.05	1.07	60P	OPACITY (WHITE BACKING)82 T0 95%, PHOTOVOLT
L124	0	86.84	89.82	-.35	.73	1.30	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L673T	*	86.85	90.15	-.10	.95	1.02	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L226B	0	86.87	89.03	-.90	.16	1.09	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L567	0	86.97	88.21	-1.42	-.48	.89	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L173A	0	86.98	88.90	-.92	-.01	1.31	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L123	0	87.02	89.60	-.38	.45	1.10	60W	OPACITY (WHITE BACKING)82 T0 95%, HUYGEN,DIGITAL
L125	0	87.02	88.93	-.87	-.02	1.10	60H	OPACITY (WHITE BACKING)82 T0 95%, HUYGEN
L390	0	87.05	89.04	-.77	.04	1.04	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L702	*	87.10	88.15	-1.37	-.61	.89	60P	OPACITY (WHITE BACKING)82 T0 95%, PHOTOVOLT
L354	0	87.10	89.30	-.54	.18	1.50	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L190R	0	87.15	89.54	-.34	.31	1.33	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L166	0	87.18	89.89	-.06	.53	1.06	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L380	*	87.20	88.60	-.98	-.37	.52	60P	OPACITY (WHITE BACKING)82 T0 95%, PHOTOVOLT
L190C	0	87.23	89.26	-.48	.06	1.18	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L704	*	87.25	88.30	-1.16	-.62	.47	60P	OPACITY (WHITE BACKING)82 T0 95%, PHOTOVOLT
L206	0	87.27	89.29	-.43	.05	1.16	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L225	0	87.28	90.05	-.12	.57	.55	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L228	0	87.29	88.72	-.83	-.36	1.26	60H	OPACITY (WHITE BACKING)82 T0 95%, HUYGEN
L139	0	87.33	89.24	-.43	-.02	1.23	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L341	0	87.35	89.23	-.42	-.05	.68	60R	OPACITY (WHITE BACKING)82 T0 95%, THWING-ALBERT (WAS SRL)
L148H	0	87.36	88.84	-.70	-.32	1.12	60H	OPACITY (WHITE BACKING)82 T0 95%, HUYGEN
L224	*	87.40	89.30	-.34	-.03	1.02	60P	OPACITY (WHITE BACKING)82 T0 95%, PHOTOVOLT
L301	0	87.42	89.00	-.54	-.26	1.19	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L738	*	87.43	90.78	.75	.97	1.02	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L132	0	87.47	89.54	-.11	.08	.98	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L108	0	87.49	89.95	-.20	.35	.94	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L755	0	87.51	89.46	-.14	-.00	.92	60R	OPACITY (WHITE BACKING)82 T0 95%, THWING-ALBERT (WAS SRL)
L278	0	87.51	89.46	-.14	-.00	.73	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L285D	0	87.52	89.21	-.32	-.18	.73	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L275	A	87.55	89.62	-.00	.08	.98	60R	OPACITY (WHITE BACKING)82 T0 95%, THWING-ALBERT (WAS SRL)
L573	0	87.58	89.97	-.27	.30	.91	60H	OPACITY (WHITE BACKING)82 T0 95%, HUYGEN
L254	0	87.60	89.43	-.10	-.09	.99	60H	OPACITY (WHITE BACKING)82 T0 95%, HUYGEN
L122	0	87.63	89.32	-.16	-.18	.92	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L259	0	87.68	89.35	-.11	-.20	.86	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L285R	0	87.69	88.96	-.38	-.48	.58	60R	OPACITY (WHITE BACKING)82 T0 95%, THWING-ALBERT (WAS SRL)
L210B	0	87.71	89.96	.35	.20	.96	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L152	0	87.71	89.48	.01	-.13	.52	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L587	0	87.74	89.76	.23	.04	1.16	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L753	0	87.79	90.73	.97	.68	1.01	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L673R	0	87.83	89.93	.42	.09	1.00	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L223B	0	87.85	89.67	.24	-.10	.94	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L210D	0	87.86	89.36	.03	-.32	1.20	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L288	0	87.87	89.74	.31	-.07	1.22	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L162	0	87.87	90.11	.57	.19	1.19	60W	OPACITY (WHITE BACKING)82 T0 95%, HUYGEN,DIGITAL
L308	0	87.88	90.10	.57	.18	.89	60H	OPACITY (WHITE BACKING)82 T0 95%, HUYGEN
L348	0	87.89	88.88	-.30	-.68	.91	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L571	0	87.90	89.62	.24	-.17	1.56	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L274P	*	87.90	89.10	-.13	-.53	.91	60P	OPACITY (WHITE BACKING)82 T0 95%, PHOTOVOLT
L339	0	87.90	89.00	-.21	-.60	1.11	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L118	0	87.91	89.34	.05	-.37	.77	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L100	*	87.92	90.04	.56	.11	.86	60E	OPACITY (WHITE BACKING)82 T0 95%, S.ELREPHO,EMY-C(10) FILTER
L581	0	87.92	89.91	.46	.02	1.13	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L594	0	87.99	90.49	.93	.37	.86	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2
L230	0	88.00	89.37	.13	-.42	.68	60B	OPACITY (WHITE BACKING)82 T0 95%, BAUSCH * LOMB
L654	0	88.02	90.05	.63	.04	1.01	60D	OPACITY (WHITE BACKING)82 T0 95%, BNL-2

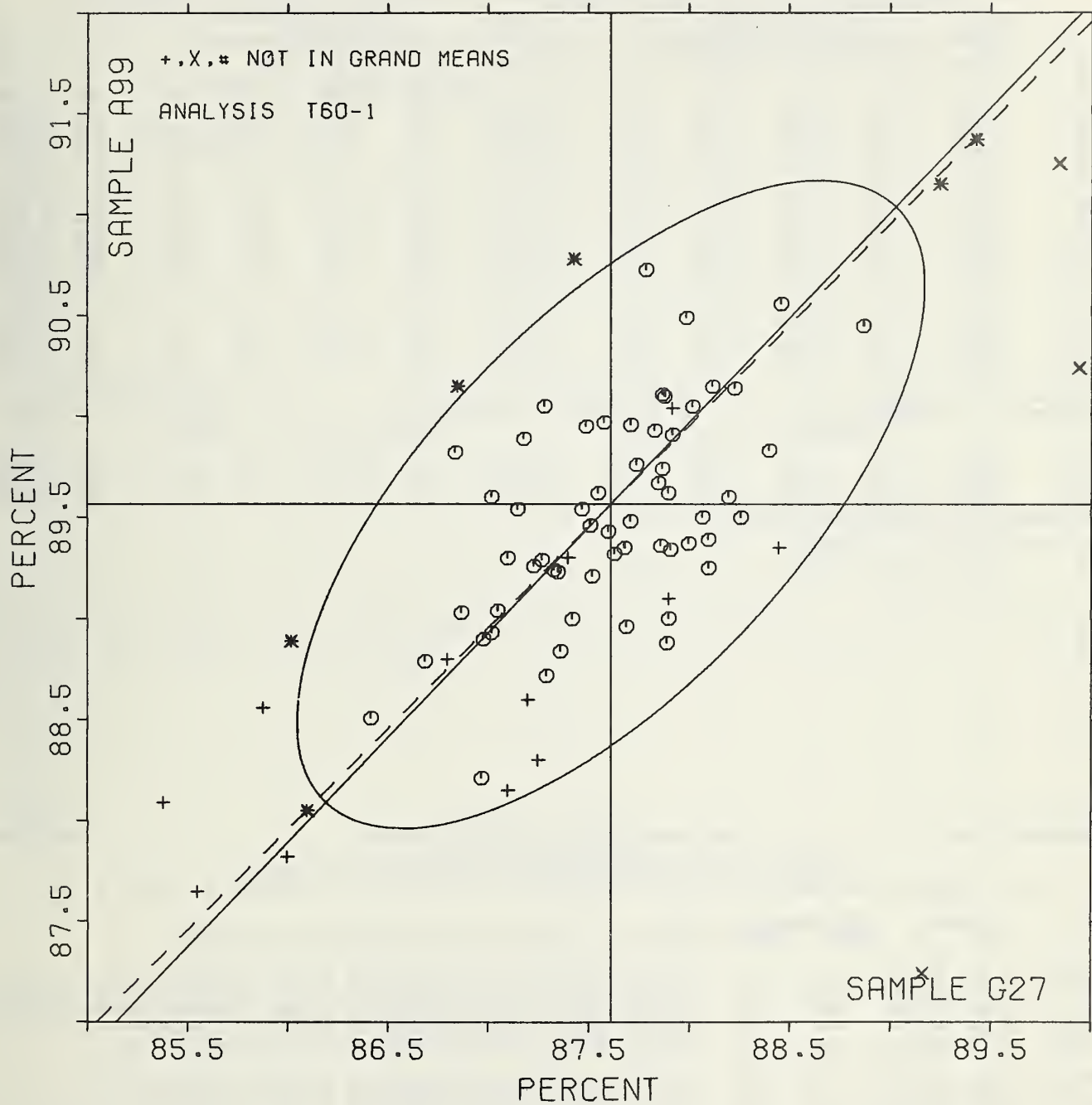
OPACITY (89% REFLECTANCE BACKING) IN PERCENT - PRIMARILY FINE PAPERS
TAPPI OFFICIAL TEST METHOD T425 6S-75, OPACITY OF PAPEP (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---	CONDITIONS
		G27	A99	MAJOR	MINOR	R.SDR	VAR		
L317	Ø	88.07	89.50	.27	-.38	.62	60B	OPACITY (WHITE BACKING)	82 TØ 95%, BAUSCH * LOMB
L157	Ø	88.10	89.25	.11	-.57	1.05	60B	OPACITY (WHITE BACKING)	82 TØ 95%, BAUSCH * LOMB
L241	Ø	88.10	89.39	.21	-.48	.73	60B	OPACITY (WHITE BACKING)	82 TØ 95%, BAUSCH * LOMB
L212	Ø	88.12	90.15	.78	.04	1.24	60H	OPACITY (WHITE BACKING)	82 TØ 95%, HUYGEN
L366	Ø	88.20	89.60	.44	-.40	1.03	60B	OPACITY (WHITE BACKING)	82 TØ 95%, BAUSCH * LOMB
L323	Ø	88.23	90.14	.85	-.05	1.07	60W	OPACITY (WHITE BACKING)	82 TØ 95%, HUYGEN, DIGITAL
L211S	Ø	88.26	89.50	.40	-.51	.66	60R	OPACITY (WHITE BACKING)	82 TØ 95%, THWING-ALBERT (WAS SRL)
L115	Ø	88.40	89.83	.74	-.39	.92	60B	OPACITY (WHITE BACKING)	82 TØ 95%, BAUSCH * LOMB
L685B	*	88.45	89.35	.43	-.76	.98	60P	OPACITY (WHITE BACKING)	82 TØ 95%, PHOTOVOLT
L105	Ø	88.46	90.56	1.31	.08	.72	60H	OPACITY (WHITE BACKING)	82 TØ 95%, HUYGEN
L262	Ø	88.87	90.45	1.51	-.30	.79	60R	OPACITY (WHITE BACKING)	82 TØ 95%, THWING-ALBERT (WAS SRL)
L692	X	89.16	87.24	-.60	-2.73	1.12	60D	OPACITY (WHITE BACKING)	82 TØ 95%, BNL-2
L554	*	89.25	91.15	2.28	-.08	.71	60B	OPACITY (WHITE BACKING)	82 TØ 95%, BAUSCH * LOMB
L712	*	89.43	91.37	2.56	-.06	1.14	60B	OPACITY (WHITE BACKING)	82 TØ 95%, BAUSCH * LOMB
L608	X	89.84	91.25	2.76	-.44	.92	60D	OPACITY (WHITE BACKING)	82 TØ 95%, BNL-2
L213	X	89.94	90.24	2.10	-1.21	1.05	60B	OPACITY (WHITE BACKING)	82 TØ 95%, BAUSCH * LOMB
GMEANS:		87.61	89.56			1.00			
		95% ELLIPSE:		2.04	.91	WITH GAMMA = 46 DEGREES			

OPACITY, B&L, 89% BACKING, FINE P.

SAMPLE G27 = 87.6 PERCENT

SAMPLE A99 = 89.6 PERCENT



OPACITY (PAPER BACKING) IN PERCENT - PRIMARILY FINE PAPERS
TAPPI OFFICIAL TEST METHOD T519 GS-78, DIFFUSE OPACITY OF PAPER - ILLUMINANT C, ELREPHO TYPE

L CODE	OFFSET WHITE BOCK 72 GRAMS PER SQUARE METER					SAMPLE A99 78 GRAMS PER SQUARE METER					REPROCOPY			TEST D. ° 10		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB			
L176	89.78	.18	.53	.59	.96	91.29	.27	1.28	.88	1.18	60J	Ø	L10C			
L182E	89.18	-.42	-1.23	.52	.84	90.93	-.09	-.42	.92	1.23	60J	Ø	L182E			
L233	89.23	-.37	-1.08	.59	.96	91.03	.01	.05	.57	.77	60J	Ø	L233			
L242	90.00	.40	1.17	.50	.82	91.04	.02	.10	.92	1.24	60J	Ø	L242			
L250T	89.76	.16	.47	.59	.96	91.15	.13	.62	.51	.69	60J	Ø	L250T			
L251	89.69	.09	.27	.84	1.36	90.71	-.31	-1.46	.62	.84	60F	Ø	L251			
L309	89.00	-.60	-1.75	.58	.95	90.99	-.03	-.14	.96	1.30	60J	Ø	L309			
L313	89.84	.24	.70	.51	.83	91.06	.04	.19	.94	1.26	60J	Ø	L313			
L360	89.91	.31	.91	.25	.40	90.86	-.16	-.75	.27	.36	60F	Ø	L360			
L446	89.53	-.07	-.21	.66	1.08	91.04	.02	.08	1.02	1.38	60J	Ø	L446			
L575	90.00	.40	1.17	.74	1.21	91.06	.04	.19	.69	.92	60J	Ø	L575			
L598	89.16	-.44	-1.28	.80	1.31	91.07	.05	.24	.47	.63	60J	Ø	L598			
L678	89.89	.29	.85	.62	1.00	91.44	.42	2.00	.59	.80	60J	Ø	L678			
L685A	89.43	-.17	-.50	.81	1.31	90.60	-.42	-1.99	1.03	1.39	60F	Ø	L685A			

GR. MEAN = 89.60 PERCENT GRAND MEAN = 91.02 PERCENT TEST DETERMINATIONS = 10
SD MEANS = .34 PERCENT SD OF MEANS = .21 PERCENT 14 LABS IN GRAND MEANS
AVERAGE SDR = .61 PERCENT AVERAGE SDR = .74 PERCENT

L118	89.42	-.18	-.53	.94	1.53	90.59	-.43	-2.03	.87	1.17	60C	+	L118
L190C	89.20	-.40	-1.17	.55	.89	90.29	-.73	-3.46	.90	1.21	60C	+	L190C
L190R	88.92	-.68	-1.99	.98	1.59	90.66	-.36	-1.70	.89	1.20	60C	+	L190R

TOTAL NUMBER OF LABORATORIES REPORTING = 17

Best values: G27 89.7 ± 0.6 percent
A99 91.0 ± 0.4 percent

OPACITY (PAPER BACKING) IN PERCENT - PRIMARILY FINE PAPERS
TAPPI OFFICIAL TEST METHOD T519 GS-78, DIFFUSE OPACITY OF PAPER - ILLUMINANT C, ELREPHO TYPE

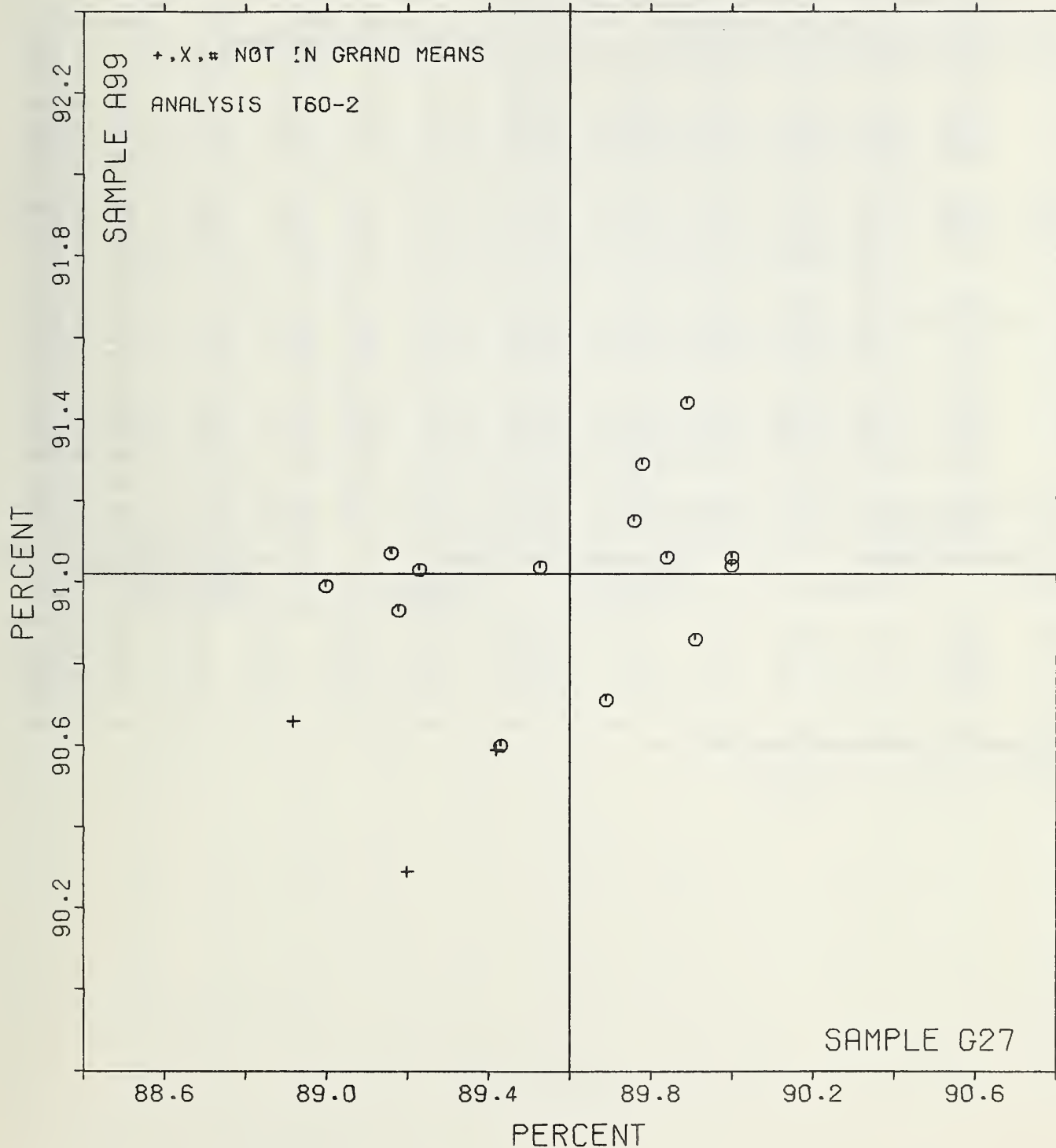
LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS					
		G27	A99	MAJOR	MINOR	R.SDR	VAR						
L190R	+	88.92	90.66	-.75	-.19	1.40	60C	OPACITY (PAPER BACKING) 82 TØ 95%, BAUSCH + LØMB					
L309	Ø	89.00	90.99	-.59	.11	1.12	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					
L598	Ø	89.16	91.07	-.42	.15	.97	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					
L182E	Ø	89.18	90.93	-.43	.01	1.04	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					
L190C	+	89.20	90.29	-.56	-.61	1.05	60C	OPACITY (PAPER BACKING) 82 TØ 95%, BAUSCH + LØMB					
L233	Ø	89.23	91.03	-.36	.10	.87	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					
L118	+	89.42	90.59	-.28	-.37	1.35	60C	OPACITY (PAPER BACKING) 82 TØ 95%, BAUSCH + LØMB					
L685A	Ø	89.43	90.60	-.27	-.37	1.35	60F	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) NØ TRAP					
L446	Ø	89.53	91.04	-.07	.03	1.23	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					
L251	Ø	89.69	90.71	.02	-.32	1.10	60F	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) NØ TRAP					
L250T	Ø	89.76	91.15	.19	.09	.83	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					
L100	Ø	89.78	91.29	.24	.22	1.07	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					
L313	Ø	89.84	91.06	.24	-.02	1.05	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					
L678	Ø	89.89	91.44	.38	.34	.90	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					
L360	Ø	89.91	90.86	.26	-.23	.38	60F	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) NØ TRAP					
L242	Ø	90.00	91.04	.39	-.08	1.03	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					
L575	Ø	90.00	91.06	.40	-.06	1.07	60J	OPACITY (PAPER BACKING) 82 TØ 95%, Z.ELREPHØ,FMY-C(10) FILTER					

GMEANS: 89.60 91.02 1.00
95% ELLIPSE: 1.01 .58 WITH GAMMA = 13 DEGREES

OPACITY, ELREPHO, PAPER BACKING, FINE P

SAMPLE G27 = 89.60 PERCENT

SAMPLE A99 = 91.02 PERCENT



OPACITY (89% REFLECTANCE BACKING) IN PERCENT - PRIMARILY NEWS, DIRECTORY, AND CATALOG
TAPPI OFFICIAL TEST METHOD T425 6S-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	SAMPLE A56 MEAN	AIR MAIL ENVELOPE 49 GRAMS PER SQUARE METER				SAMPLE G42 MEAN	100% RAG 54 GRAMS PER SQUARE METER				TEST D. - 10		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L121	78.91	-.11	-.17	1.29	1.33	69.05	.68	1.07	.44	.61	61B	0	L121
L122	78.35	-.67	-1.01	.62	.63	68.22	-.15	-.24	.67	.92	61D	0	L122
L131	78.20	-.82	-1.24	1.62	1.66	67.40	-.97	-1.53	1.17	1.61	61R	0	L131
L134	80.07	1.05	1.58	.95	.98	68.79	.42	.66	.58	.80	61R	0	L134
L150B	77.80	-1.22	-1.84	1.70	1.74	67.50	-.87	-1.38	.53	.72	61B	0	L150B
L159	79.12	.10	.15	.71	.73	68.04	-.33	-.52	.33	.46	61R	0	L159
L210B	79.75	.73	1.10	.88	.90	68.79	.42	.66	.81	1.12	61B	0	L210B
L210D	79.38	.36	.54	.84	.86	68.58	.21	.33	.87	1.20	61D	0	L210D
L261	80.10	1.08	1.62	1.51	1.54	69.45	1.08	1.71	.69	.94	61B	0	L261
L281	79.74	.72	1.08	.75	.77	68.82	.45	.71	.72	.98	61D	0	L281
L305	78.49	-.53	-.80	.39	.40	68.02	-.35	-.55	.45	.61	61B	0	L305
L315	78.95	-.07	-.11	1.24	1.27	67.93	-.44	-.70	.83	1.14	61D	0	L315
L317	78.77	-.25	-.38	1.19	1.22	68.28	-.09	-.14	.34	.46	61B	0	L317
L318	79.45	.43	.64	1.17	1.19	68.40	.03	.05	1.02	1.41	61B	0	L318
L326	78.70	-.32	-.49	1.14	1.17	68.78	.41	.65	.54	.74	61B	0	L326
L326	80.00	.98	1.47	.00	.00	69.40	1.03	1.63	.97	1.33	61B	0	L326
L333	78.61	-.41	-.62	.57	.58	67.62	-.75	-1.19	.78	1.07	61B	0	L333
L352	78.15	-.87	-1.31	1.23	1.26	68.39	.02	.03	.67	.92	61R	0	L352
L581	79.10	.08	.12	1.26	1.29	68.15	-.22	-.35	.72	.99	61B	0	L581
L599	79.65	.63	.95	.88	.90	69.55	1.18	1.86	.80	1.10	61B	0	L599
L713	78.21	-.81	-1.22	.59	.60	67.96	-.41	-.65	.49	.67	61R	0	L713
L738	79.14	.12	.18	1.05	1.08	67.44	-.93	-1.47	1.50	2.07	61D	0	L738
L756	78.87	-.15	-.23	.86	.88	67.96	-.41	-.65	.82	1.13	61R	0	L756
GR. MEAN - 79.02 PERCENT		GRAND MEAN - 68.37 PERCENT				TEST DETERMINATIONS - 10							
SD MEANS - .66 PERCENT		SD OF MEANS - .63 PERCENT				23 LABS IN GRAND MEANS							
AVERAGE SDR -		.98 PERCENT				AVERAGE SDR - .73 PERCENT							
L150J	75.38	-3.64	-5.48	.29	.30	70.94	2.57	4.06	.24	.33	61J	*	L150J
L153	79.55	.53	.79	.50	.51	68.37	-.00	-.00	.69	.95	61C	*	L153
L244	80.97	1.95	2.93	.47	.48	71.23	2.86	4.52	.52	.71	61J	*	L244
L260	78.76	-.26	-.39	.40	.41	68.49	.12	.19	.28	.39	61P	*	L260
L687	79.00	-.02	-.03	.82	.84	67.15	-1.22	-1.93	.78	1.08	61P	*	L687
L743	86.77	7.75	11.67	.45	.47	74.99	6.62	10.46	.80	1.10	61G	*	L743
TOTAL NUMBER OF LABORATORIES REPORTING - 29													
Best values: A56 79.0 ± 1.1 percent													
G42 68.3 ± 1.1 percent													

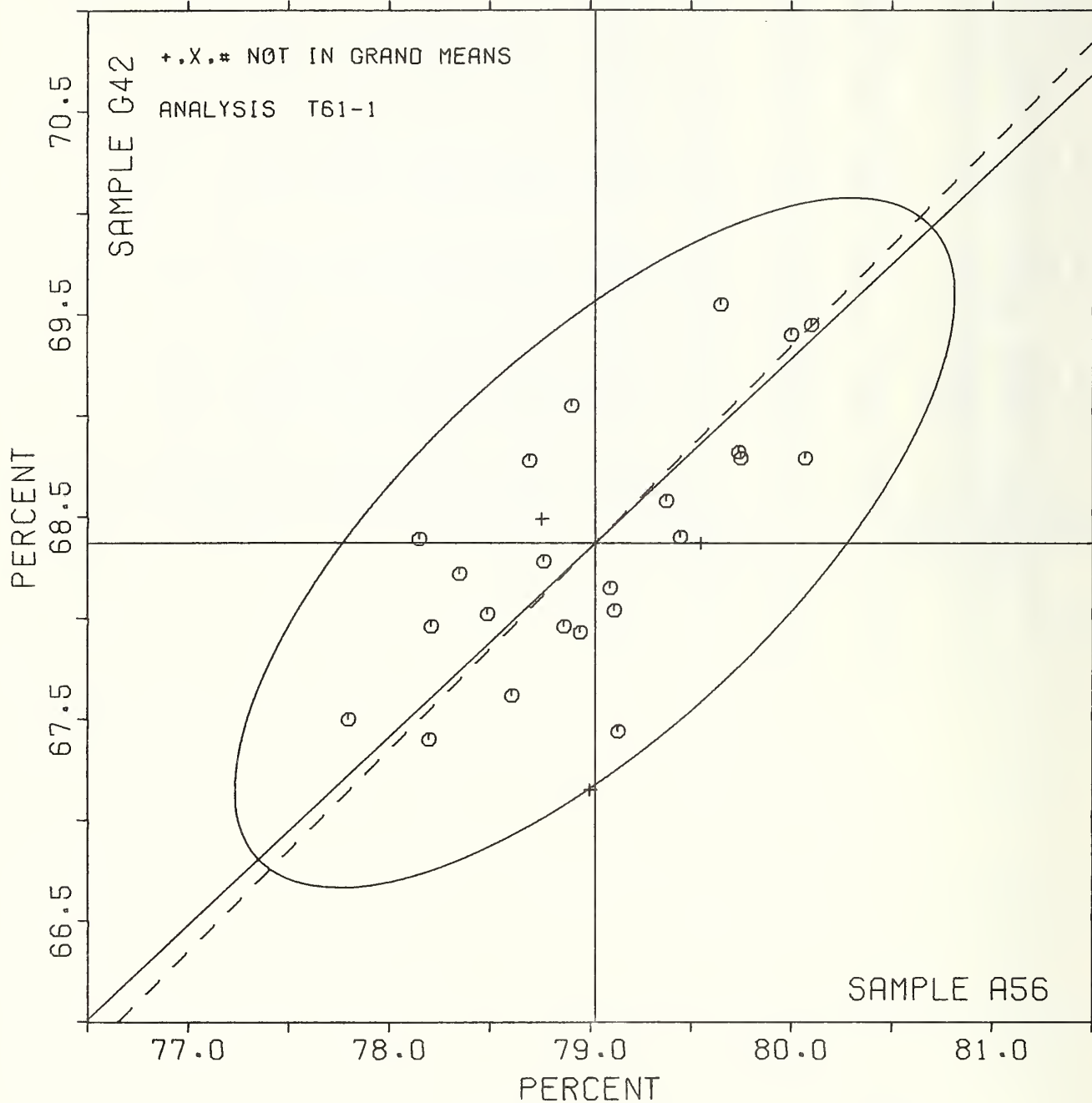
OPACITY (89% REFLECTANCE BACKING) IN PERCENT - PRIMARILY NEWS, DIRECTORY, AND CATALOG
TAPPI OFFICIAL TEST METHOD T425 6S-75, OPACITY OF PAPER (15 DEG./DIFFUSE, ILLUMINANT A) - B&L TYPE

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		A56	G42	MAJOR	MINOR	R.SDR	VAR	
L150J	*	75.38	70.94	-.90	4.36	.32	61J	OPACITY (PAPER BACKING)70 T6 90%, Z.ELREPH6,FMY-C(10) FILTER
L150B	0	77.80	67.50	-1.49	.20	1.23	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L352	0	78.15	68.39	-.62	.61	1.09	61R	OPACITY (WHITE BACKING)70 T6 90%, THWING-ALBERT (WAS SRL)
L131	0	78.20	67.40	-1.26	-.15	1.64	61R	OPACITY (WHITE BACKING)70 T6 90%, THWING-ALBERT (WAS SRL)
L713	0	78.21	67.96	-.87	.26	.63	61R	OPACITY (WHITE BACKING)70 T6 90%, THWING-ALBERT (WAS SRL)
L122	0	78.35	68.22	-.59	.35	.78	61D	OPACITY (WHITE BACKING)70 T6 90%, BNL-2
L305	0	78.49	68.02	-.63	.11	.51	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L333	0	78.61	67.62	-.81	-.27	.83	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L326	0	78.70	68.78	.04	.52	.96	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L260	*	78.76	68.49	-.11	.27	.40	61P	OPACITY (WHITE BACKING)70 T6 90%, PHOTOVOLT
L317	0	78.77	68.28	-.25	.11	.84	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L756	0	78.87	67.96	-.39	-.20	1.01	61R	OPACITY (WHITE BACKING)70 T6 90%, THWING-ALBERT (WAS SRL)
L121	0	78.91	69.05	.38	.57	.97	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L315	0	78.95	67.93	-.35	-.27	1.21	61D	OPACITY (WHITE BACKING)70 T6 90%, BNL-2
L687	*	79.00	67.15	-.85	-.88	.96	61P	OPACITY (WHITE BACKING)70 T6 90%, PHOTOVOLT
L591	0	79.10	68.15	-.09	-.21	1.14	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L159	0	79.12	68.04	-.15	-.31	.59	61R	OPACITY (WHITE BACKING)70 T6 90%, THWING-ALBERT (WAS SRL)
L738	0	79.14	67.44	-.55	-.76	1.57	61D	OPACITY (WHITE BACKING)70 T6 90%, BNL-2
L210D	0	79.38	68.58	.40	-.09	1.03	61D	OPACITY (WHITE BACKING)70 T6 90%, BNL-2
L318	0	79.45	68.40	.33	-.27	1.30	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L153	*	79.55	68.37	.39	-.36	.73	61C	OPACITY (PAPER BACKING)70 T6 90%, BAUSCH * LOMB
L599	0	79.65	69.55	1.26	.43	1.00	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L281	0	79.74	68.82	.83	-.16	.88	61D	OPACITY (WHITE BACKING)70 T6 90%, BNL-2
L210B	0	79.75	68.79	.82	-.19	1.01	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L328	0	80.00	69.40	1.42	.08	.66	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L134	0	80.07	68.79	1.05	-.41	.89	61R	OPACITY (WHITE BACKING)70 T6 90%, THWING-ALBERT (WAS SRL)
L261	0	80.10	69.45	1.52	.05	1.24	61B	OPACITY (WHITE BACKING)70 T6 90%, BAUSCH * LOMB
L244	*	80.97	71.23	3.38	.76	.60	61J	OPACITY (PAPER BACKING)70 T6 90%, Z.ELREPH6,FMY-C(10) FILTER
L743	*	86.77	74.99	10.18	-.46	.79	61G	OPACITY (OWN METHOD)45 T6 90%, Z.ELREPH6, FILTER 8
GMEANS:		79.02	68.37			1.00		
		95% ELLIPSE:		2.29	.94			WITH GAMMA * 43 DEGREES

OPACITY, B&L, 89% BACKING, NEWS

SAMPLE A56 = 79.0 PERCENT

SAMPLE G42 = 68.4 PERCENT



ANALYSIS T65-1 TABLE 1

DIRECTIONAL BLUE REFLECTANCE IN PERCENT

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

LAB CODE	SAMPLE J38		PRINTING 89 GRAMS PER SQUARE METER				SAMPLE A56		AIR MAIL ENVELOPE 49 GRAMS PER SQUARE METER				TEST D. ° 8		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB		
L108	76.12	-0.03	-0.09	.16	1.11	78.40	.11	.38	.09	.57	65N	Ø	L108		
L115	75.95	-0.21	-0.59	.30	2.12	78.42	.13	.46	.09	.55	65N	Ø	L115		
L122	75.49	-0.67	-1.89	.16	1.15	78.12	-0.17	-0.59	.09	.55	65N	Ø	L122		
L132	76.20	.04	.12	.12	.84	78.11	-0.18	-0.64	.08	.52	65N	Ø	L132		
L158	76.65	.49	1.39	.08	.53	78.71	.42	1.48	.10	.61	65N	Ø	L158		
L176A	74.67	-1.48	-4.19	.05	.33	77.60	-0.69	-2.44	.00	.00	65A	#	L176A		
L190C	76.06	-0.09	-0.27	.15	1.06	78.27	-0.02	-0.06	.09	.55	65A	Ø	L190C		
L210M	76.14	-0.02	-0.06	.11	.74	78.02	-0.27	-0.95	.18	1.09	65M	Ø	L210M		
L210N	76.54	.38	1.07	.17	1.18	78.64	.34	1.21	.15	.93	65N	Ø	L210N		
L211	75.71	-0.44	-1.26	.16	1.15	75.97	-2.32	-8.17	.18	1.14	65N	#	L211		
L223	75.91	-0.24	-0.69	.10	.70	78.19	-0.11	-0.37	.06	.40	65N	Ø	L223		
L225	76.80	.64	1.82	.09	.65	78.81	.52	1.83	.10	.61	65N	Ø	L225		
L275	75.84	-0.32	-0.90	.12	.83	78.57	.28	.99	.07	.44	65M	Ø	L275		
L285	76.20	.04	.12	.11	.75	77.72	-0.57	-2.00	.18	1.09	65N	Ø	L285		
L288	75.67	-0.48	-1.36	.09	.62	78.22	-0.07	-0.24	.07	.44	65N	Ø	L288		
L308	76.01	-0.14	-0.41	.15	1.02	78.42	.13	.46	.12	.72	65N	Ø	L308		
L315	76.67	.52	1.46	.17	1.17	78.22	-0.07	-0.24	.12	.72	65N	Ø	L315		
L317	76.26	.11	.30	.13	.91	78.00	-0.29	-1.03	.53	3.28	65M	Ø	L317		
L673R	76.99	.83	2.35	.12	.88	79.96	1.67	5.88	.07	.46	65N	#	L673R		
L692	76.31	.16	.44	.16	1.15	73.51	-4.78	-16.84	1.11	6.85	65N	#	L692		
L738	76.45	.29	.83	.15	1.06	79.54	1.24	4.38	.12	.74	65N	#	L738		
L753	76.15	-0.01	-0.02	.23	1.59	78.10	-0.19	-0.68	.63	3.92	65N	Ø	L753		

GR. MEAN ° 76.16 PERCENT GRAND MEAN ° 78.29 PERCENT TEST DETERMINATIONS ° 8
 SD MEANS ° .35 PERCENT SD OF MEANS ° .28 PERCENT 17 LABS IN GRAND MEANS
 AVERAGE SDR ° .14 PERCENT AVERAGE SDR ° .16 PERCENT

L105	76.02	-0.13	-0.37	.07	.50	78.26	-0.03	-0.11	.07	.46	65T	+	L105
L213	75.97	-0.18	-0.52	.10	.73	78.40	.11	.38	.09	.57	65T	+	L213
L219	76.50	.34	.97	.00	.00	79.06	.77	2.71	.18	1.10	65P	+	L219
L224	5.22	-70.93	-200.58	.05	.33	4.11	-74.18	-261.31	.06	.40	65H	+	L224
L241	76.32	.17	.47	.17	1.17	78.42	.13	.46	.12	.72	65I	+	L241
L249	77.47	1.32	3.73	.20	1.39	79.12	.83	2.93	.10	.64	65P	+	L249
L256	75.20	-0.96	-2.71	.17	1.19	77.79	-0.51	-1.78	.10	.61	65H	+	L256
L259	75.84	-0.32	-0.90	.17	1.18	78.22	-0.07	-0.24	.07	.44	65H	+	L259
L260	76.01	-0.14	-0.41	.06	.45	80.31	2.02	7.11	.20	1.22	65P	+	L260
L278	78.19	2.03	5.74	.20	1.38	80.00	1.71	6.01	.00	.00	65P	+	L278
L301	76.44	.28	.79	.07	.52	78.83	.54	1.90	.08	.51	65G	+	L301
L312	78.31	2.16	6.09	.37	2.61	80.31	2.02	7.11	.37	2.31	65P	+	L312
L321	79.00	2.84	8.04	.00	.00	81.00	2.71	9.53	.00	.00	65P	+	L321
L328	79.20	3.04	8.60	.27	1.88	81.06	2.77	9.75	.15	.93	65P	+	L328
L339	78.94	2.78	7.86	.18	1.24	81.12	2.83	9.97	.23	1.44	65P	+	L339
L380	79.00	2.84	8.04	.00	.00	80.00	1.71	6.01	.53	3.31	65P	+	L380
L442	75.51	-0.64	-1.82	.08	.59	78.27	-0.02	-0.06	.05	.29	65T	+	L442
L456	75.04	-1.12	-3.17	.13	.91	77.95	-0.34	-1.21	.05	.33	65P	+	L456
L562	82.00	5.84	16.52	.00	.00	83.00	4.71	16.58	.00	.00	65P	+	L562
L564	79.62	3.47	9.81	.52	3.63	79.50	1.21	4.25	.53	3.31	65P	+	L564
L587	76.26	.11	.30	.09	.64	78.70	.41	1.43	.05	.33	65I	+	L587
L617	77.66	1.51	4.26	.15	1.06	79.27	.98	3.46	.10	.64	65G	+	L617
L643	75.56	-0.59	-1.68	.16	1.12	76.51	-1.78	-6.27	.15	.90	65P	+	L643
L684	75.89	-0.27	-0.76	.11	.79	81.46	3.17	11.16	.19	1.19	65H	+	L684
L695	77.85	1.69	4.79	.35	2.46	77.94	-0.36	-1.25	.62	3.86	65P	+	L695
L698	76.55	.39	1.11	.15	1.06	78.77	.48	1.70	.10	.64	65I	+	L698
L702	78.25	2.09	5.92	.27	1.88	81.00	2.71	9.53	.00	.00	65P	+	L702
L704	77.81	1.66	4.68	.70	4.94	80.81	2.52	8.87	.53	3.29	65P	+	L704
L706	77.37	1.22	3.44	.07	.50	79.65	1.36	4.78	.08	.47	65X	+	L706
L757	75.52	-0.63	-1.79	.10	.73	77.89	-0.41	-1.43	.06	.40	65H	+	L757

TOTAL NUMBER OF LABORATORIES REPORTING ° 52

Best values: J38 76.0 ± 0.6 percent
 A56 78.3 ± 0.5 percent

The following laboratories were omitted from the grand means because of extreme test results: 176A, 211, 673R, 692, 738

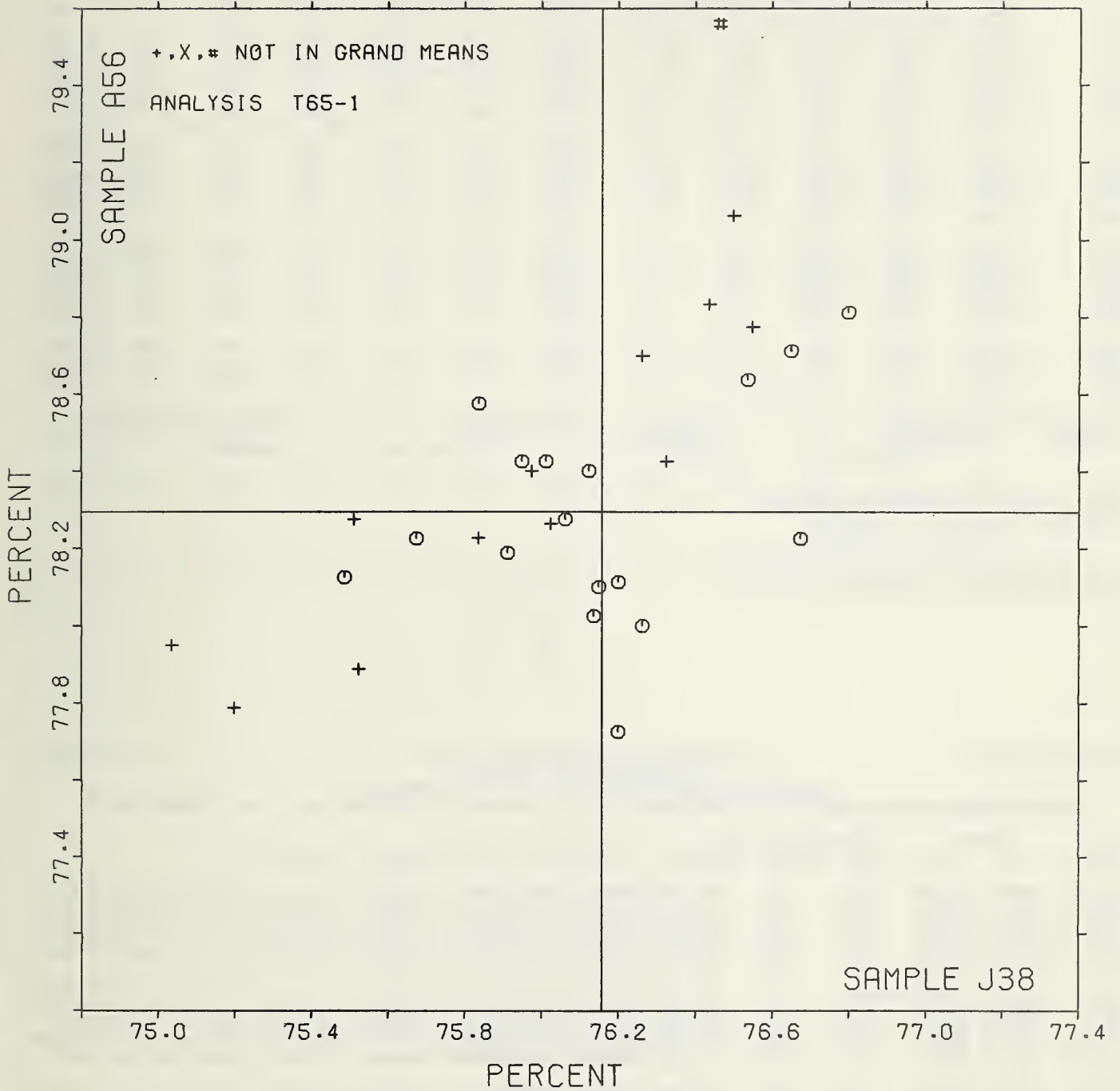
DIRECTIONAL BLUE REFLECTANCE IN PERCENT
TAPPI STANDARD T452 GS-77, 'BRIGHTNESS'; MARTIN SWEETS (ACBT & GE) IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY	TEST INSTRUMENT	CONDITIONS
		J38	A56	MAJOR	MINOR	R.SDR	VAR			
L224	*	5.22	4.11	-98.49	-28.89	.36	65B	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER	
L176A	#	74.67	77.60	-1.63	.14	.16	65A	BLUE REFLECTANCE (DIRECTIONAL)	MARTIN SWEETS (ACBT),S-2	
L456	*	75.04	77.95	-1.14	.26	.62	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L256	*	75.20	77.79	-1.08	.04	.90	65B	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER	
L122	Ø	75.49	78.12	-.66	.19	.85	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L442	*	75.51	78.27	-.57	.31	.44	65T	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER D25D2M	
L757	*	75.52	77.89	-.75	-.04	.56	65H	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER	
L643	*	75.56	76.51	-1.40	-1.25	1.01	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L288	Ø	75.67	78.22	-.45	.18	.53	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L211	#	75.71	75.97	-1.54	-1.79	1.14	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L259	*	75.84	78.22	-.31	.10	.81	65B	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER	
L275	Ø	75.84	78.57	-.14	.40	.64	65M	BLUE REFLECTANCE (DIRECTIONAL)	MARTIN SWEETS (GE), S-1	
L684	*	75.89	81.46	1.35	2.88	.99	65B	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER	
L223	Ø	75.91	78.19	-.27	.03	.55	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L115	Ø	75.95	78.42	-.11	.22	1.34	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L213	*	75.97	78.40	-.10	.18	.65	65T	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER D25D2M	
L308	Ø	76.01	78.42	-.06	.19	.87	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L260	*	76.01	80.31	.88	1.82	.83	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L105	*	76.02	78.26	-.13	.04	.48	65T	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER D25D2M	
L190C	Ø	76.06	78.27	-.09	.03	.80	65A	BLUE REFLECTANCE (DIRECTIONAL)	MARTIN SWEETS (ACBT),S-2	
L108	Ø	76.12	78.40	.03	.11	.84	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L210M	Ø	76.14	78.02	-.15	-.22	.92	65M	BLUE REFLECTANCE (DIRECTIONAL)	MARTIN SWEETS (GE), S-1	
L753	Ø	76.15	78.10	-.10	-.16	2.76	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L285	Ø	76.20	77.72	-.25	-.51	.92	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L132	Ø	76.20	78.11	-.05	-.18	.68	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L587	*	76.26	78.70	.29	.30	.49	65I	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER D25D2A	
L317	Ø	76.26	78.00	-.06	-.31	2.10	65M	BLUE REFLECTANCE (DIRECTIONAL)	MARTIN SWEETS (GE), S-1	
L692	#	76.31	73.51	-2.25	-4.22	4.00	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L241	*	76.32	78.42	.21	.03	.95	65I	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER D25D2A	
L301	*	76.44	78.83	.51	.33	.51	65G	BLUE REFLECTANCE (DIRECTIONAL)	GARDNER	
L738	#	76.45	79.54	.87	.93	.90	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L219	*	76.50	79.66	.68	.50	.55	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L210N	Ø	76.54	78.64	.50	.11	1.06	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L698	*	76.55	78.77	.58	.22	.85	65I	BLUE REFLECTANCE (DIRECTIONAL)	HUNTER D25D2A	
L158	Ø	76.65	78.71	.64	.12	.57	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L315	Ø	76.67	78.22	.41	-.32	.95	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L225	Ø	76.80	78.81	.82	.13	.63	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L673R	#	76.99	79.96	1.55	1.03	.67	65N	BLUE REFLECTANCE (DIRECTIONAL)	TECHNIDYNE/DIANG/M.S., S-4	
L706	*	77.37	79.65	1.73	.57	.48	65X	BLUE REFLECTANCE:GIVE INSTR.()DIFFUSE,()DIRECTNL,TRAP?,BASE?		
L249	*	77.47	79.12	1.56	.06	1.02	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L617	*	77.66	79.27	1.79	.10	.85	65G	BLUE REFLECTANCE (DIRECTIONAL)	GARDNER	
L704	*	77.81	80.81	2.69	1.36	4.12	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L695	*	77.85	77.94	1.29	-1.15	3.16	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L278	*	78.19	80.00	2.61	.47	.69	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L702	*	78.25	81.00	3.16	1.30	.94	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L312	*	78.31	80.31	2.88	.67	2.46	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L339	*	78.94	81.12	3.82	1.07	1.34	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L321	*	79.00	81.00	3.81	.93	.00	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L380	*	79.00	80.00	3.32	.06	1.66	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L328	*	79.20	81.06	4.02	.88	1.41	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L564	*	79.62	79.50	3.61	-.68	3.47	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
L562	*	82.00	83.00	7.41	1.16	.00	65P	BLUE REFLECTANCE (DIRECTIONAL)	PHOTOVOLT	
GMEANS:		76.16	78.29			1.00				
		95% ELLIPSE:		1.08	.68	WITH GAMMA = 29 DEGREES				

BLUE REFLECTANCE, DIRECTIONAL

SAMPLE J38 = 76.16 PERCENT

SAMPLE A56 = 78.29 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 J38		PRINTING 89 GRAMS PER SQUARE METER				SAMPLE A56		AIR MAIL ENVELOPE 49 GRAMS PER SQUARE METER				TEST D. ° 8		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB		
L100	74.92	-.24	-.29	.18	1.27	78.01	-.51	-.59	.29	2.74	65F	Ø	L100		
L121	75.82	.66	.81	.05	.33	79.35	.83	.96	.08	.71	65K	Ø	L121		
L150	73.88	-1.28	-1.56	.44	3.17	77.03	-1.49	-1.73	.36	3.36	65Q	Ø	L150		
L170	75.42	.26	.32	.05	.33	78.77	.25	.29	.05	.44	65B	Ø	L170		
L182	74.72	-.44	-.53	.13	.93	78.20	-.32	-.38	.00	.00	65F	Ø	L182		
L210K	76.40	1.24	1.51	.17	1.22	79.66	1.14	1.32	.05	.49	65K	Ø	L210K		
L242	74.69	-.47	-.58	.10	.74	77.85	-.67	-.78	.24	2.31	65F	Ø	L242		
L244	73.72	-1.44	-1.76	.13	.93	77.46	-1.06	-1.23	.05	.49	65F	Ø	L244		
L250T	75.14	-.02	-.03	.07	.54	78.17	-.35	-.41	.09	.84	65F	Ø	L250T		
L280	74.92	-.24	-.29	.09	.64	78.11	-.41	-.48	.08	.79	65Q	Ø	L280		
L313	76.49	1.33	1.62	.10	.72	79.69	1.16	1.35	.04	.33	65K	Ø	L313		
L325	79.92	4.76	5.82	.23	1.67	83.22	4.70	5.45	.42	3.93	65F	#	L325		
L349	76.59	1.43	1.74	.14	.98	80.35	1.83	2.12	.05	.50	65K	Ø	L349		
L446	74.59	-.57	-.70	.13	.92	78.09	-.44	-.51	.02	.19	65F	Ø	L446		
L573	75.16	.00	.00	.12	.86	78.65	.13	.15	.05	.50	65F	Ø	L573		
L575	74.77	-.39	-.47	.13	.93	78.36	-.16	-.19	.05	.49	65F	Ø	L575		
L598	75.52	.36	.44	.23	1.63	79.05	.53	.61	.05	.50	65K	Ø	L598		
L680	74.96	-.20	-.24	.12	.86	78.10	-.42	-.49	.24	2.31	65Q	Ø	L680		
GR. MEAN ° 75.16 PERCENT			GRAND MEAN ° 78.52 PERCENT						TEST DETERMINATIONS ° 8						
SD MEANS ° .82 PERCENT			SD OF MEANS ° .86 PERCENT						17 LABS IN GRAND MEANS						
AVERAGE SDR = .14 PERCENT			AVERAGE SDR = .11 PERCENT												
L289	74.92	-.24	-.29	.16	1.14	77.97	-.55	-.64	.24	2.24	65Ø	°	L289		
TOTAL NUMBER OF LABORATORIES REPORTING ° 19															
Best values: J38 75.0 ± 1.4 percent															
A56 78.2 ± 1.5 percent															

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

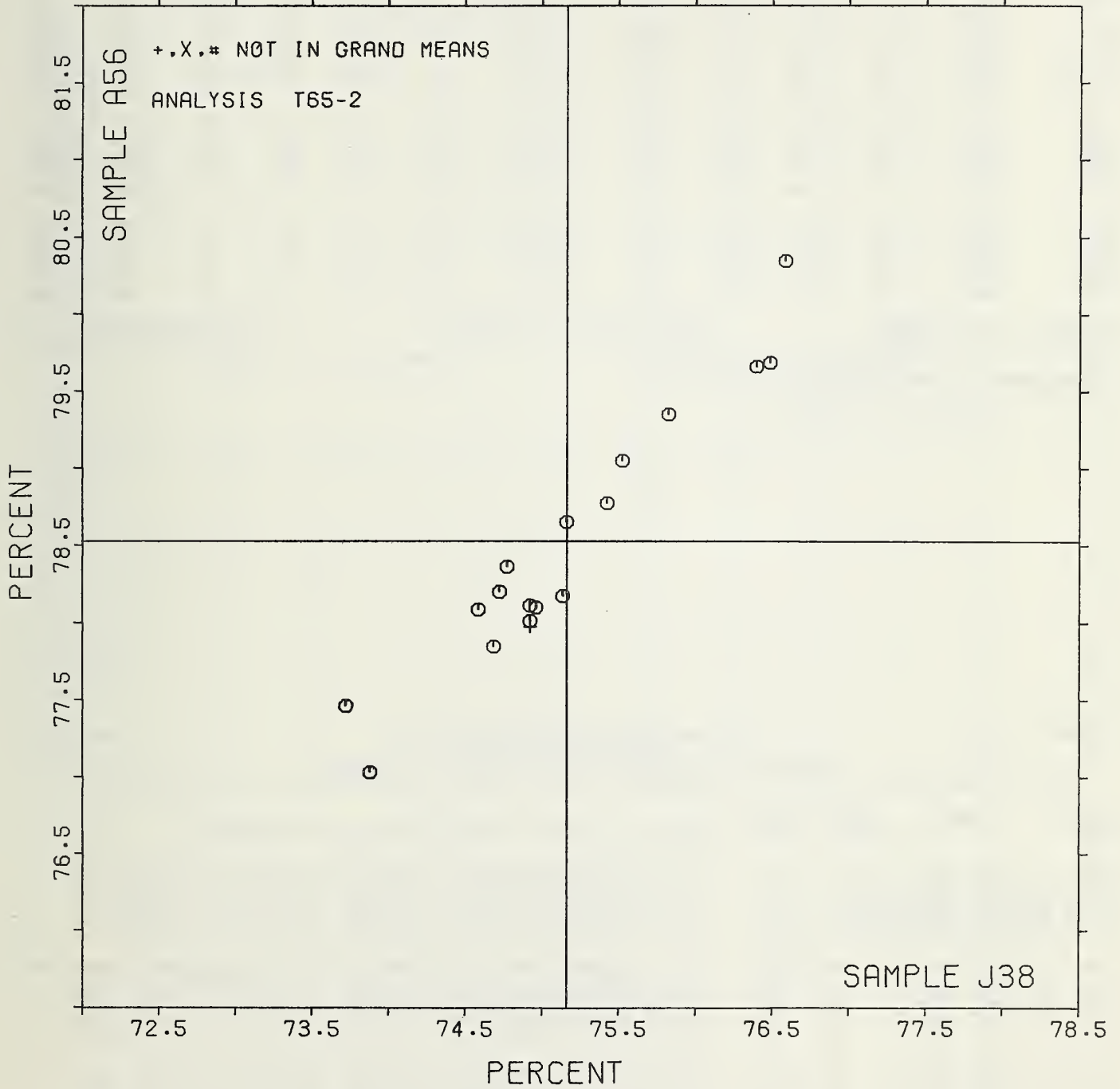
DIFFUSE BLUE REFLECTANCE IN PERCENT (GLOSS TRAP)
TAPPI SUGGESTED METHOD T525 SU-72, BRIGHTNESS OF PULP (DIFFUSE ILLUMINATION AND 0 DEG. OBSERVATION)

LAB CODE	F	MEANS		COORDINATES		AVG R.SDR VAR	PROPERTY---TEST INSTRUMENT---	CONDITIONS		
		J38	A56	MAJOR	MINOR					
L244	Ø	73.72	77.46	-1.76	.31	.71	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE		
L150	Ø	73.88	77.03	-1.96	-.10	3.27	65Q	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, ZEISS ABSOLUTE BASE		
L446	Ø	74.59	78.09	-.71	.12	.56	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE		
L242	Ø	74.69	77.85	-.82	-.12	1.53	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE		
L182	Ø	74.72	78.20	-.54	.09	.46	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE		
L575	Ø	74.77	78.36	-.38	.17	.71	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE		
L289	°	74.92	77.97	-.56	-.21	1.69	65Ø	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, SPECIFIC CALIBRATION		
L280	Ø	74.92	78.11	-.46	-.11	.71	65Q	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, ZEISS ABSOLUTE BASE		
L100	Ø	74.92	78.01	-.53	-.18	2.00	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE		
L680	Ø	74.96	78.10	-.45	-.15	1.59	65Q	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, ZEISS ABSOLUTE BASE		
L250T	Ø	75.14	78.17	-.27	-.22	.69	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE		
L573	Ø	75.16	78.65	.09	.09	.68	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE		
L170	Ø	75.42	78.77	.36	-.02	.39	65B	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NBS ABSOLUTE BASE		
L598	Ø	75.52	79.05	.63	.10	1.07	65K	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, MØ (ZEISS) BASE		
L121	Ø	75.82	79.35	1.06	.09	.52	65K	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, MØ (ZEISS) BASE		
L210K	Ø	76.40	79.66	1.68	-.12	.86	65K	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, MØ (ZEISS) BASE		
L313	Ø	76.49	79.69	1.76	-.16	.53	65K	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, MØ (ZEISS) BASE		
L349	Ø	76.59	80.35	2.31	.22	.74	65K	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, MØ (ZEISS) BASE		
L325	#	79.92	83.22	6.69	-.22	2.80	65F	DIFFUSE REFLECTANCE, ELREPHØ, GL.TRAP, NRC-PTB ABSOLUTE BASE		
GMEANS:		75.16	78.52			1.00				
		95% ELLIPSE:	3.30	.44	WITH GAMMA = 46 DEGREES					

BLUE REFLECTANCE, DIFFUSE, WITH TRAP

SAMPLE J38 = 75.2 PERCENT

SAMPLE A56 = 78.5 PERCENT



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

LAH CODE	SAMPLE J38 MEAN	PRINTING 89 GRAMS PER SQUARE METER				SAMPLE A56 MEAN	AIR MAIL ENVELOPE 49 GRAMS PER SQUARE METER				TEST D. = 8		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L157	77.47	.86	1.29	.13	1.18	79.99	.91	1.39	.04	.52	65E	Ø	L157
L161	76.81	.19	.29	.11	1.03	79.21	.13	.19	.03	.47	65E	Ø	L161
L173A	75.97	-.64	-.96	.07	.65	78.05	-1.03	-1.58	.05	.78	65E	Ø	L173A
L219	77.06	.45	.67	.07	.68	79.37	.30	.45	.05	.67	65E	Ø	L219
L238A	77.04	.42	.64	.07	.68	79.80	.72	1.10	.00	.00	65E	Ø	L238A
L241	75.01	-1.60	-2.40	.22	2.05	78.45	-.63	-.96	.08	1.10	65E	Ø	L241
L251	77.19	.57	.86	.11	1.04	78.97	-.10	-.16	.12	1.70	65E	Ø	L251
L255	76.91	.30	.45	.06	.59	79.55	.47	.72	.05	.78	65D	Ø	L255
L309	76.69	.07	.11	.10	.91	79.07	-.01	-.01	.07	1.03	65J	Ø	L309
L360	76.76	.15	.22	.22	2.02	78.79	-.29	-.45	.29	4.30	65E	Ø	L360
L384	76.71	.10	.15	.08	.77	78.90	-.18	-.28	.00	.00	65S	Ø	L384
L565	75.71	-.90	-1.35	.08	.77	78.09	-.99	-1.51	.04	.61	65W	Ø	L565
L685	77.09	.47	.71	.06	.59	79.42	.35	.53	.07	1.03	65E	Ø	L685
L734	75.89	-.73	-1.09	.08	.77	78.37	-.70	-1.08	.05	.67	65E	Ø	L734
L755	76.87	.26	.39	.14	1.28	80.15	1.07	1.64	.09	1.35	65E	Ø	L755

GR. MEAN = 76.61 PERCENT GRAND MEAN = 79.08 PERCENT TEST DETERMINATIONS = 8
SD MEANS = .67 PERCENT SD OF MEANS = .65 PERCENT 15 LABS IN GRAND MEANS
AVERAGE SDR = .11 PERCENT AVERAGE SDR = .07 PERCENT
TOTAL NUMBER OF LABORATORIES REPORTING = 15
Best values: J38 76.8 ± 1.1 percent
A56 79.0 ± 1.1 percent

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

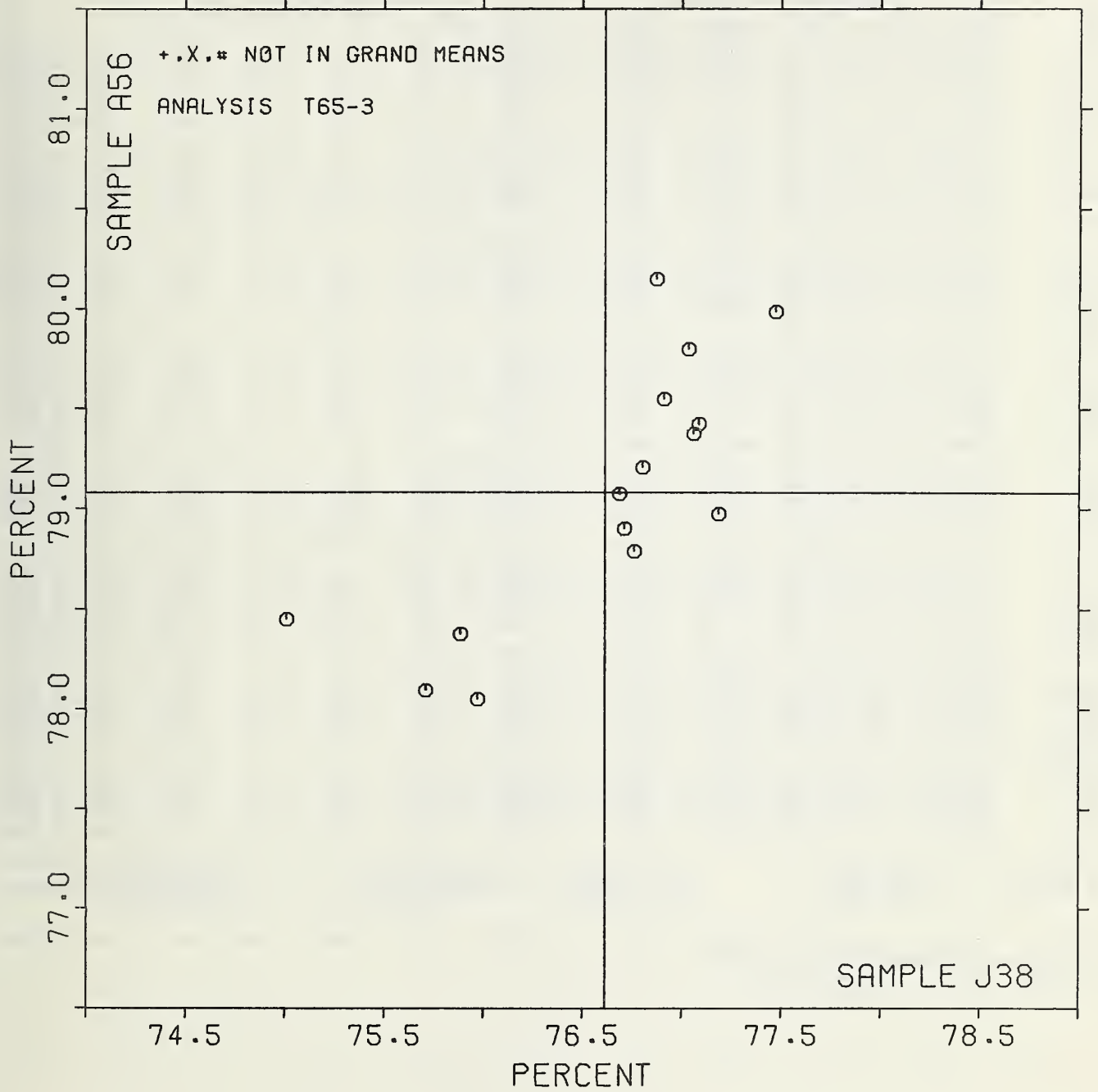
LAH CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J38	A56	MAJOR	MINOR	R.SDR	VAR			
L241	Ø	75.01	78.45	-1.59	.67	1.58	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) BASE
L565	Ø	75.71	78.09	-1.33	-.08	.69	65W	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, NHS MGØ BASE
L734	Ø	75.89	78.37	-1.01	.00	.72	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) BASE
L173A	Ø	75.97	78.05	-1.18	-.29	.71	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) HASE
L309	Ø	76.69	79.07	.05	-.06	.97	65J	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, NBS ABSOLUTE
L384	Ø	76.71	78.90	-.05	-.20	.38	65S	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, ABSOLUTE-UNKNOWN BASE
L360	Ø	76.76	78.79	-.10	-.31	3.16	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) HASE
L161	Ø	76.81	79.21	.23	-.04	.75	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) HASE
L755	Ø	76.87	80.15	.93	.58	1.31	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) HASE
L255	Ø	76.91	79.55	.54	.13	.68	65D	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, NRC-PTB ABSOLUTE
L238A	Ø	77.04	79.80	.81	.22	.34	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) BASE
L219	Ø	77.06	79.37	.53	-.10	.68	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) BASE
L685	Ø	77.09	79.42	.58	-.08	.81	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) HASE
L251	Ø	77.19	78.97	.34	-.48	1.37	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) HASE
L157	Ø	77.47	79.99	1.25	.05	.85	65E	DIFFUSE REFLECTANCE,	ELREPHØ,	NØ TRAP, MGØ (ZEISS) HASE

GMEANS: 76.61 79.08 1.00
95% ELLIPSE: 2.52 .88 WITH GAMMA = 44 DEGREES

BLUE REFLECTANCE, DIFFUSE, NO TRAP

SAMPLE J38 = 76.6 PERCENT

SAMPLE A56 = 79.1 PERCENT



SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS - HIGH RANGE
TAPPI OFFICIAL TEST METHOD T480 GS-78, SPECULAR GLOSS OF PAPER AND PAPERBOARD AT 75 DEGREES

LAB CODE	COATED BOOK					CAST COATED					TEST D. ° 10		
	E51 MEAN	118 GRAMS PER SQUARE METER				Z29 MEAN	211 GRAMS PER SQUARE METER				VAR	F	LAB
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR			
L108	68.9	1.0	.48	1.2	1.01	70.8	.9	.37	.7	.58	75H	Ø	L108
L121	68.3	.4	.20	1.5	1.27	71.4	1.5	.60	1.2	1.04	75H	Ø	L121
L122	67.4	-.4	-.22	.7	.63	69.4	-.5	-.19	.9	.76	75H	Ø	L122
L132	72.7	4.9	2.36	.8	.69	74.6	4.7	1.96	.7	.56	75G	Ø	L132
L190C	65.0	-2.9	-1.39	1.2	1.09	66.8	-3.1	-1.29	1.2	1.05	75G	Ø	L190C
L190R	68.3	.4	.20	1.6	1.38	71.0	1.1	.44	1.0	.87	75G	Ø	L190R
L206	68.7	.8	.40	1.0	.91	70.9	1.0	.40	.5	.42	75H	Ø	L206
L210	71.0	3.2	1.54	.6	.53	74.6	4.7	1.95	1.4	1.24	75H	Ø	L210
L211	66.0	-1.9	-.91	1.7	1.52	66.7	-3.2	-1.35	1.2	1.05	75H	Ø	L211
L230	66.5	-1.4	-.67	1.2	1.03	69.1	-.8	-.34	1.3	1.10	75H	Ø	L230
L251	67.9	.1	.04	1.2	1.06	69.9	-.0	-.00	.9	.75	75G	Ø	L251
L253P	69.1	1.2	.57	.9	.74	71.3	1.4	.56	.5	.41	75G	Ø	L253P
L256	70.8	2.9	1.42	1.0	.89	72.8	2.9	1.19	.9	.74	75H	Ø	L256
L262	69.3	1.4	.69	1.2	1.01	70.1	.2	.08	1.1	.94	75K	Ø	L262
L274	68.5	.6	.30	.8	.74	69.4	-.5	-.21	1.0	.83	75P	Ø	L274
L278	66.2	-1.6	-.80	1.4	1.21	66.9	-3.0	-1.26	2.0	1.67	75G	Ø	L278
L279	68.2	.3	.16	.8	.69	69.5	-.4	-.17	1.3	1.08	75G	Ø	L279
L291	68.9	1.0	.50	.9	.80	71.3	1.4	.60	1.0	.86	75H	Ø	L291
L301	69.0	1.1	.55	.9	.80	70.9	1.0	.42	.8	.68	75H	Ø	L301
L317	67.6	-.3	-.13	1.0	.84	69.5	-.4	-.17	1.1	.92	75H	Ø	L317
L321	70.9	3.0	1.47	1.2	1.05	72.7	2.8	1.18	1.3	1.07	75G	Ø	L321
L323	65.6	-2.3	-1.11	1.0	.89	68.5	-1.4	-.58	1.0	.86	75H	Ø	L323
L339	65.7	-2.2	-1.06	4.0	3.49	66.3	-3.6	-1.50	6.0	5.14	75P	Ø	L339
L349	67.9	.1	.03	1.0	.91	71.9	2.0	.85	1.4	1.17	75H	Ø	L349
L388	62.1	-5.8	-2.80	1.0	.87	63.4	-6.5	-2.70	2.1	1.81	75P	*	L388
L483	67.3	-.6	-.28	1.7	1.47	68.4	-1.5	-.61	.7	.56	75H	Ø	L483
L564	69.1	1.2	.59	1.2	1.05	70.6	.7	.29	1.6	1.41	75P	Ø	L564
L574	64.6	-3.3	-1.60	.4	.32	66.9	-3.0	-1.24	.7	.62	75G	Ø	L574
L583	69.0	1.1	.55	.8	.72	71.5	1.6	.67	1.2	1.05	75H	Ø	L583
L587	69.4	1.5	.74	.8	.74	71.5	1.6	.66	1.0	.83	75H	Ø	L587
L592	66.0	-1.9	-.91	1.0	.85	67.2	-2.7	-1.11	1.0	.88	75H	Ø	L592
L598	64.5	-3.4	-1.63	1.0	.83	67.0	-2.9	-1.21	1.2	1.00	75H	Ø	L598
L643	67.9	-.0	-.00	.6	.53	69.3	-.6	-.24	1.0	.82	75H	Ø	L643
L654	67.3	-.6	-.30	1.2	1.07	74.3	4.4	1.84	.9	.78	75H	X	L654
L668	66.6	-1.3	-.62	1.6	1.38	68.5	-1.4	-.59	1.2	1.02	75G	Ø	L668
L670	68.8	.9	.45	1.7	1.44	72.1	2.2	.92	1.0	.89	75H	Ø	L670
L697	67.1	-.8	-.37	.4	.39	69.2	-.7	-.29	.9	.80	75H	Ø	L697
L704	69.4	1.5	.74	.9	.82	71.4	1.5	.64	.3	.24	75P	Ø	L704
L738	69.0	1.1	.53	1.5	1.30	73.0	3.1	1.27	1.3	1.10	75H	Ø	L738

GR. MEAN ° 67.9 GLOSS UNITS GRAND MEAN ° 69.9 GLOSS UNITS TEST DETERMINATIONS = 10
SD MEANS ° 2.1 GLOSS UNITS SD OF MEANS ° 2.4 GLOSS UNITS 38 LABS IN GRAND MEANS
AVERAGE SDR ° 1.1 GLOSS UNITS AVERAGE SDR ° 1.2 GLOSS UNITS

L250 70.3 2.4 1.17 1.9 1.65 72.9 3.0 1.24 2.8 2.36 75Q ° L250
TOTAL NUMBER OF LABORATORIES REPORTING = 40

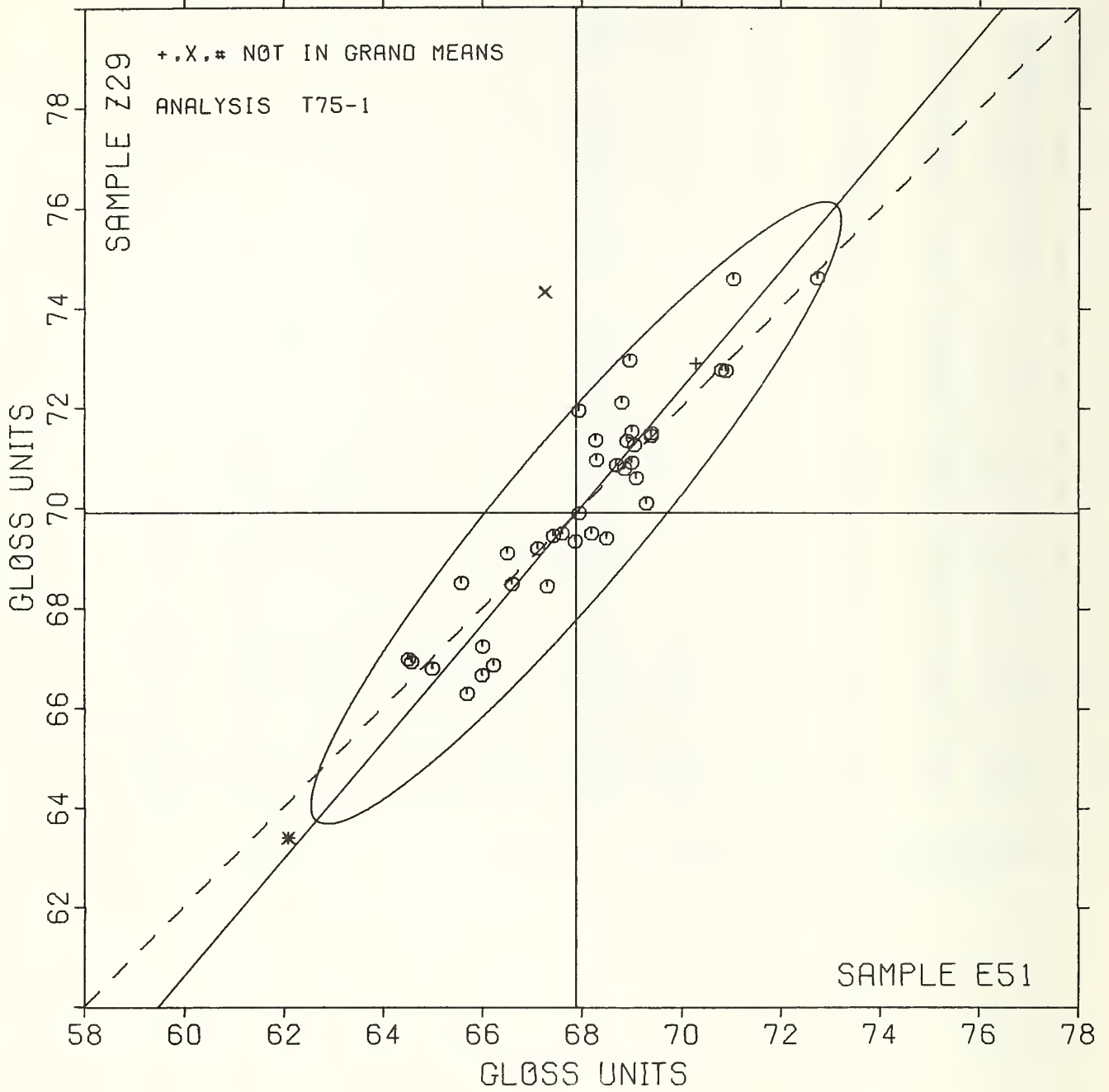
Best values: E51 68 ± 4 gloss units
229 70 ± 4 gloss units

SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS - HIGH RANGE
TAPPI OFFICIAL TEST METHOD T480 68-78, SPECULAR GLOSS OF PAPER AND PAPERBOARD AT 75 DEGREES

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		E51	Z29	MAJOR	MINOR	R.SDR	VAR			
L388	*	62.1	63.4	-8.7	.2	1.34	75P	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, PHOTOVOLT
L598	Ø	64.5	67.0	-4.4	.7	.91	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L574	Ø	64.6	66.9	-4.4	.6	.47	75G	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GARDNER
L190C	Ø	65.0	66.8	-4.2	.2	1.07	75G	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GARDNER
L323	Ø	65.6	68.5	-2.6	.8	.87	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L339	Ø	65.7	66.3	-4.2	-.7	4.32	75P	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, PHOTOVOLT
L211	Ø	66.0	66.7	-3.7	-.7	1.29	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L592	Ø	66.0	67.2	-3.2	-.3	.87	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L278	Ø	66.2	66.9	-3.4	-.7	1.44	75G	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GARDNER
L230	Ø	66.5	69.1	-1.5	.5	1.06	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L668	Ø	66.6	68.5	-1.9	.1	1.20	75G	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GARDNER
L697	Ø	67.1	69.2	-1.0	.1	.60	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L654	X	67.3	74.3	3.0	3.3	.92	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L483	Ø	67.3	68.4	-1.5	-.5	1.01	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L122	Ø	67.4	69.4	-.6	.0	.69	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L317	Ø	67.6	69.5	-.5	-.1	.88	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L643	Ø	67.9	69.3	-.4	-.4	.67	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L349	Ø	67.9	71.9	1.6	1.3	1.04	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L251	Ø	67.9	69.9	.0	-.1	.90	75G	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GARDNER
L279	Ø	68.2	69.5	-.1	-.5	.89	75G	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GARDNER
L121	Ø	68.3	71.4	1.4	.6	1.16	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L190R	Ø	68.3	71.0	1.1	.4	1.12	75G	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GARDNER
L274	Ø	68.5	69.4	.0	-.8	.78	75P	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, PHOTOVOLT
L206	Ø	68.7	70.9	1.3	-.0	.66	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L670	Ø	68.8	72.1	2.3	.7	1.17	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L108	Ø	68.9	70.8	1.3	-.2	.79	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L291	Ø	68.9	71.3	1.8	.1	.83	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L738	Ø	69.0	73.0	3.0	1.1	1.20	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L301	Ø	69.0	70.9	1.5	-.2	.74	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L583	Ø	69.0	71.5	2.0	.2	.88	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L253P	Ø	69.1	71.3	1.8	-.0	.58	75G	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GARDNER
L564	Ø	69.1	70.6	1.3	-.5	1.23	75P	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, PHOTOVOLT
L262	Ø	69.3	70.1	1.1	-1.0	.98	75K	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GAERTNER (K-C TYPE)
L704	Ø	69.4	71.4	2.2	-.2	.53	75P	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, PHOTOVOLT
L587	Ø	69.4	71.5	2.2	-.1	.78	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L250	+	70.3	72.9	3.9	.1	2.01	75Q	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, PHOTOVOLT, 20C, 65%RH
L256	Ø	70.8	72.8	4.1	-.4	.81	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L321	Ø	70.9	72.7	4.1	-.5	1.06	75G	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GARDNER
L210	Ø	71.0	74.6	5.6	.6	.88	75H	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, HUNTER
L132	Ø	72.7	74.6	6.7	-.7	.63	75G	SPECULAR	GL0SS,	75 DEGREE, 50-95 UNITS, GARDNER
GMEANS:		67.9	69.9			1.00				
		95% ELLIPSE:		8.1	1.4			WITH GAMMA = 49 DEGREES		

SPECULAR GLOSS, 75 DEGREE-HIGH RANGE

SAMPLE E51 = 67.9 GLOSS UNITS SAMPLE Z29 = 69.9 GLOSS UNITS



SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS - LOW RANGE
TAPPI OFFICIAL TEST METHOD T480 OS-78, SPECULAR GLOSS OF PAPER AND PAPERBOARD AT 75 DEGREES

LAB CODE	SAMPLE B47 MEAN	RELEASE BASE 82 GRAMS PER SQUARE METER				SAMPLE E48 MEAN	COATED GLOSS 91 GRAMS PER SQUARE METER				TEST D. ° 10			
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB	
L122	49.0	1.0	.49	1.5	.83	64.6	-.3	-.12	1.8	.98	76H	Ø	L122	
L128	48.2	.1	.07	1.3	.72	62.4	-2.5	-1.09	1.9	1.06	76G	Ø	L128	
L134	49.1	1.1	.53	1.9	1.06	65.5	.6	.27	2.3	1.27	76H	Ø	L134	
L149	43.2	-4.9	-2.39	1.7	.93	50.9	-14.0	-6.12	2.6	1.45	76G	#	L149	
L153	49.0	.9	.47	2.0	1.11	66.7	1.9	.81	1.8	1.00	76G	Ø	L153	
L162	48.0	-.1	-.03	1.3	.73	68.8	3.9	1.71	1.6	.89	76H	Ø	L162	
L173A	46.3	-1.8	-.86	1.2	.64	65.0	.1	.05	1.7	.95	76G	Ø	L173A	
L182	47.2	-.9	-.42	2.2	1.21	65.6	.7	.30	1.3	.74	76H	Ø	L182	
L210	52.8	4.7	2.33	2.0	1.11	69.1	4.2	1.82	2.1	1.20	76H	Ø	L210	
L213	49.6	1.5	.76	1.7	.95	65.2	.3	.13	1.3	.70	76H	Ø	L213	
L223	49.3	1.2	.61	1.8	.97	61.5	-3.4	-1.48	1.9	1.05	76H	Ø	L223	
L226	47.2	-.9	-.42	2.1	1.15	62.4	-2.5	-1.09	2.2	1.24	76H	Ø	L226	
L259	48.2	.1	.05	1.3	.69	63.4	-1.5	-.66	1.9	1.05	76H	Ø	L259	
L288	49.7	1.7	.83	2.2	1.23	66.6	1.7	.74	1.8	1.00	76H	Ø	L288	
L317	48.3	.2	.12	2.3	1.24	64.3	-.6	-.26	1.4	.79	76H	Ø	L317	
L328	45.9	-2.1	-1.05	2.2	1.19	67.0	2.2	.94	1.5	.86	76H	Ø	L328	
L456	47.8	-.2	-.12	1.5	.81	65.7	.8	.35	1.8	1.02	76H	Ø	L456	
L554	46.3	-1.8	-.86	1.9	1.06	63.1	-1.8	-.80	1.2	.70	76H	Ø	L554	
L713	43.0	-5.1	-2.49	2.3	1.29	61.2	-3.7	-1.63	2.7	1.52	76H	Ø	L713	
GR. MEAN	48.1	GLOSS UNITS				GRAND MEAN	64.9	GLOSS UNITS				TEST DETERMINATIONS = 10		
SD MEANS	2.0	GLOSS UNITS				SD OF MEANS	2.3	GLOSS UNITS				18 LABS IN GRAND MEANS		
		AVERAGE SDR = 1.8				GLOSS UNITS		AVERAGE SDR = 1.8				GLOSS UNITS		

L250 49.5 1.4 .71 1.8 1.01 63.7 -1.2 -.52 2.8 1.57 76Q * L250
 TOTAL NUMBER OF LABORATORIES REPORTING = 20
 Best values: B47 48 ± 3 gloss units
 E48 65 ± 4 gloss units

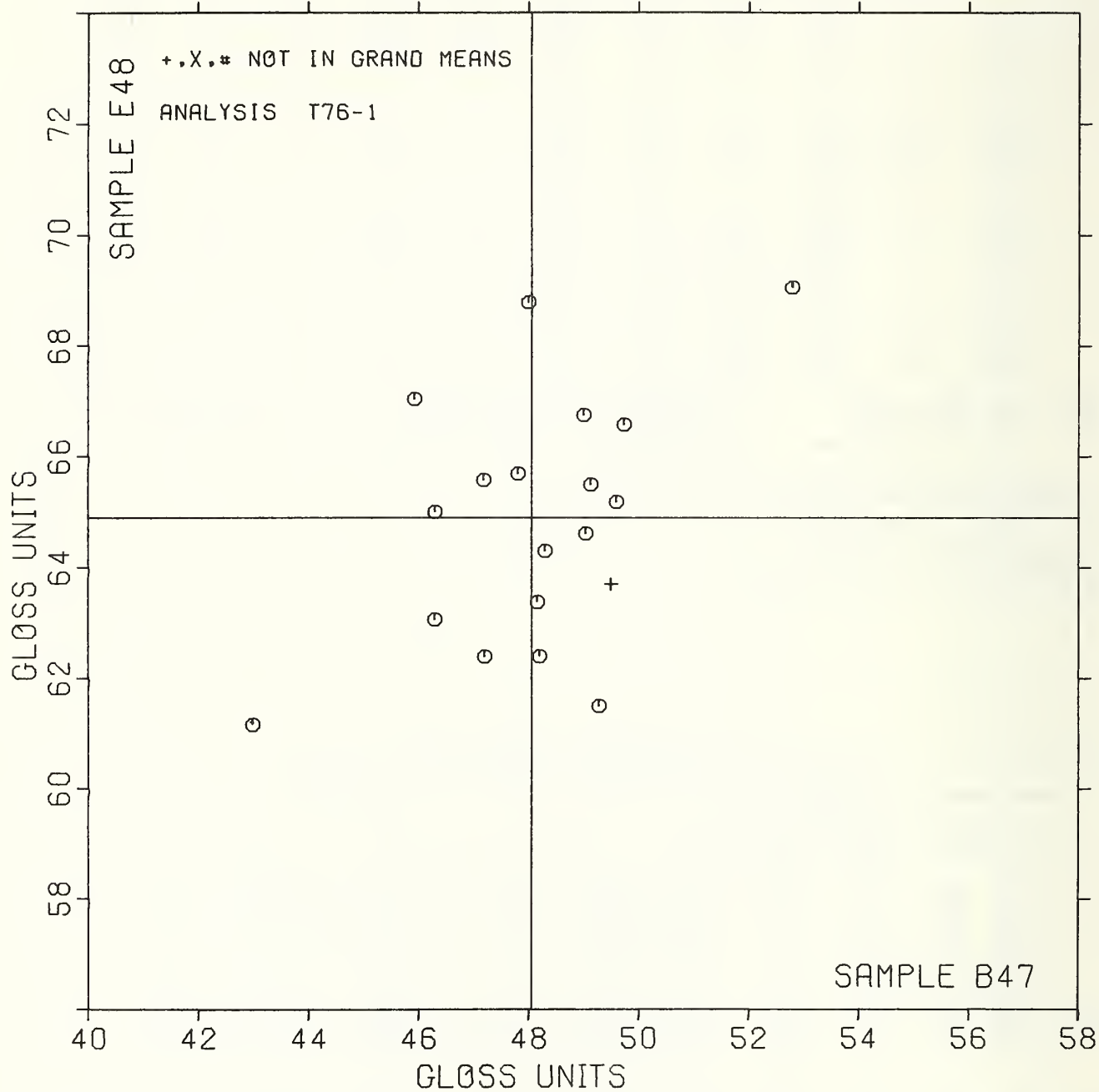
The following laboratories were omitted from the grand means because of extreme test results: 149

SPECULAR GLOSS AT 75 DEGREES, IN GLOSS UNITS - LOW RANGE
TAPPI OFFICIAL TEST METHOD T480 OS-78, SPECULAR GLOSS OF PAPER AND PAPERBOARD AT 75 DEGREES

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS				
		B47	E48	MAJOR	MINOR	R.SDR	VAR					
L713	Ø	43.0	61.2	-6.1	1.7	1.40	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L149	#	43.2	50.9	-14.0	-4.8	1.19	76G	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, GARDNER			
L328	Ø	45.9	67.0	.4	3.0	1.02	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L554	Ø	46.3	63.1	-2.5	.3	.68	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L173A	Ø	46.3	65.0	-1.0	1.4	.79	76G	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, GARDNER			
L182	Ø	47.2	65.6	.0	1.1	.97	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L226	Ø	47.2	62.4	-2.5	-.9	1.19	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L456	Ø	47.8	65.7	.5	.7	.92	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L162	Ø	48.0	68.8	3.0	2.4	.81	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L259	Ø	48.2	63.4	-1.1	-1.0	.87	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L128	Ø	48.2	62.4	-1.9	-1.7	.89	76G	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, GARDNER			
L317	Ø	48.3	64.3	-.3	-.6	1.02	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L153	Ø	49.0	66.7	2.0	.4	1.06	76G	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, GARDNER			
L122	Ø	49.0	64.6	.4	-.9	.91	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L134	Ø	49.1	65.5	1.1	-.5	1.16	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L223	Ø	49.3	61.5	-1.9	-3.1	1.01	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L250	*	49.5	63.7	-.0	-1.9	1.29	76Q	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, PHOTOVOLT, 20C, 65%RH			
L213	Ø	49.6	65.2	1.2	-1.0	.83	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L288	Ø	49.7	66.6	2.4	-.3	1.12	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
L210	Ø	52.8	69.1	6.2	-1.1	1.15	76H	SPECULAR	GLOSS, 75 DEGREE, 20-65 UNITS, HUNTER			
GMEANS:		48.1	64.9			1.00						
		95% ELLIPSE:		7.4	4.2	WITH GAMMA = 51 DEGREES						

SPECULAR GLOSS, 75 DEGREE-LOW RANGE

SAMPLE B47 = 48.1 GLOSS UNITS SAMPLE E48 = 64.9 GLOSS UNITS



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

LAB CODE	SAMPLE G30 MEAN	KRAFT ENVELOPE 123 GRAMS PER SQUARE METER				SAMPLE B48 MEAN	KRAFT ENVELOPE 76 GRAMS PER SQUARE METER				TEST D. ° 10		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	7.199	.130	1.14	.077	1.33	4.909	.101	1.06	.061	1.02	90V	Ø	L100
L105	7.133	.064	.56	.043	.75	4.885	.077	.81	.067	1.12	90Q	Ø	L105
L118	7.130	.061	.53	.048	.83	4.849	.041	.43	.060	1.00	90Q	Ø	L118
L122	7.143	.074	.65	.035	.61	4.873	.065	.68	.043	.71	90V	Ø	L122
L123F	7.345	.276	2.41	.090	1.55	4.994	.186	1.96	.072	1.21	90F	Ø	L123F
L125	7.146	.077	.67	.065	1.13	4.888	.080	.54	.051	.85	90T	Ø	L125
L128	7.092	.023	.20	.027	.47	4.832	.024	.25	.063	1.05	90T	Ø	L128
L134	7.051	-.018	-.16	.031	.53	4.759	-.050	-.52	.090	1.51	90Q	Ø	L134
L141	7.003	-.066	-.58	.031	.54	4.634	-.174	-1.84	.050	.84	90T	Ø	L141
L153	7.004	-.065	-.57	.039	.67	4.826	.018	.18	.055	.92	90T	Ø	L153
L158	7.020	-.049	-.43	.063	1.10	4.800	-.008	-.09	.047	.79	90T	Ø	L158
L159	7.292	.223	1.95	.083	1.43	4.864	.056	.59	.062	1.03	90T	Ø	L159
L162	7.229	.160	1.40	.054	.93	4.834	.026	.27	.087	1.46	90V	Ø	L162
L166	7.123	.054	.47	.059	1.02	4.872	.064	.67	.075	1.25	90T	Ø	L166
L173B	7.140	.071	.62	.070	1.21	4.870	.062	.65	.048	.81	90F	Ø	L173B
L174	7.030	-.039	-.34	.082	1.43	4.805	-.003	-.04	.096	1.60	90T	Ø	L174
L182	7.033	-.036	-.32	.053	.92	4.771	-.037	-.39	.047	.79	90L	Ø	L182
L183	6.967	-.102	-.89	.027	.47	4.757	-.051	-.54	.051	.85	90T	Ø	L183
L185	7.240	.171	1.50	.117	2.03	4.940	.132	1.39	.097	1.61	90G	Ø	L185
L190C	6.770	-.299	-2.62	.048	.84	4.680	-.128	-1.36	.042	.70	90T	*	L190C
L212	7.135	.066	.58	.047	.82	4.790	-.018	-.20	.021	.35	90T	Ø	L212
L213	7.110	.041	.36	.074	1.28	4.800	-.008	-.09	.047	.79	90T	Ø	L213
L223	7.005	-.064	-.56	.043	.75	4.753	-.055	-.59	.051	.85	90V	Ø	L223
L228	7.090	.021	.18	.057	.98	4.800	-.008	-.09	.067	1.11	90T	Ø	L228
L233	7.119	.050	.44	.053	.92	4.887	.079	.83	.038	.64	90Q	Ø	L233
L238A	7.202	.133	1.16	.066	1.14	4.875	.067	.70	.066	1.10	90T	Ø	L238A
L241	6.985	-.084	-.73	.063	1.08	4.750	-.058	-.62	.111	1.85	90T	Ø	L241
L242Ø	7.043	-.026	-.23	.023	.39	4.849	.041	.43	.047	.78	90Ø	Ø	L242Ø
L242P	7.032	-.037	-.32	.033	.57	4.799	-.010	-.10	.073	1.22	90P	Ø	L242P
L249	7.028	-.041	-.36	.049	.85	4.820	.012	.12	.052	.87	90T	Ø	L249
L257	7.150	.081	.71	.108	1.87	4.920	.112	1.18	.092	1.54	90T	Ø	L257
L259	7.229	.160	1.40	.072	1.25	4.940	.132	1.39	.051	.85	90Q	Ø	L259
L260	7.007	-.062	-.54	.037	.65	4.793	-.015	-.16	.035	.59	90T	Ø	L260
L261	7.110	.041	.36	.039	.67	4.785	-.023	-.25	.040	.67	90T	Ø	L261
L262	6.933	-.136	-1.19	.073	1.26	4.708	-.100	-1.06	.042	.69	90T	Ø	L262
L274D	7.100	.031	.27	.082	1.41	5.020	.212	2.23	.063	1.06	90D	*	L274D
L285	7.148	.079	.69	.033	.57	4.875	.067	.70	.041	.69	90Q	Ø	L285
L291	7.165	.096	.84	.049	.86	4.940	.132	1.39	.074	1.23	90T	Ø	L291
L305	7.010	-.059	-.52	.088	1.52	4.725	-.083	-.88	.072	1.20	90T	Ø	L305
L309	7.060	-.009	-.08	.070	1.21	4.830	.022	.23	.082	1.38	90T	Ø	L309
L315	7.250	.181	1.58	.085	1.47	4.810	.002	.02	.074	1.23	90T	Ø	L315
L318	7.078	.009	.08	.061	1.06	4.623	-.185	-1.96	.070	1.16	90T	*	L318
L320	7.160	.091	.80	.057	.98	4.970	.162	1.70	.042	.70	90T	Ø	L320
L323	6.843	-.226	-1.98	.051	.89	4.698	-.110	-1.17	.045	.76	90T	Ø	L323
L324	7.050	-.019	-.17	.062	1.08	4.770	-.038	-.41	.059	.98	90T	Ø	L324
L326	7.080	.011	.10	.042	.73	4.860	.052	.54	.052	.86	90T	Ø	L326
L328	7.058	-.011	-.10	.072	1.24	4.670	-.138	-1.46	.028	.47	90T	Ø	L328
L333	6.985	-.084	-.73	.053	.92	4.770	-.038	-.41	.040	.67	90V	Ø	L333
L339	6.966	-.103	-.90	.058	1.00	4.704	-.104	-1.10	.081	1.35	90T	Ø	L339
L341	7.134	.065	.57	.032	.56	4.939	.131	1.38	.030	.49	90T	Ø	L341
L352	6.879	-.190	-1.66	.032	.56	4.679	-.129	-1.37	.037	.61	90Q	Ø	L352
L356	7.066	-.003	-.03	.027	.46	4.759	-.049	-.52	.072	1.20	90T	Ø	L356
L358	6.925	-.144	-1.26	.043	.75	4.734	-.074	-.79	.066	1.10	90T	Ø	L358
L376	6.950	-.119	-1.04	.071	1.22	4.650	-.158	-1.67	.053	.88	90T	Ø	L376
L380	7.060	-.009	-.08	.052	.89	4.860	.052	.54	.052	.86	90T	Ø	L380
L382	7.030	-.039	-.34	.075	1.30	4.750	-.058	-.62	.053	.88	90T	Ø	L382
L390	7.076	.007	.06	.080	1.39	4.880	.072	.75	.055	.92	90T	Ø	L390
L442	7.283	.214	1.87	.077	1.33	4.943	.135	1.42	.105	1.75	90V	Ø	L442
L554	6.990	-.079	-.69	.061	1.06	4.850	.042	.44	.062	1.04	90D	Ø	L554
L556	7.024	-.045	-.39	.035	.61	4.741	-.067	-.71	.047	.78	90T	Ø	L556
L567	6.925	-.144	-1.26	.127	2.21	4.612	-.196	-2.07	.177	2.96	90V	Ø	L567
L571	6.890	-.179	-1.57	.074	1.28	4.800	-.008	-.09	.115	1.93	90V	Ø	L571
L574	6.866	-.203	-1.78	.044	.76	4.685	-.123	-1.30	.039	.66	90V	Ø	L574
L575	7.119	.050	.44	.054	.93	4.797	-.011	-.12	.053	.88	90T	Ø	L575
L576	7.145	.076	.67	.049	.85	4.783	-.025	-.27	.084	1.41	90T	Ø	L576

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

LAB CODE	SAMPLE G30 MEAN	KRAFT ENVELOPE 123 GRAMS PER SQUARE METER				R.SDR	SAMPLE B48 MEAN	KRAFT ENVELOPE 76 GRAMS PER SQUARE METER				TEST D. ° 10		
		DEV	N.DEV	SDR	R.SDR			DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L581	7.180	.111	.97	.075	1.30	4.925	.117	1.23	.063	1.06	90T	Ø	L581	
L587	7.000	-.069	-.60	.047	.82	4.720	-.088	-.93	.042	.70	90T	Ø	L587	
L693	7.104	.035	.31	.051	.89	4.809	.001	.01	.058	.98	90T	Ø	L693	
L704	6.855	-.214	-1.87	.107	1.85	4.625	-.183	-1.94	.068	1.13	90T	Ø	L704	
L713	7.206	.137	1.20	.051	.88	4.958	.150	1.58	.030	.51	90T	Ø	L713	
L737	6.930	-.139	-1.22	.106	1.84	4.750	-.058	-.62	.053	.88	90T	Ø	L737	
L753	6.982	-.087	-.76	.043	.74	4.823	.015	.15	.022	.36	90T	Ø	L753	
L755	7.265	.196	1.71	.034	.58	4.910	.102	1.07	.070	1.17	90T	Ø	L755	
L756	7.000	-.069	-.60	.000	.00	4.670	-.138	-1.46	.000	.00	90T	Ø	L756	
GR. MEAN ° 7.069 MILS		AVERAGE SDR ° .058 MILS				GRAND MEAN ° 4.808 MILS		AVERAGE SDR ° .060 MILS				TEST DETERMINATIONS ° 10		
SD MEANS ° .114 MILS		GRAND MEAN ° 122.14 MICROMETER				SD OF MEANS ° .095 MILS		74 LABS IN GRAND MEANS						
GR. MEAN ° 179.55 MICROMETER														
L108	6.805	-.264	-2.31	.096	1.66	4.525	-.283	-2.99	.059	.98	90C	*	L108	
L251	6.927	-.142	-1.25	.036	.63	4.716	-.092	-.97	.037	.62	90W	*	L251	
L274C	7.100	.031	.27	.094	1.63	5.000	.192	2.02	.067	1.11	90C	*	L274C	
L342	6.923	-.146	-1.28	.037	.65	4.697	-.111	-1.18	.045	.75	90U	*	L342	
L344	7.070	.001	.01	.048	.84	4.820	.012	.12	.042	.70	90U	*	L344	
L563	7.210	.141	1.23	.088	1.52	4.920	.112	1.18	.079	1.32	90U	*	L563	
L616	6.980	-.089	-.78	.042	.73	4.900	.092	.97	.047	.79	90C	*	L616	
L684	7.070	.001	.01	.048	.84	4.860	.052	.54	.052	.86	90U	*	L684	
L702	6.940	-.129	-1.13	.097	1.67	4.600	-.208	-2.20	.082	1.36	90X	*	L702	
L706	7.140	.071	.62	.070	1.21	4.780	-.028	-.30	.063	1.06	90X	*	L706	
L731	7.053	-.016	-.14	.037	.64	4.807	-.002	-.02	.067	1.12	90A	*	L731	
TOTAL NUMBER OF LABORATORIES REPORTING = 85														

Best values: G30 7.07 ± 0.19 mils
 B48 4.81 ± 0.16 mils

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS	
		G30	B48	MAJOR	MINOR	R.SDR	VAR				
L190C	*	6.770	4.680	-.315	.083	.77	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L108	*	6.805	4.525	-.383	-.061	1.32	90C	THICKNESS (CALIPER),	CADY,	HAND DRIVEN	
L323	Ø	6.843	4.698	-.246	.052	.82	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L704	Ø	6.855	4.625	-.282	-.013	1.49	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L574	Ø	6.866	4.685	-.236	.028	.71	90V	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN, DIGITIZED	
L352	Ø	6.879	4.679	-.229	.015	.58	90Q	THICKNESS (CALIPER),	EMVECC,	MOTOR DRIVEN	
L571	Ø	6.890	4.800	-.146	.103	1.60	90V	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN, DIGITIZED	
L342	*	6.923	4.697	-.184	.002	.70	90U	THICKNESS (CALIPER),	TMI,	HAND DRIVEN	
L567	Ø	6.925	4.612	-.234	-.066	2.58	90V	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN, DIGITIZED	
L358	Ø	6.925	4.734	-.159	.030	.92	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L251	*	6.927	4.716	-.169	.015	.63	90W	THICKNESS (CALIPER),	L * W,	MOTOR DRIVEN, 20 C, 65% RH	
L737	Ø	6.930	4.750	-.146	.039	1.36	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L262	Ø	6.933	4.708	-.169	.004	.98	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L702	*	6.940	4.600	-.230	-.085	1.52	90X	THICKNESS (CALIPER):	GIVE INSTR. MAKE+MODEL.(MOTOR,(HAND
L376	Ø	6.950	4.650	-.191	-.052	1.05	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L339	Ø	6.966	4.704	-.145	-.019	1.18	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L183	Ø	6.967	4.757	-.112	.022	.66	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L616	*	6.980	4.900	-.014	.127	.76	90C	THICKNESS (CALIPER),	CADY,	HAND DRIVEN	
L753	Ø	6.982	4.823	-.060	.065	.55	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L333	Ø	6.985	4.770	-.090	.021	.79	90V	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN, DIGITIZED	
L241	Ø	6.985	4.750	-.102	.006	1.47	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L554	Ø	6.990	4.850	-.037	.081	1.05	90D	THICKNESS (CALIPER),	CADY,	MOTOR DRIVEN	
L587	Ø	7.000	4.720	-.109	-.027	.76	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L756	Ø	7.000	4.670	-.140	-.067	.00	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L141	Ø	7.003	4.634	-.159	-.097	.69	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L153	Ø	7.004	4.826	-.040	.054	.80	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L223	Ø	7.005	4.753	-.085	-.004	.80	90V	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN, DIGITIZED	
L260	Ø	7.007	4.793	-.058	.026	.62	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L305	Ø	7.010	4.725	-.098	-.030	1.36	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L158	Ø	7.020	4.800	-.044	.023	.94	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L556	Ø	7.024	4.741	-.077	-.026	.70	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L249	Ø	7.028	4.820	-.025	.034	.86	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L382	Ø	7.030	4.750	-.067	-.022	1.09	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L174	Ø	7.030	4.805	-.033	.021	1.51	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L242P	Ø	7.032	4.799	-.035	.015	.90	90P	THICKNESS (CALIPER),	MESSMER,	MOTOR DRIVEN, ISO R534	
L182	Ø	7.033	4.771	-.051	-.007	.86	90L	THICKNESS (CALIPER),	L * W,	MOTOR DRIVEN	
L242Ø	Ø	7.043	4.849	.005	.048	.59	90Ø	THICKNESS (CALIPER),	MESSMER,	MOTOR DRIVEN, BS3983	
L324	Ø	7.050	4.770	-.039	-.019	1.03	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L134	Ø	7.051	4.759	-.045	-.028	1.02	90Q	THICKNESS (CALIPER),	EMVECC,	MOTOR DRIVEN	
L731	*	7.053	4.807	-.014	.009	.88	90A	THICKNESS (CALIPER),	L * W,	HAND DRIVEN	
L328	Ø	7.058	4.670	-.094	-.102	.85	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L309	Ø	7.060	4.830	.006	.022	1.29	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L380	Ø	7.060	4.860	.025	.046	.88	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L356	Ø	7.066	4.759	-.033	-.037	.83	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L684	*	7.070	4.860	.032	.040	.85	90V	THICKNESS (CALIPER),	TMI,	HAND DRIVEN	
L344	*	7.070	4.820	.008	.008	.77	90U	THICKNESS (CALIPER),	TMI,	HAND DRIVEN	
L390	Ø	7.076	4.880	.050	.052	1.16	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L318	*	7.078	4.623	-.107	-.152	1.11	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L326	Ø	7.080	4.860	.040	.034	.80	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L228	Ø	7.090	4.800	.011	-.020	1.05	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L128	Ø	7.092	4.832	.033	.004	.76	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L274D	*	7.100	5.020	.155	.148	1.24	90D	THICKNESS (CALIPER),	CADY,	MOTOR DRIVEN	
L274C	*	7.100	5.000	.142	.132	1.37	90C	THICKNESS (CALIPER),	CADY,	HAND DRIVEN	
L693	Ø	7.104	4.809	.028	-.021	.93	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L261	Ø	7.110	4.785	.018	-.044	.67	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L213	Ø	7.110	4.800	.027	-.032	1.03	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L575	Ø	7.119	4.797	.032	-.040	.91	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L233	Ø	7.119	4.887	.088	.031	.78	90Q	THICKNESS (CALIPER),	EMVECC,	MOTOR DRIVEN	
L166	Ø	7.123	4.872	.082	.017	1.13	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L118	Ø	7.130	4.849	.073	-.006	.91	90Q	THICKNESS (CALIPER),	EMVECC,	MOTOR DRIVEN	
L105	Ø	7.133	4.885	.098	.021	.94	90Q	THICKNESS (CALIPER),	EMVECC,	MOTOR DRIVEN	
L341	Ø	7.134	4.939	.132	.063	.53	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L212	Ø	7.135	4.790	.041	-.055	.59	90T	THICKNESS (CALIPER),	TMI,	MOTOR DRIVEN	
L706	*	7.140	4.780	.038	-.066	1.13	90X	THICKNESS (CALIPER):	GIVE INSTR. MAKE+MODEL.(MOTOR,(HAND
L173B	Ø	7.140	4.870	.094	.005	1.01	90F	THICKNESS (CALIPER),	FEDERAL,	MOTOR DRIVEN	

TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T90-1 TABLE 2
 THICKNESS (CALIPER), THOUSANDTHS OF AN INCH
 TAPPI OFFICIAL TEST METHOD T411 GS-76

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		G30	B48	MAJOR	MINOR	R.SDR	VAR	
L122	Ø	7.143	4.873	.098	.005	.66	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN, DIGITIZED
L576	Ø	7.145	4.783	.044	-.067	1.13	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L125	Ø	7.146	4.888	.110	.015	.99	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L285	Ø	7.148	4.875	.103	.004	.63	90Q	THICKNESS (CALIPER), EMVECO, MOTOR DRIVEN
L257	Ø	7.150	4.920	.132	.038	1.70	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L320	Ø	7.160	4.970	.171	.071	.84	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L291	Ø	7.165	4.940	.157	.045	1.05	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L581	Ø	7.180	4.925	.159	.024	1.18	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L100	Ø	7.199	4.909	.164	-.001	1.17	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN, DIGITIZED
L238A	Ø	7.202	4.875	.146	-.029	1.12	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L713	Ø	7.206	4.958	.200	.034	.69	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L563	*	7.210	4.920	.180	.001	1.42	90U	THICKNESS (CALIPER), TMI, HAND DRIVEN
L259	Ø	7.229	4.940	.207	.005	1.05	90Q	THICKNESS (CALIPER), EMVECO, MOTOR DRIVEN
L162	Ø	7.229	4.834	.142	-.078	1.20	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN, DIGITIZED
L185	Ø	7.240	4.940	.216	-.002	1.82	90G	THICKNESS (CALIPER), ANTHOR, MOTOR DRIVEN
L315	Ø	7.250	4.810	.144	-.110	1.35	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L755	Ø	7.265	4.910	.217	-.041	.88	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L442	Ø	7.283	4.943	.251	-.026	1.54	90V	THICKNESS (CALIPER), TMI, MOTOR DRIVEN, DIGITIZED
L159	Ø	7.292	4.864	.210	-.093	1.23	90T	THICKNESS (CALIPER), TMI, MOTOR DRIVEN
L123F	Ø	7.345	4.994	.332	-.024	1.38	90F	THICKNESS (CALIPER), FEDERAL, MOTOR DRIVEN
GMEANS:		7.069	4.808			1.00		
		95% ELLIPSE:		.351	.129			WITH GAMMA = 37 DEGREES

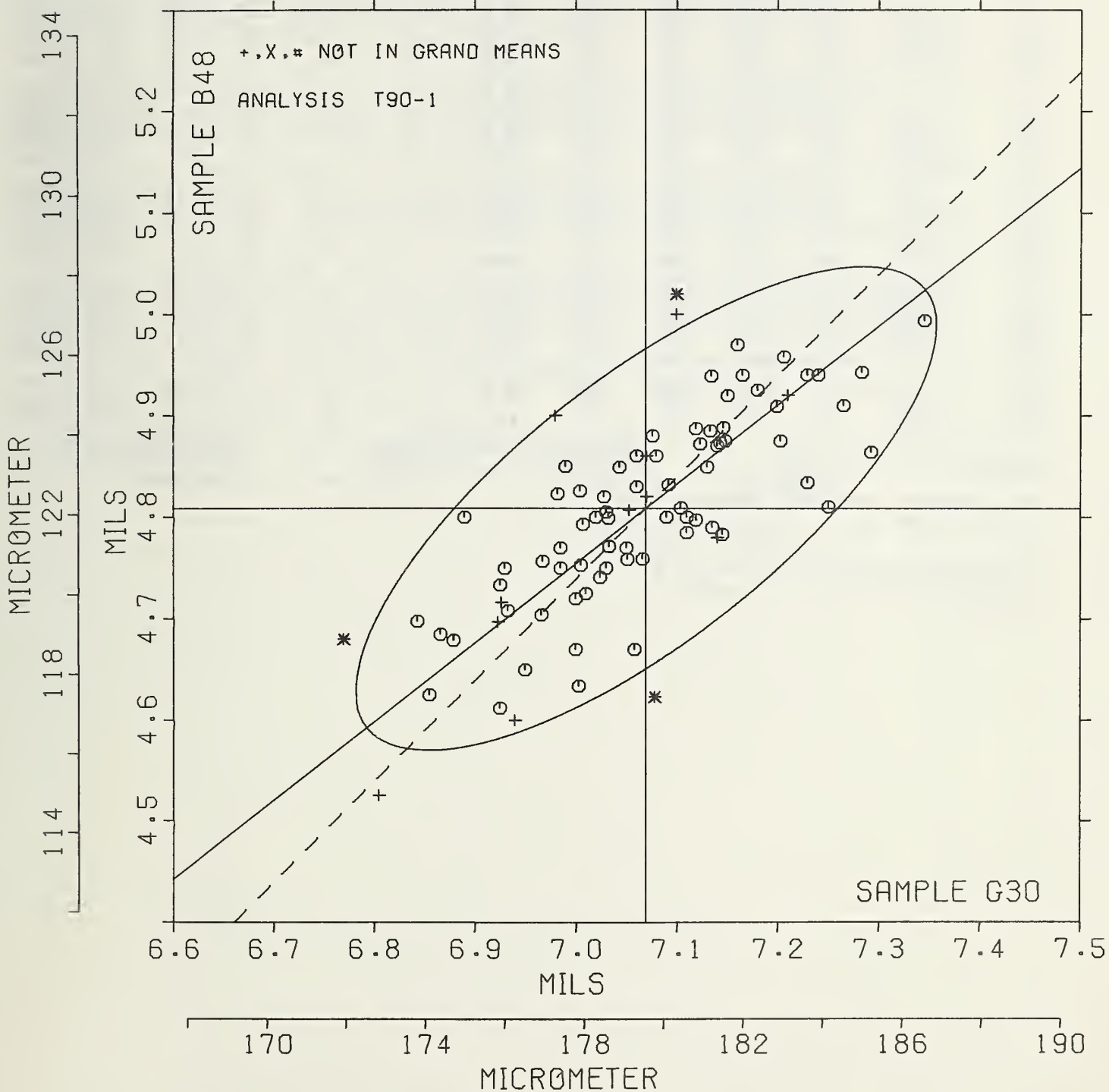
THICKNESS (CALIPER)

SAMPLE G30 = 7.07 MILS

SAMPLE B48 = 4.81 MILS

SAMPLE G30 = 179.6 MICRØMETER

SAMPLE B48 = 122.1 MICRØMETER



TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T95-1 TABLE 1
 GRAMMAGE (MASS PER UNIT AREA)
 TAPPI OFFICIAL TEST METHOD T410 68-79

LAB CODE	SAMPLE D38 MEAN	KRAFT ENVELOPE 124 GRAMS PER SQUARE METER				SAMPLE D39 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER				TEST D. = 10		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	133.30	9.22	11.32	.95	1.18	98.87	6.37	9.67	.88	1.24	95C	#	L100
L121	123.71	-.37	-.45	1.07	1.34	92.02	-.48	-.72	.63	.88	95B	Ø	L121
L162	126.00	1.92	2.36	.00	.00	92.76	.27	.40	7.28	10.24	95K	#	L162
L213	123.88	-.20	-.25	.74	.92	92.29	-.20	-.31	.59	.83	95F	Ø	L213
L233	123.32	-.76	-.94	1.68	2.10	93.15	.65	.99	.81	1.14	95T	Ø	L233
L244	123.86	-.22	-.27	.37	.46	92.34	-.15	-.24	.47	.66	95T	Ø	L244
L249	125.36	1.28	1.57	1.12	1.40	94.03	1.53	2.33	.49	.69	95I	Ø	L249
L274	124.40	.32	.39	.70	.87	93.20	.71	1.07	.63	.89	95B	Ø	L274
L280	124.40	.32	.39	.84	1.05	91.91	-.59	-.89	.90	1.27	95T	Ø	L280
L285	123.68	-.40	-.49	.09	.11	91.76	-.73	-1.11	.30	.42	95T	Ø	L285
L305	124.24	.16	.19	.35	.44	92.67	.17	.26	.20	.29	95T	Ø	L305
L339	123.52	-.56	-.68	.36	.45	92.18	-.32	-.48	.39	.55	95T	Ø	L339
L344	126.60	2.52	3.09	.52	.64	106.20	13.71	20.78	.42	.59	95T	#	L344
L442	124.99	.91	1.12	.54	.67	93.13	.64	.96	.50	.71	95K	Ø	L442
L564	124.10	.02	.02	.57	.71	92.70	.21	.31	.95	1.33	95E	Ø	L564
L567	123.60	-.48	-.59	.84	1.05	92.10	-.39	-.60	1.29	1.81	95E	Ø	L567
L571	124.80	.72	.88	.92	1.15	93.40	.91	1.37	1.07	1.51	95P	Ø	L571
L574	124.28	.20	.25	1.16	1.44	92.38	-.11	-.17	.76	1.06	95D	Ø	L574
L604	122.70	-1.38	-1.69	.67	.84	91.30	-1.19	-1.81	.67	.95	95T	Ø	L604
L693	329.50	205.42	252.21	.55	.68	94.58	2.09	3.16	.78	1.10	95G	#	L693
L704	123.73	-.35	-.43	.84	1.05	92.60	.11	.16	.74	1.04	95T	Ø	L704
L731	122.65	-1.43	-1.76	1.18	1.47	91.65	-.85	-1.28	1.06	1.48	95B	Ø	L731
L756	124.38	.30	.37	1.18	1.48	92.34	-.15	-.24	1.04	1.46	95C	Ø	L756

GR. MEAN = 124.08 G/SQ.METER GRAND MEAN = 92.49 G/SQ.METER TEST DETERMINATIONS = 10
 SD MEANS = .81 G/SQ.METER SD OF MEANS = .66 G/SQ.METER 20 LABS IN GRAND MEANS
 AVERAGE SDR = .80 G/SQ.METER AVERAGE SDR = .71 G/SQ.METER

TOTAL NUMBER OF LABORATORIES REPORTING = 23

Best values: D38 124.1 ± 1.4 grams per square meter
 D39 92.5 ± 1.1 grams per square meter

The following laboratories were omitted from the grand means because of extreme test results: 100, 344, 693

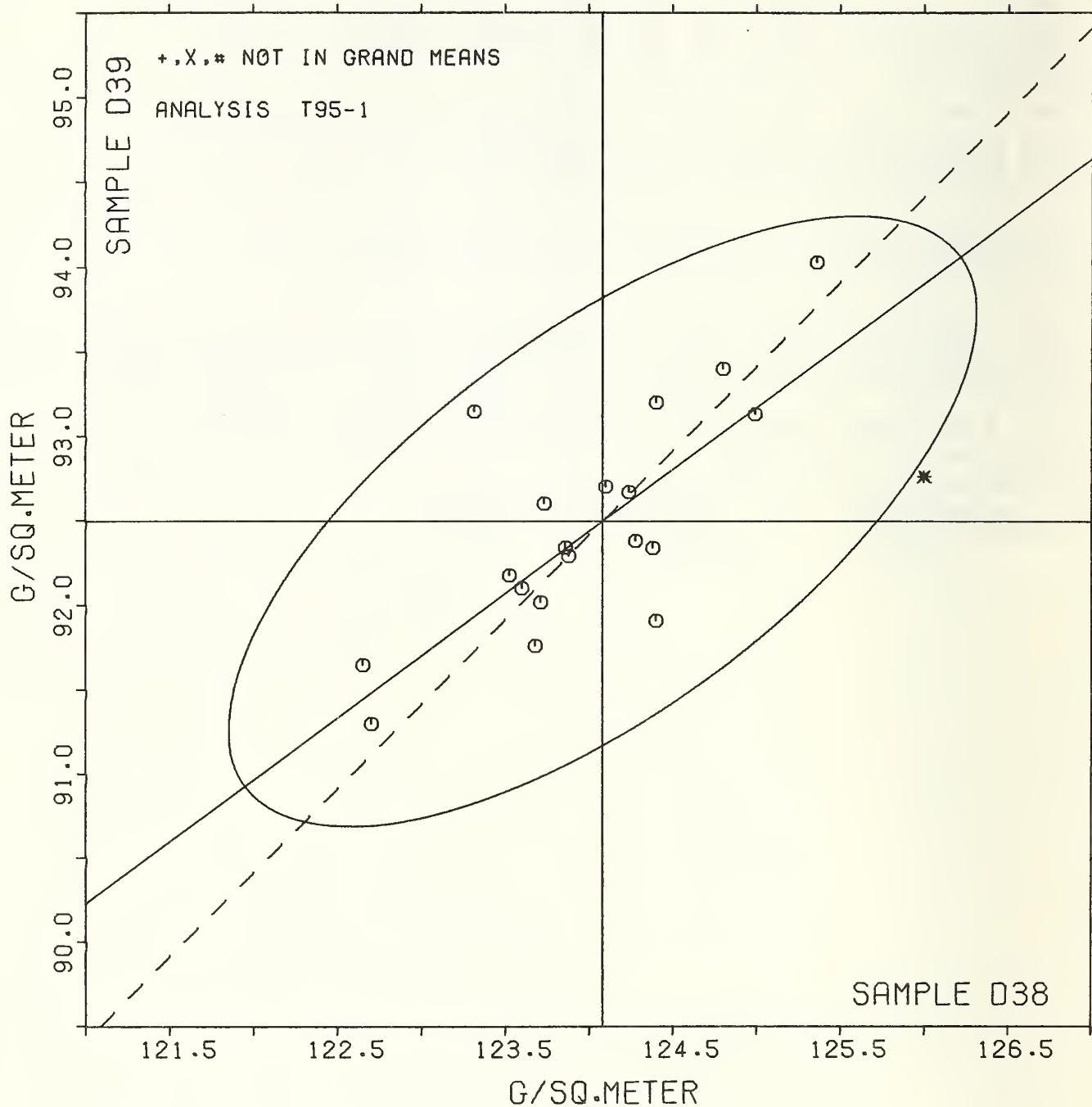
TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T95-1 TABLE 2
 GRAMMAGE (MASS PER UNIT AREA)
 TAPPI OFFICIAL TEST METHOD T410 CS-79

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		D38	D39	MAJOR	MINOR	R.SDR	VAR			
L731	Ø	122.65	91.65	-1.65	.17	1.48	95H	BASIS WEIGHT (GRAMMAGE),	SQUARE AND BLADE	
L604	Ø	122.70	91.30	-1.82	-.15	.90	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT	
L233	Ø	123.32	93.15	-.23	.98	1.62	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT	
L339	Ø	123.52	92.18	-.64	.07	.50	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT	
L567	Ø	123.60	92.10	-.62	-.03	1.43	95E	BASIS WEIGHT (GRAMMAGE),	GUILLOTINE TYPE CUTTER	
L285	Ø	123.68	91.76	-.76	-.36	.27	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT	
L121	Ø	123.71	92.02	-.58	-.17	1.11	95B	BASIS WEIGHT (GRAMMAGE),	CÓNCREA CUTTER	
L704	Ø	123.73	92.60	-.22	.29	1.04	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT	
L244	Ø	123.86	92.34	-.27	.01	.56	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT	
L213	Ø	123.88	92.29	-.28	-.05	.88	95F	BASIS WEIGHT (GRAMMAGE),	FOUR-SQUARE CUTTER	
L564	Ø	124.10	92.70	.14	.15	1.02	95E	BASIS WEIGHT (GRAMMAGE),	GUILLOTINE TYPE CUTTER	
L305	Ø	124.24	92.67	.23	.05	.36	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT	
L574	Ø	124.28	92.38	.09	-.21	1.25	95D	BASIS WEIGHT (GRAMMAGE),	DIE CUT	
L756	Ø	124.38	92.34	.15	-.30	1.47	95C	BASIS WEIGHT (GRAMMAGE),	CUTTING BOARD	
L274	Ø	124.40	93.20	.68	.38	.88	95B	BASIS WEIGHT (GRAMMAGE),	CÓNCREA CUTTER	
L280	Ø	124.40	91.91	-.09	-.66	1.16	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT	
L571	Ø	124.80	93.40	1.12	.30	1.33	95P	BASIS WEIGHT (GRAMMAGE),	PRODUCTION REAM CUTTER	
L442	Ø	124.99	93.13	1.11	-.03	.69	95K	BASIS WEIGHT (GRAMMAGE),	WEIGHED AS RECEIVED	
L249	Ø	125.36	94.03	1.94	.48	1.04	95I	BASIS WEIGHT (GRAMMAGE),	INGENTØ PAPER CUTTER	
L162	*	126.00	92.76	1.70	-.92	5.12	95K	BASIS WEIGHT (GRAMMAGE),	WEIGHED AS RECEIVED	
L344	#	126.60	106.20	10.15	9.55	.62	95T	BASIS WEIGHT (GRAMMAGE),	TEMPLATE CUT	
L100	#	133.30	98.87	11.20	-.32	1.21	95C	BASIS WEIGHT (GRAMMAGE),	CUTTING BOARD	
L693	#	329.50	94.58	166.76-119.97		.89	95G	BASIS WEIGHT (GRAMMAGE),	PRECISION CUTTER	
GMEANS:		124.08	92.49			1.00				
		95% ELLIPSE:		2.64	1.12			WITH GAMMA = 36 DEGREES		

GRAMMAGE (MASS PER UNIT AREA)

SAMPLE D38 = 124.1 G/SQ.METER

SAMPLE D39 = 92.5 G/SQ.METER



SUMMARY TABLE

TEST METHOD	SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDR	REPL CRP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPROD
AIR RESISTANCE, GURLEY T40-1 GURLEY UNITS	Z07	91.5	6.8	7.9	10	62	66	10	6.9	18.7
	Z27	41.4	3.9	10.4					9.1	10.8
AIR RESISTANCE, SHEFFIELD T40-2 SHEFF. UNITS	Z07	37.2	3.3	2.9	10	39	49	10	2.5	9.1
	Z27	87.2	7.9	18.6					16.3	21.8
AIR RESISTANCE, GURLEY HG FLOTATION T41-1 SEC/10 CC	B73	1343.	178.	563.	10	13	14	10	493.	494.
	B47	1615.	211.	446.					351.	586.
SMOOTHNESS, PARKER PRINTSURF T44-1 MICRONS	A83	4.61	.18	.23	10	7	7	10	.20	.45
	G09	5.16	.21	.20					.17	.59
SMOOTHNESS, SHEFFIELD T45-1 SHEFF. UNITS	A83	108.5	8.7	11.2	15	94	98	10	9.8	24.8
	G09	161.8	9.3	15.6					13.7	27.0
SMOOTHNESS, BEKK T45-2 BEKK SECONDS	A83	53.7	8.6	10.8	15	10	12	5	13.4	26.3
	G09	27.8	2.7	3.0					3.7	8.0
SMOOTHNESS, BENDTSEN T47-1 ML/MIN	A83	127.	35.	24.	10	6	6	10	21.	96.
	G09	215.	18.	33.					29.	49.
MOISTURE T53-1 PERCENT	G32	5.437	.289	.154	10	10	14	2	.302	.846
	G41	3.489	.238	.100					.195	.682
K & N INK ABSORPTION T56-1 K & N UNITS	G04	57.6	6.6	.7	4	9	9	2	1.4	18.3
	G21	53.1	6.5	2.2					4.3	18.2
OPACITY, B&L, 89% BACKING, FINE P. T60-1 PERCENT	G27	87.61	.62	1.02	10	65	81	5	1.26	1.93
	A99	89.56	.63	.83					1.03	1.90
OPACITY, ELREPHO, PAPER BACKING, FINE P T60-2 PERCENT	G27	89.60	.34	.61	10	14	17	5	.76	1.05
	A99	91.02	.21	.74					.92	.87
OPACITY, B&L, 89% BACKING, NEWS T61-1 PERCENT	A56	79.02	.66	.98	10	23	29	5	1.21	2.03
	G42	68.37	.63	.73					.90	1.87
BLUE REFLECTANCE, DIRECTIONAL T65-1 PERCENT	J38	76.16	.35	.14	8	17	52	5	.18	.95
	A56	78.29	.28	.16					.20	.80
BLUE REFLECTANCE, DIFFUSE, WITH TRAP T65-2 PERCENT	J38	75.16	.82	.14	8	17	19	5	.17	2.27
	A56	78.52	.86	.11					.13	2.39
BLUE REFLECTANCE, DIFFUSE, NO TRAP T65-3 PERCENT	J38	76.61	.67	.11	8	15	15	5	.13	1.85
	A56	79.08	.65	.07					.05	1.81
SPECULAR GLOSS, 75 DEGREE-HIGH RANGE T75-1 GLOSS UNITS	E51	67.9	2.1	1.1	10	38	40	5	1.4	5.8
	Z29	69.9	2.4	1.2					1.4	6.7
SPECULAR GLOSS, 75 DEGREE-LOW RANGE T76-1 GLOSS UNITS	B47	48.1	2.0	1.8	10	18	20	5	2.3	5.8
	E48	64.9	2.3	1.8					2.2	6.5
THICKNESS (CALIPER) T90-1 MILS	G30	7.069	.114	.058	10	74	85	10	.051	.317
	B48	4.808	.095	.060					.052	.263
GRAMMAGE (MASS PER UNIT AREA) T95-1 G/SQ.METER	D38	124.08	.81	.80	10	20	23	3	1.28	2.50
	D39	92.49	.66	.71					1.14	2.06

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