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NBS
PUBLICATIONS



**TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY**

**COLLABORATIVE REFERENCE PROGRAM
FOR PAPER**

**REPORT NO. 58S
STRENGTH TESTS**



**U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards**

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79-1375
1979
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NBS COLLABORATIVE REFERENCE PROGRAMS

TAPPI Paper and Board (6 times per year)

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

FKBG-API Containerboard (48 times per year)

Mullen burst of linerboard
Concora test of medium

MCCA Color and Appearance (4 times per year)

Gloss at 60°
Color and color difference

CTS Rubber (4 times per year)

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

CTS Thermal Insulation Materials (2 times per year)

19 test methods for thermal insulation materials covering:
thermal properties; strength properties; dimensions, stability,
and density properties; fire properties; and properties of
vapor barriers

ASTM Cement (2 times per year)

Chemical (11 chemical components)
Physical (8 characteristics)

AASHTO Bituminous

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

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

~~Technical Association of the Pulp and Paper Industry~~

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TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM
FOR PAPER

Report No. 58S
STRENGTH TESTS

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Office of Engineering Standards
National Engineering Laboratory

NBSIR 79-1375

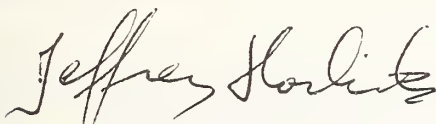
U. S. DEPARTMENT OF COMMERCE
National Bureau of Standards

INTRODUCTION

Reports 58S and 58G comprise the fourth set of reports for the 78-79 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 4 of this report for an explanation of "Best Values". Please do not confuse these Best Values with provisional values included with the samples to detect serious discrepancies at the time of test.

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

June 8, 1979

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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65-2	Blue Reflectance, Diffuse, Elrepho (Gloss Trap)
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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	14.59
	in.-lb/in. ²	J/m ²	175.1
	kg-m/m ²	J/m ²	9.807
Bending stiffness	g·cm	μN·m	98.07
Flat-crush strength (Concora)	lb	N	4.448
Ring-crush (TAPPI)	lb	N	4.448
	(ISO)	lb/6.00 in.	kN/m
Thickness	mil	μm	25.40

KEY TO TABLES AND GRAPHS

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

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

- VAR - Code for instrument type or variation in condition, see second table.
- F - Flag, with following meaning:
- + - Excluded from grand means because VAR non-standard for this analysis
- # - Excluded because data were not understood or because of a non-coded variation reported by the laboratory. (See NOTES following Table 1 for each method.)
- M - Excluded because data for one sample are missing
- X - Excluded because plotted point would fall outside of the 99% error ellipse, (see below for explanation of Graph)
- * - Included in grand means but plotted point falls outside of the 95% error ellipse. The participant should take this as a warning to reexamine his testing procedure
- S - Included in grand mean but only after omission of one of 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.
- 0 - Included in grand mean and inside 95% error ellipse.
- COORDINATES - Distances along major and minor axes of error ellipse. If special additive or concurrent model of the measuring process applies to this method, the distance along the minor axis represents the random error within a laboratory while that along the major axis also includes a systematic laboratory component of error.

95% ELLIPSE -

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

AVG R. SDR -

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

Graph -

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

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

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

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

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

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

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

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

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

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

ANALYSIS T10-1 TABLE 1
BURSTING STRENGTH, PSI
TAPPI STANDARD T403 6S-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C

LAB CODE	SAMPLE K37 75 GRAMS PER SQUARE METER PRINTING					SAMPLE J87 76 GRAMS PER SQUARE METER PRINTING					TEST D. = 15		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L121	26.58	-1.13	-.57	.90	.49	17.77	.44	.35	.82	.75	10C	Ø	L121
L131	22.73	-4.98	-2.50	2.40	1.32	14.93	-2.39	-1.90	1.28	1.18	10C	*	L131
L134	29.20	1.49	.75	1.61	.88	16.87	-.46	-.36	.83	.77	10C	Ø	L134
L150	27.20	-.51	-.26	1.73	.95	18.33	1.01	.81	.98	.90	10C	Ø	L150
L153	28.17	.46	.23	2.14	1.17	17.57	.24	.20	.96	.89	10C	Ø	L153
L158	27.80	.09	.05	2.33	1.27	16.33	-.99	-.79	1.35	1.24	10C	Ø	L158
L167	26.23	-1.48	-.75	1.13	.62	16.80	-.52	-.42	.73	.67	10C	Ø	L167
L183	27.63	-.08	-.04	1.48	.81	17.77	.44	.35	.90	.83	10C	Ø	L183
L191	23.80	-3.91	-1.97	1.39	.76	14.13	-3.19	-2.54	1.01	.93	10C	*	L191
L207	27.33	-.38	-.19	2.30	1.26	17.20	-.12	-.10	.86	.80	10C	Ø	L207
L212	28.30	.59	.30	2.43	1.33	17.83	.51	.41	1.11	1.03	10C	Ø	L212
L223A	31.33	3.62	1.82	1.45	.79	20.57	3.24	2.59	1.30	1.20	10C	*	L223A
L225	28.23	.52	.26	1.72	.94	18.30	.98	.78	1.49	1.37	10C	Ø	L225
L232	27.90	.19	.10	2.25	1.23	17.43	.11	.09	1.07	.99	10C	Ø	L232
L237A	27.00	-.71	-.36	1.07	.58	16.73	-.59	-.47	.70	.65	10C	Ø	L237A
L237B	26.80	-.91	-.46	.94	.51	17.93	.61	.49	.59	.55	10C	Ø	L237B
L243	26.67	-1.04	-.52	1.57	.86	18.90	1.58	1.26	.83	.76	10C	Ø	L243
L248	26.21	-1.50	-.76	2.03	1.11	18.38	1.05	.84	1.18	1.09	10E	Ø	L248
L249	28.43	.72	.36	2.34	1.28	17.80	.48	.38	1.29	1.19	10C	Ø	L249
L261	26.60	-1.11	-.56	1.76	.97	17.03	-.29	-.23	1.09	1.01	10C	Ø	L261
L264	28.93	1.22	.61	1.10	.60	16.33	-.99	-.79	.82	.75	10C	Ø	L264
L268	29.63	1.92	.97	1.75	.96	18.50	1.18	.94	.89	.82	10C	Ø	L268
L278	25.53	-2.18	-1.09	1.47	.80	15.47	-1.86	-1.48	.97	.90	10C	Ø	L278
L279	27.30	-.41	-.21	2.19	1.20	17.10	-.22	-.18	1.13	1.04	10C	Ø	L279
L299	32.77	5.06	2.54	2.78	1.52	18.67	1.34	1.07	1.52	1.40	10C	Ø	L299
L305	29.33	1.62	.82	1.60	.88	17.00	-.32	-.26	1.35	1.25	10C	Ø	L305
L311	30.13	2.42	1.22	2.17	1.19	18.20	.88	.70	1.31	1.21	10C	Ø	L311
L312	27.35	-.36	-.18	1.36	.74	17.13	-.20	-.16	.53	.49	10C	Ø	L312
L315	29.97	2.26	1.13	2.70	1.48	18.70	1.38	1.10	1.03	.95	10C	Ø	L315
L321	32.80	5.09	2.56	2.88	1.58	17.40	.08	.06	2.18	2.01	10C	*	L321
L326	25.50	-2.21	-1.11	2.28	1.25	17.23	-.09	-.07	1.10	1.02	10C	Ø	L326
L330	25.81	-1.90	-.95	1.59	.87	16.39	-.94	-.75	1.39	1.28	10C	Ø	L330
L331	51.37	23.66	11.89	2.55	1.39	37.07	19.74	15.75	2.57	2.37	10C	#	L331
L333	26.80	-.91	-.46	4.63	2.53	16.47	-.86	-.68	2.59	2.39	10C	Ø	L333
L339	15.97	-11.74	-5.90	.40	.22	10.67	-6.66	-5.31	.75	.69	10C	#	L339
L344	28.70	.99	.50	2.23	1.22	15.23	-2.09	-1.67	1.16	1.07	10C	Ø	L344
L356	26.20	-1.51	-.76	1.25	.68	17.60	.28	.22	1.50	1.38	10C	Ø	L356
L358	28.16	.45	.23	1.37	.75	16.50	-.82	-.66	1.02	.94	10C	Ø	L358
L360	27.37	-.34	-.17	.79	.43	18.90	1.58	1.26	.91	.84	10C	Ø	L360
L390	28.33	.62	.31	1.53	.84	17.97	.64	.51	.64	.59	10C	Ø	L390
L568	28.00	.29	.15	1.81	.99	17.87	.54	.43	1.46	1.35	10C	Ø	L568
L599	27.34	-.37	-.19	1.42	.78	18.17	.85	.68	.85	.79	10C	Ø	L599
L684	26.00	-1.71	-.86	1.88	1.03	14.77	-2.56	-2.04	1.13	1.05	10C	Ø	L684

GR. MEAN = 27.71 PSI GRAND MEAN = 17.32 PSI TEST DETERMINATIONS = 15
SD MEANS = 1.99 PSI SD OF MEANS = 1.25 PSI 41 LABS IN GRAND MEANS
AVERAGE SDR = 1.83 PSI AVERAGE SDR = 1.08 PSI

GR. MEAN = 191.1 KILOPASCAL		GRAND MEAN = 119.4 KILOPASCAL											
L128	27.80	.09	.05	1.52	.83	18.87	1.54	1.23	.99	.91	10B	*	L128
L219	27.22	-.45	-.25	2.40	1.31	17.07	-.25	-.20	1.32	1.22	10T	*	L219
L242	29.72	2.01	1.01	2.14	1.17	19.75	2.43	1.94	1.24	1.15	10T	*	L242
L250L	26.78	-.93	-.47	1.72	.94	18.51	1.19	.95	.77	.71	10N	*	L250L
L251	25.86	-1.85	-.93	1.44	.79	18.17	.85	.68	1.83	1.69	10V	*	L251

L269 31.73 4.02 2.02 1.79 .98 22.33 5.01 4.00 1.59 1.47 10A * L269
TOTAL NUMBER OF LABORATORIES REPORTING = 49

Best values: K37 27.5 ± 3.7 psi
J87 17.4 ± 2.2 psi

The following laboratories were omitted from the grand means because of extreme test results:
331, 339.

ANALYSIS T10-1 TABLE 2
BURSTING STRENGTH, PSI
TAPPI STANDARD T403 6S-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST	INSTRUMENT---	CONDITIONS
		K37	J87	MAJOR	MINOR	R ₀ SDR	VAR				
L339	#	15.97	10.67	-13.44	-1.21	.45	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L131	*	22.73	14.93	-5.52	-.12	1.25	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L151	*	23.80	14.13	-4.88	-1.29	.84	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L326	Ø	25.50	17.23	-2.05	.83	1.13	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L278	Ø	25.53	15.47	-2.75	-.79	.85	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L330	Ø	25.81	16.39	-2.11	-.07	1.08	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L251	*	25.86	18.17	-1.33	1.54	1.24	10V	BURSTING	STRENGTH	UP TØ 45 PSI,	L*W, MANUAL CLAMP, 20C, 65% RH
L684	Ø	26.00	14.77	-2.61	-1.62	1.04	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L356	Ø	26.20	17.60	-1.26	.88	1.03	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L248	Ø	26.21	18.38	-.93	1.58	1.10	10E	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L167	Ø	26.23	16.80	-1.57	.14	.65	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L121	Ø	26.58	17.77	-.85	.87	.62	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L261	Ø	26.60	17.03	-1.13	.20	.99	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L243	Ø	26.67	18.90	-.30	1.87	.81	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L250L	*	26.78	18.51	-.36	1.47	.83	10N	BURSTING	STRENGTH	UP TØ 45 PSI,	LHØMARGY, MAN. CLAMP, 20C, 65%RH
L333	Ø	26.80	16.47	-1.18	-.40	2.46	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L237B	Ø	26.80	17.93	-.58	.93	.53	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L237A	Ø	27.00	16.73	-.89	-.24	.62	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L150	Ø	27.20	18.33	-.05	1.13	.92	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L219	*	27.22	17.07	-.55	-.02	1.27	10T	BURSTING	STRENGTH	UP TØ 45 PSI,	L*W, MANUAL CLAMP
L279	Ø	27.30	17.10	-.47	-.03	1.12	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L207	Ø	27.33	17.20	-.39	.04	1.03	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L599	Ø	27.34	18.17	.01	.93	.78	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L312	Ø	27.35	17.13	-.41	-.03	.61	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L360	Ø	27.37	18.90	.34	1.58	.64	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L183	Ø	27.63	17.77	.11	.44	.82	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L128	*	27.80	18.87	.72	1.37	.87	10B	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS B, MANUAL CLAMP
L158	Ø	27.80	16.33	-.33	-.94	1.26	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L232	Ø	27.90	17.43	.22	.02	1.11	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L568	Ø	28.00	17.87	.49	.38	1.17	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L358	Ø	28.16	16.50	.07	-.93	.85	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L153	Ø	28.17	17.57	.52	.03	1.03	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L225	Ø	28.23	18.30	.88	.67	1.16	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L212	Ø	28.30	17.83	.75	.22	1.18	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L390	Ø	28.33	17.97	.83	.33	.71	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L249	Ø	28.43	17.80	.86	.14	1.24	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L344	Ø	28.70	15.23	.04	-2.31	1.15	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L264	Ø	28.93	16.33	.71	-1.41	.68	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L134	Ø	29.20	16.87	1.17	-1.03	.83	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L305	Ø	29.33	17.00	1.35	-.96	1.06	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L268	Ø	29.63	18.50	2.24	.28	.89	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L242	*	29.72	19.75	2.84	1.38	1.16	10T	BURSTING	STRENGTH	UP TØ 45 PSI,	L*W, MANUAL CLAMP
L315	Ø	29.97	18.70	2.62	.32	1.22	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L311	Ø	30.13	18.20	2.57	-.20	1.20	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L223A	*	31.33	20.57	4.64	1.46	.99	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L269	*	31.73	22.33	5.73	2.90	1.22	10A	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS A, MANUAL CLAMP
L299	Ø	32.77	18.67	5.16	-.86	1.46	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L321	*	32.80	17.40	4.67	-2.03	1.80	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
L331	#	51.37	37.07	29.70	8.21	1.88	10C	BURSTING	STRENGTH	UP TØ 45 PSI,	PERKINS C, MANUAL CLAMP
GMEANS:		27.71	17.32			1.00					
		95% ELLIPSE:		5.51	2.52						WITH GAMMA = 24 DEGREES

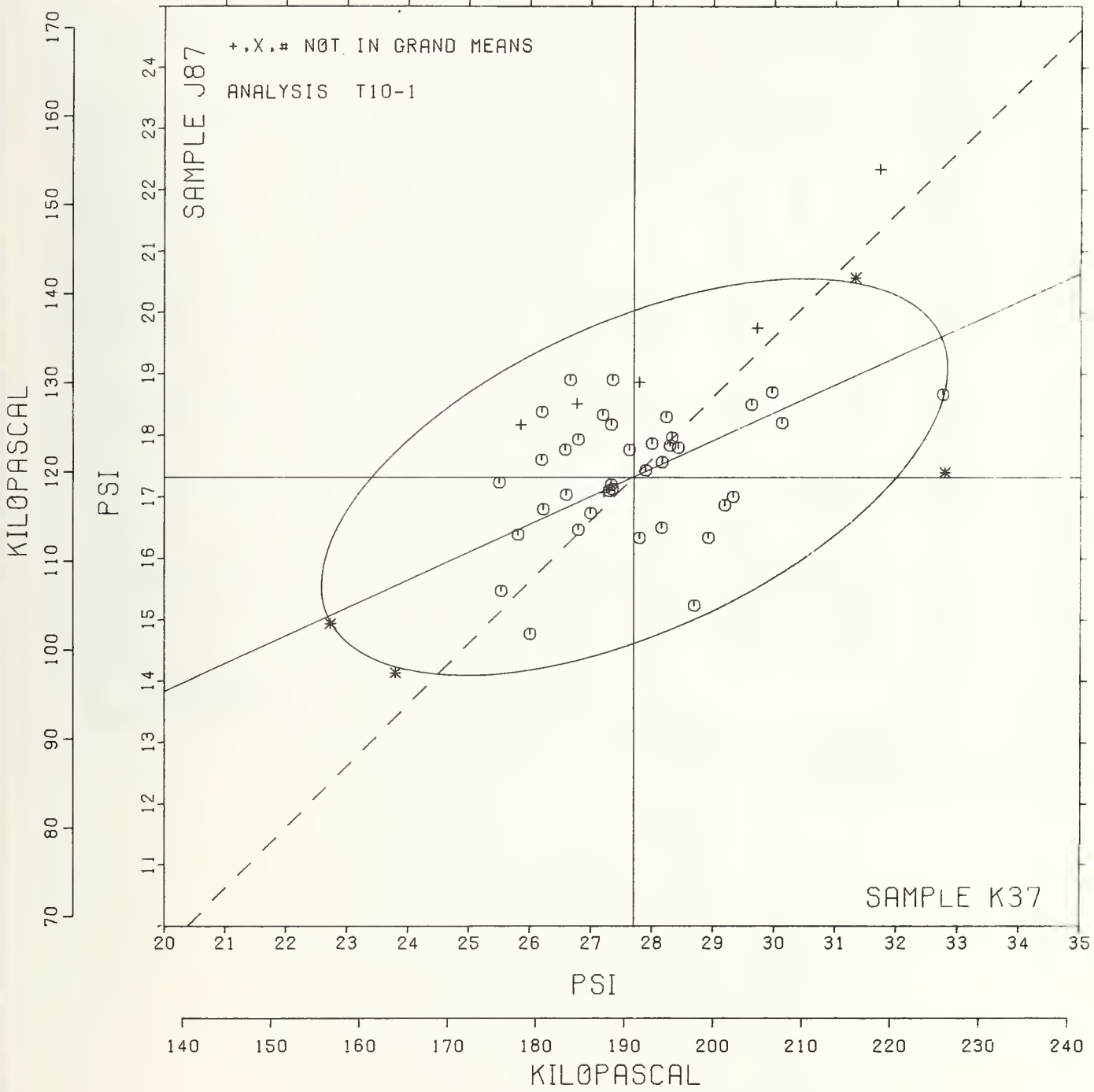
BURSTING STRENGTH, MODEL C

SAMPLE K37 = 27.7 PSI

SAMPLE J87 = 17.3 PSI

SAMPLE K37 = 191 KILOPASCAL

SAMPLE J87 = 119 KILOPASCAL



TAPPI STANDARD T403 GS-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C-A OR C WITH AIR OR HYDRAULIC CLAMPS

LAB CODE	SAMPLE K37 MEAN	PRINTING 75 GRAMS PER SQUARE METER				SAMPLE J87 MEAN	PRINTING 76 GRAMS PER SQUARE METER				TEST D. = 15		
		DEV	N, DEV	SDR	R _s SDR		DEV	N, DEV	SDR	R _s SDR	VAR	F	LAB
L100	27.82	.56	.27	1.30	.70	19.02	1.40	.73	1.09	1.03	10D	Ø	L100
L105	26.40	-.86	-.41	4.95	2.65	13.93	-3.66	-1.90	1.53	1.45	10D	Ø	L105
L106C	26.93	-.32	-.16	.88	.47	18.40	.78	.41	.63	.60	10D	Ø	L106C
L118	27.87	.61	.29	1.73	.92	19.70	2.08	1.08	1.02	.96	10D	Ø	L118
L122	25.60	-1.66	-.80	2.13	1.14	17.87	.25	.13	1.06	1.00	10F	Ø	L122
L125	24.40	-2.86	-1.38	3.08	1.65	14.23	-3.38	-1.75	1.25	1.18	10D	Ø	L125
L141	27.59	.34	.16	1.74	.93	18.34	.72	.37	1.04	.99	10D	Ø	L141
L148	29.40	2.14	1.03	1.59	.85	18.80	1.18	.61	1.01	.96	10D	Ø	L148
L157	28.90	1.64	.79	1.75	.94	19.93	2.32	1.20	.50	.47	10D	Ø	L157
L159	24.08	-3.17	-1.53	1.37	.73	16.10	-1.51	-.78	1.09	1.03	10D	Ø	L159
L162	27.80	.54	.26	1.08	.58	16.00	-1.62	-.83	.85	.80	10D	Ø	L162
L163	27.80	.54	.26	2.80	1.49	17.20	-.42	-.21	1.24	1.17	10D	Ø	L163
L166	31.30	4.04	1.95	1.59	.85	19.77	2.15	1.11	1.08	1.02	10D	Ø	L166
L185	30.60	3.34	1.61	1.39	.74	19.63	2.02	1.04	.90	.85	10D	Ø	L185
L190C	25.73	-1.52	-.73	1.53	.82	17.13	-.48	-.25	1.06	1.00	10D	Ø	L190C
L190R	27.33	.08	.04	2.02	1.08	18.20	.58	.30	.94	.89	10D	Ø	L190R
L194	26.99	-.26	-.13	1.10	.59	18.96	1.34	.69	.68	.64	10D	Ø	L194
L226B	28.23	.98	.47	2.70	1.44	18.57	.95	.49	1.18	1.11	10D	Ø	L226B
L226C	29.80	2.54	1.23	1.28	.68	18.73	1.12	.58	1.27	1.20	10D	Ø	L226C
L233	26.42	-.84	-.40	1.79	.95	17.79	.17	.09	.78	.74	10D	Ø	L233
L241	28.20	.94	.46	1.76	.94	19.25	1.64	.85	1.00	.95	10D	Ø	L241
L255	26.27	-.99	-.48	.96	.51	18.80	1.18	.61	.86	.81	10D	Ø	L255
L257A	27.00	-.26	-.12	1.77	.95	18.53	.92	.47	1.25	1.18	10D	Ø	L257A
L257B	27.93	.68	.33	1.16	.62	18.27	.65	.34	.88	.84	10D	Ø	L257B
L257C	28.27	1.01	.49	1.58	.84	18.27	.65	.34	1.10	1.04	10D	Ø	L257C
L262	28.00	.74	.36	1.63	.87	18.67	1.05	.54	1.19	1.13	10D	Ø	L262
L275	24.15	-3.11	-1.50	2.23	1.19	13.92	-3.70	-1.91	1.39	1.31	10D	Ø	L275
L280	28.43	1.18	.57	2.16	1.15	19.59	1.98	1.02	1.03	.97	10D	Ø	L280
L285	30.73	3.48	1.68	2.65	1.42	16.87	-.75	-.39	1.11	1.05	10D	*	L285
L309	29.67	2.41	1.16	2.95	1.57	18.19	.58	.30	1.44	1.36	10D	Ø	L309
L352	25.00	-2.26	-1.09	.89	.48	16.63	-.98	-.51	.67	.63	10D	Ø	L352
L563	22.86	-4.39	-2.12	1.47	.79	14.26	-3.36	-1.74	1.48	1.40	10U	Ø	L563
L567	24.07	-3.19	-1.54	2.34	1.25	15.73	-1.88	-.97	.86	.82	10D	Ø	L567
L575	28.94	1.68	.81	2.27	1.21	19.55	1.93	1.00	1.15	1.09	10D	Ø	L575
L581	26.80	-.46	-.22	3.05	1.63	17.07	-.55	-.28	1.49	1.41	10D	Ø	L581
L587	27.80	.54	.26	1.47	.79	17.90	.28	.15	1.06	1.00	10D	Ø	L587
L652	23.33	-3.92	-1.89	3.01	1.61	11.97	-5.65	-2.92	1.04	.99	10D	*	L652

GR. MEAN = 27.26 PSI
SD MEANS = 2.07 PSI

GRAND MEAN = 17.62 PSI
SD OF MEANS = 1.93 PSI

TEST DETERMINATIONS = 15
37 LABS IN GRAND MEANS

GR. MEAN = 187.5 KILOPASCAL
TOTAL NUMBER OF LABORATORIES REPORTING = 37

AVERAGE SDR = 1.87 PSI
GRAND MEAN = 121.5 KILOPASCAL
AVERAGE SDR = 1.06 PSI

Best values: K37 27.3 ± 3.3 psi
J87 17.7 ± 2.5 psi

TAPPI STANDARD T403 OS-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C-A OR C WITH AIR OR HYDRAULIC CLAMPS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		K37	J87	MAJOR	MINOR	R.SDR	VAR			
L563	Ø	22.86	14.26	-5.51	.48	1.09	10U	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L652	*	23.33	11.97	-6.70	-1.53	1.30	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L567	Ø	24.07	15.73	-3.62	.76	1.03	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L159	Ø	24.08	16.10	-3.36	1.02	.88	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L275	Ø	24.15	13.92	-4.79	-.64	1.25	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L125	Ø	24.40	14.23	-4.39	-.58	1.41	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L352	Ø	25.00	16.63	-2.33	.79	.56	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L122	Ø	25.60	17.87	-1.05	1.30	1.07	10F	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS C, H, CLAMP, TRANSDUCER
L190C	Ø	25.73	17.13	-1.45	.67	.91	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L255	Ø	26.27	18.80	.07	1.54	.66	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L105	Ø	26.40	13.93	-3.11	-2.15	2.05	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L233	Ø	26.42	17.79	-.50	.69	.85	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L581	Ø	26.80	17.07	-.71	-.10	1.52	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L106C	Ø	26.93	18.40	.29	.80	.53	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L194	Ø	26.99	18.96	.71	1.17	.61	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L257A	Ø	27.00	18.53	.43	.85	1.06	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L190R	Ø	27.33	18.20	.45	.38	.99	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L141	Ø	27.59	18.34	.74	.31	.96	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L587	Ø	27.80	17.90	.59	-.16	.89	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L163	Ø	27.80	17.20	.12	-.67	1.33	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L162	Ø	27.80	16.00	-.69	-1.56	.69	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L100	Ø	27.82	19.02	1.36	.66	.86	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L118	Ø	27.87	19.70	1.86	1.13	.94	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L257B	Ø	27.93	18.27	.94	.02	.73	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L262	Ø	28.00	18.67	1.26	.28	1.00	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L241	Ø	28.20	19.25	1.80	.57	.94	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L226B	Ø	28.23	18.57	1.36	.04	1.28	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L257C	Ø	28.27	18.27	1.19	-.20	.94	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L280	Ø	28.43	19.59	2.20	.67	1.06	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L157	Ø	28.90	19.93	2.78	.61	.70	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L575	Ø	28.94	19.55	2.55	.29	1.15	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L148	Ø	29.40	18.80	2.38	-.57	.91	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L309	Ø	29.67	18.19	2.17	-1.20	1.47	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L226C	Ø	29.80	18.73	2.63	-.89	.94	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L185	Ø	30.60	19.63	3.83	-.76	.79	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L285	*	30.73	16.87	2.07	-2.90	1.23	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
L166	Ø	31.30	19.77	4.44	-1.13	.94	10D	BURSTING STRENGTH	UP TØ 45 PSI,	PERKINS CA ØR C, AIR CLAMP
GMEANS:		27.26	17.62			1.00				
		95% ELLIPSE:		6.87	2.62	WITH GAMMA = 42 DEGREES				

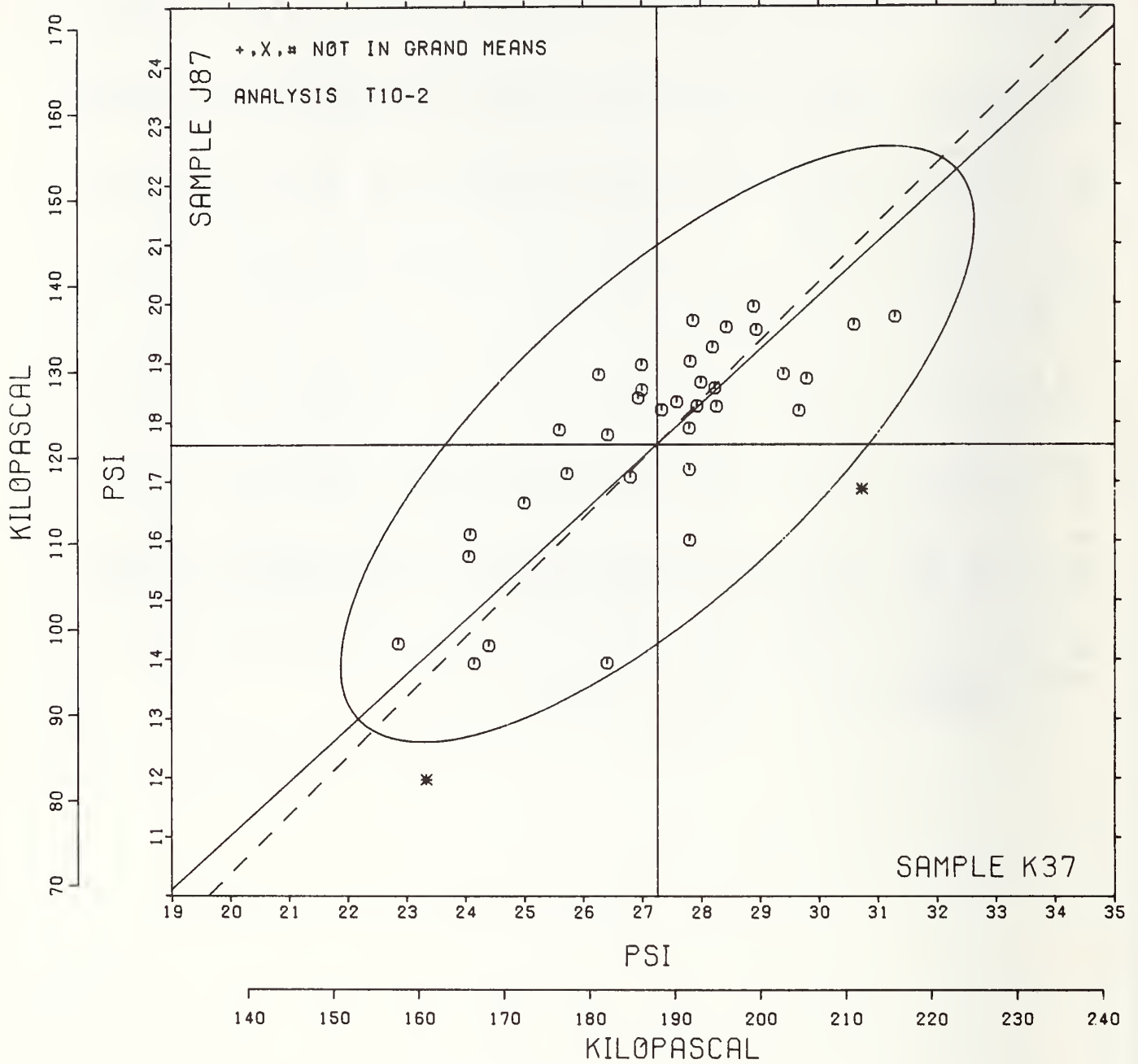
BURSTING STRENGTH, MODEL C-A

SAMPLE K37 = 27.3 PSI

SAMPLE J87 = 17.6 PSI

SAMPLE K37 = 188 KILOPASCAL

SAMPLE J87 = 121 KILOPASCAL



ANALYSIS T11-1 TABLE 1
BURSTING STRENGTH, HIGH RANGE, PSI
TAPPI STANDARD T403 GS-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C OR C-A

Table with columns for LAB CODE, SAMPLE H41, PRINTING (151 GRAMS PER SQUARE METER), SAMPLE B56, BROWN KRAFT (76 GRAMS PER SQUARE METER), TEST D., VAR, F, LAB. Includes summary statistics for Grand Mean and Average SDR.

The following laboratories were omitted from the grand means because of extreme test results: 232, 331.

ANALYSIS T11-1 TABLE 2

BURSTING STRENGTH, HIGH RANGE, PSI

TAPPI STANDARD T403 GS-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C OR C-A

LAB CODE	F	MEANS		COORDINATES		AVG R.SDR	VAR	PROPERTY---	TEST	INSTRUMENT---	CONDITIONS
		H41	B56	MAJOR	MINOR						
L565	*	7.2	5.3	-54.8	18.6	.11	11T	BURSTING	STRENGTH	40 - 100	PSI, L*W, MANUAL CLAMP
L331	#	35.3	40.4	-9.9	16.6	.39	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L232	#	49.3	27.1	-12.3	-2.5	1.28	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L622	Ø	50.7	36.3	-4.1	1.8	.68	11E	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L159	Ø	51.2	35.2	-4.7	.7	.95	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L250L	*	51.9	37.7	-2.3	1.6	.72	11N	BURSTING	STRENGTH	40 - 100	PSI, LHØMARGY, MAN. CLAMP, 20C, 65%RH
L278	Ø	51.9	36.8	-3.0	1.0	.95	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L604	Ø	52.2	35.0	-4.2	-.2	1.42	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L680	Ø	52.3	37.1	-2.6	.9	.65	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L581	Ø	52.4	33.5	-5.3	-1.3	1.05	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L248	Ø	52.8	37.8	-1.6	.9	1.00	11E	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L122	Ø	53.0	37.9	-1.5	.8	1.10	11F	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, HØ CLAMP, TRANSDUCER
L243	Ø	53.3	37.2	-1.8	.1	1.03	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L100	Ø	53.5	39.9	.5	1.5	.67	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L567	Ø	53.7	36.3	-2.3	-.7	1.08	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L330	Ø	54.0	37.5	-1.2	-.2	1.05	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L237A	Ø	54.1	41.8	2.4	2.2	.97	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L170	*	54.7	43.8	4.3	2.9	1.16	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L141	Ø	54.7	36.9	-1.2	-1.1	1.05	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L128	Ø	54.7	38.7	.2	-.0	.68	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L575	Ø	54.8	39.9	1.2	.6	1.16	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L182	Ø	54.8	40.3	1.5	.8	.75	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L599	Ø	55.0	39.2	.8	-.0	1.21	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L356	Ø	55.2	38.2	.1	-.8	.72	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L218	Ø	55.3	38.0	-.0	-1.0	1.21	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L344	Ø	55.4	38.0	.0	-1.1	.79	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L650	Ø	55.5	40.5	2.1	.3	.84	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L333	Ø	55.7	38.4	.6	-1.1	1.49	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L393	*	55.9	39.6	1.6	-.5	.85	11H	BURSTING	STRENGTH	40 - 100	PSI, PERKINS AH, HYDRAULIC CLAMP
L280	Ø	55.9	40.0	2.0	-.3	1.01	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L237B	Ø	56.2	38.9	1.2	-1.2	.55	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L279	Ø	56.3	38.0	.6	-1.8	1.20	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L238A	Ø	56.4	39.2	1.6	-1.2	1.09	11Y	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L570	*	56.9	39.1	1.8	-1.6	.83	11H	BURSTING	STRENGTH	40 - 100	PSI, PERKINS AH, HYDRAULIC CLAMP
L118	Ø	56.9	39.8	2.4	-1.2	.67	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L107	Ø	57.2	43.0	5.1	.4	1.52	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L103	Ø	57.2	40.9	3.5	-.8	.62	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L148	Ø	57.5	40.9	3.6	-1.0	1.01	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L576	*	57.7	41.6	4.3	-.8	.90	11P	BURSTING	STRENGTH	40 - 100	PSI, PERKINS LC, MANUAL CLAMP
L242	*	58.0	41.2	4.2	-1.3	.91	11T	BURSTING	STRENGTH	40 - 100	PSI, L*W, MANUAL CLAMP
L290	*	58.1	42.9	5.6	-.4	.92	11A	BURSTING	STRENGTH	40 - 100	PSI, PERKINS A, MANUAL CLAMP
L251	*	58.3	40.2	3.5	-2.1	1.27	11V	BURSTING	STRENGTH	40 - 100	PSI, L*W, MANUAL CLAMP, 20C, 65% RH
L651	X	62.7	45.3	10.2	-2.7	1.15	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L394	*	67.1	51.5	17.8	-2.6	1.41	11H	BURSTING	STRENGTH	40 - 100	PSI, PERKINS AH, HYDRAULIC CLAMP
GMEANS:		54.5	38.6			1.00					
		95% ELLIPSE:		6.9	3.0	WITH GAMMA = 53 DEGREES					

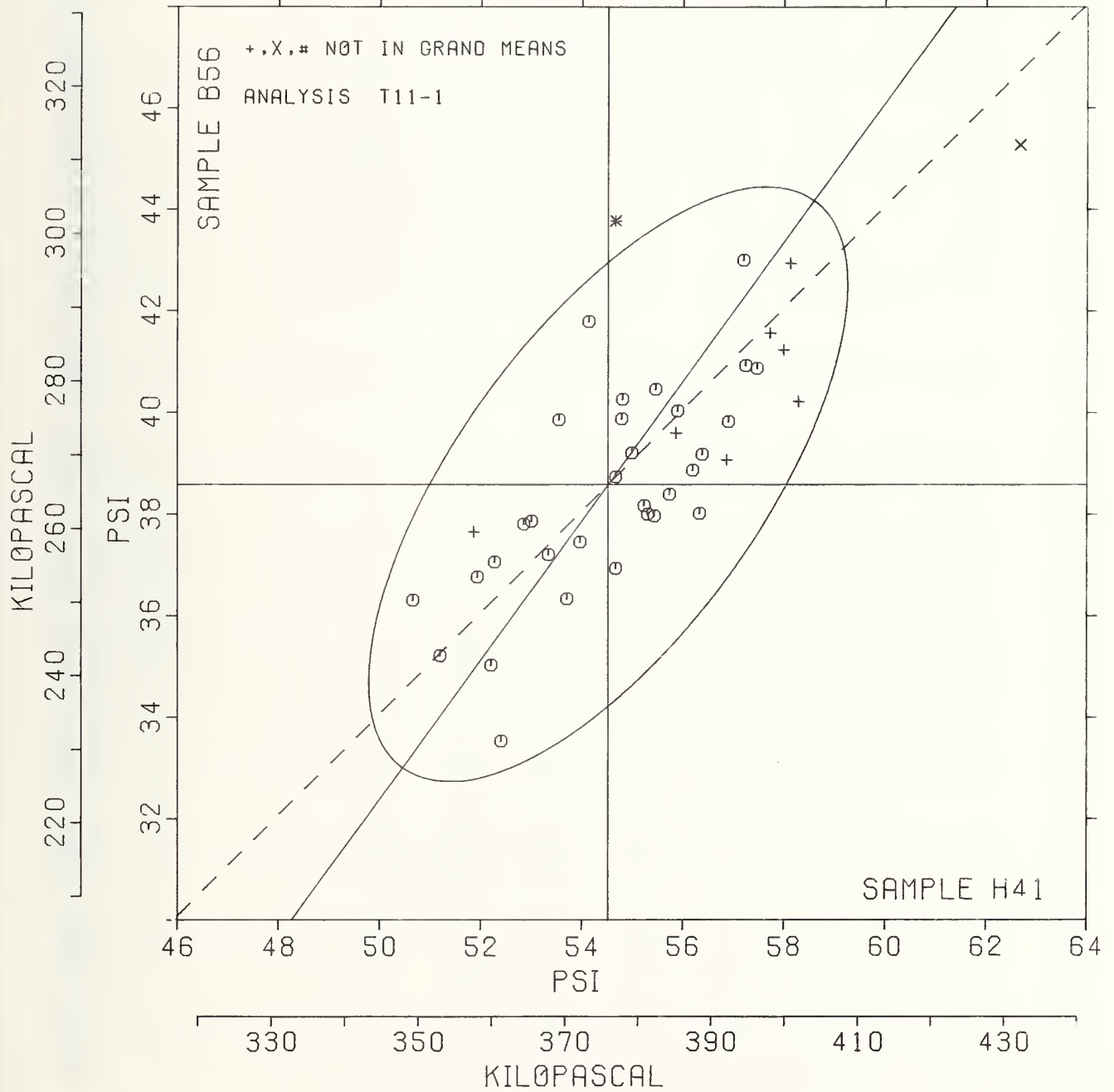
BURSTING STRENGTH, HIGH RANGE

SAMPLE H41 = 54.5 PSI

SAMPLE B56 = 38.6 PSI

SAMPLE H41 = 376 KILOPASCAL

SAMPLE B56 = 266 KILOPASCAL



TAPPI STANDARD 1414 TS-65, ANY MAKE ELMENDORF WITH DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	BOND					HEAT SET OFFSET BOOK					TEST D. 15		
	E85 MEAN	79 GEAMS DEV	PER N. DEV	SQUARE METER SDR	R. SDR	B96 MEAN	91 GRAMS DEV	PER N. DEV	SQUARE METER SDR	R. SDR	VAR	F	LAB
L100	39.47	-.28	-.14	.72	.59	45.44	-1.54	-.54	.62	.41	15M	Ø	L100
L103	39.20	-.55	-.28	.77	.63	44.27	-2.71	-.95	.96	.63	15T	Ø	L103
L105	41.33	1.59	.81	2.79	2.29	47.87	.89	.31	2.67	1.75	15T	Ø	L105
L107	41.07	1.32	.68	2.37	1.95	48.80	1.82	.64	2.70	1.78	15T	Ø	L107
L118	38.00	-1.75	-.89	.93	.76	45.00	-.98	-.34	1.69	1.11	15T	Ø	L118
L121	37.73	-2.01	-1.03	1.28	1.05	44.13	-2.84	-1.00	1.19	.78	15T	Ø	L121
L122	39.95	.20	.10	1.08	.88	47.09	.12	.04	1.33	.88	15C	Ø	L122
L124	39.80	.05	.03	1.48	1.21	45.33	-1.64	-.58	1.45	.95	15T	Ø	L124
L126	39.40	-.35	-.18	1.12	.92	46.73	-.24	-.09	2.02	1.32	15T	Ø	L126
L128	40.00	.25	.13	1.07	.88	45.33	-1.64	-.58	.82	.54	15T	Ø	L128
L131	40.40	.65	.33	1.55	1.27	49.73	2.76	.96	1.98	1.30	15A	Ø	L131
L134	42.13	2.39	1.22	1.30	1.07	45.80	2.82	.99	1.21	.79	15C	Ø	L134
L139	42.00	2.25	1.15	1.07	.88	53.40	6.42	2.25	1.35	.89	15T	*	L139
L141	37.93	-1.81	-.93	1.10	.90	44.93	-2.04	-.72	1.58	1.04	15T	Ø	L141
L143	43.33	3.59	1.84	1.59	1.30	47.20	.22	.08	1.15	.75	15T	*	L143
L145	38.53	-1.21	-.62	1.19	.97	45.87	-1.11	-.39	1.60	1.05	15T	Ø	L145
L148	40.67	.92	.47	.72	.59	46.47	-.51	-.18	1.46	.96	15T	Ø	L148
L150	55.13	15.39	7.88	.52	.42	63.87	16.89	5.91	.92	.60	15T	#	L150
L151	49.20	9.45	4.84	2.24	1.84	58.80	11.82	4.14	2.37	1.55	15C	#	L151
L153	40.13	.39	.20	.92	.75	45.53	-1.44	-.51	1.36	.89	15C	Ø	L153
L157	39.07	-.68	-.35	.96	.79	43.60	-3.38	-1.18	1.35	.89	15T	Ø	L157
L158	37.33	-2.41	-1.24	2.09	1.72	47.60	.62	.22	2.64	1.73	15R	Ø	L158
L159	44.37	4.63	2.37	8.93	7.32	57.29	10.32	3.61	10.47	6.87	15L	X	L159
L162	39.87	.12	.06	1.41	1.15	45.07	-1.91	-.67	1.03	.68	15T	Ø	L162
L163	33.33	-6.41	-3.29	1.88	1.54	39.00	-7.98	-2.79	1.07	.70	15T	*	L163
L166	39.80	.05	.03	.77	.63	45.07	-1.91	-.67	1.10	.72	15T	Ø	L166
L167	40.40	.65	.33	1.55	1.27	49.07	2.09	.73	1.03	.68	15C	Ø	L167
L170	35.53	-4.21	-2.16	1.41	1.15	44.93	-2.04	-.72	1.28	.84	15T	*	L170
L173B	38.93	-.81	-.42	.70	.58	44.13	-2.84	-1.00	.83	.55	15T	Ø	L173B
L182A	39.40	-.35	-.18	1.68	1.38	48.87	1.89	.66	1.92	1.26	15A	Ø	L182A
L182T	41.80	2.05	1.05	.94	.77	50.13	3.16	1.10	1.77	1.16	15T	Ø	L182T
L183	39.53	-.21	-.11	.92	.75	46.40	-.58	-.20	1.24	.82	15T	Ø	L183
L185	42.40	2.65	1.36	1.06	.87	48.80	1.82	.64	.86	.57	15T	Ø	L185
L189	40.53	.79	.40	.83	.68	48.33	1.36	.47	1.23	.81	15T	Ø	L189
L190C	37.47	-2.28	-1.17	.92	.75	43.67	-3.31	-1.16	.82	.54	15T	Ø	L190C
L190R	38.93	-.81	-.42	1.62	1.33	44.60	-2.38	-.83	1.59	1.05	15C	Ø	L190R
L191	43.20	3.45	1.77	1.26	1.04	50.80	3.82	1.34	1.66	1.09	15T	Ø	L191
L194	44.23	4.49	2.30	2.40	1.96	51.17	4.19	1.47	.82	.54	15T	Ø	L194
L206	40.40	.65	.33	1.18	.97	46.80	-.18	-.06	.86	.57	15T	Ø	L206
L207	49.44	9.69	4.97	5.09	4.17	50.96	3.98	1.39	4.84	3.17	15R	X	L207
L211	39.00	-.75	-.38	2.24	1.83	44.87	-2.11	-.74	1.46	.96	15R	Ø	L211
L212	42.67	2.92	1.50	3.27	2.68	58.53	11.56	4.04	8.02	5.26	15T	#	L212
L213	40.87	1.12	.57	1.25	1.02	50.40	3.42	1.20	1.35	.89	15T	Ø	L213
L219	41.07	1.32	.68	1.28	1.05	47.60	.62	.22	2.03	1.33	15L	Ø	L219
L223	41.33	1.59	.81	1.04	.86	48.49	1.52	.53	1.41	.93	15R	Ø	L223
L225	41.53	1.79	.92	1.30	1.07	50.40	3.42	1.20	.91	.60	15T	Ø	L225
L226B	20.20	-19.55	-10.01	.59	.48	24.44	-22.54	-7.89	2.28	1.49	15T	#	L226B
L226C	38.00	-1.75	-.89	1.31	1.07	45.60	-1.38	-.48	1.35	.89	15T	Ø	L226C
L228	38.13	-1.61	-.83	.52	.42	43.00	-3.98	-1.39	1.25	.82	15T	Ø	L228
L230	37.00	-2.75	-1.41	.65	.54	43.80	-3.18	-1.11	1.32	.87	15R	Ø	L230
L232	40.13	.39	.20	2.88	2.36	45.73	-1.24	-.44	1.98	1.30	15T	Ø	L232
L233	43.47	3.72	1.91	.92	.75	50.00	3.02	1.06	1.41	.93	15T	Ø	L233
L236	39.23	-.51	-.26	1.08	.89	46.33	-.64	-.23	1.63	1.07	15T	Ø	L236
L237A	39.33	-.41	-.21	1.63	1.34	48.00	1.02	.36	1.89	1.24	15T	Ø	L237A
L237B	39.93	.19	.10	1.10	.90	49.47	2.49	.87	1.13	.74	15T	Ø	L237B
L238A	38.13	-1.61	-.83	1.13	.92	44.20	-2.78	-.97	1.37	.90	15T	Ø	L238A
L241	41.20	1.45	.74	1.21	.99	49.87	2.89	1.01	1.19	.78	15T	Ø	L241
L243	38.87	-.88	-.45	1.13	.92	46.73	-.24	-.09	1.44	.94	15T	Ø	L243
L244	40.53	.79	.40	.64	.52	46.47	-.51	-.18	1.25	.82	15C	Ø	L244
L248	42.50	2.75	1.41	.92	.75	50.32	3.34	1.17	1.26	.83	15J	Ø	L248
L249	42.87	3.13	1.60	1.53	1.26	48.87	1.89	.66	2.24	1.47	15T	Ø	L249
L254	37.73	-2.01	-1.03	1.49	1.22	46.00	-.98	-.34	1.69	1.11	15T	Ø	L254
L255	40.00	.25	.13	.85	.69	45.80	-1.18	-.41	.77	.51	15T	Ø	L255
L257A	40.80	1.05	.54	1.26	1.04	50.93	3.96	1.38	1.28	.84	15C	Ø	L257A
L257B	41.07	1.32	.68	1.28	1.05	50.40	3.42	1.20	1.55	1.02	15C	Ø	L257B

ANALYSIS T15-1 TABLE 1
TEARING STRENGTH, GRAMS

TAPPI STANDARD T414 TS-65, ANY MAKE ELMENDORF WITH DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	BOND					HEAT SET OFFSET BOOK					TEST D. # 15		
	E85 MEAN	79 GRAMS PER DEV	PER SQUARE N.DEV	METER SDR	R _s SDR	SAMPLE B96 MEAN	91 GRAMS PER DEV	PER SQUARE N.DEV	METER SDR	R _s SDR	VAR	F	LAB
L257C	40.40	.65	.33	1.35	1.11	50.40	3.42	1.20	2.03	1.33	15C	Ø	L257C
L259	43.53	4.15	2.15	1.16	.95	54.00	7.02	2.46	1.31	.86	15T	Ø	L259
L261	38.73	-1.01	-.52	.80	.65	47.13	.16	.05	1.25	.82	15T	Ø	L261
L262	39.00	-.75	-.38	.65	.54	45.67	-1.31	-.46	1.45	.95	15T	Ø	L262
L264	40.00	.25	.13	2.62	2.15	47.47	.49	.17	1.41	.92	15T	Ø	L264
L268	39.40	-.35	-.18	.74	.60	44.53	-2.44	-.86	.92	.60	15T	Ø	L268
L273	36.33	-3.41	-1.75	1.88	1.54	46.20	-.78	-.27	1.66	1.09	15T	*	L273
L275	39.93	.15	.10	1.03	.85	45.60	-1.38	-.48	1.68	1.10	15T	Ø	L275
L278	39.47	-.28	-.14	.92	.75	45.47	-1.51	-.53	1.60	1.05	15T	Ø	L278
L279	38.67	-1.08	-.55	1.11	.91	46.47	-.51	-.18	1.73	1.13	15T	Ø	L279
L280	39.13	-.61	-.31	.83	.68	46.60	-.38	-.13	1.12	.74	15L	Ø	L280
L281	37.20	-2.55	-1.30	1.15	.94	42.00	-4.98	-1.74	1.31	.86	15T	Ø	L281
L285	36.33	-3.41	-1.75	1.35	1.10	44.47	-2.51	-.88	1.51	.99	15T	Ø	L285
L288	38.01	-1.73	-.89	1.12	.92	46.36	-.62	-.22	1.38	.90	15Q	Ø	L288
L290	41.13	1.35	.71	.83	.68	49.60	2.62	.92	1.18	.78	15T	Ø	L290
L291	40.73	.99	.51	2.05	1.68	48.93	1.96	.68	1.39	.91	15A	Ø	L291
L299	39.07	-.68	-.35	1.10	.90	47.07	.09	.03	1.16	.76	15T	Ø	L299
L305	40.33	.55	.30	1.99	1.63	47.93	.96	.33	2.09	1.37	15T	Ø	L305
L309	40.20	.45	.23	1.15	.94	49.27	2.29	.80	1.16	.76	15T	Ø	L309
L311	40.27	.52	.27	1.03	.85	45.47	-1.51	-.53	2.07	1.36	15T	Ø	L311
L312	38.73	-1.01	-.52	.96	.79	44.40	-2.58	-.90	2.20	1.44	15T	Ø	L312
L315	41.47	1.72	.88	1.25	1.02	47.40	.42	.15	1.55	1.02	15T	Ø	L315
L321	39.47	-.28	-.14	2.07	1.69	48.53	1.56	.54	2.07	1.36	15T	Ø	L321
L324	39.87	.12	.06	1.60	1.31	47.60	.62	.22	1.06	.69	15T	Ø	L324
L328	38.37	-1.38	-.71	1.71	1.40	42.07	-4.91	-1.72	1.10	.72	15T	Ø	L328
L331	25.93	-13.81	-7.08	2.22	1.82	17.37	-29.61	-10.37	1.25	.82	15T	#	L331
L336	39.53	-.21	-.11	1.06	.87	46.00	-.98	-.34	1.60	1.05	15T	Ø	L336
L344	40.80	1.05	.54	1.01	.83	46.13	-.84	-.30	1.77	1.16	15C	Ø	L344
L345	40.27	.52	.27	1.58	1.29	47.87	.89	.31	5.01	3.29	15T	Ø	L345
L352	40.95	1.20	.61	.96	.79	48.32	1.34	.47	.95	.62	15C	Ø	L352
L358	42.53	2.75	1.43	.83	.68	52.00	5.02	1.76	1.51	.99	15T	Ø	L358
L360	40.73	.99	.51	.92	.76	48.20	1.22	.43	1.19	.78	15T	Ø	L360
L376	36.40	-3.35	-1.71	1.59	1.31	46.00	-.98	-.34	2.10	1.38	15T	*	L376
L382	45.87	10.12	5.18	7.87	6.45	58.93	11.96	4.18	7.36	4.83	15T	#	L382
L388	42.87	3.12	1.60	1.60	1.31	44.60	-2.38	-.83	1.06	.69	15T	X	L388
L390	37.87	-1.88	-.96	1.41	1.15	46.07	-.91	-.32	2.46	1.62	15T	Ø	L390
L396M	38.20	-1.55	-.79	.77	.63	45.00	-1.98	-.69	1.81	1.19	15T	Ø	L396M
L442	40.13	.35	.20	1.19	.97	49.40	2.42	.85	2.20	1.44	15R	Ø	L442
L554	45.40	5.65	2.90	1.35	1.11	56.40	9.42	3.30	2.26	1.48	15C	*	L554
L557	37.20	-2.55	-1.30	.77	.63	45.40	-1.58	-.55	1.99	1.31	15T	Ø	L557
L558	39.60	-.15	-.07	1.12	.92	44.80	-2.18	-.76	1.26	.83	15T	Ø	L558
L559	40.07	.32	.16	1.03	.85	48.27	1.29	.45	1.67	1.09	15T	Ø	L559
L562	37.73	-2.01	-1.03	1.44	1.18	43.47	-3.51	-1.23	1.55	1.02	15T	Ø	L562
L565	39.33	-.41	-.21	1.95	1.60	44.80	-2.18	-.76	1.82	1.20	15T	Ø	L565
L566	37.73	-2.01	-1.03	1.28	1.05	45.33	-1.64	-.58	1.23	.81	15T	Ø	L566
L567	59.73	19.99	10.24	1.44	1.18	62.93	15.96	5.59	2.63	1.73	15C	#	L567
L574	46.27	6.52	3.34	1.49	1.22	47.73	.76	.26	1.67	1.09	15T	X	L574
L575	40.42	.67	.35	1.26	1.03	48.01	1.03	.36	1.33	.88	15L	Ø	L575
L576	44.87	5.12	2.62	2.75	2.25	55.60	8.62	3.02	1.55	1.02	15T	*	L576
L580	38.00	-1.75	-.89	.76	.62	42.27	-4.71	-1.65	1.22	.80	15T	Ø	L580
L581	40.04	.29	.15	.73	.60	46.69	-.28	-.10	1.71	1.12	15T	Ø	L581
L587	36.67	-3.08	-1.58	.98	.80	42.40	-4.58	-1.60	1.88	1.24	15T	Ø	L587
L596	10.80	-28.95	-14.83	1.70	1.39	12.00	-34.98	-12.24	1.77	1.16	15T	#	L596
L597	40.27	.52	.27	.70	.58	46.27	-.71	-.25	1.83	1.20	15T	Ø	L597
L599	35.87	.12	.06	1.55	1.27	47.80	.82	.29	1.66	1.09	15T	Ø	L599
L600	42.00	2.25	1.15	.93	.76	51.60	4.62	1.62	1.55	1.02	15T	Ø	L600
L604	48.27	8.52	4.37	1.49	1.22	47.33	.36	.12	1.63	1.07	15T	X	L604
L606	40.93	1.15	.61	1.03	.85	46.53	-.44	-.16	1.19	.78	15T	Ø	L606
L622	59.73	19.99	10.24	6.84	5.61	68.27	21.29	7.45	2.37	1.56	15T	#	L622
L626	38.40	-1.35	-.69	1.24	1.02	46.00	-.98	-.34	1.65	1.08	15L	Ø	L626
L651	8.53	-31.21	-15.99	.52	.42	10.13	-36.84	-12.90	.35	.23	15T	#	L651
L652	35.07	-4.68	-2.40	2.25	1.85	36.93	-10.04	-3.52	4.33	2.85	15C	X	L652
L654	35.60	-4.15	-2.12	.83	.68	42.13	-4.84	-1.70	.99	.65	15T	Ø	L654
L670	45.73	5.99	3.07	1.16	.95	61.20	14.22	4.98	6.68	4.38	15T	#	L670
L679	38.80	-.95	-.48	.68	.55	46.20	-.78	-.27	1.42	.94	15T	Ø	L679

TAPPI STANDARD T414 TS-65, ANY MAKE ELMENDORF WITH DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	SAMPLE E85 MEAN	BOND 79 GRAMS PER SQUARE METER				SAMPLE B96 MEAN	HEAT SET OFFSET BOOK 91 GRAMS PER SQUARE METER				TEST D. * 15		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L680	38.27	-1.48	-0.76	1.03	0.85	44.53	-2.44	-0.86	1.60	1.05	15T	0	L680
L684	38.07	-1.68	-0.86	1.10	0.90	41.93	-5.04	-1.77	1.67	1.09	15T	0	L684
L688	42.00	2.25	1.15	1.31	1.07	52.67	5.69	1.99	1.63	1.07	15T	0	L688
L692	39.47	-0.28	-0.14	1.64	1.35	46.47	-0.51	-0.18	2.39	1.57	15T	0	L692

GR. MEAN = 39.75 GRAMS
SD MEANS = 1.95 GRAMS

GRAND MEAN = 46.98 GRAMS
SD OF MEANS = 2.86 GRAMS

AVERAGE SDR = 1.22 GRAMS

GR. MEAN = 389.8 MILLINEWTON

GRAND MEAN = 460.7 MILLINEWTON

TEST DETERMINATIONS = 15
117 LABS IN GRAND MEANS

AVERAGE SDR = 1.52 GRAMS

L242	46.36	6.61	3.39	0.89	0.73	52.79	5.82	2.04	2.86	1.88	15U	0	L242
L250L	43.99	4.25	2.18	1.35	1.11	52.90	5.92	2.07	1.64	1.07	15B	0	L250L
L251	40.47	0.72	0.37	1.46	1.19	51.13	4.16	1.45	3.09	2.03	15K	0	L251
L610	38.20	-1.55	-0.79	1.15	0.94	45.93	-1.04	-0.37	1.62	1.07	15E	0	L610

TOTAL NUMBER OF LABORATORIES REPORTING = 138

Best values: E85 40 + 3 grams
B96 47 + 4 grams

The following laboratories were omitted from the grand means because of extreme test results:
150, 151, 212, 331, 382, 567, 622, 670.

Data from the following laboratories appear to be off by a multiplicative factor: 226B, 596, 651.

Please see the diagram on the inside of the back cover of this report which shows how to distinguish between an Elmendorf tear tester with DEEP CUTOUT and an older tester with NO CUTOUT.

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS

TAPPI STANDARD T414 TS-65, ANY MAKE ELMENDORF WITH DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS		COORDINATES		AVG R ₀ SDR	VAR	PROPERTY---TEST	INSTRUMENT---CONDITIONS
		E85	B96	MAJOR	MINOR				
L651	#	8.53	10.13	-47.82	6.73	.33	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L596	#	10.80	12.00	-45.03	5.81	1.23	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L226B	#	20.20	24.44	-29.49	4.50	.99	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L331	#	25.93	17.37	-32.41	-4.12	1.32	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L163	*	33.33	39.00	-10.17	1.17	1.12	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L652	X	35.07	36.93	-10.99	-1.40	2.35	15C	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L170	*	35.53	44.93	-3.98	2.47	1.00	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L654	Ø	35.60	42.13	-6.31	.92	.66	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L285	Ø	36.33	44.47	-3.95	1.55	1.05	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L273	*	36.33	46.20	-2.48	2.47	1.31	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L376	*	36.40	46.00	-2.61	2.31	1.34	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L587	Ø	36.67	42.40	-5.52	.16	1.02	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L230	Ø	37.00	43.80	-4.15	.63	.70	15R	TEARING STRENGTH	STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L557	Ø	37.20	45.40	-2.69	1.31	.97	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L281	Ø	37.20	42.00	-5.57	-5.50	.90	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L158	Ø	37.33	47.60	-.76	2.37	1.72	15R	TEARING STRENGTH	STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L190C	Ø	37.47	43.67	-4.02	.16	.64	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L121	Ø	37.73	44.13	-3.48	.18	.91	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L566	Ø	37.73	45.33	-2.47	.82	.93	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L562	Ø	37.73	43.47	-4.04	-.17	1.10	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L254	Ø	37.73	46.00	-1.90	1.18	1.16	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L390	Ø	37.87	46.07	-1.77	1.10	1.39	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L141	Ø	37.93	44.93	-2.70	.44	.97	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L580	Ø	38.00	42.27	-4.92	-1.04	.71	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L226C	Ø	38.00	45.60	-2.10	.74	.98	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L118	Ø	38.00	46.00	-1.76	.95	.93	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L288	Ø	38.01	46.36	-1.45	1.14	.91	15Q	TEARING STRENGTH	STANDARD, THWING-ELMENDORF, AIR CLAMP, DIGITL
L684	Ø	38.07	41.93	-5.16	-1.27	1.00	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L238A	Ø	38.13	44.20	-3.21	-.12	.91	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L228	Ø	38.13	43.00	-4.22	-.76	.62	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L610	*	38.20	45.93	-1.71	.75	1.00	15E	TEARING STRENGTH	STANDARD, THWING-ELMENDORF, AMBIENT COND.
L396M	Ø	38.20	45.00	-2.50	.25	.91	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L680	Ø	38.27	44.53	-2.86	-.05	.95	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L328	Ø	38.37	42.07	-4.89	-1.45	1.06	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L626	Ø	38.40	46.00	-1.55	.62	1.05	15L	TEARING STRENGTH	STANDARD, LØRENTZ-WETTRES
L145	Ø	38.53	45.87	-1.59	.43	1.01	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L279	Ø	38.67	46.47	-1.01	.64	1.02	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L312	Ø	38.73	44.40	-2.72	-.52	1.12	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L261	Ø	38.73	47.13	-.41	.94	.74	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L679	Ø	38.80	46.20	-1.16	.38	.74	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L243	Ø	38.87	46.73	-.68	.61	.93	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L190R	Ø	38.93	44.60	-2.44	-.58	1.19	15C	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L173B	Ø	38.93	44.13	-2.84	-.83	.56	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L262	Ø	39.00	45.67	-1.51	-.07	.74	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L211	Ø	39.00	44.87	-2.18	-.50	1.39	15R	TEARING STRENGTH	STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L299	Ø	39.07	47.07	-.29	.62	.83	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L157	Ø	39.07	43.60	-3.22	-1.23	.84	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L280	Ø	39.13	46.60	-.65	.32	.71	15L	TEARING STRENGTH	STANDARD, LØRENTZ-WETTRES
L103	Ø	39.20	44.27	-2.58	-.99	.63	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L236	Ø	39.23	46.33	-.82	.09	.98	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L565	Ø	39.33	44.80	-2.06	-.81	1.40	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L237A	Ø	39.33	48.00	.64	.89	1.29	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L182A	Ø	39.40	48.87	1.41	1.30	1.32	15A	TEARING STRENGTH	STANDARD, APPITA
L126	Ø	39.40	46.73	-.39	.16	1.12	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L268	Ø	39.40	44.53	-2.25	-1.01	.60	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L692	Ø	39.47	46.47	-.58	-.04	1.46	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L100	Ø	39.47	45.44	-1.45	-.53	.50	15M	TEARING STRENGTH	STANDARD, T. M. MIRFIELD(APPITA-ELMENDORF)
L321	Ø	39.47	48.53	1.17	1.07	1.52	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L278	Ø	39.47	45.47	-1.43	-.57	.90	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L183	Ø	39.53	46.40	-.60	-.13	.78	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L336	Ø	39.53	46.00	-.94	-.34	.96	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L558	Ø	39.60	44.80	-1.92	-1.04	.87	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L124	Ø	39.80	45.33	-1.36	-.92	1.08	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L166	Ø	39.80	45.07	-1.59	-1.07	.68	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)
L599	Ø	39.87	47.80	.76	.34	1.18	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF(SCALE TØ 100)

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS

TAPPI STANDARD T414 TS-65, ANY MAKE ELMENDORF WITH DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST	INSTRUMENT---CONDITIONS
		E85	B96	MAJOR	MINOR	R _s SDR	VAR		
L162	Ø	39.87	45.07	-1.55	-1.12	.92	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L324	Ø	39.87	47.60	.59	.23	1.00	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L275	Ø	39.53	45.60	-1.07	-.89	.98	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L237B	Ø	39.93	49.47	2.20	1.17	.82	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L122	Ø	39.95	47.09	.20	-.11	.88	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L264	Ø	40.00	47.47	.55	.05	1.54	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L255	Ø	40.00	45.80	-.86	-.84	.60	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L128	Ø	40.00	45.33	-1.26	-1.09	.71	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L581	Ø	40.04	46.69	-.08	-.40	.86	15Q	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF, AIR CLAMP, DIGITL
L559	Ø	40.07	48.27	1.26	.42	.97	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L232	Ø	40.13	45.73	-.85	-.99	1.83	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L153	Ø	40.13	45.53	-1.02	-1.10	.82	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L442	Ø	40.13	49.40	2.25	.97	1.21	15R	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L309	Ø	40.20	49.27	2.18	.84	.85	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L597	Ø	40.27	46.27	-.32	-.82	.89	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L345	Ø	40.27	47.87	1.03	.03	2.29	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L311	Ø	40.27	45.47	-1.00	-1.25	1.10	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L305	Ø	40.33	47.93	1.12	.01	1.50	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L206	Ø	40.40	46.80	.20	-.65	.77	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L167	Ø	40.40	49.07	2.12	.56	.97	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L257C	Ø	40.40	50.40	3.24	1.27	1.22	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L131	Ø	40.40	49.73	2.68	.92	1.29	15A	TEARING STRENGTH,	STANDARD, APPITA
L575	Ø	40.42	48.01	1.23	-.02	.95	15L	TEARING STRENGTH,	STANDARD, LØRENTZ-WETTRES
L251	*	40.47	51.13	3.90	1.61	1.61	15K	TEARING STRENGTH,	STANDARD, LØRENTZ-WETTRES, 20 C, 65% RH
L244	Ø	40.53	46.47	-.01	-.94	.67	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L189	Ø	40.53	48.33	1.57	.06	.75	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L148	Ø	40.67	46.47	.06	-1.05	.78	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L360	Ø	40.73	48.20	1.56	-.18	.77	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L291	Ø	40.73	48.93	2.18	.21	1.30	15A	TEARING STRENGTH,	STANDARD, APPITA
L257A	Ø	40.80	50.93	3.91	1.22	.94	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L344	Ø	40.80	46.13	-.15	-1.34	1.00	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L213	Ø	40.87	50.40	3.49	.88	.95	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L606	Ø	40.93	46.53	.26	-1.24	.81	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L352	Ø	40.95	48.32	1.78	-.30	.71	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L219	Ø	41.07	47.60	1.23	-.78	1.19	15L	TEARING STRENGTH,	STANDARD, LØRENTZ-WETTRES
L257B	Ø	41.07	50.40	3.60	.71	1.03	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L107	Ø	41.07	48.80	2.25	-.14	1.86	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L290	Ø	41.13	49.60	2.96	.23	.73	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L241	Ø	41.20	49.87	3.22	.31	.88	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L223	Ø	41.33	48.49	2.13	-.53	.89	15R	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L105	Ø	41.33	47.87	1.60	-.87	2.02	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L315	Ø	41.47	47.40	1.28	-1.23	1.02	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L225	Ø	41.53	50.40	3.85	.31	.83	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L182T	Ø	41.80	50.13	3.76	-.05	.97	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L688	Ø	42.00	52.67	6.01	1.13	1.07	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L600	Ø	42.00	51.60	5.11	.56	.89	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L139	*	42.00	53.40	6.63	1.52	.88	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L134	Ø	42.13	49.80	3.66	-.51	.93	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L185	Ø	42.40	48.80	2.96	-1.27	.72	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L248	Ø	42.50	50.32	4.30	-.55	.79	15J	TEARING STRENGTH,	STANDARD, LØRENTZ-WETTRES
L358	Ø	42.53	52.00	5.73	.32	.84	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L212	Ø	42.67	58.53	11.33	3.70	3.97	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L388	X	42.87	44.60	-.35	-3.91	1.00	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L249	Ø	42.87	48.87	3.27	-1.64	1.36	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L191	Ø	43.20	50.80	5.08	-.88	1.06	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L143	*	43.33	47.20	2.10	-2.92	1.03	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L233	Ø	43.47	50.00	4.54	-1.53	.84	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L259	Ø	43.93	54.00	8.17	.21	.91	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L250L	*	43.99	52.90	7.27	-.43	1.09	15H	TEARING STRENGTH,	STANDARD, LHØMARGY, 20 C, 65% RH
L194	Ø	44.23	51.17	5.54	-1.56	1.25	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L159	X	44.37	57.29	11.19	1.59	7.10	15L	TEARING STRENGTH,	STANDARD, LØRENTZ-WETTRES
L576	*	44.87	55.60	10.02	.27	1.63	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L554	*	45.40	56.40	10.59	.25	1.30	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L670	#	45.73	61.20	15.22	2.53	2.67	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)
L574	X	46.27	47.73	4.12	-5.11	1.16	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE TØ 100)

ANALYSIS T15-1 TABLE 2
TEARING STRENGTH, GRAMS

TAPPI STANDARD T414 TS-65, ANY MAKE ELMENDORF WITH DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY--TEST INSTRUMENT--CONDITIONS
		E85	B96	MAJOR	MINOR	R.SDR	VAR	
L242	*	46.36	52.79	8.45	-2.49	1.30	15U	TEARING STRENGTH, STANDARD, AUSTRALIAN OPT. CG.
L604	X	48.27	47.33	4.85	-7.02	1.15	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L151	#	49.20	58.80	15.04	-1.69	1.70	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L207	X	49.44	50.96	8.54	-6.07	3.67	15R	TEARING STRENGTH, STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L382	#	49.87	58.93	15.51	-2.18	5.64	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L150	#	55.13	63.87	22.49	-4.00	.51	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L622	#	59.73	68.27	28.67	-5.54	3.58	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L567	#	59.73	62.93	24.16	-8.39	1.45	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
GMEANS:		39.75	46.98			1.00		
		95% ELLIPSE:		8.28	2.40	WITH GAMMA = 57 DEGREES		

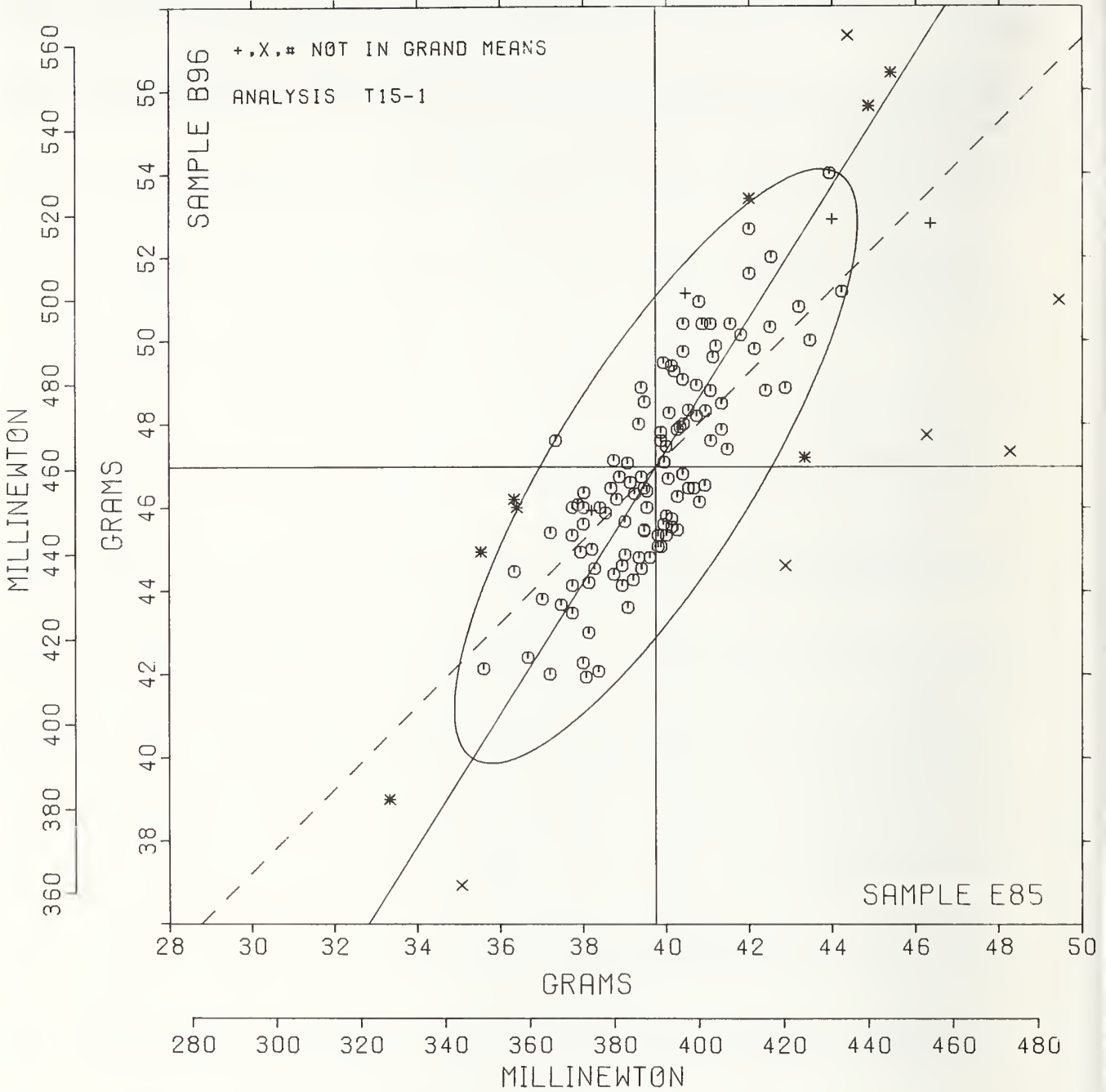
TEARING STRENGTH, DEEP CUTOUT

SAMPLE E85 = 39.7 GRAMS

SAMPLE B96 = 47.0 GRAMS

SAMPLE E85 = 390 MILLINEWTON

SAMPLE B96 = 461 MILLINEWTON



TAPPI STANDARD T414 IS-65, THWING-ELMENDORF WITHOUT DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	SAMPLE J42 MEAN	PRINTING 86 GRAMS PER SQUARE METER				SAMPLE K49 MEAN	PRINTING 105 GRAMS PER SQUARE METER				TEST D. = 15		
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L106	65.9	1.6	.64	2.7	.94	128.5	8.1	1.60	13.6	2.07	17N	Ø	L106
L122	63.9	-.4	-.15	2.5	.87	125.2	4.8	.95	6.2	.95	17N	Ø	L122
L148	67.5	3.3	1.30	1.8	.62	118.4	-2.0	-.39	2.6	.40	17N	Ø	L148
L231	65.2	1.0	.38	3.6	1.26	121.5	1.1	.21	4.3	.66	17N	Ø	L231
L234	66.1	1.9	.74	2.3	.82	121.6	1.2	.24	6.4	.97	17N	Ø	L234
L267	106.5	42.2	16.67	19.0	6.70	130.5	10.2	2.01	11.7	1.78	17N	#	L267
L269	66.0	1.8	.69	2.2	.79	122.1	1.8	.35	8.0	1.22	17N	Ø	L269
L301A	65.3	1.0	.40	1.8	.63	NO DATA REPORTED FOR SAMPLE K49					17N	M	L301
L301B	63.3	-.9	-.36	2.2	.77	116.0	-4.4	-.87	3.7	.56	17N	Ø	L301B
L308	66.3	2.0	.80	6.4	2.25	126.7	6.3	1.24	7.3	1.11	17N	Ø	L308
L326	59.7	-4.5	-1.78	3.0	1.06	115.5	-4.9	-.97	10.4	1.58	17N	Ø	L326
L339	60.5	-3.7	-1.47	2.2	.78	115.7	-4.6	-.92	5.3	.81	17N	Ø	L339
L393	62.3	-2.0	-.78	2.4	.84	113.1	-7.3	-1.45	4.4	.67	17N	Ø	L393
GR. MEAN	= 64.2 GRAMS				GRAND MEAN = 120.4 GRAMS				TEST DETERMINATIONS = 15				
SD MEANS	= 2.5 GRAMS				SD OF MEANS = 5.1 GRAMS				11 LABS IN GRAND MEANS				
	AVERAGE SDR = 2.8 GRAMS				AVERAGE SDR = 6.6 GRAMS								
GR. MEAN	= 630.1 MILLINEWTON				GRAND MEAN = 1180.5 MILLINEWTON								
L372	59.3	-4.9	-1.95	2.0	.70	112.9	-7.4	-1.47	4.2	.64	17X	*	L372
TOTAL NUMBER OF LABORATORIES REPORTING = 14													
Best values: J42 65 grams K49 120 grams													

Please see the diagram on the inside of the back cover of this report which shows how to distinguish between an Elmendorf tear tester with DEEP CUTOUT and an older tester with NO CUTOUT.

The following laboratories were omitted from the grand means because of extreme test results: 267.
Data from the following laboratories were given X codes and omitted from the grand means because the tests were made on DEEP CUTOUT tear testers: 372.

TAPPI STANDARD T414 IS-65, THWING-ELMENDORF WITHOUT DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J42	K49	MAJOR	MINOR	R. SDR	VAR			
L372	*	59.3	112.9	-8.7	2.1	.67	17X	TEARING STRENGTH,	NO CUT OUT:	GIVE INSTRUMENT MAKE, MODEL
L326	Ø	59.7	115.5	-6.2	2.5	1.32	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L339	Ø	60.5	115.7	-5.6	1.9	.79	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L393	Ø	62.3	113.1	-7.5	-.7	.75	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L301B	Ø	63.3	116.0	-4.4	-.7	.67	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L122	Ø	63.9	125.2	4.4	2.0	.91	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L231	Ø	65.2	121.5	1.3	-.5	.96	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L301A	M	65.3				.63	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L106	Ø	65.9	128.5	8.1	1.3	1.50	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L269	Ø	66.0	122.1	2.2	-1.0	1.00	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L234	Ø	66.1	121.6	1.8	-1.3	.90	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L308	Ø	66.3	126.7	6.6	.3	1.68	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L148	Ø	67.5	118.4	-.7	-3.8	.51	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
L267	#	106.5	130.5	24.1	-36.1	4.24	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF
GMEANS:		64.2	120.4			1.00				
		95% ELLIPSE:		16.5	5.7			WITH GAMMA = 69 DEGREES		

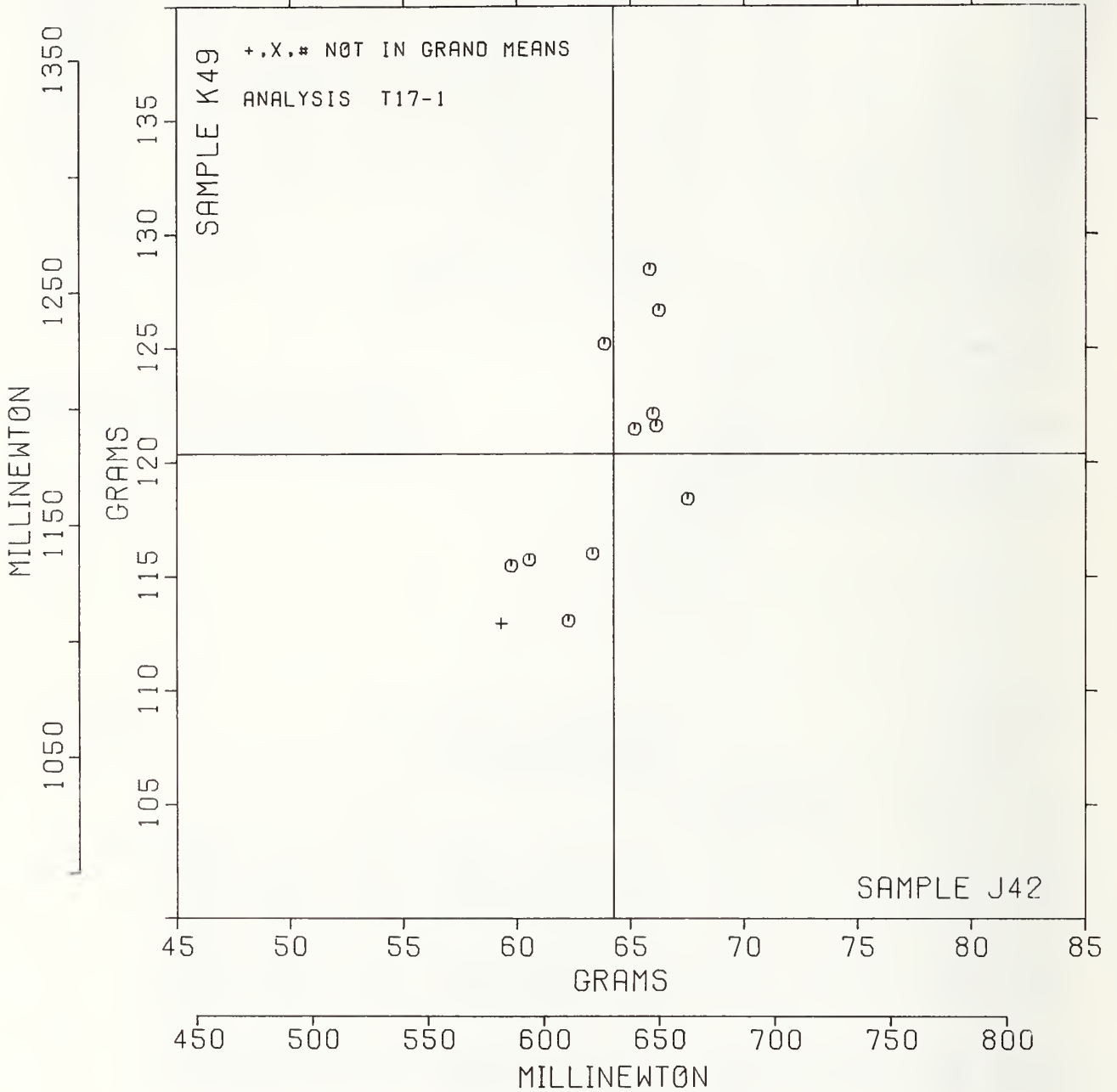
TEARING STRENGTH, NO CUTOUT

SAMPLE J42 = 64.2 GRAMS

SAMPLE K49 = 120.4 GRAMS

SAMPLE J42 = 630 MILLINEWTON

SAMPLE K49 = 1181 MILLINEWTON



ANALYSIS T19-1 TABLE 1
TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PACKAGING PAPER
TAPPI STANDARDS T404 GS-76 AND T494 GS-70, TENSILE BREAKING STRENGTH, PENDULUM AND CRE TYPES

LAB CODE	SAMPLE J01		PRINTING 98 GRAMS PER SQUARE METER				SAMPLE J16	PRINTING 149 GRAMS PER SQUARE METER				TEST D. = 20			
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN		DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB	
L100	5.41	-.18	-.59	.18	.84	8.89	.07	.18	.17	.58	19E	Ø	L100		
L106	4.99	-.60	-1.94	.31	1.46	6.62	-2.20	-5.49	.43	1.42	19A	#	L106		
L107	5.59	-.00	-.01	.24	1.14	9.01	.20	.49	.35	1.16	19A	Ø	L107		
L122	5.40	-.19	-.62	.13	.61	8.56	-.25	-.63	.22	.73	19A	Ø	L122		
L126	5.50	-.10	-.31	.29	1.39	8.73	-.08	-.19	.27	.92	19A	Ø	L126		
L151	5.06	-.53	-1.70	.21	1.01	8.32	-.49	-1.22	.25	.85	19A	Ø	L151		
L153	5.76	.17	.54	.22	1.03	9.01	.20	.50	.35	1.15	19P	Ø	L153		
L157A	5.92	.32	1.05	.17	.79	9.02	.21	.52	.26	.86	19P	Ø	L157A		
L157I	5.52	-.08	-.24	.36	1.70	8.15	-.66	-1.65	.31	1.03	19A	*	L157I		
L167	5.84	.25	.81	.11	.50	9.27	.46	1.16	.36	1.20	19G	Ø	L167		
L182I	5.29	-.31	-.99	.19	.91	8.26	-.55	-1.37	.35	1.16	19D	Ø	L182I		
L182L	5.39	-.20	-.65	.15	.73	8.41	-.40	-.99	.25	.84	19T	Ø	L182L		
L207	5.28	-.31	-1.01	.16	.76	8.72	-.09	-.23	.30	.99	19A	Ø	L207		
L219	5.36	-.24	-.76	.20	.94	8.31	-.50	-1.25	.29	.97	19E	Ø	L219		
L225	5.70	.11	.36	.20	.94	8.90	.09	.23	.21	.72	19P	Ø	L225		
L234L	5.64	.04	.14	.19	.91	8.62	-.19	-.47	.29	.97	19P	Ø	L234L		
L237A	5.69	.10	.32	.23	1.10	8.84	.02	.06	.35	1.18	19Q	Ø	L237A		
L237B	5.73	.14	.44	.24	1.14	9.07	.26	.64	.20	.68	19A	Ø	L237B		
L238A	5.46	-.13	-.42	.20	.96	8.68	-.13	-.32	.35	1.17	19T	Ø	L238A		
L243	5.37	-.23	-.73	.10	.46	8.45	-.36	-.89	.22	.74	19A	Ø	L243		
L257A	5.79	.20	.64	.16	.78	9.28	.47	1.18	.24	.79	19P	Ø	L257A		
L257C	5.73	.14	.45	.14	.65	9.07	.26	.65	.38	1.29	19P	Ø	L257C		
L264A	5.55	-.05	-.15	.16	.74	8.83	.02	.05	.27	.89	19A	Ø	L264A		
L264P	5.47	-.13	-.40	.36	1.69	9.01	.20	.49	.35	1.17	19P	Ø	L264P		
L265	5.27	-.33	-1.05	.12	.58	8.71	-.10	-.25	.19	.62	19A	Ø	L265		
L267	5.30	-.29	-.95	.14	.68	8.54	-.28	-.69	.32	1.06	19A	Ø	L267		
L268A	5.41	-.18	-.58	.24	1.15	9.03	.22	.54	.22	.72	19A	Ø	L268A		
L268P	5.77	.17	.56	.17	.79	9.36	.55	1.37	.16	.52	19P	Ø	L268P		
L273	5.50	-.09	-.29	.23	1.09	8.67	-.14	-.35	.35	1.16	19P	Ø	L273		
L280	4.84	-.75	-2.42	.42	1.98	7.69	-1.12	-2.80	.57	1.91	19G	*	L280		
L281	5.91	.31	1.01	.14	.66	9.13	.32	.79	.21	.71	19G	Ø	L281		
L305	5.78	.19	.62	.24	1.13	8.68	-.13	-.33	.15	.50	19V	Ø	L305		
L312	5.95	.35	1.14	.14	.68	9.28	.47	1.18	.28	.93	19D	Ø	L312		
L324	5.40	-.20	-.63	.19	.88	8.55	-.26	-.66	.29	.98	19A	Ø	L324		
L336	5.62	.03	.10	.21	1.01	8.89	.08	.21	.28	.95	19G	Ø	L336		
L356	5.63	.04	.12	.32	1.52	9.15	.34	.86	.39	1.29	19P	Ø	L356		
L562	6.10	.50	1.62	.28	1.33	9.39	.57	1.43	.38	1.28	19P	Ø	L562		
L565	5.92	.32	1.04	.33	1.55	8.89	.08	.20	.20	.68	19T	Ø	L565		
L568	6.08	.48	1.55	.21	.98	8.99	.18	.44	.62	2.07	19P	Ø	L568		
L575	5.33	-.27	-.86	.29	1.37	8.37	-.44	-1.10	.39	1.29	19G	Ø	L575		
L576	5.44	-.15	-.49	.20	.94	8.33	-.48	-1.19	.23	.77	19A	Ø	L576		
L580	5.74	.15	.47	.18	.88	9.09	.28	.70	.34	1.14	19G	Ø	L580		
L581	5.93	.34	1.08	.19	.90	NO DATA REPORTED FOR SAMPLE J16						19A	M	L581	
L604	5.14	-.45	-1.45	.36	1.70	8.23	-.58	-1.44	.63	2.11	19A	Ø	L604		
L606	5.75	.15	.50	.29	1.36	9.04	.23	.57	.28	.93	19P	Ø	L606		
L610	5.08	-.52	-1.66	.26	1.24	8.23	-.58	-1.45	.36	1.20	19A	Ø	L610		
L622	6.16	.57	1.84	.19	.92	9.49	.68	1.69	.39	1.29	19Ø	Ø	L622		
L650	5.94	.35	1.13	.22	1.04	9.30	.49	1.23	.30	1.02	19G	Ø	L650		
L652	6.30	.71	2.29	.21	.98	9.56	.75	1.87	.34	1.15	19A	Ø	L652		
L684	6.02	.43	1.37	.36	1.71	9.18	.37	.93	.29	.96	19G	Ø	L684		
L689	5.24	-.35	-1.13	.17	.83	8.54	-.27	-.67	.20	.67	19A	Ø	L689		
GR. MEAN =	5.59	KILONEWTON/M				GRAND MEAN =	8.81	KILONEWTON/M				TEST DETERMINATIONS = 20			
SD MEANS =	.31	KILONEWTON/M				SD OF MEANS =	.40	KILONEWTON/M				49 LABS IN GRAND MEANS			
		AVERAGE SDR =				.21	KILONEWTON/M				AVERAGE SDR =			.30	KILONEWTON/M
GR. MEAN =	31.94	LB/INCH				GRAND MEAN =	50.32	LB/INCH							
L250I	4.79	-.80	-2.59	.17	.79	7.42	-1.39	-3.48	.25	.85	19L	*	L250I		
L251	4.32	-1.27	-4.09	.44	2.09	7.42	-1.39	-3.47	.41	1.37	19I	*	L251		

TOTAL NUMBER OF LABORATORIES REPORTING = 53
Best values: J01 5.6 ± 0.5 kilonewton per meter
J16 8.8 ± 0.6 kilonewton per meter

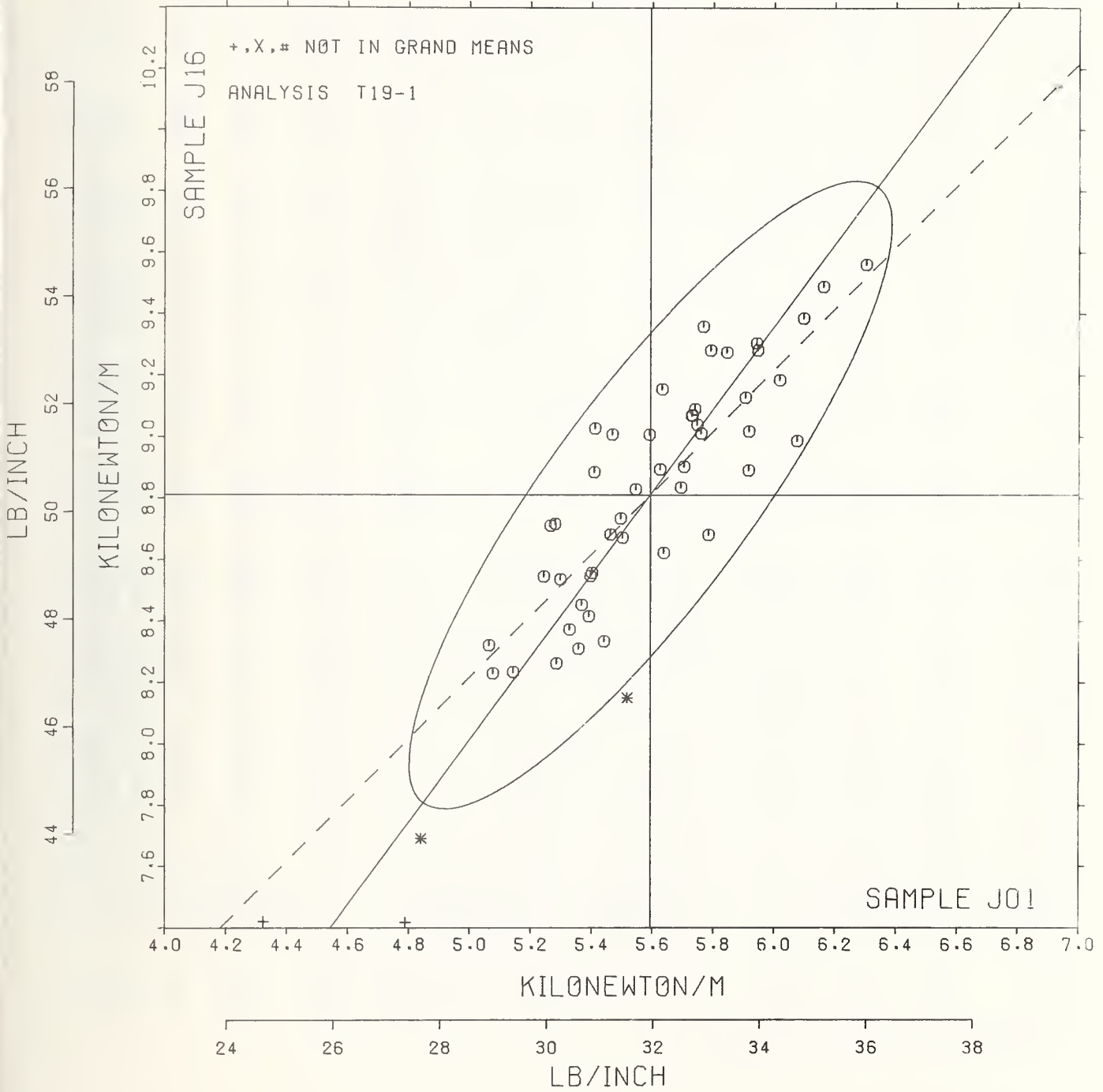
The following laboratories were omitted from the grand means because of extreme test results: 106.

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PACKAGING PAPER
TAPPI STANDARDS T404 GS-76 AND T494 GS-70, TENSILE BREAKING STRENGTH, PENDULUM AND CRE TYPES

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST	INSTRUMENT---	CONDITIONS
		J01	J16	MAJOR	MINOR	R.SDR	VAR			
L251	*	4.32	7.42	-1.87	.19	1.73	19I	TENSILE STRENGTH,	PACKAGING PAPER,	CRE, 20C, 65% RH
L250I	*	4.79	7.42	-1.60	-.19	.82	19L	TENSILE STRENGTH,	PACKAGING PAPER,	CRE, 20 C, 65% RH
L280	*	4.84	7.69	-1.35	-.06	1.95	19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L106	#	4.99	6.62	-2.12	-.83	1.44	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L151	Ø	5.06	8.32	-.71	.13	.93	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L610	Ø	5.08	8.23	-.77	.07	1.22	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L604	Ø	5.14	8.23	-.73	.02	1.91	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L689	Ø	5.24	8.54	-.42	.12	.75	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L265	Ø	5.27	8.71	-.28	.20	.60	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L207	Ø	5.28	8.72	-.26	.19	.88	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L182I	Ø	5.29	8.26	-.62	-.08	1.03	19D	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L267	Ø	5.30	8.54	-.40	.07	.87	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L575	Ø	5.33	8.37	-.51	-.05	1.33	19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L219	Ø	5.36	8.31	-.54	-.11	.95	19E	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L243	Ø	5.37	8.45	-.42	-.03	.60	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L182L	Ø	5.39	8.41	-.44	-.08	.78	19T	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L324	Ø	5.40	8.55	-.33	-.00	.93	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L122	Ø	5.40	8.56	-.32	.00	.67	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L100	Ø	5.41	8.89	-.05	.19	.71	19E	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L268A	Ø	5.41	9.03	.06	.27	.93	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L576	Ø	5.44	8.33	-.47	-.16	.86	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L238A	Ø	5.46	8.68	-.18	.03	1.06	19T	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L264P	Ø	5.47	9.01	.08	.22	1.43	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L126	Ø	5.50	8.73	-.12	.03	1.15	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L273	Ø	5.50	8.67	-.17	-.01	1.13	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L157I	*	5.52	6.15	-.58	-.33	1.37	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L264A	Ø	5.55	8.83	-.01	.05	.81	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L107	Ø	5.55	9.01	.16	.12	1.15	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L336	Ø	5.62	8.89	.09	.02	.98	19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L356	Ø	5.63	9.15	.30	.17	1.40	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L234L	Ø	5.64	8.62	-.13	-.15	.54	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L237A	Ø	5.69	8.84	.08	-.07	1.14	19Q	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L225	Ø	5.70	8.90	.14	-.03	.83	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L237B	Ø	5.73	9.07	.29	.05	.91	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L257C	Ø	5.73	9.07	.29	.04	.97	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L580	Ø	5.74	9.09	.31	.05	1.01	19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L606	Ø	5.75	9.04	.28	.01	1.14	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L153	Ø	5.76	9.01	.26	-.01	1.09	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L268P	Ø	5.77	9.36	.54	.19	.65	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L305	Ø	5.78	8.68	.01	-.23	.81	19V	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L257A	Ø	5.79	9.28	.50	.12	.79	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L167	Ø	5.84	9.27	.52	.07	.85	19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L281	Ø	5.91	9.13	.44	-.06	.69	19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L565	Ø	5.92	8.89	.26	-.21	1.12	19T	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L157A	Ø	5.92	9.02	.36	-.14	.83	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L581	M	5.93				.90	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L650	Ø	5.94	9.30	.60	.01	1.03	19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L312	Ø	5.95	9.28	.59	-.00	.81	19D	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L684	Ø	6.02	9.18	.55	-.12	1.33	19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L568	Ø	6.08	8.99	.43	-.28	1.52	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L562	Ø	6.10	9.39	.76	-.06	1.30	19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L622	Ø	6.16	9.49	.88	-.05	1.11	19Ø	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L652	Ø	6.30	9.56	1.03	-.12	1.07	19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
GMEANS:		5.59	8.81			1.00				
		95% ELLIPSE:	1.25	.34		WITH GAMMA = 53 DEGREES				

TENSILE STRENGTH, PACKAGING PAPERS

SAMPLE J01 = 5.59 KILONEWT0N/M SAMPLE J16 = 8.81 KILONEWT0N/M
 SAMPLE J01 = 31.9 LB/INCH SAMPLE J16 = 50.3 LB/INCH



TENSILE BREAKING STRENGTH, KILONEWTONS PER METER
TAPPI STANDARD T494 6S-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	PRINTING					PRINTING					TEST D. = 20		
	SAMPLE J71 MEAN	76 GRAMS PER SQUARE METER DEV	N. DEV	SDR	R. SDR	SAMPLE K39 MEAN	75 GRAMS PER SQUARE METER DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L100	3.71	.03	.16	.13	.88	4.73	-.24	-.95	.14	.61	20E	Ø	L100
L105	3.69	.01	.06	.19	1.25	5.02	.05	.18	.39	1.74	20A	Ø	L105
L118	3.75	.07	.41	.11	.72	4.87	-.11	-.42	.21	.94	20A	Ø	L118
L122	3.67	-.01	-.07	.12	.80	5.02	.04	.15	.14	.64	20A	Ø	L122
L124C	3.60	-.09	-.53	.20	1.37	4.72	-.26	-1.01	.27	1.20	20A	Ø	L124C
L125	3.85	.17	1.03	.21	1.44	5.44	.46	1.81	.31	1.41	20C	Ø	L125
L131	3.75	.07	.43	.15	1.00	5.20	.22	.85	.18	.79	20E	Ø	L131
L141T	3.55	-.13	-.83	.12	.83	4.84	-.14	-.55	.25	1.14	20A	Ø	L141T
L143	3.94	.25	1.58	.15	1.02	5.24	.26	1.01	.24	1.09	20E	Ø	L143
L148	3.65	-.03	-.20	.14	.91	4.89	-.09	-.35	.15	.66	20A	Ø	L148
L159	3.66	-.03	-.16	.15	1.03	5.06	.08	.32	.23	1.04	20A	Ø	L159
L163	3.96	.28	1.73	.13	.85	5.22	.25	.96	.22	.98	20D	Ø	L163
L167	3.85	.17	1.07	.21	1.44	5.34	.36	1.42	.25	1.14	20G	Ø	L167
L185	3.57	-.11	-.69	.14	.96	4.73	-.25	-.98	.37	1.64	20C	Ø	L185
L190R	3.71	.03	.19	.08	.55	4.77	-.21	-.82	.21	.96	20A	Ø	L190R
L194	3.44	-.24	-1.50	.18	1.21	4.64	-.34	-1.34	.23	1.04	20A	Ø	L194
L223B	3.72	.04	.24	.10	.66	5.07	.09	.35	.22	.99	20A	Ø	L223B
L226C	3.39	-.29	-1.79	.29	1.92	4.57	-.41	-1.58	.24	1.07	20C	Ø	L226C
L230	3.56	-.13	-.78	.11	.75	4.93	-.05	-.20	.12	.56	20Ø	Ø	L230
L243	3.63	-.05	-.32	.09	.62	4.84	-.14	-.55	.16	.72	20A	Ø	L243
L255	3.54	-.14	-.87	.15	1.01	4.81	-.17	-.66	.22	.99	20A	Ø	L255
L260	3.56	-.13	-.78	.12	.80	4.95	-.03	-.11	.15	.66	20A	Ø	L260
L261	3.76	.08	.51	.18	1.19	5.16	.18	.70	.19	.86	20A	Ø	L261
L278	3.62	-.07	-.41	.15	.98	5.07	.09	.37	.22	.99	20A	Ø	L278
L291	3.62	-.07	-.41	.18	1.18	4.59	-.39	-1.52	.26	1.15	20A	Ø	L291
L309	3.62	-.07	-.41	.12	.81	4.77	-.21	-.83	.30	1.32	20E	Ø	L309
L315	3.41	-.28	-1.72	.14	.93	4.65	-.33	-1.28	.28	1.24	20A	Ø	L315
L325	3.49	-.20	-1.21	.11	.77	4.80	-.18	-.70	.23	1.03	20E	Ø	L325
L328	3.77	.09	.53	.38	2.55	5.54	.56	2.19	.29	1.28	20A	*	L328
L331	3.98	.30	1.83	.15	.99	5.07	.10	.38	.29	1.28	20A	*	L331
L333	3.84	.15	.96	.11	.77	5.03	.05	.20	.18	.81	20A	Ø	L333
L344	3.73	.05	.29	.20	1.34	5.10	.12	.46	.31	1.38	20A	Ø	L344
L352	3.44	-.25	-1.53	.16	1.09	4.14	-.84	-3.27	.22	.98	20A	X	L352
L356	3.57	-.11	-.69	.12	.83	4.87	-.11	-.42	.20	.88	20A	Ø	L356
L360	3.39	-.29	-1.81	.13	.86	4.63	-.35	-1.35	.21	.96	20B	Ø	L360
L390	3.96	.27	1.71	.11	.71	5.26	.28	1.09	.18	.80	20A	Ø	L390
L442	3.73	.04	.27	.07	.46	4.94	-.04	-.14	.09	.42	20G	Ø	L442
L557	3.65	-.04	-.23	.16	1.10	4.76	-.22	-.85	.19	.86	20A	Ø	L557
L558	.75	-2.93	-18.19	.07	.44	.98	-4.00	-15.63	.06	.27	20A	#	L558
L559	3.63	-.05	-.30	.12	.83	4.93	-.04	-.18	.19	.83	20A	Ø	L559
L563A	3.58	-.10	-.61	.25	1.70	5.02	.04	.17	.39	1.75	20A	Ø	L563A
L563B	4.13	.44	2.76	.15	.98	5.77	.79	3.08	.22	.97	20A	*	L563B
L567	3.65	-.03	-.21	.24	1.60	5.09	.11	.44	.22	1.00	20A	Ø	L567
L574	3.73	.05	.32	.15	1.03	5.02	.04	.17	.21	.92	20A	Ø	L574
L575	3.57	-.11	-.68	.14	.95	4.79	-.19	-.74	.21	.93	20G	Ø	L575
L587	3.88	.20	1.22	.13	.88	5.27	.30	1.16	.23	1.02	20A	Ø	L587
L592	3.67	-.01	-.05	.16	1.06	4.99	.02	.06	.19	.84	20A	Ø	L592
L616	2.76	-.93	-5.74	.10	.68	3.65	-1.33	-5.19	.16	.74	20D	#	L616

GR. MEAN = 3.68 KILONEWTON/M GRAND MEAN = 4.98 KILONEWTON/M TEST DETERMINATIONS = 20
 SD MEANS = .16 KILONEWTON/M SD OF MEANS = .26 KILONEWTON/M 45 LABS IN GRAND MEANS
 AVERAGE SDR = .15 KILONEWTON/M AVERAGE SDR = .22 KILONEWTON/M
 GR. MEAN = 12.422 LB/15 MM GRAND MEAN = 16.788 LB/15 MM

L139	3.63	-.05	-.31	.11	.71	4.74	-.24	-.94	.20	.88	20H	*	L139
L211	11.19	7.50	46.54	.89	5.99	12.95	7.97	31.16	1.15	5.17	20I	*	L211
L250I	3.13	-.55	-3.40	.11	.77	4.21	-.76	-2.98	.22	.96	20L	*	L250I
L251	3.21	-.47	-2.94	.45	3.01	4.19	-.79	-3.07	.22	1.00	20I	*	L251

TOTAL NUMBER OF LABORATORIES REPORTING = 52
 Best values: J71 3.7 ± 0.2 kilonewton per meter
 K39 4.9 ± 0.3 kilonewton per meter

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

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

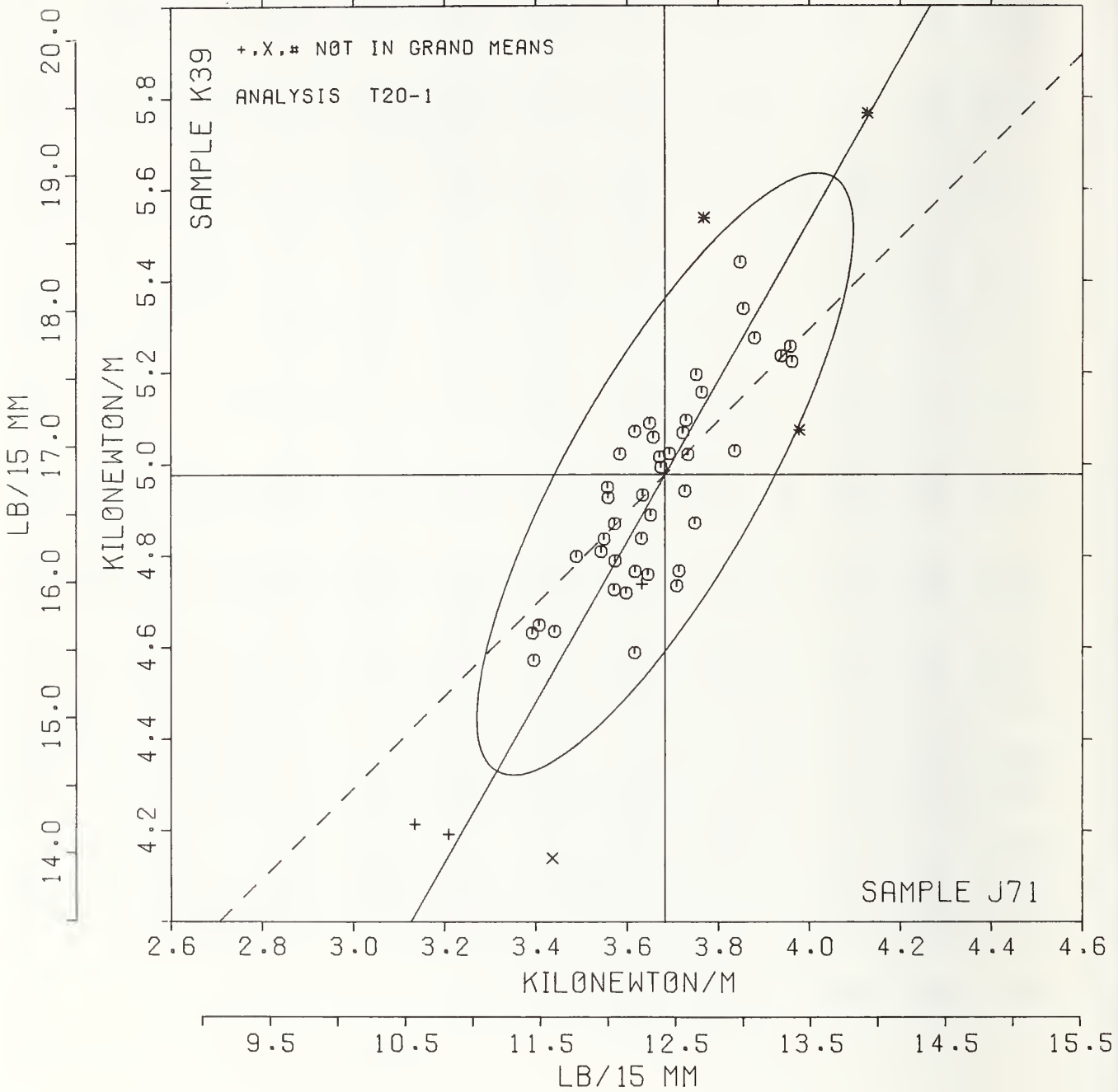
ANALYSIS T20-1 TABLE 2
TENSILE BREAKING STRENGTH, KILOGNEWTONS PER METER

TAPPI STANDARD T454 CS-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAH CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST	INSTRUMENT---	CONDITIONS
		J71	K39	MAJØE	MINØR	R.SDR	VAR			
L558	#	.75	.98	-4.93	.57	.36	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L616	#	2.76	3.65	-1.61	.15	.71	20D	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L250I	+	3.13	4.21	-.94	.10	.87	20L	TENSILE STRENGTH,	PRINTING PAPER, CRE, 20 C,	65% RH
L251	+	3.21	4.19	-.92	.02	2.01	20I	TENSILE STRENGTH,	PRINTING PAPER, CRE, 20 C,	65% RH
L360	Ø	3.39	4.63	-.45	.08	.91	20H	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L226C	Ø	3.39	4.57	-.50	.05	1.49	20C	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L315	Ø	3.41	4.65	-.42	.08	1.08	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L352	X	3.44	4.14	-.85	-.20	1.04	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L194	Ø	3.44	4.64	-.42	.04	1.13	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L325	Ø	3.49	4.80	-.25	.08	.90	20E	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L255	Ø	3.54	4.81	-.22	.04	1.00	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L141T	Ø	3.55	4.84	-.19	.05	.98	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L260	Ø	3.56	4.95	-.09	.10	.73	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L230	Ø	3.56	4.93	-.11	.08	.65	20Ø	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L185	Ø	3.57	4.73	-.27	-.03	1.30	20C	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L356	Ø	3.57	4.87	-.15	.04	.86	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L575	Ø	3.57	4.79	-.22	.00	.94	20G	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L563A	Ø	3.58	5.02	-.01	.11	1.72	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L124C	Ø	3.60	4.72	-.27	-.05	1.28	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L291	Ø	3.62	4.59	-.37	-.13	1.16	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L278	Ø	3.62	5.07	.05	.10	.99	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L309	Ø	3.62	4.77	-.22	-.05	1.07	20E	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L243	Ø	3.63	4.84	-.15	-.02	.67	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L139	+	3.63	4.74	-.23	-.07	.79	20H	TENSILE STRENGTH,	PRINTING PAPER, CRE, SHORT TEST SPAN	
L559	Ø	3.63	4.93	-.06	.02	.83	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L557	Ø	3.65	4.76	-.21	-.08	.98	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L567	Ø	3.65	5.09	.08	.09	1.30	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L148	Ø	3.65	4.89	-.09	-.02	.79	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L159	Ø	3.66	5.06	.06	.06	1.04	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L122	Ø	3.67	5.02	.03	.03	.72	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L592	Ø	3.67	4.99	.01	.02	.95	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L105	Ø	3.69	5.02	.04	.01	1.49	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L100	Ø	3.71	4.73	-.20	-.14	.74	20E	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L190R	Ø	3.71	4.77	-.17	-.13	.76	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L223B	Ø	3.72	5.07	.10	.01	.82	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L442	Ø	3.73	4.94	-.01	-.06	.44	20G	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L344	Ø	3.73	5.10	.13	.02	1.36	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L574	Ø	3.73	5.02	.06	-.02	.98	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L118	Ø	3.75	4.87	-.06	-.11	.83	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L131	Ø	3.75	5.20	.22	.05	.90	20E	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L261	Ø	3.76	5.16	.20	.02	1.03	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L328	*	3.77	5.54	.53	.20	1.92	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L333	Ø	3.84	5.03	.12	-.11	.79	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L125	Ø	3.85	5.44	.48	.09	1.43	20C	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L167	Ø	3.85	5.34	.40	.03	1.29	20G	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L587	Ø	3.88	5.27	.36	-.02	.95	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L143	Ø	3.94	5.24	.35	-.09	1.05	20E	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L390	Ø	3.96	5.26	.38	-.10	.76	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L163	Ø	3.96	5.22	.35	-.12	.92	20D	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L331	*	3.98	5.07	.23	-.21	1.14	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L563B	*	4.13	5.77	.90	.00	.98	20A	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L211	+	11.19	12.95	10.64	-2.57	5.58	20I	TENSILE STRENGTH,	PRINTING PAPER, CRE, 20 C,	65% RH
GMEANS:		3.68	4.98			1.00				
		95% ELLIPSE:		.75	.21	WITH GAMMA = 60 DEGREES				

TENSILE STRENGTH, CRE TYPE

SAMPLE J71 = 3.68 KILONEWTØN/M SAMPLE K39 = 4.98 KILONEWTØN/M
 SAMPLE J71 = 12.42 LB/15 MM SAMPLE K39 = 16.79 LB/15 MM



ANALYSIS T20-2 TABLE 1
 TENSILE BREAKING STRENGTH, KILOWEIGHTS PER METER
 TAPPI STANDARD T404 GS-76, TENSILE BREAKING STRENGTH OF PAPER AND PAPERBOARD (PENDULUM-TYPE TESTER)

LAB CODE	SAMPLE J71		PRINTING				SAMPLE K39		PRINTING				TEST D. ^o 20		
	MEAN	DEV	76 GEAMS PER SQUARE METER	N.O.DEV	SDR	R _o .SDR	MEAN	75 GRAMS PER SQUARE METER	N.O.DEV	SDR	R _o .SDR	VAR	F	LAB	
L103	3.94	.18	.99	.12	.65		5.24	.20	.97	.17	.70	20R	Ø	L103	
L108	4.10	.34	1.87	.14	.77		5.33	.29	1.40	.29	1.23	20P	Ø	L108	
L121	4.01	.25	1.38	.19	1.10		5.19	.15	.70	.12	.49	20P	Ø	L121	
L124P	3.65	-.11	-.64	.20	1.12		5.09	.05	.23	.24	1.01	20P	Ø	L124P	
L128	3.66	-.11	-.61	.14	.82		5.05	.01	.06	.23	.96	20T	Ø	L128	
L148	3.66	-.11	-.60	.14	.80		4.94	-.10	-.47	.19	.78	20P	Ø	L148	
L158	345.86	342.05	1912.63	6.33	35.88		471.06	466.02	2244.48	18.18	76.59	20T	#	L158	
L162	3.84	.08	.42	.13	.74		4.79	-.25	-1.20	.14	.61	20*	#	L162	
L182L	3.62	-.15	-.85	.13	.71		4.90	-.14	-.67	.22	.94	20T	Ø	L182L	
L189	3.93	.17	.54	.15	.87		5.44	.40	1.91	.28	1.17	20R	Ø	L189	
L191P	3.78	.01	.07	.12	.66		4.88	-.16	-.78	.15	.64	20P	Ø	L191P	
L212	3.52	-.25	-1.39	.16	.91		4.71	-.33	-1.59	.17	.74	20R	Ø	L212	
L213	3.37	-.40	-2.23	.19	1.10		4.68	-.36	-1.73	.49	2.06	20T	Ø	L213	
L218	3.68	-.09	-.50	.12	.70		4.99	-.05	-.26	.24	1.01	20P	Ø	L218	
L233	3.56	-.21	-1.17	.16	.93		4.76	-.29	-1.37	.27	1.13	20Q	Ø	L233	
L241	3.89	.12	.70	.23	1.30		5.13	.09	.43	.21	.87	20R	Ø	L241	
L242	3.54	-.23	-1.29	.16	.92		4.80	-.24	-1.18	.24	1.03	20Y	Ø	L242	
L249	3.58	-.19	-1.04	.22	1.25		4.82	-.22	-1.07	.19	.79	20P	Ø	L249	
L259	3.56	-.21	-1.16	.28	1.58		4.93	-.11	-.53	.20	.85	20P	Ø	L259	
L262	3.76	-.00	-.02	.19	1.10		5.25	.21	1.01	.22	.93	20R	Ø	L262	
L275	3.88	.12	.66	.20	1.14		5.18	.14	.68	.24	1.01	20R	Ø	L275	
L279P	3.90	.13	.75	.09	.52		5.15	.11	.52	.41	1.74	20P	Ø	L279P	
L285	3.26	-.51	-2.83	.08	.46		4.16	-.88	-4.23	.11	.46	20P	#	L285	
L290	3.70	-.06	-.36	.17	.97		5.00	-.04	-.18	.23	.96	20P	Ø	L290	
L311	3.60	-.17	-.53	.16	.90		4.82	-.22	-1.06	.26	1.08	20V	Ø	L311	
L321	3.16	-.61	-3.40	.16	.91		4.01	-1.03	-4.98	.23	.99	20Q	#	L321	
L330	3.97	.20	1.13	.25	1.40		5.20	.16	.76	.27	1.16	20P	Ø	L330	
L356	3.93	.16	.91	.24	1.37		5.19	.15	.70	.24	1.00	20P	Ø	L356	
L370	3.66	-.11	-.61	.15	.83		5.02	-.02	-.12	.20	.83	20P	Ø	L370	
L376	3.72	-.04	-.24	.22	1.25		4.90	-.14	-.67	.23	.95	20P	Ø	L376	
L393	3.89	.12	.69	.14	.79		5.26	.22	1.04	.26	1.09	20P	Ø	L393	
L554	4.54	.77	4.30	.15	.85		5.74	.70	3.38	.22	.95	20P	#	L554	
L556	4.10	.33	1.85	.15	.88		5.50	.46	2.22	.27	1.12	20P	Ø	L556	
L585	3.89	.13	.72	.19	1.08		5.22	.18	.86	.30	1.28	20V	Ø	L585	
L599	3.68	-.09	-.48	.19	1.10		4.89	-.15	-.73	.27	1.13	20V	Ø	L599	
L626	3.79	.03	.15	.14	.79		4.92	-.12	-.60	.18	.76	20T	Ø	L626	
L680	3.72	-.05	-.25	.26	1.48		5.03	-.01	-.03	.16	.67	20R	Ø	L680	
L692	3.97	.21	1.15	.21	1.20		5.20	.16	.76	.21	.90	20P	Ø	L692	

GR. MEAN = 3.77 KILOWEIGHT/M GRAND MEAN = 5.04 KILOWEIGHT/M TEST DETERMINATIONS = 20
 SD MEANS = .18 KILOWEIGHT/M SD OF MEANS = .21 KILOWEIGHT/M 34 LABS IN GRAND MEANS
 AVERAGE SDR = .18 KILOWEIGHT/M AVERAGE SDR = .24 KILOWEIGHT/M
 GR. MEAN = 12.704 LB/15 MM GRAND MEAN = 17.001 LB/15 MM
 TOTAL NUMBER OF LABORATORIES REPORTING = 38
 Best values: J71 3.7 ± 0.3 kilonewton per meter
 K39 5.0 ± 0.3 kilonewton per meter

The following laboratories were omitted from the grand means because of extreme test results: 285, 321, 554.

Data from the following laboratories appear to be off by a multiplicative factor: 158.

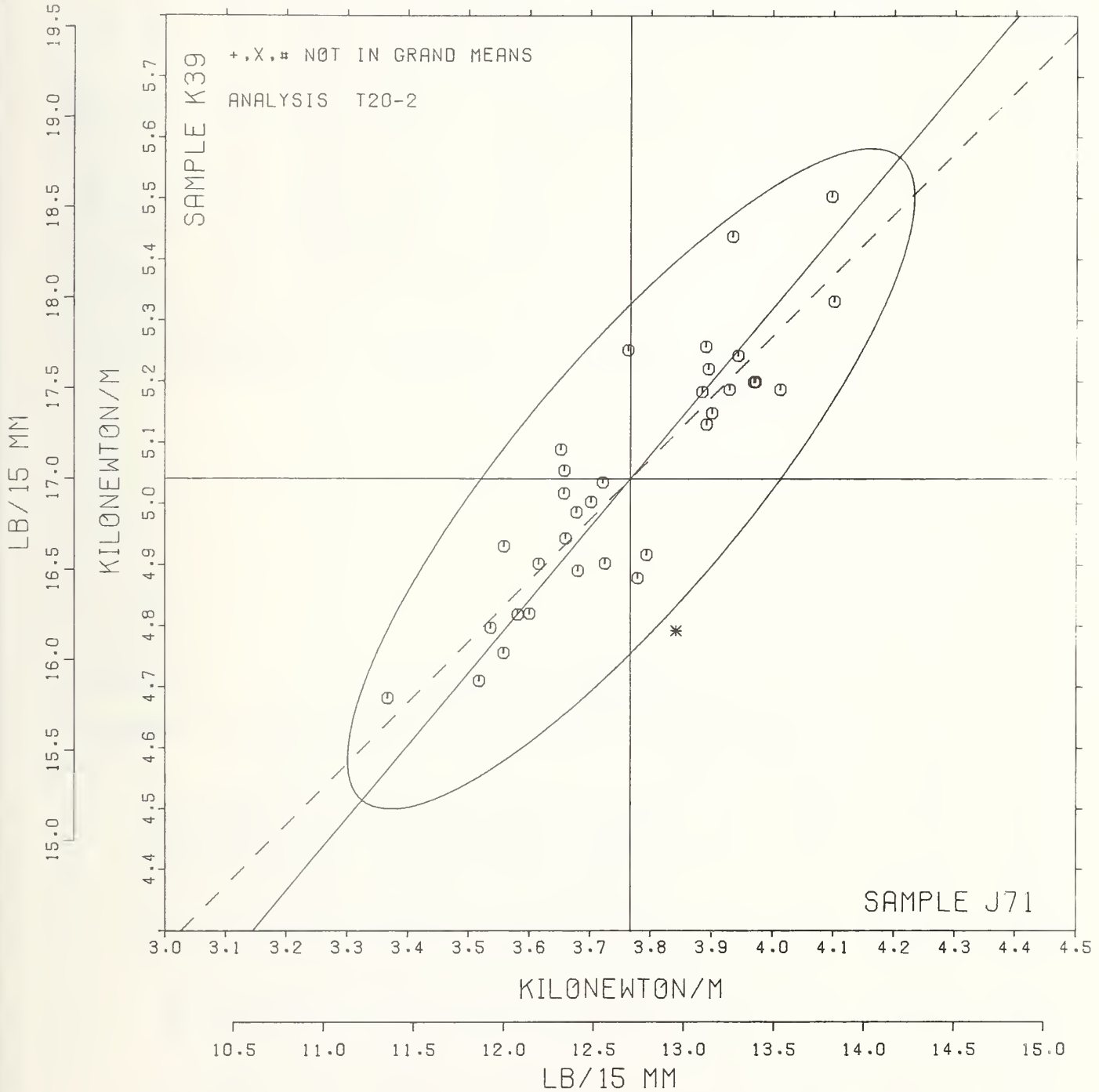
TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

TAPPI STANDARD T404 6S-76, TENSILE BREAKING STRENGTH OF PAPER AND PAPERBOARD (PENDULUM-TYPE TESTER)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST	INSTRUMENT---	CONDITIONS
		J71	K39	MAJOR	MINOR	R.SDR	VAR			
L321	#	3.16	4.01	-1.18	-.20	.95	20Q	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L285	#	3.26	4.16	-1.00	-.18	.46	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L213	Ø	3.37	4.68	-.53	.07	1.58	20T	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L212	Ø	3.52	4.71	-.41	-.02	.83	20R	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L242	Ø	3.54	4.80	-.34	.02	.97	20Y	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L233	Ø	3.56	4.76	-.35	-.02	1.03	20Q	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L259	Ø	3.56	4.93	-.22	.09	1.22	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L249	Ø	3.58	4.82	-.29	-.00	1.02	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L311	Ø	3.60	4.82	-.28	-.01	.99	20V	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L182L	Ø	3.62	4.90	-.20	.03	.82	20T	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L124P	Ø	3.65	5.09	-.04	.12	1.07	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L370	Ø	3.66	5.02	-.09	.07	.83	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L128	Ø	3.66	5.05	-.06	.09	.89	20T	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L148	Ø	3.66	4.94	-.14	.02	.79	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L218	Ø	3.68	4.99	-.10	.03	.86	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L599	Ø	3.68	4.89	-.17	-.03	1.12	20V	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L290	Ø	3.70	5.00	-.07	.02	.96	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L680	Ø	3.72	5.03	-.03	.03	1.08	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L376	Ø	3.72	4.90	-.13	-.06	1.10	20R	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L262	Ø	3.76	5.25	.16	.14	1.02	20R	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L191P	Ø	3.78	4.88	-.12	-.11	.65	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L626	Ø	3.79	4.92	-.08	-.10	.77	20T	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L162	*	3.84	4.79	-.14	-.22	.67	20*	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L275	Ø	3.88	5.18	.18	.00	1.08	20R	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L393	Ø	3.89	5.26	.24	.04	.94	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L241	Ø	3.89	5.13	.15	-.04	1.09	20R	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L585	Ø	3.89	5.22	.22	.02	1.18	20V	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L279P	Ø	3.90	5.15	.17	-.03	1.13	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L356	Ø	3.93	5.19	.22	-.03	1.19	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L189	Ø	3.93	5.44	.41	.13	1.02	20R	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L103	Ø	3.94	5.24	.27	-.01	.68	20R	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L330	Ø	3.97	5.20	.25	-.05	1.28	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L692	Ø	3.97	5.20	.25	-.06	1.05	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L121	Ø	4.01	5.19	.27	-.10	.80	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L556	Ø	4.10	5.50	.57	.04	1.00	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L108	Ø	4.10	5.33	.44	-.07	1.00	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L554	#	4.54	5.74	1.03	-.14	.90	20P	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
L158	#	345.86	471.06	576.89	37.47	56.24	20T	TENSILE STRENGTH,	PRIMARYLY PRINTING PAPERS,	PENDULUM TESTER
GMEANS:		3.77	5.04			1.00				
95% ELLIPSE:				.69	.19	WITH GAMMA = 50 DEGREES				

TENSILE STRENGTH, PENDULUM TYPE

SAMPLE J71 = 3.77 KILONEWTN/M SAMPLE K39 = 5.04 KILONEWTN/M
 SAMPLE J71 = 12.70 LB/15 MM SAMPLE K39 = 17.00 LB/15 MM



TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER
TAPPI STANDARD T494 GS-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	SAMPLE J01 98 GRAMS PER SQUARE METER					SAMPLE J16 149 GRAMS PER SQUARE METER					TEST D. = 20		
	MEAN	DEV	N. DEV	SDR	R. SDR	MEAN	DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L106	57.1	-17.4	-1.87	11.1	1.26	69.4	-49.4	-2.35	7.8	.67	25F	Ø	L106
L122	88.4	13.9	1.50	7.1	.81	142.3	23.5	1.12	8.3	.72	25P	Ø	L122
L126	74.3	-2	-0.02	12.9	1.46	125.8	7.0	.33	12.5	1.08	25G	Ø	L126
L151	68.6	-5.9	-0.63	10.5	1.19	119.1	.2	.01	8.3	.72	25F	Ø	L151
L182	76.5	2.0	.21	7.8	.88	118.4	-0.4	-0.02	9.6	.83	25B	Ø	L182
L234A	69.1	-5.4	-0.58	8.1	.92	121.9	3.1	.15	16.6	1.43	25H	Ø	L234A
L237B	73.8	-0.7	-0.07	6.1	.69	111.1	-7.7	-0.37	7.6	.65	25H	Ø	L237B
L243	78.3	3.8	.41	5.4	.61	121.1	2.3	.11	8.2	.71	25Z	Ø	L243
L250	72.4	-2.1	-0.23	6.6	.74	116.1	-2.7	-0.13	10.4	.90	25A	Ø	L250
L264	71.9	-2.6	-0.28	6.7	.76	116.1	-2.7	-0.13	12.3	1.06	25F	Ø	L264
L267	87.2	12.7	1.36	5.3	.60	135.2	16.4	.78	10.1	.87	25F	Ø	L267
L268	75.3	.8	.08	10.4	1.18	150.9	32.1	1.52	8.8	.76	25B	*	L268
L273	84.0	9.5	1.02	10.1	1.14	127.6	8.8	.42	18.0	1.56	25F	Ø	L273
L280	67.6	-6.9	-0.75	18.5	2.09	107.8	-11.0	-0.52	22.8	1.97	25B	Ø	L280
L312	91.9	17.4	1.87	5.8	.66	153.5	34.7	1.65	12.4	1.07	25J	Ø	L312
L580	71.0	-3.5	-0.38	9.4	1.06	100.7	-18.1	-0.86	11.3	.97	25C	Ø	L580
L604	58.1	-16.4	-1.76	10.3	1.17	81.8	-37.0	-1.76	13.8	1.19	25A	Ø	L604
L689	75.6	1.1	.12	8.5	.96	119.9	1.0	.05	7.1	.61	25F	Ø	L689

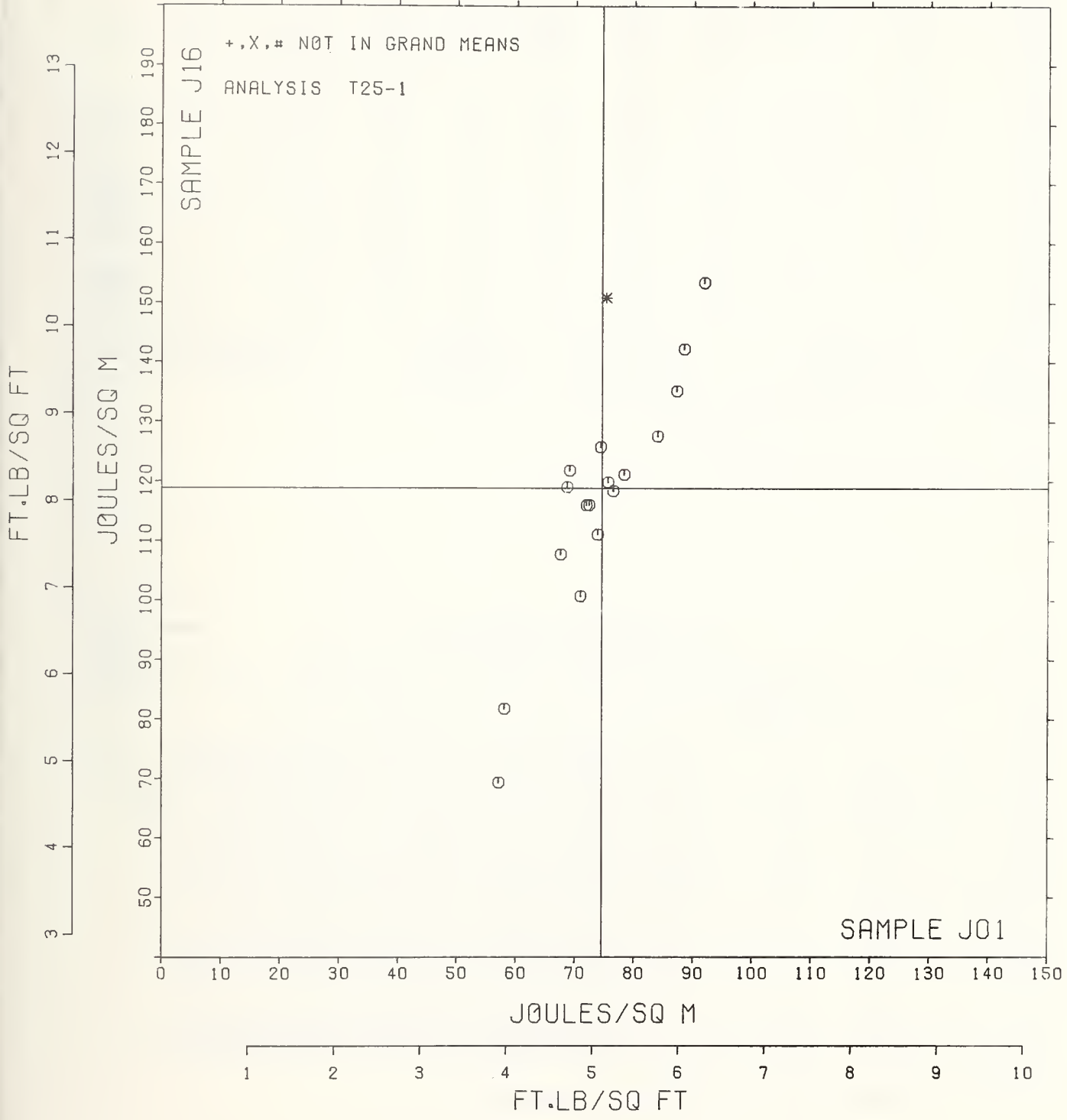
GR. MEAN = 74.5 JOULES/SQ M GRAND MEAN = 118.8 JOULES/SQ M TEST DETERMINATIONS = 20
SD MEANS = 9.3 JOULES/SC M SD OF MEANS = 21.1 JOULES/SQ M 18 LABS IN GRAND MEANS
AVERAGE SDR = 8.8 JOULES/SQ M AVERAGE SDR = 11.6 JOULES/SQ M
GR. MEAN = 5.104 FT.LB/SQ FT GRAND MEAN = 8.138 FT.LB/SQ FT
TOTAL NUMBER OF LABORATORIES REPORTING = 18
Best values: J01 75 ± 16 joules per square meter
J16 119 ± 37 joules per square meter

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER
TAPPI STANDARD T494 GS-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	F	MEANS		COORDINATES		AVG R. SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J01	J16	MAJOR	MINOR					
L106	Ø	57.1	69.4	-52.4	-2.1	.97	25F	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/FLAT JAWS		
L604	Ø	58.1	81.8	-40.5	1.6	1.18	25A	TENSILE ENERGY ABS., PACKAGING PAPER, FLAT/FLAT JAWS		
L280	Ø	67.6	107.8	-12.8	2.4	2.03	25B	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/FLAT JAWS		
L151	Ø	68.6	119.1	-1.9	5.5	.95	25F	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/FLAT JAWS		
L234A	Ø	69.1	121.9	.9	6.2	1.17	25H	TENSILE ENERGY ABS., PACKAGING PAPER, 2-PIN STRAIN GAGE		
L580	Ø	71.0	100.7	-18.1	-3.4	1.02	25C	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/LINE JAWS		
L264	Ø	71.9	116.1	-3.5	1.4	.91	25F	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/FLAT JAWS		
L250	Ø	72.4	116.1	-3.3	.9	.82	25A	TENSILE ENERGY ABS., PACKAGING PAPER, FLAT/FLAT JAWS		
L237B	Ø	73.8	111.1	-7.4	-2.2	.67	25H	TENSILE ENERGY ABS., PACKAGING PAPER, 2-PIN STRAIN GAGE		
L126	Ø	74.3	125.8	6.4	2.7	1.27	25G	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/LINE JAWS		
L268	*	75.3	150.9	30.1	11.1	.97	25B	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/FLAT JAWS		
L689	Ø	75.6	119.9	1.4	-0.6	.78	25F	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/FLAT JAWS		
L182	Ø	76.5	118.4	.3	-2.0	.85	25B	TENSILE ENERGY ABS., PACKAGING PAPER, FLAT/FLAT JAWS		
L243	Ø	78.3	121.1	3.6	-2.7	.66	25Z	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/LINE JAWS		
L273	Ø	84.0	127.6	11.7	-5.5	1.35	25F	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/FLAT JAWS		
L267	Ø	87.2	135.2	20.0	-5.7	.74	25F	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/FLAT JAWS		
L122	Ø	88.4	142.3	27.0	-4.3	.76	25P	TENSILE ENERGY ABS., PACKAGING PAPER, PATTERNED FLAT JAWS		
L312	Ø	91.9	153.5	38.6	-3.3	.87	25J	TENSILE ENERGY ABS., PACKAGING PAPER, LINE/FLAT JAWS		
GMEANS:		74.5	118.8			1.00				
95% ELLIPSE:				62.8	12.4			WITH GAMMA = 68 DEGREES		

T.E.A., PACKAGING PAPERS

SAMPLE J01 = 75. JOULES/SQ M SAMPLE J16 = 119. JOULES/SQ M
 SAMPLE J01 = 5.1 FT.LB/SQ FT SAMPLE J16 = 8.1 FT.LB/SQ FT



TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER
TAPPI STANDARD T494 GS-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

Table with columns: LAB CODE, SAMPLE J71 MEAN, 76 GRAMS PER SQUARE METER (DEV, N.DEV, SDR, R.SDR), SAMPLE K39 MEAN, 75 GRAMS PER SQUARE METER (DEV, N.DEV, SDR, R.SDR), TEST D. # 20 (VAR, F, LAB). Rows include samples L100 through L592.

GR. MEAN = 40.4 JOULES/SQ M GRAND MEAN = 54.4 JOULES/SQ M TEST DETERMINATIONS = 20
SD MEANS = 4.0 JOULES/SC M SD OF MEANS = 5.5 JOULES/SQ M 17 LABS IN GRAND MEANS
AVERAGE SDR = 4.4 JOULES/SQ M AVERAGE SDR = 5.8 JOULES/SQ M
GR. MEAN = 2.767 FT.LB/SQ FT GRAND MEAN = 3.729 FT.LB/SQ FT
TOTAL NUMBER OF LABORATORIES REPORTING = 19
Best values: J71 41 ± 6 joules per square meter
K39 54 ± 9 joules per square meter

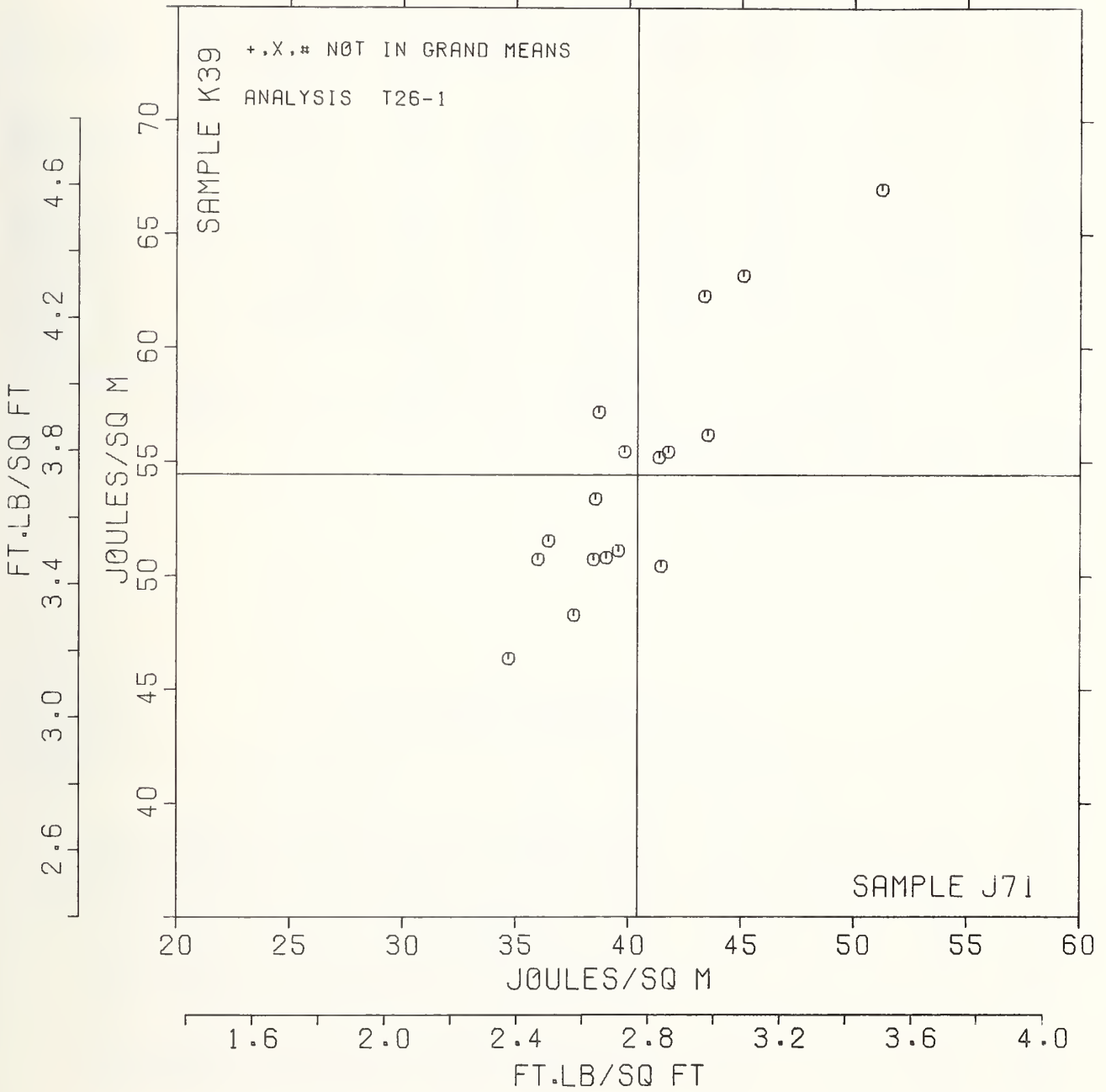
Data from the following laboratories appear to be off by a multiplicative factor: 211, 356.

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER
TAPPI STANDARD T494 GS-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

Table with columns: LAB CODE, MEANS (J71, K39), COORDINATES (MAJOR, MINOR), AVG R.SDR, VAR, PROPERTY---TEST INSTRUMENT---CONDITIONS. Rows include samples L356 through L211 and GMEANS summary.

T.E.A., PRINTING PAPERS

SAMPLE J71 = 40. JØULES/SQ M SAMPLE K39 = 54. JØULES/SQ M
 SAMPLE J71 = 2.77 FT.LB/SQ FT SAMPLE K39 = 3.73 FT.LB/SQ FT



ELONGATION TO BREAK, PERCENT - PACKAGING PAPER
TAPPI STANDARD T494 0S-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	SAMPLE J01 MEAN	PRINTING 98 GEAMS PER SQUARE METER				R ₀ SDR	SAMPLE J16 MEAN	PRINTING 149 GRAMS PER SQUARE METER				TEST D ₀ = 20		
		98 DEV	N ₀ DEV	SDR	R ₀ SDR			149 DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L100	2.095	-0.021	-0.16	.094	.54	2.005	-0.151	-0.63	.069	.53	28A	0	L100	
06	1.930	-0.186	-1.45	.313	1.80	1.610	-0.546	-2.27	.121	.94	28B	0	L106	
L122	2.335	.219	1.70	.129	.74	2.464	.308	1.28	.087	.68	28P	0	L122	
L126	1.946	-0.170	-1.32	.212	1.22	2.096	-0.060	-0.25	.136	1.06	28C	0	L126	
L151	1.560	-0.156	-1.22	.221	1.27	2.120	-0.036	-0.15	.228	1.78	28B	0	L151	
L182	2.075	-0.041	-0.32	.133	.77	2.110	-0.046	-0.19	.091	.71	28B	0	L182	
L243	2.090	-0.026	-0.20	.110	.64	2.118	-0.038	-0.16	.088	.69	28C	0	L243	
L264	2.220	.104	.81	.242	1.39	2.100	-0.056	-0.23	.169	1.31	28B	0	L264	
L265	2.197	.081	.63	.118	.68	2.209	.053	.22	.083	.64	28A	0	L265	
L267	2.269	.153	1.19	.086	.50	2.271	.115	.48	.099	.77	28B	0	L267	
L268	2.045	-0.071	-0.55	.206	1.19	2.500	.344	1.43	.145	1.13	28B	0	L268	
L280	2.089	-0.027	-0.21	.306	1.77	2.099	-0.057	-0.24	.273	2.13	28B	0	L280	
L312	2.290	.174	1.35	.107	.62	2.610	.454	1.89	.148	1.15	28B	0	L312	
L324	2.005	-0.111	-0.87	.136	.78	2.110	-0.046	-0.19	.107	.83	28P	0	L324	
L336	2.292	.176	1.37	.219	1.26	2.332	.176	.73	.117	.91	28A	0	L336	
L580	2.055	-0.061	-0.48	.196	1.13	1.820	-0.336	-1.40	.132	1.03	28C	0	L580	
L581	2.069	-0.047	-0.37	.160	.92	NO DATA REPORTED FOR SAMPLE J16				28A	M	L581		
L689	2.080	-0.036	-0.28	.120	.69	2.080	-0.076	-0.32	.089	.70	28B	0	L689	

GR. MEAN = 2.116 PERCENT GRAND MEAN = 2.156 PERCENT TEST DETERMINATIONS = 20
SD MEANS = .128 PERCENT SD OF MEANS = .240 PERCENT 17 LABS IN GRAND MEANS
AVERAGE SDR = .173 PERCENT AVERAGE SDR = .128 PERCENT

L153 2.650 .534 4.16 .185 1.07 2.615 .459 1.91 .150 1.17 28Q 0 L153
TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: J01 2.12 ± 0.18 percent
J16 2.16 ± 0.35 percent

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER
TAPPI STANDARD T494 0S-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

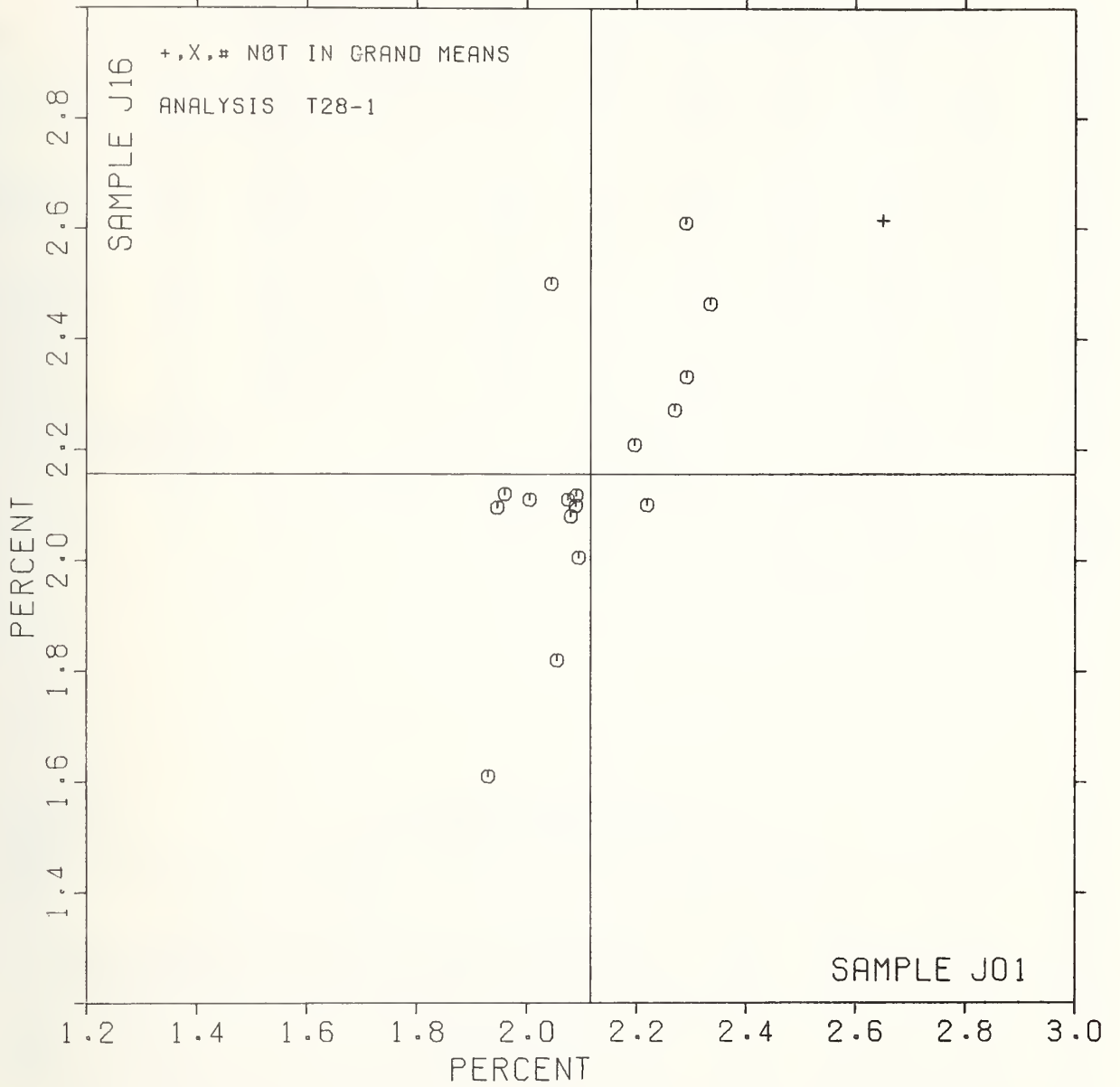
LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		J01	J16	MAJ05	MIN08	R ₀ SDR	VAR	
L106	0	1.930	1.610	-0.576	-0.034	1.37	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L126	0	1.946	2.096	-0.120	.134	1.14	28C	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/LINE JAWS
L151	0	1.560	2.120	-0.092	.131	1.53	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L324	0	2.005	2.110	-0.085	.085	.81	28P	ELONGATION, PACKAGING PAPER, LOAD CELL, PATTERNED FLAT JAWS
L268	0	2.045	2.500	.292	.156	1.16	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L580	0	2.055	1.820	-0.334	-0.070	1.08	28C	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/LINE JAWS
L581	M	2.069				.92	28A	ELONGATION, PACKAGING PAPER, LOAD CELL, FLAT/FLAT JAWS
L182	0	2.075	2.110	-0.058	.021	.74	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L689	0	2.080	2.080	-0.084	.005	.69	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L280	0	2.089	2.099	-0.063	.004	1.95	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L243	0	2.090	2.118	-0.045	.010	.66	28C	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/LINE JAWS
L100	0	2.095	2.005	-0.148	-0.038	.54	28A	ELONGATION, PACKAGING PAPER, LOAD CELL, FLAT/FLAT JAWS
L265	0	2.197	2.209	.079	-0.055	.66	28A	ELONGATION, PACKAGING PAPER, LOAD CELL, FLAT/FLAT JAWS
L264	0	2.220	2.100	-0.013	-0.117	1.35	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L267	0	2.269	2.271	.165	-0.098	.64	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L312	0	2.290	2.610	.486	.010	1.09	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L336	0	2.292	2.332	.229	-0.056	.89	28A	ELONGATION, PACKAGING PAPER, LOAD CELL, FLAT/FLAT JAWS
L122	0	2.335	2.464	.368	-0.086	.71	28P	ELONGATION, PACKAGING PAPER, LOAD CELL, PATTERNED FLAT JAWS
L153	*	2.650	2.615	.626	-0.321	1.12	28Q	ELONGATION, PACKAGING PAPER, PENDULUM, PATTERNED FLAT JAWS

GMEANS: 2.116 2.156 1.00
95% ELLIPSE: .720 .255 WITH GAMMA = 67 DEGREES

ELONGATION TO BREAK, PACKAGING PAPER

SAMPLE J01 = 2.12 PERCENT

SAMPLE J16 = 2.16 PERCENT



ANALYSIS T29-1 TABLE 1
ELONGATION TO BREAK, PERCENT - PRINTING PAPER

TAPPI STANDARD T494 GS-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	SAMPLE J71 MEAN	PRINTING 76 GRAMS PER SQUARE METER				SAMPLE K39 MEAN	PRINTING 75 GRAMS PER SQUARE METER				TEST D. = 20		
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L100	1.640	.027	.15	.082	.59	1.630	-.080	-.49	.057	.44	29A	Ø	L100
	1.312	-.300	-1.67	.197	1.41	1.475	-.235	-1.44	.180	1.39	29A	Ø	L105
L118	1.687	.075	.42	.098	.71	1.731	.021	.13	.125	.96	29A	Ø	L118
L122	1.780	.167	.93	.120	.86	1.873	.174	1.07	.143	1.10	29P	Ø	L122
L141T	1.566	-.046	-.26	.142	1.02	1.9	-.031	-.19	.165	1.27	29D	Ø	L141T
L185	1.504	-.108	-.60	.157	1.13	1.643	-.067	-.41	.160	1.24	29C	Ø	L185
L190R	1.680	.067	.37	.090	.65	1.773	.063	.39	.154	1.19	29A	Ø	L190R
L255	1.564	-.045	-.27	.136	.98	1.689	-.020	-.12	.129	.99	29P	Ø	L255
L278	1.213	-.399	-2.22	.130	.93	1.390	-.320	-1.97	.107	.83	29A	Ø	L278
L309	1.840	.227	1.26	.114	.82	1.895	.185	1.14	.141	1.09	29A	Ø	L309
L344	1.612	-.000	-.00	.157	1.13	1.669	-.041	-.25	.164	1.26	29A	Ø	L344
L356	1.735	.122	.68	.121	.87	1.895	.186	1.15	.128	.99	29A	Ø	L356
L442	1.951	.338	1.88	.095	.68	1.993	.284	1.74	.060	.47	29B	Ø	L442
L567	1.684	.072	.40	.236	1.70	1.866	.156	.96	.125	.96	29A	Ø	L567
L575	1.642	.025	.16	.166	1.20	1.658	-.052	-.32	.117	.90	29A	Ø	L575
L587	1.475	-.138	-.77	.137	.99	1.685	-.025	-.15	.109	.84	29C	Ø	L587
L592	1.529	-.083	-.46	.184	1.33	1.509	-.201	-1.23	.141	1.08	29D	Ø	L592

GR. MEAN = 1.613 PERCENT
SD MEANS = .180 PERCENT

GRAND MEAN = 1.710 PERCENT
SD OF MEANS = .163 PERCENT

TEST DETERMINATIONS = 20
17 LABS IN GRAND MEANS

AVERAGE SDR = .139 PERCENT

AVERAGE SDR = .130 PERCENT

L242	2.080	.467	2.60	.154	1.11	1.905	.195	1.20	.110	.85	29R	*	L242
L626	1.665	.052	.29	.127	.91	1.775	.065	.40	.107	.83	29R	*	L626

TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: J71 1.67 ± 0.31 percent
K39 1.70 ± 0.28 percent

ANALYSIS T29-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

TAPPI STANDARD T494 GS-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

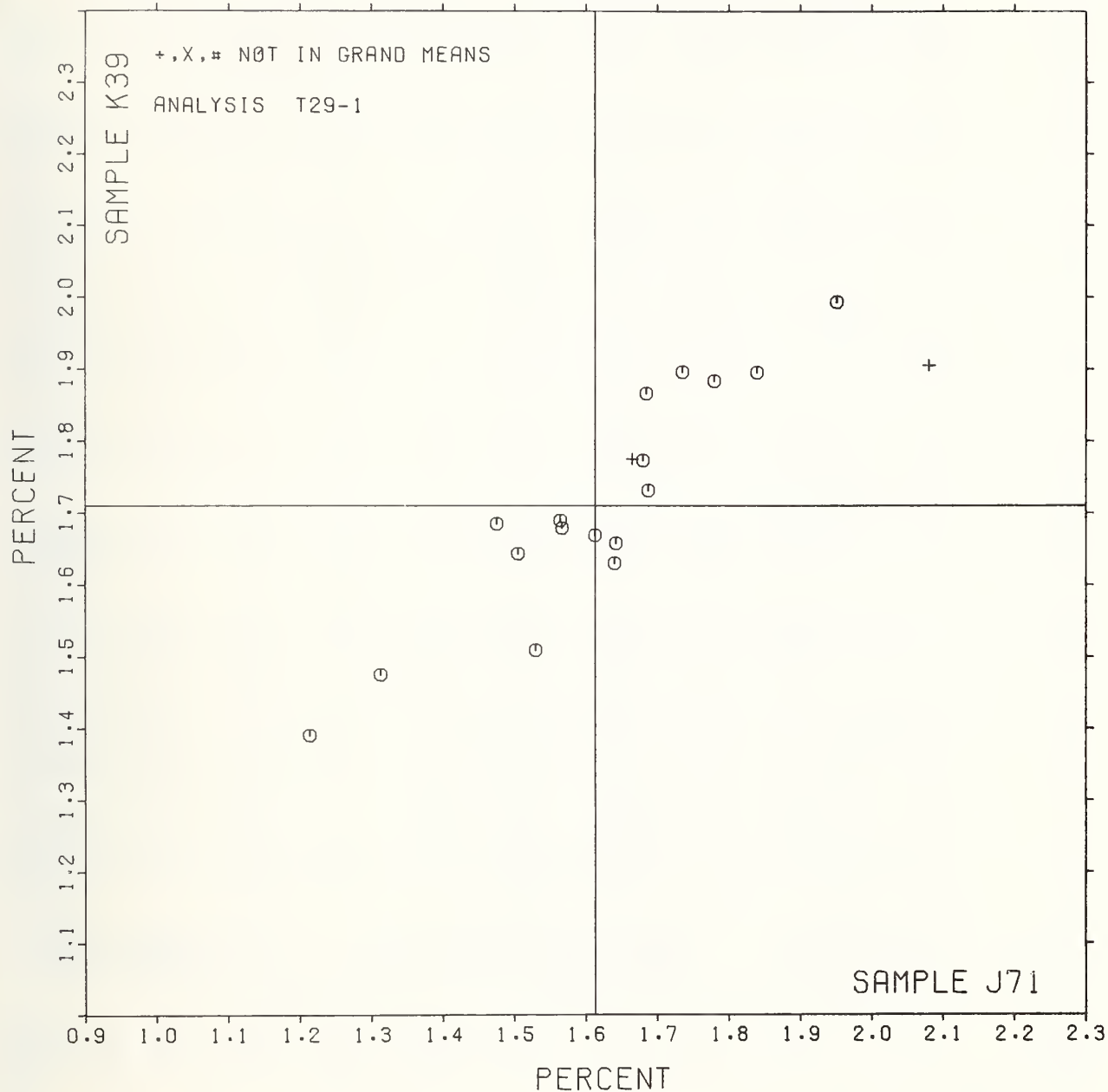
LAB CODE	F	MEANS		COORDINATES		AVG R. SDR	VAR	PROPERTY	TEST INSTRUMENT	CONDITIONS
		J71	K39	MAJOR	MINOR					
L278	Ø	1.213	1.390	-.511	.029	.88	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/FLAT JAWS	
L105	Ø	1.312	1.475	-.380	.026	1.40	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/FLAT JAWS	
L587	Ø	1.475	1.685	-.119	.074	.91	29C	ELONGATION, PRINTING	PAPERS, LOAD CELL, LINE/LINE JAWS	
L185	Ø	1.504	1.643	-.125	.023	1.18	29C	ELONGATION, PRINTING	PAPERS, LOAD CELL, LINE/LINE JAWS	
L592	Ø	1.529	1.509	-.196	-.094	1.21	29D	ELONGATION, PRINTING	PAPERS, LOAD CELL, 2-PIN STRAIN GAGE	
L255	Ø	1.564	1.689	-.050	.018	.99	29P	ELONGATION, PRINTING	PAPERS, LOAD CELL, PATTERNED FLAT JAWS	
L141T	Ø	1.566	1.679	-.055	.008	1.15	29D	ELONGATION, PRINTING	PAPERS, LOAD CELL, 2-PIN STRAIN GAGE	
L344	Ø	1.612	1.669	-.028	-.030	1.19	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/FLAT JAWS	
L100	Ø	1.640	1.630	-.033	-.077	.52	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/FLAT JAWS	
L575	Ø	1.642	1.658	-.013	-.058	1.05	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/FLAT JAWS	
L626	*	1.665	1.775	.082	.014	.87	29R	ELONGATION, PRINTING	PAPERS, PENDULUM, FLAT/FLAT JAWS	
L190R	Ø	1.680	1.773	.052	.002	.92	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/FLAT JAWS	
L567	Ø	1.684	1.866	.158	.068	1.33	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/FLAT JAWS	
L118	Ø	1.687	1.731	.070	-.034	.83	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/FLAT JAWS	
L356	Ø	1.735	1.896	.215	.057	.93	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/FLAT JAWS	
L122	Ø	1.780	1.883	.240	.018	.98	29P	ELONGATION, PRINTING	PAPERS, LOAD CELL, PATTERNED FLAT JAWS	
L309	Ø	1.840	1.895	.253	-.014	.95	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/FLAT JAWS	
L442	Ø	1.951	1.993	.441	-.015	.57	29B	ELONGATION, PRINTING	PAPERS, LOAD CELL, LINE/FLAT JAWS	
L242	*	2.080	1.905	.478	-.167	.58	29R	ELONGATION, PRINTING	PAPERS, PENDULUM, FLAT/FLAT JAWS	

GMEANS: 1.613 1.710 1.00
95% ELLIPSE: .666 .134 WITH GAMMA = 41 DEGREES

ELONGATION TO BREAK, PRINTING PAPER

SAMPLE J71 = 1.61 PERCENT

SAMPLE K39 = 1.71 PERCENT



TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T30-1 TABLE 1
FOLDING ENDURANCE (MIT), DOUBLE FOLDS
TAPPI STANDARD T511 SU-69

LAB CODE	SAMPLE B69 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER				SAMPLE B88 MEAN	HEAT SET OFFSET B68K 88 GRAMS PER SQUARE METER				TEST D. = 15			
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB	
L100M	75.	-106.	-1.35	19.	.32	42.	-5.	-0.30	12.	.69	30M	Ø	L100M	
L100N	85.	-96.	-1.22	19.	.32	42.	-5.	-0.31	17.	.92	30N	Ø	L100N	
L105	157.	-24.	-0.30	42.	.72	40.	-7.	-0.40	20.	1.11	30M	Ø	L105	
L118	201.	20.	.26	51.	.87	47.	0.	.01	19.	1.06	30D	Ø	L118	
L121	213.	32.	.41	41.	.70	5.	18.	1.10	22.	1.21	30M	Ø	L121	
L122	246.	66.	.83	122.	2.08	74.	27.	1.61	25.	1.37	30M	Ø	L122	
L124	248.	67.	.85	108.	1.84	68.	21.	1.24	33.	1.83	30N	Ø	L124	
L150	232.	51.	.65	76.	1.29	42.	-5.	-0.31	18.	1.00	30M	Ø	L150	
L158	64.	-117.	-1.49	42.	.72	19.	-28.	-1.70	12.	.66	30N	Ø	L158	
L159	237.	56.	.72	65.	1.11	48.	1.	.08	19.	1.03	30N	Ø	L159	
L162	153.	-28.	-0.35	49.	.83	39.	-8.	-0.50	18.	1.02	30M	Ø	L162	
L163	144.	-37.	-0.47	73.	1.25	38.	-9.	-0.56	18.	1.02	30N	Ø	L163	
L182M	350.	169.	2.15	96.	1.64	72.	25.	1.48	30.	1.67	30M	Ø	L182M	
L185	256.	75.	.95	70.	1.19	59.	12.	.72	26.	1.42	30N	Ø	L185	
L190C	283.	102.	1.29	85.	1.45	45.	-3.	-0.15	15.	.82	30N	Ø	L190C	
L212	271.	90.	1.14	88.	1.50	56.	9.	.53	22.	1.20	30M	Ø	L212	
L223F	291.	111.	1.40	64.	1.09	62.	15.	.88	16.	.91	30M	Ø	L223F	
L230	171.	-10.	-0.12	52.	.88	41.	-6.	-0.34	18.	1.01	30N	Ø	L230	
L232	306.	125.	1.58	96.	1.65	119.	72.	4.31	34.	1.90	30N	X	L232	
L236	118.	-63.	-0.80	41.	.70	34.	-13.	-0.76	9.	.49	30N	Ø	L236	
L238A	167.	-14.	-0.18	61.	1.05	37.	-10.	-0.58	21.	1.15	30N	Ø	L238A	
L238B	180.	-0.	-0.01	44.	.75	37.	-10.	-0.58	20.	1.12	30D	Ø	L238B	
L243	330.	149.	1.90	101.	1.72	59.	12.	.69	23.	1.28	30D	Ø	L243	
L254	87.	-64.	-1.19	73.	1.24	24.	-23.	-1.38	5.	.51	30M	Ø	L254	
L262	165.	-15.	-0.19	36.	.62	47.	0.	.02	21.	1.15	30N	Ø	L262	
L275	179.	-2.	-0.02	33.	.56	51.	4.	.22	21.	1.18	30N	Ø	L275	
L278	96.	-85.	-1.08	46.	.78	15.	-32.	-1.92	5.	.27	30C	Ø	L278	
L279	226.	45.	.58	65.	1.10	45.	-2.	-0.11	17.	.96	30N	Ø	L279	
L285A	146.	-35.	-0.45	53.	.91	53.	6.	.37	20.	1.12	30N	Ø	L285A	
L285B	179.	-1.	-0.02	47.	.80	55.	7.	.45	21.	1.18	30N	Ø	L285B	
L299	68.	-112.	-1.43	29.	.49	25.	-22.	-1.34	11.	.64	30N	Ø	L299	
L320	89.	-91.	-1.16	38.	.65	24.	-24.	-1.40	9.	.48	30N	Ø	L320	
L321	356.	175.	2.22	109.	1.86	94.	47.	2.78	22.	1.23	30M	*	L321	
L326N	57.	-123.	-1.57	18.	.31	30.	-17.	-1.00	14.	.80	30N	Ø	L326N	
L339	65.	-116.	-1.47	15.	.26	18.	-29.	-1.71	5.	.28	30N	Ø	L339	
L376	117.	-63.	-0.81	44.	.75	34.	-13.	-0.78	13.	.72	30N	Ø	L376	
L388	194.	13.	.17	53.	.60	60.	12.	.74	23.	1.25	30N	Ø	L388	
L390	149.	-32.	-0.41	67.	1.14	48.	1.	.08	19.	1.04	30N	Ø	L390	
L393	114.	-67.	-0.85	32.	.54	28.	-19.	-1.13	14.	.80	30M	Ø	L393	
L396M	234.	53.	.67	87.	1.49	63.	16.	.97	19.	1.08	30N	Ø	L396M	
L565	255.	75.	.95	119.	2.04	61.	14.	.81	19.	1.04	30N	Ø	L565	
L567	125.	-56.	-0.71	52.	.90	64.	17.	1.03	26.	1.45	30N	*	L567	
L589	192.	11.	.14	50.	.85	43.	-4.	-0.26	18.	.98	30N	Ø	L589	
L599	211.	30.	.39	116.	1.98	64.	17.	1.03	24.	1.33	30C	Ø	L599	
L622	520.	339.	4.31	309.	5.28	177.	130.	7.73	133.	7.39	30M	X	L622	
L670	178.	-2.	-0.03	32.	.55	59.	12.	.71	21.	1.19	30N	Ø	L670	
GR. MEAN *	181.	DOUBLE FOLDS				GRAND MEAN *	47.	DOUBLE FOLDS				TEST DETERMINATIONS * 15		
SD MEANS *	79.	DOUBLE FOLDS				SD OF MEANS *	17.	DOUBLE FOLDS				44 LABS IN GRAND MEANS		
		AVERAGE SDR *						AVERAGE SDR *				18. DOUBLE FOLDS		
L182S	179.	-2.	-0.02	45.	.77	43.	-4.	-0.24	17.	.92	30S	*	L182S	
L190D	133.	-47.	-0.60	42.	.71	41.	-6.	-0.35	18.	.98	30S	*	L190D	
L280	77.	-103.	-1.31	29.	.50	24.	-23.	-1.38	10.	.55	30K	*	L280	
L326S	32.	-149.	-1.89	12.	.21	27.	-20.	-1.21	11.	.60	30S	*	L326S	
L396S	181.	0.	.00	43.	.74	61.	14.	.81	24.	1.33	30T	*	L396S	

TOTAL NUMBER OF LABORATORIES REPORTING = 51

Best values: B69 200 double folds
B88 50 double folds

The ISO (International Standards Organization) is proposing that MIT folding endurance be reported as the logarithm (to the base 10) of the double fold instead of the double fold as in the past.

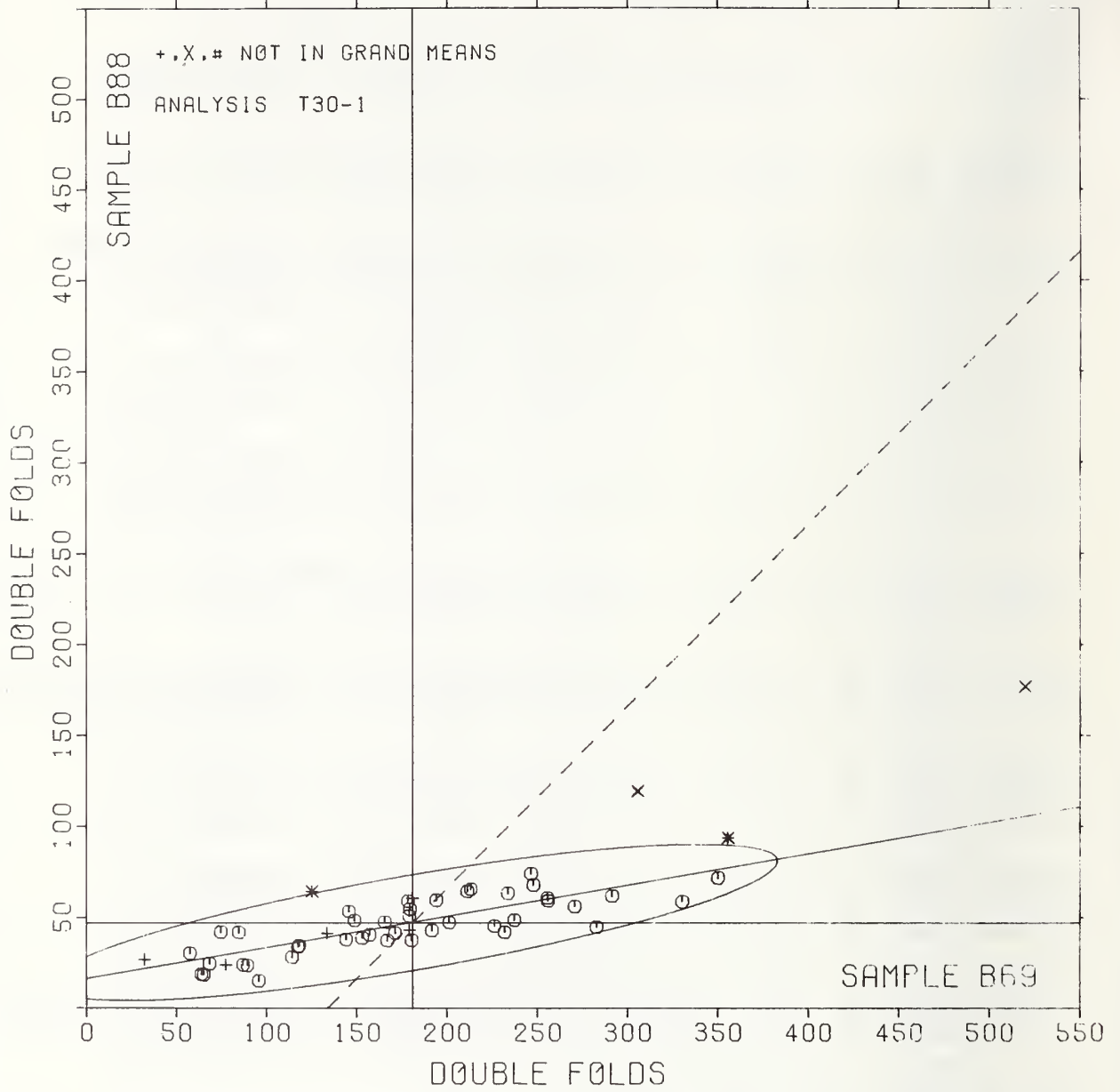
Please see page 43 of this report for a demonstration of this proposal.

TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T30-1 TABLE 2
 FOLDING ENDURANCE (MIT), DOUBLE FOLDS
 TAPPI STANDARD T511 SU-69

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST	INSTRUMENT---	CONDITIONS
		B69	B88	MAJOR	MINOR	R.SDR	VAR			
L326S	*	32.	27.	-150.	5.	.41	30S	FOLDING ENDURANCE,	SCHÖPPER,	LEIPZIG
L326N	Ø	57.	30.	-124.	4.	.56	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L158	Ø	64.	19.	-120.	-8.	.69	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L339	Ø	65.	18.	-119.	-9.	.27	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L299	Ø	68.	25.	-115.	-3.	.56	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L100M	Ø	75.	42.	-106.	13.	.50	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L280	*	77.	24.	-106.	-5.	.52	30K	FOLDING ENDURANCE,	KÖHLER-MÖLIN	
L100N	Ø	85.	42.	-96.	11.	.62	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L254	Ø	87.	24.	-96.	-7.	.88	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L320	Ø	89.	24.	-94.	-8.	.57	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L278	Ø	96.	15.	-89.	-17.	.53	30C	FOLDING ENDURANCE,	MIT,	CIRCULATING FAN IN CEILING
L393	Ø	114.	28.	-69.	-7.	.67	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L376	Ø	117.	34.	-65.	-2.	.73	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L236	Ø	118.	34.	-64.	-2.	.60	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L567	*	125.	64.	-52.	26.	1.17	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L190D	*	133.	41.	-48.	2.	.85	30S	FOLDING ENDURANCE,	SCHÖPPER,	LEIPZIG
L163	Ø	144.	38.	-38.	-3.	1.14	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L285A	Ø	146.	53.	-34.	12.	1.02	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L390	Ø	149.	48.	-31.	7.	1.09	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L162	Ø	153.	39.	-29.	-4.	.93	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L105	Ø	157.	40.	-24.	-3.	.92	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L262	Ø	165.	47.	-15.	3.	.88	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L238A	Ø	167.	37.	-15.	-7.	1.10	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L230	Ø	171.	41.	-11.	-4.	.95	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L670	Ø	176.	59.	-9.	12.	.87	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L275	Ø	179.	51.	-1.	4.	.87	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L182S	*	179.	43.	-2.	-4.	.85	30S	FOLDING ENDURANCE,	SCHÖPPER,	LEIPZIG
L285B	Ø	179.	55.	-0.	8.	.99	30M	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L238B	Ø	180.	37.	-2.	-10.	.94	30D	FOLDING ENDURANCE,	MIT,	MODIFIED DRIVE TO REDUCE HEATING
L396S	*	181.	61.	2.	13.	1.04	30T	FOLDING ENDURANCE,	SCHÖPPER,	TMI
L589	Ø	192.	43.	10.	-6.	.91	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L388	Ø	194.	60.	15.	10.	1.07	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L118	Ø	201.	47.	20.	-3.	.96	30D	FOLDING ENDURANCE,	MIT,	MODIFIED DRIVE TO REDUCE HEATING
L599	Ø	211.	64.	33.	12.	1.65	30C	FOLDING ENDURANCE,	MIT,	CIRCULATING FAN IN CEILING
L121	Ø	213.	65.	35.	13.	.96	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L279	Ø	226.	45.	44.	-10.	1.03	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L150	Ø	232.	42.	49.	-14.	1.15	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L396M	Ø	234.	63.	55.	7.	1.29	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L159	Ø	237.	48.	56.	-8.	1.07	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L122	Ø	246.	74.	69.	15.	1.73	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L124	Ø	248.	68.	69.	9.	1.83	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L565	Ø	255.	61.	76.	1.	1.54	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L185	Ø	256.	59.	76.	-1.	1.31	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L212	Ø	271.	56.	90.	-6.	1.35	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L190C	Ø	283.	45.	100.	-20.	1.13	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L223F	Ø	291.	62.	111.	-4.	1.00	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L232	X	306.	119.	135.	50.	1.78	30N	FOLDING ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L243	Ø	330.	59.	149.	-14.	1.50	30D	FOLDING ENDURANCE,	MIT,	MODIFIED DRIVE TO REDUCE HEATING
L182M	Ø	350.	72.	171.	-4.	1.66	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L321	*	356.	94.	180.	16.	1.54	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L622	X	520.	177.	356.	70.	6.33	30M	FOLDING ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
GMEANS:		181.	47.			1.00				
		95% ELLIPSE:		205.	26.	WITH GAMMA = 9 DEGREES				

FOLDING ENDURANCE (MIT)

SAMPLE B69 = 181. DOUBLE FOLDS SAMPLe B88 = 47. DOUBLE FOLDS



ANALYSIS T30-2 TABLE 1

FOLDING ENDURANCE (MIT)

DATA IS LOG(BASE 10) OF THE DOUBLE FOLD MEASUREMENT

LAB CODE	SAMPLE B69 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER				SAMPLE B88 MEAN	HEAT SET OFFSET BOOK 88 GRAMS PER SQUARE METER				TEST D. # 15		
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L100M	1.86	-.34	-1.46	.10	.61	1.60	-.02	-.12	.14	.72	30M	Ø	L100M
L100N	1.92	-.28	-1.22	.10	.60	1.59	-.03	-.17	.16	.84	30N	Ø	L100N
L105	2.18	-.01	-.06	.12	.70	1.56	-.07	-.36	.22	1.17	30M	Ø	L105
L118	2.29	.09	.41	.11	.64	1.64	.01	.07	.17	.92	30D	Ø	L118
L121	2.32	.12	.53	.10	.59	1.80	.17	.83	.13	.71	30M	Ø	L121
L122	2.32	.13	.56	.28	1.66	1.84	.22	1.07	.16	.84	30M	Ø	L122
L124	2.35	.15	.65	.23	1.36	1.77	.14	.71	.25	1.35	30N	Ø	L124
L150	2.35	.15	.65	.13	.79	1.59	-.04	-.20	.18	.93	30M	Ø	L150
L158	1.72	-.48	-2.09	.29	1.74	1.20	-.43	-2.12	.25	1.31	30N	Ø	L158
L159	2.36	.16	.71	.12	.73	1.66	.03	.15	.16	.83	30N	Ø	L159
L162	2.16	-.04	-.15	.15	.93	1.53	-.10	-.49	.25	1.35	30M	Ø	L162
L163	2.11	-.09	-.38	.21	1.26	1.54	-.09	-.44	.18	.94	30N	Ø	L163
L182M	2.53	.33	1.44	.13	.78	1.82	.20	.97	.17	.90	30M	Ø	L182M
L185	2.39	.19	.85	.13	.79	1.73	.11	.52	.19	1.02	30N	Ø	L185
L190C	2.43	.23	1.02	.14	.85	1.62	-.01	-.03	.17	.91	30N	Ø	L190C
L212	2.41	.21	.92	.16	.94	1.72	.09	.44	.17	.92	30M	Ø	L212
L223F	2.45	.26	1.12	.10	.62	1.78	.15	.73	.12	.64	30M	Ø	L223F
L230	2.22	.02	.08	.13	.78	1.58	-.05	-.25	.19	1.02	30N	Ø	L230
L232	2.46	.26	1.15	.16	.97	2.06	.43	2.13	.13	.71	30N	Ø	L232
L236	2.05	-.15	-.64	.14	.86	1.52	-.11	-.53	.12	.64	30N	Ø	L236
L238A	2.18	-.02	-.07	.23	1.37	1.50	-.13	-.64	.27	1.43	30N	Ø	L238A
L236B	2.24	.05	.20	.12	.71	1.51	-.11	-.57	.24	1.26	30D	Ø	L238B
L243	2.50	.30	1.32	.13	.81	1.73	.11	.52	.19	1.00	30D	Ø	L243
L254	1.81	-.39	-1.68	.35	2.10	1.35	-.28	-1.39	.17	.92	30M	Ø	L254
L262	2.21	.01	.05	.10	.62	1.63	.01	.03	.21	1.10	30N	Ø	L262
L275	2.25	.05	.22	.08	.48	1.67	.04	.20	.19	1.01	30N	Ø	L275
L278	1.93	-.27	-1.16	.23	1.36	1.15	-.48	-2.37	.15	.77	30C	*	L278
L279	2.34	.14	.60	.14	.84	1.63	-.00	-.00	.16	.85	30N	Ø	L279
L285A	2.13	-.07	-.29	.19	1.11	1.70	.07	.35	.16	.85	30N	Ø	L285A
L285B	2.23	.03	.15	.17	1.03	1.69	.06	.32	.23	1.20	30N	Ø	L285B
L299	1.78	-.42	-1.82	.25	1.52	1.35	-.28	-1.40	.21	1.12	30N	Ø	L299
L320	1.89	-.30	-1.32	.26	1.53	1.34	-.28	-1.40	.16	.85	30N	Ø	L320
L321	2.53	.34	1.46	.13	.79	1.96	.33	1.65	.11	.56	30M	Ø	L321
L326N	1.74	-.46	-2.00	.14	.84	1.41	-.21	-1.06	.27	1.46	30N	Ø	L326N
L339	1.80	-.40	-1.73	.11	.67	1.24	-.38	-1.90	.14	.73	30N	Ø	L339
L376	2.03	-.16	-.72	.20	1.22	1.50	-.13	-.64	.18	.95	30N	Ø	L376
L388	2.27	.08	.33	.12	.73	1.74	.11	.55	.19	1.03	30N	Ø	L388
L390	2.13	-.07	-.29	.20	1.20	1.65	.03	.13	.17	.91	30N	Ø	L390
L393	2.04	-.16	-.69	.13	.80	1.40	-.23	-1.12	.21	1.12	30M	Ø	L393
L396M	2.34	.14	.62	.17	1.04	1.78	.15	.75	.15	.78	30N	Ø	L396M
L565	2.35	.15	.66	.25	1.51	1.75	.12	.61	.19	1.03	30N	Ø	L565
L567	2.04	-.16	-.68	.27	1.63	1.80	.17	.85	.29	1.56	30N	Ø	L567
L589	2.27	.07	.31	.11	.68	1.60	-.03	-.15	.18	.93	30N	Ø	L589
L599	2.26	.07	.29	.24	1.43	1.78	.16	.78	.15	.77	30C	Ø	L599
L622	2.64	.44	1.92	.28	1.68	2.12	.49	2.42	.38	2.02	30M	Ø	L622
L670	2.24	.05	.21	.08	.47	1.74	.12	.58	.16	.85	30N	Ø	L670

GR. MEAN = 2.20 LOG(10) FOLD GRAND MEAN = 1.63 LOG(10) FOLD TEST DETERMINATIONS = 15
 SD MEANS = .23 LOG(10) FOLD SD OF MEANS = .20 LOG(10) FOLD 46 LABS IN GRAND MEANS
 AVERAGE SDR = .17 LOG(10) FOLD AVERAGE SDR = .19 LOG(10) FOLD

L182S	2.24	.04	.18	.13	.78	1.61	-.02	-.10	.16	.83	30S	*	L182S
L190D	2.11	-.09	-.39	.13	.80	1.58	-.05	-.24	.18	.97	30S	*	L190D
L280	1.86	-.34	-1.48	.18	1.06	1.34	-.28	-1.40	.17	.93	30K	*	L280
L326S	1.48	-.72	-3.13	.17	.99	1.39	-.23	-1.16	.17	.93	30S	*	L326S
L396S	2.24	.05	.21	.11	.66	1.74	.12	.58	.20	1.08	30T	*	L396S

TOTAL NUMBER OF LABORATORIES REPORTING = 51

The ISO (International Standards Organization) is proposing that MIT folding endurance be reported as the logarithm (to the base 10) of the double fold instead of the double fold as in the past.

Analysis T30-1 in this report is the same as in the past with no changes. The analysis, T30-2, shows the data as the ISO proposes. This analysis uses the raw data reported for T30-1. The raw data are converted to the logarithm (base 10) as shown in the example to the right, and then the mean of the converted data is calculated and reported as ISO folding endurance.

Raw data (Folding number in double folds)	log (base 10) of raw data
207	2.32
166	2.22
151	2.18
332	2.52
260	2.41
137	2.14
199	2.30
230	2.36
---	---
210	2.31

mean of raw data mean of logs
 "Folding endurance"

ANALYSIS 130-2 TABLE 2

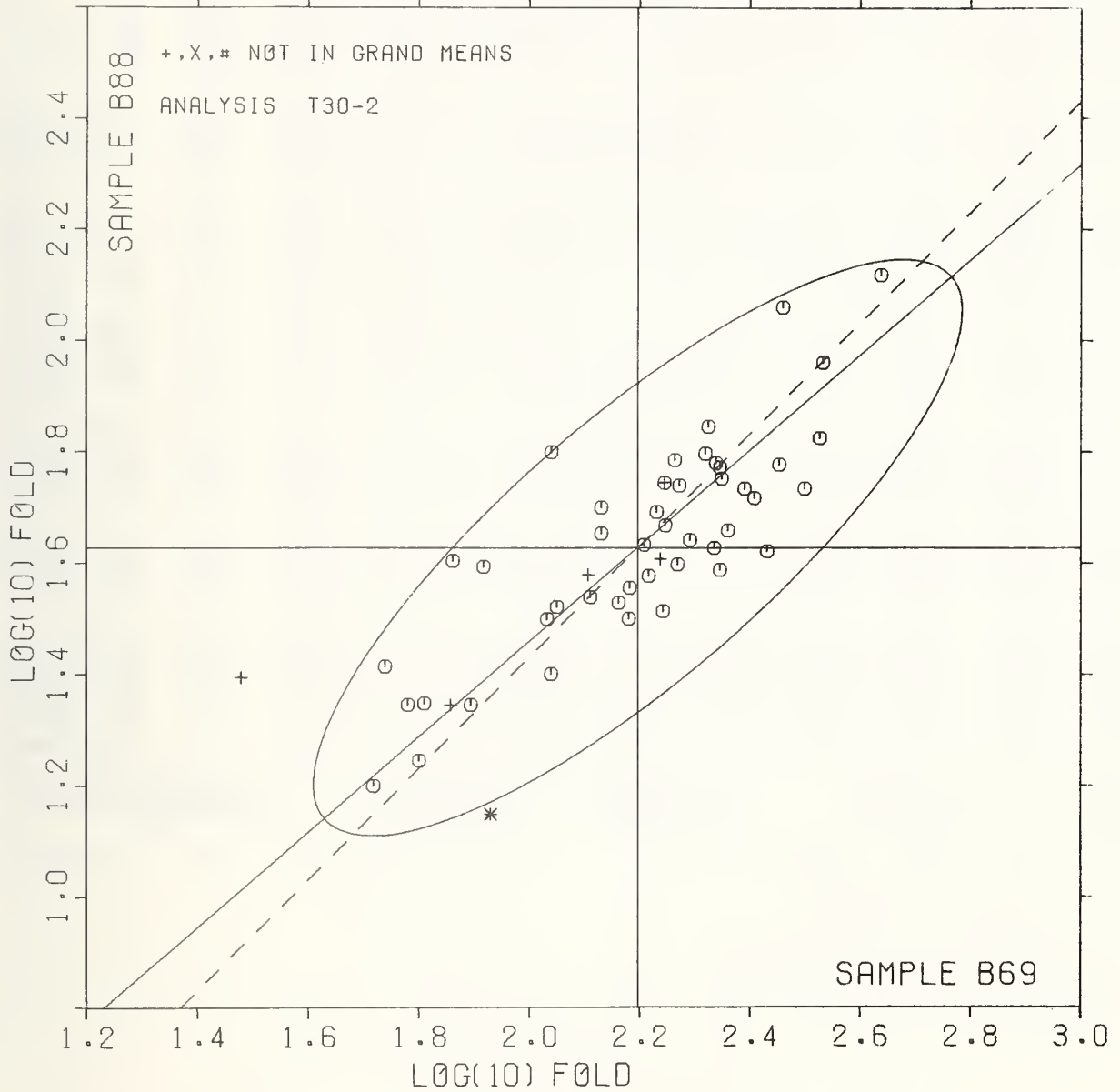
FOLDING ENDURANCE (MIT)

DATA IS LOG(BASE 10) OF THE DOUBLE FOLD MEASUREMENT

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		B69	B88	MAJOR	MINOR	R.SDR	VAR			
L326S	*	1.48	1.39	-.70	.29	.96	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L158	Ø	1.72	1.20	-.64	-.01	1.52	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L320N	Ø	1.74	1.41	-.49	.14	1.15	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L299	Ø	1.78	1.35	-.50	.06	1.32	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L339	Ø	1.80	1.24	-.55	-.03	.70	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L254	Ø	1.81	1.35	-.48	.04	1.51	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L280	*	1.86	1.34	-.44	.01	1.00	30K	FOLDING	ENDURANCE,	KÖHLER-MGLIN
L100M	Ø	1.86	1.60	-.27	.20	.66	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L320	Ø	1.89	1.34	-.41	-.02	1.19	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L100N	Ø	1.92	1.59	-.24	.16	.72	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L278	*	1.93	1.15	-.51	-.19	1.06	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L376	Ø	2.03	1.50	-.21	.01	1.08	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L393	Ø	2.04	1.40	-.27	-.07	.96	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L567	Ø	2.04	1.80	-.01	.23	1.60	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L236	Ø	2.05	1.52	-.18	.01	.75	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L190D	*	2.11	1.58	-.10	.02	.89	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L163	Ø	2.11	1.54	-.12	-.01	1.10	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L285A	Ø	2.13	1.70	-.00	.10	.98	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L390	Ø	2.13	1.65	-.03	.06	1.06	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L162	Ø	2.16	1.53	-.09	-.05	1.14	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L238A	Ø	2.18	1.50	-.10	-.09	1.40	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L105	Ø	2.18	1.56	-.06	-.05	.94	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L262	Ø	2.21	1.63	.01	-.00	.86	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L230	Ø	2.22	1.58	-.02	-.05	.90	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L285B	Ø	2.23	1.69	.07	.03	1.12	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L182S	*	2.24	1.61	.02	-.04	.80	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L238B	Ø	2.24	1.51	-.04	-.12	.98	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L670	Ø	2.24	1.74	.11	.06	.66	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L396S	*	2.24	1.74	.11	.06	.87	30T	FOLDING	ENDURANCE,	SCHÖPPER, TMI
L275	Ø	2.25	1.67	.06	-.00	.75	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L599	Ø	2.26	1.78	.15	.08	1.10	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L589	Ø	2.27	1.60	.04	-.07	.80	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L388	Ø	2.27	1.74	.13	.04	.88	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L118	Ø	2.29	1.64	.08	-.05	.78	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L121	Ø	2.32	1.80	.20	.05	.65	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L122	Ø	2.32	1.84	.24	.08	1.25	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L279	Ø	2.34	1.63	.10	-.09	.84	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L396M	Ø	2.34	1.78	.21	.02	.91	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L124	Ø	2.35	1.77	.21	.01	1.36	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L150	Ø	2.35	1.59	.09	-.13	.86	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L565	Ø	2.35	1.75	.20	-.01	1.27	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L159	Ø	2.36	1.66	.14	-.08	.78	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L185	Ø	2.39	1.73	.22	-.05	.90	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L212	Ø	2.41	1.72	.22	-.07	.93	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L190C	Ø	2.43	1.62	.17	-.16	.88	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L223F	Ø	2.45	1.78	.29	-.05	.63	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L232	Ø	2.46	2.06	.48	.16	.84	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L243	Ø	2.50	1.73	.30	-.12	.90	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L182M	Ø	2.53	1.82	.38	-.07	.84	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L321	Ø	2.53	1.96	.47	.03	.67	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L622	Ø	2.64	2.12	.65	.08	1.85	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
GMEANS:		2.20	1.63			1.00				
		95% ELLIPSE:		.75	.23	WITH GAMMA = 40 DEGREES				

FOLDING ENDURANCE (MIT)

SAMPLE B69 = 2.20 LOG(10) FOLD SAMPLe B88 = 1.63 LOG(10) FOLD



RESULTS EXPRESSED IN STANDARD GURLEY UNITS: MILLIGRAMS FOR A 1X3 INCH SPECIMEN (ACTUAL LENGTH 3.5 INCHES)

LAB CODE	SAMPLE K03					SAMPLE K41					TEST D. " 10		
	MEAN	103 GRAMS DEV	PRINTING PER SQUARE METER N. DEV	SDR	R. SDR	MEAN	60 GRAMS DEV	PRINTING PER SQUARE METER N. DEV	SDR	R. SDR	VAR	F	LAB
L100	250.8	10.3	.75	9.5	.72	143.0	32.0	2.53	5.5	.76	35G	Ø	L100
L111	240.7	.2	.02	8.3	.63	94.1	-16.9	-1.34	7.9	1.08	35G	Ø	L118
L121	231.0	-9.5	-.69	17.3	1.31	134.0	23.0	1.82	8.4	1.16	35G	Ø	L121
L122	219.2	-21.3	-1.54	27.4	2.08	97.1	-13.9	-1.10	6.2	.86	35G	Ø	L122
L132	246.0	5.5	.40	11.7	.89	135.0	22.0	1.74	17.7	2.44	35G	Ø	L132
L139	227.5	-13.0	-.94	11.9	.90	107.7	-3.3	-.26	5.8	.80	35G	Ø	L139
L148	232.9	-7.6	-.55	13.5	1.02	110.8	-.2	-.02	6.3	.87	35G	Ø	L148
L153	233.4	-7.1	-.51	10.3	.79	104.0	-7.0	-.56	3.8	.53	35G	Ø	L153
L159	269.5	29.1	2.11	12.7	.96	113.6	2.5	.20	10.3	1.42	35G	Ø	L159
L162	237.6	-2.9	-.21	11.3	.86	94.6	-16.5	-1.30	5.1	.71	35G	Ø	L162
L163	243.6	3.1	.23	23.7	1.80	100.5	-10.5	-.83	14.4	1.99	35G	Ø	L163
L183	250.7	10.2	.74	10.6	.81	119.4	8.4	.66	8.2	1.14	35G	Ø	L183
L190C	223.3	-17.2	-1.24	21.3	1.62	95.0	-16.0	-1.27	2.1	.29	35G	Ø	L190C
L212	248.1	7.6	.55	17.0	1.29	113.5	2.5	.19	8.8	1.21	35G	Ø	L212
L223	231.1	-9.4	-.68	9.7	.73	109.2	-1.8	-.15	7.1	.97	35G	Ø	L223
L232	261.1	20.6	1.50	10.0	.76	123.3	12.3	.97	6.3	.87	35G	Ø	L232
L236	231.8	-8.7	-.63	11.1	.84	93.5	-17.6	-1.39	6.5	.90	35G	Ø	L236
L241	247.1	6.6	.48	13.9	1.05	123.9	12.9	1.02	3.8	.53	35G	Ø	L241
L249	245.8	5.3	.39	18.0	1.37	113.7	2.7	.21	4.0	.56	35G	Ø	L249
L254	213.5	-27.0	-1.96	9.9	.76	109.0	-2.0	-.16	6.0	.83	35G	Ø	L254
L260	245.1	4.6	.34	4.0	.30	96.8	-14.2	-1.13	4.6	.63	35G	Ø	L260
L268	230.2	-10.3	-.74	12.1	.92	110.4	-.6	-.05	5.9	.81	35G	Ø	L268
L285	173.8	-66.7	-4.84	9.4	.72	74.6	-36.4	-2.88	9.7	1.34	35G	#	L285
L291	241.8	1.3	.10	11.1	.84	113.6	2.6	.20	4.6	.63	35G	Ø	L291
L308	233.7	-6.8	-.49	15.6	1.18	95.2	-15.8	-1.25	12.8	1.77	35G	Ø	L308
L321	272.3	31.9	2.31	20.6	1.57	117.5	6.4	.51	9.2	1.27	35G	Ø	L321
L356	234.1	-6.4	-.46	16.2	1.23	87.0	-24.0	-1.90	5.1	.71	35G	Ø	L356
L376	236.2	-4.3	-.31	12.3	.94	113.0	2.0	.16	3.7	.52	35G	Ø	L376
L382	269.8	29.4	2.13	8.4	.64	119.4	8.4	.66	3.9	.54	35G	Ø	L382
L390	239.1	-1.3	-.10	8.9	.67	112.0	1.0	.08	11.3	1.55	35G	Ø	L390
L396	230.4	-10.1	-.73	15.4	1.17	107.2	-3.8	-.30	7.5	1.04	35G	Ø	L396
L567	283.0	42.5	3.09	11.6	.88	152.0	41.0	3.24	7.9	1.09	35G	#	L567
L600	251.6	11.1	.81	7.6	.58	117.8	6.8	.54	9.2	1.27	35G	Ø	L600
L648	226.0	-14.5	-1.05	16.5	1.25	118.5	7.5	.59	11.3	1.56	35G	Ø	L648
L650	234.8	-5.7	-.41	11.6	.88	116.8	5.8	.46	4.6	.64	35G	Ø	L650
L653	245.8	5.3	.38	8.2	.62	117.0	6.0	.47	8.2	1.14	35G	Ø	L693
GR. MEAN	= 240.5 GURLEY UNITS					GRAND MEAN = 111.0 GURLEY UNITS					TEST DETERMINATIONS = 10		
SD MEANS	= 13.8 GURLEY UNITS					SD OF MEANS = 12.6 GURLEY UNITS					34 LABS IN GRAND MEANS		
	AVERAGE SDR = 13.2 GURLEY UNITS					AVERAGE SDR = 7.2 GURLEY UNITS							
L213	230.0	-10.5	-.76	11.0	.84	114.8	3.8	.30	3.8	.52	35H	Ø	L213
TOTAL NUMBER OF LABORATORIES REPORTING = 37													
Best values: K03 240 ± 27 Gurley units													
K41 110 ± 17 Gurley units													

The following laboratories were omitted from the grand means because of extreme test results: 567.

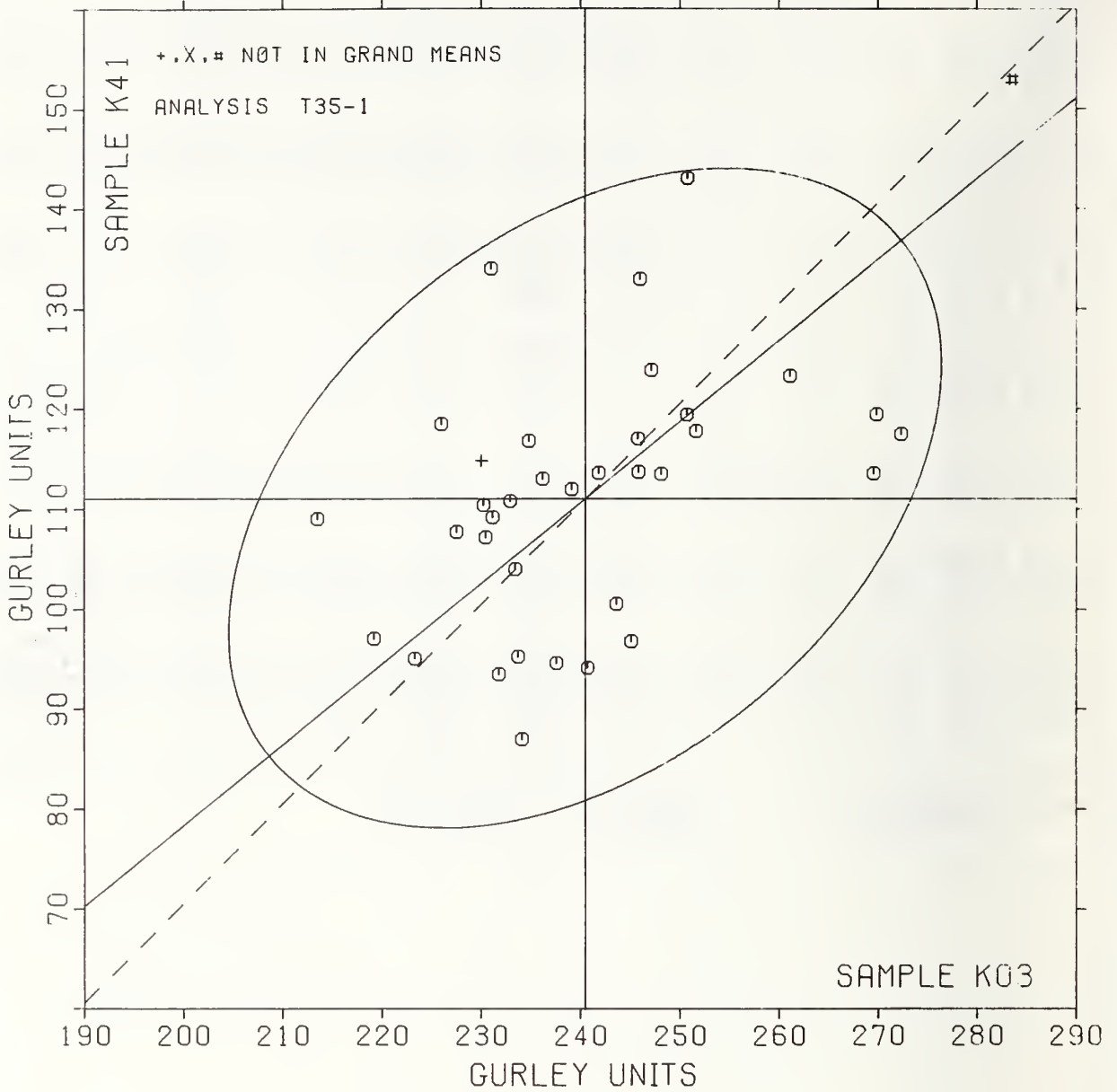
Data from the following laboratories appear to be off by a multiplicative factor: 285.

RESULTS EXPRESSED IN STANDARD GURLEY UNITS: MILLIGRAMS FOR A 1X3 INCH SPECIMEN (ACTUAL LENGTH 3.5 INCHES)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		K03	K41	MAJOR	MINOR	R ₀	SDR VAR			
L285	#	173.8	74.6	-74.8	13.5	1.03	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L254	Ø	213.5	109.0	-22.3	15.4	.79	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L122	Ø	219.2	97.1	-25.3	2.5	1.47	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L190C	Ø	223.3	95.0	-23.4	-1.7	.95	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L648	Ø	226.0	118.5	-6.6	14.9	1.41	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L139	Ø	227.5	107.7	-12.2	5.5	.85	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L213	*	230.0	114.8	-5.8	9.5	.68	35H	STIFFNESS,	GURLEY (UNITS: MG/1X3	TEST PIECE), 20 C, 65% RH
L268	Ø	230.2	110.4	-8.4	6.0	.87	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L396	Ø	230.4	107.2	-10.2	3.3	1.10	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L121	Ø	231.0	134.0	7.1	23.8	1.24	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L223	Ø	231.1	109.2	-8.4	4.5	.85	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L236	Ø	231.8	93.5	-17.8	-8.2	.87	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L148	Ø	232.9	110.8	-6.0	4.6	.95	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L153	Ø	233.4	104.0	-9.9	-1.0	.66	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L308	Ø	233.7	95.2	-15.2	-8.0	1.48	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L356	Ø	234.1	87.0	-20.0	-14.7	.97	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L650	Ø	234.8	116.8	-.8	8.0	.76	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L376	Ø	236.2	113.0	-2.1	4.2	.73	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L162	Ø	237.6	94.6	-12.6	-11.0	.79	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L390	Ø	239.1	112.0	-.4	1.6	1.11	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L118	Ø	240.7	94.1	-10.5	-13.3	.86	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L291	Ø	241.8	113.6	2.7	1.2	.74	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L163	Ø	243.6	100.5	-4.2	-10.2	1.90	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L260	Ø	245.1	96.8	-5.3	-14.0	.47	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L693	Ø	245.8	117.0	7.9	1.3	.88	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L249	Ø	245.8	113.7	5.8	-1.3	.96	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L132	Ø	246.0	133.0	18.1	13.6	1.67	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L241	Ø	247.1	123.9	13.2	5.8	.79	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L212	Ø	248.1	113.5	7.5	-2.9	1.25	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L183	Ø	250.7	119.4	13.2	.1	.97	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L100	Ø	250.8	143.0	28.1	18.4	.74	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L600	Ø	251.6	117.8	12.9	-1.7	.93	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L232	Ø	261.1	123.3	23.8	-3.4	.81	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L159	Ø	269.5	113.6	24.2	-16.3	1.19	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L382	Ø	269.8	119.4	28.1	-11.9	.59	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L321	Ø	272.3	117.5	28.9	-15.0	1.42	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L567	#	283.0	152.0	58.8	5.1	.98	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
GMEANS:		240.5	111.0			1.00				
		95% ELLIPSE:		40.9	26.5	WITH GAMMA = 38 DEGREES				

STIFFNESS, GURLEY

SAMPLE K03 = 240. GURLEY UNITS SAMPLE K41 = 111. GURLEY UNITS



TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T36-1 TABLE 1
TABER STIFFNESS

TAPPI STANDARD T489 OS-76, RESULTS EXPRESSED IN GRAM CENTIMETERS

LAB CODE	SAMPLE A65 MEAN	CONVERTER KRAFT 155 GRAMS PER SQUARE METER				SAMPLE A77 MEAN	INDEX 205 GRAMS PER SQUARE METER				TEST D. = 10						
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB				
L107A	286.7	260.1	315.94	25.9	19.76	274.8	246.9	251.55	26.0	18.27	36T	#	L107A				
L122	26.0	-.6	-.70	.9	.72	27.4	-.5	-.54	1.4	.99	36T	Ø	L122				
L123	25.2	-1.4	-1.67	2.3	1.72	26.9	-1.0	-1.05	1.7	1.22	36T	Ø	L123				
L126	26.7	.1	.15	.8	.58	27.3	-.6	-.59	1.8	1.27	36T	Ø	L126				
L150	27.8	1.2	1.49	1.2	.94	29.0	1.1	1.09	1.4	1.00	36T	Ø	L150				
L158	28.0	1.4	1.73	1.6	1.21	29.0	1.1	1.09	1.3	.91	36T	Ø	L158				
L163	27.8	1.2	1.49	1.4	1.05	30.2	2.3	2.36	.8	.56	36T	Ø	L163				
L173B	25.9	-.7	-.82	.2	.16	28.6	.7	.70	.3	.18	36T	Ø	L173B				
L182	26.8	.2	.30	1.4	1.05	27.6	-.3	-.32	1.4	1.01	36T	Ø	L182				
L207	26.3	-.2	-.30	1.2	.95	26.9	-1.0	-1.03	1.5	1.05	36T	Ø	L207				
L212	26.2	-.4	-.48	1.5	1.12	28.5	.5	.54	1.3	.94	36T	Ø	L212				
L228	27.0	.5	.58	2.1	1.57	30.0	2.1	2.11	1.5	1.06	36T	Ø	L228				
L230	27.2	.6	.76	.9	.70	27.7	-.2	-.24	1.5	1.05	36T	Ø	L230				
L236	24.8	-1.7	-2.10	1.3	1.03	26.2	-1.7	-1.74	1.7	1.17	36T	Ø	L236				
L242	28.0	1.4	1.72	1.8	1.40	28.9	1.0	.99	.9	.64	36T	Ø	L242				
L243	25.8	-.7	-.88	1.3	1.02	27.4	-.5	-.54	2.1	1.51	36T	Ø	L243				
L260	27.1	.5	.64	.8	.62	28.0	.1	.12	2.0	1.39	36T	Ø	L260				
L262	26.7	.2	.21	1.0	.79	28.3	.4	.43	.9	.66	36T	Ø	L262				
L268	26.1	-.4	-.52	1.2	.88	27.7	-.2	-.24	.7	.47	36T	Ø	L268				
L281	26.8	.2	.25	1.6	1.26	28.8	.9	.89	1.1	.80	36T	Ø	L281				
L290	25.9	-.7	-.82	1.3	1.00	26.7	-1.2	-1.25	1.5	1.04	36T	Ø	L290				
L318	25.9	-.7	-.85	1.4	1.10	26.8	-1.2	-1.18	1.4	.96	36T	Ø	L318				
L321	26.0	-.6	-.70	1.7	1.33	27.2	-.7	-.69	2.2	1.54	36T	Ø	L321				
L324	27.8	1.3	1.52	1.0	.74	28.6	.7	.71	1.5	1.03	36T	Ø	L324				
L339	50.7	24.2	29.36	.6	.48	51.1	23.2	23.66	1.5	1.05	36T	#	L339				
L388	40.8	14.2	17.28	3.0	2.33	41.3	13.4	13.62	1.6	1.10	36T	#	L388				
L442	26.3	-.3	-.33	1.0	.73	27.9	-.0	-.01	1.3	.91	36T	Ø	L442				
L570	27.1	.5	.64	1.2	.91	27.9	-.0	-.03	1.7	1.17	36T	Ø	L570				
L580	26.4	-.2	-.21	1.1	.82	28.1	.2	.17	1.9	1.30	36T	Ø	L580				
L651	26.2	-.4	-.46	1.9	1.43	27.0	-.9	-.95	1.4	1.00	36T	Ø	L651				
L692	26.0	-.5	-.64	1.5	1.16	27.1	-.8	-.80	1.7	1.17	36T	Ø	L692				
GR. MEAN =	26.6	TABER UNITS				GRAND MEAN =	27.9	TABER UNITS				TEST DETERMINATIONS = 10					
SD MEANS =	.8	TABER UNITS				SD OF MEANS =	1.0	TABER UNITS				28 LABS IN GRAND MEANS					
		AVERAGE SDR =				1.3	TABER UNITS				AVERAGE SDR =			1.4	TABER UNITS		

L250 25.4 -1.2 -1.43 1.4 1.09 25.6 -2.3 -2.38 1.0 .74 36U + L250
TOTAL NUMBER OF LABORATORIES REPORTING = 32

Best values: A65 26.5 ± 1.4 Taber units
A77 27.9 ± 1.6 Taber units

Data from the following laboratories appear to be off by a multiplicative factor: 107A, 339, 388.

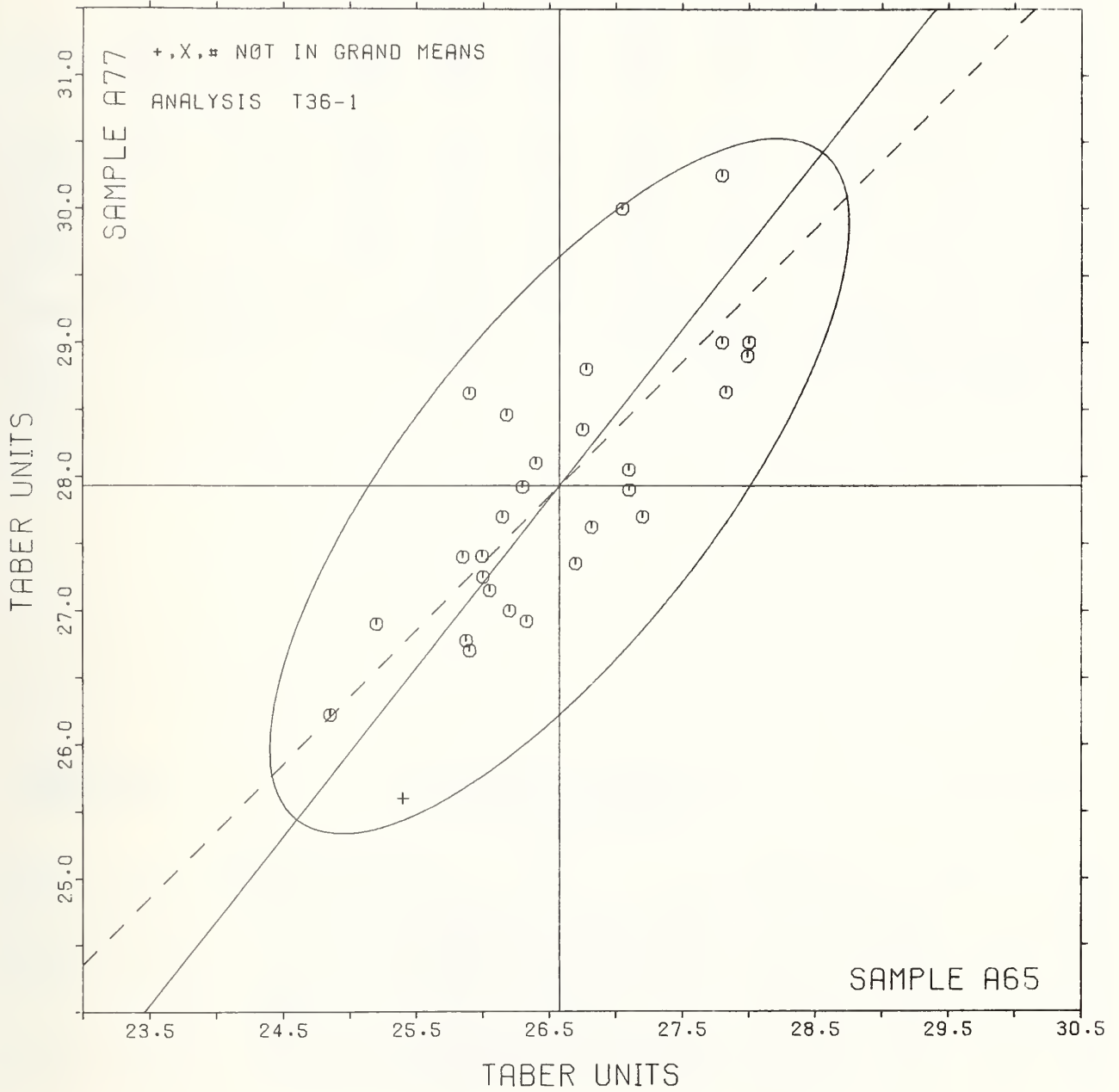
TAPPI STANDARD T489 OS-76, RESULTS EXPRESSED IN GRAM CENTIMETERS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		A65	A77	MAJOR	MINOR	R.SDR	VAR	
L236	Ø	24.8	26.2	-2.4	.3	1.10	36T	STIFFNESS, TABER
L123	Ø	25.2	26.9	-1.7	.4	1.47	36T	STIFFNESS, TABER
L250	*	25.4	25.6	-2.6	-.5	.91	36U	STIFFNESS, TABER, 20 C, 65% RB
L243	Ø	25.8	27.4	-.9	.2	1.26	36T	STIFFNESS, TABER
L318	Ø	25.9	26.8	-1.3	-.2	1.03	36T	STIFFNESS, TABER
L290	Ø	25.9	26.7	-1.4	-.2	1.02	36T	STIFFNESS, TABER
L173B	Ø	25.9	28.6	.1	1.0	.17	36T	STIFFNESS, TABER
L122	Ø	26.0	27.4	-.8	.1	.85	36T	STIFFNESS, TABER
L321	Ø	26.0	27.2	-.9	.0	1.44	36T	STIFFNESS, TABER
L692	Ø	26.0	27.1	-.9	-.1	1.17	36T	STIFFNESS, TABER
L268	Ø	26.1	27.7	-.4	.2	.68	36T	STIFFNESS, TABER
L212	Ø	26.2	28.5	.2	.6	1.03	36T	STIFFNESS, TABER
L651	Ø	26.2	27.0	-1.0	-.3	1.21	36T	STIFFNESS, TABER
L442	Ø	26.3	27.9	-.2	.2	.82	36T	STIFFNESS, TABER
L207	Ø	26.3	26.9	-.9	-.4	1.00	36T	STIFFNESS, TABER
L580	Ø	26.4	28.1	.0	.2	1.06	36T	STIFFNESS, TABER
L126	Ø	26.7	27.3	-.4	-.5	.93	36T	STIFFNESS, TABER
L262	Ø	26.7	28.3	.4	.1	.73	36T	STIFFNESS, TABER
L281	Ø	26.8	28.8	.8	.4	1.03	36T	STIFFNESS, TABER
L182	Ø	26.8	27.6	-.1	-.4	1.03	36T	STIFFNESS, TABER
L228	Ø	27.0	30.0	1.9	.9	1.32	36T	STIFFNESS, TABER
L260	Ø	27.1	28.0	.4	-.3	1.01	36T	STIFFNESS, TABER
L570	Ø	27.1	27.9	.3	-.4	1.04	36T	STIFFNESS, TABER
L230	Ø	27.2	27.7	.2	-.6	.88	36T	STIFFNESS, TABER
L163	Ø	27.8	30.2	2.6	.5	.80	36T	STIFFNESS, TABER
L150	Ø	27.8	29.0	1.6	-.3	.97	36T	STIFFNESS, TABER
L324	Ø	27.8	28.6	1.3	-.5	.88	36T	STIFFNESS, TABER
L242	Ø	28.0	28.9	1.6	-.5	1.02	36T	STIFFNESS, TABER
L158	Ø	28.0	29.0	1.7	-.5	1.06	36T	STIFFNESS, TABER
L388	#	40.8	41.3	19.3	-2.8	1.71	36T	STIFFNESS, TABER
L339	#	50.7	51.1	33.2	-4.5	.77	36T	STIFFNESS, TABER
L107A	#	286.7	274.8	355.0	-50.6	19.01	36T	STIFFNESS, TABER
GMEANS:		26.6	27.9			1.00		
		95% ELLIPSE:		3.2	1.2	WITH GAMMA = 51 DEGREES		

STIFFNESS, TABER

SAMPLE A65 = 26.6 TABER UNITS

SAMPLE A77 = 27.9 TABER UNITS



LAB CODE	SAMPLE					PRINTING					TEST D. = 4		
	J55 MEAN	93 GRAMS DEV	PER SQUARE METER N,DEV	SDR	R, SDR	J93 MEAN	89 GRAMS DEV	PER SQUARE METER N,DEV	SDR	R, SDR	VAR	F	LAB
L122	63.0	-83.4	-.40	3.2	.87	55.3	-13.9	-.21	2.8	.39	49Q	#	L122
L149	721.2	574.2	2.79	.5	.14	249.0	179.7	2.67	38.0	5.20	49L	#	L149
L158	298.7	152.3	.74	9.5	2.57	252.5	183.2	2.72	5.0	.68	49D	#	L158
L182I	22.9	-123.5	-.60	1.0	.27	32.8	-36.5	-.54	1.9	.26	49Q	#	L182I
L190C	110.7	-35.7	-.17	4.6	1.24	34.2	-35.0	-.52	2.1	.28	49T	#	L190C
L242	77.6	-68.5	-.33	7.0	1.91	22.1	-47.2	-.70	3.7	.50	49P	#	L242
L243	82.5	-64.0	-.31	5.1	1.38	67.7	-1.5	-.02	9.0	1.23	49T	#	L243
L280	113.8	-32.6	-.16	3.6	.99	65.7	-3.6	-.05	6.1	.84	49U	#	L280
L291	98.8	-47.6	-.23	1.7	.45	67.0	-2.3	-.03	8.9	1.22	49I	#	L291
L388	147.7	1.3	.01	.1	.02	81.6	12.4	.18	4.4	.61	49Q	#	L388
L598	123.4	-23.1	-.11	11.7	3.17	71.6	2.4	.03	1.7	.24	49P	#	L598
L643	16.6	-129.9	-.63	2.0	.55	11.3	-58.0	-.86	.5	.07	49I	#	L643
L651	400.0	253.5	1.23	.0	.00	276.2	207.0	3.07	2.5	.34	49F	#	L651

GR. MEAN = 146.5 KP CM/SEC GRAND MEAN = 69.3 KP CM/SEC TEST DETERMINATIONS = 4
SD MEANS = 206.1 KP CM/SEC SD OF MEANS = 67.3 KP CM/SEC 10 LABS IN GRAND MEANS
AVERAGE SDR = 3.7 KP CM/SEC AVERAGE SDR = 7.3 KP CM/SEC

TOTAL NUMBER OF LABORATORIES REPORTING = 13
Data from the following laboratories were omitted from the grand means because no viscosity values were reported: 158, 280.

Data from the following laboratories were omitted from the grand means because the values were outside the range of the instrument: 651.

LAB CODE	P	MEANS		COORDINATES		AVG R,SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS					
		J55	J93	MAJOR	MINOR								
L643	#	16.6	11.3	-141.4	-15.8	.31	49I	SURFACE PICK STRENGTH, IGT,	PIB FLUID				
L182I	#	22.9	32.8	-128.8	2.8	.27	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL				
L122	#	63.0	55.3	-83.7	12.1	.63	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL				
L242	#	77.6	22.1	-80.0	-24.0	1.21	49P	SURFACE PICK STRENGTH, IGT,	IGT OIL				
L243	#	82.5	67.7	-61.4	18.0	1.30	49T	SURFACE PICK STRENGTH, IGT,	IPC FLUID				
L291	#	98.8	67.0	-46.1	12.3	.84	49I	SURFACE PICK STRENGTH, IGT,	PIB FLUID				
L190C	#	110.7	34.2	-44.7	-22.5	.76	49T	SURFACE PICK STRENGTH, IGT,	IPC FLUID				
L280	#	113.8	65.7	-32.2	6.5	.91	49U	SURFACE PICK STRENGTH, IGT,	OIL				
L598	#	123.4	71.6	-21.3	9.3	1.70	49P	SURFACE PICK STRENGTH, IGT,	IGT OIL				
L388	#	147.7	81.6	5.0	11.4	.31	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL				
L158	#	298.7	252.5	200.7	128.3	1.63	49D	SURFACE PICK STRENGTH, IGT,	INK				
L651	#	400.0	276.2	304.4	120.2	.17	49F	SURFACE PICK STRENGTH, IGT,	INK				
L149	#	721.2	249.0	602.2	-3.3	2.67	49L	SURFACE PICK STRENGTH, IGT,	PIB FLUID				
GMEANS:		146.5	69.3			1.00							
		95% ELLIPSE:	685.1	49.4									
													WITH GAMMA = 17 DEGREES

ANALYSIS T50-1 TABLE 1
 SURFACE PICK STRENGTH, WAX NUMBER
 TAPPI STANDARD T459 6S-75, SURFACE STRENGTH OF PAPER (WAX PICK TEST)

LAB CODE	SAMPLE J55 MEAN	PRINTING 93 GRAMS PER SQUARE METER				SAMPLE J93 MEAN	PRINTING 89 GRAMS PER SQUARE METER				TEST D. = 5		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L105	12.40	-.25	-.27	.55	1.06	9.00	-.15	-.14	.00	.00	50W	Ø	L105
L122	13.00	.35	.38	1.00	1.54	7.00	-2.15	-2.02	.00	.00	50W	Ø	L122
L158	13.00	.35	.38	.00	.00	9.40	.25	.23	.55	1.66	50W	Ø	L158
L162	13.00	.35	.38	.00	.00	9.00	-.15	-.14	.00	.00	50W	Ø	L162
L173A	12.20	-.45	-.48	.45	.87	8.40	-.75	-.71	.55	1.66	50W	Ø	L173A
L182W	12.80	.15	.16	.45	.87	9.00	-.15	-.14	.00	.00	50W	Ø	L182W
L183	13.20	.55	.59	.84	1.62	9.20	.05	.04	.45	1.35	50W	Ø	L183
L213	13.40	.75	.81	.55	1.06	10.00	.85	.79	.00	.00	50W	Ø	L213
L225	14.00	1.35	1.45	.00	.00	9.20	.05	.04	.45	1.35	50W	Ø	L225
L228	10.40	-2.25	-2.41	.55	1.06	7.20	-1.95	-1.83	.45	1.35	50W	Ø	L228
L230	12.40	-.25	-.27	.55	1.06	9.40	.25	.23	.55	1.66	50W	Ø	L230
L236	12.00	-.65	-.69	.00	.00	10.00	.85	.79	.00	.00	50W	Ø	L236
L243	10.80	-1.85	-1.98	1.10	2.13	8.40	-.75	-.71	.55	1.66	50W	Ø	L243
L285	13.00	.35	.38	.71	1.37	11.20	2.05	1.92	1.10	3.31	50W	Ø	L285
L339	13.80	1.15	1.24	1.48	2.88	9.40	.25	.23	.55	1.66	50W	Ø	L339
L567	12.60	-.05	-.05	.55	1.06	10.80	1.65	1.54	.45	1.35	50W	Ø	L567
L616	13.00	.35	.38	.00	.00	9.00	-.15	-.14	.00	.00	50W	Ø	L616

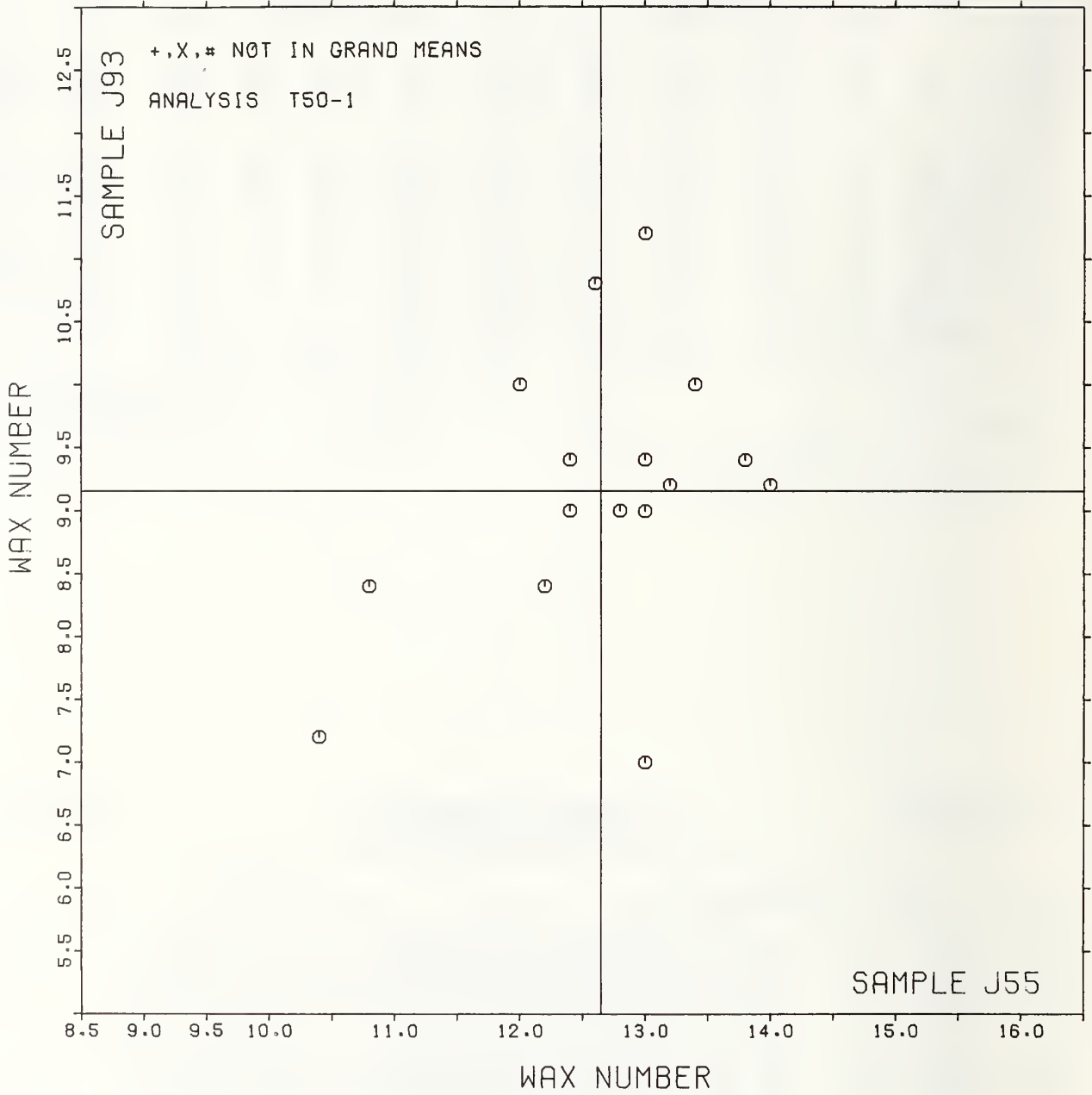
GR. MEAN = 12.65 WAX NUMBER GRAND MEAN = 9.15 WAX NUMBER TEST DETERMINATIONS = 5
 SD MEANS = .93 WAX NUMBER SD OF MEANS = 1.07 WAX NUMBER 17 LABS IN GRAND MEANS
 AVERAGE SDR = .52 WAX NUMBER AVERAGE SDR = .33 WAX NUMBER
 TOTAL NUMBER OF LABORATORIES REPORTING = 17
 Best values: J55 12.7 ± 1.6 wax number
 J93 9.0 ± 1.8 wax number

ANALYSIS T50-1 TABLE 2
 SURFACE PICK STRENGTH, WAX NUMBER
 TAPPI STANDARD T459 6S-75, SURFACE STRENGTH OF PAPER (WAX PICK TEST)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS				
		J55	J93	MAJOR	MINOR	R.SDR	VAR					
L228	Ø	10.40	7.20	-2.50	.65	1.21	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L243	Ø	10.80	8.40	-1.69	1.06	1.89	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L236	Ø	12.00	10.00	.31	1.02	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L173A	Ø	12.20	8.40	-.87	-.08	1.26	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L230	Ø	12.40	9.40	.06	.34	1.36	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L105	Ø	12.40	9.00	-.27	.11	.53	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L567	Ø	12.60	10.80	1.31	1.00	1.21	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L182W	Ø	12.80	9.00	-.04	-.21	.43	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L616	Ø	13.00	9.00	.08	-.38	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L285	Ø	13.00	11.20	1.87	.91	2.34	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L122	Ø	13.00	7.00	-1.54	-1.54	.97	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L162	Ø	13.00	9.00	.08	-.38	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L158	Ø	13.00	9.40	.41	-.14	.83	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L183	Ø	13.20	9.20	.36	-.42	1.49	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L213	Ø	13.40	10.00	1.13	-.12	.53	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L339	Ø	13.80	9.40	.87	-.79	2.27	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L225	Ø	14.00	9.20	.83	-1.07	.68	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
GMEANS:		12.65	9.15			1.00		WITH GAMMA = 54 DEGREES				
		95% ELLIPSE:		3.35	2.14							

SURFACE PICK STRENGTH, WAX

SAMPLE J55 = 12.6 WAX NUMBER SAMPLE J93 = 9.2 WAX NUMBER



TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T91-1 TABLE 1
CENCOA (CORRUGATING MEDIUM TEST-CMT)
TAPPI STANDARD T809 6S-71

LAB CODE	SAMPLE E88 MEAN		BACKING PER SQUARE METER			SAMPLE E89 MEAN		CORRUGATING MEDIUM 125 GRAMS PER SQUARE METER				TEST D. = 10		
	MEAN	DEV	N. DEV	SDR	R. SDR	MEAN	DEV	N. DEV	SDR	R. SDR	VAR	F	LAB	
L182	136.4	9.0	1.61	6.3	.77	306.4	36.8	1.45	15.7	1.06	91N	Ø	L182	
L218	117.4	-10.0	-1.78	9.4	1.16	278.2	8.6	.34	19.3	1.31	91A	Ø	L218	
L242	123.9	-3.5	-.63	4.5	.55	214.0	-55.6	-2.19	6.6	.45	91G	Ø	L242	
L248	134.4	7.0	1.25	8.2	1.00	286.5	17.0	.67	12.5	.85	91B	Ø	L248	
L255	130.3	2.9	.52	5.9	.73	231.3	-38.3	-1.51	11.1	.75	91P	Ø	L255	
L269	134.8	7.4	1.32	10.3	1.26	274.0	4.4	.17	17.7	1.20	91P	Ø	L269	
L280	121.0	-6.4	-1.14	11.0	1.35	275.5	5.9	.23	15.5	1.06	91N	Ø	L280	
L289	129.4	2.0	.36	7.4	.51	255.3	-14.3	-.56	12.4	.84	91P	Ø	L289	
L329	127.2	-.2	-.03	11.7	1.44	280.2	10.6	.42	15.6	1.06	91P	Ø	L329	
L394	125.0	-2.4	-.43	3.9	.48	264.7	-4.9	-.19	11.3	.77	91P	Ø	L394	
L621	126.1	-1.3	-.23	5.2	.64	259.0	-10.6	-.42	16.5	1.12	91P	Ø	L621	
L622	123.2	-4.2	-.75	11.3	1.39	282.0	12.4	.49	19.6	1.33	91P	Ø	L622	
L650	127.0	-.4	-.07	10.9	1.34	297.4	27.8	1.10	17.7	1.20	91N	Ø	L650	

GR. MEAN = 127.4 NEWTONS
SD MEANS = 5.6 NEWTONS

GRAND MEAN = 269.6 NEWTONS
SD OF MEANS = 25.3 NEWTONS

TEST DETERMINATIONS = 10
13 LABS IN GRAND MEANS

AVERAGE SDR = 8.2 NEWTONS

AVERAGE SDR = 14.7 NEWTONS

GR. MEAN = 28.64 POUNDS

GRAND MEAN = 60.60 POUNDS

TOTAL NUMBER OF LABORATORIES REPORTING = 13

Best values: E88 130 ± 8 newtons
E89 270 ± 50 newtons

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T91-1 TABLE 2
CENCOA (CORRUGATING MEDIUM TEST-CMT)
TAPPI STANDARD T809 6S-71

LAB CODE	F	MEANS		COORDINATES		AVG R. SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		E88	E89	MAJOR	MINOR					
L218	Ø	117.4	278.2	8.1	10.4	1.23	91A	FLAT CRUSH STRENGTH,	CENCOA,	INSTRON
L280	Ø	121.0	275.5	5.6	6.7	1.20	91N	FLAT CRUSH STRENGTH,	CENCOA,	TMI/HINDE & DAUCH
L622	Ø	123.2	282.0	12.2	4.8	1.36	91P	FLAT CRUSH STRENGTH,	CENCOA,	TMI/HINDE & DAUCH
L242	Ø	123.9	214.0	-55.7	.7	.50	91G	FLAT CRUSH STRENGTH,	CENCOA,	GAYDON FLAT CRUSH TESTER
L394	Ø	125.0	264.7	-5.0	2.2	.62	91P	FLAT CRUSH STRENGTH,	CENCOA,	TMI/HINDE & DAUCH
L621	Ø	126.1	259.0	-10.6	.8	.88	91P	FLAT CRUSH STRENGTH,	CENCOA,	TMI/HINDE & DAUCH
L650	Ø	127.0	297.4	27.8	1.8	1.27	91N	FLAT CRUSH STRENGTH,	CENCOA,	TMI/HINDE & DAUCH
L329	Ø	127.2	280.2	10.6	.7	1.25	91P	FLAT CRUSH STRENGTH,	CENCOA,	TMI/HINDE & DAUCH
L289	Ø	129.4	255.3	-14.1	-2.8	.88	91P	FLAT CRUSH STRENGTH,	CENCOA,	TMI/HINDE & DAUCH
L255	Ø	130.3	231.3	-38.1	-4.9	.74	91P	FLAT CRUSH STRENGTH,	CENCOA,	TMI/HINDE & DAUCH
L248	Ø	134.4	286.5	17.3	-6.1	.92	91B	FLAT CRUSH STRENGTH,	CENCOA,	INSTRON
L269	Ø	134.8	274.0	4.8	-7.1	1.23	91P	FLAT CRUSH STRENGTH,	CENCOA,	TMI/HINDE & DAUCH
L182	Ø	136.4	306.4	37.2	-7.1	.92	91N	FLAT CRUSH STRENGTH,	CENCOA,	TMI/HINDE & DAUCH

GMEANS: 127.4 269.6 1.00
95% ELLIPSE: 74.8 16.1 WITH GAMMA = 87 DEGREES

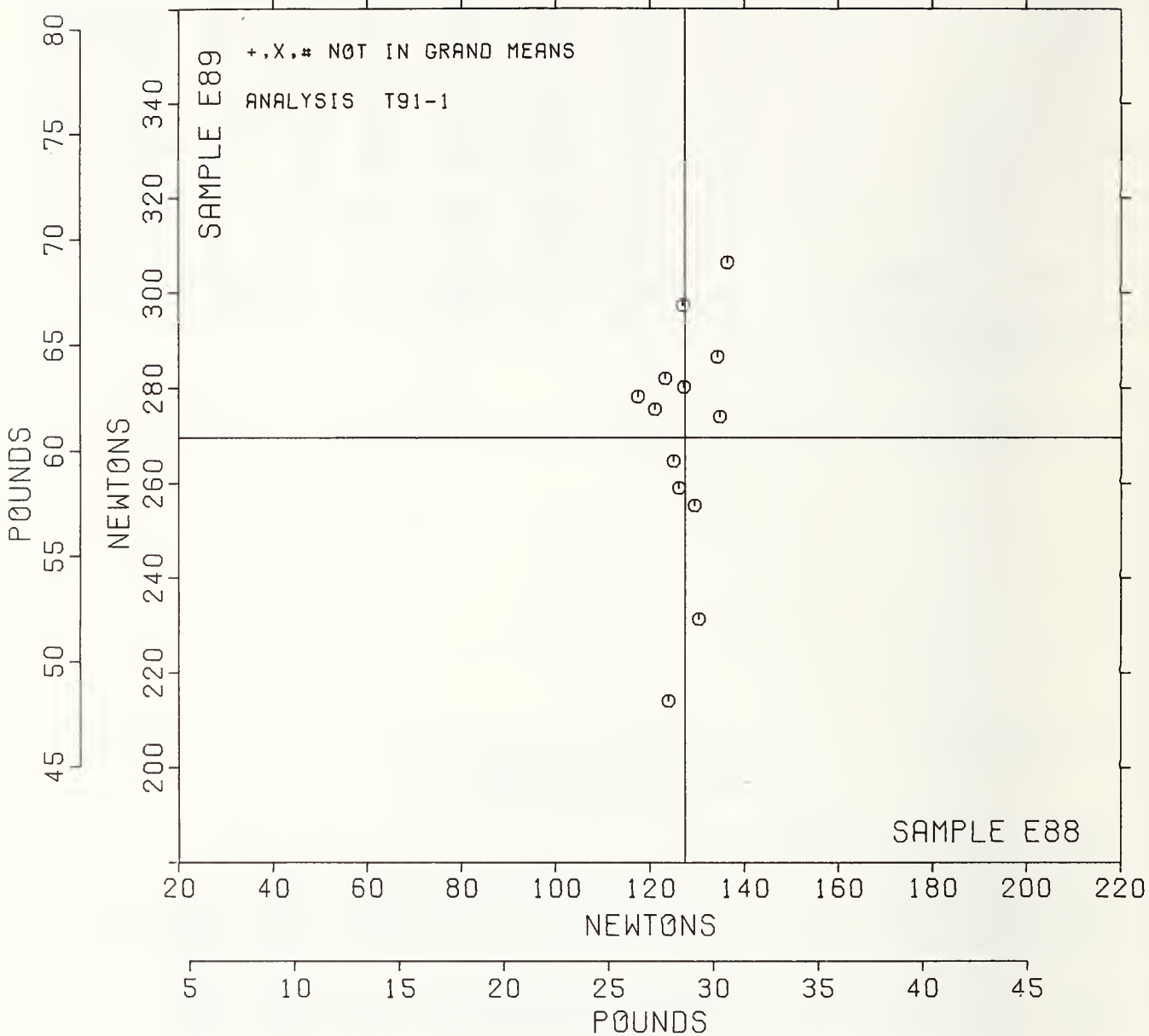
CONCORA (CMT)

SAMPLE E88 = 127. NEWTONS

SAMPLE E89 = 270. NEWTONS

SAMPLE E88 = 28.6 POUNDS

SAMPLE E89 = 60.6 POUNDS



TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T96-1 TABLE 2
 RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)
 TAPPI STANDARD T818 GS-76

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		E88	E89	MAJOR	MINOR	R.SDR	VAR	
L570	M		149.9			.43	96P	RING CRUSH, TMI/HINDE & DAUCH
L126	M		168.6			.56	96P	RING CRUSH, TMI/HINDE & DAUCH
L329	#	53.4	93.0	-114.7	4.5	.38	96P	RING CRUSH, TMI/HINDE & DAUCH
L234	Ø	88.1	146.8	-50.7	2.3	1.19	96P	RING CRUSH, TMI/HINDE & DAUCH
L621	Ø	88.6	143.9	-52.9	.3	.50	96P	RING CRUSH, TMI/HINDE & DAUCH
L333	Ø	89.4	127.4	-66.7	-8.8	.37	96I	RING CRUSH, INSTRON
L218	Ø	96.5	179.5	-18.3	11.8	1.13	96I	RING CRUSH, INSTRON
L237	Ø	57.9	181.9	-15.6	11.9	.91	96P	RING CRUSH, TMI/HINDE & DAUCH
L663	Ø	105.0	185.5	-8.8	7.7	.59	96P	RING CRUSH, TMI/HINDE & DAUCH
L336	Ø	105.9	163.9	-26.9	-4.2	.77	96P	RING CRUSH, TMI/HINDE & DAUCH
L124	Ø	106.3	164.6	-26.1	-4.2	1.19	96P	RING CRUSH, TMI/HINDE & DAUCH
L122	Ø	108.1	165.9	-24.0	-5.1	1.61	96P	RING CRUSH, TMI/HINDE & DAUCH
L393	Ø	110.3	202.4	8.4	11.7	.90	96P	RING CRUSH, TMI/HINDE & DAUCH
L562	Ø	113.0	184.1	-5.9	.1	.90	96P	RING CRUSH, TMI/HINDE & DAUCH
L686	Ø	114.2	189.3	-.8	1.7	.88	96N	RING CRUSH, TMI/HINDE & DAUCH
L191	Ø	114.3	187.3	-2.5	.5	1.45	96P	RING CRUSH, TMI/HINDE & DAUCH
L305	Ø	116.5	176.1	-10.9	-7.1	.90	96P	RING CRUSH, TMI/HINDE & DAUCH
L649	Ø	118.3	197.0	7.9	2.1	.58	96P	RING CRUSH, TMI/HINDE & DAUCH
L650	Ø	119.3	194.0	5.8	-.3	1.21	96N	RING CRUSH, TMI/HINDE & DAUCH
L171	Ø	122.9	197.8	10.9	-1.4	1.01	96N	RING CRUSH, TMI/HINDE & DAUCH
L141	Ø	123.0	209.3	20.8	4.4	1.09	96P	RING CRUSH, TMI/HINDE & DAUCH
L182	Ø	127.1	202.1	16.8	-2.8	1.25	96N	RING CRUSH, TMI/HINDE & DAUCH
L610	Ø	127.2	196.6	12.1	-5.7	.98	96P	RING CRUSH, TMI/HINDE & DAUCH
L157	Ø	131.2	230.9	43.6	8.4	.93	96P	RING CRUSH, TMI/HINDE & DAUCH
L243	Ø	131.7	216.2	31.2	.5	1.05	96P	RING CRUSH, TMI/HINDE & DAUCH
L114	Ø	137.4	218.0	35.7	-3.6	.93	96P	RING CRUSH, TMI/HINDE & DAUCH
L553	Ø	139.2	221.5	39.6	-3.3	1.26	96P	RING CRUSH, TMI/HINDE & DAUCH
L242	Ø	139.5	206.0	26.5	-11.5	1.46	96G	RING CRUSH, GAYDON FLAT CRUSH TESTER
L350	Ø	147.2	230.0	51.0	-5.8	.59	96P	RING CRUSH, TMI/HINDE & DAUCH
L107	#	169.9	290.5	114.6	5.8	1.08	96P	RING CRUSH, TMI/HINDE & DAUCH
GMEANS:		116.1	189.1			1.00		
		95% ELLIPSE:		80.4	16.8	WITH GAMMA = 59 DEGREES		

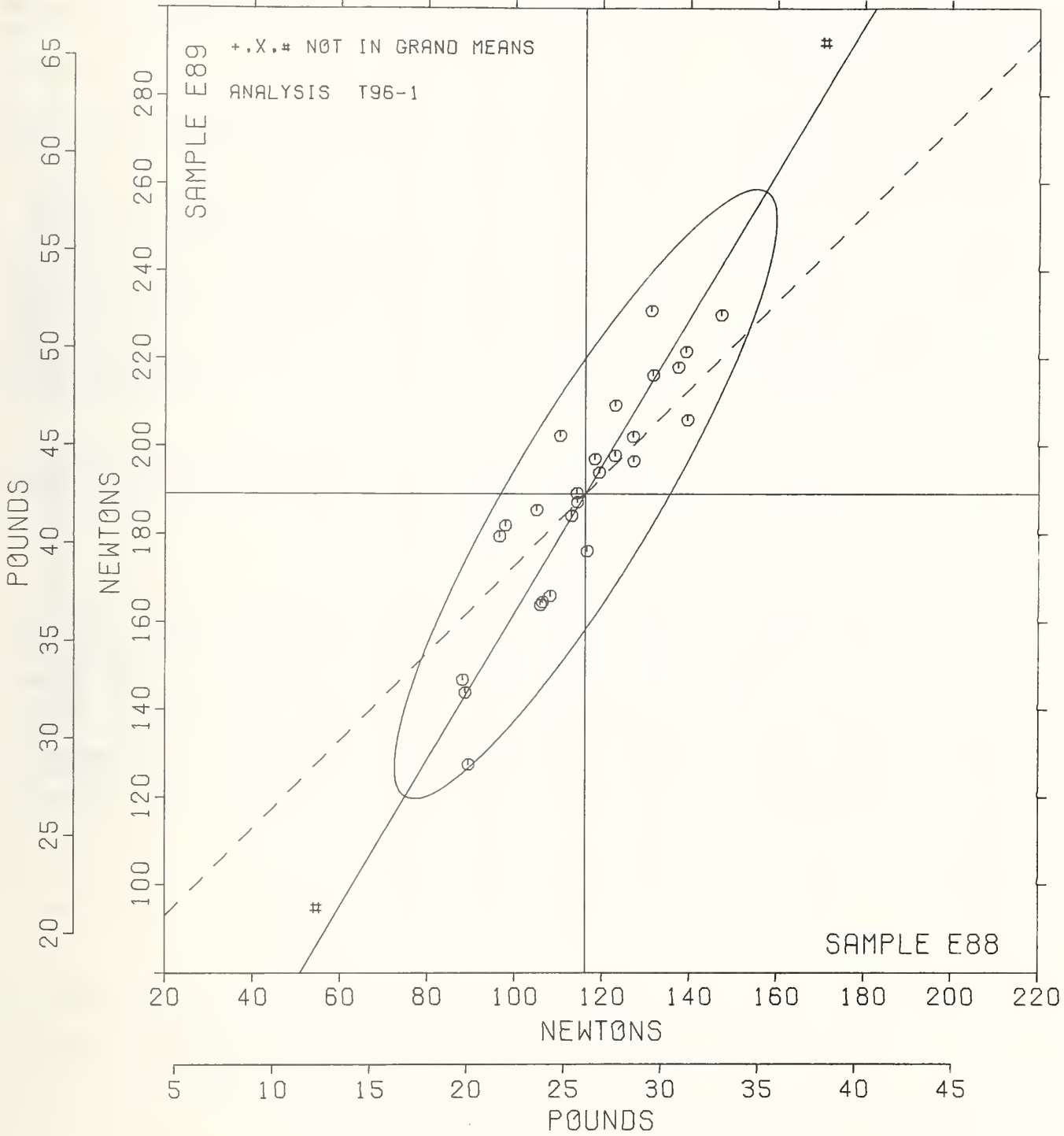
RING CRUSH

SAMPLE E88 = 116. NEWTONS

SAMPLE E89 = 189. NEWTONS

SAMPLE E88 = 26.1 POUNDS

SAMPLE E89 = 42.5 POUNDS



SUMMARY TABLE

TEST METHOD	SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDR	REPL CRP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPROD
BURSTING STRENGTH, MODEL C T10-1 PSI	K37	27.71	1.99	1.83	15	41	49	10	1.60	5.59
	J87	17.32	1.25	1.08					.95	3.52
BURSTING STRENGTH, MODEL C-A T10-2 PSI	K37	27.26	2.07	1.87	15	37	37	10	1.64	5.82
	J87	17.62	1.93	1.06					.93	5.39
BURSTING STRENGTH, HIGH RANGE T11-1 PSI	H41	54.5	1.8	2.7	15	32	44	10	2.4	5.2
	B56	38.6	2.2	3.0					2.7	6.4
TEARING STRENGTH, DEEP CUTOUT T15-1 GRAMS	E85	39.75	1.95	1.22	15	117	138	10	1.07	5.44
	B96	46.98	2.86	1.52					1.33	7.95
TEARING STRENGTH, NO CUTOUT T17-1 GRAMS	J42	64.2	2.5	2.8	15	11	14	10	2.5	7.2
	K49	120.4	5.1	6.6					5.7	14.4
TENSILE STRENGTH, PACKAGING PAPERS T19-1 KILONEWTN/M	J01	5.59	.31	.21	20	49	53	12	.17	.87
	J16	8.81	.40	.30					.24	1.12
TENSILE STRENGTH, CRE TYPE T20-1 KILONEWTN/M	J71	3.68	.16	.15	20	45	52	12	.12	.45
	K39	4.98	.26	.22					.18	.72
TENSILE STRENGTH, PENDULUM TYPE T20-2 KILONEWTN/M	J71	3.77	.18	.18	20	34	38	12	.14	.50
	K39	5.04	.21	.24					.19	.59
T.E.A., PACKAGING PAPERS T25-1 JOULES/SQ M	J01	74.5	9.3	8.8	20	18	18	12	7.1	26.2
	J16	118.8	21.1	11.6					9.3	58.6
T.E.A., PRINTING PAPERS T26-1 JOULES/SQ M	J71	40.4	4.0	4.4	20	17	19	12	3.6	11.2
	K39	54.4	5.5	5.8					4.6	15.6
ELONGATION TO BREAK, PACKAGING PAPER T28-1 PERCENT	J01	2.116	.128	.173	20	17	19	12	.139	.366
	J16	2.156	.240	.128					.103	.665
ELONGATION TO BREAK, PRINTING PAPER T29-1 PERCENT	J71	1.613	.180	.139	20	17	19	12	.111	.503
	K39	1.710	.163	.130					.104	.455
FOLDING ENDURANCE (MIT) T30-1 DOUBLE FOLDS	B69	181.	79.	59.	15	44	51	10	51.	220.
	B88	47.	17.	18.					16.	47.
FOLDING ENDURANCE (MIT) T30-2 LOG(10) FOLD	B69	2.20	.23	.17	15	46	51	10	.15	.64
	B88	1.63	.20	.19					.16	.57
STIFFNESS, GURLEY T35-1 GURLEY UNITS	K03	240.5	13.8	13.2	10	34	37	10	11.5	38.2
	K41	111.0	12.6	7.2					6.3	35.0
STIFFNESS, TABER T36-1 TABER UNITS	A65	26.6	.8	1.3	10	28	32	5	1.6	2.6
	A77	27.9	1.0	1.4					1.8	3.0
SURFACE PICK STRENGTH, IGT T49-1 KP CM/SEC	J55	146.5	206.1	3.7	4	10	13	4	5.1	571.0
	J93	69.3	67.3	7.3					10.1	186.5
SURFACE PICK STRENGTH, WAX T50-1 WAX NUMBER	J55	12.65	.93	.52	5	17	17	5	.64	2.58
	J93	9.15	1.07	.33					.41	2.95
CONCORDA (CMT) T91-1 NEWTONS	E88	127.4	5.6	8.2	10	13	13	10	7.1	15.5
	E89	269.6	25.3	14.7					12.9	70.2
RING CRUSH T96-1 NEWTONS	E88	116.1	16.4	8.7	10	26	30	10	7.6	45.5
	E89	189.1	26.1	15.3					13.4	72.3

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This diagram is composed of two full-size overlaid tracings. One tracing was made from the Thwing-Elmendorf tear tester with NO CUTOUT (old style). The other tracing was made from the Thwing-Elmendorf tear tester with DEEP CUTOUT. The cross hatched area represents the metal removed from the swinging sector when the deep cutout (new) style was created.

DEEP CUTOUT instrument
is 5/8 inch across
NO CUTOUT instrument
is 1 1/4 inch across

Note shape of pendulum
sector with respect to
an imaginary line drawn
across the top of the
specimen clamp

