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

**COLLABORATIVE REFERENCE PROGRAM  
FOR PAPER**

**REPORT NO. 65S  
STRENGTH TESTS**



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

QC  
100  
.U56  
80-1840  
1980

NBS COLLABORATIVE REFERENCE PROGRAMS

TAPPI Paper and Board (6 times per year)

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

FKBG-API Containerboard (48 times per year)

Mullen burst of linerboard  
Concora test of medium

MCCA Color and Appearance (4 times per year)

Gloss at 60°  
Color and color difference

CTS Rubber (4 times per year)

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

ASTM Cement (2 times per year)

Chemical (11 chemical components)  
Physical (15 characteristics)

AASHTO Bituminous

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

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

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TECHNICAL ASSOCIATION OF THE  
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM  
FOR PAPER

Report No. 65S  
STRENGTH TESTS

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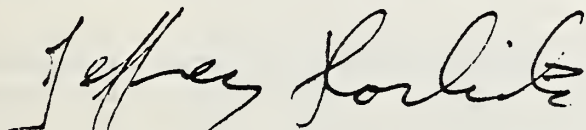


## INTRODUCTION

Reports 65S and 65G comprise the fifth set of reports for the 79-80 program year. Participants in tests which involve strength properties of paper will receive only the S report; those in tests which measure other properties will receive only the G report.

Notes and comments to individual laboratories and "Best Values" applicable to a particular method are given following Table 1 for each method. See page 1 of this report for an explanation of "Best Values". Please do not confuse these Best Values with provisional values included with the samples to detect serious discrepancies at the time of test.

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



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

September 3, 1980

## TAPPI-NBS COLLABORATIVE REFERENCE PROGRAM

### BACKGROUND AND PURPOSE

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

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

### HOW THE PROGRAM WORKS

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

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

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

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

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

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

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

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

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TABLE OF CONVERSION FACTORS TO METRIC (SI) UNITS

<u>Physical Quantity</u>	<u>To Convert From</u>	<u>To</u>	<u>Multiply by</u>
Bursting strength	psi	kPa	6.895
	kg/cm <sup>2</sup>	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 <sup>2</sup>	J/m <sup>2</sup>
in.-lb/in. <sup>2</sup>		J/m <sup>2</sup>	175.1
kg-m/m <sup>2</sup>		J/m <sup>2</sup>	9.807
Bending stiffness	g·cm	μN·m	98.07
Flat-crush strength (Concora)	lb	N	4.448
Ring-crush (TAPPI)	lb	N	4.448
	(ISO) lb/6.00 in.	kN/m	0.0292
Thickness	mil	μm	25.40



KEY TO TABLES AND GRAPHS

- MEAN - The average of individual TEST DETERMINATIONS. The number of TEST DETERMINATIONS in the seen 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  $\sigma'$  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 or her measurements relative to the average ability. The greater the number of TEST DETERMINATIONS the closer the R. SDR should be to unity. If R. SDR is outside the limits given below, the participant may not be following the procedure considered standard for this analysis:

No. of test Determinations	Lower limit for R. SDR	Upper limit for R. SDR
3	0.09	2.59
4	0.12	2.25
5	0.26	2.06
9	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:
- 9 - Included in grand mean and inside 95% error ellipse.
  - \* - 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 or her testing procedure.
  - X - Excluded because plotted point would fall outside of the 99% error ellipse, (see page 2 for explanation of Graph).
  - # - Excluded because data were not understood or because of a non-coded variation reported by the laboratory. (See the notes following Table 1 for each method).
  - o - Excluded from grand means because VAR was non-standard for the analysis.
  - M - Excluded because data for one sample are missing.
  - S - Included in grand mean but only after omission of one or more 'wild' values; that is test determinations more than 3 times AVERAGE SDR from the laboratory's MEAN. Not more than 20% of the test determination may be excluded in this manner without rejecting the laboratory.
- Best values - Given at the end of Table 1 for each method for which sufficient information is available. These best values are estimates based on a careful examination of all data, both current and past, with special attention to results obtained by the National Bureau of Standards and other recognized reference laboratories in this and other countries. All participants using equipment that is standard for the analysis should be able to achieve results within the plus-minus (+/-) limits, when these are shown along with the best values.
- COORDINATES - Distances along major and minor axes of error ellipses. 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 degrees. The solid sloping line, which may or may not lie close to the 45 degree line, is along the major axis of the error ellipse. The ellipse is drawn so that, on the average, it will include 95% of the points representing the laboratories.

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

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

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

SUMMARY -  
(At end of report)

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

REPL CFP -

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

REPL TAPPI -

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

PEPEAT -

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

PEPRCD -

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

TAPPI COLLABORATIVE REFERENCE PROGRAM  
 ANALYSIS T10-1 TABLE 1  
 BURSTING STRENGTH, PSI  
 TAPPI OFFICIAL TEST METHOD T403 49-76, PERKINS MODEL C

LAB CODE	SAMPLE G34 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER				SAMPLE G45 MEAN	NEWSPRINT 66 GRAMS PER SQUARE METER				TEST D. = 15		
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L121	19.03	1.00	.81	1.27	1.09	49.20	36.71	68.39	2.88	3.95	10C	#	L121
L134	17.73	-.30	-.24	.56	.51	12.47	-.03	-.05	.44	.60	10C	#	L134
L150	19.30	1.27	1.02	1.03	.94	13.00	.51	.94	1.07	1.46	10C	#	L150
L153	19.73	1.70	1.37	1.39	1.26	12.59	.09	.17	.86	1.18	10C	#	L153
L156	20.20	2.17	1.75	1.37	1.25	12.14	-.35	-.66	.35	.48	10C	#	L156
L167	17.68	-.35	-.28	.64	.58	47.34	34.85	64.92	.98	1.34	10C	#	L167
L183	18.27	.23	.19	1.05	.95	12.21	-.28	-.52	.51	.70	10C	#	L183
L191	17.07	-.97	-.78	1.18	1.07	12.59	.10	.19	1.02	1.40	10C	#	L191
L207	18.87	.83	.67	.83	.76	13.44	.95	1.76	.68	.93	10C	#	L207
L212	18.00	-.03	-.03	1.04	.94	12.67	.17	.32	.75	1.02	10C	#	L212
L223A	17.51	-.52	-.42	1.35	1.23	12.22	-.27	-.51	.70	.95	10C	#	L223A
L225	19.60	1.57	1.26	1.65	1.50	12.83	.34	.63	.99	1.35	10C	#	L225
L232	17.63	-.40	-.32	.81	.74	13.29	.79	1.48	1.36	1.87	10C	#	L232
L237A	18.93	.90	.73	.80	.73	12.93	.44	.82	.59	.81	10C	#	L237A
L237B	18.67	.63	.51	.72	.66	12.60	.11	.20	.51	.69	10C	#	L237B
L249	15.57	-2.16	-1.66	.91	.83	12.39	-.11	-.20	.58	.80	10C	#	L249
L261	18.24	.21	.17	.89	.72	12.58	.09	.16	.63	.86	10C	#	L261
L264	18.47	.43	.35	.74	.68	13.05	.56	1.04	.77	1.35	10C	#	L264
L274	17.63	-.40	-.32	.64	.58	12.31	-.19	-.35	.55	.76	10C	#	L274
L270	15.43	-2.60	-2.10	1.45	1.32	11.43	-1.07	-1.99	.62	.85	10C	#	L270
L305	17.37	-.67	-.54	.83	.76	13.66	1.16	2.17	.41	.56	10C	#	L305
L312	17.87	-.16	-.13	.82	.75	12.38	-.11	-.21	.37	.50	10C	#	L312
L315	19.07	1.03	.83	1.67	1.52	12.60	.11	.20	1.05	1.44	10C	#	L315
L321	19.73	1.70	1.37	1.03	.94	10.00	-2.49	-4.65	.65	.90	10C	X	L321
L326	19.37	1.33	1.00	1.23	1.12	11.53	-.97	-1.80	1.02	1.40	10C	#	L326
L330	17.97	-.17	-.15	1.39	1.26	12.09	-.41	-.76	1.23	1.69	10C	#	L330
L333	17.73	-.30	-.24	1.62	1.48	11.87	-.63	-1.17	.64	.88	10C	#	L333
L339	12.60	-5.43	-4.38	.74	.68	9.11	-4.38	-8.16	.75	1.02	10C	#	L339
L344	16.59	-1.45	-1.17	1.18	1.08	12.83	.34	.63	1.25	1.71	10C	#	L344
L356	18.70	.67	.54	1.66	.96	12.09	-.40	-.75	.49	.67	10C	#	L356
L358	18.67	.63	.51	.94	.85	12.60	.11	.20	.56	.77	10C	#	L358
L360	18.67	.63	.51	.92	.84	12.69	.20	.37	.52	.72	10C	#	L360
L366	17.97	-.07	-.05	1.11	1.01	11.61	-.88	-1.64	.59	.80	10C	#	L366
L366	18.76	.73	.59	1.83	1.67	13.49	1.00	1.86	.94	1.29	10C	#	L366
L568	15.17	-2.87	-2.31	1.49	1.35	11.34	-1.15	-2.15	.57	.77	10C	#	L568
L573	12.68	-5.35	-4.32	.93	.84	46.71	34.21	63.74	1.85	2.53	10C	#	L573
L582	15.20	-2.83	-2.28	1.33	1.21	12.56	.07	.12	.84	1.15	10C	#	L582
L599	18.27	.24	.19	.70	.64	12.73	.23	.43	.90	1.23	10C	#	L599
L625	18.77	.73	.59	1.02	.92	12.79	.30	.55	.58	.79	10C	#	L625
L684	19.60	1.57	1.26	.91	.83	12.21	-.29	-.53	.44	.61	10C	#	L684
L696	19.31	1.28	1.33	1.02	.93	53.00	40.51	75.47	3.68	5.04	10C	#	L696
L736	16.66	-1.37	-1.11	1.45	1.31	12.29	-.20	-.37	.71	.98	10C	#	L736
L744	18.37	.33	.27	1.04	.95	43.23	30.74	57.27	2.81	3.85	10C	#	L744
L757	16.83	-1.20	-.97	.82	.74	12.10	-.39	-.73	.69	.94	10C	#	L757
L759	18.77	.73	.59	1.54	1.40	12.57	.07	.14	.80	1.10	10C	#	L759

GP. MEAN * 18.03 PSI	GRAND MEAN * 12.49 PSI	TEST DETERMINATIONS * 15
SD MEANS * 1.24 PSI	SD OF MEANS * .54 PSI	38 LABS IN GRAND MEANS
AVERAGE SDR * 1.10 PSI		AVERAGE SDR * .73 PSI
GP. MEAN * 124.33 KILOPASCAL		GRAND MEAN * 96.14 KILOPASCAL

L128	18.60	.57	.46	1.30	1.18	50.40	37.91	70.62	2.23	3.05	10B	#	L128
L219	21.51	3.48	2.81	1.41	1.28	13.99	1.49	2.78	.57	.78	10T	#	L219
L242	19.73	1.70	1.37	1.01	.92	12.58	.08	.15	.62	.85	10T	#	L242
L250L	16.29	-1.74	-1.41	.90	.82	11.53	-.96	-1.79	.67	.92	10N	#	L250L
L260	16.95	-1.08	-.87	.98	.89	11.91	-.58	-1.08	.49	.67	10A	#	L260
L269	22.13	4.10	3.31	.83	.76	26.20	13.71	25.54	1.42	1.95	10A	#	L269
L484	10.66	-7.37	-5.95	.15	.14	10.11	-2.39	-4.45	.03	.04	10M	#	L484
L702	16.43	-1.60	-1.29	1.51	1.37	12.95	.46	.86	.64	.88	10X	#	L702
L704	18.33	.30	.24	3.56	3.23	12.21	-.28	-.53	1.57	2.16	10L	#	L704
L706	13.03	-5.00	-4.03	.88	.80	14.07	-.43	-.80	.63	.86	10X	#	L706

TOTAL NUMBER OF LABORATORIES REPORTING \* 55

Best values: G34 18.2 ± 2.1 psi  
 G45 12.5 ± 0.9 psi

The following laboratories were omitted from the grand means because of extreme test results: 121, 167, 339, 573, 696, 744.

ANALYSIS T10-1 TABLE 2  
BURSTING STRENGTH, PSI  
TAPPI OFFICIAL TEST METHOD T403 69-76, PERKINS MODEL C

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		G34	G45	MAJOR	MINOR	R.SDR	VAR			
L484	*	10.66	10.11	-7.64	-1.27	.09	10M	BURSTING STRENGTH	10 T6 40	PSI, REGMED WT/MOT, MANUAL CLAMP
L339	#	12.60	8.11	-6.02	-3.53	.85	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L573	#	12.68	46.71	-.25	34.63	1.69	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L706	*	13.03	12.07	-5.01	.31	.83	10X	BURSTING STRENGTH	10 T6 40	PSI: GIVE INSTR. MAKE, MODEL, CLAMP
L568	*	15.17	11.34	-3.00	-.72	1.06	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L582	*	15.20	12.56	-2.79	.48	1.18	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L279	#	15.43	11.43	-2.73	-.67	1.08	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L249	#	15.97	12.39	-2.05	.20	.81	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L2501	*	16.29	11.53	-1.87	-.69	.87	10N	BURSTING STRENGTH	10 T6 40	PSI, L&MARGY, MAN. CLAMP, 200, 65%RH
L702	*	16.43	12.95	-1.51	.69	1.13	10X	BURSTING STRENGTH	10 T6 40	PSI: GIVE INSTR. MAKE, MODEL, CLAMP
L344	#	16.59	12.83	-1.38	.55	1.40	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L336	#	16.66	12.29	-1.39	.00	1.15	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L757	#	16.83	12.10	-1.24	-.21	.84	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L260	*	16.95	11.91	-1.15	-.41	.78	10A	BURSTING STRENGTH	10 T6 40	PSI, PERKINS A, MANUAL CLAMP
L191	#	17.07	12.59	-.94	.24	1.24	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L305	#	17.37	13.66	-.49	1.25	.66	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L223A	#	17.51	12.22	-.55	-.19	1.09	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L24	#	17.63	12.31	-.42	-.13	.67	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L232	#	17.63	13.29	-.28	.84	1.30	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L167	#	17.68	47.34	4.70	34.52	.96	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L134	#	17.73	12.47	-.36	.02	.56	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L333	#	17.73	11.87	-.39	-.59	1.18	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L312	#	17.87	12.38	-.17	-.09	.63	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L366	#	17.97	11.61	-.20	-.86	.91	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L330	#	17.97	12.09	-.13	-.39	1.47	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L212	#	18.00	12.67	-.21	.18	.98	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L261	#	18.24	12.58	.22	.06	.79	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L183	#	18.27	12.21	.19	-.31	.83	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L599	#	18.27	12.73	.27	.20	.93	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L704	*	18.33	12.21	.26	-.33	2.70	10L	BURSTING STRENGTH	10 T6 40	PSI, PERKINS LC, MANUAL CLAMP
L744	#	18.37	43.23	4.86	30.35	2.47	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L264	#	18.47	13.05	.51	.49	.86	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L129	*	18.60	50.40	6.15	37.41	2.12	10B	BURSTING STRENGTH	10 T6 40	PSI, PERKINS B, MANUAL CLAMP
L360	#	18.67	12.69	.66	.10	.78	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L358	#	18.67	12.60	.64	.01	.81	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L237B	#	18.67	12.60	.64	.01	.63	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L356	#	18.70	12.09	.60	-.49	.81	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L386	#	18.76	13.49	.87	.89	1.48	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L759	#	18.77	12.57	.74	-.04	1.25	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L625	#	18.77	12.79	.77	.18	.86	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L207	#	18.87	13.44	.96	.81	.84	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L237A	#	18.93	12.93	.96	.30	.77	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L121	#	19.03	49.20	6.40	36.16	2.52	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L315	#	19.07	12.60	1.04	-.05	1.48	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L150	#	19.30	13.00	1.33	.31	1.20	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L696	#	19.31	53.00	7.24	39.88	2.98	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L326	#	19.37	11.53	1.18	-1.15	1.26	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L684	#	19.60	12.21	1.51	-.51	.72	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L225	#	19.60	12.83	1.60	.10	1.43	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L242	*	19.73	12.58	1.69	-.17	.88	10T	BURSTING STRENGTH	10 T6 40	PSI, L+W, MANUAL CLAMP
L153	#	19.73	12.59	1.70	-.16	1.22	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L321	X	19.73	10.00	1.31	-2.72	.92	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L158	#	20.20	12.14	2.09	-.67	.86	10C	BURSTING STRENGTH	10 T6 40	PSI, PERKINS C, MANUAL CLAMP
L219	*	21.51	13.99	3.66	.96	1.03	10T	BURSTING STRENGTH	10 T6 40	PSI, L+W, MANUAL CLAMP
L269	*	22.13	26.20	6.08	12.95	1.35	10A	BURSTING STRENGTH	10 T6 40	PSI, PERKINS A, MANUAL CLAMP
GMANS:		18.03	12.49			1.00				
		95% ELLIPSE:		3.24	1.32	WITH GAMMA * 8 DEGREES				

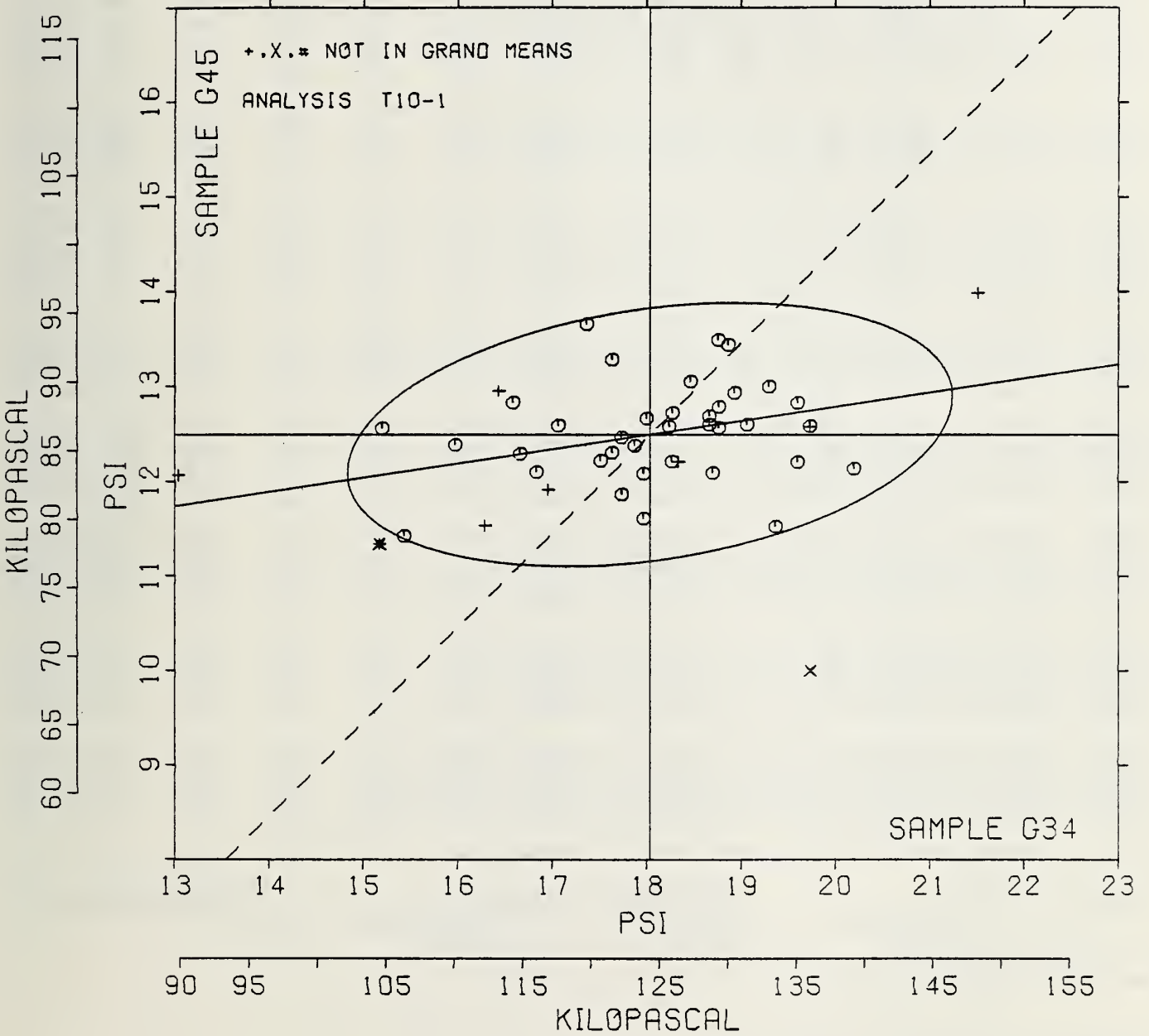
# BURSTING STRENGTH, MODEL C

SAMPLE G34 = 18.0 PSI

SAMPLE G45 = 12.5 PSI

SAMPLE G34 = 124.3 KILOPASCAL

SAMPLE G45 = 86.1 KILOPASCAL



TAPPI COLLABORATIVE REFERENCE PROGRAM  
ANALYSIS T10-2 TABLE 1  
BURSTING STRENGTH, PSI

TAPPI OFFICIAL TEST METHOD T403 GS-76, PERKINS MODEL C-A OR C WITH AIR OR HYDRAULIC CLAMPS

LAB CODE	COATED OFFSET BOOK					NEWSPRINT					TEST D. = 15		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L105	18.72	.41	.27	1.52	1.45	11.22	-1.14	-2.01	.72	1.11	10D	*	L105
L106C	17.93	-.37	-.24	1.10	1.05	48.57	36.20	63.65	3.12	4.78	10D	#	L106C
L115	18.67	.36	.23	1.08	1.04	12.51	.15	.26	.57	.88	10D	#	L115
L118	19.95	1.64	1.07	.78	.75	12.43	.07	.12	.53	.81	10D	#	L118
L125	16.57	-1.74	-1.13	2.04	1.95	12.79	.43	.76	1.01	1.55	10D	#	L125
L141	18.80	.49	.32	1.10	1.05	12.64	.28	.49	.61	.94	10D	#	L141
L148	19.47	1.16	.76	.83	.80	13.20	.84	1.47	.68	1.03	10D	#	L148
L155	21.40	3.09	2.02	.89	.85	12.54	.18	.31	.74	1.14	10D	#	L155
L157	19.47	1.16	.76	.83	.80	12.83	.46	.82	.48	.73	10D	#	L157
L159	16.00	-2.31	-1.50	1.38	1.32	12.02	-.34	-.60	.66	1.02	10D	#	L159
L162	17.00	-1.31	-.85	1.00	.96	11.20	-1.16	-2.05	.56	.86	10D	#	L162
L163	17.37	-.94	-.61	.72	.69	12.47	.11	.19	.60	.92	10D	#	L163
L166	19.97	1.66	1.08	1.23	1.18	12.91	.55	.97	.43	.65	10D	#	L166
L176	18.33	.03	.02	1.11	1.06	12.20	-.16	-.29	.54	.83	10D	#	L176
L185	19.53	1.23	.80	.93	.89	12.39	.03	.05	.63	.97	10D	#	L185
L194	17.47	-.84	-.55	.97	.93	46.43	34.07	59.90	2.18	3.33	10D	#	L194
L217	18.73	.43	.28	1.16	1.11	12.19	-.18	-.31	.82	1.26	10F	#	L217
L226B	18.52	.21	.14	1.18	1.13	47.02	34.66	60.93	2.58	3.95	10D	#	L226B
L226C	18.46	.15	.10	1.43	1.37	12.47	.10	.18	.62	.95	10D	#	L226C
L233	17.73	-.57	-.37	1.28	1.23	12.03	-.34	-.59	.78	1.19	10D	#	L233
L241	19.27	.96	.63	1.24	1.19	13.45	1.08	1.90	.81	1.23	10D	#	L241
L248	17.80	-.51	-.33	.95	.91	12.34	-.02	-.03	.46	.71	10G	#	L248
L255	15.67	-2.64	-1.72	1.23	1.18	46.33	33.97	59.72	2.66	4.08	10D	#	L255
L257A	17.20	-1.11	-.72	.94	.90	12.60	.24	.42	.51	.78	10D	#	L257A
L257B	19.40	1.09	.71	1.35	1.29	12.80	.44	.77	.94	1.44	10D	#	L257B
L257C	19.07	.76	.49	1.28	1.22	12.13	-.23	-.40	1.13	1.72	10D	#	L257C
L262	19.17	.86	.56	.94	.90	12.71	.35	.62	.37	.57	10D	#	L262
L275	16.05	-2.25	-1.47	1.06	1.02	13.25	.88	1.55	1.18	1.81	10D	#	L275
L280	19.69	1.39	.90	.90	.86	12.73	.37	.65	.70	1.08	10D	#	L280
L285	19.33	1.03	.67	.98	.93	12.55	.18	.32	.56	.85	10D	#	L285
L301A	19.13	.83	.54	.72	.69	12.31	-.05	-.09	.29	.45	10D	#	L301A
L301B	19.90	1.59	1.04	1.09	1.04	12.90	.54	.94	.66	1.00	10D	#	L301B
L309	17.57	-.74	-.48	1.00	.96	11.98	-.38	-.67	.74	1.12	10D	#	L309
L313	15.93	-2.38	-1.55	1.31	1.25	11.74	-.62	-1.10	.68	1.04	10F	#	L313
L341	17.93	-.37	-.24	.46	.44	12.34	-.02	-.04	.45	.69	10D	#	L341
L352	16.94	-1.37	-.89	.96	.92	11.87	-.49	-.86	.69	1.05	10D	#	L352
L390	14.90	-3.41	-2.22	.91	.87	11.57	-.80	-1.40	.73	1.12	10D	#	L390
L563	18.27	-.04	-.02	1.48	1.42	11.97	-.40	-.70	.67	1.03	10U	#	L563
L567	19.60	1.29	.84	.74	.70	12.80	.44	.77	.65	.99	10D	#	L567
L575	18.27	-.04	-.03	.80	.76	12.24	-.12	-.22	.64	.99	10J	#	L575
L581	19.83	1.53	.99	.90	.86	12.41	.05	.09	.35	.53	10D	#	L581
L652	16.40	-1.91	-1.24	1.68	1.61	46.67	34.30	60.31	3.47	5.31	10D	#	L652
L680	16.47	-1.84	-1.20	.92	.88	11.17	-1.20	-2.10	.60	.92	10D	#	L680
L698	18.59	.29	.19	1.15	1.10	50.60	38.24	67.23	2.92	4.47	10D	#	L698
L734	14.50	-3.81	-2.48	.89	.85	11.30	-1.06	-1.87	.53	.80	10D	#	L734
L743	19.93	1.62	1.06	1.16	1.11	13.33	.96	1.69	1.42	2.18	10D	#	L743

GR. MEAN = 18.31 PSI      GRAND MEAN = 12.36 PSI      TEST DETERMINATIONS = 15  
SD MEANS = 1.53 PSI      SD OF MEANS = .57 PSI      40 LABS IN GRAND MEANS  
AVERAGE SDR = 1.05 PSI      AVERAGE SDR = .65 PSI  
GR. MEAN = 126.23 KILOPASCAL      GRAND MEAN = 85.24 KILOPASCAL  
TOTAL NUMBER OF LABORATORIES REPORTING = 46  
Best values: G34 18.5 ± 2.6 psi  
G45 12.4 ± 1.0 psi

The following laboratories were omitted from the grand means because of extreme test results: 106C, 194, 226B, 255, 652, 698.

TAPPI COLLABORATIVE REFERENCE PROGRAM  
ANALYSIS 110-2 TABLE 2  
BURSTING STRENGTH, PSI

TAPPI OFFICIAL TEST METHOD T403 09-76, PERKINS MODEL C-A OR C WITH AIR OR HYDRAULIC CLAMPS

TAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		G34	G45	MAJOR	MINOR	R.SDR	VAR	
U34	#	14.50	11.30	-3.95	-.19	.83	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U390	#	14.90	11.57	-3.50	-.02	.99	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U255	#	15.67	46.33	4.96	33.71	2.63	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U313	#	15.93	11.74	-2.46	-.08	1.15	10I	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U159	#	16.00	12.02	-2.33	.18	1.17	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U275	#	16.05	13.25	-2.00	1.36	1.41	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U652	#	16.40	46.67	5.75	33.87	3.46	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U690	#	16.47	11.17	-2.06	-.76	.90	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U125	#	16.57	12.79	-1.60	.81	1.75	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U352	#	16.64	11.87	-1.44	-.17	.99	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U162	#	17.00	11.20	-1.53	-.84	.91	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U257A	#	17.20	12.60	-1.03	.48	.84	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U163	#	17.37	12.47	-.89	.32	.80	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U194	#	17.47	46.43	6.73	33.41	2.13	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U309	#	17.57	11.98	-.81	-.21	1.04	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U233	#	17.73	12.03	-.63	-.20	1.21	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U248	#	17.80	12.34	-.50	.09	.81	10G	BURSTING STRENGTH 10 T0 40 PSI, PERKINS C, A. CLAMP, TRANSDUCER
U106C	#	17.93	48.57	7.66	35.39	2.91	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U341	#	17.93	12.34	-.37	.06	.56	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U575	#	18.27	12.24	-.07	-.11	.87	10J	BURSTING STRENGTH 10 T0 40 PSI, PERKINS C, A. CLAMP, TRANSDUCER
U563	#	18.27	11.97	-.12	-.38	1.22	10U	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U176	#	18.33	12.20	-.01	-.17	.95	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U226C	#	18.46	12.47	.17	.07	1.16	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U226B	#	18.52	47.02	7.89	33.75	2.54	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U698	#	18.59	50.60	8.76	37.22	2.78	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U115	#	18.67	12.51	.38	.07	.96	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U105	#	18.72	11.22	.15	-1.21	1.28	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U217	#	18.73	12.19	.38	-.27	1.19	10F	BURSTING STRENGTH 10 T0 40 PSI, PERKINS C, H. CLAMP, TRANSDUCER
U141	#	18.80	12.64	.54	.16	.99	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U257C	#	19.07	12.13	.69	-.39	1.47	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U301A	#	19.13	12.31	.79	-.23	.57	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U262	#	19.17	12.71	.92	.15	.73	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U241	#	19.27	13.45	1.18	.84	1.21	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U295	#	19.33	12.55	1.04	-.05	.89	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U257B	#	19.40	12.80	1.16	.18	1.37	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U148	#	19.47	13.20	1.32	.56	.92	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U157	#	19.47	12.83	1.23	.20	.76	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U185	#	19.53	12.39	1.20	-.24	.93	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U567	#	19.60	12.80	1.36	.14	.85	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U280	#	19.65	12.73	1.43	.05	.97	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U531	#	19.83	12.41	1.50	-.29	.70	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U301B	#	19.90	12.90	1.67	.17	1.02	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U743	#	19.93	13.33	1.79	.58	1.64	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U118	#	19.95	12.43	1.61	-.30	.78	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U166	#	19.97	12.91	1.74	.17	.91	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
U155	#	21.40	12.54	3.05	-.51	.99	10D	BURSTING STRENGTH 10 T0 40 PSI, PERKINS CA OR C, AIR CLAMP
GMFANS:		18.31	12.36			1.00		
		95% ELLIPSE:		4.05	1.19			WITH GAMMA = 12 DEGREES

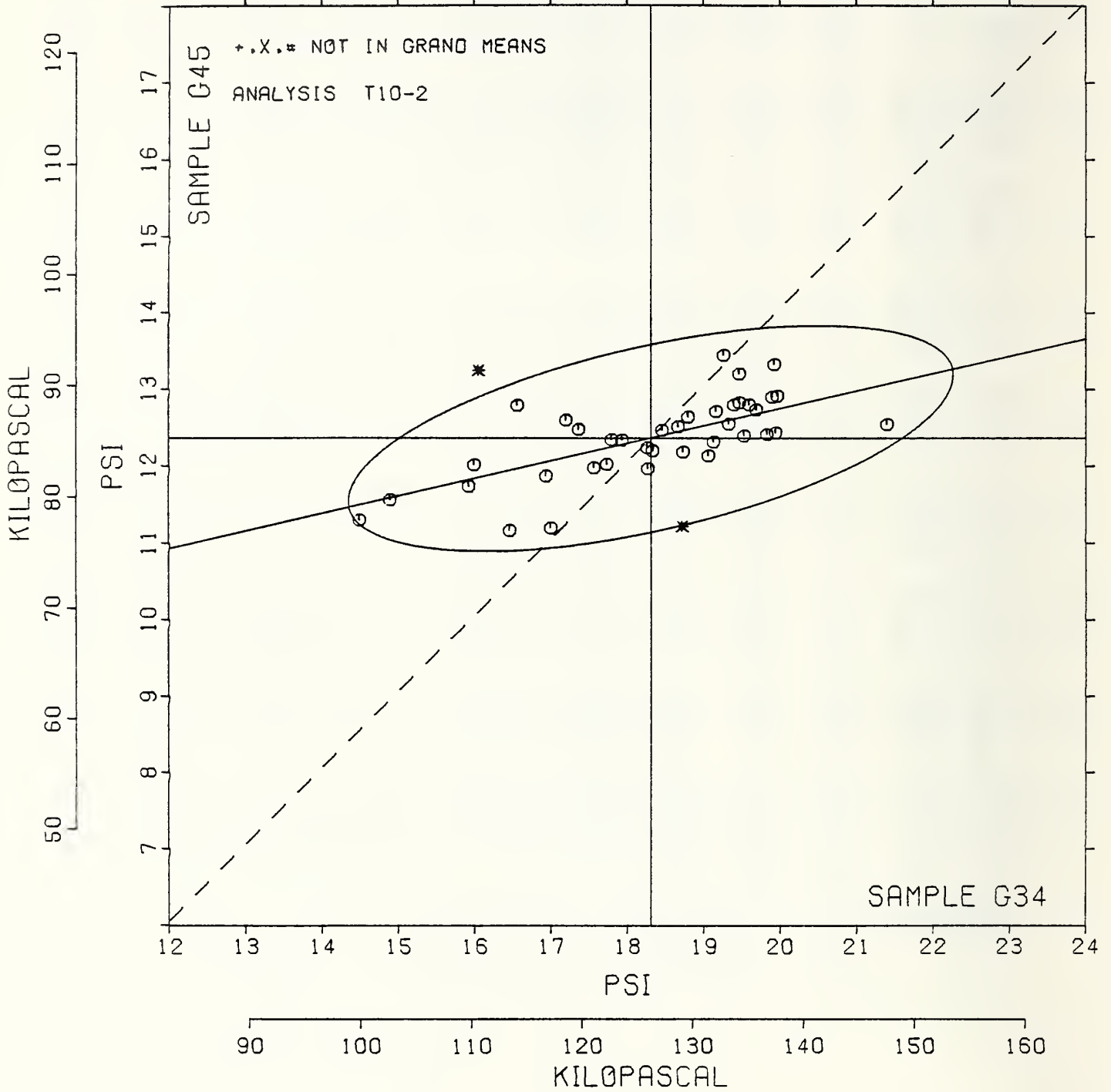
# BURSTING STRENGTH, MODEL C-A

SAMPLE G34 = 18.3 PSI

SAMPLE G45 = 12.4 PSI

SAMPLE G34 = 126 KILOPASCAL

SAMPLE G45 = 85 KILOPASCAL





BURSTING STRENGTH, PSI - HIGH RANGE  
TAPPI OFFICIAL TEST METHOD T403 09-76, PERKINS MODEL C OR C-A

TAB CODE	SAMPLE A77		INDEX 205 GRAMS PER SQUARE METER				SAMPLE E89		CORRUGATING MEDIUM 127 GRAMS PER SQUARE METER				TEST D. = 15		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB		
L103	56.7	-3.3	-1.14	2.3	.50	49.5	-1.1	-.45	2.4	.59	11C	0	L103		
L111	59.5	-.5	-.16	5.9	1.28	52.1	1.5	.59	4.5	1.09	11C	0	L107		
L116	62.1	2.1	.70	4.4	.96	51.0	.4	.16	3.3	.81	11D	0	L118		
L122	60.6	.6	.20	6.3	1.39	52.7	2.1	.86	5.7	1.37	11F	0	L122		
L126	58.0	-2.0	-.68	3.8	.83	47.5	-3.1	-1.22	3.8	.93	11D	0	L128		
L141	58.5	-1.5	-.52	4.5	.98	50.2	-.4	-.17	4.4	1.07	11D	0	L141		
L148	61.7	1.7	.57	4.9	1.07	51.2	.6	.24	3.7	.91	11D	0	L148		
L151	60.9	.9	.29	3.9	.86	49.2	-1.4	-.55	4.9	1.19	11D	0	L151		
L159	58.1	-1.9	-.63	4.1	.91	49.4	-1.2	-.46	3.0	.74	11D	0	L159		
L170	59.9	-.1	-.05	2.5	.54	49.1	-1.5	-.58	1.8	.44	11C	0	L170		
L176	58.3	-1.7	-.57	3.8	.83	49.1	-1.5	-.58	4.5	1.09	11D	0	L176		
L182	59.0	-1.0	-.34	5.7	1.25	51.2	.6	.24	3.9	.95	11D	0	L182		
L218	60.3	.3	.10	3.1	.69	53.9	3.3	1.31	3.2	.78	11D	0	L218		
L219	68.5	8.5	2.88	5.8	1.27	56.1	5.3	2.19	5.5	1.33	11C	0	L219		
L232	59.3	-.7	-.25	2.6	.57	52.9	2.3	.94	2.5	.61	11C	0	L232		
L237A	64.1	4.1	1.40	2.8	.61	54.8	4.2	1.68	3.6	.88	11C	0	L237A		
L237B	63.4	3.4	1.15	2.9	.63	55.0	4.4	1.76	3.7	.89	11C	0	L237B		
L238A	62.2	2.2	.74	4.4	.98	52.1	1.5	.61	6.4	1.55	11Y	0	L238A		
L248	54.7	-5.3	-1.81	4.1	.90	50.1	-.5	-.19	4.4	1.06	11Y	0	L248		
L278	53.0	-7.0	-2.39	4.2	.92	46.0	-4.6	-1.83	5.0	1.22	11C	0	L278		
L279	57.7	-2.3	-.77	5.6	1.22	47.6	-3.0	-1.19	5.3	1.28	11C	0	L279		
L280	64.3	4.3	1.46	7.8	1.72	51.9	1.3	.53	4.1	1.00	11D	0	L280		
L294	59.9	-.1	-.02	3.8	.84	46.4	-4.2	-1.67	5.0	1.22	11C	0	L294		
L303	58.7	-1.3	-.44	3.4	.75	48.2	-2.4	-.97	2.8	.68	11C	0	L303		
L311	60.3	.3	.09	3.9	.85	51.3	.7	.27	3.6	.87	11C	0	L311		
L330	61.7	1.7	.59	5.1	1.11	48.4	-2.1	-.85	4.7	1.13	11C	0	L330		
L333	58.3	-1.7	-.57	5.0	1.09	51.3	.7	.27	5.9	1.43	11C	0	L333		
L334	63.0	3.0	1.03	4.7	1.04	53.2	2.6	1.06	3.5	.86	11D	0	L334		
L339	58.0	-2.0	-.68	6.6	1.44	44.8	-5.8	-2.31	4.9	1.18	11C	0	L339		
L344	61.0	1.0	.34	6.0	1.31	52.1	1.5	.60	4.6	1.11	11C	0	L344		
L356	59.8	-.2	-.08	5.4	1.19	49.8	-.8	-.31	4.9	1.19	11C	0	L356		
L563	67.6	7.6	2.57	6.7	1.47	50.7	.1	.03	5.5	1.35	11Y	0	L563		
L565	58.0	-2.0	-.68	2.9	.64	49.8	-.8	-.33	1.7	.42	11D	0	L565		
L567	59.1	-.9	-.30	4.7	1.03	52.2	1.6	.64	4.3	1.04	11D	0	L567		
L575	60.6	.6	.21	4.9	1.07	51.3	.7	.27	3.7	.91	11L	0	L575		
L576	60.7	.7	.23	4.8	1.05	55.4	4.8	1.92	2.7	.65	11F	0	L576		
L591	60.8	.8	.27	4.9	1.08	51.1	.5	.22	4.1	.99	11D	0	L591		
L599	60.1	.1	.03	5.3	1.15	50.8	.2	.09	4.4	1.07	11C	0	L599		
L604	57.6	-2.4	-.80	5.7	1.26	46.9	-3.7	-1.46	3.6	.87	11C	0	L604		
L622	54.7	-5.3	-1.80	6.4	1.40	47.0	-3.5	-1.41	5.8	1.40	11F	0	L622		
L650	59.8	-.2	-.07	3.2	.70	48.1	-2.5	-1.01	4.4	1.08	11D	0	L650		
L651	60.8	.8	.27	6.7	1.47	52.4	1.8	.72	4.8	1.17	11D	0	L651		
L680	58.0	-2.0	-.68	4.9	1.08	48.5	-2.1	-.82	4.5	1.10	11D	0	L680		
L730	60.6	.6	.20	4.3	.94	48.7	-1.9	-.74	4.5	1.10	11D	0	L730		
L736	53.5	-6.5	-2.22	4.4	.97	50.3	-.3	-.12	4.9	1.19	11C	0	L736		
L743	61.5	1.5	.52	5.8	1.28	52.1	1.5	.62	6.1	1.47	11D	0	L743		
GP. MEAN	60.0	PSI				GRAND MEAN	50.6	PSI					TEST DETERMINATIONS = 15		
SD MEANS	2.9	PSI				SD OF MEANS	2.5	PSI					45 LABS IN GRAND MEANS		
			AVERAGE SDR	4.6	PSI				AVERAGE SDR	4.1	PSI				
GP. MEAN	413.7	KILOPASCAL				GRAND MEAN	348.8	KILOPASCAL							
L242	61.7	1.7	.59	5.6	1.22	51.1	.5	.20	5.3	1.28	11T	0	L242		
L250L	57.6	-2.4	-.81	5.4	1.19	48.1	-2.4	-.98	2.6	.62	11N	0	L250L		
L274	59.1	-.9	-.32	4.5	.99	50.8	.2	.08	4.0	.98	11R	0	L274		
L290	59.9	-.1	-.05	3.9	.86	53.5	2.9	1.15	3.0	.72	11A	0	L290		
L393	61.9	1.9	.66	4.4	.97	55.9	5.3	2.11	3.1	.76	11B	0	L393		
L394	64.7	4.7	1.61	4.5	.98	55.7	5.1	2.03	5.1	1.23	11H	0	L394		
L570	60.2	.2	.07	3.3	.72	52.8	2.2	.88	4.6	1.12	11H	0	L570		
L593	70.3	10.3	3.51	7.5	1.64	52.6	2.0	.80	6.4	1.56	11J	0	L593		
L598	72.9	12.9	4.39	5.3	1.16	56.0	5.4	2.16	4.5	1.09	11B	0	L598		
L625	55.8	-4.2	-1.44	4.4	.96	53.0	2.4	.98	6.5	1.58	11A	0	L625		
L737	65.6	5.6	1.90	6.4	1.41	74.5	23.9	9.53	4.9	1.19	11H	0	L737		
L738	65.3	5.3	1.81	7.3	1.59	47.1	-3.5	-1.38	6.9	1.68	11A	0	L738		
L754	65.7	5.7	1.94	4.8	1.06	55.7	5.1	2.04	3.5	.86	11N	0	L754		

TOTAL NUMBER OF LABORATORIES REPORTING = 59

Best values: A77 60 ± 5 psi  
E89 51 ± 4 psi

BURSTING STRENGTH, PSI - B'IGH RANGE  
TAPPI OFFICIAL TEST METHOD T403 GS-76, PERKINS MODEL C OR C-A

TAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		A77	E89	MAJOR	MINOR	R.SDR	VAR			
L278	4	53.0	46.0	-8.4	.6	1.07	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L276	*	53.5	50.3	-5.4	3.7	1.08	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L248	4	54.7	50.1	-4.5	2.8	.98	11I	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, A.CLAMP, TRANSDUCER
L622	*	54.7	47.0	-6.4	.4	1.40	11E	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L625	*	55.8	53.0	-1.9	4.5	1.27	11A	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS A, MANUAL CLAMP
L103	4	56.7	49.5	-3.3	1.1	.55	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L2501	*	57.6	48.1	-3.4	-0.5	.91	11N	BURSTING	STRENGTH	40 T8 85 PSI, LHMARGY, MAN. CLAMP, 20C, 65%PH
L604	4	57.6	46.9	-4.1	-1.5	1.07	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L279	4	57.7	47.6	-3.6	-1.0	1.25	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L565	4	58.0	49.8	-2.1	.6	.53	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L339	4	58.0	44.8	-5.1	-3.4	1.31	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L128	4	58.0	47.5	-3.4	-1.2	.88	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L680	4	58.0	48.5	-2.8	.4	1.09	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L159	4	58.1	49.4	-2.2	.2	.82	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L176	4	58.3	49.1	-2.2	-.2	.56	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L333	4	58.3	51.3	-.9	1.5	1.26	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L141	4	58.5	50.2	-1.5	.6	1.02	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L303	4	58.7	48.2	-2.5	-1.1	.71	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L182	4	59.0	51.2	-.4	1.1	1.10	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L274	*	59.1	50.8	-.6	.7	.98	11H	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L567	4	59.1	52.2	.3	1.8	1.04	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L232	4	59.3	52.9	.8	2.3	.59	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L107	4	59.5	52.1	.5	1.5	1.19	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L356	4	59.8	49.8	-.7	-.5	1.19	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L650	4	59.8	48.1	-1.7	-1.9	.89	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L290	*	59.9	53.5	1.6	2.4	.79	11A	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS A, MANUAL CLAMP
L170	4	59.9	49.1	-1.0	-1.1	.49	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L294	4	59.9	46.4	-2.6	-3.3	1.03	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L599	4	60.1	50.8	.2	.1	1.11	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L570	*	60.2	52.8	1.5	1.6	.92	11B	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L311	4	60.3	51.3	.6	.4	.86	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L218	4	60.3	53.9	2.2	2.4	.73	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L730	4	60.6	48.7	-.6	-1.8	1.02	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L122	4	60.6	52.7	1.8	1.3	1.38	11F	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, H.CLAMP, TRANSDUCER
L575	4	60.6	51.3	.9	.2	.99	11L	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, A.CLAMP, TRANSDUCER
L576	4	60.7	55.4	3.4	3.4	.85	11P	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS LC, MANUAL CLAMP
L651	4	60.8	52.4	1.7	1.0	1.32	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L531	4	60.8	51.1	1.0	-.0	1.04	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L151	4	60.9	49.2	-.2	-1.6	1.03	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L344	4	61.0	52.1	1.7	.6	1.21	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L743	4	61.5	52.1	2.2	.3	1.38	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L148	4	61.7	51.2	1.7	-.5	.99	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L242	*	61.7	51.1	1.7	-.6	1.25	11T	BURSTING	STRENGTH	40 T8 85 PSI, L*W, MANUAL CLAMP
L330	4	61.7	48.4	.1	-2.8	1.12	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L393	*	61.9	55.9	4.7	3.0	.86	11B	BURSTING	STRENGTH	40 T8 85 PSI, MESSMER, MANUAL CLAMP
L118	4	62.1	51.0	1.5	-.9	.89	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L238A	4	62.2	52.1	2.7	-.1	1.26	11Y	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L334	4	63.0	53.2	4.0	.3	.95	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L237B	4	63.4	55.0	5.4	1.5	.76	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L237A	4	64.1	54.8	5.8	.9	.75	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L290	4	64.3	51.9	4.2	-1.5	1.36	11D	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L394	*	64.7	55.7	6.8	1.2	1.10	11H	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L738	*	65.3	47.1	2.2	-6.0	1.64	11A	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS A, MANUAL CLAMP
L737	*	65.6	74.5	18.9	13.6	1.30	11H	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L754	*	65.7	55.7	7.6	.6	.96	11N	BURSTING	STRENGTH	40 T8 85 PSI, LHMARGY, MAN. CLAMP, 20C, 65%PH
L563	*	67.6	50.7	6.1	-4.5	1.41	11Y	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS CA, AIR CLAMP
L219	*	68.5	56.1	10.1	-.8	1.30	11C	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS C, MANUAL CLAMP
L593	*	70.3	52.6	9.4	-4.6	1.60	11J	BURSTING	STRENGTH	40 T8 85 PSI, PERKINS JUMBO, HAND DRIVEN
L598	*	72.9	56.9	13.6	-3.5	1.12	11B	BURSTING	STRENGTH	40 T8 85 PSI, MESSMER, MANUAL CLAMP
GMEANS:		60.0	50.6			1.00				
		95% ELLIPSE:		8.8	4.5			WITH GAMMA = 37 DEGREES		

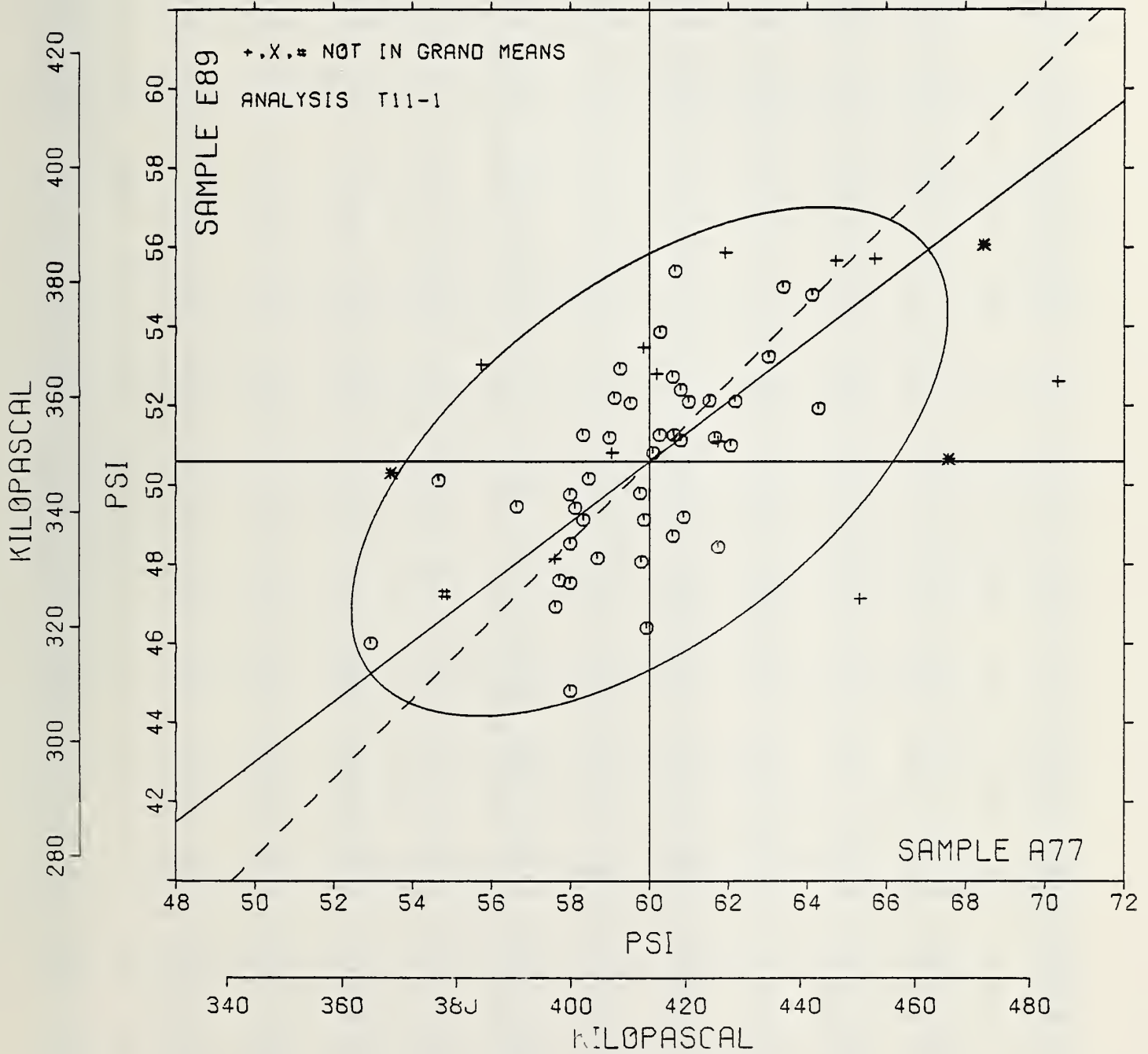
# BURSTING STRENGTH, HIGH RANGE

SAMPLE A77 = 60.0 PSI

SAMPLE E89 = 50.6 PSI

SAMPLE A77 = 414 KILOPASCAL

SAMPLE E89 = 349 KILOPASCAL



TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS  
TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

TAB CODE	SAMPLE G36 ENVELOPE 74 GRAMS PER SQUARE METER					SAMPLE G47 WRITING 59 GRAMS PER SQUARE METER					TEST D. # 15		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L103	60.60	-1.86	-.60	1.24	.57	38.03	-.37	-.18	1.01	.85	15T	#	L103
L115	61.73	-.73	-.23	1.49	.68	37.13	-1.27	-.61	1.68	1.42	15T	#	L105
L116	59.93	-2.53	-.81	2.15	.99	39.07	.67	.32	4.71	3.97	15T	#	L107
L115	58.20	-4.26	-1.37	2.11	.97	36.10	-2.30	-1.11	1.57	1.32	15C	#	L115
L116	59.40	-3.06	-.98	1.59	.73	36.03	-2.37	-1.15	.48	.41	15T	#	L116
L121	63.73	1.27	.41	2.25	1.03	40.00	1.60	.78	.82	.69	15T	#	L121
L122	63.12	.66	.21	1.28	.59	38.86	.46	.22	.99	.83	15C	#	L122
L124	61.07	-1.40	-.45	1.98	.91	38.73	.33	.16	.80	.67	15T	#	L124
L128	63.07	.60	.19	1.58	.72	39.33	.93	.45	.72	.61	15T	#	L128
L131	65.60	3.14	1.01	2.50	1.15	40.20	1.80	.87	1.21	1.02	15A	#	L131
L134	65.07	2.60	.84	.80	.37	39.93	1.53	.74	.96	.81	15C	#	L134
L139	64.20	1.74	.56	1.70	.78	39.67	1.27	.61	.72	.61	15T	#	L139
L141	57.93	-4.53	-1.45	2.09	.96	37.47	-.93	-.45	.58	.49	15T	#	L141
L143	57.87	-4.60	-1.48	2.75	1.26	36.07	-2.33	-1.13	1.10	.93	15T	#	L143
L148	62.93	.47	.15	1.98	.91	39.00	.60	.29	1.25	1.06	15T	#	L148
L150	59.40	-3.06	-.98	2.75	1.26	36.80	-1.60	-.77	1.37	1.16	15T	#	L150
L153	60.60	-1.86	-.60	3.42	1.57	37.20	-1.20	-.58	.86	.73	15C	#	L153
L155	61.77	-1.40	-.45	8.71	3.99	36.71	-1.66	-.82	.87	.73	15T	#	L155
L157	60.33	-2.13	-.68	2.47	1.13	36.70	-1.70	-.82	1.33	1.12	15T	#	L157
L158	61.73	-.73	-.23	2.25	1.03	35.80	-2.60	-1.26	2.27	1.92	15R	#	L158
L159	63.20	.74	.24	2.14	.98	37.27	-1.13	-.55	2.46	2.08	15L	#	L159
L162	57.87	-4.60	-1.48	2.77	1.27	34.33	-4.07	-1.97	2.35	1.98	15T	#	L162
L163	61.80	-.66	-.21	2.93	1.34	38.37	-.03	-.02	.67	.56	15T	#	L163
L166	61.60	-.86	-.28	2.41	1.11	37.47	-.93	-.45	.93	.79	15T	#	L166
L167	64.80	2.34	.75	1.47	.67	39.73	1.33	.65	.80	.67	15C	#	L167
L170	61.80	-.66	-.21	.86	.39	38.07	-.33	-.16	.96	.81	15T	#	L170
L173B	66.07	3.60	1.16	2.49	1.14	41.27	2.97	1.39	1.67	1.41	15T	#	L173B
L176	64.93	2.47	.79	1.49	.68	39.67	1.27	.61	2.02	1.71	15T	#	L176
L182A	61.73	-.73	-.23	3.24	1.48	33.87	-4.53	-2.20	2.61	2.20	15A	#	L182A
L182T	61.60	-.86	-.28	2.69	1.23	38.40	.00	.00	.91	.77	15T	#	L182T
L183	62.33	-.13	-.04	1.84	.84	38.50	.10	.05	.80	.68	15T	#	L183
L185	64.07	1.60	.51	2.71	1.24	39.10	.70	.34	.89	.75	15T	#	L185
L189	63.00	.54	.17	1.81	.83	34.80	-3.60	-1.74	1.42	1.20	15T	#	L189
L191	65.47	3.00	.96	1.92	.88	39.07	.67	.32	.79	.59	15T	#	L191
L194	65.63	3.17	1.02	1.46	.67	39.80	1.40	.68	.53	.44	15T	#	L194
L206	64.27	1.80	.58	2.12	.97	39.83	1.43	.69	.86	.72	15T	#	L206
L207	65.44	22.98	7.38	2.28	1.04	57.74	19.34	9.37	1.62	1.37	15R	#	L207
L211	59.53	-2.93	-.94	1.46	.67	36.40	-2.00	-.97	.63	.53	15R	#	L211
L212	61.00	-1.46	-.47	2.39	1.09	37.83	-.57	-.27	1.14	.96	15T	#	L212
L213	63.93	1.47	.47	1.94	.89	37.80	-.60	-.29	.68	.57	15T	#	L213
L217	63.62	1.16	.37	2.18	1.00	38.17	-.23	-.11	1.42	1.20	15Q	#	L217
L219	63.33	.87	.28	2.09	.96	38.60	.20	.10	.74	.62	15L	#	L219
L223	63.97	1.51	.48	1.78	.82	38.55	.15	.07	1.08	.91	15P	#	L223
L226B	63.93	1.47	.47	1.87	.86	39.33	.93	.45	.82	.69	15T	#	L226B
L226C	61.73	-.73	-.23	1.30	.60	38.27	-.13	-.06	.75	.63	15T	#	L226C
L228	61.33	-1.13	-.36	1.40	.64	38.93	.53	.26	.98	.74	15T	#	L228
L232	71.07	8.60	2.76	1.83	.84	41.87	3.47	1.68	1.30	1.10	15T	#	L232
L233	57.60	-4.86	-1.56	1.59	.73	34.33	-4.07	-1.97	1.54	1.30	15T	#	L233
L237A	60.20	-2.26	-.73	1.86	.85	36.87	-1.53	-.74	.74	.63	15T	#	L237A
L237B	62.67	.20	.07	1.50	.68	38.93	.53	.26	.80	.67	15T	#	L237B
L238A	74.47	12.20	3.85	14.73	6.74	37.47	-.93	-.45	2.10	1.77	15T	#	L238A
L241	64.87	2.40	.77	.92	.42	40.20	1.80	.87	.41	.35	15T	#	L241
L242	64.20	1.73	.56	2.70	1.24	40.06	1.66	.80	1.00	.85	15Q	#	L242
L244	64.87	2.40	.77	1.55	.71	40.00	1.60	.78	.60	.50	15C	#	L244
L248	65.42	2.95	.95	1.58	.72	39.09	.69	.34	.88	.74	15J	#	L248
L249	61.47	-1.00	-.32	2.20	1.01	37.60	-.80	-.39	.60	.51	15T	#	L249
L254	61.60	-.86	-.28	2.85	1.30	38.27	-.13	-.06	.88	.74	15T	#	L254
L255	60.30	-2.46	-.79	2.10	.96	37.20	-1.20	-.58	.86	.73	15T	#	L255
L257A	63.47	1.00	.32	3.34	1.53	36.00	-2.40	-1.16	3.38	2.85	15C	#	L257A
L257B	63.97	1.40	.45	2.56	1.17	41.13	2.73	1.32	1.46	1.23	15C	#	L257B
L257C	60.40	-2.06	-.66	3.31	1.52	37.20	-1.20	-.58	1.01	.85	15C	#	L257C
L259	62.33	-.13	-.04	2.50	1.14	38.20	-.20	-.10	.94	.79	15T	#	L259
L261	59.37	-3.10	-.99	2.51	1.15	35.90	-2.50	-1.21	.95	.80	15T	#	L261
L262	60.67	-1.80	-.58	1.18	.54	37.27	-1.13	-.55	.59	.50	15T	#	L262
L264	62.93	.47	.15	1.03	.47	41.80	3.40	1.65	1.15	.97	15T	#	L264

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS  
TAPPI TENTATIVE TEST METHOD T414 T8-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	SAMPLE G36 MEAN		ENVELOPE 74 GRAVE PER SQUARE METER			SAMPLE G47 MEAN		WRITING 50 GRAMS PER SQUARE METER			TEST D. = 15		
	DEV	N.DEV	SDR	R.SDR	DEV	N.DEV	SDR	P.SDR	VAP	F	LAB		
L273	56.73	-2.73	-0.88	2.37	1.09	38.77	.37	.18	1.22	1.03	157	#	L273
L274	63.47	1.00	.32	2.20	1.01	39.73	1.33	.65	2.12	1.79	157	#	L274
L275	63.13	.67	.21	2.36	1.08	38.97	.57	.27	.64	.54	157	#	L275
L278	71.33	8.87	2.85	1.80	.82	43.53	5.13	2.49	1.19	1.00	157	#	L278
L279	60.13	-2.33	-0.75	1.41	.64	37.07	-1.33	-.65	1.10	.93	157	#	L279
L287	67.27	-2.29	-.71	2.76	1.27	73.73	35.33	17.11	1.16	.98	181	#	L280
L281	55.67	-2.89	-.90	3.41	1.74	38.50	.10	.05	1.22	1.03	157	#	L281
L285	69.20	6.74	2.16	3.38	1.55	44.33	8.93	2.87	1.91	1.61	157	#	L285
L288	62.93	.47	.15	2.94	1.35	90.93	42.53	20.60	2.02	1.70	157	#	L288
L289	63.93	1.47	.47	1.79	.82	36.60	-1.80	-.87	1.84	1.55	157	#	L290
L291	61.27	-1.20	-.38	2.05	.94	38.57	.17	.08	1.13	.95	15A	#	L291
L301A	59.47	-3.00	-.96	1.51	.66	37.40	-1.00	-.48	1.02	.86	150	#	L301A
L303	61.73	0.73	.23	3.17	1.45	37.83	-.57	-.27	.59	.80	151	#	L303
L305	64.83	2.07	.66	2.36	1.17	43.07	4.67	2.26	1.49	1.25	157	#	L305
L306	64.90	2.34	.75	2.96	1.36	39.93	1.53	.74	.79	.59	157	#	L306
L311	64.93	2.47	.78	2.34	1.07	38.63	.23	.11	.67	.56	157	#	L311
L312	66.00	3.54	1.14	2.42	1.11	39.60	1.20	.58	1.35	1.14	157	#	L312
L313	71.37	9.40	3.02	2.00	.91	82.20	3.80	1.84	.88	.74	151	#	L313
L315	61.07	-1.40	-.46	2.58	1.18	38.13	-.27	-.13	.92	.77	157	#	L315
L321	67.53	-1.93	-.62	3.25	1.49	32.93	-5.47	-2.68	1.28	1.08	157	#	L321
L328	63.83	1.67	.34	.85	.39	40.77	2.37	1.15	2.06	1.73	157	#	L328
L333	59.30	-2.66	-.86	2.78	1.27	36.97	-1.43	-.69	1.38	1.16	187	#	L333
L334	60.67	1.80	-.58	2.16	.99	38.93	.53	.26	3.26	2.75	157	#	L334
L336	69.13	2.33	.75	2.39	1.09	36.97	-1.43	-.69	.88	.72	157	#	L336
L344	67.67	5.00	1.61	2.33	1.06	42.03	3.63	1.76	1.34	1.13	150	#	L344
L345	66.67	4.20	1.35	3.02	1.38	39.07	.67	.32	.88	.74	187	#	L345
L352	15.95	-46.82	-14.93	.83	.24	38.81	1.41	.68	.93	.78	180	#	L352
L358	54.84	-7.62	-2.48	1.85	.71	30.29	-8.11	-3.93	.98	.83	157	#	L358
L360	61.90	0.56	.18	.83	.38	35.47	-2.93	-1.42	.48	.41	157	#	L360
L372	61.60	0.86	-.28	2.95	1.35	39.00	.60	.29	1.00	.84	157	#	L372
L382	65.27	2.74	.88	1.82	.83	38.73	.33	.16	.96	.81	157	#	L382
L386	61.87	0.60	.19	2.45	1.12	37.13	-1.27	-.61	.83	.70	187	#	L386
L388	74.93	12.47	4.00	1.71	.78	84.40	16.00	7.75	.83	.70	187	#	L388
L390	61.33	-0.13	-.36	2.87	1.31	38.93	.83	.26	1.10	.93	157	#	L390
L396A	62.90	0.66	-0.10	6.45	2.95	33.73	-4.67	-2.26	1.49	1.25	187	#	L396A
L442	66.47	3.94	1.26	2.35	1.08	39.67	1.27	.61	1.05	.88	157	#	L442
L484	90.87	28.20	9.05	4.39	2.01	43.47	5.07	2.46	7.27	6.13	157	#	L484
L557	62.20	-.26	-.08	1.97	.50	39.27	.87	.42	1.51	1.27	157	#	L557
L562	62.87	.40	.13	2.03	.93	38.67	.27	.13	1.23	1.04	157	#	L562
L565	62.47	.00	.00	1.64	.75	38.67	.27	.13	1.18	.99	157	#	L565
L566	59.83	-2.93	-.94	2.47	1.13	36.17	-2.23	-1.08	.92	.77	157	#	L566
L567	63.72	1.27	.41	1.83	.84	40.13	1.73	.84	.64	.54	150	#	L567
L574	64.80	2.34	.75	5.00	2.29	39.13	.73	.36	1.19	1.00	157	#	L574
L575	62.31	0.16	.05	1.33	.61	38.16	0.24	-.12	1.41	1.19	151	#	L575
L576	68.47	6.00	1.93	1.25	.57	41.67	3.27	1.58	4.05	3.41	187	#	L576
L580	63.40	.94	.30	1.50	.66	40.49	2.00	.97	.74	.62	157	#	L580
L581	63.20	.74	.24	3.15	1.44	39.22	.82	.40	.98	.82	150	#	L581
L589	61.67	-.80	-.26	2.13	.97	38.57	.17	.08	.80	.67	157	#	L589
L604	60.93	-1.53	-.49	2.37	1.09	36.73	0.67	-.81	1.22	1.03	157	#	L604
L606	72.40	9.94	3.19	2.56	1.17	41.93	3.53	1.71	1.28	1.08	157	#	L606
L617	65.27	2.80	.90	3.17	1.45	36.87	-1.53	-.74	1.41	1.19	157	#	L610
L622	39.53	-22.93	-7.36	1.46	.67	26.70	-11.70	-5.67	1.07	.90	151	#	L622
L625	68.00	5.54	1.78	5.90	2.70	46.80	8.40	4.07	2.81	2.37	157	#	L625
L626	62.33	.07	.02	1.64	.75	39.22	.82	.40	.61	.51	151	#	L626
L651	56.80	-8.66	-1.82	1.66	.76	38.13	-.27	-.13	1.60	1.35	157	#	L651
L654	56.93	-5.53	-1.78	1.16	.53	36.73	-1.67	-.81	.70	.59	157	#	L654
L675	67.47	2.00	-.64	2.39	1.09	34.53	-3.87	-1.87	1.73	1.46	157	#	L670
L676	61.73	0.73	-.23	2.12	.97	38.13	-.27	-.13	1.13	.95	157	#	L676
L680	32.33	-30.13	-9.67	.42	.28	40.40	2.00	.97	1.18	1.00	157	#	L680
L684	63.20	.74	.24	1.66	.76	41.13	2.73	1.32	1.36	1.14	151	#	L684
L685	64.27	1.80	.58	2.49	1.14	76.93	38.53	19.66	1.49	1.25	157	#	L685
L692	62.00	-0.46	-.15	2.20	1.01	37.10	-1.30	-.63	.89	.75	157	#	L692
L696	63.73	1.27	.41	2.99	1.37	39.87	1.47	.71	1.06	.89	157	#	L696
L697	63.80	1.34	.43	1.52	.70	35.43	-2.97	-1.44	1.08	.91	157	#	L697
L698	64.33	1.87	.60	1.54	.71	41.13	2.73	1.32	3.14	2.64	151	#	L698

TEARING STRENGTH, GPAMS - PRIMARILY PRINTING PAPERS  
TAPPI TENTATIVE TEST METHOD T414 TS-66, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	SAMPLE G36		ENVELOPE 74 GPAMS PER SQUARE METER			SAMPLE G47		WRITING 59 GPAMS PER SQUARE METER			TEST D. - 15		
	MEAN	DEV	%DEV	SDR	R.SDR	MEAN	DEV	%DEV	SDR	R.SDR	VAP	F	LAB
L704	56.27	-6.20	-1.99	2.25	1.03	36.13	-2.27	-1.10	1.47	1.24	15T	*	L704
L705	52.20	-10.26	-3.30	12.52	5.73	54.47	16.07	7.78	13.79	11.63	15T	*	L705
L738	59.13	-3.33	-1.07	3.25	1.40	37.47	-0.93	-0.45	3.04	2.57	15T	*	L738
L743	61.03	-.53	-.17	1.87	.86	39.40	1.00	.48	1.39	1.17	15L	*	L743
L766S	60.67	-1.80	-0.58	2.47	1.13	38.07	-0.33	-0.16	.70	.59	15T	*	L766S
L758	69.49	6.02	1.93	4.46	2.04	44.18	5.78	2.80	1.53	1.29	15T	*	L758
L759	71.33	8.87	2.85	11.18	5.12	38.13	-.27	-.13	1.13	.95	15T	X	L759
L760A	57.52	-4.93	-1.58	2.03	.93	36.07	-2.33	-1.13	.75	.63	15P	*	L760A
L760B	59.73	-3.73	-1.20	1.87	.86	37.53	-.87	-.42	.92	.77	15L	*	L760B
L760C	58.87	-3.60	-1.16	2.03	.93	36.53	-1.87	-.90	.79	.67	15R	*	L760C
L760D	59.27	-3.20	-1.03	1.79	.82	37.03	-1.37	-.66	.74	.63	15T	*	L760D
GR. MEAN = 62.46 GRAMS			GRAND MEAN = 38.40 GRAMS			TEST DETERMINATIONS = 15							
SD MEANS = 3.11 GRAMS			SD OF MEANS = 2.06 GRAMS			127 LABS IN GRAND MEANS							
AVERAGE SDR = 2.18 GRAMS			AVERAGE SDR = 1.19 GRAMS										
GR. MEAN = 612.6 MILLINEWTON			GRAND MEAN = 376.6 MILLINEWTON										
L250T	69.57	7.10	2.28	2.55	1.17	41.98	3.58	1.73	1.00	.85	15R	*	L250T
L326	62.07	-.40	-.13	2.19	1.00	39.60	1.20	.58	1.33	1.12	15N	*	L326
L330	61.60	-.86	-.28	2.29	1.05	38.40	.00	.00	1.24	1.05	15N	*	L330
L341	60.13	-2.33	-.75	1.55	.71	36.73	-1.67	-.81	.80	.67	15N	*	L341
L356	60.13	-2.33	-.75	2.85	1.30	37.37	-1.03	-.50	1.42	1.20	15N	*	L356
L585	79.60	17.14	5.50	1.35	.62	52.80	14.40	6.97	.94	.79	15E	*	L585
L706	16.93	-45.53	-14.62	.80	.37	41.53	3.13	1.52	2.67	2.25	15X	*	L706
L734	72.11	9.64	3.10	11.27	5.16	34.99	-3.41	-1.65	1.02	.86	15N	*	L734
L746P	62.27	-.20	-.06	2.79	1.28	39.97	1.57	.76	.97	.82	15N	*	L746P
L754	67.73	5.27	1.69	1.05	.48	42.11	3.71	1.80	1.18	1.00	15H	*	L754

TOTAL NUMBER OF LABORATORIES REPORTING = 151

Best values: G36 62.3 ± 5.2 grams  
G47 38.4 ± 3.4 grams

The following laboratories were omitted from the grand means because of extreme test results: 238A, 280, 288, 352, 388, 484, 680, 685, 705.

Data from the following laboratories were not understood: 207, 622.

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS  
TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	F	MEANS		COORDINATES		AVG R. SDR	VAR	PROPERTY	TEST INSTRUMENT	CONDITIONS
		G36	G47	MAJOR	MINOR					
L352	#	15.95	39.81	-39.88	24.65	.51	15C	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (W.AIR CLAMP)
L776	#	16.93	41.53	-37.76	25.64	1.31	15X	TEARING STRENGTH	35 T6	110G: GIVE INSTRUMENT MAKE,MODEL
L686	#	32.33	40.40	-25.02	16.90	.64	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L622	#	39.59	26.70	-25.70	1.44	.78	15L	TEARING STRENGTH	35 T6	110G, LORENTZ-WETTRES
L775	#	52.28	54.47	-7.78	19.05	8.68	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L396W	#	52.80	33.73	-10.70	.83	2.10	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L359	#	54.84	30.29	-10.67	-3.17	.77	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L704	#	56.27	36.13	-6.50	1.16	1.13	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L651	#	56.90	38.13	-5.03	2.62	1.05	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L654	#	56.93	36.73	-5.62	1.35	.56	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L760A	#	57.53	36.07	-5.44	.47	.78	15R	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF, DIGITAL READOUT
L223	#	57.00	34.33	-6.25	-1.64	1.02	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L162	#	57.87	34.33	-6.02	-1.29	1.63	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L143	#	57.87	36.07	-8.15	.30	1.39	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L141	#	57.93	37.07	-4.36	1.48	.72	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L115	#	58.29	36.10	-4.84	.16	1.15	15C	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (W.AIR CLAMP)
L760B	#	58.73	37.53	-3.66	1.13	.81	15L	TEARING STRENGTH	35 T6	110G, LORENTZ-WETTRES
L760C	#	58.97	36.53	-4.05	.20	.80	15R	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF, DIGITAL READOUT
L738	#	59.13	37.47	-3.35	.87	2.03	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L760D	#	59.27	37.03	-3.45	.43	.72	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L201	#	59.37	35.99	-3.94	-0.40	.97	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L118	#	59.40	36.03	-3.84	-0.50	.57	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L157	#	59.40	36.80	-3.45	.16	1.21	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L371A	#	59.47	37.40	-3.05	.65	.77	15Q	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF, AIR CLAMP, DIGIT
L566	#	59.53	36.17	-3.66	-0.45	.95	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L211	#	59.53	36.49	-3.54	-0.25	.60	15R	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF, DIGITAL READOUT
L291	#	59.67	38.50	-2.37	1.50	1.39	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L213	#	59.73	38.77	-2.17	1.69	1.06	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L333	#	59.80	36.97	-3.02	.10	1.22	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L177	#	59.93	39.67	-1.85	1.85	2.48	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L255	#	60.00	37.20	-2.73	.20	.84	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L356	#	60.13	37.37	-2.53	.28	1.25	15N	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF, NO CUT BUT
L341	#	60.13	36.73	-2.85	-0.27	.69	15N	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF, NO CUT BUT
L336	#	60.13	36.97	-2.74	-0.06	.91	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L279	#	60.13	37.07	-2.69	.02	.79	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L237A	#	60.20	36.87	-2.73	-0.18	.74	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L287	#	60.27	37.73	-1.89	31.63	1.12	15L	TEARING STRENGTH	35 T6	110G, LORENTZ-WETTRES
L157	#	60.33	36.73	-2.70	-0.49	1.13	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L257C	#	60.40	37.20	-2.39	.03	1.19	15C	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (W.AIR CLAMP)
L677	#	60.47	34.53	-3.67	-2.33	1.27	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L321	#	60.53	32.93	-4.42	-3.75	1.28	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L153	#	60.60	37.20	-2.21	-0.10	1.15	15C	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (W.AIR CLAMP)
L103	#	60.60	38.03	-1.80	.62	.71	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L746C	#	60.67	38.07	-1.72	.62	.86	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L334	#	60.67	38.93	-1.28	1.37	1.87	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L262	#	60.67	37.27	-2.12	-0.07	.52	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L674	#	60.93	36.73	-2.16	-0.67	1.06	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L212	#	61.00	37.83	-1.55	.25	1.03	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L155	#	61.07	36.71	-2.06	-0.75	2.36	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L124	#	61.07	38.73	-1.04	.99	.79	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L315	#	61.07	39.13	-1.34	.47	.98	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L201	#	61.27	38.57	-0.55	.75	.95	15A	TEARING STRENGTH	35 T6	110G, APPITA
L390	#	61.33	38.93	-0.71	1.03	1.12	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L228	#	61.33	38.93	-0.71	1.03	.69	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L249	#	61.47	37.60	-1.26	-0.19	.76	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L339	#	61.60	38.40	-0.75	.44	1.05	15N	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF, NO CUT BUT
L182M	#	61.60	38.40	-0.75	.44	1.00	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L254	#	61.60	38.27	-0.81	.32	1.02	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L376	#	61.60	39.00	-0.44	.95	1.10	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L166	#	61.60	37.47	-1.22	-0.37	.95	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L599	#	61.67	38.57	-0.61	.55	.82	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L175	#	61.73	37.13	-1.27	-0.73	1.05	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L158	#	61.73	35.80	-1.94	-1.68	1.47	15R	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF, DIGITAL READOUT
L676	#	61.73	38.13	-0.77	.14	.96	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)
L226C	#	61.73	38.27	-0.70	.25	.61	15T	TEARING STRENGTH	35 T6	110G, THWING-ELMENDORF (SCALE TO 100)

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS  
TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

TAB CODE	F	MEANS		COORDINATES		AVG P.SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS					
		G36	G47	MAJOR	MINOR							
L182A	*	61.73	33.87	-2.91	-3.55	1.84	15A	TEARING	STRENGTH	35	T0	110G, APPITA
L303	*	61.73	37.83	-.92	-.12	.97	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETTRES
L170	*	61.80	38.07	-.74	.05	.60	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L163	*	61.80	38.37	-.59	.31	.95	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L386	*	61.87	37.13	-1.15	-.79	.91	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L360	*	61.90	35.47	-1.96	-2.25	.39	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L743	*	61.93	39.40	.04	1.13	1.01	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETTRES
L692	*	62.30	37.10	-1.76	-.89	.88	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L326	*	62.07	39.60	.26	1.24	1.06	15N	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, NO CUT CUT
L557	*	62.20	39.27	.21	.88	1.09	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L746P	*	62.27	39.97	.62	1.45	1.05	15N	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, NO CUT CUT
L575	*	62.31	38.16	-.26	-.13	.90	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETTRES
L250	*	62.33	38.20	-.21	-.11	.57	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L183	*	62.33	38.50	-.06	.15	.76	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L565	*	62.47	38.67	.14	.23	.87	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L626	*	62.53	39.22	.47	.67	.63	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETTRES
L237B	*	62.67	38.93	.44	.36	.68	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L562	*	62.87	38.67	.48	.03	.99	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L268	*	62.93	39.93	21.82	36.51	1.52	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L146	*	62.93	39.00	.71	.28	.98	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L264	*	62.93	41.80	2.12	2.70	.72	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L189	*	63.00	34.00	-1.35	-3.38	1.02	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L128	*	63.07	39.33	.95	.50	.67	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L122	*	63.12	38.86	.80	.07	.71	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W.AIR CLAMP)
L275	*	63.13	38.57	.86	.15	.81	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L581	*	63.20	39.22	1.05	.34	1.13	15Q	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, AIR CLAMP, DIGIT
L159	*	63.20	37.27	.06	-1.35	1.53	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETTRES
L684	*	63.26	41.13	2.01	1.99	.95	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETTRES
L210	*	63.33	38.60	.85	-.26	.79	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETTRES
L580	*	63.40	40.40	1.82	1.26	.65	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L274	*	63.47	39.73	1.54	.65	1.40	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L257A	*	63.47	36.00	-.34	-2.58	2.19	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W.AIR CLAMP)
L328	*	63.53	40.77	2.12	1.51	1.06	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L217	*	63.62	38.17	.88	-.78	1.10	15Q	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, AIR CLAMP, DIGIT
L606	*	63.73	39.87	1.84	.63	1.13	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L121	*	63.73	40.00	1.00	.74	.86	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L567	*	63.73	40.13	1.97	.86	.69	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W.AIR CLAMP)
L607	*	63.80	35.43	-.34	-3.24	.80	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L257B	*	63.87	41.13	2.59	1.66	1.20	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W.AIR CLAMP)
L226B	*	63.93	39.33	1.74	.07	.77	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L290	*	63.93	36.60	.36	-2.29	1.19	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L213	*	63.93	37.80	.97	-1.26	.73	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L223	*	63.97	38.55	1.38	-.63	.87	15R	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, DIGITAL READOUT
L185	*	64.07	39.10	1.74	-.20	1.00	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L242	*	64.20	40.06	2.33	.56	1.04	15U	TEARING	STRENGTH	35	T0	110G, AUSTRALIAN OPT. CO.
L139	*	64.20	39.67	2.14	.22	.69	15U	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L206	*	64.27	39.83	2.28	.33	.85	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L685	*	64.27	76.93	27.96	32.38	1.20	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L698	*	64.33	41.13	2.95	1.42	1.67	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETTRES
L375	*	64.53	43.07	4.14	2.99	1.21	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L574	*	64.80	39.13	2.39	-.54	1.65	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L300	*	64.80	39.93	2.79	.15	.97	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L167	*	64.80	39.73	2.69	-.02	.67	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W.AIR CLAMP)
L241	*	64.87	40.20	2.98	.35	.38	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L244	*	64.87	40.00	2.88	.17	.61	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W.AIR CLAMP)
L311	*	64.93	38.63	2.25	-1.04	.82	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L176	*	64.93	39.67	2.77	-.15	1.19	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L134	*	65.07	39.93	3.02	.01	.59	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W.AIR CLAMP)
L382	*	65.20	38.73	2.53	-1.09	.82	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L610	*	65.27	36.87	1.65	-2.74	1.32	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L248	*	65.42	39.09	2.90	-.89	.73	15J	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETTRES
L191	*	65.47	39.07	2.93	-.94	.74	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L131	*	65.60	40.20	3.62	-.02	1.08	15A	TEARING	STRENGTH	35	T0	110G, APPITA
L104	*	65.63	39.80	3.44	-.39	.56	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)
L312	*	66.00	39.60	3.66	-.74	1.12	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE TO 100)



TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS  
TAPPI TENTATIVE TEST METHOD T414 T8-65, INTERNAL TEARING RESISTANCE OF PAPER

TAB CODE	F	MEANS		COORDINATES		AVG R, SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS		
		C36	G47	MAJOR	MINOR				
L173B	Q	66.07	41.27	4.54	.66	1.27	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L442	"	66.40	39.67	4.84	-.89	.98	15R	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF, DIGITAL READOUT
L345	Q	66.67	39.77	3.97	-1.64	1.06	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L344	Q	67.47	42.03	6.16	.62	1.19	15C	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (W. AIR CLAMP)
L754	"	67.73	42.11	6.42	.55	.74	15W	TEARING STRENGTH	35 TO 110G, LHMARGY, 20 C, 65% RH
L625	X	68.20	46.80	9.01	4.47	2.53	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L576	Q	68.47	41.67	6.83	-.20	1.99	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L756	"	68.49	44.18	9.11	1.96	1.67	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L285	"	69.20	44.33	5.81	1.73	1.58	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L257	"	69.57	41.98	7.94	0.88	1.01	15H	TEARING STRENGTH	35 TO 110G, LHMARGY, 20 C, 65% RH
L232	"	71.07	41.87	9.18	-1.34	.97	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L278	"	71.33	43.53	10.25	-.03	.91	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L759	X	71.33	38.13	7.63	0.70	3.03	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L313	Q	71.37	42.20	10.04	1.45	.83	15L	TEARING STRENGTH	35 TO 110G, LORENTZ-WETTRES
L734	"	72.11	34.56	6.61	0.80	3.01	15W	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF, NO CUT OUT
L606	"	72.40	41.93	10.36	1.95	1.12	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L238A	Q	74.47	37.47	9.90	-6.85	4.26	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L348	"	74.93	54.00	18.93	7.54	.74	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
L565	"	79.60	52.80	22.06	3.81	.71	15E	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF, AMBIENT COND.
L207	Q	85.44	57.74	29.59	5.14	1.21	15R	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF, DIGITAL READOUT
L464	"	90.67	43.47	26.92	19.82	4.07	15T	TEARING STRENGTH	35 TO 110G, THWING-ELMENDORF (SCALE TO 100)
GMFAN3:		62.46	38.40			1.00			
		95% ELLIPSE:		9.79	3.01				WITH GAMMA = 30 DEGREES

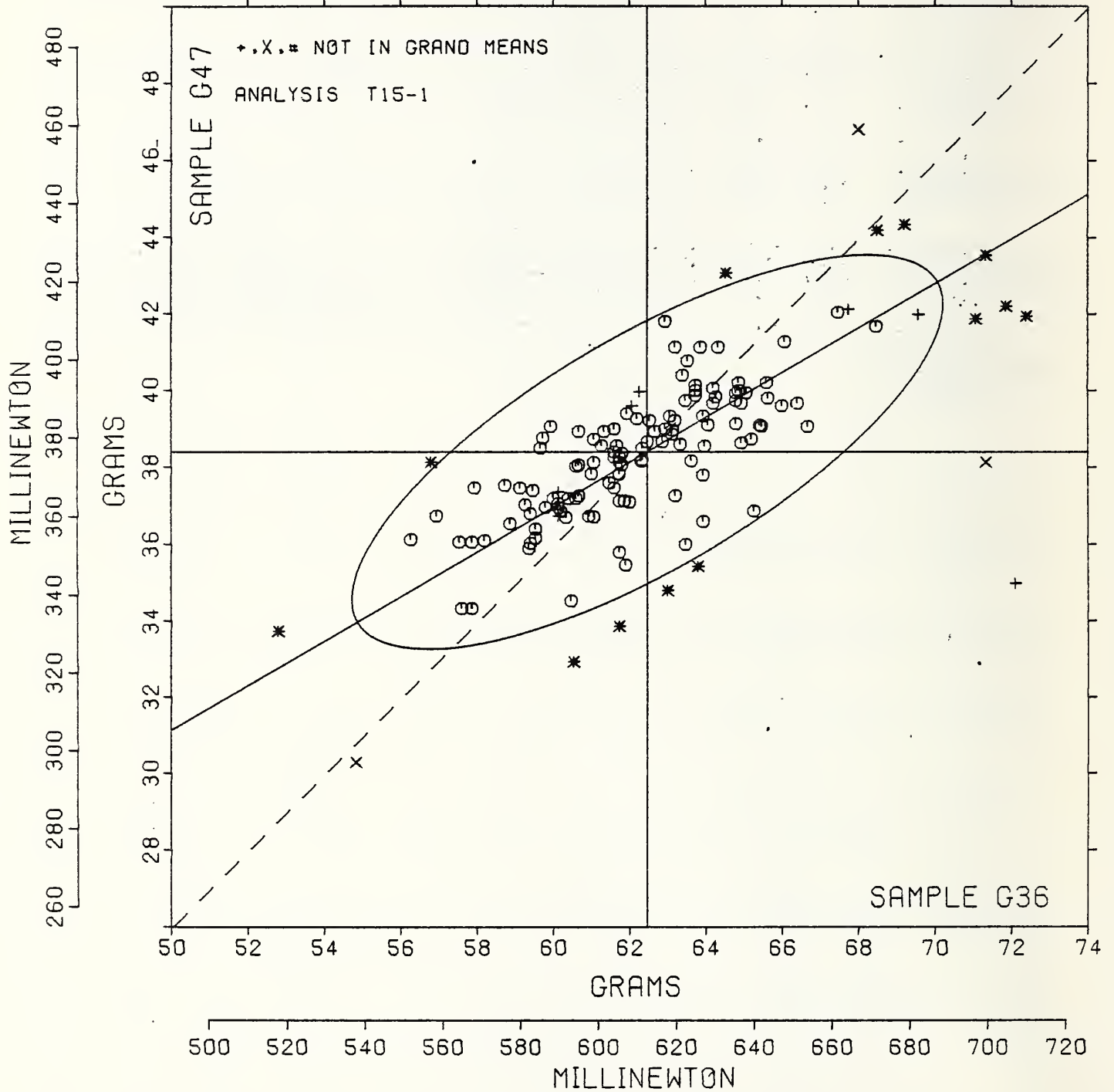
# TEARING STRENGTH, PRINTING PAPERS

SAMPLE G36 = 62.5 GRAMS

SAMPLE G47 = 38.4 GRAMS

SAMPLE G36 = 613 MILLINEWTON

SAMPLE G47 = 377 MILLINEWTON



TEARING STRENGTH, GRAMS - PRIMARILY PACKAGING PAPERS  
TAPPI TENTATIVE TEST METHOD T414 T8-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	BLEACHED					KRAFT COATING BASE					TEST D. 15		
	SAMPLE K50 MEAN	105 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G49 MEAN	96 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L122C	115.9	6.2	1.17	6.1	1.27	83.4	2.9	.72	2.3	.86	16C	0	L122C
L151	102.5	7.1	1.33	4.7	.98	75.7	4.8	1.20	4.1	1.58	16C	0	L151
L230	115.1	5.4	1.01	5.3	1.09	85.3	4.8	1.21	2.7	1.06	16R	0	L230
L231	105.6	7.1	1.76	2.9	.61	77.9	2.6	1.65	2.4	.91	16T	0	L231
L244	116.3	6.6	1.23	4.3	.89	86.6	6.1	1.54	2.1	.79	16J	0	L244
L265	111.3	1.7	.31	6.1	1.26	79.5	-1.1	1.26	3.2	1.21	16T	0	L265
L31B	114.1	7.6	1.94	4.4	.91	75.9	-4.7	1.17	2.2	.85	16Q	0	L31B
L324	116.2	7.5	1.65	3.5	.73	86.1	7.4	1.10	1.2	.48	16T	0	L324
L366	NO DATA REPORTED FOR SAMPLE K50					35.1	145.4	-11.40	1.0	.38	16T	0	L366
L353	107.5	7.2	1.41	4.2	.82	78.9	1.6	1.40	1.5	.57	16T	0	L353
L730	160.2	50.5	9.43	3.6	.74	127.3	46.8	11.76	2.2	.86	16R	0	L730
L735	116.4	6.7	1.24	5.1	1.05	84.4	3.9	.98	3.4	1.30	16T	0	L735
L737	103.6	7.6	1.13	4.7	.97	75.2	-5.3	-1.34	2.6	.99	16C	0	L737
L738	111.6	1.9	.36	6.6	1.36	83.2	2.7	.67	3.7	1.42	16T	0	L738

GR. MEAN = 109.7 GRAMS      GRAND MEAN = 80.5 GRAMS      TEST DETERMINATIONS = 15  
 SD MEANS = 5.4 GRAMS      SD OF MEANS = 4.0 GRAMS      12 LABS IN GRAND MEANS  
 AVERAGE SDR = 4.8 GRAMS      AVERAGE SDR = 2.6 GRAMS  
 GR. MEAN = 1075.6 MILLINEWTON      GRAND MEAN = 789.6 MILLINEWTON

L106	117.6	7.9	1.48	5.4	1.12	84.9	3.5	.87	2.5	.96	16N	0	L106
L122N	120.1	10.5	1.55	6.0	1.24	87.5	7.0	1.76	2.4	.91	16N	0	L122N
L148	105.6	7.1	1.01	4.2	.87	79.1	1.5	1.36	1.7	.64	16N	0	L148
L225	119.2	9.5	1.78	3.1	.64	86.5	6.0	1.51	2.4	.93	16N	0	L225
L234	117.6	7.9	1.48	6.6	1.36	88.7	8.1	2.05	3.6	1.39	16N	0	L234
L267	122.4	12.7	2.38	6.9	1.44	94.5	13.9	3.50	3.5	1.32	16N	0	L267
L269	112.5	2.9	.53	6.5	1.34	85.8	5.3	1.33	2.4	.92	16N	0	L269
L702	103.2	6.5	1.21	4.3	1.30	72.5	-8.0	-2.01	5.6	1.90	16X	0	L702

TOTAL NUMBER OF LABORATORIES REPORTING = 32  
 Best values: K50 110 ± 10 grams  
 G49 80 ± 7 grams

The following laboratories were omitted from the grand means because of extreme test results: 730.

TEARING STRENGTH, GRAMS - PRIMARILY PACKAGING PAPERS  
TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	F	MEANS		COORDINATES		AVG. R, SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
		K50	G49	MAJOR	MINOR		
1366	M		35.1			.38	16T TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (SCALE TO 100)
151	M	102.5	75.7	-8.6	.4	1.28	16C TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W. AIR CLAMP)
172	M	103.2	72.5	-9.9	-2.6	1.60	16X TEARING STRENGTH 60 TO 150G, GIVE INSTRUMENT MAKE, MODEL
1737	M	103.6	75.2	-8.0	-.7	.98	16C TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W. AIR CLAMP)
1371B	M	104.1	75.9	-7.2	-.5	.88	16Q TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF, AIR CLAMP, DIGIT
1231	M	105.6	77.9	-4.8	.3	.76	16T TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (SCALE TO 100)
1324	M	106.2	80.1	-3.0	1.7	.60	16T TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (SCALE TO 100)
1303	M	107.5	78.9	-2.7	.0	.72	16T TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (SCALE TO 100)
1148	M	105.6	79.1	-.9	-1.1	.76	16N TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF, NO CUT CUT
1265	M	111.3	79.5	.7	-1.8	1.23	16T TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (SCALE TO 100)
1739	M	111.6	83.2	3.1	1.0	1.39	16T TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (SCALE TO 100)
1268	M	112.5	85.8	5.4	2.6	1.13	16N TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF, NO CUT CUT
1237	M	115.1	85.3	7.2	.7	1.07	16R TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF, DIGITAL READOUT
11220	M	115.9	83.4	6.7	-1.4	1.07	16C TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W. AIR CLAMP)
1248	M	116.3	86.6	8.9	1.0	.84	16J TEARING STRENGTH 60 TO 150G, LOEENTZ-WETTRES
1735	M	116.4	84.4	7.7	-.8	1.18	16T TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (SCALE TO 100)
1176	M	117.6	84.0	8.5	-1.9	1.04	16N TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF, NO CUT CUT
1234	M	117.6	88.7	11.2	1.9	1.37	16N TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF, NO CUT CUT
1225	M	119.2	86.5	11.2	-.9	.79	16N TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF, NO CUT CUT
1122N	M	127.1	87.5	12.6	-.5	1.07	16N TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF, NO CUT CUT
1267	M	122.4	94.5	18.5	3.8	1.38	16N TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF, NO CUT CUT
1730	M	160.2	127.3	68.4	8.0	.80	16R TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF, DIGITAL READOUT
GMEANS:		105.7	80.5			1.00	
		95% ELLIPSE:		19.8	3.2	WITH GAMMA = 36 DEGREES	

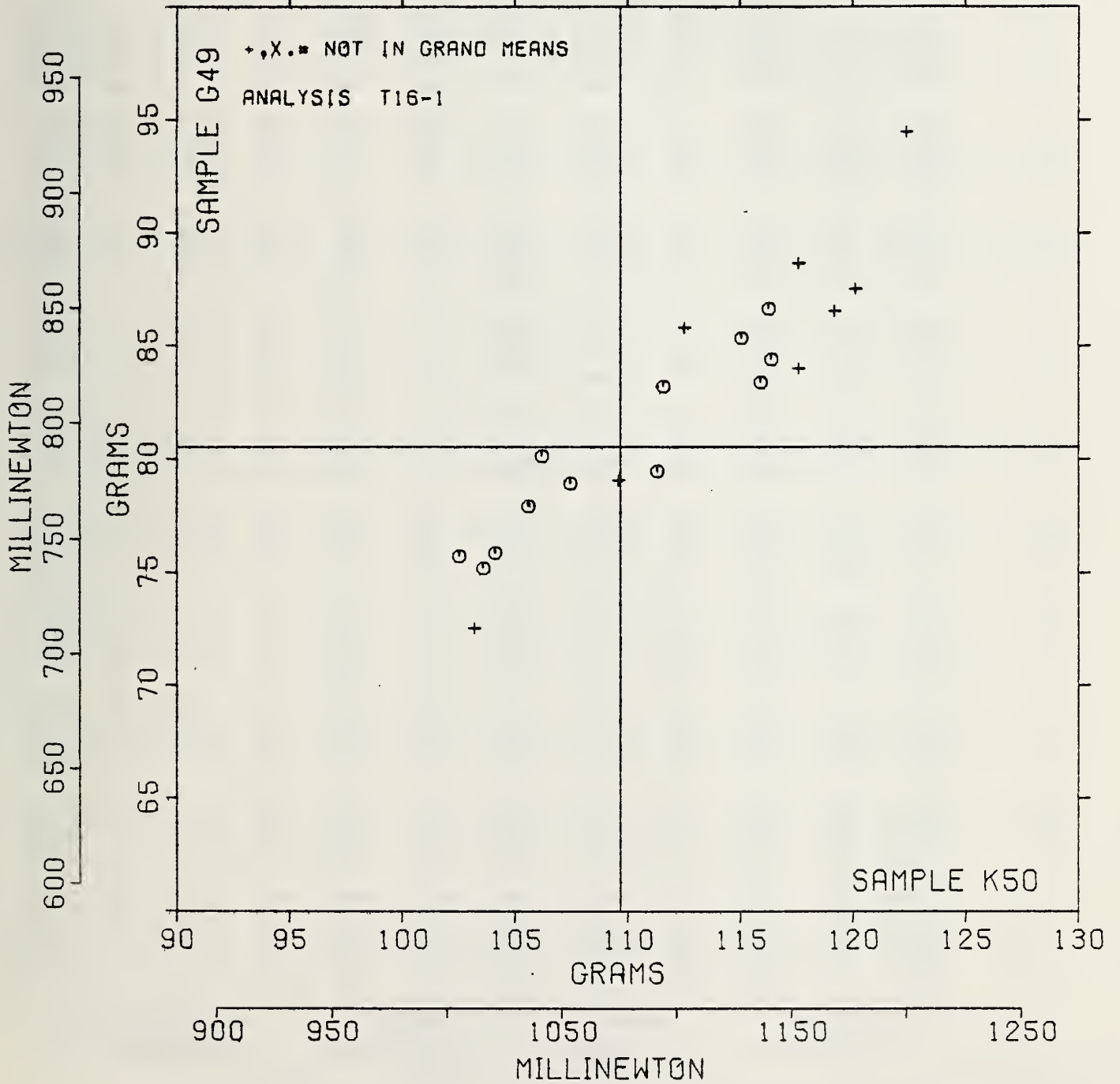
# TEARING STRENGTH, PACKAGING PAPERS

SAMPLE K50 = 110. GRAMS

SAMPLE G49 = 81. GRAMS

SAMPLE K50 = 1076 MILLINEWTON

SAMPLE G49 = 790 MILLINEWTON



TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PACKAGING PAPERS  
TAPPI OFFICIAL TEST METHODS T404 69-76 AND T494 69-70, PENDULUM AND CPE TYPES

LAB CODE	KRAFT ENVELOPE					KRAFT COATING BASE					TEST D. = 20		
	G38 MEAN	123 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	G49 MEAN	96 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L106	11.64	.11	.25	.52	1.00	10.62	.18	.46	.47	1.16	19A	Ø	L106
L107	12.63	1.10	2.58	.43	.82	11.01	.56	1.45	1.31	3.26	19A	*	L107
L122	11.28	-.25	-.58	.31	.61	10.11	-.34	-.88	.36	.88	19A	Ø	L122
L151	12.21	.68	1.58	.42	.82	10.69	.25	.65	.62	1.54	19A	Ø	L151
L157A	11.41	-.12	-.28	.52	1.01	10.37	-.08	-.20	.31	.76	19P	Ø	L157A
L157	11.24	-.25	-.67	.62	1.19	8.85	-1.60	-4.16	.51	1.26	19A	X	L157I
L167	73.35	61.86	144.46	2.55	4.93	64.03	53.59	139.43	1.88	4.66	19G	#	L167
L182	11.53	.00	.00	.51	.98	10.46	.01	.03	.28	.70	19D	Ø	L182I
L192L	11.21	-.32	-.75	.43	.82	10.10	-.34	-.89	.34	.84	19T	Ø	L182L
L217A	12.19	.66	1.54	.43	.82	10.65	.20	.52	.33	.82	19A	Ø	L217A
L217D	11.40	-.13	-.30	.61	1.18	10.09	-.35	-.92	.45	1.11	19P	Ø	L217P
L219	12.37	.84	1.96	.39	.74	11.13	.60	1.79	.32	.79	19E	Ø	L219
L225	11.95	.42	.97	.50	.97	10.79	.34	.90	.48	1.20	19P	Ø	L225
L231	11.40	-.13	-.31	.61	1.17	10.44	-.01	-.02	.34	.83	19P	Ø	L231
L237A	11.21	-.32	-.74	.74	1.43	10.72	.27	.70	.54	1.35	19Q	Ø	L237A
L237B	11.82	.29	.69	.64	1.25	10.32	-.13	-.34	.56	1.40	19A	Ø	L237B
L238A	11.14	-.39	-.90	.41	.79	9.92	-.53	-1.37	.52	1.28	19T	Ø	L238A
L257A	11.22	-.31	-.72	.44	.85	10.13	-.31	-.82	.75	1.85	19P	Ø	L257A
L264A	11.26	-.27	-.63	.74	1.43	9.73	-.72	-1.86	.52	1.28	19A	Ø	L264A
L264P	11.59	.76	.14	.51	.98	10.79	.34	.89	.28	.69	19P	Ø	L264P
L265	12.75	.52	1.21	.63	1.22	10.75	.31	.79	.36	.89	19A	Ø	L265
L267	11.39	-.14	-.32	.40	.77	10.53	.08	.22	.33	.82	19A	Ø	L267
L273	11.30	-.23	-.54	.59	1.13	10.60	.15	.40	.60	1.49	19A	Ø	L273
L274	11.40	-.13	-.31	.31	.60	10.32	-.12	-.32	.36	.90	19P	Ø	L274
L278	10.70	-.83	-1.94	.43	.84	10.07	-.37	-.97	.26	.65	19A	Ø	L278
L280	10.91	-.62	-1.45	.67	1.20	9.99	-.46	-1.19	.49	1.21	19G	Ø	L280
L281	11.78	.25	.58	.56	1.08	10.69	.25	.64	.42	1.04	19G	Ø	L281
L305	11.19	-.34	-.81	.41	.80	9.73	-.71	-1.85	.37	.92	19P	Ø	L305
L312	11.36	-.17	-.39	.76	1.47	10.59	.14	.37	.46	1.15	19D	Ø	L312
L318	11.02	-.51	-1.19	.23	.45	9.96	-.49	-1.27	.27	.68	19G	Ø	L318
L324	11.60	.37	.17	.77	1.49	10.69	.25	.64	.34	.84	19A	Ø	L324
L334	11.60	.07	.16	.50	.96	10.58	.14	.36	.31	.76	19P	Ø	L334
L336	11.88	.35	.83	.58	1.12	10.85	.41	1.06	.40	1.00	19G	Ø	L336
L356	11.70	.17	.39	.62	1.20	10.83	.38	.99	.48	1.19	19P	Ø	L356
L56E	11.23	-.30	-.70	.34	.66	10.29	-.15	-.40	.26	.65	19T	Ø	L56E
L568	11.19	-.34	-.79	.50	.97	10.27	-.18	-.47	.48	1.20	19P	Ø	L568
L575	11.70	.17	.39	.46	.89	10.47	.92	.06	.29	.72	19G	Ø	L575
L576	11.46	-.07	-.15	.47	.91	10.45	.01	.02	.21	.51	19A	Ø	L576
L580	12.31	.78	1.82	.32	.61	10.92	.47	1.23	.28	.70	19G	Ø	L580
L581	11.67	.14	.32	.76	1.48	10.67	.23	.59	.40	1.00	19A	Ø	L581
L604	12.02	.49	1.14	.65	1.25	9.74	-.71	-1.85	1.08	2.67	19A	X	L604
L676	10.88	-.65	-1.52	.38	.74	9.94	-.51	-1.32	.25	.63	19P	Ø	L606
L610	11.33	-.20	-.47	.44	.86	10.10	-.34	-.89	.27	.66	19A	Ø	L610
L622	11.34	-.19	-.45	.59	1.15	10.89	.45	1.16	.51	1.27	19G	Ø	L622
L650	11.41	-.12	-.28	.83	1.61	10.31	-.14	-.36	.58	1.45	19G	Ø	L650
L652	11.78	.25	.57	.59	1.14	10.72	.27	.70	.47	1.18	19A	Ø	L652
L676	11.03	.40	.93	.66	1.28	10.55	.10	.27	.51	1.27	19A	Ø	L676
L684	11.30	-.23	-.53	.27	.53	10.20	-.25	-.64	.29	.72	19G	Ø	L684
L689	11.13	-.40	-.94	.46	.90	10.21	-.24	-.62	.49	1.21	19A	Ø	L689
L702	11.94	.31	.73	.71	1.37	10.63	.19	.49	.65	1.62	19P	Ø	L702
L730	10.84	-.69	-1.62	.45	.88	9.34	-1.11	-2.89	.27	.66	19A	*	L730
L735	10.89	-.64	-1.49	.46	.89	10.09	-.36	-.93	.39	.96	19A	Ø	L735
L737A	12.07	.54	1.26	.44	.85	10.87	.42	1.09	.27	.66	19A	Ø	L737A
L737B	12.04	.51	1.20	.45	.88	1.64	-8.81	-22.91	.14	.35	19A	#	L737B
L760A	12.19	.66	1.53	.42	.81	10.99	.55	1.42	.35	.88	19A	Ø	L760A
L760B	11.74	.21	.49	.55	1.07	11.03	.58	1.51	.27	.67	19P	Ø	L760B

GR. MEAN = 11.53 KILONEWTON/M      GRAND MEAN = 10.45 KILONEWTON/M      TEST DETERMINATIONS = 20  
SD MEANS = .43 KILONEWTON/M      SD OF MEANS = .38 KILONEWTON/M      52 LABS IN GRAND MEANS  
AVERAGE SDR = .52 KILONEWTON/M      AVERAGE SDR = .40 KILONEWTON/M

GR. MEAN = 65.85 LB/INCH      GRAND MEAN = 59.66 LB/INCH  
L2507      10.38      -1.15      -2.69      .36      .70      9.40      -1.05      -2.73      .21      .51      19L      \*      L2507  
TOTAL NUMBER OF LABORATORIES REPORTING = 57

Best values: G38 11.5 ± 0.7 kilonewton per meter  
G49 10.5 ± 0.6 kilonewton per meter

The following laboratories were omitted from the grand means because of extreme test results: 737B.

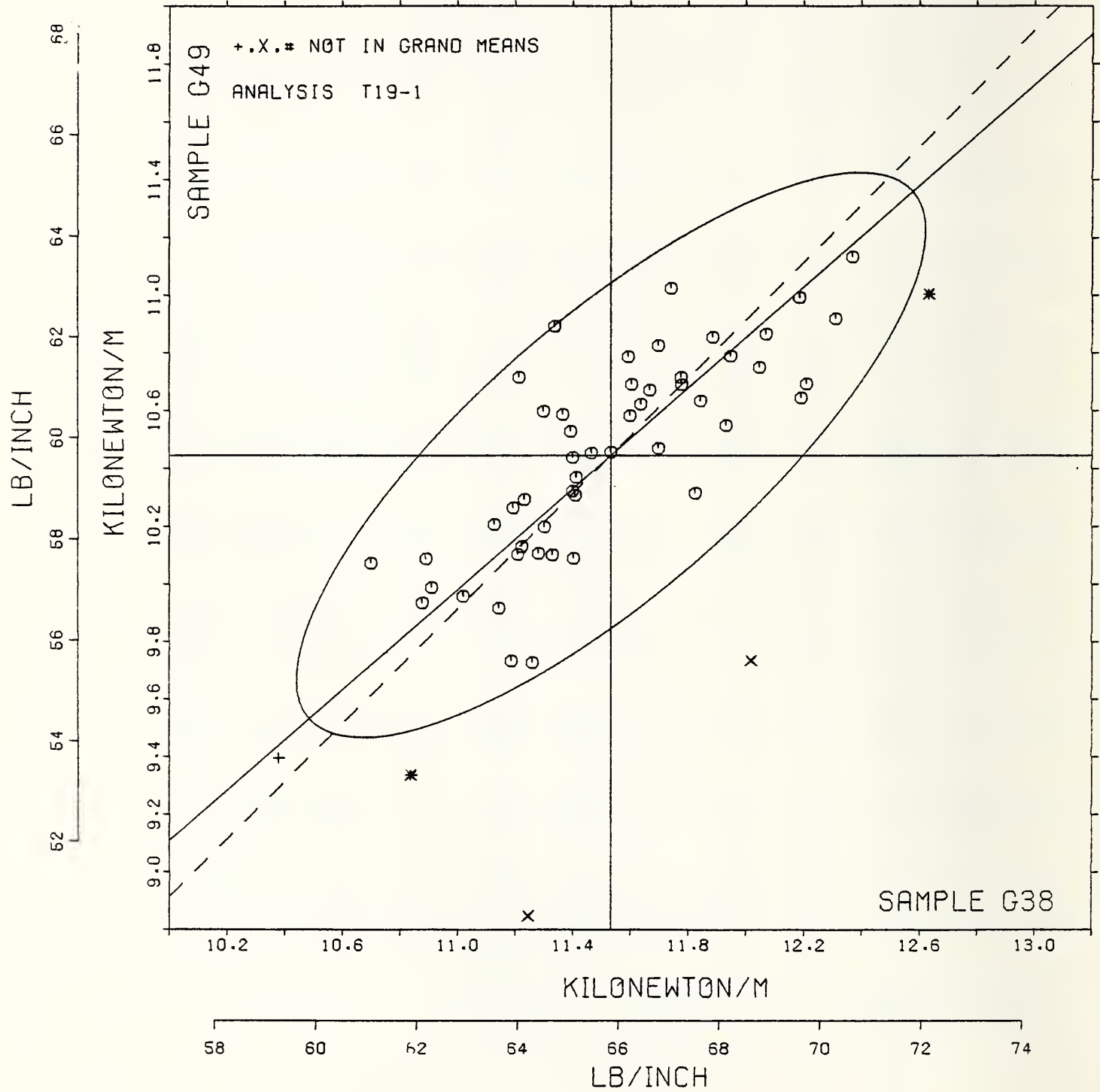
Data from the following laboratories appear to be off by a multiplicative factor: 167.

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PACKAGING PAPERS  
TAPPI OFFICIAL TEST METHODS T404 GS-76 AND T494 GS-70, PENDULUM AND CPE TYPES

TAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		G38	G49	MAJOR	MINOR	R.SDR	VAR	
T2507	*	10.38	9.40	-1.56	-.04	.61	19L	TENSILE STRENGTH, 31 T0 74 LB/IN, CRE, 20 C, 65% RH
L278	0	10.70	10.07	-.87	.27	.75	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
T730	*	10.84	9.34	-1.25	-.38	.77	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L606	0	10.88	9.94	-.83	.05	.68	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L735	0	10.89	10.09	-.72	.15	.93	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L290	0	10.91	9.99	-.77	.06	1.25	19G	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
T318	0	11.02	9.96	-.70	-.03	.57	19G	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
T695	0	11.13	10.21	-.46	.09	1.05	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CPE)
T236A	0	11.14	9.92	-.64	-.14	1.04	19T	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L305	0	11.19	9.73	-.73	-.31	.86	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L568	0	11.19	10.27	-.37	.09	1.08	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L182Y	0	11.21	10.10	-.47	-.05	.83	19T	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L237A	0	11.21	10.72	-.06	.41	1.39	19Q	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L257A	0	11.22	10.13	-.44	-.04	1.35	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L565	0	11.23	10.29	-.32	.08	.66	19T	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
T1577	X	11.24	8.85	-1.27	-1.02	1.23	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L244A	0	11.26	9.73	-.67	-.36	1.35	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L122	0	11.28	10.11	-.41	-.09	.74	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
T273	0	11.30	10.60	-.07	.27	1.31	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L694	0	11.30	10.20	-.33	-.04	.63	19W	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
T610	0	11.33	10.10	-.38	-.13	.76	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L622	0	11.34	10.89	.15	.46	1.21	190	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
T312	0	11.36	10.59	-.03	.21	1.31	19D	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CPE)
L267	0	11.39	10.53	-.05	.15	.80	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L231	0	11.40	10.44	-.10	.08	1.00	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
T274	0	11.40	10.32	-.18	-.01	.75	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
T217P	0	11.40	10.09	-.33	-.18	1.14	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L650	0	11.41	10.31	-.18	-.02	1.65	19G	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CPE)
T157A	0	11.41	10.37	-.14	.02	.89	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L576	0	11.46	10.45	-.04	.05	.71	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L1927	0	11.53	10.46	.01	.01	.84	19D	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CPE)
L264P	0	11.59	10.79	.27	.22	.83	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L334	0	11.60	10.58	.14	.06	.86	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L374	0	11.60	10.69	.22	.14	1.17	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CPE)
L106	0	11.64	10.62	.20	.06	1.08	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L581	0	11.67	10.67	.25	.08	1.24	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L356	0	11.70	10.83	.38	.18	1.19	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
T575	0	11.70	10.47	.14	-.09	.81	19G	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CPE)
T760B	0	11.74	11.03	.54	.30	.87	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L652	0	11.78	10.72	.36	.04	1.16	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L281	0	11.78	10.69	.35	.02	1.06	19G	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L237B	0	11.82	10.32	.14	-.29	1.32	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L702	0	11.84	10.63	.36	-.06	1.49	19R	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L336	0	11.88	10.85	.54	.07	1.06	19G	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CPE)
L676	0	11.93	10.55	.37	-.18	1.27	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L225	0	11.95	10.79	.54	-.01	1.09	19P	TENSILE STRENGTH, 31 T0 74 LB/IN, PENDULUM TESTER
L604	X	12.02	9.74	-.10	-.85	1.96	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CPE)
L737B	0	12.04	1.64	-5.40	-6.97	.61	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L265	0	12.05	10.75	.59	-.11	1.05	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CPE)
L737A	0	12.07	10.87	.68	-.04	.76	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L760A	0	12.19	10.99	.85	-.02	.84	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CPE)
L217A	0	12.19	10.65	.63	-.28	.82	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L181	0	12.21	10.69	.67	-.26	1.18	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L530	0	12.31	10.92	.90	-.16	.66	19G	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L219	0	12.37	11.13	1.09	-.03	.77	19E	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L107	*	12.63	11.01	1.20	-.30	2.04	19A	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
L167	*	73.39	64.03	81.84	-.29	4.79	19G	TENSILE STRENGTH, 31 T0 74 LB/IN, LOAD CELL (CRE)
GM EANS:		11.53	10.45			1.00		
95% ELLIPSE:				1.39	.47			WITH GAMMA = 41 DEGREES

# TENSILE STRENGTH, PACKAGING PAPERS

SAMPLE G38 = 11.5 KILONEWTON/M    SAMPLE G49 = 10.4 KILONEWTON/M  
 SAMPLE G38 = 65.8 LB/INCH    SAMPLE G49 = 59.7 LB/INCH





TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS  
TAPPI OFFICIAL TEST METHOD T494 #S-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	SAMPLE G40 MEAN	ENVELOPE 88 GRAMS PER SQUARE METER				SAMPLE G33 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER				TEST D. # 20		
		DEV	N.DEV	SDR	P.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L105	4.86	.06	.29	.24	.85	3.98	.09	.44	.18	.98	20A	0	L105
L115	4.60	-.20	-.70	.29	1.03	3.79	-.10	-.52	.22	1.18	20D	0	L115
L118	4.90	.10	.36	.25	.89	4.05	.16	.83	.11	.60	20A	0	L118
L122	4.60	-.20	-.72	.27	.94	3.85	-.04	-.19	.13	.70	20A	0	L122
L124C	4.84	.04	.14	.24	.83	3.96	.07	.37	.14	.74	20A	0	L124C
L125	4.95	.15	.53	.28	.98	3.79	-.10	-.52	.24	1.31	20C	0	L125
L131	4.90	.19	.67	.47	1.30	3.92	.03	.15	.19	1.00	20E	0	L131
L141	5.05	.25	.87	.24	.85	3.99	.10	.52	.17	.91	20A	0	L141
L143	5.59	.79	2.77	.33	1.17	4.10	.21	1.10	.23	1.26	20E	*	L143
L148	4.98	.08	.28	.26	.93	3.99	.10	.52	.14	.76	20A	0	L148
L155	5.19	.39	1.39	.31	1.09	4.25	.35	1.92	.16	.88	20B	0	L155
L159	4.81	.01	.05	.15	.54	3.93	.04	.19	.08	.46	20A	0	L159
L163	4.99	.19	.69	.29	1.01	4.14	.25	1.26	.13	.71	20D	0	L163
L167	5.42	.62	2.21	.32	1.13	4.36	.47	2.43	.13	.70	20E	0	L167
L176	4.30	-.50	-1.77	.32	1.11	3.55	-.34	-1.73	.23	1.25	20E	0	L176
L185	4.88	.38	.29	.25	.89	3.80	-.09	-.48	.19	1.01	20C	0	L185
L194	4.67	-.13	-.44	.34	1.19	3.83	-.26	-.32	.15	.80	20A	0	L194
L211	4.53	-.27	-.96	.34	1.21	3.14	-.75	-3.83	.40	2.17	20X	X	L211
L223B	4.73	-.07	-.23	.28	1.00	3.81	-.08	-.40	.14	.77	20A	0	L223B
L226C	4.43	-.37	-1.32	.25	.89	3.48	-.41	-2.09	.21	1.13	20C	0	L226C
L237	4.59	-.21	-.75	.18	.64	3.81	-.08	-.40	.11	.61	20E	0	L230
L255	4.75	-.05	-.19	.30	1.05	3.54	-.35	-1.79	.33	1.76	20A	0	L255
L261	4.72	-.08	-.29	.13	.47	3.70	-.19	-.96	.13	.71	20A	0	L260
L261	4.72	-.08	-.27	.19	.68	3.74	-.15	-.76	.24	1.28	20A	0	L261
L291	4.61	-.19	-.68	.28	1.00	3.75	-.14	-.73	.21	1.13	20A	0	L291
L309	4.96	.06	.20	.28	.99	3.96	.07	.37	.20	1.07	20E	0	L309
L315	4.45	-.35	-1.23	.29	1.02	3.83	-.06	-.31	.16	.84	20A	0	L315
L318	4.49	-.31	-1.11	.29	1.01	3.75	-.14	-.72	.09	.46	20C	0	L318
L325	4.52	-.28	-1.00	.47	1.65	3.84	-.05	-.25	.14	.75	20E	0	L325
L328	.81	-3.99	-14.09	.05	.18	.66	-3.23	-16.54	.03	.17	20A	#	L328
L333	4.73	-.37	-.26	.23	.82	3.65	-.24	-1.21	.29	1.54	20A	0	L333
L344	4.81	.21	.64	.23	.83	3.80	-.09	-.48	.22	1.17	20A	0	L344
L356	4.81	.21	.64	.23	.82	3.89	-.00	-.00	.14	.74	20A	0	L356
L360	4.69	-.11	-.41	.26	.92	3.99	.10	.49	.14	.75	20E	0	L360
L376	4.92	.12	.42	.78	2.73	3.97	.08	.41	.19	1.05	20A	0	L376
L386	4.83	.03	.11	.34	1.18	3.98	.09	.48	.17	.94	20E	0	L386
L390	5.13	.33	1.18	.35	1.25	4.12	.23	1.16	.30	1.62	20A	0	L390
L442	4.38	-.42	-1.48	.20	.71	3.75	-.14	-.70	.11	.56	20C	0	L442
L557	4.72	-.08	-.28	.29	1.04	3.89	-.00	-.02	.11	.62	20A	0	L557
L563	5.41	.61	2.17	.32	1.14	3.80	-.10	-.49	.33	1.79	20A	X	L563
L567	4.73	-.07	-.24	.23	.81	3.61	-.28	-1.46	.34	1.81	20A	0	L567
L574	4.96	.16	.55	.25	.89	3.99	.10	.50	.25	1.35	20A	0	L574
L575	4.70	-.10	-.34	.23	.80	4.00	.11	.56	.13	.70	20C	0	L575
L592	4.70	-.01	-.04	.26	.90	3.99	.10	.49	.18	.96	20A	0	L592
L616	4.83	.03	.10	.07	.23	4.12	.22	1.15	.03	.15	20D	0	L616
L692	4.86	.06	.20	.28	.97	3.90	.01	.05	.21	1.11	20A	0	L692
L698	4.85	.05	.18	.22	.79	3.80	-.09	-.46	.24	1.31	20E	0	L698
L705	3.09	-1.71	-6.04	.28	.97	2.40	-1.49	-7.65	.29	1.55	20A	#	L705
L706	5.19	.39	1.39	.33	1.15	3.89	-.00	-.03	.33	1.75	20E	0	L706
L732	1.00	-3.80	-13.42	.10	.37	.73	-3.16	-16.20	.08	.45	20A	#	L732
L734	5.06	.26	.93	.28	1.00	4.01	.12	.63	.20	1.08	20E	0	L734
L736	4.42	-.35	-1.36	.22	.78	3.78	-.11	-.58	.10	.54	20A	0	L736
L738	4.33	-.47	-1.65	.37	1.29	3.89	-.00	-.01	.19	1.02	20A	0	L738
L743	5.09	.29	1.04	.33	1.16	4.20	.31	1.57	.10	.55	20E	0	L743
L744	4.97	.17	.60	.56	1.97	3.74	-.15	-.79	.70	3.74	20A	0	L744
L757	4.10	-.70	-2.49	.25	.86	3.49	-.40	-2.06	.14	.77	20A	0	L757
L760A	5.32	.52	1.84	.29	1.01	4.37	.48	2.46	.13	.69	20A	0	L760A

GR. MEAN = 4.90 KILONEWTON/M GRAND MEAN = 3.89 KILONEWTON/M TEST DETERMINATIONS = 29  
 SD MEANS = .28 KILONEWTON/M SD OF MEANS = .20 KILONEWTON/M 52 LABS IN GRAND MEANS  
 AVERAGE SDR = .28 KILONEWTON/M AVERAGE SDR = .19 KILONEWTON/M  
 GR. MEAN = 16.190 LB/15 MM GRAND MEAN = 13.122 LB/15 MM

L139 4.73 -.07 -.25 .26 .90 3.77 -.12 -.60 .15 .82 20B 0 L139  
 L250T 4.20 -.60 -2.13 .20 .70 3.50 -.39 -2.00 .12 .64 20L 0 L250T

TOTAL NUMBER OF LABORATORIES REPORTING = 59  
 Best values: G40 4.8 ± 0.5 kilonewton per meter  
 G33 3.9 ± 0.3 kilonewton per meter

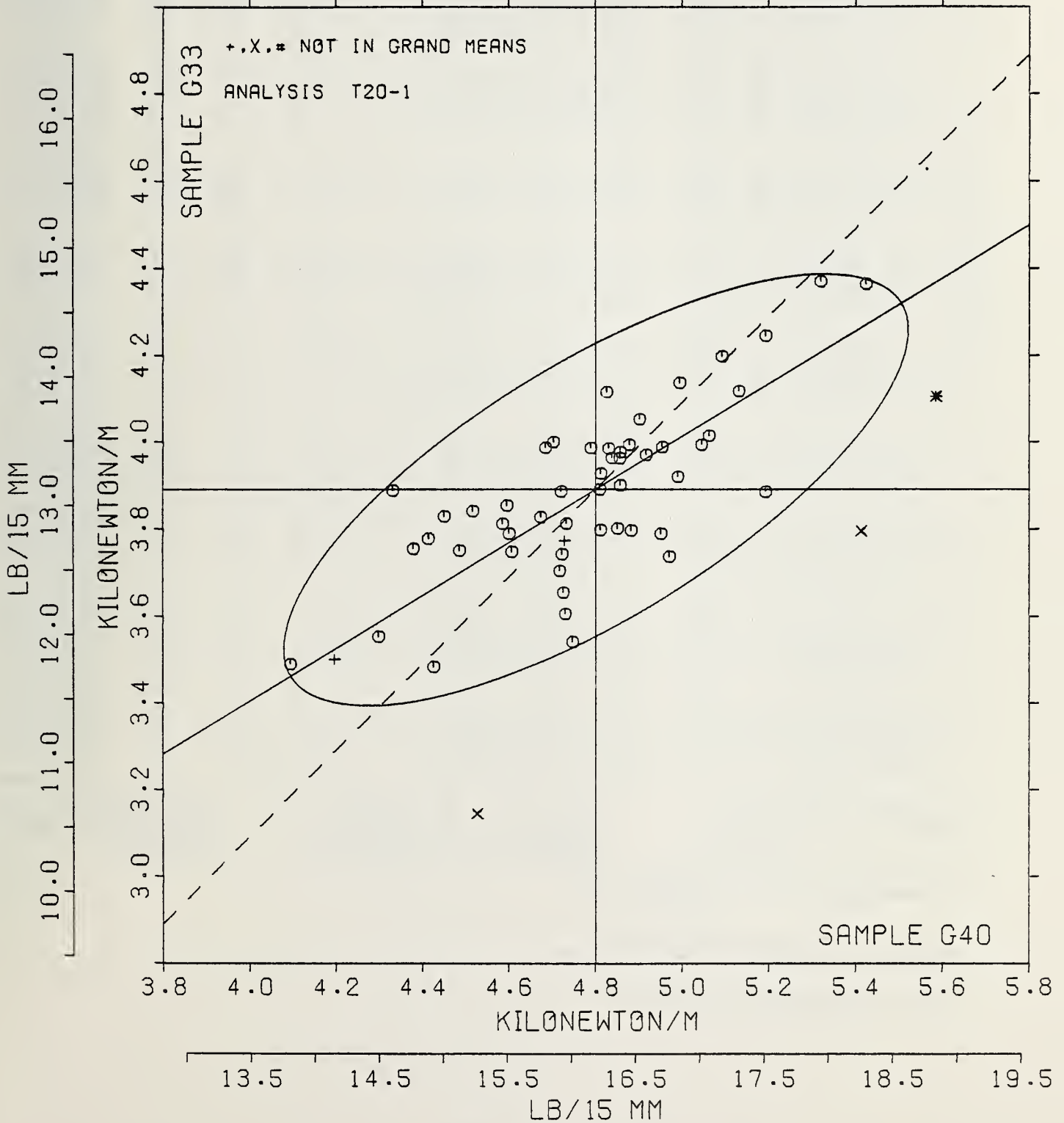
Data from the following laboratories appear to be off by a multiplicative factor: 328, 705, 732.

TENSILE BREAKING STRENGTH, KILOGRAMS PER METER - PRIMARILY PRINTING PAPERS  
TAPPI OFFICIAL TEST METHOD T494 GS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS		COORDINATES		AVG R.S.DR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS		
		G40	G33	MAJOR	MINOR					
L328	#	.81	.66	-5.09	-.68	.17	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CRE)		
L732	#	1.00	.73	-4.89	-.73	.41	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L705	#	3.09	2.40	-2.24	-.39	1.26	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L757	#	4.10	3.49	-.81	-.02	.82	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L2507	*	4.20	3.50	-.72	-.02	.67	20L	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, CRE, 20 C, 65% RH		
L176	#	4.34	3.55	-.60	-.03	1.18	20E	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L738	#	4.33	3.89	-.40	.24	1.15	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L442	#	4.38	3.75	-.43	.10	.64	20G	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L736	#	4.42	3.78	-.39	.10	.66	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L226C	#	4.43	3.48	-.53	-.15	1.01	20C	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L315	#	4.45	3.83	-.33	.13	.93	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L319	#	4.49	3.75	-.34	.04	.73	20G	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CRE)		
L325	#	4.52	3.84	-.27	.10	1.20	20E	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L211	X	4.53	3.14	-.62	-.50	1.69	20C	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L230	#	4.59	3.81	-.22	.04	.63	20G	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CRE)		
L122	#	4.60	3.85	-.19	.07	.82	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L115	#	4.60	3.79	-.22	.02	1.11	20D	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L291	#	4.61	3.75	-.24	-.02	1.06	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L194	#	4.67	3.83	-.14	.01	1.00	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L360	#	4.69	3.99	-.05	.14	.84	20B	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L575	#	4.70	4.07	-.03	.14	.75	20G	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L260	#	4.72	3.70	-.17	-.12	.59	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L567	#	4.72	3.89	-.07	.04	.83	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CPE)		
L261	#	4.72	3.74	-.14	-.09	.98	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L323	#	4.73	3.65	-.19	-.16	1.18	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L139	*	4.73	3.77	-.12	-.06	.86	20R	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, CRE, SHORT TEST SPAN		
L567	#	4.73	3.61	-.21	-.21	1.31	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L223B	#	4.73	3.81	-.10	-.03	.89	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CPE)		
L255	#	4.75	3.54	-.23	-.27	1.40	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CPE)		
L592	#	4.79	3.99	.04	.09	.93	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CPE)		
L356	#	4.81	3.89	.01	-.01	.78	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L344	#	4.81	3.80	-.04	-.09	1.00	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CRE)		
L159	#	4.81	3.93	.03	.02	.50	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L616	#	4.83	4.12	.14	.18	.19	20D	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CPE)		
L386	#	4.83	3.98	.08	.06	1.06	20E	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L124C	#	4.84	3.96	.07	.04	.79	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L698	#	4.85	3.80	-.00	-.10	1.05	20E	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CRE)		
L309	#	4.86	3.96	.09	.03	1.03	20E	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CPE)		
L692	#	4.86	3.90	.05	-.02	1.04	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L105	#	4.86	3.98	.09	.04	.92	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CPE)		
L148	#	4.88	3.99	.12	.05	.54	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L185	#	4.88	3.80	.02	-.12	.95	20C	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L118	#	4.90	4.05	.17	.08	.74	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L376	#	4.92	3.97	.14	.01	1.89	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L125	#	4.95	3.79	.08	-.17	1.15	20C	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L574	#	4.96	3.99	.18	.00	1.12	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L744	#	4.97	3.74	.07	-.22	2.85	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CPE)		
L131	#	4.99	3.92	.18	-.07	1.20	20E	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L163	#	4.99	4.14	.29	.11	.86	20D	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L1417	#	5.05	3.99	.26	-.04	.88	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CPE)		
L734	#	5.06	4.01	.29	-.03	1.04	20E	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L743	#	5.09	4.20	.41	.11	.86	20E	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CPE)		
L390	#	5.13	4.12	.40	.02	1.44	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CRE)		
L706	#	5.19	3.89	.33	-.21	1.45	20E	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L155	#	5.19	4.25	.52	.10	.99	20B	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
L760A	#	5.32	4.37	.69	.14	.95	20A	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CRE)		
L563	X	5.41	3.80	.47	-.40	1.47	20A	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CRE)		
L167	#	5.42	4.36	.78	.08	.92	20G	TENSILE STRENGTH, 14 T <sup>9</sup> 40 LB/IN, LOAD CELL (CRE)		
L143	*	5.59	4.10	.78	-.23	1.21	20E	TENSILE STRENGTH, 14 T <sup>6</sup> 40 LB/IN, LOAD CELL (CPE)		
GMEANS:		4.90	3.89			1.00				
95% ELLIPSE:				.83	.29		WITH GAMMA = 31 DEGREES			

# TENSILE STR., CRE, PRINTING PAPERS

SAMPLE G40 = 4.80 KILONEWTN/M    SAMPLE G33 = 3.89 KILONEWTN/M  
 SAMPLE G40 = 16.19 LB/15 MM    SAMPLE G33 = 13.12 LB/15 MM



ANALYSIS T20-2 TABLE 1  
 TENSILE BREAKING STRENGTH, KILOGNEWTONS PER METER - PRIMARILY PRINTING PAPERS  
 TAPPI OFFICIAL TEST METHOD T404 GS-76, PENDULUM-TYPE TESTER

LAB CODE	SAMPLE G40 MEAN	ENVELOPE 80 GRAMS PER SQUARE METER				SAMPLE G33 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER				TEST D. # LAB		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L103	4.65	-.24	-.87	.16	.59	4.08	.16	.62	.10	.54	20P	#	L103
L108	4.95	.06	.22	.19	.70	3.82	-.09	-.35	.26	1.40	20P	#	L108
L121	4.64	-.25	-.50	.29	1.06	3.79	-.12	-.45	.18	.95	20P	#	L121
L124P	4.96	-.03	-.09	.29	1.07	3.50	-.41	-1.57	.26	1.40	20P	#	L124P
L128	4.83	-.05	-.20	.26	.94	3.81	-.10	-.39	.18	.95	20T	#	L128
L148	4.64	-.25	-.52	.21	.77	3.71	-.21	-.78	.17	.90	20P	#	L148
L153	5.18	.29	1.35	.24	.87	4.14	.23	.89	.20	1.09	20P	#	L153
L162	4.61	-.28	-1.00	.28	1.04	3.72	-.19	-.73	.23	1.22	20V	#	L162
L182L	4.92	.03	.12	.33	1.19	4.05	.14	.52	.16	.85	20P	#	L182L
L183	5.08	.19	.70	.40	1.48	4.07	.16	.61	.21	1.13	20P	#	L183
L189	5.00	.11	.39	.25	.90	4.13	.21	.82	.15	.78	20P	#	L189
L191P	4.90	.01	.04	.22	.82	4.01	.10	.38	.14	.78	20P	#	L191P
L212	4.91	-.08	-.30	.39	1.44	3.92	.01	.05	.08	.45	20R	#	L212
L213	4.97	-.02	-.07	.39	1.41	3.74	-.17	-.64	.29	1.53	20T	#	L213
L218	4.85	-.04	-.16	.23	.85	4.04	.12	.47	.10	.55	20P	#	L218
L233	5.10	.21	.78	.30	1.08	4.26	.35	1.33	.17	.90	20Q	#	L233
L234	5.13	.24	.87	.21	.77	3.55	-.36	-1.36	.19	1.00	20P	#	L234
L241	4.21	-.68	-2.49	.22	.80	3.25	-.66	-2.51	.15	.83	20R	#	L241
L242	4.53	-.36	-1.31	.14	.51	3.68	-.23	-.87	.23	1.25	20Y	#	L242
L249	4.94	.05	.18	.32	1.19	4.02	.11	.42	.19	1.01	20P	#	L249
L259	5.38	.50	1.80	.33	1.21	4.29	.38	1.44	.14	.75	20P	#	L259
L262	4.95	.06	.22	.31	1.13	4.20	.29	1.11	.13	.69	20R	#	L262
L274	4.92	.03	.12	.13	.48	3.89	-.03	-.10	.07	.37	20P	#	L274
L275	4.52	-.37	-1.34	.32	1.17	3.46	-.46	-1.73	.18	.95	20R	#	L275
L279P	5.43	.54	1.98	.34	1.25	4.19	.28	1.06	.16	.85	20P	#	L279P
L285	4.30	-.59	-2.15	.28	1.02	3.77	-.14	-.54	.13	.71	20P	#	L285
L290	4.69	-.20	-.72	.24	.88	3.68	-.23	-.87	.25	1.36	20P	#	L290
L311	4.71	-.18	-.65	.28	1.03	3.90	-.01	-.02	.16	.85	20V	#	L311
L313	3.68	-1.21	-4.40	.20	.72	3.03	-.88	-3.35	.14	.74	20T	#	L313
L321	4.63	-.26	-.93	.21	.78	3.50	-.41	-1.57	.16	.87	20Q	#	L321
L330	5.17	.28	1.02	.34	1.25	4.21	.30	1.13	.20	1.07	20P	#	L330
L337	24.95	20.07	73.05	1.77	6.46	20.29	16.38	62.22	1.20	6.44	20V	#	L337
L356	5.24	.35	1.28	.34	1.23	4.09	.17	.66	.20	1.10	20P	#	L356
L366	5.18	.25	1.05	.24	.88	3.75	-.16	-.60	.44	2.38	20P	#	L366
L393	4.95	-.03	-.13	.24	.89	4.00	.09	.35	.13	.72	20P	#	L393
L484	3.78	-1.11	-4.04	.17	.63	4.48	.56	2.14	.20	1.09	20U	#	L484
L556	5.30	.41	1.48	.46	1.68	4.11	.19	.74	.43	2.32	20P	#	L556
L599	4.73	-.16	-.58	.39	1.44	3.61	-.30	-1.13	.30	1.59	20V	#	L599
L625	4.75	-.14	-.51	.31	1.12	3.56	-.35	-1.32	.22	1.18	20P	#	L625
L626	5.03	.14	.51	.23	.85	4.27	.36	1.38	.11	.59	20T	#	L626
L680	5.16	.27	.99	.19	.71	4.16	.25	.94	.15	.82	20R	#	L680
L685	4.75	-.14	-.51	.18	.67	3.97	.06	.22	.17	.91	20Y	#	L685
L714	4.87	-.02	-.08	.19	.69	4.08	.17	.63	.15	.79	20P	#	L714
L754	4.59	-.30	-1.10	.18	.66	3.71	-.20	-.76	.11	.61	20P	#	L754
L759	5.17	.28	1.01	.27	1.01	4.20	.29	1.09	.15	.82	20P	#	L759
L760B	5.22	.33	1.22	.29	1.08	4.29	.38	1.44	.14	.73	20P	#	L760B

GR. MEAN = 4.89 KILOGNEWTON/M      GRAND MEAN = 3.91 KILOGNEWTON/M      TEST DETERMINATIONS = 20  
 SD MEANS = .27 KILOGNEWTON/M      SD OF MEANS = .26 KILOGNEWTON/M      43 LABS IN GRAND MEANS  
 AVERAGE SDR = .27 KILOGNEWTON/M      AVERAGE SDR = .19 KILOGNEWTON/M  
 GR. MEAN \*16.490 LB/15 MM      GRAND MEAN \*13.191 LB/15 MM  
 TOTAL NUMBER OF LABORATORIES REPORTING = 46

Best values: G40 4.9 ± 0.5 kilonewton per meter  
 G33 3.9 ± 0.4 kilonewton per meter

The following laboratories were omitted from the grand means because of extreme test results: 313, 484.

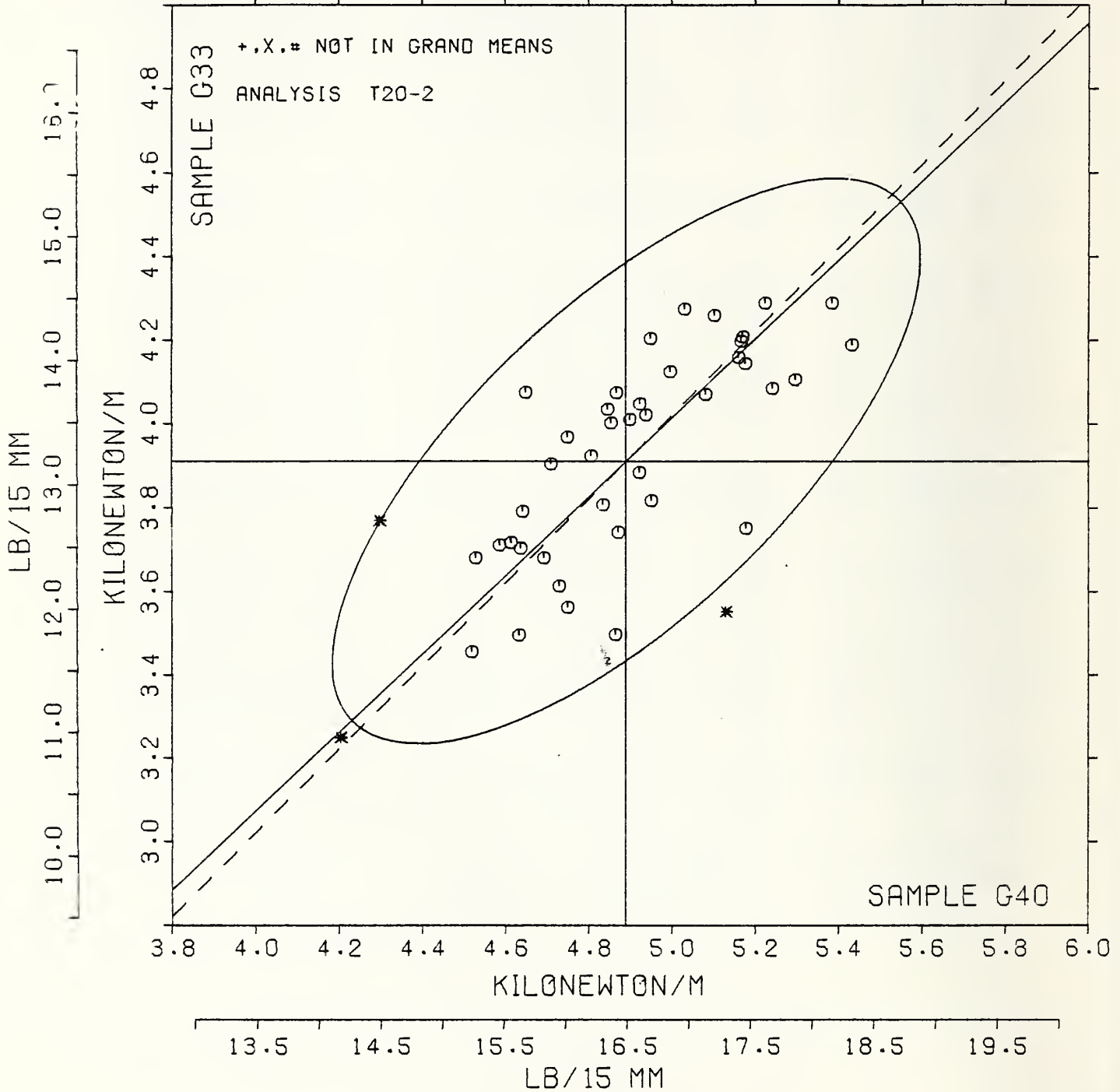
Data from the following laboratories appear to be off by a multiplicative factor: 337.

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS  
TAPPI OFFICIAL TEST METHOD T404 GS-76, PENDULUM-TYPE TESTER

TAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		G40	G33	MAJOR	MINOR	R.SDR	VAR	
L313	#	3.68	3.03	-1.48	.19	.73	20T	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L484	#	3.78	4.48	-.42	1.17	.86	20U	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L241	*	4.21	3.25	-.95	-.01	.81	20R	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L285	*	4.30	3.77	-.53	.30	.86	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L275	0	4.52	3.46	-.58	-.08	1.06	20R	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L242	9	4.53	3.68	-.42	.08	.88	20Y	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L754	#	4.59	3.71	-.36	.06	.63	20T	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L162	#	4.61	3.72	-.33	.05	1.13	20V	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L321	0	4.63	3.50	-.47	-.13	.82	20Q	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L148	9	4.64	3.71	-.33	.02	.83	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L121	#	4.64	3.79	-.26	.08	1.01	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L103	#	4.65	4.08	-.06	.28	.57	20R	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L720	#	4.69	3.68	-.30	-.03	1.12	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L311	#	4.71	3.90	-.13	.12	.94	20V	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L599	#	4.73	3.61	-.32	-.11	1.51	20V	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L685	#	4.75	3.97	-.56	.14	.79	20Y	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L625	#	4.75	3.56	-.34	-.16	1.15	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L212	#	4.81	3.92	-.05	.07	.94	20R	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L129	#	4.83	3.81	-.11	-.04	.95	20T	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L219	#	4.85	4.04	.05	.12	.70	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L353	9	4.85	4.00	.04	.09	.80	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L124P	#	4.86	3.50	-.30	-.28	1.24	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L714	#	4.87	4.08	.10	.14	.74	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L213	#	4.87	3.74	-.13	-.11	1.47	20T	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L191P	#	4.90	4.01	.08	.07	.80	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L274	#	4.92	3.89	.01	-.04	.42	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L182Y	#	4.92	4.05	.12	.08	1.02	20T	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L249	#	4.94	4.02	.11	.05	1.10	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L242	#	4.95	4.20	.24	.17	.91	20R	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L103	#	4.95	3.82	-.02	-.11	1.05	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L189	#	5.00	4.13	.22	.08	.84	20R	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L626	#	5.03	4.27	.35	.17	.72	20T	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L183	#	5.08	4.07	.25	-.02	1.31	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L233	#	5.10	4.26	.39	.11	.99	20Q	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L234	*	5.13	3.55	-.07	-.43	.89	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L680	#	5.16	4.16	.37	-.00	.76	20R	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L759	#	5.17	4.20	.40	.02	.91	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L330	#	5.17	4.21	.41	.02	1.16	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L153	#	5.18	4.14	.37	-.03	.98	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L366	#	5.18	3.75	.10	-.31	1.63	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L760B	#	5.22	4.29	.50	.05	.91	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L356	#	5.24	4.09	.38	-.11	1.17	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L556	#	5.30	4.11	.43	-.14	2.00	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L259	#	5.38	4.29	.62	-.06	.98	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L279P	#	5.43	4.19	.59	-.17	1.05	20P	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
L337	#	24.95	20.29	25.84	-1.84	6.45	20V	TENSILE STRENGTH, 14 T6 40 LB/IN, PENDULUM TESTER
GMEANS:		4.89	3.91			1.00		
95% ELLIPSE:				.90	.37			WITH GAMMA = 43 DEGREES

TENSILE STR., PENDULUM, PRINTING P.

SAMPLE G40 = 4.89 KILONEWTN/M    SAMPLe G33 = 3.91 KILONEWTN/M  
SAMPLe G40 = 16.49 LB/15 MM    SAMPLe G33 = 13.19 LB/15 MM



TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER  
TAPPI OFFICIAL TEST METHOD T494 68-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	SAMPLE G38 KRAFT ENVELOPE 123 GRAMS PER SQUARE METER					SAMPLE G49 KRAFT COATING BASE 96 GRAMS PER SQUARE METER					TEST D. * 20			
	MEAN	DEV	N.DEV	SDR	P.SDR	MEAN	DEV	N.DEV	SDR	P.SDR	VAR	F	LAB	
L106	112.9	11.3	1.00	9.4	.78	139.1	18.2	1.58	16.3	1.25	25F	0	L106	
L122	109.1	7.6	.67	8.1	.67	124.9	4.0	.34	13.8	1.06	25P	0	L122	
L151	101.5	.0	.00	13.9	1.14	115.6	-5.3	-.46	18.9	1.45	25F	0	L151	
L182	100.6	-.9	-.08	11.7	.96	126.2	5.3	.46	11.5	.89	25B	0	L182	
L219	117.6	16.1	1.42	10.6	.87	136.2	15.3	1.33	8.0	.61	25J	0	L219	
L234	69.4	-32.1	-2.83	10.6	.87	113.8	-7.1	-.62	9.4	.72	25F	*	L234	
L237B	105.1	3.6	.32	12.3	1.01	104.2	-16.7	-1.45	9.3	.72	25H	0	L237B	
L264	107.4	5.9	.52	15.3	1.25	102.3	-13.6	-1.62	13.8	1.06	25F	0	L264	
L267	106.6	5.1	.45	11.7	.96	134.3	13.3	1.16	9.8	.75	25F	0	L267	
L273	99.6	-1.9	-.17	15.5	1.27	120.0	-.9	-.08	17.7	1.36	25F	0	L273	
L278	97.9	-3.6	-.31	10.5	.86	133.5	12.5	1.09	8.8	.67	25E	0	L278	
L280	104.1	2.6	.23	17.8	1.46	116.9	-4.0	-.35	17.6	1.35	25B	0	L280	
L312	99.1	-2.5	-.22	20.1	1.65	125.0	4.1	.36	15.2	1.17	25J	0	L312	
L318	100.4	-1.1	-.10	8.3	.68	129.7	8.8	.77	11.5	.88	25A	0	L318	
L580	102.1	.6	.05	7.7	.63	115.0	-5.9	-.52	7.8	.60	25C	0	L580	
L604	90.6	-10.9	-.96	15.2	1.25	105.7	-15.2	-1.32	15.1	1.16	25A	0	L604	
L676	95.5	-6.4	-.53	12.3	1.01	103.8	-17.2	-1.49	18.5	1.42	25F	0	L676	
L689	86.7	-14.8	-1.31	9.5	.78	112.9	-8.0	-.69	14.3	1.10	25F	0	L689	
L735	94.4	-7.1	-.63	10.2	.83	118.7	-2.2	-.19	12.9	.99	25F	0	L735	
L737A	106.3	4.8	.42	8.7	.71	124.6	3.7	.32	8.0	.61	25E	0	L737A	
L737B	124.7	23.2	2.05	14.9	1.23	136.7	15.8	1.37	11.6	.89	25E	0	L737B	
GR. MEAN *	101.5	JOULES/SQ M				GRAND MEAN *	120.9	JOULES/SQ M				TEST DETERMINATIONS *		
SD MEAN *	11.3	JOULES/SQ M				SD OF MEANS *	11.5	JOULES/SQ M				21 LABS IN GRAND MEANS		
		AVERAGE SDR *						AVERAGE SDR *				13.0 JOULES/SQ M		
GR. MEAN *	6.95	FT.LB/SQ FT				GRAND MEAN *	8.28	FT.LB/SQ FT						

L250 98.0 -3.5 -.31 7.9 .64 120.7 -.2 -.02 6.9 .53 25N \* L250  
 TOTAL NUMBER OF LABORATORIES REPORTING = 22  
 Best values: G38 102 ± 20 joules per square meter  
 G49 121 ± 20 joules per square meter

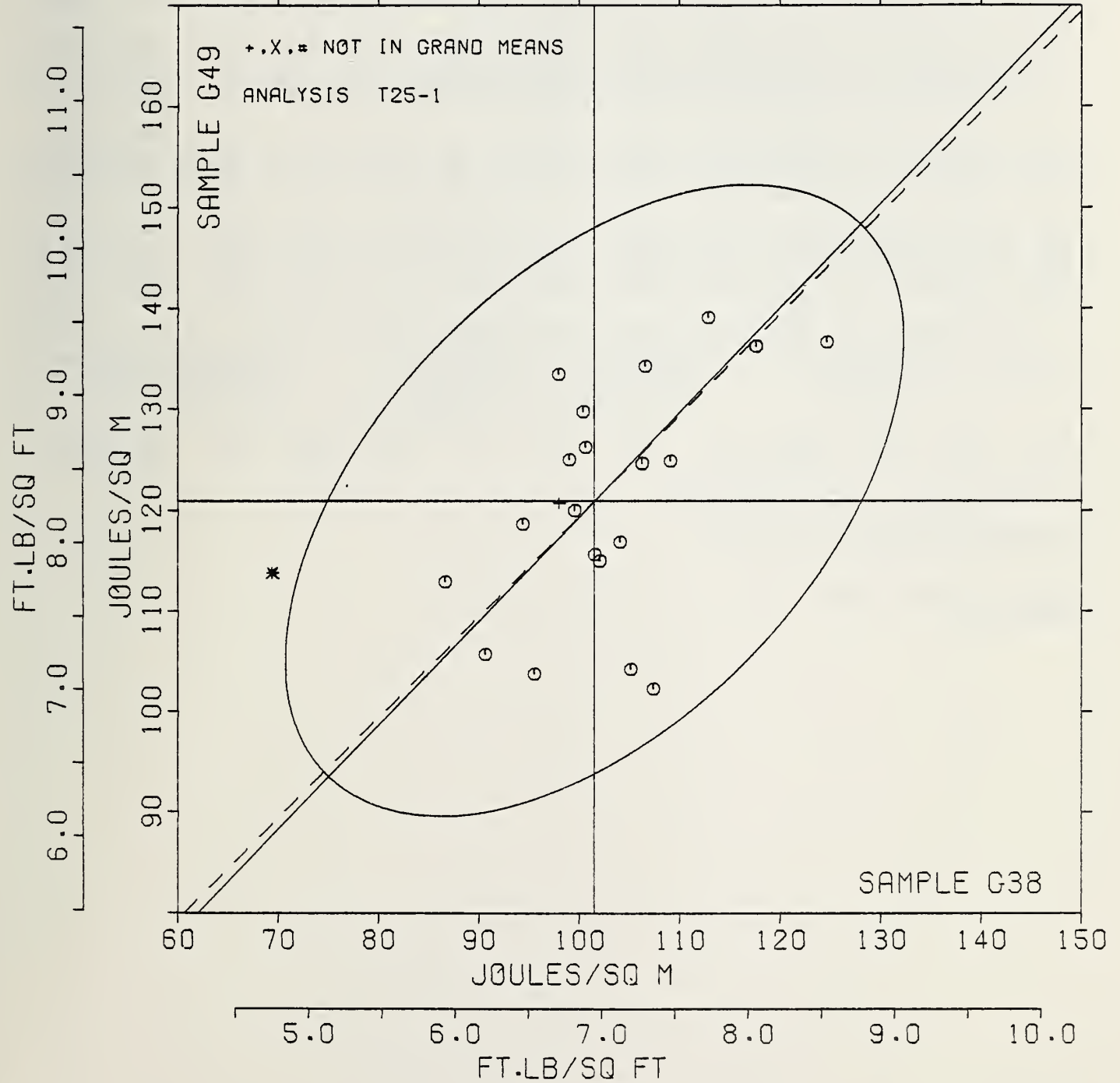
TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER  
TAPPI OFFICIAL TEST METHOD T494 CS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		G38	G49	MAJOR	MINOR	R.SDR	VAR	
L234	*	65.4	113.8	-27.4	18.1	.80	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L685	*	86.7	112.9	-16.1	5.1	.94	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L604	Ø	90.6	105.7	-18.5	-2.8	1.20	25A	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
L735	Ø	94.4	118.7	-6.5	3.6	.91	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L676	Ø	95.5	103.8	-16.5	-7.6	1.21	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L278	Ø	97.9	133.5	6.6	11.3	.76	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
L250	*	98.0	120.7	-2.6	2.4	.59	25N	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS, 2°C
L312	Ø	99.1	125.0	1.3	4.6	1.41	25J	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L273	Ø	99.6	120.0	-2.0	.8	1.32	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L318	Ø	100.4	129.7	5.6	6.9	.78	25A	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
L182	Ø	100.6	126.2	3.2	4.3	.92	25B	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L151	Ø	101.5	115.6	-3.8	-3.7	1.30	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L580	Ø	102.1	115.0	-3.9	-4.5	.61	25C	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/LINE JAWS
L280	Ø	104.1	116.9	-1.1	-4.6	1.41	25B	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L237B	Ø	105.1	104.2	-9.5	-14.2	.86	25H	TENSILE ENERGY ABSORPTION (WITH TEST T19),2-PIN STRAIN GAGE
L737A	Ø	106.3	124.6	6.0	-.8	.66	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
L267	Ø	106.6	134.3	13.1	5.6	.86	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L264	Ø	107.4	102.3	-9.3	-17.2	1.16	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L122	Ø	109.1	124.9	8.1	-2.7	.86	25P	TENSILE ENERGY ABSORPTION (WITH TEST T19),PATTERNED FLAT JAW
L106	Ø	112.9	139.1	21.0	4.5	1.01	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L219	Ø	117.6	136.2	22.2	-1.0	.74	25J	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L737B	Ø	124.7	136.7	27.5	-5.7	1.06	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
GMFANS:		101.5	120.9			1.00		
		95% ELLIPSE:		38.1	21.9			WITH GAMMA = 45 DEGREES



T.E.A., PACKAGING PAPERS

SAMPLE G38 = 102. JOULES/SQ M      SAMPLE G49 = 121. JOULES/SQ M  
 SAMPLE G38 = 6.95 FT.LB/SQ FT      SAMPLE G49 = 8.28 FT.LB/SQ FT



TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER  
TAPPI OFFICIAL TEST METHOD T494 GS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	ENVELOPE					COATED OFFSET BOOK					TEST D. 20						
	G40 MEAN	88 GRAMS PER SQUARE METER				G33 MEAN	75 GRAMS PER SQUARE METER				VAR	F	LAB				
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR							
L115	41.7	-4.2	-1.00	6.0	.97	32.6	-5.7	-1.36	5.0	1.08	26C	#	L115				
L118	44.6	-1.4	-.34	5.8	.53	39.8	1.4	.34	3.3	.72	26E	#	L118				
L122	43.6	-2.4	-.56	7.4	1.19	40.0	1.6	.39	4.2	.92	26L	#	L122				
L139	41.4	-4.6	-1.09	7.1	1.14	33.0	-5.4	-1.27	4.1	.90	26H	#	L139				
L159	49.2	3.2	.76	3.9	.63	42.0	3.7	.87	2.0	.44	26F	#	L159				
L163	44.8	-1.1	-.27	6.1	.98	39.8	1.4	.34	3.8	.83	26J	#	L163				
L167	54.2	8.3	1.96	3.2	.52	43.6	5.3	1.25	1.3	.28	26D	#	L167				
L185	46.3	.3	.08	7.3	1.17	32.1	-6.2	-1.47	5.2	1.13	26C	#	L185				
L211	47.8	3.0	.84	10.8	3.4	35.7	0.3	.14	31.8	7.7	31.1	3.3	10.6	4.2	2.1	17.8	1
L255	52.0	6.0	1.42	8.2	1.32	35.6	-2.8	-.65	9.0	1.94	26P	#	L255				
L309	53.8	7.8	1.85	11.9	1.92	42.2	3.9	.92	6.0	1.30	26J	#	L309				
L318	44.1	-1.9	-.45	5.2	.83	40.0	1.7	.40	3.7	.80	26A	#	L318				
L356	49.6	3.6	.86	7.0	1.14	39.9	1.6	.37	3.9	.95	26A	#	L356				
L376	46.7	.7	.17	8.1	1.30	47.1	8.8	2.08	5.3	1.15	26E	#	L376				
L393	42.0	-3.9	-.94	2.5	.40	35.5	-2.8	-.67	3.3	.71	26V	#	L393				
L442	42.1	-3.9	-.92	4.9	.78	40.3	2.0	.46	4.2	.90	26B	#	L442				
L563	61.9	15.9	3.77	7.8	1.25	33.8	-4.5	-1.07	10.6	2.30	26C	#	L563				
L567	45.4	-.6	-.14	6.2	1.00	32.7	-5.6	-1.33	9.1	1.97	26A	#	L567				
L575	40.5	-5.5	-1.30	4.4	.72	38.0	-.3	-.07	4.3	.92	26A	#	L575				
L592	45.5	-.4	-.10	6.5	1.05	35.8	-2.5	-.60	5.3	1.14	26H	#	L592				
L744	30.7	-15.2	-3.61	8.5	1.37	23.7	-15.4	-3.63	6.7	1.45	26E	#	L744				
GR. MEAN = 46.6 JOULES/SQ M					GRAND MEAN = 38.3 JOULES/SQ M					TEST DETERMINATIONS = 20							
SD MEANS = 4.2 JOULES/SQ M					SD OF MEANS = 4.2 JOULES/SQ M					18 LABS IN GRAND MEANS							
AVERAGE SDR = 6.2					AVERAGE SDR = 4.6					JOULES/SQ M							
GR. MEAN = 3.146 FT.LB/SQ FT					GRAND MEAN = 2.627 FT.LB/SQ FT												
L250	43.4	-2.6	-.62	4.4	.70	37.9	-.4	-.10	3.6	.79	26N	#	L250				
L738	61.3	15.3	3.63	5.8	.94	53.4	15.1	3.56	5.4	1.16	26X	#	L738				
TOTAL NUMBER OF LABORATORIES REPORTING = 23																	
Best values: G40 46 ± 7 joules per square meter																	
G33 33 ± 7 joules per square meter																	

The following laboratories were omitted from the grand means because of extreme test results: 563, 744.

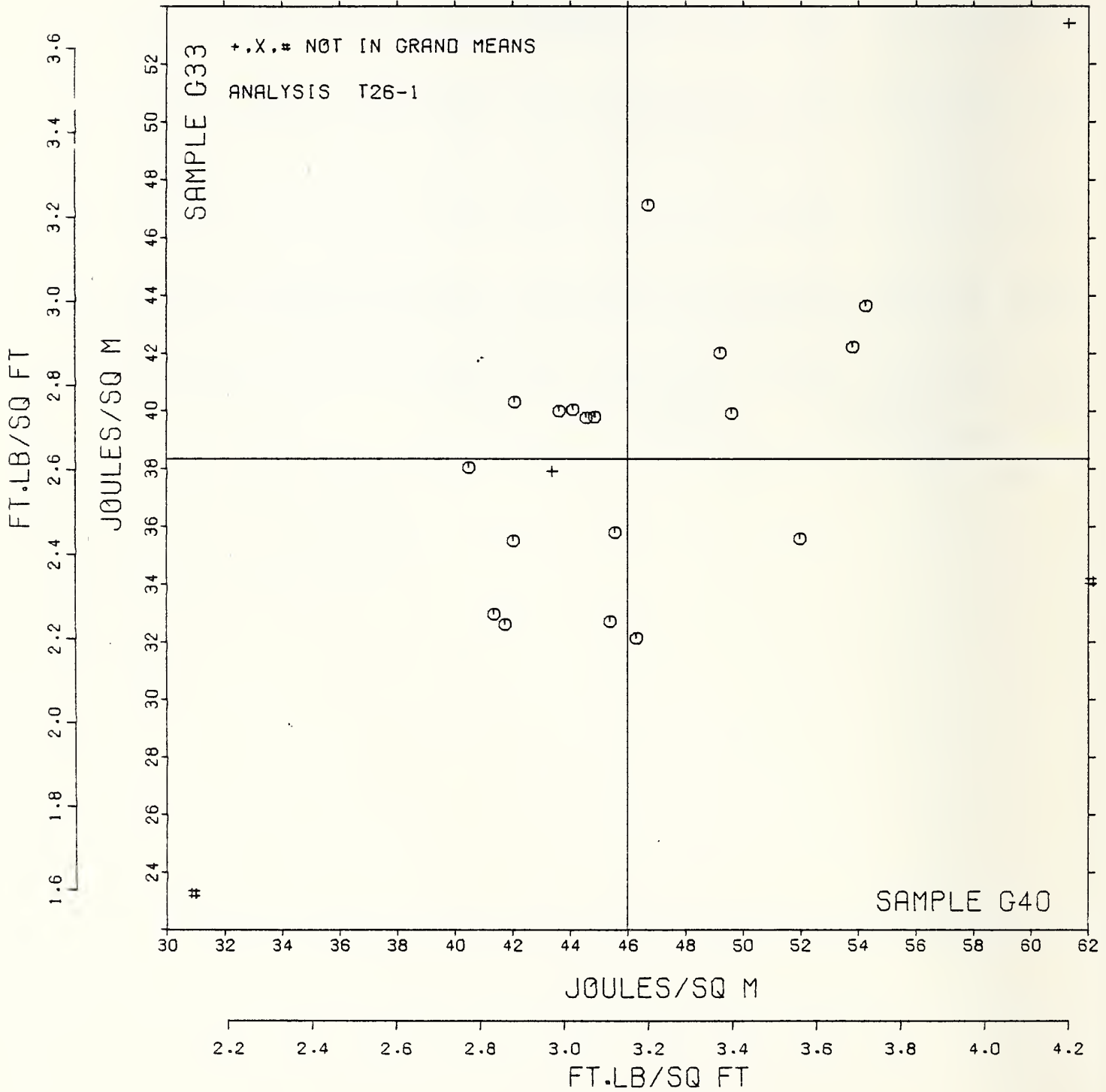
Data from the following laboratories were not understood: 211.

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER  
TAPPI OFFICIAL TEST METHOD T494 GS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---	CONDITIONS
		G40	G33	MAJOR	MINOR	R.SDR	VAR		
L744	#	30.7	23.0	-21.6	-0.0	1.41	26E	TENSILE ENERGY ABSORPTION (WITH TEST T20),	FLAT/FLAT JAWS
L575	#	40.5	38.0	-4.1	3.7	.82	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),	FLAT/FLAT JAWS
L139	#	41.4	33.0	-7.1	-5	1.02	26H	TENSILE ENERGY ABSORPTION (WITH TEST T20),	2-PIN STRAIN GAGE
L115	#	41.7	32.6	-7.0	-1.0	1.02	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),	LINE/LINE JAWS
L393	#	42.0	35.5	-4.8	.8	.55	26V	TENSILE ENERGY ABSORPTION (WITH TEST T20),	LINE/FLAT JAWS
L442	#	42.1	40.3	-1.4	4.2	.84	26B	TENSILE ENERGY ABSORPTION (WITH TEST T20),	LINE/FLAT JAWS
L250	#	43.4	37.9	-2.1	1.5	.74	26N	TENSILE ENERGY ABSORPTION (WITH TEST T20),	LINE/FLAT JAWS, 2CC
L122	#	43.6	40.0	-5	2.8	1.05	26L	TENSILE ENERGY ABSORPTION (WITH TEST T20),	PATTERNED FLAT JAW
L318	#	44.1	40.0	-1	2.5	.82	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),	FLAT/FLAT JAWS
L118	#	44.6	39.8	.0	2.0	.83	26E	TENSILE ENERGY ABSORPTION (WITH TEST T20),	FLAT/FLAT JAWS
L163	#	44.8	39.8	.2	1.8	.91	26J	TENSILE ENERGY ABSORPTION (WITH TEST T20),	LINE/FLAT JAWS
L567	#	45.4	32.7	-4.4	-3.5	1.48	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),	FLAT/FLAT JAWS
L592	#	45.5	35.8	-2.1	-1.5	1.10	26H	TENSILE ENERGY ABSORPTION (WITH TEST T20),	2-PIN STRAIN GAGE
L185	#	46.3	32.1	-4.2	-4.6	1.15	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),	LINE/LINE JAWS
L376	#	46.7	47.1	6.7	5.7	1.23	26E	TENSILE ENERGY ABSORPTION (WITH TEST T20),	FLAT/FLAT JAWS
L159	#	49.2	42.0	4.9	.3	.53	26F	TENSILE ENERGY ABSORPTION (WITH TEST T20),	LINE/FLAT JAWS
L356	#	49.6	39.9	3.7	-1.5	.99	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),	FLAT/FLAT JAWS
L255	#	52.0	35.6	2.3	-6.2	1.63	26P	TENSILE ENERGY ABSORPTION (WITH TEST T20),	PATTERNED FLAT JAW
L309	#	53.8	42.2	8.3	-2.8	1.61	26J	TENSILE ENERGY ABSORPTION (WITH TEST T20),	LINE/FLAT JAWS
L167	#	54.2	43.6	9.6	-2.1	.40	26D	TENSILE ENERGY ABSORPTION (WITH TEST T20),	2-PIN STRAIN GAGE
L739	#	61.3	53.4	21.5	-.2	1.05	26X	TENSILE ENERGY ABSORPTION (WITH TEST T20);	GIVE JAW TYPE
L563	#	61.9	33.8	8.0	-14.5	1.78	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),	LINE/LINE JAWS
L211	#	*****	*****	*****	*****	*****	26Z	TENSILE ENERGY ABSORPTION (WITH TEST T20),	LINE/LINE JAWS
GMANS:		46.0	38.3			1.00			
		95% ELLIPSE:		14.0	8.9			WITH GAMMA = 45 DEGREES	

T.E.A., PRINTING PAPERS

SAMPLE G40 = 46.      JOULES/SQ M      SAMPLE G33 = 38.      JOULES/SQ M  
 SAMPLE G40 = 3.15   FT.LB/SQ FT      SAMPLE G33 = 2.63   FT.LB/SQ FT



ELONGATION TO BREAK, PERCENT - PACKAGING PAPER  
TAPPI OFFICIAL TEST METHODS T404 GS-76 AND T494 GB-70, PENDULUM AND CPE TYPES

LAB CODE	KRAFT ENVELOPE					KRAFT COATING BASE					TEST D. - 20		
	SAMPLE G39 MEAN	123 GRAMS DEV	PER N.DEV	SQUARE SDR	METER R.SDR	SAMPLE G49 MEAN	96 GRAMS DEV	PER N.DEV	SQUARE SDR	METER R.SDR	VAP	F	LAB
L106	1.830	.309	1.82	.098	.71	2.270	.376	2.16	.172	1.10	28B	0	L106
L122	1.589	.068	.40	.071	.51	1.951	.058	.33	.134	.85	28P	0	L122
L151	1.640	.119	.70	.123	.89	1.800	-.094	-.54	.243	1.55	28B	0	L151
L182	1.430	-.091	-.54	.080	.58	1.875	-.019	-.11	.116	.74	28B	0	L182
L234	1.095	-.426	-2.52	.173	1.25	1.780	-.114	-.65	.095	.61	28B	*	L234
L264	1.760	.239	1.41	.164	1.18	1.890	-.004	-.02	.238	1.52	28B	0	L264
L265	1.427	-.094	-.56	.097	.70	1.739	-.154	-.88	.091	.58	28A	0	L265
L267	1.460	-.061	-.36	.121	.87	1.914	.021	.12	.089	.57	28B	0	L267
L278	1.655	.134	.79	.100	.72	2.175	.281	1.61	.109	.58	28A	0	L278
L280	1.711	.190	1.12	.122	.88	2.026	.133	.76	.180	1.15	28B	0	L280
L312	1.635	.114	.67	.166	1.20	2.120	.226	1.30	.379	2.42	28B	0	L312
L318	1.662	.141	.83	.077	.56	2.118	.224	1.29	.096	.61	28A	0	L318
L324	1.385	-.136	-.80	.123	.88	1.760	-.134	-.77	.123	.79	28P	0	L324
L336	1.451	-.070	-.41	.130	.94	1.863	-.031	-.18	.129	.82	28A	0	L336
L580	1.390	-.131	-.77	.102	.74	1.700	-.194	-1.11	.103	.66	28C	0	L580
L581	1.381	-.140	-.82	.160	1.15	1.760	-.133	-.76	.097	.62	28A	0	L581
L676	1.475	-.346	-.27	.636	4.59	1.530	-.364	-2.09	.384	2.45	28B	0	L676
L689	1.270	-.251	-1.48	.126	.91	1.795	-.099	-.57	.161	1.03	28B	0	L689
L730	1.587	.066	.39	.103	.75	1.894	.000	.00	.127	.81	28A	0	L730
L735	1.625	.104	.61	.129	.93	2.045	.151	.87	.147	.94	28B	0	L735
L737A	1.518	-.003	-.02	.071	.51	1.818	-.075	-.43	.070	.45	28A	0	L737A
L737B	1.487	-.034	-.20	.113	.81	1.832	-.061	-.35	.117	.75	28A	0	L737B

GR. MEAN = 1.521 PERCENT  
SD MEANS = .169 PERCENT

GRAND MEAN = 1.894 PERCENT  
SD OF MEANS = .174 PERCENT

TEST DETERMINATIONS = 20  
22 LABS IN GRAND MEANS

AVERAGE SDR = .139 PERCENT

AVERAGE SDR = .156 PERCENT

TOTAL NUMBER OF LABORATORIES REPORTING = 22

Best values: G38 1.52 ± 0.29 percent  
G49 1.88 ± 0.30 percent

ANALYSIS T29-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

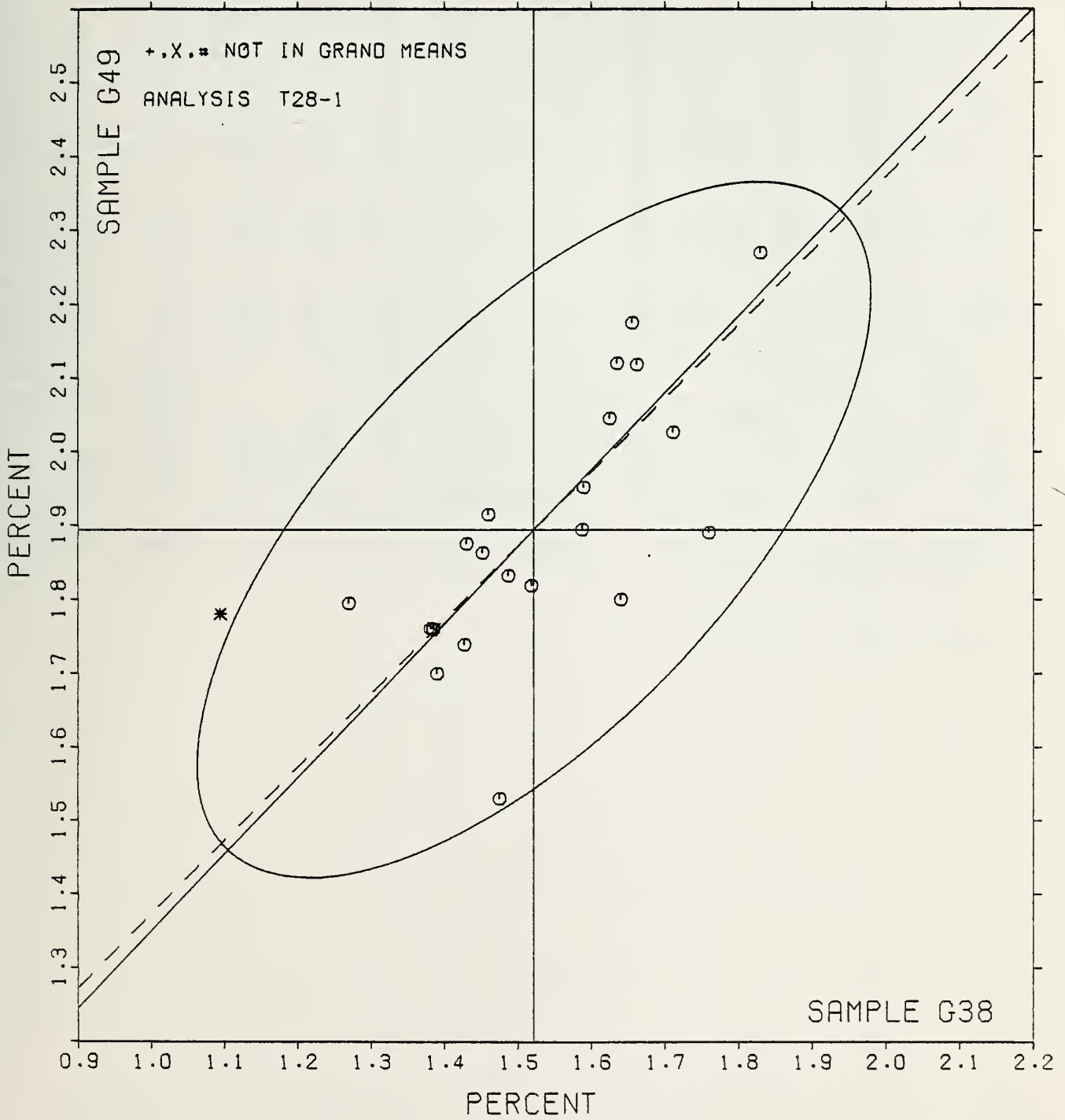
TAPPI OFFICIAL TEST METHODS T404 GS-76 AND T494 GS-70, PENDULUM AND CRE TYPES

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		G39	G49	MAJOR	MINOR	R.SDR	VAR			
T234	*	1.095	1.780	-.377	.229	.93	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
L699	#	1.270	1.795	-.245	.113	.97	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
L581	#	1.381	1.760	-.193	.009	.89	28A	ELONGATION (WITH TEST T19),	LOAD CELL,	FLAT/FLAT JAWS
L324	#	1.385	1.760	-.191	.006	.84	28P	ELONGATION (WITH TEST T19),	LOAD CELL,	PATTERNED FLAT JAWS
L580	#	1.390	1.700	-.231	-.039	.70	28C	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/LINE JAWS
L265	#	1.427	1.739	-.176	-.039	.64	28A	ELONGATION (WITH TEST T19),	LOAD CELL,	FLAT/FLAT JAWS
L192	#	1.430	1.875	-.076	.053	.66	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
L336	#	1.451	1.863	-.070	.029	.88	28A	ELONGATION (WITH TEST T19),	LOAD CELL,	FLAT/FLAT JAWS
L267	#	1.460	1.914	-.027	.059	.72	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
L676	#	1.475	1.530	-.254	-.218	3.52	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
L737B	#	1.487	1.832	-.068	-.018	.78	28A	ELONGATION (WITH TEST T19),	LOAD CELL,	FLAT/FLAT JAWS
L737A	#	1.518	1.818	-.056	-.050	.48	28A	ELONGATION (WITH TEST T19),	LOAD CELL,	FLAT/FLAT JAWS
L730	#	1.587	1.894	.046	-.048	.78	28A	ELONGATION (WITH TEST T19),	LOAD CELL,	FLAT/FLAT JAWS
L122	#	1.589	1.951	.089	-.009	.68	28P	ELONGATION (WITH TEST T19),	LOAD CELL,	PATTERNED FLAT JAWS
L735	#	1.625	2.045	.181	.030	.94	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
L312	#	1.635	2.120	.242	.074	1.81	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
L151	#	1.640	1.800	.015	-.151	1.22	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
L278	#	1.655	2.175	.296	.098	.65	28A	ELONGATION (WITH TEST T19),	LOAD CELL,	FLAT/FLAT JAWS
L318	#	1.662	2.118	.259	.054	.59	28A	ELONGATION (WITH TEST T19),	LOAD CELL,	FLAT/FLAT JAWS
L280	#	1.711	2.026	.227	-.045	1.01	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
L264	#	1.760	1.890	.163	-.175	1.35	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
L106	#	1.830	2.270	.485	.037	.90	28B	ELONGATION (WITH TEST T19),	LOAD CELL,	LINE/FLAT JAWS
GMFANS:		1.521	1.854			1.00				
		95% ELLIPSE:		.602	.267			WITH GAMMA = 46 DEGREES		

# ELONGATION TO BREAK, PACKAGING PAPER

SAMPLE G38 = 1.52 PERCENT

SAMPLE G49 = 1.89 PERCENT



ELONGATION TO BREAK, PERCENT - PRINTING PAPER  
TAPPI OFFICIAL TEST METHODS T404 69-76 AND T494 68-70, PENDULUM AND CRE TYPES

LAB CODE	SAMPLE G40		ENVELOPE 88 GRAMS PER SQUARE METER			SAMPLE G33		COATED OFFSET BOOK 75 GRAMS PER SQUARE METER			TEST D. 20		
	MEAN	DEV	N.DEV	SDP	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L105	.097	-1.390	-8.38	.014	.10	.110	-1.399	-9.69	.013	.09	29A	#	L105
L118	1.345	-.142	-.96	.135	.99	1.420	-.089	-.61	.079	.57	29A	Ø	L118
L122	1.471	-.017	-.10	.144	1.05	1.608	.099	.68	.106	.77	29P	Ø	L122
L139	1.185	-.303	-1.83	.163	1.19	1.230	-.279	-1.93	.108	.78	29D	Ø	L139
L141T	1.298	-.190	-1.14	.182	1.33	1.355	-.154	-1.07	.138	1.00	29D	Ø	L141T
L163	1.478	-.099	-.06	.129	.94	1.542	.033	.23	.101	.73	29B	Ø	L163
L176	1.422	-.065	-.39	.217	1.58	1.523	.014	.10	.213	1.54	29B	Ø	L176
L185	1.405	-.083	-.50	.147	1.07	1.305	-.204	-1.41	.136	.98	29C	Ø	L185
L255	1.806	.319	1.92	.172	1.26	1.679	.170	1.18	.251	1.82	29P	Ø	L255
L309	1.788	.301	1.81	.244	1.78	1.731	.222	1.53	.161	1.17	29A	Ø	L309
L318	1.553	.065	.39	.094	.60	1.711	.202	1.40	.103	.75	29A	Ø	L318
L344	1.665	.177	1.07	.055	.40	1.532	.023	.16	.104	.75	29A	Ø	L344
L356	1.547	.060	.36	.141	1.03	1.545	.036	.25	.098	.71	29A	Ø	L356
L386	1.290	-.198	-1.19	.129	.94	1.335	-.174	-1.21	.131	.95	29A	Ø	L386
L442	1.520	.032	.19	.070	.51	1.655	.146	1.01	.115	.83	29B	Ø	L442
L567	1.459	-.029	-.17	.125	.91	1.389	-.120	-.83	.219	1.59	29A	Ø	L567
L575	1.352	-.136	-.82	.088	.64	1.491	-.018	-.12	.152	1.10	29A	Ø	L575
L592	1.529	.042	.25	.122	.89	1.417	-.092	-.64	.139	1.01	29D	Ø	L592
L698	1.695	.207	1.25	.136	.99	1.610	.101	.70	.162	1.17	29C	Ø	L698
L736	1.460	-.028	-.17	.110	.80	1.595	.086	.59	.110	.80	29A	Ø	L736

GR. MEAN = 1.488 PERCENT      GRAND MEAN = 1.509 PERCENT      TEST DETERMINATIONS = 20  
SD OF MEANS = .166 PERCENT      SD OF MEANS = .144 PERCENT      19 LABS IN GRAND MEANS  
AVERAGE SDR = .137 PERCENT      AVERAGE SDR = .138 PERCENT

L153	1.685	.197	1.19	.118	.86	1.745	.236	1.63	.139	1.01	29R	*	L153
L242	1.695	.197	1.19	.160	1.17	1.905	.396	2.74	.201	1.46	29R	*	L242
L484	1.641	.153	.92	.153	1.11	1.516	.007	.05	.143	1.03	29R	*	L484
L626	1.335	-.152	-.92	.138	1.01	1.352	-.157	-1.09	.092	.67	29R	*	L626
L685	1.930	.442	2.66	.181	1.32	2.100	.591	4.09	.117	.85	29R	*	L685

L759      1.160      -.328      -1.98      .196      1.43      1.225      -.284      -1.97      .283      2.04      29X      \*      L759

TOTAL NUMBER OF LABORATORIES REPORTING = 26  
Best values: G40 1.48 ± 0.29 percent  
G33 1.52 ± 0.25 percent

Data from the following laboratories appear to be off by a multiplicative factor: 105.



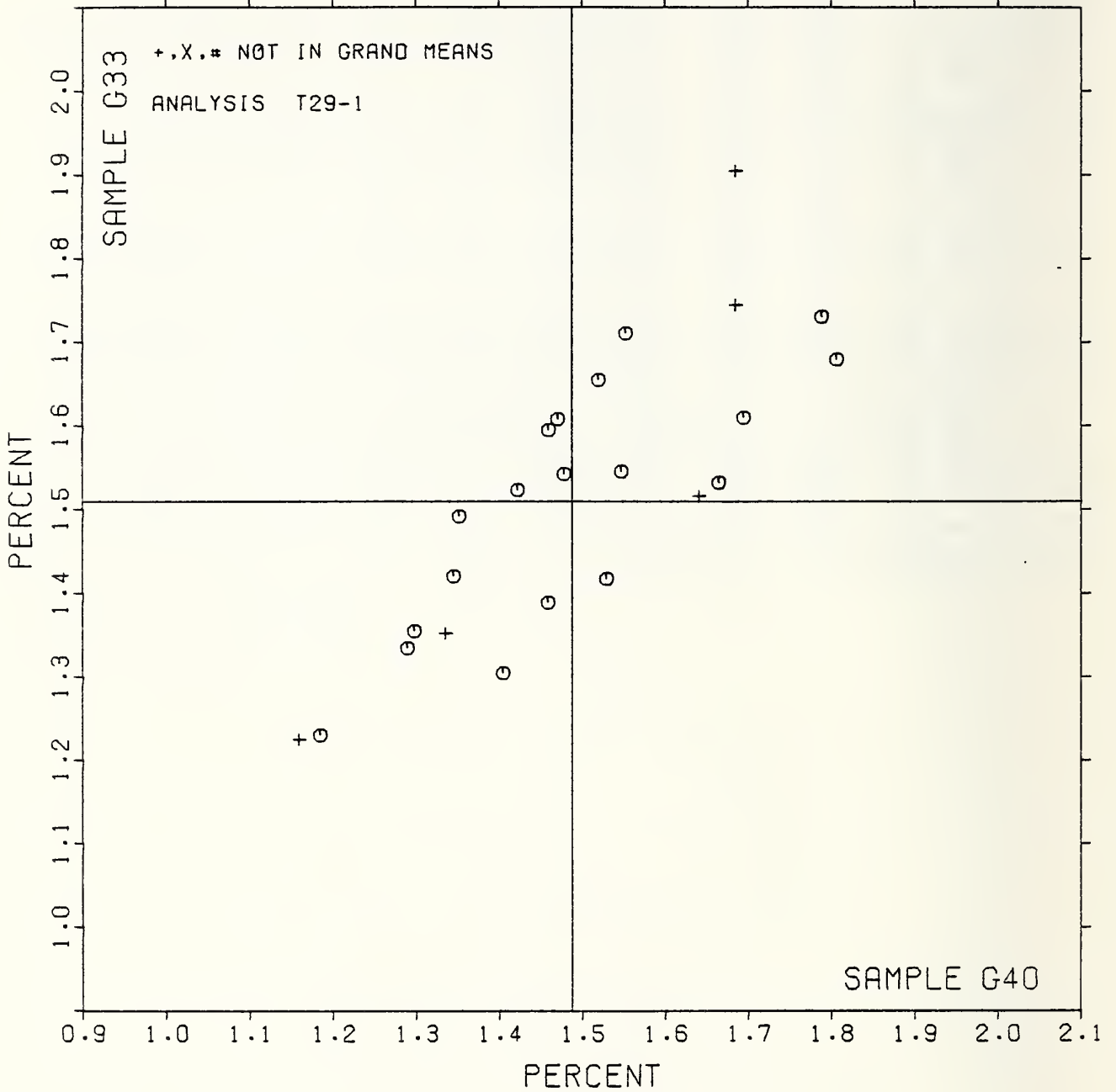
ELONGATION TO BREAK, PERCENT - PRINTING PAPER  
TAPPI OFFICIAL TEST METHODS T404 6S-76 AND T494 6S-70, PENDULUM AND CRE TYPES

LAB CODE	F	MEANS		COORDINATES		AVG R.SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		G40	G33	MAJOR	MINOR					
L105	*	.097	.110	-1.965	-.178	.19	29A	ELONGATION (WITH TEST T20),	LOAD CELL,	FLAT/FLAT JAWS
L759	+	1.160	1.225	-.434	-.007	1.74	29X	ELONGATION (WITH TEST T20):	GIVE INSTRUMENT & JAW TYPES	
L139	#	1.185	1.239	-.412	-.019	.99	29D	ELONGATION (WITH TEST T20),	LOAD CELL,	2-PIN STRAIN GAGE
L386	#	1.290	1.335	-.264	-.006	.95	29A	ELONGATION (WITH TEST T20),	LOAD CELL,	FLAT/FLAT JAWS
L141T	#	1.298	1.355	-.245	.004	1.16	29D	ELONGATION (WITH TEST T20),	LOAD CELL,	2-PIN STRAIN GAGE
T626	+	1.335	1.352	-.218	-.022	.84	29R	ELONGATION (WITH TEST T20),	PENDULUM,	FLAT/FLAT JAWS
L118	#	1.345	1.420	-.166	.024	.78	29A	ELONGATION (WITH TEST T20),	LOAD CELL,	FLAT/FLAT JAWS
L575	#	1.352	1.491	-.116	.074	.87	29A	ELONGATION (WITH TEST T20),	LOAD CELL,	FLAT/FLAT JAWS
T165	#	1.405	1.305	-.195	-.103	1.03	29C	ELONGATION (WITH TEST T20),	LOAD CELL,	LINE/LINE JAWS
L176	#	1.422	1.523	-.041	.053	1.56	29B	ELONGATION (WITH TEST T20),	LOAD CELL,	LINE/FLAT JAWS
L567	#	1.459	1.389	-.100	-.074	1.25	29A	ELONGATION (WITH TEST T20),	LOAD CELL,	FLAT/FLAT JAWS
L736	#	1.460	1.595	.034	.084	.80	29A	ELONGATION (WITH TEST T20),	LOAD CELL,	FLAT/FLAT JAWS
T122	#	1.471	1.608	.050	.087	.91	29P	ELONGATION (WITH TEST T20),	LOAD CELL,	PATTERNED FLAT JAWS
L163	#	1.478	1.542	.014	.032	.84	29B	ELONGATION (WITH TEST T20),	LOAD CELL,	LINE/FLAT JAWS
L442	#	1.520	1.655	.118	.091	.67	29B	ELONGATION (WITH TEST T20),	LOAD CELL,	LINE/FLAT JAWS
L592	#	1.529	1.417	-.027	-.097	.95	29D	ELONGATION (WITH TEST T20),	LOAD CELL,	2-PIN STRAIN GAGE
L356	#	1.547	1.545	.069	-.011	.87	29A	ELONGATION (WITH TEST T20),	LOAD CELL,	FLAT/FLAT JAWS
L318	#	1.553	1.711	.179	.113	.72	29A	ELONGATION (WITH TEST T20),	LOAD CELL,	FLAT/FLAT JAWS
L484	+	1.641	1.516	.122	-.093	1.07	29R	ELONGATION (WITH TEST T20),	PENDULUM,	FLAT/FLAT JAWS
L344	#	1.665	1.532	.151	-.096	.58	29A	ELONGATION (WITH TEST T20),	LOAD CELL,	FLAT/FLAT JAWS
L242	+	1.685	1.905	.405	.176	1.31	29R	ELONGATION (WITH TEST T20),	PENDULUM,	FLAT/FLAT JAWS
T152	+	1.695	1.745	.302	.054	.94	29R	ELONGATION (WITH TEST T20),	PENDULUM,	FLAT/FLAT JAWS
T699	#	1.695	1.610	.223	-.056	1.08	29C	ELONGATION (WITH TEST T20),	LOAD CELL,	LINE/LINE JAWS
L309	#	1.788	1.731	.373	-.023	1.47	29A	ELONGATION (WITH TEST T20),	LOAD CELL,	FLAT/FLAT JAWS
T225	#	1.806	1.679	.353	-.074	1.54	29P	ELONGATION (WITH TEST T20),	LOAD CELL,	PATTERNED FLAT JAWS
L685	+	1.930	2.100	.718	.168	1.08	29R	ELONGATION (WITH TEST T20),	PENDULUM,	FLAT/FLAT JAWS
GMEANS:		1.458	1.509			1.00				
		95% ELLIPSE:		.575	.195			WITH GAMMA = 40 DEGREES		

# ELONGATION TO BREAK, PRINTING PAPER

SAMPLE G40 = 1.49 PERCENT

SAMPLE G33 = 1.51 PERCENT



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

LAB CODE	REPROCOPY					OFFSET PRINTING					TEST D. = 15		
	SAMPLE B69 MEAN	70 GRAMS PER SQUARE METER DEV	N.DEV	SDP	R.SDR	SAMPLE G28 MEAN	94 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAP	P	LAB
L105	25.7	-174.9	-2.40	10.2	.17	8.6	-18.2	-3.03	2.1	.27	30M	#	L105
L118	194.9	-5.7	-.08	26.6	.45	24.0	-2.8	-.47	4.5	.37	30D	#	L118
L121	244.9	4.3	.06	67.5	1.15	29.8	3.0	.49	8.7	1.12	30M	#	L121
L122	244.9	44.3	.61	76.8	1.31	32.8	6.0	.99	12.8	1.64	30M	#	L122
L124	241.3	40.7	.56	41.4	.71	25.2	-1.6	-.27	8.4	1.07	30M	#	L124
L150	267.7	67.1	.92	40.6	.69	27.8	1.0	.16	8.2	1.05	30M	#	L150
L158	58.2	-142.4	-1.95	29.0	.49	12.5	-14.4	-2.39	2.8	.36	30N	#	L158
L159	460.7	260.1	3.57	55.9	.95	53.3	26.5	4.40	10.8	1.38	30N	X	L159
L162	132.7	-67.9	-.93	49.5	.84	24.6	-2.2	-.37	7.4	.95	30M	#	L162
L163	125.7	-74.9	-1.03	37.6	.64	21.6	-5.2	-.87	6.1	.78	30N	#	L163
L176	212.6	12.0	.16	92.8	1.58	31.6	4.8	.79	12.6	1.62	30N	#	L176
L182M	230.0	79.4	1.09	55.3	.94	36.1	9.3	1.54	9.0	1.15	30M	#	L182M
L185	307.9	107.3	1.47	104.5	1.78	28.8	2.0	.33	5.6	.72	30N	#	L185
L212	170.1	-30.5	-.42	51.7	.88	26.2	-.6	-.11	6.6	.85	30M	#	L212
L223F	240.2	39.6	.54	49.7	.85	35.1	8.2	1.37	12.5	1.61	30M	#	L223F
L230	168.9	-31.7	-.44	55.0	.94	32.3	5.5	.91	6.6	.84	30N	#	L230
L232	166.2	-34.4	-.47	25.0	.43	47.0	20.2	3.35	5.8	.74	30N	X	L232
L238A	164.7	-35.9	-.49	103.1	1.76	22.4	-4.4	-.74	8.3	1.06	30M	#	L238A
L238B	207.9	7.3	.10	92.3	1.57	26.9	.0	.00	9.2	1.19	30D	#	L238B
L254	235.7	35.1	.48	64.0	1.09	24.7	-2.1	-.35	9.2	1.18	30M	#	L254
L262	192.7	-17.9	-.24	22.2	.38	25.9	-1.0	-.16	9.4	1.21	30N	#	L262
L274	270.9	.3	.00	87.5	1.49	33.1	6.2	1.03	14.5	1.87	30N	#	L274
L275	115.6	-85.0	-1.17	47.5	.81	22.6	-4.2	-.71	4.0	.52	30N	#	L275
L278	92.2	-118.4	-1.62	55.3	.94	21.9	-4.9	-.82	8.7	1.12	30C	#	L278
L279	195.5	-5.1	-.07	27.0	.46	25.9	-.9	-.15	5.1	.65	30N	#	L279
L285A	344.8	144.2	1.98	75.7	1.29	35.7	8.8	1.47	9.4	1.20	30N	#	L285A
L285B	330.7	130.1	1.79	91.8	1.57	37.5	10.6	1.77	11.4	1.47	30N	#	L285B
L320	212.1	11.5	.16	77.9	1.33	28.0	1.2	.19	13.0	1.67	30N	#	L320
L321	328.3	127.7	1.75	93.7	1.60	33.7	6.8	1.13	9.3	1.20	30M	#	L321
L326M	100.0	-100.6	-1.38	30.9	.53	16.6	-10.2	-1.70	4.7	.60	30N	#	L326M
L339	105.5	-95.1	-1.30	29.2	.50	15.1	-11.7	-1.95	3.5	.45	30M	#	L339
L366A	123.3	-77.3	-1.06	53.2	.91	18.7	-8.2	-1.36	4.2	.54	30N	#	L366A
L376	133.3	-67.3	-.92	73.4	1.25	20.1	-6.7	-1.12	8.8	1.14	30N	#	L376
L388	254.4	53.8	.74	65.7	1.12	30.5	3.7	.61	6.9	.89	30N	#	L388
L390	157.8	-42.8	-.59	46.8	.80	21.3	-5.6	-.93	4.6	.59	30N	#	L390
L393	178.0	-22.6	-.31	17.3	.30	27.8	1.0	.16	4.4	.56	30M	#	L393
L396M	287.5	86.9	1.19	103.6	1.77	38.6	11.8	1.95	10.7	1.38	30N	#	L396M
L565	174.1	-26.5	-.36	29.6	.51	24.7	-2.2	-.36	5.1	.66	30N	#	L565
L567	338.1	137.5	1.89	149.7	2.55	26.0	-.8	-.14	9.7	1.24	30N	#	L567
L589	179.5	-91.1	-1.25	13.5	.23	23.2	-3.6	-.61	4.8	.61	30N	#	L589
L590	170.5	-30.1	-.41	100.6	1.72	26.4	-.4	-.07	8.4	1.08	30C	#	L590
L670	175.1	-25.5	-.35	30.4	.52	26.7	-.1	-.02	7.0	.90	30N	#	L670
L705	147.9	-52.7	-.72	29.4	.50	35.8	9.0	1.49	5.0	.65	30N	#	L705
L734	231.9	31.3	.43	70.5	1.20	32.9	6.1	1.01	7.5	.96	30C	#	L734
L737	234.2	33.6	.46	64.8	1.11	25.3	-1.6	-.26	7.3	.94	30N	#	L737
GR. MEAN	200.6	DOUBLE FOLDS		GRAND MEAN	26.8	DOUBLE FOLDS		TEST DETERMINATIONS	15				
SD MEANS	72.9	DOUBLE FOLDS		SD OF MEANS	6.0	DOUBLE FOLDS		41 LABS IN GRAND MEANS					
		AVERAGE SDP	58.6	DOUBLE FOLDS		AVERAGE SDR	7.8	DOUBLE FOLDS					
L1829	135.4	-65.2	-.89	48.9	.83	28.3	1.4	.24	10.6	1.36	30S	#	L1829
L3269	37.5	-163.1	-2.24	11.2	.19	15.6	-11.2	-1.87	5.4	.69	30S	#	L3269
L706	117.2	-83.4	-1.14	47.9	.82	22.5	-4.4	-.73	9.3	1.19	30X	#	L706
L743	138.7	-61.9	-.85	52.2	.89	18.9	-7.5	-1.31	4.6	.59	30X	#	L743

TOTAL NUMBER OF LABORATORIES EFFORTING = 49  
Best values: B69 200 double folds  
G28 27 double folds

The following laboratories were omitted from the grand means because of extreme test results: 105.

Data from the following laboratories were not understood: 705.

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.

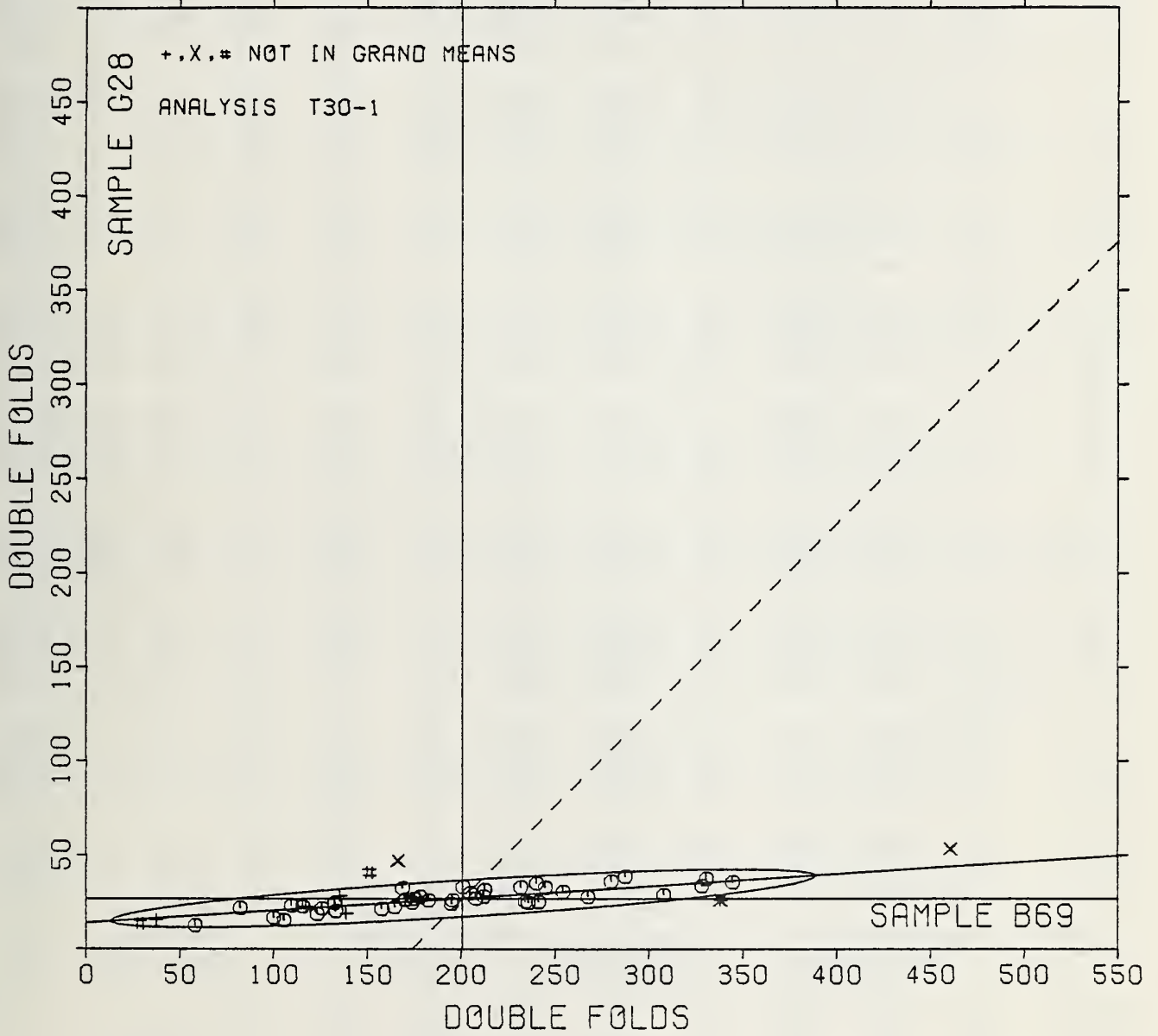
Please see page 46 of this report for a demonstration of this proposal.

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

TAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		B69	G28	MAJOR	MINOR	R.SDR	VAR	
L105	#	25.7	8.6	-175.7	-6.9	.22	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L326S	*	37.5	15.6	-163.4	-7	.44	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L158	@	58.2	12.5	-143.0	-5.1	.43	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L278	@	82.2	21.9	-118.5	2.8	1.03	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L326N	@	100.0	16.6	-101.0	-3.7	.56	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L339	@	105.5	15.1	-95.6	-5.5	.48	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L589	@	109.5	23.2	-91.2	2.3	.42	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L275	@	115.6	22.6	-95.1	1.3	.67	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L706	*	117.2	22.5	-83.5	1.0	1.00	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L366A	@	123.3	18.7	-77.7	-3.2	.73	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L163	@	125.7	21.6	-75.1	-.4	.71	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L162	@	132.7	24.6	-67.9	2.2	.90	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L176	@	133.3	20.1	-67.6	-2.3	1.19	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L125	*	135.4	28.3	-65.0	5.6	1.10	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L743	*	138.7	18.9	-62.2	-3.9	.74	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L705	#	147.9	35.8	-52.0	12.3	.58	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L390	@	157.8	21.3	-43.1	-2.8	.69	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238A	@	164.7	22.4	-36.1	-2.1	1.41	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L232	X	166.2	47.0	-33.0	22.3	.59	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L230	@	168.9	32.3	-31.3	7.5	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L212	@	170.1	26.2	-30.5	1.3	.86	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L599	@	170.5	26.4	-30.0	1.5	1.40	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L565	@	174.1	24.7	-26.6	-.5	.58	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L670	@	175.1	26.7	-25.4	1.5	.71	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L393	@	178.0	27.8	-22.5	2.4	.43	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L262	@	182.7	25.9	-17.9	.2	.79	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L118	@	194.9	24.0	-5.8	-2.5	.51	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L279	@	195.5	25.9	-5.2	-.6	.56	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L274	@	200.9	33.1	.7	6.2	1.68	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L121	@	204.9	29.8	4.5	2.7	1.14	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L238B	@	207.9	26.9	7.3	-.4	1.38	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L320	@	212.1	28.0	11.6	.4	1.50	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L176	@	212.6	31.6	12.3	4.0	1.60	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L734	@	231.9	32.9	31.6	4.1	1.08	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L737	@	234.2	25.3	33.4	-3.7	1.02	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	@	235.7	24.7	34.9	-4.4	1.14	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L223F	@	240.2	35.1	40.1	5.6	1.23	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L124	@	241.3	25.2	40.5	-4.3	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	@	244.9	32.8	44.6	3.1	1.48	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L358	@	254.4	30.5	53.9	.2	1.00	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L150	@	267.7	27.8	57.0	-3.4	.87	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L182M	@	280.0	36.1	79.8	4.1	1.05	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L396M	@	287.5	38.6	97.5	6.1	1.57	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L165	@	307.9	28.8	107.2	-5.0	1.25	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L321	@	328.3	33.7	127.9	-1.5	1.40	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L255B	@	330.7	37.5	130.6	2.2	1.52	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L567	@	338.1	26.0	137.1	-9.7	1.90	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285A	@	344.8	35.7	144.5	-.5	1.25	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L159	X	460.7	53.3	261.2	9.6	1.17	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
GMEANS:		200.6	26.8			1.00		
		95% ELLIPSE:	198.3	9.6		WITH GAMMA =	3 DEGREES	

# FOLDING ENDURANCE (MIT)

SAMPLE B69 = 201. DOUBLE FOLDS    SAMPLe G28 = 27.    DOUBLE FOLDS



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

LAB CODE	SAMPLE 869		REPROCOPY 70 GRAMS PER SQUARE METER				SAMPLE G28		OFFSET PRINTING 94 GRAMS PER SQUARE METER				TEST D. * 15		
	MEAN	DEV	N.DEV	SDR	R.SDP	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB		
L105	1.39	-.87	-4.48	.14	.98	.92	-.48	-4.22	.10	.78	30M	#	L105		
L118	2.29	.03	.16	.06	.44	1.37	-.03	-.29	.08	.63	30D	#	L118		
L121	2.28	.03	.15	.17	1.22	1.46	.05	.44	.13	1.01	30M	#	L121		
L122	2.37	.12	.60	.13	.92	1.48	.08	.67	.18	1.39	30M	#	L122		
L124	2.38	.12	.64	.07	.48	1.38	-.03	-.24	.15	1.14	30N	#	L124		
L150	2.42	.17	.87	.07	.46	1.43	.02	.19	.12	.94	30M	#	L150		
L158	1.71	-.54	-2.79	.22	1.55	1.09	-.32	-2.80	.09	.73	30N	#	L158		
L159	2.66	.41	2.10	.05	.37	1.72	.31	2.74	.09	.67	30N	#	L159		
L162	2.09	-.16	-.84	.18	1.25	1.37	-.03	-.29	.13	1.00	30M	#	L162		
L163	2.08	-.18	-.91	.15	1.03	1.32	-.09	-.78	.13	1.00	30N	#	L163		
L176	2.28	.02	.12	.23	1.61	1.46	.05	.47	.21	1.59	30N	#	L176		
L182M	2.44	.18	.95	.09	.64	1.54	.14	1.21	.12	.89	30M	#	L182M		
L185	2.47	.22	1.11	.13	.88	1.45	.05	.40	.09	.68	30M	#	L185		
L212	2.21	-.04	-.22	.14	.95	1.41	.00	.01	.10	.78	30M	#	L212		
L223F	2.37	.12	.61	.09	.62	1.52	.11	.99	.15	1.19	30M	#	L223F		
L237	2.26	-.05	-.26	.15	1.07	1.50	.10	.83	.09	.70	30M	#	L230		
L232	2.22	-.04	-.20	.07	.47	1.67	.26	2.30	.05	.41	30N	X	L232		
L238A	2.12	-.14	-.71	.34	2.34	1.32	-.09	-.78	.19	1.44	30M	#	L238A		
L238B	2.27	.02	.09	.22	1.52	1.40	-.00	-.02	.16	1.22	30D	#	L238B		
L254	2.36	.10	.53	.12	.87	1.37	-.04	-.36	.16	1.26	30M	#	L254		
L262	2.26	.00	.02	.05	.38	1.39	-.02	-.13	.14	1.05	30N	#	L262		
L274	2.27	.01	.08	.17	1.21	1.47	.07	.60	.21	1.66	30M	#	L274		
L275	2.03	-.22	-1.15	.17	1.19	1.35	-.06	-.51	.08	.60	30M	#	L275		
L278	1.83	-.42	-2.17	.26	1.85	1.32	-.09	-.78	.14	1.11	30C	#	L278		
L279	2.29	.03	.17	.06	.44	1.41	-.00	-.00	.09	.70	30N	#	L279		
L285A	2.53	.27	1.42	.09	.65	1.54	.13	1.16	.11	.87	30N	#	L285A		
L285B	2.50	.25	1.29	.13	.88	1.55	.15	1.29	.14	1.07	30M	#	L285B		
L327	2.30	.04	.23	.16	1.15	1.41	.00	.03	.18	1.42	30M	#	L320		
L321	2.50	.25	1.27	.13	.88	1.51	.11	.94	.11	.84	30M	#	L321		
L326N	1.98	-.27	-1.42	.14	1.01	1.21	-.20	-1.75	.11	.99	30N	#	L326N		
L339	2.01	-.25	-1.27	.12	.82	1.17	-.24	-2.07	.10	.78	30M	#	L330		
L366A	2.05	-.21	-1.06	.21	1.43	1.26	-.15	-1.27	.10	.77	30N	#	L366A		
L376	2.03	-.23	-1.18	.37	2.59	1.26	-.15	-1.29	.21	1.65	30N	#	L376		
L388	2.39	.14	.71	.12	.83	1.47	.07	.59	.10	.79	30M	#	L388		
L390	2.18	-.08	-.40	.15	1.04	1.32	-.09	-.77	.10	.75	30N	#	L390		
L393	2.25	-.01	-.03	.04	.29	1.44	.03	.29	.07	.53	30M	#	L393		
L396M	2.43	.18	.91	.16	1.13	1.57	.16	1.43	.13	.99	30M	#	L396M		
L565	2.23	-.02	-.10	.08	.57	1.38	-.02	-.20	.09	.72	30M	#	L565		
L567	2.48	.22	1.14	.25	1.74	1.38	-.02	-.18	.17	1.32	30M	#	L567		
L589	2.04	-.22	-1.12	.06	.38	1.36	-.05	-.43	.09	.71	30N	#	L580		
L599	2.17	-.09	-.44	.24	1.66	1.40	-.01	-.07	.16	1.21	30C	#	L599		
L677	2.24	-.02	-.09	.08	.57	1.41	.01	.06	.12	.92	30N	#	L670		
L705	2.16	-.09	-.48	.09	.62	1.55	.14	1.26	.06	.46	30M	#	L705		
L734	2.34	.09	.47	.14	1.01	1.51	.10	.87	.11	.85	30C	#	L734		
L737	2.35	.10	.52	.12	.82	1.38	-.02	-.19	.13	1.03	30N	#	L737		

GP. MEAN \* 2.25 LOG(10) FOLD      GRAND MEAN \* 1.41 LOG(10) FOLD      TEST DETERMINATIONS \* 15  
SD MEANS \* .19 LOG(10) FOLD      SD OF MEANS \* .11 LOG(10) FOLD      42 LABS IN GRAND MEANS  
AVERAGE SDR \* .14 LOG(10) FOLD      AVERAGE SDR \* .13 LOG(10) FOLD

L182S	2.11	-.15	-.75	.14	1.01	1.42	.02	.15	.16	1.24	30S	#	L182S
L326S	1.56	-.70	-3.60	.13	.89	1.17	-.24	-2.08	.16	1.21	30S	#	L326S
L706	2.03	-.22	-1.14	.19	1.31	1.32	-.09	-.79	.19	1.44	30X	#	L706
L743	2.11	-.15	-.75	.18	1.28	1.26	-.14	-1.24	.11	.87	30X	#	L743

TOTAL NUMBER OF LABORATORIES REPORTING \* 49

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 I30-1 in this report is the same as in the past with no changes. The analysis, I30-2, shows the data as the ISO proposes. This analysis uses the raw data reported for I30-1. 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
132	2.52
260	2.41
137	2.14
195	2.30
230	2.36
---	----
210	2.31

mean of raw data

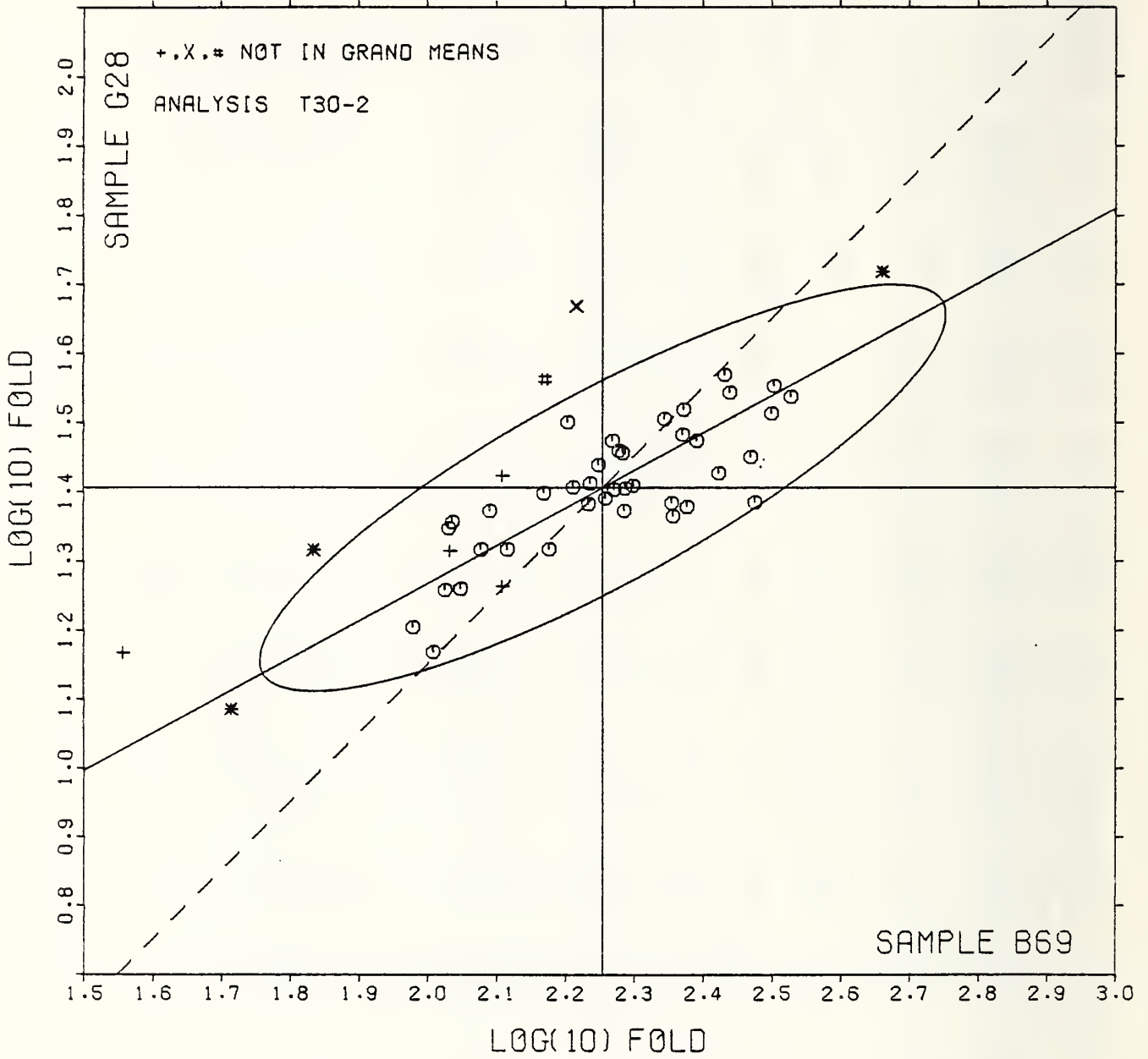
mean of logs  
"Folding endurance"

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

TAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		R69	G28	MAJOR	MINOR	R.SDR	VAR			
L105	#	1.39	.92	-.99	-.01	.88	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L326A	*	1.56	1.17	-.73	.12	1.05	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L158	*	1.71	1.09	-.63	-.02	1.14	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L278	*	1.83	1.32	-.41	.12	1.48	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L326M	o	1.98	1.21	-.34	-.05	.95	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L336	o	2.01	1.17	-.33	-.09	.80	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L376	o	2.03	1.26	-.27	-.02	2.12	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L275	o	2.03	1.35	-.22	.06	.89	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L706	*	2.03	1.32	-.24	.03	1.38	30X	FOLDING	ENDURANCE:	GIVE INSTRUMENT MAKE AND MODEL
L589	o	2.04	1.36	-.22	.06	.54	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L366A	o	2.05	1.26	-.25	-.03	1.10	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L163	o	2.09	1.32	-.20	.01	1.01	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L172	o	2.09	1.37	-.16	.05	1.13	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L182B	*	2.11	1.42	-.12	.08	1.13	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L743	*	2.11	1.26	-.20	-.06	1.08	30X	FOLDING	ENDURANCE:	GIVE INSTRUMENT MAKE AND MODEL
L238A	o	2.12	1.32	-.16	-.01	1.89	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L705	#	2.16	1.55	-.01	.17	.54	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L590	o	2.17	1.40	-.08	.03	1.43	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L390	o	2.18	1.32	-.11	-.04	.89	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L230	o	2.20	1.50	.00	.11	.89	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L212	o	2.21	1.41	-.04	.02	.87	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L232	Y	2.22	1.67	.09	.25	.44	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L565	o	2.23	1.38	-.03	-.01	.64	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L670	o	2.24	1.41	-.01	.01	.74	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L393	o	2.25	1.44	.01	.03	.41	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L262	o	2.26	1.39	-.00	-.02	.72	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L274	o	2.27	1.47	.05	.05	1.44	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L238B	o	2.27	1.40	.01	-.01	1.37	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L176	o	2.28	1.46	.05	.04	1.60	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L121	o	2.28	1.46	.05	.03	1.11	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L118	o	2.29	1.37	.01	-.04	.54	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L279	o	2.29	1.41	.03	-.02	.57	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L320	o	2.30	1.41	.04	-.02	1.28	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L734	o	2.34	1.51	.13	.04	.93	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L737	o	2.35	1.38	.08	-.07	.93	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L254	o	2.36	1.37	.07	-.08	1.07	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L122	o	2.37	1.48	.14	.01	1.15	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L223F	o	2.37	1.52	.16	.04	.90	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L124	o	2.38	1.38	.10	-.08	.81	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L386	o	2.39	1.47	.15	-.01	.81	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L150	o	2.42	1.43	.16	-.06	.70	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L396M	o	2.43	1.57	.23	.06	1.06	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L182M	o	2.44	1.54	.23	.03	.77	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L185	o	2.47	1.45	.21	-.06	.78	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L567	o	2.48	1.38	.18	-.12	1.53	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L321	o	2.50	1.51	.27	-.02	.86	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L265M	o	2.50	1.55	.29	.01	.98	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L285A	o	2.53	1.54	.30	-.01	.76	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L159	*	2.66	1.72	.51	.08	.52	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
GMEANS:		2.25	1.41			1.00				
95% ELLIPSE:				.56	.14			WITH GAMMA = 28 DEGREES		

# FOLDING ENDURANCE (MIT)

SAMPLE B69 = 2.25 LOG(10) FOLD    SAMPLE G28 = 1.41 LOG(10) FOLD





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

LAB CODE	SAMPLE B69		REPROCOPY 70 GRAMS PER SQUARE METER				SAMPLE H72		PRINTING 92 GRAMS PER SQUARE METER				TEST D. * 10		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB		
L118	80.1	3.0	.38	2.9	.59	176.9	6.7	.52	8.0	.82	35G	Ø	L118		
L121	78.0	.8	.10	10.1	2.05	162.0	-8.2	-.64	5.9	.61	35G	Ø	L121		
L122	66.2	-11.0	-1.39	6.3	1.29	162.1	-8.1	-.63	8.5	.87	35G	Ø	L122		
L132	86.5	9.3	1.18	6.3	1.27	195.5	25.3	1.95	16.1	1.66	35G	Ø	L132		
L139	81.8	4.6	.59	5.0	1.02	90.0	-80.2	-6.20	4.3	.44	35G	#	L139		
L148	81.0	3.8	.48	4.8	.98	156.1	-14.1	-1.09	6.0	.62	35G	Ø	L148		
L153	77.9	.7	.09	3.4	.70	184.9	14.7	1.13	6.7	.69	35G	Ø	L153		
L159	69.5	-7.6	-.97	2.9	.59	157.5	-12.8	-.99	7.9	.81	35G	Ø	L159		
L162	58.6	-18.5	-2.35	7.5	1.53	150.2	-20.0	-1.54	11.4	1.18	35G	#	L162		
L163	74.0	-3.2	-.40	11.3	2.29	167.5	-2.7	-.21	11.1	1.15	35G	Ø	L163		
L183	80.1	2.9	.37	8.8	1.79	191.2	21.0	1.62	11.0	1.14	35G	Ø	L183		
L212	80.4	3.2	.41	6.1	1.25	188.2	18.0	1.39	40.2	4.15	35G	#	L212		
L223	78.1	1.0	.12	3.0	.62	161.4	-3.8	-.68	5.5	.57	35G	Ø	L223		
L224	296.0	218.8	27.74	38.6	7.87	552.0	391.8	29.49	25.3	2.61	35G	#	L224		
L232	66.1	-11.0	-1.40	3.9	.79	173.3	3.1	.24	14.7	1.52	35G	Ø	L232		
L241	42.1	-35.1	-4.45	1.7	.34	93.3	-76.9	-5.94	5.6	.57	35G	#	L241		
L254	91.5	4.3	.55	2.1	.43	169.3	-.9	-.07	7.6	.79	35G	Ø	L254		
L267	31.0	3.8	.49	2.3	.47	165.2	-5.0	-.39	10.1	1.05	35G	Ø	L267		
L285	85.9	8.7	1.11	3.7	.76	165.3	-4.9	-.38	11.7	1.21	35G	Ø	L285		
L291	79.2	2.0	.26	2.5	.51	163.4	-6.8	-.53	8.3	.85	35G	Ø	L291		
L321	79.2	2.0	.26	2.8	.57	151.0	-19.2	-1.48	.1	.01	35G	Ø	L321		
L356	75.9	-1.2	-.16	2.0	.41	156.3	-13.9	-1.08	3.5	.36	35G	Ø	L356		
L376	82.8	5.6	.71	6.3	1.28	173.2	2.9	.23	7.8	.81	35G	Ø	L376		
L382	78.3	1.2	.15	5.0	1.01	176.0	5.8	.45	6.3	.65	35G	Ø	L382		
L390	81.7	4.5	.57	12.3	2.50	173.3	3.1	.24	15.2	1.57	35G	Ø	L390		
L562	80.0	2.8	.36	.0	.00	170.0	-.2	-.02	.0	.00	35G	Ø	L562		
L567	53.0	-24.2	-3.06	8.2	1.68	164.0	-6.2	-.48	7.0	.72	35G	#	L567		
L571	80.9	3.7	.47	3.8	.77	192.8	22.6	1.74	8.7	.90	35G	Ø	L571		
L650	81.2	4.0	.51	4.1	.83	180.0	9.8	.76	12.5	1.29	35G	Ø	L650		
L693	87.1	9.9	1.26	3.7	.76	185.8	15.6	1.20	6.2	.64	35G	#	L693		
L729	76.4	-.7	-.09	4.6	.94	153.7	-16.5	-1.28	10.4	1.08	35G	#	L729		
L732	1.5	-75.6	-9.59	.1	.01	3.2	-167.0	-12.90	.1	.01	35G	#	L732		

GR. MEAN \* 77.2 GURLEY UNITS                      GRAND MEAN \* 170.2 GURLEY UNITS                      TEST DETERMINATIONS \* 10  
SD MEAN \* 7.9 GURLEY UNITS                      SD OF MEANS \* 12.9 GURLEY UNITS                      28 LABS IN GRAND MEANS  
AVERAGE SDR \* 4.9 GURLEY UNITS                      AVERAGE SDR \* 9.7 GURLEY UNITS

L213                      81.0                      3.8                      .48                      5.8                      1.19                      174.3                      4.1                      .32                      5.8                      .60                      35H \* L213  
TOTAL NUMBER OF LABORATORIES REPORTING \* 33

Best values: B69 79 ± 13 Gurley units  
H72 169 ± 22 Gurley units

The following laboratories were omitted from the grand means because of extreme test results: 139.

Data from the following laboratories appear to be off by a multiplicative factor: 224, 241, 732.

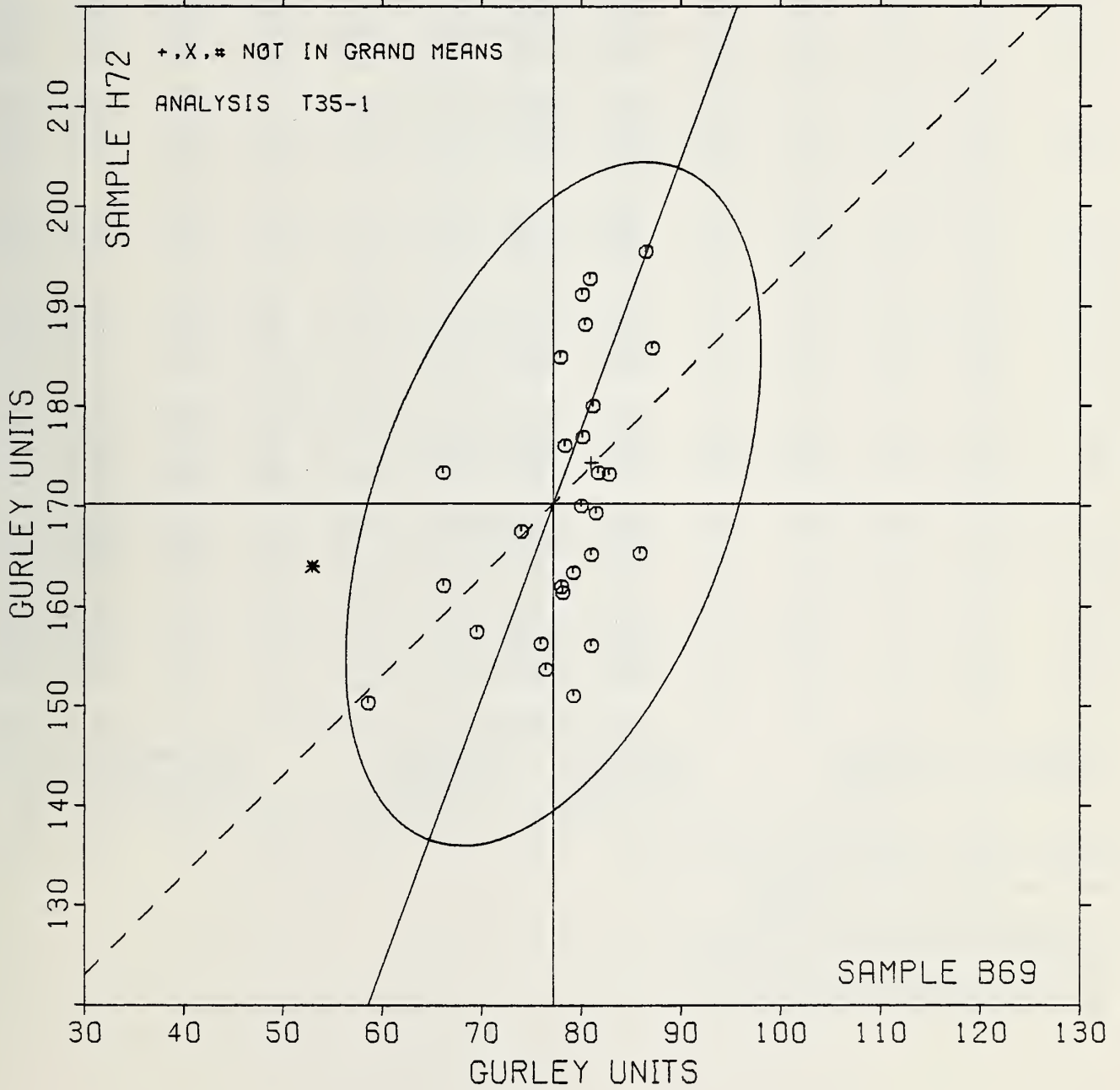
GURLEY STIFFNESS

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
		B69	H72	MAJOR	MINOR	R.SDR	VAR	
L232	#	1.5	3.2	-192.9	12.9	.01	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L241	#	42.1	93.3	-84.3	6.1	.46	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L567	*	53.0	164.0	-14.2	20.5	1.20	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L162	#	58.6	150.2	-25.2	10.4	1.35	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L232	0	66.1	173.3	-.9	11.4	1.16	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L122	0	66.2	162.1	-11.4	7.5	1.08	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L159	#	69.5	157.5	-14.6	2.7	.70	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L163	#	74.0	167.5	-3.7	2.0	1.72	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L356	#	75.9	156.3	-13.5	-3.7	.38	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L729	#	76.4	153.7	-15.7	-5.1	1.01	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L153	0	77.9	184.9	14.0	4.4	.70	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L121	#	78.0	162.0	-7.4	-3.6	1.33	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L223	#	78.1	161.4	-7.9	-4.0	.59	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L392	#	78.3	176.0	5.9	.9	.83	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L291	0	75.2	163.4	-5.7	-4.3	.68	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L321	#	79.2	151.0	-17.3	-8.6	.29	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L562	#	80.0	170.0	.8	-2.7	.00	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L193	#	80.1	191.2	20.7	4.6	1.47	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L118	#	80.1	176.9	7.3	-5	.71	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L212	#	80.4	188.2	18.0	3.2	2.70	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L571	#	80.9	192.8	22.5	4.4	.83	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L213	*	81.0	174.3	5.2	-2.2	.89	35H	STIFFNESS, GURLEY (UNITS: MG/1X3 TEST PIECE), 20 C, 65% RH
L148	0	81.0	156.1	-11.9	-8.5	.80	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L260	#	81.0	165.2	-3.4	-5.4	.76	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L650	#	81.2	180.0	10.6	-4.3	1.06	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L254	#	81.5	169.3	.6	-4.4	.61	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L300	0	81.7	173.3	4.5	-3.2	2.04	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L139	#	81.8	90.0	-73.6	-32.2	.73	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L376	0	82.8	173.2	4.7	-4.3	1.04	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L265	#	85.9	165.3	-1.6	-9.9	.98	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L132	#	86.5	195.5	26.9	.0	1.47	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L693	#	87.1	185.8	18.1	-3.9	.70	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L224	*	296.0	552.0	434.0	-72.4	5.24	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
GMEANS:		77.2	170.2			1.00		
		65% HUMIDITY:		35.9	17.8			WITH GAMMA = 69 DEGREES

STIFFNESS, GURLEY

SAMPLE B69 = 77. GURLEY UNITS      SAMPLe H72 = 170. GURLEY UNITS



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

TAPPI OFFICIAL TEST METHOD T489 (S-76), RESULTS EXPRESSED IN GRAM CENTIMETERS

TAB CODE	SAMPLE G29		OFFSET PRINTING 94 GRAMS PER SQUARE METER				SAMPLE B56		BROWN KRAFT 76 GRAMS PER SQUARE METER				TEST D. * 10		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB		
L107A	86.60	79.73	98.99	3.44	8.75	65.20	60.73	82.24	6.17	16.98	36T	#	L107A		
L122	7.93	1.06	1.32	.39	.99	5.34	.87	1.18	.30	.82	36D	#	L122		
L123	7.40	.53	.66	.52	1.31	5.10	.63	.86	.57	1.56	36T	#	L123		
L126	5.63	-1.24	-1.53	.28	.70	3.73	-.74	-1.00	.22	.62	36T	#	L126		
L150	5.92	-.95	-1.18	.28	.72	3.84	-.63	-.85	.22	.61	36T	#	L150		
L158	6.31	-.56	-.69	.17	.42	3.33	-1.14	-1.54	.14	.39	36T	#	L158		
L163	6.52	-.35	-.43	.23	.60	4.34	-.12	-.16	.16	.44	36T	#	L163		
L173B	7.35	.48	.60	.41	1.05	4.80	.33	.45	.26	.71	36T	#	L173B		
L182	7.79	.92	1.14	.46	1.18	4.90	.43	.59	.35	.96	36T	#	L182		
L207	9.19	1.32	1.64	.52	1.33	6.20	1.73	2.35	.77	2.12	36T	#	L207		
L212	7.18	.31	.39	.38	.97	4.42	-.05	-.06	.21	.58	36T	#	L212		
L219	7.40	.53	.66	.52	1.31	4.80	.33	.45	.42	1.16	36T	#	L219		
L228	6.14	-.73	-.90	.27	.69	3.75	-.71	-.96	.19	.52	36T	#	L228		
L242	1.61	-5.25	-6.52	.12	.31	1.07	-3.39	-4.59	.09	.24	36T	#	L242		
L262	9.00	1.13	1.40	.47	1.20	6.00	1.53	2.08	.47	1.30	36T	#	L262		
L274	7.00	.13	.16	.33	.85	4.10	-.37	-.50	.46	1.26	36T	#	L274		
L281	6.21	-.66	-.82	.30	.76	4.08	-.38	-.52	.38	1.04	36T	#	L281		
L290	6.93	-.74	-.95	.61	1.55	4.44	-.03	-.03	.39	1.07	36T	#	L290		
L315	7.10	.23	.29	.88	2.23	4.60	.13	.18	.97	2.66	36T	#	L315		
L318	6.77	-.09	-.12	.28	.70	4.42	-.04	-.06	.17	.46	36T	#	L318		
L321	7.50	.63	.78	.59	1.50	5.65	1.18	1.60	1.08	2.98	36T	#	L321		
L324	5.90	-.96	-1.20	.38	.98	3.89	-.57	-.77	.33	.91	36T	#	L324		
L338	5.72	-1.15	-1.43	.21	.55	3.38	-1.09	-1.47	.25	.68	36T	#	L338		
L388	13.90	7.03	8.73	1.81	4.60	10.70	6.23	8.44	.95	2.61	36T	#	L388		
L442	7.86	.99	1.23	.38	.96	5.62	.55	.75	.21	.59	36T	#	L442		
L484	4.99	-1.88	-2.33	.28	.72	3.40	-1.07	-1.44	.29	.79	36T	#	L484		
L570	10.20	3.33	4.14	.92	2.34	6.60	2.13	2.89	.84	2.32	36T	#	L570		
L580	7.20	.33	.41	.42	1.07	5.00	.53	.72	.47	1.30	36T	#	L580		
L604	6.44	-.42	-.53	.32	.81	4.26	-.21	-.28	.36	.99	36T	#	L604		
L616	7.15	.28	.35	.24	.61	4.05	-.42	-.56	.16	.44	36T	#	L616		
L651	7.70	.83	1.03	.48	1.23	5.50	1.03	1.40	.53	1.45	36T	#	L651		
L692	7.05	.18	.23	.44	1.11	4.40	-.07	-.09	.29	.81	36T	#	L692		
L703	7.45	.58	.72	.37	.94	4.05	-.42	-.56	.16	.44	36T	#	L703		
L729	7.20	.33	.41	.48	1.23	4.40	-.07	-.09	.46	1.26	36T	#	L729		
L737	5.93	-.93	-1.16	.28	.72	3.69	-.78	-1.05	.13	.35	36T	#	L737		
L756	6.01	-.86	-1.07	.39	1.00	4.00	-.47	-.63	.27	.73	36T	#	L756		
GR. MEAN *	6.87	TABER UNITS				GRAND MEAN *	4.47	TABER UNITS				TEST DETERMINATIONS * 10			
SD MEANS *	.81	TABER UNITS				SD OF MEANS *	.74	TABER UNITS				32 LABS IN GRAND MEANS			
		AVERAGE SDR = .39						AVERAGE SDR = .36				TABER UNITS			
L250	7.30	.43	.54	.42	1.07	3.72	-.75	-1.01	.09	.26	36U	#	L250		
L753	5.94	-.93	-1.15	.33	.83	3.87	-.60	-.81	.33	.91	36L	#	L753		
TOTAL NUMBER OF LABORATORIES REPORTING = 38															
Best values: G29 7.0 ± 1.4 Taber units															
B56 4.4 ± 1.3 Taber units															

The following laboratories were omitted from the grand means because of extreme test results: 570.

Data from the following laboratories appear to be off by a multiplicative factor: 107A, 242, 388.

TAPPI OFFICIAL TEST METHOD T489 68-76, RESULTS EXPRESSED IN GRAM CENTIMETERS

TAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		G29	B56	MAJOR	MINOR	R.SDR	VAR			
L242	#	1.61	1.07	-6.17	1.01	.28	36T	STIFFNESS, TABER		
L484	#	4.99	3.40	-2.11	.47	.76	36T	STIFFNESS, TABER		
L126	#	5.63	3.73	-1.41	.28	.66	36T	STIFFNESS, TABER		
L339	#	5.72	3.38	-1.58	-.03	.62	36T	STIFFNESS, TABER		
L324	#	5.90	3.89	-1.10	.22	.94	36T	STIFFNESS, TABER		
L150	#	5.92	3.84	-1.12	.17	.66	36T	STIFFNESS, TABER		
L737	#	5.93	3.69	-1.21	.05	.54	36T	STIFFNESS, TABER		
L753	#	5.94	3.87	-1.09	.18	.87	36L	STIFFNESS, LORENTZ-WETTRES		
L756	#	6.01	4.00	-.95	.23	.87	36T	STIFFNESS, TABER		
L228	#	6.14	3.76	-1.01	-.03	.61	36T	STIFFNESS, TABER		
L281	#	6.21	4.08	-.75	.16	.90	36T	STIFFNESS, TABER		
L158	#	6.31	3.33	-1.18	-.47	.41	36T	STIFFNESS, TABER		
L604	#	6.44	4.26	-.45	.13	.90	36T	STIFFNESS, TABER		
L163	#	6.52	4.34	-.34	.14	.52	36T	STIFFNESS, TABER		
L318	#	6.77	4.42	-.10	.03	.58	36T	STIFFNESS, TABER		
L290	#	6.83	4.44	-.05	.01	1.31	36T	STIFFNESS, TABER		
L274	#	7.00	4.10	-.15	-.36	1.06	36T	STIFFNESS, TABER		
L692	#	7.05	4.40	.09	-.17	.96	36T	STIFFNESS, TABER		
L315	#	7.10	4.60	.26	-.06	2.44	36T	STIFFNESS, TABER		
L616	#	7.15	4.05	-.07	-.50	.52	36T	STIFFNESS, TABER		
L212	#	7.18	4.42	.20	-.24	.78	36T	STIFFNESS, TABER		
L729	#	7.20	4.40	.20	-.27	1.25	36T	STIFFNESS, TABER		
L590	#	7.20	5.00	.60	.17	1.19	36T	STIFFNESS, TABER		
L250	#	7.30	3.72	-.18	-.84	.67	36U	STIFFNESS, TABER, 20 C, 65% RH		
L173R	#	7.35	4.80	.58	-.07	.88	36T	STIFFNESS, TABER		
L219	#	7.40	4.80	.62	-.11	1.24	36T	STIFFNESS, TABER		
L123	#	7.40	5.10	.82	.11	1.44	36T	STIFFNESS, TABER		
L703	#	7.45	4.05	.15	-.70	.69	36T	STIFFNESS, TABER		
L321	#	7.50	5.65	1.26	.45	2.24	36T	STIFFNESS, TABER		
L691	#	7.70	5.50	1.31	.21	1.34	36T	STIFFNESS, TABER		
L182	#	7.79	4.90	.97	-.30	1.07	36T	STIFFNESS, TABER		
L442	#	7.86	5.02	1.11	-.25	.78	36T	STIFFNESS, TABER		
L122	#	7.93	5.34	1.37	-.06	.91	36D	STIFFNESS, TABER, DIGITAL READOUT		
L262	#	8.00	6.00	1.87	.38	1.25	36T	STIFFNESS, TABER		
L207	#	8.19	6.20	2.14	.40	1.72	36T	STIFFNESS, TABER		
L570	#	10.20	6.60	3.90	-.65	2.33	36T	STIFFNESS, TABER		
L388	#	13.90	10.70	9.40	-.09	3.60	36T	STIFFNESS, TABER		
L107A	#	86.60	65.20	99.87	-8.44	12.86	36T	STIFFNESS, TABER		
GMEANS:		6.87	4.47			1.00				
		95% ELLIPSE:		2.76	.75			WITH GAMMA = 42 DEGREES		

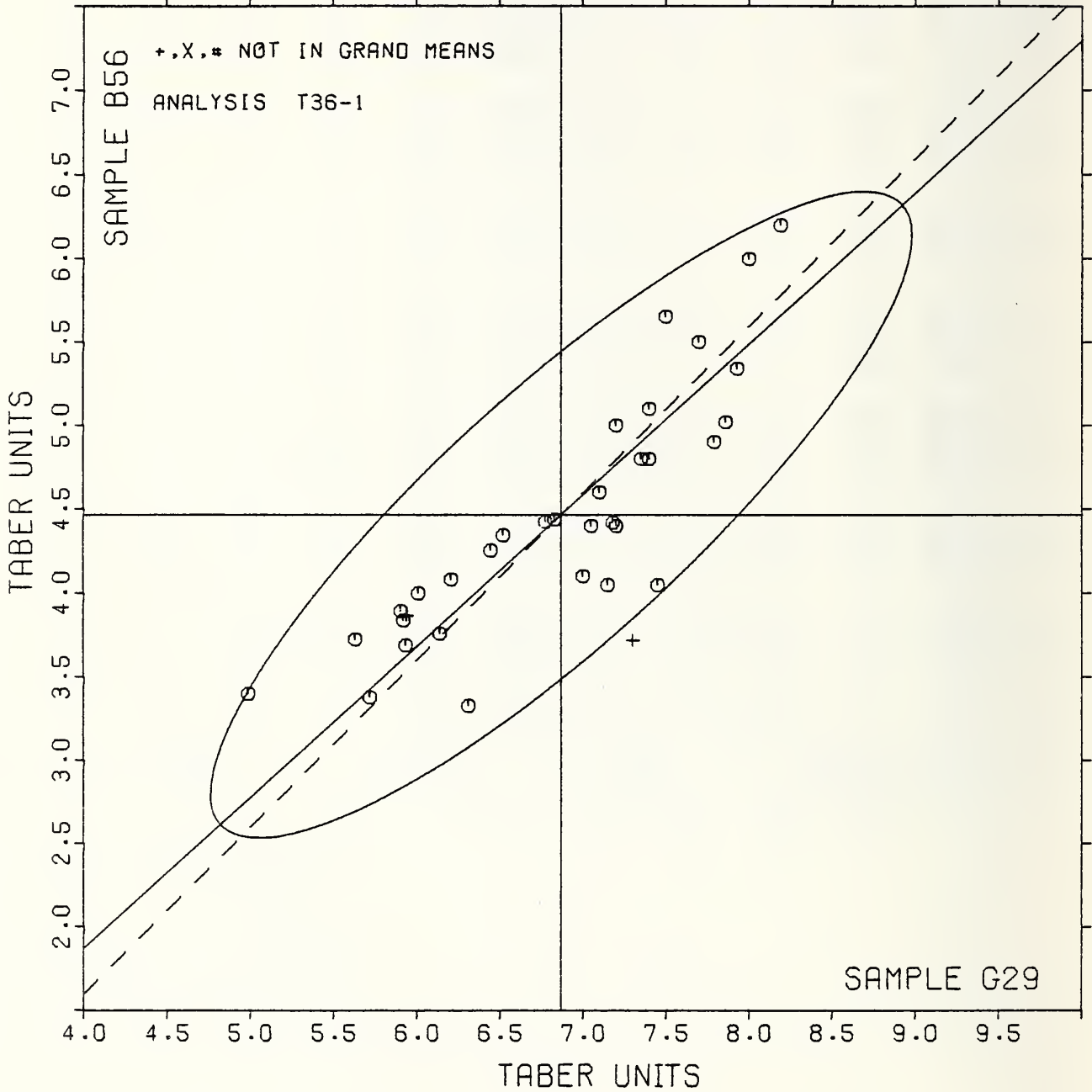
# STIFFNESS, TABER

SAMPLE G29 = 6.9

TABER UNITS

SAMPLE B56 = 4.5

TABER UNITS



SURFACE PICK STRENGTH, IGT - VISCOSITY VELOCITY PRODUCT (VVP) IN KILOPOISE CENTIMETERS/SECOND  
TAPPI SUGGESTED METHODS T514 SU-69 AND T499 SU-64

LAB CODE	HEAT SET OFFSET BOOK					CHEMICAL WOOD BOND					TEST D. # 4		
	B88 MEAN	DEV	N.DEV	SDR	R.SDR	G44 MEAN	DEV	N.DEV	SDR	P.SDR	VAR	F	LAB
L122	20.2	-11.3	-.86	1.1	.36	87.1	-32.0	-.46	1.6	.32	49Q	Ø	L122
L149	27.2	-4.3	-.33	1.4	.47	142.0	22.9	.33	.0	.00	49N	Ø	L149
L1827	27.8	-3.7	-.28	.9	.28	112.6	-6.5	-0.09	4.9	.98	49Q	Ø	L1827
L27	34.2	2.8	.21	6.9	2.31	39.0	-80.1	-1.16	2.2	.43	49F	Ø	L207
L242	62.5	31.0	2.36	14.4	4.84	NO DATA REPORTED FOR SAMPLE G44					49Q	M	L242
L274	36.9	5.4	.41	6.6	2.20	72.8	-46.3	-.67	.0	.00	49I	Ø	L274
L280	21.9	-9.6	-.73	1.4	.46	104.0	-15.1	-.22	26.6	5.28	49Q	Ø	L280
L291	37.1	5.6	.43	3.1	1.03	NO DATA REPORTED FOR SAMPLE G44					49I	M	L291
L313	25.7	-5.7	-.44	2.3	.77	169.0	49.9	.72	.0	.00	49Q	Ø	L313
L388	64.7	33.3	2.53	6.1	2.06	191.2	72.2	1.05	10.5	2.09	49Q	Ø	L388
L564	27.2	-4.2	-.32	.5	.17	NO DATA REPORTED FOR SAMPLE G44					49D	M	L564
L598	20.7	-10.8	-.82	1.2	.40	27.1	-92.0	-1.34	4.6	.90	49W	Ø	L598
L643	35.5	4.0	.30	2.0	.69	246.1	127.0	1.84	.0	.00	49I	Ø	L643
L685	43.5	12.0	.91	3.3	1.11	137.0	17.9	.26	.0	.00	49Q	#	L685
L746	34.3	2.8	.22	7.6	2.56	111.7	-7.3	-.11	.1	.01	49F	#	L746

GR. MEAN = 31.5 KP CM/SEC      GRAND MEAN = 119.1 KP CM/SEC      TEST DETERMINATIONS = 4  
 SD MEANS = 13.2 KP CM/SEC      SD OF MEANS = 68.9 KP CM/SEC      10 LABS IN GRAND MEANS  
 AVERAGE SDR = 3.0 KP CM/SEC      AVERAGE SDR = 5.0 KP CM/SEC

TOTAL NUMBER OF LABORATORIES REPORTING = 15  
 Data from the following laboratories were omitted from the grand means because no viscosity values were reported: 746. The data from these labs were converted to the common unit, cm/sec.

Data from the following laboratories were omitted from the grand means because the values obtained were outside the range of the laboratory's normal testing procedure: 685.

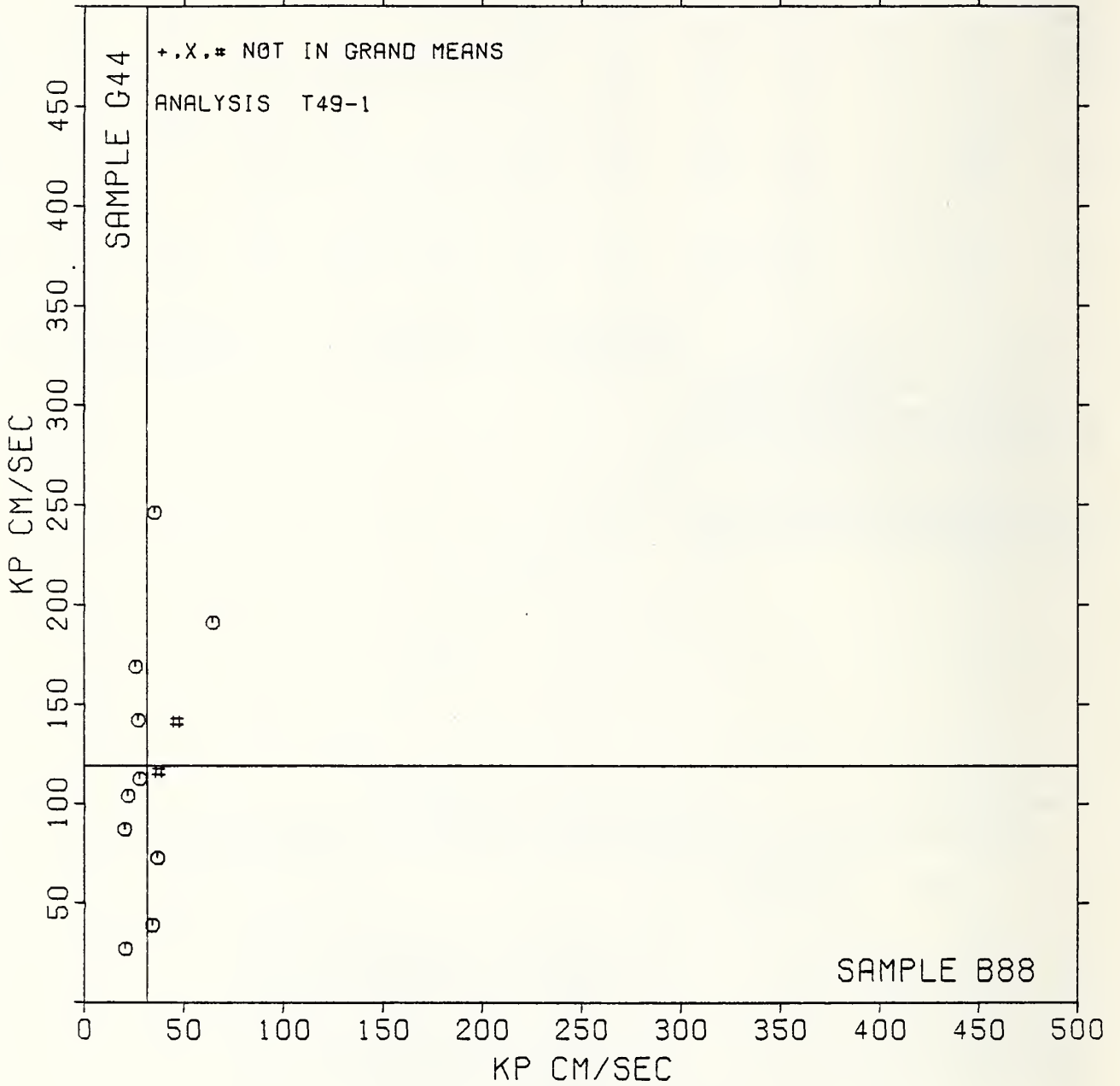
SURFACE PICK STRENGTH, IGT - VISCOSITY VELOCITY PRODUCT (VVP) IN KILOPOISE CENTIMETERS/SECOND  
TAPPI SUGGESTED METHODS T514 SU-69 AND T499 SU-64

LAB CODE	F	MEANS		COORDINATES		AVG R.SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		B88	G44	MAJOR	MINOR					
L122	Ø	20.2	87.1	-32.8	8.5	.34	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL	
L598	Ø	20.7	27.1	-92.6	2.9	.65	49W	SURFACE PICK STRENGTH, IGT,	OIL	
L280	Ø	21.9	104.0	-15.9	8.2	2.87	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL	
L313	Ø	25.7	169.0	49.2	10.0	.38	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL	
L149	Ø	27.2	142.0	22.4	6.3	.24	49N	SURFACE PICK STRENGTH, IGT,	PFB FLUID	
L564	M	27.2				.17	49D	SURFACE PICK STRENGTH, IGT,	INK	
L1827	Ø	27.8	112.6	-6.8	3.1	.63	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL	
L207	Ø	34.2	39.0	-79.6	-9.6	1.37	49I	SURFACE PICK STRENGTH, IGT,	PFB FLUID	
L746	#	34.3	111.7	-7.1	-3.5	1.29	49F	SURFACE PICK STRENGTH, IGT,	INK	
L643	Ø	35.5	246.1	126.9	7.0	.34	49I	SURFACE PICK STRENGTH, IGT,	PFB FLUID	
L274	Ø	36.9	72.8	-45.7	-9.3	1.10	49I	SURFACE PICK STRENGTH, IGT,	PFB FLUID	
L291	M	37.1				1.03	49I	SURFACE PICK STRENGTH, IGT,	PFB FLUID	
L685	#	43.5	137.0	18.9	-10.4	.56	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL	
L242	M	62.5				4.84	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL	
L388	Ø	64.7	191.2	74.8	-26.9	2.07	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL	
GMEAN'S:		31.5	119.1			1.00				
		95% ELLIPSE:		218.9	37.3	WITH GAMMA = 85 DEGREES				

# SURFACE PICK STRENGTH, IGT

SAMPLE B88 = 31. KP CM/SEC

SAMPLE G44 = 119. KP CM/SEC





SURFACE PICK STRENGTH, WAX NUMBER  
TAPPI OFFICIAL TEST METHOD T459 6S-75, SURFACE STRENGTH OF PAPER (WAX PICK TEST)

LAB CODE	HEAT SET OFFSET BOOK B88 88 GRAMS PER SQUARE METER					CHEMICAL WOOD BOND G44 73 GRAMS PER SQUARE METER					TEST D. 5		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L105	7.80	.52	1.01	.84	1.71	18.00	.58	.50	.00	.00	50W	0	L105
L115	6.60	-.68	-1.32	.89	1.82	18.60	1.18	1.03	.55	2.83	50W	0	L115
L122	7.40	.12	.23	.55	1.12	18.00	.58	.50	.00	.00	50W	0	L122
L158	7.20	-.08	-.16	.45	.91	16.00	-1.42	-1.24	.00	.00	50W	0	L158
L162	7.40	.12	.23	.55	1.12	18.00	.58	.50	.00	.00	50W	0	L162
L173A	7.20	-.08	-.16	.45	.91	11.00	-6.42	-5.61	.00	.00	50W	#	L173A
L182W	7.00	-.28	-.55	.00	.00	18.00	.58	.50	.00	.00	50W	0	L182W
L183	8.00	.72	1.39	1.00	2.04	18.00	.58	.50	.00	.00	50W	0	L183
L213	7.00	-.28	-.55	.00	.00	18.00	.58	.50	.00	.00	50W	0	L213
L225	8.20	.92	1.78	.84	1.71	18.00	.58	.50	.00	.00	50W	0	L225
L228	6.20	-1.08	-2.10	.45	.91	14.80	-2.62	-2.29	1.10	5.67	50W	0	L228
L230	7.20	-.08	-.16	.45	.91	18.00	.58	.50	.00	.00	50W	0	L230
L274	7.20	-.08	-.16	.45	.91	18.00	.58	.50	.00	.00	50W	0	L274
L285	7.40	.12	.23	.55	1.12	16.00	-1.42	-1.24	.00	.00	50W	0	L285
L339	8.60	1.32	2.56	.55	1.12	NO DATA REPORTED FOR SAMPLE G44					50W	M	L339
L366	7.20	-.08	-.16	.45	.91	15.20	-2.22	-1.94	1.10	5.67	50W	0	L366
L567	8.00	.72	1.39	.00	.00	18.00	.58	.50	.00	.00	50W	0	L567
L616	6.80	-.42	-.84	.45	.91	17.60	.18	.15	.55	2.83	50W	0	L616
L697	7.20	-.08	-.16	.45	.91	18.00	.58	.50	.00	.00	50W	0	L697
L746	7.00	-.28	-.55	.00	.00	20.00	2.58	2.25	.00	.00	50W	#	L746

GP. MEAN = 7.28 WAX NUMBER      GRAND MEAN = 17.42 WAX NUMBER      TEST DETERMINATIONS = 5  
 SD MPANS = .52 WAX NUMBER      SD GP MEANS = 1.14 WAX NUMBER      17 LABS IN GRAND MEANS  
 AVERAGE SDR = .49 WAX NUMBER      AVERAGE SDR = .19 WAX NUMBER  
 TOTAL NUMBER OF LABORATORIES REPORTING = 20  
 Best values: B88 7.2 ± 0.9 wax number  
 G44 17.7 ± 2.0 wax number

The following laboratories were omitted from the grand means because of extreme test results: 173A.

Data from the following laboratories were omitted from the grand means because the values obtained were outside the range of the laboratory's normal testing procedure: 746.

SURFACE PICK STRENGTH, WAX NUMBER  
TAPPI OFFICIAL TEST METHOD T459 6S-75, SURFACE STRENGTH OF PAPER (WAX PICK TEST)

LAB CODE	F	WEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS				
		B88	G44	MAJOR	MINOR	R.SDR	VAR					
L228	0	6.20	14.80	-2.78	.56	3.29	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L115	0	6.60	18.60	1.02	.90	2.33	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L616	0	6.80	17.60	.08	.51	1.87	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L746	0	7.00	20.00	2.47	.77	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L213	0	7.00	18.00	.51	.39	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L182W	0	7.00	18.00	.51	.39	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L158	0	7.20	16.00	-1.41	-.19	.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L173A	0	7.20	11.00	-6.32	-1.16	.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L697	0	7.20	18.00	.55	.19	.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L366	0	7.20	15.20	-2.20	-.35	3.29	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L274	0	7.20	18.00	.55	.19	.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L230	0	7.20	18.00	.55	.19	.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L162	0	7.40	18.00	.59	-.00	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L122	0	7.40	18.00	.59	-.00	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L285	0	7.40	16.00	-1.37	-.39	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L105	0	7.80	18.00	.67	-.40	.85	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L183	0	8.00	18.00	.70	-.59	1.02	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L567	0	8.00	18.00	.70	-.59	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L225	0	8.20	18.00	.74	-.79	.85	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L339	M	8.60				1.12	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				

GMFANS: 7.28 17.42      1.00  
 95% ELLIPSE: 3.26 1.33      WITH GAMMA = 79 DEGREES

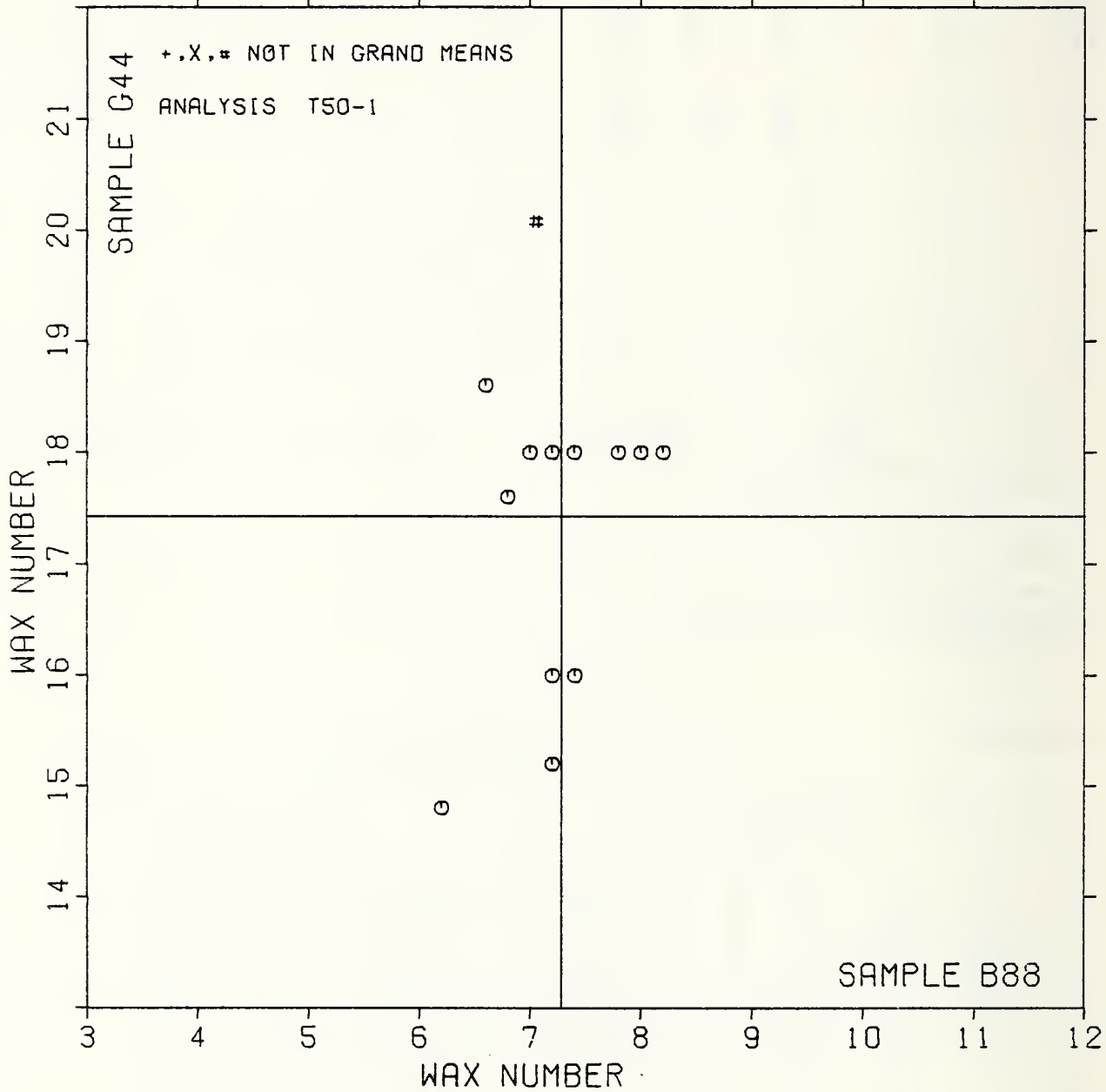
# SURFACE PICK STRENGTH, WAX

SAMPLE B88 = 7.3

WAX NUMBER

SAMPLE G44 = 17.4

WAX NUMBER



TAPPI COLLABORATIVE REFERENCE PROGRAM  
ANALYSIS T91-1 TABLE 1  
CONCORA MEDIUM TEST, NEWTONS(CMT)

TAPPI OFFICIAL TEST METHOD T809 69-71, FLAT CRUSH OF CORRUGATING MEDIUM

LAB CODE	SAMPLE Z25 MEAN	26 LB LINER 126 GRAMS PER SQUARE METER				SAMPLE G52 MEAN	TUBE WINDING 133 GRAMS PER SQUARE METER				TEST D. = 10	
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	P-LAB
L182	319.	-11.	-.53	20.	1.09	380.	1.	.03	9.	.58	91N	# L182
L185	348.	18.	.88	15.	.81	368.	19.	1.11	9.	.57	91A	# L185
L218	361.	21.	1.05	14.	.78	337.	-12.	-.70	18.	1.07	91A	# L218
L242	304.	-25.	-1.25	30.	1.66	382.	2.	.13	24.	1.44	91C	# L242
L248	348.	18.	.90	21.	1.16	384.	4.	.25	30.	1.82	91B	# L248
L269	302.	-28.	-1.39	24.	1.33	336.	-13.	-.78	16.	.97	91P	# L269
L274	332.	2.	.09	20.	1.12	352.	3.	.15	20.	1.22	91P	# L274
L280	397.	67.	3.30	30.	1.66	393.	44.	2.57	19.	1.16	91N	# L280
L313	252.	-78.	-3.85	14.	.79	290.	-60.	-3.46	12.	.71	91L	# L313
L329	341.	11.	.53	16.	.89	369.	19.	1.13	12.	.75	91P	# L329
L394	296.	-34.	-1.65	11.	.62	324.	-25.	-1.48	10.	.62	91P	# L394
L484	306.	-23.	-1.15	13.	.70	311.	-38.	-2.20	16.	1.00	91N	# L484
L621	352.	22.	1.10	13.	.71	362.	13.	.74	21.	1.27	91P	# L621
L622	335.	5.	.24	15.	.84	364.	14.	.84	15.	.93	91N	# L622
L666	335.	5.	.25	20.	1.13	366.	17.	.97	11.	.67	91P	# L666
L733	349.	10.	.92	21.	1.14	346.	-3.	-.19	18.	1.09	91P	# L733

GR. MEAN = 330. N(CMT) GRAND MEAN = 349. N(CMT) TEST DETERMINATIONS = 10  
 SD MEANS = 20. N(CMT) SD OF MEANS = 17. N(CMT) 14 LABS IN GRAND MEANS  
 AVERAGE SDR = 18. N(CMT) AVERAGE SDR = 16. N(CMT)  
 GP. MEAN = 74.17 POUNDS GRAND MEAN = 78.52 POUNDS  
 TOTAL NUMBER OF LABORATORIES REPORTING = 16  
 Best values: Z25 330 ± 36 newtons  
 G52 350 ± 30 newtons

The following laboratories were omitted from the grand means because of extreme test results: 280, 313.

TAPPI COLLABORATIVE REFERENCE PROGRAM  
ANALYSIS T91-1 TABLE 2  
CONCORA MEDIUM TEST, NEWTONS(CMT)

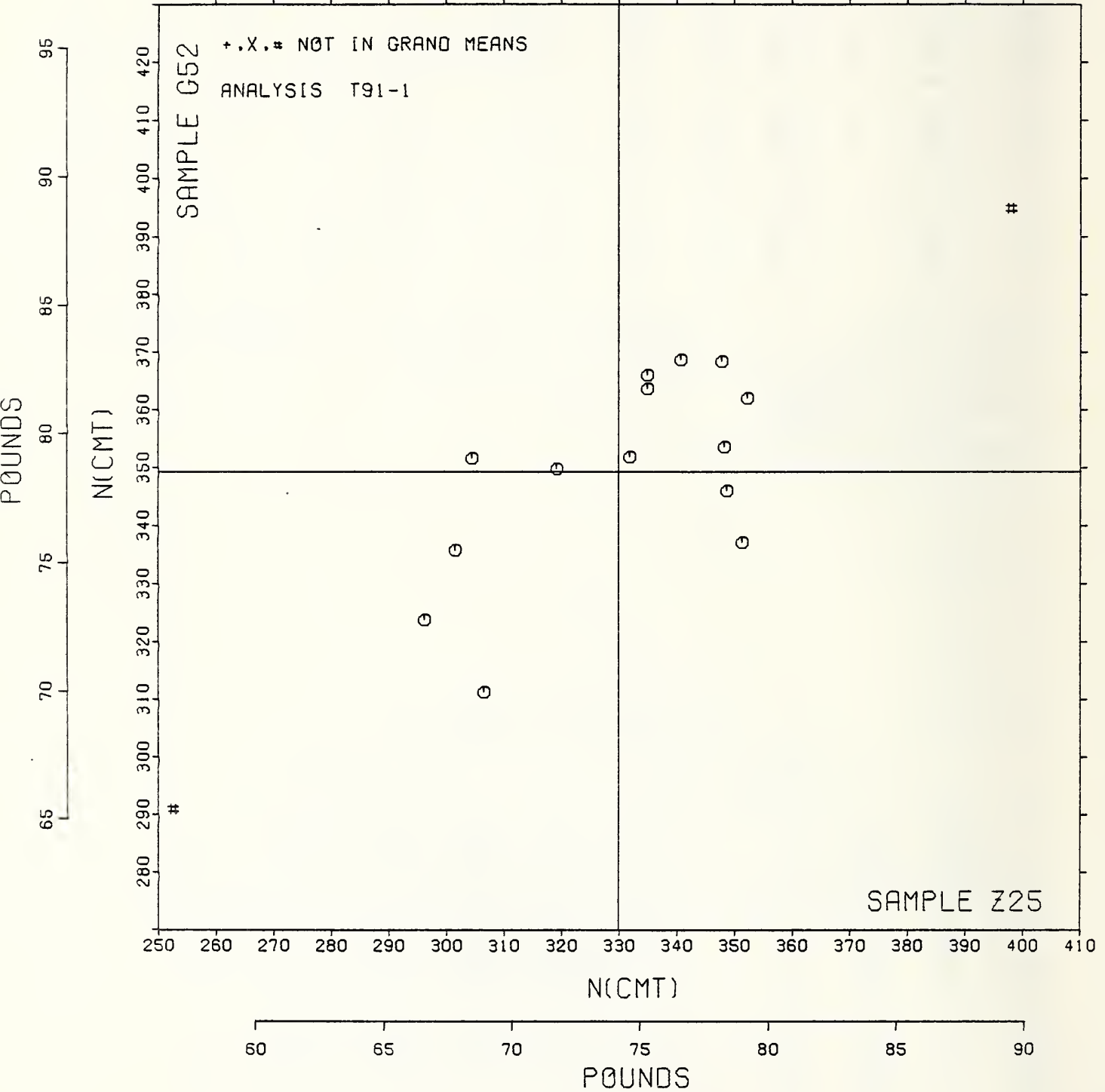
TAPPI OFFICIAL TEST METHOD T809 69-71, FLAT CRUSH OF CORRUGATING MEDIUM

LAB CODE	F	MEANS		COORDINATES		AVG R.SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		Z25	G52	MAJOR	MINOR					
L313	#	252.	290.	-98.	0.	.75	91L	FLAT CRUSH STRENGTH,	CONCORA,	LIBERTY
L394	#	296.	324.	-42.	0.	.62	91P	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
L269	#	302.	336.	-31.	7.	1.15	91P	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
L242	#	304.	352.	-19.	17.	1.55	91G	FLAT CRUSH STRENGTH,	CONCORA,	GAYDON FLAT CRUSH TESTEP
L484	#	306.	311.	-42.	-16.	.85	91N	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
L182	#	319.	350.	-8.	7.	.83	91N	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
L274	#	332.	352.	3.	1.	1.17	91P	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
L622	#	335.	364.	13.	8.	.89	91N	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
L666	#	335.	366.	14.	10.	.90	91P	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
L329	#	341.	369.	20.	9.	.82	91P	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
L185	#	348.	368.	26.	4.	.69	91A	FLAT CRUSH STRENGTH,	CONCORA,	INSTRON
L248	#	348.	354.	17.	-8.	1.49	91B	FLAT CRUSH STRENGTH,	CONCORA,	INSTRON
L733	#	349.	346.	13.	-14.	1.11	91P	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
L218	#	351.	337.	10.	-23.	.92	91A	FLAT CRUSH STRENGTH,	CONCORA,	INSTRON
L621	#	352.	362.	26.	-3.	.99	91P	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
L260	#	397.	393.	80.	-6.	1.41	91N	FLAT CRUSH STRENGTH,	CONCORA,	TMI/HINDE & DAUCH
UNFAM'D:		330.	349.			1.00				
		55% ELLIPSE:		70.	33.					WITH GAMMA = 37 DEGREES

CONCORA (CMT)

SAMPLE Z25 = 330. N(CMT)  
 SAMPLE Z25 = 74.2 POUNDS

SAMPLE G52 = 349. N(CMT)  
 SAMPLE G52 = 78.5 POUNDS



TAPPI COLLABORATIVE REFERENCE PROGRAM  
ANALYSIS T96-1 TABLE 1  
RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)  
TAPPI OFFICIAL TEST METHOD T818 69-76

LAB CODE	69 LB LINER 354 GRAMS PER SQUARE METER					42 LB LINER 211 GRAMS PER SQUARE METER					TEST D. = 10			
	228 MEAN	DEV	N.DEV	SDR	R.SDR	Z31 MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB	
L107	621.	-63.	-.60	67.	1.90	496.	-44.	-.80	49.	1.81	96P	0	L107	
L114	719.	35.	.33	38.	1.08	594.	54.	.99	13.	.49	96P	0	L114	
L122	569.	-116.	-1.11	83.	2.37	458.	-82.	-1.50	58.	2.14	96P	0	L122	
L124	837.	153.	1.46	29.	.82	580.	40.	.73	38.	1.43	96P	0	L124	
L141	719.	34.	.32	53.	1.52	559.	20.	.36	27.	1.00	96P	0	L141	
L157	567.	-117.	-1.12	49.	1.39	528.	-12.	-.22	39.	1.44	96P	0	L157	
L171	610.	-74.	-.71	108.	3.08	519.	-30.	-.55	47.	1.73	96N	0	L171	
L182	796.	112.	1.07	34.	.96	553.	13.	.24	22.	.80	96N	0	L182	
L191	734.	50.	.48	24.	.69	597.	58.	1.06	15.	.55	96P	0	L191	
L218	531.	-154.	-1.47	31.	.88	415.	-125.	-2.28	36.	1.33	96I	0	L218	
L234	489.	-196.	-1.28	21.	.61	492.	-47.	-.86	23.	.86	96P	0	L234	
L237	720.	36.	.34	25.	.71	607.	68.	1.24	15.	.55	96P	0	L237	
L242	782.	98.	.93	25.	.70	550.	11.	.20	21.	.80	96G	0	L242	
L257	674.	-11.	-.10	27.	.76	548.	8.	.15	39.	1.46	96P	0	L257	
L303	740.	56.	.53	34.	.96	571.	32.	.58	25.	.93	96N	0	L303	
L305	792.	107.	1.03	36.	1.02	494.	-45.	-.83	57.	2.13	96P	*	L305	
L329	689.	-4.	-.04	12.	.34	537.	-3.	-.05	31.	1.14	96P	0	L329	
L333	434.	-250.	-2.40	29.	.83	440.	-99.	-1.81	32.	1.21	96P	0	L333	
L336	563.	-121.	-1.16	36.	1.04	447.	-92.	-1.69	19.	.71	96P	0	L336	
L350	649.	-35.	-.34	13.	.37	548.	8.	.15	23.	.87	96P	0	L350	
L393	772.	88.	.84	29.	.83	585.	45.	.83	29.	1.07	96P	0	L393	
L484	544.	-140.	-1.34	22.	.63	458.	-82.	-1.49	17.	.63	96R	0	L484	
L553	662.	-23.	-.22	20.	.58	542.	3.	.05	12.	.46	96P	0	L553	
L562	800.	115.	1.10	52.	1.48	622.	83.	1.51	28.	1.05	96P	0	L562	
L577	743.	59.	.56	60.	1.70	551.	11.	.20	29.	1.09	96P	0	L577	
L580	727.	43.	.41	17.	.49	560.	20.	.37	21.	.79	96P	0	L580	
L603	810.	125.	1.20	30.	.86	630.	90.	1.65	23.	.87	96P	0	L603	
L610	931.	146.	1.40	19.	.53	591.	52.	.94	20.	.75	96P	0	L610	
L617	723.	38.	.37	27.	.76	528.	-12.	-.22	25.	.92	96P	0	L617	
L621	842.	159.	1.51	35.	1.01	645.	105.	1.93	18.	.68	96P	0	L621	
L623	687.	2.	.02	18.	.50	544.	4.	.07	11.	.42	96P	0	L623	
L650	754.	70.	.67	25.	.70	552.	13.	.24	33.	1.23	96N	0	L650	
L663	540.	-144.	-1.38	25.	.71	489.	-50.	-.92	34.	1.25	96P	0	L663	
L676	676.	-9.	-.08	43.	1.24	539.	-0.	-.01	25.	.94	96P	0	L676	
L686	657.	-27.	-.26	34.	.96	561.	21.	.39	18.	.67	96P	0	L686	
L703	645.	-40.	-.38	36.	1.02	503.	-37.	-.67	25.	.92	96J	0	L703	
GR. MEAN *	684. NEWTONS					GRAND MEAN *	540. NEWTONS					TEST DETERMINATIONS *	10	
SD MEANS *	104. NEWTONS					SD OF MEANS *	55. NEWTONS					36 LABS IN GRAND MEANS		
AVERAGE SDR *					35. NEWTONS	AVERAGE SDR *					27. NEWTONS			
GR. MEAN *	153.0 POUNDS					GRAND MEAN *	121.3 POUNDS							
TOTAL NUMBER OF LABORATORIES REPORTING * 36														
Best values: 228 690 ± 180 newtons														
231 540 ± 90 newtons														

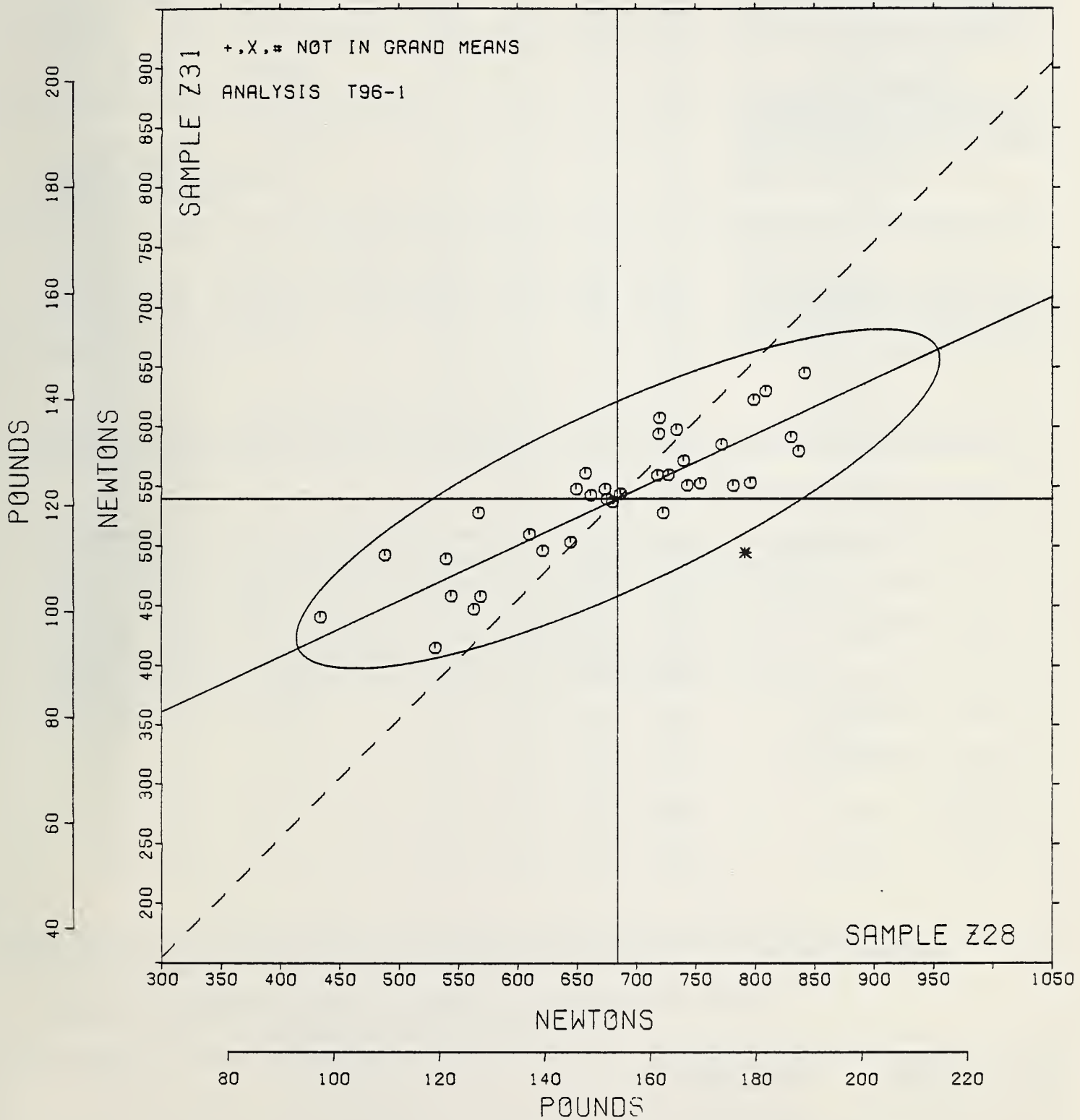
TAPPI COLLABORATIVE REFERENCE PROGRAM  
ANALYSIS T96-1 TABLE 2  
RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)  
TAPPI OFFICIAL TEST METHOD T818 OS-76

TAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		Z28	Z31	MAJOR	MINOR	R.SDR	VAR			
L333	A	434.	440.	-269.	15.	1.02	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L234	A	489.	492.	-198.	40.	.73	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L218	A	531.	415.	-192.	-48.	1.10	96I	RING CRUSH,	INSTRON	
L663	A	540.	489.	-152.	15.	.98	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L484	A	544.	458.	-102.	-15.	.63	96R	RING CRUSH,	REGMED	
L336	A	563.	447.	-149.	-33.	.87	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L157	A	567.	528.	-111.	39.	1.41	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L122	A	569.	458.	-139.	-26.	2.26	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L171	A	610.	510.	-80.	4.	2.41	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L177	A	621.	496.	-76.	-13.	1.86	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L773	A	645.	503.	-51.	-16.	.97	96J	RING CRUSH,	INSTRON	
L350	A	649.	548.	-28.	22.	.62	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L686	B	657.	561.	-15.	31.	.82	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L553	A	662.	542.	-19.	12.	.52	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L257	B	674.	548.	-6.	12.	1.11	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L676	B	676.	539.	-8.	3.	1.09	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L329	A	680.	537.	-5.	-1.	.74	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L623	A	687.	544.	4.	3.	.46	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L141	A	719.	559.	39.	4.	1.26	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L114	A	719.	594.	54.	35.	.78	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L237	A	720.	607.	61.	46.	.63	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L617	A	723.	528.	30.	-27.	.84	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L596	A	727.	560.	47.	0.	.64	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L191	A	734.	597.	79.	31.	.62	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L373	A	740.	571.	64.	5.	.55	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L577	B	743.	551.	58.	-15.	1.40	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L650	B	754.	552.	69.	-18.	.96	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L393	A	772.	585.	90.	4.	.95	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L242	A	782.	550.	93.	-31.	.75	96G	RING CRUSH,	GAYDON FLAT CRUSH TESTER	
L375	A	792.	494.	78.	-86.	1.58	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L182	B	796.	553.	107.	-35.	.88	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L562	B	800.	622.	139.	26.	1.26	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L603	A	810.	630.	152.	29.	.87	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L610	A	831.	591.	155.	-15.	.64	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L124	A	837.	580.	155.	-28.	1.13	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L621	A	842.	645.	187.	29.	.85	96P	RING CRUSH,	TMI/HINDE & DAUCH	
MEANS:		684.	540.			1.00				
		65% ELLIPSE:	297.	74.						
										WITH GAMMA = 24 DEGREES

# RING CRUSH

SAMPLE Z28 = 684. NEWTONS  
 SAMPLE Z28 = 154 POUNDS

SAMPLE Z31 = 540. NEWTONS  
 SAMPLE Z31 = 121 POUNDS



SUMMARY TABLE

TEST METHOD	SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDY	PEPL CRP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPROD
BURSTING STRENGTH, MODEL C T10-1 PSI	G34	18.03	1.24	1.10	15	38	55	10	.96	3.48
	G45	12.49	.54	.73					.64	1.53
BURSTING STRENGTH, MODEL C-A T10-2 PSI	G34	18.31	1.53	1.05	15	40	46	10	.92	4.28
	G45	12.36	.57	.65					.57	1.61
BURSTING STRENGTH, HIGH RANGE T11-1 PSI	A77	60.0	2.9	4.6	15	45	59	10	4.0	8.5
	E89	50.6	2.5	4.1					3.6	7.2
TEARING STRENGTH, PRINTING PAPERS T15-1 GPAMS	G36	62.46	3.11	2.18	15	127	151	10	1.91	8.79
	G47	38.40	2.06	1.19					1.04	5.75
TEARING STRENGTH, PACKAGING PAPERS T16-1 GRAMS	E50	109.7	5.4	4.8	15	12	22	10	4.2	15.0
	G49	80.5	4.0	2.6					2.3	11.1
TENSILE STRENGTH, PACKAGING PAPERS T19-1 KILONEWTN/M	G38	11.53	.43	.52	20	52	57	10	.45	1.23
	G49	10.45	.38	.40					.35	1.09
TENSILE STR., CPE, PRINTING PAPERS T20-1 KILONEWTN/M	G40	4.80	.28	.28	20	52	59	10	.25	.80
	G33	3.89	.20	.19					.16	.55
TENSILE STR., PENDULUM, PRINTING P. T20-2 KILONEWTN/M	G40	4.89	.27	.27	20	43	46	10	.24	.78
	G33	3.91	.26	.19					.16	.74
T.E.A., PACKAGING PAPERS T25-1 JOULES/SQ M	G38	101.5	11.3	12.2	20	21	22	10	10.7	32.3
	G49	120.9	11.5	12.0					11.4	32.9
T.E.A., PRINTING PAPERS T26-1 JOULES/SQ M	G40	46.0	4.2	6.2	20	18	23	10	5.4	12.3
	G33	38.3	4.2	4.6					4.0	12.1
ELONGATION TO BREAK, PACKAGING PAPER T28-1 PERCENT	G38	1.521	.169	.139	20	22	22	10	.121	.477
	G49	1.894	.174	.156					.137	.492
ELONGATION TO BREAK, PRINTING PAPER T29-1 PERCENT	G40	1.488	.166	.137	20	19	26	10	.120	.467
	G33	1.509	.144	.138					.121	.409
FOLDING ENDURANCE (MIT) T30-1 DOUBLE FOLDS	B69	200.6	72.9	58.6	15	41	49	10	51.4	204.1
	G28	26.8	6.0	7.8					6.8	17.1
FOLDING ENDURANCE (MIT) T30-2 LOG(10) FOLD	B69	2.25	.19	.14	15	42	49	10	.13	.54
	G28	1.41	.11	.13					.11	.32
STIFFNESS, GURLEY T35-1 GURLEY UNITS	B69	77.2	7.9	4.9	10	28	33	10	4.3	21.9
	H72	170.2	12.9	9.7					8.5	35.9
STIFFNESS, TABER T36-1 TABER UNITS	G29	6.87	.81	.39	10	32	38	5	.49	2.26
	B56	4.47	.74	.36					.45	2.07
SURFACE PECK STRENGTH, IGT T40-1 KP CM/SEC	B88	31.5	13.2	3.0	4	10	15	4	4.1	36.5
	G44	119.1	68.9	5.0					7.0	190.7
SURFACE PECK STRENGTH, WAX T50-1 WAX NUMBER	B88	7.28	.52	.49	5	17	20	5	.61	1.43
	G44	17.42	1.14	.19					.24	3.17
CONCOPA (CMT) T51-1 N(CMT)	Z25	330.	20.	18.	10	14	16	10	16.	56.
	G52	349.	17.	16.					14.	48.
RING CRUSH T56-1 NEWTONS	Z28	684.	104.	35.	10	36	36	10	31.	289.
	Z31	540.	55.	27.					24.	152.



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15. SUPPLEMENTARY NOTES  <input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached.		11. Contract/Grant No.	
16. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)  Collaborative Reference Programs provide participating laboratories with the means for checking periodically the level and uniformity of their testing in comparison with that of other participating laboratories. An important by-product of the programs is the provision of realistic pictures of the state of the testing art. This is one of the periodic reports showing averages for each participant, within and between laboratory variability, and other information for participants and standards committees.		13. Type of Report & Period Covered  FINAL	
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