TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM FOR PAPER

REPORT NO. 63[illegible]S
STRENGTH TESTS

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

NBS COLLABORATIVE REFERENCE PROGRAMS

TAPPI Paper and Board (6 times per year)

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Tensile breaking strength
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Grammage
Smoothness
Surface pick strength
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NBS Collaborative Reference Programs
A05 Technology Building
National Bureau of Standards
Washington, DC 20234

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TECHNICAL ASSOCIATION OF THE
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COLLABORATIVE REFERENCE PROGRAM FOR PAPER

Report No. 63S
STRENGTH TESTS

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U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

INTRODUCTION

Reports 63S and 63G comprise the third 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

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

June 13, 1980

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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Analyses In This Report

Analyses In The G Report

TABLE OF CONVERSION FACTORS TO METRIC (SI) UNITS

Physical Quantity	To Convert From	To	Multiply by
Bursting strength	psi	kPa	6.895
	kg/cm^2	kPa	98.07
	bar	kPa	100.00
Tearing strength	g	mN	9.807
Tensile strength	lb/in.	kN/m	.1751
	lb/0.5 in.	kN/m	.3502
	lb/15 mm	kN/m	.2965
	kg/15 mm	kN/m	.6538
	kg/25 mm	kN/m	.3923
	kg/mm	kN/m	9.807
Tensile energy absorption	$ft\text{-}lb/ft^2$	J/m^2	14.59
	$in.\text{-}lb/in.^2$	J/m^2	175.1
	$kg\text{-}m/m^2$	J/m^2	9.807
Bending stiffness	g·cm	μN·m	98.07
Flat-crush strength (Concora)	lb	N	4.448
Ring-crush (TAPPI)	lb	N	4.448
(ISO)	lb/6.00 in.	kN/m	0.0292
Thickness	mil	μm	25.40

KEY TO TABLES AND GRAPHS

MEAN - The average of individual TEST DETERMINATIONS. The number of TEST DETERMINATIONS in the mean is given in the upper right corner of the first table (TEST D.) and again at the bottom of this table.

GRAND MEAN - (GR. MEAN) The average of the individual laboratory MEANS, excluding laboratories flagged (see column F) with an X, #, or *. The GRAND MEAN is given in US customary units and, where applicable, in SI metric units.

SD OF MEANS - (SD MEANS) The standard deviation of the laboratory MEANS about the GRAND MEAN; an index of the among-laboratory precision.

DEV - The deviation or difference of the laboratory MEAN from the GRAND MEAN.

N. DEV - The normal deviate or ratio of the DEV to the SD OF MEANS; an indication of the degree of divergence of the laboratory MEAN from the GRAND MEAN. A N. DEV of more than 2 or less than -2 may indicate that the participant is not following the procedure considered standard for this analysis.

SDR - The standard deviation of repeated measurements; that is, of individual test determinations about their MEAN.

AVERAGE SDR - The average of the individual laboratory SDR's; an index of the within-laboratory precision of repeated measurements.

R. SDR - The relative standard deviation of repeated measurements; that is, the ratio of the SDR to the AVERAGE SDR; an indication of the ability of a participant to repeat his 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	2.58
4	0.18	2.25
5	0.26	2.06
8	0.40	1.77
10	0.46	1.67
15	0.56	1.53
20	0.61	1.45
25	0.65	1.39

VAP - Code for instrument type or variation in condition, see second table.

F - Flag, with following meaning:

- **Ø -** Included in grand mean and inside 95% error ellipse.
- *** -** Included in grand 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).
- **+ -** Excluded from grand means because VAP 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 ellipse. If special additive or concurrent model of the measuring process applies to this method, the distance along the minor axis represents the random error within a laboratory while that along the major axis also includes a systematic laboratory component of error.

95% ELLIPSE - Lengths of the major and minor axes of the ellipse and the angle that the major axis makes with the horizontal axis.

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

Graph - For each laboratory the MEAN for the second sample is plotted against the MEAN for the first sample, with each point representing a laboratory. The horizontal and vertical lines are the GRAND MEANS. The dashed line is drawn at 45 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 'd'. A participant whose plotted point falls outside of the ellipse should carefully reexamine the testing procedure he or she is following.

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

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

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

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

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

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

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

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

LAB CODE	SAMPLE A57 MEAN	ENVELOPE 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H06 MEAN	PRINTING 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F. = 15 VAR	F	LAB
L121	29.8	-2.0	-.79	3.0	1.43	32.8	.4	.16	1.9	1.22	10C	@	L121
L134	36.1	4.3	1.70	2.2	1.05	34.5	2.0	.88	1.6	1.06	10C	@	L134
L150	32.5	.7	.29	1.9	.92	34.3	1.8	.81	1.9	1.24	10C	@	L150
L153	35.7	4.0	1.57	2.5	1.17	36.1	3.6	1.61	1.4	.92	10C	@	L153
L158	33.9	2.1	.83	3.0	1.41	35.0	2.5	1.12	1.6	1.03	10C	@	L158
L167	30.6	-1.2	-.47	.8	.39	30.1	-2.3	-1.03	.9	.61	10C	@	L167
L183	32.5	.7	.28	1.5	.72	32.7	.3	.12	1.4	.88	10C	@	L183
L191	31.3	-.5	-.18	3.0	1.42	32.1	-.4	-.18	2.0	1.29	10C	@	L191
L207	32.1	.4	.14	2.3	1.09	33.9	1.5	.65	1.8	1.13	10C	@	L207
L212	31.6	-.2	-.08	3.2	1.50	32.1	-.4	-.16	1.7	1.07	10C	@	L212
L223A	35.1	3.3	1.32	2.3	1.10	34.2	1.7	.77	1.5	.99	10C	@	L223A
L225	33.0	1.2	.49	1.5	.69	33.4	.9	.41	1.6	1.04	10C	@	L225
L237A	32.2	.4	.17	2.0	.97	30.9	-1.6	-.71	1.1	.68	10C	@	L237A
L237B	30.0	-1.8	-.70	1.3	.60	30.3	-2.1	-.95	1.0	.63	10C	@	L237B
L243	32.0	.2	.09	1.8	.87	31.3	-1.2	-.53	1.6	1.05	10C	@	L243
L249	30.6	-1.2	-.47	2.3	1.08	31.3	-1.1	-.50	1.6	1.03	10C	@	L249
L261	33.2	1.4	.57	2.4	1.15	33.9	1.4	.62	1.5	.97	10C	@	L261
L264	31.1	-.7	-.28	1.9	.91	33.1	.6	.26	1.6	1.04	10C	@	L264
L268	31.8	.1	.03	2.2	1.07	32.6	.1	.06	1.7	1.12	10C	@	L268
L279	27.2	-4.6	-1.81	1.4	.65	27.8	-4.6	-2.05	1.4	.91	10C	@	L279
L305	34.6	2.9	1.13	2.0	.93	31.9	-.5	-.24	1.9	1.20	10C	@	L305
L312	31.4	-.4	-.16	1.2	.59	32.1	-.3	-.15	1.8	1.15	10C	@	L312
L315	33.8	2.0	.79	2.3	1.08	35.8	3.3	1.46	2.9	1.84	10C	@	L315
L321	39.0	7.2	2.86	3.2	1.50	37.1	4.7	2.06	1.6	1.00	10C	*	L321
L326	33.4	1.7	.66	1.5	.70	34.0	1.5	.66	1.1	.68	10C	@	L326
L330	31.7	-.0	-.01	2.4	1.12	32.1	-.3	-.15	1.9	1.20	10C	@	L330
L333	30.6	-1.2	-.46	3.2	1.51	33.5	1.0	.44	1.5	.97	10C	@	L333
L339	25.2	-6.6	-2.61	2.2	1.04	27.6	-4.9	-2.17	2.1	1.36	10C	*	L339
L356	29.5	-2.2	-.88	2.2	1.04	30.7	-1.7	-.77	.8	.53	10C	@	L356
L358	35.1	3.3	1.31	1.7	.81	28.5	-4.0	-1.77	.8	.52	10C	X	L358
L360	32.4	.6	.24	2.6	1.24	33.6	1.1	.49	1.8	1.15	10C	@	L360
L366	30.3	-1.4	-.57	1.6	.74	32.0	-.5	-.21	1.3	.82	10C	@	L366
L386	30.0	-1.8	-.70	2.1	1.02	32.2	-.2	-.11	1.9	1.20	10C	@	L386
L568	29.3	-2.4	-.96	1.9	.91	30.6	-1.8	-.81	1.3	.85	10C	@	L568
L573	31.0	-.7	-.29	2.1	1.00	31.4	-1.1	-.47	1.5	.96	10C	@	L573
L582	30.3	-1.4	-.57	2.4	1.12	29.3	-3.1	-1.39	1.3	.82	10C	@	L582
L599	31.2	-.5	-.21	2.2	1.07	33.4	.9	.40	2.0	1.27	10C	@	L599
L684	32.0	.2	.08	1.5	.70	32.8	.4	.16	1.1	.68	10C	@	L684
L696	33.7	2.0	.78	2.1	.99	36.3	3.9	1.71	1.1	.68	10C	@	L696
L736	27.2	-4.6	-1.80	2.3	1.07	27.3	-5.1	-2.27	1.7	1.07	10C	@	L736

GR. MEAN = 31.8 PSI — GRAND MEAN = 32.5 PSI — TEST DETERMINATIONS = 15
SD MEANS = 2.5 PSI — SD OF MEANS = 2.3 PSI — 39 LABS IN GRAND MEANS
AVERAGE SDR = 2.1 PSI — AVERAGE SDR = 1.6 PSI
GP. MEAN = 219.0 KILOPASCAL — GRAND MEAN = 223.9 KILOPASCAL

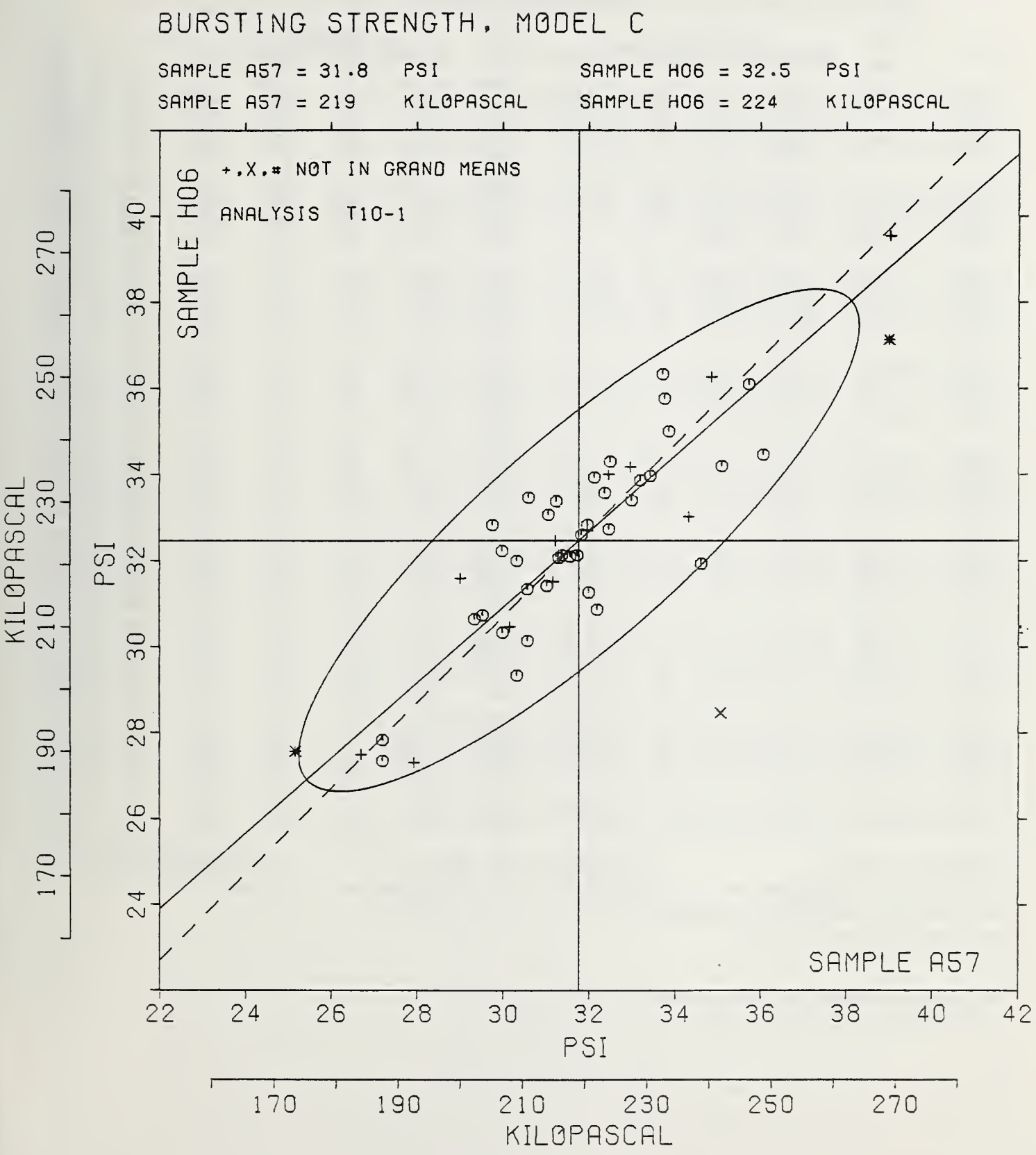
L128	32.5	.7	.28	1.3	.62	34.0	1.5	.68	1.1	.69	10E	*	L128
L219	33.0	1.2	.48	2.2	1.03	34.2	1.7	.75	1.3	.81	10T	*	L219
L242	34.3	2.6	1.01	2.4	1.12	33.0	.6	.24	1.2	.79	10T	*	L242
L250L	27.9	-3.8	-1.52	1.8	.84	27.3	-5.2	-2.29	1.0	.68	10N	*	L250L
L251	31.2	-.6	-.23	1.8	.85	31.5	-1.0	-.42	1.4	.88	10V	*	L251
L260	29.0	-2.7	-1.09	2.0	.93	31.6	-.9	-.39	1.1	.69	10X	*	L260
L269	34.9	3.1	1.23	3.8	1.80	36.3	3.8	1.68	1.3	.82	10A	*	L269
L484	30.2	-1.6	-.63	1.5	.73	30.5	-2.0	-.89	1.5	.94	10M	*	L484
L702	31.2	-.5	-.21	2.6	1.25	32.5	-.0	-.00	1.5	.96	10X	*	L702
L704	32.0	.2	.08	1.6	.77	32.7	.2	.10	1.2	.76	10L	*	L704
L706	26.7	-5.1	-2.01	2.0	.94	27.5	-5.0	-2.20	1.8	1.14	10X	*	L706
L744	39.0	7.3	2.88	3.2	1.52	39.5	7.1	3.13	2.5	1.61	10X	*	L744

TOTAL NUMBER OF LABORATORIES REPORTING = 52

Best values: A57 31.8 ± 4.3 psi
H06 32.5 ± 4.0 psi

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

LAB CODE	F	MEANS A57	MEANS B06	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L339	*	25.2	27.6	-8.2	.7	1.20	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L706	*	26.7	27.5	-7.1	-.4	1.04	10X	BURSTING STRENGTH 10 TO 40 PSI: GIVE INSTR. MAKE,MODEL,CLAMP
L279	G	27.2	27.8	-6.5	-.5	.78	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L736	G	27.2	27.3	-6.8	-.8	1.07	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L250I	*	27.9	27.3	-6.3	-1.4	.76	10N	BURSTING STRENGTH 10 TO 40 PSI,LHOMARGY,MAN.CLAMP, 20C,65%RH
L260	*	29.0	31.6	-2.7	1.1	.81	10X	BURSTING STRENGTH 10 TO 40 PSI: GIVE INSTR. MAKE,MODEL,CLAMP
L568	G	29.3	30.6	-3.0	.2	.88	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L356	G	29.5	30.7	-2.8	.2	.79	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L121	G	29.8	32.8	-1.3	1.6	1.32	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L386	G	30.0	32.2	-1.5	1.0	1.11	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L237B	G	30.0	30.3	-2.7	-.4	.61	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
I484	*	30.2	30.5	-2.5	-.5	.83	10M	BURSTING STRENGTH 10 TO 40 PSI,REGMED MT/MOT,MANUAL CLAMP
L582	G	30.3	29.3	-3.1	-1.4	.97	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L366	G	30.3	32.0	-1.4	.6	.78	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L167	G	30.6	30.1	-2.4	-1.0	.50	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L249	G	30.6	31.3	-1.6	-.1	1.06	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L333	G	30.6	33.5	-.2	1.5	1.24	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L573	G	31.0	31.4	-1.2	-.3	.98	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L264	G	31.1	33.1	-.1	.9	.98	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L251	*	31.2	31.5	-1.1	-.3	.87	10V	BURSTING STRENGTH 10 TO 40 PSI, L+W,MANUAL CLAMP, 20C,65% RH
L702	*	31.2	32.5	-.4	.3	1.11	10X	BURSTING STRENGTH 10 TO 40 PSI: GIVE INSTR. MAKE,MODEL,CLAMP
L599	G	31.2	33.4	.2	1.0	1.17	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L191	G	31.3	32.1	-.6	.0	1.35	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L312	G	31.4	32.1	-.5	.0	.87	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L212	G	31.6	32.1	-.4	-.1	1.28	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L330	G	31.7	32.1	-.3	-.2	1.16	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L268	G	31.8	32.6	.1	.1	1.10	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L704	*	32.0	32.7	.3	.0	.76	10L	BURSTING STRENGTH 10 TO 40 PSI, PERKINS LC, MANUAL CLAMP
L684	G	32.0	32.8	.4	.1	.69	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L243	G	32.0	31.3	-.6	-1.1	.96	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L207	G	32.1	33.9	1.2	.9	1.11	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L237A	G	32.2	30.9	-.7	-1.5	.83	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L360	G	32.4	33.6	1.2	.4	1.19	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L128	*	32.5	34.0	1.5	.7	.65	10H	BURSTING STRENGTH 10 TO 40 PSI, PERKINS H, MANUAL CLAMP
L183	G	32.5	32.7	.7	-.3	.80	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L150	G	32.5	34.3	1.8	.9	1.08	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L219	*	33.0	34.2	2.0	.5	.92	10T	BURSTING STRENGTH 10 TO 40 PSI, L+W,MANUAL CLAMP
L225	G	33.0	33.4	1.5	-.1	.86	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L261	G	33.2	33.9	2.0	.1	1.06	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L326	G	33.4	34.0	2.2	.0	.69	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L696	G	33.7	36.3	4.0	1.6	.83	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L315	G	33.8	35.8	3.7	1.2	1.46	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L158	G	33.9	35.0	3.2	.5	1.22	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L242	*	34.3	33.0	2.3	-1.3	.95	10T	BURSTING STRENGTH 10 TO 40 PSI, L+W,MANUAL CLAMP
L305	G	34.6	31.9	1.8	-2.3	1.07	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L269	*	34.9	36.3	4.8	.8	1.31	10A	BURSTING STRENGTH 10 TO 40 PSI, PERKINS A, MANUAL CLAMP
L358	X	35.1	28.5	-.2	-5.2	.67	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L223A	G	35.1	34.2	3.6	-.9	1.05	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L153	G	35.7	36.1	5.4	.1	1.04	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L134	G	36.1	34.5	4.5	-1.3	1.06	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L321	*	39.0	37.1	8.5	-1.3	1.25	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L744	*	39.0	39.5	10.1	.5	1.56	10X	BURSTING STRENGTH 10 TO 40 PSI: GIVE INSTR. MAKE,MODEL,CLAMP
GMEANS:		31.8	32.5			1.00		
		95% ELLIPSE:		8.4	2.4	WITH GAMMA = 41 DEGREES		


BURSTING STRENGTH, MODEL C
SAMPLE A57 = 31.8 PSI
SAMPLE A57 = 219 KILOPASCAL
SAMPLE H06 = 32.5 PSI
SAMPLE H06 = 224 KILOPASCAL
+,X,* NOT IN GRAND MEANS
ANALYSIS T10-1
SAMPLE H06
PSI
KILOPASCAL
SAMPLE A57
22 24 26 28 30 32 34 36 38 40 42
PSI
170 190 210 230 250 270
KILOPASCAL

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T10-2 TABLE 1
BURSTING STRENGTH, PSI
TAPPI OFFICIAL TEST METHOD T403 OS-76, PERKINS MODEL C-A OR C WITH AIR OR HYDRAULIC CLAMPS

LAB CODE	SAMPLE A57 MEAN	ENVELOPE 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H06 MEAN	PRINTING 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D. = 15 VAR	F	LAB
L100	31.3	-.0	-.00	1.5	.74	32.1	-.3	-.15	1.5	.85	10D	@	L100
L105	30.8	-.5	-.28	3.1	1.49	32.5	.1	.05	2.0	1.16	10D	@	L105
L106C	31.0	-.3	-.16	1.9	.91	31.4	-1.0	-.50	1.5	.86	10D	@	L106C
L115	33.2	1.9	.98	1.1	.54	35.1	2.7	1.39	1.2	.71	10D	@	L115
L118	30.9	-.5	-.25	2.1	1.04	32.7	.3	.15	1.7	.97	10D	@	L118
L122	31.3	-.0	-.01	2.3	1.12	32.7	.3	.17	1.2	.68	10F	@	L122
L125	31.4	.1	.04	3.8	1.88	34.3	1.9	.96	4.1	2.37	10D	@	L125
L141	30.6	-.8	-.41	2.2	1.05	32.5	.1	.07	1.6	.91	10D	@	L141
L148	33.2	1.9	.96	1.9	.95	33.8	1.4	.72	1.5	.89	10D	@	L148
L157	33.3	1.9	1.00	1.7	.85	34.3	1.9	.99	1.1	.67	10D	@	L157
L159	29.8	-1.5	-.79	2.2	1.07	29.6	-2.8	-1.43	2.0	1.15	10D	@	L159
L162	27.0	-4.3	-2.26	2.2	1.08	28.4	-4.0	-2.06	1.5	.88	10D	@	L162
L163	30.5	-.9	-.46	2.1	1.01	31.3	-1.1	-.59	1.1	.62	10D	@	L163
L166	34.1	2.8	1.45	1.8	.90	35.3	2.9	1.49	2.2	1.30	10D	@	L166
L176	29.9	-1.5	-.77	1.8	.89	32.1	-.3	-.14	1.5	.85	10D	@	L176
L185	31.5	.1	.06	1.2	.61	34.0	1.6	.82	1.4	.83	10D	@	L185
L190C	31.8	.4	.22	2.1	1.03	33.0	.6	.32	1.6	.95	10D	@	L190C
L190R	31.1	-.3	-.15	1.8	.86	30.9	-1.5	-.79	1.6	.92	10D	@	L190R
L217	29.6	-1.7	-.91	1.2	.58	30.5	-1.9	-.96	1.6	.96	10F	@	L217
L224	33.3	1.9	1.00	1.7	.81	33.7	1.3	.67	1.9	1.13	10D	@	L224
L226B	32.7	1.4	.72	1.6	.76	32.6	.1	.08	1.5	.87	10D	@	L226B
L226C	30.1	-1.2	-.63	1.9	.95	31.4	-1.0	-.53	1.4	.84	10D	@	L226C
L233	33.3	1.9	1.01	2.7	1.34	33.9	1.5	.77	2.2	1.30	10D	@	L233
L241	34.5	3.2	1.66	2.0	1.00	35.1	2.7	1.39	2.8	1.61	10D	@	L241
L255	30.9	-.4	-.22	1.1	.54	32.1	-.3	-.17	.9	.52	10D	@	L255
L262	30.7	-.7	-.35	2.7	1.33	33.5	1.1	.55	1.6	.94	10D	@	L262
L275	29.5	-1.8	-.96	1.8	.87	28.5	-3.9	-1.99	2.0	1.20	10D	*	L275
L280	32.2	.8	.44	1.6	.80	33.7	1.3	.65	.8	.45	10D	@	L280
L285	35.8	4.4	2.30	3.9	1.90	35.8	3.4	1.73	3.6	2.11	10D	@	L285
L309	31.8	.4	.22	2.3	1.12	32.3	-.1	-.03	1.9	1.10	10D	@	L309
L313	28.3	-3.0	-1.59	1.8	.90	28.6	-3.8	-1.94	1.4	.82	10I	@	L313
L341	31.0	-.3	-.18	1.4	.69	32.6	.2	.08	1.5	.88	10D	@	L341
L352	30.2	-1.1	-.58	3.4	1.66	31.9	-.5	-.24	1.5	.87	10D	@	L352
L563	27.5	-3.8	-2.00	1.7	.84	28.5	-3.9	-2.01	1.5	.87	10D	@	L563
L567	31.1	-.3	-.15	1.3	.65	32.1	-.3	-.14	2.1	1.25	10D	@	L567
L575	28.1	-3.2	-1.67	2.0	.96	29.9	-2.5	-1.29	1.9	1.11	10D	@	L575
L581	32.4	1.1	.57	2.3	1.14	32.7	.3	.15	1.8	1.08	10D	@	L581
L652	26.5	-4.8	-2.52	2.4	1.16	32.6	.2	.12	4.3	2.54	10D	X	L652
L680	30.5	-.8	-.44	1.9	.94	31.7	-.7	-.36	1.0	.60	10D	@	L680
L698	34.6	3.3	1.71	1.9	.95	34.9	2.5	1.30	2.2	1.31	10D	@	L698
L734	24.5	-6.8	-3.56	2.3	1.11	24.5	-7.9	-4.09	1.5	.88	10D	#	L734
L743	33.0	1.7	.86	2.2	1.08	34.1	1.7	.86	1.4	.80	10D	@	L743

GR. MEAN = 31.3 PSI — GRAND MEAN = 32.4 PSI — TEST DETERMINATIONS = 15
SD MEANS = 1.9 PSI — SD OF MEANS = 1.9 PSI — 40 LABS IN GRAND MEANS
AVERAGE SDR = 2.0 PSI — AVERAGE SDR = 1.7 PSI
GR. MEAN = 216.1 KILOPASCAL — GRAND MEAN = 223.4 KILOPASCAL
TOTAL NUMBER OF LABORATORIES REPORTING = 42

Best values: A57 31.3 ± 3.2 psi
H06 32.5 ± 3.5 psi

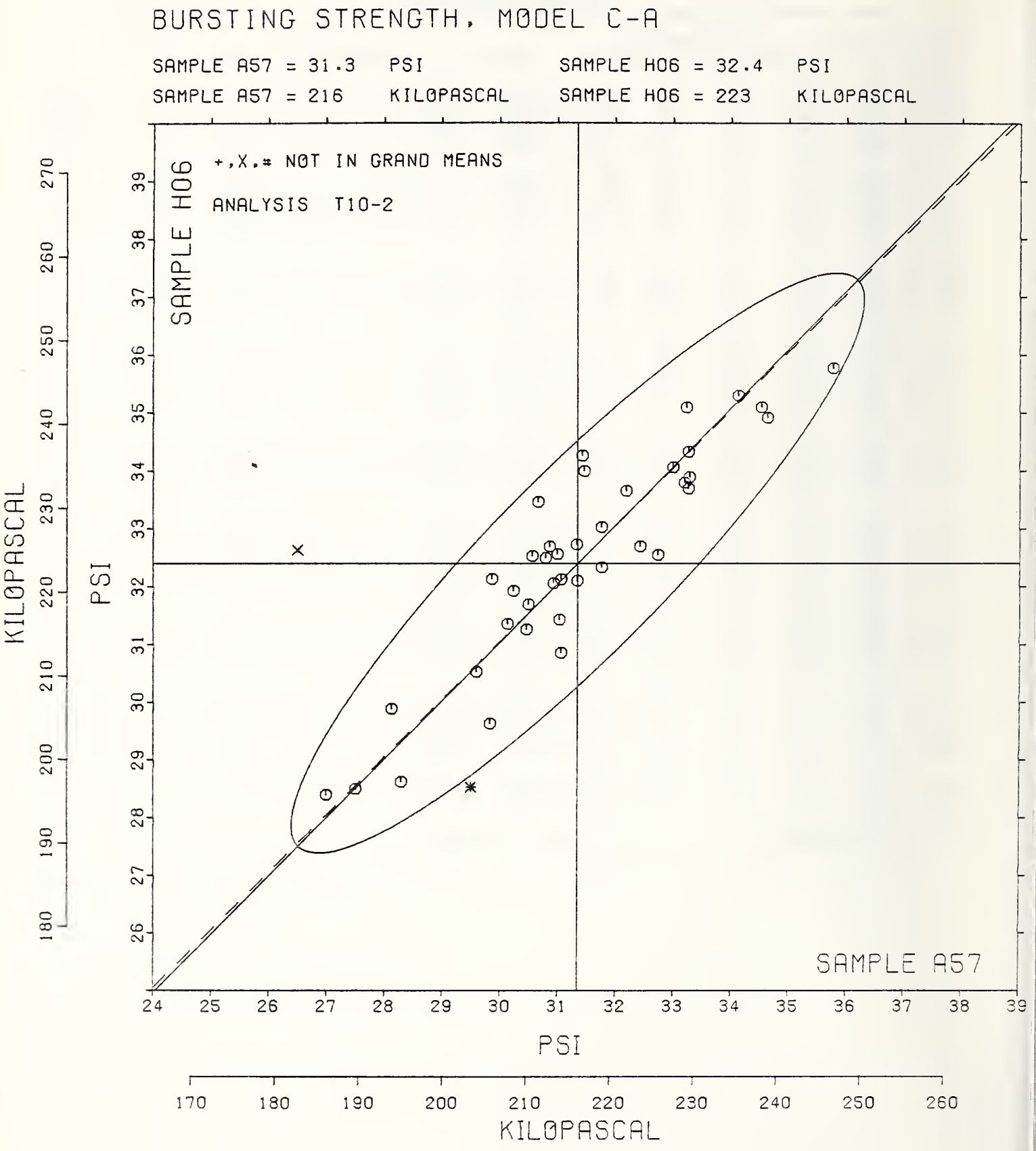
The following laboratories were omitted from the grand means because of extreme test results: 734

ANALYSIS T10-2 TABLE 2

BURSTING STRENGTH, PSI

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

LAB CODE	F	MEANS A57	MEANS B06	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L734	#	24.5	24.5	-10.5	-.7	1.00	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L652	X	26.5	32.6	-3.2	3.6	1.85	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L162	O	27.0	28.4	-5.9	.3	.98	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L563	O	27.5	28.5	-5.5	-.0	.86	10U	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L575	O	28.1	29.9	-4.0	.5	1.04	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L313	O	28.3	28.6	-4.8	-.5	.86	10I	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L275	*	29.5	28.5	-4.1	-1.4	1.03	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L217	O	29.6	30.5	-2.6	-.1	.77	10F	BURSTING STRENGTH 10 TO 40 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L159	O	29.8	29.6	-3.0	-.9	1.11	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L176	O	29.9	32.1	-1.2	.9	.87	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L226C	O	30.1	31.4	-1.6	.1	.90	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L352	O	30.2	31.9	-1.1	.5	1.26	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L163	O	30.5	31.3	-1.4	-.2	.82	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L680	O	30.5	31.7	-1.1	.1	.77	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L141	O	30.6	32.5	-.5	.6	.98	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L262	O	30.7	33.5	.3	1.2	1.13	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L105	O	30.8	32.5	-.3	.5	1.33	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L118	O	30.9	32.7	-.1	.5	1.00	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L255	O	30.9	32.1	-.5	.1	.53	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L341	O	31.0	32.6	-.1	.4	.79	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L106C	O	31.0	31.4	-.9	-.5	.89	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L190R	O	31.1	30.9	-1.3	-.9	.89	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L567	O	31.1	32.1	-.4	.0	.95	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L122	O	31.3	32.7	.2	.2	.90	10F	BURSTING STRENGTH 10 TO 40 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L100	O	31.3	32.1	-.2	-.2	.80	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L125	O	31.4	34.3	1.4	1.2	2.13	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L185	O	31.5	34.0	1.2	1.0	.72	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L190C	O	31.8	33.0	.7	.1	.99	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L309	O	31.8	32.3	.2	-.3	1.11	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L280	O	32.2	33.7	1.5	.3	.63	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L581	O	32.4	32.7	1.0	-.6	1.11	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L226B	O	32.7	32.6	1.1	-.9	.81	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L743	O	33.0	34.1	2.3	-.0	.94	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L148	O	33.2	33.8	2.3	-.3	.92	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L115	O	33.2	35.1	3.2	.6	.62	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L224	O	33.3	33.7	2.3	-.5	.97	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L157	O	33.3	34.3	2.7	-.0	.76	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L233	O	33.3	33.9	2.4	-.3	1.32	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L166	O	34.1	35.3	4.0	.1	1.10	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L241	O	34.5	35.1	4.2	-.4	1.31	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L698	O	34.6	34.9	4.1	-.6	1.13	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L285	O	35.8	35.8	5.5	-.8	2.01	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
GMEANS:		31.3	32.4			1.00		
		95% ELLIPSE:		6.9	1.5	WITH GAMMA = 45 DEGREES		


BURSTING STRENGTH, MODEL C-A
SAMPLE A57 = 31.3 PSI
SAMPLE A57 = 216 KILOPASCAL
SAMPLE H06 = 32.4 PSI
SAMPLE H06 = 223 KILOPASCAL
+,X,* NOT IN GRAND MEANS
ANALYSIS T10-2
SAMPLE H06
SAMPLE A57
PSI
KILOPASCAL
24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
170 180 190 200 210 220 230 240 250 260
26 27 28 29 30 31 32 33 34 35 36 37 38 39
180 190 200 210 220 230 240 250 260 270

ANALYSIS T11-1 TABLE 1

BURSTING STRENGTH, PSI - HIGH RANGE

TAPPI OFFICIAL TEST METHOD T403 OS-76, PERKINS MODEL C OR C-A

LAB	SAMPLE Z16 TUBE WINDING 133 GRAMS PER SQUARE METER				SAMPLE Z23 TABCARD 149 GRAMS PER SQUARE METER				TEST D. = 15		
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	74.3	-.4	-.17	4.6	.89	79.9	-.9	-.32	5.2	1.09	11D	@	L100
L103	73.8	-1.0	-.44	2.9	.57	79.0	-1.9	-.66	2.6	.55	11C	@	L103
L107	74.7	.0	.01	6.2	1.20	79.0	-1.9	-.65	6.2	1.30	11C	@	L107
L118	78.1	3.4	1.58	5.6	1.08	83.3	2.4	.84	4.4	.91	11D	@	L118
L122	76.9	2.2	1.00	5.8	1.13	81.2	.3	.12	8.0	1.67	11F	@	L122
L128	76.1	1.4	.63	3.1	.59	82.7	1.9	.65	4.9	1.03	11D	@	L128
L141	72.9	-1.8	-.86	7.2	1.39	80.7	-.2	-.06	4.5	.95	11D	@	L141
L148	74.5	-.2	-.08	4.9	.96	85.3	4.4	1.53	4.4	.92	11D	@	L148
L159	75.1	.4	.18	3.6	.69	76.8	-4.1	-1.43	5.4	1.12	11D	@	L159
L170	75.2	.5	.24	2.4	.47	82.2	1.3	.47	2.1	.43	11C	@	L170
L176	73.8	-.9	-.42	5.3	1.03	77.3	-3.6	-1.25	3.6	.76	11D	@	L176
L182	76.2	1.5	.69	5.4	1.04	78.6	-2.3	-.79	7.4	1.55	11D	@	L182
L218	83.3	8.6	4.01	5.7	1.11	86.8	5.9	2.07	8.4	1.75	11D	#	L218
L219	72.1	-2.6	-1.23	4.7	.91	76.7	-4.2	-1.46	5.0	1.04	11C	@	L219
L237A	77.3	2.6	1.19	4.8	.92	80.8	-.1	-.02	3.4	.71	11C	@	L237A
L237B	78.1	3.4	1.56	3.7	.72	85.8	4.9	1.72	4.1	.86	11C	@	L237B
L238A	89.5	14.8	6.86	8.6	1.67	94.3	13.5	4.69	8.7	1.82	11Y	#	L238A
L243	72.7	-2.0	-.93	5.1	.98	78.3	-2.5	-.88	3.9	.81	11C	@	L243
L278	76.5	1.8	.82	8.4	1.62	79.7	-1.2	-.42	4.8	1.00	11C	@	L278
L279	68.9	-5.8	-2.71	6.1	1.19	72.8	-8.1	-2.82	5.8	1.22	11C	#	L279
L280	75.9	1.2	.56	5.4	1.04	78.1	-2.7	-.96	4.7	.98	11D	@	L280
L311	88.1	13.4	6.24	12.6	2.44	108.9	28.0	9.77	11.8	2.47	11C	#	L311
L330	73.8	-.9	-.41	5.9	1.15	84.2	3.3	1.16	5.2	1.10	11C	@	L330
L333	71.9	-2.8	-1.32	4.6	.89	80.6	-.3	-.09	4.2	.87	11C	@	L333
L334	75.4	.7	.33	5.3	1.03	84.2	3.3	1.16	5.4	1.13	11D	@	L334
L339	68.0	-6.7	-3.10	4.0	.77	73.1	-7.7	-2.69	5.7	1.19	11C	#	L339
L348	71.5	-3.2	-1.51	5.4	1.05	84.4	3.5	1.23	6.9	1.44	11C	@	L348
L356	72.7	-2.0	-.95	7.3	1.43	79.1	-1.7	-.60	7.7	1.61	11C	@	L356
L563	72.4	-2.4	-1.09	6.3	1.25	80.7	-.2	-.07	5.1	1.06	11Y	@	L563
L565	75.3	.6	.29	2.2	.43	77.6	-3.3	-1.15	4.1	.85	11D	@	L565
L567	75.1	.4	.20	6.1	1.18	80.5	-.4	-.13	6.9	1.45	11D	@	L567
L575	74.0	-.8	-.35	6.6	1.28	77.7	-3.1	-1.10	4.2	.89	11D	@	L575
L576	79.8	5.1	2.35	4.1	.79	82.8	2.0	.69	2.2	.45	11P	@	L576
L581	74.5	-.2	-.08	5.7	1.10	82.2	1.3	.47	6.2	1.30	11D	@	L581
L599	76.4	1.7	.79	3.4	.66	88.1	7.3	2.54	4.7	.98	11C	@	L599
L604	74.2	-.5	-.24	7.6	1.48	84.3	3.5	1.21	4.9	1.02	11C	@	L604
L622	70.1	-4.6	-2.14	4.2	.82	81.7	.3	.29	4.9	1.02	11E	@	L622
L650	71.8	-2.9	-1.35	5.5	1.07	82.3	1.5	.51	3.0	.63	11D	@	L650
L651	76.3	1.6	.76	4.3	.83	81.7	.8	.28	5.1	1.06	11D	@	L651
L680	74.7	.0	.01	6.9	1.34	80.3	-.5	-.18	4.3	.90	11D	@	L680
L730	72.3	-2.4	-1.10	3.9	.75	78.3	-2.6	-.90	2.5	.52	11D	@	L730
L736	77.8	3.1	1.45	6.2	1.21	75.8	-5.1	-1.77	5.0	1.04	11C	@	L736

GR. MEAN = 74.7 PSI — GRAND MEAN = 80.9 PSI — TEST DETERMINATIONS = 15

SD MEANS = 2.2 PSI — SD OF MEANS = 2.9 PSI — 37 LABS IN GRAND MEANS

AVERAGE SDR = 5.2 PSI — AVERAGE SDR = 4.8 PSI

GR. MEAN = 515.1 KILOPASCAL — GRAND MEAN = 557.5 KILOPASCAL

L242	77.8	3.1	1.45	5.3	1.03	88.9	8.0	2.79	5.3	1.12	11T	*	L242
L250L	69.1	-5.6	-2.60	4.6	.89	72.4	-8.5	-2.95	5.9	1.23	11N	*	L250L
L251	83.3	8.6	4.01	4.8	.93	87.7	6.8	2.37	4.6	.96	11V	*	L251
L290	80.4	5.7	2.65	3.3	.64	89.3	8.5	2.95	4.6	.96	11A	*	L290
L393	77.1	2.4	1.10	4.8	.93	82.2	1.3	.47	4.5	.94	11B	*	L393
L394	84.5	9.8	4.54	8.6	1.68	90.7	9.9	3.44	5.3	1.11	11B	*	L394
L484	78.5	3.8	1.75	4.8	.93	79.5	-1.4	-.49	5.0	1.04	11B	*	L484
L570	75.5	.8	.38	4.4	.85	82.1	1.2	.42	3.5	.73	11B	*	L570
L593	88.9	14.2	6.61	9.5	1.85	94.2	13.3	4.65	7.4	1.55	11J	*	L593
L598	90.8	16.1	7.48	10.3	2.00	98.5	17.7	6.16	8.0	1.67	11B	*	L598
L737	85.3	10.6	4.91	9.3	1.81	96.6	15.7	5.48	6.6	1.38	11B	*	L737
L743	74.0	-.7	-.34	5.6	1.10	78.7	-2.1	-.74	5.6	1.17	11X	*	L743

TOTAL NUMBER OF LABORATORIES REPORTING = 54

Best values: Z16 75 ± 4 psi
Z23 80 ± 5 psi

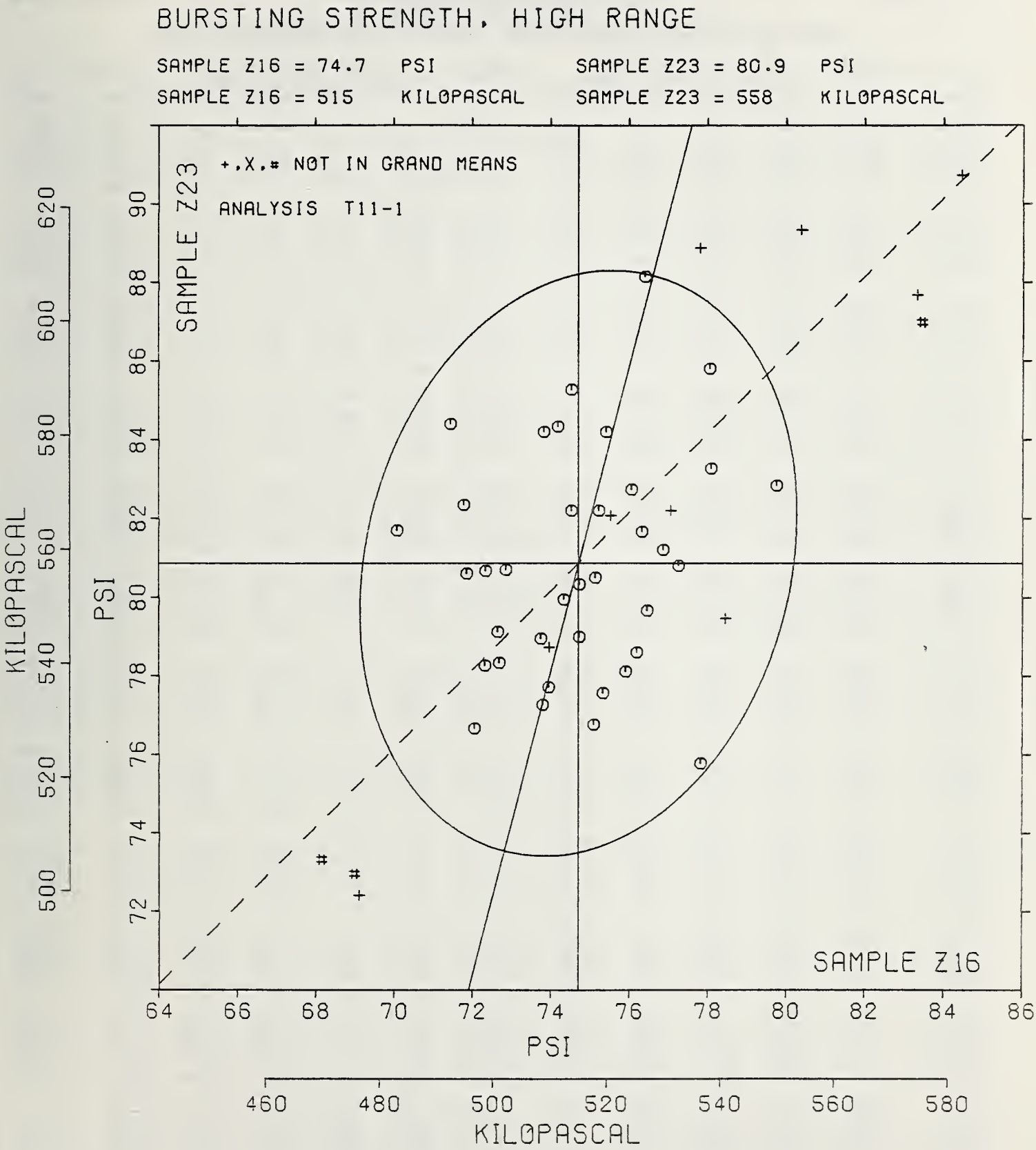
The following laboratories were omitted from the grand means because of extreme test results: 218, 238A, 279, 311, 339

ANALYSIS 111-1 TABLE 2

BURSTING STRENGTH, PSI - HIGH RANGE

TAPPI OFFICIAL TEST METHOD T403 OS-76, PERKINS MODEL C OR C-A

LAB CODE	F	MEANS Z16	MEANS Z23	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L339	#	68.0	73.1	-9.2	4.5	.98	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L279	#	68.9	72.8	-9.3	3.6	1.20	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L250L	*	69.1	72.4	-9.6	3.3	1.06	11N	BURSTING STRENGTH 40 TO 85 PSI,LBOMARGY,MAN.CLAMP, 20C,65%RH
L622	O	70.1	81.7	-.3	4.7	.92	11E	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L348	O	71.5	84.4	2.6	4.0	1.24	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L650	O	71.8	82.3	.7	3.2	.85	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L333	O	71.9	80.6	-1.0	2.7	.88	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L219	O	72.1	76.7	-4.7	1.5	.98	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L730	O	72.3	78.3	-3.1	1.6	.64	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L563	O	72.4	80.7	-.8	2.2	1.16	11Y	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L356	O	72.7	79.1	-2.2	1.5	1.52	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L243	O	72.7	78.3	-2.9	1.3	.90	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L141	O	72.9	80.7	-.6	1.7	1.17	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L103	O	73.8	79.0	-2.1	.4	.56	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L176	O	73.8	77.3	-3.7	-.0	.89	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L330	O	73.8	84.2	3.0	1.7	1.12	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L575	O	74.0	77.7	-3.2	-.1	1.08	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L743	*	74.0	78.7	-2.2	.2	1.13	11X	BURSTING STRENGTH 40 TO 85 PSI,: GIVE INSTRUMENT MAKE,MODEL
L604	O	74.2	84.3	3.2	1.4	1.25	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L100	O	74.3	79.9	-1.0	.1	.99	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L581	O	74.5	82.2	1.3	.5	1.20	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L148	O	74.5	85.3	4.2	1.3	.94	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L107	O	74.7	79.0	-1.8	-.5	1.25	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L680	O	74.7	80.3	-.5	-.2	1.12	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L159	O	75.1	76.8	-3.9	-1.4	.91	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L567	O	75.1	80.5	-.2	-.5	1.32	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L170	O	75.2	82.2	1.4	-.2	.45	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L565	O	75.3	77.6	-3.0	-1.4	.64	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L334	O	75.4	84.2	3.4	.1	1.08	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L570	*	75.5	82.1	1.4	-.5	.79	11H	BURSTING STRENGTH 40 TO 85 PSI, PERKINS AB, HYDRAULIC CLAMP
L280	O	75.9	78.1	-2.4	-1.8	1.01	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L128	O	76.1	82.7	2.2	-.2	.81	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L182	O	76.2	78.6	-1.8	-2.0	1.30	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L651	O	76.3	81.7	1.2	-1.4	.94	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L599	O	76.4	88.1	7.5	.2	.82	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L278	O	76.5	79.7	-.7	-2.0	1.31	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L122	O	76.9	81.2	.9	-2.0	1.40	11F	BURSTING STRENGTH 40 TO 85 PSI,PERKINS C, H. CLAMP,TRANSDUCER
L393	*	77.1	82.2	1.9	-2.0	.94	11H	BURSTING STRENGTH 40 TO 85 PSI, PERKINS AB, HYDRAULIC CLAMP
L237A	O	77.3	80.8	.6	-2.5	.82	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L242	*	77.8	88.9	8.5	-1.0	1.07	11T	BURSTING STRENGTH 40 TO 85 PSI, L*W,MANUAL CLAMP
L736	O	77.8	75.8	-4.1	-4.3	1.13	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L237B	O	78.1	85.8	5.6	-2.0	.79	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L118	O	78.1	83.3	3.2	-2.7	1.00	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L484	*	78.5	79.5	-.4	-4.0	.99	11H	BURSTING STRENGTH 40 TO 85 PSI, PERKINS AB, HYDRAULIC CLAMP
L576	O	79.8	82.8	3.2	-4.4	.62	11P	BURSTING STRENGTH 40 TO 85 PSI, PERKINS IC, MANUAL CLAMP
L290	*	80.4	89.3	9.6	-3.4	.80	11A	BURSTING STRENGTH 40 TO 85 PSI, PERKINS A, MANUAL CLAMP
L251	*	83.3	87.7	8.8	-6.6	.95	11V	BURSTING STRENGTH 40 TO 85 PSI, L*W,MANUAL CLAMP, 20C,65% RH
L218	#	83.3	86.8	7.9	-6.9	1.43	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L394	*	84.5	90.7	12.0	-7.0	1.39	11H	BURSTING STRENGTH 40 TO 85 PSI, PERKINS AB, HYDRAULIC CLAMP
L737	*	85.3	96.6	17.9	-6.3	1.59	11H	BURSTING STRENGTH 40 TO 85 PSI, PERKINS AB, HYDRAULIC CLAMP
L311	#	88.1	108.9	30.5	-6.0	2.46	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L593	*	88.9	94.2	16.5	-10.4	1.70	11J	BURSTING STRENGTH 40 TO 85 PSI, PERKINS JUMBO,HAND DRIVEN
L238A	#	89.5	94.3	16.7	-10.9	1.74	11Y	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L598	*	90.8	98.5	21.1	-11.2	1.83	11B	BURSTING STRENGTH 40 TO 85 PSI, MESSMER, MANUAL CLAMP
GMEANS:		74.7	80.9			1.00		
		95% ELLIPSE:		7.6	5.4	WITH GAMMA = 75 DEGREES		


BURSTING STRENGTH, HIGH RANGE
SAMPLE Z16 = 74.7 PSI
SAMPLE Z16 = 515 KILOPASCAL
SAMPLE Z23 = 80.9 PSI
SAMPLE Z23 = 558 KILOPASCAL
+,X,# NOT IN GRAND MEANS
ANALYSIS T11-1
SAMPLE Z23
PSI
KILOPASCAL
SAMPLE Z16
PSI
KILOPASCAL

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	SAMPLE G16 MEAN	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER DEV	No. DEV	SDR	Ro SDR	SAMPLE G28 MEAN	OFFSET PRINTING 54 GRAMS PER SQUARE METER DEV	No. DEV	SDR	Ro SDR	TEST Do= 15 VAR	F	LAB
L100	48.0	-2.5	-1.17	1.0	.72	68.0	-.7	-.17	2.2	.99	1SM	@	L100
L103	50.1	-.3	-.14	.8	.57	68.5	-.2	-.05	1.1	.51	1ST	@	L103
L105	49.8	-.6	-.30	1.7	1.19	70.2	1.5	.37	2.9	1.34	1ST	@	L105
L107	52.5	2.1	1.00	3.2	2.23	66.9	-1.8	-.44	2.1	.97	1ST	@	L107
L115	48.4	-2.0	-.96	1.5	1.06	62.7	-6.1	-1.50	2.5	1.13	1SC	@	L115
L118	49.5	-1.0	-.46	1.9	1.32	66.8	-1.9	-.48	1.3	.58	1ST	@	L118
L121	49.5	-1.0	-.46	1.2	.82	65.2	-3.5	-.87	2.5	1.13	1ST	@	L121
L122	49.2	-1.3	-.60	1.3	.87	70.2	1.5	.38	1.6	.75	1SC	@	L122
L124	48.2	-2.2	-1.06	2.5	1.73	66.1	-2.6	-.64	1.2	.57	1ST	@	L124
L126	51.0	.6	.27	1.3	.86	70.2	1.5	.37	2.7	1.25	1ST	@	L126
L128	50.5	.0	.02	1.1	.73	66.1	-2.6	-.64	2.1	.97	1ST	@	L128
L131	51.9	1.4	.69	1.4	.97	72.2	3.5	.86	1.8	.83	1SA	@	L131
L134	51.9	1.4	.69	.8	.57	73.3	4.6	1.14	1.3	.61	1SC	@	L134
L139	51.8	1.4	.65	.9	.59	72.4	3.7	.91	1.3	.59	1ST	@	L139
L141	49.5	-1.0	-.46	1.4	.97	65.3	-3.5	-.86	1.1	.50	1ST	@	L141
L143	43.6	-6.8	-3.25	1.3	.89	58.9	-9.8	-2.43	2.4	1.11	1ST	*	L143
L148	51.3	.9	.43	1.4	.99	69.1	.3	.08	1.7	.76	1ST	@	L148
L150	43.0	-7.4	-3.53	1.0	.71	55.6	-13.1	-3.26	1.6	.71	1ST	X	L150
L153	49.6	-.8	-.39	1.8	1.27	66.6	-2.1	-.53	1.5	.71	1SC	@	L153
L157	50.8	.4	.18	1.2	.83	67.5	-1.2	-.30	2.1	.96	1ST	@	L157
L158	46.8	-3.6	-1.72	2.0	1.35	67.1	-1.7	-.41	8.7	3.96	1SR	@	L158
L159	48.5	-2.0	-.93	1.9	1.32	70.7	2.0	.50	2.5	1.14	1SL	@	L159
L162	50.4	-.0	-.01	1.1	.77	65.7	-3.0	-.74	.9	.40	1ST	@	L162
L163	50.1	-.4	-.17	1.1	.75	65.8	-2.9	-.73	2.4	1.08	1ST	@	L163
L166	48.6	-1.8	-.87	1.4	.96	65.3	-3.5	-.86	2.3	1.06	1ST	@	L166
L167	54.0	3.6	1.70	1.3	.90	74.5	5.8	1.44	1.4	.64	1SC	@	L167
L170	47.2	-3.2	-1.53	1.0	.70	62.1	-6.6	-1.63	1.2	.54	1ST	@	L170
L173B	51.1	.6	.31	1.5	1.02	68.7	-.1	-.01	1.7	.76	1ST	@	L173B
L176	52.1	1.7	.81	2.1	1.42	71.7	3.0	.75	3.7	1.69	1ST	@	L176
L182A	48.7	-1.8	-.84	1.8	1.26	71.9	3.1	.78	3.3	1.49	1SA	@	L182A
L182T	50.9	.5	.24	1.6	1.08	71.1	2.3	.58	1.9	.87	1ST	@	L182T
L183	52.3	1.9	.91	1.5	1.06	71.3	2.5	.63	2.3	1.03	1ST	@	L183
L185	48.9	-1.6	-.74	1.7	1.16	67.0	-1.7	-.43	2.4	1.10	1ST	@	L185
L189	50.1	-.3	-.14	1.1	.77	73.5	4.8	1.19	2.7	1.23	1ST	@	L189
L190C	48.4	-2.0	-.96	1.0	.68	65.2	-3.5	-.87	1.5	.69	1ST	@	L190C
L190R	51.9	1.4	.69	1.7	1.19	69.0	.3	.07	2.0	.90	1SC	@	L190R
L191	54.4	4.0	1.89	1.5	1.06	74.8	6.1	1.51	2.7	1.23	1ST	@	L191
L195	51.2	.8	.37	2.5	1.71	67.6	-1.1	-.28	3.2	1.47	1SC	@	L195
L206	51.3	.8	.40	1.3	.92	68.4	-.3	-.08	3.2	1.48	1ST	@	L206
L207	48.9	-1.6	-.75	3.4	2.35	64.5	-4.2	-1.04	5.4	2.45	1SR	@	L207
L211	52.7	2.2	1.07	1.9	1.29	68.4	-.3	-.08	1.2	.57	1SR	@	L211
L212	52.3	1.8	.88	4.6	3.17	86.0	17.3	4.28	18.8	8.57	1ST	#	L212
L213	52.8	2.4	1.13	1.0	.70	72.5	3.8	.94	1.4	.64	1ST	@	L213
L217	51.0	.5	.26	1.4	.96	73.3	4.6	1.15	2.0	.92	1SC	@	L217
L219	51.7	1.3	.62	1.3	.88	67.9	-.9	-.21	1.6	.73	1SI	@	L219
L223	52.7	2.2	1.07	.9	.62	71.2	2.4	.61	2.4	1.11	1SR	@	L223
L224	46.5	-4.0	-1.88	1.1	.77	65.3	-3.5	-.86	1.1	.50	1ST	@	L224
L226B	51.2	.8	.37	1.5	1.01	68.4	-.3	-.08	1.1	.51	1ST	@	L226B
L226C	53.5	3.0	1.45	1.6	1.10	78.8	10.1	2.50	2.2	1.02	1ST	*	L226C
L228	51.9	1.4	.69	1.2	.82	76.1	7.4	1.84	4.0	1.81	1ST	@	L228
L233	49.1	-1.3	-.61	1.2	.82	66.2	-2.5	-.63	1.8	.81	1ST	@	L233
L237A	49.4	-1.0	-.49	1.2	.81	67.2	-1.5	-.38	1.5	.69	1ST	@	L237A
L237B	50.1	-.4	-.17	.6	.41	68.8	.1	.02	1.2	.55	1ST	@	L237B
L238A	51.9	1.4	.69	1.7	1.19	72.6	3.9	.96	2.4	1.09	1ST	@	L238A
L241	47.7	-2.7	-1.28	.8	.55	64.2	-4.5	-1.12	1.5	.69	1ST	@	L241
L242	52.6	2.1	1.02	1.3	.88	73.0	4.2	1.05	3.2	1.47	1SD	@	L242
L243	50.8	.4	.18	1.6	1.11	71.1	2.4	.60	2.0	.93	1ST	@	L243
L244	50.8	.4	.18	.8	.53	68.7	-.1	-.01	1.0	.45	1SC	@	L244
L249	48.2	-2.2	-1.06	1.3	.87	61.9	-6.9	-1.70	2.2	1.02	1ST	@	L249
L254	50.1	-.3	-.14	2.1	1.42	67.2	-1.5	-.38	1.8	.83	1ST	@	L254
L255	51.1	.7	.34	.8	.57	70.7	1.9	.48	1.0	.48	1ST	@	L255
L259	51.5	1.1	.53	.9	.63	73.1	4.3	1.08	1.7	.76	1ST	@	L259
L261	48.1	-2.3	-1.09	2.4	1.66	64.6	-4.1	-1.02	2.6	1.20	1ST	@	L261
L262	50.5	.0	.02	1.0	.68	65.1	-3.7	-.91	1.4	.66	1ST	@	L262
L264	51.5	1.0	.50	2.6	1.76	67.5	-1.3	-.31	2.1	.94	1ST	@	L264

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	SAMPLE G16 HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	SAMPLE G26 OFFSET PRINTING 54 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	TEST VAR	F	L. LAB
L268	49.2	-1.2	-.58	1.7	1.14	66.3	-2.5	-.61	2.1	.97	1ST	@	L268
L273	47.3	-3.1	-1.47	1.5	1.03	64.9	-3.8	-.94	1.8	.80	1ST	@	L273
L275	52.3	1.9	.91	1.2	.85	74.1	5.4	1.34	2.1	.96	1ST	@	L275
L277	45.5	-5.0	-2.36	2.0	1.37	58.7	-10.1	-2.49	2.2	1.02	1ST	*	L277
L278	48.5	-2.0	-.94	1.8	1.26	80.7	12.0	2.98	2.1	.97	1ST	X	L278
L279	55.7	5.3	2.53	1.4	.99	76.9	8.1	2.02	2.5	1.14	1ST	*	L279
L280	50.0	-.4	-.20	1.3	.90	72.1	3.4	.85	2.2	.99	1ST	@	L280
L281	50.4	-.0	-.01	1.4	.93	64.5	-4.2	-1.04	2.2	1.02	1ST	@	L281
L285	47.2	-3.2	-1.53	2.2	1.54	63.5	-5.3	-1.30	3.1	1.40	1ST	@	L285
L288	52.7	2.3	1.10	1.8	1.20	71.3	2.5	.63	2.1	.95	1ST	@	L288
L290	49.7	-.8	-.36	1.3	.89	69.9	1.1	.28	2.9	1.32	1ST	@	L290
L291	52.7	2.3	1.10	1.4	.99	74.5	5.7	1.42	1.8	.82	1SA	@	L291
L305	51.1	.7	.34	1.2	.82	65.7	-3.1	-.76	1.7	.78	1ST	@	L305
L309	51.8	1.4	.65	1.5	1.01	71.4	2.7	.66	1.9	.88	1ST	@	L309
L311	48.5	-1.9	-.90	1.0	.68	68.4	-.3	-.08	1.9	.86	1ST	@	L311
L312	48.4	-2.0	-.96	1.2	.85	61.5	-7.3	-1.80	2.2	1.00	1ST	@	L312
L313	49.1	-1.3	-.61	1.1	.73	69.5	.7	.18	2.4	1.09	1SL	@	L313
L315	51.5	1.1	.53	1.2	.86	67.2	-1.5	-.38	1.7	.76	1ST	@	L315
L321	49.9	-.6	-.27	.7	.51	64.5	-4.2	-1.04	2.6	1.17	1ST	@	L321
L328	51.9	1.5	.72	.7	.51	71.6	2.9	.71	1.3	.60	1ST	@	L328
L333	48.4	-2.0	-.96	2.3	1.55	65.5	-3.3	-.81	2.9	1.33	1ST	@	L333
L334	50.3	-.1	-.04	1.6	1.09	68.4	-.3	-.08	2.4	1.10	1ST	@	L334
L336	50.7	.2	.12	.7	.50	64.3	-4.5	-1.11	1.0	.47	1ST	@	L336
L345	48.7	-1.7	-.80	1.2	.80	67.7	-1.0	-.25	2.1	.94	1ST	@	L345
L348	50.0	-.4	-.20	.0	.00	68.0	-.7	-.18	1.7	.77	1ST	@	L348
L352	51.7	1.3	.60	1.1	.76	69.7	1.0	.25	2.1	.98	1SC	@	L352
L358	53.2	2.7	1.30	1.9	1.31	69.2	.5	.13	1.5	.68	1ST	@	L358
L360	50.1	-.4	-.17	1.3	.93	62.7	-6.1	-1.50	2.6	1.19	1ST	@	L360
L376	47.5	-3.0	-1.41	1.6	1.07	65.5	-3.2	-.79	2.3	1.05	1ST	@	L376
L382	66.2	15.8	7.51	1.4	.94	108.9	40.2	9.97	2.2	1.01	1ST	#	L382
L386	48.1	-2.3	-1.09	1.5	1.00	64.1	-4.6	-1.14	2.2	1.00	1ST	@	L386
L388	50.3	-.2	-.07	1.4	.95	79.5	10.7	2.66	1.5	.67	1ST	X	L388
L396M	32.5	-17.9	-8.51	4.2	2.89	48.1	-20.7	-5.12	5.1	2.35	1ST	#	L396M
L442	54.2	3.8	1.80	1.9	1.30	82.3	13.5	3.36	2.8	1.26	1SR	X	L442
L484	53.6	3.2	1.51	2.3	1.57	71.9	3.1	.76	3.8	1.74	1ST	@	L484
L558	49.3	-1.2	-.55	.8	.55	54.9	-3.9	-.96	2.6	1.21	1ST	@	L558
L562	52.1	1.6	.78	2.2	1.50	72.3	3.5	.88	1.7	.78	1ST	@	L562
L565	51.5	1.0	.50	.9	.63	72.1	3.4	.85	2.6	1.17	1ST	@	L565
L566	48.7	-1.7	-.80	1.1	.75	70.5	1.8	.45	3.2	1.47	1ST	@	L566
L567	58.8	8.4	3.99	1.0	.70	79.5	10.7	2.66	1.9	.88	1SC	X	L567
L574	52.5	2.1	1.00	1.2	.82	71.1	2.3	.58	3.6	1.65	1ST	@	L574
L575	50.8	.4	.19	1.4	.98	70.9	2.2	.54	2.0	.90	1SL	@	L575
L576	55.1	4.7	2.24	1.6	1.07	82.0	13.3	3.29	3.0	1.38	1ST	*	L576
L580	52.5	2.1	1.00	.9	.63	69.2	.5	.12	1.3	.58	1ST	@	L580
L581	51.5	1.1	.50	1.2	.83	70.4	1.7	.42	3.2	1.46	1SC	@	L581
L599	50.5	.0	.02	.9	.63	68.3	-.5	-.11	1.7	.76	1ST	@	L599
L600	52.7	2.3	1.10	1.7	1.17	72.9	4.2	1.04	2.4	1.08	1ST	@	L600
L604	45.9	-4.6	-2.17	2.6	1.76	75.5	6.7	1.67	3.3	1.52	1ST	X	L604
L606	49.3	-1.2	-.55	1.0	.66	69.6	.9	.22	1.5	.71	1ST	@	L606
L610	50.3	-.1	-.04	1.9	1.31	72.0	3.3	.81	4.0	1.83	1ST	@	L610
L622	27.1	-23.3	-11.09	2.4	1.62	42.0	-26.7	-6.63	2.8	1.29	1SL	#	L622
L626	47.6	-2.8	-1.34	1.4	.93	65.2	-3.5	-.87	2.3	1.05	1SL	@	L626
L651	11.8	-38.6	-18.38	1.1	.74	15.4	-53.3	-13.22	.6	.29	1ST	#	L651
L652	52.0	1.6	.75	2.7	1.87	75.2	6.5	1.61	2.4	1.08	1SC	@	L652
L654	46.9	-3.6	-1.69	.9	.63	61.3	-7.5	-1.85	1.3	.58	1ST	@	L654
L670	49.0	-1.4	-.68	1.7	1.19	65.7	-3.0	-.74	1.5	.68	1ST	@	L670
L676	48.4	-2.0	-.96	1.5	1.06	61.4	-7.3	-1.82	2.1	.94	1ST	@	L676
L680	51.5	1.1	.53	1.3	.89	69.1	.3	.08	2.5	1.14	1ST	@	L680
L684	52.0	1.6	.75	2.0	1.37	72.4	3.7	.91	1.9	.86	1SL	@	L684
L685	52.9	2.4	1.16	1.4	.93	72.3	3.6	.89	1.9	.86	1ST	@	L685
L692	48.1	-2.4	-1.12	1.5	1.05	66.5	-2.2	-.54	2.9	1.33	1ST	@	L692
L696	45.1	-5.4	-2.55	1.5	1.02	70.3	1.5	.38	2.4	1.08	1ST	X	L696
L697	52.6	2.2	1.04	1.1	.76	65.3	-.6	-.15	2.3	1.04	1ST	@	L697
L698	46.3	-4.2	-1.98	1.3	.92	64.7	-4.0	-.99	1.8	.80	1SL	@	L698
L704	52.5	2.0	.97	2.0	1.38	59.7	-9.0	-2.24	2.0	.90	1ST	X	L704

ANALYSIS 715-1 TABLE 1

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	SAMPLE G16 MEAN	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G28 MEAN	OFFSET PRINTING 54 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 15 VAR	F	LAB
L743	53.3	2.9	1.38	4.5	3.07	71.2	2.5	.62	2.9	1.34	15L	6	L743
L746P	51.3	.9	.41	1.4	.98	70.4	1.7	.42	2.7	1.25	15T	6	L746P
L746S	55.0	4.5	2.17	1.8	1.25	76.6	7.9	1.95	2.4	1.08	15T	6	L746S
GR. MEAN *	50.4 GRAMS			GRAND MEAN *		68.7 GRAMS			TEST DETERMINATIONS *			15	
SD MEANS *	2.1 GRAMS			SD OF MEANS *		4.0 GRAMS			120 LABS IN GRAND MEANS				
	AVERAGE SDR *	1.5 GRAMS				AVERAGE SDR *	2.2 GRAMS						
GR. MEAN *	494.5 MILLINEWTON			GRAND MEAN *		674.0 MILLINEWTON							
L225	52.7	2.2	1.07	1.0	.67	72.1	3.4	.85	1.2	.54	15V	*	L225
L250L	55.5	5.1	2.43	1.7	1.19	83.1	14.3	3.56	1.5	.70	15B	*	L250L
L251	51.9	1.4	.69	1.0	.68	77.4	8.7	2.15	2.4	1.12	15K	*	L251
L326	47.8	-2.7	-1.26	1.3	.92	66.9	-1.8	-.45	1.9	.88	15N	*	L326
L339	49.7	-.7	-.33	1.5	1.02	67.9	-.9	-.21	3.0	1.36	15N	*	L339
L341	48.5	-2.0	-.93	1.8	1.21	66.3	-2.5	-.61	1.8	.82	15N	*	L341
L356	55.3	4.9	2.34	1.2	.85	76.5	7.8	1.94	4.4	2.03	15N	*	L356
L585	50.7	.2	.12	1.4	.99	69.1	.3	.08	2.4	1.08	15E	*	L585
L705	49.1	-1.4	-.65	1.8	1.26	69.3	.6	.15	2.9	1.32	15X	*	L705
L706	29.6	-20.8	-9.91	5.1	3.48	30.1	-38.7	-9.59	4.1	1.89	15X	*	L706
L734	48.3	-2.1	-1.00	.9	.62	67.3	-1.4	-.34	2.6	1.18	15N	*	L734
L738	51.5	1.1	.53	1.9	1.32	67.3	-1.4	-.34	2.0	.91	15X	*	L738

TOTAL NUMBER OF LABORATORIES REPORTING * 145

Best values: G16 50 ± 3 grams
G28 69 ± 7 grams

The following laboratories were omitted from the grand means because of extreme test results: 212, 382, 396M

Data from the following laboratories appear to be off by a multiplicative factor: 622, 651

Data from the following laboratories appeared to be off by a multiplicative factor: 225. Code 15V was assigned temporarily put in a factor of 2.

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	F	MEANS G16	MEANS G28	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L651	#	11.8	15.4	-64.5	13.5	.52	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L622	#	27.1	42.0	-33.9	10.3	1.45	1SL	TEARING STRENGTH 3S TO 110G, LORENTZ-WETTRES
L706	*	29.6	30.1	-43.8	3.2	2.68	1SX	TEARING STRENGTH 3S TO 110G: GIVE INSTRUMENT MAKE,MODEL
L396M	#	32.5	48.1	-26.2	7.9	2.62	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L150	X	43.0	55.6	-15.0	1.4	.71	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L143	*	43.6	58.9	-11.7	2.2	1.00	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L696	X	45.1	70.3	-.8	5.5	1.05	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L277	*	45.5	58.7	-11.2	.4	1.19	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L604	X	45.9	75.5	4.3	6.9	1.64	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L698	6	46.3	64.7	-5.3	2.2	.86	1SL	TEARING STRENGTH 3S TO 110G, LORENTZ-WETTRES
L224	6	46.5	65.3	-4.8	2.2	.64	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L158	6	46.8	67.1	-3.0	2.6	2.66	1SR	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L654	6	46.9	61.3	-8.3	.2	.61	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L285	6	47.2	63.5	-6.1	.8	1.47	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L170	6	47.2	62.1	-7.3	.2	.62	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L273	6	47.3	64.9	-4.7	1.3	.91	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L376	6	47.5	65.5	-4.1	1.4	1.06	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L626	6	47.6	65.2	-4.4	1.1	.99	1SL	TEARING STRENGTH 3S TO 110G, LORENTZ-WETTRES
L241	6	47.7	64.2	-5.2	.6	.62	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L326	*	47.8	66.9	-2.8	1.7	.90	1SN	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF, NO CUT OUT
L100	6	48.0	68.0	-1.6	2.0	.85	1SM	TEARING STRENGTH 3S TO 110G, T.M.MIRFIELD(APPITA-ELMENDORF)
L692	6	48.1	66.5	-3.0	1.3	1.19	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L386	6	48.1	64.1	-5.1	.2	1.00	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L261	6	48.1	64.6	-4.7	.4	1.43	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L124	6	48.2	66.1	-3.3	1.0	1.15	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L249	6	48.2	61.9	-7.2	-.8	.94	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L734	*	48.3	67.3	-2.1	1.4	.90	1SN	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF, NO CUT OUT
L676	6	48.4	61.4	-7.5	-1.1	1.00	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L115	6	48.4	62.7	-6.4	-.6	1.10	1SC	TEARING STRENGTH 3S TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L333	6	48.4	65.5	-3.8	.5	1.44	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L312	6	48.4	61.5	-7.5	-1.1	.93	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L190C	6	48.4	65.2	-4.0	.4	.69	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L278	X	48.5	80.7	10.2	6.7	1.12	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L341	*	48.5	66.3	-3.0	.8	1.02	1SN	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF, NO CUT OUT
L159	6	48.5	70.7	1.0	2.6	1.23	1SL	TEARING STRENGTH 3S TO 110G, LORENTZ-WETTRES
L311	6	48.5	68.4	-1.1	1.6	.77	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L166	6	48.6	65.3	-3.9	.3	1.01	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L182A	6	48.7	71.9	2.2	2.9	1.38	1SA	TEARING STRENGTH 3S TO 110G, APPITA
L566	6	48.7	70.5	1.0	2.3	1.11	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L345	6	48.7	67.7	-1.6	1.1	.87	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L207	6	48.9	64.5	-4.5	-.3	2.40	1SR	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L185	6	48.9	67.0	-2.2	.7	1.13	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L670	6	49.0	65.7	-3.3	.1	.93	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L705	*	49.1	69.3	.0	1.5	1.29	1SX	TEARING STRENGTH 3S TO 110G: GIVE INSTRUMENT MAKE,MODEL
L313	6	49.1	69.5	.2	1.5	.91	1SL	TEARING STRENGTH 3S TO 110G, LORENTZ-WETTRES
L233	6	49.1	66.2	-2.8	.1	.81	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L122	6	49.2	70.2	.9	1.8	.81	1SC	TEARING STRENGTH 3S TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L268	6	49.2	66.3	-2.7	.1	1.05	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L606	6	49.3	69.6	.3	1.4	.68	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L558	6	49.3	64.9	-4.0	-.5	.88	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L237A	6	49.4	67.2	-1.8	.3	.75	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L141	6	49.5	65.3	-3.5	-.5	.73	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L121	6	49.5	65.2	-3.6	-.6	.97	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L118	6	49.5	66.8	-2.1	.1	.95	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L153	6	49.6	66.6	-2.3	-.1	.99	1SC	TEARING STRENGTH 3S TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L290	6	49.7	69.9	.7	1.2	1.10	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L339	*	49.7	67.9	-1.1	.3	1.19	1SN	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF, NO CUT OUT
L105	6	49.8	70.2	1.1	1.2	1.27	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L321	6	49.9	64.5	-4.1	-1.2	.84	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L348	6	50.0	68.0	-.8	.1	.39	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L280	6	50.0	72.1	2.9	1.8	.94	1SL	TEARING STRENGTH 3S TO 110G, LORENTZ-WETTRES
L360	6	50.1	62.7	-5.7	-2.1	1.06	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L237B	6	50.1	68.8	-.1	.4	.48	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L163	6	50.1	65.8	-2.8	-.9	.92	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)
L189	6	50.1	73.5	4.3	2.2	1.00	1ST	TEARING STRENGTH 3S TO 110G,THWING-ELMENDORF(SCALE TO 100)

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	F	MEANS G16	MEANS G28	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L103	G	50.1	68.5	-.3	.2	.54	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L254	G	50.1	67.2	-1.5	-.4	1.12	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L388	X	50.3	79.5	9.7	4.5	.81	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L610	G	50.3	72.0	3.0	1.4	1.57	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L334	G	50.3	68.4	-.3	-.0	1.10	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L162	G	50.4	65.7	-2.7	-1.2	.59	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L281	G	50.4	64.5	-3.8	-1.7	.97	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L262	G	50.5	65.1	-3.3	-1.5	.67	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L128	G	50.5	66.1	-2.3	-1.1	.85	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L595	G	50.5	68.3	-.4	-.2	.69	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L585	*	50.7	69.1	.4	-.1	1.04	15E	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF,AMBIENT COND.
L336	G	50.7	64.3	-4.0	-2.0	.48	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L244	G	50.8	68.7	.1	-.4	.49	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L243	G	50.8	71.1	2.4	.6	1.02	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L157	G	50.8	67.5	-.9	-.8	.89	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L575	G	50.8	70.9	2.1	.5	.94	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L182T	G	50.9	71.1	2.3	.5	.98	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L217	G	51.0	73.3	4.4	1.4	.94	15Q	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,AIR CLAMP,DIGIT
L126	G	51.0	70.2	1.6	.1	1.05	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L173B	G	51.1	68.7	.2	-.6	.89	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L305	G	51.1	65.7	-2.5	-1.9	.80	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L255	G	51.1	70.7	2.1	.1	.52	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L195	G	51.2	67.6	-.7	-1.2	1.59	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L226B	G	51.2	68.4	.0	-.8	.76	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L206	G	51.3	68.4	.0	-.9	1.20	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L746P	G	51.3	70.4	1.9	-.1	1.12	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L148	G	51.3	69.1	.7	-.7	.88	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L264	G	51.5	67.5	-.7	-1.5	1.35	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L565	G	51.5	72.1	3.5	.4	.90	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L581	G	51.5	70.4	2.0	-.3	1.15	15Q	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,AIR CLAMP,DIGIT
L738	*	51.5	67.3	-.8	-1.6	1.11	15X	TEARING STRENGTH 35 TO 110G: GIVE INSTRUMENT MAKE,MODEL
L315	G	51.5	67.2	-.9	-1.6	.81	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L259	G	51.5	73.1	4.4	.8	.69	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L680	G	51.5	69.1	.8	-.9	1.02	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L352	G	51.7	69.7	1.4	-.7	.87	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L219	G	51.7	67.9	-.2	-1.5	.80	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L309	G	51.8	71.4	3.0	-.2	.94	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L139	G	51.8	72.4	3.9	.2	.59	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L190R	G	51.9	69.0	.8	-1.2	1.04	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L238A	G	51.9	72.6	4.1	.3	1.14	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L251	*	51.9	77.4	8.5	2.2	.90	15K	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES, 20 C, 65% RH
L134	G	51.9	73.3	4.8	.6	.59	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L228	G	51.9	76.1	7.4	1.7	1.31	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L131	G	51.9	72.2	3.8	.1	.90	15A	TEARING STRENGTH 35 TO 110G, APPITA
L328	G	51.9	71.6	3.2	-.2	.55	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L684	G	52.0	72.4	4.0	.1	1.12	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L652	G	52.0	75.2	6.6	1.2	1.48	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L562	G	52.1	72.3	3.9	-.1	1.14	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L176	G	52.1	71.7	3.4	-.3	1.55	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L212	#	52.3	86.0	16.5	5.4	5.87	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L275	G	52.3	74.1	5.7	.5	.90	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L183	G	52.3	71.3	3.1	-.7	1.04	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L704	X	52.5	59.7	-7.4	-5.6	1.14	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L107	G	52.5	66.9	-.8	-2.7	1.60	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L574	G	52.5	71.1	3.0	-1.0	1.23	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L580	G	52.5	69.2	1.3	-1.7	.60	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L242	G	52.6	73.0	4.7	-.2	1.18	15U	TEARING STRENGTH 35 TO 110G, AUSTRALIAN SPT. CO.
L697	G	52.6	69.3	1.5	-1.7	.90	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L223	G	52.7	71.2	3.2	-1.0	.86	15R	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L211	G	52.7	68.4	.6	-2.2	.93	15R	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L225	*	52.7	72.1	4.0	-.7	.61	15V	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF X 2
L288	G	52.7	71.3	3.3	-1.1	1.08	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L291	G	52.7	74.5	6.2	.2	.91	15A	TEARING STRENGTH 35 TO 110G, APPITA
L600	G	52.7	72.9	4.8	-.4	1.13	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L213	G	52.8	72.5	4.4	-.6	.67	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)

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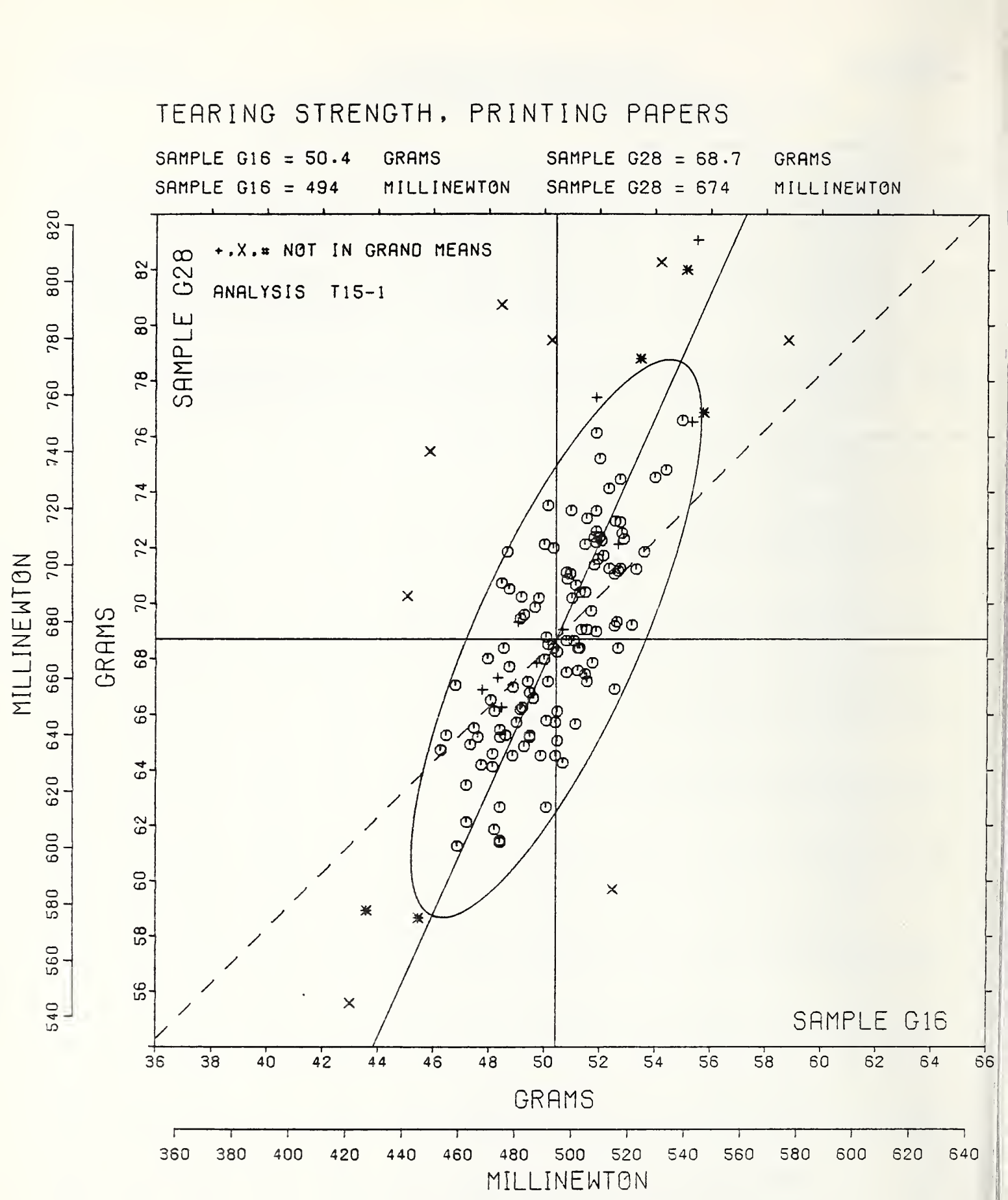
ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	F	MEANS G1G	MEANS G2G	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L685	O	52.9	72.3	4.3	-.8	.89	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L358	O	53.2	69.2	1.6	-2.3	1.00	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L743	O	53.3	71.2	3.5	-1.6	2.21	1SL	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L226C	*	53.5	78.8	10.4	1.3	1.06	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L484	O	53.6	71.9	4.2	-1.6	1.66	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L167	O	54.0	74.5	6.8	-.9	.77	1SC	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L442	X	54.2	82.3	13.9	2.1	1.28	1SR	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L191	O	54.4	74.8	7.2	-1.1	1.15	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L746S	O	55.0	76.6	9.0	-.9	1.16	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L576	*	55.1	82.0	14.0	1.1	1.22	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L356	*	55.3	76.5	9.1	-1.3	1.44	1SN	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT CUT
L250L	*	55.5	83.1	15.2	1.2	.94	1SB	TEARING STRENGTH 35 TO 110G, LHOMARGY, 20 C, 65% RH
L279	*	55.7	76.9	9.6	-1.5	1.06	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L567	X	58.8	79.5	13.2	-3.3	.79	1SC	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L382	*	66.2	108.9	43.1	2.0	.98	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
GMEANS:		50.4	68.7			1.00		
		95% ELLIPSE:		10.9	3.0	WITH GAMMA = 65 DEGREES		


TEARING STRENGTH, PRINTING PAPERS
SAMPLE G16 = 50.4 GRAMS
SAMPLE G16 = 494 MILLINEWTON
SAMPLE G28 = 68.7 GRAMS
SAMPLE G28 = 674 MILLINEWTON
+,X,* NOT IN GRAND MEANS
ANALYSIS T15-1
SAMPLE G28
GRAMS
MILLINEWTON
SAMPLE G16
GRAMS
MILLINEWTON

ANALYSIS 116-1 TABLE 1

TEARING STRENGTH, GRAMS - PRIMARILY PACKAGING PAPERS

TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	SAMPLE G20 BLEACHED KRAFT ENVELOPE 106 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE B76 KRAFT ENVELOPE 123 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB	TEST D. = 15
L122C	103.1	-1.8	-.60	5.4	1.20	117.1	-2.1	-.56	3.7	.71	16C	6	L122C	
L151	104.8	-.0	-.01	4.0	.89	120.8	1.6	.44	5.6	1.07	16C	6	L151	
L230	105.2	.4	.13	5.7	1.28	123.4	4.3	1.14	7.2	1.38	16E	6	L230	
L231T	101.3	-3.5	-1.18	4.9	1.10	117.1	-2.1	-.56	3.5	.68	16T	6	L231T	
L324	106.1	1.2	.42	2.7	.61	123.1	4.0	1.06	4.1	.79	16T	6	L324	
L366	93.6	-11.2	-3.80	4.2	.94	109.1	-10.1	-2.68	7.9	1.52	16T	#	L366	
L393	103.5	-1.4	-.46	4.0	.88	112.0	-7.2	-1.90	5.0	.96	16T	6	L393	
L554	111.2	6.4	2.15	5.0	1.12	120.7	1.5	.40	7.0	1.34	16C	6	L554	
L730	120.4	15.6	5.26	5.7	1.27	162.1	43.0	11.43	5.0	.95	16E	#	L730	
L735	124.1	19.3	6.53	4.8	1.07	145.7	26.6	7.06	6.0	1.15	16T	#	L735	
L737	103.5	-1.3	-.45	4.2	.93	119.1	-.1	-.02	5.6	1.07	16C	6	L737	

GR. MEAN = 104.8 GRAMS GRAND MEAN = 119.2 GRAMS TEST DETERMINATIONS = 15

SD MEANS = 3.0 GRAMS SD OF MEANS = 3.8 GRAMS 8 LABS IN GRAND MEANS

AVERAGE SDR = 4.5 GRAMS AVERAGE SDR = 5.2 GRAMS

GR. MEAN = 1028.1 MILLINEWTON GRAND MEAN = 1168.6 MILLINEWTON

L106	113.3	8.5	2.87	6.5	1.46	127.5	8.3	2.21	4.2	.81	16N	*	L106
L122N	113.7	8.9	3.01	9.2	2.04	130.4	11.2	2.99	9.5	1.82	16N	*	L122N
L148	105.1	.2	.08	3.8	.86	124.0	4.8	1.29	3.0	.58	16N	*	L148
L234	118.1	13.3	4.50	5.6	1.26	142.9	23.8	6.32	5.3	1.02	16N	*	L234
L267	132.8	28.0	9.46	7.7	1.73	151.7	32.6	8.66	5.3	1.02	16N	*	L267
L269	106.5	1.7	.58	3.8	.85	126.3	7.1	1.89	4.4	.84	16N	*	L269
L308	114.9	10.1	3.42	4.0	.89	140.3	21.1	5.61	4.6	.88	16N	*	L308
L702	100.0	-4.8	-1.63	4.5	1.01	114.4	-4.8	-1.26	6.2	1.19	16X	*	L702

TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: G20 104 grams
B76 119 grams

The following laboratories were omitted from the grand means because of extreme test results: 366, 730, 735

ANALYSIS 116-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PACKAGING PAPERS

TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	F	MEANS G20	B76	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L366	#	93.6	109.1	-14.5	4.3	1.23	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L702	*	100.0	114.4	-6.6	1.6	1.10	16X	TEARING STRENGTH 60 TO 150G: GIVE INSTRUMENT MAKE,MODEL
L231T	6	101.3	117.1	-3.6	1.9	.89	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L122C	6	103.1	117.1	-2.7	.4	.96	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
L393	6	103.5	112.0	-6.8	-2.6	.92	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L737	6	103.5	119.1	-.8	1.1	1.00	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
L151	6	104.8	120.8	1.4	.9	.98	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
L148	*	105.1	124.0	4.3	2.3	.72	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L230	6	105.2	123.4	3.9	1.9	1.33	16E	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF,DIGITAL READOUT
L324	6	106.1	123.1	4.0	1.0	.70	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L269	*	106.5	126.3	7.0	2.3	.85	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L554	6	111.2	120.7	4.6	-4.6	1.23	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
L106	*	113.3	127.5	11.5	-2.9	1.14	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L122N	*	113.7	130.4	14.2	-1.7	1.93	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L308	*	114.9	140.3	23.3	2.4	.89	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L234	*	118.1	142.9	27.2	1.1	1.14	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L730	#	120.4	162.1	44.8	9.2	1.11	16E	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF,DIGITAL READOUT
L735	#	124.1	145.7	32.7	-2.6	1.11	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L267	*	132.8	151.7	42.4	-6.9	1.37	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
GMEANS:		104.8	119.2			1.00		
		95% ELLIPSE:		14.4	8.1	WITH GAMMA = 58 DEGREES		

ANALYSIS 719-1 TABLE 1

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

LAB CODE	SAMPLE G18 MEAN	BUFF MANILA ENVELOPE 118 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G24 MEAN	PRINTING 105 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 20 VAR	F	LAB
L100	6.58	-.23	-.75	.27	.72	8.62	-.48	-1.05	.39	.77	1SE	G	L100
L106	6.74	-.08	-.25	.28	.74	9.24	.14	.30	.56	1.11	1SA	G	L106
L107	7.07	.26	.87	.62	1.63	9.37	.27	.59	.71	1.40	1SA	G	L107
L122	6.72	-.09	-.30	.41	1.08	9.22	.12	.26	.51	1.01	1SA	G	L122
L126	6.69	-.12	-.40	.28	.75	9.02	-.08	-.17	.34	.67	1SA	C	L126
L151	7.00	.19	.62	.37	.98	9.30	.20	.44	.60	1.19	1SA	G	L151
L157A	7.06	.25	.82	.38	1.00	8.81	-.30	-.65	.42	.84	1SP	C	L157A
L157I	6.23	-.58	-1.92	.40	1.06	7.97	-1.14	-2.49	.71	1.40	1SA	C	L157I
L167	7.39	.58	1.91	.43	1.14	9.93	.83	1.81	.53	1.05	1SG	G	L167
L182I	6.61	-.20	-.67	.41	1.08	8.89	-.21	-.46	.49	.96	1SD	G	L182I
L182L	6.53	-.28	-.91	.38	1.01	8.92	-.19	-.41	.46	.92	1ST	C	L182L
L207	6.82	.01	.02	.40	1.06	8.28	-.82	-1.80	.57	1.14	1SA	*	L207
L217A	6.92	.11	.36	.36	.96	9.04	-.07	-.15	.46	.91	1SA	G	L217A
L217P	6.88	.06	.21	.43	1.14	9.04	-.07	-.15	.39	.77	1SP	G	L217P
L219	7.01	.20	.65	.33	.88	9.57	.46	1.01	.77	1.53	1SE	G	L219
L225	7.35	.52	1.76	.37	.98	9.36	.26	.56	.38	.75	1SP	G	L225
L237A	6.91	.10	.32	.33	.89	9.61	.51	1.12	.36	.71	1SC	C	L237A
L237B	7.24	.42	1.40	.46	1.22	9.47	.36	.80	.57	1.12	1SA	G	L237B
L238A	6.31	-.50	-1.65	.35	.94	8.46	-.65	-1.42	.45	.88	1ST	C	L238A
L243	6.54	-.27	-.90	.38	1.01	8.72	-.38	-.83	.53	1.05	1SA	C	L243
L264A	6.92	.11	.36	.33	.88	9.34	.24	.53	.45	.90	1SA	G	L264A
L264P	7.15	.34	1.13	.31	.83	9.62	.52	1.14	.41	.82	1SP	G	L264P
L267	6.66	-.16	-.51	.44	1.16	9.25	.15	.33	.40	.80	1SA	C	L267
L268A	1.27	-5.54	-18.27	.06	.16	1.62	-7.48	-16.42	.08	.16	1SA	#	L268A
L268P	6.79	-.03	-.08	.50	1.32	8.83	-.28	-.61	.92	1.82	1SP	G	L268P
L273	7.07	.25	.84	.44	1.16	9.36	.25	.56	.51	1.01	1SA	G	L273
L278	6.50	-.31	-1.03	.26	.69	8.61	-.50	-1.09	.55	1.08	1SA	C	L278
L280	6.46	-.36	-1.17	.31	.82	8.55	-.55	-1.21	.43	.85	19G	C	L280
L281	6.97	.16	.51	.42	1.12	9.53	.42	.93	.44	.86	1SG	C	L281
L305	6.87	.06	.20	.33	.87	8.87	-.23	-.50	.45	.89	1SP	C	L305
L312	6.81	.00	.00	.38	1.01	9.52	.42	.92	.39	.77	1SD	G	L312
L318	5.97	-.84	-2.77	.37	.98	8.21	-.89	-1.96	.44	.87	1SG	*	L318
L324	6.46	-.35	-1.17	.39	1.04	9.15	.05	.11	.47	.93	1SA	G	L324
L334	6.89	.08	.26	.41	1.09	9.29	.19	.41	.47	.94	1SP	G	L334
L336	6.66	-.15	-.49	.43	1.15	9.04	-.07	-.14	.44	.87	1SG	G	L336
L348	7.16	.35	1.14	.34	.91	9.35	.25	.54	.42	.84	1SP	G	L348
L356	6.83	.02	.07	.46	1.23	9.12	.02	.03	.59	1.17	1SP	C	L356
L554	6.98	.17	.57	.24	.63	9.74	.64	1.39	.52	1.02	1SA	C	L554
L562	7.06	.25	.82	.40	1.05	8.84	-.26	-.58	.99	1.96	1SP	C	L562
L565	6.92	.11	.35	.40	1.06	9.01	-.10	-.21	.51	1.00	1ST	G	L565
L568	6.75	-.06	-.20	.41	1.08	9.04	-.06	-.13	.46	.91	1SP	G	L568
L575	6.60	-.22	-.71	.19	.50	8.86	-.25	-.54	.44	.86	1SG	G	L575
L576	6.71	-.10	-.33	.31	.83	9.10	-.01	-.01	.26	.51	1SA	C	L576
L580	7.26	.45	1.49	.32	.84	9.70	.60	1.31	.47	.92	1SG	G	L580
L581	7.30	.49	1.60	.34	.91	10.04	.94	2.06	.60	1.18	1SA	G	L581
L604	6.37	-.44	-1.45	.48	1.27	7.83	-1.27	-2.79	.73	1.45	1SA	*	L604
L606	7.06	.24	.81	.31	.83	9.14	.03	.07	.36	.71	1SP	G	L606
L610	6.58	-.24	-.78	.50	1.34	8.90	-.21	-.46	.43	.86	1SA	C	L610
L622	6.40	-.41	-1.36	.34	.90	8.87	-.24	-.52	.54	1.07	1SC	C	L622
L650	7.28	.47	1.55	.41	1.10	9.84	.74	1.63	.49	.98	1SG	G	L650
L652	6.53	-.28	-.93	.39	1.05	8.92	-.18	-.40	.79	1.55	1SA	G	L652
L676	7.10	.29	.95	.54	1.44	9.73	.62	1.37	.52	1.04	1SA	G	L676
L684	6.84	.03	.10	.31	.81	9.58	.48	1.06	.36	.72	1SW	C	L684
L685	6.65	-.17	-.55	.30	.79	9.06	-.04	-.09	.32	.62	1SA	C	L685
L702	4.47	-2.34	-7.73	.29	.76	5.88	-3.22	-7.07	.48	.94	1SP	#	L702
L730	6.54	-.28	-.91	.37	.97	9.08	-.02	-.05	.65	1.29	1SA	G	L730
L735	6.68	-.13	-.43	.29	.77	8.81	-.29	-.65	.30	.60	1SA	G	L735
L737A	6.66	-.15	-.50	.41	1.08	9.01	-.09	-.20	.42	.82	1SA	G	L737A
L737B	7.26	.45	1.47	.57	1.52	9.30	.20	.44	.90	1.78	1SA	G	L737B

GR. MEAN = 6.81 KILONEWTON/M — GRAND MEAN = 9.10 KILONEWTON/M — TEST DETERMINATIONS = 20
SD MEANS = .30 KILONEWTON/M — SD OF MEANS = .46 KILONEWTON/M — 57 LABS IN GRAND MEANS
AVERAGE SDR = .38 KILONEWTON/M — AVERAGE SDR = .51 KILONEWTON/M
GR. MEAN = 38.90 LB/INCH — GRAND MEAN = 51.99 LB/INCH

L250I	6.26	-.55	-1.82	.21	.58	8.44	-.66	-1.45	.28	.55	1SL	*	L250I
L251	5.68	-1.13	-3.74	.38	1.00	7.48	-1.63	-3.57	.80	1.58	1SI	*	L251

TOTAL NUMBER OF LABORATORIES REPORTING = 61

Best values: G18 6.8 ± 0.5 kilonewton per meter
G24 9.1 ± 0.8 kilonewton per meter

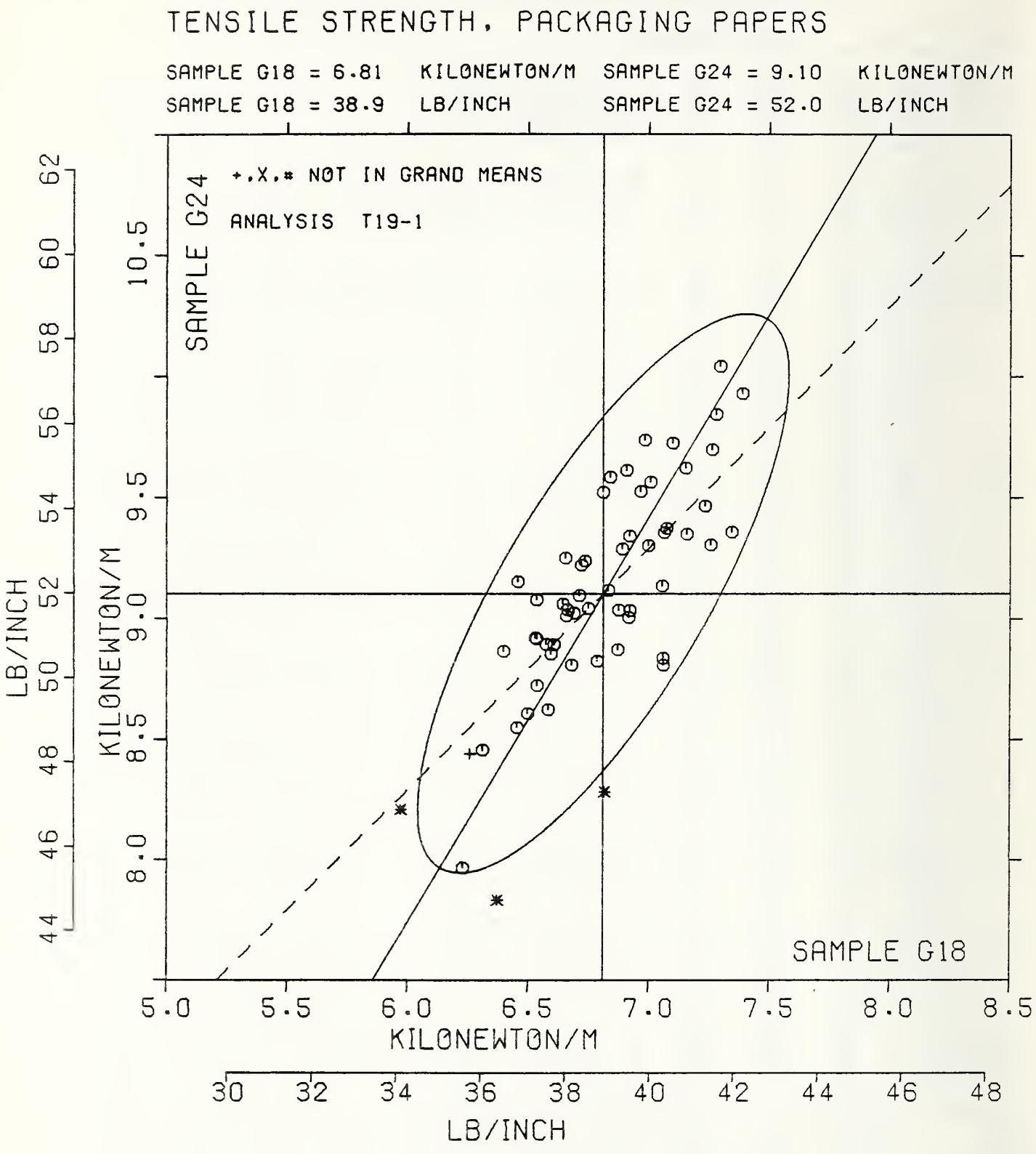
Data from the following laboratories appear to be off by a multiplicative factor: 268A, 702

ANALYSIS 719-1 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PACKAGING PAPERS

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

LAB CODE	F	MEANS G18	MEANS G24	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L268A	#	1.27	1.62	-9.26	.93	.16	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L702	#	4.47	5.88	-3.97	.36	.85	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L251	*	5.68	7.48	-1.98	.14	1.29	19I	TENSILE STRENGTH, 31 TO 74 LB/IN, CRE, 20C, 65% RH
L318	#	5.97	8.21	-1.20	.26	.93	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L157I	@	6.23	7.97	-1.27	-.08	1.23	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L250I	*	6.26	8.44	-.85	.14	.55	19L	TENSILE STRENGTH, 31 TO 74 LB/IN, CRE, 20 C, 65% RH
L238A	@	6.31	8.46	-.81	.10	.91	19T	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L604	*	6.37	7.83	-1.32	-.27	1.36	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L622	@	6.40	8.87	-.41	.23	.99	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L280	@	6.46	8.55	-.66	.02	.83	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L324	@	6.46	9.15	-.14	.33	.99	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L278	@	6.50	8.61	-.59	.02	.89	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L652	@	6.53	8.92	-.30	.15	1.30	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L182I	@	6.53	8.92	-.30	.14	.97	19T	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L730	@	6.54	9.08	-.16	.23	1.13	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L243	@	6.54	8.72	-.47	.04	1.03	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L610	@	6.58	8.90	-.30	.10	1.10	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L100	@	6.58	8.62	-.53	-.05	.74	19E	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L575	@	6.60	8.86	-.32	.06	.68	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L182I	@	6.61	8.89	-.28	.07	1.02	19D	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L689	@	6.65	9.06	-.12	.12	.71	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L267	@	6.66	9.25	.05	.21	.98	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L737A	@	6.66	9.01	-.16	.09	.95	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L336	@	6.66	9.04	-.13	.09	1.01	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L735	@	6.68	8.81	-.32	-.04	.69	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L126	@	6.69	9.02	-.13	.06	.71	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L576	@	6.71	9.10	-.06	.08	.67	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L122	@	6.72	9.22	.06	.14	1.05	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L106	@	6.74	9.24	.08	.14	.92	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L568	@	6.75	9.04	-.08	.02	1.00	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L268P	@	6.79	8.83	-.25	-.12	1.57	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L312	@	6.81	9.52	.36	.21	.89	19D	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L207	*	6.82	8.28	-.70	-.42	1.10	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L356	@	6.83	9.12	.02	-.01	1.20	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L684	@	6.84	9.58	.43	.22	.77	19W	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L305	@	6.87	8.87	-.17	-.17	.88	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L217P	@	6.88	9.04	-.02	-.09	.96	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L334	@	6.89	9.29	.20	.03	1.01	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L237A	@	6.91	9.61	.49	.18	.80	19Q	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L565	@	6.92	9.01	-.03	-.14	1.03	19T	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L264A	@	6.92	9.34	.26	.03	.89	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L217A	@	6.92	9.04	-.00	-.13	.93	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L281	@	6.97	9.53	.44	.08	.99	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L554	@	6.98	9.74	.63	.18	.83	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L151	@	7.00	9.30	.27	-.06	1.09	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L219	@	7.01	9.57	.50	.07	1.21	19E	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L606	@	7.06	9.14	.15	-.19	.77	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L562	@	7.06	8.84	-.10	-.35	1.51	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L157A	@	7.06	8.81	-.13	-.37	.92	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L273	@	7.07	9.36	.35	-.09	1.09	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L107	@	7.07	9.37	.37	-.09	1.52	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L676	@	7.10	9.73	.68	.07	1.24	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L264P	@	7.15	9.62	.62	-.03	.82	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L348	@	7.16	9.35	.39	-.17	.87	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L237B	@	7.24	9.47	.53	-.18	1.17	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L737B	@	7.26	9.30	.40	-.28	1.65	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L580	@	7.26	9.70	.74	-.08	.88	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L650	@	7.28	9.84	.88	-.02	1.04	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L581	@	7.30	10.04	1.05	.06	1.05	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L225	@	7.35	9.36	.49	-.33	.87	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L167	@	7.39	9.93	1.01	-.07	1.09	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
GMEANS:		6.81	9.10			1.00		
		95% ELLIPSE:		1.32	.43	WITH GAMMA = 59 DEGREES		


TENSILE STRENGTH, PACKAGING PAPERS
SAMPLE G18 = 6.81 KILONEWTON/M
SAMPLE G18 = 38.9 LB/INCH
SAMPLE G24 = 9.10 KILONEWTON/M
SAMPLE G24 = 52.0 LB/INCH
+,X,* NOT IN GRAND MEANS
ANALYSIS T19-1
SAMPLE G24
SAMPLE G18
KILONEWTON/M
LB/INCH
5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5
8.0 8.5 9.0 9.5 10.5
30 32 34 36 38 40 42 44 46 48
44 46 48 50 52 54 56 58 60 62

ANALYSIS T20-1 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	SAMPLE B96 MEAN	HEAT-SET OFFSET BOOK 93 GRAMS PER SQUARE METER DEV	N. DEV	SDR	R. SDR	SAMPLE G28 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER DEV	N. DEV	SDR	R. SDR	TEST D. = 20 VAR	F	LAB
L100	4.36	-.14	-.52	.17	.77	5.75	-.17	-.45	.29	1.02	20E	G	L100
L105	4.30	-.21	-.78	.27	1.25	6.02	.10	.27	.25	.88	20A	G	L105
L115	4.79	.29	1.08	.28	1.30	6.52	.61	1.58	.21	.75	20D	G	L115
L118	4.63	.13	.48	.15	.69	6.02	.10	.26	.24	.84	20A	G	L118
L122	4.51	.01	.03	.15	.67	5.87	-.05	-.12	.21	.74	20A	G	L122
L124C	4.42	-.08	-.29	.29	1.34	5.81	-.10	-.27	.38	1.32	20A	G	L124C
L125	4.93	.43	1.60	.27	1.26	6.40	.48	1.26	.50	1.75	20C	G	L125
L131	4.95	.45	1.70	.20	.91	6.55	.63	1.64	.32	1.14	20E	G	L131
L141T	4.63	.13	.49	.17	.79	6.05	.13	.35	.22	.77	20A	G	L141T
L143	5.20	.69	2.61	.28	1.26	6.91	.99	2.59	.27	.94	20E	*	L143
L148	4.68	.18	.68	.21	.98	5.85	-.07	-.18	.23	.81	20A	G	L148
L159	4.46	-.04	-.15	.25	1.14	5.94	.02	.05	.24	.86	20A	G	L159
L163	4.53	.02	.09	.20	.91	6.06	.14	.38	.22	.76	20D	G	L163
L167	4.93	.43	1.63	.13	.62	6.35	.44	1.14	.36	1.25	20G	G	L167
L176	4.13	-.37	-1.40	.26	1.17	5.26	-.66	-1.72	.43	1.50	20G	G	L176
L185	4.70	.20	.75	.20	.92	6.02	.11	.28	.32	1.12	20C	G	L185
L190R	4.46	-.04	-.14	.11	.52	5.64	-.28	-.73	.26	.92	20A	G	L190R
L211	3.79	-.71	-2.68	.39	1.79	4.72	-1.20	-3.12	.43	1.52	20C	*	L211
L223B	4.47	-.04	-.13	.21	.96	5.77	-.14	-.38	.48	1.69	20A	G	L223B
L226C	4.56	.06	.21	.15	.68	6.03	.12	.30	.37	1.30	20C	G	L226C
L230	4.33	-.18	-.66	.12	.53	5.63	-.29	-.75	.22	.78	20G	G	L230
L243	4.41	-.09	-.34	.16	.72	5.85	-.06	-.16	.20	.71	20A	G	L243
L255	4.35	-.15	-.58	.29	1.33	5.87	-.04	-.11	.24	.85	20A	G	L255
L260	4.58	.07	.28	.20	.90	6.04	.12	.32	.24	.85	20A	G	L260
L261	4.09	-.41	-1.56	.35	1.58	5.39	-.52	-1.37	.42	1.46	20A	G	L261
L291	4.21	-.29	-1.10	.30	1.37	5.68	-.24	-.62	.33	1.14	20A	G	L291
L309	4.68	.18	.66	.27	1.22	6.09	.17	.45	.26	.91	20E	G	L309
L315	4.26	-.25	-.92	.24	1.11	5.63	-.29	-.76	.27	.96	20A	G	L315
L318	4.15	-.35	-1.31	.11	.51	5.44	-.48	-1.26	.22	.77	20G	G	L318
L325	4.38	-.12	-.45	.21	.98	5.49	-.43	-1.11	.25	.89	20E	G	L325
L328	4.73	.23	.85	.21	.94	6.19	.27	.71	.28	.98	20A	G	L328
L333	4.77	.27	1.01	.19	.88	6.25	.33	.87	.32	1.11	20A	G	L333
L356	4.41	-.09	-.34	.17	.79	5.69	-.22	-.58	.21	.73	20A	G	L356
L360	6.24	1.74	6.53	.29	1.33	4.65	-1.26	-3.30	.49	1.71	20B	#	L360
L386	4.49	-.01	-.02	.18	.83	5.92	-.00	-.00	.30	1.07	20E	G	L386
L442	4.10	-.40	-1.49	.17	.76	5.59	-.32	-.84	.20	.70	20G	G	L442
L558	.92	-3.58	-13.46	.04	.18	1.14	-4.77	-12.46	.06	.22	20A	#	L558
L563	4.27	-.23	-.86	.15	.68	5.87	-.05	-.13	.21	.74	20A	G	L563
L567	4.43	-.07	-.27	.17	.79	5.70	-.21	-.56	.28	.99	20A	G	L567
L574	4.67	.17	.62	.19	.89	6.09	.17	.45	.30	1.05	20A	G	L574
L575	4.49	-.01	-.05	.19	.87	5.87	-.05	-.13	.19	.66	20G	G	L575
L592	4.39	-.11	-.42	.15	.67	5.86	-.06	-.15	.23	.79	20A	G	L592
L616	4.57	.07	.27	.26	1.18	5.85	-.07	-.18	.39	1.38	20D	G	L616
L692	4.76	.26	.98	.21	.97	6.08	.16	.42	.23	.80	20A	G	L692
L698	4.70	.20	.76	.25	1.14	6.11	.20	.52	.30	1.04	20E	G	L698
L706	4.38	-.12	-.45	.63	2.87	6.08	.16	.42	.46	1.61	20E	G	L706
L734	4.82	.32	1.21	.18	.83	6.95	1.04	2.70	.34	1.20	20E	X	L734
L736	4.45	-.05	-.18	.23	1.05	5.86	-.05	-.14	.21	.73	20A	G	L736
L738	4.22	-.28	-1.07	.34	1.55	5.58	-.34	-.89	.25	.87	20A	G	L738
L743	2.04	-2.46	-9.26	.09	.43	2.67	-3.25	-8.47	.17	.59	20C	#	L743
L744	4.87	.37	1.39	.37	1.72	6.86	.94	2.46	.20	.71	20A	*	L744
GR. MEAN =	4.50 KILONEWTON/M					GRAND MEAN =	5.92 KILONEWTON/M				TEST DETERMINATIONS =		20
SD MEANS =	.27 KILONEWTON/M					SD OF MEANS =	.38 KILONEWTON/M				47 LABS IN GRAND MEANS		
	AVERAGE SDR =	.22 KILONEWTON/M					AVERAGE SDR =	.28 KILONEWTON/M					
GR. MEAN =	15.181 LB/15 MM					GRAND MEAN =	19.958 LB/15 MM						
L139	4.63	.13	.48	.15	.71	6.05	.13	.34	.32	1.14	20H	*	L139
L250I	4.07	-.43	-1.64	.08	.37	5.41	-.51	-1.33	.13	.46	20L	*	L250I
L251	3.67	-.83	-3.14	.27	1.23	4.89	-1.03	-2.65	.51	1.80	20I	*	L251
L705	12.32	7.82	29.44	1.25	5.72	15.82	9.91	25.86	1.32	4.64	20X	*	L705

TOTAL NUMBER OF LABORATORIES REPORTING = 55

Best values: B96 4.5 ± 0.4 kilonewton per meter
G28 5.9 ± 0.6 kilonewton per meter

The following laboratories appear to have interchanged samples: 360

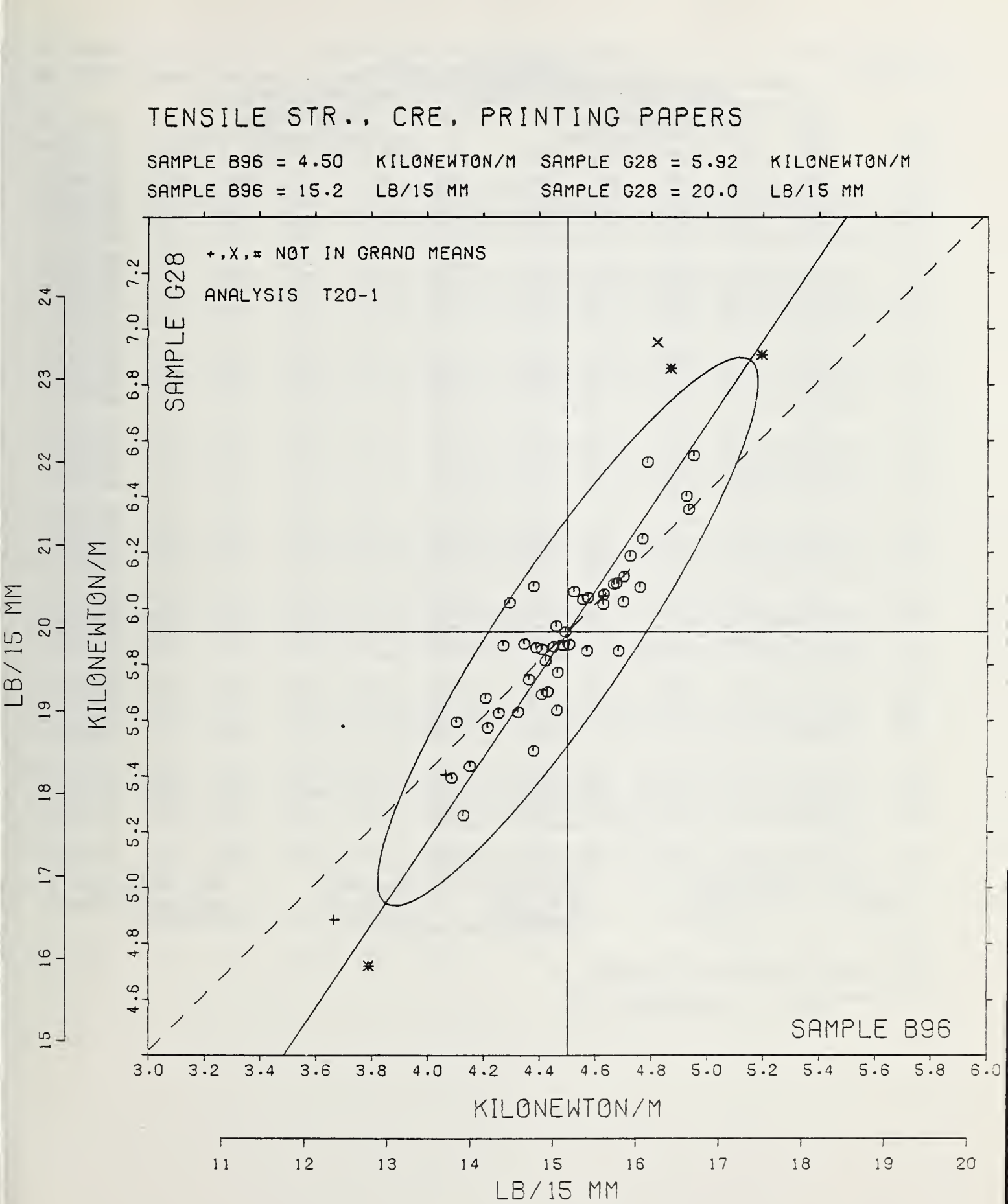
Data from the following laboratories appear to be off by a multiplicative factor: 558, 743

ANALYSIS T20-1 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS B96	MEANS G28	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L558	#	.92	1.14	-5.96	.31	.20	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L743	#	2.04	2.67	-4.07	.24	.51	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L251	*	3.67	4.89	-1.32	.12	1.52	20I	TENSILE STRENGTH, 14 TO 40 LB/IN, CRE, 20 C, 65% RH
L211	#	3.79	4.72	-1.39	-.07	1.66	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L250I	*	4.07	5.41	-.67	.08	.42	20L	TENSILE STRENGTH, 14 TO 40 LB/IN, CRE, 20 C, 65% RH
L261	@	4.09	5.39	-.67	.05	1.52	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L442	@	4.10	5.59	-.49	.15	.73	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L176	@	4.13	5.26	-.75	-.06	1.33	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L318	@	4.15	5.44	-.59	.02	.64	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L291	@	4.21	5.68	-.36	.11	1.26	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L738	@	4.22	5.58	-.44	.05	1.21	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L315	@	4.26	5.63	-.38	.04	1.03	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L563	@	4.27	5.87	-.17	.16	.71	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L105	@	4.30	6.02	-.03	.23	1.07	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L230	@	4.33	5.63	-.34	-.01	.65	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L255	@	4.35	5.87	-.12	.10	1.09	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L100	@	4.36	5.75	-.22	.02	.90	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L325	@	4.38	5.49	-.42	-.14	.93	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L706	@	4.38	6.08	.07	.19	2.24	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L592	@	4.39	5.86	-.11	.06	.73	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L356	@	4.41	5.69	-.24	-.05	.76	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L243	@	4.41	5.85	-.10	.04	.71	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L124C	@	4.42	5.81	-.13	.01	1.33	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L567	@	4.43	5.70	-.22	-.06	.89	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L736	@	4.45	5.86	-.07	.01	.89	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L159	@	4.46	5.94	-.00	.04	1.00	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L190R	@	4.46	5.64	-.25	-.13	.72	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L223B	@	4.47	5.77	-.14	-.05	1.32	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L575	@	4.49	5.87	-.05	-.02	.77	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L386	@	4.49	5.92	-.00	.00	.95	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L122	@	4.51	5.87	-.03	-.03	.71	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L163	@	4.53	6.06	.13	.06	.84	20D	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L226C	@	4.56	6.03	.13	.02	.99	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L616	@	4.57	5.85	-.02	-.10	1.28	20D	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L260	@	4.58	6.04	.14	.01	.87	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L139	*	4.63	6.05	.18	-.04	.92	20B	TENSILE STRENGTH, 14 TO 40 LB/IN, CRE, SHORT TEST SPAN
L118	@	4.63	6.02	.15	-.05	.76	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L141T	@	4.63	6.05	.18	-.03	.78	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L574	@	4.67	6.09	.23	-.04	.97	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L309	@	4.68	6.09	.24	-.05	1.06	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L148	@	4.68	5.85	.04	-.19	.89	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L185	@	4.70	6.02	.20	-.11	1.02	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L698	@	4.70	6.11	.28	-.06	1.09	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L328	@	4.73	6.19	.35	-.04	.96	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L692	@	4.76	6.08	.28	-.13	.89	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L333	@	4.77	6.25	.43	-.04	.99	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L115	@	4.79	6.52	.66	.10	1.02	20D	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L734	X	4.82	6.95	1.04	.31	1.02	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L744	*	4.87	6.86	.99	.22	1.21	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L125	@	4.93	6.40	.64	-.09	1.50	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L167	@	4.93	6.35	.60	-.12	.93	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L131	@	4.95	6.55	.77	-.02	1.02	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L143	*	5.20	6.91	1.21	-.03	1.10	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L360	#	6.24	4.65	-.08	-2.15	1.52	20B	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L705	*	12.32	15.82	12.59	-.99	5.18	20X	TENSILE STRENGTH, 14 TO 40 LB/IN: ( )PENDULUM,( )LOAD CELL
GMEANS:		4.50	5.92			1.00		
		95% ELLIPSE:		1.17	.24	WITH GAMMA = 56 DEGREES		


TENSILE STR., CRE, PRINTING PAPERS
SAMPLE B96 = 4.50 KILONEWTON/M SAMPLE G28 = 5.92 KILONEWTON/M
SAMPLE B96 = 15.2 LB/15 MM SAMPLE G28 = 20.0 LB/15 MM
+,X,* NOT IN GRAND MEANS
ANALYSIS T20-1
SAMPLE G28
KILONEWTON/M
LB/15 MM
SAMPLE B96
KILONEWTON/M
LB/15 MM

ANALYSIS T20-2 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS

TAPPI OFFICIAL TEST METHOD T404 OS-76, PENDULUM-TYPE TESTER

LAB CODE	SAMPLE B96 MEAN	HEAT-SET OFFSET BOOK 93 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	SAMPLE G28 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	TEST D.* 20 VAR	F	LAB
L103	4.64	.05	.25	.15	.62	6.23	.27	.74	.20	.65	20R	G	L103
L108	5.00	.41	1.91	.23	.99	6.65	.70	1.90	.23	.77	20P	G	L108
L121	4.20	-.36	-1.79	.34	1.47	5.93	-.03	-.07	.36	1.18	20P	*	L121
L124P	4.58	-.01	-.04	.25	1.06	6.10	.14	.39	.28	.93	20P	G	L124P
L128	4.66	.07	.32	.19	.81	6.17	.21	.57	.26	.87	20T	G	L128
L148	4.38	-.21	-.96	.24	1.04	5.49	-.47	-1.27	.34	1.12	20P	G	L148
L153	4.83	.24	1.10	.20	.87	6.32	.36	.99	.29	.97	20P	G	L153
L162	4.51	-.08	-.39	.26	1.11	6.17	.21	.58	.26	.86	20V	G	L162
L182L	4.48	-.11	-.52	.20	.85	5.98	.02	.07	.27	.88	20T	G	L182L
L183	4.59	-.00	-.01	.24	1.05	6.08	.13	.35	.36	1.21	20P	G	L183
L189	4.72	.13	.60	.22	.93	6.18	.23	.62	.31	1.03	20R	G	L189
L191P	4.52	-.07	-.34	.24	1.04	5.96	.00	.01	.15	.49	20P	G	L191P
L195	4.71	.12	.57	.27	1.14	5.93	-.02	-.07	.44	1.45	20R	G	L195
L212	4.44	-.15	-.69	.21	.91	5.55	-.41	-1.11	.55	1.83	20R	G	L212
L213	4.48	-.11	-.53	.18	.78	5.49	-.47	-1.28	.28	.92	20T	G	L213
L218	4.59	-.00	-.01	.15	.66	6.12	.16	.44	.18	.58	20P	G	L218
L233	4.59	.00	.01	.24	1.01	5.57	-.39	-1.06	.43	1.42	20Q	G	L233
L234	4.57	-.02	-.08	.16	.70	5.97	.02	.05	.17	.56	20P	G	L234
L241	4.91	.32	1.46	.30	1.29	6.20	.25	.68	.37	1.23	20R	G	L241
L242	4.23	-.36	-1.66	.15	.64	5.50	-.45	-1.22	.26	.87	20Y	G	L242
L249	4.84	.25	1.15	.17	.74	6.14	.19	.51	.16	.53	20P	G	L249
L259	4.74	.15	.70	.21	.88	6.35	.40	1.08	.25	.82	20P	G	L259
L262	4.80	.21	.97	.27	1.15	6.26	.31	.84	.36	1.21	20R	G	L262
L275	4.23	-.36	-1.66	.24	1.04	5.43	-.53	-1.44	.34	1.14	20R	G	L275
L279P	4.78	.19	.90	.30	1.28	6.30	.35	.95	.36	1.21	20P	G	L279P
L285	4.10	-.49	-2.28	.27	1.17	5.00	-.95	-2.59	.33	1.09	20P	*	L285
L290	4.42	-.17	-.78	.20	.88	5.32	-.64	-1.73	.55	1.83	20P	G	L290
L311	4.64	.05	.24	.12	.50	5.93	-.03	-.07	.27	.88	20V	G	L311
L313	4.55	-.04	-.18	.16	.70	5.86	-.09	-.25	.23	.78	20T	G	L313
L321	4.42	-.17	-.80	.25	1.07	5.67	-.28	-.77	.28	.92	20Q	G	L321
L330	4.50	-.09	-.42	.45	1.93	6.17	.21	.58	.31	1.03	20P	G	L330
L337	4.44	-.15	-.69	.51	2.19	5.94	-.02	-.05	.28	.94	20V	G	L337
L356	4.71	.12	.57	.26	1.10	6.24	.28	.76	.28	.93	20P	G	L356
L366	4.60	.01	.05	.32	1.36	5.93	-.02	-.06	.41	1.35	20P	G	L366
L393	4.59	.00	.01	.16	.67	5.85	-.11	-.29	.22	.71	20P	G	L393
L484	4.31	-.28	-1.32	.20	.88	5.53	-.42	-1.15	.23	.74	20U	G	L484
L556	4.96	.37	1.69	.35	1.48	5.90	-.05	-.15	.50	1.67	20P	*	L556
L571	4.87	.28	1.30	.50	2.15	6.88	.93	2.53	.26	.86	20P	*	L571
L626	4.69	.10	.48	.24	1.02	5.99	.04	.11	.34	1.13	20T	G	L626
L680	4.63	.04	.20	.20	.85	5.70	-.25	-.69	.45	1.49	20R	G	L680
L685	4.34	-.25	-1.15	.26	1.10	5.70	-.25	-.69	.23	.76	20Y	G	L685
L714	4.98	.39	1.81	.28	1.20	6.41	.46	1.25	.28	.94	20P	G	L714

GR. MEAN = 4.59 KILONEWTON/M GRAND MEAN = 5.95 KILONEWTON/M TEST DETERMINATIONS = 20

SD MEANS = .22 KILONEWTON/M SD OF MEANS = .37 KILONEWTON/M 42 LABS IN GRAND MEANS

AVERAGE SDR = .23 KILONEWTON/M AVERAGE SDR = .30 KILONEWTON/M

GR. MEAN =15.481 LB/15 MM GRAND MEAN =20.082 LB/15 MM

L599	1.53	-3.06	-14.13	.09	.37	2.03	-3.93	-10.69	.14	.47	20E	*	L599

TOTAL NUMBER OF LABORATORIES REPORTING = 43

Best values: B96 4.6 ± 0.3 kilonewton per meter
G28 5.9 ± 0.6 kilonewton per meter

ANALYSIS T20-2 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS

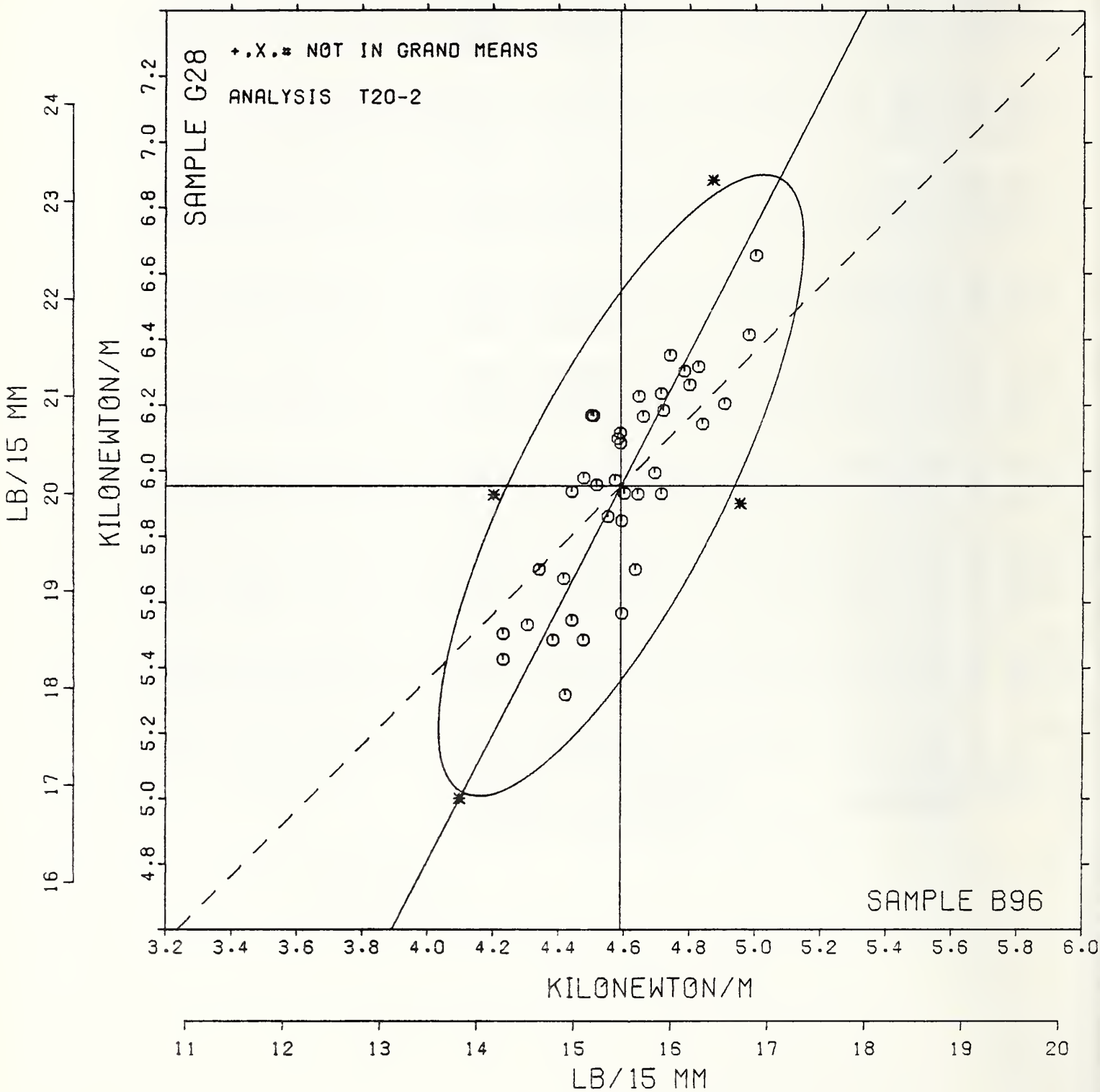
TAPPI OFFICIAL TEST METHOD T404 OS-76, PENDULUM-TYPE TESTER

LAB CODE	F	MEANS B96	MEANS G28	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L599	*	1.53	2.03	-4.89	.92	.42	20B	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L285	*	4.10	5.00	-1.07	.00	1.13	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L121	*	4.20	5.93	-.20	.33	1.32	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L242	6	4.23	5.50	-.56	.11	.76	20Y	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L275	6	4.23	5.43	-.63	.08	1.09	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L484	6	4.31	5.53	-.51	.06	.81	20U	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L685	6	4.34	5.70	-.34	.11	.93	20Y	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L148	6	4.38	5.49	-.51	-.03	1.08	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L321	6	4.42	5.67	-.33	.03	1.00	20Q	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L290	6	4.42	5.32	-.64	-.14	1.36	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L212	6	4.44	5.55	-.43	-.05	1.37	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L337	6	4.44	5.54	-.08	.12	1.56	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L213	6	4.48	5.49	-.47	-.11	.85	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L182L	6	4.48	5.58	-.03	-.11	.87	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L330	6	4.50	6.17	.15	.18	1.48	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L162	6	4.51	6.17	.15	.17	.98	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L191P	6	4.52	5.96	-.03	.07	.77	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L313	6	4.55	5.86	-.10	-.01	.74	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L234	6	4.57	5.97	.01	.02	.63	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L124P	6	4.58	6.10	.12	.07	.99	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L218	6	4.59	6.12	.14	.08	.62	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L183	6	4.59	6.08	.12	.06	1.13	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L393	6	4.59	5.85	-.09	-.05	.69	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L233	6	4.59	5.57	-.34	-.18	1.22	20Q	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L366	6	4.60	5.93	-.02	-.02	1.35	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L680	6	4.63	5.70	-.21	-.16	1.17	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L311	6	4.64	5.93	.00	-.06	.69	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L103	6	4.64	6.23	.27	.08	.64	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L128	6	4.66	6.17	.22	.04	.84	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L626	6	4.69	5.99	.08	-.07	1.07	20I	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L356	6	4.71	6.24	.31	.02	1.01	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L195	6	4.71	5.93	.04	-.12	1.29	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L189	6	4.72	6.18	.26	-.01	.98	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L259	6	4.74	6.35	.42	.05	.85	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L279P	6	4.78	6.30	.40	-.01	1.25	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L262	6	4.80	6.26	.37	-.05	1.18	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L153	6	4.83	6.32	.43	-.05	.92	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L249	6	4.84	6.14	.28	-.14	.64	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L571	*	4.87	6.88	.95	.18	1.51	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L241	6	4.91	6.20	.37	-.17	1.26	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L556	*	4.96	5.90	.12	-.35	1.57	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L714	6	4.98	6.41	.59	-.14	1.07	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L108	6	5.00	6.65	.81	-.05	.88	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
GMEANS:		4.59	5.95			1.00		
		95% ELLIPSE:		1.05	.31	WITH GAMMA = 62 DEGREES		

TENSILE STR., PENDULUM, PRINTING P.

SAMPLE B96 = 4.59 KILONEWTON/M SAMPLE G28 = 5.95 KILONEWTON/M

SAMPLE B96 = 15.5 LB/15 MM SAMPLE G28 = 20.1 LB/15 MM



ANALYSIS T25-1 TABLE 1

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	SAMPLE G18 BUFF MANILA ENVELOPE 118 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE G24 PRINTING 105 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST L.= 20 VAR	F	LAB
L106	73.2	3.3	.62	8.3	.96	88.3	5.7	.67	11.4	1.09	2SF	G	L106
L122	75.4	5.5	1.04	11.7	1.37	90.7	8.1	.94	13.2	1.26	2SF	G	L122
L126	71.3	1.5	.28	9.6	1.12	82.6	.0	.00	8.5	.81	2SG	G	L126
L151	68.5	-1.4	-.26	10.3	1.20	82.7	.2	.02	12.0	1.14	2SF	G	L151
L182	65.1	-4.8	-.90	10.7	1.24	75.8	-6.7	-.78	13.0	1.24	2SB	G	L182
L207	67.8	-2.1	-.40	9.0	1.04	66.3	-16.3	-1.89	11.7	1.12	2SF	G	L207
L219	71.1	1.2	.22	6.6	.77	85.2	2.6	.31	14.1	1.34	2SJ	G	L219
L234	78.1	8.3	1.56	8.5	.99	99.9	17.3	2.01	13.2	1.26	2SF	G	L234
L237B	71.5	1.6	.31	8.6	1.00	89.7	7.1	.83	15.8	1.51	2SB	G	L237B
L243	64.3	-5.5	-1.05	8.3	.96	34.3	-48.2	-5.60	4.5	.43	2SZ	#	L243
L264	67.6	-2.3	-.44	7.2	.84	73.8	-8.7	-1.01	5.3	.50	2SF	G	L264
L267	64.6	-5.3	-.99	9.5	1.10	81.1	-1.4	-.17	7.8	.74	2SF	G	L267
L268	81.6	11.8	2.22	8.4	.98	102.0	19.4	2.26	10.4	.99	2SE	G	L268
L273	74.0	4.1	.78	9.1	1.06	85.7	3.2	.37	10.9	1.04	2SF	G	L273
L278	71.7	1.8	.34	6.6	.77	82.8	.2	.03	11.9	1.14	2SE	G	L278
L280	74.7	4.9	.92	6.6	.77	84.0	1.5	.18	11.3	1.07	2SE	G	L280
L312	64.3	-5.5	-1.04	7.6	.88	85.1	2.6	.30	7.8	.75	2SJ	G	L312
L318	70.5	.7	.13	8.5	.99	81.4	-1.1	-.13	8.3	.79	2SA	G	L318
L580	71.4	1.5	.29	7.5	.88	83.7	1.1	.13	8.0	.77	2SC	G	L580
L676	60.0	-9.9	-1.87	9.0	1.05	77.1	-5.4	-.63	11.8	1.12	2SF	G	L676
L689	69.7	-.2	-.04	7.8	.91	79.7	-2.9	-.33	5.7	.55	2SF	G	L689
L735	70.4	.5	.10	6.2	.73	77.4	-5.1	-.59	6.9	.66	2SF	G	L735
L737A	64.2	-5.7	-1.07	9.4	1.09	73.4	-4.1	-.48	8.5	.81	2SE	G	L737A
L737B	60.2	-9.7	-1.83	10.8	1.26	65.0	-17.5	-2.03	13.7	1.31	2SE	G	L737B

GR. MEAN = 69.9 JOULES/SQ M — GRAND MEAN = 82.5 JOULES/SQ M — TEST DETERMINATIONS = 20

SD MEANS = 5.3 JOULES/SQ M — SD OF MEANS = 8.6 JOULES/SQ M — 23 LABS IN GRAND MEANS

AVERAGE SDR = 8.6 JOULES/SQ M — AVERAGE SDR = 10.5 JOULES/SQ M

GR. MEAN = 4.785 FT.LB/SQ FT — GRAND MEAN = 5.653 FT.LB/SQ FT

L250	71.7	1.9	.35	5.3	.62	81.9	-.6	-.07	7.4	.70	2SN	+	L250

TOTAL NUMBER OF LABORATORIES REPORTING = 25

Best values: G18 70 ± 9 joules per square meter
G24 83 ± 17 joules per square meter

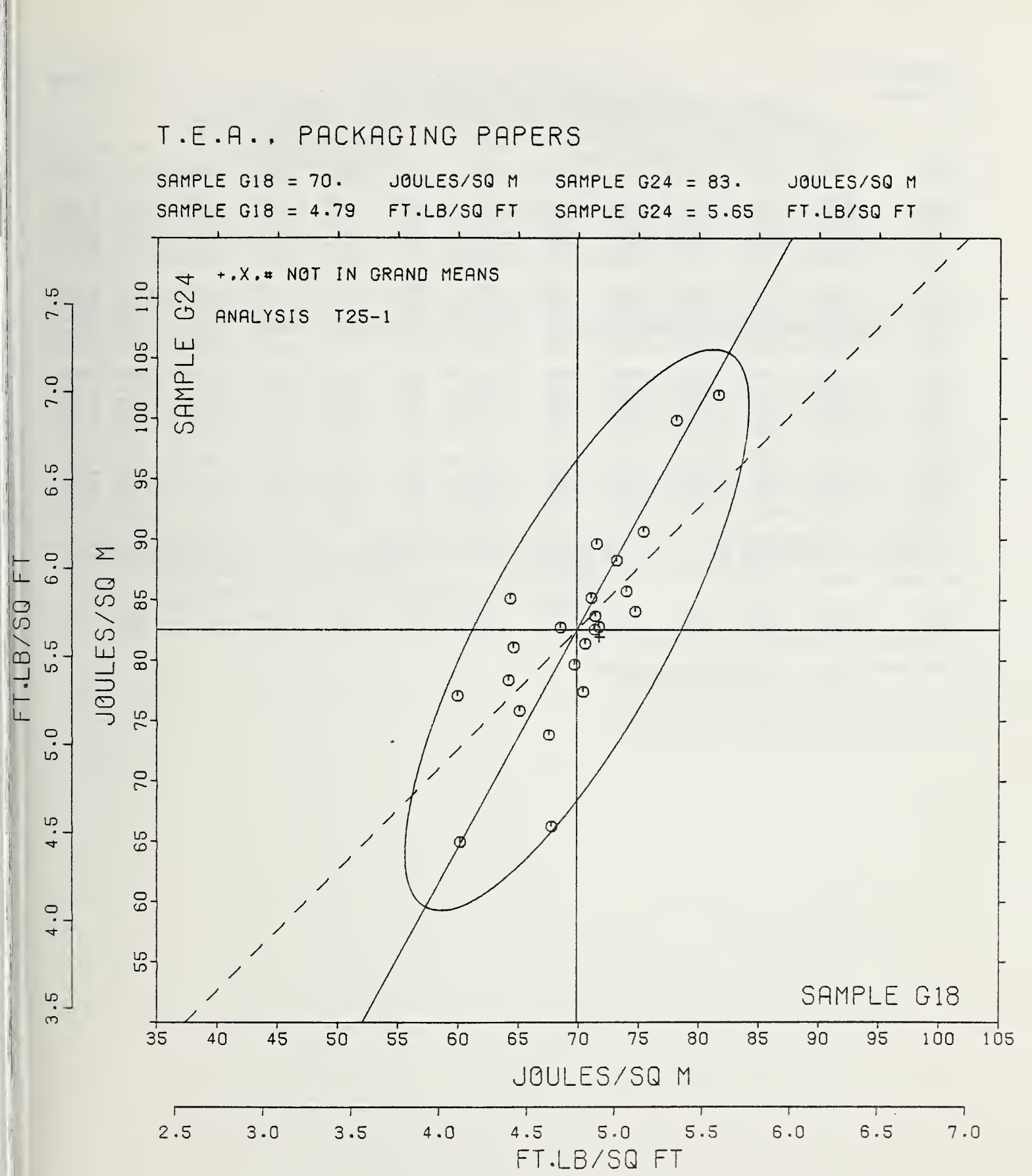
The following laboratories were omitted from the grand means because of extreme test results: 243

ANALYSIS T25-1 TABLE 2

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS G18	MEANS G24	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L676	6	60.0	77.1	-9.5	6.1	1.09	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L737B	6	60.2	65.0	-20.0	.1	1.28	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
L737A	6	64.2	78.4	-6.3	3.0	.95	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
L243	#	64.3	34.3	-45.0	-18.3	.70	25Z	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/LINE JAWS
L312	6	64.3	85.1	-.4	6.1	.81	25J	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L267	6	64.6	81.1	-3.8	3.9	.92	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L182	6	65.1	75.8	-8.2	1.0	1.24	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L264	6	67.6	73.8	-8.7	-2.2	.67	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L207	6	67.8	66.3	-15.3	-6.0	1.08	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L151	6	68.5	82.7	-.5	1.3	1.17	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L689	6	69.7	79.7	-2.6	-1.2	.73	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L735	6	70.4	77.4	-4.2	-2.9	.69	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L318	6	70.5	81.4	-.7	-1.1	.89	25A	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
L219	6	71.1	85.2	2.9	.2	1.05	25J	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L126	6	71.3	82.6	.7	-1.3	.97	25G	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/LINE JAWS
L580	6	71.4	83.7	1.7	-.8	.82	25C	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/LINE JAWS
L237B	6	71.5	89.7	7.0	2.0	1.26	25H	TENSILE ENERGY ABSORPTION (WITH TEST T19),2-PIN STRAIN GAGE
L278	6	71.7	82.8	1.1	-1.5	.95	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
L250	*	71.7	81.9	.4	-1.9	.66	25N	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS,20C
L106	6	73.2	88.3	6.6	-.1	1.03	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L273	6	74.0	85.7	4.8	-2.1	1.05	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L280	6	74.7	84.0	3.7	-3.5	.92	25H	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L122	6	75.4	90.7	9.8	-.9	1.31	25P	TENSILE ENERGY ABSORPTION (WITH TEST T19),PATTERNED FLAT JAW
L234	6	78.1	99.9	19.2	1.1	1.12	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L268	6	81.6	102.0	22.7	-1.0	.98	25H	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
GMEANS:		69.9	82.5			1.00		
		95% ELLIPSE:		26.2	7.7	WITH GAMMA = 61 DEGREES		


T.E.A., PACKAGING PAPERS
SAMPLE G18 = 70. JOULES/SQ M
SAMPLE G18 = 4.79 FT.LB/SQ FT
SAMPLE G24 = 83. JOULES/SQ M
SAMPLE G24 = 5.65 FT.LB/SQ FT
+.X.* NOT IN GRAND MEANS
ANALYSIS T25-1
SAMPLE G24
JOULES/SQ M
FT.LB/SQ FT
SAMPLE G18
JOULES/SQ M
FT.LB/SQ FT

ANALYSIS 126-1 TABLE 1

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	SAMPLE B96 MEAN	HEAT-SET OFFSET BOOK 93 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G28 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 20 VAR	F	LAB
L100	37.5	-4.0	-1.21	4.7	.91	51.2	-7.1	-1.52	6.0	.93	26A	C	L100
L118	40.6	-.8	-.25	4.1	.80	56.0	-2.3	-.49	6.4	1.00	26E	C	L118
L122	43.7	2.3	.70	4.9	.95	61.2	3.0	.63	5.3	.82	26L	C	L122
L139	38.6	-2.8	-.86	4.8	.93	53.8	-4.4	-.95	8.8	1.36	26H	C	L139
L159	43.0	1.5	.47	7.4	1.44	57.6	-.7	-.15	7.9	1.22	26F	C	L159
L163	38.2	-3.2	-.98	4.8	.92	56.2	-2.1	-.45	5.4	.84	26J	C	L163
L167	49.3	7.9	2.40	1.3	.26	63.5	5.3	1.13	3.6	.55	26D	C	L167
L185	41.2	-.2	-.06	5.9	1.14	57.0	-1.2	-.27	8.8	1.37	26C	C	L185
L211	445892.1445	850.7	********	44200.8	8576.89	644227.9	644169.6	********	63439.8	9846.21	26Z	#	L211
L255	39.6	-1.9	-.57	8.1	1.57	62.8	4.5	.97	8.4	1.30	26P	C	L255
L309	44.8	3.4	1.03	7.7	1.49	67.4	9.1	1.96	5.8	.91	26J	C	L309
L318	43.0	1.5	.46	3.1	.61	55.2	-3.1	-.65	5.5	.86	26A	C	L318
L356	42.4	1.0	.29	5.0	.96	61.9	3.7	.78	7.6	1.17	26A	C	L356
L393	37.8	-3.6	-1.10	3.8	.74	50.4	-7.9	-1.69	5.7	.88	26V	C	L393
L442	37.0	-4.4	-1.33	5.6	1.08	56.3	-1.9	-.41	6.5	1.01	26B	C	L442
L563	58.0	16.6	5.04	10.0	1.94	83.9	25.6	5.49	9.8	1.53	26C	#	L563
L567	28.8	-12.6	-3.82	4.1	.79	42.4	-15.8	-3.40	5.1	.79	26A	#	L567
L575	43.9	2.5	.74	5.6	1.08	61.8	3.6	.76	5.0	.78	26A	C	L575
L592	42.3	.9	.27	5.8	1.13	59.9	1.6	.35	6.4	1.00	26B	C	L592
L744	26.6	-14.9	-4.52	3.4	.66	36.7	-21.6	-4.62	7.2	1.12	26E	#	L744

GR. MEAN = 41.4 JOULES/SQ M GRAND MEAN = 58.3 JOULES/SQ M TEST DETERMINATIONS = 20

SD MEANS = 3.3 JOULES/SQ M SD OF MEANS = 4.7 JOULES/SQ M 16 LABS IN GRAND MEANS

AVERAGE SDR = 5.2 JOULES/SQ M AVERAGE SDR = 6.4 JOULES/SQ M

GR. MEAN = 2.838 FT.LB/SQ FT GRAND MEAN = 3.992 FT.LB/SQ FT

L250	43.6	2.2	.67	2.9	.55	57.0	-1.3	-.28	3.9	.60	26N	*	L250
L738	57.1	15.7	4.77	8.0	1.55	79.0	20.7	4.44	8.6	1.34	26I	*	L738

TOTAL NUMBER OF LABORATORIES REPORTING = 22

Best values: B96 42 ± 5 joules per square meter
G28 57 ± 6 Joules per square meter

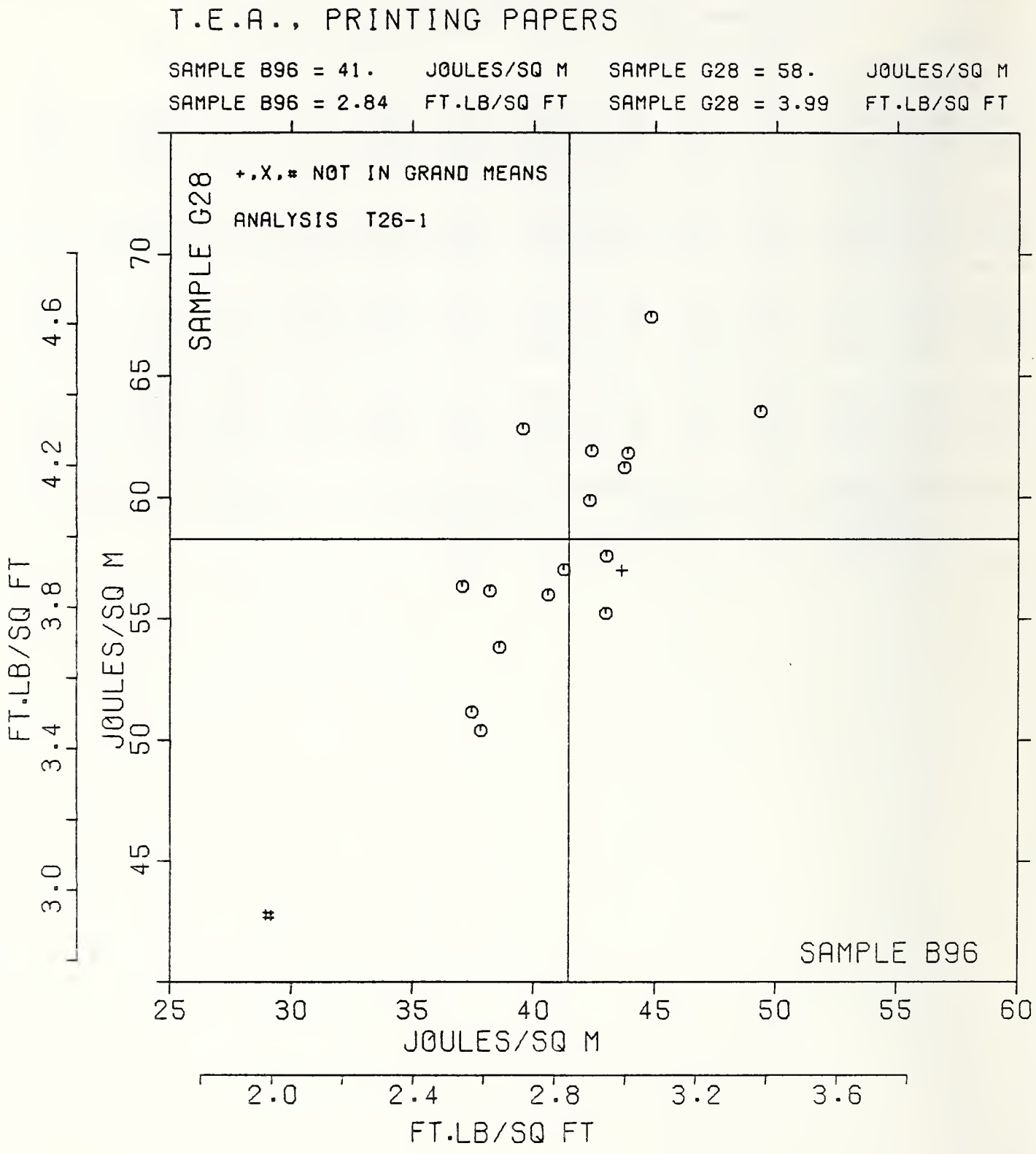
Data from the following laboratories appear to be off by a multiplicative factor: 211, 563, 567, 744

ANALYSIS T26-1 TABLE 2

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS B96	G28	COORDINATES MAJOR	MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L744	#	26.6	36.7	-26.2	1.2	.89	26E	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L567	#	28.8	42.4	-20.1	2.3	.79	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L442	G	37.0	56.3	-4.0	2.7	1.04	26B	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L100	G	37.5	51.2	-8.1	-.4	.92	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L393	G	37.8	50.4	-8.6	-1.1	.81	26V	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L163	G	38.2	56.2	-3.5	1.6	.88	26J	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L139	G	38.6	53.8	-5.3	.1	1.15	26H	TENSILE ENERGY ABSORPTION (WITH TEST T20),2-PIN STRAIN GAGE
L255	G	39.6	62.8	2.9	4.0	1.43	26P	TENSILE ENERGY ABSORPTION (WITH TEST T20),PATTERNED FLAT JAW
L118	G	40.6	56.0	-2.4	-.5	.90	26E	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L185	G	41.2	57.0	-1.2	-.5	1.25	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
L592	G	42.3	59.9	1.8	.1	1.06	26H	TENSILE ENERGY ABSORPTION (WITH TEST T20),2-PIN STRAIN GAGE
L356	G	42.4	61.9	3.6	1.1	1.07	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L318	G	43.0	55.2	-1.8	-2.9	.73	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L159	G	43.0	57.6	.2	-1.7	1.33	26P	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L250	*	43.6	57.0	.1	-2.5	.58	26N	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS,20C
L122	G	43.7	61.2	3.7	-.4	.88	26L	TENSILE ENERGY ABSORPTION (WITH TEST T20),PATTERNED FLAT JAW
L575	G	43.9	61.8	4.3	-.2	.93	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L309	G	44.8	67.4	9.5	2.0	1.20	26J	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L167	G	49.3	63.5	8.7	-3.9	.41	26D	TENSILE ENERGY ABSORPTION (WITH TEST T20),2-PIN STRAIN GAGE
L738	*	57.1	79.0	25.9	-2.4	1.44	26X	TENSILE ENERGY ABSORPTION (WITH TEST T20): GIVE JAW TYPE
L563	#	58.0	83.9	30.5	-.6	1.73	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
L211	##########	##########	##########	92	11.55	26Z		TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
GMEANS:		41.4	58.3		1.00			
		95% ELLIPSE:		15.1	5.7	WITH GAMMA = 58 DEGREES		


T.E.A., PRINTING PAPERS
SAMPLE B96 = 41. JOULES/SQ M
SAMPLE B96 = 2.84 FT.LB/SQ FT
SAMPLE G28 = 58. JOULES/SQ M
SAMPLE G28 = 3.99 FT.LB/SQ FT
+,X,* NOT IN GRAND MEANS
ANALYSIS T26-1
SAMPLE G28
SAMPLE B96
JOULES/SQ M
FT.LB/SQ FT

ANALYSIS 728-1 TABLE 1

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

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

LAB CODE	SAMPLE G18 MEAN	BUFF MANILA ENVELOPE 118 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	SAMPLE G24 MEAN	PRINTING 105 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	TEST D. = 20 VAR	F	LAB
L100	1.560	-.095	-.75	.139	.98	1.370	-.192	-1.17	.066	.56	28A	G	L100
L106	1.795	.140	1.10	.115	.81	1.820	.258	1.57	.115	.99	28E	G	L106
L122	1.759	.104	.81	.168	1.18	1.610	.048	.29	.135	1.16	28F	C	L122
L126	1.583	-.072	-.56	.103	.72	1.448	-.114	-.69	.107	.92	28C	G	L126
L151	1.700	.045	.35	.178	1.25	1.700	.138	.84	.178	1.52	28B	C	L151
L182	1.545	-.110	-.86	.143	1.01	1.390	-.172	-1.05	.165	1.42	28B	G	L182
L234	1.685	.030	.23	.223	1.57	1.570	.008	.05	.134	1.15	28B	G	L234
L243	1.513	-.142	-1.11	.112	.79	1.288	-.274	-1.67	.092	.79	28C	C	L243
L264	1.695	.040	.31	.176	1.24	1.645	.083	.51	.193	1.66	28B	G	L264
L267	1.463	-.192	-1.51	.113	.79	1.415	-.147	-.90	.090	.77	28B	C	L267
L268	1.745	.090	.70	.150	1.06	1.815	.253	1.54	.135	1.16	28B	G	L268
L278	1.704	.049	.38	.123	.87	1.595	.033	.20	.122	1.05	28A	C	L278
L280	1.877	.222	1.74	.107	.75	1.682	.120	.73	.138	1.19	28B	C	L280
L312	1.670	.015	.12	.117	.83	1.655	.093	.57	.069	.59	28B	G	L312
L318	1.755	.100	.79	.164	1.15	1.668	.106	.65	.115	.99	28A	G	L318
L324	1.420	-.235	-1.85	.140	.99	1.385	-.177	-1.08	.099	.85	28F	G	L324
L336	1.652	-.003	-.02	.177	1.25	1.661	.099	.61	.116	.99	28A	G	L336
L580	1.580	-.075	-.59	.147	1.04	1.420	-.142	-.87	.083	.72	28C	C	L580
L581	1.598	-.057	-.44	.109	.77	1.549	-.013	-.08	.082	.71	28A	G	L581
L676	1.810	.155	1.21	.121	.85	1.840	.278	1.70	.119	1.02	28B	C	L676
L689	1.615	-.040	-.32	.176	1.24	1.460	-.102	-.62	.094	.81	28E	G	L689
L735	1.835	.180	1.41	.114	.80	1.630	.068	.41	.122	1.05	28B	G	L735
L737A	1.743	.088	.69	.148	1.04	1.611	.049	.30	.104	.89	28A	C	L737A
L737B	1.419	-.236	-1.85	.146	1.03	1.260	-.302	-1.84	.124	1.06	28A	G	L737B

GR. MEAN = 1.655 PERCENT GRAND MEAN = 1.562 PERCENT TEST DETERMINATIONS = 20

SD MEANS = .127 PERCENT SD OF MEANS = .164 PERCENT 24 LABS IN GRAND MEANS

AVERAGE SDR = .142 PERCENT AVERAGE SDR = .117 PERCENT

L730	1.560	-.095	-.75	.119	.83	1.478	-.084	-.51	.158	1.36	28X	*	L730
L739	1.515	-.140	-1.10	.088	.62	1.415	-.147	-.90	.075	.64	28X	*	L739

TOTAL NUMBER OF LABORATORIES REPORTING = 26

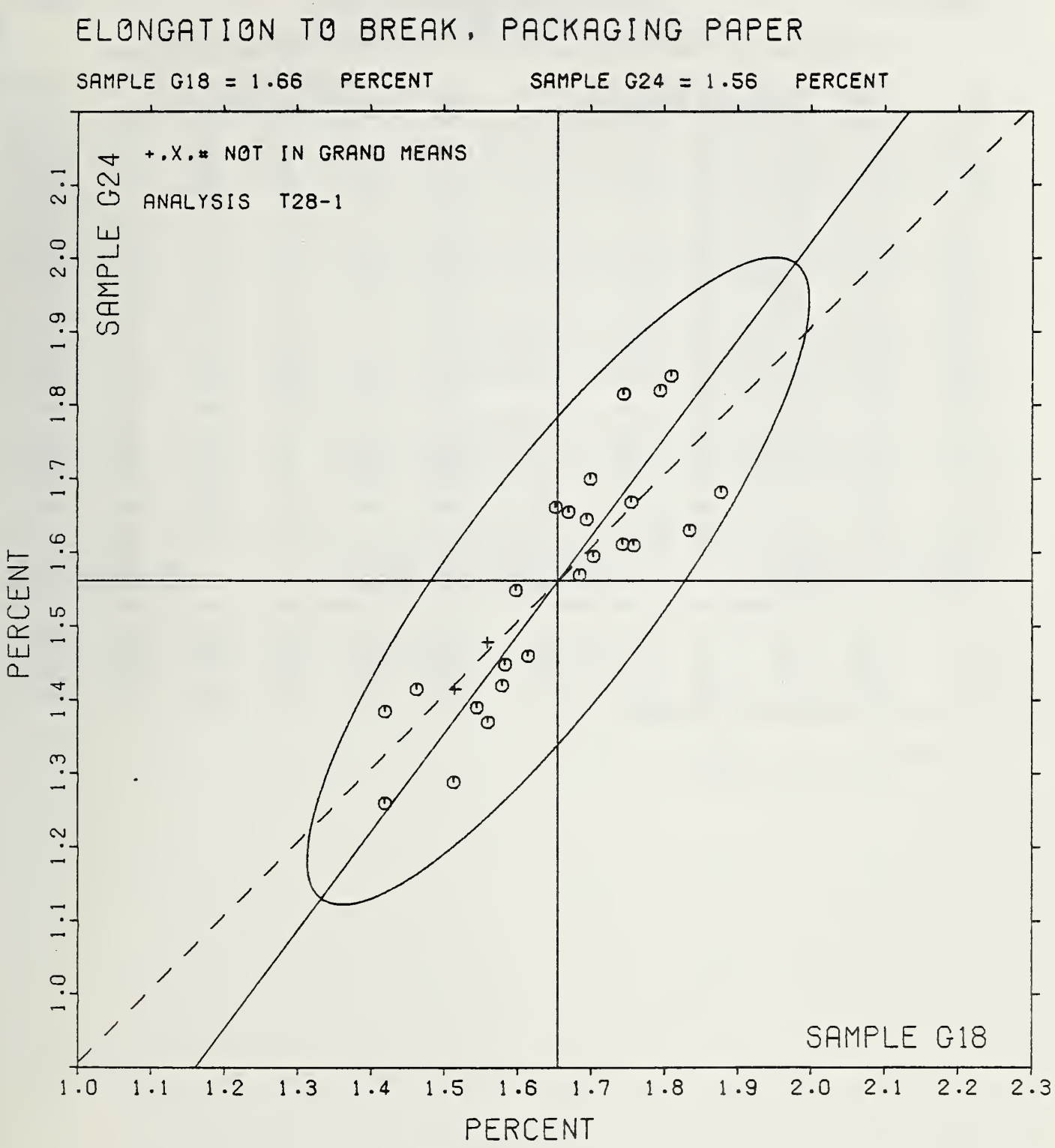
Best values: G18 1.7 ± 0.2 percent
G24 1.6 ± 0.3 percent

ANALYSIS T28-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

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

LAB CODE	F	MEANS G18	MEANS G24	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L737B	6	1.419	1.260	-.383	.008	1.04 28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L324	6	1.420	1.385	-.283	.082	.92 28P	ELONGATION (WITH TEST T19),LOAD CELL,PATTERNED FLAT JAWS
L267	6	1.463	1.415	-.233	.066	.78 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L243	6	1.513	1.288	-.304	-.050	.79 28C	ELONGATION (WITH TEST T19),LOAD CELL,LINE/LINE JAWS
L739	*	1.515	1.415	-.202	.024	.63 28X	ELONGATION (WITH TEST T19): GIVE INSTRUMENT & JAW TYPES
L182	6	1.545	1.390	-.204	-.015	1.21 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L730	*	1.560	1.478	-.124	.026	1.10 28X	ELONGATION (WITH TEST T19): GIVE INSTRUMENT & JAW TYPES
L100	6	1.560	1.370	-.211	-.039	.77 28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L580	6	1.580	1.420	-.155	-.025	.88 28C	ELONGATION (WITH TEST T19),LOAD CELL,LINE/LINE JAWS
L126	6	1.583	1.448	-.134	-.011	.82 28C	ELONGATION (WITH TEST T19),LOAD CELL,LINE/LINE JAWS
L581	6	1.598	1.549	-.044	.038	.74 28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L689	6	1.615	1.460	-.106	-.029	1.02 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L336	6	1.652	1.661	.078	.062	1.12 28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L312	6	1.670	1.655	.083	.044	.71 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L234	6	1.685	1.570	.024	-.019	1.36 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L264	6	1.695	1.645	.090	.018	1.45 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L151	6	1.700	1.700	.137	.047	1.39 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L278	6	1.704	1.595	.056	-.019	.96 28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L737A	6	1.743	1.611	.092	-.041	.97 28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L268	6	1.745	1.815	.256	.080	1.11 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L318	6	1.755	1.668	.145	-.017	1.07 28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L122	6	1.759	1.610	.101	-.054	1.17 28P	ELONGATION (WITH TEST T19),LOAD CELL,PATTERNED FLAT JAWS
L106	6	1.795	1.820	.290	.043	.90 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L676	6	1.810	1.840	.315	.042	.94 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L735	6	1.835	1.630	.162	-.103	.92 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L280	6	1.877	1.682	.230	-.106	.97 28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
GMEANS:		1.655	1.562			1.00	
		95% ELLIPSE:		.539	.142	WITH GAMMA = 53 DEGREES	


ELONGATION TO BREAK, PACKAGING PAPER
SAMPLE G18 = 1.66 PERCENT
SAMPLE G24 = 1.56 PERCENT
+.X.* NOT IN GRAND MEANS
ANALYSIS T28-1
SAMPLE G24
PERCENT
SAMPLE G18
PERCENT
1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3

ANALYSIS 729-1 TABLE 1

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

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

LAB CODE	SAMPLE B96 HEAT-SET OFFSET BOOK 93 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	SAMPLE G28 OFFSET PRINTING 94 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	TEST D. = 20 VAR	F	LAB
L100	1.330	-.095	-.62	.122	.93	1.430	-.133	-.83	.098	.81	29A	C	L100
L105	1.062	-.362	-2.35	.138	1.05	1.350	-.213	-1.33	.126	1.03	29A	*	L105
L118	1.464	.040	.26	.092	.71	1.611	.049	.30	.137	1.12	29A	C	L118
L122	1.522	.097	.63	.104	.80	1.654	.092	.57	.090	.74	29F	C	L122
L139	1.180	-.245	-1.59	.101	.77	1.260	-.303	-1.89	.150	1.24	29D	C	L139
L141T	1.284	-.140	-.91	.119	.91	1.385	-.177	-1.11	.095	.78	29D	C	L141T
L163	1.483	.058	.38	.137	1.05	1.569	.006	.04	.121	1.00	29E	C	L163
L176	1.460	.035	.23	.190	1.46	1.545	-.018	-.11	.182	1.50	29E	C	L176
L185	1.485	.060	.39	.153	1.17	1.545	-.018	-.11	.150	1.24	29C	C	L185
L190R	1.437	.013	.08	.086	.66	1.423	-.140	-.87	.116	.96	29A	C	L190R
L255	1.580	.155	1.01	.182	1.40	1.850	.287	1.79	.136	1.12	29F	C	L255
L309	1.599	.176	1.13	.158	1.21	1.895	.332	2.07	.115	.95	29A	C	L309
L318	1.667	.242	1.57	.105	.80	1.729	.167	1.04	.114	.94	29A	C	L318
L356	1.491	.067	.43	.123	.94	1.680	.118	.73	.144	1.18	29A	C	L356
L386	1.153	-.272	-1.77	.116	.89	1.367	-.195	-1.22	.098	.81	29A	C	L386
L442	1.425	.000	.00	.121	.92	1.590	.027	.17	.112	.92	29E	C	L442
L567	1.470	.045	.29	.155	1.19	1.582	.020	.12	.119	.98	29A	C	L567
L575	1.522	.098	.63	.116	.89	1.660	.097	.61	.083	.68	29A	C	L575
L592	1.580	.155	1.01	.177	1.35	1.660	.097	.61	.135	1.11	29D	C	L592
L698	1.355	-.070	-.45	.115	.88	1.505	-.058	-.36	.170	1.40	29C	C	L698
L736	1.370	-.055	-.36	.142	1.09	1.525	-.038	-.24	.064	.53	29A	C	L736
GR. MEAN =	1.425 PERCENT					GRAND MEAN =	1.563 PERCENT				TEST DETERMINATIONS =		20
SD MEANS =	.154 PERCENT					SD OF MEANS =	.160 PERCENT				21 LABS IN GRAND MEANS		
			AVERAGE SDR =	.131 PERCENT					AVERAGE SDR =	.121 PERCENT			
L153	1.410	-.015	-.10	.112	.86	1.535	-.028	-.17	.081	.67	29F	*	L153
L242	1.485	.060	.39	.123	.94	1.535	-.028	-.17	.157	1.29	29F	*	L242
L484	.859	-.565	-3.67	.177	1.35	.942	-.621	-3.87	.211	1.74	29F	*	L484
L626	1.335	-.090	-.58	.088	.67	1.415	-.148	-.92	.123	1.01	29F	*	L626
L685	1.735	.310	2.01	.146	1.12	1.735	.172	1.07	.109	.90	29F	*	L685

TOTAL NUMBER OF LABORATORIES REPORTING = 26

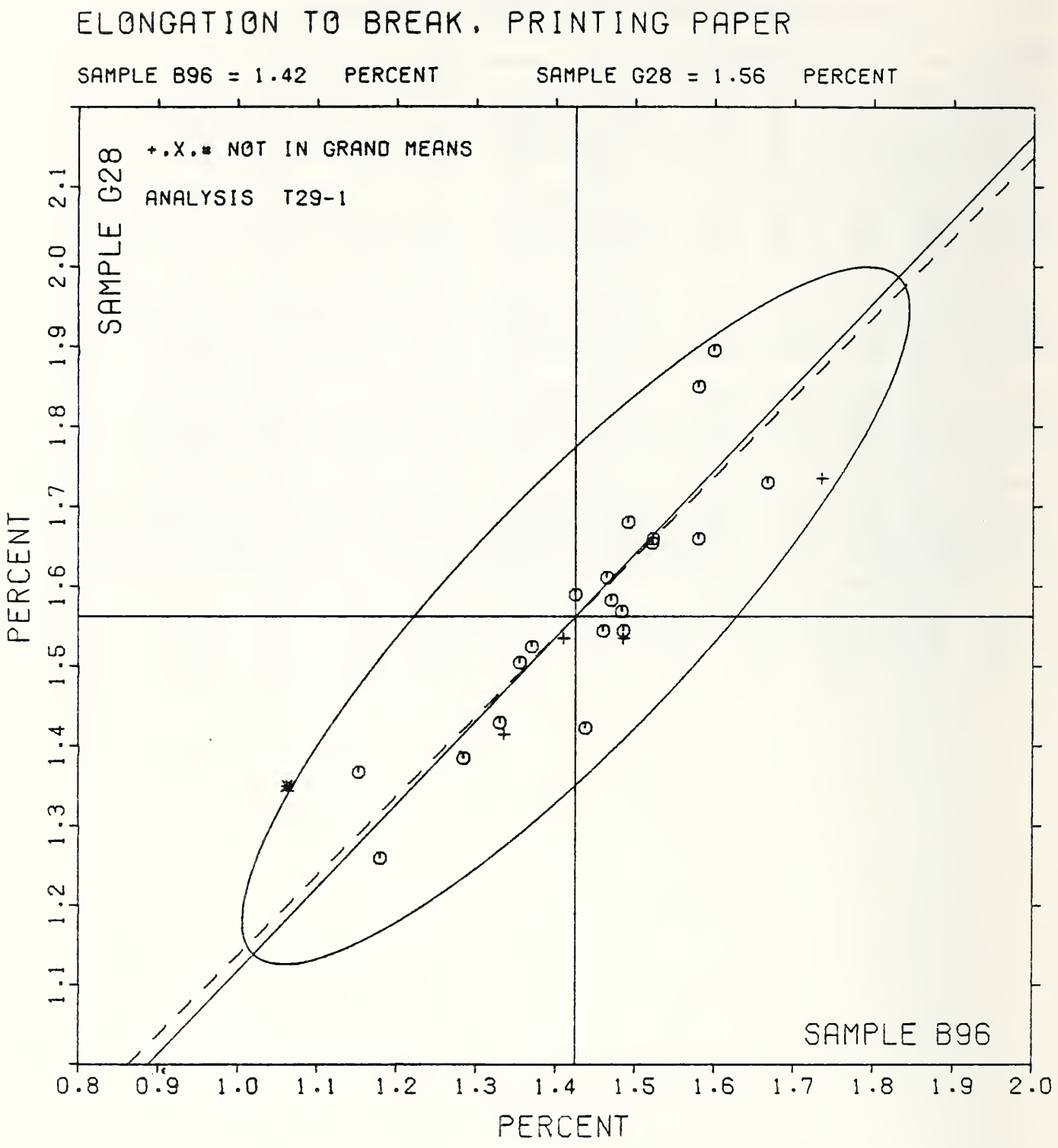
Best values: B96 1.4 ± 0.3 percent
G28 1.6 ± 0.3 percent

ANALYSIS T29-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

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

LAB CODE	F	MEANS B96	MEANS G28	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L484	*	.859	.942	-.839	-.020	1.55	29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L105	*	1.062	1.350	-.404	.115	1.04	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L386	O	1.153	1.367	-.329	.062	.85	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L139	O	1.180	1.260	-.388	-.032	1.00	29D	ELONGATION (WITH TEST T20),LOAD CELL,2-PIN STRAIN GAGE
L141T	O	1.284	1.385	-.225	-.021	.85	29D	ELONGATION (WITH TEST T20),LOAD CELL,2-PIN STRAIN GAGE
L100	O	1.330	1.430	-.162	-.023	.87	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L626	*	1.335	1.415	-.169	-.037	.84	29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L698	O	1.355	1.505	-.090	.011	1.14	29C	ELONGATION (WITH TEST T20),LOAD CELL,LINE/LINE JAWS
L736	O	1.370	1.525	-.065	.014	.81	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L153	*	1.410	1.535	-.030	-.008	.76	29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L442	O	1.425	1.590	.020	.019	.92	29B	ELONGATION (WITH TEST T20),LOAD CELL,LINE/FLAT JAWS
L190R	O	1.437	1.423	-.092	-.106	.81	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L176	O	1.460	1.545	.011	-.038	1.48	29B	ELONGATION (WITH TEST T20),LOAD CELL,LINE/FLAT JAWS
L118	O	1.464	1.611	.063	.005	.92	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L567	O	1.470	1.582	.045	-.019	1.08	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L163	O	1.483	1.569	.045	-.038	1.02	29B	ELONGATION (WITH TEST T20),LOAD CELL,LINE/FLAT JAWS
L242	*	1.485	1.535	.021	-.063	1.11	29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L185	O	1.485	1.545	.029	-.056	1.20	29C	ELONGATION (WITH TEST T20),LOAD CELL,LINE/LINE JAWS
L356	O	1.491	1.680	.131	.033	1.06	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L122	O	1.522	1.654	.133	-.007	.77	29P	ELONGATION (WITH TEST T20),LOAD CELL,PATTERNED FLAT JAWS
L575	O	1.522	1.660	.138	-.003	.79	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L255	O	1.580	1.850	.315	.086	1.26	29P	ELONGATION (WITH TEST T20),LOAD CELL,PATTERNED FLAT JAWS
L592	O	1.580	1.660	.177	-.045	1.23	29D	ELONGATION (WITH TEST T20),LOAD CELL,2-PIN STRAIN GAGE
L309	O	1.599	1.895	.361	.103	1.08	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L318	O	1.667	1.729	.288	-.060	.87	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L685	*	1.735	1.735	.339	-.105	1.01	29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
GMEANS:		1.425	1.563			1.00		
		95% ELLIPSE:		.586	.152	WITH GAMMA = 46 DEGREES		


ELONGATION TO BREAK, PRINTING PAPER
SAMPLE B96 = 1.42 PERCENT
SAMPLE G28 = 1.56 PERCENT
+.X.* NOT IN GRAND MEANS
ANALYSIS T29-1
SAMPLE G28
PERCENT
SAMPLE B96
PERCENT
0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1

ANALYSIS T230-1 TABLE 1
FOLDING ENDURANCE (MIT), DOUBLE FOLDS
TAPPI SUGGESTED METHOD T511 SU-69

LAB CODE	SAMPLE B80 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	SAMPLE A30 MEAN	REPROCOPY 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	VAR	F	LAB	TEST D. = 15
L100M	28.	-16.	-1.10	11.	.73	66.	-22.	-1.09	13.	.46	30M	@	L100M	
L100N	30.	-14.	-1.00	10.	.73	63.	-24.	-1.22	16.	.59	30N	@	L100N	
L105	47.	3.	.21	17.	1.19	90.	3.	.13	35.	1.26	30M	@	L105	
L118	43.	-1.	-.07	10.	.70	75.	-13.	-.64	21.	.76	30D	@	L118	
L121	48.	4.	.31	22.	1.55	94.	7.	.34	29.	1.06	30M	@	L121	
L122	49.	6.	.40	21.	1.47	99.	12.	.61	32.	1.16	30M	@	L122	
L124	65.	21.	1.49	21.	1.44	119.	32.	1.60	42.	1.52	30N	@	L124	
L150	25.	-19.	-1.32	10.	.67	65.	-22.	-1.10	20.	.72	30M	@	L150	
L158	17.	-26.	-1.87	6.	.44	60.	-27.	-1.36	18.	.65	30N	@	L158	
L159	48.	5.	.34	13.	.91	65.	-22.	-1.11	23.	.82	30N	@	L159	
L162	28.	-16.	-1.12	9.	.62	87.	-0.	-.01	33.	1.18	30M	@	L162	
L163	43.	-0.	-.01	13.	.89	72.	-16.	-.79	23.	.83	30N	@	L163	
L176	33.	-10.	-.72	19.	1.30	104.	17.	.85	23.	.85	30N	@	L176	
L182M	67.	23.	1.67	18.	1.24	115.	28.	1.40	28.	1.02	30M	@	L182M	
L185	66.	22.	1.57	19.	1.33	112.	24.	1.23	35.	1.25	30N	@	L185	
L190C	53.	10.	.71	12.	.83	110.	23.	1.15	24.	.89	30N	@	L190C	
L212	50.	6.	.46	14.	1.01	91.	4.	.18	36.	1.30	30M	@	L212	
L223F	53.	9.	.67	19.	1.32	117.	29.	1.46	35.	1.28	30M	@	L223F	
L230	29.	-14.	-1.00	11.	.75	47.	-40.	-2.03	14.	.51	30N	@	L230	
L238A	32.	-12.	-.83	9.	.65	96.	9.	.44	35.	1.26	30N	@	L238A	
L238B	32.	-11.	-.79	8.	.57	64.	-23.	-1.16	12.	.44	30D	@	L238B	
L243	66.	23.	1.62	15.	1.04	101.	14.	.71	16.	.59	30D	@	L243	
L254	38.	-5.	-.39	10.	.72	77.	-10.	-.50	25.	.91	30M	@	L254	
L262	49.	5.	.36	11.	.78	92.	4.	.22	34.	1.25	30N	@	L262	
L275	61.	17.	1.21	15.	1.05	118.	30.	1.52	28.	1.00	30N	@	L275	
L278	31.	-13.	-.90	13.	.94	93.	6.	.30	37.	1.33	30C	@	L278	
L279	36.	-7.	-.52	13.	.91	105.	17.	.87	39.	1.40	30N	@	L279	
L285A	33.	-10.	-.73	8.	.56	86.	-2.	-.08	40.	1.47	30N	@	L285A	
L285B	25.	-19.	-1.32	12.	.86	64.	-24.	-1.19	37.	1.33	30N	@	L285B	
L320	40.	-3.	-.25	20.	1.39	79.	-8.	-.40	41.	1.48	30N	@	L320	
L321	70.	27.	1.90	15.	1.05	108.	21.	1.05	28.	1.00	30M	@	L321	
L326N	24.	-19.	-1.38	13.	.92	58.	-29.	-1.46	22.	.79	30N	@	L326N	
L339	13.	-30.	-2.15	5.	.38	48.	-39.	-1.96	20.	.74	30M	@	L339	
L366A	47.	3.	.25	19.	1.35	93.	6.	.28	42.	1.53	30N	@	L366A	
L376	57.	13.	.95	23.	1.62	33.	-55.	-2.74	16.	.58	30N	X	L376	
L388	49.	5.	.36	20.	1.38	88.	1.	.04	29.	1.04	30N	@	L388	
L393	50.	6.	.45	14.	.98	73.	-14.	-.72	19.	.68	30M	@	L393	
L565	52.	9.	.63	10.	.72	119.	32.	1.60	29.	1.05	30N	@	L565	
L567	48.	5.	.33	19.	1.34	90.	3.	.13	25.	.91	30N	@	L567	
L589	42.	-2.	-.13	10.	.70	76.	-12.	-.58	15.	.56	30N	@	L589	
L599	52.	9.	.61	25.	1.77	84.	-3.	-.16	25.	.89	30C	@	L599	
L670	61.	17.	1.23	14.	.96	100.	12.	.62	26.	.96	30N	@	L670	
L734	55.	11.	.81	19.	1.31	107.	20.	1.00	43.	1.54	30C	@	L734	
L737	44.	0.	.02	23.	1.57	84.	-3.	-.15	21.	.75	30M	@	L737	
GR. MEAN =	44.	DOUBLE FOLDS				GRAND MEAN =	87.	DOUBLE FOLDS			TEST DETERMINATIONS = 15			
SD MEANS =	14.	DOUBLE FOLDS				SD OF MEANS =	20.	DOUBLE FOLDS			43 LABS IN GRAND MEANS			
		AVERAGE SDR =	14.	DOUBLE FOLDS			AVERAGE SDR =	28.	DOUBLE FOLDS					
L182S	40.	-3.	-.25	14.	.95	125.	38.	1.89	27.	.97	30S	*	L182S	
L190D	28.	-16.	-1.12	10.	.70	87.	-0.	-.01	34.	1.23	30S	*	L190D	
L326S	22.	-22.	-1.53	7.	.52	75.	-12.	-.61	21.	.77	30S	*	L326S	
L705	28.	-16.	-1.13	7.	.50	61.	-26.	-1.30	21.	.77	30X	*	L705	
L706	11.	-33.	-2.31	5.	.34	43.	-44.	-2.20	29.	1.04	30X	*	L706	
L743	34.	-10.	-.70	16.	1.13	86.	-1.	-.05	37.	1.33	30X	*	L743	

TOTAL NUMBER OF LABORATORIES REPORTING = 50

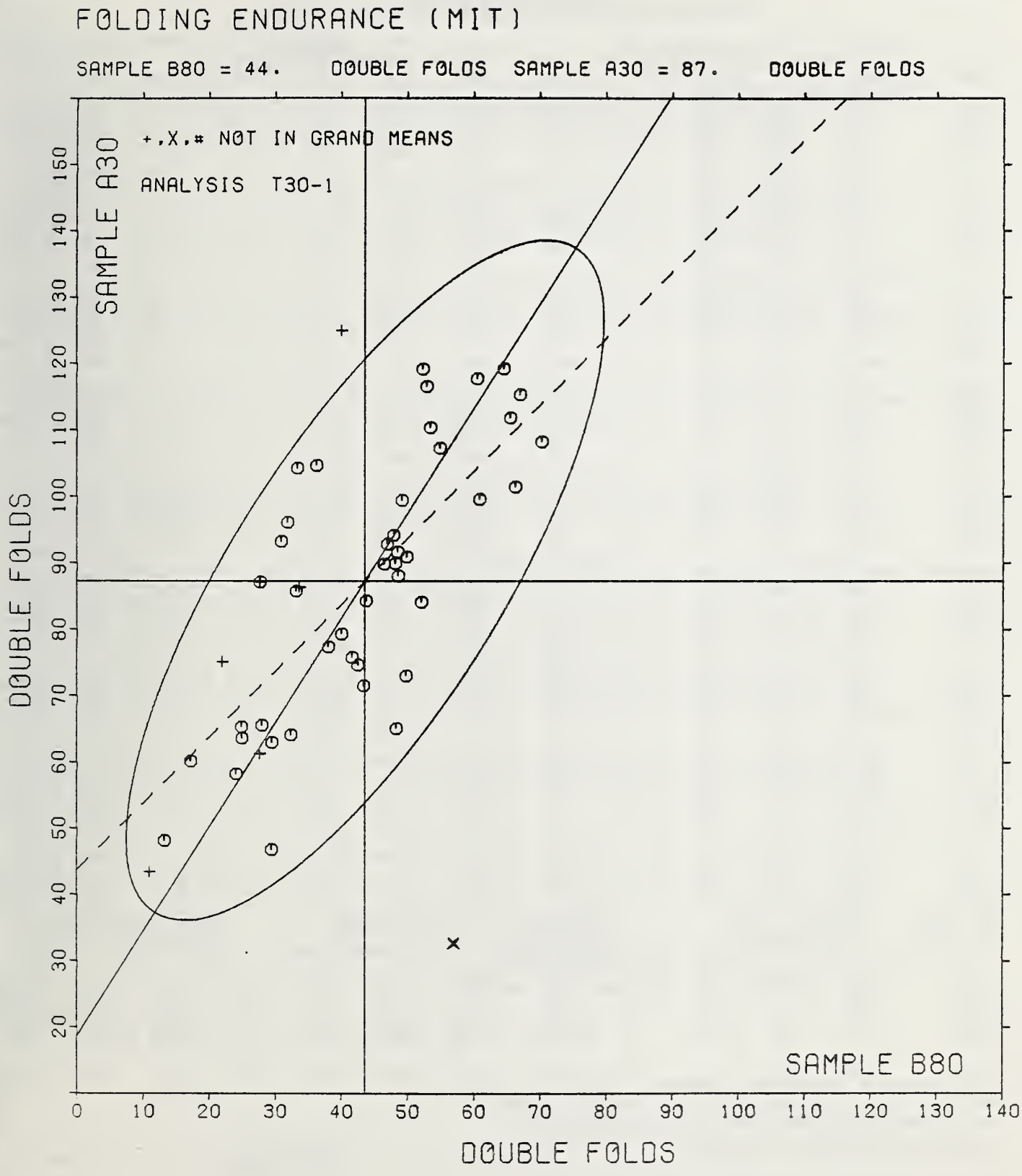
Best values: B80 45 double folds
A30 90 double folds

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

Please see page 44 of this report for a demonstration of this proposal.

ANALYSIS 730-1 TABLE 2
FOLDING ENDURANCE (MIT), DOUBLE FOLDS
TAPPI SUGGESTED METHOD T511 SU-69

LAB CODE	F	MEANS B80	MEANS A30	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L706	*	11.	43.	-54.	4.	.69	30I	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L339	O	13.	48.	-49.	5.	.56	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L158	O	17.	60.	-37.	8.	.54	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L326S	*	22.	75.	-22.	12.	.64	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L326N	O	24.	58.	-35.	1.	.85	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L150	O	25.	65.	-29.	4.	.70	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L285B	O	25.	64.	-30.	3.	1.09	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L705	*	28.	61.	-30.	-1.	.64	30I	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L190D	*	28.	87.	-9.	13.	.96	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L162	O	28.	87.	-9.	13.	.90	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L100M	O	28.	66.	-27.	1.	.60	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L230	O	29.	47.	-42.	-10.	.63	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100N	O	30.	63.	-28.	-1.	.66	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L278	O	31.	93.	-2.	14.	1.13	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L238A	O	32.	96.	1.	15.	.95	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238B	O	32.	64.	-26.	-3.	.51	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L285A	O	33.	86.	-7.	8.	1.01	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L176	O	33.	104.	9.	18.	1.07	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L743	*	34.	86.	-6.	8.	1.23	30I	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L279	O	36.	105.	11.	15.	1.15	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	O	38.	77.	-11.	-1.	.81	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L182S	*	40.	125.	30.	23.	.96	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L320	O	40.	79.	-9.	-1.	1.43	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L589	O	42.	76.	-11.	-5.	.63	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L118	O	43.	75.	-11.	-6.	.73	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L163	O	43.	72.	-13.	-8.	.86	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L737	O	44.	84.	-2.	-2.	1.16	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L105	O	47.	90.	4.	-1.	1.23	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L366A	O	47.	93.	7.	0.	1.44	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L121	O	48.	94.	8.	-0.	1.31	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L567	O	48.	90.	5.	-3.	1.12	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L159	O	48.	65.	-16.	-16.	.86	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L262	O	49.	92.	6.	-2.	1.01	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L388	O	49.	88.	3.	-4.	1.21	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	O	49.	99.	13.	2.	1.32	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L393	O	50.	73.	-9.	-13.	.83	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L212	O	50.	91.	6.	-3.	1.15	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L599	O	52.	84.	2.	-9.	1.33	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L565	O	52.	119.	32.	10.	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L223F	O	53.	117.	30.	8.	1.30	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L190C	O	53.	110.	25.	4.	.86	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L734	O	55.	107.	23.	1.	1.42	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L376	X	57.	33.	-39.	-41.	1.10	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L275	O	61.	118.	35.	2.	1.03	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L670	O	61.	100.	20.	-8.	.96	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L124	O	65.	119.	38.	-1.	1.48	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L185	O	66.	112.	32.	-5.	1.29	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L243	O	66.	101.	24.	-12.	.81	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L182M	O	67.	115.	36.	-5.	1.13	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L321	O	70.	108.	32.	-11.	1.03	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
GMEANS:		44.	87.			1.00		
		95% ELLIPSE:		59.	20.	WITH GAMMA = 57 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE B80 = 44. DOUBLE FOLDS SAMPLE A30 = 87. DOUBLE FOLDS
+,X,* NOT IN GRAND MEANS
ANALYSIS T30-1
SAMPLE A30
DOUBLE FOLDS
SAMPLE B80
DOUBLE FOLDS
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
20 30 40 50 60 70 80 90 100 110 120 130 140 150

ANALYSIS T30-2 TABLE 1
FOLDING ENDURANCE (MIT)
DATA IS LOG(BASE 10) OF THE DOUBLE FOLD MEASUREMENT

LAB CODE	SAMPLE 880 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE A30 MEAN	REPROCOPY 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D. = 15 VAR	F	LAB
L100M	1.41	-.18	-1.06	.20	1.28	1.81	-.10	-.89	.08	.58	30M	G	L100M
L100N	1.45	-.14	-.84	.14	.93	1.78	-.12	-1.12	.12	.86	30N	G	L100N
L105	1.64	.05	.32	.16	1.07	1.92	.02	.16	.17	1.17	30M	G	L105
L118	1.62	.03	.19	.10	.63	1.86	-.05	-.44	.11	.80	30D	G	L118
L121	1.64	.06	.35	.18	1.17	1.95	.05	.43	.14	.99	30M	G	L121
L122	1.65	.06	.39	.20	1.32	1.98	.07	.64	.14	.99	30M	G	L122
L124	1.79	.20	1.21	.15	1.00	2.05	.14	1.32	.16	1.12	30N	G	L124
L150	1.37	-.22	-1.32	.16	1.07	1.80	-.11	-1.01	.13	.93	30M	G	L150
L158	1.21	-.38	-2.27	.16	1.05	1.75	-.15	-1.40	.17	1.18	30N	G	L158
L159	1.67	.08	.50	.11	.75	1.79	-.12	-1.09	.16	1.11	30N	G	L159
L162	1.42	-.17	-1.00	.15	.97	1.91	.00	.04	.17	1.19	30M	G	L162
L163	1.62	.03	.20	.13	.83	1.84	-.07	-.65	.13	.92	30N	G	L163
L176	1.47	-.11	-.69	.21	1.38	2.01	.10	.91	.11	.78	30N	G	L176
L182M	1.81	.23	1.36	.11	.73	2.05	.14	1.30	.12	.81	30M	G	L182M
L185	1.80	.21	1.28	.13	.88	2.03	.12	1.12	.14	.96	30N	G	L185
L190C	1.72	.13	.80	.09	.61	2.03	.13	1.16	.09	.66	30N	G	L190C
L212	1.68	.09	.56	.14	.92	1.93	.02	.21	.16	1.16	30M	G	L212
L223F	1.69	.11	.65	.17	1.14	2.05	.14	1.31	.12	.87	30M	G	L223F
L230	1.44	-.14	-.87	.16	1.05	1.65	-.26	-2.34	.14	.98	30N	*	L230
L238A	1.49	-.10	-.59	.12	.77	1.95	.05	.42	.18	1.26	30N	G	L238A
L238B	1.50	-.09	-.54	.11	.73	1.80	-.11	-.98	.09	.62	30D	G	L238B
L243	1.81	.22	1.35	.10	.66	2.00	.09	.86	.08	.53	30D	G	L243
L254	1.57	-.02	-.13	.12	.78	1.86	-.05	-.44	.18	1.30	30M	G	L254
L262	1.67	.09	.53	.11	.70	1.94	.03	.27	.15	1.08	30N	G	L262
L275	1.77	.18	1.10	.12	.75	2.06	.15	1.40	.10	.72	30N	G	L275
L278	1.46	-.13	-.77	.17	1.09	1.94	.03	.29	.17	1.20	30C	G	L278
L279	1.52	-.06	-.37	.19	1.28	1.99	.08	.74	.18	1.28	30N	G	L279
L285A	1.51	-.08	-.47	.11	.69	1.89	-.02	-.14	.20	1.39	30N	G	L285A
L285B	1.35	-.24	-1.43	.21	1.38	1.73	-.17	-1.59	.27	1.87	30N	G	L285B
L320	1.53	-.06	-.34	.29	1.93	1.84	-.06	-.57	.24	1.65	30N	G	L320
L321	1.84	.25	1.52	.09	.60	2.02	.11	1.05	.11	.79	30M	G	L321
L326N	1.33	-.25	-1.52	.20	1.33	1.74	-.17	-1.54	.16	1.10	30N	G	L326N
L339	1.09	-.50	-2.99	.17	1.12	1.65	-.26	-2.34	.17	1.19	30M	*	L339
L366A	1.61	.03	.17	.27	1.77	1.93	.02	.22	.18	1.30	30N	G	L366A
L376	1.72	.13	.80	.19	1.25	1.46	-.45	-4.12	.24	1.71	30N	X	L376
L388	1.66	.07	.42	.17	1.08	1.92	.02	.14	.15	1.06	30N	G	L388
L393	1.68	.10	.58	.12	.76	1.85	-.06	-.52	.11	.79	30M	G	L393
L565	1.71	.12	.75	.09	.56	2.06	.16	1.44	.11	.76	30N	G	L565
L567	1.65	.06	.36	.19	1.27	1.94	.03	.27	.14	.95	30N	G	L567
L589	1.61	.02	.12	.11	.74	1.87	-.04	-.32	.09	.62	30N	G	L589
L599	1.67	.08	.51	.21	1.36	1.91	.00	.00	.13	.93	30C	G	L599
L670	1.77	.19	1.12	.11	.70	1.98	.08	.70	.12	.84	30N	G	L670
L734	1.72	.13	.80	.14	.92	2.00	.10	.88	.16	1.11	30C	G	L734
L737	1.59	.00	.03	.22	1.42	1.91	.01	.07	.11	.75	30M	G	L737
GR. MEAN =	1.59 LOG(10) FOLD				GRAND MEAN =	1.91 LOG(10) FOLD				TEST DETERMINATIONS = 15			
SD MEANS =	.17 LOG(10) FOLD				SD OF MEANS =	.11 LOG(10) FOLD				43 LABS IN GRAND MEANS			
	AVERAGE SDR = .15 LOG(10) FOLD					AVERAGE SDR = .14 LOG(10) FOLD							
L182S	1.58	-.00	-.02	.13	.86	2.09	.18	1.65	.10	.73	30S	+	L182S
L190D	1.42	-.17	-1.02	.15	.99	1.91	.00	.00	.18	1.29	30S	+	L190D
L326S	1.32	-.27	-1.61	.15	.96	1.86	-.05	-.46	.14	1.00	30S	+	L326S
L705	1.43	-.16	-.96	.12	.79	1.76	-.15	-1.35	.17	1.21	30X	+	L705
L706	1.01	-.58	-3.51	.18	1.18	1.55	-.36	-3.28	.30	2.09	30X	+	L706
L743	1.46	-.13	-.79	.30	1.98	1.90	-.01	-.05	.18	1.28	30X	+	L743

TOTAL NUMBER OF LABORATORIES REPORTING = 50

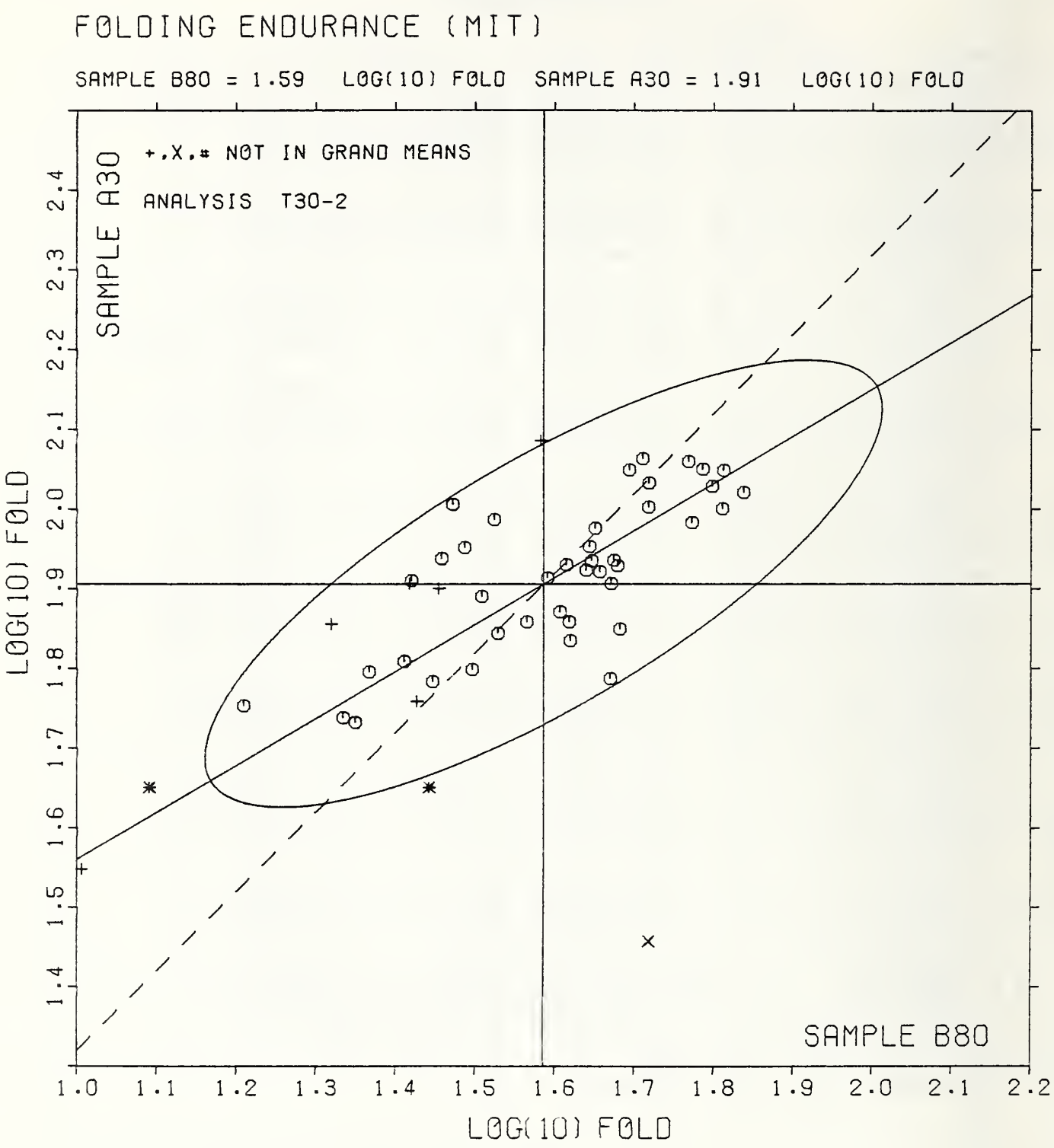
The ISO (International Standards Organization) is proposing that MIT folding endurance be reported as the logarithm (to the base 10) of the double fold instead of the double fold as in the past.

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

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

ANALYSIS T30-2 TABLE 2
FOLDING ENDURANCE (MIT)
DATA IS LOG(BASE 10) OF THE DOUBLE FOLD MEASUREMENT

LAB CODE	F	MEANS B80	MEANS A30	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDE	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L706	*	1.01	1.55	-.68	-.01	1.63	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L339	*	1.09	1.65	-.56	.03	1.16	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L158	O	1.21	1.75	-.40	.06	1.12	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L326S	*	1.32	1.86	-.26	.09	.98	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L326N	O	1.33	1.74	-.30	-.02	1.21	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285B	O	1.35	1.73	-.29	-.03	1.63	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L150	O	1.37	1.80	-.24	.02	1.00	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L100M	O	1.41	1.81	-.20	.01	.93	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L190D	*	1.42	1.91	-.14	.09	1.14	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L162	O	1.42	1.91	-.14	.05	1.08	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L705	*	1.43	1.76	-.21	-.05	1.00	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L230	*	1.44	1.65	-.25	-.15	1.01	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100N	O	1.45	1.78	-.18	-.03	.90	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L743	*	1.46	1.90	-.12	.06	1.63	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L278	O	1.46	1.94	-.09	.09	1.14	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L176	O	1.47	2.01	-.05	.14	1.08	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238A	O	1.49	1.95	-.06	.09	1.01	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238B	O	1.50	1.80	-.13	-.05	.68	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE BEATING
L285A	O	1.51	1.89	-.07	.03	1.04	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L279	O	1.52	1.99	-.01	.10	1.28	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L320	O	1.53	1.84	-.08	-.02	1.79	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	O	1.57	1.86	-.04	-.03	1.04	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L182S	*	1.58	2.09	.09	.16	.80	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L737	O	1.59	1.91	.01	.00	1.09	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L589	O	1.61	1.87	-.00	-.04	.68	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L366A	O	1.61	1.93	.04	.01	1.53	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L118	O	1.62	1.86	.00	-.06	.71	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE BEATING
L163	O	1.62	1.84	-.01	-.08	.88	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L105	O	1.64	1.92	.05	-.01	1.12	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L121	O	1.64	1.95	.07	.01	1.08	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L567	O	1.65	1.94	.07	-.01	1.11	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	O	1.65	1.98	.05	.03	1.16	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L388	O	1.66	1.92	.07	-.02	1.07	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L159	O	1.67	1.79	.01	-.14	.93	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L599	O	1.67	1.91	.07	-.04	1.14	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L262	O	1.67	1.94	.05	-.02	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L212	O	1.68	1.93	.09	-.03	1.04	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L393	O	1.68	1.85	.05	-.10	.78	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L223F	O	1.69	2.05	.17	.07	1.00	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L565	O	1.71	2.06	.19	.07	.66	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L734	O	1.72	2.00	.16	.02	1.02	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L376	X	1.72	1.46	-.11	-.45	1.48	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L190C	O	1.72	2.03	.18	.04	.63	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L275	O	1.77	2.06	.23	.04	.74	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L670	O	1.77	1.98	.20	-.03	.77	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L124	O	1.79	2.05	.25	.02	1.06	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L185	O	1.80	2.03	.24	-.00	.92	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L243	O	1.81	2.00	.24	-.03	.60	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE BEATING
L182M	O	1.81	2.05	.27	.01	.77	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L321	O	1.84	2.02	.27	-.03	.69	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
GMEANS:		1.59	1.91			1.00		
		95% ELLIPSE:		.49	.15	WITH GAMMA = 30 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE B80 = 1.59 LOG(10) FOLD SAMPLE A30 = 1.91 LOG(10) FOLD
+,X,* NOT IN GRAND MEANS
ANALYSIS T30-2
SAMPLE A30
LOG(10) FOLD
SAMPLE B80
LOG(10) FOLD
1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2
1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4

ANALYSIS T35-1 TABLE 1

GURLEY STIFFNESS

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

LAB CODE	SAMPLE A58 MEAN	WOVE ENVELOPE 94 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE K42 MEAN	PRINTING 60 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L100	281.8	1.5	.07	30.5	1.69	109.7	.6	.04	6.1	.88	35G	G	L100
L118	267.7	-12.6	-.54	25.9	1.44	91.4	-17.8	-1.34	5.0	.72	35G	G	L118
L121	242.0	-38.3	-1.64	11.4	.63	123.0	13.9	1.05	9.5	1.37	35G	*	L121
L122	260.5	-19.8	-.85	18.8	1.04	104.6	-4.5	-.34	5.6	.80	35G	G	L122
L132	292.0	11.7	.50	19.3	1.07	131.0	21.9	1.65	8.8	1.26	35G	G	L132
L139	260.6	-19.7	-.84	9.5	.53	107.2	-1.9	-.15	3.3	.48	35G	G	L139
L148	280.9	.6	.03	16.6	.92	109.2	.1	.00	7.5	1.08	35G	G	L148
L153	289.4	9.1	.39	35.4	1.97	113.6	4.5	.34	4.4	.63	35G	G	L153
L159	260.6	-19.7	-.84	17.5	.97	87.5	-21.7	-1.64	7.3	1.05	35G	G	L159
L162	257.0	-23.3	-1.00	11.8	.66	88.4	-20.7	-1.57	9.2	1.32	35G	G	L162
L163	279.0	-1.3	-.05	12.0	.67	105.5	-3.6	-.28	12.1	1.75	35G	G	L163
L183	300.2	19.9	.85	10.2	.57	117.1	8.0	.60	12.1	1.75	35G	G	L183
L190C	281.5	1.2	.05	11.1	.62	94.8	-14.4	-1.09	4.2	.61	35G	G	L190C
L195	299.5	19.2	.82	29.8	1.66	147.5	38.4	2.90	20.2	2.91	35G	*	L195
L212	283.5	3.2	.14	11.9	.66	52.8	-56.3	-4.26	2.3	.33	35G	#	L212
L223	273.9	-6.4	-.27	16.4	.91	111.7	2.6	.19	3.9	.57	35G	G	L223
L224	290.9	10.6	.45	13.7	.76	108.3	-.8	-.06	8.7	1.26	35G	G	L224
L241	208.7	-71.6	-3.06	16.4	.91	66.6	-42.5	-3.22	4.8	.69	35G	#	L241
L254	273.6	-6.7	-.29	21.7	1.21	110.6	1.5	.11	6.2	.90	35G	G	L254
L260	279.3	-1.0	-.04	9.0	.50	112.9	3.8	.28	4.3	.62	35G	G	L260
L268	284.1	3.8	.16	25.2	1.40	109.7	.5	.04	6.0	.86	35G	G	L268
L285	210.3	-70.0	-2.99	13.5	.75	68.7	-40.5	-3.06	4.8	.69	35G	#	L285
L291	286.9	6.6	.28	8.2	.46	103.3	-5.8	-.44	7.2	1.05	35G	G	L291
L308	256.3	-24.0	-1.03	23.8	1.32	93.5	-15.6	-1.18	5.9	.85	35G	G	L308
L321	277.7	-2.6	-.11	30.5	1.70	115.7	6.6	.50	9.4	1.35	35G	G	L321
L348	334.7	54.4	2.33	17.3	.96	116.9	7.8	.59	10.5	1.51	35G	G	L348
L356	251.6	-28.7	-1.23	15.4	.86	95.9	-13.2	-1.00	8.8	1.28	35G	G	L356
L376	322.7	42.4	1.81	34.3	1.91	111.2	2.1	.16	7.7	1.11	35G	G	L376
L382	291.6	11.3	.48	9.7	.54	111.7	2.5	.19	6.2	.89	35G	G	L382
L562	240.0	-40.3	-1.72	.0	.00	100.0	-9.1	-.69	.0	.00	35G	G	L562
L567	252.0	-28.3	-1.21	28.2	1.57	109.0	-.1	-.01	7.4	1.07	35G	G	L567
L571	286.0	5.7	.24	16.5	.92	122.0	12.9	.97	14.8	2.13	35G	G	L571
L600	302.0	21.7	.93	12.0	.67	113.0	3.9	.29	7.1	1.03	35G	G	L600
L650	303.6	23.3	1.00	13.6	.76	225.3	116.2	8.79	18.2	2.63	35G	#	L650
L693	336.3	56.0	2.40	20.0	1.11	129.4	20.3	1.53	6.1	.89	35G	G	L693
L729	276.6	-3.7	-.16	18.7	1.04	87.5	-21.7	-1.64	2.1	.31	35G	G	L729

GR. MEAN = 280.3 GURLEY UNITS GRAND MEAN = 109.1 GURLEY UNITS TEST DETERMINATIONS = 10

SD MEANS = 23.4 GURLEY UNITS SD OF MEANS = 13.2 GURLEY UNITS 32 LABS IN GRAND MEANS

AVERAGE SDR = 18.0 GURLEY UNITS AVERAGE SDR = 6.9 GURLEY UNITS

L213	276.5	-3.8	-.16	15.8	.88	110.1	1.0	.07	4.3	.63	35H	*	L213

TOTAL NUMBER OF LABORATORIES REPORTING = 37

Best values: A58 280 ± 40 Gurley units
K42 110 ± 20 Gurley units

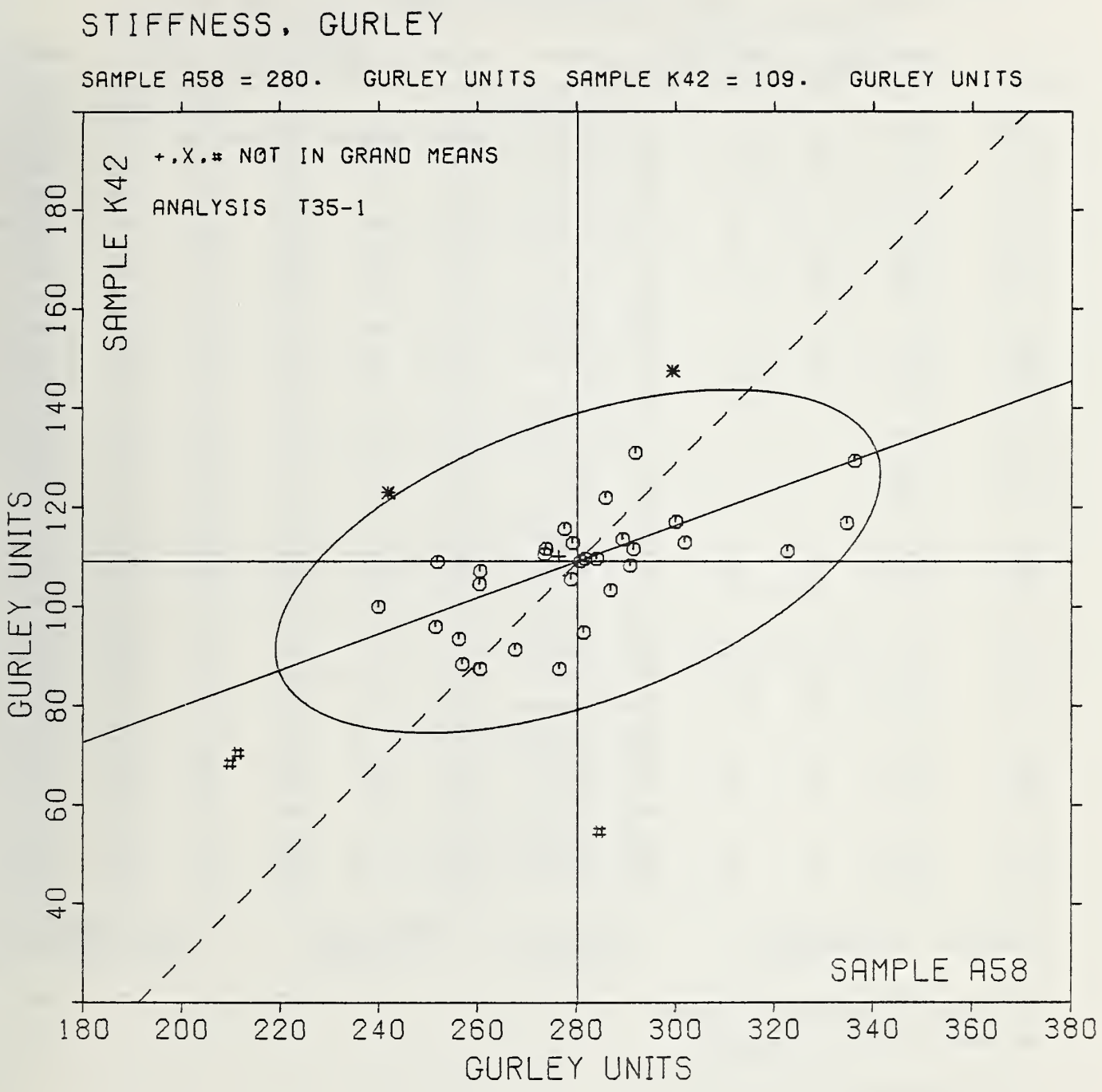
The following laboratories were omitted from the grand means because of extreme test results: 212, 241, 285, 650

ANALYSIS T35-1 TABLE 2

GURLEY STIFFNESS

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

LAB CODE	F	MEANS A50	MEANS E42	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L241	#	206.7	66.6	-81.8	-15.4	.80	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L285	#	210.3	68.7	-79.6	-14.0	.72	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L562	G	240.0	100.0	-41.0	5.2	.00	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L121	*	242.0	123.0	-31.2	26.1	1.00	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L356	G	251.6	95.9	-31.5	-2.6	1.07	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L567	G	252.0	109.0	-26.6	9.6	1.32	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L308	G	256.3	93.5	-27.9	-6.5	1.09	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L162	G	257.0	88.4	-29.0	-11.5	.99	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L122	G	260.5	104.6	-20.1	2.5	.92	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L139	G	260.6	107.2	-19.2	4.9	.50	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L159	G	260.6	87.5	-25.9	-13.6	1.01	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L118	G	267.7	91.4	-17.9	-12.4	1.08	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L254	G	273.6	110.6	-5.8	3.7	1.05	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L223	G	273.9	111.7	-5.1	4.6	.74	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L213	*	276.5	110.1	-3.2	2.2	.75	35H	STIFFNESS, GURLEY (UNITS: MG/1X3 TEST PIECE), 20 C, 65% RH
L729	G	276.6	87.5	-10.9	-19.1	.68	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L321	G	277.7	115.7	-.2	7.0	1.53	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L163	G	279.0	105.5	-2.5	-3.0	1.21	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L260	G	279.3	112.9	.4	3.9	.56	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L148	G	280.9	109.2	.6	-.2	1.00	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L190C	G	281.5	94.8	-3.8	-13.9	.61	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L100	G	281.8	109.7	1.6	-.0	1.29	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L212	#	283.5	52.8	-16.3	-54.0	.50	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L268	G	284.1	109.7	3.8	-.8	1.13	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L571	G	286.0	122.0	9.8	10.1	1.52	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L291	G	286.9	103.3	4.2	-7.8	.75	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L153	G	289.4	113.6	10.1	1.1	1.30	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L224	G	290.9	108.3	9.7	-4.4	1.01	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L382	G	291.6	111.7	11.5	-1.5	.72	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L132	G	292.0	131.0	18.5	16.5	1.17	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L195	*	299.5	147.5	31.2	29.4	2.29	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L183	G	300.2	117.1	21.4	.6	1.16	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L600	G	302.0	113.0	21.7	-3.8	.85	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L650	#	303.6	225.3	61.7	101.1	1.69	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L376	G	322.7	111.2	40.6	-12.6	1.51	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L348	G	334.7	116.9	53.8	-11.4	1.24	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L693	G	336.3	129.4	59.6	-.2	1.00	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
GMEANS:		280.3	109.1			1.00		
		95% ELLIPSE:		64.3	28.4	WITH GAMMA = 20 DEGREES		


STIFFNESS, GURLEY
SAMPLE A58 = 280. GURLEY UNITS SAMPLE K42 = 109. GURLEY UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T35-1
SAMPLE K42
GURLEY UNITS
40
60
80
100
120
140
160
180
SAMPLE A58
180
200
220
240
260
280
300
320
340
360
380
GURLEY UNITS

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T36-1 TABLE 1
TABER STIFFNESS
TAPPI OFFICIAL TEST METHOD T489 OS-76, RESULTS EXPRESSED IN GRAM CENTIMETERS

LAB CODE	SAMPLE Z18 MEAN	INDEX PAPER 256 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	SAMPLE A77 MEAN	INDEX 205 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	VAR	F	LAB	TEST D. = 10
L107A	65.8	-.8	-.23	2.2	1.04	27.6	-.6	-.37	2.7	1.68	36T	6	L107A	
L122	68.4	1.9	.56	5.6	2.67	NO DATA REPORTED FOR SAMPLE A77					36D	M	L122	
L123	59.1	-7.4	-2.23	3.2	1.54	25.6	-2.6	-1.60	.5	.33	36T	6	L123	
L126	32.3	-34.2	-10.24	1.0	.49	27.2	-1.0	-.62	.8	.53	36T	#	L126	
L150	66.8	.3	.08	4.9	2.32	28.8	.6	.39	1.2	.77	36T	6	L150	
L158	68.7	2.2	.64	2.2	1.02	25.9	-2.3	-1.42	1.0	.63	36T	6	L158	
L163	67.3	.8	.23	1.5	.73	28.0	-.2	-.11	2.4	1.49	36T	6	L163	
L173B	62.5	-4.0	-1.21	1.1	.54	26.5	-1.7	-1.04	1.6	1.00	36T	6	L173B	
L182	68.9	2.4	.72	1.3	.63	27.8	-.3	-.20	1.4	.91	36T	6	L182	
L207	85.2	18.7	5.59	7.4	3.51	44.1	16.0	9.93	6.4	4.04	36T	#	L207	
L212	68.1	1.6	.47	1.8	.86	31.1	2.9	1.82	1.9	1.20	36T	6	L212	
L228	62.8	-3.7	-1.12	1.7	.79	27.4	-.8	-.48	1.2	.77	36T	6	L228	
L230	75.1	8.6	2.56	3.4	1.60	29.7	1.5	.95	1.7	1.07	36T	*	L230	
L242	65.7	-.9	-.26	2.8	1.31	27.4	-.8	-.48	2.1	1.32	36T	6	L242	
L243	65.2	-1.3	-.40	1.6	.76	28.2	.1	.05	.9	.58	36T	6	L243	
L262	68.0	1.5	.44	1.3	.63	31.7	3.5	2.19	1.4	.89	36T	6	L262	
L268	67.3	.8	.23	1.7	.82	27.4	-.7	-.45	1.1	.72	36T	6	L268	
L290	74.3	7.8	2.32	4.6	2.20	34.9	6.7	4.18	2.8	1.77	36T	X	L290	
L313	65.7	-.8	-.25	2.2	1.05	28.2	.0	.03	1.5	.92	36T	6	L313	
L315	68.9	2.4	.70	2.4	1.13	28.0	-.2	-.11	2.1	1.33	36T	6	L315	
L318	63.3	-3.2	-.97	2.3	1.10	27.3	-.9	-.53	1.1	.69	36T	6	L318	
L321	67.7	1.2	.36	2.2	1.04	28.0	-.2	-.11	1.6	1.00	36T	6	L321	
L324	66.5	.0	.00	2.2	1.05	26.9	-1.3	-.79	1.7	1.07	36T	6	L324	
L339	68.5	1.9	.58	1.6	.75	29.1	1.0	.59	1.1	.68	36T	6	L339	
L348	73.1	6.6	1.96	1.3	.62	31.0	2.8	1.75	1.7	1.08	36T	6	L348	
L388	95.1	28.6	8.54	4.9	2.32	47.2	19.1	11.86	3.6	2.28	36T	#	L388	
L442	63.9	-2.7	-.80	1.6	.74	28.0	-.2	-.10	2.4	1.50	36T	6	L442	
L484	59.8	-6.7	-2.02	1.2	.58	25.8	-2.3	-1.45	.9	.54	36T	6	L484	
L570	71.6	5.1	1.51	4.2	2.01	30.4	2.2	1.38	2.3	1.46	36T	6	L570	
L580	66.2	-.3	-.10	1.5	.73	28.2	.0	.01	1.5	.93	36T	6	L580	
L604	65.2	-1.3	-.39	1.8	.87	28.5	.3	.20	1.7	1.10	36T	6	L604	
L616	65.3	-1.2	-.36	1.1	.50	30.4	2.2	1.41	.6	.35	36T	6	L616	
L651	66.8	.3	.08	2.1	1.02	36.4	8.2	5.11	3.9	2.45	36T	X	L651	
L692	65.6	-.9	-.28	2.7	1.29	26.7	-1.4	-.89	2.1	1.35	36T	6	L692	
L703	63.7	-2.9	-.86	1.8	.87	27.7	-.4	-.27	1.7	1.05	36T	6	L703	
L729	63.9	-2.6	-.78	1.9	.89	27.7	-.4	-.27	2.1	1.32	36T	6	L729	
L731	69.0	2.5	.73	1.7	.83	29.0	.8	.51	2.4	1.52	36T	6	L731	
L737	66.6	.1	.03	3.9	1.86	25.2	-2.9	-1.82	1.5	.92	36T	6	L737	
L739	69.9	3.4	1.00	2.3	1.10	30.1	1.9	1.20	1.4	.91	36T	6	L739	
GR. MEAN =	66.5 TABER UNITS			GRAND MEAN =		28.2 TABER UNITS			TEST DETERMINATIONS =					10
SD MEANS =	3.3 TABER UNITS			SD OF MEANS =		1.6 TABER UNITS			33 LABS IN GRAND MEANS					
	AVERAGE SDR =		2.1 TABER UNITS			AVERAGE SDR =		1.6 TABER UNITS						
L250	58.9	-7.6	-2.29	1.4	.69	25.4	-2.8	-1.73	1.7	1.06	36U	*	L250	

TOTAL NUMBER OF LABORATORIES REPORTING = 40

Best values: Z18 67 ± 7 Taber units
A77 28 ± 3 Taber units

The following laboratories were omitted from the grand means because of extreme test results: 126

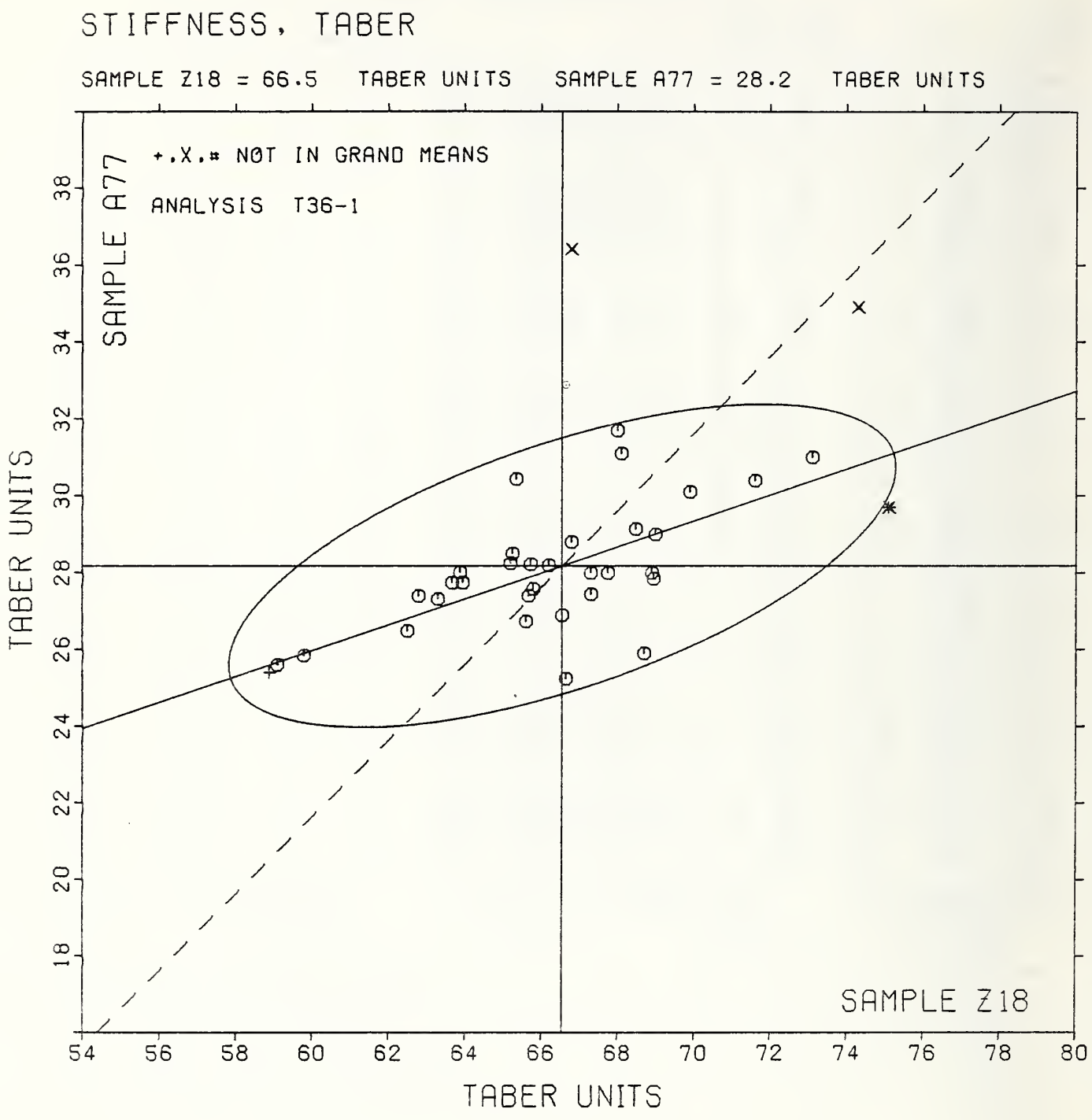
Data from the following laboratories appear to be off by a multiplicative factor: 207, 388

ANALYSIS T36-1 TABLE 2

TABER STIFFNESS

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

LAB CODE	F	MEANS Z18	MEANS A77	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L126	#	32.3	27.2	-32.8	10.0	.51	36T	STIFFNESS, TABER
L250	*	58.9	25.4	-8.1	-.2	.87	36U	STIFFNESS, TABER, 20 C, 65% RH
L123	G	59.1	25.6	-7.9	-.1	.93	36T	STIFFNESS, TABER
L484	G	59.8	25.8	-7.1	-.0	.56	36T	STIFFNESS, TABER
L173B	G	62.5	26.5	-4.4	-.3	.77	36T	STIFFNESS, TABER
L228	G	62.8	27.4	-3.8	.5	.78	36T	STIFFNESS, TABER
L318	G	63.3	27.3	-3.3	.2	.89	36T	STIFFNESS, TABER
L703	G	63.7	27.7	-2.9	.5	.96	36T	STIFFNESS, TABER
L442	G	63.9	28.0	-2.6	.7	1.12	36T	STIFFNESS, TABER
L729	G	63.9	27.7	-2.6	.4	1.11	36T	STIFFNESS, TABER
L243	G	65.2	28.2	-1.3	.5	.67	36T	STIFFNESS, TABER
L604	G	65.2	28.5	-1.1	.7	.99	36T	STIFFNESS, TABER
L616	G	65.3	30.4	-.4	2.5	.42	36T	STIFFNESS, TABER
L692	G	65.6	26.7	-1.4	-1.0	1.32	36T	STIFFNESS, TABER
L242	G	65.7	27.4	-1.1	-.4	1.32	36T	STIFFNESS, TABER
L313	G	65.7	28.2	-.8	.3	.98	36T	STIFFNESS, TABER
L107A	G	65.8	27.6	-.9	-.3	1.36	36T	STIFFNESS, TABER
L580	G	66.2	28.2	-.3	.1	.83	36T	STIFFNESS, TABER
L324	G	66.5	26.9	-.4	-1.2	1.06	36T	STIFFNESS, TABER
L737	G	66.6	25.2	-.8	-2.8	1.39	36T	STIFFNESS, TABER
L150	G	66.8	28.8	.4	.5	1.55	36T	STIFFNESS, TABER
L651	X	66.8	36.4	2.9	7.7	1.74	36T	STIFFNESS, TABER
L163	G	67.3	28.0	.7	-.4	1.11	36T	STIFFNESS, TABER
L268	G	67.3	27.4	.5	-.9	.77	36T	STIFFNESS, TABER
L321	G	67.7	28.0	1.1	-.6	1.02	36T	STIFFNESS, TABER
L262	G	68.0	31.7	2.5	2.9	.76	36T	STIFFNESS, TABER
L212	G	68.1	31.1	2.4	2.3	1.03	36T	STIFFNESS, TABER
L122	M	68.4				2.67	36D	STIFFNESS, TABER, DIGITAL READOUT
L339	G	68.5	29.1	2.1	.3	.72	36T	STIFFNESS, TABER
L158	G	68.7	25.9	1.3	-2.8	.83	36T	STIFFNESS, TABER
L315	G	68.9	28.0	2.2	-.9	1.23	36T	STIFFNESS, TABER
L182	G	68.9	27.8	2.2	-1.1	.77	36T	STIFFNESS, TABER
L731	G	69.0	29.0	2.6	-.0	1.17	36T	STIFFNESS, TABER
L739	G	69.9	30.1	3.8	.7	1.01	36T	STIFFNESS, TABER
L570	G	71.6	30.4	5.5	.5	1.74	36T	STIFFNESS, TABER
L348	G	73.1	31.0	7.1	.6	.85	36T	STIFFNESS, TABER
L290	X	74.3	34.9	9.5	3.9	1.98	36T	STIFFNESS, TABER
L230	*	75.1	29.7	8.6	-1.3	1.34	36T	STIFFNESS, TABER
L207	#	85.2	44.1	22.8	9.1	3.77	36T	STIFFNESS, TABER
L388	#	95.1	47.2	33.2	8.9	2.30	36T	STIFFNESS, TABER
GMEANS:		66.5	28.2			1.00		
		95% ELLIPSE:		9.2	3.2	WITH GAMMA = 18 DEGREES		


STIFFNESS, TABER
SAMPLE Z18 = 66.5 TABER UNITS
SAMPLE A77 = 28.2 TABER UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T36-1
SAMPLE A77
TABER UNITS
SAMPLE Z18
TABER UNITS
18
20
22
24
26
28
30
32
34
36
38
54
56
58
60
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REPORT NO. 635 TAPPI COLLABORATIVE REFERENCE PROGRAM JANUARY 1980

ANALYSIS 749-1 TABLE 1

SURFACE PICK STRENGTH, IGT - VISCOSITY VELOCITY PRODUCT (VVP) IN KILOPOISE CENTIMETERS/SECOND

TAPPI SUGGESTED METHODS T514 SU-69 AND T499 SU-64

LAB CODE	SAMPLE H81 PRINTING 84 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE B80 COATED OFFSET BOOK 75 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.= 4 VAR	F	LAB
L122	57.3	-27.7	-1.15	1.1	.23	27.9	-14.7	-.78	.4	.18	49Q	G	L122
L149	68.4	-16.6	-.69	4.5	.94	34.8	-7.7	-.41	1.6	.65	49L	G	L149
L182I	109.5	24.5	1.02	4.0	.84	31.8	-10.8	-.57	1.5	.64	49Q	G	L182I
L190C	51.7	-33.3	-1.38	2.5	.52	25.5	-17.1	-.90	1.9	.81	49T	G	L190C
L207	70.0	-15.0	-.62	12.0	2.48	36.2	-6.3	-.33	2.5	1.05	49I	G	L207
L242	55.6	-29.4	-1.22	3.4	.70	20.5	-22.1	-1.17	2.5	1.06	49Q	G	L242
L243	84.8	-.2	-.01	6.5	1.33	46.4	3.8	.20	3.0	1.26	49T	G	L243
L277	107.6	22.6	.94	2.1	.44	44.4	1.8	.10	3.0	1.28	49I	G	L277
L280	70.9	-14.1	-.59	11.5	2.39	31.7	-10.9	-.57	3.7	1.57	49Q	G	L280
L291	93.3	8.3	.34	2.9	.60	46.9	4.3	.23	4.4	1.85	49I	G	L291
L388	137.7	52.7	2.19	5.4	1.12	75.6	33.0	1.75	.0	.00	49Q	#	L388
L484	998.5	913.5	38.00	13.0	2.69	331.5	288.9	15.28	11.0	4.62	49F	#	L484
L564	83.4	-1.6	-.07	4.9	1.01	36.2	-6.4	-.34	1.2	.51	49D	G	L564
L598	125.0	40.0	1.66	5.0	1.04	55.5	12.9	.68	2.4	1.00	49W	G	L598
L643	120.2	35.2	1.47	4.5	.93	93.5	50.9	2.69	2.9	1.22	49I	G	L643
L738	90.5	5.5	.23	2.5	.52	120.0	77.4	4.09	8.2	3.44	49I	#	L738
L739	92.3	7.3	.30	2.7	.55	64.5	22.0	1.16	2.2	.91	49I	G	L739
L746	69.2	-15.8	-.66	15.7	3.24	50.8	8.2	.44	6.2	2.61	49F	#	L746

GR. MEAN = 85.0 KP CM/SEC GRAND MEAN = 42.6 KP CM/SEC TEST DETERMINATIONS = 4

SD MEANS = 24.0 KP CM/SEC SD OF MEANS = 18.9 KP CM/SEC 14 LABS IN GRAND MEANS

AVERAGE SDR = 4.8 KP CM/SEC AVERAGE SDR = 2.4 KP CM/SEC

TOTAL NUMBER OF LABORATORIES REPORTING = 18

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.

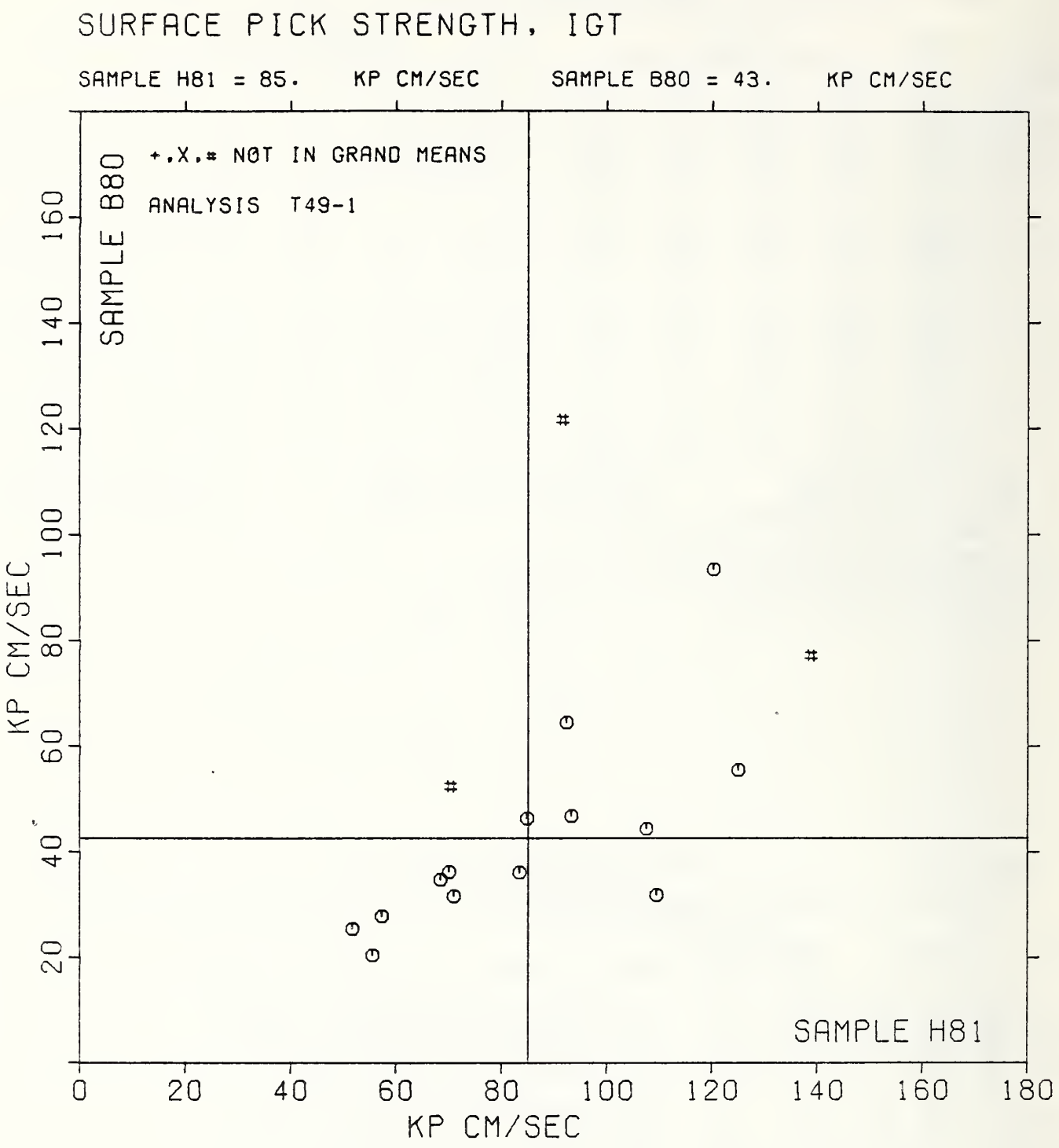
REPORT NO. 635 TAPPI COLLABORATIVE REFERENCE PROGRAM JANUARY 1980

ANALYSIS 749-1 TABLE 2

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 H81	B80	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L190C	G	51.7	25.5	-37.0	5.6	.66	49T	SURFACE PICK STRENGTH,IGT, IPC FLUID
L242	G	55.6	20.5	-36.8	-.7	.88	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L122	G	57.3	27.9	-31.0	4.3	.21	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L149	G	68.4	34.8	-18.0	3.5	.79	49L	SURFACE PICK STRENGTH,IGT, PIB FLUID
L746	#	69.2	50.8	-8.0	15.9	2.93	49F	SURFACE PICK STRENGTH,IGT, INK
L207	G	70.0	36.2	-15.5	3.7	1.77	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L280	G	70.9	31.7	-17.8	-.6	1.98	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L564	G	83.4	36.2	-5.0	-4.2	.76	49D	SURFACE PICK STRENGTH,IGT, INK
L243	G	84.8	46.4	2.1	3.2	1.30	49T	SURFACE PICK STRENGTH,IGT, IPC FLUID
L738	#	90.5	120.0	49.7	59.6	1.98	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L739	G	92.3	64.5	18.8	13.6	.73	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L291	G	93.3	46.9	9.2	-1.3	1.23	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L277	G	107.6	44.4	19.4	-11.7	.86	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L182I	G	109.5	31.8	13.6	-23.1	.74	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L643	G	120.2	93.5	58.4	20.7	1.07	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L598	G	125.0	55.5	40.0	-12.9	1.02	49W	SURFACE PICK STRENGTH,IGT, OIL
L388	#	137.7	75.6	62.1	-4.0	.56	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L484	#	998.5	331.5	910.0	-299.7	3.66	49P	SURFACE PICK STRENGTH,IGT, IGT OIL
GMEANS:		85.0	42.6			1.00		
		95% ELLIPSE:		82.9	31.7	WITH GAMMA = 35 DEGREES		


SURFACE PICK STRENGTH, IGT
SAMPLE H81 = 85. KP CM/SEC
SAMPLE B80 = 43. KP CM/SEC
+,X,# NOT IN GRAND MEANS
ANALYSIS T49-1
SAMPLE B80
KP CM/SEC
SAMPLE H81
KP CM/SEC
0 20 40 60 80 100 120 140 160 180
20 40 60 80 100 120 140 160

ANALYSIS 750-1 TABLE 1

SURFACE PICK STRENGTH, WAX NUMBER

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

LAB CODE	SAMPLE H81 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	SAMPLE B80 MEAN	COATED OFFSET STOCK 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	TEST VAR	D.* F	LAB
L105	10.80	-.67	-.70	.45	.84	8.20	-.29	-.34	.45	1.08	50%	G	L105
L115	12.40	.93	.97	.55	1.03	9.80	1.31	1.56	.45	1.08	50%	G	L115
L122	13.60	2.13	2.23	.55	1.03	10.00	1.51	1.80	.00	.00	50%	G	L122
L158	11.20	-.27	-.28	.45	.84	9.00	.51	.61	.00	.00	50%	G	L158
L162	13.00	1.53	1.60	.00	.00	9.00	.51	.61	.00	.00	50%	G	L162
L173A	10.60	-.87	-.90	.55	1.03	8.20	-.29	-.34	.45	1.08	50%	G	L173A
L182W	11.60	.13	.14	.55	1.03	8.00	-.49	-.58	.00	.00	50%	G	L182W
L183	12.00	.53	.56	.71	1.33	8.40	-.09	-.11	.55	1.32	50%	G	L183
L195	11.20	-.27	-.28	.45	.84	8.40	-.09	-.11	.55	1.32	50%	G	L195
L213	12.20	.73	.77	.45	.84	8.80	.31	.37	.45	1.08	50%	G	L213
L225	11.40	-.07	-.07	.55	1.03	8.00	-.49	-.58	.71	1.70	50%	G	L225
L228	11.20	-.27	-.28	.84	1.57	7.40	-1.09	-1.30	.55	1.32	50%	G	L228
L230	11.00	-.47	-.49	.71	1.33	8.60	.11	.13	.55	1.32	50%	G	L230
L243	8.80	-2.67	-2.78	.45	.84	7.00	-1.49	-1.77	.00	.00	50%	#	L243
L285	11.40	-.07	-.07	.55	1.03	10.80	2.31	2.75	.45	1.08	50%	#	L285
L339	12.40	.93	.97	.55	1.03	10.00	1.51	1.80	.71	1.70	50%	G	L339
L366	10.00	-1.47	-1.53	.71	1.33	8.60	.11	.13	.55	1.32	50%	G	L366
L567	16.00	4.53	4.73	.00	.00	10.00	1.51	1.80	.00	.00	50%	#	L567
L616	10.80	-.67	-.70	.45	.84	7.60	-.89	-1.06	.55	1.32	50%	G	L616
L697	9.20	-2.27	-2.37	.84	1.57	8.80	.31	.37	.84	2.01	50%	#	L697
L729	10.40	-1.07	-1.11	.55	1.03	7.60	-.89	-1.06	.55	1.32	50%	G	L729
L746	10.60	-.87	-.90	.55	1.03	7.20	-1.29	-1.53	.45	1.08	50%	G	L746

GR. MEAN = 11.47 WAX NUMBER GRAND MEAN = 8.49 WAX NUMBER TEST DETERMINATIONS = 5

SD MEANS = .96 WAX NUMBER SD OF MEANS = .84 WAX NUMBER 18 LABS IN GRAND MEANS

AVERAGE SDR = .53 WAX NUMBER AVERAGE SDR = .42 WAX NUMBER

TOTAL NUMBER OF LABORATORIES REPORTING = 22

Best values: H81 11.5 ± 1.4 wax number
B80 8.5 ± 1.3 wax number

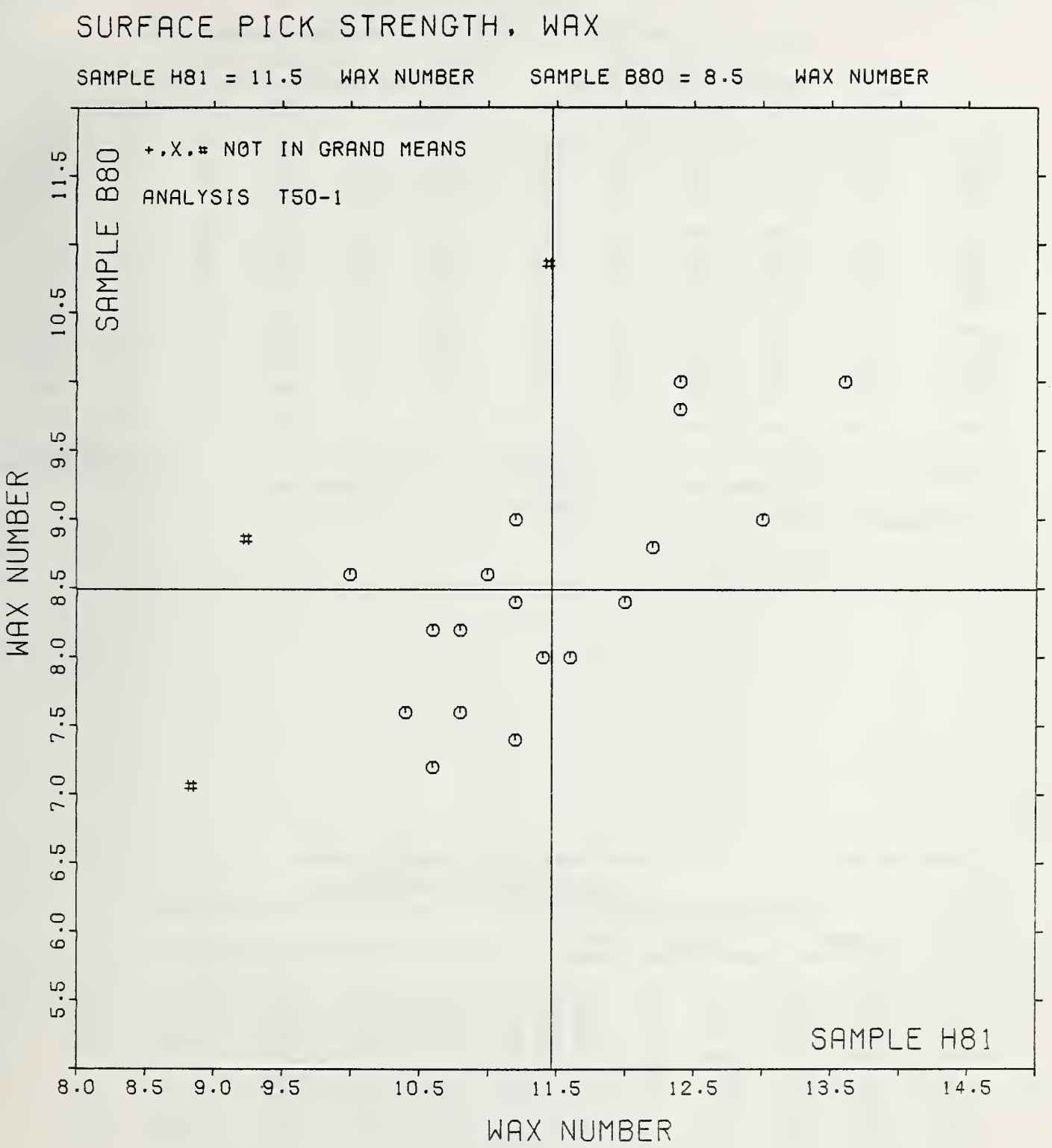
The following laboratories were omitted from the grand means because of extreme test results: 243, 285, 567, 697

ANALYSIS 150-1 TABLE 2

SURFACE PICK STRENGTH, WAX NUMBER

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

LAB CODE	F	MEANS B81	MEANS B80	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L243	#	8.80	7.00	-3.00	.57	.42	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L697	#	9.20	8.80	-1.54	1.69	1.79	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L366	O	10.00	8.60	-1.05	1.03	1.32	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L729	O	10.40	7.60	-1.39	.00	1.17	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L746	O	10.60	7.20	-1.49	-.43	1.05	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L173A	O	10.60	8.20	-.85	.33	1.05	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L616	O	10.80	7.60	-1.08	-.26	1.08	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L105	O	10.80	8.20	-.70	.21	.96	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L230	O	11.00	8.60	-.29	.38	1.32	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L158	O	11.20	9.00	.12	.56	.42	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L195	O	11.20	8.40	-.26	.10	1.08	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L228	O	11.20	7.40	-.90	-.67	1.44	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L285	#	11.40	10.80	1.43	1.82	1.05	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L225	O	11.40	8.00	-.36	-.33	1.37	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L182W	O	11.60	8.00	-.21	-.46	.51	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L183	O	12.00	8.40	.35	-.41	1.32	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L213	O	12.20	8.80	.76	-.23	.96	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L115	O	12.40	9.80	1.56	.41	1.05	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L339	O	12.40	10.00	1.68	.56	1.37	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L162	O	13.00	9.00	1.50	-.59	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L122	O	13.60	10.00	2.61	-.21	.51	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L567	#	16.00	10.00	4.45	-1.74	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
GMEANS:		11.47	8.49			1.00		
		95% ELLIPSE:		3.29	1.31	WITH GAMMA = 39 DEGREES		


SURFACE PICK STRENGTH, WAX
SAMPLE H81 = 11.5 WAX NUMBER
SAMPLE B80 = 8.5 WAX NUMBER
+,X,# NOT IN GRAND MEANS
ANALYSIS T50-1
SAMPLE B80
SAMPLE H81
WAX NUMBER
WAX NUMBER
11.5
10.5
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
8.0
8.5
9.0
9.5
10.5
11.5
12.5
13.5
14.5

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ANALYSIS T91-1 TABLE 1

CONCORA MEDIUM TEST, NEWTONS(CMT)

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

LAB CODE	SAMPLE Z13 MEAN	CORRUGATING MEDIUM 125 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE Z21 MEAN	CORRUGATING MEDIUM 127 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D. = 10 VAR	F	LAB
L100	289.	-13.	-.59	20.	1.13	194.	1.	.09	11.	1.01	91N	6	L100
L182	324.	21.	.94	20.	1.12	205.	12.	.77	10.	.90	91N	6	L182
L185	311.	8.	.36	18.	.99	183.	-10.	-.64	10.	.93	91A	6	L185
L218	285.	-17.	-.76	10.	.54	203.	10.	.62	9.	.78	91A	6	L218
L242	273.	-29.	-1.27	26.	1.48	178.	-15.	-1.00	15.	1.38	91G	6	L242
L269	284.	-19.	-.82	21.	1.18	191.	-2.	-.12	15.	1.36	91P	6	L269
L280	352.	50.	2.19	15.	.85	218.	25.	1.61	17.	1.54	91N	6	L280
L313	318.	16.	.68	19.	1.04	229.	36.	2.32	5.	.50	91L	6	L313
L329	284.	-18.	-.80	13.	.76	183.	-10.	-.64	10.	.95	91P	6	L329
L394	281.	-22.	-.95	11.	.61	178.	-15.	-.95	8.	.75	91P	6	L394
L484	314.	11.	.50	15.	.87	183.	-10.	-.67	11.	.98	91N	6	L484
L621	283.	-19.	-.84	16.	.88	169.	-24.	-1.57	11.	1.05	91P	6	L621
L622	299.	-3.	-.15	18.	1.04	197.	4.	.23	11.	.97	91N	6	L622
L650	298.	-4.	-.20	20.	1.14	187.	-6.	-.38	9.	.83	91N	6	L650
L666	342.	39.	1.72	21.	1.20	193.	-0.	-.03	11.	1.03	91P	6	L666
L733	302.	0.	.00	21.	1.18	199.	6.	.37	11.	1.05	91P	6	L733

GR. MEAN = 302. N(CMT) GRAND MEAN = 193. N(CMT) TEST DETERMINATIONS = 10

SD MEANS = 23. N(CMT) SD OF MEANS = 15. N(CMT) 16 LABS IN GRAND MEANS

AVERAGE SDR = 18. N(CMT) AVERAGE SDR = 11. N(CMT)

GR. MEAN = 68.00 POUNDS GRAND MEAN = 43.41 POUNDS

TOTAL NUMBER OF LABORATORIES REPORTING = 16

Best values: Z13 300 ± 40 newtons

Z21 190 ± 30 newtons

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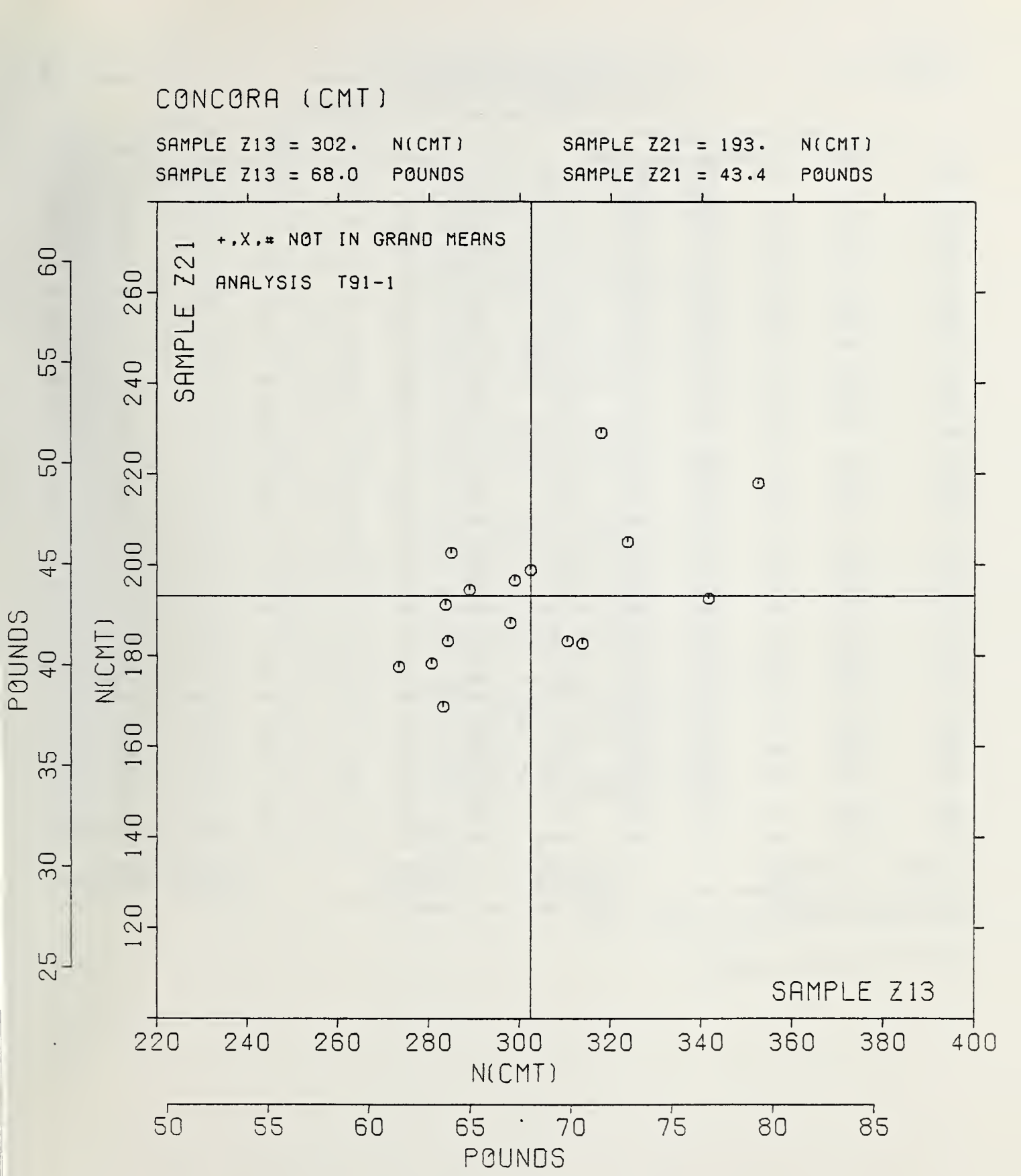
ANALYSIS T91-1 TABLE 2

CONCORA MEDIUM TEST, NEWTONS(CMT)

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

LAB CODE	F	MEANS Z13	Z21	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L242	6	273.	178.	-33.	-0.	1.43	91G	FLAT CRUSH STRENGTH, CONCORA, GAYDON FLAT CRUSH TESTER
L394	6	281.	178.	-26.	-3.	.68	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L621	6	283.	169.	-28.	-12.	.96	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L269	6	284.	191.	-17.	7.	1.27	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L329	6	284.	183.	-21.	-0.	.86	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L218	6	285.	203.	-11.	17.	.66	91A	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L100	6	289.	194.	-11.	8.	1.07	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L650	6	298.	187.	-7.	-3.	.98	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L622	6	299.	197.	-1.	5.	1.01	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L733	6	302.	199.	3.	5.	1.11	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L185	6	311.	183.	3.	-13.	.96	91A	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L484	6	314.	183.	5.	-15.	.92	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L313	6	318.	229.	30.	24.	.77	91L	FLAT CRUSH STRENGTH, CONCORA, LIBERTY
L182	6	324.	205.	24.	1.	1.01	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L666	6	342.	193.	34.	-19.	1.11	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L280	6	352.	218.	56.	-1.	1.19	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
GMEANS:		302.	193.			1.00		
		95% ELLIPSE:		71.	32.	WITH GAMMA = 27 DEGREES		


CONCORA (CMT)
SAMPLE Z13 = 302. N(CMT)
SAMPLE Z13 = 68.0 POUNDS
SAMPLE Z21 = 193. N(CMT)
SAMPLE Z21 = 43.4 POUNDS
+,X,* NOT IN GRAND MEANS
ANALYSIS T91-1
SAMPLE Z21
SAMPLE Z13
N(CMT)
POUNDS
120 140 160 180 200 220 240 260
25 30 35 40 45 50 55 60
220 240 260 280 300 320 340 360 380 400
50 55 60 65 70 75 80 85

ANALYSIS 196-1 TABLE 1

RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)

TAPPI OFFICIAL TEST METHOD T818 OS-76

LAB CODE	SAMPLE E61 LINER 194 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE Z20 42 LB. LINER 200 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.* 10 VAR	F	LAB
L100	327.	-14.	-.39	32.	1.37	379.	19.	.49	30.	1.28	S6N	C	L100
L107	274.	-67.	-1.89	22.	.92	289.	-71.	-1.79	29.	1.24	S6P	C	L107
L114	342.	1.	.03	19.	.82	338.	-22.	-.55	24.	1.03	S6P	C	L114
L122	326.	-16.	-.45	14.	.61	337.	-23.	-.57	17.	.72	S6P	C	L122
L124	315.	-26.	-.75	36.	1.53	306.	-53.	-1.35	32.	1.36	S6P	C	L124
L126	370.	29.	.81	10.	.43	388.	29.	.73	19.	.81	S6P	C	L126
L141	282.	-60.	-1.68	59.	2.48	307.	-53.	-1.33	39.	1.66	S6P	C	L141
L157	331.	-10.	-.28	24.	1.01	333.	-27.	-.67	33.	1.39	S6P	C	L157
L171	288.	-53.	-1.49	48.	2.03	325.	-34.	-.86	31.	1.30	S6N	C	L171
L182	383.	42.	1.19	20.	.86	400.	41.	1.04	26.	1.11	S6N	C	L182
L191	286.	-56.	-1.57	59.	2.49	295.	-64.	-1.63	65.	2.74	S6P	C	L191
L218	329.	-13.	-.36	8.	.32	307.	-53.	-1.33	19.	.80	S6I	C	L218
L234	290.	-51.	-1.45	44.	1.88	323.	-36.	-.91	30.	1.26	S6P	C	L234
L237	362.	20.	.57	35.	1.47	379.	20.	.49	20.	.86	S6P	C	L237
L242	372.	30.	.85	22.	.93	394.	35.	.88	23.	.95	S6G	C	L242
L243	385.	43.	1.22	21.	.87	405.	46.	1.16	23.	.96	S6P	C	L243
L305	390.	48.	1.36	26.	1.08	429.	70.	1.77	12.	.49	S6P	C	L305
L329	400.	59.	1.66	20.	.86	433.	73.	1.86	25.	1.04	S6P	C	L329
L333	369.	27.	.77	17.	.71	379.	20.	.51	23.	.97	S6P	C	L333
L336	371.	29.	.82	18.	.75	378.	19.	.47	21.	.87	S6P	C	L336
L350	299.	-42.	-1.18	51.	2.16	323.	-36.	-.92	21.	.89	S6P	C	L350
L393	364.	23.	.64	13.	.54	371.	11.	.28	13.	.55	S6P	C	L393
L484	341.	-0.	-.01	14.	.57	350.	-9.	-.23	16.	.67	S6R	C	L484
L553	352.	11.	.31	25.	1.08	361.	2.	.04	21.	.89	S6P	C	L553
L562	313.	-28.	-.80	17.	.71	332.	-28.	-.70	25.	1.05	S6P	C	L562
L570	305.	-37.	-1.03	16.	.68	366.	6.	.16	16.	.68	S6P	*	L570
L580	373.	32.	.90	27.	1.12	412.	52.	1.33	14.	.60	S6P	C	L580
L603	395.	54.	1.51	20.	.86	419.	59.	1.50	18.	.76	S6P	C	L603
L610	382.	40.	1.13	13.	.55	386.	27.	.67	22.	.94	S6P	C	L610
L617	356.	15.	.42	15.	.63	346.	-13.	-.34	21.	.88	S6P	C	L617
L621	361.	19.	.54	23.	.96	383.	24.	.60	27.	1.12	S6P	C	L621
L623	349.	7.	.21	15.	.65	388.	28.	.72	28.	1.18	S6P	C	L623
L649	368.	26.	.74	12.	.49	388.	28.	.72	27.	1.12	S6P	C	L649
L650	339.	-2.	-.07	14.	.58	380.	21.	.53	14.	.59	S6N	C	L650
L663	304.	-38.	-1.06	13.	.57	307.	-52.	-1.32	14.	.58	S6P	C	L663
L676	346.	4.	.12	13.	.55	379.	20.	.50	16.	.66	S6P	C	L676
L686	345.	4.	.11	22.	.92	336.	-23.	-.58	25.	1.06	S6P	C	L686
L703	291.	-51.	-1.43	15.	.65	306.	-53.	-1.35	15.	.63	S6J	C	L703

GR. MEAN * 341. NEWTONS GRAND MEAN * 359. NEWTONS TEST DETERMINATIONS * 10

SD MEANS * 36. NEWTONS SD OF MEANS * 40. NEWTONS 38 LABS IN GRAND MEANS

AVERAGE SDR * 24. NEWTONS AVERAGE SDR * 24. NEWTONS

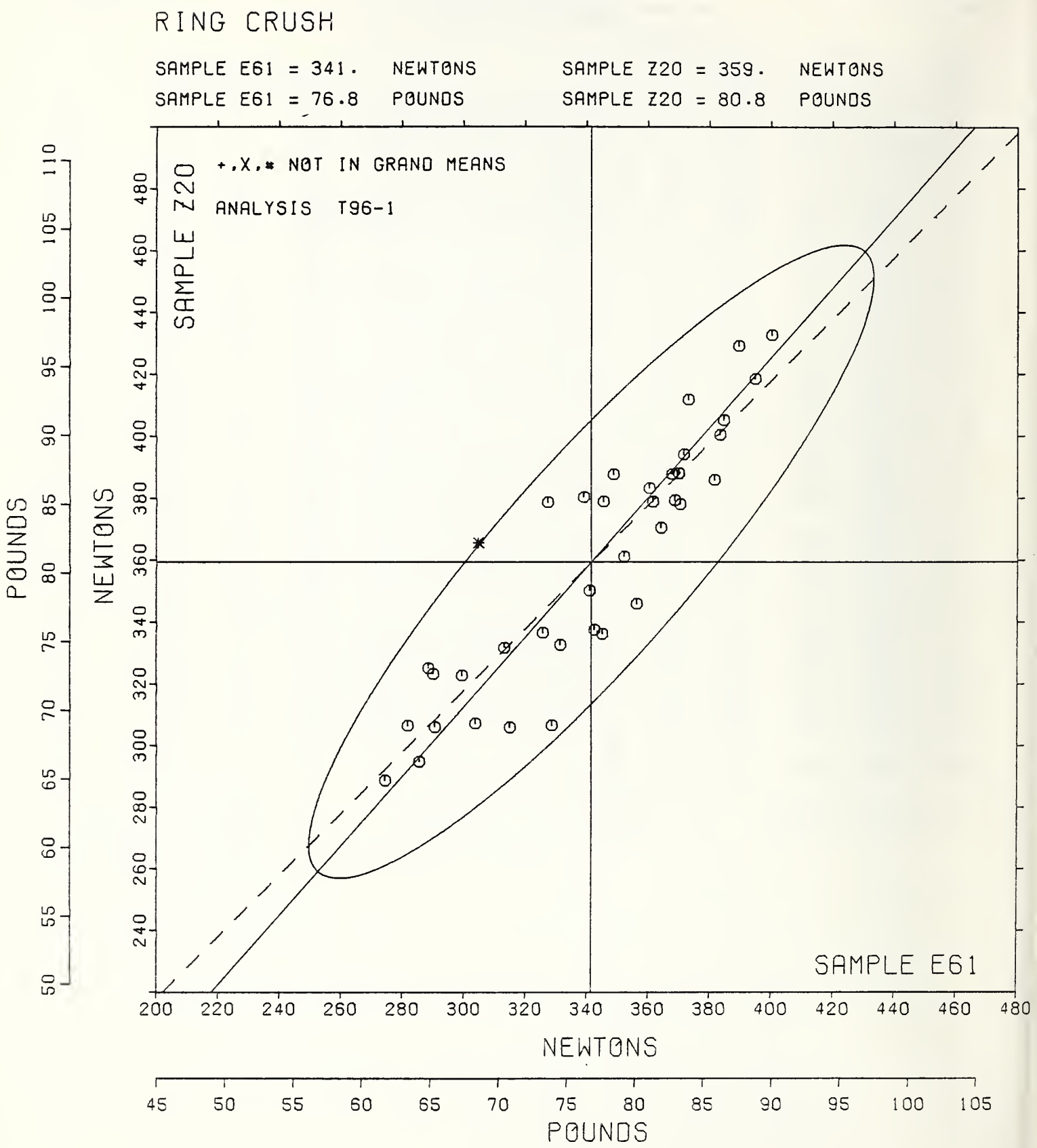
GR. MEAN * 76.75 POUNDS GRAND MEAN * 80.80 POUNDS

TOTAL NUMBER OF LABORATORIES REPORTING * 38

Best values: E61 340 ± 50 newtons
Z20 360 ± 60 newtons

ANALYSIS 796-1 TABLE 2
RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)
TAPPI OFFICIAL TEST METHOD T818 OS-76

LAB CODE	F	MEANS E61	MEANS Z20	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L107	6	274.	289.	-97.	3.	1.08	96P	RING CRUSH, TMI/HINDE & DAUCH
L141	6	282.	307.	-79.	10.	2.07	96P	RING CRUSH, TMI/HINDE & DAUCH
L191	6	286.	295.	-85.	-1.	2.61	96P	RING CRUSH, TMI/HINDE & DAUCH
L171	6	288.	325.	-61.	17.	1.67	96N	RING CRUSH, TMI/HINDE & DAUCH
L234	6	290.	323.	-61.	15.	1.57	96P	RING CRUSH, TMI/HINDE & DAUCH
L703	6	291.	306.	-74.	3.	.64	96J	RING CRUSH, INSTRON
L350	6	299.	323.	-55.	7.	1.52	96P	RING CRUSH, TMI/HINDE & DAUCH
L663	6	304.	307.	-64.	-6.	.57	96P	RING CRUSH, TMI/HINDE & DAUCH
L570	*	305.	366.	-20.	32.	.68	96P	RING CRUSH, TMI/HINDE & DAUCH
L562	6	313.	332.	-39.	3.	.88	96P	RING CRUSH, TMI/HINDE & DAUCH
L124	6	315.	306.	-58.	-16.	1.44	96P	RING CRUSH, TMI/HINDE & DAUCH
L122	6	326.	337.	-27.	-3.	.66	96P	RING CRUSH, TMI/HINDE & DAUCH
L100	6	327.	379.	5.	23.	1.32	96N	RING CRUSH, TMI/HINDE & DAUCH
L218	6	329.	307.	-48.	-25.	.56	96I	RING CRUSH, INSTRON
L157	6	331.	333.	-27.	-10.	1.20	96P	RING CRUSH, TMI/HINDE & DAUCH
L650	6	339.	380.	14.	16.	.59	96N	RING CRUSH, TMI/HINDE & DAUCH
L484	6	341.	350.	-7.	-6.	.62	96R	RING CRUSH, REGMED
L114	6	342.	338.	-16.	-15.	.93	96P	RING CRUSH, TMI/HINDE & DAUCH
L686	6	345.	336.	-15.	-18.	.99	96P	RING CRUSH, TMI/HINDE & DAUCH
L676	6	346.	379.	17.	10.	.61	96P	RING CRUSH, TMI/HINDE & DAUCH
L623	6	349.	388.	26.	13.	.91	96P	RING CRUSH, TMI/HINDE & DAUCH
L553	6	352.	361.	9.	-7.	.98	96P	RING CRUSH, TMI/HINDE & DAUCH
L617	6	356.	346.	-0.	-20.	.75	96P	RING CRUSH, TMI/HINDE & DAUCH
L621	6	361.	383.	31.	2.	1.04	96P	RING CRUSH, TMI/HINDE & DAUCH
L237	6	362.	379.	28.	-2.	1.16	96P	RING CRUSH, TMI/HINDE & DAUCH
L393	6	364.	371.	23.	-10.	.54	96P	RING CRUSH, TMI/HINDE & DAUCH
L649	6	368.	388.	39.	-1.	.81	96P	RING CRUSH, TMI/HINDE & DAUCH
L333	6	369.	379.	33.	-7.	.84	96P	RING CRUSH, TMI/HINDE & DAUCH
L126	6	370.	388.	40.	-2.	.62	96P	RING CRUSH, TMI/HINDE & DAUCH
L336	6	371.	378.	33.	-9.	.81	96P	RING CRUSH, TMI/HINDE & DAUCH
L242	6	372.	394.	46.	0.	.94	96G	RING CRUSH, GAYDON FLAT CRUSH TESTER
L580	6	373.	412.	60.	11.	.86	96P	RING CRUSH, TMI/HINDE & DAUCH
L610	6	382.	386.	47.	-12.	.75	96P	RING CRUSH, TMI/HINDE & DAUCH
L182	6	383.	400.	59.	-4.	.98	96N	RING CRUSH, TMI/HINDE & DAUCH
L243	6	385.	405.	63.	-2.	.92	96P	RING CRUSH, TMI/HINDE & DAUCH
L305	6	390.	429.	84.	10.	.79	96P	RING CRUSH, TMI/HINDE & DAUCH
L603	6	395.	419.	80.	-1.	.81	96P	RING CRUSH, TMI/HINDE & DAUCH
L329	6	400.	433.	94.	5.	.95	96P	RING CRUSH, TMI/HINDE & DAUCH
GMEANS:		341.	359.			1.00		
		95% ELLIPSE:		134.	32.	WITH GAMMA = 48 DEGREES		


RING CRUSH
SAMPLE E61 = 341. NEWTONS
SAMPLE E61 = 76.8 POUNDS
SAMPLE Z20 = 359. NEWTONS
SAMPLE Z20 = 80.8 POUNDS
+,X,* NOT IN GRAND MEANS
ANALYSIS T96-1
SAMPLE Z20
NEWTONS
POUNDS
SAMPLE E61
NEWTONS
POUNDS

SUMMARY TABLE

TEST METHOD		SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDS	REPL CHP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPROD
BURSTING STRENGTH, MODEL C		A57	31.8	2.5	2.1	15	39	52	10	1.8	7.1
T10-1	PSI	B06	32.5	2.3	1.6					1.4	6.3
BURSTING STRENGTH, MODEL C-A		A57	31.3	1.9	2.0	15	40	42	10	1.8	5.4
T10-2	PSI	B06	32.4	1.9	1.7					1.5	5.4
BURSTING STRENGTH, HIGH RANGE		Z16	74.7	2.2	5.2	15	37	54	10	4.5	6.5
T11-1	PSI	Z23	80.9	2.9	4.8					4.2	8.3
TEARING STRENGTH, PRINTING PAPERS		G16	50.4	2.1	1.5	15	120	145	10	1.3	5.9
T15-1	GRAMS	G28	68.7	4.0	2.2					1.9	11.2
TEARING STRENGTH, PACKAGING PAPERS		G20	104.8	3.0	4.5	15	8	19	10	3.5	8.5
T16-1	GRAMS	B76	119.2	3.8	5.2					4.6	10.8
TENSILE STRENGTH, PACKAGING PAPERS		G18	6.81	.30	.38	20	57	61	10	.33	.87
T19-1	KILONEWTON/M	G24	9.10	.46	.51					.44	1.30
TENSILE STR., CRE, PRINTING PAPERS		B96	4.50	.27	.22	20	47	55	10	.19	.75
T20-1	KILONEWTON/M	G28	5.92	.38	.28					.25	1.08
TENSILE STR., PENDULUM, PRINTING P.		B96	4.59	.22	.23	20	42	43	10	.20	.62
T20-2	KILONEWTON/M	G28	5.95	.37	.30					.26	1.03
T. E. A., PACKAGING PAPERS		G18	69.9	5.3	8.6	20	23	25	10	7.5	15.6
T25-1	JOULES/SQ M	G24	82.5	8.6	10.5					9.2	24.7
T. E. A., PRINTING PAPERS		B96	41.4	3.3	5.2	20	16	22	10	4.5	9.7
T26-1	JOULES/SQ M	G28	58.3	4.7	6.4					5.6	13.5
ELONGATION TO BREAK, PACKAGING PAPER		G18	1.655	.127	.142	20	24	26	10	.124	.364
T28-1	PERCENT	G24	1.562	.164	.117					.102	.460
ELONGATION TO BREAK, PRINTING PAPER		B96	1.425	.154	.131	20	21	26	10	.114	.434
T29-1	PERCENT	G28	1.563	.160	.121					.106	.451
FOLDING ENDURANCE (MIT)		B80	44.	14.	14.	15	43	50	10	13.	40.
T30-1	DOUBLE FOLDS	A30	87.	20.	28.					24.	57.
FOLDING ENDURANCE (MIT)		B80	1.59	.17	.15	15	43	50	10	.13	.47
T30-2	LOG(10) FOLD	A30	1.91	.11	.14					.12	.31
STIFFNESS, GURLEY		A58	280.3	23.4	18.0	10	32	37	10	15.7	64.8
T35-1	GURLEY UNITS	K42	109.1	13.2	6.9					6.1	36.6
STIFFNESS, TABER		Z18	66.5	3.3	2.1	10	33	40	5	2.6	9.4
T36-1	TABER UNITS	A77	28.2	1.6	1.6					2.0	4.7
SURFACE PICK STRENGTH, IGT		H81	85.0	24.0	4.8	4	14	18	4	6.7	66.6
T49-1	KP CM/SEC	B80	42.6	18.9	2.4					3.3	52.4
SURFACE PICK STRENGTH, WAX		H81	11.47	.96	.53	5	18	22	5	.66	2.65
T50-1	WAX NUMBER	B80	8.49	.84	.42					.52	2.33
CONCORA (CMT)		Z13	302.	23.	18.	10	16	16	10	16.	63.
T91-1	N(CMT)	Z21	193.	15.	11.					10.	43.
RING CRUSH		E61	341.	36.	24.	10	38	38	10	21.	98.
T96-1	NEWTONS	Z20	359.	40.	24.					21.	110.

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☐ Document describes a computer program; SF-185, FIPS Software Summary, is attached.

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.

17. KEY WORDS *(six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons)*

Collaborative reference program; Laboratory evaluation; Paper; Precision; Reference samples; Testing calibration

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