TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

NBSIR 80-1825

COLLABORATIVE REFERENCE PROGRAM FOR PAPER

REPORT NO. 62S
STRENGTH TESTS

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

NBS COLLABORATIVE REFERENCE PROGRAMS

TAPPI Paper and Board (6 times per year)

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

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- Color and color difference

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ASTM Cement (2 times per year)

- Chemical (11 chemical components)
- Physical (15 characteristics)

AASHTO Bituminous

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

NBS Collaborative Reference Programs
A05 Technology Building
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TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM FOR PAPER

Report No. 62S
STRENGTH TESTS

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NBSIR 80-1825

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

INTRODUCTION

Reports 62S and 62G comprise the second 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

February 25, 1980

TAPPI-NBS COLLABORATIVE REFERENCE PROGRAM

BACKGROUND AND PURPOSE

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

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

HOW THE PROGRAM WORKS

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

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

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

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

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

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

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

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

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65-2 Blue Reflectance, Diffuse, Elrepho (Gloss Trap)
65-3 Blue Reflectance, Diffuse, Elrepho (No Gloss Trap)
75-1 Specular Gloss, 75 degree, High Range
76-1 Specular Gloss, 75 degree, Low Range
90-1 Thickness (Caliper)
95-1 Grammage (Basis Weight)

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

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

F - Flag, with following meaning:

- **G -** 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 VAR was non-standard for the analysis.
- **M -** Excluded because data for one sample are missing.
- **S -** Included in grand mean but only after omission of one or more "wild" values; that is test determinations more than 3 times AVERAGE SDR from the laboratory's MEAN. Not more than 20% of the test determination may be excluded in this manner without rejecting the laboratory.

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

COORDINATES - Distances along major and minor axes of error 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 'O'. A participant whose plotted point falls outside of the ellipse should carefully reexamine the testing procedure he or she is following.

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

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

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

REPL 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 T1200 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 K38 PRINTING 75 GRAMS PER SQUARE METER MEAN	DEV	No. DEV	SDR	R. SDR	SAMPLE A57 ENVELOPE 89 GRAMS PER SQUARE METER MEAN	DEV	No. DEV	SDR	R. SDR	VAR	F	LAB	TEST Do = 15
L121	27.7	-.4	-.21	1.9	.94	30.3	-1.6	-.66	2.5	1.14	10C	0	L121	
L134	31.5	3.4	1.33	1.5	.73	36.5	4.6	1.91	1.9	.85	10C	0	L134	
L150	28.2	.1	.02	2.4	1.22	32.6	.7	.30	1.7	.75	10C	0	L150	
L158	29.2	1.0	.47	2.3	1.16	32.7	.9	.36	3.2	1.45	10C	0	L158	
L167	26.4	-1.8	-.83	.9	.47	29.1	-2.8	-1.14	1.4	.63	10C	0	L167	
L183	27.3	-.8	-.39	2.0	1.03	31.3	-.6	-.25	1.6	.74	10C	0	L183	
L191	30.9	2.7	1.27	1.8	.89	33.6	1.8	.73	2.9	1.33	10C	0	L191	
L203A	25.5	-2.7	-1.25	2.0	.98	29.5	-2.3	-.96	1.9	.88	10C	0	L203A	
L203B	31.0	2.8	1.31	3.0	1.50	36.4	4.5	1.85	3.3	1.51	10C	0	L203B	
L207	27.8	-.4	-.17	2.2	1.08	32.4	.5	.20	1.8	.83	10C	0	L207	
L212	29.4	1.3	.55	2.8	1.41	34.7	2.8	1.17	4.1	1.87	10C	0	L212	
L223A	31.5	3.3	1.54	2.0	.99	33.8	1.9	.78	2.4	1.10	10C	0	L223A	
L225	28.4	.2	.09	1.5	.75	33.3	1.4	.58	2.1	.95	10C	0	L225	
L232	26.2	-2.0	-.94	1.7	.84	30.5	-1.4	-.56	2.0	.92	10C	0	L232	
L237A	29.8	1.7	.77	1.3	.63	33.8	2.0	.81	1.6	.74	10C	0	L237A	
L237B	26.7	-1.5	-.70	.8	.41	30.8	-1.1	-.44	1.6	.71	10C	0	L237B	
L243	27.5	-.7	-.32	1.9	.96	31.4	-.4	-.18	3.2	1.44	10C	0	L243	
L249	25.5	-2.6	-1.23	1.7	.83	28.4	-3.4	-1.41	1.9	.86	10C	0	L249	
L261	34.4	6.3	2.91	3.3	1.67	44.7	12.9	5.30	4.7	2.14	10C	#	L261	
L264	27.1	-1.1	-.52	2.2	1.08	30.1	-1.8	-.74	1.8	.79	10C	0	L264	
L268	27.9	-.3	-.13	1.5	.74	31.5	-.4	-.17	2.1	.93	10C	0	L268	
L279	31.2	3.1	1.42	2.6	1.28	34.0	2.1	.88	3.2	1.43	10C	0	L279	
L301A	28.6	.5	.21	2.5	1.24	32.1	.2	.09	1.6	.73	10C	0	L301A	
L301B	28.6	.5	.21	1.6	.80	29.6	-2.3	-.94	2.0	.91	10C	*	L301B	
L305	30.6	2.5	1.14	3.4	1.73	32.8	.9	.37	1.6	.74	10C	0	L305	
L312	28.5	.3	.14	1.1	.55	31.5	-.4	-.15	2.5	1.15	10C	0	L312	
L315	30.7	2.5	1.15	2.3	1.18	35.0	3.1	1.29	2.4	1.10	10C	0	L315	
L321	30.8	2.6	1.22	3.1	1.56	35.4	3.5	1.44	4.3	1.93	10C	0	L321	
L326	29.5	1.3	.62	2.0	.99	32.3	.4	.19	1.7	.76	10C	0	L326	
L330	27.0	-1.2	-.55	1.8	.92	31.9	.0	.01	2.1	.94	10C	0	L330	
L333	28.6	.4	.20	2.1	1.04	32.0	.1	.05	2.5	1.12	10C	0	L333	
L339	22.2	-6.0	-2.78	2.4	1.21	25.2	-6.7	-2.76	2.2	1.00	10C	*	L339	
L344	30.7	2.5	1.15	3.4	1.71	34.7	2.8	1.15	2.8	1.25	10C	0	L344	
L356	25.2	-3.0	-1.40	1.6	.79	28.9	-3.0	-1.24	1.9	.85	10C	0	L356	
L358	26.6	-1.6	-.76	1.3	.66	30.0	-1.9	-.77	1.0	.44	10C	0	L358	
L360	28.1	-.1	-.05	2.3	1.15	30.6	-1.2	-.51	2.0	.90	10C	0	L360	
L386	28.2	.0	.01	2.4	1.18	33.5	1.6	.65	2.3	1.02	10C	0	L386	
L390	25.6	-2.6	-1.20	2.0	1.02	28.4	-3.4	-1.42	1.3	.60	10C	0	L390	
L568	28.1	-.1	-.03	2.0	1.02	31.8	-.1	-.02	2.3	1.05	10C	0	L568	
L573	24.0	-4.2	-1.94	1.0	.48	27.7	-4.2	-1.71	.9	.41	10C	0	L573	
L582	28.6	.4	.20	2.8	1.43	32.9	1.1	.44	4.1	1.94	10C	0	L582	
L599	28.0	-.2	-.07	1.9	.97	31.3	-.6	-.23	1.9	.88	10C	0	L599	
L625	31.0	2.9	1.33	1.8	.90	34.0	2.2	.89	1.8	.82	10C	0	L625	
L684	27.0	-1.2	-.55	1.0	.51	29.7	-2.2	-.89	1.2	.56	10C	0	L684	
L696	30.0	1.9	.88	2.2	1.10	35.9	4.1	1.67	2.1	.94	10C	0	L696	
L736	25.0	-3.2	-1.46	1.9	.96	30.3	-1.6	-.65	2.4	1.11	10C	0	L736	

GR. MEAN = 28.2 PSI — GRAND MEAN = 31.9 PSI — TEST DETERMINATIONS = 15
SD MEANS = 2.1 PSI — SD OF MEANS = 2.4 PSI — 45 LABS IN GRAND MEANS
AVERAGE SDR = 2.0 PSI — AVERAGE SDR = 2.2 PSI
GR. MEAN = 194.3 KILOPASCAL — GRAND MEAN = 219.7 KILOPASCAL

L128	29.9	1.8	.82	2.1	1.05	32.7	.8	.33	2.1	.93	10B	*	L128
L155	27.4	-.8	-.35	1.2	.60	30.4	-1.4	-.59	1.7	.77	10X	*	L155
L242	29.9	1.7	.79	2.0	.99	34.5	2.6	1.08	1.6	.70	10T	*	L242
L250L	2619.7	2591.5	1206.10	167.6	94.30	2946.3	2916.5	1201.34	176.9	79.98	10N	*	L250L
L251	27.5	-.7	-.34	1.6	.79	31.2	-.6	-.27	1.5	.68	10V	*	L251
L260	25.7	-2.5	-1.15	1.6	.79	29.0	-2.9	-1.19	1.8	.80	10X	*	L260
L269	32.2	4.0	1.87	2.2	1.09	36.7	4.9	2.00	2.4	1.09	10A	*	L269
L702	24.3	-3.9	-1.81	2.1	1.05	28.1	-3.7	-1.54	1.6	.70	10X	*	L702
L704	27.1	-1.1	-.50	1.3	.64	NO DATA REPORTED FOR SAMPLE A57					10L	*	L704
L706	27.5	-.6	-.30	1.4	.71	31.1	-.7	-.30	1.8	.82	10X	*	L706
L734	31.4	3.3	1.51	3.1	1.55	37.2	5.3	2.20	3.8	1.70	10H	*	L734

TOTAL NUMBER OF LABORATORIES REPORTING = 57

Best values: K38 28.3 ± 3.1 psi
A57 31.9 ± 4.0 psi

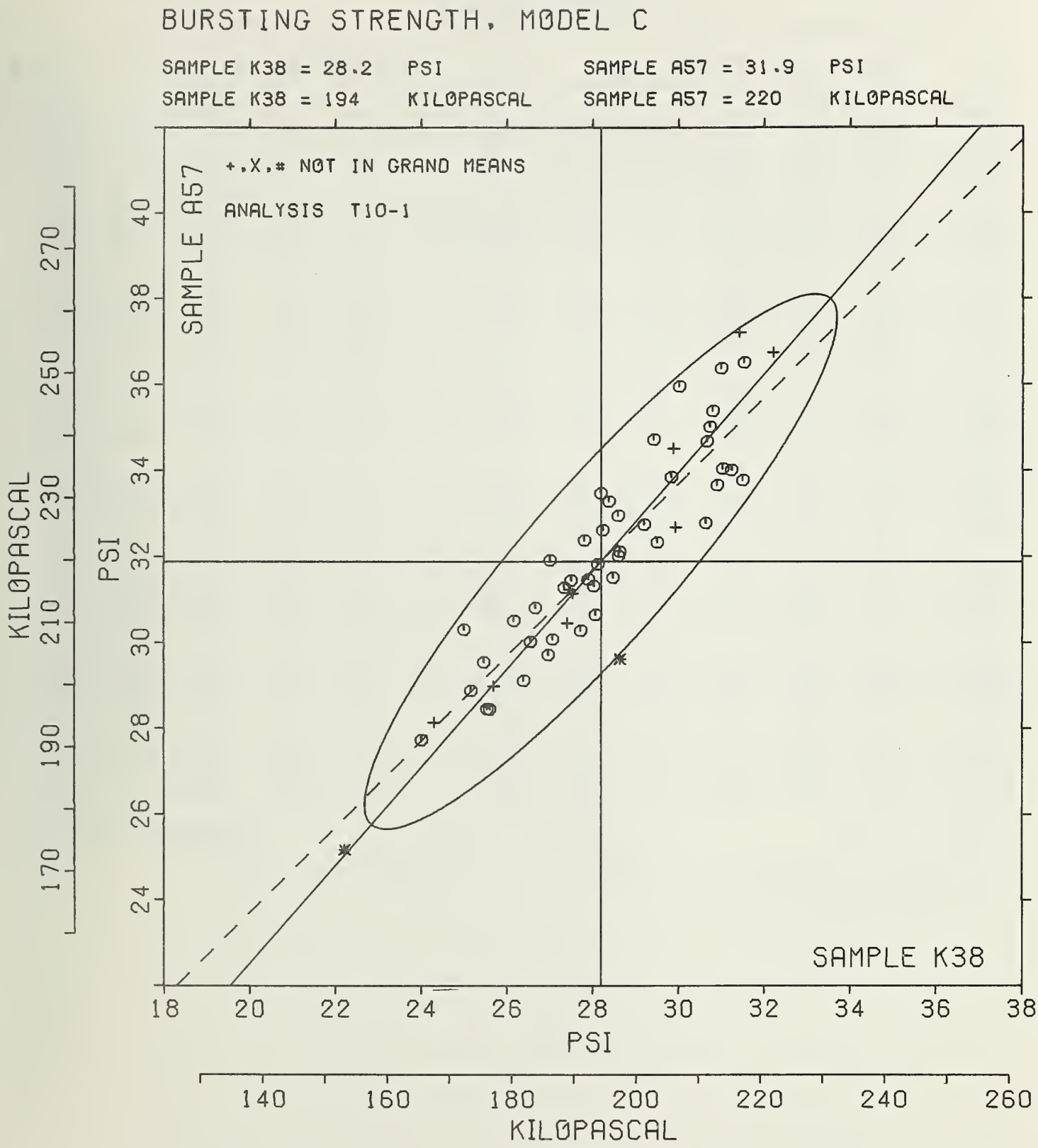
The following laboratories were omitted from the grand means because of extreme test results: 261.

ANALYSIS T10-1 TABLE 2

BURSTING STRENGTH, PSI

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

LAB CODE	F	MEANS E38	MEANS A57	COORDINATES MAJOR	COORDINATES MINOR	AVG RO.50R	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L339	*	22.2	25.2	-9.0	.1	1.10	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L573	0	24.0	27.7	-5.9	.4	.45	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L702	*	24.3	28.1	-5.4	.5	.68	10X	BURSTING STRENGTH 10 TO 40 PSI: GIVE INSTR. MAKE,MODEL,CLAMP
L736	0	25.0	30.3	-3.3	1.4	1.04	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L356	0	25.2	28.9	-4.2	.3	.62	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L203A	0	25.5	29.5	-3.5	.5	.93	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L249	0	25.5	28.4	-4.3	-.3	.84	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L390	0	25.6	28.4	-4.3	-.3	.81	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L260	*	25.7	29.0	-3.8	-.0	.79	10X	BURSTING STRENGTH 10 TO 40 PSI: GIVE INSTR. MAKE,MODEL,CLAMP
L232	0	26.2	30.5	-2.4	.6	.66	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L167	0	26.4	29.1	-3.3	-.5	.95	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L358	0	26.6	30.0	-2.5	-.0	.95	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L237B	0	26.7	30.8	-1.8	.4	.96	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L684	0	27.0	29.7	-2.4	-.5	.93	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L330	0	27.0	31.9	-.8	.9	.93	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L264	0	27.1	30.1	-2.1	-.3	.94	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L704	*	27.1				.84	10L	BURSTING STRENGTH 10 TO 40 PSI, PERKINS LC, MANUAL CLAMP
L183	0	27.3	31.3	-1.0	.2	.89	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L155	*	27.4	30.4	-1.0	-.4	.85	10X	BURSTING STRENGTH 10 TO 40 PSI: GIVE INSTR. MAKE,MODEL,CLAMP
L251	*	27.5	31.2	-1.0	.1	.74	10V	BURSTING STRENGTH 10 TO 40 PSI, L*W,MANUAL CLAMP, 20C,65% RH
L243	0	27.5	31.4	-.5	.2	1.26	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L706	*	27.5	31.1	-1.0	.0	.76	10X	BURSTING STRENGTH 10 TO 40 PSI: GIVE INSTR. MAKE,MODEL,CLAMP
L121	0	27.7	30.3	-1.3	-.7	1.04	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L2C7	0	27.8	32.4	.1	.6	.96	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L268	0	27.9	31.5	-.5	-.1	.84	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L599	0	28.0	31.3	-.5	-.3	.92	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L360	0	28.1	30.6	-1.0	-.7	1.02	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L568	0	28.1	31.8	-.1	.0	1.04	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L386	0	28.2	33.5	1.2	1.0	1.10	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L150	0	28.2	32.6	.6	.4	.99	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L225	0	28.4	33.3	1.2	.8	.85	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L312	0	28.5	31.5	-.1	-.5	.85	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L582	0	28.6	32.9	1.1	.4	1.03	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L333	0	28.6	32.0	.4	-.2	1.08	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L301A	0	28.6	32.1	.5	-.2	.98	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L301B	*	28.6	29.6	-1.4	-1.8	.66	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L156	0	29.2	32.7	1.3	-.2	1.01	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L212	0	29.4	34.7	3.0	.9	1.04	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L326	0	29.5	32.3	1.2	-.7	.88	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L237A	0	29.8	33.8	2.6	.0	.89	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L242	*	29.9	34.5	3.1	.5	.84	10T	BURSTING STRENGTH 10 TO 40 PSI, L*W,MANUAL CLAMP
L128	*	29.9	32.7	1.8	-.8	.99	10B	BURSTING STRENGTH 10 TO 40 PSI, PERKINS B, MANUAL CLAMP
L696	0	30.0	35.9	4.3	1.3	1.02	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L305	0	30.6	32.8	2.3	-1.3	1.23	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L344	0	30.7	34.7	3.7	-.0	1.48	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L315	0	30.7	35.0	4.0	.1	1.14	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L321	0	30.8	35.4	4.4	.3	1.74	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L191	0	30.9	33.6	3.1	-.9	1.11	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L203B	0	31.0	36.4	5.2	.8	1.30	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L625	0	31.0	34.0	3.5	-.7	.88	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L279	0	31.2	34.0	3.0	-.9	1.38	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L734	*	31.4	37.2	6.2	1.1	1.03	10A	BURSTING STRENGTH 10 TO 40 PSI, PERKINS AH, HYDRAULIC CLAMP
L223A	0	31.5	33.8	3.0	-1.3	1.05	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L134	0	31.5	36.5	5.7	.5	.79	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L269	*	32.2	36.7	6.3	.2	1.09	10A	BURSTING STRENGTH 10 TO 40 PSI, PERKINS A, MANUAL CLAMP
L261	#	34.4	44.7	13.8	3.8	1.91	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L250L	*	261.7	294.3	390.4	-31.7	87.14	10N	BURSTING STRENGTH 10 TO 40 PSI,LBOMARGY,MAN.CLAMP, 20C,65%RH
GMEANS:		28.2	31.9			1.00		
		95% ELLIPSE:		8.1	1.8	WITH GAMMA = 46 DEGREES		


BURSTING STRENGTH, MODEL C
SAMPLE K38 = 28.2 PSI
SAMPLE K38 = 194 KILOPASCAL
SAMPLE A57 = 31.9 PSI
SAMPLE A57 = 220 KILOPASCAL
+,X,* NOT IN GRAND MEANS
ANALYSIS T10-1
SAMPLE A57
PSI
KILOPASCAL
SAMPLE K38
PSI
KILOPASCAL

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 K38 PRINTING 75 GRAMS PER SQUARE METER MEAN	DEV	NO. DEV	SDR	RO. SDR	SAMPLE A57 ENVELOPE 89 GRAMS PER SQUARE METER MEAN	DEV	NO. DEV	SDR	RO. SDR	VAR	F	LAB	TEST DO. = 15
L105	25.3	-2.3	-1.00	1.4	.84	28.3	-2.7	-1.15	1.9	1.03	10D	O	L105	
L106C	29.9	2.3	1.01	1.1	.65	33.3	2.4	1.01	1.3	.70	10D	O	L106C	
L115	30.4	2.8	1.23	1.7	.98	33.2	2.3	.97	1.9	1.03	10D	O	L115	
L118	28.9	1.3	.59	2.1	1.23	32.2	1.3	.54	1.4	.79	10D	O	L118	
L122	26.3	-1.2	-.53	2.1	1.25	30.0	-.9	-.39	1.8	.96	10F	O	L122	
L125	27.1	-.4	-.18	1.8	1.05	30.5	-.4	-.17	1.3	.69	10D	O	L125	
L141	27.9	.4	.18	2.1	1.20	31.6	.7	.28	1.9	1.02	10D	O	L141	
L148	28.9	1.4	.60	1.8	1.07	32.2	1.3	.54	2.3	1.27	10D	O	L148	
L157	30.6	3.0	1.33	1.3	.77	33.9	3.0	1.27	1.7	.95	10D	O	L157	
L159	24.5	-3.0	-1.33	2.0	1.20	27.1	-3.8	-1.64	1.8	1.00	10D	O	L159	
L162	20.9	-6.7	-2.92	1.5	.88	24.9	-6.0	-2.58	2.1	1.13	10D	*	L162	
L163	27.5	-.1	-.03	1.6	.94	31.3	.3	.14	1.1	.62	10D	O	L163	
L166	31.4	3.9	1.69	1.2	.72	34.7	3.7	1.60	2.0	1.10	10D	O	L166	
L176	23.7	-3.9	-1.70	1.0	.95	26.3	-2.6	-1.12	2.0	1.06	10D	O	L176	
L185	28.9	1.3	.57	1.5	.85	31.6	.7	.28	1.4	.73	10D	O	L185	
L190C	28.2	.6	.28	1.6	.91	31.8	.9	.38	1.9	1.04	10D	O	L190C	
L194	26.6	-1.0	-.43	1.1	.65	29.9	-1.1	-.46	1.6	.85	10D	O	L194	
L217	27.6	.0	.02	1.4	.82	29.6	-1.3	-.58	2.7	1.45	10F	O	L217	
L224	28.6	1.1	.47	1.9	1.13	33.6	2.7	1.15	2.0	1.06	10D	O	L224	
L226B	27.4	-.1	-.05	1.3	.75	32.3	1.3	.56	2.1	1.12	10D	O	L226B	
L226C	27.7	.1	.05	1.9	1.12	30.5	-.5	-.20	1.4	.75	10D	O	L226C	
L233	28.7	1.1	.50	1.2	.71	31.2	.3	.12	1.7	.91	10D	O	L233	
L241	29.5	1.9	.85	2.8	1.61	32.5	1.5	.65	2.6	1.41	10D	O	L241	
I248	28.3	.8	.33	2.0	1.17	30.2	-.7	-.31	1.9	1.01	10K	O	L248	
L255	25.7	-1.8	-.80	1.3	.76	28.2	-2.8	-1.19	1.8	.97	10D	O	L255	
L262	27.5	-.0	-.01	.8	.49	31.8	.9	.37	2.0	1.06	10D	O	L262	
L275	26.9	-.7	-.30	2.0	1.15	30.0	-1.0	-.42	2.1	1.12	10D	O	L275	
L280	29.6	2.1	.91	1.6	1.07	33.4	2.4	1.04	1.7	.90	10D	O	L280	
L285	29.9	2.4	1.04	2.7	1.58	35.5	4.6	1.97	3.7	2.02	10D	*	L285	
L309	27.4	-.2	-.09	2.2	1.28	32.5	1.5	.66	1.7	.94	10D	O	L309	
L313	24.3	-3.3	-1.44	2.2	1.28	27.6	-3.4	-1.44	2.2	1.17	10I	O	L313	
L341	27.4	-.2	-.08	1.2	.67	31.6	.7	.30	1.3	.69	10D	O	L341	
L352	25.4	-2.2	-.98	1.4	.79	29.3	-1.6	-.70	1.3	.71	10D	O	L352	
L563	23.1	-4.5	-1.96	1.5	.89	27.0	-4.0	-1.70	1.9	1.04	10U	O	L563	
L575	20.5	-1.1	-.48	1.6	.94	28.7	-2.2	-.95	1.7	.94	10D	O	L575	
L581	28.8	1.2	.53	1.5	.87	31.5	.6	.25	2.3	1.23	10D	O	L581	
L587	30.2	2.6	1.16	1.8	1.05	32.3	1.4	.58	2.1	1.12	10D	O	L587	
L652	25.1	-2.4	-1.06	2.9	1.66	28.1	-2.8	-1.22	3.2	1.75	10D	O	L652	
L680	29.1	1.5	.66	1.8	1.03	31.6	.7	.30	1.7	.92	10D	O	L680	
L698	30.6	3.1	1.34	2.5	1.47	33.9	3.0	1.26	1.7	.90	10D	O	L698	

GR. MEAN = 27.6 PSI GRAND MEAN = 30.9 PSI TEST DETERMINATIONS = 15

SD MEANS = 2.3 PSI SD OF MEANS = 2.3 PSI 40 LABS IN GRAND MEANS

AVERAGE SDR = 1.7 PSI AVERAGE SDR = 1.8 PSI

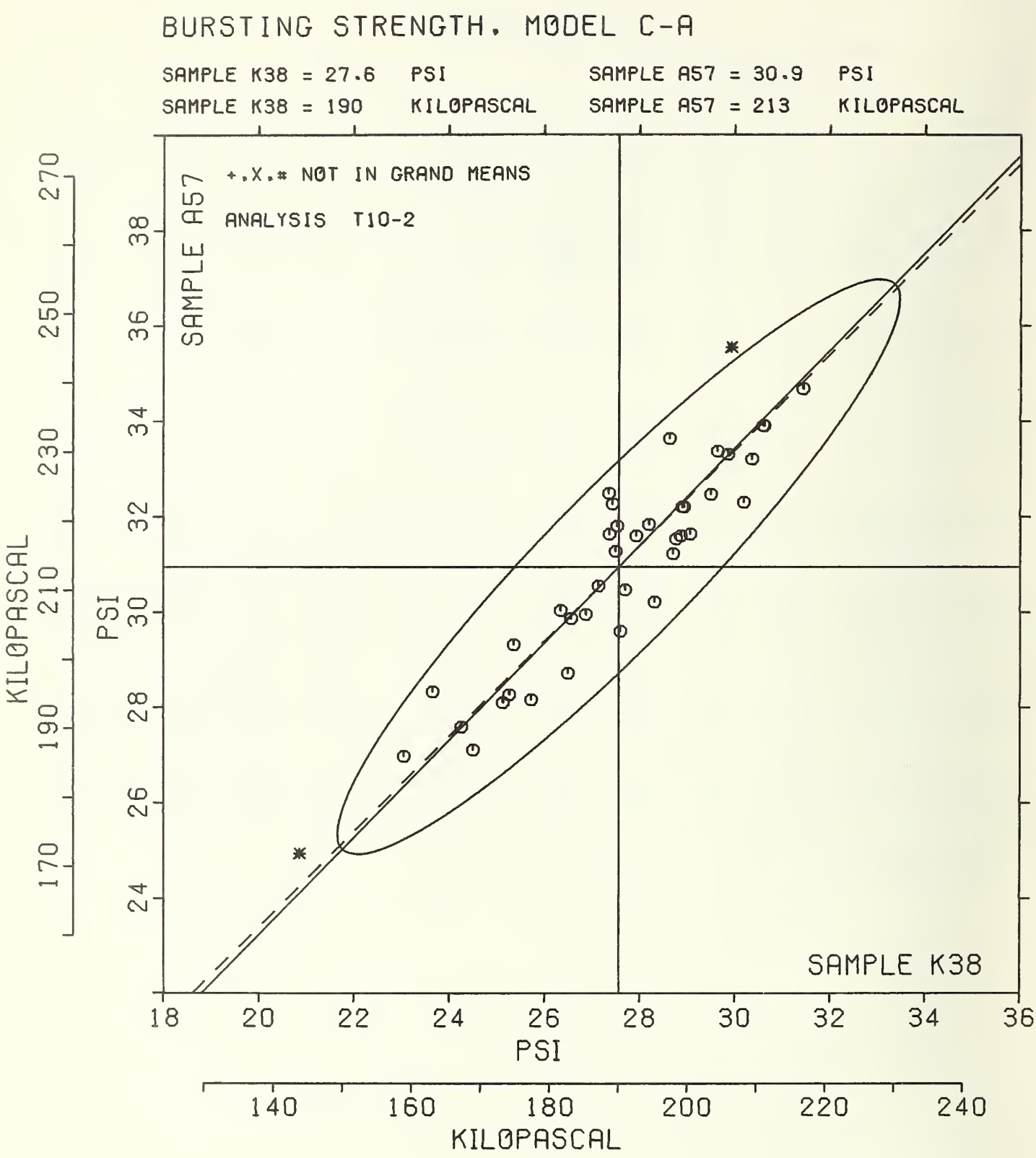
GR. MEAN = 190.0 KILOPASCAL GRAND MEAN = 213.3 KILOPASCAL

TOTAL NUMBER OF LABORATORIES REPORTING = 40

Best values: K38 27.7 ± 3.4 psi
A57 31.0 ± 3.7 psi

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 E38	MEANS A57	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SQR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L162	*	20.9	24.9	-9.0	.6	1.00	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L563	O	23.1	27.0	-6.0	.4	.97	10U	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L176	O	23.7	28.3	-4.6	1.0	1.01	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L313	O	24.3	27.6	-4.7	.0	1.22	10I	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L159	O	24.5	27.1	-4.9	-.5	1.10	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L652	O	25.1	28.1	-3.7	-.3	1.72	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L105	O	25.3	28.3	-3.5	-.2	.94	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L352	O	25.4	29.3	-2.7	.4	.75	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L255	O	25.7	28.2	-3.3	-.6	.87	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L122	O	26.3	30.0	-1.5	.2	1.11	10F	BURSTING STRENGTH 10 TO 40 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L575	O	26.5	28.7	-2.3	-.8	.94	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L194	O	26.6	29.9	-1.5	-.0	.75	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L275	O	26.9	30.0	-1.2	-.2	1.13	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L125	O	27.1	30.5	-.6	.0	.87	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L309	O	27.4	32.5	1.0	1.2	1.11	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L341	O	27.4	31.6	.4	.6	.83	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L226B	O	27.4	32.3	.9	1.0	.93	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L163	O	27.5	31.3	.2	.3	.78	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L262	O	27.5	31.8	.6	.6	.77	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L217	O	27.6	29.6	-.9	-1.0	1.13	10F	BURSTING STRENGTH 10 TO 40 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L226C	O	27.7	30.5	-.2	-.4	.94	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L141	O	27.9	31.6	.7	.2	1.11	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L190C	O	28.2	31.8	1.1	.2	.98	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L248	O	28.3	30.2	.0	-1.1	1.09	10K	BURSTING STRENGTH 10 TO 40 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L224	O	28.6	33.6	2.7	1.1	1.09	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L233	O	28.7	31.2	1.0	-.6	.81	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L581	O	28.8	31.5	1.3	-.5	1.05	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L185	O	28.9	31.6	1.4	-.5	.79	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L118	O	28.9	32.2	1.8	-.1	1.01	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L148	O	28.9	32.2	1.9	-.1	1.17	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L680	O	29.1	31.6	1.5	-.6	.98	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L241	O	29.5	32.5	2.4	-.3	1.01	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L280	O	29.6	33.4	3.2	.2	.98	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L106C	O	29.9	33.3	3.3	-.0	.97	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L285	*	29.9	35.5	4.9	1.5	1.30	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L587	O	30.2	32.3	2.8	-.9	1.08	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L115	O	30.4	33.2	3.6	-.4	1.01	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L157	O	30.6	33.9	4.2	-.1	.86	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L698	O	30.6	33.9	4.3	-.1	1.18	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L166	O	31.4	34.7	5.4	-.2	.91	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
GMEANS:		27.6	30.9			1.00		
		95% ELLIPSE:		8.3	1.6	WITH GAMMA = 45 DEGREES		


BURSTING STRENGTH. MODEL C-A
SAMPLE K38 = 27.6 PSI
SAMPLE K38 = 190 KILOPASCAL
SAMPLE A57 = 30.9 PSI
SAMPLE A57 = 213 KILOPASCAL
+.X.* NOT IN GRAND MEANS
ANALYSIS T10-2
SAMPLE A57
PSI
KILOPASCAL
SAMPLE K38
PSI
KILOPASCAL
18 20 22 24 26 28 30 32 34 36
140 160 180 200 220 240
24 26 28 30 32 34 36 38
170 190 210 230 250 270

ANALYSIS T11-1 TABLE 1

BURSTING STRENGTH, PSI - HIGH RANGE

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

LAB CODE	SAMPLE B63 MEAN	KRAFT 124 GRAMS PER SQUARE METER DEV	NO. DEV	SDR	R. SDR	SAMPLE Z15 MEAN	TUBE WINDING 133 GRAMS PER SQUARE METER DEV	NO. DEV	SDR	R. SDR	TEST D. = 15 VAR	F	LAB
L103	61.6	-.4	-.11	2.8	.74	74.7	-1.0	-.31	3.6	.67	11C	@	L103
L107	64.4	2.4	.61	4.6	1.22	70.2	-5.5	-1.72	4.3	.81	11C	X	L107
L118	64.8	2.8	.72	4.1	1.09	77.2	1.5	.47	5.0	.94	11D	@	L118
L128	61.1	-.9	-.22	3.1	.83	75.3	-.4	-.13	4.4	.82	11D	@	L128
L141	66.6	4.6	1.19	4.9	1.30	79.3	3.6	1.13	6.0	1.12	11D	@	L141
L148	62.7	.7	.17	4.2	1.12	76.5	.9	.27	5.0	.94	11D	@	L148
L159	56.3	-5.7	-1.44	2.6	.68	71.2	-4.5	-1.41	4.4	.83	11D	@	L159
L170	62.9	.9	.23	5.5	1.47	75.2	-.5	-.16	4.8	.90	11C	@	L170
L176	58.1	-3.9	-.97	2.9	.76	75.5	-.2	-.06	4.8	.90	11D	@	L176
L182	63.7	1.7	.44	3.6	.96	74.9	-.7	-.23	4.6	.86	11D	@	L182
L218	62.8	.8	.20	3.3	.87	77.3	1.6	.50	6.4	1.19	11D	@	L218
L232	58.2	-3.8	-.96	8.4	2.22	74.4	-1.2	-.39	6.8	1.28	11C	@	L232
L237A	72.1	10.1	2.56	3.3	.88	79.1	3.5	1.09	4.4	.82	11C	*	L237A
L237B	60.2	-1.8	-.45	1.5	.40	76.9	1.2	.38	4.0	.75	11C	@	L237B
L238A	72.3	10.3	2.59	6.5	1.74	83.7	8.0	2.51	6.5	1.22	11Y	*	L238A
L243	59.9	-2.1	-.55	3.6	.97	72.8	-2.8	-.89	5.0	.93	11C	@	L243
L248	61.6	-.4	-.10	4.7	1.26	76.0	.4	.11	6.2	1.17	11K	@	L248
L278	58.1	-3.9	-.98	4.7	1.24	75.5	-.2	-.05	6.3	1.17	11C	@	L278
L279	71.1	9.1	2.29	4.2	1.13	93.2	17.5	5.51	11.6	2.17	11C	#	L279
L280	62.8	.8	.19	3.1	.82	75.4	-.2	-.07	6.9	1.30	11D	@	L280
L303	55.7	-6.3	-1.58	2.1	.57	68.4	-7.3	-2.30	3.5	.66	11C	@	L303
L311	64.2	2.2	.55	3.8	1.02	77.6	2.0	.62	5.0	.94	11C	@	L311
L330	62.4	.4	.11	5.1	1.36	75.8	.1	.04	5.6	1.05	11C	@	L330
L333	61.0	-1.0	-.25	3.9	1.03	75.4	-2.3	-.71	7.0	1.30	11C	@	L333
L334	65.8	3.8	.96	3.0	.78	77.5	1.8	.57	5.1	.95	11D	@	L334
L339	56.9	-5.1	-1.27	2.5	.66	68.7	-7.0	-2.20	5.2	.98	11C	@	L339
L344	68.1	6.1	1.53	6.1	1.61	79.5	4.3	1.34	5.0	.94	11C	@	L344
L348	60.8	-1.2	-.31	3.8	1.01	75.1	-.5	-.17	7.6	1.42	11C	@	L348
L356	62.6	.6	.15	3.5	.92	81.2	5.5	1.74	7.8	1.45	11C	*	L356
L563	59.1	-2.9	-.74	4.1	1.08	71.2	-4.4	-1.39	6.3	1.18	11Y	@	L563
L565	60.8	-1.2	-.29	1.9	.51	74.7	-.9	-.29	2.3	.43	11D	@	L565
L575	55.2	-6.8	-1.71	3.5	.92	71.4	-4.2	-1.33	4.9	.92	11D	@	L575
L576	63.0	1.0	.25	2.5	.66	75.2	-.5	-.16	5.5	1.02	11P	@	L576
L581	62.1	.1	.02	4.2	1.12	74.8	-.9	-.27	4.5	.84	11D	@	L581
L599	64.3	2.3	.58	5.2	1.38	76.9	1.2	.38	5.5	1.04	11C	@	L599
L604	59.3	-2.7	-.69	2.5	.66	75.5	-.2	-.06	6.3	1.17	11C	@	L604
L622	61.9	-.1	-.03	4.9	1.30	76.8	1.1	.36	7.8	1.46	11E	@	L622
L650	61.1	-.9	-.22	4.1	1.09	76.6	.9	.29	4.0	.76	11D	@	L650
L651	69.2	7.2	1.82	4.0	1.07	80.1	4.4	1.38	8.2	1.53	11F	@	L651
L680	60.9	-1.1	-.28	2.9	.76	78.5	2.8	.88	3.1	.57	11D	@	L680
L730	57.5	-4.5	-1.12	2.5	.66	70.9	-4.8	-1.51	5.8	1.09	11D	@	L730

GR. MEAN = 62.0 PSI — GRAND MEAN = 75.7 PSI — TEST DETERMINATIONS = 15

SD MEANS = 4.0 PSI — SD OF MEANS = 3.2 PSI — 39 LABS IN GRAND MEANS

AVERAGE SDR = 3.8 PSI — AVERAGE SDR = 5.3 PSI

GR. MEAN = 427.4 KILOPASCAL — GRAND MEAN = 521.7 KILOPASCAL

L242	64.2	2.2	.55	4.9	1.31	79.5	3.8	1.20	5.0	.94	11T	*	L242
L250L	5722.7	5660.7	1427.39	542.2	143.93	6747.3	6671.7	2096.34	341.7	63.90	11N	*	L250L
L251	66.6	4.6	1.16	3.5	.93	82.5	6.8	2.13	5.9	1.11	11V	*	L251
L290	66.6	4.6	1.16	3.3	.87	81.1	5.4	1.70	4.5	.84	11A	*	L290
L393	63.9	1.9	.49	3.7	.97	76.3	.6	.19	3.1	.58	11B	*	L393
L394	65.7	3.7	.94	2.5	.66	78.0	2.3	.73	5.5	1.02	11H	*	L394
L570	60.5	-1.5	-.37	2.9	.76	76.3	.7	.21	3.2	.61	11H	*	L570
L593	73.7	11.7	2.96	6.7	1.77	90.5	14.8	4.65	6.3	1.18	11J	*	L593
L598	65.1	3.1	.78	6.9	1.82	86.1	10.5	3.29	5.2	.98	11B	*	L598
L625	67.5	5.5	1.38	4.1	1.09	79.9	4.2	1.33	3.9	.73	11A	*	L625
L736	52.0	-10.0	-2.54	3.0	.80	64.5	-11.2	-3.51	6.3	1.17	11A	*	L736
L737	69.7	7.7	1.95	5.4	1.43	84.9	9.3	2.91	5.5	1.02	11H	*	L737
L738	51.3	-10.7	-2.69	5.5	1.46	66.7	-9.0	-2.83	9.2	1.72	11X	*	L738

TOTAL NUMBER OF LABORATORIES REPORTING = 54

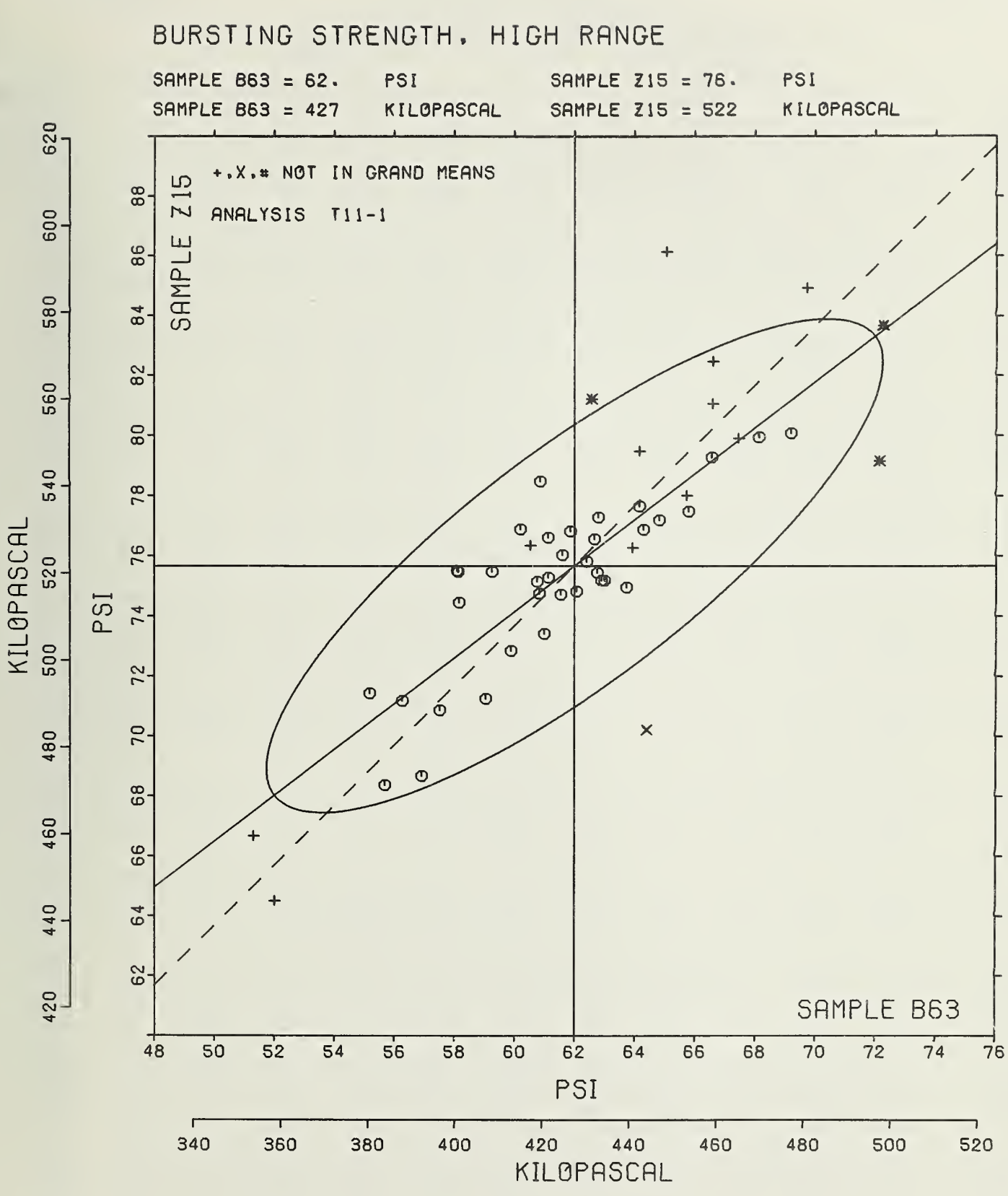
Best values: B63 62 ± 7 psi

Z15 75 ± 6 psi

The following laboratories were omitted from the grand means because of extreme test results: 279.

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T11-1 TABLE 2
BURSTING STRENGTH, PSI - HIGH RANGE
TAPPI OFFICIAL TEST METHOD T403 OS-76, PERKINS MODEL C OR C-A

LAB CODE	F	MEANS B63	MEANS Z15	COORDINATES MAJOR	COORDINATES MINOR	AVG RESID VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L738	*	51.3	66.7	-13.9	-.7	1.59	11X BURSTING STRENGTH 40 TO 85 PSI,: GIVE INSTRUMENT MAKE,MODEL
L736	*	52.0	64.5	-14.7	-2.8	.99	11A BURSTING STRENGTH 40 TO 85 PSI, PERKINS A, MANUAL CLAMP
L575	O	55.2	71.4	-8.0	.8	.92	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L303	O	55.7	68.4	-9.4	-2.0	.61	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L159	O	56.3	71.2	-7.3	-.1	.76	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L339	O	56.9	68.7	-8.3	-2.5	.82	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L730	O	57.5	70.9	-6.5	-1.1	.88	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L278	O	58.1	75.5	-3.2	2.2	1.20	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L176	O	58.1	75.5	-3.2	2.2	.63	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L232	O	58.2	74.4	-3.8	1.3	1.75	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L563	O	59.1	71.2	-5.0	-1.7	1.13	11Y BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L604	O	59.3	75.5	-2.3	1.5	.51	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L243	O	59.9	72.8	-3.4	-1.0	.95	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L237B	O	60.2	76.9	-.7	2.0	.58	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L570	*	60.5	76.3	-.7	1.4	.63	11H BURSTING STRENGTH 40 TO 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L348	O	60.8	75.1	-1.3	.3	1.21	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L565	O	60.8	74.7	-1.5	-.0	.47	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L680	O	60.9	78.5	.8	2.9	.67	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L333	O	61.0	73.4	-2.2	-1.2	1.16	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L650	O	61.1	76.6	-.1	1.3	.53	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L128	O	61.1	75.3	-.9	.2	.62	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L103	O	61.6	74.7	-.9	-.5	.71	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L248	O	61.6	76.0	-.1	.5	1.21	11K BURSTING STRENGTH 40 TO 85 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L622	O	61.9	76.8	.6	1.0	1.38	11E BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L581	O	62.1	74.8	-.5	-.7	.98	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L330	O	62.4	75.8	.4	-.1	1.21	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L356	#	62.6	81.2	3.8	4.1	1.19	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L148	O	62.7	76.5	1.1	.3	1.03	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L280	O	62.8	75.4	.5	-.7	1.06	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L218	O	62.8	77.3	1.6	.8	1.03	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L170	O	62.9	75.2	.4	-.9	1.19	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L576	O	63.0	75.2	.5	-1.0	.54	11P BURSTING STRENGTH 40 TO 85 PSI, PERKINS LC, MANUAL CLAMP
L182	O	63.7	74.9	.9	-1.6	.91	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L393	*	63.9	76.3	1.9	-.7	.78	11H BURSTING STRENGTH 40 TO 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L311	O	64.2	77.6	2.9	.2	.98	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L242	*	64.2	79.5	4.0	1.7	1.13	11T BURSTING STRENGTH 40 TO 85 PSI, L*W,MANUAL CLAMP
L599	O	64.3	76.9	2.6	-.5	1.21	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L107	X	64.4	70.2	-1.4	-3.8	1.02	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L118	O	64.8	77.2	3.2	-.5	1.01	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L598	*	65.1	86.1	8.8	6.4	1.40	11B BURSTING STRENGTH 40 TO 85 PSI, MESSMER, MANUAL CLAMP
L394	*	65.7	78.0	4.4	-.4	.85	11H BURSTING STRENGTH 40 TO 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L334	O	65.8	77.5	4.1	-.9	.87	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L141	O	66.6	79.3	5.8	.1	1.21	11D BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L290	*	66.6	81.1	6.9	1.5	.66	11A BURSTING STRENGTH 40 TO 85 PSI, PERKINS A, MANUAL CLAMP
L251	*	66.6	82.5	7.8	2.6	1.02	11V BURSTING STRENGTH 40 TO 85 PSI, L*W,MANUAL CLAMP, 20C,65% RH
L625	*	67.5	79.9	6.9	.0	.91	11A BURSTING STRENGTH 40 TO 85 PSI, PERKINS A, MANUAL CLAMP
L344	O	68.1	79.9	7.5	-.3	1.28	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L651	O	69.2	80.1	8.4	-.9	1.30	11F BURSTING STRENGTH 40 TO 85 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L737	*	69.7	84.9	11.8	2.7	1.23	11H BURSTING STRENGTH 40 TO 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L279	#	71.1	93.2	17.9	8.4	1.65	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L237A	#	72.1	79.1	10.2	-3.4	.65	11C BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L238A	*	72.3	83.7	13.0	.1	1.48	11Y BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L593	*	73.7	90.5	18.3	4.6	1.47	11J BURSTING STRENGTH 40 TO 85 PSI, PERKINS JUMBO,HAND DRIVEN
L250L	*	5722.7	6747.3	8550.5	1035.7	103.91	11N BURSTING STRENGTH 40 TO 85 PSI,LHOMARGY,MAN.CLAMP, 20C,65%RH
GMEANS:		62.0	75.7			1.00	
		95% ELLIPSE:		12.6	3.8	WITH GAMMA = 37 DEGREES	


BURSTING STRENGTH, HIGH RANGE
SAMPLE B63 = 62. PSI
SAMPLE B63 = 427 KILOPASCAL
SAMPLE Z15 = 76. PSI
SAMPLE Z15 = 522 KILOPASCAL
+,X,* NOT IN GRAND MEANS
ANALYSIS T11-1
SAMPLE Z15
PSI
KILOPASCAL
SAMPLE B63
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 E85 BOND 79 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	SAMPLE G15 HEAT-SET OFFSET BOOK 93 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	TEST D. = 15 VAR	F	LAB
L103	37.73	-1.62	-.75	.59	.49	50.40	-1.26	-.53	1.40	.90	15T	6	L103
L105	37.87	-1.48	-.69	1.77	1.45	49.47	-2.19	-.93	1.41	.90	15T	6	L105
L107	40.00	.65	.30	10.69	8.80	39.00	-15.66	-6.63	5.07	3.25	15T	#	L107
L115	40.67	1.32	.61	2.19	1.81	49.60	-2.06	-.87	1.68	1.08	15C	6	L115
L118	37.80	-1.55	-.72	1.21	.99	49.73	-1.93	-.82	1.58	1.01	15T	6	L118
L121	40.00	.65	.30	1.46	1.20	50.47	-1.19	-.51	1.13	.72	15T	6	L121
L122	38.17	-1.18	-.55	.90	.74	50.71	-.95	-.40	1.30	.84	15C	6	L122
L124	35.87	-3.48	-1.62	1.55	1.28	49.53	-2.13	-.90	1.81	1.16	15T	6	L124
L126	39.60	.25	.12	1.84	1.52	51.53	-.13	-.05	1.68	1.08	15T	6	L126
L128	37.87	-1.48	-.69	1.36	1.12	51.13	-.53	-.22	.99	.63	15T	6	L128
L131	44.00	4.65	2.17	1.31	1.08	54.93	3.27	1.39	1.98	1.27	15A	6	L131
L134	41.07	1.72	.80	.88	.73	52.40	.74	.31	.99	.63	15C	6	L134
L139	40.53	1.18	.55	.83	.69	52.53	.87	.37	1.46	.93	15T	6	L139
L141	37.73	-1.62	-.75	1.44	1.18	49.33	-2.33	-.99	.98	.63	15T	6	L141
L143	36.93	-2.42	-1.13	1.28	1.05	48.53	-3.13	-1.32	1.46	.93	15T	6	L143
L145	29.80	-9.55	-4.45	1.47	1.21	35.53	-16.13	-6.83	5.26	3.37	15T	#	L145
L148	39.47	.12	.05	.92	.75	52.00	.34	.14	.76	.48	15T	6	L148
L150	37.45	-1.90	-.89	.34	.28	49.08	-2.58	-1.09	1.20	.77	15T	6	L150
L157	35.93	-3.42	-1.59	.88	.73	47.87	-3.79	-1.61	1.25	.80	15T	6	L157
L158	40.00	.65	.30	2.00	1.65	48.53	-3.13	-1.32	1.77	1.13	15R	*	L158
L159	38.80	-.55	-.26	1.52	1.25	49.73	-1.93	-.82	2.09	1.34	15L	6	L159
L162	36.53	-2.82	-1.31	.74	.61	50.00	-1.66	-.70	1.07	.69	15T	6	L162
L163	40.87	1.52	.71	1.13	.93	52.87	1.21	.51	1.60	1.02	15T	6	L163
L166	38.07	-1.28	-.60	1.22	1.01	52.33	.67	.28	1.40	.90	15T	6	L166
L170	39.07	-.28	-.13	1.03	.85	52.20	.54	.23	1.01	.65	15T	6	L170
L176	37.73	-1.62	-.75	1.28	1.05	53.07	1.41	.60	1.28	.82	15T	6	L176
L182A	38.67	-.68	-.32	1.18	.97	49.00	-2.66	-1.13	2.33	1.49	15A	6	L182A
L182T	40.93	1.58	.74	1.22	1.01	54.13	2.47	1.05	2.00	1.28	15T	6	L182T
L183	39.87	.52	.24	.83	.69	52.20	.54	.23	.94	.60	15T	6	L183
L185	37.47	-1.88	-.88	.74	.61	51.33	-.33	-.14	1.05	.67	15T	6	L185
L189	39.33	-.02	-.01	.96	.80	51.47	-.19	-.08	1.36	.87	15T	6	L189
L190C	38.67	-.68	-.32	.90	.74	50.73	-.93	-.39	1.33	.86	15T	6	L190C
L191	39.47	.12	.05	1.41	1.16	51.73	.07	.03	3.53	2.27	15T	6	L191
L194	45.30	5.95	2.77	2.75	2.25	50.50	4.84	2.05	1.28	.82	15T	*	L194
L195	38.13	-1.22	-.57	1.41	1.16	50.27	-1.39	-.59	1.49	.95	15C	6	L195
L206	38.47	-.88	-.41	1.13	.93	50.40	-1.26	-.53	1.99	1.28	15T	6	L206
L207	49.09	9.74	4.54	1.47	1.21	51.80	.14	.06	1.06	.68	15R	#	L207
L211	36.73	-2.62	-1.22	.59	.49	49.00	-2.66	-1.13	1.25	.80	15R	6	L211
L212	39.73	.38	.18	4.50	3.70	50.40	4.74	2.01	4.47	2.86	15T	*	L212
L213	41.33	1.98	.92	1.23	1.02	53.00	1.94	.82	1.06	.68	15T	6	L213
L217	37.62	-1.73	-.81	.99	.81	48.84	-2.82	-1.19	1.04	.67	15Q	6	L217
L223	40.29	.94	.44	1.07	.88	52.01	.35	.15	1.09	.70	15R	6	L223
L224	35.53	-3.82	-1.78	.52	.43	48.67	-4.99	-2.11	1.11	.71	15T	6	L224
L225	41.80	2.45	1.14	.77	.64	NO DATA REPORTED FOR SAMPLE G15					15T	M	L225
L228	35.87	-3.48	-1.62	2.07	1.70	40.13	-11.53	-4.88	2.20	1.41	15T	#	L228
L232	40.00	.65	.30	1.07	.88	50.13	4.47	1.89	1.41	.90	15T	*	L232
L233	37.93	-1.42	-.66	.80	.66	51.20	-.46	-.19	1.93	1.24	15T	6	L233
L237A	38.60	-.75	-.35	1.12	.92	53.13	1.47	.62	1.19	.76	15T	6	L237A
L237B	40.60	1.25	.58	.74	.61	54.73	3.07	1.30	.96	.62	15T	6	L237B
L238A	36.27	-3.08	-1.44	1.03	.85	49.33	-2.33	-.99	2.50	1.60	15T	6	L238A
L241	42.73	3.38	1.58	1.33	1.10	50.67	5.01	2.12	1.45	.93	15T	6	L241
L242	41.92	2.57	1.20	1.04	.86	55.15	3.49	1.48	1.56	1.00	15U	6	L242
L243	37.60	-1.75	-.82	1.30	1.07	51.53	-.13	-.05	1.19	.76	15T	6	L243
L244	42.80	3.45	1.61	.94	.77	50.00	4.34	1.84	1.73	1.11	15C	6	L244
L248	39.44	.09	.04	.63	.52	51.00	-.66	-.28	1.72	1.11	15J	6	L248
L249	42.00	2.65	1.23	4.09	3.37	51.73	.07	.03	1.03	.66	15T	6	L249
L254	38.53	-.82	-.38	.92	.75	51.47	-.19	-.08	1.19	.76	15T	6	L254
L255	39.13	-.22	-.10	.83	.69	49.87	-1.79	-.76	.92	.59	15T	6	L255
L259	42.80	3.45	1.61	1.15	.94	50.20	4.54	1.92	1.08	.69	15T	6	L259
L261	37.33	-2.02	-.94	1.45	1.19	47.80	-3.86	-1.63	1.48	.95	15T	6	L261
L262	40.07	.72	.33	.80	.66	51.40	-.26	-.11	.74	.47	15T	6	L262
L264	40.00	.65	.30	2.14	1.76	52.27	.61	.26	1.83	1.17	15T	6	L264
L268	39.60	.25	.12	1.12	.92	51.85	.19	.08	1.48	.95	15T	6	L268
L273	36.27	-3.08	-1.44	1.22	1.01	51.47	-.19	-.08	1.60	1.02	15T	6	L273
L275	41.87	2.52	1.17	.99	.82	53.27	1.61	.68	1.49	.95	15T	6	L275

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 E85 MEAN	BOND 79 GRAMS PER SQUARE METER DEV	NO.DEV	SDR	R. SDR	SAMPLE G15 MEAN	HEAT-SET OFFSET BOOK 93 GRAMS PER SQUARE METER DEV	NO.DEV	SDR	R. SDR	VAR	F	LAB
											TEST D. = 15		
L278	41.73	2.38	1.11	1.28	1.05	55.33	3.67	1.56	1.80	1.15	15T	Ø	L278
L279	39.07	-.28	-.13	2.12	1.75	50.53	-1.13	-.48	1.60	1.02	15T	Ø	L279
L280	39.07	-.28	-.13	.96	.79	52.33	.67	.28	1.40	.90	15L	Ø	L280
L281	39.20	-.15	-.07	1.37	1.13	50.13	-1.53	-.65	1.64	1.05	15T	Ø	L281
L285	35.73	-3.62	-1.68	3.28	2.70	47.73	-3.93	-1.66	2.12	1.36	15T	Ø	L285
L288	40.33	.98	.46	2.74	2.26	53.87	2.21	.93	1.60	1.02	15T	Ø	L288
L290	41.07	1.72	.80	.96	.79	51.80	.14	.06	1.21	.77	15T	Ø	L290
L291	39.60	.25	.12	.83	.68	49.80	-1.86	-.79	1.32	.85	15A	Ø	L291
L303	42.93	3.58	1.67	1.83	1.51	56.53	4.87	2.06	2.07	1.32	15L	Ø	L303
L305	37.53	-1.82	-.85	.92	.75	51.27	-.39	-.17	1.53	.98	15T	Ø	L305
L309	40.07	.72	.33	.96	.79	52.67	1.01	.43	1.84	1.18	15T	Ø	L309
L311	40.67	1.32	.61	1.95	1.61	52.40	.74	.31	1.88	1.21	15T	Ø	L311
L312	38.73	-.62	-.29	1.10	.91	50.07	-1.59	-.67	2.28	1.46	15T	Ø	L312
L313	38.93	-.42	-.19	2.12	1.75	52.13	.47	.20	2.45	1.57	15L	Ø	L313
L315	39.47	.12	.05	1.30	1.07	53.29	1.63	.69	.95	.61	15T	Ø	L315
L321	40.80	1.45	.68	1.08	.89	52.67	1.01	.43	1.35	.86	15T	Ø	L321
L328	39.47	.12	.05	1.19	.98	50.90	-.76	-.32	1.07	.69	15T	Ø	L328
L333	42.40	3.05	1.42	1.30	1.07	53.87	2.21	.93	1.36	.87	15T	Ø	L333
L334	36.67	-2.68	-1.25	.62	.51	49.73	-1.93	-.82	1.49	.95	15T	Ø	L334
L336	39.53	.18	.09	.99	.82	52.00	.34	.14	1.60	1.03	15T	Ø	L336
L344	38.00	-1.35	-.63	.85	.70	51.40	-.26	-.11	2.82	1.81	15C	Ø	L344
L345	39.47	.12	.05	.74	.61	52.33	.67	.28	1.05	.67	15T	Ø	L345
L348	38.93	-.42	-.19	1.03	.85	54.40	2.74	1.16	1.35	.87	15T	Ø	L348
L352	44.19	4.84	2.25	2.24	1.84	56.42	4.76	2.02	2.94	1.88	15C	Ø	L352
L358	43.87	4.52	2.10	.92	.75	55.07	3.41	1.44	1.03	.66	15T	Ø	L358
L360	39.00	-.35	-.16	1.41	1.16	49.53	-2.13	-.90	1.36	.87	15T	Ø	L360
L376	37.13	-2.22	-1.03	.99	.82	49.20	-2.46	-1.04	1.82	1.17	15T	Ø	L376
L382	35.00	-4.35	-2.03	.65	.54	33.67	-17.99	-7.62	.92	.59	15T	#	L382
L386	34.40	-4.95	-2.31	1.12	.92	46.40	-5.26	-2.23	1.55	.99	15T	Ø	L386
L388	46.67	7.32	3.41	1.80	1.48	47.07	-4.59	-1.95	2.12	1.36	15T	X	L388
L390	39.67	.32	.15	1.30	1.23	54.13	2.47	1.05	1.51	.97	15T	Ø	L390
L442	43.33	3.98	1.85	1.18	.97	54.67	3.01	1.27	2.23	1.43	15R	Ø	L442
L558	37.67	-1.68	-.78	.82	.67	49.47	-2.19	-.93	1.19	.76	15T	Ø	L558
L562	40.40	1.05	.49	1.30	1.07	52.20	.54	.23	.86	.55	15T	Ø	L562
L565	40.13	.78	.36	2.42	1.99	52.67	1.01	.43	1.18	.75	15T	Ø	L565
L566	39.73	.38	.18	.96	.79	52.07	.41	.17	1.87	1.20	15T	Ø	L566
L574	39.67	.32	.15	2.06	1.69	51.87	.21	.09	2.45	1.57	15T	Ø	L574
L575	39.53	.18	.09	.83	.69	50.73	-.93	-.39	1.87	1.20	15L	Ø	L575
L576	41.27	1.92	.89	1.03	.85	54.60	2.94	1.24	2.16	1.39	15T	Ø	L576
L580	38.27	-1.08	-.50	.70	.58	46.40	-3.26	-1.38	.83	.53	15T	Ø	L580
L581	38.64	-.71	-.33	.66	.54	52.33	.67	.28	.97	.62	15Q	Ø	L581
L587	39.87	.52	.24	.92	.75	52.53	.87	.37	1.41	.90	15T	Ø	L587
L596	13.60	-25.75	-11.99	4.69	3.86	12.73	-38.93	-16.48	2.46	1.58	15T	#	L596
L599	39.53	.18	.09	.83	.69	50.27	-1.39	-.59	1.39	.89	15T	Ø	L599
L600	40.47	1.12	.52	1.30	1.07	54.67	3.01	1.27	1.84	1.18	15T	Ø	L600
L604	51.73	12.38	5.77	1.98	1.63	46.53	-3.13	-1.32	2.56	1.64	15T	#	L604
L606	41.13	1.78	.83	.99	.82	53.20	1.54	.65	1.01	.65	15T	Ø	L606
L610	44.27	4.92	2.29	2.37	1.95	58.00	6.34	2.68	2.73	1.75	15T	*	L610
L618	39.73	.38	.18	.70	.58	49.20	-2.46	-1.04	2.11	1.35	15T	Ø	L618
L622	26.67	-12.68	-5.91	.82	.67	25.33	-26.33	-11.15	.90	.58	15L	#	L622
L625	43.27	3.92	1.82	5.95	4.89	52.53	.87	.37	3.96	2.54	15T	*	L625
L626	37.13	-2.22	-1.03	.64	.53	49.93	-1.73	-.73	1.33	.86	15L	Ø	L626
L651	9.07	-30.28	-14.10	.26	.21	11.33	-40.33	-17.08	.49	.31	15T	#	L651
L652	39.71	.36	.17	2.46	2.03	51.87	.21	.09	2.33	1.49	15C	Ø	L652
L654	36.60	-2.75	-1.28	.69	.52	49.47	-2.19	-.93	1.55	1.00	15T	Ø	L654
L670	36.80	-2.55	-1.19	1.08	.89	46.53	-3.13	-1.32	1.68	1.08	15T	Ø	L670
L676	38.13	-1.22	-.57	.92	.75	50.80	-.86	-.36	1.97	1.26	15T	Ø	L676
L684	39.20	-.15	-.07	1.47	1.21	49.20	-2.46	-1.04	5.39	3.45	15L	Ø	L684
L685	42.80	3.45	1.61	1.52	1.25	53.47	1.81	.76	1.77	1.13	15T	Ø	L685
L692	37.33	-2.02	-.94	1.05	.86	50.13	-1.53	-.65	.99	.63	15T	Ø	L692
L696	32.93	-6.42	-2.99	1.28	1.05	47.07	-4.59	-1.95	1.28	.82	15T	*	L696
L697	39.15	-.20	-.09	.87	.72	51.56	-.10	-.04	1.39	.89	15T	Ø	L697
L698	37.93	-1.42	-.66	.80	.66	51.67	.01	.00	1.76	1.13	15L	Ø	L698
L704	38.67	-.68	-.32	2.09	1.72	NO DATA REPORTED FOR SAMPLE G15					15T	M	L704
L735	38.27	-1.08	-.50	1.49	1.22	50.40	-1.26	-.53	1.55	.99	15T	Ø	L735

GR. MEAN = 39.35 GRAMS GRAND MEAN = 51.66 GRAMS TEST DETERMINATIONS = 15

SD MEANS = 2.15 GRAMS SD OF MEANS = 2.36 GRAMS 118 LABS IN GRAND MEANS

AVERAGE SDR = 1.21 GRAMS AVERAGE SDR = 1.56 GRAMS

GR. MEAN = 385.9 MILLINEWTON GRAND MEAN = 506.6 MILLINEWTON

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 E85 MEAN	BOND 79 GRAMS PER SQUARE METER DEV	No.DEV	SDR	Ro.SDR	SAMPLE G15 MEAN	HEAT-SET OFFSET BOOK 93 GRAMS PER SQUARE METER DEV	No.DEV	SDR	Ro.SDR	TEST Do. = 15 VAR	F	LAB
L155	40.93	1.58	.74	2.28	1.88	50.00	-1.66	-.70	1.85	1.19	15X	*	L155
L167	40.80	1.45	.65	1.01	.83	52.83	1.17	.50	1.28	.82	15W	*	L167
L226B	38.53	-.82	-.38	1.19	.98	50.67	-.99	-.42	1.45	.93	15V	*	L226B
L226C	39.39	.04	.02	1.46	1.21	50.43	-1.23	-.52	1.27	.81	15V	*	L226C
L250L	44.47	5.12	2.38	1.41	1.16	53.93	2.27	.96	1.49	.95	15H	*	L250L
L251	38.20	-1.15	-.54	1.70	1.40	50.20	-1.46	-.62	1.82	1.17	15K	*	L251
L301A	37.13	-2.22	-1.03	.99	.82	48.13	-3.53	-1.49	1.19	.76	15N	*	L301A
L326	43.53	4.18	1.93	7.07	5.82	50.07	-1.59	-.67	1.67	1.07	15N	*	L326
L339	40.67	1.32	.61	1.18	.97	56.07	4.41	1.87	1.71	1.10	15N	*	L339
L341	40.80	1.45	.68	.94	.77	53.93	2.27	.96	1.62	1.04	15N	*	L341
L356	38.20	-1.15	-.54	1.26	1.04	53.40	1.74	.74	2.16	1.39	15N	*	L356
L396M	39.93	.58	.27	1.67	1.37	53.13	1.47	.62	1.30	.83	15V	*	L396M
L585	42.80	3.45	1.61	1.26	1.04	57.33	5.67	2.40	2.09	1.34	15E	*	L585
L680	37.73	-1.62	-.75	1.28	1.05	50.93	-.73	-.31	1.28	.82	15V	*	L680
L705	39.73	.38	.18	1.83	1.51	49.07	-2.59	-1.10	2.81	1.80	15X	*	L705
L706	37.33	-2.02	-.94	.98	.80	51.20	-.46	-.19	4.13	2.65	15V	*	L706
L734	38.67	-.68	-.32	1.63	1.34	54.27	.61	.26	4.33	2.78	15N	*	L734
L738	39.07	-.28	-.13	1.67	1.37	53.07	1.41	.60	1.67	1.07	15X	*	L738

TOTAL NUMBER OF LABORATORIES REPORTING = 148

Best values: E85 39.5 ± 3.5 grams
G15 51.6 ± 4.0 grams

The following laboratories were omitted from the grand means because of extreme test results: 107, 145, 207, 228, 382, 604, 622.

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

Data from the following laboratories appeared to be off by a multiplicative factor: 226B, 226C, 396M, 680, 706. 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 E85	MEANS G15	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L651	#	9.07	11.33	-50.26	-4.15	.26	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L596	#	13.60	12.73	-46.20	-6.61	2.72	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L622	#	26.67	25.33	-28.10	-8.01	.62	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L145	#	29.80	35.53	-18.40	-3.57	2.29	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L696	#	32.93	47.07	-7.70	1.75	.54	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L386	O	34.40	46.40	-7.22	.21	.96	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L382	#	35.00	33.67	-10.34	-8.70	.56	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L224	O	35.53	46.67	-9.27	-.46	.57	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L285	O	35.73	47.73	-5.34	.10	2.63	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L228	#	35.87	40.13	-10.93	-5.05	1.56	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L124	O	35.87	49.53	-3.90	1.19	1.22	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L157	O	35.93	47.87	-5.11	.03	.76	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L273	O	36.27	51.47	-2.19	2.18	1.02	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L238A	O	36.27	49.33	-3.79	.76	1.23	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L162	O	36.53	50.00	-3.11	1.00	.65	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L654	O	36.60	49.47	-3.47	.60	.76	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L334	O	36.67	49.73	-3.22	.73	.73	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L211	O	36.73	49.00	-3.73	.19	.65	15K	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L670	O	36.80	48.53	-4.03	-.17	.59	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L143	O	36.93	48.53	-3.94	-.27	.59	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L301A	*	37.13	48.13	-4.11	-.69	.79	15N	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L626	O	37.13	49.93	-2.76	.51	.69	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L376	O	37.13	49.20	-3.31	.02	.99	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L706	*	37.33	51.20	-1.68	1.20	1.72	15V	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF X 2
L692	O	37.33	50.13	-2.48	.49	.75	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L261	O	37.33	47.80	-4.23	-1.06	1.07	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L150	O	37.45	49.08	-3.19	-.29	.53	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L185	O	37.47	51.33	-1.50	1.19	.64	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L305	O	37.53	51.27	-1.50	1.10	.67	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L243	O	37.60	51.53	-1.26	1.22	.91	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L217	O	37.62	48.84	-3.26	-.58	.74	15Q	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,AIR CLAMP,DIGIT
L558	O	37.67	49.47	-2.76	-.20	.72	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L680	*	37.73	50.93	-1.62	.73	.54	15V	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF X 2
L103	O	37.73	50.40	-2.02	.37	.69	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L176	O	37.73	53.07	-.02	2.14	.94	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L141	O	37.73	49.33	-2.81	-.34	.90	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L118	O	37.80	49.73	-2.47	-.12	1.00	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L105	O	37.87	49.47	-2.63	-.35	1.18	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L128	O	37.87	51.13	-1.38	.76	.88	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L698	O	37.93	51.67	-.94	1.06	.89	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L233	O	37.93	51.20	-1.29	.75	.95	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L344	O	38.00	51.40	-1.09	.84	1.25	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L166	O	38.07	52.33	-.35	1.41	.95	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L676	O	38.13	50.80	-1.45	.34	1.01	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L195	O	38.13	50.27	-1.65	-.02	1.06	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L122	O	38.17	50.71	-1.49	.25	.79	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L356	*	38.20	53.40	.54	2.02	1.21	15N	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L251	*	38.20	50.20	-1.86	-.11	1.26	15K	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES, 20 C, 65% RH
L735	O	38.27	50.40	-1.66	-.03	1.11	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L580	O	38.27	48.40	-3.16	-1.36	.56	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L206	O	38.47	50.40	-1.53	-.18	1.10	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L226B	*	38.53	50.67	-1.29	-.05	.95	15V	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF X 2
L254	O	38.53	51.47	-.69	.48	.76	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L237A	O	38.60	53.13	.60	1.54	.64	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L581	O	38.64	52.33	.03	.98	.58	15Q	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,AIR CLAMP,DIGIT
L734	*	38.67	52.27	-.00	.91	2.16	15N	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L704	M	38.67				1.72	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L182A	O	38.67	49.00	-2.44	-1.26	1.23	15A	TEARING STRENGTH 35 TO 110G, APPITA
L190C	O	38.67	50.73	-1.15	-.10	.00	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L312	O	38.73	50.07	-1.00	-.00	1.18	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L159	O	38.80	49.73	-1.81	-.87	1.29	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L348	O	38.93	54.40	1.77	2.13	.86	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L313	O	38.93	52.13	.08	.63	1.00	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L360	O	39.00	49.53	-1.82	-1.15	1.02	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L738	*	39.07	53.07	.86	1.15	1.22	15X	TEARING STRENGTH 35 TO 110G: GIVE INSTRUMENT MAKE,MODEL

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

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

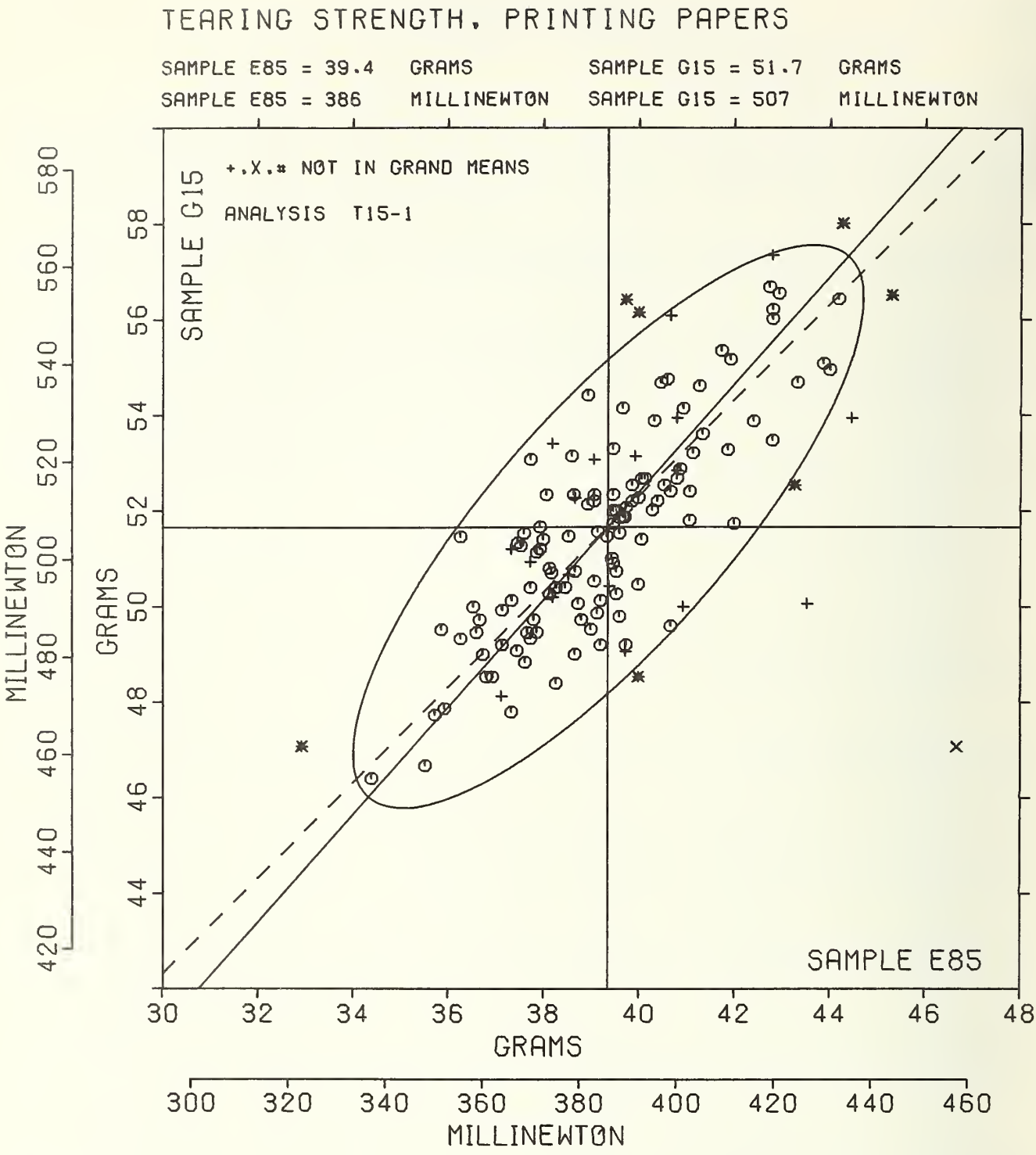
LAB CODE	F	MEANS E85	MEANS G15	COORDINATES MAJOR	COORDINATES MINOR	AVG 2.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L170	G	39.07	52.20	.21	.57	.75	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L280	G	39.07	52.33	.31	.66	.64	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L279	G	39.07	50.53	-1.03	-.54	1.38	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L255	G	39.13	49.87	-1.48	-1.03	.64	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L697	G	39.15	51.56	-.21	.09	.60	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L684	G	39.20	49.20	-1.94	-1.52	2.03	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L281	G	39.20	50.13	-1.24	-.90	1.09	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L189	G	39.33	51.47	-.16	-.12	.64	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L226C	*	39.39	50.43	-.90	-.85	1.01	15V	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF X 2
L248	G	39.44	51.00	-.43	-.51	.81	15J	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L191	G	39.47	51.73	.13	-.04	1.71	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L345	G	39.47	52.33	.58	.36	.64	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L148	G	39.47	52.00	.33	.14	.62	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L328	G	39.47	50.90	-.49	-.59	.63	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L315	G	39.47	53.29	1.29	.99	.64	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L599	G	39.53	50.27	-.92	-1.06	.79	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L575	G	39.53	50.73	-.57	-.75	.94	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L336	G	39.53	52.00	.38	.09	.92	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L291	G	39.60	49.80	-1.22	-1.42	.76	15A	TEARING STRENGTH 35 TO 110G, APPITA
L126	G	39.60	51.53	.07	-.27	1.30	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L268	G	39.60	51.85	.31	-.06	.94	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L574	G	39.67	51.87	.36	-.10	1.03	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L390	G	39.67	54.13	2.06	1.41	1.10	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L652	G	39.71	51.87	.40	-.13	1.76	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L705	*	39.73	49.07	-1.68	-2.01	1.66	15X	TEARING STRENGTH 35 TO 110G: GIVE INSTRUMENT MAKE,MODEL
L212	*	39.73	56.40	3.80	2.86	3.26	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L618	G	39.73	49.20	-1.58	-1.92	.67	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L566	G	39.73	52.07	.50	-.02	.99	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L587	G	39.87	52.53	1.00	.19	.63	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L183	G	39.87	52.20	.75	-.03	.64	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L396M	*	39.93	53.13	1.49	.54	1.10	15V	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF X 2
L264	G	40.00	52.27	.88	-.08	1.47	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L158	*	40.00	48.53	-1.91	-2.56	1.39	15K	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L107	#	40.00	36.00	-11.27	-10.89	6.03	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L121	G	40.00	50.47	-.46	-1.28	.96	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L232	*	40.00	56.13	3.78	2.49	.89	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L309	G	40.07	52.67	1.23	.13	.98	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L262	G	40.07	51.40	.28	-.71	.50	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L565	G	40.13	52.67	1.27	.08	1.07	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L223	G	40.29	52.01	.89	-.47	.79	15R	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L288	G	40.33	53.87	2.30	.73	1.64	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L562	G	40.40	52.20	1.10	-.43	.61	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L600	G	40.47	54.67	2.99	1.16	1.13	15J	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L139	G	40.53	52.53	1.44	-.30	.61	15J	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L237B	G	40.60	54.73	3.13	1.11	.61	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L311	G	40.67	52.40	1.43	-.49	1.41	15J	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L339	*	40.67	56.07	4.17	1.94	1.63	15N	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L115	G	40.67	49.60	-.67	-2.35	1.44	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L321	G	40.80	52.67	1.72	-.42	.68	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L341	*	40.80	53.93	2.66	.43	.91	15N	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L167	*	40.80	52.83	1.84	-.30	.63	15W	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF X .5
L163	G	40.87	52.87	1.91	-.33	.58	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L155	*	40.93	50.00	-.19	-2.29	1.53	15X	TEARING STRENGTH 35 TO 110G: GIVE INSTRUMENT MAKE,MODEL
L182T	G	40.93	54.13	2.90	.46	1.14	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L290	G	41.07	51.80	1.24	-1.19	.78	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L134	G	41.07	52.40	1.69	-.79	.66	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L606	G	41.13	53.20	2.34	-.31	.73	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L576	G	41.27	54.60	3.47	.52	1.12	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L213	G	41.33	53.60	2.77	-.19	.65	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L278	G	41.73	55.33	4.33	.66	1.10	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L225	M	41.80				.64	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L275	G	41.87	53.27	2.87	-.81	.68	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L242	G	41.92	55.15	4.32	.39	.93	15U	TEARING STRENGTH 35 TO 110G, AUSTRALIAN OPT. CO.
L249	G	42.00	51.73	1.81	-1.93	2.01	15J	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L333	G	42.40	53.87	3.67	-.81	.97	15J	TEARING STRENGTH 35 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 E85	MEANS G15	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SQR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L241	O	42.73	56.67	5.99	.80	1.01	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L585	*	42.80	57.33	6.53	1.19	1.19	15E TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF,AMBIENT COND.
L259	O	42.80	56.20	5.68	.44	.82	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L685	O	42.80	53.47	3.04	-1.38	1.19	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L244	O	42.80	56.00	5.54	.30	.94	15C TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L303	O	42.93	56.53	6.02	.56	1.62	15L TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L625	*	43.27	52.53	3.25	-2.35	3.72	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L442	O	43.33	54.67	4.89	-.98	1.20	15R TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L326	*	43.53	50.07	1.59	-4.19	3.44	15N TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L358	O	43.87	55.07	5.55	-1.11	.71	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L131	O	44.00	54.93	5.54	-1.30	1.17	15A TEARING STRENGTH 35 TO 110G, APPITA
L352	O	44.19	56.42	6.77	-.45	1.66	15C TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L610	*	44.27	58.00	8.00	.54	1.65	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L250L	*	44.47	53.93	5.10	-2.31	1.06	15A TEARING STRENGTH 35 TO 110G, LHOMARGY, 20 C, 65% RH
L194	*	45.30	56.50	7.57	-1.23	1.53	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L388	X	46.67	47.07	1.43	-8.52	1.42	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L207	#	49.09	51.80	6.58	-7.19	.94	15R TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L604	#	51.73	48.53	5.89	-11.33	1.04	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
GMEANS:		39.35	51.66			1.00	
		95% ELLIPSE:		7.56	2.47	WITH GAMMA = 48 DEGREES	


TEARING STRENGTH, PRINTING PAPERS
SAMPLE E85 = 39.4 GRAMS
SAMPLE E85 = 386 MILLINEWTON
SAMPLE G15 = 51.7 GRAMS
SAMPLE G15 = 507 MILLINEWTON
+.X.* NOT IN GRAND MEANS
ANALYSIS T15-1
SAMPLE G15
GRAMS
MILLINEWTON
SAMPLE E85
GRAMS
MILLINEWTON

ANALYSIS T16-1 TABLE 1

TEARING STRENGTH, GRAMS - PRIMARILY PACKAGING PAPERS

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

LAB CODE	SAMPLE B63 KRAFT 124 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	SAMPLE G19 BLEACHED KRAFT 106 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	VAR	F	LAB	TEST D. = 15
L122C	123.0	1.5	.34	6.1	1.22	108.0	3.1	.72	4.7	1.01	16C	Ø	L122C	
L151	115.7	-5.8	-1.30	4.3	.85	95.6	-9.3	-2.17	4.7	1.02	16C	Ø	L151	
L230	120.8	-.7	-.17	4.7	.94	106.9	2.0	.47	5.7	1.23	16R	Ø	L230	
L231T	121.9	.3	.07	5.8	1.16	106.9	2.0	.47	5.5	1.20	16T	Ø	L231T	
L248	126.0	4.4	1.00	2.8	.57	107.9	3.0	.70	3.8	.82	16J	Ø	L248	
L265	118.0	-3.5	-.80	5.2	1.03	100.9	-4.0	-.93	5.1	1.10	16T	Ø	L265	
L324	130.2	8.7	1.94	7.7	1.54	108.3	3.4	.78	2.6	.57	16T	Ø	L324	
L393	117.9	-3.7	-.83	3.3	.66	102.9	-2.0	-.46	3.8	.83	16T	Ø	L393	
L554	120.4	-1.1	-.26	5.2	1.04	106.7	1.8	.41	5.6	1.22	16C	Ø	L554	
L737	125.1	3.5	.79	4.5	.90	119.2	14.3	3.33	23.4	5.04	16C	#	L737	
GR. MEAN = 121.5 GRAMS						GRAND MEAN = 104.9 GRAMS								TEST DETERMINATIONS = 15
SD MEANS = 4.5 GRAMS						SD OF MEANS = 4.3 GRAMS								9 LABS IN GRAND MEANS
			AVERAGE SDR = 5.0 GRAMS					AVERAGE SDR = 4.6 GRAMS						
GR. MEAN = 1191.9 MILLINEWTON						GRAND MEAN = 1028.8 MILLINEWTON								
L106	130.8	9.3	2.08	6.8	1.36	112.9	8.0	1.87	4.4	.95	16N	*	L106	
L122N	134.5	13.0	2.92	7.1	1.41	114.1	9.2	2.15	3.8	.82	16N	*	L122N	
L148	132.1	10.6	2.38	4.7	.94	116.8	11.9	2.77	4.8	1.04	16N	*	L148	
L234	138.1	16.6	3.72	5.0	.99	117.9	13.0	3.02	5.4	1.17	16N	*	L234	
L267	139.9	18.3	4.11	6.5	1.29	118.7	13.8	3.21	5.4	1.17	16N	*	L267	
L269	121.9	.3	.07	6.2	1.23	108.8	3.9	.91	5.4	1.17	16N	*	L269	
L301B	113.6	-7.9	-1.78	5.0	1.00	95.6	-9.3	-2.17	4.8	1.03	16N	*	L301B	
L308	132.3	10.7	2.41	5.1	1.01	113.6	8.7	2.03	6.2	1.35	16N	*	L308	
L702	117.6	-3.9	-.89	5.4	1.08	101.9	-3.0	-.71	6.6	1.42	16X	*	L702	
L728	118.7	-2.9	-.65	4.0	.92	97.2	-7.7	-1.80	3.8	.83	16N	*	L728	
L730	117.1	-4.5	-1.00	4.3	.85	106.9	2.0	.46	2.7	.58	16X	*	L730	
L738	123.6	2.1	.48	4.2	.84	100.0	-4.9	-1.14	4.0	.86	16V	*	L738	

TOTAL NUMBER OF LABORATORIES REPORTING = 22

Best values: B63 122 grams
G19 107 grams

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

Data from the following laboratories appeared to be off by a mutiplicative factor: 738, Code 16V was assigned temporarily to put in a factor of 2

ANALYSIS T16-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PACKAGING PAPERS

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

LAB CODE	F	MEANS B63	MEANS G19	COORDINATES MAJOR	COORDINATES MINOR	AVG K.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L301B	*	113.6	95.6	-12.2	-1.3	1.02	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L151	O	115.7	95.6	-10.6	-2.7	.93	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
L730	*	117.1	106.9	-1.9	4.5	.72	16X	TEARING STRENGTH 60 TO 150G: GIVE INSTRUMENT MAKE,MODEL
L702	*	117.6	101.9	-5.0	.5	1.25	16X	TEARING STRENGTH 60 TO 150G: GIVE INSTRUMENT MAKE,MODEL
L393	O	117.9	102.9	-4.0	1.1	.75	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L265	O	118.0	100.9	-5.3	-.4	1.07	16F	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L728	*	118.7	97.2	-7.4	-3.6	.88	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L554	O	120.4	106.7	.4	2.1	1.13	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
L230	O	120.8	106.9	.9	2.0	1.09	16R	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF,DIGITAL READOUT
L231T	O	121.9	106.9	1.0	1.2	1.18	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L269	*	121.9	108.8	2.9	2.6	1.20	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L122C	O	123.0	108.0	3.2	1.2	1.11	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
L738	*	123.6	100.0	-1.9	-5.0	.85	16V	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF X 2
L737	#	125.1	119.2	12.4	7.9	2.57	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
L248	O	126.0	107.9	5.3	-.9	.69	16J	TEARING STRENGTH 60 TO 150G, LORENTZ-WETTRES
L324	O	130.2	108.3	8.6	-3.5	1.05	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L106	*	130.8	112.9	12.2	-.6	1.15	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L148	*	132.1	116.8	15.9	1.3	.99	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L308	*	132.3	113.6	13.8	-1.1	1.16	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L122N	*	134.5	114.1	15.8	-2.3	1.12	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L234	*	138.1	117.9	21.0	-2.1	1.08	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L267	*	139.9	118.7	22.8	-2.7	1.23	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
GMEANS:		121.5	104.9			1.00		
		95% ELLIPSE:		19.2	6.7	WITH GAMMA = 43 DEGREES		

ANALYSIS T19-1 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 J02 BLEACHED 98 GRAMS PER SQUARE METER MEAN	DEV	NO.DEV	SDR	R. SDR	SAMPLE G17 BUFF MANILA 118 GRAMS PER SQUARE METER MEAN	DEV	NO.DEV	SDR	R. SDR	VAR	F	LAB	TEST D. = 20
L106	5.46	-.20	-.07	.34	1.46	7.03	.14	.47	.39	1.02	19A	ó	L106	
L107	4.87	-.79	-2.66	.37	1.61	6.14	-.74	-2.48	.71	1.84	19A	*	L107	
L122	5.44	-.22	-.74	.24	1.04	6.85	-.03	-.10	.35	.92	19A	ó	L122	
L126	5.48	-.18	-.61	.14	.46	6.80	-.09	-.28	.35	.90	19A	ó	L126	
L151	6.02	.37	1.24	.21	.91	7.37	.49	1.62	.42	1.09	19A	ó	L151	
L157A	6.01	.35	1.18	.19	.81	6.99	.10	.34	.25	.64	19P	ó	L157A	
L157I	5.13	-.53	-1.80	.20	.86	6.12	-.77	-2.57	.34	.89	19A	*	L157I	
L167	6.11	.45	1.53	.24	1.03	7.67	.78	2.62	.34	.88	19G	*	L167	
L182I	5.48	-.18	-.60	.28	1.20	6.53	-.36	-1.19	.36	.92	19D	ó	L182I	
L182L	5.68	.02	.07	.16	.70	6.83	-.06	-.20	.44	1.14	19T	ó	L182L	
L207	5.64	-.01	-.05	.17	.75	6.69	-.19	-.64	.42	1.08	19A	ó	L207	
L217A	5.71	.05	.18	.23	1.00	6.99	.11	.36	.40	1.02	19A	ó	L217A	
L217P	5.73	.07	.24	.17	.74	6.80	-.08	-.27	.39	1.00	19P	ó	L217P	
L225	5.83	.17	.59	.22	.95	7.12	.24	.79	.32	.83	19P	ó	L225	
L237A	5.78	.12	.41	.30	1.30	7.05	.16	.55	.41	1.07	19Q	ó	L237A	
L237B	5.37	-.29	-.98	.32	1.37	6.90	.02	.06	.49	1.26	19A	ó	L237B	
L238A	5.59	-.07	-.25	.24	1.04	6.81	-.07	-.24	.36	.92	19T	ó	L238A	
L243	5.39	-.26	-.90	.13	.58	6.75	-.14	-.47	.24	.61	19A	ó	L243	
L264A	5.72	.07	.22	.19	.82	7.09	.20	.68	.31	.81	19A	ó	L264A	
L264P	6.06	.40	1.37	.24	1.05	7.38	.49	1.64	.31	.80	19P	ó	L264P	
L265	5.81	.15	.52	.21	.91	6.90	.02	.06	.42	1.08	19A	ó	L265	
L267	5.62	-.04	-.15	.17	.73	6.83	-.06	-.20	.36	.92	19A	ó	L267	
L268A	5.96	.31	1.04	.17	.72	7.09	.21	.69	.37	.96	19A	ó	L268A	
L268P	6.45	.79	2.66	.61	2.65	6.63	-.26	-.86	.67	1.74	19P	X	L268P	
L273	5.39	-.26	-.90	.33	1.41	6.86	-.02	-.07	.38	.98	19P	ó	L273	
L278	5.64	-.01	-.05	.15	.65	6.86	-.02	-.08	.40	1.03	19A	ó	L278	
L280	5.53	-.12	-.42	.22	.96	6.62	-.26	-.88	.28	.71	19G	ó	L280	
L281	5.95	.30	1.00	.15	.65	7.19	.30	1.00	.43	1.11	19G	ó	L281	
L305	6.15	.49	1.67	.26	1.11	7.27	.39	1.30	.37	.94	19P	ó	L305	
L312	5.95	.29	.98	.20	.84	6.84	-.04	-.14	.40	1.03	19D	ó	L312	
L324	5.51	-.15	-.51	.12	.51	6.69	-.19	-.64	.32	.84	19A	ó	L324	
L334	5.85	.19	.65	.16	.71	6.88	-.01	-.03	.23	.60	19P	ó	L334	
L336	180.90	175.24	594.44	8.00	34.51	224.90	218.01	727.28	12.77	33.01	19G	#	L336	
L348	5.40	-.26	-.87	.30	1.27	NO DATA REPORTED FOR SAMPLE G17					19P	M	L348	
L356	5.43	-.23	-.78	.28	1.21	6.67	-.22	-.73	.42	1.09	19P	ó	L356	
L554	5.89	.23	.78	.36	1.56	7.09	.20	.68	.39	1.01	19A	ó	L554	
L562	6.08	.43	1.43	.22	.95	6.54	-.35	-1.15	.17	.45	19P	X	L562	
L565	6.05	.39	1.33	.19	.84	7.16	.27	.90	.34	.88	19T	ó	L565	
L568	6.05	.39	1.33	.18	.76	7.05	.16	.54	.36	.93	19P	ó	L568	
L575	5.53	-.13	-.43	.21	.91	6.87	-.02	-.05	.30	.77	19G	ó	L575	
L576	5.59	-.07	-.23	.18	.76	7.05	.16	.54	.28	.73	19A	ó	L576	
L580	5.98	.32	1.09	.20	.86	7.09	.20	.68	.39	1.02	19G	ó	L580	
L581	5.29	-.37	-1.26	.42	1.82	7.02	.14	.45	.31	.79	19A	*	L581	
L604	5.42	-.24	-.82	.44	1.88	6.45	-.44	-1.46	.42	1.10	19A	ó	L604	
L606	5.73	.08	.26	.20	.85	6.98	.09	.31	.48	1.23	19P	ó	L606	
L610	5.16	-.50	-1.70	.22	.96	6.22	-.67	-2.23	.52	1.33	19A	ó	L610	
L622	6.68	1.03	3.48	.26	1.13	6.06	1.17	3.91	.47	1.22	19G	X	L622	
L650	5.92	.26	.89	.29	1.24	7.25	.37	1.23	.44	1.13	19G	ó	L650	
L652	5.80	.14	.47	.22	.93	6.65	-.24	-.80	.37	.96	19A	ó	L652	
L676	5.78	.12	.41	.37	1.61	7.05	.17	.56	.49	1.26	19A	ó	L676	
L684	5.79	.14	.46	.43	1.92	6.68	-.21	-.69	.95	2.45	19W	ó	L684	
L689	5.11	-.55	-1.85	.21	.90	6.49	-.40	-1.33	.31	.80	19A	ó	L689	
L730	5.54	-.12	-.41	.14	.59	6.96	.07	.24	.41	1.06	19A	ó	L730	
L735	5.32	-.34	-1.15	.24	1.03	6.68	-.20	-.67	.37	.95	19A	ó	L735	
L737A	5.48	-.17	-.59	.21	.92	6.65	-.24	-.79	.46	1.20	19A	ó	L737A	
L737B	6.11	.46	1.55	.25	1.09	7.23	.34	1.15	.29	.75	19A	ó	L737B	
L738	5.37	-.29	-.98	.41	1.78	6.81	-.07	-.25	.43	1.11	19A	ó	L738	
L250I	3.36	-2.30	-7.79	.06	.27	4.06	-2.83	-9.42	.13	.34	19L	+	L250I	
L251	4.77	-.89	-3.02	.26	1.13	5.94	-.94	-3.14	.48	1.23	19I	+	L251	
L702	20.60	14.94	50.66	.75	3.24	24.46	17.58	58.64	1.53	3.95	19X	+	L702	

GR. MEAN = 5.66 KILONEWTON/M — GRAND MEAN = 6.89 KILONEWTON/M — TEST DETERMINATIONS = 20
SD MEANS = .29 KILONEWTON/M — SD OF MEANS = .30 KILONEWTON/M — 52 LABS IN GRAND MEANS
AVERAGE SDR = .23 KILONEWTON/M — AVERAGE SDR = .39 KILONEWTON/M
GR. MEAN = 32.31 LB/INCH — GRAND MEAN = 39.32 LB/INCH

TOTAL NUMBER OF LABORATORIES REPORTING = 60

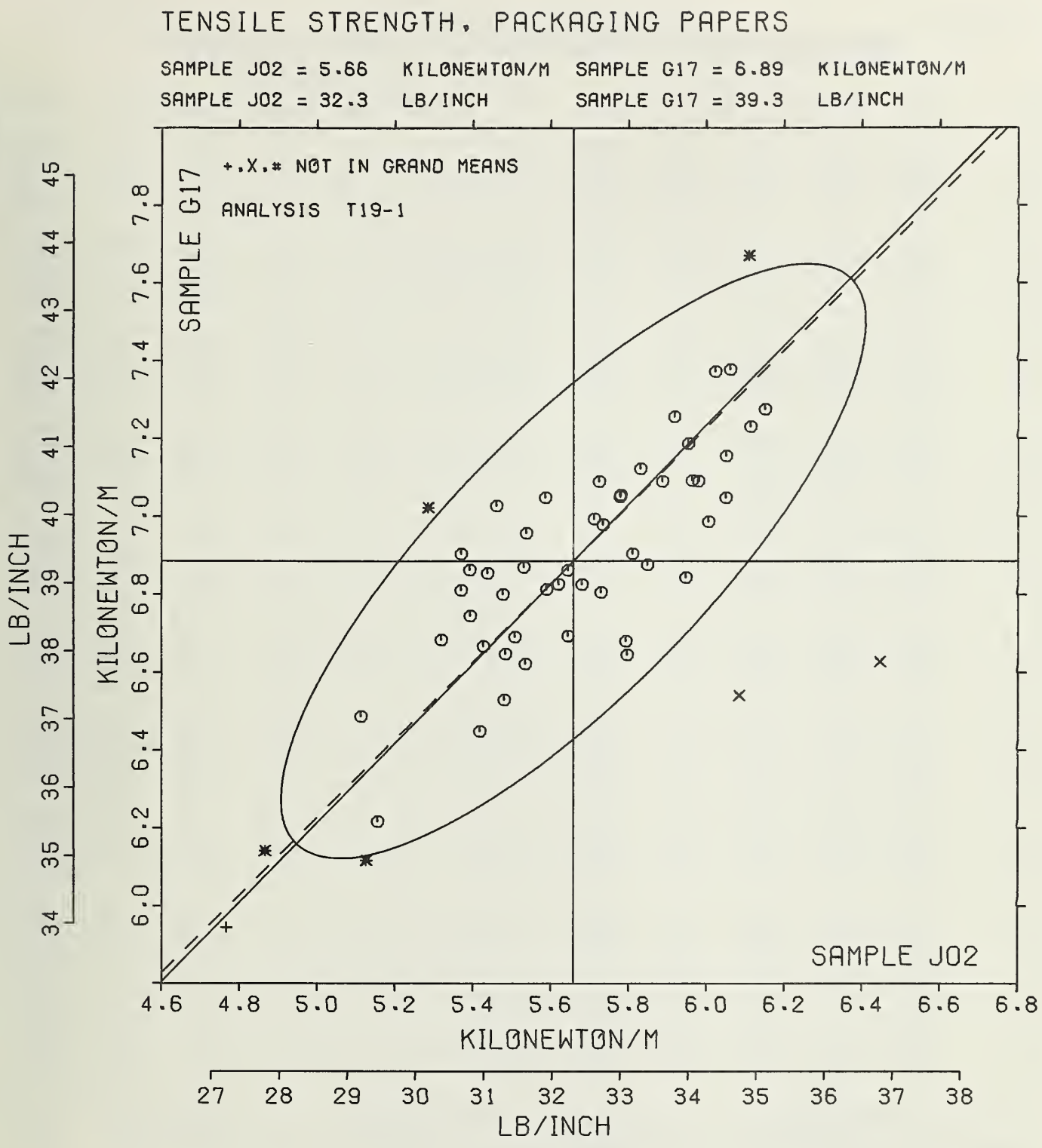
Best values: J02 5.7 ± 0.5 kilonewton per meter
G17 6.9 ± 0.5 kilonewton per meter

Data from the following laboratories appear to be off by a multiplicative factor: 336.

ANALYSIS T19-1 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 J02	MEANS G17	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SQR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L250I	*	3.36	4.06	-3.03	-.34	.30 19L	TENSILE STRENGTH, 31 TO 74 LB/IN, CRE, 20 C, 65% RH
L251	*	4.77	5.94	-1.30	-.02	1.18 19I	TENSILE STRENGTH, 31 TO 74 LB/IN, CRE, 20C, 65% RH
L107	#	4.87	6.14	-1.09	.04	1.73 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L689	O	5.11	6.49	-.07	.11	.65 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L157I	#	5.13	6.12	-.92	-.16	.68 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L610	O	5.16	6.22	-.83	-.11	1.15 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L581	#	5.29	7.02	-.16	.36	1.30 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L735	O	5.32	6.68	-.38	.10	.99 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L738	O	5.37	6.81	-.25	.15	1.44 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L237B	O	5.37	6.90	-.19	.22	1.32 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L273	O	5.39	6.86	-.20	.17	1.26 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L243	O	5.39	6.75	-.28	.09	.80 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L348	M	5.40				1.27 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L604	O	5.42	6.45	-.48	-.13	1.49 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L356	O	5.43	6.67	-.32	.01	1.15 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L122	O	5.44	6.85	-.18	.14	.98 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L106	O	5.46	7.03	-.04	.24	1.24 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L126	O	5.48	6.80	-.19	.07	.68 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L182I	O	5.48	6.53	-.38	-.12	1.00 19J	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L737A	O	5.48	6.65	-.29	-.04	1.06 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L324	O	5.51	6.69	-.24	-.03	.68 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L575	O	5.53	6.87	-.10	.08	.84 19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L280	O	5.53	6.62	-.27	-.10	.84 19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L730	O	5.54	6.96	-.03	.14	.82 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L576	O	5.59	7.05	.07	.17	.75 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L238A	O	5.59	6.81	-.10	-.00	.98 19T	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L267	O	5.62	6.83	-.07	-.01	.82 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L278	O	5.64	6.86	-.03	-.01	.84 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L207	O	5.64	6.69	-.15	-.12	.91 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L182I	O	5.68	6.83	-.03	-.06	.92 19T	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L217A	O	5.71	6.99	.11	.04	1.01 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L264A	O	5.72	7.09	.19	.10	.81 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L217P	O	5.73	6.80	-.01	-.11	.87 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L606	O	5.73	6.98	.12	.01	1.04 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L237A	O	5.78	7.05	.20	.03	1.18 19Q	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L676	O	5.78	7.05	.21	.03	1.44 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L684	O	5.79	6.68	-.05	-.24	2.19 19W	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L652	O	5.80	6.65	-.08	-.27	.95 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L265	O	5.81	6.90	.12	-.10	1.00 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L225	O	5.83	7.12	.29	.04	.89 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L334	O	5.85	6.88	.13	-.14	.86 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L554	O	5.89	7.09	.31	-.02	1.29 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L650	O	5.92	7.25	.45	.07	1.19 19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L312	O	5.95	6.84	.17	-.24	.94 19J	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L281	O	5.95	7.19	.42	-.00	.88 19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L268A	O	5.96	7.09	.36	-.07	.84 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L580	O	5.98	7.09	.37	-.09	.94 19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L157A	O	6.01	6.99	.32	-.18	.72 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L151	O	6.02	7.37	.60	.08	1.00 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L568	O	6.05	7.05	.39	-.17	.85 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L565	O	6.05	7.16	.47	-.09	.86 19T	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L264P	O	6.06	7.38	.63	.06	.93 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L562	X	6.08	6.54	.05	-.55	.70 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L167	#	6.11	7.67	.88	.23	.96 19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L737B	O	6.11	7.23	.56	-.08	.92 19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L305	O	6.15	7.27	.62	-.08	1.03 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L268P	X	6.45	6.63	.37	-.74	2.19 19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L622	X	6.68	8.06	1.56	.09	1.17 19O	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L702	*	20.60	24.46	23.01	1.63	3.00 19X	TENSILE STRENGTH, 31 TO 74 LB/IN: ( ) PENDULUM,( )LOAD CELL
L336	#	18C.90	224.90	278.37	27.34	33.76 19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
GMEANS:		5.66	6.89			1.00	
		95% ELLIPSE:		1.02	.34	WITH GAMMA = 45 DEGREES	


TENSILE STRENGTH, PACKAGING PAPERS
SAMPLE J02 = 5.66 KILONEWTON/M
SAMPLE J02 = 32.3 LB/INCH
SAMPLE G17 = 6.89 KILONEWTON/M
SAMPLE G17 = 39.3 LB/INCH
+.X.* NOT IN GRAND MEANS
ANALYSIS T19-1
SAMPLE G17
KILONEWTON/M
LB/INCH
SAMPLE J02
KILONEWTON/M
LB/INCH

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	SAMPLE J72 PRINTING 76 GRAMS PER SQUARE METER					SAMPLE B95 HEAT-SET OFFSET BOOK 90 GRAMS PER SQUARE METER					TEST D. = 20		
CODE	MEAN	DEV	N.DEV	SDR	R. SDR	MEAN	DEV	N.DEV	SDR	R. SDR	VAR	F	LAB
L105	3.77	.07	.43	.20	1.19	4.46	-.11	-.41	.39	1.74	20A	G	L105
L115	3.87	.17	.98	.17	1.02	4.82	.26	.99	.11	.49	20D	G	L115
L118	3.78	.08	.47	.08	.51	4.73	.16	.63	.13	.57	20A	G	L118
L122	3.69	-.01	-.04	.10	.59	4.45	-.12	-.45	.24	1.05	20A	G	L122
L124C	3.79	.09	.51	.22	1.37	4.76	.20	.76	.20	.86	20A	G	L124C
L125	3.84	.15	.84	.33	1.99	4.88	.32	1.22	.23	.99	20C	G	L125
L131	3.75	.05	.27	.13	.78	4.77	.21	.79	.15	.67	20E	G	L131
L141T	3.68	-.02	-.10	.16	.97	4.57	.00	.02	.17	.74	20A	G	L141T
L143	4.13	.43	2.43	.20	1.24	5.10	.53	2.04	.22	.96	20E	G	L143
L148	3.77	.07	.41	.16	.96	4.63	.07	.26	.24	1.07	20A	G	L148
L159	3.70	.00	.02	.14	.83	4.61	.05	.20	.22	.95	20A	G	L159
L163	3.69	-.01	-.06	.11	.69	4.53	-.03	-.12	.17	.74	20D	G	L163
L167	3.91	.22	1.24	.24	1.44	4.91	.35	1.33	.26	1.12	20G	G	L167
L176	3.37	-.53	-1.66	.19	1.19	4.08	-.49	-1.87	.30	1.33	20G	G	L176
L185	3.68	-.02	-.11	.20	1.19	4.78	.22	.83	.17	.74	20C	G	L185
L194	3.41	-.29	-1.66	.12	.70	4.23	-.33	-1.28	.14	.63	20A	G	L194
L211	3.35	-.35	-1.99	.20	1.20	3.85	-.71	-2.73	.40	1.77	20C	*	L211
L223B	3.70	.00	.00	.08	.49	4.52	-.04	-.16	.20	.87	20A	G	L223B
L226C	3.53	-.17	-.95	.10	.64	4.26	-.31	-1.18	.24	1.07	20C	G	L226C
L230	3.21	-.49	-2.79	.08	.49	3.88	-.68	-2.61	.12	.55	20G	*	L230
L243	3.66	-.04	-.24	.13	.78	4.52	-.04	-.16	.16	.69	20A	G	L243
L255	3.78	.08	.44	.12	.74	4.69	.12	.48	.22	.96	20A	G	L255
L260	3.58	-.12	-.66	.11	.64	4.57	.00	.02	.22	.96	20A	G	L260
L261	3.77	.07	.42	.20	1.24	4.58	.02	.07	.28	1.22	20A	G	L261
L291	3.50	-.20	-1.17	.28	1.69	3.89	-.68	-2.61	.44	1.92	20A	X	L291
L309	3.82	.12	.67	.20	1.20	4.71	.14	.55	.27	1.18	20E	G	L309
L315	3.59	-.11	-.64	.14	.83	4.47	-.09	-.36	.14	.62	20A	G	L315
L325	3.57	-.13	-.75	.16	.95	4.49	-.08	-.30	.18	.78	20E	G	L325
L328	.36	-3.34	-19.21	.02	.09	.45	-4.12	-15.83	.03	.11	20A	#	L328
L333	3.73	.03	.16	.12	.72	4.70	.13	.51	.15	.68	20A	G	L333
L344	3.94	.24	1.38	.17	1.01	4.70	.14	.53	.41	1.83	20A	G	L344
L356	3.62	-.08	-.44	.12	.75	4.45	-.11	-.43	.21	.94	20A	G	L356
L360	3.74	.04	.23	.25	1.53	4.54	-.02	-.09	.30	1.34	20B	G	L360
L386	3.92	.22	1.23	.24	1.46	4.90	.33	1.28	.25	1.08	20E	G	L386
L390	4.39	.69	3.95	.51	3.09	4.26	-.30	-1.17	.50	2.18	20A	X	L390
L442	3.55	-.14	-.83	.13	.78	4.38	-.18	-.69	.18	.77	20G	G	L442
L558	.72	-2.98	-17.14	.03	.16	.91	-3.66	-14.06	.04	.16	20A	#	L558
L563	3.78	.08	.43	.16	.98	4.69	.13	.49	.31	1.36	20A	G	L563
L574	3.77	.07	.42	.10	.62	4.79	.23	.88	.26	1.15	20A	G	L574
L575	3.76	.06	.32	.09	.54	4.62	.06	.22	.13	.55	20G	G	L575
L587	3.72	.02	.13	.13	.76	4.70	.14	.54	.17	.75	20A	G	L587
L592	3.47	-.23	-1.35	.18	1.10	4.39	-.18	-.68	.14	.60	20A	G	L592
L616	2.47	-1.23	-7.04	.33	1.99	2.30	-2.27	-8.71	.19	.85	20D	#	L616
L618	3.48	-.22	-1.29	.17	1.06	4.05	-.51	-1.96	.48	2.11	20A	G	L618
L692	3.62	-.08	-.47	.19	1.13	4.54	-.02	-.08	.19	.85	20A	G	L692
L698	3.91	.21	1.23	.18	1.10	4.74	.18	.67	.20	.87	20E	G	L698
L706	3.87	.17	.99	.34	2.08	4.54	-.03	-.10	.42	1.83	20E	G	L706
L732	3.83	.13	.73	.21	1.31	4.80	.24	.92	.19	.85	20A	G	L732
L734	1.67	-2.03	-11.66	.11	.65	1.99	-2.57	-9.88	.16	.69	20C	#	L734
L736	3.67	-.03	-.17	.14	.85	4.41	-.15	-.59	.32	1.43	20A	G	L736

GR. MEAN = 3.70 KILONEWTON/M GRAND MEAN = 4.56 KILONEWTON/M TEST DETERMINATIONS = 20

SD MEANS = .17 KILONEWTON/M SD OF MEANS = .26 KILONEWTON/M 44 LABS IN GRAND MEANS

AVERAGE SDR = .16 KILONEWTON/M AVERAGE SDR = .23 KILONEWTON/M

GR. MEAN = 12.477 LB/15 MM GRAND MEAN = 15.393 LB/15 MM

L139	3.66	-.04	-.23	.15	.90	4.62	.06	.23	.15	.64	20H	*	L139
L155	10.85	7.16	41.11	.37	2.27	12.87	8.31	31.93	.87	3.84	20X	*	L155
L250I	5.02	1.32	7.60	.12	.76	5.97	1.40	5.39	.27	1.21	20L	*	L250I
L251	3.13	-.57	-3.26	.23	1.37	3.79	-.77	-2.96	.32	1.40	20I	*	L251
L705	21.10	17.40	99.99	.78	4.73	25.61	21.05	80.91	1.96	8.64	20X	*	L705
L738	20.18	16.48	94.69	.81	4.95	25.10	20.54	78.93	.68	3.01	20X	*	L738

TOTAL NUMBER OF LABORATORIES REPORTING = 50

Best values: J72 3.7 ± 0.3 kilonewton per meter

B95 4.5 ± 0.4 kilonewton per meter

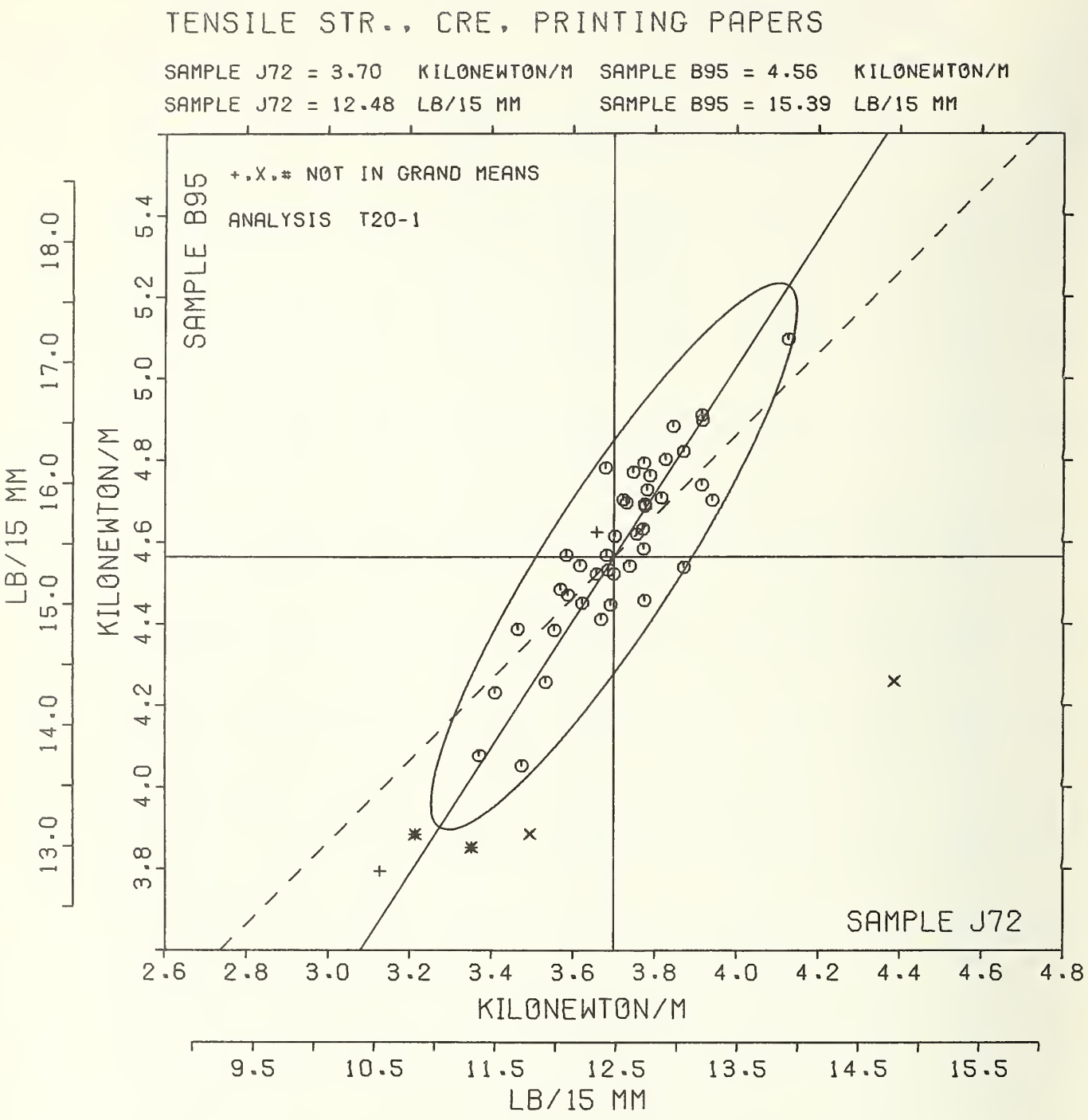
Data from the following laboratories appear to be off by a multiplicative factor: 328, 558, 616 734.

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 J72	MEANS B95	COORDINATES MAJOR	COORDINATES MINOR	AVG Σ.SQX	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L328	#	.36	.45	-5.27	.59	.40	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L558	#	.72	.91	-4.09	.53	.16	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L734	#	1.67	1.99	-3.20	.32	.07	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L616	#	2.47	2.30	-2.57	-.19	1.42	20D	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L251	*	3.13	3.79	-.96	.06	1.39	20I	TENSILE STRENGTH, 14 TO 40 LB/IN, CRE, 20 C, 65% RH
L230	*	3.21	3.88	-.83	.04	.02	20D	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L211	*	3.35	3.85	-.79	-.09	1.48	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L176	@	3.37	4.08	-.59	.01	1.66	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L194	@	3.41	4.23	-.44	.06	.09	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L592	@	3.47	4.39	-.27	.10	.05	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L618	@	3.48	4.05	-.55	-.09	1.58	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L291	X	3.50	3.89	-.68	-.19	1.60	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L226C	@	3.53	4.26	-.39	-.03	.05	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L442	@	3.55	4.38	-.23	.02	.78	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L325	@	3.57	4.49	-.14	.07	.57	20B	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L260	@	3.58	4.57	-.06	.10	.00	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L315	@	3.59	4.47	-.14	.04	.73	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L692	@	3.62	4.54	-.06	.06	.99	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L356	@	3.62	4.45	-.14	.00	.55	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L243	@	3.66	4.52	-.06	.01	.74	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L139	*	3.66	4.62	.03	.07	.77	20H	TENSILE STRENGTH, 14 TO 40 LB/IN, CRE, SHORT TEST SPAN
L736	@	3.67	4.41	-.14	-.06	1.64	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L185	@	3.68	4.78	.17	.13	.57	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L141T	@	3.68	4.57	-.01	.02	.65	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L163	@	3.69	4.53	-.03	-.01	.72	20D	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L122	@	3.69	4.45	-.10	-.06	.62	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L223B	@	3.70	4.52	-.03	-.02	.68	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L159	@	3.70	4.61	.04	.02	.89	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L587	@	3.72	4.70	.13	.06	.76	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L333	@	3.73	4.70	.13	.05	.70	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L360	@	3.74	4.54	.00	-.05	1.43	20B	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L131	@	3.75	4.77	.20	.07	.73	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L575	@	3.76	4.62	.06	-.02	.05	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L148	@	3.77	4.63	.10	-.02	1.01	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L261	@	3.77	4.58	.06	-.05	1.43	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L574	@	3.77	4.79	.23	.06	.08	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L105	@	3.77	4.46	-.06	-.12	1.46	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L563	@	3.78	4.69	.15	.01	1.17	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L255	@	3.78	4.69	.15	.00	.85	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L118	@	3.78	4.73	.18	.02	.94	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L124C	@	3.79	4.76	.22	.03	1.12	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L309	@	3.82	4.71	.18	-.02	1.19	20B	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L732	@	3.83	4.80	.27	.02	1.08	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L125	@	3.84	4.88	.35	.05	1.49	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L115	@	3.87	4.82	.31	-.00	.75	20D	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L706	@	3.87	4.54	.07	-.16	1.95	20B	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L698	@	3.91	4.74	.20	-.09	.98	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L167	@	3.91	4.91	.41	.01	1.26	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L386	@	3.92	4.90	.40	-.00	1.27	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L344	@	3.94	4.70	.25	-.13	1.42	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L143	@	4.13	5.10	.06	-.07	1.40	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L390	X	4.39	4.26	.11	-.74	2.64	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L250I	*	5.02	5.97	1.89	-.36	.98	20L	TENSILE STRENGTH, 14 TO 40 LB/IN, CRE, 20 C, 65% RH
L155	*	10.85	12.87	10.00	-4.53	3.65	20X	TENSILE STRENGTH, 14 TO 40 LB/IN: ( )PENDULUM,( )LOAD CELL
L738	*	20.18	25.10	20.19	-2.77	3.98	20X	TENSILE STRENGTH, 14 TO 40 LB/IN: ( )PENDULUM,( )LOAD CELL
L705	*	21.10	25.61	27.12	-3.26	.09	20X	TENSILE STRENGTH, 14 TO 40 LB/IN: ( )PENDULUM,( )LOAD CELL
GMEANS:		3.70	4.56			1.00		
		95% ELLIPSE:		.79	.16	WITH GAMMA = 57 DEGREES		


TENSILE STR., CRE, PRINTING PAPERS
SAMPLE J72 = 3.70 KILONEWTON/M SAMPLE B95 = 4.56 KILONEWTON/M
SAMPLE J72 = 12.48 LB/15 MM SAMPLE B95 = 15.39 LB/15 MM
+,X,* NOT IN GRAND MEANS
ANALYSIS T20-1
SAMPLE B95
KILONEWTON/M
LB/15 MM
SAMPLE J72
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 J72 MEAN	PRINTING 76 GRAMS PER SQUARE METER DEV	NO. DEV	SDR	R. SDR	SAMPLE B95 MEAN	HEAT-SET OFFSET BOOK 90 GRAMS PER SQUARE METER DEV	NO. DEV	SDR	R. SDR	VAR	F	LAB
L103	3.83	.08	.46	.11	.69	4.60	.02	.06	.20	.85	20R	@	L103
L108	4.09	.33	1.76	.14	.86	4.96	.38	1.44	.26	1.07	20P	@	L108
L121	3.84	.09	.46	.08	.49	4.38	-.20	-.74	.32	1.35	20P	@	L121
L124P	3.86	.10	.55	.17	1.04	4.68	.10	.37	.20	.83	20P	@	L124P
L128	3.67	-.08	-.43	.16	.99	4.53	-.05	-.18	.15	.65	20T	@	L128
L148	3.70	-.05	-.27	.15	.91	4.41	-.17	-.64	.16	.76	20P	@	L148
L162	3.80	.05	.24	.14	.84	4.68	.10	.39	.22	.91	20V	@	L162
L182L	3.66	-.09	-.46	.14	.83	4.60	.02	.06	.14	.56	20T	@	L182L
L183	3.76	.00	.02	.18	1.07	4.36	-.22	-.81	.24	.99	20P	@	L183
L189	4.02	.27	1.43	.12	.70	5.11	.53	1.98	.19	.80	20R	@	L189
L191P	3.74	-.01	-.07	.16	.96	4.61	.03	.12	.17	.73	20P	@	L191P
L195	3.64	-.11	-.61	.22	1.34	4.40	-.18	-.69	.28	1.19	20R	@	L195
L212	3.70	-.05	-.29	.15	.90	4.45	-.13	-.48	.25	1.06	20R	@	L212
L213	3.52	-.23	-1.23	.33	2.03	4.34	-.24	-.91	.37	1.57	20T	@	L213
L218	3.78	.02	.13	.13	.82	4.71	.13	.50	.18	.77	20P	@	L218
L233	3.74	-.02	-.09	.21	1.27	4.42	-.16	-.59	.31	1.31	20Q	@	L233
L234	3.67	-.09	-.47	.12	.75	4.67	.09	.34	.13	.55	20P	@	L234
L241	3.54	-.21	-1.12	.19	1.18	4.39	-.19	-.72	.15	.65	20R	@	L241
L242	3.55	-.21	-1.11	.15	.92	4.45	-.13	-.48	.25	1.04	20Y	@	L242
L249	3.75	-.01	-.04	.15	.90	4.61	.03	.12	.24	1.03	20P	@	L249
L259	3.90	.15	.78	.11	.66	4.92	.34	1.28	.20	.83	20P	@	L259
L262	3.70	-.06	-.31	.14	.84	4.75	.17	.63	.14	.58	20R	@	L262
L275	3.73	-.03	-.14	.22	1.32	4.71	.13	.50	.20	.85	20R	@	L275
L279P	4.05	.30	1.60	.12	.72	5.05	.47	1.77	.32	1.36	20P	@	L279P
L285	3.20	-.55	-2.93	.24	1.47	4.06	-.52	-1.93	.35	1.45	20P	*	L285
L290	3.58	-.17	-.91	.20	1.20	4.38	-.20	-.74	.34	1.41	20P	@	L290
L311	3.81	.06	.30	.14	.84	4.82	.04	.16	.14	.58	20V	@	L311
L313	3.47	-.28	-1.51	.14	.83	4.39	-.19	-.72	.15	.62	20T	@	L313
L321	3.52	-.23	-1.23	.15	.91	3.87	-.71	-2.66	.25	1.04	20Q	*	L321
L330	3.93	.17	.92	.25	1.50	4.66	.08	.32	.38	1.61	20P	@	L330
L337	4.01	.25	1.34	.10	.59	4.88	.30	1.14	.12	.51	20V	@	L337
L356	3.55	-.20	-1.08	.17	1.07	4.51	-.07	-.26	.24	1.02	20P	@	L356
L393	3.82	.07	.37	.09	.55	4.75	.17	.64	.16	.66	20P	@	L393
L556	3.88	.13	.69	.27	1.65	4.55	-.03	-.12	.48	2.02	20P	@	L556
L571	4.02	.27	1.42	.27	1.64	4.83	.25	.94	.45	1.89	20P	@	L571
L599	3.53	-.22	-1.17	.25	1.55	4.63	-.55	-2.04	.29	1.21	20V	@	L599
L625	4.08	.33	1.75	.13	.77	4.97	.39	1.47	.19	.78	20P	@	L625
L626	3.88	.12	.65	.14	.85	4.82	.24	.89	.17	.72	20T	@	L626
L680	3.72	-.03	-.18	.21	1.27	4.35	-.23	-.88	.39	1.64	20R	@	L680
L685	3.64	-.11	-.61	.11	.67	4.33	-.25	-.93	.19	.81	20Y	@	L685
L714	3.99	.23	1.25	.19	1.14	4.70	.12	.46	.27	1.14	20P	@	L714
L728	3.79	.04	.20	.14	.85	4.84	.26	.98	.25	1.05	20P	@	L728

GR. MEAN = 3.75 KILONEWTON/M GRAND MEAN = 4.58 KILONEWTON/M TEST DETERMINATIONS = 20

SD MEANS = .19 KILONEWTON/M SD OF MEANS = .27 KILONEWTON/M 42 LABS IN GRAND MEANS

AVERAGE SDR = .16 KILONEWTON/M AVERAGE SDR = .24 KILONEWTON/M

GR. MEAN =12.662 LB/15 MM GRAND MEAN =15.447 LB/15 MM

TOTAL NUMBER OF LABORATORIES REPORTING = 42

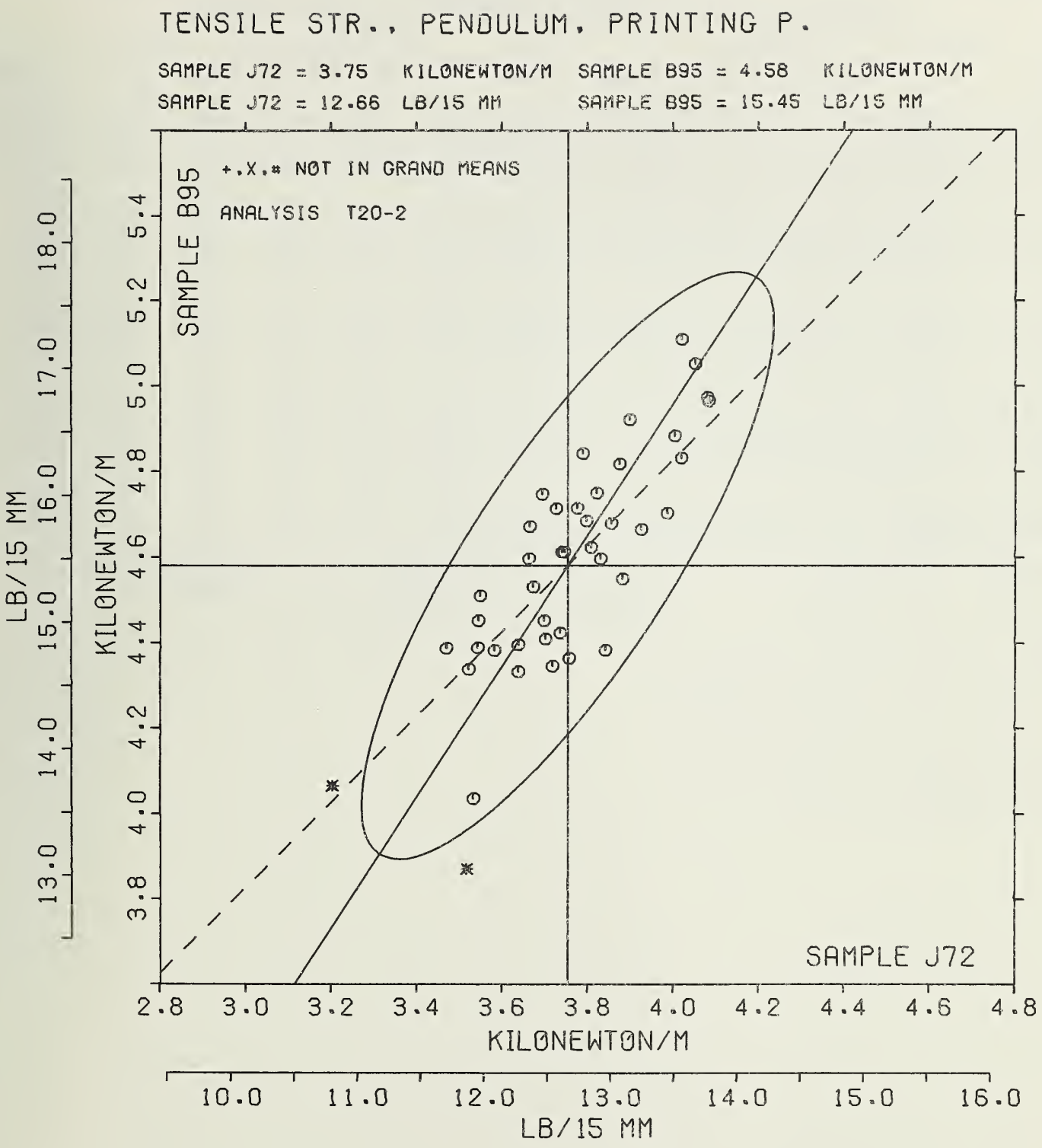
Best values: J72 3.7 ± 0.3 kilonewton per meter
B95 4.6 ± 0.5 kilonewton per meter

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 J72	MEANS B95	COORDINATES MAJOR	COORDINATES MINOR	AVG DEV	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L285	*	3.20	4.06	-.73	.18	1.45	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L313	6	3.47	4.39	-.32	.13	.72	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L321	*	3.52	3.87	-.72	-.19	.97	20Q	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L213	6	3.52	4.34	-.33	.06	1.80	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L599	6	3.53	4.03	-.56	-.11	1.38	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L241	6	3.54	4.39	-.28	.07	.91	20K	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L242	6	3.55	4.45	-.22	.10	.98	20Y	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L356	6	3.55	4.51	-.17	.13	1.04	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L290	6	3.58	4.38	-.26	.03	1.30	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L195	6	3.64	4.40	-.22	-.00	1.27	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L685	6	3.64	4.33	-.27	-.04	.74	20Y	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L182L	6	3.66	4.60	-.04	.08	.71	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L234	6	3.67	4.67	.03	.12	.65	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L128	6	3.67	4.53	-.08	.04	.82	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L262	6	3.70	4.75	.11	.14	.71	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L212	6	3.70	4.45	-.14	-.02	.98	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L148	6	3.70	4.41	-.17	-.05	.83	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L680	6	3.72	4.35	-.22	-.10	1.45	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L275	6	3.73	4.71	.10	.09	1.08	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L233	6	3.74	4.42	-.14	-.07	1.29	20Q	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L191P	6	3.74	4.61	.02	.03	.65	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L249	6	3.75	4.61	.02	.02	.96	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L183	6	3.76	4.36	-.18	-.12	1.03	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L218	6	3.78	4.71	.13	.05	.79	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L728	6	3.79	4.84	.24	.11	.95	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L162	6	3.80	4.68	.11	.02	.86	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L311	6	3.81	4.62	.07	-.02	.71	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L393	6	3.82	4.75	.15	.03	.61	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L103	6	3.83	4.60	.06	-.06	.77	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L121	6	3.84	4.38	-.12	-.18	.92	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L124P	6	3.86	4.68	.14	-.03	.94	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L626	6	3.88	4.82	.27	.03	.79	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L556	6	3.88	4.55	.04	-.13	1.64	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L259	6	3.90	4.92	.36	.06	.76	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L330	6	3.93	4.66	.17	-.10	1.56	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L714	6	3.99	4.70	.23	-.13	1.14	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L337	6	4.01	4.88	.39	-.05	.95	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L571	6	4.02	4.83	.36	-.09	1.77	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L189	6	4.02	5.11	.59	.06	.75	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L279P	6	4.05	5.05	.56	.01	1.04	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L625	6	4.08	4.97	.51	-.06	.78	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L108	6	4.09	4.96	.50	-.07	.97	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
GMEANS:		3.75	4.58			1.00		
		95% ELLIPSE:		.81	.24	WITH GAMMA = 56 DEGREES		


TENSILE STR., PENDULUM, PRINTING P.
SAMPLE J72 = 3.75 KILONEWTON/M SAMPLE B95 = 4.58 KILONEWTON/M
SAMPLE J72 = 12.66 LB/15 MM SAMPLE B95 = 15.45 LB/15 MM
+.X.* NOT IN GRAND MEANS
ANALYSIS T20-2
SAMPLE B95
KILONEWTON/M
3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4
LB/15 MM
13.0 14.0 15.0 16.0 17.0 18.0
SAMPLE J72
2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8
KILONEWTON/M
10.0 11.0 12.0 13.0 14.0 15.0 16.0
LB/15 MM

ANALYSIS T25-1 TABLE 1

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER

TAPPI OFFICIAL TEST METHOD T494 OS-79, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	SAMPLE J02 BLEACHED 98 GRAMS PER SQUARE METER MEAN	DEV	NO.DEV	SDR	RO.SDR	SAMPLE G17 BUFF MANILA 118 GRAMS PER SQUARE METER MEAN	DEV	NO.DEV	SDR	RO.SDR	VAR	F	LAB	TEST DO. = 20
L106	79.3	-.5	-.05	14.7	1.59	75.2	3.6	.50	8.7	.95	25F	@	L106	
L122	85.8	6.1	.64	10.7	1.16	79.0	7.5	1.03	8.5	.92	25P	@	L122	
L126	78.5	-1.3	-.14	6.3	.67	68.5	-3.0	-.42	8.1	.88	25G	@	L126	
L151	88.6	8.9	.93	7.0	.85	76.2	4.7	.65	11.2	1.22	25F	@	L151	
L182	78.8	-1.0	-.10	8.1	.87	60.1	-11.5	-1.58	9.3	1.01	25B	@	L182	
L207	79.6	-.2	-.02	10.3	1.11	64.2	-7.4	-1.01	12.6	1.37	25F	@	L207	
L234	95.8	16.0	1.69	6.2	.67	82.2	10.7	1.47	8.6	.93	25F	@	L234	
L237B	67.3	-12.5	-1.32	12.4	1.33	71.4	-.1	-.02	10.0	1.08	25H	@	L237B	
L243	80.0	.3	.03	5.8	.63	66.5	-3.1	-.42	5.7	.62	25Z	@	L243	
L264	73.8	-6.0	-.63	3.9	.42	64.6	-6.9	-.95	8.7	.94	25F	@	L264	
L267	85.8	6.0	.63	6.9	.75	78.2	6.7	.92	9.2	1.01	25F	@	L267	
L268	91.1	11.3	1.19	7.4	.80	78.6	7.0	.97	8.5	.93	25B	@	L268	
L273	78.2	-1.6	-.17	14.1	1.52	78.9	7.4	1.02	8.2	.89	25F	@	L273	
L278	83.1	3.3	.35	7.4	.80	71.4	-.2	-.02	11.3	1.23	25E	@	L278	
L280	87.1	7.3	.77	10.5	1.13	72.1	.6	.08	7.2	.78	25B	@	L280	
L312	88.2	8.4	.89	9.4	1.01	77.4	5.9	.81	10.2	1.11	25J	@	L312	
L580	85.2	5.4	.57	9.3	1.02	65.7	-5.8	-.80	10.0	1.09	25C	@	L580	
L604	109.5	29.8	3.13	11.4	1.23	114.1	42.5	5.86	22.7	2.47	25A	#	L604	
L676	59.5	-20.3	-2.14	13.5	1.46	54.7	-16.8	-2.31	9.7	1.05	25F	@	L676	
L689	63.0	-11.8	-1.24	8.0	.86	63.8	-7.8	-1.07	8.1	.88	25F	@	L689	
L735	16.5	-63.3	-6.66	2.2	.24	7.1	-64.5	-8.88	.9	.10	25F	#	L735	
L737A	61.0	-18.8	-1.98	2.8	.30	70.3	4.8	.66	6.0	.65	25E	*	L737A	
L737B	80.7	.9	.09	12.5	1.35	75.3	3.8	.52	10.2	1.11	25F	@	L737B	

GRO MEAN = 79.8 JOULES/SQ M GRAND MEAN = 71.5 JOULES/SQ M TEST DETERMINATIONS = 20

SD MEANS = 9.5 JOULES/SQ M SD OF MEANS = 7.3 JOULES/SQ M 21 LABS IN GRAND MEANS

AVERAGE SDR = 9.3 JOULES/SQ M AVERAGE SDR = 9.2 JOULES/SQ M

GRO MEAN = 5.465 FT.LB/SQ FT GRAND MEAN = 4.901 FT.LB/SQ FT

L250	46.0	-33.8	-3.56	2.0	.29	43.7	-27.9	-3.94	3.5	.38	25N	*	L250	

TOTAL NUMBER OF LABORATORIES REPORTING = 24

Best values: J02 80 ± 16 joules per square meter
G17 72 ± 10 joules per square meter

The following laboratories were omitted from the grand means because of extreme test results: 604.

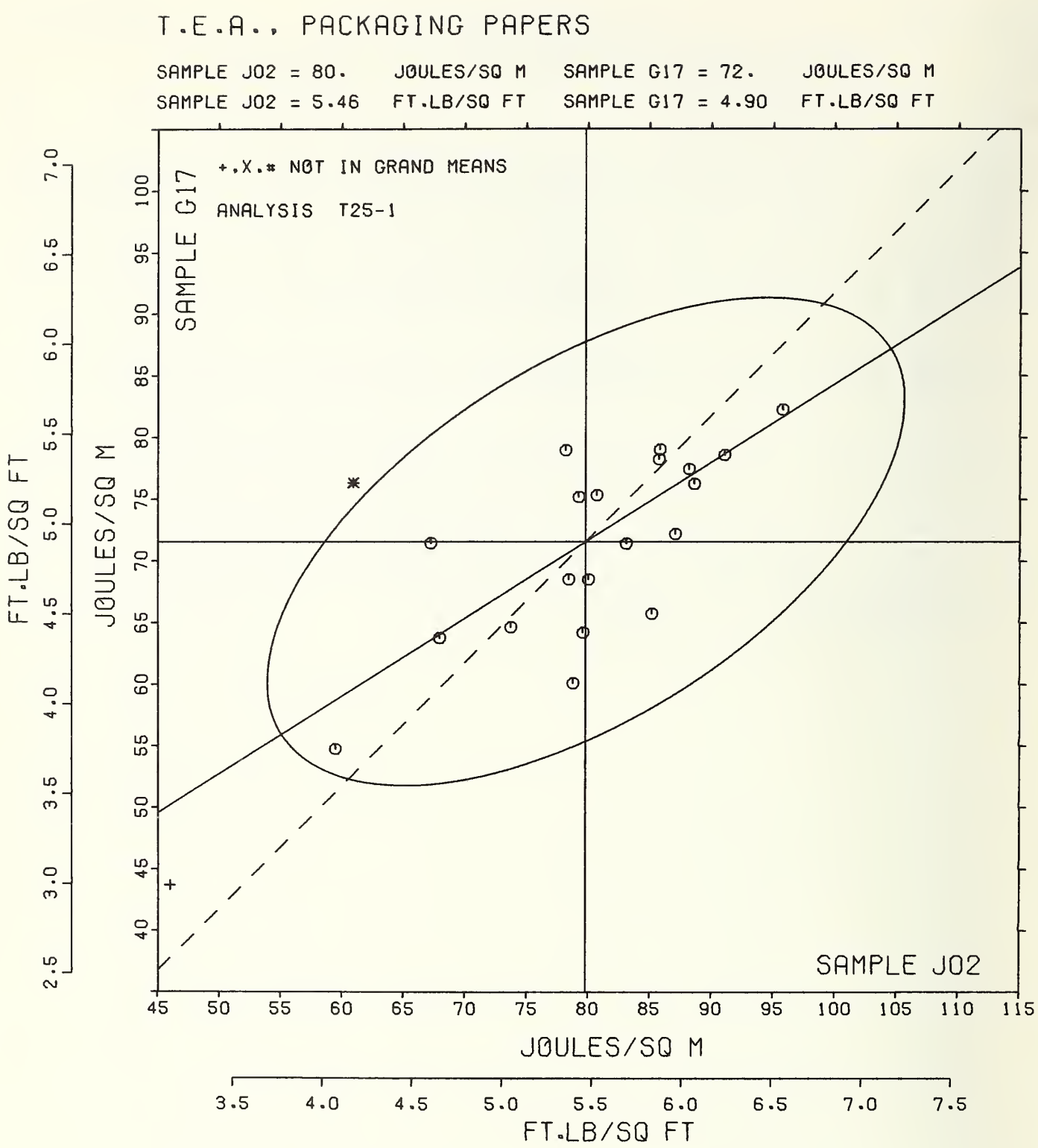
Data from the following laboratories appear to be off by a multiplicative factor: 735

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 J02	MEANS G17	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SQR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L735	#	16.3	7.1	-87.9	-21.7	.17	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L250	*	46.0	43.7	-43.5	-5.5	.03	25N	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS,20C
L676	@	59.5	54.7	-26.1	-3.4	1.25	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L737A	*	61.0	76.3	-13.4	14.1	.48	25A	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
L237B	@	67.3	71.4	-10.6	.6	1.21	25H	TENSILE ENERGY ABSORPTION (WITH TEST T19),2-PIN STRAIN GAGE
L689	@	68.0	63.8	-14.1	-.3	.87	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L264	@	73.8	64.6	-8.8	-2.6	.06	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L273	@	78.2	78.9	2.0	7.1	1.20	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L126	@	78.3	68.5	-2.7	-1.9	.78	25G	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/LINE JAWS
L182	@	78.8	60.1	-.9	-9.2	.94	25B	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L106	@	79.3	75.2	1.3	3.3	1.27	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L207	@	79.6	64.2	-4.1	-6.1	1.24	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L243	@	80.0	68.5	-1.4	-2.7	.02	25Z	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/LINE JAWS
L737B	@	80.7	75.3	2.8	2.7	1.23	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L278	@	83.1	71.4	2.7	-1.9	1.01	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
L580	@	85.2	65.7	1.3	-7.8	1.06	25C	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/LINE JAWS
L267	@	85.8	78.2	8.0	2.4	.08	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L122	@	85.8	79.0	9.1	3.1	1.04	25P	TENSILE ENERGY ABSORPTION (WITH TEST T19),PATTERNED FLAT JAW
L280	@	87.1	72.1	6.5	-3.4	.96	25A	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L312	@	88.2	77.4	10.3	.5	1.06	25J	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L151	@	88.6	76.2	10.0	-.8	1.03	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L268	@	91.1	78.6	13.3	-.1	.66	25B	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L234	@	95.8	82.2	19.2	.5	.00	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
L604	#	109.5	114.1	47.9	20.1	1.65	25A	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
GMEANS:		79.8	71.5			1.00		
		95% ELLIPSE:		29.4	14.3	WITH GAMMA = 32 DEGREES		


T.E.A., PACKAGING PAPERS
SAMPLE J02 = 80. JOULES/SQ M
SAMPLE J02 = 5.46 FT.LB/SQ FT
SAMPLE G17 = 72. JOULES/SQ M
SAMPLE G17 = 4.90 FT.LB/SQ FT
+,X,* NOT IN GRAND MEANS
ANALYSIS T25-1
SAMPLE G17
JOULES/SQ M
FT.LB/SQ FT
SAMPLE J02
JOULES/SQ M
FT.LB/SQ FT

REPORT NO. 628 TAPPI COLLABORATIVE REFERENCE PROGRAM NOVEMBER 1979

ANALYSIS T26-1 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 J72 PRINTING 76 GRAMS PER SQUARE METER MEAN	DEV	NO.DEV	SDR	RO.SDR	SAMPLE B95 HEAT-SET OFFSET BOOK 90 GRAMS PER SQUARE METER MEAN	DEV	NO.DEV	SDR	RO.SDR	VAR	F	LAB	TEST DO.= 20
L115	42.0	-1.1	-.24	4.4	.83	44.0	.5	.13	3.4	.62	26C	Ø	L115	
L118	43.5	.4	.09	4.1	.78	42.9	-.7	-.17	3.3	.60	26E	Ø	L118	
L122	40.4	3.3	.87	3.7	.70	42.7	-.8	-.21	6.7	1.22	26L	Ø	L122	
L139	38.4	-4.7	-.99	4.3	.82	38.7	-4.9	-1.26	5.2	.94	26H	Ø	L139	
L159	45.3	2.1	.45	5.4	1.02	43.2	-.3	-.08	6.9	1.25	26F	Ø	L159	
L163	40.9	-2.3	-.47	4.1	.77	38.9	-4.7	-1.20	3.8	.69	26J	Ø	L163	
L167	39.1	-4.0	-.84	2.4	.44	49.1	5.6	1.43	2.6	.46	26D	*	L167	
L185	35.7	-7.4	-1.58	7.0	1.31	40.2	-3.3	-.86	5.0	.90	26C	Ø	L185	
L211	40.3	-2.9	-.61	11.1	2.07	43.4	-.1	-.04	5.7	1.04	26Z	Ø	L211	
L255	49.5	6.3	1.33	4.3	.80	48.3	4.8	1.24	6.2	1.13	26P	Ø	L255	
L309	49.0	5.9	1.23	6.9	1.30	46.8	5.3	1.37	9.6	1.75	26J	Ø	L309	
L356	47.5	4.4	.92	5.8	1.10	45.3	1.7	.44	5.8	1.05	26A	Ø	L356	
L393	36.2	-6.9	-1.45	3.9	.06	36.2	-7.3	-1.90	3.2	.57	26V	Ø	L393	
L442	44.5	1.4	.29	3.7	.70	45.8	.3	.08	4.4	.79	26B	Ø	L442	
L563	53.5	10.4	2.18	8.8	1.65	50.7	7.2	1.85	9.6	1.74	26C	Ø	L563	
L575	42.9	-.3	-.06	2.8	.52	41.1	-2.4	-.63	2.7	.49	26A	Ø	L575	
L587	40.6	-2.5	-.52	5.4	1.01	42.8	-.7	-.19	5.6	1.02	26C	Ø	L587	
L592	41.0	-2.1	-.44	5.2	.97	43.6	.0	.01	6.5	1.19	26H	Ø	L592	

GRO. MEAN = 43.1 JOULES/SQ M GRAND MEAN = 43.5 JOULES/SQ M TEST DETERMINATIONS = 20

SD MEANS = 4.8 JOULES/SQ M SD OF MEANS = 3.9 JOULES/SQ M 18 LABS IN GRAND MEANS

AVERAGE SDR = 5.3 JOULES/SQ M AVERAGE SDR = 5.5 JOULES/SQ M

GRO. MEAN = 2.955 FT.LB/SQ FT GRAND MEAN = 2.983 FT.LB/SQ FT

L250	81.5	38.4	8.07	5.1	.95	65.6	22.0	5.69	7.8	1.41	26N	*	L250	

TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: J72 43 ± 7 joules per square meter

B95 43 ± 6 joules per square meter

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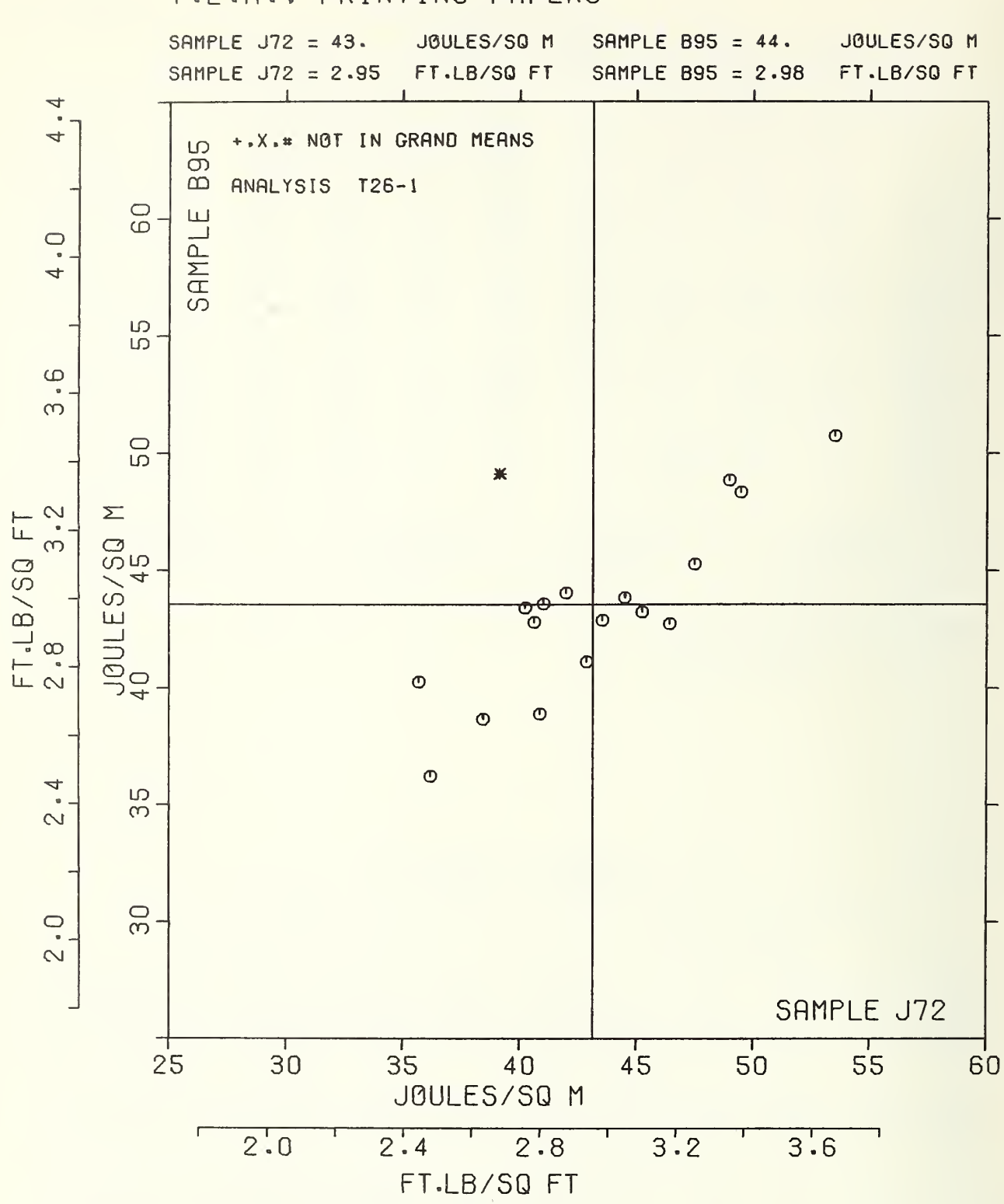
ANALYSIS T26-1 TABLE 2

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 J72	B95	COORDINATES MAJOR	MINOR	AVG RO.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L185	Ø	35.7	40.2	-7.9	1.8	1.11	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
L393	Ø	36.2	36.2	-10.0	-1.7	.61	26V	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L139	Ø	38.4	38.7	-6.7	-1.1	.98	26H	TENSILE ENERGY ABSORPTION (WITH TEST T20),2-PIN STRAIN GAGE
L167	*	39.1	49.1	.2	6.8	.45	26D	TENSILE ENERGY ABSORPTION (WITH TEST T20),2-PIN STRAIN GAGE
L211	Ø	40.3	43.4	-2.4	1.6	1.06	26Z	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
L587	Ø	40.6	42.8	-2.4	.9	1.02	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
L163	Ø	40.9	38.9	-4.6	-2.4	.73	26J	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L592	Ø	41.0	43.6	-1.7	1.3	1.06	26H	TENSILE ENERGY ABSORPTION (WITH TEST T20),2-PIN STRAIN GAGE
L115	Ø	42.0	44.0	-.6	1.1	.73	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
L575	Ø	42.9	41.1	-1.7	-1.8	.01	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L118	Ø	43.5	42.9	-.1	-.8	.09	26E	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L442	Ø	44.5	43.8	1.3	-.0	.74	26B	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L159	Ø	45.3	43.2	1.5	-1.5	1.13	26F	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L122	Ø	46.4	42.7	2.1	-2.6	.50	26L	TENSILE ENERGY ABSORPTION (WITH TEST T20),PATTERNED FLAT JAW
L356	Ø	47.5	45.3	4.5	-1.3	1.07	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L309	Ø	49.0	48.8	7.9	.7	1.52	26J	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L255	Ø	49.5	48.3	7.9	.0	.50	26P	TENSILE ENERGY ABSORPTION (WITH TEST T20),PATTERNED FLAT JAW
L563	Ø	53.5	50.7	12.6	-.5	1.09	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
L250	*	81.5	65.6	43.9	-5.6	1.18	26N	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS,20C
GMEANS:		43.1	43.5			1.00		
		95% ELLIPSE:		15.9	6.1	WITH GAMMA = 37 DEGREES		


T.E.A., PRINTING PAPERS
SAMPLE J72 = 43. JOULES/SQ M
SAMPLE J72 = 2.95 FT.LB/SQ FT
SAMPLE B95 = 44. JOULES/SQ M
SAMPLE B95 = 2.98 FT.LB/SQ FT
+.X.* NOT IN GRAND MEANS
ANALYSIS T26-1
SAMPLE B95
SAMPLE J72
JOULES/SQ M
FT.LB/SQ FT
25 30 35 40 45 50 55 60
2.0 2.4 2.8 3.2 3.6 4.0 4.4
30 35 40 45 50 55 60
2.0 2.4 2.8 3.2 3.6

ANALYSIS T28-1 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 J02 BLEACHED 98 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	SAMPLE G17 BUFF MANILA 118 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	VAR	F	LAB	TEST D. = 20
L106	2.330	.199	1.42	.287	1.73	1.900	.254	1.66	.117	.91	28B	ó	L106	
L122	2.261	.130	.93	.177	1.07	1.820	.175	1.14	.120	.93	28P	ó	L122	
L126	2.033	-.097	-.70	.114	.69	1.536	-.109	-.71	.113	.88	28C	ó	L126	
L151	2.100	-.031	-.22	.176	1.07	1.740	.094	.62	.196	1.52	28B	ó	L151	
L182	2.085	-.046	-.33	.093	.56	1.445	-.201	-1.31	.123	.96	28B	ó	L182	
L234	2.750	.619	4.43	.089	.54	2.220	.574	3.74	.120	.93	28B	#	L234	
L243	2.107	-.024	-.17	.106	.64	1.542	-.104	-.68	.085	.66	28C	ó	L243	
L264	2.115	-.016	-.11	.163	.98	1.580	-.066	-.43	.151	1.17	28B	ó	L264	
L265	2.108	-.023	-.16	.153	.92	1.584	-.061	-.40	.121	.94	28A	ó	L265	
L267	2.320	.190	1.36	.106	.64	1.857	.212	1.38	.147	1.14	28B	ó	L267	
L268	2.233	.102	.73	.122	.74	1.783	.138	.90	.099	.76	28B	ó	L268	
L278	2.145	.014	.10	.110	.66	1.625	-.021	-.13	.145	1.12	28A	ó	L278	
L280	2.114	-.016	-.12	.203	1.22	1.599	-.047	-.30	.101	.78	28B	ó	L280	
L312	2.240	.109	.78	.157	.95	1.655	.209	1.36	.110	.85	28B	ó	L312	
L324	1.932	-.198	-1.42	.153	.92	1.442	-.203	-1.32	.127	.98	28P	ó	L324	
L336	2.072	-.058	-.42	.218	1.31	1.596	-.050	-.32	.133	1.03	28A	ó	L336	
L580	2.075	-.055	-.40	.165	.99	1.450	-.196	-1.28	.157	1.22	28C	ó	L580	
L581	1.556	-.574	-4.11	.188	1.13	1.537	-.108	-.71	.133	1.03	28A	#	L581	
L676	1.885	-.246	-1.76	.287	1.73	1.530	-.116	-.75	.149	1.16	28B	ó	L676	
L689	1.945	-.186	-1.33	.101	.97	1.550	-.096	-.62	.147	1.14	28B	ó	L689	
L735	2.430	.299	2.14	.205	1.24	1.920	.274	1.79	.077	.60	28B	ó	L735	
L737A	2.230	.100	.71	.143	.86	1.626	-.019	-.12	.169	1.31	28A	ó	L737A	
L737B	1.985	-.146	-1.04	.182	1.10	1.575	-.070	-.46	.123	.96	28A	ó	L737B	

GR. MEAN = 2.131 PERCENT GRAND MEAN = 1.646 PERCENT TEST DETERMINATIONS = 20

SD MEANS = .140 PERCENT SD OF MEANS = .153 PERCENT 21 LABS IN GRAND MEANS

AVERAGE SDR = .166 PERCENT AVERAGE SDR = .129 PERCENT

L730	2.216	.085	.61	.203	1.22	1.654	.009	.06	.114	.88	28X	*	L730	
L739	2.495	.364	2.61	.094	.57	1.780	.134	.88	.140	1.08	28X	*	L739	

TOTAL NUMBER OF LABORATORIES REPORTING = 25

Best values: J02 2.1 ± 0.2 percent
G17 1.6 ± 0.3 percent

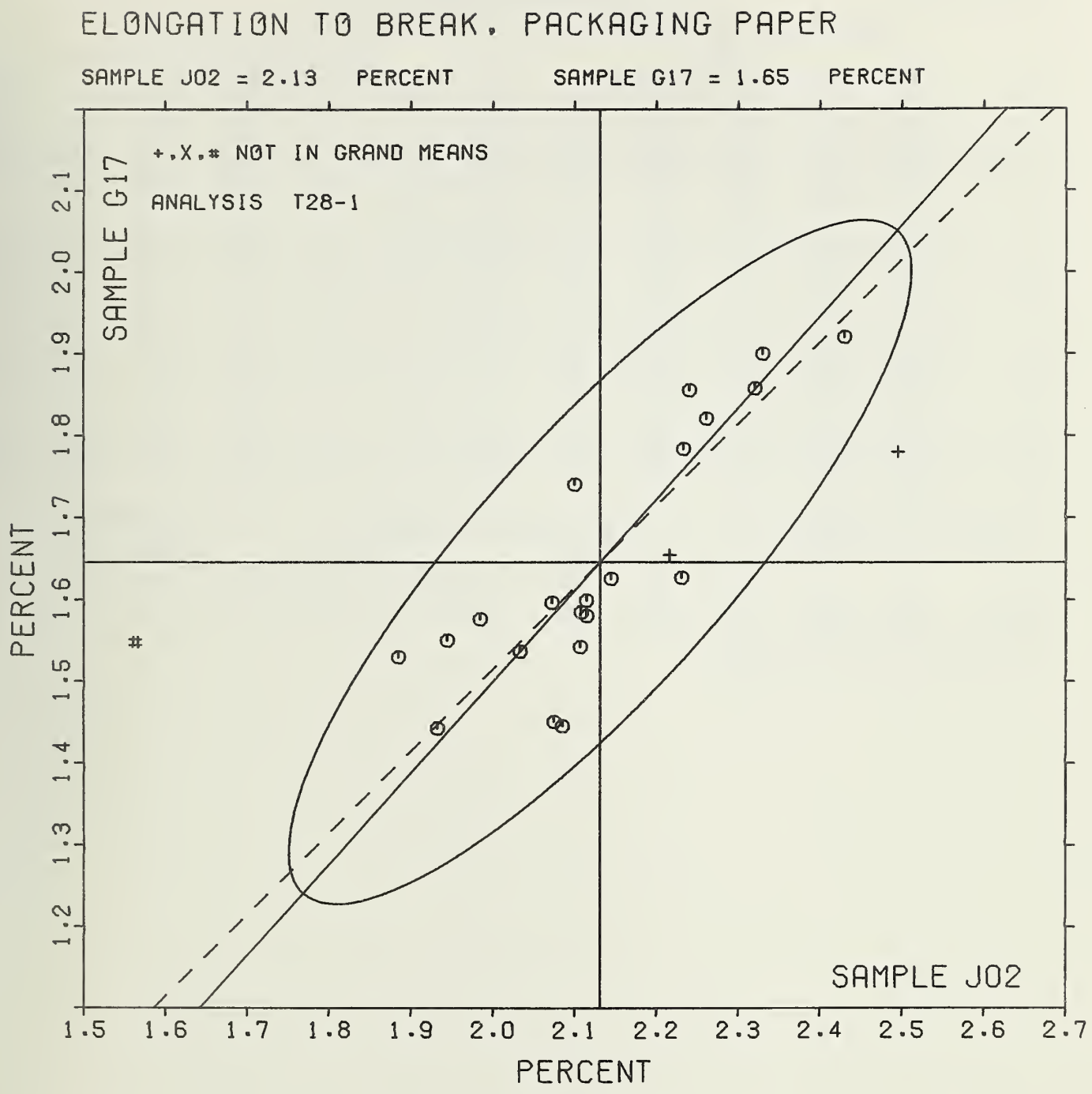
The following laboratories were omitted from the grand means because of extreme test results: 234, 581.

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 J02	MEANS G17	COORDINATES MAJOR	COORDINATES MINOR	AVG SQDEV	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L581	#	1.556	1.537	-.464	.356	1.08	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L676	6	1.885	1.530	-.250	.106	1.44	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L324	6	1.932	1.442	-.284	.012	.95	28P	ELONGATION (WITH TEST T19),LOAD CELL,PATTERNED FLAT JAWS
L689	6	1.945	1.550	-.195	.075	1.05	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L737B	6	1.985	1.575	-.150	.062	1.03	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L126	6	2.033	1.536	-.146	-.000	.78	28C	ELONGATION (WITH TEST T19),LOAD CELL,LINE/LINE JAWS
L336	6	2.072	1.596	-.076	.010	1.17	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L580	6	2.075	1.450	-.183	-.089	1.11	28C	ELONGATION (WITH TEST T19),LOAD CELL,LINE/LINE JAWS
L182	6	2.085	1.445	-.180	-.100	.76	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L151	6	2.100	1.740	.050	.086	1.29	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L243	6	2.107	1.542	-.093	-.051	.85	28C	ELONGATION (WITH TEST T19),LOAD CELL,LINE/LINE JAWS
L265	6	2.108	1.584	-.001	-.024	.93	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L280	6	2.114	1.599	-.040	-.019	1.00	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L264	6	2.115	1.580	-.059	-.032	1.08	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L278	6	2.145	1.625	-.006	-.024	.89	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L730	*	2.216	1.654	.063	-.058	1.05	28X	ELONGATION (WITH TEST T19): GIVE INSTRUMENT & JAW TYPES
L737A	6	2.230	1.626	.052	-.087	1.09	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L268	6	2.233	1.783	.171	.016	.75	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L312	6	2.240	1.855	.229	.058	.90	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L122	6	2.261	1.820	.217	.020	1.00	28P	ELONGATION (WITH TEST T19),LOAD CELL,PATTERNED FLAT JAWS
L267	6	2.320	1.857	.284	.000	.89	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L106	6	2.330	1.900	.322	.021	1.52	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L735	6	2.430	1.920	.404	-.040	.92	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L739	*	2.495	1.780	.343	-.182	.83	28X	ELONGATION (WITH TEST T19): GIVE INSTRUMENT & JAW TYPES
L234	#	2.750	2.220	.841	-.078	.73	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
GMEANS:		2.131	1.646			1.00		
		95% ELLIPSE:		.543	.155	WITH GAMMA = 48 DEGREES		


ELONGATION TO BREAK, PACKAGING PAPER
SAMPLE J02 = 2.13 PERCENT
SAMPLE G17 = 1.65 PERCENT
+,X,* NOT IN GRAND MEANS
ANALYSIS T28-1
SAMPLE G17
PERCENT
1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1
SAMPLE J02
1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7
PERCENT

ANALYSIS T29-1 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 J72 MEAN	PRINTING 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	SAMPLE B95 MEAN	HEAT-SET OFFSET BOOK 90 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	TEST D. = 20 VAR	F	LAB
L105	1.387	-.302	-1.91	.151	1.00	1.075	-.360	-1.65	.183	1.31	29A	ó	L105
L118	1.735	.045	.20	.111	.74	1.464	.029	.13	.086	.62	29A	ó	L118
L122	1.872	.182	.79	.124	.82	1.482	.047	.21	.134	.96	29P	ó	L122
L139	1.415	-.275	-1.19	.131	.87	1.120	-.315	-1.44	.132	.95	29D	ó	L139
L141T	1.444	-.246	-1.06	.189	1.25	1.275	-.160	-.73	.118	.85	29D	ó	L141T
L163	1.773	.083	.36	.133	.88	1.478	.043	.20	.112	.80	29B	ó	L163
L176	1.769	.079	.34	.200	1.33	1.433	-.002	-.01	.223	1.60	29B	ó	L176
L185	1.549	-.140	-.61	.185	1.22	1.433	-.002	-.01	.126	.90	29C	ó	L185
L255	2.261	.571	2.46	.125	.83	1.941	.506	2.31	.171	1.22	29P	ó	L255
L309	1.960	.271	1.17	.201	1.33	1.702	.267	1.22	.201	1.44	29A	ó	L309
L344	1.517	-.172	-.75	.149	.99	1.242	-.193	-.88	.151	1.08	29A	ó	L344
L356	1.920	.231	1.00	.158	1.04	1.571	.136	.62	.136	.98	29A	ó	L356
L386	1.305	-.385	-1.67	.147	.97	1.135	-.300	-1.37	.088	.63	29A	ó	L386
L442	1.820	.130	.57	.115	.76	1.515	.080	.36	.099	.71	29B	ó	L442
L575	1.700	.011	.05	.077	.51	1.388	-.047	-.21	.053	.38	29A	ó	L575
L587	1.685	-.005	-.02	.140	.97	1.660	.225	1.03	.164	1.17	29C	ó	L587
L592	1.676	-.014	-.06	.240	1.59	1.611	.176	.81	.187	1.33	29D	ó	L592
L698	1.735	.045	.20	.179	1.18	1.490	.055	.25	.133	.95	29C	ó	L698
L736	1.575	-.115	-.50	.107	.71	1.250	-.185	-.85	.157	1.13	29A	ó	L736

GR. MEAN = 1.690 PERCENT GRAND MEAN = 1.435 PERCENT TEST DETERMINATIONS = 20

SD MEANS = .231 PERCENT SD OF MEANS = .219 PERCENT 19 LABS IN GRAND MEANS

AVERAGE SDR = .151 PERCENT AVERAGE SDR = .140 PERCENT

L242	2.205	.515	2.23	.147	.97	1.860	.425	1.94	.147	1.05	29R	*	L242
L626	1.550	-.140	-.60	.100	.66	1.317	-.118	-.54	.099	.71	29R	*	L626
L685	1.680	-.010	-.04	.120	.79	1.380	-.055	-.25	.111	.79	29R	*	L685

TOTAL NUMBER OF LABORATORIES REPORTING = 22

Best values: J72 1.7 ± 0.3 percent

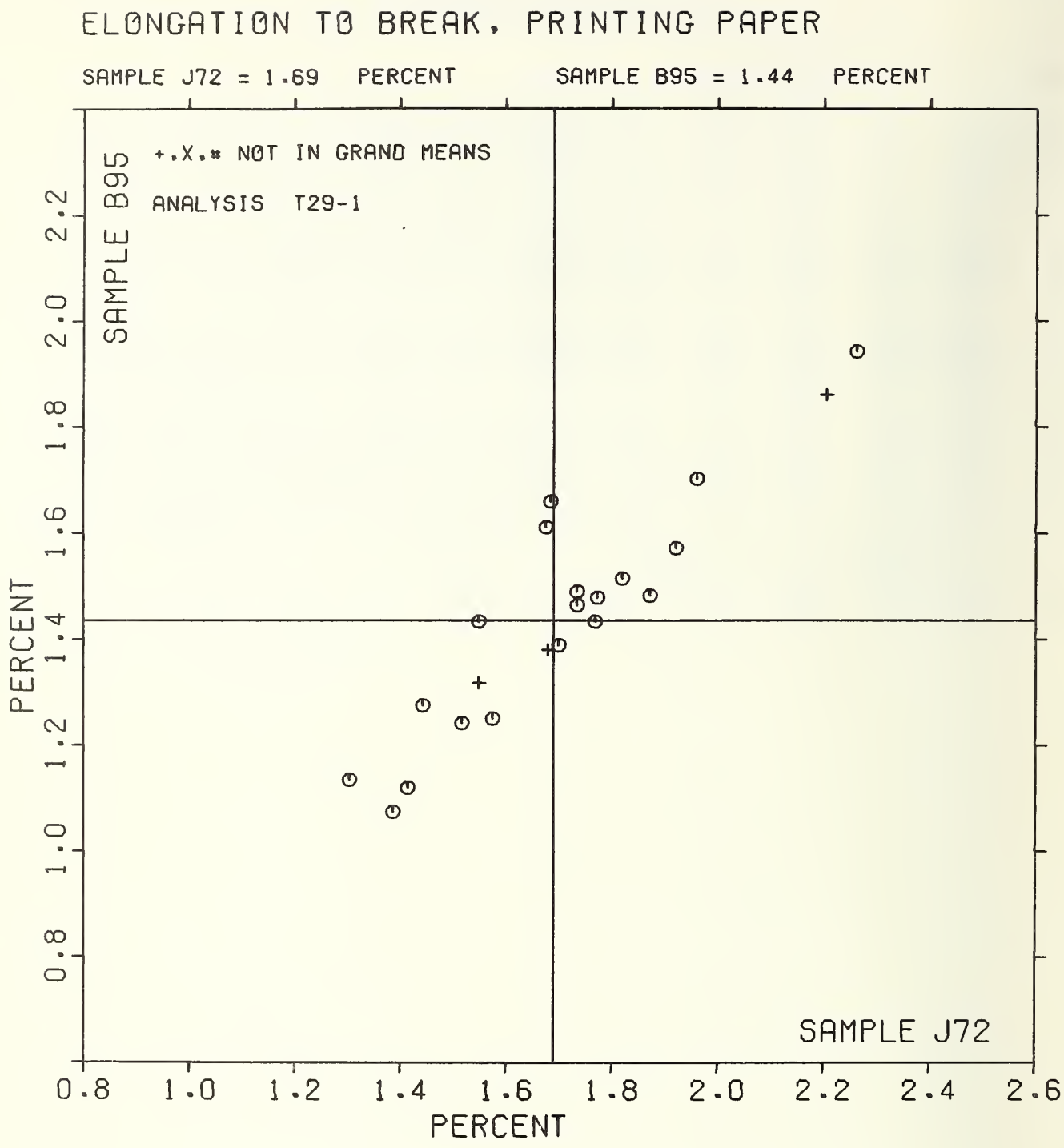
B95 1.5 ± 0.4 percent

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 J72	MEANS B95	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L386	6	1.305	1.135	-.486	.045	.86 29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L105	6	1.387	1.075	-.467	-.055	1.16 29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L139	6	1.415	1.120	-.416	-.041	.91 29D	ELONGATION (WITH TEST T20),LOAD CELL,2-PIN STRAIN GAGE
L141T	6	1.444	1.275	-.288	.052	1.05 29D	ELONGATION (WITH TEST T20),LOAD CELL,2-PIN STRAIN GAGE
L344	6	1.517	1.242	-.258	-.023	1.03 29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L185	6	1.549	1.433	-.103	.095	1.66 29C	ELONGATION (WITH TEST T20),LOAD CELL,LINE/LINE JAWS
L626	*	1.550	1.317	-.182	.010	.89 29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L736	6	1.575	1.250	-.210	-.058	.92 29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L592	6	1.670	1.611	.111	.138	1.46 29D	ELONGATION (WITH TEST T20),LOAD CELL,2-PIN STRAIN GAGE
L685	*	1.680	1.380	-.045	-.034	.79 29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L587	6	1.685	1.660	.151	.167	1.07 29C	ELONGATION (WITH TEST T20),LOAD CELL,LINE/LINE JAWS
L575	6	1.700	1.388	-.024	-.042	.45 29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L698	6	1.735	1.490	.071	.009	1.07 29C	ELONGATION (WITH TEST T20),LOAD CELL,LINE/LINE JAWS
L118	6	1.735	1.464	.053	-.010	.86 29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L176	6	1.769	1.433	.057	-.056	1.46 29B	ELONGATION (WITH TEST T20),LOAD CELL,LINE/FLAT JAWS
L163	6	1.773	1.478	.090	-.026	.84 29B	ELONGATION (WITH TEST T20),LOAD CELL,LINE/FLAT JAWS
L442	6	1.820	1.515	.150	-.031	.73 29B	ELONGATION (WITH TEST T20),LOAD CELL,LINE/FLAT JAWS
L122	6	1.872	1.482	.165	-.091	.89 29P	ELONGATION (WITH TEST T20),LOAD CELL,PATTERNED FLAT JAWS
L356	6	1.920	1.571	.262	-.059	1.01 29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L309	6	1.960	1.702	.380	.009	1.38 29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L242	*	2.205	1.860	.666	-.044	1.01 29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L255	6	2.261	1.941	.763	-.024	1.02 29P	ELONGATION (WITH TEST T20),LOAD CELL,PATTERNED FLAT JAWS
GMEANS:		1.690	1.435			1.00	
		95% ELLIPSE:		.855	.193	WITH GAMMA = 43 DEGREES	


ELONGATION TO BREAK, PRINTING PAPER
SAMPLE J72 = 1.69 PERCENT
SAMPLE B95 = 1.44 PERCENT
+.X.* NOT IN GRAND MEANS
ANALYSIS T29-1
SAMPLE B95
SAMPLE J72
PERCENT
PERCENT
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6

ANALYSIS T30-1 TABLE 1
FOLDING ENDURANCE (MIT), DOUBLE FOLDS
TAPPA SUGGESTED METHOD T511 SU-69

LAB CODE	SAMPLE B30 BOOK PAPER 77 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	VAR	F	LAB	TEST D. = 15
L105	13.3	-3.3	-1.21	2.3	.43	37.5	-10.0	-.66	15.4	.88	30M	ø	L105	
L118	18.1	1.2	.43	4.7	.89	38.3	-9.2	-.60	11.8	.68	30D	ø	L118	
L121	10.7	-.2	-.08	6.0	1.12	66.4	12.9	.84	27.6	1.58	30M	ø	L121	
L122	21.3	4.4	1.53	6.3	1.18	107.0	59.5	3.89	56.4	3.23	30M	X	L122	
L124	19.7	2.8	.98	5.2	.98	53.6	6.1	.40	13.0	.74	30N	ø	L124	
L150	19.3	2.4	.84	6.7	1.27	61.7	14.2	.93	15.0	.86	30M	ø	L150	
L158	12.3	-4.6	-1.58	2.8	.52	21.8	-25.7	-1.68	10.1	.58	30N	ø	L158	
L159	18.7	1.8	.63	3.9	.73	50.9	3.4	.22	15.1	.86	30N	ø	L159	
L162	15.7	-1.2	-.40	4.1	.77	42.8	-4.7	-.31	21.2	1.21	30M	ø	L162	
L163	16.3	-.5	-.17	4.4	.82	44.4	-3.1	-.20	15.3	.87	30N	ø	L163	
L176	34.7	17.8	6.16	12.8	2.41	137.2	89.7	5.87	70.6	4.04	30N	#	L176	
L182M	24.4	7.6	2.61	4.5	.84	69.6	22.1	1.45	12.0	.69	30M	*	L182M	
L185	20.5	3.6	1.25	6.0	1.13	77.5	30.0	1.96	22.2	1.27	30N	ø	L185	
L190C	17.7	.9	.31	7.3	1.36	45.7	-1.8	-.12	13.1	.75	30N	ø	L190C	
L212	18.1	1.3	.45	4.7	.89	48.3	.8	.05	18.2	1.04	30M	ø	L212	
L223F	19.7	2.8	.96	5.2	.98	45.1	-2.4	-.15	14.4	.83	30M	ø	L223F	
L230	14.1	-2.7	-.93	4.8	.90	52.9	5.4	.35	16.1	.92	30N	ø	L230	
L238A	16.3	-.5	-.17	4.5	.84	50.6	3.1	.20	16.8	.96	30N	ø	L238A	
L238B	11.7	-5.2	-1.70	4.4	.83	18.7	-28.8	-1.89	9.8	.56	30D	ø	L238B	
L243	19.0	2.2	.75	7.3	1.38	52.2	4.7	.31	25.7	1.47	30D	ø	L243	
L254	18.9	2.0	.70	7.0	1.31	86.6	33.1	2.16	38.8	2.22	30M	ø	L254	
L262	17.1	.3	.10	6.4	1.20	55.7	8.2	.54	21.0	1.20	30N	ø	L262	
L275	17.2	.4	.13	5.6	1.06	27.8	-19.7	-1.29	11.2	.64	30N	ø	L275	
L278	15.5	-1.3	-.45	6.6	1.25	23.9	-23.6	-1.55	12.0	.69	30C	ø	L278	
L279	18.0	1.2	.40	5.3	.99	58.9	11.4	.74	18.7	1.07	30N	ø	L279	
L285A	13.6	-1.2	-.43	7.3	1.37	38.5	-9.0	-.59	20.5	1.18	30N	ø	L285A	
L285B	38.9	22.0	7.61	18.0	3.50	23.9	-23.6	-1.55	6.5	.37	30N	#	L285B	
L320	19.3	2.5	.86	6.2	1.17	50.3	2.8	.19	21.6	1.24	30N	ø	L320	
L321	18.3	1.4	.49	6.2	1.17	54.4	6.9	.45	28.6	1.64	30M	ø	L321	
L326N	14.8	-2.0	-.70	6.7	1.26	23.3	-24.2	-1.58	11.9	.68	30N	ø	L326N	
L339	12.7	-4.2	-1.44	4.0	.76	26.4	-21.1	-1.38	11.1	.64	30M	ø	L339	
L376	13.9	-2.9	-1.00	3.4	.64	36.4	-11.1	-.73	20.7	1.19	30N	ø	L376	
L388	16.1	-.7	-.24	5.8	1.09	55.3	7.8	.51	20.9	1.20	30N	ø	L388	
L390	14.9	-1.9	-.66	5.2	.98	33.1	-14.4	-.94	17.0	.98	30N	ø	L390	
L393	16.3	-.6	-.20	4.9	.92	47.2	-.3	-.02	6.3	.36	30M	ø	L393	
L396M	21.0	4.2	1.44	8.2	1.55	68.5	21.0	1.37	23.5	1.34	30N	ø	L396M	
L565	19.9	3.1	1.07	7.4	1.39	61.0	13.5	.88	18.0	1.03	30N	ø	L565	
L589	12.9	-3.9	-1.33	2.6	.48	32.7	-14.8	-.97	9.2	.52	30N	ø	L589	
L599	17.5	.6	.22	3.8	.71	67.6	20.1	1.31	20.8	1.19	30C	ø	L599	
L670	20.2	3.4	1.16	6.6	1.24	56.3	8.8	.58	17.9	1.03	30N	ø	L670	
L734	11.8	-5.0	-1.74	2.0	.38	46.5	1.0	.07	19.0	1.09	30C	*	L734	
L737	13.1	-3.8	-1.30	3.2	.60	34.1	-13.4	-.87	15.6	.89	30N	ø	L737	

GR. MEAN = 16.8 DOUBLE FOLDS — GRAND MEAN = 47.5 DOUBLE FOLDS — TEST DETERMINATIONS = 15
SD MEANS = 2.9 DOUBLE FOLDS — SD OF MEANS = 15.3 DOUBLE FOLDS — 39 LABS IN GRAND MEANS
AVERAGE SDR = 5.3 DOUBLE FOLDS — AVERAGE SDR = 17.5 DOUBLE FOLDS

L182S	24.6	7.8	2.68	5.0	.94	45.5	-2.0	-.13	15.5	.89	30S	*	L182S
L190D	20.1	3.2	1.12	5.4	1.02	15.5	-32.0	-2.09	4.9	.28	30S	*	L190D
L326S	15.9	-.9	-.31	4.6	.87	28.1	-21.4	-1.40	9.0	.51	30S	*	L326S
L705	15.6	-1.2	-.41	2.4	.45	56.6	-8.9	-.58	5.9	.34	30X	*	L705
L706	11.1	-5.8	-1.99	3.1	.58	12.7	-34.8	-2.27	6.5	.37	30X	*	L706

TOTAL NUMBER OF LABORATORIES REPORTING = 47

Best values: B30 17 double folds
B80 49 double folds

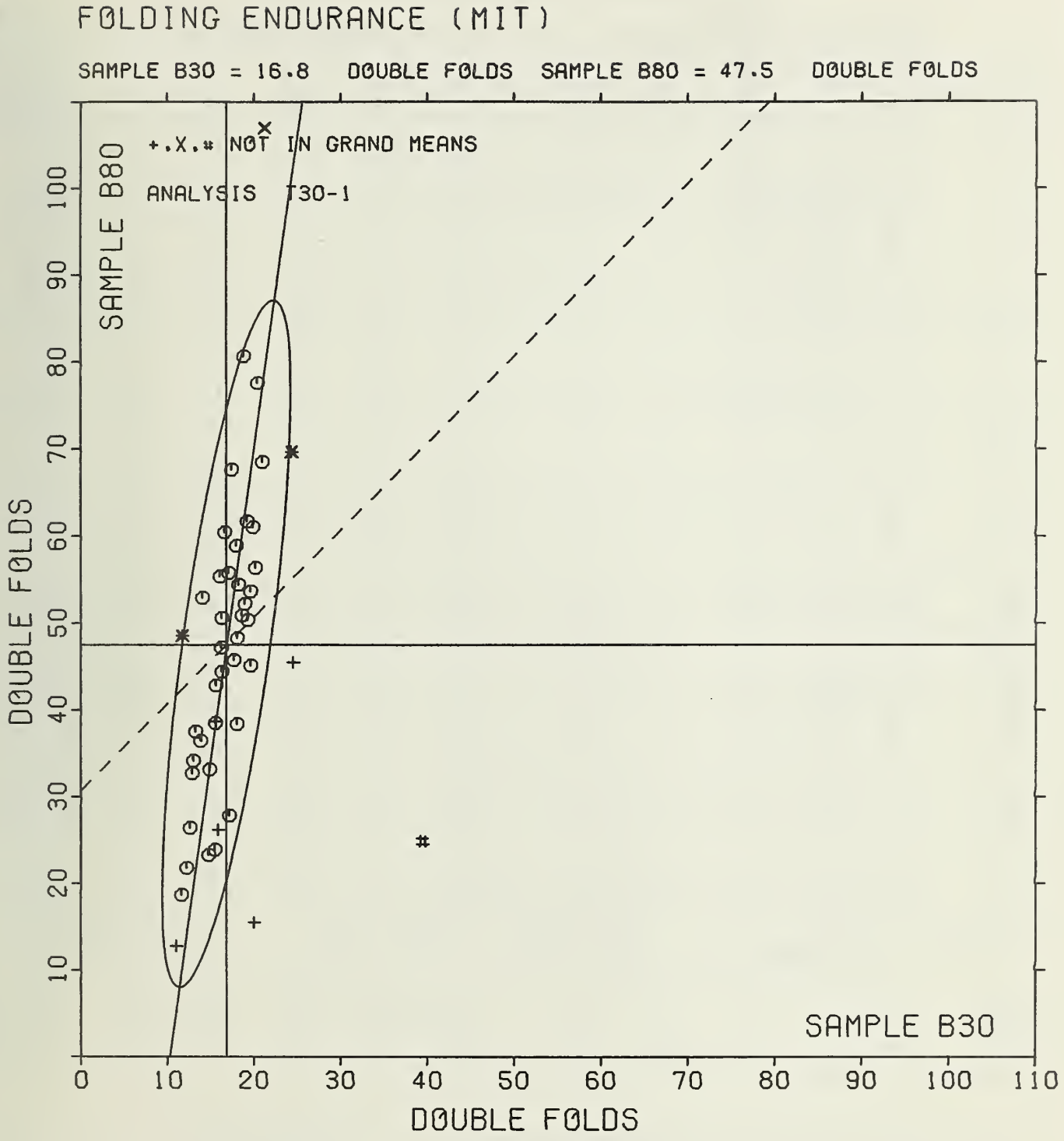
The following laboratories were omitted from the grand means because of extreme test results: 176, 285B.

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

LAB CODE	F	MEANS E30	MEANS B80	COORDINATES MAJOR	COORDINATES MINOR	AVG RESIDUE	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L706	*	11.1	12.7	-35.2	0.9	0.48	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L238B	6	11.7	18.7	-29.3	1.1	0.70	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L734	*	11.8	48.5	0.3	5.1	0.74	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L158	6	12.3	21.8	-26.1	1.0	0.55	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L339	6	12.7	26.4	-21.5	1.2	0.70	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L589	6	12.9	32.7	-15.2	1.8	0.50	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L737	6	13.1	34.1	-13.8	1.9	0.75	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L105	6	13.3	37.5	-10.4	2.1	0.66	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L376	6	13.9	36.4	-11.4	1.3	0.51	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L230	6	14.1	52.9	4.9	3.4	0.51	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L326N	6	14.8	23.3	-24.3	-1.3	0.57	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L390	6	14.9	33.1	-14.5	-0.1	0.98	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L278	6	15.5	23.9	-23.6	-2.0	0.97	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L285A	6	15.6	38.5	-9.1	-0.0	1.27	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L705	*	15.6	38.6	-8.9	-0.0	0.59	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L162	6	15.7	42.8	-4.8	0.5	0.99	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L326S	*	15.9	26.1	-21.3	-2.1	0.69	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L388	6	16.1	55.3	7.7	1.8	1.15	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L393	6	16.3	47.2	-0.4	0.5	0.64	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L163	6	16.3	44.4	-3.1	0.1	0.65	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238A	6	16.3	50.6	3.0	0.9	0.90	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L121	6	16.7	60.4	12.8	1.9	1.35	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L262	6	17.1	55.7	8.2	0.8	1.20	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L275	6	17.2	27.8	-19.5	-3.1	0.85	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L599	6	17.5	67.6	20.0	2.1	0.95	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L190C	6	17.7	45.7	-1.0	-1.1	1.06	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L279	6	18.0	58.9	11.4	0.4	1.03	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L118	6	18.1	38.3	-8.9	-2.5	0.78	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L212	6	18.1	48.3	0.9	-1.2	0.97	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L321	6	18.3	54.4	7.0	-0.5	1.41	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L159	6	18.7	50.9	3.0	-1.4	0.80	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	6	18.9	80.6	33.1	2.6	1.76	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L243	6	19.0	52.2	5.0	-1.5	1.42	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L150	6	19.3	61.7	14.4	-0.5	1.06	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L320	6	19.3	50.3	3.2	-2.1	1.20	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L124	6	19.7	53.6	6.4	-2.0	0.66	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L223F	6	19.7	45.1	-2.0	-3.1	0.90	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L565	6	19.9	61.0	13.6	-1.2	1.21	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L190D	*	20.1	15.5	-31.3	-7.6	0.05	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L670	6	20.2	56.3	9.2	-2.1	1.13	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L185	6	20.5	77.5	30.2	0.5	1.20	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L396M	6	21.0	68.5	21.3	-1.2	1.45	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	X	21.3	107.0	59.5	3.8	2.20	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L182M	*	24.4	69.6	22.9	-4.4	0.76	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L182S	*	24.6	45.5	-0.9	-8.0	0.91	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L176	#	34.7	137.2	91.3	-5.3	3.23	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285B	#	38.9	23.9	-20.4	-25.1	1.53	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
GMEANS:		16.8	47.5			1.00		
		95% ELLIPSE:		39.9	5.1	WITH GAMMA = 82 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE B30 = 16.8 DOUBLE FOLDS SAMPLE B80 = 47.5 DOUBLE FOLDS
+.X.# NOT IN GRAND MEANS
ANALYSIS T30-1
SAMPLE B80
DOUBLE FOLDS
SAMPLE B30
DOUBLE FOLDS
0 10 20 30 40 50 60 70 80 90 100 110
10 20 30 40 50 60 70 80 90 100

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

LAB CODE	SAMPLE B30 MEAN	BOOK PAPER 77 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	SAMPLE B60 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	VAR	F	LAB	TEST D. = 15
L105	1.12	-.08	-1.09	.05	.59	1.54	-.09	-.55	.19	1.13	30M	@	L105	
L118	1.24	.04	.33	.10	.77	1.57	-.06	-.37	.13	.75	30D	@	L118	
L121	1.20	-.00	-.00	.15	1.12	1.74	.11	.64	.21	1.23	30M	@	L121	
L122	1.31	.11	1.36	.13	1.00	1.95	.33	1.93	.29	1.71	30M	@	L122	
L124	1.28	.08	1.01	.11	.83	1.72	.09	.52	.11	.66	30N	@	L124	
L150	1.26	.06	.75	.15	1.14	1.78	.15	.88	.11	.65	30M	@	L150	
L158	1.08	-.12	-1.01	.10	.73	1.30	-.33	-1.95	.19	1.10	30N	@	L158	
L159	1.26	.06	.75	.09	.68	1.69	.06	.34	.14	.85	30N	@	L159	
L162	1.18	-.02	-.27	.11	.82	1.59	-.04	-.26	.20	1.20	30M	@	L162	
L163	1.20	-.00	-.00	.12	.91	1.62	-.00	-.03	.15	.86	30N	@	L163	
L176	1.51	.30	3.95	.19	1.39	2.05	.42	2.49	.34	2.03	30N	#	L176	
L182M	1.38	.18	2.31	.09	.63	1.84	.21	1.23	.08	.46	30M	@	L182M	
L185	1.29	.09	1.16	.13	.96	1.87	.24	1.43	.14	.82	30N	@	L185	
L190C	1.22	.02	.20	.17	1.23	1.64	.01	.08	.13	.80	30N	@	L190C	
L212	1.24	.04	.54	.12	.86	1.65	.03	.15	.17	.99	30M	@	L212	
L223F	1.28	.08	1.00	.12	.85	1.63	.00	.02	.15	.86	30M	@	L223F	
L230	1.13	-.07	-.97	.14	1.07	1.71	.08	.47	.11	.67	30N	@	L230	
L238A	1.20	-.01	-.07	.13	.93	1.68	.05	.32	.14	.82	30N	@	L238A	
L238B	1.04	-.17	-2.17	.18	1.33	1.21	-.42	-2.47	.24	1.42	30D	@	L238B	
L243	1.25	.05	.07	.15	1.09	1.68	.05	.27	.19	1.14	30D	@	L243	
L254	1.25	.04	.57	.17	1.25	1.85	.22	1.33	.24	1.41	30M	@	L254	
L262	1.21	.01	.09	.15	1.10	1.72	.09	.54	.15	.89	30N	@	L262	
L275	1.21	.01	.07	.17	1.26	1.41	-.21	-1.27	.16	.97	30N	@	L275	
L278	1.16	-.04	-.32	.16	1.17	1.34	-.29	-1.74	.19	1.14	30C	@	L278	
L279	1.24	.04	.46	.13	.96	1.75	.12	.72	.14	.80	30N	@	L279	
L285A	1.14	-.06	-.76	.22	1.60	1.53	-.09	-.56	.22	1.28	30N	@	L285A	
L285B	1.55	.34	4.46	.20	1.50	1.36	-.27	-1.59	.13	.79	30N	#	L285B	
L320	1.27	.06	.82	.14	1.02	1.66	.03	.20	.20	1.16	30N	@	L320	
L321	1.24	.04	.46	.14	1.05	1.68	.05	.31	.23	1.34	30M	@	L321	
L326N	1.14	-.06	-.81	.16	1.15	1.33	-.30	-1.79	.18	1.09	30N	@	L326N	
L339	1.08	-.12	-1.54	.13	.97	1.39	-.24	-1.43	.17	1.03	30M	@	L339	
L376	1.13	-.07	-.93	.11	.84	1.50	-.13	-.78	.25	1.46	30N	@	L376	
L388	1.18	-.02	-.29	.16	1.21	1.71	.09	.51	.16	.96	30N	@	L388	
L390	1.15	-.05	-.67	.15	1.08	1.46	-.16	-.97	.24	1.40	30N	@	L390	
L393	1.19	-.01	-.14	.14	1.01	1.67	.04	.24	.06	.34	30M	@	L393	
L396M	1.29	.09	1.16	.16	1.20	1.80	.17	1.03	.19	1.11	30N	@	L396M	
L565	1.27	.07	.88	.17	1.24	1.77	.14	.82	.13	.78	30N	@	L565	
L589	1.10	-.10	-1.26	.08	.62	1.50	-.13	-.78	.13	.76	30N	@	L589	
L599	1.23	.03	.40	.09	.67	1.81	.18	1.07	.14	.83	30C	@	L599	
L670	1.28	.08	1.01	.16	1.18	1.73	.10	.59	.15	.87	30N	@	L670	
L734	1.07	-.14	-1.76	.06	.60	1.66	.03	.16	.17	.99	30C	*	L734	
L737	1.10	-.10	-1.26	.11	.79	1.49	-.14	-.83	.21	1.26	30N	@	L737	
GR. MEAN =	1.20 LOG(10) FOLD				GRAND MEAN =	1.63 LOG(10) FOLD				TEST DETERMINATIONS = 15				
SD MEANS =	.08 LOG(10) FOLD			SD OF MEANS =		.17 LOG(10) FOLD				40 LABS IN GRAND MEANS				
		AVERAGE SDR =	.13 LOG(10) FOLD				AVERAGE SDR =	.17 LOG(10) FOLD						
L182S	1.38	.18	2.34	.09	.67	1.64	.01	.04	.14	.85	30S	*	L182S	
L190D	1.29	.08	1.06	.13	.97	1.17	-.46	-2.73	.14	.85	30S	*	L190D	
L326S	1.19	-.02	-.22	.13	.94	1.40	-.23	-1.37	.13	.77	30S	*	L326S	
L705	1.19	-.01	-.17	.07	.50	1.58	-.05	-.28	.07	.40	30X	*	L705	
L706	1.03	-.17	-2.26	.12	.67	1.06	-.57	-3.38	.21	1.24	30X	*	L706	

TOTAL NUMBER OF LABORATORIES REPORTING = 47

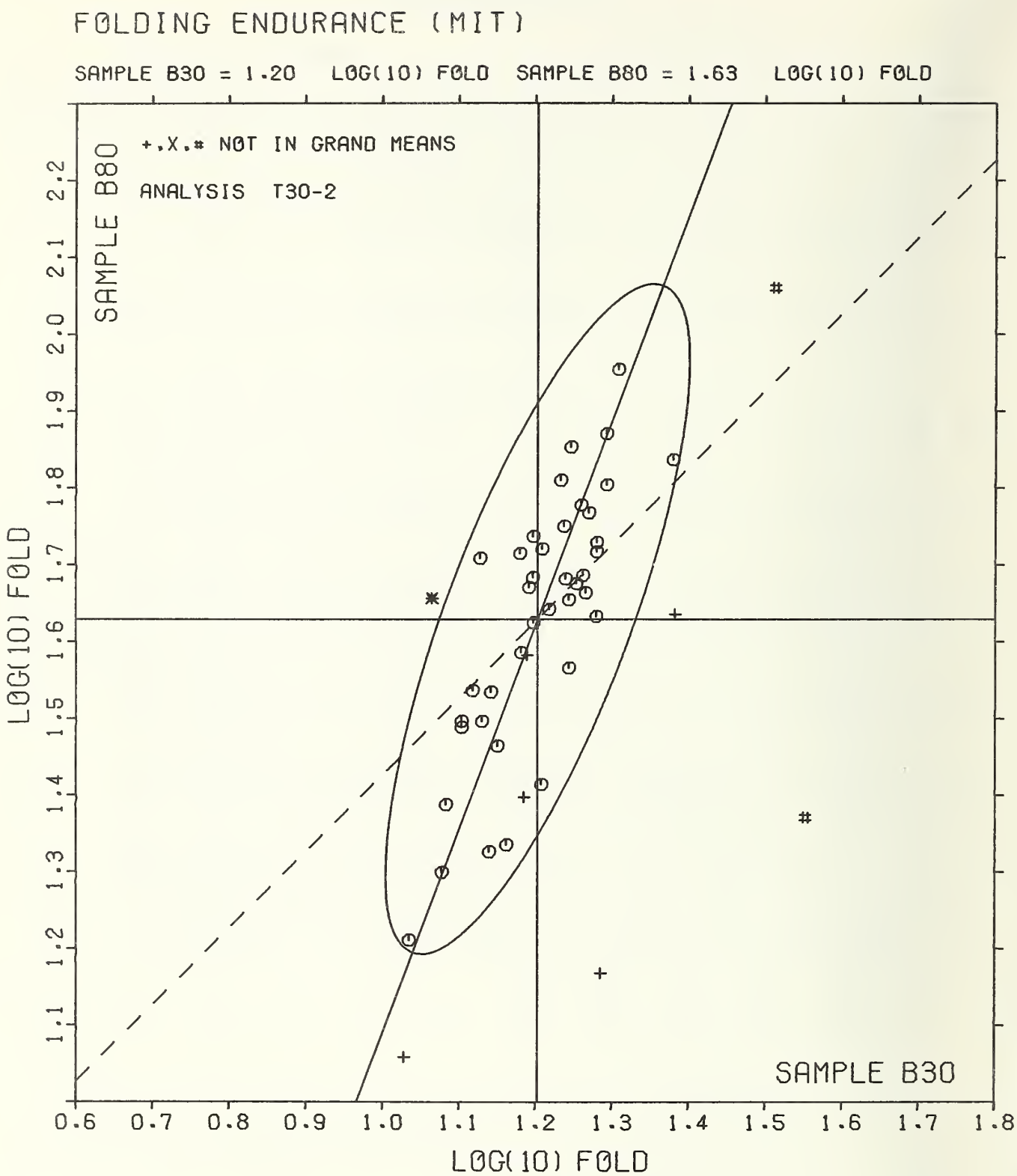
The ISO (International Standards Organization) is proposing that MIT folding endurance be reported as the logarithm (to the base 10) of the double fold instead of the double fold as in the past.

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 E30	MEANS B80	COORDINATES MAJOR	COORDINATES MINOR	AVG RESID VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L706	*	1.03	1.06	-.00	-.04	1.05	30X FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L238B	6	1.04	1.21	-.45	.01	1.37	30D FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L734	*	1.07	1.66	-.02	.14	.60	30C FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L158	6	1.08	1.30	-.35	.00	.92	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L339	6	1.08	1.39	-.27	.03	1.00	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L737	6	1.10	1.49	-.17	.04	1.02	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L589	6	1.10	1.50	-.16	.05	.69	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L105	6	1.12	1.54	-.12	.05	.66	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L230	6	1.13	1.71	.05	.10	.87	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L376	6	1.13	1.50	-.15	.02	1.15	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L326N	6	1.14	1.33	-.31	-.05	1.13	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285A	6	1.14	1.53	-.11	.02	1.47	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L390	6	1.15	1.46	-.17	-.01	1.24	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L278	6	1.16	1.34	-.29	-.07	1.15	30C FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L388	6	1.18	1.71	.07	.05	1.09	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L162	6	1.18	1.59	-.05	.00	1.01	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L326S	*	1.19	1.40	-.22	-.07	.86	30S FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L705	*	1.19	1.58	-.05	-.00	.43	30X FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L393	6	1.19	1.67	.03	.02	.68	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L238A	6	1.20	1.68	.05	.02	.67	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L121	6	1.20	1.74	.10	.04	1.16	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L163	6	1.20	1.62	-.01	.00	.89	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L275	6	1.21	1.41	-.20	-.08	1.12	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L262	6	1.21	1.72	.09	.03	1.00	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L190C	6	1.22	1.64	.02	-.01	1.02	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L599	6	1.23	1.81	.18	.03	.75	30C FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L279	6	1.24	1.75	.13	.01	.88	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L321	6	1.24	1.68	.06	-.02	1.19	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L212	6	1.24	1.65	.04	-.03	.92	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L118	6	1.24	1.57	-.04	-.06	.76	30D FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L254	6	1.25	1.85	.22	.04	1.03	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L243	6	1.25	1.68	.06	-.03	1.12	30D FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L150	6	1.26	1.78	.16	-.00	.89	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L159	6	1.26	1.69	.07	-.04	.77	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L320	6	1.27	1.66	.05	-.05	1.09	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L565	6	1.27	1.77	.15	-.01	1.01	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L223F	6	1.28	1.63	.03	-.07	.66	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L124	6	1.28	1.72	.11	-.04	.74	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L670	6	1.28	1.73	.12	-.04	1.02	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L190D	*	1.29	1.17	-.40	-.24	.91	30S FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L396M	6	1.29	1.80	.20	-.02	1.16	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L185	6	1.29	1.87	.26	.00	.89	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	6	1.31	1.95	.34	.01	1.35	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L182M	6	1.38	1.84	.26	-.09	.54	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L182S	*	1.38	1.64	.07	-.17	.76	30S FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L176	#	1.51	2.05	.50	-.14	1.71	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285B	#	1.55	1.36	-.13	-.42	1.15	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
GMEANS:		1.20	1.63			1.00	
		95% ELLIPSE:		.46	.12	WITH GAMMA = 69 DEGREES	


FOLDING ENDURANCE (MIT)
SAMPLE B30 = 1.20 LOG(10) FOLD SAMPLE B80 = 1.63 LOG(10) FOLD
+.X.* NOT IN GRAND MEANS
ANALYSIS T30-2
SAMPLE B80
LOG(10) FOLD
SAMPLE B30
LOG(10) FOLD
0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8
1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2

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 K04 MEAN	PRINTING 103 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	SAMPLE A58 MEAN	WOVE ENVELOPE 94 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	VAR	F	LAB
L118	222.	-22.	-1.57	9.	.68	258.	-23.	-1.31	10.	.61	35G	6	L118
L121	226.	-19.	-1.33	10.	.72	243.	-39.	-2.17	12.	.69	35G	6	L121
L122	235.	-9.	-.07	15.	1.12	284.	2.	.11	21.	1.26	35G	6	L122
L132	202.	17.	1.25	15.	1.11	280.	-2.	-.10	19.	1.13	35G	6	L132
L139	242.	-3.	-.25	9.	.65	262.	-20.	-1.13	6.	.34	35G	6	L139
L148	239.	-5.	-.39	11.	.81	262.	-0.	-.01	14.	.82	35G	6	L148
L159	273.	28.	2.04	14.	1.03	309.	27.	1.53	22.	1.29	35G	6	L159
L162	241.	-4.	-.28	6.	.46	259.	-22.	-1.24	7.	.40	35G	6	L162
L163	235.	-9.	-.67	17.	1.26	289.	8.	.43	34.	2.02	35G	6	L163
L172	219.	-25.	-1.81	18.	1.37	272.	-10.	-.55	19.	1.13	35G	6	L172
L183	265.	21.	1.48	10.	.77	320.	38.	2.13	15.	.88	35G	6	L183
L190C	260.	16.	1.14	10.	.75	287.	5.	.27	7.	.45	35G	6	L190C
L195	257.	12.	.87	10.	.75	287.	6.	.31	13.	.77	35G	6	L195
L212	264.	20.	1.40	28.	2.13	302.	20.	1.14	39.	2.34	35G	6	L212
L223	246.	1.	.10	10.	.76	282.	1.	.03	13.	.77	35G	6	L223
L224	244.	-1.	-.07	14.	1.07	293.	11.	.63	12.	.72	35G	6	L224
L232	249.	4.	.31	40.	3.03	281.	-1.	-.07	13.	.79	35G	6	L232
L241	161.	-83.	-5.93	7.	.49	196.	-86.	-4.81	18.	1.06	35G	#	L241
L254	230.	-14.	-1.03	6.	.46	274.	-7.	-.41	17.	1.01	35G	6	L254
L260	255.	10.	.74	7.	.55	279.	-2.	-.13	5.	.28	35G	6	L260
L268	241.	-3.	-.24	14.	1.02	281.	-0.	-.02	16.	.96	35G	6	L268
L285	171.	-74.	-5.28	8.	.57	200.	-81.	-4.55	14.	.84	35G	#	L285
L291	264.	19.	1.37	8.	.58	308.	26.	1.45	20.	1.17	35G	6	L291
L308	239.	-6.	-.41	9.	.64	277.	-5.	-.27	12.	.72	35G	6	L308
L321	283.	38.	2.70	13.	.99	351.	69.	3.85	15.	.88	35G	#	L321
L348	189.	-56.	-4.04	5.	.36	215.	-67.	-3.72	14.	.85	35G	#	L348
L356	230.	-14.	-1.04	9.	.69	260.	-21.	-1.19	15.	.89	35G	6	L356
L376	246.	2.	.12	14.	1.07	301.	20.	1.10	34.	2.02	35G	6	L376
L382	252.	8.	.57	13.	1.00	263.	1.	.05	16.	.93	35G	6	L382
L390	238.	-6.	-.40	9.	.69	292.	11.	.59	7.	.39	35G	6	L390
L562	244.	-1.	-.04	19.	1.42	250.	-32.	-1.78	11.	.63	35G	6	L562
L571	257.	12.	.87	24.	1.80	345.	63.	3.53	15.	.90	35G	#	L571
L600	247.	2.	.17	11.	.85	298.	17.	.93	12.	.73	35G	6	L600
L650	260.	15.	1.09	10.	.77	242.	-40.	-2.22	24.	1.44	35G	#	L650
L729	3520.	3276.	239.27	219.	16.09	4249.	3568.	221.62	221.	13.22	35G	#	L729
L732	226.	-19.	-1.33	20.	1.53	276.	-6.	-.34	48.	2.85	35G	6	L732

GR. MEAN = 245. GURLEY UNITS GRAND MEAN = 282. GURLEY UNITS TEST DETERMINATIONS = 10

SD MEANS = 14. GURLEY UNITS SD OF MEANS = 18. GURLEY UNITS 29 LABS IN GRAND MEANS

AVERAGE SDR = 13. GURLEY UNITS AVERAGE SDR = 17. GURLEY UNITS

L213	241.	-4.	-.28	9.	.66	271.	-11.	-.60	14.	.82	35H	*	L213

TOTAL NUMBER OF LABORATORIES REPORTING = 37

Best values: K04 240 ± 24 Gurley units
A58 280 ± 29 Gurley units

The following laboratories were omitted from the grand means because of extreme test results: 285, 321, 348, 571, 650.

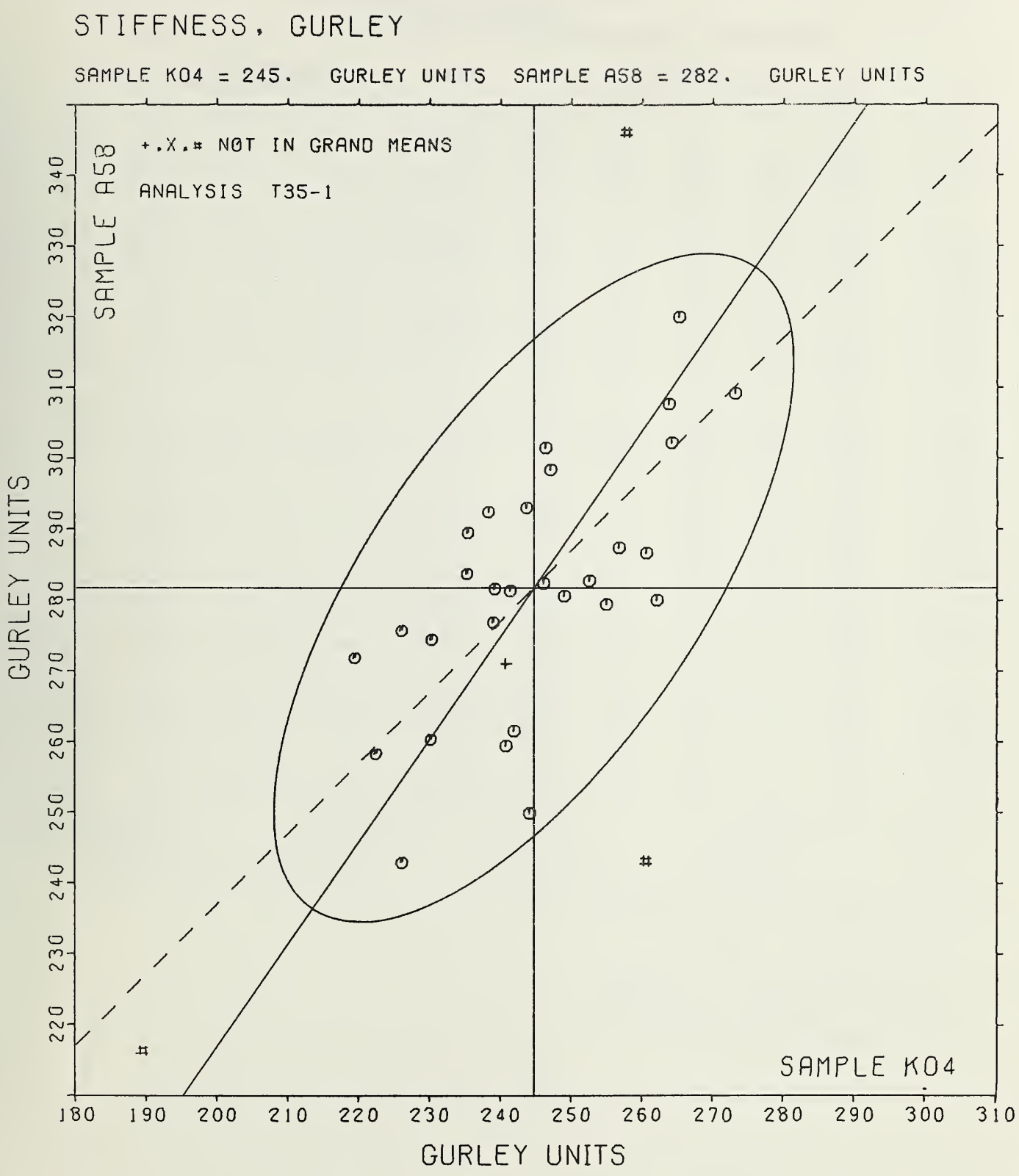
Data from the following laboratories appear to be off by a multiplicative factor: 241, 729

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 B04	MEANS A58	COORDINATES MAJOR	COORDINATES MINOR	AVG K.SQR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L241	#	161.	196.	-11.	20.	.77	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L285	#	171.	200.	-10.	14.	.71	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L348	#	189.	215.	-8.	8.	.61	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L172	@	219.	272.	-22.	15.	1.42	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L118	@	222.	258.	-5.	5.	.65	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L732	@	226.	276.	-10.	12.	2.19	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L121	@	226.	243.	-4.	-7.	.71	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L356	@	230.	260.	-2.	-0.	.79	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L254	@	230.	274.	-14.	8.	.74	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L122	@	235.	284.	-4.	9.	1.19	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L163	@	235.	289.	1.	12.	1.05	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L390	@	238.	292.	5.	11.	.54	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L308	@	239.	277.	-7.	2.	.63	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L148	@	239.	282.	-3.	4.	.61	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L213	*	241.	271.	-11.	-3.	.74	35A STIFFNESS, GURLEY (UNITS: MG/1X3 TEST PIECE), 20 C, 65% RH
L162	@	241.	259.	-21.	-9.	.43	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L268	@	241.	281.	-2.	2.	.59	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L139	@	242.	262.	-18.	-9.	.50	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L224	@	244.	293.	9.	7.	.89	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L562	@	244.	250.	-26.	-18.	1.63	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L223	@	246.	282.	1.	-1.	.76	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L376	@	246.	301.	17.	10.	1.55	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L600	@	247.	298.	13.	7.	.79	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L232	@	249.	281.	1.	-4.	1.91	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L382	@	252.	283.	5.	-6.	.97	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L260	@	255.	279.	4.	-10.	.42	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L195	@	257.	287.	12.	-7.	.76	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L571	#	257.	345.	59.	26.	1.33	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L650	#	260.	242.	-24.	-35.	1.10	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L190C	@	260.	287.	13.	-10.	.66	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L132	@	262.	280.	8.	-15.	1.12	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L291	@	264.	308.	32.	-1.	.88	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L212	@	264.	302.	26.	-4.	2.24	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L183	@	265.	320.	43.	5.	.62	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L159	@	273.	309.	39.	-8.	1.16	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L321	#	283.	351.	79.	7.	.93	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L729	#	3520.	4249.	5120.	-442.	14.06	35G STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
GMEANS:		245.	282.			1.00	
		95% ELLIPSE:		55.	23.	WITH GAMMA = 55 DEGREES	


STIFFNESS, GURLEY
SAMPLE K04 = 245. GURLEY UNITS SAMPLE A58 = 282. GURLEY UNITS
+,X,# NOT IN GRAND MEANS
ANALYSIS T35-1
SAMPLE A58
GURLEY UNITS
220 230 240 250 260 270 280 290 300 310 320 330 340
SAMPLE K04
180 190 200 210 220 230 240 250 260 270 280 290 300 310
GURLEY UNITS

ANALYSIS T3o-1 TABLE 1

TABER STIFFNESS

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

LAB CODE	SAMPLE Z02 MEAN	INDEX PAPER 225 GRAMS PER SQUARE METER DEV	N. DEV	SDR	R. SDR	SAMPLE Z17 MEAN	INDEX PAPER 256 GRAMS PER SQUARE METER DEV	N. DEV	SDR	R. SDR	TEST D. = 10 VAR	F	LAB
L107A	64.5	2.4	.77	3.0	1.32	70.5	2.7	.82	2.8	1.22	36T	@	L107A
L122	62.1	.0	.00	2.4	1.06	67.1	-.7	-.22	2.3	1.03	36D	@	L122
L123	64.9	2.8	.90	2.4	1.05	67.5	-.3	-.09	2.2	.96	36T	@	L123
L126	60.3	-1.8	-.57	2.1	.93	66.4	-1.4	-.43	1.7	.73	36T	@	L126
L150	60.6	-1.5	-.46	2.2	.94	67.6	-.2	-.06	2.1	.91	36T	@	L150
L158	62.6	.5	.16	.9	.37	71.5	3.7	1.11	2.9	1.30	36T	@	L158
L163	64.1	2.0	.64	1.9	.84	69.5	1.7	.52	2.9	1.29	36T	@	L163
L182	61.6	-.5	-.15	2.1	.90	68.8	1.0	.29	2.0	.90	36T	@	L182
L207	64.3	2.3	.72	3.9	1.68	71.1	3.3	.99	3.2	1.41	36T	@	L207
L212	61.9	-.2	-.05	2.4	1.02	66.0	-1.8	-.53	2.4	1.05	36T	@	L212
L228	60.9	-1.2	-.36	3.1	1.35	71.8	4.0	1.20	2.7	1.21	36T	*	L228
L230	62.2	.1	.04	2.7	1.17	68.5	.7	.21	3.2	1.43	36T	@	L230
L242	63.1	1.0	.32	2.5	1.10	73.1	5.3	1.59	4.0	1.76	36T	@	L242
L243	61.2	-.8	-.27	2.9	1.27	64.8	-3.0	-.91	1.4	.62	36T	@	L243
L262	62.8	.8	.24	1.2	.50	67.2	-.6	-.18	1.5	.67	36T	@	L262
L268	63.4	1.3	.42	1.9	.80	68.5	.7	.22	1.9	.83	36T	@	L268
L281	64.6	2.0	.62	2.8	1.22	71.3	3.5	1.07	2.0	.89	36T	@	L281
L290	57.5	-4.5	-1.40	1.9	.81	65.8	-2.0	-.61	1.0	.46	36T	@	L290
L315	61.1	-1.0	-.32	3.0	1.30	63.8	-4.0	-1.21	3.4	1.52	36T	@	L315
L318	56.7	-5.4	-1.72	2.0	.87	61.6	-6.2	-1.87	2.3	1.03	36T	@	L318
L321	58.0	-4.1	-1.31	2.7	1.15	64.4	-3.4	-1.04	2.5	1.12	36T	@	L321
L324	61.1	-1.0	-.32	3.1	1.33	66.6	-1.2	-.37	1.3	.59	36T	@	L324
L339	61.3	-.7	-.24	2.7	1.19	67.0	-.8	-.23	1.7	.76	36T	@	L339
L348	68.7	6.0	2.12	3.0	1.54	74.0	6.2	1.86	2.7	1.20	36T	@	L348
L388	88.5	26.4	8.43	3.4	1.46	97.5	29.7	8.94	2.9	1.28	36T	#	L388
L442	60.6	-1.5	-.47	2.6	1.14	64.3	-3.5	-1.05	1.1	.50	36T	@	L442
L570	67.9	5.8	1.80	2.8	1.20	71.8	4.0	1.20	3.0	1.32	36T	@	L570
L580	62.3	.2	.07	1.3	.54	66.3	-1.5	-.45	1.5	.66	36T	@	L580
L604	66.2	4.2	1.33	2.1	.92	70.5	2.7	.81	2.8	1.26	36T	@	L604
L616	63.5	3.5	1.11	4.0	1.75	30.7	-37.1	-11.18	.7	.30	36T	#	L616
L651	64.2	2.1	.66	1.5	.67	72.1	4.3	1.29	1.7	.74	36T	@	L651
L692	58.5	-3.6	-1.16	1.6	.69	63.9	-3.9	-1.18	2.5	1.10	36T	@	L692
L703	61.1	-1.0	-.32	2.7	1.19	66.5	-1.3	-.41	1.8	.82	36T	@	L703
L729	63.5	1.4	.43	1.7	.76	67.7	-.1	-.02	4.0	1.77	36T	@	L729
L731	60.4	-1.7	-.54	1.8	.80	65.9	-1.9	-.56	1.4	.60	36T	@	L731
L737	52.7	-9.4	-3.01	1.4	.62	59.3	-8.5	-2.56	1.1	.49	36T	*	L737
L739	65.8	3.7	1.19	1.8	.76	70.4	2.6	.78	1.3	.56	36T	@	L739

GR. MEAN = 62.1 TABER UNITS GRAND MEAN = 67.8 TABER UNITS TEST DETERMINATIONS = 10

SD MEANS = 3.1 TABER UNITS SE OF MEANS = 3.3 TABER UNITS 35 LABS IN GRAND MEANS

AVERAGE SDR = 2.3 TABER UNITS AVERAGE SDR = 2.3 TABER UNITS

L250	60.0	-2.1	-.67	3.1	1.35	64.0	-3.8	-1.15	2.2	.96	36U	*	L250

TOTAL NUMBER OF LABORATORIES REPORTING = 38

Best values: Z02 62 ± 5 Taber units
Z17 68 ± 5 Taber units

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

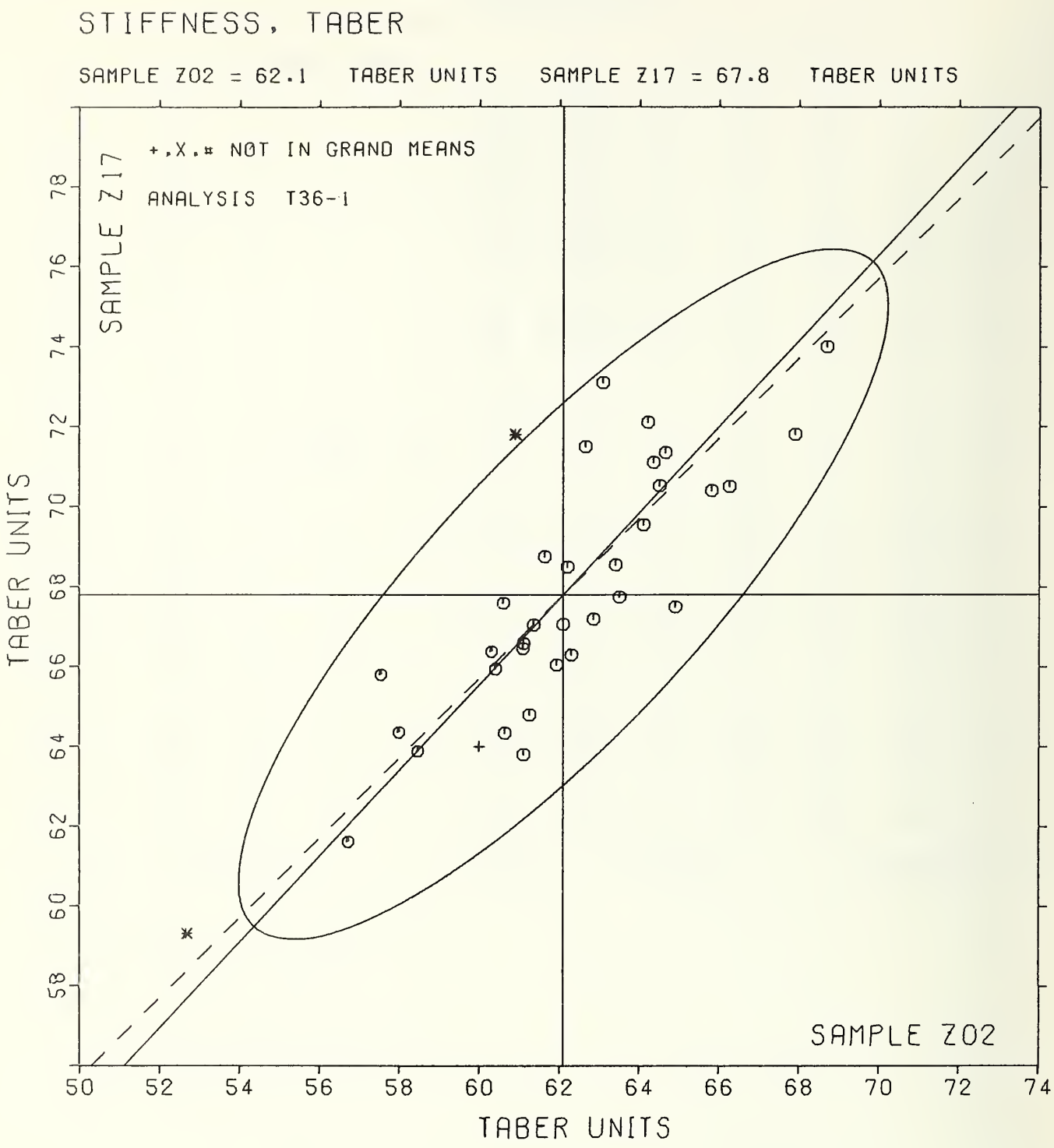
Data from the following laboratories appear to be off by a multiplicative factor: 388

ANALYSIS T36-1 TABLE 2

TABER STIFFNESS

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

LAB CODE	F	MEANS 202	MEANS Z17	COORDINATES MAJOR	COORDINATES MINOR	AVG MAJOR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L737	*	52.7	59.3	-12.6	1.1	.95	36T STIFFNESS, TABER
L318	@	56.7	61.6	-8.2	-.3	.95	36T STIFFNESS, TABER
L290	@	57.5	65.8	-4.6	2.0	.83	36T STIFFNESS, TABER
L321	@	58.0	64.4	-5.3	.7	1.13	36T STIFFNESS, TABER
L692	@	58.5	63.9	-5.3	-.0	.99	36T STIFFNESS, TABER
L250	*	60.0	64.0	-4.2	-1.1	1.16	36U STIFFNESS, TABER, 20 C, 65% RH
L126	@	60.3	66.4	-2.3	.3	.83	36T STIFFNESS, TABER
L731	@	60.4	65.9	-2.5	-.0	.70	36T STIFFNESS, TABER
L150	@	60.6	67.6	-1.2	.9	.93	36T STIFFNESS, TABER
L442	@	60.6	64.3	-3.5	-1.3	.82	36T STIFFNESS, TABER
L228	*	60.9	71.8	2.1	3.6	1.26	36T STIFFNESS, TABER
L703	@	61.1	66.5	-1.7	-.2	1.00	36T STIFFNESS, TABER
L324	@	61.1	66.6	-1.6	-.1	.96	36T STIFFNESS, TABER
L315	@	61.1	63.8	-3.6	-2.0	1.41	36T STIFFNESS, TABER
L243	@	61.2	64.8	-2.8	-1.4	.94	36T STIFFNESS, TABER
L339	@	61.3	67.0	-1.1	.0	.97	36T STIFFNESS, TABER
L182	@	61.6	68.8	.4	1.0	.90	36T STIFFNESS, TABER
L212	@	61.9	66.0	-1.4	-1.1	1.03	36T STIFFNESS, TABER
L122	@	62.1	67.1	-.5	-.5	1.04	36D STIFFNESS, TABER, DIGITAL READOUT
L230	@	62.2	68.5	.6	.4	1.30	36T STIFFNESS, TABER
L580	@	62.3	66.3	-1.0	-1.2	.80	36T STIFFNESS, TABER
L158	@	62.6	71.5	3.1	2.1	.83	36T STIFFNESS, TABER
L262	@	62.8	67.2	.1	-1.0	.99	36T STIFFNESS, TABER
L242	@	63.1	73.1	4.5	2.9	1.43	36T STIFFNESS, TABER
L268	@	63.4	68.5	1.4	-.5	.82	36T STIFFNESS, TABER
L729	@	63.5	67.7	.9	-1.1	1.26	36T STIFFNESS, TABER
L163	@	64.1	69.5	2.6	-.3	1.07	36T STIFFNESS, TABER
L651	@	64.2	72.1	4.0	1.4	.70	36T STIFFNESS, TABER
L207	@	64.3	71.1	3.9	.6	1.35	36T STIFFNESS, TABER
L107A	@	64.5	70.5	3.6	.1	1.27	36T STIFFNESS, TABER
L281	@	64.6	71.3	4.3	.5	1.15	36T STIFFNESS, TABER
L123	@	64.9	67.5	1.7	-2.3	1.01	36T STIFFNESS, TABER
L616	#	65.5	30.7	-24.8	-27.8	1.03	36T STIFFNESS, TABER
L739	@	65.8	70.4	4.4	-1.0	.86	36T STIFFNESS, TABER
L604	@	66.2	70.5	4.8	-1.2	1.09	36T STIFFNESS, TABER
L570	@	67.9	71.8	6.9	-1.5	1.26	36T STIFFNESS, TABER
L348	@	68.7	74.0	9.0	-.6	1.37	36T STIFFNESS, TABER
L388	#	88.5	97.5	39.7	.9	1.37	36T STIFFNESS, TABER
GMEANS:		62.1	67.8			1.00	
		95% ELLIPSE:		11.4	3.4	WITH GAMMA = 47 DEGREES	


STIFFNESS, TABER
SAMPLE Z02 = 62.1 TABER UNITS
SAMPLE Z17 = 67.8 TABER UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T36-1
SAMPLE Z17
TABER UNITS
SAMPLE Z02
TABER UNITS
50
52
54
56
58
60
62
64
66
68
70
72
74
58
60
62
64
66
68
70
72
74
76
78

REPORT NO. 62S — TAPPI COLLABORATIVE REFERENCE PROGRAM — NOVEMBER 1979

ANALYSIS T49-1 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 J56 PRINTING 93 GRAMS PER SQUARE METER MEAN	DEV	NO.DEV	SDR	R.SDR	SAMPLE H81 PRINTING 84 GRAMS PER SQUARE METER MEAN	DEV	NO.DEV	SDR	R.SDR	TEST D. = 4 VAR	F	LAB
L182I	120.5	-2.9	-.69	7.0	1.56	91.1	.7	.03	5.2	.96	49Q	6	L182I
L190C	82.5	-40.9	-1.23	1.0	.22	51.2	-39.2	-1.65	3.4	.63	49T	6	L190C
L207	128.7	5.4	.18	2.9	.64	89.0	-1.4	-.06	4.8	.88	49I	6	L207
L242	71.7	-51.7	-1.55	4.9	1.09	57.5	-32.9	-1.39	5.2	.96	49Q	6	L242
L280	150.3	27.0	.81	7.0	1.57	98.6	8.2	.34	8.0	1.48	49Q	6	L280
L291	94.6	-28.8	-.87	6.9	1.55	71.2	-19.2	-.81	6.5	1.20	49I	6	L291
L313	114.0	-9.4	-.28	.0	.00	89.5	-.9	-.04	3.0	.55	49Q	6	L313
L388	186.3	62.9	1.89	10.3	2.31	129.6	39.2	1.65	12.5	2.30	49Q	6	L388
L598	141.6	18.2	.55	2.8	.62	127.2	36.8	1.55	2.8	.51	49W	6	L598
L643	162.5	39.1	1.18	6.0	1.33	103.6	13.2	.56	4.4	.81	49I	6	L643
L738	119.7	-3.0	-.11	3.5	.78	82.2	-8.2	-.34	5.6	1.03	49I	6	L738
L739	107.8	-15.6	-.47	1.5	.34	94.2	3.8	.16	3.7	.69	49I	6	L739

GR. MEAN = 123.4 KP CM/SEC — GRAND MEAN = 90.4 KP CM/SEC — TEST DETERMINATIONS = 4

SD MEANS = 33.2 KP CM/SEC — SD OF MEANS = 23.7 KP CM/SEC — 12 LABS IN GRAND MEANS

AVERAGE SDR = 4.5 KP CM/SEC — AVERAGE SDR = 5.4 KP CM/SEC

TOTAL NUMBER OF LABORATORIES REPORTING = 12

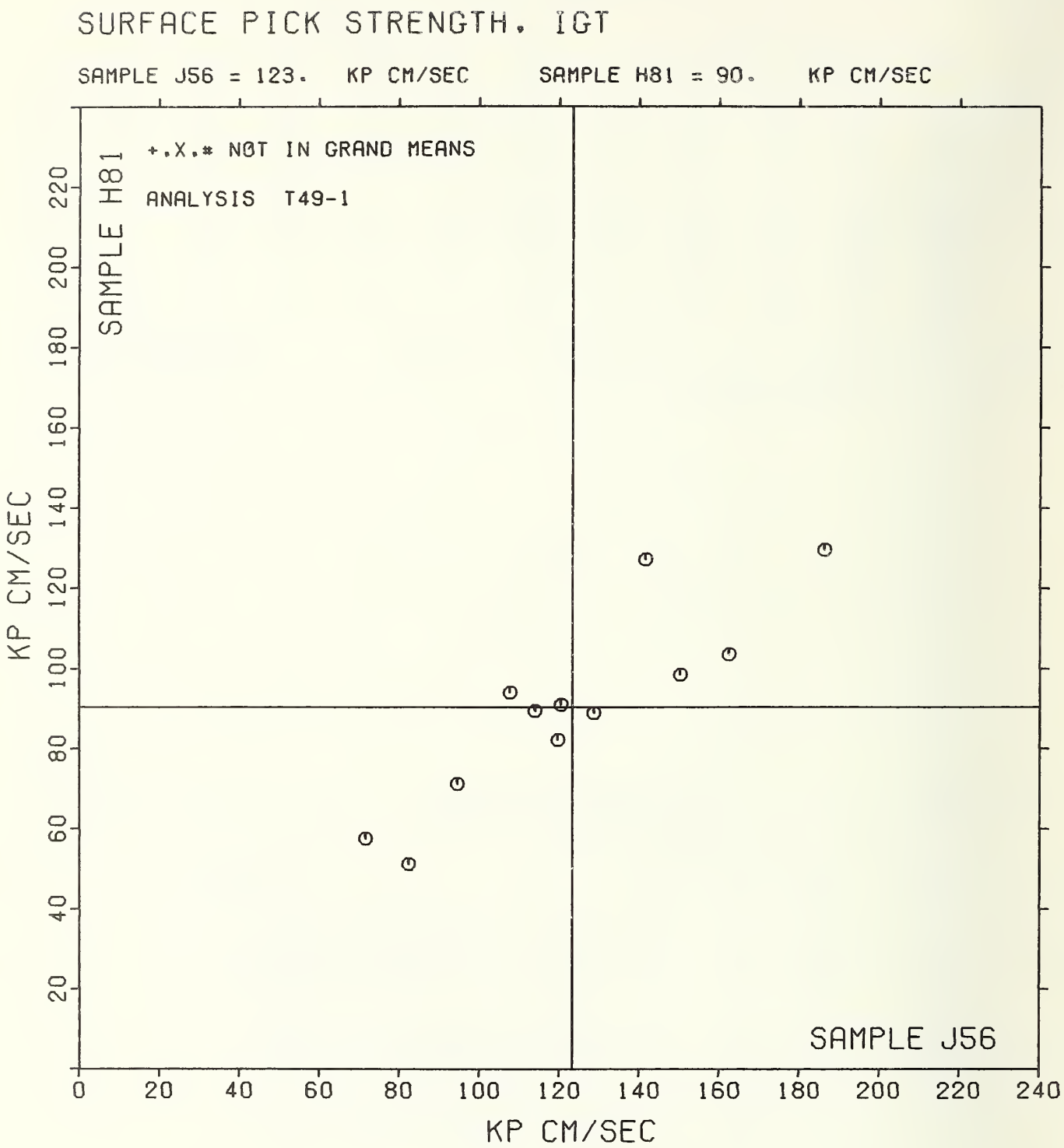
REPORT NO. 62S — TAPPI COLLABORATIVE REFERENCE PROGRAM — NOVEMBER 1979

ANALYSIS T49-1 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 J56	H81	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L242	6	71.7	57.5	-61.2	2.2	1.02	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L190C	6	82.5	51.2	-55.9	-9.1	.43	49T	SURFACE PICK STRENGTH,IGT, IPC FLUID
L291	6	94.6	71.2	-34.6	.5	1.36	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L739	6	107.8	94.2	-10.7	11.9	.21	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L313	6	114.0	89.5	-8.2	4.5	.28	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L738	6	119.7	82.2	-7.6	-4.7	.90	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L182I	6	120.5	91.1	-2.0	2.2	1.26	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L207	6	128.7	89.0	3.0	-4.2	.76	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L598	6	141.6	127.2	35.9	20.0	.56	49W	SURFACE PICK STRENGTH,IGT, OIL
L280	6	150.3	98.6	20.9	-8.6	1.52	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L643	6	162.5	103.6	39.7	-11.3	1.07	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L388	6	186.3	129.6	74.1	-3.4	2.30	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
GMEANS:		123.4	90.4			1.00		
		95% ELLIPSE:		119.5	27.3	WITH GAMMA = 34 DEGREES		


SURFACE PICK STRENGTH, IGT
SAMPLE J56 = 123. KP CM/SEC
SAMPLE H81 = 90. KP CM/SEC
+.X.* NOT IN GRAND MEANS
ANALYSIS T49-1
SAMPLE H81
KP CM/SEC
SAMPLE J56
KP CM/SEC
0 20 40 60 80 100 120 140 160 180 200 220 240
20 40 60 80 100 120 140 160 180 200 220

ANALYSIS T50-1 TABLE 1
SURFACE PICK STRENGTH, WAX NUMBER
TAPPI OFFICIAL TEST METHOD T459 OS-75, SURFACE STRENGTH OF PAPER (WAX PICK TEST)

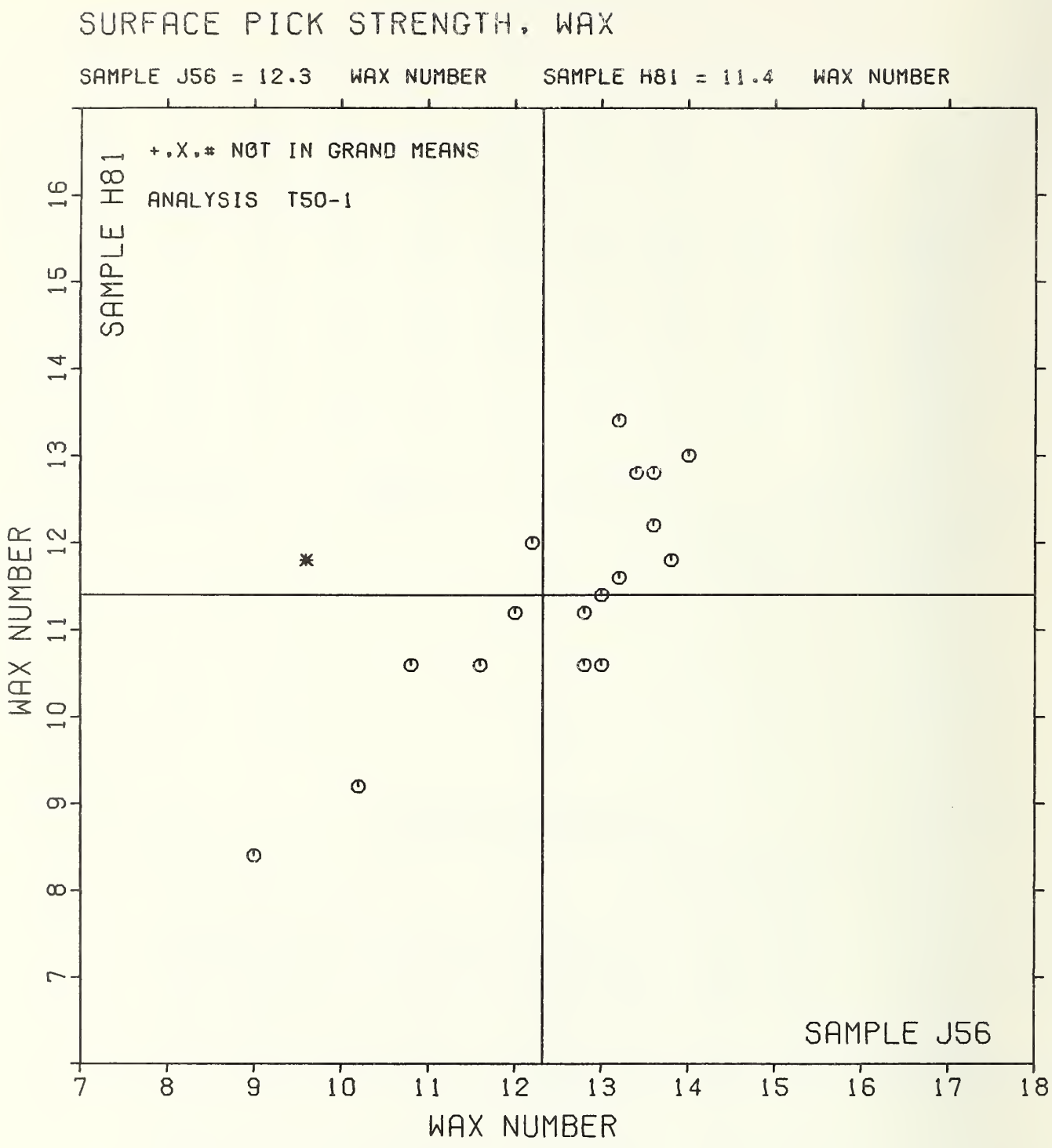
LAB CODE	SAMPLE J56 MEAN	PRINTING 93 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	SAMPLE H81 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	TEST D. = 5 VAR	F	LAB
L105	10.80	-1.52	-1.01	.45	.79	10.60	-.80	-.62	.55	.98	50W	Ø	L105
L115	12.20	-.12	-.08	.84	1.48	12.00	.60	.46	.71	1.27	50W	Ø	L115
L122	13.00	.68	.45	.00	.00	10.60	-.80	-.62	.55	.98	50W	Ø	L122
L158	13.20	.88	.59	.45	.79	11.60	.20	.15	.55	.98	50W	Ø	L158
L162	13.60	1.28	.85	.55	.97	12.20	.80	.62	.45	.80	50W	Ø	L162
L182W	12.80	.48	.32	.45	.79	11.20	-.20	-.15	.45	.80	50W	Ø	L182W
L183	13.60	1.28	.85	.89	1.58	12.80	1.40	1.08	.84	1.50	50W	Ø	L183
L195	13.00	.68	.45	.00	.00	11.40	.00	.00	.55	.98	50W	Ø	L195
L213	13.40	1.08	.72	.55	.97	12.80	1.40	1.08	.45	.80	50W	Ø	L213
L225	14.00	1.68	1.12	.00	.00	13.00	1.60	1.24	.00	.00	50W	Ø	L225
L228	10.20	-2.12	-1.41	.45	.79	9.20	-2.20	-1.70	.45	.80	50W	Ø	L228
L230	12.80	.48	.32	.45	.79	10.60	-.80	-.62	.55	.98	50W	Ø	L230
L243	9.00	-3.32	-2.21	.71	1.25	8.40	-3.00	-2.32	.55	.98	50W	Ø	L243
L285	9.60	-2.72	-1.81	.89	1.58	11.80	.40	.31	.84	1.50	50W	*	L285
L339	12.00	-.32	-.21	1.22	2.16	11.20	-.20	-.15	1.30	2.34	50W	Ø	L339
L616	13.20	.88	.59	.45	.79	13.40	2.00	1.55	.55	.98	50W	Ø	L616
L697	11.60	-.72	-.48	.89	1.58	10.60	-.80	-.62	.55	.98	50W	Ø	L697
L729	13.80	1.48	.99	1.30	2.30	11.80	.40	.31	.45	.80	50W	Ø	L729

GR. MEAN = 12.32 WAX NUMBER GRAND MEAN = 11.40 WAX NUMBER TEST DETERMINATIONS = 5
SD MEANS = 1.50 WAX NUMBER SD OF MEANS = 1.29 WAX NUMBER 18 LABS IN GRAND MEANS
AVERAGE SDR = .57 WAX NUMBER AVERAGE SDR = .56 WAX NUMBER
TOTAL NUMBER OF LABORATORIES REPORTING = 18

Best values: J56 12.6 ± 2.3 wax number
H81 11.5 ± 2.0 wax number

ANALYSIS T50-1 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 J56	MEANS H81	COORDINATES MAJOR	COORDINATES MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L243	Ø	9.00	8.40	-4.47	-.23	1.12	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L285	*	9.60	11.80	-1.86	2.03	1.34	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L228	Ø	10.20	9.20	-3.03	-.37	.60	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L105	Ø	10.80	10.60	-1.69	.34	.09	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L697	Ø	11.60	10.60	-1.07	-.17	1.26	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L339	Ø	12.00	11.20	-.38	.05	2.25	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L115	Ø	12.20	12.00	.26	.54	1.37	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L182W	Ø	12.80	11.20	.24	-.46	.60	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L230	Ø	12.80	10.60	-.13	-.92	.39	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L195	Ø	13.00	11.40	.53	-.43	.49	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L122	Ø	13.00	10.60	.02	-1.05	.49	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L616	Ø	13.20	13.40	1.94	1.00	.89	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L158	Ø	13.20	11.60	.81	-.40	.89	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L213	Ø	13.40	12.80	1.72	.41	.88	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L162	Ø	13.60	12.20	1.30	-.19	.08	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L183	Ø	13.60	12.80	1.87	.28	1.34	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L729	Ø	13.80	11.80	1.40	-.62	1.35	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L225	Ø	14.00	13.00	2.31	.18	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
GMEANS:		12.32	11.40			1.00		
95% ELLIPSE:				5.12	2.01	WITH GAMMA = 39 DEGREES		


SURFACE PICK STRENGTH, WAX
SAMPLE J56 = 12.3 WAX NUMBER
SAMPLE H81 = 11.4 WAX NUMBER
+.X.* NOT IN GRAND MEANS
ANALYSIS T50-1
SAMPLE H81
SAMPLE J56
WAX NUMBER
WAX NUMBER
7
8
9
10
11
12
13
14
15
16
17
18

REPORT NO. 62S — TAPPI COLLABORATIVE REFERENCE PROGRAM — NOVEMBER 1979

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 Z09 CORRUGATING MEDIUM 132 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	SAMPLE Z14 CORRUGATING MEDIUM 125 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R. SDR	VAR	F	LAB
											TEST D. = 10		
L182	236.	-0.	-.02	11.	.94	314.	19.	.75	21.	1.47	91N	@	L182
L185	251.	14.	.86	15.	1.31	334.	40.	1.56	18.	1.23	91A	@	L185
L218	249.	12.	.68	14.	1.21	274.	-20.	-.79	12.	.82	91A	@	L218
L242	186.	-50.	-2.67	13.	1.15	252.	-43.	-1.67	10.	.71	91G	@	L242
L269	243.	6.	.30	10.	.87	291.	-3.	-.13	14.	.96	91P	@	L269
L280	272.	35.	1.83	13.	1.12	336.	41.	1.63	9.	.62	91N	@	L280
L313	204.	-33.	-1.83	8.	.67	254.	-40.	-1.58	10.	.71	91L	@	L313
L329	234.	-2.	-.12	9.	.79	281.	-13.	-.53	16.	1.06	91P	@	L329
L394	227.	-10.	-.47	12.	1.02	280.	-14.	-.56	14.	.96	91P	@	L394
L621	229.	-8.	-.38	17.	1.48	299.	4.	.18	21.	1.43	91P	@	L621
L622	238.	1.	.00	11.	.92	310.	15.	.60	8.	.53	91N	@	L622
L650	253.	16.	.76	7.	.61	310.	16.	.62	21.	1.47	91N	@	L650
L666	242.	6.	.26	11.	.91	298.	3.	.12	16.	1.07	91S	@	L666
L733	250.	13.	.82	12.	1.02	290.	-5.	-.20	14.	.96	91P	@	L733

GR. MEAN = 237. N(CMT) — GRAND MEAN = 295. N(CMT) — TEST DETERMINATIONS = 10

SD MEANS = 21. N(CMT) — SD OF MEANS = 25. N(CMT) — 14 LABS IN GRAND MEANS

AVERAGE SDR = 12. N(CMT) — AVERAGE SDR = 15. N(CMT)

GR. MEAN = 53.25 POUNDS — GRAND MEAN = 66.21 POUNDS

TOTAL NUMBER OF LABORATORIES REPORTING = 14

Best values: Z09 240 ± 40 newtons

Z14 290 ± 40 newtons

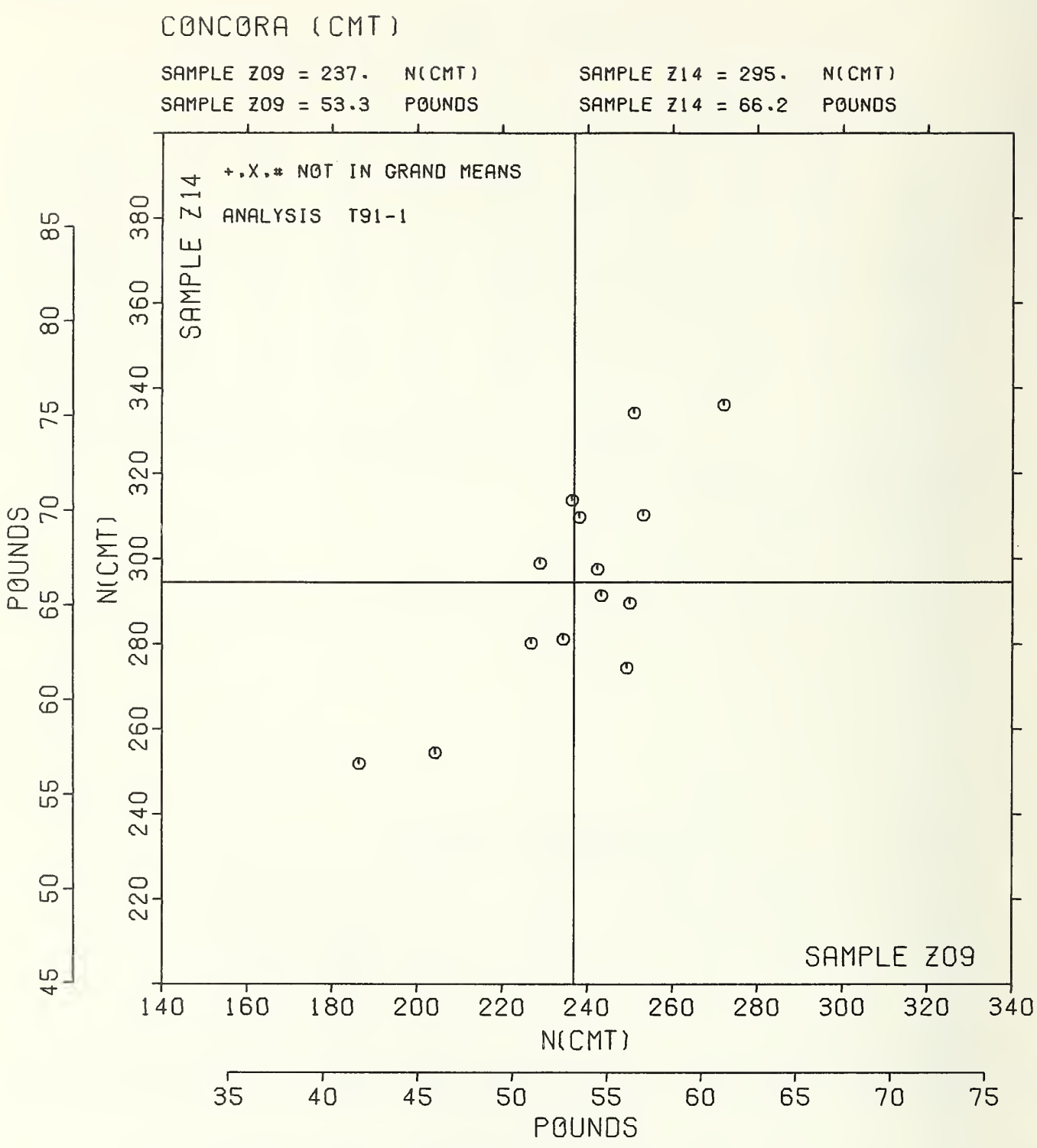
REPORT NO. 62S — TAPPI COLLABORATIVE REFERENCE PROGRAM — NOVEMBER 1979

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 Z09	Z14	COORDINATES MAJOR	MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L242	@	186.	252.	-65.	13.	.93	91G	FLAT CRUSH STRENGTH, CONCORA, GAYDON FLAT CRUSH TESTER
L313	@	204.	254.	-52.	1.	.89	91L	FLAT CRUSH STRENGTH, CONCORA, LIBERTY
L394	@	227.	280.	-17.	-1.	.99	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L621	@	229.	299.	-2.	9.	1.45	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L329	@	234.	281.	-12.	-6.	.93	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L182	@	236.	314.	15.	12.	1.20	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L622	@	238.	310.	13.	8.	.73	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L666	@	242.	298.	6.	-2.	.99	91S	FLAT CRUSH STRENGTH, CONCORA, TOYO SEIKI (METHOD JIS-P-8126)
L269	@	243.	291.	2.	-7.	.91	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L218	@	249.	274.	-8.	-22.	1.02	91A	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L733	@	250.	290.	4.	-13.	.99	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L185	@	251.	334.	40.	14.	1.27	91A	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L650	@	253.	310.	22.	-3.	1.04	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L280	@	272.	336.	54.	-2.	.87	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
GMEANS:		237.	295.			1.00		
		95% ELLIPSE:		91.	31.	WITH GAMMA = 51 DEGREES		


CONCORA (CMT)
SAMPLE Z09 = 237. N(CMT)
SAMPLE Z09 = 53.3 POUNDS
SAMPLE Z14 = 295. N(CMT)
SAMPLE Z14 = 66.2 POUNDS
+.X.* NOT IN GRAND MEANS
ANALYSIS T91-1
SAMPLE Z14
SAMPLE Z09
N(CMT)
POUNDS
140 160 180 200 220 240 260 280 300 320 340
35 40 45 50 55 60 65 70 75
220 240 260 280 300 320 340 360 380
45 50 55 60 65 70 75 80 85

ANALYSIS T90-1 TABLE 1

RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)

TAPPI OFFICIAL TEST METHOD T818 OS-76

LAB CODE	SAMPLE Z12 CORRUGATING MEDIUM 132 GRAMS PER SQUARE METER MEAN	DEV	N. DEV	SDR	R. SDR	SAMPLE L01 LINER 194 GRAMS PER SQUARE METER MEAN	DEV	N. DEV	SDR	R. SDR	VAR	F	LAB	TEST D. = 10
L107	172.	-1.	-.07	11.	1.07	328.	-18.	-.45	10.	.50	96P	@	L107	
L114	185.	11.	.08	12.	1.14	324.	-22.	-.54	14.	.68	96P	@	L114	
L122	150.	-23.	-1.47	22.	2.09	326.	-20.	-.51	30.	1.43	96P	@	L122	
L124	189.	15.	.78	12.	1.11	383.	37.	.93	33.	1.58	96P	@	L124	
L126	168.	-5.	-.20	11.	1.00	349.	3.	.07	15.	.73	96P	@	L126	
L141	168.	15.	.73	13.	1.20	353.	7.	.17	28.	1.33	96P	@	L141	
L157	161.	-13.	-.65	11.	1.00	304.	-42.	-1.05	15.	.72	96P	@	L157	
L182	184.	11.	.54	11.	.98	380.	34.	.86	20.	.96	96N	@	L182	
L191	204.	30.	1.52	11.	1.05	411.	65.	1.65	11.	.50	96P	@	L191	
L218	173.	-1.	-.05	6.	.56	312.	-34.	-.86	14.	.68	96I	@	L218	
L234	153.	-20.	-1.01	10.	1.51	272.	-74.	-1.87	48.	2.31	96P	@	L234	
L237	166.	-8.	-.39	7.	.62	372.	26.	.67	26.	1.26	96P	@	L237	
L242	194.	20.	1.02	6.	.58	373.	27.	.69	11.	.51	96G	@	L242	
L243	185.	11.	.53	10.	.96	382.	36.	.92	11.	.54	96P	@	L243	
L303	181.	8.	.40	28.	2.61	359.	14.	.34	15.	.70	96N	@	L303	
L305	158.	-16.	-.80	10.	1.50	359.	13.	.32	40.	1.90	96P	@	L305	
L329	198.	25.	1.25	7.	.65	360.	34.	.86	6.	.27	96P	@	L329	
L333	166.	-7.	-.35	12.	1.14	321.	-25.	-.63	34.	1.63	96P	@	L333	
L336	155.	-19.	-.95	6.	.55	353.	7.	.19	26.	1.26	96P	@	L336	
L350	187.	13.	.67	10.	.89	361.	35.	.88	23.	1.11	96P	@	L350	
L393	173.	-1.	-.05	8.	.75	351.	5.	.13	17.	.83	96P	@	L393	
L553	197.	23.	1.16	11.	1.07	357.	11.	.28	23.	1.12	96P	@	L553	
L562	149.	-25.	-1.26	13.	1.37	290.	-55.	-1.40	23.	1.09	96P	@	L562	
L570	134.	-39.	-1.98	6.	.58	366.	-39.	-.99	16.	.77	96P	@	L570	
L580	225.	52.	2.60	12.	1.14	412.	66.	1.67	9.	.42	96P	*	L580	
L603	171.	-2.	-.12	9.	.88	401.	55.	1.39	27.	1.30	96P	@	L603	
L610	185.	11.	.58	9.	.88	370.	24.	.61	16.	.74	96P	@	L610	
L617	172.	-2.	-.09	9.	.88	327.	-19.	-.48	16.	.78	96P	@	L617	
L621	169.	-4.	-.24	9.	.84	376.	30.	.76	30.	1.46	96P	@	L621	
L623	180.	6.	.31	8.	.76	353.	18.	.44	8.	.40	96P	@	L623	
L625	123.	-50.	-2.54	10.	1.52	243.	-102.	-2.59	17.	.80	96P	*	L625	
L649	189.	16.	.80	7.	.65	356.	10.	.25	20.	.94	96P	@	L649	
L650	174.	1.	.05	7.	.66	358.	12.	.31	17.	.79	96N	@	L650	
L663	161.	-13.	-.65	9.	.80	264.	-82.	-1.56	29.	1.37	96P	@	L663	
L676	175.	1.	.05	8.	.72	346.	0.	.01	25.	1.22	96P	@	L676	
L686	173.	-1.	-.05	13.	1.22	571.	225.	5.69	17.	.80	96P	#	L686	
L703	154.	-20.	-1.00	9.	.88	287.	-58.	-1.47	12.	.57	96J	@	L703	

GR. MEAN = 174. NEWTONS GRAND MEAN = 346. NEWTONS TEST DETERMINATIONS = 10

SD MEANS = 20. NEWTONS SD OF MEANS = 40. NEWTONS 36 LABS IN GRAND MEANS

AVERAGE SDR = 11. NEWTONS AVERAGE SDR = 21. NEWTONS

GR. MEAN = 39.02 POUNDS GRAND MEAN = 77.74 POUNDS

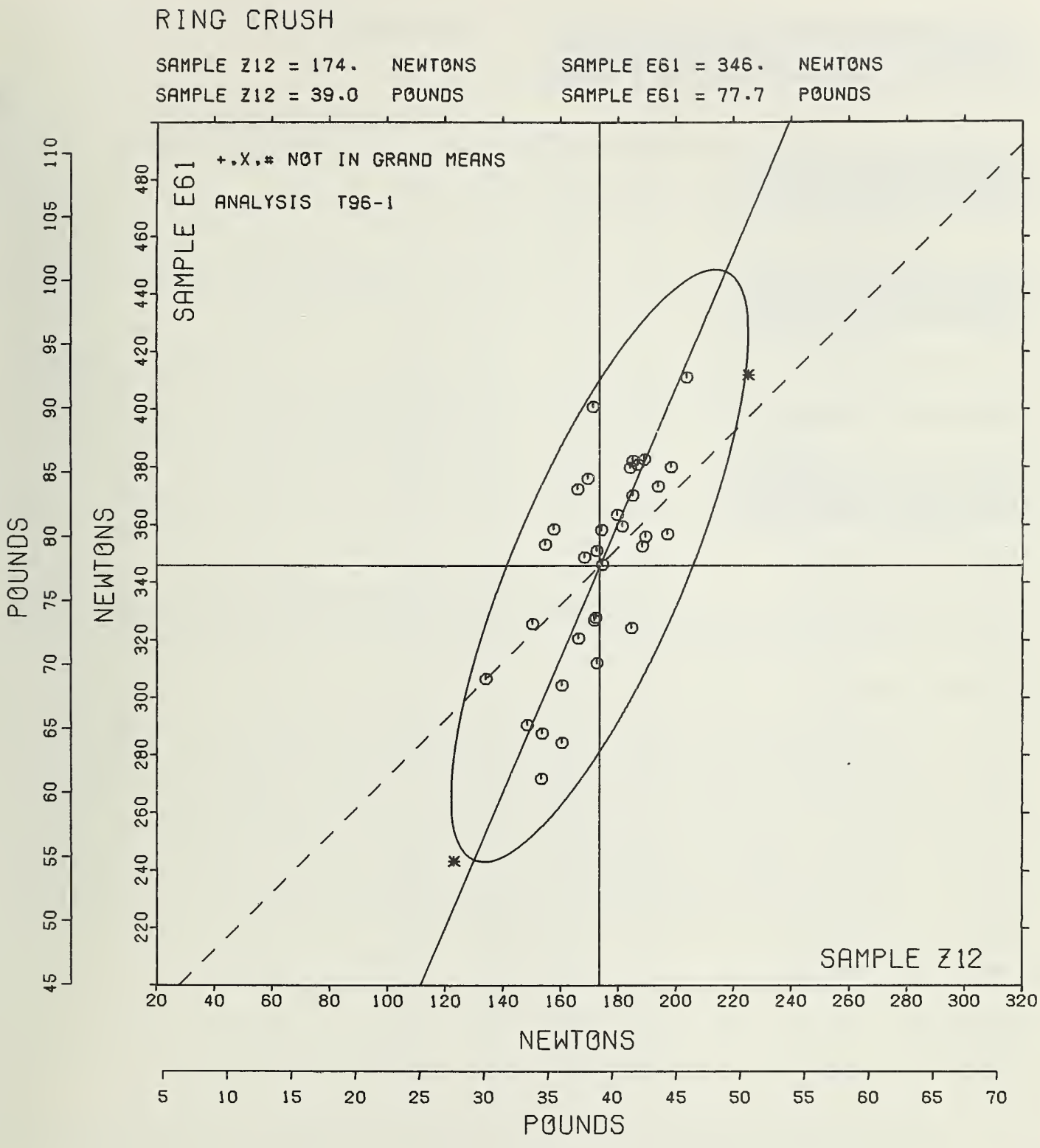
TOTAL NUMBER OF LABORATORIES REPORTING = 37

Best values: Z12 170 ± 30 newtons

E61 350 ± 60 newtons

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

LAB CODE	F	MEANS Z12	MEANS E61	COORDINATES MAJOR	COORDINATES MINOR	AVG & SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L625	#	123.	243.	-114.	6.	1.16	96P RING CRUSH, TMI/HINDE & DAUCH
L570	@	134.	306.	-52.	21.	.08	96P RING CRUSH, TMI/HINDE & DAUCH
L562	@	149.	290.	-61.	1.	1.23	96P RING CRUSH, TMI/HINDE & DAUCH
L122	@	150.	326.	-28.	13.	1.76	96P RING CRUSH, TMI/HINDE & DAUCH
L234	@	153.	272.	-76.	-11.	1.91	96P RING CRUSH, TMI/HINDE & DAUCH
L703	@	154.	287.	-61.	-5.	.73	96J RING CRUSH, INSTRON
L336	@	155.	353.	-1.	20.	.90	96P RING CRUSH, TMI/HINDE & DAUCH
L305	@	158.	359.	5.	20.	1.70	96P RING CRUSH, TMI/HINDE & DAUCH
L663	@	161.	284.	-62.	-12.	1.11	96P RING CRUSH, TMI/HINDE & DAUCH
L157	@	161.	304.	-43.	-4.	.00	96P RING CRUSH, TMI/HINDE & DAUCH
L237	@	166.	372.	21.	17.	.94	96P RING CRUSH, TMI/HINDE & DAUCH
L333	@	166.	321.	-28.	-3.	1.39	96P RING CRUSH, TMI/HINDE & DAUCH
L126	@	168.	349.	1.	0.	.86	96P RING CRUSH, TMI/HINDE & DAUCH
L621	@	169.	376.	26.	10.	1.15	96P RING CRUSH, TMI/HINDE & DAUCH
L603	@	171.	401.	50.	24.	1.09	96P RING CRUSH, TMI/HINDE & DAUCH
L617	@	172.	327.	-18.	-6.	.03	96P RING CRUSH, TMI/HINDE & DAUCH
L107	@	172.	328.	-17.	-6.	.79	96P RING CRUSH, TMI/HINDE & DAUCH
L686	#	173.	571.	207.	89.	1.91	96P RING CRUSH, TMI/HINDE & DAUCH
L393	@	173.	351.	4.	3.	.79	96P RING CRUSH, TMI/HINDE & DAUCH
L218	@	173.	312.	-32.	-12.	.02	96I RING CRUSH, INSTRON
L650	@	174.	358.	12.	4.	.73	96N RING CRUSH, TMI/HINDE & DAUCH
L676	@	175.	346.	1.	-1.	.97	96P RING CRUSH, TMI/HINDE & DAUCH
L623	@	180.	363.	19.	1.	.58	96P RING CRUSH, TMI/HINDE & DAUCH
L303	@	181.	359.	16.	-2.	1.66	96N RING CRUSH, TMI/HINDE & DAUCH
L182	@	184.	380.	35.	3.	.97	96N RING CRUSH, TMI/HINDE & DAUCH
L114	@	185.	324.	-15.	-19.	.91	96P RING CRUSH, TMI/HINDE & DAUCH
L243	@	185.	382.	38.	4.	.75	96P RING CRUSH, TMI/HINDE & DAUCH
L610	@	185.	370.	27.	-1.	.01	96P RING CRUSH, TMI/HINDE & DAUCH
L350	@	187.	381.	37.	2.	1.00	96P RING CRUSH, TMI/HINDE & DAUCH
L141	@	188.	353.	12.	-11.	1.26	96P RING CRUSH, TMI/HINDE & DAUCH
L124	@	189.	383.	40.	6.	1.33	96P RING CRUSH, TMI/HINDE & DAUCH
L649	@	189.	356.	13.	-11.	.60	96P RING CRUSH, TMI/HINDE & DAUCH
L242	@	194.	373.	33.	-3.	.34	96G RING CRUSH, GAYDON FLAT CRUSH TESTER
L553	@	197.	357.	19.	-17.	1.10	96P RING CRUSH, TMI/HINDE & DAUCH
L329	@	198.	380.	41.	-9.	.46	96P RING CRUSH, TMI/HINDE & DAUCH
L191	@	204.	411.	72.	-2.	.78	96P RING CRUSH, TMI/HINDE & DAUCH
L580	#	225.	412.	81.	-21.	.78	96P RING CRUSH, TMI/HINDE & DAUCH
GMEANS:		174.	346.			1.00	
		95% ELLIPSE:		111.	30.	WITH GAMMA = 66 DEGREES	


RING CRUSH
SAMPLE Z12 = 174. NEWTONS
SAMPLE Z12 = 39.0 POUNDS
SAMPLE E61 = 346. NEWTONS
SAMPLE E61 = 77.7 POUNDS
+.X.* NOT IN GRAND MEANS
ANALYSIS T96-1
SAMPLE E61
SAMPLE Z12
NEWTONS
POUNDS
220 240 260 280 300 320 340 360 380 400 420 440 460 480
45 50 55 60 65 70 75 80 85 90 95 100 105 110
20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320
5 10 15 20 25 30 35 40 45 50 55 60 65 70

SUMMARY TABLE

TEST METHOD	SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDR	REPL CRP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPROD
BURSTING STRENGTH, MODEL C	K36	28.2	2.1	2.0	15	45	57	10	1.7	6.0
T10-1 PSI	A57	31.9	2.4	2.2					1.9	6.8
BURSTING STRENGTH, MODEL C-A	K38	27.0	2.3	1.7	15	40	40	10	1.5	6.4
T10-2 PSI	A57	30.9	2.3	1.8					1.6	6.5
BURSTING STRENGTH, HIGH RANGE	B63	62.0	4.0	3.8	15	39	54	10	3.3	11.1
T11-1 PSI	Z15	75.7	3.2	5.3					4.7	9.2
TEARING STRENGTH, PRINTING PAPERS	B85	39.35	2.15	1.21	15	118	148	10	1.06	5.98
T15-1 GRAMS	G15	51.66	2.36	1.56					1.37	6.59
TEARING STRENGTH, PACKAGING PAPERS	B63	121.5	4.5	5.0	15	9	22	10	4.4	12.6
T16-1 GRAMS	G19	104.9	4.3	4.6					4.1	12.1
TENSILE STRENGTH, PACKAGING PAPERS	J02	5.66	.29	.23	20	52	60	10	.20	.83
T19-1 KILONEWTON/M	G17	6.89	.30	.39					.34	.86
TENSILE STR., CRE, PRINTING PAPERS	J72	3.70	.17	.16	20	44	56	10	.14	.49
T20-1 KILONEWTON/M	B95	4.56	.26	.23					.20	.73
TENSILE STR., PENDULUM, PRINTING P.	J72	3.75	.19	.16	20	42	42	10	.14	.53
T20-2 KILONEWTON/M	B95	4.58	.27	.24					.21	.75
T.E.A., PACKAGING PAPERS	J02	79.8	9.5	9.3	20	21	24	10	8.1	26.9
T25-1 JOULES/SQ M	G17	71.5	7.3	9.2					8.1	20.9
T.E.A., PRINTING PAPERS	J72	43.1	4.6	5.3	20	18	19	10	4.7	13.6
T26-1 JOULES/SQ M	B95	43.5	3.9	5.5					4.8	11.2
ELONGATION TO BREAK, PACKAGING PAPER	J02	2.131	.140	.166	20	21	25	10	.145	.401
T28-1 PERCENT	G17	1.646	.153	.129					.113	.432
ELONGATION TO BREAK, PRINTING PAPER	J72	1.690	.231	.151	20	19	22	10	.132	.646
T29-1 PERCENT	B95	1.435	.219	.140					.122	.612
FOLDING ENDURANCE (MIT)	B30	16.6	2.9	5.3	15	39	47	10	4.7	8.5
T30-1 DOUBLE FOLDS	B80	47.5	15.3	17.5					15.3	43.3
FOLDING ENDURANCE (MIT)	B30	1.20	.08	.13	15	40	47	10	.12	.22
T30-2 LOG(10) FOLD	B80	1.63	.17	.17					.15	.48
STIFFNESS, GURLEY	K04	245.	14.	13.	10	29	37	10	12.	39.
T35-1 GURLEY UNITS	A58	282.	18.	17.					15.	50.
STIFFNESS, TABER	Z02	62.1	3.1	2.3	10	35	38	5	2.9	8.9
T36-1 TABER UNITS	Z17	67.8	3.3	2.3					2.8	9.4
SURFACE PICK STRENGTH, IGT	J56	123.4	33.2	4.5	4	12	12	4	6.2	91.9
T49-1 KP CM/SEC	H81	90.4	23.7	5.4					7.5	65.7
SURFACE PICK STRENGTH, WAX	J50	12.32	1.50	.57	5	18	18	5	.70	4.16
T50-1 WAX NUMBER	H81	11.40	1.29	.56					.69	3.58
CONCORA (CMT)	Z09	237.	21.	12.	10	14	14	10	10.	59.
T91-1 N(CMT)	Z14	295.	25.	15.					13.	70.
RING CRUSH	Z12	174.	20.	11.	10	36	37	10	9.	55.
T96-1 NEWTONS	B61	346.	40.	21.					18.	110.

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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.

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