TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM FOR PAPER

REPORT NO. 59S
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
- pH
- Opacity
- Blue reflectance (brightness)
- Specular gloss, 75°
- Thickness
- Concora (flat crush)
- Ring crush

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- Hardness
- Mooney viscosity
- Vulcanization properties

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

ASTM Cement (2 times per year)

- Chemical (11 chemical components)
- Physical (8 characteristics)

AASHTO Bituminous

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

NBS Collaborative Reference Programs
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Report No. 59S
STRENGTH TESTS

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U. S. DEPARTMENT OF COMMERCE
National Bureau of Standards

INTRODUCTION

Reports 59S and 59G comprise the fifth set of reports for the 78-79 program year. Participants in tests which involve strength properties of paper will receive only the S report; those in tests which measure other properties will receive only the G report.

Notes and comments to individual laboratories and "Best Values" applicable to a particular method are given following Table 1 for each method. See page 4 of this report for an explanation of "Best Values". Please do not confuse these Best Values with provisional values included with the samples to detect serious discrepancies at the time of test.

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

Jeffrey Horlick

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

July 27, 1979

BACKGROUND AND PURPOSE

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

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

HOW THE PROGRAM WORKS

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

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

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

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

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

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

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

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

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Analyses In This Report

Analyses In The G Report

TABLE OF CONVERSION FACTORS TO METRIC (SI) UNITS

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

KEY TO TABLES AND GRAPHS

MEAN -	The average of individual TEST DETERMINATIONS. The number of TEST DETERMINATIONS in the mean is given in the upper right corner of the first table (TEST D.) and again at the bottom of this table.
GRAND MEAN - (GR. MEAN)	The average of the individual laboratory MEANS, excluding laboratories flagged (see column F) with an X, # , or +. The GRAND MEAN is given in US customary units and, where applicable, in SI metric units.
SD OF MEANS - (SD MEANS)	The standard deviation of the laboratory MEANS about the GRAND MEAN; an index of the among-laboratory precision.
DEV -	The deviation or difference of the laboratory MEAN from the GRAND MEAN.
N. DEV -	The normal deviate or ratio of the DEV to the SD OF MEANS; an indication of the degree of divergence of the laboratory MEAN from the GRAND MEAN. A N. DEV of more than 2 or less than -2 may indicate that the participant is not following the procedure considered standard for this analysis.
SDR -	The standard deviation of repeated measurements; that is, of individual test determinations about their MEAN.
AVERAGE SDR -	The average of the individual laboratory SDR's; an index of the within-laboratory precision of repeated measurements.
R. SDR -	The relative standard deviation of repeated measurements; that is, the ratio of the SDR to the AVERAGE SDR: an indication of the ability of a participant to repeat his 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
5	0.27	2.06
8	0.40	1.77
10	0.46	1.67
15	0.56	1.53
20	0.61	1.45
25	0.65	1.39

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

F - Flag, with following meaning:

+ - Excluded from grand means because VAR non-standard for this analysis

- Excluded because data were not understood or because of a non-coded variation reported by the laboratory. (See NOTES following Table 1 for each method.)

M - Excluded because data for one sample are missing

X - Excluded because plotted point would fall outside of the 99% error ellipse, (see below for explanation of Graph)

* - Included in grand means but plotted point falls outside of the 95% error ellipse. The participant should take this as a warning to reexamine his testing procedure

S - Included in grand mean but only after omission of one of more 'wild' values; that is, test determinations more than 3 times AVERAGE SDR from the laboratory's MEAN. Not more than 20% of the test determination may be excluded in this manner without rejecting the laboratory.

O - Included in grand mean and inside 95% error ellipse.

COORDINATES - Distances along major and minor axes of error ellipse. If special additive or concurrent model of the measuring process applies to this method, the distance along the minor axis represents the random error within a laboratory while that along the major axis also includes a systematic laboratory component of error.

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

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

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

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

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

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

Summary - (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 Standard or assumed here if there is no TAPPI Standard. This quantity is needed in the computation of TAPPI repeatability and reproducibility from the SD OF MEANS and the AVER SDR. See TAPPI Standard T1206 for definitions and computations.

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

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

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

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

LAB CODE	SAMPLE J87 MEAN	PRINTING 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	SAMPLE J40 MEAN	PRINTING 85 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R. SDR	TEST D. = 15 VAR	F	LAB
L121	16.77	-.75	-.62	1.28	1.13	27.60	-1.96	-1.02	1.24	.76	10C	6	L121
L131	14.73	-2.79	-2.31	1.71	1.52	24.53	-5.03	-2.62	2.17	1.32	10C	*	L131
L134	17.80	.28	.23	.77	.69	32.27	2.70	1.41	1.53	.93	10C	6	L134
L150	18.90	1.38	1.15	1.34	1.19	30.20	.64	.33	.96	.58	10C	6	L150
L153	17.10	-.42	-.35	1.20	1.06	28.67	-.90	-.47	1.36	.83	10C	6	L153
L158	17.33	-.19	-.15	1.45	1.28	29.33	-.23	-.12	1.95	1.19	10C	6	L158
L167	17.70	.18	.15	.59	.52	27.40	-2.16	-1.13	.85	.52	10C	6	L167
L183	17.37	-.15	-.13	.79	.70	28.10	-1.46	-.76	1.66	1.01	10C	6	L183
L191	13.87	-3.65	-3.03	.77	.68	28.10	-1.46	-.76	1.74	1.06	10C	*	L191
L203A	16.67	-.85	-.71	.86	.76	29.10	-.46	-.24	1.45	.88	10C	6	L203A
L203B	16.10	-1.42	-1.18	1.31	1.16	31.30	1.74	.91	2.16	1.31	10C	6	L203B
L207	18.03	.51	.43	1.20	1.07	29.29	-.27	-.14	1.19	.72	10C	6	L207
L212	17.10	-.42	-.35	1.11	.98	27.87	-1.70	-.89	1.73	1.05	10C	6	L212
L223A	20.08	2.56	2.12	1.68	1.49	30.10	.54	.28	1.17	.71	10C	6	L223A
L225	17.50	-.02	-.02	.96	.85	30.53	.97	.51	1.27	.77	10C	6	L225
L232	13.90	-3.62	-3.00	1.20	1.06	26.60	-2.96	-1.55	1.66	1.01	10C	*	L232
L237A	16.80	-.72	-.60	.73	.64	29.80	.24	.12	1.03	.63	10C	6	L237A
L237B	17.57	.05	.04	.56	.50	28.57	-1.00	-.52	.92	.56	10C	6	L237B
L243	17.87	.35	.29	1.04	.92	28.63	-.93	-.49	.81	.49	10C	6	L243
L248	18.83	1.31	1.09	1.20	1.06	29.30	-.26	-.14	1.23	.75	10E	6	L248
L249	17.92	.40	.33	1.21	1.07	29.97	.40	.21	1.51	.92	10C	6	L249
L261	18.69	1.17	.97	1.03	.92	29.90	.34	.18	1.38	.84	10C	6	L261
L264	17.47	-.05	-.04	.83	.74	33.00	3.44	1.79	1.20	.73	10C	6	L264
L268	18.40	.88	.73	1.24	1.10	30.33	.77	.40	1.72	1.04	10C	6	L268
L278	16.47	-1.05	-.87	1.03	.91	28.07	-1.50	-.78	1.91	1.16	10C	6	L278
L279	18.05	.53	.44	1.20	1.06	29.03	-.53	-.28	1.85	1.13	10C	6	L279
L299	19.07	1.55	1.28	1.62	1.44	32.57	3.00	1.57	1.67	1.01	10C	6	L299
L305	18.00	.48	.40	.76	.67	28.90	-.66	-.35	1.82	1.11	10C	6	L305
L311	18.10	.58	.48	1.23	1.09	31.70	2.14	1.11	1.54	.94	10C	6	L311
L312	18.75	1.23	1.02	.94	.83	31.84	2.28	1.19	1.21	.74	10C	6	L312
L321	18.60	1.08	.90	1.79	1.59	33.40	3.84	2.00	1.93	1.17	10C	6	L321
L326	17.10	-.42	-.35	.87	.77	29.03	-.53	-.28	2.00	1.22	10C	6	L326
L330	17.47	-.05	-.04	1.00	.89	31.85	2.29	1.19	3.40	2.07	10C	6	L330
L331	17.47	-.05	-.04	1.51	1.33	29.40	-.16	-.09	1.30	.79	10Y	6	L331
L333	17.87	.35	.29	2.50	2.22	26.93	-2.63	-1.37	4.23	2.57	10C	6	L333
L339	10.40	-7.12	-5.91	.51	.45	16.00	-13.56	-7.08	.00	.00	10C	#	L339
L344	17.33	-.19	-.15	1.22	1.08	28.97	-.60	-.31	1.89	1.15	10C	6	L344
L356	18.51	.99	.82	.73	.65	26.90	-2.66	-1.39	2.20	1.34	10C	6	L356
L358	16.83	-.69	-.57	.72	.64	29.97	.40	.21	.82	.50	10C	6	L358
L360	18.30	.78	.65	1.19	1.06	29.33	-.23	-.12	1.58	.96	10C	6	L360
L390	17.80	.28	.23	1.32	1.17	32.03	2.47	1.29	1.83	1.11	10C	6	L390
L568	18.17	.65	.54	.96	.85	29.63	.07	.04	2.24	1.36	10C	6	L568
L599	17.62	.10	.08	.90	.79	29.70	.14	.07	1.89	1.15	10C	6	L599
L684	16.70	-.82	-.68	1.00	.88	27.73	-1.83	-.96	1.79	1.09	10C	6	L684
L696	18.15	.63	.53	1.36	1.21	33.35	3.79	1.98	2.00	1.22	10C	6	L696

GR. MEAN = 17.52 PSI — GRAND MEAN = 29.56 PSI — TEST DETERMINATIONS = 15
SD MEANS = 1.21 PSI — SD OF MEANS = 1.92 PSI — 44 LABS IN GRAND MEANS
AVERAGE SDR = 1.13 PSI — AVERAGE SDR = 1.64 PSI
GR. MEAN = 120.8 KILOPASCAL — GRAND MEAN = 203.8 KILOPASCAL

L128	17.47	-.05	-.04	.83	.74	29.80	.24	.12	1.08	.66	10B	•	L128
L242	19.78	2.26	1.87	1.14	1.01	31.81	2.25	1.17	1.11	.68	10T	•	L242
L250L	17.16	-.36	-.30	1.22	1.08	27.31	-2.26	-1.18	1.47	.89	10N	•	L250L
L269	21.93	4.41	3.66	1.67	1.48	33.13	3.57	1.86	2.07	1.26	10A	•	L269

TOTAL NUMBER OF LABORATORIES REPORTING = 49

Best values: J87 17.7 ± 2.2 psi
J40 29.7 ± 3.1 psi

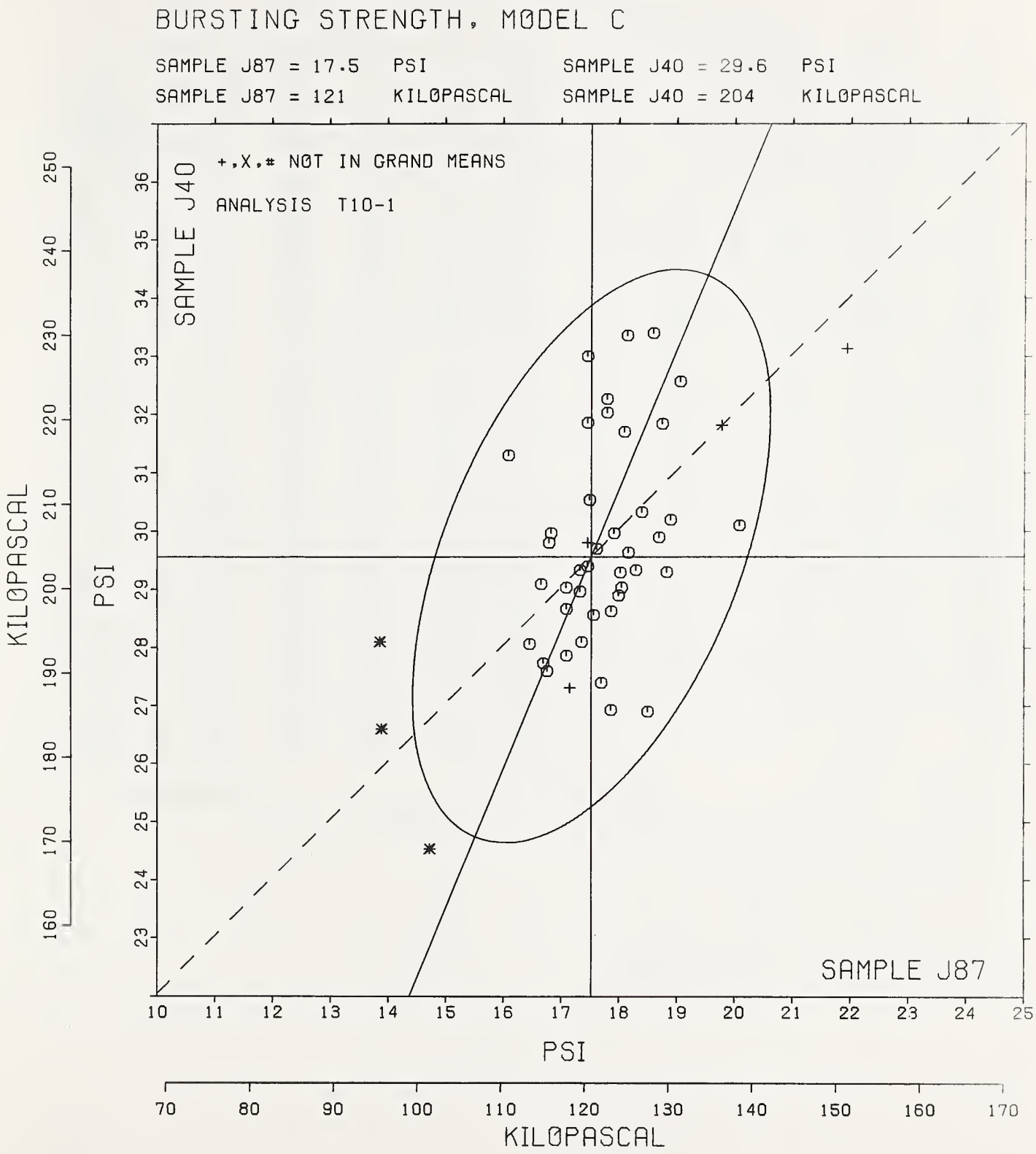
The following laboratories were omitted from the grand means because of extreme test results: 339.

ANALYSIS T10-1 TABLE 2

BURSTING STRENGTH, PSI

TAPPI STANDARD T403 OS-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C

LAB CODE	P	MEANS J87	MEANS J40	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L339	#	10.40	16.00	-15.26	1.35	.22	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L191	#	13.87	28.10	-2.76	2.81	.87	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L232	#	13.90	26.60	-4.13	2.20	1.04	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L131	#	14.73	24.53	-5.72	.64	1.42	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L203B	O	16.10	31.30	1.06	1.98	1.24	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L278	O	16.47	28.07	-1.79	.40	1.03	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L203A	O	16.67	29.10	-.76	.61	.82	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L684	O	16.70	27.73	-2.01	.05	.99	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L121	O	16.77	27.60	-2.10	-.06	.94	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L237A	O	16.80	29.80	-.06	.75	.64	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L358	O	16.83	29.97	.11	.79	.57	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L153	O	17.10	28.67	-.99	.04	.94	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L212	O	17.10	27.87	-1.73	-.27	1.01	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L326	O	17.10	29.03	-.65	.18	.99	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L250L	*	17.16	27.31	-2.22	-.53	.98	10N	BURSTING STRENGTH UP TO 45 PSI,LHOMARGY,MAN.CLAMP, 20C,65%RH
L344	O	17.33	28.97	-.62	-.06	1.12	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L158	O	17.33	29.33	-.28	.08	1.23	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L183	O	17.37	28.10	-1.41	-.42	.85	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L128	*	17.47	29.80	.20	.14	.70	10B	BURSTING STRENGTH UP TO 45 PSI, PERKINS B, MANUAL CLAMP
L331	O	17.47	29.40	-.17	-.01	1.06	10Y	BURSTING STRENGTH UP TO 45 PSI,PERKINS C, M.CLAMP,TRANSDUCER
L330	O	17.47	31.85	2.09	.93	1.48	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L264	O	17.47	33.00	3.15	1.37	.73	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L225	O	17.50	30.53	.89	.39	.81	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L237B	O	17.57	28.57	-.90	-.43	.53	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L599	O	17.62	29.70	.16	-.04	.97	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L167	O	17.70	27.40	-1.93	-1.00	.52	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L390	O	17.80	32.03	2.39	.69	1.14	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L134	O	17.80	32.27	2.60	.78	.81	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L243	O	17.87	28.63	-.73	-.68	.71	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L333	O	17.87	26.93	-2.30	-1.33	2.40	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L249	O	17.92	29.97	.53	-.22	.99	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L305	O	18.00	28.90	-.43	-.70	.89	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L207	O	18.03	29.29	-.05	-.58	.89	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L279	O	18.05	29.03	-.29	-.69	1.09	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L311	O	18.10	31.70	2.19	.29	1.01	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L696	O	18.15	33.35	3.74	.87	1.21	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L568	O	18.17	29.63	.31	-.57	1.11	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L360	O	18.30	29.33	.09	-.81	1.01	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L268	O	18.40	30.33	1.05	-.52	1.07	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L356	O	18.51	26.90	-2.08	-1.94	.99	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L321	O	18.60	33.40	3.96	.48	1.38	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L261	O	18.69	29.90	.76	-.95	.88	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L312	O	18.75	31.84	2.58	-.26	.79	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L248	O	18.83	29.30	.26	-1.31	.90	10E	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L150	O	18.90	30.20	1.12	-1.03	.89	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L299	O	19.07	32.57	3.37	-.27	1.23	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L242	*	19.78	31.81	2.94	-1.22	.84	10T	BURSTING STRENGTH UP TO 45 PSI, L*W,MANUAL CLAMP
L223A	O	20.08	30.10	1.48	-2.16	1.10	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L269	*	21.93	33.13	4.99	-2.70	1.37	10A	BURSTING STRENGTH UP TO 45 PSI, PERKINS A, MANUAL CLAMP
GMEANS:		17.52	29.56			1.00		
		95% ELLIPSE:		5.22	2.55	WITH GAMMA = 67 DEGREES		


BURSTING STRENGTH, MODEL C
SAMPLE J87 = 17.5 PSI
SAMPLE J87 = 121 KILOPASCAL
SAMPLE J40 = 29.6 PSI
SAMPLE J40 = 204 KILOPASCAL
+,X,* NOT IN GRAND MEANS
ANALYSIS T10-1
SAMPLE J40
PSI
KILOPASCAL
SAMPLE J87
PSI
KILOPASCAL

ANALYSIS T10-2 TABLE 1
BURSTING STRENGTH, PSI

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

LAB CODE	SAMPLE J87 MEAN	PRINTING 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J40 MEAN	PRINTING 85 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 15 VAR	F	LAB
L100	19.68	1.77	1.30	1.16	.98	31.87	2.30	1.31	1.14	.71	10D	O	L100
L105	11.63	-6.28	-4.59	1.81	1.54	23.37	-6.20	-3.51	1.49	.93	10D	X	L105
L106C	16.73	.82	.60	1.03	.88	29.07	-.50	-.28	1.58	.98	10D	O	L106C
L115	18.63	.72	.53	1.29	1.09	31.03	1.47	.83	1.91	1.19	10D	O	L115
L118	19.33	1.42	1.04	.90	.77	28.63	-.93	-.53	1.09	.68	10D	O	L118
L122	16.00	-1.91	-1.40	.76	.64	26.73	-2.83	-1.60	1.49	.92	10F	O	L122
L125	16.00	-1.91	-1.40	1.89	1.61	29.67	.10	.06	2.16	1.34	10D	O	L125
L141	17.90	-.01	-.01	.93	.79	28.30	-1.26	-.71	1.77	1.10	10D	O	L141
L148	18.53	.62	.46	1.36	1.15	29.53	-.03	-.02	1.64	1.02	10D	O	L148
L157	18.97	1.06	.77	1.36	1.15	31.13	1.57	.89	1.85	1.15	10D	O	L157
L159	16.83	-1.08	-.79	1.74	1.48	26.82	-2.74	-1.55	1.15	.71	10D	O	L159
L162	15.60	-2.31	-1.69	1.72	1.47	28.27	-1.30	-.73	2.31	1.44	10D	O	L162
L163	17.57	-.34	-.25	1.57	1.33	29.30	-.26	-.15	1.16	.72	10D	O	L163
L166	19.03	1.12	.82	1.16	.98	32.23	2.67	1.51	1.45	.90	10D	O	L166
L176	19.53	1.62	1.19	.52	.44	31.07	1.50	.85	1.10	.68	10D	O	L176
L185	19.47	1.56	1.14	.83	.71	29.80	.24	.13	1.52	.95	10D	O	L185
L190C	16.93	-.98	-.71	1.27	1.08	27.90	-1.66	-.94	1.67	1.04	10D	O	L190C
L217	18.33	.42	.31	1.05	.89	29.00	-.56	-.32	1.60	1.00	10F	O	L217
L226B	18.02	.11	.08	1.10	.93	29.27	-.30	-.17	1.96	1.22	10D	O	L226B
L226C	15.89	-2.02	-1.48	1.23	1.04	27.92	-1.64	-.93	1.79	1.11	10D	O	L226C
L233	17.98	.07	.05	1.39	1.18	29.45	-.12	-.07	1.61	1.00	10D	O	L233
L241	18.84	.93	.68	1.29	1.09	31.73	2.17	1.23	1.84	1.14	10D	O	L241
L255	16.67	-1.24	-.91	.49	.41	26.67	-2.90	-1.64	1.18	.73	10D	O	L255
L257A	18.53	.62	.46	.92	.78	30.93	1.37	.78	1.79	1.11	10D	O	L257A
L257B	18.20	.29	.21	1.32	1.12	31.47	1.90	1.08	2.07	1.28	10D	O	L257B
L257C	18.67	.76	.55	1.40	1.19	31.67	2.10	1.19	1.11	.69	10D	O	L257C
L262	18.03	.12	.09	.85	.73	30.23	.67	.38	1.92	1.19	10D	O	L262
L275	16.03	-1.88	-1.37	1.07	.91	26.69	-2.88	-1.63	2.43	1.51	10D	O	L275
L280	20.03	2.12	1.56	1.28	1.09	31.14	1.58	.89	1.39	.87	10D	O	L280
L285	16.47	-1.44	-1.06	1.68	1.43	32.63	3.07	1.74	1.93	1.20	10D	X	L285
L309	19.46	1.55	1.14	1.07	.91	32.86	3.30	1.87	1.37	.85	10D	O	L309
L341	18.27	.36	.26	.70	.60	28.87	-.70	-.39	1.51	.94	10D	O	L341
L352	164.47	146.56	107.27	10.72	9.11	252.53	222.97	126.29	11.69	7.27	10D	#	L352
L563	14.09	-3.81	-2.79	1.79	1.52	26.47	-3.09	-1.75	2.52	1.56	10U	*	L563
L567	18.41	.50	.36	2.05	1.75	30.07	.50	.29	1.03	.64	10D	O	L567
L575	17.18	-.73	-.53	1.37	1.17	27.87	-1.69	-.96	1.26	.78	10D	O	L575
L581	17.13	-.78	-.57	.99	.84	29.93	.37	.21	2.63	1.64	10D	O	L581
L652	12.20	-5.71	-4.18	1.35	1.14	26.47	-3.10	-1.75	1.72	1.07	10D	#	L652
L688	18.31	.40	.29	.96	.82	31.09	1.52	.86	1.21	.75	10D	O	L688

GR. MEAN = 17.91 PSI GRAND MEAN = 29.56 PSI TEST DETERMINATIONS = 15
SD MEANS = 1.37 PSI SD OF MEANS = 1.77 PSI 35 LABS IN GRAND MEANS
AVERAGE SDR = 1.18 PSI AVERAGE SDR = 1.61 PSI
GR. MEAN = 123.5 KILOPASCAL GRAND MEAN = 203.8 KILOPASCAL
TOTAL NUMBER OF LABORATORIES REPORTING = 39

Best values: J87 18.0 ± 2.0 psi
J40 29.6 ± 2.4 psi

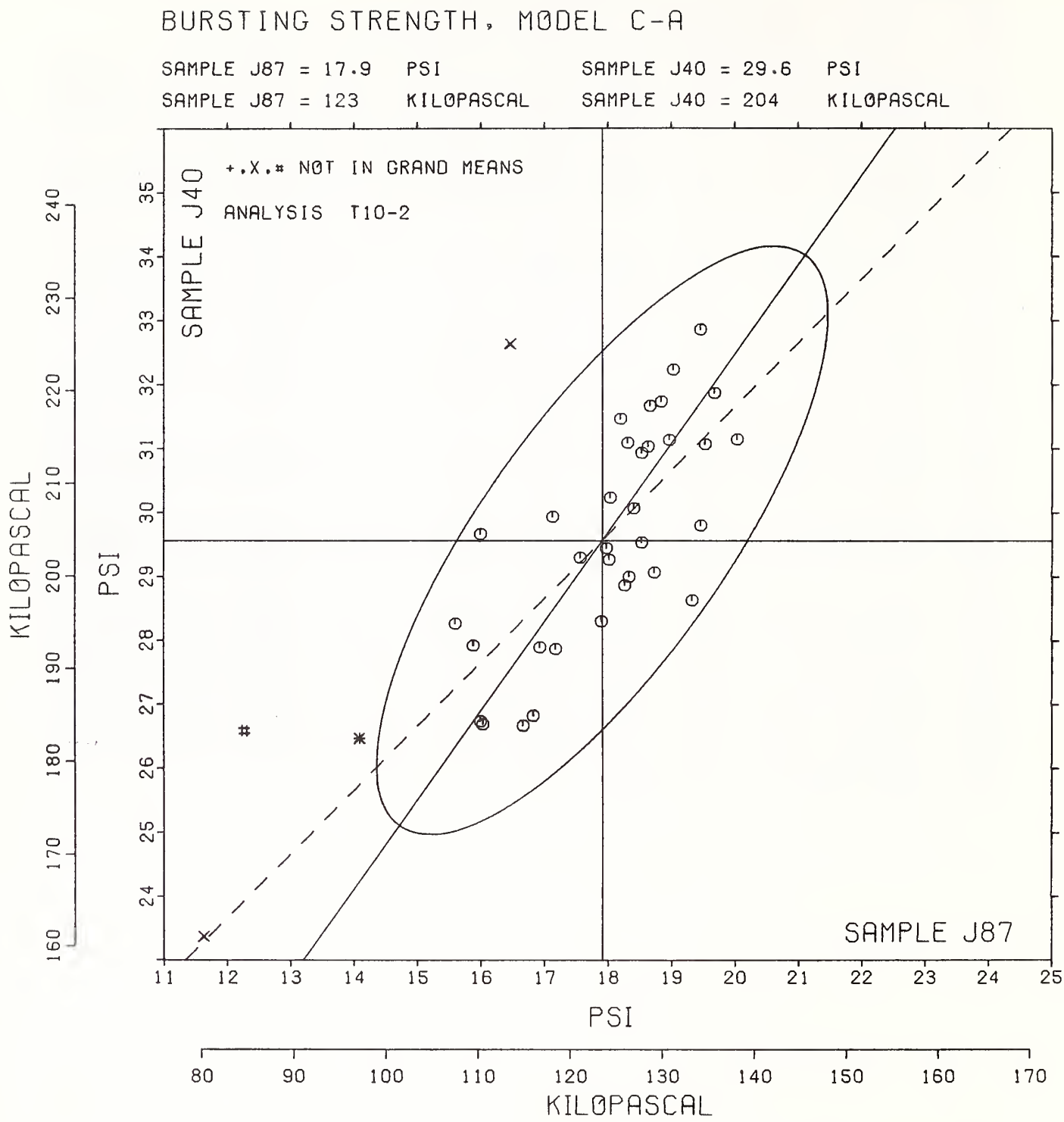
Data from the following laboratories appear to be off by a multiplicative factor: 352.

Data from the following laboratories were omitted from the grand means because the tests were performed in ambient conditions: 652.

ANALYSIS T10-2 TABLE 2
BURSTING STRENGTH, PSI

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

LAB CODE	F	MEANS J87	MEANS J40	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L105	X	11.63	23.37	-8.69	1.49	1.23	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L652	#	12.20	26.47	-5.84	2.84	1.11	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L563	*	14.09	26.47	-4.74	1.30	1.54	10U	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L162	O	15.60	28.27	-2.40	1.12	1.45	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L226C	O	15.89	27.92	-2.51	.69	1.08	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L125	O	16.00	29.67	-1.03	1.61	1.47	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L122	O	16.00	26.73	-3.41	-.10	.78	10F	BURSTING STRENGTH UP TO 45 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L275	O	16.03	26.69	-3.43	-.15	1.21	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L285	X	16.47	32.63	1.66	2.96	1.32	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L255	O	16.67	26.67	-3.08	-.68	.57	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L159	O	16.83	26.82	-2.86	-.72	1.10	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L190C	O	16.93	27.90	-1.92	-.18	1.06	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L581	O	17.13	29.93	-.15	.85	1.24	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L575	O	17.18	27.87	-1.80	-.39	.97	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L163	O	17.57	29.30	-.41	.13	1.03	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L141	O	17.90	28.30	-1.03	-.73	.95	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L233	O	17.98	29.45	-.05	-.13	1.09	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L226B	O	18.02	29.27	-.18	-.26	1.08	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L262	O	18.03	30.23	.62	.29	.96	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L257B	O	18.20	31.47	1.72	.87	1.20	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L341	O	18.27	28.87	-.36	-.70	.77	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L688	O	18.31	31.09	1.47	.57	.78	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L217	O	18.33	29.00	-.21	-.67	.94	10F	BURSTING STRENGTH UP TO 45 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L567	O	18.41	30.07	.70	-.11	1.19	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L257A	O	18.53	30.93	1.48	.29	.95	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L148	O	18.53	29.53	.34	-.52	1.09	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L115	O	18.63	31.03	1.62	.27	1.14	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L257C	O	18.67	31.67	2.15	.61	.94	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L106C	O	18.73	29.07	.08	-.96	.93	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L241	O	18.84	31.73	2.31	.51	1.12	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L157	O	18.97	31.13	1.89	.06	1.15	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L166	O	19.03	32.23	2.83	.64	.94	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L118	O	19.33	28.63	.07	-1.69	.72	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L309	O	19.46	32.86	3.58	.66	.88	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L185	O	19.47	29.80	1.10	-1.13	.83	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L176	O	19.53	31.07	2.17	-.44	.56	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L100	O	19.68	31.87	2.91	-.10	.85	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L280	O	20.03	31.14	2.52	-.81	.98	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L352	#	164.47	252.53	266.61	10.81	8.19	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
GMEANS:		17.91	29.56			1.00		
		95% ELLIPSE:		5.48	1.92	WITH GAMMA = 54 DEGREES		


BURSTING STRENGTH, MODEL C-A
SAMPLE J87 = 17.9 PSI
SAMPLE J87 = 123 KILOPASCAL
SAMPLE J40 = 29.6 PSI
SAMPLE J40 = 204 KILOPASCAL
+.X.* NOT IN GRAND MEANS
ANALYSIS T10-2
SAMPLE J40
SAMPLE J87
PSI
KILOPASCAL
PSI
KILOPASCAL

ANALYSIS T11-1 TABLE 1

BURSTING STRENGTH, HIGH RANGE, PSI

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

LAB CODE	SAMPLE B56 BROWN KRAFT 76 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE K30 KRAFT 123 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L100	41.0	2.4	1.32	2.8	.96	61.7	2.7	1.02	3.5	.82	11D	O	L100
L103	41.7	3.0	1.68	1.9	.65	61.6	2.6	.98	1.8	.42	11C	O	L103
L107	41.0	2.3	1.29	3.1	1.07	60.8	1.8	.67	2.9	.69	11C	O	L107
L118	39.4	.8	.43	1.9	.65	56.8	-2.2	-.83	2.1	.49	11D	O	L118
L122	35.9	-2.8	-1.55	2.3	.79	56.5	-2.6	-.97	5.2	1.24	11F	O	L122
L128	40.3	1.7	.93	1.3	.45	61.1	2.0	.77	2.5	.59	11D	O	L128
L141	37.8	-.9	-.50	2.2	.77	60.1	1.1	.40	4.4	1.05	11D	O	L141
L148	39.9	1.2	.67	3.0	1.06	59.9	.9	.34	5.7	1.34	11D	O	L148
L159	35.8	-2.9	-1.60	3.0	1.03	56.0	-3.0	-1.14	4.0	.95	11D	O	L159
L170	37.3	-1.3	-.74	2.4	.85	62.6	3.6	1.35	3.1	.74	11C	O	L170
L176	40.9	2.3	1.26	2.6	.89	65.0	6.0	2.25	3.4	.80	11D	O	L176
L182	38.9	.2	.11	5.0	1.74	60.9	1.9	.72	4.4	1.05	11D	O	L182
L218	39.5	.8	.44	3.3	1.16	58.3	-.7	-.27	3.0	.71	11D	O	L218
L232	40.3	1.7	.93	4.4	1.52	52.2	-6.8	-2.57	6.3	1.50	11C	X	L232
L237A	39.0	.4	.20	1.7	.59	63.4	4.4	1.65	2.7	.65	11C	O	L237A
L237B	39.0	.3	.17	1.1	.40	59.4	.4	.14	2.0	.48	11C	O	L237B
L238A	35.6	-3.1	-1.70	3.3	1.16	57.1	-1.9	-.73	6.6	1.55	11Y	O	L238A
L243	38.4	-.3	-.16	2.2	.78	55.9	-3.1	-1.19	3.2	.74	11C	O	L243
L248	36.5	-2.2	-1.21	5.0	1.73	58.2	-.9	-.33	4.1	.96	11E	O	L248
L278	37.4	-1.3	-.70	2.8	.99	56.2	-2.9	-1.08	7.2	1.70	11C	O	L278
L279	39.7	1.1	.60	3.6	1.25	62.2	3.2	1.20	7.3	1.72	11C	O	L279
L280	41.8	3.2	1.75	2.8	.97	64.2	5.2	1.97	4.1	.96	11D	O	L280
L294	38.4	-.3	-.15	3.0	1.05	58.2	-.8	-.32	3.3	.79	11C	O	L294
L303	38.8	.2	.09	2.8	.98	57.5	-1.6	-.59	3.7	.87	11C	O	L303
L330	39.1	.5	.26	3.4	1.18	58.9	-.1	-.04	5.4	1.29	11C	O	L330
L331	38.3	-.4	-.22	2.9	1.01	58.0	-1.0	-.39	4.5	1.07	11G	O	L331
L333	38.2	-.5	-.26	4.9	1.71	60.8	1.8	.67	5.0	1.18	11C	O	L333
L334	41.0	2.3	1.29	3.1	1.08	60.4	1.4	.52	3.5	.82	11D	O	L334
L344	37.9	-.8	-.44	3.5	1.22	57.5	-1.5	-.58	5.3	1.24	11C	O	L344
L356	36.7	-1.9	-1.07	2.3	.79	55.9	-3.2	-1.20	5.9	1.40	11C	O	L356
L565	38.4	-.3	-.16	1.2	.41	60.2	1.1	.43	2.4	.57	11D	O	L565
L567	40.8	2.1	1.18	2.3	.80	60.8	1.8	.68	3.9	.93	11D	O	L567
L575	38.8	.1	.05	3.7	1.27	57.9	-1.1	-.43	4.9	1.15	11D	O	L575
L581	39.3	.7	.37	2.6	.90	55.4	-3.6	-1.37	5.2	1.23	11D	O	L581
L599	40.2	1.5	.85	3.8	1.31	59.5	.4	.16	5.8	1.37	11C	O	L599
L604	35.3	-3.3	-1.85	2.0	.70	56.2	-2.8	-1.07	4.1	.97	11C	O	L604
L622	36.5	-2.1	-1.18	3.2	1.12	53.6	-5.4	-2.04	4.9	1.15	11E	O	L622
L650	36.0	-2.6	-1.46	3.5	1.21	55.7	-3.4	-1.27	4.2	1.00	11D	O	L650
L651	40.4	1.7	.96	4.3	1.49	58.0	-1.0	-.39	5.5	1.30	11D	O	L651
L680	36.9	-1.8	-1.00	2.4	.84	59.9	.9	.34	4.3	1.02	11D	O	L680
GR. MEAN =	38.7 PSI					GRAND MEAN =	59.0 PSI				TEST DETERMINATIONS =		15
SD MEANS =	1.8 PSI					SD OF MEANS =	2.6 PSI				39 LABS IN GRAND MEANS		
				AVERAGE SDR =	2.9 PSI				AVERAGE SDR =	4.2 PSI			
GR. MEAN =	266.6 KILOPASCAL					GRAND MEAN =	407.0 KILOPASCAL						
L242	42.4	3.7	2.07	2.7	.93	61.0	2.0	.76	5.3	1.26	11T	*	L242
L250L	36.6	-2.1	-1.15	2.0	.69	55.1	-3.9	-1.49	4.2	.99	11N	*	L250L
L290	47.6	8.9	4.95	2.9	1.02	64.8	5.8	2.18	3.8	.89	11A	*	L290
L393	38.5	-.1	-.07	3.5	1.21	59.0	-.0	-.01	4.0	.95	11H	*	L393
L394	50.3	11.6	6.43	1.4	.50	65.8	6.8	2.56	2.5	.60	11H	*	L394
L570	39.7	1.1	.59	2.1	.71	59.5	.4	.16	3.5	.83	11H	*	L570
L576	39.8	1.1	.63	2.3	.80	61.7	2.7	1.01	4.7	1.10	11P	*	L576
L593	41.1	2.4	1.33	3.8	1.31	65.3	6.2	2.35	6.7	1.59	11J	*	L593

TOTAL NUMBER OF LABORATORIES REPORTING = 48

Best values: B56 39 ± 3 psi

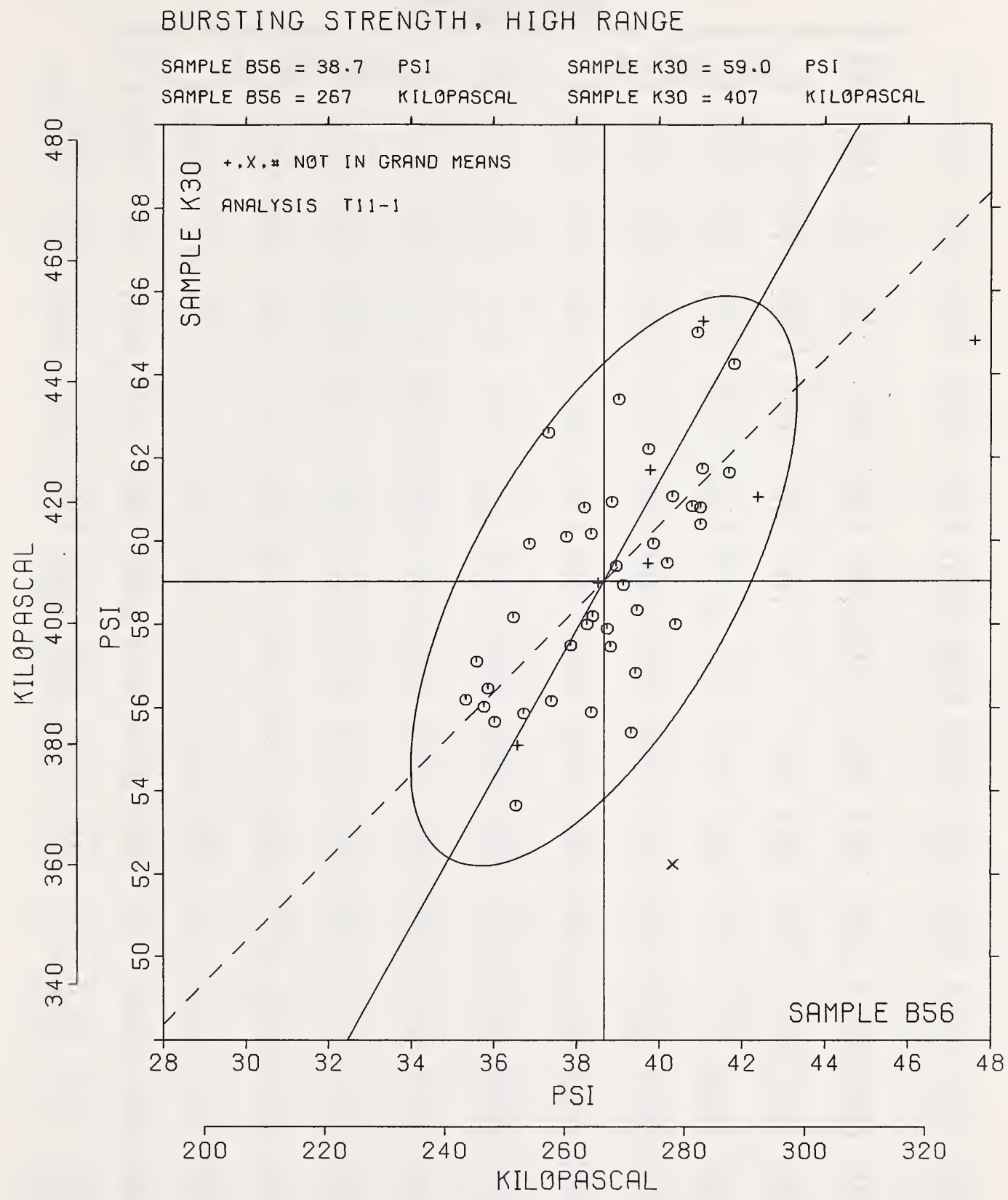
K30 59 ± 4 psi

ANALYSIS T11-1 TABLE 2

BURSTING STRENGTH, HIGH RANGE, PSI

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

LAB CODE	F	MEANS B56	MEANS K30	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L604	O	35.3	56.2	-4.1	1.5	.84	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L238A	O	35.6	57.1	-3.2	1.7	1.36	11Y	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L159	O	35.8	56.0	-4.0	1.0	.99	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L122	O	35.9	56.5	-3.6	1.2	1.01	11F	BURSTING STRENGTH 40 - 100 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L650	O	36.0	55.7	-4.2	.6	1.11	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L248	O	36.5	58.2	-1.8	1.5	1.34	11E	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L622	O	36.5	53.6	-5.7	-.8	1.14	11E	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L250L	*	36.6	55.1	-4.4	-.1	.84	11N	BURSTING STRENGTH 40 - 100 PSI,LBORMARGY,MAN.CLAMP, 20C,65%RH
L356	O	36.7	55.9	-3.7	.1	1.09	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L680	O	36.9	59.9	-.1	2.0	.93	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L170	O	37.3	62.6	2.5	2.9	.79	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L278	O	37.4	56.2	-3.1	-.3	1.34	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L141	O	37.8	60.1	.5	1.3	.91	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L344	O	37.9	57.5	-1.7	-.1	1.23	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L333	O	38.2	60.8	1.3	1.3	1.44	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L331	O	38.3	58.0	-1.1	-.2	1.04	11G	BURSTING STRENGTH 40 - 100 PSI,PERKINS C, M.CLAMP,TRANSDUCER
L565	O	38.4	60.2	.8	.8	.49	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L243	O	38.4	55.9	-2.9	-1.3	.76	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L294	O	38.4	58.2	-.9	-.2	.92	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L393	*	38.5	59.0	-.1	.1	1.08	11H	BURSTING STRENGTH 40 - 100 PSI, PERKINS AH, HYDRAULIC CLAMP
L575	O	38.8	57.9	-1.0	-.6	1.21	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L303	O	38.8	57.5	-1.3	-.9	.92	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L182	O	38.9	60.9	1.8	.8	1.39	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L237B	O	39.0	59.4	.5	-.1	.44	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L237A	O	39.0	63.4	4.0	1.8	.62	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L330	O	39.1	58.9	.1	-.5	1.23	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L581	O	39.3	55.4	-2.8	-2.4	1.06	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L118	O	39.4	56.8	-1.5	-1.8	.57	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L218	O	39.5	58.3	-.2	-1.0	.93	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L570	*	39.7	59.5	.9	-.7	.77	11H	BURSTING STRENGTH 40 - 100 PSI, PERKINS AH, HYDRAULIC CLAMP
L279	O	39.7	62.2	3.3	.6	1.49	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L576	*	39.8	61.7	2.9	.3	.95	11P	BURSTING STRENGTH 40 - 100 PSI, PERKINS LC, MANUAL CLAMP
L148	O	39.9	59.9	1.4	-.6	1.20	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L599	O	40.2	59.5	1.1	-1.1	1.34	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L128	O	40.3	61.1	2.6	-.5	.52	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L232	X	40.3	52.2	-5.1	-4.8	1.51	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L651	O	40.4	58.0	-.1	-2.0	1.40	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L567	O	40.8	60.8	2.6	-1.0	.87	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L176	O	40.9	65.0	6.3	.9	.85	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L334	O	41.0	60.4	2.3	-1.4	.95	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L107	O	41.0	60.8	2.7	-1.2	.88	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L100	O	41.0	61.7	3.5	-.8	.89	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L593	*	41.1	65.3	6.6	1.0	1.45	11J	BURSTING STRENGTH 40 - 100 PSI, PERKINS JUMBO,HAND DRIVEN
L103	O	41.7	61.6	3.8	-1.4	.54	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L280	O	41.8	64.2	6.1	-.2	.97	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L242	*	42.4	61.0	3.6	-2.3	1.10	11T	BURSTING STRENGTH 40 - 100 PSI, L*W,MANUAL CLAMP
L290	*	47.6	64.8	9.4	-5.0	.96	11A	BURSTING STRENGTH 40 - 100 PSI, PERKINS A, MANUAL CLAMP
L394	*	50.3	65.8	11.6	-6.8	.55	11B	BURSTING STRENGTH 40 - 100 PSI, PERKINS AH, HYDRAULIC CLAMP
GMEANS:		38.7	59.0			1.00		
		95% ELLIPSE:		7.6	3.2	WITH GAMMA = 60 DEGREES		


BURSTING STRENGTH, HIGH RANGE
SAMPLE B56 = 38.7 PSI
SAMPLE B56 = 267 KILOPASCAL
SAMPLE K30 = 59.0 PSI
SAMPLE K30 = 407 KILOPASCAL
+,X,* NOT IN GRAND MEANS
ANALYSIS T11-1
SAMPLE K30
PSI
KILOPASCAL
SAMPLE B56
PSI
KILOPASCAL

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS

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

LAB CODE	SAMPLE B96 MEAN	HEAT SET OFFSET BOOK 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G01 MEAN	PRINTING 116 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D. = 15 VAR	F	LAB
L100	47.4	.3	.11	.6	.39	86.9	1.5	.36	1.2	.44	15M	6	L100
L103	46.9	-.2	-.07	1.0	.60	84.9	-.5	-.11	2.0	.71	15T	6	L103
L105	47.8	.7	.27	1.3	.82	87.9	2.5	.59	2.0	.74	15T	6	L105
L107	48.3	1.2	.46	2.4	1.48	91.7	6.4	1.50	3.2	1.17	15T	6	L107
L115	45.1	-2.0	-.82	1.8	1.12	81.9	-3.5	-.82	2.7	.97	15C	6	L115
L118	46.1	-1.0	-.42	1.2	.76	84.4	-.9	-.22	2.3	.85	15T	6	L118
L121	43.7	-3.4	-1.39	1.5	.93	82.1	-3.3	-.77	2.0	.72	15T	6	L121
L122	41.5	-5.6	-2.25	1.0	.64	79.7	-5.6	-1.31	2.7	.98	15C	6	L122
L124	46.7	-.4	-.15	1.7	1.07	85.5	.1	.03	2.6	.93	15T	6	L124
L128	46.8	-.3	-.13	1.4	.86	87.0	1.7	.39	1.9	.68	15T	6	L128
L131	50.9	3.8	1.54	2.0	1.23	86.9	1.6	.37	2.8	1.03	15A	6	L131
L134	52.6	5.5	2.21	1.4	.84	93.2	7.9	1.85	2.4	.86	15C	6	L134
L139	48.3	1.2	.49	1.6	.99	84.4	-.9	-.22	1.7	.63	15T	6	L139
L141	46.4	-.7	-.29	1.4	.84	82.3	-3.0	-.71	3.5	1.29	15T	6	L141
L143	45.5	-1.6	-.66	3.5	2.16	81.5	-3.8	-.89	3.5	1.29	15T	6	L143
L145	9.9	-37.2	-14.96	.3	.16	20.0	-65.3	-15.35	.5	.20	15T	#	L145
L148	50.4	3.3	1.32	1.4	.84	89.5	4.1	.97	1.8	.64	15T	6	L148
L150	44.7	-2.4	-.99	1.0	.61	83.5	-1.8	-.43	2.4	.89	15T	6	L150
L151	63.8	16.7	6.71	2.1	1.29	103.1	17.8	4.18	2.1	.77	15C	X	L151
L153	47.1	-.0	-.02	1.2	.72	88.1	2.8	.66	3.0	1.11	15C	6	L153
L157	44.7	-2.4	-.96	1.4	.90	83.9	-1.5	-.35	2.9	1.06	15T	6	L157
L158	47.5	.4	.14	2.2	1.37	82.9	-2.4	-.57	4.1	1.51	15T	6	L158
L159	49.5	2.4	.96	2.7	1.66	79.3	-6.0	-1.42	2.7	.99	15L	*	L159
L162	47.1	-.0	-.02	1.3	.80	88.1	2.8	.66	3.0	1.08	15T	6	L162
L163	44.4	-2.7	-1.09	1.5	.91	82.7	-2.7	-.63	3.6	1.32	15T	6	L163
L166	46.1	-1.0	-.42	1.1	.69	85.7	.4	.09	2.0	.72	15T	6	L166
L167	49.7	2.6	1.05	2.0	1.23	89.7	4.4	1.03	2.3	.82	15C	6	L167
L170	45.9	-1.2	-.50	1.0	.62	78.9	-6.4	-1.51	1.0	.38	15T	6	L170
L173B	48.5	1.4	.54	1.1	.66	86.9	1.5	.36	2.0	.71	15T	6	L173B
L176	47.2	.1	.03	1.3	.79	89.1	3.7	.88	2.9	1.06	15T	6	L176
L182A	48.9	1.8	.70	2.4	1.47	80.2	-5.1	-1.21	5.6	2.05	15A	6	L182A
L182T	50.3	3.2	1.29	1.4	.87	90.2	4.9	1.14	3.1	1.11	15T	6	L182T
L183	46.2	-.9	-.37	1.3	.82	87.2	1.9	.44	2.9	1.04	15T	6	L183
L185	46.4	-.7	-.29	.6	.39	84.9	-.4	-.10	2.7	.99	15T	6	L185
L189	47.1	.0	.01	1.3	.81	89.0	3.7	.86	2.5	.91	15T	6	L189
L190C	46.7	-.4	-.18	1.2	.73	81.7	-3.7	-.86	2.7	.97	15T	6	L190C
L191	46.3	-.8	-.34	2.0	1.23	82.1	-3.2	-.75	3.2	1.19	15T	6	L191
L195	43.6	-3.5	-1.41	1.7	1.07	85.6	.3	.06	2.6	.96	15C	6	L195
L206	47.3	.2	.09	1.3	.80	87.3	1.9	.45	3.1	1.12	15T	6	L206
L207	49.6	2.5	1.02	1.5	.92	86.9	1.6	.37	2.2	.80	15R	6	L207
L211	46.1	-1.0	-.40	2.2	1.35	81.2	-4.1	-.97	1.9	.68	15R	6	L211
L212	46.8	-.3	-.13	1.8	1.11	87.7	2.4	.56	5.3	1.95	15T	6	L212
L213	49.7	2.6	1.05	1.5	.93	80.5	-4.8	-1.13	2.1	.75	15T	6	L213
L217	48.4	1.3	.53	3.1	1.90	87.5	2.2	.51	4.7	1.71	15T	6	L217
L223	48.6	1.5	.61	1.1	.67	88.0	2.7	.63	2.4	.87	15R	6	L223
L226C	45.6	-1.5	-.61	2.3	1.44	84.3	-1.0	-.23	2.1	.78	15T	6	L226C
L228	45.6	-1.5	-.61	2.2	1.35	81.8	-3.5	-.83	2.7	.98	15T	6	L228
L230	43.6	-3.5	-1.41	1.3	.83	80.6	-4.8	-1.12	4.1	1.49	15R	6	L230
L232	46.0	-1.1	-.45	2.0	1.25	86.0	.7	.15	2.1	.78	15T	6	L232
L233	46.7	-.4	-.15	1.2	.72	87.3	2.0	.47	2.0	.74	15T	6	L233
L236	50.9	3.8	1.51	1.6	.97	88.7	3.3	.78	4.4	1.61	15T	6	L236
L237A	46.3	-.8	-.32	1.0	.61	86.2	.9	.20	1.5	.54	15T	6	L237A
L237B	48.1	1.0	.41	1.2	.74	89.9	4.5	1.06	1.6	.57	15T	6	L237B
L238A	44.5	-2.6	-1.04	1.5	.91	82.1	-3.2	-.75	2.7	.97	15T	6	L238A
L241	46.8	-.3	-.13	.9	.59	90.7	5.3	1.25	1.2	.45	15T	6	L241
L242	48.2	1.1	.44	1.4	.88	88.3	2.9	.69	1.8	.67	15U	6	L242
L243	47.1	-.0	-.02	1.8	1.09	85.1	-.2	-.05	2.9	1.04	15T	6	L243
L244	47.9	.8	.33	1.8	1.09	91.1	5.7	1.35	1.9	.68	15C	6	L244
L248	49.2	2.0	.82	1.2	.73	86.7	1.4	.32	2.3	.86	15J	6	L248
L249	46.7	-.4	-.18	3.1	1.92	80.7	-4.7	-1.10	4.0	1.47	15T	6	L249
L254	47.1	-.0	-.02	1.3	.80	89.1	3.7	.88	3.8	1.38	15T	6	L254
L255	46.5	-.6	-.23	.7	.46	83.1	-2.2	-.52	2.4	.86	15T	6	L255
L257A	48.3	1.2	.46	1.3	.80	78.9	-6.4	-1.51	2.4	.87	15C	6	L257A
L257B	48.7	1.6	.62	1.6	1.02	78.7	-6.7	-1.57	2.5	.90	15C	*	L257B
L257C	47.6	.5	.19	1.5	.97	79.1	-6.3	-1.47	2.4	.87	15C	6	L257C

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS

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

	SAMPLE	HEAT SET OFFSET BOOK				SAMPLE	PRINTING				TEST D.* 15		
LAB	B96	91 GRAMS PER SQUARE METER				G01	116 GRAMS PER SQUARE METER						
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L259	51.7	4.6	1.86	2.2	1.34	78.8	-6.5	-1.54	3.5	1.29	1ST	X	L259
L261	45.0	-2.1	-.85	1.2	.74	83.2	-2.1	-.50	1.9	.68	1ST	O	L261
L262	46.5	-.6	-.23	1.5	.94	87.0	1.7	.39	2.5	.90	1ST	O	L262
L264	47.2	.1	.03	2.7	1.69	81.3	-4.0	-.94	2.9	1.06	1ST	O	L264
L268	44.7	-2.4	-.99	1.4	.90	84.5	-.8	-.19	2.9	1.05	1ST	O	L268
L273	50.8	3.7	1.48	2.9	1.81	91.3	6.0	1.41	2.7	.98	1ST	O	L273
L275	49.3	2.2	.86	1.5	.93	92.4	7.1	1.66	3.0	1.08	1ST	O	L275
L277	40.7	-6.4	-2.59	1.2	.77	74.5	-10.8	-2.54	3.7	1.36	1ST	*	L277
L278	48.0	.9	.36	1.3	.82	86.8	1.5	.34	2.8	1.02	1ST	O	L278
L279	48.6	1.5	.60	2.1	1.31	86.7	1.4	.33	3.0	1.10	1ST	O	L279
L280	46.4	-.7	-.29	1.4	.84	81.4	-3.9	-.93	2.4	.88	15L	O	L280
L281	45.6	-1.5	-.61	1.1	.66	89.0	3.7	.86	2.4	.89	1ST	O	L281
L285	39.3	-7.8	-3.13	2.4	1.46	77.1	-8.3	-1.94	3.1	1.13	1ST	*	L285
L288	48.7	1.6	.65	1.8	1.14	87.2	1.9	.44	3.4	1.26	1ST	O	L288
L290	49.2	2.1	.84	2.2	1.38	86.7	1.4	.33	2.4	.87	1ST	O	L290
L291	50.0	2.9	1.16	1.6	1.03	90.4	5.1	1.19	2.7	.98	15A	O	L291
L299	46.5	-.6	-.23	1.4	.88	86.7	1.3	.31	4.1	1.50	1ST	O	L299
L303	48.4	1.3	.52	2.0	1.24	87.3	2.0	.47	2.6	.96	15L	O	L303
L305	47.2	.1	.03	1.3	.79	95.5	10.1	2.38	1.8	.64	1ST	*	L305
L309	48.3	1.2	.46	1.7	1.04	86.3	.9	.22	2.7	.99	1ST	O	L309
L311	45.3	-1.8	-.74	1.7	1.07	84.5	-.8	-.19	3.8	1.39	1ST	O	L311
L312	48.4	1.3	.52	3.4	2.12	79.2	-6.1	-1.44	3.1	1.13	1ST	O	L312
L321	49.2	2.1	.84	6.5	4.06	93.6	8.3	1.94	15.3	5.58	1ST	O	L321
L324	46.7	-.4	-.15	1.3	.80	81.7	-3.6	-.85	1.8	.65	1ST	O	L324
L328	46.2	-.9	-.37	2.2	1.36	85.4	.1	.01	2.2	.80	1ST	O	L328
L331	43.6	-3.5	-1.41	2.5	1.56	80.3	-5.1	-1.19	2.3	.83	1ST	O	L331
L334	43.7	-3.4	-1.36	1.6	.98	80.8	-4.5	-1.07	2.7	1.00	1ST	O	L334
L344	69.1	22.0	8.83	7.0	4.34	111.9	26.5	6.23	4.0	1.47	15C	#	L344
L345	49.0	1.9	.76	1.3	.82	89.1	3.8	.89	2.7	1.00	1ST	O	L345
L352	52.0	4.9	1.96	1.2	.73	95.8	10.5	2.47	2.3	.82	15C	*	L352
L358	54.9	7.8	3.12	2.0	1.22	95.8	10.5	2.46	1.8	.66	1ST	*	L358
L360	46.8	-.3	-.11	.8	.52	83.9	-1.4	-.33	2.7	.97	1ST	O	L360
L372	47.2	.0	.01	.6	.40	82.3	-3.0	-.71	1.1	.41	1ST	O	L372
L376	45.7	-1.4	-.58	1.8	1.10	85.1	-.3	-.06	2.1	.77	1ST	O	L376
L382	51.4	4.3	1.72	1.6	1.02	92.7	7.3	1.72	4.8	1.75	1ST	O	L382
L388	51.5	4.4	1.78	2.3	1.41	72.3	-13.0	-3.06	2.5	.91	1ST	X	L388
L390	52.1	5.0	2.02	2.1	1.29	96.5	11.1	2.61	3.1	1.13	1ST	*	L390
L396M	49.5	2.4	.95	1.3	.81	82.8	-2.5	-.60	2.5	.90	1ST	O	L396M
L442	49.3	2.2	.86	1.9	1.21	87.2	1.9	.44	2.8	1.01	15R	O	L442
L554	61.0	13.9	5.58	2.5	1.56	88.2	2.9	.67	6.0	2.19	15C	X	L554
L557	43.5	-3.6	-1.47	1.4	.88	84.9	-.4	-.10	3.0	1.10	1ST	O	L557
L558	43.0	-4.1	-1.66	1.0	.62	80.1	-5.3	-1.24	2.4	.89	1ST	O	L558
L559	43.9	-3.2	-1.28	1.0	.60	86.7	1.3	.31	1.6	.58	1ST	O	L559
L562	42.5	-4.6	-1.84	1.2	.74	80.8	-4.5	-1.07	3.6	1.32	1ST	O	L562
L565	44.1	-3.0	-1.20	1.4	.85	78.7	-6.7	-1.57	2.0	.71	1ST	O	L565
L566	45.0	-2.1	-.85	1.1	.67	77.6	-7.7	-1.82	2.0	.74	1ST	O	L566
L567	46.4	-.7	-.29	1.5	.97	85.5	.1	.03	2.6	.93	15C	O	L567
L574	47.2	.1	.03	2.0	1.23	82.4	-2.9	-.69	2.4	.88	1ST	O	L574
L575	47.3	.2	.08	.9	.59	85.1	-.2	-.05	1.3	.49	15L	O	L575
L576	53.2	6.1	2.45	2.7	1.69	93.9	8.5	2.00	2.5	.91	1ST	*	L576
L580	46.7	-.4	-.18	1.2	.73	85.7	.4	.09	1.3	.49	1ST	O	L580
L581	46.4	-.7	-.28	1.6	1.02	85.7	.4	.09	4.4	1.61	15Q	O	L581
L596	11.8	-35.3	-14.21	1.4	.86	21.3	-64.1	-15.06	1.4	.52	1ST	#	L596
L597	46.1	-1.0	-.40	1.4	.88	84.3	-1.1	-.25	2.4	.87	1ST	O	L597
L599	46.7	-.4	-.15	1.6	1.01	89.0	3.7	.86	3.3	1.19	1ST	O	L599
L600	49.9	2.8	1.11	1.4	.85	87.3	2.0	.47	2.7	.98	1ST	O	L600
L604	50.9	3.8	1.54	2.6	1.62	82.1	-3.2	-.75	3.1	1.12	1ST	*	L604
L606	47.7	.6	.22	1.3	.80	86.8	1.5	.34	2.2	.82	1ST	O	L606
L618	46.8	-.3	-.13	1.7	1.03	84.4	-.9	-.22	2.4	.88	1ST	O	L618
L622	70.5	23.4	9.42	3.1	1.91	95.1	9.8	2.30	6.7	2.43	1ST	#	L622
L626	50.1	3.0	1.19	1.4	.90	84.3	-1.0	-.24	3.0	1.08	15L	O	L626
L651	46.4	-.7	-.29	1.4	.84	76.3	-9.1	-2.13	2.5	.91	1ST	*	L651
L652	47.7	.6	.25	2.9	1.79	87.7	2.4	.56	3.8	1.40	15C	#	L652
L654	43.6	-3.5	-1.41	1.5	.96	80.5	-4.8	-1.13	2.4	.88	1ST	O	L654
L670	49.0	1.9	.76	1.3	.78	73.5	-11.8	-2.77	1.8	.64	1ST	X	L670

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS

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

LAB CODE	SAMPLE B96 HEAT SET OFFSET BOOK 91 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE G01 PRINTING 116 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	VAR	P	LAB	TEST D.F. 15
L676	46.4	-.7	-.29	1.7	1.05	81.5	-3.8	-.89	2.5	.90	15T	G	L676	
L679	48.9	1.8	.73	1.2	.76	87.4	2.1	.48	2.4	.89	15T	G	L679	
L680	45.9	-1.2	-.50	1.6	1.00	85.1	-.3	-.06	2.6	.95	15T	G	L680	
L684	45.1	-2.0	-.82	1.0	.64	86.9	1.6	.37	1.3	.47	15L	G	L684	
L685	50.0	2.9	1.16	1.5	.94	86.1	.8	.19	2.2	.80	15T	G	L685	
L692	48.5	1.4	.57	2.4	1.49	85.4	.1	.01	2.5	.91	15T	G	L692	
L696	44.9	-2.2	-.88	2.3	1.40	85.6	.3	.06	2.5	.92	15T	G	L696	
L698	42.2	-4.9	-1.98	1.8	1.13	84.4	-.9	-.22	2.7	.98	15L	G	L698	
GR. MEAN =	47.1 GRAMS					GRAND MEAN =	85.3 GRAMS							TEST DETERMINATIONS = 15
SD MEANS =	2.5 GRAMS					SD OF MEANS =	4.3 GRAMS							128 LABS IN GRAND MEANS
	AVERAGE SDR =			1.6 GRAMS			AVERAGE SDR =			2.7 GRAMS				
GR. MEAN =	462.1 MILLINEWTON					GRAND MEAN =	836.9 MILLINEWTON							
L126	46.7	-.4	-.18	1.6	.99	88.9	3.5	.83	2.7	.97	15V	*	L126	
L225	49.7	2.6	1.05	1.7	1.04	90.9	5.6	1.31	2.3	.82	15V	*	L225	
L226B	49.1	2.0	.81	1.4	.85	88.6	3.3	.77	3.1	1.14	15V	*	L226B	
L250L	55.8	8.7	3.49	1.6	1.00	93.0	7.7	1.80	2.4	.88	15H	*	L250L	
L610	63.9	16.8	6.74	19.9	12.42	66.3	-19.1	-4.48	21.9	7.97	15E	*	L610	
L688	50.9	3.8	1.54	2.6	1.62	92.1	6.8	1.60	3.0	1.08	15V	*	L688	
L697	44.2	-2.9	-1.17	1.3	.82	86.3	1.0	.24	3.0	1.09	15X	*	L697	

TOTAL NUMBER OF LABORATORIES REPORTING = 145

Best values: B96 47 ± 4 grams
G01 85 ± 7 grams

The following laboratories were omitted from the grand means because of extreme test results: 344, 622.

Data from the following laboratories appear to be off by a multiplicative factor: 145, 596.

Data from the following laboratories were omitted from the grand means because the tests were performed in ambient conditions: 652.

Data from the following laboratories appeared to be off by a multiplicative factor: 126, 225, 226B, 688. Code 15V was assigned temporarily to put in a factor of 2.

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

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS

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

LAB CODE	F	MEANS B96	G01	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L145	#	9.9	20.0	-74.8	7.8	.18	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L596	#	11.8	21.3	-72.9	6.6	.69	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L285	*	39.3	77.1	-10.7	3.8	1.30	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L277	*	40.7	74.5	-12.5	1.6	1.07	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L122	6	41.5	79.7	-7.4	2.9	.81	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L698	6	42.2	84.4	-2.8	4.1	1.06	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L562	6	42.5	80.8	-6.0	2.4	1.03	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L558	6	43.0	80.1	-6.5	1.7	.76	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L557	6	43.5	84.9	-1.8	3.2	.99	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L654	6	43.6	80.5	-5.8	1.3	.92	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L331	6	43.6	80.3	-6.1	1.2	1.20	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L195	6	43.6	85.6	-1.2	3.3	1.02	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L230	6	43.6	80.6	-5.8	1.3	1.16	15R	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,DIGITAL READOUT
L121	6	43.7	82.1	-4.4	1.8	.83	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L334	6	43.7	80.8	-5.5	1.3	.99	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L559	6	43.9	86.7	-.1	3.4	.59	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L565	6	44.1	78.7	-7.3	.1	.78	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L697	*	44.2	86.3	-.2	3.1	.95	15X	TEARING STRENGTH, STANDARD: GIVE INSTRUMENT MAKE,MODEL
L163	6	44.4	82.7	-3.5	1.4	1.11	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L238A	6	44.5	82.1	-4.0	1.1	.94	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L150	6	44.7	83.5	-2.6	1.5	.75	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L268	6	44.7	84.5	-1.7	1.9	.98	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L157	6	44.7	83.9	-2.3	1.6	.98	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L696	6	44.9	85.6	-.6	2.1	1.16	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L566	6	45.0	77.6	-7.9	-1.2	.70	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L261	6	45.0	83.2	-2.8	1.1	.71	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L684	6	45.1	86.9	.6	2.5	.56	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L115	6	45.1	81.9	-4.0	.5	1.05	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L311	6	45.3	84.5	-1.5	1.4	1.23	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L143	6	45.5	81.5	-4.2	-.0	1.73	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L281	6	45.6	89.0	2.7	2.9	.78	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L228	6	45.6	81.8	-3.9	-.0	1.16	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L226C	6	45.6	84.3	-1.5	1.0	1.11	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L376	6	45.7	85.1	-.8	1.2	.94	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L68C	6	45.9	85.1	-.8	1.0	.97	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L170	6	45.9	78.9	-6.4	-1.4	.50	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L232	6	46.0	86.0	.2	1.3	1.01	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L118	6	46.1	84.4	-1.3	.6	.81	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L166	6	46.1	85.7	-.1	1.1	.70	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L597	6	46.1	84.3	-1.4	.5	.87	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L211	6	46.1	81.2	-4.2	-.8	1.01	15R	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,DIGITAL READOUT
L328	6	46.2	85.4	-.3	.9	1.08	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L183	6	46.2	87.2	1.3	1.6	.93	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L191	6	46.3	82.1	-3.3	-.5	1.21	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L237A	6	46.3	86.2	.5	1.1	.57	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L676	6	46.4	81.5	-3.8	-.9	.98	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L651	*	46.4	76.3	-8.6	-3.0	.88	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L567	6	46.4	85.5	-.2	.7	.95	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L141	6	46.4	82.3	-3.0	-.6	1.07	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L185	6	46.4	84.9	-.7	.5	.69	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L280	6	46.4	81.4	-3.9	-.9	.86	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L581	6	46.4	85.7	.1	.8	1.32	15Q	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,AIR CLAMP,DIGITL
L299	6	46.5	86.7	1.0	1.1	1.19	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L262	6	46.5	87.0	1.3	1.2	.92	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L255	6	46.5	83.1	-2.3	-.4	.66	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L126	*	46.7	88.9	3.0	1.8	.98	15V	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)X2
L580	6	46.7	85.7	.2	.6	.61	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L190C	6	46.7	81.7	-3.5	-1.1	.85	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L249	6	46.7	80.7	-4.5	-1.5	1.70	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L599	6	46.7	89.0	3.2	1.8	1.10	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L124	6	46.7	85.5	-.0	.4	1.00	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L233	6	46.7	87.3	1.7	1.2	.73	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L324	6	46.7	81.7	-3.5	-1.1	.73	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L128	6	46.8	87.0	1.4	1.0	.77	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L618	6	46.8	84.4	-1.0	-.1	.96	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS

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

LAB CODE	F	MEANS B96	MEANS G01	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L241	6	46.8	90.7	4.7	2.4	.52	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L212	6	46.8	87.7	2.1	1.3	1.53	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L360	6	46.8	83.9	-1.4	-.3	.75	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L103	6	46.9	84.9	-.5	-.0	.66	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L162	6	47.1	88.1	2.5	1.2	.94	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L243	6	47.1	85.1	-.2	-.0	1.07	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L254	6	47.1	89.1	3.4	1.5	1.09	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L153	6	47.1	88.1	2.5	1.2	.92	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L189	6	47.1	89.0	3.4	1.5	.86	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L372	6	47.2	82.3	-2.7	-1.2	.40	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L264	6	47.2	81.3	-3.6	-1.7	1.37	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L574	6	47.2	82.4	-2.7	-1.3	1.05	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L176	6	47.2	89.1	3.4	1.4	.93	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L305	*	47.2	95.5	9.3	4.0	.72	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L575	6	47.3	85.1	-.1	-.3	.54	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L206	6	47.3	87.3	1.8	.6	.96	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L100	6	47.4	86.9	1.5	.4	.42	15M	TEARING STRENGTH, STANDARD, T.M.MIRFIELD(APPITA-ELMENDORF)
L158	6	47.5	82.9	-2.1	-1.3	1.44	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L257C	6	47.6	79.1	-5.6	-3.0	.92	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L606	6	47.7	86.8	1.6	.1	.81	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L652	#	47.7	87.7	2.4	.4	1.59	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L105	6	47.8	87.9	2.6	.4	.78	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L244	6	47.9	91.1	5.6	1.6	.89	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L278	6	48.0	86.8	1.7	-.2	.92	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L237B	6	48.1	89.9	4.6	.9	.65	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L242	6	48.2	88.3	3.1	.2	.78	15U	TEARING STRENGTH, STANDARD, AUSTRALIAN 6PT. CO.
L257A	6	48.3	78.9	-5.4	-3.6	.83	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L309	6	48.3	86.3	1.3	-.7	1.01	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L107	6	48.3	91.7	6.3	1.5	1.32	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L139	6	48.3	84.4	-.4	-1.5	.81	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L303	6	48.4	87.3	2.3	-.4	1.10	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L312	6	48.4	79.2	-5.1	-3.6	1.62	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L217	6	48.4	87.5	2.5	-.3	1.81	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L173B	6	48.5	86.9	1.9	-.6	.69	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L692	6	48.5	85.4	.6	-1.3	1.20	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L279	6	48.6	86.7	1.9	-.8	1.20	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L223	6	48.6	88.0	3.1	-.3	.77	15R	TEARING STRENGTH, STANDARD, THWING-ELMENDORF,DIGITAL READOUT
L257B	*	48.7	78.7	-5.5	-4.1	.96	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L288	6	48.7	87.2	2.4	-.7	1.20	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L182A	6	48.9	80.2	-4.0	-3.7	1.76	15A	TEARING STRENGTH, STANDARD, APPITA
L679	6	48.9	87.4	2.6	-.8	.83	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L345	6	49.0	89.1	4.2	-.2	.91	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L670	X	49.0	73.5	-10.1	-6.5	.71	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L226B	+	49.1	88.6	3.8	-.5	.99	15V	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)X2
L248	6	49.2	86.7	2.1	-1.3	.79	15J	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L321	6	49.2	93.6	8.4	1.4	4.82	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L290	6	49.2	86.7	2.1	-1.3	1.12	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L275	6	49.3	92.4	7.3	.9	1.01	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L442	6	49.3	87.2	2.6	-1.2	1.11	15R	TEARING STRENGTH, STANDARD, THWING-ELMENDORF,DIGITAL READOUT
L396M	6	49.5	82.8	-1.4	-3.2	.85	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L159	*	49.5	79.3	-4.6	-4.6	1.32	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L207	6	49.6	86.9	2.4	-1.7	.86	15R	TEARING STRENGTH, STANDARD, THWING-ELMENDORF,DIGITAL READOUT
L225	+	49.7	90.9	6.2	-.2	.93	15V	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)X2
L167	6	49.7	89.7	5.1	-.6	1.03	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L213	6	49.7	80.5	-3.4	-4.3	.84	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L600	6	49.9	87.3	2.9	-1.7	.91	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L685	6	50.0	86.1	1.9	-2.3	.87	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L291	6	50.0	90.4	5.8	-.6	1.00	15A	TEARING STRENGTH, STANDARD, APPITA
L626	6	50.1	84.3	.3	-3.1	.99	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L182T	6	50.3	90.2	5.7	-1.0	.99	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L148	6	50.4	89.5	5.1	-1.3	.74	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L273	6	50.8	91.3	7.0	-1.0	1.40	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L236	6	50.9	88.7	4.6	-2.1	1.29	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L688	+	50.9	92.1	7.8	-.8	1.35	15V	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)X2
L131	6	50.9	86.9	3.0	-2.9	1.13	15A	TEARING STRENGTH, STANDARD, APPITA

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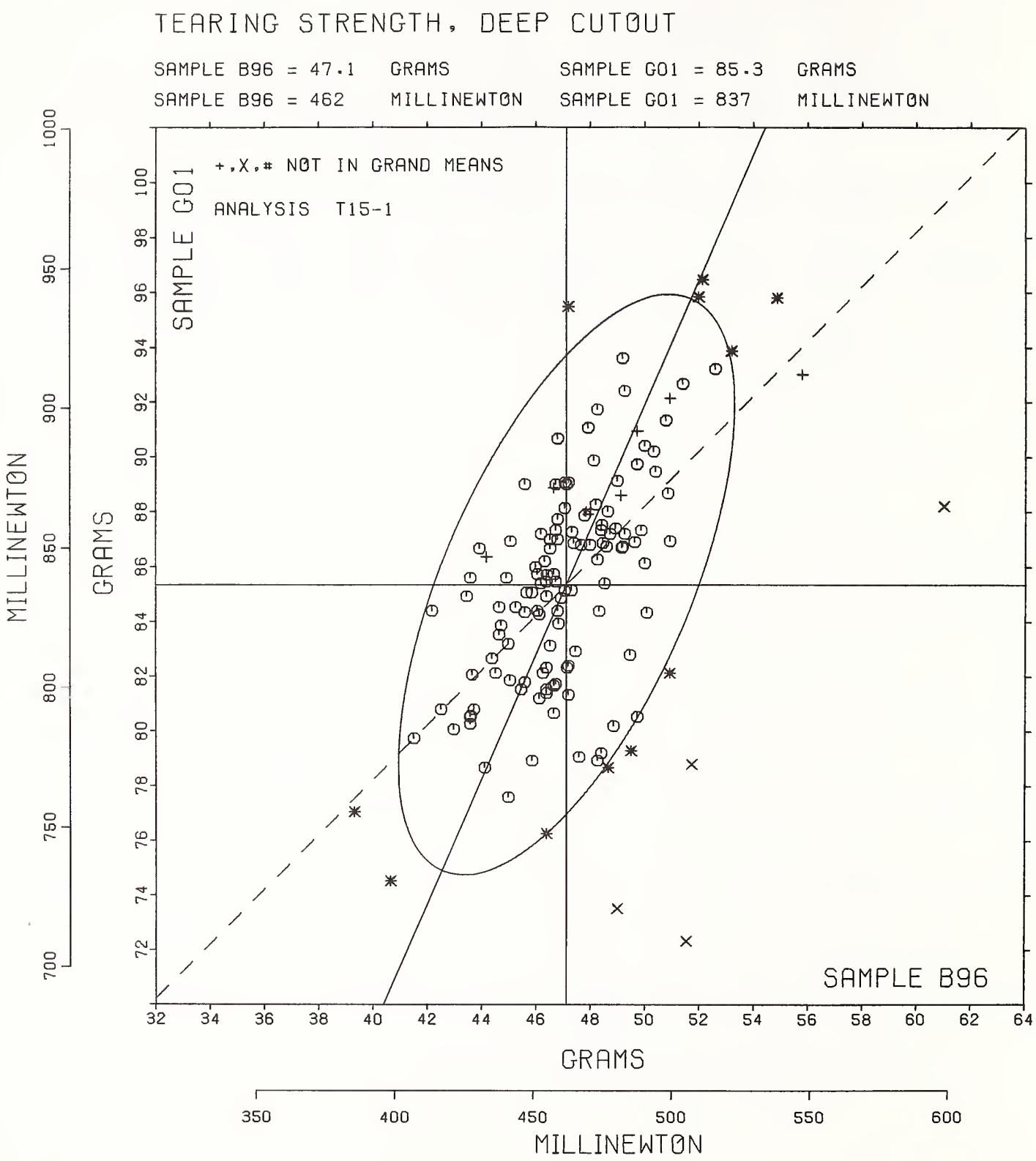
ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS

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

LAB CODE	F	MEANS B96	G01	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L604	*	50.9	82.1	-1.4	-4.8	1.37	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L382	O	51.4	92.7	8.4	-1.0	1.39	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L388	X	51.5	72.3	-10.1	-9.3	1.16	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L259	X	51.7	78.8	-4.1	-6.9	1.32	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L352	*	52.0	95.8	11.6	-.2	.78	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L390	*	52.1	96.5	12.2	-.1	1.21	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L134	O	52.6	93.2	9.4	-1.9	.85	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L576	*	53.2	93.9	10.3	-2.1	1.30	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L358	*	54.9	95.8	12.7	-2.9	.94	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L250L	*	55.8	93.0	10.5	-4.9	.94	15H	TEARING STRENGTH, STANDARD, LHOMARGY, 20 C, 65% RH
L554	X	61.0	88.2	8.2	-11.6	1.88	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L151	X	63.8	103.1	23.0	-8.1	1.03	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L610	*	63.9	66.3	-10.7	-23.0	10.20	15E	TEARING STRENGTH, STANDARD, THWING-ELMENDORF, AMBIENT COND.
L344	#	69.1	111.9	33.1	-9.4	2.91	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L622	#	70.5	95.1	18.4	-17.5	2.17	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
GMEANS:		47.1	85.3			1.00		
		95% ELLIPSE:		11.4	4.5	WITH GAMMA = 66 DEGREES		


TEARING STRENGTH, DEEP CUTOUT
SAMPLE B96 = 47.1 GRAMS
SAMPLE B96 = 462 MILLINEWTON
SAMPLE G01 = 85.3 GRAMS
SAMPLE G01 = 837 MILLINEWTON
+,X,# NOT IN GRAND MEANS
ANALYSIS T15-1
SAMPLE G01
GRAMS
MILLINEWTON
SAMPLE B96
GRAMS
MILLINEWTON

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ANALYSIS T17-1 TABLE 1

TEARING STRENGTH, GRAMS

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

LAB CODE	SAMPLE K49 MEAN	PRINTING 105 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE K20 MEAN	KRAFT 123 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 15 VAR	F	LAB
L122	113.7	-3.1	-.44	4.8	.85	138.5	-4.6	-.51	7.3	1.08	17N	O	L122
L148	124.1	7.3	1.05	4.8	.84	156.5	13.4	1.51	5.2	.77	17N	O	L148
L231	119.7	2.9	.42	2.8	.49	150.5	7.4	.83	5.9	.86	17N	O	L231
L267	126.4	9.6	1.37	5.4	.95	152.3	9.2	1.03	9.1	1.34	17N	O	L267
L269	120.8	4.0	.57	5.5	.96	147.5	4.4	.49	7.8	1.15	17N	O	L269
L301A	111.1	-5.7	-.82	4.2	.74	145.5	2.4	.26	7.8	1.15	17N	O	L301A
L301B	109.6	-7.2	-1.03	7.5	1.31	139.9	-3.2	-.36	5.0	.74	17N	O	L301B
L308	126.8	10.0	1.43	10.8	1.89	148.4	5.3	.59	7.5	1.10	17N	O	L308
L326	110.3	-6.5	-.94	5.5	.97	132.7	-10.4	-1.17	5.0	.73	17N	O	L326
L339	108.3	-8.5	-1.22	4.9	.86	131.5	-11.6	-1.30	6.0	.89	17N	O	L339
L341	122.7	5.9	.84	2.7	.47	180.4	37.3	4.18	5.4	.79	17N	#	L341
L393	114.1	-2.7	-.38	6.6	1.15	130.9	-12.2	-1.36	8.1	1.19	17N	O	L393
GR. MEAN = 116.8 GRAMS						GRAND MEAN = 143.1 GRAMS					TEST DETERMINATIONS = 15		
SD MEANS = 7.0 GRAMS						SD OF MEANS = 8.9 GRAMS					11 LABS IN GRAND MEANS		
			AVERAGE SDR =	5.7 GRAMS				AVERAGE SDR =	6.8 GRAMS				
GR. MEAN =1145.5 MILLINEWTON						GRAND MEAN =1403.4 MILLINEWTON							
L106	130.9	14.1	2.02	4.4	.77	163.2	20.1	2.25	2.9	.43	17V	*	L106
L234	117.6	.8	.11	6.2	1.09	152.3	9.2	1.03	6.8	1.01	17V	*	L234

TOTAL NUMBER OF LABORATORIES REPORTING = 14

Best values: K49 116 grams
K20 144 grams

The following laboratories were omitted from the grand means because of extreme test results: 341.

Data from the following laboratories appeared to be off by a multiplicative factor: 106, 234. Code 17V was assigned temporarily to put in a factor of 2.

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

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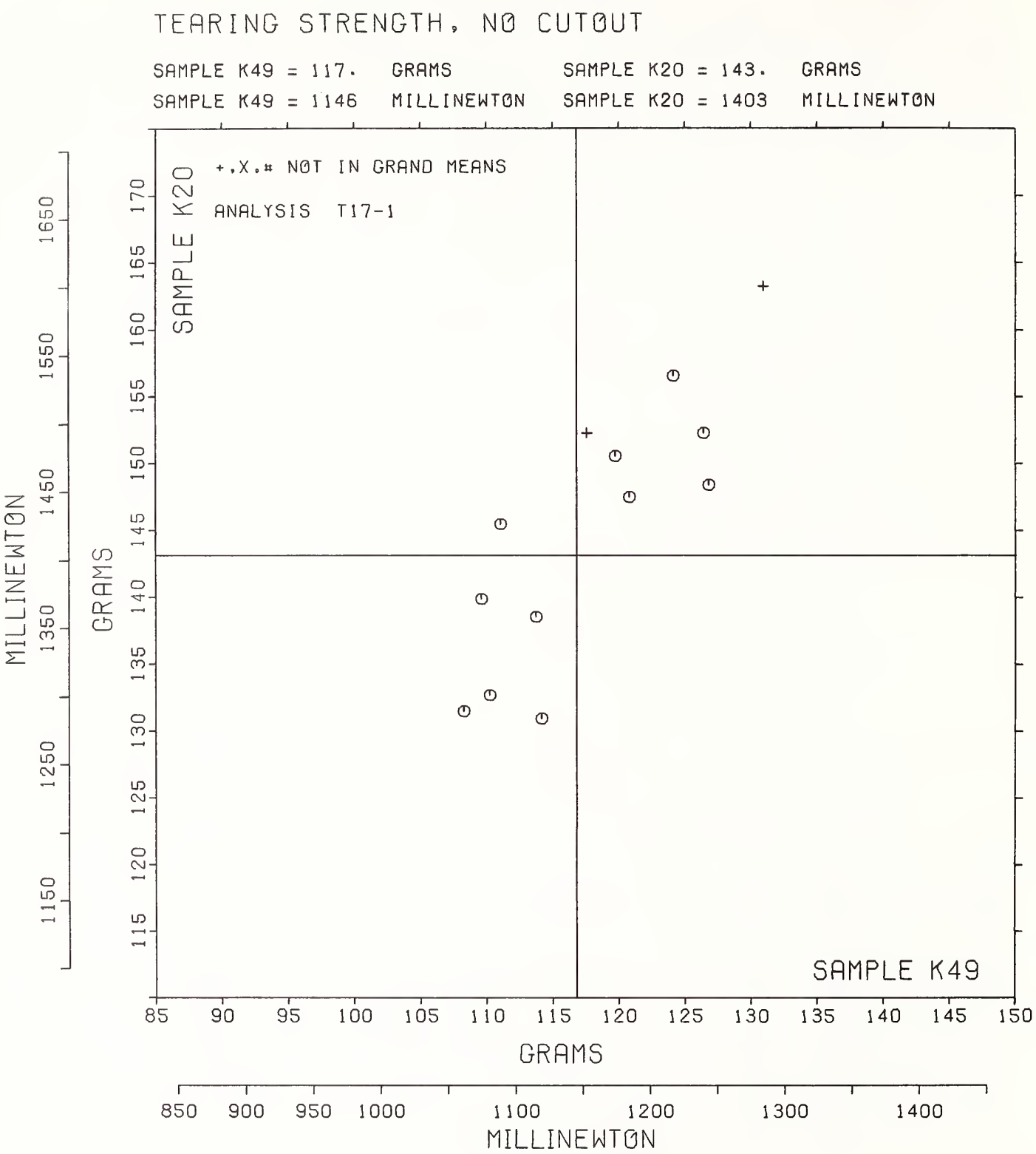
ANALYSIS T17-1 TABLE 2

TEARING STRENGTH, GRAMS

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

LAB CODE	F	MEANS K49	K20	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L339	O	108.3	131.5	-14.4	-.0	.87	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L301B	O	109.6	139.9	-6.9	3.9	1.03	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L326	O	110.3	132.7	-12.3	-.9	.85	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L301A	O	111.1	145.5	-1.5	6.0	.94	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L122	O	113.7	138.5	-5.5	-.2	.96	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L393	O	114.1	130.9	-11.4	-5.1	1.17	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L234	*	117.6	152.3	7.8	4.8	1.05	17V	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF(MULT BY 2)
L231	O	119.7	150.5	7.7	2.1	.68	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L269	O	120.8	147.5	5.9	-.6	1.06	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L341	#	122.7	180.4	33.5	17.5	.63	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L148	O	124.1	156.5	15.2	2.1	.80	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L267	O	126.4	152.3	13.1	-2.3	1.14	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L308	O	126.8	148.4	10.2	-4.9	1.49	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L106	*	130.9	163.2	24.6	.6	.60	17V	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF(MULT BY 2)
GMEANS:		116.8	143.1			1.00		
95% ELLIPSE:				33.2	10.5	WITH GAMMA = 53 DEGREES		


TEARING STRENGTH, NØ CUTØUT
SAMPLE K49 = 117. GRAMS
SAMPLE K49 = 1146 MILLINEWTØN
SAMPLE K20 = 143. GRAMS
SAMPLE K20 = 1403 MILLINEWTØN
+,X,# NØT IN GRAND MEANS
ANALYSIS T17-1
SAMPLE K20
GRAMS
MILLINEWTØN
SAMPLE K49
GRAMS
MILLINEWTØN

ANALYSIS T19-1 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PACKAGING PAPER

TAPPI STANDARDS T404 OS-76 AND T494 OS-70, TENSILE BREAKING STRENGTH, PENDULUM AND CRE TYPES

LAB CODE	SAMPLE J16 149 GRAMS PER SQUARE METER MEAN	PRINTING DEV	N.DEV	SDR	R.SDR	SAMPLE K32 105 GRAMS PER SQUARE METER MEAN	PRINTING DEV	N.DEV	SDR	R.SDR	TEST D.= 20 VAR	F	LAB
L106	8.50	-.29	-.91	.33	1.02	8.29	-.51	-1.79	.47	1.03	19A	O	L106
L107	.90	-7.89	-24.52	.06	.19	.89	-7.91	-27.84	.07	.16	19A	#	L107
L122	8.43	-.37	-1.14	.29	.91	8.52	-.29	-1.01	.43	.94	19A	O	L122
L126	8.49	-.30	-.93	.26	.79	8.75	-.05	-.19	.32	.70	19A	O	L126
L151	8.83	.03	.10	.46	1.42	8.26	-.54	-1.90	.23	.50	19A	*	L151
L153	9.09	.30	.93	.33	1.00	8.98	.18	.62	.58	1.27	19P	O	L153
L157A	9.06	.26	.82	.32	.98	8.76	-.05	-.16	.47	1.04	19P	O	L157A
L157I	8.80	.00	.01	.25	.78	7.64	-1.17	-4.11	.40	.87	19A	X	L157I
L167	9.44	.65	2.01	.28	.87	9.26	.46	1.60	.30	.66	19G	O	L167
L182I	8.38	-.41	-1.27	.29	.89	8.57	-.23	-.81	.36	.78	19D	O	L182I
L182L	8.48	-.32	-.99	.34	1.04	8.57	-.23	-.82	.50	1.09	19T	O	L182L
L207	9.17	.37	1.16	.27	.82	8.71	-.09	-.33	.34	.74	19A	O	L207
L217P	9.09	.30	.92	.42	1.28	8.97	.17	.59	.26	.57	19P	O	L217P
L225	8.90	.10	.31	.24	.73	9.16	.35	1.24	.36	.80	19P	O	L225
L234L	8.62	-.18	-.55	.25	.77	8.60	-.20	-.71	.35	.77	19P	O	L234L
L237A	8.67	-.12	-.39	.31	.96	8.96	.15	.54	.22	.49	19Q	O	L237A
L237B	9.23	.43	1.35	.34	1.06	9.52	.71	2.51	.60	1.32	19A	O	L237B
L238A	8.85	.06	.18	.33	1.02	8.98	.17	.61	.53	1.16	19T	O	L238A
L243	8.48	-.31	-.98	.22	.68	8.69	-.11	-.39	.40	.87	19A	O	L243
L257A	8.92	.13	.39	.21	.65	8.74	-.07	-.23	.30	.65	19P	O	L257A
L257C	8.99	.20	.62	.29	.91	8.69	-.11	-.39	.32	.69	19P	O	L257C
L264A	8.73	-.06	-.19	.30	.94	8.90	.10	.34	.38	.84	19A	O	L264A
L264P	9.08	.28	.88	.33	1.02	9.09	.28	.99	.39	.87	19P	O	L264P
L265	8.66	-.13	-.41	.32	.99	8.71	-.09	-.33	.56	1.23	19A	O	L265
L267	8.47	-.33	-1.02	.36	1.10	8.77	-.04	-.13	.39	.86	19A	O	L267
L268A	9.45	.66	2.04	.33	1.00	9.34	.54	1.89	.58	1.26	19A	O	L268A
L268P	9.04	.25	.76	.22	.67	9.02	.22	.77	.63	1.38	19P	O	L268P
L273	8.75	-.04	-.13	.27	.82	8.78	-.02	-.07	.52	1.14	19P	O	L273
L280	8.25	-.54	-1.69	.30	.91	8.59	-.21	-.75	.46	1.00	19G	O	L280
L281	8.95	.16	.49	.26	.80	8.76	-.05	-.17	.39	.85	19G	O	L281
L305	8.70	-.09	-.29	.17	.51	8.73	-.07	-.26	.27	.58	19V	O	L305
L312	8.55	-.25	-.76	.47	1.46	8.51	-.29	-1.03	.43	.94	19D	O	L312
L324	8.62	-.18	-.55	.23	.72	8.83	.03	.09	.54	1.18	19A	O	L324
L334	9.16	.36	1.13	.30	.92	9.08	.27	.96	.52	1.13	19P	O	L334
L356	8.89	.09	.29	.49	1.50	8.66	-.14	-.49	.72	1.58	19P	O	L356
L562	9.36	.57	1.76	.45	1.38	8.61	-.20	-.70	.51	1.12	19P	*	L562
L565	8.67	-.13	-.40	.21	.66	8.83	.03	.09	.16	.36	19T	O	L565
L568	9.00	.21	.64	.29	.90	8.86	.06	.21	.59	1.30	19P	O	L568
L575	8.47	-.32	-.99	.34	1.05	8.66	-.15	-.52	.58	1.27	19G	O	L575
L576	8.88	.09	.27	.20	.62	8.88	.08	.28	.55	1.21	19A	O	L576
L580	8.74	-.05	-.15	.32	.98	8.36	-.44	-1.55	.43	.94	19G	O	L580
L581	8.96	.16	.51	.41	1.26	9.41	.61	2.14	.45	1.00	19A	O	L581
L582	7.84	-.95	-2.95	.27	.83	8.24	-.56	-1.98	.50	1.10	19A	*	L582
L604	8.32	-.48	-1.48	.78	2.40	7.73	-1.07	-3.77	.96	2.12	19A	X	L604
L606	8.85	.05	.17	.23	.71	8.83	.02	.07	.56	1.24	19P	O	L606
L610	8.42	-.37	-1.15	.32	.99	8.54	-.26	-.91	.46	1.01	19A	O	L610
L622	8.89	.09	.29	.38	1.17	8.75	-.05	-.18	.46	1.01	19O	O	L622
L650	9.01	.22	.67	.36	1.11	9.10	.30	1.06	.49	1.07	19G	O	L650
L652	9.67	.87	2.71	.42	1.29	9.65	.84	2.97	.49	1.07	19A	#	L652
L676	8.83	.04	.11	.68	2.10	9.20	.40	1.39	.61	1.33	19A	O	L676
L684	8.48	-.31	-.96	.89	2.73	8.75	-.05	-.19	.82	1.81	19*	O	L684

GR. MEAN = 8.79 KILONEWTON/M GRAND MEAN = 8.80 KILONEWTON/M TEST DETERMINATIONS = 20

SD MEANS = .32 KILONEWTON/M SD OF MEANS = .28 KILONEWTON/M 47 LABS IN GRAND MEANS

AVERAGE SDR = .32 KILONEWTON/M AVERAGE SDR = .46 KILONEWTON/M

GR. MEAN = 50.22 LB/INCH GRAND MEAN = 50.28 LB/INCH

L250I	7.56	-1.23	-3.82	.23	.71	7.67	-1.13	-3.98	.26	.58	19L	*	L250I

TOTAL NUMBER OF LABORATORIES REPORTING = 52

Best values: J16 8.8 ± 0.5 kilonewtons per meter
K32 8.8 ± 0.5 kilonewtons per meter

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

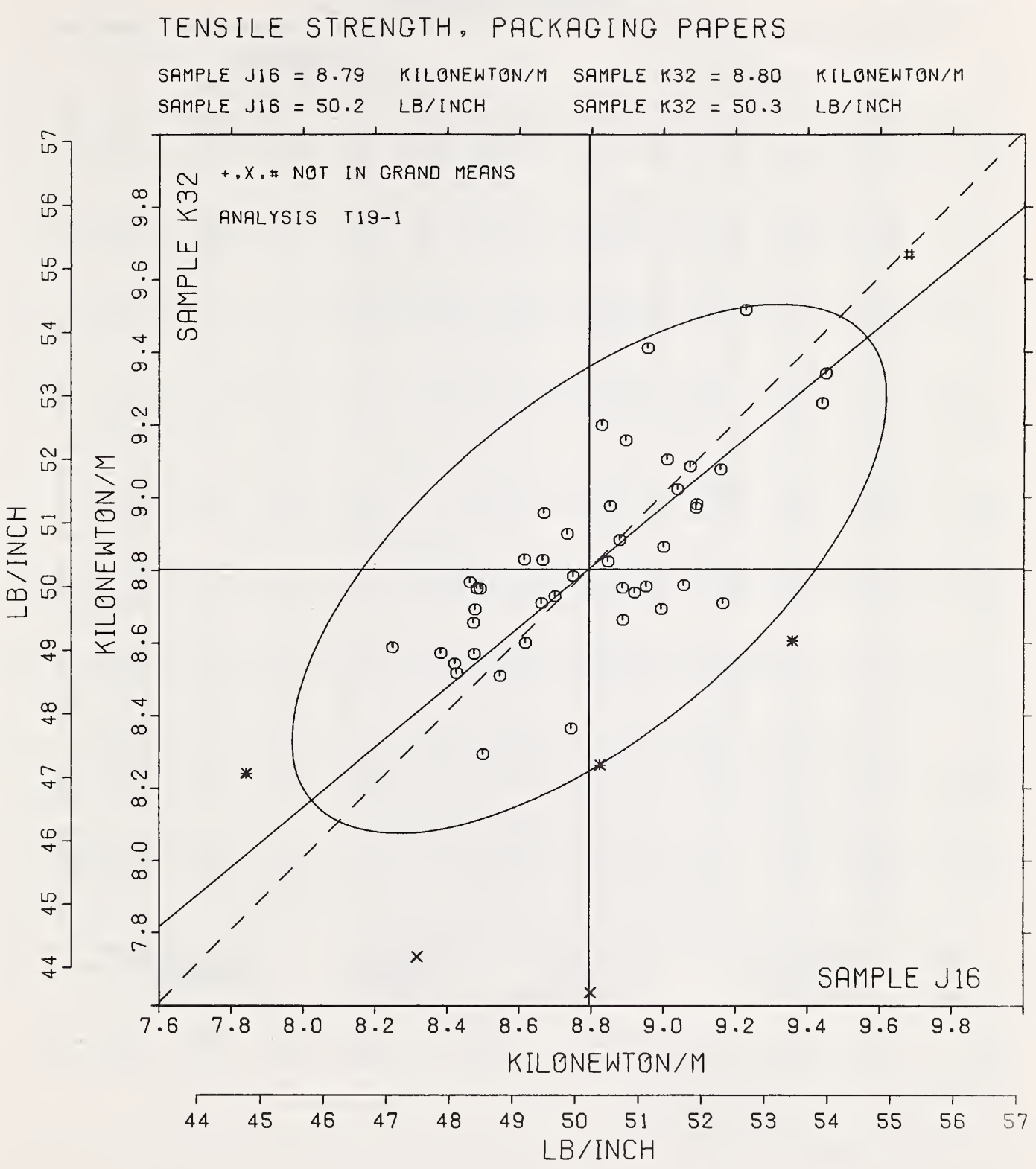
Data from the following laboratories were omitted from the grand means because the tests were performed in ambient conditions: 652.

ANALYSIS T19-1 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PACKAGING PAPER

TAPPI STANDARDS T404 OS-76 AND T494 OS-70, TENSILE BREAKING STRENGTH, PENDULUM AND CRE TYPES

LAB CODE	F	MEANS J16	MEANS K32	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L107	#	.90	.89	-11.12	-1.08	.18	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L250I	+	7.56	7.67	-1.67	-.09	.64	19L	TENSILE STRENGTH, PACKAGING PAPER, CRE, 20 C, 65% RH
L582	#	7.84	8.24	-1.09	.17	.97	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L280	O	8.25	8.59	-.56	.18	.96	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L604	X	8.32	7.73	-1.05	-.52	2.26	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L182I	O	8.38	8.57	-.46	.08	.84	19D	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L610	O	8.42	8.54	-.45	.04	1.00	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L122	O	8.43	8.52	-.46	.01	.92	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L267	O	8.47	8.77	-.28	.18	.98	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L575	O	8.47	8.66	-.34	.09	1.16	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L182L	O	8.48	8.57	-.39	.02	1.06	19T	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L243	O	8.48	8.69	-.31	.11	.78	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L684	O	8.48	8.75	-.27	.16	2.27	19*	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L126	O	8.49	8.75	-.27	.15	.74	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L106	O	8.50	8.29	-.55	-.21	1.02	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L312	O	8.55	8.51	-.38	-.07	1.20	19D	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L324	O	8.62	8.83	-.12	.13	.95	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L234L	O	8.62	8.60	-.26	-.04	.77	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L265	O	8.66	8.71	-.16	.01	1.11	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L565	O	8.67	8.83	-.08	.10	.51	19T	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L237A	O	8.67	8.96	.00	.20	.73	19Q	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L305	O	8.70	8.73	-.12	.00	.55	19V	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L264A	O	8.73	8.90	.02	.11	.89	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L580	O	8.74	8.36	-.32	-.31	.96	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L273	O	8.75	8.78	-.05	.01	.98	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L157I	X	8.80	7.64	-.74	-.90	.83	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L151	#	8.83	8.26	-.32	-.44	.96	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L676	O	8.83	9.20	.28	.28	1.72	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L606	O	8.85	8.83	.05	-.02	.97	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L238A	O	8.85	8.98	.15	.10	1.09	19T	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L576	O	8.88	8.88	.12	.01	.91	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L622	O	8.89	8.75	.04	-.10	1.09	19O	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L356	O	8.89	8.66	-.02	-.17	1.54	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L225	O	8.90	9.16	.30	.21	.77	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L257A	O	8.92	8.74	.06	-.13	.65	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L281	O	8.95	8.76	.09	-.14	.82	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L581	O	8.96	9.41	.51	.36	1.13	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L257C	O	8.99	8.69	.08	-.21	.80	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L568	O	9.00	8.86	.20	-.09	1.10	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L650	O	9.01	9.10	.36	.09	1.09	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L268P	O	9.04	9.02	.33	.01	1.02	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L157A	O	9.06	8.76	.17	-.20	1.01	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L264P	O	9.08	9.09	.40	.04	.94	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L217P	O	9.09	8.97	.34	-.06	.93	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L153	O	9.09	8.98	.34	-.05	1.14	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L334	O	9.16	9.08	.46	-.02	1.02	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L207	O	9.17	8.71	.23	-.31	.78	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L237B	O	9.23	9.52	.79	.27	1.19	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L562	#	9.36	8.61	.31	-.51	1.25	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L167	O	9.44	9.26	.79	-.06	.76	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L268A	O	9.45	9.34	.85	-.00	1.13	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L652	#	9.67	9.65	1.21	.10	1.18	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
GMEANS:		8.79	8.80			1.00		
		95% ELLIPSE:		1.00	.46	WITH GAMMA = 39 DEGREES		


TENSILE STRENGTH, PACKAGING PAPERS
SAMPLE J16 = 8.79 KILONEWTON/M SAMPLE K32 = 8.80 KILONEWTON/M
SAMPLE J16 = 50.2 LB/INCH SAMPLE K32 = 50.3 LB/INCH
+,X,# NOT IN GRAND MEANS
ANALYSIS T19-1
SAMPLE K32
KILONEWTON/M
LB/INCH
SAMPLE J16
KILONEWTON/M
LB/INCH

ANALYSIS T20-1 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

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

LAB CODE	SAMPLE K39 PRINTING 75 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE G03 HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.= 20 VAR	F	LAB
L100	4.35	-.54	-1.83	.39	1.63	2.97	-.22	-1.34	.16	1.09	20E	@	L100
L105	4.75	-.14	-.48	.55	2.34	3.22	.03	.16	.14	.93	20A	@	L105
L115	4.86	-.03	-.12	.15	.64	3.13	-.06	-.37	.15	1.03	20D	@	L115
L118	4.89	-.00	-.01	.21	.87	3.12	-.07	-.42	.11	.77	20A	@	L118
L122	4.89	-.01	-.02	.18	.75	3.13	-.07	-.39	.14	.94	20A	@	L122
L124C	4.27	-.62	-2.10	.55	2.32	3.11	-.09	-.52	.12	.82	20A	*	L124C
L125	5.02	.13	.43	.31	1.29	3.22	.03	.18	.14	.96	20C	@	L125
L131	4.98	.09	.29	.26	1.09	3.20	.01	.07	.21	1.41	20E	@	L131
L141T	5.02	.13	.44	.30	1.26	3.19	-.00	-.00	.14	.97	20A	@	L141T
L143	5.55	.66	2.25	.23	.99	3.64	.45	2.66	.14	.95	20E	*	L143
L148	4.86	-.03	-.11	.18	.75	2.98	-.22	-1.29	.11	.77	20A	@	L148
L159	4.83	-.06	-.22	.22	.93	3.10	-.10	-.57	.17	1.17	20A	@	L159
L163	5.08	.19	.64	.26	1.08	3.27	.08	.45	.15	1.01	20D	@	L163
L167	5.56	.67	2.29	.18	.74	3.59	.40	2.39	.11	.75	20G	@	L167
L185	4.97	.08	.27	.20	.85	3.25	.05	.33	.12	.82	20C	@	L185
L223B	4.99	.10	.33	.18	.78	3.10	-.09	-.56	.23	1.56	20A	@	L223B
L226C	4.57	-.32	-1.08	.33	1.40	3.08	-.11	-.66	.22	1.54	20C	@	L226C
L230	4.98	.09	.32	.14	.58	3.24	.04	.26	.12	.81	20G	@	L230
L243	4.89	-.01	-.02	.19	.81	3.15	-.05	-.27	.11	.75	20A	@	L243
L255	5.15	.26	.90	.24	1.00	3.24	.05	.29	.13	.92	20A	@	L255
L260	4.90	.01	.03	.17	.72	3.20	.01	.04	.10	.67	20A	@	L260
L261	5.15	.26	.88	.27	1.15	3.37	.17	1.03	.20	1.35	20A	@	L261
L278	5.09	.20	.69	.21	.89	3.30	.11	.65	.15	1.04	20A	@	L278
L291	4.74	-.15	-.53	.15	.64	2.98	-.21	-1.25	.19	1.29	20A	@	L291
L309	4.27	-.62	-2.10	.27	1.14	2.98	-.21	-1.24	.17	1.14	20E	@	L309
L325	4.99	.10	.34	.23	.96	3.05	-.15	-.87	.17	1.14	20E	@	L325
L328	4.87	-.02	-.06	.20	.85	3.07	-.12	-.72	.22	1.48	20A	@	L328
L331	5.13	.24	.81	.33	1.39	3.51	.32	1.90	.20	1.35	20A	@	L331
L333	5.06	.16	.56	.24	1.00	3.27	.07	.43	.11	.76	20A	@	L333
L344	5.06	.17	.59	.31	1.31	3.24	.05	.29	.11	.73	20A	@	L344
L352	4.06	-.83	-2.83	.39	1.66	2.85	-.35	-2.06	.14	.98	20A	*	L352
L356	4.78	-.12	-.39	.32	1.36	3.16	-.04	-.22	.15	1.04	20A	@	L356
L360	4.92	.03	.11	.25	1.06	3.30	.11	.66	.15	1.04	20B	@	L360
L390	4.96	.07	.22	.30	1.28	3.24	.05	.28	.16	1.09	20A	@	L390
L442	4.90	.01	.03	.10	.43	3.27	.08	.45	.11	.74	20G	@	L442
L557	4.89	-.00	-.00	.21	.87	3.23	.04	.22	.09	.61	20A	@	L557
L558	.94	-3.95	-13.43	.03	.14	.67	-2.52	-15.03	.03	.23	20A	#	L558
L559	5.13	.24	.82	.11	.48	3.25	.06	.35	.11	.72	20A	@	L559
L563A	4.28	-.61	-2.08	.36	1.52	2.76	-.44	-2.60	.19	1.29	20A	*	L563A
L563B	1.94	-2.95	-10.04	.38	1.60	1.49	-1.70	-10.14	.07	.45	20A	#	L563B
L567	4.86	-.03	-.09	.15	.64	3.15	-.05	-.28	.13	.88	20A	@	L567
L574	4.94	.05	.17	.19	.82	3.27	.08	.48	.14	.96	20A	@	L574
L575L	4.99	.10	.33	.23	.98	3.17	-.02	-.14	.10	.70	20G	@	L575L
L592	4.83	-.06	-.21	.16	.66	3.22	.03	.17	.11	.72	20A	@	L592
L618	4.82	-.07	-.25	.34	1.44	3.31	.12	.69	.23	1.56	20A	@	L618
L698	5.13	.24	.83	.27	1.15	3.42	.23	1.34	.11	.78	20E	@	L698

GR. MEAN = 4.89 KILONEWTON/M — GRAND MEAN = 3.19 KILONEWTON/M — TEST DETERMINATIONS = 20

SD MEANS = .29 KILONEWTON/M — SD OF MEANS = .17 KILONEWTON/M — 44 LABS IN GRAND MEANS

AVERAGE SDR = .24 KILONEWTON/M — AVERAGE SDR = .15 KILONEWTON/M

GR. MEAN =16.496 LB/15 MM — GRAND MEAN =10.770 LB/15 MM

L139	5.02	.13	.45	.24	1.02	3.25	.06	.36	.13	.91	20H	*	L139
L211	13.94	9.05	30.78	1.26	5.30	9.87	6.67	39.75	.94	6.43	20I	*	L211
L250I	4.33	-.56	-1.91	.14	.60	2.69	-.50	-2.98	.09	.61	20L	*	L250I

TOTAL NUMBER OF LABORATORIES REPORTING = 49

Best values: K39 4.9 ± 0.6 kilonewton per meter
G03 3.2 ± 0.3 kilonewton per meter

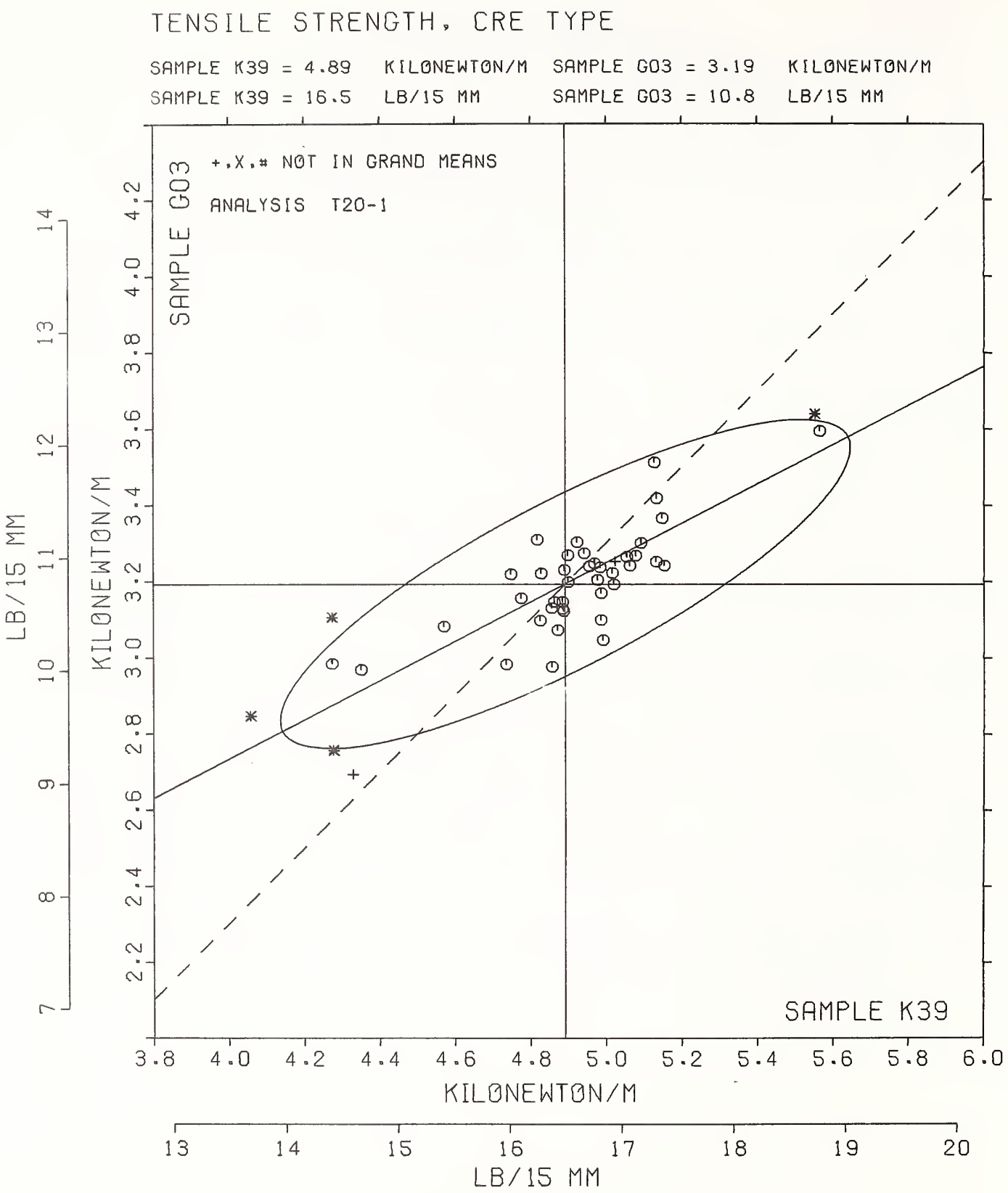
Data from the following laboratories appear to be off by a multiplicative factor: 558, 563B.

ANALYSIS T20-1 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

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

LAB CODE	F	MEANS K39	G03	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L558	#	.94	.67	-4.67	-.43	.19	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L563B	#	1.94	1.49	-3.40	-.16	1.03	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L352	*	4.06	2.85	-.90	.07	1.32	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L124C	*	4.27	3.11	-.59	.21	1.57	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L309	O	4.27	2.98	-.64	.10	1.14	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L563A	*	4.28	2.76	-.74	-.11	1.40	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L250I	+	4.33	2.69	-.73	-.19	.61	20L	TENSILE STRENGTH, PRINTING PAPER, CRE, 20 C, 65% RH
L100	O	4.35	2.97	-.58	.05	1.36	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L226C	O	4.57	3.08	-.33	.05	1.47	20C	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L291	O	4.74	2.98	-.23	-.12	.97	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L105	O	4.75	3.22	-.11	.09	1.63	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L356	O	4.78	3.16	-.12	.02	1.20	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L618	O	4.82	3.31	-.01	.14	1.50	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L159	O	4.83	3.10	-.10	-.06	1.05	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L592	O	4.83	3.22	-.04	.05	.69	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L115	O	4.86	3.13	-.06	-.04	.84	20D	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L148	O	4.86	2.98	-.13	-.18	.76	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L567	O	4.86	3.15	-.05	-.03	.76	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L328	O	4.87	3.07	-.07	-.10	1.17	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L243	O	4.89	3.15	-.03	-.04	.78	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L122	O	4.89	3.13	-.03	-.06	.85	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L118	O	4.89	3.12	-.04	-.06	.82	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L557	O	4.89	3.23	.02	.03	.74	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L442	O	4.90	3.27	.04	.06	.58	20G	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L260	O	4.90	3.20	.01	.00	.69	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L360	O	4.92	3.30	.08	.08	1.05	20B	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L574	O	4.94	3.27	.08	.05	.89	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L390	O	4.96	3.24	.08	.01	1.19	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L185	O	4.97	3.25	.09	.01	.84	20C	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L131	O	4.98	3.20	.08	-.03	1.25	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L230	O	4.98	3.24	.10	-.00	.70	20G	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L223B	O	4.99	3.10	.04	-.13	1.17	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L575L	O	4.99	3.17	.07	-.06	.84	20G	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L325	O	4.99	3.05	.02	-.18	1.05	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L125	O	5.02	3.22	.13	-.03	1.13	20C	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L141T	O	5.02	3.19	.12	-.06	1.11	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L139	+	5.02	3.25	.15	-.01	.96	20H	TENSILE STRENGTH, PRINTING PAPER, CRE, SHORT TEST SPAN
L333	O	5.06	3.27	.18	-.01	.88	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L344	O	5.06	3.24	.18	-.04	1.02	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L163	O	5.08	3.27	.20	-.02	1.04	20D	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L278	O	5.09	3.30	.23	.00	.96	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L331	O	5.13	3.51	.36	.17	1.37	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L559	O	5.13	3.25	.24	-.06	.60	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L698	O	5.13	3.42	.32	.09	.96	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L261	O	5.15	3.37	.31	.04	1.25	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L255	O	5.15	3.24	.26	-.08	.96	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L143	*	5.55	3.64	.79	.09	.97	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L167	O	5.56	3.59	.78	.05	.75	20G	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L211	+	13.94	9.87	11.10	1.78	5.86	20I	TENSILE STRENGTH, PRINTING PAPER, CRE, 20 C, 65% RH
GMEANS:		4.89	3.19			1.00		
		95% ELLIPSE:		.84	.22	WITH GAMMA = 27 DEGREES		


TENSILE STRENGTH, CRE TYPE
SAMPLE K39 = 4.89 KILONEWTON/M SAMPLE G03 = 3.19 KILONEWTON/M
SAMPLE K39 = 16.5 LB/15 MM SAMPLE G03 = 10.8 LB/15 MM
+,X,# NOT IN GRAND MEANS
ANALYSIS T20-1
SAMPLE G03
KILONEWTON/M
LB/15 MM
SAMPLE K39
KILONEWTON/M
LB/15 MM

ANALYSIS T20-2 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

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

LAB CODE	SAMPLE K39 MEAN	PRINTING 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G03 MEAN	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 20 VAR	F	LAB
L103	5.00	-.00	-.01	.15	.59	3.29	-.02	-.07	.12	.74	20R	O	L103
L121	5.29	.28	1.03	.26	1.05	3.25	-.05	-.20	.16	.99	20P	*	L121
L124P	4.83	-.18	-.64	.28	1.14	3.29	-.01	-.05	.16	.99	20P	O	L124P
L128	5.00	-.01	-.03	.21	.82	3.32	.01	.05	.14	.86	20T	O	L128
L148	4.88	-.12	-.44	.20	.79	3.19	-.12	-.46	.16	1.00	20P	O	L148
L158	4.33	-.67	-2.43	.18	.70	2.69	-.61	-2.41	.15	.96	20T	O	L158
L162	4.75	-.26	-.93	.23	.93	3.16	-.14	-.57	.16	1.02	20*	O	L162
L182L	4.88	-.12	-.45	.29	1.17	3.13	-.17	-.69	.10	.60	20T	O	L182L
L189	5.13	.12	.44	.23	.92	3.42	.12	.45	.15	.95	20R	O	L189
L191P	5.08	.08	.30	.22	.87	3.32	.01	.05	.11	.69	20P	O	L191P
L195	4.94	-.06	-.22	.32	1.28	3.27	-.04	-.15	.24	1.53	20R	O	L195
L212	4.98	-.02	-.07	.24	.94	3.26	-.05	-.19	.21	1.32	20R	O	L212
L213	4.51	-.49	-1.78	.32	1.30	2.96	-.35	-1.36	.16	1.02	20T	O	L213
L218	5.12	.12	.42	.20	.81	3.21	-.09	-.37	.08	.53	20P	O	L218
L233	5.06	.06	.21	.21	.84	3.35	.05	.19	.14	.87	20Q	O	L233
L241	5.28	.27	1.00	.12	.49	3.28	-.02	-.09	.11	.72	20R	O	L241
L242	4.83	-.17	-.62	.22	.87	3.07	-.23	-.91	.17	1.09	20Y	O	L242
L249	5.05	.04	.16	.30	1.22	3.34	.03	.13	.19	1.21	20P	O	L249
L259	5.34	.33	1.21	.24	.97	3.57	.27	1.05	.09	.55	20P	O	L259
L262	5.15	.15	.53	.22	.87	3.44	.13	.52	.15	.96	20R	O	L262
L275	4.68	-.32	-1.18	.28	1.10	3.02	-.28	-1.11	.18	1.11	20R	O	L275
L279P	5.31	.31	1.13	.46	1.85	3.81	.51	2.00	.27	1.69	20P	O	L279P
L285	4.83	-.17	-.62	.31	1.23	3.47	.16	.64	.31	1.98	20P	*	L285
L290	4.99	-.01	-.03	.23	.91	3.48	.18	.70	.16	1.03	20P	O	L290
L311	4.89	-.11	-.39	.24	.97	3.27	-.03	-.12	.14	.89	20V	O	L311
L321	4.17	-.83	-3.03	.39	1.57	2.51	-.80	-3.13	.14	.90	20Q	*	L321
L330	5.16	.16	.57	.19	.75	3.34	.03	.13	.16	.99	20P	O	L330
L356	5.09	.09	.32	.49	1.98	3.30	-.00	-.00	.23	1.47	20P	O	L356
L376	5.14	.14	.49	.23	.91	3.30	-.01	-.02	.22	1.37	20P	O	L376
L393	5.30	.29	1.07	.17	.68	3.52	.22	.85	.18	1.10	20P	O	L393
L554	5.55	.55	1.99	.21	.82	3.86	.56	2.18	.14	.91	20P	O	L554
L556	5.31	.31	1.11	.23	.94	3.64	.33	1.31	.18	1.11	20P	O	L556
L571	1.15	-3.85	-13.97	.05	.21	.77	-2.53	-9.94	.04	.25	20P	#	L571
L585	5.21	.21	.76	.30	1.20	3.43	.13	.51	.14	.86	20V	O	L585
L599	4.87	-.13	-.48	.35	1.40	3.19	-.11	-.45	.22	1.40	20V	O	L599
L626	5.06	.06	.21	.24	.94	3.42	.12	.46	.10	.63	20T	O	L626
L680	4.97	-.03	-.12	.25	.99	3.40	.09	.37	.14	.91	20R	O	L680
L692	5.15	.15	.54	.26	1.05	3.51	.20	.79	.15	.92	20P	O	L692

GR. MEAN = 5.00 KILONEWTON/M GRAND MEAN = 3.30 KILONEWTON/M TEST DETERMINATIONS = 20

SD MEANS = .28 KILONEWTON/M SD OF MEANS = .25 KILONEWTON/M 37 LABS IN GRAND MEANS

AVERAGE SDR = .25 KILONEWTON/M AVERAGE SDR = .16 KILONEWTON/M

GR. MEAN =16.875 LB/15 MM GRAND MEAN =11.146 LB/15 MM

TOTAL NUMBER OF LABORATORIES REPORTING = 38

Best values: K39 5.0 $\pm$ 0.4 kilonewton per meter
G03 3.3 $\pm$ 0.4 kilonewton per meter

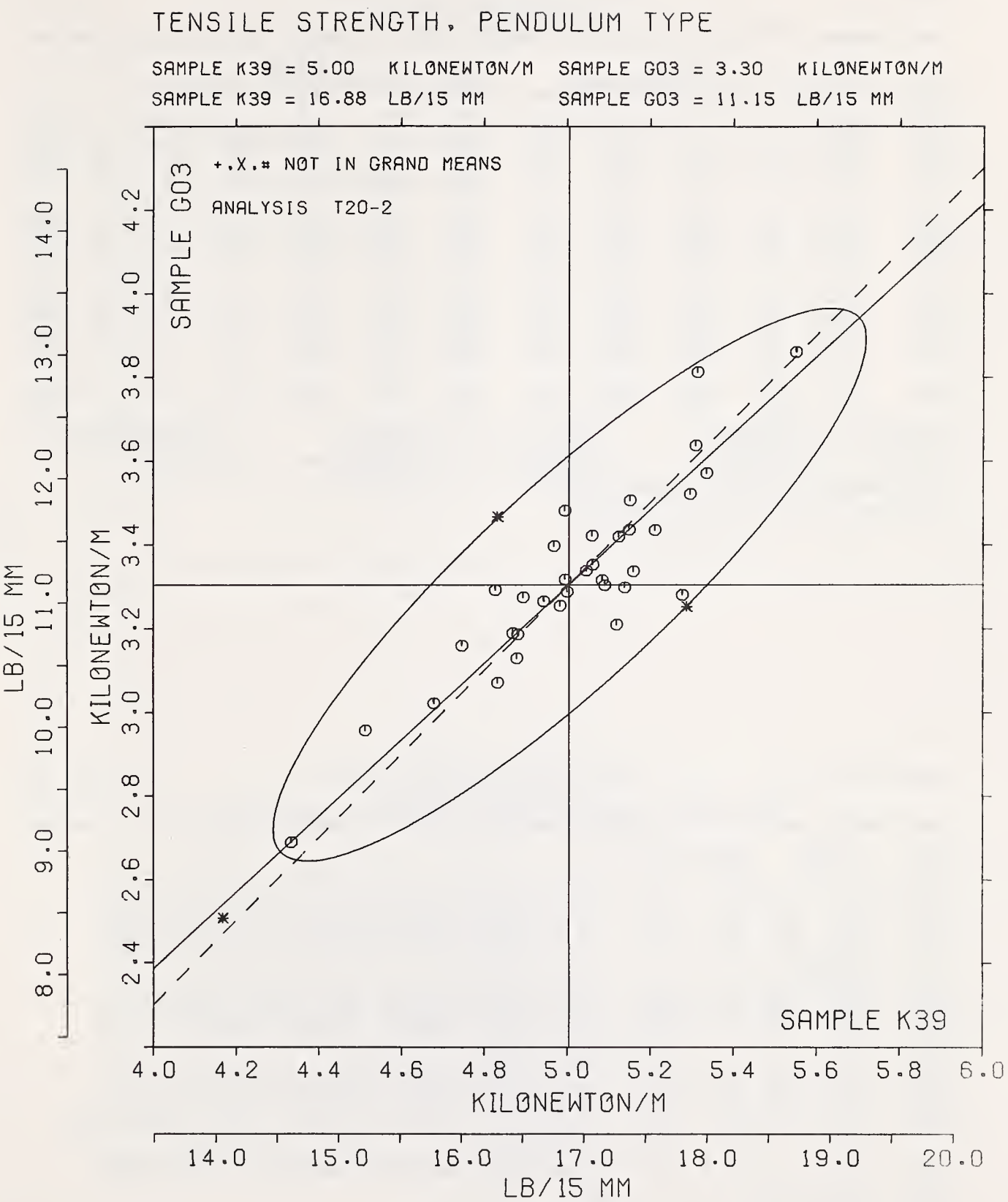
Data from the following laboratories appear to be off by a multiplicative factor: 571.

ANALYSIS T20-2 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

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

LAB CODE	F	MEANS E39	MEANS G03	COORDINATES MAJOR	COORDINATES MINOR	AVG E.SDE	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L571	#	1.15	.77	-4.55	.73	.23	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L321	*	4.17	2.51	-1.15	-.03	1.24	20Q	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L158	O	4.33	2.69	-.91	-.00	.83	20T	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L213	O	4.51	2.96	-.59	.07	1.16	20T	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L275	O	4.68	3.02	-.43	.01	1.11	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L162	O	4.75	3.16	-.29	.07	.98	20*	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L124P	O	4.83	3.29	-.14	.11	1.06	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L285	*	4.83	3.47	-.02	.23	1.60	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L242	O	4.83	3.07	-.28	-.06	.98	20Y	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L599	O	4.87	3.19	-.18	.01	1.40	20V	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L182L	O	4.88	3.13	-.21	-.04	.89	20T	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L148	O	4.88	3.19	-.17	-.00	.89	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L311	O	4.89	3.27	-.10	.05	.93	20V	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L195	O	4.94	3.27	-.07	.01	1.40	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L680	O	4.97	3.40	.04	.09	.95	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L212	O	4.98	3.26	-.05	-.02	1.13	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L290	O	4.99	3.48	.11	.14	.97	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L128	O	5.00	3.32	.00	.02	.84	20T	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L103	O	5.00	3.29	-.01	-.01	.66	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L249	O	5.05	3.34	.05	-.00	1.21	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L626	O	5.06	3.42	.12	.05	.79	20T	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L233	O	5.06	3.35	.08	-.00	.85	20Q	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L191P	O	5.08	3.32	.07	-.05	.78	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L356	O	5.09	3.30	.06	-.06	1.72	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L218	O	5.12	3.21	.02	-.15	.67	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L189	O	5.13	3.42	.17	.00	.94	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L376	O	5.14	3.30	.10	-.10	1.14	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L262	O	5.15	3.44	.20	-.00	.91	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L692	O	5.15	3.51	.25	.05	.99	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L330	O	5.16	3.34	.14	-.08	.87	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L585	O	5.21	3.43	.24	-.04	1.03	20V	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L241	O	5.28	3.28	.19	-.20	.60	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L121	*	5.29	3.25	.18	-.23	1.02	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L393	O	5.30	3.52	.36	-.04	.89	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L556	O	5.31	3.64	.45	.04	1.02	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L279P	O	5.31	3.81	.57	.17	1.77	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L259	O	5.34	3.57	.43	-.03	.76	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L554	O	5.55	3.86	.78	.04	.87	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
GMEANS:		5.00	3.30			1.00		
		95% ELLIPSE:		.94	.23	WITH GAMMA = 42 DEGREES		


TENSILE STRENGTH, PENDULUM TYPE
SAMPLE K39 = 5.00 KILONEWTON/M SAMPLE GO3 = 3.30 KILONEWTON/M
SAMPLE K39 = 16.88 LB/15 MM SAMPLE GO3 = 11.15 LB/15 MM
+.X.* NOT IN GRAND MEANS
ANALYSIS T20-2
SAMPLE GO3
KILONEWTON/M
LB/15 MM
SAMPLE K39
KILONEWTON/M
LB/15 MM

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ANALYSIS T25-1 TABLE 1

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER

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

LAB CODE	SAMPLE J16 MEAN	PRINTING 149 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE K32 MEAN	PRINTING 105 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 20 VAR	F	LAB
L106	128.4	4.3	.27	15.3	1.18	74.2	-7.6	-.62	12.5	1.16	25F	O	L106
L122	139.4	15.3	.97	12.4	.95	85.0	3.2	.26	7.8	.73	25P	O	L122
L126	130.7	6.6	.41	11.6	.89	82.0	.2	.02	8.1	.75	25G	O	L126
L151	131.5	7.4	.47	9.4	.72	91.6	9.8	.80	9.0	.83	25F	O	L151
L182	118.8	-5.2	-.33	8.7	.67	71.5	-10.3	-.84	9.8	.91	25B	O	L182
L237B	139.0	14.9	.94	13.3	1.02	102.7	20.9	1.71	24.8	2.31	25H	O	L237B
L243	124.6	.5	.03	7.4	.57	75.5	-6.3	-.52	8.2	.76	25Z	O	L243
L250	111.4	-12.7	-.80	5.3	.40	64.3	-17.5	-1.43	3.7	.35	25A	O	L250
L264	117.1	-7.0	-.44	11.7	.90	76.9	-4.9	-.40	8.9	.83	25F	O	L264
L267	133.3	9.2	.58	13.0	.99	80.2	-1.6	-.13	7.7	.72	25F	O	L267
L268	146.9	22.8	1.44	10.0	.77	92.2	10.4	.85	15.1	1.41	25B	O	L268
L273	127.6	3.5	.22	10.9	.84	87.7	5.9	.48	12.3	1.15	25F	O	L273
L280	111.2	-12.9	-.81	10.5	.81	74.2	-7.6	-.62	8.3	.77	25B	O	L280
L312	150.0	26.0	1.63	22.1	1.69	103.3	21.5	1.76	12.4	1.16	25J	O	L312
L580	99.4	-24.7	-1.55	13.0	1.00	58.9	-22.9	-1.87	6.3	.58	25C	O	L580
L604	101.6	-22.5	-1.41	24.4	1.87	92.6	10.9	.89	16.4	1.53	25A	O	L604
L676	98.6	-25.5	-1.61	22.5	1.73	77.5	-4.2	-.35	11.3	1.05	25F	O	L676

GR. MEAN = 124.1 JOULES/SQ M GRAND MEAN = 81.8 JOULES/SQ M TEST DETERMINATIONS = 20

SD MEANS = 15.9 JOULES/SQ M SD OF MEANS = 12.3 JOULES/SQ M 17 LABS IN GRAND MEANS

AVERAGE SDR = 13.0 JOULES/SQ M AVERAGE SDR = 10.7 JOULES/SQ M

GR. MEAN = 8.501 FT.LB/SQ FT GRAND MEAN = 5.602 FT.LB/SQ FT

TOTAL NUMBER OF LABORATORIES REPORTING = 17

Best values: J16 124 ± 25 joules per square meter

K32 82 ± 21 joules per square meter

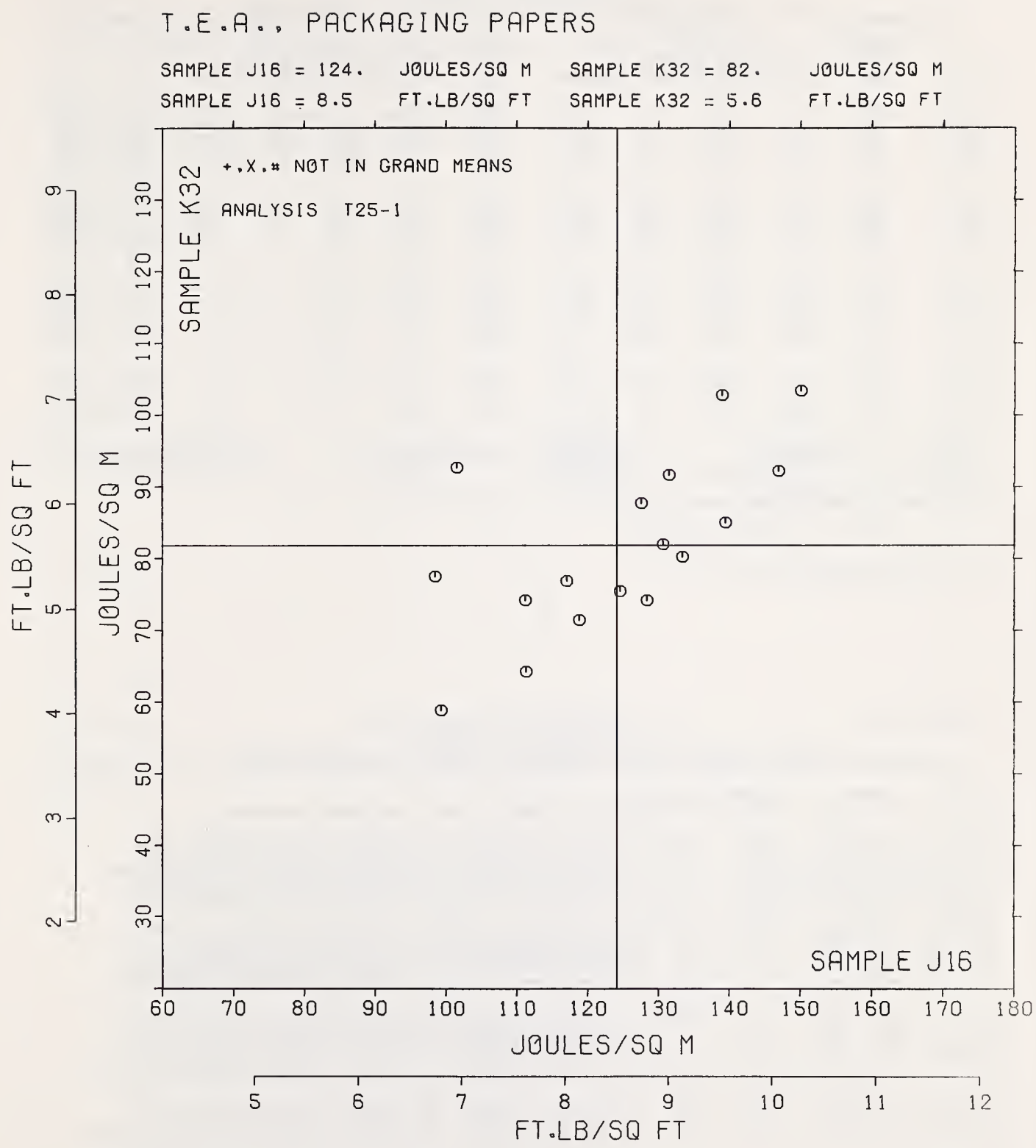
REPORT NO. 59S TAPPI COLLABORATIVE REPERENCE PROGRAM APRIL 1979

ANALYSIS T25-1 TABLE 2

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER

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

LAB CODE	F	MEANS J16	K32	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L676	O	98.6	77.5	-23.5	10.8	1.39	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L580	O	99.4	58.9	-33.3	-5.1	.79	25C	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/LINE JAWS
L604	O	101.6	92.6	-12.5	21.6	1.70	25A	TENSILE ENERGY ABS.,PACKAGING PAPER,FLAT/FLAT JAWS
L280	O	111.2	74.2	-14.9	1.0	.79	25B	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L250	O	111.4	64.3	-20.4	-7.3	.38	25A	TENSILE ENERGY ABS.,PACKAGING PAPER,FLAT/FLAT JAWS
L264	O	117.1	76.9	-8.5	-.1	.86	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L182	O	118.8	71.5	-10.1	-5.6	.79	25B	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L243	O	124.6	75.5	-3.1	-5.5	.66	25Z	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/LINE JAWS
L273	O	127.6	87.7	6.2	2.9	.99	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L106	O	128.4	74.2	-.7	-8.7	1.17	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L126	O	130.7	82.0	5.5	-3.5	.82	25G	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/LINE JAWS
L151	O	131.5	91.6	11.7	4.0	.78	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L267	O	133.3	80.2	6.8	-6.5	.86	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L237B	O	139.0	102.7	24.1	9.0	1.67	25H	TENSILE ENERGY ABS.,PACKAGING PAPER,2-PIN STRAIN GAGE
L122	O	139.4	85.0	14.5	-5.9	.84	25P	TENSILE ENERGY ABS.,PACKAGING PAPER,PATTERNED FLAT JAWS
L268	O	146.9	92.2	24.7	-4.2	1.09	25B	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L312	O	150.0	103.3	33.6	3.3	1.43	25J	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
GMEANS:		124.1	81.8			1.00		
95% ELLIPSE:				51.6	22.4	WITH GAMMA = 34 DEGREES		


T.E.A., PACKAGING PAPERS
SAMPLE J16 = 124. JOULES/SQ M
SAMPLE J16 = 8.5 FT.LB/SQ FT
SAMPLE K32 = 82. JOULES/SQ M
SAMPLE K32 = 5.6 FT.LB/SQ FT
+,X,* NOT IN GRAND MEANS
ANALYSIS T25-1
SAMPLE K32
SAMPLE J16
JOULES/SQ M
FT.LB/SQ FT
30 40 50 60 70 80 90 100 110 120 130
2 3 4 5 6 7 8 9
60 70 80 90 100 110 120 130 140 150 160 170 180
JOULES/SQ M
5 6 7 8 9 10 11 12
FT.LB/SQ FT

ANALYSIS T26-1 TABLE 1

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER

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

LAB	SAMPLE	PRINTING				SAMPLE	HEAT SET OFFSET BOOK				TEST D.F. 20		
	K39	75 GRAMS PER SQUARE METER				G03	76 GRAMS PER SQUARE METER						
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L115	54.4	.0	.00	4.0	.73	32.0	.7	.23	1.9	.57	26C	@	L115
L118	56.1	1.7	.33	6.2	1.14	31.4	.1	.04	3.7	1.13	26E	@	L118
L121	87.6	33.2	6.58	14.1	2.60	47.6	16.3	5.15	14.5	4.40	26D	#	L121
L122	62.1	7.8	1.54	6.7	1.24	35.3	3.9	1.25	4.1	1.24	26L	@	L122
L139	55.4	1.1	.21	6.6	1.22	32.0	.6	.20	4.0	1.22	26H	@	L139
L159	56.4	2.0	.39	5.6	1.03	32.0	.7	.21	4.8	1.45	26F	@	L159
L163	55.3	.9	.17	5.6	1.03	32.2	.9	.29	3.2	.95	26J	@	L163
L167	55.6	1.3	.25	1.8	.32	35.9	4.6	1.46	1.1	.33	26D	@	L167
L185	51.7	-2.7	-.53	6.2	1.14	31.5	.2	.06	3.6	1.08	26C	@	L185
L211	55.5	1.1	.22	8.7	1.60	30.1	-1.2	-.39	4.3	1.31	26Z	@	L211
L250	52.2	-2.2	-.44	3.5	.64	28.0	-3.3	-1.04	2.2	.66	26A	@	L250
L255	57.1	2.7	.54	7.0	1.28	30.5	-.8	-.25	4.2	1.28	26P	@	L255
L309	41.7	-12.7	-2.51	8.4	1.53	28.9	-2.4	-.76	5.3	1.59	26J	*	L309
L356	60.7	6.3	1.25	6.3	1.15	32.1	.8	.25	4.5	1.37	26A	@	L356
L393	52.1	-2.3	-.45	2.9	.53	29.5	-1.8	-.58	3.0	.89	26V	@	L393
L442	59.5	5.1	1.02	2.7	.50	37.4	6.1	1.92	2.1	.65	26B	@	L442
L567	46.0	-8.4	-1.67	5.8	1.07	23.0	-8.4	-2.64	2.7	.82	26A	@	L567
L575	57.9	3.5	.70	7.0	1.29	31.7	.4	.12	2.9	.87	26A	@	L575
L592	49.2	-5.1	-1.02	6.0	1.10	30.1	-1.2	-.37	3.9	1.19	26H	@	L592

GR. MEAN = 54.4 JOULES/SQ M — GRAND MEAN = 31.3 JOULES/SQ M — TEST DETERMINATIONS = 20

SD MEANS = 5.0 JOULES/SQ M — SD OF MEANS = 3.2 JOULES/SQ M — 18 LABS IN GRAND MEANS

AVERAGE SDR = 5.4 JOULES/SQ M — AVERAGE SDR = 3.3 JOULES/SQ M

GR. MEAN = 3.726 FT.LB/SQ FT — GRAND MEAN = 2.146 FT.LB/SQ FT

TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: K39 54 ± 8 joules per square meter
G03 31 ± 5 joules per square meter

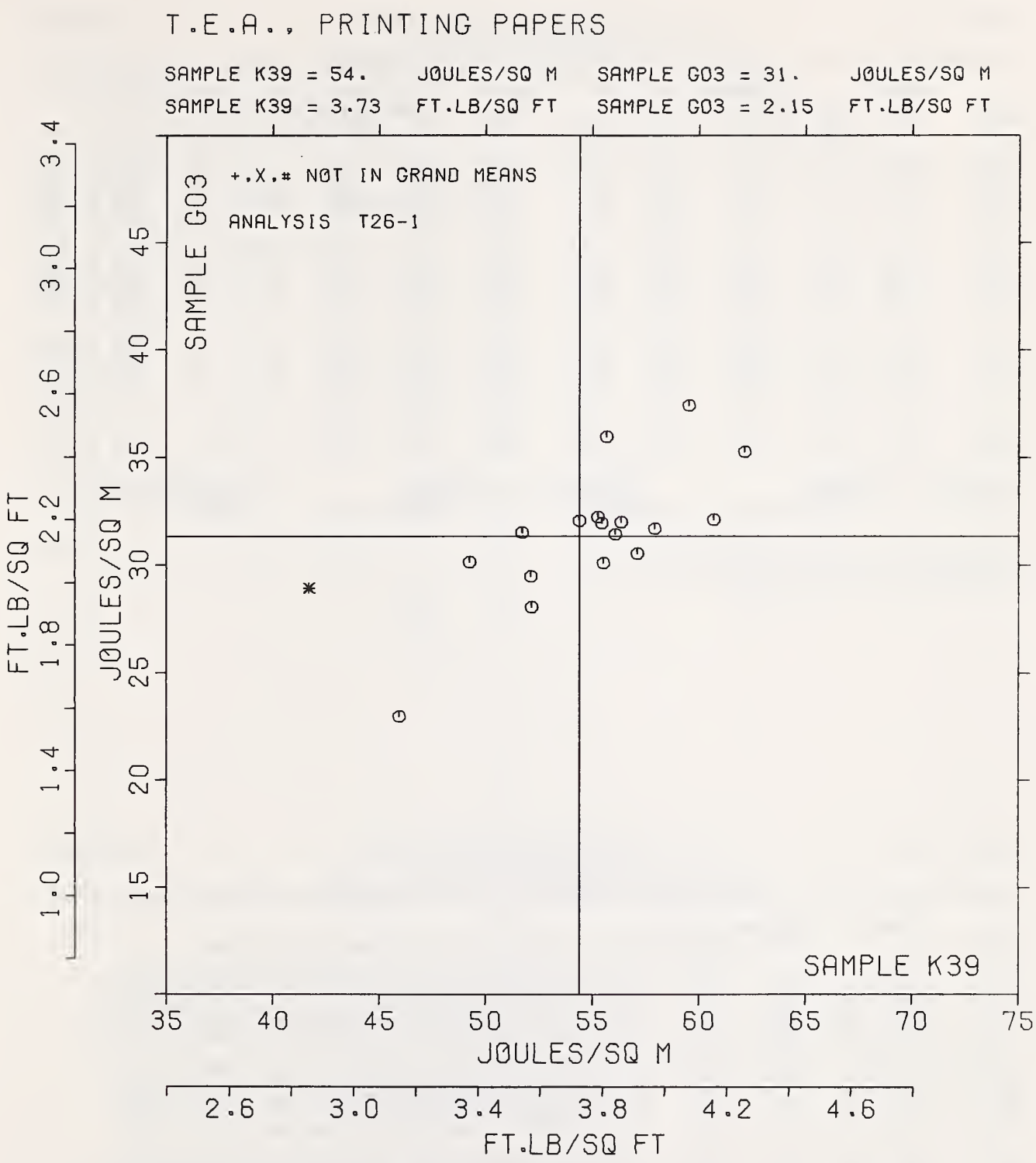
Data from the following laboratories appear to be off by a multiplicative factor: 121.

ANALYSIS T26-1 TABLE 2

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER

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

LAB		MEANS		COORDINATES		AVG			
CODE	F	K39	G03	MAJOR	MINOR	R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS	
L309	*	41.7	28.9	-12.3	3.8	1.56	26J	TENSILE ENERGY ABS.,	PRINTING PAPERS,LINE/FLAT JAWS
L567	@	46.0	23.0	-11.3	-3.5	.95	26A	TENSILE ENERGY ABS.,	PRINTING PAPERS,FLAT/FLAT JAWS
L592	@	49.2	30.1	-5.1	1.4	1.14	26H	TENSILE ENERGY ABS.,	PRINTING PAPERS,2-PIN STRAIN GAGE
L185	@	51.7	31.5	-2.3	1.4	1.11	26C	TENSILE ENERGY ABS.,	PRINTING PAPERS,LINE/LINE JAWS
L393	@	52.1	29.5	-2.9	-.6	.71	26V	TENSILE ENERGY ABS.,	PRINTING PAPERS,LINE/FLAT JAWS
L250	@	52.2	28.0	-3.5	-1.9	.65	26A	TENSILE ENERGY ABS.,	PRINTING PAPERS,FLAT/FLAT JAWS
L115	@	54.4	32.0	.3	.6	.65	26C	TENSILE ENERGY ABS.,	PRINTING PAPERS,LINE/LINE JAWS
L163	@	55.3	32.2	1.2	.4	.99	26J	TENSILE ENERGY ABS.,	PRINTING PAPERS,LINE/FLAT JAWS
L139	@	55.4	32.0	1.2	.1	1.22	26H	TENSILE ENERGY ABS.,	PRINTING PAPERS,2-PIN STRAIN GAGE
L211	@	55.5	30.1	.4	-1.6	1.46	26Z	TENSILE ENERGY ABS.,	PRINTING PAPERS,LINE/LINE JAWS
L167	@	55.6	35.9	3.3	3.5	.33	26D	TENSILE ENERGY ABS.,	PRINTING PAPERS,2-PIN STRAIN GAGE
L118	@	56.1	31.4	1.5	-.7	1.13	26E	TENSILE ENERGY ABS.,	PRINTING PAPERS,FLAT/FLAT JAWS
L159	@	56.4	32.0	2.1	-.3	1.24	26F	TENSILE ENERGY ABS.,	PRINTING PAPERS,LINE/FLAT JAWS
L255	@	57.1	30.5	2.0	-2.0	1.28	26P	TENSILE ENERGY ABS.,	PRINTING PAPERS,PATTERNED FLAT JAWS
L575	@	57.9	31.7	3.3	-1.3	1.08	26A	TENSILE ENERGY ABS.,	PRINTING PAPERS,FLAT/FLAT JAWS
L442	@	59.5	37.4	7.4	3.0	.58	26B	TENSILE ENERGY ABS.,	PRINTING PAPERS,LINE/FLAT JAWS
L356	@	60.7	32.1	5.9	-2.2	1.26	26A	TENSILE ENERGY ABS.,	PRINTING PAPERS,FLAT/FLAT JAWS
L122	@	62.1	35.3	8.7	-.1	1.24	26L	TENSILE ENERGY ABS.,	PRINTING PAPERS,PATTERNED FLAT JAWS
L121	#	87.6	47.6	37.0	-1.1	3.50	26D	TENSILE ENERGY ABS.,	PRINTING PAPERS,2-PIN STRAIN GAGE
GMEANS:		54.4	31.3			1.00			
		95% ELLIPSE:		15.6	5.6	WITH GAMMA = 27 DEGREES			


T.E.A., PRINTING PAPERS
SAMPLE K39 = 54. JOULES/SQ M
SAMPLE K39 = 3.73 FT.LB/SQ FT
SAMPLE G03 = 31. JOULES/SQ M
SAMPLE G03 = 2.15 FT.LB/SQ FT
+.X.# NOT IN GRAND MEANS
ANALYSIS T26-1
SAMPLE G03
SAMPLE K39
JOULES/SQ M
FT.LB/SQ FT
35 40 45 50 55 60 65 70 75
15 20 25 30 35 40 45
1.0 1.4 1.8 2.2 2.6 3.0 3.4
2.6 3.0 3.4 3.8 4.2 4.6

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ANALYSIS T28-1 TABLE 1

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

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

LAB CODE	SAMPLE J16 149 GRAMS PER SQUARE METER PRINTING MEAN	DEV	N.DEV	SDR	R. SDR	SAMPLE K32 105 GRAMS PER SQUARE METER PRINTING MEAN	DEV	N.DEV	SDR	R. SDR	TEST D. ° 20 VAR	F	LAB
L106	2.37	.12	.52	.27	1.60	1.69	.13	.64	.17	1.14	28B	O	L106
L122	2.42	.17	.75	.14	.81	1.61	.05	.26	.08	.53	28P	O	L122
L126	2.24	-.01	-.02	.13	.78	1.49	-.07	-.34	.09	.65	28C	O	L126
L151	2.38	.13	.56	.30	1.81	1.94	.38	1.85	.23	1.62	28B	O	L151
L182	2.08	-.16	-.71	.08	.48	1.36	-.20	-.96	.11	.79	28B	O	L182
L243	2.15	-.10	-.41	.08	.47	1.39	-.17	-.83	.09	.64	28C	O	L243
L264	2.09	-.15	-.67	.19	1.12	1.45	-.10	-.50	.11	.73	28B	O	L264
L265	2.04	-.21	-.92	.15	.88	1.46	-.10	-.47	.13	.88	28A	O	L265
L267	2.23	-.02	-.09	.17	1.02	1.45	-.11	-.54	.11	.77	28B	O	L267
L268	2.45	.21	.89	.12	.71	1.66	.11	.52	.16	1.08	28B	O	L268
L280	2.07	-.17	-.75	.12	.69	1.46	-.09	-.45	.08	.56	28B	O	L280
L312	2.78	.53	2.29	.28	1.68	2.04	.49	2.35	.11	.73	28B	O	L312
L324	2.07	-.18	-.78	.13	.77	1.44	-.12	-.57	.09	.65	28P	O	L324
L580	1.84	-.40	-1.75	.16	.97	1.30	-.25	-1.22	.18	1.24	28C	O	L580
L581	2.05	-.19	-.84	.17	1.03	1.49	-.07	-.33	.12	.81	28A	O	L581
L582	2.50	.25	1.08	.00	.00	1.44	-.12	-.58	.46	3.17	28A	O	L582
L676	2.45	.20	.86	.37	2.18	1.80	.24	1.17	.15	1.03	28B	O	L676
GR. MEAN =	2.25 PERCENT					GRAND MEAN =	1.56 PERCENT				TEST DETERMINATIONS = 20		
SD MEANS =	.23 PERCENT					SD OF MEANS =	.21 PERCENT				17 LABS IN GRAND MEANS		
	AVERAGE SDR =	.17 PERCENT				AVERAGE SDR =	.14 PERCENT						
L153	2.80	.55	2.38	.18	1.07	2.08	.53	2.55	.08	.56	28Q	*	L153

TOTAL NUMBER OF LABORATORIES REPORTING = 18

Best values: J16 2.2 ± 0.3 percent
K32 1.5 ± 0.3 percent

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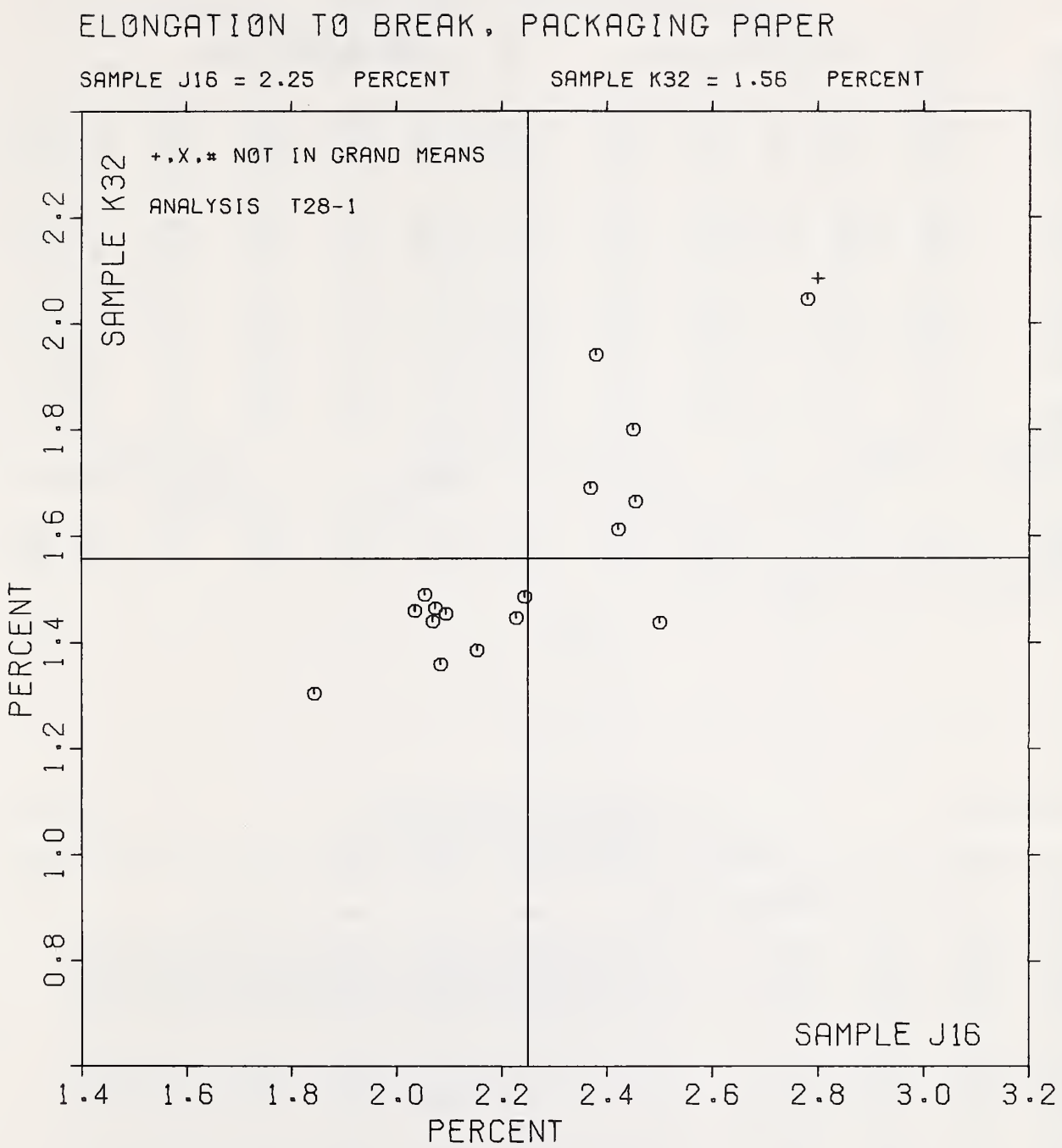
ANALYSIS T28-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

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

LAB CODE	F	MEANS J16	K32	COORDINATES MAJOR	MINOR	AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L580	O	1.84	1.30	-.47	.07	1.11	28C	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/LINE JAWS
L265	O	2.04	1.46	-.23	.07	.88	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,FLAT/FLAT JAWS
L581	O	2.05	1.49	-.19	.08	.92	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,FLAT/FLAT JAWS
L324	O	2.07	1.44	-.21	.03	.71	28P	ELONGATION,PACKAGING PAPER,LOAD CELL,PATTERNED FLAT JAWS
L280	O	2.07	1.46	-.19	.04	.63	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L182	O	2.08	1.36	-.25	-.04	.64	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L264	O	2.09	1.45	-.18	.02	.92	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L243	O	2.15	1.39	-.18	-.07	.55	28C	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/LINE JAWS
L267	O	2.23	1.45	-.09	-.07	.89	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L126	O	2.24	1.49	-.05	-.05	.71	28C	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/LINE JAWS
L106	O	2.37	1.69	.18	.02	1.37	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L151	O	2.38	1.94	.35	.20	1.71	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L122	O	2.42	1.61	.17	-.07	.67	28P	ELONGATION,PACKAGING PAPER,LOAD CELL,PATTERNED FLAT JAWS
L676	O	2.45	1.80	.31	.05	1.60	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L268	O	2.45	1.66	.23	-.05	.90	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L582	O	2.50	1.44	.11	-.26	1.58	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,FLAT/FLAT JAWS
L312	O	2.78	2.04	.72	.02	1.20	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L153	*	2.80	2.08	.76	.04	.82	28Q	ELONGATION,PACKAGING PAPER,PENDULUM, PATTERNED FLAT JAWS
GMEANS:		2.25	1.56			1.00		
		95% ELLIPSE:		.83	.27	WITH GAMMA = 41 DEGREES		


ELONGATION TO BREAK, PACKAGING PAPER
SAMPLE J16 = 2.25 PERCENT
SAMPLE K32 = 1.56 PERCENT
+,X,* NOT IN GRAND MEANS
ANALYSIS T28-1
SAMPLE K32
SAMPLE J16
PERCENT
PERCENT
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
3.0
3.2

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ANALYSIS T29-1 TABLE 1

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

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

LAB CODE	SAMPLE K39 MEAN	PRINTING 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G03 MEAN	HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F = 20 VAR	F	LAB
L100	1.480	-.230	-1.53	.207	1.38	1.280	-.221	-1.41	.120	.92	29A	O	L100
L105	1.337	-.373	-2.48	.219	1.46	1.100	-.401	-2.56	.126	.96	29A	O	L105
L118	1.895	.185	1.23	.112	.75	1.691	.190	1.21	.129	.98	29A	O	L118
L121	1.657	-.053	-.35	.169	1.13	1.387	-.114	-.73	.271	2.08	29D	O	L121
L122	1.949	.239	1.58	.150	1.00	1.686	.185	1.18	.127	.97	29P	O	L122
L141T	1.680	-.030	-.20	.177	1.18	1.464	-.037	-.24	.108	.83	29D	O	L141T
L185	1.646	-.064	-.43	.133	.89	1.510	.009	.06	.130	1.00	29C	O	L185
L255	1.705	-.005	-.04	.126	.84	1.445	-.056	-.36	.134	1.03	29P	O	L255
L278	1.715	.005	.03	.099	.66	1.425	-.076	-.49	.141	1.08	29A	O	L278
L309	1.766	.056	.37	.199	1.33	1.722	.221	1.41	.177	1.36	29A	O	L309
L344	1.739	.029	.19	.166	1.10	1.564	.063	.40	.084	.64	29A	O	L344
L356	1.846	.136	.90	.131	.87	1.523	.022	.14	.149	1.14	29A	O	L356
L442	1.802	.092	.61	.096	.64	1.608	.107	.68	.081	.62	29B	O	L442
L567	1.822	.112	.74	.132	.88	1.573	.072	.46	.103	.79	29A	O	L567
L575	1.792	.082	.54	.136	.91	1.529	.027	.18	.094	.72	29A	O	L575
L592	1.568	-.142	-.94	.162	1.08	1.407	-.094	-.60	.164	1.25	29D	O	L592
L698	1.675	-.035	-.24	.133	.89	1.605	.104	.66	.083	.63	29C	O	L698
GR. MEAN = 1.710 PERCENT						GRAND MEAN = 1.501 PERCENT					TEST DETERMINATIONS = 20		
SD MEANS = .151 PERCENT						SD OF MEANS = .157 PERCENT					17 LABS IN GRAND MEANS		
AVERAGE SDR = .150 PERCENT						AVERAGE SDR = .131 PERCENT							
L242	2.180	.470	3.12	.180	1.20	2.130	.629	4.01	.145	1.11	29R	*	L242
L626	1.620	-.090	-.60	.158	1.05	1.340	-.161	-1.03	.094	.72	29R	*	L626

TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: K39 1.7 ± 0.3 percent
G03 1.5 ± 0.3 percent

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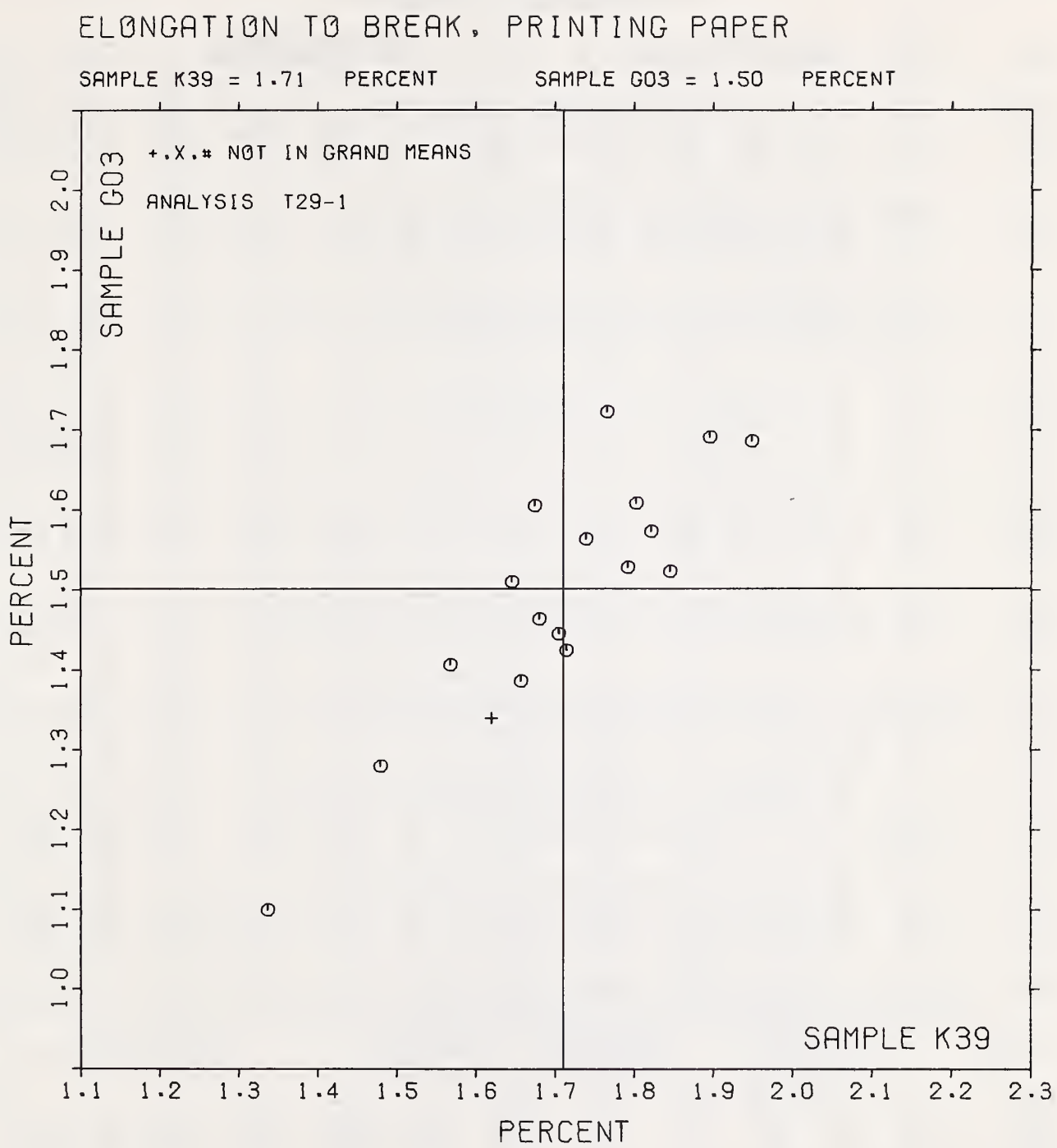
ANALYSIS T29-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

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

LAB CODE	F	MEANS K39	MEANS G03	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L105	O	1.337	1.100	-.548	-.007	1.21	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L100	O	1.480	1.280	-.319	.014	1.15	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L592	O	1.568	1.407	-.166	.038	1.17	29D	ELONGATION,PRINTING PAPERS,LOAD CELL,2-PIN STRAIN GAGE
L626	*	1.620	1.340	-.179	-.046	.89	29R	ELONGATION,PRINTING PAPERS,PENDULUM, FLAT/FLAT JAWS
L185	O	1.646	1.510	-.038	.053	.94	29C	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/LINE JAWS
L121	O	1.657	1.387	-.119	-.041	1.60	29D	ELONGATION,PRINTING PAPERS,LOAD CELL,2-PIN STRAIN GAGE
L698	O	1.675	1.605	.051	.097	.76	29C	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/LINE JAWS
L141T	O	1.680	1.464	-.048	-.004	1.00	29D	ELONGATION,PRINTING PAPERS,LOAD CELL,2-PIN STRAIN GAGE
L255	O	1.705	1.445	-.044	-.035	.93	29P	ELONGATION,PRINTING PAPERS,LOAD CELL,PATTERNED FLAT JAWS
L278	O	1.715	1.425	-.052	-.056	.87	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L344	O	1.739	1.564	.065	.022	.87	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L309	O	1.766	1.722	.198	.113	1.34	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L575	O	1.792	1.529	.076	-.040	.82	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L442	O	1.802	1.608	.141	.007	.63	29B	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/FLAT JAWS
L567	O	1.822	1.573	.129	-.031	.84	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L356	O	1.846	1.523	.110	-.083	1.01	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,PLAT/PLAT JAWS
L118	O	1.895	1.691	.265	-.003	.87	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L122	O	1.949	1.686	.298	-.045	.99	29P	ELONGATION,PRINTING PAPERS,LOAD CELL,PATTERNED FLAT JAWS
L242	*	2.180	2.130	.779	.094	1.16	29R	ELONGATION,PRINTING PAPERS,PENDULUM, FLAT/PLAT JAWS
GMEANS:		1.710	1.501			1.00		
95% ELLIPSE:				.591	.148	WITH GAMMA = 46 DEGREES		


ELONGATION TO BREAK, PRINTING PAPER
SAMPLE K39 = 1.71 PERCENT
SAMPLE G03 = 1.50 PERCENT
+.X.* NOT IN GRAND MEANS
ANALYSIS T29-1
SAMPLE G03
PERCENT
1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
SAMPLE K39
1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
PERCENT

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

LAB CODE	SAMPLE B88 MEAN	HEAT SET OFFSET BOOK 88 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE A92 MEAN	WOVE ENVELOPE PAPER 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
											TEST D. = 15		
L100M	33.5	-15.4	-.95	16.2	.82	20.9	-9.6	-1.51	5.9	.57	30M	@	L100M
L100N	35.5	-13.5	-.83	14.2	.72	22.3	-8.2	-1.29	6.4	.62	30N	@	L100N
L105	49.1	.1	.01	20.6	1.05	25.9	-4.6	-.72	7.2	.70	30M	@	L105
L118	52.1	3.2	.19	16.0	.81	29.3	-1.3	-.20	11.0	1.07	30D	@	L118
L121	35.0	-14.0	-.86	10.6	.54	30.3	-.3	-.05	14.3	1.39	30M	@	L121
L122	71.4	22.4	1.38	56.0	2.84	36.5	5.9	.92	13.4	1.30	30M	@	L122
L124	37.9	-11.1	-.68	7.3	.37	27.5	-3.1	-.48	7.2	.70	30N	@	L124
L150	40.8	-8.2	-.50	18.3	.93	29.8	-.8	-.12	9.8	.95	30M	@	L150
L158	27.3	-21.7	-1.33	12.9	.65	20.0	-10.6	-1.65	10.0	.97	30N	@	L158
L159	68.3	19.4	1.19	11.3	.57	36.5	6.0	.93	11.9	1.16	30N	@	L159
L162	25.1	-23.8	-1.46	12.3	.62	26.9	-3.6	-.57	13.2	1.28	30M	@	L162
L163	47.9	-1.0	-.06	24.7	1.25	26.9	-3.6	-.57	9.7	.94	30N	@	L163
L176	52.5	3.5	.21	19.0	.96	43.2	12.6	1.98	21.9	2.13	30N	*	L176
L182M	62.5	13.5	.83	28.5	1.44	38.1	7.6	1.19	17.0	1.65	30M	@	L182M
L185	72.0	23.0	1.41	38.8	1.96	37.7	7.2	1.12	10.0	.98	30N	@	L185
L190C	54.5	5.6	.34	13.5	.68	36.3	5.7	.89	6.0	.58	30N	@	L190C
L212	52.9	4.0	.24	7.9	.40	34.7	4.1	.64	11.3	1.10	30M	@	L212
L223F	79.2	30.2	1.85	29.6	1.50	37.5	6.9	1.08	11.5	1.11	30M	@	L223F
L230	41.4	-7.6	-.47	15.7	.80	31.3	.7	.11	9.6	.94	30N	@	L230
L232	74.9	25.9	1.59	28.8	1.46	41.7	11.2	1.75	12.7	1.23	30N	@	L232
L236	46.7	-2.3	-.14	15.5	.79	31.7	1.1	.17	11.8	1.15	30N	@	L236
L238A	48.1	-.8	-.05	9.7	.49	27.7	-2.8	-.44	12.5	1.22	30N	@	L238A
L238B	36.3	-12.7	-.78	10.3	.52	28.5	-2.1	-.33	9.4	.92	30D	@	L238B
L243	76.8	27.8	1.71	34.9	1.77	33.3	2.7	.42	8.9	.87	30D	@	L243
L254	41.9	-7.0	-.43	37.2	1.88	23.7	-6.8	-1.07	11.7	1.14	30M	@	L254
L262	36.5	-12.4	-.76	12.9	.65	26.3	-4.3	-.67	9.4	.91	30M	@	L262
L275	87.5	38.5	2.36	34.1	1.73	37.5	7.0	1.09	18.3	1.77	30M	@	L275
L278	28.5	-20.5	-1.26	11.6	.59	27.3	-3.3	-.52	7.8	.76	30C	@	L278
L279	38.8	-10.2	-.62	16.6	.84	28.3	-2.2	-.35	13.4	1.30	30N	@	L279
L285A	39.7	-9.2	-.57	16.6	.84	32.3	1.8	.28	8.7	.84	30N	@	L285A
L285B	31.5	-17.4	-1.07	15.6	.79	31.1	.5	.08	9.1	.88	30N	@	L285B
L299	28.5	-20.4	-1.25	13.6	.69	21.5	-9.1	-1.42	6.9	.67	30M	@	L299
L320	40.3	-8.7	-.53	23.6	1.20	25.2	-5.4	-.84	10.5	1.02	30N	@	L320
L321	84.7	35.7	2.19	41.4	2.10	36.7	6.1	.96	8.9	.86	30M	@	L321
L326N	30.0	-19.0	-1.16	18.8	.95	24.8	-5.8	-.90	9.6	.93	30N	@	L326N
L339	23.8	-25.2	-1.54	7.7	.39	17.5	-13.1	-2.05	4.9	.47	30N	@	L339
L376	37.9	-11.0	-.68	21.0	1.07	26.3	-4.2	-.66	8.0	.78	30N	@	L376
L388	53.7	4.8	.29	21.1	1.07	34.6	4.0	.63	10.6	1.03	30N	@	L388
L390	49.3	.4	.02	18.3	.92	31.5	.9	.14	8.8	.86	30N	@	L390
L393	49.1	.1	.01	14.1	.72	24.3	-6.2	-.97	4.6	.44	30M	@	L393
L396M	61.5	12.6	.77	21.0	1.06	43.0	12.4	1.95	17.9	1.74	30N	@	L396M
L565	58.3	9.3	.57	24.1	1.22	40.0	9.4	1.48	12.6	1.22	30N	@	L565
L567	45.3	-3.6	-.22	20.1	1.02	31.3	.8	.12	13.4	1.30	30N	@	L567
L589	55.3	6.4	.39	16.9	.86	35.3	4.7	.74	11.2	1.09	30N	@	L589
L599	55.9	7.0	.43	20.5	1.04	32.0	1.4	.23	11.9	1.16	30C	@	L599
L622	108.3	59.3	3.64	68.5	3.47	41.2	10.6	1.66	16.8	1.63	30M	X	L622
L670	53.3	4.3	.26	7.9	.40	20.8	-9.8	-1.53	4.3	.42	30N	@	L670
GR. MEAN =	49.0 DOUBLE FOLDS			GRAND MEAN =		30.6 DOUBLE FOLDS			TEST DETERMINATIONS =		15		
SD MEANS =	16.3 DOUBLE FOLDS			SD OF MEANS =		6.4 DOUBLE FOLDS			46 LABS IN GRAND MEANS				
	AVERAGE SDR =			19.7 DOUBLE FOLDS		AVERAGE SDR =			10.3 DOUBLE FOLDS				
L182S	50.7	1.8	.11	27.1	1.37	36.3	5.8	.90	12.3	1.19	30S	*	L182S
L190D	15.6	-33.4	-2.05	6.9	.35	30.4	-.2	-.02	11.6	1.13	30S	*	L190D
L280	39.6	-9.4	-.58	23.1	1.17	31.7	1.1	.17	11.4	1.11	30K	*	L280
L326S	25.8	-23.2	-1.42	5.4	.27	23.7	-6.8	-1.07	8.3	.81	30S	*	L326S
L396S	13.1	-35.9	-2.20	5.4	.27	24.3	-6.2	-.97	15.7	1.53	30T	*	L396S

TOTAL NUMBER OF LABORATORIES REPORTING = 52

Best values: B88 50 double folds
A92 30 double folds

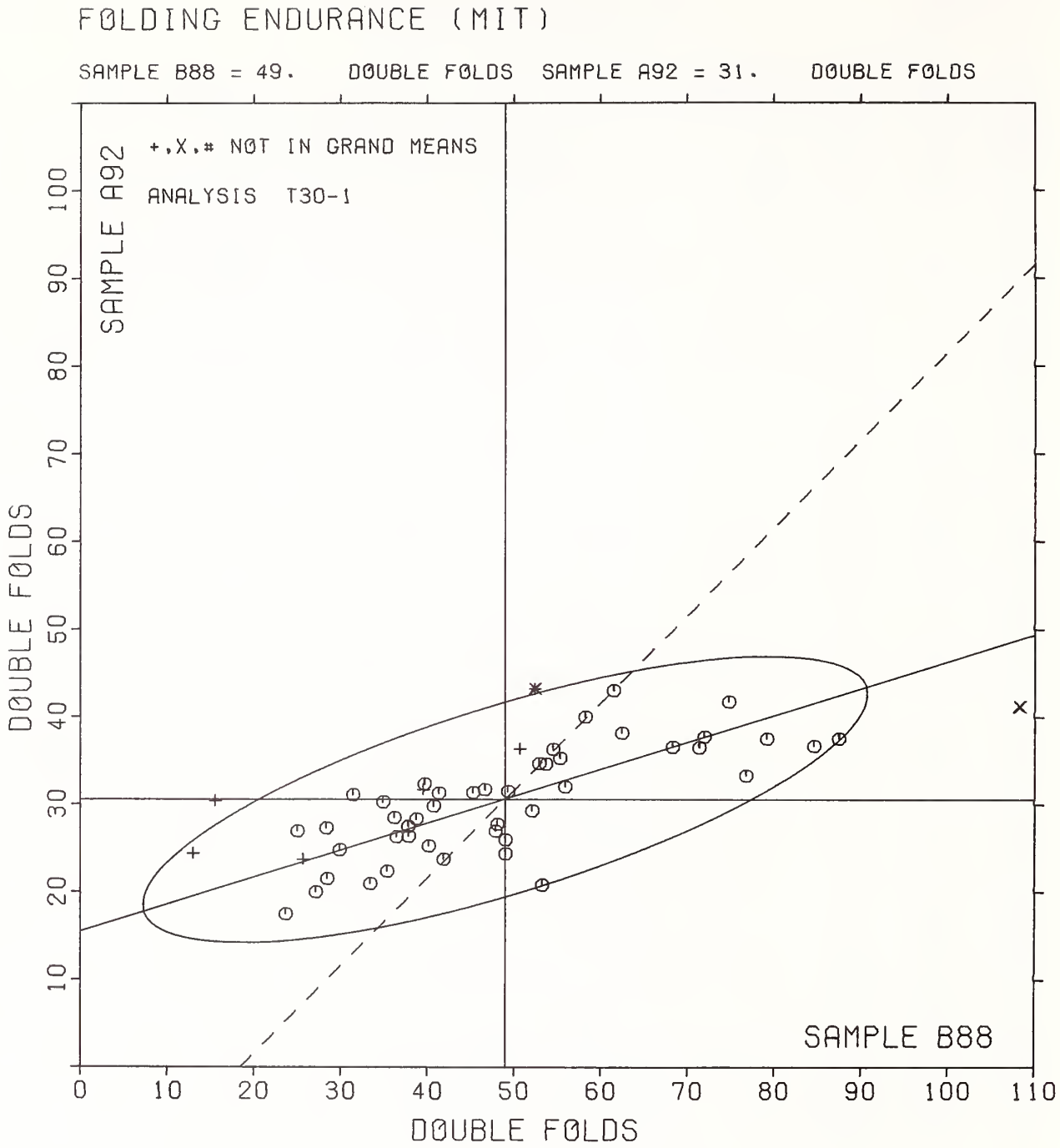
The following laboratories were omitted from the grand means because of extreme test results: 105, 190C, 232, 622.

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

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

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

LAB CODE	F	MEANS B88	MEANS A92	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L396S	*	13.1	24.3	-36.2	4.6	.90	30T	FOLDING ENDURANCE, SCHOPPER, TMI
L190D	*	15.6	30.4	-31.9	9.7	.74	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L339	O	23.8	17.5	-27.9	-5.1	.43	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L162	O	25.1	26.9	-23.9	3.6	.95	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L326S	*	25.8	23.7	-24.2	.3	.54	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L158	O	27.3	20.0	-23.9	-3.7	.81	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L278	O	28.5	27.3	-20.6	2.9	.67	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L299	O	28.5	21.5	-22.2	-2.7	.68	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L326N	O	30.0	24.8	-19.8	.1	.94	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285B	O	31.5	31.1	-16.5	5.6	.84	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100M	O	33.5	20.9	-17.6	-4.6	.69	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L121	O	35.0	30.3	-13.4	3.8	.96	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L100N	O	35.5	22.3	-15.3	-3.9	.67	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238B	O	36.3	28.5	-12.8	1.7	.72	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L262	O	36.5	26.3	-13.2	-.4	.78	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L124	O	37.9	27.5	-11.5	.3	.54	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L376	O	37.9	26.3	-11.8	-.8	.92	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L279	O	38.8	28.3	-10.4	.9	1.07	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L280	*	39.6	31.7	-8.6	3.8	1.14	30K	FOLDING ENDURANCE, KOHLER-MOLIN
L285A	O	39.7	32.3	-8.3	4.4	.84	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L320	O	40.3	25.2	-9.9	-2.6	1.11	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L150	O	40.8	29.8	-8.0	1.7	.94	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L230	O	41.4	31.3	-7.0	2.9	.87	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	O	41.9	23.7	-8.7	-4.4	1.51	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L567	O	45.3	31.3	-3.3	1.8	1.16	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L236	O	46.7	31.7	-1.9	1.7	.97	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L163	O	47.9	26.9	-2.1	-3.2	1.10	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238A	O	48.1	27.7	-1.6	-2.5	.85	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L393	O	49.1	24.3	-1.8	-6.0	.58	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L105	O	49.1	25.9	-1.3	-4.4	.87	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L390	O	49.3	31.5	.6	.8	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L182S	*	50.7	36.3	3.4	5.0	1.28	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L118	O	52.1	29.3	2.6	-2.2	.94	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L176	*	52.5	43.2	7.1	11.1	1.54	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L212	O	52.9	34.7	5.0	2.8	.75	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L670	O	53.3	20.8	1.2	-10.6	.41	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L388	O	53.7	34.6	5.7	2.5	1.05	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L190C	O	54.5	36.3	7.0	3.8	.63	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L589	O	55.3	35.3	7.5	2.6	.97	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L599	O	55.9	32.0	7.1	-.7	1.10	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L565	O	58.3	40.0	11.7	6.3	1.22	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L396M	O	61.5	43.0	15.7	8.2	1.40	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L182M	O	62.5	38.1	15.1	3.3	1.55	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L159	O	68.3	36.5	20.3	.0	.87	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	O	71.4	36.5	23.2	-1.0	2.07	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L185	O	72.0	37.7	24.1	.1	1.47	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L232	O	74.9	41.7	28.0	3.0	1.35	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L243	O	76.8	33.3	27.4	-5.6	1.32	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L223F	O	79.2	37.5	30.9	-2.3	1.31	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L321	O	84.7	36.7	35.9	-4.7	1.48	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L275	O	87.5	37.5	38.8	-4.7	1.75	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L622	X	108.3	41.2	59.8	-7.3	2.55	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
GMEANS:		49.0	30.6			1.00		
		95% ELLIPSE:		43.6	10.6	WITH GAMMA = 17 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE B88 = 49. DOUBLE FOLDS
SAMPLE A92 = 31. DOUBLE FOLDS
+,X,* NOT IN GRAND MEANS
ANALYSIS T30-1
SAMPLE A92
DOUBLE FOLDS
SAMPLE B88
DOUBLE FOLDS
0
10
20
30
40
50
60
70
80
90
100
110

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

LAB CODE	SAMPLE B88 88 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE A92 WOVE ENVELOPE PAPER 75 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.F. 15 VAR	F	LAB
L100M	1.48	-.15	-.98	.20	1.13	1.30	-.15	-1.64	.13	.85	30M	6	L100M
L100N	1.52	-.12	-.74	.17	.95	1.33	-.12	-1.34	.12	.84	30N	6	L100N
L105	1.65	.01	.07	.22	1.24	1.40	-.06	-.61	.11	.75	30M	6	L105
L118	1.70	.06	.41	.13	.73	1.44	-.02	-.17	.15	1.02	30D	6	L118
L121	1.52	-.11	-.70	.14	.75	1.44	-.02	-.19	.19	1.32	30M	6	L121
L122	1.75	.11	.71	.31	1.72	1.54	.08	.85	.15	1.02	30M	6	L122
L124	1.57	-.06	-.41	.08	.45	1.42	-.03	-.35	.12	.79	30N	6	L124
L150	1.57	-.06	-.41	.19	1.06	1.45	-.00	-.04	.14	.92	30M	6	L150
L158	1.39	-.24	-1.56	.20	1.13	1.26	-.20	-2.10	.18	1.23	30N	6	L158
L159	1.83	.19	1.24	.07	.37	1.54	.08	.91	.14	.95	30N	6	L159
L162	1.35	-.28	-1.80	.21	1.16	1.39	-.07	-.77	.20	1.36	30M	6	L162
L163	1.63	-.01	-.06	.23	1.26	1.41	-.05	-.55	.15	.99	30N	6	L163
L176	1.70	.06	.40	.14	.78	1.59	.13	1.41	.21	1.40	30N	6	L176
L182M	1.76	.13	.81	.17	.93	1.54	.09	.92	.19	1.28	30M	6	L182M
L185	1.81	.18	1.12	.20	1.10	1.56	.10	1.12	.12	.81	30N	6	L185
L190C	1.72	.09	.57	.11	.59	1.55	.10	1.03	.08	.52	30N	6	L190C
L212	1.72	.08	.54	.06	.35	1.52	.06	.67	.14	.92	30M	6	L212
L223F	1.87	.24	1.53	.14	.80	1.55	.10	1.04	.14	.94	30M	6	L223F
L230	1.59	-.05	-.30	.17	.92	1.47	.02	.18	.14	.96	30N	6	L230
L232	1.84	.21	1.33	.17	.94	1.60	.14	1.54	.14	.94	30N	6	L232
L236	1.65	.01	.08	.14	.79	1.47	.02	.16	.16	1.09	30N	6	L236
L238A	1.67	.04	.25	.08	.47	1.41	-.05	-.49	.16	1.08	30N	6	L238A
L238B	1.54	-.09	-.58	.12	.68	1.43	-.03	-.33	.17	1.16	30D	6	L238B
L243	1.85	.21	1.36	.19	1.03	1.51	.05	.53	.12	.83	30D	6	L243
L254	1.44	-.19	-1.21	.43	2.39	1.33	-.13	-1.40	.21	1.45	30M	6	L254
L262	1.54	-.10	-.63	.16	.88	1.40	-.06	-.66	.14	.98	30M	6	L262
L275	1.91	.27	1.74	.18	1.02	1.53	.07	.80	.20	1.34	30M	6	L275
L278	1.43	-.21	-1.34	.16	.88	1.42	-.04	-.41	.12	.84	30C	6	L278
L279	1.54	-.09	-.58	.22	1.19	1.41	-.04	-.47	.18	1.25	30N	6	L279
L285A	1.56	-.08	-.48	.20	1.09	1.49	.04	.39	.12	.83	30N	6	L285A
L285B	1.44	-.20	-1.26	.26	1.43	1.48	.02	.21	.12	.79	30N	6	L285B
L299	1.41	-.23	-1.44	.21	1.15	1.31	-.15	-1.59	.15	.99	30M	6	L299
L320	1.53	-.10	-.66	.27	1.46	1.37	-.09	-.95	.17	1.16	30N	6	L320
L321	1.89	.26	1.64	.17	.95	1.55	.09	1.02	.11	.73	30M	6	L321
L326N	1.41	-.23	-1.46	.25	1.39	1.37	-.09	-.96	.15	1.03	30N	6	L326N
L339	1.35	-.28	-1.79	.14	.80	1.23	-.23	-2.48	.12	.82	30N	6	L339
L376	1.53	-.10	-.65	.20	1.11	1.40	-.06	-.61	.14	.95	30N	6	L376
L388	1.70	.06	.41	.17	.94	1.52	.06	.64	.15	1.01	30N	6	L388
L390	1.66	.03	.18	.17	.96	1.48	.02	.26	.13	.86	30N	6	L390
L393	1.67	.04	.24	.14	.75	1.38	-.08	-.84	.08	.56	30M	6	L393
L396M	1.76	.13	.82	.16	.89	1.60	.14	1.54	.17	1.18	30N	6	L396M
L565	1.73	.10	.62	.18	.99	1.58	.12	1.34	.14	.92	30N	6	L565
L567	1.62	-.02	-.10	.19	1.04	1.46	.00	.02	.19	1.27	30N	6	L567
L589	1.72	.09	.55	.15	.83	1.53	.07	.76	.13	.91	30N	6	L589
L599	1.72	.09	.55	.16	.87	1.48	.02	.24	.15	1.02	30C	6	L599
L622	1.94	.31	1.98	.31	1.68	1.58	.13	1.36	.17	1.17	30M	6	L622
L670	1.72	.09	.56	.06	.35	1.31	-.15	-1.59	.09	.62	30N	X	L670
GR. MEAN =	1.63 LOG(10) FOLD				GRAND MEAN =	1.46 LOG(10) FOLD				TEST DETERMINATIONS = 15			
SD MEANS =	.16 LOG(10) FOLD				SD OF MEANS =	.09 LOG(10) FOLD				46 LABS IN GRAND MEANS			
	AVERAGE SDR =	.18 LOG(10) FOLD				AVERAGE SDR =	.15 LOG(10) FOLD						
L182S	1.66	.03	.17	.19	1.05	1.54	.08	.84	.16	1.08	30S	*	L182S
L190D	1.15	-.49	-3.11	.21	1.17	1.45	-.01	-.07	.18	1.21	30S	*	L190D
L280	1.54	-.10	-.63	.24	1.31	1.48	.02	.23	.14	.93	30K	*	L280
L326S	1.40	-.23	-1.48	.09	.48	1.35	-.11	-1.15	.16	1.05	30S	*	L326S
L396S	1.08	-.55	-3.54	.18	1.01	1.31	-.15	-1.58	.27	1.80	30T	*	L396S

TOTAL NUMBER OF LABORATORIES REPORTING = 52

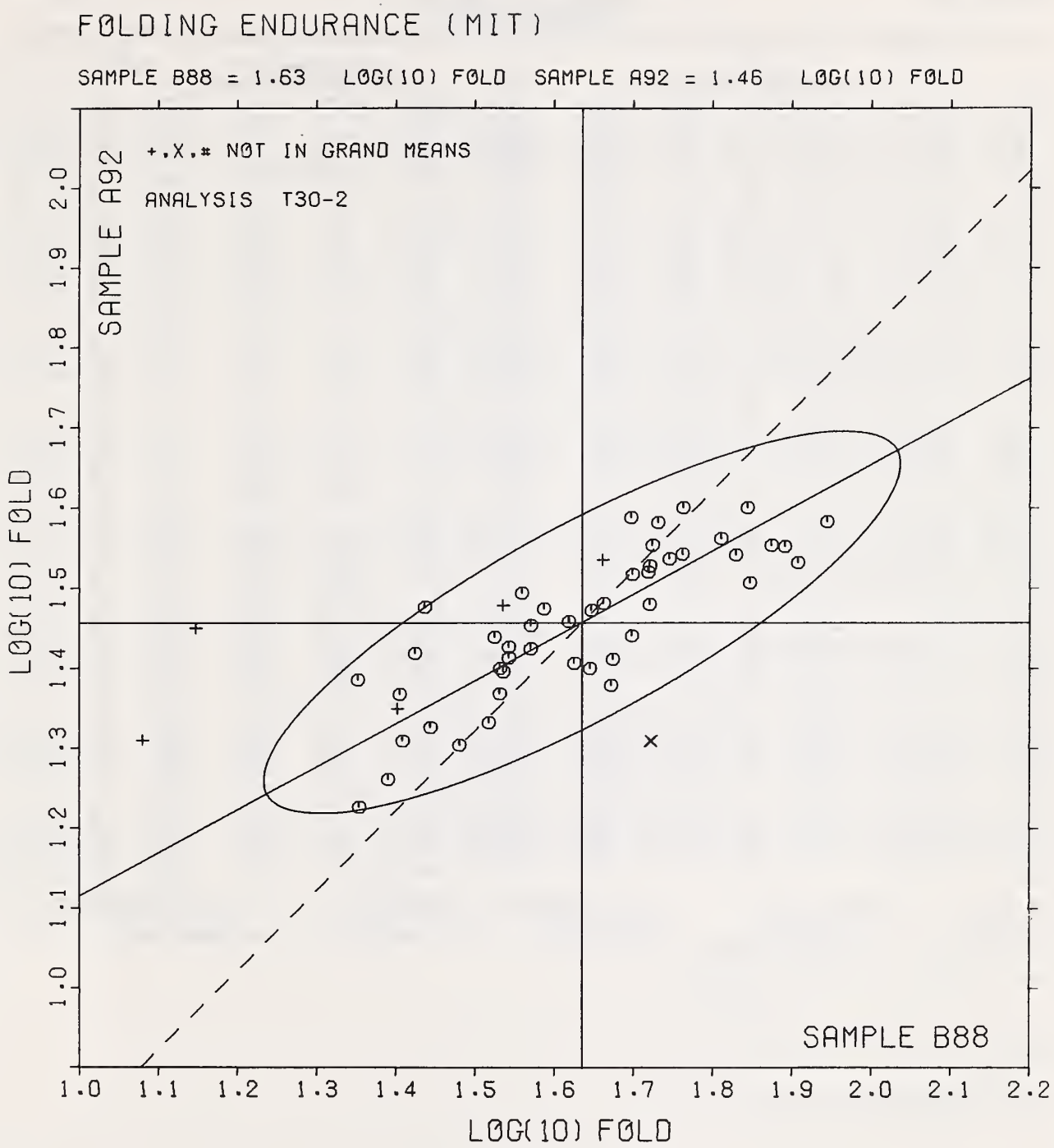
The ISO (International Standards Organization) is proposing that MIT folding endurance be reported as the logarithm (to the base 10) of the double fold instead of the double fold as in the past.

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 B88	MEANS A92	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L396S	*	1.08	1.31	-.56	.13	1.40	30T	FOLDING ENDURANCE, SCHOPPER, TMI
L190D	*	1.15	1.45	-.43	.22	1.19	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L162	O	1.35	1.39	-.28	.07	1.26	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L339	O	1.35	1.23	-.36	-.07	.81	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L158	O	1.39	1.26	-.31	-.06	1.18	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L326S	*	1.40	1.35	-.25	.02	.77	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L326N	O	1.41	1.37	-.24	.03	1.21	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L299	O	1.41	1.31	-.27	-.02	1.07	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L278	O	1.43	1.42	-.20	.07	.86	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L285B	O	1.44	1.48	-.16	.11	1.11	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	O	1.44	1.33	-.23	-.02	1.92	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L100M	O	1.48	1.30	-.21	-.06	.99	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L100N	O	1.52	1.33	-.16	-.05	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L121	O	1.52	1.44	-.11	.04	1.03	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L320	O	1.53	1.37	-.13	-.03	1.31	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L376	O	1.53	1.40	-.12	-.00	1.03	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L280	*	1.54	1.48	-.08	.07	1.12	30K	FOLDING ENDURANCE, KOHLER-MOLIN
L262	O	1.54	1.40	-.12	-.01	.93	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L238B	O	1.54	1.43	-.10	.02	.92	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L279	O	1.54	1.41	-.10	.00	1.22	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285A	O	1.56	1.49	-.05	.07	.96	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L124	O	1.57	1.42	-.07	.00	.62	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L150	O	1.57	1.45	-.06	.03	.99	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L230	O	1.59	1.47	-.03	.04	.94	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L567	O	1.62	1.46	-.01	.01	1.15	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L163	O	1.63	1.41	-.03	-.04	1.13	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L105	O	1.65	1.40	-.02	-.06	1.00	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L236	O	1.65	1.47	.02	.01	.94	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L182S	*	1.66	1.54	.06	.06	1.07	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L390	O	1.66	1.48	.04	.01	.91	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L393	O	1.67	1.38	-.00	-.09	.65	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L238A	O	1.67	1.41	.01	-.06	.77	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L176	O	1.70	1.59	.12	.09	1.09	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L118	O	1.70	1.44	.05	-.04	.87	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L388	O	1.70	1.52	.09	.02	.97	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L212	O	1.72	1.52	.10	.02	.63	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L599	O	1.72	1.48	.09	-.02	.94	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L589	O	1.72	1.53	.11	.02	.87	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L670	X	1.72	1.31	.01	-.17	.48	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L190C	O	1.72	1.55	.12	.04	.55	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L565	O	1.73	1.58	.14	.06	.96	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	O	1.75	1.54	.14	.02	1.37	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L182M	O	1.76	1.54	.15	.01	1.10	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L396M	O	1.76	1.60	.18	.07	1.03	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L185	O	1.81	1.56	.20	.01	.96	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L159	O	1.83	1.54	.21	-.02	.66	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L232	O	1.84	1.60	.25	.03	.94	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L243	O	1.85	1.51	.21	-.06	.93	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L223F	O	1.87	1.55	.26	-.03	.87	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L321	O	1.89	1.55	.27	-.04	.84	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L275	O	1.91	1.53	.28	-.06	1.18	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L622	O	1.94	1.58	.33	-.04	1.43	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
GMEANS:		1.63	1.46			1.00		
95% ELLIPSE:				.45	.12	WITH GAMMA = 28 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE B88 = 1.63 LOG(10) FOLD
SAMPLE A92 = 1.46 LOG(10) FOLD
+.X.* NOT IN GRAND MEANS
ANALYSIS T30-2
SAMPLE A92
LOG(10) FOLD
SAMPLE B88
LOG(10) FOLD
1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2

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 K41 MEAN	PRINTING 60 GRAMS PER SQUARE METER DEV	N. DEV	SDR	R. SDR	SAMPLE J26 MEAN	PRINTING 103 GRAMS PER SQUARE METER DEV	N. DEV	SDR	R. SDR	TEST D. = 10 VAR	F	LAB
L100	132.0	22.8	1.75	6.3	.88	268.0	24.0	1.45	12.7	1.04	35G	ó	L100
L118	108.4	-.8	-.06	4.8	.68	224.2	-19.8	-1.19	10.0	.81	35G	ó	L118
L121	118.0	8.8	.67	9.2	1.28	247.0	3.0	.18	29.8	2.43	35G	ó	L121
L122	99.9	-9.3	-.72	8.8	1.22	209.8	-34.2	-2.06	8.6	.70	35G	ó	L122
L132	126.0	16.6	1.29	9.1	1.27	245.0	1.0	.06	10.8	.88	35G	ó	L132
L139	108.9	-.3	-.02	3.6	.50	233.8	-10.2	-.61	15.6	1.27	35G	ó	L139
L148	110.2	1.0	.08	1.7	.24	243.6	-.4	-.02	9.7	.79	35G	ó	L148
L153	105.9	-3.3	-.26	7.4	1.03	243.0	-1.0	-.06	3.7	.30	35G	ó	L153
L159	93.9	-15.3	-1.18	10.5	1.46	237.3	-6.6	-.40	28.5	2.32	35G	ó	L159
L162	87.7	-21.5	-1.65	6.0	.84	225.1	-18.9	-1.13	7.6	.62	35G	ó	L162
L163	70.5	-38.7	-2.97	15.2	2.12	229.5	-14.5	-.87	30.3	2.47	35G	*	L163
L183	117.2	8.0	.61	5.6	.79	258.1	14.1	.85	14.3	1.17	35G	ó	L183
L190C	69.7	-39.5	-3.04	8.9	1.24	161.2	-82.8	-4.98	9.4	.76	35G	#	L190C
L195	125.6	16.4	1.26	16.2	2.26	237.8	-6.1	-.37	11.8	.97	35G	ó	L195
L212	115.2	6.0	.46	5.1	.72	269.8	25.8	1.55	9.7	.79	35G	ó	L212
L213	112.6	3.4	.26	3.9	.54	232.0	-12.0	-.72	13.2	1.08	35G	ó	L213
L223	105.1	-4.1	-.32	4.1	.57	239.9	-4.1	-.24	5.4	.44	35G	ó	L223
L232	118.4	9.2	.71	10.4	1.45	263.4	19.4	1.17	10.1	.83	35G	ó	L232
L236	54.0	-55.2	-4.24	12.6	1.77	159.5	-84.5	-5.08	9.0	.73	35G	#	L236
L241	118.3	9.1	.70	7.1	.99	255.3	11.3	.68	10.5	.86	35G	ó	L241
L249	113.4	4.2	.32	8.4	1.17	255.3	11.3	.68	12.8	1.05	35G	ó	L249
L254	109.4	.2	.01	7.8	1.10	217.1	-26.9	-1.62	11.5	.94	35G	ó	L254
L260	104.9	-4.3	-.33	5.1	.71	251.3	7.3	.44	6.8	.56	35G	ó	L260
L268	96.4	-12.8	-.98	3.2	.45	201.4	-42.6	-2.56	8.5	.70	35G	ó	L268
L285	67.4	-41.8	-3.21	6.2	.87	182.4	-61.6	-3.70	10.1	.82	35G	X	L285
L291	115.7	6.5	.50	10.0	1.39	256.1	12.1	.73	16.7	1.36	35G	ó	L291
L308	92.6	-16.7	-1.28	11.5	1.60	238.1	-5.9	-.35	12.2	1.00	35G	ó	L308
L321	117.8	8.6	.66	9.5	1.33	234.9	-9.1	-.55	7.4	.60	35G	ó	L321
L356	83.5	-25.7	-1.98	6.6	.91	240.6	-3.3	-.20	13.5	1.10	35G	ó	L356
L376	118.6	9.4	.72	4.9	.68	257.5	13.5	.81	8.6	.70	35G	ó	L376
L382	114.0	4.8	.37	6.9	.96	254.9	10.9	.66	12.9	1.05	35G	ó	L382
L390	102.2	-7.0	-.54	8.6	1.21	241.8	-2.2	-.13	10.9	.89	35G	ó	L390
L396	109.7	.4	.03	3.3	.46	245.9	2.0	.12	11.6	.95	35G	ó	L396
L567	133.0	23.8	1.83	12.5	1.75	259.0	15.0	.90	16.0	1.30	35G	ó	L567
L571	111.5	2.3	.18	4.7	.66	281.0	37.0	2.23	24.2	1.98	35G	ó	L571
L600	113.0	3.8	.29	8.5	1.19	247.5	3.5	.21	9.3	.76	35G	ó	L600
L648	104.3	-4.9	-.38	6.2	.87	250.8	6.9	.41	7.8	.64	35G	ó	L648
L650	108.9	-.3	-.02	6.0	.84	242.8	-1.2	-.07	14.0	1.14	35G	ó	L650
L693	71.2	-38.0	-2.92	7.0	.97	160.7	-83.3	-5.01	9.7	.79	35G	#	L693

GR. MEAN = 109.2 GURLEY UNITS GRAND MEAN = 244.0 GURLEY UNITS TEST DETERMINATIONS = 10

SD MEANS = 13.0 GURLEY UNITS SD OF MEANS = 16.6 GURLEY UNITS 35 LABS IN GRAND MEANS

AVERAGE SDR = 7.2 GURLEY UNITS AVERAGE SDR = 12.3 GURLEY UNITS

TOTAL NUMBER OF LABORATORIES REPORTING = 39

Best values: K41 110 ± 20 Gurley units
J26 240 ± 30 Gurley units

The following laboratories were omitted from the grand means because of extreme test results: 236, 693.

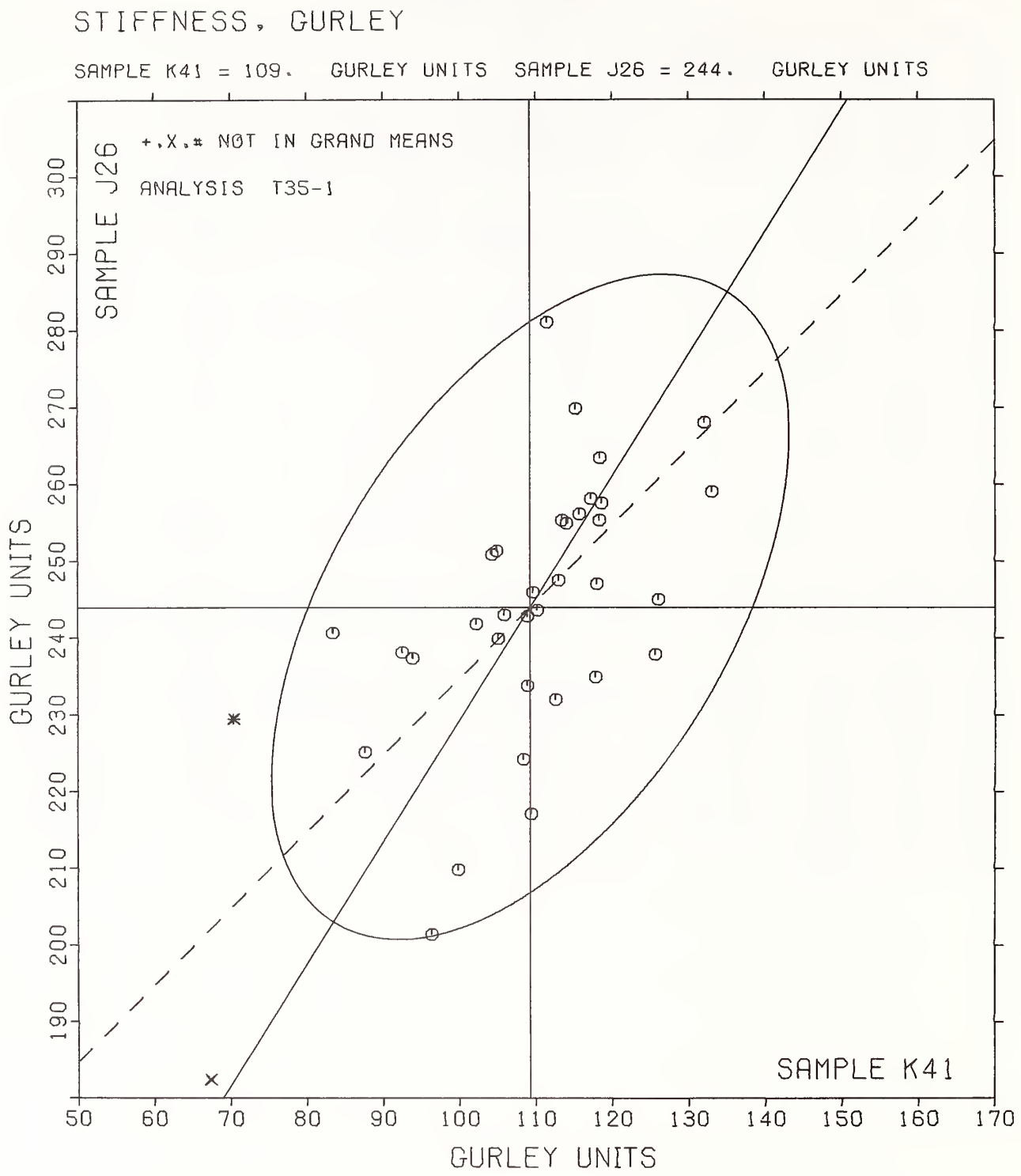
Data from the following laboratories appear to be off by a multiplicative factor: 190C.

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 E41	MEANS J26	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L236	#	54.0	159.5	-100.9	1.7	1.25	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L285	X	67.4	182.4	-74.4	2.6	.85	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L190C	#	69.7	161.2	-91.1	-10.7	1.00	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L163	*	70.5	229.5	-32.9	25.1	2.30	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L693	#	71.2	160.7	-90.7	-12.2	.88	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L356	@	83.5	240.6	-16.5	20.0	1.01	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L162	@	87.7	225.1	-27.4	8.2	.73	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L308	@	92.6	238.1	-13.8	11.0	1.30	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L159	@	93.9	237.3	-13.8	9.4	1.89	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L268	@	96.4	201.4	-42.9	-11.8	.57	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L122	@	99.9	209.8	-33.9	-10.3	.96	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L390	@	102.2	241.8	-5.6	4.7	1.05	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L648	@	104.3	250.8	3.2	7.8	.75	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L260	@	104.9	251.3	3.9	7.6	.63	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L223	@	105.1	239.9	-5.6	1.3	.51	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L153	@	105.9	243.0	-2.6	2.3	.67	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L118	@	108.4	224.2	-17.2	-9.8	.74	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L650	@	108.9	242.8	-1.2	-.4	.99	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L139	@	108.9	233.8	-8.8	-5.1	.89	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L254	@	109.4	217.1	-22.6	-14.5	1.02	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L396	@	109.7	245.9	1.9	.7	.70	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L148	@	110.2	243.6	.2	-1.0	.51	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L571	@	111.5	281.0	32.6	17.8	1.32	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L213	@	112.6	232.0	-8.3	-9.2	.81	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L600	@	113.0	247.5	5.0	-1.3	.97	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L249	@	113.4	255.3	11.8	2.5	1.11	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L382	@	114.0	254.9	11.8	1.8	1.00	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L212	@	115.2	269.8	25.0	8.7	.75	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L291	@	115.7	256.1	13.7	1.0	1.38	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L183	@	117.2	258.1	16.2	.8	.98	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L321	@	117.8	234.9	-3.1	-12.1	.97	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L121	@	118.0	247.0	7.2	-5.8	1.86	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L241	@	118.3	255.3	14.4	-1.6	.92	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L232	@	118.4	263.4	21.3	2.6	1.14	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L376	@	118.6	257.5	16.5	-.7	.69	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L195	@	125.6	237.8	3.5	-17.1	1.61	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L132	@	126.0	245.0	9.8	-13.7	1.07	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L100	@	132.0	268.0	32.5	-6.5	.96	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L567	@	133.0	259.0	25.4	-12.1	1.52	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
GMEANS:		109.2	244.0			1.00		
		95% ELLIPSE:		48.4	25.9	WITH GAMMA = 57 DEGREES		


STIFFNESS, GURLEY
SAMPLE K41 = 109. GURLEY UNITS SAMPLE J26 = 244. GURLEY UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T35-1
SAMPLE J26
GURLEY UNITS
190 200 210 220 230 240 250 260 270 280 290 300
SAMPLE K41
50 60 70 80 90 100 110 120 130 140 150 160 170
GURLEY UNITS

ANALYSIS T36-1 TABLE 1

TABER STIFFNESS

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

LAB CODE	SAMPLE A77 MEAN	INDEX 205 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J70 MEAN	PRINTING 85 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L107A	28.31	.67	.27	1.52	.99	7.33	1.17	1.09	.25	.64	36T	6	L107A
L122	26.46	-1.18	-.48	1.23	.80	6.86	.70	.65	.32	.81	36T	6	L122
L123	26.80	-.84	-.34	1.81	1.18	5.90	-.26	-.24	.88	2.22	36T	6	L123
L126	27.15	-.49	-.20	1.34	.87	4.42	-1.74	-1.63	.17	.43	36T	6	L126
L150	27.60	-.04	-.02	2.07	1.35	5.90	-.26	-.24	.74	1.87	36T	6	L150
L158	3.12	-24.52	-9.86	.13	.09	50.47	44.31	41.33	3.39	8.59	36T	#	L158
L163	19.55	-8.09	-3.25	2.19	1.43	4.30	-1.86	-1.74	.35	.89	36T	*	L163
L173B	27.44	-.20	-.08	1.71	1.11	6.62	.46	.43	.26	.66	36T	6	L173B
L182	27.63	-.01	-.01	1.42	.92	6.09	-.07	-.07	.47	1.19	36T	6	L182
L207	27.60	-.04	-.02	1.18	.77	7.44	1.28	1.20	.27	.67	36T	6	L207
L212	26.65	-.99	-.40	2.64	1.72	5.94	-.22	-.21	.10	.25	36T	6	L212
L228	27.73	.09	.03	1.60	1.04	4.73	-1.43	-1.33	.17	.43	36T	6	L228
L230	35.20	7.56	3.04	2.20	1.44	8.60	2.44	2.28	1.35	3.42	36T	*	L230
L236	27.88	.24	.09	1.26	.82	5.01	-1.15	-1.07	.17	.43	36T	6	L236
L242	30.84	3.20	1.29	1.36	.89	7.98	1.82	1.70	1.04	2.63	36T	6	L242
L243	27.30	-.34	-.14	1.23	.80	6.38	.22	.20	.18	.46	36T	6	L243
L260	27.75	.11	.04	.59	.38	6.25	.09	.08	.26	.67	36T	6	L260
L262	28.35	.71	.28	1.20	.79	7.05	.89	.83	.37	.94	36T	6	L262
L268	28.90	1.26	.51	.94	.61	6.30	.14	.13	.35	.89	36T	6	L268
L281	28.64	1.00	.40	1.79	1.17	6.59	.43	.41	.27	.69	36T	6	L281
L290	30.40	2.76	1.11	1.71	1.12	7.11	.95	.89	.82	2.08	36T	6	L290
L318	26.30	-1.34	-.54	1.76	1.15	5.85	-.31	-.29	.38	.96	36T	6	L318
L321	22.95	-4.69	-1.89	2.86	1.87	5.09	-1.07	-1.00	.67	1.70	36T	6	L321
L324	27.79	.15	.06	.98	.64	4.93	-1.23	-1.15	.12	.29	36T	6	L324
L339	28.30	.66	.26	.75	.49	4.43	-1.73	-1.61	.18	.45	36T	6	L339
L388	42.15	14.51	5.83	2.00	1.31	25.50	19.34	18.04	1.31	3.33	36T	#	L388
L442	27.71	.07	.03	1.25	.81	6.79	.63	.59	.31	.79	36T	6	L442
L570	28.00	.36	.14	1.56	1.02	7.00	.84	.78	.82	2.07	36T	6	L570
L580	27.70	.06	.02	.82	.54	6.10	-.06	-.06	.32	.80	36T	6	L580
L651	28.10	.46	.18	3.28	2.14	5.60	-.56	-.52	.52	1.31	36T	6	L651
L692	26.63	-1.01	-.41	1.50	.98	6.04	-.12	-.11	.26	.66	36T	6	L692

GR. MEAN = 27.64 TABER UNITS — GRAND MEAN = 6.16 TABER UNITS — TEST DETERMINATIONS = 10

SD MEANS = 2.49 TABER UNITS — SD OF MEANS = 1.07 TABER UNITS — 29 LABS IN GRAND MEANS

AVERAGE SDR = 1.53 TABER UNITS — AVERAGE SDR = .39 TABER UNITS

L250	25.04	-2.60	-1.05	1.54	1.01	6.51	.35	.33	.40	1.02	36U	*	L250

TOTAL NUMBER OF LABORATORIES REPORTING = 32

Best values: A77 27.7 ± 4.0 Taber units
A70 6.1 ± 1.7 Taber units

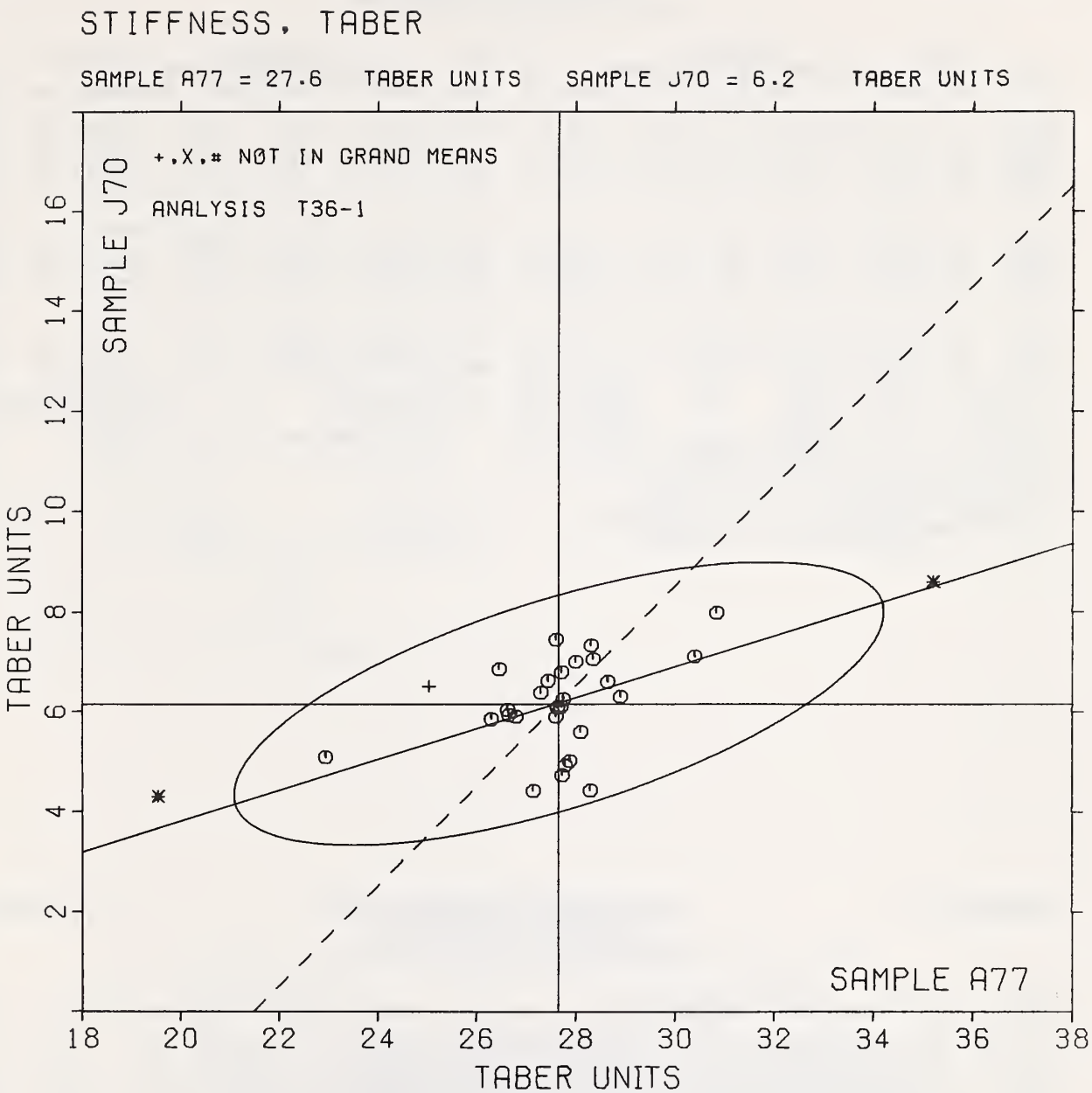
The following laboratories were omitted from the grand means because of extreme test results: 158, 388.

ANALYSIS T36-1 TABLE 2

TABER STIFFNESS

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

LAB CODE	F	MEANS A77	MEANS J70	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L158	#	3.12	50.47	-10.35	49.57	4.34	36T	STIFFNESS, TABER
L163	*	19.55	4.30	-8.28	.61	1.16	36T	STIFFNESS, TABER
L321	⌀	22.95	5.09	-4.80	.36	1.78	36T	STIFFNESS, TABER
L250	*	25.04	6.51	-2.38	1.10	1.02	36U	STIFFNESS, TABER, 20 C, 65% RH
L318	⌀	26.30	5.85	-1.37	.10	1.05	36T	STIFFNESS, TABER
L122	⌀	26.46	6.86	-.92	1.02	.81	36T	STIFFNESS, TABER
L692	⌀	26.63	6.04	-1.00	.18	.82	36T	STIFFNESS, TABER
L212	⌀	26.65	5.94	-1.01	.08	.98	36T	STIFFNESS, TABER
L123	⌀	26.80	5.90	-.88	.00	1.70	36T	STIFFNESS, TABER
L126	⌀	27.15	4.42	-.99	-1.52	.65	36T	STIFFNESS, TABER
L243	⌀	27.30	6.38	-.26	.31	.63	36T	STIFFNESS, TABER
L173B	⌀	27.44	6.62	-.06	.50	.89	36T	STIFFNESS, TABER
L207	⌀	27.60	7.44	.34	1.24	.72	36T	STIFFNESS, TABER
L150	⌀	27.60	5.90	-.12	-.24	1.61	36T	STIFFNESS, TABER
L162	⌀	27.63	6.09	-.03	-.06	1.06	36T	STIFFNESS, TABER
L580	⌀	27.70	6.10	.04	-.07	.67	36T	STIFFNESS, TABER
L442	⌀	27.71	6.79	.25	.58	.80	36T	STIFFNESS, TABER
L228	⌀	27.73	4.73	-.34	-1.39	.74	36T	STIFFNESS, TABER
L260	⌀	27.75	6.25	.13	.05	.53	36T	STIFFNESS, TABER
L324	⌀	27.79	4.93	-.22	-1.22	.47	36T	STIFFNESS, TABER
L236	⌀	27.88	5.01	-.11	-1.17	.63	36T	STIFFNESS, TABER
L570	⌀	28.00	7.00	.59	.70	1.55	36T	STIFFNESS, TABER
L651	⌀	28.10	5.60	.27	-.67	1.73	36T	STIFFNESS, TABER
L339	⌀	28.30	4.43	.12	-1.85	.47	36T	STIFFNESS, TABER
L107A	⌀	28.31	7.33	.98	.92	.82	36T	STIFFNESS, TABER
L262	⌀	28.35	7.05	.94	.64	.86	36T	STIFFNESS, TABER
L281	⌀	28.64	6.59	1.08	.12	.93	36T	STIFFNESS, TABER
L268	⌀	28.90	6.30	1.24	-.24	.75	36T	STIFFNESS, TABER
L290	⌀	30.40	7.11	2.91	.09	1.60	36T	STIFFNESS, TABER
L242	⌀	30.84	7.98	3.60	.80	1.76	36T	STIFFNESS, TABER
L230	*	35.20	8.60	7.94	.10	2.43	36T	STIFFNESS, TABER
L388	#	42.15	25.50	19.57	14.20	2.32	36T	STIFFNESS, TABER
GMEANS:		27.64	6.16			1.00		
		95% ELLIPSE:		6.84	2.07	WITH GAMMA = 17 DEGREES		


STIFFNESS, TABER
SAMPLE A77 = 27.6 TABER UNITS
SAMPLE J70 = 6.2 TABER UNITS
+,X,* NØT IN GRAND MEANS
ANALYSIS T36-1
SAMPLE J70
TABER UNITS
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
SAMPLE A77
TABER UNITS

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T49-1 TABLE 1
SURFACE PICK STRENGTH, IGT

LAB CODE	SAMPLE J93 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J52 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 4 VAR	F	LAB
L122	44.5	-13.5	-.42	2.0	.67	53.2	-3.4	-.12	1.8	.48	49Q	O	L122
L149	31.3	-26.7	-.83	2.6	.83	34.9	-21.7	-.74	3.6	.95	49L	O	L149
L182I	27.9	-30.1	-.94	2.9	.94	29.6	-27.0	-.92	3.6	.96	49Q	O	L182I
L190C	56.5	-1.5	-.05	2.6	.86	60.7	4.1	.14	1.3	.33	49T	O	L190C
L207	74.5	16.5	.51	3.4	1.11	43.2	-13.4	-.46	5.1	1.35	49I	O	L207
L242	44.8	-13.2	-.41	2.8	.90	57.0	.4	.01	10.0	2.66	49P	O	L242
L277	89.2	31.2	.98	5.6	1.81	81.7	25.1	.86	10.6	2.81	49I	O	L277
L280	65.7	7.7	.24	2.1	.68	62.2	5.6	.19	1.4	.38	49U	#	L280
L291	99.0	41.0	1.28	2.1	.67	87.2	30.6	1.04	1.3	.34	49I	O	L291
L388	102.6	44.6	1.39	6.2	2.03	108.0	51.4	1.75	.0	.00	49Q	O	L388
L598	214.7	156.7	4.89	15.1	4.92	215.2	158.6	5.40	6.2	1.65	49W	#	L598
L643	9.7	-48.3	-1.51	.5	.18	10.4	-46.3	-1.58	.4	.12	49I	O	L643
L651	203.2	145.2	4.53	.0	.00	203.2	146.6	4.99	.0	.00	49F	#	L651

GR. MEAN = 58.0 KP CM/SEC — GRAND MEAN = 56.6 KP CM/SEC — TEST DETERMINATIONS = 4
SJ MEANS = 32.0 KP CM/SEC — SD OF MEANS = 29.4 KP CM/SEC — 10 LABS IN GRAND MEANS
AVERAGE SDR = 3.1 KP CM/SEC — AVERAGE SDR = 3.8 KP CM/SEC
TOTAL NUMBER OF LABORATORIES REPORTING = 13

Data from the following laboratories were omitted from the grand means because no viscosity values were reported: 280, 598, 651. The data from these labs were converted to the common unit, cm/sec.

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T49-1 TABLE 2
SURFACE PICK STRENGTH, IGT

LAB CODE	F	MEANS J93	J52	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L643	O	9.7	10.4	-66.9	-1.7	.15	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L182I	O	27.9	29.6	-40.4	.3	.95	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L149	O	31.3	34.9	-34.3	1.9	.89	49L	SURFACE PICK STRENGTH,IGT, PIB FLUID
L122	O	44.5	53.2	-12.3	6.6	.57	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L242	O	44.8	57.0	-9.5	9.2	1.78	49P	SURFACE PICK STRENGTH,IGT, IGT OIL
L190C	O	56.5	60.7	1.7	4.1	.60	49T	SURFACE PICK STRENGTH,IGT, IPC FLUID
L280	#	65.7	62.2	9.5	-1.1	.53	49U	SURFACE PICK STRENGTH,IGT, OIL
L207	O	74.5	43.2	3.2	-21.0	1.23	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L277	O	89.2	81.7	40.0	-2.4	2.31	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L291	O	99.0	87.2	50.9	-4.9	.51	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L388	O	102.6	108.0	67.6	8.0	1.01	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L651	#	203.2	203.2	206.0	10.7	.00	49F	SURFACE PICK STRENGTH,IGT, INK
L598	#	214.7	215.2	222.7	11.9	3.28	49W	SURFACE PICK STRENGTH,IGT, OIL
GMEANS:		58.0	56.6			1.00		
		95% ELLIPSE:		134.8	27.6	WITH GAMMA = 42 DEGREES		

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

LAB CODE	SAMPLE J93 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J52 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 5 VAR	F	LAB
L105	10.00	.76	.77	.00	.00	9.60	.51	.58	.55	1.37	50W	O	L105
L122	9.00	-.24	-.24	.00	.00	NO DATA REPORTED FOR SAMPLE J52					50W	M	L122
L158	9.20	-.04	-.04	.45	1.45	9.60	.51	.58	.55	1.37	50W	O	L158
L162	9.00	-.24	-.24	.00	.00	9.00	-.09	-.10	.00	.00	50W	O	L162
L173A	8.00	-1.24	-1.25	.00	.00	7.60	-1.49	-1.69	.55	1.37	50W	O	L173A
L182W	9.20	-.04	-.04	.45	1.45	9.40	.31	.35	.55	1.37	50W	O	L182W
L183	9.00	-.24	-.24	.00	.00	9.20	.11	.13	.45	1.12	50W	O	L183
L195	9.40	.16	.16	.55	1.78	9.00	-.09	-.10	.00	.00	50W	O	L195
L213	8.80	-.44	-.44	.45	1.45	9.00	-.09	-.10	.00	.00	50W	O	L213
L225	11.60	2.36	2.38	.55	1.78	10.20	1.11	1.26	.84	2.09	50W	*	L225
L228	8.60	-.64	-.64	.55	1.78	7.80	-1.29	-1.46	.84	2.09	50W	O	L228
L230	8.60	-.64	-.64	.55	1.78	8.40	-.69	-.78	.55	1.37	50W	O	L230
L236	10.00	.76	.77	.00	.00	10.00	.91	1.03	.00	.00	50W	O	L236
L243	7.40	-1.84	-1.85	.55	1.78	7.60	-1.49	-1.69	.89	2.23	50W	O	L243
L285	25.40	16.16	16.31	5.77	18.70	24.20	15.11	17.13	7.22	18.03	50W	#	L285
L339	9.40	.16	.16	.55	1.78	9.40	.31	.35	.55	1.37	50W	O	L339
L567	9.00	-.24	-.24	.00	.00	9.00	-.09	-.10	.00	.00	50W	O	L567
L697	10.60	1.36	1.37	.55	1.78	10.60	1.51	1.71	.55	1.37	50W	O	L697

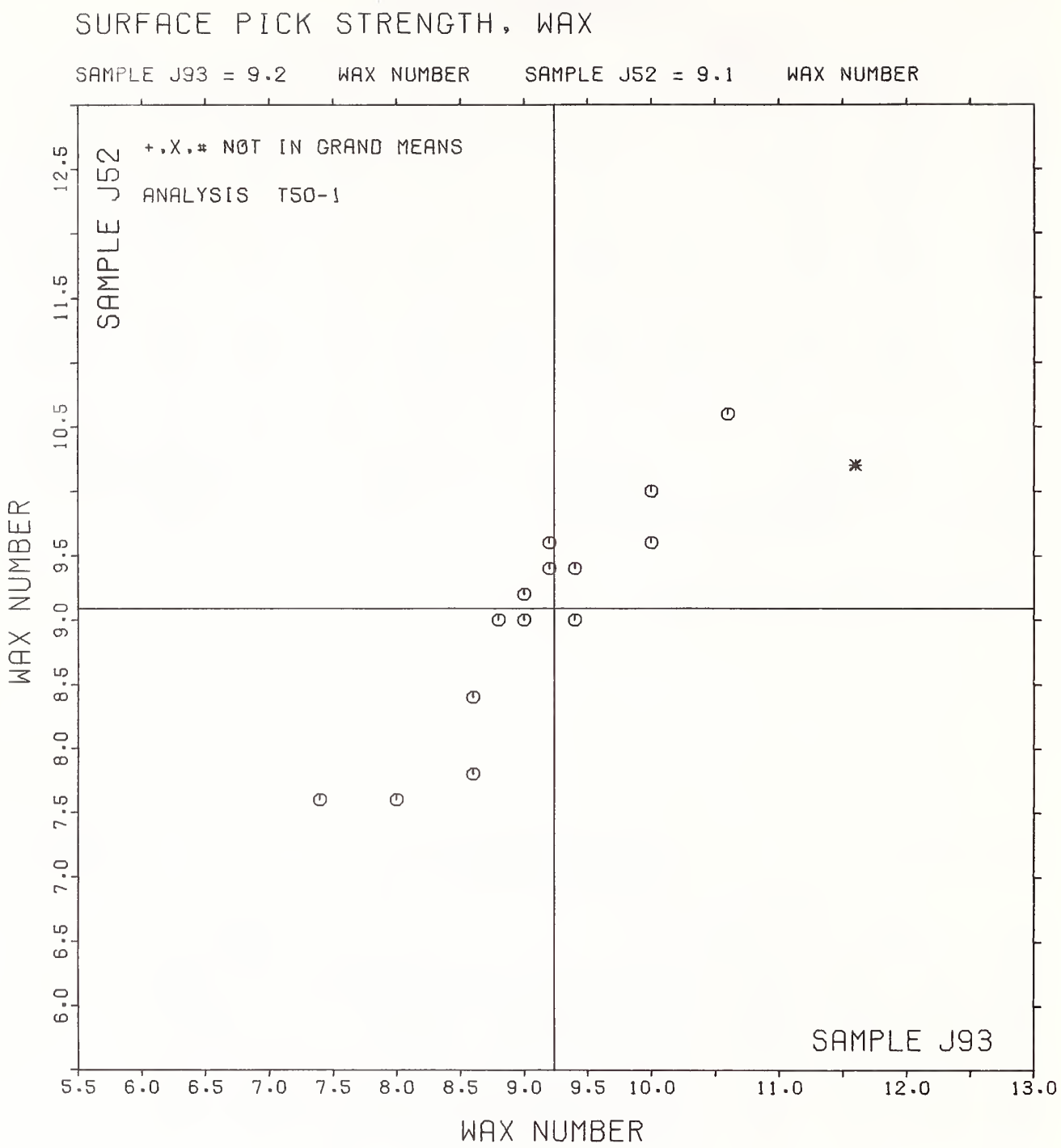
GR. MEAN = 9.24 WAX NUMBER — GRAND MEAN = 9.09 WAX NUMBER — TEST DETERMINATIONS = 5
SD MEANS = .99 WAX NUMBER — SD OF MEANS = .88 WAX NUMBER — 16 LABS IN GRAND MEANS
AVERAGE SDR = .31 WAX NUMBER — AVERAGE SDR = .40 WAX NUMBER
TOTAL NUMBER OF LABORATORIES REPORTING = 18

Best values: J93 9.0 ± 1.5 wax number
J52 9.0 ± 1.3 wax number

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

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

LAB CODE	F	MEANS J93	J52	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L243	O	7.40	7.60	-2.36	.09	2.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L173A	O	8.00	7.60	-1.91	-.30	.68	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L230	O	8.60	8.40	-.93	-.10	1.57	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L228	O	8.60	7.80	-1.33	-.55	1.93	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L213	O	8.80	9.00	-.39	.22	.72	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L567	O	9.00	9.00	-.24	.09	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L162	O	9.00	9.00	-.24	.09	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L183	O	9.00	9.20	-.10	.24	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L122	M	9.00				.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L182W	O	9.20	9.40	.18	.26	1.41	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L158	O	9.20	9.60	.31	.41	1.41	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L339	O	9.40	9.40	.33	.13	1.57	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L195	O	9.40	9.00	.06	-.17	.89	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L236	O	10.00	10.00	1.17	.18	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L105	O	10.00	9.60	.91	-.12	.68	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L697	O	10.60	10.60	2.02	.24	1.57	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L225	*	11.60	10.20	2.51	-.72	1.93	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L285	#	25.40	24.20	22.12	.70	18.36	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
GMEANS:		9.24	9.09			1.00		
95% ELLIPSE:				3.65	.88	WITH GAMMA = 41 DEGREES		


SURFACE PICK STRENGTH, WAX
SAMPLE J93 = 9.2 WAX NUMBER
SAMPLE J52 = 9.1 WAX NUMBER
+.X.* NOT IN GRAND MEANS
ANALYSIS T50-1
SAMPLE J52
SAMPLE J93
WAX NUMBER
WAX NUMBER
5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 11.0 12.0 13.0
6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.5 11.5 12.5

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T91-1 TABLE 1
CONCORA (CORRUGATING MEDIUM TEST-CMT)
TAPPI STANDARD T809 OS-71

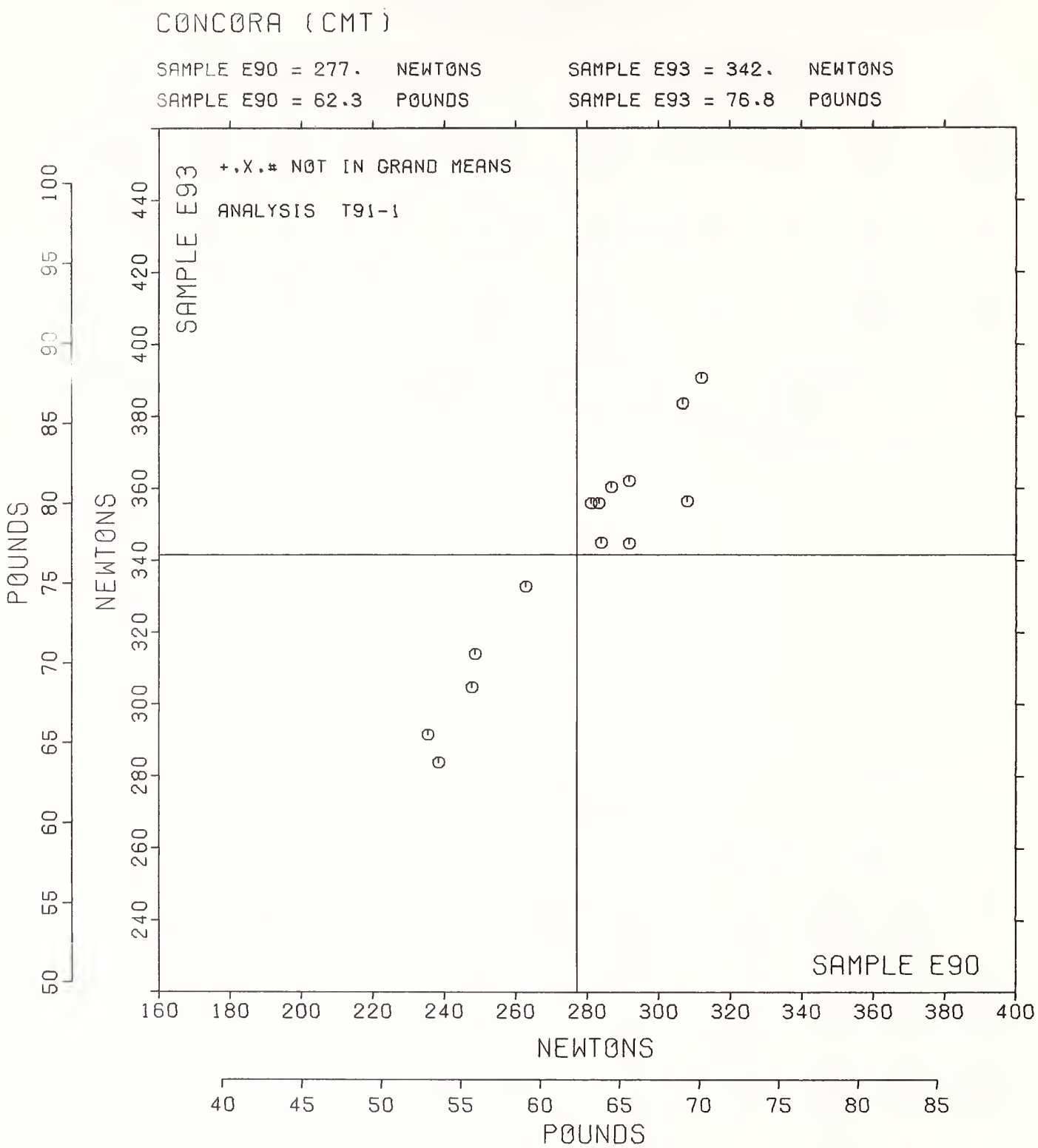
LAB CODE	SAMPLE E90 CORRUGATING MEDIUM 125 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE E93 TUBE WINDING 133 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
											TEST D.= 10		
L176	292.	15.	.57	17.	1.11	345.	3.	.10	26.	1.64	91P	G	L176
L182	312.	35.	1.34	21.	1.38	391.	49.	1.52	18.	1.14	91N	G	L182
L218	249.	-28.	-1.09	11.	.71	314.	-27.	-.85	14.	.87	91A	G	L218
L242	235.	-42.	-1.60	6.	.41	291.	-50.	-1.54	12.	.73	91G	G	L242
L248	307.	30.	1.14	23.	1.51	383.	42.	1.30	28.	1.79	91B	G	L248
L255	238.	-39.	-1.49	12.	.78	284.	-58.	-1.78	12.	.76	91P	G	L255
L269	283.	6.	.24	24.	1.56	356.	14.	.44	13.	.84	91P	G	L269
L280	284.	7.	.27	15.	.99	345.	3.	.11	20.	1.29	91N	G	L280
L289	248.	-29.	-1.13	12.	.78	305.	-37.	-1.14	14.	.90	91P	G	L289
L329	281.	4.	.16	21.	1.33	356.	14.	.44	20.	1.28	91P	G	L329
L394	263.	-14.	-.55	5.	.31	333.	-9.	-.27	5.	.29	91P	G	L394
L621	308.	31.	1.19	15.	.98	356.	15.	.46	11.	.71	91P	G	L621
L622	292.	15.	.57	13.	.84	362.	21.	.64	12.	.75	91P	G	L622
L650	287.	10.	.37	20.	1.32	360.	19.	.58	16.	.99	91N	G	L650

GR. MEAN = 277. NEWTONS GRAND MEAN = 342. NEWTONS TEST DETERMINATIONS = 10
SD MEANS = 26. NEWTONS SD OF MEANS = 32. NEWTONS 14 LABS IN GRAND MEANS
AVERAGE SDR = 16. NEWTONS AVERAGE SDR = 16. NEWTONS
GR. MEAN = 62.29 POUNDS GRAND MEAN = 76.77 POUNDS
TOTAL NUMBER OF LABORATORIES REPORTING = 14

Best values: E90 280 ± 40 newtons
E93 350 ± 60 newtons

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T91-1 TABLE 2
CONCORA (CORRUGATING MEDIUM TEST-CMT)
TAPPI STANDARD T809 OS-71

LAB CODE	F	MEANS E90	E93	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L242	G	235.	291.	-65.	1.	.57	91G	FLAT CRUSH STRENGTH, CONCORA, GAYDON FLAT CRUSH TESTER
L255	G	238.	284.	-69.	-6.	.77	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L289	G	248.	305.	-47.	0.	.84	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L218	G	249.	314.	-39.	5.	.79	91A	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L394	G	263.	333.	-16.	6.	.30	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L329	G	281.	356.	14.	6.	1.31	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L269	G	283.	356.	15.	4.	1.20	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L280	G	284.	345.	7.	-3.	1.14	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L650	G	287.	360.	21.	4.	1.15	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L176	G	292.	345.	12.	-10.	1.37	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L622	G	292.	362.	25.	1.	.80	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L248	G	307.	383.	51.	3.	1.65	91B	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L621	G	308.	356.	31.	-15.	.84	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L182	G	312.	391.	60.	3.	1.26	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
GMEANS:		277.	342.			1.00		
		95% ELLIPSE:		119.	18.	WITH GAMMA = 51 DEGREES		


CONCORA (CMT)
SAMPLE E90 = 277. NEWTONS
SAMPLE E90 = 62.3 POUNDS
SAMPLE E93 = 342. NEWTONS
SAMPLE E93 = 76.8 POUNDS
+,X,# NOT IN GRAND MEANS
ANALYSIS T91-1
SAMPLE E93
SAMPLE E90
NEWTONS
POUNDS
160 180 200 220 240 260 280 300 320 340 360 380 400
240 260 280 300 320 340 360 380 400 420 440
50 55 60 65 70 75 80 85 90 95 100
40 45 50 55 60 65 70 75 80 85

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS TS6-1 TABLE 1
RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)
TAPPI STANDARD T818 OS-76

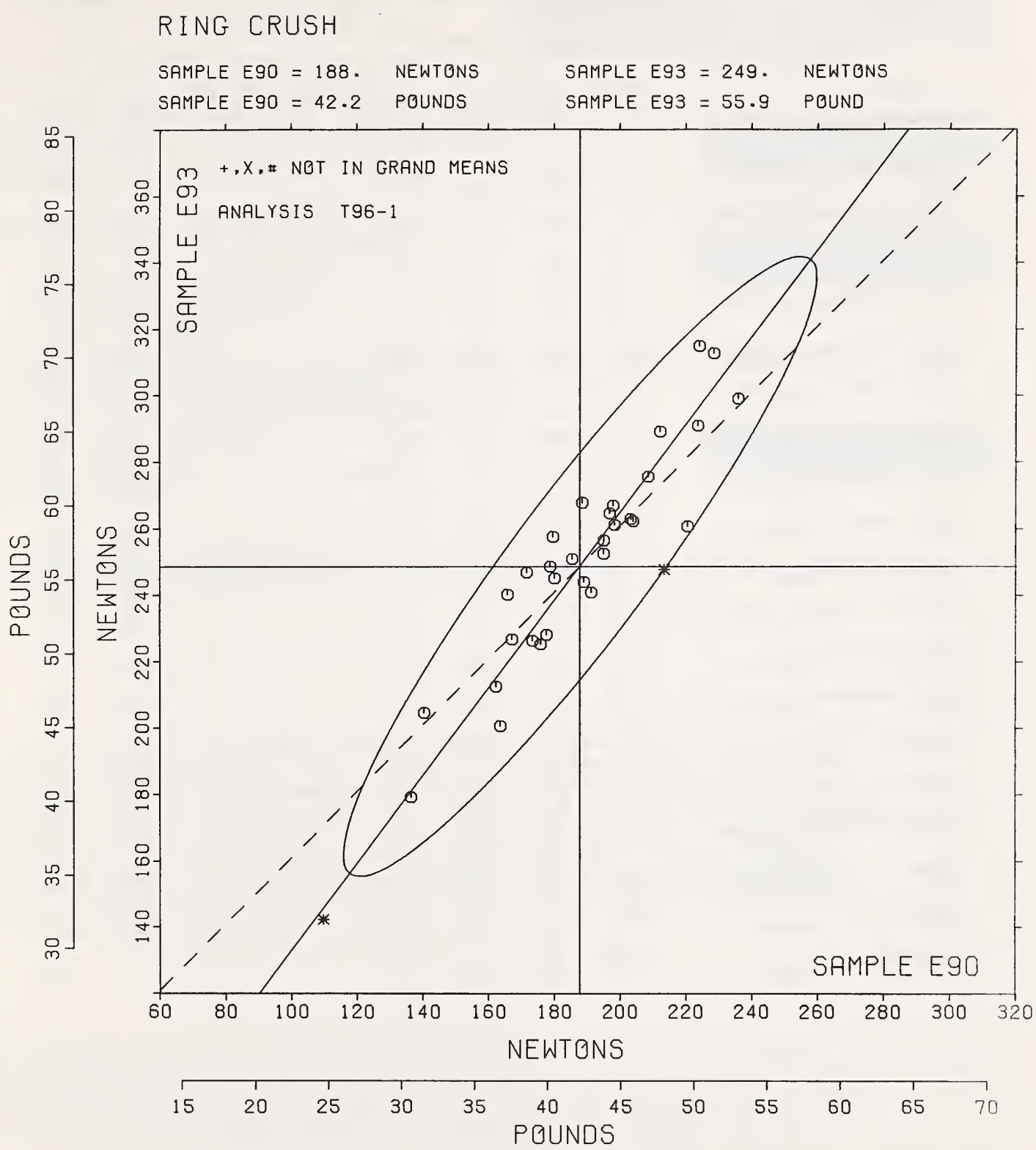
LAB CODE	SAMPLE E90 MEAN	CORRUGATING MEDIUM 125 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E93 MEAN	TUBE WINDING 133 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L107	137.	-51.	-1.86	14.	1.06	179.	-69.	-1.94	10.	.67	96P	@	L107
L114	221.	33.	1.19	8.	.59	261.	12.	.34	16.	1.05	96P	@	L114
L122	173.	-14.	-.52	18.	1.41	226.	-22.	-.62	19.	1.25	96P	@	L122
L124	198.	10.	.37	13.	1.00	267.	18.	.51	14.	.92	96P	@	L124
L126	176.	-12.	-.43	8.	.64	225.	-23.	-.65	14.	.90	96P	@	L126
L141	191.	4.	.13	12.	.90	241.	-8.	-.22	11.	.74	96P	@	L141
L157	224.	36.	1.31	12.	.96	291.	42.	1.18	14.	.92	96P	@	L157
L171	204.	16.	.59	15.	1.15	262.	14.	.38	9.	.58	96N	@	L171
L176	164.	-24.	-.87	14.	1.12	201.	-48.	-1.35	19.	1.27	96P	@	L176
L182	209.	21.	.76	8.	.59	276.	27.	.76	18.	1.21	96N	@	L182
L191	198.	11.	.39	25.	1.90	261.	12.	.35	27.	1.77	96P	@	L191
L218	189.	1.	.05	21.	1.64	244.	-5.	-.13	16.	1.04	96I	@	L218
L234	141.	-47.	-1.71	20.	1.52	205.	-44.	-1.23	18.	1.20	96P	@	L234
L237	185.	-2.	-.08	7.	.56	251.	2.	.06	10.	.68	96P	@	L237
L242	236.	48.	1.75	13.	.97	299.	50.	1.41	10.	.66	96G	@	L242
L243	229.	41.	1.48	16.	1.23	313.	64.	1.79	13.	.88	96P	@	L243
L303	197.	9.	.33	11.	.85	265.	16.	.45	14.	.90	96N	@	L303
L305	172.	-16.	-.58	6.	.49	247.	-2.	-.05	7.	.44	96N	@	L305
L329	224.	36.	1.32	18.	1.36	315.	66.	1.86	15.	1.00	96P	@	L329
L333	110.	-78.	-2.83	5.	.36	142.	-106.	-2.98	4.	.24	96I	*	L333
L350	203.	16.	.56	10.	.81	263.	14.	.40	21.	1.39	96P	@	L350
L393	179.	-9.	-.32	15.	1.17	249.	-0.	-.00	13.	.88	96P	@	L393
L553	212.	24.	.89	19.	1.48	289.	40.	1.13	13.	.89	96P	@	L553
L562	180.	-8.	-.28	10.	.79	245.	-4.	-.10	33.	2.20	96P	@	L562
L570	167.	-21.	-.74	5.	.37	227.	-22.	-.61	11.	.76	96P	@	L570
L610	214.	26.	.93	12.	.90	248.	-1.	-.02	21.	1.40	96P	*	L610
L617	180.	-8.	-.29	8.	.61	258.	9.	.25	20.	1.30	96P	@	L617
L621	195.	7.	.26	18.	1.40	253.	4.	.11	18.	1.18	96P	@	L621
L649	166.	-22.	-.79	6.	.43	240.	-8.	-.24	10.	.67	96P	@	L649
L650	195.	7.	.27	14.	1.10	256.	8.	.22	14.	.94	96N	@	L650
L663	162.	-25.	-.92	14.	1.09	213.	-36.	-1.01	16.	1.07	96P	@	L663
L676	178.	-10.	-.37	10.	.73	228.	-20.	-.57	13.	.83	96P	@	L676
L686	189.	1.	.03	14.	1.07	268.	19.	.54	12.	.82	96P	@	L686

GR. MEAN = 188. NEWTONS — GRAND MEAN = 249. NEWTONS — TEST DETERMINATIONS = 10
SD MEANS = 28. NEWTONS — SD OF MEANS = 36. NEWTONS — 33 LABS IN GRAND MEANS
AVERAGE SDR = 13. NEWTONS — AVERAGE SDR = 15. NEWTONS
GR. MEAN = 42.21 POUNDS — GRAND MEAN = 55.90 POUNDS
TOTAL NUMBER OF LABORATORIES REPORTING = 33

Best values: E90 190 ± 40 newtons
E93 250 ± 60 newtons

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

LAB CODE	F	MEANS E90	E93	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L333	*	110.	142.	-132.	-2.	.30	96I	RING CRUSH, INSTRON
L107	O	137.	179.	-86.	-1.	.86	96P	RING CRUSH, TMI/HINDE & DAUCH
L234	O	141.	205.	-64.	11.	1.36	96P	RING CRUSH, TMI/HINDE & DAUCH
L663	O	162.	213.	-44.	-2.	1.08	96P	RING CRUSH, TMI/HINDE & DAUCH
L176	O	164.	201.	-53.	-10.	1.19	96P	RING CRUSH, TMI/HINDE & DAUCH
L649	O	166.	240.	-20.	12.	.55	96P	RING CRUSH, TMI/HINDE & DAUCH
L570	O	167.	227.	-30.	3.	.56	96P	RING CRUSH, TMI/HINDE & DAUCH
L305	O	172.	247.	-11.	12.	.47	96N	RING CRUSH, TMI/HINDE & DAUCH
L122	O	173.	226.	-26.	-2.	1.33	96P	RING CRUSH, TMI/HINDE & DAUCH
L126	O	176.	225.	-26.	-5.	.77	96P	RING CRUSH, TMI/HINDE & DAUCH
L676	O	178.	228.	-22.	-4.	.78	96P	RING CRUSH, TMI/HINDE & DAUCH
L393	O	179.	249.	-5.	7.	1.03	96P	RING CRUSH, TMI/HINDE & DAUCH
L617	O	180.	258.	2.	12.	.95	96P	RING CRUSH, TMI/HINDE & DAUCH
L562	O	180.	245.	-7.	4.	1.50	96P	RING CRUSH, TMI/HINDE & DAUCH
L237	O	185.	251.	0.	3.	.62	96P	RING CRUSH, TMI/HINDE & DAUCH
L686	O	189.	268.	16.	11.	.95	96P	RING CRUSH, TMI/HINDE & DAUCH
L218	O	189.	244.	-3.	-4.	1.34	96I	RING CRUSH, INSTRON
L141	O	191.	241.	-4.	-7.	.82	96P	RING CRUSH, TMI/HINDE & DAUCH
L621	O	195.	253.	8.	-3.	1.29	96P	RING CRUSH, TMI/HINDE & DAUCH
L650	O	195.	256.	11.	-1.	1.02	96N	RING CRUSH, TMI/HINDE & DAUCH
L303	O	197.	265.	18.	2.	.87	96N	RING CRUSH, TMI/HINDE & DAUCH
L124	O	198.	267.	21.	3.	.96	96P	RING CRUSH, TMI/HINDE & DAUCH
L191	O	198.	261.	16.	-1.	1.84	96P	RING CRUSH, TMI/HINDE & DAUCH
L350	O	203.	263.	21.	-4.	1.10	96P	RING CRUSH, TMI/HINDE & DAUCH
L171	O	204.	262.	21.	-5.	.87	96N	RING CRUSH, TMI/HINDE & DAUCH
L182	O	209.	276.	34.	-0.	.90	96N	RING CRUSH, TMI/HINDE & DAUCH
L553	O	212.	289.	47.	5.	1.18	96P	RING CRUSH, TMI/HINDE & DAUCH
L610	*	214.	248.	15.	-21.	1.15	96P	RING CRUSH, TMI/HINDE & DAUCH
L114	O	221.	261.	29.	-19.	.82	96P	RING CRUSH, TMI/HINDE & DAUCH
L157	O	224.	291.	55.	-3.	.94	96P	RING CRUSH, TMI/HINDE & DAUCH
L329	O	224.	315.	75.	11.	1.18	96P	RING CRUSH, TMI/HINDE & DAUCH
L243	O	229.	313.	76.	6.	1.06	96P	RING CRUSH, TMI/HINDE & DAUCH
L242	O	236.	299.	69.	-8.	.82	96G	RING CRUSH, GAYDON FLAT CRUSH TESTER
GMEANS:		188.	249.			1.00		
		95% ELLIPSE:		116.	21.	WITH GAMMA = 52 DEGREES		


RING CRUSH
SAMPLE E90 = 188. NEWTONS
SAMPLE E90 = 42.2 POUNDS
SAMPLE E93 = 249. NEWTONS
SAMPLE E93 = 55.9 POUND
+,X,* NOT IN GRAND MEANS
ANALYSIS T96-1
SAMPLE E93
NEWTONS
POUNDS
SAMPLE E90
NEWTONS
POUNDS

SUMMARY TABLE

TEST METHOD	SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDR	REPL CRP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPROD
BURSTING STRENGTH, MODEL C	J87	17.52	1.21	1.13	15	44	49	10	.99	3.39
T10-1 PSI	J40	29.56	1.92	1.64					1.44	5.37
BURSTING STRENGTH, MODEL C-A	J87	17.91	1.37	1.18	15	35	39	10	1.03	3.83
T10-2 PSI	J40	29.56	1.77	1.61					1.41	4.96
BURSTING STRENGTH, HIGH RANGE	B56	38.7	1.8	2.9	15	39	48	10	2.5	5.2
T11-1 PSI	K30	59.0	2.6	4.2					3.7	7.6
TEARING STRENGTH, DEEP CUTOUT	B96	47.1	2.5	1.6	15	128	145	10	1.4	6.9
T15-1 GRAMS	G01	85.3	4.3	2.7					2.4	11.9
TEARING STRENGTH, NO CUTOUT	K49	116.8	7.0	5.7	15	11	14	10	5.0	19.6
T17-1 GRAMS	K20	143.1	8.9	6.8					6.0	25.0
TENSILE STRENGTH, PACKAGING PAPERS	J16	8.79	.32	.32	20	47	52	12	.26	.91
T19-1 KILONEWTON/M	K32	8.80	.28	.46					.36	.82
TENSILE STRENGTH, CRE TYPE	K39	4.89	.29	.24	20	44	49	12	.19	.82
T20-1 KILONEWTON/M	G03	3.19	.17	.15					.12	.47
TENSILE STRENGTH, PENDULUM TYPE	K39	5.00	.28	.25	20	37	38	12	.20	.77
T20-2 KILONEWTON/M	G03	3.30	.25	.16					.13	.71
T.E.A., PACKAGING PAPERS	J16	124.1	15.9	13.0	20	17	17	12	10.4	44.5
T25-1 JOULES/SQ M	K32	81.8	12.3	10.7					8.6	34.4
T.E.A., PRINTING PAPERS	K39	54.4	5.0	5.4	20	18	19	12	4.4	14.2
T26-1 JOULES/SQ M	G03	31.3	3.2	3.3					2.6	8.9
ELONGATION TO BREAK, PACKAGING PAPER	J16	2.25	.23	.17	20	17	18	12	.13	.65
T28-1 PERCENT	K32	1.56	.21	.14					.12	.58
ELONGATION TO BREAK, PRINTING PAPER	K39	1.710	.151	.150	20	17	19	12	.120	.424
T29-1 PERCENT	G03	1.501	.157	.131					.104	.440
FOLDING ENDURANCE (MIT)	B88	49.0	16.3	19.7	15	46	52	10	17.3	46.2
T30-1 DOUBLE FOLDS	A92	30.6	6.4	10.3					9.0	18.5
FOLDING ENDURANCE (MIT)	B88	1.63	.16	.18	15	46	52	10	.16	.44
T30-2 LOG(10) FOLD	A92	1.46	.09	.15					.13	.27
STIFFNESS, GURLEY	K41	109.2	13.0	7.2	10	35	39	10	6.3	36.1
T35-1 GURLEY UNITS	J26	244.0	16.6	12.3					10.7	46.0
STIFFNESS, TABER	A77	27.64	2.49	1.53	10	29	32	5	1.90	7.02
T36-1 TABER UNITS	J70	6.16	1.07	.39					.49	2.99
SURFACE PICK STRENGTH, IGT	J93	58.0	32.0	3.1	4	10	13	4	4.3	88.7
T49-1 KP CM/SEC	J52	56.6	29.4	3.8					5.2	81.3
SURFACE PICK STRENGTH, WAX	J93	9.24	.99	.31	5	16	18	5	.38	2.75
T50-1 WAX NUMBER	J52	9.09	.88	.40					.50	2.44
CONCORA (CMT)	E90	277.	26.	16.	10	14	14	10	14.	72.
T91-1 NEWTONS	E93	342.	32.	16.					14.	90.
RING CRUSH	E90	188.	28.	13.	10	33	33	10	11.	76.
T96-1 NEWTONS	E93	249.	36.	15.					13.	99.

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9241 Wood Glade Drive, Great Falls, VA 22066
and Technical Association of the Pulp and Paper Industry

13. Type of Report & Period Covered: FINAL

14. Sponsoring Agency Code

15. SUPPLEMENTARY NOTES

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

16. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)

Collaborative Reference Programs provide participating laboratories with the means for checking periodically the level and uniformity of their testing in comparison with that of other participating laboratories. An important by-product of the programs is the provision of realistic pictures of the state of the testing art. This is one of the periodic reports showing averages for each participant, within and between laboratory variability, and other information for participants and standards committees.

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

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

18. AVAILABILITY ☐ Unlimited

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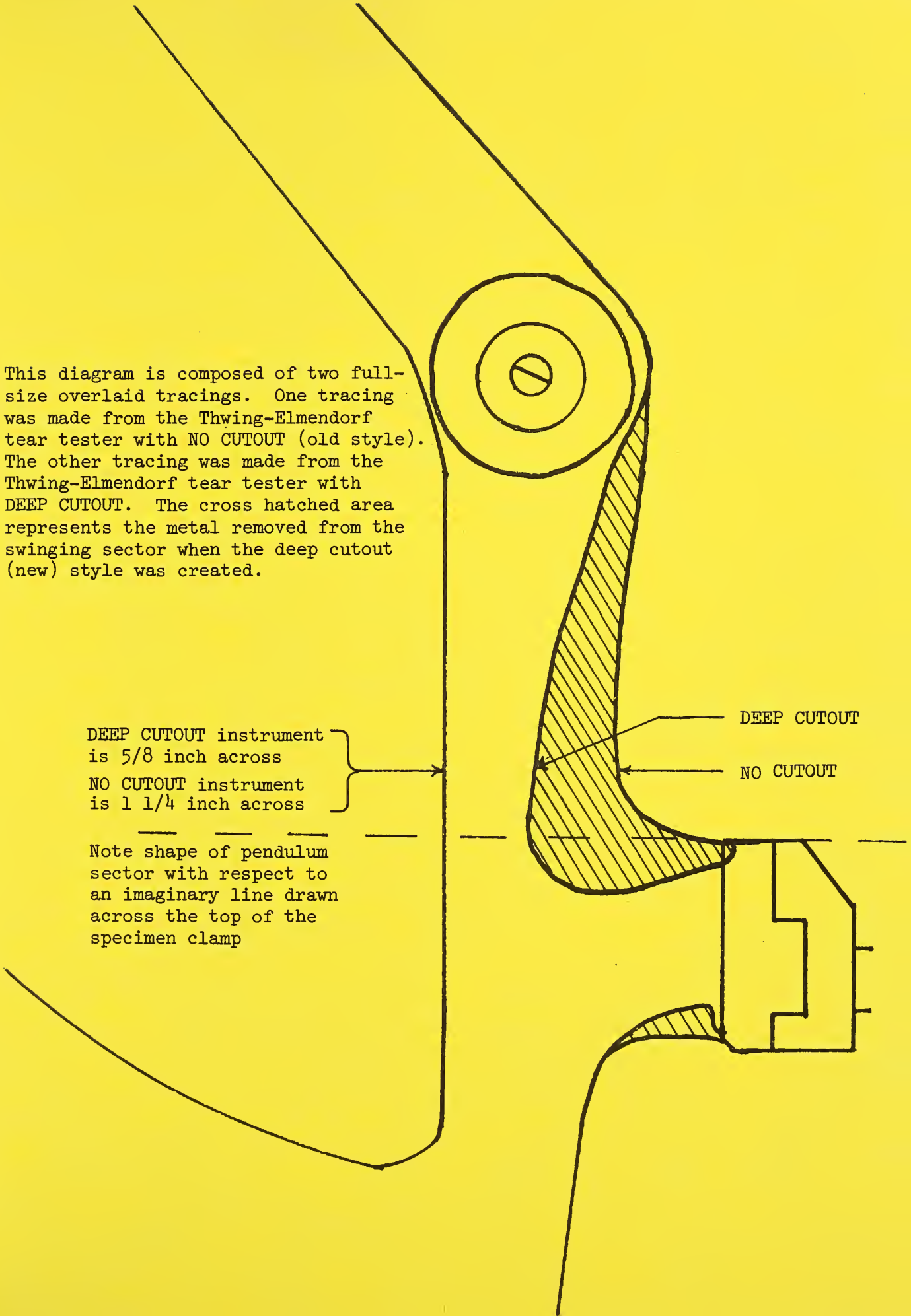
This diagram is composed of two full-size overlaid tracings. One tracing was made from the Thwing-Elmendorf tear tester with NO CUTOUT (old style). The other tracing was made from the Thwing-Elmendorf tear tester with DEEP CUTOUT. The cross hatched area represents the metal removed from the swinging sector when the deep cutout (new) style was created.
DEEP CUTOUT instrument is 5/8 inch across
NO CUTOUT instrument is 1 1/4 inch across
Note shape of pendulum sector with respect to an imaginary line drawn across the top of the specimen clamp
DEEP CUTOUT
NO CUTOUT