TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM FOR PAPER

REPORT NO. 58S
STRENGTH TESTS

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

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

CTS Thermal Insulation Materials (2 times per year)

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

ASTM Cement (2 times per year)

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

AASHTO Bituminous

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

NBS Collaborative Reference Programs
A05 Technology Building
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TECHNICAL ASSOCIATION OF THE
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Report No. 58S
STRENGTH TESTS

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NBSIR 79-1375

U. S. DEPARTMENT OF COMMERCE
National Bureau of Standards

INTRODUCTION

Reports 58S and 58G comprise the fourth set of reports for the 78-79 program year. Participants in tests which involve strength properties of paper will receive only the S report; those in tests which measure other properties will receive only the G report.

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

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

Jeffrey Horlick

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

June 8, 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.

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

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

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

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

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

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

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

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

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

GR. MEAN = 27.71 PSI — GRAND MEAN = 17.32 PSI — TEST DETERMINATIONS = 15
SD MEANS = 1.99 PSI — SD OF MEANS = 1.25 PSI — 41 LABS IN GRAND MEANS
AVERAGE SDR = 1.83 PSI — AVERAGE SDR = 1.08 PSI
GR. MEAN = 191.1 KILOPASCAL — GRAND MEAN = 119.4 KILOPASCAL

L128	27.80	.09	.05	1.52	.83	18.87	1.54	1.23	.99	.91	10B	•	L128
L219	27.22	-.49	-.25	2.40	1.31	17.07	-.25	-.20	1.32	1.22	10T	•	L219
L242	29.72	2.01	1.01	2.14	1.17	19.75	2.43	1.94	1.24	1.15	10T	•	L242
L250L	26.78	-.93	-.47	1.72	.94	18.51	1.19	.95	.77	.71	10N	•	L250L
L251	25.86	-1.85	-.93	1.44	.79	18.17	.85	.68	1.83	1.69	10V	•	L251
L269	31.73	4.02	2.02	1.79	.98	22.33	5.01	4.00	1.59	1.47	10A	•	L269

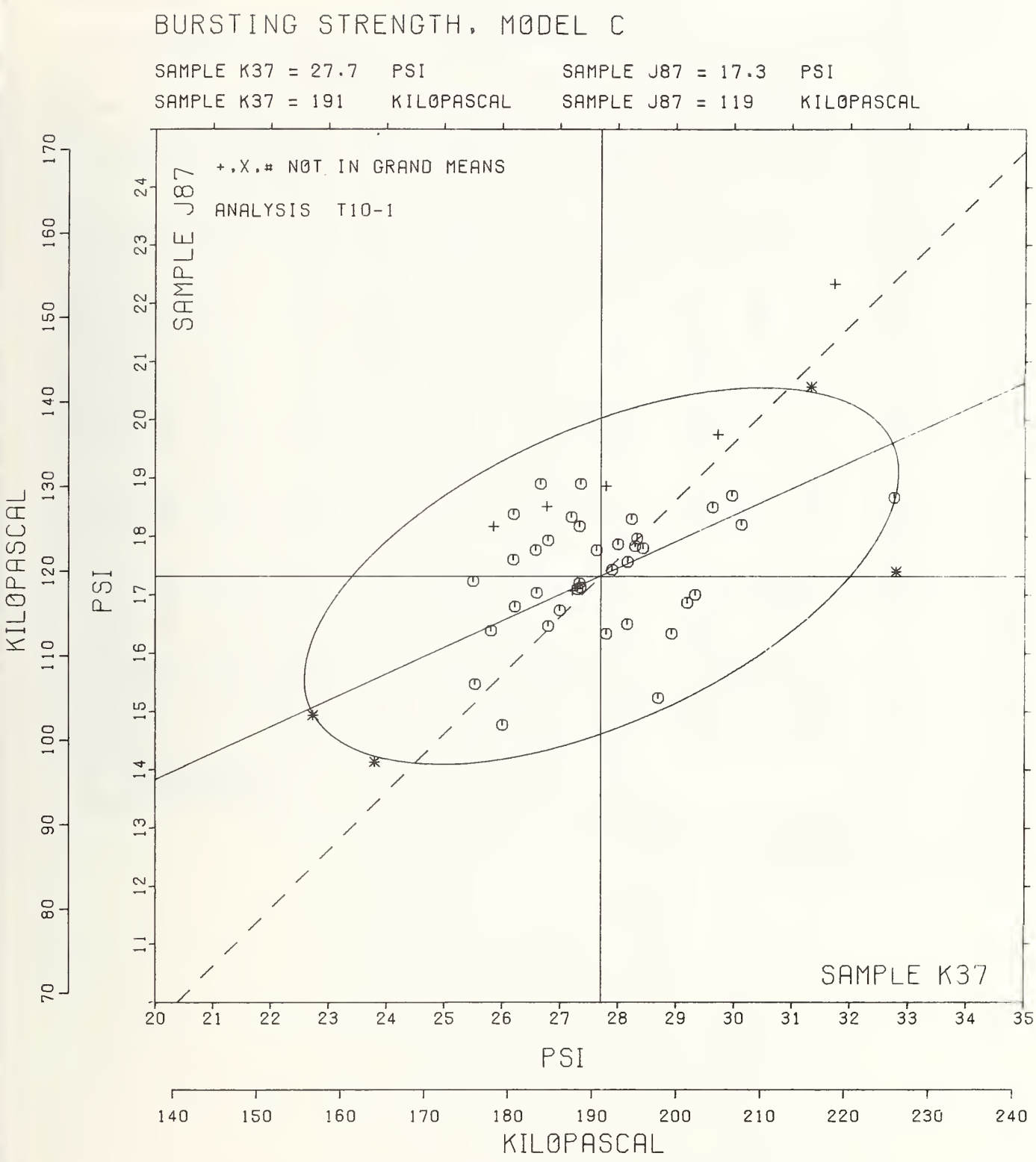
TOTAL NUMBER OF LABORATORIES REPORTING = 49

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

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

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T10-1 TABLE 2
BURSTING STRENGTH, PSI
TAPPI STANDARD T403 OS-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C

LAB CODE	F	MEANS K37	MEANS J87	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L339	#	15.97	10.67	-13.44	-1.21	.45	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L131	*	22.73	14.93	-5.52	-.12	1.25	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L191	*	23.80	14.13	-4.88	-1.29	.84	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L326	O	25.50	17.23	-2.05	.83	1.13	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L278	O	25.53	15.47	-2.75	-.79	.85	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L330	O	25.81	16.39	-2.11	-.07	1.08	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L251	*	25.86	18.17	-1.33	1.54	1.24	10V	BURSTING STRENGTH UP TO 45 PSI, L*W,MANUAL CLAMP, 20C,65% RH
L684	O	26.00	14.77	-2.61	-1.62	1.04	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L356	O	26.20	17.60	-1.26	.88	1.03	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L248	O	26.21	18.38	-.93	1.58	1.10	10E	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L167	O	26.23	16.80	-1.57	.14	.65	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L121	O	26.58	17.77	-.85	.87	.62	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L261	O	26.60	17.03	-1.13	.20	.99	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L243	O	26.67	18.90	-.30	1.87	.81	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L250L	*	26.78	18.51	-.36	1.47	.83	10N	BURSTING STRENGTH UP TO 45 PSI,LHOMARGY,MAN.CLAMP, 20C,65%RH
L333	O	26.80	16.47	-1.18	-.40	2.46	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L237B	O	26.80	17.93	-.58	.93	.53	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L237A	O	27.00	16.73	-.89	-.24	.62	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L150	O	27.20	18.33	-.05	1.13	.92	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L219	*	27.22	17.07	-.55	-.02	1.27	10T	BURSTING STRENGTH UP TO 45 PSI, L*W,MANUAL CLAMP
L279	O	27.30	17.10	-.47	-.03	1.12	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L207	O	27.33	17.20	-.39	.04	1.03	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L599	O	27.34	18.17	.01	.93	.78	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L312	O	27.35	17.13	-.41	-.03	.61	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L360	O	27.37	18.90	.34	1.58	.64	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L183	O	27.63	17.77	.11	.44	.82	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L128	*	27.80	18.87	.72	1.37	.87	10B	BURSTING STRENGTH UP TO 45 PSI, PERKINS B, MANUAL CLAMP
L158	O	27.80	16.33	-.33	-.94	1.26	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L232	O	27.90	17.43	.22	.02	1.11	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L568	O	28.00	17.87	.49	.38	1.17	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L358	O	28.16	16.50	.07	-.93	.85	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L153	O	28.17	17.57	.52	.03	1.03	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L225	O	28.23	18.30	.88	.67	1.16	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L212	O	28.30	17.83	.75	.22	1.18	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L390	O	28.33	17.97	.83	.33	.71	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L249	O	28.43	17.80	.86	.14	1.24	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L344	O	28.70	15.23	.04	-2.31	1.15	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L264	O	28.93	16.33	.71	-1.41	.68	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L134	O	29.20	16.87	1.17	-1.03	.83	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L305	O	29.33	17.00	1.35	-.96	1.06	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L268	O	29.63	18.50	2.24	.28	.89	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L242	*	29.72	19.75	2.84	1.38	1.16	10T	BURSTING STRENGTH UP TO 45 PSI, L*W,MANUAL CLAMP
L315	O	29.97	18.70	2.62	.32	1.22	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L311	O	30.13	18.20	2.57	-.20	1.20	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L223A	*	31.33	20.57	4.64	1.46	.99	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L269	*	31.73	22.33	5.73	2.90	1.22	10A	BURSTING STRENGTH UP TO 45 PSI, PERKINS A, MANUAL CLAMP
L299	O	32.77	18.67	5.16	-.86	1.46	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L321	*	32.80	17.40	4.67	-2.03	1.80	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L331	#	51.37	37.07	29.70	8.21	1.88	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
GMEANS:		27.71	17.32			1.00		
		95% ELLIPSE:		5.51	2.52	WITH GAMMA = 24 DEGREES		


BURSTING STRENGTH, MØDEL C
SAMPLE K37 = 27.7 PSI
SAMPLE K37 = 191 KILØPASCAL
SAMPLE J87 = 17.3 PSI
SAMPLE J87 = 119 KILØPASCAL
+,X,# NØT IN GRAND MEANS
ANALYSIS T10-1
SAMPLE J87
PSI
KILØPASCAL
SAMPLE K37
PSI
KILØPASCAL

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 K37 MEAN	PRINTING 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J87 MEAN	PRINTING 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 15 VAR	F	LAB
L100	27.82	.56	.27	1.30	.70	19.02	1.40	.73	1.09	1.03	10D	O	L100
L105	26.40	-.86	-.41	4.95	2.65	13.93	-3.68	-1.90	1.53	1.45	10D	O	L105
L106C	26.93	-.32	-.16	.88	.47	18.40	.78	.41	.63	.60	10D	O	L106C
L118	27.87	.61	.29	1.73	.92	19.70	2.08	1.08	1.02	.96	10D	O	L118
L122	25.60	-1.66	-.80	2.13	1.14	17.87	.25	.13	1.06	1.00	10F	O	L122
L125	24.40	-2.86	-1.38	3.08	1.65	14.23	-3.38	-1.75	1.25	1.18	10D	O	L125
L141	27.59	.34	.16	1.74	.93	18.34	.72	.37	1.04	.99	10D	O	L141
L148	29.40	2.14	1.03	1.59	.85	18.80	1.18	.61	1.01	.96	10D	O	L148
L157	28.90	1.64	.79	1.75	.94	19.93	2.32	1.20	.50	.47	10D	O	L157
L159	24.08	-3.17	-1.53	1.37	.73	16.10	-1.51	-.78	1.09	1.03	10D	O	L159
L162	27.80	.54	.26	1.08	.58	16.00	-1.62	-.83	.85	.80	10D	O	L162
L163	27.80	.54	.26	2.80	1.49	17.20	-.42	-.21	1.24	1.17	10D	O	L163
L166	31.30	4.04	1.95	1.59	.85	19.77	2.15	1.11	1.08	1.02	10D	O	L166
L185	30.60	3.34	1.61	1.39	.74	19.63	2.02	1.04	.90	.85	10D	O	L185
L190C	25.73	-1.52	-.73	1.53	.82	17.13	-.48	-.25	1.06	1.00	10D	O	L190C
L190R	27.33	.08	.04	2.02	1.08	18.20	.58	.30	.94	.89	10D	O	L190R
L194	26.99	-.26	-.13	1.10	.59	18.96	1.34	.69	.68	.64	10D	O	L194
L226B	28.23	.98	.47	2.70	1.44	18.57	.95	.49	1.18	1.11	10D	O	L226B
L226C	29.80	2.54	1.23	1.28	.68	18.73	1.12	.58	1.27	1.20	10D	O	L226C
L233	26.42	-.84	-.40	1.79	.95	17.79	.17	.09	.78	.74	10D	O	L233
L241	28.20	.94	.46	1.76	.94	19.25	1.64	.85	1.00	.95	10D	O	L241
L255	26.27	-.99	-.48	.96	.51	18.80	1.18	.61	.86	.81	10D	O	L255
L257A	27.00	-.26	-.12	1.77	.95	18.53	.92	.47	1.25	1.18	10D	O	L257A
L257B	27.93	.68	.33	1.16	.62	18.27	.65	.34	.88	.84	10D	O	L257B
L257C	28.27	1.01	.49	1.58	.84	18.27	.65	.34	1.10	1.04	10D	O	L257C
L262	28.00	.74	.36	1.63	.87	18.67	1.05	.54	1.19	1.13	10D	O	L262
L275	24.15	-3.11	-1.50	2.23	1.19	13.92	-3.70	-1.91	1.39	1.31	10D	O	L275
L280	28.43	1.18	.57	2.16	1.15	19.59	1.98	1.02	1.03	.97	10D	O	L280
L285	30.73	3.48	1.68	2.65	1.42	16.87	-.75	-.39	1.11	1.05	10D	*	L285
L309	29.67	2.41	1.16	2.95	1.57	18.19	.58	.30	1.44	1.36	10D	O	L309
L352	25.00	-2.26	-1.09	.89	.48	16.63	-.98	-.51	.67	.63	10D	O	L352
L563	22.86	-4.39	-2.12	1.47	.79	14.26	-3.36	-1.74	1.48	1.40	10U	O	L563
L567	24.07	-3.19	-1.54	2.34	1.25	15.73	-1.88	-.97	.86	.82	10D	O	L567
L575	28.94	1.68	.81	2.27	1.21	19.55	1.93	1.00	1.15	1.09	10D	O	L575
L581	26.80	-.46	-.22	3.05	1.63	17.07	-.55	-.28	1.49	1.41	10D	O	L581
L587	27.80	.54	.26	1.47	.79	17.90	.28	.15	1.06	1.00	10D	O	L587
L652	23.33	-3.92	-1.89	3.01	1.61	11.97	-5.65	-2.92	1.04	.99	10D	*	L652

GR. MEAN = 27.26 PSI GRAND MEAN = 17.62 PSI TEST DETERMINATIONS = 15

SD MEANS = 2.07 PSI SD OF MEANS = 1.93 PSI 37 LABS IN GRAND MEANS

AVERAGE SDR = 1.87 PSI AVERAGE SDR = 1.06 PSI

GR. MEAN = 187.9 KILOPASCAL GRAND MEAN = 121.5 KILOPASCAL

TOTAL NUMBER OF LABORATORIES REPORTING = 37

Best values: K37 27.3 ± 3.3 psi

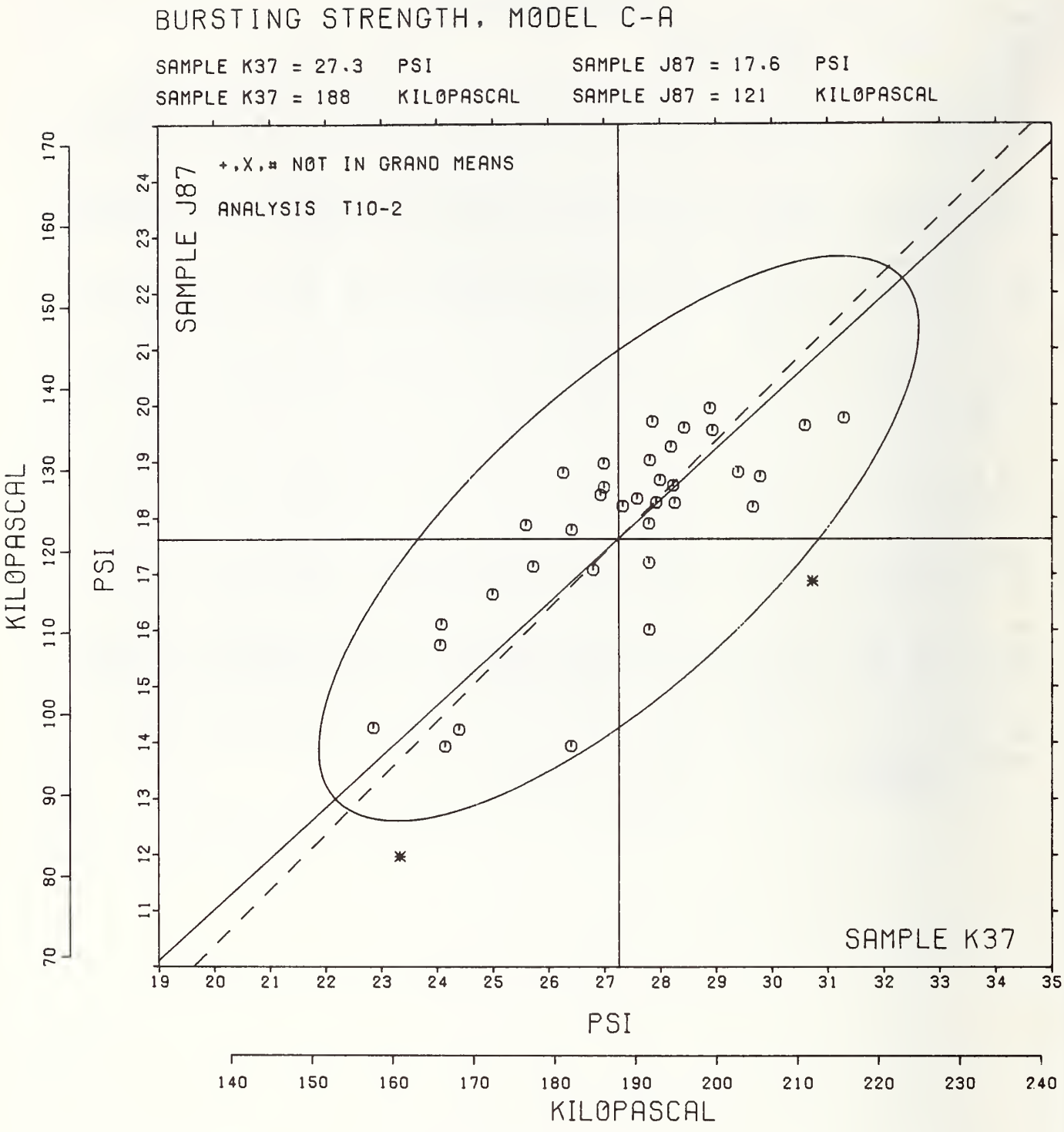
J87 17.7 ± 2.5 psi

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


BURSTING STRENGTH, MODEL C-A
SAMPLE K37 = 27.3 PSI
SAMPLE K37 = 188 KILOPASCAL
SAMPLE J87 = 17.6 PSI
SAMPLE J87 = 121 KILOPASCAL
+,X,* NOT IN GRAND MEANS
ANALYSIS T10-2
SAMPLE J87
SAMPLE K37
PSI
KILOPASCAL
11 12 13 14 15 16 17 18 19 20 21 22 23 24
70 80 90 100 110 120 130 140 150 160 170
19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
140 150 160 170 180 190 200 210 220 230 240

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 H41 PRINTING 151 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE B56 BROWN KRAFT 76 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L100	53.5	-1.0	-.54	2.8	1.03	39.9	1.3	.57	2.1	.71	11D	O	L100
L103	57.2	2.7	1.51	1.7	.65	40.9	2.3	1.04	1.8	.60	11C	O	L103
L107	57.2	2.7	1.48	3.9	1.44	43.0	4.4	1.97	4.9	1.60	11C	O	L107
L118	56.9	2.4	1.32	2.2	.84	39.8	1.2	.56	2.7	.90	11D	O	L118
L122	53.0	-1.5	-.84	3.4	1.25	37.9	-.7	-.32	2.9	.94	11F	O	L122
L128	54.7	.1	.08	2.3	.86	38.7	.1	.07	1.5	.49	11D	O	L128
L141	54.7	.1	.08	3.2	1.19	36.9	-1.7	-.74	2.8	.92	11D	O	L141
L148	57.5	2.9	1.63	2.6	.97	40.9	2.3	1.02	3.2	1.05	11D	O	L148
L159	51.2	-3.3	-1.84	2.4	.90	35.2	-3.4	-1.51	3.0	.99	11D	O	L159
L170	54.7	.1	.08	3.4	1.27	43.8	5.2	2.32	3.2	1.06	11C	*	L170
L182	54.8	.3	.16	2.1	.77	40.3	1.7	.75	2.2	.73	11D	O	L182
L218	55.3	.8	.43	3.9	1.44	38.0	-.6	-.26	3.0	.97	11D	O	L218
L232	49.3	-5.3	-2.90	3.4	1.28	27.1	-11.5	-5.12	3.9	1.28	11C	#	L232
L237A	54.1	-.4	-.21	2.4	.88	41.8	3.2	1.44	3.2	1.05	11C	O	L237A
L237B	56.2	1.7	.93	1.3	.47	38.9	.3	.13	1.9	.63	11C	O	L237B
L238A	56.4	1.9	1.03	2.4	.88	39.2	.6	.27	3.9	1.30	11Y	O	L238A
L243	53.3	-1.2	-.65	2.7	1.02	37.2	-1.4	-.62	3.1	1.04	11C	O	L243
L248	52.8	-1.7	-.92	3.0	1.10	37.8	-.8	-.35	2.7	.90	11E	O	L248
L278	51.9	-2.6	-1.43	2.7	.99	36.8	-1.8	-.81	2.8	.91	11C	O	L278
L279	56.3	1.8	1.00	2.7	1.01	38.0	-.6	-.25	4.2	1.39	11C	O	L279
L280	55.9	1.4	.76	2.4	.91	40.0	1.4	.65	3.3	1.10	11D	O	L280
L330	54.0	-.6	-.31	2.4	.91	37.5	-1.1	-.51	3.6	1.19	11C	O	L330
L331	35.3	-19.3	-10.64	1.2	.46	40.4	1.8	.81	1.0	.33	11C	#	L331
L333	55.7	1.2	.67	3.2	1.17	38.4	-.2	-.08	5.4	1.80	11C	O	L333
L344	55.4	.9	.51	1.6	.60	38.0	-.6	-.28	3.0	.99	11C	O	L344
L356	55.2	.7	.40	2.1	.77	38.2	-.4	-.19	2.0	.67	11C	O	L356
L567	53.7	-.8	-.45	2.8	1.03	36.3	-2.3	-1.01	3.4	1.13	11D	O	L567
L575	54.8	.3	.15	2.8	1.04	39.9	1.3	.58	3.9	1.27	11D	O	L575
L581	52.4	-2.1	-1.17	3.4	1.27	33.5	-5.1	-2.26	2.7	.91	11D	O	L581
L599	55.0	.5	.26	3.7	1.38	39.2	.6	.27	3.2	1.04	11C	O	L599
L604	52.2	-2.3	-1.28	3.7	1.37	35.0	-3.6	-1.59	4.5	1.48	11C	O	L604
L622	50.7	-3.9	-2.14	2.7	1.01	36.3	-2.3	-1.02	2.3	.75	11E	O	L622
L650	55.5	.9	.52	2.3	.84	40.5	1.9	.84	2.5	.83	11D	O	L650
L651	62.7	8.1	4.50	3.7	1.38	45.3	6.7	2.99	2.8	.92	11D	X	L651
L680	52.3	-2.3	-1.24	2.7	.99	37.1	-1.5	-.68	2.1	.70	11D	O	L680

GR. MEAN = 54.5 PSI — GRAND MEAN = 38.6 PSI — TEST DETERMINATIONS = 15
SD MEANS = 1.8 PSI — SD OF MEANS = 2.2 PSI — 32 LABS IN GRAND MEANS
AVERAGE SDR = 2.7 PSI — AVERAGE SDR = 3.0 PSI
GR. MEAN = 375.9 KILOPASCAL — GRAND MEAN = 266.0 KILOPASCAL

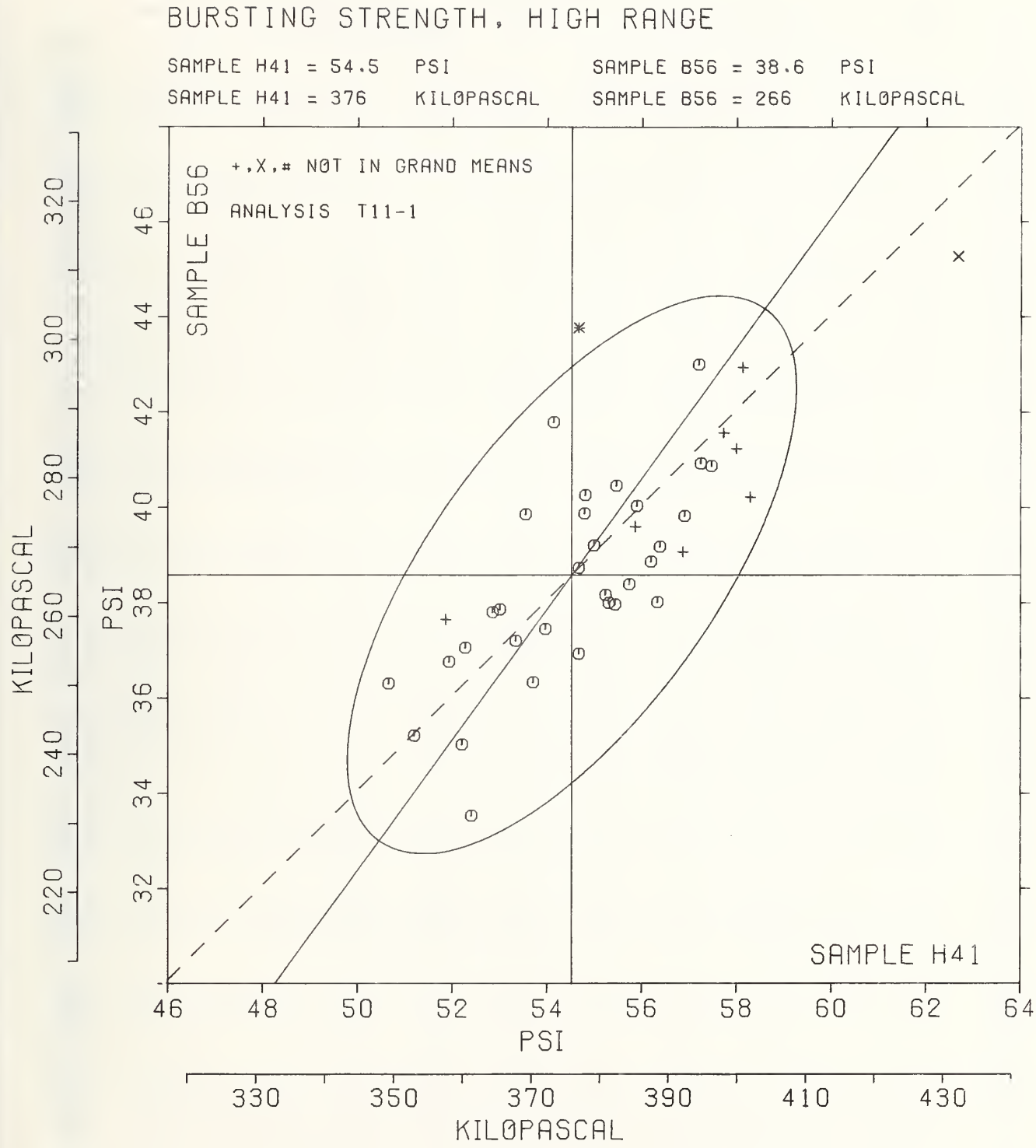
L242	58.0	3.5	1.93	2.3	.86	41.2	2.6	1.18	2.9	.95	11T	*	L242
L250L	51.9	-2.7	-1.47	1.7	.62	37.7	-.9	-.42	2.5	.82	11N	*	L250L
L251	58.3	3.8	2.09	3.3	1.25	40.2	1.6	.73	3.9	1.29	11V	*	L251
L290	58.1	3.6	2.00	2.2	.83	42.9	4.3	1.94	3.1	1.02	11A	*	L290
L393	55.9	1.3	.75	2.6	.95	39.6	1.0	.45	2.2	.74	11H	*	L393
L394	67.1	12.5	6.94	4.1	1.51	51.5	12.9	5.76	4.0	1.31	11H	*	L394
L565	7.2	-47.3	-26.16	.3	.10	5.3	-33.3	-14.89	.4	.13	11T	*	L565
L570	56.9	2.3	1.30	2.0	.74	39.1	.5	.21	2.8	.92	11H	*	L570
L576	57.7	3.2	1.78	2.5	.93	41.6	3.0	1.33	2.6	.86	11P	*	L576

TOTAL NUMBER OF LABORATORIES REPORTING = 44
Best values: H41 54 ± 3 psi
B56 38 ± 3 psi

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

ANALYSIS T11-1 TABLE 2
BURSTING STRENGTH, HIGH RANGE, PSI
TAPPI STANDARD T403 OS-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C OR C-A

LAB CODE	F	MEANS H41	MEANS B56	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L565	*	7.2	5.3	-54.8	18.6	.11	11T	BURSTING STRENGTH 40 - 100 PSI, L*W,MANUAL CLAMP
L331	#	35.3	40.4	-9.9	16.6	.39	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L232	#	49.3	27.1	-12.3	-2.5	1.28	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L622	O	50.7	36.3	-4.1	1.8	.88	11E	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L159	O	51.2	35.2	-4.7	.7	.95	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L250L	*	51.9	37.7	-2.3	1.6	.72	11N	BURSTING STRENGTH 40 - 100 PSI,LHOMARGY,MAN.CLAMP, 20C,65%RH
L278	O	51.9	36.8	-3.0	1.0	.95	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L604	O	52.2	35.0	-4.2	-.2	1.42	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L680	O	52.3	37.1	-2.6	.9	.85	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L581	O	52.4	33.5	-5.3	-1.3	1.09	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L248	O	52.8	37.8	-1.6	.9	1.00	11E	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L122	O	53.0	37.9	-1.5	.8	1.10	11F	BURSTING STRENGTH 40 - 100 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L243	O	53.3	37.2	-1.8	.1	1.03	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L100	O	53.5	39.9	.5	1.5	.87	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L567	O	53.7	36.3	-2.3	-.7	1.08	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L330	O	54.0	37.5	-1.2	-.2	1.05	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L237A	O	54.1	41.8	2.4	2.2	.97	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L170	*	54.7	43.8	4.3	2.9	1.16	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L141	O	54.7	36.9	-1.2	-1.1	1.05	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L128	O	54.7	38.7	.2	-.0	.68	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L575	O	54.8	39.9	1.2	.6	1.16	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L182	O	54.8	40.3	1.5	.8	.75	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L599	O	55.0	39.2	.8	-.0	1.21	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L356	O	55.2	38.2	.1	-.8	.72	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L218	O	55.3	38.0	-.0	-1.0	1.21	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L344	O	55.4	38.0	.0	-1.1	.79	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L650	O	55.5	40.5	2.1	.3	.84	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L333	O	55.7	38.4	.6	-1.1	1.49	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L393	*	55.9	39.6	1.6	-.5	.85	11H	BURSTING STRENGTH 40 - 100 PSI, PERKINS AH, HYDRAULIC CLAMP
L280	O	55.9	40.0	2.0	-.3	1.01	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L237B	O	56.2	38.9	1.2	-1.2	.55	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L279	O	56.3	38.0	.6	-1.8	1.20	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L238A	O	56.4	39.2	1.6	-1.2	1.09	11Y	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L570	*	56.9	39.1	1.8	-1.6	.83	11H	BURSTING STRENGTH 40 - 100 PSI, PERKINS AH, HYDRAULIC CLAMP
L118	O	56.9	39.8	2.4	-1.2	.87	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L107	O	57.2	43.0	5.1	.4	1.52	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L103	O	57.2	40.9	3.5	-.8	.62	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L148	O	57.5	40.9	3.6	-1.0	1.01	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L576	*	57.7	41.6	4.3	-.8	.90	11P	BURSTING STRENGTH 40 - 100 PSI, PERKINS LC, MANUAL CLAMP
L242	*	58.0	41.2	4.2	-1.3	.91	11T	BURSTING STRENGTH 40 - 100 PSI, L*W,MANUAL CLAMP
L290	*	58.1	42.9	5.6	-.4	.92	11A	BURSTING STRENGTH 40 - 100 PSI, PERKINS A, MANUAL CLAMP
L251	*	58.3	40.2	3.5	-2.1	1.27	11V	BURSTING STRENGTH 40 - 100 PSI, L*W,MANUAL CLAMP, 20C,65% RH
L651	X	62.7	45.3	10.2	-2.7	1.15	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L394	*	67.1	51.5	17.8	-2.6	1.41	11H	BURSTING STRENGTH 40 - 100 PSI, PERKINS AH, HYDRAULIC CLAMP
GMEANS:		54.5	38.6			1.00		
		95% ELLIPSE:		6.9	3.0	WITH GAMMA = 53 DEGREES		


BURSTING STRENGTH, HIGH RANGE
SAMPLE H41 = 54.5 PSI
SAMPLE H41 = 376 KILOPASCAL
SAMPLE B56 = 38.6 PSI
SAMPLE B56 = 266 KILOPASCAL
+,X,* NOT IN GRAND MEANS
ANALYSIS T11-1
SAMPLE B56
PSI
KILOPASCAL
SAMPLE H41
PSI
KILOPASCAL
32
34
36
38
40
42
44
46
220
240
260
280
300
320
46
48
50
52
54
56
58
60
62
64
330
350
370
390
410
430

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 E65 MEAN	BOND 79 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE B96 MEAN	HEAT SET OFFSET BOOK 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L100	39.47	-.28	-.14	.72	.59	45.44	-1.54	-.54	.62	.41	15M	6	L100
L103	39.20	-.55	-.28	.77	.63	44.27	-2.71	-.95	.96	.63	15T	6	L103
L105	41.33	1.59	.81	2.79	2.29	47.87	.89	.31	2.67	1.75	15T	6	L105
L107	41.07	1.32	.68	2.37	1.95	48.80	1.82	.64	2.70	1.78	15T	6	L107
L118	38.00	-1.75	-.89	.93	.76	46.00	-.98	-.34	1.69	1.11	15T	6	L118
L121	37.73	-2.01	-1.03	1.28	1.05	44.13	-2.84	-1.00	1.19	.78	15T	6	L121
L122	39.95	.20	.10	1.08	.88	47.09	.12	.04	1.33	.88	15C	6	L122
L124	39.80	.05	.03	1.48	1.21	45.33	-1.64	-.58	1.45	.95	15T	6	L124
L126	39.40	-.35	-.18	1.12	.92	46.73	-.24	-.09	2.02	1.32	15T	6	L126
L128	40.00	.25	.13	1.07	.88	45.33	-1.64	-.58	.82	.54	15T	6	L128
L131	40.40	.65	.33	1.55	1.27	49.73	2.76	.96	1.98	1.30	15A	6	L131
L134	42.13	2.39	1.22	1.30	1.07	49.80	2.82	.99	1.21	.79	15C	6	L134
L139	42.00	2.25	1.15	1.07	.88	53.40	6.42	2.25	1.35	.89	15T	*	L139
L141	37.93	-1.81	-.93	1.10	.90	44.93	-2.04	-.72	1.58	1.04	15T	6	L141
L143	43.33	3.59	1.84	1.59	1.30	47.20	.22	.08	1.15	.75	15T	*	L143
L145	38.53	-1.21	-.62	1.19	.97	45.87	-1.11	-.39	1.60	1.05	15T	6	L145
L148	40.67	.92	.47	.72	.59	46.47	-.51	-.18	1.46	.96	15T	6	L148
L150	55.13	15.39	7.88	.52	.42	63.87	16.89	5.91	.92	.60	15T	#	L150
L151	49.20	9.45	4.84	2.24	1.84	58.80	11.82	4.14	2.37	1.55	15C	#	L151
L153	40.13	.39	.20	.92	.75	45.53	-1.44	-.51	1.36	.89	15C	6	L153
L157	39.07	-.68	-.35	.96	.79	43.60	-3.38	-1.18	1.35	.89	15T	6	L157
L158	37.33	-2.41	-1.24	2.09	1.72	47.60	.62	.22	2.64	1.73	15R	6	L158
L159	44.37	4.63	2.37	8.93	7.32	57.29	10.32	3.61	10.47	6.87	15L	X	L159
L162	39.87	.12	.06	1.41	1.15	45.07	-1.91	-.67	1.03	.68	15T	6	L162
L163	33.33	-6.41	-3.29	1.88	1.54	39.00	-7.98	-2.79	1.07	.70	15T	*	L163
L166	39.80	.05	.03	.77	.63	45.07	-1.91	-.67	1.10	.72	15T	6	L166
L167	40.40	.65	.33	1.55	1.27	49.07	2.09	.73	1.03	.68	15C	6	L167
L170	35.53	-4.21	-2.16	1.41	1.15	44.93	-2.04	-.72	1.28	.84	15T	*	L170
L173B	38.93	-.81	-.42	.70	.58	44.13	-2.84	-1.00	.83	.55	15T	6	L173B
L182A	39.40	-.35	-.18	1.68	1.38	48.87	1.89	.66	1.92	1.26	15A	6	L182A
L182T	41.80	2.05	1.05	.94	.77	50.13	3.16	1.10	1.77	1.16	15T	6	L182T
L183	39.53	-.21	-.11	.92	.75	46.40	-.58	-.20	1.24	.82	15T	6	L183
L185	42.40	2.65	1.36	1.06	.87	48.80	1.82	.64	.86	.57	15T	6	L185
L189	40.53	.79	.40	.83	.68	48.33	1.36	.47	1.23	.81	15T	6	L189
L190C	37.47	-2.28	-1.17	.92	.75	43.67	-3.31	-1.16	.82	.54	15T	6	L190C
L190R	38.93	-.81	-.42	1.62	1.33	44.60	-2.38	-.83	1.59	1.05	15C	6	L190R
L191	43.20	3.45	1.77	1.26	1.04	50.80	3.82	1.34	1.66	1.09	15T	6	L191
L194	44.23	4.49	2.30	2.40	1.96	51.17	4.19	1.47	.82	.54	15T	6	L194
L206	40.40	.65	.33	1.18	.97	46.80	-.18	-.06	.86	.57	15T	6	L206
L207	49.44	9.69	4.97	5.09	4.17	50.96	3.98	1.39	4.84	3.17	15R	X	L207
L211	39.00	-.75	-.38	2.24	1.83	44.87	-2.11	-.74	1.46	.96	15R	6	L211
L212	42.67	2.92	1.50	3.27	2.68	58.53	11.56	4.04	8.02	5.26	15T	#	L212
L213	40.87	1.12	.57	1.25	1.02	50.40	3.42	1.20	1.35	.89	15T	6	L213
L219	41.07	1.32	.68	1.28	1.05	47.60	.62	.22	2.03	1.33	15L	6	L219
L223	41.33	1.59	.81	1.04	.86	48.49	1.52	.53	1.41	.93	15R	6	L223
L225	41.53	1.79	.92	1.30	1.07	50.40	3.42	1.20	.91	.60	15T	6	L225
L226B	20.20	-19.55	-10.01	.59	.48	24.44	-22.54	-7.89	2.28	1.49	15T	#	L226B
L226C	38.00	-1.75	-.89	1.31	1.07	45.60	-1.38	-.48	1.35	.89	15T	6	L226C
L228	38.13	-1.61	-.83	.52	.42	43.00	-3.98	-1.39	1.25	.82	15T	6	L228
L230	37.00	-2.75	-1.41	.65	.54	43.80	-3.18	-1.11	1.32	.87	15R	6	L230
L232	40.13	.39	.20	2.68	2.36	45.73	-1.24	-.44	1.98	1.30	15T	6	L232
L233	43.47	3.72	1.91	.92	.75	50.00	3.02	1.06	1.41	.93	15T	6	L233
L236	39.23	-.51	-.26	1.08	.89	46.33	-.64	-.23	1.63	1.07	15T	6	L236
L237A	39.33	-.41	-.21	1.63	1.34	48.00	1.02	.36	1.89	1.24	15T	6	L237A
L237B	39.93	.19	.10	1.10	.90	49.47	2.49	.87	1.13	.74	15T	6	L237B
L238A	38.13	-1.61	-.83	1.13	.92	44.20	-2.78	-.97	1.37	.90	15T	6	L238A
L241	41.20	1.45	.74	1.21	.99	49.87	2.89	1.01	1.19	.78	15T	6	L241
L243	38.87	-.88	-.45	1.13	.92	46.73	-.24	-.09	1.44	.94	15T	6	L243
L244	40.53	.79	.40	.64	.52	46.47	-.51	-.18	1.25	.82	15C	6	L244
L248	42.50	2.75	1.41	.92	.75	50.32	3.34	1.17	1.26	.83	15J	6	L248
L249	42.87	3.13	1.60	1.53	1.26	48.87	1.89	.66	2.24	1.47	15T	6	L249
L254	37.73	-2.01	-1.03	1.49	1.22	46.00	-.98	-.34	1.69	1.11	15T	6	L254
L255	40.00	.25	.13	.85	.69	45.80	-1.18	-.41	.77	.51	15T	6	L255
L257A	40.80	1.05	.54	1.26	1.04	50.93	3.96	1.38	1.28	.84	15C	6	L257A
L257B	41.07	1.32	.68	1.28	1.05	50.40	3.42	1.20	1.55	1.02	15C	6	L257B

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS

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

LAB CODE	SAMPLE E85 MEAN	BOND 79 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE B96 MEAN	HEAT SET OFFSET BOOK 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L257C	40.40	.65	.33	1.35	1.11	50.40	3.42	1.20	2.03	1.33	15C	O	L257C
L259	43.93	4.19	2.15	1.16	.95	54.00	7.02	2.46	1.31	.86	15T	O	L259
L261	38.73	-1.01	-.52	.80	.65	47.13	.16	.05	1.25	.82	15T	O	L261
L262	39.00	-.75	-.38	.65	.54	45.67	-1.31	-.46	1.45	.95	15T	O	L262
L264	40.00	.25	.13	2.62	2.15	47.47	.49	.17	1.41	.92	15T	O	L264
L268	39.40	-.35	-.18	.74	.60	44.53	-2.44	-.86	.92	.60	15T	O	L268
L273	36.33	-3.41	-1.75	1.88	1.54	46.20	-.78	-.27	1.66	1.09	15T	*	L273
L275	39.93	.19	.10	1.03	.85	45.60	-1.38	-.48	1.68	1.10	15T	O	L275
L278	39.47	-.28	-.14	.92	.75	45.47	-1.51	-.53	1.60	1.05	15T	O	L278
L279	38.67	-1.08	-.55	1.11	.91	46.47	-.51	-.18	1.73	1.13	15T	O	L279
L280	39.13	-.61	-.31	.83	.68	46.60	-.38	-.13	1.12	.74	15L	O	L280
L281	37.20	-2.55	-1.30	1.15	.94	42.00	-4.98	-1.74	1.31	.86	15T	O	L281
L285	36.33	-3.41	-1.75	1.35	1.10	44.47	-2.51	-.88	1.51	.99	15T	O	L285
L288	38.01	-1.73	-.89	1.12	.92	46.36	-.62	-.22	1.38	.90	15Q	O	L288
L290	41.13	1.39	.71	.83	.68	49.60	2.62	.92	1.18	.78	15T	O	L290
L291	40.73	.99	.51	2.05	1.68	48.93	1.96	.68	1.39	.91	15A	O	L291
L299	39.07	-.68	-.35	1.10	.90	47.07	.09	.03	1.16	.76	15T	O	L299
L305	40.33	.59	.30	1.99	1.63	47.93	.96	.33	2.09	1.37	15T	O	L305
L309	40.20	.45	.23	1.15	.94	49.27	2.29	.80	1.16	.76	15T	O	L309
L311	40.27	.52	.27	1.03	.85	45.47	-1.51	-.53	2.07	1.36	15T	O	L311
L312	38.73	-1.01	-.52	.96	.79	44.40	-2.58	-.90	2.20	1.44	15T	O	L312
L315	41.47	1.72	.88	1.25	1.02	47.40	.42	.15	1.55	1.02	15T	O	L315
L321	39.47	-.28	-.14	2.07	1.69	48.53	1.56	.54	2.07	1.36	15T	O	L321
L324	39.87	.12	.06	1.60	1.31	47.60	.62	.22	1.06	.69	15T	O	L324
L328	38.37	-1.38	-.71	1.71	1.40	42.07	-4.91	-1.72	1.10	.72	15T	O	L328
L331	25.93	-13.81	-7.08	2.22	1.82	17.37	-29.61	-10.37	1.25	.82	15T	#	L331
L336	39.53	-.21	-.11	1.06	.87	46.00	-.98	-.34	1.60	1.05	15T	O	L336
L344	40.80	1.05	.54	1.01	.83	46.13	-.84	-.30	1.77	1.16	15C	O	L344
L345	40.27	.52	.27	1.58	1.29	47.87	.89	.31	5.01	3.29	15T	O	L345
L352	40.95	1.20	.61	.96	.79	48.32	1.34	.47	.95	.62	15C	O	L352
L358	42.53	2.79	1.43	.83	.68	52.00	5.02	1.76	1.51	.99	15T	O	L358
L360	40.73	.99	.51	.92	.76	48.20	1.22	.43	1.19	.78	15T	O	L360
L376	36.40	-3.35	-1.71	1.59	1.31	46.00	-.98	-.34	2.10	1.38	15T	*	L376
L382	49.87	10.12	5.18	7.87	6.45	58.93	11.96	4.18	7.36	4.83	15T	#	L382
L388	42.87	3.12	1.60	1.60	1.31	44.60	-2.38	-.83	1.06	.69	15T	X	L388
L390	37.87	-1.88	-.96	1.41	1.15	46.07	-.91	-.32	2.46	1.62	15T	O	L390
L396M	38.20	-1.55	-.79	.77	.63	45.00	-1.98	-.69	1.81	1.19	15T	O	L396M
L442	40.13	.39	.20	1.19	.97	49.40	2.42	.85	2.20	1.44	15R	O	L442
L554	45.40	5.65	2.90	1.35	1.11	56.40	9.42	3.30	2.26	1.48	15C	*	L554
L557	37.20	-2.55	-1.30	.77	.63	45.40	-1.58	-.55	1.99	1.31	15T	O	L557
L558	39.60	-.15	-.07	1.12	.92	44.80	-2.18	-.76	1.26	.83	15T	O	L558
L559	40.07	.32	.16	1.03	.85	48.27	1.29	.45	1.67	1.09	15T	O	L559
L562	37.73	-2.01	-1.03	1.44	1.18	43.47	-3.51	-1.23	1.55	1.02	15T	O	L562
L565	39.33	-.41	-.21	1.95	1.60	44.80	-2.18	-.76	1.82	1.20	15T	O	L565
L566	37.73	-2.01	-1.03	1.28	1.05	45.33	-1.64	-.58	1.23	.81	15T	O	L566
L567	59.73	19.99	10.24	1.44	1.18	62.93	15.96	5.59	2.63	1.73	15C	#	L567
L574	46.27	6.52	3.34	1.49	1.22	47.73	.76	.26	1.67	1.09	15T	X	L574
L575	40.42	.67	.35	1.26	1.03	48.01	1.03	.36	1.33	.88	15L	O	L575
L576	44.87	5.12	2.62	2.75	2.25	55.60	8.62	3.02	1.55	1.02	15T	*	L576
L580	38.00	-1.75	-.89	.76	.62	42.27	-4.71	-1.65	1.22	.80	15T	O	L580
L581	40.04	.29	.15	.73	.60	46.69	-.28	-.10	1.71	1.12	15Q	O	L581
L587	36.67	-3.08	-1.58	.98	.80	42.40	-4.58	-1.60	1.88	1.24	15T	O	L587
L596	10.80	-28.95	-14.83	1.70	1.39	12.00	-34.98	-12.24	1.77	1.16	15T	#	L596
L597	40.27	.52	.27	.70	.58	46.27	-.71	-.25	1.83	1.20	15T	O	L597
L599	39.87	.12	.06	1.55	1.27	47.80	.82	.29	1.66	1.09	15T	O	L599
L600	42.00	2.25	1.15	.93	.76	51.60	4.62	1.62	1.55	1.02	15T	O	L600
L604	48.27	8.52	4.37	1.49	1.22	47.33	.36	.12	1.63	1.07	15T	X	L604
L606	40.93	1.19	.61	1.03	.85	46.53	-.44	-.16	1.19	.78	15T	O	L606
L622	59.73	19.99	10.24	6.84	5.61	68.27	21.29	7.45	2.37	1.56	15T	#	L622
L626	38.40	-1.35	-.69	1.24	1.02	46.00	-.98	-.34	1.65	1.08	15L	O	L626
L651	8.53	-31.21	-15.99	.52	.42	10.13	-36.84	-12.90	.35	.23	15T	#	L651
L652	35.07	-4.68	-2.40	2.25	1.85	36.93	-10.04	-3.52	4.33	2.85	15C	X	L652
L654	35.60	-4.15	-2.12	.83	.68	42.13	-4.84	-1.70	.99	.65	15T	O	L654
L670	45.73	5.99	3.07	1.16	.95	61.20	14.22	4.98	6.68	4.38	15T	#	L670
L679	38.80	-.95	-.48	.68	.55	46.20	-.78	-.27	1.42	.94	15T	O	L679

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 E85 BOND 79 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE B96 HEAT SET OFFSET BOOK 91 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L680	38.27	-1.48	-.76	1.03	.85	44.53	-2.44	-.86	1.60	1.05	15T	@	L680
L684	38.07	-1.68	-.86	1.10	.90	41.93	-5.04	-1.77	1.67	1.09	15T	@	L684
L688	42.00	2.25	1.15	1.31	1.07	52.67	5.69	1.99	1.63	1.07	15T	@	L688
L692	39.47	-.28	-.14	1.64	1.35	46.47	-.51	-.18	2.39	1.57	15T	@	L692
GR. MEAN = 39.75 GRAMS						GRAND MEAN = 46.98 GRAMS					TEST DETERMINATIONS = 15		
SD MEANS = 1.95 GRAMS						SD OF MEANS = 2.86 GRAMS					117 LABS IN GRAND MEANS		
AVERAGE SDR = 1.22 GRAMS						AVERAGE SDR = 1.52 GRAMS							
GR. MEAN = 389.8 MILLINEWTON						GRAND MEAN = 460.7 MILLINEWTON							
L242	46.36	6.61	3.39	.89	.73	52.79	5.82	2.04	2.86	1.88	15U	*	L242
L250L	43.99	4.25	2.18	1.35	1.11	52.90	5.92	2.07	1.64	1.07	15B	*	L250L
L251	40.47	.72	.37	1.46	1.19	51.13	4.16	1.45	3.09	2.03	15K	*	L251
L610	38.20	-1.55	-.79	1.15	.94	45.93	-1.04	-.37	1.62	1.07	15E	*	L610

TOTAL NUMBER OF LABORATORIES REPORTING = 138

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

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

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

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

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS

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

LAB CODE	F	MEANS E85	MEANS B96	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L651	#	8.53	10.13	-47.82	6.73	.33	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L596	#	10.80	12.00	-45.03	5.81	1.28	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L226B	#	20.20	24.44	-29.49	4.50	.99	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L331	#	25.93	17.37	-32.41	-4.12	1.32	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L163	#	33.33	39.00	-10.17	1.17	1.12	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L652	X	35.07	36.93	-10.99	-1.40	2.35	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L170	#	35.53	44.93	-3.98	2.47	1.00	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L654	O	35.60	42.13	-6.31	.92	.66	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L285	O	36.33	44.47	-3.95	1.55	1.05	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L273	#	36.33	46.20	-2.48	2.47	1.31	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L376	#	36.40	46.00	-2.61	2.31	1.34	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L587	O	36.67	42.40	-5.52	.16	1.02	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L230	O	37.00	43.80	-4.15	.63	.70	15R	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,DIGITAL READOUT
L557	O	37.20	45.40	-2.69	1.31	.97	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L281	O	37.20	42.00	-5.57	-.50	.90	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L158	O	37.33	47.60	-.76	2.37	1.72	15R	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,DIGITAL READOUT
L190C	O	37.47	43.67	-4.02	.16	.64	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L121	O	37.73	44.13	-3.48	.18	.91	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L566	O	37.73	45.33	-2.47	.82	.93	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L562	O	37.73	43.47	-4.04	-.17	1.10	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L254	O	37.73	46.00	-1.90	1.18	1.16	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L390	O	37.87	46.07	-1.77	1.10	1.39	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L141	O	37.93	44.93	-2.70	.44	.97	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L580	O	38.00	42.27	-4.92	-1.04	.71	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L226C	O	38.00	45.60	-2.10	.74	.98	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L118	O	38.00	46.00	-1.76	.95	.93	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L288	O	38.01	46.36	-1.45	1.14	.91	15Q	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,AIR CLAMP,DIGITL
L684	O	38.07	41.93	-5.16	-1.27	1.00	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L238A	O	38.13	44.20	-3.21	-.12	.91	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L228	O	38.13	43.00	-4.22	-.76	.62	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L610	*	38.20	45.93	-1.71	.75	1.00	15E	TEARING STRENGTH, STANDARD, THWING-ELMENDORF,AMBIENT COND.
L396M	O	38.20	45.00	-2.50	.25	.91	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L680	O	38.27	44.53	-2.86	-.05	.95	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L328	O	38.37	42.07	-4.89	-1.45	1.06	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L626	O	38.40	46.00	-1.55	.62	1.05	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L145	O	38.53	45.87	-1.59	.43	1.01	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L279	O	38.67	46.47	-1.01	.64	1.02	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L312	O	38.73	44.40	-2.72	-.52	1.12	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L261	O	38.73	47.13	-.41	.94	.74	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L679	O	38.80	46.20	-1.16	.38	.74	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L243	O	38.87	46.73	-.68	.61	.93	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L190R	O	38.93	44.60	-2.44	-.58	1.19	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L173B	O	38.93	44.13	-2.84	-.83	.56	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L262	O	39.00	45.67	-1.51	-.07	.74	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L211	O	39.00	44.87	-2.18	-.50	1.39	15R	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,DIGITAL READOUT
L299	O	39.07	47.07	-.29	.62	.83	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L157	O	39.07	43.60	-3.22	-1.23	.84	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L280	O	39.13	46.60	-.65	.32	.71	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L103	O	39.20	44.27	-2.58	-.99	.63	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L236	O	39.23	46.33	-.82	.09	.98	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L565	O	39.33	44.80	-2.06	-.81	1.40	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L237A	O	39.33	48.00	.64	.89	1.29	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L182A	O	39.40	48.87	1.41	1.30	1.32	15A	TEARING STRENGTH, STANDARD, APPITA
L126	O	39.40	46.73	-.39	.16	1.12	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L268	O	39.40	44.53	-2.25	-1.01	.60	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L692	O	39.47	46.47	-.58	-.04	1.46	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L100	O	39.47	45.44	-1.45	-.58	.50	15M	TEARING STRENGTH, STANDARD, T.M.MIRFIELD(APPITA-ELMENDORF)
L321	O	39.47	48.53	1.17	1.07	1.52	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L278	O	39.47	45.47	-1.43	-.57	.90	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L183	O	39.53	46.40	-.60	-.13	.78	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L336	O	39.53	46.00	-.94	-.34	.96	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L558	O	39.60	44.80	-1.92	-1.04	.87	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L124	O	39.80	45.33	-1.36	-.92	1.08	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L166	O	39.80	45.07	-1.59	-1.07	.68	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L599	O	39.87	47.80	.76	.34	1.18	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)

ANALYSIS T15-1 TABLE 2

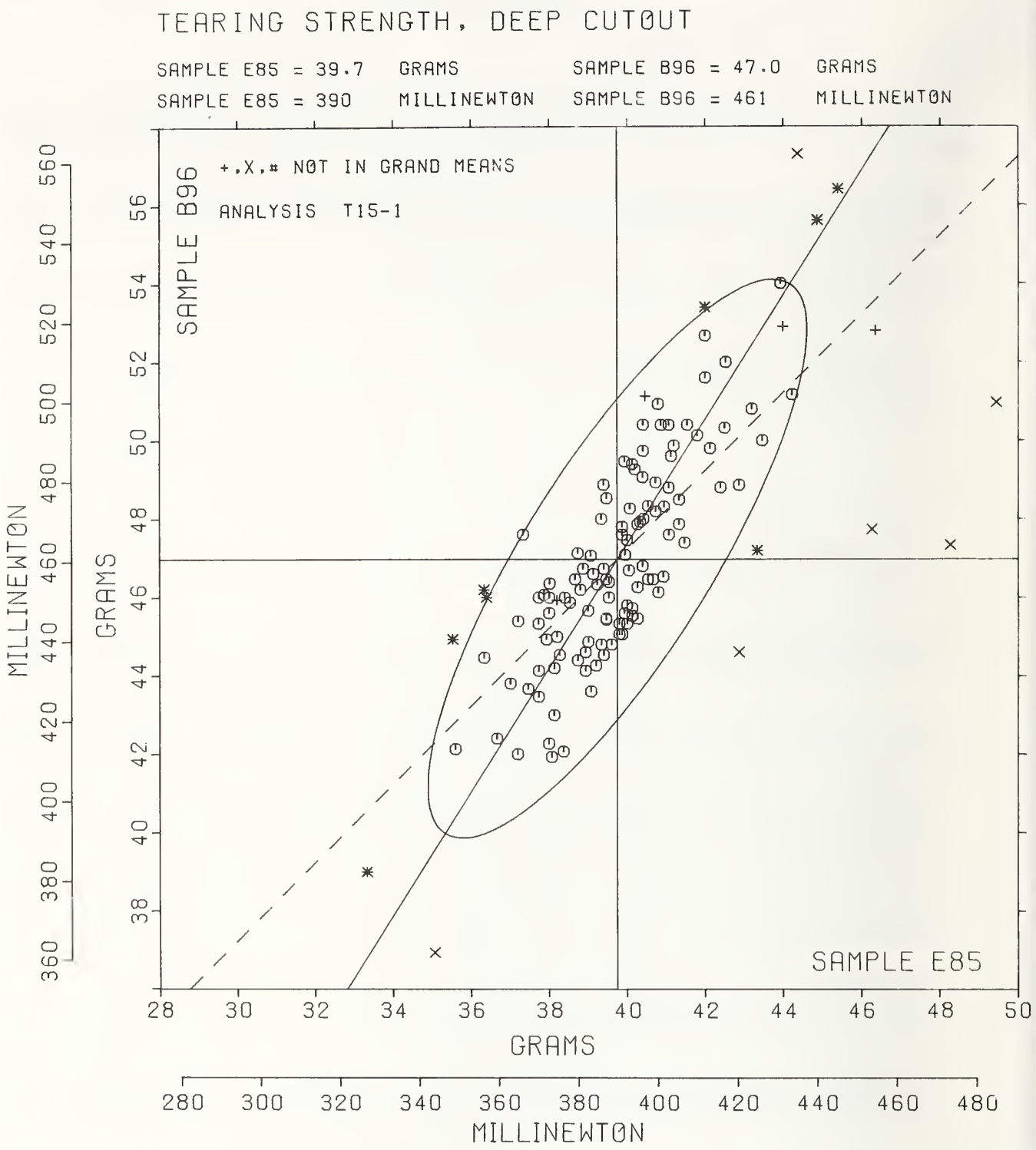
TEARING STRENGTH, GRAMS

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

LAB CODE	F	MEANS E85	B96	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L162	O	39.87	45.07	-1.55	-1.12	.92	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L324	O	39.87	47.60	.59	.23	1.00	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L[illegible]5	O	39.93	45.60	-1.07	-.89	.98	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L237B	O	39.93	49.47	2.20	1.17	.82	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L122	O	39.95	47.09	.20	-.11	.88	15C	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (W.AIR CLAMP)
L264	O	40.00	47.47	.55	.05	1.54	15T	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (SCALE TO 100)
L255	O	40.00	45.80	-.86	-.84	.60	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L128	O	40.00	45.33	-1.26	-1.09	.71	15T	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (SCALE TO 100)
L581	O	40.04	46.69	-.08	-.40	.86	15Q	TEARING STRENGTH, STANDARD, THWING-ELMENDORF, AIR CLAMP, DIGITL
L559	O	40.07	48.27	1.26	.42	.97	15T	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (SCALE TO 100)
L232	O	40.13	45.73	-.85	-.99	1.83	15T	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (SCALE TO 100)
L153	O	40.13	45.53	-1.02	-1.10	.82	15C	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (W.AIR CLAMP)
L442	O	40.13	49.40	2.25	.97	1.21	15R	TEARING STRENGTH, STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L309	O	40.20	49.27	2.18	.84	.85	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L597	O	40.27	46.27	-.32	-.82	.89	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L345	O	40.27	47.87	1.03	.03	2.29	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L311	O	40.27	45.47	-1.00	-1.25	1.10	15T	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (SCALE TO 100)
L305	O	40.33	47.93	1.12	.01	1.50	15T	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (SCALE TO 100)
L206	O	40.40	46.80	.20	-.65	.77	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L167	O	40.40	49.07	2.12	.56	.97	15C	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (W.AIR CLAMP)
L257C	O	40.40	50.40	3.24	1.27	1.22	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L131	O	40.40	49.73	2.68	.92	1.29	15A	TEARING STRENGTH, STANDARD, APPITA
L575	O	40.42	48.01	1.23	-.02	.95	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L251	*	40.47	51.13	3.90	1.61	1.61	15K	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES, 20 C, 65% RH
L244	O	40.53	46.47	-.01	-.94	.67	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L189	O	40.53	48.33	1.57	.06	.75	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L148	O	40.67	46.47	.06	-1.05	.78	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L360	O	40.73	48.20	1.56	-.18	.77	15T	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (SCALE TO 100)
L291	O	40.73	48.93	2.18	.21	1.30	15A	TEARING STRENGTH, STANDARD, APPITA
L257A	O	40.80	50.93	3.91	1.22	.94	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L344	O	40.80	46.13	-.15	-1.34	1.00	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L213	O	40.87	50.40	3.49	.88	.95	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L606	O	40.93	46.53	.26	-1.24	.81	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L352	O	40.95	48.32	1.78	-.30	.71	15C	TEARING STRENGTH, STANDARD, TEWING-ELMENDORF (W.AIR CLAMP)
L219	O	41.07	47.60	1.23	-.78	1.19	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L257B	O	41.07	50.40	3.60	.71	1.03	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L107	O	41.07	48.80	2.25	-.14	1.86	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L290	O	41.13	49.60	2.96	.23	.73	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L241	O	41.20	49.87	3.22	.31	.88	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L223	O	41.33	48.49	2.13	-.53	.89	15R	TEARING STRENGTH, STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L105	O	41.33	47.87	1.60	-.87	2.02	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L315	O	41.47	47.40	1.28	-1.23	1.02	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L225	O	41.53	50.40	3.85	.31	.83	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L182T	O	41.80	50.13	3.76	-.05	.97	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L688	O	42.00	52.67	6.01	1.13	1.07	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L600	O	42.00	51.60	5.11	.56	.89	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L139	*	42.00	53.40	6.63	1.52	.88	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L134	O	42.13	49.80	3.66	-.51	.93	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L185	O	42.40	48.80	2.96	-1.27	.72	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L248	O	42.50	50.32	4.30	-.55	.79	15J	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L358	O	42.53	52.00	5.73	.32	.84	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L212	#	42.67	58.53	11.33	3.70	3.97	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L388	X	42.87	44.60	-.35	-3.91	1.00	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L249	O	42.87	48.87	3.27	-1.64	1.36	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L191	O	43.20	50.80	5.08	-.88	1.06	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L143	*	43.33	47.20	2.10	-2.92	1.03	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L233	O	43.47	50.00	4.54	-1.53	.84	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L259	O	43.93	54.00	8.17	.21	.91	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L250L	*	43.99	52.90	7.27	-.43	1.09	15H	TEARING STRENGTH, STANDARD, LHOMARGY, 20 C, 65% RH
L194	O	44.23	51.17	5.94	-1.56	1.25	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L159	X	44.37	57.29	11.19	1.59	7.10	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L576	*	44.87	55.60	10.02	.27	1.63	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L554	*	45.40	56.40	10.99	.25	1.30	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L670	#	45.73	61.20	15.22	2.53	2.67	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (SCALE TO 100)
L574	X	46.27	47.73	4.12	-5.11	1.16	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 E85	MEANS B96	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L242	*	46.36	52.79	8.45	-2.49	1.30	15U	TEARING STRENGTH, STANDARD, AUSTRALIAN OPT. CO.
L604	X	48.27	47.33	4.85	-7.02	1.15	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L151	#	49.20	58.80	15.04	-1.69	1.70	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L207	X	49.44	50.96	8.54	-6.07	3.67	15R	TEARING STRENGTH, STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L382	#	49.87	58.93	15.51	-2.18	5.64	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L150	#	55.13	63.87	22.49	-4.00	.51	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L622	#	59.73	68.27	28.67	-5.54	3.58	15T	TEARING STRENGTH, STANDARD, THWING-ELMENDORF(SCALE TO 100)
L567	#	59.73	62.93	24.16	-8.39	1.45	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
GMEANS:		39.75	46.98			1.00		
		95% ELLIPSE:		8.28	2.40	WITH GAMMA = 57 DEGREES		


TEARING STRENGTH, DEEP CUTOUT
SAMPLE E85 = 39.7 GRAMS
SAMPLE E85 = 390 MILLINEWTON
SAMPLE B96 = 47.0 GRAMS
SAMPLE B96 = 461 MILLINEWTON
+,X,* NOT IN GRAND MEANS
ANALYSIS T15-1
SAMPLE B96
GRAMS
MILLINEWTON
SAMPLE E85
GRAMS
MILLINEWTON

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 J42 MEAN	PRINTING 86 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE K49 MEAN	PRINTING 105 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 15 VAR	F	LAB
L106	65.9	1.6	.64	2.7	.94	128.5	8.1	1.60	13.6	2.07	17N	0	L106
L122	63.9	-.4	-.15	2.5	.87	125.2	4.8	.95	6.2	.95	17N	0	L122
L148	67.5	3.3	1.30	1.8	.62	118.4	-2.0	-.39	2.6	.40	17N	0	L148
L231	65.2	1.0	.38	3.6	1.26	121.5	1.1	.21	4.3	.66	17N	0	L231
L234	66.1	1.9	.74	2.3	.82	121.6	1.2	.24	6.4	.97	17N	0	L234
L267	106.5	42.2	16.67	19.0	6.70	130.5	10.2	2.01	11.7	1.78	17N	#	L267
L269	66.0	1.8	.69	2.2	.79	122.1	1.8	.35	8.0	1.22	17N	0	L269
L301A	65.3	1.0	.40	1.8	.63	NO DATA REPORTED FOR SAMPLE K49					17N	M	L301
L301B	63.3	-.9	-.36	2.2	.77	116.0	-4.4	-.87	3.7	.56	17N	0	L301B
L308	66.3	2.0	.80	6.4	2.25	126.7	6.3	1.24	7.3	1.11	17N	0	L308
L326	59.7	-4.5	-1.78	3.0	1.06	115.5	-4.9	-.97	10.4	1.58	17N	0	L326
L339	60.5	-3.7	-1.47	2.2	.78	115.7	-4.6	-.92	5.3	.81	17N	0	L339
L393	62.3	-2.0	-.78	2.4	.84	113.1	-7.3	-1.45	4.4	.67	17N	0	L393
GR. MEAN =	64.2 GRAMS					GRAND MEAN =	120.4 GRAMS				TEST DETERMINATIONS =		15
SD MEANS =	2.5 GRAMS					SD OF MEANS =	5.1 GRAMS				11 LABS IN GRAND MEANS		
	AVERAGE SDR =	2.8 GRAMS					AVERAGE SDR =	6.6 GRAMS					
GR. MEAN =	630.1 MILLINEWTON					GRAND MEAN =	1180.5 MILLINEWTON						
L372	59.3	-4.9	-1.95	2.0	.70	112.9	-7.4	-1.47	4.2	.64	17X	*	L372

TOTAL NUMBER OF LABORATORIES REPORTING = 14

Best values: J42 65 grams
K49 120 grams

The following laboratories were omitted from the grand means because of extreme test results: 267.

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

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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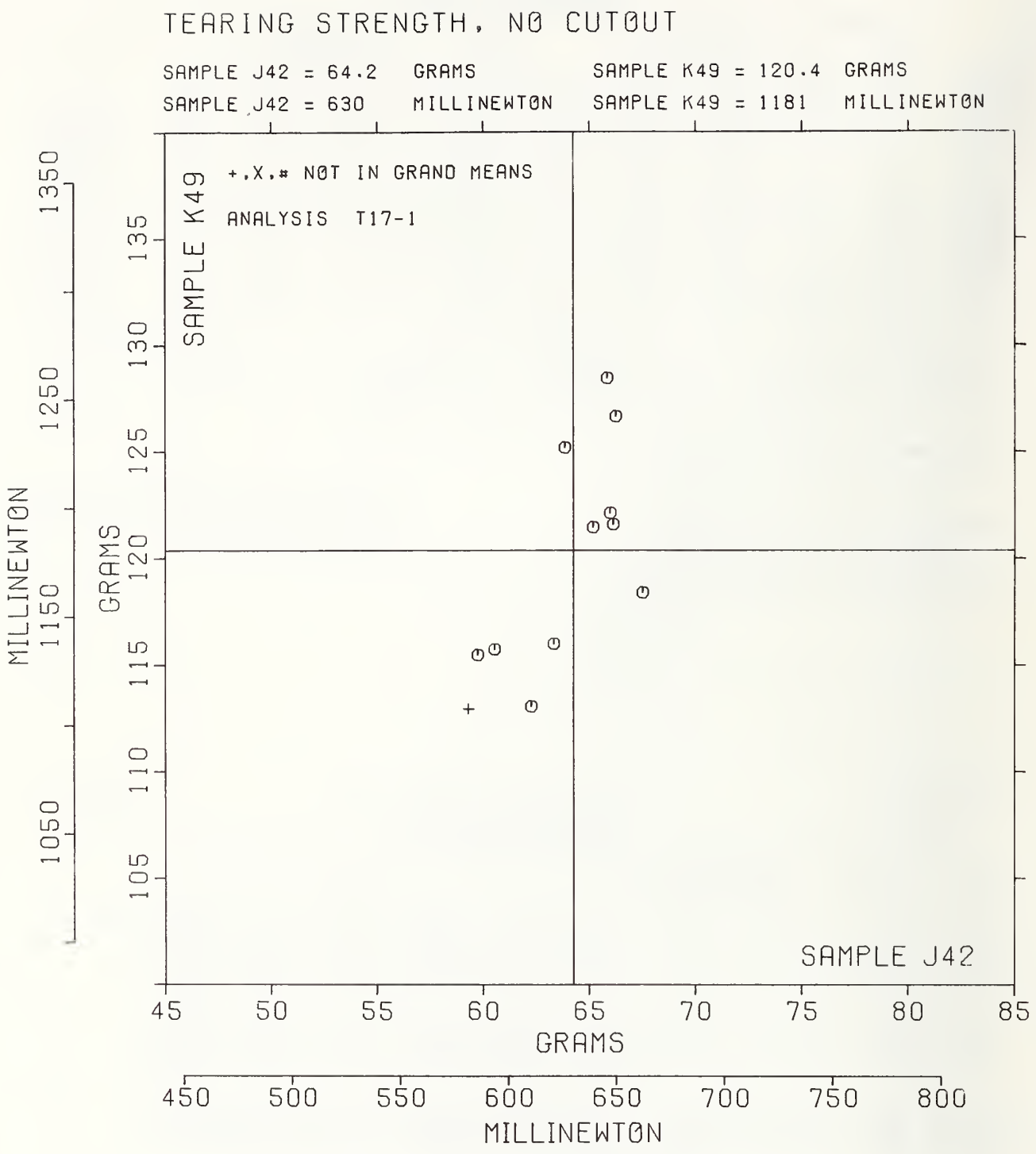
ANALYSIS T17-1 TABLE 2
TEARING STRENGTH, GRAMS
TAPPI STANDARD T414 TS-65, THWING-ELMENDORF WITHOUT DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	F	MEANS J42	K49	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L372	*	59.3	112.9	-8.7	2.1	.67	17X	TEARING STRENGTH, NO CUT OUT: GIVE INSTRUMENT MAKE,MODEL
L326	0	59.7	115.5	-6.2	2.5	1.32	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L339	0	60.5	115.7	-5.6	1.9	.79	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L393	0	62.3	113.1	-7.5	-.7	.75	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L301B	0	63.3	116.0	-4.4	-.7	.67	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L122	0	63.9	125.2	4.4	2.0	.91	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L231	0	65.2	121.5	1.3	-.5	.96	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L301A	M	65.3				.63	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L106	0	65.9	128.5	8.1	1.3	1.50	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L269	0	66.0	122.1	2.2	-1.0	1.00	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L234	0	66.1	121.6	1.8	-1.3	.90	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L308	0	66.3	126.7	6.6	.3	1.68	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L148	0	67.5	118.4	-.7	-3.8	.51	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L267	#	106.5	130.5	24.1	-36.1	4.24	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
GMEANS:		64.2	120.4			1.00		
		95% ELLIPSE:		16.5	5.7	WITH GAMMA = 69 DEGREES		


TEARING STRENGTH, NØ CUTØUT
SAMPLE J42 = 64.2 GRAMS
SAMPLE J42 = 630 MILLINEWTØN
SAMPLE K49 = 120.4 GRAMS
SAMPLE K49 = 1181 MILLINEWTØN
+,X,* NØT IN GRAND MEANS
ANALYSIS T17-1
SAMPLE K49
SAMPLE J42
GRAMS
MILLINEWTØN
105 110 115 120 125 130 135
1050 1150 1250 1350
45 50 55 60 65 70 75 80 85
450 500 550 600 650 700 750 800

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

GR. MEAN = 5.59 KILONEWTON/M — GRAND MEAN = 8.81 KILONEWTON/M — TEST DETERMINATIONS = 20

SD MEANS = .31 KILONEWTON/M — SD OF MEANS = .40 KILONEWTON/M — 49 LABS IN GRAND MEANS

AVERAGE SDR = .21 KILONEWTON/M — AVERAGE SDR = .30 KILONEWTON/M

GR. MEAN = 31.94 LB/INCH — GRAND MEAN = 50.32 LB/INCH

L250I	4.79	-.80	-2.59	.17	.79	7.42	-1.39	-3.48	.25	.85	19L	+	L250I
L251	4.32	-1.27	-4.09	.44	2.09	7.42	-1.39	-3.47	.41	1.37	19I	+	L251

TOTAL NUMBER OF LABORATORIES REPORTING = 53

Best values: J01 5.6 $\pm$ 0.5 kilonewton per meter
J16 8.8 $\pm$ 0.6 kilonewton per meter

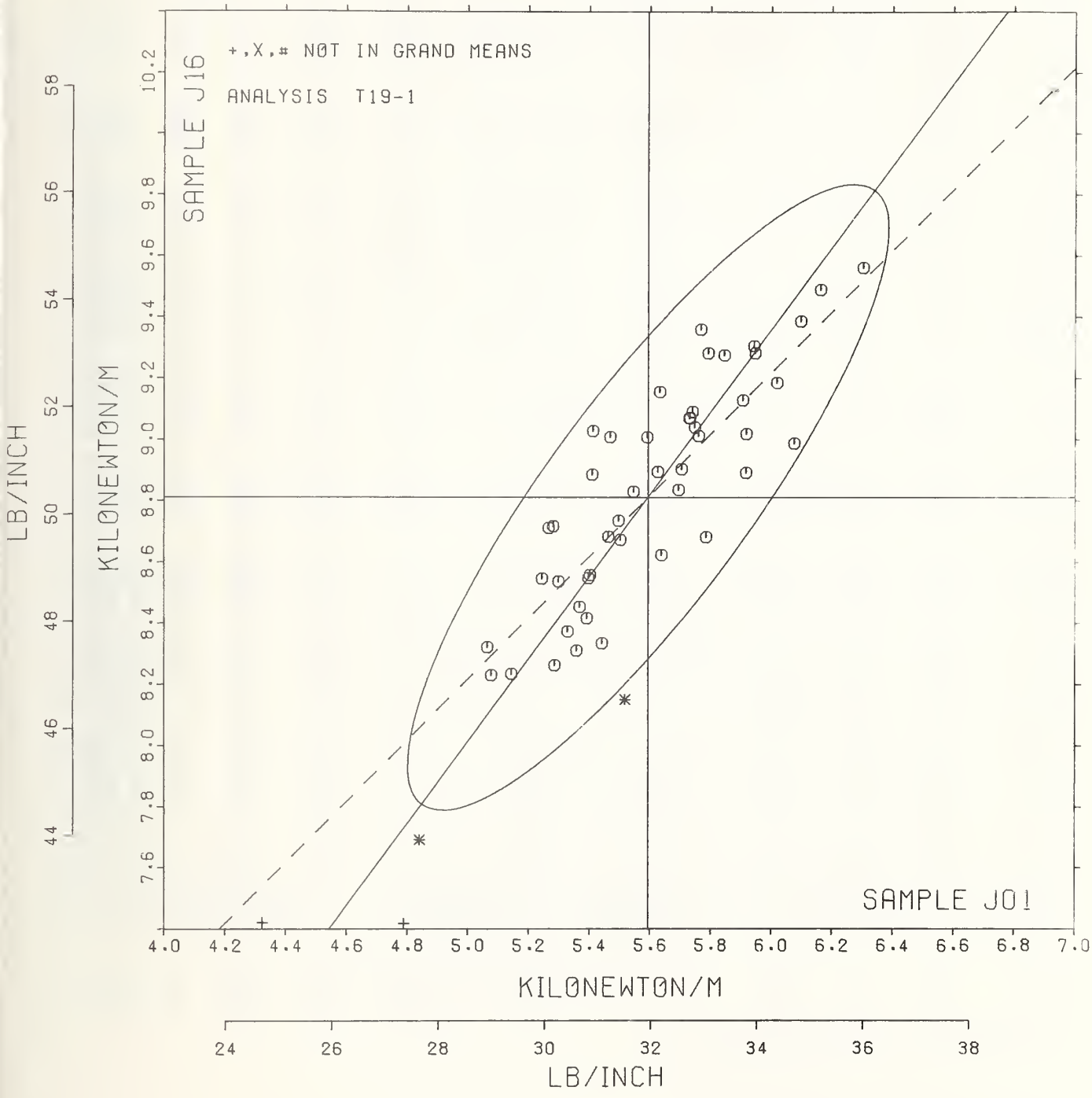
The following laboratories were omitted from the grand means because of extreme test results: 106.

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 J01	MEANS J16	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L251	*	4.32	7.42	-1.87	.19	1.73	19I	TENSILE STRENGTH, PACKAGING PAPER, CRE, 20C, 65% RH
L250I	*	4.79	7.42	-1.60	-.19	.82	19L	TENSILE STRENGTH, PACKAGING PAPER, CRE, 20 C, 65% RH
L280	*	4.84	7.69	-1.35	-.06	1.95	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L106	#	4.99	6.62	-2.12	-.83	1.44	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L151	O	5.06	8.32	-.71	.13	.93	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L610	O	5.08	8.23	-.77	.07	1.22	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L604	O	5.14	8.23	-.73	.02	1.91	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L689	O	5.24	8.54	-.42	.12	.75	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L265	O	5.27	8.71	-.28	.20	.60	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L207	O	5.28	8.72	-.26	.19	.88	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L182I	O	5.29	8.26	-.62	-.08	1.03	19D	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L267	O	5.30	8.54	-.40	.07	.87	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L575	O	5.33	8.37	-.51	-.05	1.33	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L219	O	5.36	8.31	-.54	-.11	.95	19E	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L243	O	5.37	8.45	-.42	-.03	.60	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L182L	O	5.39	8.41	-.44	-.08	.78	19T	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L324	O	5.40	8.55	-.33	-.00	.93	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L122	O	5.40	8.56	-.32	.00	.67	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L100	O	5.41	8.89	-.05	.19	.71	19E	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L268A	O	5.41	9.03	.06	.27	.93	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L576	O	5.44	8.33	-.47	-.16	.86	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L238A	O	5.46	8.68	-.18	.03	1.06	19T	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L264P	O	5.47	9.01	.08	.22	1.43	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L126	O	5.50	8.73	-.12	.03	1.15	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L273	O	5.50	8.67	-.17	-.01	1.13	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L157I	*	5.52	8.15	-.58	-.33	1.37	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L264A	O	5.55	8.83	-.01	.05	.81	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L107	O	5.59	9.01	.16	.12	1.15	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L336	O	5.62	8.89	.09	.02	.98	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L356	O	5.63	9.15	.30	.17	1.40	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L234L	O	5.64	8.62	-.13	-.15	.94	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L237A	O	5.69	8.84	.08	-.07	1.14	19Q	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L225	O	5.70	8.90	.14	-.03	.83	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L237B	O	5.73	9.07	.29	.05	.91	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L257C	O	5.73	9.07	.29	.04	.97	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L580	O	5.74	9.09	.31	.05	1.01	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L606	O	5.75	9.04	.28	.01	1.14	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L153	O	5.76	9.01	.26	-.01	1.09	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L268P	O	5.77	9.36	.54	.19	.65	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L305	O	5.78	8.68	.01	-.23	.81	19V	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L257A	O	5.79	9.28	.50	.12	.79	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L167	O	5.84	9.27	.52	.07	.85	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L281	O	5.91	9.13	.44	-.06	.69	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L565	O	5.92	8.89	.26	-.21	1.12	19T	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L157A	O	5.92	9.02	.36	-.14	.83	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L581	M	5.93				.90	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L650	O	5.94	9.30	.60	.01	1.03	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L312	O	5.95	9.28	.59	-.00	.81	19D	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L684	O	6.02	9.18	.55	-.12	1.33	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L568	O	6.08	8.99	.43	-.28	1.52	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L562	O	6.10	9.39	.76	-.06	1.30	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L622	O	6.16	9.49	.88	-.05	1.11	19O	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L652	O	6.30	9.56	1.03	-.12	1.07	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
GMEANS:		5.59	8.81			1.00		
		95% ELLIPSE:		1.25	.34	WITH GAMMA = 53 DEGREES		


TENSILE STRENGTH, PACKAGING PAPERS
SAMPLE J01 = 5.59 KILONEWTON/M SAMPLE J16 = 8.81 KILONEWTON/M
SAMPLE J01 = 31.9 LB/INCH SAMPLE J16 = 50.3 LB/INCH
+,X,# NOT IN GRAND MEANS
ANALYSIS T19-1
SAMPLE J16
SAMPLE J01
LB/INCH
KILONEWTON/M
44 46 48 50 52 54 56 58
7.6 7.8 8.0 8.2 8.4 8.6 8.8 9.0 9.2 9.4 9.6 9.8 10.2
4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6 5.8 6.0 6.2 6.4 6.6 6.8 7.0
KILONEWTON/M
24 26 28 30 32 34 36 38
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 J71 MEAN	PRINTING 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE K39 MEAN	PRINTING 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 20 VAR	F	LAB
L100	3.71	.03	.16	.13	.88	4.73	-.24	-.95	.14	.61	20E	O	L100
L105	3.69	.01	.06	.19	1.25	5.02	.05	.18	.39	1.74	20A	O	L105
L118	3.75	.07	.41	.11	.72	4.87	-.11	-.42	.21	.94	20A	O	L118
L122	3.67	-.01	-.07	.12	.80	5.02	.04	.15	.14	.64	20A	O	L122
L124C	3.60	-.09	-.53	.20	1.37	4.72	-.26	-1.01	.27	1.20	20A	O	L124C
L125	3.85	.17	1.03	.21	1.44	5.44	.46	1.81	.31	1.41	20C	O	L125
L131	3.75	.07	.43	.15	1.00	5.20	.22	.85	.18	.79	20E	O	L131
L141T	3.55	-.13	-.83	.12	.83	4.84	-.14	-.55	.25	1.14	20A	O	L141T
L143	3.94	.25	1.58	.15	1.02	5.24	.26	1.01	.24	1.09	20E	O	L143
L148	3.65	-.03	-.20	.14	.91	4.89	-.09	-.35	.15	.66	20A	O	L148
L159	3.66	-.03	-.16	.15	1.03	5.06	.08	.32	.23	1.04	20A	O	L159
L163	3.96	.28	1.73	.13	.85	5.22	.25	.96	.22	.98	20D	O	L163
L167	3.85	.17	1.07	.21	1.44	5.34	.36	1.42	.25	1.14	20G	O	L167
L185	3.57	-.11	-.69	.14	.96	4.73	-.25	-.98	.37	1.64	20C	O	L185
L190R	3.71	.03	.19	.08	.55	4.77	-.21	-.82	.21	.96	20A	O	L190R
L194	3.44	-.24	-1.50	.18	1.21	4.64	-.34	-1.34	.23	1.04	20A	O	L194
L223B	3.72	.04	.24	.10	.66	5.07	.09	.35	.22	.99	20A	O	L223B
L226C	3.39	-.29	-1.79	.29	1.92	4.57	-.41	-1.58	.24	1.07	20C	O	L226C
L230	3.56	-.13	-.78	.11	.75	4.93	-.05	-.20	.12	.56	20G	O	L230
L243	3.63	-.05	-.32	.09	.62	4.84	-.14	-.55	.16	.72	20A	O	L243
L255	3.54	-.14	-.87	.15	1.01	4.81	-.17	-.66	.22	.99	20A	O	L255
L260	3.56	-.13	-.78	.12	.80	4.95	-.03	-.11	.15	.66	20A	O	L260
L261	3.76	.08	.51	.18	1.19	5.16	.18	.70	.19	.86	20A	O	L261
L278	3.62	-.07	-.41	.15	.98	5.07	.09	.37	.22	.99	20A	O	L278
L291	3.62	-.07	-.41	.18	1.18	4.59	-.39	-1.52	.26	1.15	20A	O	L291
L309	3.62	-.07	-.41	.12	.81	4.77	-.21	-.83	.30	1.32	20E	O	L309
L315	3.41	-.28	-1.72	.14	.93	4.65	-.33	-1.28	.28	1.24	20A	O	L315
L325	3.49	-.20	-1.21	.11	.77	4.80	-.18	-.70	.23	1.03	20E	O	L325
L328	3.77	.09	.53	.38	2.55	5.54	.56	2.19	.29	1.28	20A	*	L328
L331	3.98	.30	1.83	.15	.99	5.07	.10	.38	.29	1.28	20A	*	L331
L333	3.84	.15	.96	.11	.77	5.03	.05	.20	.18	.81	20A	O	L333
L344	3.73	.05	.29	.20	1.34	5.10	.12	.46	.31	1.38	20A	O	L344
L352	3.44	-.25	-1.53	.16	1.09	4.14	-.84	-3.27	.22	.98	20A	X	L352
L356	3.57	-.11	-.69	.12	.83	4.87	-.11	-.42	.20	.88	20A	O	L356
L360	3.39	-.29	-1.81	.13	.86	4.63	-.35	-1.35	.21	.96	20B	O	L360
L390	3.96	.27	1.71	.11	.71	5.26	.28	1.09	.18	.80	20A	O	L390
L442	3.73	.04	.27	.07	.46	4.94	-.04	-.14	.09	.42	20G	O	L442
L557	3.65	-.04	-.23	.16	1.10	4.76	-.22	-.85	.19	.86	20A	O	L557
L558	.75	-2.93	-18.19	.07	.44	.98	-4.00	-15.63	.06	.27	20A	#	L558
L559	3.63	-.05	-.30	.12	.83	4.93	-.04	-.18	.19	.83	20A	O	L559
L563A	3.58	-.10	-.61	.25	1.70	5.02	.04	.17	.39	1.75	20A	O	L563A
L563B	4.13	.44	2.76	.15	.98	5.77	.79	3.08	.22	.97	20A	*	L563B
L567	3.65	-.03	-.21	.24	1.60	5.09	.11	.44	.22	1.00	20A	O	L567
L574	3.73	.05	.32	.15	1.03	5.02	.04	.17	.21	.92	20A	O	L574
L575	3.57	-.11	-.68	.14	.95	4.79	-.19	-.74	.21	.93	20G	O	L575
L587	3.88	.20	1.22	.13	.88	5.27	.30	1.16	.23	1.02	20A	O	L587
L592	3.67	-.01	-.05	.16	1.06	4.99	.02	.06	.19	.84	20A	O	L592
L616	2.76	-.93	-5.74	.10	.68	3.65	-1.33	-5.19	.16	.74	20D	#	L616

GR. MEAN = 3.68 KILONEWTON/M GRAND MEAN = 4.98 KILONEWTON/M TEST DETERMINATIONS = 20

SD MEANS = .16 KILONEWTON/M SD OF MEANS = .26 KILONEWTON/M 45 LABS IN GRAND MEANS

AVERAGE SDR = .15 KILONEWTON/M AVERAGE SDR = .22 KILONEWTON/M

GR. MEAN =12.422 LB/15 MM GRAND MEAN =16.788 LB/15 MM

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

TOTAL NUMBER OF LABORATORIES REPORTING = 52

Best values: J71 3.7 ± 0.2 kilonewton per meter

K39 4.9 ± 0.3 kilonewton per meter

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

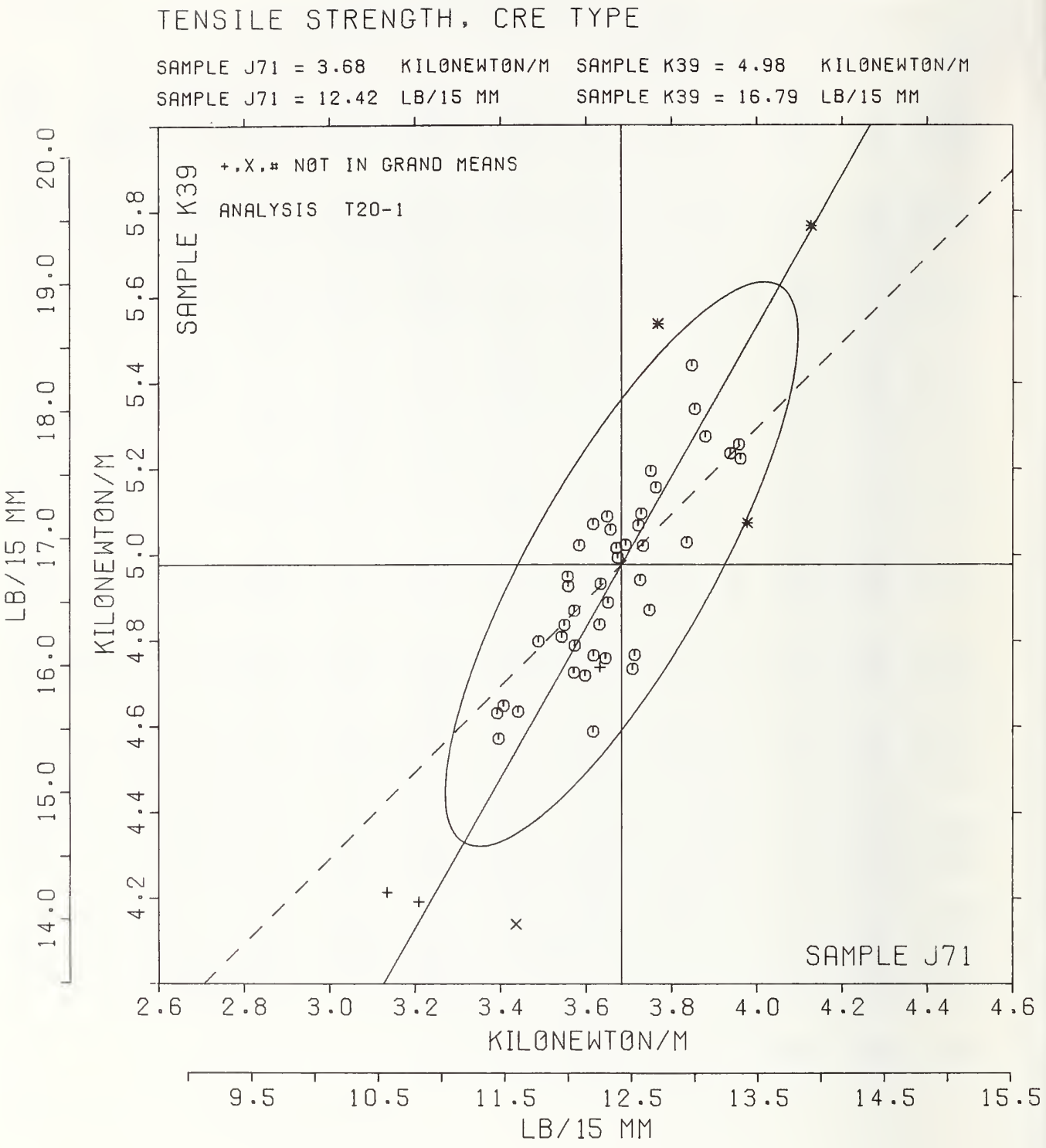
Data from the following laboratories appear to be off by a multiplicative factor: 558.

ANALYSIS T20-1 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

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

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


TENSILE STRENGTH, CRE TYPE
SAMPLE J71 = 3.68 KILØNEWTØN/M SAMPLE K39 = 4.98 KILØNEWTØN/M
SAMPLE J71 = 12.42 LB/15 MM SAMPLE K39 = 16.79 LB/15 MM
+,X,* NØT IN GRAND MEANS
ANALYSIS T20-1
SAMPLE K39
SAMPLE J71
KILØNEWTØN/M
LB/15 MM
2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6
9.5 10.5 11.5 12.5 13.5 14.5 15.5
4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6 5.8
14.0 15.0 16.0 17.0 18.0 19.0 20.0

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)

	SAMPLE	PRINTING				SAMPLE	PRINTING				TEST D.= 20		
LAB	J71	76 GRAMS PER SQUARE METER				K39	75 GRAMS PER SQUARE METER						
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L103	3.94	.18	.99	.12	.65	5.24	.20	.97	.17	.70	20R	O	L103
L108	4.10	.34	1.87	.14	.77	5.33	.29	1.40	.29	1.23	20P	O	L108
L121	4.01	.25	1.38	.19	1.10	5.19	.15	.70	.12	.49	20P	O	L121
L124P	3.65	-.11	-.64	.20	1.12	5.09	.05	.23	.24	1.01	20P	O	L124P
L128	3.66	-.11	-.61	.14	.82	5.05	.01	.06	.23	.96	20T	O	L128
L148	3.66	-.11	-.60	.14	.80	4.94	-.10	-.47	.19	.78	20P	O	L148
L158	345.86	342.09	1912.63	6.33	35.88	471.06	466.02	2244.48	18.18	76.59	20T	#	L158
L162	3.84	.08	.42	.13	.74	4.79	-.25	-1.20	.14	.61	20*	*	L162
L182L	3.62	-.15	-.85	.13	.71	4.90	-.14	-.67	.22	.94	20T	O	L182L
L189	3.93	.17	.94	.15	.87	5.44	.40	1.91	.28	1.17	20R	O	L189
L191P	3.78	.01	.07	.12	.66	4.88	-.16	-.78	.15	.64	20P	O	L191P
L212	3.52	-.25	-1.39	.16	.91	4.71	-.33	-1.59	.17	.74	20R	O	L212
L213	3.37	-.40	-2.23	.19	1.10	4.68	-.36	-1.73	.49	2.06	20T	O	L213
L218	3.68	-.09	-.50	.12	.70	4.99	-.05	-.26	.24	1.01	20P	O	L218
L233	3.56	-.21	-1.17	.16	.93	4.76	-.29	-1.37	.27	1.13	20Q	O	L233
L241	3.89	.12	.70	.23	1.30	5.13	.09	.43	.21	.87	20R	O	L241
L242	3.54	-.23	-1.29	.16	.92	4.80	-.24	-1.18	.24	1.03	20Y	O	L242
L249	3.58	-.19	-1.04	.22	1.25	4.82	-.22	-1.07	.19	.79	20P	O	L249
L259	3.56	-.21	-1.16	.28	1.58	4.93	-.11	-.53	.20	.85	20P	O	L259
L262	3.76	-.00	-.02	.19	1.10	5.25	.21	1.01	.22	.93	20R	O	L262
L275	3.88	.12	.66	.20	1.14	5.18	.14	.68	.24	1.01	20R	O	L275
L279P	3.90	.13	.75	.09	.52	5.15	.11	.52	.41	1.74	20P	O	L279P
L285	3.26	-.51	-2.83	.08	.46	4.16	-.88	-4.23	.11	.46	20P	#	L285
L290	3.70	-.06	-.36	.17	.97	5.00	-.04	-.18	.23	.96	20P	O	L290
L311	3.60	-.17	-.93	.16	.90	4.82	-.22	-1.06	.26	1.08	20V	O	L311
L321	3.16	-.61	-3.40	.16	.91	4.01	-1.03	-4.98	.23	.99	20Q	#	L321
L330	3.97	.20	1.13	.25	1.40	5.20	.16	.76	.27	1.16	20P	O	L330
L356	3.93	.16	.91	.24	1.37	5.19	.15	.70	.24	1.00	20P	O	L356
L370	3.66	-.11	-.61	.15	.83	5.02	-.02	-.12	.20	.83	20P	O	L370
L376	3.72	-.04	-.24	.22	1.25	4.90	-.14	-.67	.23	.95	20P	O	L376
L393	3.89	.12	.69	.14	.79	5.26	.22	1.04	.26	1.09	20P	O	L393
L554	4.54	.77	4.30	.15	.85	5.74	.70	3.38	.22	.95	20P	#	L554
L556	4.10	.33	1.85	.15	.88	5.50	.46	2.22	.27	1.12	20P	O	L556
L585	3.89	.13	.72	.19	1.08	5.22	.18	.86	.30	1.28	20V	O	L585
L599	3.68	-.09	-.48	.19	1.10	4.89	-.15	-.73	.27	1.13	20V	O	L599
L626	3.79	.03	.15	.14	.79	4.92	-.12	-.60	.18	.76	20T	O	L626
L680	3.72	-.05	-.25	.26	1.48	5.03	-.01	-.03	.16	.67	20R	O	L680
L692	3.97	.21	1.15	.21	1.20	5.20	.16	.76	.21	.90	20P	O	L692

GR. MEAN = 3.77 KILONEWTON/M GRAND MEAN = 5.04 KILONEWTON/M TEST DETERMINATIONS = 20

SD MEANS = .18 KILONEWTON/M SD OF MEANS = .21 KILONEWTON/M 34 LABS IN GRAND MEANS

AVERAGE SDR = .18 KILONEWTON/M AVERAGE SDR = .24 KILONEWTON/M

GR. MEAN =12.704 LB/15 MM GRAND MEAN =17.001 LB/15 MM

TOTAL NUMBER OF LABORATORIES REPORTING = 38

Best values: J71 3.7 ± 0.3 kilonewton per meter
K39 5.0 ± 0.3 kilonewton per meter

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

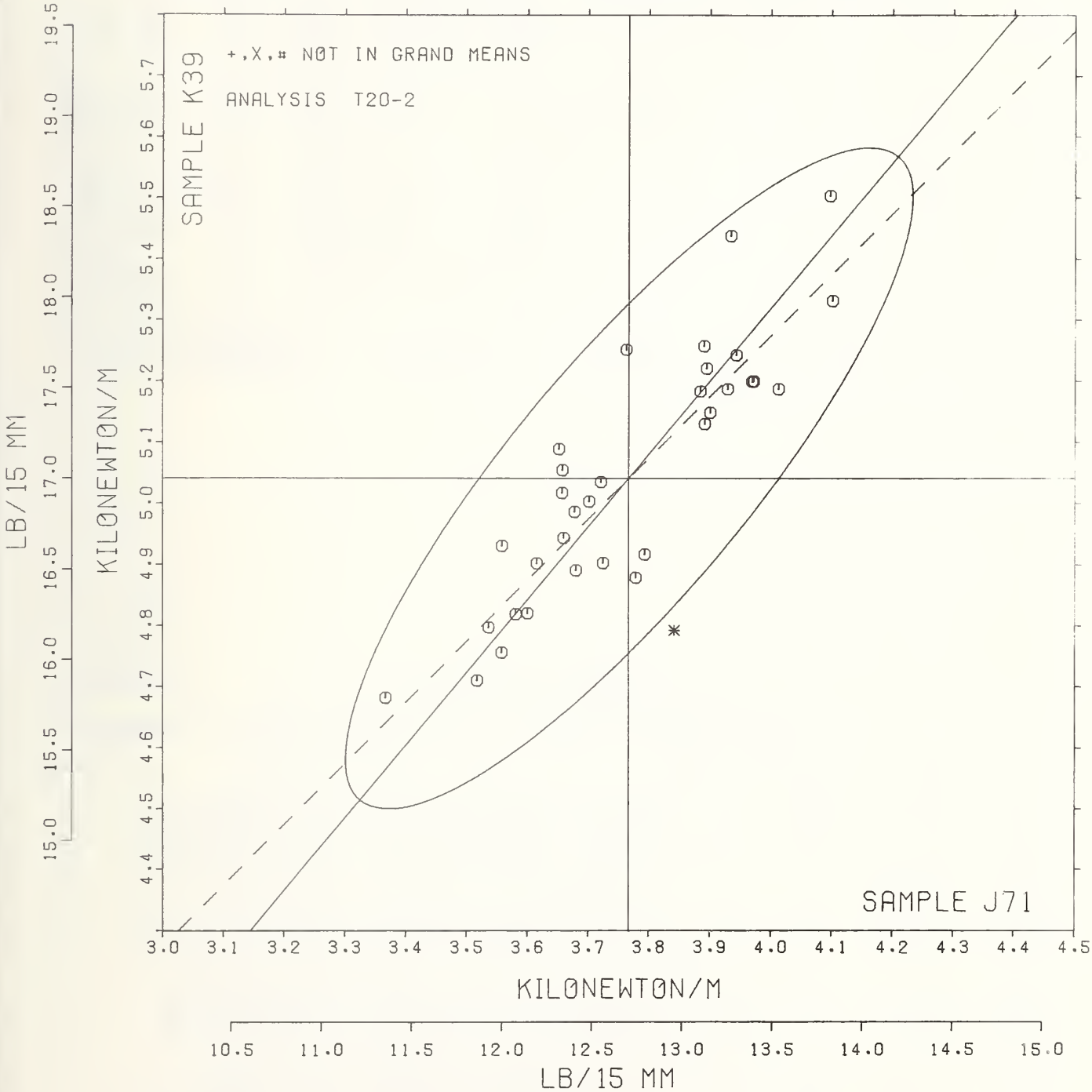
Data from the following laboratories appear to be off by a multiplicative factor: 158.

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


TENSILE STRENGTH, PENDULUM TYPE
SAMPLE J71 = 3.77 KILONEWTON/M SAMPLE K39 = 5.04 KILONEWTON/M
SAMPLE J71 = 12.70 LB/15 MM SAMPLE K39 = 17.00 LB/15 MM
+,X,# NOT IN GRAND MEANS
ANALYSIS T20-2
SAMPLE K39
KILONEWTON/M
LB/15 MM
SAMPLE J71
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 J01 MEAN	PRINTING 98 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J16 MEAN	PRINTING 149 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 20 VAR	F	LAB
L106	57.1	-17.4	-1.87	11.1	1.26	69.4	-49.4	-2.35	7.8	.67	25F	O	L106
L122	88.4	13.9	1.50	7.1	.81	142.3	23.5	1.12	8.3	.72	25P	O	L122
L126	74.3	-.2	-.02	12.9	1.46	125.8	7.0	.33	12.5	1.08	25G	O	L126
L151	68.6	-5.9	-.63	10.5	1.19	119.1	.2	.01	8.3	.72	25F	O	L151
L182	76.5	2.0	.21	7.8	.88	118.4	-.4	-.02	9.6	.83	25B	O	L182
L234A	69.1	-5.4	-.58	8.1	.92	121.9	3.1	.15	16.6	1.43	25H	O	L234A
L237B	73.8	-.7	-.07	6.1	.69	111.1	-7.7	-.37	7.6	.65	25H	O	L237B
L243	78.3	3.8	.41	5.4	.61	121.1	2.3	.11	8.2	.71	25Z	O	L243
L250	72.4	-2.1	-.23	6.6	.74	116.1	-2.7	-.13	10.4	.90	25A	O	L250
L264	71.9	-2.6	-.28	6.7	.76	116.1	-2.7	-.13	12.3	1.06	25F	O	L264
L267	87.2	12.7	1.36	5.3	.60	135.2	16.4	.78	10.1	.87	25F	O	L267
L268	75.3	.8	.08	10.4	1.18	150.9	32.1	1.52	8.8	.76	25B	*	L268
L273	84.0	9.5	1.02	10.1	1.14	127.6	8.8	.42	18.0	1.56	25F	O	L273
L280	67.6	-6.9	-.75	18.5	2.09	107.8	-11.0	-.52	22.8	1.97	25B	O	L280
L312	91.9	17.4	1.87	5.8	.66	153.5	34.7	1.65	12.4	1.07	25J	O	L312
L580	71.0	-3.5	-.38	9.4	1.06	100.7	-18.1	-.86	11.3	.97	25C	O	L580
L604	58.1	-16.4	-1.76	10.3	1.17	81.8	-37.0	-1.76	13.8	1.19	25A	O	L604
L689	75.6	1.1	.12	8.5	.96	119.9	1.0	.05	7.1	.61	25F	O	L689

GR. MEAN = 74.5 JOULES/SQ M — GRAND MEAN = 118.8 JOULES/SQ M — TEST DETERMINATIONS = 20

SD MEANS = 9.3 JOULES/SQ M — SD OF MEANS = 21.1 JOULES/SQ M — 18 LABS IN GRAND MEANS

AVERAGE SDR = 8.8 JOULES/SQ M — AVERAGE SDR = 11.6 JOULES/SQ M

GR. MEAN = 5.104 FT.LB/SQ FT — GRAND MEAN = 8.138 FT.LB/SQ FT

TOTAL NUMBER OF LABORATORIES REPORTING = 18

Best values: J01 75 ± 16 joules per square meter

J16 119 ± 37 joules per square meter

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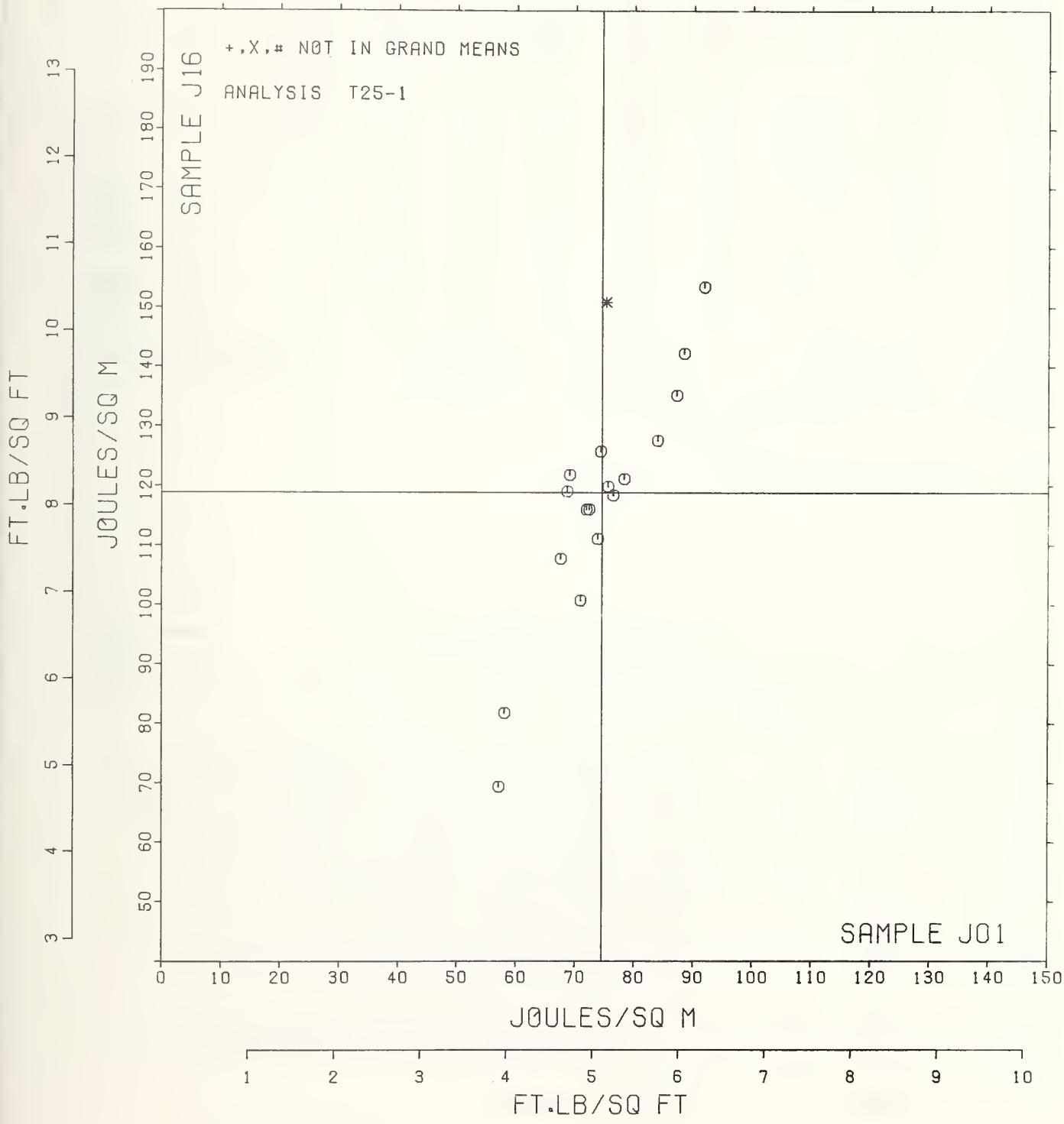
ANALYSIS T25-1 TABLE 2

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 J01	J16	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L106	O	57.1	69.4	-52.4	-2.1	.97	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L604	O	58.1	81.8	-40.5	1.6	1.18	25A	TENSILE ENERGY ABS.,PACKAGING PAPER,FLAT/FLAT JAWS
L280	O	67.6	107.8	-12.8	2.4	2.03	25B	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L151	O	68.6	119.1	-1.9	5.5	.95	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L234A	O	69.1	121.9	.9	6.2	1.17	25H	TENSILE ENERGY ABS.,PACKAGING PAPER,2-PIN STRAIN GAGE
L580	O	71.0	100.7	-18.1	-3.4	1.02	25C	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/LINE JAWS
L264	O	71.9	116.1	-3.5	1.4	.91	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L250	O	72.4	116.1	-3.3	.9	.82	25A	TENSILE ENERGY ABS.,PACKAGING PAPER,FLAT/FLAT JAWS
L237B	O	73.8	111.1	-7.4	-2.2	.67	25H	TENSILE ENERGY ABS.,PACKAGING PAPER,2-PIN STRAIN GAGE
L126	O	74.3	125.8	6.4	2.7	1.27	25G	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/LINE JAWS
L268	*	75.3	150.9	30.1	11.1	.97	25B	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L689	O	75.6	119.9	1.4	-.6	.78	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L182	O	76.5	118.4	.3	-2.0	.85	25B	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L243	O	78.3	121.1	3.6	-2.7	.66	25Z	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/LINE JAWS
L273	O	84.0	127.6	11.7	-5.5	1.35	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L267	O	87.2	135.2	20.0	-5.7	.74	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L122	O	88.4	142.3	27.0	-4.3	.76	25P	TENSILE ENERGY ABS.,PACKAGING PAPER,PATTERNED FLAT JAWS
L312	O	91.9	153.5	38.6	-3.3	.87	25J	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
GMEANS:		74.5	118.8			1.00		
		95% ELLIPSE:		62.8	12.4	WITH GAMMA = 68 DEGREES		


T.E.A., PACKAGING PAPERS
SAMPLE J01 = 75. JOULES/SQ M
SAMPLE J01 = 5.1 FT.LB/SQ FT
SAMPLE J16 = 119. JOULES/SQ M
SAMPLE J16 = 8.1 FT.LB/SQ FT
+,X,# NOT IN GRAND MEANS
ANALYSIS T25-1
SAMPLE J16
JOULES/SQ M
FT.LB/SQ FT
SAMPLE J01
JOULES/SQ M
FT.LB/SQ FT

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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 CODE	SAMPLE J71 MEAN	PRINTING 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE K39 MEAN	PRINTING 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F = 20 VAR	F	LAB
L100	41.5	1.1	.27	2.7	.60	50.4	-4.0	-.72	2.5	.43	26A	O	L100
L118	43.5	3.1	.80	3.6	.81	56.2	1.7	.32	6.4	1.10	26E	O	L118
L122	45.1	4.7	1.19	4.7	1.05	63.2	8.8	1.58	7.3	1.26	26L	O	L122
L139	41.4	1.0	.25	3.9	.89	55.2	.8	.14	5.9	1.02	26B	O	L139
L159	43.4	3.0	.75	5.8	1.31	62.3	7.9	1.42	7.1	1.23	26F	O	L159
L163	39.5	-.8	-.21	4.9	1.10	51.1	-3.3	-.60	6.2	1.07	26J	O	L163
L167	38.5	-1.8	-.46	2.1	.48	53.4	-1.0	-.19	2.5	.44	26D	O	L167
L185	36.0	-4.4	-1.11	4.7	1.05	50.7	-3.7	-.67	9.1	1.57	26C	O	L185
L211	87.8	47.4	11.98	11.2	2.53	119.2	64.8	11.70	14.7	2.54	26Z	#	L211
L250	38.4	-1.9	-.49	4.5	1.00	50.7	-3.7	-.67	6.0	1.04	26A	O	L250
L255	36.5	-3.9	-.99	5.0	1.12	51.5	-2.9	-.52	6.7	1.16	26P	O	L255
L309	41.8	1.4	.35	4.1	.93	55.5	1.0	.18	7.3	1.26	26J	O	L309
L356	21.3	-19.1	-4.82	2.2	.49	30.9	-23.5	-4.25	3.1	.54	26A	#	L356
L393	39.8	-.6	-.14	3.0	.67	55.5	1.0	.19	4.8	.82	26V	O	L393
L442	51.2	10.8	2.74	3.0	.68	67.0	12.6	2.27	3.2	.56	26B	O	L442
L567	34.7	-5.7	-1.44	7.8	1.74	46.4	-8.1	-1.46	5.9	1.02	26A	O	L567
L575	39.0	-1.4	-.35	5.6	1.26	50.8	-3.6	-.66	5.8	1.01	26A	O	L575
L587	38.7	-1.7	-.43	4.8	1.09	57.2	2.8	.50	6.4	1.11	26C	O	L587
L592	37.6	-2.8	-.71	5.5	1.23	48.3	-6.2	-1.11	5.2	.89	26H	O	L592

GR. MEAN = 40.4 JOULES/SQ M — GRAND MEAN = 54.4 JOULES/SQ M — TEST DETERMINATIONS = 20

SD MEANS = 4.0 JOULES/SQ M — SD OF MEANS = 5.5 JOULES/SQ M — 17 LABS IN GRAND MEANS

AVERAGE SDR = 4.4 JOULES/SQ M — AVERAGE SDR = 5.8 JOULES/SQ M

GR. MEAN = 2.767 FT.LB/SQ FT — GRAND MEAN = 3.729 FT.LB/SQ FT

TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: J71 41 ± 6 joules per square meter
K39 54 ± 9 joules per square meter

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

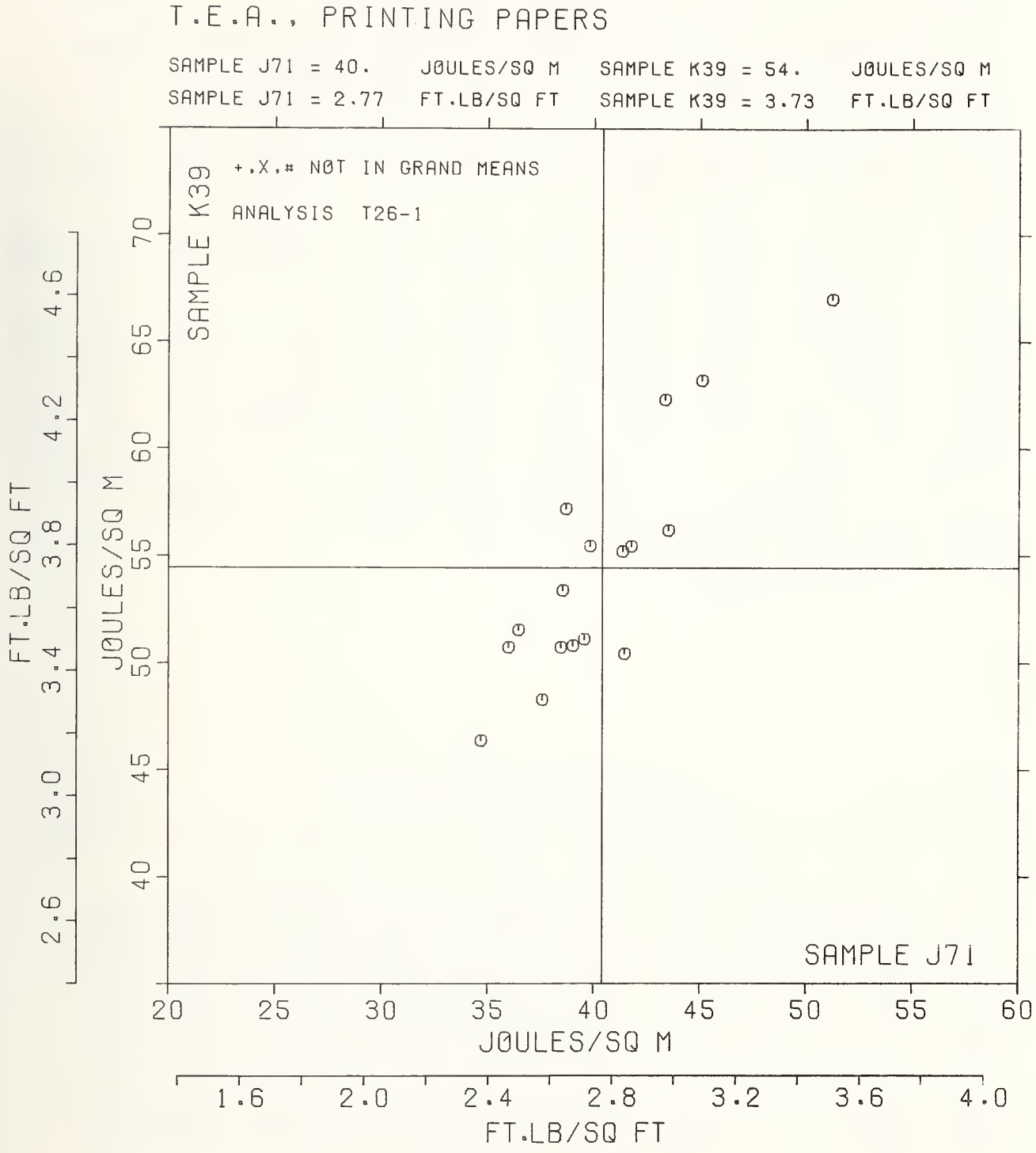
REPORT NO. 58S — TAPPI COLLABORATIVE REFERENCE PROGRAM — FEBRUARY 1979

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 CODE	F	MEANS J71	K39	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L356	#	21.3	30.9	-30.2	2.5	.52	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L567	O	34.7	46.4	-9.9	.1	1.38	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L185	O	36.0	50.7	-5.6	1.5	1.31	26C	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/LINE JAWS
L255	O	36.5	51.5	-4.6	1.6	1.14	26P	TENSILE ENERGY ABS.,PRINTING PAPERS,PATTERNED FLAT JAWS
L592	O	37.6	48.3	-6.7	-1.2	1.06	26H	TENSILE ENERGY AES.,PRINTING PAPERS,2-PIN STRAIN GAGE
L250	O	38.4	50.7	-4.1	-.5	1.02	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L167	O	38.5	53.4	-1.9	.9	.46	26D	TENSILE ENERGY ABS.,PRINTING PAPERS,2-PIN STRAIN GAGE
L587	O	38.7	57.2	1.3	3.0	1.10	26C	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/LINE JAWS
L575	O	39.0	50.8	-3.8	-.9	1.13	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L163	O	39.5	51.1	-3.2	-1.2	1.08	26J	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/FLAT JAWS
L393	O	39.8	55.5	.5	1.0	.75	26V	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/FLAT JAWS
L139	O	41.4	55.2	1.2	-.4	.96	26B	TENSILE ENERGY ABS.,PRINTING PAPERS,2-PIN STRAIN GAGE
L100	O	41.5	50.4	-2.7	-3.1	.52	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L309	O	41.8	55.5	1.6	-.6	1.09	26J	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/FLAT JAWS
L159	O	43.4	62.3	8.2	2.0	1.27	26F	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/FLAT JAWS
L118	O	43.5	56.2	3.2	-1.6	.96	26E	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L122	O	45.1	63.2	9.9	1.1	1.16	26L	TENSILE ENERGY ABS.,PRINTING PAPERS,PATTERNED FLAT JAWS
L442	O	51.2	67.0	16.5	-1.9	.62	26B	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/FLAT JAWS
L211	#	87.8	119.2	80.2	-2.6	2.54	26Z	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/LINE JAWS
GMEANS:		40.4	54.4			1.00		
		95% ELLIPSE:		18.5	4.5	WITH GAMMA = 55 DEGREES		


T.E.A., PRINTING PAPERS
SAMPLE J71 = 40. JOULES/SQ M
SAMPLE J71 = 2.77 FT.LB/SQ FT
SAMPLE K39 = 54. JOULES/SQ M
SAMPLE K39 = 3.73 FT.LB/SQ FT
+,X,# NOT IN GRAND MEANS
ANALYSIS T26-1
SAMPLE K39
SAMPLE J71
JOULES/SQ M
FT.LB/SQ FT
20 25 30 35 40 45 50 55 60
40 45 50 55 60 65 70
2.6 3.0 3.4 3.8 4.2 4.6
1.6 2.0 2.4 2.8 3.2 3.6 4.0

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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 J01 MEAN	PRINTING 98 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J16 MEAN	PRINTING 149 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F = 20 VAR	F	LAB
L100	2.095	-.021	-.16	.094	.54	2.005	-.151	-.63	.069	.53	28A	O	L100
L106	1.930	-.186	-1.45	.313	1.80	1.610	-.546	-2.27	.121	.94	28E	O	L106
L122	2.335	.219	1.70	.129	.74	2.464	.308	1.28	.087	.68	28P	O	L122
L126	1.946	-.170	-1.32	.212	1.22	2.096	-.060	-.25	.136	1.06	28C	O	L126
L151	1.960	-.156	-1.22	.221	1.27	2.120	-.036	-.15	.228	1.78	28B	O	L151
L182	2.075	-.041	-.32	.133	.77	2.110	-.046	-.19	.091	.71	28B	O	L182
L243	2.090	-.026	-.20	.110	.64	2.118	-.038	-.16	.088	.69	28C	O	L243
L264	2.220	.104	.81	.242	1.39	2.100	-.056	-.23	.169	1.31	28B	O	L264
L265	2.197	.081	.63	.118	.68	2.209	.053	.22	.083	.64	28A	O	L265
L267	2.269	.153	1.19	.086	.50	2.271	.115	.48	.099	.77	28B	O	L267
L268	2.045	-.071	-.55	.206	1.19	2.500	.344	1.43	.145	1.13	28B	O	L268
L280	2.089	-.027	-.21	.306	1.77	2.099	-.057	-.24	.273	2.13	28B	O	L280
L312	2.290	.174	1.35	.107	.62	2.610	.454	1.89	.148	1.15	28B	O	L312
L324	2.005	-.111	-.87	.136	.78	2.110	-.046	-.19	.107	.83	28P	O	L324
L336	2.292	.176	1.37	.219	1.26	2.332	.176	.73	.117	.91	28A	O	L336
L580	2.055	-.061	-.48	.196	1.13	1.820	-.336	-1.40	.132	1.03	28C	O	L580
L581	2.069	-.047	-.37	.160	.92	NO DATA REPORTED FOR SAMPLE J16					28A	M	L581
L689	2.080	-.036	-.28	.120	.69	2.080	-.076	-.32	.089	.70	28B	O	L689

GR. MEAN = 2.116 PERCENT — GRAND MEAN = 2.156 PERCENT — TEST DETERMINATIONS = 20

SD MEANS = .128 PERCENT — SD OF MEANS = .240 PERCENT — 17 LABS IN GRAND MEANS

AVERAGE SDR = .173 PERCENT — AVERAGE SDR = .128 PERCENT

L153	2.650	.534	4.16	.185	1.07	2.615	.459	1.91	.150	1.17	28Q	*	L153

TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: J01 2.12 ± 0.18 percent

J16 2.16 ± 0.35 percent

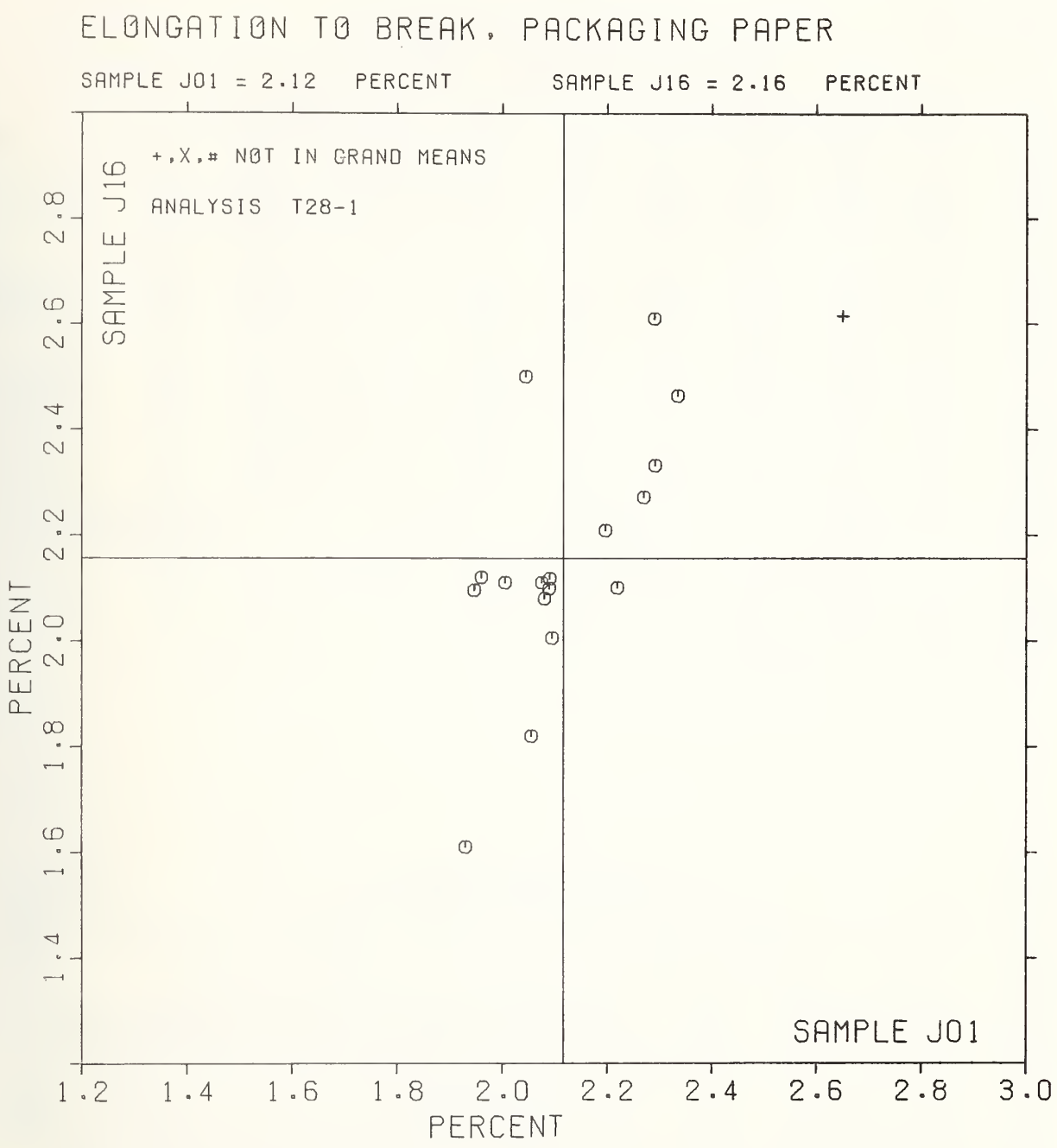
REPORT NO. 58S — TAPPI COLLABORATIVE REFERENCE PROGRAM — FEBRUARY 1979

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 J01	J16	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L106	O	1.930	1.610	-.576	-.034	1.37	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L126	O	1.946	2.096	-.120	.134	1.14	28C	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/LINE JAWS
L151	O	1.960	2.120	-.092	.131	1.53	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L324	O	2.005	2.110	-.085	.085	.81	28P	ELONGATION,PACKAGING PAPER,LOAD CELL,PATTERNED FLAT JAWS
L268	O	2.045	2.500	.292	.196	1.16	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L580	O	2.055	1.820	-.334	-.070	1.08	28C	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/LINE JAWS
L581	M	2.069				.92	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,FLAT/FLAT JAWS
L182	O	2.075	2.110	-.058	.021	.74	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L689	O	2.080	2.080	-.084	.005	.69	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L280	O	2.089	2.099	-.063	.004	1.95	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L243	O	2.090	2.118	-.045	.010	.66	28C	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/LINE JAWS
L100	O	2.095	2.005	-.148	-.038	.54	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,FLAT/FLAT JAWS
L265	O	2.197	2.209	.079	-.055	.66	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,FLAT/FLAT JAWS
L264	O	2.220	2.100	-.013	-.117	1.35	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L267	O	2.269	2.271	.165	-.098	.64	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L312	O	2.290	2.610	.486	.010	.89	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L336	O	2.292	2.332	.229	-.096	1.09	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,FLAT/FLAT JAWS
L122	O	2.335	2.464	.368	-.086	.71	28P	ELONGATION,PACKAGING PAPER,LOAD CELL,PATTERNED FLAT JAWS
L153	*	2.650	2.615	.626	-.321	1.12	28Q	ELONGATION,PACKAGING PAPER,PENDULUM, PATTERNED FLAT JAWS
GMEANS:		2.116	2.156			1.00		
95% ELLIPSE:				.720	.255	WITH GAMMA = 67 DEGREES		


ELØNGATIØN TØ BREAK, PACKAGING PAPER
SAMPLE J01 = 2.12 PERCENT
SAMPLE J16 = 2.16 PERCENT
+,X,# NØT IN GRAND MEANS
ANALYSIS T28-1
SAMPLE J16
PERCENT
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
SAMPLE J01
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
3.0
PERCENT

REPORT NO. 58S — TAPPI COLLABORATIVE REFERENCE PROGRAM — FEBRUARY 1979

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 J71 MEAN	PRINTING 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE K39 MEAN	PRINTING 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F = 20 VAR	F	LAB
L100	1.640	.027	.15	.082	.59	1.630	-.080	-.49	.057	.44	29A	O	L100
L105	1.312	-.300	-1.67	.197	1.41	1.475	-.235	-1.44	.180	1.39	29A	O	L105
L118	1.687	.075	.42	.098	.71	1.731	.021	.13	.125	.96	29A	O	L118
L122	1.780	.167	.93	.120	.86	1.883	.174	1.07	.143	1.10	29P	O	L122
L141T	1.566	-.046	-.26	.142	1.02	1.599	-.031	-.19	.165	1.27	29D	O	L141T
L185	1.504	-.108	-.60	.157	1.13	1.643	-.067	-.41	.160	1.24	29C	O	L185
L190R	1.680	.067	.37	.090	.65	1.773	.063	.39	.154	1.19	29A	O	L190R
L255	1.564	-.049	-.27	.136	.98	1.689	-.020	-.12	.129	.99	29P	O	L255
L278	1.213	-.399	-2.22	.130	.93	1.390	-.320	-1.97	.107	.83	29A	O	L278
L309	1.840	.227	1.26	.114	.82	1.895	.185	1.14	.141	1.09	29A	O	L309
L344	1.612	-.000	-.00	.157	1.13	1.669	-.041	-.25	.164	1.26	29A	O	L344
L356	1.735	.122	.68	.121	.87	1.896	.186	1.15	.128	.99	29A	O	L356
L442	1.951	.338	1.88	.095	.68	1.993	.284	1.74	.060	.47	29B	O	L442
L567	1.684	.072	.40	.236	1.70	1.866	.156	.96	.125	.96	29A	O	L567
L575	1.642	.029	.16	.166	1.20	1.658	-.052	-.32	.117	.90	29A	O	L575
L587	1.475	-.138	-.77	.137	.99	1.685	-.025	-.15	.109	.84	29C	O	L587
L592	1.529	-.083	-.46	.184	1.33	1.509	-.201	-1.23	.141	1.08	29D	O	L592

GR. MEAN = 1.613 PERCENT — GRAND MEAN = 1.710 PERCENT — TEST DETERMINATIONS = 20

SD MEANS = .180 PERCENT — SD OF MEANS = .163 PERCENT — 17 LABS IN GRAND MEANS

AVERAGE SDR = .139 PERCENT — AVERAGE SDR = .130 PERCENT

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

TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: J71 1.62 ± 0.31 percent

K39 1.70 ± 0.28 percent

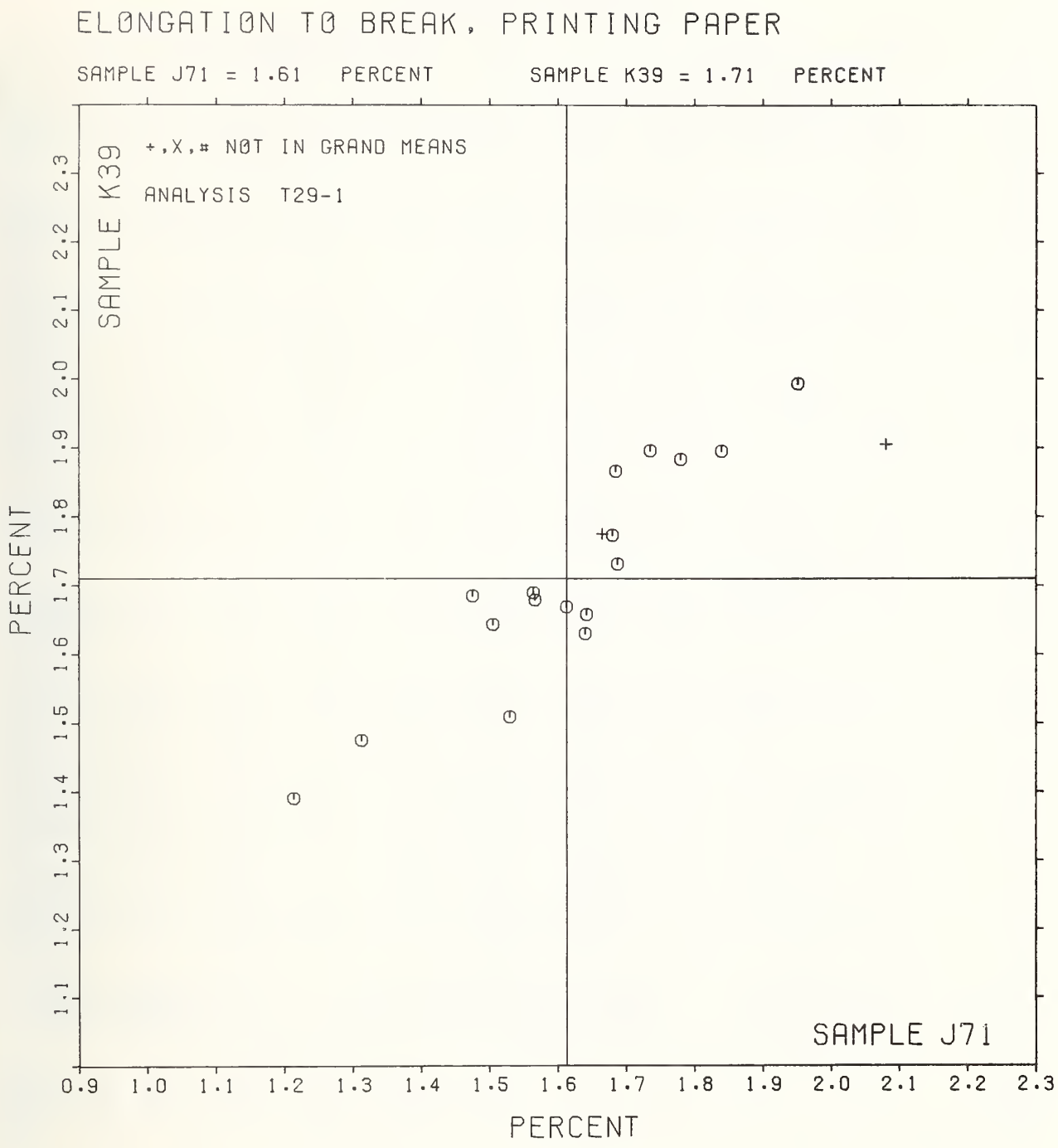
REPORT NO. 58S — TAPPI COLLABORATIVE REFERENCE PROGRAM — FEBRUARY 1979

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 J71	K39	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L278	O	1.213	1.390	-.511	.029	.88	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L105	O	1.312	1.475	-.380	.026	1.40	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L587	O	1.475	1.685	-.119	.074	.91	29C	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/LINE JAWS
L185	O	1.504	1.643	-.125	.023	1.18	29C	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/LINE JAWS
L592	O	1.529	1.509	-.196	-.094	1.21	29D	ELONGATION,PRINTING PAPERS,LOAD CELL,2-PIN STRAIN GAGE
L255	O	1.564	1.689	-.050	.018	.99	29P	ELONGATION,PRINTING PAPERS,LOAD CELL,PATTERNED FLAT JAWS
L141T	O	1.566	1.679	-.055	.008	1.15	29D	ELONGATION,PRINTING PAPERS,LOAD CELL,2-PIN STRAIN GAGE
L344	O	1.612	1.669	-.028	-.030	1.19	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L100	O	1.640	1.630	-.033	-.077	.52	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L575	O	1.642	1.658	-.013	-.058	1.05	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L626	*	1.665	1.775	.082	.014	.87	29R	ELONGATION,PRINTING PAPERS,PENDULUM, FLAT/FLAT JAWS
L190R	O	1.680	1.773	.092	.002	.92	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L567	O	1.684	1.866	.158	.068	1.33	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L118	O	1.687	1.731	.070	-.034	.83	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L356	O	1.735	1.896	.215	.057	.93	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L122	O	1.780	1.883	.240	.018	.98	29P	ELONGATION,PRINTING PAPERS,LOAD CELL,PATTERNED FLAT JAWS
L309	O	1.840	1.895	.293	-.014	.95	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L442	O	1.951	1.993	.441	-.015	.57	29B	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/FLAT JAWS
L242	*	2.080	1.905	.478	-.167	.58	29R	ELONGATION,PRINTING PAPERS,PENDULUM, FLAT/FLAT JAWS
GMEANS:		1.613	1.710			1.00		
		95% ELLIPSE:		.666	.134	WITH GAMMA = 41 DEGREES		


ELONGATION TO BREAK, PRINTING PAPER
SAMPLE J71 = 1.61 PERCENT
SAMPLE K39 = 1.71 PERCENT
+,X,# NOT IN GRAND MEANS
ANALYSIS T29-1
SAMPLE K39
SAMPLE J71
PERCENT
PERCENT
0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
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

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

LAB CODE	SAMPLE B69 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE B88 MEAN	HEAT SET OFFSET BOOK 88 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F. = 15 VAR	F	LAB
L100M	75.	-106.	-1.35	19.	.32	42.	-5.	-.30	12.	.69	30M	O	L100M
L100N	85.	-96.	-1.22	19.	.32	42.	-5.	-.31	17.	.92	30N	O	L100N
L105	157.	-24.	-.30	42.	.72	40.	-7.	-.40	20.	1.11	30M	O	L105
L118	201.	20.	.26	51.	.87	47.	0.	.01	19.	1.06	30D	O	L118
L121	213.	32.	.41	41.	.70	58.	18.	1.10	22.	1.21	30M	O	L121
L122	246.	66.	.83	122.	2.08	74.	27.	1.61	25.	1.37	30M	O	L122
L124	248.	67.	.85	108.	1.84	68.	21.	1.24	33.	1.83	30N	O	L124
L150	232.	51.	.65	76.	1.29	42.	-5.	-.31	18.	1.00	30M	O	L150
L158	64.	-117.	-1.49	42.	.72	19.	-28.	-1.70	12.	.66	30N	O	L158
L159	237.	56.	.72	65.	1.11	48.	1.	.08	19.	1.03	30N	O	L159
L162	153.	-28.	-.35	49.	.83	39.	-8.	-.50	18.	1.02	30M	O	L162
L163	144.	-37.	-.47	73.	1.25	38.	-9.	-.56	18.	1.02	30N	O	L163
L182M	350.	169.	2.15	96.	1.64	72.	25.	1.48	30.	1.67	30M	O	L182M
L185	256.	75.	.95	70.	1.19	59.	12.	.72	26.	1.42	30N	O	L185
L190C	283.	102.	1.29	85.	1.45	45.	-3.	-.15	15.	.82	30N	O	L190C
L212	271.	90.	1.14	88.	1.50	56.	9.	.53	22.	1.20	30M	O	L212
L223F	291.	111.	1.40	64.	1.09	62.	15.	.88	16.	.91	30M	O	L223F
L230	171.	-10.	-.12	52.	.88	41.	-6.	-.34	18.	1.01	30N	O	L230
L232	306.	125.	1.58	96.	1.65	119.	72.	4.31	34.	1.90	30N	X	L232
L236	118.	-63.	-.80	41.	.70	34.	-13.	-.76	9.	.49	30N	O	L236
L238A	167.	-14.	-.18	61.	1.05	37.	-10.	-.58	21.	1.15	30N	O	L238A
L238B	180.	-0.	-.01	44.	.75	37.	-10.	-.58	20.	1.12	30D	O	L238B
L243	330.	149.	1.90	101.	1.72	59.	12.	.69	23.	1.28	30D	O	L243
L254	87.	-94.	-1.19	73.	1.24	24.	-23.	-1.38	9.	.51	30M	O	L254
L262	165.	-15.	-.19	36.	.62	47.	0.	.02	21.	1.15	30N	O	L262
L275	179.	-2.	-.02	33.	.56	51.	4.	.22	21.	1.18	30N	O	L275
L278	96.	-85.	-1.08	46.	.78	15.	-32.	-1.92	5.	.27	30C	O	L278
L279	226.	45.	.58	65.	1.10	45.	-2.	-.11	17.	.96	30N	O	L279
L285A	146.	-35.	-.45	53.	.91	53.	6.	.37	20.	1.12	30N	O	L285A
L285B	179.	-1.	-.02	47.	.80	55.	7.	.45	21.	1.18	30N	O	L285B
L299	68.	-112.	-1.43	29.	.49	25.	-22.	-1.34	11.	.64	30N	O	L299
L320	89.	-91.	-1.16	38.	.65	24.	-24.	-1.40	9.	.48	30N	O	L320
L321	356.	175.	2.22	109.	1.86	94.	47.	2.78	22.	1.23	30M	*	L321
L326N	57.	-123.	-1.57	18.	.31	30.	-17.	-1.00	14.	.80	30N	O	L326N
L339	65.	-116.	-1.47	15.	.26	18.	-29.	-1.71	5.	.28	30N	O	L339
L376	117.	-63.	-.81	44.	.75	34.	-13.	-.78	13.	.72	30N	O	L376
L388	194.	13.	.17	53.	.90	60.	12.	.74	23.	1.25	30N	O	L388
L390	149.	-32.	-.41	67.	1.14	48.	1.	.08	19.	1.04	30N	O	L390
L393	114.	-67.	-.85	32.	.54	28.	-19.	-1.13	14.	.80	30M	O	L393
L396M	234.	53.	.67	87.	1.49	63.	16.	.97	19.	1.08	30N	O	L396M
L565	255.	75.	.95	119.	2.04	61.	14.	.81	19.	1.04	30N	O	L565
L567	125.	-56.	-.71	52.	.90	64.	17.	1.03	26.	1.45	30N	*	L567
L589	192.	11.	.14	50.	.85	43.	-4.	-.26	18.	.98	30N	O	L589
L599	211.	30.	.39	116.	1.98	64.	17.	1.03	24.	1.33	30C	O	L599
L622	520.	339.	4.31	309.	5.28	177.	130.	7.73	133.	7.39	30M	X	L622
L670	178.	-2.	-.03	32.	.55	59.	12.	.71	21.	1.19	30N	O	L670
GR. MEAN =	181.	DOUBLE FOLDS				GRAND MEAN =	47.	DOUBLE FOLDS			TEST DETERMINATIONS =		15
SD MEANS =	79.	DOUBLE FOLDS				SD OF MEANS =	17.	DOUBLE FOLDS			44 LABS IN GRAND MEANS		
		AVERAGE SDR =		59.	DOUBLE FOLDS			AVERAGE SDR =		18.	DOUBLE FOLDS		
L182S	179.	-2.	-.02	45.	.77	43.	-4.	-.24	17.	.92	30S	*	L182S
L190D	133.	-47.	-.60	42.	.71	41.	-6.	-.35	18.	.98	30S	*	L190D
L280	77.	-103.	-1.31	29.	.50	24.	-23.	-1.38	10.	.55	30K	*	L280
L326S	32.	-149.	-1.89	12.	.21	27.	-20.	-1.21	11.	.60	30S	*	L326S
L396S	181.	0.	.00	43.	.74	61.	14.	.81	24.	1.33	30T	*	L396S

TOTAL NUMBER OF LABORATORIES REPORTING = 51

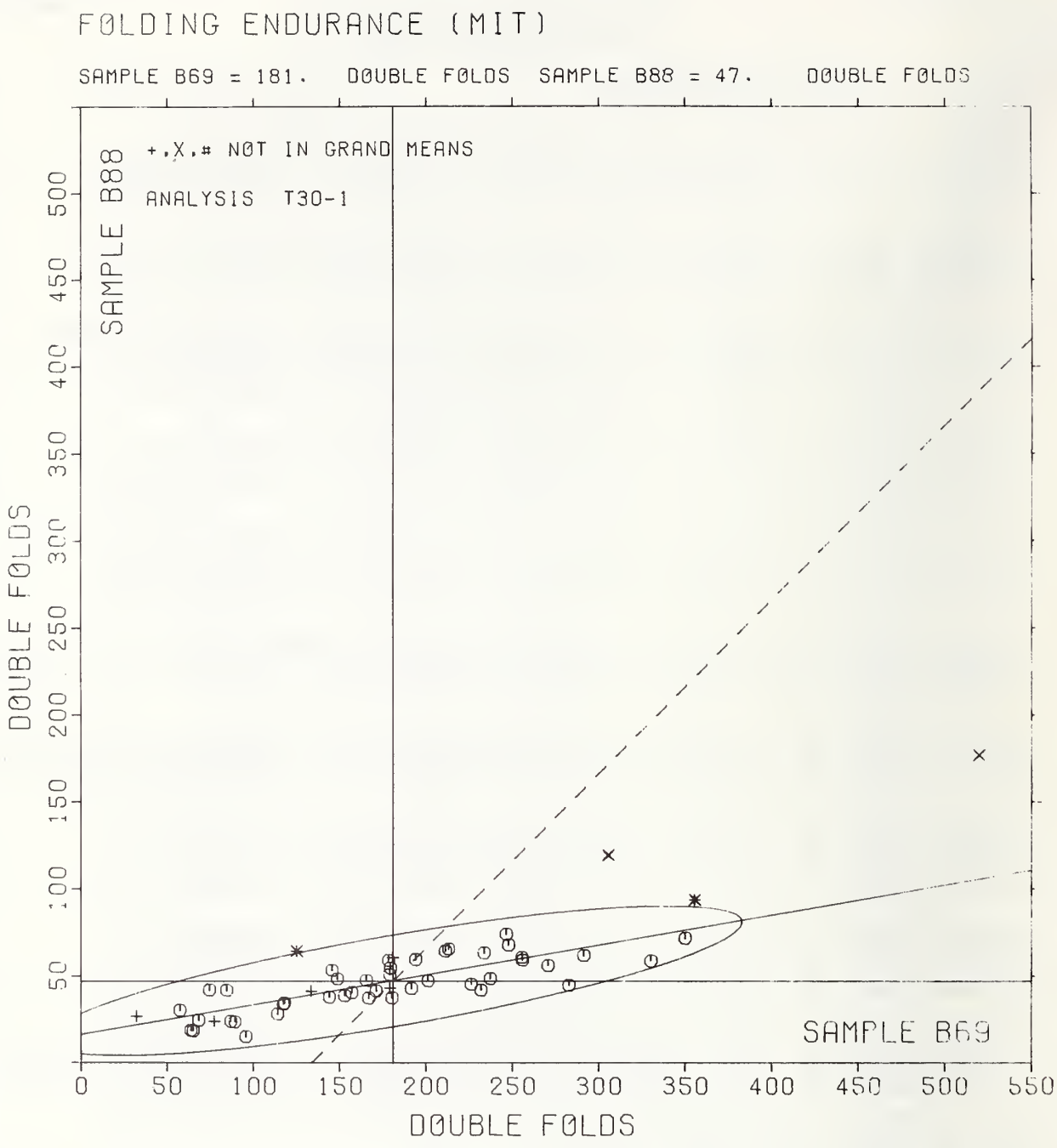
Best values: B69 200 double folds
B88 50 double folds

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

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

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

LAB CODE	F	MEANS B69	MEANS B88	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L326S	*	32.	27.	-150.	5.	.41	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L326N	O	57.	30.	-124.	4.	.56	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L158	O	64.	19.	-120.	-8.	.69	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L339	O	65.	18.	-119.	-9.	.27	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L299	O	68.	25.	-115.	-3.	.56	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100M	O	75.	42.	-106.	13.	.50	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L280	*	77.	24.	-106.	-5.	.52	30K	FOLDING ENDURANCE, KOHLER-MCLIN
L100N	O	85.	42.	-96.	11.	.62	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	O	87.	24.	-96.	-7.	.88	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L320	O	89.	24.	-94.	-8.	.57	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L278	O	96.	15.	-89.	-17.	.53	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L393	O	114.	28.	-69.	-7.	.67	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L376	O	117.	34.	-65.	-2.	.73	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L236	O	118.	34.	-64.	-2.	.60	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L567	*	125.	64.	-52.	26.	1.17	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L190D	*	133.	41.	-48.	2.	.85	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L163	O	144.	38.	-38.	-3.	1.14	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285A	O	146.	53.	-34.	12.	1.02	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L390	O	149.	48.	-31.	7.	1.09	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L162	O	153.	39.	-29.	-4.	.93	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L105	O	157.	40.	-24.	-3.	.92	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L262	O	165.	47.	-15.	3.	.88	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238A	O	167.	37.	-15.	-7.	1.10	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L230	O	171.	41.	-11.	-4.	.95	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L670	O	178.	59.	-0.	12.	.87	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L275	O	179.	51.	-1.	4.	.87	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L182S	*	179.	43.	-2.	-4.	.85	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L285B	O	179.	55.	-0.	8.	.99	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238B	O	180.	37.	-2.	-10.	.94	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L396S	*	181.	61.	2.	13.	1.04	30T	FOLDING ENDURANCE, SCHOPPER, TMI
L589	O	192.	43.	10.	-6.	.91	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L388	O	194.	60.	15.	10.	1.07	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L118	O	201.	47.	20.	-3.	.96	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L599	O	211.	64.	33.	12.	1.65	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L121	O	213.	65.	35.	13.	.96	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L279	O	226.	45.	44.	-10.	1.03	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L150	O	232.	42.	49.	-14.	1.15	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L396M	O	234.	63.	55.	7.	1.29	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L159	O	237.	48.	56.	-8.	1.07	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	O	246.	74.	69.	15.	1.73	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L124	O	248.	68.	69.	9.	1.83	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L565	O	255.	61.	76.	1.	1.54	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L185	O	256.	59.	76.	-1.	1.31	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L212	O	271.	56.	90.	-6.	1.35	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L190C	O	283.	45.	100.	-20.	1.13	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L223F	O	291.	62.	111.	-4.	1.00	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L232	X	306.	119.	135.	50.	1.78	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L243	O	330.	59.	149.	-14.	1.50	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L182M	O	350.	72.	171.	-4.	1.66	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L321	*	356.	94.	180.	16.	1.54	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L622	X	520.	177.	356.	70.	6.33	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
GMEANS:		181.	47.			1.00		
		95% ELLIPSE:		205.	26.	WITH GAMMA = 9 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE B69 = 181. DOUBLE FOLDS SAMPLE B88 = 47. DOUBLE FOLDS
+,X,# NOT IN GRAND MEANS
ANALYSIS T30-1
SAMPLE B88
DOUBLE FOLDS
SAMPLE B69
DOUBLE FOLDS
0 50 100 150 200 250 300 350 400 450 500 550
50 100 150 200 250 300 350 400 450 500

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

LAB CODE	SAMPLE B69 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE B88 MEAN	HEAT SET OFFSET BOOK 88 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 15 VAR	F	LAB
L100M	1.86	-.34	-1.46	.10	.61	1.60	-.02	-.12	.14	.72	30M	6	L100M
L100N	1.92	-.28	-1.22	.10	.60	1.59	-.03	-.17	.16	.84	30N	6	L100N
L105	2.18	-.01	-.06	.12	.70	1.56	-.07	-.36	.22	1.17	30M	6	L105
L118	2.29	.09	.41	.11	.64	1.64	.01	.07	.17	.92	30D	6	L118
L121	2.32	.12	.53	.10	.59	1.80	.17	.83	.13	.71	30M	6	L121
L122	2.32	.13	.56	.28	1.66	1.84	.22	1.07	.16	.84	30M	6	L122
L124	2.35	.15	.65	.23	1.36	1.77	.14	.71	.25	1.35	30N	6	L124
L150	2.35	.15	.65	.13	.79	1.59	-.04	-.20	.18	.93	30M	6	L150
L158	1.72	-.48	-2.09	.29	1.74	1.20	-.43	-2.12	.25	1.31	30N	6	L158
L159	2.36	.16	.71	.12	.73	1.66	.03	.15	.16	.83	30N	6	L159
L162	2.16	-.04	-.15	.15	.93	1.53	-.10	-.49	.25	1.35	30M	6	L162
L163	2.11	-.09	-.38	.21	1.26	1.54	-.09	-.44	.18	.94	30N	6	L163
L182M	2.53	.33	1.44	.13	.78	1.82	.20	.97	.17	.90	30M	6	L182M
L185	2.39	.19	.85	.13	.79	1.73	.11	.52	.19	1.02	30N	6	L185
L190C	2.43	.23	1.02	.14	.85	1.62	-.01	-.03	.17	.91	30N	6	L190C
L212	2.41	.21	.92	.16	.94	1.72	.09	.44	.17	.92	30M	6	L212
L223F	2.45	.26	1.12	.10	.62	1.78	.15	.73	.12	.64	30M	6	L223F
L230	2.22	.02	.08	.13	.78	1.58	-.05	-.25	.19	1.02	30N	6	L230
L232	2.46	.26	1.15	.16	.97	2.06	.43	2.13	.13	.71	30N	6	L232
L236	2.05	-.15	-.64	.14	.86	1.52	-.11	-.53	.12	.64	30N	6	L236
L238A	2.18	-.02	-.07	.23	1.37	1.50	-.13	-.64	.27	1.43	30N	6	L238A
L238B	2.24	.05	.20	.12	.71	1.51	-.11	-.57	.24	1.26	30D	6	L238B
L243	2.50	.30	1.32	.13	.81	1.73	.11	.52	.19	1.00	30D	6	L243
L254	1.81	-.39	-1.68	.35	2.10	1.35	-.28	-1.39	.17	.92	30M	6	L254
L262	2.21	.01	.05	.10	.62	1.63	.01	.03	.21	1.10	30N	6	L262
L275	2.25	.05	.22	.08	.48	1.67	.04	.20	.19	1.01	30N	6	L275
L278	1.93	-.27	-1.16	.23	1.36	1.15	-.48	-2.37	.15	.77	30C	*	L278
L279	2.34	.14	.60	.14	.84	1.63	-.00	-.00	.16	.85	30N	6	L279
L285A	2.13	-.07	-.29	.19	1.11	1.70	.07	.35	.16	.85	30N	6	L285A
L285B	2.23	.03	.15	.17	1.03	1.69	.06	.32	.23	1.20	30N	6	L285B
L299	1.78	-.42	-1.82	.25	1.52	1.35	-.28	-1.40	.21	1.12	30N	6	L299
L320	1.89	-.30	-1.32	.26	1.53	1.34	-.28	-1.40	.16	.85	30N	6	L320
L321	2.53	.34	1.46	.13	.79	1.96	.33	1.65	.11	.56	30M	6	L321
L326N	1.74	-.46	-2.00	.14	.84	1.41	-.21	-1.06	.27	1.46	30N	6	L326N
L339	1.80	-.40	-1.73	.11	.67	1.24	-.38	-1.90	.14	.73	30N	6	L339
L376	2.03	-.16	-.72	.20	1.22	1.50	-.13	-.64	.18	.95	30N	6	L376
L388	2.27	.08	.33	.12	.73	1.74	.11	.55	.19	1.03	30N	6	L388
L390	2.13	-.07	-.29	.20	1.20	1.65	.03	.13	.17	.91	30N	6	L390
L393	2.04	-.16	-.69	.13	.80	1.40	-.23	-1.12	.21	1.12	30M	6	L393
L396M	2.34	.14	.62	.17	1.04	1.78	.15	.75	.15	.78	30N	6	L396M
L565	2.35	.15	.66	.25	1.51	1.75	.12	.61	.19	1.03	30N	6	L565
L567	2.04	-.16	-.68	.27	1.63	1.80	.17	.85	.29	1.56	30N	6	L567
L589	2.27	.07	.31	.11	.68	1.60	-.03	-.15	.18	.93	30N	6	L589
L599	2.26	.07	.29	.24	1.43	1.78	.16	.78	.15	.77	30C	6	L599
L622	2.64	.44	1.92	.28	1.68	2.12	.49	2.42	.38	2.02	30M	6	L622
L670	2.24	.05	.21	.08	.47	1.74	.12	.58	.16	.85	30N	6	L670
GR. MEAN =	2.20 LOG(10) FOLD			GRAND MEAN =		1.63 LOG(10) FOLD			TEST DETERMINATIONS = 15				
SD MEANS =	.23 LOG(10) FOLD			SD OF MEANS =		.20 LOG(10) FOLD			46 LABS IN GRAND MEANS				
	AVERAGE SDR =			.17 LOG(10) FOLD		AVERAGE SDR =			.19 LOG(10) FOLD				
L182S	2.24	.04	.18	.13	.78	1.61	-.02	-.10	.16	.83	30S	*	L182S
L190D	2.11	-.09	-.39	.13	.80	1.58	-.05	-.24	.18	.97	30S	*	L190D
L280	1.86	-.34	-1.48	.18	1.06	1.34	-.28	-1.40	.17	.93	30K	*	L280
L326S	1.48	-.72	-3.13	.17	.99	1.39	-.23	-1.16	.17	.93	30S	*	L326S
L396S	2.24	.05	.21	.11	.66	1.74	.12	.58	.20	1.08	30T	*	L396S

TOTAL NUMBER OF LABORATORIES REPORTING = 51

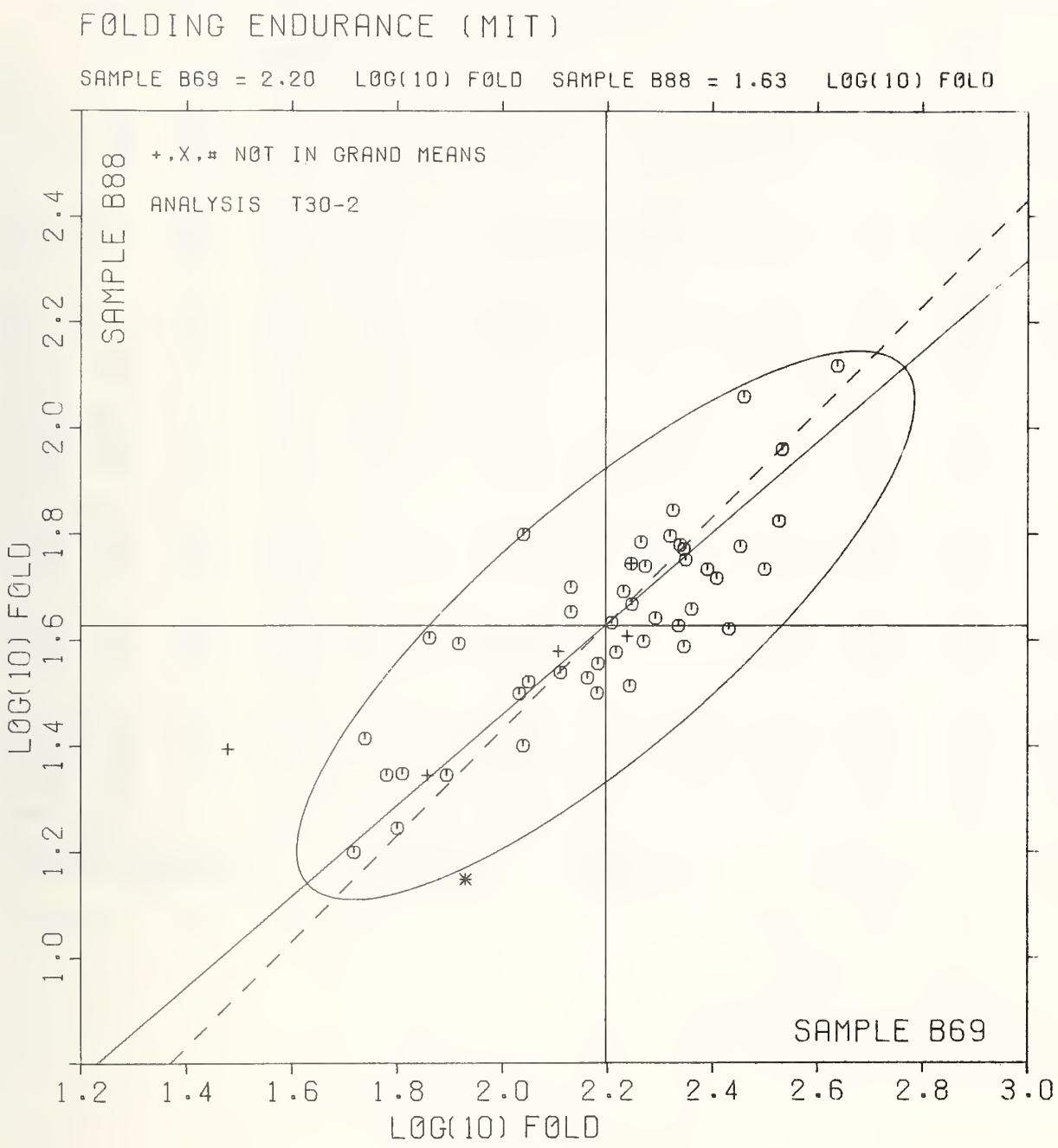
The ISO (International Standards Organization) is proposing that MIT folding endurance be reported as the logarithm (to the base 10) of the double fold instead of the double fold as in the past.

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

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

ANALYSIS I30-2 TABLE 2
FOLDING ENDURANCE (MIT)
DATA IS LOG(BASE 10) OF THE DOUBLE FOLD MEASUREMENT

LAB CODE	F	MEANS B69	MEANS B88	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L326S	*	1.48	1.39	-.70	.29	.96	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L158	O	1.72	1.20	-.64	-.01	1.52	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L32[illegible]N	O	1.74	1.41	-.49	.14	1.15	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L299	O	1.78	1.35	-.50	.06	1.32	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L339	O	1.80	1.24	-.55	-.03	.70	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	O	1.81	1.35	-.48	.04	1.51	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L280	*	1.86	1.34	-.44	.01	1.00	30K	FOLDING ENDURANCE, KOHLER-MOLIN
L100M	O	1.86	1.60	-.27	.20	.66	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L320	O	1.89	1.34	-.41	-.02	1.19	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100N	O	1.92	1.59	-.24	.16	.72	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L278	*	1.93	1.15	-.51	-.19	1.06	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L376	O	2.03	1.50	-.21	.01	1.08	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L393	O	2.04	1.40	-.27	-.07	.96	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L567	O	2.04	1.80	-.01	.23	1.60	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L236	O	2.05	1.52	-.18	.01	.75	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L190D	*	2.11	1.58	-.10	.02	.89	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L163	O	2.11	1.54	-.12	-.01	1.10	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285A	O	2.13	1.70	-.00	.10	.98	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L390	O	2.13	1.65	-.03	.06	1.06	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L162	O	2.16	1.53	-.09	-.05	1.14	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L238A	O	2.18	1.50	-.10	-.09	1.40	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L105	O	2.18	1.56	-.06	-.05	.94	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L262	O	2.21	1.63	.01	-.00	.86	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L230	O	2.22	1.58	-.02	-.05	.90	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285B	O	2.23	1.69	.07	.03	1.12	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L182S	*	2.24	1.61	.02	-.04	.80	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L238B	O	2.24	1.51	-.04	-.12	.98	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L670	O	2.24	1.74	.11	.06	.66	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L396S	*	2.24	1.74	.11	.06	.87	30T	FOLDING ENDURANCE, SCHOPPER, TMI
L275	O	2.25	1.67	.06	-.00	.75	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L599	O	2.26	1.78	.15	.08	1.10	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L589	O	2.27	1.60	.04	-.07	.80	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L388	O	2.27	1.74	.13	.04	.88	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L118	O	2.29	1.64	.08	-.05	.78	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L121	O	2.32	1.80	.20	.05	.65	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L122	O	2.32	1.84	.24	.08	1.25	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L279	O	2.34	1.63	.10	-.09	.84	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L396M	O	2.34	1.78	.21	.02	.91	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L124	O	2.35	1.77	.21	.01	1.36	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L150	O	2.35	1.59	.09	-.13	.86	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L565	O	2.35	1.75	.20	-.01	1.27	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L159	O	2.36	1.66	.14	-.08	.78	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L185	O	2.39	1.73	.22	-.05	.90	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L212	O	2.41	1.72	.22	-.07	.93	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L190C	O	2.43	1.62	.17	-.16	.88	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L223F	O	2.45	1.78	.29	-.05	.63	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L232	O	2.46	2.06	.48	.16	.84	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L243	O	2.50	1.73	.30	-.12	.90	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L182M	O	2.53	1.82	.38	-.07	.84	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L321	O	2.53	1.96	.47	.03	.67	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L622	O	2.64	2.12	.65	.08	1.85	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
GMEANS:		2.20	1.63			1.00		
		95% ELLIPSE:		.75	.23	WITH GAMMA = 40 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE B69 = 2.20 LOG(10) FOLD SAMPLE B88 = 1.63 LOG(10) FOLD
+,X,# NOT IN GRAND MEANS
ANALYSIS T30-2
SAMPLE B88
LOG(10) FOLD
1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4
SAMPLE B69
1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0
LOG(10) FOLD

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 K03 MEAN	PRINTING 103 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE K41 MEAN	PRINTING 60 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L100	250.8	10.3	.75	9.5	.72	143.0	32.0	2.53	5.5	.76	35G	@	L100
L118	240.7	.2	.02	8.3	.63	94.1	-16.9	-1.34	7.9	1.08	35G	@	L118
L121	231.0	-9.5	-.69	17.3	1.31	134.0	23.0	1.82	8.4	1.16	35G	@	L121
L122	219.2	-21.3	-1.54	27.4	2.08	97.1	-13.9	-1.10	6.2	.86	35G	@	L122
L132	246.0	5.5	.40	11.7	.89	133.0	22.0	1.74	17.7	2.44	35G	@	L132
L139	227.5	-13.0	-.94	11.9	.90	107.7	-3.3	-.26	5.8	.80	35G	@	L139
L148	232.9	-7.6	-.55	13.5	1.02	110.8	-.2	-.02	6.3	.87	35G	@	L146
L153	233.4	-7.1	-.51	10.3	.79	104.0	-7.0	-.56	3.8	.53	35G	@	L153
L159	269.5	29.1	2.11	12.7	.96	113.6	2.5	.20	10.3	1.42	35G	@	L159
L162	237.6	-2.9	-.21	11.3	.86	94.6	-16.5	-1.30	5.1	.71	35G	@	L162
L163	243.6	3.1	.23	23.7	1.80	100.5	-10.5	-.83	14.4	1.99	35G	@	L163
L183	250.7	10.2	.74	10.6	.81	119.4	8.4	.66	8.2	1.14	35G	@	L183
L190C	223.3	-17.2	-1.24	21.3	1.62	95.0	-16.0	-1.27	2.1	.29	35G	@	L190C
L212	248.1	7.6	.55	17.0	1.29	113.5	2.5	.19	8.8	1.21	35G	@	L212
L223	231.1	-9.4	-.68	9.7	.73	109.2	-1.8	-.15	7.1	.97	35G	@	L223
L232	261.1	20.6	1.50	10.0	.76	123.3	12.3	.97	6.3	.87	35G	@	L232
L236	231.8	-8.7	-.63	11.1	.84	93.5	-17.6	-1.39	6.5	.90	35G	@	L236
L241	247.1	6.6	.48	13.9	1.05	123.9	12.9	1.02	3.8	.53	35G	@	L241
L249	245.8	5.3	.39	18.0	1.37	113.7	2.7	.21	4.0	.56	35G	@	L249
L254	213.5	-27.0	-1.96	9.9	.76	109.0	-2.0	-.16	6.0	.83	35G	@	L254
L260	245.1	4.6	.34	4.0	.30	96.8	-14.2	-1.13	4.6	.63	35G	@	L260
L268	230.2	-10.3	-.74	12.1	.92	110.4	-.6	-.05	5.9	.81	35G	@	L268
L285	173.8	-66.7	-4.84	9.4	.72	74.6	-36.4	-2.88	9.7	1.34	35G	#	L285
L291	241.8	1.3	.10	11.1	.84	113.6	2.6	.20	4.6	.63	35G	@	L291
L308	233.7	-6.8	-.49	15.6	1.18	95.2	-15.8	-1.25	12.8	1.77	35G	@	L308
L321	272.3	31.9	2.31	20.6	1.57	117.5	6.4	.51	9.2	1.27	35G	@	L321
L356	234.1	-6.4	-.46	16.2	1.23	87.0	-24.0	-1.90	5.1	.71	35G	@	L356
L376	236.2	-4.3	-.31	12.3	.94	113.0	2.0	.16	3.7	.52	35G	@	L376
L382	269.8	29.4	2.13	8.4	.64	119.4	8.4	.66	3.9	.54	35G	@	L382
L390	239.1	-1.3	-.10	8.9	.67	112.0	1.0	.08	11.3	1.55	35G	@	L390
L396	230.4	-10.1	-.73	15.4	1.17	107.2	-3.8	-.30	7.5	1.04	35G	@	L396
L567	283.0	42.5	3.09	11.6	.88	152.0	41.0	3.24	7.9	1.09	35G	#	L567
L600	251.6	11.1	.81	7.6	.58	117.8	6.8	.54	9.2	1.27	35G	@	L600
L648	226.0	-14.5	-1.05	16.5	1.25	118.5	7.5	.59	11.3	1.56	35G	@	L648
L650	234.8	-5.7	-.41	11.6	.88	116.8	5.8	.46	4.6	.64	35G	@	L650
L693	245.8	5.3	.38	8.2	.62	117.0	6.0	.47	8.2	1.14	35G	@	L693

GR. MEAN = 240.5 GURLEY UNITS — GRAND MEAN = 111.0 GURLEY UNITS — TEST DETERMINATIONS = 10

SD MEANS = 13.8 GURLEY UNITS — SD OF MEANS = 12.6 GURLEY UNITS — 34 LABS IN GRAND MEANS

AVERAGE SDR = 13.2 GURLEY UNITS — AVERAGE SDR = 7.2 GURLEY UNITS

L213	230.0	-10.5	-.76	11.0	.84	114.8	3.8	.30	3.8	.52	35H	*	L213

TOTAL NUMBER OF LABORATORIES REPORTING = 37

Best values: K03 240 ± 27 Gurley units
K41 110 ± 17 Gurley units

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

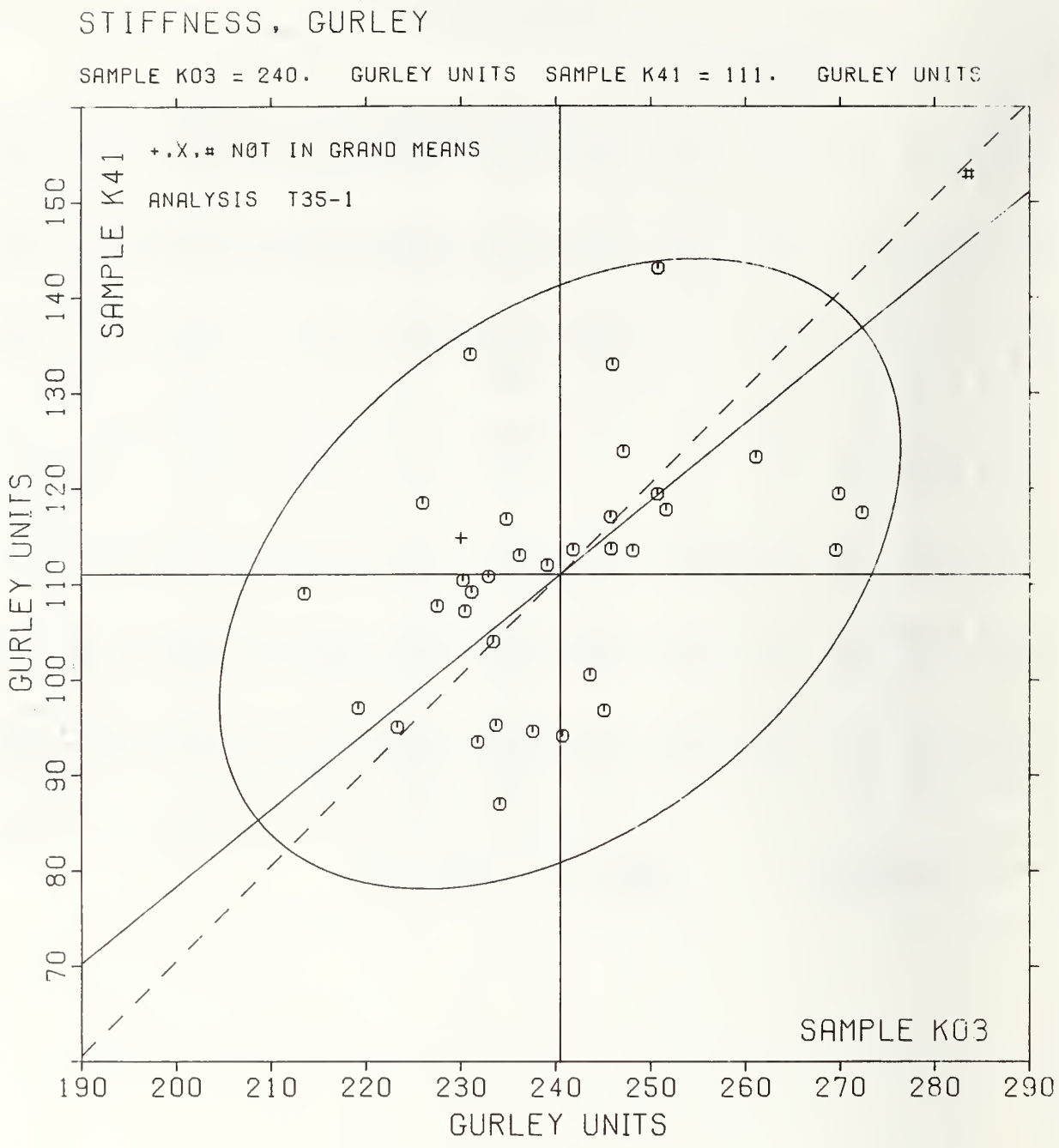
Data from the following laboratories appear to be off by a multiplicative factor: 285.

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 K03	MEANS K41	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L285	#	173.8	74.6	-74.8	13.5	1.03	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L254	6	213.5	109.0	-22.3	15.4	.79	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L122	6	219.2	97.1	-25.3	2.5	1.47	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L190C	6	223.3	95.0	-23.4	-1.7	.95	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L648	6	226.0	118.5	-6.6	14.9	1.41	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L139	6	227.5	107.7	-12.2	5.5	.85	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L213	*	230.0	114.8	-5.8	9.5	.68	35H	STIFFNESS, GURLEY (UNITS: MG/1X3 TEST PIECE), 20 C, 65% RH
L268	6	230.2	110.4	-8.4	6.0	.87	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L396	6	230.4	107.2	-10.2	3.3	1.10	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L121	6	231.0	134.0	7.1	23.8	1.24	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L223	6	231.1	109.2	-8.4	4.5	.85	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L236	6	231.8	93.5	-17.8	-8.2	.87	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L148	6	232.9	110.8	-6.0	4.6	.95	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L153	6	233.4	104.0	-9.9	-1.0	.66	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L308	6	233.7	95.2	-15.2	-8.0	1.48	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L356	6	234.1	87.0	-20.0	-14.7	.97	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L650	6	234.8	116.8	-.8	8.0	.76	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L376	6	236.2	113.0	-2.1	4.2	.73	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L162	6	237.6	94.6	-12.6	-11.0	.79	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L390	6	239.1	112.0	-.4	1.6	1.11	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L118	6	240.7	94.1	-10.5	-13.3	.86	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L291	6	241.8	113.6	2.7	1.2	.74	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L163	6	243.6	100.5	-4.2	-10.2	1.90	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L260	6	245.1	96.8	-5.3	-14.0	.47	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L693	6	245.8	117.0	7.9	1.3	.88	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L249	6	245.8	113.7	5.8	-1.3	.96	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L132	6	246.0	133.0	18.1	13.6	1.67	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L241	6	247.1	123.9	13.2	5.8	.79	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L212	6	248.1	113.5	7.5	-2.9	1.25	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L183	6	250.7	119.4	13.2	.1	.97	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L100	6	250.8	143.0	28.1	18.4	.74	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L600	6	251.6	117.8	12.9	-1.7	.93	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L232	6	261.1	123.3	23.8	-3.4	.81	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L159	6	269.5	113.6	24.2	-16.3	1.19	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L382	6	269.8	119.4	28.1	-11.9	.59	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L321	6	272.3	117.5	28.9	-15.0	1.42	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L567	#	283.0	152.0	58.8	5.1	.98	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
GMEANS:		240.5	111.0			1.00		
		95% ELLIPSE:		40.9	26.5	WITH GAMMA = 38 DEGREES		


STIFFNESS, GURLEY
SAMPLE K03 = 240. GURLEY UNITS SAMPLE K41 = 111. GURLEY UNITS
+,X,# NOT IN GRAND MEANS
ANALYSIS T35-1
SAMPLE K41
GURLEY UNITS
70
80
90
100
110
120
130
140
150
SAMPLE K03
190
200
210
220
230
240
250
260
270
280
290
GURLEY UNITS

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

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

GR. MEAN = 26.6 TABER UNITS — GRAND MEAN = 27.9 TABER UNITS — TEST DETERMINATIONS = 10
SD MEANS = .8 TABER UNITS — SD OF MEANS = 1.0 TABER UNITS — 28 LABS IN GRAND MEANS
AVERAGE SDR = 1.3 TABER UNITS — AVERAGE SDR = 1.4 TABER UNITS

L250	25.4	-1.2	-1.43	1.4	1.09	25.6	-2.3	-2.38	1.0	.74	36U	*	L250

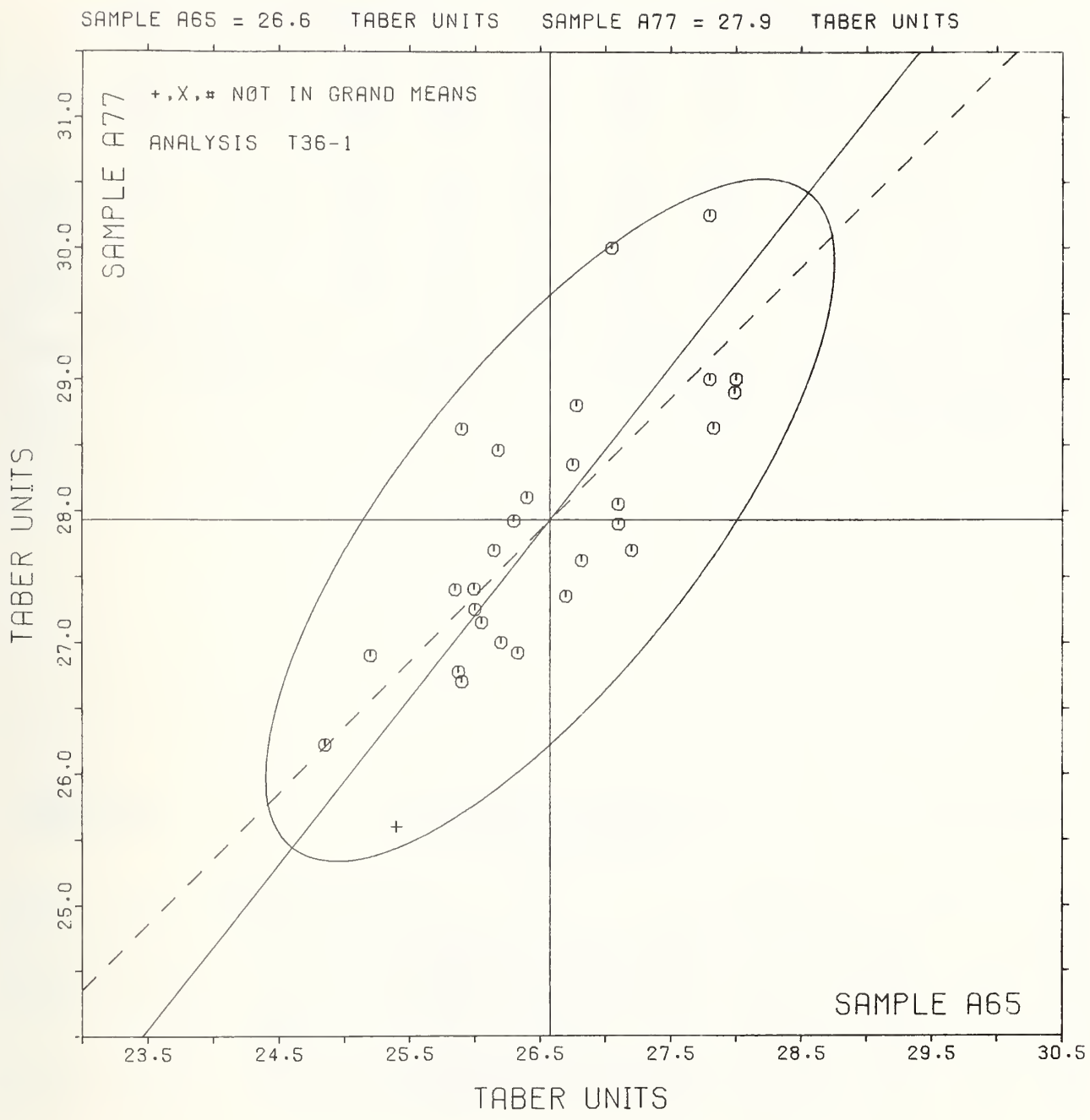
TOTAL NUMBER OF LABORATORIES REPORTING = 32

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

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

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T36-1 TABLE 2
TABER STIFFNESS
TAPPI STANDARD T489 OS-76, RESULTS EXPRESSED IN GRAM CENTIMETERS

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


STIFFNESS, TABER
SAMPLE A65 = 26.6 TABER UNITS
SAMPLE A77 = 27.9 TABER UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T36-1
SAMPLE A77
TABER UNITS
31.0
30.0
29.0
28.0
27.0
26.0
25.0
SAMPLE A65
23.5
24.5
25.5
26.5
27.5
28.5
29.5
30.5
TABER UNITS

ANALYSIS T49-1 TABLE 1
SURFACE PICK STRENGTH, IGT

LAB CODE	SAMPLE J55 MEAN	PRINTING 93 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE J93 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 4 VAR	F	LAB
L122	63.0	-83.4	-.40	3.2	.87	55.3	-13.9	-.21	2.8	.39	49Q	@	L122
L149	721.2	574.8	2.79	.5	.14	249.0	179.7	2.67	38.0	5.20	49L	@	L149
L158	298.7	152.3	.74	9.5	2.57	252.5	183.2	2.72	5.0	.68	49D	#	L158
L182I	22.9	-123.5	-.60	1.0	.27	32.8	-36.5	-.54	1.9	.26	49Q	@	L182I
L190C	110.7	-35.7	-.17	4.6	1.24	34.2	-35.0	-.52	2.1	.28	49T	@	L190C
L242	77.6	-68.9	-.33	7.0	1.91	22.1	-47.2	-.70	3.7	.50	49P	@	L242
L243	82.5	-64.0	-.31	5.1	1.38	67.7	-1.5	-.02	9.0	1.23	49T	@	L243
L280	113.8	-32.6	-.16	3.6	.99	65.7	-3.6	-.05	6.1	.84	49U	#	L280
L291	98.8	-47.6	-.23	1.7	.45	67.0	-2.3	-.03	8.9	1.22	49I	@	L291
L388	147.7	1.3	.01	.1	.02	81.6	12.4	.18	4.4	.61	49Q	@	L388
L598	123.4	-23.1	-.11	11.7	3.17	71.6	2.4	.03	1.7	.24	49P	@	L598
L643	16.6	-129.9	-.63	2.0	.55	11.3	-58.0	-.86	.5	.07	49I	@	L643
L651	400.0	253.5	1.23	.0	.00	276.2	207.0	3.07	2.5	.34	49F	#	L651

GR. MEAN = 146.5 KP CM/SEC GRAND MEAN = 69.3 KP CM/SEC TEST DETERMINATIONS = 4
SD MEANS = 206.1 KP CM/SEC SD OF MEANS = 67.3 KP CM/SEC 10 LABS IN GRAND MEANS
AVERAGE SDR = 3.7 KP CM/SEC AVERAGE SDR = 7.3 KP CM/SEC
TOTAL NUMBER OF LABORATORIES REPORTING = 13

Data from the following laboratories were omitted from the grand means because no viscosity values were reported: 158, 280.

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

ANALYSIS T49-1 TABLE 2
SURFACE PICK STRENGTH, IGT

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

REPORT NO. 58S

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

FEBRUARY 1979

LAB CODE	SAMPLE J55 PRINTING 93 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE J93 PRINTING 89 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.= 5 VAR	F	LAB
L105	12.40	-.25	-.27	.55	1.06	9.00	-.15	-.14	.00	.00	50W	O	L105
L122	13.00	.35	.38	1.00	1.94	7.00	-2.15	-2.02	.00	.00	50W	O	L122
L158	13.00	.35	.38	.00	.00	9.40	.25	.23	.55	1.66	50W	O	L158
L162	13.00	.35	.38	.00	.00	9.00	-.15	-.14	.00	.00	50W	O	L162
L173A	12.20	-.45	-.48	.45	.87	8.40	-.75	-.71	.55	1.66	50W	O	L173A
L182W	12.80	.15	.16	.45	.87	9.00	-.15	-.14	.00	.00	50W	O	L182W
L183	13.20	.55	.59	.84	1.62	9.20	.05	.04	.45	1.35	50W	O	L183
L213	13.40	.75	.81	.55	1.06	10.00	.85	.79	.00	.00	50W	O	L213
L225	14.00	1.35	1.45	.00	.00	9.20	.05	.04	.45	1.35	50W	O	L225
L228	10.40	-2.25	-2.41	.55	1.06	7.20	-1.95	-1.83	.45	1.35	50W	O	L228
L230	12.40	-.25	-.27	.55	1.06	9.40	.25	.23	.55	1.66	50W	O	L230
L236	12.00	-.65	-.69	.00	.00	10.00	.85	.79	.00	.00	50W	O	L236
L243	10.80	-1.85	-1.98	1.10	2.13	8.40	-.75	-.71	.55	1.66	50W	O	L243
L285	13.00	.35	.38	.71	1.37	11.20	2.05	1.92	1.10	3.31	50W	O	L285
L339	13.80	1.15	1.24	1.48	2.88	9.40	.25	.23	.55	1.66	50W	O	L339
L567	12.60	-.05	-.05	.55	1.06	10.80	1.65	1.54	.45	1.35	50W	O	L567
L616	13.00	.35	.38	.00	.00	9.00	-.15	-.14	.00	.00	50W	O	L616

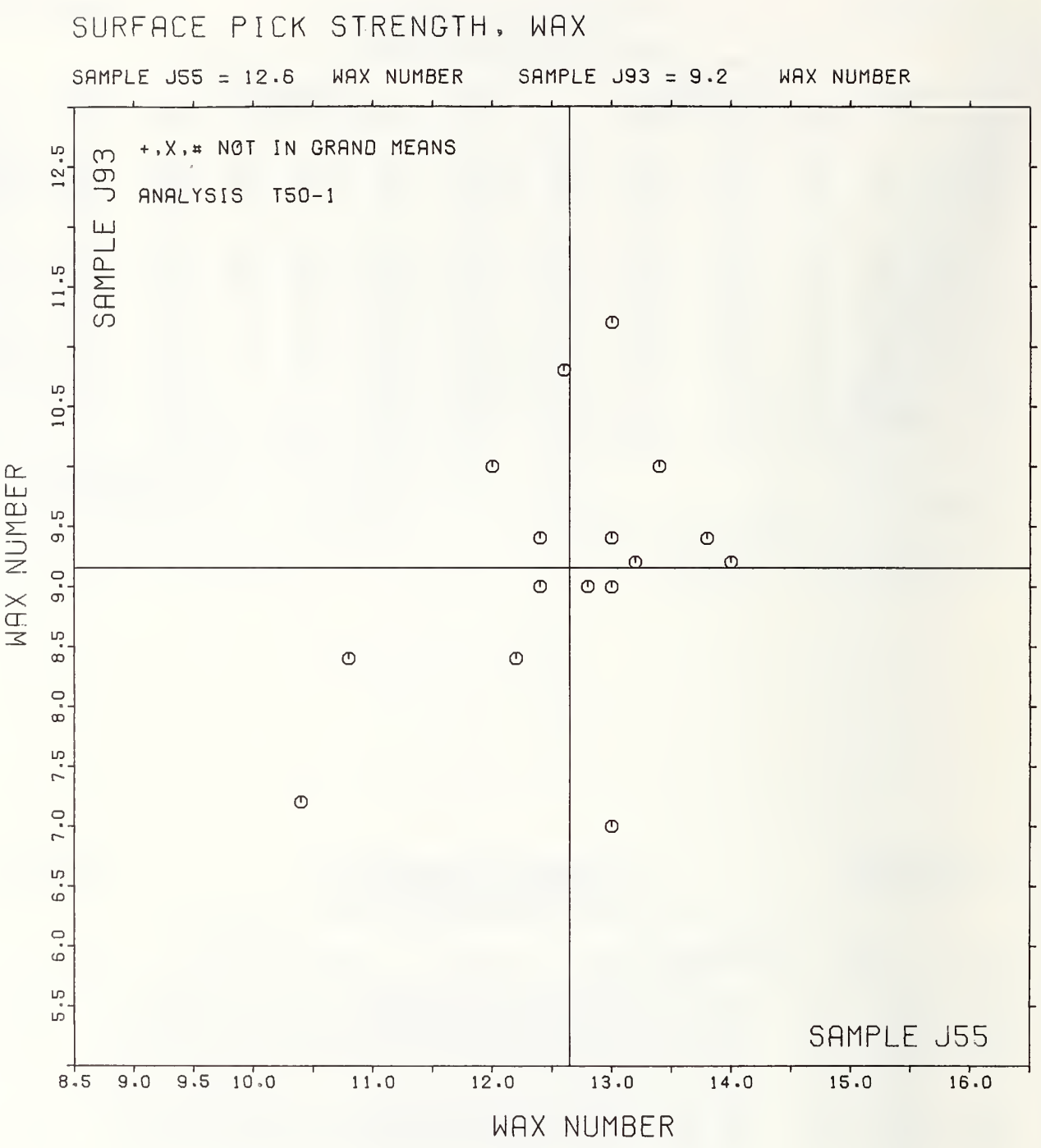
GR. MEAN = 12.65 WAX NUMBER — GRAND MEAN = 9.15 WAX NUMBER — TEST DETERMINATIONS = 5
SD MEANS = .93 WAX NUMBER — SD OF MEANS = 1.07 WAX NUMBER — 17 LABS IN GRAND MEANS
AVERAGE SDR = .52 WAX NUMBER — AVERAGE SDR = .33 WAX NUMBER
TOTAL NUMBER OF LABORATORIES REPORTING = 17
Best values: J55 12.7 ± 1.6 wax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

REPORT NO. 58S

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

FEBRUARY 1979

LAB CODE	F	MEANS J55	J93	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L228	O	10.40	7.20	-2.90	.69	1.21	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L243	O	10.80	8.40	-1.69	1.06	1.89	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L236	O	12.00	10.00	.31	1.02	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L173A	O	12.20	8.40	-.87	-.08	1.26	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L230	O	12.40	9.40	.06	.34	1.36	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L105	O	12.40	9.00	-.27	.11	.53	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L567	O	12.60	10.80	1.31	1.00	1.21	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L182W	O	12.80	9.00	-.04	-.21	.43	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L616	O	13.00	9.00	.08	-.38	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L285	O	13.00	11.20	1.87	.91	2.34	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L122	O	13.00	7.00	-1.54	-1.54	.97	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L162	O	13.00	9.00	.08	-.38	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L158	O	13.00	9.40	.41	-.14	.83	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L183	O	13.20	9.20	.36	-.42	1.49	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L213	O	13.40	10.00	1.13	-.12	.53	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L339	O	13.80	9.40	.87	-.79	2.27	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L225	O	14.00	9.20	.83	-1.07	.68	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
GMEANS:		12.65	9.15			1.00		
95% ELLIPSE:				3.35	2.14	WITH GAMMA = 54 DEGREES		


SURFACE PICK STRENGTH, WAX
SAMPLE J55 = 12.6 WAX NUMBER
SAMPLE J93 = 9.2 WAX NUMBER
+,X,* NOT IN GRAND MEANS
ANALYSIS T50-1
SAMPLE J93
SAMPLE J55
WAX NUMBER
WAX NUMBER
12.5
11.5
10.5
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
8.5
9.0
9.5
10.0
11.0
12.0
13.0
14.0
15.0
16.0

REPORT NO. 58S

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

FEBRUARY 1979

LAB CODE	SAMPLE E88 MEAN	BACKING 98 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E89 MEAN	CORRUGATING MEDIUM 125 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L182	136.4	9.0	1.61	6.3	.77	306.4	36.8	1.45	15.7	1.06	91N	O	L182
L218	117.4	-10.0	-1.78	9.4	1.16	278.2	8.6	.34	19.3	1.31	91A	O	L218
L242	123.9	-3.5	-.63	4.5	.55	214.0	-55.6	-2.19	6.6	.45	91G	O	L242
L248	134.4	7.0	1.25	8.2	1.00	286.5	17.0	.67	12.5	.85	91B	O	L248
L255	130.3	2.9	.52	5.9	.73	231.3	-38.3	-1.51	11.1	.75	91P	O	L255
L269	134.8	7.4	1.32	10.3	1.26	274.0	4.4	.17	17.7	1.20	91P	O	L269
L280	121.0	-6.4	-1.14	11.0	1.35	275.5	5.9	.23	15.5	1.06	91N	O	L280
L289	129.4	2.0	.36	7.4	.91	255.3	-14.3	-.56	12.4	.84	91P	O	L289
L329	127.2	-.2	-.03	11.7	1.44	280.2	10.6	.42	15.6	1.06	91P	O	L329
L394	125.0	-2.4	-.43	3.9	.48	264.7	-4.9	-.19	11.3	.77	91P	O	L394
L621	126.1	-1.3	-.23	5.2	.64	259.0	-10.6	-.42	16.5	1.12	91P	O	L621
L622	123.2	-4.2	-.75	11.3	1.39	282.0	12.4	.49	19.6	1.33	91P	O	L622
L650	127.0	-.4	-.07	10.9	1.34	297.4	27.8	1.10	17.7	1.20	91N	O	L650

GR. MEAN = 127.4 NEWTONS — GRAND MEAN = 269.6 NEWTONS — TEST DETERMINATIONS = 10
SD MEANS = 5.6 NEWTONS — SD OF MEANS = 25.3 NEWTONS — 13 LABS IN GRAND MEANS
AVERAGE SDR = 8.2 NEWTONS — AVERAGE SDR = 14.7 NEWTONS
GR. MEAN = 28.64 POUNDS — GRAND MEAN = 60.60 POUNDS
TOTAL NUMBER OF LABORATORIES REPORTING = 13

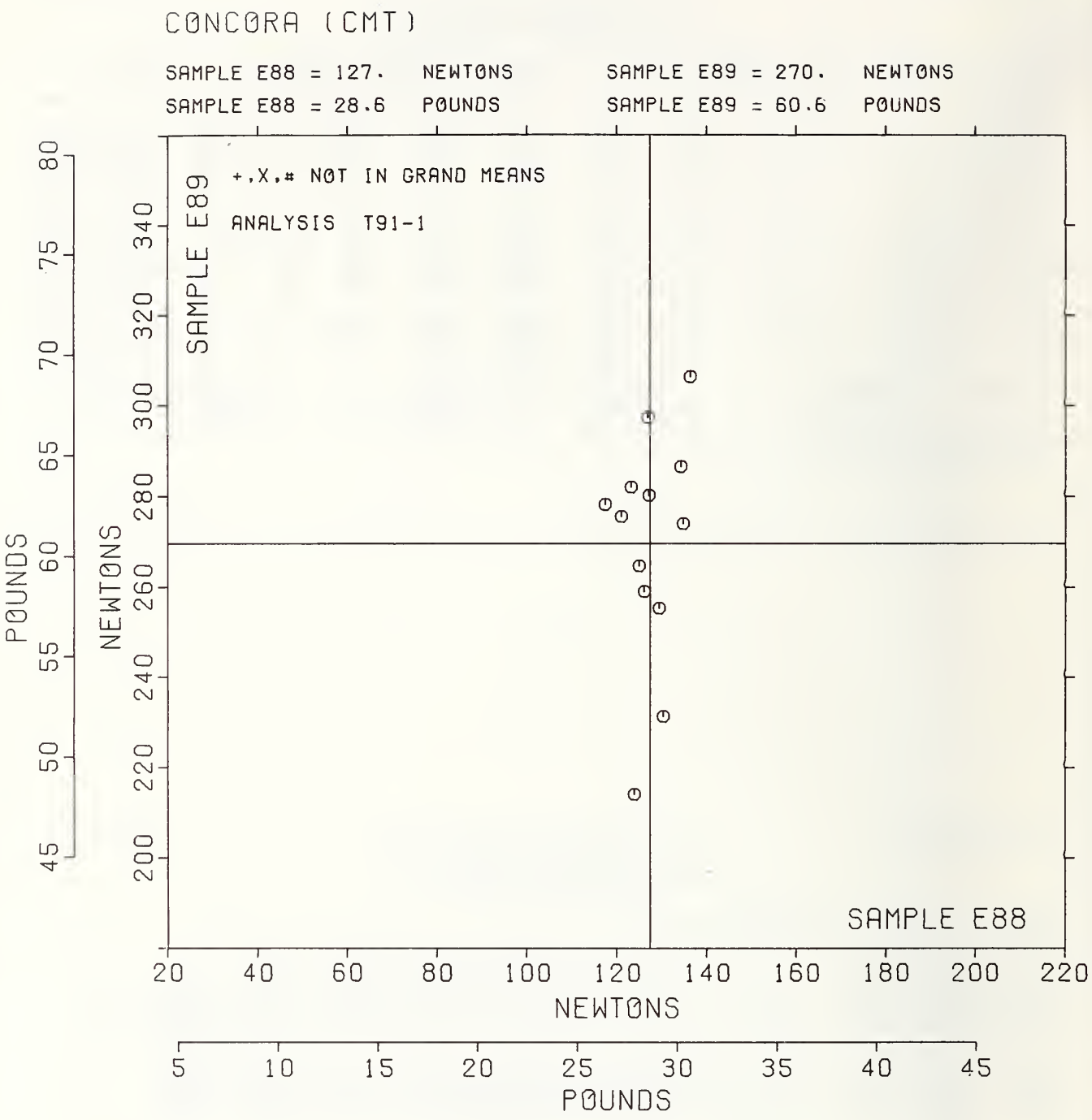
Best values: E88 130 ± 8 newtons
E89 270 ± 50 newtons

REPORT NO. 58S

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

FEBRUARY 1979

LAB CODE	F	MEANS E88	E89	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L218	O	117.4	278.2	8.1	10.4	1.23	91A	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L280	O	121.0	275.5	5.6	6.7	1.20	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L622	O	123.2	282.0	12.2	4.8	1.36	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L242	O	123.9	214.0	-55.7	.7	.50	91G	FLAT CRUSH STRENGTH, CONCORA, GAYDON FLAT CRUSH TESTER
L394	O	125.0	264.7	-5.0	2.2	.62	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L621	O	126.1	259.0	-10.6	.8	.88	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L650	O	127.0	297.4	27.8	1.8	1.27	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L329	O	127.2	280.2	10.6	.7	1.25	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L289	O	129.4	255.3	-14.1	-2.8	.88	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L255	O	130.3	231.3	-38.1	-4.9	.74	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L248	O	134.4	286.5	17.3	-6.1	.92	91B	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L269	O	134.8	274.0	4.8	-7.1	1.23	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L182	O	136.4	306.4	37.2	-7.1	.92	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
GMEANS:		127.4	269.6			1.00		
		95% ELLIPSE:		74.8	16.1	WITH GAMMA = 87 DEGREES		


CONCORA (CMT)
SAMPLE E88 = 127. NEWTONS
SAMPLE E88 = 28.6 POUNDS
SAMPLE E89 = 270. NEWTONS
SAMPLE E89 = 60.6 POUNDS
+,X,# NOT IN GRAND MEANS
ANALYSIS T91-1
SAMPLE E89
SAMPLE E88
NEWTONS
POUNDS
20 40 60 80 100 120 140 160 180 200 220
200 220 240 260 280 300 320 340
45 50 55 60 65 70 75 80
5 10 15 20 25 30 35 40 45

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

LAB CODE	SAMPLE E88 BACKING 98 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE E89 CORRUGATING MEDIUM 125 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.= 10 VAR	F	LAB
L107	169.9	53.8	3.28	10.4	1.20	290.5	101.3	3.88	14.5	.95	96P	#	L107
L114	137.4	21.4	1.30	8.0	.92	218.0	28.8	1.10	14.4	.94	96P	O	L114
L122	108.1	-8.0	-.49	18.8	2.16	165.9	-23.2	-.89	16.1	1.05	96P	O	L122
L124	106.3	-9.8	-.60	9.5	1.09	164.6	-24.6	-.94	19.6	1.28	96P	O	L124
L126	NO DATA REPORTED FOR SAMPLE E88					168.6	-20.6	-.79	8.6	.56	96P	M	L126
L141	123.0	6.9	.42	10.2	1.18	209.3	20.1	.77	15.4	1.00	96P	O	L141
L157	131.2	15.1	.92	9.7	1.11	230.9	41.7	1.60	11.4	.74	96P	O	L157
L171	122.9	6.8	.42	6.1	.70	197.8	8.7	.33	20.1	1.31	96N	O	L171
L182	127.1	11.0	.67	9.1	1.05	202.1	13.0	.50	22.3	1.46	96N	O	L182
L191	114.3	-1.8	-.11	15.1	1.74	187.3	-1.9	-.07	17.6	1.15	96P	O	L191
L218	96.5	-19.6	-1.19	9.7	1.12	179.5	-9.7	-.37	17.4	1.14	96I	O	L218
L234	88.1	-28.0	-1.71	9.8	1.13	146.8	-42.4	-1.62	19.1	1.25	96P	O	L234
L237	97.9	-18.2	-1.11	4.2	.48	181.9	-7.2	-.28	20.6	1.34	96P	O	L237
L242	139.5	23.4	1.43	12.8	1.47	206.0	16.9	.65	22.1	1.44	96G	O	L242
L243	131.7	15.6	.95	8.7	1.00	216.2	27.0	1.03	16.7	1.09	96P	O	L243
L305	116.5	.5	.03	9.6	1.10	176.1	-13.0	-.50	10.7	.70	96P	O	L305
L329	53.4	-62.7	-3.82	3.0	.34	93.0	-96.2	-3.68	6.4	.42	96P	#	L329
L333	89.4	-26.7	-1.62	3.4	.40	127.4	-61.7	-2.36	5.1	.34	96I	O	L333
L336	105.9	-10.2	-.62	6.0	.70	163.9	-25.2	-.97	12.9	.84	96P	O	L336
L350	147.2	31.1	1.90	9.2	1.07	230.0	40.8	1.56	13.9	.91	96P	O	L350
L393	110.3	-5.8	-.35	8.3	.96	202.4	13.2	.51	13.0	.85	96P	O	L393
L553	139.2	23.1	1.41	12.4	1.43	221.5	32.4	1.24	16.6	1.09	96P	O	L553
L562	113.0	-3.1	-.19	6.4	.73	184.1	-5.0	-.19	16.4	1.07	96P	O	L562
L570	NO DATA REPORTED FOR SAMPLE E88					149.9	-39.3	-1.50	6.6	.43	96P	M	L570
L610	127.2	11.1	.68	8.7	1.00	196.6	7.5	.29	14.6	.96	96P	O	L610
L621	88.6	-27.5	-1.67	3.4	.39	143.9	-45.3	-1.73	9.2	.60	96P	O	L621
L649	118.3	2.2	.14	4.3	.50	197.0	7.9	.30	10.1	.66	96P	O	L649
L650	119.3	3.2	.20	9.5	1.10	194.0	4.9	.19	20.1	1.32	96N	O	L650
L663	105.0	-11.1	-.68	5.2	.60	185.5	-3.7	-.14	8.9	.58	96P	O	L663
L686	114.2	-1.9	-.11	7.5	.86	189.3	.2	.01	13.8	.90	96N	O	L686

GR. MEAN = 116.1 NEWTONS — GRAND MEAN = 189.1 NEWTONS — TEST DETERMINATIONS = 10
SD MEANS = 16.4 NEWTONS — SD OF MEANS = 26.1 NEWTONS — 26 LABS IN GRAND MEANS
AVERAGE SDR = 8.7 NEWTONS — AVERAGE SDR = 15.3 NEWTONS
GR. MEAN = 26.10 POUNDS — GRAND MEAN = 42.52 POUNDS
TOTAL NUMBER OF LABORATORIES REPORTING = 30

Best values: E88 110 ± 30 newtons
E89 190 ± 40 newtons

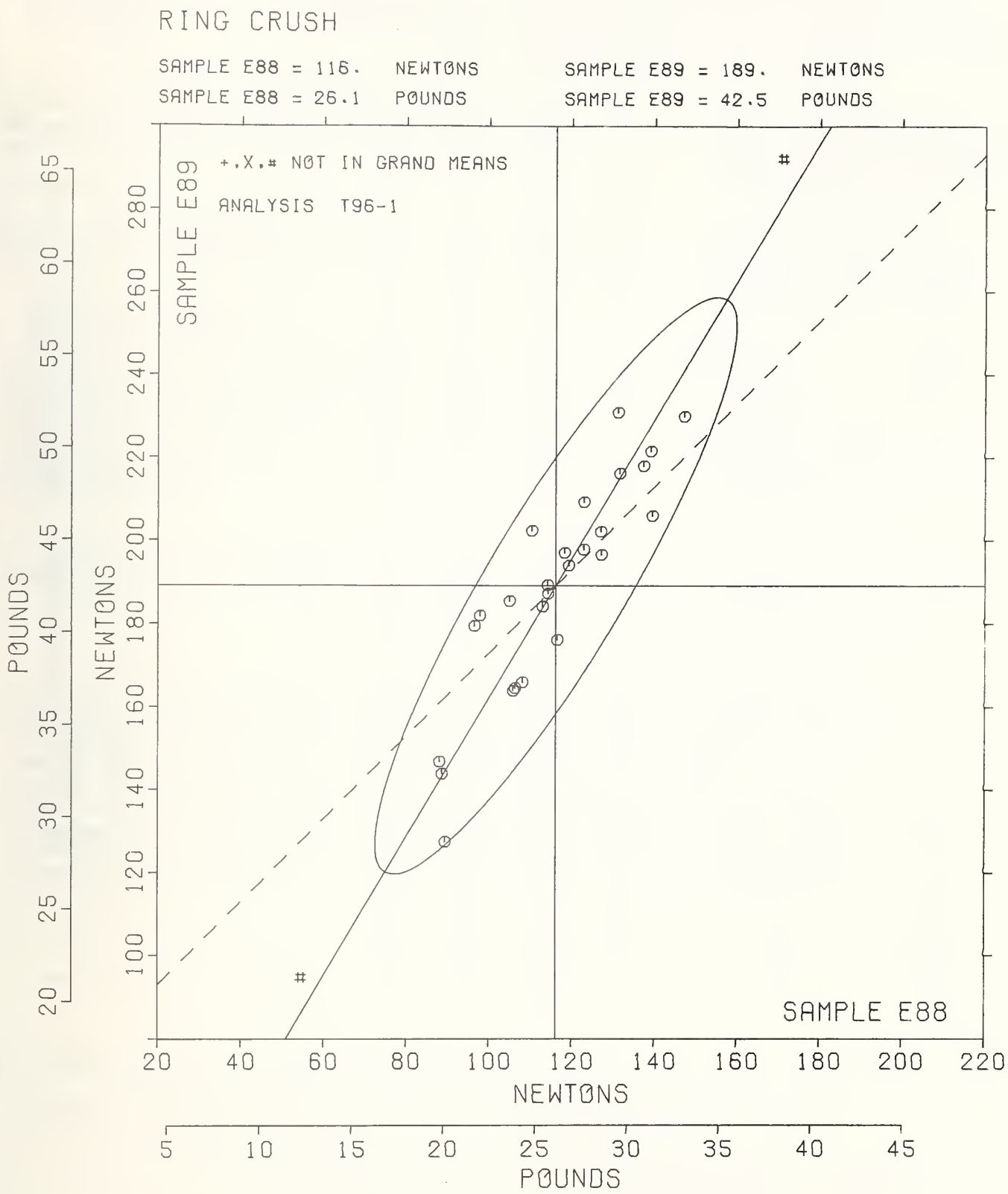
The following laboratories were omitted from the grand means because of extreme test results:
107, 329.

ANALYSIS T96-1 TABLE 2

RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)

TAPPI STANDARD T818 OS-76

LAB CODE	F	MEANS E88	MEANS E89	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L570	M		149.9			.43	96P	RING CRUSH, TMI/HINDE & DAUCH
L126	M		168.6			.56	96P	RING CRUSH, TMI/HINDE & DAUCH
L329	#	53.4	93.0	-114.7	4.5	.38	96P	RING CRUSH, TMI/HINDE & DAUCH
L234	O	88.1	146.8	-50.7	2.3	1.19	96P	RING CRUSH, TMI/HINDE & DAUCH
L621	O	88.6	143.9	-52.9	.3	.50	96P	RING CRUSH, TMI/HINDE & DAUCH
L333	O	89.4	127.4	-66.7	-8.8	.37	96I	RING CRUSH, INSTRON
L218	O	96.5	179.5	-18.3	11.8	1.13	96I	RING CRUSH, INSTRON
L237	O	97.9	181.9	-15.6	11.9	.91	96P	RING CRUSH, TMI/HINDE & DAUCH
L663	O	105.0	185.5	-8.8	7.7	.59	96P	RING CRUSH, TMI/HINDE & DAUCH
L336	O	105.9	163.9	-26.9	-4.2	.77	96P	RING CRUSH, TMI/HINDE & DAUCH
L124	O	106.3	164.6	-26.1	-4.2	1.19	96P	RING CRUSH, TMI/HINDE & DAUCH
L122	O	108.1	165.9	-24.0	-5.1	1.61	96P	RING CRUSH, TMI/HINDE & DAUCH
L393	O	110.3	202.4	8.4	11.7	.90	96P	RING CRUSH, TMI/HINDE & DAUCH
L562	O	113.0	184.1	-5.9	.1	.90	96P	RING CRUSH, TMI/HINDE & DAUCH
L686	O	114.2	189.3	-.8	1.7	.88	96N	RING CRUSH, TMI/HINDE & DAUCH
L191	O	114.3	187.3	-2.5	.5	1.45	96P	RING CRUSH, TMI/HINDE & DAUCH
L305	O	116.5	176.1	-10.9	-7.1	.90	96P	RING CRUSH, TMI/HINDE & DAUCH
L649	O	118.3	197.0	7.9	2.1	.58	96P	RING CRUSH, TMI/HINDE & DAUCH
L650	O	119.3	194.0	5.8	-.3	1.21	96N	RING CRUSH, TMI/HINDE & DAUCH
L171	O	122.9	197.8	10.9	-1.4	1.01	96N	RING CRUSH, TMI/HINDE & DAUCH
L141	O	123.0	209.3	20.8	4.4	1.09	96P	RING CRUSH, TMI/HINDE & DAUCH
L182	O	127.1	202.1	16.8	-2.8	1.25	96N	RING CRUSH, TMI/HINDE & DAUCH
L610	O	127.2	196.6	12.1	-5.7	.98	96P	RING CRUSH, TMI/HINDE & DAUCH
L157	O	131.2	230.9	43.6	8.4	.93	96P	RING CRUSH, TMI/HINDE & DAUCH
L243	O	131.7	216.2	31.2	.5	1.05	96P	RING CRUSH, TMI/HINDE & DAUCH
L114	O	137.4	218.0	35.7	-3.6	.93	96P	RING CRUSH, TMI/HINDE & DAUCH
L553	O	139.2	221.5	39.6	-3.3	1.26	96P	RING CRUSH, TMI/HINDE & DAUCH
L242	O	139.5	206.0	26.5	-11.5	1.46	96G	RING CRUSH, GAYDON FLAT CRUSH TESTER
L350	O	147.2	230.0	51.0	-5.8	.99	96P	RING CRUSH, TMI/HINDE & DAUCH
L107	#	169.9	290.5	114.6	5.8	1.08	96P	RING CRUSH, TMI/HINDE & DAUCH
GMEANS:		116.1	189.1			1.00		
		95% ELLIPSE:		80.4	16.8	WITH GAMMA = 59 DEGREES		


RING CRUSH
SAMPLE E88 = 116. NEWTONS
SAMPLE E88 = 26.1 POUNDS
SAMPLE E89 = 189. NEWTONS
SAMPLE E89 = 42.5 POUNDS
+.X.# NOT IN GRAND MEANS
ANALYSIS T96-1
SAMPLE E89
SAMPLE E88
NEWTONS
POUNDS
20 40 60 80 100 120 140 160 180 200 220
100 120 140 160 180 200 220 240 260 280
20 25 30 35 40 45 50 55 60 65
5 10 15 20 25 30 35 40 45

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	K37	27.71	1.99	1.83	15	41	49	10	1.60	5.59
T10-1 PSI	J87	17.32	1.25	1.08					.95	3.52
BURSTING STRENGTH, MODEL C-A	K37	27.26	2.07	1.87	15	37	37	10	1.64	5.82
T10-2 PSI	J87	17.62	1.93	1.06					.93	5.39
BURSTING STRENGTH, HIGH RANGE	H41	54.5	1.8	2.7	15	32	44	10	2.4	5.2
T11-1 PSI	B56	38.6	2.2	3.0					2.7	6.4
TEARING STRENGTH, DEEP CUTOUT	E85	39.75	1.95	1.22	15	117	138	10	1.07	5.44
T15-1 GRAMS	B96	46.98	2.86	1.52					1.33	7.95
TEARING STRENGTH, NO CUTOUT	J42	64.2	2.5	2.8	15	11	14	10	2.5	7.2
T17-1 GRAMS	K49	120.4	5.1	6.6					5.7	14.4
TENSILE STRENGTH, PACKAGING PAPERS	J01	5.59	.31	.21	20	49	53	12	.17	.87
T19-1 KILONEWTON/M	J16	8.81	.40	.30					.24	1.12
TENSILE STRENGTH, CRE TYPE	J71	3.68	.16	.15	20	45	52	12	.12	.45
T20-1 KILONEWTON/M	K39	4.98	.26	.22					.18	.72
TENSILE STRENGTH, PENDULUM TYPE	J71	3.77	.18	.18	20	34	38	12	.14	.50
T20-2 KILONEWTON/M	K39	5.04	.21	.24					.19	.59
T.E.A., PACKAGING PAPERS	J01	74.5	9.3	8.8	20	18	18	12	7.1	26.2
T25-1 JOULES/SQ M	J16	118.8	21.1	11.6					9.3	58.6
T.E.A., PRINTING PAPERS	J71	40.4	4.0	4.4	20	17	19	12	3.6	11.2
T26-1 JOULES/SQ M	K39	54.4	5.5	5.8					4.6	15.6
ELONGATION TO BREAK, PACKAGING PAPER	J01	2.116	.128	.173	20	17	19	12	.139	.366
T28-1 PERCENT	J16	2.156	.240	.128					.103	.669
ELONGATION TO BREAK, PRINTING PAPER	J71	1.613	.180	.139	20	17	19	12	.111	.503
T29-1 PERCENT	K39	1.710	.163	.130					.104	.455
FOLDING ENDURANCE (MIT)	B69	181.	79.	59.	15	44	51	10	51.	220.
T30-1 DOUBLE FOLDS	B88	47.	17.	18.					16.	47.
FOLDING ENDURANCE (MIT)	B69	2.20	.23	.17	15	46	51	10	.15	.64
T30-2 LOG(10) FOLD	B88	1.63	.20	.19					.16	.57
STIFFNESS, GURLEY	K03	240.5	13.8	13.2	10	34	37	10	11.5	38.2
T35-1 GURLEY UNITS	K41	111.0	12.6	7.2					6.3	35.0
STIFFNESS, TABER	A65	26.6	.8	1.3	10	28	32	5	1.6	2.6
T36-1 TABER UNITS	A77	27.9	1.0	1.4					1.8	3.0
SURFACE PICK STRENGTH, IGT	J55	146.5	206.1	3.7	4	10	13	4	5.1	571.0
T49-1 KP CM/SEC	J93	69.3	67.3	7.3					10.1	186.5
SURFACE PICK STRENGTH, WAX	J55	12.65	.93	.52	5	17	17	5	.64	2.58
T50-1 WAX NUMBER	J93	9.15	1.07	.33					.41	2.95
CONCORA (CMT)	E88	127.4	5.6	8.2	10	13	13	10	7.1	15.5
T91-1 NEWTONS	E89	269.6	25.3	14.7					12.9	70.2
RING CRUSH	E88	116.1	16.4	8.7	10	26	30	10	7.6	45.5
T96-1 NEWTONS	E89	189.1	26.1	15.3					13.4	72.3

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

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

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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.