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

NBSIR 80-1822

**COLLABORATIVE REFERENCE PROGRAM
FOR PAPER**

**REPORT NO. 61S
STRENGTH TESTS**



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

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80-1822

1980

NBS COLLABORATIVE REFERENCE PROGRAMS

TAPPI Paper and Board (6 times per year)

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

FKBG-API Containerboard (48 times per year)

Mullen burst of linerboard
Concora test of medium

MCCA Color and Appearance (4 times per year)

Gloss at 60°
Color and color difference

CTS Rubber (4 times per year)

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

ASTM Cement (2 times per year)

Chemical (11 chemical components)
Physical (15 characteristics)

AASHTO Bituminous

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

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

SEP 19 1980

Not on file

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TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM
FOR PAPER

Report No. 61S
STRENGTH TESTS

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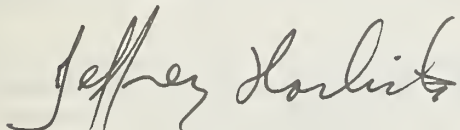
J. Horlick
Office of Testing Laboratory Evaluation Technology
Office of Engineering Standards
National Engineering Laboratory

INTRODUCTION

Reports 61S and 61G comprise the first set of reports for the 79-80 program year. Participants in tests which involve strength properties of paper will receive only the S report; those in tests which measure other properties will receive only the G report.

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

If there are any questions on the notes, the analyses, or the reports in general, contact Robert G. Powell or Jeffrey Horlick on 301/521-2946.



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

February 1, 1980

TAPPI-NBS COLLABORATIVE REFERENCE PROGRAM

BACKGROUND AND PURPOSE

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

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

HOW THE PROGRAM WORKS

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

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

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

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

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

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

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

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

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TABLE OF CONVERSION FACTORS TO METRIC (SI) UNITS

<u>Physical Quantity</u>	<u>To Convert From</u>	<u>To</u>	<u>Multiply by</u>
Bursting strength	psi	kPa	6.895
	kg/cm 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-lb/ft ²	J/m ²	14.59
	in.-lb/in. ²	J/m ²	175.1
	kg-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 _c) and again at the bottom of this table.
GRAND MEAN - (CP- 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 _r 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 _r DEV of more than 2 or less than -2 may indicate that the participant is not following the procedure considered standard for this analysis.
SDP -	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 _c SDR -	The relative standard deviation of repeated measurements; that is, the ratio of the SD _r to the AVERAGE SD _r ; an indication of the ability of a participant to repeat his or her measurements relative to the average ability. The greater the number of TEST DETERMINATIONS the closer the R _c SDR should be to unity. If R _c 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 _c SDR	Upper limit for R _c SDR
-----	-----	-----
3	0.09	2.58
4	0.18	2.25
5	0.26	2.06
8	0.40	1.77
10	0.46	1.67
15	0.56	1.53
20	0.61	1.45
25	0.65	1.39

VAP -	Code for instrument type or variation in condition, see second table.
F -	Flag, with following meanings:
Q -	Included in grand mean and inside 95% error ellipse.
* -	Included in grand means but plotted point falls outside of the 95% error ellipse. The participant should take this as a warning to reexamine his or her testing procedure.
X -	Excluded because plotted point would fall outside of the 99% error ellipse, (see page 2 for explanation of Graph).
# -	Excluded because data were not understood or because of a non-coded variation reported by the laboratory. (See the notes following Table 1 for each method).
+ -	Excluded from grand means because VAP was non-standard for the analysis.
M -	Excluded because data for one sample are missing.
S -	Included in grand mean but only after omission of one or more 'wild' values; that is test determinations more than 3 times AVERAGE SD _r from the laboratory's MEAN. Not more than 20% of the test determination may be excluded in this manner without rejecting the laboratory.
Best values -	Given at the end of Table 1 for each method for which sufficient information is available. These best values are estimates based on a careful examination of all data, both current and past, with special attention to results obtained by the National Bureau of Standards and other recognized reference laboratories in this and other countries. All participants using equipment that is standard for the analysis should be able to achieve results within the plus-minus (+/-) limits, when these are shown along with the best values.
COORDINATES -	Distances along major and minor axes of error ellipse. If special additive or concurrent model of the measuring process applies to this method, the distance along the minor axis represents the random error within a laboratory while that along the major axis also includes a systematic laboratory component of error.
95% ELLIPSE -	Lengths of the major and minor axes of the ellipse and the angle that the major axis makes with the horizontal axis.
AVG R _c SDR -	Average of the R _c SD _r s for the two samples; an indication of the laboratory's precision of repeated measurements.

Graph -

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

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

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

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

SUMMARY -
(At end of report)

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

REPL CRP -

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

REPL TAPPI -

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

REPEAT -

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

REPROD -

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

ANALYSIS T10-1 TABLE 1

BURSTING STRENGTH, PSI

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

LAB CODE	SAMPLE J68 MEAN	PAINTING 76 GRAMS PER SQUARE METER				SAMPLE K38 MEAN	PRINTING 75 GRAMS PER SQUARE METER				TEST D ₀ = 15		
		DEV	N ₀ DEV	SDR	R ₀ SDR		DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
I121	16.85	-0.24	-0.19	0.90	0.84	29.58	1.16	0.61	1.12	0.58	10C	0	I121
I134	16.40	-0.70	-0.54	0.83	0.77	30.47	2.05	1.08	1.25	0.64	10C	0	I134
I150	18.37	1.27	0.50	1.33	1.24	26.37	-0.05	-0.03	1.57	0.81	10C	0	I150
I153	18.37	1.27	0.50	0.93	0.87	30.80	2.38	1.25	1.68	0.97	10C	0	I153
I158	17.33	0.24	0.10	1.40	1.30	27.53	-0.89	-0.47	2.17	1.12	10C	0	I158
I167	17.31	0.21	0.10	0.57	0.53	26.27	-0.15	-0.08	1.47	0.76	10C	0	I167
I183	17.27	0.17	0.10	1.10	1.02	27.37	-1.05	-0.56	1.77	0.91	10C	0	I183
I191	14.07	-2.43	-1.00	1.71	1.59	29.17	0.75	0.39	2.40	1.24	10C	0	I191
I203A	16.35	-0.75	-0.55	1.19	1.11	26.35	-2.07	-1.09	2.31	1.20	10C	0	I203A
I203B	16.28	-0.81	-0.55	1.57	1.27	30.87	2.45	1.29	1.92	0.99	10C	0	I203B
I207	17.67	0.57	0.44	1.27	1.13	30.03	1.61	0.85	1.46	0.76	10C	0	I207
I212	17.17	0.07	0.00	1.35	1.25	30.83	2.41	1.27	3.00	1.55	10C	0	I212
I223A	18.49	1.39	1.00	1.47	1.37	30.20	1.78	0.94	2.23	1.16	10C	0	I223A
I225	17.40	0.30	0.23	1.21	1.13	29.73	1.31	0.69	1.99	1.03	10C	0	I225
I237A	17.10	0.00	0.00	0.05	0.79	27.67	-0.75	-0.40	1.58	0.82	10C	0	I237A
I237B	16.77	-0.33	-0.20	0.50	0.40	26.20	-2.22	-1.17	1.00	0.52	10C	0	I237B
I249	15.19	-1.91	-1.40	0.70	0.70	24.37	-4.05	-2.13	2.35	1.22	10C	0	I249
I261	17.20	0.10	0.00	1.13	1.05	26.83	0.41	0.22	1.80	0.93	10C	0	I261
I264	16.73	-0.30	-0.23	0.70	0.65	27.33	-1.09	-0.57	1.18	0.61	10C	0	I264
I275	17.70	0.60	0.47	1.05	0.93	31.43	3.01	1.59	2.81	1.45	10C	0	I275
I305	17.20	0.10	0.00	0.59	0.55	31.30	2.88	1.52	1.24	0.64	10C	0	I305
I312	16.00	-0.50	-0.39	0.00	0.50	29.33	0.91	0.48	1.48	0.77	10C	0	I312
I315	18.23	1.14	0.80	0.90	0.84	31.63	3.21	1.69	1.43	0.74	10C	0	I315
I326	19.10	2.00	1.55	1.18	1.10	26.60	0.38	0.20	2.11	1.09	10C	0	I326
I330	18.40	1.30	1.01	0.75	0.70	29.52	1.10	0.58	2.29	1.18	10C	0	I330
I333	15.33	-1.70	-1.57	2.79	2.00	25.67	-2.55	-1.34	4.03	2.09	10C	0	I333
I339	11.67	-5.43	-4.21	1.08	1.00	26.18	-8.24	-4.34	1.86	0.96	10C	#	I339
I344	17.97	0.87	0.57	2.38	2.21	27.17	-1.25	-0.66	3.39	1.75	10C	0	I344
I356	19.36	2.27	1.70	1.03	0.95	25.97	-2.45	-1.29	1.18	0.61	10C	*	I356
I358	15.97	-1.13	-0.80	0.09	0.04	27.97	-0.45	-0.24	1.01	0.52	10C	0	I358
I360	17.83	0.74	0.57	0.41	0.38	28.13	-0.29	-0.15	1.95	1.01	10C	0	I360
I366	17.93	0.84	0.55	1.27	1.18	27.00	-1.42	-0.75	2.10	1.09	10C	0	I366
I386	13.53	-3.50	-2.70	1.02	1.51	26.47	-1.95	-1.03	2.50	1.29	10C	*	I386
I390	17.10	0.00	0.00	1.18	1.10	26.07	-0.35	-0.19	1.81	0.94	10C	0	I390
I568	18.13	1.03	0.80	1.17	1.09	27.09	-0.73	-0.39	1.97	1.02	10C	0	I568
I573	14.00	-3.10	-2.40	0.50	0.52	24.71	-3.71	-1.96	1.05	0.54	10C	*	I573
I599	17.95	0.80	0.50	0.50	0.54	29.01	0.59	0.31	2.13	1.10	10C	0	I599
I684	16.50	-0.60	-0.40	0.73	0.68	26.03	-2.39	-1.26	1.11	0.57	10C	0	I684
I696	17.95	0.80	0.50	0.80	0.74	29.94	1.52	0.80	2.59	1.34	10C	0	I696

GR₀ MEAN = 17.10 PSI

SD MEANS = 1.29 PSI

GRAND MEAN = 26.42 PSI

SD OF MEANS = 1.90 PSI

TEST DETERMINATIONS = 15

38 LABS IN GRAND MEANS

AVERAGE SDR = 1.00 PSI

AVERAGE SDR = 1.93 PSI

GR₀ MEAN = 117.9 KILOPASCAL

GRAND MEAN = 196.0 KILOPASCAL

I128	17.53	0.44	0.34	1.00	0.99	27.87	-0.55	-0.29	1.55	0.80	10B	*	I128
I219	20.81	3.71	2.00	0.94	0.88	30.82	2.40	1.27	1.00	0.52	10T	*	I219
I242	19.62	2.53	1.50	0.80	0.74	30.65	2.27	1.20	2.53	1.31	10T	*	I242
I250I	1677.17	1660.07	1200.70	81.60	75.88	2561.00	2552.58	1343.98	121.93	63.04	10N	*	I250I
I251	18.56	1.40	1.13	0.90	0.84	26.56	0.14	0.08	2.21	1.14	10V	*	I251
I260	15.17	-1.93	-1.50	1.37	1.28	25.33	-3.09	-1.63	1.57	0.81	10X	*	I260
I269	22.40	5.30	4.11	1.45	1.35	32.47	4.05	2.13	1.51	0.78	10A	*	I269
I484	15.97	-1.13	-0.80	0.92	0.85	25.40	-3.02	-1.59	1.68	0.87	10M	*	I484

TOTAL NUMBER OF LABORATORIES REPORTING = 47

Best values: J68 17.2 ± 2.2 psi

K38 28.3 ± 3.0 psi

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

ANALYSIS T10-1 TABLE 2

BURSTING STRENGTH, PSI

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

LAB CODE	F	MEANS		COORDINATES		AVG X _{COORD}	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS					
		J68	K38	MAJOR	MINOR								
L339	#	11.67	20.18	-9.79	1.01	0.96	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L386	*	13.53	26.47	-3.14	2.53	1.40	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L573	*	14.00	24.71	-4.03	1.41	0.53	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L191	0	14.67	29.17	-0.20	2.53	1.42	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L260	*	15.17	25.33	-3.59	0.58	1.04	10X	BURSTING	STRENGTH	10	T0	40	PSI: GIVE INSTR. MAKE, MODEL, CLAMP
L249	0	15.19	24.37	-4.48	0.19	0.90	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L333	0	15.33	25.27	-3.04	0.63	2.34	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L484	*	15.67	25.40	-3.22	-0.13	0.00	10M	BURSTING	STRENGTH	10	T0	40	PSI, REGMED MT/MOT, MANUAL CLAMP
L358	A	15.97	27.97	-0.00	0.87	0.55	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L203B	0	16.24	30.87	1.94	1.70	1.13	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L203A	0	16.35	26.35	-2.20	-0.12	1.15	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L134	0	16.40	30.47	1.01	1.44	0.71	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L684	0	16.50	26.03	-2.43	-0.38	0.03	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L312	0	16.60	29.33	0.05	0.01	0.00	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L264	A	16.73	27.33	-1.14	-0.09	0.63	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L237B	0	16.77	26.20	-2.17	-0.56	0.45	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L121	0	16.85	29.58	0.97	0.07	0.71	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L390	0	17.10	28.07	-0.33	-0.14	1.02	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L237A	0	17.10	27.67	-0.09	-0.30	0.00	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L212	0	17.17	30.33	2.25	0.87	1.40	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L261	0	17.20	28.83	0.42	0.07	0.59	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L305	0	17.20	31.30	2.09	1.02	0.59	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L163	0	17.27	27.37	-0.91	-0.57	0.97	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L167	0	17.31	28.27	-0.06	-0.25	0.04	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L158	0	17.33	27.53	-0.73	-0.56	1.21	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L225	0	17.40	29.73	1.33	0.23	1.08	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L128	*	17.53	27.87	-0.34	-0.02	0.59	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L207	0	17.67	30.03	1.71	0.10	0.97	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L279	0	17.70	31.43	3.01	0.01	1.21	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L360	0	17.83	28.13	0.02	-0.79	0.69	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L366	0	17.93	27.00	-0.90	-1.52	1.13	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L696	0	17.95	29.94	1.73	-0.19	1.04	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L599	0	17.95	29.01	0.07	-0.56	0.02	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L344	0	17.97	27.17	-0.22	-1.29	1.94	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L568	0	18.13	27.69	-0.23	-1.23	1.05	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L315	0	18.23	31.63	3.40	0.20	0.75	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L153	0	18.37	30.80	2.09	-0.25	0.07	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L150	0	18.37	28.37	0.44	-1.19	1.02	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L330	0	18.40	29.52	1.52	-0.77	0.94	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L223A	0	18.49	30.20	2.13	-0.59	1.26	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L251	*	18.56	28.56	0.70	-1.29	0.99	10V	BURSTING	STRENGTH	10	T0	40	PSI, L*W, MANUAL CLAMP, 20C, 65% RH
L326	0	19.10	28.80	1.13	-1.70	1.10	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L356	*	19.30	25.97	-1.30	-3.04	0.78	10C	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS C, MANUAL CLAMP
L242	*	19.62	30.69	3.07	-1.45	1.03	10I	BURSTING	STRENGTH	10	T0	40	PSI, L*W, MANUAL CLAMP
L219	*	20.81	30.82	3.06	-2.49	0.70	10I	BURSTING	STRENGTH	10	T0	40	PSI, L*W, MANUAL CLAMP
L269	*	22.40	32.47	5.79	-3.32	1.07	10A	BURSTING	STRENGTH	10	T0	40	PSI, PERKINS A, MANUAL CLAMP
L250L	*1677.0172531.00	2990.91	-3.50.51	0.40	10N	BURSTING	STRENGTH	10	T0	40	PSI, LBOMARGY, MAN. CLAMP, 20C, 65% RH		
GMEANS:		17.10	28.42			1.00							
55% ELLIPSE:				5.19	2.89								W.L.H. GAMMA = 67 DEGREES

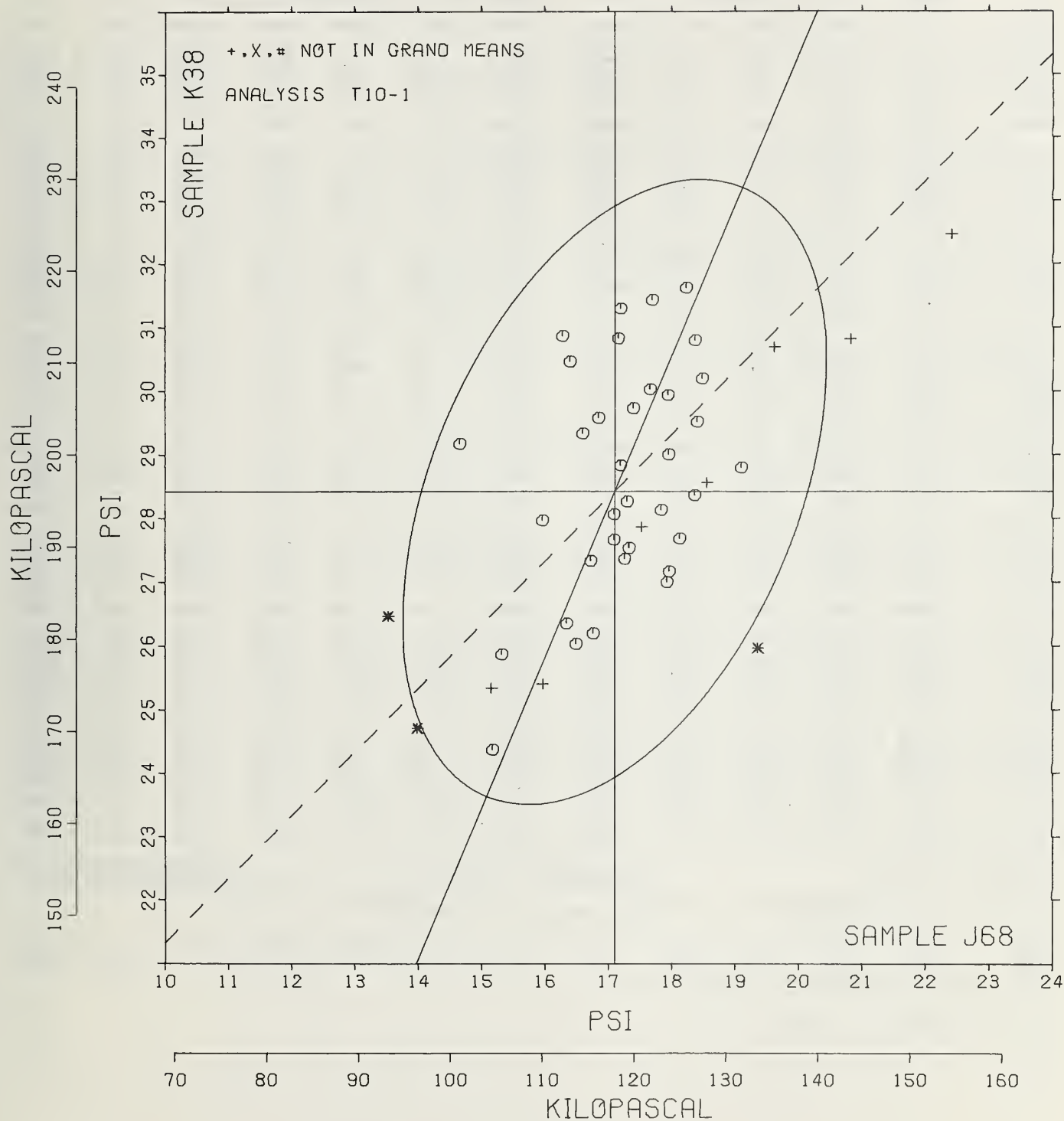
BURSTING STRENGTH, MODEL C

SAMPLE J68 = 17.1 PSI

SAMPLE K38 = 28.4 PSI

SAMPLE J68 = 118 KILOPASCAL

SAMPLE K38 = 196 KILOPASCAL



ANALYSIS T10-2 TABLE 1
 BULKING STRENGTH, PSI
 TAFPI OFFICIAL TEST METHOD J68-70, PERKINS MODEL C-A OR C WITH AIR OR HYDRAULIC CLAMPS

LAB CODE	SAMPLE J68 76 GRAMS PER SQUARE METER					SAMPLE K38 75 GRAMS PER SQUARE METER					TEST D ₀ = 15		
	MEAN	DEV	NO DEV	SDR	R ₀ SDR	MEAN	DEV	NO DEV	SDR	R ₀ SDR	VAR	F	LAB
L105	18.20	1.14	.71	1.57	1.24	28.67	1.10	.48	2.06	1.16	10D	0	L105
L106C	17.33	.27	.17	.82	.74	28.77	-.80	-.35	1.72	.97	10D	0	L106C
L115	17.20	.14	.09	.77	.70	30.07	2.50	1.10	1.45	.82	10D	0	L115
L118	19.28	2.22	1.55	1.44	1.30	25.57	2.00	.88	1.67	.94	10D	0	L118
L122	17.93	.87	.54	1.33	1.20	27.40	-.17	-.07	1.59	.90	10F	0	L122
L125	12.70	-4.30	-2.70	5.00	4.51	22.99	-4.58	-2.01	3.66	2.06	10D	*	L125
L141	17.63	.57	.30	.95	.86	27.87	.30	.13	2.65	1.49	10D	0	L141
L148	18.13	1.07	.57	.92	.83	29.67	2.30	1.01	1.77	1.00	10D	0	L148
L157	19.07	2.01	1.25	1.34	1.21	30.60	3.03	1.33	2.82	1.59	10D	0	L157
L159	15.27	-1.79	-1.41	1.22	1.10	29.48	-3.09	-1.36	2.00	1.13	10D	0	L159
L162	13.33	-3.75	-2.51	1.45	1.31	27.87	.30	.13	1.96	1.10	10D	X	L162
L163	17.63	.57	.30	1.03	.93	28.07	.50	.22	1.73	.98	10D	0	L163
L166	17.87	.81	.50	1.25	1.12	30.83	3.26	1.44	1.23	.70	10D	0	L166
L176	15.80	-1.26	-.70	1.20	1.14	24.27	-3.30	-1.45	2.19	1.23	10D	0	L176
L185	18.07	1.01	.62	.70	.63	25.73	2.16	.95	2.19	1.23	10D	0	L185
L190C	17.40	.34	.21	1.72	1.50	27.40	-.17	-.07	1.24	.70	10D	0	L190C
L190R	17.20	.14	.09	1.08	.98	27.53	-.04	-.02	1.30	.73	10D	0	L190R
L194	18.53	1.47	.94	.81	.73	28.10	.53	.23	1.53	.86	10D	0	L194
L217	18.67	1.81	1.12	1.13	1.02	27.60	.03	.01	2.13	1.29	10F	0	L217
L224	17.83	.77	.40	.99	.90	29.43	1.86	.82	2.03	1.14	10D	0	L224
L226B	17.85	.79	.49	1.29	1.17	28.29	.72	.32	1.68	.95	10D	0	L226B
L226C	17.80	.74	.40	1.19	1.08	29.83	2.26	1.00	1.69	.95	10D	0	L226C
L233	15.32	-1.74	-1.00	1.31	1.18	26.11	-1.46	-.64	1.23	.70	10D	0	L233
L241	18.13	1.07	.67	1.04	1.08	29.53	1.96	.86	1.64	.93	10D	0	L241
L248	17.30	.24	.15	1.05	.95	28.81	-.76	-.34	1.94	1.09	10K	0	L248
L262	18.37	1.31	.81	.72	.65	25.13	1.56	.69	1.29	.73	10D	0	L262
L275	14.81	-2.25	-1.33	.88	.79	25.08	-2.49	-1.10	2.13	1.20	10D	0	L275
L280	19.55	2.49	1.55	.67	.61	30.61	3.04	1.34	1.89	1.07	10D	0	L280
L285	16.93	-.13	-.00	1.02	1.07	25.27	1.70	.75	2.60	1.47	10D	0	L285
L309	16.05	-1.01	-.62	1.25	1.13	27.03	-.54	-.24	1.70	.96	10D	0	L309
L313	15.07	-1.99	-1.25	.72	.65	24.27	-3.30	-1.45	1.49	.84	10I	0	L313
L341	17.23	.17	.11	.76	.65	27.30	-.27	-.12	1.08	.61	10D	0	L341
L352	15.94	-1.12	-.69	1.08	.97	25.25	-2.32	-1.02	1.42	.80	10D	0	L352
L563	13.19	-3.87	-2.46	1.25	1.12	22.10	-5.47	-2.41	1.58	.89	10U	0	L563
L567	16.53	-.53	-.33	.84	.75	28.29	-1.28	-.56	1.62	.91	10D	0	L567
L575	17.17	.11	.07	1.50	1.41	28.17	-1.40	-.61	2.05	1.16	10D	0	L575
L581	18.47	1.41	.97	.85	.75	29.47	1.90	.83	2.05	1.16	10D	0	L581
L587	17.80	.74	.40	1.15	1.03	27.10	-.47	-.21	1.31	.74	10D	0	L587
L652	13.77	-3.29	-2.04	.90	.82	25.13	-2.44	-1.07	1.84	1.04	10D	0	L652
L680	15.30	-1.70	-1.09	1.31	1.18	25.23	-2.34	-1.03	1.86	1.05	10D	0	L680
L698	17.81	.75	.40	1.09	.98	31.52	3.95	1.74	3.94	2.22	10D	*	L698

GR₀ MEAN = 17.06 PSI

SD MEANS = 1.61 PSI

AVERAGE SDR = 1.11 PSI

GR₀ MEAN = 117.6 KILOPASCAL

GRAND MEAN = 27.57 PSI

SD OF MEANS = 2.27 PSI

GRAND MEAN = 190.1 KILOPASCAL

TEST DETERMINATIONS = 15

40 LABS IN GRAND MEANS

AVERAGE SDR = 1.77 PSI

L337 29.50 12.44 7.71 1.05 1.47 42.00 14.43 6.35 2.37 1.34 10H * L337
 L704 15.17 -1.89 -1.17 1.54 1.39 NO DATA REPORTED FOR SAMPLE K38 10L * L704
 TOTAL NUMBER OF LABORATORIES REPORTING = 43

Best values: J68 17.3 ± 2.2 psi
 K38 27.6 ± 3.4 psi

TAPPI OFFICIAL TEST METHOD T403 65-70, PERKINS MODEL C-A OR C WITH AIR OR HYDRAULIC CLAMPS

LAB CODE	F	MEANS		COORDINATES		AVG 40.00K VAR	PROPERTY---TEST	INSTRUMENT---	CONDITIONS
		J69	K38	MAJOR	MINOR				
L125	*	12.70	22.59	-0.25	1.07	0.29	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L563	Ø	13.19	22.10	-0.70	0.17	1.01	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L162	X	13.33	27.87	-1.83	0.26	1.01	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L652	Ø	13.77	25.13	-3.00	1.38	0.53	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L275	Ø	14.81	25.08	-3.32	0.48	1.00	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L313	Ø	15.07	24.27	-3.65	-0.19	0.75	10I BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L704	*	15.17				1.09	10L BURSTING STRENGTH	10 T6 40 PSI,	PERKINS LC, MANUAL CLAMP
L159	Ø	15.27	24.48	-3.57	-0.23	1.12	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L680	Ø	15.30	25.23	-2.92	0.16	1.11	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L233	Ø	15.32	26.11	-2.16	0.63	0.94	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L176	Ø	15.80	24.27	-3.44	-0.79	1.19	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L352	Ø	15.94	25.25	-2.55	-0.30	0.89	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L309	Ø	16.05	27.03	-1.01	0.53	1.04	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L567	Ø	16.53	26.29	-1.30	-0.28	0.83	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L285	Ø	16.93	29.27	1.34	1.05	1.47	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L575	Ø	17.17	26.17	-1.10	-0.87	1.08	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L115	Ø	17.20	30.07	2.15	1.27	0.76	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L190R	Ø	17.20	27.53	0.05	-0.14	0.80	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L341	Ø	17.23	27.30	-0.13	-0.29	0.82	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L248	Ø	17.30	26.81	-0.50	-0.63	1.02	10A BURSTING STRENGTH	10 T6 40 PSI,	PERKINS C, H ₂ O CLAMP, TRANSDUCER
L106C	Ø	17.33	26.77	-0.51	-0.68	0.85	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L190C	Ø	17.40	27.40	0.05	-0.38	1.13	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L141	Ø	17.63	27.87	0.57	-0.31	1.18	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L163	Ø	17.63	28.07	0.73	-0.20	0.95	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L587	Ø	17.80	27.10	0.02	-0.88	0.89	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L226C	Ø	17.80	29.83	2.29	0.65	1.11	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L698	*	17.81	31.52	3.70	1.58	1.00	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L224	Ø	17.83	29.43	1.98	0.40	1.02	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L226B	Ø	17.85	28.29	1.04	-0.26	1.00	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L166	Ø	17.87	30.83	3.16	1.15	0.91	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L122	Ø	17.93	27.40	0.55	-0.82	1.05	10R BURSTING STRENGTH	10 T6 40 PSI,	PERKINS C, H ₂ O CLAMP, TRANSDUCER
L185	Ø	18.07	29.73	2.30	0.37	0.93	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L148	Ø	18.13	29.87	2.51	0.39	0.91	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L241	Ø	18.13	29.53	2.23	0.20	1.00	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L105	Ø	18.20	28.67	1.55	-0.34	1.00	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L262	Ø	18.37	29.13	2.03	-0.21	0.89	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L581	Ø	18.47	29.47	2.30	-0.11	0.85	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L194	Ø	18.53	28.10	1.20	-0.93	0.80	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L217	Ø	18.87	27.60	1.03	-1.48	1.11	10R BURSTING STRENGTH	10 T6 40 PSI,	PERKINS C, H ₂ O CLAMP, TRANSDUCER
L157	Ø	19.07	30.60	3.64	0.02	1.40	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L118	Ø	19.28	29.57	2.90	-0.73	1.12	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L280	Ø	19.55	30.61	3.92	-0.38	0.84	10D BURSTING STRENGTH	10 T6 40 PSI,	PERKINS CA OR C, AIR CLAMP
L337	*	29.50	42.00	10.92	-2.29	1.40	10H BURSTING STRENGTH	10 T6 40 PSI,	PERKINS AB, HYDRAULIC CLAMP
GMEANS:		17.06	27.57			1.00			
		95% ELLIPSE:	0.95	1.84			WILD GAMMA = 50 DEGREES		

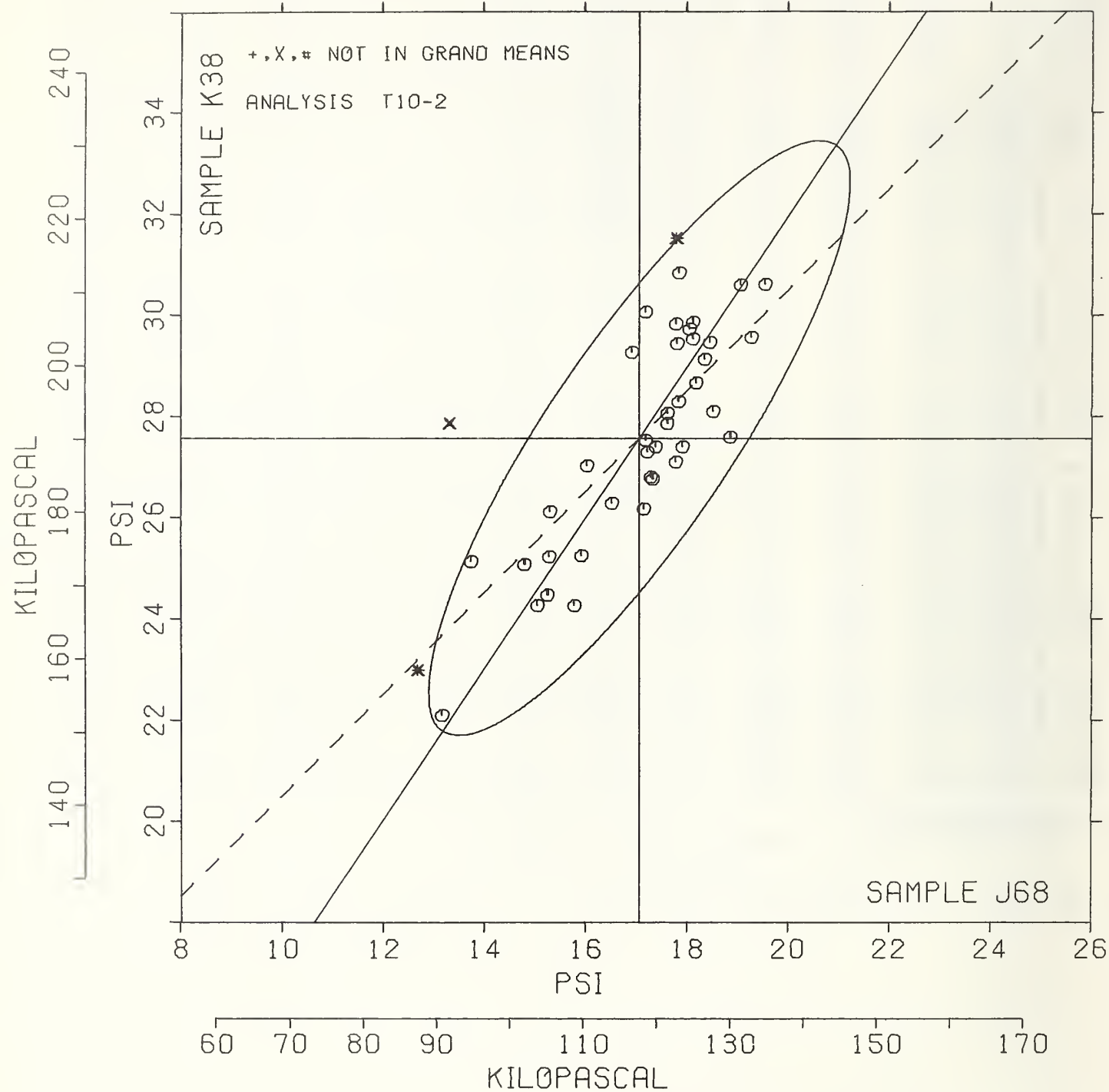
BURSTING STRENGTH, MODEL C-A

SAMPLE J68 = 17.1 PSI

SAMPLE K38 = 27.6 PSI

SAMPLE J68 = 118 KILOPASCAL

SAMPLE K38 = 190 KILOPASCAL



ANALYSIS T11-1 TABLE 1
BURSTING STRENGTH, PSI - HIGH RANGE
TAPPI OFFICIAL TEST METHOD T403 DS-76, PERKINS MODEL C OR C-A

LAB CODE	SAMPLE K28 105 GRAMS PER SQUARE METER					SAMPLE B63 124 GRAMS PER SQUARE METER					TEST D ₀ = 15		
	MEAN	DEV	NO DEV	SDR	R ₀ SDR	MEAN	DEV	NO DEV	SDR	R ₀ SDR	VAR	F	LAB
L107	51.7	2.0	.00	4.5	1.19	64.1	2.5	.79	3.4	.84	11C	Ø	L107
L118	49.8	.1	.00	4.0	1.06	60.0	4.3	1.36	4.7	1.15	11D	Ø	L118
L122	50.2	.5	.22	2.8	.75	63.1	1.4	.45	5.1	1.24	11F	Ø	L122
L128	49.1	-.8	-.20	2.5	.66	60.3	-1.3	-.40	3.0	.73	11D	Ø	L128
L141	53.2	3.6	1.40	5.9	1.58	67.0	5.4	1.68	4.3	1.07	11D	Ø	L141
L148	51.1	1.4	.00	3.4	.91	62.5	1.2	.39	3.0	.74	11D	Ø	L148
L159	45.9	-3.7	-1.00	5.4	1.45	57.0	-4.6	-1.43	4.7	1.16	11D	Ø	L159
L170	50.9	1.2	.04	1.5	.30	61.2	-.4	-.12	1.4	.35	11C	Ø	L170
L176	47.9	-1.7	-.75	3.0	.80	63.5	1.9	.60	4.5	1.10	11D	Ø	L176
L182	49.6	-.1	-.00	3.0	.90	63.1	1.4	.45	3.7	.90	11D	Ø	L182
L218	52.7	3.1	1.28	3.0	1.02	65.9	4.3	1.35	6.1	1.50	11D	Ø	L218
L219	46.9	-2.7	-1.14	4.5	1.20	58.3	-3.4	-1.05	3.7	.91	11C	Ø	L219
L237A	50.5	.8	.33	2.0	.70	59.5	-2.1	-.65	2.6	.65	11C	Ø	L237A
L237B	49.3	-.4	-.10	2.0	.53	60.8	-.9	-.27	2.7	.65	11C	Ø	L237B
L248	48.6	-1.0	-.45	3.0	.96	60.8	-.8	-.25	2.9	.72	11K	Ø	L248
L278	47.0	-2.7	-1.12	4.1	1.09	57.2	-4.4	-1.37	4.4	1.09	11C	Ø	L278
L279	63.7	14.9	5.85	4.0	1.00	75.7	14.0	4.39	9.3	2.28	11C	#	L279
L280	50.9	1.2	.30	3.0	.95	63.2	1.6	.51	4.3	1.05	11D	Ø	L280
L294	51.4	1.7	.72	4.0	1.00	59.4	-2.2	-.69	4.9	1.20	11C	Ø	L294
L303	44.8	-4.8	-2.02	2.7	.73	56.6	-5.1	-1.58	3.2	.79	11C	Ø	L303
L311	55.1	5.3	2.28	6.2	1.65	60.5	4.9	1.54	7.7	1.88	11C	Ø	L311
L330	51.9	2.3	.90	4.0	1.27	63.8	2.2	.68	4.0	.99	11C	Ø	L330
L333	49.1	-.5	-.20	4.3	1.15	61.2	-.4	-.13	3.5	.85	11C	Ø	L333
L334	52.4	2.8	1.15	4.0	1.08	64.0	2.4	.75	2.9	.72	11D	Ø	L334
L339	40.2	-3.5	-1.40	2.0	.67	55.9	-5.8	-1.80	4.4	1.09	11C	Ø	L339
L344	50.6	.9	.37	2.0	.69	64.1	2.5	.78	6.3	1.55	11C	Ø	L344
L348	48.2	-1.5	-.05	4.2	1.13	58.4	-3.2	-1.00	4.9	1.21	11C	Ø	L348
L356	50.9	1.2	.30	3.0	.91	63.0	1.3	.42	3.9	.97	11C	Ø	L356
L563	45.3	-4.4	-1.00	2.8	.75	56.1	-5.5	-1.73	6.2	1.52	11Y	Ø	L563
L565	47.9	-1.8	-.75	1.0	.47	61.2	-.5	-.14	2.8	.69	11D	Ø	L565
L567	48.0	-1.7	-.70	3.4	.92	62.0	.4	.12	2.4	.59	11D	Ø	L567
L575	48.8	-.9	-.37	6.7	1.79	59.6	-2.0	-.62	6.1	1.51	11D	Ø	L575
L576	51.1	1.4	.30	5.0	1.54	63.3	1.7	.54	3.6	.89	11P	Ø	L576
L581	50.5	.8	.34	3.5	.94	60.7	-.9	-.29	3.2	.78	11D	Ø	L581
L599	51.2	1.5	.00	2.7	.73	66.1	4.5	1.40	6.2	1.51	11C	Ø	L599
L604	48.8	-.8	-.35	4.0	1.24	57.2	-4.4	-1.38	3.8	.93	11C	Ø	L604
L622	48.0	-1.0	-.05	4.1	1.09	62.7	1.1	.35	3.7	.92	11E	Ø	L622
L650	48.7	-1.0	-.41	4.9	1.31	59.2	-2.4	-.75	3.6	.88	11D	Ø	L650
L651	55.1	5.4	2.25	3.0	.96	66.6	6.4	1.99	3.4	.83	11D	Ø	L651
L680	48.0	-1.7	-.74	2.0	.74	66.0	-1.7	-.52	3.5	.85	11D	Ø	L680

GR₀ MEAN = 49.7 PSI

SD MEANS = 2.4 PSI

GRAND MEAN = 61.6 PSI

SD OF MEANS = .02 PSI

TEST DETERMINATIONS = 15

39 LABS IN GRAND MEANS

AVERAGE SDR = 3.8 PSI

AVERAGE SDR = 4.1 PSI

GR₀ MEAN = 342.5 KILOPASCAL

GRAND MEAN = 424.8 KILOPASCAL

L242	53.6	4.0	1.00	4.0	1.28	66.2	4.6	1.44	5.8	1.43	11T	+	L242
L250L	436.5	4314.8	1799.00	310.6	84.81	5350.5	5288.9	1652.06	224.6	55.21	11N	+	L250L
L251	52.1	2.4	1.01	3.7	.99	62.8	1.2	.38	4.7	1.16	11V	+	L251
L290	53.6	3.9	1.04	2.0	.70	64.2	2.6	.81	3.5	.86	11A	+	L290
L393	51.3	1.0	.00	4.9	1.31	66.7	5.0	1.58	3.6	.88	11H	+	L393
L394	59.1	9.4	3.92	5.2	1.40	74.9	10.3	3.22	5.6	1.39	11H	+	L394
L484	50.3	.7	.27	4.0	1.06	61.0	-.6	-.19	3.4	.83	11H	+	L484
L570	52.0	2.3	.37	2.2	.59	61.5	-.1	-.03	4.0	.97	11H	+	L570
L593	65.7	16.0	6.07	5.9	1.58	74.1	12.4	3.89	7.8	1.92	11J	+	L593
L598	53.5	3.9	1.01	6.4	2.24	71.1	9.5	2.97	6.3	1.55	11B	+	L598

TOTAL NUMBER OF LABORATORIES REPORTING = 50

Best values: K28 50 \pm 4 psi
B63 62 \pm 5 psi

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

BURSTING STRENGTH, PSI - HIGH RANGE
TAPPI OFFICIAL TEST METHOD T403 05-76, PERKINS MODEL C OR C-A

LAB CODE	F	MEANS		COORDINATES		AVG K _{0.50K}	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS						
		B28	B63	MAJOR	MINOR									
L303	Ø	44.8	56.6	-6.9	1.0	0.70	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L563	Ø	45.3	56.1	-7.1	0.4	1.14	11Y	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L159	Ø	45.9	57.0	-5.9	0.4	1.30	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L339	Ø	46.2	55.9	-6.7	-0.5	0.68	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L219	Ø	46.9	58.3	-4.3	0.3	1.00	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L278	Ø	47.0	57.2	-5.1	-0.3	1.09	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L565	Ø	47.9	61.2	-1.4	1.2	0.53	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L176	Ø	47.9	63.5	0.0	2.5	0.93	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L680	Ø	48.0	60.0	-2.3	0.4	0.79	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L567	Ø	48.0	62.0	-0.7	1.6	0.70	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L622	Ø	48.0	62.7	-0.0	2.0	1.00	11E	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L348	Ø	48.2	58.4	-3.5	-0.6	1.17	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L248	Ø	48.6	60.8	-1.2	0.4	0.64	11K	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C, H ₂ O CLAMP,	TRANSDUCER
L650	Ø	48.7	59.2	-2.5	-0.6	1.09	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L575	Ø	48.8	59.6	-2.1	-0.4	1.05	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L604	Ø	48.8	57.2	-4.1	-1.9	1.09	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L128	Ø	49.1	60.3	-1.4	-0.2	0.70	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L333	Ø	49.1	61.2	-0.7	0.2	1.00	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L237B	Ø	49.3	60.8	-0.9	-0.2	0.59	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L182	Ø	49.6	63.1	1.1	0.9	0.53	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L118	Ø	49.8	66.0	3.6	2.4	1.11	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L122	Ø	50.2	63.1	1.5	0.4	1.00	11F	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C, H ₂ O CLAMP,	TRANSDUCER
L484	+	50.3	61.0	-0.1	-0.9	0.55	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS AB,	HYDRAULIC CLAMP
L237A	Ø	50.5	59.5	-1.2	-1.8	0.68	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L581	Ø	50.5	60.7	-0.3	-1.2	0.60	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L344	Ø	50.6	64.1	2.5	0.7	1.12	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L280	Ø	50.9	63.2	2.0	-0.0	1.00	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L356	Ø	50.9	63.0	1.8	-0.2	0.54	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L170	Ø	50.9	61.2	0.4	-1.2	0.55	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L576	Ø	51.1	63.3	2.2	-0.1	1.22	11F	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS LC,	MANUAL CLAMP
L148	Ø	51.1	62.9	1.8	-0.4	0.65	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L599	Ø	51.2	66.1	4.5	1.4	1.12	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L393	+	51.3	66.7	5.0	1.6	1.09	11A	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS AB,	HYDRAULIC CLAMP
L294	Ø	51.4	59.4	-0.8	-2.7	1.13	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L107	Ø	51.7	64.1	3.2	-0.2	1.02	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L330	Ø	51.9	63.8	3.1	-0.6	1.13	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L570	+	52.0	61.5	1.3	-1.9	0.78	11A	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS AB,	HYDRAULIC CLAMP
L251	+	52.1	62.8	2.4	-1.3	1.08	11V	BURSTING	STRENGTH	40	TØ	85 PSI,	1" W, MANUAL CLAMP,	20C, 65% RH
L334	Ø	52.4	64.0	3.6	-0.9	0.90	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L218	Ø	52.7	65.9	5.3	-0.0	1.26	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L141	Ø	53.2	67.0	6.5	0.2	1.53	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L598	+	53.5	71.1	10.0	2.3	1.50	11A	BURSTING	STRENGTH	40	TØ	85 PSI,	MESSMER,	MANUAL CLAMP
L290	+	53.6	64.2	4.4	-1.7	0.76	11A	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS A,	MANUAL CLAMP
L242	+	53.6	66.2	6.1	-0.6	1.55	11F	BURSTING	STRENGTH	40	TØ	85 PSI,	1" W, MANUAL CLAMP	
L651	Ø	55.1	68.0	8.3	-0.7	0.69	11D	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS CA,	AIR CLAMP
L311	Ø	55.1	66.5	7.2	-1.6	1.77	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L394	+	55.1	71.9	13.6	-1.7	1.59	11A	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS AB,	HYDRAULIC CLAMP
L279	#	63.7	75.7	19.6	-3.3	1.67	11C	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS C,	MANUAL CLAMP
L593	+	65.7	74.1	19.4	-5.9	1.75	11J	BURSTING	STRENGTH	40	TØ	85 PSI,	PERKINS JUMBI,	HAND DRIVEN
L250L	+	4364.5	5350.5	6809.3	-472.4	70.01	11N	BURSTING	STRENGTH	40	TØ	85 PSI,	1/8" MARGY,	MANO CLAMP, 20C, 65% RH
GMEANS:		49.7	61.6			1.06								
95% ELLIPSE:				9.9	2.9									W/IN GAMMA = 54 DEGREES

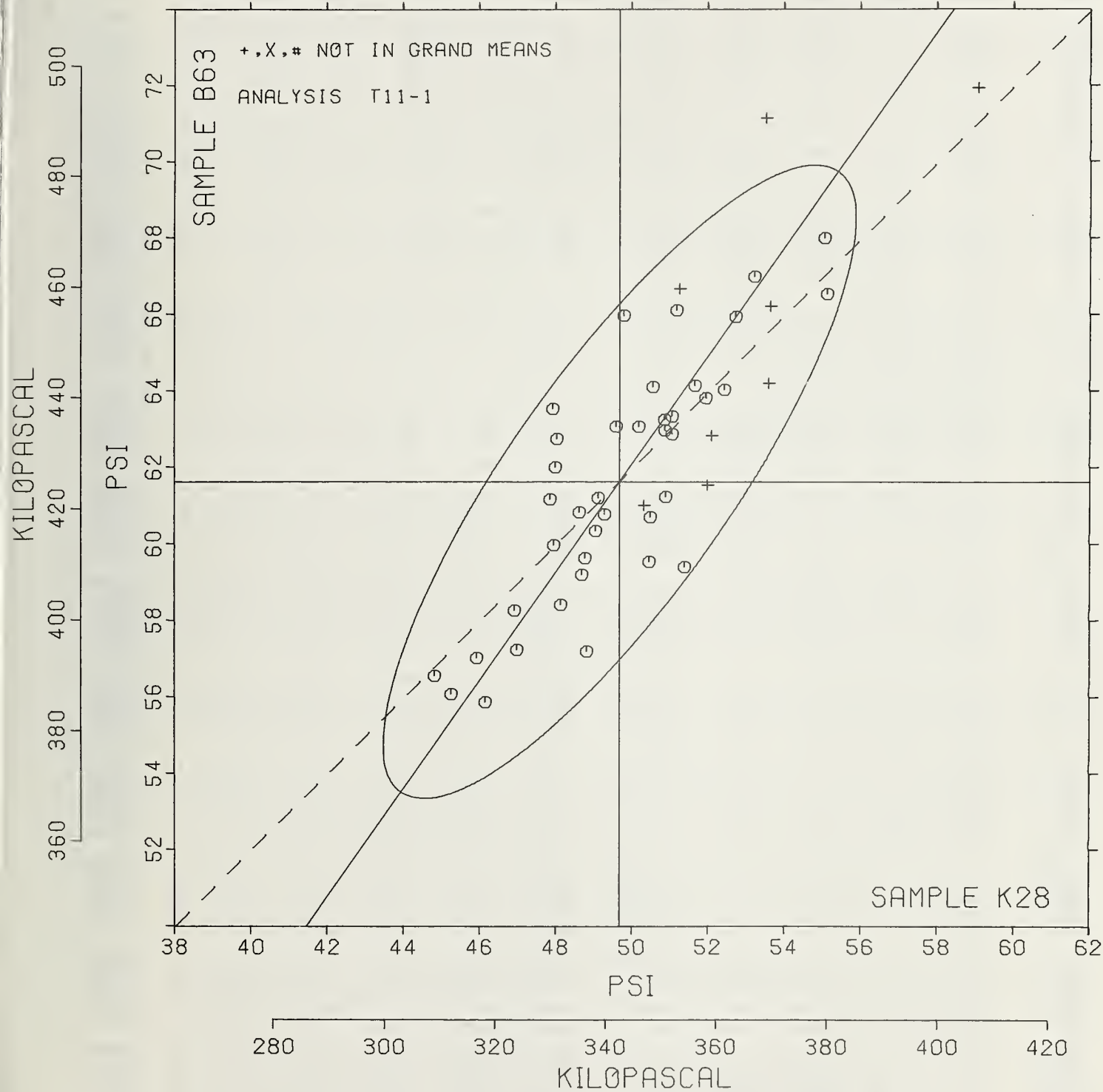
BURSTING STRENGTH, HIGH RANGE

SAMPLE K28 = 49.7 PSI

SAMPLE B63 = 61.6 PSI

SAMPLE K28 = 342 KILOPASCAL

SAMPLE B63 = 425 KILOPASCAL



ANALYSIS T15-1 TABLE 1
 TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS
 TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	SAMPLE G08 61 GRAMS PER SQUARE METER					SAMPLE E66 79 GRAMS PER SQUARE METER					TEST D ₀ = 15		
	MEAN	DEV	NO DEV	SDR	NO SDR	MEAN	DEV	NO DEV	SDR	NO SDR	VAK	F	LAB
L105	36.5	-2.4	-1.20	1.0	1.03	39.1	-1.0	-0.46	2.7	2.16	15T	0	L105
L107	37.6	-1.4	-0.71	1.0	1.00	35.7	-4.4	-2.00	2.0	1.58	15T	0	L107
L115	38.1	-0.9	-0.40	1.4	0.93	36.0	-4.2	-1.88	0.8	0.68	15C	0	L115
L118	37.8	-1.2	-0.00	1.3	0.85	38.6	-1.6	-0.71	0.6	0.51	15T	0	L118
L121	35.2	-3.8	-1.00	1.0	0.05	36.7	-3.5	-1.58	1.0	0.78	15T	0	L121
L124	39.2	0.2	0.13	0.9	0.61	40.6	0.4	0.20	0.8	0.66	15T	0	L124
L128	39.5	0.6	0.30	0.8	0.54	40.1	-0.1	-0.04	0.8	0.64	15T	0	L128
L134	39.9	1.0	0.1	1.1	0.71	42.2	2.0	0.93	1.3	1.01	15C	0	L134
L139	38.8	-0.2	-0.00	0.9	0.56	40.4	0.2	0.11	1.1	0.90	15T	0	L139
L141	39.7	0.7	0.37	2.0	1.26	39.3	-0.8	-0.37	1.3	1.08	15T	0	L141
L143	38.9	-2.1	-1.00	1.0	1.03	38.6	-1.6	-0.71	1.2	0.95	15T	0	L143
L148	38.9	-0.0	-0.01	1.0	1.18	39.7	-0.4	-0.19	0.7	0.56	15T	0	L148
L150	50.9	11.9	0.21	1.5	0.97	49.3	9.1	4.13	0.8	0.64	15T	0	L150
L153	38.2	-0.4	-0.39	1.1	0.74	39.7	-0.5	-0.22	1.5	1.23	15C	0	L153
L157	37.1	-1.8	-0.30	1.4	0.91	37.5	-2.7	-1.22	2.5	2.00	15T	0	L157
L158	41.9	2.9	1.02	2.4	1.58	39.6	-0.6	-0.25	1.7	1.38	15R	0	L158
L159	38.6	-0.4	-0.10	2.5	1.00	39.6	-0.4	-0.16	1.2	0.97	15L	0	L159
L162	37.2	-1.8	-0.34	1.1	0.74	38.1	-2.0	-0.92	0.9	0.73	15T	0	L162
L163	38.7	-0.3	-0.13	1.1	0.72	38.8	-1.4	-0.61	1.0	0.81	15T	0	L163
L166	39.8	0.8	0.44	0.9	0.61	39.5	-0.7	-0.31	0.9	0.73	15T	0	L166
L167	40.5	1.6	0.02	1.0	0.54	42.6	2.4	1.11	0.7	0.59	15C	0	L167
L170	32.7	-6.2	-3.24	0.8	0.52	35.5	-4.6	-2.09	0.9	0.73	15T	0	L170
L176	41.3	2.4	1.02	2.4	1.52	41.2	1.0	0.47	2.4	1.89	15T	0	L176
L182A	37.1	-1.9	-0.38	1.0	1.13	39.0	-1.2	-0.52	1.1	0.86	15A	0	L182A
L182T	41.3	2.4	1.02	2.2	1.44	42.3	2.2	0.99	1.6	1.31	15T	0	L182T
L183	37.8	-1.2	-0.00	1.0	0.65	37.3	-2.8	-1.28	0.6	0.49	15T	0	L183
L185	39.2	0.2	0.13	1.4	0.59	41.0	0.8	0.38	1.3	1.00	15T	0	L185
L189	37.5	-1.4	-0.74	0.9	0.59	39.7	-0.5	-0.22	0.9	0.72	15T	0	L189
L190C	39.1	0.1	0.00	2.0	1.03	40.7	0.6	0.26	1.4	1.11	15T	0	L190C
L190R	39.0	0.0	0.00	1.4	0.86	40.5	0.4	0.17	0.8	0.67	15C	0	L190R
L191	38.7	-2.3	-1.03	1.2	0.60	40.3	0.1	0.05	1.5	1.19	15T	0	L191
L194	42.2	3.2	1.00	0.9	0.51	43.6	3.4	1.54	1.2	0.98	15T	0	L194
L195	38.5	-0.5	-0.20	1.9	1.24	40.7	0.5	0.23	2.1	1.67	15C	0	L195
L206	39.7	0.8	0.41	1.5	0.96	41.3	1.1	0.50	1.2	0.93	15T	0	L206
L207	49.4	10.4	0.43	1.2	0.77	53.5	13.3	6.02	2.0	1.60	15R	0	L207
L211	39.7	0.0	0.41	1.0	0.63	40.3	0.2	0.08	0.8	0.65	15R	0	L211
L212	37.2	-1.8	-0.31	2.7	1.70	35.9	-4.3	-1.94	1.4	1.08	15T	0	L212
L213	38.8	-0.2	-0.00	1.0	0.90	43.1	2.9	1.32	1.3	1.02	15T	0	L213
L217	41.2	2.2	1.11	1.7	1.09	41.5	1.3	0.59	0.8	0.65	15Q	0	L217
L219	37.3	-1.0	-0.54	2.0	1.20	36.6	-3.4	-1.52	1.7	1.32	15L	0	L219
L223	39.4	0.0	0.20	1.2	0.77	40.3	0.1	0.04	0.6	0.48	15K	0	L223
L224	37.4	-1.6	-0.64	1.5	0.97	36.5	-1.6	-0.74	0.7	0.59	15T	0	L224
L225	40.2	1.2	0.00	1.1	0.74	44.2	4.0	1.83	1.0	0.81	15T	0	L225
L228	52.4	13.4	7.01	1.7	1.11	54.9	14.8	6.70	1.3	1.02	15T	0	L228
L233	39.0	0.0	0.03	1.3	0.61	39.6	-0.6	-0.25	1.2	0.99	15T	0	L233
L237A	37.1	-1.8	-0.30	1.2	0.60	40.0	-0.2	-0.07	0.8	0.68	15T	0	L237A
L237B	38.8	-0.2	-0.00	1.9	1.20	43.3	3.1	1.41	1.3	1.07	15T	0	L237B
L241	40.9	2.0	1.00	0.9	0.57	43.5	3.4	1.53	0.5	0.41	15T	0	L241
L242	40.3	1.3	0.70	1.0	1.05	40.7	0.6	0.25	1.8	1.46	15U	0	L242
L244	39.3	0.4	0.20	1.0	0.66	40.4	0.2	0.11	1.4	1.12	15C	0	L244
L248	38.6	-0.3	-0.17	1.0	0.99	41.3	1.1	0.51	0.8	0.61	15J	0	L248
L249	38.7	-2.3	-1.19	1.0	0.88	37.7	-2.5	-1.13	1.4	1.12	15T	0	L249
L254	39.3	0.4	0.20	1.4	0.93	40.1	-0.0	-0.01	1.6	1.28	15T	0	L254
L259	43.3	4.3	2.20	1.0	0.80	46.3	6.1	2.77	1.0	0.77	15T	0	L259
L261	37.3	-1.7	-0.80	0.9	0.57	38.5	-1.6	-0.74	0.9	0.73	15T	0	L261
L262	39.1	0.2	0.00	0.9	0.59	42.1	2.0	0.90	1.1	0.90	15T	0	L262
L264	38.9	-0.6	-0.01	2.4	1.03	37.1	-3.1	-1.40	1.8	1.46	15T	0	L264
L273	42.9	3.9	2.00	1.7	1.11	41.1	1.0	0.44	1.2	1.00	15T	0	L273
L275	39.0	0.0	0.00	1.0	0.90	42.1	2.0	0.90	1.2	1.00	15T	0	L275
L277	42.1	3.1	1.02	2.0	1.30	42.1	1.9	0.87	1.3	1.07	15T	0	L277
L278	40.4	1.4	0.70	1.4	0.67	41.6	1.4	0.65	1.5	1.24	15T	0	L278
L279	38.7	-0.3	-0.10	5.5	3.04	39.5	-0.7	-0.31	1.4	1.13	15T	0	L279
L280	38.1	-0.8	-0.40	1.1	0.73	39.9	-0.2	-0.10	1.0	0.83	15L	0	L280
L281	41.3	2.4	1.02	2.0	1.20	44.3	4.1	1.86	1.1	0.88	15T	0	L281
L285	40.8	7.8	4.00	3.0	1.94	36.8	-1.4	-0.61	3.3	2.62	15T	X	L285

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

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

LAB CODE	SAMPLE G08 MEAN					SAMPLE E86 MEAN					TEST D ₀ = 15				
	61 GRAMS PER SQUARE METER					79 GRAMS PER SQUARE METER					BOND				
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB		
L288	40.7	1.7	0.09	0.9	0.58	41.0	0.8	0.38	1.2	0.96	15T	0	L288		
L290	39.3	0.4	0.20	1.1	0.72	40.3	5.1	2.32	1.0	0.77	15T	*	L290		
L291	37.1	-1.0	-0.90	1.0	0.77	41.3	1.1	0.50	1.3	1.07	15A	0	L291		
L303	42.1	3.2	1.00	2.2	1.42	40.1	-0.1	-0.04	0.6	0.47	15L	0	L303		
L305	38.6	-0.4	-0.10	1.1	0.72	36.7	-1.5	-0.68	1.2	0.94	15T	0	L305		
L309	39.5	0.3	0.27	1.4	0.88	39.9	-0.3	-0.13	1.1	0.85	15T	0	L309		
L311	38.1	-0.8	-0.40	2.4	1.52	40.3	0.1	0.05	1.1	0.88	15T	0	L311		
L312	38.5	-0.4	-0.22	2.1	1.33	36.5	-3.6	-1.64	1.9	1.54	15T	0	L312		
L313	33.9	-3.1	-1.01	1.1	0.73	30.0	-4.2	-1.88	0.8	0.68	15L	0	L313		
L315	37.9	-1.1	-0.37	1.0	1.00	36.3	-1.8	-0.83	0.9	0.72	15T	0	L315		
L328	38.1	-0.8	-0.40	1.0	0.64	39.1	-1.0	-0.46	0.7	0.59	15T	0	L328		
L333	37.5	-1.4	-0.74	1.5	0.94	36.5	-1.7	-0.77	1.3	1.04	15T	0	L333		
L334	37.1	-1.9	-0.50	1.0	0.07	39.8	-0.4	-0.16	1.3	1.06	15T	0	L334		
L344	41.5	2.5	1.31	1.0	1.00	41.9	1.8	0.80	1.3	1.02	15C	0	L344		
L345	37.7	-1.3	-0.07	1.1	0.72	36.5	-1.7	-0.77	1.2	1.00	15T	0	L345		
L348	39.6	0.0	0.04	1.5	1.00	39.7	-0.4	-0.19	0.8	0.64	15T	0	L348		
L352	41.5	2.0	1.30	0.9	0.55	42.5	2.3	1.04	0.8	0.62	15C	0	L352		
L358	38.9	-0.0	-0.01	1.0	1.02	39.2	-0.9	-0.42	1.2	0.97	15T	0	L358		
L360	38.9	-0.1	-0.00	0.5	0.35	45.5	5.3	2.42	1.4	1.10	15T	*	L360		
L376	41.6	2.0	1.30	1.1	0.08	41.4	1.2	0.56	1.4	1.08	15T	0	L376		
L382	42.8	3.8	2.01	0.0	3.87	42.0	1.8	0.84	2.1	1.71	15T	0	L382		
L386	38.0	-1.0	-0.30	1.5	0.81	30.5	-1.7	-0.77	0.7	0.59	15T	0	L386		
L388	49.6	10.0	3.00	8.3	3.37	43.9	5.7	2.59	0.5	0.41	15T	#	L388		
L390	41.1	2.2	1.14	1.3	0.64	42.8	2.6	1.20	1.4	1.10	15T	0	L390		
L442	42.9	4.0	2.00	1.0	0.02	41.8	1.6	0.74	0.8	0.62	15R	0	L442		
L484	43.1	4.2	2.10	2.1	1.33	42.3	2.1	0.96	0.9	0.71	15T	0	L484		
L557	40.9	1.9	1.00	1.0	0.03	45.3	5.2	2.35	0.6	0.49	15T	0	L557		
L562	38.0	-1.0	-0.30	1.3	0.55	39.6	-0.6	-0.25	1.1	0.90	15T	0	L562		
L565	38.5	-0.5	-0.20	1.4	0.88	36.9	-1.2	-0.55	1.4	1.11	15T	0	L565		
L566	38.3	-0.7	-0.30	1.5	0.90	40.8	0.6	0.29	1.3	1.01	15T	0	L566		
L567	39.3	0.4	0.20	1.0	1.05	41.9	1.7	0.77	1.6	1.28	15C	0	L567		
L574	37.9	-1.0	-0.30	3.1	1.97	39.7	-0.5	-0.22	1.4	1.16	15T	0	L574		
L575	36.3	-2.0	-1.37	1.2	0.76	36.9	-1.2	-0.55	1.0	0.77	15L	0	L575		
L576	40.0	1.0	0.30	1.9	1.24	42.8	2.6	1.20	1.1	0.92	15T	0	L576		
L580	39.2	0.2	0.10	1.7	1.07	37.2	-3.0	-1.34	1.0	0.81	15T	0	L580		
L581	40.5	1.0	0.32	1.1	0.66	41.9	1.7	0.79	0.9	0.69	15Q	0	L581		
L587	38.3	-0.7	-0.30	1.3	0.63	39.7	-0.4	-0.19	1.5	1.19	15T	0	L587		
L597	40.3	1.3	0.09	1.0	1.18	39.6	-0.3	-0.13	1.9	1.54	15T	0	L597		
L599	37.6	-1.4	-0.71	1.1	0.60	40.3	0.2	0.08	2.1	1.70	15T	0	L599		
L600	41.3	2.3	1.21	0.9	0.57	41.6	1.6	0.74	2.0	1.58	15T	0	L600		
L604	36.3	-2.7	-1.40	1.5	0.90	36.7	-3.5	-1.58	1.0	0.78	15T	0	L604		
L606	41.3	2.4	1.24	1.0	0.00	43.4	3.2	1.47	1.3	1.04	15T	0	L606		
L610	36.3	-2.0	-1.37	1.2	0.80	40.2	0.0	0.02	0.9	0.75	15T	0	L610		
L618	36.4	-2.0	-1.33	4.5	2.94	41.9	1.7	0.77	1.8	1.41	15T	*	L618		
L622	50.8	11.8	0.10	2.9	1.00	52.4	12.2	5.55	1.4	1.08	15L	#	L622		
L626	42.2	3.2	1.07	1.2	0.80	39.5	-0.6	-0.28	1.1	0.85	15L	0	L626		
L651	30.8	-2.2	-1.12	1.7	1.07	37.1	-3.1	-1.40	1.8	1.46	15T	0	L651		
L652	39.5	0.5	0.27	2.0	1.05	40.5	0.4	0.17	1.9	1.54	15C	0	L652		
L654	39.7	0.8	0.44	0.8	0.52	40.9	0.8	0.35	1.5	1.19	15T	0	L654		
L670	37.1	-1.8	-0.30	1.7	1.09	36.1	-2.1	-0.95	1.3	1.02	15T	0	L670		
L676	37.6	-1.4	-0.71	1.7	1.11	37.5	-2.7	-1.22	1.2	0.95	15T	0	L676		
L680	38.9	-0.0	-0.01	2.0	1.28	36.0	-2.2	-0.98	1.3	1.05	15T	0	L680		
L684	30.9	-2.0	-1.00	1.7	1.08	30.4	-3.8	-1.70	3.0	2.43	15L	0	L684		
L685	54.8	15.8	8.00	1.0	0.00	57.5	17.3	7.84	1.2	0.95	15T	#	L685		
L692	37.2	-1.8	-0.91	1.1	0.70	41.5	1.4	0.62	1.3	1.04	15T	0	L692		
L696	34.4	-4.0	-2.07	1.4	0.67	36.3	-1.9	-0.86	1.0	0.83	15T	*	L696		
L697	38.0	-1.0	-0.30	1.9	1.21	40.7	0.5	0.22	0.8	0.68	15T	0	L697		
L698	40.6	1.0	0.00	1.9	1.22	40.7	0.6	0.26	1.1	0.88	15L	0	L698		
L704	42.9	3.9	2.04	2.4	1.58	NO DATA REPORTED FOR SAMPLE E86					15T	M	L704		

GR₀ MEAN = 39.0 GRAMS

SD MEANS = 1.9 GRAMS

AVERAGE SDR =

GR₀ MEAN = 382.0 MILLINEWTON

GRAND MEAN = 40.2 GRAMS

SD OF MEANS = 2.2 GRAMS

1.05 GRAMS

GRAND MEAN = 393.8 MILLINEWTON

TEST DETERMINATIONS = 15

116 LABS IN GRAND MEANS

AVERAGE SDR = 1.3 GRAMS

ANALYSIS T15-1 TABLE 1
 TENSILE STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS
 TAPPI TENTATIVE TEST METHOD T414 1S-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	SAMPLE G08 61 GRAMS PER SQUARE METER					SAMPLE E86 79 GRAMS PER SQUARE METER					TEST D ₀ = 15		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L131	45.1	6.1	3.21	1.7	1.09	45.9	3.7	1.70	1.0	.82	15W	+	L131
L226B	41.8	2.8	1.44	2.0	1.32	41.2	1.0	.47	1.2	.97	15V	+	L226B
L226C	33.1	-5.9	-3.07	1.0	.07	32.3	-7.9	-3.58	1.0	.83	15V	+	L226C
L250L	44.7	5.8	3.04	1.8	1.17	45.4	5.3	2.38	1.4	1.15	15H	+	L250L
L251	38.9	-0.1	-0.04	1.4	.91	39.7	-0.4	-0.19	1.5	1.19	15K	+	L251
L301A	38.0	-1.0	-0.39	1.5	.95	39.9	-0.3	-0.13	1.1	.90	15N	+	L301A
L326	41.0	2.0	1.07	2.5	1.60	39.9	-0.3	-0.13	1.5	1.20	15N	+	L326
L339	37.8	-1.2	-0.00	2.0	1.30	39.8	-0.4	-0.16	1.1	.92	15N	+	L339
L356	42.7	3.7	1.04	2.7	1.72	45.1	4.9	2.22	.8	.64	15N	+	L356
L585	42.0	3.0	1.04	1.8	1.16	40.6	.4	.19	1.0	.78	15E	+	L585
L705	60.5	21.6	11.25	5.4	3.50	50.9	10.8	4.88	4.1	3.30	15X	+	L705
TOTAL NUMBER OF LABORATORIES REPORTING = 135													

Best values: G08 39 \pm 3 grams
 E86 40 \pm 3 grams

The following laboratories were omitted from the grand means because of extreme test results: 150, 207, 228, 388, 622, 685.

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

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

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

LAB CODE	F	MEANS G08	E86	COORDINATES MAJOR	MINOR	AVG NO. SUM VAR	PROPERTY---	TEST	INSTRUMENT---	CONDITIONS
L170	*	32.7	35.5	-7.0	1.9	0.02	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L226C	*	33.1	32.3	-9.8	-0.4	0.75	15V	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF X 2
L696	*	34.4	38.3	-4.3	2.4	0.65	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L121	0	35.2	36.7	-5.1	0.7	0.72	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L313	0	35.9	36.0	-5.2	-0.2	0.70	15L	TEARING STRENGTH	35 T0	110G, LORENTZ-WETTRES
L604	0	36.3	36.7	-4.4	-0.1	0.07	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L610	0	36.3	40.2	-1.0	2.1	0.77	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L575	0	36.3	38.9	-2.0	1.3	0.70	15L	TEARING STRENGTH	35 T0	110G, LORENTZ-WETTRES
L618	*	36.4	41.9	-0.3	3.1	2.18	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L105	0	36.5	39.1	-2.3	1.2	1.09	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L249	0	36.7	37.7	-3.4	0.2	0.90	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L191	0	36.7	40.3	-1.3	1.8	0.99	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L651	0	36.8	37.1	-3.0	-0.3	1.07	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L143	0	36.9	38.6	-2.5	0.6	0.99	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L684	0	36.9	36.4	-4.2	-0.8	1.70	15L	TEARING STRENGTH	35 T0	110G, LORENTZ-WETTRES
L334	0	37.1	39.8	-1.5	1.2	0.06	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L182A	0	37.1	39.0	-2.1	0.7	0.99	15A	TEARING STRENGTH	35 T0	110G, APPITA
L157	0	37.1	37.5	-3.2	-0.3	1.46	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L670	0	37.1	38.1	-2.8	0.1	1.06	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L291	0	37.1	41.3	-0.3	2.1	0.92	15A	TEARING STRENGTH	35 T0	110G, APPITA
L237A	0	37.1	40.0	-1.3	1.3	0.74	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L692	0	37.2	41.5	-0.9	2.2	0.07	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L162	0	37.2	38.1	-2.7	0.1	0.74	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L212	0	37.2	35.9	-4.4	-1.3	1.42	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L261	0	37.3	38.5	-2.5	0.3	0.65	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L219	0	37.3	36.8	-3.0	-0.8	1.09	15L	TEARING STRENGTH	35 T0	110G, LORENTZ-WETTRES
L224	0	37.4	38.5	-2.2	0.2	0.78	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L333	0	37.5	38.5	-2.2	0.0	0.99	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L189	0	37.5	39.7	-1.3	0.8	0.66	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L107	0	37.6	35.7	-4.3	-1.7	1.09	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L676	0	37.6	37.5	-2.9	-0.0	1.03	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L599	0	37.6	40.3	-0.7	1.2	1.19	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L345	0	37.7	38.5	-2.1	-0.1	0.66	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L339	*	37.8	39.8	-1.0	0.7	1.11	15H	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF, NO CUT OUT
L118	0	37.8	38.6	-1.0	-0.1	0.66	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L183	0	37.8	37.3	-2.9	-0.9	0.07	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L315	0	37.9	38.3	-2.1	-0.3	0.09	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L574	0	37.9	39.7	-1.0	0.5	1.07	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L697	0	38.0	40.7	-0.2	1.1	0.94	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L301A	*	38.0	39.9	-0.6	0.0	0.92	15N	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF, NO CUT OUT
L562	0	38.0	39.6	-1.0	0.4	0.07	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L386	0	38.0	38.5	-1.0	-0.3	0.73	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L115	0	38.1	36.0	-3.8	-1.9	0.06	15C	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (W. AIR CLAMP)
L328	0	38.1	39.1	-1.3	-0.0	0.02	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L311	0	38.1	40.3	-0.4	0.7	1.00	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L280	0	38.1	39.9	-0.7	0.5	0.70	15L	TEARING STRENGTH	35 T0	110G, LORENTZ-WETTRES
L153	0	38.2	39.7	-0.9	0.3	0.99	15C	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (W. AIR CLAMP)
L587	0	38.3	39.7	-0.8	0.3	1.01	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L566	0	38.3	40.8	0.1	0.9	0.99	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L565	0	38.5	38.9	-1.3	-0.4	0.99	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L195	0	38.5	40.7	0.1	0.7	1.46	15C	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (W. AIR CLAMP)
L312	0	38.5	36.5	-3.1	-1.9	1.44	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L159	0	38.6	39.8	-0.5	0.1	1.00	15L	TEARING STRENGTH	35 T0	110G, LORENTZ-WETTRES
L305	0	38.6	38.7	-1.4	-0.7	0.03	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L248	0	38.6	41.3	0.7	1.0	0.66	15J	TEARING STRENGTH	35 T0	110G, LORENTZ-WETTRES
L163	0	38.7	38.8	-1.2	-0.6	0.76	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L279	0	38.7	39.5	-0.7	-0.2	2.33	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L139	0	38.8	40.4	0.1	0.3	0.73	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L213	0	38.8	43.1	2.2	1.9	0.99	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L237B	0	38.8	43.3	2.3	2.1	1.13	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L251	*	38.9	39.7	-0.4	-0.2	1.05	15A	TEARING STRENGTH	35 T0	110G, LORENTZ-WETTRES, 20 C. C. X RM
L360	*	38.9	45.5	4.1	3.4	0.72	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L680	0	38.9	38.0	-1.7	-1.3	1.10	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L148	0	38.9	39.7	-0.3	-0.3	0.07	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)
L264	0	38.9	37.1	-2.4	-1.9	1.00	15T	TEARING STRENGTH	35 T0	110G, THWING-ELMENDORF (SCALE T0 100)

ANALYSIS T15-1 TABLE 2
TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS
TAPPI TENTATIVE TEST METHOD T414 TS-05, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	F	MEANS		COORDINATES		AVE		PROPERTY--TEST INSTRUMENT--CONDITIONS											
		GCS	E86	MAJOR	MINOR	SD	VAR												
L358	0	38.9	39.2	-0.7	-0.0	1.000	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L190R	0	39.0	40.5	0.3	0.2	0.77	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W0AIR CLAMP)							
L275	0	39.0	42.1	1.0	1.2	0.97	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L233	0	39.0	39.6	-0.4	-0.4	0.90	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L190C	0	39.1	40.7	0.5	0.3	1.037	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L262	0	39.1	42.1	1.7	1.1	0.75	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L124	0	39.2	40.6	0.5	0.1	0.04	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L580	0	39.2	37.2	-2.1	-2.0	0.94	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L185	0	39.2	41.0	0.8	0.3	0.54	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L290	*	39.3	45.3	4.2	2.9	0.74	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L254	0	39.3	40.1	0.2	-0.3	1.011	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L567	0	39.3	41.9	1.0	0.8	1.017	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W0AIR CLAMP)							
L244	0	39.3	40.4	0.4	-0.1	0.90	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W0AIR CLAMP)							
L223	0	39.4	40.3	0.4	-0.3	0.02	15K	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, DIGITAL READOUT							
L309	0	39.5	39.9	0.1	-0.0	0.00	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L652	0	39.5	40.5	0.0	-0.2	1.000	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W0AIR CLAMP)							
L128	0	39.5	40.1	0.3	-0.5	0.09	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L348	0	39.6	39.7	0.1	-0.8	0.02	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L141	0	39.7	39.3	-0.2	-1.1	1.017	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L206	0	39.7	41.3	1.4	0.1	0.95	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L211	0	39.7	40.3	0.0	-0.5	0.74	15K	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, DIGITAL READOUT							
L654	0	39.7	40.9	1.1	-0.1	0.05	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L166	0	39.8	39.5	-0.0	-1.1	0.07	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L134	0	39.9	42.2	2.2	0.5	0.00	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W0AIR CLAMP)							
L576	0	40.0	42.8	2.7	0.8	1.008	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L225	0	40.2	44.2	3.9	1.0	0.70	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L597	0	40.3	39.9	0.0	-1.2	1.000	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L242	0	40.3	40.7	1.0	-0.7	1.000	15U	TEARING	STRENGTH	35	T0	110G, AUSTRALIAN OPT. CO.							
L278	0	40.4	41.6	2.0	-0.2	1.000	15A	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L581	0	40.5	41.9	2.0	-0.1	0.09	15U	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, AIR CLAMP, DIGIT							
L167	0	40.5	42.6	2.9	0.3	0.01	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W0AIR CLAMP)							
L698	0	40.0	40.7	1.0	-0.9	1.005	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETIRES							
L288	0	40.7	41.0	1.7	-0.8	0.77	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L557	0	40.9	45.3	5.2	1.8	0.90	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L241	0	40.9	43.5	3.9	0.0	0.49	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L326	*	41.0	39.9	1.1	-1.8	1.040	15N	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, NO CUT OUT							
L390	0	41.1	42.8	3.4	-0.0	0.97	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L217	0	41.2	41.5	2.4	-0.9	0.07	15U	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, AIR CLAMP, DIGIT							
L600	0	41.3	41.8	2.7	-0.8	1.007	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L176	0	41.3	41.2	2.0	-1.2	1.071	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L281	0	41.3	44.3	4.7	0.7	1.007	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L182T	0	41.3	42.3	3.2	-0.5	1.007	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L606	0	41.3	43.4	4.0	0.2	0.00	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L344	0	41.5	41.9	3.0	-0.8	1.001	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W0AIR CLAMP)							
L352	0	41.5	42.5	3.4	-0.0	0.00	15C	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (W0AIR CLAMP)							
L376	0	41.6	41.4	2.0	-1.3	0.06	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L226B	*	41.8	41.2	2.0	-1.0	1.014	15V	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF X 2							
L158	0	41.9	39.6	1.4	-2.0	1.048	15K	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, DIGITAL READOUT							
L585	*	42.0	40.6	2.2	-2.1	0.97	15B	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, AMBIENT COND.							
L277	0	42.1	42.1	3.4	-1.2	1.018	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L303	0	42.1	40.1	1.9	-2.5	0.95	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETIRES							
L626	0	42.2	39.5	1.0	-2.9	0.03	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETIRES							
L194	0	42.2	43.6	4.7	-0.4	0.79	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L356	*	42.7	45.1	0.2	0.2	1.010	15N	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, NO CUT OUT							
L382	0	42.8	42.0	3.8	-1.8	2.079	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L273	0	42.9	41.1	3.2	-2.4	1.006	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L704	M	42.9				1.003	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L442	0	42.9	41.8	3.0	-2.1	0.02	15K	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, DIGITAL READOUT							
L484	0	43.1	42.3	4.3	-1.9	1.002	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L259	*	43.3	46.3	7.0	0.5	0.02	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L250L	*	44.7	45.4	7.7	-1.2	1.010	15H	TEARING	STRENGTH	35	T0	110G, IHOMARGY, 20 C, 65% FH							
L131	*	45.1	43.9	0.8	-2.4	0.90	15W	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF X .5							
L285	X	46.8	38.8	3.9	-7.0	2.026	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L207	#	49.4	53.5	10.9	0.2	1.018	15R	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF, DIGITAL READOUT							
L388	#	49.6	45.9	11.1	-4.7	2.009	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L622	#	50.8	52.4	17.0	-1.6	1.047	15L	TEARING	STRENGTH	35	T0	110G, LORENTZ-WETIRES							
L150	#	50.9	49.3	14.0	-3.0	0.01	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L200	"	51.4	51.0	19.0	-1.2	1.007	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L201	"	54.0	57.0	23.4	-1.5	0.00	15T	TEARING	STRENGTH	35	T0	110G, THWING-ELMENDORF (SCALE T0 100)							
L705	*	60.5	50.9	21.9	-10.1	3.040	15A	TEARING	STRENGTH	35	T0	110G: GIVE INSTRUMENT MAKE, MODEL							
GMEANS:		39.0	40.2			1.000													
		55% ELLIPSE:		0.6	3.0							WITH GAMMA = 51 DEGREES							

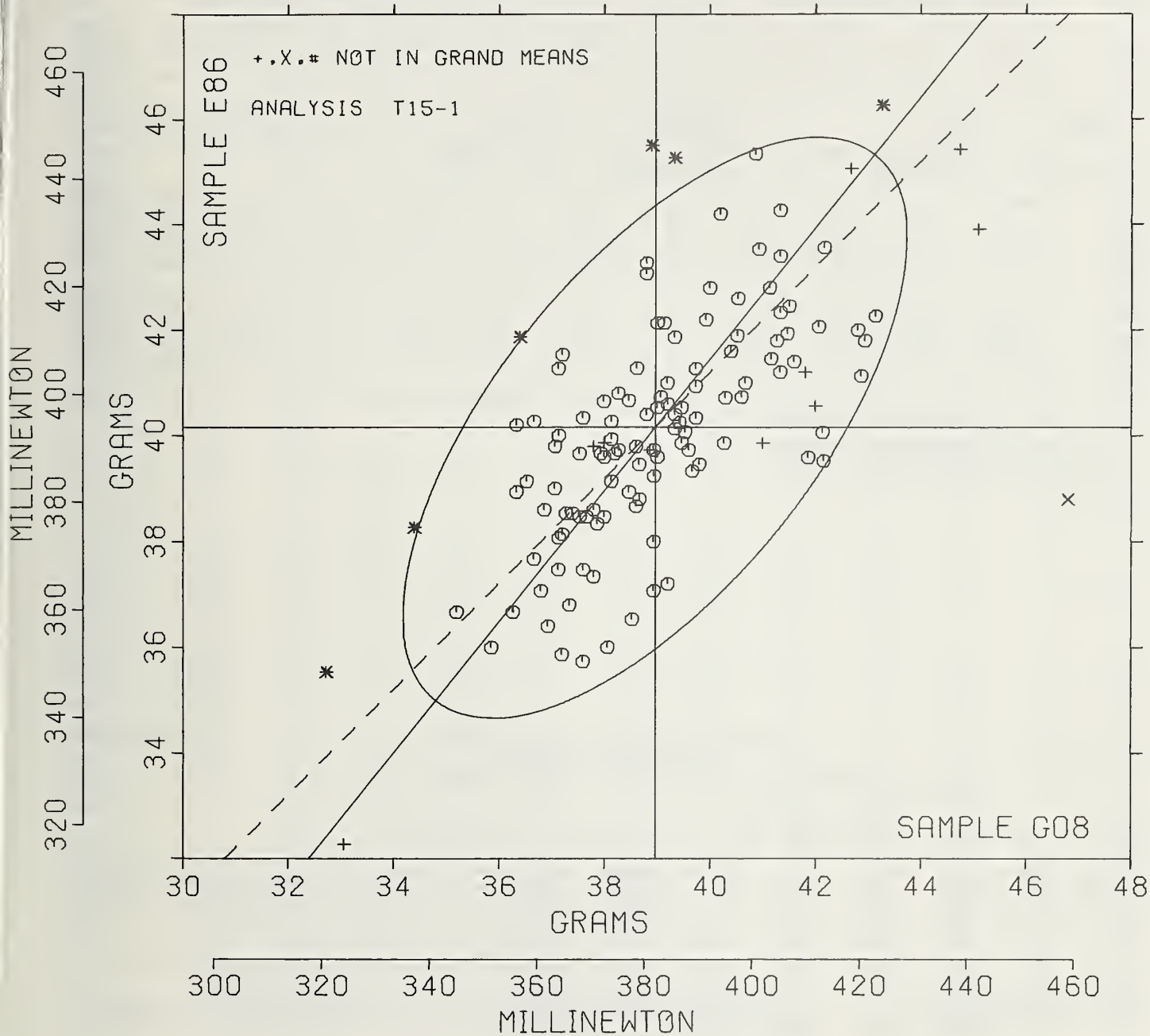
TEARING STRENGTH, PRINTING PAPERS

SAMPLE G08 = 39.0 GRAMS

SAMPLE E86 = 40.2 GRAMS

SAMPLE G08 = 382 MILLINEWTON

SAMPLE E86 = 394 MILLINEWTON



ANALYSIS T16-1 TABLE 1
 TEARING STRENGTH, GRAMS - PRIMARILY PACKAGING PAPERS
 TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	SAMPLE K36		SPECIAL 105 GRAMS PER SQUARE METER				SAMPLE B63		KRAFT 124 GRAMS PER SQUARE METER				TEST D ₀ = 15		
	MEAN	DEV	NO. DEV	SDR	NO. SDR		MEAN	DEV	NO. DEV	SDR	NO. SDR	VAR	F	LAB	
L151	118.0	1.9	0.32	3.3	0.76		125.6	-6.5	-1.09	5.6	1.00	16C	6	L151	
L248	110.8	0.7	0.20	4.0	0.94		139.3	7.1	1.20	4.0	0.72	16J	6	L248	
L324	110.8	-5.3	-1.40	3.3	0.70		129.2	-2.9	-0.49	5.5	0.98	16T	6	L324	
L554	118.8	2.7	0.74	6.0	1.54		134.4	2.3	0.38	7.4	1.31	16C	6	L554	
GR ₀ MEAN = 118.1 GRAMS						GRAND MEAN = 132.1 GRAMS						TEST DETERMINATIONS = 15			
SD MEANS = 3.6 GRAMS						SD OF MEANS = 6.0 GRAMS						4 LABS IN GRAND MEANS			
AVERAGE SDR = 4.3 GRAMS						AVERAGE SDR = 5.6 GRAMS									
GR ₀ MEAN = 1138.6 MILLINEWTON						GRAND MEAN = 1295.6 MILLINEWTON									
L106	109.9	-6.2	-1.72	2.0	0.59		58.9	-73.2	-12.24	1.7	0.30	16N	+	L106	
L148	117.3	1.2	0.34	3.0	0.84		131.7	-0.4	-0.06	3.8	0.68	16N	+	L148	
L231	112.2	-3.9	-1.00	4.1	0.95		132.1	0.0	0.00	5.4	0.96	16N	+	L231	
L234	121.2	5.1	1.40	3.0	0.87		144.5	12.4	2.08	4.2	0.75	16N	+	L234	
L267	141.5	25.4	6.59	5.9	1.37		166.0	33.9	5.67	5.7	1.01	16N	+	L267	
L269	117.3	1.2	0.34	0.0	1.58		127.1	-5.0	-0.84	5.5	0.99	16N	+	L269	
L301B	109.3	-6.0	-1.00	3.0	0.87		120.4	-5.7	-0.96	6.0	1.07	16N	+	L301B	
L308	128.0	11.9	3.20	3.7	0.85		139.1	7.0	1.16	3.3	0.58	16N	+	L308	
L341	160.0	43.9	12.00	3.3	0.77		186.8	56.7	9.48	5.6	1.00	16N	+	L341	
L366	111.7	-4.4	-1.20	4.2	0.98		120.5	-5.6	-0.93	9.8	1.74	16V	+	L366	
L393	104.7	-11.4	-3.10	4.1	0.96		121.1	-11.0	-1.85	4.9	0.87	16N	+	L393	
TOTAL NUMBER OF LABORATORIES REPORTING = 15															

Data from the following laboratories appeared to be off by a multiplicative factor: 336.
 Code 16V was assigned temporarily to put in a factor of 2.

ANALYSIS T16-1 TABLE 2
 TEARING STRENGTH, GRAMS - PRIMARILY PACKAGING PAPERS
 TAPPI TENTATIVE TEST METHOD T414 TS-65, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY--TEST INSTRUMENT--CONDITIONS									
		K36	B63	MAJOR	MINOR	COORD	VAR										
L393	+	104.7	121.1	-13.1	9.0	0.91	10N	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF,	NO CUT OUT				
L301B	+	109.3	126.4	-7.0	5.6	0.57	10N	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF,	NO CUT OUT				
L106	+	109.9	58.9	-73.0	-6.5	0.43	16N	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF,	NO CUT OUT				
L324	6	110.8	129.2	-3.9	4.6	0.67	10T	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF (SCALE TO 100)					
L366	+	111.7	126.5	-0.3	3.2	1.00	16V	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF X 2					
L231	+	112.2	132.1	-0.0	3.8	0.95	10N	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF,	NO CUT OUT				
L248	6	116.8	139.3	7.1	0.7	0.63	16J	TEARING	STRENGTH	60	T6	150G, LORENTZ-WETTES					
L148	+	117.3	131.7	-0.1	-1.3	0.70	10N	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF,	NO CUT OUT				
L269	+	117.3	127.1	-4.7	-2.2	1.20	16N	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF,	NO CUT OUT				
L151	6	118.0	125.6	-6.0	-3.2	0.66	16C	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF (W. AIR CLAMP)					
L554	6	118.8	134.4	2.8	-2.2	1.42	16C	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF (W. AIR CLAMP)					
L234	+	121.2	144.5	13.2	-2.5	0.61	16N	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF,	NO CUT OUT				
L308	+	128.0	139.1	9.2	-10.3	0.72	16N	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF,	NO CUT OUT				
L267	+	141.5	166.0	38.3	-18.1	1.15	16N	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF,	NO CUT OUT				
L341	+	160.0	186.8	64.3	-31.7	0.88	10N	TEARING	STRENGTH	60	T6	150G, THWING-ELMENDORF,	NO CUT OUT				
GMEANS:		116.1	132.1			1.00											
		95% ELLIPSE:		40.1	20.5	WITH GAMMA = 78 DEGREES											

ANALYSIS T19-1 TABLE 1
TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PACKAGING PAPERS
TAPPI OFFICIAL TEST METHODS T404 GS-70 AND T494 GS-70, PENDULUM AND CRE TYPES

LAB CODE	SAMPLE K34 123 GRAMS PER SQUARE METER					SAMPLE J02 98 GRAMS PER SQUARE METER					TEST D ₀ = 20		
	MEAN	DEV	N ₀ DEV	SDR	±0 SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L106	9.44	0.14	0.33	0.33	0.88	5.68	0.03	0.08	0.25	1.15	19A	0	L106
L107	9.95	0.41	1.34	0.53	1.54	5.98	0.32	1.02	0.36	1.66	19A	0	L107
L151	9.45	0.10	0.33	0.77	1.27	5.25	0.40	1.26	0.18	0.84	19A	0	L151
L157A	9.63	0.08	0.20	0.59	0.97	5.95	0.29	0.92	0.19	0.85	19P	0	L157A
L157I	9.03	0.52	1.72	0.43	0.71	5.47	0.19	0.59	0.26	1.19	19A	0	L157I
L167	61.19	51.65	174.24	2.00	4.40	30.02	29.37	92.09	1.21	5.48	19G	#	L167
L182I	9.42	0.13	0.43	0.55	0.91	5.40	0.19	0.61	0.19	0.87	19D	0	L182I
L182L	9.48	0.07	0.22	0.47	0.78	5.57	0.08	0.26	0.21	0.94	19T	0	L182L
L207	9.60	0.05	0.17	0.62	1.03	5.52	0.13	0.41	0.21	0.94	19A	0	L207
L217A	9.71	0.10	0.33	0.50	0.92	5.68	0.03	0.09	0.13	0.61	19A	0	L217A
L217P	9.40	0.15	0.39	0.59	0.97	5.45	0.20	0.63	0.20	0.92	19P	0	L217P
L219	10.21	0.60	2.00	0.51	0.84	6.66	0.40	1.26	0.18	0.84	19E	0	L219
L225	9.95	0.40	1.31	0.59	0.58	6.08	0.42	1.32	0.18	0.82	19P	0	L225
L237A	9.46	0.09	0.29	0.47	0.77	6.24	0.59	1.85	0.23	1.04	19Q	*	L237A
L237B	9.48	0.07	0.22	0.70	1.10	5.72	0.07	0.22	0.28	1.27	19A	0	L237B
L264A	9.30	0.25	0.84	0.57	0.95	5.75	0.09	0.30	0.14	0.65	19A	0	L264A
L264P	9.62	0.07	0.23	0.53	0.87	6.12	0.47	1.47	0.22	0.99	19P	0	L264P
L265	9.46	0.09	0.31	0.48	0.79	5.70	0.04	0.14	0.24	1.07	19A	0	L265
L267	9.06	0.49	1.62	0.81	1.02	5.08	0.57	1.80	0.14	0.63	19A	0	L267
L273	9.66	0.11	0.37	0.67	1.10	5.73	0.08	0.25	0.26	1.17	19P	0	L273
L278	9.59	0.04	0.13	0.69	0.99	5.75	0.09	0.28	0.17	0.76	19A	0	L278
L280	9.03	0.52	1.72	0.57	0.94	5.17	0.48	1.51	0.49	2.21	19G	0	L280
L281	9.72	0.17	0.37	0.60	1.09	5.71	0.05	0.17	0.13	0.61	19G	0	L281
L305	9.51	0.04	0.12	0.22	0.36	5.91	0.26	0.81	0.20	0.90	19P	0	L305
L312	9.50	0.05	0.10	0.73	1.20	5.79	0.13	0.41	0.18	0.84	19D	0	L312
L318	8.78	0.77	2.34	0.43	0.71	4.95	0.71	2.22	0.21	0.95	19G	*	L318
L324	9.82	0.27	0.91	0.47	0.78	5.54	0.12	0.37	0.26	1.19	19A	0	L324
L334	10.07	0.52	1.73	0.47	0.78	5.97	0.32	1.00	0.20	0.93	19P	0	L334
L348	9.21	0.34	1.11	0.50	0.92	5.59	0.07	0.21	0.16	0.73	19P	0	L348
L356	9.71	0.16	0.32	0.82	1.35	5.42	0.24	0.74	0.24	1.10	19P	0	L356
L554	9.89	0.34	1.13	0.83	1.04	6.45	0.40	1.25	0.24	1.11	19P	0	L554
L562	9.82	0.27	0.91	1.80	2.97	5.78	0.12	0.39	0.29	1.34	19P	0	L562
L565	9.44	0.11	0.33	0.42	0.70	6.22	0.56	1.76	0.16	0.72	19T	*	L565
L568	8.21	1.34	4.43	0.85	1.07	5.20	0.45	1.43	0.23	1.04	19P	#	L568
L575	9.52	0.03	0.10	0.47	0.78	5.66	0.01	0.02	0.17	0.79	19G	0	L575
L576	9.56	0.01	0.02	0.54	0.90	5.74	0.09	0.28	0.16	0.75	19A	0	L576
L580	9.77	0.22	0.73	0.57	0.93	5.89	0.24	0.74	0.17	0.75	19G	0	L580
L581	9.51	0.04	0.12	0.50	0.92	5.44	0.22	0.68	0.17	0.75	19A	0	L581
L604	9.03	0.52	1.74	0.71	1.18	4.72	0.93	2.92	0.44	1.99	19A	*	L604
L606	9.09	0.14	0.47	0.33	0.54	5.66	0.00	0.00	0.20	0.93	19P	0	L606
L610	9.36	0.19	0.63	0.51	0.84	5.56	0.10	0.30	0.14	0.63	19A	0	L610
L650	9.34	0.20	0.66	0.75	1.23	5.45	0.20	0.64	0.39	1.76	19G	0	L650
L652	9.65	0.10	0.33	0.54	0.90	5.77	0.11	0.35	0.24	1.10	19A	0	L652
L662	10.93	1.38	4.57	0.57	0.95	6.32	0.67	2.10	0.29	1.32	19A	#	L662
L676	10.20	0.65	2.13	1.13	1.90	5.67	0.01	0.04	0.50	2.25	19A	*	L676
L684	9.50	0.05	0.10	0.71	1.17	5.49	0.17	0.52	0.35	1.58	19W	0	L684
L689	9.63	0.08	0.27	0.41	0.67	5.42	0.24	0.74	0.18	0.84	19A	0	L689

GR₀ MEAN = 9.55 KILONEWTON/M GRAND MEAN = 5.65 KILONEWTON/M TEST DETERMINATIONS = 20
SD MEANS = 0.30 KILONEWTON/M SD OF MEANS = 0.32 KILONEWTON/M 44 LABS IN GRAND MEANS
AVERAGE SDR = 0.61 KILONEWTON/M AVERAGE SDR = 0.22 KILONEWTON/M
GR₀ MEAN = 54.54 LB/INCH GRAND MEAN = 32.30 LB/INCH

L250I 8.76 0.79 2.30 0.24 0.40 4.86 0.80 2.50 0.11 0.50 19L * L250I
L251 8.08 1.47 4.00 0.74 1.22 4.50 1.10 3.45 0.28 1.28 19I * L251

TOTAL NUMBER OF LABORATORIES REPORTING = 49

Best values: K34 9.5 ± 0.5 kilonewton per meter
J02 5.6 ± 0.5 kilonewton per meter

The following laboratories were omitted from the grand means because of extreme test results: 568, 662.

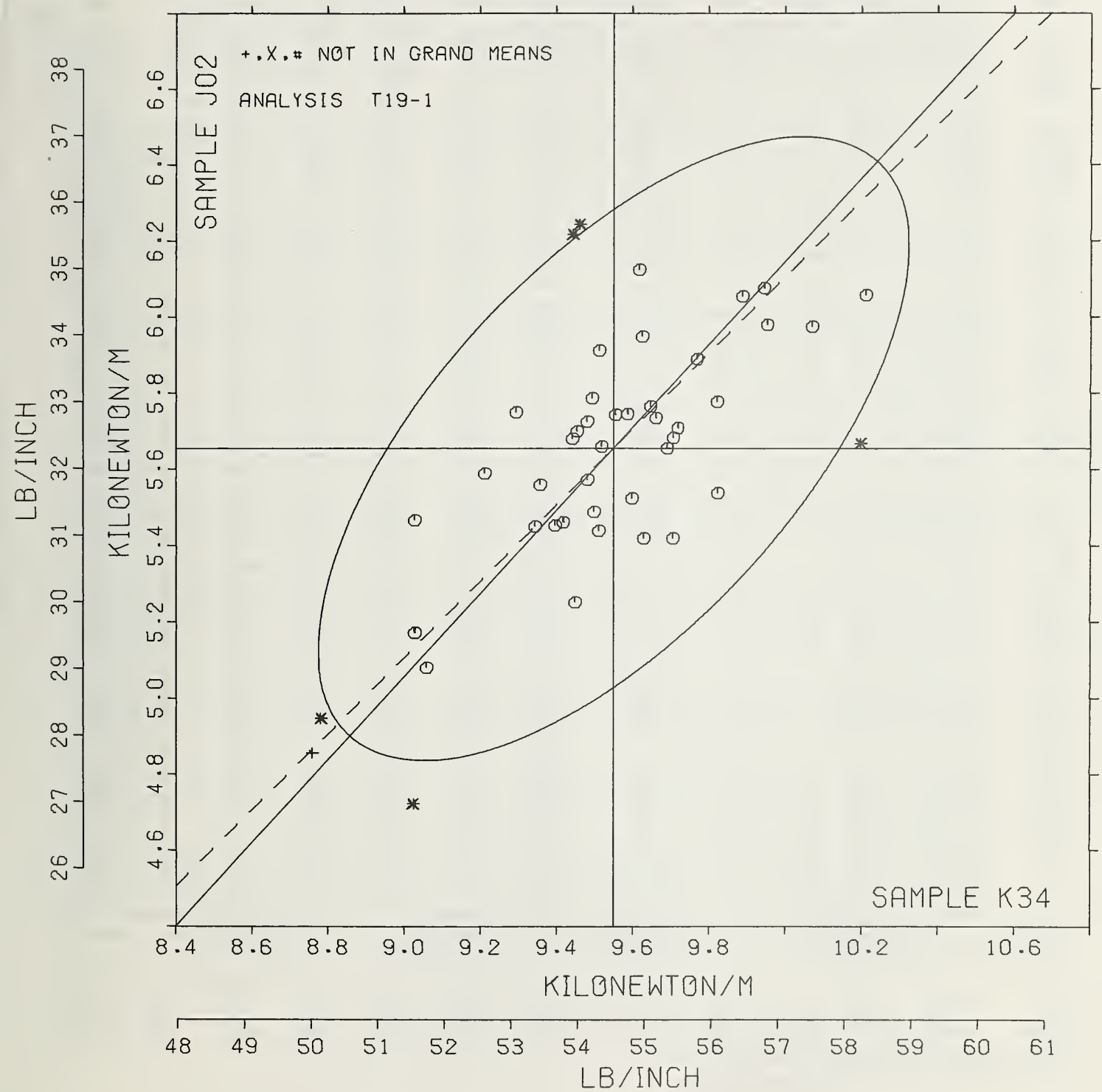
Data from the following laboratories appear to be off by a multiplicative factor: 167.

ANALYSIS T19-1 TABLE 2
TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PACKAGING PAPERS
TAPPI OFFICIAL TEST METHODS T404 GS-76 AND T494 GS-70, PENDULUM AND CRE TYPES

LAB CODE	F	MEANS		COORDINATES		AVG R _{0.50} VAR	PROPERTY---	TEST	INSTRUMENT---	CONDITIONS
		K34	J02	MAJOR	MINOR					
L251	*	8.06	4.56	-1.30	.34	1.45	191	TENSILE STRENGTH,	31 T6 74	LB/IN, CRE, 20C, 65% RH
L568	#	8.21	5.20	-1.24	.68	1.05	191	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L2501	*	8.76	4.86	-1.12	.04	.45	191	TENSILE STRENGTH,	31 T6 74	LB/IN, CRE, 20 C, 65% RH
L318	*	8.78	4.95	-1.04	.09	.63	190	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L604	*	9.03	4.72	-1.04	-.24	1.59	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L1571	Ø	9.03	5.47	-.49	.26	.95	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L260	Ø	9.03	5.17	-.71	.06	1.53	190	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L267	Ø	9.06	5.08	-.75	-.03	.62	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L348	Ø	9.21	5.59	-.20	.20	.63	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L264A	Ø	9.30	5.75	-.10	.25	.60	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L650	Ø	9.34	5.45	-.29	.01	1.50	190	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L610	Ø	9.36	5.56	-.20	.08	.73	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L217F	Ø	9.40	5.45	-.20	-.02	.95	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L1821	Ø	9.42	5.46	-.23	-.04	.09	190	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L106	Ø	9.44	5.68	-.05	.10	1.01	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L565	*	9.44	6.22	.34	.46	.71	191	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L151	Ø	9.45	5.25	-.30	-.20	1.05	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L265	Ø	9.46	5.70	-.03	.10	.93	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L237A	*	9.46	6.24	.38	.46	.90	190	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L237B	Ø	9.48	5.72	.01	.10	1.21	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L1821	Ø	9.48	5.57	-.11	-.01	.66	19T	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L312	Ø	9.50	5.75	.00	.13	1.02	190	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L684	Ø	9.50	5.49	-.16	-.08	1.37	19W	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L581	Ø	9.51	5.44	-.16	-.12	.64	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L305	Ø	9.51	5.91	.17	.20	.63	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L575	Ø	9.52	5.66	-.02	.02	.76	190	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L576	Ø	9.56	5.74	.07	.05	.62	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L278	Ø	9.59	5.75	.09	.03	.66	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L207	Ø	9.60	5.52	-.06	-.13	.98	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L264P	Ø	9.62	6.12	.39	.27	.55	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L157A	Ø	9.63	5.95	.27	.14	.91	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L689	Ø	9.63	5.42	-.12	-.22	.75	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L652	Ø	9.65	5.77	.15	.00	1.00	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L273	Ø	9.66	5.73	.15	-.03	1.14	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L606	Ø	9.69	5.66	.10	-.10	.73	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L356	Ø	9.71	5.42	-.07	-.28	1.23	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L217A	Ø	9.71	5.68	.13	-.10	.77	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L281	Ø	9.72	5.71	.16	-.09	.65	190	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L580	Ø	9.77	5.89	.32	-.00	.64	190	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L562	Ø	9.82	5.78	.26	-.12	2.15	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L324	Ø	9.82	5.54	.10	-.28	.59	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L554	Ø	9.89	6.05	.32	.02	1.07	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L225	Ø	9.95	6.08	.36	-.01	.90	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L107	Ø	9.95	5.98	.51	-.08	1.60	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L334	Ø	10.07	5.97	.59	-.17	.66	19P	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L676	*	10.20	5.67	.45	-.47	2.68	19A	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L219	Ø	10.21	6.06	.74	-.22	.64	19E	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
L662	#	10.93	6.32	1.42	-.57	1.14	190	TENSILE STRENGTH,	31 T6 74	LB/IN, PENDULUM TESTER
L167	#	61.19	35.02	56.55	-18.22	4.54	190	TENSILE STRENGTH,	31 T6 74	LB/IN, LOAD CELL (CRE)
GMEANS:		9.55	5.65			1.00				
55% ELLIPSE:				1.02	.48					WITH GAMMA = 47 DEGREES

TENSILE STRENGTH, PACKAGING PAPERS

SAMPLE K34 = 9.55 KILONEWTN/M SAMPLE J02 = 5.65 KILONEWTN/M
 SAMPLE K34 = 54.5 LB/INCH SAMPLE J02 = 32.3 LB/INCH



ANALYSIS T20-1 TABLE 1
TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS
TAPPI OFFICIAL TEST METHOD T494 GS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	G08 61 GRAMS PER SQUARE METER					J72 76 GRAMS PER SQUARE METER					TEST D ₀ = 2"		
	MEAN	DEV	NO DEV	SDR	R ₀ SDR	MEAN	DEV	NO DEV	SDR	R ₀ SDR	VAR	F	LAB
L105	3.118	0.101	0.000	0.158	1.012	3.342	0.285	1.037	0.232	1.051	20A	0	L105
L115	3.350	0.131	0.000	0.090	0.66	4.013	0.387	1.087	0.093	0.60	20D	0	L115
L118	3.229	0.100	0.000	0.100	0.75	3.725	0.099	0.48	0.084	0.55	20A	0	L118
L124C	3.070	0.149	0.077	0.157	1.012	3.515	0.112	0.54	0.171	1.011	20A	0	L124C
L125	3.264	0.045	0.000	0.221	1.050	3.607	0.180	0.87	0.166	1.008	20C	0	L125
L131	3.215	0.004	0.000	0.101	1.014	3.555	0.031	0.15	0.215	1.040	20E	0	L131
L141T	3.272	0.053	0.000	0.180	1.033	3.721	0.094	0.45	0.145	0.94	20A	0	L141T
L143	3.530	0.311	1.001	0.134	0.95	3.914	0.287	1.039	0.177	1.015	20E	0	L143
L148	3.302	0.083	0.000	0.107	0.76	3.787	0.160	0.77	0.182	1.018	20A	0	L148
L159	3.300	0.081	0.000	0.142	1.001	3.667	0.041	0.20	0.129	0.84	20A	0	L159
L163	3.286	0.067	0.000	0.141	1.000	3.777	0.156	0.73	0.100	0.65	20D	0	L163
L167	3.770	0.551	2.000	0.163	1.015	4.070	0.443	2.014	0.103	0.67	20G	*	L167
L176	2.946	0.273	1.041	0.203	1.067	3.255	0.371	1.079	0.269	1.075	20G	0	L176
L185	3.368	0.149	0.077	0.128	0.91	3.792	0.166	0.80	0.127	0.82	20C	0	L185
L190R	3.133	0.080	0.000	0.100	1.013	3.233	0.393	1.090	0.181	1.017	20A	0	L190R
L194	3.118	0.101	0.000	0.090	0.65	3.519	0.108	0.52	0.147	0.95	20A	0	L194
L211	2.636	0.583	3.000	0.318	2.026	3.116	0.510	2.046	0.407	2.064	20C	*	L211
L223B	3.215	0.004	0.000	0.119	0.85	3.746	0.120	0.58	0.125	0.81	20A	0	L223B
L226C	3.345	0.120	0.000	0.130	0.92	3.345	0.282	1.036	0.253	1.064	20C	*	L226C
L230	3.023	0.190	1.000	0.097	0.09	3.521	0.106	0.51	0.105	0.68	20E	0	L230
L260	3.037	0.182	0.000	0.101	0.71	3.379	0.248	1.020	0.195	1.026	20A	0	L260
L261	3.560	0.341	1.070	0.109	0.77	4.033	0.406	1.096	0.277	1.080	20A	0	L261
L291	2.959	0.260	1.000	0.202	1.043	3.518	0.109	0.53	0.169	1.010	20A	0	L291
L309	3.325	0.106	0.000	0.113	0.80	3.750	0.123	0.59	0.165	1.007	20E	0	L309
L315	3.135	0.084	0.000	0.150	1.007	3.566	0.041	0.20	0.159	1.003	20A	0	L315
L318	2.910	0.300	1.000	0.090	0.04	3.426	0.201	0.97	0.075	0.48	20G	0	L318
L325	3.109	0.110	0.000	0.151	1.007	3.697	0.071	0.34	0.117	0.76	20E	0	L325
L328	3.370	0.151	0.000	0.101	0.71	3.780	0.153	0.74	0.127	0.82	20A	0	L328
L333	3.295	0.070	0.000	0.119	0.84	3.664	0.057	0.28	0.211	1.037	20A	0	L333
L344	3.121	0.098	0.000	0.240	1.074	3.646	0.020	0.10	0.323	2.010	20A	0	L344
L356	3.196	0.023	0.000	0.124	0.88	3.637	0.010	0.05	0.168	1.009	20A	0	L356
L360	3.108	0.111	0.000	0.100	0.74	3.474	0.153	0.74	0.144	0.93	20B	0	L360
L376	2.951	0.268	1.000	0.330	2.038	3.639	0.012	0.06	0.111	0.72	20A	0	L376
L386	3.276	0.057	0.000	0.124	0.80	3.661	0.035	0.17	0.108	0.70	20E	0	L386
L390	3.211	0.000	0.000	0.180	1.020	3.738	0.112	0.54	0.166	1.008	20A	0	L390
L442	3.225	0.000	0.000	0.112	0.79	3.615	0.012	0.06	0.075	0.48	20G	0	L442
L557	3.132	0.087	0.000	0.137	0.97	3.501	0.126	0.61	0.078	0.51	20A	0	L557
L563	3.386	0.167	0.000	0.170	1.021	3.656	0.029	0.14	0.160	1.004	20A	0	L563
L567	3.119	0.100	0.000	0.101	0.71	3.523	0.104	0.50	0.117	0.76	20A	0	L567
L574	3.410	0.191	0.000	0.070	0.51	3.752	0.125	0.60	0.134	0.87	20A	0	L574
L575	3.240	0.021	0.000	0.119	0.84	3.725	0.098	0.47	0.125	0.81	20G	0	L575
L587	3.318	0.099	0.000	0.101	0.72	3.566	0.061	0.29	0.204	1.032	20A	0	L587
L592	3.527	0.308	1.000	0.101	0.71	3.643	0.216	1.004	0.106	0.69	20A	0	L592
L616	0.190	3.029	1.000	0.010	0.11	0.201	3.426	1.053	0.018	0.12	20D	*	L616
L618	3.264	0.045	0.000	0.254	1.080	3.512	0.315	1.052	0.182	1.018	20A	*	L618
L692	15.691	12.472	64.000	0.690	4.089	17.614	14.187	68.048	0.701	4.055	20A	*	L692
L698	3.181	0.038	0.000	0.150	1.000	3.599	0.028	0.14	0.161	1.004	20E	0	L698

GR₀ MEAN = 3.219 KILONEWTON/M

GRAND MEAN = 3.627 KILONEWTON/M

TEST DETERMINATIONS = 20

SD MEANS = 0.193 KILONEWTON/M

SD OF MEANS = 0.207 KILONEWTON/M

45 LABS IN GRAND MEANS

AVERAGE SDR = 0.141 KILONEWTON/M

AVERAGE SDR = 0.154 KILONEWTON/M

GR₀ MEAN = 10.857 LB/15 MM

GRAND MEAN = 12.232 LB/15 MM

L139 3.231 0.012 0.000 0.124 0.88 3.699 0.072 0.35 0.146 0.95 20H * L139

L250I 2.831 0.368 2.000 0.107 1.019 3.323 0.304 1.047 0.062 0.40 20L * L250I

L251 2.500 0.719 3.072 0.210 1.053 2.999 0.627 3.003 0.289 1.087 20I * L251

L705 18.950 15.731 61.000 1.530 14.004 20.600 16.973 81.093 1.896 12.030 20X * L705

TOTAL NUMBER OF LABORATORIES REPORTING = 51

Best values: G08 3.2 ± 0.3 kilonewton per meter

J72 3.6 ± 0.3 kilonewton per meter

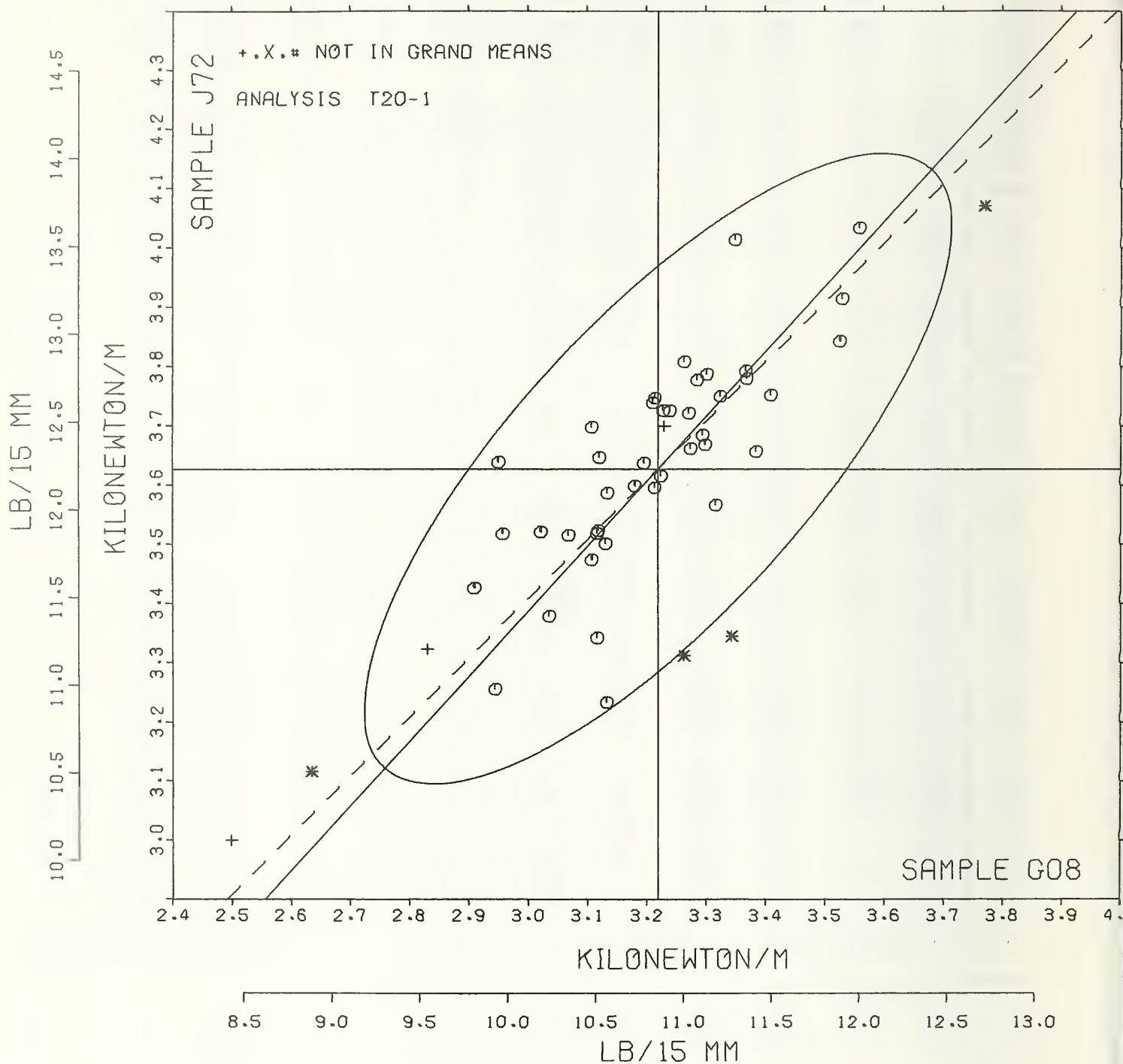
Data from the following laboratories appear to be
off by a multiplicative factor: 616, 692.

ANALYSIS T20-1 TABLE 2
 TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS
 TAPPI OFFICIAL TEST METHOD T494 GS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS		COORDINATES		AVG NO. OF	VAR	PROPERTY--TEST INSTRUMENT--CONDITIONS			
		G08	J72	MAJOR	MINOR						
L616	#	0.190	0.201	-0.072	-0.071	0.41	200	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L251	*	20.500	20.999	-0.940	-0.109	1.070	201	TENSILE STRENGTH,	14	T0 40 LB/IN, CRE,	20 C, 65% RH
L211	*	20.636	30.110	-0.770	-0.007	2.040	200	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L2501	*	20.831	30.323	-0.400	-0.082	0.00	20L	TENSILE STRENGTH,	14	T0 40 LB/IN, CRE,	20 C, 65% RH
L318	0	20.910	30.426	-0.300	-0.093	0.00	20G	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L176	0	20.546	30.255	-0.400	-0.048	1.001	20G	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L376	0	20.951	30.639	-0.172	-0.200	1.000	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L291	0	20.959	30.518	-0.200	-0.119	1.000	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L230	0	30.023	30.521	-0.211	-0.074	0.00	200	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L260	0	30.037	30.379	-0.300	-0.003	0.09	200	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L124C	0	30.070	30.515	-0.100	-0.000	1.011	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L360	0	30.100	30.474	-0.100	-0.021	0.04	200	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L325	0	30.109	30.697	-0.022	-0.129	0.01	20E	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L105	0	30.118	30.342	-0.279	-0.117	1.001	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L194	0	30.118	30.515	-0.140	-0.002	0.00	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L567	0	30.119	30.523	-0.144	-0.004	0.74	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L344	0	30.121	30.646	-0.001	-0.006	1.002	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L557	0	30.132	30.501	-0.102	-0.020	0.74	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L190R	0	30.133	30.233	-0.348	-0.202	1.015	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L315	0	30.135	30.566	-0.080	-0.035	1.005	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L698	0	30.181	30.599	-0.047	-0.009	1.000	20E	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L356	0	30.196	30.637	-0.000	-0.024	0.00	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L390	0	30.211	30.738	-0.077	-0.061	1.010	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L131	0	30.215	30.595	-0.020	-0.018	1.007	20E	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L223B	0	30.215	30.746	-0.000	-0.004	0.03	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L442	0	30.225	30.615	-0.000	-0.012	0.04	20G	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L118	0	30.229	30.725	-0.000	-0.009	0.00	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L139	*	30.231	30.699	-0.001	-0.040	0.02	200	TENSILE STRENGTH,	14	T0 40 LB/IN, CRE,	SHORT TEST SPAN
L575	0	30.240	30.725	-0.087	-0.001	0.03	200	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L618	*	30.264	30.312	-0.202	-0.245	1.009	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L125	0	30.264	30.807	-0.104	-0.008	1.002	20C	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L141T	0	30.272	30.721	-0.100	-0.024	1.013	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L386	0	30.276	30.661	-0.004	-0.018	0.79	20E	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L163	0	30.290	30.777	-0.100	-0.002	0.02	20D	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L333	0	30.295	30.684	-0.004	-0.018	1.011	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L159	0	30.300	30.667	-0.004	-0.002	0.02	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L148	0	30.302	30.787	-0.174	-0.000	0.07	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L587	0	30.310	30.566	-0.022	-0.114	1.002	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L309	0	30.323	30.750	-0.102	-0.004	0.04	20E	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L226C	*	30.345	30.345	-0.124	-0.203	1.000	20C	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L115	0	30.350	40.013	-0.374	-0.104	0.04	20D	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L185	0	30.368	30.792	-0.223	-0.001	0.07	20C	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L328	0	30.370	30.780	-0.210	-0.008	0.77	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L563	0	30.386	30.656	-0.134	-0.103	1.012	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L574	0	30.410	30.752	-0.221	-0.007	0.09	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L592	0	30.527	30.843	-0.307	-0.002	0.70	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L143	0	30.530	30.914	-0.422	-0.030	1.000	20E	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L261	0	30.560	40.033	-0.500	-0.022	1.000	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L167	*	30.770	40.070	-0.699	-0.108	0.01	20G	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L692	#	150.691	170.814	-100.000	-0.347	40.72	20A	TENSILE STRENGTH,	14	T0 40 LB/IN,	LOAD CELL (CRE)
L705	*	180.950	200.600	-230.141	-0.103	100.17	20A	TENSILE STRENGTH,	14	T0 40 LB/IN: () PENDULUM, () LOAD CELL	
GMEANS:		30.219	30.627			1000					
		95% ELLIPSE:		0.000	0.240			WITH GAMMA = 47 DEGREES			

TENSILE STR., CRE, PRINTING PAPERS

SAMPLE G08 = 3.22 KILONEWTN/M SAMPLE J72 = 3.63 KILONEWTN/M
 SAMPLE G08 = 10.86 LB/15 MM SAMPLE J72 = 12.23 LB/15 MM



ANALYSIS T20-2 TABLE 1
TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS
TAPPI OFFICIAL TEST METHOD T404 05-76, PENDULUM-TYPE TESTER

LAB CODE	SAMPLE G08 MEAN	WRITING 61 GRAMS PER SQUARE METER				SAMPLE J72 MEAN	PRINTING 76 GRAMS PER SQUARE METER				TEST D ₀ = 20		
		DEV	N ₀ DEV	SDR	R ₀ SDR		DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L108	3.39	.13	.003	.11	.76	3.78	.11	.65	.13	.73	20P	Ø	L108
L121	3.21	-.04	-.24	.15	1.01	3.61	-.07	-.43	.14	.79	20P	Ø	L121
L124P	3.11	-.15	-.74	.10	1.11	3.64	-.04	-.23	.22	1.22	20P	Ø	L124P
L128	3.19	-.07	-.34	.14	.96	3.70	.02	.15	.15	.82	20T	Ø	L128
L148	3.23	-.03	-.13	.10	.65	3.62	-.06	-.34	.19	1.04	20P	Ø	L148
L153	3.31	.05	.20	.18	1.21	3.77	.10	.60	.18	.98	20P	Ø	L153
L162	2.97	-.29	-1.40	.20	1.35	3.60	-.08	-.48	.26	1.45	20V	Ø	L162
L182L	3.08	-.10	-.50	.12	.82	3.63	-.04	-.27	.12	.65	20T	Ø	L182L
L183	3.15	-.11	-.52	.16	1.19	3.71	.03	.20	.17	.95	20P	Ø	L183
L189	3.53	.28	1.34	.17	1.13	3.94	.26	1.63	.13	.74	20R	Ø	L189
L191P	3.54	.28	1.33	.16	.65	3.70	.03	.17	.29	1.58	20P	Ø	L191P
L195	3.03	-.23	-1.10	.19	1.30	3.61	-.07	-.41	.27	1.50	20R	Ø	L195
L212	2.75	-.50	-2.44	.17	1.16	3.34	-.34	-2.11	.28	1.56	20R	Ø	L212
L213	3.18	-.03	-.37	.18	1.19	3.48	-.19	-1.21	.18	1.02	20T	Ø	L213
L218	3.26	.00	.00	.07	.44	3.55	-.13	-.81	.08	.43	20P	Ø	L218
L233	3.40	.15	.70	.15	1.01	3.76	.08	.50	.15	.85	20Q	Ø	L233
L234	3.25	-.01	-.04	.13	.86	3.63	-.05	-.30	.09	.50	20P	Ø	L234
L241	3.22	-.03	-.10	.17	1.17	3.66	-.02	-.12	.17	.96	20R	Ø	L241
L242	2.94	-.32	-1.55	.13	.80	3.47	-.21	-1.29	.14	.80	20Y	Ø	L242
L249	3.32	.06	.29	.12	.63	3.83	.15	.95	.18	1.02	20P	Ø	L249
L259	3.17	-.05	-.40	.12	.63	3.66	-.01	-.08	.15	.82	20P	Ø	L259
L262	3.40	.14	.70	.11	.74	3.90	.22	1.40	.12	.69	20R	Ø	L262
L275	2.95	-.31	-1.43	.25	1.68	3.44	-.24	-1.48	.22	1.21	20R	Ø	L275
L279P	3.74	.48	2.33	.29	1.92	4.06	.38	2.37	.14	.79	20P	Ø	L279P
L285	3.29	.03	.13	.12	.78	3.50	-.18	-1.11	.17	.92	20P	Ø	L285
L290	2.93	-.33	-1.55	.08	.57	3.35	-.32	-2.02	.15	.82	20P	Ø	L290
L311	3.27	.02	.09	.13	.85	3.82	.14	.89	.16	.88	20V	Ø	L311
L313	3.22	-.04	-.20	.11	.73	3.67	-.01	-.03	.11	.60	20T	Ø	L313
L330	3.46	.20	.90	.21	1.41	3.71	.03	.20	.27	1.49	20P	Ø	L330
L337	3.47	.22	1.00	.24	1.58	3.96	.29	1.80	.31	1.72	20V	Ø	L337
L356	3.19	-.07	-.33	.20	1.37	3.64	-.03	-.21	.25	1.41	20P	Ø	L356
L366	3.45	.19	.91	.17	1.12	3.57	-.11	-.67	.25	1.39	20P	Ø	L366
L393	3.35	.09	.40	.09	.60	3.61	.13	.83	.16	.86	20P	Ø	L393
L484	3.00	-.20	-1.27	.12	.82	3.61	-.06	-.39	.20	1.08	20U	Ø	L484
L556	3.51	.25	1.23	.09	.59	3.94	.27	1.66	.18	.97	20P	Ø	L556
L571	3.55	.29	1.42	.22	1.50	3.75	.07	.44	.24	1.32	20P	Ø	L571
L596	3.38	.12	.60	.18	1.19	3.46	-.22	-1.34	.20	1.08	20V	*	L596
L626	3.39	.14	.60	.11	.74	3.67	-.01	-.04	.13	.71	20T	Ø	L626
L680	3.42	.16	.60	.12	.79	3.80	.15	.95	.16	.90	20R	Ø	L680
L685	3.03	-.22	-1.00	.14	.93	3.67	-.00	-.02	.14	.78	20Y	Ø	L685
L714	3.30	.04	.20	.12	.81	3.67	-.00	-.02	.19	1.04	20P	Ø	L714

GR₀ MEAN = 3.26 KILONEWTON/M

GRAND MEAN = 3.66 KILONEWTON/M

TEST DETERMINATIONS = 20

SD MEANS = .21 KILONEWTON/M

SD OF MEANS = .16 KILONEWTON/M

41 LABS IN GRAND MEANS

AVERAGE SDR = .15 KILONEWTON/M

AVERAGE SDR = .18 KILONEWTON/M

GR₀ MEAN = 10.984 LB/15 MM

GRAND MEAN = 12.398 LB/15 MM

TOTAL NUMBER OF LABORATORIES REPORTING = 41

Best values: G08 3.3 ± 0.4 kilonewton per meter

J72 3.7 ± 0.3 kilonewton per meter

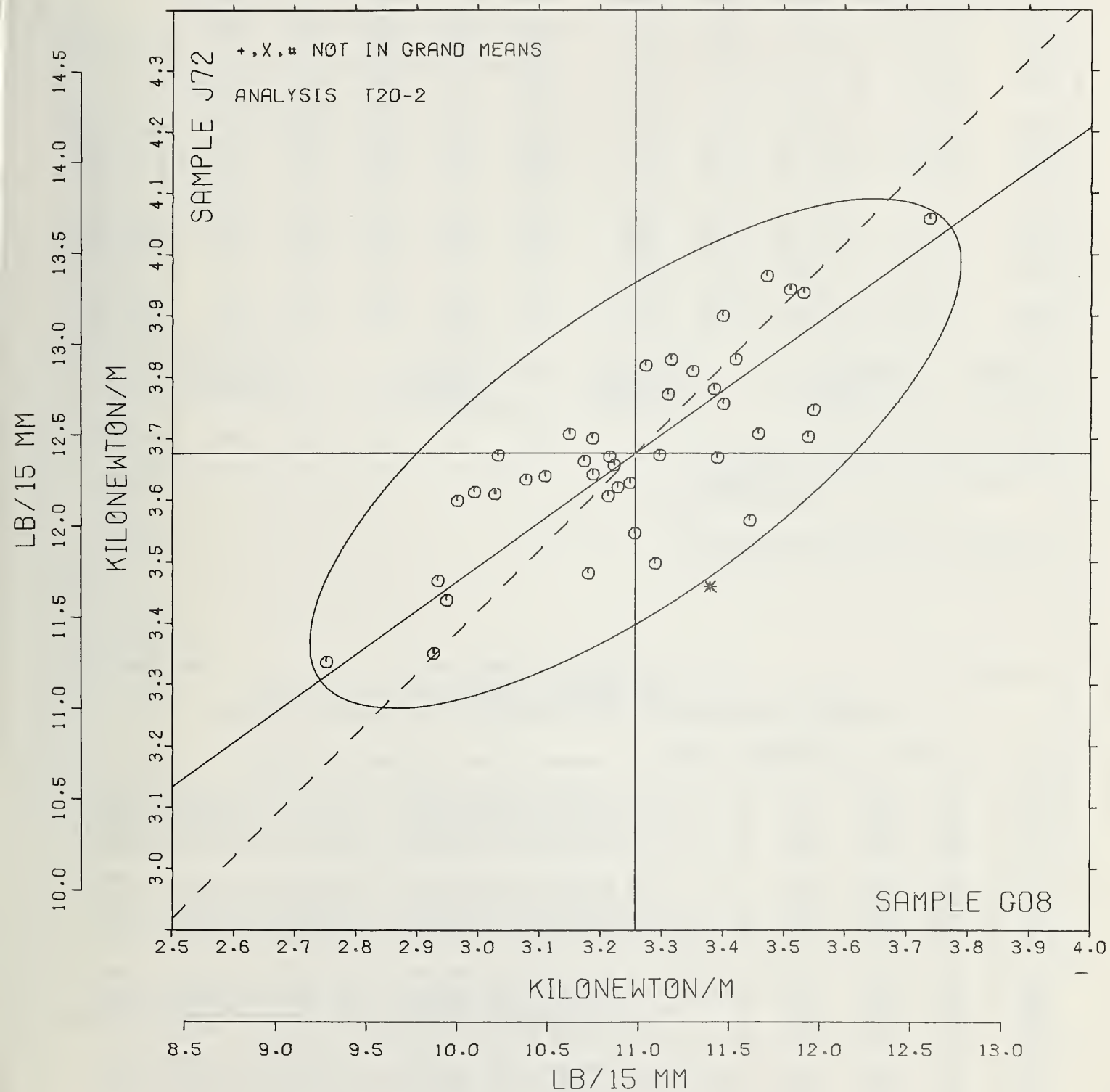
ANALYSIS T20-2 TABLE 2
TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS
TAPPI OFFICIAL TEST METHOD T404 OS-76, PENDULUM-TYPE TESTER

LAB CODE	F	MEANS		COORDINATES		AVG X ₀ SUB	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS			
		G08	J72	MAJOR	MINOR						
L212	Ø	2,075	3,034	-0.01	0.02	1,035	20K	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L290	Ø	2,093	3,035	-0.40	-0.07	0.09	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L242	Ø	2,094	3,047	-0.30	0.02	0.03	20Y	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L275	Ø	2,095	3,044	-0.39	-0.02	1,045	20K	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L162	Ø	2,097	3,060	-0.20	0.11	1,040	20V	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L484	Ø	3,000	3,061	-0.25	0.10	0.95	20U	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L195	Ø	3,003	3,061	-0.22	0.08	1,040	20R	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L685	Ø	3,003	3,067	-0.18	0.13	0.05	20Y	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L182L	Ø	3,008	3,063	-0.17	0.07	0.73	20T	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L124P	Ø	3,011	3,064	-0.14	0.05	1,015	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L183	Ø	3,015	3,071	-0.07	0.09	1,007	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L259	Ø	3,017	3,066	-0.07	0.04	0.03	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L213	Ø	3,018	3,048	-0.17	-0.11	1,041	20T	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L128	Ø	3,019	3,070	-0.04	0.06	0.09	20T	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L356	Ø	3,019	3,064	-0.08	0.01	1,039	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L121	Ø	3,021	3,061	-0.08	-0.03	0.90	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L313	Ø	3,022	3,067	-0.04	0.02	0.06	20T	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L241	Ø	3,022	3,066	-0.04	0.00	1,007	20K	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L148	Ø	3,023	3,062	-0.05	-0.03	0.04	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L234	Ø	3,025	3,063	-0.03	-0.03	0.08	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L218	Ø	3,026	3,055	-0.00	-0.11	0.44	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L311	Ø	3,027	3,082	0.10	0.11	0.07	20V	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L285	Ø	3,029	3,050	-0.00	-0.16	0.05	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L714	Ø	3,030	3,067	0.03	-0.03	0.92	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L153	Ø	3,031	3,077	0.10	0.05	1,010	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L249	Ø	3,032	3,083	0.14	0.09	0.92	20K	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L393	Ø	3,035	3,081	0.10	0.05	0.73	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L599	*	3,038	3,046	-0.03	-0.25	1,014	20V	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L108	Ø	3,039	3,078	0.17	0.01	0.74	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L626	Ø	3,039	3,067	0.11	-0.08	0.73	20T	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L262	Ø	3,040	3,090	0.25	0.10	0.71	20K	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L233	Ø	3,040	3,076	0.17	-0.02	0.95	20Q	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L680	Ø	3,042	3,083	0.22	0.03	0.05	20K	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L366	Ø	3,045	3,057	0.09	-0.20	1,025	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L330	Ø	3,046	3,071	0.10	-0.09	1,045	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L337	Ø	3,047	3,096	0.34	0.11	1,005	20V	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L556	Ø	3,051	3,094	0.30	0.07	0.70	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L189	Ø	3,053	3,094	0.30	0.05	0.93	20K	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L191P	Ø	3,054	3,070	0.25	-0.14	1,042	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L571	Ø	3,055	3,075	0.20	-0.11	1,041	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
L279P	Ø	3,074	4,006	0.01	0.03	1,005	20P	TENSILE STRENGTH,	14	TØ	40 LB/IN, PENDULUM TESTER
GMEANS:		3,026	3,068			1,000					
95% ELLIPSE:				0.03	0.23	WITH GAMMA = 35 DEGREES					

TENSILE STR., PENDULUM, PRINTING P.

SAMPLE G08 = 3.26 KILONEWTN/M SAMPLE J72 = 3.68 KILONEWTN/M

SAMPLE G08 = 10.98 LB/15 MM SAMPLE J72 = 12.40 LB/15 MM



ANALYSIS T25-1 TABLE 1
TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER
TAPPI OFFICIAL TEST METHOD T494 GS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	SAMPLE K34 123 GRAMS PER SQUARE METER					SAMPLE J02 98 GRAMS PER SQUARE METER					TEST D _c = 20		
	MEAN	DEV	N _o DEV	SDR	R _o SDR	MEAN	DEV	N _o DEV	SDR	R _o SDR	VAR	F	LAB
L106	105.6	9.7	1.04	1.05	0.79	80.2	5.9	0.78	9.8	1.06	25F	0	L106
L151	90.4	0.4	0.00	17.1	1.29	73.9	-6.4	-0.85	8.1	0.87	25F	0	L151
L182	92.4	-3.0	-0.33	10.9	0.83	77.9	-2.5	-0.33	6.7	0.72	25B	0	L182
L207	103.6	7.7	1.30	11.3	0.86	79.7	-0.7	-0.09	11.4	1.22	25F	0	L207
L219	101.7	5.8	0.37	10.4	0.79	90.2	9.9	1.30	7.4	0.80	25J	0	L219
L234	104.8	8.9	1.43	13.3	1.01	88.9	8.6	1.13	7.5	0.81	25F	0	L234
L237B	99.8	-6.1	-1.03	12.7	0.96	74.6	-5.8	-0.76	10.8	1.16	25H	0	L237B
L264	90.4	-5.0	-0.33	10.1	0.77	75.8	-4.5	-0.60	5.8	0.62	25F	0	L264
L267	100.6	4.7	0.73	13.0	1.03	75.4	-5.0	-0.66	6.4	0.69	25F	0	L267
L273	93.8	2.9	0.30	10.7	1.27	88.7	8.4	1.11	11.2	1.21	25G	0	L273
L278	94.7	-1.2	-0.20	14.0	1.00	65.9	5.5	0.73	8.4	0.90	25E	0	L278
L280	98.4	2.0	0.43	12.3	0.93	77.3	-3.0	-0.40	16.5	1.77	25B	0	L280
L312	94.1	-1.8	-0.30	17.3	1.31	91.5	11.2	1.47	10.5	1.13	25J	0	L312
L318	90.2	-5.7	-0.33	13.8	1.05	60.4	0.0	0.00	6.6	0.71	25A	0	L318
L580	87.2	-8.7	-1.47	12.7	0.90	61.0	0.7	0.09	5.2	0.56	25C	0	L580
L604	82.1	-13.8	-2.02	14.0	1.12	151.1	50.8	6.70	31.8	3.42	25A	#	L604
L676	87.9	-8.0	-1.33	18.7	1.42	62.0	-18.3	-2.42	16.1	1.73	25F	0	L676
L689	93.7	-2.2	-0.33	9.0	0.66	76.4	-4.0	-0.52	9.7	1.04	25F	0	L689

GR_o MEAN = 95.9 JOULES/SQ M GRAND MEAN = 80.3 JOULES/SQ M TEST DETERMINATIONS = 20
SD MEANS = 5.9 JOULES/SQ M SD OF MEANS = 7.6 JOULES/SQ M 17 LABS IN GRAND MEANS
AVERAGE SDR = 13.2 JOULES/SQ M AVERAGE SDR = 9.3 JOULES/SQ M
GR_o MEAN = 6.565 FT.LB./SQ FT GRAND MEAN = 5.503 FT.LB./SQ FT

L250 99.5 3.0 0.01 0.01 0.46 61.2 0.8 0.11 3.4 0.36 25N * L250
TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: K34 95 ± 8 joules per square meter
J02 80 ± 13 joules per square meter

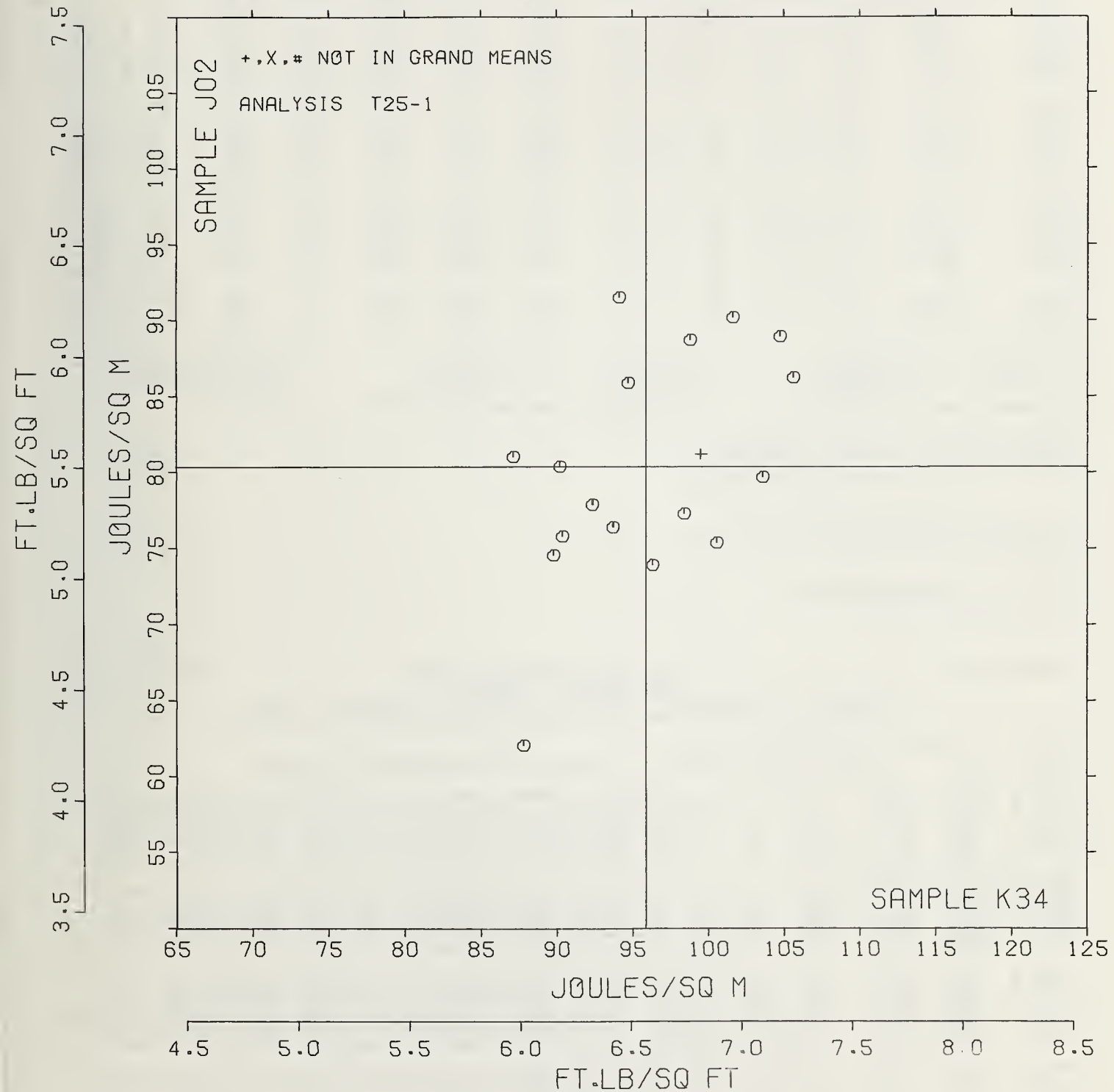
The following laboratories were omitted from the grand means because of extreme test results: 604.

ANALYSIS T25-1 TABLE 2
TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER
TAPPI OFFICIAL TEST METHOD T494 GS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERLY--TEST INSTRUMENT--CONDITIONS
		K34	J02	MAJOR	MINOR	R _o SDR	VAR	
L604	#	82.1	131.1	30.0	30.7	2.27	25A	TENSILE ENERGY ABSORPTION (WITH TEST T19), FLAT/FLAT JAWS
L580	0	87.2	81.0	-4.1	7.7	0.70	25C	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/LINE JAWS
L676	0	87.9	62.0	-19.8	-3.0	1.37	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L237B	0	89.8	74.6	-8.1	2.1	1.06	25H	TENSILE ENERGY ABSORPTION (WITH TEST T19), 2-PIN STRAIN GAGE
L318	0	90.2	80.4	-3.0	4.8	0.08	25A	TENSILE ENERGY ABSORPTION (WITH TEST T19), FLAT/FLAT JAWS
L264	0	90.4	75.8	-0.8	2.3	0.09	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L182	0	92.4	77.9	-4.0	1.7	0.77	25D	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L689	0	93.7	76.4	-4.0	-0.3	0.00	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L312	0	94.1	91.5	8.0	7.4	1.22	25J	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L278	0	94.7	85.9	4.1	3.9	0.90	25B	TENSILE ENERGY ABSORPTION (WITH TEST T19), FLAT/FLAT JAWS
L151	0	96.4	73.9	-5.2	-3.8	1.08	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L280	0	98.4	77.3	-1.2	-3.8	1.33	25D	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L273	0	98.8	68.7	8.7	2.0	1.24	25G	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/LINE JAWS
L250	*	99.5	81.2	2.7	-2.6	0.41	25N	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS, 25C
L267	0	100.6	75.4	-1.7	-0.0	0.00	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L219	0	101.7	90.2	11.4	0.4	0.79	25J	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L207	0	103.6	79.7	3.0	-0.9	1.04	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L234	0	104.8	88.9	12.0	-2.9	0.91	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
L106	0	105.6	86.2	10.2	-5.1	0.93	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19), LINE/FLAT JAWS
GMEANS:		95.9	80.3			1.00		
95% ELLIPSE:		23.0	12.8			WIND GAMMA = 57 DEGREES		

T.E.A., PACKAGING PAPERS

SAMPLE K34 = 96. JOULES/SQ M SAMPLE J02 = 80. JOULES/SQ M
 SAMPLE K34 = 6.57 FT.LB/SQ FT SAMPLE J02 = 5.50 FT.LB/SQ FT



ANALYSIS T26-1 TABLE 1
TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER
TAPPI OFFICIAL TEST METHOD T494 GS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	SAMPLE G08 MEAN	WAXING 61 GRAMS PER SQUARE METER				SAMPLE J72 MEAN	PRINTING 76 GRAMS PER SQUARE METER				TEST D ₀ = 20		
		DEV	N ₀ DEV	SDX	R ₀ SDR		DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L115	33.3	-0.3	-0.24	2.4	0.07	45.6	4.8	1.84	3.3	0.75	26C	0	L115
L118	31.9	-1.7	-1.00	3.0	0.84	39.7	-1.1	-0.44	3.8	0.87	26E	0	L118
L139	34.8	1.1	0.71	4.9	1.37	41.4	0.6	0.24	5.3	1.21	26H	0	L139
L159	34.1	0.4	0.28	3.9	1.08	40.3	-0.6	-0.21	5.2	1.18	26F	0	L159
L163	33.0	-0.7	-0.42	4.1	1.14	43.3	2.5	0.95	3.6	0.83	26J	0	L163
L167	37.7	4.0	2.54	1.0	0.45	40.7	-0.1	-0.05	1.0	0.24	26D	0	L167
L185	31.0	-2.7	-1.00	5.4	1.41	39.0	-1.8	-0.71	3.7	0.85	26C	0	L185
L211	35.4	1.7	1.00	4.5	1.20	41.5	0.7	0.26	4.9	1.12	26Z	0	L211
L309	39.6	6.0	3.00	7.0	2.00	50.6	15.8	6.11	8.9	2.04	26J	#	L309
L318	33.7	0.0	0.01	3.9	1.07	44.8	4.0	1.53	5.5	1.25	26A	0	L318
L356	33.8	0.2	0.10	3.7	1.03	41.2	0.3	0.13	5.7	1.30	26A	0	L356
L393	32.6	-1.1	-0.00	2.9	0.81	38.0	-2.8	-1.08	4.0	0.91	26V	0	L393
L442	38.3	4.7	2.00	2.0	0.71	1.8	-39.0	-15.06	0.1	0.01	26B	#	L442
L563	41.3	7.0	4.00	0.0	1.84	52.9	12.1	4.67	12.8	2.92	26C	#	L563
L567	32.1	-1.5	-0.37	3.7	1.04	38.5	-2.3	-0.89	3.9	0.89	26A	0	L567
L575	33.2	-0.4	-0.20	3.0	0.99	43.4	2.6	1.01	4.7	1.08	26A	0	L575
L587	34.1	0.5	0.30	3.0	0.97	30.8	-4.0	-1.56	7.2	1.64	26C	0	L587
L592	34.1	0.4	0.20	3.4	0.93	36.2	-2.7	-1.03	3.9	0.89	26H	0	L592

GR₀ MEAN = 33.7 JOULES/SQ M GRAND MEAN = 40.8 JOULES/SQ M TEST DETERMINATIONS = 20
SD MEANS = 1.6 JOULES/SQ M SD OF MEANS = 2.6 JOULES/SQ M 15 LABS IN GRAND MEANS
AVERAGE SDX = 3.0 JOULES/SQ M AVERAGE SDR = 4.4 JOULES/SQ M
GR₀ MEAN = 2.306 FT₀ LB/SQ FT GRAND MEAN = 2.796 FT₀ LB/SQ FT

L250 34.4 0.3 0.40 3.0 1.00 46.9 6.1 2.36 2.6 0.59 26N + L250
TOTAL NUMBER OF LABORATORIES PARTICIPATING = 19
Best values: G08 34 ± 2 joules per square meter
J72 41 ± 4 joules per square meter

The following laboratories were omitted from the grand means because of extreme test results: 309, 442.

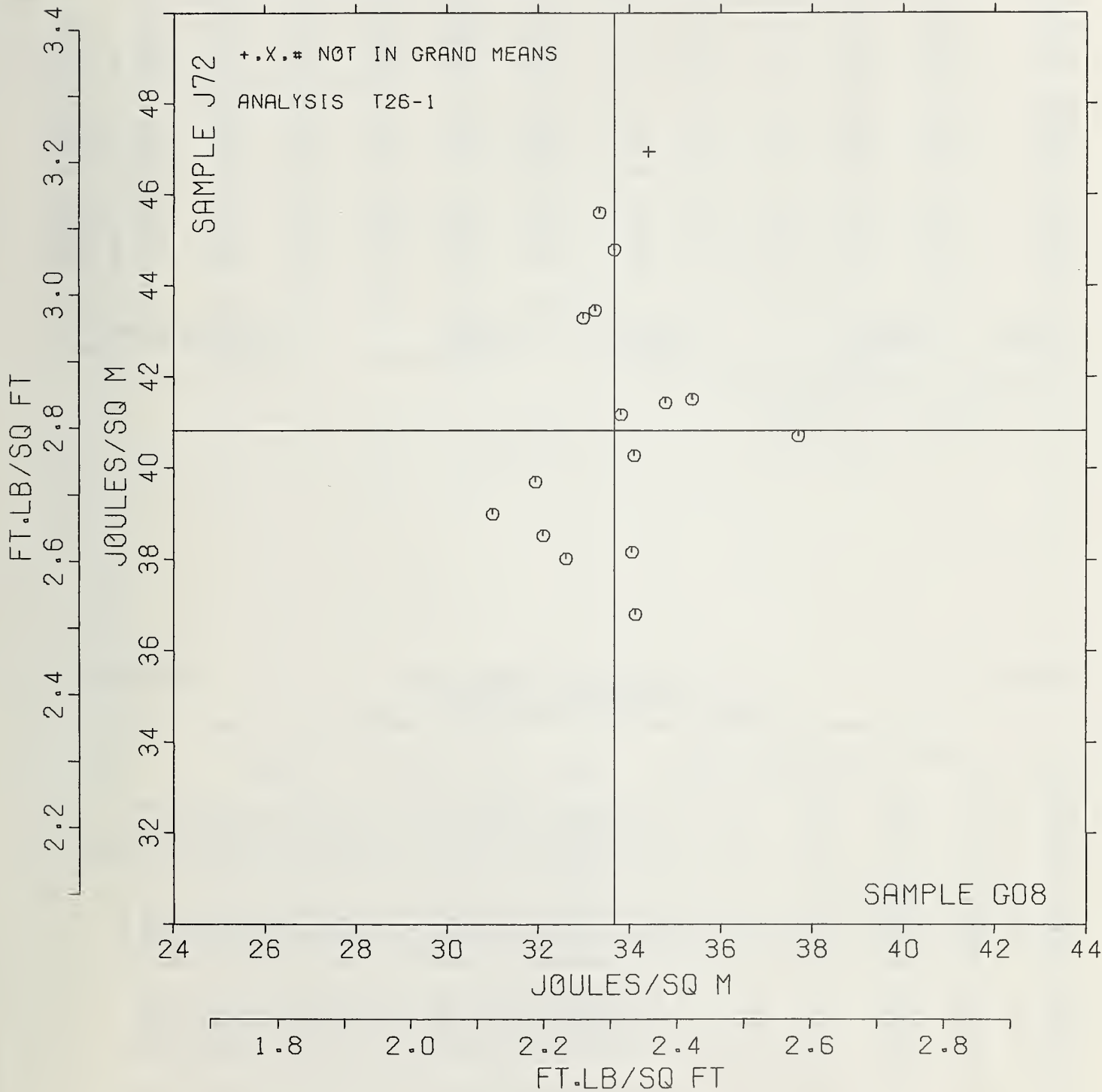
Data from the following laboratories appear to be off by a multiplicative factor: 563

ANALYSIS T26-1 TABLE 2
TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER
TAPPI OFFICIAL TEST METHOD T494 GS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS		COORDINATES		AVG R ₀ SDX VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS						
		G08	J72	MAJOR	MINOR								
L185	0	31.0	39.0	-2.1	2.4	1.13	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/LINE JAWS					
L118	0	31.9	39.7	-1.3	1.0	0.0	20E	TENSILE ENERGY ABSORPTION (WITH TEST T20), FLAT/FLAT JAWS					
L567	0	32.1	38.5	-2.0	1.3	0.0	20A	TENSILE ENERGY ABSORPTION (WITH TEST T20), FLAT/FLAT JAWS					
L393	0	32.6	38.0	-2.9	0.7	0.06	20V	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/FLAT JAWS					
L163	0	33.0	43.3	2.4	1.0	0.55	26J	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/FLAT JAWS					
L575	0	33.2	43.4	2.6	0.7	1.04	20A	TENSILE ENERGY ABSORPTION (WITH TEST T20), FLAT/FLAT JAWS					
L115	0	33.3	45.6	4.7	0.9	0.71	20C	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/LINE JAWS					
L318	0	33.7	44.8	3.9	0.5	1.16	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20), FLAT/FLAT JAWS					
L356	0	33.8	41.2	0.4	-0.1	1.17	20A	TENSILE ENERGY ABSORPTION (WITH TEST T20), FLAT/FLAT JAWS					
L592	0	34.1	38.2	-2.0	-0.7	0.51	26H	TENSILE ENERGY ABSORPTION (WITH TEST T20), 2-PIN STRAIN GAGE					
L159	0	34.1	40.3	-0.3	-0.5	1.13	26F	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/FLAT JAWS					
L587	0	34.1	36.8	-3.9	-1.0	1.01	20C	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/LINE JAWS					
L250	+	34.4	46.9	6.2	-0.0	0.0	20N	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/FLAT JAWS, 20C					
L139	0	34.8	41.4	0.7	-1.0	1.29	26H	TENSILE ENERGY ABSORPTION (WITH TEST T20), 2-PIN STRAIN GAGE					
L211	0	35.4	41.5	0.9	-1.0	1.10	26Z	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/LINE JAWS					
L167	0	37.7	40.7	0.4	-4.0	0.34	20D	TENSILE ENERGY ABSORPTION (WITH TEST T20), 2-PIN STRAIN GAGE					
L442	#	38.3	1.8	-38.1	-9.4	0.0	26D	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/FLAT JAWS					
L309	#	39.6	56.6	10.4	-4.0	2.04	26J	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/FLAT JAWS					
L563	#	41.3	52.9	12.9	-0.1	2.03	20C	TENSILE ENERGY ABSORPTION (WITH TEST T20), LINE/LINE JAWS					
GMEANS:		33.7	40.8			1.00							
95% ELLIPSE:				7.0	4.5			Width GAMMA = 82 DEGREES					

T.E.A., PRINTING PAPERS

SAMPLE G08 = 33.7 JOULES/SQ M SAMPLE J72 = 40.8 JOULES/SQ M
 SAMPLE G08 = 2.31 FT.LB/SQ FT SAMPLE J72 = 2.80 FT.LB/SQ FT



ANALYSIS T28-1 TABLE 1
 ELONGATION TO BREAK, PERCENT - PACKAGING PAPER
 TAPPI OFFICIAL TEST METHODS T404 CS-70 AND T494 CS-70, PENDULUM AND CRE TYPES

LAB CODE	SAMPLE K34 123 GRAMS PER SQUARE METER					SAMPLE J02 98 GRAMS PER SQUARE METER					TEST D ₀ = 20		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L106	1.96	.22	1.33	.10	.64	2.41	.27	1.49	.19	1.05	28B	Ø	L106
L151	1.90	.10	1.02	.18	1.15	2.12	-.03	-.17	.19	1.03	28B	Ø	L151
L182	1.55	-.18	-.18	.10	.65	2.07	-.07	-.42	.12	.66	28B	Ø	L182
L234	1.85	.11	.70	.17	1.10	2.33	.18	1.01	.15	.80	28B	Ø	L234
L264	1.67	-.07	-.43	.11	.70	1.89	-.26	-1.46	.12	.64	28B	Ø	L264
L265	1.63	-.11	-.09	.11	.70	2.16	.01	.08	.14	.77	28A	Ø	L265
L267	1.77	.03	.20	.15	.97	2.18	.03	.18	.14	.79	28B	Ø	L267
L278	1.66	-.08	-.45	.14	.90	2.18	.04	.20	.16	.86	28A	Ø	L278
L280	1.76	.02	.13	.14	.88	2.28	.13	.72	.29	1.61	28B	Ø	L280
L312	1.75	.02	.11	.15	1.00	2.36	.22	1.21	.22	1.21	28B	Ø	L312
L318	1.80	.00	.44	.09	.59	2.29	.14	.80	.17	.95	28A	Ø	L318
L324	1.62	-.12	-.74	.06	.40	1.77	-.38	-2.13	.14	.76	28P	Ø	L324
L580	1.54	-.19	-1.21	.14	.93	2.00	-.15	-.84	.14	.75	28C	Ø	L580
L581	1.68	-.00	-.33	.11	.72	2.21	.06	.36	.16	.90	28A	Ø	L581
L676	2.11	.37	2.33	.57	3.71	2.17	.02	.11	.31	1.70	28B	Ø	L676
L689	1.54	-.19	-1.21	.15	.95	1.94	-.20	-1.15	.28	1.52	28B	Ø	L689

GR₀ MEAN = 1.74 PERCENT

GRAND MEAN = 2.15 PERCENT

TEST DETERMINATIONS = 20

SD MEANS = .16 PERCENT

SD OF MEANS = .18 PERCENT

16 LABS IN GRAND MEANS

AVERAGE SDR = .15 PERCENT

AVERAGE SDR = .18 PERCENT

TOTAL NUMBER OF LABORATORIES REPORTING = 10

Best values: K34 1.7 ± 0.2 percent

J02 2.2 ± 0.3 percent

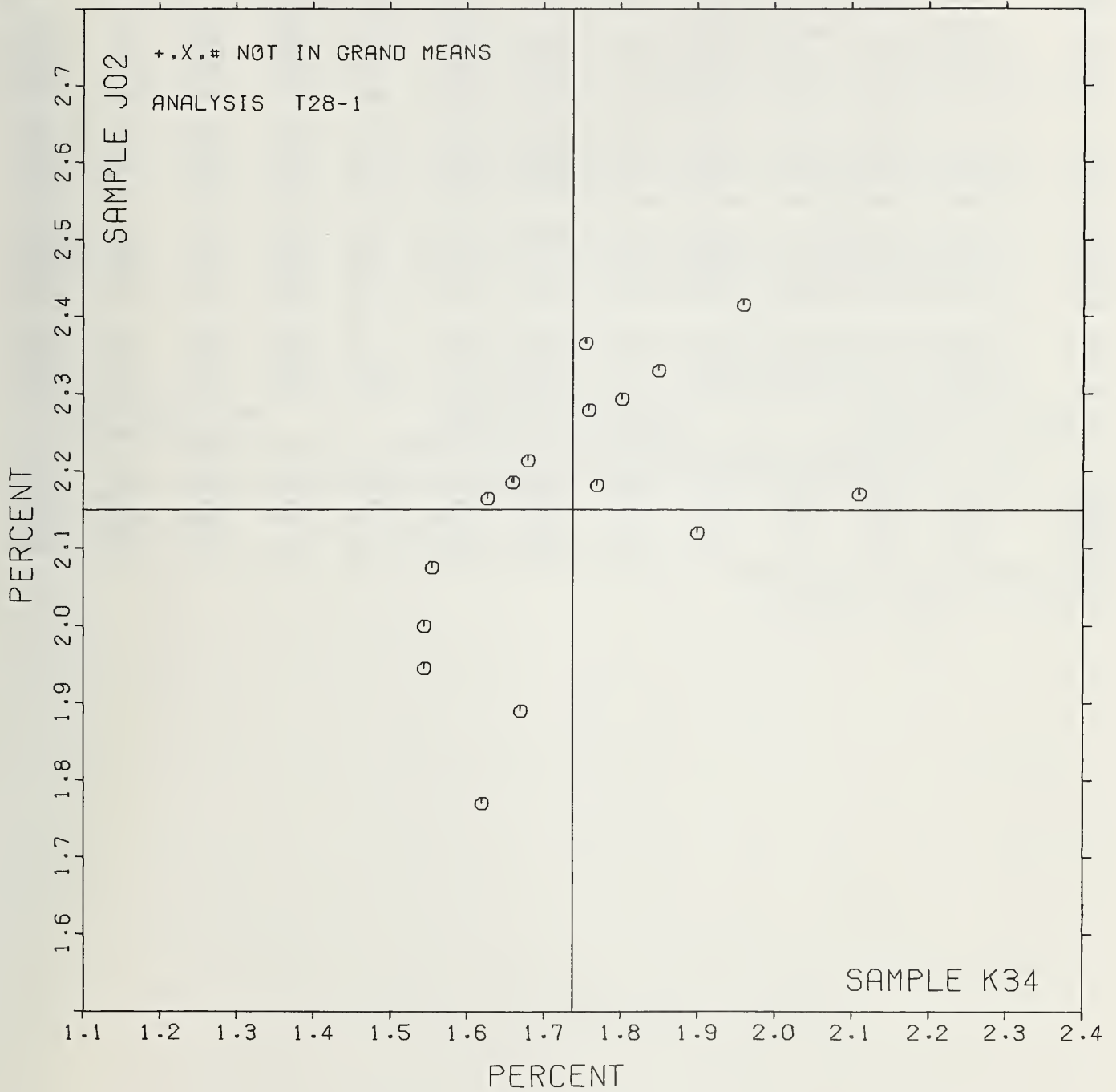
ANALYSIS T28-1 TABLE 2
 ELONGATION TO BREAK, PERCENT - PACKAGING PAPER
 TAPPI OFFICIAL TEST METHODS T404 CS-70 AND T494 CS-70, PENDULUM AND CRE TYPES

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		K34	J02	MAJOR	MINOR	N ₀ SDR	VAR	
L689	Ø	1.54	1.94	-.28	.02	1.24	28B	ELONGATION (WITH TEST T19), LEAD CELL, LINE/FLAT JAWS
L580	Ø	1.54	2.00	-.24	.05	.64	28C	ELONGATION (WITH TEST T19), LEAD CELL, LINE/LINE JAWS
L182	Ø	1.55	2.07	-.17	.09	.65	28B	ELONGATION (WITH TEST T19), LEAD CELL, LINE/FLAT JAWS
L324	Ø	1.62	1.77	-.37	-.15	.55	28P	ELONGATION (WITH TEST T19), LEAD CELL, PATTERNED FLAT JAWS
L265	Ø	1.63	2.16	-.00	.09	.74	28A	ELONGATION (WITH TEST T19), LEAD CELL, FLAT/FLAT JAWS
L278	Ø	1.66	2.18	-.02	.08	.66	28A	ELONGATION (WITH TEST T19), LEAD CELL, FLAT/FLAT JAWS
L264	Ø	1.67	1.89	-.24	-.11	.67	28B	ELONGATION (WITH TEST T19), LEAD CELL, LINE/FLAT JAWS
L581	Ø	1.68	2.21	.01	.09	.61	28A	ELONGATION (WITH TEST T19), LEAD CELL, FLAT/FLAT JAWS
L312	Ø	1.75	2.36	.10	.12	1.10	28B	ELONGATION (WITH TEST T19), LEAD CELL, LINE/FLAT JAWS
L280	Ø	1.76	2.28	.11	.06	1.25	28B	ELONGATION (WITH TEST T19), LEAD CELL, LINE/FLAT JAWS
L267	Ø	1.77	2.18	.04	-.00	.68	28B	ELONGATION (WITH TEST T19), LEAD CELL, LINE/FLAT JAWS
L318	Ø	1.80	2.29	.15	.04	.77	28A	ELONGATION (WITH TEST T19), LEAD CELL, FLAT/FLAT JAWS
L234	Ø	1.85	2.33	.21	.03	.75	28B	ELONGATION (WITH TEST T19), LEAD CELL, LINE/FLAT JAWS
L151	Ø	1.90	2.12	.06	-.14	1.09	28B	ELONGATION (WITH TEST T19), LEAD CELL, LINE/FLAT JAWS
L106	Ø	1.96	2.41	.35	-.00	.65	28B	ELONGATION (WITH TEST T19), LEAD CELL, LINE/FLAT JAWS
L676	Ø	2.11	2.17	.25	-.27	2.71	28B	ELONGATION (WITH TEST T19), LEAD CELL, LINE/FLAT JAWS
GMEANS:		1.74	2.15			1.00		
95% ELLIPSE:				.00	.32			WITH GAMMA = 50 DEGREES

ELONGATION TO BREAK, PACKAGING PAPER

SAMPLE K34 = 1.74 PERCENT

SAMPLE J02 = 2.15 PERCENT



ANALYSIS T29-1 TABLE 1

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

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

LAB CODE	SAMPLE G08	WAITING 61 GRAMS PER SQUARE METER				SAMPLE J72	PRINTING 76 GRAMS PER SQUARE METER				TEST D ₀ = 20		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L105	1.0337	-0.280	-1.003	0.147	1.004	1.0287	-0.433	-1.093	0.168	1.014	29A	0	L105
L118	1.0604	-0.013	-0.000	0.111	0.79	1.0717	-0.003	-0.01	0.107	0.73	29A	0	L118
L139	1.0360	-0.058	-0.033	0.157	1.011	1.0580	-0.140	-0.62	0.151	1.002	29D	0	L139
L141T	1.0465	-0.153	-0.09	0.185	1.032	1.0344	-0.176	-0.78	0.143	0.97	29D	0	L141T
L163	1.0537	-0.081	-0.47	0.121	0.86	1.0730	0.010	0.05	0.102	0.69	29B	0	L163
L176	1.0575	-0.043	-0.20	0.217	1.034	1.0670	-0.050	-0.22	0.258	1.075	29B	0	L176
L185	1.0480	-0.133	-0.00	0.101	1.014	1.0620	-0.100	-0.45	0.115	0.78	29C	0	L185
L190R	1.0546	-0.071	-0.41	0.179	1.027	1.0517	-0.203	-0.90	0.152	1.003	29A	0	L190R
L309	1.0946	0.323	1.090	0.240	1.071	2.0341	0.621	2.76	0.250	1.070	29A	*	L309
L318	1.0650	0.033	0.19	0.094	0.60	1.0996	0.276	1.23	0.108	0.73	29A	0	L318
L344	1.0489	-0.123	-0.74	0.220	1.050	1.0610	-0.110	-0.49	0.267	1.081	29A	0	L344
L356	1.0595	-0.022	-0.10	0.123	0.88	1.0698	-0.022	-0.10	0.137	0.93	29A	0	L356
L386	1.0380	-0.038	-0.22	0.120	0.85	1.0675	-0.045	-0.20	0.141	0.96	29A	0	L386
L442	1.0920	0.302	1.070	0.115	0.82	1.0830	0.110	0.49	0.057	0.39	29B	0	L442
L567	1.0654	0.030	0.21	0.100	0.75	1.0731	0.061	0.27	0.100	0.68	29A	0	L567
L575	1.0375	-0.043	-0.20	0.133	0.95	1.0750	0.030	0.13	0.128	0.87	29A	0	L575
L587	1.0695	0.077	0.40	0.110	0.78	1.0735	0.015	0.07	0.179	1.021	29C	0	L587
L592	1.0510	-0.103	-0.00	0.133	0.95	1.0565	-0.155	-0.69	0.160	1.008	29D	0	L592
L698	2.0015	0.397	2.000	0.104	0.74	2.0035	0.315	1.40	0.184	1.025	29C	0	L698

GR₀ MEAN = 1.0618 PERCENT

SD MEANS = 0.172 PERCENT

GRAND MEAN = 1.0720 PERCENT

SD OF MEANS = 0.225 PERCENT

TEST DETERMINATIONS = 20

19 LABS IN GRAND MEANS

AVERAGE SDR = 0.141 PERCENT

AVERAGE SDR = 0.148 PERCENT

L153	1.0040	-0.578	-0.00	0.139	0.99	1.0235	-0.485	-2.16	0.127	0.86	29R	*	L153
L242	2.0255	0.637	0.70	0.190	1.030	2.0575	0.855	3.81	0.155	1.005	29R	*	L242
L484	1.0418	-0.200	-1.00	0.150	1.010	1.0612	-0.108	-0.48	0.230	1.056	29R	*	L484
L626	1.0345	-0.073	-0.42	0.060	0.49	1.0550	-0.170	-0.76	0.128	0.87	29R	*	L626
L685	1.0595	-0.023	-0.10	0.070	0.54	2.0110	0.390	1.74	0.189	1.028	29R	*	L685

TOTAL NUMBER OF LABORATORIES REPORTING = 24

Best values: G08 1.60 ± 0.32 percent

J72 1.69 ± 0.35 percent

ANALYSIS T25-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

TAPPI OFFICIAL TEST METHODS T404 68-76 AND T494 69-70, PENDULUM AND CRE TYPES

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		G09	J72	MAJOR	MINOR	X. STD	VAR	
L153	*	1.040	1.235	-0.733	0.179	0.32	29R	ELONGATION (WITH TEST T20), PENDULUM, FLAT/FLAT JAWS
L105	0	1.337	1.287	-0.515	-0.030	1.09	29A	ELONGATION (WITH TEST T20), LOAD CELL, FLAT/FLAT JAWS
L484	*	1.418	1.612	-0.203	0.097	1.33	29K	ELONGATION (WITH TEST T20), PENDULUM, FLAT/FLAT JAWS
L141T	0	1.465	1.544	-0.232	0.019	1.14	29D	ELONGATION (WITH TEST T20), LOAD CELL, 2-PIN STRAIN GAGE
L185	0	1.480	1.620	-0.102	0.052	0.90	29C	ELONGATION (WITH TEST T20), LOAD CELL, LINE/LINE JAWS
L344	0	1.489	1.610	-0.104	0.038	1.03	29A	ELONGATION (WITH TEST T20), LOAD CELL, FLAT/FLAT JAWS
L592	0	1.510	1.565	-0.109	-0.005	1.01	29D	ELONGATION (WITH TEST T20), LOAD CELL, 2-PIN STRAIN GAGE
L163	0	1.537	1.730	-0.039	0.071	0.77	29B	ELONGATION (WITH TEST T20), LOAD CELL, LINE/FLAT JAWS
L626	*	1.545	1.550	-0.180	-0.042	0.08	29R	ELONGATION (WITH TEST T20), PENDULUM, FLAT/FLAT JAWS
L190R	0	1.540	1.517	-0.200	-0.063	1.45	29A	ELONGATION (WITH TEST T20), LOAD CELL, FLAT/FLAT JAWS
L139	0	1.560	1.580	-0.147	-0.036	1.37	29D	ELONGATION (WITH TEST T20), LOAD CELL, 2-PIN STRAIN GAGE
L176	0	1.575	1.670	-0.005	0.005	1.04	29B	ELONGATION (WITH TEST T20), LOAD CELL, LINE/FLAT JAWS
L575	0	1.575	1.750	-0.001	0.052	0.91	29A	ELONGATION (WITH TEST T20), LOAD CELL, FLAT/FLAT JAWS
L386	0	1.580	1.675	-0.009	0.004	0.90	29A	ELONGATION (WITH TEST T20), LOAD CELL, FLAT/FLAT JAWS
L685	*	1.595	2.110	0.301	0.249	0.91	29R	ELONGATION (WITH TEST T20), PENDULUM, FLAT/FLAT JAWS
L356	0	1.595	1.698	-0.031	0.005	0.90	29A	ELONGATION (WITH TEST T20), LOAD CELL, FLAT/FLAT JAWS
L118	0	1.604	1.717	-0.010	0.009	0.70	29A	ELONGATION (WITH TEST T20), LOAD CELL, FLAT/FLAT JAWS
L318	0	1.650	1.996	0.242	0.137	0.70	29A	ELONGATION (WITH TEST T20), LOAD CELL, FLAT/FLAT JAWS
L567	0	1.654	1.781	0.071	0.007	0.71	29A	ELONGATION (WITH TEST T20), LOAD CELL, FLAT/FLAT JAWS
L587	0	1.695	1.735	0.008	-0.054	0.99	29C	ELONGATION (WITH TEST T20), LOAD CELL, LINE/LINE JAWS
L442	0	1.920	1.830	0.207	-0.179	0.00	29B	ELONGATION (WITH TEST T20), LOAD CELL, LINE/FLAT JAWS
L309	*	1.940	2.034	0.090	0.102	1.70	29A	ELONGATION (WITH TEST T20), LOAD CELL, FLAT/FLAT JAWS
L698	0	2.015	2.035	0.489	-0.134	0.99	29C	ELONGATION (WITH TEST T20), LOAD CELL, LINE/LINE JAWS
L242	*	2.255	2.575	1.000	-0.008	1.20	29K	ELONGATION (WITH TEST T20), PENDULUM, FLAT/FLAT JAWS
GMEANS:		1.618	1.720			1.00		
		55% ELLIPSE:		0.753	0.206			WITH GAMMA = 53 DEGREES

SAMPLE G08 = 1.62 PERCENT SAMPLE J72 = 1.72 PERCENT



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

SEPTEMBER 1975

LAB CODE	HEAT SET OFFSET BOOK					BOOK PAPER					TEST D ₀ = 15		
	SAMPLE B88 MEAN	88 GRAMS PER SQUARE METER DEV	N ₀ DEV	SDR	R ₀ SDR	SAMPLE B30 MEAN	77 GRAMS PER SQUARE METER DEV	N ₀ DEV	SDP	R ₀ SDR	VAR	F	LAB
L105	42.7	-8.6	-0.00	14.0	0.73	17.9	1.3	0.61	7.0	1.51	30M	0	L105
L118	58.1	6.8	0.49	16.4	0.81	17.7	1.1	0.52	4.4	0.95	30D	0	L118
L121	33.1	-18.2	-1.00	14.3	0.70	16.8	0.2	0.08	4.2	0.89	30M	0	L121
L124	72.3	21.0	1.00	26.9	1.52	16.5	-0.2	-0.08	5.6	1.20	30N	0	L124
L150	62.3	11.0	0.00	33.7	1.06	15.9	-0.7	-0.33	4.0	0.85	30M	0	L150
L159	72.7	21.4	1.00	29.3	1.44	20.3	3.7	1.75	4.8	1.03	30N	0	L159
L162	59.4	8.1	0.09	27.6	1.30	18.9	2.3	1.09	5.9	1.27	30M	0	L162
L163	36.8	-14.5	-1.00	13.5	0.67	13.7	-3.0	-1.41	3.8	0.80	30N	0	L163
L176	73.7	22.4	1.00	34.5	1.70	17.5	0.9	0.42	3.6	0.78	30M	0	L176
L182M	74.6	23.3	1.00	25.7	1.27	17.3	0.7	0.33	4.2	0.90	30M	0	L182M
L185	59.3	8.0	0.00	17.7	0.87	15.9	-0.8	-0.37	4.5	0.96	30N	0	L185
L190C	105.6	54.3	3.00	46.1	2.27	17.5	0.8	0.39	4.5	0.96	30N	#	L190C
L212	52.7	1.4	0.10	11.2	0.55	17.1	0.5	0.23	5.6	1.21	30M	0	L212
L223F	53.1	1.8	0.13	14.5	0.72	16.6	-0.0	-0.02	4.6	0.99	30M	0	L223F
L230	50.3	-1.0	-0.00	19.0	0.90	14.5	-2.2	-1.03	2.8	0.59	30N	0	L230
L254	46.2	-5.1	-0.37	18.7	0.92	15.9	-0.7	-0.33	3.6	0.76	30M	0	L254
L262	54.3	3.0	0.21	21.7	1.07	14.0	-2.6	-1.25	4.2	0.90	30N	0	L262
L275	51.3	0.0	0.00	16.1	0.80	26.4	3.8	1.78	8.8	1.89	30N	0	L275
L278	29.2	-22.1	-1.00	13.0	0.78	12.8	-3.8	-1.82	3.5	0.75	30C	0	L278
L279	63.9	12.6	0.91	31.2	1.54	16.1	-0.5	-0.24	7.0	1.50	30N	0	L279
L285A	18.5	-32.8	-2.00	4.2	0.21	18.4	1.8	0.83	4.3	0.93	30N	*	L285A
L285B	81.7	30.4	2.00	26.2	1.29	99.7	83.0	39.34	33.4	7.16	30N	#	L285B
L320	46.6	-4.7	-0.34	19.2	0.94	15.9	-0.7	-0.33	3.2	0.68	30N	0	L320
L326N	41.6	-9.7	-0.70	23.4	1.15	16.2	-0.4	-0.21	5.1	1.08	30N	0	L326N
L339	25.3	-26.0	-1.00	10.8	0.53	12.3	-4.3	-2.04	2.9	0.62	30M	0	L339
L366A	56.3	5.0	0.00	17.1	0.84	16.3	1.6	0.77	4.6	0.99	30N	0	L366A
L376	37.0	-14.3	-1.00	14.2	0.70	13.8	-2.8	-1.34	3.1	0.66	30N	0	L376
L388	61.4	10.1	0.70	18.0	0.89	18.2	1.6	0.74	3.9	0.84	30N	0	L388
L390	45.1	-6.2	-0.40	31.9	1.57	14.9	-1.7	-0.81	4.5	1.05	30N	0	L390
L393	43.1	-8.2	-0.39	12.7	0.63	16.5	-0.2	-0.08	4.1	0.88	30M	0	L393
L396M	62.7	11.4	0.00	40.7	2.01	21.8	5.2	2.45	5.1	1.09	30N	0	L396M
L565	55.1	3.8	0.20	22.4	1.10	17.0	0.4	0.17	6.5	1.40	30N	0	L565
L589	44.2	-7.1	-0.32	7.0	0.35	16.3	-0.4	-0.18	3.3	0.71	30N	0	L589
L595	53.9	2.0	0.19	12.9	0.64	17.9	1.2	0.58	5.8	1.24	30C	0	L595
L670	56.5	5.2	0.30	16.2	0.60	15.6	-1.0	-0.49	4.8	1.04	30N	0	L670

GR₀ MEAN = 51.3 DOUBLE FOLDS
SD MEANS = 13.8 DOUBLE FOLDS
AVERAGE SDR = 20.3 DOUBLE FOLDS

GRAND MEAN = 16.6 DOUBLE FOLDS
SD OF MEANS = 2.1 DOUBLE FOLDS
AVERAGE SDR = 4.7 DOUBLE FOLDS

TEST DETERMINATIONS = 15
33 LABS IN GRAND MEANS

L182S	40.2	-11.1	-0.01	16.2	0.69	19.9	3.3	1.56	4.8	1.03	30S	*	L182S
L190D	24.2	-27.1	-1.00	6.9	0.34	18.7	2.0	0.96	5.4	1.15	30S	*	L190D
L326S	29.1	-22.2	-1.00	9.0	0.47	21.5	4.9	2.32	6.5	1.40	30S	*	L326S
L705	45.2	-6.1	-0.44	15.2	0.75	16.3	-0.4	-0.18	5.1	1.10	30X	*	L705

TOTAL NUMBER OF LABORATORIES REPORTING = 39

Best values: B88 52 double folds
B30 17 double folds

The following laboratories were omitted from the grand means because of extreme test results: 190C, 285B.

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

Please see page 40 of this report for a demonstration of this proposal.

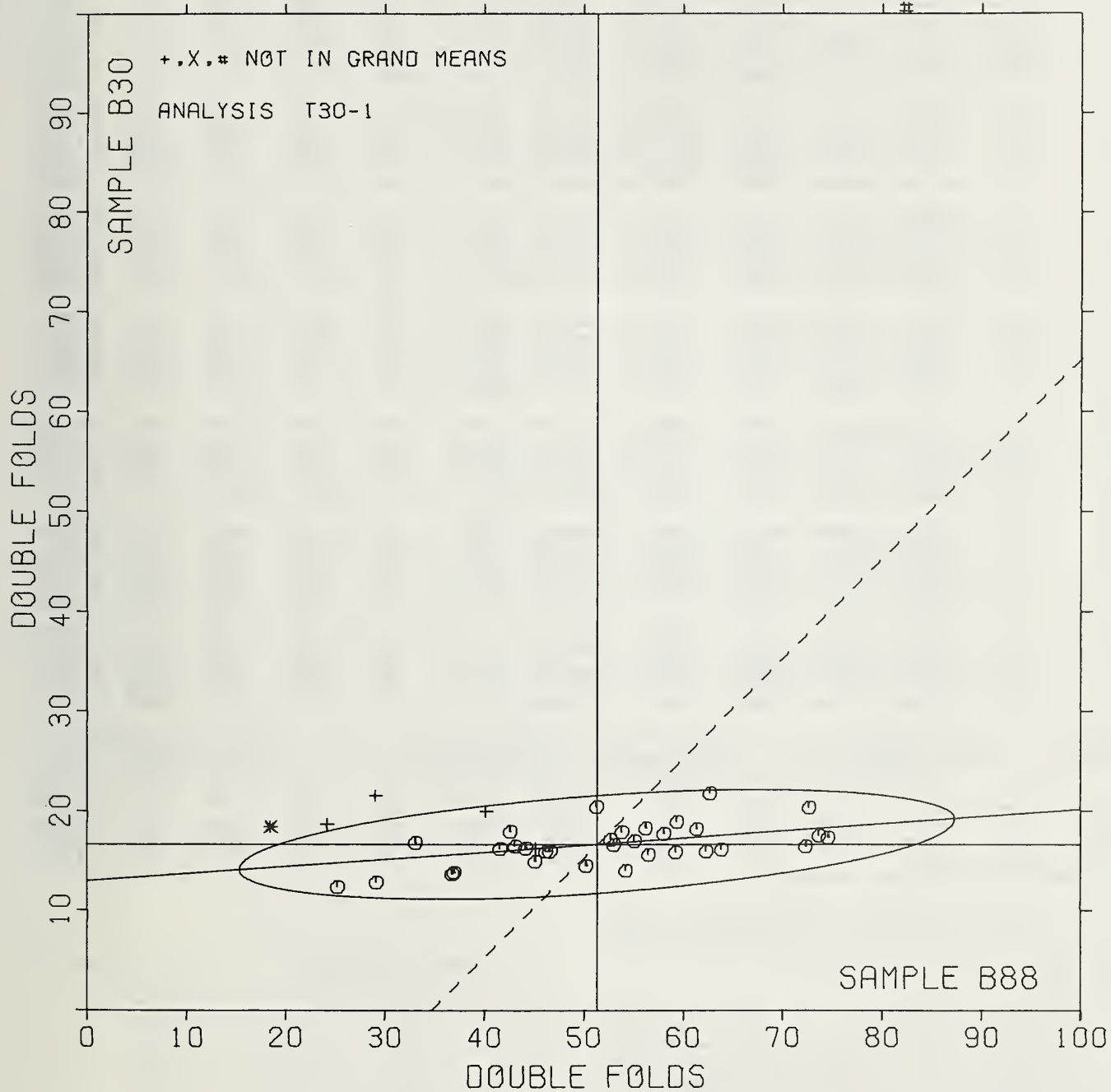
TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T30-1 TABLE 2
FOLDING ENDURANCE (MIT), DOUBLE FOLDS
TAPPI SUGGESTED METHOD T511 SU-69

SEPTEMBER 1979

AB CODE	F	MEANS		COORDINATES		AVG K _{0.5} VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
		B88	B30	MAJOR	MINOR		
28EA	*	18.5	18.4	-32.0	4.1	0.57	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
190D	*	24.2	18.7	-20.9	4.0	0.75	30S FOLDING ENDURANCE, SCHÖPPER, LEIPZIG
339	Ø	25.3	12.3	-20.3	-2.4	0.50	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
326S	*	29.1	21.5	-21.8	0.5	0.93	30S FOLDING ENDURANCE, SCHÖPPER, LEIPZIG
278	Ø	29.2	12.8	-22.3	-2.2	0.70	30C FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
121	Ø	33.1	16.8	-18.1	1.5	0.00	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
163	Ø	36.3	13.7	-14.7	-1.9	0.74	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
376	Ø	37.0	13.8	-14.5	-1.8	0.68	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
182S	*	40.2	19.9	-10.8	4.1	0.50	30S FOLDING ENDURANCE, SCHÖPPER, LEIPZIG
326N	Ø	41.0	16.2	-9.7	0.3	1.12	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
105	Ø	42.7	17.9	-8.5	1.9	1.12	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
393	Ø	43.1	16.5	-8.2	0.4	0.75	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
589	Ø	44.2	16.3	-7.1	0.1	0.53	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
390	Ø	45.1	14.9	-0.3	-1.3	1.01	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
705	*	45.2	16.3	-6.1	0.1	0.92	30X FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
254	Ø	46.2	15.9	-3.1	-0.3	0.84	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
320	Ø	46.6	15.9	-4.7	-0.4	0.81	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
230	Ø	50.3	14.5	-1.2	-2.1	0.78	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
275	Ø	51.3	20.4	0.3	3.8	1.04	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
212	Ø	52.7	17.1	1.5	0.4	0.88	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
223F	Ø	53.1	16.6	1.7	-0.2	0.85	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
599	Ø	53.9	17.9	2.0	1.0	0.94	30C FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
262	Ø	54.3	14.0	2.8	-2.8	0.99	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
565	Ø	55.1	17.0	3.8	0.1	1.00	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
366A	Ø	56.3	18.3	5.1	1.3	0.92	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
670	Ø	56.5	15.6	5.1	-1.4	0.92	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
118	Ø	58.1	17.7	6.8	0.6	0.88	30D FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
185	Ø	59.3	15.9	7.9	-1.3	0.91	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
162	Ø	59.4	18.9	8.2	1.7	1.02	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
388	Ø	61.4	18.2	10.2	0.8	0.86	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
150	Ø	62.3	15.9	10.9	-1.5	1.00	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
396M	Ø	62.7	21.8	11.8	4.3	1.05	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
279	Ø	63.9	16.1	12.5	-1.4	1.02	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
124	Ø	72.3	16.5	21.0	-1.7	1.00	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
159	Ø	72.7	20.3	21.0	2.2	1.03	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
176	Ø	73.7	17.5	22.4	-0.7	1.04	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
182M	Ø	74.0	17.3	23.3	-1.0	1.08	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
285B	#	81.7	9.7	30.3	80.6	4.02	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
190C	#	105.6	17.5	54.2	-3.1	1.01	30N FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
MEANS:		51.3	16.6			1.00	
		95% ELLIPSE:		36.1	4.9	WITH GAMMA = 4 DEGREES	

FOLDING ENDURANCE (MIT)

SAMPLE B88 = 51.3 DOUBLE FOLDS SAMPLE B30 = 16.6 DOUBLE FOLDS



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

LAB CODE	SAMPLE B88 MEAN	HEAT SET OFFSET BOOK 88 GRAMS PER SQUARE METER				SAMPLE L30 MEAN	BOOK PAPER 77 GRAMS PER SQUARE METER				TEST D ₀ = 15		
		DEV	N ₀ DEV	SDR	R ₀ SDR		DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L105	1.0590	-.083	-.74	.231	1.38	1.0222	.022	.41	.172	1.42	30M	0	L105
L118	1.0749	.077	.00	.110	.70	1.0237	.037	.67	.105	.86	30D	0	L118
L121	1.0483	-.189	-1.00	.185	1.11	1.0211	.011	.20	.121	1.00	30M	0	L121
L124	1.0338	.166	1.01	.131	.79	1.0193	-.007	-.13	.151	1.24	30N	0	L124
L150	1.0740	.067	.07	.228	1.36	1.0169	-.010	-.19	.111	.91	30M	0	L150
L159	1.0328	.155	1.05	.161	1.08	1.0299	.099	1.80	.091	.74	30N	0	L159
L162	1.0729	.050	.46	.207	1.24	1.0255	.056	1.01	.147	1.20	30M	0	L162
L163	1.0538	-.134	-1.04	.103	.97	1.0121	-.079	-1.44	.116	.95	30N	0	L163
L176	1.0227	.154	1.01	.195	1.17	1.0235	.036	.65	.088	.73	30M	0	L176
L182M	1.0847	.175	1.40	.157	.94	1.0227	.027	.49	.107	.88	30M	0	L182M
L185	1.0757	.084	.72	.120	.72	1.0185	-.015	-.28	.121	1.00	30N	0	L185
L190C	1.0988	.316	2.00	.181	1.09	1.0229	.029	.53	.112	.92	30N	#	L190C
L212	1.0712	.040	.04	.053	.59	1.0214	.014	.25	.134	1.10	30M	0	L212
L223F	1.0710	.033	.02	.117	.70	1.0202	.003	.05	.132	1.08	30M	0	L223F
L230	1.0668	-.004	-.04	.180	1.08	1.0153	-.047	-.86	.084	.69	30N	0	L230
L254	1.0027	-.043	-.37	.197	1.18	1.0192	-.008	-.14	.098	.80	30M	0	L254
L262	1.0099	.020	.22	.108	1.13	1.0128	-.072	-1.31	.130	1.07	30N	0	L262
L275	1.0092	.020	.17	.128	.77	1.0272	.073	1.32	.186	1.53	30N	0	L275
L278	1.0418	-.254	-2.10	.202	1.21	1.0091	-.109	-1.99	.126	1.04	30C	0	L278
L279	1.0753	.080	.00	.233	1.40	1.0173	-.027	-.49	.180	1.48	30N	0	L279
L285A	1.0257	-.415	-3.05	.099	.60	1.0253	.053	.97	.107	.88	30N	X	L285A
L285B	1.0392	.220	1.00	.139	.83	1.0974	.774	14.12	.153	1.26	30N	#	L285B
L320	1.0628	-.044	-.00	.206	1.24	1.0195	-.005	-.09	.082	.68	30N	0	L320
L326N	1.0565	-.108	-.92	.222	1.33	1.0191	-.009	-.16	.131	1.07	30N	0	L326N
L339	1.0300	-.312	-2.00	.207	1.24	1.0081	-.119	-2.18	.098	.80	30M	*	L339
L366A	1.0732	.059	.00	.132	.79	1.0250	.050	.91	.104	.85	30N	0	L366A
L376	1.0536	-.130	-1.10	.178	1.07	1.0130	-.070	-1.27	.094	.77	30N	0	L376
L388	1.0769	.097	.00	.139	.83	1.0249	.050	.90	.103	.84	30N	0	L388
L390	1.0579	-.093	-.79	.246	1.47	1.0152	-.048	-.87	.143	1.18	30N	0	L390
L393	1.0617	-.056	-.47	.152	.79	1.0206	.006	.11	.095	.78	30M	0	L393
L396M	1.0730	.057	.40	.241	1.45	1.0328	.128	2.33	.101	.83	30N	*	L396M
L565	1.0701	.029	.24	.200	1.24	1.0204	.004	.08	.153	1.26	30N	0	L565
L589	1.0640	-.032	-.21	.067	.40	1.0203	.003	.06	.089	.73	30N	0	L589
L599	1.0719	.047	.40	.108	.60	1.0232	.032	.58	.138	1.13	30C	0	L599
L670	1.0738	.065	.00	.115	.68	1.0176	-.024	-.43	.122	1.00	30N	0	L670

GR₀ MEAN = 1.0672 LOG(10) FOLD

GRAND MEAN = 1.0200 LOG(10) FOLD

TEST DETERMINATIONS = 15

SD MEANS = .118 LOG(10) FOLD

SD OF MEANS = .055 LOG(10) FOLD

32 LABS IN GRAND MEANS

AVERAGE SDR = .107 LOG(10) FOLD

AVERAGE SDR = .122 LOG(10) FOLD

L182S	1.0561	-.111	-.90	.203	1.22	1.0288	.088	1.60	.105	.87	30S	*	L182S
L190D	1.0368	-.304	-2.00	.119	.72	1.0256	.056	1.02	.117	.96	30S	*	L190D
L326S	1.0442	-.230	-1.00	.144	.86	1.0311	.111	2.03	.151	1.24	30S	*	L326S
L705	1.0634	-.033	-.00	.138	.83	1.0188	-.011	-.21	.152	1.25	30X	*	L705

TOTAL NUMBER OF LABORATORIES PARTICIPATING = 39

The ISO (International Standards Organization) is proposing that Mil 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
100	2.00
151	2.18
352	2.55
200	2.30
157	2.14
199	2.30
250	2.40
---	---
210	2.32

mean of raw data

mean of logs
"Folding endurance"

ANALYSIS T30-2 TABLE 2

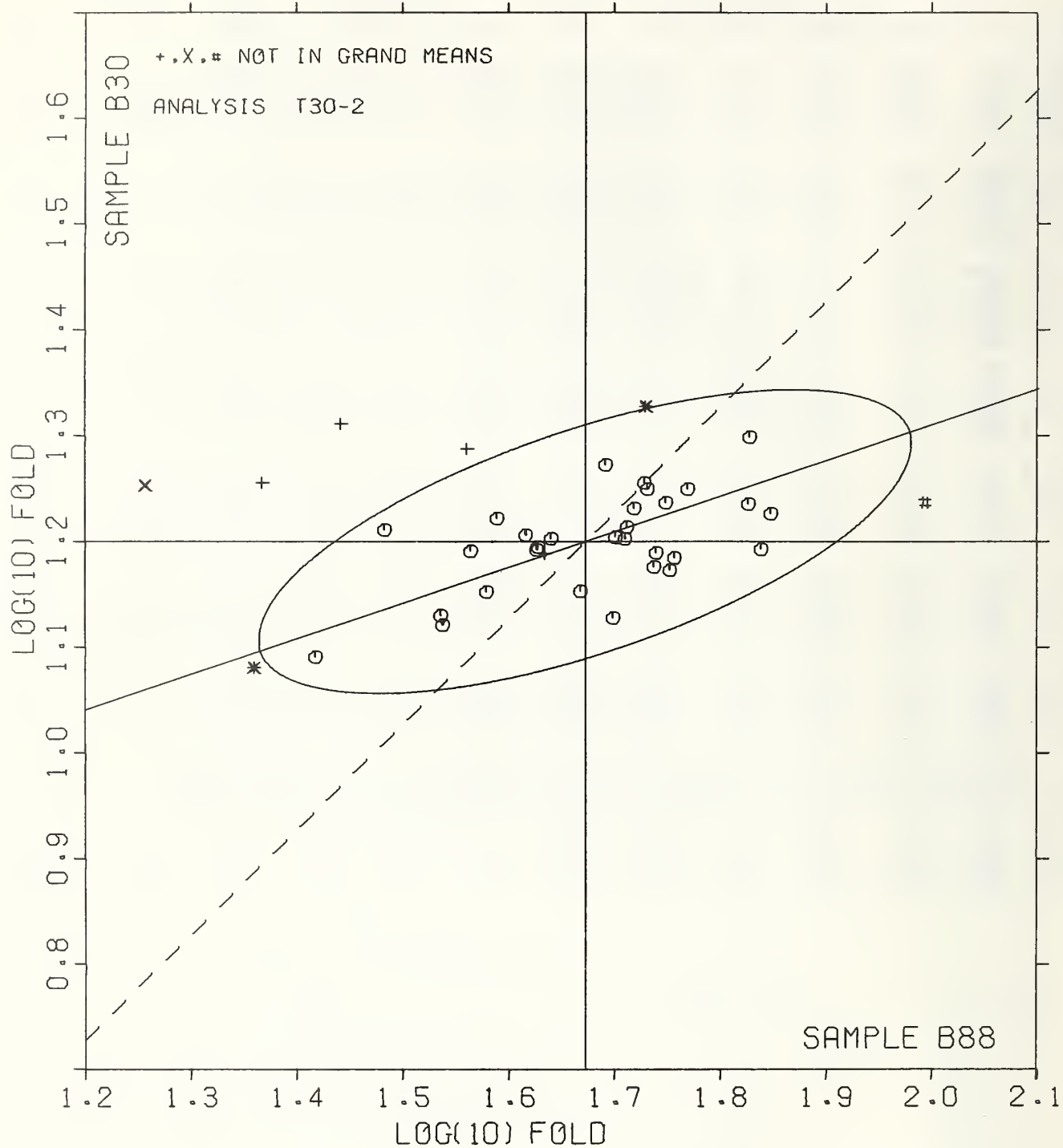
FOLDING ENDURANCE (MIT)

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST	INSTRUMENT---	CONDITIONS
		E88	B30	MAJOR	MINOR	Z ₀	VAR				
L285A	X	1.257	1.253	-0.370	0.183	0.74	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L339	*	1.360	1.081	-0.334	-0.013	1.002	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L190D	*	1.368	1.256	-0.270	0.150	0.64	30S	FOLDING	ENDURANCE,	SCHÖPPER,	LEIPZIG
L278	Ø	1.413	1.091	-0.270	-0.022	1.012	30C	FOLDING	ENDURANCE,	MIT,	CIRCULATING FAN IN CEILING
L326S	*	1.442	1.311	-0.183	0.179	1.005	30S	FOLDING	ENDURANCE,	SCHÖPPER,	LEIPZIG
L121	Ø	1.483	1.211	-0.170	0.071	1.005	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L376	Ø	1.536	1.130	-0.152	-0.022	0.92	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L163	Ø	1.538	1.121	-0.153	-0.032	0.90	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L182S	*	1.561	1.288	-0.070	0.119	1.004	30S	FOLDING	ENDURANCE,	SCHÖPPER,	LEIPZIG
L326N	Ø	1.565	1.191	-0.105	0.020	1.020	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L390	Ø	1.579	1.152	-0.103	-0.015	1.002	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L105	Ø	1.590	1.222	-0.071	0.048	1.040	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L393	Ø	1.617	1.206	-0.051	0.024	0.78	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L254	Ø	1.627	1.192	-0.040	0.007	0.99	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L320	Ø	1.628	1.195	-0.044	0.009	0.96	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L705	*	1.634	1.188	-0.040	0.001	1.004	30X	FOLDING	ENDURANCE:	GIVE	INSTRUMENT MAKE AND MODEL
L589	Ø	1.640	1.203	-0.029	0.013	0.57	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L230	Ø	1.668	1.153	-0.019	-0.043	0.68	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L275	Ø	1.692	1.272	0.042	0.062	1.015	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L262	Ø	1.699	1.128	0.002	-0.077	1.040	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L565	Ø	1.701	1.204	0.029	-0.005	1.025	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L223F	Ø	1.710	1.202	0.037	-0.010	0.89	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L212	Ø	1.712	1.214	0.042	0.001	0.64	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L595	Ø	1.719	1.232	0.054	0.015	0.89	30C	FOLDING	ENDURANCE,	MIT,	CIRCULATING FAN IN CEILING
L162	Ø	1.729	1.255	0.071	0.035	1.022	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L396M	*	1.730	1.328	0.090	0.103	1.014	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L366A	Ø	1.732	1.250	0.072	0.028	0.82	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L670	Ø	1.738	1.176	0.054	-0.043	0.64	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L150	Ø	1.740	1.189	0.060	-0.031	1.014	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L118	Ø	1.749	1.237	0.064	0.011	0.78	30D	FOLDING	ENDURANCE,	MIT,	MODIFIED DRIVE TO REDUCE HEATING
L279	Ø	1.753	1.173	0.067	-0.051	1.044	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L185	Ø	1.757	1.185	0.075	-0.041	0.80	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L388	Ø	1.769	1.249	0.108	0.016	0.64	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L176	Ø	1.827	1.235	0.157	-0.016	0.55	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L159	Ø	1.828	1.299	0.179	0.044	0.91	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L124	Ø	1.838	1.193	0.155	-0.060	1.001	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L182M	Ø	1.847	1.227	0.174	-0.030	0.91	30M	FOLDING	ENDURANCE,	MIT,	WITH CENTRIFUGAL FAN
L285B	#	1.892	1.974	0.455	0.064	1.005	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
L190C	#	1.583	1.229	0.308	-0.073	1.000	30N	FOLDING	ENDURANCE,	MIT,	NO CENTRIFUGAL FAN
GMEANS:		1.672	1.200			1.000					
		5% ELLIPSE:		0.324	0.105	WITH GAMMA = 18 DEGREES					

FOLDING ENDURANCE (MIT)

SAMPLE B88 = 1.67 LOG(10) FOLD SAMPLE B30 = 1.20 LOG(10) FOLD



ANALYSIS T35-1 TABLE 1

GURLEY STIFFNESS

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

LAB CODE	SAMPLE J28 MEAN	PRINTING 93 GRAMS PER SQUARE METER				SAMPLE K04 MEAN	PRINTING 103 GRAMS PER SQUARE METER				TEST D ₀ = 10		
		DEV	N ₀ DEV	SDR	R ₀ SDR		DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L118	458 ₀	-7 ₀	-0.22	41 ₀	1.59	235 ₀	-7 ₀	-0.25	12 ₀	0.93	35G	Ø	L118
L121	488 ₀	22 ₀	0.00	33 ₀	1.26	230 ₀	-12 ₀	-0.42	11 ₀	0.80	35G	Ø	L121
L132	470 ₀	4 ₀	0.10	36 ₀	1.37	276 ₀	28 ₀	0.99	17 ₀	1.29	35G	Ø	L132
L139	455 ₀	-11 ₀	-0.31	16 ₀	0.60	230 ₀	-12 ₀	-0.43	9 ₀	0.69	35G	Ø	L139
L148	445 ₀	-21 ₀	-0.02	20 ₀	1.00	216 ₀	-24 ₀	-0.85	12 ₀	0.68	35G	Ø	L148
L153	476 ₀	10 ₀	0.30	32 ₀	1.22	248 ₀	6 ₀	0.23	8 ₀	0.58	35G	Ø	L153
L159	501 ₀	35 ₀	1.04	17 ₀	0.66	270 ₀	28 ₀	1.01	15 ₀	1.11	35G	Ø	L159
L162	384 ₀	-82 ₀	-2.40	33 ₀	1.28	219 ₀	-22 ₀	-0.79	18 ₀	1.37	35G	*	L162
L163	472 ₀	6 ₀	0.19	20 ₀	0.77	264 ₀	-38 ₀	-1.34	8 ₀	0.59	35G	Ø	L163
L172	428 ₀	-38 ₀	-1.11	7 ₀	0.25	219 ₀	-23 ₀	-0.82	7 ₀	0.56	35G	Ø	L172
L183	536 ₀	70 ₀	2.00	17 ₀	0.63	266 ₀	45 ₀	1.58	16 ₀	1.20	35G	Ø	L183
L190C	336 ₀	-79 ₀	-2.04	26 ₀	1.00	186 ₀	-55 ₀	-1.96	16 ₀	1.17	35G	Ø	L190C
L195	469 ₀	4 ₀	0.11	29 ₀	1.13	246 ₀	4 ₀	0.14	6 ₀	0.49	35G	Ø	L195
L212	508 ₀	43 ₀	1.20	34 ₀	1.31	306 ₀	66 ₀	2.34	67 ₀	5.08	35G	Ø	L212
L223	457 ₀	-8 ₀	-0.24	12 ₀	0.44	236 ₀	-4 ₀	-0.14	10 ₀	0.72	35G	Ø	L223
L224	471 ₀	5 ₀	0.10	16 ₀	0.60	237 ₀	-5 ₀	-0.16	14 ₀	1.07	35G	Ø	L224
L241	502 ₀	36 ₀	1.07	25 ₀	0.94	266 ₀	24 ₀	0.84	18 ₀	1.35	35G	Ø	L241
L254	437 ₀	-28 ₀	-0.03	24 ₀	0.94	230 ₀	-12 ₀	-0.43	10 ₀	0.79	35G	Ø	L254
L260	476 ₀	11 ₀	0.32	5 ₀	0.19	263 ₀	21 ₀	0.75	5 ₀	0.35	35G	Ø	L260
L285	459 ₀	-6 ₀	-0.13	26 ₀	0.99	248 ₀	6 ₀	0.21	9 ₀	0.72	35G	Ø	L285
L291	491 ₀	25 ₀	0.74	24 ₀	0.92	256 ₀	8 ₀	0.30	12 ₀	0.93	35G	Ø	L291
L308	470 ₀	4 ₀	0.12	42 ₀	1.62	241 ₀	-1 ₀	-0.03	9 ₀	0.67	35G	Ø	L308
L348	479 ₀	14 ₀	0.40	58 ₀	2.22	257 ₀	15 ₀	0.52	19 ₀	1.46	35G	Ø	L348
L356	444 ₀	-22 ₀	-0.64	29 ₀	1.13	226 ₀	-16 ₀	-0.55	6 ₀	0.47	35G	Ø	L356
L376	477 ₀	11 ₀	0.32	28 ₀	1.09	238 ₀	-4 ₀	-0.14	8 ₀	0.62	35G	Ø	L376
L382	492 ₀	26 ₀	0.73	25 ₀	0.98	258 ₀	16 ₀	0.57	16 ₀	1.23	35G	Ø	L382
L390	472 ₀	6 ₀	0.19	22 ₀	0.86	237 ₀	-5 ₀	-0.16	12 ₀	0.91	35G	Ø	L390
L562	394 ₀	-72 ₀	-2.11	53 ₀	2.02	184 ₀	-58 ₀	-2.05	13 ₀	0.96	35G	Ø	L562
L567	440 ₀	-26 ₀	-0.70	29 ₀	1.13	211 ₀	-31 ₀	-1.09	19 ₀	1.45	35G	Ø	L567
L571	487 ₀	21 ₀	0.63	22 ₀	0.83	304 ₀	62 ₀	2.20	18 ₀	1.39	35G	*	L571
L600	475 ₀	9 ₀	0.20	11 ₀	0.44	237 ₀	-5 ₀	-0.18	6 ₀	0.46	35G	Ø	L600
L650	501 ₀	35 ₀	1.04	18 ₀	0.69	246 ₀	4 ₀	0.13	7 ₀	0.50	35G	Ø	L650

GR. MEAN = 466 GURLEY UNITS GRAND MEAN = 242 GURLEY UNITS TEST DETERMINATIONS = 10
 SD MEANS = 34 GURLEY UNITS SD OF MEANS = 28 GURLEY UNITS 32 LABS IN GRAND MEANS
 AVERAGE SDR = 20 GURLEY UNITS AVERAGE SDR = 13 GURLEY UNITS

L213 468₀ 3₀ 0.03 39₀ 1.51 229₀ -13₀ -0.45 10₀ 0.74 35H * L213

TOTAL NUMBER OF LABORATORIES REPORTING = 33

Best values: J28 470 ± 53 Gurley units
 K04 240 ± 56 Gurley units

ANALYSIS T35-1 TABLE 2

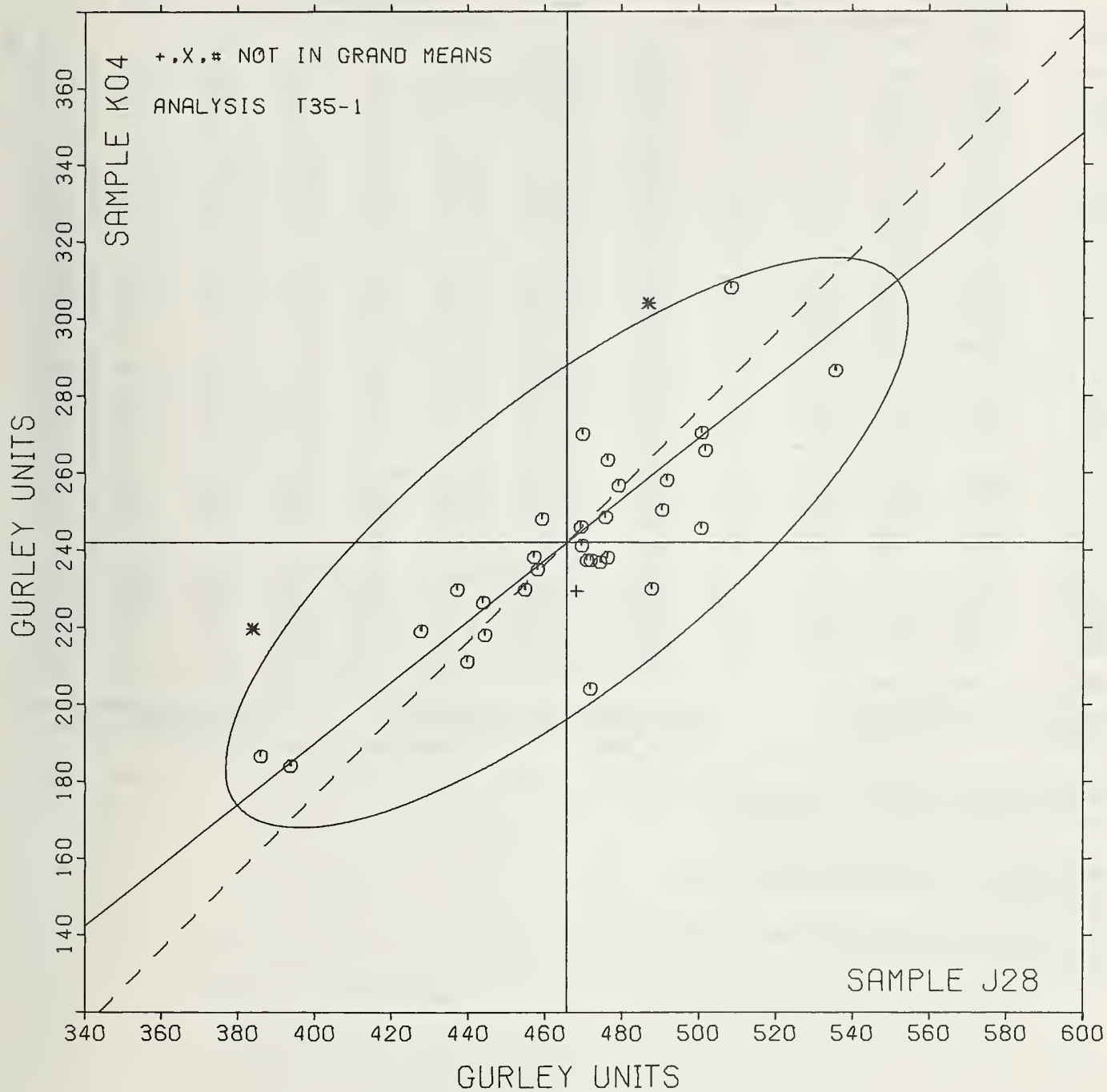
GURLEY STIFFNESS

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS	
		J28	K04	MAJOR	MINOR	R ₀	VAL		
L162	*	364 ₀	219 ₀	-74 ₀	33 ₀	10.33	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L190C	0	386 ₀	186 ₀	-97 ₀	0 ₀	10.09	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L562	0	354 ₀	184 ₀	-92 ₀	-1 ₀	10.49	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L172	0	428 ₀	219 ₀	-44 ₀	5 ₀	0.41	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L254	0	437 ₀	230 ₀	-30 ₀	8 ₀	0.00	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L567	0	440 ₀	211 ₀	-39 ₀	-8 ₀	10.29	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L356	0	444 ₀	226 ₀	-27 ₀	1 ₀	0.00	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L148	0	445 ₀	218 ₀	-31 ₀	-6 ₀	0.44	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L139	0	455 ₀	230 ₀	-16 ₀	-3 ₀	0.04	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L223	0	457 ₀	238 ₀	-9 ₀	2 ₀	0.03	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L118	0	458 ₀	235 ₀	-10 ₀	-1 ₀	10.26	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L285	0	459 ₀	248 ₀	-1 ₀	9 ₀	0.05	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L213	*	468 ₀	229 ₀	-0 ₀	-12 ₀	10.42	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 TEST PIECE), 20 C, 65% RH
L195	0	469 ₀	246 ₀	3 ₀	1 ₀	0.01	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L308	0	470 ₀	241 ₀	3 ₀	-3 ₀	10.14	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L132	0	470 ₀	270 ₀	21 ₀	19 ₀	10.33	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L224	0	471 ₀	237 ₀	1 ₀	-7 ₀	0.03	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L163	0	472 ₀	204 ₀	-19 ₀	-34 ₀	0.00	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L390	0	472 ₀	237 ₀	2 ₀	-0 ₀	0.08	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L600	0	475 ₀	237 ₀	4 ₀	-10 ₀	0.45	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L153	0	476 ₀	248 ₀	12 ₀	-1 ₀	0.90	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L260	0	476 ₀	263 ₀	22 ₀	10 ₀	0.27	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L376	0	477 ₀	238 ₀	0 ₀	-10 ₀	0.00	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L348	0	479 ₀	257 ₀	20 ₀	3 ₀	10.04	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L571	*	487 ₀	304 ₀	55 ₀	35 ₀	10.11	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L121	0	488 ₀	230 ₀	10 ₀	-23 ₀	10.03	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L291	0	491 ₀	250 ₀	25 ₀	-9 ₀	0.03	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L382	0	492 ₀	258 ₀	31 ₀	-4 ₀	10.10	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L650	0	501 ₀	246 ₀	30 ₀	-19 ₀	0.00	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L159	0	501 ₀	270 ₀	45 ₀	0 ₀	0.09	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L241	0	502 ₀	266 ₀	43 ₀	-4 ₀	10.15	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L212	0	508 ₀	308 ₀	75 ₀	25 ₀	30.19	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L183	0	536 ₀	286 ₀	82 ₀	-8 ₀	0.42	35G	STIFFNESS,	GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
GMEANS:		466 ₀	242 ₀			10.00			
		95% ELLIPSE:		109 ₀	37 ₀	WIND GAMMA = 38 DEGREES			

STIFFNESS, GURLEY

SAMPLE J28 = 466. GURLEY UNITS SAMPLE K04 = 242. GURLEY UNITS



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

SEPTEMBER 1979

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

LAB CODE	SAMPLE B63	SAMPLE 124 GRAMS PER SQUARE METER				SAMPLE Z01	INDEX PAPER 225 GRAMS PER SQUARE METER				TEST D ₀ = 10		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L107A	20.70	1.82	1.99	1.42	1.80	63.70	.99	.27	2.31	.94	36T	0	L107A
L123	18.70	.18	.19	1.10	1.47	57.50	-5.21	-1.41	3.24	1.31	36T	0	L123
L126	18.30	.58	.63	.55	.70	62.85	.14	.04	2.61	1.06	36T	0	L126
L150	19.40	.52	.57	.84	1.07	69.50	6.79	1.85	1.58	.64	36T	0	L150
L163	20.20	1.32	1.45	1.09	1.38	65.05	2.34	.64	2.09	.85	36T	0	L163
L182	18.75	.13	.14	.75	.56	64.73	-1.98	-.54	2.09	.85	36T	0	L182
L207	19.54	.66	.73	.85	1.08	65.15	2.44	.66	4.41	1.78	36T	0	L207
L212	18.37	.50	.55	.29	.37	60.70	-2.01	-.55	1.71	.69	36T	0	L212
L219	18.25	.63	.68	.92	1.17	60.55	-2.16	-.59	2.34	.95	36T	0	L219
L228	17.20	-1.68	-1.83	.63	.80	92.10	29.39	7.98	4.41	1.78	36T	#	L228
L230	23.60	4.72	5.10	1.55	1.71	71.80	9.09	2.47	4.16	1.68	36T	X	L230
L242	19.80	.92	1.01	.79	1.00	66.25	5.54	1.51	2.06	.83	36T	0	L242
L262	19.80	.92	1.01	.54	.68	63.80	1.09	.30	2.06	.83	36T	0	L262
L281	19.54	.60	.73	.85	1.08	71.45	8.74	2.37	3.54	1.43	36T	0	L281
L290	17.35	-1.53	-1.67	.63	.79	58.90	-3.81	-1.03	2.51	1.02	36T	0	L290
L313	19.02	.15	.16	.42	.53	65.05	.34	.09	2.75	1.11	36T	0	L313
L315	18.90	.02	.03	1.10	1.39	60.90	-1.81	-.49	2.02	.82	36T	0	L315
L318	18.43	-.45	-.49	.55	.69	58.98	-3.73	-1.01	2.38	.96	36T	0	L318
L324	20.29	1.41	1.54	.80	1.02	65.04	.33	.09	2.29	.93	36T	0	L324
L339	19.77	.89	.90	1.85	2.34	65.74	3.03	.82	2.83	1.15	36T	0	L339
L348	56.74	37.80	41.50	4.68	5.17	150.20	93.49	25.39	11.51	4.66	36T	#	L348
L388	36.45	17.57	19.21	2.09	2.65	85.40	22.69	6.16	6.38	2.58	36T	#	L388
L442	17.58	-1.30	-1.42	.65	.82	59.45	-3.26	-.88	2.67	1.08	36T	0	L442
L484	17.61	-1.27	-1.35	.75	.95	57.06	-5.65	-1.53	1.95	.79	36T	0	L484
L570	19.70	.82	.90	1.34	1.69	67.00	4.29	1.17	3.09	1.25	36T	0	L570
L580	19.40	-.48	-.52	.52	.65	62.70	-.01	-.00	2.06	.83	36T	0	L580
L604	19.10	.22	.24	.77	.98	62.90	.19	.05	2.75	1.11	36T	0	L604
L616	17.82	-1.00	-1.15	.41	.52	59.00	-3.71	-1.01	1.60	.65	36T	0	L616
L651	17.80	-1.08	-1.10	.42	.53	65.40	2.69	.73	2.37	.96	36T	0	L651
L692	17.95	-.93	-1.01	.64	.82	58.05	-4.66	-1.26	2.09	.85	36T	0	L692
L703	18.58	-.29	-.32	.41	.52	61.68	-1.03	-.28	3.30	1.34	36T	0	L703
GR ₀ MEAN = 18.88 TABER UNITS GRAND MEAN = 62.71 TABER UNITS TEST DETERMINATIONS = 10													
SD MEANS = .91 TABER UNITS SD OF MEANS = 3.66 TABER UNITS 27 LABS IN GRAND MEANS													
AVERAGE SDR = .79 INDEX UNITS AVERAGE SDR = 2.47 TABER UNITS													

L250 18.15 -.73 -.79 .67 .85 64.25 1.54 .42 2.06 .83 36U * L250
 TOTAL NUMBER OF LABORATORIES REPORTING = 32
 Best values: B63 18.8 ± 1.2 Taber units
 Z01 62.8 ± 5.7 Taber units

The following laboratories were omitted from the grand means because of extreme test results: 228, 388.

Data from the following laboratories appear to be off by a multiplicative factor: 348

ANALYSIS T36-1 TABLE 2

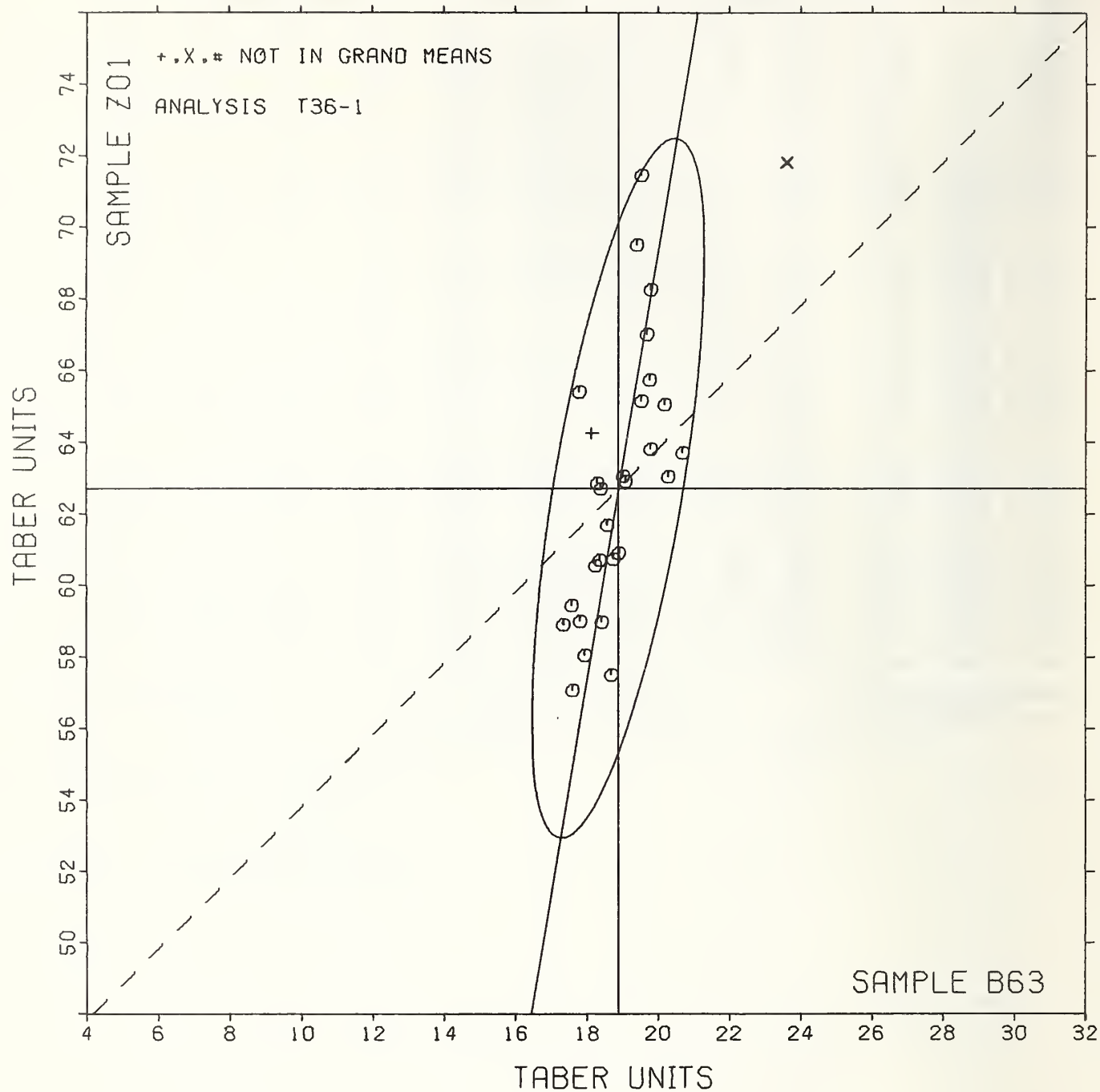
TABER STIFFNESS

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

LAB CODE	F	MEANS		COORDINATES		AVG R ₀ S ₀ Δ	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		B63	Z01	MAJOR	MINOR					
L228	#	17.20	92.10	28.72	6.49	1.29	36T	STIFFNESS,	TABER	
L250	Ø	17.35	58.90	-4.01	0.88	0.91	36T	STIFFNESS,	TABER	
L442	Ø	17.58	59.45	-3.43	0.74	0.95	36T	STIFFNESS,	TABER	
L484	Ø	17.61	57.06	-5.78	0.32	0.07	36T	STIFFNESS,	TABER	
L651	Ø	17.80	65.40	2.48	1.50	0.75	36T	STIFFNESS,	TABER	
L616	Ø	17.82	59.00	-3.03	0.43	0.56	36T	STIFFNESS,	TABER	
L692	Ø	17.95	58.05	-4.75	0.15	0.83	36T	STIFFNESS,	TABER	
L250	+	18.15	64.25	1.40	0.97	0.04	36U	STIFFNESS,	TABER,	20 C, 65% RH
L219	Ø	18.25	60.55	-2.23	0.26	1.00	36T	STIFFNESS,	TABER	
L126	Ø	18.30	62.85	0.05	0.59	0.88	36T	STIFFNESS,	TABER	
L212	Ø	18.37	60.70	-2.00	0.16	0.53	36T	STIFFNESS,	TABER	
L580	Ø	18.40	62.70	-0.08	0.47	0.74	36T	STIFFNESS,	TABER	
L318	Ø	18.43	58.98	-3.75	-0.17	0.83	36T	STIFFNESS,	TABER	
L703	Ø	18.58	61.68	-1.06	0.12	0.93	36T	STIFFNESS,	TABER	
L123	Ø	18.70	57.50	-5.16	-0.68	1.09	36T	STIFFNESS,	TABER	
L182	Ø	18.75	60.73	-1.97	-0.20	0.90	36T	STIFFNESS,	TABER	
L315	Ø	18.90	60.90	-1.78	-0.32	1.11	36T	STIFFNESS,	TABER	
L313	Ø	19.02	63.05	0.30	-0.09	0.82	36T	STIFFNESS,	TABER	
L604	Ø	19.10	62.90	0.23	-0.19	1.05	36T	STIFFNESS,	TABER	
L150	Ø	19.40	69.50	0.79	0.60	0.85	36T	STIFFNESS,	TABER	
L281	Ø	19.54	71.45	8.73	0.78	1.20	36T	STIFFNESS,	TABER	
L207	Ø	19.54	65.15	2.52	-0.25	1.43	36T	STIFFNESS,	TABER	
L570	Ø	19.70	67.00	4.37	-0.11	1.47	36T	STIFFNESS,	TABER	
L339	Ø	19.77	65.74	3.14	-0.38	1.74	36T	STIFFNESS,	TABER	
L262	Ø	19.80	63.80	1.23	-0.73	0.76	36T	STIFFNESS,	TABER	
L242	Ø	19.80	68.25	5.02	0.00	0.92	36T	STIFFNESS,	TABER	
L163	Ø	20.20	65.05	2.53	-0.92	1.11	36T	STIFFNESS,	TABER	
L324	Ø	20.29	63.04	0.36	-1.34	0.97	36T	STIFFNESS,	TABER	
L107A	Ø	20.70	63.70	1.28	-1.64	1.57	36T	STIFFNESS,	TABER	
L230	X	23.60	71.80	9.75	-3.10	1.70	36T	STIFFNESS,	TABER	
L388	#	36.45	85.40	25.27	-13.60	2.01	36T	STIFFNESS,	TABER	
L348	#	56.74	156.20	98.45	-21.97	4.91	36T	STIFFNESS,	TABER	
GMEANS:		18.88	62.71			1.00				
		55% ELLIPSE:		9.90	1.83	WITH GAMMA = 80 DEGREES				

STIFFNESS, TABER

SAMPLE B63 = 18.9 TABER UNITS SAMPLE Z01 = 62.7 TABER UNITS



ANALYSIS T49-1 TABLE 1

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

LAB CODE	SAMPLE J54 149 GRAMS PER SQUARE METER					SAMPLE J56 93 GRAMS PER SQUARE METER					TEST D ₀ = 4		
	MEAN	DEV	N ₀ DEV	SD _X	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L122	63.7	-23.5	-0.00	2.0	0.34	76.9	-52.7	-0.97	2.0	0.27	49Q	0	L122
L149	93.9	6.7	0.24	5.0	0.92	167.8	38.2	0.71	8.7	1.17	49L	0	L149
L182I	74.8	-12.4	-0.40	6.0	1.00	82.6	-46.9	-0.87	10.2	1.37	49Q	0	L182I
L190C	56.7	-30.4	-1.10	3.0	0.53	69.0	-60.6	-1.12	5.4	0.72	49T	0	L190C
L207	83.0	-4.2	-0.10	3.0	0.03	132.0	2.4	0.04	2.8	0.38	49I	0	L207
L242	1400.0	1312.0	47.00	70.7	11.00	2062.5	1932.0	35.72	75.0	10.11	49P	#	L242
L277	72.1	-15.0	-0.54	4.0	0.75	68.2	-41.4	-0.76	10.0	1.35	49I	0	L277
L280	73.0	-14.2	-0.51	10.0	1.04	112.2	-17.4	-0.32	4.5	0.60	49Q	0	L280
L291	87.0	-0.1	-0.00	8.0	1.39	NO DATA REPORTED FOR SAMPLE J56					49I	M	L291
L313	152.2	65.1	2.00	6.1	1.00	236.0	108.4	2.00	13.1	1.76	49W	0	L313
L388	91.8	4.0	0.17	13.9	2.29	167.4	37.8	0.70	6.2	0.84	49Q	0	L388
L484	1865.0	1777.0	04.41	38.0	6.32	1558.7	1429.2	26.41	23.6	3.18	49P	#	L484
L598	34.8	-52.4	-1.00	0.0	0.15	NO DATA REPORTED FOR SAMPLE J56					49W	M	L598
L643	110.5	23.3	0.04	5.0	0.60	161.8	32.3	0.60	11.4	1.53	49I	0	L643

GR₀ MEAN = 87.2 KP CM/SEC

GRAND MEAN = 129.6 KP CM/SEC

TEST DETERMINATIONS = 4

SD MEANS = 27.7 KP CM/SEC

SD OF MEANS = 54.1 KP CM/SEC

10 LABS IN GRAND MEANS

AVERAGE SDR = 6.1 KP CM/SEC

AVERAGE SDR = 7.4 KP CM/SEC

TOTAL NUMBER OF LABORATORIES REPORTING = 14

Data from the following laboratories were omitted
from the grand means because no viscosity values
were reported: 242, 484.

ANALYSIS T49-1 TABLE 2

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

LAB CODE	F	MEANS		COORDINATES		AVG D ₀ SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS						
		J54	J56	MAJOR	MINOR								
L598	M	34.8				0.15	49W	SURFACE PICK STRENGTH, IGT, 0IL					
L190C	0	56.7	69.0	-07.0	0.4	0.02	49T	SURFACE PICK STRENGTH, IGT, IPC FLUID					
L122	0	63.7	76.9	-07.7	-2.4	0.00	49Q	SURFACE PICK STRENGTH, IGT, IGT 0IL					
L277	0	72.1	88.2	-43.0	-4.9	1.00	49I	SURFACE PICK STRENGTH, IGT, PIB FLUID					
L280	0	73.0	112.2	-21.9	5.0	1.12	49Q	SURFACE PICK STRENGTH, IGT, IGT 0IL					
L182I	0	74.8	82.6	-47.0	-9.8	1.22	49Q	SURFACE PICK STRENGTH, IGT, IGT 0IL					
L207	0	83.0	132.0	0.3	4.8	0.00	49I	SURFACE PICK STRENGTH, IGT, PIB FLUID					
L291	M	87.0				1.00	49I	SURFACE PICK STRENGTH, IGT, PIB FLUID					
L388	0	91.8	167.4	35.9	12.0	1.00	49Q	SURFACE PICK STRENGTH, IGT, IGT 0IL					
L149	0	93.9	167.8	37.2	10.9	1.00	49L	SURFACE PICK STRENGTH, IGT, PIB FLUID					
L643	0	110.5	161.8	39.0	-0.0	1.20	49I	SURFACE PICK STRENGTH, IGT, PIB FLUID					
L313	0	152.2	238.0	120.0	-10.2	1.00	49W	SURFACE PICK STRENGTH, IGT, 0IL					
L242	#	1400.0	2062.5	2314.0	-518.4	10.00	49P	SURFACE PICK STRENGTH, IGT, IGT 0IL					
L484	#	1865.0	1558.7	2069.0	-958.7	4.70	49P	SURFACE PICK STRENGTH, IGT, IGT 0IL					
GMEANS:		87.2	129.6			1.00							
		95% ELLIPSE:	190.9	25.8				WITH GAMMA = 63 DEGREES					

ANALYSIS T50-1 TABLE 1

SURFACE PICK STRENGTH, WAX NUMBER

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

LAB CODE	SAMPLE J54		PRINTING 149 GRAMS PER SQUARE METER				SAMPLE J56		PRINTING 93 GRAMS PER SQUARE METER				TEST D ₀ = 5		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR		MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR		VAR	F	LAB
L105	8.80	-1.11	-1.09	.43	.83		8.00	-4.79	-7.77	.00	.00		50W	#	L105
L115	10.40	.49	.09	1.14	2.11		13.00	.21	.35	1.00	2.22		50W	0	L115
L158	10.00	.09	.17	.00	.00		13.00	.21	.35	.00	.00		50W	0	L158
L162	10.20	.29	.33	.43	.83		13.60	.81	1.32	.55	1.22		50W	0	L162
L182W	11.20	1.29	2.33	.43	.83		12.40	-.39	-.63	.55	1.22		50W	0	L182W
L183	10.40	.49	.09	.33	1.01		13.20	.41	.67	.84	1.86		50W	0	L183
L195	10.00	.09	.17	1.00	1.85		12.20	-.59	-.95	.84	1.86		50W	0	L195
L213	10.00	.09	.17	.00	.00		13.00	.21	.35	.00	.00		50W	0	L213
L225	9.80	-.11	-.19	.04	1.35		14.00	1.21	1.97	.00	.00		50W	0	L225
L228	9.80	-.11	-.19	.43	.83		13.00	.21	.35	.00	.00		50W	0	L228
L230	9.60	-.31	-.33	.33	1.01		12.40	-.39	-.63	.55	1.22		50W	0	L230
L285	9.20	-.71	-1.27	.43	.83		11.80	-.99	-1.60	.45	.99		50W	0	L285
L339	10.20	.29	.33	.43	.83		12.20	-.59	-.95	.45	.99		50W	0	L339
L366	9.40	-.51	-.91	.33	1.01		12.40	-.39	-.63	.55	1.22		50W	0	L366
L567	9.00	-.91	-1.03	.71	1.31		13.40	.61	1.00	.55	1.22		50W	0	L567
L616	9.40	-.51	-.91	.33	1.01		12.20	-.59	-.95	.45	.99		50W	0	L616
L697	9.00	-.91	-1.03	1.22	2.20		9.40	-3.39	-5.50	.55	1.22		50W	#	L697

GR₀ MEAN = 9.91 WAX NUMBER

GRAND MEAN = 12.79 WAX NUMBER

TEST DETERMINATIONS = 5

SD MEANS = .55 WAX NUMBER

SD OF MEANS = .62 WAX NUMBER

15 LABS IN GRAND MEANS

AVERAGE SDR = .54 WAX NUMBER

AVERAGE SDR = .45 WAX NUMBER

TOTAL NUMBER OF LABORATORIES REPORTING = 17

Best values: J54 10.0 ± 0.9 wax number

J56 12.8 ± 1.1 wax number

The following laboratories were omitted from the grand means because of extreme test results: 105, 697.

ANALYSIS T50-1 TABLE 2

SURFACE PICK STRENGTH, WAX NUMBER

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS							
		J54	J56	MAJOR	MINOR	R ₀ SDR	VAR								
105	#	8.80	8.00	-4.00	-0.70	.41	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
697	#	9.00	9.40	-3.49	-.38	1.74	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
567	0	9.00	13.40	.24	1.07	1.26	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
285	0	9.20	11.80	-1.18	.30	.31	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
616	0	9.40	12.20	-.73	.20	1.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
366	0	9.40	12.40	-.34	.33	1.11	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
230	0	9.60	12.40	-.47	.15	1.11	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
228	0	9.80	13.00	.10	.18	.41	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
225	0	9.80	14.00	1.09	.54	.77	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
158	0	10.00	13.00	.23	-.01	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
213	0	10.00	13.00	.23	-.01	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
195	0	10.00	12.20	-.51	-.30	1.25	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
162	0	10.20	13.60	.00	.02	1.02	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
339	0	10.20	12.20	-.44	-.49	.91	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
115	0	10.40	13.00	.30	-.38	2.16	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
183	0	10.40	13.20	.30	-.31	1.44	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
182W	0	11.20	12.40	.11	-1.35	1.02	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 GS75)							
MEANS:		9.91	12.79			1.00									
95% ELLIPSE:				1.79	1.55			WITH GAMMA = 68 DEGREES							

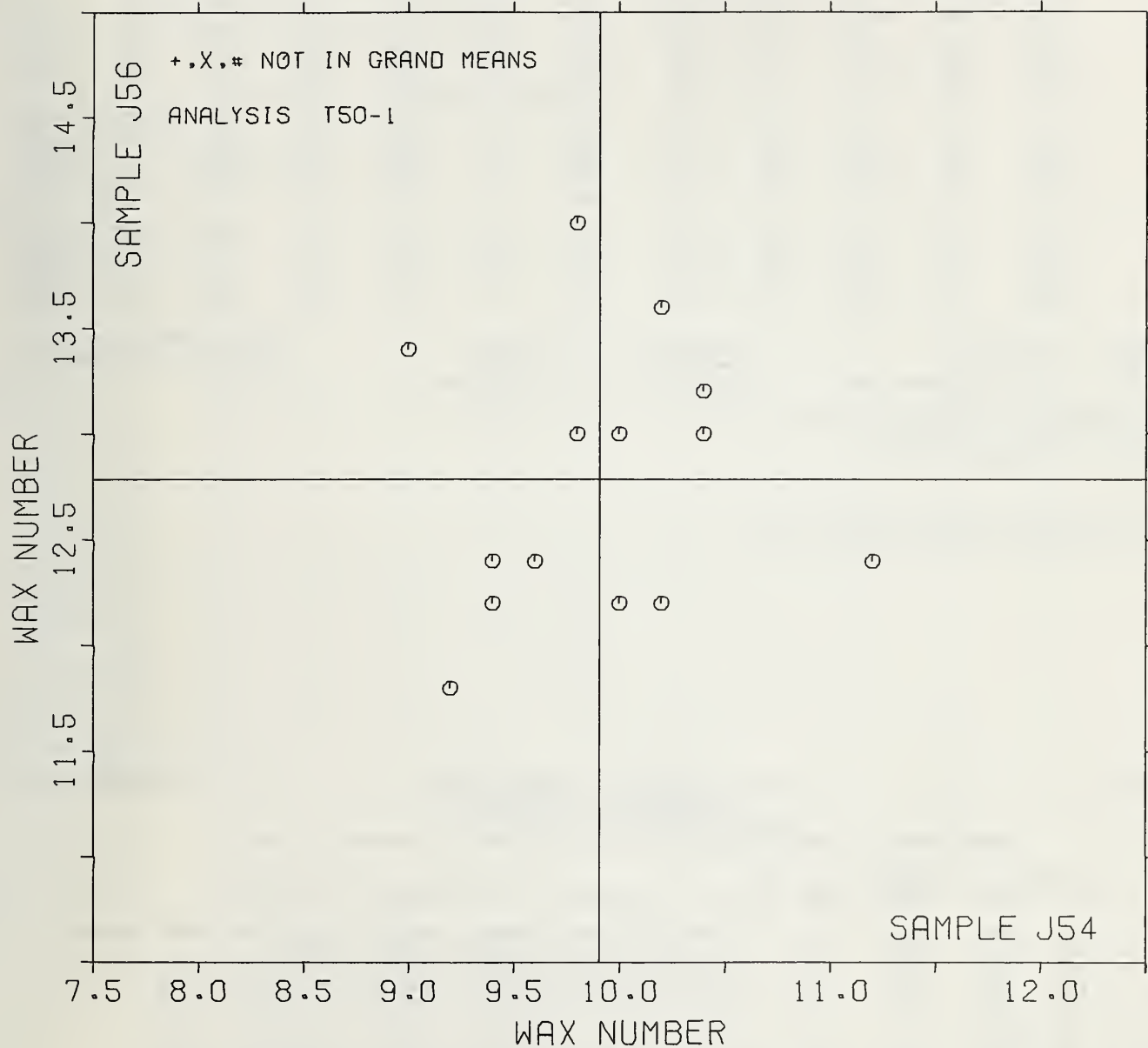
SURFACE PICK STRENGTH, WAX

SAMPLE J54 = 9.9

WAX NUMBER

SAMPLE J56 = 12.8

WAX NUMBER



ANALYSIS T91-1 TABLE 1
CONCOMA MEDIUM TEST 1, NEWTONS (CMT)
TAPPI OFFICIAL TEST METHOD T809 GS-71, FLAT CRUSH OF CORRUGATING MEDIUM

LAB CODE	SAMPLE	LINCOLNBOARD					SAMPLE	CORRUGATING MEDIUM					TEST D ₀ = 10		
	Bo7	143 GRAMS PER SQUARE METER					209	132 GRAMS PER SQUARE METER					VAR	F	LAH
	MEAN	DEV	No DEV	SDR	R ₀ SDR	MEAN	DEV	No DEV	SDR	R ₀ SDR					
L182	187 ₀	-4 ₀	-0.24	7 ₀	0.54	253 ₀	7 ₀	0.58	9 ₀	0.71	91N	Ø	L182		
L185	202 ₀	11 ₀	0.39	12 ₀	0.94	260 ₀	15 ₀	1.18	17 ₀	1.32	91A	Ø	L185		
L218	166 ₀	-26 ₀	-1.04	6 ₀	0.46	201 ₀	15 ₀	1.20	13 ₀	0.98	91A	Ø	L218		
L242	162 ₀	-29 ₀	-1.00	0 ₀	0.51	176 ₀	-69 ₀	-5.45	8 ₀	0.65	91G	#	L242		
L248	231 ₀	39 ₀	2.15	20 ₀	1.58	257 ₀	12 ₀	0.90	15 ₀	1.14	91H	Ø	L248		
L269	194 ₀	2 ₀	0.13	9 ₀	0.74	248 ₀	2 ₀	0.19	8 ₀	0.58	91P	Ø	L269		
L280	213 ₀	22 ₀	1.00	25 ₀	1.99	264 ₀	19 ₀	1.47	14 ₀	1.10	91N	Ø	L280		
L313	197 ₀	5 ₀	0.30	13 ₀	1.04	227 ₀	-19 ₀	-1.46	5 ₀	0.35	91L	Ø	L313		
L329	167 ₀	-25 ₀	-1.03	7 ₀	0.59	238 ₀	-7 ₀	-0.58	14 ₀	1.05	91P	Ø	L329		
L394	176 ₀	-16 ₀	-0.67	8 ₀	0.62	233 ₀	-13 ₀	-1.00	21 ₀	1.63	91P	Ø	L394		
L484	179 ₀	-13 ₀	-0.79	10 ₀	0.80	229 ₀	-16 ₀	-1.24	12 ₀	0.92	91N	Ø	L484		
L621	204 ₀	12 ₀	0.60	21 ₀	1.72	232 ₀	-13 ₀	-1.01	18 ₀	1.41	91P	Ø	L621		
L622	179 ₀	-12 ₀	-0.68	14 ₀	1.16	237 ₀	-9 ₀	-0.68	8 ₀	0.64	91N	Ø	L622		
L650	186 ₀	-5 ₀	-0.23	13 ₀	1.00	244 ₀	-1 ₀	-0.10	14 ₀	1.05	91N	Ø	L650		
L666	201 ₀	10 ₀	0.54	9 ₀	0.76	252 ₀	7 ₀	0.54	15 ₀	1.13	91S	Ø	L666		

GR. MEAN = 192.0 N(CMT) GRAND MEAN = 245.0 N(CMT) TEST DETERMINATIONS = 10
SD MEANS = 18.0 N(CMT) SD OF MEANS = 13.0 N(CMT) 14 LAJS IN GRAND MEANS
AVERAGE SDR = 12.0 N(CMT) AVERAGE SDR = 13.0 N(CMT)
GR. MEAN = 43.08 POUNDS GRAND MEAN = 55.14 POUNDS
TOTAL NUMBER OF LABORATORIES REPORTING = 15
Best values: E67 190 + 30 newtons
 Z09 240 + 20 newtons

The following laboratories were omitted from the grand means because of extreme test results: 242.

ANALYSIS T91-1 TABLE 2
CONCORA MEDIUM TEST, NEWIENS(CMT)
TAPPI OFFICIAL TEST METHOD 4809 GS-71. FLAT CRUSH OF CORRUGATING MEDIUM

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY--TEST INSTRUMENT--CONDITIONS				
		E67	Z09	ADJ04	ADJ08	ADJ04	VAR					
L242	#	162 ₀	176 ₀	-53 ₀	-53 ₀	0.58	91G	FLAT	CRUSH	STRENGTH,	CANCORA,	GAYDON FLAT CRUSH TESTER
L218	Ø	166 ₀	261 ₀	-14 ₀	24 ₀	0.72	91A	FLAT	CRUSH	STRENGTH,	CANCORA,	INSTRON
L329	Ø	167 ₀	238 ₀	-20 ₀	3 ₀	0.62	91P	FLAT	CRUSH	STRENGTH,	CANCORA,	TMI/HINDE & DAUCH
L394	Ø	176 ₀	233 ₀	-20 ₀	-8 ₀	1.012	91P	FLAT	CRUSH	STRENGTH,	CANCORA,	TMI/HINDE & DAUCH
L484	Ø	179 ₀	229 ₀	-18 ₀	-10 ₀	0.00	91N	FLAT	CRUSH	STRENGTH,	CANCORA,	TMI/HINDE & DAUCH
L622	Ø	179 ₀	237 ₀	-13 ₀	-3 ₀	0.99	91N	FLAT	CRUSH	STRENGTH,	CANCORA,	TMI/HINDE & DAUCH
L650	Ø	186 ₀	244 ₀	-3 ₀	1 ₀	1.005	91N	FLAT	CRUSH	STRENGTH,	CANCORA,	TMI/HINDE & DAUCH
L182	Ø	187 ₀	253 ₀	-1 ₀	0 ₀	0.62	91N	FLAT	CRUSH	STRENGTH,	CANCORA,	TMI/HINDE & DAUCH
L265	Ø	194 ₀	248 ₀	3 ₀	1 ₀	0.00	91P	FLAT	CRUSH	STRENGTH,	CANCORA,	TMI/HINDE & DAUCH
L313	Ø	197 ₀	227 ₀	-2 ₀	-19 ₀	0.09	91L	FLAT	CRUSH	STRENGTH,	CANCORA,	LIBERTY
L666	Ø	201 ₀	252 ₀	12 ₀	3 ₀	0.54	91B	FLAT	CRUSH	STRENGTH,	CANCORA,	TOYO SEIKI (METHOD JIS-P-8126)
L185	Ø	202 ₀	260 ₀	10 ₀	10 ₀	1.015	91A	FLAT	CRUSH	STRENGTH,	CANCORA,	INSTRON
L621	Ø	204 ₀	232 ₀	0 ₀	-17 ₀	1.030	91P	FLAT	CRUSH	STRENGTH,	CANCORA,	TMI/HINDE & DAUCH
L280	Ø	213 ₀	264 ₀	27 ₀	9 ₀	1.005	91N	FLAT	CRUSH	STRENGTH,	CANCORA,	TMI/HINDE & DAUCH
L248	Ø	231 ₀	257 ₀	41 ₀	-4 ₀	1.000	91B	FLAT	CRUSH	STRENGTH,	CANCORA,	INSTRON
GMEANS:		192 ₀	245 ₀			1.000						
		55% ELLIPSE:		50 ₀	-3 ₀		WAVE	GAMMA = 22	DEGREES			

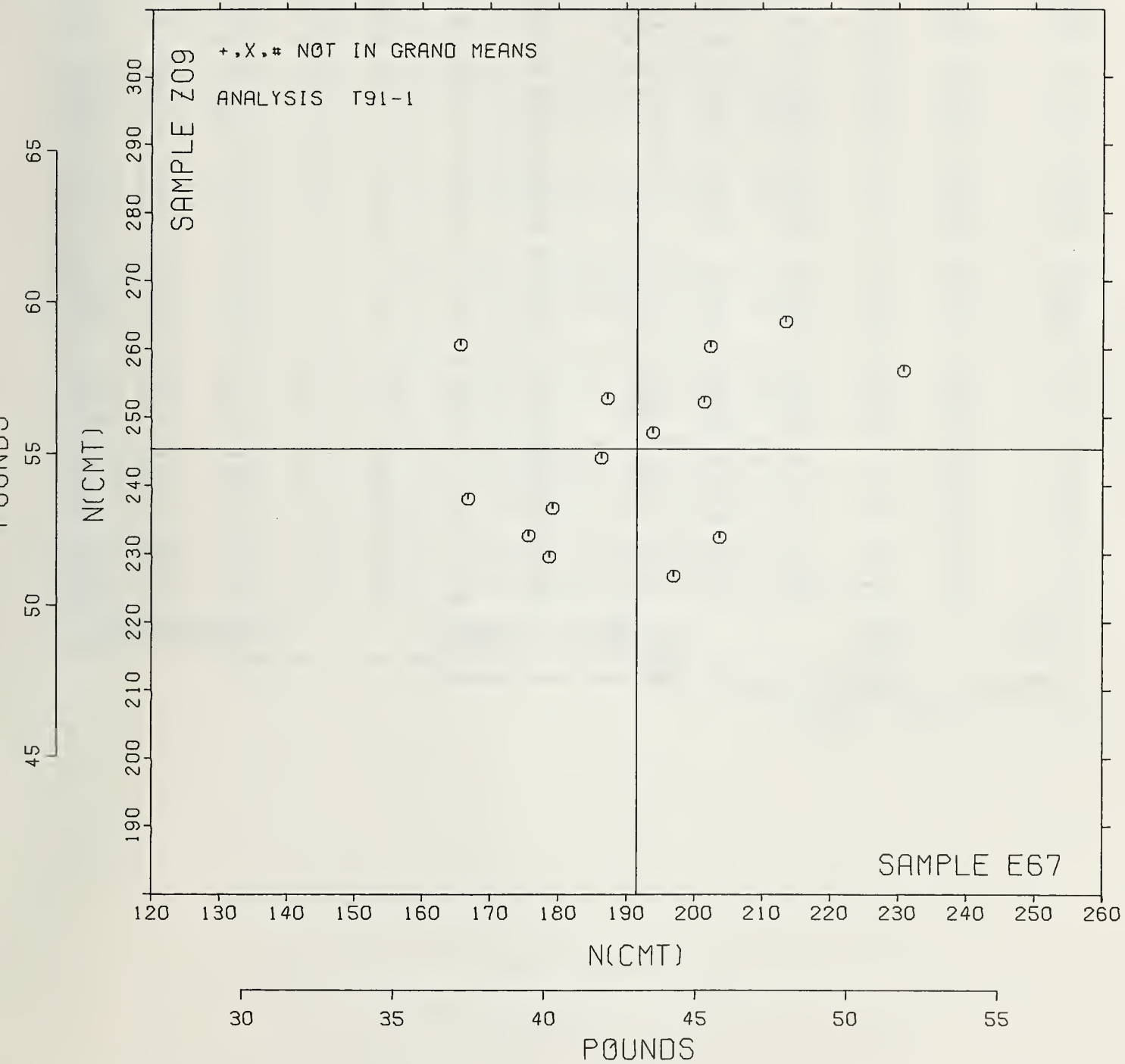
CONCORA (CMT)

SAMPLE E67 = 192. N(CMT)

SAMPLE Z09 = 245. N(CMT)

SAMPLE E67 = 43.1 POUNDS

SAMPLE Z09 = 55.1 POUNDS



TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T96-1 TABLE 1
RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)
TAPPI OFFICIAL TEST METHOD T818 6S-76

SEPTEMBER 1979

LAB CODE	LINBOARD					CORRUGATING MEDIUM					TEST D ₀ = 10		
	SAMPLE E67 MEAN	143 GRAMS PER DEV	SQUARE METER NO. DEV	SDR	2. SDR	SAMPLE Z11 MEAN	132 GRAMS PER DEV	SQUARE METER NO. DEV	SDR	R ₀ SDR	VAR	F	LAB
L107	210.	-32.	-1.00	18.	1.11	155.	-21.	-1.09	8.	.72	96P	6	L107
L114	250.	9.	.00	14.	.91	201.	25.	1.30	8.	.81	96P	6	L114
L124	259.	18.	.74	18.	1.15	190.	14.	.73	10.	.92	96P	6	L124
L141	231.	-10.	-.04	16.	1.10	104.	-12.	-.62	20.	1.98	96P	6	L141
L157	230.	-12.	-.04	19.	1.18	181.	5.	.23	5.	.46	96P	6	L157
L171	227.	-14.	-.00	19.	1.17	145.	-31.	-1.60	28.	2.70	96N	6	L171
L182	270.	29.	1.48	14.	.88	192.	16.	.84	8.	.81	96N	6	L182
L191	230.	-11.	-.04	31.	1.98	109.	-7.	-.36	21.	2.07	96P	6	L191
L218	233.	-8.	-.04	10.	1.00	170.	-6.	-.33	11.	1.07	96I	6	L218
L234	200.	-41.	-1.00	24.	1.02	130.	-46.	-2.36	10.	.97	96P	6	L234
L237	202.	21.	.04	20.	1.07	168.	-8.	-.40	12.	1.19	96P	6	L237
L242	295.	54.	2.49	15.	.83	213.	37.	1.89	7.	.69	96G	6	L242
L303	243.	2.	.00	10.	.03	178.	2.	.11	6.	.59	96N	6	L303
L305	226.	-16.	-.00	12.	.78	188.	12.	.62	10.	1.01	96P	6	L305
L329	231.	39.	1.01	14.	.91	194.	18.	.94	8.	.81	96P	6	L329
L333	231.	-10.	-.04	10.	.93	161.	-15.	-.75	6.	.57	96P	6	L333
L350	235.	-6.	-.07	21.	1.03	188.	12.	.60	18.	1.69	96P	6	L350
L393	266.	25.	1.01	19.	1.22	184.	8.	.39	9.	.91	96P	6	L393
L484	210.	-31.	-1.00	13.	.80	157.	-19.	-.97	12.	1.11	96P	6	L484
L553	251.	10.	.04	10.	1.00	109.	13.	.64	10.	.95	96P	6	L553
L562	222.	-20.	-.01	14.	.91	171.	-5.	-.24	17.	1.65	96P	6	L562
L570	204.	-38.	-1.00	13.	.82	139.	-37.	-1.91	5.	.44	96P	6	L570
L580	278.	37.	1.04	12.	.73	199.	23.	1.17	7.	.70	96P	6	L580
L603	223.	-19.	-.70	33.	2.10	153.	-23.	-1.20	9.	.88	96P	6	L603
L610	268.	26.	1.00	10.	.02	196.	20.	1.01	13.	1.28	96P	6	L610
L617	242.	1.	.00	10.	.64	176.	2.	.10	7.	.67	96P	6	L617
L621	249.	8.	.02	19.	1.18	180.	4.	.22	4.	.38	96P	6	L621
L623	204.	22.	.02	8.	.53	180.	4.	.21	8.	.76	96P	6	L623
L649	225.	-16.	-.07	10.	.61	172.	-4.	-.20	7.	.70	96P	6	L649
L650	258.	17.	.00	14.	.07	200.	24.	1.22	7.	.64	96N	6	L650
L663	224.	-17.	-.70	13.	.82	170.	-6.	-.29	12.	1.18	96P	6	L663
L676	260.	18.	.74	8.	.51	196.	22.	1.12	11.	1.06	96P	6	L676
L686	255.	14.	.00	10.	1.02	184.	8.	.39	6.	.61	96P	6	L686
L703	196.	-45.	-1.00	9.	.59	146.	-28.	-1.42	10.	1.01	96J	6	L703

GR₀ MEAN = 241. NEWTONS

GRAND MEAN = 176. NEWTONS

TEST DETERMINATIONS = 10

SD MEANS = 24. NEWTONS

SD OF MEANS = 20. NEWTONS

34 LABS IN GRAND MEANS

AVERAGE SDR = 10. NEWTONS

AVERAGE SDR = 10. NEWTONS

GR₀ MEAN = 54.26 POUNDS

GRAND MEAN = 39.57 POUNDS

TOTAL NUMBER OF LABORATORIES REPORTING = 34

Best values: E67 240 ± 40 newtons

Z11 180 ± 30 newtons

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T96-1 TABLE 2
RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)
TAPPI OFFICIAL TEST METHOD T818 6S-76

SEPTEMBER 1979

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY--TEST INSTRUMENT--CONDITIONS		
		E67	Z11	MAJOR	MINOR	MO	VAR			
L703	Ø	156.	148.	-53.	6.	000	90J	RING CRUSH,	INSTRON	
L234	Ø	200.	130.	-61.	-12.	1044	90P	RING CRUSH,	TMI/HINDE & DAUCH	
L570	Ø	204.	139.	-53.	-7.	003	90P	RING CRUSH,	TMI/HINDE & DAUCH	
L107	Ø	210.	155.	-30.	3.	092	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L484	Ø	210.	157.	-30.	4.	090	96R	RING CRUSH,	REGMED	
L562	Ø	222.	171.	-19.	8.	1048	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L603	Ø	223.	153.	-29.	-7.	1049	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L663	Ø	224.	170.	-17.	0.	1000	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L649	Ø	225.	172.	-15.	7.	000	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L305	Ø	226.	168.	-5.	19.	090	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L171	Ø	227.	145.	-30.	-10.	1094	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L157	Ø	230.	181.	-7.	11.	002	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L191	Ø	230.	169.	-13.	1.	2002	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L141	Ø	231.	164.	-10.	-3.	1057	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L333	Ø	231.	161.	-17.	-5.	075	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L218	Ø	233.	170.	-11.	-0.	1004	96I	RING CRUSH,	INSTRON	
L350	Ø	235.	168.	2.	13.	1051	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L617	Ø	242.	178.	2.	1.	005	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L303	Ø	243.	178.	3.	1.	001	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L621	Ø	249.	180.	9.	-1.	078	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L114	Ø	250.	201.	22.	15.	000	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L553	Ø	251.	189.	10.	4.	098	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L686	Ø	255.	184.	10.	-2.	002	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L650	Ø	258.	200.	20.	9.	075	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L124	Ø	259.	190.	23.	1.	1003	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L676	Ø	260.	198.	20.	6.	078	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L237	Ø	262.	168.	12.	-19.	1058	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L623	Ø	264.	180.	20.	-10.	005	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L393	Ø	266.	184.	24.	-9.	1000	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L610	Ø	268.	190.	30.	-0.	095	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L182	Ø	270.	192.	33.	-5.	004	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L580	Ø	278.	159.	43.	-4.	071	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L329	Ø	281.	194.	42.	-9.	000	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L242	Ø	295.	213.	05.	-3.	070	96G	RING CRUSH,	GAYDON FLAT CRUSH TESTER	
GMEANS:		241.	176.			1000				
		95% ELLIPSE:		70.	22.	WALL GAMMA = 37 DEGREES				

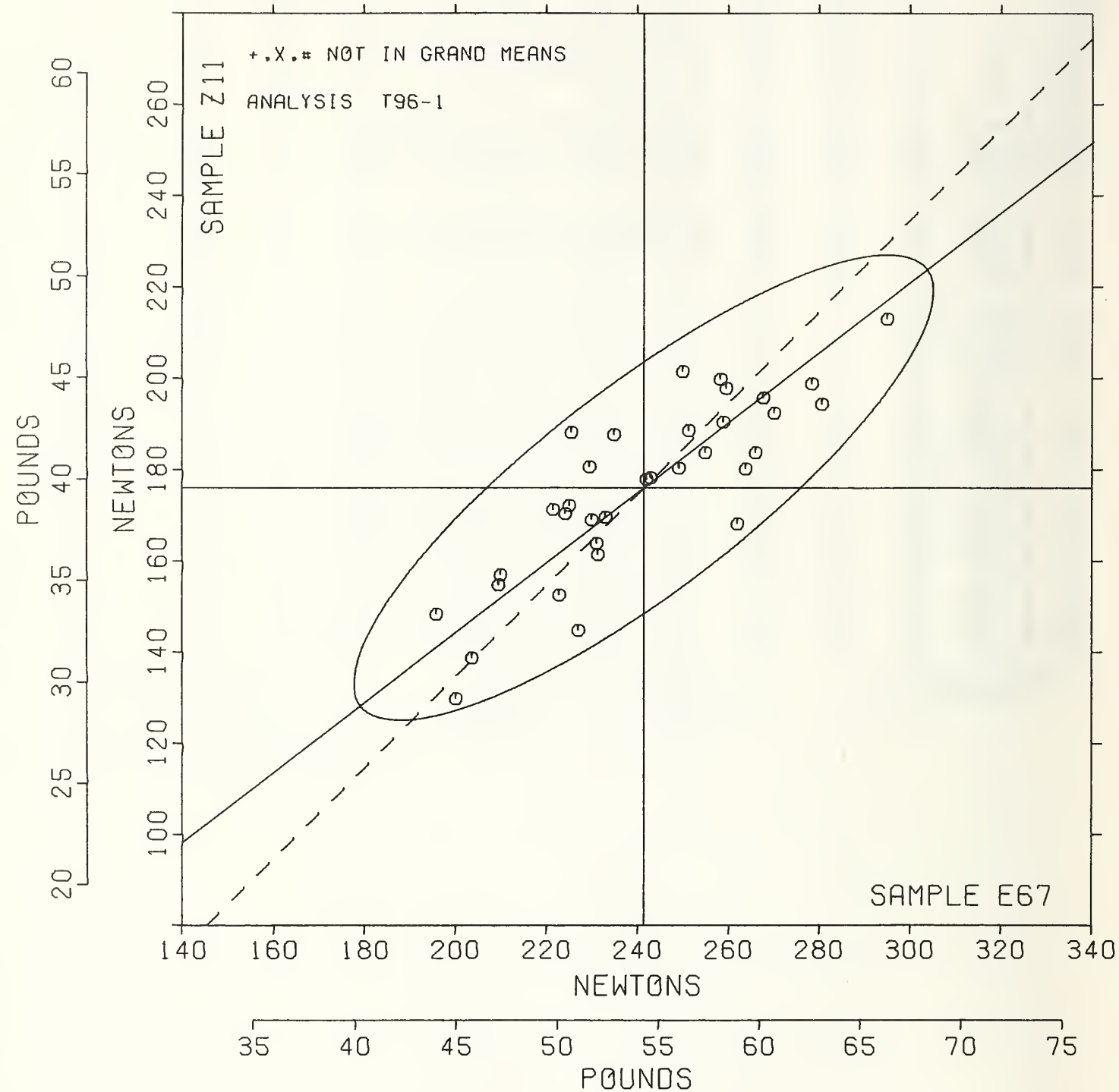
RING CRUSH

SAMPLE E67 = 241. NEWTONS

SAMPLE Z11 = 176. NEWTONS

SAMPLE E67 = 54.3 POUNDS

SAMPLE Z11 = 39.6 POUNDS



SUMMARY TABLE

TEST METHOD	SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDR	REPL CRP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPROD
BURSTING STRENGTH, MODEL C T10-1 PSI	J08 A38	170.10 280.42	1029 1090	1008 1093	15	38	47	10	094 1069	3061 5035
BURSTING STRENGTH, MODEL C-A T10-2 PSI	J08 A38	170.06 270.57	1001 2027	1011 1077	15	40	43	10	097 1055	4051 6036
BURSTING STRENGTH, HIGH RANGE T11-1 PSI	A28 A03	490.7 610.6	20.4 30.2	30.8 40.1	15	39	50	10	303 306	609 901
TEARING STRENGTH, PRINTING PAPERS T15-1 GRAMS	G08 E80	390.0 400.2	10.9 20.2	10.5 10.3	15	116	135	10	104 101	504 601
TEARING STRENGTH, PACKAGING PAPERS T16-1 GRAMS	K30 A03	1160.1 1320.1	30.6 60.0	40.3 50.6	15	4	15	10	308 409	1003 1608
TENSILE STRENGTH, PACKAGING PAPERS T19-1 KILONEWTN/M	K34 J02	90.55 50.65	0.30 0.32	0.61 0.22	20	44	49	10	053 019	092 089
TENSILE STRENGTH, CRE, PRINTING PAPERS T20-1 KILONEWTN/M	G08 J72	302.19 306.27	0.193 0.207	0.141 0.154	20	45	51	10	0124 0135	0542 0582
TENSILE STRENGTH, PENDULUM, PRINTING P. T20-2 KILONEWTN/M	G08 J72	302.6 300.8	0.21 0.10	0.15 0.18	20	41	41	10	013 016	058 046
T0E0A0, PACKAGING PAPERS T25-1 JOULES/SQ M	K34 J02	950.9 800.3	50.9 70.0	130.2 90.3	20	17	19	10	1106 801	1804 2108
T0E0A0, PRINTING PAPERS T26-1 JOULES/SQ M	G08 J72	330.7 400.8	10.0 20.0	30.6 40.4	20	15	19	10	302 308	409 707
ELONGATION TO BREAK, PACKAGING PAPER T28-1 PERCENT	K34 J02	10.74 20.15	0.10 0.18	0.15 0.18	20	16	16	10	014 016	045 051
ELONGATION TO BREAK, PRINTING PAPER T29-1 PERCENT	G08 J72	100.18 107.20	0.172 0.225	0.141 0.148	20	19	24	10	0123 0129	0485 0629
FOLDING ENDURANCE (MIT) T30-1 DOUBLE FOLDS	A08 A30	510.3 160.0	130.8 20.1	200.3 40.7	15	33	39	10	1708 401	3905 603
FOLDING ENDURANCE (MIT) T30-2 LOG(10) FOLD	A08 A30	100.72 102.00	0.118 0.055	0.167 0.122	15	32	39	10	0146 0107	0337 0164
STIFFNESS, GURLEY T35-1 GURLEY UNITS	J28 A04	4060 2420	340 280	260 130	10	32	33	10	230 120	940 780
STIFFNESS, TABER T36-1 TABER UNITS	A03 Z01	180.88 620.71	0.91 300.8	0.79 20.47	10	27	32	5	058 3006	2063 10043
SURFACE PICK STRENGTH, IGT T49-1 KP CM/SEC	J54 J50	070.2 1290.6	270.7 540.1	60.1 70.4	4	10	14	4	804 1003	7608 14909
SURFACE PICK STRENGTH, WAX T50-1 WAX NUMBER	J54 J50	90.91 120.79	0.55 0.62	0.54 0.45	5	15	17	5	067 056	1054 1071
CENCOGRA (CMT) T91-1 N(CMT)	E07 Z09	1920 2450	100 130	120 130	10	14	15	10	110 110	500 350
RING CRUSH T96-1 NEWTONS	E07 Z11	2410 1700	240 200	160 100	10	34	34	10	140 90	680 540

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