

NBSIR 79-1370



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

**COLLABORATIVE REFERENCE PROGRAM
FOR PAPER**

**REPORT NO. 57S
STRENGTH TESTS**



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

NBS COLLABORATIVE REFERENCE PROGRAMS

TAPPI Paper and Board (6 times per year)

Bursting strength	Smoothness
Tearing strength	Surface pick strength
Tensile breaking strength	K & N ink absorption
Elongation to break	pH
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

CTS Thermal Insulation Materials (2 times per year)

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

ASTM Cement (2 times per year)

Chemical (11 chemical components)
Physical (8 characteristics)

AASHTO Bituminous

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

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

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

**COLLABORATIVE REFERENCE PROGRAM
FOR PAPER**

**Report No. 57S
STRENGTH TESTS**

**R. G. Powell
TAPPI-NBS Research Associate
Collaborative Testing Services, Inc.**

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

NBSIR 79-1370

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



INTRODUCTION

Reports 57S and 57G comprise the third set of reports for the 78-79 program year. Participants in tests which involve strength properties of paper will receive only the S report; those in tests which measure other properties will receive only the G report.

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

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



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

April 23, 1979

BACKGROUND AND PURPOSE

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

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

HOW THE PROGRAM WORKS

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

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

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

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

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

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

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

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

TABLE OF CONTENTS

Analyses In This Report

PAGE

i	Introduction
ii	Description of Program
iv	Metric Conversion Table
1	Key to Tables and Graphs
5	10-1 Bursting Strength - Up to 45 psi
8	10-2 Bursting Strength - Up to 45 psi, Air Clamps
11	11-1 Bursting Strength - Up to 100 psi
14	15-1 Tearing Strength - Deep Cutout
21	17-1 Tearing Strength - No Cutout
23	19-1 Tensile Breaking Strength - Packaging Papers
26	20-1 Tensile Breaking Strength - Printing Papers, CRE
29	20-2 Tensile Breaking Strength - Printing Papers, pendulum
32	25-1 Tensile Energy Absorption - Packaging Papers
34	26-1 Tensile Energy Absorption - Printing Papers
36	28-1 Elongation to Break - Packaging Papers
38	29-1 Elongation to Break - Printing Papers
40	30-1 Folding Endurance, MIT type
43	30-2 Folding Endurance, MIT type, log (base 10)
46	35-1 Stiffness, Gurley
49	36-1 Stiffness, Taber
52	49-1 Surface Pick Strength, IGT
53	50-1 Surface Pick Strength, Wax
55	91-1 Concora (Flat Crush)
57	96-1 Ring Crush
60	Summary
	Diagram of Elmendorf tear testers, deep cutout vs. no cutout

Analyses In The G Report

40-1	Air Resistance, Gurley Oil type
40-2	Air Resistance, Sheffield type
41-1	Air Resistance, Gurley Mercury type
44-1	Smoothness, Parker Printsurf
45-1	Smoothness, Sheffield type
45-2	Smoothness, Bekk type
47-1	Smoothness, Bendtsen type
56-1	K & N Ink Absorption
57-1	pH, Cold Extraction
57-2	pH, Hot Extraction
60-1	Opacity, White (89%) Backing
60-2	Opacity, Paper Backing, B & L type
60-3	Opacity, Paper Backing, Elrepho type
65-1	Blue Reflectance (Brightness), Directional
65-2	Blue Reflectance, Diffuse, Elrepho (Gloss Trap)
65-3	Blue Reflectance, Diffuse, Elrepho (No Gloss Trap)
75-1	Specular Gloss, 75 degree
90-1	Thickness (Caliper)
95-1	Grammage (Basis Weight)

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.) and again at the bottom of this table.
- GRAND MEAN - (GR. MEAN) The average of the individual laboratory MEANS, excluding laboratories flagged (see column F) with an X, #, or +. The GRAND MEAN is given in US customary units and, where applicable, in SI metric units.
- SD OF MEANS - (SD MEANS) The standard deviation of the laboratory MEANS about the GRAND MEAN; an index of the among-laboratory precision.
- DEV - The deviation or difference of the laboratory MEAN from the GRAND MEAN.
- N. DEV - The normal deviate or ratio of the DEV to the SD OF MEANS; an indication of the degree of divergence of the laboratory MEAN from the GRAND MEAN. A N. DEV of more than 2 or less than -2 may indicate that the participant is not following the procedure considered standard for this analysis.
- SDR - The standard deviation of repeated measurements; that is, of individual test determinations about their MEAN.
- AVERAGE SDR - The average of the individual laboratory SDR's; an index of the within-laboratory precision of repeated measurements.
- R. SDR - The relative standard deviation of repeated measurements; that is, the ratio of the SDR to the AVERAGE SDR: an indication of the ability of a participant to repeat his measurements relative to the average ability. The greater the number of TEST DETERMINATIONS the closer the R. SDR should be to unity. If R. SDR is outside the limits given below, the participant may not be following the procedure considered standard for this analysis:

<u>No. of test Determinations</u>	<u>Lower limit for R. SDR</u>	<u>Upper limit for R. SDR</u>
3	0.09	2.58
5	0.27	2.06
8	0.40	1.77
10	0.46	1.67
15	0.56	1.53
20	0.61	1.45
25	0.65	1.39

- VAR - Code for instrument type or variation in condition, see second table.
- F - Flag, with following meaning:
- + - Excluded from grand means because VAR non-standard for this analysis
- # - Excluded because data were not understood or because of a non-coded variation reported by the laboratory. (See NOTES following Table 1 for each method.)
- M - Excluded because data for one sample are missing
- X - Excluded because plotted point would fall outside of the 99% error ellipse, (see below for explanation of Graph)
- * - Included in grand means but plotted point falls outside of the 95% error ellipse. The participant should take this as a warning to reexamine his testing procedure
- S - Included in grand mean but only after omission of one of more 'wild' values; that is, test determinations more than 3 times AVERAGE SDR from the laboratory's MEAN. Not more than 20% of the test determination may be excluded in this manner without rejecting the laboratory.
- 0 - Included in grand mean and inside 95% error ellipse.
- COORDINATES - Distances along major and minor axes of error ellipse. If special additive or concurrent model of the measuring process applies to this method, the distance along the minor axis represents the random error within a laboratory while that along the major axis also includes a systematic laboratory component of error.

95% ELLIPSE -

Lengths of the major and minor axes of the ellipse and the angle that the major axis makes with the horizontal axis.

AVG R. SDR -

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

Graph -

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

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

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

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

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

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

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

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

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

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

ANALYSIS T10-1 TABLE 1
BURSTING STRENGTH, PSI
TAPPI STANDARD T403 68-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C

LAB CODE	SAMPLE J67		PRINTING 76 GRAMS PER SQUARE METER				SAMPLE K37		PRINTING 75 GRAMS PER SQUARE METER				TEST D. = 15		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB		
L121	15.33	-1.53	-1.29	1.03	.88	25.20	-2.32	-1.34	1.42	.77	10C	6	L121		
L128	18.47	1.60	1.35	.83	.71	27.60	-1.12	-1.07	1.80	.97	10C	6	L128		
L131	15.13	-1.73	-1.46	.35	.30	25.73	-1.99	-1.06	.59	.32	10C	6	L131		
L134	16.23	-.63	-.53	.59	.51	30.80	3.08	1.64	1.54	.83	10C	*	L134		
L150	17.27	.40	.34	1.61	1.38	28.73	1.01	.54	2.23	1.20	10C	6	L150		
L153	17.90	1.03	.87	1.47	1.25	29.80	2.08	1.10	1.66	.89	10C	6	L153		
L158	16.20	-.67	-.56	1.37	1.17	26.73	-.99	-.53	1.22	.66	10C	6	L158		
L161	12.63	-4.23	-3.56	1.11	.95	24.33	-3.39	-1.80	2.23	1.20	10C	X	L161		
L167	16.60	-.27	-.22	.54	.46	26.45	-1.28	-.68	.89	.48	10C	6	L167		
L183	17.03	.17	.14	1.34	1.15	27.83	.11	.06	2.03	1.09	10C	6	L183		
L203B	13.97	-2.90	-2.44	1.25	1.07	28.90	1.18	.63	3.10	1.67	10C	X	L203B		
L203S	16.05	-.82	-.69	1.39	1.19	26.93	-.79	-.42	3.16	1.70	10C	6	L203S		
L207	18.53	1.67	1.40	1.01	.86	30.80	3.08	1.64	2.26	1.22	10C	6	L207		
L212	16.77	-.10	-.08	1.18	1.01	26.97	-.76	-.40	1.83	.98	10C	6	L212		
L223A	19.17	2.31	1.94	1.58	1.35	31.57	3.84	2.04	2.02	1.09	10C	6	L223A		
L225	16.97	.10	.09	1.30	1.11	29.50	1.78	.94	2.04	1.10	10C	6	L225		
L232	15.73	-1.13	-.95	1.45	1.24	27.97	.24	.13	1.52	.82	10C	6	L232		
L237A	14.13	-2.73	-2.30	.92	.78	24.93	-2.79	-1.48	.80	.43	10C	6	L237A		
L237B	17.00	.13	.11	1.07	.91	26.53	-1.19	-.63	.88	.47	10C	6	L237B		
L243	17.33	.47	.39	1.36	1.16	26.23	-1.49	-.79	2.75	1.48	10C	6	L243		
L248	17.42	.55	.47	1.10	.94	27.19	-.53	-.28	1.48	.79	10E	6	L248		
L249	16.95	.09	.07	1.36	1.17	28.28	.56	.30	2.01	1.08	10C	6	L249		
L261	16.60	-.27	-.22	1.00	.86	27.10	-.62	-.33	2.01	1.08	10C	6	L261		
L264	16.67	-.20	-.17	.82	.70	26.27	-1.46	-.78	1.49	.80	10C	6	L264		
L274	17.07	.20	.17	1.00	.85	30.63	2.91	1.55	1.39	.75	10C	6	L274		
L278	15.07	-1.80	-1.51	1.33	1.14	26.63	-1.09	-.58	2.05	1.10	10C	6	L278		
L279	16.83	-.03	-.03	1.03	.88	25.93	-1.79	-.95	1.99	1.07	10C	6	L279		
L299	18.87	2.00	1.68	1.53	1.31	31.60	3.88	2.06	2.00	1.08	10C	6	L299		
L311	18.03	1.17	.98	1.41	1.20	31.13	3.41	1.81	2.49	1.34	10C	6	L311		
L312	16.59	.12	.10	1.09	.93	28.46	.74	.39	1.72	.92	10C	6	L312		
L315	19.27	2.40	2.02	1.56	1.33	30.73	3.01	1.60	2.10	1.13	10C	6	L315		
L321	17.23	.37	.31	1.13	.97	29.07	1.34	.71	2.23	1.20	10C	6	L321		
L326	16.80	-.07	-.05	1.10	.94	26.53	-1.19	-.63	1.43	.77	10C	6	L326		
L330	16.31	-.56	-.47	1.20	1.03	26.12	-1.60	-.85	2.79	1.50	10C	6	L330		
L331	16.87	.00	.00	1.45	1.25	27.40	-.32	-.17	2.16	1.17	10C	6	L331		
L333	14.75	-2.11	-1.78	1.26	1.08	24.88	-2.84	-1.51	2.16	1.16	10C	6	L333		
L339	10.51	-6.35	-5.34	.05	.04	15.52	-12.20	-6.49	.11	.06	10C	#	L339		
L344	15.57	-1.30	-1.09	1.22	1.05	26.80	-.92	-.49	2.12	1.14	10C	6	L344		
L356	17.43	.56	.47	1.17	1.00	25.78	-1.94	-1.03	2.23	1.20	10C	6	L356		
L358	16.90	.03	.03	.51	.43	28.19	.47	.25	1.39	.75	10C	6	L358		
L360	17.52	.65	.55	1.11	.95	27.65	-.08	-.04	1.81	.98	10C	6	L360		
L366	17.60	.73	.62	1.43	1.22	27.23	-.49	-.26	1.92	1.03	10C	6	L366		
L390	18.33	1.47	1.23	1.36	1.16	28.60	.88	.47	1.20	.65	10C	6	L390		
L568	17.50	.63	.53	.96	.82	28.32	.60	.32	2.55	1.37	10C	6	L568		
L599	17.51	.65	.55	.95	.81	28.25	.52	.28	1.89	1.02	10C	6	L599		
L626	15.68	-1.18	-.99	1.03	.88	25.85	-1.88	-1.00	2.19	1.18	10C	6	L626		
L684	14.45	-2.42	-2.03	1.33	1.14	24.91	-2.82	-1.50	1.97	1.06	10C	6	L684		

GR. MEAN = 16.87 PSI

SD MEANS = 1.19 PSI

GRAND MEAN = 27.72 PSI

SD OF MEANS = 1.88 PSI

TEST DETERMINATIONS = 15

44 LABS IN GRAND MEANS

AVERAGE SDR = 1.17 PSI

AVERAGE SDR = 1.86 PSI

GR. MEAN = 116.3 KILOPASCAL

GRAND MEAN = 191.2 KILOPASCAL

L219	15.82	-1.04	-.88	1.60	1.37	25.96	-1.77	-.94	2.37	1.28	10T	*	L219
L242	19.43	2.56	2.16	1.57	1.34	29.88	2.16	1.15	2.23	1.20	10T	*	L242
L250L	17.50	.63	.53	1.31	1.12	26.78	-.95	-.50	2.17	1.17	10N	*	L250L
L269	20.73	3.87	3.25	1.62	1.39	31.40	3.68	1.96	2.16	1.17	10A	*	L269
L484	15.83	-1.03	-.87	1.13	.97	25.13	-2.59	-1.38	1.58	.85	10M	*	L484

TOTAL NUMBER OF LABORATORIES REPORTING = 52

Best values: J67 16.9 ± 2.2 psi
K37 27.5 ± 3.0 psi

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

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS					
		J67	K37	MAJOR	MINOR	R.SDR	VAR						
L339	#	10.51	15.52	-13.76	-.24	.05	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L161	X	12.63	24.33	-5.00	2.10	1.08	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L203B	X	13.97	28.90	-.35	3.11	1.37	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L237A	Ø	14.13	24.93	-3.76	1.07	.61	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L684	Ø	14.45	24.91	-3.63	.78	1.10	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L333	Ø	14.75	24.88	-3.51	.50	1.12	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L278	Ø	15.07	26.63	-1.82	1.06	1.12	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L131	Ø	15.13	25.73	-2.58	.57	.31	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L121	Ø	15.33	25.20	-2.95	.14	.82	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L344	Ø	15.57	26.80	-1.43	.70	1.09	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L626	Ø	15.68	25.85	-2.21	.14	1.03	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L232	Ø	15.73	27.97	-.33	1.11	1.03	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L219	*	15.82	25.96	-2.05	.08	1.32	10T	BURSTING	STRENGTE	UP T6	45 PSI,	L*W,MANUAL CLAMP	
L484	*	15.83	25.13	-2.77	-.33	.91	10M	BURSTING	STRENGTE	UP T6	45 PSI,	REGMED MT/MOT,MANUAL CLAMP	
L203S	Ø	16.05	26.93	-1.08	.34	1.44	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L158	Ø	16.20	26.73	-1.19	.11	.92	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L134	*	16.23	30.80	2.40	2.02	.67	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L330	Ø	16.31	26.12	-1.68	-.27	1.27	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L167	Ø	16.60	26.45	-1.25	-.38	.47	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L261	Ø	16.60	27.10	-.67	-.06	.97	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L264	Ø	16.67	26.27	-1.38	-.52	.75	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L212	Ø	16.77	26.97	-.71	-.27	1.00	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L326	Ø	16.80	26.53	-1.08	-.51	.86	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L279	Ø	16.83	25.93	-1.59	-.83	.98	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L331	Ø	16.87	27.40	-.28	-.16	1.21	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L358	Ø	16.90	28.19	.43	.19	.59	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L249	Ø	16.95	28.28	.53	.19	1.12	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L225	Ø	16.97	29.50	1.61	.76	1.11	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L312	Ø	16.99	28.46	.70	.24	.93	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L237B	Ø	17.00	26.53	-.98	-.69	.69	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L183	Ø	17.03	27.83	.18	-.10	1.12	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L274	Ø	17.07	30.63	2.65	1.21	.80	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L321	Ø	17.23	29.07	1.36	.32	1.08	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L150	Ø	17.27	28.73	1.08	.13	1.29	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L243	Ø	17.33	26.23	-1.09	-1.12	1.32	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L248	Ø	17.42	27.19	-.20	-.74	.87	10E	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L356	Ø	17.43	25.78	-1.44	-1.42	1.10	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L250L	*	17.50	26.78	-.53	-1.01	1.14	10N	BURSTING	STRENGTE	UP T6	45 PSI,	L*HOMARROY,MAN. CLAMP, 20C, 65%RH	
L568	Ø	17.50	28.32	.83	-.27	1.10	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L599	Ø	17.51	28.25	.77	-.32	.91	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L360	Ø	17.52	27.65	.24	-.61	.96	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L366	Ø	17.60	27.23	-.08	-.88	1.13	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L153	Ø	17.90	29.80	2.32	.08	1.07	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L311	Ø	18.03	31.13	3.55	.60	1.27	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L390	Ø	18.33	28.60	1.47	-.87	.90	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L128	Ø	18.47	27.60	.66	-1.47	.84	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L207	Ø	18.53	30.80	3.50	.00	1.04	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L299	Ø	18.87	31.60	4.36	.09	1.19	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L223A	Ø	19.17	31.57	4.48	-.19	1.22	10C	BURSTING	STRENGTE	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L315	Ø	19.27	30.73	3.79	-.67	1.23	10C	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS C,	MANUAL CLAMP
L242	*	19.43	29.88	3.12	-1.23	1.27	10T	BURSTING	STRENGTH	UP T6	45 PSI,	L*W,MANUAL CLAMP	
L269	*	20.73	31.40	5.08	-1.64	1.28	10A	BURSTING	STRENGTH	UP T6	45 PSI,	PERKINS A,	MANUAL CLAMP
GMEANS:		16.87	27.72			1.00							
		95% ELLIPSE:	5.40	1.86				WITE GAMMA = 61 DEGREES					

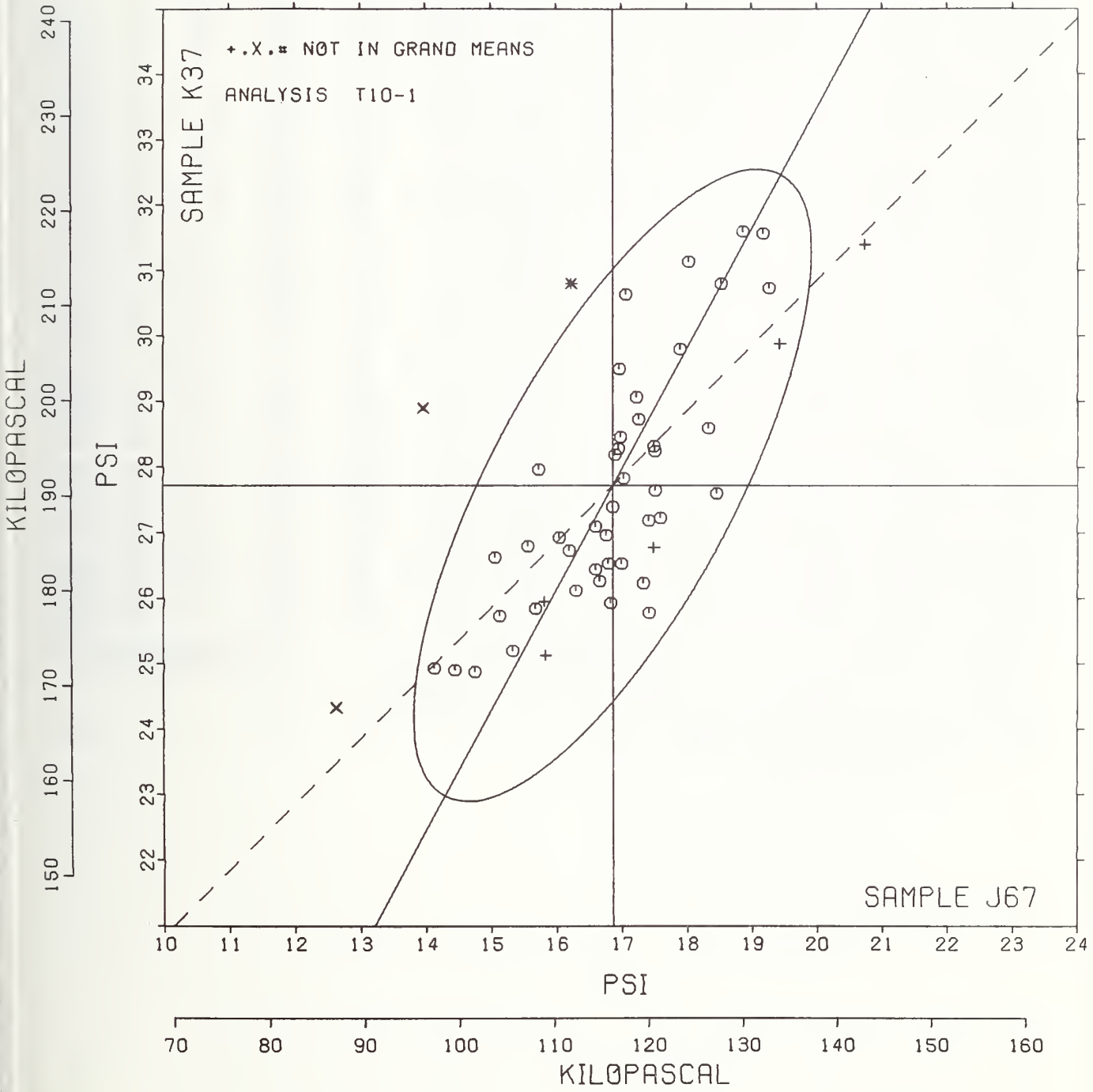
BURSTING STRENGTH, MODEL C

SAMPLE J67 = 16.9 PSI

SAMPLE K37 = 27.7 PSI

SAMPLE J67 = 116 KILOPASCAL

SAMPLE K37 = 191 KILOPASCAL



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

LAB CODE	SAMPLE J67 76 GRAMS PER SQUARE METER					SAMPLE K37 75 GRAMS PER SQUARE METER					TEST D. = 15		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	16.17	1.33	.77	.91	.85	27.40	-.03	-.01	.99	.54	10D	Ø	L100
L105	13.83	-3.00	-1.72	.72	.67	22.81	-4.61	-1.94	2.54	1.39	10D	Ø	L105
L122	16.80	-.03	-.02	1.01	.94	26.00	-1.43	-.60	2.07	1.13	10F	Ø	L122
L125	18.60	1.77	1.01	1.45	1.35	30.37	2.94	1.24	1.37	.75	10D	Ø	L125
L141	17.53	.70	.40	1.26	1.17	28.23	.81	.34	1.31	.71	10D	Ø	L141
L148	17.80	.97	.56	1.21	1.12	28.80	1.37	.58	1.90	1.03	10D	Ø	L148
L157	18.53	1.70	.98	1.39	1.29	29.77	2.34	.98	2.76	1.50	10D	Ø	L157
L162	16.47	-.37	-.21	1.19	1.10	25.73	-1.69	-.71	1.94	1.06	10D	Ø	L162
L163	16.10	-.73	-.42	1.02	.95	26.30	-1.13	-.47	1.92	1.04	10D	Ø	L163
L166	17.63	.80	.46	1.13	1.04	29.83	2.41	1.01	1.83	1.00	10D	Ø	L166
L185	18.53	1.70	.98	1.19	1.10	29.47	2.04	.86	1.73	.94	10D	Ø	L185
L190C	16.63	-.20	-.11	.74	.69	25.17	-2.26	-.95	1.90	1.03	10D	Ø	L190C
L190R	17.13	.30	.17	1.17	1.09	28.23	.81	.34	1.67	.91	10D	Ø	L190R
L194	18.36	1.53	.88	.71	.66	27.53	.10	.04	1.24	.68	10D	Ø	L194
L217	17.27	.43	.25	.70	.65	25.53	-1.89	-.80	1.30	.71	10F	Ø	L217
L226B	17.27	.44	.25	1.41	1.31	28.05	.62	.26	1.75	.95	10D	Ø	L226B
L226C	18.53	1.69	.97	.71	.66	29.07	1.64	.69	2.28	1.24	10D	Ø	L226C
L241	18.17	1.33	.77	.99	.91	29.47	2.04	.86	1.52	.83	10D	Ø	L241
L255	16.27	-.57	-.32	.70	.65	25.47	-1.96	-.82	.74	.40	10D	Ø	L255
L257A	17.67	.83	.48	.90	.83	28.67	1.24	.52	1.72	.94	10D	Ø	L257A
L257B	17.60	.77	.44	1.06	.98	27.47	.04	.02	1.92	1.05	10D	Ø	L257B
L257C	17.67	.83	.48	1.45	1.34	28.27	.84	.35	1.58	.86	10D	Ø	L257C
L262	17.27	.43	.25	1.15	1.06	31.23	3.81	1.60	1.50	.82	10D	Ø	L262
L275	12.37	-4.46	-2.56	1.13	1.05	22.96	-4.47	-1.88	2.74	1.49	10D	Ø	L275
L280	19.06	2.23	1.28	1.18	1.09	29.93	2.50	1.05	2.80	1.52	10D	Ø	L280
L285	15.73	-1.10	-.63	2.40	2.23	30.20	2.77	1.17	1.82	.99	10D	*	L285
L309	16.89	.06	.04	.67	.62	27.87	.45	.19	2.28	1.24	10D	Ø	L309
L352	15.48	-1.35	-.78	.78	.72	25.00	-2.43	-1.02	1.95	1.06	10D	Ø	L352
L563	12.93	-3.90	-2.24	1.35	1.25	21.25	-6.17	-2.59	1.68	.91	10D	*	L563
L567	14.67	-2.17	-1.24	1.45	1.34	25.13	-2.29	-.96	1.36	.74	10D	Ø	L567
L575	18.63	1.80	1.03	1.29	1.20	28.80	1.37	.58	2.06	1.12	10D	Ø	L575
L581	15.40	-1.43	-.82	1.87	1.74	27.50	.07	.03	1.63	.89	10D	Ø	L581
L587	17.20	.37	.21	.84	.78	29.03	1.61	.68	1.49	.81	10D	Ø	L587
L652	12.83	-4.00	-2.30	1.08	1.00	24.20	-3.23	-1.36	2.74	1.49	10D	Ø	L652
L688	18.09	1.25	.72	1.13	1.05	29.19	1.76	.74	2.07	1.13	10D	Ø	L688

GR. MEAN = 16.83 PSI
SD MEANS = 1.74 PSI

GRAND MEAN = 27.43 PSI
SD OF MEANS = 2.38 PSI

TEST DETERMINATIONS = 15
35 LABS IN GRAND MEANS

AVERAGE SDR = 1.08 PSI
GR. MEAN = 116.1 KILOPASCAL

AVERAGE SDR = 1.84 PSI
GRAND MEAN = 189.1 KILOPASCAL

L313	12.85	-3.98	-2.28	1.17	1.09	22.01	-5.41	-2.27	.99	.54	10I	*	L313
TOTAL NUMBER OF LABORATORIES REPORTING = 36													

Best values: J67 17.0 ± 2.4 psi
K37 27.4 ± 3.5 psi

TAPPI STANDARD T403 68-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C-A OR C WITH AIR OR HYDRAULIC CLAMPS

LAB CODE	F	MEANS		COORDINATES		AVG R, SDR VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J67	K37	MAJ95	MIN9R				
L275	6	12.37	22.96	-6.20	1.16	1.27	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L652	6	12.83	24.20	-4.92	1.48	1.25	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L313	*	12.85	22.01	-6.71	.23	.81	10I	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L563	*	12.93	21.25	-7.30	-.27	1.08	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L105	6	13.83	22.81	-5.50	-.13	1.03	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L567	6	14.67	25.13	-3.12	.49	1.04	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L581	6	15.40	27.50	-.75	1.22	1.31	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L352	6	15.48	25.00	-2.77	-.25	.89	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L285	*	15.73	30.20	1.67	2.47	1.61	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L163	6	16.10	26.30	-1.34	-.03	1.00	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L255	6	16.27	25.47	-1.94	-.64	.53	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L162	6	16.47	25.73	-1.60	-.65	1.08	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L190C	6	16.63	25.17	-1.98	-1.11	.86	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L122	6	16.80	26.00	-1.20	-.78	1.03	10P	BURSTING STRENGTH	UP T6 45 PSI, PERKINS C, H. CLAMP, TRANSDUCER
L309	6	16.89	27.87	.40	.20	.93	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L190R	6	17.13	28.23	.84	.21	1.00	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L587	6	17.20	29.03	1.53	.60	.80	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L262	6	17.27	31.23	3.39	1.79	.94	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L217	6	17.27	25.53	-1.32	-1.43	.68	10F	BURSTING STRENGTH	UP T6 45 PSI, PERKINS C, H. CLAMP, TRANSDUCER
L226B	6	17.27	28.05	.76	-.01	1.13	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L141	6	17.53	28.23	1.06	-.12	.94	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L257B	6	17.60	27.47	.47	-.61	1.01	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L166	6	17.63	29.83	2.44	.70	1.02	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L257C	6	17.67	28.27	1.16	-.21	1.10	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L257A	6	17.67	28.67	1.50	.01	.89	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L148	6	17.80	28.80	1.68	-.02	1.08	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L688	6	18.09	29.19	2.16	-.04	1.09	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L100	6	18.17	27.40	.73	-1.12	.69	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L241	6	18.17	29.47	2.44	.05	.87	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L194	6	18.36	27.53	.95	-1.20	.67	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L226C	6	18.53	29.07	2.31	-.47	.95	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L157	6	18.53	29.77	2.89	-.08	1.40	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L185	6	18.53	29.47	2.64	-.25	1.02	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L125	6	18.60	30.37	3.43	.20	1.05	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L575	6	18.63	28.80	2.15	-.71	1.16	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
L280	6	19.06	29.93	3.32	-.43	1.31	10D	BURSTING STRENGTH	UP T6 45 PSI, PERKINS CA OR C, AIR CLAMP
GMHANS:		16.83	27.43			1.00			
		95% ELLIPSE:		7.35	2.21			WIDE GAMMA = 65 DEGREES	

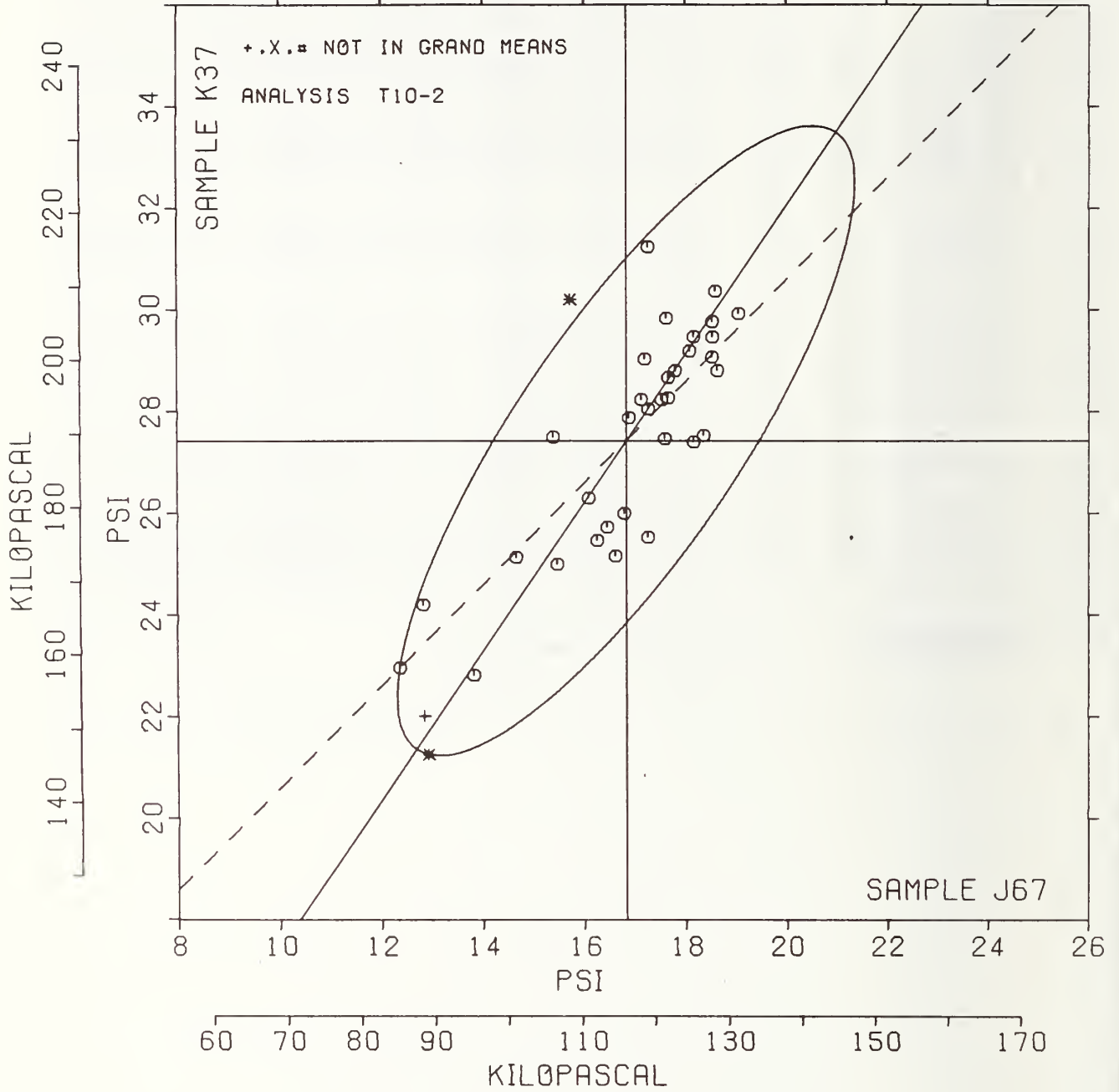
BURSTING STRENGTH, MODEL C-A

SAMPLE J67 = 16.8 PSI

SAMPLE K37 = 27.4 PSI

SAMPLE J67 = 116 KILOPASCAL

SAMPLE K37 = 189 KILOPASCAL



ANALYSIS T11-1 TABLE 1
BURSTING STRENGTH, HIGH RANGE, PSI
TAPPI STANDARD T403 68-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C OR C-A

LAB CODE	SAMPLE K27 MEAN	PRINTING 105 GRAMS PER SQUARE METER				SAMPLE H41 MEAN	PRINTING 151 GRAMS PER SQUARE METER				TEST D. - 15		
		DEV	N,DEV	SDR	R,SDR		DEV	N,DEV	SDR	R,SDR	VAR	F	LAB
L100	50.6	.1	.03	2.6	.68	53.8	-.9	-.35	1.6	.59	11D	Ø	L100
L107	49.9	-.6	-.23	3.9	1.02	54.5	-.2	-.09	3.6	1.31	11C	Ø	L107
L122	55.3	4.8	1.82	4.8	1.25	61.3	6.6	2.46	2.7	.99	11F	Ø	L122
L128	49.5	-1.0	-.39	3.1	.80	55.5	.8	.28	2.1	.76	11D	Ø	L128
L141	51.0	.5	.18	3.9	1.02	55.7	1.0	.37	3.7	1.34	11D	Ø	L141
L148	52.1	1.7	.63	3.1	.80	55.3	.6	.23	3.2	1.17	11D	Ø	L148
L182	49.1	-1.4	-.54	3.9	1.02	53.4	-1.3	-.48	2.7	.99	11D	Ø	L182
L218	53.7	3.3	1.24	5.3	1.37	58.3	3.6	1.33	2.8	1.02	11D	Ø	L218
L232	47.3	-3.2	-1.21	5.1	1.34	52.6	-2.1	-.79	3.2	1.16	11C	Ø	L232
L237A	50.1	-.3	-.13	2.4	.63	54.5	-.2	-.09	2.3	.83	11C	Ø	L237A
L237B	49.5	-.9	-.36	2.5	.66	54.9	.2	.08	2.4	.88	11C	Ø	L237B
L238A	57.6	7.1	2.72	6.1	1.59	57.9	3.2	1.18	3.4	1.23	11Y	*	L238A
L243	47.9	-2.6	-.99	3.5	.92	53.3	-1.4	-.52	1.4	.51	11C	Ø	L243
L248	50.0	-.5	-.20	4.0	1.03	54.1	-.6	-.23	3.4	1.22	11E	Ø	L248
L278	50.1	-.4	-.16	4.9	1.28	52.6	-2.1	-.79	3.3	1.18	11C	Ø	L278
L279	51.3	.8	.30	3.9	1.02	56.5	1.8	.66	2.7	.99	11C	Ø	L279
L280	51.3	.8	.31	3.1	.82	57.2	2.5	.92	2.1	.77	11D	Ø	L280
L303	48.4	-2.0	-.78	3.1	.81	54.0	-.7	-.27	2.4	.88	11C	Ø	L303
L330	50.8	.3	.11	4.8	1.24	52.0	-2.7	-1.01	2.6	.95	11C	Ø	L330
L331	53.5	3.0	1.14	2.9	.75	57.7	3.0	1.12	2.8	1.02	11C	Ø	L331
L333	52.3	1.9	.70	5.9	1.52	54.6	-.1	-.04	3.1	1.11	11C	Ø	L333
L344	51.5	1.1	.40	1.9	.49	54.3	-.4	-.15	2.6	.94	11C	Ø	L344
L356	46.7	-3.8	-1.44	3.4	.89	53.2	-1.5	-.55	2.6	.95	11C	Ø	L356
L565	50.0	-.5	-.18	2.8	.73	52.2	-2.5	-.93	2.7	1.00	11D	Ø	L565
L567	51.9	1.4	.53	3.2	.83	56.1	1.4	.50	3.2	1.17	11D	Ø	L567
L575	52.0	1.5	.56	5.4	1.41	55.6	.9	.35	2.5	.90	11D	Ø	L575
L581	45.1	-5.3	-2.03	4.0	1.04	51.4	-3.3	-1.23	2.9	1.05	11D	Ø	L581
L599	50.5	.0	.00	3.5	.90	56.6	1.9	.69	3.7	1.32	11C	Ø	L599
L604	46.9	-3.6	-1.36	4.8	1.26	48.3	-6.4	-2.37	2.6	.96	11C	Ø	L604
L622	46.7	-3.8	-1.45	4.5	1.16	49.7	-5.0	-1.86	3.1	1.13	11E	Ø	L622
L650	51.7	1.2	.45	4.2	1.10	55.6	.9	.32	3.2	1.14	11D	Ø	L650
L651	53.8	3.3	1.26	4.7	1.22	59.9	5.2	1.94	2.9	1.06	11D	Ø	L651
L680	48.1	-2.4	-.92	3.8	.99	52.9	-1.8	-.68	2.0	.71	11D	Ø	L680

GR. MEAN = 50.5 PSI

GRAND MEAN = 54.7 PSI

TEST DETERMINATIONS = 15

SD MEANS = 2.6 PSI

SD OF MEANS = 2.7 PSI

33 LABS IN GRAND MEANS

AVERAGE SDR =

3.8 PSI

AVERAGE SDR =

2.8 PSI

GR. MEAN = 348.1 KILOPASCAL

GRAND MEAN = 377.2 KILOPASCAL

L242	55.8	5.3	2.03	3.2	.83	58.4	3.7	1.36	2.9	1.06	11T	*	L242
L250L	46.9	-3.6	-1.35	2.4	.62	51.9	-2.8	-1.04	2.3	.84	11N	*	L250L
L274	51.0	.5	.20	2.1	.56	55.5	.8	.28	2.9	1.04	11E	*	L274
L290	57.2	6.7	2.56	2.7	.70	59.3	4.6	1.69	2.5	.99	11A	*	L290
L393	51.0	.5	.20	3.6	.94	57.3	2.6	.95	3.2	1.15	11E	*	L393
L394	58.7	8.2	3.11	2.8	.74	59.4	4.7	1.74	2.7	1.00	11H	*	L394
L484	52.3	1.9	.70	3.7	.97	60.7	6.0	2.21	2.6	.94	11H	*	L484
L570	55.3	4.9	1.85	5.4	1.41	61.1	6.4	2.36	3.6	1.32	11E	*	L570
L576	53.7	3.3	1.24	4.5	1.17	58.7	4.0	1.47	2.6	.95	11P	*	L576
L593	66.9	16.4	6.23	8.1	2.11	67.4	12.7	4.70	3.2	1.16	11J	*	L593
L598	65.5	15.1	5.72	8.2	2.12	69.2	14.5	5.37	4.0	1.46	11*	*	L598

TOTAL NUMBER OF LABORATORIES REPORTING = 44

Best values: K27 50 ± 4 psi
H41 55 ± 3 psi

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		K27	H41	MAJOR	MINOR	R.	SDR VAR			
L581	Ø	45.1	51.4	-6.1	1.5	1.05	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L622	Ø	46.7	49.7	-6.3	-0.7	1.15	11B	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L356	Ø	46.7	53.2	-3.7	1.7	.92	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L604	Ø	46.9	48.3	-7.1	-1.9	1.11	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L250L	*	46.9	51.9	-4.5	.6	.73	11N	BURSTING STRENGTH	40 - 100	PSI, LBO MARGY, MAN. CLAMP, 20C, 65%RB
L232	Ø	47.3	52.6	-3.8	.8	1.25	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L243	Ø	47.9	53.3	-2.8	.9	.71	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L680	Ø	48.1	52.9	-3.0	.5	.85	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L303	Ø	48.4	54.0	-2.0	1.0	.85	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L182	Ø	49.1	53.4	-1.9	.1	1.00	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L128	Ø	49.5	55.5	-.2	1.3	.78	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L237B	Ø	49.5	54.9	-.5	.8	.77	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L107	Ø	49.9	54.5	-.6	.3	1.16	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L248	Ø	50.0	54.1	-.8	-.0	1.12	11B	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L565	Ø	50.0	52.2	-2.1	-1.4	.86	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L278	Ø	50.1	52.6	-1.8	-1.2	1.23	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L237A	Ø	50.1	54.5	-.4	.1	.73	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L599	Ø	50.5	56.6	1.4	1.3	1.11	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L100	Ø	50.6	53.8	-.6	-.7	.64	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L330	Ø	50.8	52.0	-1.8	-2.1	1.09	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L141	Ø	51.0	55.7	1.1	.3	1.18	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L393	*	51.0	57.3	2.2	1.4	1.04	11B	BURSTING STRENGTH	40 - 100	PSI, PERKINS AB, HYDRAULIC CLAMP
L274	*	51.0	55.5	.9	.2	.80	11B	BURSTING STRENGTH	40 - 100	PSI, PERKINS AB, HYDRAULIC CLAMP
L279	Ø	51.3	56.5	1.8	.7	1.00	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L280	Ø	51.3	57.2	2.4	1.1	.79	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L344	Ø	51.5	54.3	.4	-1.0	.72	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L650	Ø	51.7	55.6	1.4	-.3	1.12	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L567	Ø	51.9	56.1	1.9	-.0	1.00	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L575	Ø	52.0	55.6	1.7	-.4	1.16	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L148	Ø	52.1	55.3	1.6	-.8	.99	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L484	*	52.3	60.7	5.6	2.8	.95	11B	BURSTING STRENGTH	40 - 100	PSI, PERKINS AB, HYDRAULIC CLAMP
L333	Ø	52.3	54.6	1.2	-1.4	1.32	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L331	Ø	53.5	57.7	4.3	-.0	.88	11C	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L576	*	53.7	58.7	5.1	.4	1.06	11P	BURSTING STRENGTH	40 - 100	PSI, PERKINS LC, MANUAL CLAMP
L218	Ø	53.7	58.3	4.8	.2	1.20	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L651	Ø	53.8	59.9	6.1	1.3	1.14	11D	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L122	Ø	55.3	61.3	8.1	1.2	1.12	11P	BURSTING STRENGTH	40 - 100	PSI, PERKINS C, H. CLAMP, TRANSDUCER
L570	*	55.3	61.1	7.9	.9	1.36	11B	BURSTING STRENGTH	40 - 100	PSI, PERKINS AB, HYDRAULIC CLAMP
L242	*	55.8	58.4	6.4	-1.3	.94	11T	BURSTING STRENGTH	40 - 100	PSI, L.W. MANUAL CLAMP
L290	*	57.2	59.3	7.9	-1.7	.79	11A	BURSTING STRENGTH	40 - 100	PSI, PERKINS A, MANUAL CLAMP
L238A	*	57.6	57.9	7.3	-2.9	1.41	11Y	BURSTING STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L394	*	58.7	59.4	9.1	-2.6	.87	11B	BURSTING STRENGTH	40 - 100	PSI, PERKINS AB, HYDRAULIC CLAMP
L598	Ø	65.5	69.2	20.9	-.7	1.79	11*	BURSTING STRENGTH	40 - 100	PSI, MESSMER, MANUAL CLAMP
L553	*	66.9	67.4	20.5	-2.9	1.64	11J	BURSTING STRENGTH	40 - 100	PSI, PERKINS JUMBO, HAND DRIVEN
GMEANS:		50.5	54.7			1.00				
		95% ELLIPSE:		9.4	3.0			WITH GAMMA - 45 DEGREES		

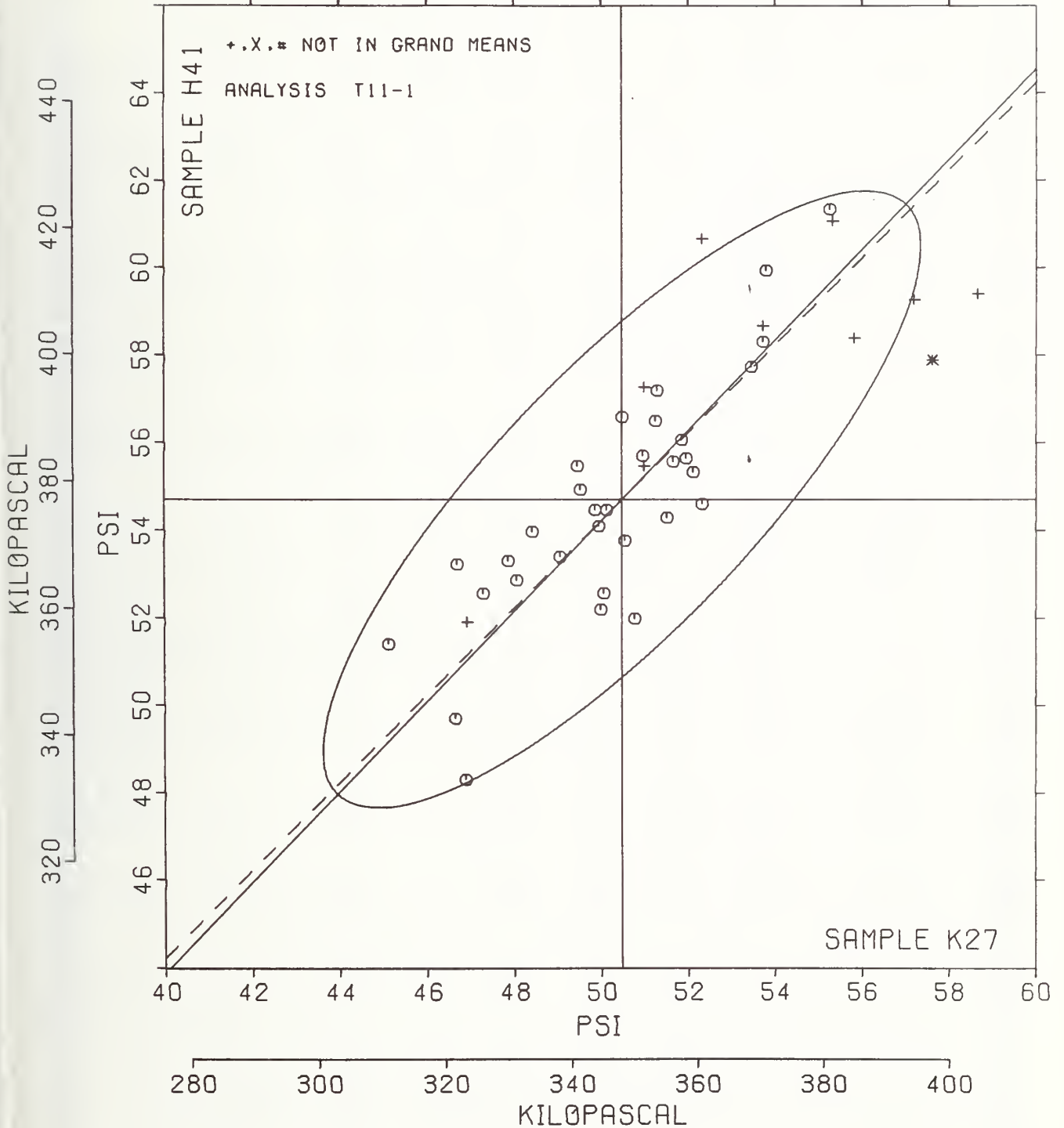
BURSTING STRENGTH, HIGH RANGE

SAMPLE K27 = 50.5 PSI

SAMPLE H41 = 54.7 PSI

SAMPLE K27 = 348 KILOPASCAL

SAMPLE H41 = 377 KILOPASCAL



TAPPI STANDARD 1414 TS-65, ANY MAKE ELMENDORF WITH DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	PRINTING					SAMPLE R85 MEAN	BOND					TEST D. = 15		
	K25 MEAN	75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR		79 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB	
L100	41.3	-1.1	-.51	.6	.40	39.7	-.3	-.15	1.0	.81	15M	0	L100	
L105	42.7	.3	.12	2.6	1.74	40.5	.6	.26	1.2	.94	15T	0	L105	
L107	44.0	1.6	.73	1.3	.88	41.7	1.8	.81	.7	.56	15T	0	L107	
L121	35.6	-6.8	-3.11	2.6	1.78	35.6	-4.4	-2.02	1.5	1.23	15T	*	L121	
L122	43.8	1.4	.65	1.4	.96	43.3	3.3	1.54	1.2	.99	15C	0	L122	
L124	42.1	-.3	-.12	2.1	1.39	40.5	.6	.26	2.3	1.85	15T	0	L124	
L126	42.9	.5	.21	1.7	1.14	41.8	1.8	.85	1.7	1.35	15T	0	L126	
L128	42.4	-.0	-.00	1.2	.84	40.7	.7	.32	.7	.57	15T	0	L128	
L131	47.7	5.3	2.40	1.0	.66	45.3	5.3	2.45	.7	.56	15A	*	L131	
L134	40.9	-1.5	-.70	.8	.56	39.7	-.2	-.11	.9	.70	15C	0	L134	
L139	43.9	1.5	.70	1.0	.70	41.8	1.8	.85	.7	.54	15T	0	L139	
L141	42.3	-.1	-.06	1.5	1.00	39.5	-.5	-.23	.9	.73	15T	0	L141	
L143	35.4	-7.0	-3.20	1.8	1.19	29.9	-10.1	-4.68	4.1	3.26	15T	#	L143	
L145	8.5	-33.9	-15.46	.8	.56	7.8	-32.2	-14.88	.4	.33	15T	#	L145	
L148	40.5	-1.9	-.85	.8	.56	39.5	-.4	-.20	.5	.41	15T	0	L148	
L150	53.0	10.6	4.83	1.1	.72	50.3	10.4	4.79	.8	.65	15T	#	L150	
L151	53.1	10.7	4.86	2.9	1.98	47.7	7.8	3.59	1.2	.92	15C	#	L151	
L153	42.3	-.1	-.03	1.4	.98	39.1	-.8	-.39	.7	.59	15C	0	L153	
L157	41.8	-.6	-.28	2.1	1.40	39.3	-.6	-.30	.8	.65	15T	0	L157	
L158	41.6	-.8	-.37	1.7	1.16	40.1	.2	.07	3.6	2.84	15R	0	L158	
L162	43.3	.9	.42	1.0	.66	40.5	.6	.26	1.4	1.12	15T	0	L162	
L163	44.2	1.8	.82	1.8	1.23	39.4	-.6	-.26	1.2	.99	15T	0	L163	
L166	42.4	-.0	-.00	1.2	.80	39.5	-.5	-.23	1.1	.84	15T	0	L166	
L167	41.9	-.5	-.25	1.8	1.19	39.3	-.6	-.30	1.2	.98	15C	0	L167	
L173B	44.5	2.1	.97	1.4	.95	41.3	1.4	.63	1.0	.77	15T	0	L173B	
L182A	43.3	.9	.39	2.3	1.52	38.3	-1.7	-.79	1.3	1.06	15A	0	L182A	
L182T	46.9	4.5	2.07	1.4	.97	43.8	3.8	1.77	.9	.68	15T	0	L182T	
L183	41.8	-.6	-.28	.9	.58	37.5	-2.5	-1.16	.8	.66	15T	0	L183	
L185	42.8	.4	.18	1.7	1.18	41.3	1.4	.63	.8	.65	15T	0	L185	
L189	43.0	.6	.27	1.5	1.02	41.8	1.8	.85	.9	.75	15T	0	L189	
L190C	43.1	.7	.33	1.1	.76	39.5	-.4	-.20	.7	.59	15T	0	L190C	
L190R	40.9	-1.5	-.70	.8	.56	37.7	-2.3	-1.07	.6	.49	15C	0	L190R	
L191	36.1	-6.3	-2.86	1.8	1.19	34.4	-5.6	-2.58	1.1	.89	15T	*	L191	
L194	45.1	2.7	1.24	1.2	.79	43.6	3.6	1.66	1.2	.94	15T	0	L194	
L195	44.1	1.7	.79	1.8	1.19	39.7	-.2	-.11	1.5	1.18	15C	0	L195	
L206	42.9	.5	.21	1.1	.76	39.5	-.5	-.23	1.0	.79	15R	0	L206	
L207	51.2	8.7	3.99	2.3	1.53	49.5	9.5	4.40	1.5	1.17	15R	#	L207	
L211	42.3	-.1	-.03	1.3	.87	41.4	1.4	.66	1.7	1.33	15R	0	L211	
L212	43.9	1.5	.67	1.6	1.11	40.7	.8	.35	1.8	1.39	15T	0	L212	
L213	44.3	1.6	.85	1.3	.86	42.0	2.0	.94	1.3	1.04	15T	0	L213	
L217	43.2	.8	.36	1.2	.80	41.5	1.5	.70	.7	.53	15T	0	L217	
L219	43.2	.8	.36	2.1	1.43	41.3	1.4	.63	1.0	.77	15L	0	L219	
L223	43.8	1.4	.64	1.0	.70	40.3	.3	.16	.9	.71	15R	0	L223	
L225	43.3	.9	.39	1.0	.70	43.4	3.4	1.59	.8	.66	15T	0	L225	
L226B	43.3	.9	.42	2.2	1.50	40.0	.0	.01	1.5	1.20	15T	0	L226B	
L226C	39.2	-3.2	-1.45	1.4	.91	36.2	-3.7	-1.73	.8	.64	15T	0	L226C	
L228	46.3	3.9	1.76	2.0	1.34	40.7	.7	.32	2.0	1.55	15T	*	L228	
L232	42.0	-.4	-.19	1.7	1.14	39.6	-.4	-.17	1.9	1.49	15T	0	L232	
L236	45.7	3.3	1.52	1.5	1.04	42.7	2.7	1.25	1.5	1.19	15T	0	L236	
L237A	40.7	-1.7	-.76	1.3	.90	37.8	-2.2	-1.00	1.1	.86	15T	0	L237A	
L237B	43.0	.6	.27	1.0	.68	40.6	.6	.29	.9	.72	15T	0	L237B	
L238A	40.7	-1.7	-.76	1.4	.94	39.3	-.7	-.33	1.2	.97	15T	0	L238A	
L241	44.7	2.3	1.06	1.1	.74	43.1	3.1	1.43	.8	.63	15T	0	L241	
L243	42.8	.4	.18	1.2	.82	39.6	-.4	-.17	.7	.58	15T	0	L243	
L244	45.3	2.9	1.31	1.3	.90	43.8	3.8	1.77	1.5	1.21	15C	0	L244	
L248	42.6	.2	.10	1.9	1.28	40.3	.4	.16	.5	.42	15J	0	L248	
L249	40.4	-2.0	-.92	1.4	.95	37.6	-2.4	-1.10	1.1	.84	15T	0	L249	
L254	44.9	2.5	1.15	1.5	1.00	40.8	.8	.38	1.3	1.00	15T	0	L254	
L255	42.3	-.1	-.06	.5	.31	38.6	-1.4	-.63	.5	.40	15T	0	L255	
L257A	43.5	1.1	.48	1.2	.80	41.6	1.6	.75	.8	.66	15C	0	L257A	
L257B	43.5	1.1	.48	1.4	.95	42.0	2.0	.94	1.3	1.04	15C	0	L257B	
L257C	43.1	.7	.30	1.7	1.13	41.9	1.9	.88	1.2	.94	15C	0	L257C	
L259	42.3	-.1	-.03	1.8	1.19	40.9	1.0	.44	1.2	.92	15T	0	L259	
L261	41.5	-.9	-.40	1.3	.88	37.9	-2.0	-.94	1.0	.76	15T	0	L261	
L262	42.1	-.3	-.15	1.1	.74	40.0	.0	.01	1.1	.90	15T	0	L262	

TAPPI STANDARD 1414 TS-65, ANY MAKE ELMENDORF WITH DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

LAB CODE	SAMPLE K25 MEAN	PRINTING 75 GRAMS PER SQUARE METER				SAMPLE K25 MEAN	BOND 79 GRAMS PER SQUARE METER				TEST D ₀ = 15		
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L264	42.9	.5	.24	1.8	1.24	35.7	-4.2	-1.96	1.8	1.45	15T	X	L264
L273	43.6	1.2	.54	1.7	1.14	38.4	-1.6	-.73	1.2	.99	15T	Ø	L273
L274	42.9	.5	.24	.9	.60	39.7	-.2	-.11	.5	.36	15T	Ø	L274
L275	41.3	-1.1	-.49	1.2	.83	40.7	.8	.35	1.4	1.10	15T	Ø	L275
L278	43.2	.8	.36	1.3	.85	40.9	1.0	.44	1.3	1.02	15T	Ø	L278
L279	42.4	-.0	-.00	2.2	1.51	39.5	-.5	-.23	1.2	.94	15T	Ø	L279
L280	40.5	-1.9	-.85	1.1	.72	39.3	-.7	-.33	1.0	.76	15L	Ø	L280
L281	41.6	-.8	-.37	1.4	.91	37.7	-2.2	-1.04	.9	.70	15T	Ø	L281
L285	37.1	-5.3	-2.44	1.3	.86	36.3	-3.6	-1.68	4.6	3.66	15T	*	L285
L288	41.0	-1.4	-.64	1.6	1.09	39.0	-.9	-.43	1.0	.81	15Q	Ø	L288
L290	38.9	-3.5	-1.62	1.5	.98	38.5	-1.5	-.70	1.4	1.12	15T	Ø	L290
L291	43.8	1.4	.64	2.4	1.64	42.5	2.5	1.15	1.8	1.47	15A	Ø	L291
L303	37.3	-5.1	-2.31	1.3	.91	35.3	-4.6	-2.15	1.4	1.11	15L	Ø	L303
L309	43.1	.7	.30	1.3	.90	40.4	.4	.20	.9	.72	15T	Ø	L309
L311	41.5	-.9	-.43	2.2	1.46	40.1	.2	.07	1.7	1.34	15T	Ø	L311
L312	40.9	-1.5	-.67	1.7	1.13	38.4	-1.6	-.73	1.4	1.07	15T	Ø	L312
L313	41.9	-.5	-.25	1.6	1.08	40.0	.0	.01	1.1	.85	15L	Ø	L313
L315	43.6	1.2	.54	1.7	1.14	39.8	-.2	-.08	1.7	1.31	15T	Ø	L315
L321	40.2	-2.2	-1.01	.9	.64	36.9	-3.1	-1.44	.9	.73	15T	Ø	L321
L324	41.2	-1.2	-.54	1.2	.82	39.1	-.8	-.39	1.6	1.27	15T	Ø	L324
L328	42.9	.5	.21	.5	.33	40.1	.2	.08	.3	.23	15T	Ø	L328
L331	37.4	-5.0	-2.28	2.3	1.53	34.9	-5.1	-2.36	1.1	.89	15T	Ø	L331
L336	44.3	1.9	.85	1.5	1.04	41.2	1.2	.57	1.1	.86	15T	Ø	L336
L344	43.2	.8	.36	1.5	1.00	40.4	.4	.20	1.5	1.23	15C	Ø	L344
L345	42.9	.5	.24	2.4	1.60	42.1	2.2	1.00	2.6	2.03	15T	Ø	L345
L352	39.8	-2.6	-1.19	1.3	.89	37.2	-2.8	-1.28	.7	.55	15C	Ø	L352
L360	39.9	-2.5	-1.13	1.3	.86	38.4	-1.6	-.73	1.5	1.15	15T	Ø	L360
L366	37.5	-4.9	-2.22	1.2	.80	34.7	-5.3	-2.45	1.2	.98	15T	Ø	L366
L382	42.3	-.1	-.03	1.6	1.07	40.1	.2	.07	.9	.73	15T	Ø	L382
L388	37.9	-4.5	-2.07	1.5	.98	37.6	-2.4	-1.10	1.5	1.19	15T	Ø	L388
L390	46.7	4.3	1.94	1.1	.75	43.5	3.6	1.65	.8	.66	15T	Ø	L390
L396M	43.7	1.3	.61	5.2	3.49	44.0	4.0	1.86	3.8	3.00	15T	Ø	L396M
L442	40.4	-2.0	-.92	1.4	.95	37.3	-2.7	-1.23	1.0	.83	15R	Ø	L442
L484	45.3	2.9	1.34	1.5	1.04	42.5	2.5	1.17	2.4	1.91	15T	Ø	L484
L554	45.7	3.3	1.49	1.8	1.19	43.2	3.2	1.49	1.3	1.00	15C	Ø	L554
L557	41.3	-1.1	-.49	1.8	1.22	36.8	-3.2	-1.47	2.4	1.88	15T	Ø	L557
L558	43.3	.9	.39	2.0	1.34	41.7	1.8	.81	3.5	2.77	15T	Ø	L558
L559	42.5	.1	.03	1.4	.92	38.9	-1.1	-.51	1.5	1.19	15T	Ø	L559
L562	42.5	.1	.03	1.6	1.08	40.7	.8	.35	2.8	2.23	15T	Ø	L562
L565	45.3	2.9	1.31	1.9	1.26	43.9	4.0	1.83	1.0	.82	15T	Ø	L565
L566	45.7	3.3	1.52	1.3	.86	40.8	.8	.38	1.0	.80	15T	Ø	L566
L567	44.1	1.7	.78	2.9	1.98	39.6	-.4	-.17	1.8	1.42	15C	Ø	L567
L574	39.9	-2.5	-1.16	2.7	1.80	39.9	-.1	-.05	2.8	2.20	15T	Ø	L574
L575	41.5	-.9	-.41	.9	.62	40.2	.2	.08	1.2	.92	15L	Ø	L575
L576	46.4	4.0	1.82	1.3	.88	43.9	4.0	1.83	1.4	1.10	15T	Ø	L576
L580	42.8	.4	.18	.6	.38	38.3	-1.7	-.79	.6	.47	15T	Ø	L580
L581	44.6	2.2	1.02	1.2	.80	40.5	.5	.24	.9	.70	15Q	Ø	L581
L587	41.2	-1.2	-.55	1.7	1.12	36.7	-3.3	-1.53	1.8	1.43	15T	Ø	L587
L596	10.2	-32.2	-14.70	1.2	.82	10.2	-29.8	-13.77	.9	.75	15T	#	L596
L597	43.5	1.1	.48	1.2	.80	40.1	.2	.07	.5	.41	15T	Ø	L597
L599	42.1	-.3	-.12	1.1	.76	41.1	1.2	.54	1.6	1.23	15T	Ø	L599
L600	44.9	2.5	1.15	1.1	.74	40.7	.7	.32	.8	.65	15T	Ø	L600
L604	59.5	17.1	7.79	6.4	4.32	54.9	15.0	6.92	3.5	2.81	15T	#	L604
L606	40.3	-2.1	-.98	1.2	.83	39.8	-.2	-.08	1.4	1.13	15T	Ø	L606
L618	40.2	-2.2	-1.01	1.0	.68	40.4	.4	.20	.8	.66	15T	Ø	L618
L622	63.7	21.3	9.73	3.2	2.16	60.8	20.8	9.64	1.7	1.31	15T	#	L622
L651	10.3	-32.1	-14.67	.6	.40	9.9	-30.0	-13.90	.3	.20	15T	#	L651
L652	49.9	7.5	3.40	5.0	3.37	48.8	8.8	4.08	4.6	3.64	15C	#	L652
L654	38.6	-3.8	-1.74	1.0	.67	35.4	-4.6	-2.12	.6	.50	15T	Ø	L654
L670	41.5	-.9	-.43	1.0	.67	37.6	-2.4	-1.10	1.6	1.27	15T	Ø	L670
L676	44.0	1.6	.73	2.4	1.61	40.1	.2	.07	1.9	1.53	15T	Ø	L676
L679	43.3	.9	.39	1.5	1.00	38.3	-1.7	-.79	1.1	.87	15T	Ø	L679
L680	40.9	-1.5	-.67	1.3	.86	38.4	-1.6	-.73	1.1	.89	15T	Ø	L680
L685	41.3	-1.1	-.52	2.1	1.43	39.2	-.8	-.36	1.7	1.38	15T	Ø	L685
L688	42.7	.3	.12	1.0	.66	42.8	2.8	1.31	1.0	.80	15T	Ø	L688

GR. MEAN = 42.4 GRAMS
SD MEANS = 2.2 GRAMS

GRAND MEAN = 40.0 GRAMS
SD OF MEANS = 2.2 GRAMS

TEST DETERMINATIONS = 15
119 LABS IN GRAND MEANS

AVERAGE SDR = 1.5 GRAMS
GR. MEAN = 415.9 MILLINEWTON

AVERAGE SDR = 1.3 GRAMS
GRAND MEAN = 392.0 MILLINEWTON

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

LAB CODE	SAMPLE K25 75 GRAMS PER SQUARE METER					SAMPLE E85 79 GRAMS PER SQUARE METER					TEST D. 15		
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L230	39.1	-3.3	-1.49	1.4	.94	37.3	-2.7	-1.23	1.0	.76	15V	*	L230
L242	43.6	1.2	.54	1.8	1.22	41.1	1.1	.51	1.3	1.02	15U	*	L242
L250L	45.4	3.0	1.38	1.2	.81	44.3	4.4	2.01	1.5	1.15	15H	*	L250L
L299	45.4	3.0	1.37	1.4	.91	42.7	2.8	1.28	.9	.70	15V	*	L299
L610	40.5	-1.5	-.85	1.9	1.30	38.9	-1.1	-.51	.9	.73	15E	*	L610
L684	33.7	-8.7	-3.96	1.8	1.18	32.3	-7.6	-3.53	.9	.71	15X	*	L684
TOTAL NUMBER OF LABORATORIES REPORTING = 136													

Best values: K25 43 ± 3 grams
E85 40 ± 3 grams

The following laboratories were omitted from the grand means because of extreme test results: 143, 150, 151, 207, 604, 622, 652.

Data from the following laboratories appear to be off by a multiplicative factor: 145, 596, 651.

Data from the following laboratories appeared to be off by a multiplicative factor: 230, 299. Code 15V was assigned temporarily to put in a factor of 2.

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

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

LAB CODE	F	MEANS		COORDINATES		AVG R. SDR	VAR	PROPERTY---TEST	INSTRUMENT---CONDITIONS
		K25	E85	MAJOR	MINOR				
L145	#	8.5	7.8	-46.7	.8	.45	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L596	#	10.2	10.2	-43.8	1.4	.78	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L651	#	10.3	9.9	-44.0	1.1	.30	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L684	*	33.7	32.3	-11.5	.6	.95	15X	TEARING STRENGTH,	STANDARD: GIVE INSTRUMENT MAKE, MODEL
L143	#	35.4	29.9	-12.1	-2.3	2.22	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L121	*	35.6	35.6	-7.9	1.7	1.51	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L191	*	36.1	34.4	-8.4	.4	1.04	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L285	*	37.1	36.3	-6.4	1.1	2.26	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L303	Ø	37.3	35.3	-6.9	.2	1.01	15L	TEARING STRENGTH,	STANDARD, LORENTZ-WETTRES
L331	Ø	37.4	34.9	-7.1	-.1	1.21	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L366	Ø	37.5	34.7	-7.2	-.4	.89	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L388	Ø	37.9	37.6	-4.9	1.5	1.09	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L654	Ø	38.6	35.4	-5.9	-.6	.56	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L290	Ø	38.9	38.5	-3.6	1.4	1.05	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L230	*	39.1	37.3	-4.2	.4	.85	15V	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)X2
L225C	Ø	39.2	36.2	-4.9	-.4	.78	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L352	Ø	39.8	37.2	-3.8	-.1	.72	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L574	Ø	39.9	39.9	-1.9	1.7	2.00	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L360	Ø	39.9	38.4	-2.9	.6	1.01	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L618	Ø	40.2	40.4	-1.3	1.9	.67	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L321	Ø	40.2	36.9	-3.8	-.7	.68	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L606	Ø	40.3	39.8	-1.6	1.4	.98	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L442	Ø	40.4	37.3	-3.3	-.5	.89	15R	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L249	Ø	40.4	37.6	-3.1	-.3	.89	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L610	*	40.5	38.9	-2.1	.5	1.01	15E	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF, AMBIENT COND.
L148	Ø	40.5	39.5	-1.6	1.0	.49	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L280	Ø	40.5	39.3	-1.8	.8	.74	15L	TEARING STRENGTH,	STANDARD, LORENTZ-WETTRES
L238A	Ø	40.7	39.3	-1.7	.7	.95	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L237A	Ø	40.7	37.8	-2.7	-.4	.88	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L134	Ø	40.9	39.7	-1.3	.9	.63	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L190R	Ø	40.9	37.7	-2.7	-.6	.53	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L680	Ø	40.9	38.4	-2.2	-.1	.88	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L312	Ø	40.9	38.4	-2.2	-.1	1.10	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L288	Ø	41.0	39.0	-1.7	.3	.95	15Q	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF, AIR CLAMP, DIGITL
L587	Ø	41.2	36.7	-3.2	-1.5	1.27	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L324	Ø	41.2	39.1	-1.4	.2	1.04	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L685	Ø	41.3	39.2	-1.4	.2	1.41	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L100	Ø	41.3	39.7	-1.0	.6	.61	15M	TEARING STRENGTH,	STANDARD, T. M. HIRFIELD, APPITA-ELMENDORF)
L557	Ø	41.3	36.8	-3.0	-1.5	1.55	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L275	Ø	41.3	40.7	-.2	1.3	.97	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L670	Ø	41.5	37.6	-2.3	-1.0	.97	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L311	Ø	41.5	40.1	-.6	.8	1.40	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L575	Ø	41.5	40.2	-.5	.8	.77	15L	TEARING STRENGTH,	STANDARD, LORENTZ-WETTRES
L261	Ø	41.5	37.9	-2.1	-.8	.82	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L158	Ø	41.6	40.1	-.5	.7	2.00	15R	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L281	Ø	41.6	37.7	-2.1	-1.0	.81	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L157	Ø	41.8	39.3	-.9	-.0	1.03	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L183	Ø	41.8	37.5	-2.2	-1.4	.62	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L313	Ø	41.9	40.0	-.4	.4	.96	15L	TEARING STRENGTH,	STANDARD, LORENTZ-WETTRES
L167	Ø	41.9	39.3	-.8	-.1	1.09	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L232	Ø	42.0	39.6	-.6	.0	1.32	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L262	Ø	42.1	40.0	-.2	.3	.82	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L124	Ø	42.1	40.5	.2	.6	1.62	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L599	Ø	42.1	41.1	.6	1.0	1.00	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L141	Ø	42.3	39.5	-.5	-.3	.87	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L255	Ø	42.3	38.6	-1.1	-.9	.36	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L153	Ø	42.3	39.1	-.6	-.5	.78	15C	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L382	Ø	42.3	40.1	.1	.2	.90	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L211	Ø	42.3	41.4	.9	1.1	1.10	15R	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L259	Ø	42.3	40.9	.6	.7	1.06	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L166	Ø	42.4	39.5	-.4	-.4	.82	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L128	Ø	42.4	40.7	.5	.5	.71	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L279	Ø	42.4	39.5	-.4	-.4	1.22	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L562	Ø	42.5	40.7	.6	.5	1.66	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)
L559	Ø	42.5	38.9	-.7	-.8	1.06	15T	TEARING STRENGTH,	STANDARD, THWING-ELMENDORF (SCALE T6 100)

TAPPI STANDARD 1414 TS-65, ANY MAKE ELMENDORF WITE DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

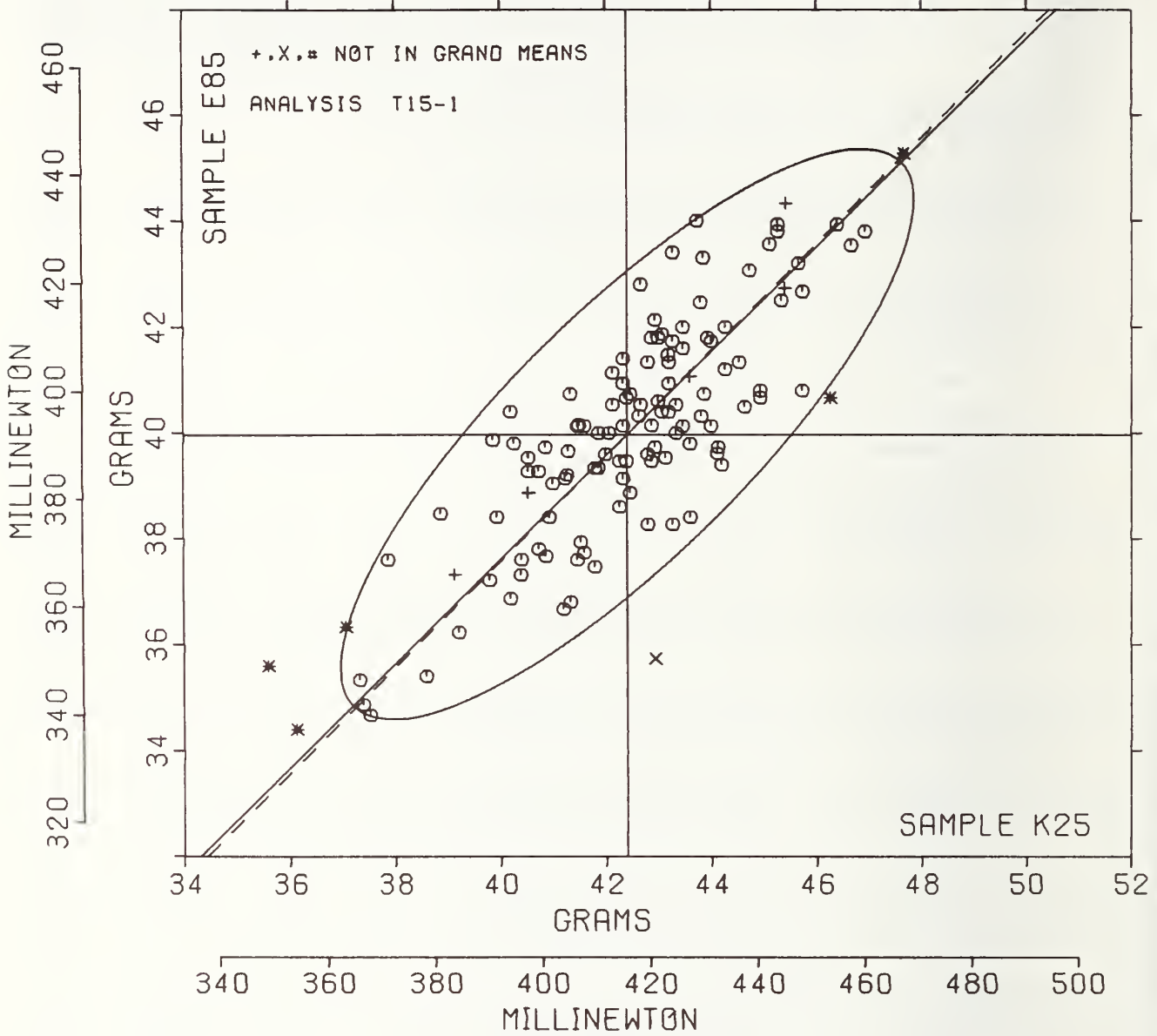
LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST	INSTRUMENT---	CONDITIONS
		R25	E85	MAJOR	MINOR	R.SDR	VAR				
L248	Ø	42.6	40.3	.4	.1	.85	15J	TEARING STRENGTH,	STANDARD,	LORENTZ-WETTRETS	
L688	Ø	42.7	42.8	2.2	1.8	.73	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L105	Ø	42.7	40.5	.6	.2	1.34	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L243	Ø	42.8	39.6	.0	-.5	.70	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L580	Ø	42.8	38.3	-.9	-1.5	.42	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L185	Ø	42.8	41.3	1.2	.7	.91	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L206	Ø	42.9	39.5	-.0	-.7	.77	15R	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF, DIGITAL READOUT	
L126	Ø	42.9	41.8	1.6	1.0	1.24	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L328	Ø	42.9	40.1	.5	-.2	.28	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L274	Ø	42.9	39.7	.2	-.5	.48	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L345	Ø	42.9	42.1	1.9	1.2	1.82	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L264	X	42.9	35.7	-2.6	-3.4	1.34	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L237B	Ø	43.0	40.6	.9	.0	.70	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L189	Ø	43.0	41.8	1.7	.9	.88	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L309	Ø	43.1	40.4	.8	-.2	.81	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L257C	Ø	43.1	41.9	1.8	.9	1.03	15C	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (W.AIR CLAMP)	
L190C	Ø	43.1	39.5	.2	-.8	.67	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L217	Ø	43.2	41.5	1.6	.5	.67	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L278	Ø	43.2	40.9	1.2	.1	.93	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L344	Ø	43.2	40.4	.9	-.3	1.11	15C	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (W.AIR CLAMP)	
L219	Ø	43.2	41.3	1.5	.4	1.10	15L	TEARING STRENGTH,	STANDARD,	LORENTZ-WETTRETS	
L182A	Ø	43.3	38.3	-.6	-1.8	1.29	15A	TEARING STRENGTH,	STANDARD,	AFFITA	
L679	Ø	43.3	38.3	-.6	-1.8	.94	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L225	Ø	43.3	43.4	3.0	1.8	.68	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L558	Ø	43.3	41.7	1.8	.7	2.06	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L226H	Ø	43.3	40.0	.7	-.6	1.35	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L162	Ø	43.3	40.5	1.1	-.2	.89	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L597	Ø	43.5	40.1	.9	-.6	.61	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L257A	Ø	43.5	41.6	1.9	.4	.73	15C	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (W.AIR CLAMP)	
L257B	Ø	43.5	42.0	2.2	.7	.99	15C	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (W.AIR CLAMP)	
L242	*	43.6	41.1	1.6	-.1	1.12	15U	TEARING STRENGTH,	STANDARD,	AUSTRALIAN OPT. CO.	
L273	Ø	43.6	38.4	-.3	-2.0	1.06	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L315	Ø	43.6	39.8	.7	-1.0	1.22	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L396M	Ø	43.7	44.0	3.8	1.9	3.25	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L291	Ø	43.8	42.5	2.7	.8	1.55	15A	TEARING STRENGTH,	STANDARD,	AFFITA	
L223	Ø	43.8	40.3	1.2	-.7	.71	15R	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF, DIGITAL READOUT	
L122	Ø	43.8	43.3	3.4	1.4	.97	15C	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (W.AIR CLAMP)	
L212	Ø	43.9	40.7	1.6	-.5	1.25	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L139	Ø	43.9	41.8	2.4	.2	.62	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L676	Ø	44.0	40.1	1.2	-1.0	1.57	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L107	Ø	44.0	41.7	2.4	.1	.72	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L567	Ø	44.1	39.6	1.0	-1.5	1.70	15C	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (W.AIR CLAMP)	
L195	Ø	44.1	39.7	1.1	-1.4	1.19	15C	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (W.AIR CLAMP)	
L163	Ø	44.2	39.4	.9	-1.7	1.11	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L336	Ø	44.3	41.2	2.2	-.4	.95	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L213	Ø	44.3	42.0	2.7	.1	.95	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L173B	Ø	44.5	41.3	2.5	-.5	.86	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L581	Ø	44.6	40.5	2.0	-1.2	.75	15Q	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF, AIR CLAMP, DIGITL	
L241	Ø	44.7	43.1	3.8	.6	.69	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L254	Ø	44.9	40.8	2.4	-1.2	1.00	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L600	Ø	44.9	40.7	2.3	-1.3	.70	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L194	Ø	45.1	43.6	4.4	.7	.86	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L565	Ø	45.3	43.9	4.8	.8	1.04	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L244	Ø	45.3	43.8	4.7	.7	1.05	15C	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (W.AIR CLAMP)	
L484	Ø	45.3	42.5	3.9	-.2	1.48	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L299	*	45.4	42.7	4.1	-.1	.81	15V	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100) X2	
L250L	*	45.4	44.3	5.2	1.0	.98	15H	TEARING STRENGTH,	STANDARD,	LBOMARGY, 20 C, 65% RH	
L554	Ø	45.7	43.2	4.6	.0	1.10	15C	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (W.AIR CLAMP)	
L566	Ø	45.7	40.8	3.0	-1.7	.83	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L236	Ø	45.7	42.7	4.3	-.4	1.11	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L228	*	46.3	40.7	3.2	-2.2	1.44	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L576	Ø	46.4	43.9	5.6	.0	.99	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L390	Ø	46.7	43.5	5.5	-.4	.71	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L182T	Ø	46.9	43.8	5.9	-.4	.83	15T	TEARING STRENGTH,	STANDARD,	TEWING-ELMENDORF (SCALE TO 100)	
L131	*	47.7	45.3	7.5	.1	.61	15A	TEARING STRENGTH,	STANDARD,	AFFITA	

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

LAB CODE	F	MEANS		COORDINATES		AVG R. STD VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		K2S	B85	MAJOR	MINOR				
L652	#	49.9	48.8	11.5	1.1	3.50	15C	TEARING STRENGTH, STANDARD,	THWING-ELMENDORF (W.AIR CLAMP)
L207	#	51.2	49.5	12.9	.6	1.35	15X	TEARING STRENGTH, STANDARD,	THWING-ELMENDORF, DIGITAL READOUT
L150	#	53.0	50.3	14.8	-0	.68	15T	TEARING STRENGTH, STANDARD,	THWING-ELMENDORF (SCALE TO 100)
L151	#	53.1	47.7	13.0	-1.9	1.45	15C	TEARING STRENGTH, STANDARD,	THWING-ELMENDORF (W.AIR CLAMP)
L604	#	55.5	54.9	22.7	-1.3	3.56	15T	TEARING STRENGTH, STANDARD,	THWING-ELMENDORF (SCALE TO 100)
L622	#	63.7	60.8	29.8	-.1	1.74	15T	TEARING STRENGTH, STANDARD,	THWING-ELMENDORF (SCALE TO 100)
GMEANS:		42.4	40.0			1.00			
		95% ELLIPSE:		7.3	2.3				WITH GAMMA = 44 DEGREES

TEARING STRENGTH, DEEP CUTOUT

SAMPLE K25 = 42.4 GRAMS SAMPLE E85 = 40.0 GRAMS
 SAMPLE K25 = 416 MILLINEWTON SAMPLE E85 = 392 MILLINEWTON



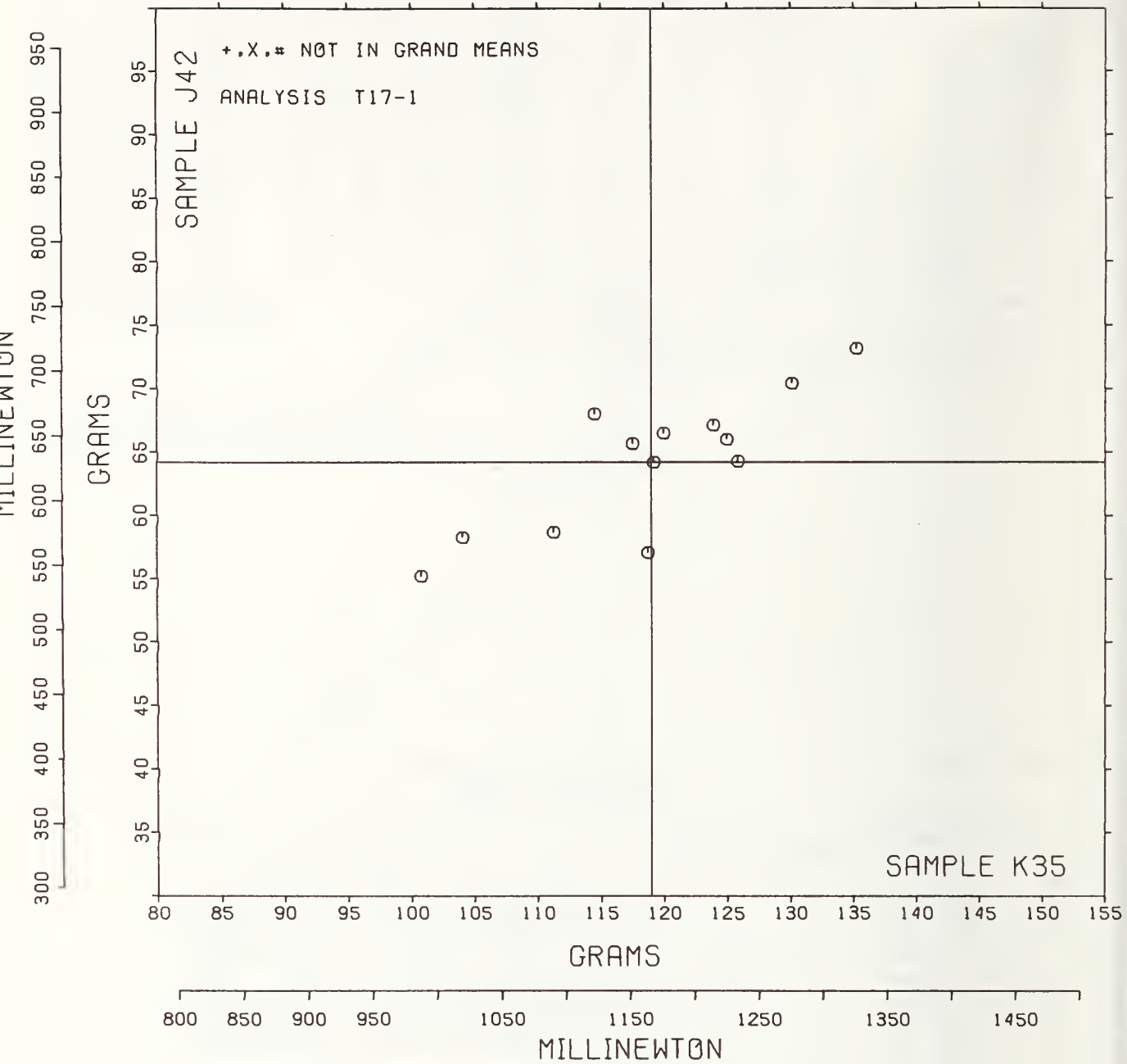
TEARING STRENGTH, NO CUTOUT

SAMPLE K35 = 119. GRAMS

SAMPLE J42 = 64. GRAMS

SAMPLE K35 = 1166 MILLINEWTON

SAMPLE J42 = 629 MILLINEWTON



ANALYSIS T19-1 TABLE 1
 TENSILE BREAKING STRENGTH, KILOWEIGHTS PER METER - PACKAGING PAPER
 TAPPI STANDARDS T404 GS-76 AND T494 GS-70, TENSILE BREAKING STRENGTH, PENDULUM AND CRE TYPES

LAB CODE	KRAFT					PRINTING					TEST D. = 20		
	K33	123 GRAMS PER SQUARE METER				J01	98 GRAMS PER SQUARE METER				VAR	F	LAB
	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR			
L100	9.05	-.38	-.91	.43	.73	5.19	-.33	-1.00	.20	.81	19E	0	L100
L107	8.42	-1.01	-2.42	.97	1.65	4.93	-.59	-1.77	.59	2.40	19A	0	L107
L122	9.40	-.03	-.07	.58	.59	5.43	-.09	-.26	.19	.76	19A	0	L122
L126	9.49	.05	.12	.58	.98	5.60	.08	.23	.18	.75	19A	0	L126
L151	9.44	.01	.02	.60	1.03	5.18	-.34	-1.02	.21	.84	19A	0	L151
L153	9.99	.56	1.33	.67	1.15	5.90	.38	1.16	.14	.56	19P	0	L153
L157A	9.53	.20	.48	.64	1.09	5.97	.45	1.36	.16	.67	19P	0	L157A
L157I	8.60	-.83	-1.98	.62	1.06	5.25	-.27	-.81	.16	.64	19A	0	L157I
L167	10.51	1.08	2.57	.60	1.02	5.96	.45	1.34	.23	.92	19G	*	L167
L182I	9.12	-.32	-.76	.58	.98	5.33	-.19	-.56	.14	.57	19D	0	L182I
L182L	9.20	-.23	-.55	.60	1.02	5.47	-.05	-.16	.20	.82	19T	0	L182L
L207	9.45	.02	.04	.66	1.12	5.55	.03	.10	.16	.64	19A	0	L207
L217P	9.57	.13	.31	.58	.98	5.68	.16	.47	.19	.79	19P	0	L217P
L219	9.19	-.25	-.59	.51	.87	10.55	5.03	15.13	.37	1.49	19E	*	L219
L225	9.20	-.24	-.57	.50	.86	5.62	.10	.29	.18	.72	19P	0	L225
L234L	9.29	-.15	-.35	.64	1.09	5.71	.19	.57	.23	.95	19P	0	L234L
L237A	9.47	.04	.09	.88	1.50	6.19	.67	2.02	.27	1.08	19Q	*	L237A
L237B	9.58	.54	1.30	.70	1.19	5.62	.10	.31	.27	1.12	19A	0	L237B
L238A	9.58	.15	.36	.86	1.46	5.59	.07	.21	.46	1.87	19T	0	L238A
L243	9.30	-.14	-.32	.57	.98	5.32	-.20	-.61	.13	.52	19A	0	L243
L257A	9.46	.02	.05	.53	.89	5.77	.25	.76	.22	.88	19P	0	L257A
L257C	9.42	-.02	-.04	.28	.48	5.61	.09	.26	.16	.67	19P	0	L257C
L264A	9.51	.07	.17	.51	.87	5.01	-.51	-1.54	.21	.87	19A	0	L264A
L264P	9.60	.16	.39	.72	1.22	5.71	.19	.58	.35	1.43	19P	0	L264P
L267	9.51	.08	.18	.47	.80	5.47	-.05	-.15	.14	.55	19A	0	L267
L273	9.57	.14	.33	.78	1.33	5.42	-.10	-.29	.21	.85	19P	0	L273
L274	9.43	-.01	-.01	.41	.70	5.66	.14	.42	.14	.58	19P	0	L274
L280	9.09	-.34	-.82	.39	.66	5.07	-.45	-1.34	.30	1.24	19G	0	L280
L281	9.64	.21	.50	.64	1.09	5.98	.46	1.39	.13	.53	19G	0	L281
L312	9.19	-.24	-.57	.44	.75	5.25	-.26	-.79	.24	.98	19D	0	L312
L318	8.88	-.56	-1.33	.47	.80	4.99	-.53	-1.60	.11	.44	19G	0	L318
L324	9.64	.21	.50	.37	.63	5.53	.01	.02	.20	.82	19A	0	L324
L336	9.51	.08	.19	.52	.89	5.52	.01	.02	.24	.99	19G	0	L336
L356	9.83	.39	.94	.76	1.29	5.68	.16	.48	.30	1.21	19P	0	L356
L366	9.84	.41	.97	.52	.89	5.49	-.02	-.07	.51	2.07	19P	0	L366
L562	10.22	.78	1.87	.67	1.14	5.80	.28	.84	.28	1.12	19P	0	L562
L565	9.05	-.38	-.91	.46	.73	5.96	.44	1.31	.24	.97	19T	*	L565
L568	10.02	.59	1.41	.57	.97	6.15	.63	1.90	.23	.92	19P	0	L568
L575	9.33	-.10	-.24	.46	.78	5.53	.04	.11	.20	.79	19G	0	L575
L576	9.34	-.10	-.23	.56	.56	5.29	-.23	-.68	.16	.63	19A	0	L576
L580	9.45	.02	.05	.64	1.08	5.67	.15	.45	.22	.91	19G	0	L580
L581	2.02	-7.42	-17.72	.10	.16	1.12	-4.40	-13.24	.07	.29	19A	#	L581
L582	8.36	-1.07	-2.57	.75	1.28	4.88	-.64	-1.92	.32	1.32	19A	*	L582
L604	9.20	-.24	-.57	.61	1.04	4.83	-.69	-2.06	.88	3.58	19A	0	L604
L606	9.14	-.29	-.69	.42	.71	5.39	-.13	-.38	.23	.95	19P	0	L606
L610	9.00	-.43	-1.04	.69	1.17	5.31	-.20	-.62	.21	.84	19A	0	L610
L622	9.56	.13	.31	.58	1.00	5.48	-.04	-.12	.27	1.10	190	0	L622
L650	9.90	.47	1.13	.48	.81	5.77	.26	.77	.22	.89	19G	0	L650
L652	10.22	.78	1.87	.64	1.08	6.14	.62	1.86	.17	.67	19A	0	L652
L676	9.29	-.14	-.34	1.08	1.85	5.14	-.38	-1.15	.49	1.98	19A	0	L676
L689	9.36	-.08	-.18	.44	.75	5.41	-.11	-.33	.26	1.06	19A	0	L689

GR. MEAN = 9.43 KILOWEIGHT/M GRAND MEAN = 5.52 KILOWEIGHT/M TEST DETERMINATIONS = 20
 SD MEANS = .42 KILOWEIGHT/M SD OF MEANS = .33 KILOWEIGHT/M 49 LABS IN GRAND MEANS
 AVERAGE SDR = .59 KILOWEIGHT/M AVERAGE SDR = .25 KILOWEIGHT/M
 GR. MEAN = 53.88 LB/INCH GRAND MEAN = 31.52 LB/INCH

L250I 8.68 -.75 -1.80 .31 .54 4.87 -.65 -1.94 .10 .41 19L * L250I
 L684 10.30 .87 2.07 .71 1.21 6.31 .79 2.38 .33 1.34 19I * L684
 TOTAL NUMBER OF LABORATORIES REPORTING = 53

Best values: K33 9.4 ± 0.8 kilonewtons per meter
 J01 5.5 ± 0.6 kilonewtons per meter

The following laboratories were omitted from the grand means because of extreme test results: 219.

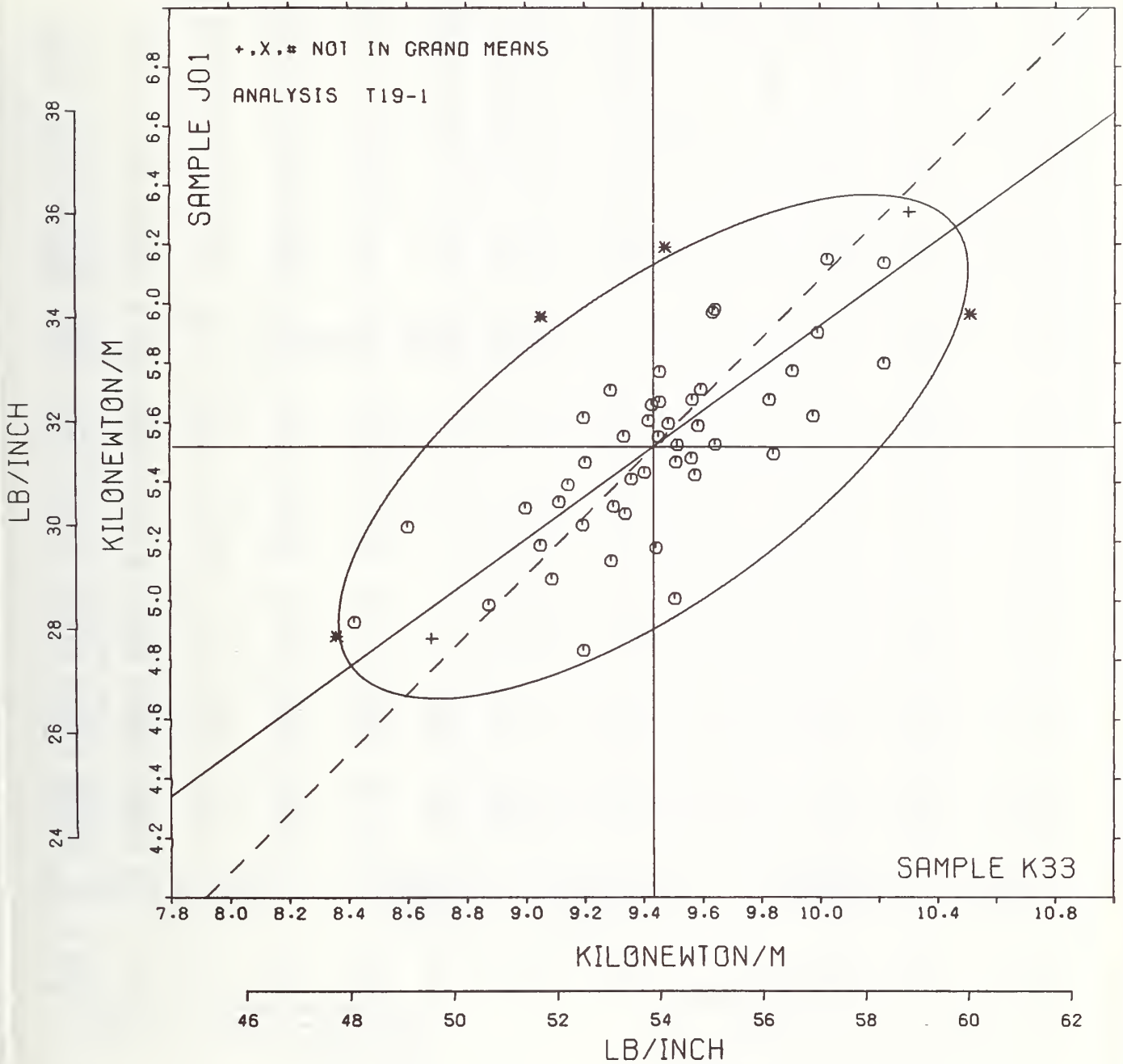
Data from the following laboratories appear to be off by a multiplicative factor: 581.

TENSILE BREAKING STRENGTH, KILOGNEWTONS PER METER - PACKAGING PAPER
TAPPI STANDARDS T404 GS-76 AND T494 GS-70, TENSILE BREAKING STRENGTH, PENDULUM AND CRE TYPES

LAI CODE	F	MEANS		COORDINATES		AVG R. SDR VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		K33	J01	MAJOR	MINOR				
L581	#	2.02	1.12	-8.59	.76	.23 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L582	*	8.36	4.88	-1.24	.11	1.30 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L107	0	8.42	4.93	-1.17	.11	2.02 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L1571	0	8.60	5.25	-.83	.27	.85 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L2501	*	8.68	4.87	-.99	-.09	.47 19L	TENSILE STRENGTH,	PACKAGING PAPER,	CRE, 20 C, 65% RH
L318	0	8.88	4.99	-.76	-.11	.62 19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L610	0	9.00	5.31	-.47	.09	1.01 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L100	0	9.05	5.19	-.50	-.05	.77 19E	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L565	*	9.05	5.56	-.05	.58	.87 19T	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L280	0	9.09	5.07	-.54	-.16	.95 19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L1821	0	9.12	5.33	-.37	.04	.78 19D	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L606	0	9.14	5.39	-.31	.07	.83 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L219	#	9.19	10.55	2.74	4.23	1.18 19E	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L312	0	9.19	5.25	-.35	-.07	.86 19D	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L604	0	9.20	4.83	-.59	-.42	2.31 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L225	0	9.20	5.62	-.14	.22	.79 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L182L	0	9.20	5.47	-.22	.09	.92 19T	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L234L	0	9.29	5.71	-.01	.24	1.02 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L676	0	9.29	5.14	-.34	-.23	1.92 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L243	0	9.30	5.32	-.23	-.08	.75 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L575	0	9.33	5.55	-.06	.09	.79 19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L576	0	9.34	5.29	-.21	-.13	.80 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L689	0	9.36	5.41	-.12	-.04	.90 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L122	0	9.40	5.43	-.08	-.05	.87 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L257C	0	9.42	5.61	.04	.08	.57 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L274	0	9.43	5.66	.08	.12	.64 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L151	0	9.44	5.18	-.19	-.28	.94 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L207	0	9.45	5.55	.03	.02	.88 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L580	0	9.45	5.67	.11	.11	.99 19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L257A	0	9.46	5.77	.16	.19	.89 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L237A	*	9.47	6.19	.42	.52	1.29 19Q	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L126	0	9.49	5.60	.09	.03	.86 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L264A	0	9.51	5.01	-.24	-.46	.87 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L267	0	9.51	5.47	.03	-.09	.68 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L336	0	9.51	5.52	.07	-.04	.94 19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L622	0	9.56	5.48	.08	-.11	1.05 19G	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L217P	0	9.57	5.68	.20	.05	.89 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L273	0	9.57	5.42	.06	-.16	1.09 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L238A	0	9.58	5.59	.16	-.03	1.67 19T	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L264P	0	9.60	5.71	.24	.06	1.32 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L157A	0	9.63	5.97	.43	.25	.88 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L281	0	9.64	5.98	.44	.25	.81 19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L324	0	9.64	5.53	.17	-.12	.73 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L356	0	9.83	5.68	.41	-.10	1.25 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L366	0	9.84	5.49	.32	-.26	1.48 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L650	0	9.90	5.77	.53	-.07	.85 19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L237B	0	9.98	5.62	.50	-.23	1.15 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L153	0	9.99	5.90	.68	-.01	.85 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L568	0	10.02	6.15	.85	.17	.95 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L652	0	10.22	6.14	1.00	.04	.88 19A	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L562	0	10.22	5.80	.80	-.23	1.13 19P	TENSILE STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L684	*	10.30	6.31	1.17	.13	1.27 19I	TENSILE STRENGTH,	PACKAGING PAPER,	CRE, 20C, 65% RH
L167	*	10.51	5.56	1.13	-.27	.97 19G	TENSILE STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
GMEANS:		9.43	5.52			1.00			
		95% ELLIPSE:		1.26	.52	WITH GAMMA = 35 DEGREES			

TENSILE STRENGTH, PACKAGING PAPERS

SAMPLE K33 = 9.4 KILONEWTON/M SAMPLE J01 = 5.5 KILONEWTON/M
 SAMPLE K33 = 53.9 LB/INCH SAMPLE J01 = 31.5 LB/INCH



TENSILE BREAKING STRENGTH, KILOWEIGHTS PER METER
TAPPI STANDARD T494 63-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	SAMPLE J06 85 GRAMS PER SQUARE METER					SAMPLE J71 76 GRAMS PER SQUARE METER					TEST D. = 20				
	MEAN	DEV	N.DEV	SDR	R. SDR	MEAN	DEV	N.DEV	SDR	R. SDR	VAR	F	LAB		
L100	5.13	-.18	-1.08	.17	.74	3.63	-.01	-.08	.12	.75	20E	0	L100		
L105	5.62	.31	1.81	.27	1.17	3.69	.05	.41	.14	.90	20A	0	L105		
L122	5.24	-.07	-.41	.18	.76	3.66	.02	.15	.14	.87	20A	0	L122		
L124C	5.27	-.04	-.22	.23	1.00	3.51	-.13	-.98	.21	1.36	20A	0	L124C		
L125	5.41	.05	.55	.35	1.53	3.82	.18	1.39	.13	.83	20C	0	L125		
L131	5.44	.13	.73	.17	.71	3.78	.14	1.11	.13	.82	20E	0	L131		
L141T	5.22	-.05	-.50	.22	.93	3.61	-.03	-.20	.13	.81	20A	0	L141T		
L143	5.87	.56	3.28	.21	.89	4.01	.37	2.85	.12	.74	20E	#	L143		
L148	5.50	.55	3.44	.22	.95	3.87	.24	1.82	.18	1.16	20A	#	L148		
L163	5.40	.09	.50	.18	.77	3.72	.08	.60	.13	.80	20D	0	L163		
L185	5.17	-.14	-.81	.37	1.59	3.44	-.19	-1.50	.21	1.36	20C	0	L185		
L190R	5.26	-.05	-.30	.26	1.13	3.65	.01	.10	.14	.91	20A	0	L190R		
L194	5.11	-.21	-1.20	.17	.71	3.55	-.09	-.70	.13	.85	20A	0	L194		
L223B	5.49	.18	1.05	.12	.52	3.73	.09	.73	.14	.87	20A	0	L223B		
L226C	5.37	.06	.35	.46	2.00	3.62	-.01	-.11	.29	1.85	20C	0	L226C		
L230	5.24	-.07	-.41	.16	.70	3.54	-.10	-.74	.08	.53	20D	0	L230		
L243	5.36	.05	.29	.11	.46	3.58	-.05	-.41	.16	1.04	20A	0	L243		
L255	5.44	.13	.77	.17	.74	NO DATA REPORTED FOR SAMPLE J71							20A	M	L255
L260	5.98	.67	3.94	.24	1.04	3.98	.34	2.62	.18	1.17	20A	#	L260		
L261	5.49	.18	1.04	.28	1.19	3.86	.22	1.72	.18	1.13	20A	0	L261		
L278	5.51	.20	1.19	.16	.70	3.88	.24	1.88	.20	1.28	20A	0	L278		
L291	4.90	-.41	-2.39	.19	.81	3.59	-.05	-.38	.17	1.05	20A	*	L291		
L309	5.16	-.15	-.87	.25	1.07	3.65	.01	.09	.12	.76	20E	0	L309		
L315	5.13	-.16	-1.08	.23	.98	3.43	-.20	-1.56	.17	1.12	20A	0	L315		
L318	4.98	-.33	-1.92	.14	.59	3.38	-.26	-1.98	.10	.63	20G	0	L318		
L325	5.32	.00	.03	.20	.87	3.62	-.02	-.17	.14	.88	20E	0	L325		
L328	5.09	-.22	-1.29	.19	.82	3.59	-.05	-.37	.16	1.03	20A	0	L328		
L331	6.08	.76	4.47	.28	1.23	3.97	.33	2.56	.13	.82	20A	#	L331		
L333	5.44	.13	.77	.17	.72	3.78	.14	1.09	.14	.90	20A	0	L333		
L344	5.55	.24	1.40	.21	.89	3.78	.14	1.08	.13	.84	20A	0	L344		
L352	5.52	.20	1.20	.41	1.74	3.79	.16	1.20	.16	1.04	20A	0	L352		
L356	5.42	.11	.64	.15	.63	3.64	.01	.05	.14	.91	20A	0	L356		
L360	5.40	.09	.53	.21	.90	3.69	.06	.43	.10	.65	20B	0	L360		
L390	5.48	.17	.99	.27	1.17	3.76	.12	.92	.12	.79	20A	0	L390		
L442	5.28	-.03	-.18	.14	.59	3.60	-.04	-.28	.10	.62	20G	0	L442		
L557	5.05	-.26	-1.53	.23	.99	3.42	-.22	-1.68	.16	1.01	20A	0	L557		
L558	1.13	-4.18	-24.44	.06	.27	.75	-2.89	-22.19	.04	.27	20A	#	L558		
L559	5.97	.66	3.86	.14	.62	4.09	.46	3.51	.07	.42	20A	#	L559		
L563A	5.51	.20	1.18	.29	1.26	3.77	.13	1.00	.27	1.70	20A	0	L563A		
L567	5.22	-.09	-.51	.21	.90	3.39	-.25	-1.93	.16	1.04	20A	0	L567		
L574	6.01	.70	4.09	.25	1.10	3.90	.27	2.05	.19	1.23	20A	#	L574		
L575	5.31	.00	.02	.24	1.01	3.64	.00	.04	.19	1.19	20G	0	L575		
L592	5.32	.01	.03	.26	1.14	3.62	-.01	-.10	.15	.93	20A	0	L592		
L616	1.16	-4.15	-24.25	.11	.49	.62	-3.02	-23.18	.05	.33	20D	#	L616		
L618	5.38	.06	.38	.49	2.12	3.53	-.10	-.80	.31	1.99	20A	0	L618		

GR. MEAN = 5.31 KILOWEIGHT/M GRAND MEAN = 3.64 KILOWEIGHT/M TEST DETERMINATIONS = 20
SD MEANS = .17 KILOWEIGHT/M SD OF MEANS = .13 KILOWEIGHT/M 36 LABS IN GRAND MEANS
AVERAGE SDR = .23 KILOWEIGHT/M AVERAGE SDR = .16 KILOWEIGHT/M
GR. MEAN = 17.912 LB/15 MM GRAND MEAN = 12.267 LB/15 MM

L139	5.33	.02	.13	.28	1.20	3.61	-.03	-.23	.17	1.07	20H	*	L139
L211	1.97	-3.34	-19.52	.45	1.92	3.68	.04	.33	.42	2.71	20I	*	L211
L250I	4.74	-.57	-3.32	.14	.59	3.23	-.41	-3.15	.10	.63	20L	*	L250I

TOTAL NUMBER OF LABORATORIES REPORTING = 48

Best values: J06 5.3 ± 0.2 kiloweights per meter
J71 3.6 ± 0.2 kiloweights per meter

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

It is suspected that the following laboratories received samples which were different from the rest: 143, 148, 260, 331, 559, 574.

For these six laboratories the following applies:

	J06	J71
GMEAN	5.97	3.97
SDMEAN	.07	.08

TENSILE BREAKING STRENGTH, KILOGRAMS PER METER

TAPPI STANDARD T494 G8-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J06	J71	MAJOR	MINOR	R.SDR	VAR			
L558	#	1.13	.75	-5.08	.02	.27	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L616	#	1.16	.62	-5.13	-.10	.41	20D	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L211	*	1.57	3.68	-2.71	1.94	2.32	20I	TENSILE STRENGTH,	PRINTING PAPER, CRE, 20 C,	65% RH
L2501	*	4.74	3.23	-.70	-.01	.61	20L	TENSILE STRENGTH,	PRINTING PAPER, CRE, 20 C,	65% RH
L291	*	4.90	3.59	-.36	.19	.93	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L318	o	4.98	3.38	-.42	-.02	.61	20G	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L557	o	5.05	3.42	-.34	-.03	1.00	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L328	o	5.09	3.59	-.21	.09	.93	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L194	o	5.11	3.55	-.22	.04	.78	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L100	o	5.13	3.63	-.16	.10	.75	20E	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L315	o	5.13	3.43	-.27	-.06	1.05	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L309	o	5.16	3.65	-.12	.09	.92	20E	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L185	o	5.17	3.44	-.23	-.08	1.47	20C	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L567	o	5.22	3.39	-.22	-.16	.97	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L141T	o	5.22	3.61	-.09	.03	.87	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L230	o	5.24	3.54	-.11	-.04	.62	20G	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L122	o	5.24	3.66	-.05	.06	.81	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L190R	o	5.26	3.65	-.03	.04	1.02	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L124C	o	5.27	3.51	-.10	-.08	1.18	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L442	o	5.28	3.60	-.05	-.01	.60	20G	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L575	o	5.31	3.64	.01	.00	1.10	20G	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L325	o	5.32	3.62	-.01	-.02	.87	20E	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L592	o	5.32	3.62	-.00	-.01	1.03	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L139	*	5.33	3.61	.00	-.04	1.13	20H	TENSILE STRENGTH,	PRINTING PAPER, CRE, SHORT TEST SPAN	
L243	o	5.36	3.58	.01	-.07	.75	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L226C	o	5.37	3.62	.04	-.05	1.92	20C	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L618	o	5.38	3.53	-.01	-.12	2.05	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L163	o	5.40	3.72	.12	.02	.79	20D	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L360	o	5.40	3.69	.11	-.01	.78	20B	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L125	o	5.41	3.82	.18	.09	1.18	20C	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L356	o	5.42	3.64	.09	-.06	.77	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L131	o	5.44	3.78	.19	.05	.76	20E	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L255	M	5.44				.74	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L333	o	5.44	3.78	.19	.04	.81	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L390	o	5.48	3.76	.21	.00	.98	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L261	o	5.49	3.86	.27	.08	1.16	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L223B	o	5.49	3.73	.20	-.02	.70	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L563A	o	5.51	3.77	.24	-.01	1.48	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L278	o	5.51	3.88	.31	.08	.99	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L352	o	5.52	3.79	.26	.01	1.39	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L344	o	5.55	3.78	.28	-.02	.86	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L105	o	5.62	3.69	.28	-.13	1.03	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L143	#	5.87	4.01	.67	-.02	.81	20E	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L148	#	5.90	3.87	.62	-.14	1.05	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L559	#	5.97	4.09	.80	-.00	.52	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L260	#	5.98	3.98	.75	-.10	1.11	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L574	#	6.01	3.90	.73	-.18	1.16	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
L331	#	6.08	3.97	.82	-.16	1.02	20A	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	LOAD CELL (CRE)
GMEANS:		5.31	3.64			1.00				
		95% ELLIPSE:		.52	.19	WITH GAMMA = 34 DEGREES				

ANALYSIS T20-2 TABLE 1
TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

TAPPI STANDARD T404 G8-76, TENSILE BREAKING STRENGTH OF PAPER AND PAPERBOARD (PENDULUM-TYPE TESTER)

LAB CODE	SAMPLE J06 MEAN	PRINTING 85 GRAMS PER SQUARE METER				SAMPLE J71 MEAN	PRINTING 76 GRAMS PER SQUARE METER				TEST D.° 20		
		DEV	N.DEV	SDR	R.SDR		DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L108	6.02	.57	1.75	.29	1.23	4.03	.29	1.40	.20	1.27	20P	0	L108
L124P	5.18	-.27	-.81	.25	1.05	3.56	-.19	-.90	.15	.95	20P	0	L124P
L128	5.39	-.05	-.16	.20	.86	3.67	-.08	-.37	.13	.83	20T	0	L128
L148	5.45	.00	.01	.19	.82	3.68	-.06	-.29	.21	1.30	20P	0	L148
L158	5.13	-.32	-.97	.24	1.00	3.52	-.22	-1.08	.10	.65	20T	0	L158
L162	4.88	-.57	-1.73	.24	1.03	3.64	-.10	-.49	.15	.93	20*	0	L162
L182L	5.38	-.06	-.19	.17	.73	3.66	-.09	-.42	.13	.79	20T	0	L182L
L189	5.58	.14	.43	.23	.97	3.66	-.08	-.41	.10	.60	20R	0	L189
L191P	5.83	.39	1.19	.26	1.12	3.95	.20	.99	.15	.91	20P	0	L191P
L195	5.29	-.15	-.46	.19	.81	3.59	-.15	-.74	.17	1.03	20R	0	L195
L212	4.93	-.51	-1.56	.17	.73	3.26	-.48	-2.33	.14	.86	20K	0	L212
L213	5.45	.01	.02	.24	1.03	3.65	-.09	-.45	.18	1.12	20T	0	L213
L218	5.49	.05	.16	.19	.83	3.71	-.04	-.17	.15	.96	20P	0	L218
L241	5.82	.38	1.16	.22	.92	3.89	.15	.73	.11	.68	20R	0	L241
L242	5.12	-.32	-.98	.23	.99	3.57	-.17	-.84	.13	.81	20Y	0	L242
L249	5.30	-.14	-.42	.20	.86	3.56	-.18	-.89	.22	1.38	20P	0	L249
L259	5.66	.22	.66	.25	1.07	4.02	.27	1.33	.17	1.07	20P	0	L259
L262	5.54	.10	.29	.23	.98	3.93	.18	.90	.12	.75	20R	0	L262
L274	5.48	.04	.11	.09	.37	3.75	.00	.02	.09	.54	20P	0	L274
L275	5.63	.18	.56	.32	1.38	4.08	.33	1.61	.15	.95	20R	0	L275
L279P	5.77	.32	.98	.21	.89	3.89	.14	.70	.11	.67	20P	0	L279P
L285	4.87	-.57	-1.73	.10	.44	3.70	-.05	-.22	.25	1.55	20P	*	L285
L290	5.58	.14	.42	.28	1.19	3.64	-.11	-.51	.13	.81	20P	0	L290
L311	5.25	-.19	-.59	.28	1.19	3.71	-.03	-.16	.16	1.01	20V	0	L311
L313	4.81	-.63	-1.92	.13	.55	3.33	-.41	-1.99	.09	.57	20T	0	L313
L321	4.92	-.52	-1.59	.30	1.26	3.56	-.18	-.88	.37	2.30	20Q	0	L321
L330	5.27	.42	1.29	.30	1.27	3.85	.11	.51	.24	1.51	20P	0	L330
L356	5.44	.00	.00	.31	1.30	3.85	.10	.50	.20	1.27	20P	0	L356
L393	5.76	.32	.97	.20	.84	3.96	.22	1.07	.13	.79	20P	0	L393
L484	4.98	-.46	-1.41	.20	.84	3.47	-.28	-1.34	.13	.82	20U	0	L484
L554	5.77	.33	1.00	.17	.74	3.98	.24	1.16	.15	.93	20P	0	L554
L556	5.78	.34	1.04	.29	1.23	3.93	.19	.90	.18	1.15	20P	0	L556
L563P	5.73	.29	.88	.25	1.06	4.18	.43	2.10	.18	1.10	20P	0	L563P
L585	6.00	.56	1.71	.29	1.25	3.92	.18	.86	.20	1.24	20V	0	L585
L599	5.34	-.10	-.30	.39	1.67	3.63	-.11	-.55	.24	1.50	20V	0	L599
L626	5.65	.20	.62	.30	1.27	3.90	.16	.77	.20	1.24	20T	0	L626
L680	5.38	-.06	-.18	.24	1.04	3.79	.03	.24	.14	.87	20R	0	L680
L685	5.36	-.08	-.25	.16	.67	3.39	-.16	-.75	.14	.87	20Y	0	L685

GR. MEAN = 5.44 KILONEWTON/M

SD MEANS = .33 KILONEWTON/M

GR. MEAN = 18.357 LB/15 MM

TOTAL NUMBER OF LABORATORIES REPORTING = 38

Best values: J06 5.5 ± 0.6 kilonewtons per meter

J71 3.7 ± 0.3 kilonewtons per meter

GRAND MEAN = 3.74 KILONEWTON/M

SD OF MEANS = .21 KILONEWTON/M

GRAND MEAN = 12.626 LB/15 MM

AVERAGE SDR = .24 KILONEWTON/M

AVERAGE SDR = .16 KILONEWTON/M

TEST DETERMINATIONS = 20

38 LABS IN GRAND MEANS

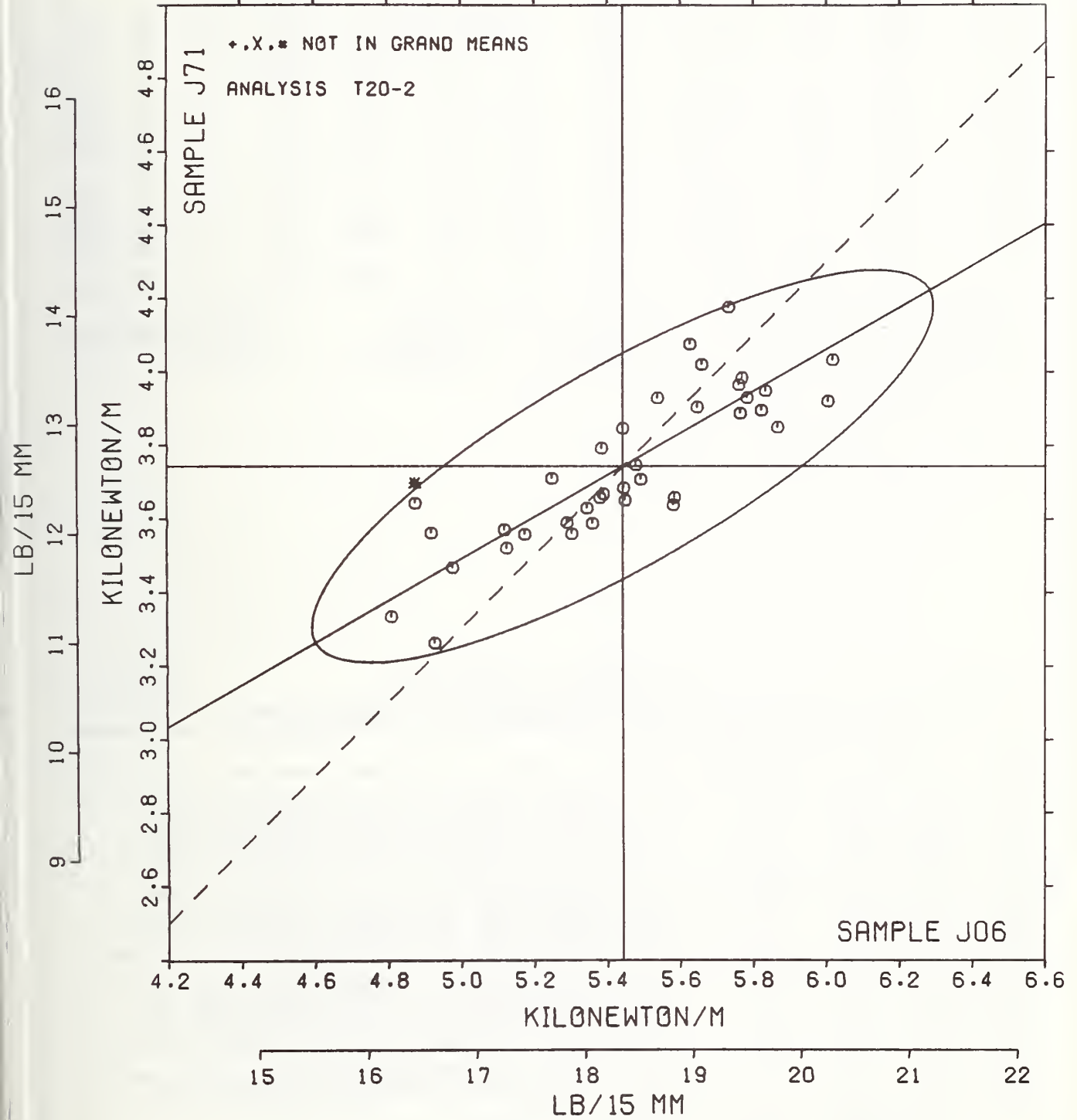
ANALYSIS T20-2 TABLE 2
TENSILE BREAKING STRENGTH, KILOGNEWTONS PER METER

TAPPI STANDARD T404 6S-76, TENSILE BREAKING STRENGTH OF PAPER AND PAPERBOARD (PENDULUM-TYPE TESTER)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST	INSTRUMENT---	CONDITIONS
		J06	J71	MAJOR	MINOR	R.SDR	VAR				
L313	0	4.81	3.33	-.75	-.04	.56	20T	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L285	*	4.87	3.70	-.52	.24	.99	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L162	0	4.88	3.64	-.54	.19	.98	20*	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L321	0	4.92	3.56	-.54	.10	1.78	20Q	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L212	0	4.93	3.26	-.68	-.16	.79	20R	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L484	0	4.98	3.47	-.54	-.01	.83	20U	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L242	0	5.12	3.57	-.37	.01	.90	20Y	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L158	0	5.13	3.52	-.39	-.04	.82	20T	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L124P	0	5.18	3.56	-.32	-.03	1.00	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L311	0	5.25	3.71	-.18	.07	1.10	20V	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L195	0	5.29	3.59	-.21	-.06	.92	20R	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L249	0	5.30	3.56	-.21	-.09	1.12	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L599	0	5.34	3.63	-.14	-.05	1.58	20V	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L685	0	5.36	3.59	-.15	-.09	.77	20Y	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L182L	0	5.38	3.66	-.10	-.04	.76	20T	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L680	0	5.38	3.79	-.03	.07	.95	20R	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L128	0	5.39	3.67	-.08	-.04	.84	20T	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L356	0	5.44	3.85	.05	.09	1.28	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L148	3	5.45	3.68	-.03	-.05	1.06	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L213	0	5.45	3.65	-.04	-.08	1.07	20T	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L274	0	5.48	3.75	.03	-.01	.46	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L218	0	5.49	3.71	.03	-.06	.89	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L262	0	5.54	3.93	.17	.11	.86	20R	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L290	0	5.58	3.64	.07	-.16	1.00	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L189	0	5.58	3.66	.08	-.14	.79	20R	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L275	0	5.63	4.08	.32	.20	1.16	20R	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L626	0	5.65	3.90	.26	.04	1.25	20T	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L259	0	5.66	4.02	.32	.13	1.07	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L563P	0	5.73	4.18	.47	.23	1.08	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L393	0	5.76	3.96	.39	.03	.82	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L279P	0	5.77	3.89	.35	-.04	.78	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L554	0	5.77	3.98	.40	.05	.83	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L556	0	5.78	3.93	.39	-.01	1.19	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L241	0	5.82	3.89	.41	-.06	.80	20R	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L191P	0	5.83	3.95	.44	-.02	1.02	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L330	0	5.87	3.85	.42	-.12	1.39	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L585	0	6.00	3.92	.58	-.13	1.24	20V	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
L108	0	6.02	4.03	.64	-.03	1.25	20P	TENSILE	STRENGTH,	PRIMARILY	PRINTING PAPERS, PENDULUM TESTER
GMEANS:		5.44	3.74			1.00					
95% ELLIPSE:				.97	.27						WITH GAMMA = 29 DEGREES

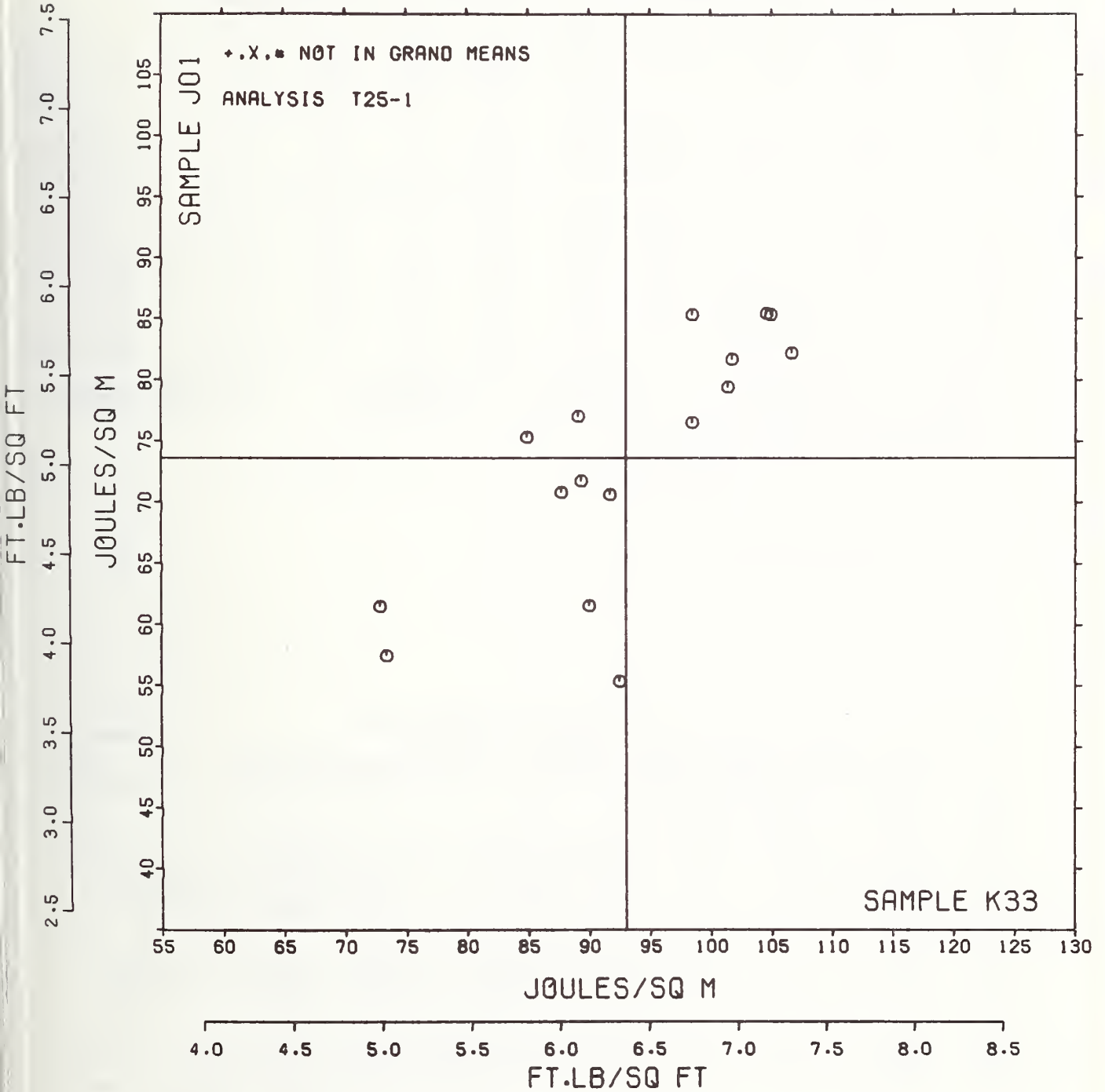
TENSILE STRENGTH, PENDULUM TYPE

SAMPLE J06 = 5.44 KILONEWTON/M SAMPLE J71 = 3.74 KILONEWTON/M
 SAMPLE J06 = 18.4 LB/15 MM SAMPLE J71 = 12.6 LB/15 MM



T.E.A., PACKAGING PAPERS

SAMPLE K33 = 93. JOULES/SQ M SAMPLE J01 = 74. JOULES/SQ M
 SAMPLE K33 = 6.37 FT.LB/SQ FT SAMPLE J01 = 5.04 FT.LB/SQ FT



TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER
TAPPI STANDARD T494 GS-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	SAMPLE J06 MEAN	PRINTING 85 GEAMS PER SQUARE METER				R,SDR	SAMPLE J71 MEAN	PRINTING 76 GRAMS PER SQUARE METER				TEST D. = 20		
		DEV	N.DEV	SDR	R,SDR			DEV	N.DEV	SDR	R,SDR	VAR	F	LAE
L100	54.7	-4.2	-1.01	3.6	.64	42.9	1.8	.45	3.5	.76	26A	Ø	L100	
L121	34.8	-24.1	-5.78	1.2	.21	23.6	-17.5	-4.43	.8	.17	26D	#	L121	
L122	62.7	3.8	.90	5.8	1.04	44.8	3.6	.92	4.6	1.01	26L	Ø	L122	
L139	58.4	-.6	-.13	7.9	1.43	37.4	-3.7	-.94	4.6	1.00	26B	Ø	L139	
L163	55.8	.9	.21	5.6	1.02	43.4	2.2	.56	4.0	.87	26J	Ø	L163	
L167	58.5	-.4	-.10	2.4	.43	39.7	-1.4	-.37	2.4	.51	26D	Ø	L167	
L185	52.1	-6.8	-1.64	10.4	1.88	32.8	-8.3	-2.10	6.7	1.46	26C	Ø	L185	
L211	62.8	3.9	.93	6.5	1.17	40.2	-.9	-.23	6.6	1.43	26C	Ø	L211	
L250	53.1	-5.8	-1.38	2.5	.44	37.0	-4.2	-1.06	3.4	.73	26A	Ø	L250	
L255	60.2	1.3	.31	3.8	.69	NO DATA REPORTED FOR SAMPLE J71						26P	M	L255
L309	61.5	2.6	.63	8.1	1.46	45.7	4.6	1.16	3.9	.84	26J	Ø	L309	
L318	60.1	1.2	.29	5.6	1.01	43.7	2.6	.65	5.2	1.12	26A	Ø	L318	
L356	65.3	6.4	1.53	5.1	.91	43.6	2.5	.63	5.6	1.21	26A	Ø	L356	
L393	58.2	-.8	-.18	4.2	.76	38.8	-2.4	-.60	4.2	.91	26V	Ø	L393	
L442	63.7	4.8	1.16	4.3	.78	47.0	5.9	1.48	3.4	.73	26B	Ø	L442	
L567	47.7	-11.2	-2.70	5.2	.94	27.1	-14.1	-3.55	4.9	1.06	26A	#	L567	
L575	53.9	-5.0	-1.20	5.6	1.01	38.9	-2.2	-.56	6.5	1.41	26A	Ø	L575	
L592	506.8	447.9	107.50	59.9	10.81	355.9	314.8	79.44	43.1	9.36	26B	#	L592	

GR. MEAN = 58.9 JOULES/SQ M GRAND MEAN = 41.1 JOULES/SQ M TEST DETERMINATIONS = 20
SD MEANS = 4.2 JOULES/SQ M SD OF MEANS = 4.0 JOULES/SQ M 14 LABS IN GRAND MEANS
AVERAGE SDR = 5.5 JOULES/SQ M AVERAGE SDR = 4.6 JOULES/SQ M
GR. MEAN = 4.036 PT.LB/SQ FT GRAND MEAN = 2.619 PT.LB/SQ FT
TOTAL NUMBER OF LABORATORIES REPORTING = 18
Best values: J06 59 ± 6 joules per square meter
J71 41 ± 6 joules per square meter

The following laboratories were omitted from the grand means because of extreme test results: 121, 567.

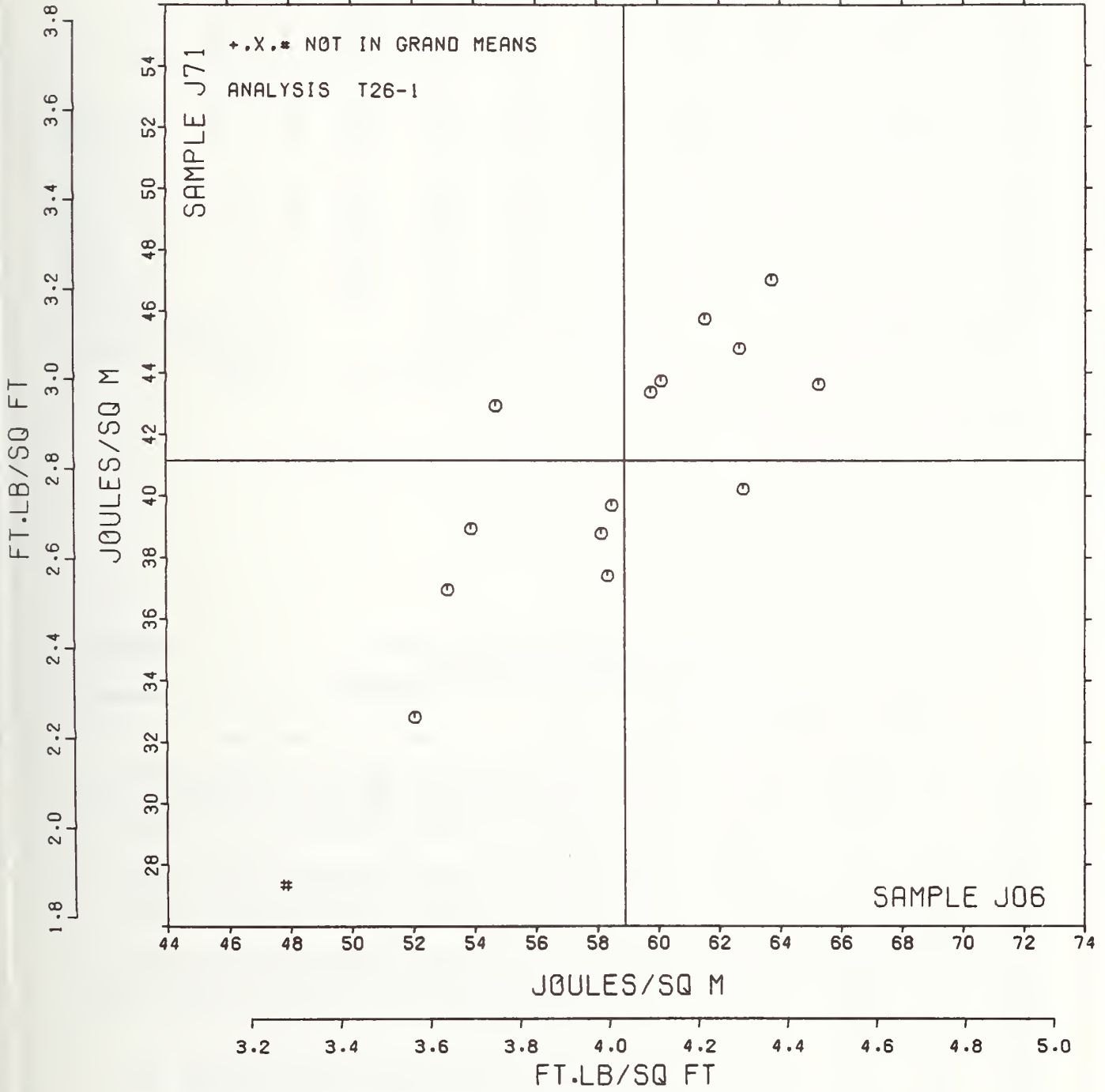
Data from the following laboratories appear to be off by a multiplicative factor: 592.

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER
TAPPI STANDARD T494 GS-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	F	MEANS		COORDINATES		AVG R,SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J06	J71	MAJOR	MINOR					
L121	#	34.8	23.6	-29.6	3.6	.19	26D	TENSILE ENERGY ABS.	PRINTING PAPERS	2-PIN STRAIN GAGE
L567	#	47.7	27.1	-17.8	-2.6	1.00	26A	TENSILE ENERGY ABS.	PRINTING PAPERS	FLAT/PLAT JAWS
L185	Ø	52.1	32.8	-10.7	-1.4	1.67	26C	TENSILE ENERGY ABS.	PRINTING PAPERS	LINE/LINE JAWS
L250	Ø	53.1	37.0	-7.1	.9	.59	26A	TENSILE ENERGY ABS.	PRINTING PAPERS	FLAT/PLAT JAWS
L575	Ø	53.9	38.9	-5.2	1.8	1.21	26A	TENSILE ENERGY ABS.	PRINTING PAPERS	FLAT/PLAT JAWS
L100	Ø	54.7	42.9	-1.8	4.2	.70	26A	TENSILE ENERGY ABS.	PRINTING PAPERS	FLAT/PLAT JAWS
L393	Ø	58.2	38.8	-2.2	-1.2	.84	26V	TENSILE ENERGY ABS.	PRINTING PAPERS	LINE/PLAT JAWS
L139	Ø	58.4	37.4	-2.9	-2.3	1.22	26B	TENSILE ENERGY ABS.	PRINTING PAPERS	2-PIN STRAIN GAGE
L167	Ø	58.5	39.7	-1.3	-.8	.47	26D	TENSILE ENERGY ABS.	PRINTING PAPERS	2-PIN STRAIN GAGE
L163	Ø	55.8	43.4	2.1	1.0	.94	26J	TENSILE ENERGY ABS.	PRINTING PAPERS	LINE/PLAT JAWS
L318	Ø	60.1	43.7	2.6	1.1	1.07	26A	TENSILE ENERGY ABS.	PRINTING PAPERS	FLAT/PLAT JAWS
L255	M	60.2				.69	26P	TENSILE ENERGY ABS.	PRINTING PAPERS	PATTERNED PLAT JAWS
L309	Ø	61.5	45.7	5.1	1.6	1.15	26J	TENSILE ENERGY ABS.	PRINTING PAPERS	LINE/PLAT JAWS
L122	Ø	62.7	44.8	5.2	.1	1.03	26L	TENSILE ENERGY ABS.	PRINTING PAPERS	PATTERNED PLAT JAWS
L211	Ø	62.8	40.2	2.2	-3.3	1.30	26C	TENSILE ENERGY ABS.	PRINTING PAPERS	LINE/LINE JAWS
L442	Ø	63.7	47.0	7.5	1.0	.76	26B	TENSILE ENERGY ABS.	PRINTING PAPERS	LINE/PLAT JAWS
L356	Ø	65.3	43.6	6.3	-2.5	1.06	26A	TENSILE ENERGY ABS.	PRINTING PAPERS	FLAT/PLAT JAWS
L592	#	506.8	355.9	542.1	-76.0	10.08	26H	TENSILE ENERGY ABS.	PRINTING PAPERS	2-PIN STRAIN GAGE
GBEANS:		58.9	41.1			1.00				
		95% ELLIPSE:	15.6	5.9		WITH GAMMA = 43 DEGREES				

T.E.A., PRINTING PAPERS

SAMPLE J06 = 59. JOULES/SQ M SAMPLE J71 = 41. JOULES/SQ M
 SAMPLE J06 = 4.04 FT.LB/SQ FT SAMPLE J71 = 2.82 FT.LB/SQ FT



ELONGATION TO BREAK, PERCENT - PACKAGING PAPER
TAPPI STANDARD T494 6S-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	KRAFT					PRINTING					TEST D. = 20		
	K33 MEAN	123 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	J01 MEAN	98 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100	1.53	-.13	-.59	.09	.57	2.07	-.02	-.08	.16	.88	28A	Ø	L100
L122	1.77	.10	.45	.10	.64	2.26	.16	.62	.19	1.05	28P	Ø	L122
L126	1.57	-.10	-.44	.13	.78	2.08	-.01	-.05	.15	.86	28C	Ø	L126
L151	1.94	.27	1.19	.20	1.20	2.28	.18	.71	.23	1.30	28B	Ø	L151
L182	1.55	-.12	-.53	.09	.58	2.10	.00	.02	.12	.69	28B	Ø	L182
L243	1.45	-.22	-.56	.11	.69	2.02	-.07	-.28	.13	.71	28C	Ø	L243
L264	1.70	.03	.13	.12	.72	1.73	-.36	-1.38	.15	.83	28B	Ø	L264
L267	1.60	-.07	-.32	.10	.63	2.17	.08	.30	.10	.58	28B	Ø	L267
L280	1.73	.06	.25	.08	.50	2.08	-.01	-.05	.26	1.50	28B	Ø	L280
L312	1.59	.32	1.41	.16	.95	2.52	.42	1.63	.27	1.55	28B	Ø	L312
L318	1.81	.14	.61	.10	.63	2.44	.34	1.31	.11	.60	28A	Ø	L318
L324	1.49	-.18	-.79	.12	.74	1.94	-.16	-.61	.14	.82	28P	Ø	L324
L336	1.71	.04	.18	.10	.60	2.22	.12	.47	.20	1.12	28A	Ø	L336
L580	1.28	-.35	-1.72	.18	1.12	1.56	-.53	-2.03	.12	.70	28C	Ø	L580
L581	1.50	-.17	-.76	.14	.85	1.71	-.39	-1.48	.23	1.29	28A	Ø	L581
L582	2.25	.58	2.56	.51	3.15	2.50	.40	1.55	.00	.00	28A	Ø	L582
L676	1.64	-.03	-.13	.45	2.75	2.09	-.01	-.02	.48	2.70	28B	Ø	L676
L689	1.54	-.12	-.55	.15	.90	1.93	-.16	-.61	.14	.81	28B	Ø	L689

GR. MEAN = 1.67 PERCENT GRAND MEAN = 2.10 PERCENT TEST DETERMINATIONS = 20
SD MEANS = .23 PERCENT SD OF MEANS = .26 PERCENT 18 LABS IN GRAND MEANS
AVERAGE SDR = .16 PERCENT AVERAGE SDR = .18 PERCENT

L153 2.67 1.00 4.41 .28 1.75 3.07 .98 3.75 .12 .66 28Q + L153
TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: K33 1.7 ± 0.3 percent
J01 2.1 ± 0.4 percent

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER
TAPPI STANDARD T494 6S-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

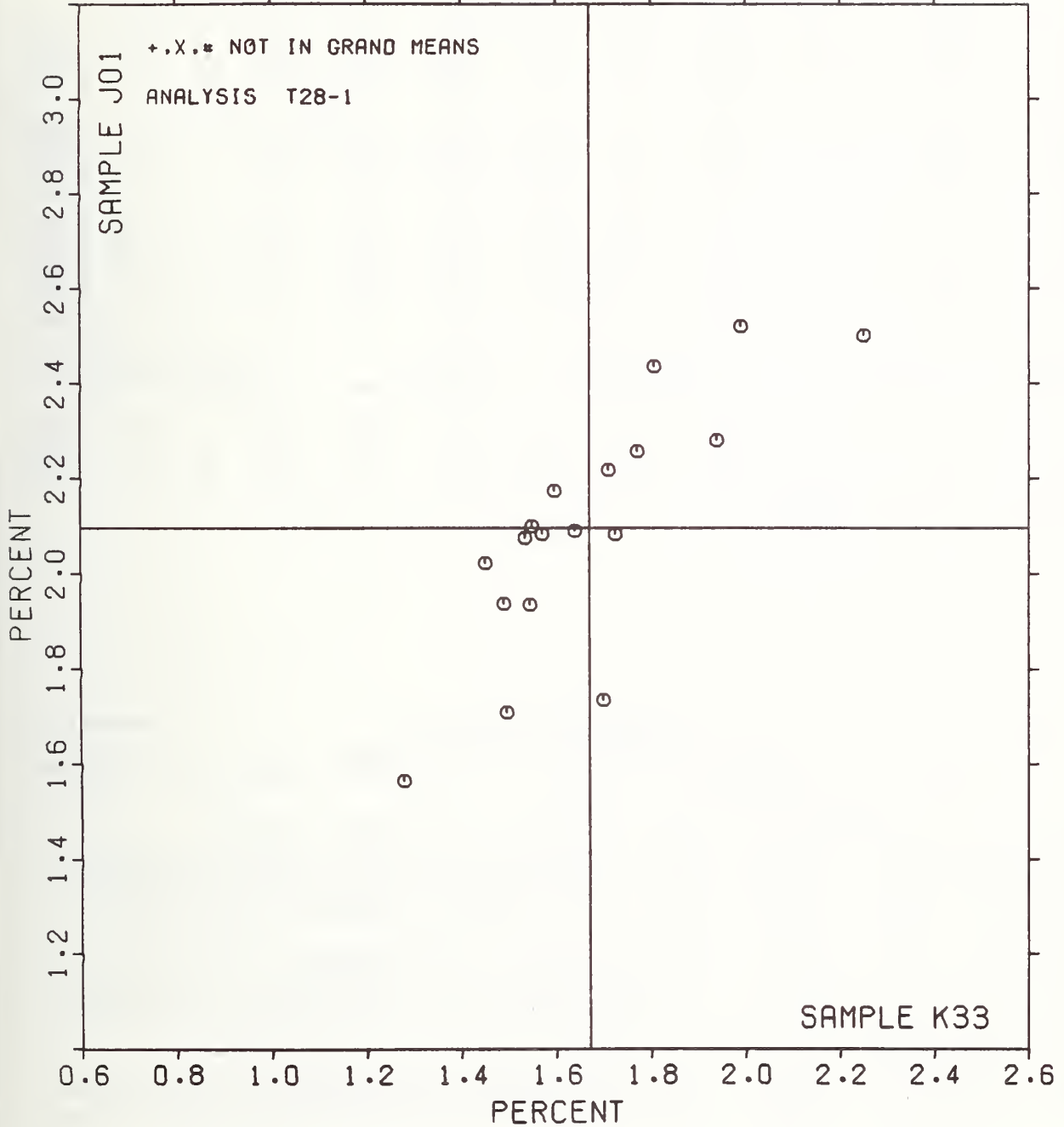
LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY	TEST INSTRUMENT	CONDITIONS
		K33	J01	MAJOR	MINOR	R.SDR	VAR			
L580	Ø	1.28	1.56	-.66	-.04	.91	28C	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/LINE	JAWS
L243	Ø	1.45	2.02	-.20	.12	.70	28C	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/LINE	JAWS
L324	Ø	1.49	1.94	-.24	.04	.78	28P	ELONGATION, PACKAGING PAPER, LOAD	CELL, PATTERNED	FLAT JAWS
L581	Ø	1.50	1.71	-.41	-.12	1.07	28A	ELONGATION, PACKAGING PAPER, LOAD	CELL, FLAT/FLAT	JAWS
L100	Ø	1.53	2.07	-.10	.09	.73	28A	ELONGATION, PACKAGING PAPER, LOAD	CELL, FLAT/FLAT	JAWS
L689	Ø	1.54	1.93	-.20	-.01	.86	28B	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/PLAT	JAWS
L182	Ø	1.55	2.10	-.07	.09	.64	28B	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/PLAT	JAWS
L126	Ø	1.57	2.08	-.07	.07	.82	28C	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/LINE	JAWS
L267	Ø	1.60	2.17	.01	.11	.61	28B	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/PLAT	JAWS
L676	Ø	1.64	2.09	-.02	.02	2.73	28B	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/PLAT	JAWS
L264	Ø	1.70	1.73	-.26	-.26	.77	28B	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/PLAT	JAWS
L336	Ø	1.71	2.22	.12	.05	.86	28A	ELONGATION, PACKAGING PAPER, LOAD	CELL, FLAT/PLAT	JAWS
L280	Ø	1.73	2.08	.03	-.05	1.00	28B	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/PLAT	JAWS
L122	Ø	1.77	2.26	.19	.03	.84	28P	ELONGATION, PACKAGING PAPER, LOAD	CELL, PATTERNED	FLAT JAWS
L318	Ø	1.81	2.44	.35	.11	.62	28A	ELONGATION, PACKAGING PAPER, LOAD	CELL, FLAT/PLAT	JAWS
L151	Ø	1.94	2.28	.32	-.09	1.25	28B	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/PLAT	JAWS
L312	Ø	1.99	2.52	.53	.03	1.25	28B	ELONGATION, PACKAGING PAPER, LOAD	CELL, LINE/PLAT	JAWS
L582	Ø	2.25	2.50	.68	-.18	1.57	28A	ELONGATION, PACKAGING PAPER, LOAD	CELL, FLAT/PLAT	JAWS
L153	*	2.67	3.07	1.39	-.14	1.20	28Q	ELONGATION, PACKAGING PAPER, PENDULUM, PATTERNED	FLAT	JAWS

GMEANS: 1.67 2.10 1.00
95% ELLIPSE: .91 .29 WITH GAMMA = 49 DEGREES

ELONGATION TO BREAK, PACKAGING PAPER

SAMPLE K33 = 1.67 PERCENT

SAMPLE J01 = 2.10 PERCENT



ANALYSIS T29-1 TABLE 1

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

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

LAB CODE	SAMPLE J06					SAMPLE J71					TEST D. " 20		
	MEAN	85 GEAMS PER SQUARE DEV	PRINTING PER SQUARE N.DEV	METER SDR	R.SDR	MEAN	76 GRAMS PER SQUARE DEV	PRINTING PER SQUARE N.DEV	METER SDR	R.SDR	VAR	F	LAB
L100	1.535	-.114	-.66	.067	.56	1.690	.049	.23	.117	.81	29A	0	L100
L105	1.575	-.074	-.43	.183	1.53	1.387	-.254	-1.19	.151	1.05	29A	0	L105
L122	1.799	.150	.87	.118	.99	1.809	.168	.79	.124	.86	29P	0	L122
L141T	1.616	-.033	-.19	.093	.78	1.626	-.015	-.07	.109	.75	29D	0	L141T
L185	1.490	-.159	-.92	.174	1.46	1.440	-.201	-.95	.180	1.25	29C	0	L185
L190R	1.511	-.138	-.80	.134	1.12	1.621	-.020	-.09	.146	1.01	29A	0	L190R
L255	1.735	.086	.50	.071	.60	NO DATA REPORTED FOR SAMPLE J71							
L278	1.880	.231	1.34	.120	1.00	1.740	.099	.47	.150	1.04	29A	0	L278
L309	1.887	.238	1.38	.149	1.25	1.960	.319	1.51	.107	.74	29A	0	L309
L318	1.888	.239	1.38	.099	.83	1.885	.244	1.15	.158	1.09	29A	0	L318
L344	1.575	-.074	-.43	.103	.86	1.606	-.035	-.16	.130	.90	29A	0	L344
L356	1.856	.207	1.20	.112	.93	1.758	.117	.55	.163	1.13	29A	0	L356
L442	1.718	.065	.40	.080	.67	1.861	.220	1.04	.110	.76	29B	0	L442
L567	1.389	-.260	-1.51	.110	.92	1.172	-.469	-2.21	.161	1.12	29A	0	L567
L575	1.551	-.098	-.57	.090	.75	1.614	-.027	-.13	.170	1.18	29A	0	L575
L592	1.466	-.183	-1.06	.159	1.33	1.444	-.197	-.93	.188	1.31	29D	0	L592

GR. MEAN = 1.649 PERCENT GRAND MEAN = 1.641 PERCENT TEST DETERMINATIONS = 20
 SD MEANS = .173 PERCENT SD OF MEANS = .212 PERCENT 15 LABS IN GRAND MEANS
 AVERAGE SDR = .119 PERCENT AVERAGE SDR = .144 PERCENT

L242	1.785	.136	.79	.093	.78	2.185	.544	2.56	.169	1.17	29R	0	L242
L484	1.654	.005	.03	.190	1.59	1.669	.028	.13	.238	1.65	29R	0	L484
L626	1.730	.081	.47	.130	1.09	1.720	.079	.37	.136	.94	29R	0	L626
L685	1.965	.316	1.83	.157	1.31	1.875	.234	1.10	.125	.87	29R	0	L685

TOTAL NUMBER OF LABORATORIES REPORTING = 20

Best values: J06 1.65 ± 0.23 percent
 J71 1.64 ± 0.31 percent

ANALYSIS T29-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

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

LAB CODE	F	MEANS		COORDINATES		AVG R.SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J06	J71	MAJOR	MINOR					
L567	0	1.389	1.172	-.530	-.085	1.02	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, PLAT/PLAT JAWS	
L592	0	1.466	1.444	-.268	.022	1.32	29D	ELONGATION, PRINTING	PAPERS, LOAD CELL, 2-PIN STRAIN GAGE	
L185	0	1.490	1.440	-.256	.001	1.36	29C	ELONGATION, PRINTING	PAPERS, LOAD CELL, LINE/LINE JAWS	
L190R	0	1.511	1.621	-.101	.096	1.07	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, PLAT/PLAT JAWS	
L100	0	1.535	1.690	-.032	.120	.68	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, PLAT/PLAT JAWS	
L575	0	1.551	1.614	-.082	.060	.97	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, PLAT/PLAT JAWS	
L105	0	1.575	1.387	-.245	-.098	1.29	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, PLAT/PLAT JAWS	
L344	0	1.575	1.606	-.073	.037	.88	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, PLAT/PLAT JAWS	
L141T	0	1.616	1.626	-.032	.017	.77	29D	ELONGATION, PRINTING	PAPERS, LOAD CELL, 2-PIN STRAIN GAGE	
L484	0	1.654	1.669	.025	.013	1.62	29R	ELONGATION, PRINTING	PAPERS, PENDULUM, PLAT/PLAT JAWS	
L442	0	1.718	1.861	.216	.082	.72	29B	ELONGATION, PRINTING	PAPERS, LOAD CELL, LINE/PLAT JAWS	
L626	0	1.730	1.720	.112	-.015	1.02	29R	ELONGATION, PRINTING	PAPERS, PENDULUM, PLAT/PLAT JAWS	
L255	M	1.735				.60	29P	ELONGATION, PRINTING	PAPERS, LOAD CELL, PATTERNED FLAT JAWS	
L242	0	1.785	2.185	.512	.229	.98	29R	ELONGATION, PRINTING	PAPERS, PENDULUM, PLAT/PLAT JAWS	
L122	0	1.799	1.809	.225	-.014	.92	29P	ELONGATION, PRINTING	PAPERS, LOAD CELL, PATTERNED FLAT JAWS	
L356	0	1.856	1.758	.220	-.091	1.03	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/PLAT JAWS	
L278	0	1.880	1.740	.220	-.120	1.02	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, PLAT/PLAT JAWS	
L309	0	1.887	1.960	.398	.010	.99	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, PLAT/PLAT JAWS	
L318	0	1.888	1.885	.339	-.037	.96	29A	ELONGATION, PRINTING	PAPERS, LOAD CELL, FLAT/PLAT JAWS	
L685	0	1.965	1.875	.379	-.104	1.09	29R	ELONGATION, PRINTING	PAPERS, PENDULUM, FLAT/PLAT JAWS	

GMBANS: 1.649 1.641 1.00
 95% ELLIPSE: .754 .213 WITH GAMMA = 51 DEGREES

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

LAB CODE	SAMPLE J30 MEAN	PRINTING 85 GRAMS PER SQUARE METER				SAMPLE J32 MEAN	PRINTING 86 GRAMS PER SQUARE METER				TEST D. = 15		
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L100M	16.1	-5.4	-.81	2.2	.30	63.4	-7.4	-.40	7.8	.45	30M	Ø	L100M
L100N	15.8	-5.6	-.85	1.9	.25	65.3	-5.4	-.30	7.1	.41	30N	Ø	L100N
L105	21.6	.2	.03	6.2	.85	69.3	-1.4	-.08	24.0	1.40	30M	Ø	L105
L121	2.9	-18.5	-2.78	.6	.08	27.9	-42.9	-2.34	9.2	.53	30M	#	L121
L122	24.3	2.8	.43	10.5	1.44	94.0	23.2	1.27	19.9	1.16	30M	Ø	L122
L124	21.7	.3	.05	4.9	.68	72.3	1.6	.09	11.0	.64	30N	Ø	L124
L150	19.2	-2.2	-.33	4.3	.59	60.9	-9.8	-.54	16.6	.97	30M	Ø	L150
L158	14.4	-7.0	-1.06	4.5	.62	41.9	-28.8	-1.58	13.0	.76	30N	Ø	L158
L162	19.5	-2.0	-.29	4.3	.59	65.2	-5.6	-.30	18.4	1.07	30M	Ø	L162
L163	18.5	-3.0	-.44	3.1	.43	46.9	-23.8	-1.30	13.9	.81	30N	Ø	L163
L182M	29.5	8.0	1.21	21.2	2.90	87.2	16.4	.90	24.7	1.44	30M	Ø	L182M
L185	21.1	-.3	-.04	6.7	.91	84.3	13.5	.74	15.3	.89	30N	Ø	L185
L190C	32.1	10.7	1.61	9.6	1.31	108.0	37.2	2.03	33.0	1.93	30N	Ø	L190C
L212	21.0	-.4	-.06	3.8	.52	70.4	-.4	-.02	14.5	.84	30M	Ø	L212
L223F	18.0	-3.4	-.51	4.8	.66	76.4	5.6	.31	13.5	.79	30M	Ø	L223F
L230	17.5	-3.5	-.58	6.5	.89	62.1	-8.7	-.48	13.5	.79	30N	Ø	L230
L231	36.7	15.2	2.25	7.0	.96	114.9	44.1	2.41	31.5	1.84	30M	Ø	L231
L232	32.7	11.3	1.70	5.9	.81	93.1	22.3	1.22	12.4	.72	30N	Ø	L232
L236	16.1	-5.4	-.81	2.5	.34	63.2	-7.6	-.41	17.0	.99	30N	Ø	L236
L238A	13.1	-8.3	-1.25	2.1	.29	51.4	-19.4	-1.06	9.6	.56	30N	Ø	L238A
L238B	15.2	-6.2	-.94	3.5	.47	67.4	-3.4	-.18	13.9	.81	30D	Ø	L238B
L243	27.5	6.0	.91	13.3	1.82	79.4	8.6	.47	20.8	1.21	30D	Ø	L243
L254	11.7	-9.8	-1.47	3.6	.50	36.1	-34.6	-1.89	18.1	1.06	30M	Ø	L254
L262	15.9	-5.6	-.84	3.2	.43	61.8	-9.0	-.49	14.4	.84	30M	Ø	L262
L274	34.3	12.5	1.94	19.0	2.60	100.3	29.6	1.61	16.6	.97	30N	Ø	L274
L275	16.7	-4.8	-.71	3.6	.50	84.5	13.7	.75	17.4	1.01	30N	Ø	L275
L278	11.8	-9.6	-1.45	2.1	.29	35.2	-35.6	-1.94	10.7	.62	30C	Ø	L278
L279	17.5	-3.5	-.58	5.5	.75	62.7	-8.1	-.44	19.7	1.15	30N	Ø	L279
L285A	20.5	-1.0	-.14	4.3	.59	76.9	6.2	.34	14.8	.86	30N	Ø	L285A
L285B	19.9	-1.5	-.22	10.4	1.42	84.5	13.8	.75	24.8	1.45	30N	Ø	L285B
L299	18.7	-2.7	-.40	5.0	.69	58.5	-12.2	-.67	19.2	1.12	30N	Ø	L299
L320	18.1	-3.4	-.50	17.3	2.37	53.5	-17.2	-.94	17.8	1.04	30N	Ø	L320
L326N	16.3	-5.1	-.77	11.1	1.52	52.3	-18.4	-1.01	17.7	1.03	30N	Ø	L326N
L339	15.3	-6.1	-.92	15.7	2.15	47.6	-23.2	-1.27	12.2	.71	30N	Ø	L339
L366A	25.2	3.8	.57	20.7	2.84	78.3	7.5	.41	17.7	1.03	30N	Ø	L366A
L388	41.0	19.6	2.95	31.1	4.26	74.9	4.1	.22	10.2	.60	30N	X	L388
L390	20.4	-1.0	-.15	6.5	.89	80.3	9.5	.52	18.3	1.07	30N	Ø	L390
L393	32.5	11.0	1.66	14.0	1.91	62.3	-8.4	-.46	13.2	.77	30M	*	L393
L396M	28.9	7.5	1.13	19.7	2.70	55.2	-15.6	-.85	8.4	.49	30N	*	L396M
L565	28.5	7.1	1.07	13.9	1.90	94.7	23.9	1.30	25.2	1.47	30N	Ø	L565
L567	29.5	8.0	1.21	8.7	1.19	82.1	11.3	.62	24.1	1.40	30N	Ø	L567
L589	16.7	-4.8	-.71	3.1	.43	70.3	-.4	-.02	12.9	.75	30N	Ø	L589
L599	30.9	9.5	1.43	7.2	.98	70.2	-.6	-.03	17.5	1.02	30C	Ø	L599
L622	45.8	24.4	3.67	23.4	3.20	131.8	61.0	3.33	44.2	2.58	30M	X	L622
L670	18.7	-2.7	-.40	2.4	.33	88.1	17.3	.94	15.4	.90	30N	Ø	L670

GR. MEAN = 21.4 DOUBLE FOLDS GRAND MEAN = 70.8 DOUBLE FOLDS TEST DETERMINATIONS = 15
 SD MEANS = 6.6 DOUBLE FOLDS SD OF MEANS = 18.3 DOUBLE FOLDS 42 LABS IN GRAND MEANS
 AVERAGE SDR = 7.3 DOUBLE FOLDS AVERAGE SDR = 17.1 DOUBLE FOLDS

L182S	19.0	-2.4	-.36	4.7	.64	144.1	73.3	4.00	26.9	1.57	30S	*	L182S
L190D	18.6	-2.8	-.42	5.5	.75	156.4	85.6	4.68	48.0	2.80	30S	*	L190D
L280	13.2	-8.2	-1.24	3.7	.50	61.3	-9.4	-.52	12.8	.74	30K	*	L280
L326S	20.0	-1.4	-.21	25.3	3.47	127.1	56.4	3.08	76.3	4.45	30S	*	L326S
L396S	55.7	34.2	5.15	43.0	5.88	107.0	36.2	1.98	72.8	4.25	30T	*	L396S

TOTAL NUMBER OF LABORATORIES REPORTING = 50

Best values: J30 23 double folds
 J32 72 double folds

The following laboratories were omitted from the grand means because of extreme test results: 121.

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

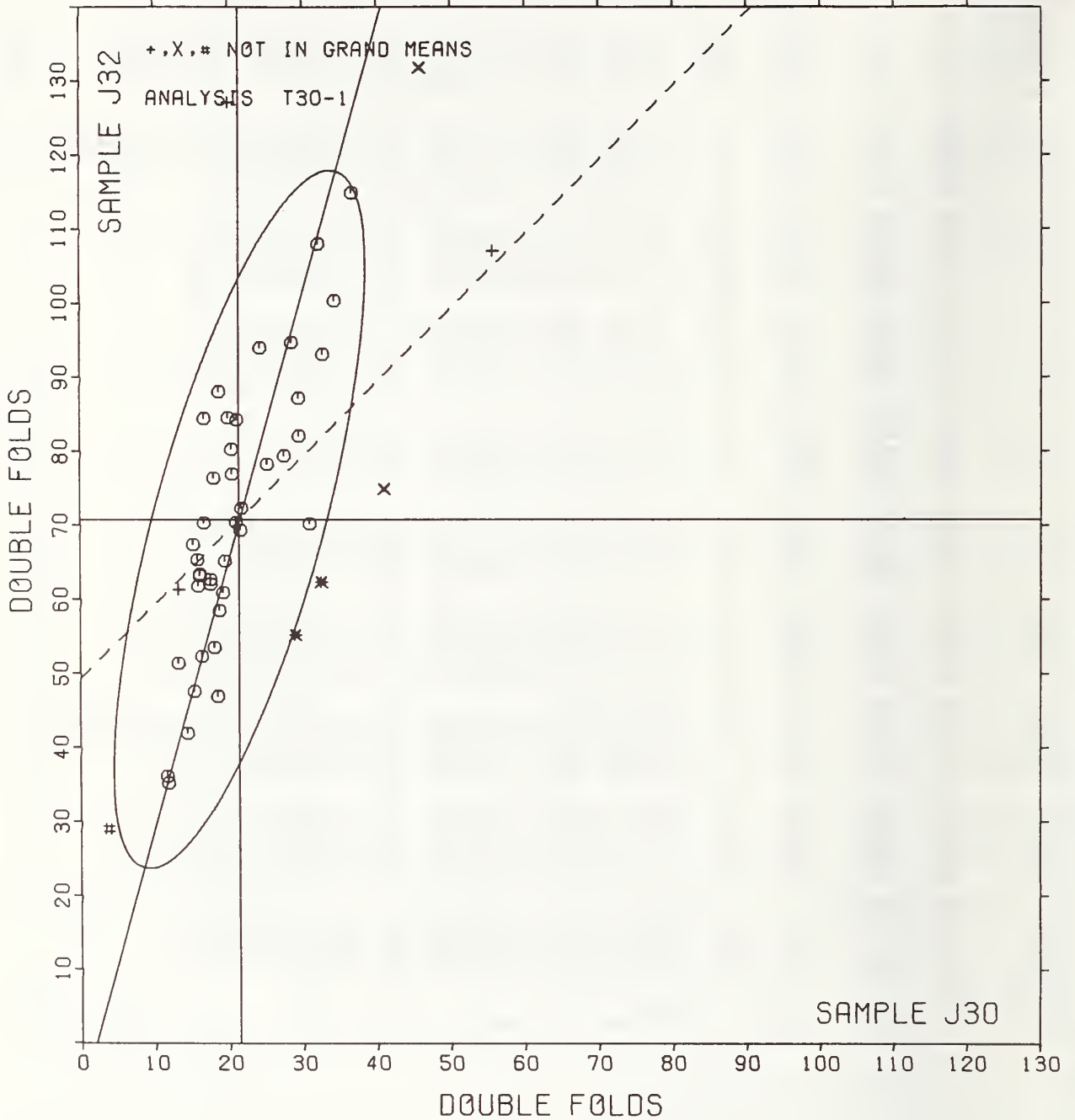
Please see page 43 of this report for a demonstration of this proposal.

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T30-1 TABLE 2
FOLDING ENDURANCE (MIT), DOUBLE FOLDS
TAPPI STANDARD T511 8U-69

LAB CODE	F	MEANS		COORDINATES		AVG R. STD VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
		J30	J32	MAJOR	MINOR		
L121	#	2.9	27.9	-46.3	6.4	.31	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L254	0	11.7	36.1	-36.0	.2	.78	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L278	0	11.8	35.2	-36.9	-.2	.46	30C FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L238A	0	13.1	51.4	-20.9	2.8	.42	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L280	*	13.2	61.3	-11.3	5.4	.62	30K FOLDING ENDURANCE, KOHLER-MOLIN
L158	0	14.4	41.9	-29.7	-.9	.69	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238B	0	15.2	67.4	-4.9	5.1	.64	30D FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L339	0	15.3	47.6	-24.0	-.3	1.43	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100N	0	15.8	65.3	-6.7	4.0	.33	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L262	0	15.9	61.8	-10.1	3.0	.64	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100M	0	16.1	63.4	-8.5	3.2	.38	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L236	0	16.1	63.2	-8.7	3.1	.67	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L326N	0	16.3	52.3	-19.1	-.0	1.27	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L589	0	16.7	70.3	-1.7	4.5	.59	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L275	0	16.7	84.5	11.9	8.2	.76	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L279	0	17.5	62.7	-8.9	1.6	.95	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L230	0	17.5	62.1	-9.4	1.4	.84	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L223F	0	18.0	76.4	4.5	4.8	.72	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L320	0	18.1	53.5	-17.5	-1.4	1.70	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L163	0	18.5	46.9	-23.8	-3.5	.62	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L190D	*	18.6	156.4	81.8	25.6	1.77	30S FOLDING ENDURANCE, SCHOFFER, LEIFZIG
L670	0	18.7	88.1	15.9	7.2	.61	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L299	0	18.7	58.5	-12.5	-.7	.90	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L182S	*	19.0	144.1	70.0	21.9	1.10	30S FOLDING ENDURANCE, SCHOFFER, LEIFZIG
L150	0	19.2	60.9	-10.1	-.5	.78	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L162	0	19.5	65.2	-5.9	.4	.83	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L285B	0	19.9	84.5	12.9	5.1	1.44	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L226S	*	20.0	127.1	53.9	16.4	3.96	30S FOLDING ENDURANCE, SCHOFFER, LEIFZIG
L390	0	20.4	80.3	8.9	3.5	.98	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285A	0	20.5	76.9	5.7	2.6	.73	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L212	0	21.0	70.4	-.5	.3	.68	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L185	0	21.1	84.3	12.9	3.9	.90	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L105	0	21.6	69.3	-1.3	-.6	1.13	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L124	0	21.7	72.3	1.6	.1	.66	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	0	24.3	94.0	23.1	3.5	1.30	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L366A	0	25.2	78.3	8.2	-1.6	1.93	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L243	0	27.5	79.4	9.9	-3.5	1.52	30D FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L565	0	28.5	94.7	24.9	-.5	1.68	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L396M	*	28.9	55.2	-13.0	-11.4	1.59	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L182M	0	29.5	67.2	18.0	-3.4	2.17	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L567	0	29.5	82.1	13.0	-4.7	1.30	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L599	0	30.9	70.2	2.0	-5.3	1.00	30C FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L190C	0	32.1	108.0	38.7	-.4	1.62	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L393	*	32.5	62.3	-5.2	-12.9	1.34	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L232	0	32.7	93.1	24.5	-5.0	.77	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L274	0	34.3	100.3	31.9	-4.6	1.79	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L231	0	36.7	114.9	46.6	-2.9	1.40	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L388	X	41.0	74.9	9.2	-17.8	2.43	30M FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L622	X	45.8	131.8	65.3	-7.2	2.89	30M FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L396S	*	55.7	107.0	44.1	-23.3	5.06	30T FOLDING ENDURANCE, SCHOFFER, TMI
OMEANS:		21.4	70.8			1.00	
95% ELLIPSE:				48.8	11.5		WITH GAMMA = 74 DEGREES

FOLDING ENDURANCE (MIT)

SAMPLE J30 = 21. DOUBLE FOLDS SAMPLE J32 = 71. DOUBLE FOLDS



TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T30-2 TABLE 1
FOLDING ENDURANCE (MIT)

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

LAB CODE	PRINTING 85 GRAMS PER SQUARE METER					PRINTING 86 GRAMS PER SQUARE METER					TEST D.° 15		
	J30 MEAN	DEV	N.DEV	SDR	R.SDR	J32 MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L100M	1.202	-.096	-.70	.060	.44	1.799	-.029	-.23	.051	.46	30M	0	L100M
L100N	1.196	-.103	-.74	.051	.37	1.813	-.015	-.12	.046	.42	30N	0	L100N
L105	1.313	.015	.11	.151	1.09	1.809	-.019	-.15	.190	1.71	30M	0	L105
L121	.459	-.840	-6.06	.092	.67	1.422	-.407	-3.24	.152	1.37	30M	#	L121
L122	1.356	.057	.41	.158	1.15	1.965	.137	1.09	.083	.75	30M	0	L122
L124	1.327	.028	.20	.099	.71	1.855	.026	.21	.067	.60	30N	0	L124
L150	1.273	-.026	-.19	.101	.73	1.769	-.059	-.47	.122	1.10	30M	0	L150
L158	1.139	-.155	-1.15	.133	.96	1.604	-.225	-1.79	.133	1.20	30N	0	L158
L162	1.279	-.019	-.14	.099	.72	1.795	-.034	-.27	.143	1.29	30M	0	L162
L163	1.261	-.038	-.27	.074	.53	1.656	-.172	-1.37	.116	1.05	30N	0	L163
L182M	1.406	.107	.78	.219	1.58	1.924	.095	.76	.127	1.14	30M	0	L182M
L185	1.304	.006	.04	.139	1.01	1.919	.091	.72	.077	.70	30N	0	L185
L190C	1.489	.190	1.37	.132	.95	2.010	.182	1.45	.155	1.39	30N	0	L190C
L212	1.316	.017	.12	.078	.57	1.838	.010	.08	.097	.87	30M	0	L212
L223F	1.240	-.058	-.42	.119	.86	1.877	.049	.39	.077	.69	30M	0	L223F
L230	1.217	-.081	-.58	.156	1.13	1.783	-.045	-.36	.097	.87	30N	0	L230
L231	1.557	.258	1.86	.085	.61	2.047	.219	1.74	.109	.98	30M	0	L231
L232	1.508	.210	1.51	.080	.58	1.965	.137	1.09	.058	.52	30N	0	L232
L236	1.201	-.097	-.70	.067	.49	1.788	-.041	-.32	.107	.97	30N	0	L236
L238A	1.113	-.185	-1.34	.069	.50	1.703	-.125	-1.00	.090	.81	30N	0	L238A
L238B	1.169	-.125	-.93	.114	.83	1.818	-.011	-.08	.108	.97	30D	0	L238B
L243	1.405	.107	.77	.164	1.19	1.885	.056	.45	.122	1.10	30D	0	L243
L254	1.048	-.250	-1.81	.132	.95	1.510	-.318	-2.53	.213	1.92	30M	0	L254
L262	1.192	-.106	-.77	.090	.65	1.780	-.049	-.39	.104	.94	30N	0	L262
L274	1.488	.190	1.37	.200	1.45	1.996	.168	1.33	.072	.65	30N	0	L274
L275	1.212	-.086	-.62	.093	.68	1.917	.089	.71	.095	.86	30N	0	L275
L278	1.065	-.233	-1.68	.078	.56	1.529	-.299	-2.38	.126	1.14	30C	0	L278
L279	1.226	-.072	-.52	.124	.89	1.771	-.057	-.46	.169	1.52	30N	0	L279
L285A	1.301	.003	.02	.099	.72	1.878	.050	.40	.090	.81	30N	0	L285A
L285B	1.255	-.044	-.32	.203	1.47	1.908	.080	.63	.138	1.25	30N	0	L285B
L299	1.259	-.039	-.28	.110	.80	1.745	-.083	-.67	.147	1.33	30N	0	L299
L320	1.180	-.118	-.85	.213	1.54	1.705	-.123	-.98	.152	1.37	30N	0	L320
L326N	1.150	-.145	-1.07	.221	1.60	1.695	-.134	-1.06	.152	1.37	30N	0	L326N
L339	1.066	-.232	-1.68	.285	2.06	1.664	-.164	-1.31	.112	1.01	30N	0	L339
L366A	1.318	.015	.14	.250	1.81	1.882	.054	.43	.109	.98	30N	0	L366A
L388	1.516	.218	1.57	.283	2.05	1.871	.042	.34	.059	.53	30N	0	L388
L390	1.291	-.008	-.06	.130	.94	1.894	.066	.52	.100	.90	30N	0	L390
L393	1.473	.175	1.26	.191	1.38	1.786	-.043	-.34	.093	.84	30M	0	L393
L396M	1.364	.065	.47	.304	2.20	1.737	-.091	-.73	.067	.60	30N	0	L396M
L565	1.420	.122	.88	.169	1.22	1.960	.131	1.05	.131	1.18	30N	0	L565
L567	1.452	.153	1.11	.131	.94	1.895	.067	.53	.137	1.23	30N	0	L567
L589	1.215	-.084	-.60	.082	.60	1.841	.012	.10	.078	.70	30N	0	L589
L599	1.482	.183	1.32	.087	.63	1.834	.005	.04	.109	.98	30C	0	L599
L622	1.616	.317	2.29	.200	1.45	2.090	.262	2.09	.181	1.63	30M	0	L622
L670	1.265	-.025	-.21	.056	.40	1.939	.111	.88	.074	.67	30N	0	L670

GR. MEAN = 1.298 LOG(10) FOLD GRAND MEAN = 1.828 LOG(10) FOLD TEST DETERMINATIONS = 15
SD MEANS = .139 LOG(10) FOLD SD OF MEANS = .126 LOG(10) FOLD 44 LABS IN GRAND MEANS
AVERAGE SDR = .138 LOG(10) FOLD AVERAGE SDR = .111 LOG(10) FOLD

L182S	1.265	-.034	-.24	.119	.86	2.151	.323	2.57	.081	.73	30S	*	L182S
L190D	1.251	-.048	-.34	.136	.98	2.175	.347	2.77	.132	1.19	30S	*	L190D
L280	1.104	-.194	-1.40	.127	.92	1.779	-.049	-.39	.086	.78	30K	*	L280
L326S	1.183	-.116	-.84	.255	1.85	2.057	.228	1.82	.192	1.73	30S	*	L326S
L396S	1.611	.312	2.25	.384	2.78	1.955	.127	1.01	.251	2.27	30T	*	L396S

TOTAL NUMBER OF LABORATORIES REPORTING = 50

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

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

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

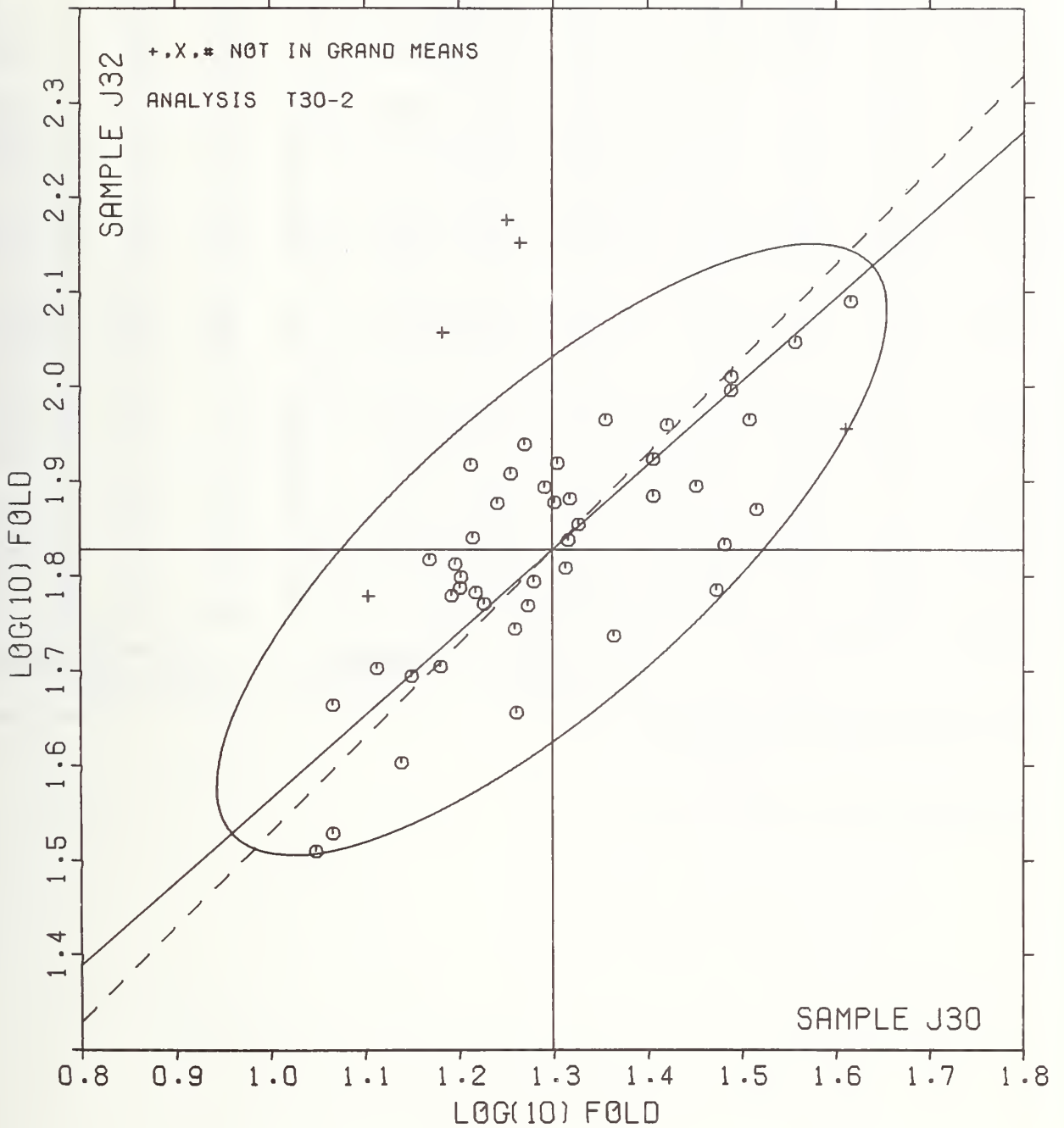
mean of raw data mean of logs
"Folding endurance"

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

LAB CODE	F	MEANS		COORDINATES		AVG R. SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J30	J32	MAJOR	MINOR					
L121	#	.459	1.422	-.899	.250	1.02	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L254	Ø	1.048	1.510	-.398	-.073	1.43	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L278	Ø	1.065	1.529	-.373	-.071	.85	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L339	Ø	1.066	1.664	-.283	.030	1.54	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L280	*	1.104	1.779	-.178	.092	.85	30K	FOLDING	ENDURANCE,	KOHLER-MOLIN
L238A	Ø	1.113	1.703	-.222	.028	.65	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L158	Ø	1.139	1.604	-.268	-.063	1.08	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L326N	Ø	1.150	1.695	-.200	-.002	1.48	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L238B	Ø	1.169	1.818	-.104	.077	.90	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L320	Ø	1.180	1.705	-.170	-.014	1.45	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L326S	*	1.183	2.057	.064	.248	1.79	30S	FOLDING	ENDURANCE,	SCHÖPFER, LEIPZIG
L262	Ø	1.192	1.780	-.112	.034	.80	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L100N	Ø	1.196	1.813	-.087	.056	.39	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L236	Ø	1.201	1.788	-.100	.034	.73	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L100M	Ø	1.202	1.799	-.092	.042	.45	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L275	Ø	1.212	1.917	-.006	.124	.77	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L589	Ø	1.215	1.841	-.055	.065	.65	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L230	Ø	1.217	1.783	-.091	.019	1.00	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L279	Ø	1.226	1.771	-.092	.005	1.21	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L223F	Ø	1.240	1.877	-.012	.075	.78	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L190D	*	1.251	2.175	.194	.252	1.09	30S	FOLDING	ENDURANCE,	SCHÖPFER, LEIPZIG
L285B	Ø	1.255	1.908	.020	.089	1.36	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L299	Ø	1.259	1.745	-.085	-.037	1.06	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L163	Ø	1.261	1.656	-.142	-.104	.79	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L182S	*	1.265	2.151	.188	.265	.80	30S	FOLDING	ENDURANCE,	SCHÖPFER, LEIPZIG
L670	Ø	1.269	1.939	.051	.102	.54	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L150	Ø	1.273	1.769	-.058	-.027	.92	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L162	Ø	1.279	1.755	-.037	-.013	1.00	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L390	Ø	1.291	1.854	.038	.054	.92	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L285A	Ø	1.301	1.878	.035	.035	.76	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L185	Ø	1.304	1.919	.065	.064	.85	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L105	Ø	1.313	1.805	-.002	-.024	1.40	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L212	Ø	1.316	1.838	.019	-.004	.72	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L366A	Ø	1.318	1.882	.050	.027	1.39	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L124	Ø	1.327	1.855	.039	.001	.66	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L122	Ø	1.356	1.965	.133	.065	.95	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L396M	Ø	1.364	1.737	-.011	-.112	1.40	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L243	Ø	1.405	1.885	.118	-.028	1.14	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L182M	Ø	1.406	1.924	.144	.001	1.36	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L565	Ø	1.420	1.960	.178	.018	1.20	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L567	Ø	1.452	1.895	.159	-.051	1.09	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L393	Ø	1.473	1.786	.103	-.148	1.11	30M	FOLDING	ENDURANCE,	MIT, WITE CENTRIFUGAL FAN
L599	Ø	1.482	1.834	.141	-.117	.80	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L274	Ø	1.488	1.996	.253	.000	1.05	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L190C	Ø	1.489	2.010	.263	.011	1.17	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L232	Ø	1.508	1.965	.248	-.036	.55	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L388	Ø	1.516	1.871	.191	-.112	1.29	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L231	Ø	1.557	2.047	.338	-.007	.80	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L396S	*	1.611	1.955	.318	-.111	2.52	30T	FOLDING	ENDURANCE,	SCHÖPFER, TMI
L622	Ø	1.616	2.090	.411	-.013	1.54	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
GMEANS:		1.298	1.828			1.00				
		95% ELLIPSE:		.453	.160	WITH GAMMA = 41 DEGREES				

FOLDING ENDURANCE (MIT)

SAMPLE J30 = 1.30 LOG(10) FOLD SAMPLE J32 = 1.83 LOG(10) FOLD

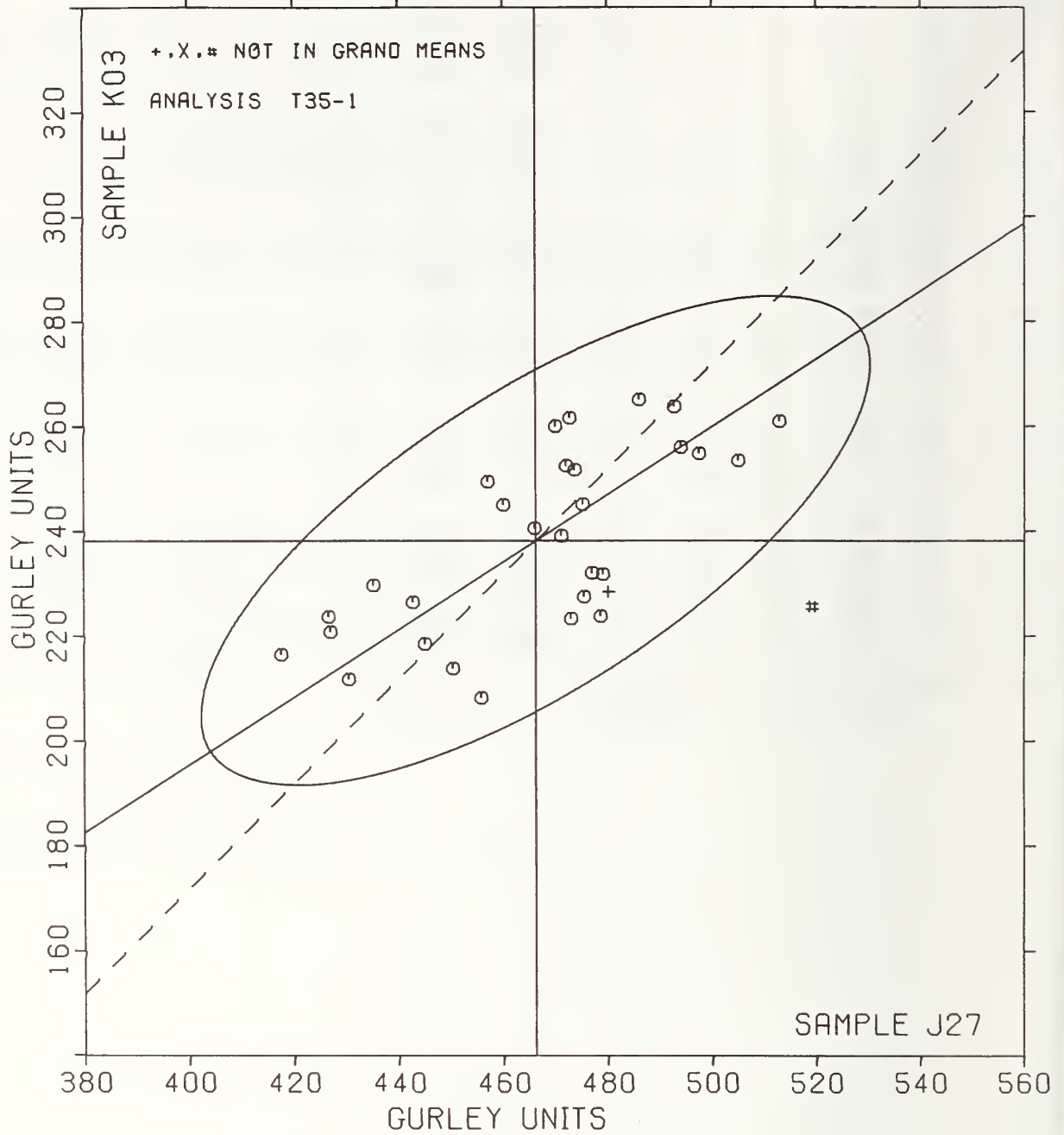


RESULTS EXPRESSED IN STANDARD GURLEY UNITS; MILLIGRAMS FOR A 1X3 INCH SPECIMEN (ACTUAL LENGTH 3.5 INCHES)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST	INSTRUMENT---	CONDITIONS
		J27	K03	MAJOR	MINOR	R.S.D.P	VAR				
L212	#	376.	175.	-110.	-4.	1.06	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L254	Ø	418.	216.	-53.	8.	.83	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L223	Ø	427.	224.	-41.	9.	.48	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L236	Ø	427.	221.	-42.	7.	.64	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L153	Ø	430.	212.	-44.	-3.	1.17	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L139	Ø	435.	230.	-31.	10.	.94	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L356	Ø	443.	226.	-26.	3.	.81	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L190C	Ø	445.	218.	-28.	-5.	1.04	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L122	Ø	450.	214.	-27.	-12.	1.16	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L321	Ø	456.	208.	-25.	-19.	1.33	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L396	Ø	457.	249.	-2.	14.	.76	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L132	Ø	460.	245.	-2.	9.	1.17	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L100	Ø	466.	240.	1.	2.	.76	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L567	Ø	470.	260.	15.	16.	1.09	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L308	Ø	471.	239.	5.	-2.	.75	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L390	Ø	472.	252.	13.	9.	1.09	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L260	Ø	473.	262.	18.	16.	.58	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L162	Ø	473.	223.	-2.	-16.	.98	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L249	Ø	474.	252.	14.	7.	1.14	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L650	Ø	475.	245.	11.	1.	1.05	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L195	Ø	475.	227.	2.	-14.	1.40	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L163	Ø	477.	232.	6.	-11.	1.67	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L148	Ø	479.	224.	3.	-19.	1.38	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L291	Ø	479.	232.	7.	-12.	.94	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L232	#	480.	117.	-54.	-109.	.57	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L213	*	480.	228.	6.	-16.	1.17	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	TEST PIECE), 20 C, 65% RH
L382	Ø	486.	265.	31.	12.	.96	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L241	Ø	493.	264.	36.	7.	.80	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L121	Ø	494.	256.	33.	-0.	.90	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L183	Ø	497.	255.	35.	-3.	.80	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L285	Ø	505.	253.	41.	-8.	1.25	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L600	Ø	513.	261.	52.	-6.	1.14	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
L648	#	518.	224.	36.	-40.	.83	350	STIFFNESS,	GURLEY	(UNITS: MG/1X3	-ACTUALLY 3.5- TEST PIECE)
GMEANS:		466.	238.			1.00					
		95% ELLIPSE:	74.	28.		WITH GAMMA = 32 DEGREES					

STIFFNESS, GURLEY

SAMPLE J27 = 466. GURLEY UNITS SAMPLE K03 = 238. GURLEY UNITS



TAPPI STANDARD T489 08-76, RESULTS EXPRESSED IN GRAM CENTIMETERS

LAB CODE	SAMPLE B63 MEAN	KRAFT ENVELOPE 124 GEAMS PER SQUARE METER					SAMPLE A65 MEAN	CONVERTER KRAFT 155 GRAMS PER SQUARE METER					TEST D.° 10		
		DEV	N.DEV	SDR	R.SDR	DEV		N.DEV	SDR	R.SDR	VAR	F	LAB		
L107A	18.90	.42	.64	.81	1.06	26.47	-.04	-.04	1.03	.93	36T	Ø	L107A		
L122	17.70	-.78	-1.20	.60	.78	27.12	.61	.60	1.31	1.19	36T	Ø	L122		
L123	18.20	-.28	-.43	1.14	1.49	25.30	-1.21	-1.18	1.42	1.29	36T	Ø	L123		
L126	18.67	.19	.29	.55	.73	25.12	-1.38	-1.35	1.07	.97	36T	Ø	L126		
L150	19.30	.82	1.25	1.06	1.39	28.20	1.69	1.66	1.55	1.41	36T	Ø	L150		
L158	1.84	-16.64	-25.47	.17	.23	2.97	-23.54	-23.07	.19	.18	36T	#	L158		
L163	19.05	.57	.87	.64	.84	27.45	.94	.93	1.21	1.10	36T	Ø	L163		
L173B	17.46	-1.02	-1.57	.54	.71	26.66	.15	.15	.32	.29	36T	Ø	L173B		
L182	18.57	.09	.13	.71	.93	26.36	-.15	-.14	1.18	1.07	36T	Ø	L182		
L207	18.03	-.45	-.69	1.21	1.59	26.40	-.10	-.10	1.65	1.50	36T	Ø	L207		
L212	18.03	-.45	-.69	.59	.78	26.78	.27	.27	.87	.79	36T	Ø	L212		
L228	18.50	.02	.03	1.08	1.42	24.90	-1.61	-1.57	1.10	1.00	36T	Ø	L228		
L230	20.20	1.72	2.63	1.23	1.61	31.20	4.69	4.60	3.01	2.74	36T	#	L230		
L236	17.80	-.68	-1.05	.55	.72	25.18	-1.33	-1.30	1.32	1.20	36T	Ø	L236		
L242	20.02	1.54	2.35	.44	.57	30.14	3.63	3.56	.74	.68	36T	#	L242		
L243	18.45	-.03	-.05	.76	1.00	27.30	.79	.78	.62	.75	36T	Ø	L243		
L260	18.93	.45	.68	.40	.53	28.17	1.66	1.63	.66	.60	36T	Ø	L260		
L262	18.75	.27	.41	.63	.83	27.90	1.39	1.37	.97	.88	36T	Ø	L262		
L274	19.05	.57	.87	.69	.90	26.30	-.21	-.20	.63	.57	36T	Ø	L274		
L281	18.19	-.25	-.44	.55	.72	27.41	.91	.89	1.26	1.14	36T	Ø	L281		
L290	18.90	.42	.64	.52	.68	26.45	-.06	-.05	1.44	1.31	36T	Ø	L290		
L313	17.80	-.68	-1.05	.42	.55	26.40	-.11	-.10	.97	.88	36T	Ø	L313		
L318	18.60	.12	.18	.94	1.24	26.42	-.08	-.08	1.01	.92	36T	Ø	L318		
L321	17.11	-1.37	-2.10	.63	.82	24.36	-2.15	-2.10	.90	.81	36T	Ø	L321		
L324	19.50	1.02	1.56	.45	.59	27.56	1.05	1.03	1.09	.99	36T	Ø	L324		
L339	54.40	35.92	54.97	2.87	3.76	77.10	50.59	49.59	3.17	2.88	36T	#	L339		
L388	26.76	8.28	12.67	2.79	3.66	31.35	4.84	4.75	1.96	1.78	36T	#	L388		
L442	17.55	-.93	-1.43	.60	.79	25.55	-.96	-.94	.89	.81	36T	Ø	L442		
L484	18.08	-.40	-.62	.45	.59	25.29	-1.22	-1.19	.62	.57	36T	Ø	L484		
L570	18.30	-.18	-.28	.95	1.24	26.50	-.01	-.01	1.72	1.56	36T	Ø	L570		
L580	19.20	.72	1.10	.63	.83	25.90	-.61	-.59	.88	.80	36T	Ø	L580		
L616	19.40	.92	1.40	.97	1.27	27.30	.79	.78	.67	.61	36T	Ø	L616		
L651	19.50	1.02	1.56	2.27	2.98	27.40	.89	.88	2.27	2.06	36T	Ø	L651		

GR. MEAN = 18.48 TABER UNITS GRAND MEAN = 26.51 TABER UNITS TEST DETERMINATIONS = 10
SD MEANS = .65 TABER UNITS SD OF MEANS = 1.02 TABER UNITS 28 LABS IN GRAND MEANS
AVERAGE SDR = .76 TABER UNITS AVERAGE SDR = 1.10 TABER UNITS

L250 17.25 -1.23 -1.89 .26 .35 25.05 -1.46 -1.43 .90 .81 36U • L250
TOTAL NUMBER OF LABORATORIES REPORTING = 34

Best values: B63 18.5 ± 0.9 Taber units
A65 26.5 ± 1.6 Taber units

The following laboratories were omitted from the grand means because of extreme test results: 230, 242, 388.

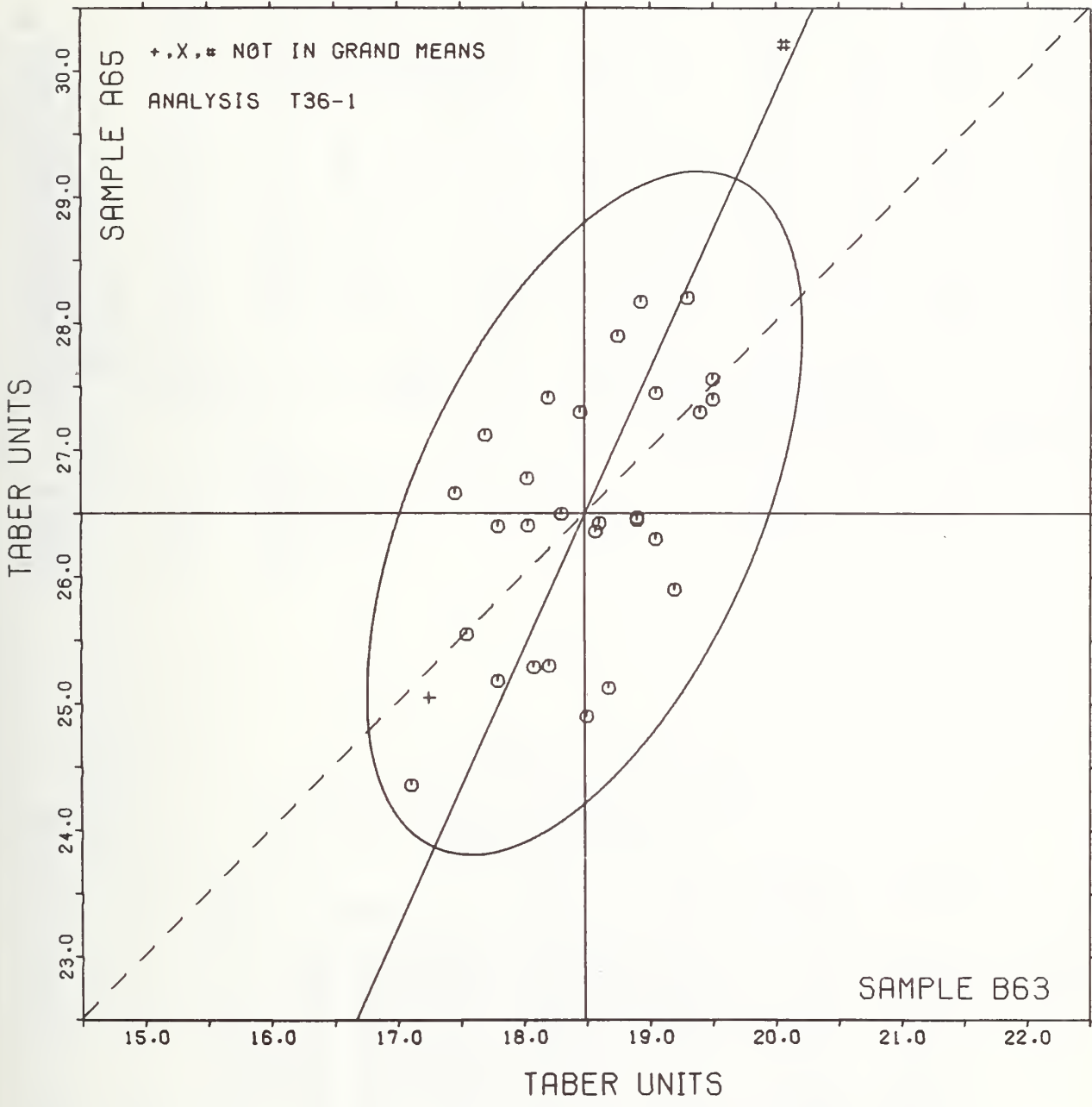
Data from the following laboratories appear to be off by a multiplicative factor: 158, 339.

TAPPI STANDARD T489 08-76, RESULTS EXPRESSED IN GRAM CENTIMETERS

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		B63	A65	MAJOR	MINOR	R.SDR	VAR	
L158	#	1.84	2.97	-28.31	5.42	.20	36T	STIFFNESS, TABER
L321	Ø	17.11	24.36	-2.52	.36	.82	36T	STIFFNESS, TABER
L250	*	17.25	25.05	-1.84	.52	.58	36U	STIFFNESS, TABER, 20 C, 65% RB
L173B	Ø	17.46	26.66	-.28	1.00	.50	36T	STIFFNESS, TABER
L442	Ø	17.55	25.55	-1.26	.45	.80	36T	STIFFNESS, TABER
L122	Ø	17.70	27.12	.24	.97	.99	36T	STIFFNESS, TABER
L236	Ø	17.80	25.18	-1.49	.07	.96	36T	STIFFNESS, TABER
L313	Ø	17.80	26.40	-.38	.58	.72	36T	STIFFNESS, TABER
L212	Ø	18.03	26.78	.06	.53	.79	36T	STIFFNESS, TABER
L207	Ø	18.03	26.40	-.28	.37	1.55	36T	STIFFNESS, TABER
L484	Ø	18.08	25.29	-1.27	-.14	.58	36T	STIFFNESS, TABER
L281	Ø	18.19	27.41	.71	.64	.93	36T	STIFFNESS, TABER
L123	Ø	18.20	25.30	-1.22	-.24	1.39	36T	STIFFNESS, TABER
L570	Ø	18.30	26.50	-.08	.16	1.40	36T	STIFFNESS, TABER
L243	Ø	18.45	27.30	.71	.36	.87	36T	STIFFNESS, TABER
L228	Ø	18.50	24.90	-1.46	-.68	1.21	36T	STIFFNESS, TABER
L182	Ø	18.57	26.36	-.10	-.14	1.00	36T	STIFFNESS, TABER
L318	Ø	18.60	26.42	-.03	-.14	1.08	36T	STIFFNESS, TABER
L126	Ø	18.67	25.12	-1.18	-.75	.85	36T	STIFFNESS, TABER
L262	Ø	18.75	27.90	1.38	.33	.85	36T	STIFFNESS, TABER
L107A	Ø	18.90	26.47	.14	-.39	1.00	36T	STIFFNESS, TABER
L290	Ø	18.90	26.45	.12	-.40	.99	36T	STIFFNESS, TABER
L260	Ø	18.93	28.17	1.70	.28	.56	36T	STIFFNESS, TABER
L163	Ø	19.05	27.45	1.09	-.13	.97	36T	STIFFNESS, TABER
L274	Ø	19.05	26.30	.05	-.60	.74	36T	STIFFNESS, TABER
L580	Ø	19.20	25.90	-.26	-.90	.81	36T	STIFFNESS, TABER
L150	Ø	19.30	28.20	1.88	-.04	1.40	36T	STIFFNESS, TABER
L616	Ø	19.40	27.30	1.10	-.51	.94	36T	STIFFNESS, TABER
L324	Ø	19.50	27.56	1.38	-.49	.79	36T	STIFFNESS, TABER
L651	Ø	19.50	27.40	1.23	-.56	2.52	36T	STIFFNESS, TABER
L242	#	20.02	30.14	3.94	.10	.62	36T	STIFFNESS, TABER
L230	#	20.20	31.20	4.98	.38	2.17	36T	STIFFNESS, TABER
L388	#	26.76	31.35	7.83	-5.53	2.72	36T	STIFFNESS, TABER
L339	#	54.40	77.10	60.92	-11.79	3.32	36T	STIFFNESS, TABER
GMBANS:		18.48	26.51			1.00		
		95% ELLIPSE:		2.90	1.37	WITH GAMMA = 65 DEGREES		

STIFFNESS, TABER

SAMPLE B63 = 18.5 TABER UNITS SAMPLE A65 = 26.5 TABER UNITS



TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T50-1 TABLE 1
SURFACE PICK STRENGTH, WAX NUMBER

TAPPI STANDARD T459 68-75, SURFACE STRENGTH OF PAPER (WAX PICK TEST)

LAB CODE	PRINTING J53 149 GRAMS PER SQUARE METER					PRINTING J55 93 GRAMS PER SQUARE METER					TEST D. = 5		
	MEAN	DEV	N. DEV	SDR	R. SDR	MEAN	DEV	N. DEV	SDR	R. SDR	VAR	F	LAB
L105	11.00	.81	1.05	.71	1.35	11.40	-1.48	-1.08	.55	.88	50W	6	L105
L122	9.60	-.59	-.76	.55	1.04	13.40	.52	.38	.55	.88	50W	6	L122
L158	9.60	-.59	-.76	.89	1.70	12.60	-.28	-.21	.55	.88	50W	6	L158
L162	10.00	-.19	-.25	1.00	1.90	13.40	.52	.38	.55	.88	50W	6	L162
L173A	10.60	.41	.53	.55	1.04	12.20	-.68	-.50	.45	.72	50W	6	L173A
L182W	11.00	.81	1.05	.00	.00	12.80	-.08	-.06	.45	.72	50W	6	L182W
L183	10.00	-.19	-.25	.00	.00	13.20	.32	.23	.34	1.35	50W	6	L183
L195	10.80	.61	.79	.45	.85	12.80	-.08	-.06	.45	.72	50W	6	L195
L213	10.20	.01	.01	.84	1.59	13.80	.92	.67	1.30	2.10	50W	6	L213
L225	9.80	-.39	-.51	.45	.85	13.00	.12	.09	.71	1.14	50W	6	L225
L228	9.60	-.59	-.76	.55	1.04	10.40	-2.48	-1.82	.55	.88	50W	6	L228
L230	9.20	-.99	-1.28	.45	.85	12.40	-.48	-.35	.55	.88	50W	6	L230
L236	9.80	-.39	-.51	.45	.85	13.40	.52	.38	.55	.88	50W	6	L236
L243	8.40	-1.79	-2.32	.55	1.04	9.60	-3.28	-2.40	1.14	1.84	50W	6	L243
L274	10.00	-.19	-.25	.00	.00	13.20	.32	.23	.45	.72	50W	6	L274
L285	11.20	1.01	1.31	1.10	2.09	14.40	1.52	1.11	1.14	1.84	50W	6	L285
L339	9.80	-.39	-.51	.45	.85	13.20	.32	.23	1.10	1.77	50W	6	L339
L366	10.60	.41	.53	.55	1.04	12.40	-.48	-.35	.55	.88	50W	6	L366
L567	11.40	1.21	1.57	.55	1.04	16.00	3.12	2.29	.00	.00	50W	6	L567
L616	11.20	1.01	1.31	.45	.85	14.00	1.12	.82	.00	.00	50W	6	L616

GR. MEAN = 10.19 WAX NUMBER GRAND MEAN = 12.88 WAX NUMBER TEST DETERMINATIONS = 5
 SD MEANS = .77 WAX NUMBER SD OF MEANS = 1.36 WAX NUMBER 20 LABS IN GRAND MEANS
 AVERAGE SDR = .53 WAX NUMBER AVERAGE SDR = .62 WAX NUMBER
 TOTAL NUMBER OF LABORATORIES REPORTING = 20
 Best values: J53 10.1 + 1.2 wax number
 J55 12.8 + 2.5 wax number

TAPPI COLLABORATIVE REFERENCE PROGRAM
ANALYSIS T50-1 TABLE 2
SURFACE PICK STRENGTH, WAX NUMBER

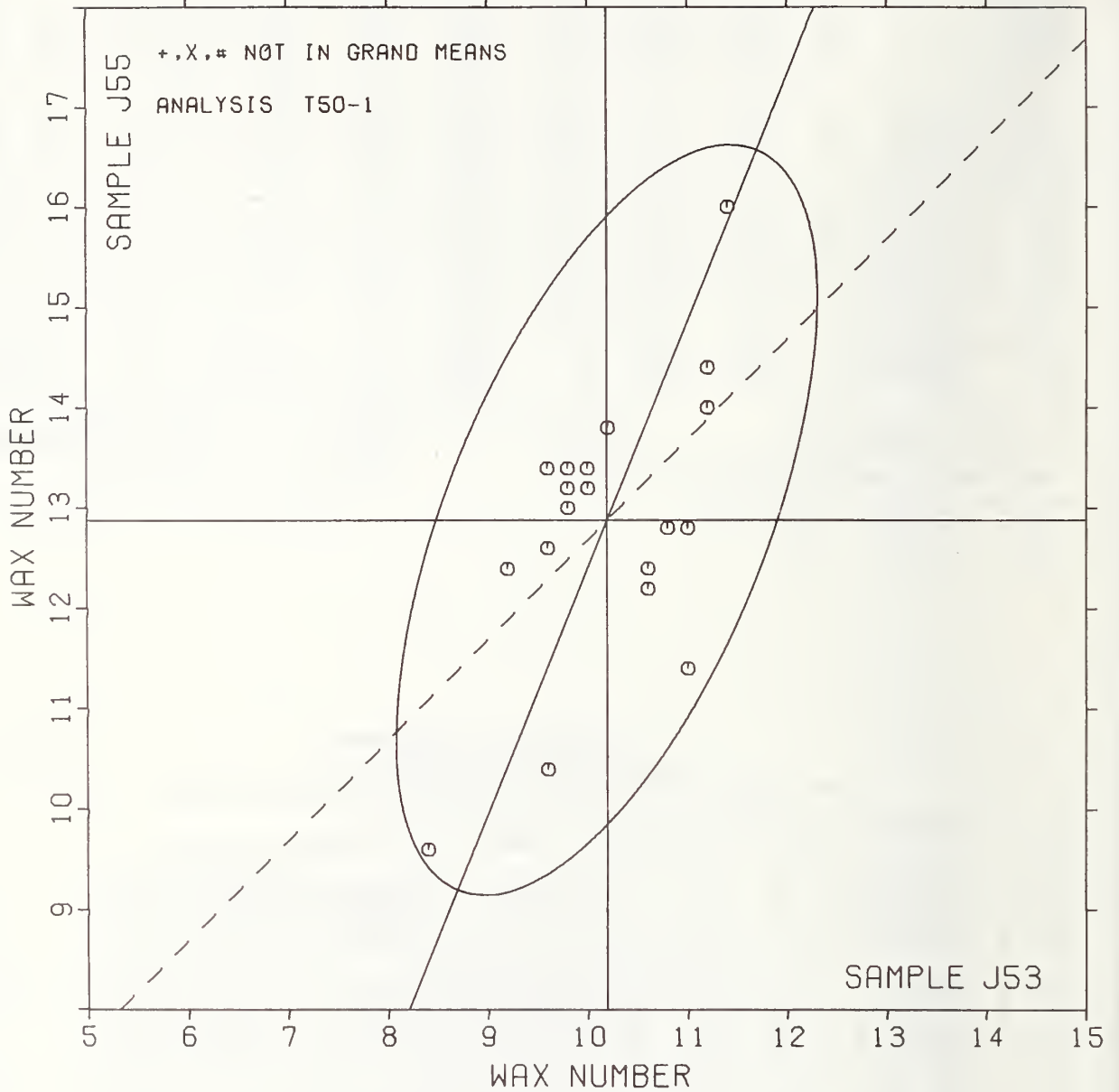
TAPPI STANDARD T459 68-75, SURFACE STRENGTH OF PAPER (WAX PICK TEST)

LAB CODE	F	MEANS		COORDINATES		AVG R. SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS				
		J53	J55	MAJOR	MINOR			PROPERTY	TEST INSTRUMENT	CONDITIONS		
L243	6	8.40	9.60	-3.71	.42	1.44	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L230	6	9.20	12.40	-.82	.74	.87	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L122	6	9.60	13.40	.26	.74	.96	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L158	6	9.60	12.60	-.48	.44	1.29	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L228	6	9.60	10.40	-2.52	-.39	.96	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L339	6	9.80	13.20	.15	.48	1.31	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L236	6	9.80	13.40	.33	.56	.87	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L225	6	9.80	13.00	-.04	.41	1.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L274	6	10.00	13.20	.22	.30	.36	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L183	6	10.00	13.20	.22	.30	.68	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L162	6	10.00	13.40	.41	.37	1.39	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L213	6	10.20	13.80	.86	.34	1.85	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L366	6	10.60	12.40	-.29	-.56	.96	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L173A	6	10.60	12.20	-.48	-.64	.88	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L195	6	10.80	12.80	.16	-.60	.79	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L105	6	11.00	11.40	-1.07	-1.31	1.12	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L182W	6	11.00	12.80	.23	-.78	.36	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L616	6	11.20	14.00	1.42	-.51	.43	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L285	6	11.20	14.40	1.79	-.36	1.96	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				
L567	6	11.40	16.00	3.35	.05	.52	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6875)				

GMEANS: 10.19 12.88 1.00
 95% ELLIPSE: 3.98 1.61 WITH GAMMA = 67 DEGREES

SURFACE PICK STRENGTH, WAX

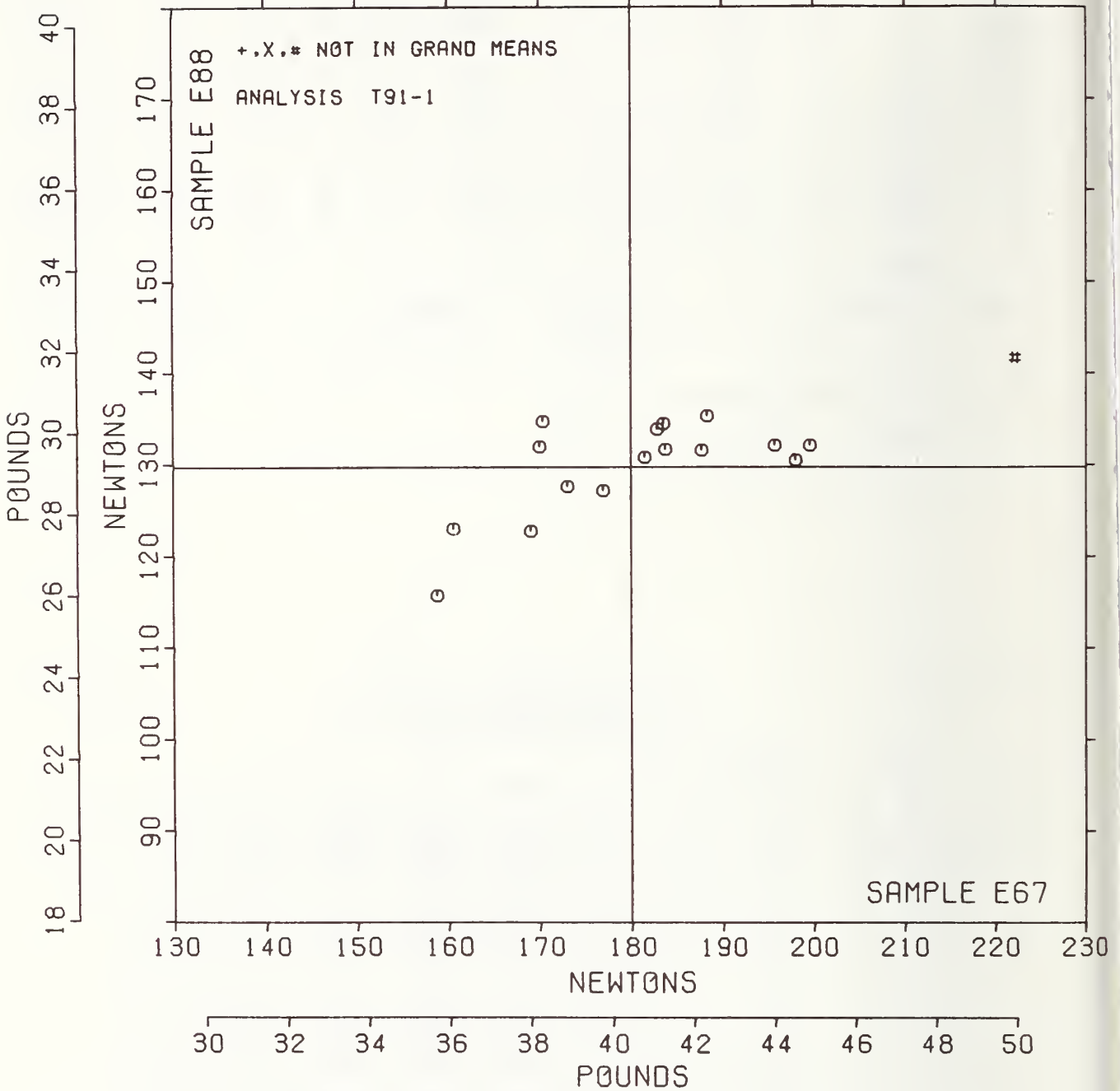
SAMPLE J53 = 10.2 WAX NUMBER SAMPLE J55 = 12.9 WAX NUMBER



CONCORA (CMT)

SAMPLE E67 = 180. NEWTONS
 SAMPLE E67 = 40.5 POUNDS

SAMPLE E88 = 130. NEWTONS
 SAMPLE E88 = 29.2 POUNDS



TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS 196-1 TABLE 2
 RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)
 TAPPI STANDARD T818 68-76

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		E67	E88	MAJOR	MINOR	R.SDR	VAR			
L333	0	167.2	87.2	-68.5	8.4	.61	96I	RING CRUSH,	INSTRON	
L107	0	170.8	83.2	-67.1	3.2	.90	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L234	0	171.7	82.7	-66.5	2.4	1.62	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L141	0	187.5	76.3	-55.3	-10.4	2.25	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L621	0	196.2	89.5	-41.6	-2.5	.65	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L617	0	197.0	85.8	-42.5	-6.2	1.29	96I	RING CRUSH,	INSTRON	
L274	0	197.0	98.7	-36.7	5.3	.41	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L336	0	200.2	99.6	-33.5	4.7	.77	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L663	0	201.5	94.7	-34.5	-.3	.97	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L114	0	206.4	98.7	-28.3	1.1	.60	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L484	0	208.9	95.6	-27.5	-2.8	.79	96R	RING CRUSH,	REGMED	
L100	*	209.4	129.1	-11.9	26.8	.36	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L570	0	216.2	82.3	-27.0	-18.0	.57	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L237	0	218.0	97.6	-18.5	-5.1	.62	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L676	0	220.4	103.4	-13.7	-1.1	.96	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L126	M	223.3				.91	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L122	0	230.0	104.1	-4.9	-4.8	1.76	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L562	0	231.7	105.9	-2.5	-4.0	.86	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L393	0	238.0	109.0	4.5	-4.1	.60	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L649	0	239.7	111.6	7.3	-2.5	.81	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L182	0	240.4	124.4	13.6	8.6	.75	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L191	0	242.9	123.7	15.5	6.8	2.33	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L124	0	245.1	109.4	11.0	-6.5	.80	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L610	0	246.0	119.2	16.2	1.5	.94	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L157	0	253.5	120.1	23.4	-1.2	.91	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L350	*	264.7	155.7	49.4	25.6	1.00	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L242	0	276.5	143.0	54.2	8.9	1.04	96G	RING CRUSH,	GAYDON FLAT CRUSH INSTR	
L329	0	277.1	131.2	49.4	-1.9	.93	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L553	0	277.1	138.8	52.9	4.9	1.17	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L243	0	281.1	133.9	54.2	-1.3	.87	96P	RING CRUSH,	TMI/HINDE & DAUCH	
L650	0	283.4	139.9	59.0	3.0	.89	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L303	0	284.7	129.5	55.4	-6.8	1.06	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L269	0	285.4	117.8	50.8	-17.6	1.08	96N	RING CRUSH,	TMI/HINDE & DAUCH	
L603	0	294.9	127.2	63.5	-13.5	1.22	96P	RING CRUSH,	TMI/HINDE & DAUCH	
GMANS:		232.1	110.6			1.00				
		95% ELLIPSE:	108.3	24.9				WITH GAMMA = 26 DEGREES		

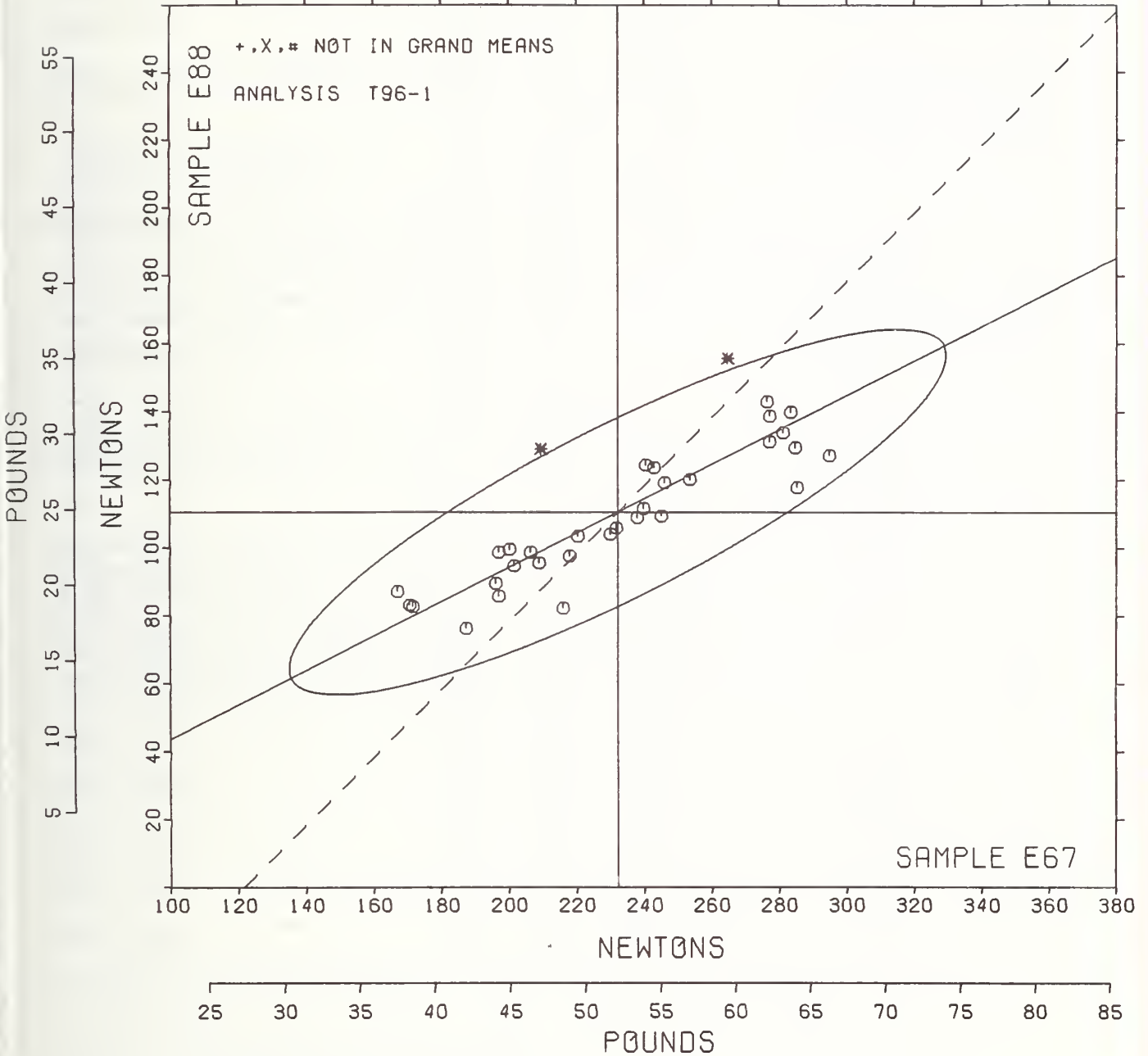
RING CRUSH

SAMPLE E67 = 232. NEWTONS

SAMPLE E88 = 111. NEWTONS

SAMPLE E67 = 52.2 POUNDS

SAMPLE E88 = 24.9 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	J67	16.87	1.19	1.17	15	44	52	10	1.02	3.35
	K37	27.72	1.88	1.86					1.63	5.29
BURSTING STRENGTH, MODEL C-A T10-2 PSI	J67	16.83	1.74	1.08	15	35	36	10	.94	4.86
	K37	27.43	2.38	1.84					1.61	6.66
BURSTING STRENGTH, HIGH RANGE T11-1 PSI	K27	50.5	2.6	3.8	15	33	44	10	3.4	7.5
	B41	54.7	2.7	2.8					2.4	7.6
TEARING STRENGTH, DEEP CUTOUT T15-1 GRAMS	K25	42.4	2.2	1.5	15	119	136	10	1.3	6.1
	B85	40.0	2.2	1.3					1.1	6.0
TEARING STRENGTH, NO CUTOUT T17-1 GRAMS	K35	118.9	9.7	4.0	15	13	13	10	3.5	27.0
	J42	64.2	5.4	2.9					2.5	15.0
TENSILE STRENGTH, PACKAGING PAPERS T19-1 KILOWTON/M	K33	9.43	.42	.59	20	49	53	12	.47	1.20
	J01	5.52	.33	.25					.20	.93
TENSILE STRENGTH, CRE TYPE T20-1 KILOWTON/M	J06	5.31	.17	.23	20	36	48	12	.19	.49
	J71	3.64	.13	.16					.13	.37
TENSILE STRENGTH, PENDULUM TYPE T20-2 KILOWTON/M	J06	5.44	.33	.24	20	38	38	12	.19	.92
	J71	3.74	.21	.16					.13	.58
T.E.A., PACKAGING PAPERS T25-1 GULES/SQ M	K33	93.0	10.3	12.4	20	16	17	12	9.9	29.2
	J01	73.6	10.1	9.1					7.3	28.2
T.E.A., PRINTING PAPERS T26-1 GULES/SQ M	J06	58.9	4.2	5.5	20	14	18	12	4.4	11.9
	J71	41.1	4.0	4.6					3.7	11.2
ELONGATION TO BREAK, PACKAGING PAPER T28-1 PERCENT	K33	1.67	.23	.16	20	18	19	12	.13	.63
	J01	2.10	.26	.18					.14	.73
ELONGATION TO BREAK, PRINTING PAPER T29-1 PERCENT	J06	1.649	.173	.119	20	15	20	12	.095	.482
	J71	1.641	.212	.144					.115	.592
FOLDING ENDURANCE (MIT) T30-1 DOUBLE FOLDS	J30	21.4	6.6	7.3	15	42	50	10	6.4	18.8
	J32	70.8	18.3	17.1					15.0	51.5
FOLDING ENDURANCE (MIT) T30-2 LOG(10) FOLD	J30	1.298	.139	.138	15	44	50	10	.121	.390
	J32	1.828	.126	.111					.097	.352
STIFFNESS, GURLEY T35-1 GURLEY UNITS	J27	466.	24.	23.	10	29	33	10	20.	67.
	K03	238.	18.	14.					12.	49.
STIFFNESS, TABER T36-1 TABER UNITS	B63	18.48	.65	.76	10	28	34	5	.94	1.93
	A65	26.51	1.02	1.10					1.36	2.99
SURFACE PICK STRENGTH, IGT T49-1 IP CM/SEC	J53	64.7	29.7	3.6	4	8	15	4	5.0	82.3
	J55	87.5	51.6	10.7					14.8	143.0
SURFACE PICK STRENGTH, WAX T50-1 WAX NUMBER	J53	10.19	.77	.53	5	20	20	5	.65	2.14
	J55	12.88	1.36	.62					.77	3.78
CONCOCA (CMI) T91-1 NEWTONS	B67	180.0	12.4	11.4	10	16	18	10	10.0	34.4
	B88	129.7	5.3	7.4					6.5	14.7
RING CRUSH T96-1 NEWTONS	B67	232.1	37.2	17.6	10	33	34	10	15.4	103.2
	B88	110.6	20.6	9.7					8.5	57.0

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET	1. PUBLICATION OR REPORT NO. TAPPI CRP 57S	2. Grant/Assessment No.	3. Recipient's Accession No.
4. TITLE AND SUBTITLE Technical Association of the Pulp and Paper Industry COLLABORATIVE REFERENCE PROGRAM FOR PAPER Report #57S		5. Publication Date April 23, 1979	
7. AUTHOR(S) R. G. Powell, J. Horlick		6. Performing Organization Code	
9. PERFORMING ORGANIZATION NAME AND ADDRESS NATIONAL BUREAU OF STANDARDS DEPARTMENT OF COMMERCE WASHINGTON, DC 20234		8. Performing Organ. Report No. NBSIR 79-1370	
12. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (Street, City, State, ZIP) Collaborative Testing Services, Inc., 9241 Wood Glade Drive, Great Falls, Virginia 22066; and Technical Association of the Pulp and Paper Industry		10. Project/Task/Work Unit No.	
15. SUPPLEMENTARY NOTES <input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached.		11. Contract/Grant No.	
16. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.) Collaborative Reference Programs provide participating laboratories with the means for checking periodically the level and uniformity of their testing in comparison with that of other participating laboratories. An important by-product of the programs is the provision of realistic pictures of the state of the testing art. This is one of the periodic reports showing averages for each participant, within and between laboratory variability, and other information for participants and standards committees.		13. Type of Report & Period Covered Final	
17. KEY WORDS (six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons) Collaborative reference program; Laboratory evaluation; Paper; Precision; Reference samples; Testing calibration		14. Sponsoring Agency Code	
18. AVAILABILITY <input type="checkbox"/> Unlimited <input checked="" type="checkbox"/> For Official Distribution. Do Not Release to NTIS <input type="checkbox"/> Order From Sup. of Doc., U.S. Government Printing Office, Washington, DC 20402, SD Stock No. SN003-003- <input type="checkbox"/> Order From National Technical Information Service (NTIS), Springfield, VA. 22161	19. SECURITY CLASS (THIS REPORT) UNCLASSIFIED	21. NO. OF PRINTED PAGES 67	
		20. SECURITY CLASS (THIS PAGE) UNCLASSIFIED	22. Price



This diagram is composed of two full-size overlaid tracings. One tracing was made from the Thwing-Elmendorf tear tester with NO CUTOUT (old style). The other tracing was made from the Thwing-Elmendorf tear tester with DEEP CUTOUT. The cross hatched area represents the metal removed from the swinging sector when the deep cutout (new) style was created.

DEEP CUTOUT instrument
is $\frac{5}{8}$ inch across

NO CUTOUT instrument
is $1 \frac{1}{4}$ inch across

Note shape of pendulum
sector with respect to
an imaginary line drawn
across the top of the
specimen clamp

