

A11100 986573

NBS
PUBLICATIONS

NAT'L INST. OF STAND & TECH R.I.C.



A11105 042285



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

**COLLABORATIVE REFERENCE PROGRAM
FOR PAPER**

**REPORT NO. 60S
STRENGTH TESTS**



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

QC

100

.U56

79-1807

1979

C.2

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

FEB 27 1980

not Acc. Cure

60100

456

79-1807

1979

c. 2

TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM
FOR PAPER

Report No. 60S
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 79-1807

U. S. DEPARTMENT OF COMMERCE
National Bureau of Standards

INTRODUCTION

Reports 60S and 60G comprise the last set of reports for the 78-79 program year. Participants in tests which involve strength properties of paper will receive only the G report; those in tests which measure other properties will receive only the S 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

August 13, 1979

TAPPI-NBS COLLABORATIVE REFERENCE PROGRAM

BACKGROUND AND PURPOSE

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

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

HOW THE PROGRAM WORKS

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

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

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

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

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

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

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

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

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
54	50-1 Surface Pick Strength, Wax
56	91-1 Concora (Flat Crush)
58	96-1 Ring Crush
61	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
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.
- O - Included in grand mean and inside 95% error ellipse.
- COORDINATES - Distances along major and minor axes of error ellipse. If special additive or concurrent model of the measuring process applies to this method, the distance along the minor axis represents the random error within a laboratory while that along the major axis also includes a systematic laboratory component of error.

- 95% ELLIPSE - Lengths of the major and minor axes of the ellipse and the angle that the major axis makes with the horizontal axis.
- AVG R. SDR - Average of the R. SDR for the two samples; an indication of the laboratory's precision of repeated measurements.
- Graph - For each laboratory the MEAN for the second sample is plotted against the MEAN for the first sample, with each point representing a laboratory. The horizontal and vertical lines are the GRAND MEANS. The dashed line is drawn at 45°. The solid sloping line, which may or may not lie close to the 45° line, is along the major axis of the error ellipse. The ellipse is drawn so that , on the average, it will include 95% of the points representing the laboratories.

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

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

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

- Summary - 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.

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

LAB CODE	SAMPLE J40					SAMPLE J68					TEST D ₀ * 15		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L121	27.37	-2.10	-1.10	1.34	.87	17.32	.02	.01	1.30	1.16	10C	0	L121
L131	27.73	-1.74	-.91	2.05	1.33	15.13	-2.16	-1.53	1.19	1.06	10C	0	L131
L134	31.93	2.46	1.29	1.28	.83	16.80	-.50	-.35	1.26	1.13	10C	0	L134
L150	28.97	-.50	-.26	.97	.63	17.23	-.06	-.04	1.62	1.45	10C	0	L150
L153	30.47	1.00	.52	1.48	.96	17.67	.37	.26	.99	.89	10C	0	L153
L158	28.73	-.74	-.39	1.05	.68	16.33	-.96	-.68	.92	.82	10C	0	L158
L167	29.27	-.20	-.11	.72	.47	18.09	.79	.56	.66	.59	10C	0	L167
L183	26.93	-2.54	-1.33	1.22	.79	17.23	-.06	-.04	1.45	1.29	10C	0	L183
L191	28.10	-1.37	-.72	1.66	1.08	13.97	-3.33	-2.36	1.27	1.14	10C	0	L191
L203A	28.12	-1.35	-.71	1.83	1.19	16.28	-1.01	-.72	1.37	1.22	10C	0	L203A
L203B	30.78	1.31	.69	2.39	1.55	16.08	-1.21	-.86	1.49	1.33	10C	0	L203B
L207	30.27	.80	.42	1.45	.94	18.80	1.50	1.07	.62	.55	10C	0	L207
L212	29.00	-.47	-.25	1.56	1.01	17.17	-.13	-.09	.94	.84	10C	0	L212
L223A	30.43	.96	.50	1.29	.84	18.91	1.61	1.14	.98	.88	10C	0	L223A
L225	31.10	1.63	.85	1.28	.83	18.47	1.17	.83	1.48	1.32	10C	0	L225
L232	26.03	-3.44	-1.80	1.25	.81	16.43	-.86	-.61	.59	.53	10C	0	L232
L237A	28.00	-1.47	-.77	1.46	.95	16.87	-.43	-.30	.92	.82	10C	0	L237A
L237B	28.93	-.54	-.28	1.16	.76	18.80	1.50	1.07	.94	.84	10C	0	L237B
L248	28.46	-1.01	-.53	1.22	.79	18.79	1.50	1.06	1.28	1.14	10E	0	L248
L249	30.16	.69	.36	2.02	1.31	17.12	-.18	-.13	.87	.78	10C	0	L249
L261	28.74	-.73	-.38	1.93	1.25	17.83	.54	.38	1.36	1.21	10C	0	L261
L264	29.40	-.07	-.04	.83	.54	15.47	-1.83	-1.30	1.25	1.11	10C	0	L264
L274	29.93	.46	.24	1.15	.75	16.90	-.40	-.28	.71	.64	10C	0	L274
L278	27.03	-2.44	-1.28	1.55	1.01	14.97	-2.33	-1.65	1.30	1.16	10C	0	L278
L279	31.20	1.73	.91	2.14	1.39	17.73	.44	.31	.70	.63	10C	0	L279
L299	35.03	5.56	2.91	1.77	1.15	20.30	3.00	2.13	.94	.84	10C	*	L299
L305	29.83	.36	.19	1.29	.84	16.90	-.40	-.28	.76	.68	10C	0	L305
L311	31.13	1.66	.87	2.12	1.37	18.67	1.37	.97	1.35	1.20	10C	0	L311
L312	29.47	-.00	-.00	1.21	.79	17.24	-.06	-.04	.73	.66	10C	0	L312
L315	33.07	3.60	1.88	1.74	1.13	18.23	.94	.66	1.19	1.06	10C	0	L315
L321	33.70	4.23	2.21	1.26	.82	18.80	1.50	1.07	1.32	1.18	10C	0	L321
L326	31.03	1.56	.82	.90	.58	20.37	3.07	2.18	1.41	1.26	10C	0	L326
L330	29.10	-.37	-.19	1.93	1.25	17.74	.44	.31	1.24	1.11	10C	0	L330
L331	27.80	-1.67	-.87	1.78	1.16	15.73	-1.56	-1.11	.80	.71	10Y	0	L331
L333	26.87	-2.60	-1.36	3.62	2.35	15.60	-1.70	-1.20	2.53	2.26	10C	0	L333
L339	23.83	-5.64	-2.95	1.37	.89	12.10	-5.20	-3.69	1.24	1.11	10C	X	L339
L344	26.43	-3.04	-1.59	1.59	1.03	15.07	-2.23	-1.58	.88	.79	10C	0	L344
L356	27.20	-2.27	-1.19	2.08	1.35	18.07	.77	.55	1.17	1.04	10C	0	L356
L358	30.50	1.03	.54	.56	.37	16.47	-.83	-.59	.40	.36	10C	0	L358
L360	29.70	.23	.12	1.35	.87	17.93	.64	.45	1.15	1.02	10C	0	L360
L366	28.83	-.64	-.33	1.73	1.12	18.70	1.40	1.00	.92	.82	10C	0	L366
L390	29.43	-.04	-.02	1.22	.79	16.50	-.80	-.56	1.12	1.00	10C	0	L390
L568	31.90	2.43	1.27	1.70	1.11	19.20	1.90	1.35	1.26	1.13	10C	0	L568
L599	30.04	.57	.30	1.88	1.22	17.30	.00	.00	1.33	1.19	10C	0	L599
L684	28.50	-.97	-.51	1.95	1.26	15.83	-1.46	-1.04	1.13	1.01	10C	0	L684
L696	33.67	4.20	2.20	2.60	1.69	18.58	1.28	.91	1.49	1.33	10C	#	L696
GR ₀ MEAN = 29.47 PSI					GRAND MEAN = 17.30 PSI					TEST DETERMINATIONS = 15			
SD MEANS = 1.91 PSI					SD OF MEANS = 1.41 PSI					44 LABS IN GRAND MEANS			
AVERAGE SDR = 1.54 PSI					AVERAGE SDR = 1.12 PSI								
GR ₀ MEAN = 203.2 KILOPASCAL					GRAND MEAN = 119.3 KILOPASCAL								
L128	30.60	1.13	.59	1.30	.84	19.00	1.70	1.21	1.00	.89	10B	*	L128
L219	32.62	3.15	1.65	1.06	.69	20.08	2.78	1.97	1.44	1.28	10T	*	L219
L242	31.75	2.29	1.20	2.09	1.36	19.89	2.60	1.84	1.09	.97	10T	*	L242
L250L	26.00	-3.47	-1.81	1.28	.83	16.58	-.72	-.51	.82	.73	10N	*	L250L
L251	30.69	1.22	.64	2.04	1.33	19.53	2.23	1.58	.84	.75	10V	*	L251
L269	33.60	4.13	2.16	1.55	1.01	21.67	4.37	3.10	1.40	1.25	10A	*	L269
L484	27.70	-1.77	-.93	1.42	.93	15.97	-1.33	-.94	.61	.55	10M	*	L484

TOTAL NUMBER OF LABORATORIES REPORTING = 53

Best values: J40 29.5 ± 3.1 psi
J68 17.3 ± 2.3 psi

Data from the following laboratories were omitted from the grand means because the tests were performed in ambient conditions: 695.

TAPPI STANDARD T403 68-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST	INSTRUMENT---	CONDITIONS
		J40	J68	MAJOR	MINOR	R,SDR	VAR			
L339	X	23.83	12.10	-7.52	-1.50	1.00	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L250L	*	26.00	16.58	-3.33	1.19	.78	10N	BURSTING STRENGTH	UP T0	45 PSI, LHMARGY, MAN. CLAMP, 20C, 65%RH
L232	Ø	26.03	16.43	-3.38	1.05	.67	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L344	Ø	26.43	15.07	-3.75	-.32	.91	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L333	Ø	26.87	15.60	-3.11	-.09	2.31	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L183	Ø	26.93	17.23	-2.20	1.27	1.04	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L278	Ø	27.03	14.97	-3.29	-.72	1.09	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L356	Ø	27.20	18.07	-1.54	1.84	1.20	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L121	Ø	27.37	17.32	-1.78	1.11	1.02	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L484	*	27.70	15.97	-2.20	-.21	.74	10M	BURSTING STRENGTH	UP T0	45 PSI, REGMED MT/M0T, MANUAL CLAMP
L131	Ø	27.73	15.13	-2.61	-.94	1.20	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L331	Ø	27.80	15.73	-2.24	-.46	.93	10Y	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, M. CLAMP, TRANSDUCER
L237A	Ø	28.00	16.87	-1.48	.40	.88	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L191	Ø	28.10	13.97	-2.90	-2.13	1.11	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L203A	Ø	28.12	16.28	-1.68	-.16	1.21	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L248	Ø	28.46	18.79	-.08	1.80	.97	10E	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L684	Ø	28.50	15.83	-1.59	-.74	1.14	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L158	Ø	28.73	16.33	-1.13	-.44	.75	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L261	Ø	28.74	17.83	-.34	.84	1.23	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L366	Ø	28.83	18.70	.19	1.53	.97	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L237B	Ø	28.93	18.80	.33	1.56	.80	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L150	Ø	28.97	17.23	-.46	.21	1.04	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L212	Ø	29.00	17.17	-.47	.13	.92	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L330	Ø	29.10	17.74	-.08	.57	1.18	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L167	Ø	29.27	18.09	.24	.78	.53	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L264	Ø	29.40	15.47	-1.01	-1.53	.82	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L390	Ø	29.43	16.50	-.45	-.66	.90	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L312	Ø	29.47	17.24	-.03	-.05	.72	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L360	Ø	29.70	17.93	.53	.42	.95	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L305	Ø	29.83	16.90	.10	-.53	.76	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L274	Ø	29.93	16.90	.19	-.58	.69	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L599	Ø	30.04	17.30	.49	-.29	1.21	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L249	Ø	30.16	17.12	.50	-.51	1.05	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L207	Ø	30.27	18.80	1.46	.87	.75	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L223A	Ø	30.43	18.91	1.66	.87	.86	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L153	Ø	30.47	17.67	1.04	-.20	.92	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L358	Ø	30.50	16.47	.45	-1.24	.36	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L128	*	30.60	19.00	1.85	.87	.87	10B	BURSTING STRENGTH	UP T0	45 PSI, PERKINS B, MANUAL CLAMP
L251	*	30.69	19.53	2.21	1.27	1.04	10V	BURSTING STRENGTH	UP T0	45 PSI, L*W, MANUAL CLAMP, 20C, 65% RH
L203B	Ø	30.78	16.08	.49	-1.72	1.44	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L326	Ø	31.03	20.37	2.93	1.81	.92	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L225	Ø	31.10	18.47	2.00	.15	1.08	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L311	Ø	31.13	18.67	2.13	.30	1.29	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L279	Ø	31.20	17.73	1.70	-.53	1.01	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L242	*	31.75	19.89	3.30	1.03	1.16	10T	BURSTING STRENGTH	UP T0	45 PSI, L*W, MANUAL CLAMP
L568	Ø	31.90	19.20	3.07	.36	1.12	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L134	Ø	31.93	16.80	1.84	-1.71	.98	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L219	*	32.62	20.08	4.13	.73	.98	10T	BURSTING STRENGTH	UP T0	45 PSI, L*W, MANUAL CLAMP
L315	Ø	33.07	18.23	3.56	-1.07	1.10	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L269	*	33.60	21.67	5.80	1.58	1.13	10A	BURSTING STRENGTH	UP T0	45 PSI, PERKINS A, MANUAL CLAMP
L696	#	33.67	18.58	4.25	-1.09	1.51	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L321	Ø	33.70	18.80	4.39	-.92	1.00	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
L299	*	35.03	20.30	6.31	-.33	.99	10C	BURSTING STRENGTH	UP T0	45 PSI, PERKINS C, MANUAL CLAMP
GMEANS:		29.47	17.30			1.00				
		95% ELLIPSE:		5.53	2.57			WITH GAMMA = 31 DEGREES		

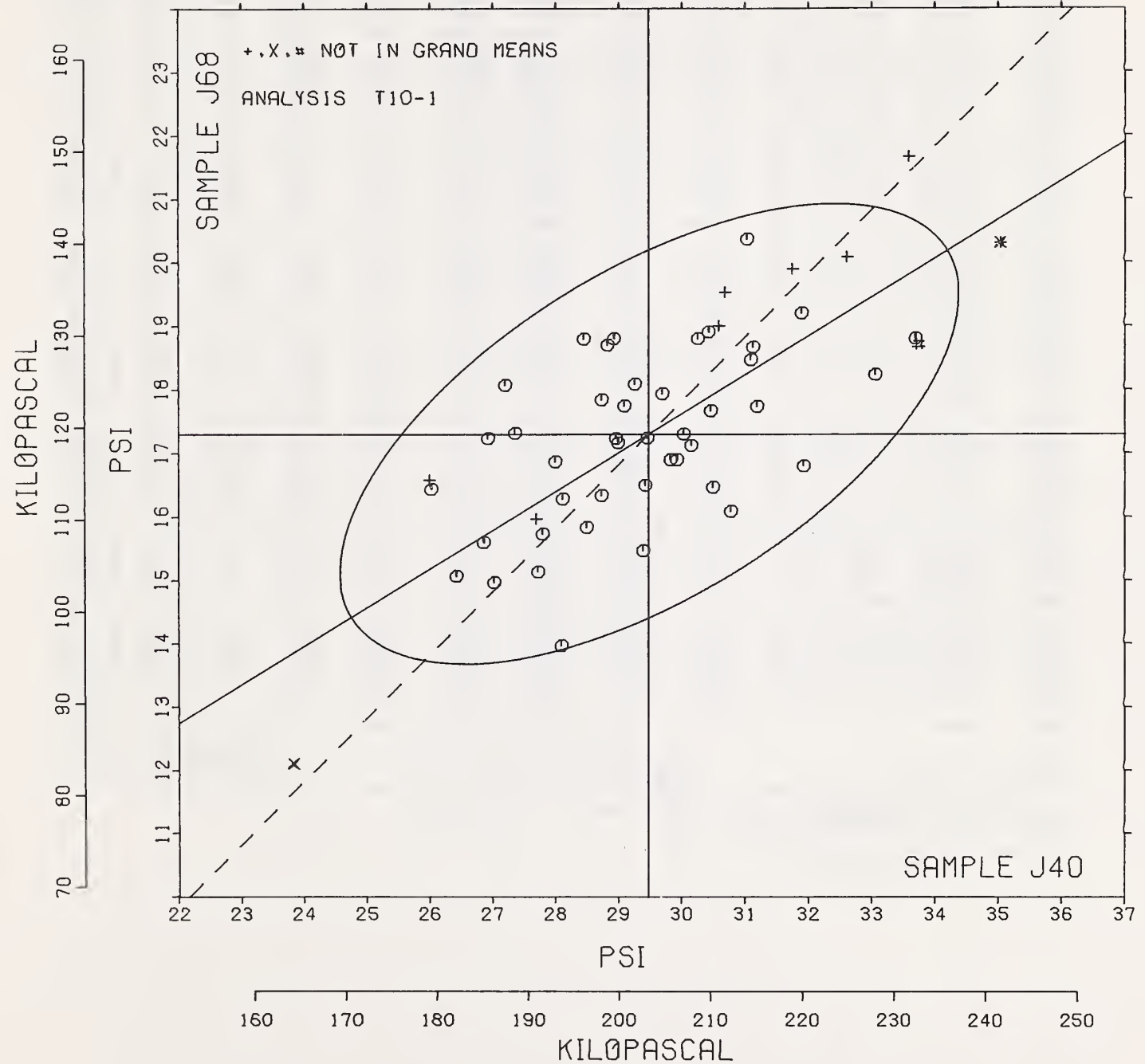
BURSTING STRENGTH, MODEL C

SAMPLE J40 = 29.5 PSI

SAMPLE J68 = 17.3 PSI

SAMPLE J40 = 203 KILOPASCAL

SAMPLE J68 = 119 KILOPASCAL



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

LAB CODE	SAMPLE J40	PRINTING 85 GRAMS PER SQUARE METER				SAMPLE J68	PRINTING 76 GRAMS PER SQUARE METER				TEST D ₀ " 15		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L100	30.71	1.56	.81	1.50	.94	19.15	1.81	.95	.93	.86	10D	Ø	L100
L105	29.13	-.02	-.01	2.23	1.40	17.00	-.34	-.18	1.21	1.12	10D	Ø	L105
L106C	29.00	-.15	-.08	1.65	1.03	18.13	.79	.42	1.30	1.20	10D	Ø	L106C
L115	31.27	2.12	1.09	1.81	1.14	16.23	-1.11	-.58	1.12	1.03	10D	*	L115
L118	30.20	1.05	.54	1.74	1.09	18.83	1.49	.78	.94	.87	10D	Ø	L118
L122	27.53	-1.62	-.83	1.60	1.00	15.20	-2.14	-1.12	1.01	.94	10F	Ø	L122
L125	27.37	-1.78	-.92	2.22	1.40	14.83	-2.51	-1.32	1.53	1.41	10D	Ø	L125
L148	30.80	1.65	.85	1.08	.68	18.47	1.13	.59	1.25	1.15	10D	Ø	L148
L157	31.70	2.55	1.32	1.18	.74	18.83	1.49	.79	1.21	1.11	10D	Ø	L157
L159	26.32	-2.83	-1.46	1.69	1.06	15.89	-1.45	-.76	1.15	1.06	10D	Ø	L159
L162	27.53	-1.62	-.83	1.46	.91	13.60	-3.74	-1.97	2.06	1.90	10D	Ø	L162
L163	29.23	.08	.04	1.40	.88	18.07	.73	.38	.98	.90	10D	Ø	L163
L166	31.93	2.78	1.44	2.09	1.31	18.53	1.19	.63	.85	.79	10D	Ø	L166
L176	30.40	1.25	.65	.99	.62	20.53	3.19	1.68	.64	.59	10D	Ø	L176
L185	30.93	1.78	.92	1.22	.77	18.57	1.23	.65	1.16	1.07	10D	Ø	L185
L190C	27.53	-1.62	-.83	1.36	.85	16.33	-1.01	-.53	1.18	1.08	10D	Ø	L190C
L190R	28.53	-.62	-.32	1.59	1.00	16.97	-.37	-.20	1.34	1.24	10D	Ø	L190R
L194	29.73	.58	.30	1.43	.89	19.00	1.66	.87	.53	.49	10D	Ø	L194
L217	30.47	1.32	.68	1.19	.75	19.13	1.79	.94	1.19	1.10	10F	Ø	L217
L224	30.77	1.62	.83	2.03	1.28	18.60	1.26	.66	1.70	1.57	10D	Ø	L224
L226B	29.01	-.14	-.07	1.45	.91	17.93	.59	.31	1.15	1.06	10D	Ø	L226B
L226C	24.93	-4.22	-2.17	2.81	1.76	14.87	-2.47	-1.30	1.32	1.21	10D	Ø	L226C
L233	28.30	-.85	-.44	1.33	.83	17.71	.37	.20	.89	.82	10D	Ø	L233
L241	29.97	.82	.42	2.02	1.27	18.91	1.57	.83	1.21	1.12	10D	Ø	L241
L255	27.73	-1.42	-.73	.59	.37	16.73	-.61	-.32	.59	.55	10D	Ø	L255
L257A	29.20	.05	.03	1.42	.89	18.33	.99	.52	1.29	1.19	10D	Ø	L257A
L257B	29.53	.38	.20	1.19	.75	17.87	.53	.28	.83	.77	10D	Ø	L257B
L257C	29.40	.25	.13	2.41	1.52	17.73	.39	.21	.88	.82	10D	Ø	L257C
L262	30.30	1.15	.59	1.35	.85	18.13	.79	.42	1.03	.95	10D	Ø	L262
L275	25.25	-3.90	-2.01	1.45	.91	12.65	-4.69	-2.47	1.21	1.11	10D	Ø	L275
L280	32.94	3.79	1.96	1.64	1.03	19.91	2.57	1.35	.90	.83	10D	Ø	L280
L309	29.15	-.00	-.00	1.64	1.03	17.46	.12	.06	.96	.88	10D	Ø	L309
L313	25.60	-3.55	-1.83	1.61	1.01	14.36	-2.98	-1.57	1.27	1.17	10I	Ø	L313
L341	29.20	.05	.03	.80	.50	17.23	-.11	-.06	.42	.38	10D	Ø	L341
L352	26.29	-2.86	-1.47	1.71	1.07	16.25	-1.09	-.57	.83	.77	10D	Ø	L352
L563	30.30	1.15	.59	1.91	1.20	16.89	-.45	-.24	.96	.88	10U	Ø	L563
L575	31.13	1.98	1.02	1.56	.98	18.58	1.24	.65	1.15	1.06	10D	Ø	L575
L581	29.90	.75	.39	1.51	.95	19.20	1.86	.98	1.01	.94	10D	Ø	L581
L652	25.33	-3.82	-1.97	2.25	1.41	12.07	-5.27	-2.77	1.60	1.48	10D	*	L652
L688	29.73	.58	.30	2.50	1.57	18.30	.96	.51	.89	.82	10D	Ø	L688
L698	30.81	1.66	.86	1.58	.99	17.87	.53	.28	1.32	1.21	10D	Ø	L698

GR₀ MEAN = 29.15 PSI

GRAND MEAN = 17.34 PSI

TEST DETERMINATIONS = 15

SD MEANS = 1.94 PSI

SD OF MEANS = 1.90 PSI

41 LABS IN GRAND MEANS

AVERAGE SDR = 1.59 PSI

AVERAGE SDR = 1.08 PSI

GR₀ MEAN = 201.0 KILOPASCAL

GRAND MEAN = 119.6 KILOPASCAL

TOTAL NUMBER OF LABORATORIES REPORTING = 41

Best values: J40 29.3 ± 3.6 psi

J68 17.4 ± 3.1 psi

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

LAB CODE	F	MEANS		COORDINATES		AVG R ₀ SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
		J40	J68	MAJOR	MINOR		
L226C	Ø	24.93	14.87	-4.74	1.18	1.49	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L275	Ø	25.25	12.65	-6.07	-0.63	1.01	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L652	*	25.33	12.07	-6.41	-1.10	1.45	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L313	Ø	25.60	14.36	-4.62	.35	1.09	10I BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L352	Ø	26.29	16.25	-2.80	1.22	.92	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L159	Ø	26.32	15.89	-3.04	.94	1.06	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L125	Ø	27.37	14.83	-3.03	-0.55	1.40	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L190C	Ø	27.53	16.33	-1.86	.41	.97	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L162	Ø	27.53	13.60	-3.77	-1.55	1.41	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L122	Ø	27.53	15.20	-2.65	-0.40	.97	10F BURSTING STRENGTH UP TØ 45 PSI, PERKINS C, H. CLAMP, TRANSDUCER
L255	Ø	27.73	16.73	-1.44	.56	.46	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L233	Ø	28.30	17.71	-.35	.86	.83	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L190R	Ø	28.53	16.97	-0.70	.16	1.12	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L106C	Ø	29.00	18.13	.45	.67	1.12	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L226B	Ø	29.01	17.93	.31	.52	.99	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L105	Ø	29.13	17.00	-.25	-.23	1.26	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L309	Ø	29.15	17.46	.08	.09	.96	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L341	Ø	29.20	17.23	-.04	-.11	.44	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L257A	Ø	29.20	18.33	.73	.68	1.04	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L163	Ø	29.23	18.07	.57	.46	.89	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L257C	Ø	29.40	17.73	.46	.11	1.17	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L257B	Ø	29.53	17.87	.64	.11	.76	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L688	Ø	29.73	18.30	1.08	.28	1.19	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L194	Ø	29.73	19.00	1.58	.78	.69	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L581	Ø	29.90	19.20	1.84	.81	.94	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L241	Ø	29.97	18.91	1.69	.55	1.19	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L118	Ø	30.20	18.83	1.79	.33	.98	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L563	Ø	30.30	16.89	.50	-1.12	1.04	10U BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L262	Ø	30.30	18.13	1.38	-.24	.90	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L176	Ø	30.40	20.53	3.13	1.41	.60	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L217	Ø	30.47	19.13	2.20	.36	.92	10F BURSTING STRENGTH UP TØ 45 PSI, PERKINS C, H. CLAMP, TRANSDUCER
L100	Ø	30.71	19.15	2.39	.20	.90	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L224	Ø	30.77	18.60	2.04	-.23	1.42	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L148	Ø	30.80	18.47	1.97	-.35	.91	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L698	Ø	30.81	17.87	1.56	-.78	1.10	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L185	Ø	30.93	18.57	2.13	-.37	.92	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L575	Ø	31.13	18.58	2.28	-.49	1.02	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L115	*	31.27	16.23	.74	-2.27	1.08	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L157	Ø	31.70	18.83	2.87	-.71	.93	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L166	Ø	31.93	18.53	2.83	-1.09	1.05	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
L280	Ø	32.94	19.91	4.51	-.81	.93	10D BURSTING STRENGTH UP TØ 45 PSI, PERKINS CA ØR C, AIR CLAMP
GMEANS:		29.15	17.34			1.00	
		95% ELLIPSE:		6.70	2.04		WITH GAMMA = 44 DEGREES

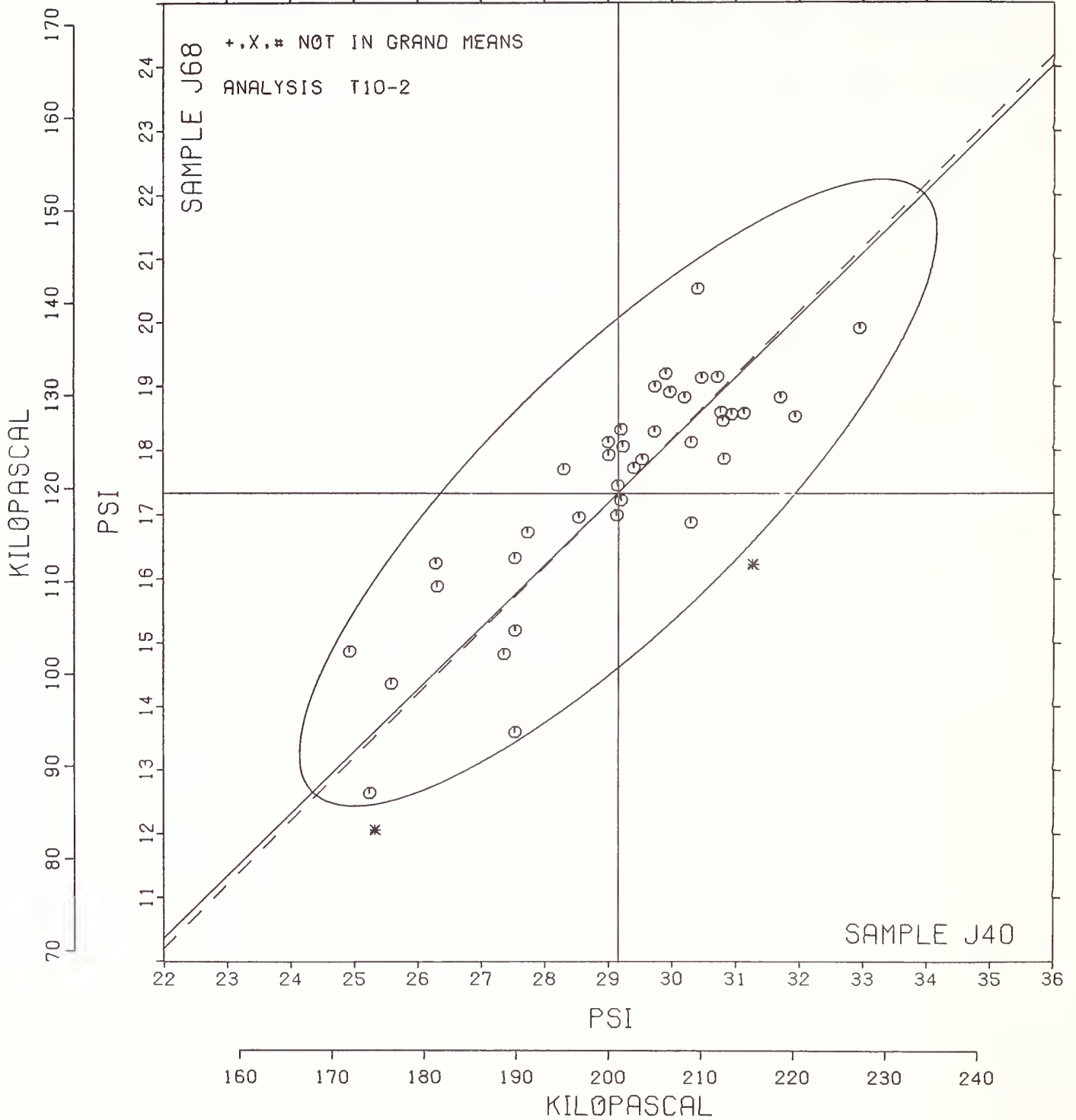
BURSTING STRENGTH, MODEL C-A

SAMPLE J40 = 29.1 PSI

SAMPLE J68 = 17.3 PSI

SAMPLE J40 = 201 KILOPASCAL

SAMPLE J68 = 120 KILOPASCAL



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

LAB CODE	SAMPLE K30 KRAFT						SAMPLE K28 PRINTING						TEST D ₀ = 15		
	MEAN	DEV	N ₀ DEV	PER SQUARE METER	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	PER SQUARE METER	SDR	R ₀ SDR	VAR	F	LAB
L100	59.5	.7	.25	3.8	.98	51.9	2.5	.98	3.1	.85	11D	0	L100		
L103	62.7	3.8	1.43	2.2	.56	51.2	1.8	.70	1.4	.38	11C	0	L103		
L107	60.7	1.8	.68	5.6	1.43	52.6	3.2	1.26	4.8	1.33	11C	0	L107		
L118	63.1	4.2	1.60	4.1	1.06	52.4	3.0	1.18	3.7	1.02	11D	0	L118		
L122	56.3	-2.6	-.98	2.9	.74	46.7	-2.6	-1.03	3.6	.99	11F	0	L122		
L128	59.1	.2	.08	3.1	.80	49.4	.0	.01	3.5	.98	11D	0	L128		
L148	61.9	3.0	1.13	4.1	1.06	51.5	2.2	.85	4.3	1.20	11D	0	L148		
L159	56.1	-2.8	-1.04	3.9	1.00	48.6	-.8	-.30	3.7	1.04	11D	0	L159		
L170	61.5	2.6	.99	2.4	.63	50.3	.9	.35	1.4	.38	11C	0	L170		
L176	58.5	-.3	-.13	3.2	.83	51.3	2.0	.77	4.4	1.22	11D	0	L176		
L182	58.1	-.8	-.30	6.4	1.63	48.9	-.5	-.20	4.5	1.25	11D	0	L182		
L218	59.0	.1	.05	4.2	1.07	47.8	-1.6	-.63	4.0	1.10	11D	0	L218		
L232	50.7	-8.2	-3.08	8.3	2.12	43.8	-5.6	-2.19	4.2	1.18	11C	*	L232		
L237A	57.1	-1.8	-.68	1.3	.33	48.4	-1.0	-.38	1.0	.27	11C	0	L237A		
L237B	60.2	1.3	.50	2.3	.59	51.7	2.3	.90	1.8	.50	11C	0	L237B		
L238A	61.6	2.7	1.03	6.1	1.56	49.1	-.3	-.12	4.2	1.16	11Y	0	L238A		
L248	58.3	-.5	-.20	4.5	1.16	49.9	.5	.19	4.3	1.20	11E	0	L248		
L278	55.6	-3.2	-1.22	5.1	1.31	47.4	-1.9	-.76	3.3	.91	11C	0	L278		
L279	59.4	.5	.19	3.1	.80	55.9	6.6	2.57	3.1	.86	11C	X	L279		
L280	62.1	3.2	1.22	3.2	.83	52.9	3.6	1.40	3.8	1.04	11D	0	L280		
L294	59.3	.4	.15	3.8	.98	53.8	4.4	1.73	4.2	1.15	11C	*	L294		
L303	58.0	-.9	-.34	1.9	.49	48.4	-.9	-.37	2.5	.71	11C	0	L303		
L330	60.2	1.4	.52	3.5	.91	51.8	2.4	.94	3.7	1.02	11C	0	L330		
L331	57.0	-1.9	-.70	5.0	1.29	45.9	-3.4	-1.34	4.0	1.10	11G	0	L331		
L333	58.6	-.3	-.10	4.6	1.19	50.7	1.4	.53	4.3	1.20	11C	0	L333		
L334	62.7	3.8	1.44	5.5	1.41	52.9	3.5	1.38	2.1	.57	11D	0	L334		
L344	56.9	-2.0	-.75	5.3	1.35	46.7	-2.7	-1.06	4.9	1.36	11C	0	L344		
L356	59.5	.6	.23	2.1	.53	48.6	-.8	-.31	2.9	.79	11C	0	L356		
L565	57.8	-1.1	-.40	3.3	.85	48.5	-.8	-.33	2.6	.72	11D	0	L565		
L575	60.1	1.3	.48	6.1	1.56	51.2	1.8	.71	4.4	1.21	11D	0	L575		
L581	58.9	.1	.03	4.0	1.02	48.7	-.7	-.27	5.3	1.48	11D	0	L581		
L599	61.0	2.1	.80	3.5	.91	49.8	.4	.16	3.3	.92	11C	0	L599		
L604	58.5	-.4	-.14	5.1	1.30	47.5	-1.9	-.73	4.6	1.28	11C	0	L604		
L622	54.2	-4.6	-1.75	3.3	.84	43.3	-6.0	-2.36	4.2	1.16	11E	0	L622		
L650	57.7	-1.1	-.43	4.1	1.06	46.8	-2.6	-1.00	5.0	1.39	11D	0	L650		
L651	61.7	2.5	1.08	2.3	.59	51.1	1.7	.66	5.3	1.46	11D	0	L651		
L680	55.1	-3.8	-1.43	4.4	1.12	46.0	-3.4	-1.32	3.0	.82	11D	0	L680		
GR. MEAN =	58.9	PSI		GRAND MEAN =	49.4	PSI		TEST DETERMINATIONS =	15						
SD MEANS =	2.6	PSI		SD OF MEANS =	2.6	PSI		36 LABS IN GRAND MEANS							
		AVERAGE SDR =	3.9	PSI		AVERAGE SDR =	3.6	PSI							
GR. MEAN =	405.5	KILOPASCAL		GRAND MEAN =	340.4	KILOPASCAL									
L242	63.8	4.9	1.86	3.9	1.01	53.2	3.8	1.50	4.1	1.13	11T	*	L242		
L250L	54.9	-4.0	-1.51	3.0	.76	46.0	-3.4	-1.33	2.9	.81	11N	*	L250L		
L251	67.0	8.1	3.07	4.5	1.16	60.6	11.2	4.37	3.3	.93	11V	*	L251		
L274	55.3	-3.5	-1.33	5.1	1.31	55.3	6.0	2.33	4.6	1.28	11H	*	L274		
L290	61.5	2.6	.98	3.2	.83	54.9	5.6	2.17	2.1	.59	11A	*	L290		
L393	57.0	-1.5	-.70	4.3	1.10	48.5	-.9	-.35	3.4	.94	11H	*	L393		
L394	71.0	12.1	4.58	4.2	1.07	63.9	14.6	5.69	3.3	.93	11H	*	L394		
L570	60.2	1.3	.50	3.7	.96	50.3	.9	.35	3.7	1.03	11H	*	L570		
L576	62.6	3.7	1.41	3.5	.90	51.2	1.8	.72	3.6	1.00	11P	*	L576		
L598	63.9	5.1	1.91	4.4	1.12	55.5	6.1	2.38	5.2	1.43	11B	*	L598		

TOTAL NUMBER OF LABORATORIES REPORTING = 47

Best values: K30 59 ± 4 psi
K28 49 ± 4 psi

BURSTING STRENGTH, HIGH RANGE, PSI
TAPPI STANDARD T403 6S-76, BURSTING STRENGTH OF PAPER - PERKINS MODEL C OR C-A

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS			
		K30	K28	MAJOR	MINOR	R _s	SDR VAR				
L232	*	50.7	43.8	-9.8	1.6	1.65	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L622	Ø	54.2	43.3	-7.5	-1.1	1.00	11E	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L250L	*	54.9	46.0	-5.2	.3	.78	11N	BURSTING	STRENGTH	40 - 100	PSI, LHMARGY, MAN. CLAMP, 20C, 65%RH
L680	Ø	55.1	46.0	-5.1	.2	.97	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L274	*	55.3	55.3	1.6	6.7	1.30	11H	BURSTING	STRENGTH	40 - 100	PSI, PERKINS AH, HYDRAULIC CLAMP
L278	Ø	55.6	47.4	-3.7	.8	1.11	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L159	Ø	56.1	48.6	-2.5	1.4	1.02	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L122	Ø	56.3	46.7	-3.7	-.1	.86	11F	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, H. CLAMP, TRANSDUCER
L344	Ø	56.9	46.7	-3.3	-.6	1.35	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L393	*	57.0	48.5	-2.0	.6	1.02	11H	BURSTING	STRENGTH	40 - 100	PSI, PERKINS AH, HYDRAULIC CLAMP
L331	Ø	57.0	45.9	-3.7	-1.2	1.20	11G	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, M. CLAMP, TRANSDUCER
L237A	Ø	57.1	48.4	-2.0	.5	.30	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L650	Ø	57.7	46.8	-2.6	-1.1	1.23	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L565	Ø	57.8	48.5	-1.3	.1	.78	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L303	Ø	58.0	48.4	-1.3	-.1	.60	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L182	Ø	58.1	48.9	-.9	.2	1.44	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L248	Ø	58.3	49.9	-.0	.7	1.18	11E	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L604	Ø	58.5	47.5	-1.6	-1.1	1.29	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L176	Ø	58.5	51.3	1.1	1.6	1.03	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L333	Ø	58.6	50.7	.8	1.2	1.20	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L581	Ø	58.9	48.7	-.4	-.6	1.25	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L218	Ø	59.0	47.8	-1.0	-1.3	1.09	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L128	Ø	59.1	49.4	.2	-.1	.89	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L294	*	59.3	53.8	3.4	2.9	1.07	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L279	X	59.4	55.9	4.9	4.4	.83	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L356	Ø	59.5	48.6	-.1	-1.0	.66	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L100	Ø	59.5	51.9	2.2	1.3	.91	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L575	Ø	60.1	51.2	2.2	.4	1.39	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L570	*	60.2	50.3	1.6	-.3	1.00	11H	BURSTING	STRENGTH	40 - 100	PSI, PERKINS AH, HYDRAULIC CLAMP
L237B	Ø	60.2	51.7	2.6	.7	.55	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L330	Ø	60.2	51.8	2.7	.8	.96	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L107	Ø	60.7	52.6	3.5	1.1	1.38	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L599	Ø	61.0	49.8	1.8	-1.2	.91	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L290	*	61.5	54.9	5.7	2.2	.71	11A	BURSTING	STRENGTH	40 - 100	PSI, PERKINS A, MANUAL CLAMP
L170	Ø	61.5	50.3	2.5	-1.2	.50	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L238A	Ø	61.6	49.1	1.8	-2.1	1.36	11Y	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L651	Ø	61.7	51.1	3.2	-.8	1.02	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L148	Ø	61.9	51.5	3.7	-.5	1.13	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L280	Ø	62.1	52.9	4.8	.3	.94	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L576	*	62.6	51.2	4.0	-1.3	.95	11P	BURSTING	STRENGTH	40 - 100	PSI, PERKINS LC, MANUAL CLAMP
L103	Ø	62.7	51.2	4.0	-1.3	.47	11C	BURSTING	STRENGTH	40 - 100	PSI, PERKINS C, MANUAL CLAMP
L334	Ø	62.7	52.9	5.2	-.1	.99	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L118	Ø	63.1	52.4	5.2	-.7	1.04	11D	BURSTING	STRENGTH	40 - 100	PSI, PERKINS CA, AIR CLAMP
L242	*	63.8	53.2	6.2	-.6	1.07	11T	BURSTING	STRENGTH	40 - 100	PSI, L*W, MANUAL CLAMP
L598	*	63.9	55.5	7.9	.9	1.28	11B	BURSTING	STRENGTH	40 - 100	PSI, MESSMER, MANUAL CLAMP
L251	*	67.0	60.6	13.6	2.5	1.04	11V	BURSTING	STRENGTH	40 - 100	PSI, L*W, MANUAL CLAMP, 20C, 65% RH
L394	*	71.0	63.9	18.8	2.1	1.00	11H	BURSTING	STRENGTH	40 - 100	PSI, PERKINS AH, HYDRAULIC CLAMP
GMEANS:		58.9	49.4			1.00					
		95% ELLIPSE:		9.1	2.8						WITH GAMMA = 43 DEGREES

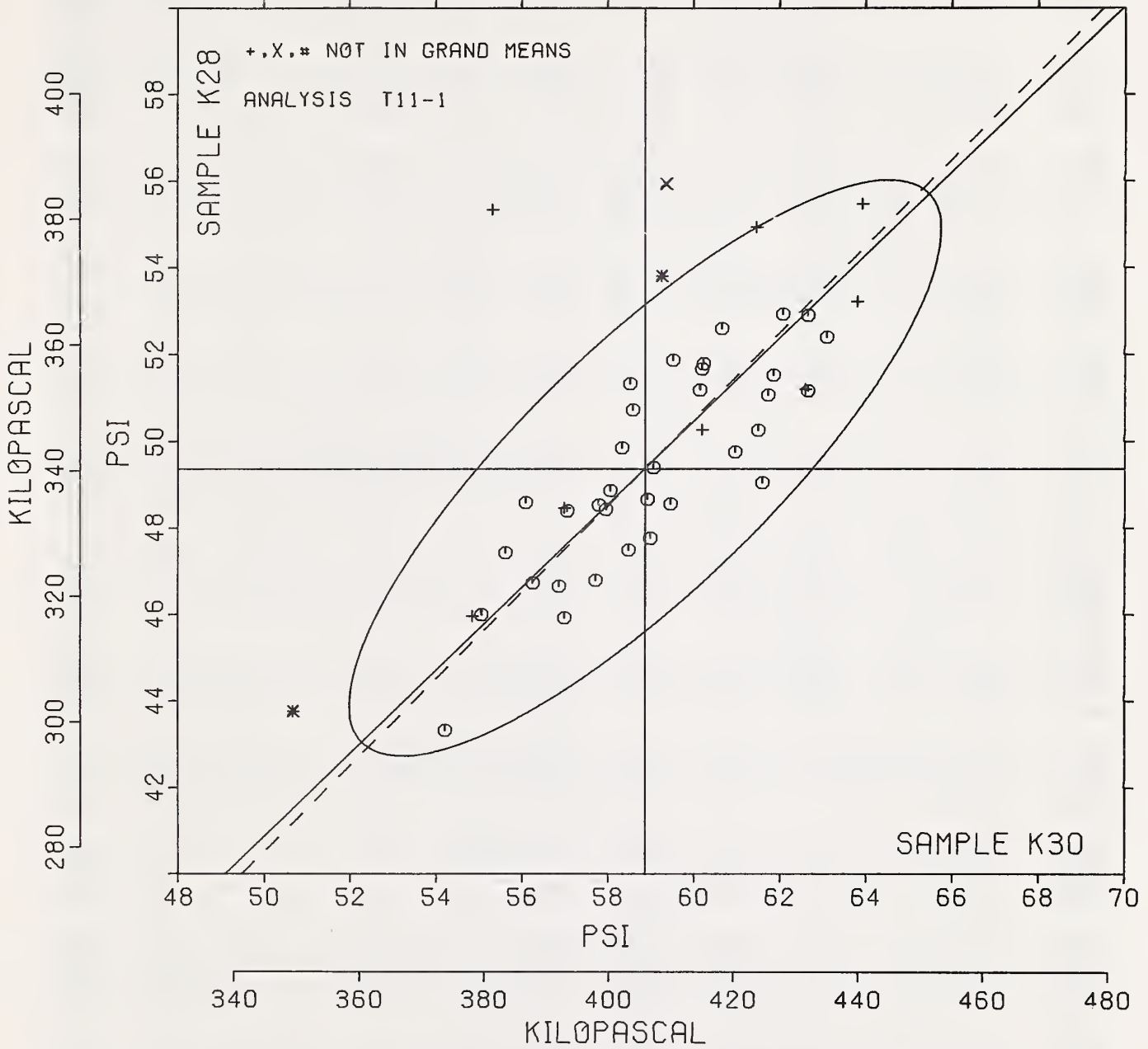
BURSTING STRENGTH, HIGH RANGE

SAMPLE K30 = 58.9 PSI

SAMPLE K28 = 49.4 PSI

SAMPLE K30 = 406 KILOPASCAL

SAMPLE K28 = 340 KILOPASCAL



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

LAB CODE	PRINTING					WRITING					TEST D ₀ = 15		
	SAMPLE G02 MEAN	116 GRAMS PER SQUARE METER DEV	N ₀ DEV	SDR	R ₀ SDR	SAMPLE G07 MEAN	74 GRAMS PER SQUARE METER DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L100	82.2	-3.1	-.88	2.1	.77	35.9	-2.8	-1.39	.7	.49	15M	0	L100
L103	84.3	-1.1	-.30	1.8	.67	37.3	-1.4	-.68	1.0	.67	15T	0	L103
L105	82.9	-2.4	-.69	2.3	.84	48.3	9.5	4.70	1.3	.88	15T	X	L105
L107	86.7	1.3	.38	2.5	.92	39.6	.9	.43	2.6	1.82	15T	0	L107
L115	84.0	-1.3	-.37	2.2	.81	37.5	-1.2	-.59	2.4	1.66	15C	0	L115
L118	84.9	-.5	-.13	1.7	.64	37.3	-1.5	-.72	.8	.55	15T	0	L118
L121	85.0	-.3	-.09	3.3	1.24	37.9	-.8	-.39	1.8	1.26	15T	0	L121
L122	80.5	-4.5	-1.40	3.3	1.24	36.0	-2.7	-1.32	1.5	1.01	15C	0	L122
L124	86.5	1.1	.33	2.6	.99	38.2	-.5	-.26	1.8	1.23	15T	0	L124
L126	85.9	.6	.17	2.3	.85	38.4	-.3	-.16	1.7	1.16	15T	0	L126
L128	84.7	-.7	-.19	1.2	.46	38.5	-.2	-.09	.9	.63	15T	0	L128
L131	92.0	6.7	1.91	3.6	1.35	41.7	3.0	1.48	3.8	2.59	15A	0	L131
L134	90.5	5.2	1.49	2.0	.75	43.3	4.6	2.27	.8	.56	15C	0	L134
L139	87.3	2.0	.57	2.8	1.04	37.3	-1.5	-.72	.9	.61	15T	0	L139
L143	72.3	-13.0	-3.72	2.9	1.10	32.0	-6.7	-3.31	2.4	1.64	15T	X	L143
L148	82.5	-2.8	-.80	1.9	.72	37.3	-1.4	-.68	1.6	1.12	15T	0	L148
L150	93.7	8.4	2.41	2.6	.97	46.7	7.9	3.91	1.4	.96	15T	X	L150
L151	95.0	9.7	2.77	2.4	.91	44.2	5.5	2.70	1.7	1.17	15C	*	L151
L153	87.4	2.1	.59	2.3	.84	39.6	.9	.43	1.2	.81	15C	0	L153
L157	82.3	-3.0	-.86	2.4	.90	35.4	-3.3	-1.64	1.2	.81	15T	0	L157
L158	87.5	2.1	.61	4.7	1.77	43.7	5.0	2.47	2.8	1.94	15R	*	L158
L159	80.9	-4.4	-1.26	4.0	1.48	37.0	-1.7	-.85	2.5	1.73	15L	0	L159
L162	85.3	.0	.00	2.6	.96	36.9	-1.8	-.88	1.3	.88	15T	0	L162
L163	81.9	-3.5	-.99	2.4	.88	35.9	-2.8	-1.37	1.2	.84	15T	0	L163
L166	84.4	-.9	-.27	2.8	1.04	39.1	.4	.20	1.1	.77	15T	0	L166
L167	85.5	.1	.04	1.6	.60	37.6	-1.1	-.55	.8	.57	15C	0	L167
L170	80.1	-5.2	-1.49	1.2	.44	36.5	-2.2	-1.08	1.0	.68	15T	0	L170
L173B	85.7	.3	.10	2.4	.88	37.7	-1.0	-.49	1.5	1.02	15T	0	L173B
L176	87.7	2.4	.69	2.9	1.09	39.5	.7	.37	1.2	.82	15T	0	L176
L182A	77.7	-7.6	-2.18	3.2	1.18	37.2	-1.5	-.75	2.3	1.59	15A	0	L182A
L182T	91.1	5.7	1.64	3.5	1.31	39.2	.5	.23	1.4	.94	15T	0	L182T
L183	89.0	3.7	1.05	1.8	.68	41.5	2.7	1.35	.7	.51	15T	0	L183
L185	85.3	-.1	-.02	2.4	.91	38.9	.2	.10	1.5	1.02	15T	0	L185
L189	85.5	.1	.04	2.1	.78	35.6	-3.1	-1.54	1.0	.68	15T	0	L189
L190C	89.3	4.0	1.15	2.5	.92	40.0	1.3	.63	1.3	.86	15T	0	L190C
L191	92.0	6.7	1.91	4.1	1.52	37.6	-1.1	-.55	1.4	.93	15T	*	L191
L194	90.3	5.0	1.42	2.6	.97	41.0	2.3	1.14	1.1	.75	15T	0	L194
L195	91.7	6.4	1.83	3.3	1.23	39.9	1.1	.56	3.6	2.47	15C	0	L195
L206	85.1	-.2	-.06	2.8	1.04	39.0	.3	.14	1.8	1.25	15T	0	L206
L207	90.7	5.4	1.55	2.6	.96	55.2	16.5	8.13	2.8	1.94	15R	#	L207
L211	84.1	-1.2	-.34	2.6	.98	39.1	.3	.17	1.4	.99	15R	0	L211
L212	84.1	-1.3	-.36	4.1	1.52	38.7	-.1	-.03	2.6	1.81	15T	0	L212
L213	84.7	-.7	-.19	2.0	.73	36.7	-2.1	-1.01	1.0	.67	15T	0	L213
L217	90.5	5.2	1.48	2.3	.86	38.9	.2	.10	1.1	.79	15Q	0	L217
L219	84.9	-.4	-.11	2.7	1.01	40.4	1.7	.82	2.0	1.40	15L	0	L219
L223	88.7	3.3	.96	1.7	.63	40.7	2.0	.98	1.0	.71	15R	0	L223
L224	82.5	-2.9	-.82	2.0	.73	34.9	-3.9	-1.90	.8	.57	15T	0	L224
L225	88.3	2.9	.84	2.4	.89	41.3	2.5	1.25	1.4	.95	15T	0	L225
L226C	84.4	-.9	-.27	3.5	1.30	39.1	.3	.17	1.3	.88	15T	0	L226C
L228	85.1	-.3	-.08	1.7	.64	37.7	-1.0	-.49	1.0	.66	15T	0	L228
L230	82.1	-3.2	-.92	4.3	1.61	35.8	-2.9	-1.45	1.2	.80	15R	0	L230
L232	84.8	-.5	-.15	2.2	.84	37.6	-1.1	-.55	1.5	1.07	15T	0	L232
L233	91.2	5.9	1.68	3.5	1.31	42.1	3.3	1.65	2.8	1.92	15T	0	L233
L236	85.2	-.1	-.04	3.3	1.22	36.6	-2.1	-1.05	1.8	1.21	15T	0	L236
L237A	84.5	-.9	-.25	1.5	.56	39.0	.3	.14	1.4	.94	15T	0	L237A
L237B	86.8	1.5	.42	1.9	.72	39.7	1.0	.50	1.0	.66	15T	0	L237B
L238A	87.5	2.5	.73	2.6	.96	38.5	-.3	-.13	1.4	.93	15T	0	L238A
L241	86.1	.7	.21	1.7	.64	42.5	3.8	1.87	.6	.44	15T	0	L241
L242	85.4	.0	.01	2.4	.89	38.1	-.6	-.28	1.1	.79	15U	0	L242
L244	86.8	1.5	.42	2.3	.86	39.9	1.2	.59	1.0	.71	15C	0	L244
L248	84.6	-.7	-.21	2.3	.85	38.1	-.6	-.30	1.8	1.21	15J	0	L248
L249	85.1	-.2	-.06	2.3	.86	39.5	.8	.40	1.5	1.04	15T	0	L249
L254	87.1	1.7	.50	3.3	1.23	39.5	.7	.37	1.2	.82	15T	0	L254
L255	85.2	-.1	-.04	1.0	.38	38.3	-.4	-.19	.5	.34	15T	0	L255
L257A	84.9	-.4	-.11	2.7	1.01	40.4	1.7	.82	1.1	.77	15C	0	L257A

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

LAB CODE	PRINTING					WRITING					TEST D ₀ = 15		
	G02 MEAN	116 GEAMS PER SQUARE METER DEV	N ₀ DEV	SDR	R ₀ SDR	G07 MEAN	74 GRAMS PER SQUARE METER DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L257B	83.9	-1.5	-0.42	2.4	0.91	39.9	1.1	0.56	1.6	1.10	15C	Ø	L257B
L257C	83.6	-1.7	-0.50	2.6	0.99	40.1	1.4	0.69	1.9	1.32	15C	Ø	L257C
L259	83.6	-1.7	-0.50	4.0	1.51	36.0	-2.7	-1.34	1.4	0.94	15T	Ø	L259
L261	85.3	0	0.00	3.4	1.28	37.9	-0.8	-0.39	1.3	0.88	15T	Ø	L261
L262	84.9	-0.4	-0.11	2.3	0.84	42.8	4.1	2.01	1.3	0.87	15T	*	L262
L264	84.8	-0.5	-0.15	3.1	1.16	41.1	2.3	1.15	1.8	1.26	15T	Ø	L264
L273	90.3	4.9	1.41	2.0	0.74	43.5	4.7	2.33	1.5	1.00	15T	Ø	L273
L274	85.7	0.4	0.12	1.5	0.56	39.2	0.5	0.23	1.0	0.70	15T	Ø	L274
L275	NO DATA REPORTED FOR SAMPLE G02					39.7	0.9	0.46	1.3	0.89	15T	M	L275
L277	87.6	2.3	0.65	3.7	1.39	39.9	1.1	0.56	1.8	1.22	15T	Ø	L277
L278	89.5	4.1	1.18	3.0	1.11	38.5	-2	-0.09	1.2	0.82	15T	Ø	L278
L279	80.9	-4.4	-1.26	3.2	1.19	36.1	-2.6	-1.28	1.2	0.82	15T	Ø	L279
L280	80.7	-4.6	-1.32	2.8	1.03	35.2	-3.5	-1.73	0.9	0.65	15L	Ø	L280
L281	84.5	-0.9	-0.25	3.6	1.35	40.5	1.7	0.86	1.1	0.77	15T	Ø	L281
L285	82.7	-2.7	-0.76	3.5	1.31	38.4	-0.3	-0.16	1.7	1.19	15T	Ø	L285
L288	89.9	4.6	1.32	4.0	1.51	42.5	3.8	1.87	1.9	1.32	15T	Ø	L288
L290	84.3	-1.1	-0.30	2.3	0.86	39.0	0.3	0.14	1.5	1.04	15T	Ø	L290
L291	81.8	-3.5	-1.01	2.5	0.94	36.6	-2.1	-1.05	1.0	0.68	15A	Ø	L291
L299	89.6	4.3	1.22	2.7	1.00	40.9	2.2	1.09	2.4	1.63	15T	Ø	L299
L303	82.7	-2.7	-0.76	1.6	0.61	36.7	-2.0	-0.98	1.3	0.88	15L	Ø	L303
L305	84.9	-0.5	-0.13	1.9	0.70	38.3	-0.4	-0.19	1.0	0.72	15T	Ø	L305
L309	86.4	1.1	0.31	4.5	1.67	38.0	-0.7	-0.36	1.3	0.90	15T	Ø	L309
L311	79.7	-5.6	-1.60	2.2	0.83	35.1	-3.6	-1.77	1.6	1.07	15T	Ø	L311
L312	82.1	-3.3	-0.93	3.3	1.23	38.9	0.2	0.10	1.7	1.15	15T	Ø	L312
L313	81.3	-4.0	-1.14	3.6	1.34	35.9	-2.9	-1.41	1.6	1.10	15L	Ø	L313
L315	84.3	-1.0	-0.29	2.4	0.88	40.3	1.5	0.76	1.2	0.80	15T	Ø	L315
L321	80.0	-5.3	-1.53	2.5	0.93	40.4	1.7	0.82	4.5	3.13	15T	*	L321
L324	84.0	-1.4	-0.39	1.3	0.49	38.5	-0.2	-0.11	0.9	0.61	15T	Ø	L324
L328	83.3	-2.1	-0.59	2.3	0.84	37.1	-1.6	-0.78	1.6	1.13	15T	Ø	L328
L331	84.1	-1.2	-0.34	3.8	1.41	40.2	1.5	0.73	3.0	2.05	15T	Ø	L331
L334	81.7	-3.6	-1.03	2.2	0.83	36.3	-2.5	-1.21	1.8	1.20	15T	Ø	L334
L336	86.3	1.0	0.29	4.4	1.63	40.1	1.4	0.69	2.0	1.40	15T	Ø	L336
L344	95.7	10.3	2.96	22.1	8.24	40.3	1.6	0.79	1.4	1.00	15C	*	L344
L345	81.1	-4.2	-1.20	2.6	0.96	37.2	-1.5	-0.75	1.9	1.31	15T	Ø	L345
L352	88.3	3.0	0.85	2.4	0.91	41.1	2.4	1.18	1.6	1.08	15C	Ø	L352
L358	93.3	8.0	2.29	2.2	0.82	43.5	4.7	2.33	1.7	1.16	15T	*	L358
L360	85.2	-0.2	-0.05	1.8	0.66	38.5	-0.2	-0.11	0.9	0.65	15T	Ø	L360
L372	85.5	0.2	0.06	2.5	0.93	40.2	1.5	0.73	0.4	0.28	15T	Ø	L372
L376	82.0	-3.3	-0.95	3.4	1.29	36.4	-2.3	-1.14	1.6	1.13	15T	Ø	L376
L382	85.3	-0.1	-0.02	2.5	0.94	39.5	0.8	0.40	1.0	0.68	15T	Ø	L382
L388	77.7	-7.6	-2.18	2.7	1.00	50.8	12.1	5.94	3.1	2.12	15T	X	L388
L390	88.1	2.8	0.80	3.6	1.35	40.7	1.9	0.96	1.0	0.72	15T	Ø	L390
L396M	88.0	2.7	0.76	2.8	1.03	40.6	1.9	0.92	1.5	1.00	15T	Ø	L396M
L442	53.9	8.5	2.44	2.8	1.05	42.1	3.4	1.68	1.6	1.13	15R	Ø	L442
L484	86.1	0.8	0.23	3.1	1.15	39.1	0.3	0.17	1.0	0.71	15T	Ø	L484
L554	85.4	0	0.01	4.4	1.66	40.8	2.1	1.02	1.6	1.11	15C	Ø	L554
L557	85.6	0.2	0.07	3.2	1.18	36.7	-2.1	-1.01	1.4	0.96	15T	Ø	L557
L558	83.1	-2.3	-0.65	3.5	1.32	36.5	-2.2	-1.08	0.9	0.63	15T	Ø	L558
L559	87.4	2.1	0.59	1.8	0.69	37.5	-1.3	-0.62	1.3	0.90	15T	Ø	L559
L562	82.1	-3.2	-0.92	1.6	0.60	36.6	-2.1	-1.05	1.5	1.07	15T	Ø	L562
L565	81.9	-3.5	-0.99	3.7	1.37	39.8	1.1	0.53	1.0	0.70	15T	Ø	L565
L566	76.3	-9.0	-2.58	2.6	0.97	37.9	-0.8	-0.39	1.9	1.29	15T	*	L566
L575	83.9	-1.5	-0.42	2.0	0.75	36.7	-2.0	-0.99	1.1	0.73	15L	Ø	L575
L576	92.9	7.6	2.18	2.2	0.82	39.4	0.7	0.33	1.8	1.27	15T	*	L576
L580	86.7	1.4	0.40	1.3	0.50	39.7	0.9	0.46	1.4	1.00	15T	Ø	L580
L581	83.0	-2.4	-0.68	3.0	1.14	37.9	-0.9	-0.42	1.5	1.02	15Q	Ø	L581
L596	328.5	243.2	69.65	39.1	14.61	153.9	115.1	56.67	16.9	11.61	15T	#	L596
L597	84.7	-0.7	-0.19	2.0	0.73	39.7	1.0	0.50	0.7	0.48	15T	Ø	L597
L599	84.6	-0.7	-0.21	2.8	1.06	37.2	-1.5	-0.75	1.6	1.08	15T	Ø	L599
L600	86.4	1.1	0.31	3.9	1.45	39.8	1.1	0.53	1.6	1.08	15T	Ø	L600
L604	77.3	-8.0	-2.29	2.5	0.92	60.0	21.3	10.47	4.5	3.12	15T	#	L604
L606	82.4	-2.9	-0.84	2.2	0.83	36.7	-2.0	-0.98	1.5	1.06	15T	Ø	L606
L610	86.8	1.5	0.42	2.5	0.94	37.5	-1.3	-0.62	1.3	0.90	15T	Ø	L610
L622	92.9	7.6	2.18	3.8	1.44	51.4	12.7	6.24	3.5	2.38	15T	X	L622
L626	81.3	-4.0	-1.14	2.4	0.91	36.6	-2.1	-1.03	1.2	0.85	15L	Ø	L626

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

LAB CODE	SAMPLE G02 116 GRAMS PRINTING PEE SQUARE METER					SAMPLE G07 74 GRAMS WRITING PER SQUARE METER					TEST D ₀ = 15		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L651	78.9	-6.4	-1.83	1.8	.68	39.4	.7	.33	4.1	2.83	15T	*	L651
L652	86.7	1.4	.40	5.6	2.10	38.8	.1	.04	3.6	2.48	15C	Ø	L652
L654	79.9	-5.4	-1.55	2.4	.90	37.3	-1.5	-.72	1.3	.88	15T	Ø	L654
L670	78.1	-7.3	-2.08	2.8	1.03	36.7	-2.1	-1.01	1.5	1.06	15T	Ø	L670
L676	80.5	-4.8	-1.37	3.5	1.31	35.2	-3.5	-1.73	1.7	1.14	15T	Ø	L676
L679	87.4	2.1	.59	3.0	1.13	39.1	.3	.17	1.2	.84	15T	Ø	L679
L680	86.2	.5	.25	2.4	.89	40.2	1.5	.73	3.1	2.13	15T	Ø	L680
L684	88.7	3.3	.96	3.3	1.22	51.3	12.6	6.21	3.8	2.58	15L	X	L684
L692	86.4	1.1	.31	2.3	.87	35.9	-2.9	-1.41	1.2	.82	15T	Ø	L692
L696	84.3	-1.1	-.30	3.8	1.44	37.3	-1.4	-.68	2.7	1.85	15T	#	L696
L697	84.7	-.6	-.17	2.9	1.09	38.0	-.7	-.34	1.3	.90	15T	Ø	L697
L698	85.3	.0	.00	3.2	1.19	39.5	.7	.37	1.1	.73	15L	Ø	L698

GR. MEAN = 85.3 GRAMS GRAND MEAN = 38.7 GRAMS TEST DETERMINATIONS = 15
SD MEANS = 3.5 GRAMS SD OF MEANS = 2.0 GRAMS 131 LABS IN GRAND MEANS

AVERAGE SDR = 2.7 GRAMS AVERAGE SDR = 1.5 GRAMS

GR. MEAN = 836.8 MILLINEWTON GRAND MEAN = 379.8 MILLINEWTON

L190R	85.7	.4	.12	1.8	.68	36.7	-2.1	-1.01	1.0	.67	15V	*	L190R
L226B	86.7	1.3	.38	1.4	.54	37.7	-1.0	-.49	1.3	.88	15V	*	L226B
L250L	92.7	7.3	2.10	3.6	1.33	41.9	3.2	1.58	1.5	1.00	15H	*	L250L
L251	85.1	-.3	-.08	3.4	1.27	38.3	-.4	-.19	1.4	1.00	15K	*	L251
L366	80.1	-5.2	-1.49	3.0	1.11	36.3	-2.5	-1.21	1.5	1.02	15V	*	L366
L688	91.1	5.7	1.64	4.7	1.74	42.9	4.2	2.07	2.3	1.55	15V	*	L688

TOTAL NUMBER OF LABORATORIES REPORTING = 148

Best values: G02 85 ± 6 grams
G07 38 ± 3 grams

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.

The following laboratories were omitted from the grand means because of extreme test results: 207, 604.

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

Data from the following laboratories were omitted from the grand means because the tests were performed in ambient conditions: 696.

Data from the following laboratories appeared to be off by a multiplicative factor: 190R, 226B, 366, 688. Code 15V was assigned temporarily put in a factor of 2.

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

LAB CODE	F	MEANS		COORDINATES		AVG R ₀ SDR	VAR	PROPERTY---TEST	INSTRUMENT---CONDITIONS
		G02	G07	MAJOR	MINOR				
L275	M		39.7			.89	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L143	X	72.3	32.0	-14.6	-.8	1.37	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L566	*	76.3	37.9	-8.5	3.0	1.13	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L604	#	77.3	60.0	1.4	22.7	2.02	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L388	X	77.7	50.8	-2.0	14.1	1.56	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L182A	Ø	77.7	37.2	-7.6	1.7	1.39	15A	TEARING STRENGTH	STANDARD, APPITA
L670	Ø	78.1	36.7	-7.5	1.1	1.05	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L651	*	78.9	39.4	-5.6	3.2	1.76	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L311	Ø	79.7	35.1	-6.6	-1.0	.95	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L654	Ø	79.9	37.3	-5.5	.9	.89	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L321	*	80.0	40.4	-4.2	3.7	2.03	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L366	*	80.1	36.3	-5.7	-.1	1.07	15V	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100) X2
L170	Ø	80.1	36.5	-5.6	.1	.56	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L122	Ø	80.5	36.0	-5.5	-.5	1.13	15C	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L676	Ø	80.5	35.2	-5.8	-1.3	1.22	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L280	Ø	80.7	35.2	-5.6	-1.3	.84	15L	TEARING STRENGTH	STANDARD, LÖRENTZ-WETTRES
L279	Ø	80.9	36.1	-5.1	-.6	1.01	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L159	Ø	80.9	37.0	-4.7	.2	1.61	15L	TEARING STRENGTH	STANDARD, LÖRENTZ-WETTRES
L345	Ø	81.1	37.2	-4.5	.3	1.13	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L626	Ø	81.3	36.6	-4.5	-.3	.88	15L	TEARING STRENGTH	STANDARD, LÖRENTZ-WETTRES
L313	Ø	81.3	35.9	-4.8	-1.0	1.22	15L	TEARING STRENGTH	STANDARD, LÖRENTZ-WETTRES
L334	Ø	81.7	36.3	-4.3	-.8	1.02	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L291	Ø	81.8	36.6	-4.1	-.5	.81	15A	TEARING STRENGTH	STANDARD, APPITA
L565	Ø	81.9	39.8	-2.7	2.4	1.03	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L163	Ø	81.9	35.9	-4.3	-1.1	.86	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L376	Ø	82.0	36.4	-4.0	-.8	1.21	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L312	Ø	82.1	38.9	-2.9	1.5	1.19	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L230	Ø	82.1	35.8	-4.1	-1.4	1.20	15E	TEARING STRENGTH	STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L562	Ø	82.1	36.6	-3.8	-.6	.83	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L100	Ø	82.2	35.9	-4.0	-1.3	.63	15M	TEARING STRENGTH	STANDARD, T. M. MIRFIELD (APPITA-ELMENDORF)
L157	Ø	82.3	35.4	-4.1	-1.8	.86	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L606	Ø	82.4	36.7	-3.5	-.6	.94	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L224	Ø	82.5	34.9	-4.2	-2.3	.65	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L148	Ø	82.5	37.3	-3.1	-.1	.92	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L303	Ø	82.7	36.7	-3.2	-.7	.75	15L	TEARING STRENGTH	STANDARD, LÖRENTZ-WETTRES
L285	Ø	82.7	38.4	-2.6	.8	1.25	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L105	X	82.9	48.3	1.7	9.7	.86	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L581	Ø	83.0	37.9	-2.5	.2	1.08	15Q	TEARING STRENGTH	STANDARD, THWING-ELMENDORF, AIR CLAMP, DIGITL
L558	Ø	83.1	36.5	-3.0	-1.1	.97	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L328	Ø	83.3	37.1	-2.5	-.6	.99	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L259	Ø	83.6	36.0	-2.7	-1.8	1.22	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L257C	Ø	83.6	40.1	-1.0	2.0	1.15	15C	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L257B	Ø	83.9	39.9	-.9	1.6	1.01	15C	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L575	Ø	83.9	36.7	-2.1	-1.2	.74	15L	TEARING STRENGTH	STANDARD, LÖRENTZ-WETTRES
L324	Ø	84.0	38.5	-1.3	.4	.55	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L115	Ø	84.0	37.5	-1.7	-.6	1.23	15C	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (W. AIR CLAMP)
L212	Ø	84.1	38.7	-1.2	.5	1.67	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L331	Ø	84.1	40.2	-.5	1.8	1.73	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L211	Ø	84.1	39.1	-1.0	.8	.98	15R	TEARING STRENGTH	STANDARD, THWING-ELMENDORF, DIGITAL READOUT
L656	#	84.3	37.3	-1.5	-.8	1.64	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L103	Ø	84.3	37.3	-1.5	-.8	.67	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L290	Ø	84.3	39.0	-.9	.7	.95	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L315	Ø	84.3	40.3	-.3	1.8	.84	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L166	Ø	84.4	39.1	-.7	.8	.91	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L226C	Ø	84.4	39.1	-.7	.7	1.09	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L281	Ø	84.5	40.5	-.1	1.9	1.06	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L237A	Ø	84.5	39.0	-.7	.6	.75	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L599	Ø	84.6	37.2	-1.3	-1.1	1.07	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L248	Ø	84.6	38.1	-.9	-.3	1.03	15J	TEARING STRENGTH	STANDARD, LÖRENTZ-WETTRES
L597	Ø	84.7	39.7	-.2	1.2	.61	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L128	Ø	84.7	38.5	-.7	.1	.55	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L213	Ø	84.7	36.7	-1.4	-1.6	.70	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L697	Ø	84.7	38.0	-.8	-.4	.99	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L232	Ø	84.8	37.6	-.9	-.8	.95	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)
L264	Ø	84.8	41.1	.5	2.4	1.21	15T	TEARING STRENGTH	STANDARD, THWING-ELMENDORF (SCALE T0 100)

TAPPI STANDARD I414 TS-65, ANY MAKE ELMENDORF WITH DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

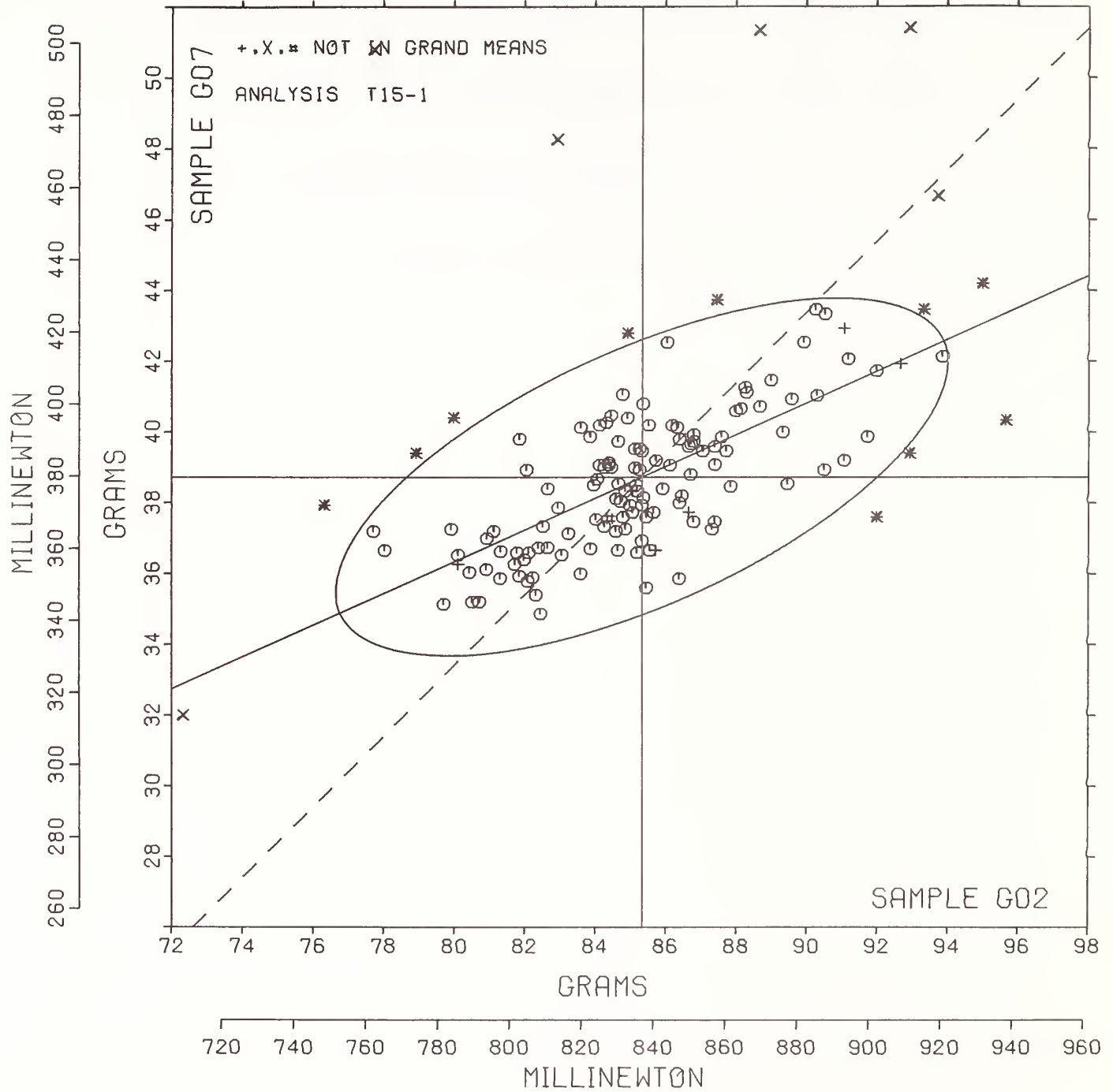
LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST	INSTRUMENT---	CONDITIONS
		G02	G07	MAJOR	MINOR	R _s	VAR			
L305	Ø	84.9	38.3	-.6	-.2	.71	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L118	Ø	84.9	37.3	-1.0	-1.1	.60	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L219	Ø	84.9	40.4	.3	1.7	1.20	15L	TEARING STRENGTH,	STANDARD,	LØRENTZ-WETTRES
L257A	Ø	84.9	40.4	.3	1.7	.89	15C	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (W ₀ AIR CLAMP)
L262	*	84.9	42.8	1.3	3.9	.86	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L121	Ø	85.0	37.9	-.6	-.6	1.25	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L251	*	85.1	38.3	-.4	-.2	1.13	15K	TEARING STRENGTH,	STANDARD,	LØRENTZ-WETTRES, 20 C, 65% RH
L228	Ø	85.1	37.7	-.6	-.8	.65	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L206	Ø	85.1	39.0	-.1	.3	1.14	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L249	Ø	85.1	39.5	.2	.8	.95	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L360	Ø	85.2	38.5	-.2	-.1	.66	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L236	Ø	85.2	36.6	-1.0	-1.9	1.22	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L255	Ø	85.2	38.3	-.3	-.3	.36	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L185	Ø	85.3	38.9	.0	.2	.97	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L382	Ø	85.3	39.5	.3	.8	.81	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L658	Ø	85.3	39.5	.3	.7	.96	15L	TEARING STRENGTH,	STANDARD,	LØRENTZ-WETTRES
L261	Ø	85.3	37.9	-.3	-.7	1.08	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L162	Ø	85.3	36.9	-.7	-1.6	.92	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L554	Ø	85.4	40.8	.9	1.9	1.38	15C	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (W ₀ AIR CLAMP)
L242	Ø	85.4	38.1	-.2	-.5	.84	15U	TEARING STRENGTH,	STANDARD,	AUSTRALIAN ØPT. CØ.
L189	Ø	85.5	35.6	-1.2	-2.9	.73	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L167	Ø	85.5	37.6	-.3	-1.1	.58	15C	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (W ₀ AIR CLAMP)
L372	Ø	85.5	40.2	.8	1.3	.61	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L557	Ø	85.6	36.7	-.6	-2.0	1.07	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L173B	Ø	85.7	37.7	-.1	-1.0	.95	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L190R	*	85.7	36.7	-.5	-2.0	.68	15V	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100) X2
L274	Ø	85.7	39.2	.6	.3	.63	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L126	Ø	85.9	38.4	.4	-.5	1.00	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L241	Ø	86.1	42.5	2.2	3.2	.54	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L484	Ø	86.1	39.1	.9	-.0	.93	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L680	Ø	86.2	40.2	1.4	1.0	1.51	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L336	Ø	86.3	40.1	1.5	.9	1.51	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L692	Ø	86.4	35.9	-.2	-3.0	.84	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L600	Ø	86.4	39.8	1.4	.5	1.27	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L309	Ø	86.4	38.0	.7	-1.1	1.29	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L124	Ø	86.5	38.2	.8	-.9	1.11	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L226B	*	86.7	37.7	.8	-1.5	.71	15V	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100) X2
L107	Ø	86.7	39.6	1.6	.3	1.37	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L652	Ø	86.7	38.8	1.3	-.5	2.29	15C	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (W ₀ AIR CLAMP)
L580	Ø	86.7	39.7	1.7	.3	.75	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L610	Ø	86.8	37.5	.8	-1.7	.92	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L244	Ø	86.8	39.9	1.8	.5	.79	15C	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (W ₀ AIR CLAMP)
L237B	Ø	86.8	39.7	1.8	.3	.69	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L254	Ø	87.1	39.5	1.9	-.0	1.02	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L139	Ø	87.3	37.3	1.2	-2.2	.83	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L679	Ø	87.4	39.1	2.0	-.5	.98	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L153	Ø	87.4	39.6	2.2	-.0	.83	15C	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (W ₀ AIR CLAMP)
L559	Ø	87.4	37.5	1.4	-2.0	.79	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L158	*	87.5	43.7	4.0	3.7	1.86	15R	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF, DIGITAL READOUT
L277	Ø	87.6	39.9	2.5	.1	1.30	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L176	Ø	87.7	39.5	2.5	-.3	.95	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L238A	Ø	87.9	38.5	2.2	-1.3	.94	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L396M	Ø	88.0	40.6	3.2	.6	1.01	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L390	Ø	88.1	40.7	3.4	.6	1.04	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L225	Ø	88.3	41.3	3.7	1.1	.92	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L352	Ø	88.3	41.1	3.7	1.0	.99	15C	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (W ₀ AIR CLAMP)
L684	X	88.7	51.3	8.2	10.1	1.90	15L	TEARING STRENGTH,	STANDARD,	LØRENTZ-WETTRES
L223	Ø	88.7	40.7	3.9	.4	.67	15R	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF, DIGITAL READOUT
L183	Ø	89.0	41.5	4.5	1.0	.59	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L190C	Ø	89.3	40.0	4.2	-.5	.89	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L278	Ø	89.5	38.5	3.7	-1.9	.96	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L299	Ø	89.6	40.9	4.8	.3	1.31	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L288	Ø	89.9	42.5	5.8	1.6	1.42	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L273	Ø	90.3	43.5	6.4	2.3	.87	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L194	Ø	90.3	41.0	5.5	.1	.86	15T	TEARING STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST	INSTRUMENT---	CONDITIONS
		G02	G07	MAJOR	MINOR	R, SDR	VAR				
L217	Ø	90.5	38.9	4.8	-1.9	.82	15Q	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF, AIR CLAMP, DIGITL
L134	Ø	90.5	43.3	6.6	2.1	.65	15C	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (W. AIR CLAMP)
L207	#	90.7	55.2	11.7	12.9	1.45	15R	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF, DIGITAL READOUT
L688	*	91.1	42.9	7.0	1.5	1.64	15V	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100) X2
L182T	Ø	91.1	39.2	5.4	-1.9	1.13	15T	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L233	Ø	91.2	42.1	6.7	.6	1.61	15T	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L195	Ø	91.7	39.9	6.3	-1.6	1.85	15C	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (W. AIR CLAMP)
L131	Ø	92.0	41.7	7.3	.0	1.97	15A	TEARING	STRENGTH,	STANDARD,	APPITA
L191	*	92.0	37.6	5.6	-3.8	1.23	15T	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L250L	*	92.7	41.9	8.0	-.1	1.17	15H	TEARING	STRENGTH,	STANDARD,	LHOMARGY, 20 C, 65% RH
L622	X	92.9	51.4	12.1	8.5	1.91	15T	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L576	*	92.9	39.4	7.2	-2.5	1.04	15T	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L358	*	93.3	43.5	9.2	1.1	.99	15T	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L150	X	93.7	46.7	10.9	3.8	.96	15T	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
L442	Ø	93.9	42.1	9.2	-.4	1.09	15R	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF, DIGITAL READOUT
L151	*	95.0	44.2	11.1	1.0	1.04	15C	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (W. AIR CLAMP)
L344	*	95.7	40.3	10.1	-2.8	4.62	15C	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (W. AIR CLAMP)
L596	#	328.5	153.9	269.0	5.5	13.11	15T	TEARING	STRENGTH,	STANDARD,	THWING-ELMENDORF (SCALE TØ 100)
GMEANS:		85.3	38.7			1.00					
		95% ELLIPSE:		9.4	3.6	WITH GAMMA = 24 DEGREES					

TEARING STRENGTH, DEEP CUTOUT

SAMPLE G02 = 85.3 GRAMS SAMPLE G07 = 38.7 GRAMS
 SAMPLE G02 = 837 MILLINEWTON SAMPLE G07 = 380 MILLINEWTON



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

LAB CODE	SAMPLE K20		KRAFT PER SQUARE METER			SAMPLE K36		PRINTING PER SQUARE METER			TEST D ₀ = 15		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L106	152.5	4.1	.71	4.4	.68	121.5	.9	.15	3.7	.80	17N	Ø	L106
L122	146.4	-1.9	-.33	6.5	1.01	124.4	3.8	.66	8.4	1.82	17N	Ø	L122
L148	143.7	-4.6	-.79	4.4	.68	116.3	-4.3	-.75	3.8	.81	17N	Ø	L148
L231	145.7	-2.6	-.45	6.1	.95	117.7	-2.9	-.50	2.9	.63	17N	Ø	L231
L267	156.5	8.2	1.40	9.1	1.42	126.0	5.4	.94	6.8	1.47	17N	Ø	L267
L269	145.6	-2.7	-.47	10.7	1.67	125.1	4.5	.79	5.5	1.18	17N	Ø	L269
L308	155.9	7.5	1.29	7.9	1.23	128.1	7.5	1.31	5.8	1.24	17N	Ø	L308
L326	144.0	-4.3	-.74	9.1	1.41	117.8	-2.8	-.48	3.8	.81	17N	Ø	L326
L339	154.9	6.6	1.13	5.3	.83	124.9	4.3	.75	4.7	1.00	17N	Ø	L339
L341	148.0	-.3	-.06	3.0	.47	115.6	-5.0	-.87	2.7	.59	17N	Ø	L341
L393	138.4	-9.9	-1.70	4.2	.66	109.1	-11.5	-2.00	3.0	.65	17N	Ø	L393
GR. MEAN = 148.3 GRAMS			GRAND MEAN = 120.6 GRAMS			TEST DETERMINATIONS = 15							
SD MEANS = 5.8 GRAMS			SD OF MEANS = 5.8 GRAMS			11 LABS IN GRAND MEANS							
AVERAGE SDR = 6.4 GRAMS			AVERAGE SDR = 4.6 GRAMS										
GR. MEAN = 1454.7 MILLINEWTON			GRAND MEAN = 1182.6 MILLINEWTON										
L234	140.0	-8.3	-1.43	6.2	.97	122.5	1.9	.34	3.2	.70	17V	*	L234
TOTAL NUMBER OF LABORATORIES REPORTING = 12													

Best values: K20 147 grams
K36 121 grams

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

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

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS	
		K20	K36	MAJOR	MINOR	R ₀ SDR	VAR				
L393	Ø	138.4	109.1	-15.2	-1.2	.65	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
L234	*	140.0	122.5	-4.6	7.2	.83	17V	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF (MULT BY 2)	
L148	Ø	143.7	116.3	-6.3	.1	.75	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
L326	Ø	144.0	117.8	-5.0	1.1	1.11	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
L269	Ø	145.6	125.1	1.2	5.2	1.42	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
L231	Ø	145.7	117.7	-3.9	-.2	.79	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
L122	Ø	146.4	124.4	1.3	4.1	1.41	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
L341	Ø	148.0	115.6	-3.7	-3.3	.53	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
L106	Ø	152.5	121.5	3.6	-2.3	.74	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
L339	Ø	154.9	124.9	7.7	-1.5	.91	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
L308	Ø	155.9	128.1	10.7	.1	1.24	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
L267	Ø	156.5	126.0	9.6	-1.9	1.44	17N	TEARING STRENGTH,	NO CUT OUT,	THWING-ELMENDORF	
GMEANS:		148.3	120.6			1.00					
		95% ELLIPSE:	24.0	8.0	WITH GAMMA = 44 DEGREES						

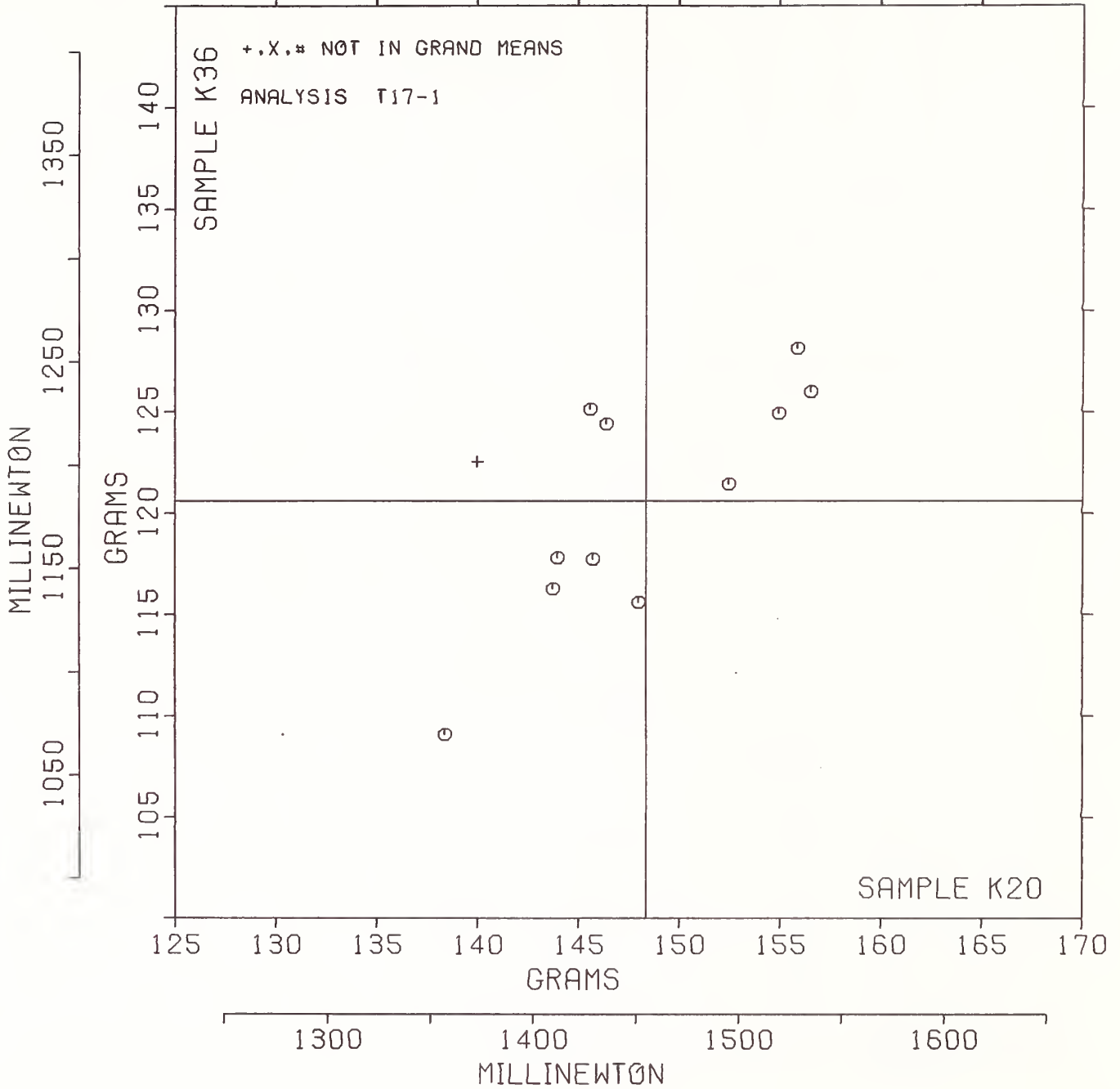
TEARING STRENGTH, NO CUTOUT

SAMPLE K20 = 148. GRAMS

SAMPLE K36 = 121. GRAMS

SAMPLE K20 = 1455 MILLINEWTON

SAMPLE K36 = 1183 MILLINEWTON



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

LAB CODE	SAMPLE K32 105 GRAMS PER SQUARE METER					SAMPLE K34 123 GRAMS PER SQUARE METER					TEST D ₀ = 20			
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB	
L100	8.80	.16	.39	.25	.53	9.81	.41	.99	.27	.46	19E	Ø	L100	
L106	8.76	.11	.29	.56	1.17	9.39	-.02	-.05	.37	.64	19A	Ø	L106	
L107	7.83	-.81	-2.04	.48	1.01	8.57	-.84	-2.04	.47	.81	19A	Ø	L107	
L122	8.39	-.25	-.64	.41	.86	9.29	-.11	-.27	.57	.97	19A	Ø	L122	
L126	8.94	.29	.73	.27	.58	9.11	-.29	-.71	.47	.80	19A	Ø	L126	
L151	8.22	-.43	-1.07	.44	.92	8.86	-.55	-1.34	.44	.75	19A	Ø	L151	
L153	8.70	.05	.12	.41	.87	9.72	.31	.76	.65	1.10	19P	Ø	L153	
L157A	8.35	-.30	-.74	.56	1.18	9.95	.55	1.33	.61	1.04	19P	Ø	L157A	
L157I	8.01	-.64	-1.60	.62	1.31	9.63	.23	.55	.76	1.29	19A	Ø	L157I	
L167	9.75	1.10	2.77	.55	1.16	10.55	1.15	2.78	.57	.97	19G	*	L167	
L182I	8.55	-.10	-.24	.43	.91	9.46	.06	.14	.52	.89	19D	Ø	L182I	
L182L	8.75	.11	.27	.40	.85	9.24	-.17	-.41	.54	.92	19T	Ø	L182L	
L207	8.51	-.14	-.34	.28	.59	9.33	-.08	-.19	.53	.91	19A	Ø	L207	
L217P	8.91	.26	.65	.37	.78	9.73	.33	.79	.63	1.08	19P	Ø	L217P	
L219	8.91	.26	.66	.42	.88	9.40	-.01	-.01	.69	1.17	19E	Ø	L219	
L224	8.73	.08	.20	.44	.92	9.58	.17	.42	.68	1.16	19A	Ø	L224	
L225	8.65	.01	.02	.41	.85	9.58	.18	.43	.54	.92	19P	Ø	L225	
L234L	8.44	-.21	-.52	.29	.60	8.86	-.54	-1.32	.59	1.01	19P	Ø	L234L	
L237A	8.85	.21	.52	.41	.85	9.48	.07	.17	.44	.75	19Q	Ø	L237A	
L237B	9.23	.59	1.47	.49	1.03	9.53	.12	.29	.50	.85	19A	Ø	L237B	
L238A	8.81	.16	.41	.62	1.29	9.50	.09	.22	.62	1.06	19T	Ø	L238A	
L257A	8.98	.34	.84	.41	.87	9.48	.07	.18	.61	1.04	19P	Ø	L257A	
L257C	8.94	.29	.74	.47	.99	9.55	.14	.34	.40	.69	19P	Ø	L257C	
L264A	9.01	.36	.90	.44	.93	9.28	-.13	-.31	.60	1.03	19A	Ø	L264A	
L264P	8.98	.33	.83	.32	.68	9.71	.31	.75	.70	1.19	19P	Ø	L264P	
L265	7.99	-.65	-1.64	.38	.79	9.11	-.30	-.73	.42	.71	19A	Ø	L265	
L267	8.76	.11	.29	.44	.93	9.33	-.08	-.19	.64	1.09	19A	Ø	L267	
L273	8.43	-.22	-.54	.38	.81	8.60	-.81	-1.96	.56	.95	19P	Ø	L273	
L274	8.65	.01	.02	.26	.54	9.17	-.24	-.58	.16	.28	19P	Ø	L274	
L280	8.10	-.54	-1.37	.56	1.18	9.08	-.33	-.80	.52	.88	19G	Ø	L280	
L281	8.67	.02	.06	.38	.81	9.07	-.34	-.81	.43	.74	19G	Ø	L281	
L305	8.71	.06	.15	.22	.46	10.08	.67	1.63	.45	.76	19V	Ø	L305	
L312	8.69	.04	.10	.49	1.02	9.49	.08	.20	.64	1.09	19D	Ø	L312	
L318	8.66	.02	.04	.46	.98	9.22	-.19	-.46	.34	.58	19G	Ø	L318	
L324	8.78	.14	.34	.50	1.06	9.52	.11	.28	.58	.99	19A	Ø	L324	
L334	8.51	-.14	-.35	.46	.97	9.88	.47	1.14	.48	.81	19P	Ø	L334	
L336	8.31	-.34	-.85	.52	1.10	9.38	-.02	-.05	.53	.91	19G	Ø	L336	
L356	8.91	.26	.66	.67	1.41	9.48	.07	.17	.92	1.57	19P	Ø	L356	
L366	8.58	-.06	-.16	.66	1.40	9.72	.31	.75	.62	1.06	19P	Ø	L366	
L562	8.26	-.39	-.98	.97	2.04	9.67	.27	.65	1.40	2.39	19P	Ø	L562	
L565	8.40	-.24	-.61	.74	1.56	9.29	-.12	-.28	.35	.59	19T	Ø	L565	
L568	7.55	-1.10	-2.77	.33	.70	8.88	-.53	-1.28	.53	.90	19P	*	L568	
L575	8.76	.11	.27	.54	1.13	9.36	-.05	-.12	.62	1.06	19G	Ø	L575	
L576	8.84	.19	.48	.44	.92	9.33	-.08	-.19	.59	1.01	19A	Ø	L576	
L580	8.47	-.18	-.45	.47	1.00	8.44	-.97	-2.34	.61	1.04	19G	*	L580	
L581	8.98	.34	.84	.47	.99	9.93	.52	1.26	.60	1.03	19A	Ø	L581	
L582	8.05	-.59	-1.49	.61	1.29	9.11	-.30	-.72	.53	.91	19A	Ø	L582	
L604	8.17	-.47	-1.19	.58	1.22	8.88	-.53	-1.28	1.12	1.91	19A	Ø	L604	
L606	8.79	.15	.37	.39	.83	9.57	.17	.40	.52	.89	19P	Ø	L606	
L610	8.23	-.42	-1.05	.31	.65	9.15	-.26	-.62	.50	.86	19A	Ø	L610	
L622	9.47	.82	2.07	.56	1.17	10.30	.89	2.16	.62	1.06	19Ø	Ø	L622	
L650	9.21	.57	1.43	.57	1.19	9.63	.22	.54	.73	1.24	19G	Ø	L650	
L652	10.10	1.46	3.66	.63	1.31	9.37	-.04	-.09	.70	1.19	19A	X	L652	
L676	9.15	.50	1.26	.63	1.33	10.06	.65	1.58	.93	1.59	19A	Ø	L676	
L684	8.91	.26	.66	.89	1.86	8.91	-.50	-1.21	.97	1.66	19*	Ø	L684	
L689	8.57	-.08	-.19	.42	.89	9.16	-.25	-.60	.51	.87	19A	Ø	L689	
GR. MEAN =	8.65	KILONEWTON/M				GRAND MEAN =	9.41	KILONEWTON/M				TEST DETERMINATIONS = 20		
SD MEANS =	.40	KILONEWTON/M				SD OF MEANS =	.41	KILONEWTON/M				55 LABS IN GRAND MEANS		
		AVERAGE SDR = .48						AVERAGE SDR = .59				KILONEWTON/M		
GR. MEAN =	49.39	LB/INCH				GRAND MEAN =	53.72	LB/INCH						
L250I	8.15	-.49	-1.24	.18	.37	8.24	-1.16	-2.82	.30	.52	19L	*	L250I	
L251	7.06	-.59	-2.48	.55	1.16	8.51	-.90	-2.18	.47	.81	19I	*	L251	

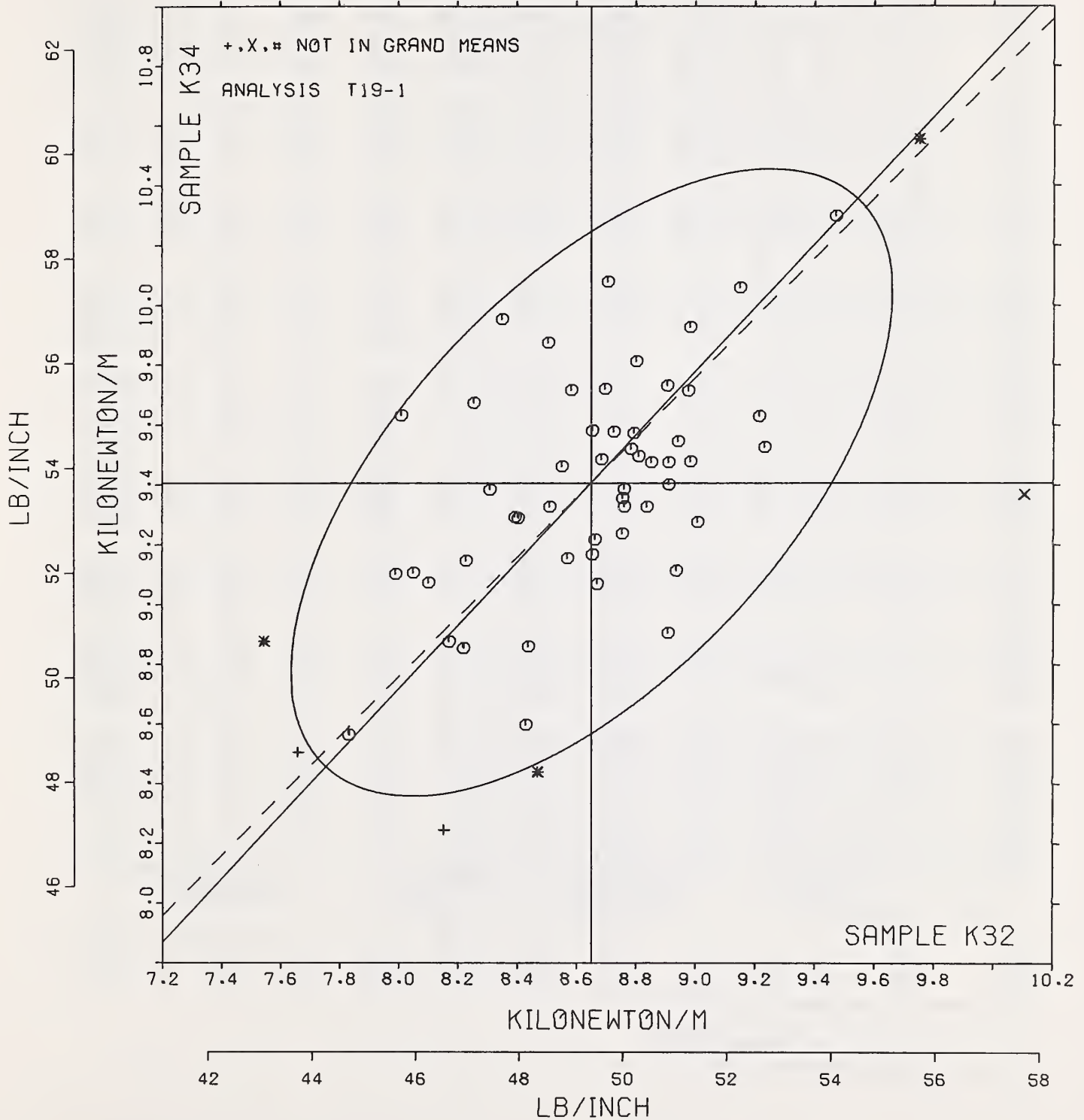
TOTAL NUMBER OF LABORATORIES REPORTING = 58
Best values: K32 8.7 ± 0.7 kilonewton per meter
K34 9.4 ± 0.7 kilonewton per meter

TENSILE BREAKING STRENGTH, KILOWEIGHTS PER METER - PACKAGING PAPER
TAPPI STANDARDS T404 6S-76 AND T494 6S-70, TENSILE BREAKING STRENGTH, PENDULUM AND CRE TYPES

LAB CODE	F	MEANS		COORDINATES		AVG R.SDR	VAR	PROPERTY---	TEST	INSTRUMENT---	CONDITIONS
		K32	K34	MAJOR	MINOR						
L568	*	7.55	8.88	-1.14	.44	.80	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L251	*	7.66	8.51	-1.33	.10	.98	19I	TENSILE	STRENGTH,	PACKAGING PAPER,	CRE, 20C, 65% RH
L107	Ø	7.83	8.57	-1.17	.02	.91	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L265	Ø	7.99	9.11	-.67	.27	.75	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L157I	Ø	8.01	9.63	-.27	.62	1.30	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L582	Ø	8.05	9.11	-.62	.23	1.10	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L280	Ø	8.10	9.08	-.61	.17	1.03	19G	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L250I	*	8.15	8.24	-1.19	-.44	.44	19L	TENSILE	STRENGTH,	PACKAGING PAPER,	CRE, 20 C, 65% RH
L604	Ø	8.17	8.88	-.71	-.02	1.56	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L151	Ø	8.22	8.86	-.69	-.07	.84	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L610	Ø	8.23	9.15	-.47	.13	.76	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L562	Ø	8.26	9.67	-.07	.47	2.21	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L336	Ø	8.31	9.38	-.25	.23	1.00	19G	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L157A	Ø	8.35	9.95	.20	.59	1.11	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L122	Ø	8.39	9.29	-.26	.11	.92	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L565	Ø	8.40	9.29	-.25	.10	1.08	19T	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L273	Ø	8.43	8.60	-.74	-.40	.88	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L234L	Ø	8.44	8.86	-.54	-.22	.81	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L580	*	8.47	8.44	-.83	-.53	1.02	19G	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L334	Ø	8.51	9.88	.25	.42	.89	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L207	Ø	8.51	9.33	-.15	.05	.75	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L182I	Ø	8.55	9.46	-.02	.11	.90	19D	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L689	Ø	8.57	9.16	-.23	-.12	.88	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L366	Ø	8.58	9.72	.18	.26	1.23	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L274	Ø	8.65	9.17	-.17	-.17	.41	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L225	Ø	8.65	9.58	.13	.12	.89	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L318	Ø	8.66	9.22	-.13	-.14	.78	19G	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L281	Ø	8.67	9.07	-.23	-.25	.77	19G	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L312	Ø	8.69	9.49	.09	.03	1.06	19D	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L153	Ø	8.70	9.72	.26	.18	.98	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L305	Ø	8.71	10.08	.53	.42	.61	19V	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L224	Ø	8.73	9.58	.18	.06	1.04	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L182L	Ø	8.75	9.24	-.05	-.19	.88	19T	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L575	Ø	8.76	9.36	.04	-.11	1.09	19G	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L106	Ø	8.76	9.39	.06	-.10	.90	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L267	Ø	8.76	9.33	.02	-.14	1.01	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L324	Ø	8.78	9.52	.18	-.02	1.02	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L606	Ø	8.79	9.57	.22	.01	.86	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L100	Ø	8.80	9.81	.40	.17	.50	19E	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L238A	Ø	8.81	9.50	.18	-.06	1.18	19T	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L576	Ø	8.84	9.33	.07	-.19	.97	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L237A	Ø	8.85	9.48	.19	-.10	.80	19Q	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L217P	Ø	8.91	9.73	.41	.03	.93	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L684	Ø	8.91	8.91	-.18	-.53	1.76	19*	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L356	Ø	8.91	9.48	.23	-.14	1.49	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L219	Ø	8.91	9.40	.18	-.20	1.03	19E	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L126	Ø	8.94	9.11	-.01	-.41	.69	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L257C	Ø	8.94	9.55	.30	-.12	.84	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L264P	Ø	8.98	9.71	.45	-.03	.94	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L581	Ø	8.98	9.93	.61	.11	1.01	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L257A	Ø	8.98	9.48	.28	-.19	.95	19P	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L264A	Ø	9.01	9.28	.15	-.35	.98	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L676	Ø	9.15	10.06	.82	.08	1.46	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L650	Ø	9.21	9.63	.55	-.26	1.21	19G	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L237B	Ø	9.23	9.53	.49	-.34	.94	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L622	Ø	9.47	10.30	1.21	.01	1.11	19Ø	TENSILE	STRENGTH,	PACKAGING PAPER,	PENDULUM TESTER
L167	*	9.75	10.55	1.59	-.02	1.07	19G	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
L652	X	10.10	9.37	.57	-1.09	1.25	19A	TENSILE	STRENGTH,	PACKAGING PAPER,	LOAD CELL (CRE)
GMEANS:		8.65	9.41			1.00					
		5% ELLIPSE:		1.30	.65			WITH GAMMA = 46 DEGREES			

TENSILE STRENGTH, PACKAGING PAPERS

SAMPLE K32 = 8.6 KILONEWTON/M SAMPLE K34 = 9.4 KILONEWTON/M
 SAMPLE K32 = 49.4 LB/INCH SAMPLE K34 = 53.7 LB/INCH



TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

TAPPI STANDARD T494 0S-70, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	SAMPLE G04 BEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER					SAMPLE G07 WRITING 74 GRAMS PER SQUARE METER					TEST D ₀ = 20		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L100	3.08	-.05	-.46	.13	.94	3.50	.18	1.14	.13	.84	20E	0	L100
L105	3.27	.14	1.29	.13	.88	3.34	.02	1.10	.10	.64	20A	0	L105
L115	3.00	-.13	-1.20	.13	.95	3.27	-.05	-.32	.14	.94	20D	0	L115
L118	3.14	.01	.09	.15	1.03	3.32	-.00	-.01	.15	1.01	20A	0	L118
L122	3.12	-.01	-.08	.13	.95	3.28	-.04	-.24	.08	.57	20A	0	L122
L124C	3.07	-.06	-.57	.15	1.05	2.91	-.41	-2.60	.17	1.11	20A	*	L124C
L125	3.25	.12	1.08	.21	1.50	3.46	.14	.87	.15	.99	20C	0	L125
L131	3.23	.10	.93	.13	.94	3.26	-.06	-.38	.25	1.65	20E	0	L131
L143	1.98	-1.15	-10.43	.09	.65	2.11	-1.21	-7.64	.08	.52	20E	#	L143
L148	3.21	.08	.72	.19	1.33	3.24	-.09	-.54	.28	1.85	20A	0	L148
L159	3.11	-.02	-.23	.12	.85	3.46	.14	.88	.11	.73	20A	0	L159
L163	3.02	-.11	-.98	.14	.95	3.52	.20	1.26	.12	.84	20D	0	L163
L167	3.51	.38	3.44	.10	.68	3.84	.52	3.29	.11	.74	20G	X	L167
L176	2.89	-.24	-2.16	.30	2.10	2.86	-.47	-2.93	.45	3.05	20G	*	L176
L185	3.22	.09	.84	.12	.87	3.56	.24	1.51	.13	.89	20C	0	L185
L190R	2.99	-.14	-1.31	.14	1.02	3.17	-.16	-.98	.18	1.23	20A	0	L190R
L194	3.01	-.12	-1.09	.13	.90	3.36	.04	.24	.11	.75	20A	0	L194
L223B	3.12	-.01	-.12	.16	1.14	3.28	-.04	-.27	.13	.88	20A	0	L223B
L226C	1.40	-1.73	-15.69	.10	.69	1.71	-1.62	-10.19	.09	.61	20C	#	L226C
L230	3.06	-.07	-.63	.09	.62	3.18	-.14	-.91	.10	.66	20E	0	L230
L260	3.02	-.11	-.98	.12	.85	3.14	-.18	-1.13	.09	.59	20A	0	L260
L261	3.16	.03	.27	.13	.91	3.35	.03	.17	.09	.58	20A	0	L261
L278	3.24	.11	.99	.16	1.13	3.34	.02	.14	.19	1.29	20A	0	L278
L291	2.97	-.16	-1.42	.18	1.27	3.33	.01	.06	.26	1.76	20A	0	L291
L309	3.19	.06	.53	.17	1.20	3.16	-.16	-1.02	.16	1.08	20E	0	L309
L315	3.04	-.09	-.82	.13	.93	3.19	-.13	-.83	.14	.94	20A	0	L315
L318	3.11	-.02	-.22	.09	.64	3.35	.03	.16	.12	.83	20G	0	L318
L325	3.19	.06	.51	.15	1.09	3.28	-.04	-.26	.17	1.14	20E	0	L325
L328	3.17	.04	.35	.12	.81	3.51	.19	1.17	.14	.92	20A	0	L328
L331	3.22	.09	.81	.17	1.20	3.41	.09	.54	.17	.94	20A	0	L331
L333	3.27	.14	1.30	.13	.89	3.49	.17	1.04	.11	.74	20A	0	L333
L344	3.03	-.10	-.88	.17	1.17	3.33	.01	.05	.19	1.27	20A	0	L344
L352	3.00	-.13	-1.18	.15	1.08	3.29	-.03	-.20	.16	1.06	20A	0	L352
L356	3.19	.06	.58	.07	.49	3.31	-.01	-.05	.14	.93	20A	0	L356
L360	3.19	.05	.49	.16	1.13	3.46	.14	.88	.16	1.06	20B	0	L360
L390	3.23	.10	.87	.13	.93	3.40	.08	.51	.15	1.04	20A	0	L390
L442	3.11	-.02	-.23	.11	.80	3.31	-.02	-.10	.08	.52	20G	0	L442
L557	2.97	-.16	-1.42	.15	1.07	3.25	-.07	-.44	.17	1.15	20A	0	L557
L558	3.13	-.00	-.01	.12	.82	3.32	-.00	-.03	.12	.81	20A	0	L558
L559	3.20	.07	.62	.09	.61	3.62	.30	1.86	.08	.53	20A	0	L559
I563A	2.97	-.16	-1.48	.24	1.69	3.22	-.10	-.65	.25	1.69	20A	0	I563A
L563B	3.41	.28	2.54	.16	1.15	3.59	.27	1.67	.20	1.32	20A	0	L563B
L575	3.27	.14	1.29	.11	.74	3.33	.01	.05	.12	.82	20G	0	L575
L592	3.22	.05	.83	.15	1.02	3.31	-.01	-.09	.14	.91	20A	0	L592
L616	1.06	-2.07	-18.81	.04	.29	1.16	-2.17	-13.65	.08	.51	20D	#	L616
L692	3.07	-.06	-.53	.16	1.15	3.09	-.23	-1.48	.21	1.38	20A	0	L692
L698	3.25	.12	1.06	.20	1.37	3.51	.18	1.16	.18	1.21	20E	0	L698

GR₀ MEAN = 3.13 KILONEWTON/M GRAND MEAN = 3.32 KILONEWTON/M TEST DETERMINATIONS = 20
SD MEANS = .11 KILONEWTON/M SD OF MEANS = .16 KILONEWTON/M 43 LABS IN GRAND MEANS
AVERAGE SDR = .14 KILONEWTON/M AVERAGE SDR = .15 KILONEWTON/M
GR₀ MEAN = 10.559 LB/15 MM GRAND MEAN = 11.206 LB/15 MM

L139	3.23	.10	.92	.11	.78	3.44	.12	.73	.13	.84	20H	*	L139
L211	9.37	6.24	56.65	.48	3.40	10.15	6.83	43.05	.54	3.63	20I	*	L211
L250I	2.58	-.55	-5.00	.08	.55	2.66	-.66	-4.16	.12	.80	20L	*	L250I
L251	2.69	-.44	-4.03	.22	1.54	2.72	-.60	-3.77	.24	1.58	20I	*	L251

TOTAL NUMBER OF LABORATORIES REPORTING = 51

Best values: G04 3.1 ± 0.2 kilonewton per meter
G07 3.3 ± 0.3 kilonewton per meter

Data from the following laboratories appear to be off by a multiplicative factor: 143, 226C, 616.

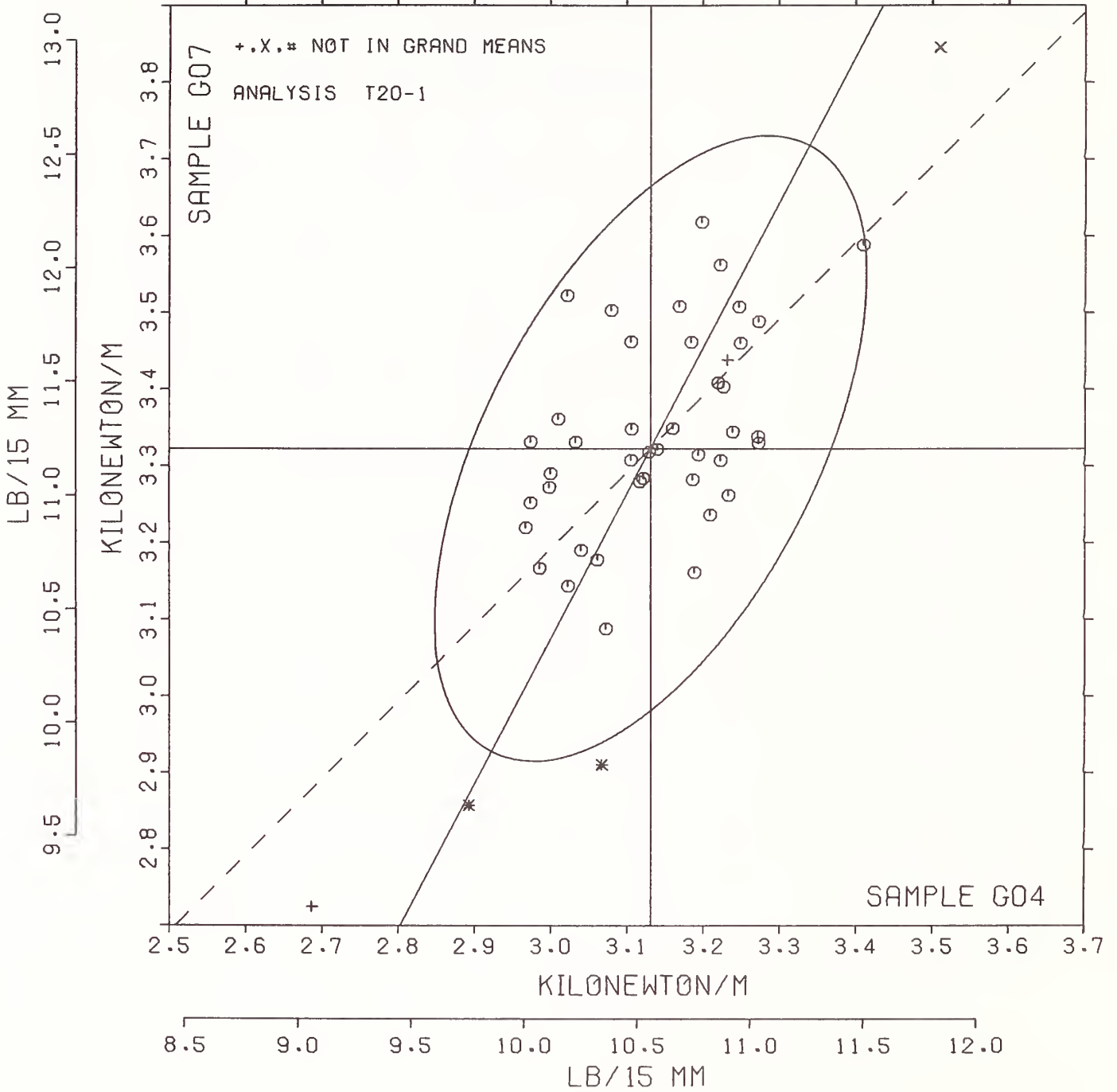
TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

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
		G04	G07	MAJOR	MINOR	R ₀ SDR	VAR				
L616	#	1.06	1.16	-2.88	.82	.40	20D	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L226C	#	1.40	1.71	-2.23	.77	.65	20C	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L143	#	1.98	2.11	-1.61	.45	.59	20E	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L250I	*	2.58	2.66	-.84	.18	.68	20L	TENSILE	STRENGTH,	PRINTING PAPER, CRE, 20 C,	65% RH
L251	*	2.69	2.72	-.74	.11	1.56	20I	TENSILE	STRENGTH,	PRINTING PAPER, CRE, 20 C,	65% RH
L176	*	2.89	2.86	-.52	-.01	2.57	20G	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L563A	0	2.97	3.22	-.17	.10	1.69	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L557	0	2.97	3.25	-.14	.11	1.11	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L291	0	2.97	3.33	-.07	.14	1.51	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L190R	0	2.99	3.17	-.21	.06	1.13	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L115	0	3.00	3.27	-.11	.09	.94	20D	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L352	0	3.00	3.29	-.09	.10	1.07	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L194	0	3.01	3.36	-.02	.12	.83	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L163	0	3.02	3.52	.13	.19	.89	20D	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L260	0	3.02	3.14	-.21	.01	.72	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L344	0	3.03	3.33	-.04	.09	1.22	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L315	0	3.04	3.19	-.16	.02	.94	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L230	0	3.06	3.18	-.16	-.01	.64	200	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L124C	*	3.07	2.91	-.39	-.14	1.08	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L692	0	3.07	3.09	-.23	-.06	1.27	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L100	0	3.08	3.50	.14	.13	.89	20E	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L159	0	3.11	3.46	.11	.09	.79	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L442	0	3.11	3.31	-.02	.01	.66	20G	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L318	0	3.11	3.35	.01	.03	.73	20G	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L223B	0	3.12	3.28	-.04	-.01	1.01	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L122	0	3.12	3.28	-.04	-.01	.76	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L558	0	3.12	3.32	-.00	-.00	.81	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L118	0	3.14	3.32	.00	-.01	1.02	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L261	0	3.16	3.35	.04	-.01	.74	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L328	0	3.17	3.51	.18	.05	.87	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L360	0	3.19	3.46	.15	.02	1.09	20B	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L325	0	3.19	3.28	-.01	-.07	1.11	20E	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L309	0	3.19	3.16	-.12	-.13	1.14	20E	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L356	0	3.19	3.31	.02	-.06	.71	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L559	0	3.20	3.62	.29	.08	.57	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L148	0	3.21	3.24	-.04	-.11	1.59	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L331	0	3.22	3.41	.12	-.04	1.07	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L592	0	3.22	3.31	.03	-.09	.97	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L185	0	3.22	3.56	.26	.03	.88	20C	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L390	0	3.23	3.40	.12	-.05	.98	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L139	*	3.23	3.44	.15	-.04	.81	20H	TENSILE	STRENGTH,	PRINTING PAPER, CRE, SHORT TEST SPAN	
L131	0	3.23	3.26	-.01	-.12	1.29	20E	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L278	0	3.24	3.34	.07	-.09	1.21	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L698	0	3.25	3.51	.22	-.02	1.29	20E	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L125	0	3.25	3.46	.18	-.04	1.25	20C	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L105	0	3.27	3.34	.08	-.12	.76	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L575	0	3.27	3.33	.07	-.12	.78	20G	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L333	0	3.27	3.49	.21	-.05	.81	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L563B	0	3.41	3.59	.36	-.12	1.24	20A	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L167	X	3.51	3.84	.64	-.09	.71	20G	TENSILE	STRENGTH,	PRIMARYLY PRINTING PAPERS,	LOAD CELL (CRE)
L211	*	9.37	10.15	8.95	-2.33	3.52	20I	TENSILE	STRENGTH,	PRINTING PAPER, CRE, 20 C,	65% RH
GMEANS:		3.13	3.32			1.00					
		95% ELLIPSE:		.45	.22	WITH GAMMA = 62 DEGREES					

TENSILE STRENGTH, CRE TYPE

SAMPLE G04 = 3.13 KILONEWTON/M SAMPLE G07 = 3.32 KILONEWTON/M
 SAMPLE G04 = 10.56 LB/15 MM SAMPLE G07 = 11.21 LB/15 MM



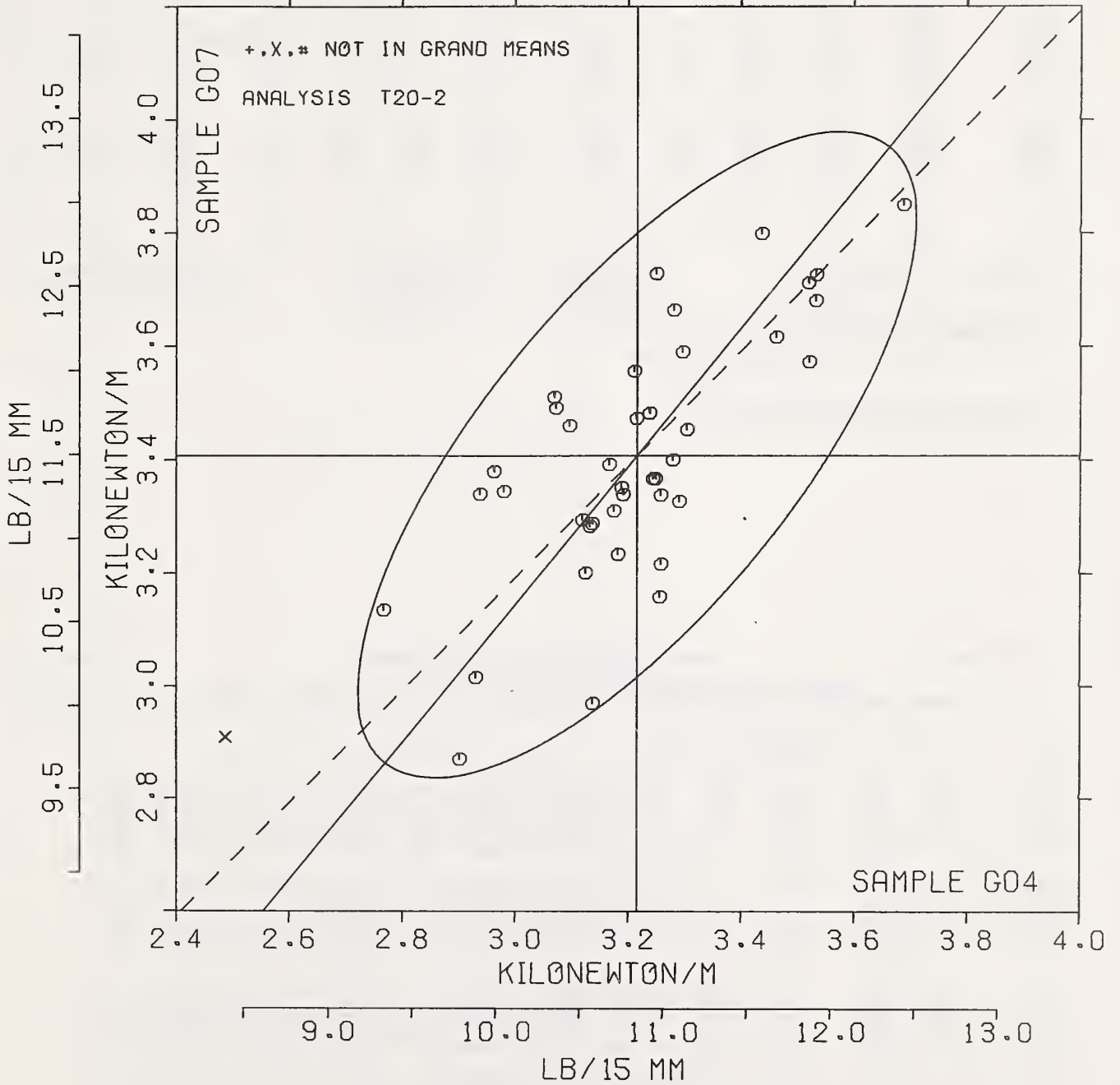
ANALYSIS T20-2 TABLE 2
TENSILE BREAKING STRENGTH, KILOGNEWTONS PER METER

TAPPI STANDARD T404 69-76, TENSILE BREAKING STRENGTH OF PAPER AND PAPERBOARD (PENDULUM-TYPE TESTER)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST	INSTRUMENT---	CONDITIONS	
		G04	G07	MAJOR	MINOR	R ₀ SDR	VAR				
L158	X	2.49	2.91	-.85	.25	.83	20T	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L213	Ø	2.77	3.13	-.49	.17	.88	20T	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L195	Ø	2.90	2.87	-.61	-.10	1.09	20R	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L321	Ø	2.93	3.02	-.48	-.03	1.30	20Q	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L680	Ø	2.94	3.34	-.23	.17	1.23	20R	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L242	Ø	2.96	3.38	-.18	.18	.69	20Y	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L233	Ø	2.98	3.34	-.20	.14	.94	20Q	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L128	Ø	3.07	3.51	-.01	.18	1.03	20T	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L313	Ø	3.07	3.49	-.03	.16	.99	20T	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L241	Ø	3.10	3.46	-.03	.13	.84	20R	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L585	Ø	3.12	3.29	-.15	.00	.71	20V	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L148	Ø	3.13	3.20	-.22	-.06	.94	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L182L	Ø	3.13	3.28	-.15	-.01	1.03	20T	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L275	Ø	3.14	3.29	-.14	-.01	1.03	20R	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L290	Ø	3.14	2.97	-.39	-.22	.81	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L124P	Ø	3.17	3.39	-.04	.03	1.41	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L356	Ø	3.18	3.31	-.10	-.03	1.25	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L484	Ø	3.18	3.23	-.16	-.09	.51	20U	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L212	Ø	3.19	3.35	-.06	-.01	1.13	20R	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L274	Ø	3.19	3.34	-.07	-.03	.77	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L626	Ø	3.21	3.56	.11	.10	.73	20T	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L311	Ø	3.22	3.47	.05	.04	.95	20V	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L249	Ø	3.24	3.48	.07	.03	1.04	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L191P	Ø	3.24	3.37	-.01	-.05	1.04	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L376	Ø	3.25	3.37	-.01	-.05	1.14	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L330	Ø	3.25	3.73	.27	.18	1.16	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L162	Ø	3.26	3.16	-.17	-.19	1.20	20*	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L103	Ø	3.26	3.34	-.03	-.08	.76	20R	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L285	Ø	3.26	3.22	-.12	-.15	.65	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L599	Ø	3.28	3.40	.04	-.05	1.18	20V	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L121	Ø	3.28	3.66	.24	.11	.82	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L108	Ø	3.29	3.33	-.01	-.11	1.35	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L262	Ø	3.30	3.59	.19	.05	.80	20R	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L218	Ø	3.31	3.45	.09	-.04	.81	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L279P	Ø	3.44	3.80	.44	.08	1.44	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L571	Ø	3.46	3.62	.32	-.06	1.28	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L554	Ø	3.52	3.71	.43	-.04	.89	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L189	Ø	3.52	3.57	.32	-.13	.91	20R	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L259	Ø	3.53	3.68	.41	-.07	1.03	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L393	Ø	3.53	3.73	.45	-.04	.89	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
L556	Ø	3.69	3.85	.64	-.08	1.35	20P	TENSILE STRENGTH,	PRIMARILY PRINTING PAPERS,	PENDULUM TESTER	
GMEANS:		3.22	3.41			1.00					
		95% ELLIPSE:		.70	.28			WITH GAMMA = 50 DEGREES			

TENSILE STRENGTH, PENDULUM TYPE

SAMPLE G04 = 3.22 KILONEWTN/M SAMPLE G07 = 3.41 KILONEWTN/M
 SAMPLE G04 = 10.84 LB/15 MM SAMPLE G07 = 11.49 LB/15 MM



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

LAB CODE	SAMPLE K32 105 GRAMS PER SQUARE METER PRINTING					SAMPLE K34 123 GRAMS PER SQUARE METER KRAFT					TEST D ₀ = 20		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L106	77.9	.0	.00	15.4	1.56	87.3	-4.7	-.45	12.2	.96	25F	Ø	L106
L122	82.3	4.5	.61	10.6	1.08	106.7	14.6	1.38	12.1	.95	25P	Ø	L122
L126	87.5	9.6	1.30	6.6	.67	94.3	2.2	.21	10.8	.85	25G	Ø	L126
L151	77.3	-.6	-.08	10.7	1.08	91.8	-.3	-.03	14.0	1.10	25F	Ø	L151
L182	69.5	-8.4	-1.14	10.7	1.09	92.9	.8	.08	11.6	.91	25B	Ø	L182
L237B	84.3	6.4	.87	9.3	.94	92.4	.4	.04	9.7	.76	25H	Ø	L237B
L250	74.6	-3.3	-.45	2.9	.30	87.4	-4.7	-.44	9.7	.76	25A	Ø	L250
L264	78.3	.4	.05	7.1	.72	86.3	-5.8	-.54	11.9	.93	25F	Ø	L264
L267	80.7	2.9	.39	8.3	.84	99.5	7.4	.70	14.5	1.14	25F	Ø	L267
L273	83.9	6.0	.82	10.5	1.06	96.9	4.8	.45	13.1	1.03	25F	Ø	L273
L280	65.5	-12.3	-1.68	11.0	1.11	85.8	-6.2	-.59	11.1	.88	25B	Ø	L280
L312	88.4	10.5	1.43	15.0	1.53	111.8	19.7	1.86	17.5	1.38	25J	Ø	L312
L318	84.2	6.3	.86	8.9	.91	99.3	7.3	.68	12.0	.94	25A	Ø	L318
L580	65.5	-12.4	-1.68	10.2	1.04	65.0	-27.0	-2.54	10.7	.84	25C	Ø	L580
L604	49.0	-28.9	-3.92	8.4	.85	99.9	7.8	.74	9.6	.75	25A	#	L604
L676	77.0	-.9	-.12	11.0	1.12	93.5	1.5	.14	20.8	1.64	25F	Ø	L676
L689	69.2	-8.7	-1.19	9.4	.96	81.9	-10.1	-.95	11.9	.93	25F	Ø	L689

GR₀ MEAN = 77.9 JOULES/SQ M GRAND MEAN = 92.1 JOULES/SQ M TEST DETERMINATIONS = 20
SD MEANS = 7.4 JOULES/SQ M SD OF MEANS = 10.6 JOULES/SQ M 16 LABS IN GRAND MEANS
AVERAGE SDR = 9.8 JOULES/SQ M AVERAGE SDR = 12.7 JOULES/SQ M
GR₀ MEAN = 5.335 FT.LB/SC FT GRAND MEAN = 6.306 FT.LB/SQ FT
TOTAL NUMBER OF LABORATORIES REPORTING = 17
Best values: K32 78 ± 11 joules per square meter
K34 93 ± 15 joules per square meter

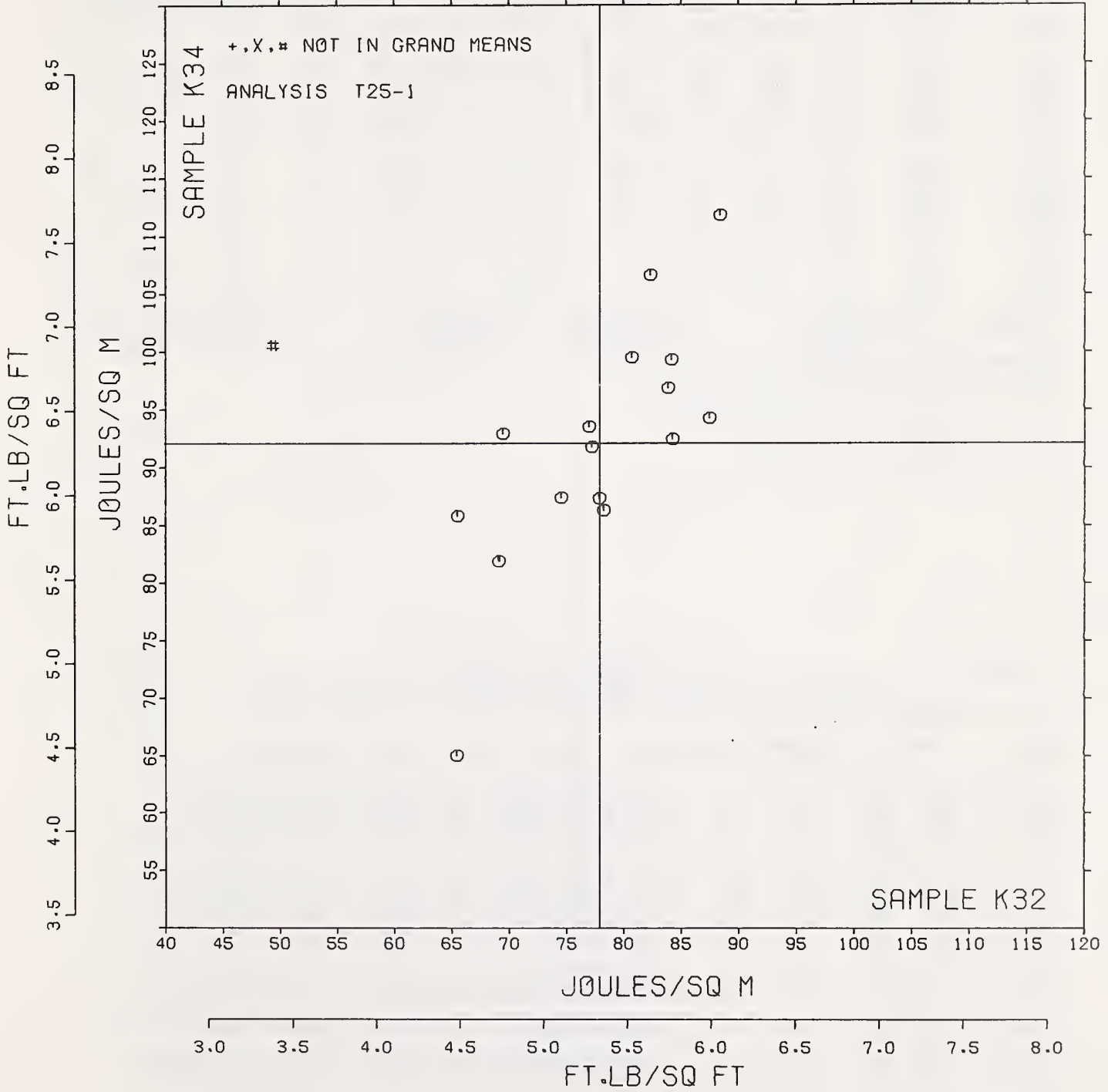
The following laboratories were omitted from the grand means because of extreme test results: 604.

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

LAB CODE	F	MEANS		COORDINATES		AVG R ₀ SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS				
		K32	K34	MAJOR	MINOR			PROPERTY	TEST INSTRUMENT	CONDITIONS		
L604	#	49.0	99.9	-8.6	28.6	.80	25A	TENSILE ENERGY ABS.	PACKAGING PAPER, FLAT/FLAT	JAWS		
L580	Ø	65.5	65.0	-29.5	-3.8	.94	25C	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/LINE	JAWS		
L280	Ø	65.5	85.8	-11.8	7.2	.99	25B	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/FLAT	JAWS		
L689	Ø	69.2	81.9	-13.2	2.0	.95	25F	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/FLAT	JAWS		
L182	Ø	69.5	92.9	-3.7	7.5	1.00	25B	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/FLAT	JAWS		
L250	Ø	74.6	87.4	-5.7	.3	.53	25A	TENSILE ENERGY ABS.	PACKAGING PAPER, FLAT/FLAT	JAWS		
L676	Ø	77.0	93.5	.8	1.5	1.38	25F	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/FLAT	JAWS		
L151	Ø	77.3	91.8	-.6	.4	1.09	25F	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/FLAT	JAWS		
L106	Ø	77.9	87.3	-4.0	-2.5	1.26	25F	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/FLAT	JAWS		
L264	Ø	78.3	86.3	-4.7	-3.4	.83	25F	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/FLAT	JAWS		
L267	Ø	80.7	99.5	7.8	1.5	.99	25F	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/FLAT	JAWS		
L122	Ø	82.3	106.7	14.8	3.9	1.01	25P	TENSILE ENERGY ABS.	PACKAGING PAPER, PATTERNED FLAT	JAWS		
L273	Ø	83.9	96.9	7.3	-2.6	1.05	25F	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/FLAT	JAWS		
L318	Ø	84.2	99.3	9.5	-1.5	.92	25A	TENSILE ENERGY ABS.	PACKAGING PAPER, FLAT/FLAT	JAWS		
L237B	Ø	84.3	92.4	3.7	-5.2	.85	25H	TENSILE ENERGY ABS.	PACKAGING PAPER, 2-PIN STRAIN	GAGE		
L126	Ø	87.5	94.3	7.0	-7.0	.76	25G	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/LINE	JAWS		
L312	Ø	88.4	111.8	22.3	1.5	1.45	25J	TENSILE ENERGY ABS.	PACKAGING PAPER, LINE/FLAT	JAWS		
GMEANS:		77.9	92.1			1.00						
		95% ELLIPSE:		34.7	11.6	WITH GAMMA = 58 DEGREES						

T.E.A., PACKAGING PAPERS

SAMPLE K32 = 78. JOULES/SQ M SAMPLE K34 = 92. JOULES/SQ M
 SAMPLE K32 = 5.33 FT.LB/SQ FT SAMPLE K34 = 6.31 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 G04 MEAN	HEAT SET OFFSET BLOCK 76 GRAMS PER SQUARE METER			SAMPLE G07 MEAN	WRITING 74 GRAMS PER SQUARE METER			TEST D ₀ = 20				
		76 GRAMS PER SQUARE METER	76 GRAMS PER SQUARE METER	76 GRAMS PER SQUARE METER		74 GRAMS PER SQUARE METER	74 GRAMS PER SQUARE METER	74 GRAMS PER SQUARE METER	VAR	F	LAB		
L100	32.3	-0.2	-0.11	2.0	0.68	38.6	3.7	1.30	3.0	0.78	26A	Ø	L100
L115	30.2	-2.3	-1.05	2.2	0.72	36.0	1.2	0.40	3.6	0.95	26C	Ø	L115
L118	30.8	-1.7	-0.79	3.8	1.28	32.3	-2.5	-0.86	4.3	1.12	26E	Ø	L118
L122	34.7	2.2	1.03	2.9	0.96	36.4	1.5	0.52	3.6	0.95	26L	Ø	L122
L139	33.5	1.0	0.46	2.3	0.78	36.3	1.5	0.52	5.0	1.31	26H	Ø	L139
L159	33.1	0.6	0.26	3.4	1.12	39.3	4.4	1.54	4.1	1.08	26F	Ø	L159
L163	29.3	-3.2	-1.51	2.8	0.92	35.5	0.7	0.24	3.5	0.91	26J	Ø	L163
L167	35.1	2.6	1.22	1.0	0.32	38.4	3.6	1.25	1.1	0.29	26D	Ø	L167
L185	61.0	28.5	13.38	6.1	2.04	68.8	34.0	11.76	8.2	2.16	26C	#	L185
L211	32.3	-0.2	-0.67	6.3	2.10	32.0	-2.8	-0.98	5.4	1.42	26Z	Ø	L211
L250	28.4	-4.1	-1.90	2.6	0.86	29.4	-5.4	-1.87	4.2	1.10	26A	Ø	L250
L309	32.6	0.1	0.03	3.7	1.24	31.2	-3.7	-1.26	5.4	1.43	26J	Ø	L309
L318	31.8	-0.7	-0.31	4.3	1.44	36.7	1.9	0.65	3.1	0.82	26A	Ø	L318
L356	33.7	1.2	0.56	2.7	0.90	34.5	-0.3	-0.10	5.2	1.36	26A	Ø	L356
L393	30.2	-2.3	-1.06	2.2	0.72	31.0	-3.8	-1.33	2.3	0.61	26V	Ø	L393
L442	36.0	3.5	1.66	2.5	0.84	36.7	1.8	0.63	3.2	0.83	26B	Ø	L442
L575	34.2	1.7	0.77	3.1	1.01	33.6	-1.2	-0.42	3.9	1.03	26A	Ø	L575
L592	34.2	1.7	0.80	3.3	1.11	34.2	-0.6	-0.22	3.8	1.01	26H	Ø	L592

GR. MEAN = 32.5 JOULES/SQ M GRAND MEAN = 34.8 JOULES/SQ M TEST DETERMINATIONS = 20
 SD MEANS = 2.1 JOULES/SQ M SD OF MEANS = 2.9 JOULES/SQ M 17 LABS IN GRAND MEANS
 AVERAGE SDR = 3.0 JOULES/SQ M AVERAGE SDR = 3.8 JOULES/SQ M
 GR. MEAN = 2.226 FT.LB/SQ FT GRAND MEAN = 2.386 FT.LB/SQ FT
 TOTAL NUMBER OF LABORATORIES REPORTING = 18
 Best values: G04 32 ± 4 joules per square meter
 G07 35 ± 4 joules per square meter

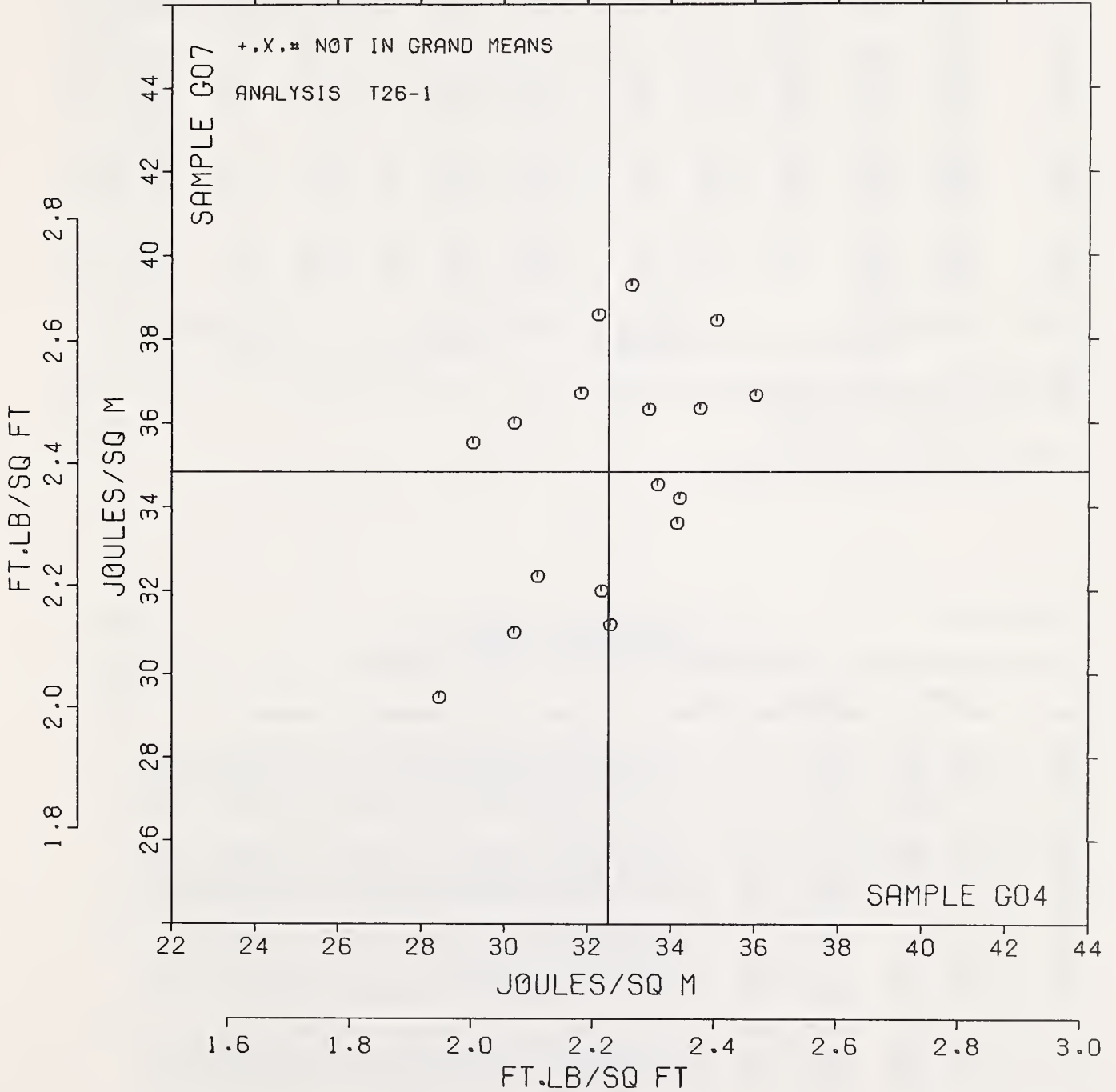
Data from the following laboratories appear to be off by a multiplicative factor: 185.

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		PROPERTY---TEST INSTRUMENT---CONDITIONS
		G04	G07	MAJOR	MINOR	R ₀ SDR	VAR	
L250	Ø	28.4	29.4	-6.7	1.0	0.98	26A	TENSILE ENERGY ABS., PRINTING PAPERS, FLAT/FLAT JAWS
L163	Ø	29.3	35.5	-0.9	3.2	0.91	26J	TENSILE ENERGY ABS., PRINTING PAPERS, LINE/FLAT JAWS
L393	Ø	30.2	31.0	-4.4	0.1	0.67	26V	TENSILE ENERGY ABS., PRINTING PAPERS, LINE/FLAT JAWS
L115	Ø	30.2	36.0	-0.1	2.5	0.84	26C	TENSILE ENERGY ABS., PRINTING PAPERS, LINE/LINE JAWS
L118	Ø	30.8	32.3	-3.0	0.3	1.20	26E	TENSILE ENERGY ABS., PRINTING PAPERS, FLAT/FLAT JAWS
L318	Ø	31.8	36.7	1.3	1.5	1.13	26A	TENSILE ENERGY ABS., PRINTING PAPERS, FLAT/FLAT JAWS
L100	Ø	32.3	38.6	3.2	2.0	0.73	26A	TENSILE ENERGY ABS., PRINTING PAPERS, FLAT/FLAT JAWS
L211	Ø	32.3	32.0	-2.6	-1.2	1.76	26Z	TENSILE ENERGY ABS., PRINTING PAPERS, LINE/LINE JAWS
L309	Ø	32.6	31.2	-3.2	-1.8	1.33	26J	TENSILE ENERGY ABS., PRINTING PAPERS, LINE/FLAT JAWS
L159	Ø	33.1	39.3	4.2	1.7	1.10	26F	TENSILE ENERGY ABS., PRINTING PAPERS, LINE/FLAT JAWS
L139	Ø	33.5	36.3	1.8	-0.1	1.04	26H	TENSILE ENERGY ABS., PRINTING PAPERS, 2-PIN STRAIN GAGE
L356	Ø	33.7	34.5	0.3	-1.2	1.13	26A	TENSILE ENERGY ABS., PRINTING PAPERS, FLAT/FLAT JAWS
L575	Ø	34.2	33.6	-0.3	-2.0	1.02	26A	TENSILE ENERGY ABS., PRINTING PAPERS, FLAT/FLAT JAWS
L592	Ø	34.2	34.2	0.3	-1.8	1.06	26H	TENSILE ENERGY ABS., PRINTING PAPERS, 2-PIN STRAIN GAGE
L122	Ø	34.7	36.4	2.4	-1.2	0.95	26L	TENSILE ENERGY ABS., PRINTING PAPERS, PATTERNED FLAT JAWS
L167	Ø	35.1	38.4	4.4	-0.5	0.31	26D	TENSILE ENERGY ABS., PRINTING PAPERS, 2-PIN STRAIN GAGE
L442	Ø	36.0	36.7	3.3	-2.2	0.83	26B	TENSILE ENERGY ABS., PRINTING PAPERS, LINE/FLAT JAWS
L185	#	61.0	68.8	43.5	-8.7	2.10	26C	TENSILE ENERGY ABS., PRINTING PAPERS, LINE/LINE JAWS
GMEANS:		32.5	34.8			1.00		
		95% ELLIPSE:		8.9	4.8	WITH GAMMA = 61 DEGREES		

T.E.A., PRINTING PAPERS

SAMPLE G04 = 32.5 JOULES/SQ M SAMPLE G07 = 34.8 JOULES/SQ M
 SAMPLE G04 = 2.23 FT.LB/SQ FT SAMPLE G07 = 2.39 FT.LB/SQ FT



ANALYSIS T28-1 TABLE 1

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

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

LAB CODE	SAMPLE K32		PRINTING 105 GRAMS PER SQUARE METER			SAMPLE K34		KRAFT 123 GRAMS PER SQUARE METER			TEST D ₀ = 20		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L100	1.410	-.128	-.64	.064	.51	1.585	-.093	-.46	.067	.53	28A	0	L100
L106	1.520	-.018	-.09	.219	1.73	1.680	.002	.01	.177	1.41	28B	0	L106
L122	1.664	.126	.63	.118	.93	1.873	.195	.96	.113	.90	28P	0	L122
L126	1.542	.004	.02	.068	.53	1.610	-.068	-.34	.110	.88	28C	0	L126
L151	1.750	.212	1.06	.267	2.10	1.760	.082	.40	.201	1.60	28B	0	L151
L182	1.335	-.203	-1.01	.114	.90	1.570	-.108	-.54	.103	.82	28B	0	L182
L264	1.570	.032	.16	.086	.68	1.645	-.033	-.17	.150	1.20	28B	0	L264
L265	1.409	-.129	-.64	.113	.89	1.578	-.100	-.50	.117	.93	28A	0	L265
L267	1.414	-.124	-.62	.114	.90	1.623	-.055	-.27	.128	1.02	28B	0	L267
L280	1.423	-.115	-.57	.126	.99	1.640	-.038	-.19	.103	.82	28B	0	L280
L312	1.840	.302	1.51	.139	1.10	2.005	.327	1.61	.164	1.31	28B	0	L312
L318	1.586	.048	.24	.095	.75	1.744	.066	.32	.102	.81	28A	0	L318
L324	1.425	-.113	-.56	.085	.67	1.585	-.093	-.46	.099	.79	28P	0	L324
L336	1.443	-.094	-.47	.129	1.02	1.651	-.027	-.14	.121	.96	28A	0	L336
L580	1.375	-.163	-.81	.148	1.17	1.305	-.373	-1.85	.164	1.31	28C	*	L580
L581	1.570	.033	.16	.152	1.20	1.662	-.016	-.08	.096	.77	28A	0	L581
L582	2.500	.962	4.81	.000	.00	2.625	.947	4.68	.385	3.07	28A	#	L582
L676	2.100	.562	2.81	.395	3.11	2.230	.552	2.73	.434	3.46	28B	*	L676
L689	1.300	-.238	-1.19	.141	1.11	1.465	-.213	-1.06	.157	1.25	28B	0	L689

GR. MEAN = 1.538 PERCENT GRAND MEAN = 1.678 PERCENT TEST DETERMINATIONS = 20
 SD MEANS = .200 PERCENT SD OF MEANS = .202 PERCENT 18 LABS IN GRAND MEANS
 AVERAGE SDR = .127 PERCENT AVERAGE SDR = .125 PERCENT

L153 1.525 -.012 -.06 .097 .76 1.815 .137 .68 .163 1.30 28Q * L153
 TOTAL NUMBER OF LABORATORIES REPORTING = 20

Best values: K32 1.51 ± 0.32 percent
 K34 1.67 ± 0.21 percent

The following laboratories were omitted from the grand means because of extreme test results: 582.

ANALYSIS T28-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

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

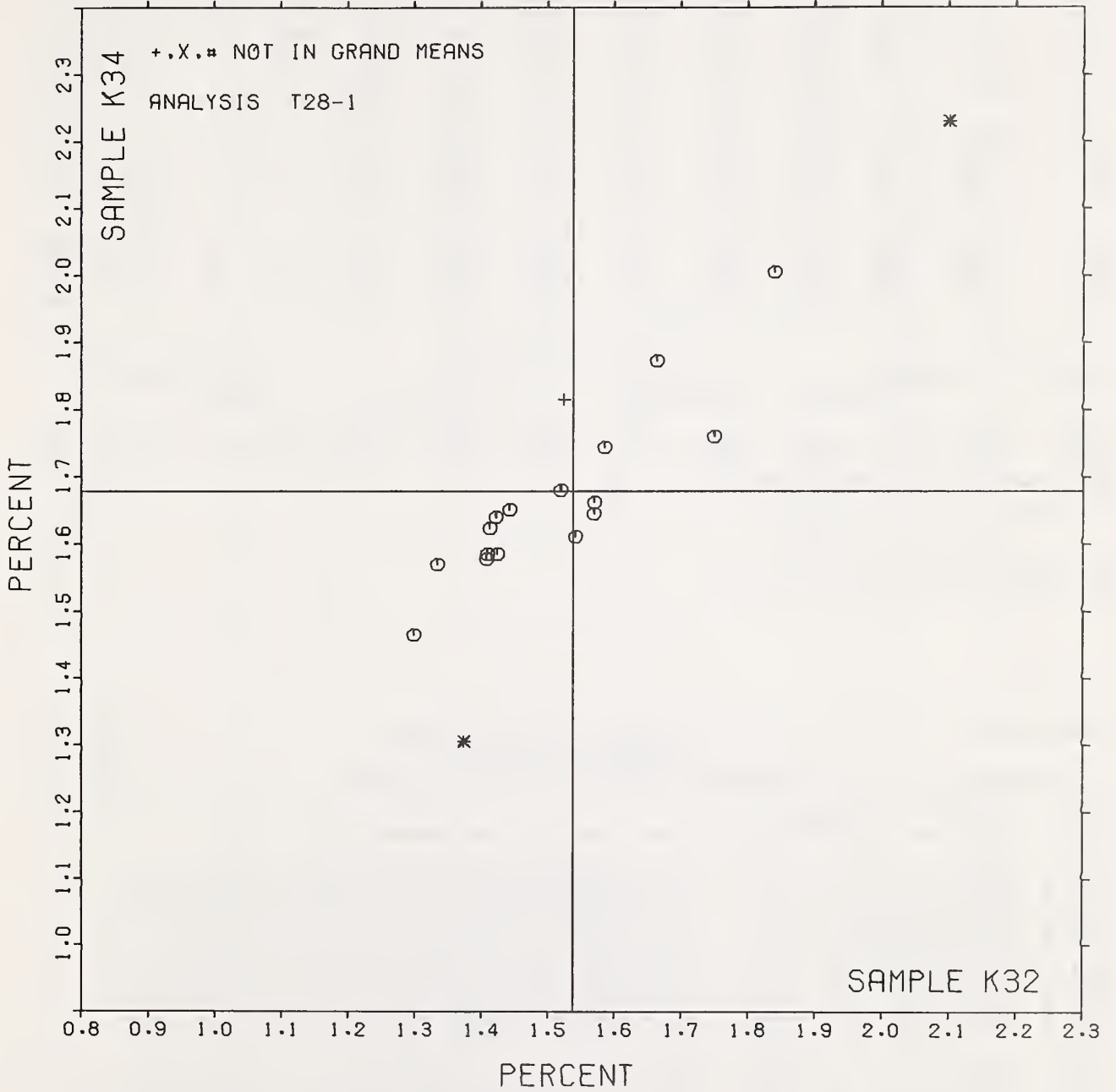
LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		K32	K34	MAJOR	MINOR	R ₀ SDR	VAR	
L689	0	1.300	1.465	-.319	.019	1.18	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L182	0	1.335	1.570	-.220	.068	.86	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L580	*	1.375	1.305	-.380	-.147	1.24	28C	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/LINE JAWS
L265	0	1.409	1.578	-.162	.021	.91	28A	ELONGATION, PACKAGING PAPER, LOAD CELL, FLAT/FLAT JAWS
L100	0	1.410	1.585	-.156	.025	.52	28A	ELONGATION, PACKAGING PAPER, LOAD CELL, FLAT/FLAT JAWS
L267	0	1.414	1.623	-.126	.049	.96	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L280	0	1.423	1.640	-.108	.054	.91	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L324	0	1.425	1.585	-.146	.014	.73	28P	ELONGATION, PACKAGING PAPER, LOAD CELL, PATTERNED FLAT JAWS
L336	0	1.443	1.651	-.086	.048	.99	28A	ELONGATION, PACKAGING PAPER, LOAD CELL, FLAT/FLAT JAWS
L106	0	1.520	1.690	-.011	.014	1.57	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L153	*	1.525	1.815	.088	.105	1.03	28Q	ELONGATION, PACKAGING PAPER, PENDULUM, PATTERNED FLAT JAWS
L126	0	1.542	1.610	-.045	-.051	.70	28C	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/LINE JAWS
L264	0	1.570	1.645	-.001	-.047	.94	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L581	0	1.570	1.662	.011	-.035	.98	28A	ELONGATION, PACKAGING PAPER, LOAD CELL, FLAT/FLAT JAWS
L318	0	1.586	1.744	.081	.012	.78	28A	ELONGATION, PACKAGING PAPER, LOAD CELL, FLAT/FLAT JAWS
L122	0	1.664	1.873	.227	.047	.92	28P	ELONGATION, PACKAGING PAPER, LOAD CELL, PATTERNED FLAT JAWS
L151	0	1.750	1.760	.207	-.094	1.85	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L312	0	1.840	2.005	.445	.014	1.20	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L676	*	2.100	2.230	.788	-.012	3.29	28B	ELONGATION, PACKAGING PAPER, LOAD CELL, LINE/FLAT JAWS
L582	#	2.500	2.625	1.350	-.019	1.53	28A	ELONGATION, PACKAGING PAPER, LOAD CELL, FLAT/FLAT JAWS

GMEANS: 1.538 1.678 1.00
 95% ELLIPSE: .775 .155 WITH GAMMA = 45 DEGREES

ELONGATION TO BREAK, PACKAGING PAPER

SAMPLE K32 = 1.54 PERCENT

SAMPLE K34 = 1.68 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 G04		HEAT SET OFFSET BOOK 76 GRAMS PER SQUARE METER			SAMPLE G07		WRITING 74 GRAMS PER SQUARE METER			TEST D ₀ = 20	
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F LAB
L100	1.520	-.063	-.56	.089	.83	1.620	.035	.30	.089	.61	29A	Ø L100
L105	1.362	-.220	-1.95	.128	1.19	1.300	-.285	-2.48	.174	1.19	29A	Ø L105
L118	1.588	.006	.05	.098	.92	1.617	.032	.28	.165	1.13	29A	Ø L118
L122	1.786	.204	1.81	.126	1.17	1.773	.188	1.63	.118	.81	29P	Ø L122
L176	2.412	.830	7.36	.429	3.99	2.137	.551	4.78	.658	4.51	29B	# L176
L185	1.496	-.086	-.77	.078	.72	1.504	-.081	-.71	.153	1.05	29C	Ø L185
L190R	1.452	-.131	-1.16	.129	1.20	1.510	-.075	-.65	.203	1.39	29A	Ø L190R
L278	1.460	-.123	-1.09	.105	.97	1.495	-.090	-.78	.139	.96	29A	Ø L278
L309	1.706	.123	1.09	.117	1.09	1.652	.067	.58	.212	1.45	29A	Ø L309
L318	1.650	.068	.60	.071	.66	1.720	.135	1.17	.089	.61	29A	Ø L318
L344	1.552	-.031	-.27	.127	1.18	1.530	-.056	-.48	.192	1.32	29A	Ø L344
L356	1.572	-.010	-.09	.104	.97	1.563	-.022	-.19	.159	1.09	29A	Ø L356
L442	1.684	.102	.90	.075	.70	1.625	.040	.35	.090	.62	29B	Ø L442
L575	1.587	.005	.04	.100	.93	1.540	-.045	-.39	.108	.74	29A	Ø L575
L592	1.680	.057	.86	.120	1.11	1.620	.035	.30	.140	.96	29D	Ø L592
L698	1.644	.061	.54	.146	1.36	1.710	.125	1.08	.157	1.08	29C	Ø L698

GR. MEAN = 1.583 PERCENT GRAND MEAN = 1.585 PERCENT TEST DETERMINATIONS = 20
 SD MEANS = .113 PERCENT SD OF MEANS = .115 PERCENT 15 LABS IN GRAND MEANS
 AVERAGE SDR = .107 PERCENT AVERAGE SDR = .146 PERCENT

L242	1.970	.387	3.43	.126	1.17	2.135	.550	4.76	.088	.60	29R	* L242
L484	1.026	-.557	-4.94	.205	1.91	1.054	-.531	-4.61	.195	1.33	29R	* L484
L626	1.505	-.078	-.69	.083	.77	1.520	-.065	-.57	.077	.53	29R	* L626

TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: G04 1.58 ± 0.20 percent
 G07 1.61 ± 0.16 percent

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

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)

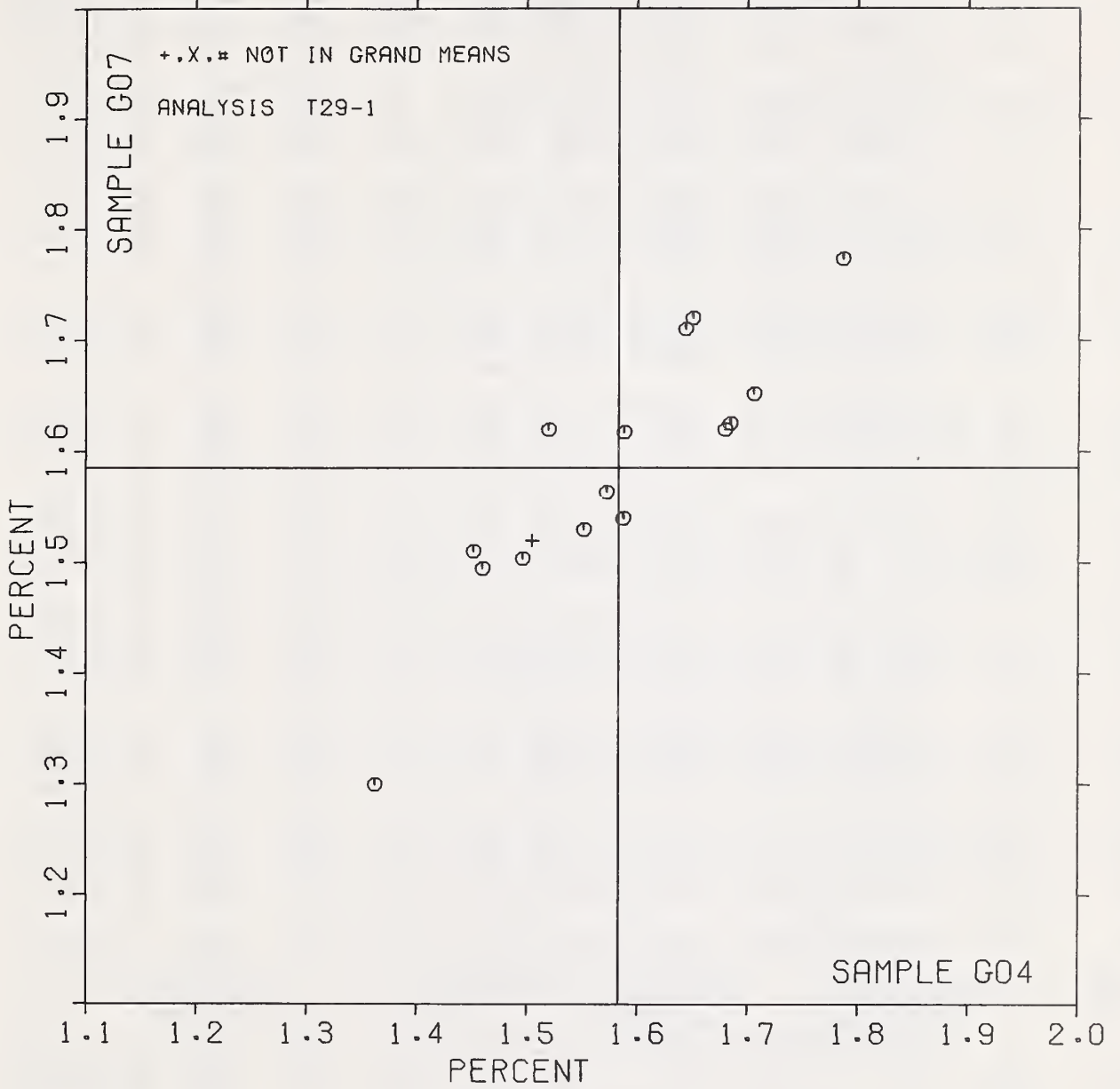
LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		G04	G07	MAJOR	MINOR	R ₀ SDR	VAR			
L484	*	1.026	1.054	-.769	.028	1.62	29R	ELONGATION, PRINTING PAPERS, PENDULUM, FLAT/FLAT	JAWS	
L105	Ø	1.362	1.300	-.358	-.042	1.19	29A	ELONGATION, PRINTING PAPERS, LOAD CELL, FLAT/FLAT	JAWS	
L190R	Ø	1.452	1.510	-.145	.041	1.29	29A	ELONGATION, PRINTING PAPERS, LOAD CELL, FLAT/FLAT	JAWS	
L278	Ø	1.460	1.495	-.151	.025	.96	29A	ELONGATION, PRINTING PAPERS, LOAD CELL, FLAT/FLAT	JAWS	
L185	Ø	1.456	1.504	-.119	.005	.88	29C	ELONGATION, PRINTING PAPERS, LOAD CELL, LINE/LINE	JAWS	
L626	*	1.505	1.520	-.101	.010	.65	29R	ELONGATION, PRINTING PAPERS, PENDULUM, FLAT/FLAT	JAWS	
L100	Ø	1.520	1.620	-.015	.069	.72	29A	ELONGATION, PRINTING PAPERS, LOAD CELL, FLAT/FLAT	JAWS	
L344	Ø	1.552	1.530	-.061	-.017	1.25	29A	ELONGATION, PRINTING PAPERS, LOAD CELL, FLAT/FLAT	JAWS	
L356	Ø	1.572	1.563	-.023	-.008	1.03	29A	ELONGATION, PRINTING PAPERS, LOAD CELL, FLAT/FLAT	JAWS	
L575	Ø	1.587	1.540	-.029	-.035	.84	29A	ELONGATION, PRINTING PAPERS, LOAD CELL, FLAT/FLAT	JAWS	
L118	Ø	1.588	1.617	.027	.018	1.02	29A	ELONGATION, PRINTING PAPERS, LOAD CELL, FLAT/FLAT	JAWS	
L698	Ø	1.644	1.710	.132	.043	1.22	29C	ELONGATION, PRINTING PAPERS, LOAD CELL, LINE/LINE	JAWS	
L318	Ø	1.650	1.720	.144	.046	.63	29A	ELONGATION, PRINTING PAPERS, LOAD CELL, FLAT/FLAT	JAWS	
L592	Ø	1.680	1.620	.093	-.045	1.04	29D	ELONGATION, PRINTING PAPERS, LOAD CELL, 2-PIN STRAIN GAGE		
L442	Ø	1.684	1.625	.100	-.045	.66	29B	ELONGATION, PRINTING PAPERS, LOAD CELL, LINE/FLAT	JAWS	
L309	Ø	1.706	1.652	.134	-.042	1.27	29A	ELONGATION, PRINTING PAPERS, LOAD CELL, FLAT/FLAT	JAWS	
L122	Ø	1.786	1.773	.277	-.015	.99	29P	ELONGATION, PRINTING PAPERS, LOAD CELL, PATTERNED FLAT	JAWS	
L242	*	1.970	2.135	.664	.106	.89	29R	ELONGATION, PRINTING PAPERS, PENDULUM, FLAT/FLAT	JAWS	
L176	#	2.412	2.137	.974	-.209	4.25	29B	ELONGATION, PRINTING PAPERS, LOAD CELL, LINE/FLAT	JAWS	

GMEANS: 1.583 1.585
 95% ELLIPSE: .448 .110 1.00 WITH GAMMA = 45 DEGREES

ELONGATION TO BREAK, PRINTING PAPER

SAMPLE G04 = 1.58 PERCENT

SAMPLE G07 = 1.59 PERCENT



LAB CODE	SAMPLE A92 MEAN	WAVE ENVELOPE PAPER 75 GRAMS PER SQUARE METER				SAMPLE B88 MEAN	HEAT SET OFFSET BOOK 68 GRAMS PER SQUARE METER				TEST D ₀ = 15			
		DEV	N ₀ DEV	SDR	R ₀ SDR		DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB	
L100M	21.2	-9.6	-1.63	6.3	.60	31.7	-18.4	-1.26	9.4	.46	30M	0	L100M	
L100N	22.8	-8.0	-1.36	7.5	.71	36.0	-14.2	-.97	9.2	.46	30N	0	L100N	
L105	12.7	-18.1	-3.08	2.3	.22	8.2	-42.0	-2.87	2.4	.12	30M	#	L105	
L118	28.5	-2.3	-.40	6.0	.57	44.4	-5.8	-.39	16.3	.81	30D	0	L118	
L121	28.1	-2.7	-.45	12.2	1.15	53.6	3.4	.23	30.5	1.51	30M	0	L121	
L122	31.3	.5	.09	10.0	.94	62.7	12.6	.86	27.8	1.37	30M	0	L122	
L124	29.1	-1.7	-.28	7.1	.67	55.7	5.6	.38	12.6	.62	30N	0	L124	
L150	28.1	-2.7	-.46	7.1	.67	45.2	-5.0	-.34	34.5	1.71	30M	0	L150	
L158	20.4	-10.4	-1.77	6.2	.58	23.8	-26.4	-1.80	7.7	.38	30N	0	L158	
L159	37.6	6.8	1.16	13.2	1.24	50.1	-.1	-.01	17.3	.86	30N	0	L159	
L162	27.1	-3.7	-.62	12.1	1.14	27.5	-22.7	-1.55	11.9	.59	30M	0	L162	
L163	33.5	2.7	.46	12.0	1.13	33.7	-16.5	-1.13	14.4	.71	30N	0	L163	
L176	41.1	10.3	1.74	12.6	1.19	74.7	24.6	1.68	29.0	1.43	30N	0	L176	
L182M	35.9	5.1	.86	12.5	1.18	68.3	18.2	1.24	16.9	.83	30M	0	L182M	
L185	38.1	7.3	1.25	14.4	1.36	74.1	28.0	1.64	22.6	1.12	30N	0	L185	
L190C	44.3	13.5	2.30	15.2	1.43	122.7	72.5	4.95	58.3	2.88	30N	#	L190C	
L212	30.1	-.7	-.11	14.1	1.33	63.7	13.6	.93	15.8	.78	30M	0	L212	
L223F	42.2	11.4	1.94	12.3	1.16	59.3	9.2	.63	23.8	1.18	30M	0	L223F	
L230	34.4	3.6	.61	11.0	1.03	36.9	-13.3	-.91	21.6	1.07	30N	0	L230	
L232	44.5	13.7	2.33	15.7	1.48	94.1	44.0	3.00	42.1	2.08	30N	#	L232	
L236	32.7	1.9	.32	11.5	1.08	43.7	-6.4	-.44	15.0	.74	30N	0	L236	
L238A	19.5	-11.3	-1.91	6.6	.62	21.7	-28.5	-1.95	11.7	.58	30N	0	L238A	
L238B	20.7	-10.1	-1.72	8.2	.77	23.6	-26.6	-1.82	9.2	.45	30D	0	L238B	
L254	20.1	-10.7	-1.81	9.8	.93	40.7	-9.5	-.65	29.1	1.44	30M	0	L254	
L262	29.9	-.9	-.15	8.9	.84	58.8	8.6	.59	20.1	1.00	30N	0	L262	
L274	32.5	1.7	.29	11.1	1.04	55.4	5.2	.36	23.1	1.14	30N	0	L274	
L275	43.6	12.8	2.17	13.6	1.28	69.3	19.1	1.30	24.1	1.19	30N	0	L275	
L278	28.9	-1.5	-.32	10.0	.95	33.1	-17.0	-1.16	11.4	.56	30C	0	L278	
L279	34.1	3.3	.57	12.1	1.14	65.7	15.6	1.06	22.0	1.09	30N	0	L279	
L285A	25.0	-5.8	-.99	6.6	.63	54.9	4.8	.33	31.7	1.57	30N	0	L285A	
L285B	29.0	-1.8	-.31	11.5	1.08	56.3	6.1	.42	29.0	1.43	30N	0	L285B	
L299	31.1	.3	.06	10.2	.96	72.7	22.5	1.54	27.3	1.35	30N	0	L299	
L320	30.7	-.1	-.01	9.3	.88	57.6	7.4	.51	27.5	1.36	30M	0	L320	
L321	36.3	5.5	.93	13.4	1.26	39.4	-10.8	-.74	19.6	.97	30M	0	L321	
L326N	29.7	-1.1	-.18	13.5	1.27	32.4	-17.8	-1.21	12.1	.60	30N	0	L326N	
L339	24.6	-6.2	-1.05	11.2	1.06	45.1	-5.1	-.35	15.5	.77	30N	0	L339	
L366A	36.9	6.1	1.03	13.9	1.31	56.7	6.5	.44	19.2	.95	30N	0	L366A	
L376	32.4	1.6	.27	16.7	1.57	49.3	-.8	-.06	38.4	1.90	30N	0	L376	
L388	33.3	2.5	.43	10.4	.98	55.1	5.0	.34	22.2	1.10	30N	0	L388	
L390	29.1	-1.7	-.28	10.6	1.00	49.3	-.8	-.06	25.6	1.27	30N	0	L390	
L393	26.4	-4.4	-.75	5.1	.48	41.9	-8.2	-.56	11.1	.55	30M	0	L393	
L396M	35.3	4.5	.77	12.4	1.17	73.1	22.9	1.56	32.9	1.63	30N	0	L396M	
L565	34.7	3.9	.67	12.5	1.18	63.1	13.0	.89	22.6	1.12	30N	0	L565	
L589	30.1	-.7	-.12	10.1	.95	41.1	-9.0	-.62	13.1	.65	30N	0	L589	
L599	31.5	.7	.11	10.3	.97	57.1	6.9	.47	23.3	1.15	30C	0	L599	
L622	49.5	18.7	3.17	29.2	2.75	130.8	80.6	5.51	103.6	5.13	30M	#	L622	
L670	36.5	5.7	.96	10.1	.96	58.9	8.7	.59	11.4	.57	30N	0	L670	
GR. MEAN =	30.8	DOUBLE FOLDS				GRAND MEAN =	50.2	DOUBLE FOLDS				TEST DETERMINATIONS = 15		
SD MEANS =	5.9	DOUBLE FOLDS				SD OF MEANS =	14.6	DOUBLE FOLDS				43 LABS IN GRAND MEANS		
		AVERAGE SDR = 10.6						AVERAGE SDR = 20.2				DOUBLE FOLDS		
L182S	23.7	-7.1	-1.21	9.1	.86	36.7	-13.5	-.92	14.2	.70	30S	*	L182S	
L190D	34.9	4.1	.69	10.8	1.02	22.7	-27.4	-1.88	8.1	.40	30S	*	L190D	
L280	16.6	-14.2	-2.41	6.8	.64	15.3	-34.8	-2.38	6.6	.33	30K	*	L280	
L326S	34.3	3.5	.60	9.1	.86	33.3	-16.8	-1.15	8.4	.42	30S	*	L326S	
L396S	18.5	-12.3	-2.10	6.3	.59	17.5	-32.6	-2.23	6.1	.30	30T	*	L396S	

TOTAL NUMBER OF LABORATORIES REPORTING = 52

Best values: A92 30 double folds
B88 50 double folds

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

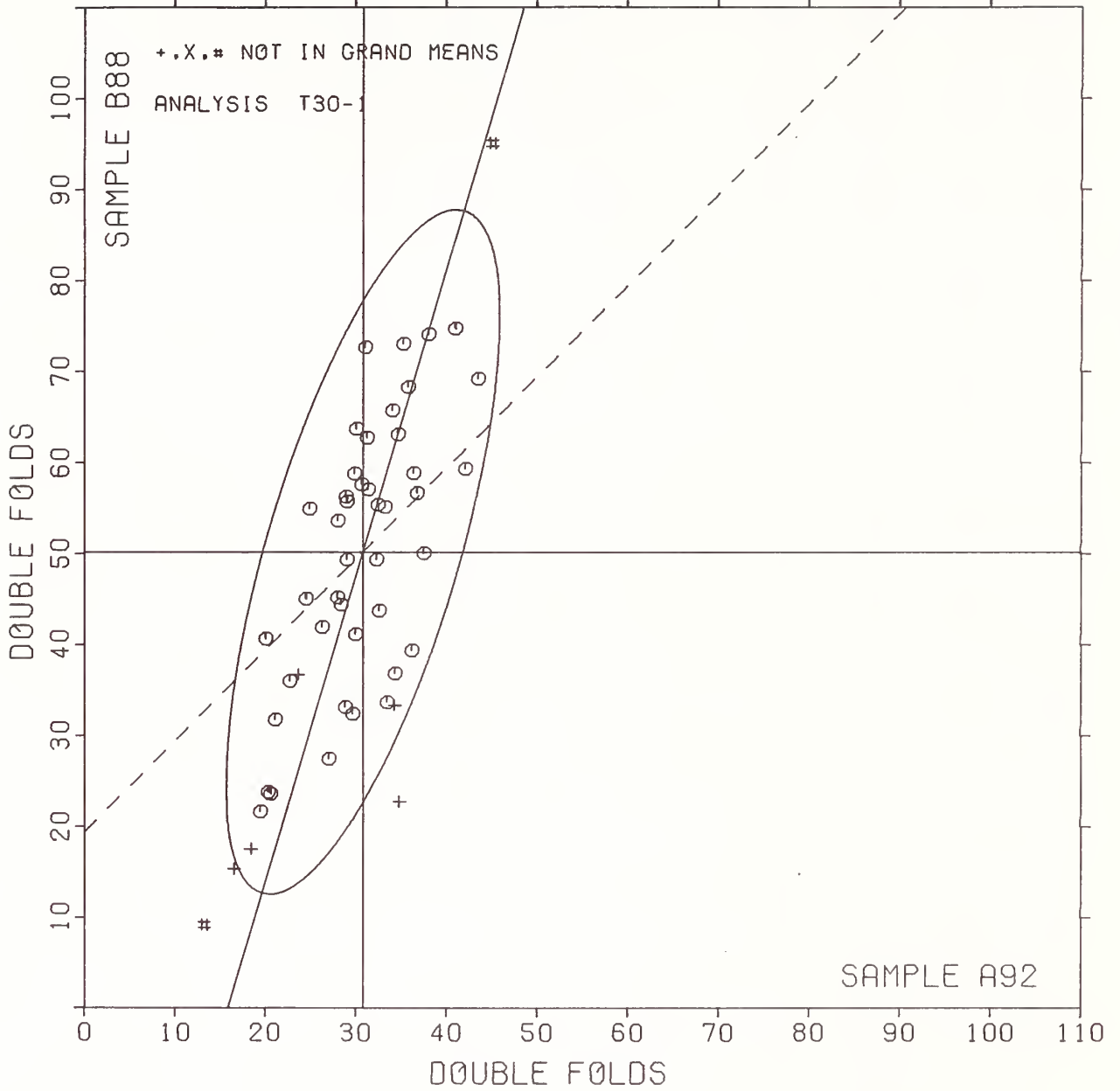
The ISO (International Standards Organization) is proposing that MIT folding endurance be reported as the logarithm (to the base 10) of the double fold instead of the double fold as in the past.

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

LAB CODE	F	MEANS		COORDINATES		AVG R ₀ SDR	VAR	PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		A92	B88	MAJORE	MINORE					
L105	#	12.7	8.2	-45.4	5.4	.17	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L280	+	16.6	15.3	-37.4	3.7	.48	30K	FOLDING	ENDURANCE,	KÖHLER-MÖLIN
L396S	+	18.5	17.5	-34.8	2.5	.45	30T	FOLDING	ENDURANCE,	SCHÖPPER, TWI
L238A	+	19.5	21.7	-30.5	2.7	.60	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L254	+	20.1	40.7	-12.2	7.5	1.18	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L158	+	20.4	23.8	-28.2	2.5	.48	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L238B	+	20.7	23.6	-28.4	2.1	.61	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L100M	+	21.2	31.7	-20.4	3.9	.53	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L100N	+	22.8	36.0	-15.9	3.6	.58	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L182S	+	23.7	36.7	-15.0	3.0	.78	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L339	+	24.6	45.1	-6.7	4.5	.91	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L285A	+	25.0	54.9	2.9	6.9	1.10	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L393	+	26.4	41.9	-9.2	1.9	.52	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L162	+	27.1	27.5	-22.8	-3.0	.66	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L150	+	28.1	45.2	-5.5	1.2	1.19	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L121	+	28.1	53.6	2.5	3.5	1.33	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L118	+	28.5	44.4	-6.2	.6	.69	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L278	+	28.9	33.1	-16.9	-3.1	.76	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L285B	+	29.0	56.3	5.3	3.5	1.26	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L390	+	29.1	49.3	-1.3	1.4	1.13	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L124	+	29.1	55.7	4.9	3.2	.65	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L326N	+	29.7	32.4	-17.3	-4.0	.93	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L262	+	29.9	58.8	8.0	3.3	.92	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L589	+	30.1	41.1	-8.9	-1.9	.80	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L212	+	30.1	63.7	12.8	4.5	1.05	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L320	+	30.7	57.6	7.1	2.2	1.12	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L299	+	31.1	72.7	21.7	6.1	1.15	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L122	+	31.3	62.7	12.2	3.1	1.16	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L599	+	31.5	57.1	6.8	1.3	1.06	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L376	+	32.4	49.3	-.4	-1.8	1.74	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L274	+	32.5	55.4	5.5	-.2	1.09	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L236	+	32.7	43.7	-5.6	-3.6	.91	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L388	+	33.3	55.1	5.5	-1.0	1.04	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L163	+	33.6	33.7	-15.0	-7.3	.92	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L279	+	34.1	65.7	15.9	1.2	1.11	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L326S	+	34.3	33.3	-15.1	-8.2	.64	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L230	+	34.4	36.9	-11.7	-7.2	1.05	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L565	+	34.7	63.1	13.5	-.1	1.15	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L190D	+	34.9	22.7	-25.1	-11.7	.71	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L396M	+	35.3	73.1	23.2	2.2	1.40	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L182M	+	35.9	68.3	18.8	.3	1.01	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L321	+	36.3	39.4	-8.8	-8.3	1.11	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L670	+	36.5	58.9	9.9	-3.0	.76	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L366A	+	36.9	56.7	8.0	-4.0	1.13	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L159	+	37.6	50.1	1.8	-6.5	1.05	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L185	+	38.1	74.1	25.1	-.2	1.24	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L176	+	41.1	74.7	26.5	-2.8	1.31	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L223F	+	42.2	59.3	12.0	-8.3	1.17	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L275	+	43.6	69.3	21.9	-6.8	1.24	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L190C	+	44.3	122.7	73.3	7.7	2.16	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L232	+	44.5	94.1	46.0	-.6	1.78	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L622	+	49.5	130.8	82.6	5.1	3.94	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
GMEANS:		30.8	50.2			1.00				
		95% ELLIPSE:		39.1	10.7					WITH GAMMA = 73 DEGREES

FOLDING ENDURANCE (MIT)

SAMPLE A92 = 31. DOUBLE FOLDS SAMPLE B88 = 50. DOUBLE FOLDS



ANALYSIS T30-2 TABLE 1

FOLDING ENDURANCE (MIT)

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

LAB CODE	SAMPLE A92 WAVE ENVELOPE PAPER 75 GRAMS PER SQUARE METER					SAMPLE B88 HEAT SET OFFSET BOOK 88 GRAMS PER SQUARE METER					TEST D. # 15		
	MEAN	DEV	N _o DEV	SDR	R _o SDR	MEAN	DEV	N _o DEV	SDR	R _o SDR	VAR	F	LAB
L100M	1.31	-.15	-1.67	.14	.93	1.49	-.16	-1.08	.11	.63	30M	0	L100M
L100N	1.34	-.12	-1.35	.15	.99	1.54	-.10	-.69	.11	.60	30N	0	L100N
L105	1.10	-.36	-4.03	.08	.51	.90	-.75	-5.12	.12	.69	30M	#	L105
L118	1.45	-.01	-.12	.09	.63	1.62	-.02	-.15	.15	.85	30D	0	L118
L121	1.41	-.05	-.54	.21	1.38	1.67	.03	.20	.23	1.29	30M	0	L121
L122	1.48	.02	.23	.13	.90	1.76	.12	.79	.19	1.06	30M	0	L122
L124	1.45	-.00	-.02	.10	.66	1.74	.09	.63	.10	.55	30N	0	L124
L150	1.43	-.02	-.26	.13	.85	1.57	-.07	-.51	.27	1.53	30M	0	L150
L158	1.29	-.16	-1.84	.13	.87	1.35	-.29	-2.01	.16	.91	30N	0	L158
L159	1.55	.10	1.08	.14	.97	1.68	.03	.23	.14	.80	30N	0	L159
L162	1.39	-.06	-.71	.20	1.32	1.40	-.25	-1.68	.20	1.12	30M	0	L162
L163	1.50	.05	.51	.15	.99	1.50	-.15	-1.02	.17	.94	30N	0	L163
L176	1.60	.14	1.58	.12	.80	1.84	.20	1.38	.16	.93	30N	0	L176
L182M	1.53	.08	.85	.14	.96	1.82	.18	1.23	.11	.60	30M	0	L182M
L185	1.55	.10	1.09	.16	1.09	1.85	.21	1.42	.13	.76	30N	0	L185
L190C	1.62	.16	1.80	.18	1.22	2.02	.37	2.57	.30	1.73	30N	#	L190C
L212	1.44	-.01	-.14	.18	1.17	1.79	.15	1.03	.10	.56	30M	0	L212
L223F	1.61	.15	1.70	.13	.87	1.74	.10	.67	.18	1.01	30M	0	L223F
L230	1.52	.06	.67	.14	.95	1.51	-.13	-.92	.22	1.26	30N	0	L230
L232	1.62	.17	1.89	.15	1.00	1.93	.29	1.99	.19	1.11	30N	#	L232
L236	1.49	.03	.37	.16	1.05	1.61	-.03	-.20	.16	.92	30N	0	L236
L238A	1.27	-.19	-2.11	.15	.99	1.28	-.36	-2.48	.22	1.23	30N	0	L238A
L238B	1.28	-.17	-1.94	.18	1.18	1.35	-.30	-2.05	.16	.89	30D	0	L238B
L254	1.25	-.20	-2.29	.23	1.52	1.50	-.14	-.98	.33	1.85	30M	0	L254
L262	1.46	.00	.01	.14	.92	1.74	.10	.69	.15	.88	30N	0	L262
L274	1.49	.04	.39	.14	.94	1.70	.06	.40	.21	1.18	30N	0	L274
L275	1.62	.16	1.83	.14	.95	1.82	.17	1.19	.15	.84	30N	0	L275
L278	1.44	-.02	-.22	.16	1.05	1.50	-.14	-.99	.13	.76	30C	0	L278
L279	1.51	.06	.63	.14	.92	1.79	.15	1.01	.16	.93	30N	0	L279
L285A	1.38	-.07	-.81	.12	.79	1.68	.03	.24	.24	1.37	30N	0	L285A
L285B	1.43	-.02	-.27	.17	1.12	1.70	.05	.35	.23	1.30	30N	0	L285B
L299	1.47	.02	.17	.15	.99	1.83	.19	1.30	.16	.93	30N	0	L299
L320	1.47	.01	.16	.13	.86	1.71	.06	.44	.23	1.32	30N	0	L320
L321	1.53	.08	.85	.16	1.09	1.55	-.10	-.68	.22	1.23	30N	0	L321
L326N	1.44	-.02	-.23	.18	1.24	1.48	-.16	-1.11	.17	.94	30N	0	L326N
L339	1.36	-.10	-1.11	.17	1.16	1.63	-.01	-.09	.14	.81	30N	0	L339
L366A	1.54	.08	.95	.16	1.04	1.73	.08	.56	.17	.97	30N	0	L366A
L376	1.46	-.00	-.00	.23	1.54	1.59	-.05	-.38	.31	1.74	30N	0	L376
L388	1.50	.05	.52	.14	.94	1.71	.06	.43	.19	1.05	30N	0	L388
L390	1.43	-.02	-.23	.17	1.15	1.64	-.00	-.03	.22	1.27	30N	0	L390
L393	1.41	-.04	-.47	.08	.57	1.61	-.04	-.26	.13	.71	30M	0	L393
L396M	1.52	.07	.76	.15	1.01	1.83	.19	1.27	.17	.98	30N	0	L396M
L565	1.52	.06	.67	.15	1.02	1.78	.13	.90	.15	.85	30N	0	L565
L589	1.46	.00	.04	.13	.84	1.59	-.05	-.36	.15	.85	30N	0	L589
L599	1.47	.02	.22	.15	1.00	1.71	.07	.47	.22	1.24	30C	0	L599
L622	1.60	.14	1.62	.33	2.21	1.92	.28	1.90	.53	3.03	30M	#	L622
L670	1.55	.09	1.02	.12	.79	1.76	.12	.81	.09	.52	30N	0	L670

GR. MEAN = 1.46 LOG(10) FOLD GRAND MEAN = 1.64 LOG(10) FOLD TEST DETERMINATIONS = 15
 SD MEANS = .09 LOG(10) FOLD SD OF MEANS = .15 LOG(10) FOLD 43 LABS IN GRAND MEANS
 AVERAGE SDR = .15 LOG(10) FOLD AVERAGE SDR = .18 LOG(10) FOLD

L182S	1.35	-.11	-1.23	.16	1.10	1.54	-.11	-.74	.16	.92	30S	*	L182S
L190D	1.52	.07	.75	.14	.93	1.33	-.32	-2.16	.17	.95	30S	*	L190D
L280	1.19	-.27	-3.02	.18	1.21	1.15	-.50	-3.41	.19	1.10	30K	*	L280
L326S	1.52	.07	.73	.12	.79	1.51	-.14	-.93	.12	.69	30S	*	L326S
L396S	1.24	-.21	-2.37	.14	.95	1.22	-.42	-2.91	.15	.85	30T	*	L396S

TOTAL NUMBER OF LABORATORIES REPORTING = 52

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

Analysis T30-1 in this report is the same as in the past with no changes. The analysis, T30-2, shows the data as the ISO proposes. This analysis uses the raw data reported for T30-1. The raw data are converted to the logarithm (base 10) as shown in the example to the right, and then the mean of the converted data is calculated and reported as IS⁴ 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

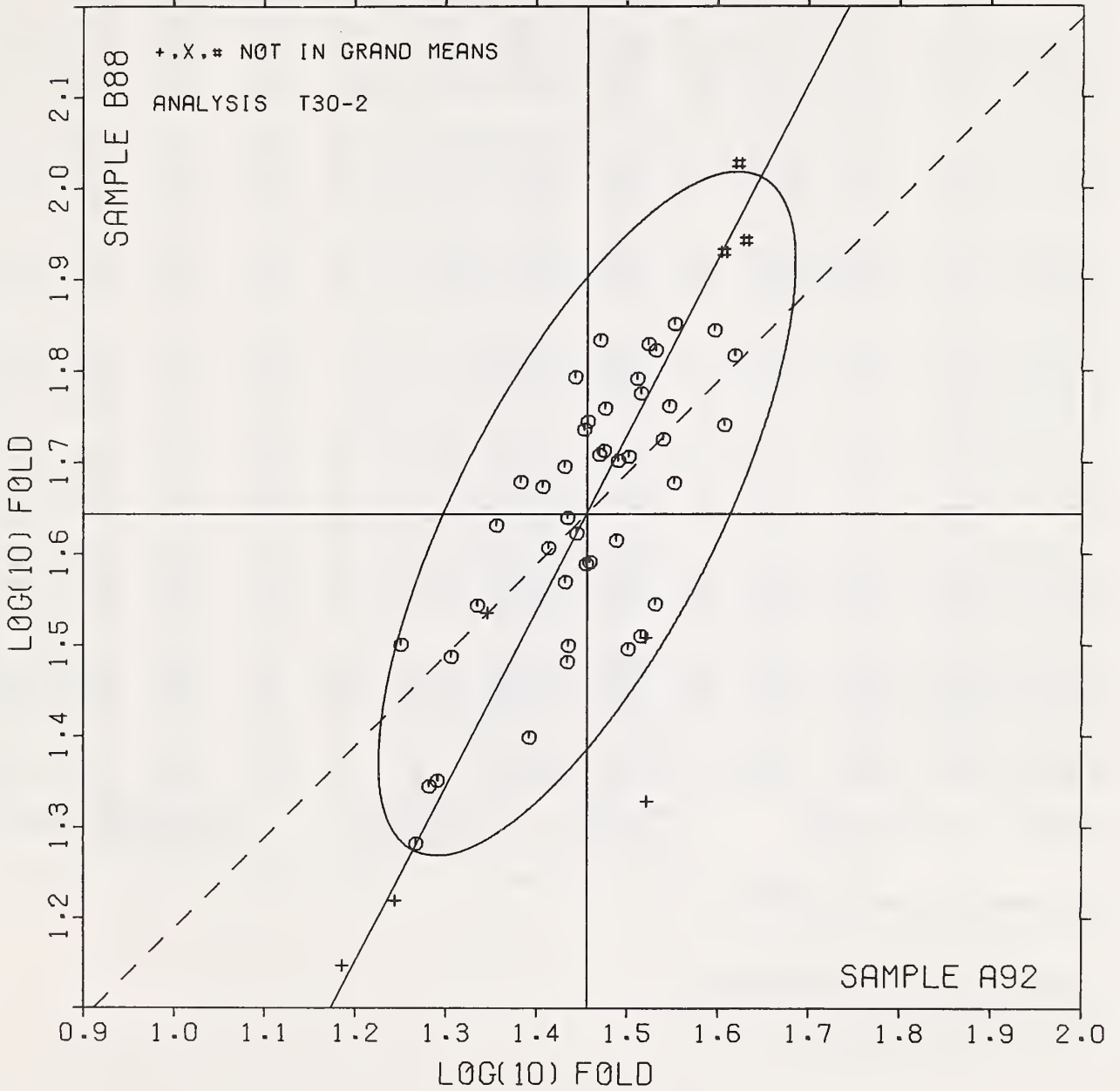
mean of logs
"Folding endurance"

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST	INSTRUMENT---	CONDITIONS
		A92	B88	MAJOR	MINOR	R.SDR	VAR			
L105	#	1.10	.90	-.83	-.02	.60	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L280	*	1.19	1.15	-.57	.01	1.15	30K	FOLDING	ENDURANCE,	KGELER-MOLIN
L396S	*	1.24	1.22	-.47	-.01	.90	30T	FOLDING	ENDURANCE,	SCHÖPPER, TMI
L254	Ø	1.25	1.50	-.22	.12	1.69	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L238A	Ø	1.27	1.28	-.41	.00	1.11	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L238B	Ø	1.28	1.35	-.34	.02	1.04	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L158	Ø	1.29	1.35	-.34	.01	.89	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L100M	Ø	1.31	1.49	-.21	.06	.78	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L100N	Ø	1.34	1.54	-.14	.06	.79	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L182S	*	1.35	1.54	-.15	.05	1.01	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L339	Ø	1.36	1.63	-.06	.08	.99	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L285A	Ø	1.38	1.68	-.00	.08	1.08	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L162	Ø	1.39	1.40	-.25	-.06	1.22	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L121	Ø	1.41	1.67	.00	.06	1.33	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L393	Ø	1.41	1.61	-.05	.02	.64	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L285B	Ø	1.43	1.70	.03	.04	1.21	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L150	Ø	1.43	1.57	-.08	-.01	1.19	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L390	Ø	1.43	1.64	-.01	.02	1.21	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L326N	Ø	1.44	1.48	-.15	-.06	1.09	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L278	Ø	1.44	1.50	-.14	-.05	.91	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L212	Ø	1.44	1.79	.13	.08	.87	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L118	Ø	1.45	1.62	-.02	-.00	.74	30D	FOLDING	ENDURANCE,	MIT, MODIFIED DRIVE TO REDUCE HEATING
L124	Ø	1.45	1.74	.08	.04	.60	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L376	Ø	1.46	1.59	-.05	-.02	1.64	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L262	Ø	1.46	1.74	.09	.05	.90	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L589	Ø	1.46	1.59	-.04	-.03	.85	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L320	Ø	1.47	1.71	.06	.02	1.09	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L299	Ø	1.47	1.83	.18	.07	.96	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L599	Ø	1.47	1.71	.07	.01	1.12	30C	FOLDING	ENDURANCE,	MIT, CIRCULATING FAN IN CEILING
L122	Ø	1.48	1.76	.11	.03	.98	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L236	Ø	1.49	1.61	-.01	-.04	.99	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L274	Ø	1.49	1.70	.07	-.00	1.06	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L163	Ø	1.50	1.50	-.11	-.11	.96	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L388	Ø	1.50	1.71	.08	-.01	1.00	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L279	Ø	1.51	1.79	.16	.02	.92	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L230	Ø	1.52	1.51	-.09	-.11	1.10	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L565	Ø	1.52	1.78	.14	.01	.94	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L326S	*	1.52	1.51	-.09	-.12	.74	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L190D	*	1.52	1.33	-.25	-.20	.94	30S	FOLDING	ENDURANCE,	SCHÖPPER, LEIPZIG
L396M	Ø	1.52	1.83	.20	.02	.99	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L321	Ø	1.53	1.55	-.05	-.11	1.16	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L182M	Ø	1.53	1.82	.19	.01	.78	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L366A	Ø	1.54	1.73	.11	-.04	1.00	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L670	Ø	1.55	1.76	.15	-.03	.65	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L159	Ø	1.55	1.68	.07	-.07	.88	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L185	Ø	1.55	1.85	.23	.01	.93	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L176	Ø	1.60	1.84	.24	-.03	.87	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L622	#	1.60	1.92	.31	-.00	2.62	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L223F	Ø	1.61	1.74	.16	-.09	.94	30M	FOLDING	ENDURANCE,	MIT, WITH CENTRIFUGAL FAN
L190C	#	1.62	2.02	.41	.03	1.48	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L275	Ø	1.62	1.82	.23	-.07	.90	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
L232	#	1.62	1.93	.33	-.02	1.05	30N	FOLDING	ENDURANCE,	MIT, NO CENTRIFUGAL FAN
GMEANS:		1.46	1.64			1.00				
95% ELLIPSE:				.42	.14	WITH GAMMA = 62 DEGREES				

FOLDING ENDURANCE (MIT)

SAMPLE A92 = 1.46 LOG(10) FOLD SAMPLE B88 = 1.64 LOG(10) FOLD



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

LAB CODE	SAMPLE J26 103 GRAMS PER SQUARE METER PRINTING					SAMPLE J28 93 GRAMS PER SQUARE METER PRINTING					TEST D. = 10			
	MEAN	DEV	N, DEV	SDR	R, SDR	MEAN	DEV	N, DEV	SDR	R, SDR	VAR	F	LAB	
L100	256.	14.	.67	10.	.93	451.	-19.	-.61	11.	.40	35G	Ø	L100	
L118	242.	-1.	-.03	16.	1.40	489.	18.	.57	46.	1.64	35G	Ø	L118	
L121	216.	-26.	-1.30	8.	.75	416.	-55.	-1.72	26.	.93	35G	Ø	L121	
L122	225.	-17.	-.84	20.	1.76	449.	-22.	-.70	38.	1.36	35G	Ø	L122	
L132	234.	-8.	-.41	10.	.86	398.	-73.	-2.28	16.	.58	35G	*	L132	
L139	240.	-3.	-.14	6.	.51	440.	-31.	-.98	21.	.75	35G	Ø	L139	
L148	234.	-9.	-.43	11.	.98	476.	5.	.15	30.	1.08	35G	Ø	L148	
L153	243.	1.	.05	13.	1.13	476.	5.	.16	37.	1.33	35G	Ø	L153	
L159	260.	18.	.88	14.	1.29	492.	22.	.67	78.	2.83	35G	Ø	L159	
L162	223.	-19.	-.94	9.	.83	452.	-19.	-.60	19.	.68	35G	Ø	L162	
L163	221.	-21.	-1.05	17.	1.54	452.	-19.	-.59	40.	1.43	35G	Ø	L163	
L183	240.	-2.	-.12	12.	1.09	471.	0.	.00	25.	.89	35G	Ø	L183	
L190C	183.	-59.	-2.91	8.	.67	404.	-67.	-2.09	25.	.91	35G	*	L190C	
L195	292.	50.	2.46	59.	5.27	489.	18.	.58	33.	1.18	35G	*	L195	
L212	255.	13.	.63	8.	.67	502.	31.	.96	40.	1.44	35G	Ø	L212	
L223	242.	0.	.00	5.	.44	467.	-4.	-.13	13.	.47	35G	Ø	L223	
L224	272.	30.	1.46	14.	1.29	508.	38.	1.17	25.	.89	35G	Ø	L224	
L232	260.	17.	.85	8.	.69	503.	32.	1.00	23.	.82	35G	Ø	L232	
L236	274.	32.	1.57	12.	1.03	536.	65.	2.02	19.	.67	35G	Ø	L236	
L241	171.	-71.	-3.51	9.	.77	245.	-226.	-7.06	6.	.22	35G	#	L241	
L249	258.	15.	.76	15.	1.33	464.	-7.	-.23	29.	1.05	35G	Ø	L249	
L254	219.	-23.	-1.16	12.	1.05	444.	-27.	-.84	27.	.99	35G	Ø	L254	
L260	245.	2.	.11	3.	.28	472.	1.	.03	8.	.31	35G	Ø	L260	
L285	250.	8.	.38	14.	1.20	474.	3.	.09	22.	.78	35G	Ø	L285	
L291	248.	6.	.29	12.	1.05	517.	46.	1.45	19.	.67	35G	Ø	L291	
L308	238.	-4.	-.22	12.	1.09	467.	-4.	-.12	35.	1.28	35G	Ø	L308	
L321	199.	-43.	-2.13	16.	1.44	418.	-53.	-1.66	19.	.70	35G	Ø	L321	
L356	234.	-8.	-.40	7.	.59	481.	10.	.30	24.	.86	35G	Ø	L356	
L376	246.	4.	.18	11.	.95	486.	15.	.48	43.	1.55	35G	Ø	L376	
L382	254.	12.	.59	11.	.95	457.	-14.	-.45	19.	.70	35G	Ø	L382	
L390	249.	7.	.32	9.	.84	477.	6.	.19	12.	.45	35G	Ø	L390	
L396	244.	2.	.08	15.	1.31	457.	-14.	-.44	28.	1.02	35G	Ø	L396	
L571	71.	-171.	-8.41	8.	.73	128.	-343.	-10.73	15.	.53	35G	#	L571	
L600	244.	2.	.09	12.	1.04	509.	38.	1.20	22.	.79	35G	Ø	L600	
L648	255.	12.	.61	7.	.65	497.	26.	.83	38.	1.37	35G	Ø	L648	
L650	242.	-0.	-.02	11.	1.02	514.	43.	1.35	35.	1.26	35G	Ø	L650	
L693	245.	3.	.12	10.	.88	478.	7.	.23	17.	.61	35G	Ø	L693	
GR. MEAN =	242.	GURLEY UNITS				GRAND MEAN =	471.	GURLEY UNITS				TEST DETERMINATIONS = 10		
SD MEANS =	20.	GURLEY UNITS				SD OF MEANS =	32.	GURLEY UNITS				35 LABS IN GRAND MEANS		
		AVERAGE SDR = 11.						AVERAGE SDR = 28.				GURLEY UNITS		

L213 241. -2. -.08 10. .87 454. -16. -.51 27. .98 35H * L213
TOTAL NUMBER OF LABORATORIES REPORTING = 38

Best values: J26 240 ± 40 Gurley units
J28 470 ± 50 Gurley units

The following laboratories were omitted from the grand means because of extreme test results: 241.

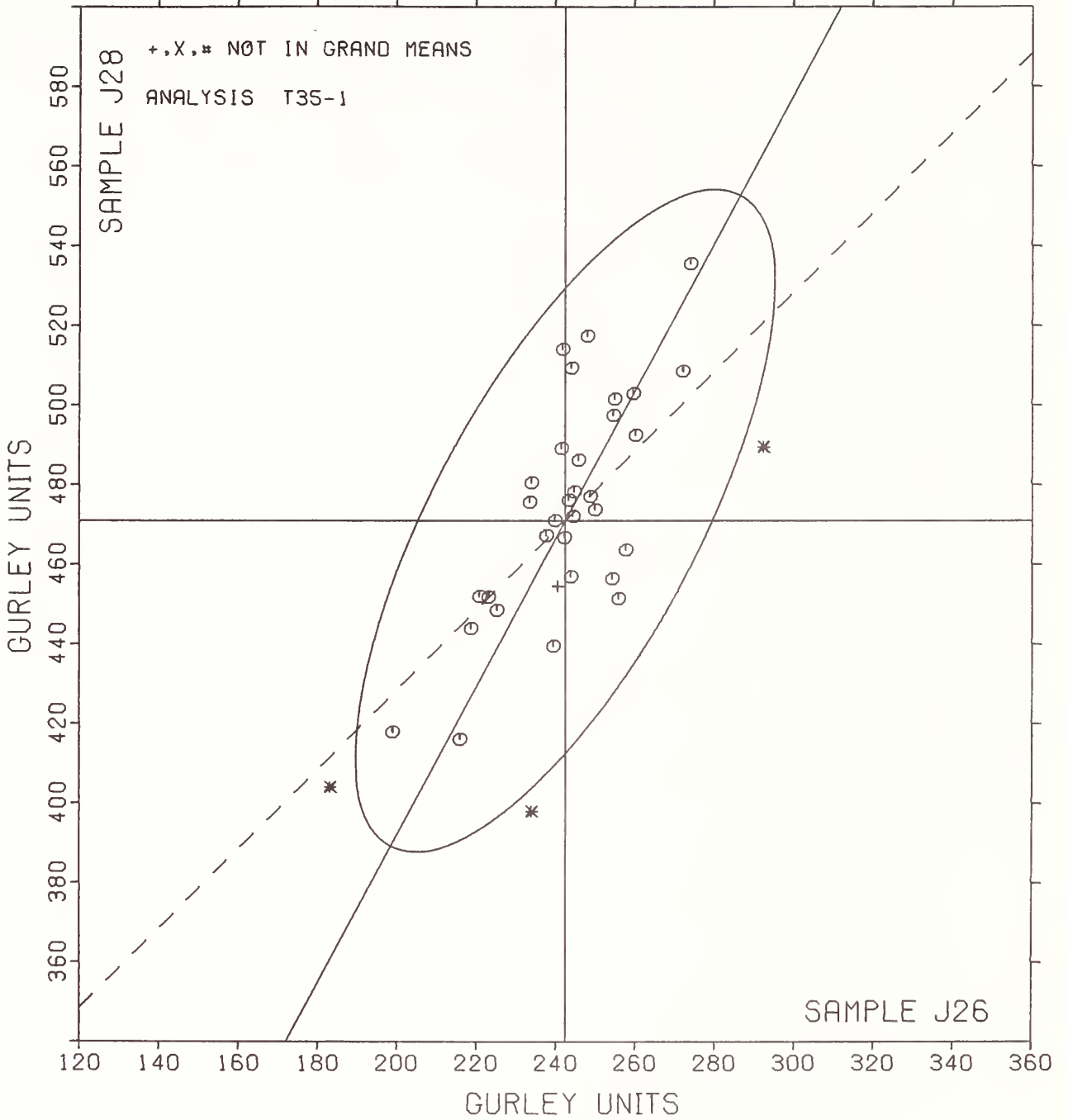
Data from the following laboratories appear to be off by a multiplicative factor: 571.

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
		J26	J28	MAJOR	MINOR	R _s	SDR VAR	
L571	#	71.	128.	-383.	-12.	.63	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L241	#	171.	245.	-233.	-44.	.50	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L190C	*	183.	404.	-87.	20.	.79	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L321	Ø	159.	418.	-67.	13.	1.07	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L121	Ø	216.	416.	-61.	-3.	.84	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L254	Ø	219.	444.	-35.	8.	1.02	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L163	Ø	221.	452.	-27.	10.	1.49	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L162	Ø	223.	452.	-26.	8.	.75	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L122	Ø	225.	449.	-28.	4.	1.56	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L148	Ø	234.	476.	-0.	10.	1.03	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L132	*	234.	398.	-68.	-27.	.72	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L356	Ø	234.	481.	5.	12.	.72	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L308	Ø	238.	467.	-5.	2.	1.18	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L139	Ø	240.	440.	-29.	-12.	.63	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L183	Ø	240.	471.	-1.	2.	.99	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L213	*	241.	454.	-15.	-6.	.92	35H	STIFFNESS, GURLEY (UNITS: MG/1X3 TEST PIECE), 20 C, 65% RH
L118	Ø	242.	489.	16.	9.	1.52	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L650	Ø	242.	514.	38.	21.	1.14	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L223	Ø	242.	467.	-4.	-2.	.45	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L153	Ø	243.	476.	5.	1.	1.23	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L396	Ø	244.	457.	-12.	-8.	1.16	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L600	Ø	244.	509.	35.	17.	.92	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L260	Ø	245.	472.	2.	-1.	.29	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L693	Ø	245.	478.	8.	1.	.75	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L376	Ø	246.	486.	15.	4.	1.25	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L291	Ø	248.	517.	44.	17.	.86	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L390	Ø	249.	477.	8.	-3.	.64	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L285	Ø	250.	474.	6.	-5.	.99	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L382	Ø	254.	457.	-7.	-17.	.82	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L648	Ø	255.	497.	29.	2.	1.01	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L212	Ø	255.	502.	33.	3.	1.05	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L100	Ø	256.	451.	-11.	-21.	.67	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L249	Ø	258.	464.	1.	-17.	1.19	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L232	Ø	260.	503.	36.	-0.	.76	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L159	Ø	260.	492.	27.	-6.	2.06	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L224	Ø	272.	508.	47.	-8.	1.09	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L236	Ø	274.	536.	72.	3.	.85	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L195	*	292.	489.	40.	-35.	3.23	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
GMEANS:		242.	471.			1.00		
		95% ELLIPSE:		93.	33.	WITH GAMMA = 61 DEGREES		

STIFFNESS, GURLEY

SAMPLE J26 = 242. GURLEY UNITS SAMPLE J28 = 471. GURLEY UNITS



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

LAB CODE	SAMPLE J70 MEAN	PRINTING 25 GRAMS PER SQUARE METER				SAMPLE B63 MEAN	KRAFT ENVELOPE 124 GRAMS PER SQUARE METER				TEST D ₀ = 10	
		DEV	N ₀ DEV	SDR	R ₀ SDR		DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F LAB
L107A	6.08	2.19	2.09	.43	1.28	19.51	.67	.50	.54	.68	36T	Ø L107A
L122	6.41	.52	.49	.28	.83	17.35	-1.49	-1.11	2.12	2.65	36T	Ø L122
L123	6.20	.31	.29	.42	1.25	18.70	-.14	-.10	.48	.61	36T	Ø L123
L126	4.58	-1.32	-1.26	.20	.59	17.72	-1.11	-.83	.40	.50	36T	Ø L126
L150	4.45	-1.44	-1.38	.16	.49	18.80	-.04	-.03	1.75	2.20	36T	Ø L150
L158	2.28	-3.62	-3.47	.15	.44	5.11	-13.72	-10.27	.14	.17	36T	# L158
L163	5.41	-.48	-.46	.19	.57	19.45	.61	.46	.86	1.08	36T	Ø L163
L173B	6.47	.58	.55	.30	.88	18.67	-.17	-.13	.45	.56	36T	Ø L173B
L182	6.10	.21	.20	.47	1.39	18.62	-.22	-.16	.88	1.11	36T	Ø L182
L207	7.63	1.74	1.66	.59	1.73	19.47	.63	.47	.65	.81	36T	Ø L207
L228	5.48	-.41	-.40	.47	1.40	19.00	.16	.12	.82	1.02	36T	Ø L228
L230	6.60	.71	.68	.70	2.07	20.30	1.46	1.09	1.42	1.78	36T	Ø L230
L236	4.97	-.92	-.89	.22	.64	22.30	3.46	2.59	2.06	2.58	36T	* L236
L242	6.22	.33	.32	.43	1.28	18.96	.12	.09	.90	1.13	36T	Ø L242
L260	6.16	.27	.26	.33	.98	18.53	-.31	-.23	.71	.89	36T	Ø L260
L262	6.10	.21	.20	.57	1.68	20.70	1.86	1.39	.48	.61	36T	Ø L262
L274	6.00	.11	.10	.24	.70	18.95	.11	.08	.60	.75	36T	Ø L274
L290	6.50	.61	.58	.39	1.17	21.90	3.06	2.29	1.10	1.38	36T	Ø L290
L313	5.23	-.66	-.64	.21	.62	1.95	-16.89	-12.64	.07	.09	36T	# L313
L318	4.50	-1.39	-1.33	.10	.30	17.37	-1.46	-1.09	.44	.56	36T	Ø L318
L321	5.00	-.89	-.86	.00	.00	17.24	-1.60	-1.19	.55	.69	36T	Ø L321
L324	5.03	-.86	-.83	.16	.48	19.10	.26	.20	.70	.88	36T	Ø L324
L339	4.22	-1.67	-1.60	.17	.49	17.25	-1.59	-1.19	.42	.53	36T	Ø L339
L388	5.45	-.44	-.42	.25	.75	68.95	50.11	37.50	2.92	3.66	36T	# L388
L442	6.41	.52	.49	.34	1.01	19.04	.20	.15	.52	.65	36T	Ø L442
L484	4.26	-1.63	-1.57	.25	.75	16.90	-1.94	-1.45	.61	.77	36T	Ø L484
L570	6.30	.41	.39	.48	1.43	19.10	.26	.20	.74	.93	36T	Ø L570
L580	5.90	.01	.01	.57	1.68	17.70	-1.14	-.85	.67	.85	36T	Ø L580
L616	6.00	.11	.10	.00	.00	17.25	-1.59	-1.19	.26	.33	36T	Ø L616
L651	8.20	2.31	2.21	.63	1.87	19.60	.76	.57	1.58	1.98	36T	Ø L651
L692	5.85	-.04	-.04	.24	.71	17.95	-.89	-.66	.86	1.08	36T	Ø L692

GR. MEAN = 5.89 TABER UNITS GRAND MEAN = 18.84 TABER UNITS TEST DETERMINATIONS = 10
 SD MEANS = 1.04 TABER UNITS SD OF MEANS = 1.34 TABER UNITS 28 LABS IN GRAND MEANS
 AVERAGE SDR = .34 TABER UNITS AVERAGE SDR = .80 TABER UNITS

L250 6.65 .76 .72 .53 1.56 18.13 -.71 -.53 .54 .68 36U * L250
 TOTAL NUMBER OF LABORATORIES REPORTING = 32

Best values: J70 6.0 ± 1.7 Taber units
 B63 18.8 ± 1.8 Taber units

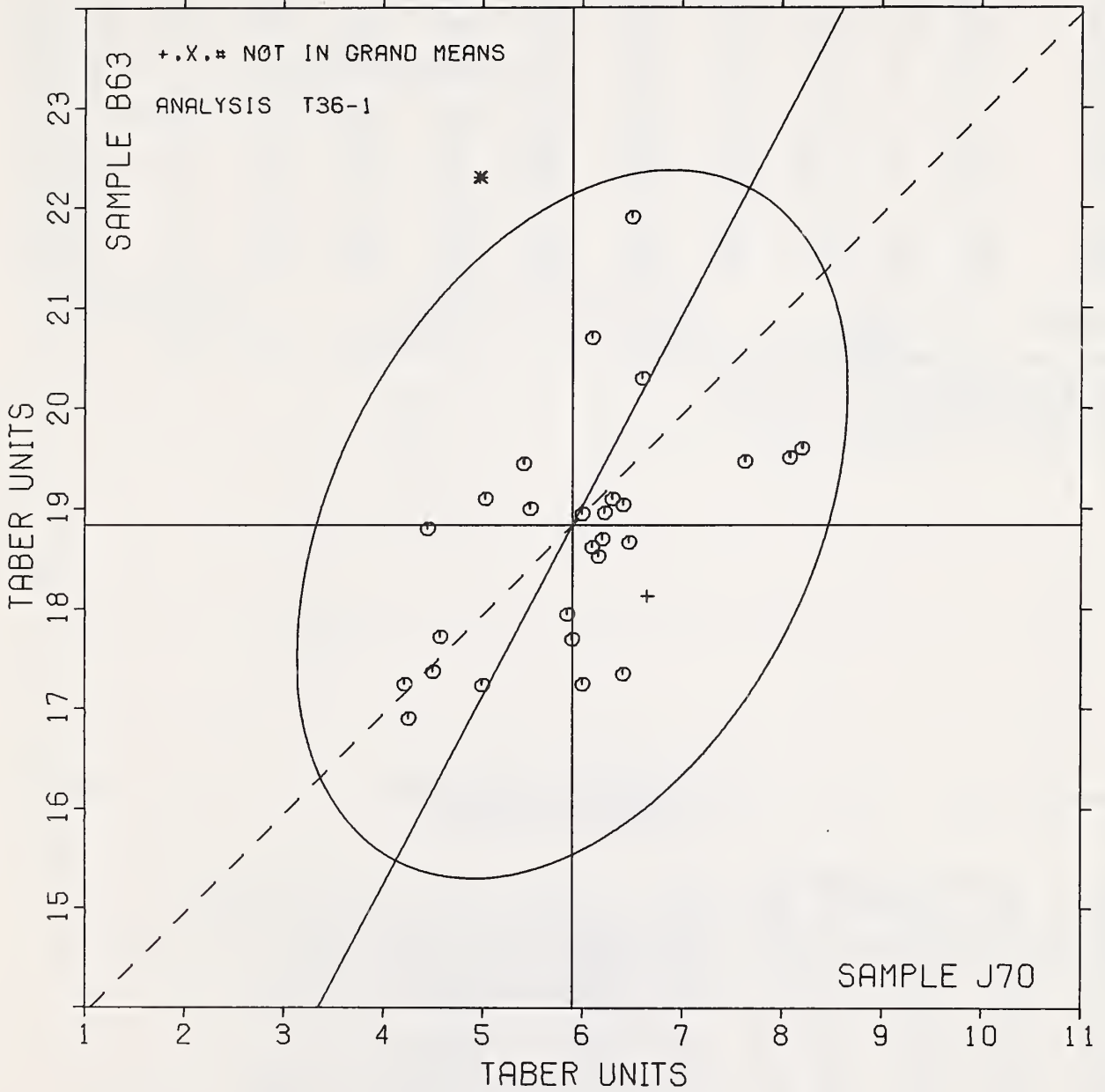
The following laboratories were omitted from the grand means because of extreme test results: 158, 313, 388.

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J70	B63	MAJOR	MINOR	R.SDR	VAR			
L158	#	2.28	5.11	-13.83	-3.19	.31	36T	STIFFNESS,	TABER	
L339	Ø	4.22	17.25	-2.18	.74	.51	36T	STIFFNESS,	TABER	
L484	Ø	4.26	16.90	-2.48	.54	.76	36T	STIFFNESS,	TABER	
L150	Ø	4.45	18.80	-.71	1.26	1.34	36T	STIFFNESS,	TABER	
L318	Ø	4.50	17.37	-1.94	.55	.43	36T	STIFFNESS,	TABER	
L126	Ø	4.58	17.72	-1.60	.65	.55	36T	STIFFNESS,	TABER	
L236	*	4.57	22.30	2.63	2.43	1.61	36T	STIFFNESS,	TABER	
L321	Ø	5.00	17.24	-1.83	.05	.34	36T	STIFFNESS,	TABER	
L324	Ø	5.03	19.10	-.17	.89	.68	36T	STIFFNESS,	TABER	
L313	#	5.23	1.95	-15.25	-7.28	.35	36T	STIFFNESS,	TABER	
L163	Ø	5.41	19.45	.32	.71	.83	36T	STIFFNESS,	TABER	
L388	#	5.45	68.95	44.14	23.74	2.21	36T	STIFFNESS,	TABER	
L228	Ø	5.48	19.00	-.05	.44	1.21	36T	STIFFNESS,	TABER	
L692	Ø	5.85	17.95	-.81	-.37	.90	36T	STIFFNESS,	TABER	
L580	Ø	5.90	17.70	-1.00	-.53	1.26	36T	STIFFNESS,	TABER	
L274	Ø	6.00	18.95	.15	-.04	.72	36T	STIFFNESS,	TABER	
L616	Ø	6.00	17.25	-1.36	-.83	.17	36T	STIFFNESS,	TABER	
L182	Ø	6.10	18.62	-.10	-.28	1.25	36T	STIFFNESS,	TABER	
L262	Ø	6.10	20.70	1.74	.69	1.14	36T	STIFFNESS,	TABER	
L260	Ø	6.16	18.53	-.15	-.38	.94	36T	STIFFNESS,	TABER	
L123	Ø	6.20	18.70	.02	-.33	.93	36T	STIFFNESS,	TABER	
L242	Ø	6.22	18.96	.26	-.24	1.21	36T	STIFFNESS,	TABER	
L570	Ø	6.30	19.10	.42	-.24	1.18	36T	STIFFNESS,	TABER	
L122	Ø	6.41	17.35	-1.08	-1.15	1.74	36T	STIFFNESS,	TABER	
L442	Ø	6.41	19.04	.42	-.36	.83	36T	STIFFNESS,	TABER	
L173B	Ø	6.47	18.67	.12	-.59	.72	36T	STIFFNESS,	TABER	
L290	Ø	6.50	21.90	2.99	.89	1.27	36T	STIFFNESS,	TABER	
L230	Ø	6.60	20.30	1.62	.06	1.92	36T	STIFFNESS,	TABER	
L250	*	6.65	18.13	-.27	-1.00	1.12	36U	STIFFNESS,	TABER,	20 C, 65% RH
L207	Ø	7.63	19.47	1.37	-1.24	1.27	36T	STIFFNESS,	TABER	
L107A	Ø	8.08	19.51	1.61	-1.62	.98	36T	STIFFNESS,	TABER	
L651	Ø	8.20	19.60	1.75	-1.68	1.92	36T	STIFFNESS,	TABER	
GMEANS:		5.89	18.84			1.00				
		95% ELLIPSE:		3.79	2.40			WITH GAMMA = 62 DEGREES		

STIFFNESS, TABER

SAMPLE J70 = 5.9 TABER UNITS SAMPLE B63 = 18.8 TABER UNITS



LAB CODE	SAMPLE J52					SAMPLE J54					TEST D. = 4		
	MEAN	89 GRAMS PER SQUARE METER		PRINTING PER SQUARE METER		MEAN	149 GRAMS PER SQUARE METER		PRINTING PER SQUARE METER		VAR	F	LAB
		DEV	N. DEV	SDR	R. SDR		DEV	N. DEV	SDR	R. SDR			
L122	40.5	-13.4	-0.61	1.7	.44	53.2	-15.3	-0.49	1.4	.33	49Q	Ø	L122
L149	38.7	-15.3	-0.69	6.1	1.63	44.3	-24.2	-0.78	5.5	1.32	49L	Ø	L149
L182I	30.5	-23.4	-1.06	1.4	.38	25.1	-43.4	-1.40	.6	.14	49Q	Ø	L182I
L190C	50.0	-4.0	-0.18	3.6	.94	57.5	-11.0	-0.36	4.2	1.01	49T	Ø	L190C
L207	56.7	2.8	.13	8.1	2.14	NO DATA REPORTED FOR SAMPLE J54				49I	M	L207	
L242	28.8	-25.2	-1.14	1.7	.46	41.0	-27.5	-0.89	3.3	.80	49P	Ø	L242
L274	60.1	6.1	.28	2.0	.52	60.6	-7.9	-0.25	1.3	.30	49I	Ø	L274
L277	73.9	19.9	.90	11.6	3.07	114.7	46.2	1.49	7.9	1.89	49I	Ø	L277
L280	48.8	-5.1	-0.23	2.6	.69	69.6	1.1	.04	3.8	.91	49U	#	L280
L291	61.0	7.1	.32	2.2	.58	66.7	-1.8	-0.06	2.5	.60	49I	Ø	L291
L484	83.1	29.1	1.32	1.0	.26	94.8	26.3	.85	4.4	1.06	49P	Ø	L484
L564	21.2	-32.8	-1.48	7.5	1.97	44.5	-24.0	-0.77	11.0	2.65	49D	Ø	L564
L598	78.1	24.1	1.09	3.9	1.03	102.1	33.6	1.09	4.8	1.15	49W	Ø	L598
L643	81.6	27.6	1.25	2.7	.73	117.4	48.9	1.58	3.1	.75	49I	Ø	L643

GR. MEAN = 54.0 KP CM/SEC GRAND MEAN = 68.5 KP CM/SEC TEST DETERMINATIONS = 4
SD MEANS = 22.1 KP CM/SEC SD OF MEANS = 31.0 KP CM/SEC 12 LABS IN GRAND MEANS
AVERAGE SDR = 3.8 KP CM/SEC AVERAGE SDR = 4.2 KP CM/SEC

TOTAL NUMBER OF LABORATORIES REPORTING = 14

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---	TEST INSTRUMENT---	CONDITIONS
		J52	J54	MAJOR	MINOR	R. SDR	VAR			
L564	Ø	21.2	44.5	-38.4	13.3	2.31	49D	SURFACE PICK STRENGTH, IGT,	INK	
L242	Ø	28.8	41.0	-36.9	5.0	.63	49P	SURFACE PICK STRENGTH, IGT,	IGT OIL	
L182I	Ø	30.5	25.1	-49.0	-5.4	.26	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL	
L149	Ø	38.7	44.3	-28.6	-1.2	1.47	49L	SURFACE PICK STRENGTH, IGT,	PIB FLUID	
L122	Ø	40.5	53.2	-20.2	2.3	.38	49Q	SURFACE PICK STRENGTH, IGT,	IGT OIL	
L280	#	48.8	69.6	-2.0	4.9	.80	49U	SURFACE PICK STRENGTH, IGT,	OIL	
L190C	Ø	50.0	57.5	-11.3	-3.0	.98	49T	SURFACE PICK STRENGTH, IGT,	IPC FLUID	
L207	M	56.7				2.14	49I	SURFACE PICK STRENGTH, IGT,	PIB FLUID	
L274	Ø	60.1	60.6	-3.0	-9.5	.41	49I	SURFACE PICK STRENGTH, IGT,	PIB FLUID	
L291	Ø	61.0	66.7	2.6	-6.9	.59	49I	SURFACE PICK STRENGTH, IGT,	PIB FLUID	
L277	Ø	73.9	114.7	49.3	9.9	2.48	49I	SURFACE PICK STRENGTH, IGT,	PIB FLUID	
L598	Ø	78.1	102.1	41.4	-4.7	1.09	49W	SURFACE PICK STRENGTH, IGT,	OIL	
L643	Ø	81.6	117.4	55.9	5.1	.74	49I	SURFACE PICK STRENGTH, IGT,	PIB FLUID	
L484	Ø	83.1	94.8	38.2	-9.0	.66	49P	SURFACE PICK STRENGTH, IGT,	IGT OIL	
GMEANS:		54.0	68.5			1.00				
		95% ELLIPSE:		112.2	22.0	WITH GAMMA = 55 DEGREES				

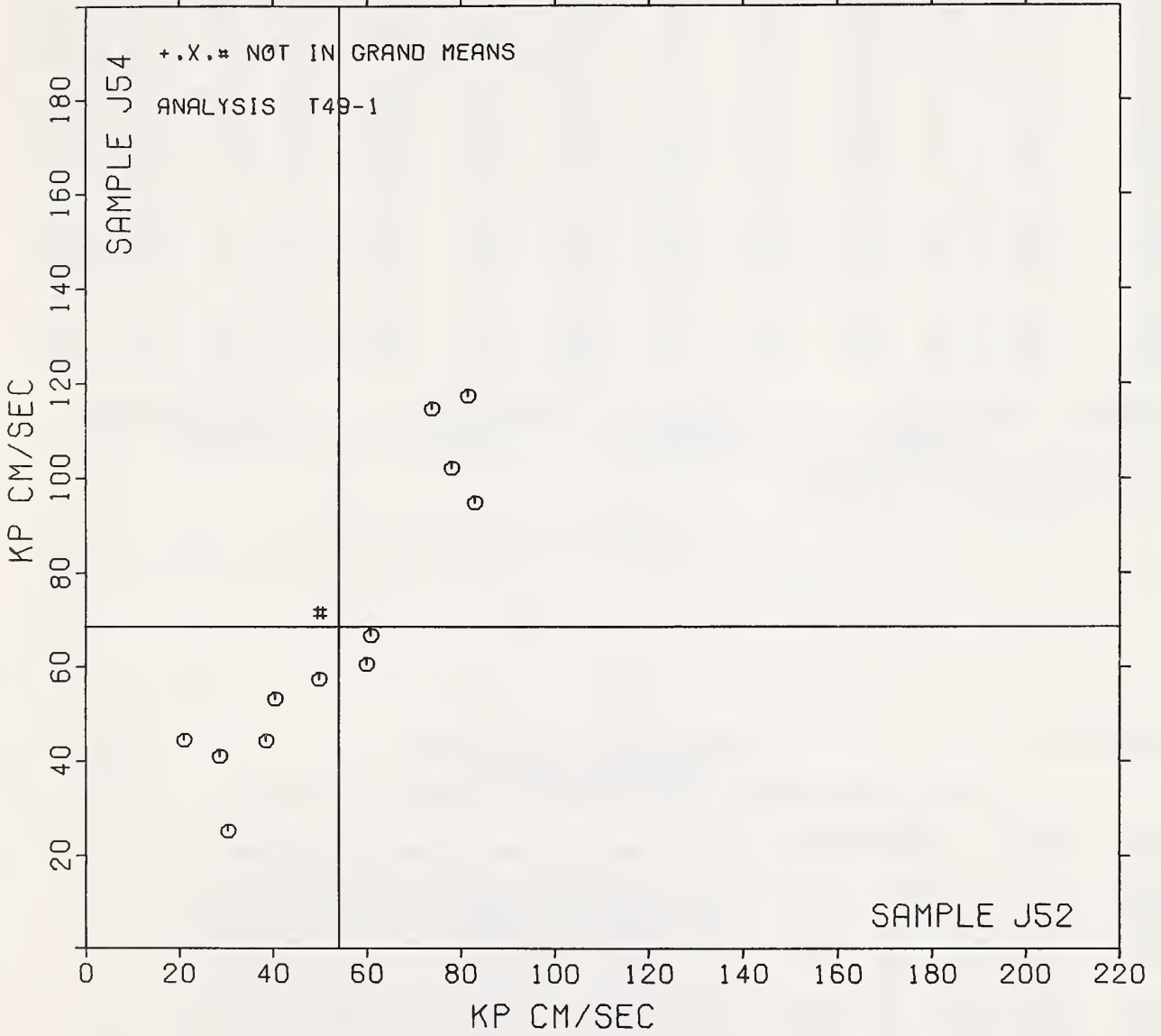
SURFACE PICK STRENGTH, IGT

SAMPLE J52 = 54.

KP CM/SEC

SAMPLE J54 = 69.

KP CM/SEC



TAPPI STANDARD T459 6S-75, SURFACE STRENGTH OF PAPER (WAX PICK TEST)

LAB CODE	PRINTING					PRINTING					TEST D ₅₀ = 5		
	J52 MEAN	89 GRAMS PER SQUARE DEV	PER SQUARE METER N ₀ DEV	SDR	R ₀ SDR	J54 MEAN	149 GRAMS PER SQUARE DEV	PER SQUARE METER N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L105	11.00	1.99	2.48	.00	.00	11.00	1.16	1.41	.00	.00	50W	Ø	L105
L122	8.80	-.21	-.26	.45	1.13	10.00	.16	.19	.00	.00	50W	Ø	L122
L158	9.00	-.01	-.01	.00	.00	9.00	-.84	-1.02	.00	.00	50W	Ø	L158
L162	9.00	-.01	-.01	.00	.00	9.00	-.84	-1.02	.00	.00	50W	Ø	L162
L173A	7.20	-1.81	-2.26	.45	1.13	8.00	-1.84	-2.24	.00	.00	50W	Ø	L173A
L182W	9.20	.19	.24	.45	1.13	10.60	.76	.92	.55	2.25	50W	Ø	L182W
L183	8.80	-.21	-.26	.45	1.13	9.40	-.44	-.54	.55	2.25	50W	Ø	L183
L195	8.40	-.61	-.76	.55	1.38	9.40	-.44	-.54	.55	2.25	50W	Ø	L195
L213	8.80	-.21	-.26	.84	2.11	11.20	1.36	1.65	.45	1.84	50W	Ø	L213
L225	9.40	.35	.49	.55	1.38	9.60	-.24	-.29	.55	2.25	50W	Ø	L225
L228	8.00	-1.01	-1.26	.00	.00	9.00	-.84	-1.02	.00	.00	50W	Ø	L228
L230	8.40	-.61	-.76	.55	1.38	9.40	-.44	-.54	.55	2.25	50W	Ø	L230
L236	9.20	.19	.24	.45	1.13	10.00	.16	.19	.00	.00	50W	Ø	L236
L274	9.40	.35	.49	.55	1.38	10.40	.56	.68	.55	2.25	50W	Ø	L274
L285	10.40	1.39	1.73	.55	1.38	10.00	.16	.19	.00	.00	50W	Ø	L285
L339	8.80	-.21	-.26	.45	1.13	10.00	.16	.19	.00	.00	50W	Ø	L339
L366	9.20	.19	.24	.84	2.11	11.20	1.36	1.65	.45	1.84	50W	Ø	L366
L616	9.00	-.01	-.01	.00	.00	10.00	.16	.19	.00	.00	50W	Ø	L616
L697	9.20	.15	.24	.45	1.13	9.80	-.04	-.05	.45	1.84	50W	Ø	L697

GR. MEAN = 9.01 WAX NUMBER GRAND MEAN = 9.84 WAX NUMBER TEST DETERMINATIONS = 5
SD MEANS = .80 WAX NUMBER SD OF MEANS = .82 WAX NUMBER 19 LABS IN GRAND MEANS
AVERAGE SDR = .40 WAX NUMBER AVERAGE SDR = .24 WAX NUMBER

TOTAL NUMBER OF LABORATORIES REPORTING = 19

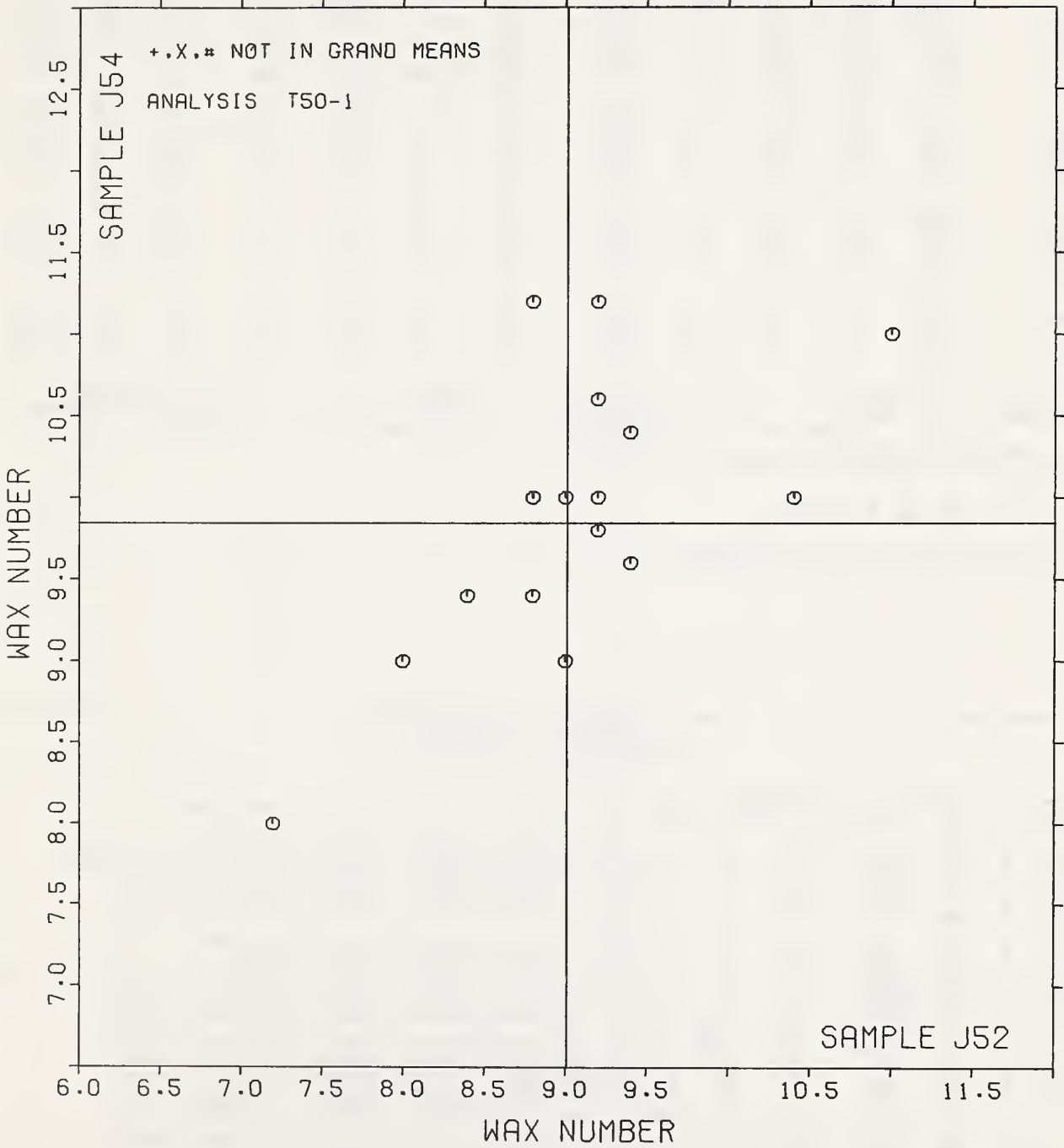
Best values: J52 9.0 ± 1.4 wax number
J54 10.0 ± 1.2 wax number

TAPPI STANDARD T459 6S-75, SURFACE STRENGTH OF PAPER (WAX PICK TEST)

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS				
		J52	J54	MAJ ₉₅	MIN ₉₀	R ₀ SDR	VAR					
L173A	Ø	7.20	8.00	-2.58	.03	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L228	Ø	8.00	9.00	-1.31	.15	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L230	Ø	8.40	9.40	-.74	.14	1.81	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L195	Ø	8.40	9.40	-.74	.14	1.81	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L339	Ø	8.80	10.00	-.03	.26	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L122	Ø	8.80	10.00	-.03	.26	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L213	Ø	8.80	11.20	.83	1.09	1.57	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L183	Ø	8.80	9.40	-.46	-.15	1.69	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L616	Ø	9.00	10.00	.11	.12	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L162	Ø	9.00	9.00	-.62	-.57	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L158	Ø	9.00	9.00	-.62	-.57	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L697	Ø	9.20	9.80	.10	-.17	1.48	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L182W	Ø	9.20	10.60	.68	.39	1.69	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L236	Ø	9.20	10.00	.25	-.03	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L366	Ø	9.20	11.20	1.11	.80	1.97	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L274	Ø	9.40	10.40	.67	.10	1.81	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L225	Ø	9.40	9.60	.09	-.45	1.81	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L285	Ø	10.40	10.00	1.08	-.89	.69	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
L105	Ø	11.00	11.00	2.21	-.64	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 6S75)				
GMEANS:		9.01	9.84			1.00						
		95% ELLIPSE:		2.87	1.35	WITH GAMMA = 46 DEGREES						

SURFACE PICK STRENGTH, WAX

SAMPLE J52 = 9.0 WAX NUMBER SAMPLE J54 = 9.8 WAX NUMBER



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

LAB CODE	SAMPLE E94					SAMPLE E67					TEST D ₀ = 10		
	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	MEAN	DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L100	352.	15.	.85	8.	.47	200.	16.	1.26	6.	.53	91N	Ø	L100
L176	347.	11.	.60	14.	.85	169.	-14.	-1.08	13.	1.19	91P	Ø	L176
L182	357.	20.	1.16	16.	.95	178.	-5.	-.36	16.	1.48	91N	Ø	L182
L218	312.	-25.	-1.40	9.	.51	162.	-21.	-1.63	16.	1.47	91A	Ø	L218
L242	291.	-46.	-2.60	12.	.70	174.	-9.	-.70	12.	1.12	91G	Ø	L242
L248	395.	58.	3.31	19.	1.15	228.	45.	3.47	15.	1.36	91B	#	L248
L255	224.	-113.	-6.38	4.	.22	158.	-25.	-1.94	9.	.82	91P	#	L255
L269	332.	-5.	-.26	18.	1.06	174.	-9.	-.67	8.	.72	91P	Ø	L269
L274	339.	3.	.15	11.	.66	186.	3.	.21	12.	1.12	91P	Ø	L274
L280	330.	-6.	-.36	21.	1.27	178.	-5.	-.39	11.	1.00	91N	Ø	L280
L289	339.	3.	.15	5.	.31	195.	12.	.93	7.	.62	91P	Ø	L289
L313	332.	-5.	-.29	22.	1.33	185.	2.	.16	8.	.75	91L	Ø	L313
L329	366.	29.	1.66	17.	1.04	177.	-6.	-.44	9.	.81	91P	Ø	L329
L394	330.	-7.	-.38	14.	.85	166.	-17.	-1.29	9.	.80	91P	Ø	L394
L484	325.	-12.	-.66	9.	.54	183.	-0.	-.01	6.	.56	91N	Ø	L484
L621	339.	3.	.15	26.	1.54	209.	26.	2.01	18.	1.66	91P	Ø	L621
L622	351.	14.	.78	23.	1.37	182.	-1.	-.09	10.	.95	91P	Ø	L622
L650	349.	13.	.72	24.	1.44	202.	19.	1.44	11.	1.04	91N	Ø	L650
L666	332.	-5.	-.26	36.	2.11	192.	9.	.66	13.	1.17	91S	Ø	L666

GR₀ MEAN = 337. NEWTONS
SD MEANS = 18. NEWTONS
AVERAGE SDR = 17. NEWTONS
GRAND MEAN = 183. NEWTONS
SD OF MEANS = 13. NEWTONS
AVERAGE SDR = 11. NEWTONS
TEST DETERMINATIONS = 10
17 LABS IN GRAND MEANS
GR₀ MEAN = 75.72 POUNDS
GRAND MEAN = 41.17 POUNDS
TOTAL NUMBER OF LABORATORIES REPORTING = 19

Best values: E94 350 ± 30 newtons
E67 180 ± 20 newtons

The following laboratories were omitted from the grand means because of extreme test results: 248, 255.

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

LAB CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		E94	E67	MAJOR	MINOR	R ₀ SDR	VAR	
L255	#	224.	158.	-113.	23.	.52	91P	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L242	Ø	291.	174.	-46.	10.	.91	91G	FLAT CRUSH STRENGTH, CENCORA, GAYDON FLAT CRUSH TESTER
L218	Ø	312.	162.	-31.	-9.	.99	91A	FLAT CRUSH STRENGTH, CENCORA, INSTRON
L484	Ø	325.	183.	-11.	5.	.55	91N	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L394	Ø	330.	166.	-13.	-13.	.83	91P	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L280	Ø	330.	178.	-8.	-2.	1.14	91N	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L313	Ø	332.	185.	-4.	4.	1.04	91L	FLAT CRUSH STRENGTH, CENCORA, LIBERTY
L666	Ø	332.	192.	-1.	10.	1.64	91S	FLAT CRUSH STRENGTH, CENCORA, TGYO SEIKI (METHOD JIS-P-8126)
L269	Ø	332.	174.	-8.	-6.	.89	91P	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L274	Ø	339.	186.	3.	1.	.89	91P	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L289	Ø	339.	195.	7.	10.	.47	91P	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L621	Ø	339.	209.	13.	23.	1.60	91P	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L176	Ø	347.	169.	4.	-17.	1.02	91P	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L650	Ø	349.	202.	19.	12.	1.24	91N	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L622	Ø	351.	182.	12.	-7.	1.16	91P	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L100	Ø	352.	200.	20.	9.	.50	91N	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L182	Ø	357.	178.	17.	-13.	1.22	91N	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L329	Ø	366.	177.	24.	-17.	.92	91P	FLAT CRUSH STRENGTH, CENCORA, TMI/HINDE & DAUCH
L248	#	395.	228.	72.	18.	1.26	91B	FLAT CRUSH STRENGTH, CENCORA, INSTRON
GMEANS:		337.	183.			1.00		
95% ELLIPSE:				52.	33.	WITH GAMMA = 23 DEGREES		

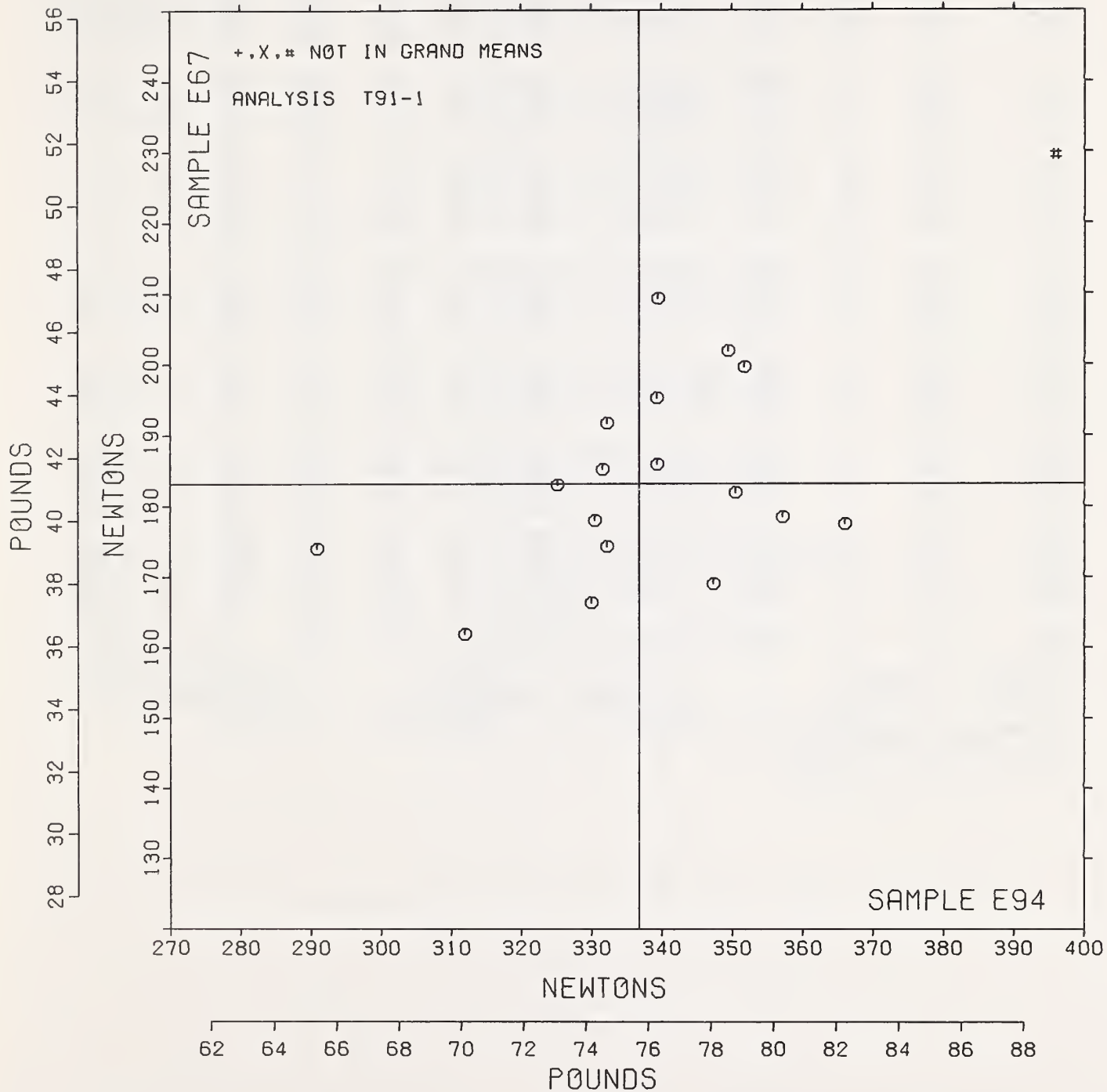
CONCORA (CMT)

SAMPLE E94 = 337. NEWTONS

SAMPLE E67 = 183. NEWTONS

SAMPLE E94 = 75.7 POUNDS

SAMPLE E67 = 41.2 POUNDS



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

JUNE 1979

LAB CODE	SAMPLE E94 MEAN	TUBE WINDING 133 G/MS PER SQUARE METER				SAMPLE E67 MEAN	KRAFT 143 G/MS PER SQUARE METER				TEST D ₀ = 10		
		DEV	N ₀ DEV	SDR	R ₀ SDR		DEV	N ₀ DEV	SDR	R ₀ SDR	VAR	F	LAB
L100	274.	29.	.97	7.	.46	267.	29.	1.05	6.	.39	96N	Ø	L100
L107	189.	-56.	-1.84	21.	1.31	181.	-56.	-2.01	15.	1.04	96P	Ø	L107
L114	276.	31.	1.03	11.	.72	260.	22.	.79	14.	.95	96P	Ø	L114
L122	215.	-30.	-.99	21.	1.33	209.	-29.	-1.04	20.	1.36	96P	Ø	L122
L124	250.	5.	.16	20.	1.27	219.	-19.	-.66	20.	1.42	96P	Ø	L124
L126	226.	-19.	-.61	13.	.81	216.	-22.	-.76	10.	.67	96P	Ø	L126
L157	244.	-1.	-.02	9.	.54	250.	12.	.41	16.	1.10	96P	Ø	L157
L171	229.	-16.	-.52	18.	1.15	227.	-11.	-.39	11.	.74	96N	Ø	L171
L176	208.	-37.	-1.21	18.	1.18	209.	-29.	-1.03	27.	1.90	96P	Ø	L176
L182	258.	13.	.44	16.	1.00	239.	1.	.05	12.	.80	96N	Ø	L182
L191	229.	-16.	-.53	27.	1.75	225.	-13.	-.46	21.	1.44	96P	Ø	L191
L218	225.	-20.	-.66	11.	.69	207.	-31.	-1.11	9.	.66	96I	Ø	L218
L234	177.	-68.	-2.25	36.	2.31	196.	-42.	-1.50	33.	2.32	96P	*	L234
L237	270.	25.	.84	19.	1.20	266.	28.	1.00	16.	1.08	96P	Ø	L237
L242	279.	34.	1.13	20.	1.29	269.	32.	1.12	22.	1.54	96G	Ø	L242
L274	180.	-65.	-2.14	8.	.52	178.	-60.	-2.13	10.	.71	96P	Ø	L274
L303	284.	39.	1.29	13.	.83	273.	35.	1.25	15.	1.04	96N	Ø	L303
L305	255.	10.	.34	22.	1.40	244.	6.	.22	16.	1.14	96N	Ø	L305
L329	295.	51.	1.67	16.	1.04	273.	35.	1.25	23.	1.58	96P	Ø	L329
L333	206.	-39.	-1.28	22.	1.44	227.	-11.	-.38	14.	.98	96I	Ø	L333
L336	228.	-17.	-.56	13.	.82	227.	-11.	-.39	14.	1.00	96P	Ø	L336
L350	265.	20.	.67	12.	.77	254.	17.	.59	13.	.93	96P	Ø	L350
L393	257.	12.	.39	15.	.93	256.	18.	.63	11.	.77	96P	Ø	L393
L484	234.	-11.	-.37	14.	.90	225.	-12.	-.44	11.	.79	96R	Ø	L484
L553	270.	25.	.82	13.	.86	247.	9.	.33	17.	1.15	96P	Ø	L553
L562	240.	-5.	-.15	27.	1.72	224.	-14.	-.49	19.	1.29	96P	Ø	L562
L570	241.	-4.	-.13	10.	.66	225.	-13.	-.46	11.	.77	96P	Ø	L570
L603	262.	17.	.57	19.	1.21	246.	8.	.29	17.	1.15	96P	Ø	L603
L610	250.	5.	.17	12.	.77	243.	5.	.19	9.	.60	96P	Ø	L610
L617	244.	-1.	-.03	20.	1.29	255.	17.	.62	8.	.53	96P	Ø	L617
L621	289.	44.	1.47	18.	1.12	291.	53.	1.90	16.	1.08	96P	Ø	L621
L623	281.	36.	1.19	11.	.69	281.	43.	1.54	15.	1.03	96P	Ø	L623
L649	238.	-6.	-.21	7.	.47	216.	-22.	-.77	15.	1.02	96P	Ø	L649
L650	288.	43.	1.43	14.	.88	287.	49.	1.75	14.	1.00	96N	Ø	L650
L663	219.	-25.	-.84	12.	.76	208.	-30.	-1.06	14.	.94	96P	Ø	L663
L676	231.	-14.	-.47	15.	.98	243.	5.	.19	11.	.77	96P	Ø	L676
L686	251.	7.	.22	19.	1.22	235.	-3.	-.11	9.	.65	96P	Ø	L686

GR₀ MEAN = 245. NEWTONS

SD MEANS = 30. NEWTONS

AVERAGE SDR = 16. NEWTONS

GR₀ MEAN = 55.01 POUNDS

TOTAL NUMBER OF LABORATORIES REPORTING = 37

GRAND MEAN = 238. NEWTONS

SD OF MEANS = 28. NEWTONS

AVERAGE SDR = 14. NEWTONS

GRAND MEAN = 53.48 POUNDS

TEST DETERMINATIONS = 10

37 LABS IN GRAND MEANS

Best values: E94 250 ± 50 newtons

E67 230 ± 50 newtons

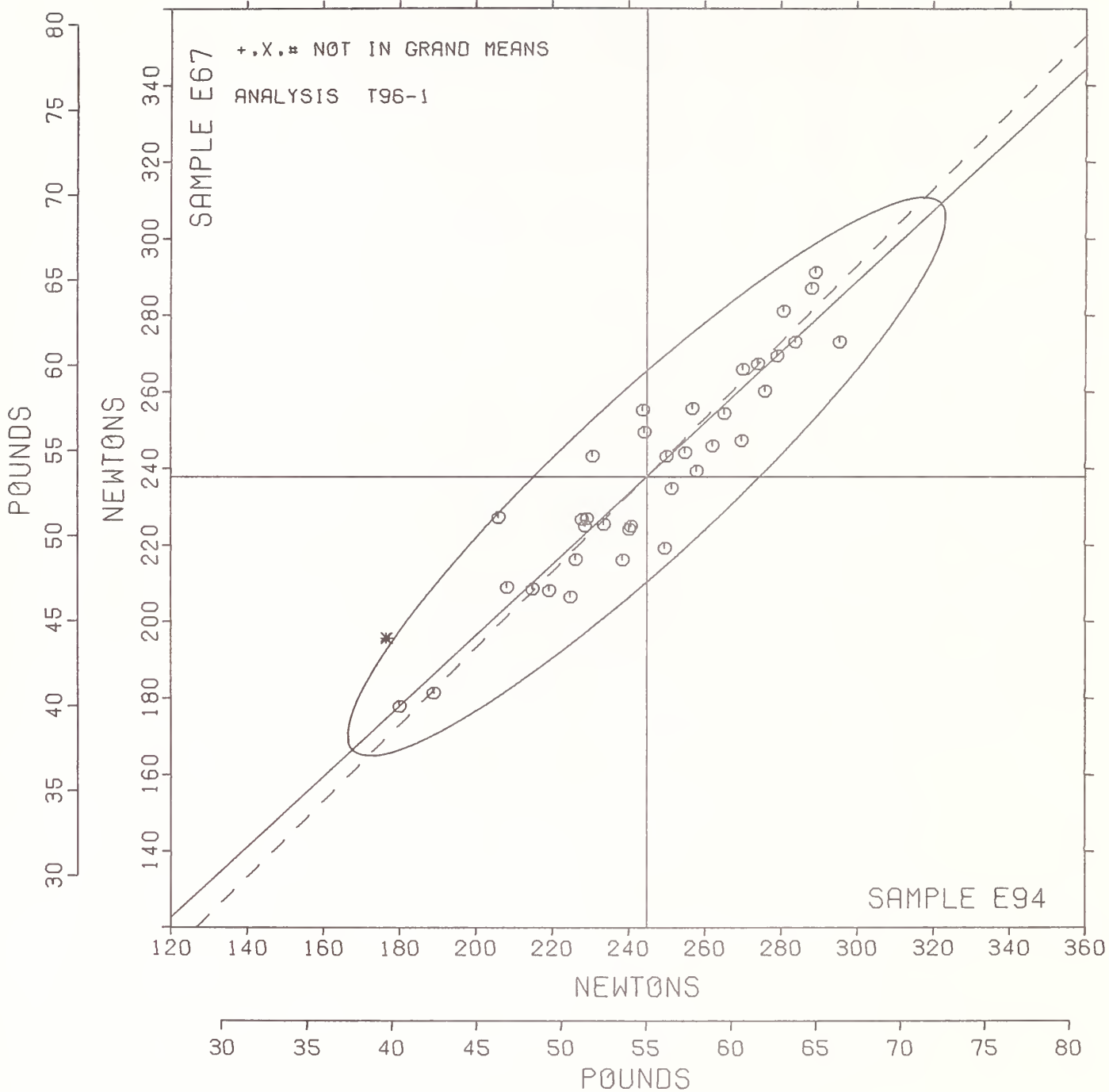
TAPPI COLLABORATIVE REFERENCE PROGRAM
 ANALYSIS T96-1 TABLE 2
 RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)
 TAPPI STANDARD T818 GS-76

LAH CODE	F	MEANS		COORDINATES		AVG		PROPERTY---TEST INSTRUMENT---CONDITIONS
		E94	E67	MAJOR	MINOR	E.SDR	VAR	
L234	*	177.	196.	-79.	15.	2.32	96P	RING CRUSH, TMI/HINDE & DAUCH
L274	Ø	180.	178.	-88.	-0.	.62	96P	RING CRUSH, TMI/HINDE & DAUCH
L107	Ø	189.	181.	-75.	-4.	1.18	96P	RING CRUSH, TMI/HINDE & DAUCH
L333	Ø	206.	227.	-36.	19.	1.21	96I	RING CRUSH, INSTRON
L176	Ø	208.	209.	-46.	4.	1.54	96P	RING CRUSH, TMI/HINDE & DAUCH
L122	Ø	215.	209.	-42.	-1.	1.35	96P	RING CRUSH, TMI/HINDE & DAUCH
L663	Ø	219.	208.	-39.	-5.	.85	96P	RING CRUSH, TMI/HINDE & DAUCH
L218	Ø	225.	207.	-36.	-9.	.67	96I	RING CRUSH, INSTRON
L126	Ø	226.	216.	-28.	-3.	.74	96P	RING CRUSH, TMI/HINDE & DAUCH
L336	Ø	228.	227.	-20.	3.	.91	96P	RING CRUSH, TMI/HINDE & DAUCH
L191	Ø	229.	225.	-21.	1.	1.59	96P	RING CRUSH, TMI/HINDE & DAUCH
L171	Ø	229.	227.	-19.	3.	.95	96N	RING CRUSH, TMI/HINDE & DAUCH
L676	Ø	231.	243.	-7.	14.	.87	96P	RING CRUSH, TMI/HINDE & DAUCH
L484	Ø	234.	225.	-17.	-2.	.84	96R	RING CRUSH, REGMED
L649	Ø	238.	216.	-19.	-12.	.74	96P	RING CRUSH, TMI/HINDE & DAUCH
L562	Ø	240.	224.	-13.	-7.	1.50	96P	RING CRUSH, TMI/HINDE & DAUCH
L570	Ø	241.	225.	-12.	-7.	.72	96P	RING CRUSH, TMI/HINDE & DAUCH
L617	Ø	244.	255.	11.	13.	.91	96P	RING CRUSH, TMI/HINDE & DAUCH
L157	Ø	244.	250.	8.	9.	.82	96P	RING CRUSH, TMI/HINDE & DAUCH
L124	Ø	250.	219.	-9.	-17.	1.35	96P	RING CRUSH, TMI/HINDE & DAUCH
L610	Ø	250.	243.	8.	0.	.68	96P	RING CRUSH, TMI/HINDE & DAUCH
L686	Ø	251.	235.	3.	-7.	.93	96P	RING CRUSH, TMI/HINDE & DAUCH
L305	Ø	255.	244.	12.	-2.	1.27	96N	RING CRUSH, TMI/HINDE & DAUCH
L393	Ø	257.	256.	21.	5.	.85	96P	RING CRUSH, TMI/HINDE & DAUCH
L182	Ø	258.	239.	11.	-8.	.90	96N	RING CRUSH, TMI/HINDE & DAUCH
L603	Ø	262.	246.	18.	-6.	1.18	96P	RING CRUSH, TMI/HINDE & DAUCH
L350	Ø	265.	254.	26.	-2.	.85	96P	RING CRUSH, TMI/HINDE & DAUCH
L553	Ø	270.	247.	25.	-10.	1.00	96P	RING CRUSH, TMI/HINDE & DAUCH
L237	Ø	270.	266.	38.	3.	1.14	96P	RING CRUSH, TMI/HINDE & DAUCH
L100	Ø	274.	267.	41.	2.	.42	96N	RING CRUSH, TMI/HINDE & DAUCH
L114	Ø	276.	260.	38.	-5.	.83	96P	RING CRUSH, TMI/HINDE & DAUCH
L242	Ø	279.	269.	47.	-0.	1.42	96G	RING CRUSH, GAYDON FLAT CRUSH TESTER
L623	Ø	281.	281.	56.	7.	.86	96P	RING CRUSH, TMI/HINDE & DAUCH
L303	Ø	284.	273.	53.	-1.	.94	96N	RING CRUSH, TMI/HINDE & DAUCH
L656	Ø	288.	287.	65.	7.	.94	96N	RING CRUSH, TMI/HINDE & DAUCH
L621	Ø	289.	291.	69.	9.	1.10	96P	RING CRUSH, TMI/HINDE & DAUCH
L329	Ø	295.	273.	61.	-9.	1.31	96P	RING CRUSH, TMI/HINDE & DAUCH
GMEANS:		245.	238.			1.00		
		95% ELLIPSE:		105.	21.			WITH GAMMA = 42 DEGREES

RING CRUSH

SAMPLE E94 = 245. NEWTONS
 SAMPLE E94 = 55.0 POUNDS

SAMPLE E67 = 238. NEWTONS
 SAMPLE E67 = 53.5 POUNDS



SUMMARY TABLE

TEST METHOD	SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDR	REPL CRP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPRCD
BURSTING STRENGTH, MODEL C T10-1 PSI	J40	29.47	1.91	1.54	15	44	53	10	1.35	5.35
	J68	17.30	1.41	1.12					.98	3.95
BURSTING STRENGTH, MODEL C-A T10-2 PSI	J40	29.15	1.94	1.59	15	41	41	10	1.40	5.43
	J68	17.34	1.90	1.08					.95	5.30
BURSTING STRENGTH, HIGH RANGE T11-1 PSI	K30	58.9	2.6	3.9	15	36	47	10	3.4	7.6
	K28	49.4	2.6	3.6					3.2	7.3
TEARING STRENGTH, DEEP CUTOUT T15-1 GRAMS	G02	85.3	3.5	2.7	15	131	148	10	2.3	9.8
	G07	38.7	2.0	1.5					1.3	5.7
TEARING STRENGTH, NO CUTOUT T17-1 GRAMS	K20	148.3	5.8	6.4	15	11	12	10	5.6	16.5
	K36	120.6	5.8	4.6					4.1	16.2
TENSILE STRENGTH, PACKAGING PAPERS T19-1 KILONEWTN/M	K32	8.65	.40	.48	20	55	58	12	.38	1.13
	K34	9.41	.41	.59					.47	1.18
TENSILE STRENGTH, CRE TYPE T20-1 KILONEWTN/M	G04	3.13	.11	.14	20	43	51	12	.11	.31
	G07	3.32	.16	.15					.12	.45
TENSILE STRENGTH, PENDULUM TYPE T20-2 KILONEWTN/M	G04	3.22	.19	.16	20	40	41	12	.12	.54
	G07	3.41	.22	.16					.12	.62
T.E.A., PACKAGING PAPERS T25-1 JOULES/SQ M	K32	77.9	7.4	9.8	20	16	17	12	7.9	21.0
	K34	92.1	10.6	12.7					10.2	30.1
T.E.A., PRINTING PAPERS T26-1 JOULES/SQ M	G04	32.5	2.1	3.0	20	17	18	12	2.4	6.1
	G07	34.8	2.9	3.8					3.0	8.2
ELONGATION TO BREAK, PACKAGING PAPER T28-1 PERCENT	K32	1.538	.200	.127	20	18	20	12	.101	.558
	K34	1.678	.202	.125					.100	.564
ELONGATION TO BREAK, PRINTING PAPER T29-1 PERCENT	G04	1.583	.113	.107	20	15	19	12	.086	.317
	G07	1.585	.115	.146					.117	.328
FOLDING ENDURANCE (MIT) T30-1 DOUBLE FOLDS	A92	30.8	5.9	10.6	15	43	52	10	9.3	17.2
	B88	50.2	14.6	20.2					17.7	41.8
FOLDING ENDURANCE (MIT) T30-2 LOG(10) FOLD	A92	1.46	.09	.15	15	43	52	10	.13	.26
	B88	1.64	.15	.18					.15	.41
STIFFNESS, GURLEY T35-1 GURLEY UNITS	J26	242.	20.	11.	10	35	38	10	10.	56.
	J28	471.	32.	28.					24.	89.
STIFFNESS, TABER T36-1 TABER UNITS	J70	5.89	1.04	.34	10	28	32	5	.42	2.91
	B63	18.84	1.34	.80					.99	3.77
SURFACE PICK STRENGTH, IGT T49-1 KP CM/SEC	J52	54.0	22.1	3.8	4	12	14	4	5.2	61.1
	J54	68.5	31.0	4.2					5.8	85.9
SURFACE PICK STRENGTH, WAX T50-1 WAX NUMBER	J52	9.01	.80	.40	5	19	19	5	.49	2.22
	J54	9.84	.82	.24					.30	2.28
CONCORDA (CMI) T91-1 NEWTONS	E94	337.	18.	17.	10	17	19	10	15.	49.
	E67	183.	13.	11.					10.	36.
RING CRUSH T96-1 NEWTONS	E94	245.	30.	16.	10	37	37	10	14.	84.
	E67	238.	28.	14.					13.	78.

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET	1. PUBLICATION OR REPORT NO. TAPPI CRP 60S	2. Gov't. Accession No.	3. Recipient's Accession No.
4. TITLE AND SUBTITLE Technical Association of the Pulp and Paper Industry COLLABORATIVE REFERENCE PROGRAM FOR PAPER Report #60S		5. Publication Date August 13, 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 79-1807	
12. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (Street, City, State, ZIP) Collaborative Testing Services, Inc. 9241 Wood Glade Drive, Great Falls, VA 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	19. SECURITY CLASS (THIS REPORT) UNCLASSIFIED	21. NO. OF PRINTED PAGES 68	
<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	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 5/8 inch across

NO CUTOUT instrument
is 1 1/4 inch across

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

