TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM FOR PAPER

REPORT NO. 65S
STRENGTH TESTS

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

NBS COLLABORATIVE REFERENCE PROGRAMS

TAPPI Paper and Board (6 times per year)

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

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- Concora test of medium

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

ASTM Cement (2 times per year)

- Chemical (11 chemical components)
- Physical (15 characteristics)

AASHTO Bituminous

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

NBS Collaborative Reference Programs
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TECHNICAL ASSOCIATION OF THE
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COLLABORATIVE REFERENCE PROGRAM FOR PAPER

Report No. 65S
STRENGTH TESTS

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U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

INTRODUCTION

Reports 65S and 65G comprise the fifth set of reports for the 79-80 program year. Participants in tests which involve strength properties of paper will receive only the S report; those in tests which measure other properties will receive only the G report.

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

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

Jeffrey Horlick

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

September 3, 19[illegible]

TAPPI-NBS COLLABORATIVE REFERENCE PROGRAM

BACKGROUND AND PURPOSE

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

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

HOW THE PROGRAM WORKS

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

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

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

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

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

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

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

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

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Analyses In This Report

Analyses In The S Report

TABLE OF CONVERSION FACTORS TO METRIC (SI) UNITS

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

KEY TO TABLES AND GRAPHS

MEAN - The average of individual TEST DETERMINATIONS. The number of TEST DETERMINATIONS in the mean is given in the upper right corner of the first table (TEST D.) and again at the bottom of this table.

GRAND MEAN (GR. MEAN) - The average of the individual laboratory MEANS, excluding laboratories flagged (see column F) with an X, #, or *. The GRAND MEAN is ~' 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 or her measurements relative to the average ability. The greater the number of TEST DETERMINATIONS the closer the R. SDR should be to unity. If R. SDR is outside the limits given below, the participant may not be following the procedure considered standard for this analysis:

No. of test Determinations	Lower limit for R. SDR	Upper limit for R. SDR
3	0.09	2.58
4	0.18	2.25
5	0.26	2.06
9	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:

- 9 - Included in grand mean and inside 95% error ellipse.
- * - Included in grand means but plotted point falls outside of the 95% error ellipse. The participant should take this as a warning to reexamine his or her testing procedure.
- X - Excluded because plotted point would fall outside of the 99% error ellipse, (see page 2 for explanation of Graph).
- # - Excluded because data were not understood or because of a non-coded variation reported by the laboratory. (See the notes following Table 1 for each method).
- + - Excluded from grand means because VAR was non-standard for the analysis.
- M - Excluded because data for one sample are missing.
- S - Included in grand mean but only after omission of one or more 'wild' values; that is test determinations more than 3 times AVERAGE SDR from the laboratory's MEAN. Not more than 20% of the test determination may be excluded in this manner without rejecting the laboratory.

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

COORDINATES - Distances along major and minor axes of error ellipse. If special additive or concurrent model of the measuring process applies to this method, the distance along the miror 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 degrees. The solid sloping line, which may or may not lie close to the 45 degree line, is along the major axis of the error ellipse. The ellipse is drawn so that, on the average, it will include 95% of the points representing the laboratories.

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

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

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

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

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

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

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

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

ANALYSIS T10-1 TABLE 1
BURSTING STRENGTH, PSI
TAPPI OFFICIAL TEST METHOD T403 OS-76, PERKINS MODEL C

LAB CODE	SAMPLE G34 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G45 MEAN	NEWSPRINT 66 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L121	19.03	1.00	.81	1.20	1.09	49.20	36.71	68.39	2.88	3.95	10C	#	L121
L134	17.73	-.30	-.24	.56	.51	12.47	-.03	-.05	.44	.60	10C	@	L134
L150	19.30	1.27	1.02	1.03	.94	13.00	.51	.94	1.07	1.46	10C	@	L150
L153	19.73	1.70	1.37	1.39	1.26	12.59	.09	.17	.86	1.18	10C	@	L153
L156	20.20	2.17	1.75	1.37	1.25	12.14	-.35	-.66	.35	.48	10C	@	L158
L167	17.68	-.35	-.28	.64	.58	47.34	34.85	64.92	.98	1.34	10C	#	L167
L183	18.27	.23	.19	1.05	.95	12.21	-.28	-.52	.51	.70	10C	@	L183
L191	17.07	-.97	-.78	1.18	1.07	12.59	.10	.19	1.02	1.40	10C	@	L191
L207	18.87	.83	.67	.83	.76	13.44	.95	1.76	.68	.93	10C	@	L207
L212	18.00	-.03	-.03	1.04	.94	12.67	.17	.32	.75	1.02	10C	@	L212
L223A	17.51	-.52	-.42	1.35	1.23	12.22	-.27	-.51	.70	.95	10C	@	L223A
L225	19.66	1.57	1.26	1.65	1.50	12.83	.34	.63	.99	1.35	10C	@	L225
L232	17.63	-.40	-.32	.81	.74	13.29	.79	1.48	1.36	1.87	10C	@	L232
L237A	18.93	.90	.73	.80	.73	12.93	.44	.82	.59	.81	10C	@	L237A
L237B	18.67	.63	.51	.72	.66	12.60	.11	.20	.51	.69	10C	@	L237B
L249	15.97	-2.06	-1.66	.91	.83	12.39	-.11	-.20	.58	.80	10C	@	L249
L261	18.24	.21	.17	.80	.72	12.58	.09	.16	.63	.86	10C	@	L261
L264	18.47	.43	.35	.74	.68	13.05	.56	1.04	.77	1.05	10C	@	L264
L274	17.63	-.40	-.32	.64	.58	12.31	-.19	-.35	.55	.76	10C	@	L274
L279	15.43	-2.60	-2.10	1.45	1.32	11.43	-1.07	-1.99	.62	.85	10C	@	L279
L305	17.37	-.67	-.54	.83	.76	13.66	1.16	2.17	.41	.56	10C	@	L305
L312	17.87	-.16	-.13	.82	.75	12.38	-.11	-.21	.37	.50	10C	@	L312
L315	19.07	1.03	.83	1.67	1.52	12.60	.11	.20	1.05	1.44	10C	@	L315
L321	19.73	1.70	1.37	1.03	.94	10.00	-2.49	-4.65	.65	.90	10C	X	L321
L326	19.37	1.33	1.08	1.23	1.12	11.53	-.97	-1.80	1.02	1.40	10C	@	L326
L330	17.97	-.07	-.05	1.39	1.26	12.09	-.41	-.76	1.23	1.69	10C	@	L330
L333	17.73	-.30	-.24	1.62	1.48	11.87	-.63	-1.17	.64	.88	10C	@	L333
L339	12.60	-5.43	-4.38	.74	.68	8.11	-4.38	-8.16	.75	1.02	10C	#	L339
L344	16.59	-1.45	-1.17	1.18	1.08	12.83	.34	.63	1.25	1.71	10C	@	L344
L356	18.70	.67	.54	1.06	.96	12.09	-.40	-.75	.49	.67	10C	@	L356
L358	18.67	.63	.51	.94	.85	12.60	.11	.20	.56	.77	10C	@	L358
L360	18.67	.63	.51	.92	.84	12.69	.20	.37	.52	.72	10C	@	L360
L366	17.97	-.07	-.05	1.11	1.01	11.61	-.88	-1.64	.59	.80	10C	@	L366
L386	18.76	.73	.59	1.83	1.67	13.49	1.00	1.86	.94	1.29	10C	@	L386
L568	15.17	-2.87	-2.31	1.49	1.35	11.34	-1.15	-2.15	.57	.77	10C	*	L568
L573	12.68	-5.35	-4.32	.93	.84	46.71	34.21	63.74	1.85	2.53	10C	#	L573
L582	15.23	-2.83	-2.28	1.33	1.21	12.56	.07	.12	.84	1.15	10C	@	L582
L599	18.27	.24	.19	.70	.64	12.73	.23	.43	.90	1.23	10C	@	L599
L625	18.77	.73	.59	1.02	.92	12.79	.30	.55	.58	.79	10C	@	L625
L684	19.60	1.57	1.26	.91	.83	12.21	-.29	-.53	.44	.61	10C	@	L684
L696	19.31	1.28	1.03	1.02	.93	53.00	40.51	75.47	3.68	5.04	10C	#	L696
L736	16.66	-1.37	-1.11	1.45	1.31	12.29	-.20	-.37	.71	.98	10C	@	L736
L744	18.37	.33	.27	1.04	.95	43.23	30.74	57.27	2.81	3.85	10C	#	L744
L757	16.83	-1.20	-.97	.82	.74	12.10	-.39	-.73	.69	.94	10C	@	L757
L759	18.77	.73	.59	1.54	1.40	12.57	.07	.14	.80	1.10	10C	@	L759

GP. MEAN = 18.03 PSI GRAND MEAN = 12.49 PSI TEST DETERMINATIONS = 15
SD MEANS = 1.24 PSI SD OF MEANS = .54 PSI 38 LABS IN GRAND MEANS
AVERAGE SDR = 1.10 PSI AVERAGE SDR = .73 PSI
GP. MEAN = 124.33 KILOPASCAL GRAND MEAN = 86.14 KILOPASCAL

L128	18.60	.57	.46	1.30	1.18	50.40	37.91	70.62	2.23	3.05	10B	+	L128
L219	21.51	3.48	2.81	1.41	1.28	13.99	1.49	2.78	.57	.78	10T	+	L219
L242	19.73	1.70	1.37	1.01	.92	12.58	.08	.15	.62	.85	10T	+	L242
L250L	16.29	-1.74	-1.41	.90	.82	11.53	-.96	-1.79	.67	.92	10N	+	L250L
L260	16.95	-1.08	-.87	.98	.89	11.91	-.58	-1.08	.49	.67	10A	+	L260
L269	22.13	4.10	3.31	.83	.76	26.26	13.71	25.54	1.42	1.95	10A	+	L269
L484	10.66	-7.37	-5.95	.15	.14	10.11	-2.39	-4.45	.03	.04	10M	+	L484
L702	16.43	-1.60	-1.29	1.51	1.37	12.95	.46	.86	.64	.88	10X	+	L702
L704	18.33	.30	.24	3.56	3.23	12.21	-.28	-.53	1.57	2.16	10L	+	L704
L706	13.03	-5.00	-4.03	.88	.80	12.07	-.43	-.80	.63	.86	10X	+	L706

TOTAL NUMBER OF LABORATORIES REPORTING = 55

Best values: G34 18.2 ± 2.1 psi
G45 12.5 ± 0.9 psi

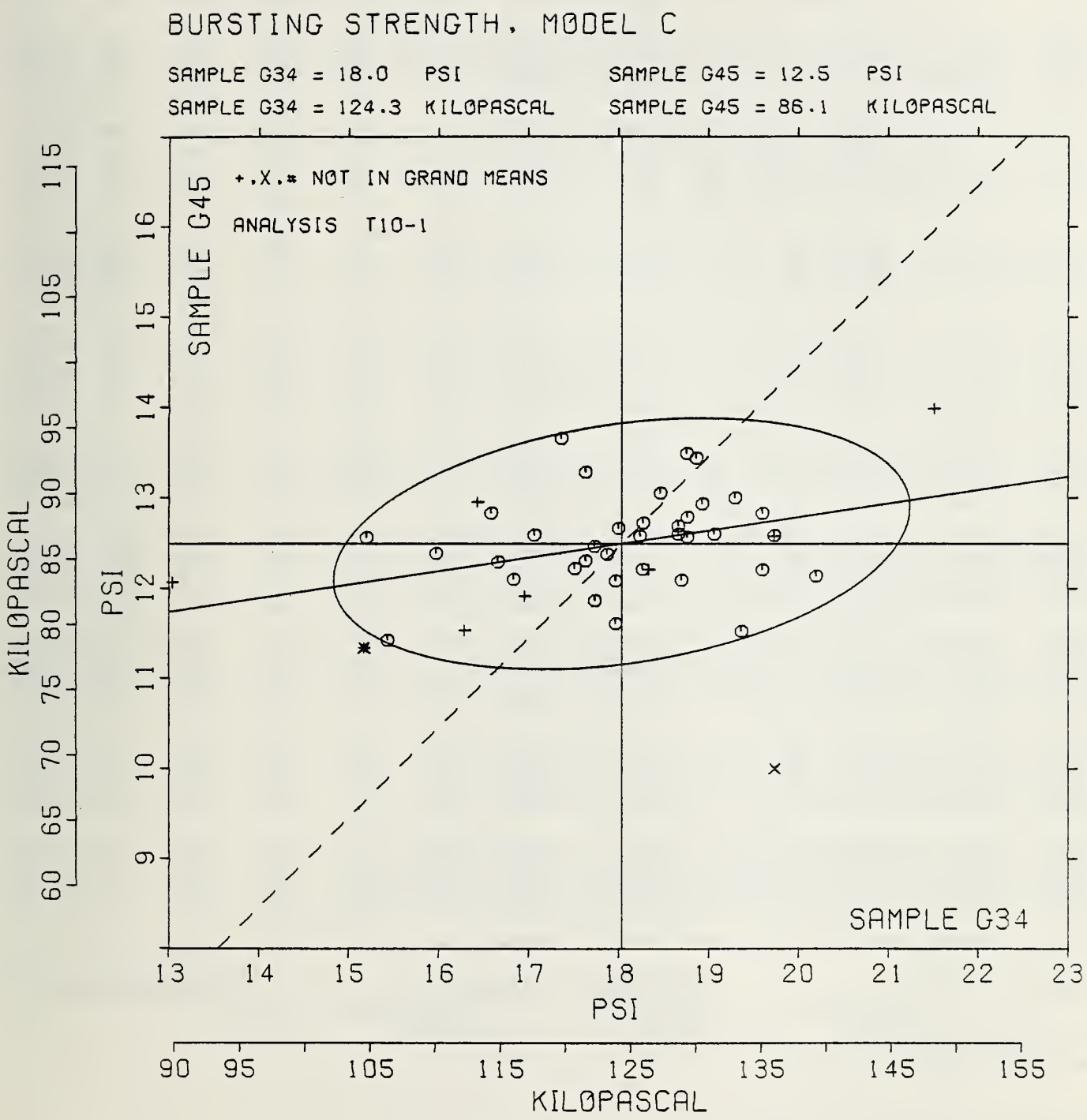
The following laboratories were omitted from the grand means because of extreme test results: 121, 167, 339, 573, 696, 744.

ANALYSIS T10-1 TABLE 2

BURSTING STRENGTH, PSI

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

LAB CODE	F	MEANS G34	MEANS G45	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L484	*	10.66	10.11	-7.64	-1.27	.09	10M	BURSTING STRENGTH 10 TO 40 PSI,REGMED MT/MOT,MANUAL CLAMP
L339	#	12.60	8.11	-6.02	-3.53	.85	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L573	#	12.68	46.71	-.25	34.63	1.69	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L706	*	13.03	12.07	-5.01	.31	.83	10X	BURSTING STRENGTH 10 TO 40 PSI: GIVE INSTR. MAKE,MODEL,CLAMP
L568	*	15.17	11.34	-3.00	-.72	1.06	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L582	A	15.20	12.56	-2.79	.48	1.18	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L279	A	15.43	11.43	-2.73	-.67	1.08	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L249	A	15.97	12.39	-2.05	.20	.81	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L250L	*	16.29	11.53	-1.87	-.69	.87	10N	BURSTING STRENGTH 10 TO 40 PSI,LHOMARGY,MAN.CLAMP, 20C,65%RH
L702	*	16.43	12.95	-1.51	.69	1.13	10X	BURSTING STRENGTH 10 TO 40 PSI: GIVE INSTR. MAKE,MODEL,CLAMP
L344	A	16.59	12.83	-1.38	.55	1.40	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L336	A	16.66	12.29	-1.39	.00	1.15	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L757	A	16.83	12.10	-1.24	-.21	.84	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L260	*	16.95	11.91	-1.15	-.41	.78	10A	BURSTING STRENGTH 10 TO 40 PSI, PERKINS A, MANUAL CLAMP
L191	A	17.07	12.59	-.94	.24	1.24	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L305	A	17.37	13.66	-.49	1.25	.66	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L223A	A	17.51	12.22	-.55	-.19	1.09	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L274	A	17.63	12.31	-.42	-.13	.67	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L232	A	17.63	13.29	-.28	.84	1.30	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L167	#	17.68	47.34	4.79	34.52	.96	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L134	A	17.73	12.47	-.30	.02	.56	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L333	A	17.73	11.87	-.39	-.58	1.18	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L312	A	17.87	12.38	-.17	-.09	.63	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L366	A	17.97	11.61	-.20	-.86	.91	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L330	A	17.97	12.09	-.13	-.39	1.47	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L212	A	18.00	12.67	-.01	.18	.98	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L261	A	18.24	12.58	.22	.06	.79	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L183	A	18.27	12.21	.19	-.31	.83	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L599	A	18.27	12.73	.27	.20	.93	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L704	*	18.33	12.21	.26	-.33	2.70	10L	BURSTING STRENGTH 10 TO 40 PSI, PERKINS LC, MANUAL CLAMP
L744	#	18.37	43.23	4.86	30.35	2.49	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L264	A	18.47	13.05	.51	.49	.86	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L128	*	18.60	50.40	6.15	37.41	2.12	10B	BURSTING STRENGTH 10 TO 40 PSI, PERKINS B, MANUAL CLAMP
L360	A	18.67	12.69	.66	.10	.78	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L358	A	18.67	12.60	.64	.01	.81	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L237B	A	18.67	12.60	.64	.01	.68	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L356	A	18.70	12.09	.60	-.49	.81	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L386	A	18.76	13.49	.87	.88	1.48	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L759	A	18.77	12.57	.74	-.04	1.25	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L625	A	18.77	12.79	.77	.18	.86	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L207	A	18.87	13.44	.96	.81	.84	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L237A	A	18.93	12.93	.96	.30	.77	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L121	#	19.03	49.20	6.40	36.16	2.52	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L315	A	19.07	12.60	1.04	-.05	1.48	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L150	A	19.30	13.00	1.33	.31	1.20	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L696	#	19.31	53.00	7.24	39.88	2.98	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L326	A	19.37	11.53	1.18	-1.15	1.26	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L684	A	19.60	12.21	1.51	-.51	.72	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L225	A	19.60	12.83	1.60	.10	1.43	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L242	*	19.73	12.58	1.69	-.17	.88	10T	BURSTING STRENGTH 10 TO 40 PSI, L+W,MANUAL CLAMP
L153	A	19.73	12.59	1.70	-.16	1.22	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L321	X	19.73	10.00	1.31	-2.72	.92	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L158	A	20.20	12.14	2.09	-.67	.86	10C	BURSTING STRENGTH 10 TO 40 PSI, PERKINS C, MANUAL CLAMP
L219	*	21.51	13.99	3.66	.96	1.03	10T	BURSTING STRENGTH 10 TO 40 PSI, L+W,MANUAL CLAMP
L269	*	22.13	26.20	6.08	12.95	1.35	10A	BURSTING STRENGTH 10 TO 40 PSI, PERKINS A, MANUAL CLAMP
GMEANS:		18.03	12.49			1.00		
		95% ELLIPSE:		3.24	1.32	WITH GAMMA = 8 DEGREES		


BURSTING STRENGTH, MODEL C
SAMPLE G34 = 18.0 PSI
SAMPLE G34 = 124.3 KILOPASCAL
SAMPLE G45 = 12.5 PSI
SAMPLE G45 = 86.1 KILOPASCAL
+.X.* NOT IN GRAND MEANS
ANALYSIS T10-1
SAMPLE G45
PSI
KILOPASCAL
SAMPLE G34
PSI
KILOPASCAL

ANALYSIS T10-2 TABLE 1

BURSTING STRENGTH, PSI

TAPPI OFFICIAL TEST METHOD T403 OS-76, PERKINS MODEL C-A OR C WITH AIR OR HYDRAULIC CLAMPS

LAB CODE	SAMPLE G34 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G45 MEAN	NEWSPRINT 66 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L105	18.72	.41	.27	1.52	1.45	11.22	-1.14	-2.01	.72	1.11	10D	*	L105
L106C	17.93	-.37	-.24	1.10	1.05	48.57	36.20	63.65	3.12	4.78	10D	*	L106C
L115	18.67	.36	.23	1.08	1.04	12.51	.15	.26	.57	.88	10D	@	L115
L118	19.95	1.64	1.07	.78	.75	12.43	.07	.12	.53	.81	10D	@	L118
L125	16.57	-1.74	-1.13	2.04	1.95	12.79	.43	.76	1.01	1.55	10D	@	L125
L141	18.80	.49	.32	1.10	1.05	12.64	.28	.49	.61	.94	10D	@	L141
L148	19.47	1.16	.76	.83	.80	13.20	.84	1.47	.68	1.03	10D	@	L148
L155	21.40	3.09	2.02	.89	.85	12.54	.18	.31	.74	1.14	10D	@	L155
L157	19.47	1.16	.76	.83	.80	12.83	.46	.82	.48	.73	10D	@	L157
L159	16.00	-2.31	-1.50	1.38	1.32	12.02	-.34	-.60	.66	1.02	10D	@	L159
L162	17.00	-1.31	-.85	1.00	.96	11.20	-1.16	-2.05	.56	.86	10D	@	L162
L163	17.37	-.94	-.61	.72	.69	12.47	.11	.19	.60	.92	10D	@	L163
L166	19.97	1.66	1.08	1.23	1.18	12.91	.55	.97	.43	.65	10D	@	L166
L176	18.33	.03	.02	1.11	1.06	12.20	-.16	-.29	.54	.83	10D	@	L176
L185	19.53	1.23	.80	.93	.89	12.39	.03	.05	.63	.97	10D	@	L185
L194	17.47	-.84	-.55	.97	.93	46.43	34.07	59.90	2.18	3.33	10D	*	L194
L217	18.73	.43	.28	1.16	1.11	12.19	-.18	-.31	.82	1.26	10F	@	L217
L226B	18.52	.21	.14	1.18	1.13	47.02	34.66	60.93	2.58	3.95	10D	*	L226B
L226C	18.46	.15	.10	1.43	1.37	12.47	.10	.18	.62	.95	10D	@	L226C
L233	17.73	-.57	-.37	1.28	1.23	12.03	-.34	-.59	.78	1.19	10D	@	L233
L241	19.27	.96	.63	1.24	1.19	13.45	1.08	1.90	.81	1.23	10D	@	L241
L248	17.80	-.51	-.33	.95	.91	12.34	-.02	-.03	.46	.71	10G	@	L248
L255	15.67	-2.64	-1.72	1.23	1.18	46.33	33.97	59.72	2.66	4.08	10D	*	L255
L257A	17.20	-1.11	-.72	.94	.90	12.60	.24	.42	.51	.78	10D	@	L257A
L257B	19.40	1.09	.71	1.35	1.29	12.80	.44	.77	.94	1.44	10D	@	L257B
L257C	19.07	.76	.49	1.28	1.22	12.13	-.23	-.40	1.13	1.72	10D	@	L257C
L262	19.17	.86	.56	.94	.90	12.71	.35	.62	.37	.57	10D	@	L262
L275	16.05	-2.25	-1.47	1.06	1.02	13.25	.88	1.55	1.18	1.81	10D	*	L275
L280	19.69	1.39	.90	.90	.86	12.73	.37	.65	.70	1.08	10D	@	L280
L295	19.33	1.03	.67	.98	.93	12.55	.18	.32	.56	.85	10D	@	L295
L301A	19.13	.83	.54	.72	.69	12.31	-.05	-.09	.29	.45	10D	@	L301A
L301B	19.90	1.59	1.04	1.09	1.04	12.90	.54	.94	.66	1.00	10D	@	L301B
L309	17.57	-.74	-.48	1.00	.96	11.98	-.38	-.67	.74	1.12	10D	@	L309
L313	15.93	-2.38	-1.55	1.31	1.25	11.74	-.62	-1.10	.68	1.04	10I	@	L313
L341	17.93	-.37	-.24	.46	.44	12.34	-.02	-.04	.45	.69	10D	@	L341
L352	16.94	-1.37	-.89	.96	.92	11.87	-.49	-.86	.69	1.05	10D	@	L352
L390	14.90	-3.41	-2.22	.91	.87	11.57	-.80	-1.40	.73	1.12	10D	@	L390
L563	18.27	-.04	-.02	1.48	1.42	11.97	-.40	-.70	.67	1.03	10U	@	L563
L567	19.60	1.29	.84	.74	.70	12.80	.44	.77	.65	.99	10D	@	L567
L575	18.27	-.04	-.03	.80	.76	12.24	-.12	-.22	.64	.99	10J	@	L575
L581	19.83	1.53	.99	.90	.86	12.41	.05	.09	.35	.53	10D	@	L581
L652	16.40	-1.91	-1.24	1.68	1.61	46.67	34.30	60.31	3.47	5.31	10D	*	L652
L680	16.47	-1.84	-1.20	.92	.88	11.17	-1.20	-2.10	.60	.92	10D	@	L680
L698	18.59	.29	.19	1.15	1.10	50.60	38.24	67.23	2.92	4.47	10D	*	L698
L734	14.50	-3.81	-2.48	.89	.85	11.30	-1.06	-1.87	.53	.80	10D	@	L734
L743	19.93	1.62	1.06	1.16	1.11	13.33	.96	1.69	1.42	2.18	10D	@	L743

GR. MEAN = 18.31 PSI GRAND MEAN = 12.36 PSI TEST DETERMINATIONS = 15

SD MEANS = 1.53 PSI SD OF MEANS = .57 PSI 40 LABS IN GRAND MEANS

AVERAGE SDR = 1.05 PSI AVERAGE SDR = .65 PSI

GR. MEAN =126.23 KILOPASCAL GRAND MEAN = 85.24 KILOPASCAL

TOTAL NUMBER OF LABORATORIES REPORTING = 46

Best values: G34 18.5 ± 2.6 psi
G45 12.4 ± 1.0 psi

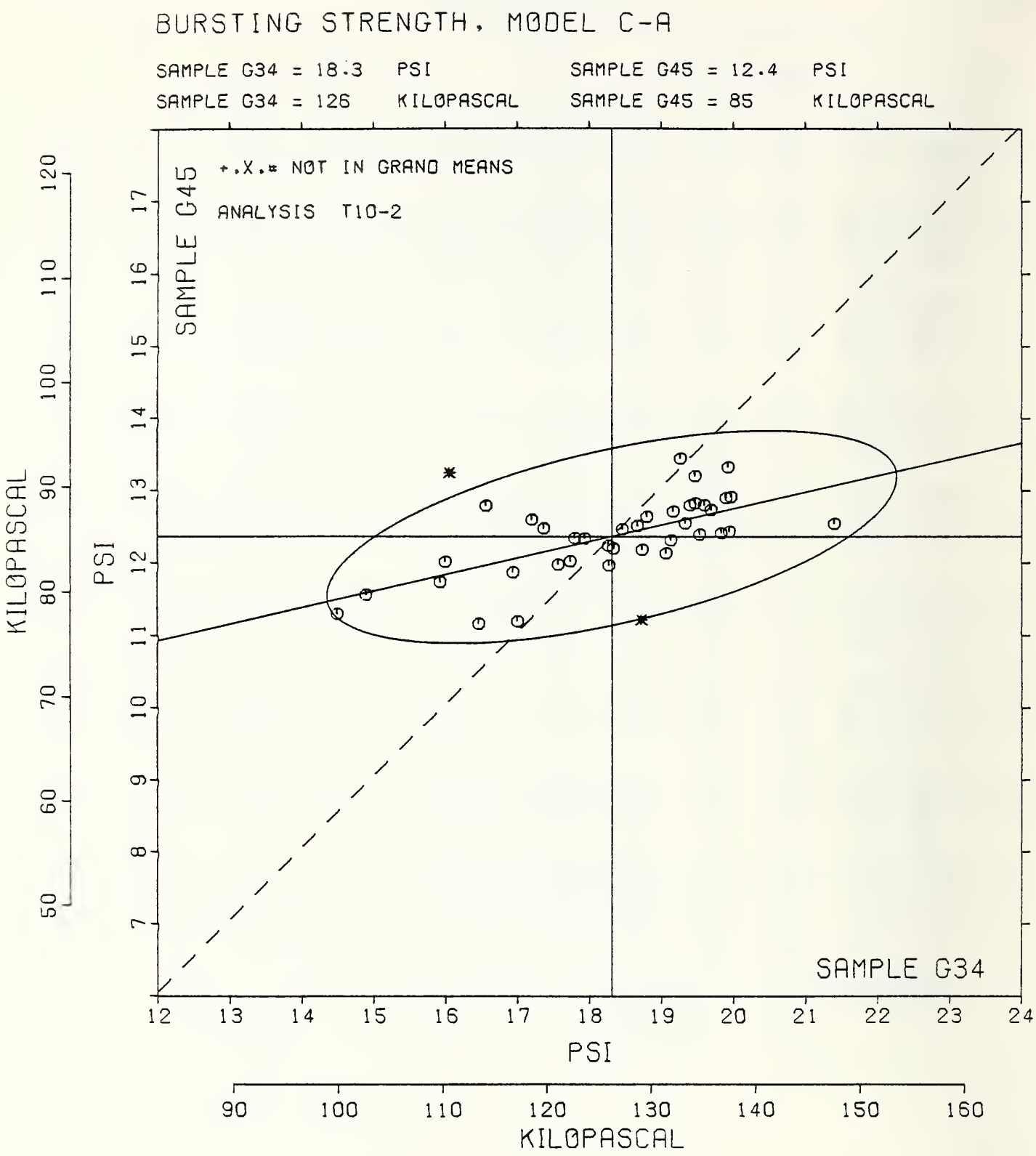
The following laboratories were omitted from the grand means because of extreme test results: 106C, 194, 226B, 255, 652, 698.

ANALYSIS T10-2 TABLE 2

BURSTING STRENGTH, PSI

TAPPI OFFICIAL TEST METHOD T403 OS-76, PERKINS MODEL C-A OR C WITH AIR OR HYDRAULIC CLAMPS

LAB CODE	F	MEANS G34	MEANS G45	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L734	A	14.50	11.30	-3.95	-.19	.83	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L390	A	14.90	11.57	-3.50	-.02	.99	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L255	#	15.67	46.33	4.96	33.71	2.63	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L313	A	15.93	11.74	-2.46	-.08	1.15	10I	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L159	A	16.00	12.02	-2.33	.18	1.17	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L275	*	16.05	13.25	-2.00	1.36	1.41	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L652	#	16.40	46.67	5.75	33.87	3.46	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L680	A	16.47	11.17	-2.06	-.76	.90	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L125	A	16.57	12.79	-1.60	.81	1.75	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L352	A	16.64	11.87	-1.44	-.17	.99	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L162	A	17.00	11.20	-1.53	-.84	.91	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L257A	A	17.20	12.60	-1.03	.48	.84	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L163	A	17.37	12.47	-.89	.32	.80	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L194	#	17.47	46.43	6.73	33.41	2.13	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L309	A	17.57	11.98	-.81	-.21	1.04	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L233	A	17.73	12.03	-.63	-.20	1.21	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L248	A	17.80	12.34	-.50	.09	.81	10G	BURSTING STRENGTH 10 TO 40 PSI,PERKINS C, A.CLAMP,TRANSDUCER
L106C	#	17.93	48.57	7.66	35.39	2.91	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L341	A	17.93	12.34	-.37	.06	.56	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L575	A	18.27	12.24	-.07	-.11	.87	10J	BURSTING STRENGTH 10 TO 40 PSI,PERKINS C, A.CLAMP,TRANSDUCER
L563	A	18.27	11.97	-.12	-.38	1.22	10U	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L176	A	18.33	12.20	-.01	-.17	.95	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L226C	O	18.46	12.47	.17	.07	1.16	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L226B	#	18.52	47.02	7.89	33.75	2.54	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L698	#	18.59	50.60	8.76	37.22	2.78	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L115	A	18.67	12.51	.38	.07	.96	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L105	*	18.72	11.22	.15	-1.21	1.28	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L217	A	18.73	12.19	.38	-.27	1.19	10F	BURSTING STRENGTH 10 TO 40 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L141	O	18.80	12.64	.54	.16	.99	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L257C	A	19.07	12.13	.69	-.39	1.47	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L301A	A	19.13	12.31	.79	-.23	.57	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L262	A	19.17	12.71	.92	.15	.73	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L241	A	19.27	13.45	1.18	.84	1.21	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L295	A	19.33	12.55	1.04	-.05	.89	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L257B	A	19.40	12.80	1.16	.18	1.37	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L148	O	19.47	13.20	1.32	.56	.92	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L157	A	19.47	12.83	1.23	.20	.76	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L185	A	19.53	12.39	1.20	-.24	.93	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L567	A	19.60	12.80	1.36	.14	.85	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L280	A	19.69	12.73	1.43	.05	.97	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L581	A	19.83	12.41	1.50	-.29	.70	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L301B	A	19.90	12.90	1.67	.17	1.02	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L743	O	19.93	13.33	1.79	.58	1.64	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L118	O	19.95	12.43	1.61	-.30	.78	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L166	A	19.97	12.91	1.74	.17	.91	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
L155	O	21.40	12.54	3.35	-.51	.99	10D	BURSTING STRENGTH 10 TO 40 PSI, PERKINS CA OR C, AIR CLAMP
GMEANS:		18.31	12.36			1.00		
		95% ELLIPSE:		4.05	1.19	WITH GAMMA = 12 DEGREES		


BURSTING STRENGTH, MODEL C-A
SAMPLE G34 = 18.3 PSI
SAMPLE G34 = 126 KILOPASCAL
SAMPLE G45 = 12.4 PSI
SAMPLE G45 = 85 KILOPASCAL
+,X,* NOT IN GRAND MEANS
ANALYSIS T10-2
SAMPLE G45
SAMPLE G34
PSI
KILOPASCAL
7 8 9 10 11 12 13 14 15 16 17
50 60 70 80 90 100 110 120
12 13 14 15 16 17 18 19 20 21 22 23 24
90 100 110 120 130 140 150 160

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

	SAMPLE	INDEX				SAMPLE	CORRUGATING MEDIUM				TEST D. 15		
LAB	A77	205 GRAMS PER SQUARE METER				B89	127 GRAMS PER SQUARE METER						
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L103	56.7	-3.3	-1.14	2.3	.50	49.5	-1.1	-.45	2.4	.59	11C	@	L103
L107	59.5	-.5	-.16	5.9	1.28	52.1	1.5	.59	4.5	1.09	11C	@	L107
L118	62.1	2.1	.70	4.4	.96	51.0	.4	.16	3.3	.81	11D	@	L118
L122	60.6	.6	.20	6.3	1.39	52.7	2.1	.86	5.7	1.37	11F	@	L122
L128	58.0	-2.0	-.68	3.8	.83	47.5	-3.1	-1.22	3.8	.93	11D	@	L128
L141	58.5	-1.5	-.52	4.5	.98	50.2	-.4	-.17	4.4	1.07	11D	@	L141
L148	61.7	1.7	.57	4.9	1.07	51.2	.6	.24	3.7	.91	11D	@	L148
L151	60.9	.9	.29	3.9	.86	49.2	-1.4	-.55	4.9	1.19	11D	@	L151
L159	58.1	-1.9	-.63	4.1	.91	49.4	-1.2	-.46	3.0	.74	11D	@	L159
L170	59.9	-.1	-.05	2.5	.54	49.1	-1.5	-.58	1.8	.44	11C	@	L170
L176	58.3	-1.7	-.57	3.8	.83	49.1	-1.5	-.58	4.5	1.09	11D	@	L176
L182	59.0	-1.0	-.34	5.7	1.25	51.2	.6	.24	3.9	.95	11D	@	L182
L218	60.3	.3	.10	3.1	.69	53.9	3.3	1.31	3.2	.78	11D	@	L218
L219	68.5	8.5	2.88	5.8	1.27	56.1	5.5	2.19	5.5	1.33	11C	*	L219
L232	59.3	-.7	-.25	2.6	.57	52.9	2.3	.94	2.5	.61	11C	@	L232
L237A	64.1	4.1	1.40	2.8	.61	54.8	4.2	1.68	3.6	.88	11C	@	L237A
L237B	63.4	3.4	1.15	2.9	.63	55.0	4.4	1.76	3.7	.89	11C	@	L237B
L238A	62.2	2.2	.74	4.4	.98	52.1	1.5	.61	6.4	1.55	11Y	@	L238A
L248	54.7	-5.3	-1.81	4.1	.90	50.1	-.5	-.19	4.4	1.06	11I	@	L248
L278	53.0	-7.0	-2.39	4.2	.92	46.0	-4.6	-1.83	5.0	1.22	11C	@	L278
L279	57.7	-2.3	-.77	5.6	1.22	47.6	-3.0	-1.19	5.3	1.28	11C	@	L279
L280	64.3	4.3	1.46	7.8	1.72	51.9	1.3	.53	4.1	1.00	11D	@	L280
L294	59.9	-.1	-.02	3.8	.84	46.4	-4.2	-1.67	5.0	1.22	11C	@	L294
L303	58.7	-1.3	-.44	3.4	.75	48.2	-2.4	-.97	2.8	.68	11C	@	L303
L311	60.3	.3	.09	3.9	.85	51.3	.7	.27	3.6	.87	11C	@	L311
L330	61.7	1.7	.59	5.1	1.11	48.4	-2.1	-.85	4.7	1.13	11C	@	L330
L333	58.3	-1.7	-.57	5.0	1.09	51.3	.7	.27	5.9	1.43	11C	@	L333
L334	63.0	3.0	1.03	4.7	1.04	53.2	2.6	1.06	3.5	.86	11D	@	L334
L339	58.0	-2.0	-.68	6.6	1.44	44.8	-5.8	-2.31	4.9	1.18	11C	@	L339
L344	61.0	1.0	.34	6.0	1.31	52.1	1.5	.60	4.6	1.11	11C	@	L344
L356	59.8	-.2	-.08	5.4	1.19	49.8	-.8	-.31	4.9	1.19	11C	@	L356
L563	67.6	7.6	2.57	6.7	1.47	50.7	.1	.03	5.5	1.35	11Y	*	L563
L565	58.0	-2.0	-.68	2.9	.64	49.8	-.8	-.33	1.7	.42	11D	@	L565
L567	59.1	-.9	-.30	4.7	1.03	52.2	1.6	.64	4.3	1.04	11D	@	L567
L575	60.6	.6	.21	4.9	1.07	51.3	.7	.27	3.7	.91	11L	@	L575
L576	60.7	.7	.23	4.8	1.05	55.4	4.8	1.92	2.7	.65	11P	@	L576
L581	60.8	.8	.27	4.9	1.08	51.1	.5	.22	4.1	.99	11D	@	L581
L599	60.1	.1	.03	5.3	1.15	50.8	.2	.09	4.4	1.07	11C	@	L599
L604	57.6	-2.4	-.80	5.7	1.26	46.9	-3.7	-1.46	3.6	.87	11C	@	L604
L622	54.7	-5.3	-1.80	6.4	1.40	47.0	-3.5	-1.41	5.8	1.40	11F	*	L622
L650	59.8	-.2	-.07	3.2	.70	48.1	-2.5	-1.01	4.4	1.08	11D	@	L650
L651	60.8	.8	.27	6.7	1.47	52.4	1.8	.72	4.8	1.17	11D	@	L651
L680	58.0	-2.0	-.68	4.9	1.08	48.5	-2.1	-.82	4.5	1.10	11D	@	L680
L730	60.6	.6	.20	4.3	.94	48.7	-1.9	-.74	4.5	1.10	11D	@	L730
L736	53.5	-6.5	-2.22	4.4	.97	50.3	-.3	-.12	4.9	1.19	11C	*	L736
L743	61.5	1.5	.52	5.8	1.28	52.1	1.5	.62	6.1	1.47	11D	@	L743

GP. MEAN = 60.0 PSI — GRAND MEAN = 50.6 PSI — TEST DETERMINATIONS = 15
SD MEANS = 2.9 PSI — SD OF MEANS = 2.5 PSI — 45 LABS IN GRAND MEANS
AVERAGE SDR = 4.6 PSI — AVERAGE SDR = 4.1 PSI
GP. MEAN = 413.7 KILOPASCAL — GRAND MEAN = 348.8 KILOPASCAL

L242	61.7	1.7	.59	5.6	1.22	51.1	.5	.20	5.3	1.28	11T	*	L242
L250L	57.6	-2.4	-.81	5.4	1.19	48.1	-2.4	-.98	2.6	.62	11N	*	L250L
L274	59.1	-.9	-.32	4.5	.99	50.8	.2	.08	4.0	.98	11H	*	L274
L290	59.9	-.1	-.05	3.9	.86	53.5	2.9	1.15	3.0	.72	11A	*	L290
L393	61.9	1.9	.66	4.4	.97	55.9	5.3	2.11	3.1	.76	11B	*	L393
L394	64.7	4.7	1.61	4.5	.98	55.7	5.1	2.03	5.1	1.23	11H	*	L394
L570	60.2	.2	.07	3.3	.72	52.8	2.2	.88	4.6	1.12	11H	*	L570
L593	70.3	10.3	3.51	7.5	1.64	52.6	2.0	.80	6.4	1.56	11J	*	L593
L598	72.9	12.9	4.39	5.3	1.16	56.0	5.4	2.16	4.5	1.09	11B	*	L598
L625	55.8	-4.2	-1.44	4.4	.96	53.0	2.4	.98	6.5	1.58	11A	*	L625
L737	65.6	5.6	1.90	6.4	1.41	74.5	23.9	9.53	4.9	1.19	11H	*	L737
L738	65.3	5.3	1.81	7.3	1.59	47.1	-3.5	-1.38	6.9	1.68	11A	*	L738
L754	65.7	5.7	1.94	4.8	1.06	55.7	5.1	2.04	3.5	.86	11N	*	L754

TOTAL NUMBER OF LABORATORIES REPORTING = 59

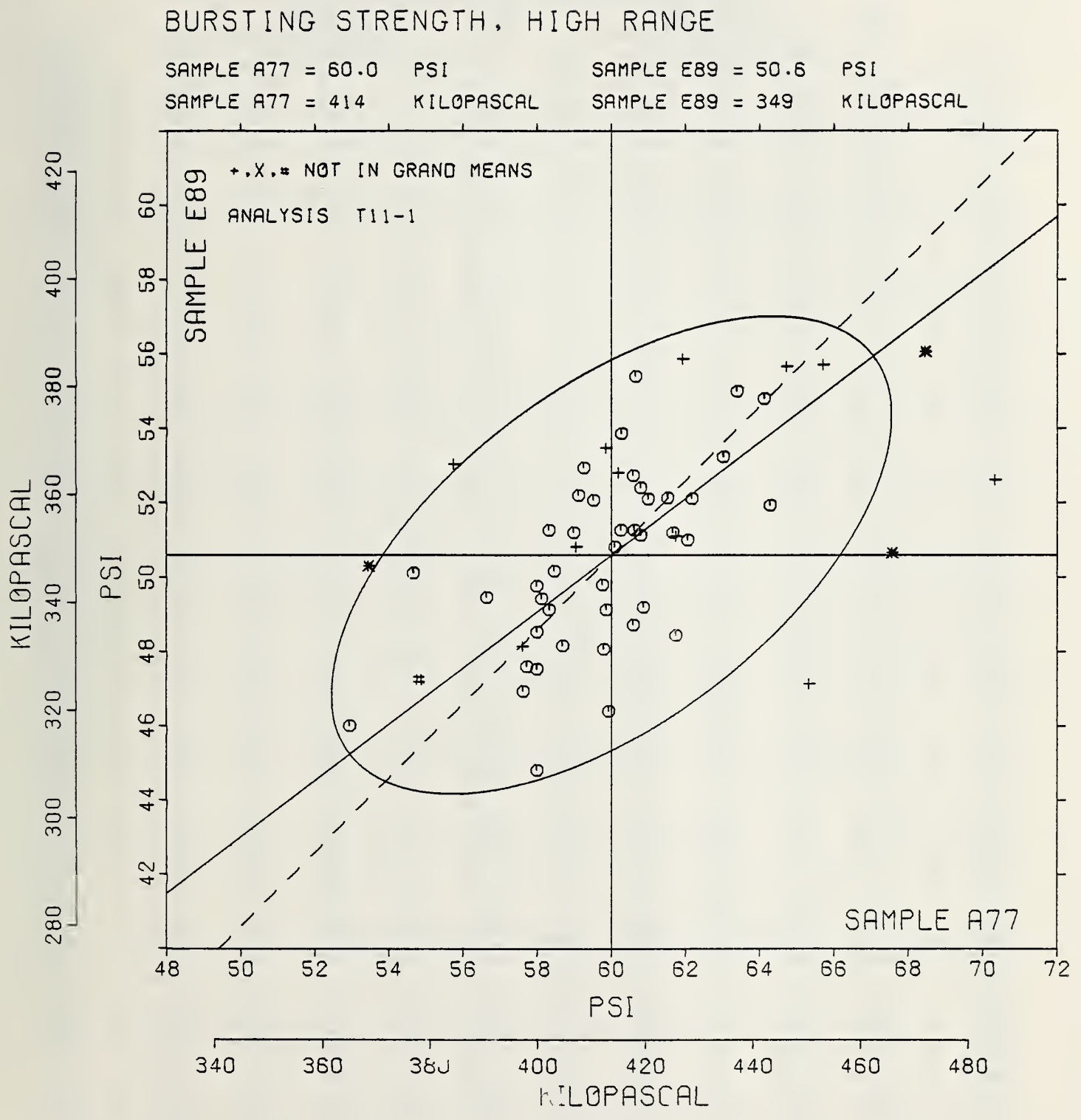
Best values: A77 60 ± 5 psi
B89 51 ± 4 psi

ANALYSIS T11-1 TABLE 2

BURSTING STRENGTH, PSI - HIGH RANGE

TAPPI OFFICIAL TEST METHOD T403 OS-76, PERKINS MODEL C OR C-A

LAB CODE	F	MEANS A77	MEANS E89	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L278	A	53.0	46.0	-8.4	.6	1.07	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L736	*	53.5	50.3	-5.4	3.7	1.08	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L248	A	54.7	50.1	-4.5	2.8	.98	11I	BURSTING STRENGTH 40 TO 85 PSI,PERKINS C, A.CLAMP,TRANSDUCER
L622	*	54.7	47.0	-6.4	.4	1.40	11E	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L625	*	55.8	53.0	-1.9	4.5	1.27	11A	BURSTING STRENGTH 40 TO 85 PSI, PERKINS A, MANUAL CLAMP
L103	A	56.7	49.5	-3.3	1.1	.55	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L250L	*	57.6	48.1	-3.4	-.5	.91	11N	BURSTING STRENGTH 40 TO 85 PSI,LHOMARGY,MAN.CLAMP, 20C,65%RH
L604	A	57.6	46.9	-4.1	-1.5	1.07	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L279	A	57.7	47.6	-3.6	-1.0	1.25	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L565	A	58.0	49.8	-2.1	.6	.53	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L339	A	58.0	44.8	-5.1	-3.4	1.31	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L128	A	58.0	47.5	-3.4	-1.2	.88	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L680	A	58.0	48.5	-2.8	-.4	1.09	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L159	A	58.1	49.4	-2.2	.2	.82	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L176	A	58.3	49.1	-2.2	-.2	.96	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L333	A	58.3	51.3	-.9	1.5	1.26	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L141	A	58.5	50.2	-1.5	.6	1.02	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L303	A	58.7	48.2	-2.5	-1.1	.71	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L182	A	59.0	51.2	-.4	1.1	1.10	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L274	*	59.1	50.8	-.6	.7	.98	11H	BURSTING STRENGTH 40 TO 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L567	A	59.1	52.2	.3	1.8	1.04	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L232	A	59.3	52.9	.8	2.3	.59	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L107	A	59.5	52.1	.5	1.5	1.19	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L356	A	59.8	49.8	-.7	-.5	1.19	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L650	A	59.8	48.1	-1.7	-1.9	.89	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L290	*	59.9	53.5	1.6	2.4	.79	11A	BURSTING STRENGTH 40 TO 85 PSI, PERKINS A, MANUAL CLAMP
L170	A	59.9	49.1	-1.0	-1.1	.49	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L294	A	59.9	46.4	-2.6	-3.3	1.03	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L599	A	60.1	50.8	.2	.1	1.11	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L570	*	60.2	52.8	1.5	1.6	.92	11B	BURSTING STRENGTH 40 TO 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L311	A	60.3	51.3	.6	.4	.86	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L218	A	60.3	53.9	2.2	2.4	.73	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L730	A	60.6	48.7	-.6	-1.8	1.02	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L122	A	60.6	52.7	1.8	1.3	1.39	11F	BURSTING STRENGTH 40 TO 85 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L575	A	60.6	51.3	.9	.2	.99	11L	BURSTING STRENGTH 40 TO 85 PSI,PERKINS C, A.CLAMP,TRANSDUCER
L576	A	60.7	55.4	3.4	3.4	.85	11P	BURSTING STRENGTH 40 TO 85 PSI, PERKINS LC, MANUAL CLAMP
L651	A	60.8	52.4	1.7	1.0	1.32	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L581	A	60.8	51.1	1.0	-.0	1.04	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L151	A	60.9	49.2	-.2	-1.6	1.03	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L344	A	61.0	52.1	1.7	.6	1.21	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L743	A	61.5	52.1	2.2	.3	1.38	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L148	A	61.7	51.2	1.7	-.5	.99	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L242	*	61.7	51.1	1.7	-.6	1.25	11T	BURSTING STRENGTH 40 TO 85 PSI, L+W,MANUAL CLAMP
L330	A	61.7	48.4	.1	-2.8	1.12	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L393	*	61.9	55.9	4.7	3.0	.86	11B	BURSTING STRENGTH 40 TO 85 PSI, MESSMER, MANUAL CLAMP
L118	A	62.1	51.0	1.9	-.9	.89	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L238A	A	62.2	52.1	2.7	-.1	1.26	11Y	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L334	A	63.0	53.2	4.0	.3	.95	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L237B	A	63.4	55.0	5.4	1.5	.76	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L237A	A	64.1	54.8	5.8	.9	.75	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L280	A	64.3	51.9	4.2	-1.5	1.36	11D	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L304	*	64.7	55.7	6.8	1.2	1.10	11H	BURSTING STRENGTH 40 TO 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L738	*	65.3	47.1	2.2	-6.0	1.64	11A	BURSTING STRENGTH 40 TO 85 PSI, PERKINS A, MANUAL CLAMP
L737	*	65.6	74.5	18.9	15.6	1.30	11H	BURSTING STRENGTH 40 TO 85 PSI, PERKINS AH, HYDRAULIC CLAMP
L754	*	65.7	55.7	7.6	.6	.96	11N	BURSTING STRENGTH 40 TO 85 PSI,LHOMARGY,MAN.CLAMP, 20C,65%RH
L563	*	67.6	58.7	6.1	-4.5	1.41	11Y	BURSTING STRENGTH 40 TO 85 PSI, PERKINS CA, AIR CLAMP
L219	*	68.5	56.1	10.1	-.8	1.30	11C	BURSTING STRENGTH 40 TO 85 PSI, PERKINS C, MANUAL CLAMP
L593	*	70.3	52.6	9.4	-4.6	1.60	11J	BURSTING STRENGTH 40 TO 85 PSI, PERKINS JUMBO,HAND DRIVEN
L598	*	72.9	56.0	13.6	-3.5	1.12	11B	BURSTING STRENGTH 40 TO 85 PSI, MESSMER, MANUAL CLAMP
GMEANS:		60.0	50.6			1.00		
		95% ELLIPSE:		8.8	4.5	WITH GAMMA = 37 DEGREES		


BURSTING STRENGTH, HIGH RANGE
SAMPLE A77 = 60.0 PSI
SAMPLE A77 = 414 KILOPASCAL
SAMPLE E89 = 50.6 PSI
SAMPLE E89 = 349 KILOPASCAL
+.X.* NOT IN GRAND MEANS
ANALYSIS T11-1
SAMPLE E89
PSI
KILOPASCAL
SAMPLE A77
PSI
KILOPASCAL

ANALYSIS I15-1 TABLE 1

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

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

LAB CODE	SAMPLE G36 MEAN	ENVELOPE 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G47 MEAN	WRITING 59 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L103	60.60	-1.86	-.60	1.24	.57	38.03	-.37	-.18	1.01	.85	1ST	@	L103
L105	61.73	-.73	-.23	1.49	.68	37.13	-1.27	-.61	1.68	1.42	1ST	@	L105
L107	59.93	-2.53	-.81	2.15	.99	39.07	.67	.32	4.71	3.97	1ST	@	L107
L115	58.20	-4.26	-1.37	2.11	.97	36.10	-2.30	-1.11	1.57	1.32	1SC	@	L115
L118	59.40	-3.06	-.98	1.59	.73	36.03	-2.37	-1.15	.48	.41	1ST	@	L118
L121	63.73	1.27	.41	2.25	1.03	40.00	1.60	.78	.82	.69	1ST	@	L121
L122	63.12	.66	.21	1.28	.59	38.86	.46	.22	.99	.83	1SC	@	L122
L124	61.07	-1.40	-.45	1.98	.91	38.73	.33	.16	.80	.67	1ST	@	L124
L128	63.07	.60	.19	1.58	.72	39.33	.93	.45	.72	.61	1ST	@	L128
L131	65.60	3.14	1.01	2.50	1.15	40.20	1.80	.87	1.21	1.02	15A	@	L131
L134	65.07	2.60	.84	.80	.37	39.93	1.53	.74	.96	.81	1SC	@	L134
L139	64.20	1.74	.56	1.70	.78	39.67	1.27	.61	.72	.61	1ST	@	L139
L141	57.93	-4.53	-1.45	2.09	.96	37.47	-.93	-.45	.58	.49	1ST	@	L141
L143	57.87	-4.60	-1.48	2.75	1.26	36.07	-2.33	-1.13	1.10	.93	1ST	@	L143
L148	62.93	.47	.15	1.98	.91	39.00	.60	.29	1.25	1.06	1ST	@	L148
L150	59.40	-3.06	-.98	2.75	1.26	36.80	-1.60	-.77	1.37	1.16	1ST	@	L150
L153	60.60	-1.86	-.60	3.42	1.57	37.20	-1.20	-.58	.86	.73	1SC	@	L153
L155	61.07	-1.40	-.45	8.71	3.99	36.71	-1.69	-.82	.87	.73	1ST	@	L155
L157	61.33	-2.13	-.68	2.47	1.13	36.70	-1.70	-.82	1.33	1.12	1ST	@	L157
L158	61.73	-.73	-.23	2.25	1.03	35.80	-2.60	-1.26	2.27	1.92	15R	@	L158
L159	63.20	.74	.24	2.14	.98	37.27	-1.13	-.55	2.46	2.08	15L	@	L159
L162	57.87	-4.60	-1.48	2.77	1.27	34.33	-4.07	-1.97	2.35	1.98	1ST	@	L162
L163	61.80	-.66	-.21	2.93	1.34	38.37	-.03	-.02	.67	.56	1ST	@	L163
L166	61.60	-.86	-.28	2.41	1.11	37.47	-.93	-.45	.93	.79	1ST	@	L166
L167	64.80	2.34	.75	1.47	.67	39.73	1.33	.65	.80	.67	1SC	@	L167
L170	61.80	-.66	-.21	.86	.39	38.07	-.33	-.16	.96	.81	1ST	@	L170
L173B	66.07	3.60	1.16	2.49	1.14	41.27	2.87	1.39	1.67	1.41	1ST	@	L173B
L176	64.93	2.47	.79	1.49	.68	39.67	1.27	.61	2.02	1.71	1ST	@	L176
L182A	61.73	-.73	-.23	3.24	1.48	33.87	-4.53	-2.20	2.61	2.20	15A	*	L182A
L182T	61.60	-.86	-.28	2.69	1.23	38.40	.00	.00	.91	.77	1ST	@	L182T
L183	62.33	-.13	-.04	1.84	.84	38.50	.10	.05	.80	.68	1ST	@	L183
L185	64.07	1.60	.51	2.71	1.24	39.10	.70	.34	.89	.75	1ST	@	L185
L189	63.00	.54	.17	1.81	.83	34.80	-3.60	-1.74	1.42	1.20	1ST	*	L189
L191	65.47	3.00	.96	1.92	.88	39.07	.67	.32	.70	.59	1ST	@	L191
L194	65.63	3.17	1.02	1.46	.67	39.80	1.40	.68	.53	.44	1ST	@	L194
L206	64.27	1.80	.58	2.12	.97	39.83	1.43	.69	.86	.72	1ST	@	L206
L207	85.44	22.98	7.38	2.28	1.04	57.74	19.34	9.37	1.62	1.37	15R	#	L207
L211	58.53	-2.93	-.94	1.46	.67	36.40	-2.00	-.97	.63	.53	15R	@	L211
L212	61.00	-1.46	-.47	2.39	1.09	37.83	-.57	-.27	1.14	.96	1ST	@	L212
L213	63.93	1.47	.47	1.94	.89	37.80	-.60	-.29	.68	.57	1ST	@	L213
L217	63.62	1.16	.37	2.18	1.00	38.17	-.23	-.11	1.42	1.20	15Q	@	L217
L219	63.33	.87	.28	2.09	.96	38.60	.20	.10	.74	.62	15L	@	L219
L223	63.97	1.51	.48	1.78	.82	38.55	.15	.07	1.08	.91	15R	@	L223
L2268	63.93	1.47	.47	1.87	.86	39.33	.93	.45	.82	.69	1ST	@	L226B
L226C	61.73	-.73	-.23	1.30	.60	38.27	-.13	-.06	.75	.63	1ST	@	L226C
L228	61.33	-1.13	-.36	1.40	.64	38.93	.53	.26	.98	.74	1ST	@	L228
L232	71.07	8.60	2.76	1.83	.84	41.87	3.47	1.68	1.30	1.10	1ST	*	L232
L233	57.60	-4.86	-1.56	1.59	.73	34.33	-4.07	-1.97	1.54	1.30	1ST	@	L233
L237A	60.20	-2.26	-.73	1.86	.85	36.87	-1.53	-.74	.74	.63	1ST	@	L237A
L237B	62.67	.20	.07	1.50	.68	38.93	.53	.26	.80	.67	1ST	@	L237B
L238A	74.47	12.00	3.85	14.73	6.74	37.47	-.93	-.45	2.10	1.77	1ST	#	L238A
L241	64.87	2.40	.77	.92	.42	40.20	1.80	.87	.41	.35	1ST	@	L241
L242	64.20	1.73	.56	2.70	1.24	40.06	1.66	.80	1.00	.85	15U	@	L242
L244	64.87	2.40	.77	1.55	.71	40.00	1.60	.78	.60	.50	15C	@	L244
L248	65.42	2.95	.95	1.58	.72	39.09	.69	.34	.88	.74	15J	@	L248
L249	61.47	-1.00	-.32	2.20	1.01	37.60	-.80	-.39	.60	.51	1ST	@	L249
L254	61.60	-.86	-.28	2.85	1.30	38.27	-.13	-.06	.88	.74	1ST	@	L254
L255	60.00	-2.46	-.79	2.10	.96	37.20	-1.20	-.58	.86	.73	1ST	@	L255
L257A	63.47	1.00	.32	3.34	1.53	36.00	-2.40	-1.16	3.38	2.85	1SC	@	L257A
L257B	63.87	1.40	.45	2.56	1.17	41.13	2.73	1.32	1.46	1.23	1SC	@	L257B
L257C	60.40	-2.06	-.66	3.31	1.52	37.20	-1.20	-.58	1.01	.85	1SC	@	L257C
L259	62.33	-.13	-.04	2.50	1.14	38.20	-.20	-.10	.94	.79	1ST	@	L259
L261	59.37	-3.10	-.99	2.51	1.15	35.90	-2.50	-1.21	.95	.80	1ST	@	L261
L262	60.67	-1.80	-.58	1.18	.54	37.27	-1.13	-.55	.59	.50	1ST	@	L262
L264	62.93	.47	.15	1.03	.47	41.80	3.40	1.65	1.15	.97	1ST	@	L264

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

TAPPI TENTATIVE TEST METHOD T414 TS-66, INTERNAL TEARING RESISTANCE OF PAPER

LAB CODE	SAMPLE G36 MEAN	ENVELOPE 74 GRAMS PER SQUARE METER DEV	M.DEV	SDR	R.SDR	SAMPLE G47 MEAN	WRITING 59 GRAMS PER SQUARE METER DEV	M.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L273	59.73	-2.73	-.88	2.37	1.09	38.77	.37	.18	1.22	1.03	15T	@	L273
L274	63.67	1.00	.32	2.20	1.01	39.73	1.33	.65	2.12	1.79	15T	@	L274
L275	63.13	.67	.21	2.36	1.08	38.97	.57	.27	.64	.54	15T	@	L275
L278	71.33	8.87	2.85	1.80	.82	43.53	5.13	2.49	1.19	1.00	15T	*	L278
L279	60.13	-2.33	-.75	1.41	.64	37.07	-1.33	-.65	1.10	.93	15T	@	L279
L280	60.27	-2.29	-.71	2.76	1.27	73.73	35.33	17.11	1.16	.98	18L	*	L280
L281	59.67	-2.89	-.90	3.81	1.74	38.50	.10	.05	1.22	1.03	15T	@	L281
L285	69.20	6.74	2.16	3.38	1.55	44.33	5.93	2.87	1.91	1.61	15T	*	L285
L288	62.93	.47	.15	2.94	1.35	80.93	42.53	20.60	2.02	1.70	15T	*	L288
L290	63.93	1.47	.47	1.79	.82	36.60	-1.80	-.87	1.84	1.55	15T	@	L290
L291	61.27	-1.20	-.38	2.05	.94	38.57	.17	.08	1.13	.95	15A	@	L291
L301A	59.47	-3.00	-.96	1.51	.69	37.40	-1.00	-.48	1.02	.86	15Q	@	L301A
L303	61.73	-.73	-.23	3.17	1.46	37.83	-.57	-.27	.59	.50	15L	@	L303
L305	64.53	2.07	.66	2.56	1.17	43.07	4.67	2.26	1.49	1.25	15T	*	L305
L309	64.80	2.34	.75	2.96	1.36	39.93	1.53	.74	.79	.59	15T	@	L309
L311	64.83	2.47	.78	2.34	1.07	38.63	.23	.11	.67	.56	15T	@	L311
L312	66.00	3.64	1.14	2.42	1.11	39.60	1.20	.58	1.35	1.14	15T	@	L312
L313	71.37	9.40	3.02	2.00	.91	42.20	3.80	1.84	.88	.74	15L	*	L313
L315	61.07	-.90	-.46	2.58	1.18	38.13	-.27	-.13	.92	.77	15T	@	L315
L321	60.83	-1.93	-.62	3.25	1.49	32.93	-5.47	-2.65	1.28	1.08	15T	*	L321
L328	63.83	1.07	.34	.85	.39	40.77	2.37	1.15	2.06	1.73	15T	@	L328
L333	59.30	-3.66	-.86	2.78	1.27	36.97	-1.43	-.69	1.38	1.16	18T	@	L333
L334	60.67	-1.80	-.58	2.16	.99	38.93	.53	.26	3.24	2.75	15T	@	L334
L336	69.13	2.33	.75	2.39	1.09	36.97	-1.43	-.69	.88	.72	15T	@	L336
L344	67.67	5.00	1.61	2.33	1.06	42.03	3.63	1.76	1.34	1.13	15C	@	L344
L345	66.67	4.20	1.35	3.02	1.38	39.07	.67	.32	.88	.74	18T	@	L345
L352	15.95	-46.82	-14.93	.83	.24	39.81	1.41	.68	.93	.78	18C	*	L352
L358	54.84	-7.62	-2.45	1.85	.71	30.29	-8.11	-3.93	.98	.83	15T	X	L358
L360	61.90	.56	.18	.83	.38	35.47	-2.93	-1.42	.48	.41	15T	@	L360
L376	61.60	.86	-.28	2.95	1.35	39.00	.60	.29	1.00	.84	15T	@	L376
L382	65.87	2.74	.88	1.82	.83	38.73	.33	.16	.96	.81	15T	@	L382
L386	61.87	.60	.19	2.46	1.12	37.13	-1.27	-.61	.83	.70	18T	@	L386
L388	74.93	12.47	4.00	1.71	.78	84.40	16.00	7.75	.83	.70	18T	*	L388
L396	61.33	-1.13	-.36	2.87	1.31	38.93	.83	.26	1.10	.93	15T	@	L396
L396W	52.80	-9.66	-3.10	6.45	2.95	33.73	-4.67	-2.26	1.49	1.25	18T	*	L396W
L442	66.93	3.94	1.26	2.35	1.08	39.67	1.27	.61	1.05	.88	15R	@	L442
L484	90.67	28.20	9.05	4.39	2.01	43.47	5.07	2.45	7.27	6.13	15T	*	L484
L557	62.20	-.26	-.08	1.97	.90	39.27	.87	.42	1.51	1.27	15T	@	L557
L562	62.67	.40	.13	2.03	.93	38.67	.27	.13	1.23	1.04	15T	@	L562
L565	62.47	.00	.00	1.64	.75	38.67	.27	.13	1.18	.99	15T	@	L565
L566	59.83	-2.93	-.94	2.47	1.13	36.17	-2.23	-1.08	.92	.77	15T	@	L566
L567	63.73	1.27	.41	1.83	.84	40.13	1.73	.84	.64	.54	15C	@	L567
L574	64.80	2.34	.75	5.00	2.29	39.13	.73	.36	1.19	1.00	15T	@	L574
L575	62.31	-.16	-.05	1.33	.61	38.16	-.24	-.12	1.41	1.19	15L	@	L575
L576	68.47	6.00	1.93	1.25	.57	41.67	3.27	1.58	4.05	3.41	15T	@	L576
L580	63.40	.94	.30	1.50	.69	40.40	2.00	.97	.74	.62	15T	@	L580
L581	63.20	.74	.24	3.15	1.44	39.22	.82	.40	.98	.82	15Q	@	L581
L569	61.67	-.80	-.26	2.13	.97	38.57	.17	.08	.80	.67	15T	@	L569
L604	60.93	-1.53	-.49	2.37	1.09	36.73	-1.67	-.81	1.22	1.03	15T	@	L604
L606	72.40	9.94	3.19	2.56	1.17	41.93	3.53	1.71	1.28	1.08	15T	*	L606
L610	65.27	2.80	.90	3.17	1.45	36.87	-1.53	-.74	1.41	1.19	15T	@	L610
L622	39.53	-22.93	-7.36	1.46	.67	26.70	-11.70	-5.67	1.07	.90	15L	*	L622
L625	68.00	5.54	1.78	5.90	2.70	46.80	8.40	4.07	2.81	2.37	15T	X	L625
L626	62.53	.07	.02	1.64	.75	39.22	.82	.40	.61	.51	15L	@	L626
L651	56.80	-5.66	-1.82	1.66	.76	38.13	-.27	-.13	1.66	1.38	15T	*	L651
L654	56.93	-5.53	-1.78	1.16	.53	36.73	-1.67	-.81	.70	.59	15T	@	L654
L670	60.47	-2.00	-.64	2.39	1.09	34.53	-3.87	-1.87	1.73	1.46	15T	@	L670
L676	61.73	-.73	-.23	2.12	.97	38.13	-.27	-.13	1.13	.95	15T	@	L676
L680	32.33	-30.13	-9.67	.62	.28	40.40	2.00	.97	1.18	1.00	15T	*	L680
L684	63.20	.74	.24	1.66	.76	41.13	2.73	1.32	1.36	1.14	15L	@	L684
L685	64.27	1.80	.58	2.49	1.14	76.93	38.53	19.66	1.49	1.25	15T	*	L685
L692	62.00	-.46	-.15	2.20	1.01	37.10	-1.30	-.63	.89	.75	15T	@	L692
L696	63.73	1.27	.41	2.99	1.37	39.87	1.47	.71	1.06	.89	15T	@	L696
L697	63.80	1.34	.43	1.52	.70	35.43	-2.97	-1.44	1.08	.91	15T	*	L697
L698	64.33	1.87	.60	1.54	.71	41.13	2.73	1.32	3.14	2.64	15L	@	L698

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

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

LAB CODE	SAMPLE G36 ENVELOPE 74 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE G47 WRITING 59 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L704	56.27	-6.20	-1.99	2.25	1.03	36.13	-2.27	-1.10	1.47	1.24	15T	@	L704
L705	52.20	-10.26	-3.30	12.52	5.73	54.47	16.07	7.78	13.79	11.63	15T	#	L705
L738	59.13	-3.33	-1.07	3.25	1.49	37.47	-.93	-.45	3.04	2.57	15T	@	L738
L743	61.93	-.53	-.17	1.87	.86	39.40	1.00	.48	1.39	1.17	15L	@	L743
L746S	60.67	-1.80	-.58	2.47	1.13	38.07	-.33	-.16	.70	.59	15T	@	L746S
L758	68.49	6.02	1.93	4.46	2.04	44.18	5.78	2.80	1.53	1.29	15T	*	L758
L759	71.33	8.87	2.85	11.18	5.12	38.13	-.27	-.13	1.13	.95	15T	X	L759
L760A	57.53	-4.93	-1.58	2.03	.93	36.07	-2.33	-1.13	.75	.63	15R	@	L760A
L760B	58.73	-3.73	-1.20	1.87	.86	37.53	-.87	-.42	.92	.77	15L	@	L760B
L760C	58.87	-3.60	-1.16	2.03	.93	36.53	-1.87	-.90	.79	.67	15R	@	L760C
L760D	59.27	-3.20	-1.03	1.79	.82	37.03	-1.37	-.66	.74	.63	15T	@	L760D
GR. MEAN = 62.46 GRAMS				GRAND MEAN = 38.40 GRAMS					TEST DETERMINATIONS = 15				
SD MEANS = 3.11 GRAMS				SD OF MEANS = 2.06 GRAMS					127 LABS IN GRAND MEANS				
	AVERAGE SDR = 2.18 GRAMS					AVERAGE SDR = 1.19 GRAMS							
GR. MEAN = 612.6 MILLINEWTON				GRAND MEAN = 376.6 MILLINEWTON									
L250L	69.57	7.10	2.28	2.55	1.17	41.98	3.58	1.73	1.00	.85	15R	*	L250L
L326	62.07	-.40	-.13	2.19	1.00	39.60	1.20	.58	1.33	1.12	15N	*	L326
L339	61.60	-.86	-.28	2.29	1.05	38.40	.00	.00	1.24	1.05	15N	*	L339
L341	60.13	-2.33	-.75	1.55	.71	36.73	-1.67	-.81	.80	.67	15N	*	L341
L356	60.13	-2.33	-.75	2.85	1.30	37.37	-1.03	-.50	1.42	1.20	15N	*	L356
L585	79.60	17.14	5.50	1.35	.62	52.80	14.40	6.97	.94	.79	15E	*	L585
L706	16.93	-45.53	-14.62	.80	.37	41.53	3.13	1.52	2.67	2.25	15X	*	L706
L734	72.11	9.64	3.10	11.27	5.16	34.99	-3.41	-1.65	1.02	.86	15N	*	L734
L746P	62.27	-.20	-.06	2.79	1.28	39.97	1.57	.76	.97	.82	15N	*	L746P
L754	67.73	5.27	1.69	1.05	.48	42.11	3.71	1.80	1.18	1.00	15R	*	L754

TOTAL NUMBER OF LABORATORIES REPORTING = 151

Best values: G36 62.3 ± 5.2 grams
G47 38.4 ± 3.4 grams

The following laboratories were omitted from the grand means because of extreme test results: 238A, 280, 288, 352, 388, 484, 680, 685, 705.

Data from the following laboratories were not understood: 207, 622.

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

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

LAB CODE	F	MEANS G36	MEANS G47	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L352	#	15.95	39.81	-39.48	24.65	.51	15C TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
[illegible]76	*	16.93	41.53	-37.76	25.64	1.31	15X TEARING STRENGTH 35 TO 110G: GIVE INSTRUMENT MAKE,MODEL
[illegible]68[illegible]	#	32.33	40.46	-25.02	16.98	.64	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L622	#	39.53	26.79	-25.70	1.44	.78	15L TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L[illegible]5	#	52.28	54.47	-.78	19.05	8.69	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
I396[illegible]	*	52.89	33.73	-10.70	.83	2.10	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L358	X	54.84	30.29	-10.67	-3.17	.77	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]04	*	56.27	36.13	-6.50	1.16	1.13	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]61	*	56.90	38.13	-5.03	2.62	1.05	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]654	*	56.93	36.73	-6.62	1.35	.56	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L[illegible]60A	*	57.53	36.07	-5.44	.47	.78	15R TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L233	*	57.68	34.33	-6.25	-1.66	1.02	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]162	*	57.87	34.33	-6.02	-1.20	1.63	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
I143	*	57.87	36.07	-5.15	.30	1.09	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]141	*	57.93	37.87	-4.36	1.48	.72	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]115	*	58.27	36.13	-4.84	.16	1.15	15C TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
[illegible]760B	*	58.73	37.53	-3.66	1.13	.81	15L TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
[illegible]760[illegible]	*	58.97	36.53	-4.05	.20	.80	15R TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L738	*	59.13	37.47	-3.35	.87	2.03	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L760D	*	59.27	37.03	-3.45	.43	.72	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]2e1	*	59.37	35.93	-3.94	-.60	.97	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]118	*	59.40	36.03	-3.84	-.50	.57	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L15[illegible]	*	59.40	36.80	-3.45	.16	1.21	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]71A	*	59.47	37.40	-3.09	.65	.77	15Q TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,AIR CLAMP,DIGIT
I566	*	59.53	36.17	-3.66	-.45	.95	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]211	*	59.53	36.40	-3.54	-.25	.60	15R TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
[illegible]281	*	59.67	38.50	-2.37	1.50	1.39	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]2[illegible]3	*	59.73	38.77	-2.17	1.69	1.06	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]333	*	59.80	36.97	-3.02	.10	1.22	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L1[illegible]	*	59.93	39.67	-1.85	1.85	2.48	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
I255	*	60.00	37.20	-2.73	.20	.84	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L356	*	60.13	37.37	-2.53	.28	1.25	15N TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L341	*	60.13	36.73	-2.85	-.27	.69	15N TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L33[illegible]	*	60.13	36.97	-2.74	-.06	.91	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L2[illegible]9	*	60.13	37.07	-2.69	.02	.79	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L237A	*	60.20	36.87	-2.73	-.18	.74	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L28[illegible]	*	60.27	73.73	15.89	31.63	1.12	15L TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L157	*	60.33	36.73	-2.70	-.49	1.13	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L25[illegible]C	*	60.40	37.20	-2.39	.03	1.19	15C TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L6[illegible]	*	60.47	34.53	-3.67	-2.33	1.27	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]321	*	60.53	32.93	-4.42	-3.75	1.28	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]153	*	60.60	37.20	-2.21	-.10	1.15	15C TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
[illegible]103	*	60.60	38.03	-1.80	.62	.71	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]46[illegible]	*	60.67	38.07	-1.72	.62	.86	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
I334	*	60.67	38.93	-1.28	1.37	1.87	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L262	*	60.67	37.27	-2.12	-.07	.52	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L6[illegible]4	*	60.93	36.73	-2.16	-.67	1.06	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
I212	*	61.00	37.83	-1.55	.25	1.03	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L155	*	61.07	36.71	-2.06	-.75	2.36	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
I124	*	61.07	38.73	-1.04	.99	.79	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
I315	*	61.07	38.13	-1.34	.47	.98	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
[illegible]2[illegible]	*	61.27	38.57	-.95	.75	.95	15A TEARING STRENGTH 35 TO 110G, APPITA
L390	*	61.33	38.93	-.71	1.03	1.12	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L228	*	61.33	38.93	-.71	1.03	.69	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L249	*	61.47	37.60	-1.26	-.19	.76	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L33[illegible]	*	61.60	38.40	-.76	.44	1.05	15N TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
I182[illegible]	*	61.60	38.40	-.75	.44	1.00	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L254	*	61.60	38.27	-.81	.32	1.02	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L3[illegible]6	*	61.60	39.00	-.44	.95	1.10	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L166	*	61.60	37.47	-1.22	-.37	.95	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L59[illegible]	*	61.67	38.67	-.61	.55	.82	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L1[illegible]5	*	61.73	37.13	-1.27	-.73	1.05	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
I158	*	61.73	35.80	-1.94	-1.88	1.47	15R TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L676	*	61.73	38.13	-.77	.14	.96	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L226C	*	61.73	38.27	-.76	.25	.61	15T TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

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

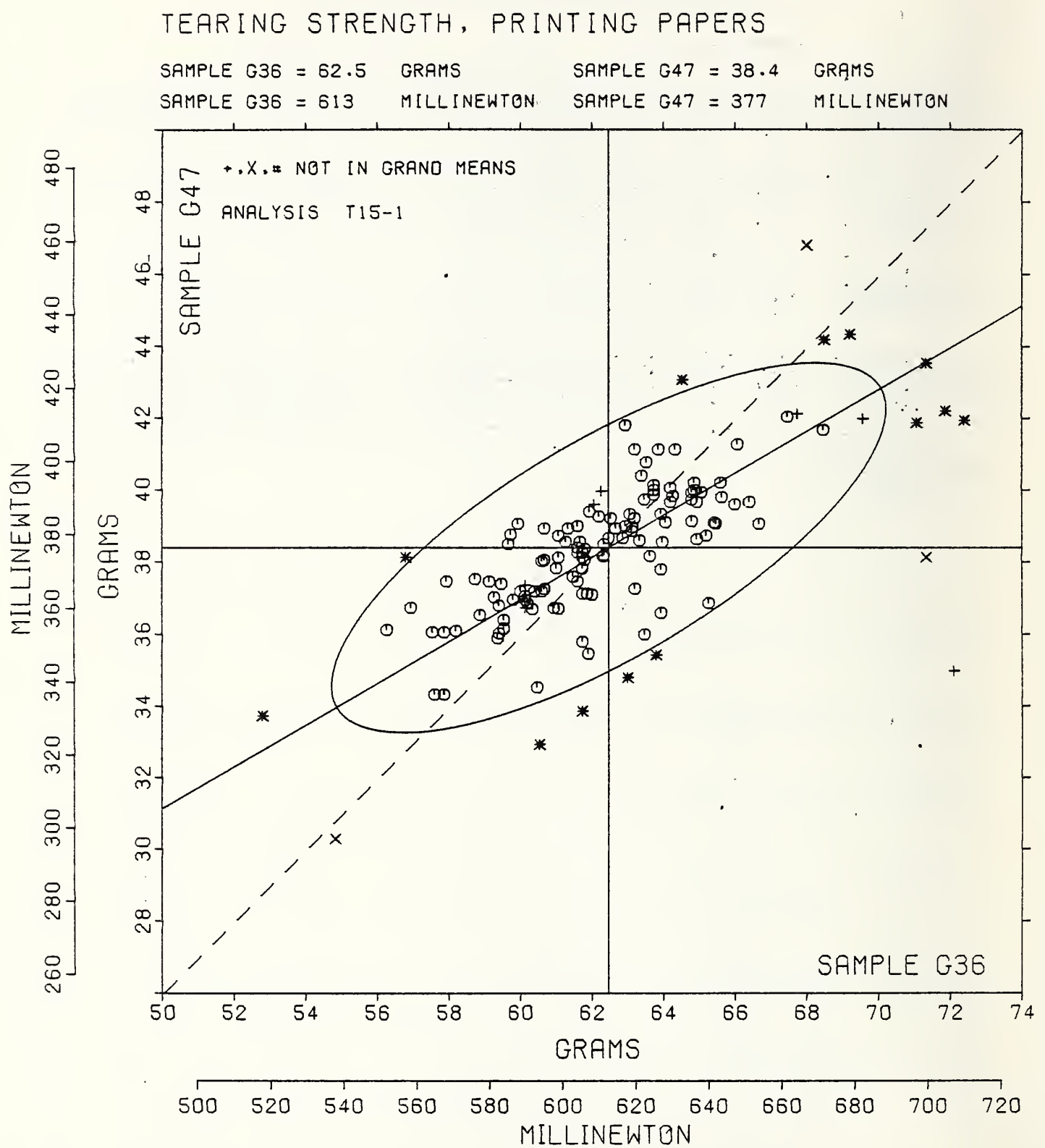
TAB CODE	F	MEANS G36	MEANS G47	COORDINATES MAJOR	COORDINATES MINOR	AVG P.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L182A	*	61.73	33.87	-2.91	-3.55	1.84	15A	TEARING STRENGTH 35 TO 110G, APPITA
L303	A	61.73	37.83	-.92	-.12	.97	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L170	B	61.80	38.07	-.74	.05	.60	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L163	B	61.80	38.37	-.59	.31	.95	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L386	A	61.87	37.13	-1.15	-.79	.91	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L360	A	61.90	35.47	-1.96	-2.25	.39	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L143	A	61.93	39.40	.04	1.13	1.01	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L692	A	62.00	37.10	-1.06	-.89	.88	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L326	*	62.07	39.60	.26	1.24	1.06	15N	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L557	B	62.20	39.27	.21	.88	1.09	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L746P	*	62.27	39.97	.62	1.45	1.05	15N	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L575	A	62.31	38.16	-.26	-.13	.90	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L256	A	62.33	38.20	-.21	-.11	.97	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L183	A	62.33	38.50	-.06	.15	.76	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L565	A	62.47	38.67	.14	.23	.87	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L626	A	62.53	39.22	.47	.67	.63	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L237B	A	62.67	38.93	.44	.36	.68	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L562	B	62.87	38.67	.48	.03	.99	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L288	A	62.93	80.93	21.82	36.51	1.52	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L146	A	62.93	39.00	.71	.28	.98	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L264	A	62.93	41.80	2.12	2.70	.72	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L189	*	63.00	34.80	-1.35	-3.38	1.82	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L128	A	63.07	39.33	.99	.50	.67	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L122	B	63.12	38.86	.80	.07	.71	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L25S	A	63.13	38.57	.86	.15	.81	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L581	A	63.20	39.22	1.05	.34	1.13	15Q	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,AIR CLAMP,DIGIT
L159	B	63.20	37.27	.06	-1.35	1.53	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L684	A	63.20	41.13	2.01	1.99	.95	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L219	A	63.33	38.60	.85	-.26	.79	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L580	A	63.40	40.40	1.82	1.26	.65	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L274	A	63.47	39.73	1.54	.65	1.40	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L257A	A	63.47	36.00	-.34	-2.58	2.19	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L328	A	63.53	40.77	2.12	1.51	1.06	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L217	A	63.62	38.17	.88	-.78	1.10	15Q	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,AIR CLAMP,DIGIT
L696	A	63.73	39.87	1.84	.63	1.13	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L121	B	63.73	40.00	1.90	.74	.86	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L567	A	63.73	40.13	1.97	.86	.69	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L69?	*	63.80	35.43	-.34	-3.24	.80	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L257B	A	63.87	41.13	2.59	1.66	1.20	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L226B	B	63.93	39.33	1.74	.07	.77	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L290	B	63.93	36.60	.36	-2.29	1.19	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L213	A	63.93	37.80	.97	-1.26	.73	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L223	B	63.97	38.55	1.38	-.63	.87	15R	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L185	B	64.07	39.10	1.74	-.20	1.00	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L242	A	64.20	40.06	2.33	.56	1.04	15U	TEARING STRENGTH 35 TO 110G, AUSTRALIAN DPT. CO.
L139	A	64.20	39.67	2.14	.22	.69	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L206	A	64.27	39.83	2.28	.33	.85	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L685	*	64.27	76.93	29.96	32.38	1.20	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L698	B	64.33	41.13	2.99	1.42	1.67	15L	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L375	*	64.53	43.07	4.14	2.99	1.21	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L574	A	64.80	39.13	2.39	-.54	1.65	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L300	A	64.80	39.93	2.79	.15	.97	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L167	A	64.80	39.73	2.69	-.02	.67	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L241	A	64.87	40.20	2.98	.35	.38	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L244	B	64.87	40.00	2.88	.17	.61	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L311	A	64.93	38.63	2.25	-1.04	.82	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L176	A	64.93	39.67	2.77	-.15	1.19	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L134	A	65.07	39.93	3.02	.01	.59	15C	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L382	A	65.20	38.73	2.53	-1.09	.82	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L61?	A	65.27	36.87	1.65	-2.74	1.32	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L248	B	65.42	39.09	2.90	-.89	.73	15J	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L191	A	65.47	39.07	2.93	-.94	.74	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L131	A	65.60	40.20	3.62	-.02	1.08	15A	TEARING STRENGTH 35 TO 110G, APPITA
L194	A	65.63	39.80	3.44	-.39	.56	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L312	A	66.00	39.60	3.66	-.74	1.12	15T	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PRINTING PAPERS

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

LAB CODE	F	MEANS C36	MEANS C47	COORDINATES MAJOR	COORDINATES MINOR	AVG R,SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L173B	G	66.07	41.27	4.56	.66	1.27	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L442	*	66.46	39.67	4.04	-.89	.98	1SR	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L345	G	66.67	39.77	3.97	-1.64	1.06	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L344	G	67.47	42.03	6.15	.62	1.19	1SC	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF (W.AIR CLAMP)
L754	*	67.73	42.11	6.42	.55	.74	1SN	TEARING STRENGTH 35 TO 110G, LHOMARGY, 20 C, 65% RH
L625	X	68.20	46.80	9.81	4.47	2.53	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L576	G	68.47	41.67	6.83	-.20	1.99	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L756	*	68.49	44.18	9.11	1.96	1.67	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L265	*	69.20	44.33	8.81	1.73	1.58	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L250	*	69.57	41.98	7.94	.68	1.01	1SH	TEARING STRENGTH 35 TO 110G, LHOMARGY, 20 C, 65% RH
L232	*	71.07	41.87	9.18	-1.34	.97	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L278	*	71.33	43.53	10.25	-.03	.91	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L759	X	71.33	38.13	7.53	-4.70	3.03	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L313	G	71.97	42.20	10.04	-1.45	.83	1SL	TEARING STRENGTH 35 TO 110G, LORENTZ-WETTRES
L734	*	72.11	34.56	6.61	-7.80	3.01	1SN	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF, NO CUT OUT
L606	*	72.40	41.93	10.36	-1.95	1.12	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L238A	G	74.47	37.47	9.90	-6.85	4.26	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L368	G	74.93	54.40	18.83	7.54	.74	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
L565	*	79.60	52.80	22.06	3.81	.71	1SE	TEARING STRENGTH 35 TO 110G, THWING-ELMENDORF,AMBIENT COND.
L207	G	85.44	57.74	29.59	5.14	1.21	1SR	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF,DIGITAL READOUT
L484	G	90.67	43.47	26.92	-9.82	4.07	1ST	TEARING STRENGTH 35 TO 110G,THWING-ELMENDORF(SCALE TO 100)
GMEANS:		62.46	38.49			1.00		
		95% ELLIPSE:		9.79	3.01	WITH GAMMA = 30 DEGREES		


TEARING STRENGTH, PRINTING PAPERS
SAMPLE G36 = 62.5 GRAMS
SAMPLE G36 = 613 MILLINEWTON
SAMPLE G47 = 38.4 GRAMS
SAMPLE G47 = 377 MILLINEWTON
+.X.* NOT IN GRAND MEANS
ANALYSIS T15-1
SAMPLE G47
GRAMS
MILLINEWTON
SAMPLE G36
GRAMS
MILLINEWTON
28 30 32 34 36 38 40 42 44 46 48
260 280 300 320 340 360 380 400 420 440 460 480
50 52 54 56 58 60 62 64 66 68 70 72 74
500 520 540 560 580 600 620 640 660 680 700 720

ANALYSIS T16-1 TABLE 1

TEARING STRENGTH, GRAMS - PRIMARILY PACKAGING PAPERS

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

LAB CODE	SAMPLE K50 BLEACHED 105 GRAMS PER SQUARE METER MEAN	DEV	V.DEV	SDR	R.SDR	SAMPLE G49 KRAFT COATING BASE 96 GRAMS PER SQUARE METER MEAN	DEV	V.DEV	SDR	R.SDR	VAR	F	LAB	TEST D.* 15
L122C	115.9	6.2	1.17	6.1	1.27	83.4	2.9	.72	2.3	.86	16C	G	L122C	
L151	102.5	+7.1	+1.33	4.7	.98	75.7	+4.8	+1.20	4.1	1.58	16C	G	L151	
L230	115.1	5.4	1.01	5.3	1.09	86.3	1.8	1.21	2.7	1.06	16R	G	L230	
L231	109.6	+4.1	+.76	2.9	.61	77.9	-2.6	+.65	2.4	.91	16T	G	L231	
L248	116.3	6.6	1.23	4.3	.89	86.6	6.1	1.54	2.1	.79	16J	G	L248	
L265	111.3	1.7	.31	6.1	1.26	79.5	+1.1	+.26	3.2	1.21	16T	G	L265	
L301B	104.1	+5.6	+1.04	4.4	.91	75.9	-4.7	+1.17	2.2	.85	16Q	G	L301B	
L324	106.2	+3.5	+.65	3.5	.73	80.1	+.4	+.10	1.2	.48	16T	G	L324	
L366	NO DATA REPORTED FOR SAMPLE K50					35.1	-45.4	-11.40	1.0	.38	16T	M	L366	
L393	107.5	+2.2	+.41	4.2	.88	78.9	+1.6	+.40	1.5	.57	16T	G	L393	
L730	160.2	50.5	9.43	3.6	.74	127.3	46.8	11.76	2.2	.86	16R	#	L730	
L735	116.4	6.7	1.24	5.1	1.05	84.4	3.9	.98	3.4	1.30	16T	G	L735	
L737	103.6	+6.1	+1.13	4.7	.97	75.2	-5.3	-1.34	2.6	.99	16C	G	L737	
L738	111.6	1.9	.36	6.6	1.36	83.2	2.7	.67	3.7	1.42	16T	G	L738	

GR. MEAN * 109.7 GRAMS GRAND MEAN * 80.5 GRAMS TEST DETERMINATIONS * 15

SD MEANS * 5.4 GRAMS SD OF MEANS * 4.0 GRAMS 12 LABS IN GRAND MEANS

AVERAGE SDR * 4.8 GRAMS AVERAGE SDR * 2.6 GRAMS

GR. MEAN *1075.6 MILLINEWTON GRAND MEAN * 789.6 MILLINEWTON

L106	117.6	7.9	1.46	5.4	1.12	84.9	3.5	.87	2.5	.96	16N	*	L106
L122N	120.1	10.5	1.95	6.0	1.24	87.5	7.0	1.76	2.4	.91	16N	*	L122N
L148	105.6	+.1	+.01	4.2	.87	79.1	-1.5	+.36	1.7	.64	16N	*	L148
L225	119.2	9.5	1.78	3.1	.64	86.5	6.0	1.51	2.4	.93	16N	*	L225
L234	117.6	7.9	1.48	6.6	1.36	88.7	8.1	2.05	3.6	1.39	16N	*	L234
L267	122.4	12.7	2.38	6.9	1.44	94.5	13.9	3.50	3.5	1.32	16N	*	L267
L269	112.5	2.9	.53	6.5	1.34	86.8	5.3	1.33	2.4	.92	16N	*	L269
L702	103.2	+6.5	+1.21	4.3	1.30	72.5	-8.0	+2.01	5.8	1.90	16X	*	L702

TOTAL NUMBER OF LABORATORIES REPORTING * 22

Best values: K50 110 ± 10 grams
G49 80 ± 7 grams

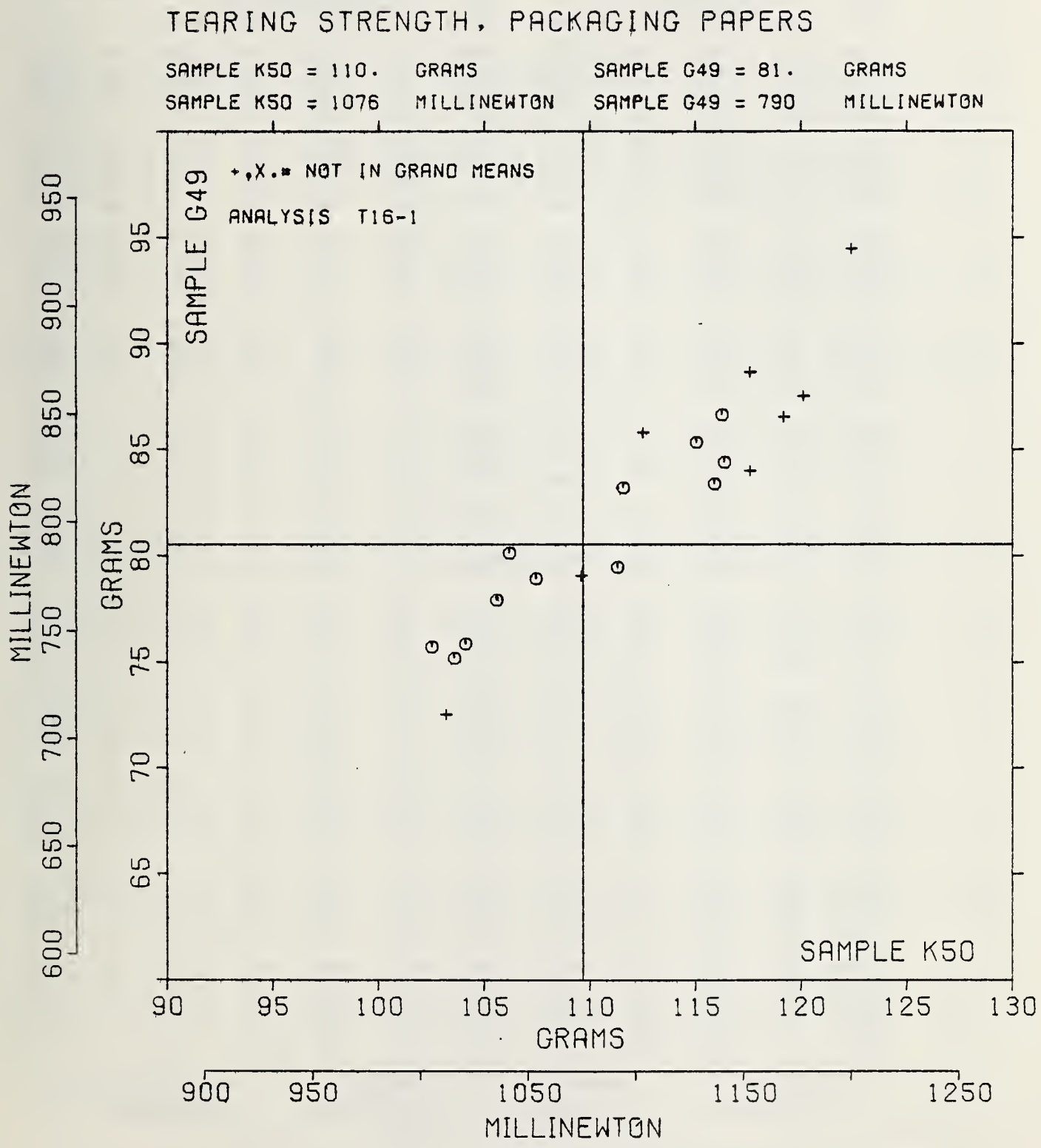
The following laboratories were omitted from the grand means because of extreme test results: 730.

ANALYSIS T16-1 TABLE 2

TEARING STRENGTH, GRAMS - PRIMARILY PACKAGING PAPERS

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

LAB CODE	F	MEANS K50	G49	COORDINATES MAJOR	MINOR	AVG. R,SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
I366	M		35.1			.38	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
T151	*	102.5	75.7	-8.6	.4	1.28	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
L[illegible]2	*	103.2	72.5	-9.9	-2.6	1.60	16X	TEARING STRENGTH 60 TO 150G: GIVE INSTRUMENT MAKE,MODEL
I[illegible]3	A	103.6	75.2	-8.0	-.7	.98	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
I3[illegible]1B	A	104.1	75.9	-7.2	-.5	.88	16Q	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF,AIR CLAMP,DIGIT
I231	A	105.6	77.9	-4.8	.3	.76	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L324	A	106.2	80.1	-3.0	1.7	.60	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L393	A	107.5	78.9	-2.7	.0	.72	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
T148	*	109.6	79.1	-.9	-1.1	.76	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
I265	A	111.3	79.5	.7	-1.8	1.23	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
L[illegible]39	A	111.6	83.2	3.1	1.0	1.39	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
I269	*	112.5	85.8	5.4	2.6	1.13	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
I23[illegible]	A	115.1	85.3	7.2	.7	1.07	16R	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF,DIGITAL READOUT
I122[illegible]	A	115.9	83.4	6.7	-1.4	1.07	16C	TEARING STRENGTH 60 TO 150G, THWING-ELMENDORF (W.AIR CLAMP)
I249	A	116.3	86.6	8.9	1.0	.84	16J	TEARING STRENGTH 60 TO 150G, LORENTZ-WETTRES
I[illegible]35	A	116.4	84.4	7.7	-.8	1.18	16T	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF(SCALE TO 100)
I[illegible]6	*	117.6	84.0	8.5	-1.9	1.04	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
I234	*	117.6	88.7	11.2	1.9	1.37	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
I225	*	119.2	86.5	11.2	-.9	.79	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
L122N	*	120.1	87.5	12.6	-.5	1.07	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
I267	*	122.4	94.5	18.5	3.8	1.38	16N	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF, NO CUT OUT
T[illegible]30	A	160.2	127.3	68.4	8.0	.80	16R	TEARING STRENGTH 60 TO 150G,THWING-ELMENDORF,DIGITAL READOUT
GMEANS:		109.7	80.5			1.00		
		95% ELLIPSE:		19.8	3.2	WITH GAMMA = 36 DEGREES		


TEARING STRENGTH, PACKAGING PAPERS
SAMPLE K50 = 110. GRAMS
SAMPLE K50 = 1076 MILLINEWTON
SAMPLE G49 = 81. GRAMS
SAMPLE G49 = 790 MILLINEWTON
+,X,* NOT IN GRAND MEANS
ANALYSIS T16-1
SAMPLE G49
SAMPLE K50
GRAMS
MILLINEWTON
90 95 100 105 110 115 120 125 130
65 70 75 80 85 90 95
600 650 700 750 800 850 900 950

ANALYSIS T19-1 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PACKAGING PAPERS

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

LAB CODE	SAMPLE G38 MEAN	KRAFT ENVELOPE 123 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G49 MEAN	KRAFT COATING BASE 96 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 20 VAR	F	LAB
L106	11.64	.11	.25	.52	1.00	10.62	.18	.46	.47	1.16	19A	@	L106
L107	12.63	1.10	2.58	.43	.82	11.01	.56	1.45	1.31	3.26	19A	*	L107
L122	11.28	-.25	-.58	.31	.61	10.11	-.34	-.88	.36	.88	19A	@	L122
L151	12.21	.68	1.58	.42	.82	10.69	.25	.65	.62	1.54	19A	@	L151
L157A	11.41	-.12	-.28	.52	1.01	10.37	-.08	-.20	.31	.76	19P	@	L157A
L157I	11.24	-.29	-.67	.62	1.19	8.85	-1.60	-4.16	.51	1.26	19A	X	L157I
L167	73.39	61.86	144.46	2.55	4.93	64.03	53.59	139.43	1.88	4.66	19Q	#	L167
L182I	11.53	.00	.00	.51	.98	10.46	.01	.03	.28	.70	19D	@	L182I
L182L	11.21	-.32	-.75	.43	.82	10.10	-.34	-.89	.34	.84	19T	@	L182L
L217A	12.19	.66	1.54	.43	.82	10.65	.20	.52	.33	.82	19A	@	L217A
L217P	11.40	-.13	-.30	.61	1.18	10.09	-.35	-.92	.45	1.11	19P	@	L217P
L219	12.37	.84	1.96	.39	.74	11.13	.69	1.79	.32	.79	19E	@	L219
L225	11.95	.42	.97	.50	.97	10.79	.34	.90	.48	1.20	19P	@	L225
L231	11.40	-.13	-.31	.61	1.17	10.44	-.01	-.02	.34	.83	19P	@	L231
L237A	11.21	-.32	-.74	.74	1.43	10.72	.27	.70	.54	1.35	19Q	@	L237A
L237B	11.82	.29	.69	.64	1.25	10.32	-.13	-.34	.56	1.40	19A	@	L237B
L238A	11.14	-.39	-.90	.41	.79	9.92	-.53	-1.37	.52	1.28	19T	@	L238A
L257A	11.22	-.31	-.72	.44	.85	10.13	-.31	-.82	.75	1.85	19P	@	L257A
L264A	11.26	-.27	-.63	.74	1.43	9.73	-.72	-1.86	.52	1.28	19A	@	L264A
L264P	11.59	.06	.14	.51	.98	10.79	.34	.89	.28	.69	19P	@	L264P
L265	12.05	.52	1.21	.63	1.22	10.75	.31	.79	.36	.89	19A	@	L265
L267	11.39	-.14	-.32	.40	.77	10.53	.08	.22	.33	.82	19A	@	L267
L273	11.30	-.23	-.54	.59	1.13	10.60	.15	.40	.60	1.49	19A	@	L273
L274	11.40	-.13	-.31	.31	.60	10.32	-.12	-.32	.36	.90	19P	@	L274
L278	10.70	-.83	-1.94	.43	.84	10.07	-.37	-.97	.26	.65	19A	@	L278
L280	10.91	-.62	-1.45	.67	1.29	9.99	-.46	-1.19	.49	1.21	19G	@	L280
L281	11.78	.25	.58	.56	1.08	10.69	.25	.64	.42	1.04	19G	@	L281
L305	11.19	-.34	-.81	.41	.80	9.73	-.71	-1.85	.37	.92	19P	@	L305
L312	11.36	-.17	-.39	.76	1.47	10.59	.14	.37	.46	1.15	19D	@	L312
L318	11.02	-.51	-1.19	.23	.45	9.96	-.49	-1.27	.27	.68	19G	@	L318
L324	11.60	.07	.17	.77	1.49	10.69	.25	.64	.34	.84	19A	@	L324
L334	11.60	.07	.16	.50	.96	10.58	.14	.36	.31	.76	19P	@	L334
L336	11.88	.35	.83	.58	1.12	10.85	.41	1.06	.40	1.00	19G	@	L336
L356	11.70	.17	.39	.62	1.20	10.83	.38	.99	.48	1.19	19P	@	L356
L565	11.23	-.30	-.70	.34	.66	10.29	-.15	-.40	.26	.65	19T	@	L565
L568	11.19	-.34	-.79	.50	.97	10.27	-.18	-.47	.48	1.20	19P	@	L568
L575	11.78	.17	.39	.46	.89	10.47	.02	.06	.29	.72	19G	@	L575
L576	11.46	-.07	-.15	.47	.91	10.45	.01	.02	.21	.51	19A	@	L576
L580	12.31	.78	1.82	.32	.61	10.92	.47	1.23	.28	.70	19G	@	L580
L581	11.67	.14	.32	.76	1.48	10.67	.23	.59	.40	1.00	19A	@	L581
L604	12.02	.49	1.14	.65	1.25	9.74	-.71	-1.85	1.08	2.67	19A	X	L604
L606	10.88	-.65	-1.52	.38	.74	9.94	-.51	-1.32	.25	.63	19P	@	L606
L610	11.33	-.20	-.47	.44	.86	10.10	-.34	-.89	.27	.66	19A	@	L610
L622	11.34	-.19	-.45	.59	1.15	10.89	.45	1.16	.51	1.27	19G	@	L622
L650	11.41	-.12	-.28	.83	1.61	10.31	-.14	-.36	.58	1.45	19G	@	L650
L652	11.78	.25	.57	.59	1.14	10.72	.27	.70	.47	1.18	19A	@	L652
L676	11.93	.40	.93	.66	1.28	10.55	.10	.27	.51	1.27	19A	@	L676
L684	11.30	-.23	-.53	.27	.53	10.20	-.25	-.64	.29	.72	19W	@	L684
L689	11.13	-.40	-.94	.46	.90	10.21	-.24	-.62	.49	1.21	19A	@	L689
L702	11.84	.31	.73	.71	1.37	10.63	.19	.49	.65	1.62	19P	@	L702
L730	10.84	-.69	-1.62	.45	.88	9.34	-1.11	-2.89	.27	.66	19A	*	L730
L735	10.89	-.64	-1.49	.46	.89	10.09	-.36	-.93	.39	.96	19A	@	L735
L737A	12.07	.54	1.26	.44	.85	10.87	.42	1.09	.27	.66	19A	@	L737A
L737B	12.04	.51	1.20	.45	.88	1.64	-8.81	-22.91	.14	.35	19A	#	L737B
L760A	12.19	.66	1.53	.42	.81	10.99	.55	1.42	.35	.88	19A	@	L760A
L760B	11.74	.21	.49	.55	1.07	11.03	.58	1.51	.27	.67	19P	@	L760B

GR. MEAN = 11.53 KILONEWTON/M GRAND MEAN = 10.45 KILONEWTON/M TEST DETERMINATIONS = 20

SD MEANS = .43 KILONEWTON/M SD OF MEANS = .38 KILONEWTON/M 52 LABS IN GRAND MEANS

AVERAGE SDR = .52 KILONEWTON/M AVERAGE SDR = .40 KILONEWTON/M

GR. MEAN = 65.85 LB/INCH GRAND MEAN = 59.66 LB/INCH

L250I	10.38	-1.15	-2.69	.36	.70	9.40	-1.05	-2.73	.21	.51	19L	*	L250I

TOTAL NUMBER OF LABORATORIES REPORTING = 57

Best values: G38 11.5 ± 0.7 kilonewton per meter
G49 10.5 ± 0.6 kilonewton per meter

The following laboratories were omitted from the grand means because of extreme test results: 737B.

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

ANALYSIS T19-1 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PACKAGING PAPERS

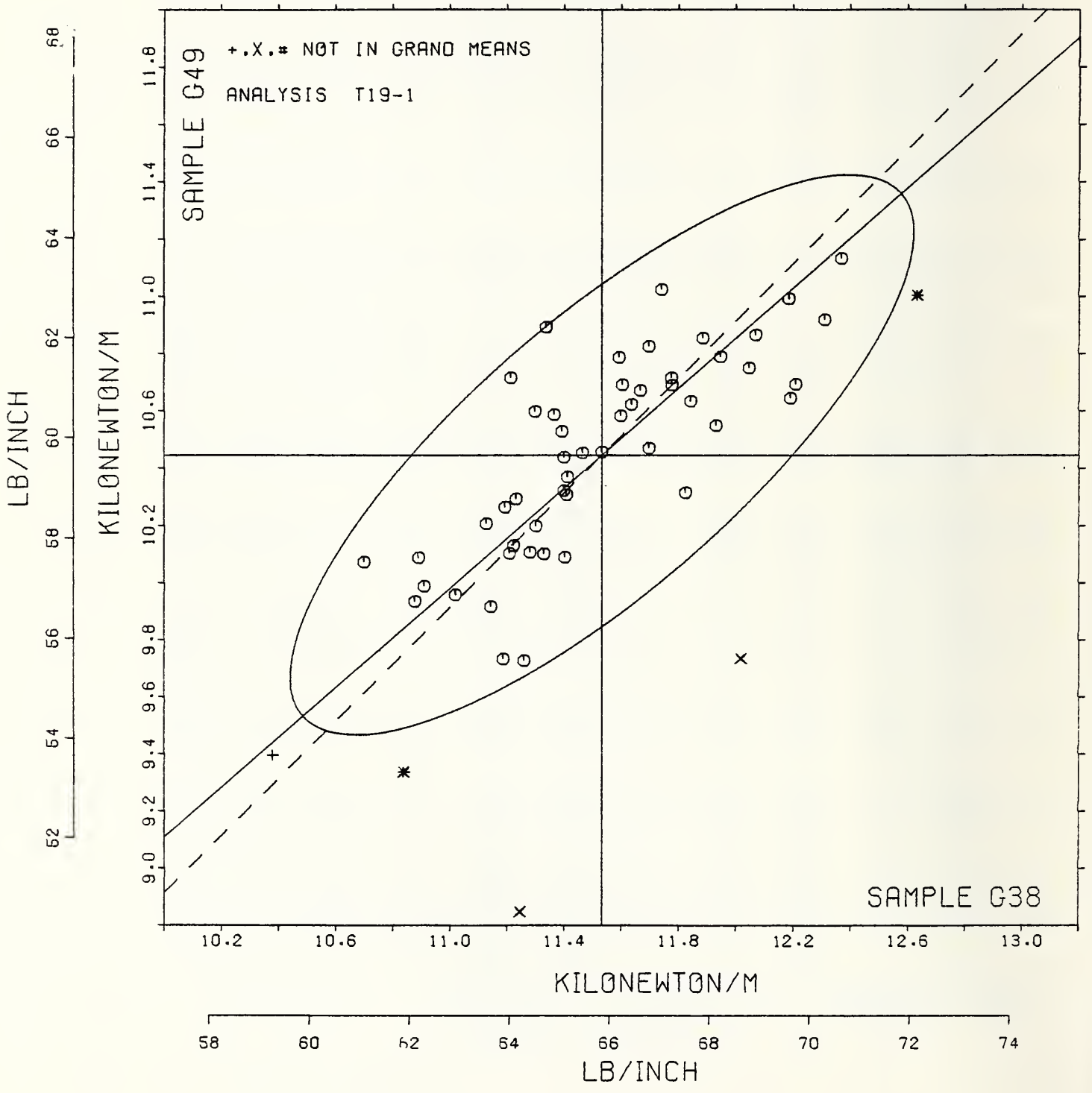
TAPPI OFFICIAL TEST METHODS T404 OS-76 AND T494 OS-70, PENDULUM AND CRE TYPES

LAB CODE	F	MEANS G38	MEANS G49	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L250?	*	10.38	9.40	-1.56	-.04	.61	19L	TENSILE STRENGTH, 31 TO 74 LB/IN, CRE, 20 C, 65% RH
L278	G	10.70	10.07	-.87	.27	.75	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L?30	*	10.84	9.34	-1.25	-.38	.77	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L666	G	10.88	9.94	-.83	.05	.68	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
I735	G	10.89	10.09	-.72	.15	.93	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L280	G	10.91	9.99	-.77	.06	1.25	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L318	G	11.02	9.96	-.70	-.03	.57	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I695	G	11.13	10.21	-.46	.09	1.05	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I236A	G	11.14	9.92	-.64	-.14	1.04	19T	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L305	G	11.19	9.73	-.73	-.31	.86	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L568	G	11.19	10.27	-.37	.09	1.08	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L182?	G	11.21	10.10	-.47	-.05	.83	19T	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
I237A	G	11.21	10.72	-.06	.41	1.39	19Q	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L257A	G	11.22	10.13	-.44	-.04	1.35	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
I565	G	11.23	10.29	-.32	.08	.66	19T	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
I157?	X	11.24	8.85	-1.27	-1.02	1.23	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L264A	G	11.26	9.73	-.67	-.36	1.35	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L122	G	11.28	10.11	-.41	-.09	.74	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I2?3	G	11.30	10.60	-.07	.27	1.31	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L6?4	G	11.30	10.20	-.33	-.04	.63	19W	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I610	G	11.33	10.10	-.38	-.13	.76	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L622	G	11.34	10.89	.15	.46	1.21	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
I312	G	11.36	10.59	-.03	.21	1.31	19D	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L267	G	11.39	10.53	-.05	.15	.80	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I231	G	11.40	10.44	-.10	.08	1.00	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
I2?4	G	11.40	10.32	-.18	-.01	.75	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
I21?P	G	11.40	10.09	-.33	-.18	1.14	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L650	G	11.41	10.31	-.18	-.02	1.53	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I15?A	G	11.41	10.37	-.14	.02	.89	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L5?6	G	11.46	10.45	-.04	.05	.7?	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I1?2?	G	11.53	10.46	.01	.01	.84	19D	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L264P	G	11.59	10.79	.27	.22	.83	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L334	G	11.60	10.58	.14	.06	.86	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L324	G	11.60	10.69	.22	.14	1.17	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I106	G	11.64	10.62	.20	.06	1.08	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L581	G	11.67	10.67	.25	.08	1.24	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I356	G	11.70	10.83	.38	.18	1.19	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L5?5	G	11.70	10.47	.14	-.09	.81	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I?60B	G	11.74	11.03	.54	.30	.87	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L652	G	11.78	10.72	.36	.04	1.16	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L281	G	11.78	10.69	.35	.02	1.06	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L23?B	G	11.82	10.32	.14	-.29	1.32	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L?02	G	11.84	10.63	.36	-.06	1.49	19R	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L336	G	11.88	10.85	.54	.07	1.06	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L676	G	11.93	10.55	.37	-.18	1.27	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L225	G	11.95	10.79	.54	-.01	1.09	19P	TENSILE STRENGTH, 31 TO 74 LB/IN, PENDULUM TESTER
L604	X	12.02	9.74	-.10	-.85	1.96	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I?37B	*	12.04	1.64	-5.40	-6.97	.61	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L265	G	12.05	10.75	.59	-.11	1.05	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I73?A	G	12.07	10.87	.68	-.04	.76	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L?60A	G	12.19	10.99	.85	-.02	.84	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L217A	G	12.19	10.65	.63	-.28	.82	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L151	G	12.21	10.69	.67	-.26	1.18	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L580	G	12.31	10.92	.90	-.16	.66	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I219	G	12.37	11.13	1.09	-.03	.77	19E	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
L107	*	12.63	11.61	1.20	-.30	2.04	19A	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
I167	*	73.39	64.03	81.84	-.29	4.79	19G	TENSILE STRENGTH, 31 TO 74 LB/IN, LOAD CELL (CRE)
GMEANS:		11.53	10.45			1.00		
		95% ELLIPSE:		1.39	.47	WITH GAMMA = 41 DEGREES		

TENSILE STRENGTH, PACKAGING PAPERS

SAMPLE G38 = 11.5 KILONEWTON/M SAMPLE G49 = 10.4 KILONEWTON/M

SAMPLE G38 = 65.8 LB/INCH SAMPLE G49 = 59.7 LB/INCH



ANALYSIS T20-1 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB	SAMPLE G40	ENVELOPE 88 GRAMS PER SQUARE METER				SAMPLE G33	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER				TEST D.F. 20		
CODE	MEAN	DEV	N.DEV	SDR	P.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L105	4.86	.06	.20	.24	.85	3.98	.09	.44	.18	.98	20A	@	L105
L115	4.60	-.20	-.70	.29	1.03	3.79	-.10	-.52	.22	1.18	20D	@	L115
L118	4.90	.10	.36	.25	.89	4.05	.16	.83	.11	.60	20A	@	L118
L122	4.60	-.20	-.72	.27	.94	3.85	-.04	-.19	.13	.70	20A	@	L122
L124C	4.84	.04	.14	.24	.83	3.96	.07	.37	.14	.74	20A	@	L124C
L125	4.95	.15	.53	.28	.98	3.79	-.10	-.52	.24	1.31	20C	@	L125
L131	4.99	.19	.67	.42	1.39	3.92	.03	.15	.19	1.00	20E	@	L131
L141T	5.05	.25	.87	.24	.85	3.99	.10	.52	.17	.91	20A	@	L141T
L143	5.59	.79	2.77	.33	1.17	4.10	.21	1.10	.23	1.26	20E	*	L143
L148	4.88	.08	.28	.26	.93	3.99	.10	.52	.14	.76	20A	@	L148
L155	5.19	.39	1.39	.31	1.09	4.25	.35	1.82	.16	.88	20B	@	L155
L159	4.81	.01	.05	.15	.54	3.93	.04	.19	.08	.46	20A	@	L159
L163	4.99	.19	.69	.29	1.01	4.14	.25	1.26	.13	.71	20D	@	L163
L167	5.42	.62	2.21	.32	1.13	4.36	.47	2.43	.13	.70	20G	@	L167
L176	4.30	-.50	-1.77	.32	1.11	3.55	-.34	-1.73	.23	1.25	20E	@	L176
L185	4.88	.08	.29	.25	.89	3.80	-.09	-.48	.19	1.01	20C	@	L185
L194	4.67	-.13	-.44	.34	1.19	3.83	-.06	-.32	.15	.80	20A	@	L194
L211	4.53	-.27	-.96	.34	1.21	3.14	-.75	-3.83	.40	2.17	20C	X	L211
L223B	4.73	-.07	-.23	.28	1.00	3.81	-.08	-.40	.14	.77	20A	@	L223B
L226C	4.43	-.37	-1.32	.25	.89	3.48	-.41	-2.09	.21	1.13	20C	@	L226C
L230	4.59	-.21	-.75	.18	.64	3.81	-.08	-.40	.11	.61	20G	@	L230
L255	4.75	-.05	-.19	.30	1.05	3.54	-.35	-1.79	.33	1.76	20A	@	L255
L260	4.72	-.08	-.29	.13	.47	3.70	-.19	-.96	.13	.71	20A	@	L260
L261	4.72	-.08	-.27	.19	.68	3.74	-.15	-.76	.24	1.28	20A	@	L261
L291	4.61	-.19	-.68	.28	1.00	3.75	-.14	-.73	.21	1.13	20A	@	L291
L309	4.96	.06	.20	.28	.99	3.96	.07	.37	.20	1.07	20E	@	L309
L315	4.45	-.35	-1.23	.29	1.02	3.83	-.06	-.31	.16	.84	20A	@	L315
L318	4.49	-.31	-1.11	.29	1.01	3.75	-.14	-.72	.09	.46	20G	@	L318
L325	4.52	-.28	-1.00	.47	1.65	3.84	-.05	-.25	.14	.75	20F	@	L325
L328	.81	-3.99	-14.09	.05	.18	.66	-3.23	-16.54	.03	.17	20A	#	L328
L333	4.73	-.07	-.26	.23	.82	3.65	-.24	-1.21	.29	1.54	20A	@	L333
L344	4.81	.01	.04	.23	.83	3.80	-.09	-.48	.22	1.17	20A	@	L344
L356	4.81	.01	.04	.23	.82	3.89	-.00	-.00	.14	.74	20A	@	L356
L360	4.69	-.11	-.41	.26	.92	3.99	.10	.49	.14	.75	20B	@	L360
L376	4.92	.12	.42	.78	2.73	3.97	.08	.41	.19	1.05	20A	@	L376
L386	4.83	.03	.11	.34	1.18	3.98	.09	.48	.17	.94	20E	@	L386
L390	5.13	.33	1.18	.35	1.25	4.12	.23	1.16	.30	1.62	20A	@	L390
L442	4.38	-.42	-1.48	.20	.71	3.75	-.14	-.70	.11	.56	20G	@	L442
L557	4.72	-.08	-.28	.29	1.04	3.89	-.00	-.02	.11	.62	20A	@	L557
L563	5.41	.61	2.17	.32	1.14	3.80	-.10	-.49	.33	1.79	20A	X	L563
L567	4.73	-.07	-.24	.23	.81	3.61	-.28	-1.46	.34	1.81	20A	@	L567
L574	4.96	.16	.55	.25	.89	3.99	.10	.50	.25	1.35	20A	@	L574
L575	4.70	-.10	-.34	.23	.80	4.00	.11	.56	.13	.70	20G	@	L575
L592	4.79	-.01	-.04	.26	.90	3.99	.10	.49	.18	.96	20A	@	L592
L616	4.83	.03	.10	.07	.23	4.12	.22	1.15	.03	.15	20D	@	L616
L692	4.86	.06	.20	.28	.97	3.90	.01	.05	.21	1.11	20A	@	L692
L698	4.85	.05	.18	.22	.79	3.80	-.09	-.46	.24	1.31	20E	@	L698
L705	3.09	-1.71	-6.04	.28	.97	2.40	-1.49	-7.65	.29	1.55	20A	#	L705
L706	5.19	.39	1.39	.33	1.15	3.89	-.00	-.03	.33	1.75	20E	@	L706
L732	1.00	-3.80	-13.42	.10	.37	.73	-3.16	-16.20	.08	.45	20A	#	L732
L734	5.06	.26	.93	.28	1.00	4.01	.12	.63	.20	1.08	20E	@	L734
L736	4.42	-.39	-1.36	.22	.78	3.78	-.11	-.58	.10	.54	20A	@	L736
L738	4.33	-.47	-1.65	.37	1.29	3.89	-.00	-.01	.19	1.02	20A	@	L738
L743	5.09	.29	1.04	.33	1.16	4.20	.31	1.57	.10	.55	20E	@	L743
L744	4.97	.17	.60	.56	1.97	3.74	-.15	-.79	.70	3.74	20A	@	L744
L757	4.10	-.70	-2.49	.25	.86	3.49	-.40	-2.06	.14	.77	20A	@	L757
L760A	5.32	.52	1.84	.29	1.01	4.37	.48	2.46	.13	.69	20A	@	L760A

GR. MEAN = 4.90 KILONEWTON/M GRAND MEAN = 3.89 KILONEWTON/M TEST DETERMINATIONS = 20

SD MEANS = .28 KILONEWTON/M SD OF MEANS = .20 KILONEWTON/M 52 LABS IN GRAND MEANS

AVERAGE SDR = .28 KILONEWTON/M AVERAGE SDR = .19 KILONEWTON/M

GR. MEAN =16.190 LB/15 MM GRAND MEAN =13.122 LB/15 MM

L139	4.73	-.07	-.25	.26	.90	3.77	-.12	-.60	.15	.82	20H	* L139
L250T	4.20	-.60	-2.13	.20	.70	3.50	-.39	-2.00	.12	.64	20L	* L250T

TOTAL NUMBER OF LABORATORIES REPORTING = 54

Best values: G40 4.8 ± 0.5 kilonewton per meter

G33 3.9 ± 0.3 kilonewton per meter

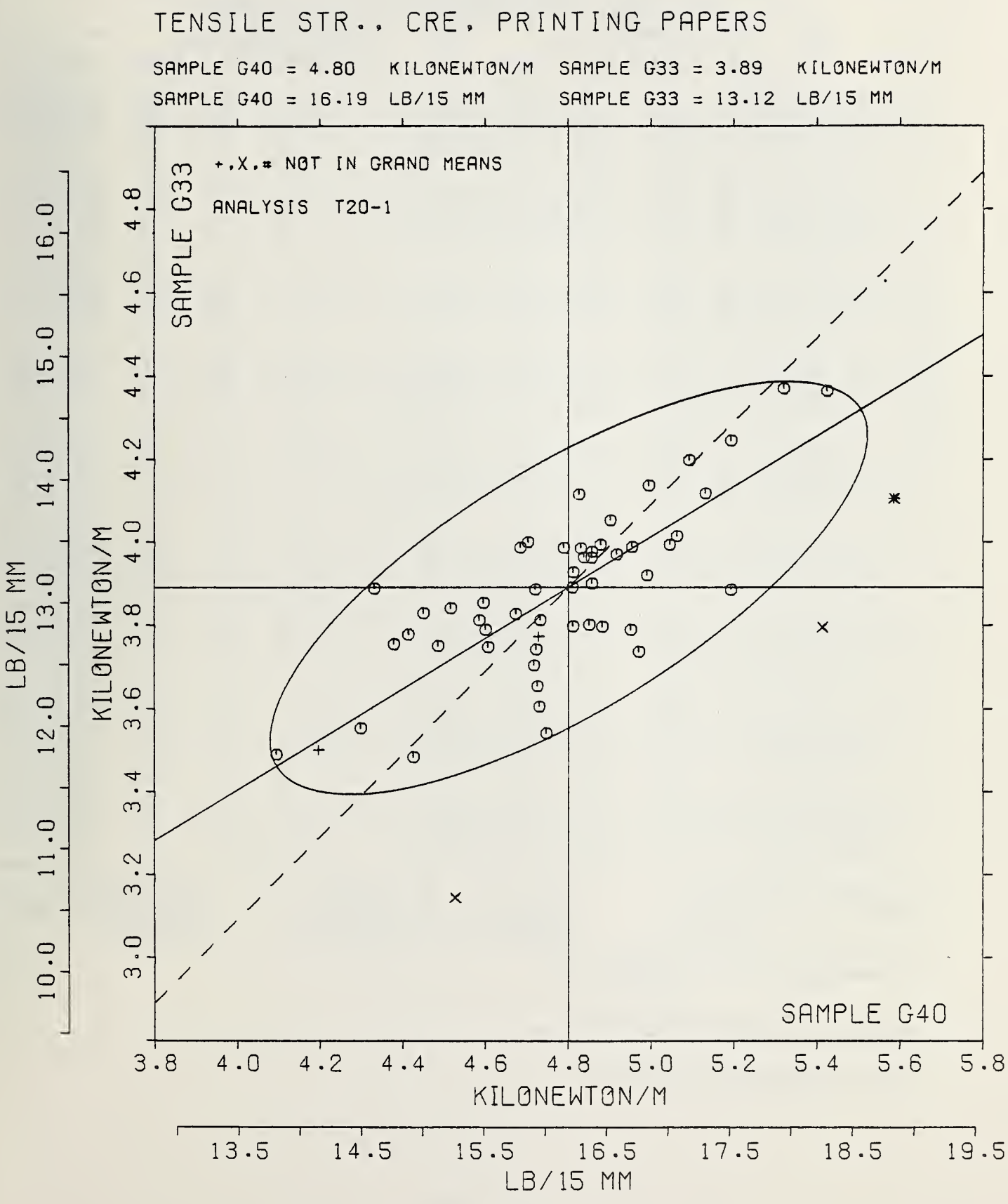
Data from the following laboratories appear to be off by a multiplicative factor: 328, 705, 732.

ANALYSIS T20-1 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS G40	G33	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L328	#	.81	.66	-5.09	-.68	.17	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L732	#	1.00	.73	-4.89	-.73	.41	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L705	#	3.09	2.40	-2.24	-.39	1.26	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L757	#	4.10	3.49	-.81	.02	.82	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
T2507	*	4.20	3.50	-.72	-.02	.67	20L	TENSILE STRENGTH, 14 TO 40 LB/IN, CRE, 20 C, 65% RH
I176	@	4.30	3.55	-.60	-.03	1.18	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L738	@	4.33	3.85	-.40	.24	1.15	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L442	@	4.38	3.75	-.43	.10	.64	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L736	@	4.42	3.78	-.39	.10	.66	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
I226C	@	4.43	3.48	-.53	-.15	1.01	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
I315	@	4.45	3.83	-.33	.13	.93	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
I319	@	4.49	3.75	-.34	.04	.73	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L325	@	4.52	3.84	-.27	.10	1.20	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L211	X	4.53	3.14	-.62	-.50	1.69	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
I23C	@	4.59	3.81	-.22	.04	.63	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L122	@	4.60	3.85	-.19	.07	.82	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L115	@	4.60	3.79	-.22	.02	1.11	20D	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
I291	@	4.61	3.75	-.24	-.02	1.06	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L194	@	4.67	3.83	-.14	.01	1.00	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L360	@	4.69	3.99	-.05	.14	.84	20B	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L575	@	4.70	4.00	-.03	.14	.75	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L260	@	4.72	3.70	-.17	-.12	.59	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L557	@	4.72	3.89	-.07	.04	.83	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L261	@	4.72	3.74	-.14	-.09	.98	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L323	@	4.73	3.65	-.19	-.16	1.18	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L139	*	4.73	3.77	-.12	-.06	.86	20H	TENSILE STRENGTH, 14 TO 40 LB/IN, CRE, SHORT TEST SPAN
L567	@	4.73	3.61	-.21	-.21	1.31	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L223B	@	4.73	3.81	-.10	-.03	.89	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L255	@	4.75	3.54	-.23	-.27	1.40	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L592	@	4.79	3.99	.04	.09	.93	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L356	@	4.81	3.89	.01	-.01	.78	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L344	@	4.81	3.80	-.04	-.09	1.00	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L159	@	4.81	3.93	.03	.02	.50	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L616	@	4.83	4.12	.14	.18	.19	20D	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L386	@	4.83	3.98	.08	.06	1.06	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L124C	@	4.84	3.96	.07	.04	.79	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
I698	@	4.85	3.80	-.00	-.10	1.05	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L309	@	4.86	3.96	.09	.03	1.03	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L692	@	4.86	3.90	.05	-.02	1.04	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L105	@	4.86	3.98	.09	.04	.92	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L148	@	4.88	3.99	.12	.05	.84	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
I185	@	4.88	3.80	.02	-.12	.95	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L118	@	4.90	4.05	.17	.08	.74	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L376	@	4.92	3.97	.14	.01	1.89	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L125	@	4.95	3.79	.08	-.17	1.15	20C	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L574	@	4.96	3.99	.18	.00	1.12	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L744	@	4.97	3.74	.07	-.22	2.85	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
I131	@	4.99	3.92	.18	-.07	1.20	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L163	@	4.99	4.14	.29	.11	.86	20D	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L141T	@	5.05	3.99	.26	-.04	.88	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L734	@	5.06	4.01	.29	-.03	1.04	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L743	@	5.09	4.20	.41	.11	.86	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L390	@	5.13	4.12	.40	.02	1.44	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L706	@	5.19	3.89	.33	-.21	1.45	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L155	@	5.19	4.25	.52	.10	.99	20B	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L760A	@	5.32	4.37	.69	.14	.85	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L563	X	5.41	3.80	.47	-.40	1.47	20A	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L167	@	5.42	4.36	.78	.08	.92	20G	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
L143	*	5.59	4.10	.78	-.23	1.21	20E	TENSILE STRENGTH, 14 TO 40 LB/IN, LOAD CELL (CRE)
GMEANS:		4.80	3.89			1.00		
		95% ELLIPSE:		.83	.29	WITH GAMMA = 31 DEGREES		


TENSILE STR., CRE, PRINTING PAPERS
SAMPLE G40 = 4.80 KILONEWTON/M
SAMPLE G40 = 16.19 LB/15 MM
SAMPLE G33 = 3.89 KILONEWTON/M
SAMPLE G33 = 13.12 LB/15 MM
+,X,* NOT IN GRAND MEANS
ANALYSIS T20-1
SAMPLE G33
KILONEWTON/M
LB/15 MM
SAMPLE G40
KILONEWTON/M
LB/15 MM

ANALYSIS T20-2 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS

TAPPI OFFICIAL TEST METHOD T404 OS-76, PENDULUM-TYPE TESTER

LAB CODE	SAMPLE G40 MEAN	ENVELOPE 88 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G33 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 20 VAR	F	LAB
L103	4.65	-.24	-.87	.16	.59	4.08	.16	.62	.10	.54	20R	@	L103
L108	4.95	.06	.22	.19	.70	3.82	-.09	-.35	.26	1.40	20P	@	L108
L121	4.64	-.25	-.90	.29	1.06	3.79	-.12	-.45	.18	.95	20P	@	L121
L124P	4.96	-.03	-.09	.29	1.07	3.50	-.41	-1.57	.26	1.40	20P	@	L124P
L128	4.83	-.05	-.20	.26	.94	3.81	-.10	-.39	.18	.95	20T	@	L128
L148	4.64	-.25	-.92	.21	.77	3.71	-.21	-.78	.17	.90	20P	@	L148
L153	5.18	.29	1.05	.24	.87	4.14	.23	.89	.20	1.09	20P	@	L153
L162	4.61	-.28	-1.00	.28	1.04	3.72	-.19	-.73	.23	1.22	20V	@	L162
L182L	4.92	.03	.12	.33	1.19	4.05	.14	.52	.16	.85	20T	@	L182L
L183	5.08	.19	.70	.40	1.48	4.07	.16	.61	.21	1.13	20P	@	L183
L189	5.00	.11	.39	.25	.90	4.13	.21	.82	.15	.78	20R	@	L189
L191P	4.90	.01	.04	.22	.82	4.01	.10	.38	.14	.78	20P	@	L191P
L212	4.81	-.08	-.30	.39	1.44	3.92	.01	.05	.08	.45	20R	@	L212
L213	4.87	-.02	-.07	.39	1.41	3.74	-.17	-.64	.29	1.53	20T	@	L213
L218	4.85	-.04	-.16	.23	.85	4.04	.12	.47	.10	.55	20P	@	L218
L233	5.10	.21	.78	.30	1.08	4.26	.35	1.33	.17	.90	20Q	@	L233
L234	5.13	.24	.87	.21	.77	3.55	-.36	-1.36	.19	1.00	20P	*	L234
L241	4.21	-.68	-2.49	.22	.80	3.25	-.66	-2.51	.15	.83	20R	*	L241
L242	4.53	-.36	-1.31	.14	.51	3.68	-.23	-.87	.23	1.25	20Y	@	L242
L249	4.94	.05	.18	.32	1.19	4.02	.11	.42	.19	1.01	20P	@	L249
L259	5.38	.50	1.80	.33	1.21	4.29	.38	1.44	.14	.75	20P	@	L259
L262	4.95	.06	.22	.31	1.13	4.20	.29	1.11	.13	.69	20R	@	L262
L274	4.92	.03	.12	.13	.48	3.89	-.03	-.10	.07	.37	20P	@	L274
L275	4.52	-.37	-1.34	.32	1.17	3.46	-.46	-1.73	.18	.95	20R	@	L275
L279P	5.43	.54	1.98	.34	1.25	4.19	.28	1.06	.16	.85	20P	@	L279P
L285	4.30	-.59	-2.15	.28	1.02	3.77	-.14	-.54	.13	.71	20P	*	L285
L290	4.69	-.20	-.72	.24	.88	3.68	-.23	-.87	.25	1.36	20P	@	L290
L311	4.71	-.18	-.65	.28	1.03	3.90	-.01	-.02	.16	.85	20V	@	L311
L313	3.68	-1.21	-4.40	.20	.72	3.03	-.88	-3.35	.14	.74	20T	#	L313
L321	4.63	-.26	-.93	.21	.78	3.50	-.41	-1.57	.16	.87	20Q	@	L321
L330	5.17	.28	1.02	.34	1.25	4.21	.30	1.13	.20	1.07	20P	@	L330
L337	24.95	20.07	73.05	1.77	6.46	20.29	16.38	62.22	1.20	6.44	20V	*	L337
L356	5.24	.35	1.28	.34	1.23	4.09	.17	.66	.20	1.10	20P	@	L356
L366	5.18	.29	1.05	.24	.88	3.75	-.16	-.60	.44	2.38	20P	@	L366
L393	4.95	-.03	-.13	.24	.89	4.00	.09	.35	.13	.72	20P	@	L393
L484	3.78	-1.11	-4.04	.17	.63	4.48	.56	2.14	.20	1.09	20U	#	L484
L556	5.30	.41	1.48	.46	1.68	4.11	.19	.74	.43	2.32	20P	@	L556
L599	4.73	-.16	-.58	.39	1.44	3.61	-.30	-1.13	.30	1.59	20V	*	L599
L625	4.75	-.14	-.51	.31	1.12	3.56	-.35	-1.32	.22	1.18	20P	@	L625
L626	5.03	.14	.51	.23	.85	4.27	.36	1.38	.11	.59	20T	@	L626
L680	5.16	.27	.99	.19	.71	4.16	.25	.94	.15	.82	20R	@	L680
L685	4.75	-.14	-.51	.18	.67	3.97	.06	.22	.17	.91	20Y	@	L685
L714	4.87	-.02	-.08	.19	.69	4.08	.17	.63	.15	.79	20P	@	L714
L754	4.59	-.30	-1.10	.18	.66	3.71	-.20	-.76	.11	.61	20T	@	L754
L759	5.17	.28	1.01	.27	1.01	4.20	.29	1.09	.15	.82	20P	@	L759
L760B	5.22	.33	1.22	.29	1.08	4.29	.38	1.44	.14	.73	20P	@	L760B

GR. MEAN * 4.89 KILONEWTON/M GRAND MEAN * 3.91 KILONEWTON/M TEST DETERMINATIONS * 20

SD MEANS * .27 KILONEWTON/M SD OF MEANS * .26 KILONEWTON/M 43 LABS IN GRAND MEANS

AVERAGE SDR * .27 KILONEWTON/M AVERAGE SDR * .19 KILONEWTON/M

GR. MEAN *16.490 LB/15 MM GRAND MEAN *13.191 LB/15 MM

TOTAL NUMBER OF LABORATORIES REPORTING * 46

Best values: G40 4.9 ± 0.5 kilonewton per meter
G33 3.9 ± 0.4 kilonewton per meter

The following laboratories were omitted from the grand means because of extreme test results: 313, 484.

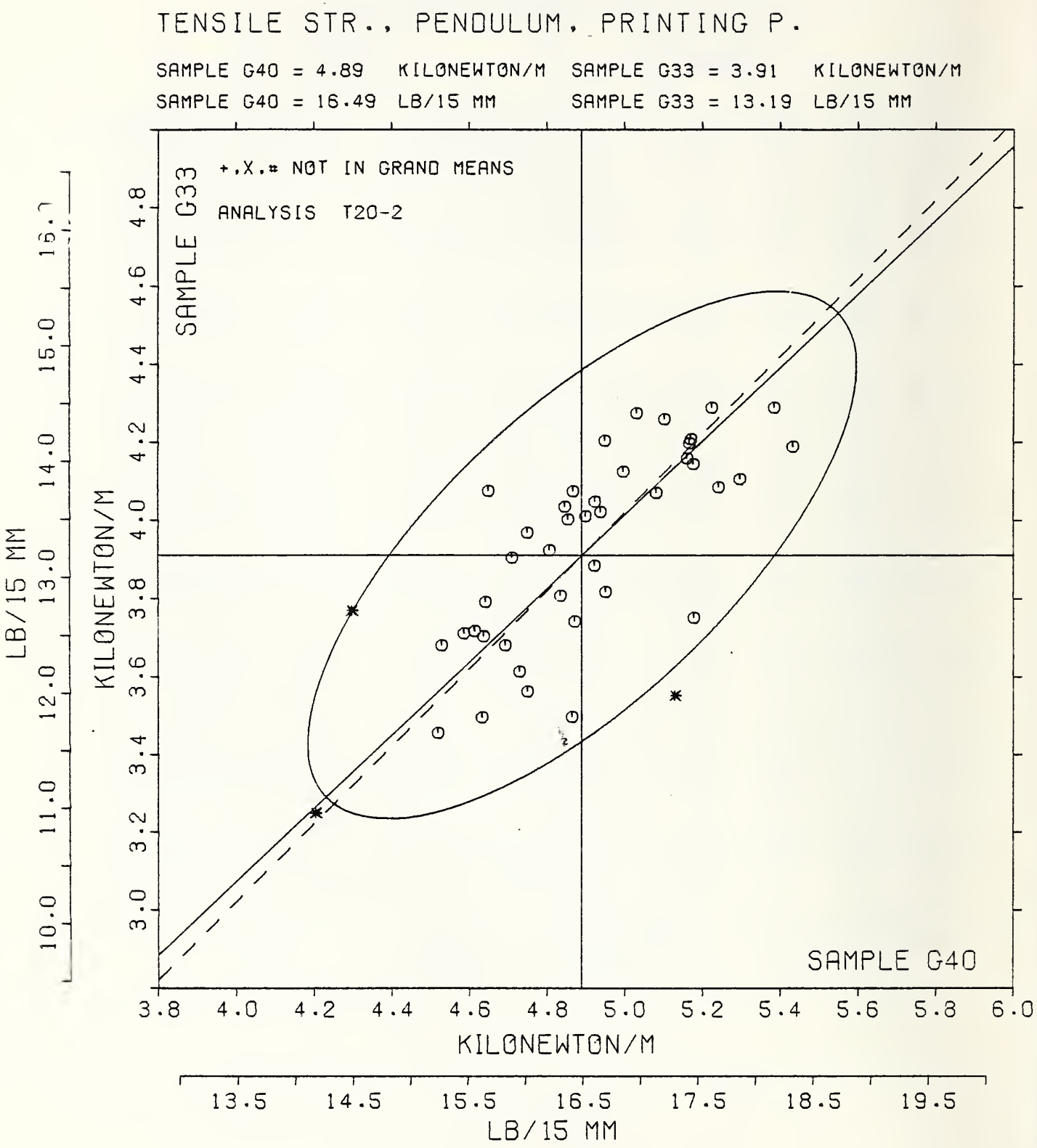
Data from the following laboratories appear to be off by a multiplicative factor: 337.

ANALYSIS T20-2 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PRIMARILY PRINTING PAPERS

TAPPI OFFICIAL TEST METHOD T404 OS-76, PENDULUM-TYPE TESTER

LAB CODE	F	MEANS G40	MEANS G33	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L313	#	3.68	3.03	-1.48	.19	.73	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L484	#	3.78	4.48	-.42	1.17	.86	20U	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L241	*	4.21	3.25	-.95	-.01	.81	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L285	*	4.30	3.77	-.53	.30	.86	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L275	G	4.52	3.46	-.58	-.08	1.06	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L242	G	4.53	3.68	-.42	.08	.88	20Y	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L754	G	4.59	3.71	-.36	.06	.63	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L162	G	4.61	3.72	-.33	.05	1.13	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L321	G	4.63	3.50	-.47	-.13	.82	20O	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L148	G	4.64	3.71	-.33	.02	.83	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L121	G	4.64	3.79	-.26	.08	1.01	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L103	G	4.65	4.08	-.06	.28	.57	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L290	G	4.69	3.68	-.30	-.03	1.12	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L311	G	4.71	3.90	-.13	.12	.94	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L599	G	4.73	3.61	-.32	-.11	1.51	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L685	G	4.75	3.97	-.06	.14	.79	20Y	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L625	G	4.75	3.56	-.34	-.16	1.15	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L212	G	4.81	3.92	-.05	.07	.94	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L128	G	4.83	3.81	-.11	-.04	.95	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L219	G	4.85	4.04	.05	.12	.70	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L393	G	4.85	4.00	.04	.09	.80	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L124P	G	4.86	3.50	-.30	-.28	1.24	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L714	G	4.87	4.08	.10	.14	.74	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L213	G	4.87	3.74	-.13	-.11	1.47	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L191P	G	4.90	4.01	.08	.07	.80	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L274	G	4.92	3.89	.01	-.04	.42	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L182L	G	4.92	4.05	.12	.08	1.02	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L24S	G	4.94	4.02	.11	.05	1.10	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L262	G	4.95	4.20	.24	.17	.91	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L103	G	4.95	3.82	-.02	-.11	1.05	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L189	G	5.00	4.13	.22	.08	.84	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L626	G	5.03	4.27	.35	.17	.72	20T	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L183	G	5.08	4.07	.25	-.02	1.31	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L233	G	5.10	4.26	.39	.11	.99	20Q	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L234	*	5.13	3.55	-.07	-.43	.89	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L680	G	5.16	4.16	.37	-.00	.76	20R	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L759	G	5.17	4.20	.40	.02	.91	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L330	G	5.17	4.21	.41	.02	1.16	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L153	G	5.18	4.14	.37	-.03	.98	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L366	G	5.18	3.75	.10	-.31	1.63	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L760B	G	5.22	4.29	.60	.05	.91	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L356	G	5.24	4.09	.38	-.11	1.17	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L556	G	5.30	4.11	.43	-.14	2.00	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L259	G	5.38	4.29	.62	-.06	.98	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L279P	G	5.43	4.19	.59	-.17	1.05	20P	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
L337	#	24.95	20.29	25.84	-1.84	6.45	20V	TENSILE STRENGTH, 14 TO 40 LB/IN, PENDULUM TESTER
GMEANS:		4.89	3.91			1.00		
		95% ELLIPSE:		.90	.37	WITH GAMMA = 43 DEGREES		


TENSILE STR., PENDULUM, PRINTING P.
SAMPLE G40 = 4.89 KILONEWTON/M
SAMPLE G40 = 16.49 LB/15 MM
SAMPLE G33 = 3.91 KILONEWTON/M
SAMPLE G33 = 13.19 LB/15 MM
+,X,# NOT IN GRAND MEANS
ANALYSIS T20-2
SAMPLE G33
KILONEWTON/M
LB/15 MM
SAMPLE G40
KILONEWTON/M
LB/15 MM

ANALYSIS T25-1 TABLE 1

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	SAMPLE G38 MEAN	KRAFT ENVELOPE 123 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE G49 MEAN	KRAFT COATING BASE 96 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 20 VAR	F	LAB
L106	112.9	11.3	1.00	9.4	.78	139.1	18.2	1.58	16.3	1.25	25F	0	L106
L122	109.1	7.6	.67	8.1	.67	124.9	4.0	.34	13.8	1.06	25P	0	L122
L151	101.5	.0	.00	13.9	1.14	115.6	-5.3	-.46	18.9	1.45	25P	0	L151
L182	100.6	-.9	-.08	11.7	.96	126.2	5.3	.46	11.5	.89	25B	0	L182
L219	117.6	16.1	1.42	10.6	.87	136.2	15.3	1.33	8.0	.61	25J	0	L219
L234	69.4	-32.1	-2.83	10.6	.87	113.8	-7.1	-.62	9.4	.72	25F	*	L234
L237B	105.1	3.6	.32	12.3	1.01	104.2	-16.7	-1.45	9.3	.72	25H	0	L237B
L264	107.4	5.9	.52	15.3	1.25	102.3	-18.6	-1.62	13.8	1.06	25F	0	L264
L267	106.6	5.1	.45	11.7	.96	134.3	13.3	1.16	9.8	.75	25P	0	L267
L273	99.6	-1.9	-.17	15.5	1.27	120.0	-.9	-.08	17.7	1.36	25F	0	L273
L278	97.9	-3.6	-.31	10.5	.86	133.5	12.5	1.09	8.8	.67	25E	0	L278
L280	104.1	2.6	.23	17.8	1.46	116.9	-4.0	-.35	17.6	1.35	25B	0	L280
L312	99.1	-2.5	-.22	20.1	1.65	125.0	4.1	.36	15.2	1.17	25J	0	L312
L318	100.4	-1.1	-.10	8.3	.68	129.7	8.8	.77	11.5	.88	25A	0	L318
L580	102.1	.6	.05	7.7	.63	115.0	-5.9	-.52	7.8	.60	25C	0	L580
L604	90.6	-10.9	-.96	15.2	1.25	105.7	-15.2	-1.32	15.1	1.16	25A	0	L604
L676	95.5	-6.0	-.53	12.3	1.01	103.8	-17.2	-1.49	18.5	1.42	25F	0	L676
L689	86.7	-14.8	-1.31	9.5	.78	112.9	-8.0	-.69	14.3	1.10	25F	0	L689
L735	94.4	-7.1	-.63	10.2	.83	118.7	-2.2	-.19	12.9	.99	25P	0	L735
L737A	106.3	4.8	.42	8.7	.71	124.6	3.7	.32	8.0	.61	25E	0	L737A
L737B	124.7	23.2	2.05	14.9	1.23	136.7	15.8	1.37	11.6	.89	25E	0	L737B

GR. MEAN * 101.5 JOULES/SQ M — GRAND MEAN * 120.9 JOULES/SQ M — TEST DETERMINATIONS * 20

SD MEANS * 11.3 JOULES/SQ M — SD OF MEANS * 11.5 JOULES/SQ M — 21 LABS IN GRAND MEANS

AVERAGE SDR * 12.2 JOULES/SQ M — AVERAGE SDR * 13.0 JOULES/SQ M

GR. MEAN * 6.95 FT.LB/SQ FT — GRAND MEAN * 8.28 FT.LB/SQ FT

L250	98.0	-3.5	-.31	7.9	.64	120.7	-.2	-.02	6.9	.53	25N	*	L250

TOTAL NUMBER OF LABORATORIES REPORTING * 22

Best values: G38 102 ± 20 joules per square meter

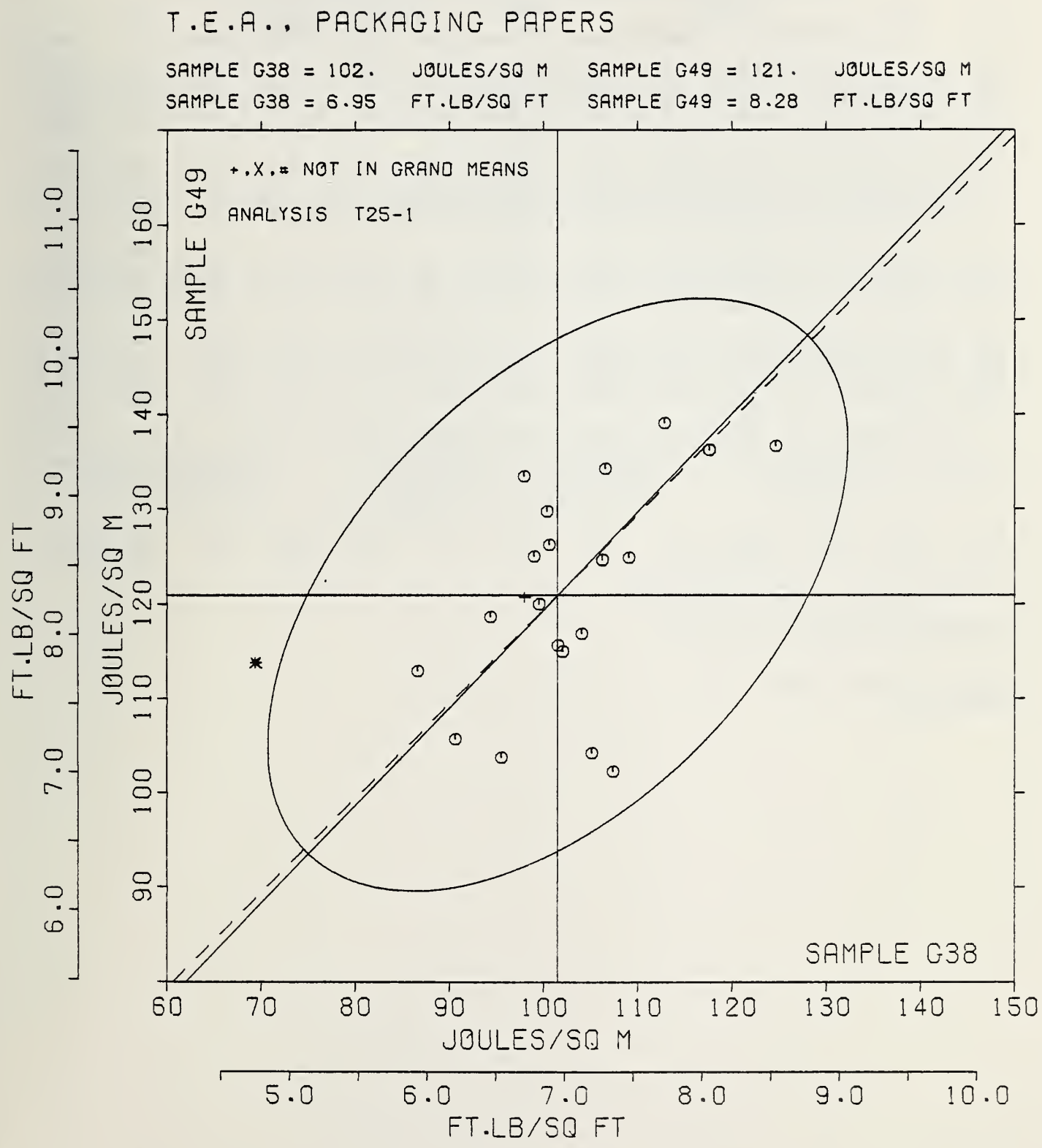
G49 121 ± 20 joules per square meter

ANALYSIS T25-1 TABLE 2

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS G38	MEANS G49	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
1234	*	69.4	113.8	-27.4	18.1	.80	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1685	*	86.7	112.9	-16.1	5.1	.94	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1604	*	90.6	105.7	-18.5	-2.8	1.20	25A	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
1735	*	94.4	118.7	-6.5	3.6	.91	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1676	*	95.5	103.8	-16.5	-7.6	1.21	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1278	*	97.9	133.5	6.6	11.3	.76	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
1250	*	98.0	120.7	-2.6	2.4	.59	25N	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS,2**
1312	*	99.1	125.0	1.3	4.6	1.41	25J	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1273	*	99.6	120.0	-2.0	.8	1.32	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1318	*	100.4	129.7	5.6	6.9	.78	25A	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
1182	*	100.6	126.2	3.2	4.3	.92	25B	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1151	*	101.5	115.6	-3.8	-3.7	1.30	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1580	*	102.1	115.0	-3.9	-4.5	.61	25C	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/LINE JAWS
1280	*	104.1	116.9	-1.1	-4.6	1.41	25B	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1237B	*	105.1	104.2	-9.5	-14.2	.86	25H	TENSILE ENERGY ABSORPTION (WITH TEST T19),2-PIN STRAIN GAGE
1737A	*	106.3	124.6	6.0	-.8	.66	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
1267	*	106.6	134.3	13.1	5.6	.86	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1264	*	107.4	102.3	-9.3	-17.2	1.16	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1122	*	109.1	124.9	8.1	-2.7	.86	25P	TENSILE ENERGY ABSORPTION (WITH TEST T19),PATTERNED FLAT JAW
1106	*	112.9	139.1	21.0	4.5	1.01	25F	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1219	*	117.6	136.2	22.2	-1.0	.74	25J	TENSILE ENERGY ABSORPTION (WITH TEST T19),LINE/FLAT JAWS
1737B	*	124.7	136.7	27.5	-5.7	1.06	25E	TENSILE ENERGY ABSORPTION (WITH TEST T19),FLAT/FLAT JAWS
GMEANS:		101.5	120.9			1.00		
		95% ELLIPSE:		38.1	21.9	WITH GAMMA = 45 DEGREES		


T.E.A., PACKAGING PAPERS
SAMPLE G38 = 102. JOULES/SQ M
SAMPLE G38 = 6.95 FT.LB/SQ FT
SAMPLE G49 = 121. JOULES/SQ M
SAMPLE G49 = 8.28 FT.LB/SQ FT
+.X.* NOT IN GRAND MEANS
ANALYSIS T25-1
SAMPLE G49
JOULES/SQ M
FT.LB/SQ FT
SAMPLE G38
JOULES/SQ M
FT.LB/SQ FT

ANALYSIS T26-1 TABLE 1

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER

TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB	SAMPLE	ENVELOPE 88 GRAMS PER SQUARE METER				SAMPLE	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER				TEST D.F 20		
CODE	G40 MEAN	DEV	N.DEV	SDR	R.SDR	G33 MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L115	41.7	-4.2	-1.00	6.0	.97	32.6	-5.7	-1.36	5.0	1.08	26C	@	L115
L118	44.6	-1.4	-.34	5.8	.93	39.8	1.4	.34	3.3	.72	26E	@	L118
L122	43.6	-2.4	-.56	7.4	1.19	40.0	1.6	.39	4.2	.92	26L	@	L122
L139	41.4	-4.6	-1.09	7.1	1.14	33.0	-5.4	-1.27	4.1	.90	26H	@	L139
L159	49.2	3.2	.76	3.9	.63	42.0	3.7	.87	2.0	.44	26F	@	L159
L163	44.8	-1.1	-.27	6.1	.98	39.8	1.4	.34	3.8	.83	26J	@	L163
L167	54.2	8.3	1.96	3.2	.52	43.6	5.3	1.25	1.3	.28	26D	@	L167
L185	46.3	.3	.08	7.3	1.17	32.1	-6.2	-1.47	5.2	1.13	26C	@	L185
L211	477830.4	477784.4	********	108583.4	17506.23	314357.0	314318.7	74311.33	100642.0	21817.81	26Z	#	L211
L255	52.0	6.0	1.42	8.2	1.32	35.6	-2.8	-.65	9.0	1.94	26P	@	L255
L309	53.8	7.8	1.85	11.9	1.92	42.2	3.9	.92	6.0	1.30	26J	@	L309
L318	44.1	-1.9	-.45	5.2	.83	40.0	1.7	.40	3.7	.80	26A	@	L318
L356	49.6	3.6	.86	7.0	1.14	39.9	1.6	.37	3.9	.85	26A	@	L356
L376	46.7	.7	.17	8.1	1.30	47.1	8.8	2.08	5.3	1.15	26E	@	L376
L393	42.0	-3.9	-.94	2.5	.40	35.5	-2.8	-.67	3.3	.71	26V	@	L393
L442	42.1	-3.9	-.92	4.9	.78	40.3	2.0	.46	4.2	.90	26B	@	L442
L563	61.9	15.9	3.77	7.8	1.25	33.8	-4.5	-1.07	10.6	2.30	26C	#	L563
L567	45.4	-.6	-.14	6.2	1.00	32.7	-5.6	-1.33	9.1	1.97	26A	@	L567
L575	40.5	-5.5	-1.30	4.4	.72	38.0	-.3	-.07	4.3	.92	26A	@	L575
L592	45.5	-.4	-.10	6.5	1.05	35.8	-2.5	-.60	5.3	1.14	26H	@	L592
L744	30.7	-15.2	-3.61	8.5	1.37	23.9	-15.4	-3.63	6.7	1.45	26E	#	L744

GR. MEAN = 46.0 JOULES/SQ M — GRAND MEAN = 38.3 JOULES/SQ M — TEST DETERMINATIONS = 20

SD MEANS = 4.2 JOULES/SQ M — SD OF MEANS = 4.2 JOULES/SQ M — 18 LABS IN GRAND MEANS

AVERAGE SDR = 6.2 JOULES/SQ M — AVERAGE SDR = 4.6 JOULES/SQ M

GR. MEAN = 3.149 FT.LB/SQ FT — GRAND MEAN = 2.627 FT.LB/SQ FT

L250	43.4	-2.6	-.62	4.4	.70	37.9	-.4	-.10	3.6	.79	26N	*	L250
L738	61.3	15.3	3.63	5.8	.94	53.4	15.1	3.56	5.4	1.16	26X	*	L738

TOTAL NUMBER OF LABORATORIES REPORTING = 23

Best values: G40 46 ± 7 joules per square meter
G33 33 ± 7 joules per square meter

The following laboratories were omitted from the grand means because of extreme test results: 563, 744.

Data from the following laboratories were not understood: 211.

ANALYSIS T26-1 TABLE 2

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER

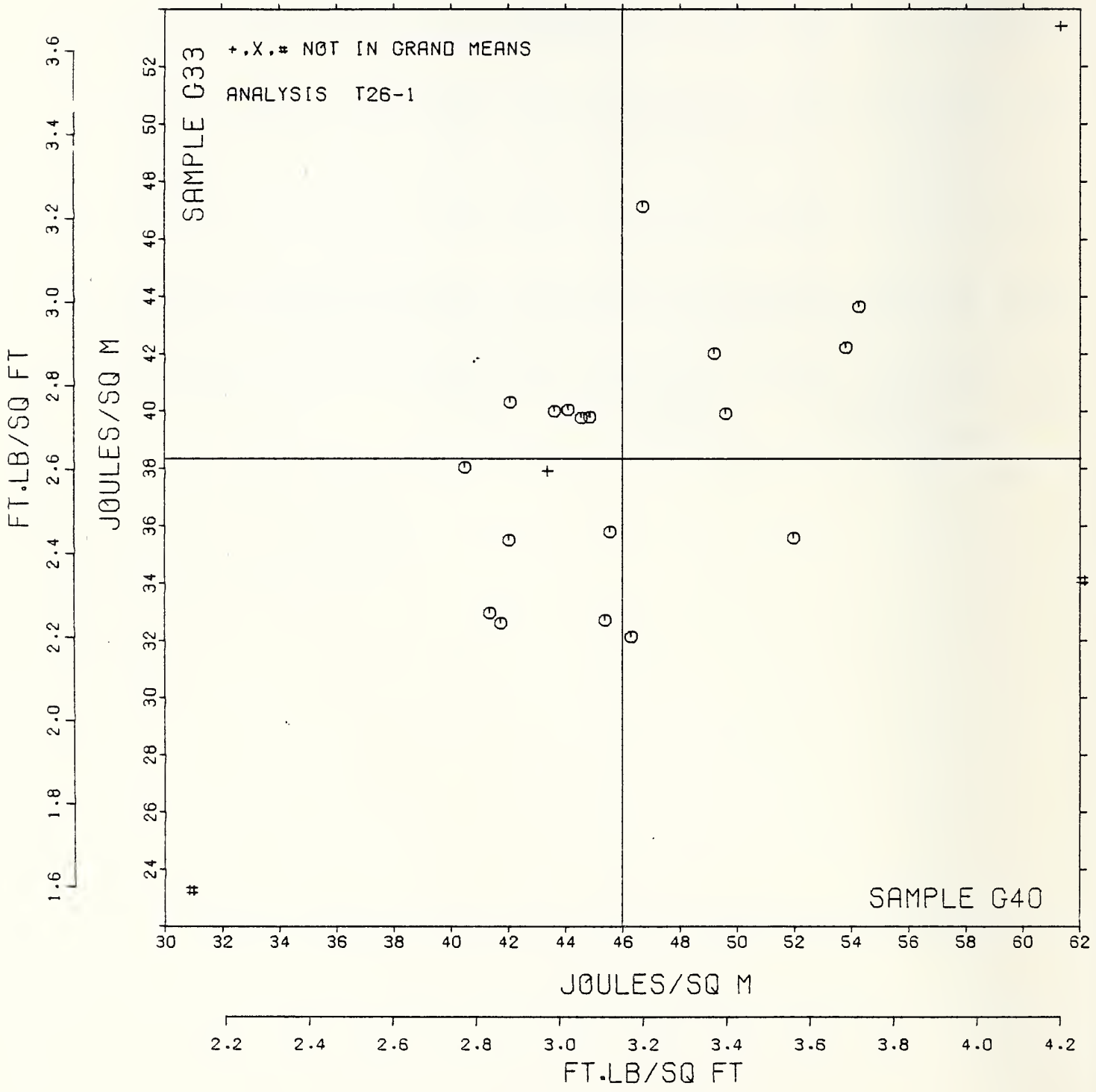
TAPPI OFFICIAL TEST METHOD T494 OS-70, CONSTANT RATE OF ELONGATION APPARATUS

LAB CODE	F	MEANS G40	MEANS G33	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L744	*	30.7	23.0	-21.6	-.0	1.41	26E	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L575	A	40.5	38.0	-4.1	3.7	.82	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L139	A	41.4	33.0	-7.1	-.5	1.02	26H	TENSILE ENERGY ABSORPTION (WITH TEST T20),2-PIN STRAIN GAGE
L115	A	41.7	32.6	-7.0	-1.0	1.02	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
L393	A	42.0	35.5	-4.8	.8	.55	26V	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L442	A	42.1	40.3	-1.4	4.2	.84	26B	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L250	*	43.4	37.9	-2.1	1.5	.74	26N	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS,20C
L122	A	43.6	40.0	-.5	2.8	1.05	26L	TENSILE ENERGY ABSORPTION (WITH TEST T20),PATTERNED FLAT JAW
L318	A	44.1	40.0	-.1	2.5	.82	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L118	A	44.6	39.8	.0	2.0	.83	26E	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L163	A	44.8	39.8	.2	1.8	.91	26J	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L567	A	45.4	32.7	-4.4	-3.5	1.48	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L592	A	45.5	35.8	-2.1	-1.5	1.10	26H	TENSILE ENERGY ABSORPTION (WITH TEST T20),2-PIN STRAIN GAGE
L185	A	46.3	32.1	-4.2	-4.6	1.15	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
L376	A	46.7	47.1	6.7	5.7	1.23	26E	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L159	A	49.2	42.0	4.9	.3	.53	26F	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L356	A	49.6	39.9	3.7	-1.5	.99	26A	TENSILE ENERGY ABSORPTION (WITH TEST T20),FLAT/FLAT JAWS
L255	A	52.0	35.6	2.3	-6.2	1.63	26P	TENSILE ENERGY ABSORPTION (WITH TEST T20),PATTERNED FLAT JAW
L309	A	53.8	42.2	8.3	-2.8	1.61	26J	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/FLAT JAWS
L167	A	54.2	43.6	9.6	-2.1	.40	26D	TENSILE ENERGY ABSORPTION (WITH TEST T20),2-PIN STRAIN GAGE
L738	*	61.3	53.4	21.5	-.2	1.05	26X	TENSILE ENERGY ABSORPTION (WITH TEST T20): GIVE JAW TYPE
L563	*	61.9	33.8	8.0	-14.5	1.78	26C	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
L211	**********	**********	**********	**********	**********	**********	26Z	TENSILE ENERGY ABSORPTION (WITH TEST T20),LINE/LINE JAWS
GMEANS:		46.0	38.3			1.00		
		95% ELLIPSE:		14.0	8.9	WITH GAMMA = 45 DEGREES		

T.E.A., PRINTING PAPERS

SAMPLE G40 = 46. JOULES/SQ M SAMPLE G33 = 38. JOULES/SQ M

SAMPLE G40 = 3.15 FT.LB/SQ FT SAMPLE G33 = 2.63 FT.LB/SQ FT



ANALYSIS I28-1 TABLE 1

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

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

LAB CODE	SAMPLE G39 KRAFT ENVELOPE 123 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE G49 KRAFT COATING BASE 96 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.* 20 VAR	F	LAB
L106	1.830	.309	1.82	.098	.71	2.270	.376	2.16	.172	1.10	28B	G	L106
L122	1.589	.068	.40	.071	.51	1.951	.058	.33	.134	.85	28P	G	L122
L151	1.640	.119	.70	.123	.89	1.800	-.094	-.54	.243	1.55	28B	G	L151
L182	1.430	-.091	-.54	.080	.58	1.875	-.019	-.11	.116	.74	28B	G	L182
L234	1.095	-.426	-2.52	.173	1.25	1.780	-.114	-.65	.095	.61	28B	*	L234
L264	1.760	.239	1.41	.164	1.18	1.890	-.004	-.02	.238	1.52	28B	G	L264
L265	1.427	-.094	-.56	.097	.70	1.739	-.154	-.88	.091	.58	28A	G	L265
L267	1.460	-.061	-.36	.121	.87	1.914	.021	.12	.089	.57	29B	G	L267
L278	1.655	.134	.79	.100	.72	2.175	.281	1.61	.091	.58	28A	G	L278
L280	1.711	.190	1.12	.122	.88	2.026	.133	.76	.180	1.15	28B	G	L280
L312	1.635	.114	.67	.166	1.20	2.120	.226	1.30	.379	2.42	28B	G	L312
L318	1.662	.141	.83	.077	.56	2.118	.224	1.29	.096	.61	28A	G	L318
L324	1.385	-.136	-.80	.123	.88	1.760	-.134	-.77	.123	.79	28P	G	L324
L336	1.451	-.070	-.41	.130	.94	1.863	-.031	-.18	.129	.82	28A	G	L336
L580	1.390	-.131	-.77	.102	.74	1.700	-.194	-1.11	.103	.66	28C	G	L580
L581	1.381	-.140	-.82	.160	1.15	1.760	-.133	-.76	.097	.62	28A	G	L581
L676	1.475	-.046	-.27	.636	4.59	1.530	-.364	-2.09	.384	2.45	28B	G	L676
L689	1.270	-.251	-1.48	.126	.91	1.795	-.099	-.57	.161	1.03	28B	G	L689
L730	1.587	.066	.39	.103	.75	1.894	.000	.00	.127	.81	28A	G	L730
L735	1.625	.104	.61	.129	.93	2.045	.151	.87	.147	.94	28B	G	L735
L737A	1.518	-.003	-.02	.071	.51	1.818	-.075	-.43	.070	.45	28A	G	L737A
L737B	1.487	-.034	-.20	.113	.81	1.832	-.061	-.35	.117	.75	28A	G	L737B

GR. MEAN * 1.521 PERCENT GRAND MEAN * 1.894 PERCENT TEST DETERMINATIONS * 20

SD MEANS * .169 PERCENT SD OF MEANS * .174 PERCENT 22 LABS IN GRAND MEANS

AVERAGE SDR * .139 PERCENT AVERAGE SDR * .156 PERCENT

TOTAL NUMBER OF LABORATORIES REPORTING * 22

Best values: G38 1.52 ± 0.29 percent

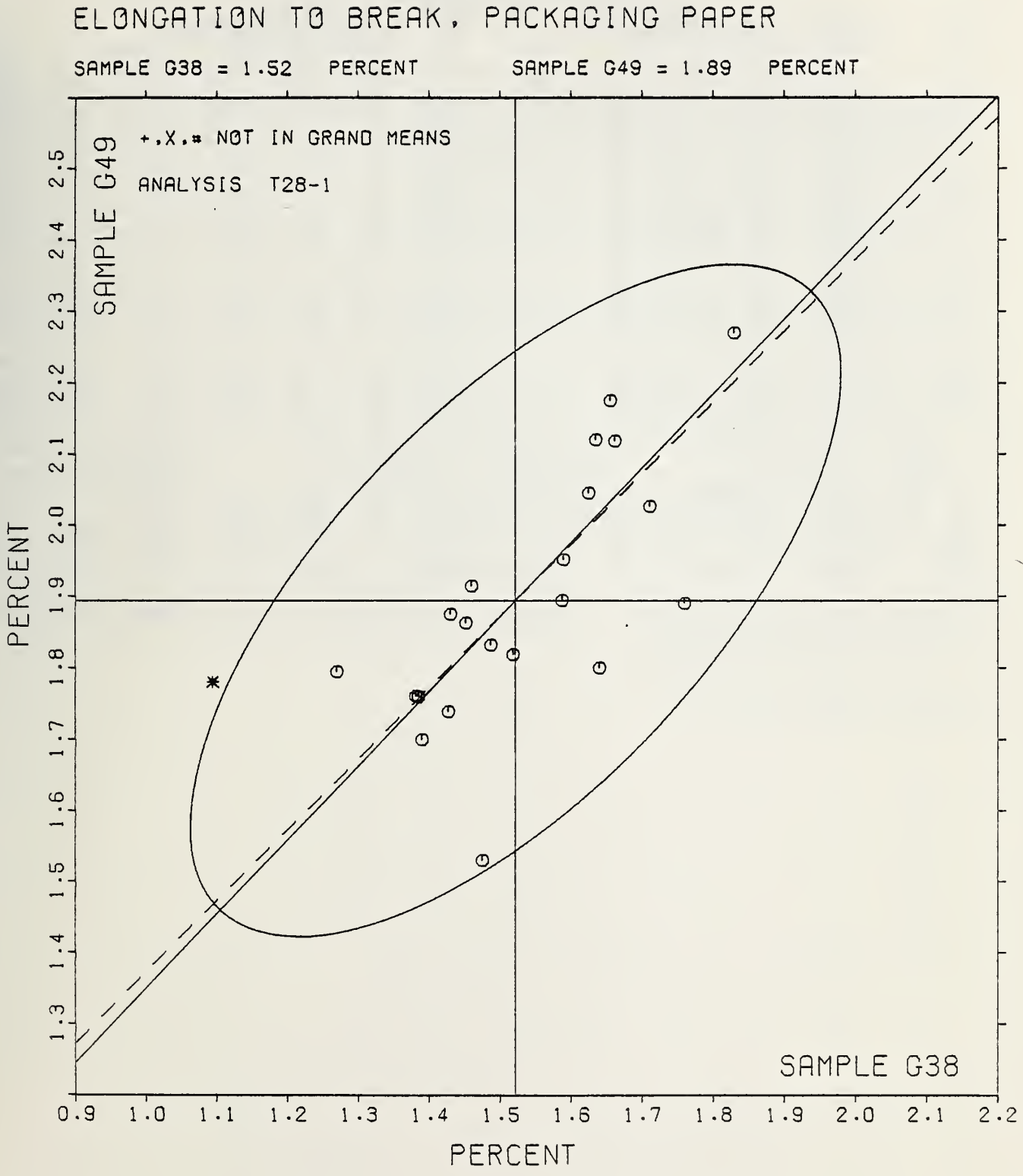
G49 1.88 ± 0.30 percent

ANALYSIS T28-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

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

LAB CODE	F	MEANS G38	MEANS G49	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
T234	*	1.095	1.780	-.377	.229	.93	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L689	A	1.270	1.795	-.245	.113	.97	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L581	A	1.381	1.760	-.193	.009	.89	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L324	A	1.385	1.760	-.191	.006	.84	28P	ELONGATION (WITH TEST T19),LOAD CELL,PATTERNED FLAT JAWS
L580	A	1.390	1.700	-.231	-.039	.70	28C	ELONGATION (WITH TEST T19),LOAD CELL,LINE/LINE JAWS
L265	B	1.427	1.739	-.176	-.039	.64	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L182	A	1.430	1.875	-.076	.053	.66	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L336	A	1.451	1.863	-.070	.029	.88	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L267	A	1.460	1.914	-.027	.059	.72	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L676	B	1.475	1.530	-.294	-.218	3.52	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L737B	A	1.487	1.832	-.068	-.018	.78	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L737A	B	1.518	1.818	-.056	-.050	.48	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L730	B	1.587	1.894	.046	-.048	.78	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L122	A	1.589	1.951	.089	-.009	.68	28P	ELONGATION (WITH TEST T19),LOAD CELL,PATTERNED FLAT JAWS
L735	A	1.625	2.045	.181	.030	.94	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L312	A	1.635	2.120	.242	.074	1.81	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L151	A	1.640	1.900	.015	-.151	1.22	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L278	A	1.655	2.175	.296	.098	.65	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L318	A	1.662	2.118	.259	.054	.59	28A	ELONGATION (WITH TEST T19),LOAD CELL,FLAT/FLAT JAWS
L280	A	1.711	2.026	.227	-.045	1.01	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L264	A	1.760	1.890	.163	-.175	1.35	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
L106	A	1.830	2.270	.485	.037	.90	28B	ELONGATION (WITH TEST T19),LOAD CELL,LINE/FLAT JAWS
GMEANS:		1.521	1.894			1.00		
		95% ELLIPSE:		.602	.267	WITH GAMMA = 46 DEGREES		


ELONGATION TO BREAK, PACKAGING PAPER
SAMPLE G38 = 1.52 PERCENT
SAMPLE G49 = 1.89 PERCENT
+,X,* NOT IN GRAND MEANS
ANALYSIS T28-1
SAMPLE G49
PERCENT
SAMPLE G38
PERCENT
0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2
1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5

ANALYSIS T29-1 TABLE 1
ELONGATION TO BREAK, PERCENT - PRINTING PAPER
TAPPI OFFICIAL TEST METHODS T404 OS-76 AND T494 OS-70, PENDULUM AND CRE TYPES

LAB CODE	SAMPLE G40 MEAN	ENVELOPE 88 GRAMS PER SQUARE METER DEV	N.DEV	SDP	R.SDR	SAMPLE G33 MEAN	COATED OFFSET BOOK 75 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 20 VAR	F	LAB
L105	.097	-1.390	-8.38	.014	.10	.110	-1.399	-9.69	.013	.09	29A	#	L105
L118	1.345	-.142	-.96	.135	.99	1.420	-.089	-.61	.079	.57	29A	0	L118
L122	1.471	-.017	-.10	.144	1.05	1.608	.099	.68	.106	.77	29P	0	L122
L139	1.185	-.303	-1.83	.163	1.19	1.230	-.279	-1.93	.108	.78	29D	0	L139
L141T	1.298	-.190	-1.14	.182	1.33	1.355	-.154	-1.07	.138	1.00	29D	0	L141T
L163	1.478	-.009	-.06	.129	.94	1.542	.033	.23	.101	.73	29B	0	L163
L176	1.422	-.065	-.39	.217	1.58	1.523	.014	.10	.213	1.54	29B	0	L176
L185	1.405	-.083	-.50	.147	1.07	1.305	-.204	-1.41	.136	.98	29C	0	L185
L255	1.806	.319	1.92	.172	1.26	1.679	.170	1.18	.251	1.82	29P	0	L255
L309	1.788	.301	1.81	.244	1.78	1.731	.222	1.53	.161	1.17	29A	0	L309
L318	1.553	.065	.39	.094	.69	1.711	.202	1.40	.103	.75	29A	0	L318
L344	1.665	.177	1.07	.055	.40	1.532	.023	.16	.104	.75	29A	0	L344
L356	1.547	.060	.36	.141	1.03	1.545	.036	.25	.098	.71	29A	0	L356
L386	1.290	-.198	-1.19	.129	.94	1.335	-.174	-1.21	.131	.95	29A	0	L386
L442	1.520	.032	.19	.070	.51	1.655	.146	1.01	.115	.83	29B	0	L442
L567	1.459	-.029	-.17	.125	.91	1.389	-.120	-.83	.219	1.59	29A	0	L567
L575	1.352	-.136	-.82	.088	.64	1.491	-.018	-.12	.152	1.10	29A	0	L575
L592	1.529	.042	.25	.122	.89	1.417	-.092	-.64	.139	1.01	29D	0	L592
L608	1.695	.207	1.25	.136	.99	1.610	.101	.70	.162	1.17	29C	0	L608
L736	1.460	-.028	-.17	.110	.80	1.595	.086	.59	.110	.80	29A	0	L736
GR. MEAN =	1.488 PERCENT					GRAND MEAN =	1.509 PERCENT				TEST DETERMINATIONS =		20
SD MEANS =	.166 PERCENT					SD OF MEANS =	.144 PERCENT				19 LABS IN GRAND MEANS		
		AVERAGE SDR =		.137 PERCENT			AVERAGE SDR =		.138 PERCENT				
L153	1.685	.197	1.19	.118	.86	1.745	.236	1.63	.139	1.01	29R	*	L153
L242	1.695	.197	1.19	.160	1.17	1.905	.396	2.74	.201	1.46	29R	*	L242
L484	1.641	.153	.92	.153	1.11	1.516	.007	.05	.143	1.03	29R	*	L484
L626	1.335	-.152	-.92	.138	1.01	1.352	-.157	-1.09	.092	.67	29R	*	L626
L685	1.930	.442	2.66	.181	1.32	2.100	.591	4.09	.117	.85	29R	*	L685
L759	1.160	-.328	-1.98	.196	1.43	1.225	-.284	-1.97	.283	2.04	29X	*	L759

TOTAL NUMBER OF LABORATORIES REPORTING = 26

Best values: G40 1.48 ± 0.29 percent
G33 1.52 ± 0.25 percent

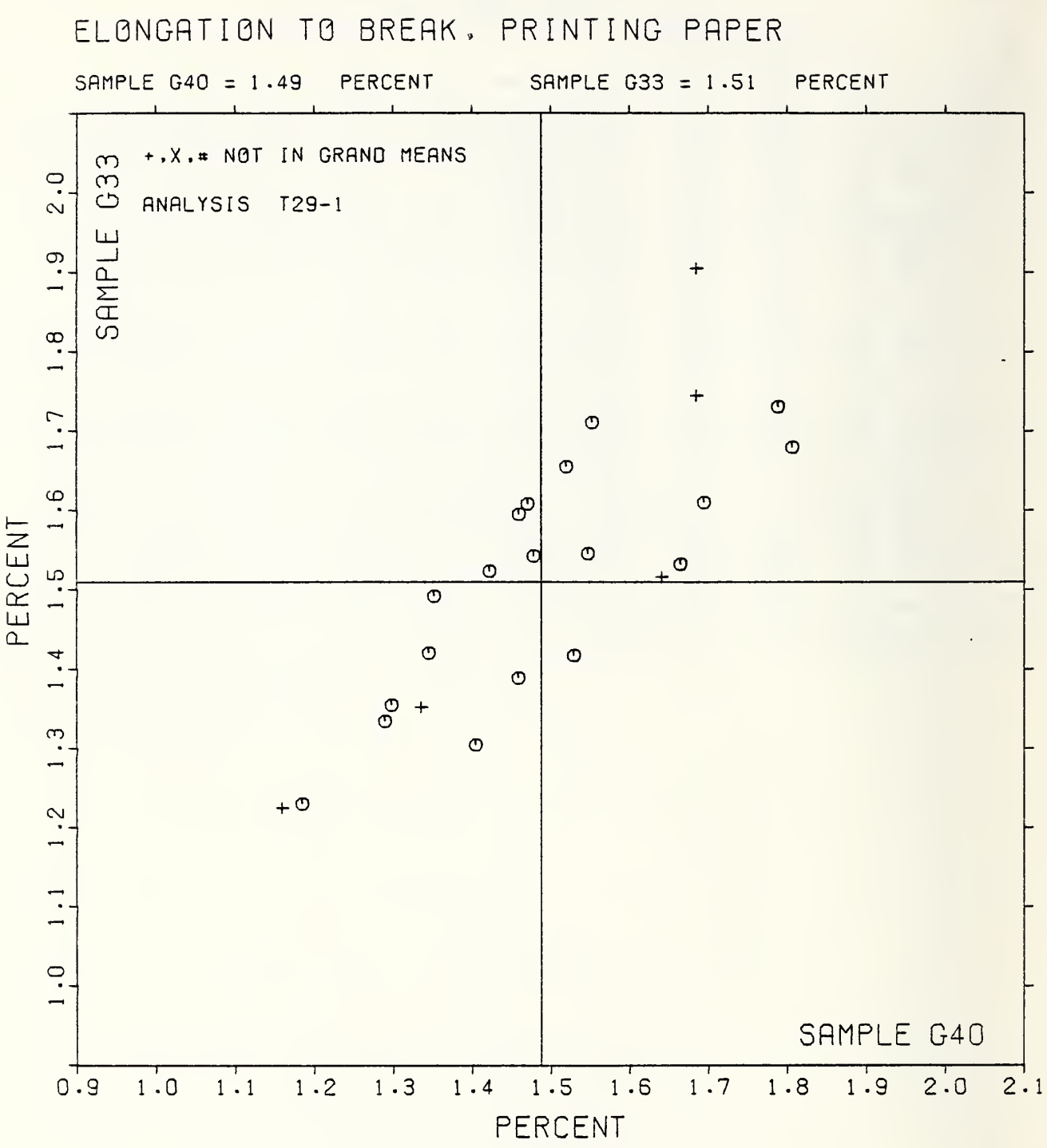
Data from the following laboratories appear to be off by a multiplicative factor: 105.

ANALYSIS I29-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

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

LAB CODE	F	MEANS G40	G33	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L105	*	.097	.110	-1.965	-.178	.10	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L759	*	1.160	1.225	-.434	-.007	1.74	29X	ELONGATION (WITH TEST T20): GIVE INSTRUMENT & JAW TYPES
L139	G	1.185	1.230	-.412	-.019	.99	29D	ELONGATION (WITH TEST T20),LOAD CELL,2-PIN STRAIN GAGE
L386	G	1.290	1.335	-.264	-.006	.95	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L141T	G	1.298	1.355	-.245	.004	1.16	29D	ELONGATION (WITH TEST T20),LOAD CELL,2-PIN STRAIN GAGE
L626	*	1.335	1.352	-.218	-.022	.84	29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L118	G	1.345	1.420	-.166	.024	.78	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L575	G	1.352	1.491	-.116	.074	.87	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L165	G	1.405	1.305	-.195	-.103	1.03	29C	ELONGATION (WITH TEST T20),LOAD CELL,LINE/LINE JAWS
L176	G	1.422	1.523	-.041	.053	1.56	29B	ELONGATION (WITH TEST T20),LOAD CELL,LINE/FLAT JAWS
L567	G	1.459	1.389	-.100	-.074	1.25	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L736	G	1.460	1.595	.034	.084	.80	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L122	G	1.471	1.608	.050	.087	.91	29P	ELONGATION (WITH TEST T20),LOAD CELL,PATTERNED FLAT JAWS
L163	G	1.478	1.542	.014	.032	.84	29B	ELONGATION (WITH TEST T20),LOAD CELL,LINE/FLAT JAWS
L442	G	1.520	1.655	.118	.091	.67	29B	ELONGATION (WITH TEST T20),LOAD CELL,LINE/FLAT JAWS
L592	G	1.529	1.417	-.027	-.097	.95	29D	ELONGATION (WITH TEST T20),LOAD CELL,2-PIN STRAIN GAGE
L356	G	1.547	1.545	.069	-.011	.87	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L319	G	1.553	1.711	.179	.113	.72	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L484	*	1.641	1.516	.122	-.093	1.07	29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L344	G	1.665	1.532	.151	-.096	.58	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L242	*	1.685	1.905	.405	.176	1.31	29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L152	*	1.695	1.745	.302	.054	.94	29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
L699	G	1.695	1.610	.223	-.056	1.08	29C	ELONGATION (WITH TEST T20),LOAD CELL,LINE/LINE JAWS
L309	G	1.788	1.731	.373	-.023	1.47	29A	ELONGATION (WITH TEST T20),LOAD CELL,FLAT/FLAT JAWS
L285	G	1.806	1.679	.353	-.074	1.54	29P	ELONGATION (WITH TEST T20),LOAD CELL,PATTERNED FLAT JAWS
L685	*	1.930	2.100	.718	.168	1.68	29R	ELONGATION (WITH TEST T20),PENDULUM, FLAT/FLAT JAWS
GMEANS:		1.458	1.509			1.00		
		95% ELLIPSE:		.575	.195	WITH GAMMA = 40 DEGREES		


ELONGATION TO BREAK, PRINTING PAPER
SAMPLE G40 = 1.49 PERCENT
SAMPLE G33 = 1.51 PERCENT
+,X,* NOT IN GRAND MEANS
ANALYSIS T29-1
SAMPLE G33
SAMPLE G40
PERCENT
PERCENT
1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0
0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1

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

LAB CODE	SAMPLE B69 REPROCOPY 70 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE G28 OFFSET PRINTING 94 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	P	LAB
L105	25.7	-174.9	-2.40	10.2	.17	8.6	-18.2	-3.03	2.1	.27	30M	*	L105
L118	194.9	-5.7	-.08	26.6	.45	24.0	-2.8	-.47	4.5	.57	30D	G	L118
L121	294.9	4.3	.06	67.5	1.15	29.8	3.0	.49	8.7	1.12	30M	G	L121
L122	244.9	44.3	.61	76.8	1.31	32.8	6.0	.99	12.8	1.64	30M	G	L122
L124	241.3	40.7	.56	41.4	.71	25.2	-1.6	-.27	8.4	1.07	30N	*	L124
L150	267.7	67.1	.92	40.6	.69	27.8	1.0	.16	8.2	1.05	30M	G	L150
L158	58.2	-142.4	-1.95	29.0	.49	12.5	-14.4	-2.39	2.8	.36	30N	G	L158
L159	460.7	260.1	3.57	55.9	.95	53.3	26.5	4.40	10.8	1.38	30N	X	L159
L162	132.7	-67.9	-.93	49.5	.84	24.6	-2.2	-.37	7.4	.95	30M	G	L162
L163	125.7	-74.9	-1.03	37.6	.64	21.6	-5.2	-.87	6.1	.78	30N	G	L163
L176	212.6	12.0	.16	92.8	1.58	31.6	4.8	.79	12.6	1.62	30N	G	L176
L182M	280.0	79.4	1.09	55.3	.94	36.1	9.3	1.54	9.0	1.15	30M	G	L182M
L185	307.9	107.3	1.47	104.5	1.78	28.8	2.0	.33	5.6	.72	30N	G	L185
L212	170.1	-30.5	-.42	51.7	.88	26.2	-.6	-.11	6.6	.85	30M	G	L212
L223F	240.2	39.6	.54	49.7	.85	35.1	8.2	1.37	12.5	1.61	30M	*	L223F
L230	168.9	-31.7	-.44	55.0	.94	32.3	5.5	.91	6.6	.84	30N	G	L230
L232	166.2	-34.4	-.47	25.0	.43	47.0	20.2	3.35	5.8	.74	30N	X	L232
L238A	164.7	-35.9	-.49	103.1	1.76	22.4	-4.4	-.74	8.3	1.06	30N	G	L238A
L238B	207.9	7.3	.10	92.3	1.57	26.9	.0	.00	9.2	1.19	30D	G	L238B
L254	235.7	35.1	.48	64.0	1.09	24.7	-2.1	-.35	9.2	1.18	30M	G	L254
L262	192.7	-17.9	-.24	22.2	.38	25.9	-1.0	-.16	9.4	1.21	30N	G	L262
L274	290.9	.3	.00	87.5	1.49	33.1	6.2	1.03	14.5	1.87	30N	G	L274
L275	115.6	-85.0	-1.17	47.5	.81	22.6	-4.2	-.71	4.0	.52	30N	G	L275
L278	82.2	-118.4	-1.62	55.3	.94	21.9	-4.9	-.82	8.7	1.12	30C	*	L278
L279	195.5	-5.1	-.07	27.0	.46	25.9	-.9	-.15	5.1	.65	30N	G	L279
L285A	344.8	144.2	1.98	75.7	1.29	35.7	8.8	1.47	9.4	1.20	30N	G	L285A
L285B	330.7	130.1	1.79	91.8	1.57	37.5	10.6	1.77	11.4	1.47	30N	*	L285B
L320	212.1	11.5	.16	77.9	1.33	28.0	1.2	.19	13.0	1.67	30N	G	L320
L321	328.3	127.7	1.75	93.7	1.60	33.7	6.8	1.13	9.3	1.20	30M	G	L321
L326N	100.0	-100.6	-1.38	30.9	.53	16.6	-10.2	-1.70	4.7	.60	30N	G	L326N
L339	105.5	-95.1	-1.30	29.2	.50	15.1	-11.7	-1.95	3.5	.45	30M	G	L339
L366A	123.3	-77.3	-1.06	53.2	.91	18.7	-8.2	-1.36	4.2	.54	30N	G	L366A
L376	133.3	-67.3	-.92	73.4	1.25	20.1	-6.7	-1.12	8.8	1.14	30N	G	L376
L388	254.4	53.8	.74	65.7	1.12	30.5	3.7	.61	6.9	.89	30N	G	L388
L390	157.8	-42.8	-.59	46.8	.80	21.3	-5.6	-.93	4.6	.59	30N	G	L390
L393	178.0	-22.6	-.31	17.3	.30	27.8	1.0	.16	4.4	.56	30M	G	L393
L396M	287.5	86.9	1.19	103.6	1.77	38.6	11.8	1.95	10.7	1.38	30N	G	L396M
L565	174.1	-26.5	-.36	29.6	.51	24.7	-2.2	-.36	5.1	.66	30N	G	L565
L567	338.1	137.5	1.89	149.7	2.55	26.0	-.8	-.14	9.7	1.24	30N	*	L567
L589	109.5	-91.1	-1.25	13.5	.23	23.2	-3.6	-.61	4.8	.61	30N	G	L589
L590	170.5	-30.1	-.41	100.6	1.72	26.4	-.4	-.07	8.4	1.08	30C	*	L590
L670	175.1	-25.5	-.35	30.4	.52	26.7	-.1	-.02	7.0	.90	30N	G	L670
L705	147.9	-52.7	-.72	29.4	.50	35.8	9.0	1.49	5.0	.65	30N	*	L705
L734	231.9	31.3	.43	70.5	1.20	32.9	6.1	1.01	7.5	.96	30C	G	L734
L737	234.2	33.6	.46	64.8	1.11	25.3	-1.6	-.26	7.3	.94	30N	G	L737
GR. MEAN = 200.6 DOUBLE FOLDS						GRAND MEAN = 26.8 DOUBLE FOLDS					TEST DETERMINATIONS = 15		
SD MEANS = 72.9 DOUBLE FOLDS						SD OF MEANS = 6.0 DOUBLE FOLDS					41 LABS IN GRAND MEANS		
AVERAGE SDR = 58.6 DOUBLE FOLDS						AVERAGE SDR = 7.8 DOUBLE FOLDS							
L182S	135.4	-65.2	-.89	48.9	.83	28.3	1.4	.24	10.6	1.36	30S	=	L182S
L326S	37.5	-163.1	-2.24	11.2	.19	15.6	-11.2	-1.87	5.4	.69	30S	=	L326S
L706	117.2	-83.4	-1.14	47.9	.82	22.5	-4.4	-.73	9.3	1.19	30X	=	L706
L743	138.7	-61.9	-.85	52.2	.89	18.9	-7.9	-1.31	4.6	.59	30X	=	L743

TOTAL NUMBER OF LABORATORIES REPORTING = 49

Best values: B69 200 double folds
G28 27 double folds

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

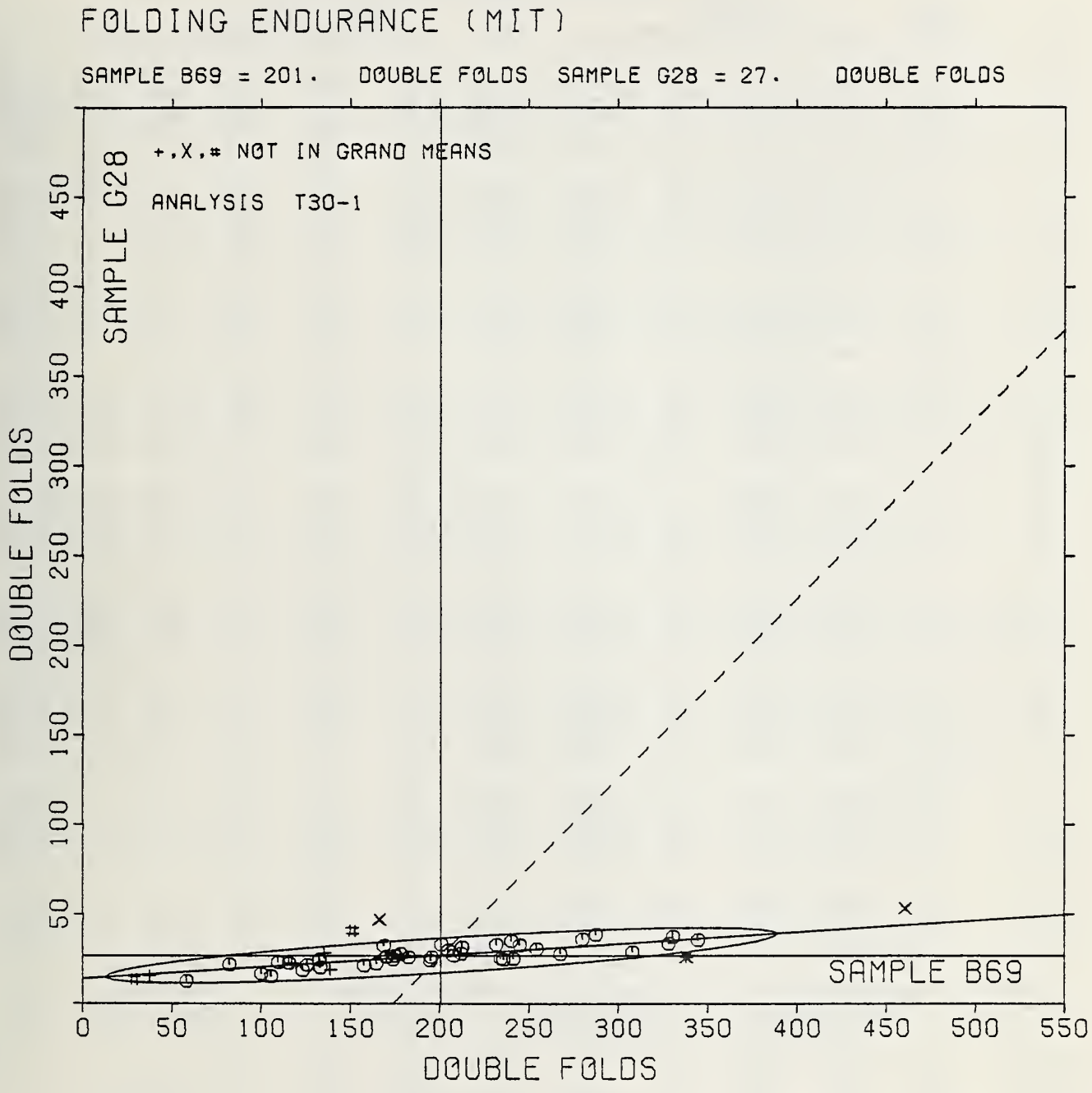
Data from the following laboratories were not understood: 705.

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 46 of this report for a demonstration of this proposal.

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

LAB CODE	F	MEANS B69	MEANS G28	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L105	#	25.7	8.6	-175.7	-6.9	.22	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L326S	*	37.5	15.6	-163.4	-.7	.44	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L158	@	58.2	12.5	-143.0	-5.1	.43	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L278	^	82.2	21.9	-118.5	2.8	1.03	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L326N	@	100.0	16.6	-101.0	-3.7	.56	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L339	@	105.5	15.1	-95.6	-5.5	.48	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L589	^	109.5	23.2	-91.2	2.3	.42	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L275	^	115.6	22.6	-95.1	1.3	.67	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L706	*	117.2	22.5	-83.5	1.0	1.00	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L366A	^	123.3	18.7	-77.7	-3.2	.73	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L163	@	125.7	21.6	-75.1	-.4	.71	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L162	@	132.7	24.6	-67.9	2.2	.90	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L376	^	133.3	20.1	-67.6	-2.3	1.19	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L182S	*	135.4	28.3	-65.0	5.6	1.10	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L743	*	138.7	18.9	-62.2	-3.9	.74	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L705	#	147.9	35.8	-52.0	12.3	.58	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L390	^	157.8	21.3	-43.1	-2.8	.69	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238A	^	164.7	22.4	-36.1	-2.1	1.41	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L232	X	166.2	47.0	-33.0	22.3	.59	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L230	^	168.9	32.3	-31.3	7.5	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L212	^	170.1	26.2	-30.5	1.3	.86	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L599	^	170.5	26.4	-30.0	1.5	1.40	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L565	^	174.1	24.7	-26.6	-.5	.58	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L670	^	175.1	26.7	-25.4	1.5	.71	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L393	^	178.0	27.8	-22.5	2.4	.43	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L262	^	182.7	25.9	-17.9	.2	.79	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L118	@	184.9	24.0	-5.8	-2.5	.51	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L279	^	185.5	25.9	-5.2	-.6	.56	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L274	@	200.9	33.1	.7	6.2	1.68	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L121	^	204.9	29.8	4.5	2.7	1.14	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L238B	^	207.9	26.9	7.3	-.4	1.38	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L320	@	212.1	28.0	11.6	.4	1.50	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L176	^	212.6	31.6	12.3	4.0	1.60	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L734	^	231.9	32.9	31.6	4.1	1.08	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L737	@	234.2	25.3	33.4	-3.7	1.02	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	^	235.7	24.7	34.9	-4.4	1.14	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L223F	^	240.2	35.1	40.1	5.6	1.23	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L124	@	241.3	25.2	40.5	-4.3	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	@	244.9	32.8	44.6	3.1	1.48	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L388	^	264.4	30.5	53.9	.2	1.00	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L150	@	267.7	27.8	67.0	-3.4	.87	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L182M	@	280.0	36.1	79.8	4.1	1.05	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L396M	@	287.5	38.6	87.5	6.1	1.57	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L185	^	307.9	28.8	107.2	-5.0	1.25	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L321	@	328.3	33.7	127.9	-1.5	1.40	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L285B	@	330.7	37.5	130.6	2.2	1.52	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L567	*	338.1	26.0	137.1	-9.7	1.90	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285A	^	344.8	35.7	144.5	-.5	1.25	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L159	X	460.7	53.3	261.2	9.6	1.17	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
GMEANS:		200.6	26.8			1.00		
		95% ELLIPSE:		198.3	9.6	WITH GAMMA = 3 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE B69 = 201. DOUBLE FOLDS SAMPLE G28 = 27. DOUBLE FOLDS
+,X,# NOT IN GRAND MEANS
ANALYSIS T30-1
SAMPLE G28
DOUBLE FOLDS
50
100
150
200
250
300
350
400
450
0
50
100
150
200
250
300
350
400
450
500
550
DOUBLE FOLDS
SAMPLE B69

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

LAB CODE	SAMPLE B69 REPROCOPY 70 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE G28 OFFSET PRINTING 94 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L105	1.39	-.87	-4.48	.14	.98	.92	-.48	-4.22	.10	.78	30M	*	L105
L118	2.29	.03	.16	.06	.44	1.37	-.03	-.29	.08	.63	30D		L118
L121	2.28	.03	.15	.17	1.22	1.46	.05	.44	.13	1.01	30M		L121
L122	2.37	.12	.60	.13	.92	1.48	.08	.67	.18	1.39	30M		L122
L124	2.38	.12	.64	.07	.48	1.38	-.03	-.24	.15	1.14	30N		L124
L150	2.42	.17	.87	.07	.46	1.43	.02	.19	.12	.94	30M		L150
L158	1.71	-.54	-2.79	.22	1.55	1.09	-.32	-2.80	.09	.73	30N	*	L158
L159	2.66	.41	2.10	.05	.37	1.72	.31	2.74	.09	.67	30N	*	L159
L162	2.09	-.16	-.84	.18	1.25	1.37	-.03	-.29	.13	1.00	30M		L162
L163	2.08	-.18	-.91	.15	1.03	1.32	-.09	-.78	.13	1.00	30N		L163
L176	2.28	.02	.12	.23	1.61	1.46	.05	.47	.21	1.59	30N		L176
L182M	2.44	.18	.95	.09	.64	1.54	.14	1.21	.12	.89	30M		L182M
L185	2.47	.22	1.11	.13	.88	1.45	.05	.40	.09	.68	30N		L185
L212	2.21	-.04	-.22	.14	.95	1.41	.00	.01	.10	.78	30M		L212
L223F	2.37	.12	.61	.09	.62	1.52	.11	.99	.15	1.19	30M		L223F
L230	2.26	-.05	-.26	.15	1.07	1.50	.10	.83	.09	.70	30N		L230
L232	2.22	-.04	-.20	.07	.47	1.67	.26	2.30	.05	.41	30N	X	L232
L238A	2.12	-.14	-.71	.34	2.34	1.32	-.09	-.78	.19	1.44	30N		L238A
L238B	2.27	.02	.09	.22	1.52	1.40	-.00	-.02	.16	1.22	30D		L238B
L254	2.36	.10	.53	.12	.87	1.37	-.04	-.36	.16	1.26	30M		L254
L262	2.26	.00	.02	.05	.38	1.39	-.02	-.13	.14	1.05	30N		L262
L274	2.27	.01	.08	.17	1.21	1.47	.07	.60	.21	1.66	30N		L274
L275	2.03	-.22	-1.15	.17	1.19	1.35	-.06	-.51	.08	.60	30N		L275
L278	1.83	-.42	-2.17	.26	1.85	1.32	-.09	-.78	.14	1.11	30C	*	L278
L279	2.29	.03	.17	.06	.44	1.41	-.00	-.00	.09	.70	30N		L279
L285A	2.53	.27	1.42	.09	.65	1.54	.13	1.16	.11	.87	30N		L285A
L285B	2.50	.25	1.29	.13	.88	1.55	.15	1.29	.14	1.07	30N		L285B
L320	2.30	.04	.23	.16	1.15	1.41	.00	.03	.18	1.42	30N		L320
L321	2.50	.25	1.27	.13	.88	1.51	.11	.94	.11	.84	30M		L321
L326N	1.98	-.27	-1.42	.14	1.01	1.21	-.20	-1.75	.11	.99	30N		L326N
L339	2.01	-.25	-1.27	.12	.82	1.17	-.24	-2.07	.10	.78	30M		L339
L366A	2.05	-.21	-1.06	.21	1.43	1.26	-.15	-1.27	.10	.77	30N		L366A
L376	2.03	-.23	-1.18	.37	2.59	1.26	-.15	-1.29	.21	1.65	30N		L376
L388	2.39	.14	.71	.12	.83	1.47	.07	.59	.10	.79	30N		L388
L390	2.18	-.08	-.40	.15	1.04	1.32	-.09	-.77	.10	.75	30N		L390
L393	2.25	-.01	-.03	.04	.29	1.44	.03	.29	.07	.53	30M		L393
L396M	2.43	.18	.91	.16	1.13	1.57	.16	1.43	.13	.99	30N		L396M
L565	2.23	-.02	-.10	.08	.57	1.38	-.02	-.20	.09	.72	30N		L565
L567	2.48	.22	1.14	.25	1.74	1.38	-.02	-.18	.17	1.32	30N		L567
L589	2.04	-.22	-1.12	.06	.38	1.36	-.05	-.43	.09	.71	30N		L589
L599	2.17	-.09	-.44	.24	1.66	1.40	-.01	-.07	.16	1.21	30C		L599
L670	2.24	-.02	-.09	.08	.57	1.41	.01	.06	.12	.92	30N		L670
L705	2.16	-.09	-.48	.09	.62	1.55	.14	1.26	.06	.46	30N		L705
L734	2.34	.09	.47	.14	1.01	1.51	.10	.87	.11	.85	30C		L734
L737	2.35	.10	.52	.12	.82	1.38	-.02	-.19	.13	1.03	30N		L737
GP. MEAN =	2.25 LOG(10) FOLD				GRAND MEAN =	1.41 LOG(10) FOLD				TEST DETERMINATIONS =	15		
SD MEANS =	.19 LOG(10) FOLD				SD OF MEANS =	.11 LOG(10) FOLD				42 LABS IN GRAND MEANS			
	AVERAGE SDR =			.14	LOG(10) FOLD	AVERAGE SDR =			.13	LOG(10) FOLD			
L182S	2.11	-.15	-.75	.14	1.01	1.42	.02	.15	.16	1.24	30S	+	L182S
L326S	1.56	-.70	-3.60	.13	.89	1.17	-.24	-2.08	.16	1.21	30S	+	L326S
L706	2.03	-.22	-1.14	.19	1.31	1.32	-.09	-.79	.19	1.44	30X	+	L706
L743	2.11	-.15	-.75	.18	1.28	1.26	-.14	-1.24	.11	.87	30X	+	L743

TOTAL NUMBER OF LABORATORIES REPORTING = 49

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

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

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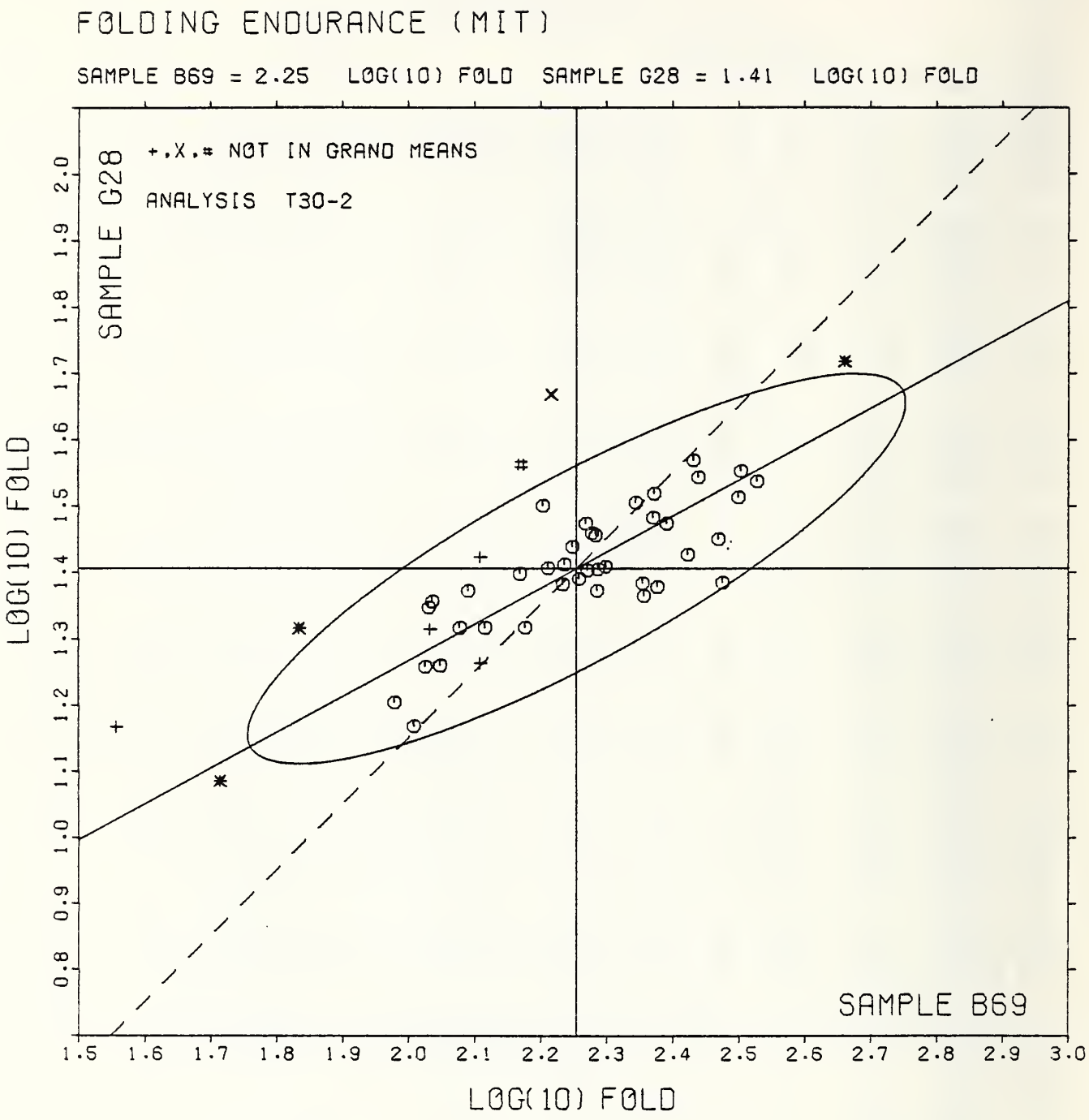
210	2.31
mean of raw data	mean of logs "Folding endurance"

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

LAB CODE	F	MEANS B69	MEANS G28	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L105	#	1.39	.92	-.99	-.01	.88	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L326S	*	1.56	1.17	-.73	.12	1.05	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L158	*	1.71	1.09	-.63	-.02	1.14	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L278	*	1.83	1.32	-.41	.12	1.48	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L326N	@	1.98	1.21	-.34	-.05	.95	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L339	@	2.01	1.17	-.33	-.09	.80	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L376	@	2.03	1.26	-.27	-.02	2.12	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L275	@	2.03	1.35	-.22	.06	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L306	*	2.03	1.32	-.24	.03	1.38	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L589	@	2.04	1.36	-.22	.06	.54	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L366A	@	2.05	1.26	-.25	-.03	1.10	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L163	@	2.09	1.32	-.20	.01	1.01	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L162	@	2.09	1.37	-.16	.05	1.13	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L182S	*	2.11	1.42	-.12	.08	1.13	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L343	*	2.11	1.26	-.20	-.06	1.08	30X	FOLDING ENDURANCE: GIVE INSTRUMENT MAKE AND MODEL
L238A	@	2.12	1.32	-.16	-.01	1.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L305	#	2.16	1.55	-.01	.17	.54	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L599	@	2.17	1.40	-.08	.03	1.43	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L390	@	2.18	1.32	-.11	-.04	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L230	@	2.20	1.50	.00	.11	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L212	@	2.21	1.41	-.04	.02	.87	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L232	%	2.22	1.67	.09	.25	.44	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L565	@	2.23	1.38	-.03	-.01	.64	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L670	@	2.24	1.41	-.01	.01	.74	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L393	@	2.25	1.44	.01	.03	.41	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L262	@	2.26	1.39	-.00	-.02	.72	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L274	@	2.27	1.47	.05	.05	1.44	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238B	@	2.27	1.40	.01	-.01	1.37	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L176	@	2.28	1.46	.05	.04	1.60	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L121	@	2.28	1.46	.05	.03	1.11	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L118	@	2.29	1.37	.01	-.04	.54	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L279	@	2.29	1.41	.03	-.02	.57	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L320	@	2.30	1.41	.04	-.02	1.28	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L734	@	2.34	1.51	.13	.04	.93	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L737	@	2.35	1.38	.08	-.07	.93	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	@	2.36	1.37	.07	-.08	1.07	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L122	@	2.37	1.48	.14	.01	1.15	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L223F	@	2.37	1.52	.16	.04	.90	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L124	@	2.38	1.38	.10	-.08	.81	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L386	@	2.39	1.47	.15	-.01	.81	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L150	@	2.42	1.43	.16	-.06	.70	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L396M	@	2.43	1.57	.23	.06	1.06	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L182M	@	2.44	1.54	.23	.03	.77	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L165	@	2.47	1.45	.21	-.06	.78	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L567	@	2.48	1.38	.18	-.12	1.53	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L321	@	2.50	1.51	.27	-.02	.86	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L265B	@	2.50	1.55	.29	.01	.98	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L265A	@	2.53	1.54	.30	-.01	.76	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L159	*	2.66	1.72	.51	.08	.52	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
GMEANS:		2.25	1.41			1.00		
		95% ELLIPSE:		.56	.14	WITH GAMMA = 28 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE B69 = 2.25 LOG(10) FOLD SAMPLE G28 = 1.41 LOG(10) FOLD
+,X,# NOT IN GRAND MEANS
ANALYSIS T30-2
SAMPLE G28
LOG(10) FOLD
SAMPLE B69
LOG(10) FOLD

REPORT NO. 658 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1980

ANALYSIS T535-1 TABLE 1

GURLEY STIFFNESS

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

LAB CODE	SAMPLE B69 REPROCOPY 70 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE H72 PRINTING 92 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.F 10 VAR	F	LAB
L118	80.1	3.0	.38	2.9	.59	176.9	6.7	.52	8.0	.82	35G	G	L118
L121	78.0	.8	.10	10.1	2.05	162.0	-8.2	-.64	5.9	.61	35G	G	L121
L122	66.2	-11.0	-1.39	6.3	1.29	162.1	-8.1	-.63	8.5	.87	35G	G	L122
L132	86.5	9.3	1.18	6.3	1.27	195.5	25.3	1.95	16.1	1.66	35G	G	L132
L139	81.8	4.6	.59	5.0	1.02	90.0	-80.2	-6.20	4.3	.44	35G	*	L139
L148	81.0	3.8	.48	4.8	.98	156.1	-14.1	-1.09	6.0	.62	35G	G	L148
L153	77.9	.7	.09	3.4	.70	184.9	14.7	1.13	6.7	.69	35G	G	L153
L159	69.5	-7.6	-.97	2.9	.59	157.5	-12.8	-.99	7.9	.81	35G	G	L159
L162	58.6	-18.5	-2.35	7.5	1.53	150.2	-20.0	-1.54	11.4	1.18	35G	G	L162
L163	74.0	-3.2	-.40	11.3	2.29	167.5	-2.7	-.21	11.1	1.15	35G	G	L163
L183	80.1	2.9	.37	8.8	1.79	191.2	21.0	1.62	11.0	1.14	35G	G	L183
L212	80.4	3.2	.41	6.1	1.25	188.2	18.0	1.39	40.2	4.15	35G	G	L212
L223	78.1	1.0	.12	3.0	.62	161.4	-8.8	-.68	5.5	.57	35G	G	L223
L224	296.0	218.8	27.74	38.6	7.87	552.0	381.8	29.49	25.3	2.61	35G	*	L224
L232	66.1	-11.0	-1.40	3.9	.79	173.3	3.1	.24	14.7	1.52	35G	G	L232
L241	42.1	-35.1	-4.45	1.7	.34	93.3	-76.9	-5.94	5.6	.57	35G	*	L241
L254	81.5	4.3	.55	2.1	.43	169.3	-.9	-.07	7.6	.79	35G	G	L254
L260	81.0	3.8	.49	2.3	.47	165.2	-5.0	-.39	10.1	1.05	35G	G	L260
L285	85.9	8.7	1.11	3.7	.76	165.3	-4.9	-.38	11.7	1.21	35G	G	L285
L291	79.2	2.0	.26	2.5	.51	163.4	-6.8	-.53	8.3	.85	35G	G	L291
L321	79.2	2.0	.26	2.8	.57	151.0	-19.2	-1.48	.1	.01	35G	G	L321
L356	75.9	-1.2	-.16	2.0	.41	156.3	-13.9	-1.08	3.5	.36	35G	G	L356
L376	82.8	5.6	.71	6.3	1.28	173.2	2.9	.23	7.8	.81	35G	G	L376
L382	78.3	1.2	.15	5.0	1.01	176.0	5.8	.45	6.3	.65	35G	G	L382
L390	81.7	4.5	.57	12.3	2.50	173.3	3.1	.24	15.2	1.57	35G	G	L390
L562	80.0	2.8	.36	.0	.00	170.0	-.2	-.02	.0	.00	35G	G	L562
L567	53.0	-24.2	-3.06	8.2	1.68	164.0	-6.2	-.48	7.0	.72	35G	*	L567
L571	80.9	3.7	.47	3.8	.77	192.8	22.6	1.74	8.7	.90	35G	G	L571
L650	81.2	4.0	.51	4.1	.83	180.0	9.8	.76	12.5	1.29	35G	G	L650
L693	87.1	9.9	1.26	3.7	.76	185.8	15.6	1.20	6.2	.64	35G	G	L693
L729	76.4	-.7	-.09	4.6	.94	153.7	-16.5	-1.28	10.4	1.08	35G	G	L729
L732	1.5	-75.6	-9.59	.1	.01	3.2	-167.0	-12.90	.1	.01	35G	*	L732

GR. MEAN = 77.2 GURLEY UNITS GRAND MEAN = 170.2 GURLEY UNITS TEST DETERMINATIONS = 10

SD MEANS = 7.9 GURLEY UNITS SD OF MEANS = 12.9 GURLEY UNITS 28 LABS IN GRAND MEANS

AVERAGE SDR = 4.9 GURLEY UNITS AVERAGE SDR = 9.7 GURLEY UNITS

L213	81.0	3.8	.48	5.8	1.19	174.3	4.1	.32	5.8	.60	35H	*	L213

TOTAL NUMBER OF LABORATORIES REPORTING = 33

Best values: B69 79 ± 13 Gurley units
H72 169 ± 22 Gurley units

The following laboratories were omitted from the grand means because of extreme test results: 139.

Data from the following laboratories appear to be off by a multiplicative factor: 224, 241, 732.

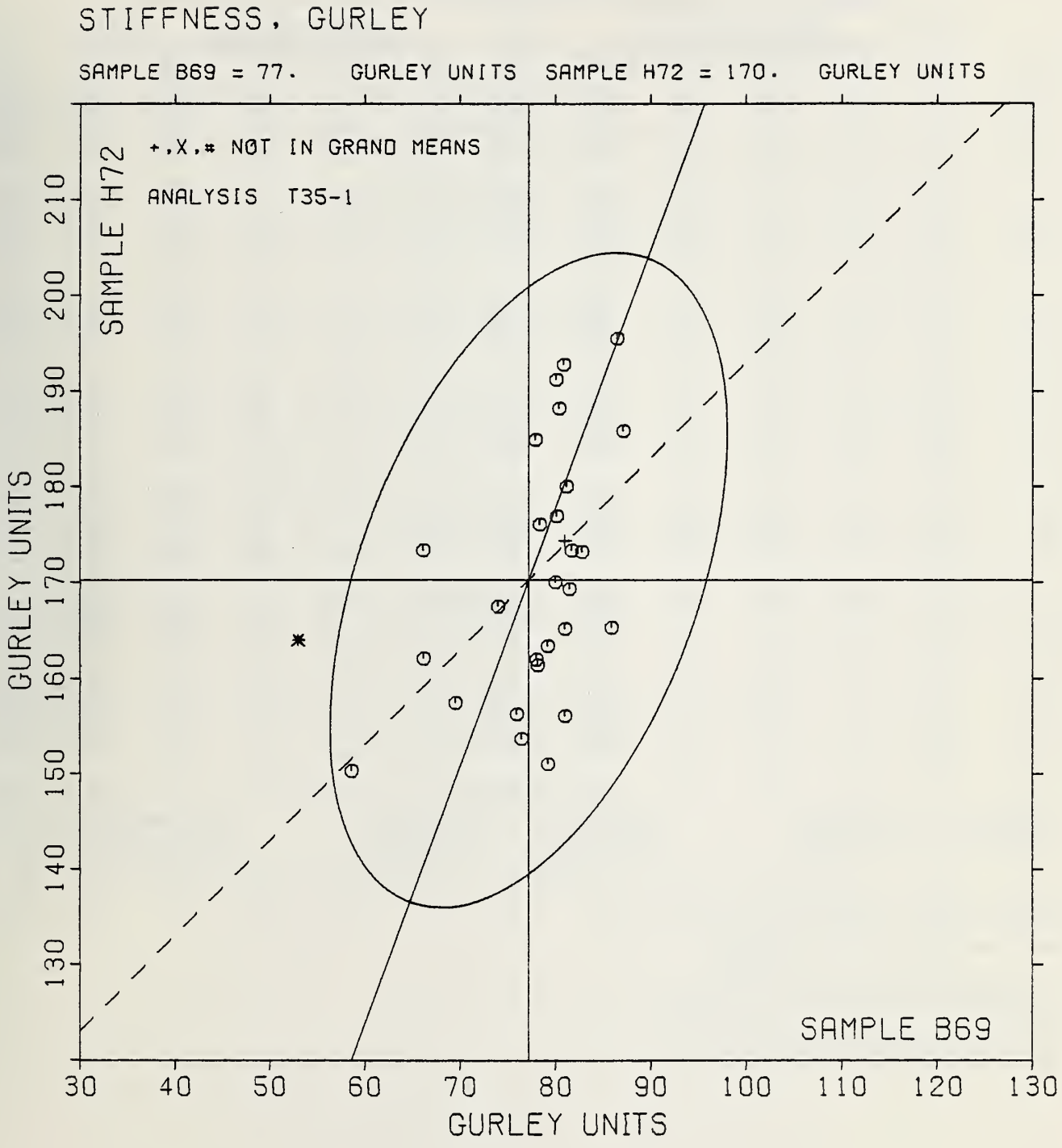
REPORT NO. 65S TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1980

ANALYSIS T35-1 TABLE 2

GURLEY STIFFNESS

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

LAB CODE	F	MEANS B69	MEANS H72	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L732	#	1.5	3.2	-192.9	12.9	.61	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L241	#	42.1	93.3	-84.3	6.1	.46	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L567	*	53.0	164.0	-14.2	20.5	1.20	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L162	@	58.6	150.2	-25.2	10.4	1.35	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L232	@	66.1	173.3	-.9	11.4	1.16	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L122	@	66.2	162.1	-11.4	7.5	1.08	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L159	@	69.5	157.5	-14.6	2.7	.70	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L163	@	74.0	167.5	-3.7	2.0	1.72	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L356	@	75.9	156.3	-13.5	-3.7	.38	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L729	@	76.4	153.7	-15.7	-5.1	1.01	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L153	@	77.9	184.9	14.0	4.4	.70	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L121	@	78.0	162.0	-7.4	-3.6	1.33	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L223	@	78.1	161.4	-7.9	-4.0	.59	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L382	@	78.3	176.0	5.9	.9	.83	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L291	@	79.2	163.4	-5.7	-4.3	.68	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L321	@	79.2	151.0	-17.3	-8.6	.29	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L562	@	80.0	170.0	.8	-2.7	.00	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L183	@	80.1	191.2	20.7	4.6	1.47	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L118	@	80.1	176.9	7.3	-.5	.71	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L212	@	80.4	188.2	18.0	3.2	2.70	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L571	@	80.9	192.8	22.5	4.4	.83	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L213	+	81.0	174.3	5.2	-2.2	.89	35H	STIFFNESS, GURLEY (UNITS: MG/1X3 TEST PIECE), 20 C, 65% RH
L142	@	81.0	156.1	-11.9	-8.5	.80	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L260	@	81.0	165.2	-3.4	-5.4	.76	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L650	@	81.2	180.0	10.6	-.3	1.06	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L254	@	81.5	169.3	.6	-4.4	.61	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L390	@	81.7	173.3	4.5	-3.2	2.04	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L139	#	81.8	90.0	-73.6	-32.2	.73	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L376	@	82.8	173.2	4.7	-4.3	1.04	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L265	@	85.9	165.3	-1.6	-9.9	.98	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L132	@	86.5	195.5	26.9	.0	1.47	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L693	@	87.1	185.8	18.1	-3.9	.70	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L224	#	296.0	552.0	434.0	-72.4	5.24	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
GMEANS:		77.2	170.2			1.00		
		95% ELLIPSE:		35.9	17.8	WITH GAMMA = 69 DEGREES		


STIFFNESS, GURLEY
SAMPLE B69 = 77. GURLEY UNITS
SAMPLE H72 = 170. GURLEY UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T35-1
SAMPLE H72
GURLEY UNITS
130 140 150 160 170 180 190 200 210
SAMPLE B69
30 40 50 60 70 80 90 100 110 120 130
GURLEY UNITS

ANALYSIS I36-1 TABLE 1

TABER STIFFNESS

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

LAB CODE	SAMPLE G29 MEAN	OFFSET PRINTING 94 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE B56 MEAN	BROWN KRAFT 76 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 10 VAR	F	LAB
L107A	86.60	79.73	98.99	3.44	8.75	65.20	60.73	82.24	6.17	16.98	36T	#	L107A
L122	7.93	1.06	1.32	.39	.99	5.34	.87	1.18	.30	.82	36D	@	L122
L123	7.40	.53	.66	.52	1.31	5.10	.63	.86	.57	1.56	36T	@	L123
L126	5.63	-1.24	-1.53	.28	.70	3.73	-.74	-1.00	.22	.62	36T	@	L126
L150	5.92	-.95	-1.18	.28	.72	3.84	-.63	-.85	.22	.61	36T	@	L150
L158	6.31	-.56	-.69	.17	.42	3.33	-1.14	-1.54	.14	.39	36T	@	L158
L163	6.52	-.35	-.43	.23	.60	4.34	-.12	-.16	.16	.44	36T	@	L163
L173B	7.35	.48	.60	.41	1.05	4.80	.33	.45	.26	.71	36T	@	L173B
L182	7.79	.92	1.14	.46	1.18	4.90	.43	.59	.35	.96	36T	@	L182
L207	9.19	1.32	1.64	.52	1.33	6.20	1.73	2.35	.77	2.12	36T	@	L207
L212	7.18	.31	.39	.38	.97	4.42	-.05	-.06	.21	.58	36T	@	L212
L219	7.40	.53	.66	.52	1.31	4.80	.33	.45	.42	1.16	36T	@	L219
L228	6.14	-.73	-.90	.27	.69	3.75	-.71	-.96	.19	.52	36T	@	L228
L242	1.61	-5.25	-6.52	.12	.31	1.07	-3.39	-4.59	.09	.24	36T	#	L242
L262	9.00	1.13	1.40	.47	1.20	6.00	1.53	2.08	.47	1.30	36T	@	L262
L274	7.00	.13	.16	.33	.85	4.10	-.37	-.50	.46	1.26	36T	@	L274
L281	6.21	-.66	-.82	.30	.76	4.08	-.38	-.52	.38	1.04	36T	@	L281
L290	6.83	-.04	-.05	.61	1.55	4.44	-.03	-.03	.39	1.07	36T	@	L290
L315	7.10	.23	.29	.88	2.23	4.60	.13	.18	.97	2.66	36T	@	L315
L318	6.77	-.09	-.12	.28	.70	4.42	-.04	-.06	.17	.46	36T	@	L318
L321	7.50	.63	.78	.59	1.50	5.65	1.18	1.60	1.08	2.98	36T	@	L321
L324	5.90	-.96	-1.20	.38	.98	3.89	-.57	-.77	.33	.91	36T	@	L324
L339	5.72	-1.15	-1.43	.21	.55	3.38	-1.09	-1.47	.25	.68	36T	@	L339
L388	13.90	7.03	8.73	1.81	4.60	10.70	6.23	8.44	.95	2.61	36T	#	L388
L442	7.86	.99	1.23	.38	.96	5.02	.55	.75	.21	.59	36T	@	L442
L484	4.99	-1.88	-2.33	.28	.72	3.40	-1.07	-1.44	.29	.79	36T	@	L484
L570	13.20	3.33	4.14	.92	2.34	6.60	2.13	2.89	.84	2.32	36T	#	L570
L580	7.20	.33	.41	.42	1.07	5.00	.53	.72	.47	1.30	36T	@	L580
L604	6.44	-.42	-.53	.32	.81	4.26	-.21	-.28	.36	.99	36T	@	L604
L616	7.15	.28	.35	.24	.61	4.05	-.42	-.56	.16	.44	36T	@	L616
L651	7.70	.83	1.03	.48	1.23	5.50	1.03	1.40	.53	1.45	36T	@	L651
L692	7.05	.18	.23	.44	1.11	4.40	-.07	-.09	.29	.81	36T	@	L692
L703	7.45	.58	.72	.37	.94	4.05	-.42	-.56	.16	.44	36T	@	L703
L729	7.20	.33	.41	.48	1.23	4.40	-.07	-.09	.46	1.26	36T	@	L729
L737	5.93	-.93	-1.16	.28	.72	3.69	-.78	-1.05	.13	.35	36T	@	L737
L756	6.01	-.86	-1.07	.39	1.00	4.00	-.47	-.63	.27	.73	36T	@	L756

GR. MEAN = 6.87 TABER UNITS GRAND MEAN = 4.47 TABER UNITS TEST DETERMINATIONS = 10

SD MEANS = .81 TABER UNITS SD OF MEANS = .74 TABER UNITS 32 LABS IN GRAND MEANS

AVERAGE SDR = .39 TABER UNITS AVERAGE SDR = .36 TABER UNITS

L250	7.30	.43	.54	.42	1.07	3.72	-.75	-1.01	.09	.26	36U	*	L250
L753	5.94	-.93	-1.15	.33	.83	3.87	-.60	-.81	.33	.91	36L	*	L753

TOTAL NUMBER OF LABORATORIES REPORTING = 38

Best values: G29 7.0 ± 1.4 Taber units
B56 4.4 ± 1.3 Taber units

The following laboratories were omitted from the grand means because of extreme test results: 570.

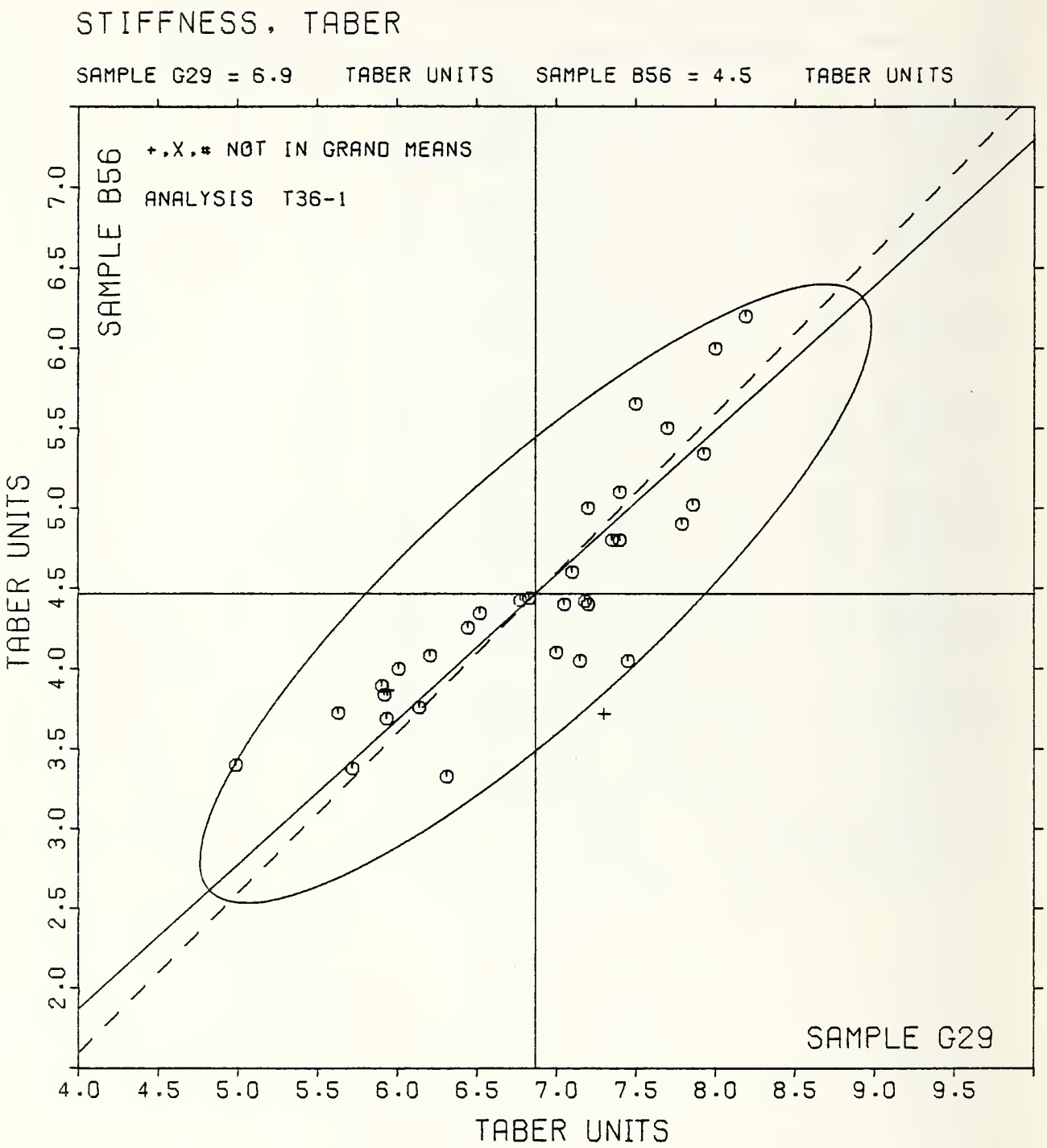
Data from the following laboratories appear to be off by a multiplicative factor: 107A, 242, 388.

ANALYSIS T36-1 TABLE 2

TABER STIFFNESS

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

LAB CODE	F	MEANS G29	MEANS B56	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L242	#	1.61	1.07	-6.17	1.01	.28	36T	STIFFNESS, TABER
L484	A	4.99	3.40	-2.11	.47	.76	36T	STIFFNESS, TABER
L126	A	5.63	3.73	-1.41	.28	.66	36T	STIFFNESS, TABER
L339	A	5.72	3.38	-1.58	-.03	.62	36T	STIFFNESS, TABER
L324	A	5.90	3.89	-1.10	.22	.94	36T	STIFFNESS, TABER
L150	A	5.92	3.84	-1.12	.17	.66	36T	STIFFNESS, TABER
L737	A	5.93	3.69	-1.21	.05	.54	36T	STIFFNESS, TABER
L753	*	5.94	3.87	-1.09	.18	.87	36L	STIFFNESS, LORENTZ-WEITRES
L756	A	6.01	4.00	-.95	.23	.87	36T	STIFFNESS, TABER
L228	A	6.14	3.76	-1.01	-.03	.61	36T	STIFFNESS, TABER
L291	A	6.21	4.08	-.75	.16	.90	36T	STIFFNESS, TABER
L158	A	6.31	3.33	-1.18	-.47	.41	36T	STIFFNESS, TABER
L604	A	6.44	4.26	-.45	.13	.90	36T	STIFFNESS, TABER
L163	A	6.52	4.34	-.34	.14	.52	36T	STIFFNESS, TABER
L318	A	6.57	4.42	-.10	.03	.58	36T	STIFFNESS, TABER
L290	A	6.83	4.44	-.05	.01	1.31	36T	STIFFNESS, TABER
L214	A	7.00	4.10	-.15	-.36	1.06	36T	STIFFNESS, TABER
L692	A	7.05	4.40	.09	-.17	.96	36T	STIFFNESS, TABER
L315	A	7.10	4.60	.26	-.06	2.44	36T	STIFFNESS, TABER
L616	A	7.15	4.05	-.07	-.50	.52	36T	STIFFNESS, TABER
L212	A	7.18	4.42	.20	-.24	.78	36T	STIFFNESS, TABER
L729	A	7.20	4.40	.20	-.27	1.25	36T	STIFFNESS, TABER
L590	A	7.20	5.00	.60	.17	1.19	36T	STIFFNESS, TABER
L250	*	7.30	3.72	-.18	-.84	.67	36U	STIFFNESS, TABER, 20 C, 65% RH
L173B	A	7.35	4.80	.58	-.07	.88	36T	STIFFNESS, TABER
L219	A	7.40	4.80	.62	-.11	1.24	36T	STIFFNESS, TABER
L123	A	7.40	5.10	.82	.11	1.44	36T	STIFFNESS, TABER
L703	A	7.45	4.05	.15	-.70	.69	36T	STIFFNESS, TABER
L321	A	7.50	5.65	1.26	.45	2.24	36T	STIFFNESS, TABER
L651	A	7.70	5.50	1.31	.21	1.34	36T	STIFFNESS, TABER
L182	A	7.79	4.99	.97	-.30	1.07	36T	STIFFNESS, TABER
L442	A	7.86	5.02	1.11	-.25	.78	36T	STIFFNESS, TABER
L122	A	7.93	5.34	1.37	-.06	.91	36D	STIFFNESS, TABER, DIGITAL READOUT
L262	A	8.00	6.00	1.87	.38	1.25	36T	STIFFNESS, TABER
L207	A	8.19	6.20	2.14	.40	1.72	36T	STIFFNESS, TABER
L570	#	10.20	6.60	3.96	-.65	2.33	36T	STIFFNESS, TABER
L388	#	13.90	10.70	9.40	-.09	3.60	36T	STIFFNESS, TABER
L107A	#	86.60	65.20	99.87	-8.44	12.86	36T	STIFFNESS, TABER
GMEANS:		6.87	4.47			1.00		
		95% ELLIPSE:		2.76	.75	WITH GAMMA = 42 DEGREES		


STIFFNESS, TABER
SAMPLE G29 = 6.9 TABER UNITS
SAMPLE B56 = 4.5 TABER UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T36-1
SAMPLE B56
TABER UNITS
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
SAMPLE G29
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
TABER UNITS

REPORT NO. 65S TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1980

ANALYSIS T49-1 TABLE 1

SURFACE PICK STRENGTH, IGT - VISCOSITY VELOCITY PRODUCT (VVP) IN KILOPOISE CENTIMETERS/SECOND

TAPPI SUGGESTED METHODS T514 SU-69 AND T499 SU-64

LAB	SAMPLE	HEAT SET OFFSET BOOK				SAMPLE	CHEMICAL WOOD BOND				TEST D.F. = 4		
	B88	88 GRAMS PER SQUARE METER				G44	73 GRAMS PER SQUARE METER						
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L122	20.2	-11.3	-.86	1.1	.36	87.1	-32.0	-.46	1.6	.32	49Q	G	L122
L149	27.2	-4.3	-.33	1.4	.47	142.0	22.9	.33	.0	.00	49N	G	L149
L182I	27.8	-3.7	-.28	.9	.28	112.6	-6.5	-.09	4.9	.98	49Q	G	L182I
L207	34.2	2.8	.21	6.9	2.31	39.0	-80.1	-1.16	2.2	.43	49I	G	L207
L242	62.5	31.0	2.36	14.4	4.84	NO DATA REPORTED FOR SAMPLE G44					49Q	M	L242
I274	36.9	5.4	.41	6.6	2.20	72.8	-46.3	-.67	.0	.00	49I	G	I274
L280	21.9	-9.6	-.73	1.4	.46	104.0	-15.1	-.22	26.6	5.28	49Q	G	L280
L291	37.1	5.6	.43	3.1	1.03	NO DATA REPORTED FOR SAMPLE G44					49I	M	L291
L313	25.7	-5.7	-.44	2.3	.77	169.0	49.9	.72	.0	.00	49Q	G	L313
L388	64.7	33.3	2.53	6.1	2.06	191.2	72.2	1.05	10.5	2.09	49Q	G	L388
L564	27.2	-4.2	-.32	.5	.17	NO DATA REPORTED FOR SAMPLE G44					49D	M	L564
L598	20.7	-11.8	-.82	1.2	.40	27.1	-92.0	-1.34	4.6	.90	49W	G	L598
L643	35.5	4.0	.30	2.0	.69	246.1	127.0	1.84	.0	.00	49I	G	I643
L685	43.5	12.0	.91	3.3	1.11	137.0	17.9	.26	.0	.00	49Q	#	L685
L746	34.3	2.8	.22	7.6	2.56	111.7	-7.3	-.11	.1	.01	49F	#	L746

GR. MEAN = 31.5 KP CM/SEC GRAND MEAN = 119.1 KP CM/SEC TEST DETERMINATIONS = 4

SD MEANS = 13.2 KP CM/SEC SD OF MEANS = 68.9 KP CM/SEC 10 LABS IN GRAND MEANS

AVERAGE SDR = 3.0 KP CM/SEC AVERAGE SDR = 5.0 KP CM/SEC

TOTAL NUMBER OF LABORATORIES REPORTING = 15

Data from the following laboratories were omitted from the grand means because no viscosity values were reported: 746. The data from these labs were converted to the common unit, cm/sec.

Data from the following laboratories were omitted from the grand means because the values obtained were outside the range of the laboratory's normal testing procedure: 685.

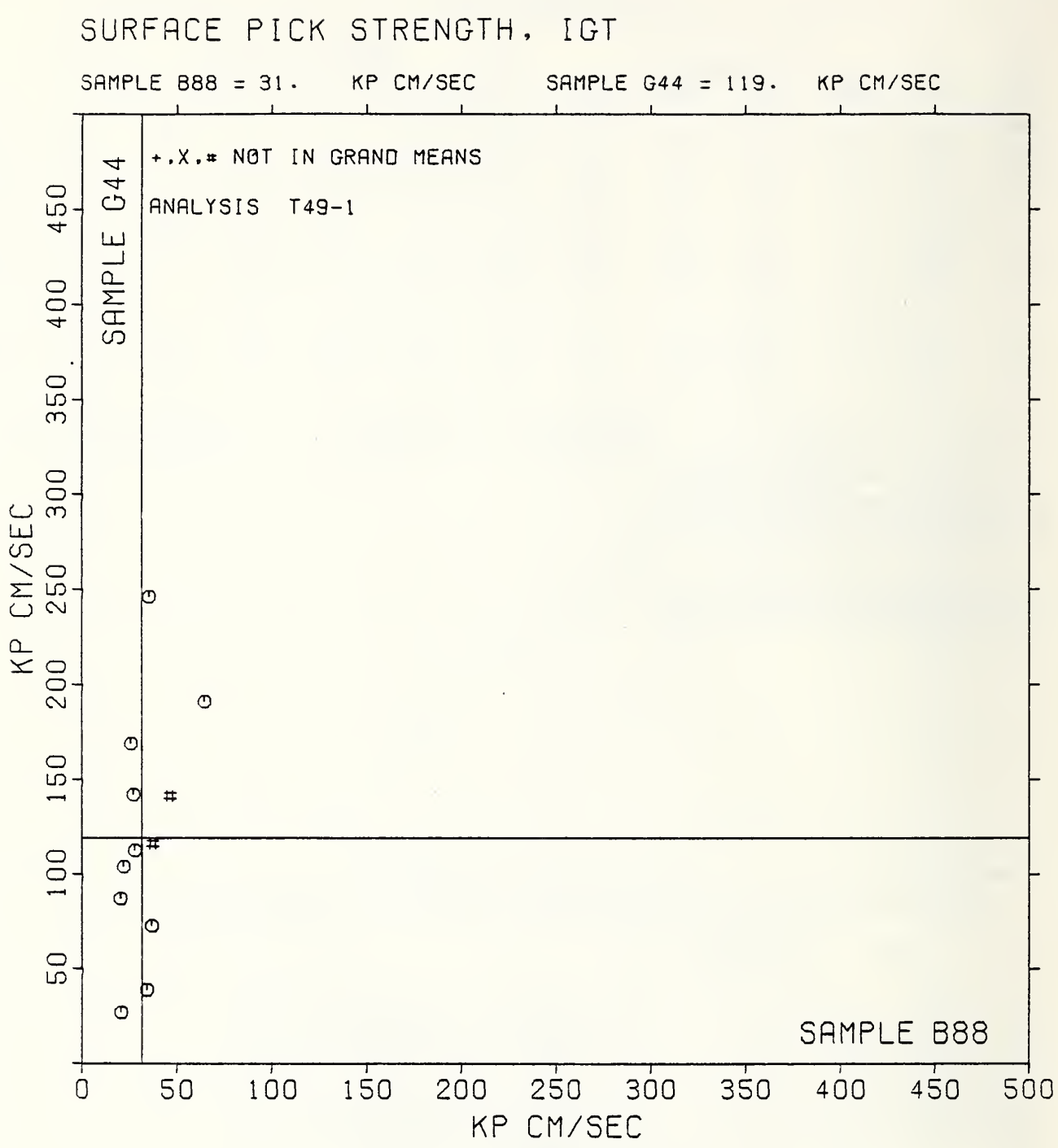
REPORT NO. 65S TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1980

ANALYSIS T49-1 TABLE 2

SURFACE PICK STRENGTH, IGT - VISCOSITY VELOCITY PRODUCT (VVP) IN KILOPOISE CENTIMETERS/SECOND

TAPPI SUGGESTED METHODS T514 SU-69 AND T499 SU-64

LAB		MEANS		COORDINATES		AVG		
CODE	F	B88	G44	MAJOR	MINOR	R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L122	G	20.2	87.1	-32.8	8.5	.34	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L598	G	20.7	27.1	-52.6	2.9	.65	49W	SURFACE PICK STRENGTH,IGT, OIL
L280	G	21.9	104.0	-15.9	8.2	2.87	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L313	G	25.7	169.0	49.2	10.0	.38	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L149	G	27.2	142.0	22.4	6.3	.24	49N	SURFACE PICK STRENGTH,IGT, PIB FLUID
L564	M	27.2				.17	49D	SURFACE PICK STRENGTH,IGT, INK
L182I	G	27.8	112.6	-6.8	3.1	.63	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
I207	G	34.2	39.0	-79.6	-9.6	1.37	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L746	#	34.3	111.7	-7.1	-3.5	1.29	49F	SURFACE PICK STRENGTH,IGT, INK
I643	G	35.5	246.1	126.9	7.0	.34	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
I274	G	36.9	72.8	-45.7	-9.3	1.10	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
I291	M	37.1				1.03	49I	SURFACE PICK STRENGTH,IGT, PIB FLUID
L685	#	43.5	137.0	18.9	-10.4	.56	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
I242	M	62.5				4.84	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
L388	G	64.7	191.2	74.8	-26.9	2.07	49Q	SURFACE PICK STRENGTH,IGT, IGT OIL
GMEANS:		31.5	119.1			1.00		
		95% ELLIPSE:		218.9	37.3	WITH GAMMA = 85 DEGREES		


SURFACE PICK STRENGTH, IGT
SAMPLE B88 = 31. KP CM/SEC
SAMPLE G44 = 119. KP CM/SEC
+,X,# NOT IN GRAND MEANS
ANALYSIS T49-1
SAMPLE G44
SAMPLE B88
KP CM/SEC
KP CM/SEC
0
50
100
150
200
250
300
350
400
450
500

REPORT NO. 658 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1980

ANALYSIS TSO-1 TABLE 1

SURFACE PICK STRENGTH, WAX NUMBER

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

LAB	SAMPLE	HEAT SET OFFSET BOOK				SAMPLE	CHEMICAL WOOD BOND				TEST D.* 5		
	B88	88 GRAMS PER SQUARE METER				G44	73 GRAMS PER SQUARE METER						
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L105	7.80	.52	1.01	.84	1.71	18.00	.58	.50	.00	.00	50W	O	L105
L115	6.60	-.68	-1.32	.89	1.82	18.60	1.18	1.03	.55	2.83	50W	O	L115
L122	7.40	.12	.23	.55	1.12	18.00	.58	.50	.00	.00	50W	O	L122
L158	7.20	-.08	-.16	.45	.91	16.00	-1.42	-1.24	.00	.00	50W	O	L158
L162	7.40	.12	.23	.55	1.12	18.00	.58	.50	.00	.00	50W	O	L162
L173A	7.20	-.08	-.16	.45	.91	11.00	-6.42	-5.61	.00	.00	50W	#	L173A
L182W	7.00	-.28	-.55	.00	.00	18.00	.58	.50	.00	.00	50W	O	L182W
L183	8.00	.72	1.39	1.00	2.04	18.00	.58	.50	.00	.00	50W	O	L183
L213	7.00	-.28	-.55	.00	.00	18.00	.58	.50	.00	.00	50W	O	L213
L225	8.20	.92	1.78	.84	1.71	18.00	.58	.50	.00	.00	50W	O	L225
L228	6.20	-1.08	-2.10	.45	.91	14.80	-2.62	-2.29	1.10	5.67	50W	O	L228
L230	7.20	-.08	-.16	.45	.91	18.00	.58	.50	.00	.00	50W	O	L230
L274	7.20	-.08	-.16	.45	.91	18.00	.58	.50	.00	.00	50W	O	L274
L285	7.40	.12	.23	.55	1.12	16.00	-1.42	-1.24	.00	.00	50W	O	L285
L339	8.60	1.32	2.56	.55	1.12	NO DATA REPORTED FOR SAMPLE G44					50W	M	L339
L366	7.20	-.08	-.16	.45	.91	15.20	-2.22	-1.94	1.10	5.67	50W	O	L366
L567	8.00	.72	1.39	.00	.00	18.00	.58	.50	.00	.00	50W	O	L567
L616	6.80	-.48	-.94	.45	.91	17.60	.18	.15	.55	2.83	50W	O	L616
L697	7.20	-.08	-.16	.45	.91	18.00	.58	.50	.00	.00	50W	O	L697
L746	7.00	-.28	-.55	.00	.00	20.00	2.58	2.25	.00	.00	50W	#	L746

GR. MEAN * 7.28 WAX NUMBER GRAND MEAN * 17.42 WAX NUMBER TEST DETERMINATIONS * 5

SD MEANS * .52 WAX NUMBER SD OF MEANS * 1.14 WAX NUMBER 17 LABS IN GRAND MEANS

AVERAGE SDR * .49 WAX NUMBER AVERAGE SDR * .19 WAX NUMBER

TOTAL NUMBER OF LABORATORIES REPORTING * 20

Best values: B88 7.2 ± 0.9 wax number
G44 17.7 ± 2.0 wax number

The following laboratories were omitted from the grand means because of extreme test results: 173A.

Data from the following laboratories were omitted from the grand means because the values obtained were outside the range of the laboratory's normal testing procedure: 746.

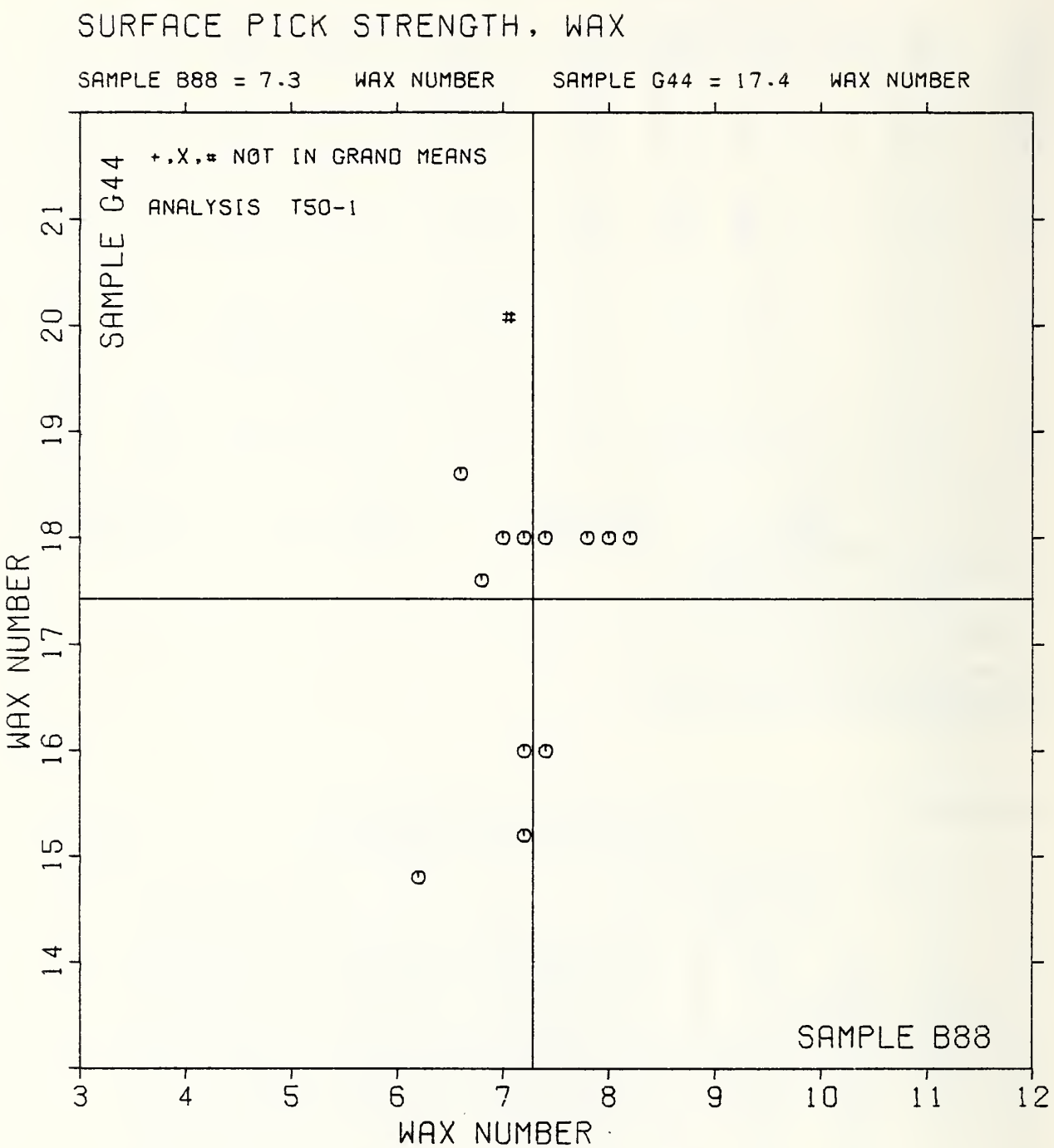
REPORT NO. 658 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1980

ANALYSIS TSO-1 TABLE 2

SURFACE PICK STRENGTH, WAX NUMBER

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

LAB		MEANS		COORDINATES		AVG		
CODE	F	B88	G44	MAJOR	MINOR	R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L228	O	6.20	14.80	-2.78	.56	3.29	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L115	O	6.60	18.60	1.02	.90	2.33	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L616	O	6.80	17.60	.08	.51	1.87	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L746	#	7.00	20.00	2.47	.77	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L213	O	7.00	18.00	.51	.39	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L182W	O	7.00	18.00	.51	.39	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L158	O	7.20	16.00	-1.41	-.19	.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L173A	#	7.20	11.00	-6.32	-1.16	.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L697	O	7.20	18.00	.55	.19	.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L366	O	7.20	15.20	-2.20	-.35	3.29	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L274	O	7.20	18.00	.55	.19	.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L230	O	7.20	18.00	.55	.19	.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L162	O	7.40	18.00	.59	-.00	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L122	O	7.40	18.00	.59	-.00	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L285	O	7.40	16.00	-1.37	-.39	.56	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L105	O	7.80	18.00	.67	-.40	.85	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L183	O	8.00	18.00	.70	-.59	1.02	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L567	O	8.00	18.00	.70	-.59	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L225	O	8.20	18.00	.74	-.79	.85	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L339	M	8.60				1.12	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
GMEANS:		7.28	17.42			1.00		
		95% ELLIPSE:		3.26	1.33	WITH GAMMA * 78 DEGREES		


SURFACE PICK STRENGTH, WAX
SAMPLE B88 = 7.3 WAX NUMBER
SAMPLE G44 = 17.4 WAX NUMBER
+,X,# NOT IN GRAND MEANS
ANALYSIS T50-1
SAMPLE G44
SAMPLE B88
WAX NUMBER
WAX NUMBER
3
4
5
6
7
8
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10
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20
21

REPORT NO. 658 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1980

ANALYSIS T91-1 TABLE 1

CONCORA MEDIUM TEST, NEWTONS(CMT)

TAPPI OFFICIAL TEST METHOD T809 OS-71, FLAT CRUSH OF CORRUGATING MEDIUM

LAB CODE	SAMPLE Z25 26 LB LINER 126 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE G52 TUBE WINDING 133 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.F. 10 VAR	F	LAB
L182	319.	-11.	-.63	20.	1.09	360.	1.	.03	9.	.58	91N	#	L182
L185	348.	18.	.88	15.	.81	368.	19.	1.11	9.	.87	91A	@	L185
L218	381.	21.	1.08	14.	.78	337.	-12.	-.70	18.	1.07	91A	@	L218
L242	304.	-26.	-1.25	30.	1.66	382.	2.	.13	24.	1.44	91G	@	L242
L248	348.	18.	.90	21.	1.16	384.	4.	.25	30.	1.82	91E	@	L248
L269	302.	-28.	-1.39	24.	1.33	336.	-13.	-.78	16.	.97	91P	@	L269
L274	332.	2.	.09	20.	1.12	352.	3.	.15	20.	1.22	91P	@	L274
L280	397.	67.	3.30	30.	1.66	393.	44.	2.57	19.	1.16	91N	#	L280
L313	252.	-78.	-3.85	14.	.79	290.	-60.	-3.46	12.	.71	91L	#	L313
L329	341.	11.	.53	16.	.89	369.	19.	1.13	12.	.75	91P	@	L329
L394	296.	-34.	-1.65	11.	.62	324.	-25.	-1.48	10.	.62	91P	@	L394
L484	306.	-23.	-1.15	13.	.70	311.	-38.	-2.20	16.	1.00	91N	@	L484
L621	352.	22.	1.10	13.	.71	362.	13.	.74	21.	1.27	91P	@	L621
L622	335.	5.	.24	15.	.84	364.	14.	.84	15.	.93	91N	@	L622
L666	335.	5.	.25	20.	1.13	366.	17.	.97	11.	.67	91P	@	L666
L733	349.	10.	.52	21.	1.14	346.	-3.	-.19	18.	1.09	91P	@	L733

GR. MEAN = 330. N(CMT) GRAND MEAN = 349. N(CMT) TEST DETERMINATIONS = 10

SD MEANS = 20. N(CMT) SD OF MEANS = 17. N(CMT) 14 LABS IN GRAND MEANS

AVERAGE SDR = 18. N(CMT) AVERAGE SDR = 16. N(CMT)

GR. MEAN = 74.17 POUNDS GRAND MEAN = 78.52 POUNDS

TOTAL NUMBER OF LABORATORIES REPORTING = 16

Best values: Z25 330 ± 36 newtons

G52 350 ± 30 newtons

The following laboratories were omitted from the grand means because of extreme test results: 280, 313.

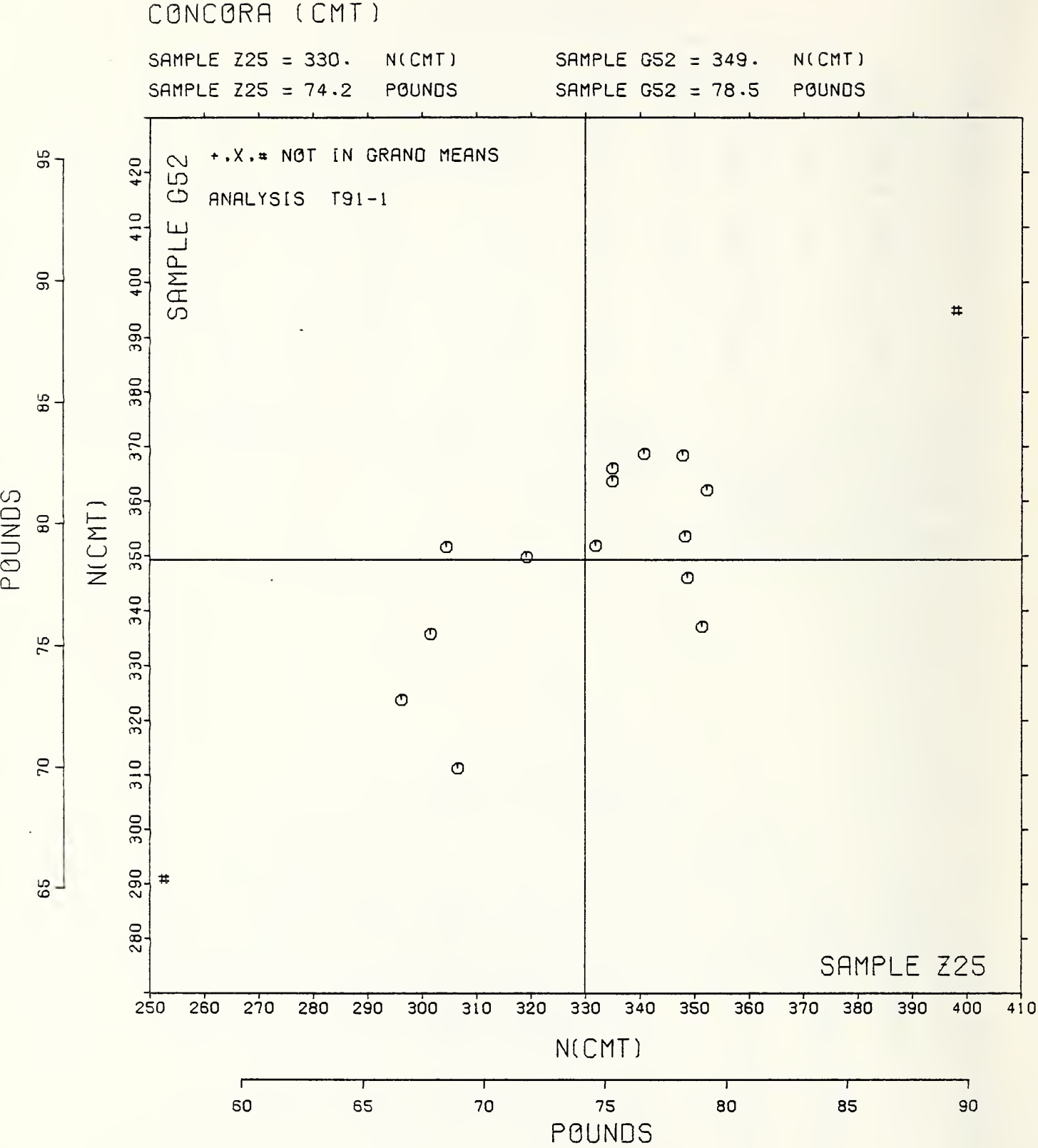
REPORT NO. 658 TAPPI COLLABORATIVE REFERENCE PROGRAM APRIL 1980

ANALYSIS T91-1 TABLE 2

CONCORA MEDIUM TEST, NEWTONS(CMT)

TAPPI OFFICIAL TEST METHOD T809 OS-71, FLAT CRUSH OF CORRUGATING MEDIUM

LAB CODE	F	MEANS Z25	G52	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L313	#	252.	290.	-98.	0.	.75	91L	FLAT CRUSH STRENGTH, CONCORA, LIBERTY
L394	@	296.	324.	-42.	0.	.62	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L269	@	302.	336.	-31.	7.	1.15	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L242	@	304.	352.	-19.	17.	1.55	91G	FLAT CRUSH STRENGTH, CONCORA, GAYDON FLAT CRUSH TESTER
L484	@	306.	311.	-42.	-16.	.85	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L182	@	319.	350.	-8.	7.	.83	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L274	@	332.	352.	3.	1.	1.17	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L622	@	335.	364.	13.	8.	.89	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L666	@	335.	366.	14.	10.	.90	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L329	@	341.	369.	20.	9.	.82	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L185	@	348.	368.	26.	4.	.69	91A	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L248	@	348.	354.	17.	-8.	1.49	91B	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L733	@	349.	346.	13.	-14.	1.11	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L218	@	351.	337.	10.	-23.	.92	91A	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L621	@	352.	362.	26.	-3.	.99	91P	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
L280	#	397.	393.	80.	-6.	1.41	91N	FLAT CRUSH STRENGTH, CONCORA, TMI/HINDE & DAUCH
GMEANS:		330.	349.			1.00		
		95% ELLIPSE:		70.	33.	WITH GAMMA = 37 DEGREES		


CONCORA (CMT)
SAMPLE Z25 = 330. N(CMT)
SAMPLE Z25 = 74.2 POUNDS
SAMPLE G52 = 349. N(CMT)
SAMPLE G52 = 78.5 POUNDS
+.X.# NOT IN GRAND MEANS
ANALYSIS T91-1
SAMPLE G52
SAMPLE Z25
N(CMT)
POUNDS
250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410
280 290 300 310 320 330 340 350 360 370 380 390 400 410 420
65 70 75 80 85 90 95
60 65 70 75 80 85 90

ANALYSIS T96-1 TABLE 1
RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)
TAPPI OFFICIAL TEST METHOD T818 OS-76

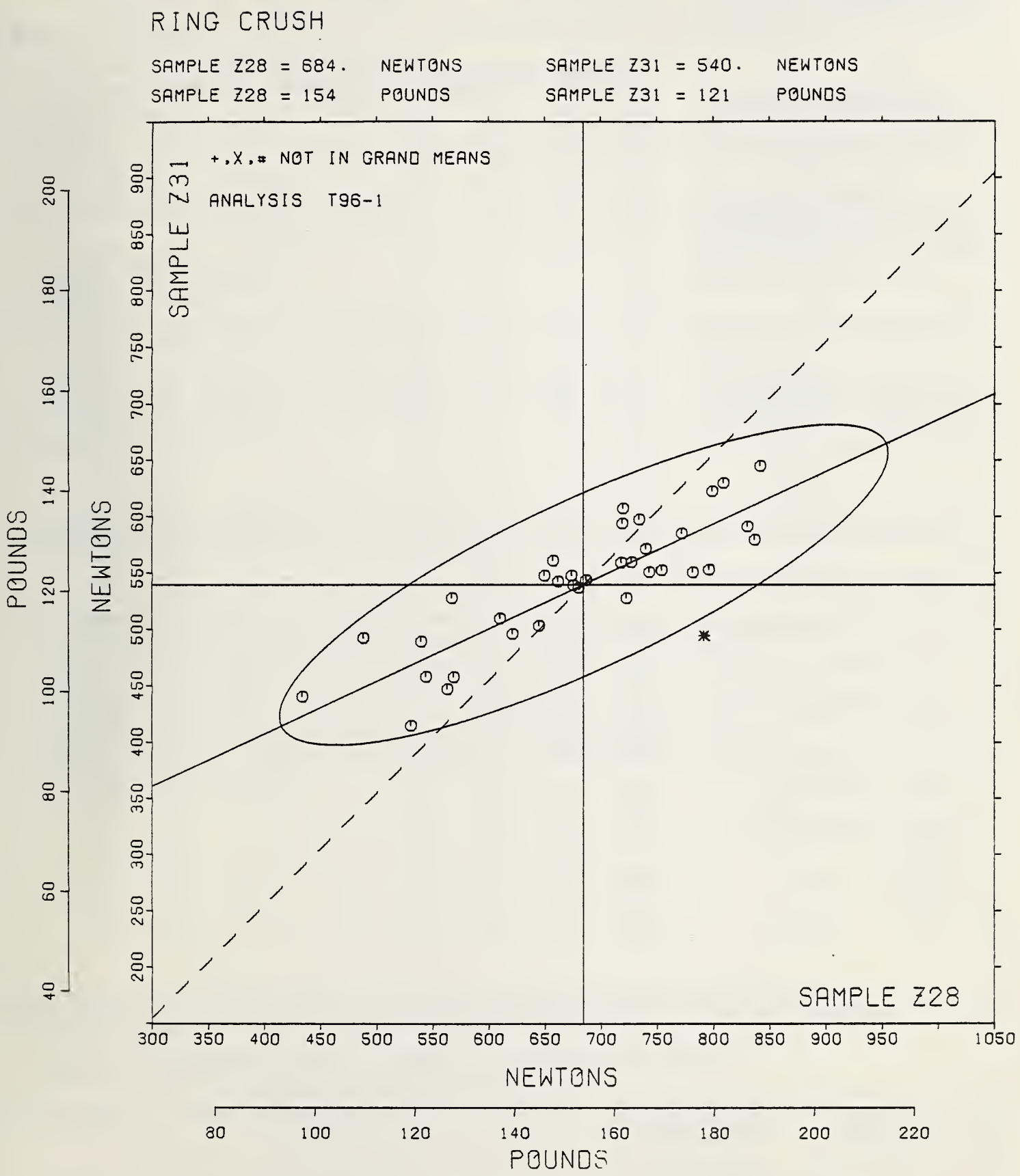
LAB CODE	SAMPLE Z28 MEAN	69 LB LINER 354 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE Z31 MEAN	42 LB LINER 211 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 10 VAR	F	LAB
L107	621.	-63.	-.60	67.	1.90	496.	-44.	-.80	49.	1.81	96P	G	L107
L114	719.	35.	.33	38.	1.08	594.	54.	.99	13.	.49	96P	G	L114
L122	569.	-116.	-1.11	83.	2.37	458.	-82.	-1.50	58.	2.14	96P	G	L122
L124	837.	153.	1.46	29.	.82	580.	40.	.73	38.	1.43	96P	G	L124
L141	718.	34.	.32	53.	1.52	559.	20.	.36	27.	1.00	96P	G	L141
L157	567.	-117.	-1.12	49.	1.39	528.	-12.	-.22	39.	1.44	96P	G	L157
L171	610.	-74.	-.71	108.	3.08	510.	-30.	-.55	47.	1.73	96N	G	L171
L182	796.	112.	1.07	34.	.96	553.	13.	.24	22.	.80	96N	G	L182
L191	734.	50.	.48	24.	.69	597.	58.	1.06	15.	.55	96P	G	L191
L218	531.	-154.	-1.47	31.	.88	415.	-125.	-2.28	36.	1.33	96I	G	L218
L234	488.	-196.	-1.88	21.	.61	492.	-47.	-.86	23.	.86	96P	G	L234
L237	720.	36.	.34	25.	.71	607.	68.	1.24	15.	.55	96P	G	L237
L242	782.	98.	.93	25.	.70	550.	11.	.20	21.	.80	96G	G	L242
L257	674.	-11.	-.10	27.	.76	548.	8.	.15	39.	1.46	96P	G	L257
L303	740.	56.	.53	34.	.96	571.	32.	.58	25.	.93	96N	G	L303
L305	792.	107.	1.03	36.	1.02	494.	-45.	-.83	57.	2.13	96P	G	L305
L329	689.	-4.	-.04	12.	.34	537.	-3.	-.05	31.	1.14	96P	G	L329
L333	434.	-250.	-2.40	29.	.83	440.	-99.	-1.81	32.	1.21	96P	G	L333
L336	563.	-121.	-1.16	36.	1.04	447.	-92.	-1.69	19.	.71	96P	G	L336
L350	649.	-35.	-.34	13.	.37	548.	8.	.15	23.	.87	96P	G	L350
L393	772.	88.	.84	29.	.83	585.	45.	.83	29.	1.07	96P	G	L393
L484	544.	-140.	-1.34	22.	.63	458.	-82.	-1.49	17.	.63	96R	G	L484
L553	662.	-23.	-.22	20.	.58	542.	3.	.05	12.	.46	96P	G	L553
L562	800.	115.	1.10	52.	1.48	622.	83.	1.51	28.	1.05	96P	G	L562
L570	743.	59.	.56	60.	1.70	551.	11.	.20	29.	1.09	96P	G	L570
L580	727.	43.	.41	17.	.49	560.	20.	.37	21.	.79	96P	G	L580
L603	810.	125.	1.20	30.	.86	630.	90.	1.65	23.	.87	96P	G	L603
L610	831.	146.	1.40	19.	.53	591.	52.	.94	20.	.75	96P	G	L610
L617	723.	38.	.37	27.	.76	528.	-12.	-.22	25.	.92	96P	G	L617
L621	842.	158.	1.51	35.	1.01	645.	105.	1.93	18.	.68	96P	G	L621
L623	687.	2.	.02	18.	.50	544.	4.	.07	11.	.42	96P	G	L623
L650	754.	70.	.67	25.	.70	552.	13.	.24	33.	1.23	96N	G	L650
L663	540.	-144.	-1.38	25.	.71	489.	-50.	-.92	34.	1.25	96P	G	L663
L676	676.	-9.	-.08	43.	1.24	539.	-0.	-.01	25.	.94	96P	G	L676
L686	657.	-27.	-.26	34.	.96	561.	21.	.39	18.	.67	96P	G	L686
L703	645.	-40.	-.38	36.	1.02	503.	-37.	-.67	25.	.92	96J	G	L703

GR. MEAN • 684. NEWTONS GRAND MEAN • 540. NEWTONS TEST DETERMINATIONS • 10
SD MEANS • 104. NEWTONS SD OF MEANS • 55. NEWTONS 36 LABS IN GRAND MEANS
AVERAGE SDR • 35. NEWTONS AVERAGE SDR • 27. NEWTONS
GR. MEAN • 153.9 POUNDS GRAND MEAN • 121.3 POUNDS
TOTAL NUMBER OF LABORATORIES REPORTING • 36

Best values: Z28 690 ± 180 newtons
Z31 540 ± 90 newtons

ANALYSIS T96-1 TABLE 2
RING CRUSH (COMPPESSION RESISTANCE OF PAPERBOARD)
TAPPI OFFICIAL TEST METHOD T818 OS-76

LAB CODE	F	MEANS Z28	Z31	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L333	A	434.	440.	-269.	15.	1.02	96P	RING CRUSH, TMI/HINDE & DAUCH
L234	A	488.	492.	-198.	40.	.73	96P	RING CRUSH, TMI/HINDE & DAUCH
L218	A	531.	415.	-192.	-48.	1.10	96I	RING CRUSH, INSTRON
L663	A	540.	489.	-152.	15.	.98	96P	RING CRUSH, TMI/HINDE & DAUCH
L464	A	544.	458.	-162.	-15.	.63	96R	RING CRUSH, REGMED
L336	A	563.	447.	-149.	-33.	.87	96P	RING CRUSH, TMI/HINDE & DAUCH
L157	A	567.	528.	-111.	39.	1.41	96P	RING CRUSH, TMI/HINDE & DAUCH
T122	A	569.	458.	-139.	-26.	2.26	96P	RING CRUSH, TMI/HINDE & DAUCH
L171	A	619.	510.	-80.	4.	2.41	96N	RING CRUSH, TMI/HINDE & DAUCH
L1[illegible]7	A	621.	496.	-76.	-13.	1.86	96P	RING CRUSH, TMI/HINDE & DAUCH
L[illegible]3	A	645.	503.	-51.	-16.	.97	96J	RING CRUSH, INSTRON
L35[illegible]	A	649.	548.	-28.	22.	.62	96P	RING CRUSH, TMI/HINDE & DAUCH
L686	A	657.	561.	-15.	31.	.82	96P	RING CRUSH, TMI/HINDE & DAUCH
L553	A	662.	542.	-19.	12.	.52	96P	RING CRUSH, TMI/HINDE & DAUCH
L257	A	674.	548.	-6.	12.	1.11	96P	RING CRUSH, TMI/HINDE & DAUCH
T676	A	676.	539.	-8.	3.	1.09	96P	RING CRUSH, TMI/HINDE & DAUCH
L329	A	680.	537.	-5.	-1.	.74	96P	RING CRUSH, TMI/HINDE & DAUCH
I623	A	687.	544.	4.	3.	.46	96P	RING CRUSH, TMI/HINDE & DAUCH
T141	A	718.	559.	39.	4.	1.26	96P	RING CRUSH, TMI/HINDE & DAUCH
L114	A	719.	594.	54.	35.	.78	96P	RING CRUSH, TMI/HINDE & DAUCH
L237	A	720.	607.	61.	46.	.63	96P	RING CRUSH, TMI/HINDE & DAUCH
L617	A	723.	528.	30.	-27.	.84	96P	RING CRUSH, TMI/HINDE & DAUCH
T586	A	727.	560.	47.	0.	.64	96P	RING CRUSH, TMI/HINDE & DAUCH
L191	A	734.	597.	70.	31.	.62	96P	RING CRUSH, TMI/HINDE & DAUCH
I3[illegible]3	A	740.	571.	64.	5.	.95	96N	RING CRUSH, TMI/HINDE & DAUCH
I5[illegible]	A	743.	551.	58.	-15.	1.40	96P	RING CRUSH, TMI/HINDE & DAUCH
L65[illegible]	A	754.	552.	69.	-18.	.96	96N	RING CRUSH, TMI/HINDE & DAUCH
T393	A	772.	585.	90.	4.	.95	96P	RING CRUSH, TMI/HINDE & DAUCH
L242	A	782.	550.	93.	-31.	.75	96G	RING CRUSH, GAYDON FLAT CRUSH TESTER
L3[illegible]5	A	792.	494.	78.	-86.	1.58	96P	RING CRUSH, TMI/HINDE & DAUCH
L182	A	796.	553.	107.	-35.	.88	96N	RING CRUSH, TMI/HINDE & DAUCH
T562	A	800.	622.	139.	26.	1.26	96P	RING CRUSH, TMI/HINDE & DAUCH
L603	A	810.	630.	152.	29.	.87	96P	RING CRUSH, TMI/HINDE & DAUCH
I610	A	831.	591.	155.	-15.	.64	96P	RING CRUSH, TMI/HINDE & DAUCH
L124	A	837.	580.	155.	-28.	1.13	96P	RING CRUSH, TMI/HINDE & DAUCH
L621	A	842.	645.	187.	29.	.85	96P	RING CRUSH, TMI/HINDE & DAUCH
GMEANS:		684.	540.			1.00		
		95% ELLIPSE:		297.	74.	WITH GAMMA = 24 DEGREES		


RING CRUSH
SAMPLE Z28 = 684. NEWTONS
SAMPLE Z28 = 154 POUNDS
SAMPLE Z31 = 540. NEWTONS
SAMPLE Z31 = 121 POUNDS
+,X,* NOT IN GRAND MEANS
ANALYSIS T96-1
SAMPLE Z31
SAMPLE Z28
NEWTONS
POUNDS
200 180 160 140 120 100 80 60 40
900 850 800 750 700 650 600 550 500 450 400 350 300 250 200
300 350 400 450 500 550 600 650 700 750 800 850 900 950 1050
80 100 120 140 160 180 200 220

SUMMARY TABLE

TEST METHOD		SAMPLE CODE	GRAND MEAN	SD OF MEAN	AVER SDR	REPL CRP	LABS INCL	LABS PARTIC	REPL TAPPI	REPEAT	REPROD
BURSTING STRENGTH, MODEL C		G34	18.03	1.24	1.10	15	38	55	10	.96	3.48
T10-1	PSI	G45	12.49	.54	.73					.64	1.53
BURSTING STRENGTH, MODEL C-A		G34	18.31	1.53	1.05	15	40	46	10	.92	4.28
T10-2	PSI	G45	12.36	.57	.65					.57	1.61
BURSTING STRENGTH, HIGH RANGE		A77	60.0	2.9	4.6	15	45	59	10	4.0	8.5
T11-1	PSI	E89	50.6	2.5	4.1					3.6	7.2
TEARING STRENGTH, PRINTING PAPERS		G36	62.46	3.11	2.18	15	127	151	10	1.91	8.79
T15-1	GRAMS	G47	38.40	2.06	1.19					1.04	5.75
TEARING STRENGTH, PACKAGING PAPERS		E50	109.7	5.4	4.8	15	12	22	10	4.2	15.0
T16-1	GRAMS	G49	80.5	4.0	2.6					2.3	11.1
TENSILE STRENGTH, PACKAGING PAPERS		G38	11.53	.43	.52	20	52	57	10	.45	1.23
T19-1	KILONEWTON/M	G49	10.45	.38	.40					.35	1.09
TENSILE STR., CPE, PRINTING PAPERS		G40	4.80	.28	.28	20	52	59	10	.25	.80
T20-1	KILONEWTON/M	G33	3.89	.20	.19					.16	.55
TENSILE STR., PENDULUM, PRINTING P.		G40	4.89	.27	.27	20	43	46	10	.24	.76
T20-2	KILONEWTON/M	G33	3.91	.26	.19					.16	.74
T.E.A., PACKAGING PAPERS		G38	101.5	11.3	12.2	20	21	22	10	10.7	32.3
T25-1	JOULES/SQ M	G49	120.9	11.5	13.0					11.4	32.9
T.E.A., PRINTING PAPERS		G40	46.0	4.2	6.2	20	18	23	10	5.4	12.3
T26-1	JOULES/SQ M	G33	38.3	4.2	4.6					4.0	12.1
ELONGATION TO BREAK, PACKAGING PAPER		G38	1.521	.169	.139	20	22	22	10	.121	.477
T28-1	PERCENT	G49	1.894	.174	.156					.137	.492
ELONGATION TO BREAK, PRINTING PAPER		G40	1.488	.166	.137	20	19	26	10	.120	.467
T29-1	PERCENT	G33	1.509	.144	.138					.121	.409
FOLDING ENDURANCE (MIT)		B69	200.6	72.9	58.6	15	41	49	10	51.4	204.1
T30-1	DOUBLE FOLDS	G28	26.8	6.0	7.8					6.8	17.1
FOLDING ENDURANCE (MIT)		B69	2.25	.19	.14	15	42	49	10	.13	.54
T30-2	LOG(10) FOLD	G28	1.41	.11	.13					.11	.32
STIFFNESS, GURLEY		B69	77.2	7.9	4.9	10	28	33	10	4.3	21.9
T35-1	GURLEY UNITS	H72	170.2	12.9	9.7					8.5	35.9
STIFFNESS, TABER		G29	6.87	.81	.39	10	32	38	5	.49	2.26
T36-1	TABER UNITS	B56	4.47	.74	.36					.45	2.07
SURFACE PICK STRENGTH, IGT		B88	31.5	13.2	3.0	4	10	15	4	4.1	36.5
T49-1	KP CM/SEC	G44	119.1	68.9	5.0					7.0	190.7
SURFACE PICK STRENGTH, WAX		B88	7.28	.52	.49	5	17	20	5	.61	1.43
T50-1	WAX NUMBER	G44	17.42	1.14	.19					.24	3.17
CONCORA (CMT)		Z25	330.	20.	18.	10	14	16	10	16.	56.
T91-1	N(CMT)	G52	349.	17.	16.					14.	48.
RING CRUSH		Z28	684.	104.	35.	10	36	36	10	31.	289.
T96-1	NEWTONS	Z31	540.	55.	27.					24.	152.

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

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

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

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

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

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