TECHNICAL ASSOCIATION OF THE
PULP AND PAPER INDUSTRY

COLLABORATIVE REFERENCE PROGRAM FOR PAPER

REPORT NO. 49S
STRENGTH TESTS

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

NBS COLLABORATIVE REFERENCE PROGRAMS

TAPPI Paper and Board (6 times per year)

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

FKBG-API Containerboard (48 times per year)

- Mullen burst of linerboard
- Concora test of medium

MCCA Color and Appearance (4 times per year)

- Gloss at 60°
- Color and color difference
- Retroreflectivity

Rubber (4 times per year)

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

ASTM Textiles (3 times per year)

- Flammability (FF3-71 and FF5-74)

ASTM Cement (2 times per year)

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

AASHTO Bituminous

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

Collaborative Reference Programs
B360 Polymer Building
National Bureau of Standards
Washington, D.C. 20234

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TECHNICAL ASSOCIATION OF THE
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Report No. 49S
STRENGTH TESTS

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U. S. DEPARTMENT OF COMMERCE
National Bureau of Standards

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Introduction

Reports 49S and 49G comprise the first set of reports for the 77-78 program year. Both reports will no longer be sent automatically to all participants. 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 for individual laboratories and "Best Values" applicable to a particular method are given following Table 1 for each method. See page 4 of this report for an explanation of "Best Values." Please do not confuse these best values with provisional values included with the samples to detect serious discrepancies at the time of test.

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

Edwin B. Randall, Jr., Administrator
TAPPI Collaborative Reference Program
Laboratory Evaluation Technology Section

December 1, 1977

BACKGROUND AND PURPOSE

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

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

HOW THE PROGRAM WORKS

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

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

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

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

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

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

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

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

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Analyses In This Report

Analyses In The G Report

TABLE OF CONVERSION FACTORS TO METRIC (SI) UNITS

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

KEY TO TABLES AND GRAPHS

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

GRAND MEAN - (GR. MEAN) The average of the individual laboratory MEANS, excluding laboratories flagged (see column F) with an X, # , or +. The GRAND MEAN is given in US customary units and, where applicable, in SI metric units.

SD OF MEANS - (SD MEANS) The standard deviation of the laboratory MEANS about the GRAND MEAN; an index of the among-laboratory precision.

DEV - The deviation or difference of the laboratory MEAN from the GRAND MEAN.

N. DEV - The normal deviate or ratio of the DEV to the SD OF MEANS; an indication of the degree of divergence of the laboratory MEAN from the GRAND MEAN. A N. DEV of more than 2 or less than -2 may indicate that the participant is not following the procedure considered standard for this analysis.

SDR - The standard deviation of repeated measurements; that is, of individual test determinations about their MEAN.

AVERAGE SDR - The average of the individual laboratory SDR's; an index of the within-laboratory precision of repeated measurements.

R. SDR - The relative standard deviation of repeated measurements; that is, the ratio of the SDR to the AVERAGE SDR: an indication of the ability of a participant to repeat his measurements relative to the average ability. The greater the number of TEST DETERMINATIONS the closer the R. SDR should be to unity. If R. SDR is outside the limits given below, the participant may not be following the procedure considered standard for this analysis:

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

VAR - Code for instrument type or variation in condition, see second table.

F - Flag, with following meaning:

+ - Excluded from grand means because VAR non-standard for this analysis

- Excluded because data were not understood or because of a non-coded variation reported by the laboratory. (See NOTES following Table 1 for each method.)

M - Excluded because data for one sample are missing

X - Excluded because plotted point would fall outside of the 99% error ellipse, (see below for explanation of Graph)

* - Included in grand means but plotted point falls outside of the 95% error ellipse. The participant should take this as a warning to reexamine his testing procedure

S - Included in grand mean but only after omission of one of more 'wild' values; that is, test determinations more than 3 times AVERAGE SDR from the laboratory's MEAN. Not more than 20% of the test determination may be excluded in this manner without rejecting the laboratory.

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

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

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

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

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

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

(GRAPH NOTE) 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.

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

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

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

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

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

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

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

LAB CODE	SAMPLE H60 MEAN	PRINTING 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H05 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDP	TEST D.= 15 VAR	F	LAB
L107	19.20	.99	.75	.86	.71	32.93	.72	.46	1.71	1.06	10C	O	L107
L121	16.53	-1.68	-1.28	1.84	1.52	31.97	-.25	-.16	1.42	.88	10C	O	L121
L131	16.67	-1.55	-1.18	1.29	1.07	31.87	-.35	-.22	1.68	1.05	10C	O	L131
L134	18.00	-.21	-.16	1.58	1.31	33.43	1.22	.77	2.16	1.35	10C	O	L134
L150	18.53	.32	.24	1.27	1.06	33.77	1.55	.99	1.93	1.20	10C	O	L150
L153	20.70	2.49	1.90	2.02	1.68	34.77	2.58	1.62	1.92	1.19	10C	O	L153
L158	19.40	1.19	.90	.99	.82	33.87	1.65	1.05	1.13	.70	10C	O	L158
L162	13.37	-4.85	-3.70	1.33	1.10	26.87	-5.35	-3.39	1.51	.94	10C	X	L162
L167	17.66	-.55	-.42	.58	.48	32.45	.24	.15	.90	.56	10C	O	L167
L183	16.93	-1.28	-.98	1.37	1.14	29.80	-2.41	-1.53	1.67	1.04	10C	O	L183
L191	16.50	-1.71	-1.31	1.04	.86	30.93	-1.28	-.81	1.40	.87	10C	O	L191
L203A	19.70	1.49	1.13	.94	.78	34.40	2.19	1.39	1.97	1.23	10C	O	L203A
L203B	17.27	-.95	-.72	.72	.60	30.53	-1.68	-1.07	1.49	.93	10C	O	L203B
L207	20.57	2.35	1.79	.90	.75	35.23	3.02	1.92	1.62	1.01	10C	O	L207
L223A	18.79	.57	.44	1.05	.87	34.40	2.19	1.39	1.21	.75	10C	O	L223A
L225	18.87	.65	.50	.74	.62	32.10	-.11	-.07	1.75	1.09	10C	O	L225
L232	19.10	.89	.68	1.11	.92	32.87	.65	.42	1.96	1.22	10C	O	L232
L237A	17.30	-.91	-.70	.65	.54	31.93	-.28	-.18	1.00	.62	10C	O	L237A
L237B	17.87	-.35	-.27	.95	.79	31.57	-.65	-.41	.96	.60	10C	O	L237B
L243	18.40	.19	.14	1.07	.89	31.90	-.31	-.20	1.26	.80	10C	O	L243
L248	18.04	-.18	-.13	1.16	.96	30.92	-1.29	-.82	1.37	.85	10E	O	L248
L249	16.79	-1.42	-1.08	.88	.73	30.44	-1.77	-1.13	1.61	1.00	10C	O	L249
L261	17.49	-.72	-.55	1.22	1.01	29.51	-2.70	-1.71	1.41	.88	10C	O	L261
L264	18.07	-.15	-.11	.88	.73	31.47	-.75	-.47	.92	.57	10C	O	L264
L268	17.27	-.95	-.72	1.33	1.11	32.47	.25	.16	1.64	1.02	10C	O	L268
L274	16.80	-1.41	-1.08	1.25	1.04	33.11	.89	.57	1.17	.73	10C	O	L274
L275	14.99	-3.22	-2.46	1.05	.87	31.93	-.28	-.18	1.73	1.08	10C	*	L275
L279	16.38	-1.83	-1.40	.75	.63	29.50	-2.71	-1.72	1.28	.80	10C	O	L279
L299	20.77	2.55	1.95	1.37	1.14	34.40	2.19	1.39	1.90	1.18	10C	O	L299
L305	17.27	-.95	-.72	.88	.73	31.63	-.58	-.37	1.41	.88	10C	O	L305
L311	19.67	1.45	1.11	.90	.75	33.40	1.19	.75	1.24	.77	10C	O	L311
L312	17.70	-.51	-.39	1.46	1.21	31.87	-.35	-.22	1.45	.90	10C	O	L312
L315	20.67	2.45	1.87	1.21	1.00	34.93	2.72	1.73	1.98	1.23	10C	O	L315
L321	20.78	2.57	1.96	1.90	1.58	39.19	6.98	4.43	3.90	2.43	10C	X	L321
L322	17.89	-.32	-.24	1.78	1.47	31.07	-1.15	-.73	1.53	.95	10C	O	L322
L326	17.27	-.95	-.72	1.33	1.11	30.87	-1.35	-.85	1.19	.74	10C	O	L326
L330	19.77	1.56	1.19	.86	.71	32.86	.65	.41	1.37	.85	10C	O	L330
L331	18.47	.25	.19	1.36	1.12	33.27	1.05	.67	2.22	1.38	10C	O	L331
L333	19.60	1.39	1.06	1.24	1.03	32.33	.12	.08	3.92	2.44	10C	O	L333
L339	18.31	.09	.07	2.70	2.24	31.40	-.81	-.52	1.61	1.00	10C	O	L339
L344	19.43	1.22	.93	1.13	.94	31.73	-.48	-.30	1.93	1.20	10C	O	L344
L356	19.36	1.15	.87	1.88	1.56	30.39	-1.82	-1.16	1.61	1.00	10C	O	L356
L358	18.87	.65	.50	1.16	.96	31.83	-.38	-.24	1.94	1.21	10C	O	L358
L360	16.73	-1.48	-1.13	.75	.62	30.55	-1.67	-1.06	1.96	1.22	10C	O	L360
L390	18.83	.62	.47	1.21	1.00	34.37	2.15	1.37	1.39	.87	10C	O	L390
L563	17.17	-1.04	-.79	1.89	1.57	33.43	1.21	.77	2.25	1.40	10C	O	L563
L568	18.28	.07	.05	1.16	.96	28.44	-3.77	-2.40	1.32	.82	10C	*	L568
L599	18.00	-.21	-.16	1.49	1.24	32.95	.74	.47	1.23	.77	10C	O	L599

GR. MEAN = 18.21 PSI — GRAND MEAN = 32.21 PSI — TEST DETERMINATIONS = 15
SD MEANS = 1.31 PSI — SD OF MEANS = 1.57 PSI — 46 LABS IN GRAND MEANS
AVERAGE SDR = 1.21 PSI — AVERAGE SDR = 1.61 PSI
GR. MEAN = 125.6 KILOPASCAL — GRAND MEAN = 222.1 KILOPASCAL

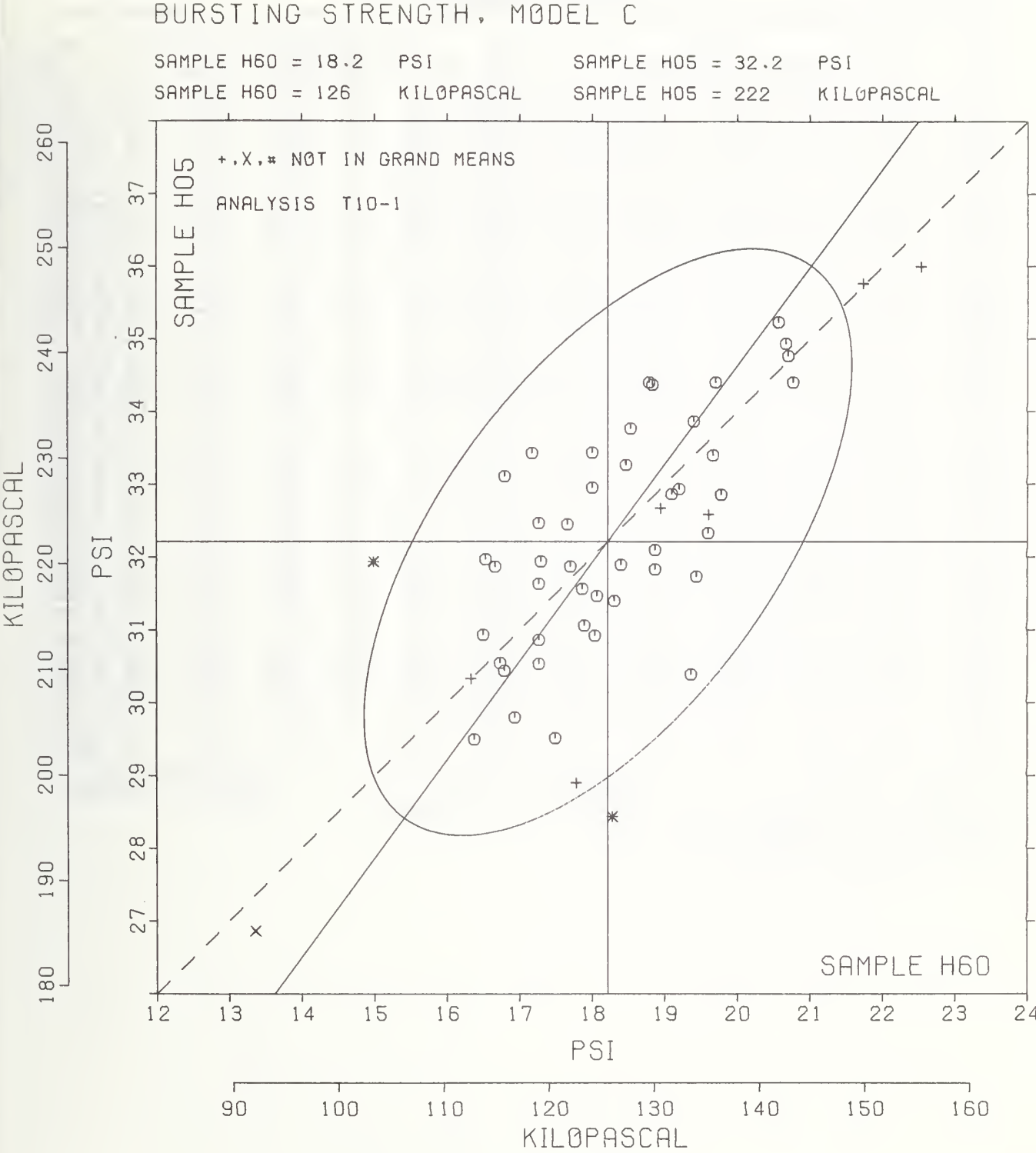
L128	16.33	-1.88	-1.43	1.05	.87	30.33	-1.88	-1.19	1.45	.90	10B	*	L128
L242	19.60	1.39	1.06	1.22	1.01	32.59	.37	.24	1.25	.78	10T	*	L242
L250L	17.79	-.43	-.33	1.16	.96	28.90	-3.31	-2.10	1.06	.66	10N	*	L250L
L251	18.95	.73	.56	.82	.68	32.67	.46	.29	.93	.58	10V	*	L251
L269	21.73	3.52	2.68	1.32	1.10	35.77	3.55	2.26	1.51	.94	10A	*	L269
L484	22.53	4.32	3.29	.83	.69	36.00	3.79	2.40	1.73	1.08	10M	*	L484

TOTAL NUMBER OF LABORATORIES REPORTING = 54

Best Values: H60 18.3 ± 2.2 psi
H05 32.4 ± 2.5 psi

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

LAB CODE	P	MEANS H60	MEANS H05	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L162	X	13.37	26.87	-7.18	.72	1.02	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L275	*	14.99	31.93	-2.14	2.43	.97	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L128	*	16.33	30.33	-2.63	.40	.88	10B	BURSTING STRENGTH UP TO 45 PSI, PERKINS H, MANUAL CLAMP
L279	O	16.38	29.50	-3.27	-.14	.71	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L191	O	16.50	30.93	-2.05	.62	.86	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L121	O	16.53	31.97	-1.20	1.21	1.20	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L131	O	16.67	31.87	-1.20	1.04	1.06	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L360	O	16.73	30.55	-2.22	.20	.92	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L249	O	16.79	30.44	-2.27	.09	.86	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L274	O	16.80	33.11	-.12	1.67	.88	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L183	O	16.93	29.80	-2.70	-.40	1.09	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L563	O	17.17	33.43	.36	1.56	1.48	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L305	O	17.27	31.63	-1.03	.42	.80	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L203H	O	17.27	30.53	-1.91	-.24	.76	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L326	O	17.27	30.87	-1.65	-.04	.92	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L268	O	17.27	32.47	-.36	.91	1.06	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L237A	O	17.30	31.93	-.77	.57	.58	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L261	O	17.49	29.51	-2.60	-1.02	.94	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L167	O	17.66	32.45	-.14	.59	.52	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L312	O	17.70	31.87	-.58	.21	1.06	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L250L	*	17.79	28.90	-2.92	-1.62	.81	10N	BURSTING STRENGTH UP TO 45 PSI,LHOMARGY,MAN.CLAMP, 20C,65%RH
L237H	O	17.87	31.57	-.73	-.10	.69	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L322	O	17.89	31.07	-1.11	-.42	1.21	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L599	O	18.00	32.95	.47	.61	1.00	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L134	O	18.00	33.43	.85	.90	1.33	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L248	O	18.04	30.92	-1.14	-.62	.91	10E	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L264	O	18.07	31.47	-.69	-.32	.65	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L568	*	18.28	28.44	-3.00	-2.29	.89	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L339	O	18.31	31.40	-.60	-.56	1.62	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L243	O	18.40	31.90	-.14	-.34	.84	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L331	O	18.47	33.27	1.00	.42	1.25	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L150	O	18.53	33.77	1.44	.67	1.13	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L223A	O	18.79	34.40	2.10	.84	.81	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L390	O	18.83	34.37	2.10	.78	.93	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L358	O	18.87	31.83	.08	-.75	1.08	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L225	O	18.87	32.10	.30	-.59	.85	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L251	*	18.95	32.67	.81	-.32	.63	10V	BURSTING STRENGTH UP TO 45 PSI, L*W,MANUAL CLAMP, 20C,65% RH
L232	O	19.10	32.87	1.05	-.32	1.07	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L107	O	19.20	32.93	1.17	-.36	.89	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L356	O	19.36	30.39	-.78	-2.00	1.28	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L158	O	19.40	33.87	2.03	.03	.76	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L344	O	19.43	31.73	.34	-1.27	1.07	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L333	O	19.60	32.33	.92	-1.04	1.74	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L242	*	19.60	32.59	1.13	-.90	.89	10T	BURSTING STRENGTH UP TO 45 PSI, L*W,MANUAL CLAMP
L311	O	19.67	33.40	1.82	-.46	.76	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L203A	O	19.70	34.40	2.64	.10	1.00	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L330	O	19.77	32.86	1.45	-.87	.78	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L207	O	20.57	35.23	3.83	-.10	.88	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L315	O	20.67	34.93	3.65	-.36	1.12	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L153	O	20.70	34.77	3.53	-.48	1.44	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L299	O	20.77	34.40	3.28	-.75	1.16	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L321	X	20.78	39.19	7.14	2.08	2.00	10C	BURSTING STRENGTH UP TO 45 PSI, PERKINS C, MANUAL CLAMP
L269	*	21.73	35.77	4.95	-.72	1.02	10A	BURSTING STRENGTH UP TO 45 PSI, PERKINS A, MANUAL CLAMP
L484	*	22.53	36.00	5.61	-1.22	.88	10M	BURSTING STRENGTH UP TO 45 FSI,REGNED MT/MOT,MANUAL CLAMP
GMEANS:		18.21	32.21			1.00		
		95% EILIPSE:		4.72	2.30	WITH GAMMA = 53 DEGREES		


BURSTING STRENGTH, MØDEL C
SAMPLE H60 = 18.2 PSI
SAMPLE H60 = 126 KILØPASCAL
SAMPLE H05 = 32.2 PSI
SAMPLE H05 = 222 KILØPASCAL
+,X,* NØT IN GRAND MEANS
ANALYSIS T10-1
SAMPLE H05
PSI
KILØPASCAL
SAMPLE H60
PSI
KILØPASCAL

ANALYSIS T10-2 TABLE 1
BURSTING STRENGTH, PSI

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

LAB CODE	SAMPLE H60 MEAN	PRINTING 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H05 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 15 VAR	F	LAB
L100	19.86	1.26	1.18	1.21	1.01	33.09	.60	.57	1.83	1.19	10D	O	L100
L115	16.67	-1.94	-1.83	.98	.81	34.13	1.65	1.57	1.42	.92	10D	*	L115
L118	20.01	1.41	1.33	1.33	1.11	32.47	-.02	-.02	1.23	.80	10D	O	L118
L122	19.20	.60	.56	1.21	1.01	31.53	-.95	-.91	1.46	.94	10F	O	L122
L125	17.73	-.87	-.82	2.31	1.93	36.93	4.45	4.24	2.63	1.71	10D	X	L125
L141	18.03	-.57	-.54	1.26	1.05	32.12	-.37	-.35	1.93	1.25	10D	O	L141
L148	19.40	.80	.75	.91	.76	33.93	1.45	1.38	1.39	.90	10D	O	L148
L157	21.07	2.46	2.32	1.15	.96	34.20	1.71	1.63	1.51	.98	10D	O	L157
L159	15.38	-3.22	-3.04	1.10	.92	27.70	-4.79	-4.56	1.19	.77	10D	X	L159
L163	18.97	.36	.34	1.33	1.11	32.93	.45	.43	1.91	1.24	10D	O	L163
L166	17.17	-1.44	-1.36	.94	.78	31.17	-1.32	-1.26	.90	.58	10D	O	L166
L176	20.63	2.03	1.91	1.33	1.11	33.37	.88	.84	1.45	.94	10D	O	L176
L185	19.71	1.11	1.05	.49	.41	32.55	.06	.06	.57	.37	10D	O	L185
L190C	18.20	-.40	-.38	1.26	1.06	31.07	-1.42	-1.35	1.83	1.19	10D	O	L190C
L190R	19.27	.66	.62	.80	.67	32.27	-.22	-.21	1.57	1.02	10D	O	L190R
L194	18.15	-.45	-.43	1.01	.84	31.28	-1.21	-1.15	1.39	.90	10D	O	L194
L202	18.83	.23	.22	.84	.70	31.70	-.79	-.75	1.16	.75	10D	O	L202
L217	18.27	-.34	-.32	.75	.63	30.60	-1.89	-1.80	1.49	.97	10D	O	L217
L224	18.70	.10	.09	1.49	1.24	32.93	.45	.43	1.62	1.05	10D	O	L224
L226B	19.51	.90	.85	.79	.66	32.52	.03	.03	1.92	1.24	10D	O	L226B
L226C	18.42	-.18	-.17	1.81	1.51	33.83	1.34	1.28	2.46	1.60	10D	O	L226C
L241	19.07	.46	.44	1.74	1.45	31.27	-1.22	-1.16	1.02	.66	10D	O	L241
L255	17.93	-.67	-.63	.70	.59	30.53	-1.95	-1.86	1.19	.77	10D	O	L255
L257A	17.27	-1.34	-1.26	2.19	1.82	32.93	.45	.43	1.75	1.13	10D	O	L257A
L257B	17.53	-1.07	-1.01	1.88	1.57	33.60	1.11	1.06	2.10	1.36	10D	O	L257B
L257C	17.20	-1.40	-1.33	1.37	1.15	32.67	.18	.17	1.95	1.27	10D	O	L257C
L262	16.83	-1.77	-1.67	.70	.58	33.00	.51	.49	1.45	.94	10D	O	L262
L280	19.83	1.22	1.15	1.15	.96	33.99	1.51	1.44	1.36	.88	10D	O	L280
L285	17.93	-.67	-.63	1.28	1.07	31.93	-.55	-.53	1.53	.99	10D	O	L285
L309	17.55	-1.05	-.99	1.57	1.31	30.84	-1.65	-1.57	2.29	1.48	10D	O	L309
L341	18.83	.23	.22	.96	.80	32.33	-.15	-.14	1.11	.72	10D	O	L341
L352	18.09	-.52	-.49	.84	.70	31.56	-.93	-.88	.84	.54	10D	O	L352
L378	17.42	-1.19	-1.12	1.06	.88	33.07	.58	.55	2.31	1.50	10D	O	L378
L567	19.33	.73	.69	1.59	1.33	33.20	.71	.68	1.37	.89	10D	O	L567
L575	18.78	.18	.17	1.23	1.02	31.85	-.63	-.60	1.38	.90	10D	O	L575
L581	18.60	-.00	-.00	1.49	1.24	32.90	.41	.39	1.59	1.03	10D	O	L581
L587	18.90	.30	.28	1.09	.91	33.63	1.15	1.09	1.59	1.03	10D	O	L587

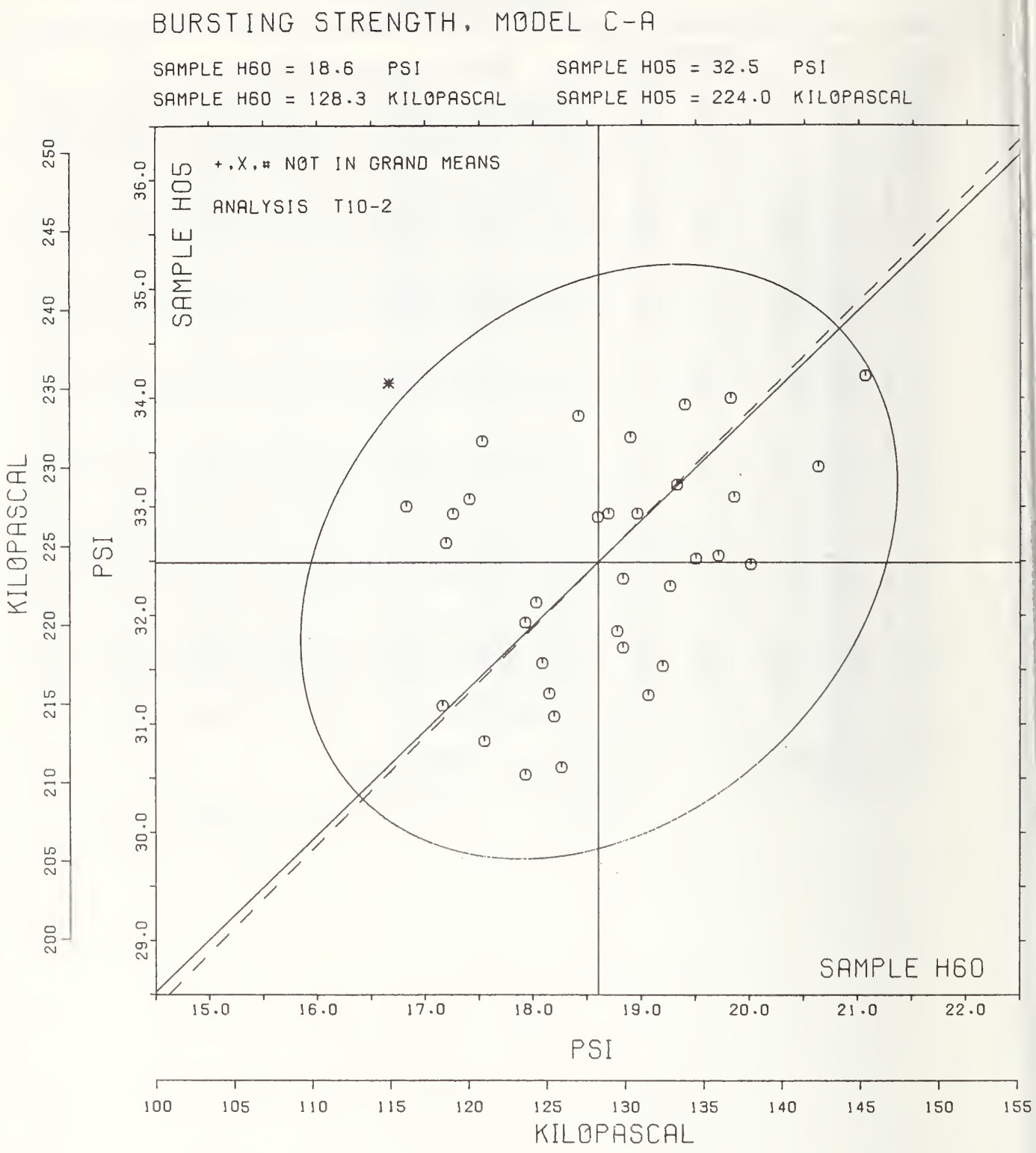
GR. MEAN = 18.60 PSI GRAND MEAN = 32.49 PSI TEST DETERMINATIONS = 15
SD MEANS = 1.06 PSI SD OF MEANS = 1.05 PSI 35 LABS IN GRAND MEANS
AVERAGE SDR = 1.20 PSI AVERAGE SDR = 1.54 PSI
GR. MEAN = 128.3 KILOPASCAL GRAND MEAN = 224.0 KILOPASCAL
TOTAL NUMBER OF LABORATORIES REPORTING = 37

Best Values: H60 18.7 ± 1.6 psi
H05 32.5 ± 1.6 psi

ANALYSIS T10-2 TABLE 2
BURSTING STRENGTH, PSI

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

LAB CODE	F	MEANS B60	B05	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L159	X	15.38	27.70	-5.64	-1.21	.85	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L115	*	16.67	34.13	-.25	2.53	.87	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L262	O	16.83	33.00	-.92	1.60	.76	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L166	O	17.17	31.17	-1.95	.05	.68	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L257C	O	17.20	32.67	-.88	1.11	1.21	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L257A	O	17.27	32.93	-.65	1.25	1.48	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L378	O	17.42	33.07	-.45	1.24	1.19	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L257B	O	17.53	33.60	.00	1.55	1.47	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L309	O	17.55	30.84	-1.90	-.45	1.40	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L125	X	17.73	36.93	2.46	3.81	1.82	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L285	O	17.93	31.93	-.87	.07	1.03	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L255	O	17.93	30.53	-1.84	-.94	.68	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L141	O	18.03	32.12	-.66	.13	1.15	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L352	O	18.09	31.56	-1.02	-.31	.62	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L194	O	18.15	31.28	-1.16	-.55	.87	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L190C	O	18.20	31.07	-1.28	-.74	1.12	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L217	O	18.27	30.60	-1.55	-1.12	.80	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L226C	O	18.42	33.83	.80	1.09	1.56	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L581	O	18.60	32.90	.28	.30	1.14	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L224	O	18.70	32.93	.38	.26	1.15	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L575	O	18.78	31.85	-.31	-.58	.96	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L202	O	18.83	31.70	-.38	-.72	.73	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L341	O	18.83	32.33	.06	-.27	.76	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L587	O	18.90	33.63	1.01	.62	.97	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L163	O	18.97	32.93	.57	.07	1.17	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L241	O	19.07	31.27	-.51	-1.20	1.05	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L122	O	19.20	31.53	-.23	-1.10	.98	10F	BURSTING STRENGTH UP TO 45 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L190R	O	19.27	32.27	.32	-.62	.84	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L567	O	19.33	33.20	1.02	.01	1.11	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L148	O	19.40	33.93	1.58	.49	.83	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L226B	O	19.51	32.52	.67	-.60	.95	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L185	O	19.71	32.55	.84	-.73	.39	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L280	O	19.83	33.59	1.93	.24	.92	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L100	O	19.86	33.09	1.32	-.44	1.10	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L118	O	20.01	32.47	1.00	-.99	.95	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L176	O	20.63	33.37	2.07	-.77	1.02	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
L157	O	21.07	34.20	2.96	-.48	.97	10D	BURSTING STRENGTH UP TO 45 PSI, PERKINS CA OR C, AIR CLAMP
GMEANS:		18.60	32.49			1.00		
		95% ELLIPSE:		3.09	2.36	WITH GAMMA = 43 DEGREES		


BURSTING STRENGTH, MODEL C-A
SAMPLE H60 = 18.6 PSI
SAMPLE H60 = 128.3 KILOPASCAL
SAMPLE H05 = 32.5 PSI
SAMPLE H05 = 224.0 KILOPASCAL
+,X,# NOT IN GRAND MEANS
ANALYSIS T10-2
SAMPLE H05
SAMPLE H60
PSI
KILOPASCAL
29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
200
205
210
215
220
225
230
235
240
245
250
15.0
16.0
17.0
18.0
19.0
20.0
21.0
22.0
100
105
110
115
120
125
130
135
140
145
150
155

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

LAB CODE	SAMPLE E24 MEAN	INDEX 242 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE B08 MEAN	KRAFT 149 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L100	68.0	.2	.08	5.6	1.44	80.0	1.7	.40	5.8	.87	11D	O	L100
L103	67.6	-.2	-.07	3.3	.85	83.7	5.4	1.30	6.1	.93	11C	O	L103
L107	71.8	4.0	1.57	3.8	.98	84.6	6.2	1.51	7.7	1.17	11C	O	L107
L118	69.5	1.6	.65	3.3	.86	80.7	2.3	.56	5.7	.86	11D	O	L118
L122	67.5	-.3	-.11	3.8	.97	75.2	-3.2	-.77	5.8	.88	11F	O	L122
L128	65.0	-2.8	-1.12	2.8	.73	77.6	-.8	-.19	5.2	.80	11D	O	L128
L141	68.8	1.0	.39	3.4	.88	84.1	5.8	1.39	8.1	1.23	11D	O	L141
L148	69.9	2.1	.83	2.7	.70	80.1	1.8	.43	3.5	.53	11D	O	L148
L159	63.8	-4.0	-1.59	3.3	.84	76.3	-2.0	-.49	4.4	.67	11D	O	L159
L170	68.9	1.1	.44	3.0	.78	71.9	-6.5	-1.57	4.3	.65	11C	O	L170
L174	68.7	.9	.36	3.7	.94	78.3	-.1	-.03	8.8	1.35	11D	O	L174
L176	69.2	1.4	.55	3.1	.80	68.9	-9.5	-2.30	6.7	1.02	11D	*	L176
L182	66.7	-1.2	-.46	4.0	1.02	75.3	-3.0	-.74	7.7	1.17	11D	O	L182
L218	67.0	-.8	-.31	4.2	1.08	79.8	1.4	.34	6.3	.96	11D	O	L218
L232	69.0	1.1	.45	3.0	.78	80.6	2.2	.54	10.6	1.60	11C	O	L232
L237A	69.1	1.3	.52	1.6	.41	79.5	1.2	.28	2.6	.40	11C	O	L237A
L237B	68.6	.8	.31	1.9	.48	83.8	5.4	1.31	2.4	.37	11C	O	L237B
L238A	67.9	.1	.04	4.0	1.03	81.7	3.3	.80	9.7	1.48	11D	O	L238A
L243	68.5	.7	.28	3.2	.82	78.7	.3	.07	5.8	.88	11C	O	L243
L248	62.3	-5.5	-2.16	3.4	.88	68.7	-9.6	-2.33	6.2	.95	11E	O	L248
L273	70.5	2.6	1.05	5.6	1.43	79.1	.8	.18	4.1	.62	11C	O	L273
L279	66.3	-1.5	-.60	2.1	.53	77.7	-.6	-.15	4.0	.61	11C	O	L279
L280	69.8	2.0	.78	3.4	.86	79.8	1.4	.34	8.6	1.30	11D	O	L280
L294	66.4	-1.4	-.56	4.0	1.03	89.4	11.0	2.67	10.7	1.63	11C	#	L294
L303	66.5	-1.3	-.52	2.8	.73	73.0	-5.4	-1.31	6.4	.98	11C	O	L303
L331	70.7	2.9	1.15	4.9	1.25	80.2	1.8	.44	8.4	1.28	11C	O	L331
L333	62.9	-4.9	-1.93	10.9	2.81	74.5	-3.9	-.95	12.3	1.87	11C	O	L333
L334	68.3	.5	.19	3.5	.90	79.1	.7	.18	5.6	.85	11D	O	L334
L344	71.4	3.6	1.43	3.5	.90	86.1	7.7	1.87	7.1	1.08	11C	O	L344
L356	65.9	-2.0	-.77	5.0	1.29	75.9	-2.5	-.61	8.4	1.28	11C	O	L356
L362	63.0	-4.8	-1.91	3.1	.81	74.7	-3.7	-.90	5.0	.76	11D	O	L362
L378	68.7	.9	.36	3.6	.91	76.0	-2.4	-.57	8.0	1.22	11D	O	L378
L392	62.7	-5.1	-2.01	5.2	1.35	76.9	-1.5	-.36	6.6	1.01	11C	O	L392
L565	69.1	1.3	.52	2.6	.67	83.7	5.3	1.28	6.1	.93	11D	O	L565
L567	68.3	.5	.20	4.2	1.08	77.2	-1.2	-.28	7.0	1.06	11D	O	L567
L575	71.4	3.6	1.41	7.8	2.01	79.8	1.4	.34	9.3	1.41	11D	O	L575

GR. MEAN = 67.8 PSI GRAND MEAN = 78.4 PSI TEST DETERMINATIONS = 15
SD MEANS = 2.5 PSI SD OF MEANS = 4.1 PSI 35 LABS IN GRAND MEANS
AVERAGE SDR = 3.9 PSI AVERAGE SDR = 6.6 PSI
GR. MEAN = 467.6 KILOPASCAL GRAND MEAN = 540.4 KILOPASCAL

L242	71.2	3.4	1.33	2.9	.74	80.2	1.8	.43	8.8	1.34	11T	*	L242
L250L	67.7	-.2	-.06	3.7	.96	72.5	-5.9	-1.42	6.8	1.03	11N	*	L250L
L251	62.2	-5.6	-2.22	2.1	.54	73.6	-4.8	-1.16	3.4	.52	11V	*	L251
L274	69.1	1.3	.52	2.3	.59	80.1	1.8	.43	3.8	.57	11H	*	L274
L290	71.2	3.4	1.34	3.8	.97	83.3	4.9	1.18	5.2	.78	11A	*	L290
L393	68.7	.8	.33	3.5	.90	81.3	3.0	.72	4.9	.75	11B	*	L393
L394	80.0	12.2	4.82	2.2	.56	86.3	8.0	1.93	8.9	1.35	11H	*	L394
L570	73.7	5.8	2.31	2.7	.70	85.7	7.3	1.77	8.3	1.26	11H	*	L570
L576	69.7	1.9	.76	3.8	.97	83.5	5.1	1.23	5.5	.84	11P	*	L576
L593	84.2	16.4	6.48	3.0	.77	97.5	19.2	4.64	7.5	1.14	11J	*	L593

TOTAL NUMBER OF LABORATORIES REPORTING = 46

Best Values: E24 68 ± 5 psi
H08 78 ± 6 psi

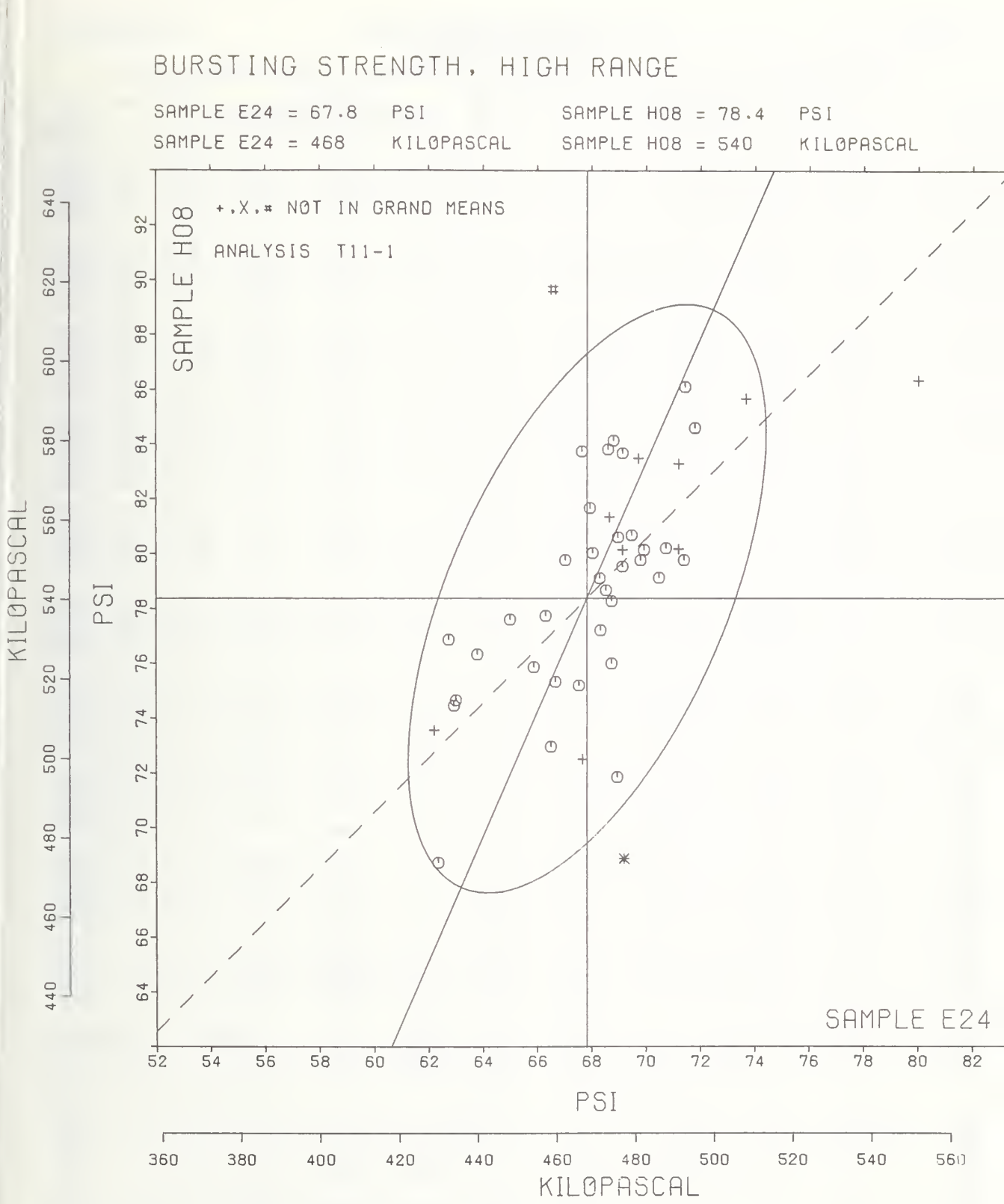
The following laboratories were omitted from the grand means because of extreme test results: 294.

ANALYSIS T11-1 TABLE 2

BURSTING STRENGTH, HIGH RANGE, PSI

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

LAB CODE	F	MEANS E24	MEANS H08	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L251	*	62.2	73.6	-6.7	3.2	.53	11V	BURSTING STRENGTH 40 - 100 PSI, L*W,MANUAL CLAMP, 20C,65% RH
L248	O	62.3	68.7	-11.0	1.1	.91	11E	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L392	O	62.7	76.9	-3.4	4.1	1.18	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L333	O	62.9	74.5	-5.5	2.9	2.34	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L362	O	63.0	74.7	-5.3	2.9	.78	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L159	O	63.8	76.3	-3.5	2.9	.75	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L128	O	65.0	77.6	-1.8	2.3	.76	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L356	O	65.9	75.9	-3.1	.8	1.28	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L279	O	66.3	77.7	-1.2	1.1	.57	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L294	#	66.4	89.4	9.5	5.7	1.33	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L303	O	66.5	73.0	-5.5	-1.0	.85	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L182	O	66.7	75.3	-3.2	-.2	1.10	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L218	O	67.0	79.8	1.0	1.3	1.02	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L122	O	67.5	75.2	-3.0	-1.0	.93	11F	BURSTING STRENGTH 40 - 100 PSI,PERKINS C, H.CLAMP,TRANSDUCER
L103	O	67.6	83.7	4.8	2.3	.89	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L250L	*	67.7	72.5	-5.4	-2.2	1.00	11N	BURSTING STRENGTH 40 - 100 PSI,LHOMARGY,MAN.CLAMP, 20C,65%RH
L238A	O	67.9	81.7	3.1	1.2	1.25	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L100	O	68.0	80.0	1.6	.5	1.16	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L334	O	68.3	79.1	.9	-.1	.87	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L567	O	68.3	77.2	-.9	-.9	1.07	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L243	O	68.5	78.7	.6	-.5	.85	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L237H	O	68.6	83.8	5.3	1.5	.43	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L393	*	68.7	81.3	3.1	.4	.82	11H	BURSTING STRENGTH 40 - 100 PSI, PERKINS AH, HYDRAULIC CLAMP
L378	O	68.7	76.0	-1.8	-1.8	1.07	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L174	O	68.7	78.3	.3	-.9	1.14	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L141	O	68.8	84.1	5.7	1.4	1.05	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L170	O	68.9	71.9	-5.5	-3.6	.72	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L232	O	69.0	80.6	2.5	-.2	1.19	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L565	O	69.1	83.7	5.4	.9	.80	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L274	*	69.1	80.1	2.1	-.5	.58	11H	BURSTING STRENGTH 40 - 100 PSI, PERKINS AH, HYDRAULIC CLAMP
L237A	O	69.1	79.5	1.6	-.7	.40	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L176	*	69.2	68.9	-8.1	-5.1	.91	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L118	O	69.5	80.7	2.8	-.6	.86	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L576	*	69.7	83.5	5.4	.3	.90	11P	BURSTING STRENGTH 40 - 100 PSI, PERKINS LC, MANUAL CLAMP
L280	O	69.8	79.8	2.1	-1.3	1.08	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L148	O	69.9	80.1	2.5	-1.2	.62	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L273	O	70.5	79.1	1.8	-2.1	1.02	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L331	O	70.7	80.2	2.8	-1.9	1.27	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L242	*	71.2	80.2	3.0	-2.4	1.04	11T	BURSTING STRENGTH 40 - 100 PSI, L*W,MANUAL CLAMP
L290	*	71.2	83.3	5.8	-1.1	.88	11A	BURSTING STRENGTH 40 - 100 PSI, PERKINS A, MANUAL CLAMP
L575	O	71.4	79.8	2.7	-2.7	1.71	11D	BURSTING STRENGTH 40 - 100 PSI, PERKINS CA, AIR CLAMP
L344	O	71.4	86.1	8.5	-.2	.99	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L107	O	71.8	84.6	7.3	-1.1	1.07	11C	BURSTING STRENGTH 40 - 100 PSI, PERKINS C, MANUAL CLAMP
L570	*	73.7	85.7	9.0	-2.4	.98	11H	BURSTING STRENGTH 40 - 100 PSI, PERKINS AH, HYDRAULIC CLAMP
L394	*	80.0	86.3	12.2	-8.0	.96	11H	BURSTING STRENGTH 40 - 100 PSI, PERKINS AH, HYDRAULIC CLAMP
L593	*	84.2	97.5	24.1	-7.3	.96	11J	BURSTING STRENGTH 40 - 100 PSI, PERKINS JUMBO,HAND DRIVEN
GMEANS:		67.8	78.4			1.00		
		95% ELLIPSE:		11.5	5.1	WITH GAMMA = 66 DEGREES		


BURSTING STRENGTH, HIGH RANGE
SAMPLE E24 = 67.8 PSI
SAMPLE E24 = 468 KILOPASCAL
SAMPLE H08 = 78.4 PSI
SAMPLE H08 = 540 KILOPASCAL
+,X,# NOT IN GRAND MEANS
ANALYSIS T11-1
SAMPLE H08
PSI
KILOPASCAL
SAMPLE E24
PSI
KILOPASCAL

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS

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

LAB CODE	SAMPLE E05 MEAN	BROWN KRAFT 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H03 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 15 VAR	F	LAB
L100	60.4	-2.6	-.94	2.0	.92	63.3	-.9	-.29	2.1	1.07	15M	0	L100
L103	62.7	-.3	-.10	1.6	.74	62.3	-2.0	-.65	1.6	.83	15T	0	L103
L107	15.7	-47.3	-17.38	.7	.34	15.1	-49.2	-16.10	.6	.30	15T	#	L107
L115	59.8	-3.1	-1.14	1.4	.67	57.7	-6.6	-2.15	1.8	.94	15C	0	L115
L118	62.1	-.8	-.30	2.0	.91	63.2	-1.0	-.34	2.1	1.10	15T	0	L118
L121	60.5	-2.4	-.89	2.1	.96	62.5	-1.7	-.56	1.8	.90	15T	0	L121
L122	59.7	-3.3	-1.20	2.3	1.09	60.3	-3.9	-1.28	1.8	.93	15C	0	L122
L124	62.0	-.9	-.35	2.6	1.22	62.8	-1.4	-.47	2.4	1.21	15T	0	L124
L126	63.1	.2	.07	1.6	.76	63.9	-.4	-.12	1.9	.98	15T	0	L126
L128	61.7	-1.3	-.47	1.7	.78	62.9	-1.3	-.43	1.8	.92	15T	0	L128
L134	65.9	2.9	1.07	2.0	.91	69.5	5.2	1.71	1.7	.86	15T	0	L134
L139	65.2	2.3	.83	2.6	1.19	67.1	2.8	.93	1.8	.92	15T	0	L139
L141	62.9	-.0	-.00	1.6	.73	63.1	-1.1	-.36	1.4	.69	15T	0	L141
L148	64.0	1.1	.39	3.0	1.40	57.1	-7.2	-2.35	2.4	1.21	15T	X	L148
L150	59.6	-3.3	-1.23	1.9	.89	61.5	-2.7	-.89	1.7	.85	15T	0	L150
L151	78.8	15.9	5.83	4.0	1.88	75.9	11.7	3.83	2.9	1.49	15C	#	L151
L153	62.0	-.9	-.35	2.1	.96	63.9	-.3	-.10	1.7	.85	15C	0	L153
L157	61.8	-1.1	-.42	2.5	1.14	63.1	-1.1	-.36	1.6	.84	15T	0	L157
L158	62.8	-.1	-.05	3.7	1.71	60.5	-3.7	-1.21	2.7	1.36	15R	0	L158
L159	68.4	5.5	2.01	4.6	2.12	67.2	3.0	.97	2.4	1.21	15L	0	L159
L162	63.3	.3	.12	1.8	.81	64.2	-.0	-.01	1.4	.73	15T	0	L162
L163	64.3	1.3	.49	2.7	1.26	65.5	1.3	.42	1.5	.77	15T	0	L163
L166	63.7	.7	.27	1.4	.67	67.0	2.8	.90	2.2	1.14	15T	0	L166
L167	54.5	1.6	.58	1.2	.55	63.7	-.5	-.17	1.0	.53	15C	0	L167
L170	61.9	-1.0	-.37	2.2	1.02	60.1	-4.2	-1.37	.9	.45	15T	0	L170
L173B	59.6	-3.3	-1.23	1.1	.52	65.1	.8	.27	1.0	.53	15T	0	L173B
L174S	64.3	1.3	.49	3.8	1.79	62.7	-1.6	-.52	2.9	1.48	15T	0	L174S
L176	61.3	-1.6	-.59	2.2	1.03	64.3	.0	.01	2.7	1.39	15T	0	L176
L182A	64.3	1.3	.49	3.1	1.44	60.7	-3.5	-1.15	1.8	.92	15A	0	L182A
L182T	62.8	-.1	-.05	1.9	.88	65.2	1.0	.31	1.9	.99	15T	0	L182T
L183	60.9	-2.1	-.76	1.3	.60	61.1	-3.1	-1.02	2.5	1.27	15T	0	L183
L185	61.1	-1.8	-.67	1.8	.86	61.3	-2.9	-.95	2.0	1.03	15T	0	L185
L189	61.1	-1.8	-.67	1.3	.60	64.5	.3	.10	1.8	.94	15T	0	L189
L190C	63.5	.5	.19	1.4	.65	64.7	.4	.14	1.0	.53	15T	0	L190C
L190R	61.1	-1.8	-.67	1.7	.80	62.2	-2.0	-.67	1.8	.91	15C	0	L190R
L191	66.4	3.5	1.27	1.5	.72	69.5	5.2	1.71	2.1	1.06	15T	0	L191
L194	65.1	2.1	.78	3.0	1.40	64.3	.1	.03	2.1	1.09	15T	0	L194
L195	62.4	-.5	-.20	1.9	.89	66.5	2.2	.73	1.5	.77	15C	0	L195
L206	62.0	-1.0	-.36	2.3	1.05	62.8	-1.4	-.47	2.7	1.38	15R	0	L206
L207	62.7	-.3	-.10	2.1	.97	66.3	2.0	.66	1.7	.85	15T	0	L207
L213	61.9	-1.1	-.40	2.2	1.01	65.8	1.6	.51	2.6	1.31	15T	0	L213
L217	63.4	.5	.17	1.9	.87	63.4	-.8	-.28	2.7	1.38	15T	0	L217
L223	63.4	.5	.18	2.0	.95	65.2	.9	.31	1.1	.56	15R	0	L223
L224	59.8	-3.1	-1.16	1.5	.71	62.6	-1.6	-.54	2.1	1.09	15T	0	L224
L225	67.3	4.3	1.59	1.0	.48	66.6	2.4	.77	2.2	1.11	15T	0	L225
L226B	65.6	2.7	.98	2.9	1.37	68.5	4.2	1.38	2.8	1.43	15T	0	L226B
L226C	58.4	-4.5	-1.67	2.2	1.01	58.5	-5.8	-1.89	1.7	.88	15T	0	L226C
L228	60.3	-2.7	-.98	1.7	.77	60.5	-3.7	-1.21	2.6	1.31	15T	0	L228
L232	69.2	6.3	2.30	9.1	4.22	65.7	1.5	.49	3.0	1.54	15T	*	L232
L236	58.8	-4.1	-1.52	3.5	1.64	58.9	-5.3	-1.74	1.8	.94	15T	0	L236
L237A	60.7	-2.3	-.84	1.6	.76	62.4	-1.8	-.60	1.4	.69	15T	0	L237A
L237B	62.8	-.1	-.05	2.1	.98	67.6	3.4	1.10	1.7	.88	15T	0	L237B
L238A	56.1	-6.8	-2.50	2.1	.96	58.7	-5.6	-1.83	1.8	.92	15T	*	L238A
L241	66.7	3.7	1.37	2.0	.92	70.3	6.0	1.97	2.3	1.15	15T	0	L241
L243	62.9	-.1	-.03	2.5	1.16	65.1	.9	.29	2.5	1.29	15T	0	L243
L244	63.8	.9	.32	1.4	.64	65.0	.8	.25	1.3	.67	15C	0	L244
L248	63.8	.9	.31	1.7	.79	67.1	2.8	.92	1.8	.92	15J	0	L248
L249	61.1	-1.8	-.68	1.1	.53	61.6	-2.6	-.87	1.9	.97	15T	0	L249
L254	62.9	-.1	-.03	1.8	.82	63.7	-.6	-.19	2.3	1.15	15T	0	L254
L255	62.7	-.2	-.08	2.3	1.05	62.1	-2.1	-.69	1.8	.94	15T	0	L255
L257A	62.8	-.1	-.05	2.4	1.10	65.9	1.6	.53	1.8	.90	15C	0	L257A
L257B	63.2	.3	.09	2.2	1.04	66.3	2.0	.66	2.1	1.08	15C	0	L257B
L257C	62.3	-.7	-.25	1.5	.69	65.9	1.6	.53	1.4	.72	15C	0	L257C
L259	62.7	-.3	-.10	2.2	1.00	64.3	.1	.03	1.4	.74	15T	0	L259
L261	61.6	-1.3	-.49	2.2	1.01	62.9	-1.4	-.45	1.8	.94	15T	0	L261

ANALYSIS T15-1 TABLE 1

TEARING STRENGTH, GRAMS

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

LAB CODE	SAMPLE E05 MEAN	BROWN KRAFT 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H03 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 15 VAR	F	LAB
L262	62.3	-.6	-.22	.5	.23	67.5	3.2	1.06	.8	.43	15T	@	L262
L264	23.3	-39.6	-14.56	1.0	.45	17.5	-46.7	-15.30	.6	.33	15I	#	L264
L265	93.2	30.3	11.12	13.0	6.04	96.5	32.3	10.57	10.6	5.43	15T	#	L265
L268	66.3	3.3	1.22	2.0	.92	66.9	2.6	.86	2.2	1.14	15T	@	L268
L273	62.9	-.0	-.00	2.5	1.14	63.4	-.8	-.28	1.4	.72	15T	@	L273
L274	62.0	-.9	-.35	1.5	.70	62.9	-1.3	-.43	2.0	1.01	15T	@	L274
L275	65.8	2.9	1.05	1.8	.83	69.2	5.0	1.62	2.1	1.06	15T	@	L275
L277	71.2	8.3	3.04	2.4	1.10	69.6	5.4	1.75	1.9	.96	15T	*	L277
L278	65.4	2.5	.90	2.8	1.31	68.6	4.4	1.43	2.2	1.11	15I	@	L278
L279	68.3	5.3	1.96	2.9	1.35	68.0	3.8	1.23	2.8	1.45	15I	@	L279
L280	64.1	1.2	.44	2.4	1.09	64.1	-.1	-.04	2.1	1.07	15L	@	L280
L281	61.2	-1.7	-.64	2.1	.97	62.1	-2.1	-.69	2.0	1.02	15T	@	L281
L285	54.7	-8.3	-3.04	3.9	1.81	46.5	-17.7	-5.80	2.9	1.47	15T	#	L285
L288	65.7	2.7	1.00	2.3	1.05	66.4	2.2	.71	1.8	.90	15Q	@	L288
L290	68.6	5.7	2.08	2.0	.93	73.2	9.0	2.93	2.0	1.04	15I	*	L290
L291	60.7	-2.3	-.84	1.8	.84	62.4	-1.8	-.60	1.1	.57	15A	@	L291
L299	63.0	.1	.02	2.1	.99	65.1	.9	.29	2.3	1.17	15I	@	L299
L301	64.4	1.5	.54	2.1	.99	65.6	1.4	.44	2.2	1.11	15Q	@	L301
L303	63.4	.5	.17	2.0	.91	66.8	2.6	.84	2.3	1.19	15L	@	L303
L305	61.3	-1.7	-.62	1.3	.62	60.7	-3.5	-1.15	1.7	.85	15T	@	L305
L309	61.2	-1.7	-.64	2.0	.93	61.0	-3.2	-1.06	2.3	1.16	15T	@	L309
L311	63.6	.7	.24	2.5	1.17	61.6	-2.6	-.87	1.5	.79	15T	@	L311
L312	63.9	.9	.34	2.1	.96	68.5	4.2	1.38	3.3	1.70	15T	@	L312
L315	65.3	2.4	.88	3.8	1.75	69.6	5.4	1.75	1.5	.77	15I	@	L315
L321	56.8	-6.1	-2.26	1.6	.73	57.8	-6.4	-2.11	.6	.29	15T	@	L321
L328	59.5	-3.5	-1.28	1.8	.83	62.6	-1.6	-.54	1.5	.77	15T	@	L328
L331	62.2	-.7	-.25	3.0	1.39	58.7	-5.5	-1.80	2.2	1.10	15T	S	L331
L334	56.3	-6.6	-2.43	2.4	1.11	58.9	-5.3	-1.74	1.9	.96	15T	@	L334
L336	57.0	-5.9	-2.18	2.1	.99	59.7	-4.5	-1.48	2.3	1.15	15T	@	L336
L344	67.6	4.7	1.71	2.7	1.28	66.5	2.2	.73	2.9	1.48	15C	@	L344
L345	64.5	1.6	.58	4.7	2.20	63.1	-1.1	-.36	2.3	1.18	15T	@	L345
L352	62.7	-.3	-.10	2.1	.99	64.7	.5	.15	2.6	1.32	15C	@	L352
L360	62.3	-.7	-.25	3.1	1.43	62.3	-2.0	-.65	2.2	1.13	15T	@	L360
L362	61.8	-1.1	-.42	1.5	.68	61.4	-2.8	-.93	1.4	.69	15T	@	L362
L376	65.7	2.8	1.03	2.8	1.31	68.7	4.4	1.45	2.2	1.14	15T	@	L376
L378	68.5	5.5	2.03	3.0	1.39	66.9	2.7	.88	2.4	1.21	15T	@	L378
L382	64.9	2.0	.73	2.2	1.00	64.7	.5	.16	1.9	.99	15T	@	L382
L390	61.7	-1.2	-.44	6.7	3.10	61.5	-2.8	-.91	1.7	.88	15T	@	L390
L392	62.8	-.1	-.05	1.6	.75	61.1	-3.2	-1.04	3.2	1.61	15I	@	L392
L396M	62.4	-.5	-.20	1.5	.72	64.4	.2	.05	2.0	1.04	15T	@	L396M
L484	68.3	5.3	1.96	1.7	.77	66.8	2.6	.84	2.0	1.01	15T	@	L484
L565	61.2	-1.7	-.64	2.5	1.17	66.1	1.9	.62	3.2	1.62	15T	@	L565
L567	61.9	-1.1	-.40	2.2	1.02	64.8	.6	.18	1.5	.75	15C	@	L567
L575	63.8	.9	.32	1.3	.62	66.5	2.2	.73	1.8	.90	15L	@	L575
L576	64.8	1.9	.68	1.5	.71	70.0	5.8	1.89	2.2	1.11	15T	@	L576
L580	61.5	-1.5	-.54	2.1	.96	62.8	-1.4	-.47	2.7	1.37	15T	@	L580
L581	66.4	3.5	1.29	1.7	.79	66.6	2.3	.76	2.1	1.08	15Q	@	L581
L587	59.6	-3.3	-1.23	2.2	1.01	62.0	-2.2	-.73	1.7	.86	15T	@	L587
L596	78.9	16.0	5.88	5.1	2.38	65.9	1.6	.53	3.0	1.52	15T	#	L596
L599	62.3	-.7	-.25	1.7	.79	65.2	1.0	.31	1.6	.82	15I	@	L599

GR. MEAN = 62.9 GRAMS — GRAND MEAN = 64.2 GRAMS — TEST DETERMINATIONS = 15

SD MEANS = 2.7 GRAMS — SD OF MEANS = 3.1 GRAMS — 108 LABS IN GRAND MEANS

AVERAGE SDR = 2.2 GRAMS — AVERAGE SDR = 2.0 GRAMS

GR. MEAN = 617.3 MILLINEWTON — GRAND MEAN = 630.0 MILLINEWTON

L211	60.9	-2.0	-.74	2.0	.92	59.5	-4.8	-1.56	1.9	.98	15V	+ L211
L230	60.0	-2.9	-1.08	2.1	.99	59.4	-4.8	-1.58	2.4	1.21	15V	+ L230
L242	63.8	.9	.32	1.9	.90	64.8	.6	.18	1.9	.99	15U	+ L242
L250L	79.8	16.9	6.20	3.9	1.83	75.3	11.1	3.64	2.8	1.45	15H	+ L250L
L251	67.8	4.9	1.79	2.7	1.27	69.7	5.4	1.78	1.5	.79	15K	+ L251
L531	66.4	3.5	1.27	7.2	3.33	61.2	-3.0	-1.00	3.8	1.92	15E	+ L531
L610	64.1	1.2	.44	3.2	1.51	70.4	6.2	2.02	1.9	.96	15E	+ L610

TOTAL NUMBER OF LABORATORIES REPORTING = 122

Best Values: E05 63 ± 5 grams
H03 64 ± 5 grams

The following laboratories were omitted from the grand means because of extreme test results: 151, 265, 285, 596.

Data from the following laboratories appear to be off by a multiplicative factor: 107, 264.

Data from the following laboratories appeared to be off by a multiplicative factor: 211, 230. Code 15V was assigned temporarily to put in a factor of 2.

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

ANALYSIS T15-1 TABLE 2
TEARING STRENGTH, GRAMS
TAPPI STANDARD T414 TS-65, ANY MAKE ELMENDORF WITH DEEP CUTOUT IS STANDARD FOR THIS ANALYSIS

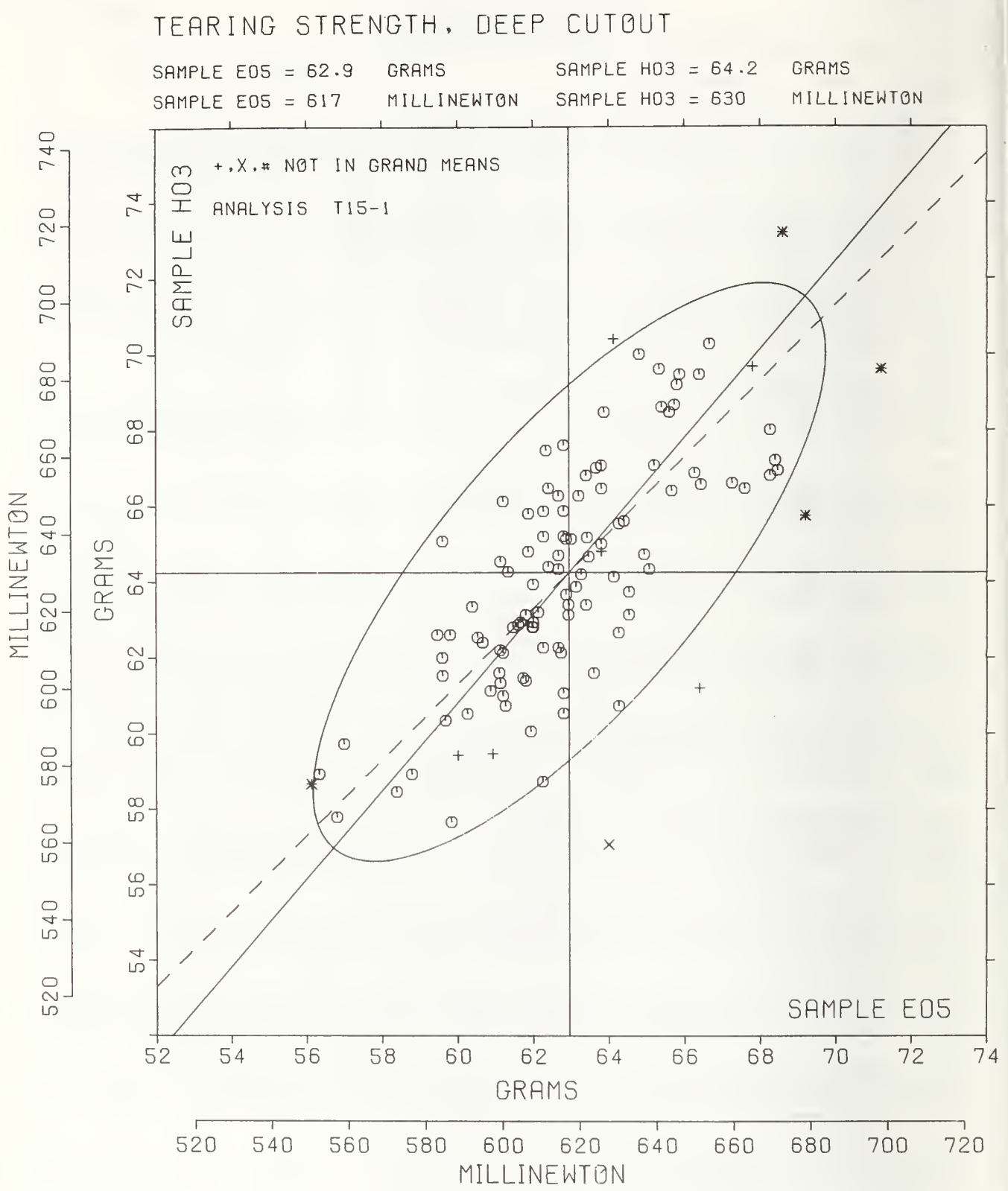
LAB CODE	F	MEANS E05	MEANS H03	COORDINATES MAJOR	COORDINATES MINOR	AVG E.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L107	#	15.7	15.1	-68.1	3.8	.32	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L264	#	23.3	17.5	-61.2	-.4	.39	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L285	#	54.7	46.5	-18.8	-5.3	1.64	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L238A	*	56.1	58.7	-8.7	1.5	.94	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L334	@	56.3	58.9	-8.3	1.6	1.03	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L321	@	56.8	57.8	-8.9	.5	.51	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L336	@	57.0	59.7	-7.3	1.6	1.07	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L226C	@	58.4	58.5	-7.3	-.3	.94	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L236	@	58.8	58.9	-6.7	-.3	1.29	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L328	@	59.5	62.6	-3.5	1.6	.80	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L587	@	59.6	62.0	-3.9	1.1	.93	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L173B	@	59.6	65.1	-1.6	3.1	.52	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L150	@	59.6	61.5	-4.2	.8	.87	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L122	@	59.7	60.3	-5.1	-.1	1.01	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L224	@	59.8	62.6	-3.3	1.3	.90	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L115	@	59.8	57.7	-7.0	-1.9	.80	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L230	*	60.0	59.4	-5.6	-.9	1.10	15V	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)X2
L228	@	60.3	60.5	-4.6	-.4	1.04	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L100	@	60.4	63.3	-2.3	1.4	1.00	15M	TEARING STRENGTH, STANDARD, T.M.MIRFIELD(APPITA-ELMENDORF)
L121	@	60.5	62.5	-2.9	.7	.93	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L291	@	60.7	62.4	-2.9	.5	.70	15A	TEARING STRENGTH, STANDARD, APPITA
L237A	@	60.7	62.4	-2.9	.5	.72	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L183	@	60.9	61.1	-3.7	-.5	.93	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L211	*	60.9	59.5	-4.9	-1.6	.95	15V	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)X2
L249	@	61.1	61.6	-3.2	-.3	.75	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L190R	@	61.1	62.2	-2.7	.0	.86	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L189	@	61.1	64.5	-1.0	1.6	.77	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L185	@	61.1	61.3	-3.4	-.5	.95	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L565	@	61.2	66.1	.3	2.6	1.39	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L309	@	61.2	61.0	-3.6	-.8	1.05	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L281	@	61.2	62.1	-2.7	-.1	1.00	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L305	@	61.3	60.7	-3.8	-1.0	.74	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L176	@	61.3	64.3	-1.0	1.2	1.21	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L580	@	61.5	62.8	-2.1	.2	1.16	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L261	@	61.6	62.9	-1.9	.1	.97	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L128	@	61.7	62.9	-1.8	.1	.85	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L390	@	61.7	61.5	-2.9	-.9	1.99	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L362	@	61.8	61.4	-2.9	-1.0	.69	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L157	@	61.8	63.1	-1.6	.1	.99	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L567	@	61.9	64.8	-.3	1.2	.89	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L213	@	61.9	65.8	.5	1.8	1.16	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L170	@	61.9	60.1	-3.8	-2.0	.73	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L206	@	62.0	62.8	-1.7	-.2	1.22	15R	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,DIGITAL READOUT
L153	@	62.0	63.9	-.8	.5	.91	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L274	@	62.0	62.9	-1.6	-.1	.86	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L124	@	62.0	62.8	-1.7	-.2	1.21	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L118	@	62.1	63.2	-1.3	-.1	1.00	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L331	S	62.2	58.7	-4.6	-3.1	1.24	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L599	@	62.3	65.2	.3	1.1	.81	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L360	@	62.3	62.3	-1.9	-.8	1.28	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L257C	@	62.3	65.9	.8	1.6	.70	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L262	@	62.3	67.5	2.0	2.6	.33	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L396M	@	62.4	64.4	-.2	.5	.88	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L195	@	62.4	66.5	1.3	1.9	.83	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L352	@	62.7	64.7	.2	.5	1.15	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L207	@	62.7	66.3	1.4	1.5	.91	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L103	@	62.7	62.3	-1.7	-1.1	.78	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L259	@	62.7	64.3	-.1	.3	.87	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L255	@	62.7	62.1	-1.7	-1.2	.99	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L392	@	62.8	61.1	-2.5	-2.0	1.18	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L182T	@	62.8	65.2	.6	.7	.93	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L257A	@	62.8	65.9	1.1	1.2	1.00	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L158	@	62.8	60.5	-2.9	-2.3	1.54	15R	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,DIGITAL READOUT
L237B	@	62.8	67.6	2.5	2.3	.93	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L254	@	62.9	63.7	-.5	-.3	.99	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)

ANALYSIS T15-1 TABLE 2

TEARING STRENGTH, GRAMS

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

LAB CODE	F	MEANS E05	MEANS H03	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L243	6	62.9	65.1	.6	.6	1.23	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L141	6	62.9	63.1	-.8	-.7	.71	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L273	6	62.9	63.4	-.6	-.5	.93	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L299	6	63.0	65.1	.7	.5	1.08	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L126	6	63.1	63.9	-.2	-.4	.87	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L257B	6	63.2	66.3	1.7	1.1	1.06	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L162	6	63.3	64.2	.2	-.3	.77	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L217	6	63.4	63.4	-.3	-.9	1.13	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L303	6	63.4	66.8	2.2	1.3	1.05	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L223	6	63.4	65.2	1.0	.2	.76	15R	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,DIGITAL READOUT
L190C	6	63.5	64.7	.7	-.1	.59	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L311	6	63.6	61.6	-1.6	-2.2	.98	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L166	6	63.7	67.0	2.6	1.2	.91	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L248	6	63.8	67.1	2.7	1.2	.86	15J	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L242	*	63.8	64.8	1.0	-.3	.94	15U	TEARING STRENGTH, STANDARD, AUSTRALIAN OPT. CO.
L575	6	63.8	66.5	2.2	.8	.76	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L244	6	63.8	65.0	1.1	-.2	.65	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L312	6	63.9	68.5	3.8	2.1	1.33	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L148	X	64.0	57.1	-4.8	-5.5	1.31	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L610	*	64.1	70.4	5.4	3.1	1.24	15E	TEARING STRENGTH, STANDARD, THWING-ELMENDORF,AMBIENT COND.
L280	6	64.1	64.1	.7	-1.0	1.08	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L174S	6	64.3	62.7	-.3	-2.0	1.63	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L163	6	64.3	65.5	1.8	-.2	1.01	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L182A	6	64.3	60.7	-1.8	-3.3	1.18	15A	TEARING STRENGTH, STANDARD, APPITA
L301	6	64.4	65.6	2.0	-.2	1.05	15Q	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,AIR CLAMP,DIGITL
L167	6	64.5	63.7	.7	-1.5	.54	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORE (W.AIR CLAMP)
L345	6	64.5	63.1	.2	-1.9	1.69	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L576	6	64.8	70.0	5.6	2.3	.91	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L382	6	64.9	64.7	1.7	-1.2	1.00	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L194	6	65.1	64.3	1.5	-1.6	1.24	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L139	6	65.2	67.1	3.6	.1	1.05	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORE(SCALE TO 100)
L315	6	65.3	69.6	5.6	1.7	1.26	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L278	6	65.4	68.6	4.9	1.0	1.21	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L226B	6	65.6	68.5	4.9	.7	1.40	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L288	6	65.7	66.4	3.4	-.7	.98	15Q	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,AIR CLAMP,DIGITL
L376	6	65.7	68.7	5.2	.8	1.22	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L275	6	65.8	69.2	5.6	1.1	.94	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L134	6	65.9	69.5	5.9	1.2	.89	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L268	6	66.3	66.9	4.2	-.8	1.03	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L531	*	66.4	61.2	-.1	-4.6	2.63	15E	TEARING STRENGTH, STANDARD, THWING-ELMENDORF,AMBIENT COND.
L191	6	66.4	69.5	6.2	.8	.89	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L581	6	66.4	66.6	4.0	-1.1	.94	15Q	TEARING STRENGTH, STANDARD,THWING-ELMENDORF,AIR CLAMP,DIGITL
L241	6	66.7	70.3	7.0	1.1	1.04	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L225	6	67.3	66.6	4.6	-1.7	.79	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L344	6	67.6	66.5	4.7	-2.1	1.38	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L251	*	67.8	69.7	7.3	-.1	1.03	15K	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES, 20 C, 65% RH
L484	6	68.3	66.8	5.4	-2.4	.89	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L279	6	68.3	68.0	6.3	-1.6	1.40	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORE(SCALE TO 100)
L159	6	68.4	67.2	5.8	-2.2	1.66	15L	TEARING STRENGTH, STANDARD, LORENTZ-WETTRES
L378	6	68.5	66.9	5.6	-2.4	1.30	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L290	*	68.6	73.2	10.5	1.5	.98	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORE(SCALE TO 100)
L232	*	69.2	65.7	5.2	-3.8	2.88	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORE(SCALE TO 100)
L277	*	71.2	69.6	9.4	-2.8	1.03	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L151	#	78.8	75.9	19.2	-4.4	1.68	15C	TEARING STRENGTH, STANDARD, THWING-ELMENDORF (W.AIR CLAMP)
L596	#	78.9	65.9	11.7	-11.1	1.95	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
L250L	*	79.8	75.3	19.4	-5.6	1.64	15H	TEARING STRENGTH, STANDARD, LHOMARGY, 20 C, 65% RH
L265	#	93.2	96.5	44.2	-1.9	5.73	15T	TEARING STRENGTH, STANDARD,THWING-ELMENDORF(SCALE TO 100)
GMEANS:		62.9	64.2			1.00		
		95% ELLIPSE:		9.6	3.5	WITH GAMMA = 49 DEGREES		


TEARING STRENGTH, DEEP CUTOUT
SAMPLE E05 = 62.9 GRAMS
SAMPLE E05 = 617 MILLINEWTON
SAMPLE H03 = 64.2 GRAMS
SAMPLE H03 = 630 MILLINEWTON
+,X,* NOT IN GRAND MEANS
ANALYSIS T15-1
SAMPLE H03
GRAMS
MILLINEWTON
SAMPLE E05
GRAMS
MILLINEWTON

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

LAB CODE	SAMPLE E04 MEAN	BROWN KRAFT 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E17 MEAN	BROWN KRAFT 74 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L122	71.1	5.8	1.51	6.8	2.15	69.3	4.2	1.36	5.8	2.05	17N	O	L122
L148	64.0	-1.3	-.34	3.4	1.07	65.1	.0	.01	3.2	1.13	17N	O	L148
L174N	61.6	-3.7	-.97	2.9	.93	61.9	-3.2	-1.02	4.0	1.40	17N	O	L174N
L231	61.2	-4.1	-1.07	1.3	.42	60.5	-4.5	-1.44	.9	.32	17N	O	L231
L234	67.1	1.8	.46	1.7	.53	67.5	2.4	.78	2.6	.90	17N	O	L234
L267	66.9	1.6	.43	2.1	.65	66.1	1.1	.34	2.8	.98	17N	O	L267
L269	65.4	.1	.03	3.2	1.02	67.0	2.0	.63	3.1	1.09	17N	O	L269
L301	63.0	-2.3	-.60	1.7	.55	63.9	-1.1	-.35	1.7	.59	17N	O	L301
L308	67.0	1.7	.45	1.8	.56	66.9	1.8	.59	2.6	.91	17N	O	L308
L324	57.3	-8.0	-2.10	2.7	.86	58.0	-7.0	-2.26	3.6	1.27	17N	O	L324
L326	63.4	-1.9	-.50	2.9	.91	64.1	-1.0	-.31	2.3	.81	17N	O	L326
L341	70.8	5.5	1.44	2.4	.75	67.4	2.4	.76	1.2	.42	17N	O	L341
L366	67.2	1.9	.50	3.8	1.19	67.5	2.5	.80	2.4	.85	17N	O	L366
L562	68.2	2.9	.76	7.7	2.43	65.3	.3	.10	3.6	1.28	17N	O	L562
GR. MEAN =	65.3 GRAMS					GRAND MEAN =	65.0 GRAMS				TEST DETERMINATIONS =		15
SD MEANS =	3.8 GRAMS					SD OF MEANS =	3.1 GRAMS				14 LABS IN GRAND MEANS		
	AVERAGE SDR =	3.2 GRAMS					AVERAGE SDR =	2.8 GRAMS					
GR. MEAN =	640.3 MILLINEWTON					GRAND MEAN =	637.7 MILLINEWTON						
L339	62.6	-2.7	-.71	2.1	.65	62.5	-2.5	-.81	2.9	1.03	17V	*	L339
L566	88.3	23.0	6.01	4.1	1.30	86.7	21.6	6.95	4.2	1.48	17X	*	L566

TOTAL NUMBER OF LABORATORIES REPORTING = 16

Best Values: E04 65 ± 4 grams
E17 65 ± 5 grams

Data from the following laboratories appeared to be off by a multiplicative factor: 339. Code 17V was assigned temporarily to put in a factor of 2.

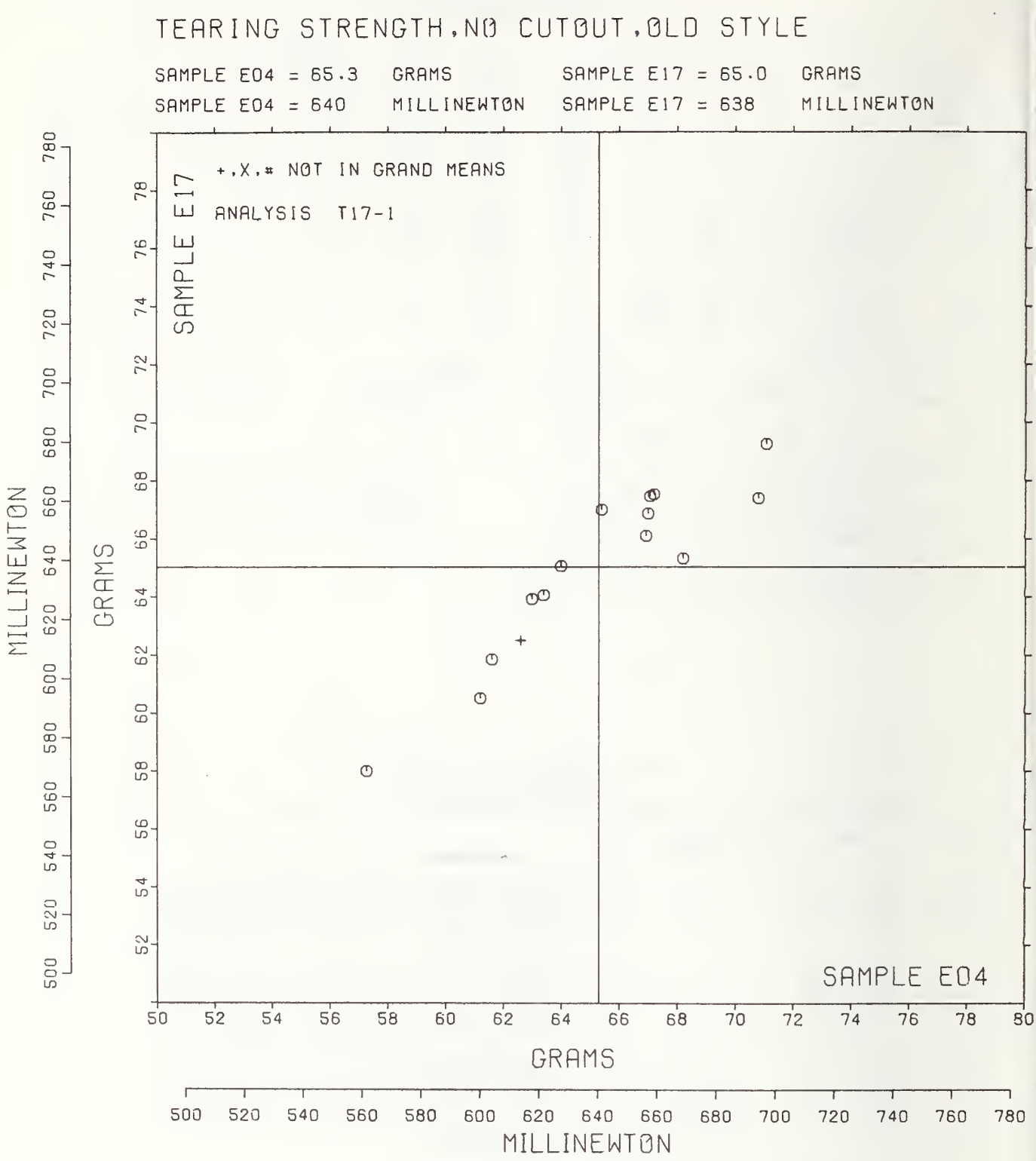
Data from the following laboratories were given X codes and omitted from the grand means because the tests were made on DEEP CUTOUT tear testers: 566.

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

REPORT NO. 49S TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977

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

LAB CODE	F	MEANS E04	E17	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L324	O	57.3	58.0	-10.7	-.5	1.07	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L231	O	61.2	60.5	-6.0	-.9	.37	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L174N	O	61.6	61.9	-4.9	-.2	1.16	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L339	*	62.6	62.5	-3.7	-.3	.84	17V	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORP(MULT BY 2)
L301	O	63.0	63.9	-2.5	.6	.57	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L326	O	63.4	64.1	-2.1	.4	.86	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORP
L148	O	64.0	65.1	-1.0	.8	1.10	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L269	O	65.4	67.0	1.3	1.5	1.05	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L267	O	66.9	66.1	1.9	-.2	.81	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORP
L308	O	67.0	66.9	2.5	.4	.74	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORP
L234	O	67.1	67.5	2.9	.8	.72	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORP
L366	O	67.2	67.5	3.1	.8	1.02	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORP
L562	O	68.2	65.3	2.5	-1.6	1.85	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L341	O	70.8	67.4	5.8	-1.6	.58	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L122	O	71.1	69.3	7.2	-.3	2.10	17N	TEARING STRENGTH, NO CUT OUT, THWING-ELMENDORF
L566	*	88.3	86.7	31.5	2.5	1.39	17X	TEARING STRENGTH
GMEANS:		65.3	65.0			1.00		
		95% ELLIPSE:		14.1	2.7	WITH GAMMA = 38 DEGREES		


TEARING STRENGTH,NO CUTOUT,OLD STYLE
SAMPLE E04 = 65.3 GRAMS
SAMPLE E04 = 640 MILLINEWTON
SAMPLE E17 = 65.0 GRAMS
SAMPLE E17 = 638 MILLINEWTON
+,X,* NOT IN GRAND MEANS
ANALYSIS T17-1
SAMPLE E17
SAMPLE E04
GRAMS
MILLINEWTON
50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80
500 520 540 560 580 600 620 640 660 680 700 720 740 760 780

ANALYSIS T19-1 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PACKAGING PAPER

TAPPI STANDARDS T404 OS-76 AND T494 OS-70, TENSILE BREAKING STRENGTH, PENDULUM AND CRE TYPES

LAB CODE	SAMPLE H56 KRAFT 147 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE H09 KRAFT 147 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	I.SDR	TEST D.* 20 VAR	F	LAB
L107	9.38	-.14	-.32	.97	1.59	6.80	-.24	-.82	.65	1.31	19A	O	L107
L122	9.91	.40	.91	.38	.62	7.14	.09	.31	.71	1.41	19A	O	L122
L126	9.31	-.20	-.47	.79	1.29	6.91	-.14	-.48	.56	1.11	19A	O	L126
L151	9.09	-.42	-.98	.57	.94	6.63	-.42	-1.41	.51	1.02	19A	O	L151
L153	9.87	.36	.82	.64	1.05	7.33	.29	.96	.46	.91	19P	O	L153
L157A	10.10	.59	1.35	.63	1.03	7.21	.17	.56	.59	1.17	19P	O	L157A
L157I	8.69	-.83	-1.91	.70	1.14	6.96	-.09	-.29	.50	1.01	19A	O	L157I
L167	9.99	.47	1.09	.36	.59	7.41	.36	1.22	.33	.65	19P	O	L167
L174	9.97	.45	1.04	.73	1.21	7.18	.13	.44	.59	1.18	19A	O	L174
L182I	9.61	.09	.21	.45	.73	6.84	-.21	-.71	.53	1.07	19D	O	L182I
L182L	9.39	-.12	-.29	.71	1.16	6.89	-.16	-.54	.56	1.12	19T	O	L182L
L207	8.47	-1.05	-2.41	.14	.22	7.50	.45	1.50	.58	1.16	19A	X	L207
L217A	9.05	-.46	-1.06	.51	.83	6.99	-.06	-.20	.50	1.00	19A	O	L217A
L217P	9.06	-.46	-1.06	.53	.87	7.16	.11	.36	.69	1.39	19P	O	L217P
L224	9.71	.19	.44	.98	1.61	7.14	.10	.32	.39	.77	19A	O	L224
L225	9.61	.09	.21	.72	1.17	7.29	.24	.81	.66	1.32	19P	O	L225
L234L	9.18	-.34	-.78	.52	.85	7.11	.06	.20	.70	1.39	19P	O	L234L
L237A	9.83	.32	.73	.53	.87	7.49	.44	1.47	.42	.85	19Q	O	L237A
L237B	9.68	.17	.39	.69	1.14	7.34	.29	.99	.50	1.01	19A	O	L237B
L238A	10.09	.58	1.32	.71	1.16	7.08	.04	.12	.54	1.08	19T	O	L238A
L243	9.51	-.00	-.00	.56	.91	6.74	-.31	-1.03	.54	1.09	19A	O	L243
L257A	9.59	.07	.17	.54	.88	7.14	.09	.30	.32	.64	19P	O	L257A
L257B	9.53	.01	.03	.44	.72	7.26	.21	.70	.28	.55	19P	O	L257B
L257C	9.44	-.08	-.18	.33	.53	7.01	-.04	-.13	.29	.57	19P	O	L257C
L264P	9.92	.40	.93	.41	.67	7.34	.29	.97	.43	.87	19P	O	L264P
L265	9.05	-.46	-1.07	.84	1.38	7.02	-.03	-.09	.33	.65	19A	O	L265
L267	8.66	-.86	-1.98	.54	.88	6.54	-.51	-1.70	.50	1.00	19A	O	L267
L268A	9.18	-.33	-.76	.58	.95	7.04	-.01	-.03	.45	.91	19A	O	L268A
L268P	9.60	.08	.18	.50	.82	7.26	.21	.70	.41	.83	19P	O	L268P
L273	9.84	.32	.74	.82	1.35	7.59	.55	1.83	.72	1.45	19P	O	L273
L274	9.63	.11	.26	.41	.67	6.92	-.13	-.44	.22	.45	19P	O	L274
L280	9.35	-.17	-.38	.53	.87	6.93	-.11	-.38	.43	.86	19G	O	L280
L281	10.18	.67	1.53	.58	.95	7.08	.03	.09	.40	.80	19G	O	L281
L305	10.37	.85	1.96	.40	.66	7.18	.14	.46	.27	.54	19P	O	L305
L312	9.25	-.26	-.60	.50	.82	7.08	.03	.09	.65	1.29	19D	O	L312
L318	8.91	-.61	-1.40	.62	1.01	6.63	-.42	-1.40	.44	.88	19G	O	L318
L324	9.40	-.12	-.27	.70	1.15	6.90	-.15	-.50	.46	.92	19A	O	L324
L334	10.10	.58	1.34	.58	.95	7.03	-.02	-.07	.80	1.60	19P	O	L334
L336	9.61	.10	.22	.58	.96	6.73	-.32	-1.06	.43	.85	19G	O	L336
L356	10.10	.58	1.34	.85	1.39	7.64	.59	1.97	.68	1.36	19P	O	L356
L392	9.63	.12	.27	.71	1.17	7.11	.06	.20	.61	1.22	19A	O	L392
L562	NO DATA REPORTED FOR SAMPLE H56					39.58	32.53	108.97	4.25	8.51	19X	M	L562
L565	9.42	-.10	-.23	.28	.47	7.61	.56	1.88	.34	.67	19T	*	L565
L568	9.44	-.08	-.18	.75	1.24	7.16	.11	.38	.34	.68	19P	O	L568
L575	9.27	-.24	-.56	.63	1.03	6.64	-.41	-1.37	.46	.93	19D	O	L575
L576	9.98	.46	1.07	.40	.65	6.43	-.61	-2.05	.53	1.05	19A	X	L576
L580	9.74	.22	.52	.73	1.20	7.06	.01	.04	.58	1.16	19G	O	L580
L582	9.22	-.30	-.68	.59	.96	6.46	-.59	-1.98	.56	1.13	19A	O	L582
L610	8.28	-1.23	-2.84	.49	.80	6.23	-.82	-2.74	.60	1.20	19A	*	L610
GR. MEAN =	9.52 KILONEWTON/M					GRAND MEAN =	7.05 KILONEWTON/M				TEST DETERMINATIONS =		20
SD MEANS =	.43 KILONEWTON/M					SD OF MEANS =	.30 KILONEWTON/M				46 LABS IN GRAND MEANS		
	AVERAGE SDR =		.61 KILONEWTON/M				AVERAGE SDR =		.50 KILONEWTON/M				
GR. MEAN =	54.35 LB/INCH					GRAND MEAN =	40.25 LB/INCH						
L250I	8.48	-1.03	-2.38	.71	1.17	6.07	-.97	-3.26	.41	.82	19L	*	L250I
L251	7.79	-1.72	-3.96	.76	1.25	6.48	-.57	-1.91	.44	.88	19I	*	L251

TOTAL NUMBER OF LABORATORIES REPORTING = 51

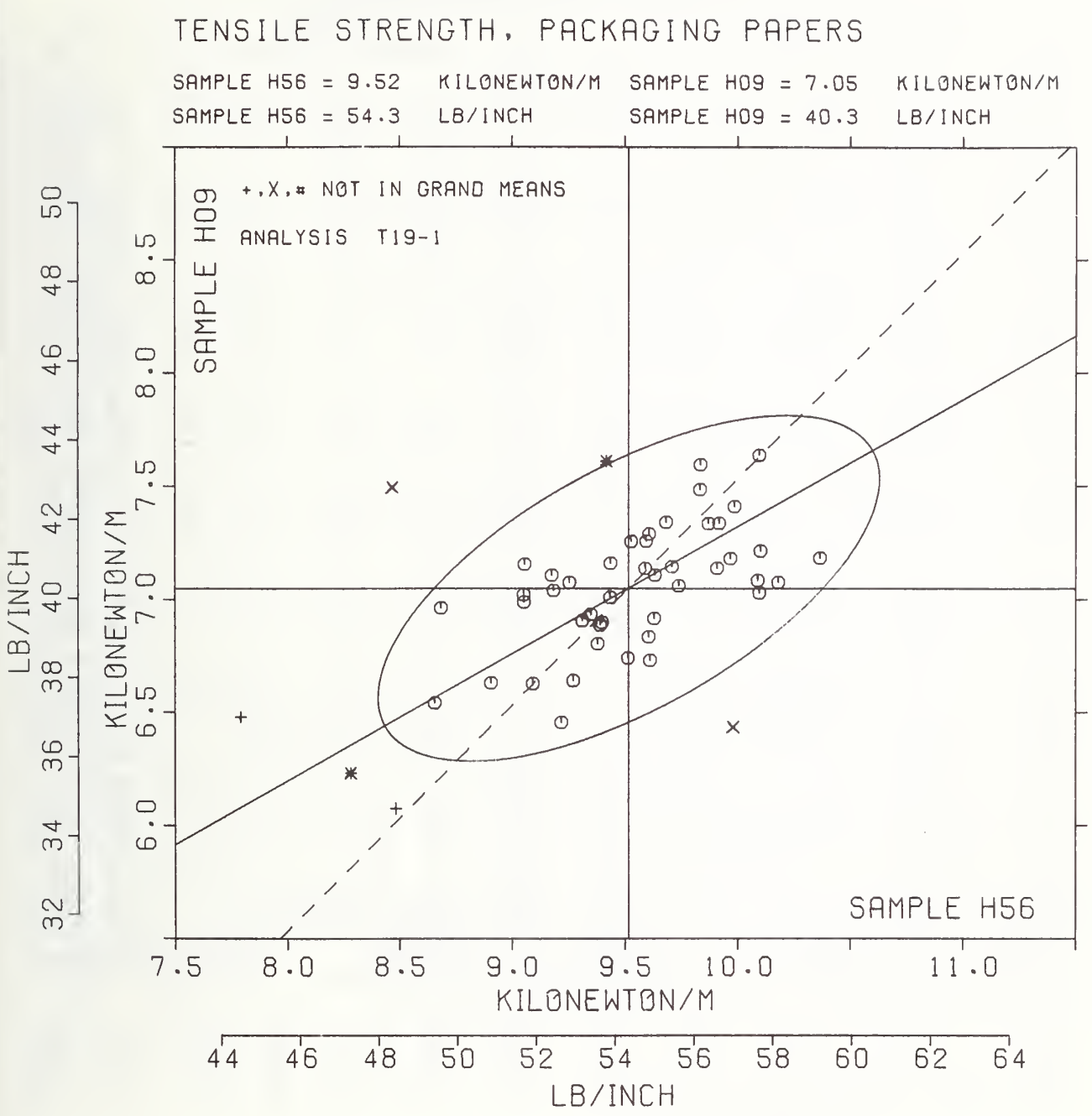
Best Values: H56 9.5 ± 0.6 kilonewton per meter
H09 7.0 ± 0.5 kilonewton per meter

ANALYSIS T19-1 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER - PACKAGING PAPER

TAPPI STANDARDS T404 OS-76 AND T494 OS-70, TENSILE BREAKING STRENGTH, PENDULUM AND CRE TYPES

LAB CODE	F	MEANS H56	MEANS H09	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L562	M		39.58			8.51	19X	TENSILH STRENGTH, PACKAGING PAPER: ( ) PENDULUM,( )LOAD CEL
L251	*	7.79	6.48	-1.78	.35	1.07	19I	TENSILE STRENGTH, PACKAGING PAPER, CRE, 20C, 65% RH
L610	*	8.28	6.23	-1.48	-.11	1.00	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L207	X	8.47	7.50	-.69	.90	.69	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L250I	*	8.48	6.07	-1.38	-.34	1.00	19L	TENSILE STRENGTH, PACKAGING PAPER, CRE, 20 C, 65% RH
L267	O	8.66	6.54	-1.00	-.02	.94	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L157I	O	8.69	6.96	-.77	.33	1.07	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L318	O	8.91	6.63	-.73	-.07	.95	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L265	O	9.05	7.02	-.42	.20	1.02	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L217A	O	9.05	6.99	-.43	.17	.91	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L217P	O	9.06	7.16	-.35	.32	1.13	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L151	O	9.09	6.63	-.58	-.16	.98	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L234L	O	9.18	7.11	-.27	.22	1.12	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L268A	O	9.18	7.04	-.29	.15	.93	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L582	O	9.22	6.46	-.55	-.37	1.04	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L312	O	9.25	7.08	-.21	.15	1.06	19D	TENSILH STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L575	O	9.27	6.64	-.41	-.24	.98	19D	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L126	O	9.31	6.91	-.25	-.02	1.20	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L280	O	9.35	6.93	-.20	-.02	.87	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L107	O	9.38	6.80	-.24	-.14	1.45	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L182L	O	9.39	6.89	-.19	-.08	1.14	19T	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L324	O	9.40	6.90	-.17	-.07	1.03	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L565	*	9.42	7.61	.19	.54	.57	19T	TENSILH STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L257C	O	9.44	7.01	-.09	.01	.55	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L568	O	9.44	7.16	-.01	.14	.96	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L243	O	9.51	6.74	-.15	-.27	1.00	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L257H	O	9.53	7.26	.11	.18	.64	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L257A	O	9.59	7.14	.11	.04	.76	19P	TENSILH STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L268P	O	9.60	7.26	.17	.14	.82	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L182I	O	9.61	6.84	-.02	-.23	.90	19D	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L225	O	9.61	7.29	.20	.16	1.24	19P	TENSILH STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L336	O	9.61	6.73	-.07	-.32	.91	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L274	O	9.63	6.92	.04	-.17	.56	19P	TENSILH STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L392	O	9.63	7.11	.13	-.01	1.20	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L237B	O	9.68	7.34	.29	.17	1.07	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L224	O	9.71	7.14	.22	-.01	1.19	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L580	O	9.74	7.06	.20	-.10	1.18	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L237A	O	9.83	7.49	.49	.23	.86	19Q	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L273	O	9.84	7.59	.55	.32	1.40	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L153	O	9.87	7.33	.45	.08	.98	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L122	O	9.91	7.14	.39	-.11	1.02	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L264P	O	9.92	7.34	.49	.05	.77	19P	TENSILH STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L174	O	9.97	7.18	.46	-.11	1.19	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L576	X	9.98	6.43	.10	-.76	.85	19A	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L167	O	9.99	7.41	.59	.09	.62	19P	TENSILH STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L238A	O	10.09	7.08	.52	-.25	1.12	19T	TENSILH STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L356	O	10.10	7.64	.79	.23	1.37	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L334	O	10.10	7.03	.50	-.30	1.28	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L157A	O	10.10	7.21	.59	-.14	1.10	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
L281	O	10.18	7.08	.59	-.30	.87	19G	TENSILE STRENGTH, PACKAGING PAPER, LOAD CELL (CRE)
L305	O	10.37	7.18	.81	-.30	.60	19P	TENSILE STRENGTH, PACKAGING PAPER, PENDULUM TESTER
GMEANS:		9.52	7.05			1.00		
		95% ELLIPSE:		1.24	.53	WITH GAMMA = 29 DEGREES		


TENSILE STRENGTH, PACKAGING PAPERS
SAMPLE H56 = 9.52 KILONEWTON/M SAMPLE H09 = 7.05 KILONEWTON/M
SAMPLE H56 = 54.3 LB/INCH SAMPLE H09 = 40.3 LB/INCH
+,X,* NOT IN GRAND MEANS
ANALYSIS T19-1
SAMPLE H09
KILONEWTON/M
LB/INCH
SAMPLE H56
KILONEWTON/M
LB/INCH

ANALYSIS T20-1 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

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

LAB CODE	SAMPLE B95 MEAN	HEAT SET OFFSET BOOK 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H43 MEAN	PRINTING 91 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.* 20 VAR	F	LAB
L100	4.46	-.03	-.18	.19	.98	7.55	.39	.75	.22	.71	20E	O	L100
L115	4.45	-.05	-.25	.18	.95	7.53	.36	.69	.17	.54	20D	O	L115
L118	4.60	.10	.56	.17	.90	7.42	.26	.50	.20	.66	20A	O	L118
L122	4.55	.05	.29	.23	1.19	7.30	.13	.26	.27	.87	20A	O	L122
L124C	4.45	-.04	-.22	.24	1.28	6.94	-.22	-.44	.48	1.58	20A	O	L124C
L125	4.65	.15	.84	.21	1.12	7.72	.55	1.07	.35	1.16	20C	O	L125
L131	4.76	.26	1.43	.30	1.57	7.73	.56	1.09	.41	1.35	20E	O	L131
L141T	4.55	.05	.28	.20	1.04	6.79	-.38	-.73	.36	1.17	20A	O	L141T
L143	5.01	.52	2.85	.22	1.14	8.39	1.22	2.37	.36	1.16	20E	#	L143
L148	4.65	.16	.86	.24	1.24	6.98	-.19	-.37	.54	1.77	20A	O	L148
L159	4.45	-.04	-.22	.29	1.54	5.90	-1.27	-2.45	.63	2.07	20A	O	L159
L163	4.63	.13	.74	.13	.67	7.37	.21	.40	.32	1.06	20D	O	L163
L176	4.30	-.20	-1.09	.29	1.52	7.19	.02	.03	.36	1.16	20E	O	L176
L185	4.50	.01	.04	.19	1.01	7.65	.48	.94	.21	.68	20C	O	L185
L190R	4.37	-.12	-.66	.14	.75	7.51	.34	.67	.15	.51	20A	O	L190R
L194	4.43	-.07	-.36	.18	.96	7.37	.20	.39	.20	.67	20A	O	L194
L206	4.75	.25	1.39	.10	.53	7.69	.52	1.01	.15	.47	20A	O	L206
L223B	4.60	.10	.57	.12	.63	7.58	.41	.80	.20	.65	20A	O	L223B
L226C	4.82	.32	1.77	.21	1.12	7.78	.61	1.18	.26	.84	20C	O	L226C
L230	4.38	-.12	-.64	.13	.70	7.16	-.01	-.01	.18	.59	20O	O	L230
L243	4.51	.01	.06	.15	.77	7.26	.09	.18	.27	.87	20A	O	L243
L255	4.70	.20	1.12	.17	.90	7.77	.60	1.17	.12	.40	20A	O	L255
L260	4.39	-.10	-.57	.20	1.04	4.96	-2.21	-4.28	.27	.89	20A	X	L260
L261	4.23	-.26	-1.44	.20	1.08	6.83	-.34	-.66	.34	1.12	20A	O	L261
L278	4.18	-.31	-1.71	.25	1.30	7.15	-.02	-.04	.32	1.04	20A	O	L278
L291	4.63	.13	.73	.43	2.25	8.72	1.56	3.01	.26	.85	20A	#	L291
L309	4.71	.21	1.17	.24	1.28	6.89	-.27	-.53	.66	2.15	20E	O	L309
L315	4.28	-.22	-1.19	.15	.81	7.18	.01	.02	.47	1.54	20A	O	L315
L318	4.23	-.27	-1.47	.13	.69	7.12	-.05	-.10	.18	.59	20G	O	L318
L328	4.55	.05	.30	.19	.98	7.47	.30	.59	.24	.79	20A	O	L328
L331	4.68	.18	1.00	.18	.93	5.93	-1.24	-2.40	.33	1.08	20A	*	L331
L333	4.43	-.06	-.33	.20	1.05	7.52	.36	.69	.22	.73	20A	O	L333
L344	4.33	-.17	-.91	.18	.96	7.49	.32	.62	.22	.72	20A	O	L344
L352	3.40	-1.10	-6.02	.27	1.42	NO DATA REPORTED FOR SAMPLE H43					20A	M	L352
L360	4.20	-.30	-1.64	.07	.37	6.48	-.69	-1.34	.25	.83	20B	O	L360
L378	4.53	.04	.20	.16	.83	6.56	-.61	-1.17	.22	.73	20A	O	L378
L390	4.43	-.06	-.34	.18	.94	7.43	.27	.52	.64	2.09	20A	O	L390
L531	4.66	.16	.89	.27	1.42	7.73	.56	1.09	.28	.91	20A	O	L531
L563A	4.00	-.50	-2.72	.38	1.98	6.41	-.76	-1.46	.58	1.90	20A	*	L563A
L567	4.58	.09	.49	.19	1.00	6.34	-.83	-1.61	.21	.70	20A	O	L567
L574	4.60	.11	.58	.14	.76	7.63	.47	.90	.20	.67	20A	O	L574
L575	4.46	-.03	-.17	.21	1.13	6.22	-.95	-1.83	.53	1.72	20D	O	L575
L587	4.51	.02	.10	.29	1.52	NO DATA REPORTED FOR SAMPLE H43					20A	M	L587
L592	4.67	.17	.95	.20	1.05	6.97	-.20	-.38	.27	.87	20A	O	L592

GR. MEAN = 4.49 KILONEWTON/M — GRAND MEAN = 7.17 KILONEWTON/M — TEST DETERMINATIONS = 20

SD MEANS = .18 KILONEWTON/M — SD OF MEANS = .52 KILONEWTON/M — 39 LABS IN GRAND MEANS

AVERAGE SDR = .19 KILONEWTON/M — AVERAGE SDR = .31 KILONEWTON/M

GR. MEAN =15.160 LB/15 MM — GRAND MEAN =24.174 LB/15 MM

L139	4.37	-.13	-.71	.20	1.05	6.68	-.49	-.94	.28	.91	20H	*	L139
L231	4.66	.16	.90	.19	1.02	6.70	-.47	-.91	.52	1.69	20H	*	L231
L250I	4.15	-.34	-1.88	.13	.68	6.47	-.70	-1.35	.20	.67	20L	*	L250I
L251	3.69	-.81	-4.41	.27	1.44	6.30	-.86	-1.67	.50	1.62	20I	*	L251
L563P	4.33	-.16	-.89	.26	1.39	6.99	-.18	-.35	.40	1.31	20P	*	L563P

TOTAL NUMBER OF LABORATORIES REPORTING = 49

Best Values: B95 4.5 ± 0.3 kilonewton per meter
H43 7.2 ± 0.8 kilonewton per meter

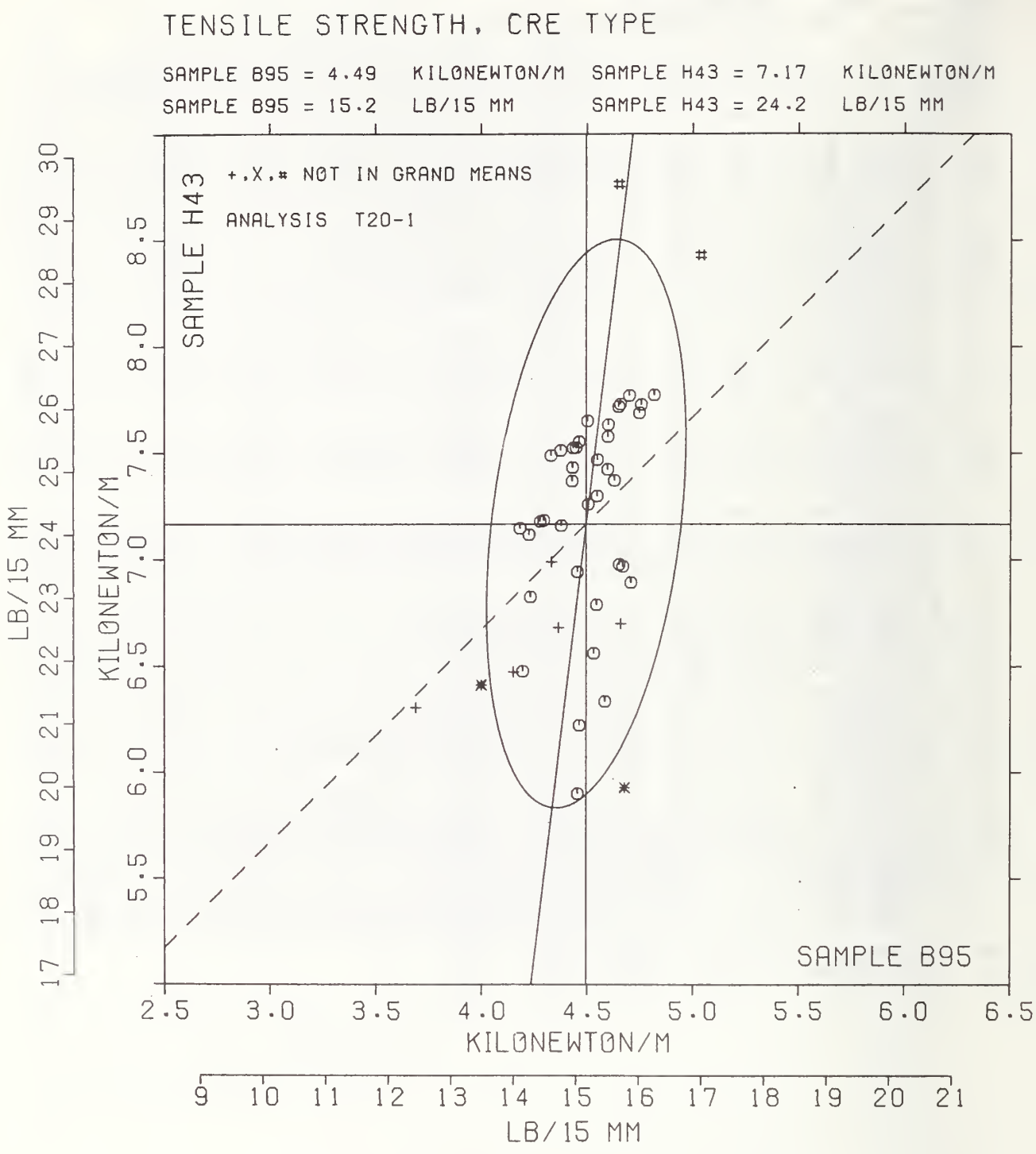
The following laboratories were omitted from the grand means because of extreme test results: 143, 291.

ANALYSIS T20-1 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

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

LAB CODE	F	MEANS H95	H43	COORDINATES MAJOR	MINOR	AVG M.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L352	M	3.40				1.42	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE
L251	*	3.69	6.30	-.95	.70	1.53	20I	TENSILE STRENGTH, PRINTING PAPER, CRE, 20 C, 65% RH
L563A	*	4.00	6.41	-.81	.40	1.94	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L250I	*	4.15	6.47	-.73	.26	.67	20L	TENSILE STRENGTH, PRINTING PAPER, CRE, 20 C, 65% RH
L278	O	4.18	7.15	-.06	.31	1.17	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L360	O	4.20	6.48	-.72	.21	.60	20B	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L318	O	4.23	7.12	-.08	.26	.64	20G	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L261	O	4.23	6.83	-.37	.22	1.10	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L315	O	4.23	7.18	-.01	.22	1.18	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L176	O	4.30	7.19	-.01	.20	1.34	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L344	O	4.33	7.49	.30	.20	.84	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L563P	*	4.33	6.99	-.20	.14	1.35	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L139	*	4.37	6.68	-.50	.07	.98	20H	TENSILE STRENGTH, PRINTING PAPER, CRE, SHORT TEST SPAN
L190R	O	4.37	7.51	.33	.16	.63	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L230	O	4.38	7.16	-.02	.11	.65	20G	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L260	X	4.39	4.96	-2.21	-.16	.96	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L194	O	4.43	7.37	.19	.09	.81	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L390	O	4.43	7.43	.26	.09	1.52	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L333	O	4.43	7.52	.35	.10	.89	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L115	O	4.45	7.53	.35	.09	.74	20D	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L124C	O	4.45	6.94	-.23	.01	1.43	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L159	O	4.45	5.90	-1.26	-.11	1.81	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L100	O	4.46	7.55	.38	.08	.84	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L575	O	4.46	6.22	-.94	-.08	1.42	20D	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L185	O	4.50	7.65	.48	.05	.84	20C	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L243	O	4.51	7.26	.09	-.00	.82	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L587	M	4.51				1.52	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE
L378	O	4.53	6.56	-.60	-.11	.78	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L141T	O	4.55	6.79	-.37	-.10	1.11	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L122	O	4.55	7.30	.14	-.04	1.03	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L328	O	4.55	7.47	.31	-.02	.89	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L567	O	4.58	6.34	-.82	-.19	.85	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L118	O	4.60	7.42	.27	-.07	.78	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L223B	O	4.60	7.58	.42	-.05	.64	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L574	O	4.60	7.63	.48	-.05	.71	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L291	#	4.63	8.72	1.56	.05	1.55	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L163	O	4.63	7.37	.22	-.11	.86	20D	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L125	O	4.65	7.72	.56	-.09	1.14	20C	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L148	O	4.65	6.98	-.17	-.18	1.51	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L531	O	4.66	7.73	.58	-.09	1.17	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L231	*	4.66	6.70	-.45	-.22	1.36	20H	TENSILE STRENGTH, PRINTING PAPER, CRE, SHORT TEST SPAN
L592	O	4.67	6.97	-.18	-.20	.96	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L331	*	4.68	5.93	-1.21	-.33	1.00	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L255	O	4.70	7.77	.62	-.13	.65	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L309	O	4.71	6.89	-.25	-.24	1.71	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L206	O	4.75	7.69	.55	-.19	.50	20A	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L131	O	4.76	7.73	.59	-.19	1.46	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L226C	O	4.82	7.78	.64	-.25	.98	20C	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
L143	#	5.01	8.39	1.28	-.37	1.15	20E	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, LOAD CELL (CRE)
GMEANS:		4.49	7.17			1.00		
		95% ELLIPSE:		1.34	.45	WITH GAMMA = 83 DEGREES		


TENSILE STRENGTH, CRE TYPE
SAMPLE B95 = 4.49 KILONEWTON/M SAMPLE H43 = 7.17 KILONEWTON/M
SAMPLE B95 = 15.2 LB/15 MM SAMPLE H43 = 24.2 LB/15 MM
+,X,* NOT IN GRAND MEANS
ANALYSIS T20-1
SAMPLE H43
KILONEWTON/M
LB/15 MM
SAMPLE B95
KILONEWTON/M
LB/15 MM

ANALYSIS T20-2 TABLE 1

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

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

	SAMPLE	HEAT SET OFFSET BOOK				SAMPLE	PRINTING				TEST D.= 20		
LAB	B95	91 GRAMS PER SQUARE METER				H43	91 GRAMS PER SQUARE METER						
CODE	MEAN	DEV	N.DEV	SDR	R.SDR	MEAN	DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
L103	4.70	.14	.50	.18	.88	7.76	.76	.90	.25	.78	20R	O	L103
L108	4.68	.12	.42	.12	.60	5.94	-1.06	-1.25	.27	.85	20P	O	L108
L121	4.86	.31	1.08	.20	.96	7.89	.89	1.05	.25	.81	20P	O	L121
L124P	4.31	-.25	-.87	.37	1.80	7.17	.17	.20	.33	1.05	20P	O	L124P
L128	4.55	.04	.12	.19	.94	7.40	.40	.48	.25	.81	20T	O	L128
L148	4.52	-.04	-.13	.17	.83	6.51	-.48	-.57	.60	1.91	20P	O	L148
L162	4.65	.09	.32	.20	.98	7.42	.42	.50	.35	1.10	20T	O	L162
L182L	4.53	-.03	-.09	.13	.63	7.26	.26	.31	.28	.88	20T	O	L182L
L189	4.89	.33	1.16	.29	1.39	7.69	.69	.81	.38	1.21	20R	O	L189
L191P	4.59	.04	.14	.20	.99	7.30	.30	.36	.28	.88	20P	O	L191P
L195	4.52	-.03	-.10	.30	1.44	7.34	.34	.40	.39	1.23	20R	O	L195
L213	4.70	.15	.52	.23	1.12	7.30	.30	.35	.46	1.48	20T	O	L213
L218	4.21	-.35	-1.21	.20	.96	7.79	.79	.94	.23	.74	20P	O	L218
L241	4.70	.14	.49	.20	.98	7.61	.61	.72	.19	.60	20R	O	L241
L242	4.25	-.31	-1.07	.19	.90	7.24	.24	.29	.27	.87	20Y	O	L242
L249	4.49	-.07	-.24	.17	.83	7.30	.30	.35	.20	.64	20P	O	L249
L254	4.51	-.04	-.16	.16	.78	7.52	.52	.61	.20	.63	20P	O	L254
L259	5.12	.56	1.96	.21	1.03	6.79	-.21	-.25	.60	1.90	20P	O	L259
L262	4.33	-.23	-.79	.14	.66	7.64	.64	.75	.16	.52	20R	O	L262
L274	4.43	-.12	-.42	.14	.68	7.41	.41	.48	.19	.62	20P	O	L274
L275	4.34	-.21	-.75	.27	1.31	6.73	-.27	-.31	.37	1.18	20R	O	L275
L279P	4.26	-.29	-1.03	.23	1.12	5.85	-1.15	-1.35	.45	1.43	20P	O	L279P
L285	4.08	-.47	-1.65	.12	.56	4.90	-2.10	-2.47	.11	.36	20P	*	L285
L290	4.15	-.40	-1.41	.14	.70	6.36	-.64	-.76	.29	.91	20P	O	L290
L311	4.14	-.42	-1.45	.19	.92	6.92	-.08	-.09	.36	1.13	20V	O	L311
L321	5.20	.65	2.25	.30	1.44	7.77	.78	.92	.41	1.32	20V	O	L321
L322	4.32	-.24	-.83	.35	1.68	4.49	-2.51	-2.96	.39	1.24	20P	*	L322
L330	5.04	.48	1.69	.19	.93	5.64	-1.36	-1.61	.50	1.58	20P	*	L330
L356	4.57	.01	.05	.32	1.54	5.37	-1.63	-1.93	.29	.93	20P	O	L356
L362	4.68	.13	.44	.26	1.23	7.38	.38	.45	.48	1.54	20R	O	L362
L370	5.15	.59	2.06	.16	.76	7.78	.78	.93	.19	.61	20P	O	L370
L376	4.64	.09	.30	.18	.85	7.70	.71	.83	.30	.95	20P	O	L376
L393	4.71	.15	.54	.16	.77	7.40	.40	.48	.29	.94	20P	O	L393
L484	4.32	-.24	-.83	.26	1.24	7.10	.10	.12	.24	.78	20U	O	L484
L585	4.31	-.24	-.84	.11	.55	6.94	-.06	-.07	.13	.41	20V	O	L585
L599	4.50	-.05	-.17	.25	1.20	7.35	.35	.42	.42	1.35	20V	O	L599

GR. MEAN = 4.55 KILONEWTON/M GRAND MEAN = 7.00 KILONEWTON/M TEST DETERMINATIONS = 20

SD MEANS = .29 KILONEWTON/M SD OF MEANS = .85 KILONEWTON/M 36 LABS IN GRAND MEANS

AVERAGE SDR = .21 KILONEWTON/M AVERAGE SDR = .31 KILONEWTON/M

GR. MEAN =15.360 LB/15 MM GRAND MEAN =23.603 LB/15 MM

TOTAL NUMBER OF LABORATORIES REPORTING = 36

Best Values: B95 4.5 $\pm$ 0.5 kilonewton per meter

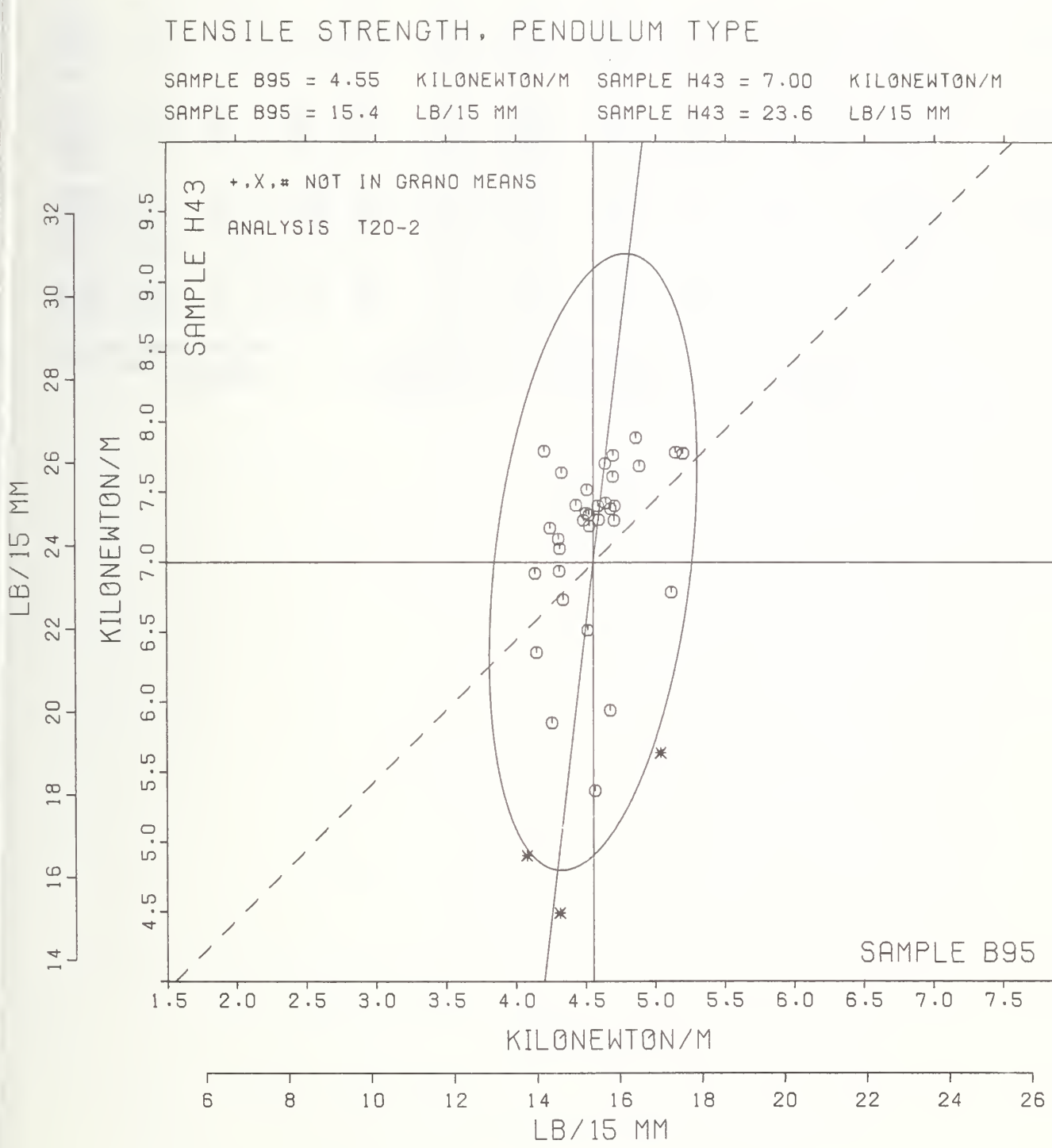
H43 7.2 $\pm$ 1.3 kilonewton per meter

ANALYSIS T20-2 TABLE 2

TENSILE BREAKING STRENGTH, KILONEWTONS PER METER

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

LAB CODE	F	MEANS H95	MEANS H43	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L285	*	4.08	4.90	-2.14	.23	.46	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L311	O	4.14	6.92	-.13	.40	1.02	20V	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L290	O	4.15	6.36	-.69	.33	.80	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L218	O	4.21	7.79	.75	.44	.85	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L242	O	4.25	7.24	.21	.33	.88	20Y	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L279P	O	4.26	5.85	-1.17	.16	1.27	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L124P	O	4.31	7.17	.14	.27	1.43	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L585	O	4.31	6.94	-.09	.23	.48	20V	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L322	*	4.32	4.49	-2.52	-.05	1.46	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L484	O	4.32	7.10	.07	.25	1.01	20U	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L262	O	4.33	7.64	.61	.30	.59	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L275	O	4.34	6.73	-.29	.18	1.25	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L274	O	4.43	7.41	.39	.17	.65	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L249	O	4.49	7.30	.29	.10	.74	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L599	O	4.50	7.35	.34	.09	1.27	20V	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L254	O	4.51	7.52	.51	.10	.71	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L148	O	4.52	6.51	-.49	-.02	1.37	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L195	O	4.52	7.34	.33	.07	1.34	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L182L	O	4.53	7.26	.25	.05	.75	20T	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L356	O	4.57	5.37	-1.62	-.20	1.24	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L128	O	4.59	7.40	.40	.01	.87	20T	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L191P	O	4.59	7.30	.31	-.00	.93	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L376	O	4.64	7.70	.71	-.00	.90	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L162	O	4.65	7.42	.43	-.04	1.04	20T	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L108	O	4.68	5.94	-1.04	-.24	.73	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L362	O	4.68	7.38	.40	-.08	1.39	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L241	O	4.70	7.61	.62	-.07	.79	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L103	O	4.70	7.76	.78	-.05	.83	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L213	O	4.70	7.30	.31	-.11	1.30	20T	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L393	O	4.71	7.40	.42	-.11	.85	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L121	O	4.86	7.89	.92	-.20	.88	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L189	O	4.89	7.69	.72	-.25	1.30	20R	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L330	*	5.04	5.64	-1.30	-.64	1.26	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L259	O	5.12	6.79	-.15	-.58	1.47	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L370	O	5.15	7.78	.85	-.50	.69	20P	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
L321	O	5.20	7.77	.85	-.55	1.38	20V	TENSILE STRENGTH, PRIMARILY PRINTING PAPERS, PENDULUM TESTER
GMEANS:		4.55	7.00			1.00		
		95% ELLIPSE:		2.21	.70	WITH GAMMA = 83 DEGREES		


TENSILE STRENGTH, PENDULUM TYPE
SAMPLE B95 = 4.55 KILONEWTON/M SAMPLE H43 = 7.00 KILONEWTON/M
SAMPLE B95 = 15.4 LB/15 MM SAMPLE H43 = 23.6 LB/15 MM
+,X,* NOT IN GRAND MEANS
ANALYSIS T20-2
SAMPLE H43
KILONEWTON/M
LB/15 MM
SAMPLE B95
KILONEWTON/M
LB/15 MM

ANALYSIS T25-1 TABLE 1

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER

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

LAB CODE	SAMPLE H56 KRAFT 147 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE H09 KRAFT 147 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	VAR	P	LAB	TEST D.= 20
L122	132.4	36.6	5.84	14.7	1.06	249.9	57.3	4.61	52.4	1.82	25P	#	L122	
L126	97.2	1.4	.22	17.2	1.23	198.1	5.5	.44	32.2	1.12	25G	O	L126	
L151	104.5	8.7	1.39	18.0	1.29	202.4	9.8	.79	35.2	1.22	25F	O	L151	
L174	90.9	-5.0	-.79	17.5	1.26	188.5	-4.1	-.33	33.1	1.15	25Y	O	L174	
L182	96.7	.9	.14	10.5	.75	196.5	3.9	.31	24.8	.86	25B	O	L182	
L234B	102.0	6.2	.98	18.6	1.33	224.9	32.3	2.60	32.6	1.13	25H	O	L234B	
L237B	102.1	6.2	.99	14.9	1.06	184.9	-7.7	-.62	28.9	1.00	25B	O	L237B	
L243	91.0	-4.8	-.76	10.2	.73	186.0	-6.6	-.53	29.4	1.02	25Z	O	L243	
L250	95.1	-.7	-.11	12.2	.88	189.9	-2.7	-.22	20.9	.73	25A	O	L250	
L265	94.0	-1.8	-.29	12.7	.91	175.7	-16.9	-1.36	23.3	.81	25E	O	L265	
L267	82.4	-13.4	-2.14	13.2	.95	178.6	-14.0	-1.13	32.6	1.13	25F	O	L267	
L268	2602.9	2507.0	399.97	591.8	42.44	6220.4	6027.8	485.46	1034.7	35.93	25F	#	L268	
L273	52.2	-43.6	-6.96	5.8	.42	120.7	-71.9	-5.79	16.0	.56	25F	#	L273	
L280	95.1	-.7	-.12	11.5	.83	198.0	5.4	.44	25.9	.90	25B	O	L280	
L312	127.5	31.7	5.05	13.9	.99	242.0	49.4	3.98	39.4	1.37	25J	#	L312	
L318	94.9	-.9	-.15	12.9	.92	195.8	3.2	.26	23.5	.82	25A	O	L318	
L336	105.4	9.6	1.53	11.9	.85	196.7	4.1	.33	31.0	1.08	25A	O	L336	
L580	90.2	-5.6	-.89	13.9	1.00	180.3	-12.3	-.99	29.7	1.03	25C	O	L580	

GR. MEAN = 95.8 JOULES/SQ M GRAND MEAN = 192.6 JOULES/SQ M TEST DETERMINATIONS = 20

SD MEANS = 6.3 JOULES/SQ M SD OF MEANS = 12.4 JOULES/SQ M 14 LABS IN GRAND MEANS

AVERAGE SDR = 13.9 JOULES/SQ M AVERAGE SDR = 28.8 JOULES/SQ M

GR. MEAN = 6.56 FT.LB/SQ FT GRAND MEAN = 13.19 FT.LB/SQ FT

TOTAL NUMBER OF LABORATORIES REPORTING = 18

Best Values: H56 95 $\pm$ 10 joules per square meter
H09 190 $\pm$ 15 joules per square meter

The following laboratories were omitted from the grand means because of extreme test results: 122, 273, 312.

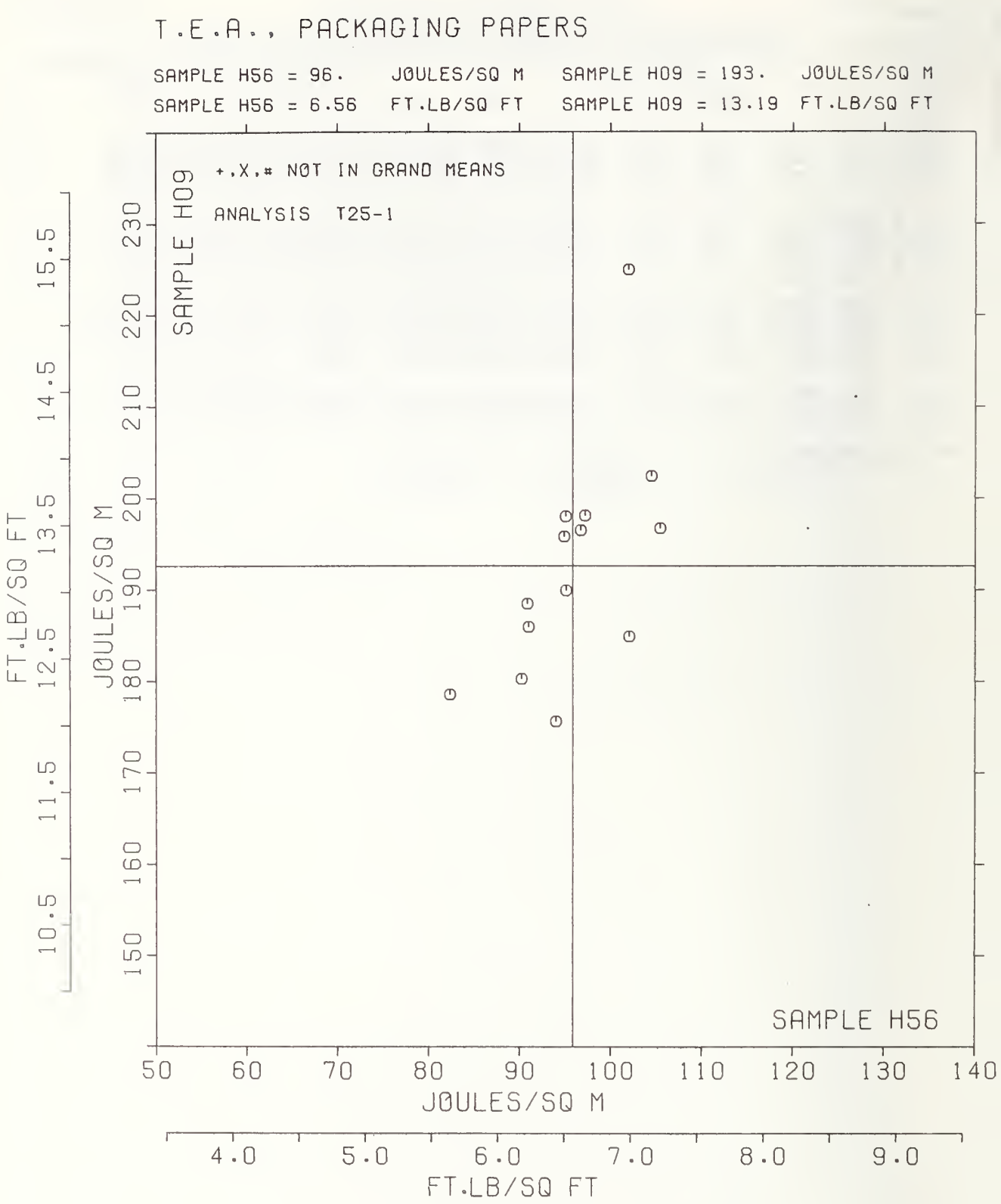
Data from the following laboratories were not understood: 268.

ANALYSIS T25-1 TABLE 2

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PACKAGING PAPER

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

LAB CODE	F	MEANS B56	MEANS B09	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L273	#	52.2	120.7	-82.5	16.5	.49	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L267	O	82.4	178.6	-17.7	7.8	1.04	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L580	O	90.2	180.3	-13.5	1.1	1.01	25C	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/LINE JAWS
L174	O	90.9	188.5	-5.5	3.3	1.20	25Y	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L243	O	91.0	186.0	-7.9	2.3	.88	25Z	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/LINE JAWS
L265	O	94.0	175.7	-16.5	-4.1	.86	25E	TENSILE ENERGY ABS.,PACKAGING PAPER,FLAT/FLAT JAWS
L318	O	94.9	195.8	2.7	2.0	.87	25A	TENSILE ENERGY ABS.,PACKAGING PAPER,FLAT/FLAT JAWS
L280	O	95.1	198.0	4.8	2.5	.86	25B	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L250	O	95.1	189.9	-2.8	-.2	.80	25A	TENSILE ENERGY ABS.,PACKAGING PAPER,FLAT/FLAT JAWS
L182	O	96.7	196.5	4.0	.5	.81	25B	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L126	O	97.2	198.1	5.6	.6	1.17	25G	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/LINE JAWS
L234B	O	102.0	224.9	32.5	5.2	1.23	25E	TENSILE ENERGY ABS.,PACKAGING PAPER,2-PIN STRAIN GAGE
L237B	O	102.1	184.9	-5.1	-8.5	1.03	25H	TENSILE ENERGY ABS.,PACKAGING PAPER,2-PIN STRAIN GAGE
L151	O	104.5	202.4	12.2	-4.8	1.26	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L336	O	105.4	196.7	7.2	-7.6	.97	25A	TENSILE ENERGY ABS.,PACKAGING PAPER,FLAT/FLAT JAWS
L312	#	127.5	242.0	57.2	-13.0	1.18	25J	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
L122	#	132.4	249.9	66.3	-14.9	1.44	25P	TENSILE ENERGY ABS.,PACKAGING PAPER,PATTERNED FLAT JAWS
L268	#	2602.9	6220.4	6521.2	-307.4	39.18	25F	TENSILE ENERGY ABS.,PACKAGING PAPER,LINE/FLAT JAWS
GMEANS:		95.8	192.6			1.00		
		95% ELLIPSE:		38.0	13.6	WITH GAMMA = 70 DEGREES		


T.E.A., PACKAGING PAPERS
SAMPLE H56 = 96. JOULES/SQ M
SAMPLE H56 = 6.56 FT.LB/SQ FT
SAMPLE H09 = 193. JOULES/SQ M
SAMPLE H09 = 13.19 FT.LB/SQ FT
+,X,* NOT IN GRAND MEANS
ANALYSIS T25-1
SAMPLE H09
SAMPLE H56
JOULES/SQ M
FT.LB/SQ FT
50 60 70 80 90 100 110 120 130 140
150 160 170 180 190 200 210 220 230
10.5 11.5 12.5 13.5 14.5 15.5
4.0 5.0 6.0 7.0 8.0 9.0

ANALYSIS T26-1 TABLE 1

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER

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

LAB CODE	SAMPLE B95 HEAT SET OFFSET BOOK 91 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE H43 PRINTING 91 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.= 20 VAR	F	LAB
L100	38.0	-3.2	-.99	4.3	.85	88.2	6.3	.44	6.6	.79	26A	@	L100
L115	43.6	2.4	.74	3.6	.72	88.1	6.3	.44	4.1	.49	26C	@	L115
L118	42.9	1.7	.52	4.6	.92	93.1	11.3	.78	7.4	.88	26E	@	L118
L121	37.7	-3.5	-1.08	5.9	1.18	87.8	5.9	.41	7.6	.90	26D	@	L121
L122	3.2	-38.0	-11.73	.5	.10	7.3	-74.6	-5.16	.7	.09	26P	#	L122
L139	37.5	-3.7	-1.15	6.0	1.20	67.9	-13.9	-.96	9.3	1.12	26H	@	L139
L159	41.9	.7	.21	8.5	1.69	58.5	-23.3	-1.61	13.5	1.62	26F	@	L159
L163	41.7	.5	.15	3.5	.69	84.7	2.9	.20	11.6	1.39	26J	@	L163
L185	39.0	-2.2	-.68	5.9	1.17	91.2	9.4	.65	6.6	.79	26C	@	L185
L206	42.4	1.1	.35	2.6	.51	90.0	8.2	.57	4.9	.59	26Y	@	L206
L231	37.4	-3.9	-1.20	6.5	1.29	62.8	-19.0	-1.32	15.2	1.82	26E	@	L231
L250	46.8	5.5	1.70	4.2	.83	97.5	15.7	1.09	6.3	.76	26A	@	L250
L255	48.0	6.7	2.08	5.8	1.15	109.8	27.9	1.93	8.0	.95	26P	@	L255
L309	4.3	-36.9	-11.40	.7	.14	11.6	-70.3	-4.86	2.6	.31	26A	#	L309
L318	43.1	1.9	.58	5.6	1.11	95.1	13.2	.92	7.7	.92	26A	@	L318
L378	42.8	1.6	.50	3.7	.74	75.2	-6.7	-.46	7.7	.92	26A	@	L378
L393	36.4	-4.8	-1.49	3.8	.75	75.5	-6.3	-.43	6.4	.76	26V	@	L393
L567	42.2	1.0	.30	5.4	1.07	82.2	.4	.03	5.8	.69	26A	@	L567
L575	41.7	.5	.14	5.3	1.06	65.6	-16.2	-1.12	15.1	1.81	26B	@	L575
L587	40.4	-.8	-.25	6.0	1.19	NO DATA REPORTED FOR SAMPLE B43					26C	M	L587
L592	39.1	-2.2	-.67	5.3	1.06	59.6	-22.2	-1.54	6.8	.82	26G	@	L592

GR. MEAN = 41.2 JOULES/SQ M GRAND MEAN = 81.8 JOULES/SQ M TEST DETERMINATIONS = 20

SD MEANS = 3.2 JOULES/SQ M SD OF MEANS = 14.4 JOULES/SQ M 18 LABS IN GRAND MEANS

AVERAGE SDR = 5.0 JOULES/SQ M AVERAGE SDR = 8.3 JOULES/SQ M

GR. MEAN = 2.825 FT.LB/SQ FT GRAND MEAN = 5.605 FT.LB/SQ FT

TOTAL NUMBER OF LABORATORIES REPORTING = 21

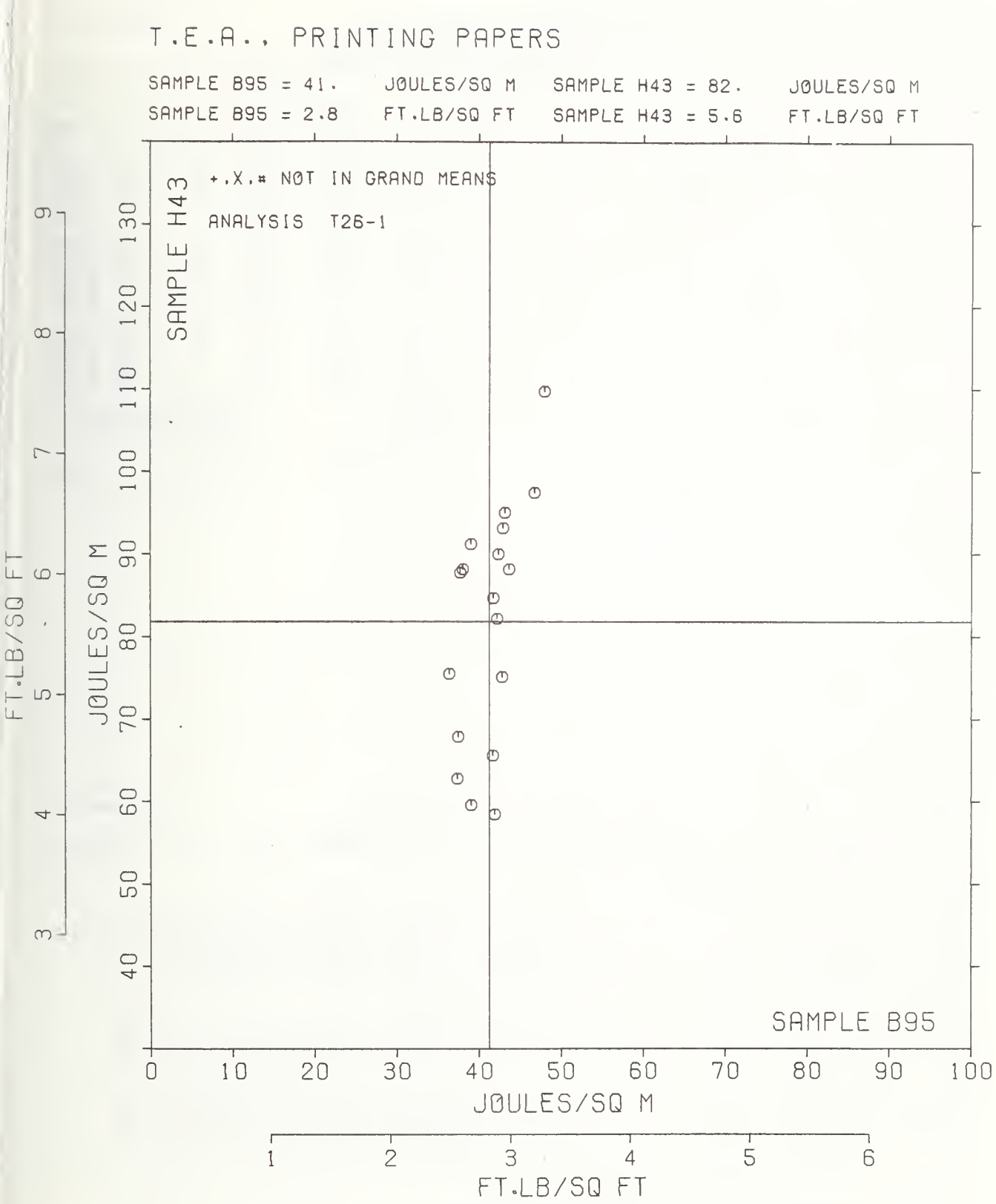
Data from the following laboratories were not understood: 122, 309.

ANALYSIS T26-1 TABLE 2

TENSILE ENERGY ABSORPTION, JOULES PER SQUARE METER - PRINTING PAPER

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

LAB CODE	P	MEANS BSS	MEANS H43	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L122	#	3.2	7.3	-78.9	27.9	.09	26P	TENSILE ENERGY ABS.,PRINTING PAPERS,PATTERNED FLAT JAWS
L309	#	4.3	11.6	-74.5	27.4	.23	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L393	O	36.4	75.5	-6.9	4.0	.76	26V	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/FLAT JAWS
L231	O	37.4	62.8	-19.4	1.4	1.55	26E	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L139	O	37.5	67.9	-14.3	1.9	1.16	26H	TENSILE ENERGY ABS.,PRINTING PAPERS,2-PIN STRAIN GAGE
L121	O	37.7	87.8	5.4	4.3	1.04	26D	TENSILE ENERGY ABS.,PRINTING PAPERS,2-PIN STRAIN GAGE
L100	O	38.0	88.2	5.9	4.0	.82	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L185	O	39.0	91.2	9.0	3.4	.98	26C	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/LINE JAWS
L592	O	39.1	59.6	-22.3	-.8	.94	26G	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/LINE JAWS
L587	M	40.4				1.19	26C	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/LINE JAWS
L575	O	41.7	65.6	-16.0	-2.6	1.43	26B	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/FLAT JAWS
L163	O	41.7	84.7	2.9	-.1	1.04	26J	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/FLAT JAWS
L159	O	41.9	58.5	-23.0	-3.7	1.65	26P	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/FLAT JAWS
L567	O	42.2	82.2	.5	-.9	.88	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L206	O	42.4	90.0	8.3	-.1	.55	26Y	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/FLAT JAWS
L378	O	42.8	75.2	-6.4	-2.5	.83	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L118	O	42.9	93.1	11.5	-.2	.90	26E	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L318	O	43.1	95.1	13.4	-.1	1.01	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L115	O	43.6	88.1	6.6	-1.6	.60	26C	TENSILE ENERGY ABS.,PRINTING PAPERS,LINE/LINE JAWS
L250	O	46.8	97.5	16.3	-3.4	.79	26A	TENSILE ENERGY ABS.,PRINTING PAPERS,FLAT/FLAT JAWS
L299	O	48.0	109.8	28.6	-3.0	1.05	26P	TENSILE ENERGY ABS.,PRINTING PAPERS,PATTERNED FLAT JAWS
GMEANS:		41.2	81.8			1.00		
		95% ELLIPSE:		40.5	7.3	WITH GAMMA = 82 DEGREES		


T.E.A., PRINTING PAPERS
SAMPLE B95 = 41. JOULES/SQ M
SAMPLE B95 = 2.8 FT.LB/SQ FT
SAMPLE H43 = 82. JOULES/SQ M
SAMPLE H43 = 5.6 FT.LB/SQ FT
+,X,* NOT IN GRAND MEANS
ANALYSIS T26-1
SAMPLE H43
SAMPLE B95
JOULES/SQ M
FT.LB/SQ FT
0 10 20 30 40 50 60 70 80 90 100
40 50 60 70 80 90 100 110 120 130
3 4 5 6 7 8 9
1 2 3 4 5 6

REPORT NO. 49S TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977

ANALYSIS T28-1 TABLE 1

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

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

LAB CODE	SAMPLE 856 MEAN	KRAFT 147 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H09 MEAN	KRAFT 147 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F. 20 VAR	P	LAB
L122	2.04	.30	1.32	.29	1.95	5.01	.74	1.90	.75	1.51	28P	6	L122
L126	1.57	-.17	-.74	.15	1.00	4.12	-.16	-.40	.45	.90	28C	6	L126
L151	1.96	.22	.98	.12	.83	4.54	.27	.69	.45	.92	28B	6	L151
L182	1.60	-.14	-.61	.11	.76	4.14	-.13	-.34	.30	.60	28B	6	L182
L243	1.48	-.26	-1.14	.10	.68	3.92	-.35	-.90	.38	.76	28C	6	L243
L265	1.67	-.07	-.29	.13	.87	4.02	-.25	-.65	.38	.77	28A	6	L265
L267	1.56	-.18	-.81	.16	1.11	3.95	-.32	-.83	.52	1.05	28B	6	L267
L268	1.55	-.19	-.84	.17	1.15	4.00	-.27	-.69	.44	.88	28B	6	L268
L280	1.72	-.02	-.08	.10	.70	4.33	.06	.14	.34	.69	28B	6	L280
L312	2.32	.58	2.57	.15	.99	4.66	.39	1.01	1.40	2.83	28B	6	L312
L318	1.75	.01	.04	.11	.73	4.67	.39	1.01	.32	.65	28A	6	L318
L324	1.53	-.21	-.92	.13	.88	3.93	-.34	-.88	.40	.81	28P	6	L324
L336	1.83	.09	.39	.14	.97	4.93	.65	1.68	.39	.79	28A	6	L336
L580	1.77	.03	.14	.21	1.44	3.85	-.42	-1.07	.33	.67	28C	6	L580
L582	1.73	-.00	-.02	.14	.95	4.02	-.26	-.66	.58	1.18	28A	6	L582
L153	2.12	.38	1.69	.14	.94	4.69	.42	1.08	.42	.85	28Q	*	L153

GR. MEAN = 1.74 PERCENT GRAND MEAN = 4.27 PERCENT TEST DETERMINATIONS = 20

SD MEANS = .23 PERCENT SD OF MEANS = .39 PERCENT 15 LABS IN GRAND MEANS

AVERAGE SDR = .15 PERCENT AVERAGE SDR = .50 PERCENT

TOTAL NUMBER OF LABORATORIES REPORTING = 16

Best Values: H56 1.7 ± 0.4 percent
H09 4.2 ± 0.7 percent.

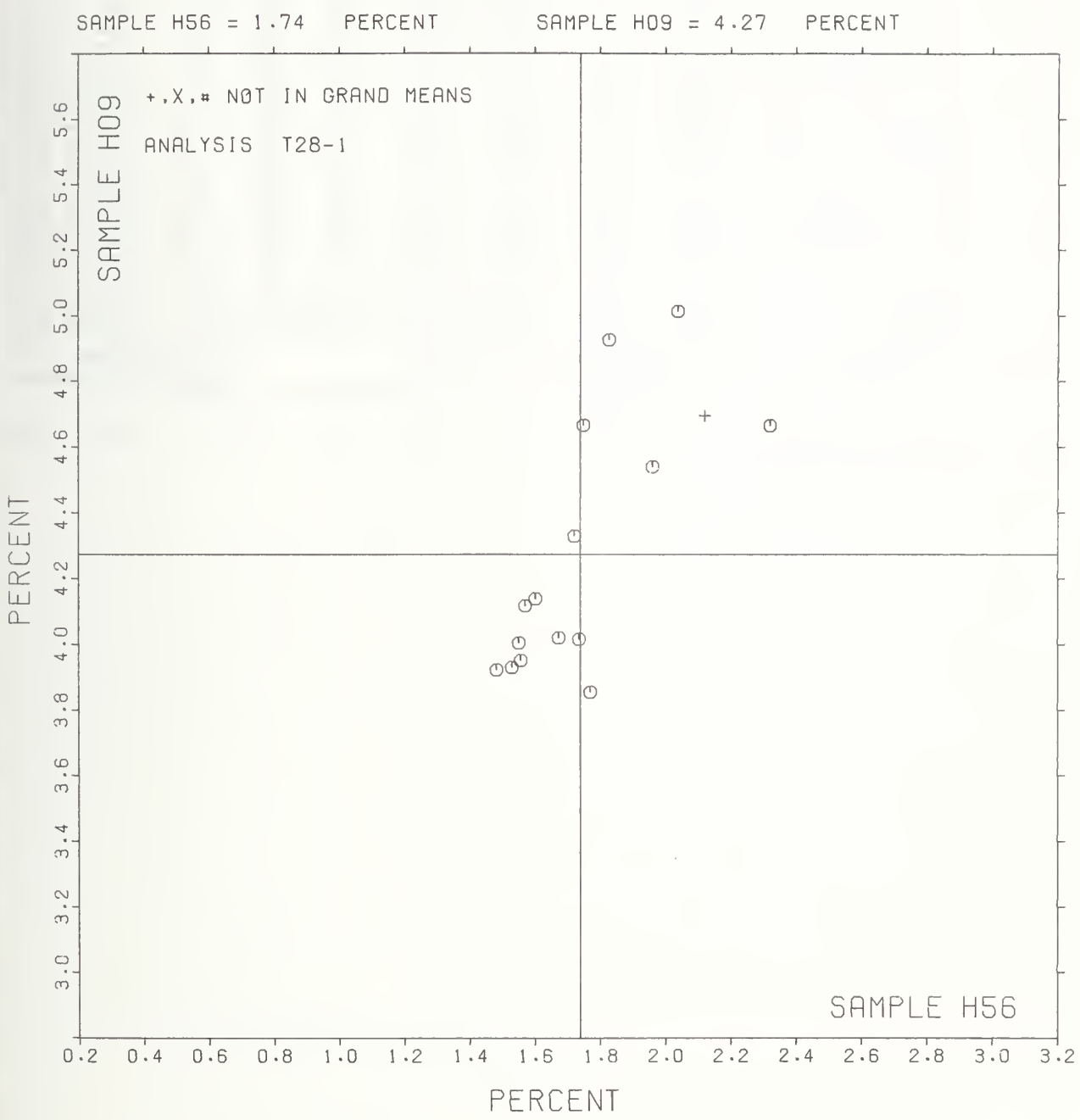
REPORT NO. 49S TAPPI COLLABORATIVE REFERENCE PROGRAM SEPTEMBER 1977

ANALYSIS T28-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PACKAGING PAPER

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

LAB CODE	F	MEANS 856	809	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L243	6	1.48	3.92	-.43	.08	.72	28C	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/LINE JAWS
L324	6	1.53	3.93	-.40	.04	.84	28P	ELONGATION,PACKAGING PAPER,LOAD CELL,PATTERNED PLAT JAWS
L268	6	1.55	4.00	-.32	.05	1.01	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L267	6	1.56	3.95	-.37	.02	1.08	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L126	6	1.57	4.12	-.21	.08	.95	28C	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/LINE JAWS
L182	6	1.60	4.14	-.18	.07	.68	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L265	6	1.67	4.02	-.26	-.05	.82	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,PLAT/PLAT JAWS
L280	6	1.72	4.33	.04	.04	.69	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/PLAT JAWS
L582	6	1.73	4.02	-.23	-.11	1.06	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,FLAT/FLAT JAWS
L318	6	1.75	4.67	.36	.16	.69	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,FLAT/PLAT JAWS
L580	6	1.77	3.85	-.36	-.21	1.06	28C	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/LINE JAWS
L336	6	1.83	4.93	.63	.21	.88	28A	ELONGATION,PACKAGING PAPER,LOAD CELL,FLAT/PLAT JAWS
L151	6	1.96	4.54	.34	-.08	.87	28B	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/FLAT JAWS
L122	6	2.04	5.01	.80	.05	1.73	28P	ELONGATION,PACKAGING PAPER,LOAD CELL,PATTERNED PLAT JAWS
L153	*	2.12	4.69	.55	-.16	.90	28Q	ELONGATION,PACKAGING PAPER,PENDULUM, PATTERNED PLAT JAWS
L312	6	2.32	4.66	.61	-.35	1.91	288	ELONGATION,PACKAGING PAPER,LOAD CELL,LINE/PLAT JAWS
GMEANS:		1.74	4.27			1.00		
		95% ELLIPSE:		1.22	.41	WITH GAMMA = 64 DEGREES		


ELONGATION TO BREAK, PACKAGING PAPER
SAMPLE H56 = 1.74 PERCENT
SAMPLE H09 = 4.27 PERCENT
+,X,# NOT IN GRAND MEANS
ANALYSIS T28-1
SAMPLE H09
PERCENT
3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6
SAMPLE H56
0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2
PERCENT

ANALYSIS T29-1 TABLE 1

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

TAPPI STANDARD T494 OS-7C, TENSILE BREAKING PROPERTIES OF PAPER & PAPERBOARD (CONSTANT RATE OF ELONGATION)

LAB CODE	SAMPLE B95 91 GRAMS PER SQUARE METER MEAN	HEAT SET OFFSET BOOK DEV	N.DEV	SDR	R.SDR	SAMPLE H43 91 GRAMS PER SQUARE METER MEAN	PRINTING DEV	N.DEV	SDR	R.SDR	TEST D.= 20 VAR	F	LAB
L100	1.335	-.174	-1.26	.093	.71	1.775	-.197	-.69	.107	.75	29A	6	L100
L118	1.527	.019	.14	.114	.87	2.049	.077	.27	.109	.77	29A	6	L118
L121	1.417	-.092	-.66	.182	1.39	1.982	.010	.04	.131	.92	29D	6	L121
L122	1.575	.066	.48	.161	1.23	2.205	.233	.81	.150	1.05	29P	6	L122
L141T	1.322	-.186	-1.35	.124	.94	1.534	-.438	-1.53	.133	.94	29D	6	L141T
L176	1.554	.046	.33	.208	1.58	2.323	.351	1.23	.203	1.43	298	6	L176
L185	1.430	-.079	-.57	.153	1.16	1.920	-.052	-.18	.083	.59	29C	6	L185
L190R	1.460	-.049	-.35	.105	.80	2.049	.077	.27	.074	.52	29A	6	L190R
L231	1.815	.306	2.22	.127	.97	2.015	.043	.15	.218	1.53	29A	*	L231
L255	1.578	.069	.50	.126	.96	2.199	.227	.79	.122	.85	29P	6	L255
L309	1.670	.162	1.18	.171	1.30	2.531	.559	1.96	.378	2.66	29A	6	L309
L318	1.568	.060	.44	.086	.66	2.071	.099	.35	.106	.74	29A	6	L318
L344	1.706	.198	1.44	.124	.94	2.137	.165	.58	.134	.94	29A	6	L344
L378	1.496	-.012	-.09	.076	.58	1.812	-.160	-.56	.115	.81	29A	6	L378
L567	1.370	-.139	-1.01	.133	1.01	1.902	-.070	-.25	.104	.73	29A	6	L567
L575	1.474	-.034	-.25	.116	.89	1.625	-.347	-1.22	.232	1.63	298	6	L575
L587	1.480	-.029	-.21	.115	.88	NO DATA REPORTED FOR SAMPLE H43					29C	M	L587
L592	1.344	-.165	-1.19	.124	.95	1.398	-.574	-2.01	.096	.67	29C	6	L592

GR. MEAN = 1.509 PERCENT — GRAND MEAN = 1.972 PERCENT — TEST DETERMINATIONS = 20

SD MEANS = .138 PERCENT — SD OF MEANS = .286 PERCENT — 17 LABS IN GRAND MEANS

AVERAGE SDR = .131 PERCENT — AVERAGE SDR = .142 PERCENT

L242	1.610	.101	.74	.192	1.46	2.420	.448	1.57	.132	.93	29R	*	L242
L484	1.322	-.186	-1.35	.156	1.19	1.787	-.185	-.65	.272	1.91	29R	*	L484

TOTAL NUMBER OF LABORATORIES REPORTING = 20

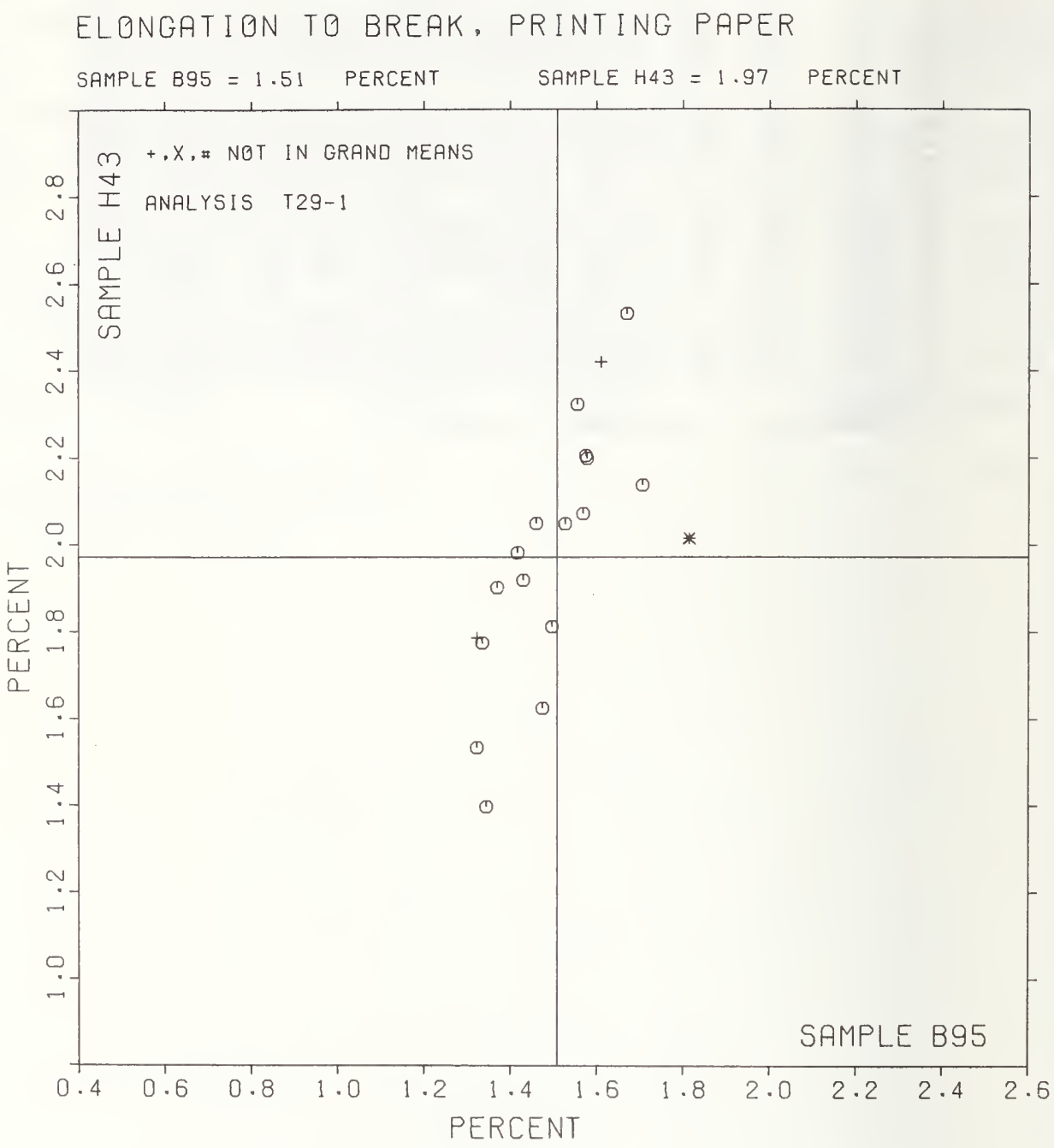
Best Values: B95 1.5 ± 0.2 percent
H43 1.9 ± 0.5 percent

ANALYSIS T29-1 TABLE 2

ELONGATION TO BREAK, PERCENT - PRINTING PAPER

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

LAB CODE	F	MEANS B95	MEANS B43	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L141T	O	1.322	1.534	-.475	.024	.94	29D	ELONGATION,PRINTING PAPERS,LOAD CELL,2-PIN STRAIN GAGE
L484	*	1.322	1.787	-.238	.111	1.55	29R	ELONGATION,PRINTING PAPERS,PENDULUM, FLAT/FLAT JAWS
L100	O	1.335	1.775	-.245	.095	.73	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L592	O	1.344	1.398	-.596	-.043	.81	29C	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/LINE JAWS
L567	O	1.370	1.902	-.114	.106	.87	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L121	O	1.417	1.982	-.022	.089	1.15	29D	ELONGATION,PRINTING PAPERS,LOAD CELL,2-PIN STRAIN GAGE
L185	O	1.430	1.920	-.076	.056	.88	29C	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/LINE JAWS
L190R	O	1.460	2.049	.056	.072	.66	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L575	O	1.474	1.625	-.338	-.088	1.26	29B	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/FLAT JAWS
L587	M	1.480				.88	29C	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/LINE JAWS
L378	O	1.496	1.812	-.154	-.044	.69	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L118	O	1.527	2.049	.078	.009	.82	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L176	O	1.554	2.323	.345	.077	1.51	29B	ELONGATION,PRINTING PAPERS,LOAD CELL,LINE/FLAT JAWS
L318	O	1.568	2.071	.114	-.022	.70	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L122	O	1.575	2.205	.241	.018	1.14	29P	ELONGATION,PRINTING PAPERS,LOAD CELL,PATTERNED FLAT JAWS
L255	O	1.578	2.199	.237	.013	.91	29P	ELONGATION,PRINTING PAPERS,LOAD CELL,PATTERNED FLAT JAWS
L242	*	1.610	2.420	.455	.059	1.20	29R	ELONGATION,PRINTING PAPERS,PENDULUM, FLAT/FLAT JAWS
L309	O	1.670	2.531	.581	.040	1.98	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L344	O	1.706	2.137	.223	-.129	.94	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
L231	*	1.815	2.015	.145	-.273	1.25	29A	ELONGATION,PRINTING PAPERS,LOAD CELL,FLAT/FLAT JAWS
GMEANS:		1.509	1.972			1.00		
		95% ELLIPSE:		.847	.270	WITH GAMMA = 69 DEGREES		


ELONGATION TO BREAK, PRINTING PAPER
SAMPLE B95 = 1.51 PERCENT
SAMPLE H43 = 1.97 PERCENT
+,X,* NOT IN GRAND MEANS
ANALYSIS T29-1
SAMPLE H43
PERCENT
SAMPLE B95
PERCENT
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6

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

LAB CODE	SAMPLE B46 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H11 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDP	TEST D.F 15 VAR	F	LAB
L100M	58.	-16.	-.80	15.	.95	62.	-60.	-1.35	17.	.43	30M	O	L100M
L100N	46.	-28.	-1.39	13.	.83	59.	-63.	-1.41	18.	.47	30N	O	L100N
L105	78.	4.	.20	10.	.67	147.	25.	.56	52.	1.34	30M	O	L105
L118	75.	1.	.05	15.	.97	106.	-16.	-.36	26.	.66	30D	O	L118
L121	71.	-4.	-.17	16.	1.01	91.	-30.	-.68	24.	.62	30M	O	L121
L122	121.	47.	2.31	37.	2.37	164.	42.	.94	51.	1.32	30M	*	L122
L124	64.	-10.	-.51	13.	.83	139.	17.	.39	46.	1.18	30N	O	L124
L150	77.	3.	.14	18.	1.14	122.	0.	.01	40.	1.02	30M	O	L150
L158	48.	-26.	-1.28	12.	.77	72.	-49.	-1.10	42.	1.09	30N	O	L158
L159	91.	17.	.83	18.	1.18	190.	68.	1.53	56.	1.45	30N	O	L159
L162	75.	1.	.04	19.	1.21	113.	-9.	-.20	57.	1.46	30M	O	L162
L163	61.	-13.	-.66	10.	.61	126.	4.	.09	33.	.85	30N	O	L163
L176	20.	-54.	-2.66	6.	.37	8.	-114.	-2.54	3.	.06	30N	#	L176
L182M	100.	26.	1.28	22.	1.38	196.	75.	1.67	28.	.72	30M	O	L182M
L185	83.	9.	.43	10.	.62	158.	37.	.82	28.	.73	30N	O	L185
L190C	80.	6.	.29	25.	1.58	111.	-11.	-.25	37.	.94	30N	O	L190C
L223F	85.	11.	.55	13.	.86	133.	11.	.25	39.	1.02	30M	O	L223F
L230	54.	-20.	-.97	16.	1.04	112.	-10.	-.22	39.	1.01	30N	O	L230
L232	89.	15.	.75	17.	1.08	135.	13.	.29	47.	1.21	30N	O	L232
L236	65.	-9.	-.43	9.	.55	58.	-64.	-1.43	16.	.41	30N	O	L236
L238A	51.	-23.	-1.13	16.	1.01	94.	-27.	-.61	36.	.93	30N	O	L238A
L238B	70.	-4.	-.18	17.	1.10	131.	10.	.21	44.	1.12	30D	O	L238B
L243	75.	1.	.07	12.	.77	191.	69.	1.54	62.	1.59	30D	O	L243
L254	71.	-3.	-.16	13.	.83	130.	8.	.18	49.	1.26	30M	O	L254
L262	87.	13.	.65	29.	1.84	136.	15.	.33	75.	1.93	30N	O	L262
L275	136.	62.	3.09	21.	1.34	226.	104.	2.34	104.	2.68	30N	*	L275
L278	59.	-15.	-.73	13.	.86	64.	-57.	-1.28	20.	.52	30C	O	L278
L279	73.	-1.	-.04	10.	.62	148.	26.	.59	16.	.41	30N	O	L279
L285A	99.	24.	1.21	23.	1.47	142.	20.	.45	66.	1.69	30N	O	L285A
L285B	101.	27.	1.35	33.	2.09	135.	13.	.30	76.	1.95	30N	O	L285B
L299	41.	-33.	-1.63	9.	.58	43.	-79.	-1.76	15.	.40	30N	O	L299
L321	92.	18.	.91	18.	1.17	182.	61.	1.35	40.	1.02	30M	O	L321
L326N	160.	86.	4.27	18.	1.16	173.	52.	1.16	28.	.73	30N	X	L326N
L339	38.	-36.	-1.76	10.	.67	51.	-70.	-1.57	18.	.47	30N	O	L339
L341	79.	5.	.23	17.	1.10	126.	4.	.10	48.	1.23	30C	O	L341
L366A	53.	-21.	-1.02	11.	.70	67.	-55.	-1.23	25.	.63	30N	O	L366A
L376	65.	-9.	-.45	13.	.82	76.	-46.	-1.02	22.	.58	30N	O	L376
L378	72.	-2.	-.08	20.	1.29	173.	52.	1.16	43.	1.12	30N	O	L378
L388	70.	-4.	-.21	13.	.85	155.	33.	.74	57.	1.47	30N	O	L388
L390	37.	-37.	-1.84	7.	.42	48.	-74.	-1.66	22.	.55	30N	O	L390
L396M	68.	-6.	-.29	16.	1.05	98.	-24.	-.53	28.	.72	30N	O	L396M
L531	82.	7.	.37	24.	1.54	145.	23.	.51	71.	1.83	30N	O	L531
L565	79.	5.	.26	16.	1.00	148.	26.	.58	26.	.67	30N	O	L565
L567	94.	20.	1.01	13.	.86	163.	41.	.92	50.	1.30	30N	O	L567
L589	65.	-9.	-.46	17.	1.06	83.	-38.	-.86	35.	.91	30N	O	L589
L599	78.	3.	.17	16.	1.01	106.	-15.	-.34	43.	1.11	30C	O	L599
GR. MEAN *	74. DOUBLE FOLDS					GRAND MEAN *	122. DOUBLE FOLDS				TEST DETERMINATIONS *		15
SD MEANS *	20. DOUBLE FOLDS					SD OF MEANS *	45. DOUBLE FOLDS				44 LABS IN GRAND MEANS		
		AVERAGE SDR *		16. DOUBLE FOLDS				AVERAGE SDR *		39. DOUBLE FOLDS			
L143	160.	86.	4.28	31.	1.97	138.	16.	.36	52.	1.34	30T	*	L143
L182S	155.	81.	4.03	34.	2.18	135.	13.	.29	57.	1.46	30S	*	L182S
L190D	154.	79.	3.94	37.	2.40	131.	10.	.21	48.	1.24	30S	*	L190D
L280	99.	25.	1.24	42.	2.67	91.	-31.	-.68	34.	.89	30K	*	L280
L326S	152.	78.	3.87	25.	1.59	111.	-11.	-.24	43.	1.11	30S	*	L326S
L366B	135.	61.	3.02	47.	2.99	106.	-16.	-.35	50.	1.29	30T	*	L366B
L396S	166.	92.	4.58	30.	1.93	196.	75.	1.67	63.	1.61	30T	*	L396S
L581	148.	74.	3.67	24.	1.56	111.	-10.	-.23	38.	.98	30T	*	L581

TOTAL NUMBER OF LABORATORIES REPORTING * 54

Best Values: H46 85 double folds
H11 180 double folds

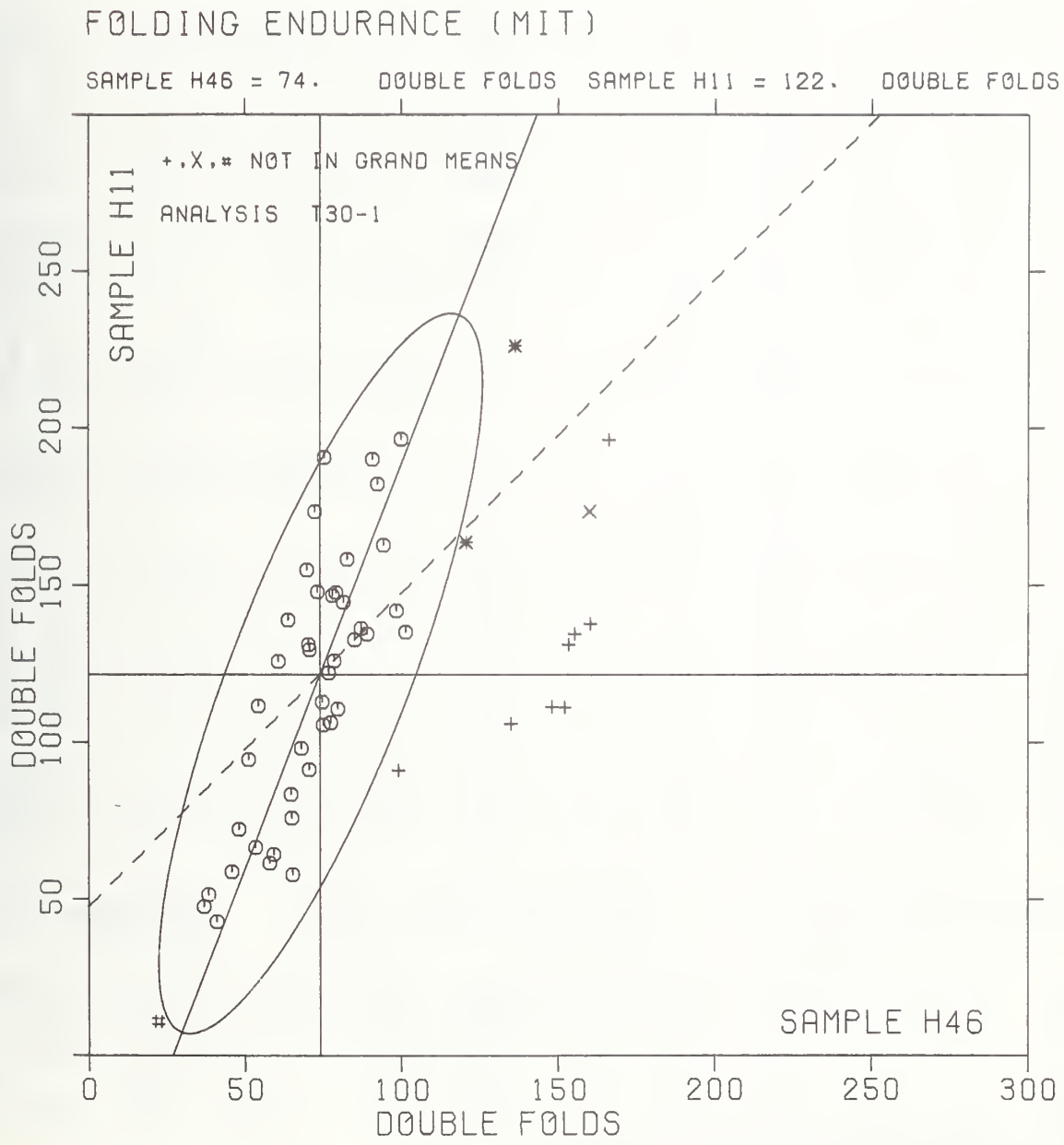
The following laboratories were omitted from the grand means because of extreme test results: 176.

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 44 of this report for a demonstration of this proposal.

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

LAB CODE	F	MEANS H46	MEANS H11	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L176	#	20.	8.	-125.	9.	.22	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L390	O	37.	48.	-82.	8.	.49	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L339	O	38.	51.	-78.	8.	.57	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L299	O	41.	43.	-85.	2.	.49	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100N	O	46.	59.	-69.	3.	.65	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L158	O	48.	72.	-55.	6.	.93	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238A	O	51.	94.	-34.	11.	.97	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L366A	O	53.	67.	-59.	-1.	.67	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L230	O	54.	112.	-16.	15.	1.03	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100M	O	58.	62.	-62.	-7.	.69	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L278	O	59.	64.	-59.	-7.	.69	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L163	O	61.	126.	-1.	14.	.73	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L124	O	64.	139.	12.	16.	1.01	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L58S	O	65.	83.	-39.	-5.	.98	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L376	O	65.	76.	-46.	-8.	.70	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L236	O	65.	58.	-63.	-15.	.48	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L396M	O	68.	98.	-24.	-3.	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L388	O	70.	155.	29.	16.	1.16	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238B	O	70.	131.	8.	7.	1.11	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L121	O	71.	91.	-30.	-8.	.81	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L254	O	71.	130.	6.	6.	1.04	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L378	O	72.	173.	48.	20.	1.20	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L279	O	73.	148.	24.	10.	.52	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L162	O	75.	113.	-8.	-4.	1.34	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L118	O	75.	106.	-15.	-7.	.81	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L243	O	75.	191.	65.	24.	1.18	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L150	O	77.	122.	1.	-2.	1.08	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L599	O	78.	106.	-13.	-9.	1.06	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L105	O	78.	147.	25.	5.	1.00	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L341	O	79.	126.	6.	-3.	1.17	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L565	O	79.	148.	26.	5.	.83	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L190C	O	80.	111.	-8.	-9.	1.26	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L531	O	82.	145.	24.	1.	1.68	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L185	O	83.	158.	37.	5.	.68	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L223F	O	85.	133.	14.	-6.	.94	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L262	O	87.	136.	18.	-7.	1.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L232	O	89.	135.	18.	-9.	1.15	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L159	O	91.	190.	70.	9.	1.31	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L321	O	92.	182.	63.	5.	1.09	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L567	O	94.	163.	46.	-4.	1.08	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285A	O	99.	142.	28.	-15.	1.58	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L280	*	99.	91.	-19.	-34.	1.78	30K	FOLDING ENDURANCE, KOHLER-MOLIN
L182M	O	100.	196.	79.	3.	1.05	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L285B	O	101.	135.	22.	-21.	2.02	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L122	*	121.	164.	56.	-28.	1.85	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L366B	*	135.	106.	7.	-63.	2.14	30T	FOLDING ENDURANCE, SCHOPPER, TMI
L275	*	136.	226.	120.	-20.	2.01	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L581	*	148.	111.	17.	-73.	1.27	30T	FOLDING ENDURANCE, SCHOPPER, TMI
L326S	*	152.	111.	18.	-77.	1.35	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L190D	*	154.	131.	38.	-71.	1.82	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L182S	*	155.	135.	41.	-71.	1.82	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L326N	X	160.	173.	79.	-61.	.95	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L143	*	160.	138.	46.	-75.	1.65	30T	FOLDING ENDURANCE, SCHOPPER, TMI
L396S	*	166.	196.	103.	-59.	1.77	30T	FOLDING ENDURANCE, SCHOPPER, TMI
GMEANS:		74.	122.			1.00		
		95% ELLIPSE:		123.	29.	WITH GAMMA = 68 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE H46 = 74. DOUBLE FOLDS
SAMPLE H11 = 122. DOUBLE FOLDS
+,X,* NOT IN GRAND MEANS
ANALYSIS T30-1
SAMPLE H11
DOUBLE FOLDS
50
100
150
200
250
SAMPLE H46
0
50
100
150
200
250
300
DOUBLE FOLDS

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

LAB CODE	SAMPLE H46 MEAN	PRINTING 84 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H11 MEAN	PRINTING 89 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.F 15 VAR	F	LAB
L100M	1.749	-.094	-.78	.119	1.23	1.775	-.250	-1.36	.116	.75	30M	G	L100M
L100N	1.647	-.196	-1.62	.120	1.24	1.749	-.275	-1.50	.131	.85	30N	G	L100N
L105	1.889	.046	.38	.060	.62	2.141	.116	.63	.158	1.02	30M	G	L105
L118	1.868	.025	.21	.078	.81	2.010	-.014	-.08	.114	.74	30D	G	L118
L121	1.835	-.008	-.06	.120	1.24	1.946	-.078	-.43	.116	.75	30N	G	L121
L122	2.060	.217	1.79	.148	1.53	2.192	.168	.91	.145	.94	30M	G	L122
L124	1.796	-.047	-.38	.091	.94	2.118	.094	.51	.159	1.03	30N	G	L124
L150	1.875	.032	.26	.101	1.04	2.069	.044	.24	.125	.81	30M	G	L150
L158	1.671	-.172	-1.41	.107	1.10	1.789	-.236	-1.28	.257	1.67	30N	G	L158
L159	1.950	.107	.88	.090	.93	2.260	.235	1.28	.137	.89	30N	G	L159
L162	1.860	.018	.14	.116	1.20	1.994	-.031	-.17	.245	1.59	30M	G	L162
L163	1.779	-.064	-.53	.064	.66	2.086	.061	.33	.115	.74	30N	G	L163
L176	1.295	-.548	-4.51	.116	1.20	.876	-1.148	-6.24	.153	.99	30N	#	L176
L182M	1.991	.148	1.22	.091	.94	2.289	.265	1.44	.060	.39	30M	G	L182M
L185	1.915	.072	.59	.049	.51	2.193	.168	.92	.078	.50	30N	G	L185
L190C	1.884	.041	.34	.127	1.31	2.027	.002	.01	.122	.79	30N	G	L190C
L223F	1.925	.082	.68	.069	.71	2.104	.079	.43	.135	.88	30M	G	L223F
L230	1.719	-.124	-1.02	.120	1.24	2.024	-.000	-.00	.148	.96	30N	G	L230
L232	1.942	.099	.82	.086	.89	2.105	.080	.44	.151	.98	30N	G	L232
L236	1.811	-.032	-.26	.060	.61	1.748	-.276	-1.50	.112	.73	30N	G	L236
L238A	1.693	-.150	-1.23	.122	1.26	1.947	-.077	-.42	.160	1.04	30N	G	L238A
L238B	1.837	-.006	-.05	.099	1.03	2.094	.069	.38	.154	1.00	30D	G	L238B
L243	1.872	.029	.24	.071	.73	2.260	.236	1.28	.135	.88	30D	G	L243
L254	1.843	-.000	-.00	.083	.85	2.083	.058	.32	.169	1.10	30M	G	L254
L262	1.916	.073	.60	.158	1.63	2.081	.057	.31	.221	1.43	30N	G	L262
L275	2.130	.287	2.36	.069	.72	2.315	.290	1.58	.188	1.22	30N	G	L275
L278	1.763	-.080	-.66	.093	.96	1.787	-.237	-1.29	.146	.95	30C	G	L278
L279	1.862	.019	.16	.057	.59	2.167	.143	.78	.048	.31	30N	G	L279
L285A	1.982	.139	1.15	.104	1.07	2.116	.092	.50	.174	1.13	30N	G	L285A
L285B	1.985	.142	1.17	.140	1.44	2.059	.034	.19	.268	1.74	30N	G	L285B
L299	1.602	-.241	-1.98	.108	1.11	1.602	-.423	-2.30	.173	1.12	30N	G	L299
L321	1.958	.115	.95	.088	.91	2.251	.227	1.23	.093	.61	30M	G	L321
L326N	2.202	.359	2.96	.047	.48	2.234	.210	1.14	.069	.45	30N	X	L326N
L339	1.569	-.274	-2.26	.126	1.30	1.684	-.341	-1.85	.165	1.07	30N	G	L339
L341	1.887	.044	.36	.087	.90	2.069	.045	.24	.175	1.14	30C	d	L341
L366A	1.719	-.124	-1.02	.094	.97	1.800	-.224	-1.22	.142	.92	30N	G	L366A
L376	1.803	-.039	-.32	.095	.98	1.864	-.160	-.87	.119	.77	30N	G	L376
L378	1.841	-.002	-.01	.141	1.45	2.225	.201	1.09	.117	.76	30N	G	L378
L388	1.837	-.006	-.05	.083	.86	2.157	.133	.72	.183	1.19	30N	G	L388
L390	1.561	-.282	-2.32	.081	.84	1.630	-.394	-2.14	.219	1.42	30N	G	L390
L396M	1.824	-.019	-.16	.091	.94	1.974	-.050	-.27	.128	.83	30N	G	L396M
L531	1.896	.053	.44	.116	1.20	2.085	.060	.33	.304	1.97	30N	G	L531
L565	1.891	.048	.40	.085	.87	2.163	.139	.76	.075	.49	30N	G	L565
L567	1.971	.128	1.05	.062	.64	2.184	.159	.87	.177	1.15	30N	G	L567
L589	1.799	-.044	-.36	.105	1.08	1.882	-.143	-.78	.197	1.28	30N	G	L589
L599	1.881	.038	.31	.088	.91	1.979	-.046	-.25	.232	1.51	30C	G	L599
GR. MEAN = 1.843 LOG(10) FOLD						GRAND MEAN = 2.024 LOG(10) FOLD					TEST DETERMINATIONS = 15		
SD MEANS = .121 LOG(10) FOLD						SD OF MEANS = .184 LOG(10) FOLD					44 LABS IN GRAND MEANS		
AVERAGE SDR = .097 LOG(10) FOLD						AVERAGE SDR = .154 LOG(10) FOLD							
L143	2.198	.355	2.92	.080	.82	2.104	.080	.43	.190	1.23	30T	*	L143
L182S	2.181	.338	2.78	.098	1.01	2.088	.064	.35	.203	1.31	30S	*	L182S
L190D	2.173	.330	2.72	.111	1.14	2.093	.069	.37	.148	.96	30S	*	L190D
L280	1.969	.126	1.04	.148	1.53	1.926	-.099	-.54	.185	1.20	30K	*	L280
L326S	2.177	.334	2.75	.071	.74	2.014	-.011	-.06	.177	1.15	30S	*	L326S
L366B	2.107	.264	2.18	.145	1.50	1.976	-.049	-.27	.224	1.45	30T	*	L366B
L396S	2.214	.371	3.05	.084	.86	2.274	.250	1.36	.128	.83	30T	*	L396S
L581	2.165	.322	2.65	.070	.73	2.025	.001	.00	.137	.89	30T	*	L581

TOTAL NUMBER OF LABORATORIES REPORTING = 54

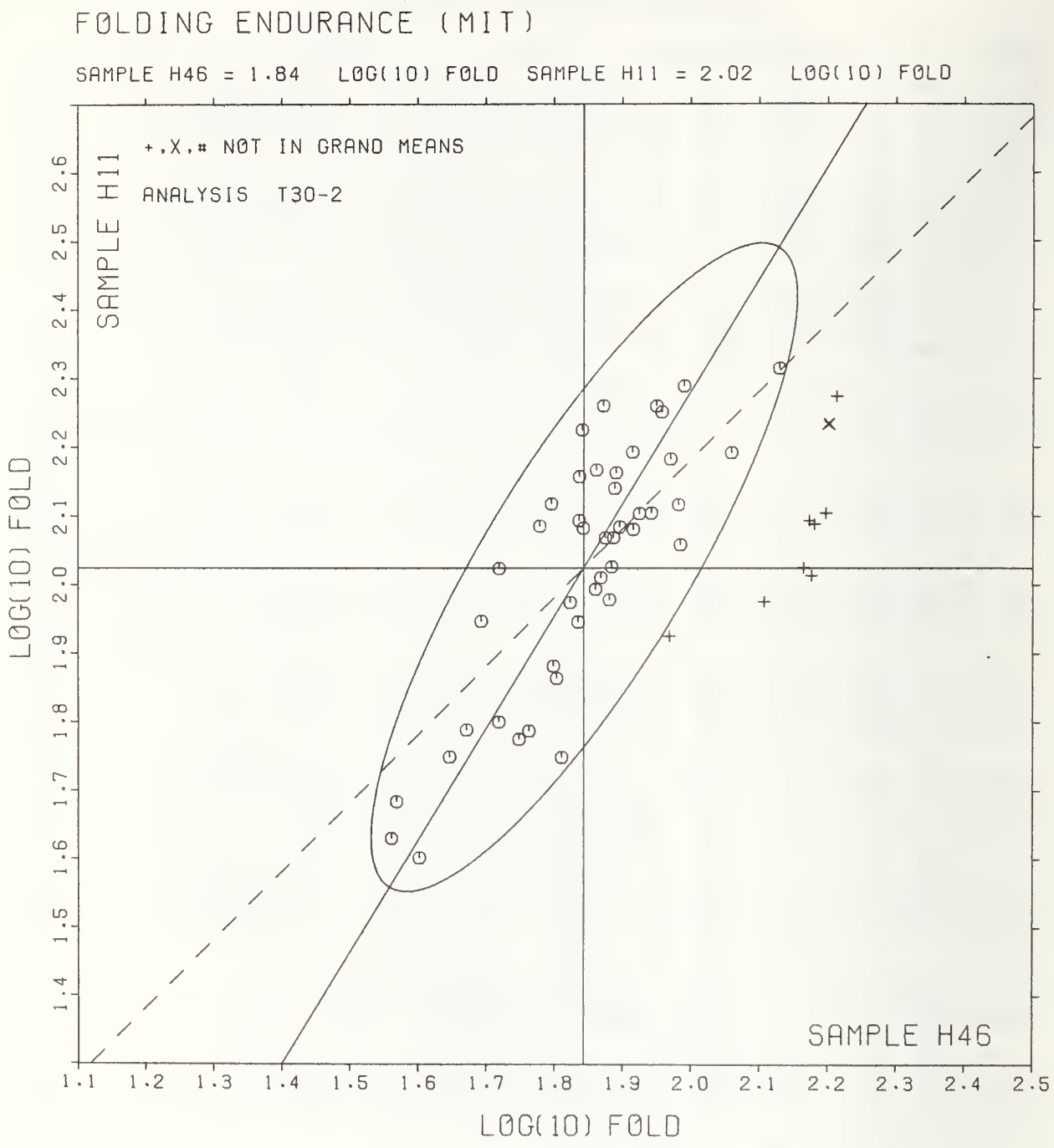
The ISO (International Standards Organization) is proposing that MIT folding endurance be reported as the logarithm (to the base 10) of the double fold instead of the double fold as in the past.

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

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

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

LAB CODE	F	MEANS B46	MEANS H11	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L176	#	1.295	.876	-1.265	-.131	1.10	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L390	O	1.561	1.630	-.483	.035	1.13	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L339	O	1.569	1.684	-.434	.056	1.19	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L299	O	1.602	1.602	-.486	-.015	1.12	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100N	O	1.647	1.749	-.337	.024	1.04	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L158	O	1.671	1.785	-.291	.024	1.39	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L238A	O	1.693	1.947	-.144	.088	1.15	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L366A	O	1.719	1.800	-.256	-.011	.94	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L230	O	1.719	2.024	-.065	.105	1.10	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L100M	O	1.749	1.775	-.262	-.050	.99	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L278	O	1.763	1.787	-.244	-.056	.95	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L163	O	1.779	2.086	.019	.087	.70	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L124	O	1.796	2.118	.055	.089	.98	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L589	O	1.799	1.882	-.145	-.037	1.18	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L376	O	1.803	1.864	-.157	-.050	.88	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L236	O	1.811	1.748	-.252	-.117	.67	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L396M	O	1.824	1.974	-.053	-.010	.89	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L121	O	1.835	1.946	-.071	-.034	.99	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L238B	O	1.837	2.094	.056	.041	1.01	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L388	O	1.837	2.157	.110	.074	1.02	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L378	O	1.841	2.225	.171	.106	1.11	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L254	O	1.843	2.083	.049	.031	.97	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L162	O	1.860	1.994	-.017	-.031	1.39	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L279	O	1.862	2.167	.132	.058	.45	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L118	O	1.868	2.010	.001	-.029	.77	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L243	O	1.872	2.260	.216	.098	.81	30D	FOLDING ENDURANCE, MIT, MODIFIED DRIVE TO REDUCE HEATING
L150	O	1.875	2.069	.054	-.004	.93	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L559	O	1.881	1.979	-.019	-.056	1.21	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L190C	O	1.884	2.027	.023	-.034	1.05	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L341	O	1.887	2.069	.061	-.014	1.02	30C	FOLDING ENDURANCE, MIT, CIRCULATING FAN IN CEILING
L105	O	1.889	2.141	.123	.022	.82	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L565	O	1.891	2.163	.144	.031	.68	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L531	O	1.896	2.085	.079	-.014	1.58	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L185	O	1.915	2.193	.181	.026	.51	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L262	O	1.916	2.081	.086	-.033	1.53	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L223F	O	1.925	2.104	.111	-.029	.79	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L232	O	1.942	2.105	.120	-.043	.93	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L159	O	1.950	2.260	.257	.031	.91	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L321	O	1.958	2.251	.253	.020	.76	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L280	*	1.969	1.926	-.019	-.159	1.36	30K	FOLDING ENDURANCE, KOHLER-MOLIN
L567	O	1.971	2.184	.202	-.026	.90	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285A	O	1.982	2.116	.151	-.071	1.10	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L285B	O	1.985	2.059	.103	-.103	1.59	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L182M	O	1.991	2.289	.303	.012	.67	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L122	O	2.060	2.192	.257	-.098	1.23	30M	FOLDING ENDURANCE, MIT, WITH CENTRIFUGAL FAN
L366B	*	2.107	1.976	.096	-.251	1.48	30T	FOLDING ENDURANCE, SCHOPPER, TMI
L275	O	2.130	2.315	.397	-.093	.97	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L581	*	2.165	2.025	.169	-.274	.81	30T	FOLDING ENDURANCE, SCHOPPER, TMI
L190D	*	2.173	2.093	.231	-.246	1.05	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L326S	*	2.177	2.014	.165	-.291	.94	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L182S	*	2.181	2.088	.231	-.255	1.16	30S	FOLDING ENDURANCE, SCHOPPER, LEIPZIG
L143	*	2.198	2.104	.253	-.261	1.03	30T	FOLDING ENDURANCE, SCHOPPER, TMI
L326N	X	2.202	2.234	.366	-.197	.47	30N	FOLDING ENDURANCE, MIT, NO CENTRIFUGAL FAN
L396S	*	2.214	2.274	.407	-.186	.85	30T	FOLDING ENDURANCE, SCHOPPER, TMI
GMEANS:		1.843	2.024			1.00		
		95% ELLIPSE:		.546	.149	WITH GAMMA = 58 DEGREES		


FOLDING ENDURANCE (MIT)
SAMPLE H46 = 1.84 LOG(10) FOLD SAMPLE H11 = 2.02 LOG(10) FOLD
+,X,* NOT IN GRAND MEANS
ANALYSIS T30-2
SAMPLE H11
LOG(10) FOLD
SAMPLE H46
LOG(10) FOLD
1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5
1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6

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 H64 106 GRAMS PER SQUARE METER MEAN	PRINTING DEV	N.DEV	SDR	R.SDR	SAMPLE H66 108 GRAMS PER SQUARE METER MEAN	PRINTING DEV	N.DEV	SDR	R.SDR	TEST D.F 10 VAR	F	LAB
L100	406.	19.	.75	14.	.79	526.	70.	2.22	35.	1.18	35G	*	L100
L118	386.	-0.	-.01	16.	.90	463.	8.	.25	28.	.93	35G	G	L118
L121	446.	60.	2.31	41.	2.37	500.	45.	1.41	41.	1.39	35G	G	L121
L122	397.	11.	.42	20.	1.17	460.	5.	.15	20.	.68	35G	G	L122
L132	342.	-44.	-1.72	15.	.85	412.	-43.	-1.37	42.	1.43	35G	G	L132
L139	382.	-4.	-.17	15.	.88	442.	-14.	-.43	22.	.76	35G	G	L139
L148	371.	-15.	-.58	11.	.66	421.	-35.	-1.10	11.	.38	35G	G	L148
L153	399.	12.	.47	11.	.66	439.	-17.	-.53	30.	1.01	35G	G	L153
L159	360.	-27.	-1.04	20.	1.13	417.	-39.	-1.22	32.	1.08	35G	G	L159
L162	385.	-1.	-.05	16.	.93	448.	-7.	-.22	24.	.81	35G	G	L162
L163	375.	-11.	-.44	30.	1.72	449.	-6.	-.20	55.	1.85	35G	G	L163
L183	421.	34.	1.33	10.	.60	515.	60.	1.89	42.	1.43	35G	G	L183
L190C	418.	32.	1.23	10.	.58	451.	-4.	-.13	9.	.29	35G	G	L190C
L195	412.	26.	1.00	18.	1.04	501.	46.	1.45	23.	.76	35G	G	L195
L223	379.	-7.	-.29	11.	.61	443.	-12.	-.39	26.	.88	35G	G	L223
L224	378.	-9.	-.34	16.	.94	459.	4.	.13	19.	.64	35G	G	L224
L232	382.	-5.	-.19	13.	.76	507.	52.	1.64	41.	1.39	35G	*	L232
L236	370.	-16.	-.62	23.	1.30	439.	-16.	-.50	35.	1.18	35G	G	L236
L241	411.	24.	.95	18.	1.04	487.	32.	1.01	60.	2.03	35G	G	L241
L249	377.	-10.	-.37	8.	.45	426.	-30.	-.93	18.	.61	35G	G	L249
L254	348.	-39.	-1.51	10.	.60	415.	-41.	-1.29	34.	1.17	35G	G	L254
L260	390.	4.	.15	10.	.58	461.	6.	.19	12.	.42	35G	G	L260
L268	333.	-53.	-2.06	19.	1.11	410.	-45.	-1.42	20.	.69	35G	G	L268
L285	410.	24.	.93	17.	.96	467.	11.	.35	21.	.70	35G	G	L285
L291	395.	9.	.35	9.	.50	479.	24.	.75	46.	1.56	35G	G	L291
L297	350.	-37.	-1.42	12.	.68	415.	-40.	-1.27	18.	.61	35G	G	L297
L308	383.	-3.	-.11	15.	.87	446.	-9.	-.30	34.	1.14	35G	G	L308
L321	368.	-19.	-.72	8.	.49	447.	-9.	-.27	24.	.82	35G	G	L321
L356	383.	-4.	-.15	19.	1.07	445.	-10.	-.31	24.	.82	35G	G	L356
L376	356.	-31.	-1.20	17.	.99	419.	-37.	-1.16	28.	.93	35G	G	L376
L378	365.	-21.	-.83	16.	.95	431.	-24.	-.77	27.	.92	35G	G	L378
L382	426.	39.	1.52	38.	2.17	476.	21.	.66	43.	1.44	35G	G	L382
L390	409.	22.	.87	31.	1.76	491.	36.	1.13	34.	1.14	35G	G	L390
L396	398.	12.	.46	9.	.53	458.	2.	.08	29.	.99	35G	G	L396
L567	427.	40.	1.56	30.	1.72	496.	41.	1.29	34.	1.15	35G	G	L567
L575	374.	-12.	-.48	21.	1.19	432.	-23.	-.74	40.	1.36	35G	G	L575

GR. MEAN = 386. GURLEY UNITS GRAND MEAN = 455. GURLEY UNITS TEST DETERMINATIONS = 10

SD MEANS = 26. GURLEY UNITS SD OF MEANS = 32. GURLEY UNITS 36 LABS IN GRAND MEANS

AVERAGE SDR = 17. GURLEY UNITS AVERAGE SDR = 30. GURLEY UNITS

L213	355.	-32.	-1.23	10.	.55	374.	-81.	-2.57	4.	.13	35B	*	L213

TOTAL NUMBER OF LABORATORIES REPORTING = 37

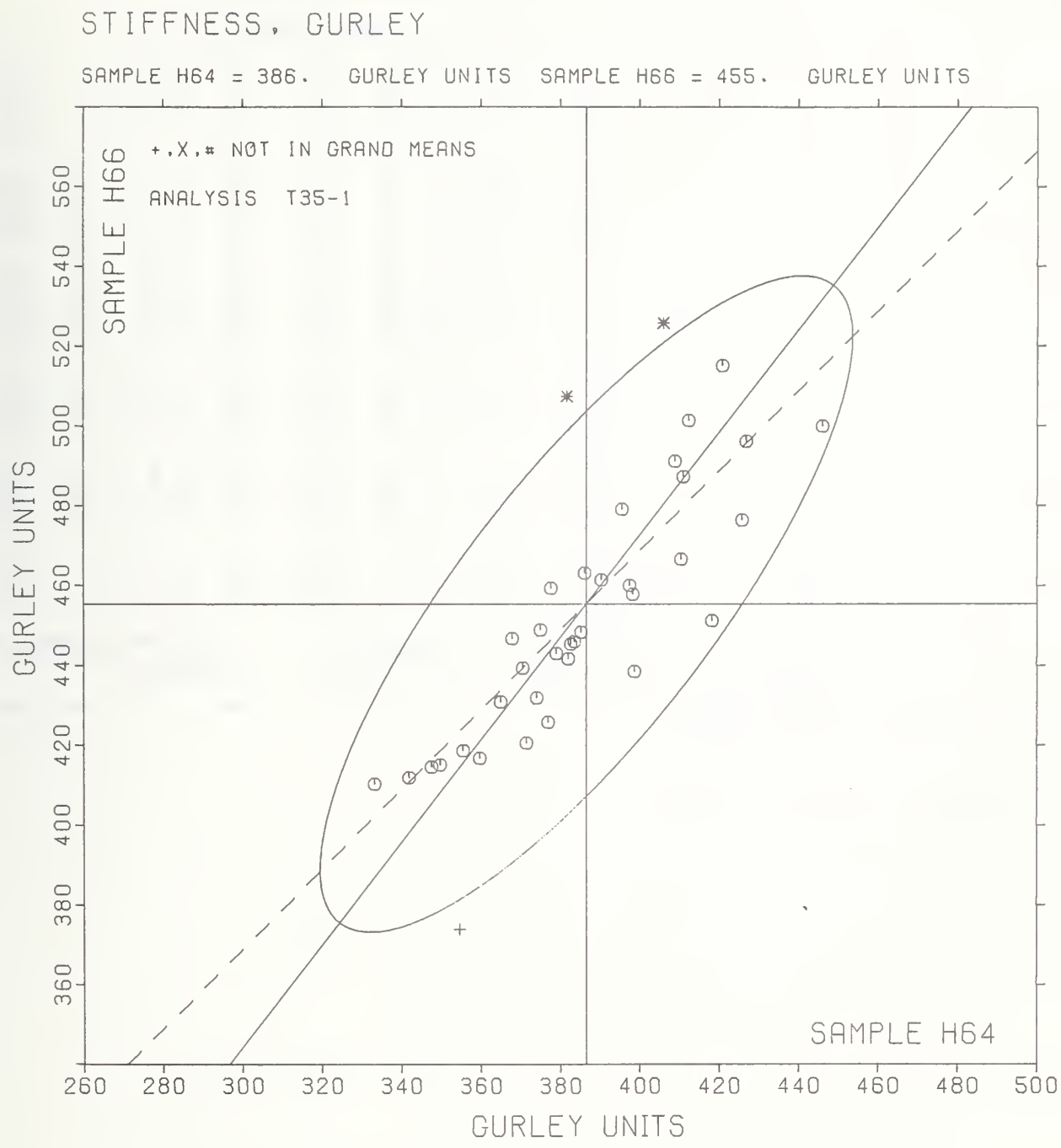
Best Values: H64 390 ± 40 Gurley Units
H66 455 ± 45 Gurley Units

ANALYSIS T35-1 TABLE 2

GURLEY STIFFNESS

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

LAB CODE	F	MEANS H64	MEANS H66	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L268	0	333.	410.	-68.	14.	.90	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L132	0	342.	412.	-62.	8.	1.14	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L254	0	348.	415.	-56.	6.	.88	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L257	0	350.	415.	-54.	4.	.65	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L213	*	355.	374.	-84.	-25.	.34	35H	STIFFNESS, GURLEY (UNITS: MG/1X3 TEST PIECE), 20 C, 65% RH
L376	0	356.	419.	-48.	2.	.96	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L159	0	360.	417.	-47.	-3.	1.11	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L378	0	365.	431.	-32.	2.	.94	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L321	0	368.	447.	-18.	9.	.65	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L236	0	370.	439.	-22.	3.	1.24	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L148	0	371.	421.	-37.	-10.	.52	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L575	0	374.	432.	-26.	-5.	1.27	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L163	0	375.	449.	-12.	5.	1.79	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L249	0	377.	426.	-29.	-11.	.53	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L224	0	378.	459.	-2.	9.	.79	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L223	0	379.	443.	-14.	-2.	.74	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L232	*	382.	507.	38.	36.	1.08	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L139	0	382.	442.	-13.	-5.	.82	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L356	0	383.	445.	-10.	-3.	.95	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L308	0	383.	446.	-9.	-3.	1.00	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L162	0	385.	448.	-6.	-3.	.87	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L118	0	386.	463.	6.	5.	.91	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L260	0	390.	461.	7.	1.	.50	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L291	0	395.	479.	24.	7.	1.03	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L122	0	397.	460.	10.	-6.	.93	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L396	0	398.	458.	9.	-8.	.76	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L153	0	399.	439.	-6.	-20.	.83	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L100	*	406.	526.	67.	28.	.98	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L390	0	409.	491.	42.	4.	1.45	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L285	0	410.	467.	24.	-12.	.83	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L241	0	411.	487.	40.	0.	1.54	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L195	0	412.	501.	52.	8.	.90	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L190C	0	418.	451.	16.	-28.	.43	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L183	0	421.	515.	68.	10.	1.01	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L382	0	426.	476.	41.	-18.	1.81	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L567	0	427.	496.	57.	-7.	1.43	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
L121	0	446.	500.	72.	-20.	1.88	35G	STIFFNESS, GURLEY (UNITS: MG/1X3 -ACTUALLY 3.5- TEST PIECE)
GMEANS:		386.	455.			1.00		
		95% ELLIPSE:		101.	32.	WITH GAMMA = 52 DEGREES		


STIFFNESS, GURLEY
SAMPLE H64 = 386. GURLEY UNITS SAMPLE H66 = 455. GURLEY UNITS
+,X,* NOT IN GRAND MEANS
ANALYSIS T35-1
SAMPLE H66
GURLEY UNITS
360 380 400 420 440 460 480 500 520 540 560
SAMPLE H64
260 280 300 320 340 360 380 400 420 440 460 480 500
GURLEY UNITS

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

LAB CODE	SAMPLE E38 MEAN	BLEACHED BACKING 93 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE E28 MEAN	KRAFT ENVELOPE 121 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	VAR	F	LAB
											TEST D.= 10		
L107A	2.40	-.10	-.32	.16	.97	22.40	15.23	18.57	2.32	6.56	36T	#	L107A
L122	2.51	.01	.02	.22	1.36	7.92	.75	.91	.32	.89	36T	@	L122
L123	2.21	-.29	-.91	.14	.85	18.00	10.83	13.21	.67	1.89	36T	#	L123
L126	1.90	-.60	-1.85	.10	.65	5.18	-1.99	-2.42	.38	1.07	36T	@	L126
L149	2.52	.12	.36	.26	1.63	7.32	.15	.18	.19	.55	36T	@	L149
L150	2.05	-.45	-1.40	.25	1.56	11.70	4.53	5.52	1.70	4.82	36T	#	L150
L158	2.23	-.27	-.85	.09	.57	5.99	-1.18	-1.44	.33	.94	36T	@	L158
L163	2.42	-.08	-.24	.21	1.28	7.20	.03	.03	.31	.87	36T	@	L163
L173B	2.70	.20	.61	.00	.00	8.33	1.16	1.41	.13	.35	36T	@	L173B
L176	2.80	.30	.92	.26	1.61	7.65	.48	.58	.47	1.34	36T	@	L176
L182	2.07	-.44	-1.35	.21	1.33	7.18	.01	.01	.52	1.47	36T	@	L182
L207	4.32	1.82	5.64	.39	2.44	8.73	1.56	1.90	.71	2.02	36T	#	L207
L228	2.25	-.25	-.75	.10	.61	6.09	-1.08	-1.32	.22	.62	36T	@	L228
L242	2.90	.40	1.23	.36	2.23	8.67	1.50	1.83	.58	1.64	36T	@	L242
L243	3.07	.57	1.75	.27	1.67	7.35	.18	.22	.63	1.77	36T	@	L243
L260	2.41	-.09	-.28	.07	.42	6.85	-.32	-.39	.12	.35	36T	@	L260
L262	2.41	-.09	-.29	.06	.35	6.89	-.28	-.34	.08	.23	36T	@	L262
L268	2.50	-.00	-.01	.00	.00	7.44	.27	.33	.13	.36	36T	@	L268
L273	3.37	.87	2.68	.18	1.14	7.47	.30	.36	.28	.79	36T	*	L273
L274	2.40	-.10	-.32	.21	1.31	7.00	-.17	-.21	.53	1.49	36T	@	L274
L281	2.36	-.15	-.45	.15	.95	6.42	-.76	-.92	.35	.99	36T	@	L281
L290	2.37	-.13	-.41	.11	.66	19.95	12.78	15.58	1.32	3.74	36T	#	L290
L318	2.23	-.27	-.84	.13	.80	7.92	.75	.92	.33	.95	36T	@	L318
L321	2.50	-.00	-.01	.00	.00	8.15	.98	1.19	.82	2.32	36T	@	L321
L324	2.47	-.03	-.10	.18	1.10	6.56	-.61	-.75	.33	.94	36T	@	L324
L339	.16	-2.34	-7.25	.02	.10	16.52	9.35	11.41	.43	1.22	36T	#	L339
L570	2.52	.02	.05	.13	.82	6.69	-.48	-.59	.43	1.23	36T	@	L570
L580	2.43	-.07	-.23	.37	2.31	7.49	.32	.39	.23	.66	36T	@	L580
GR. MEAN =	2.50 TABER UNITS					GRAND MEAN =	7.17 TABER UNITS				TEST DETERMINATIONS = 10		
SD MEANS =	.32 TABER UNITS					SD OF MEANS =	.82 TABER UNITS				22 LABS IN GRAND MEANS		
		AVERAGE SDR =		.16 TABER UNITS			AVERAGE SDR =		.35 TABER UNITS				
L250	1.76	-.74	-2.30	.10	.60	6.55	-.62	-.76	.28	.80	36U	*	L250

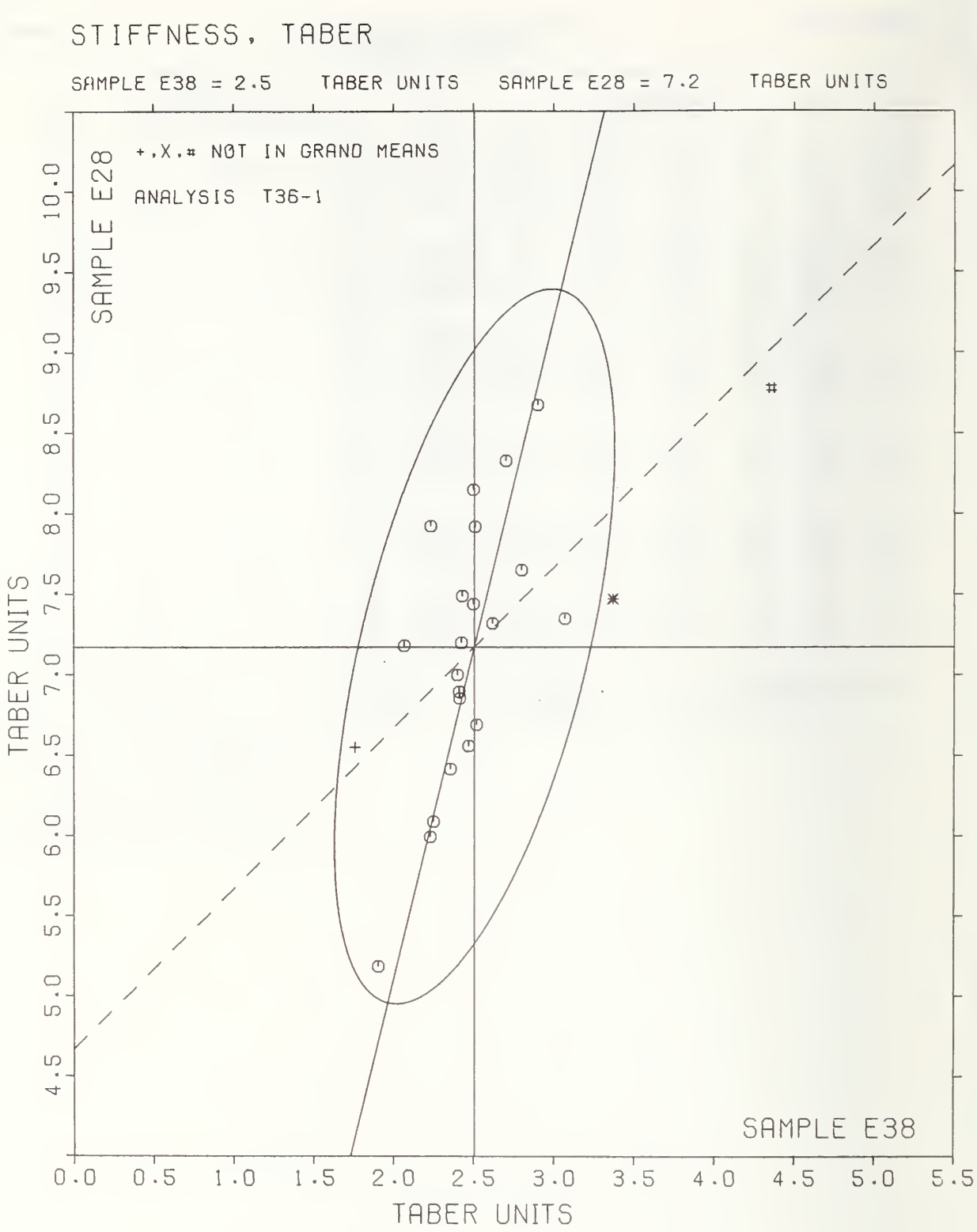
TOTAL NUMBER OF LABORATORIES REPORTING = 29

Best Values: E38 2.5 ± 0.5 Taber Units
E28 7.3 ± 1.3 Taber Units

Data from the following laboratories appear to be off by a multiplicative factor: 107A, 123, 150, 207, 290, 339.

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

LAB CODE	F	MEANS E38	MEANS E28	COORDINATES MAJOR	COORDINATES MINOR	AVG R,SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L339	#	.16	16.52	8.53	4.49	.66	36T	STIFFNESS, TABER
L250	*	1.76	6.55	-.78	.58	.70	36U	STIFFNESS, TABER, 20 C, 65% RH
L126	O	1.90	5.18	-2.07	.11	.86	36T	STIFFNESS, TABER
L150	#	2.05	11.70	4.29	1.51	3.19	36T	STIFFNESS, TABER
L182	O	2.07	7.18	-.10	.43	1.40	36T	STIFFNESS, TABER
L123	#	2.21	18.00	10.45	2.85	1.37	36T	STIFFNESS, TABER
L158	O	2.23	5.99	-1.21	-.01	.75	36T	STIFFNESS, TABER
L318	O	2.23	7.92	.67	.44	.87	36T	STIFFNESS, TABER
L228	O	2.25	6.09	-1.11	-.01	.61	36T	STIFFNESS, TABER
L281	O	2.36	6.42	-.77	-.04	.97	36T	STIFFNESS, TABER
L290	#	2.37	19.95	12.38	3.16	2.20	36T	STIFFNESS, TABER
L107A	#	2.40	22.40	14.77	3.71	3.77	36T	STIFFNESS, TABER
L274	O	2.40	7.00	-.19	.06	1.40	36T	STIFFNESS, TABER
L262	O	2.41	6.89	-.29	.03	.29	36T	STIFFNESS, TABER
L260	O	2.41	6.85	-.33	.01	.39	36T	STIFFNESS, TABER
L163	O	2.42	7.20	.01	.08	1.08	36T	STIFFNESS, TABER
L580	O	2.43	7.49	.29	.15	1.49	36T	STIFFNESS, TABER
L324	O	2.47	6.56	-.60	-.11	1.02	36T	STIFFNESS, TABER
L268	O	2.50	7.44	.26	.07	.18	36T	STIFFNESS, TABER
L321	O	2.50	8.15	.95	.24	1.16	36T	STIFFNESS, TABER
L122	O	2.51	7.92	.73	.17	1.13	36T	STIFFNESS, TABER
L570	O	2.52	6.69	-.46	-.13	1.02	36T	STIFFNESS, TABER
L149	O	2.62	7.32	.17	-.08	1.09	36T	STIFFNESS, TABER
L173B	O	2.70	8.33	1.17	.08	.18	36T	STIFFNESS, TABER
L176	O	2.80	7.65	.53	-.17	1.48	36T	STIFFNESS, TABER
L242	O	2.90	8.67	1.55	-.03	1.93	36T	STIFFNESS, TABER
L243	O	3.07	7.35	.31	-.51	1.72	36T	STIFFNESS, TABER
L273	*	3.37	7.47	.49	-.77	.96	36T	STIFFNESS, TABER
L207	#	4.32	8.73	1.94	-1.40	2.23	36T	STIFFNESS, TABER
GMEANS:		2.50	7.17			1.00		
		95% ELLIPSE:		2.28	.71	WITH GAMMA = 76 DEGREES		


STIFFNESS, TABER
SAMPLE E38 = 2.5 TABER UNITS
SAMPLE E28 = 7.2 TABER UNITS
+,X,# NOT IN GRAND MEANS
ANALYSIS T36-1
SAMPLE E28
TABER UNITS
SAMPLE E38
TABER UNITS
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5
4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0

ANALYSIS T49-1 TABLE 1
SURFACE PICK STRENGTH, IGT

LAB CODE	SAMPLE E08 MEAN	BI FINISH PRINTING 112 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	SAMPLE H78 MEAN	PRINTING 151 GRAMS PER SQUARE METER DEV	N.DEV	SDR	R.SDR	TEST D.= 4 VAR	F	LAB
L107	42.5	-5.1	-.28	8.6	2.78	77.0	3.9	.15	.0	.00	49I	G	L107
L121	372.5	324.9	17.85	79.7	25.81	NO DATA REPORTED FOR SAMPLE H78					49F	M	L121
L122	39.2	-8.4	-.46	1.3	.43	64.1	-9.1	-.36	2.6	.61	49D	G	L122
L149	39.7	-7.9	-.44	.9	.28	54.2	-19.0	-.75	2.6	.59	49L	G	L149
L182I	25.9	-21.7	-1.19	.9	.28	28.7	-44.4	-1.75	.3	.08	49Q	G	L182I
L183	59.3	11.7	.64	1.4	.45	NO DATA REPORTED FOR SAMPLE H78					49Q	M	L183
L190C	54.5	6.9	.38	1.8	.60	79.1	5.9	.23	8.0	1.83	49T	G	L190C
L207	62.7	15.1	.83	7.4	2.38	92.7	19.6	.77	8.0	1.84	49I	G	L207
L242	32.3	-15.3	-.84	4.6	1.50	58.0	-15.2	-.60	3.2	.74	49P	G	L242
L277	45.4	-2.3	-.12	2.3	.75	88.3	15.2	.60	4.1	.94	49I	G	L277
L278	114.7	67.1	3.68	17.9	5.79	151.0	77.9	3.07	9.7	2.22	49D	#	L278
L280	3.7	-43.9	-2.41	.0	.00	3.7	-69.4	-2.73	.0	.00	49U	#	L280
L291	59.6	12.0	.66	2.8	.90	NO DATA REPORTED FOR SAMPLE H78					49V	M	L291
L382	54.1	6.4	.35	2.1	.69	NO DATA REPORTED FOR SAMPLE H78					49V	M	L382
L388	86.4	38.8	2.13	.0	.00	116.1	43.0	1.69	10.3	2.37	49Q	G	L388
L484	495.0	447.4	24.58	19.1	6.20	717.5	644.4	25.38	34.0	7.81	49P	#	L484

GR. MEAN = 47.6 KP CM/SEC GRAND MEAN = 73.1 KP CM/SEC TEST DETERMINATIONS = 4
SD MEANS = 18.2 KP CM/SEC SD OF MEANS = 25.4 KP CM/SEC 9 LABS IN GRAND MEANS
AVERAGE SDR = 3.1 KP CM/SEC AVERAGE SDR = 4.4 KP CM/SEC
TOTAL NUMBER OF LABORATORIES REPORTING = 16

The following laborstories were excluded from the grand means because no viscosity values were reported: 280, 484.

TAPPI COLLABORATIVE REFERENCE PROGRAM

ANALYSIS T49-1
SURFACE PICK STRENGTH, IGT

	REPORTED BY LAB					CALCULATED		
LAB CODE	MEANS E08	MEANS H78	UNITS	VISCOSITY in Poise	FLUID	MEANS IN kP cm/sec E08	MEANS IN kP cm/sec H78	assumed viscosity
L107	42.5	77.0	kP cm/sec	681	PIB from IPC	42.5	77.0	
L121	372	600+	ft/min	---	IPI #2 Ink	---	---	
L122	39.2	64.1	kP cm/sec	230	IPI #3 Ink	39.2	64.1	
L149	923	1260	mm/sec	430	Polybutene	39.7	54.2	
L158	Instrument out of order							
L182	25.9	28.7	kP cm/sec	146	IGT Low Visc Oil	25.9	28.7	
L183	59.3	No Pick	kP cm/sec	210	IGT Low Visc Oil	59.3	---	
L190	54.5	79.1	kP cm/sec	734	IPC Fluid	54.5	79.1	
L207	62.7	92.7	kP cm/sec	---	---	62.7	92.7	
L242	1925	3450	mm/sec	168	IGT Low Visc Oil	32.3	58.0	
L243	NO DATA							
L274	NO DATA							
L276	NO DATA							
L277	45.4	88.3	kP cm/sec	432	Polybutene	45.4	88.3	
L278	114.7	151.0	kP cm/sec	753	#5 Ink	114.7	151.0	
L280	3.71+	3.71+	m/sec	---	Low Oil	---	---	
L291	59.6	No Pick	kP cm/sec	625	Polybutane	59.6	---	
L337	NO DATA							
L382	54.1	No Pick	kP cm/sec	625	Polybutane	54.1	---	
L388	86.4	116.1	kP cm/sec	720	Oil	86.4	116.1	
L484	495	717.5	mm/sec	---	IGT Oil	---	---	
L590	NO DATA							
L694	NO DATA							

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

LAB CODE	SAMPLE E08 HI FINISH PRINTING 112 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE H78 PRINTING 151 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.• S VAR	F	LAB
L105	9.60	.52	.77	.55	1.20	8.60	-1.05	-1.44	.55	1.31	50W	6	L105
L122	8.80	-.28	-.42	.45	.98	9.80	.15	.20	.45	1.07	50W	6	L122
L158	8.60	-.48	-.72	.55	1.20	10.00	.35	.48	.71	1.70	50W	6	L158
L162	9.00	-.08	-.13	.00	.00	9.80	.15	.20	.45	1.07	50W	6	L162
L173A	8.00	-1.08	-1.62	.00	.00	7.00	-2.65	-3.63	.00	.00	50W	#	L173A
L182W	8.40	-.68	-1.02	.55	1.20	9.20	-.45	-.62	.45	1.07	50W	6	L182W
L183	9.60	.52	.77	.55	1.20	10.20	.55	.75	.45	1.07	50W	6	L183
L195	8.80	-.28	-.42	.45	.98	8.80	-.85	-1.17	.45	1.07	50W	6	L195
L213	9.40	.32	.47	.55	1.20	10.20	.55	.75	.45	1.07	50W	6	L213
L225	9.00	-.08	-.13	.00	.00	10.00	.35	.48	.00	.00	50W	6	L225
L228	8.60	-.48	-.72	.55	1.20	8.60	-1.05	-1.44	.55	1.31	50W	6	L228
L230	9.40	.32	.47	.55	1.20	9.00	-.65	-.89	.00	.00	50W	6	L230
L236	10.00	.92	1.36	.00	.00	10.60	.95	1.30	.55	1.31	50W	6	L236
L243	8.20	-.88	-1.32	.84	1.84	8.80	-.85	-1.17	.45	1.07	50W	6	L243
L274	9.00	-.08	-.13	.71	1.55	10.00	.35	.48	.00	.00	50W	6	L274
L285	10.00	.92	1.36	.00	.00	10.00	.35	.48	.00	.00	50W	6	L285
L339	10.80	1.72	2.56	.45	.98	12.00	2.35	3.22	.00	.00	50W	#	L339
L366	10.20	1.12	1.66	.84	1.84	10.80	1.15	1.57	.45	1.07	50W	6	L366
L378	9.60	.52	.77	.55	1.20	10.80	1.15	1.57	.84	2.01	50W	6	L378
L390	7.60	-1.48	-2.21	.55	1.20	9.00	-.65	-.89	.71	1.70	50W	6	L390
LS67	8.80	-.28	-.42	.45	.98	9.20	-.45	-.62	.45	1.07	50W	6	LS67

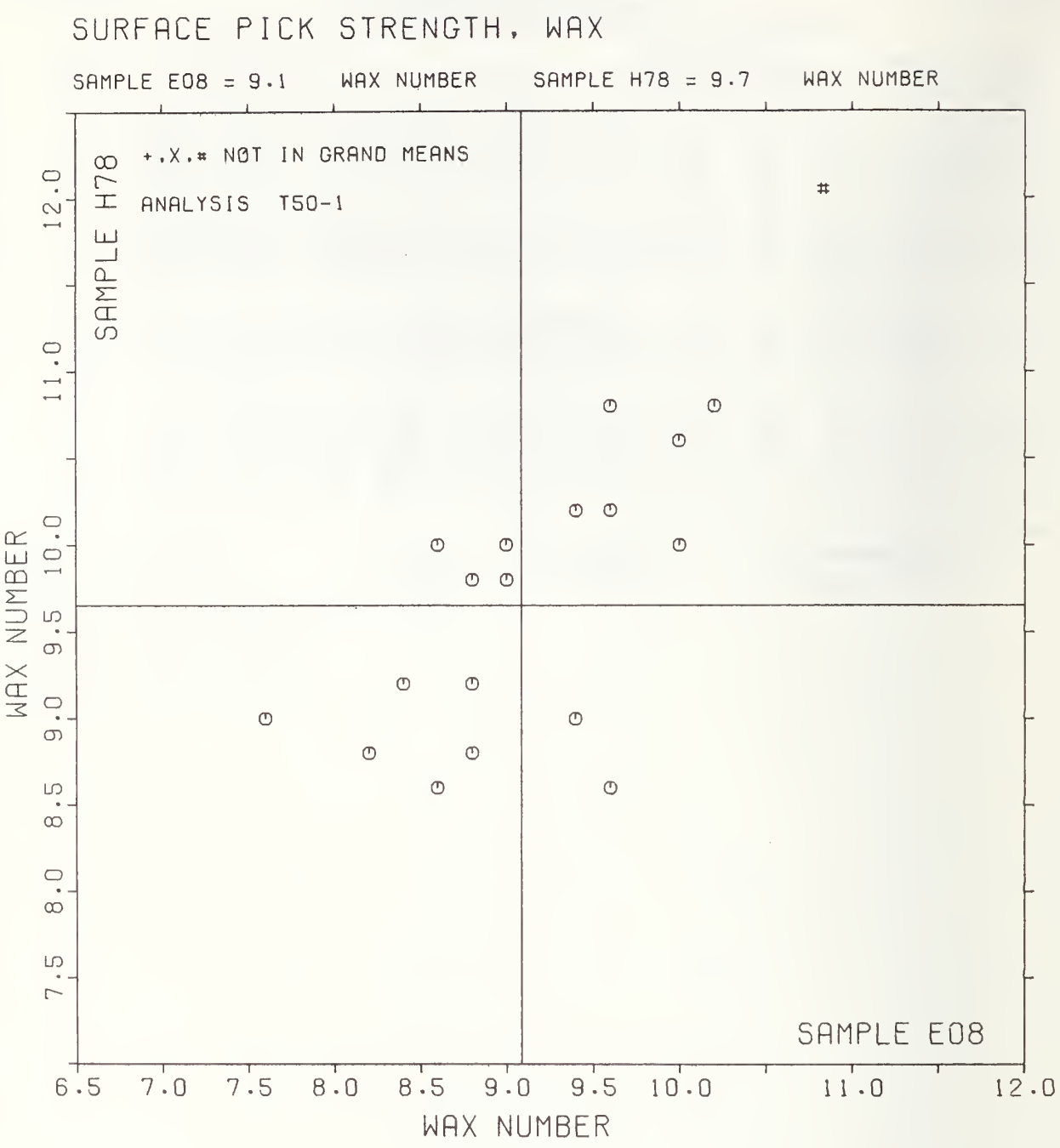
GR. MEAN • 9.08 WAX NUMBER GRAND MEAN • 9.65 WAX NUMBER TEST DETERMINATIONS • 5
SD MEANS • .67 WAX NUMBER SD OF MEANS • .73 WAX NUMBER 19 LABS IN GRAND MEANS
AVERAGE SDR • .46 WAX NUMBER AVERAGE SDR • .42 WAX NUMBER
TOTAL NUMBER OF LABORATORIES REPORTING • 21

Best Values: E08 9.0 ± 1.0 Wax number
E78 9.7 ± 0.9 Wax number

The following laboratories were omitted from the grand means because of extreme test results: 173A, 339.

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

LAB CODE	F	MEANS E08	H78	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L390	O	7.60	9.00	-1.47	.69	1.45	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L173A	#	8.00	7.00	-2.71	-.53	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L243	O	8.20	8.80	-1.22	.11	1.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L182W	O	8.40	9.20	-.79	.22	1.14	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L158	O	8.60	10.00	-.06	.59	1.45	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L228	O	8.60	8.60	-1.11	-.33	1.26	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L567	O	8.80	9.20	-.53	-.08	1.03	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L122	O	8.80	9.80	-.08	.31	1.03	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L195	O	8.80	8.80	-.83	-.35	1.03	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L274	O	9.00	10.00	.21	.29	.78	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L225	O	9.00	10.00	.21	.29	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L162	O	9.00	9.80	.06	.16	.54	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L230	O	9.40	9.00	-.28	-.67	.60	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L213	O	9.40	10.20	.62	.12	1.14	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L183	O	9.60	10.20	.75	-.03	1.14	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L105	O	9.60	8.60	-.45	-1.08	1.26	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L378	O	9.60	10.80	1.20	.37	1.61	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L236	O	10.00	10.60	1.32	-.07	.66	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L285	O	10.00	10.00	.86	-.46	.00	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L366	O	10.20	10.80	1.60	-.09	1.46	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
L339	#	10.80	12.00	2.90	.25	.49	50W	SURFACE PICK STRENGTH, WAX (TAPPI T459 OS75)
GMEANS:		9.08	9.65			1.00		
		95% ELLIPSE:		2.46	1.20	WITH GAMMA = 48 DEGREES		


SURFACE PICK STRENGTH, WAX
SAMPLE E08 = 9.1 WAX NUMBER
SAMPLE H78 = 9.7 WAX NUMBER
+.X.* NOT IN GRAND MEANS
ANALYSIS T50-1
SAMPLE H78
SAMPLE E08
WAX NUMBER
WAX NUMBER
6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 11.0 12.0
7.5 8.0 8.5 9.0 9.5 10.0 11.0 12.0

REPORT NO. 49S

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

SEPTEMBER 1977

LAB CODE	SAMPLE E03 149 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE E61 195 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.* 10 VAR	F	LAB
	CONVERTER KRAFT					LINERBOARD							
L100	184.	16.	1.68	16.	1.45	200.	-3.	-.17	10.	.92	91H	O	L100
L176	181.	12.	1.33	11.	.98	200.	-2.	-.13	8.	.72	91I	O	L176
L182	180.	12.	1.27	9.	.86	221.	18.	1.12	12.	1.09	91T	O	L182
L185	170.	1.	.14	21.	1.90	194.	-9.	-.53	14.	1.26	91A	O	L185
L218	160.	-8.	-.87	5.	.50	209.	7.	.42	10.	.92	91A	O	L218
L242	160.	-8.	-.85	12.	1.07	168.	-35.	-2.10	22.	1.96	91Y	O	L242
L248	174.	6.	.61	14.	1.26	220.	18.	1.10	16.	1.43	91Y	O	L248
L255	169.	0.	.03	13.	1.24	196.	-7.	-.40	13.	1.18	91I	O	L255
L269	164.	-4.	-.44	11.	1.04	198.	-4.	-.24	6.	.53	91I	O	L269
L274	168.	-1.	-.06	5.	.43	194.	-8.	-.51	9.	.77	91R	O	L274
L289	153.	-15.	-1.64	9.	.84	NO DATA REPORTED FOR SAMPLE E61					91I	M	L289
L329	157.	-12.	-1.26	10.	.90	223.	21.	1.27	19.	1.66	91I	O	L329
L394	161.	-8.	-.83	8.	.70	205.	3.	.16	4.	.39	91R	O	L394
L484	153.	-16.	-1.69	8.	.72	175.	-27.	-1.65	5.	.44	91I	O	L484
L575	170.	2.	.18	9.	.79	208.	6.	.36	13.	1.19	91H	O	L575
L666	175.	7.	.76	13.	1.15	224.	21.	1.29	6.	.54	91S	O	L666

GR. MEAN = 168. NEWTONS GRAND MEAN = 202. NEWTONS TEST DETERMINATIONS = 10
SD MEANS = 9. NEWTONS SD OF MEANS = 17. NEWTONS 15 LABS IN GRAND MEANS
AVERAGE SDR = 11. NEWTONS AVERAGE SDR = 11. NEWTONS
GR. MEAN = 37.83 POUNDS GRAND MEAN = 45.49 POUNDS
TOTAL NUMBER OF LABORATORIES REPORTING = 16

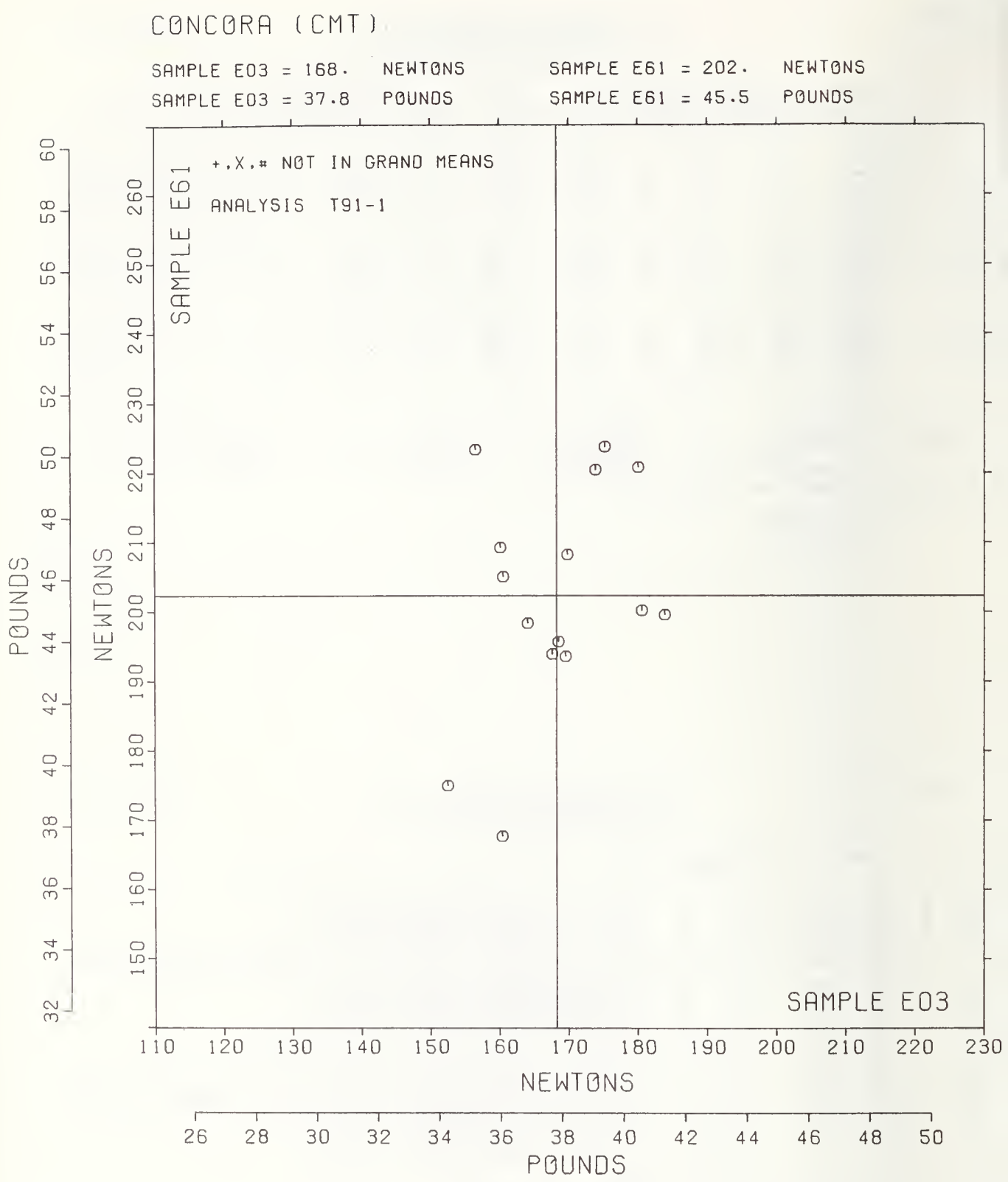
Best Values: E03 170 newtons
E61 200 newtons

REPORT NO. 49S

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

SEPTEMBER 1977

LAB CODE	F	MEANS E03	E61	COORDINATES MAJOR	MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L484	O	153.	175.	-31.	8.	.58	91I	FLAT CRUSH STRENGTH, CONCORA, H*D
L289	M	153.				.84	91I	FLAT CRUSH STRENGTH, CONCORA, H*D
L329	O	157.	223.	17.	17.	1.28	91I	FLAT CRUSH STRENGTH, CONCORA, H*D
L218	O	160.	209.	4.	10.	.71	91A	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L242	O	160.	168.	-35.	-2.	1.51	91Y	FLAT CRUSH STRENGTH, CONCORA: GIVE METHOD*INSTR.MAKE & MODEL
L394	O	161.	205.	1.	8.	.55	91R	FLAT CRUSH STRENGTH, CONCORA, TMI
L269	O	164.	198.	-5.	3.	.79	91I	FLAT CRUSH STRENGTH, CONCORA, H*D
L274	O	168.	194.	-8.	-2.	.60	91R	FLAT CRUSH STRENGTH, CONCORA, TMI
L255	O	169.	196.	-6.	-2.	1.21	91I	FLAT CRUSH STRENGTH, CONCORA, H*D
L185	O	170.	194.	-8.	-4.	1.58	91A	FLAT CRUSH STRENGTH, CONCORA, INSTRON
L575	O	170.	208.	6.	0.	.99	91H	FLAT CRUSH STRENGTH, CONCORA, H*D
L248	O	174.	220.	19.	-1.	1.34	91Y	FLAT CRUSH STRENGTH, CONCORA: GIVE METHOD*INSTR.MAKE & MODEL
L666	O	175.	224.	22.	-1.	.85	91S	FLAT CRUSH STRENGTH, CONCORA, TOYO SEIKI (METHOD JIS-P-8126)
L182	O	180.	221.	21.	-6.	.98	91T	FLAT CRUSH STRENGTH, CONCORA, TMI
L176	O	181.	200.	1.	-12.	.85	91I	FLAT CRUSH STRENGTH, CONCORA, H*D
L100	O	184.	200.	2.	-16.	1.19	91H	FLAT CRUSH STRENGTH, CONCORA, H*D
GMEANS:		168.	202.			1.00		
		95% ELLIPSE:		49.	24.	WITH GAMMA = 74 DEGREES		


CONCORA (CMT)
SAMPLE E03 = 168. NEWTONS
SAMPLE E03 = 37.8 POUNDS
SAMPLE E61 = 202. NEWTONS
SAMPLE E61 = 45.5 POUNDS
+,X,# NOT IN GRAND MEANS
ANALYSIS T91-1
SAMPLE E61
NEWTONS
POUNDS
SAMPLE E03
NEWTONS
POUNDS

ANALYSIS T96-1 TABLE 1
RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)
TAPPI STANDARD T472 SU-68

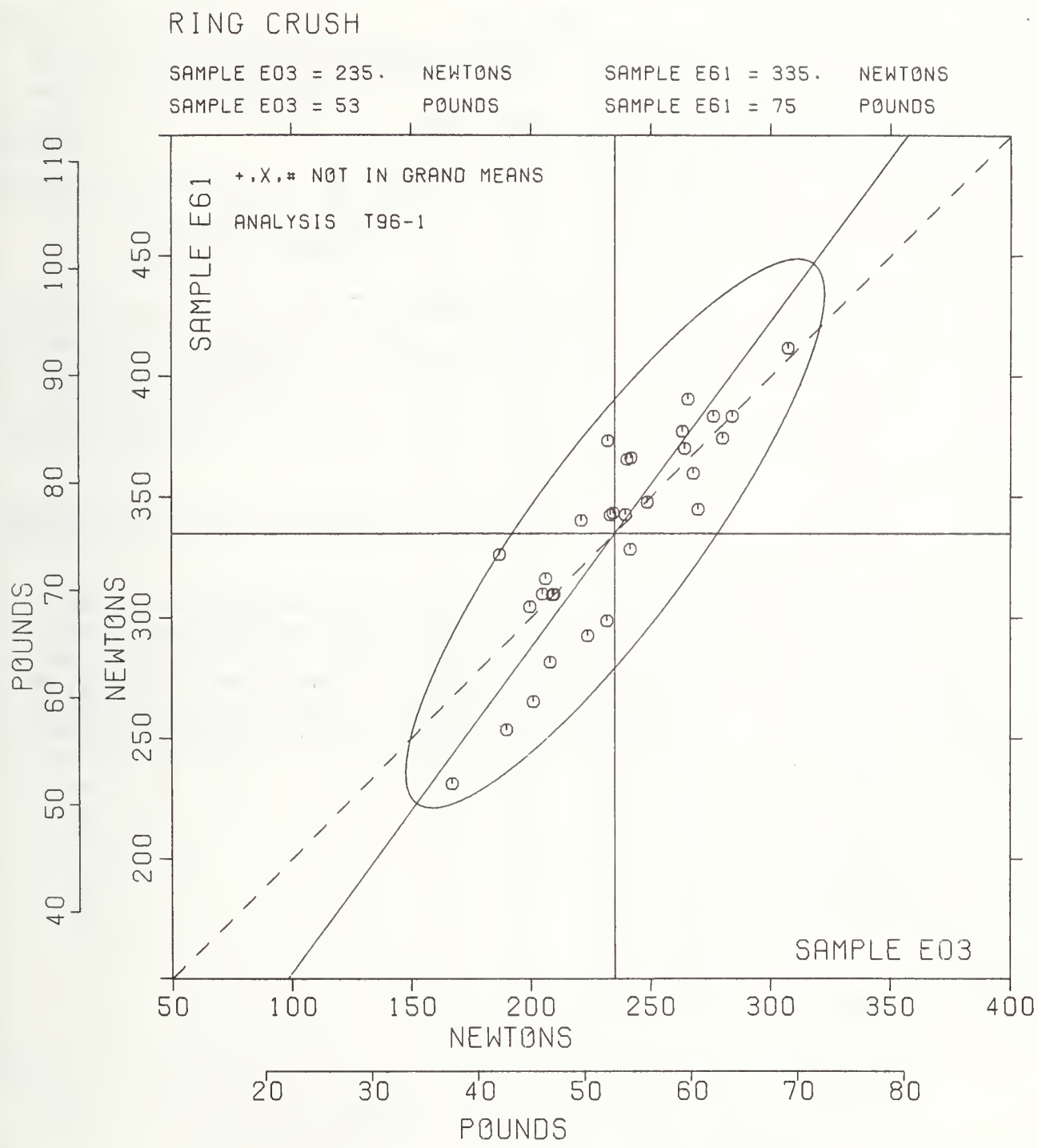
LAB CODE	SAMPLE E03 CONVERTER KRAFT 149 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	SAMPLE E61 LINERBOARD 195 GRAMS PER SQUARE METER MEAN	DEV	N.DEV	SDR	R.SDR	TEST D.F 10 VAR	F	LAB
L100	242.	7.	.20	14.	.80	366.	31.	.73	23.	1.06	96H	@	L100
L107	234.	-1.	-.02	17.	.93	343.	9.	.20	15.	.68	96P	@	L107
L114	266.	31.	.92	18.	1.00	391.	56.	1.29	21.	.97	96P	@	L114
L122	307.	72.	2.18	46.	2.59	412.	77.	1.78	22.	.99	96P	@	L122
L124	232.	-3.	-.10	21.	1.19	299.	-36.	-.83	20.	.90	96P	@	L124
L126	240.	5.	.14	9.	.50	343.	8.	.18	28.	1.26	96P	@	L126
L127	187.	-48.	-1.44	13.	.75	326.	-9.	-.20	23.	1.07	96P	@	L127
L141	210.	-25.	-.76	19.	1.05	310.	-25.	-.58	31.	1.40	96P	@	L141
L157	249.	14.	.41	15.	.84	348.	13.	.30	18.	.82	96P	@	L157
L159	201.	-34.	-1.02	17.	.98	265.	-70.	-1.61	34.	1.53	96I	@	L159
L171	270.	35.	1.05	24.	1.35	345.	10.	.23	15.	.67	96H	@	L171
L176	190.	-45.	-1.36	18.	1.01	254.	-81.	-1.88	36.	1.65	96P	@	L176
L182	280.	45.	1.36	8.	.48	374.	40.	.92	10.	.48	96B	@	L182
L191	208.	-27.	-.81	26.	1.48	282.	-53.	-1.23	54.	2.49	96P	@	L191
L242	284.	49.	1.48	20.	1.14	383.	49.	1.13	15.	.70	96Y	@	L242
L274	167.	-68.	-2.04	12.	.65	231.	-104.	-2.40	12.	.53	96X	@	L274
L303	263.	28.	.85	14.	.80	377.	42.	.98	14.	.65	96H	@	L303
L305	232.	-3.	-.08	9.	.53	373.	38.	.89	18.	.83	96P	@	L305
L307	200.	-35.	-1.06	9.	.51	305.	-30.	-.70	13.	.58	96P	@	L307
L329	268.	33.	.99	27.	1.52	360.	25.	.58	20.	.92	96P	@	L329
L336	233.	-2.	-.05	20.	1.12	342.	8.	.18	21.	.97	96H	@	L336
L350	242.	7.	.20	16.	.89	328.	-7.	-.15	19.	.87	96P	@	L350
L393	240.	5.	.16	17.	.96	366.	31.	.71	11.	.49	96P	@	L393
L484	205.	-30.	-.90	18.	1.03	310.	-25.	-.58	15.	.68	96M	@	L484
L562	224.	-11.	-.34	36.	2.05	293.	-42.	-.98	50.	2.30	96P	@	L562
L570	221.	-14.	-.42	18.	1.01	340.	5.	.13	13.	.59	96T	@	L570
L575	276.	41.	1.24	9.	.53	383.	49.	1.13	11.	.52	96B	@	L575
L603	206.	-29.	-.86	17.	.94	316.	-19.	-.43	37.	1.70	96P	@	L603
L610	264.	29.	.88	12.	.67	370.	35.	.82	16.	.72	96P	@	L610
L663	209.	-26.	-.78	13.	.71	310.	-25.	-.58	21.	.96	96P	@	L663

GR. MEAN = 235. NEWTONS GRAND MEAN = 335. NEWTONS TEST DETERMINATIONS = 10
SD MEANS = 33. NEWTONS SD OF MEANS = 43. NEWTONS 30 LABS IN GRAND MEANS
AVERAGE SDR = 18. NEWTONS AVERAGE SDR = 22. NEWTONS
GR. MEAN = 52.83 POUNDS GRAND MEAN = 75.27 POUNDS
TOTAL NUMBER OF LABORATORIES REPORTING = 30

Best Values: E03 240 newtons
E61 350 newtons

ANALYSIS T96-1 TABLE 2
RING CRUSH (COMPRESSION RESISTANCE OF PAPERBOARD)
TAPPI STANDARD T472 SU-68

LAB CODE	F	MEANS E03	MEANS E61	COORDINATES MAJOR	COORDINATES MINOR	AVG R.SDR	VAR	PROPERTY---TEST INSTRUMENT---CONDITIONS
L274	0	167.	231.	-124.	-7.	.59	96X	RING CRUSH: GIVE INSTRUMENT MAKE * MODEL
L127	0	187.	326.	-36.	33.	.91	96P	RING CRUSH, H AND D
L176	0	190.	254.	-92.	-12.	1.33	96P	RING CRUSH, H AND D
L307	0	200.	305.	-45.	10.	.55	96P	RING CRUSH, H AND D
L159	0	201.	265.	-76.	-14.	1.26	96I	RING CRUSH, INSTRON
L484	0	205.	310.	-38.	9.	.86	96R	RING CRUSH, REGMED
L603	0	206.	316.	-32.	12.	1.32	96P	RING CRUSH, H AND D
L151	0	208.	282.	-59.	-10.	1.98	96P	RING CRUSH, H AND D
L663	0	209.	310.	-36.	6.	.84	96P	RING CRUSH, H AND D
L141	0	210.	310.	-35.	5.	1.23	96P	RING CRUSH, H AND D
L570	0	221.	340.	-4.	14.	.80	96T	RING CRUSH, TMI
L562	0	224.	293.	-41.	-16.	2.18	96P	RING CRUSH, H AND D
L124	0	232.	299.	-31.	-19.	1.04	96P	RING CRUSH, H AND D
L305	0	232.	373.	29.	25.	.68	96P	RING CRUSH, H AND D
L336	0	233.	342.	5.	6.	1.04	96H	RING CRUSH, H AND D
L107	0	234.	343.	7.	6.	.81	96P	RING CRUSH, H AND D
L126	0	240.	343.	9.	1.	.88	96P	RING CRUSH, H AND D
L353	0	240.	366.	28.	14.	.72	96P	RING CRUSH, H AND D
L350	0	242.	328.	-1.	-9.	.88	96P	RING CRUSH, H AND D
L100	0	242.	366.	29.	13.	.93	96H	RING CRUSH, H AND D
L157	0	249.	348.	19.	-3.	.83	96P	RING CRUSH, H AND D
L303	0	263.	377.	51.	2.	.73	96H	RING CRUSH, H AND D
L610	0	264.	370.	46.	-3.	.69	96P	RING CRUSH, H AND D
L114	0	266.	391.	63.	9.	.98	96P	RING CRUSH, H AND D
L329	0	268.	360.	40.	-11.	1.22	96P	RING CRUSH, H AND D
L171	0	270.	345.	29.	-22.	1.01	96H	RING CRUSH, H AND D
L575	0	276.	383.	64.	-4.	.52	96H	RING CRUSH, H AND D
L182	0	280.	374.	59.	-13.	.48	96H	RING CRUSH, H AND D
L242	0	284.	383.	68.	-10.	.92	96Y	RING CRUSH: GIVE INSTRUMENT MAKE * MODEL
L122	0	307.	412.	105.	-12.	1.79	96P	RING CRUSH, H AND D
GMEANS:		235.	335.			1.00		
		95% ELLIPSE:		139.	35.	WITH GAMMA * 53 DEGREES		


RING CRUSH
SAMPLE E03 = 235. NEWTONS
SAMPLE E03 = 53 POUNDS
SAMPLE E61 = 335. NEWTONS
SAMPLE E61 = 75 POUNDS
+,X,* NOT IN GRAND MEANS
ANALYSIS T96-1
SAMPLE E61
SAMPLE E03
NEWTONS
POUNDS
50 100 150 200 250 300 350 400
200 250 300 350 400 450
40 50 60 70 80 90 100 110
20 30 40 50 60 70 80

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	H60	18.21	1.31	1.21	15	46	54	10	1.06	3.68
T10-1 PSI	H05	32.21	1.57	1.61					1.41	4.44
BURSTING STRENGTH, MODEL C-A	H60	18.60	1.06	1.20	15	35	37	10	1.05	3.00
T10-2 PSI	H05	32.49	1.05	1.54					1.35	3.01
BURSTING STRENGTH, HIGH RANGE	E24	67.8	2.5	3.9	15	35	46	10	3.4	7.3
T11-1 PSI	H08	78.4	4.1	6.6					5.8	11.9
TEARING STRENGTH, DEEP CUTOUT	E05	62.9	2.7	2.2	15	108	122	10	1.9	7.6
T15-1 GRAMS	H03	64.2	3.1	2.0					1.7	8.5
TEARING STRENGTH, NO CUTOUT, OLD STYLE	E04	65.3	3.8	3.2	15	14	16	10	2.8	10.7
T17-1 GRAMS	E17	65.0	3.1	2.8					2.5	8.7
TENSILE STRENGTH, PACKAGING PAPERS	H56	9.52	.43	.61	20	46	51	12	.49	1.24
T19-1 KILONEWTON/M	H09	7.05	.30	.50					.40	.86
TENSILE STRENGTH, CRE TYPE	B95	4.49	.18	.19	20	39	49	12	.15	.51
T20-1 KILONEWTON/M	H43	7.17	.52	.31					.24	1.44
TENSILE STRENGTH, PENDULUM TYPE	B95	4.55	.29	.21	20	36	36	12	.17	.80
T20-2 KILONEWTON/M	H43	7.00	.85	.31					.25	2.35
T.E.A., PACKAGING PAPERS	H56	95.8	6.3	13.9	20	14	18	12	11.2	18.7
T25-1 JOULES/SQ M	H09	192.6	12.4	28.8					23.0	37.4
T.E.A., PRINTING PAPERS	B95	41.2	3.2	5.0	20	18	21	12	4.0	9.3
T26-1 JOULES/SQ M	H43	81.8	14.4	8.3					6.7	40.2
ELONGATION TO BREAK, PACKAGING PAPER	H56	1.74	.23	.15	20	15	16	12	.12	.63
T28-1 PERCENT	H09	4.27	.39	.50					.40	1.11
ELONGATION TO BREAK, PRINTING PAPER	B95	1.509	.138	.131	20	17	20	12	.105	.387
T29-1 PERCENT	H43	1.972	.286	.142					.114	.795
FOLDING ENDURANCE (MIT)	H46	74.	20.	16.	15	44	54	10	14.	55.
T30-1 DOUBLE FOLDS	H11	122.	45.	39.					34.	125.
FOLDING ENDURANCE (MIT)	H46	1.843	.121	.097	15	44	54	10	.085	.340
T30-2 LOG(10) FOLD	H11	2.024	.184	.154					.135	.515
STIFFNESS, GURLEY	H64	386.	26.	17.	10	36	37	10	15.	71.
T35-1 GURLEY UNITS	H66	455.	32.	30.					26.	88.
STIFFNESS, TABER	E38	2.50	.32	.16	10	22	29	5	.20	.91
T36-1 TABER UNITS	E28	7.17	.82	.35					.44	2.29
SURFACE PICK STRENGTH, IGT	E08	47.6	18.2	3.1	4	9	16	4	4.3	50.4
T49-1 KP CM/SEC	H78	73.1	25.4	4.4					6.0	70.3
SURFACE PICK STRENGTH, WAX	E08	9.08	.67	.46	5	19	21	5	.56	1.86
T50-1 WAX NUMBER	H78	9.65	.73	.42					.52	2.02
CONCORA (CMT)	E03	168.	9.	11.	10	15	16	10	10.	26.
T91-1 NEWTONS	E61	202.	17.	11.					10.	46.
RING CRUSH	E03	235.	33.	18.	10	30	30	10	16.	92.
T96-1 NEWTONS	E61	335.	43.	22.					19.	120.

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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 participaitng laboratories. An important by-product of the programs is the provision of realistic pictures of the state of the testing art. This is one of the periodic reports showing averages for each participant, within and between laboratory variability, and other information for participants and standards committees.

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