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BROOKS & PERKINS INCORPORATED

DETROIT, MICHIGAN

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(19) Report 529-Phase-1

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(6) REPORT ON THE TESTING OF
PALLET-CARGO, AIRCRAFT
HCU-53/E (XA1)
AND NET SET - CARGO TIEDOWN
AIRCRAFT PALLET
A/A28H- 1(XA1)
(PHASE 1) [redacted]

(11)

Prepared for:

Air Force Systems Command
Aeronautical Systems Division
Wright Patterson Air Force Base
Dayton, Ohio
Contract AF33(657)13582
(15)

Prepared by:

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Defense Products Division
1950 West Fort Street
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(11) 10 April 1967

(12) 178p.

(402 472)

ABSTRACT

This report was prepared and submitted in compliance with Item 5 of contract AF 33(657)13582.

This report consists of two phases, the first of which is presented herein. This phase consisted of the testing of small samples of various core materials in order to arrive at the best core construction, exclusive of balsa wood, for use in an ~~88" x 108"~~ 463L logistic aircraft cargo platform.

The scope of work covered in Phase 1 of the testing follows the requirements outlined in "Test Plan for Universal Platform and Cargo Restraint Device", paragraph 10.0, dated 17 March 1966, which was prepared by this contractor and approved by ASD.

Phase 2 of the report is presented under separate cover. This portion contains those reports pertaining to the testing of the full-size platforms and comparative tests on the HCU-6/E aircraft cargo pallet, together with their respective nets and chain-type restraints.

Division of this report into two phases is intended to reduce the bulk resulting from combining these, and to present in one package, i.e. Phase 2, the material of most interest to the user of aircraft cargo pallets and restraint systems.

It is noted that lab test sheets are included as back-up material only. The data taken from these lab sheets is plotted on the figures of this report.

P.X.i

* WERE TESTED

** 88-IN X 108-IN.

TABLE OF CONTENTS

TEST RESULTS

Conveyor Rollers

The dynamic pulling force with a unit roller load of 650 pounds was greatest for cores made with paper honeycomb and least for those with aluminum honeycomb. The aluminum core samples indicate a pulling force reduction as the cell size is diminished. The paper-poly-paper samples required more pulling force than the plain paper samples. At elevated temperatures, the aluminum core pulling force remained approximately the same, while the paper samples pulling force increased by approximately 130 per cent.

Spring Loaded Balls

The dynamic pulling force with a unit roller load of 26 pounds per ball was greatest for cores made with paper honeycomb and least for cores made with aluminum honeycomb. The pulling force diminished as the cell size of the aluminum core was reduced. The pulling force for samples made with paper-poly-paper honeycomb was greater than that for samples made with plain paper honeycomb. At elevated temperatures, all core materials except the one sample made from paper-poly-paper experienced an increase in pulling force. This one sample showed a slight reduction.

Casters

The breakaway pulling force, with a unit caster load of 140 pounds, of the best performing aluminum core sample was less than one-half of the pulling force of the best paper core samples when pulled parallel to the plane of the caster. All samples experienced increased pulling force at elevated temperatures.

The results of the test with the caster turned 90 degrees to the direction of pull, were similar.

Puncture

All of the materials tested, except one, plain paper honeycomb, performed well in this test as evidenced by the small amounts of permanent set. The aluminum honeycomb samples and especially those made from 5052 alloy in the smaller cell sizes, indicate a superiority over the paper core materials.

Water Absorption

The paper-poly-paper and plain paper honeycomb material supplied by the same manufacturer, Hexcel, absorbed significant amounts of water accompanied by a serious loss of compressive strength. These regained some of their original strength when dried out. The one material foamed with polyurethane absorbed approximately one-tenth as much water compared to the unfoamed, and retained 80 per cent of its compressive strength.

The other two unfoamed paper honeycomb materials absorbed small amounts of water and retained approximately 70 per cent of their compressive strength while wet.

All of the materials, except one, suffered a permanent loss of compressive strength when restored to the dry state. The one exception indicated a slight increase.

Flexure

All paper samples were affected by temperature, the amount of deflection increasing with temperature. All paper samples, except one, compared at the same load level, deflected approximately equally.

All of the aluminum samples were unaffected by temperature at the load level chosen for comparison.

When carried to ultimate load, failure occurred in the core for the paper samples while for aluminum, failure occurred at the adhesive joints.

Shear

The core materials rated in order of decreasing shear strength are as follows: 1/4" -3003 -.003 aluminum, 3/16" -3003 - .0025 aluminum, Hexcel paper-poly-paper, Douglas paper-poly-paper, Douglas plain paper, and Hexcel plain paper.

Teeter Rollers

No paper honeycomb sample was able to withstand the required load without appreciable permanent set. Only two aluminum core samples could support the required load with zero permanent set. Both of these were made with 1/8" -5056 -.002 material, one with a .080" and the other with a .100" bottom skin of 7075-T6 material.

Fungus

Only one paper honeycomb material was resistant to fungus growth, Douglas plain paper.

The testing of urethane foam-filled paper honeycomb samples was confined to fungus testing and water absorption testing. All of the other samples required for the remaining tests were either impossible to obtain, or of inferior quality, i.e. warpage, poor fill and non-uniform density.

SUMMARY OF RESULTS

Conveyor Roller Test: 2" diameter x 3.75" long roller @ 650 Lbs./Roller.

Dynamic pull force in pounds on 2 rollers.

Material	Room Temperature	125° F.
H	13.7	18.6
HP	14.5	18.3
D	13.2	17.0
DP	14.0	18.7
R	10.5	Not Tested
S	11.6	11.5
T	12.3	12.0

Spring Loaded Ball Conveyor Test: 1" diameter steel balls with 65 pound capacity spring.

Dynamic pull force in pounds on 6 balls at a load of 26 Lbs./ball.

Material	Room Temperature	125° F.
H	3.1	3.7
HP	4.2	3.8
D	2.7	3.8
DP	3.4	Not Tested
R	1.8	3.1
S	2.2	3.3
T	2.5	3.8

Caster Test: 4" diameter x 1.5" wide steel caster @ 140 Lbs./Caster.

Breakaway pull force on 4 casters with casters parallel to direction of movement.

Material	Room Temperature	125°F.
H	11.5	21.0
HP	13.6	15.2
D	9.6	20.8
DP	12.7	Not Tested
R	4.2	8.5
S	5.0	13.6
T	5.2	14.1

Breakaway force with caster turned 90° to direction of movement.

Material	Room Temperature	125°F.
H	57.0	56.5
HP	49.0	61.0
D	54.0	50.0
DP	72.0	Not Tested
R	32.0	35.0
S	35.0	41.0
T	39.9	45.0

Puncture Test: 1" square steel mandrel @ 750 Lbs.

Material	Permanent set, inches
H	.0150
HP	.0050
D	.0035
DP	.0015
R	.0030
S	.0030
T	.0010
A	.0005
B	.0000

Water Absorption Test:

Material	% Water absorbed	Compressive strength, PSI		
		Dry	Wet	Wetted and dried
HP(foamed)	3.12	460	367	295
H	60.0	172	0	125
HP	29.0	224	58	125
D	3.4	462	335	490
DP	3.1	423	300	350

Flexure Test: 48" x 6" x 2.25" beam with 3 equal spans.

Deflection in inches with an applied net load of 1000 pounds.

Material	-40°F.	Room Temperature	125°F.
H	.25*	.25	.72*
HP	.15	.17	.45
D	.17	.19	.50
DP	.20	.21	.53
R	.16	.14	.16
S	.14	.14	.16
T	.16	.16	Not Tested

* Failed at 800 pounds.

Shear Test: 12" x 6" x 2.25" sandwich with restraint extrusion bonded to each 6" side.

Double shear load, pounds

Material	-40°F.	Room Temperature	125°F.
H	1740	1370	1000
HP	5250	4550	1800
D	4000	3480	1180
DP	4200	3000	1450
R	5900	5550	3350
S	6720	4300	3700
T	Not Tested		

Tester Roller Test: 2" diameter x 3.75" long roller @ 6300 pound load

Material	Permanent set, inches
H	.369
HP	.226
D	.232
DP	.345
R	.314
S	.112
T	.112
C	.090
D	.060
E	.080
F	.080
G	0
H	.040
J	0

Fungus Test: Per MIL-STD-810, Method 508.1, Procedure II.

Material	Amount of Fungus Growth
H	Dense
HP	Light
D	None
DP	Very Light
HP (Foam Filled)	Dense

CONCLUSIONS

Only one core material, 1/8" - .002 - 5056 aluminum alloy honeycomb, was judged to be suitable based on its performance in the core evaluation testing.

All of the other core materials tested were unsuitable because of their failure in one or more of the series of tests, ~~as presented on the attached fold-out sheet, page xvi.~~ The paper honeycomb sample "HP", for example, was unsuitable in regard to mandrel penetration resistance, fungus resistance, water migration resistance and teeter roller indentation.

Based on the fabrication problems encountered by the various vendors selected to fill the paper honeycomb with urethane foam, the process is considered to be impractical at the present state of the art. Some of the troubles reported were non-uniform density and incomplete fill. However, a few small samples were salvaged for limited testing.

From the results of the tests on these few small samples, the following conclusions may be drawn concerning the urethane foam when used for filling paper honeycomb:

1. It reduces water migration by a factor of 10 when used in a sandwich panel.
2. It doubles the gross dry compression strength of the sandwich panel it comprises.
3. Its use increases the gross wet compression strength of the sandwich panel by a factor of six.
4. It has an exceptionally poor resistance to fungus growth.

The adhesive system, Fuller 7007 is resistant to fungus, as was shown in the fungus tests performed on the sandwich panel made from paper honeycomb "D".

MATERIAL IDENTIFICATION

The following identification system was used for the various core materials during the core evaluation tests only.

Hexcel Products, Inc., Havre de Grace, Maryland:

H: Plain paper honeycomb, 99 - 3/8 - 25; ream weight 99 pounds, 3/8" cell, 25% impregnation.

HP: Paper-poly-paper, 90P90 - 1/2 - 25; ream weight 90 pounds, 1/2" cell, 25% impregnation.

T: Aluminum honeycomb, 3/8" - 5052 - .005; 3/8" cell, 5052 alloy, .005" ribbon.

A: Aluminum honeycomb, 1/4" - 5052 - .0025; 1/4" cell, 5052 alloy, .0025" ribbon.

B, C, D, E, F: Aluminum honeycomb, 1/4" - 5052 - .003; 1/4" cell, 5052 alloy, .003" ribbon.

G, H, J: Aluminum honeycomb, 1/8" - 5056 - .002; 1/8" cell, 5056 alloy, .002" ribbon.

Douglas Aircomb, as supplied by Airsupply Company, a Division of the Garrett Corporation, Indianapolis, Indiana:

D: Plain paper honeycomb, style 125-35, type 20; 125 pounds ream weight, 3/8" cell, 35% impregnation.

DP: Paper-poly-paper, similar to the above.

Honeycomb Company of America, Bridgeport, Connecticut:

R: Aluminum honeycomb, 3/16" - 3003 - .0025; 3/16" cell, 3003 alloy, .0025" ribbon.

S: Aluminum honeycomb, 1/4" - 3003 - .003; 1/4" cell, 3003 alloy, .003" ribbon.

CONSTRUCTION OF SAMPLES

All beam strength test samples were fabricated with the upper facing made from 6061-T6 aluminum alloy sheet, .06 inches thick. The lower skin was made from 7075-T6 aluminum alloy sheet, .08 inches thick. The adhesive used was Fuller 7007 2-part epoxy, cured at room temperature, with a clamping pressure of 5 - 10 psi.

The conveyor resistance samples were faced with 6061-T6 aluminum alloy, .06 inches thick. The adhesive used was Fuller 7007 2-part epoxy, cured at room temperature, with a clamping pressure of 5 - 10 psi.

The shear test samples were made with an upper skin of 6061 - T6 aluminum alloy, .06 inches thick and a lower skin of 7075 -T6 aluminum alloy, .08 inches thick. The short edges of the sample were fitted and bonded to extrusions of the design currently used by Brooks & Perkins, Inc. in the manufacture of HCU-6/E cargo pallets. Adhesive used was Fuller 7007 2-part epoxy, cured at room temperature, with a clamping pressure of 5-10 psi.

The fungus resistance, water absorption and puncture resistance samples were made with upper and lower facings of 6061-T6 aluminum alloy. The sample A16HP(2) was foam-filled with polyurethane foam having a 2 PCF density by Hardigg Industries of South Deerfield, Massachusetts. The adhesive used by Fuller 7077 2-part epoxy, cured at room temperature with a clamping pressure of 5-10 psi.

The teeter roller indentation samples, except for samples D, E, F, H and J, were faced with an upper skin of .06 inch thick 6061-T6 aluminum alloy and a lower skin of .08 inch thick 7075-T6 aluminum alloy. Fuller 7007 2-part epoxy was used as the adhesive, which was cured at room temperature at a clamping pressure of 5-10 psi.

Sample H and D used Narmco 328 as an adhesive.

Sample E and J were fabricated with a lower skin of 7075-T6 aluminum alloy, .100 inches thick, using Narmco 328 adhesive.

Sample F had a lower skin of 7075-T6 aluminum alloy, .125 inches thick and used Narmco 328 as an adhesive.

TEST SAMPLES

Beam Strength: 48" x 6" x 2 1/4"

- 40°F: 4H(1), 5HP(1), 6D(1), 7DP(1), 29R(1), 30S(1), 31T(1)
R.T.: 4H(2), 5HP(2), 6D(2), 7DP(2), 29R(2), 30S(2), 31T(2)
125°F: 4H(3), 5HP(3), 6D(3), 7DP(3), 29R(3), 30S(3), 31T(3)

Conveyor Resistance: 24" x 12" x 2 1/4"

Rollers: 11H(1), 12HP(1), 13D(1), 14DP(1), 41R(1), 42S(1), 43T(1)
Spring Loaded
Balls: 11H(2), 12HP(2), 13D(2), 14DP(2), 41R(2), 42S(2), 43T(2)
Casters: 11H(3), 12HP(3), 13D(3), 14DP(3), 41R(3), 42S(3), 43T(3)

Shear Strength: 12" x 6" x 2 1/4"

- 40°F: 25H(1), 26HP(1), 27D(1), 28DP(1), 44R(1), 45S(1)
R.T.: 25H(2), 26HP(2), 27D(2), 28DP(2), 44R(2), 45S(2)
125°F: 25H(3), 26HP(3), 27D(3), 28DP(3), 44R(3), 45S(3)

Fungus Resistance: 12" x 6" x 2 1/4"

A - 16 - HP(2), 18H(1), 19HP(1), 20D(1), 21DP(1)

Water Absorption: 3" x 3" x 2 1/4"

A - 16 - HP(2), 18H(2), 19HP(2), 20D(2), 21DP(2)

Puncture Resistance: 12" x 6" x 2 1/4"

18H(1), 19HP(1), 20D(1), 21DP(1), 47R(1), 48S(1), 49T(1), A, B

Brooks & Perkins

Tester Roller Indentation: 24" x 12" x 2 1/4"

11H(4), 12HP(4), 13D(4), 14DP(4), 41R(4), 42S(4), 43T(4), C, D, E, F, G, H, J

Core Material	Sample Identification					
Hexcel Plain Paper	H	S	S	S	S	S
Hexcel Paper Poly Paper	HP	S	S	S	S	S
Douglas Plain Paper	D	S	S	S	S	S
Douglas Paper Poly Paper	DP	S	S	S	S	S
Urethane Foamed Hexcel Plain Paper	A1618P(2)	S	S	S	S	S
Aluminum Honeycomb:						
3/16-5003-.0025	R	S	S*	S	S	S
1/4-5003-.003	S	S	S	S	S	S
3/8-5052-.005	T	S	S	S	S	S
1/4-5052-.0025	A	S*	S*	S*	S*	S*
1/4-5052-.003 (Note 1)	C	S*	S*	S*	S*	S*
1/4-5052-.003 (Note 2)	D	S*	S*	S*	S*	S*
1/4-5052-.003 (Note 3)	E	S*	S*	S*	S*	S*
1/4-5052-.003 (Note 4)	F	S*	S*	S*	S*	S*
1/8-5056-.002 (Note 5)	G	S*	S*	S*	S*	S*
1/8-5056-.002 (Note 6)	H	S*	S*	S*	S*	S*
1/8-5056-.002 (Note 7)	J	S*	S*	S*	S*	S*

NOTES:

1 - .060-6061T6 Upper Skin, .080-7075T6 Bottom Skin, Adhesive Fuller H2031B
2 - .060-6061T6 Upper Skin, .080-7075T6 Bottom Skin, Adhesive Narmco 7343
3 - .060-6061T6 Upper Skin, .100-7075T6 Bottom Skin, Adhesive Narmco 7343
4 - .060-6061T6 Upper Skin, .080-7075T6 Bottom Skin, Adhesive Narmco 7343
5 - .060-6061T6 Upper Skin, .080-7075T6 Bottom Skin, Adhesive Fuller H2031B
6 - .060-6061T6 Upper Skin, .080-7075T6 Bottom Skin, Adhesive Narmco 7343
7 - .060-6061T6 Upper Skin, .100-7075T6 Bottom Skin, Adhesive Narmco 7343
8) Adhesive, Fuller 1077 appears to be resistant to fungus growth.

EVALUATION OF PATENT MATERIALS AND CONSTRUCTION

[illegible] 3/8 [illegible]	Construction 1" Square Mandrel	Water Absorption	Fungus Resistance	[illegible]	[illegible]	[illegible]
S	NS	NS	NS	NS	NS	
S	NS	NS	NS	S	S	
S	S	NS	S (Note 3)	S	S	
S	S	NS	NS	NS	NS	
S	NS	NS	NS	NS	NS	N
S	S	S	S	S	S	S
S	S	S	S	S	S	S
S	S	S	S	S	S	S
S*	S	S	S	S*	S*	S
S*	S*	S	S	S*	S*	S*
S*	S*	S	S	S*	S*	S
S*	S*	S	S	S*	S*	S
S*	S*	S	S	S*	S*	S
S*	S*	S	S	S*	S*	S
S*	S*	S	S	S*	S*	S
S*	S*	S	S	S*	S*	S

* Predicted result based on minimum mechanical properties guaranteed by standard honeycomb supplier, and results of tests on similar material with lower mechanical properties.

CODE:

S, NS - Suitable or n[illegible] the basic re[illegible]

Fungus Resistance	Flexural Sheer -40°F	Flexural Sheer R.T.	Flexural Sheer 250°F	Punch Sheer -40°F	Punch Sheer R.T.	Punch Sheer 125°F	Tensile Shear Interlaminar
NS	NS	NS	NS	S	S	S	NS
NS	S	S	S	S	S	S	NS
S(Note 6)	S	S	S	S	S	S	NS
NS	S	S	S	S	S	S	NS
NS	NS	NS	NS	S	S	S	NS
S	S	S	S	S	S	S	NS
S	S	S	S	S	S	S	NS
S	S	S	S*	S*	S*	S*	NS
S	S*	S*	S*	S*	S*	S*	NS*
S	S*	S*	S*	S*	S*	S*	NS
S	S*	S*	S*	S*	S*	S*	NS
S	S*	S*	S*	S*	S*	S*	NS
S	S*	S*	S*	S*	S*	S*	NS
S	S*	S*	S*	S*	S*	S*	NS
S	S*	S*	S*	S*	S*	S*	S
S	S*	S*	S*	S*	S*	S*	NS
S	S*	S*	S*	S*	S*	S*	S

CODE:

S, NS - Suitable or not suitable to allow the end item to meet the basic requirements of the pallet specification.

operties guaranteed
sets on similar

NAME OF TEST:	Roller Test.
ITEMS TESTED:	11H(1), 12HP(1), 13D(1), 14DP(1), 41R(1), 42S(1), 43T(1).
PURPOSE OF TEST:	To determine the force required to initiate movement over 2" diameter x 3 3/4" rollers of sandwich panels having different cores, at room temperature and at + 125°F.
DESCRIPTION OF TEST APPARATUS:	Dolly with two (2) 2" diameter x 3 3/4" rollers, ten (10) 5 - pound weights, two (2) 0 - 15 psi indicators, two (2) 0 - 300 psi indicators, pneumatic cylinder, valve, pressure regulator and counterpoise test fixture mounted on a table.
TEST PROCEDURE:	The specimen was placed on the test fixture table and the dolly was placed on top of the specimen. The load on the rollers was applied in 5 - pound increments by 5 - pound weights, which were placed on one end of the counterpoise, so that the actual applied force was 140 pounds per 5 pounds of weight. For each increase in the applied force, the dolly was moved back and forth and the reading, in psi, of the pneumatic pressure required to initiate the movement of the dolly was recorded. Each stroke of the actuating cylinder was 10 inches.
TEST RESULTS:	The aluminum honeycomb core specimens had less roller rolling resistance at all test temperatures than the paper honeycomb core specimens. The aluminum honeycomb core specimens showed no change in rolling resistance with increase in temperature, while the paper honeycomb core specimen showed increased rolling resistance with an increase in temperature. The results indicate that as the cell size of the aluminum honeycomb decreases, the rolling resistance also decreases Sample 41R(1) was destroyed while heating to temperature in the oven.
EXHIBIT:	See Figure 1 and 2.

CONVEYOR ROLLER TEST- +125°F

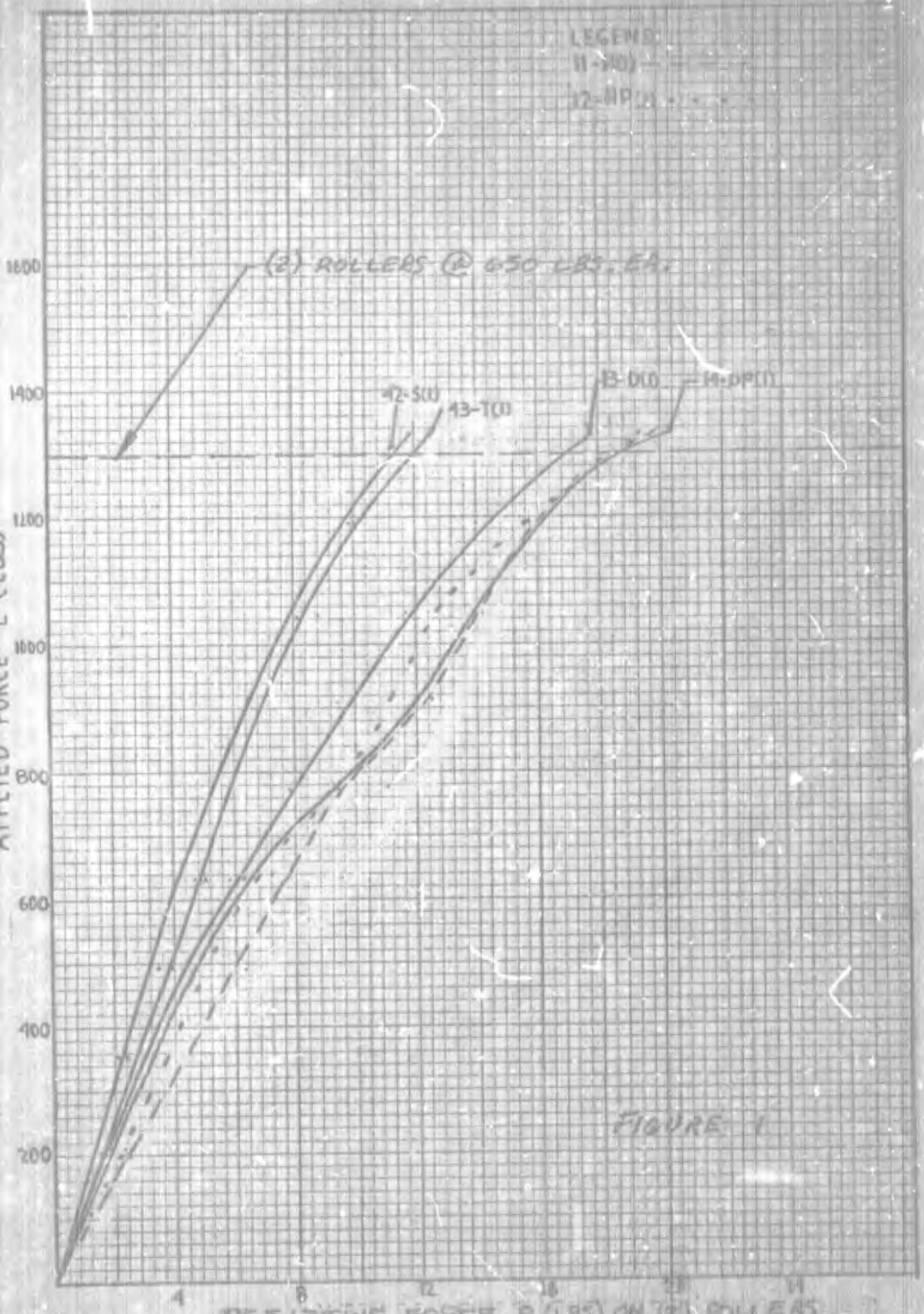


FIGURE 1

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 11-H(1)

Fabrication Data:

Date Sample was bonded: ______

Adhesive Used: Fuller [illegible] 7007 [illegible]

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: [illegible]

Remarks: ______

Test Data:

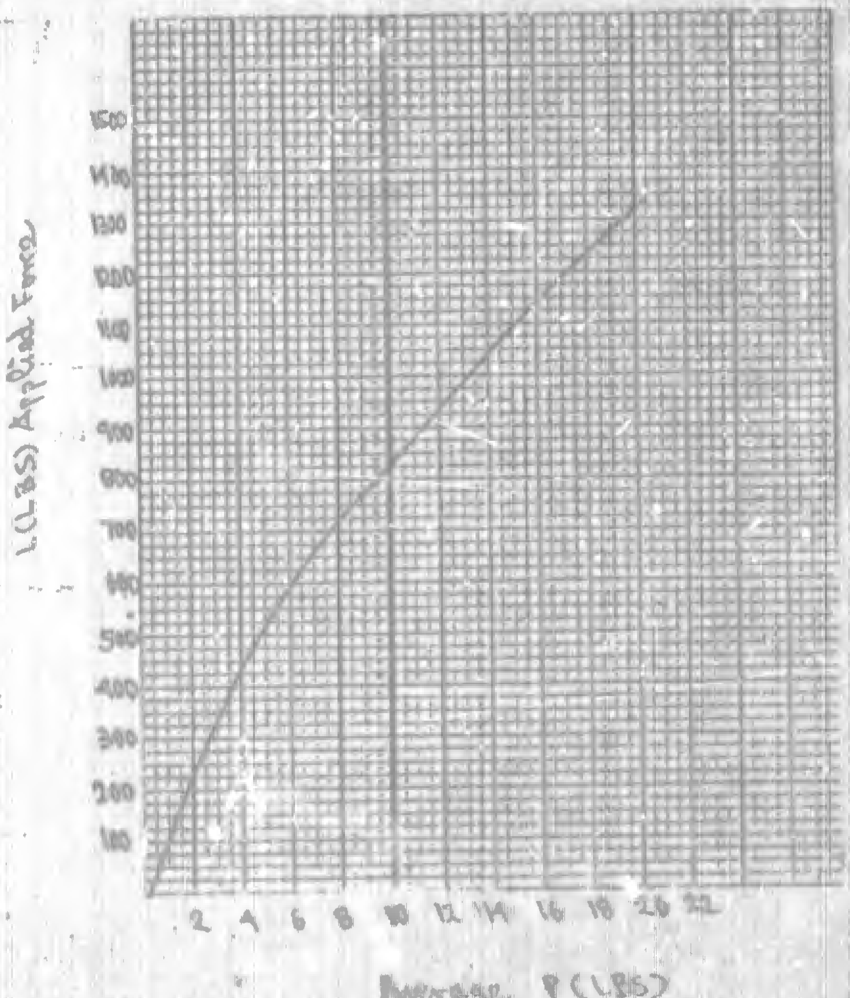
Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started: 8-31-66

Date Test was completed: 8-31-66

[illegible]	[illegible]	[illegible]			
0	113	1.7			
5	351	2.12			
10	444	3.71			
15	631	[illegible]			
20	773	[illegible]			
25	914	12.5			
30	1054	[illegible]			
35	1140	15.7			
40	1224	[illegible]			



Remarks:

Test Performed By: [illegible signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 12 - HP(1)

Fabrication Data:

Date Sample was bonded: ______

Adhesive Used: Fuller R7007 A

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 psi

Remarks: ______

Test Data:

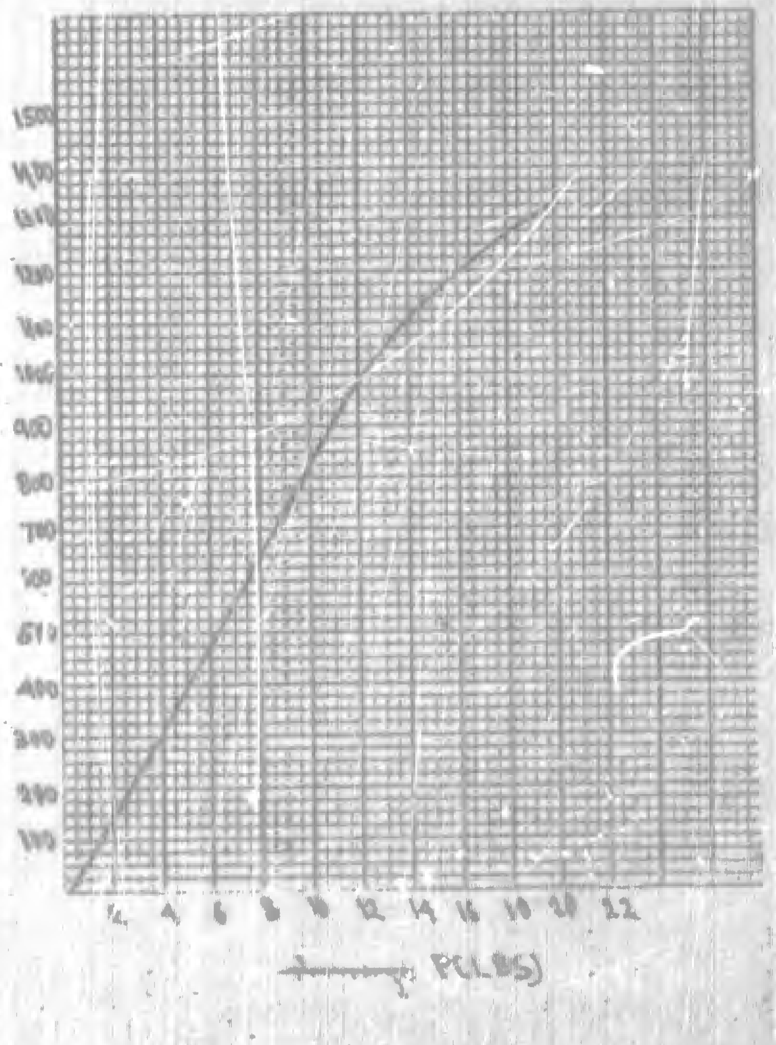
Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started: 8-31-66

Date Test was completed: 8-31-66

Applied Load	Applied Force	P [illegible]			
0	214	1.6			
5	359	3.5			
10	499	4.71			
15	639	7.35			
20	779	9.41			
25	919	11.0			
30	1059	12.5			
35	1199	15.7			
40	1339	20.2			



Remarks:

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 13 - D(1)

Fabrication Data:

Date Sample was bonded: ______

Adhesive Used: Fuller 87007 D

Curing Time and Temperature: 24 hrs at Room Temperature

Clamping Pressure. 5 - 10 PSI

Remarks: ______

Test Data:

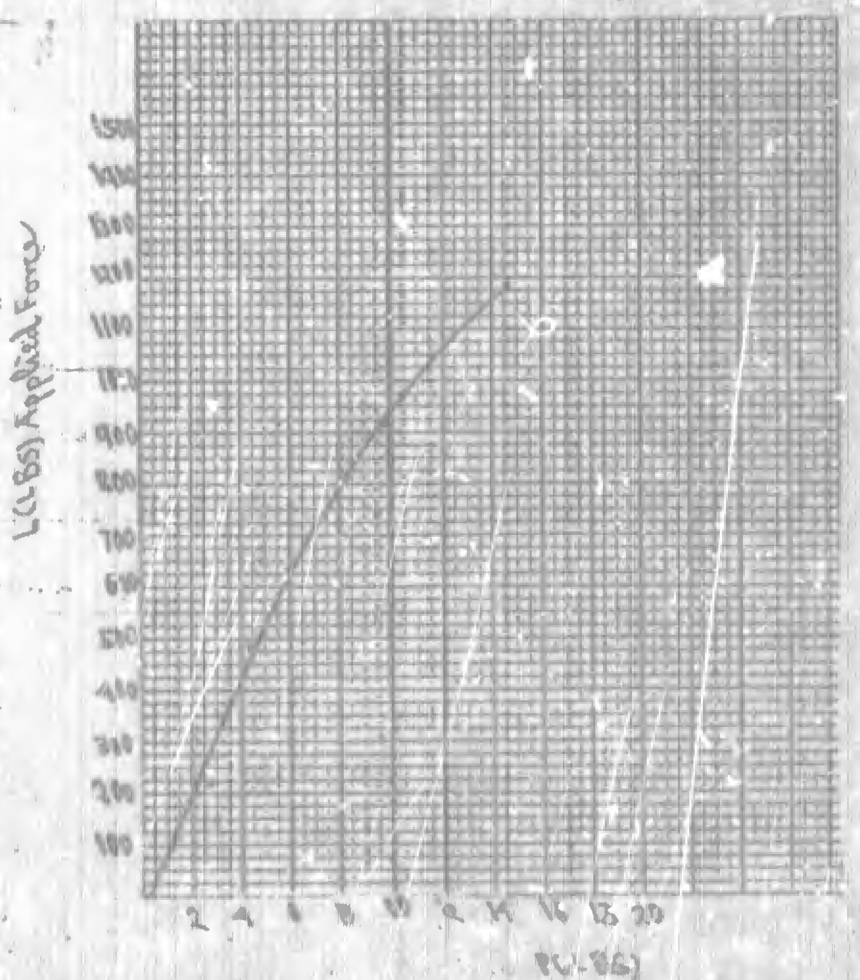
Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started: 8-31-66

Date Test was completed: 8-31-66

[illegible]	[illegible]	[illegible]			
6	114	2.6			
7	254	3.0			
11	349	4.1			
15	531	5.8			
20	704	7.8			
25	914	9.8			
30	1057	11.6			
35	1191	13.6			
40	1324	17.5			



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 14 - DP(1)

Fabrication Data:

Date Sample was bonded: ____

Adhesive Used: Fuller R7007 0

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks: ____

Test Data:

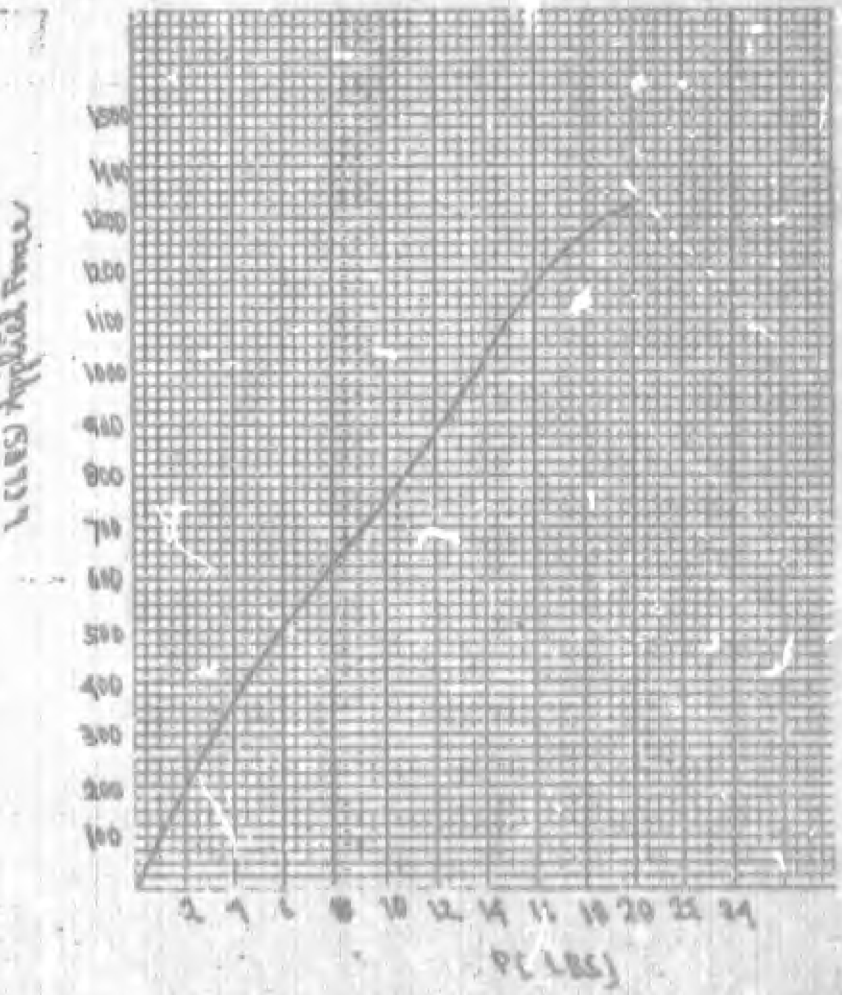
Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started: 8-31-66

Date Test was completed: 8-31-66

[illegible]	[illegible]	V [illegible]			
0	214	2.3			
5	359	3.1			
10	499	6.28			
15	639	9.42			
20	779	11.0			
25	919	12.6			
30	1059	14.[illegible]			
35	1199	15.8			
40	1339	20.4			



Remarks:

Test Performed By: [illegible signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 42-511

Fabrication Data:

Date Sample was bonded:

Adhesive Used: Fuller R7007 A

Curing Time and Temperature: 24 Hours Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

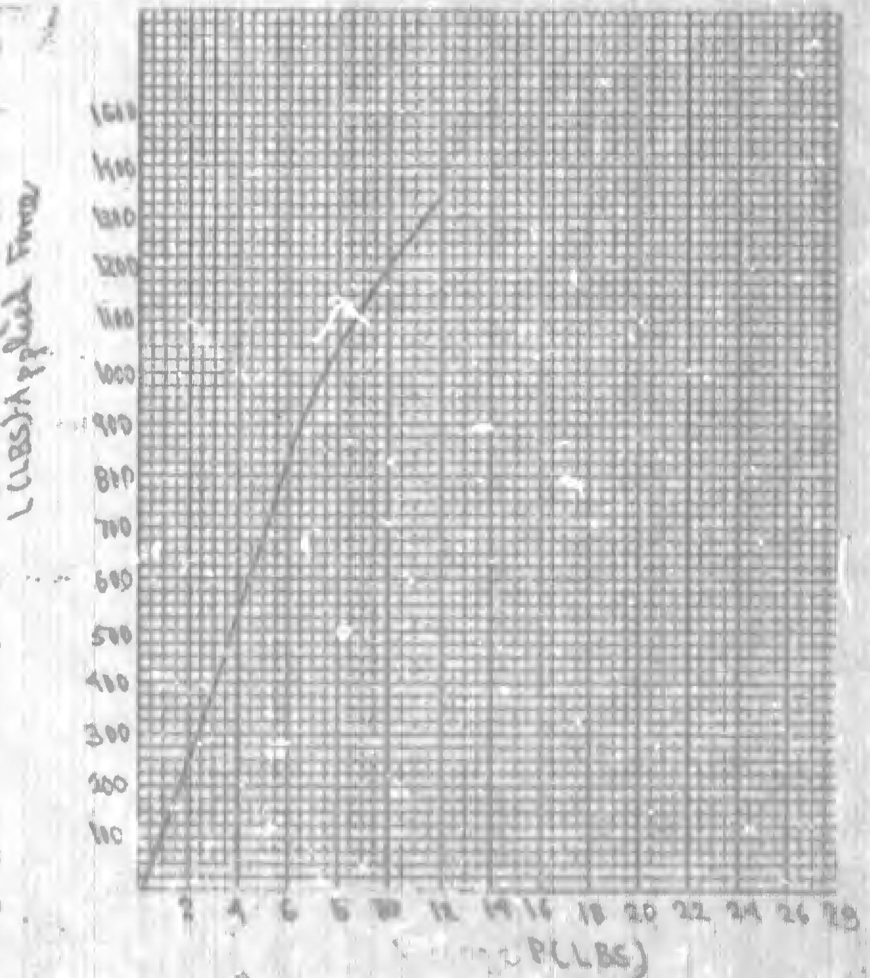
Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started: 8-31-66

Date Test was completed: 8-31-66

[illegible]	[illegible]	P		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		



Remarks:

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 43-101

Fabrication Data:

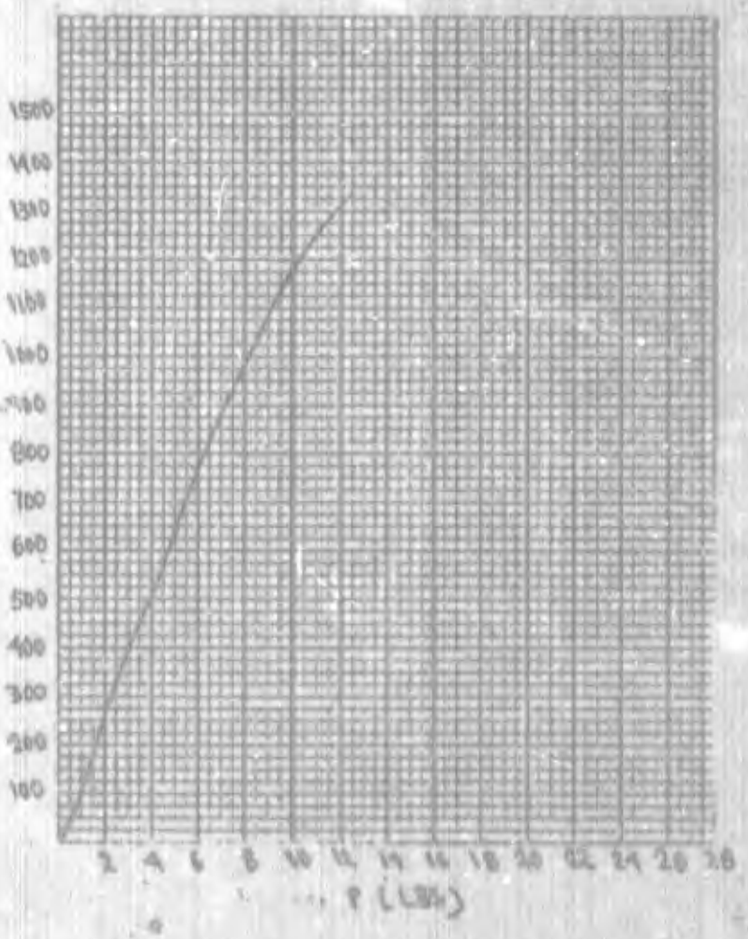
Date Sample was bonded:
Adhesive Used: Fuller R7076
Curing Time and Temperature: 24 Hrs @ Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: √ Conveyor ___ Ball √ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: √ 125° F ___ Room Temperature ___ -40° F ___ other
Date Test was started: 8-31-66
Date Test was completed: 8-31-66

		P			
0		1.9			
.5		2.3			
1.0		3.9			
1.5		5.6			
2.0	17.1	5.7			
2.5	11.4	6.8			
3.0	653	8.7			
3.5	1149	10.8			
4.0	1534	12.4			



L (LBS) Applied Force

Remarks:

Test Performed By: [signature]

CONVEYOR ROLLER TEST - ROOM TEMPERATURE

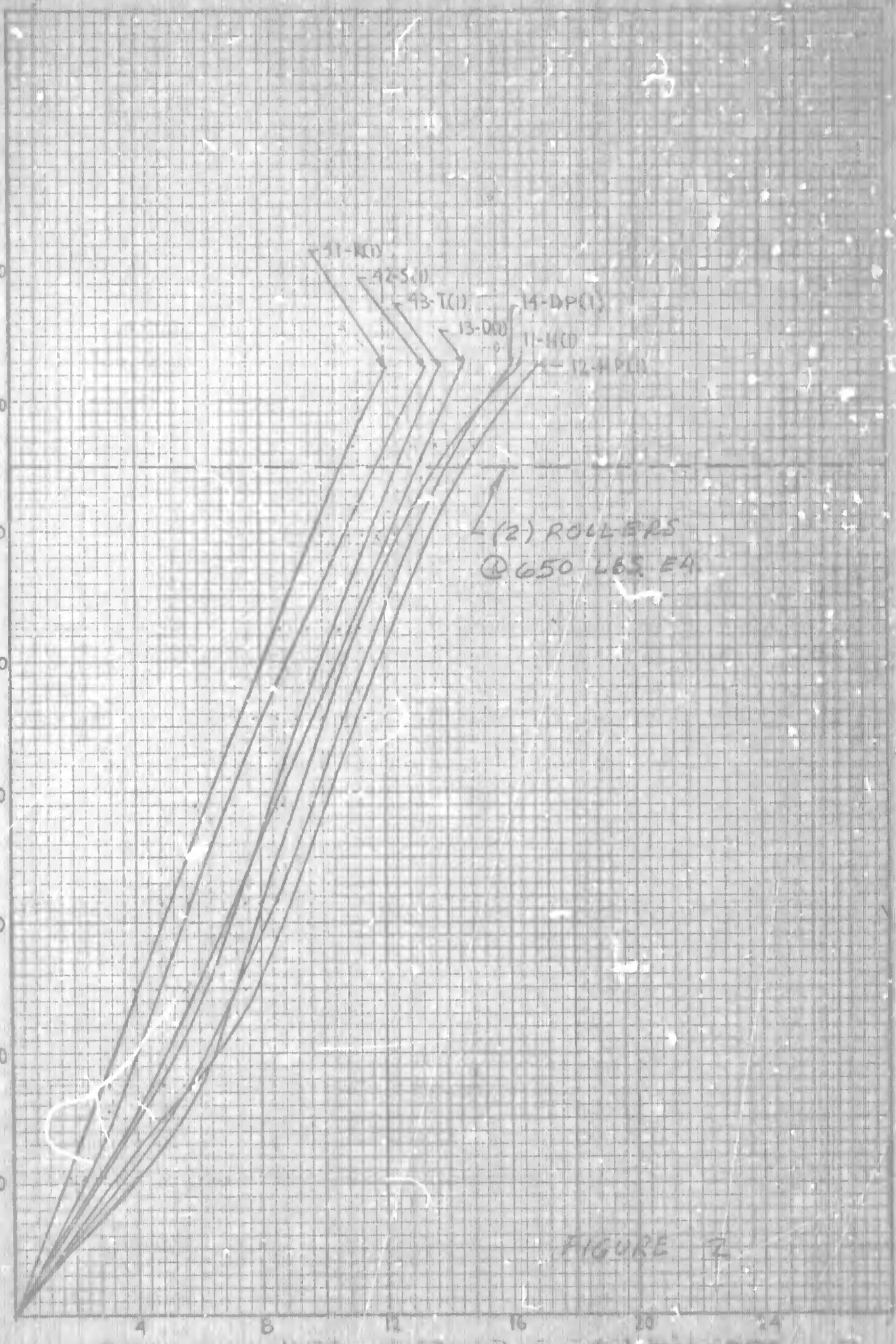


FIGURE 7

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: [illegible]

Fabrication Data:

Date Sample was bonded: 7-6-66

Adhesive Used: Furane 8700 B

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

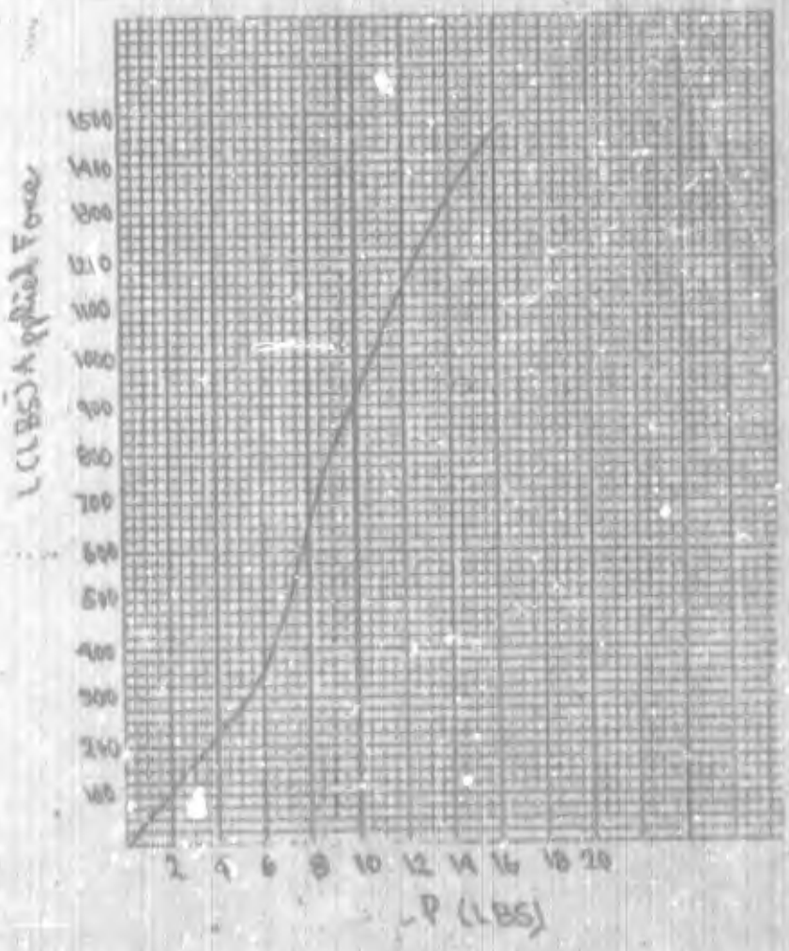
Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-9-66

Date Test was completed: 8-9-66

[illegible]					



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 12 - WP(1)

Fabrication Data:

Date Sample was bonded: 7-6-66

Adhesive Used: Fuller R7007 A/

Curing Time and Temperature: 24 Hr at Room Temperature

Clamping Pressure: 5-10 psi

Remarks:

Test Data:

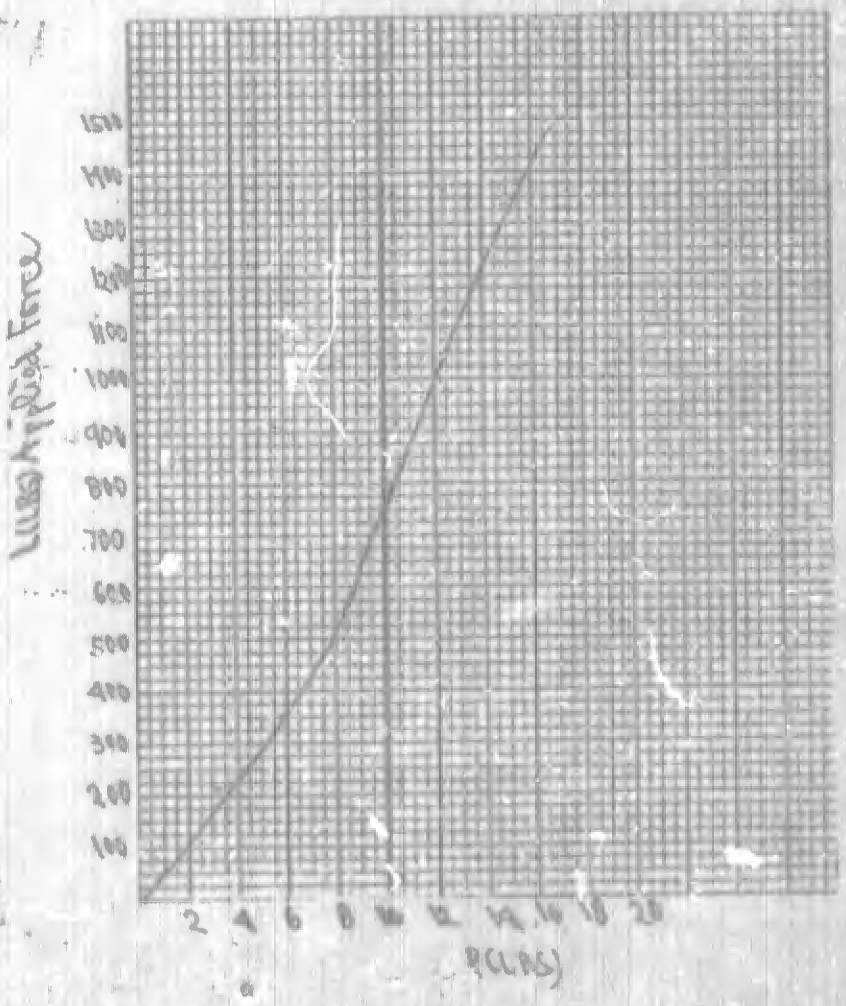
Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-9-66

Date Test was completed: 8-9-66

[illegible]	[illegible]	[illegible]		
0	[illegible]	[illegible]		
5	[illegible]	[illegible]		
10	[illegible]	[illegible]		
15	[illegible]	[illegible]		
20	[illegible]	[illegible]		
25	[illegible]	[illegible]		
30	[illegible]	[illegible]		
35	[illegible]	[illegible]		
40	[illegible]	[illegible]		
45	[illegible]	[illegible]		



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: B - S(1)

Fabrication Data:

Date Sample was bonded: 7-6-66

Adhesive Used: Fuller R 7007 [illegible]

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks: ________

Test Data:

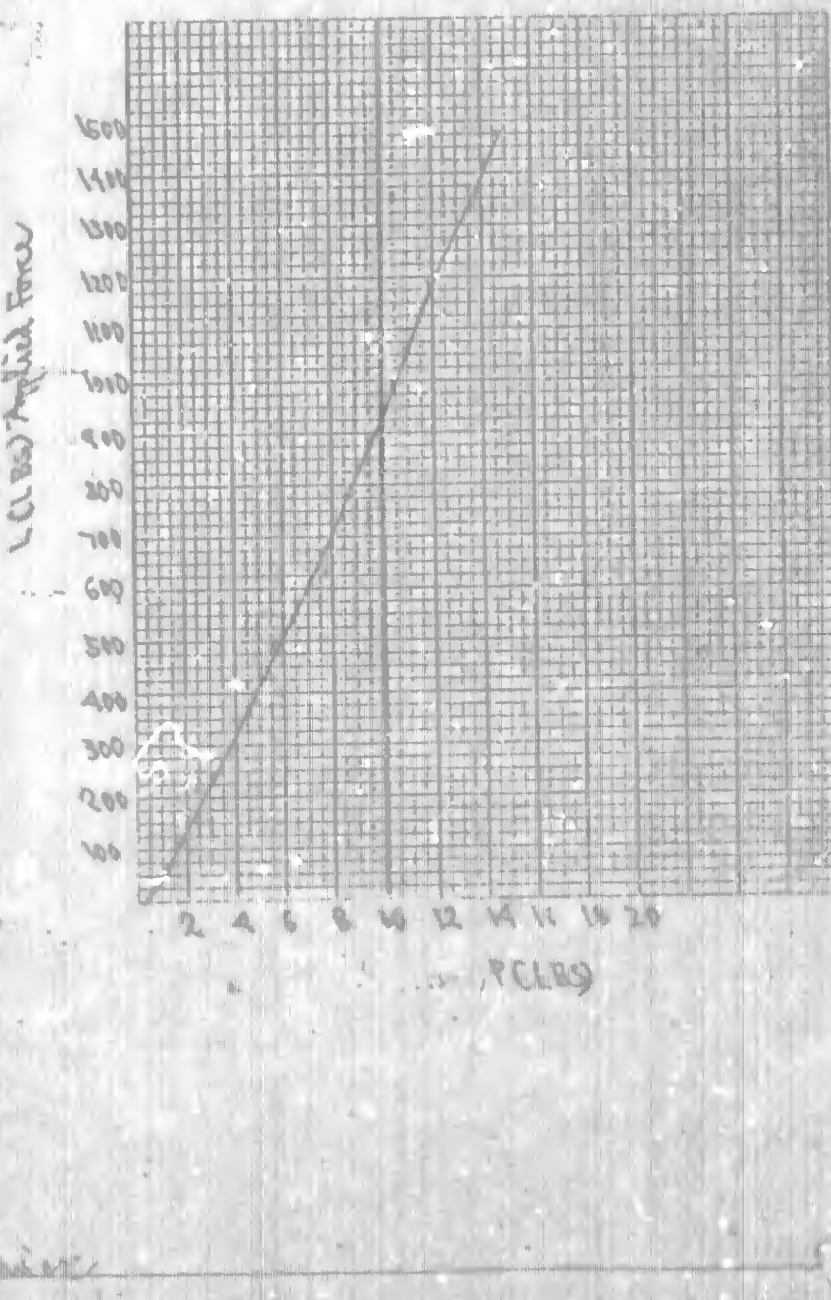
Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-9-66

Date Test was completed: 8-9-66

[illegible]	[illegible]	[illegible]			
0	33[illegible]	2.3			
5	[illegible]	4.5			
10	18[illegible]	5.5			
15	[illegible]	7.7			
20	77[illegible]	8.5			
25	91[illegible]	10.0			
30	1054	10.8			
35	[illegible]	11.7			
40	123[illegible]	[illegible]			
45	137[illegible]	[illegible]			



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: [illegible]

Fabrication Data:

Date Sample was bonded: 7-8-66

Adhesive Used: [illegible]

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

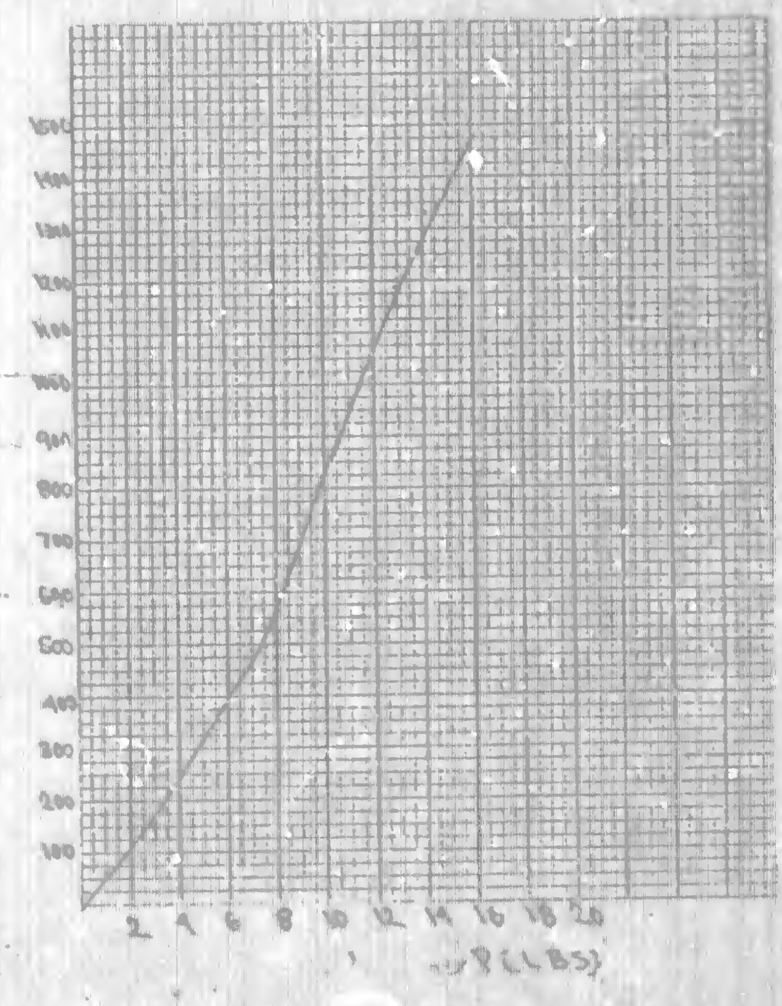
Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-9-66

Date Test was completed: 8-9-66

[illegible]	[illegible]	P			
0	[illegible]	[illegible]			
5	[illegible]	[illegible]			
10	[illegible]	[illegible]			
15	[illegible]	85			
20	[illegible]	[illegible]			
25	[illegible]	[illegible]			
30	[illegible]	[illegible]			
35	[illegible]	[illegible]			
40	[illegible]	[illegible]			
45	[illegible]	[illegible]			



Remarks:

Test Performed By: [illegible]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: A\-\(1)

Fabrication Data:

Date Sample was bonded: 7-25-66

Adhesive Used: Fuller R7007 Q

Curing Time and Temperature: 24 Hrs. @ Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

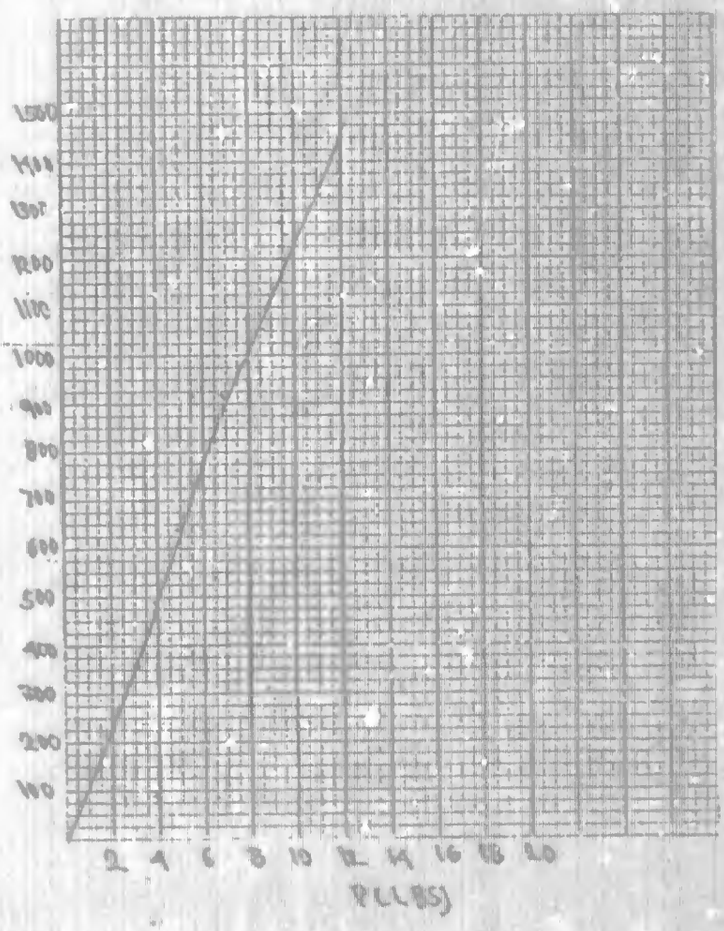
Type of Test: ✓ Conveyor ____ Ball ✓ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other

Date Test was started: 8-15-66

Date Test was completed: 8-15-66

0					
10					
15					
20					
25					
30					
35					
40					
42					



Remarks:

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 42 - 50

Fabrication Data:

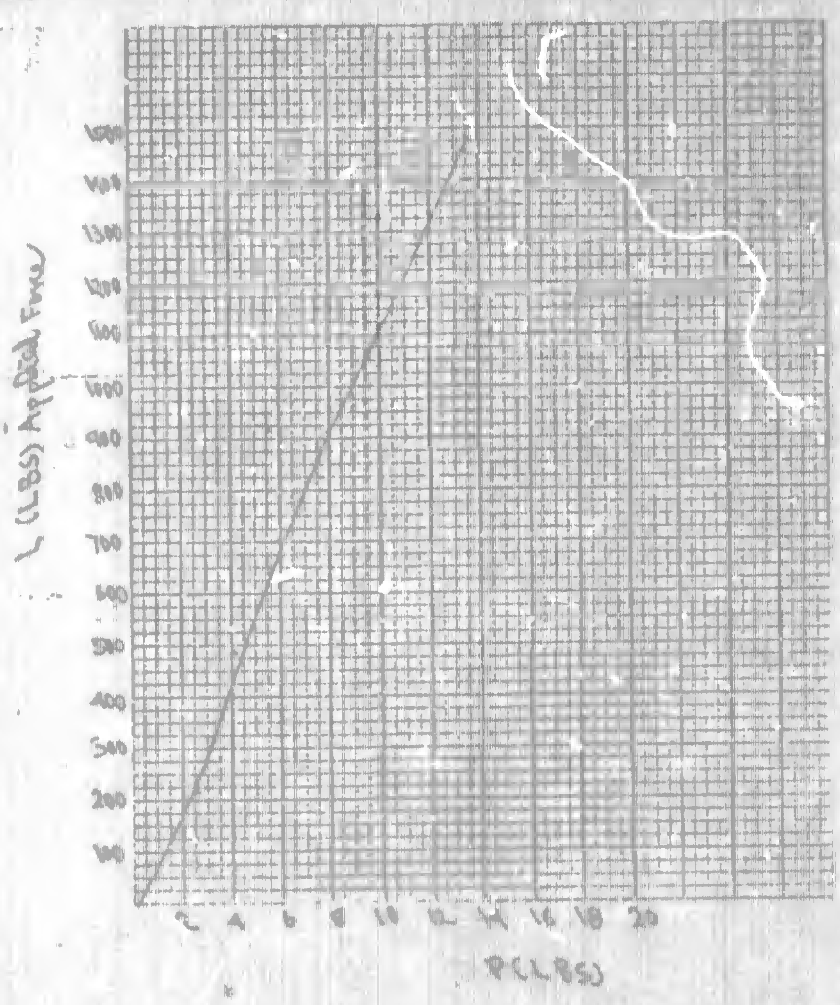
Date Sample was bonded: 7-6-66
Adhesive Used: Fuller H7[illegible]
Curing Time and Temperature: 24 Hr. at Room Temperature
Clamping Pressure: 5-10 psi
Remarks:

Test Data:

Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture
___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 8-9-66
Date Test was completed: 8-9-66

[illegible]	[illegible]	P			
0	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible].5			
[illegible]	[illegible]	[illegible].5			
[illegible]	[illegible]	5.0			
[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]			



Remarks:

Test Performed By: [illegible signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 4D-T(1)

Fabrication Data:

Date Sample was bonded: 7-25-66

Adhesive Used: Fuller [illegible]

Curing Time and Temperature: 24 hrs at Room Temperature

Clamping Pressure: 5-10 psi

Remarks:

Test Data:

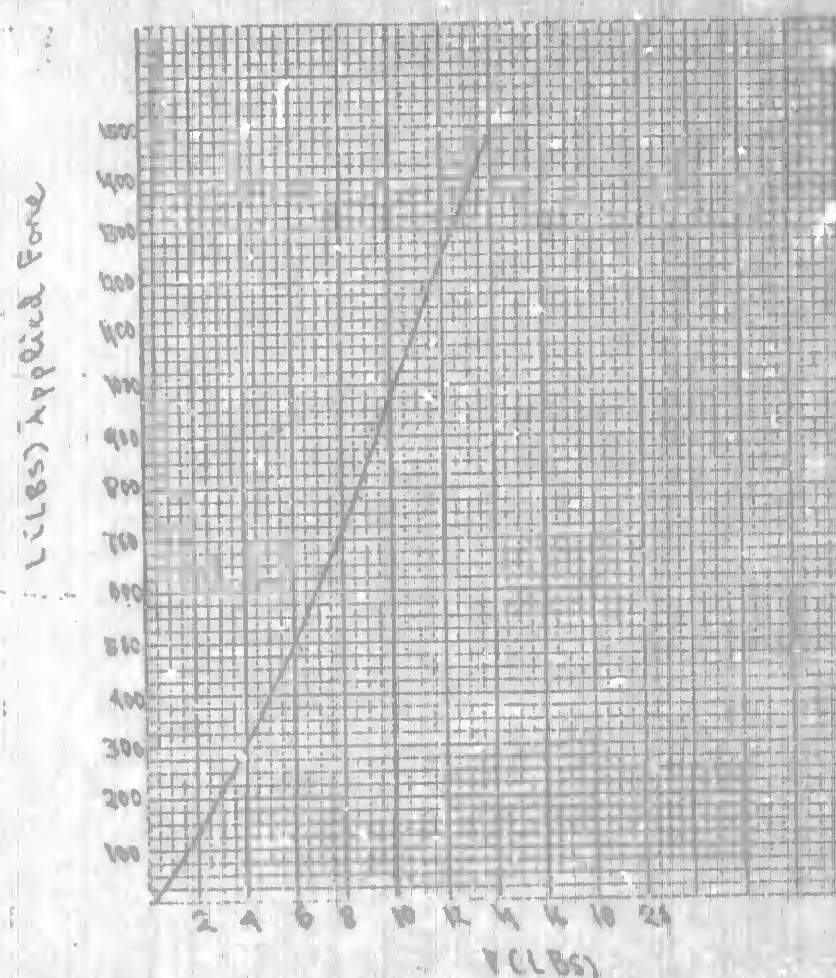
Type of Test: ✓ Conveyor ___ Ball ✓ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-15-66

Date Test was completed: 8-15-66

[illegible]	[illegible]	[illegible]			
0	[illegible]	1.4			
5	[illegible]	4.7			
10	[illegible]	6.75			
15	[illegible]	7.8			
20	[illegible]	8.45			
25	[illegible]	9.70			
30	1059	11.6			
35	[illegible]	11.7			
40	[illegible]	12.2			
45	[illegible]	12.8			



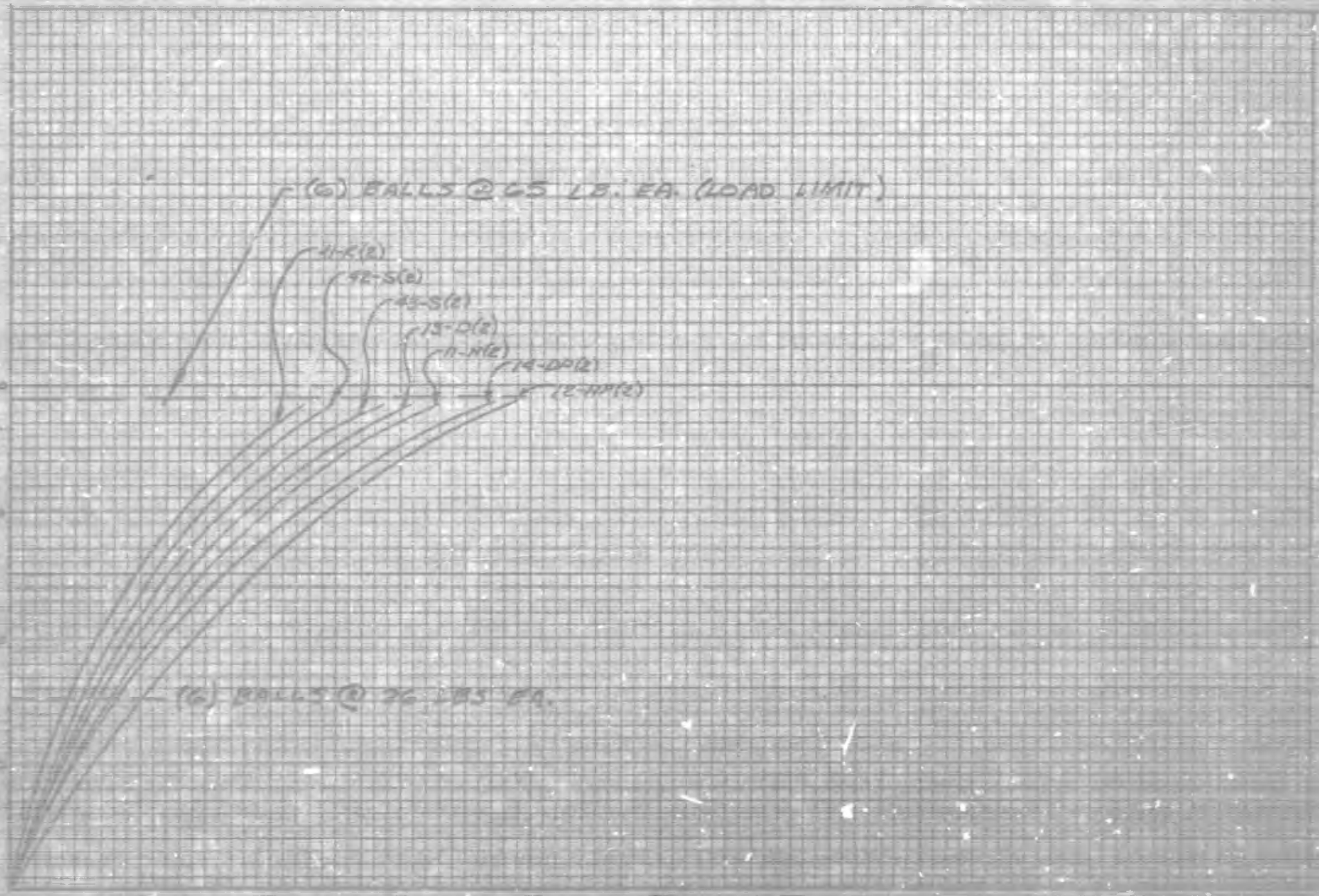
Remarks:

Test Performed By: [illegible signature]

BROOKS & PERKINS

NAME OF TEST:	Spring Loaded Ball.
ITEMS TESTED:	11H(2), 12HP(2), 13D(2), 14DP(2), 41T(2), 42S(2), 43T(2).
PURPOSE OF TEST:	To measure the resistance to movement over 1" diameter spring loaded balls, of specimens having different cores. This test was performed at room temperature and at 125°F.
TEST EQUIPMENT:	Pressure regulator 0 - 60 psi, two (2) 0 - 15 psi pressure gages, two (2) 0 - 300 pressure gages, one (1) pneumatic cylinder, one (1) air valve, one (1) test fixture with counterpoise, ten (10) 5 - pound weights, ten (10) 1 - pound weights, and six (6) 1" diameter spring loaded balls mounted in a dolly on a 5" square grid pattern, each ball having a capacity of 65 pounds.
TEST PROCEDURE:	The specimen was fixed to the top of the test fixture table and the dolly was placed on top of the specimen. One-pound weights were placed at one end of the test fixture and, by virtue of the counterpoise design, each one-pound increment resulted in an actual applied force on the specimen of 27 pounds. At each applied force increment, the dolly was moved back and forth and the pneumatic pressure, in psi, required to initiate the movement, was recorded. Each stroke of the actuating cylinder was 10 inches.
TEST RESULTS:	The aluminum honeycomb core specimens had less ball rolling resistance at all test temperatures than the paper honeycomb core specimen. The aluminum and paper honeycomb core samples showed an increase in ball rolling resistance with an increase in temperature. The balls did not bottom out during the test.
EXHIBIT:	See Figure 3 and 4.

1" DIA. SPRING LOADED BALL TEST - ROOM TEMPERATURE



BROOKS & PERKINS INC.

TEST DATA

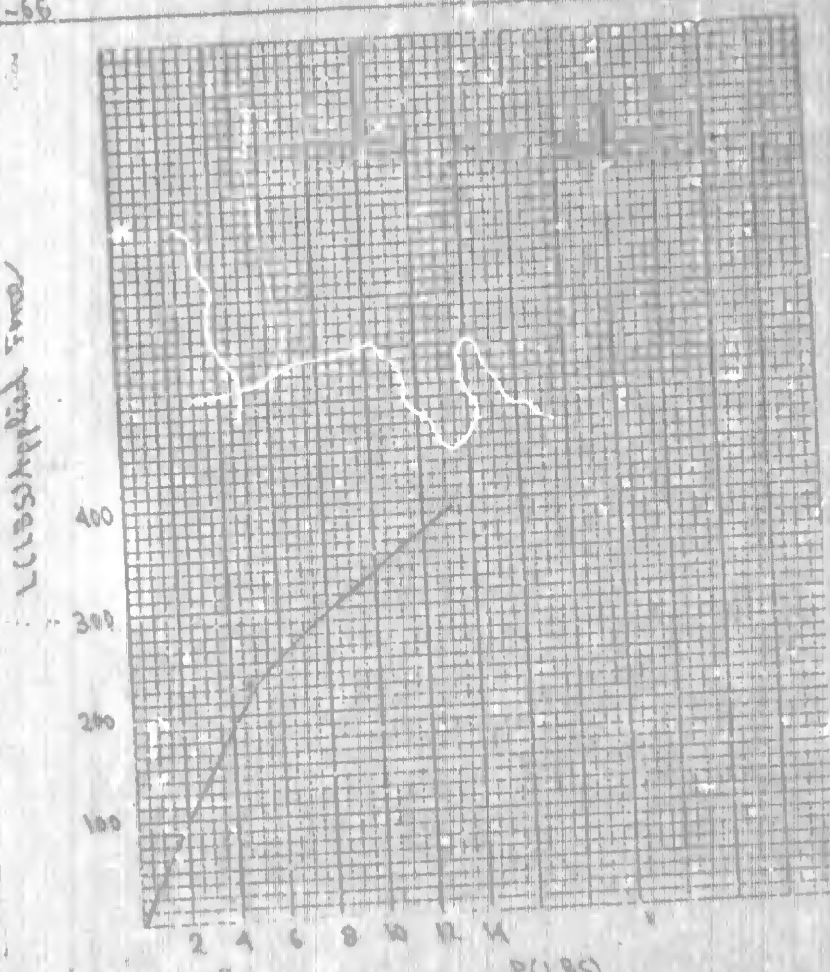
UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 11-11(2)

Fabrication Data:
Date Sample was bonded: 7-6-66
Adhesive Used: Fuller R7007 [illegible]
Curing Time and Temperature: 24 Hr at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:
Type of Test: ____ Conveyor ✓ Ball ____ Roller ____ Caster ____ Puncture ____ Beam strength ____ Shear Strength ____ Water Absorption ____ Fungus ____ Teeter Roller
Test Temperature. ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 8-11-66
Date Test was completed: 8-11-66

[illegible]	[illegible]				
0	[illegible]	[illegible]			
1	125	[illegible]			
2	[illegible]	1.63			
3	[illegible]	[illegible]			
4	[illegible]	[illegible]			
5	[illegible]	4.61			
6	[illegible]	[illegible]			
7	157	[illegible]			



Remarks:

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: [illegible]

Fabrication Data:

Date Sample was bonded: 7-8-66

Adhesive Used: Fuller 87007 A

Curing Time and Temperature: 24 Hrs @ Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

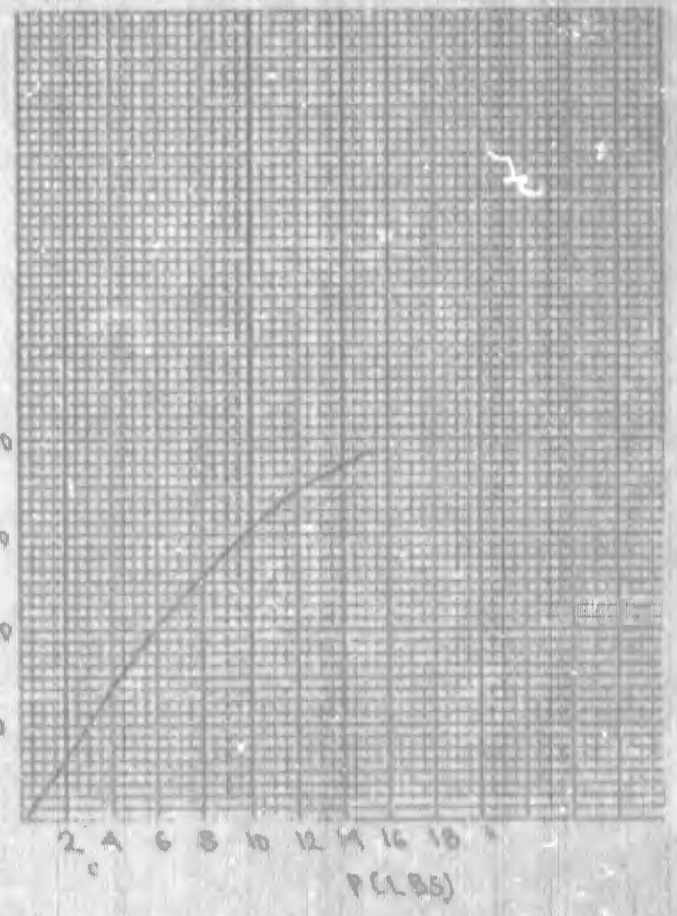
Type of Test: ____ Conveyor ✓ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other

Date Test was started: 8-11-66

Date Test was completed: 8-11-66

		P			
0	[illegible]	[illegible]			
1	[illegible]	[illegible]			
2	[illegible]	[illegible]			
3	[illegible]	[illegible]			
4	[illegible]	[illegible]			
5	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]			
7	[illegible]	[illegible]			



Remarks:

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: [illegible]

Fabrication Data:

Date Sample was bonded: [illegible] 7-29-66

Adhesive Used: [illegible] Fuller B7007 A/

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

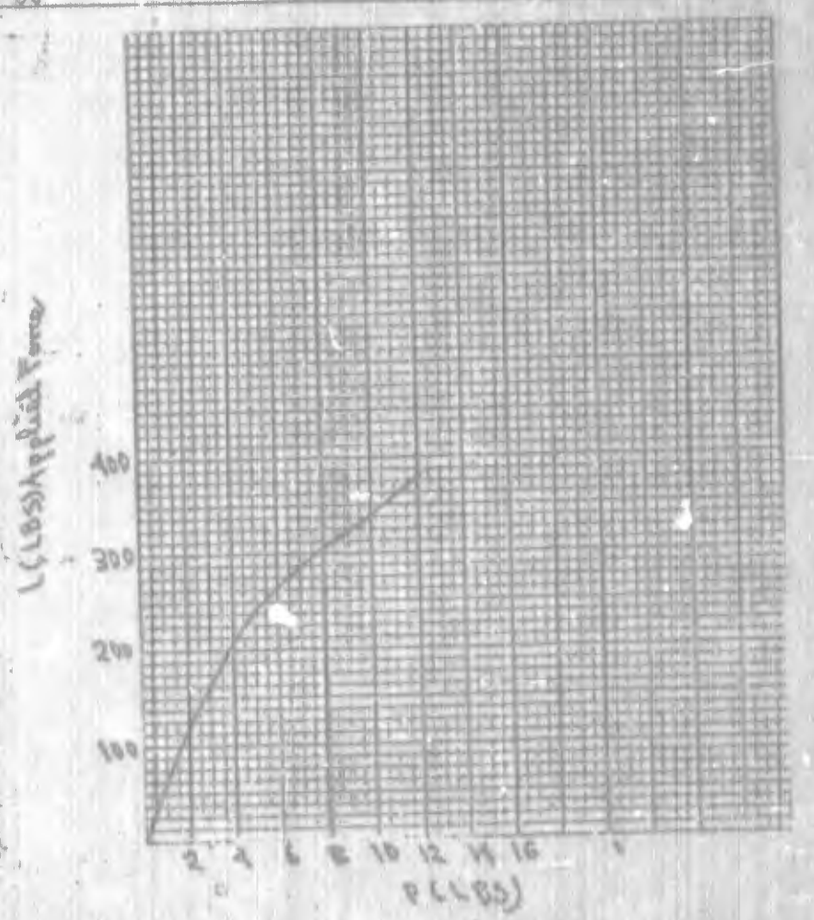
Type of Test: ____ Conveyor √ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ____ √ Room Temperature ____ -40° F ____ other

Date Test was started: 8-11-66

Date Test was completed: 8-11-66

[illegible]	[illegible]				
0	[illegible]	[illegible]			
1	[illegible]	[illegible]			
2	[illegible]	[illegible]			
3	[illegible]	[illegible]			
4	[illegible]	[illegible]			
5	[illegible]	[illegible]			
6	[illegible]	[illegible]			
7	[illegible]	[illegible]			



Remarks:

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: [illegible] (1)

Fabrication Data:

Date Sample was bonded: 7-9-66

Adhesive Used: [illegible]

Curing Time and Temperature: 24 [illegible] Room Temperature

Clamping Pressure: 5-10 [illegible]

Remarks:

Test Data:

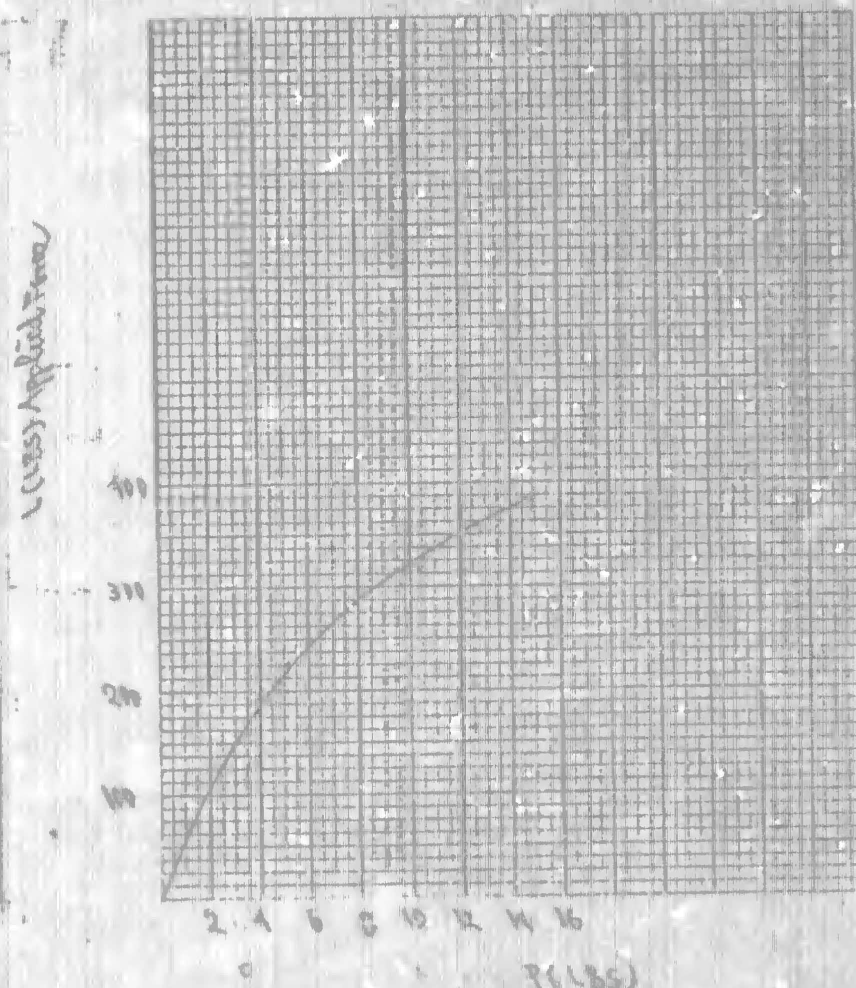
Type of Test: ___ Conveyor ✓ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-11-66

Date Test was completed: 8-11-66

Applied Load	Applied Force	F
0	149	4.62
1	225	5.10
2	253	6.63
3	274	7.86
4	306	9.7
5	333	10.9
6	360	12.7
7	327	14.8



Remarks: surface was marked and scratched.

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: A1-R(2)

Fabrication Data:

Date Sample was bonded: 7-18-66

Adhesive Used: Epibond R1821A

Curing Time and Temperature: 24 hrs @ Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

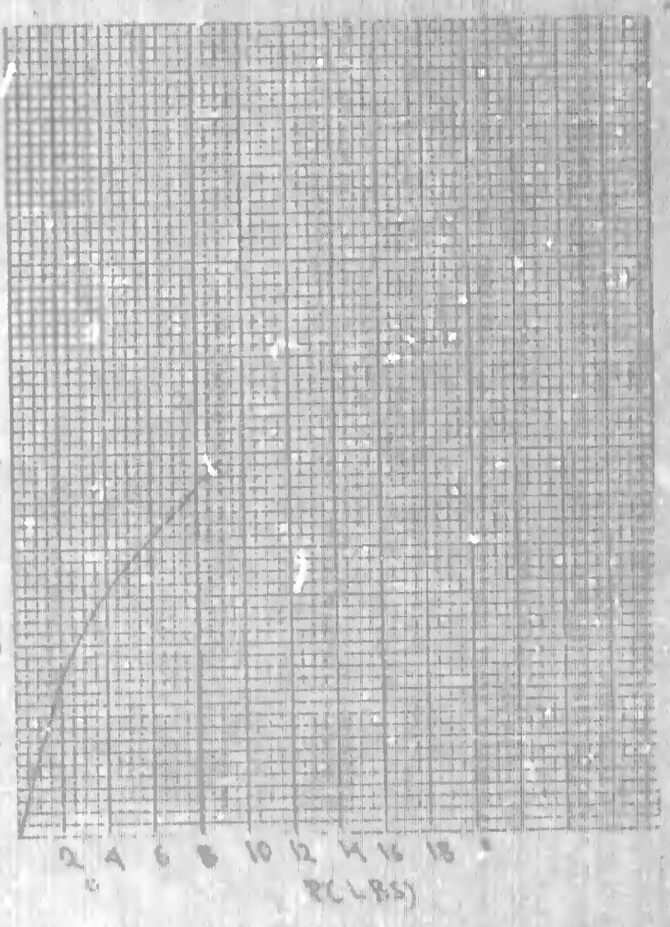
Type of Test: ____ Conveyor ✓ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other

Date Test was started: 8-16-66

Date Test was completed: 8-16-66

0	185				
1	175				
2	180				
3	174				
4	166				
5	170				
6	166				
7	160				



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 42-3(2)

Fabrication Data:

Date Sample was bonded: 7-10-66

Adhesive Used: Fuller R7997 R

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10psi

Remarks:

Test Data:

Type of Test: ___ Conveyor ✓ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-16-66

Date Test was completed: 8-16-66

[illegible]	[illegible]				
0	[illegible]	[illegible]			
1	[illegible]	[illegible]			
2	[illegible]	[illegible]			
3	[illegible]	[illegible]			
4	[illegible]	[illegible]			
5	[illegible]	[illegible]			
6	[illegible]	[illegible]			
7	[illegible]	[illegible]			

Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 43-T123

Fabrication Data:

Date Sample was bonded: 7-6-66

Adhesive Used: [illegible]

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

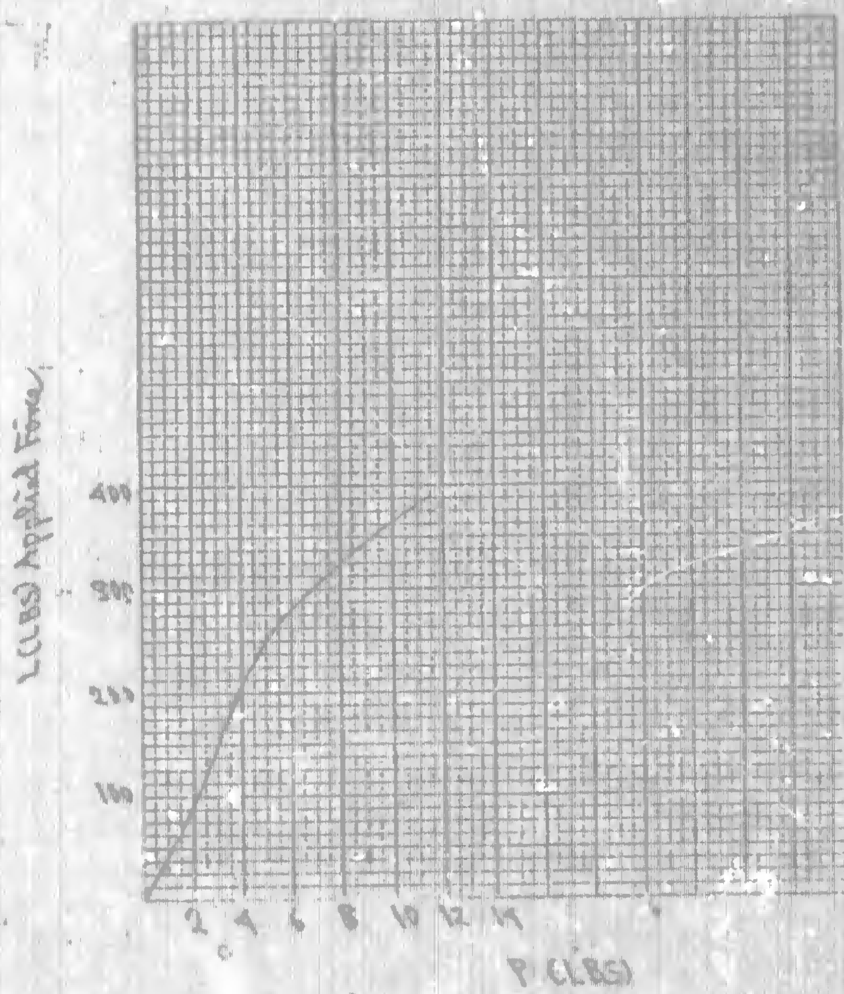
Type of Test: ___ Conveyor √ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F √ Room Temperature ___ -40° F ___ other

Date Test was started: 8-11-66

Date Test was completed: 8-11-66

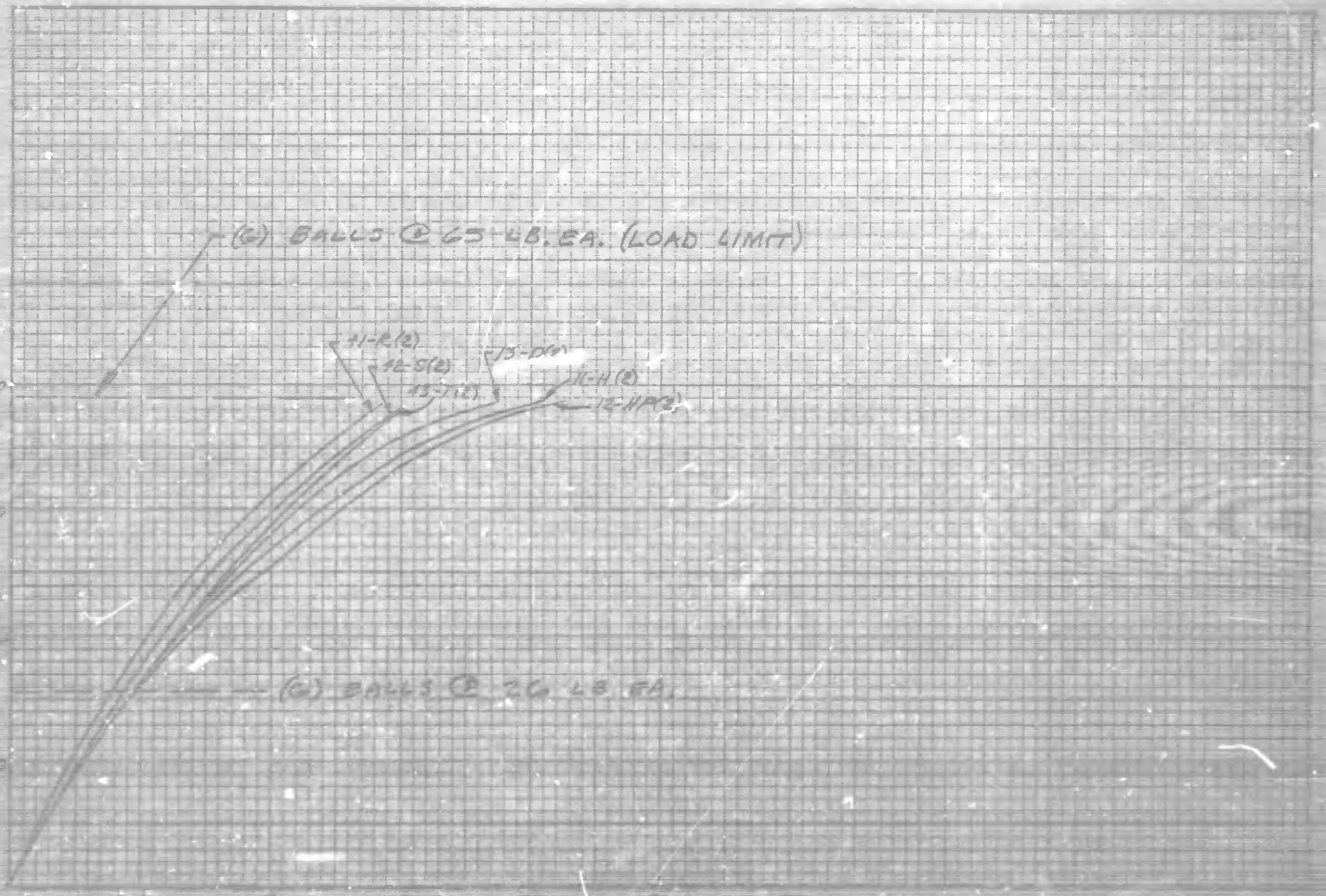
[illegible]	[illegible]				
0	[illegible]	[illegible]			
1	75	[illegible]			
2	152	[illegible]			
3	[illegible]	[illegible]			
4	[illegible]	[illegible]			
5	[illegible]	[illegible]			
6	[illegible]	[illegible]			
7	[illegible]	[illegible]			



Remarks:

Test Performed By: [signature]

1" DIA. SPRING LOADED BALL TEST - +125°F



BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 11-14(2)

Fabrication Data:

Date Sample was bonded: ________

Adhesive Used: Fuller R7007A

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks ________

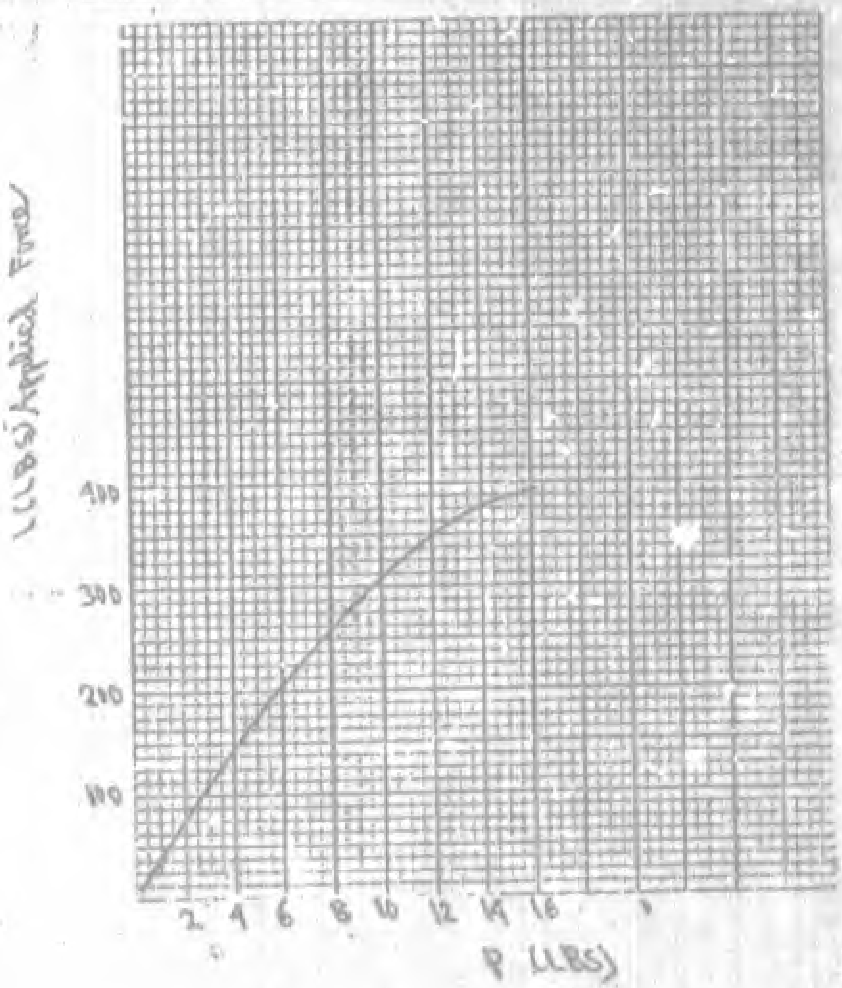
Test Data:

Type of Test: ____ Conveyor ✓ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-30-66

Date Test was completed: 8-30-66



Remarks:

Test Performed By:

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: [illegible]

Fabrication Data:

Date Sample was bonded:

Adhesive Used: [illegible]

Curing Time and Temperature: [illegible]

Clamping Pressure: [illegible]

Remarks:

Test Data:

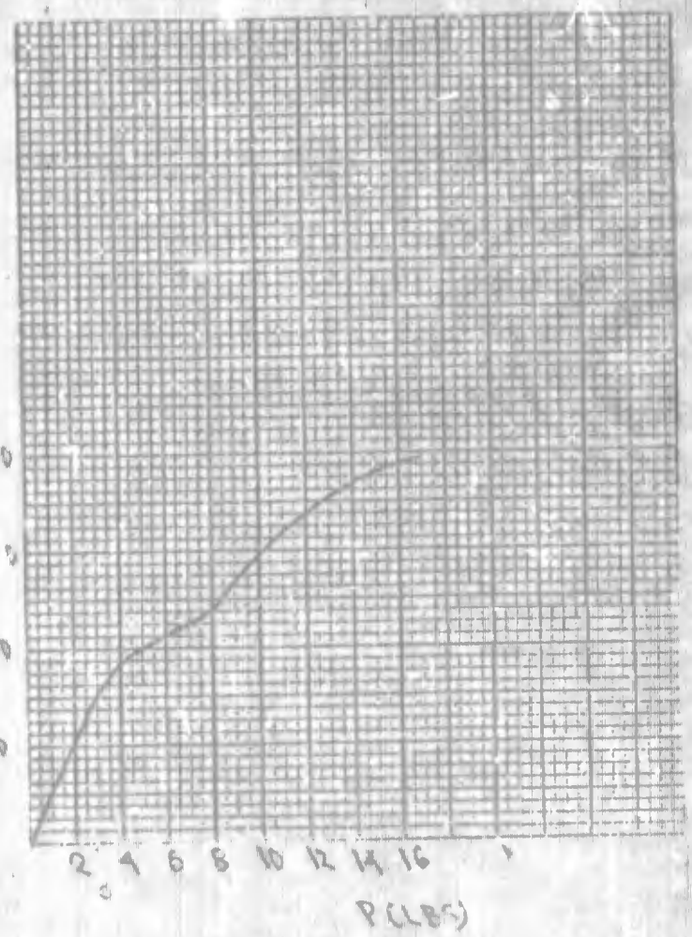
Type of Test: ____ Conveyor ✓ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-30-66

Date Test was completed: 8-30-66

		P			
0	[illegible]	[illegible]			
1	[illegible]	1.05			
2	[illegible]	3.5			
3	[illegible]	6.91			
4	[illegible]	11.2			
5	[illegible]	11.5			
6	[illegible]	[illegible]			
7	[illegible]	[illegible]			



Remarks:

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: B-D(2)

Fabrication Data:

Date Sample was bonded:

Adhesive Used: Fuller B7007A

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

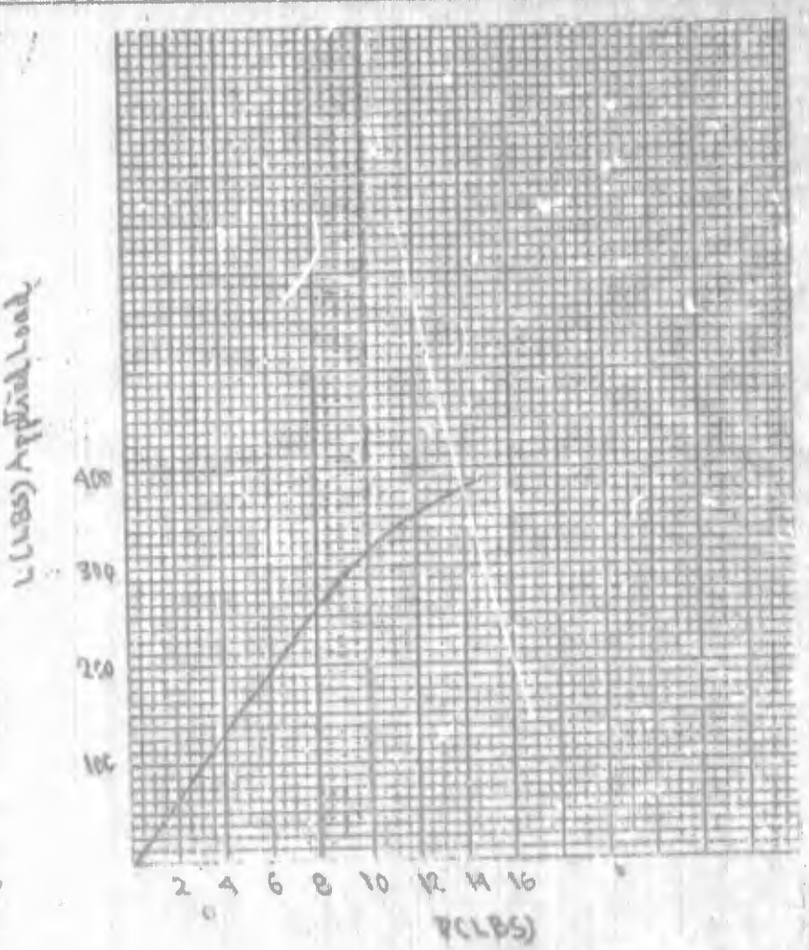
Type of Test: ____ Conveyor ✓ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-30-66

Date Test was completed: 8-30-66

		P			
0					



Remarks:

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 14-DP(2)

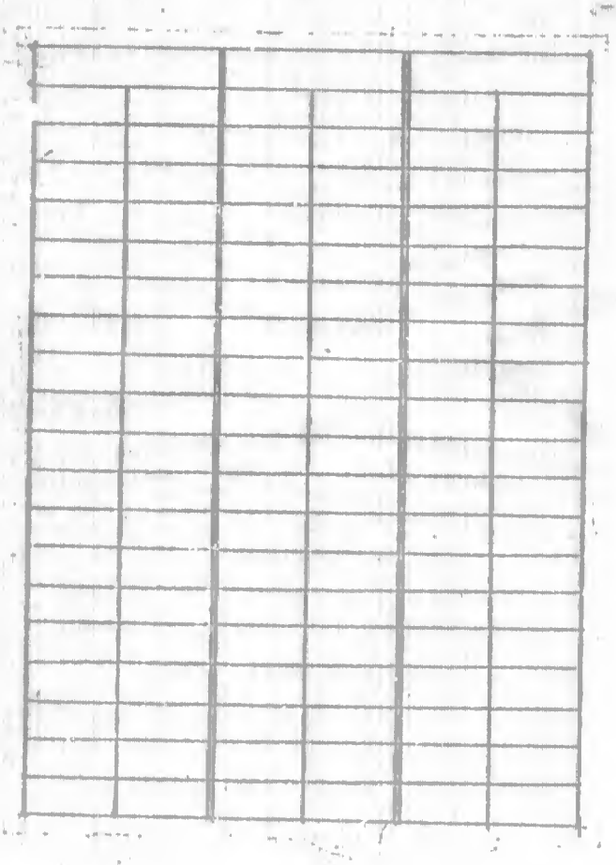
Fabrication Data:

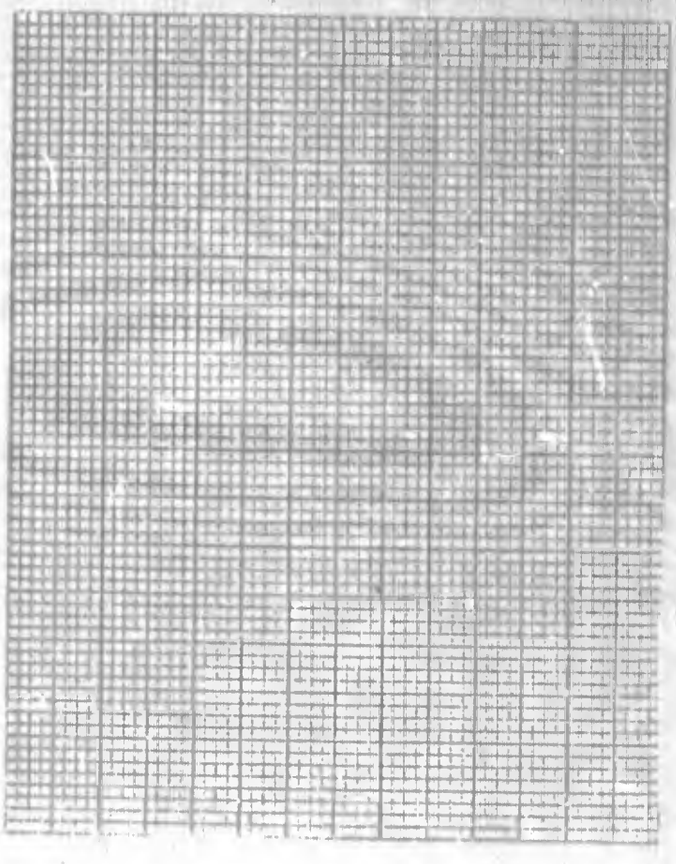
Date Sample was bonded:
Adhesive Used: Fuller R7007A
Curing Time and Temperature: 24 Hr at Room Temperature
Clamping Pressure: 5-10 psi
Remarks:

Test Data:

Type of Test: ____ Conveyor ✓ Ball ✓ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Peam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other
Date Test was started: 8-30-66
Date Test was completed: 8-30-66





Remarks: This test could not be carried out, because the aluminum skin separated from the core when ~~panel is~~ was held in oven at 150°C for 1 HR.

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 41-R(2)

Fabrication Data:

Date Sample was bonded:

Adhesive Used: Fiber R1007Q

Curing Time and Temperature: 24 Hours Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

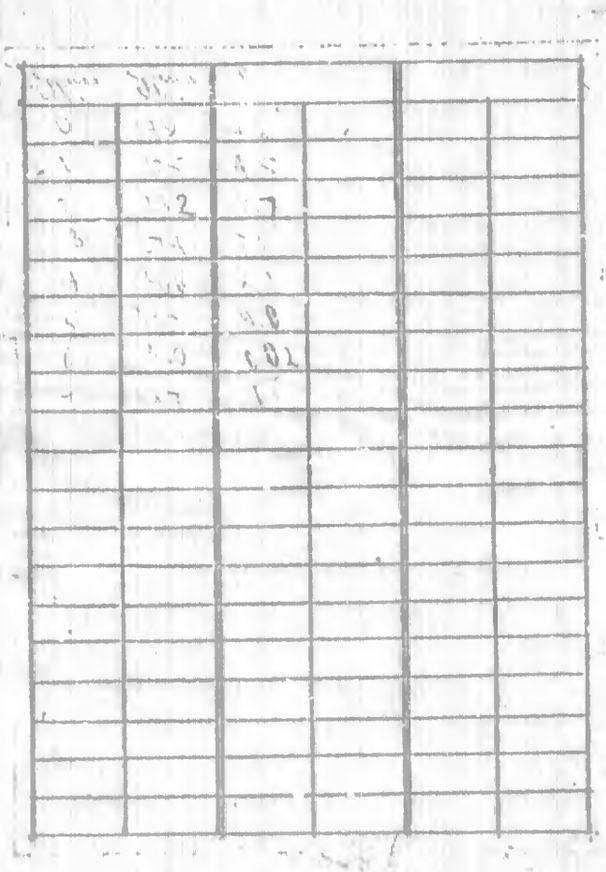
Test Data:

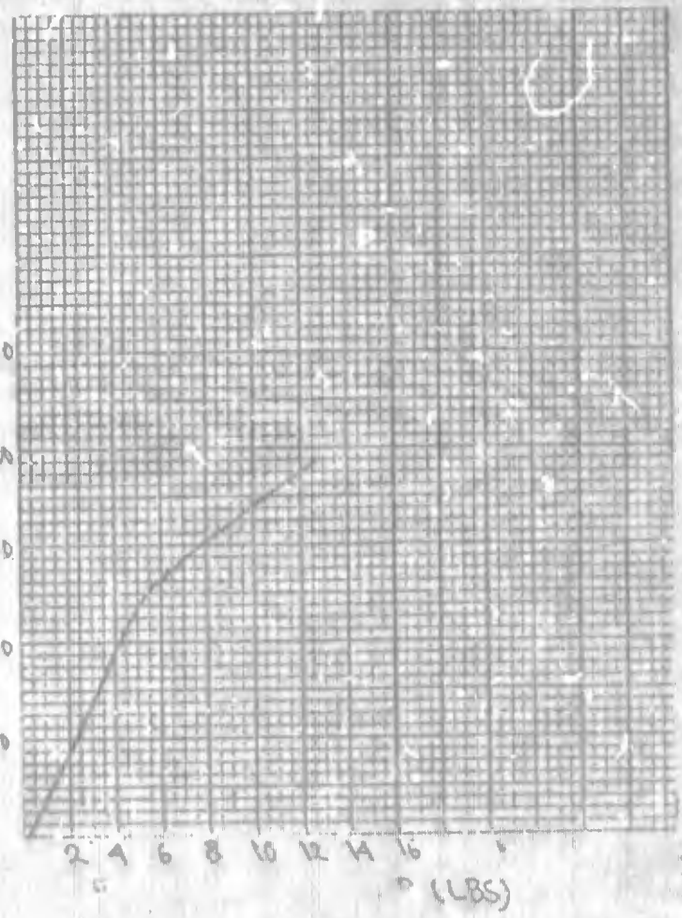
Type of Test: ____ Conveyor ✓ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-30-66

Date Test was completed: 8-30-66





Remarks:

Test Performed By:

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: [illegible]

Fabrication Data:

Date Sample was bonded:

Adhesive Used: Fuller R3007B

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 psi

Remarks:

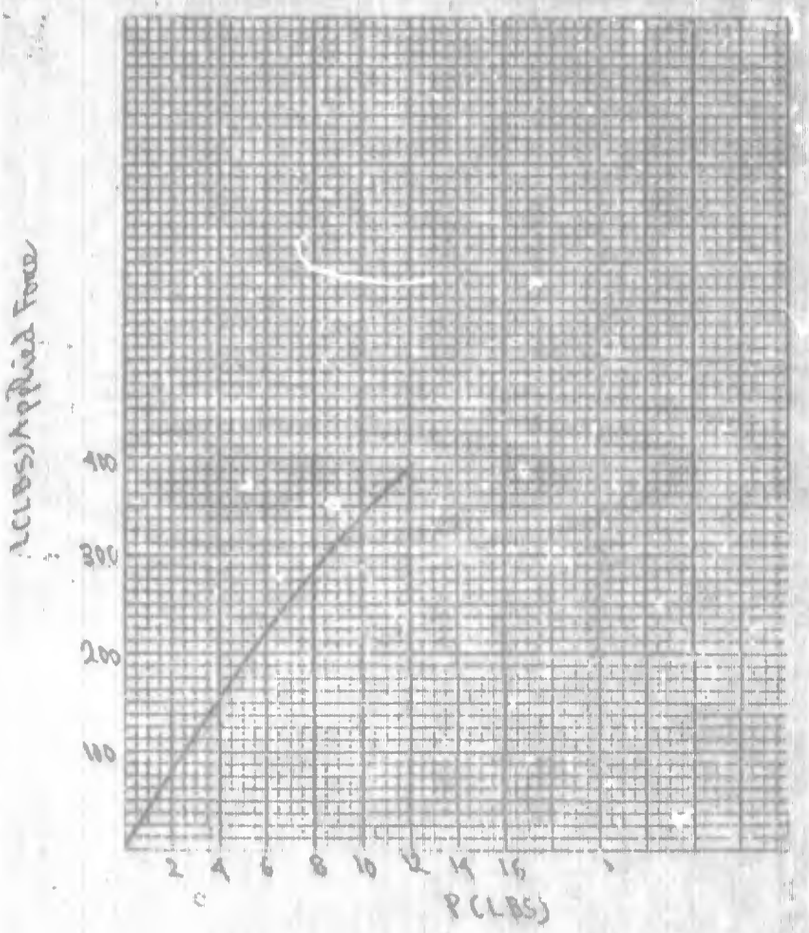
Test Data:

Type of Test: ____ Conveyor ✓ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-30-66

Date Test was completed: 8-30-66



Remarks:

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 43-T(2)

Fabrication Data:

Date Sample was bonded:

Adhesive Used: Fuller R10070

Curing Time and Temperature: 24 Hours Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

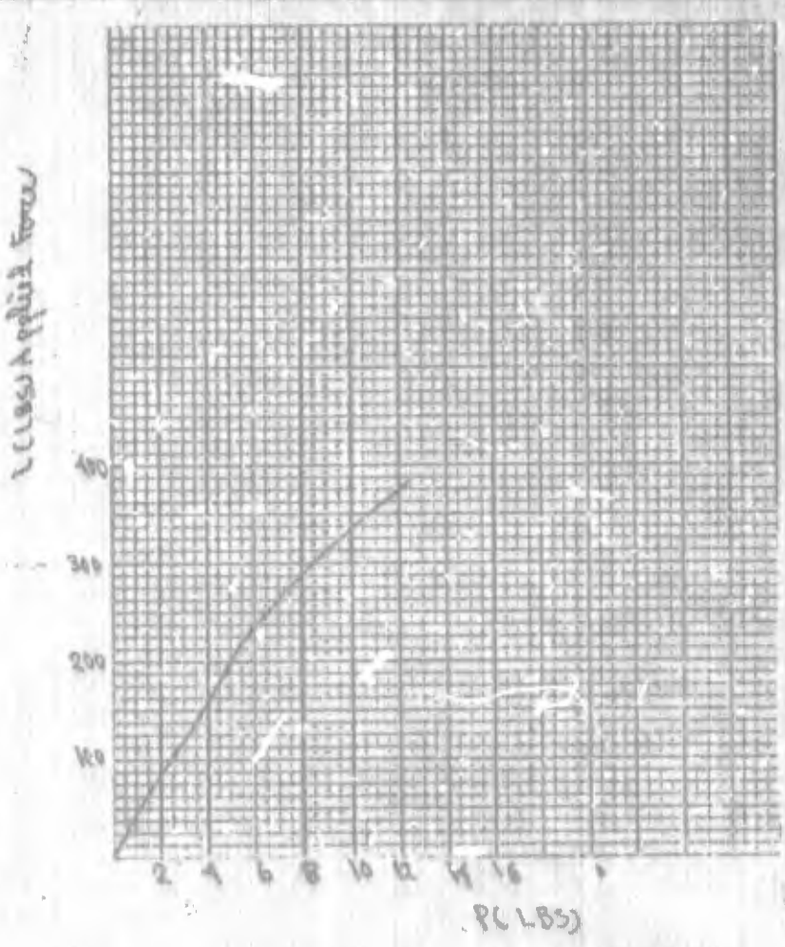
Test Data:

Type of Test: ____ Conveyor ✓ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-30-66

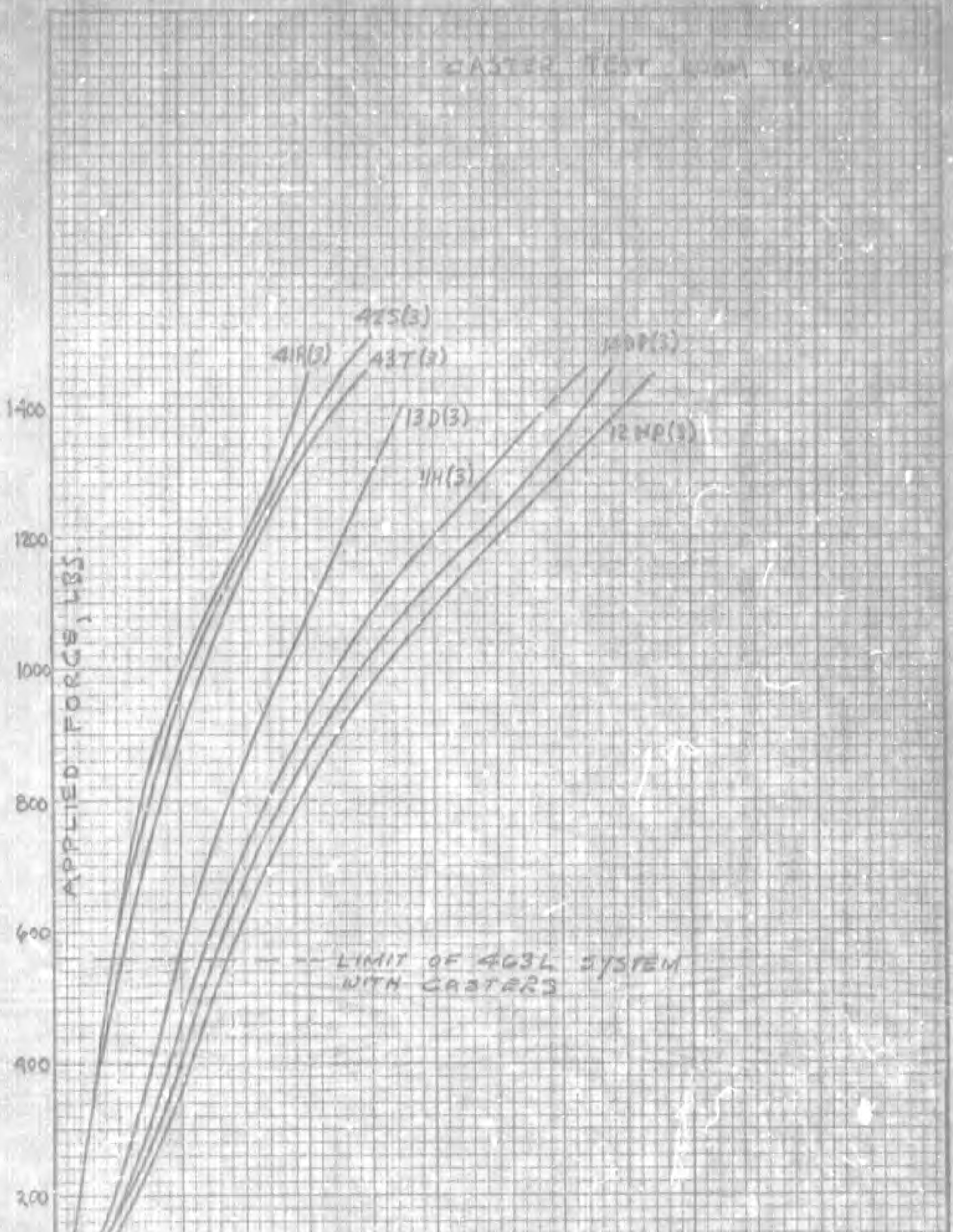
Date Test was completed: 8-30-66



Remarks:

Test Performed By:

NAME OF TEST:	Caster Test.
ITEMS TESTED:	11H(3), 12HP(3), 13D(3), 14DP(3), 41R(3), 42S(3), 43T(3).
PURPOSE OF TEST:	To measure the resistance to initiating the movement of a 4" diameter x 1 1/2" caster, subjected to different loads, over the surface of specimens with different cores at room temperature and at +125°F, with the casters parallel to and at 90° to the direction of movement.
DESCRIPTION OF TEST APPARATUS:	Two (2) 0 - 15 psi gages, two (2) 0 - 300 psi gages, dolly with four (4) 4" diameter x 1 1/2" casters mounted to it, pressure regulator 0 - 60 psi, one (1) hydraulic cylinder, one (1) air valve, one (1) test fixture with counterpoise, and ten (10) 5-pound weights.
TEST PROCEDURE:	The specimen was fixed to the top of the test fixture table and the dolly was placed on top of the specimen. Five pound weights were placed at one end of the test fixture and, by virtue of the counterpoise design, each one-pound increment resulted in an actual applied force on the specimen of 135 pounds. At each applied force increment, the dolly was moved back and forth and the resistive force, in psi, required to initiate the movement, was recorded. The sample, 43T(3), after being tested at room temperature, was destroyed while heating in the oven for the high temperature.
TEST RESULTS:	The aluminum honeycomb core specimens had less caster rolling resistance at all test emperatures than the paper honeycomb core specimens. The aluminum and paper honeycomb core specimens showed an increase in caster rolling resistance with an increase in temperature.
EXHIBITS:	See Figure 5, 6, 7, and 8.


43T(3)
13D(3)
11H(3)
12MP(3)
APPLIED FORCE, LBS
LIMIT OF 463L SYSTEM
WITH CASTERS
RESISTIVE FORCE P (LBS) ON (4) CASTERS
200
400
600
800
1000
1200
1400
10
20
30
40
50

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 11-4(2)

Fabrication Data:

Date Sample was bonded: 7-6-66

Adhesive Used: Fuller R 3007 BV

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 8-10 PSI

Remarks:

Test Data:

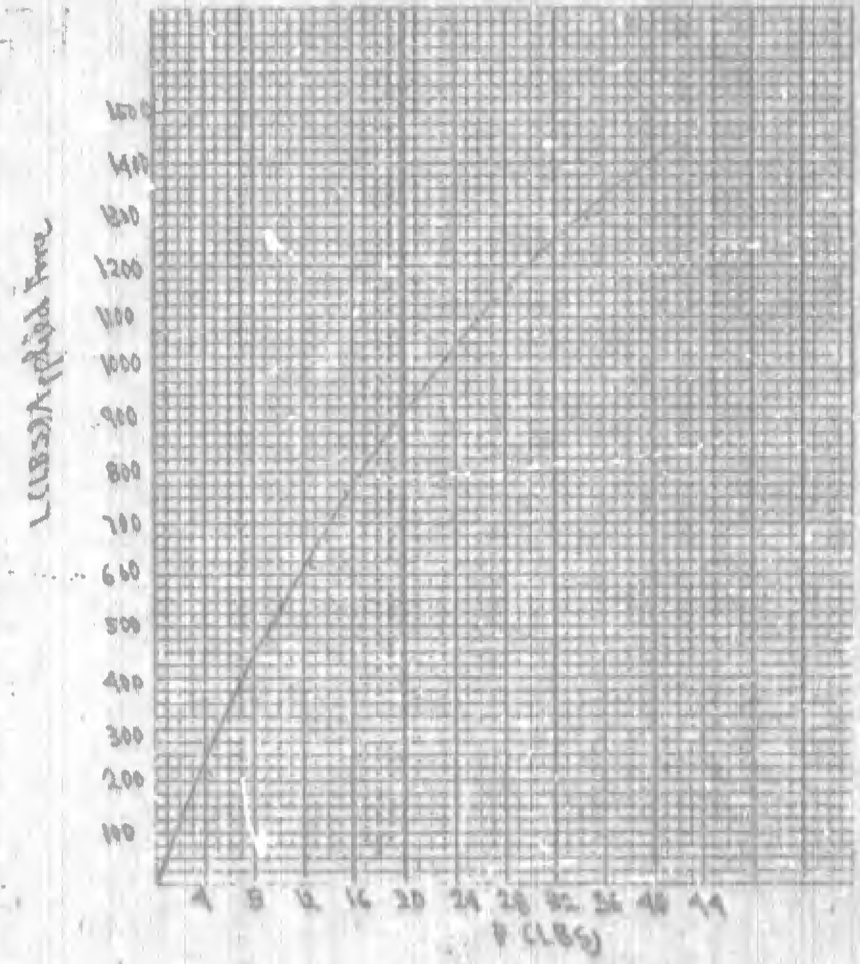
Type of Test: ____ Conveyor ____ Ball ✓ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other

Date Test was started: 8-10-66

Date Test was completed: 8-10-66

[illegible]	[illegible]	P			
0	318	5.2			
5	353	3.0			
10	483	6.9			
15	623	11.1			
20	758	15.5			
25	893	19.2			
30	1028	23.2			
35	1163	28.1			
40	1298	34.3			
45	1433	42			



Remarks: Indentation made in the surface were very slight

Test Performed By: [illegible signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 12-10 (3)

Fabrication Data:

Date Sample was bonded: 7-6-66

Adhesive Used: Fuller R 7007 A

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

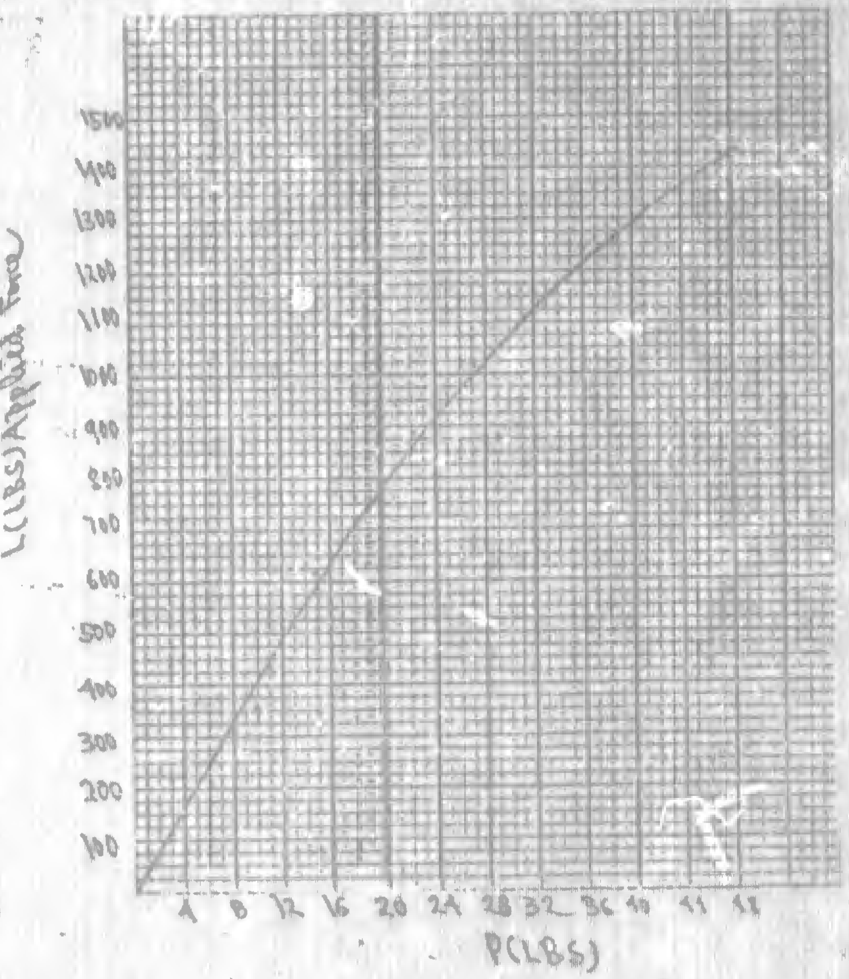
Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other

Date Test was started: 8-10-66

Date Test was completed: 8-10-66

Applied Load	Applied Force	P
0	118	6.6
5	353	9.8
10	488	12.0
15	623	14.9
20	753	18.2
25	893	22.1
30	1028	27.1
35	1163	33.8
40	1298	40.1
45	1133	48.1



Remarks:

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 12-D12)

Fabrication Data:

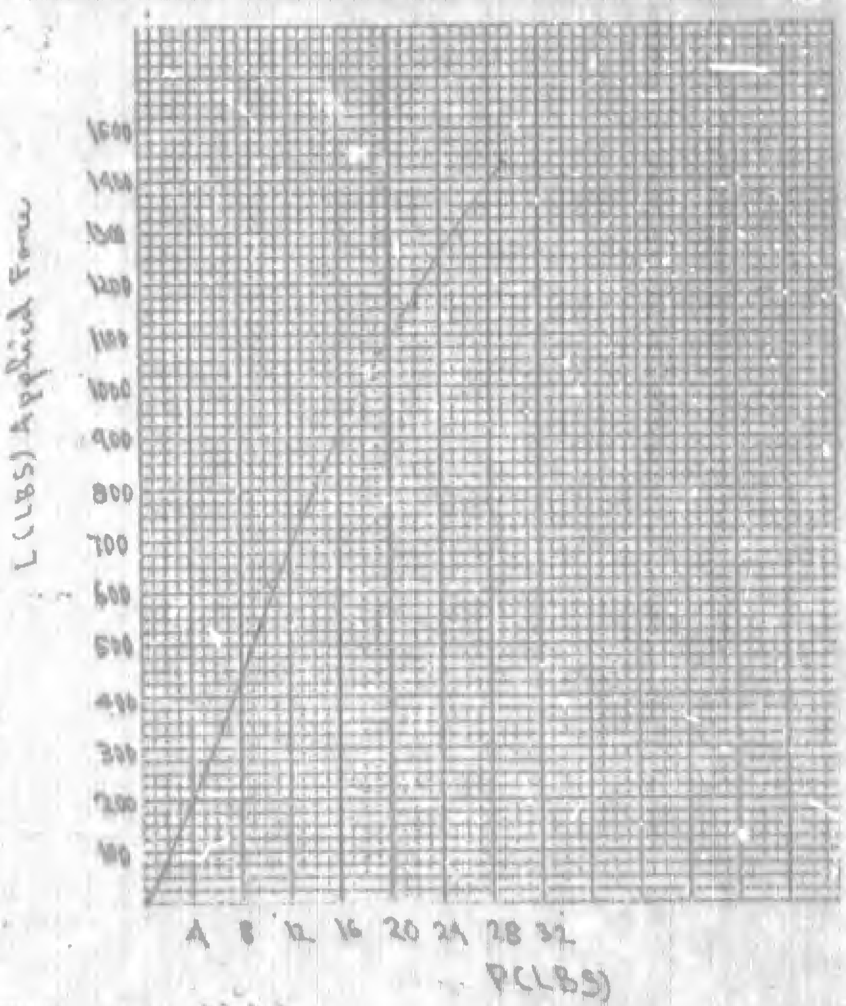
Date Sample was bonded: 7-8-66
Adhesive Used: Fuller [illegible]
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ca[ster] ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 8-11-66
Date Test was completed: 8-11-66

[illegible]	[illegible]	P			
0	218	4.2			
.5	353	6.5			
10	488	8.6			
15	623	10.9			
20	758	12.9			
25	893	15.4			
30	1028	19.8			
35	1163	22.1			
40	1298	25.8			
45	1433	29.1			



Remarks: The indentation marks were very slight. Scratches were made on the surface

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: K-DP(3)

Fabrication Data:

Date Sample was bonded: 7-8-66

Adhesive Used: Fuller R7007m

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

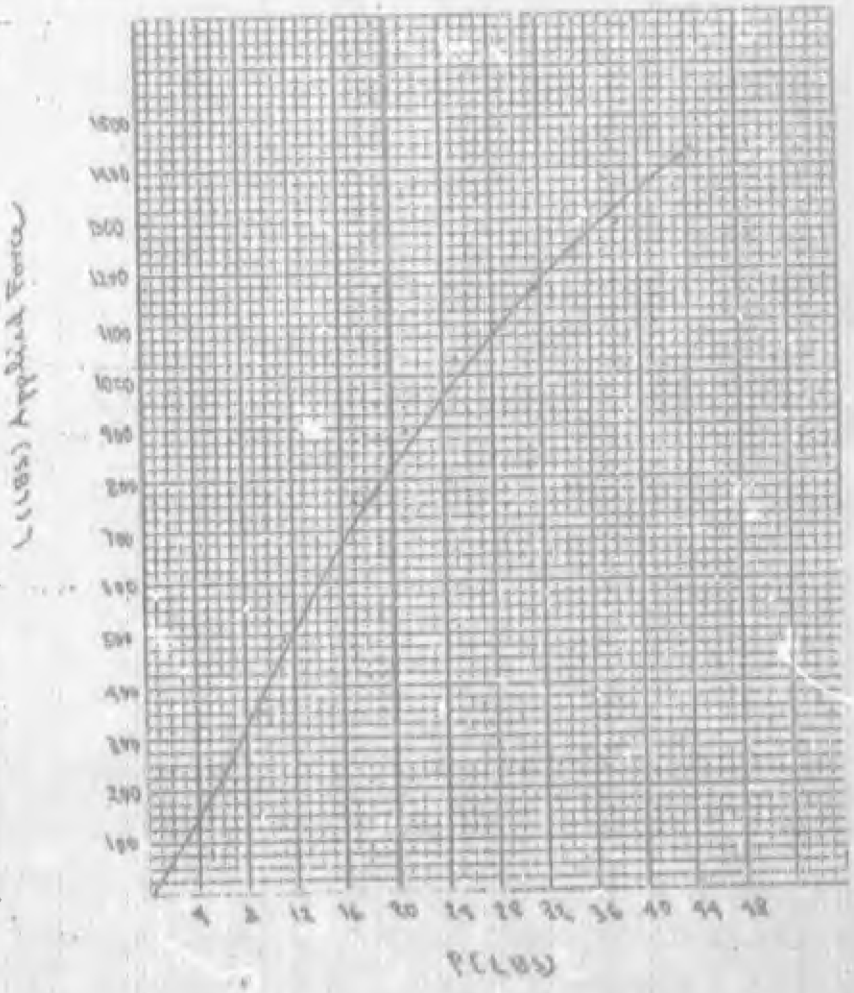
Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-10-66

Date Test was completed: 8-10-66

Applied Weight	Applied Force	P			
1	218	1.0			
5	353	9.1			
10	488	11			
15	623	14.6			
20	758	[illegible]			
25	893	21			
30	1028	25.1			
35	1163	33.4			
40	1298	38.1			
45	1433	44.4			



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 41-R(3)

Fabrication Data:

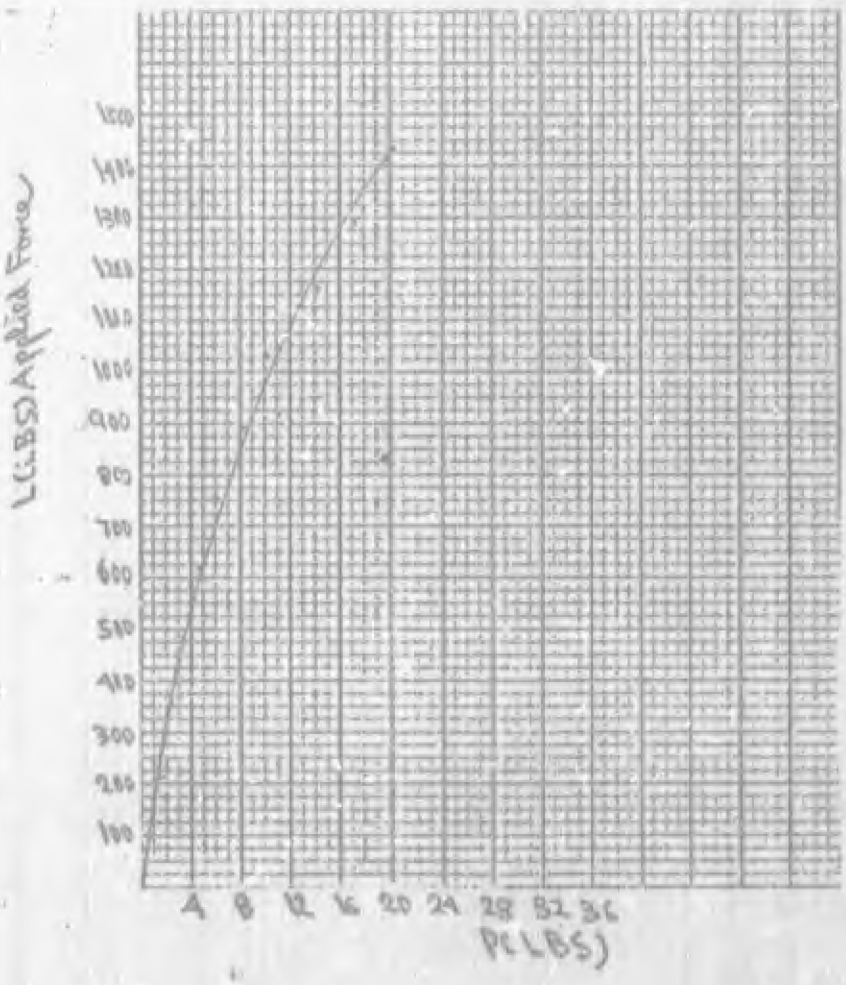
Date Sample was bonded: 7-8-66
Adhesive Used: Fuller R7007A
Curing Time and Temperature: 24 Hours Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture
___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 8-10-66
Date Test was completed: 8-11-66

[illegible]	[illegible]				
0	219	1.4			
5	353	3.3			
10	493	3.3			
15	623	4.7			
20	758	6.1			
25	893	8.1			
30	1028	11.4			
35	1163	14.6			
40	1298	17.2			
45	1433	20.1			



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 42-5(3)

Fabrication Data:

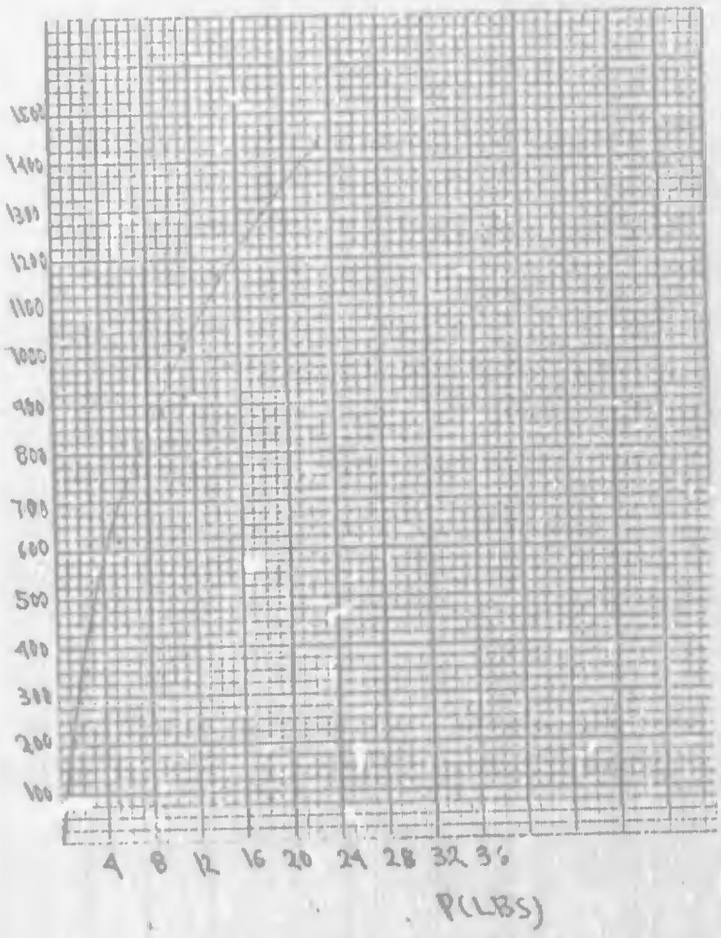
Date Sample was bonded: 7-18-66
Adhesive Used: Fuller R7007 Bx
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller √ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F √ Room Temperature ____ -40° F ____ other
Date Test was started: 8-15-66
Date Test was completed: 8-15-66

		P			
0	218	1.9			
5	353	3.5			
10	933	9.0			
15	623	5.9			
20	759	7.1			
25	993	9.1			
30	1049	11.2			
35	1114	19.3			
40	1998	18.3			
45	1433	23.0			



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIV[illegible] [illegible]FORM CODE BY [illegible]

Sample Identification Code: 43-T(3)

Fabrication Data:

Date Sample was bonded: 7-10-66
Adhesive Used: Fuller R7007 B/
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

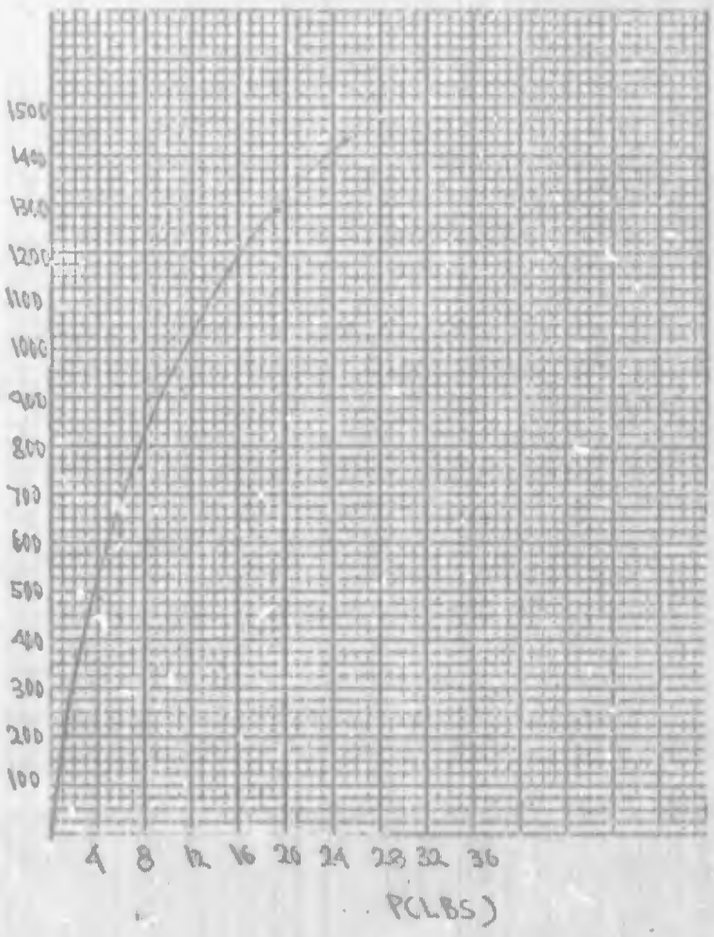
Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 8-16-66
Date Test was completed: 8-16-66

[illegible]	[illegible]	P			
0	218	1.4			
5	253	2.5			
10	288	3.1			
15	423	6.0			
20	758	1.9			
25	843	10.1			
30	1012	12.9			
35	1162	15.9			
40	1248	16.1			
45	1432	15.8			

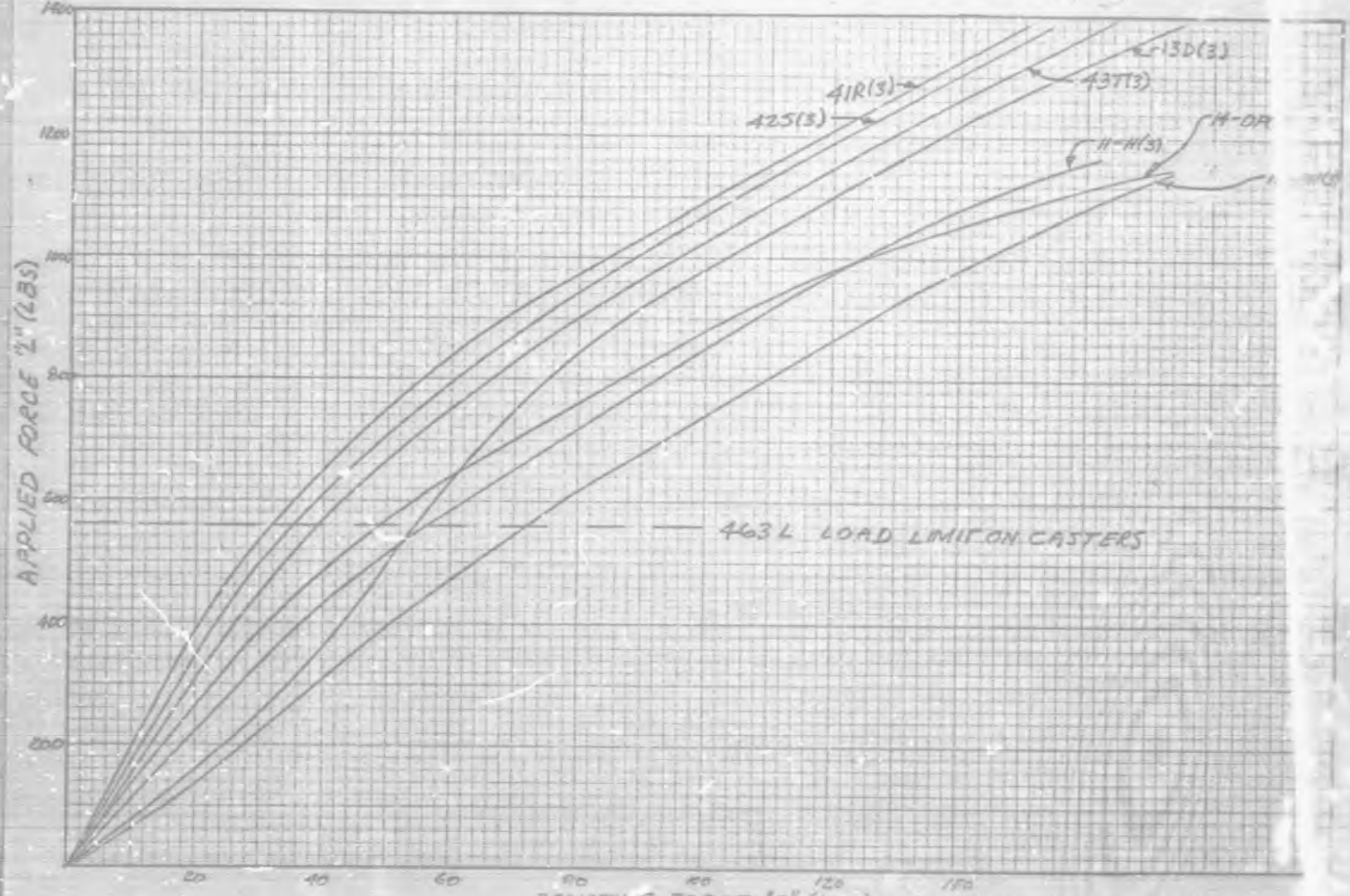
L(LBS) Applied Force



Remarks:

Test Performed By: [illegible]

CASTER TEST - 90° TO DIRECTION OF MOVEMENT - ROOM TEMPERATURE



BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 11-H(3)

Fabrication Data:

Date Sample was bonded: 7-26-66
Adhesive Used: Fuller B7007A
Curing Time and Temperature: 24 Hrs @ Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

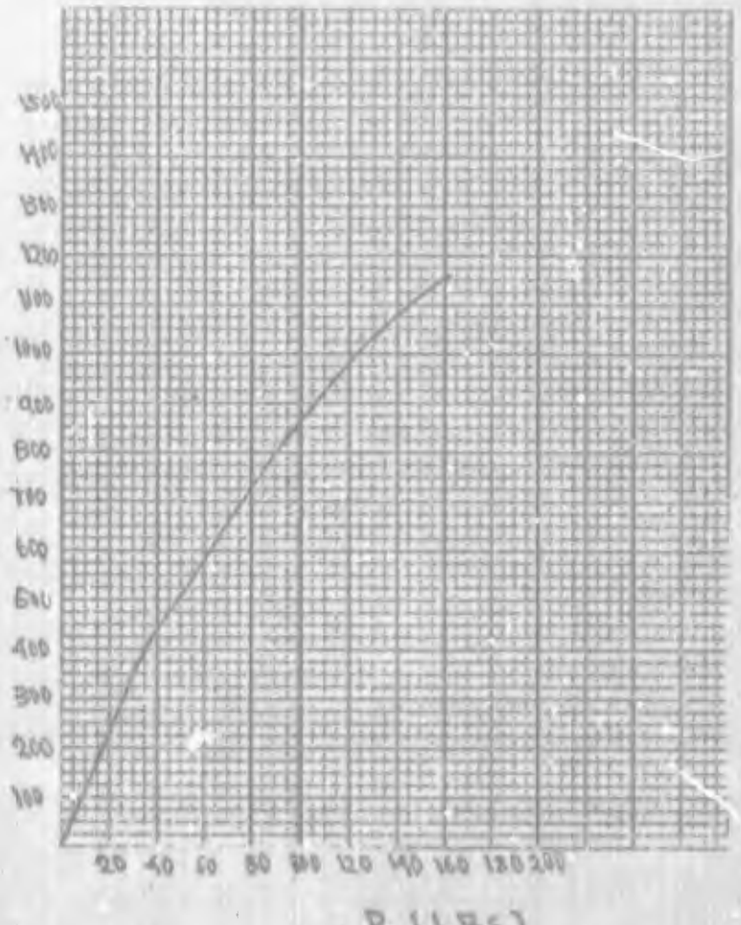
Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength
____ Tecter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 8-12-66
Date Test was completed: 8-12-66

0	210	21			
5	553	34.4			
10	998	49.2			
15	1323	66			
20	1758	83			
25	2313	107			
30	2963	126			
35	3663	161			
40	4348				
45	5123				

L (LBS) Applied Force



Remarks:
Caster was placed 90° to the direction of movement
Test was terminated at 1163# because the pressure regulator did not have the capacity to regulate above 60 PSI
This test produced indentations and scratches on the surface of the specimen

Test Performed By: [illegible]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 12-HP(3)

Fabrication Data:

Date Sample was bonded: 7-6-66
Adhesive Used: Fuller B-7017A
Curing Time and Temperature: 24 hrs at Room Temperature
Clamping Pressure: 5-10 psi
Remarks:

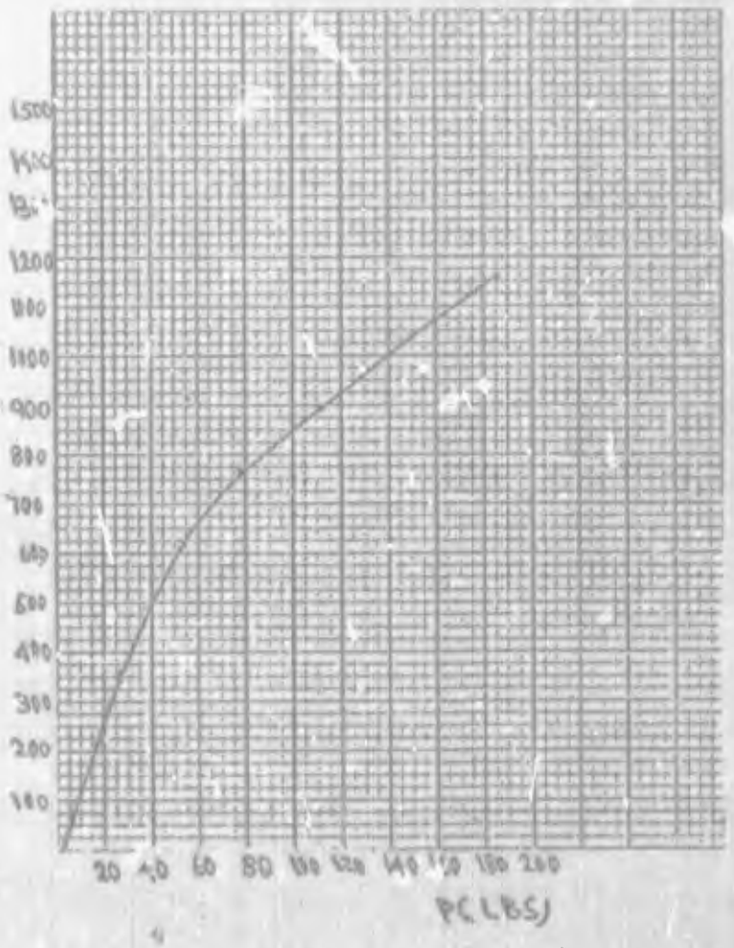
Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 8-12-66
Date Test was completed: 8-12-66

Time	Deflection	P
0	219	19
5	353	35.1
10	488	54.2
15	643	59.8
20	758	78.3
25	893	112.0
30	1028	147
35	1163	184
40	1298	
45	1433	

Load Applied Force



Remarks:

Testers were placed 90° to the direction of movement
Test was terminated at 1163 because the pressure regulator did not have the capacity to regulate above 600 psi.
This test produced indentations and scratches on the surface of the specimen.

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 12 D(3)

Fabrication Data:

Date Sample was bonded:
Adhesive Used: Fuller 3700 B
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

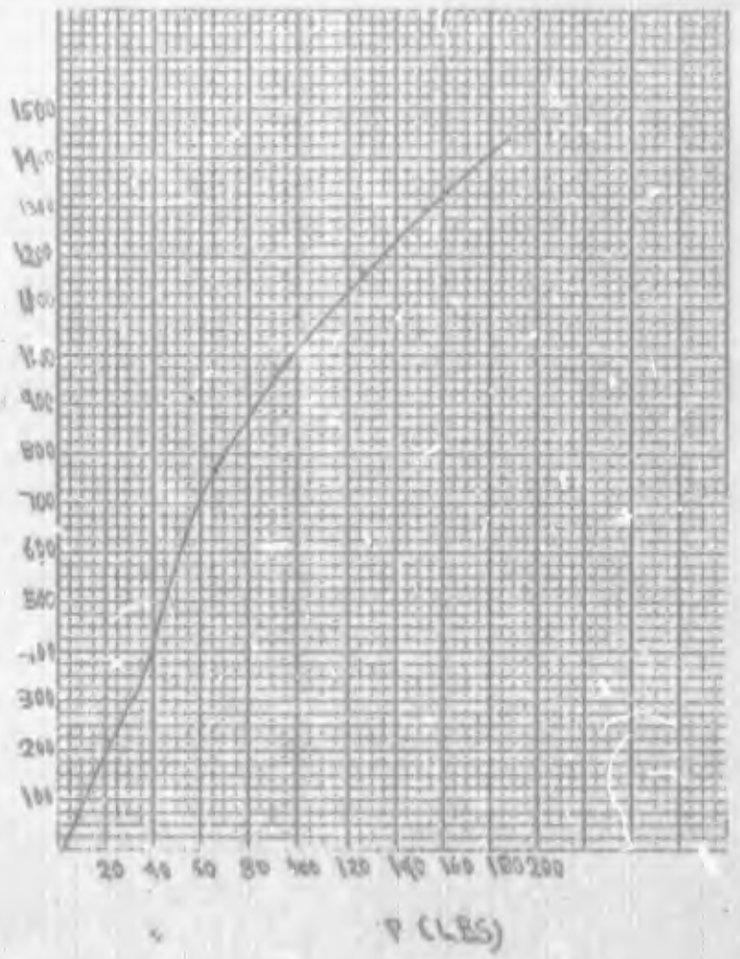
Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 8-12-66
Date Test was completed: 8-12-66

		P			
0	218	21			
5	553	342			
10	736	97			
15	823	165			
20	959	66			
25	843	39			
30	1083	189			
35	1163	126			
40	1298	159			
45	1423	189			

L (LBS) Applied Force



Remarks:

Cutter were placed 90° to the direction of ~~travel~~ movement.
This test produced slight identations and scratches on the surface of the specimens.

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 14-DP(3)

Fabrication Data:

Date Sample was bonded: 7-8-66
Adhesive Used: Fuller R 7007 A
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 psi
Remarks:

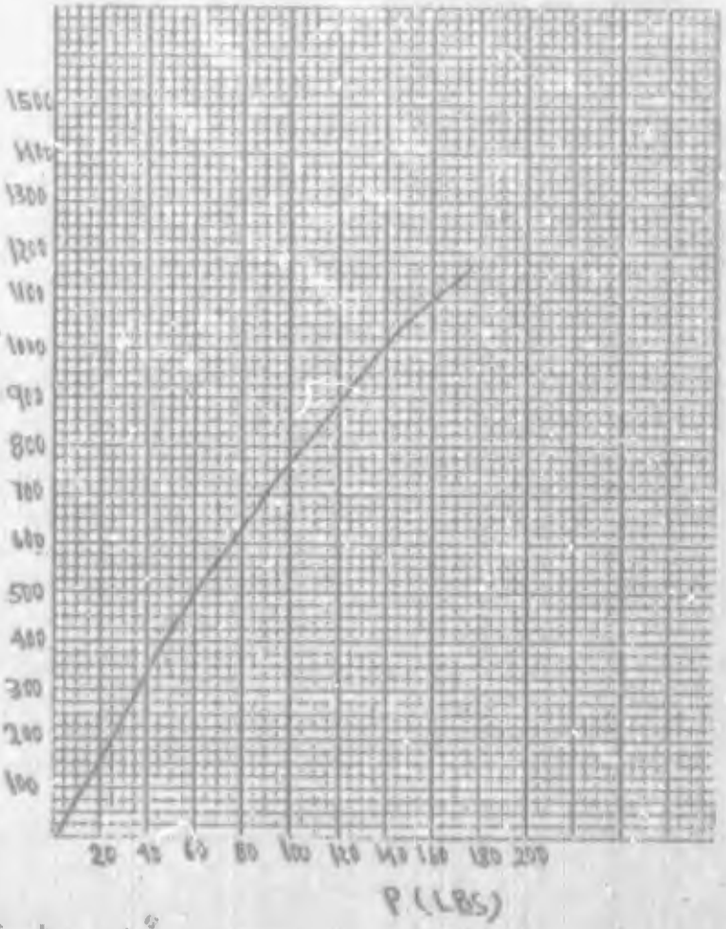
Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 8-12-66
Date Test was completed: 8-12-66

		P
0	218	19
5	353	47
10	488	59
15	623	79
20	758	102
25	893	123
30	1028	131
35	1163	179
40	1298	
95	1433	

L (LBS) Applied Force



Remarks: Cores were placed 90° to the direction of movement
This test produced slight identations and scratches on the surface of the specimen
Test was terminated at 1163' because the pressure regulator did not have the capacity to regulate above 60 psi.

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 41-R(3)

Fabrication Data:

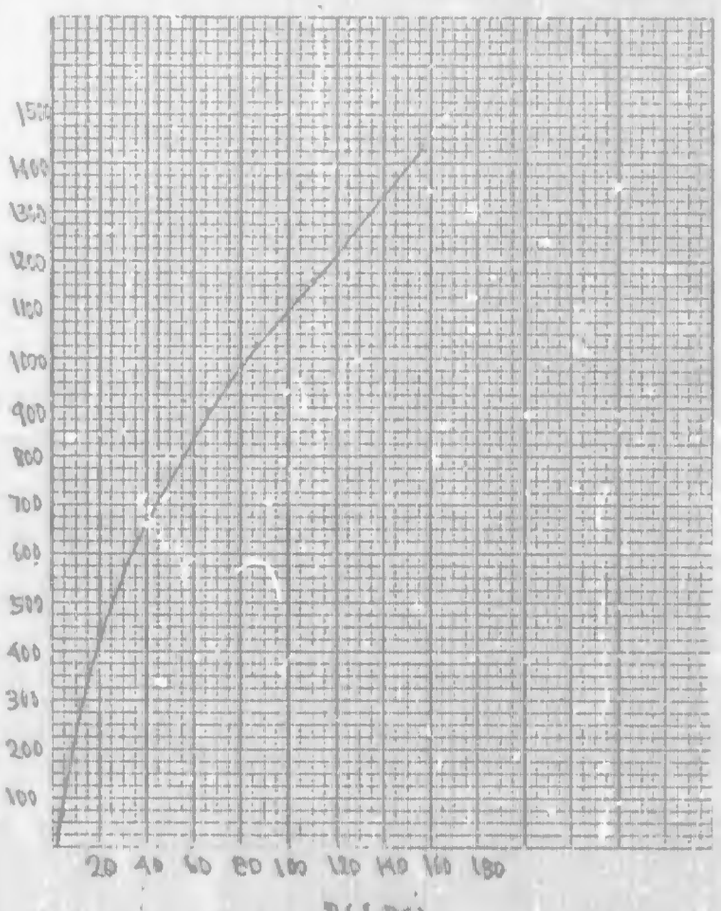
Date Sample was bonded: 7-8-66
Adhesive Used: Fuller R7007A
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 8-12-66
Date Test was completed: 8-12-66

0	13	12			
5	353	16			
10	443	26			
15	523	41			
20	753	54			
25	893	66			
30	1023	77			
35	1163	131			
40	1263	134			
45	1333	158			



Remarks: Cores were placed 90° to the direction of movement
~~Cores~~ This test produced very slight ablation and cracking on the surface of the specimens

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 42-S(3)

Fabrication Data:

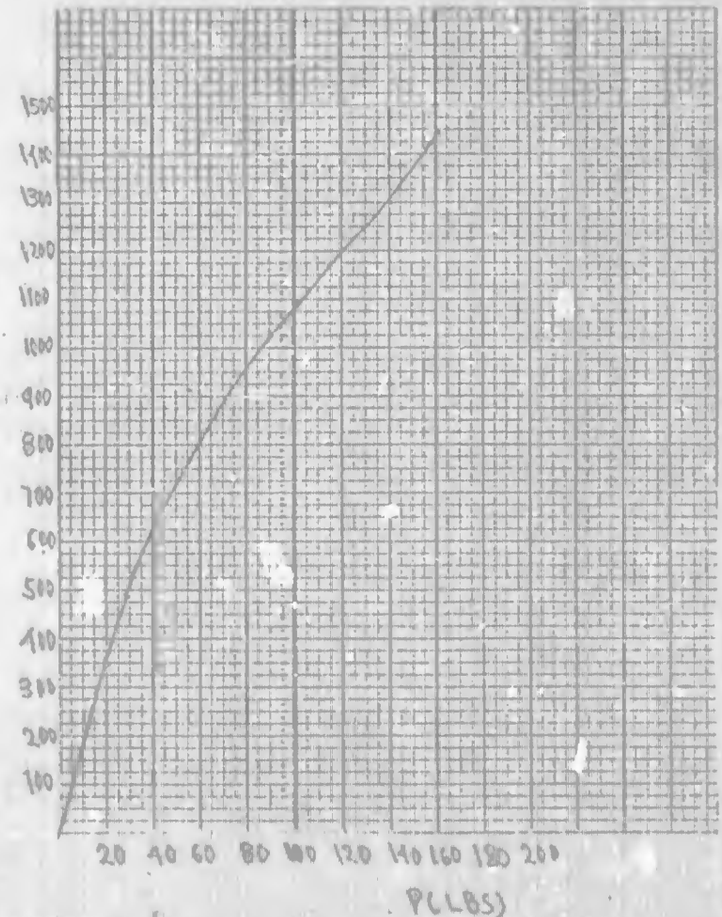
Date Sample was bonded: 7-10-66
Adhesive Used: Fuller R7007A/
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 psi
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 8-16-66
Date Test was completed: 8-16-66

		P			
0	218	19			
5	553	20			
10	988	28			
15	623	40			
20	758	56			
25	893	72			
30	1028	92			
35	1163	115			
40	1298	141			
45	1433	167			



Remarks: Cores were placed 90° to the direction of movement
This test produced slight indentation and scratches on the surface of the specimen.

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 43T(3)

Fabrication Data:

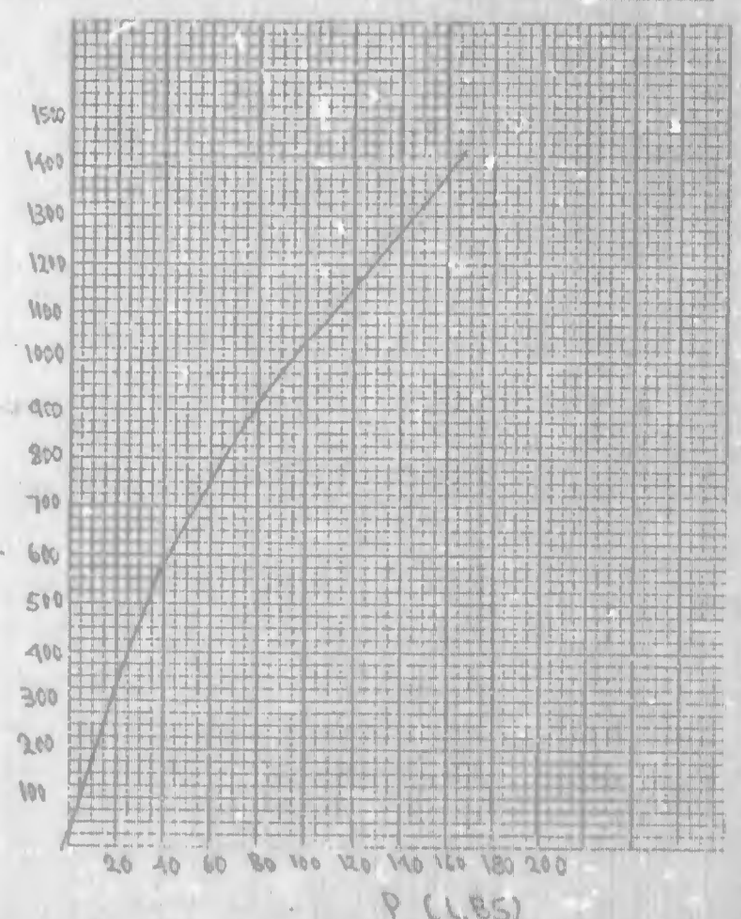
Date Sample was borded: 7-10-66
Adhesive Used: Fuller R7007A/
Curing Time and Temperature: 24 Hours Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength
____ Teeter Roller

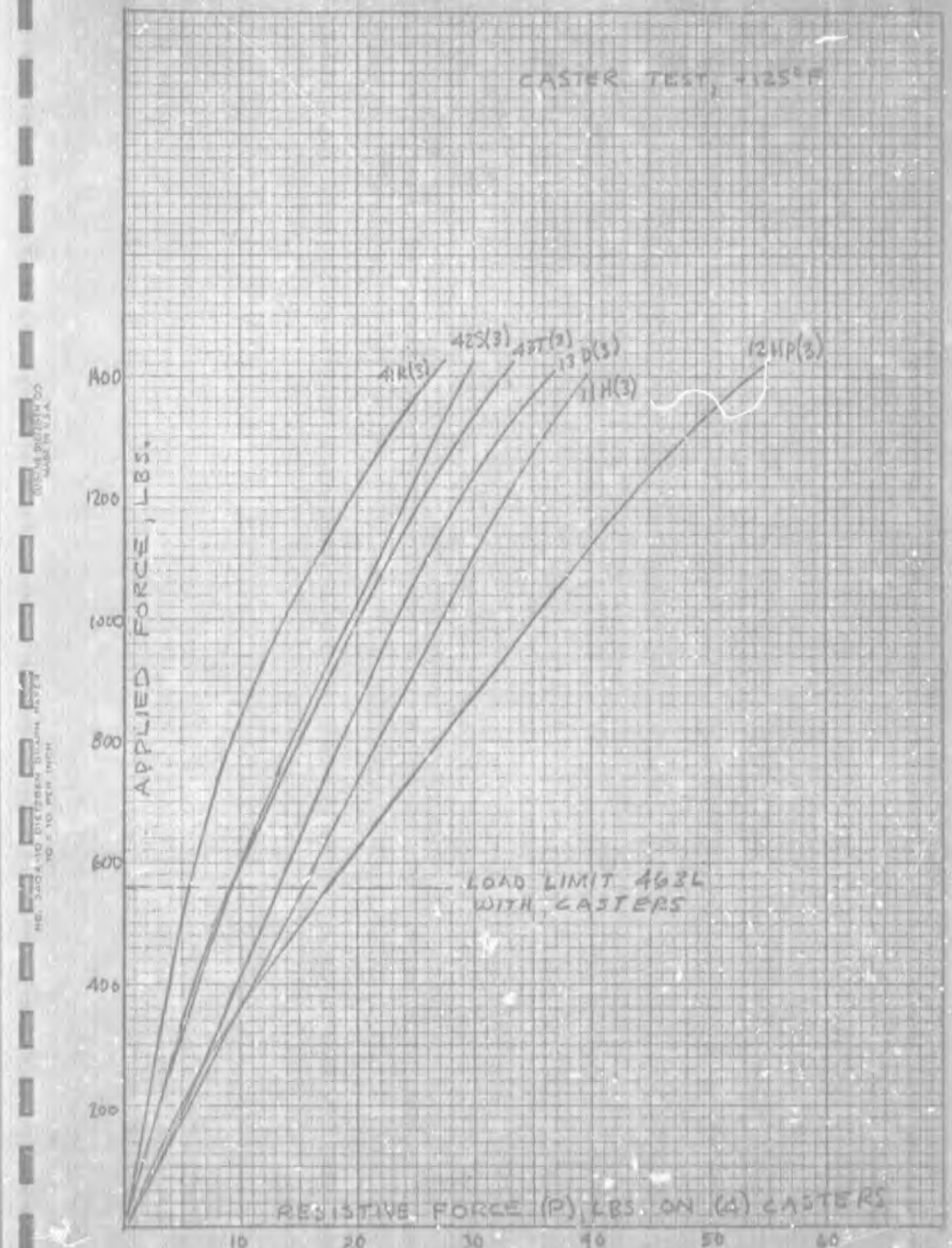
Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 8-15-66
Date Test was completed: 8-15-66

0	218	14			
5	353	22			
10	483	32			
15	623	44			
20	758	60			
25	893	78			
30	1028	98			
35	1163	121			
40	1298	148			
45	1433	169			



Remarks: Cuts were placed 90° to the direction of movement. This test produced slight identations and scratches on the surface of the specimen.

Test Performed By: [illegible]


CASTER TEST, +125°F
APPLIED FORCE, LBS.
RESISTIVE FORCE (P) LBS. ON (4) CASTERS
41K(3)
42S(3)
43T(3)
13 D(3)
11 H(3)
12HP(3)
LOAD LIMIT 4634 WITH CASTERS
1400
1200
1000
800
600
400
200
10
20
30
40
50
60

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 11-M131

Fabrication Data:

Date Sample was bonded:

Adhesive Used: Fuller R-7007 G

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

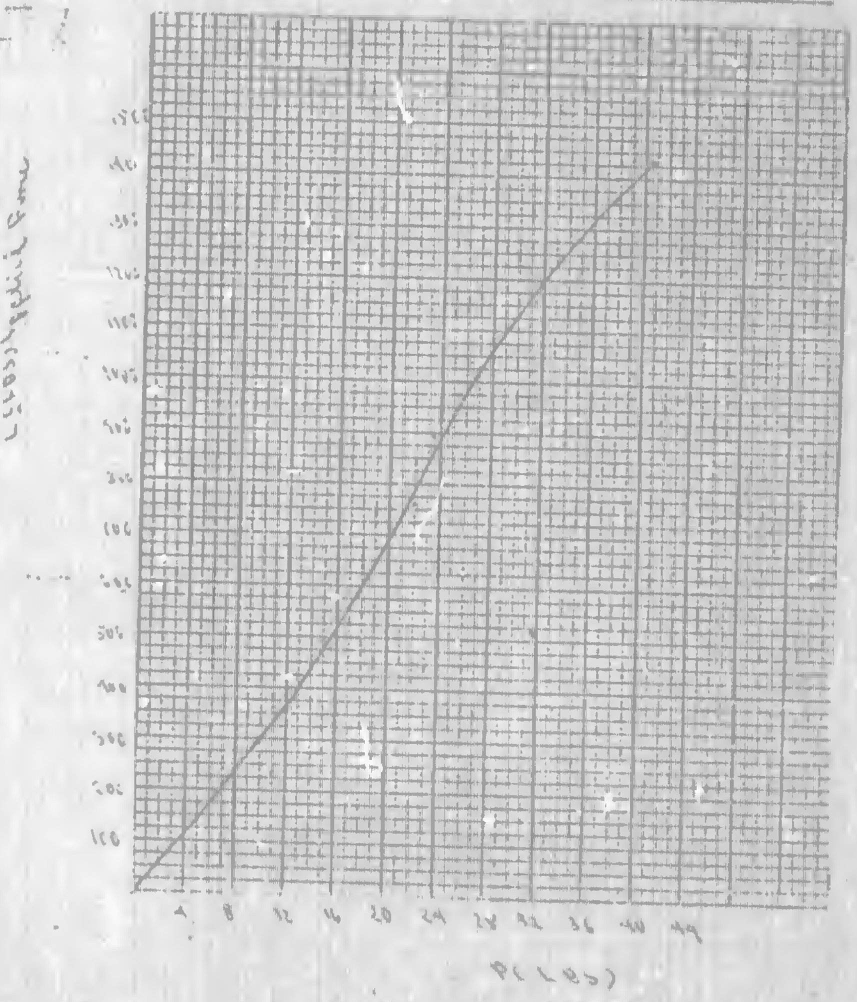
Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started: 3-30-61

Date Test was completed: 3-30-61

[illegible]	[illegible]	P			
0	218	26.1			
5	353	11.5			
10	4[illegible]	15.7			
15	613	19.8			
20	758	22			
25	843	23.5			
30	1023	26.5			
35	1163	31.4			
40	1248	36			
45	1433	40.1			



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 12-HP(3)

Fabrication Data:

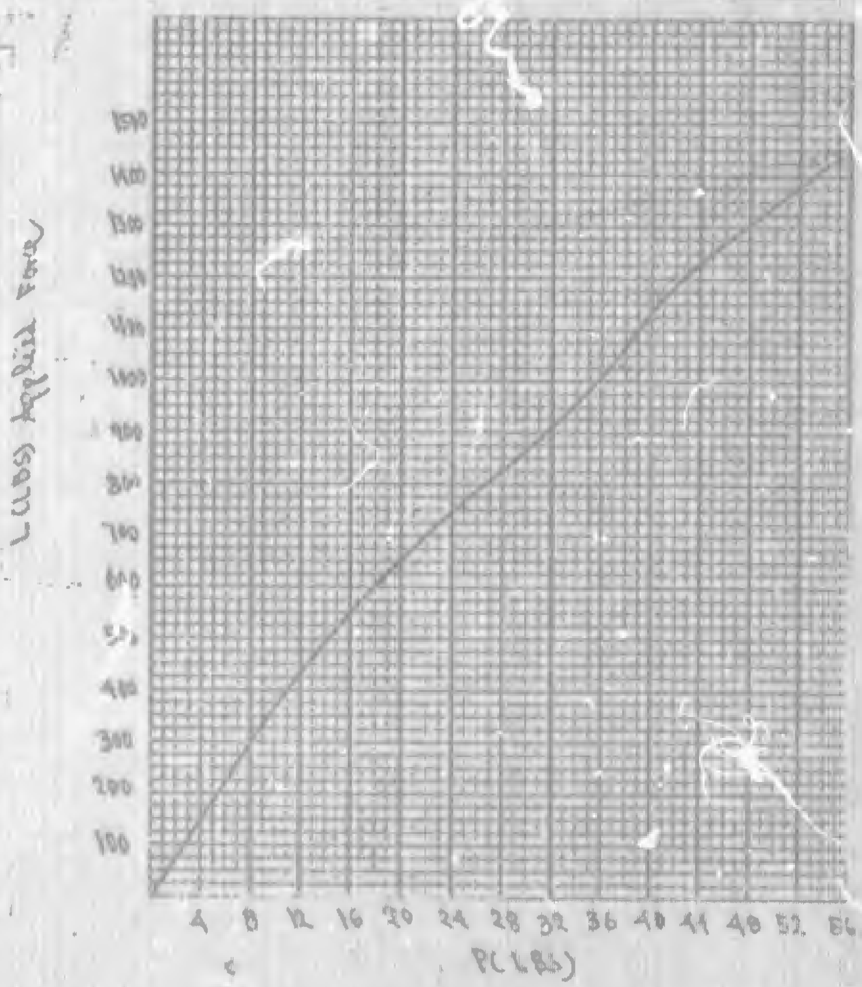
Date Sample was bonded:
Adhesive Used: Fuller R7007A
Curing Time and Temperature: 24 Hrs. at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other
Date Test was started: 8-30-66
Date Test was completed: 8-30-66

[illegible]	[illegible]	[illegible]		
0	110	8.6		
5	153	5.41		
10	182	14.1		
15	123	18.8		
20	758	[illegible]		
25	943	31.7		
30	1123	[illegible]		
35	1163	[illegible]		
40	1298	47.1		
45	1437	55		



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 18-D(3)

Fabrication Data:

Date Sample was bonded:
Adhesive Used: Fuller R7001 A/
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

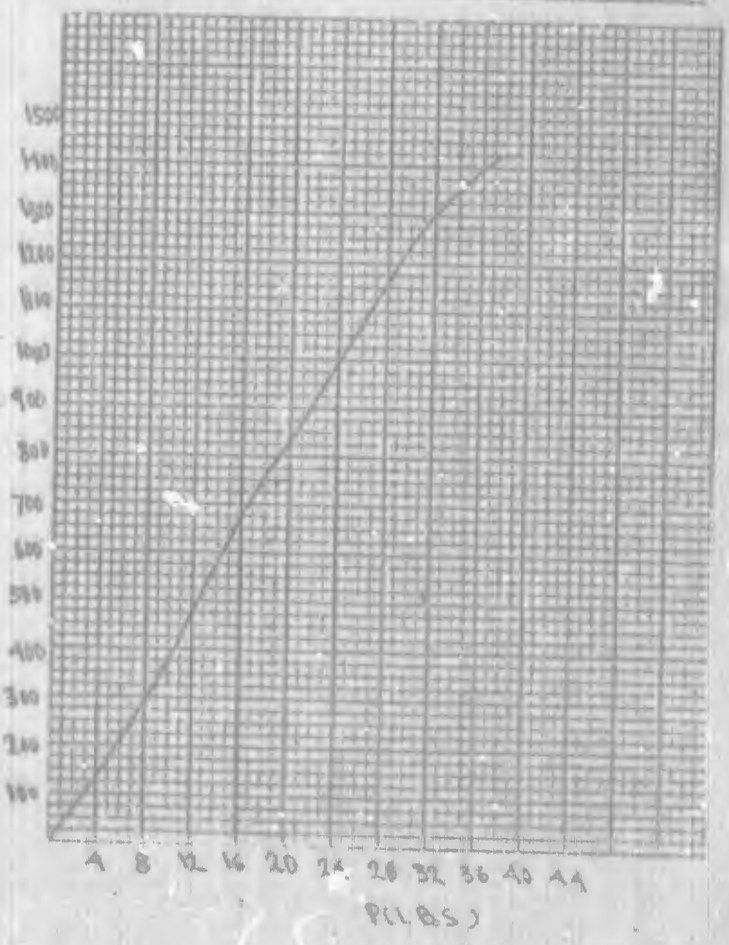
Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other
Date Test was started: 8-20-66
Date Test was completed: 8-25-66

0	.218	8.5			
5	.253	9.9			
10	.298	12.5			
15	.343	14.1			
20	.388	17.3			
25	.433	20.0			
30	.478	25.0			
35	.523	28.2			
40	.568	31.4			
45	.613	37.8			

LOADS: Applied Force



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: A1-R(3)

Fabrication Data:

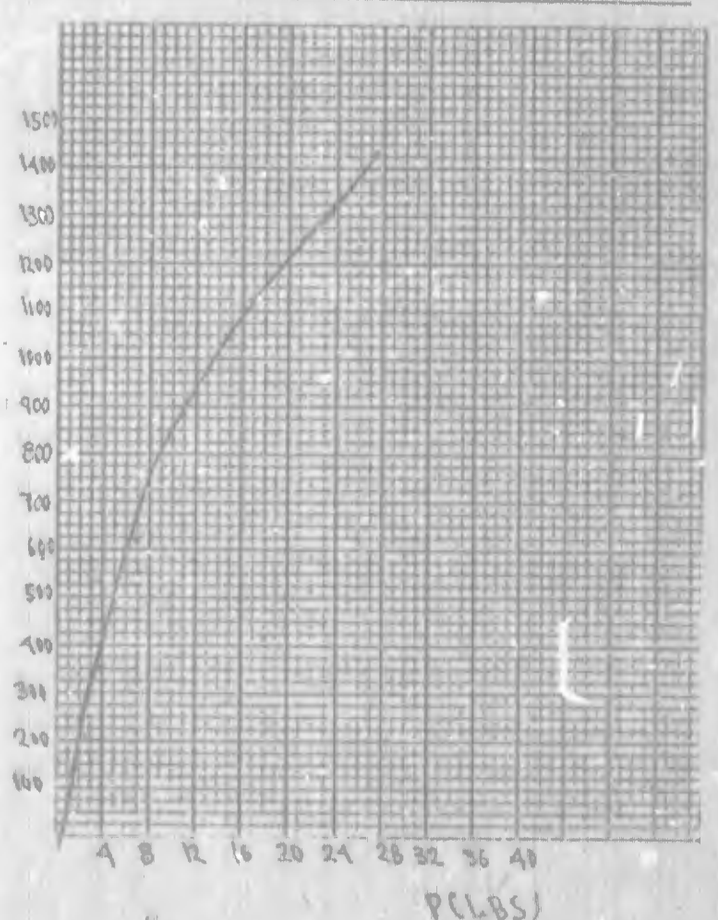
Date Sample was bonded:
Adhesive Used: Fuller R7007B
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure:
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other
Date Test was started: 8-30-66
Date Test was completed: 8-30-66

		P
0	219	2.4
.5	253	3.8
10	488	5.1
15	523	6.8
20	758	8.0
25	843	11.0
30	1028	14.0
35	1163	18.8
40	1298	23.1
45	1433	27.2



Remarks:

Test Performed By: M. Hirschfeld

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: A2-5(3)

Fabrication Data:

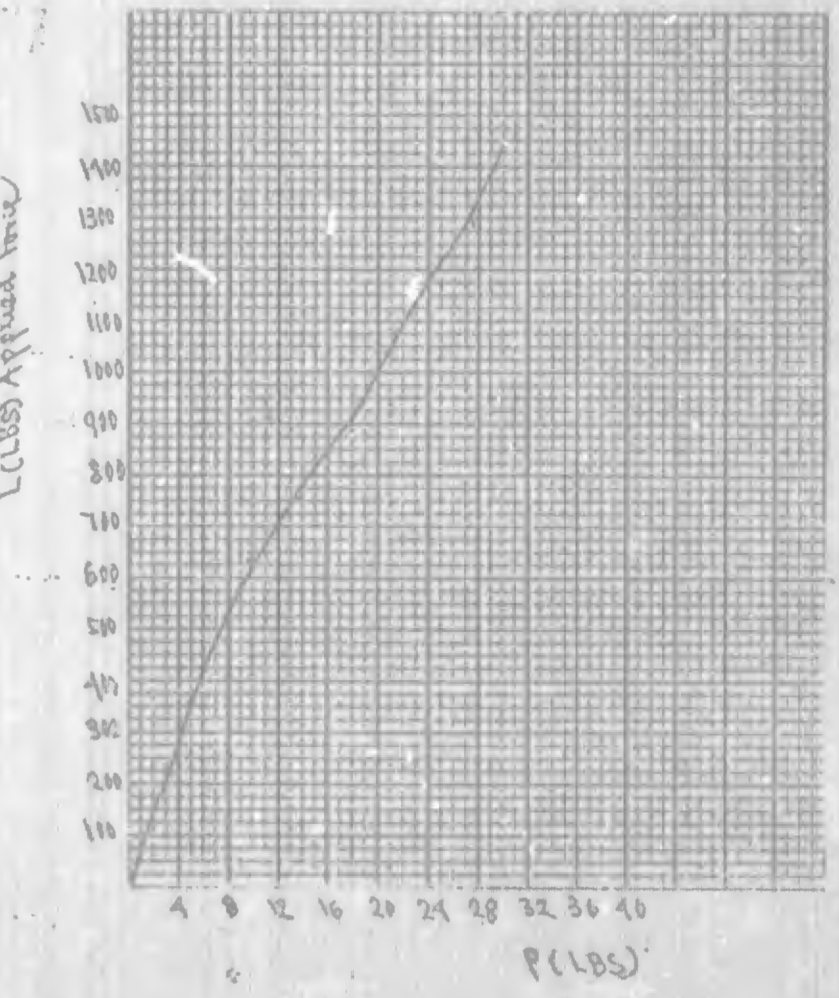
Date Sample was bonded:
Adhesive Used: Fuller R7007A
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other
Date Test was started: 8-30-66
Date Test was completed: 8-30-66

Applied Wt.	Applied Force	P
0	218	2.5
5	353	5.0
10	483	7.6
15	673	10.0
20	758	13.8
25	913	17.9
30	1028	18.0
35	1163	20.0
40	1248	23.5
45	1422	36.0



Remarks:

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 43-T(3)

Fabrication Data:

Date Sample was bonded:

Adhesive Used: Fuller R7997 a.

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 psi

Remarks:

Test Data:

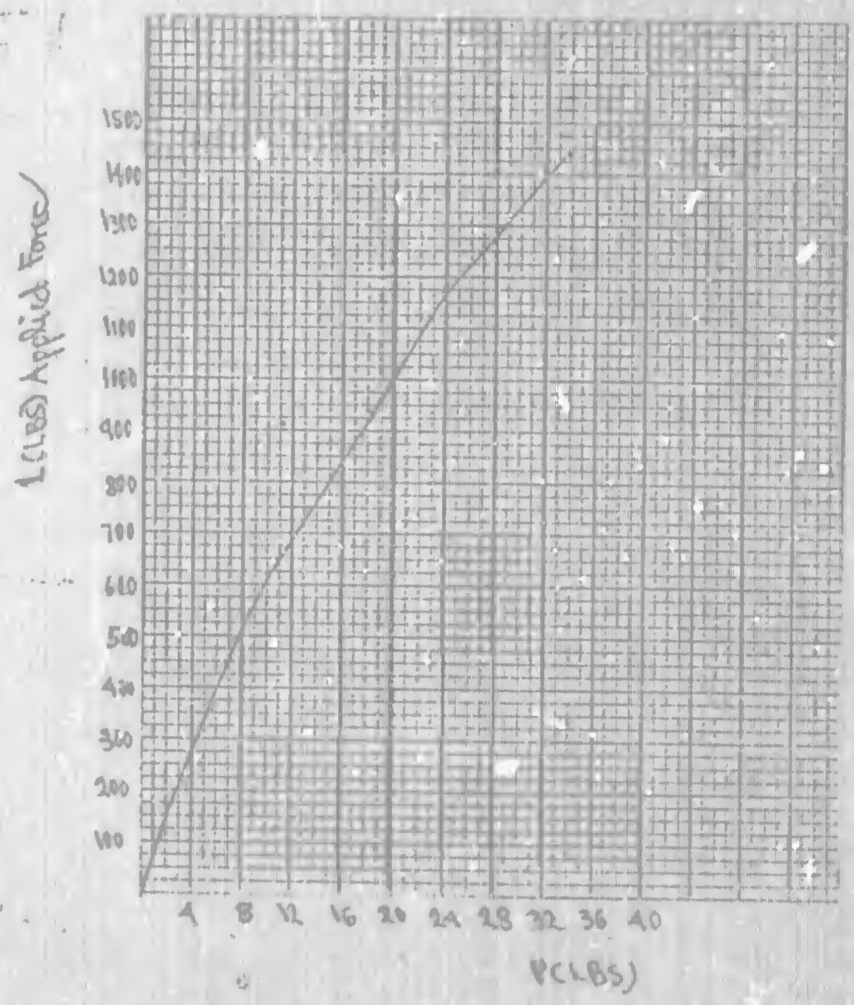
Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started: 8-30-66

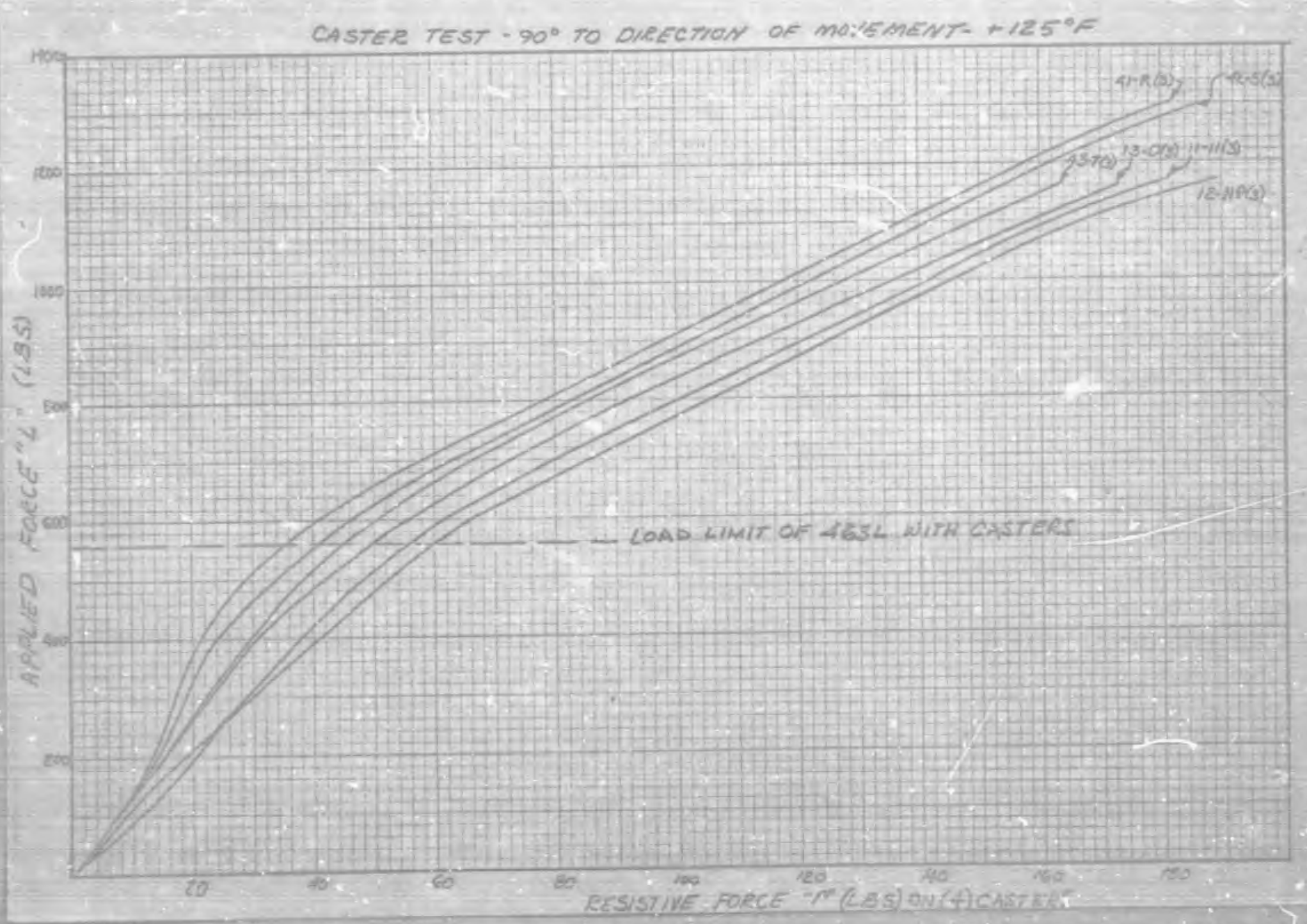
Date Test was completed: 8-30-66

Applied Load	Applied Force	[illegible]		
0	218	4.5		
5	353	5.5		
10	488	7.8		
15	623	10.2		
20	758	14.0		
25	843	18.2		
30	1028	21.3		
35	111[illegible]	24.0		
40	1298	[illegible]		
45	1433	[illegible]		



Remarks:

Test Performed By:



BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 11-H13

Fabrication Data:

Date Sample was bonded: ______

Adhesive Used: Fuller R.7887B

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks: Casters were 90° to the direction of movement

Test Data:

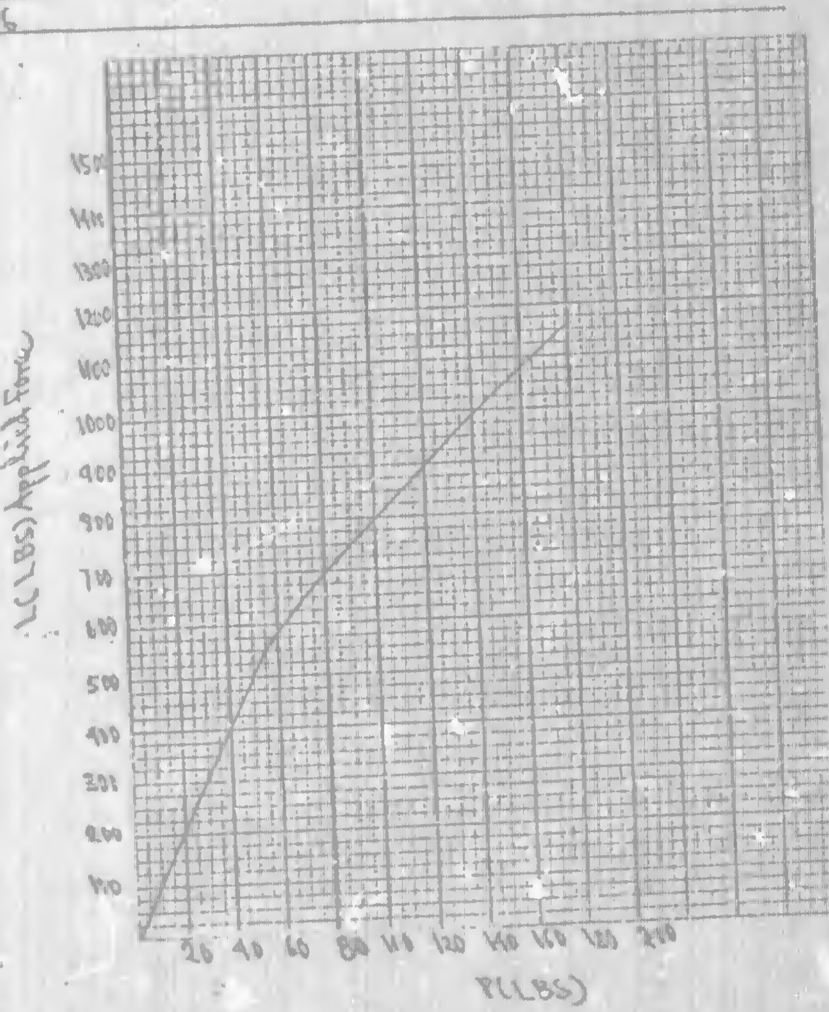
Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-31-66

Date Test was completed: 8-31-66

[illegible]	[illegible]				
[illegible]	[illegible]				
[illegible]	[illegible]				
[illegible]	[illegible]				
[illegible]	[illegible]				
[illegible]	[illegible]				
[illegible]	[illegible]				
[illegible]	[illegible]				
[illegible]	[illegible]				
[illegible]	[illegible]				



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 12-4(13)

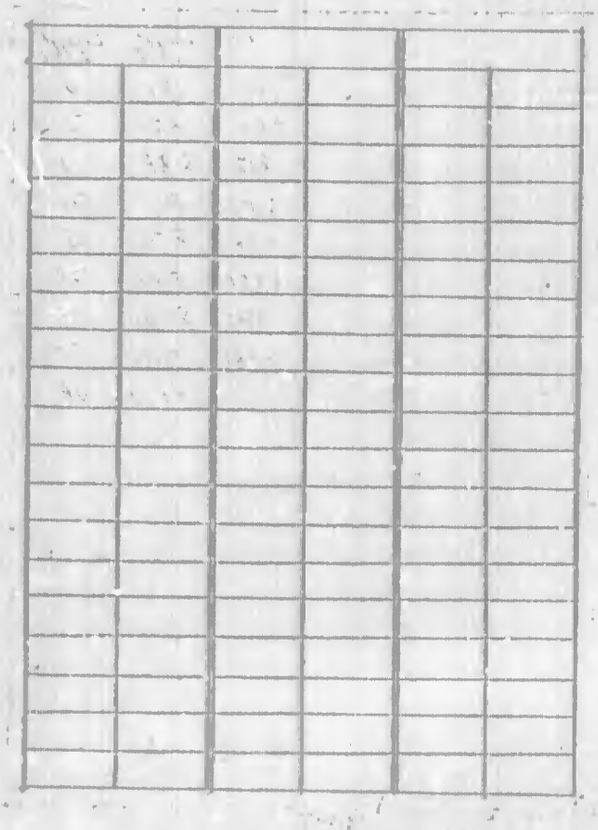
Fabrication Data:

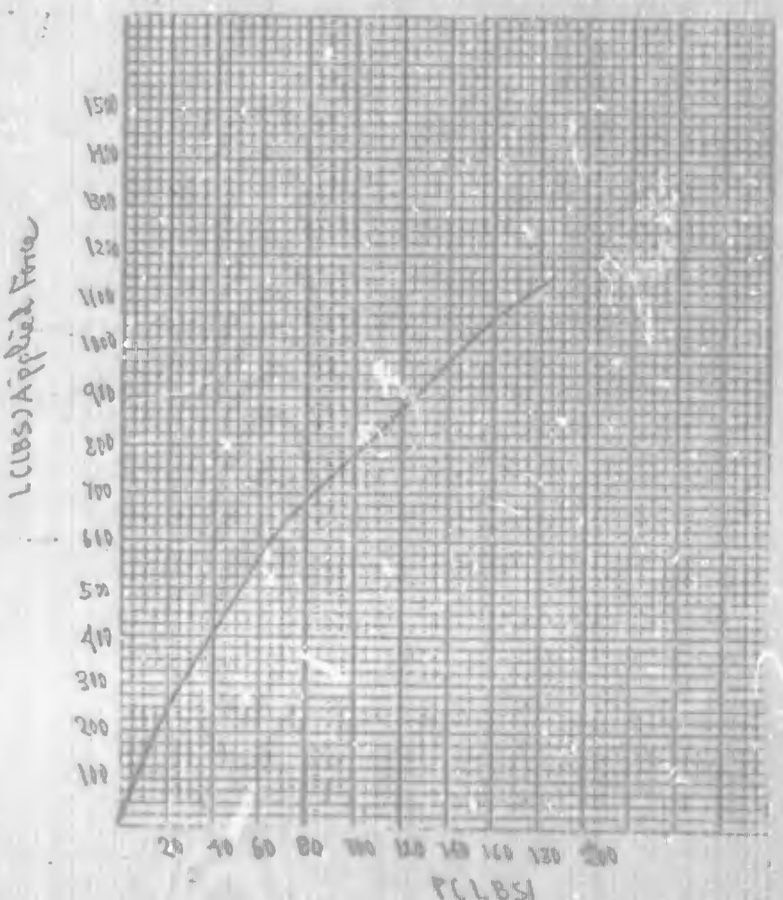
Date Sample was bonded:
Adhesive Used: Fuller K7107A
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks: Cores were 90° to the direction of movement

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other
Date Test was started: 8-31-66
Date Test was completed: 8-31-66





Remarks:

Test Performed By:

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: B-8(3)

Fabrication Data:

Date Sample was bonded:
Adhesive Used: Fallex B7007 Bx
Curing Time and Temperature: 24 Hrs @ Room Temperature
Clamping Pressure: 5-10 PSI
Remarks: Laden was 90° to the direction of movement

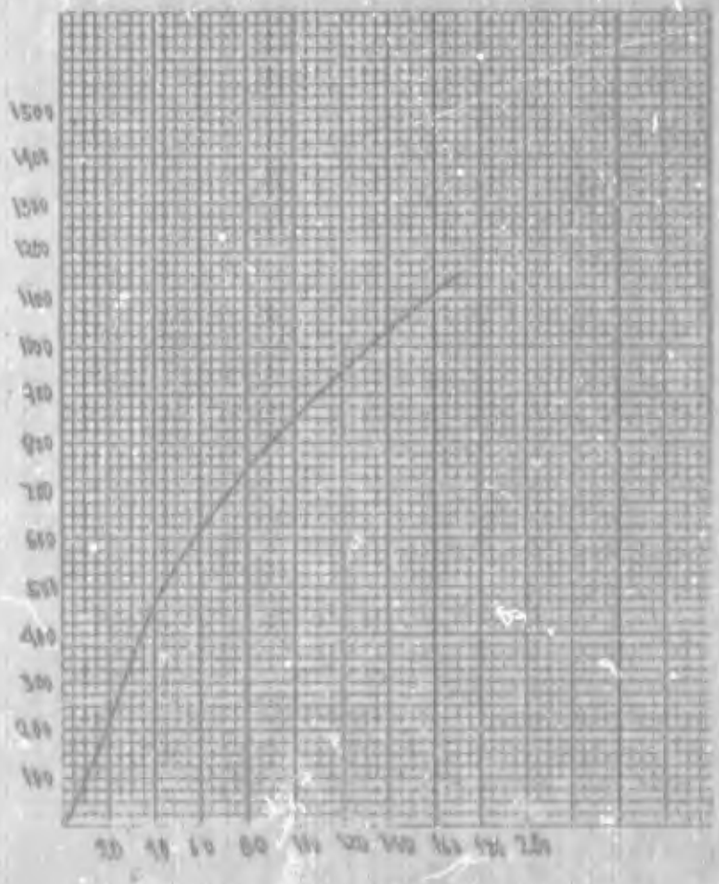
Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller √ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: √ 125° F ____ Room Temperature ____ -40° F ____ other
Date Test was started: 8-31-66
Date Test was completed: 8-31-66

0					

L (LBS) Applied Force



Remarks:

Test Performed By:

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 41-R(3)

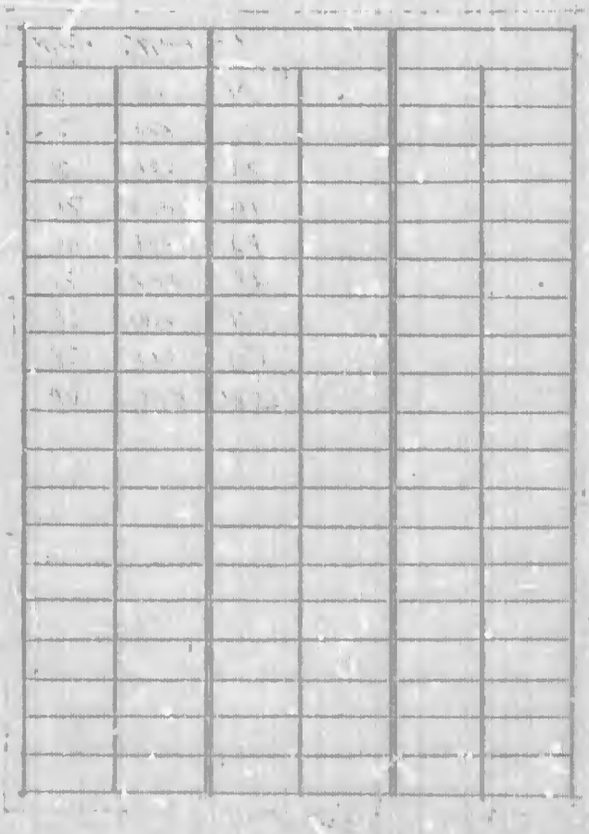
Fabrication Data:

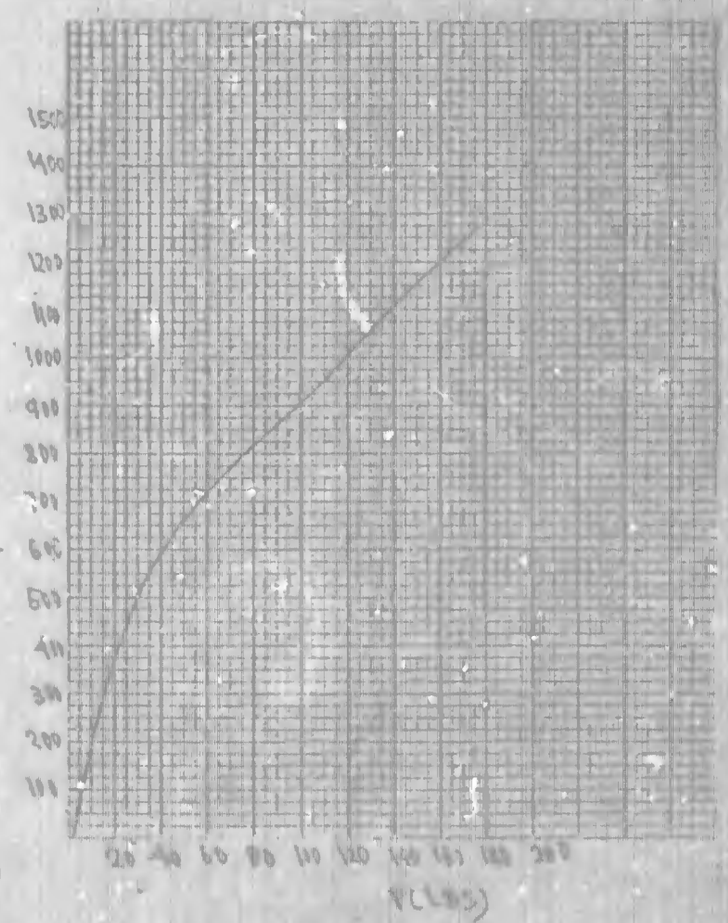
Date Sample was bonded:
Adhesive Used: Fuller R-7007A/
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks: Cooling done 90° to the direction of movement

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other
Date Test was started: 8-31-66
Date Test was completed: 8-31-66





Remarks:

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 42-S(3)

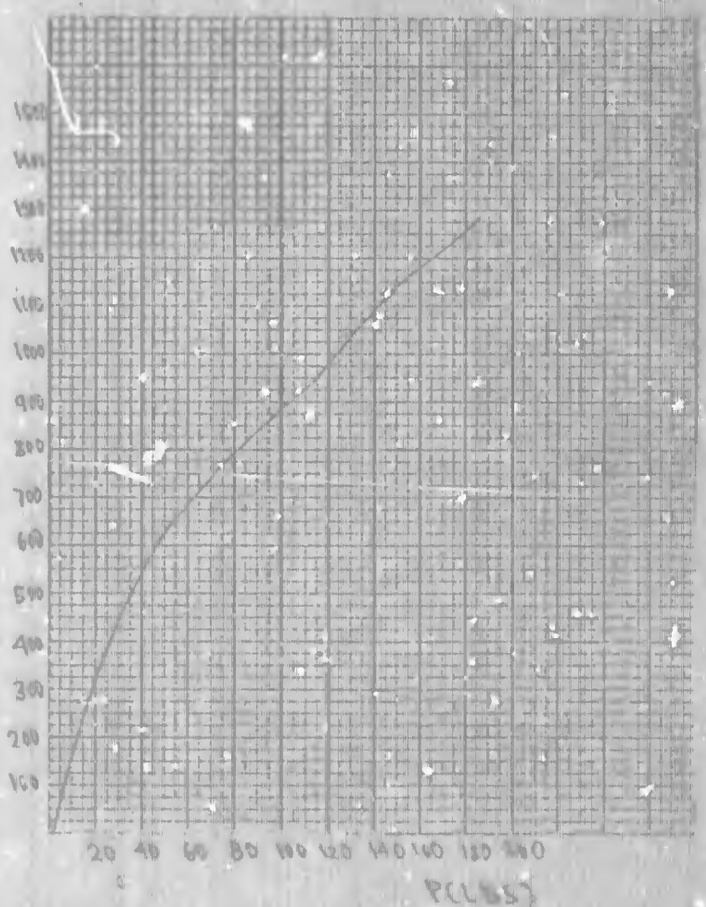
Fabrication Data:

Date Sample was bonded:
Adhesive Used: Fuller B7107A/
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks: Caster axis 90° to the direction of movement

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ✓ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other
Date Test was started: 8-31-66
Date Test was completed: 8-31-66



Remarks:

Test Performed By:

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: A3-X(3)

Fabrication Data:

Date Sample was bonded:

Adhesive Used: Fuller R7807A

Curing Time and Temperature: 24 Hrs @ Room Temperature

Clamping Pressure: 5-10 Psi

Remarks: Loads were 90° to the direction of movement

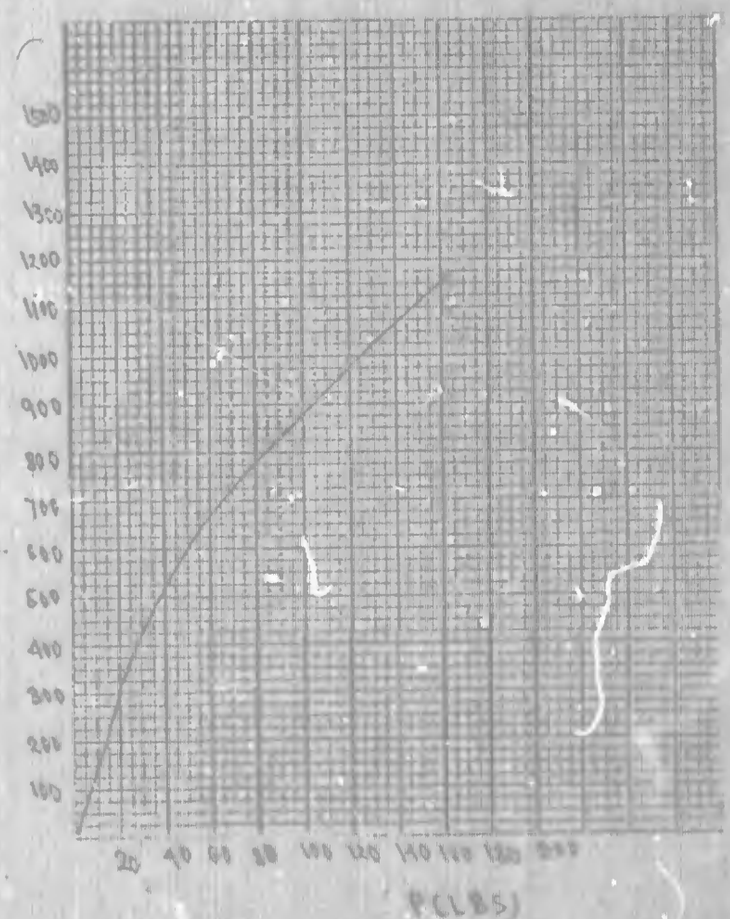
Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ✓ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-31-66

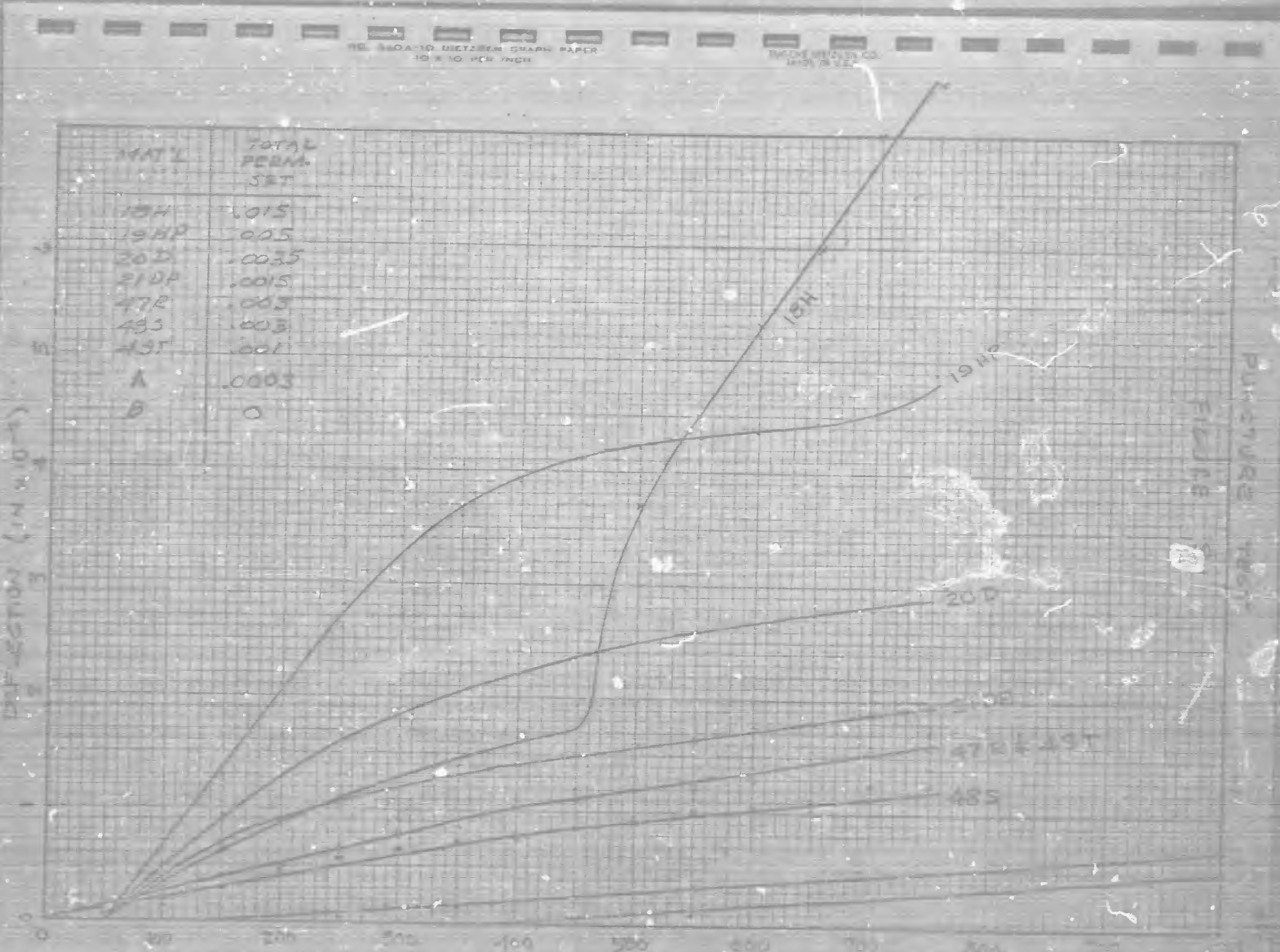
Date Test was completed: 8-31-66



Remarks:

Test Performed By:

NAME OF TEST:	Puncture.
ITEMS TESTED:	18H(1), 19HP(1), 20D(1), 21DP(1), 47R(1), 48R(1), 49T(1), A, B.
PURPOSE OF TEST:	To determine the degree of resistance to penetration, by a 1" square area steel mandrel, of each of nine sandwich panels.
DESCRIPTION OF TEST APPARATUS:	Baldwin Tensile Testing Machine 60,000 pound capacity and dial indicator with .001" divisions.
TEST PROCEDURE:	Each panel was laid on the lower steel anvil of the testing machine. The 1" square mandrel was attached to the upper anvil and the load, in 50 pound increments, was applied to the upper surface of the sandwich panel until a maximum of 750 pounds was induced at which load level the permanent set was measured.
TEST RESULTS:	All of the aluminum core material yielded low amounts of permanent sets at the 750 psi level. The two cores made with Douglas plain paper or paper poly paper showed only slightly higher permanent sets, while the two Hexcel paper cores were significantly weaker. As can be seen from the graph the two samples made from 5052 alloy aluminum exhibited the best puncture resistance characteristics.
EXHIBITS:	See Figure 9.


NO. 340A-10 DIETZGEN GRAPH PAPER
10 X 10 PER INCH
DIETZGEN CO.
PUNCTURE TEST
FIGURE
MAT'L
TOTAL PERM. SET
18H .015
19HP .005
20D .0035
21DP .0015
47R .003
493 .003
49T .001
A .0003
B 0
18H
19HP
20D
47R & 49T
485
DEFLECTION (IN x10⁻¹)
0
1
2
3
4
5
6
100
200
300
400
500
600
700
800

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 18 4 (1)

Fabrication Data:

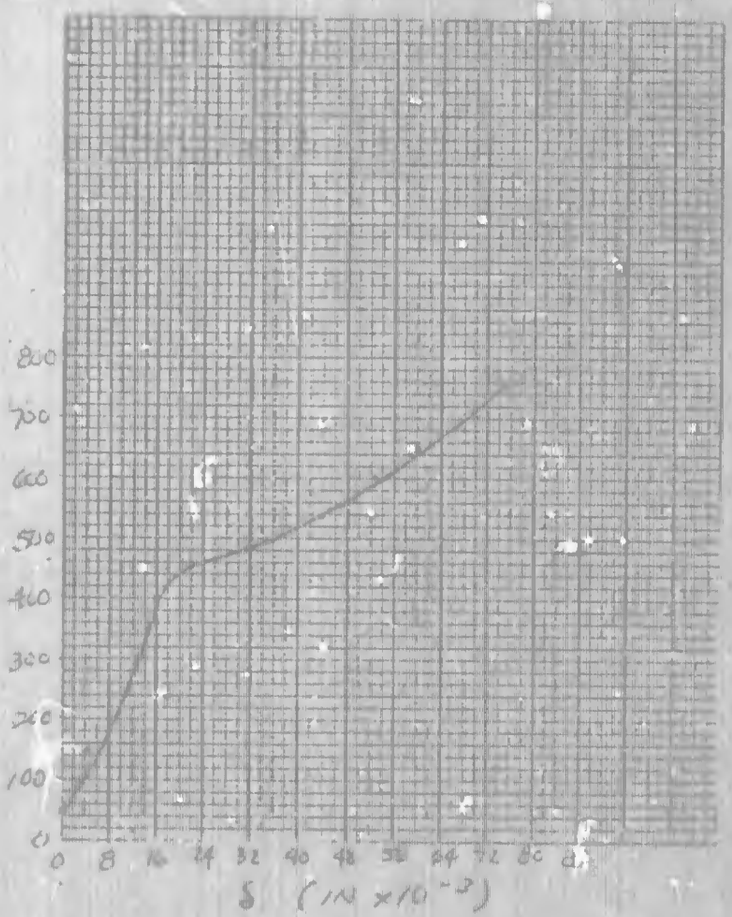
Date Sample was bonded: 6-22-66
Adhesive Used: FULLER 2-2007 A/B
Curing Time and Temperature: (48) HRS @ RT
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ✓ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 7-6-66
Date Test was completed: 7-6-66

f	δ
50	0
100	.003
150	.0065
200	.009
250	.011
300	.0125
350	.014
400	.016
450	.0175
500	.037
550	.045
600	.053
650	.060
700	.070
750	.075 (0.15 set)



Remarks:
ULT. LOAD = 2370 LB (PSI)

Test Performed By: D. Ryder

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 19 HP (1)

Fabrication Data:

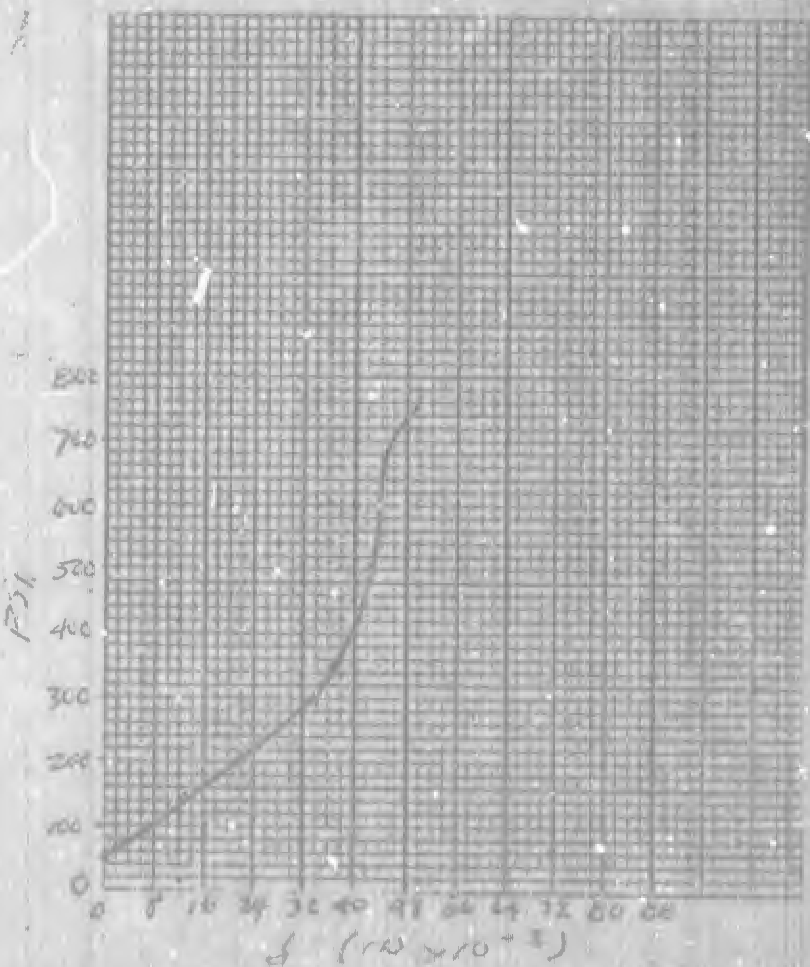
Date Sample was bonded: 6-22-66
Adhesive Used: FULLER R 7007 A/B
Curing Time and Temperature: (48) HR @ R.T.
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ✓ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 7-6-66
Date Test was completed: 7-6-66

P	S				
50	0				
100	007				
150	013				
200	021				
250	028				
300	034				
350	036				
400	039				
450	041				
500	042				
550	043				
600	0435				
650	0445				
700	045				
750	.049	(CC.5 ...)			



Remarks:

ULT LOAD = 2300 LB (PSI)

Test Performed By: A. R. [illegible]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: ~~20~~ D(1)

Fabrication Data:

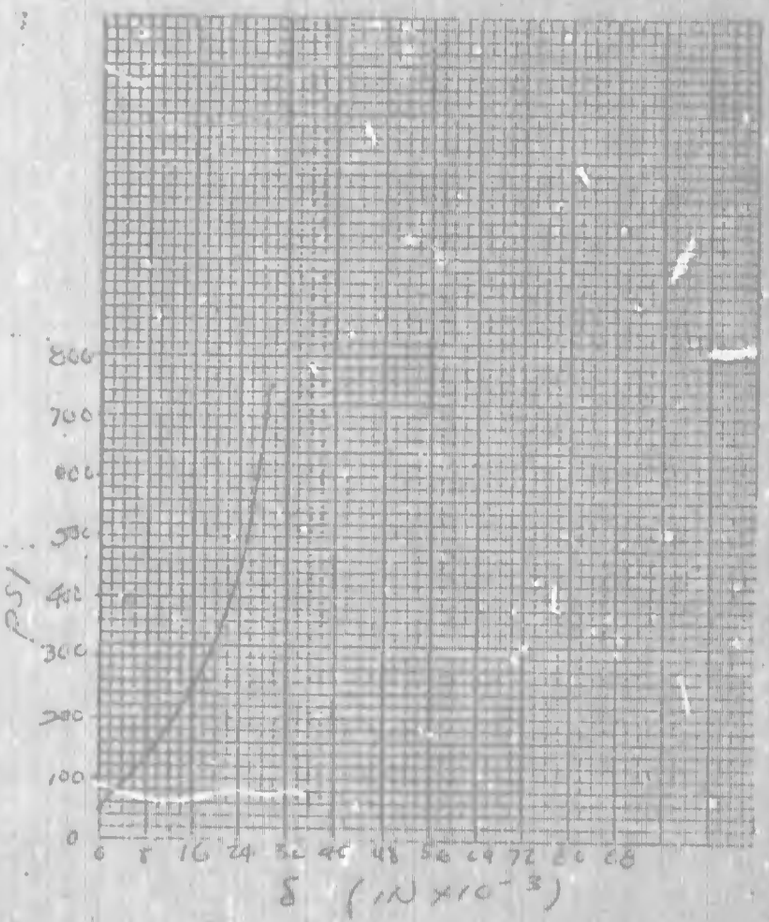
Date Sample was bonded: 6-22-66
Adhesive Used: Fuller R 7002 NF
Curing Time and Temperature: (48) HR @ R.T.
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ✓ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 7-6-66
Date Test was completed: 7-6-66

P	δ				
50	0				
100	0.5				
150	.0095				
200	.013				
250	016				
300	.019				
350	0205				
400	022				
450	024				
500	025				
550	026				
600	0265				
650	0275				
700	028				
750	.029	(.0035	set)		



Remarks:

ULT LOAD = 2360 LB (PSI)

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 21 DP (1)

Fabrication Data:

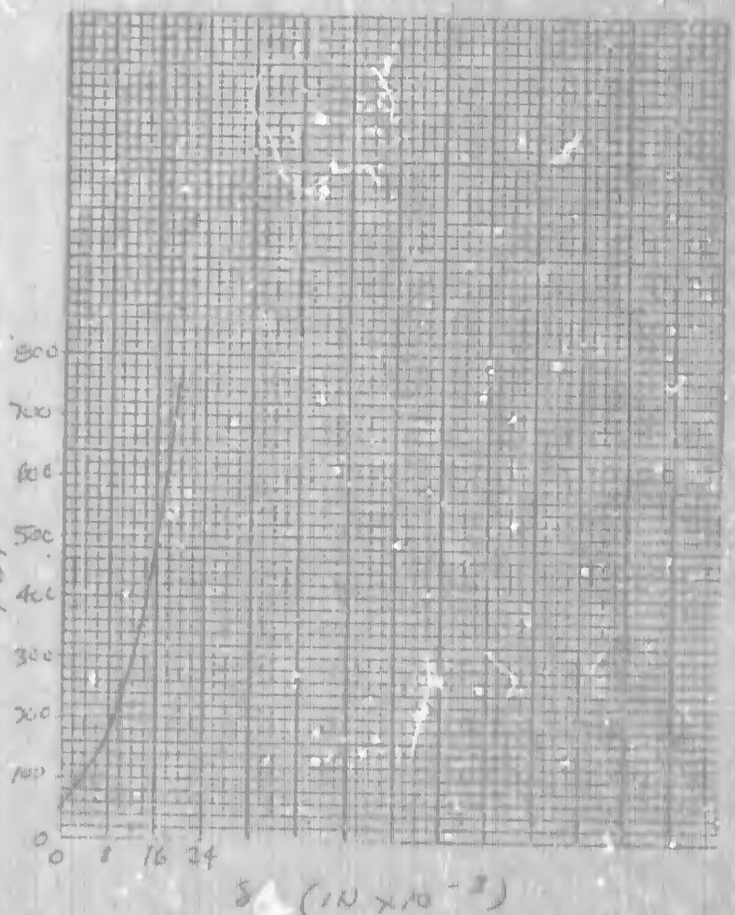
Date Sample was bonded: 6-22-66
Adhesive Used: Fuller F-7007 A/B
Curing Time and Temperature: (40) HR @ RT
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ✓ Pressure
____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 7-6-66
Date Test was completed: 7-6-66

P	S				
50	0				
100	004				
150	007				
200	0085				
250	010				
300	012				
350	013				
400	014				
450	015				
500	016				
550	0165				
600	0175				
650	018				
700	019				
750	0195	(.0015	.025)		



Remarks:

ULT LOAD = 2380 LBS (PSI)

Test Performed By: A. Rybarczyk

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 47-861

Fabrication Data:

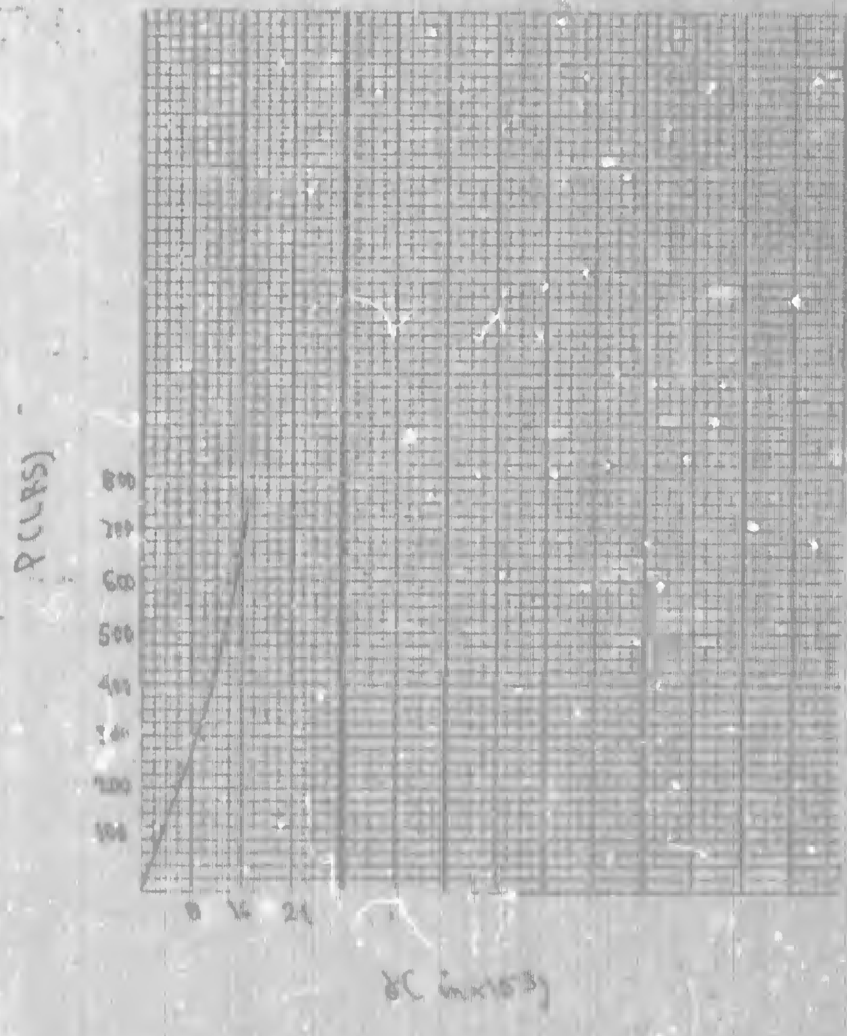
Date Sample was bonded:
Adhesive Used: Miller 87007A
Curing Time and Temperature: 24 hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ✓ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 8-19-66
Date Test was completed: 8-19-66

P	δ				
0	0				
50	.001				
100	.002				
150	.004				
200	.005				
250	.006				
300	.009				
350	.010				
400	.011				
450	.012				
500	.012				
550	.012				
600	.014				
650	.015				
700	.016				
750	.017	set .003			



Remarks: yield 4300 lbs

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 48-S(1)

Fabrication Data:

Date Sample was bonded:
Adhesive Used: Fuller R7007A
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

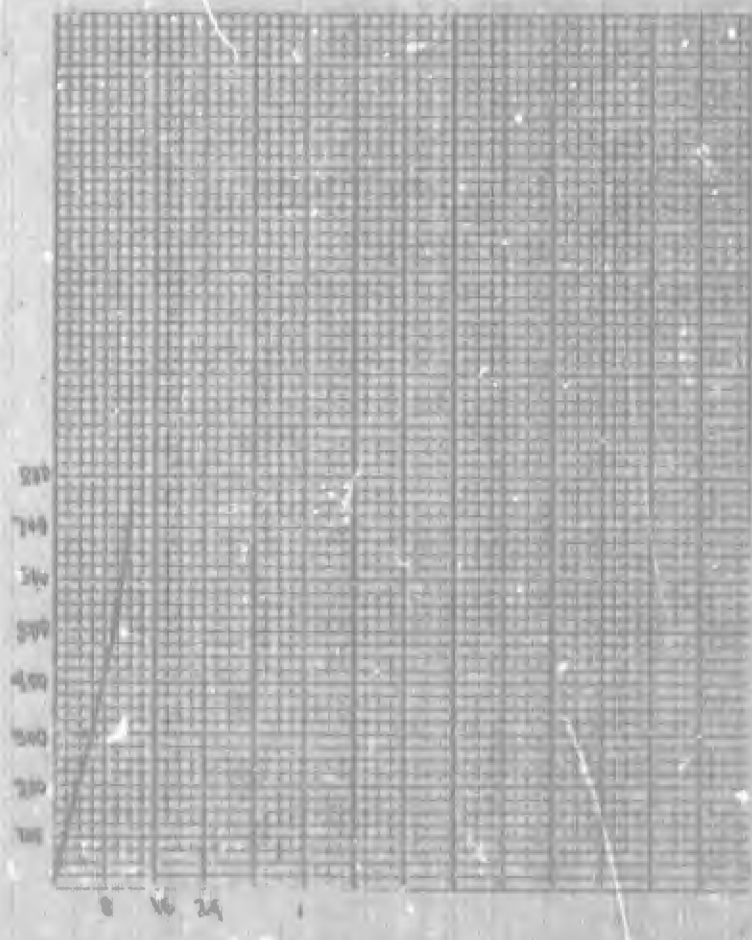
Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ✓ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: [illegible]
Date Test was completed: 8-19-66

P	δ				
0	0				
50	.0005				
100	.0015				
150	.0030				
200	.0040				
250	.0050				
300	.0065				
350	.0070				
400	.0080				
450	.0085				
500	.0090				
550	.0100				
600	.0112				
650	.0115				
700	.0122				
757	.0125	[illegible]			



Remarks: Failed at 4000 lbs

Test Performed By:

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: A9?(1)

Fabrication Data:

Date Sample was bonded: ______

Adhesive Used: Fuller R1007A

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks: ______

Test Data:

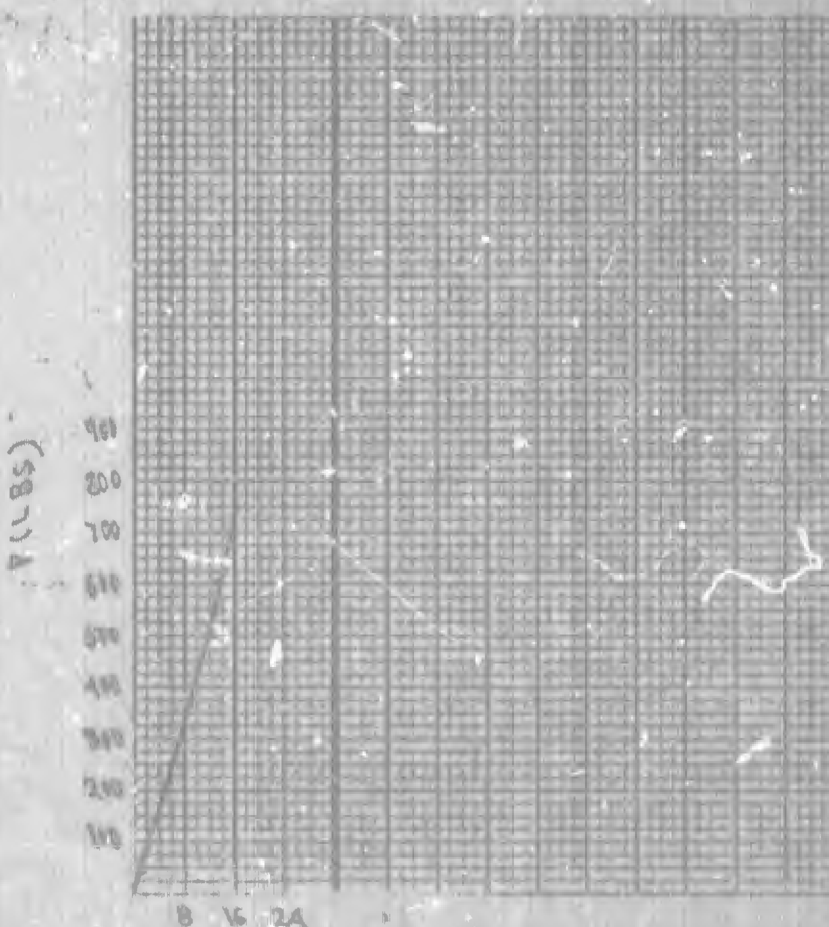
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ✓ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-19-66

Date Test was completed: 8-1?-66

P	δ				
0	0				
50	.0015				
100	.002				
150	.004				
200	.005				
250	.0065				
300	.008				
350	.0085				
400	.010				
450	.011				
500	.012				
550	.0125				
600	.013				
650	.0145				
700	.0155				
750	.018	ult. [illegible]			



Remarks: Failed at [illegible] LBS

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: B

Fabrication Data:

Date Sample was bonded:
Adhesive Used: FULLER R7007 [illegible]
Curing Time and Temperature: 40 HR @ R.T.
Clamping Pressure: 5 PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ✓ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started:
Date Test was completed:

P	S				
150	0				
250	0				
350	0				
450	.0005				
550	.001				
650	.002				
750	.003	0	SET		
800	.0035				
900	.004	0	SET		
1000	.005				
1100	.006				
1200	.007				
1300	.0075				
1400	.0085				
1500	.009				
1600	.010				
1700	.011				
1800	.0125				
1900	YIELD				

Remarks:

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: A

Fabrication Data:

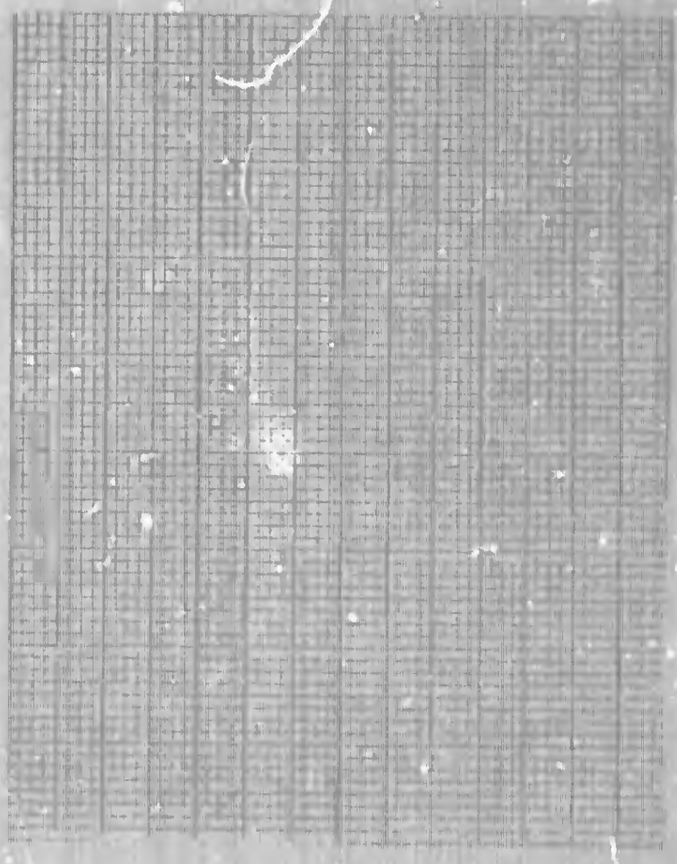
Date Sample was bonded:
Adhesive Used: EPOXY R 7003 A/B
Curing Time and Temperature: 45 MIN @ R.T.
Clamping Pressure: 5 PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ✓ Puncture
___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started:
Date Test was completed:

P	δ				
150	0				
250	.0003				
350	.0015				
450	.0025				
550	.0035				
650	.004				
750	.005	.0003 SET			
800	.0055				
900	.006				
1000	.007				
1100	.008				
1200	.009				
1300	.011				
1380	FAILED				



Remarks:

Test Performed By: [signature]

Brooks & Perkins

NAME OF TEST: Water absorption test.

ITEM TESTED: A16HP(2), 18H(2), 19HP, 20L(2), 21DP(2).

PURPOSE OF TEST: To measure the percentage of water absorption and its effect on the compressive strength of sandwich panels made with the materials described above.

DESCRIPTION OF TEST APPARATUS: Detroit Testing Company tensile testing machine, 10,000 pound capacity.

TEST PROCEDURE: Three pieces of each of the samples were cut to a size of 3" x 3". Into the top surface of each a hole .50 inch dia. x .50 inch deep was drilled. One of each of the various specimens was set aside for use as a control. Each of the two remaining were allowed to soak up water at room temperature for (3) hours. This was accomplished by means of a clay dam around the hole which was filled with excess water. Each of the pieces had been previously weighed and the weights recorded. After the soak period the pieces were again weighed. One of the two pieces was then baked in an oven for (2) hours at 150°F. The desiccated piece was then weighed. All three pieces were then subjected to compression; control, soaked and dried, and wet. The compression load was carried to failure in each case.

TEST RESULTS:

The percent water absorption by weight was calculated and plotted against compressive strength, the results of which are shown in Figure 13. The solid lines on this graph represent those sample which were tested in the wet condition, the dotted lines those which were wetted and desiccated before testing. It will be noted that except for sample .20D the desiccated samples experienced a reduction in strength upon return to the 0% water condition. The 0% water coordinate line represents the compressive strength of the control specimen, which was not subjected to water absorption. The specimens A16HP(2), 20D and 21DP represent low levels of water absorption, being respectively crushed foam-filled Hexcel paper poly paper, Douglas Aircomb plain paper and Douglas Aircomb paper poly paper. Figures 10, 11 and 12 are load-deflection curves for the control specimen, wet specimen, and the wet specimen and desiccated specimen respectively.

EXHIBITS:

See Figure 10, 11, 12 and 13.

TESTED @ R.T. IN COMPRESSION

(1) HOLE IN CENTER, TOP SKIN
1/2" DIA x 1/2" DEEP

SAMPLE SIZE: 3"x3"x2 1/8" + FABRIC

MATL: 6061-T6 ALUM. ALLOY
.062 THICKNESS

FIG. 19

WATER ADMITTED VIA 1/2" DIA HOLE FOR (3) HR @ R.T. & TESTED IN COMPRESSION

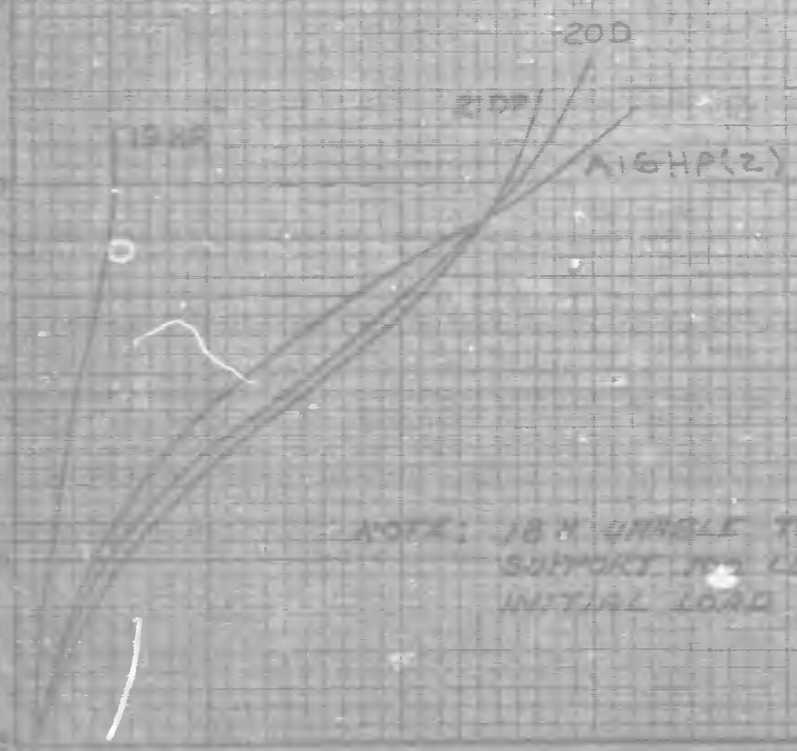
16 HP = HEXCEL PAPER - POLY - PAPER FILLED WITH URETHANE FOAM

18 HP = HEXCEL PLAIN PAPER

19 HP = HEXCEL PAPER - POLY - PAPER

20 D = DOUGLAS PLAIN PAPER

21 DP = DOUGLAS PAPER POLY PAPER

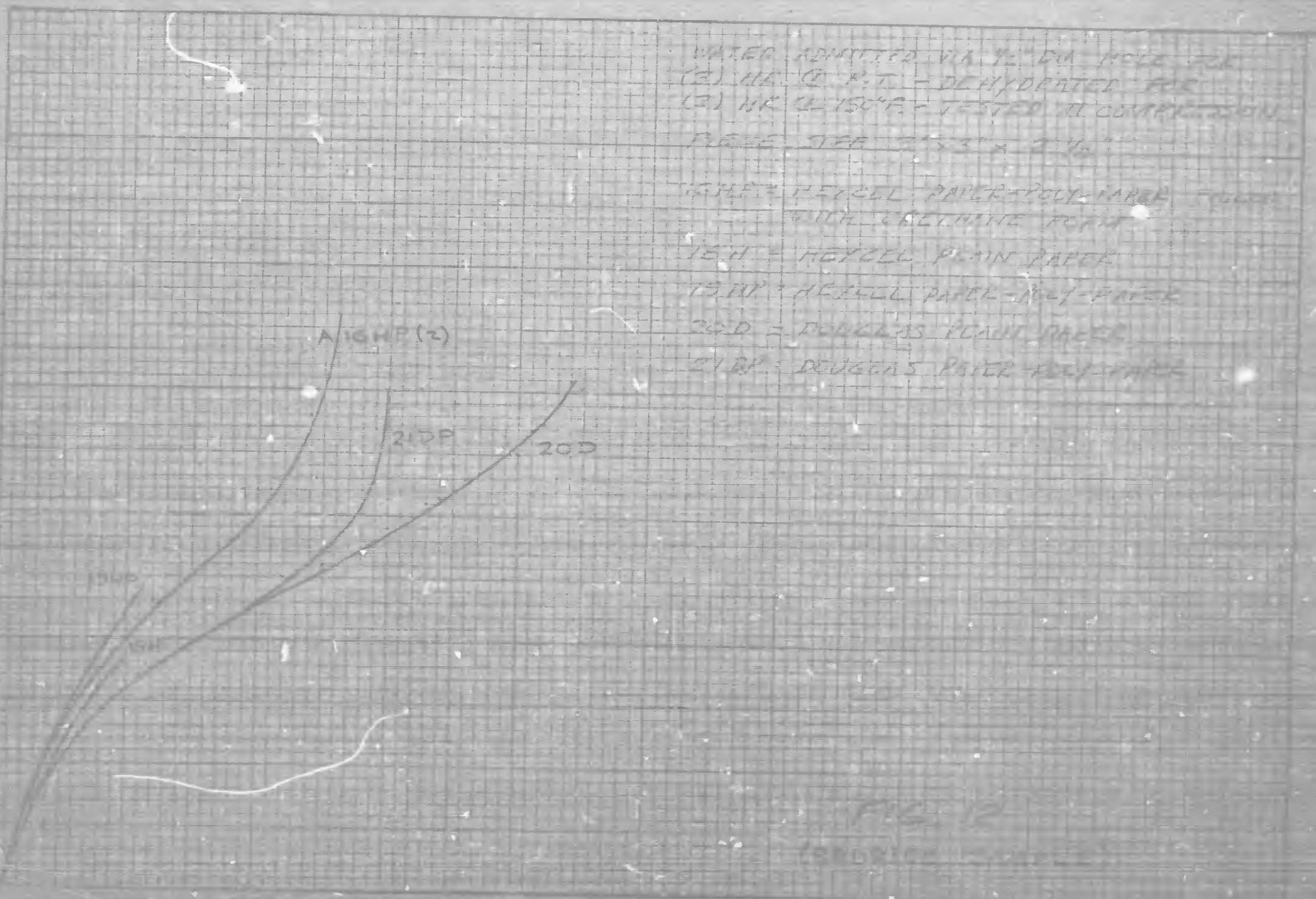


NOTE: 18 HP ANGLE TO SUPPORT JIG AT INITIAL LOAD

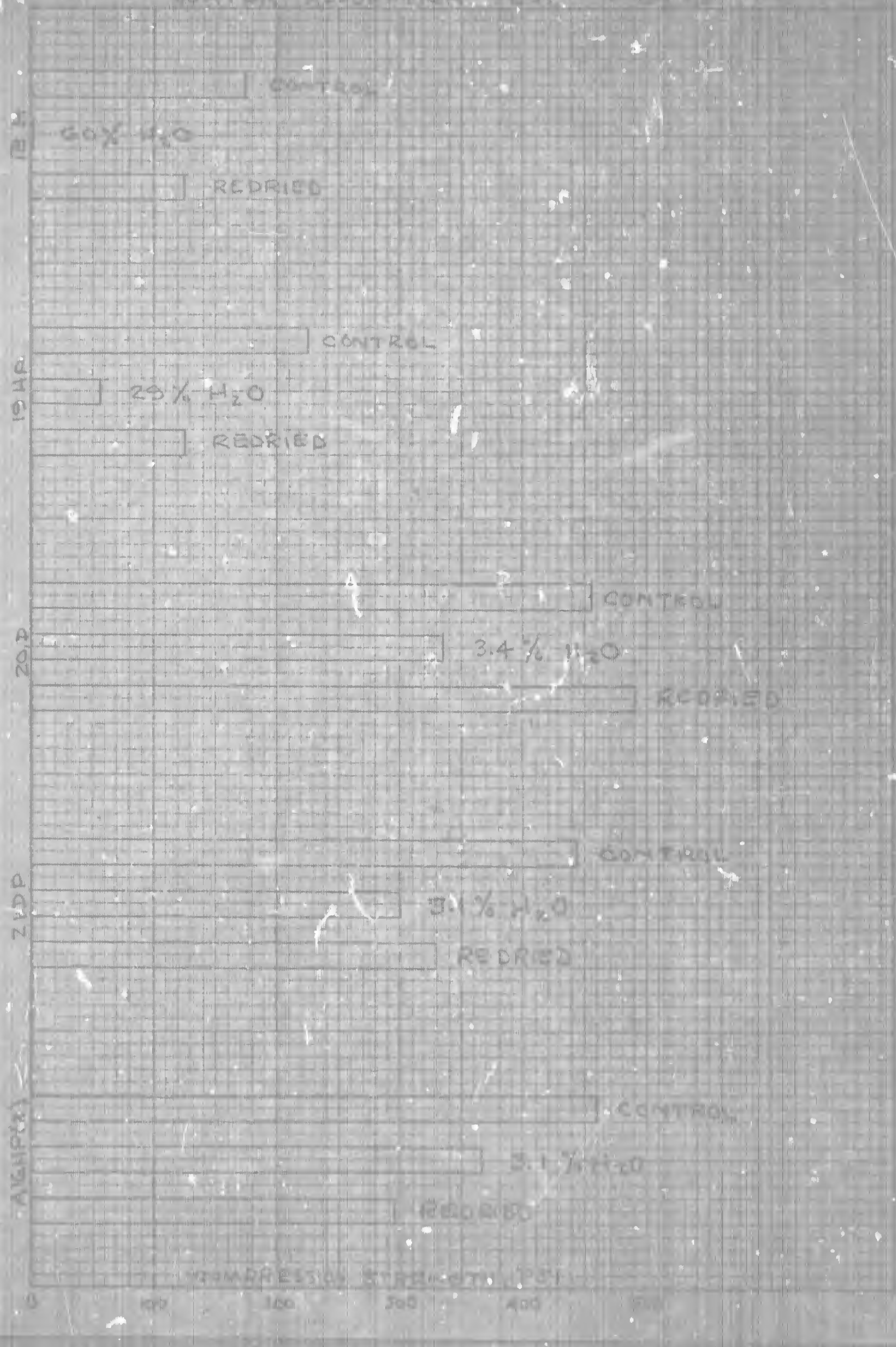
FIG. 1

NO. 340A-10 DIETZGEN GRAPH PAPER
10 X 10 PER INCH

EUGENE DIETZGEN CO
MADE IN U.S.A.



WATER ABSORPTION TEST



[illegible] INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 18 H (2) -WET

Fabrication Data:

Date Sample was bonded: 6-22-66
Adhesive Used: FULLER R 7007 A/B
Curing Time and Temperature: 48 HR. R.T.
Clamping Pressure: (.5) PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 7-22-66
Date Test was completed: 7-22-66

WEIGHT OF DRY SAMPLE = 69.8 GR.

WEIGHT OF SAMPLE AFTER ADMISSION OF DISTILLED H_2O FOR (3) HR. @ R.T. THROUGH 1/2" DIA HOLE X 1/2" DEEP = 111.6 GR.

TOTAL WATER ABSORPTION = 41.8 GR.

% H_2O ABSORBED = 41.8 / 69.8 = 60%

PSI COMP ULT = 0

Remarks: PIECE FAILURE WHILE ATTEMPTING TO OBTAIN NO LB LOAD TO SET DIAL INDICATOR TO 0.
PIECE WAS DRY AND DELAMINATED PRIOR TO WATER EXPOSURE SIMILAR TO 18 H (2) CONTROL PIECE.

Test Performed By: [illegible] - T. [illegible] (L.S.P.)

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 19 PP (2) - WET

Fabrication Data:

Date Sample was bonded: 6-22-66

Adhesive Used: FULLER E 7057 AIR

Curing Time and Temperature: (48) HRS R.T.

Clamping Pressure: (5) PSI

Remarks:

Test Data:

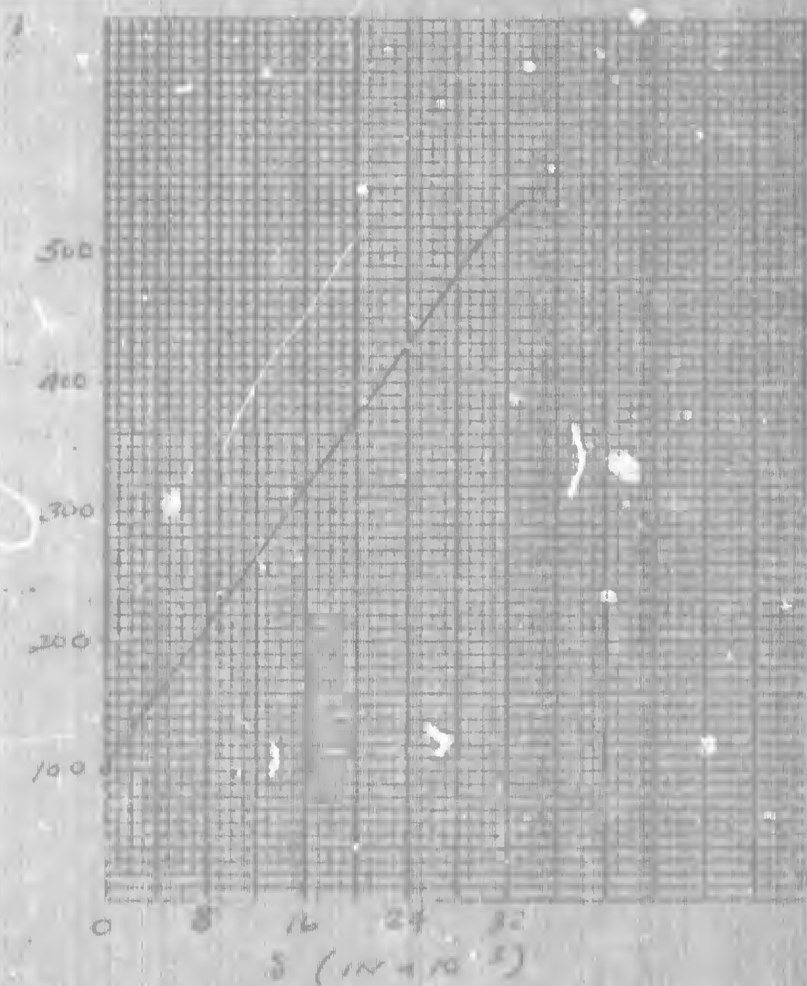
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 7-22-66

Date Test was completed: 7-22-66

P	S				
100	0				
200	.010				
300	.016				
400	.022				
500	.026				
520	.033	(FAIL)			
DRY	WEIGHT	=		81.0	gr
WET	WEIGHT	=		104.	6 gr
TOTAL	WATER	=		23.	6 gr
%	H_2O	ABS.	=	236 / 81	= 29%



Remarks:

PSI (COMP ULT) = 520/9 = 57.8 PSI

Test Performed By: D. [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 20 D (2) [illegible]

Fabrication Data:

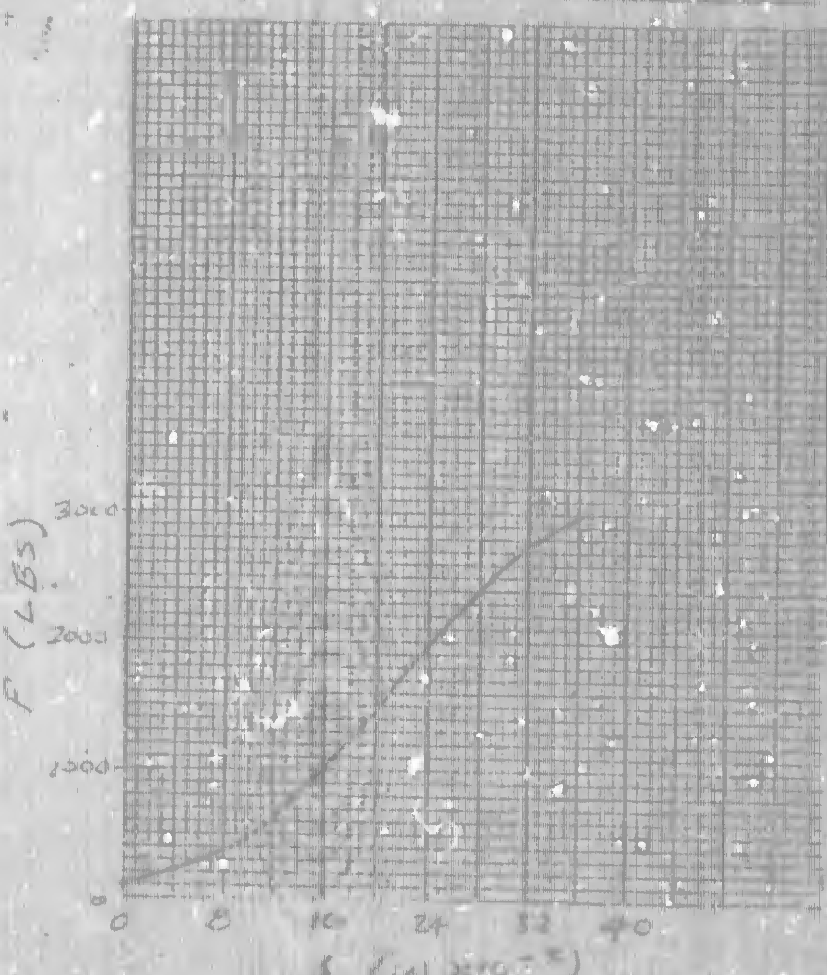
Date Sample was bonded: 6-22-66
Adhesive Used: FULLER [illegible]
Curing Time and Temperature: (48) HR @ R.T.
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 7-22-66
Date Test was completed: 7-22-66

P	δ	P	δ		
100	.000	2000	.024		
200	.004	2100	.025		
300	.007	2200	.0255		
400	.008	2300	.0265		
500	.010	2400	.028		
600	.012	2500	.029		
700	.013	2600	.030		
800	.014	2800	.033		
900	.015	3000	.037	(FAIL)	
1000	.016				
1100	.017				
1200	.017				
1300	.018				
1400	.019				
1500	.020				
1600	.021				
1700	.0215				
1800	.022				
1900	.024				



Remarks:

DRY WGT = 71.0 gr
WET WGT = 73.4 gr } % H_2O = $\frac{2.4}{71.0}$ = 3.4%
H_2O ABS = 2.4 gr
PSI @ FAIL = $\frac{3000}{9}$ = 334 PSI

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 21 DP(2) WET

Fabrication Data:

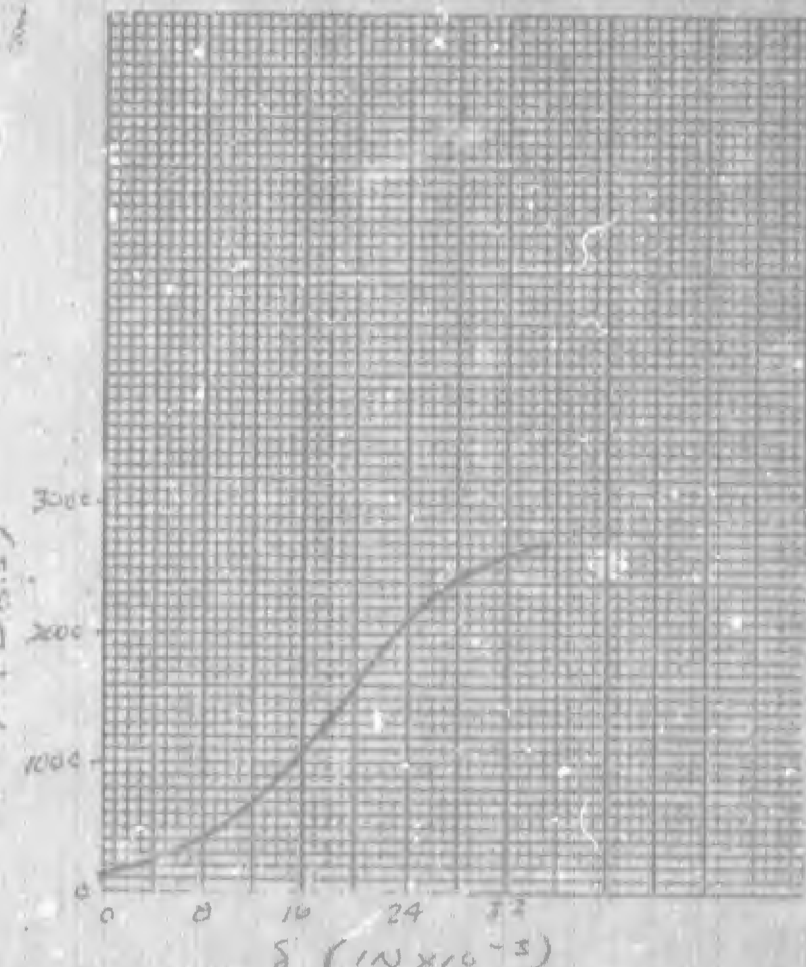
Date Sample was bonded: 6-22-66
Adhesive Used: FULLER R 2007 A/B
Curing Time and Temperature: (48) HR R.T.
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 7-22-66
Date Test was completed: 7-22-66

P	δ	P	δ		
100	0	2000	.023		
200	.003	2100	.0237		
300	.006	2200	.025		
400	.008	2300	.026		
500	.0075	2400	.027		
600	.0105	2500	.029		
700	.012	2600	.031		
800	.013	2700	.035	(FAIL)	
900	.014				
1000	.015				
1100	.0155				
1200	.017				
1300	.0175				
1400	.018				
1500	.019				
1600	.020				
1700	.0205				
1800	.021				
1900	.022				



Remarks:

DRY WGT = 71.0 gr
WET WGT = 72.5 gr
NET H_2O = 1.5 gr
% H_2O = $\frac{1.5}{71.0}$ = 2.1%

$PSI_{COMP\ ULT} = \frac{2700}{5} = 540$ PSI

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: AL H (2) -WET

Fabrication Data:

Date Sample was bonded: 8-4-66

Adhesive Used: [illegible]

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture

✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength

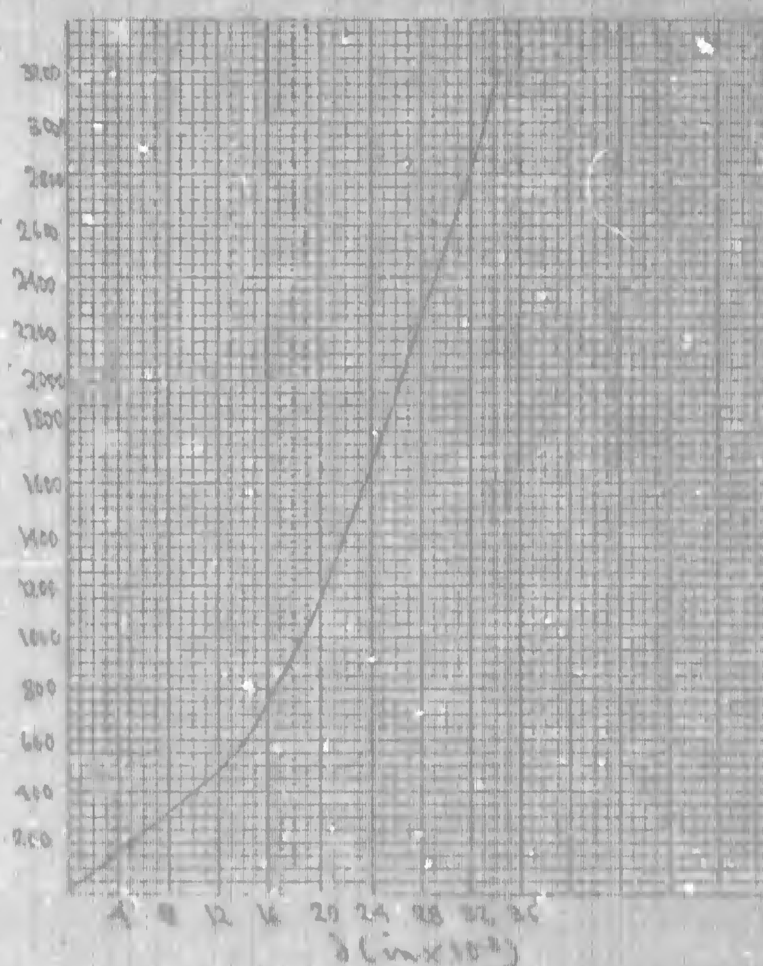
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-5-66

Date Test was completed: 8-5-66

P	δ				
0					
200	.005				
400	.010				
600	.014				
800	.016				
1000	.018	set	.004		
1200	.020				
1400	.021				
1600	.023				
1800	.024				
2000	.026	set	.006		
2200	.027				
2400	.028				
2600	.029				
2800	.031				
3000	.032	set	.021		
3200	.034				



Remarks: Failed at 3300 LBS

Dry weight 96.0 gm

Wet weight 99.0 gm

Net H_2O 3.0 gm

% H_2O = $\frac{3.0}{96}$ = 3.12%

Pin Comp Wt. = $\frac{3300}{[illegible]}$ = [illegible]

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 18 H(2)-CONTROL

Fabrication Data:

Date Sample was bonded: 6-27-66

Adhesive Used: FULLER R 7007 A/B

Curing Time and Temperature: 48 HR. R.T.

Clamping Pressure: (5) PSI

Remarks:

Test Data:

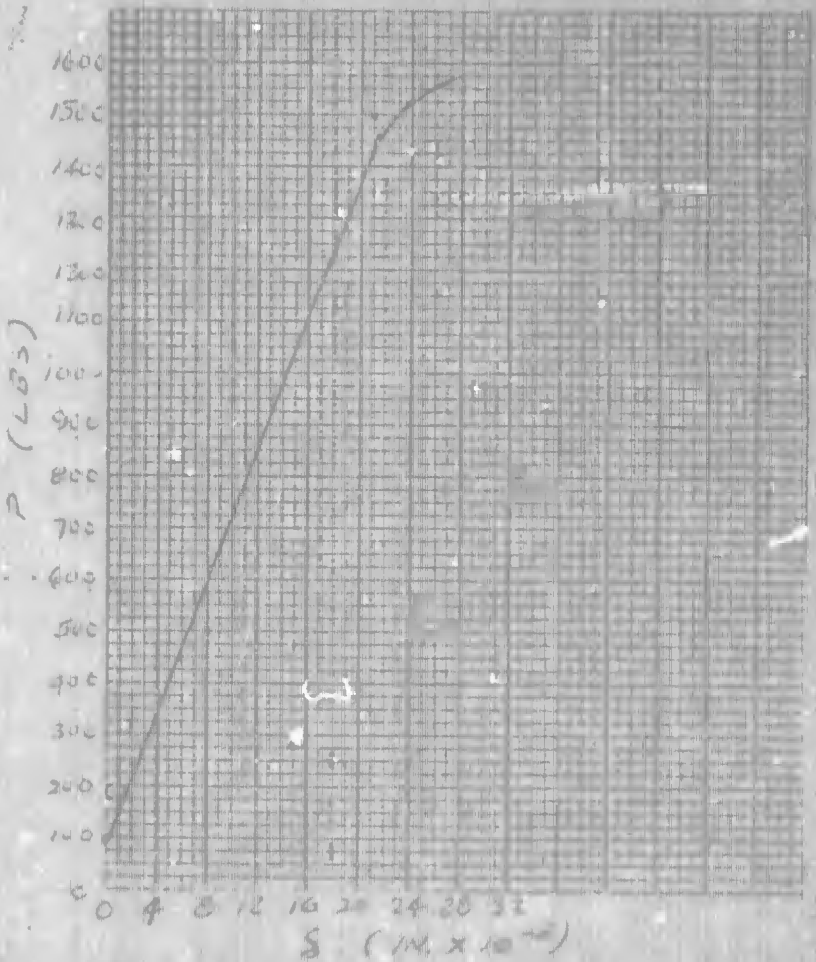
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 7-22-66

Date Test was completed: 7-22-66

P	S				
100	0				
500	.008				
1000	.014				
1500	.021	(.014 SET)			
1550	.028	(FAILURE)			



Remarks:

GROSS SAMPLE WEIGHT 69.5 GRAMS AFTER OVEN DRY FOR 1/2 HR @ 150°F TO DRIVE OFF H_2O ABSORBED FROM ATMOSPHERE

$PSI_{COMP\ ULT} = \frac{1550}{9} = 172$ PSI

Test Performed By: [illegible] and T. [illegible]

[illegible] INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 18 HP (2) - CONTROL

Fabrication Data:

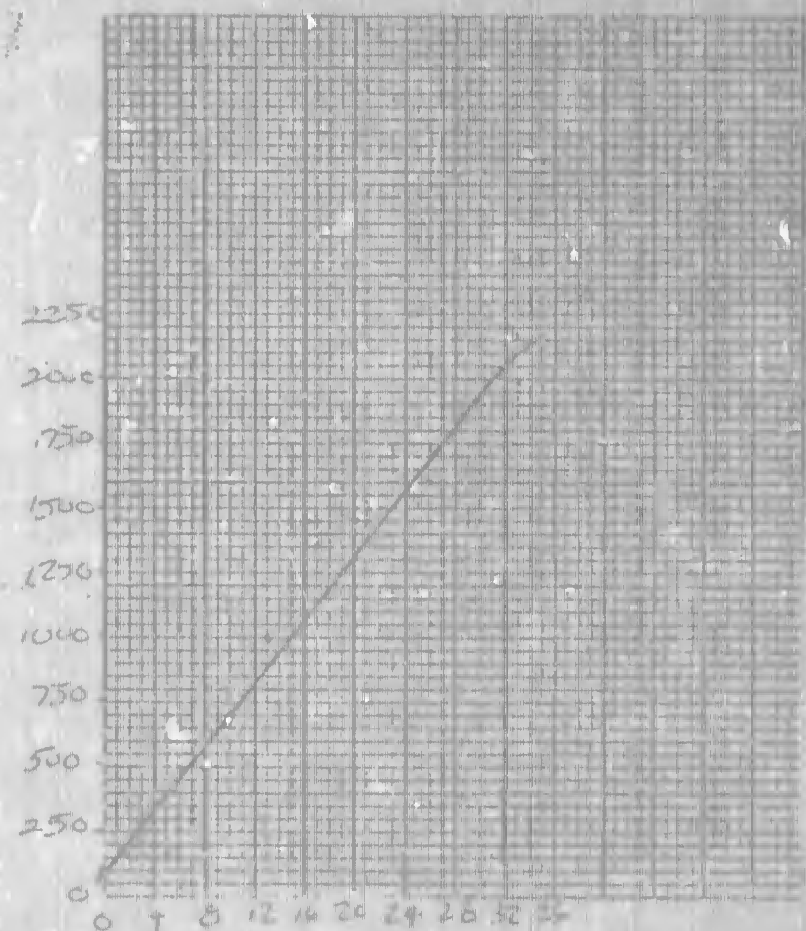
Date Sample was bonded: 6-22-66
Adhesive Used: FULLER F 7080 A/B
Curing Time and Temperature: (16) HRS R.T.
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Tecter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 7-22-66
Date Test was completed: 7-22-66

P	S		
100	0		
500	.008	(.002 SET)	
700	.010	(.002	")
1000	.013	(.002	")
1450	.020	(.007	")
1600	.022	(.010	")
2000	.033	(.013	")
2020	FAILURE		



Remarks: DEHYDRATED PER 18H (2) CONTROL PC.
GROSS WGT (DEHYDRATED) = 81.0 gr.
$PSI_{COMP\ ULT} = \frac{2020}{9} = 225$ PSI

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 20 D (2) CONTROL

Fabrication Data:

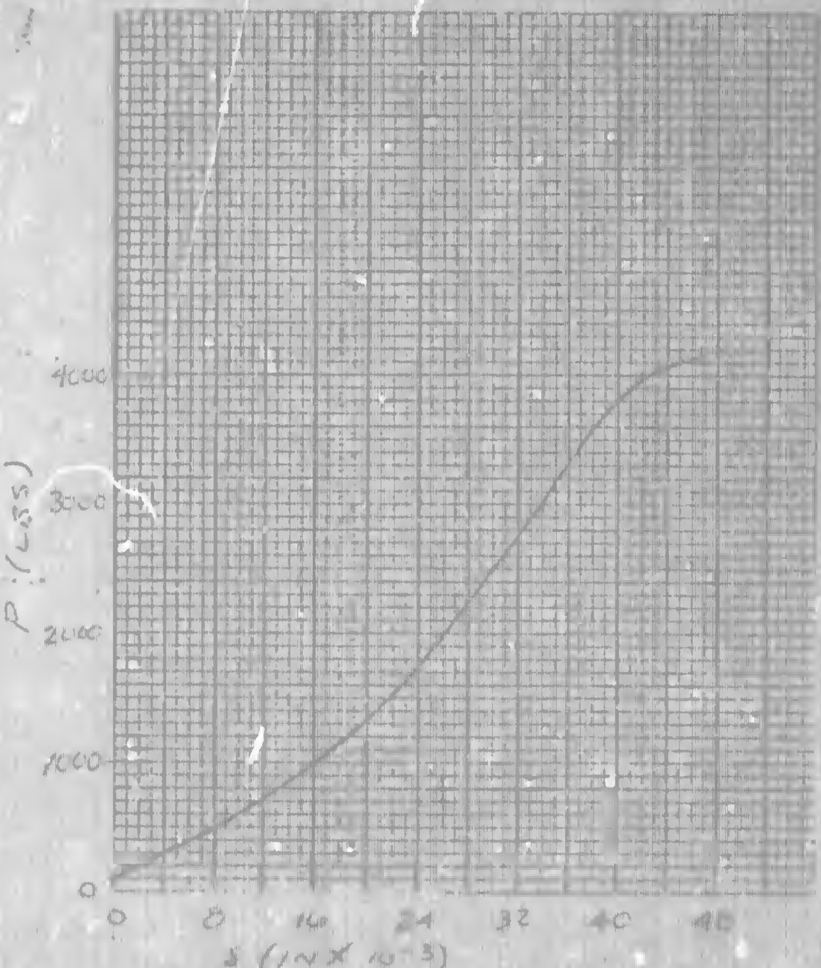
Date Sample was bonded: 6-22-66
Adhesive Used: FULLER R 7007 A/B
Curing Time and Temperature: (48) HR R.T.
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 7-22-66
Date Test was completed: 7-22-66

P	S				
100	0				
500	.008				
1000	.016				
1500	.022				
2000	.026				
2500	.030				
3000	.034				
3200	.035				
3400	.037				
3600	.038				
3800	.040				
4000	.042				
4110	.047	(FAIL)			



Remarks:

DRY WGT = 70.7 gr after (1/2) HRS @ 150° F
PSI (COMP ULT) = 4110/9 = 457 PSI

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 21, DP (2) control

Fabrication Data:

Date Sample was bonded: 6-22-66

Adhesive Used: [illegible]

Curing Time and Temperature: [illegible]

Clamping Pressure: (3) PSI

Remarks:

Test Data:

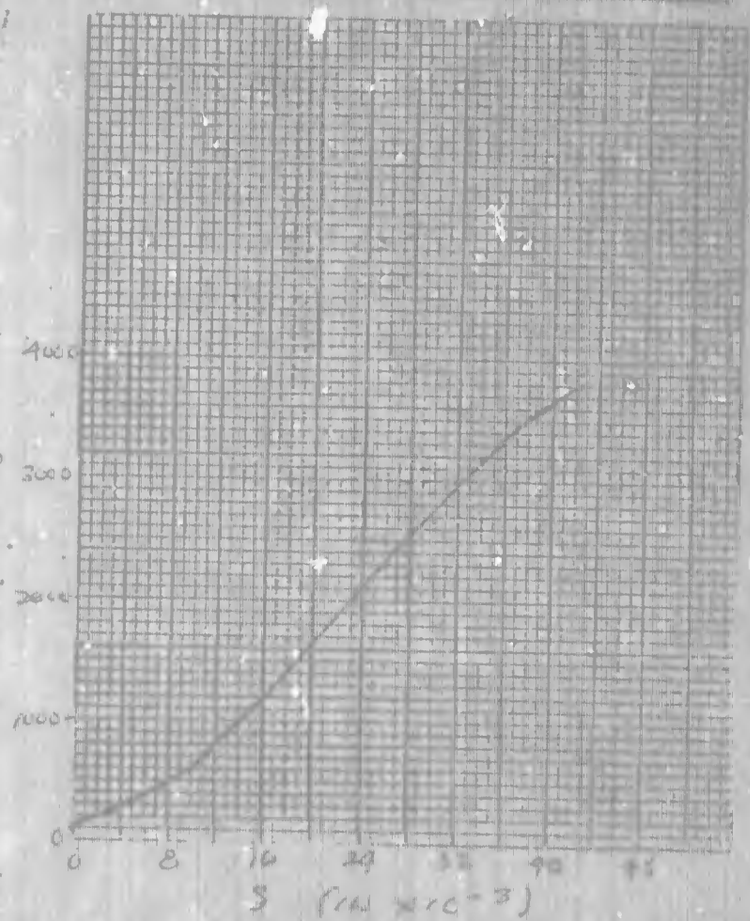
Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
✓ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other

Date Test was started: 7-22-66

Date Test was completed: 7-22-66

P	S				
100	0				
300	.005				
600	.010	.001	est		
900	.013	.003	est		
1500	.018	.008	est		
2000	.023				
2300	.026	.004	est		
3000	.032				
3200	.034	.002	est		
3600	.039	.007	est		
3900	.042	(F=1.C)			



Remarks:

DRY WGT = 70.5 gr

3" x 3" sample

$P.S.I._{COMP\ WGT} = \frac{3810}{9} = 420\ PSI$

Test Performed By: A Reynolds

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: [illegible] - CONTROL

Fabrication Data:

Date Sample was bonded: 8-1-66

Adhesive Used: [illegible]

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

Type of Test: __ Conveyor __ Ball __ Roller __ Caster __ Puncture

✓ Water Absorption __ Fungus __ Beam strength __ Shear Strength

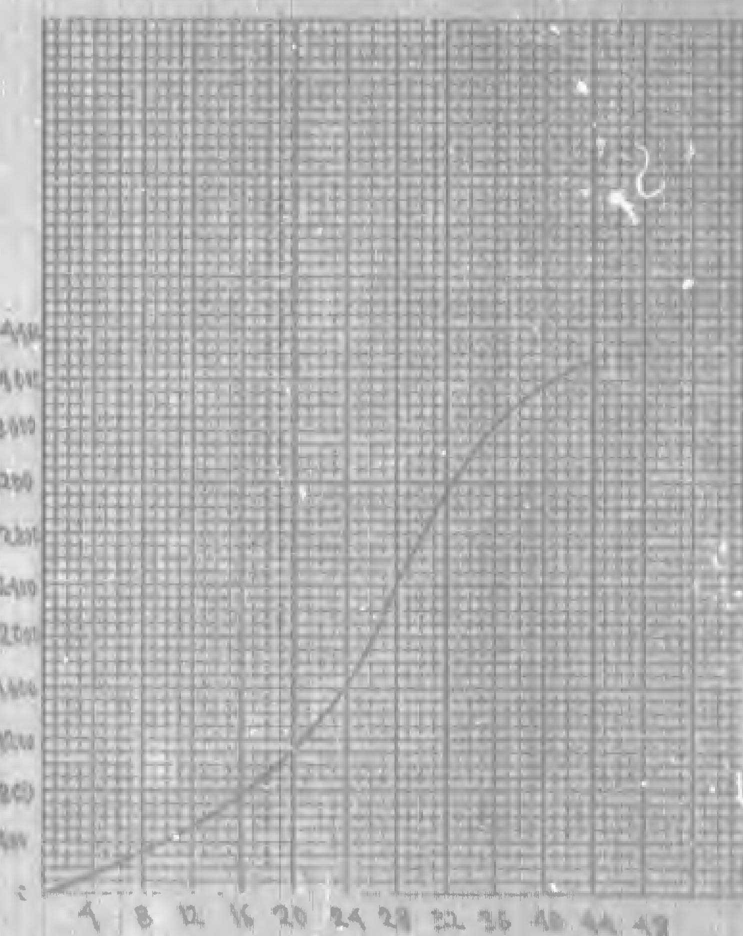
__ Teeter Roller

Test Temperature: __ 125° F ✓ Room Temperature __ -40° F __ [illegible]

Date Test was started: 8-5-66

Date Test was completed: 8-5-66

P	δ	P	δ		
0	0	3800	.037		
200	.007	4000	.046	[illegible]	[illegible]
400	.011	4100	.075		
600	.014	4150			
800	.015				
1000	.019	[illegible]			
1200	.020				
1400	.022				
1600	.023				
1800	.025				
2000	.026	[illegible]			
2200	.027				
2400	.028				
2600	[illegible]				
2800	.030				
3000	.031	[illegible]			
3200	[illegible]				
3400	.033				
3600	.035				



Remarks: Failed at 4150 lbs.
Gross sample weight 46.0 grams ~~[illegible]~~

PSI compression ult. $\frac{4150}{?}$ = 462 psi

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 18 H (2) - DRY

Fabrication Data:

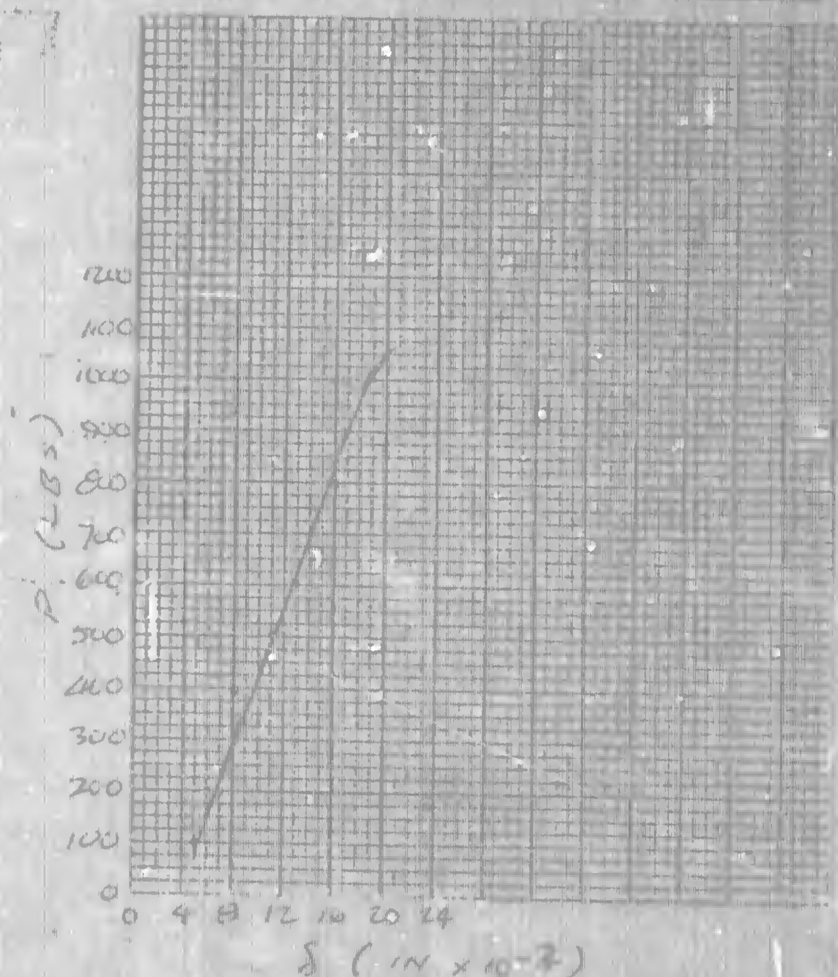
Date Sample was bonded: 6-22-66
Adhesive Used: FULLER R707 A/B
Curing Time and Temperature: 48 HR R.T.
Clamping Pressure: .5 PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 7-22-66
Date Test was completed: 7-22-66

P	δ				
100	0				
200	.005				
300	.007				
400	.008				
500	.011				
600	.013				
700	.014				
800	.016				
900	.017				
1000	.019				
1100	FAIL				



Remarks: DEHYDRATED SIMILAR TO 18 H (2)-CONTROL. WATER ADMITTED VIA 1/2" DIA x 1/2 DEEP HOLE FOR (3) HRS @ R.T. WET WT = 110.5 gr; DRY FOR (2) HR @ 150°F TO (0) gr H_2O =
PSI (COMP ULT) = $\frac{1100}{9}$ = 122. PSI

Test Performed By: [signature] & T. [signature] (5213)

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 13 HP (2) ACY

Fabrication Data:

Date Sample was bonded: 6-22-66

Adhesive Used: EC-1566 & 2007 A/B

Curing Time and Temperature: (48) HR @ RT

Clamping Pressure: (8) PSI

Remarks:

Test Data:

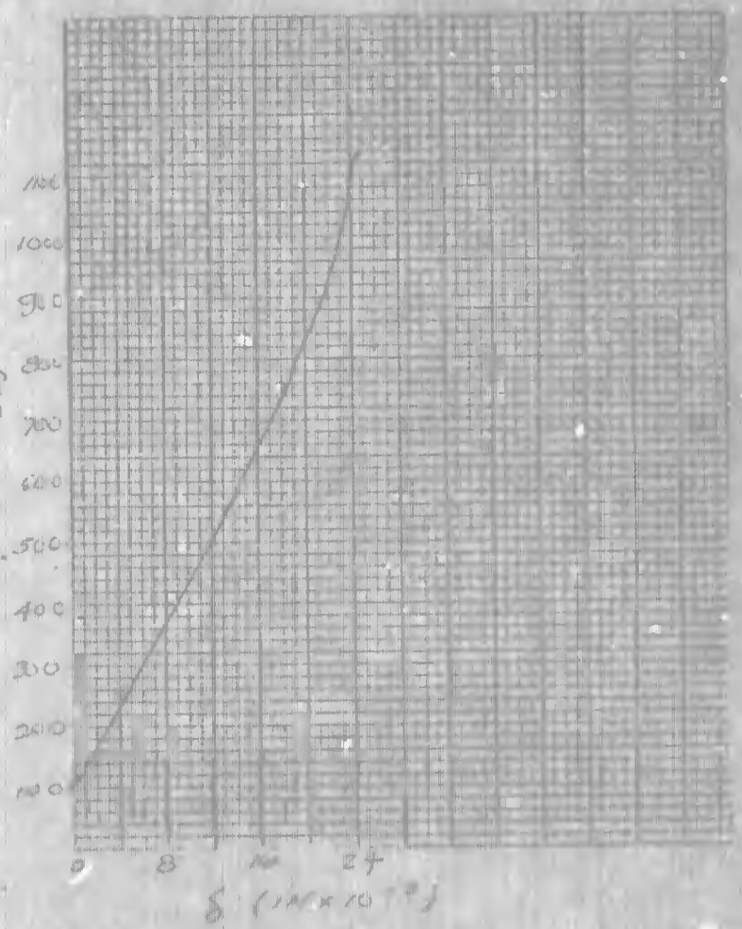
Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
✓ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125°F ✓ Room Temperature ____ -40°F ____ other

Date Test was started: 7-22-66

Date Test was completed: 7-22-66

P	δ				
100	0				
500	.012				
700	.017				
900	.020				
1100	.024				
1120	(FAIL)				
DRY WGT =		8.5	5 g		
WET WGT =		111.0	g		
DRY WGT =		8.5	5 g		



Remarks:

(2) plume residual wet after (2) HRS @ 150°F

PSI comp wet = 1120 / 9 = 124 PSI

Test Performed By: [signature]

[illegible] & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 20 D (2) - DRY

Fabrication Data:

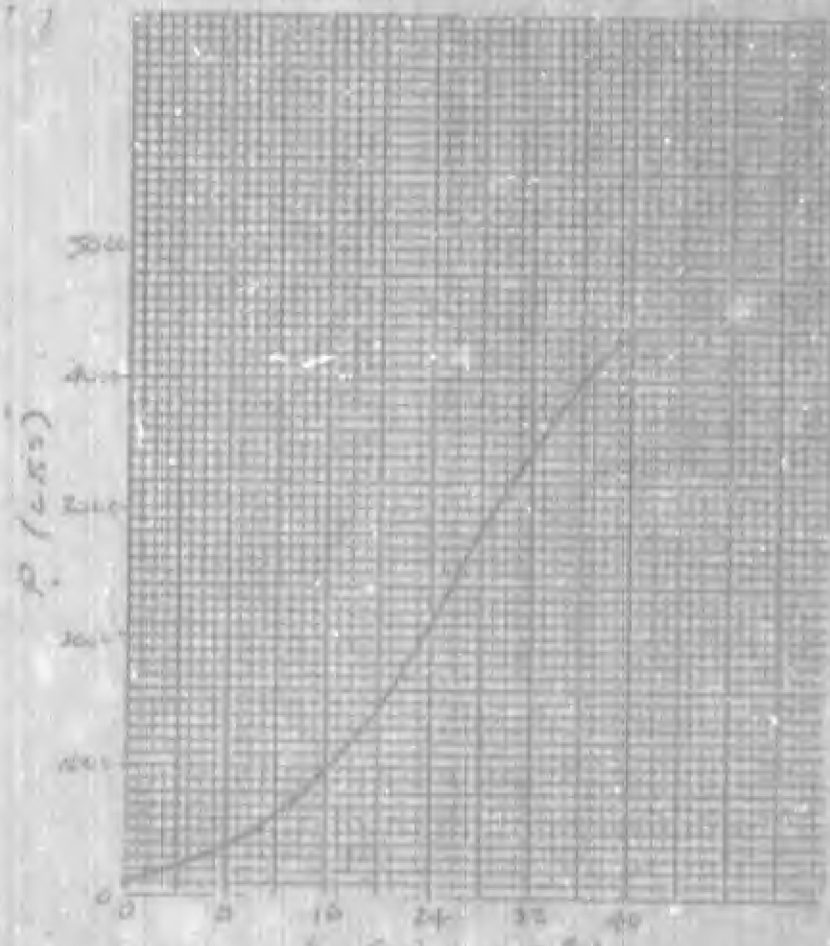
Date Sample was bonded: 6-22-66
Adhesive Used: E 7005 A/B
Curing Time and Temperature: (48) HR @ R.T.
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125°F ✓ Room Temperature ___ -40°F ___ other
Date Test was started: 7-22-66
Date Test was completed: 7-22-66

P	δ	P	δ		
100	0	3600	.033		
500	.010	3700	.0335		
700	.013	3800	.035		
900	.015	4000	.035		
1100	.017	4100	.037		
1300	.018	4200	.0375		
1500	.020	4300	.039		
1800	.022	4900	.041	FAIL	
2000	.023				
2200	.024				
2500	.026				
2600	.027				
2900	.028				
3000	.029				
3100	.030				
3200	.030				
3300	.031				
3400	.0315				
3500	.032				



Remarks: DRY WGT = 71 gr.
~~[illegible]~~
(0) gr after (2) HR @ 150°F
PSI COMP ULT = 4900/10 = 490 PSI

Test Performed By: [illegible signature]

[illegible] INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 21 DP (2) DRY

Fabrication Data:

Date Sample was bonded: 6-22-66

Adhesive Used: FULLER R 7002 A/B

Curing Time and Temperature: (48) HRS @ R.T.

Clamping Pressure: (5) PSI

Remarks:

Test Data:

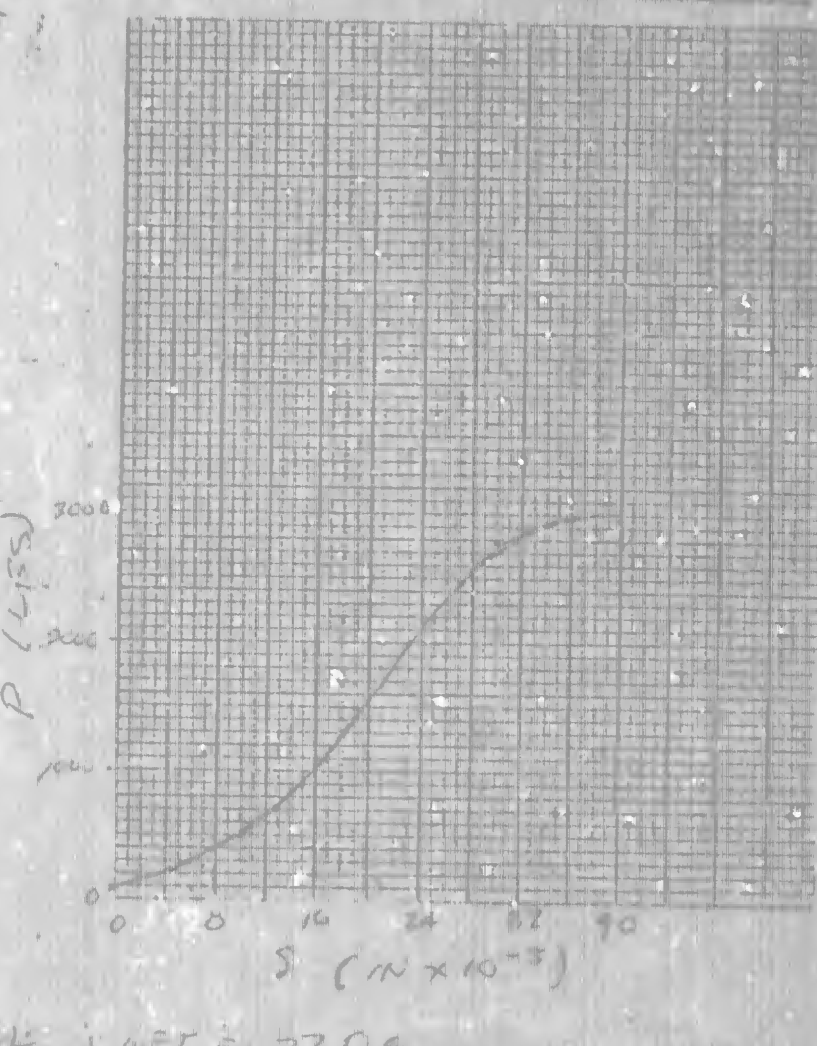
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
✓ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 7-22-66

Date Test was completed: 7-22-66

P	δ				
100	0				
500	010				
700	013				
900	015				
1100	017	.0025 set			
1300	018				
1500	019				
1800	021				
2000	023				
2200	025	.004 set			
2500	027				
2800	030				
2900	033				
2980	040	(FAIL)			



Remarks:

DRY WGT = 71.4 gr ; WET = 77.0 g.
(0) H_2O [illegible] after dry
PSI coup. ult. = $\frac{2980}{9}$ = 330 PSI

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: [illegible]

Fabrication Data:

Date Sample was bonded: [illegible]

Adhesive Used: [illegible]

Curing Time and Temperature: [illegible]

Clamping Pressure: [illegible]

Remarks:

Test Data:

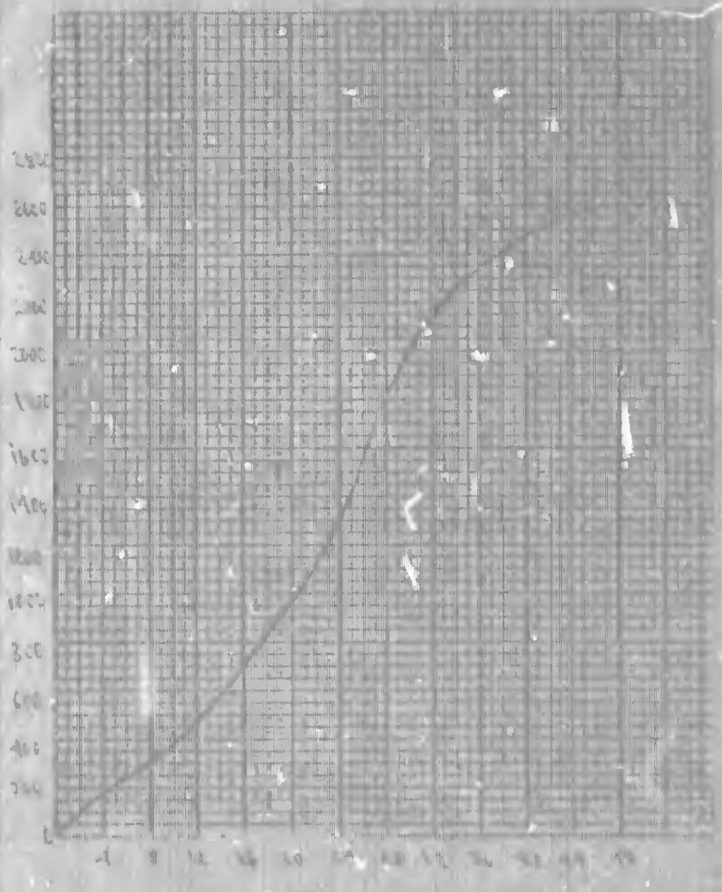
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
_/_ Water Absorption ___ Fungus ___ Beam strength ___ Shear strength
___ Teeter Roller

Test Temperature: ___ 125° F _/_ Room Temperature ___ -40° F ___ other

Date Test was started: [illegible]

Date Test was completed: [illegible]

.200	.009
400	.011
600	.015
800	.017
1000	.020
1200	.023
1400	.025
1600	.028
1800	.028
2000	.030
2200	.031
2400	.033
2600	.034
2800	



Remarks: Failed at 2600 lbs

Test Performed By: [illegible]

BROOKS & PERKINS

NAME OF TEST:	Fungus Resistance.
ITEM TESTED:	A16HP(2), 18H(1), 19HP(1), 20D(1), 21DP(1)
PURPOSE OF TEST:	To determine the resistance to fungus of each of the above organic core materials.
DESCRIPTION OF TEST APPARATUS AND PROCEDURE:	One specimen, 2" by 2" by 3/8", was cut from each sample. The specimens were placed in petri dishes containing a dextrose culture medium. The specimens were innoculated by spraying them with a suspension containing the following fungi: Chaetomium globosim, Aspergillus niger, Aspergillus flavus, and Penicillum citrinum. The specimens were incubated for 14 days at 87° ±1°F and 100% relative humidity. APPLICABLE SPECIFICATIONS: MIL-STD-810A, Method 508.1, Procedure II. MIL-F-8261A.
TEST RESULTS:	"A16HP(2)" showed Aspergillus flavus and Aspergillus niger growing on approximately 60 to 70 percent of the sample. "19HP(1)" showed light growth of Aspergillus flavus and Penicillum citrinum. "18H(1)" showed dense growth of Penicillum citrinum and Aspergillus flavus. "20D(1)" showed no fungus growth. "21DP(1)" showed very light growth of Aspergillus flavus.
CONCLUSION:	All paper honeycomb failed the test except Douglas aircomb (Sample 20D). The epoxy adhesive used, Fuller 7007, is not affected by fungus as evidenced by Sample 20D.
EXHIBIT:	This test was conducted by an outside testing agency, The Detroit Testing Laboratory, Detroit, Michigan, whose test report number 608005C appears in the appendix.

NAME OF TEST: Flexure Test.

ITEMS TESTED: 4H(1), 4H(2), 4H(3), 5HP(1), 5HP(2), 5HP(3), 6D(1), 6D(2), 6D(3), 7DP(1), 7DP(2), 7DP(3), 29R(1), 29R(2), 29R(3), 30S(1), 30S(2), 30S(3), 31T(1), 31T(2).

PURPOSE OF TEST: To determine the core-to-skin adherence of the above samples at each of the following temperatures:

$-40^{\circ}F$, Room Temperature, and $+125^{\circ}F$.

DESCRIPTION OF TEST APPARATUS: Baldwin tensile testing machine, 60,000 pound capacity; one three span beam loading fixture and one flat scale.

TEST PROCEDURE: Each sample was placed in the test fixture and subjected to load increments with these and the corresponding deflections recorded. The room temperature samples were tested at a temperature of approximately $75^{\circ}F$. The cold test samples were brought to temperature in a box of dry ice, while the hot test samples were heated to temperature in an oven.

TEST RESULTS: The results of the tests at each of the three test temperatures were recorded and plotted on graphs.

Paper Sample 4H exhibited the least strength at all test temperatures, being well below the other six samples. Except at elevated temperature, the paper sample 5HP followed closely the behavior of the aluminum samples. At high temperature, its strength deteriorated to that of the other paper samples.

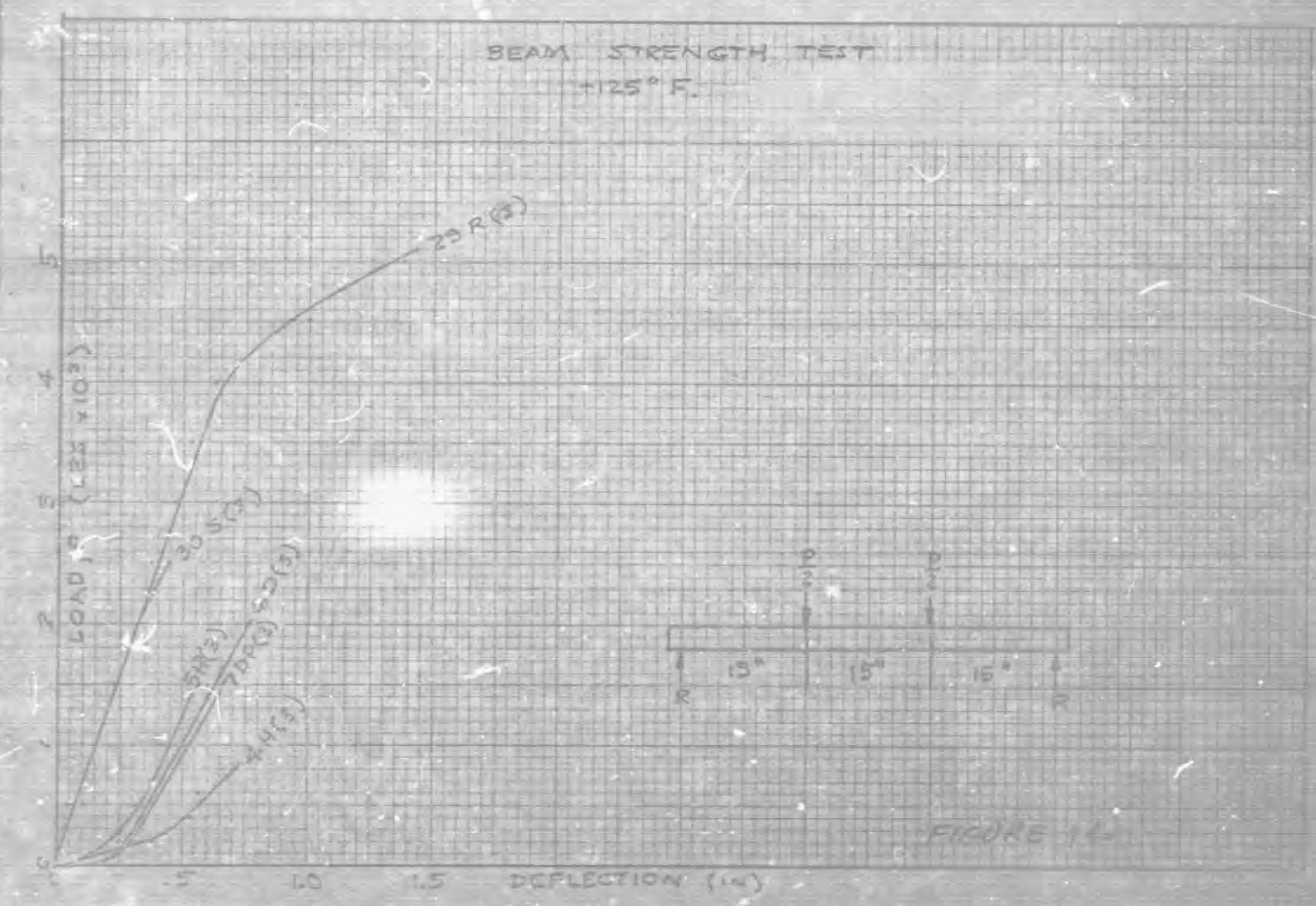
The three aluminum samples exhibited the best strength being progressively stronger in order of diminishing cell size.

All of the paper samples exhibited perfect core-to-skin adherences, failure occuring because of core rupture. The two aluminum samples 30S and 31T failed by adhesive rupture.

The remaining aluminum specimen 29R could not be tested to failure because of the limitations of deflection inherent in the test fixture design.

Sample 31T(3) was destroyed while heating to temperature in the oven.

EXHIBITS: Figure 14, 15, and 16.



BEAM STRENGTH TEST
+125° F.
LOAD, P (LBS x 10³)
DEFLECTION (IN)
0
.5
1.0
1.5
1
2
3
4
5
25 R (3)
30 S (3)
5H (3)
7DP (3)
S 5 (3)
4 H (3)
P/2
15"
15"
15"
R
R
FIGURE 14

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 4 H (3)

Fabrication Data:

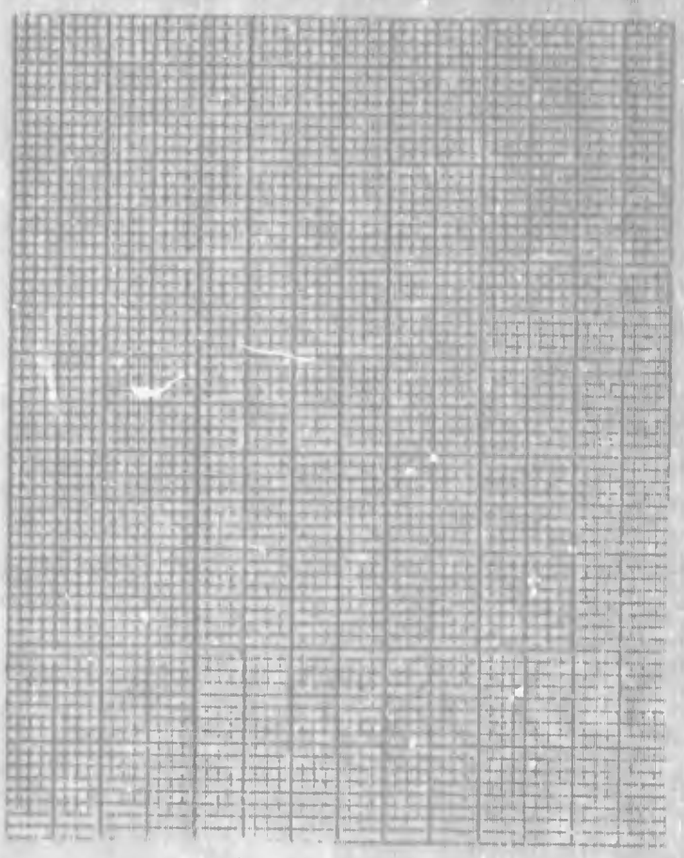
Date Sample was bonded:
Adhesive Used:
Curing Time and Temperature:
Clamping Pressure:
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other
Date Test was started: 8-18-60
Date Test was completed: 8-18-60

P	δ				
200	3/8				
400	15/32				
600	9/16				
800	23/32				
800	12/16	FAIL			



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 5 HP(3)

Fabrication Data:

Date Sample was bonded: _____

Adhesive Used: _____

Curing Time and Temperature: _____

Clamping Pressure: _____

Remarks: _____

Test Data:

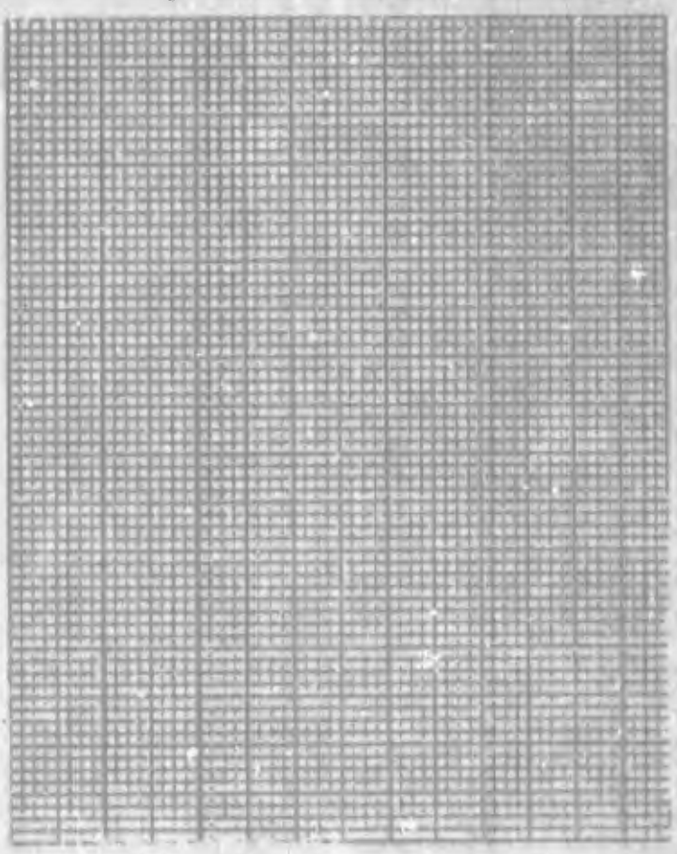
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ✓ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperatare ___ -40° F ___ other

Date Test was started: 8-18-66

Date Test was completed: 8-18-66

P	δ				
200	.25				
500	.31				
1000	13/32				
1500	17/32	F			



Remarks:

Test Performed By: D. Kybourden

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: GDC3

Fabrication Data:

Date Sample was bonded: _____

Adhesive Used: _____

Curing Time and Temperature: _____

Clamping Pressure: _____

Remarks: _____

Test Data:

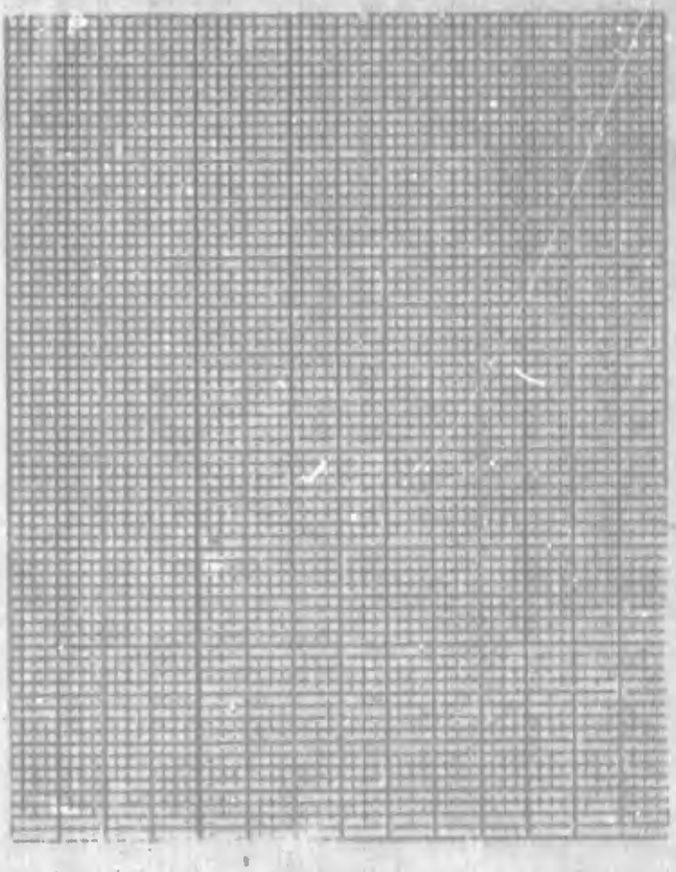
Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-18-66

Date Test was completed: 8-18-66

P	S				
100	2~~.5~~				
500	11/32				
1000	15/32				
1500	19/34				
2000	3/4	FAIL			



Remarks:

Test Performed By: A. Ryburn

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 7DP(5)

Fabrication Data:

Date Sample was bonded: _____

Adhesive Used: _____

Curing Time and Temperature: _____

Clamping Pressure: _____

Remarks: _____

Test Data:

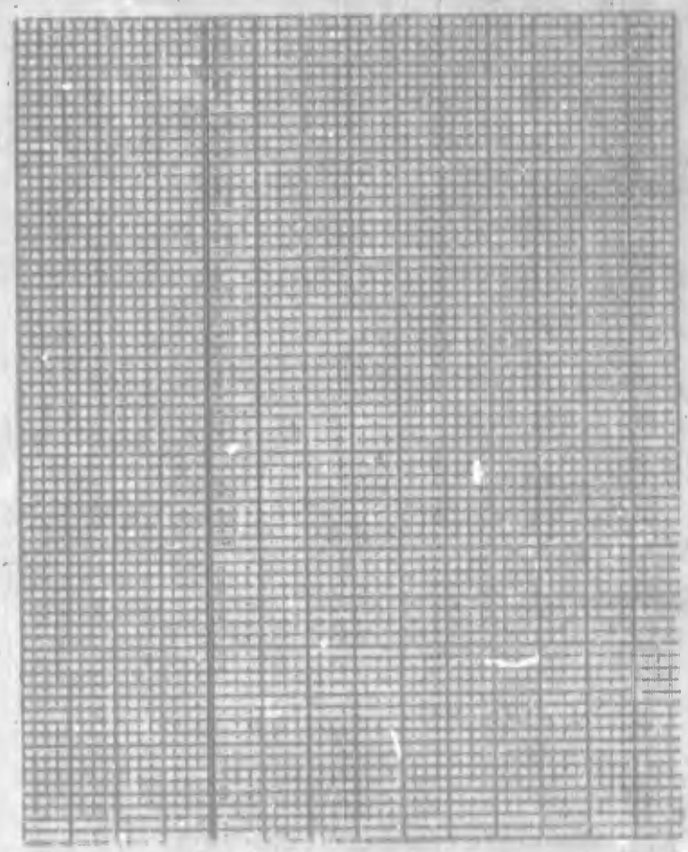
Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-18-66

Date Test was completed: _____

P	δ				
500	3/8				
1000	1/2				
~~1500~~	~~3/4~~				
1450	21/32	FAIL			



Remarks:

Test Performed By: D. Rybarczyk

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 29-R (3)

Fabrication Data:

Date Sample was bonded:

Adhesive Used: Fuller R 7007 Q

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 8-10 psi

Remarks:

Test Data:

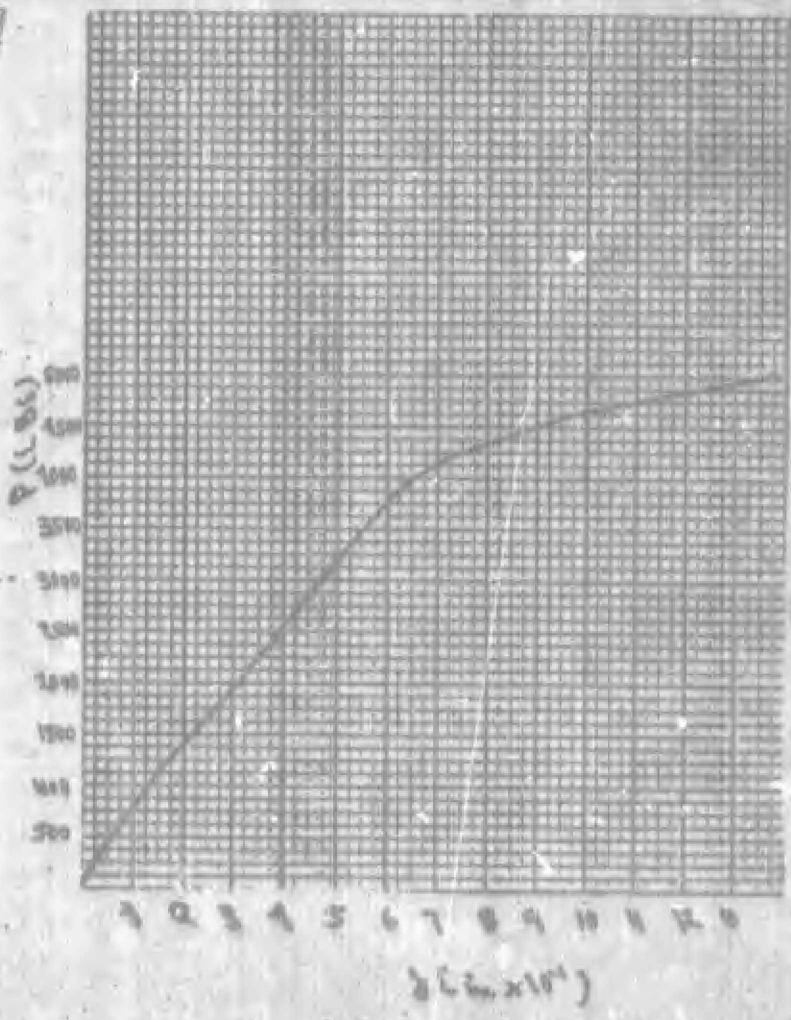
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ✓ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started: 8-30-66

Date Test was completed: 8-30-66

P	δ				
0	0				
500	.0[illegible]				
1000	.125				
1500	.218				
2000	.312				
2500	.375				
3000	.468				
3500	.531				
4000	.625				
4500	1.000				
5000	1.375				
5500	—				



Remarks: At 5200# deflection was 2"
At 5250# deflection was 2.5"
permanent set = 1 5/8

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 30-S(3)

Fabrication Data:

Date Sample was bonded: _____

Adhesive Used: Epibond R 1001 B/

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 psi

Remarks: _____

Test Data:

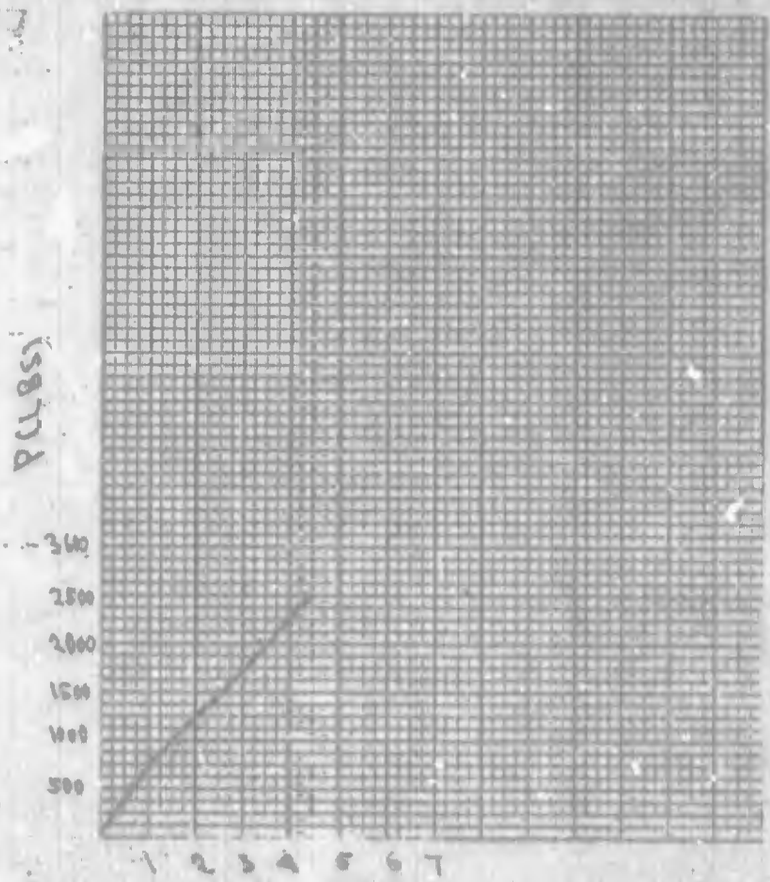
Type of Test: ____ Conveyor ____ Ball ✓ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ✓ 125°F ____ Room Temperature ____ -40°F ____ other

Date Test was started: 8-30-66

Date Test was completed: 8-30-66

P	δ
0	0
500	.062
1000	.156
1500	.250
2000	.344
2500	.437
3000	–
3500	–



Remarks: Failed at 2720 lbs. Bond broke

Test Performed By: [signature]

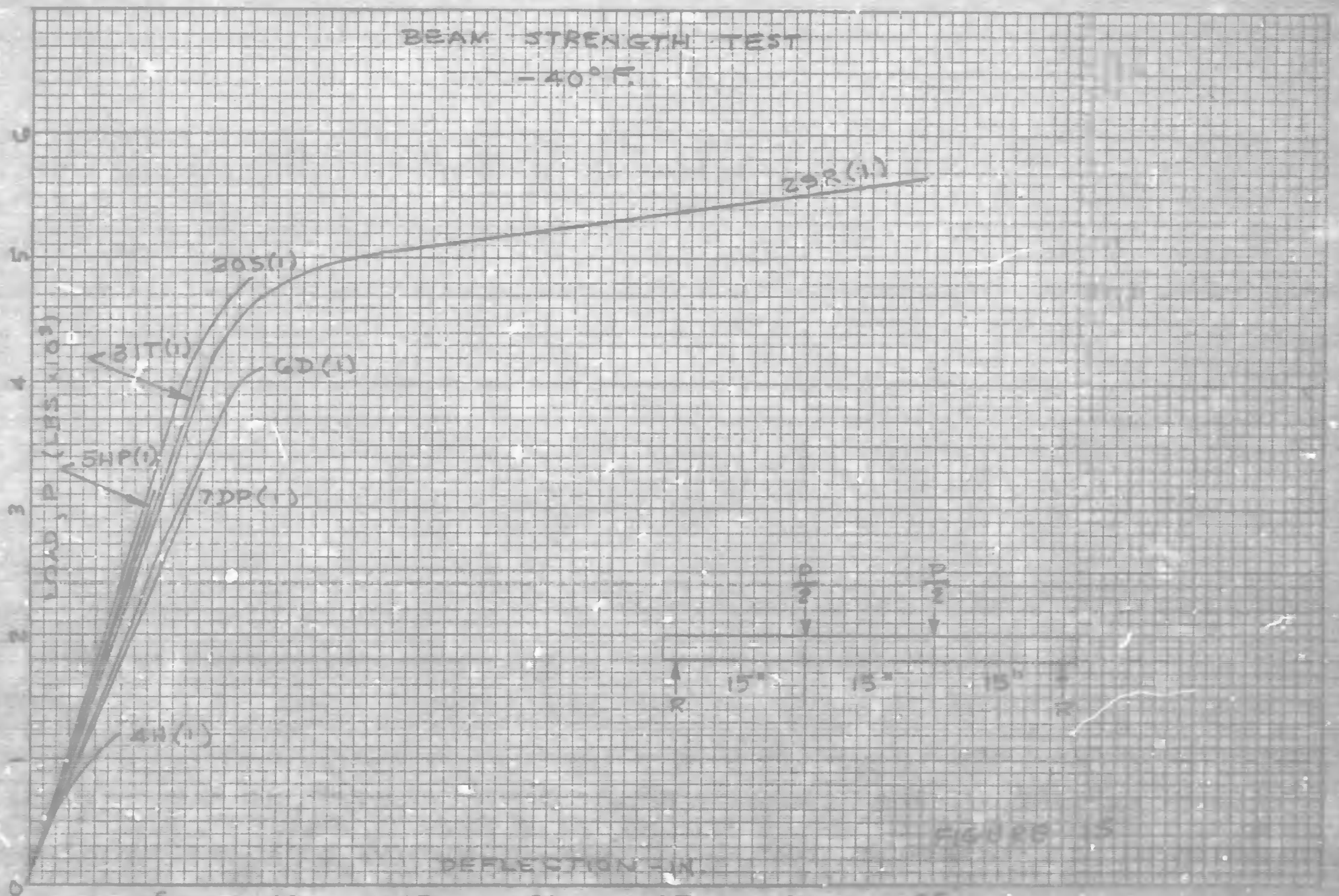


FIGURE 15

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: A-H(1)

Fabrication Data:

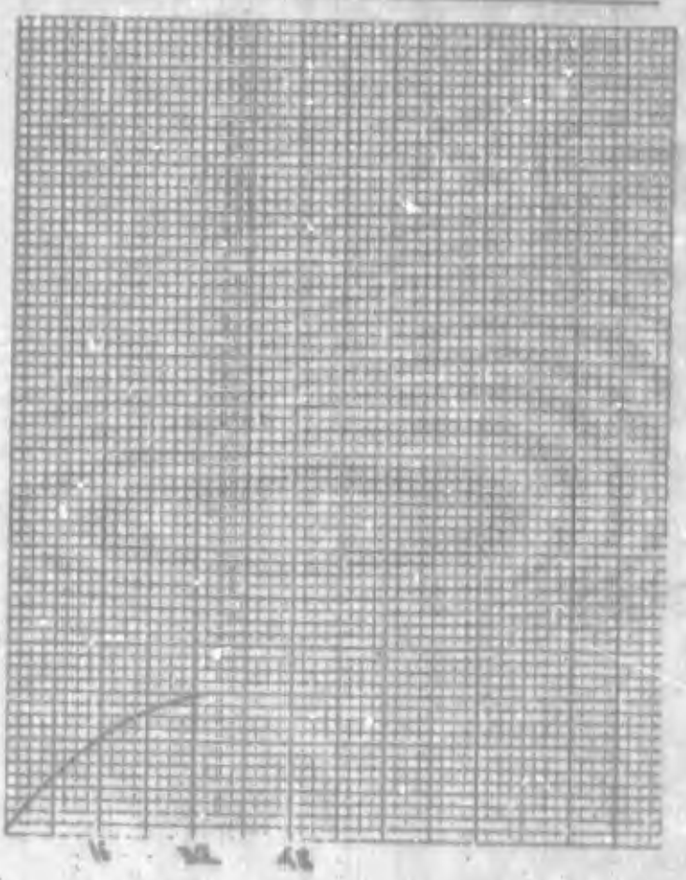
Date Sample was bonded: 7-6-66
Adhesive Used: FULLER R7007Q
Curing Time and Temperature: 24 HRS at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125°F ____ Room Temperature ✓ -60°F ____ other
Date Test was started: 8-4-66
Date Test was completed: 8-4-66

P	δ
0	0
400	.063
800	.157
1200	.349



Remarks: Failed at 1220 LBS
The cold box temperature was approximately -70°F while the specimen temperature was approximately -60°F.

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 5-HP(1)

Fabrication Data:

Date Sample was bonded: 6-29-66

Adhesive Used: Fuller R7907 a/

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 psi

Remarks:

Test Data:

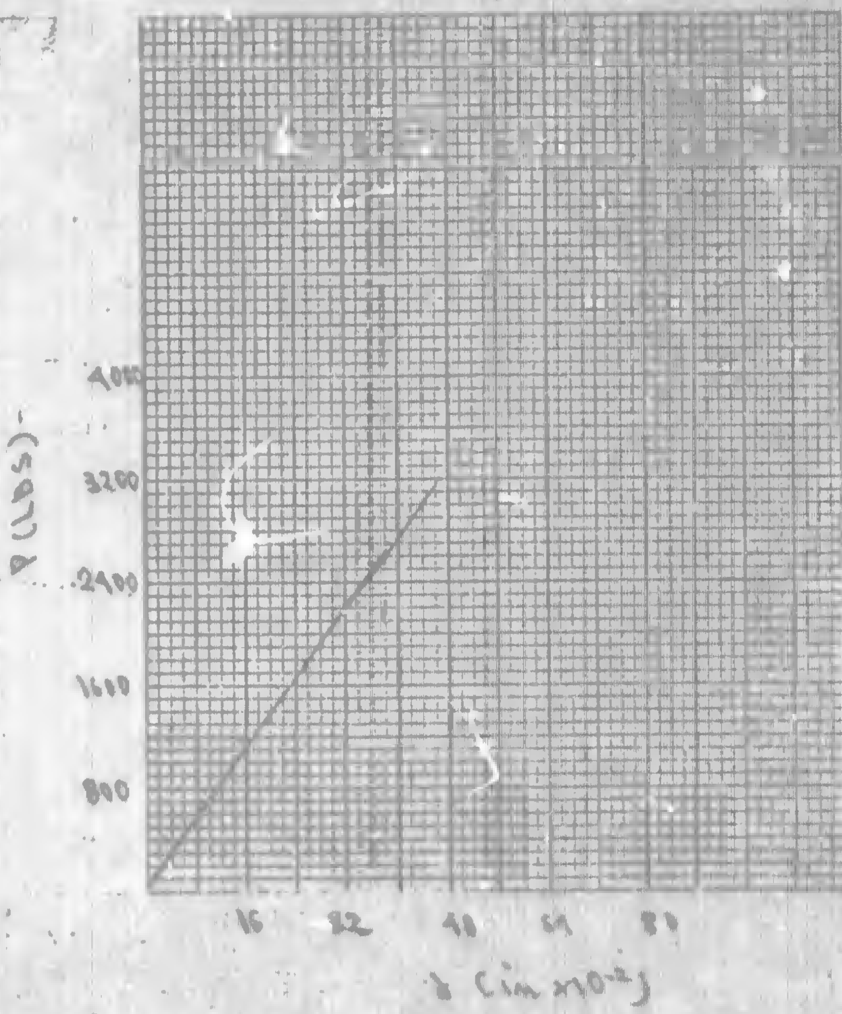
Type of Test: ___ Conveyor ___ Ball ✓ ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ✓ ___ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ✓ ___ -40° F ___ other

Date Test was started: 8-4-66

Date Test was completed: 8-4-66

P	δ				
0	0				
400	.032				
800	.094				
1200	.157				
1600	.219				
2000	.282				
2400	.344				
2800	.407				
3200	.469				



Remarks: Failed at 3110 LBS

Permanent set of 1/16" was encountered at 2800 LBS.

Test Performed By: [signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 6-B(1)

Fabrication Data:

Date Sample was bonded: 6-24-66

Adhesive Used: FULLER R7001 A

Curing Time and Temperature: 48 HRS at Room Temperature

Clamping Pressure:

Remarks:

Test Data:

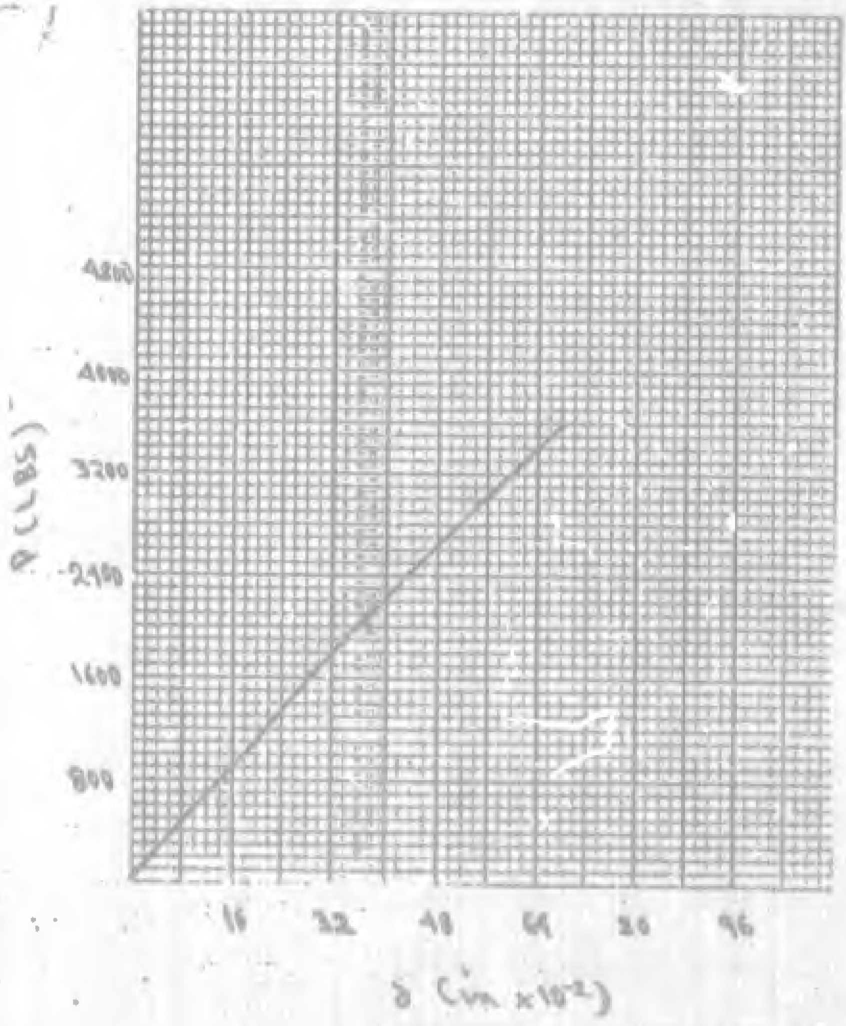
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ✓ Beam strength ___ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ✓ -40° F ___ other

Date Test was started: 8-4-66

Date Test was completed: 8-4-66

P	δ				
0	0				
400	.062				
800	.156				
1200	.218				
1600	.281				
2000	.375				
2400	.437				
2800	.530				
3200	.620				
3600	.680				
4000	.812				
4400	—				



Remarks: Failed at 4230 LBS.

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 7-DP(1)

Fabrication Data:

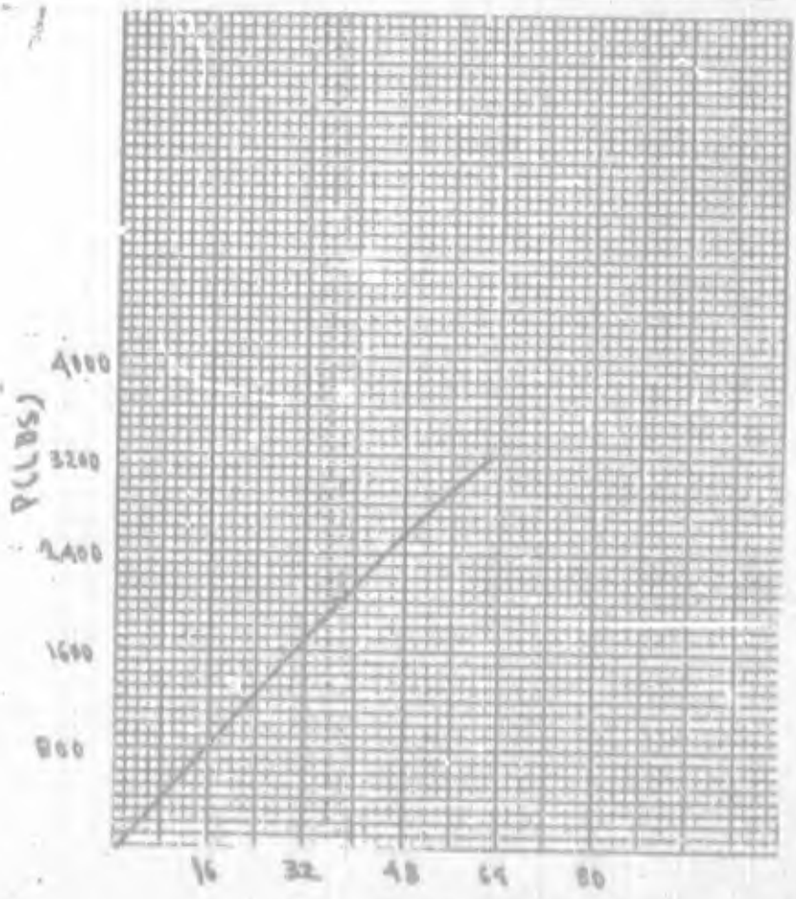
Date Sample was bonded: 6-29-66
Adhesive Used: Fuller R7007A
Curing Time and Temperature: 24 Hrs at Room Temp
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ✓ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ____ Room Temperature ✓ -40° F ____ other
Date Test was started: 8-4-66
Date Test was completed: 8-9-66

P	δ
0	0
400	.043
800	.156
1200	.218
1600	.281
2000	375
2400	.437
2800	.531
3200	.625



Remarks: Failed at 3240 lbs.

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 29-B(1)

Fabrication Data:

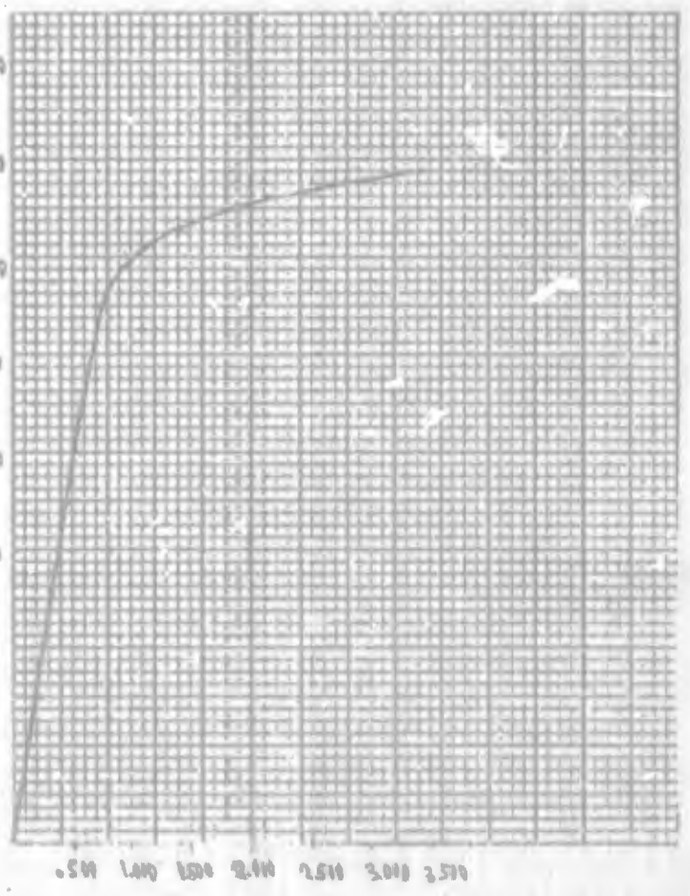
Date Sample was bonded: 6-29-66
Adhesive Used: Fuller R7007 R
Curing Time and Temperature: 48 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ✓ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ____ Room Temperature ✓ -40° F ____ other
Date Test was started: 8-4-66
Date Test was completed: 8-4-66

P	δ
0	0
400	.032
800	.057
1200	.119
1600	.282
2000	.344
2400	.407
2800	.469
3200	.532
3600	.594
4000	.682
4400	.750
4800	.967
5000	1.401
5200	1.401
5400	2.401
5580	3.407



Remarks: At 5500 LBS the stress was 1".
Due to limitation of the machine a failure could not be effected.

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 30-S (1)

Fabrication Data:

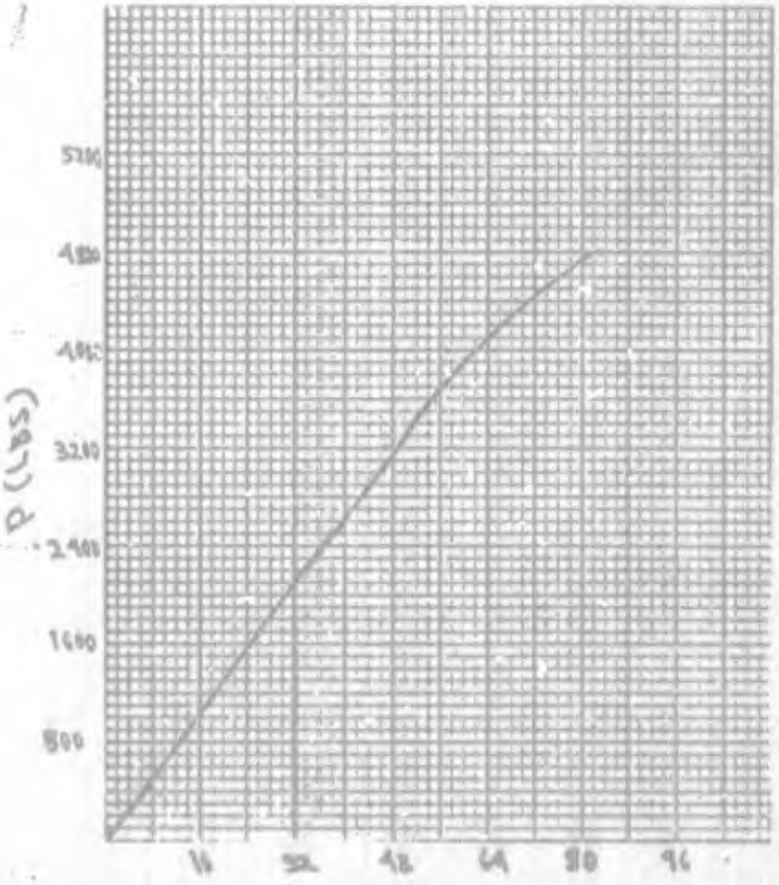
Date Sample was bonded: 6-29-66
Adhesive Used: FULLER R7007 B
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ____ Room Temperature ✓ -40° F ____ other
Date Test was started: 8-4-66
Date Test was completed: 8-9-66

P	δ
0	0
400	0.02
800	.195
1200	.184
1600	.250
2000	.313
2400	.375
2800	.437
3200	.467
3600	.557
4000	.587
4400	.697
4800	.837



Remarks: Failed at 5100 LBS.
The bond failed
The temperature of the cold box was approximately -75° F while that of the specimen approximately -40°

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 31-T(1)

Fabrication Data:

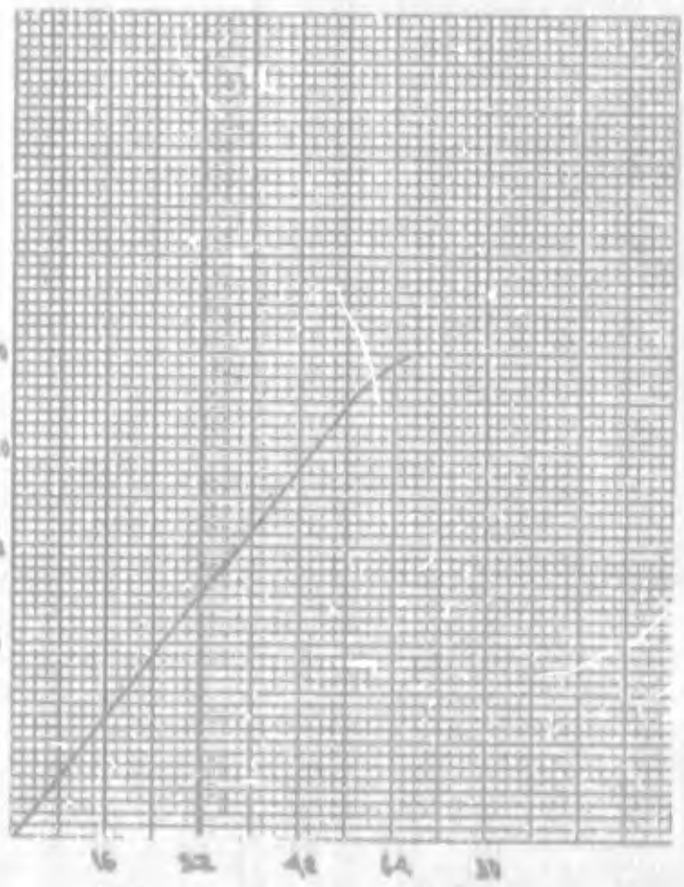
Date Sample was bonded: 6-29-66
Adhesive Used: FULLER R7007Q
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ____ Room Temperature ✓ -40° F ____ other
Date Test was started: 8-4-66
Date Test was completed: 8-4-66

P	δ
0	0
400	.063
800	.125
1200	.183
1600	.250
2000	.313
2400	.375
2800	.438
3200	.500
3600	.563
4000	.657



P (lbs)

δ (in x 10^{-2})

Remarks: Failed at 4220 LBS
The bond failed
The temperature of the cold box was approximately -75° while that of the specimen approximately -40° F.

Test Performed By: [signature]

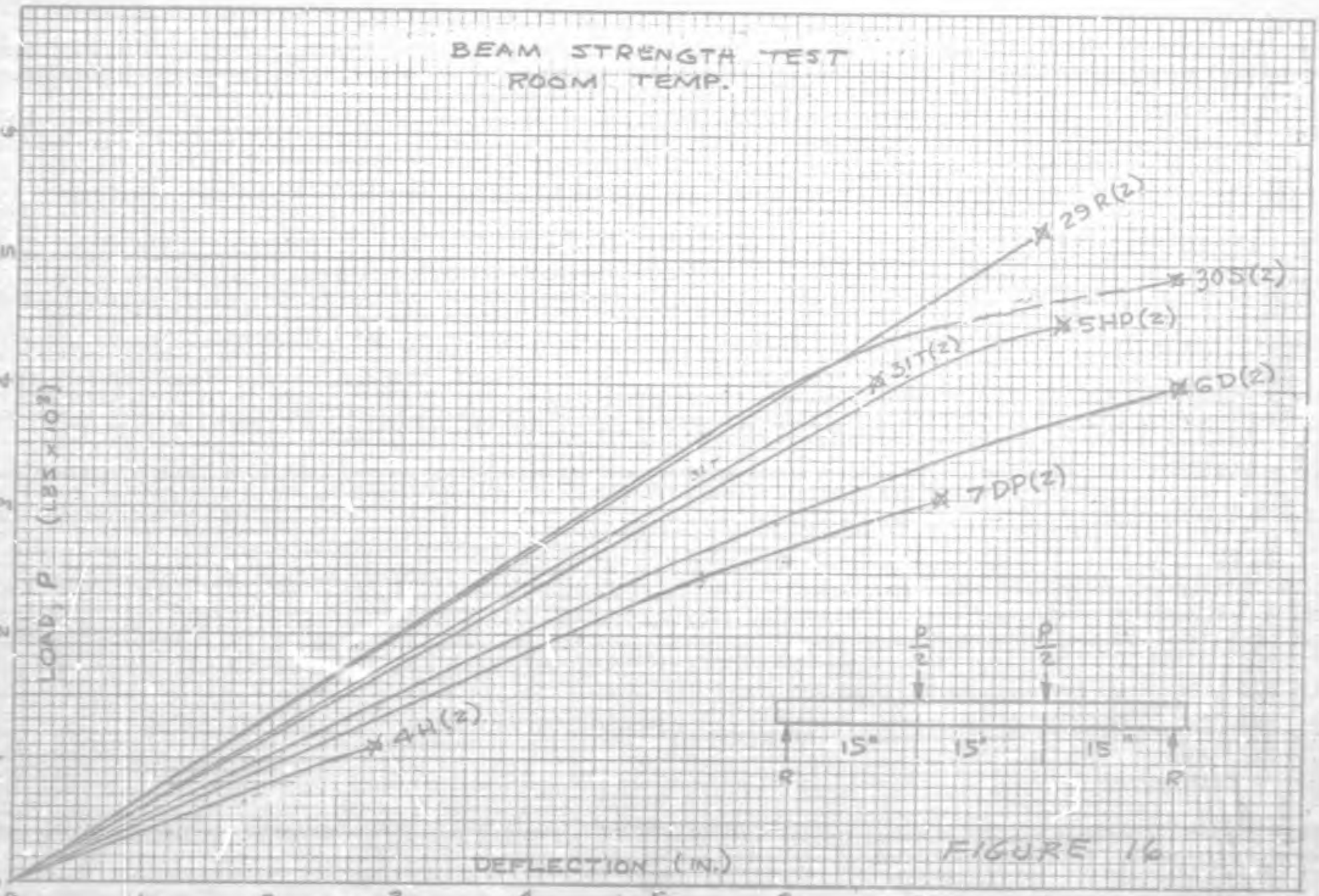


FIGURE 16

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 4H (2)

Fabrication Data:

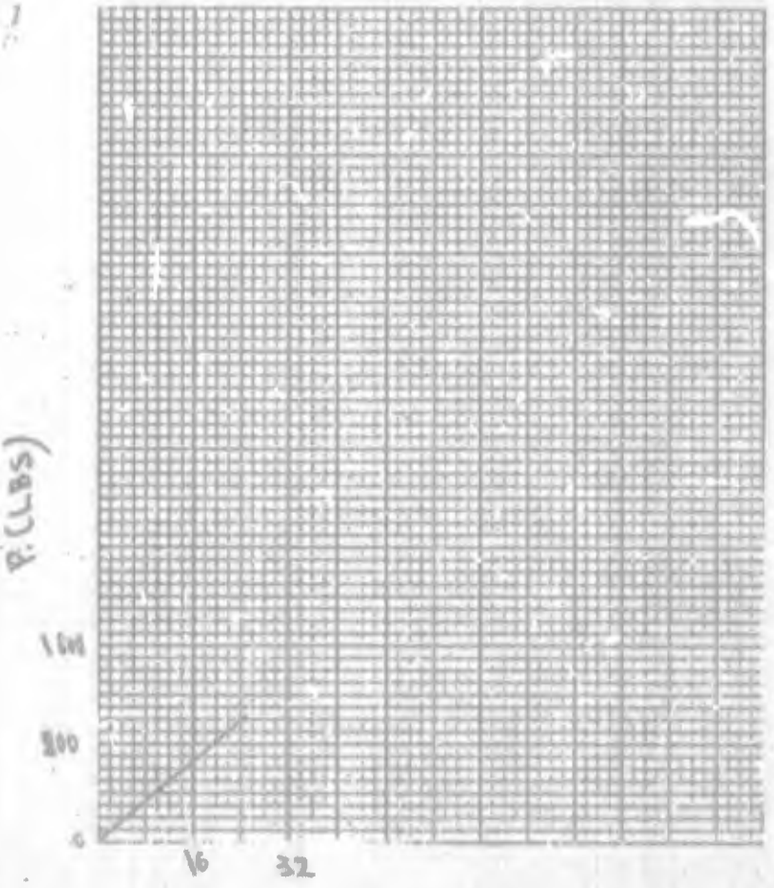
Date Sample was bonded: 7-6-66
Adhesive Used: EA 115R R7007-A
Curing Time and Temperature: 24 HRS at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 8-3-66
Date Test was completed: 8-3-66

P	δ				
0					
500	.043				
1000	.151				
1100	Failed				



Remarks: Failed at 1100 LBS

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: .5 HP (2)

Fabrication Data:

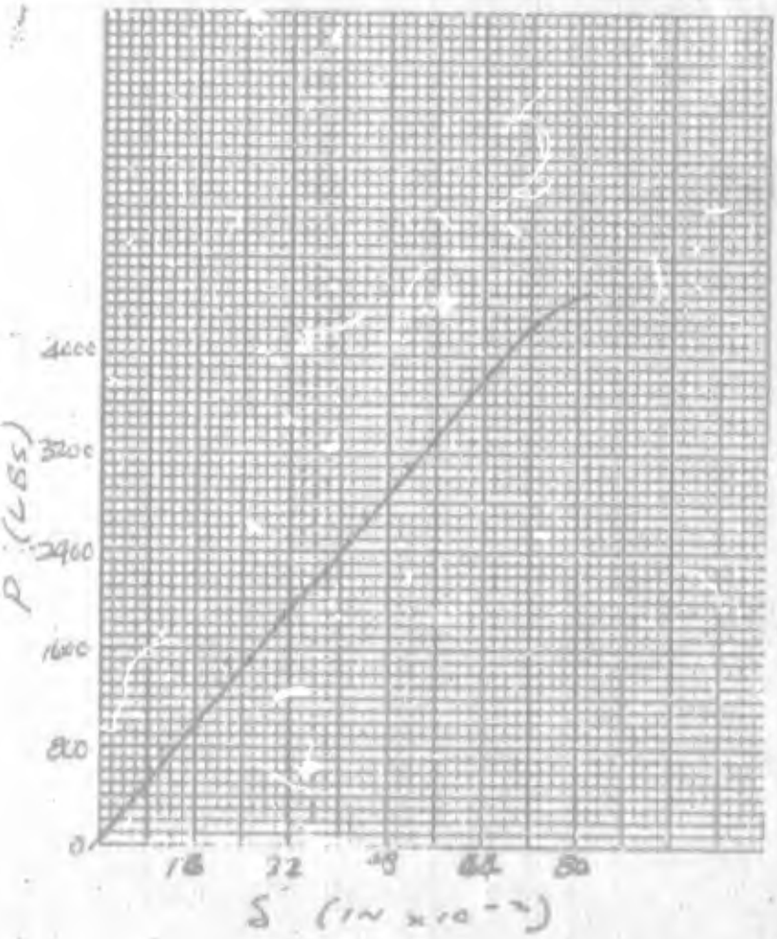
Date Sample was bonded: 6-24-66
Adhesive Used: FULLER R7007-Q
Curing Time and Temperature: (45) HR @ R.T
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
___ Water Absorption ___ Fungus ✓ Beam strength ___ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 7-6-66
Date Test was completed: 7-6-66

P	δ	P	δ		
100	.01	2300	.38		
200	.03	2500	.41		
300	.05	2700	.44		
400	.06	2900	.48		
500	.07	3100	.51		
600	.10	3300	.56		
700	.12	3500	.59		
800	.12	3700	.62		
900	.15	3900	.64		
1000	.16	3900	.67		
1100	.18	4000	.68	.02	SET
1300	.21	4100	.69		
1500	.25	4200	.71	.03	SET
1700	.28	4500	.81	.06	SET
1800	.29	4550	(FAIL)		
1900	.31				
2000	.33				
2100	.35				
2200	.38				



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 6D(2)

Fabrication Data:

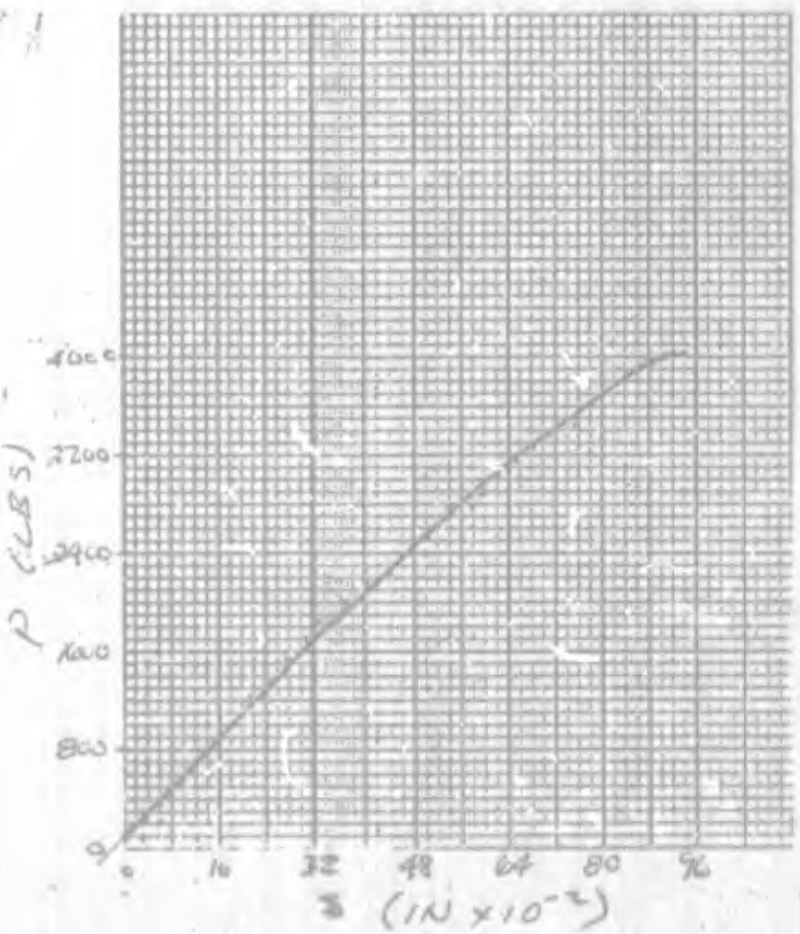
Date Sample was bonded: 6-24-66
Adhesive Used: FULLER R 7007 G
Curing Time and Temperature: (48) HR R.T.
Clamping Pressure: (.5) PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 7-6-66
Date Test was completed: 7-6-66

P	δ	P	δ		
100	0	2920	.59		
220	.03	3040	.62		
380	.06	3190	.65		
530	.09	3280	.68		
660	.12	3380	.71		
870	.15	3520	.75		
1020	.18	3640	.78		
1200	.21	3760	.81		
1330	.25	3850	.84		
1550	.28	3940	.88		
1690	.31	4010	.90		
1850	.34	4030	.94	FAIL	
1980	.37				
2120	.41				
2260	.44				
2390	.47				
2510	.50				
2670	.53				
2780	.56				



Remarks:

Test Performed By: A. Rybinski

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 7-DP (2)

Fabrication Data:

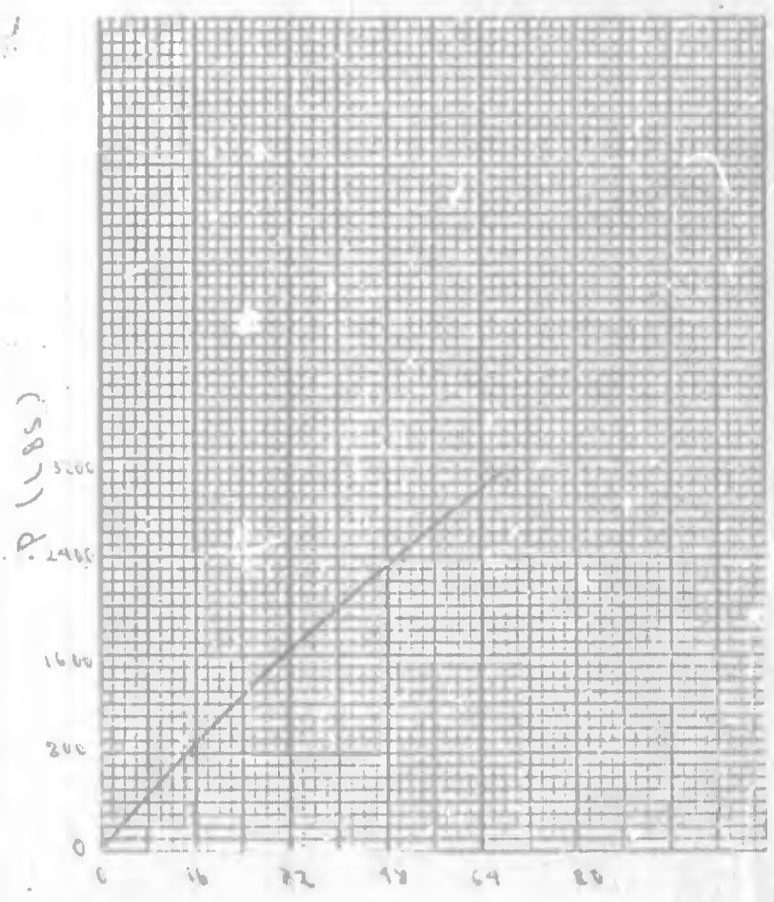
Date Sample was bonded: 7-8-66
Adhesive Used: FULLER R700T-G
Curing Time and Temperature: 24 Hr. at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ / Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ____ / Room Temperature ____ -40° F ____ other
Date Test was started: 8-3-66
Date Test was completed: 8-3-66

P	δ
0	0
200	.031
400	.062
600	.093
800	.125
1000	.145
1200	.156
1400	.281
1600	.312
1800	.375
2000	.437
2200	.500
2400	.531
2600	.593
2800	.625
3000	.685
3100	Failure



Remarks: Failed at 3100 lbs

Test Performed By: J. Mulhearn

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 29 E (2)

Fabrication Data:

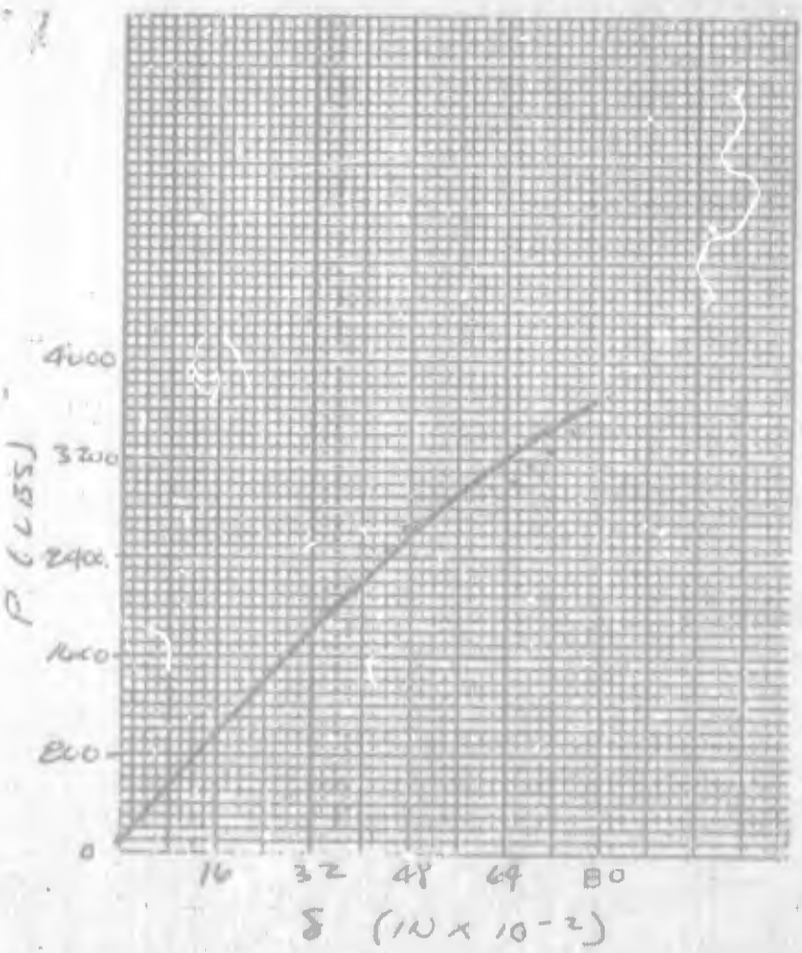
Date Sample was bonded: 6-24-66
Adhesive Used: FULLER 2700T-5
Curing Time and Temperature: (48) @ R.T.
Clamping Pressure: (5) PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 6-17-66
Date Test was completed: 6-17-66

P	δ	P	δ		
100	.0	2710	.62		
200	.02	3000	.65		
300	.03	3170	.68		
400	.04	3230	.71		
500	.06	3430	.75		
600	.08	3640	.78		
700	.09	3710	.81		
800	.12	3720	(FAIL)		
900	.13				
1050	.18				
1280	.21				
1470	.25				
1680	.28				
1870	31				
1990	.34				
2120	.37				
2360	.40				
2480	.44				
2660	.47				



Remarks:

Test Performed By: A. R. Anderson

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 30 S(2)

Fabrication Data:

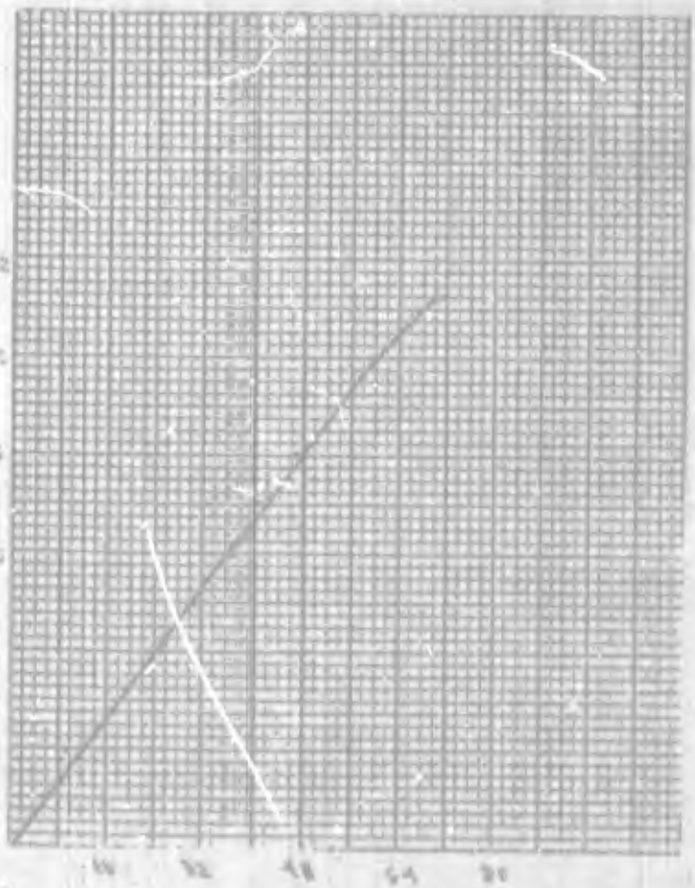
Date Sample was bonded: 6-29-66
Adhesive Used: FULLER R7067 B
Curing Time and Temperature: 24 Hrs at Room Temp
Clamping Pressure: 5-10 psi
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started:
Date Test was completed:

P	δ
0	0
400	.066
800	.094
1000	.157
1200	.188
1600	.250
2000	.313
2400	.375
2800	.407
3200	.469
3600	.532
4000	.594
4560	.719



Remarks: Failed at 4840 Lbs

Test Performed By:

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 317(2)

Fabrication Data:

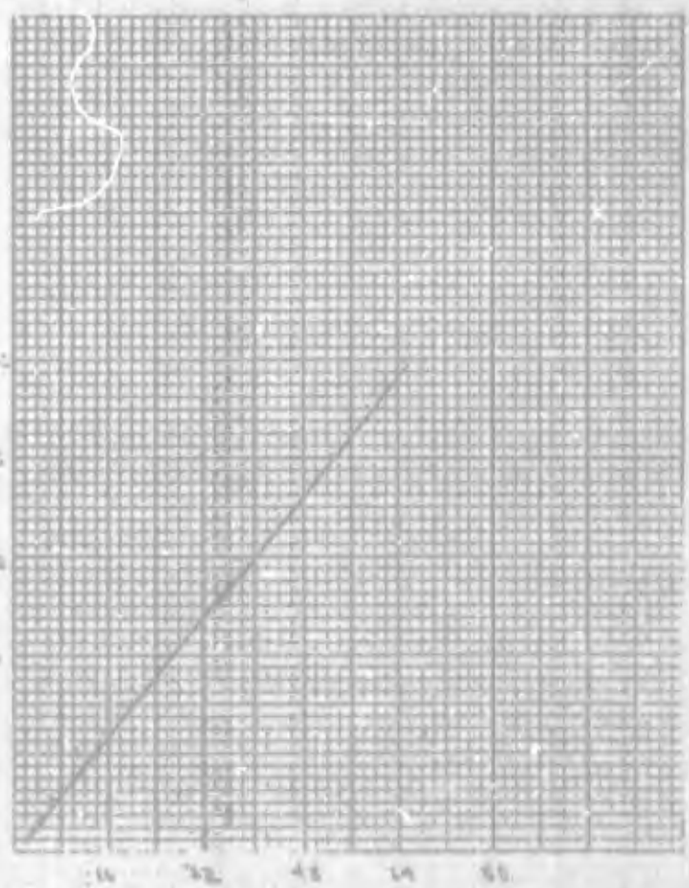
Date Sample was bonded: 6-29-61
Adhesive Used: FULLER R7007 Q
Curing Time and Temperature: 24 HRS at Room Temp
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ✓ Beam strength ____ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 8-3-61
Date Test was completed: 8-3-61

P	δ
0	0
400	.063
800	.125
1000	.157
1200	.194
1600	.250
2000	.313
2400	.375
2800	.438
3200	.502
3600	.564
4000	.627



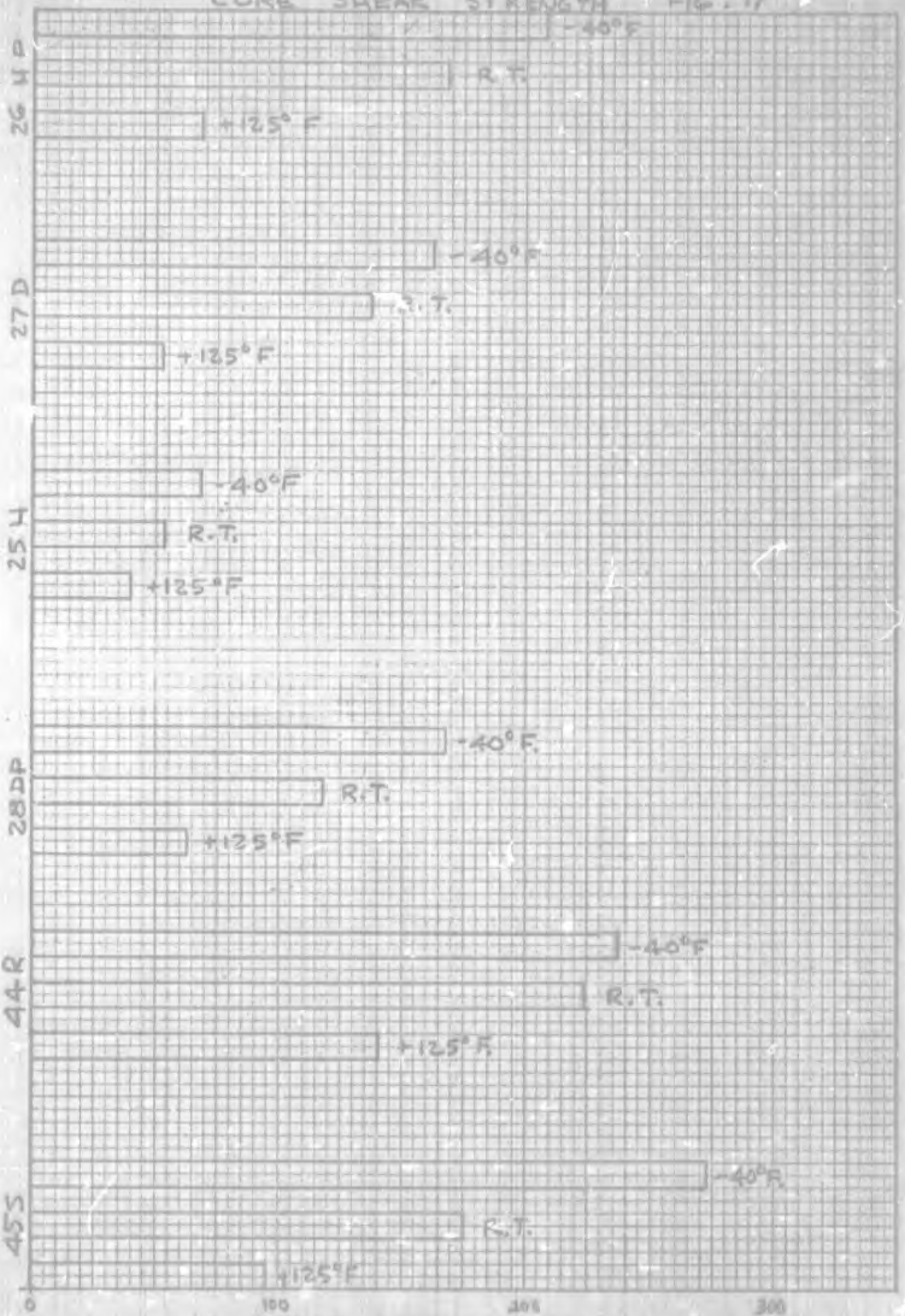
Remarks: Failed at 4050 LBS
At 4000 LBS there was 1/32" out.

Test Performed By: [signature]

BROOKS & PERKINS

NAME OF TEST:	Shear Test.
ITEMS TESTED:	25H(1), 25H(2), 25H(3), 26HP(1), 26HP(2), 26HP(3), 27D(1), 27D(2), 27D(3), 28DP(1), 28DP(2), 28DP(3), 44R(1), 44R(2), 44R(3), 45S(1), 45S(2), 45S(3).
PURPOSE OF TEST:	To determine core shear strength at temperatures of - 40°F, room temperature and 125°F.
DESCRIPTION OF TEST APPARATUS:	Baldwin tensile test machine, 60,000 capacity and (3) loading blocks.
TEST PROCEDURE:	The six samples for the cold test were brought to temperature by means of immersion in a box of dry ice. Samples were removed and placed in the test machine and tested to destruction. The hot test samples were similarly tested after immersion in an oven set to 125°F. The room temperature during testing of the remaining samples was approximately 80°F.
TEST RESULTS:	The shear strength of the various samples are presented on the accompanying graph on which these values are plotted against the three test temperatures. All of the samples experienced a reduction in strength at elevated temperatures, while the greatest strength was obtained at low temperature. The core material T, 3/8" aluminum honeycomb, was destroyed in fabrication during the cutting operation.
EXHIBITS:	Figure 17.

CORE SHEAR STRENGTH FIG. 17



BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 25-H(1)

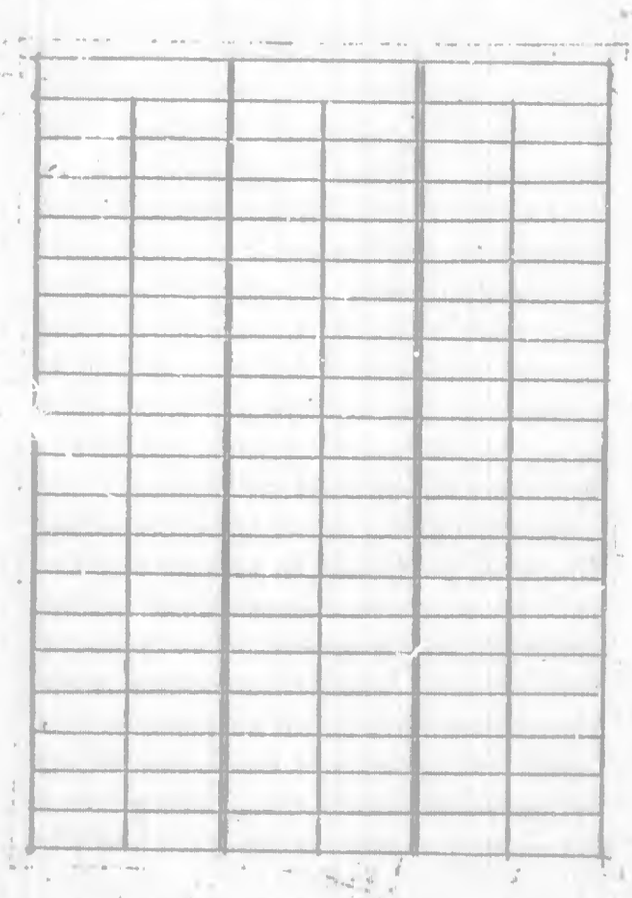
Fabrication Data:

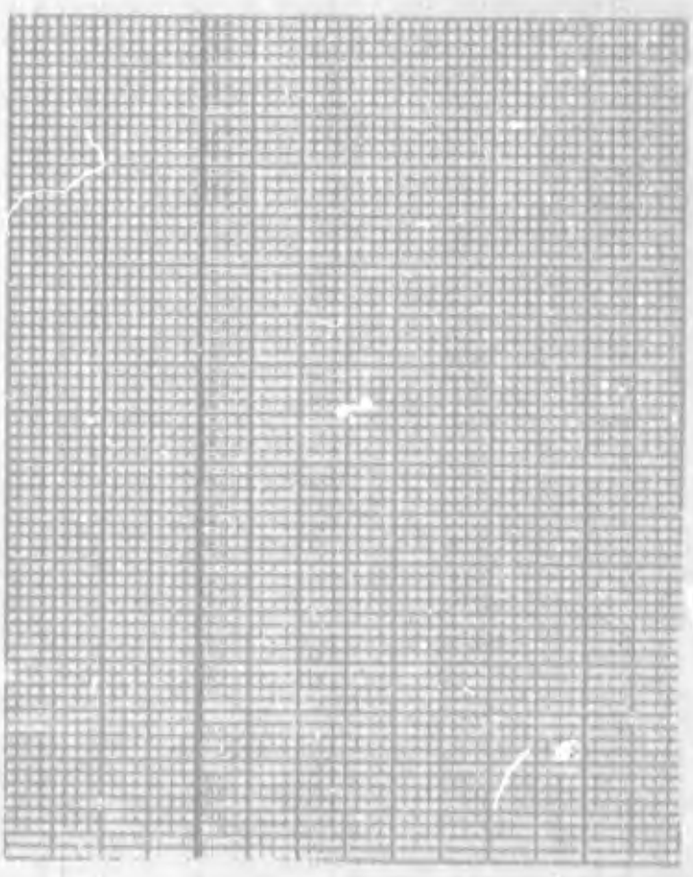
Date Sample was bonded: 6-24-66
Adhesive Used: FULLER A7607 B
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ____ Room Temperature ____ -40° F ____ other
Date Test was started: 8-2-66
Date Test was completed: 8-2-66





Remarks: Failed at 1740 LBS.
Con failed first then bond
Temperature of cold box approx. -75° F
Estimated temp. of sample - 40° F

Test Performed By: A. Hendrickson

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 26 - HP(1)

Fabrication Data:

Date Sample was bonded: 6-24-66
Adhesive Used: FULLER R7007A
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ✓ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ✓ -40° F ___ other
Date Test was started: 8-2-66
Date Test was completed: 8-2-66

Remarks: Failed at ~~4~~5250 LBS.
Core failed before the first then bend
Temperature of cold box approx. -75°F
Estimated temp. of sample -40°F

Test Performed By: [illegible signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 27 - D(1)

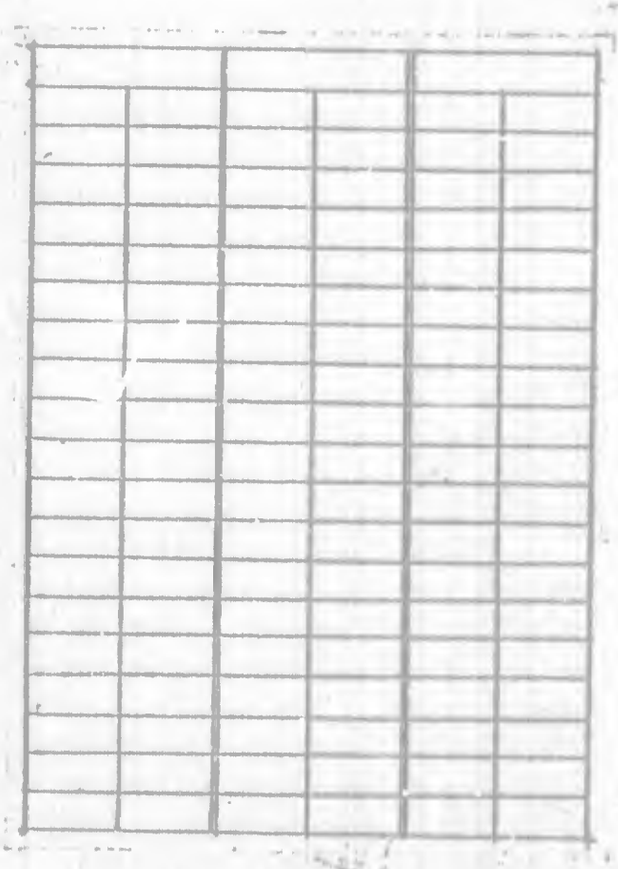
Fabrication Data:

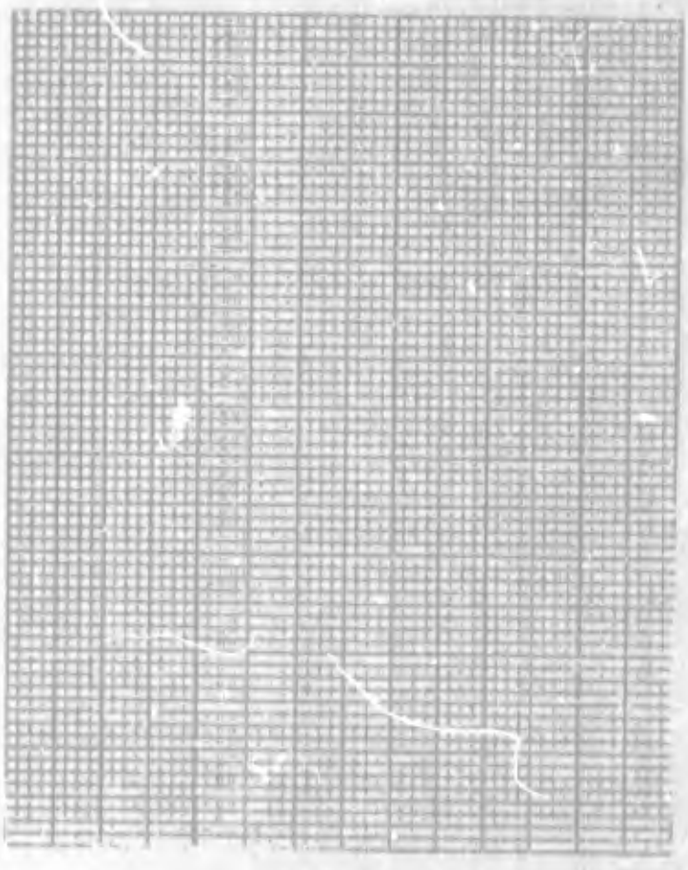
Date Sample was bonded: 6-24-66
Adhesive Used: FULLER A709 I B
Curing Time and Temperature: 24 Hrs. at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ✓ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ____ Room Temperature ✓ -40° F ____ other
Date Test was started: 8-2-66
Date Test was completed: 8-2-66





Remarks: Failed at 4000 LBS
Con failed first then bond.
Temperature of cold box approx. -75° F
Estimated temp. of sample -98° F

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 2C - DP (1)

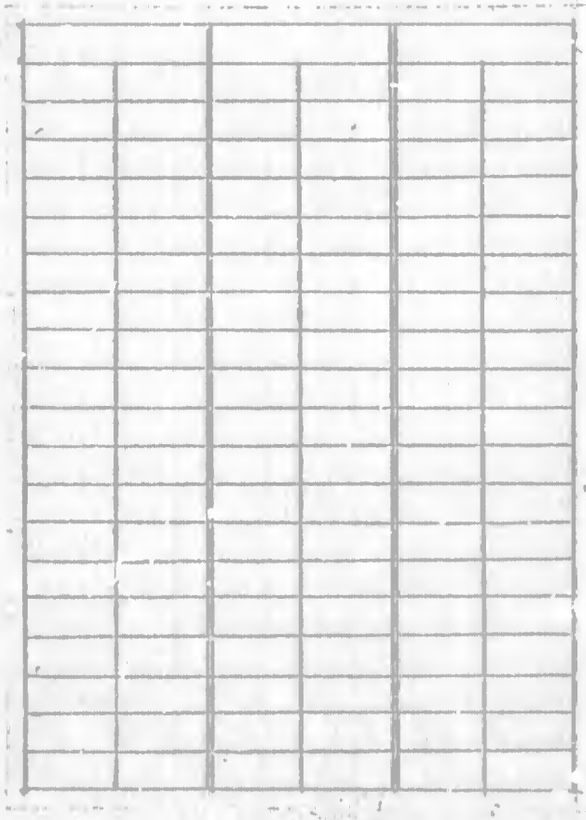
Fabrication Data:

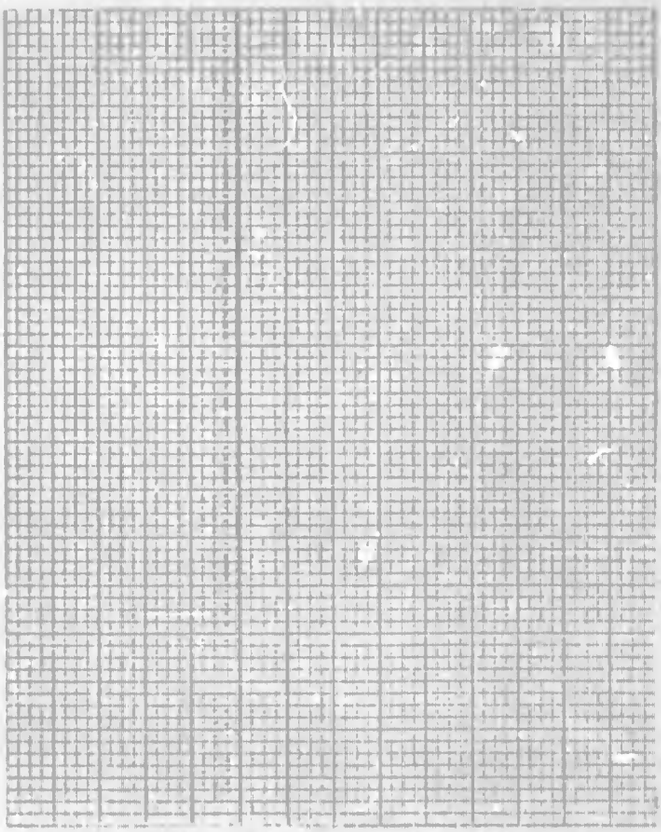
Date Sample was bonded: 6-24-66
Adhesive Used: Fuller B7067D
Curing Time and Temperature: 24 hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Beam strength ____ / Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ____ Room Temperature ____ / ____ -40° F ____ other
Date Test was started: 8-2-66
Date Test was completed: 8-2-66





Remarks: Failed at 4200 lbs.
Core failed first then bond
Temperature of cold box approx -75° F
Estimated temp. of sample -40° F

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 44-R(1)

Fabrication Data:

Date Sample was bonded: ____

Adhesive Used: FULLER R7078

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks: ____

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ✓ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ✓ -40° F ___ other

Date Test was started: 8-19-66

Date Test was completed: 8-19-66

Remarks: Yielded at 442 LBS

Failed at 5900 LBS

Test Performed By: [illegible signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: A5-S(1)

Fabrication Data:

Date Sample was bonded: ______

Adhesive Used: Fuller 870078

Curing Time and Temperature: 24 Hrs at Room Temperature

Clamping Pressure: 5-10 PSI

Remarks: ______

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ✓ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ✓ -40° F ___ other

Date Test was started: 8-19-66

Date Test was completed: 8-19-66

Remarks: Yielded at 5930 LBS
Failed at 6720 LBS

Test Performed By: [illegible signature]

BROOKS & PERKINS INC.

-130-

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 25 - H(2)

Fabrication Data:

Date Sample was bonded: 6-24-66

Adhesive Used: FULLER R7007B

Curing Time and Temperature: 24 Hrs at Room Temp

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

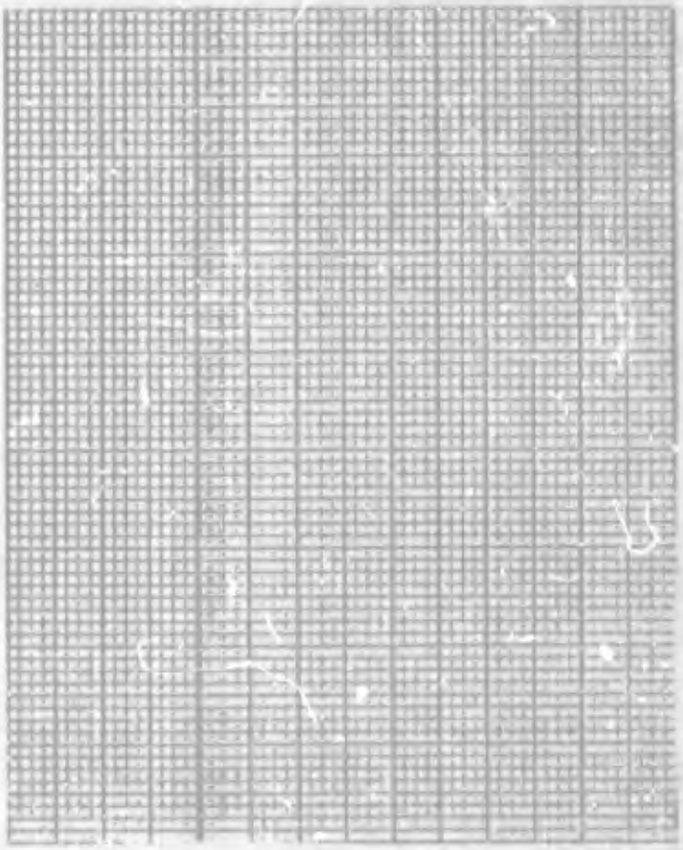
Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other

Date Test was started: 8-3-66

Date Test was completed: 8-3-66

Failed at 1570 lbs.



Remarks:

Core failed first time load.

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 26 - HP (2)

Fabrication Data:

Date Sample was bonded: 6-24-66
Adhesive Used: FULLER R7007A
Curing Time and Temperature: 24 hrs @ Room Temp
Clamping Pressure: 5-10 PSI
Remarks:

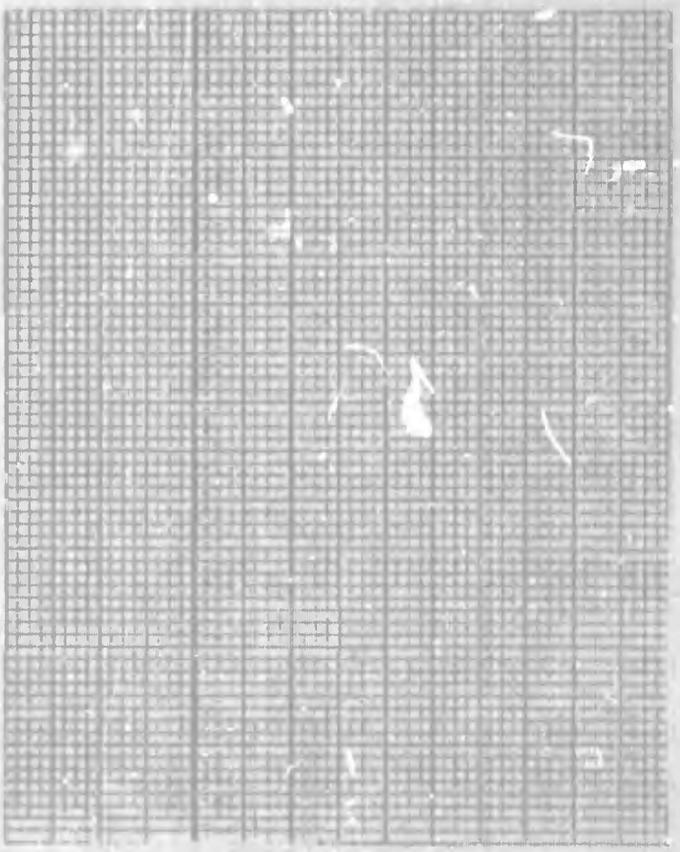
Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ✓ Shear Strength ___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other
Date Test was started: 8-3-66
Date Test was completed: 8-3-66

P	δ				

Failed at 550 lbs.



Remarks:

Core failed first then bond

Test Performed By: [illegible]

BROOKS & PERKINS INC.

-132-

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 27 - D(2)

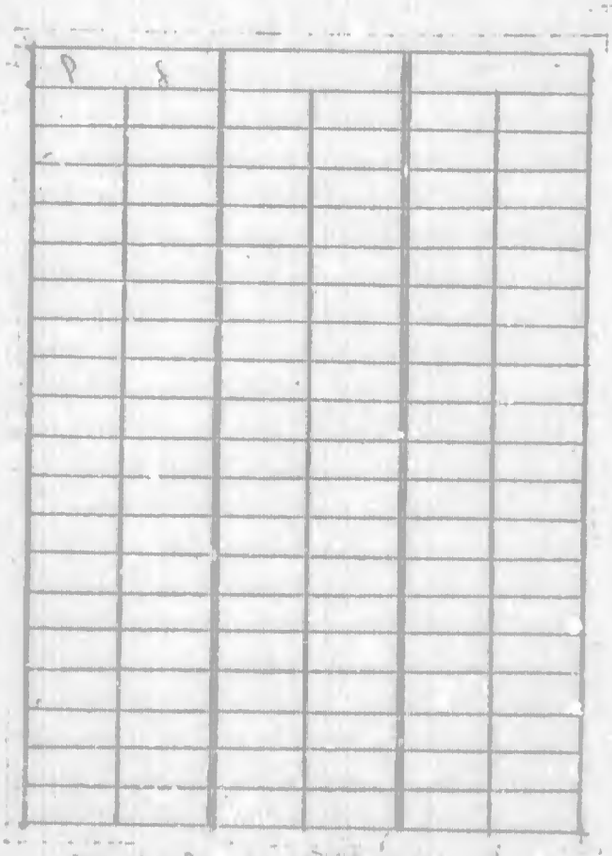
Fabrication Data:

Date Sample was bonded: 6-24-66
Adhesive Used: FULLER R7007B
Curing Time and Temperature: 24 Hrs at Room Temp
Clamping Pressure: 5-10 PSI
Remarks:

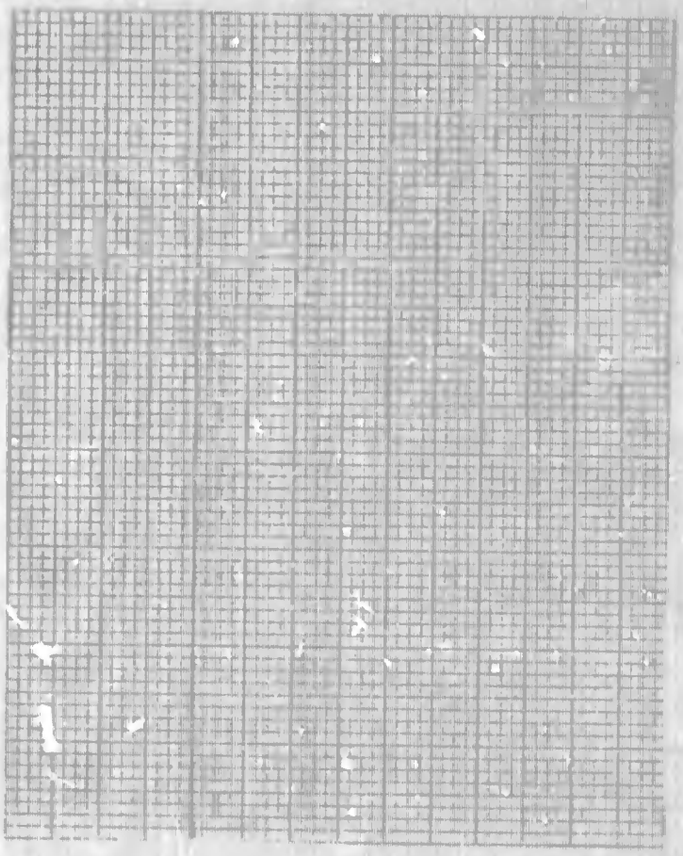
Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ✓ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 8-3-66
Date Test was completed: 8-3-66



Failed at 3420 lbs



Remarks:

Core failed first then bond.

Test Performed By:

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 29 - 309(2)

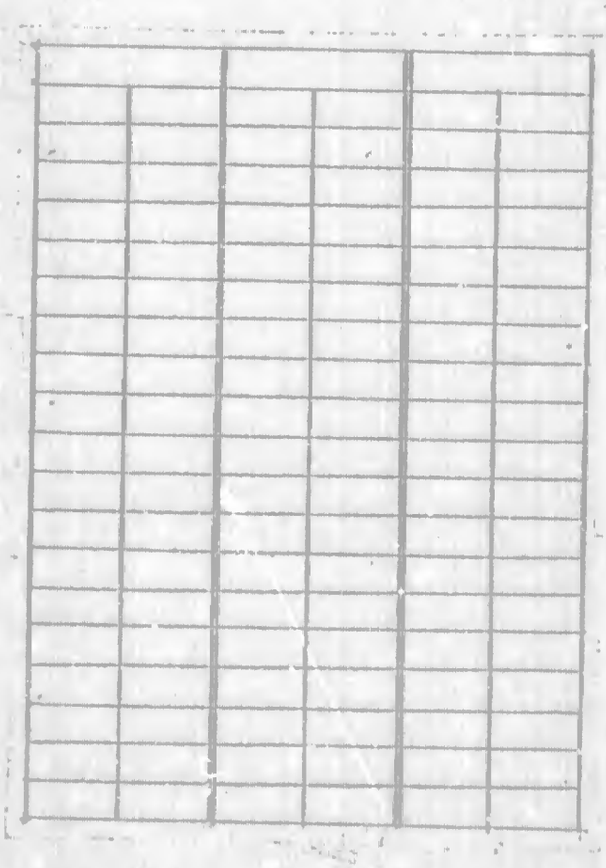
Fabrication Data:

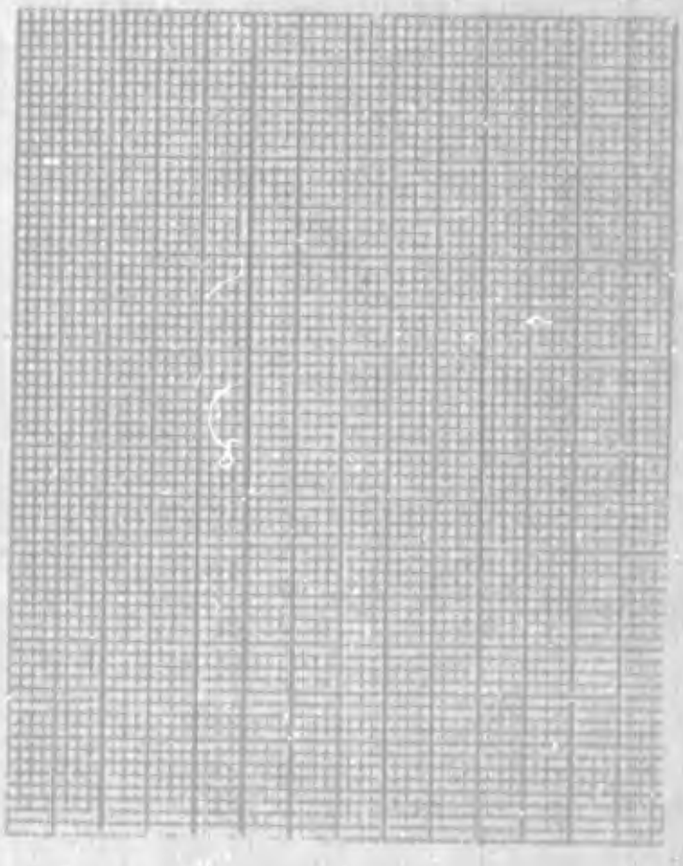
Date Sample was bonded: 6-24-66
Adhesive Used: Fuller R7007 A
Curing Time and Temperature: 24 Hrs at Room Temperature
Clamping Pressure: 5-10 PSI
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Beam strength ___✓___ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ___✓___ Room Temperature ____ -40° F ____ other
Date Test was started: 8-3-66
Date Test was completed: 8-3-66





Remarks: Failed at 3100 lbs.
Core failed first then bond

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 44 E(2)

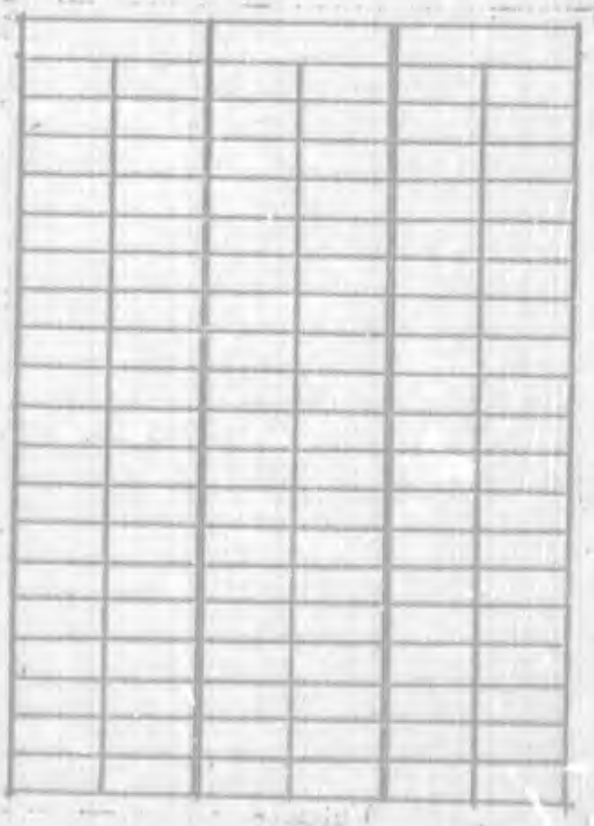
Fabrication Data:

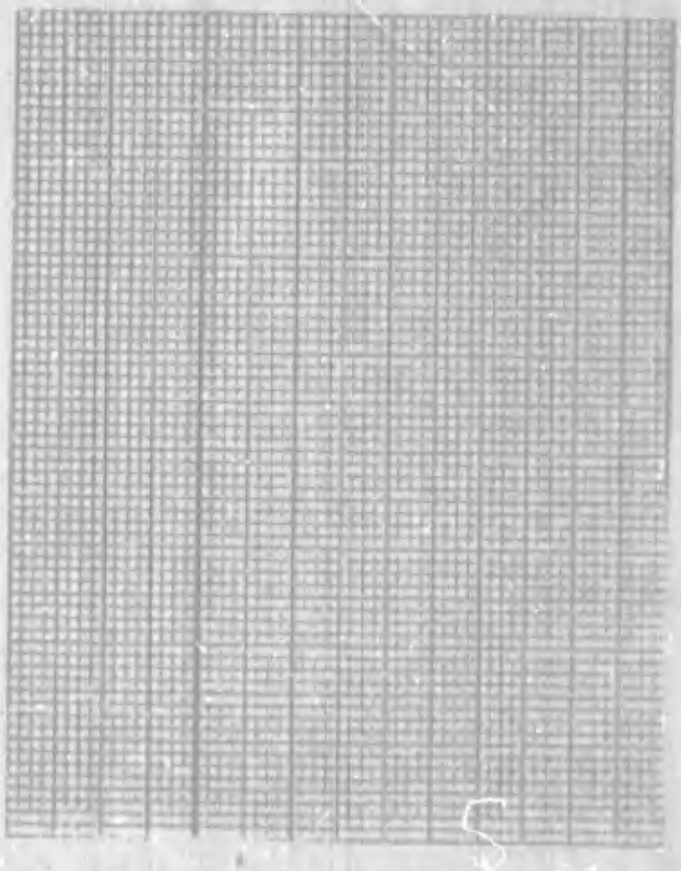
Date Sample was bonded:
Adhesive Used:
Curing Time and Temperature:
Clamping Pressure:
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Beam strength ✓ Shear Strength
____ Teeter Roller

Test Temperature: ____ 125° F ✓ Room Temperature ____ -40° F ____ other
Date Test was started: 8-18-66
Date Test was completed: 8-18-66





Remarks:

5550 ULT.

Test Performed By: D. Robertson

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 455(2)

Fabrication Data:

Date Sample was bonded:

Adhesive Used:

Curing Time and Temperature:

Clamping Pressure:

Remarks:

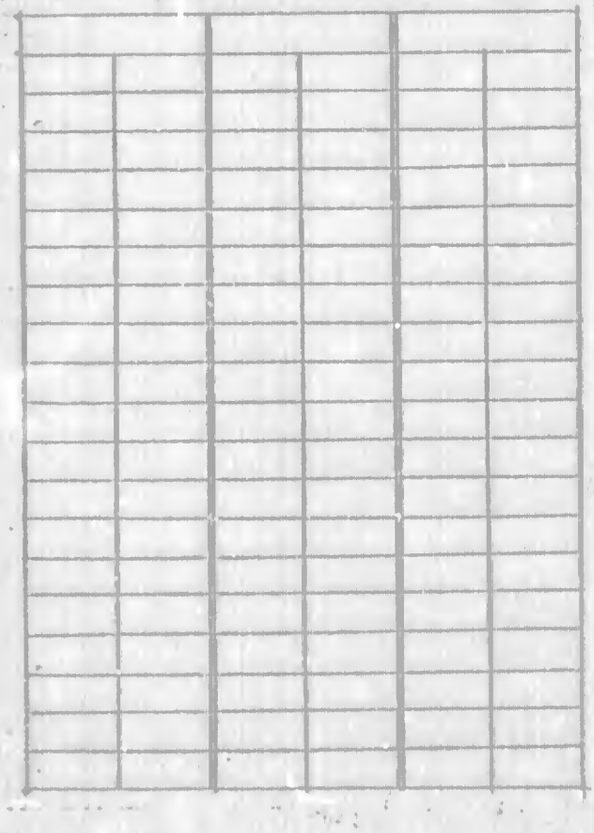
Test Data:

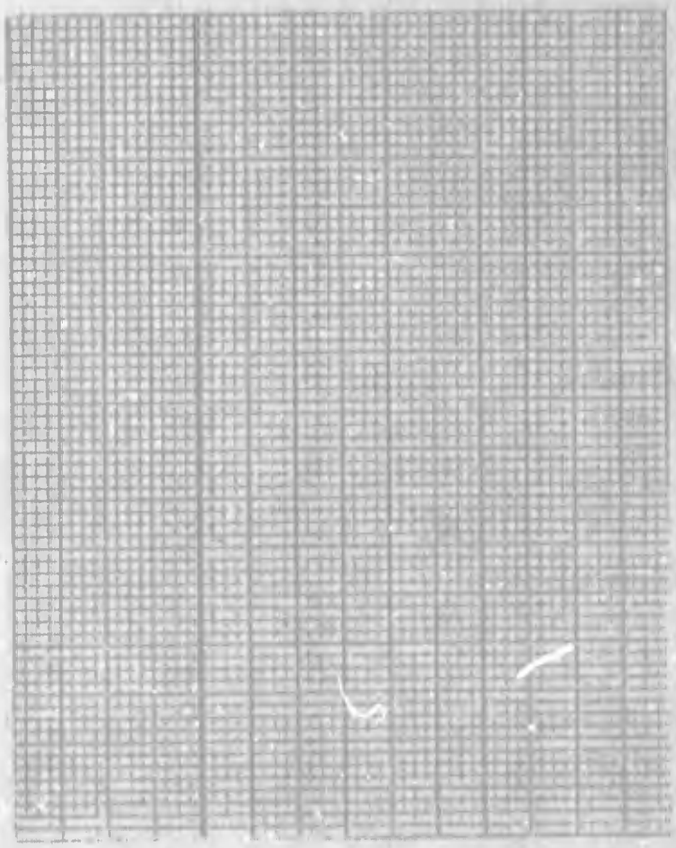
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
___ Water Absorption ___ Fungus ___ Beam strength ✓ Shear Strength
___ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started: 8-18-66

Date Test was completed: 8-18-66





Remarks:

A300 ULT.

Test Performed By: D. Arnold

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 25 - H131

Fabrication Data:

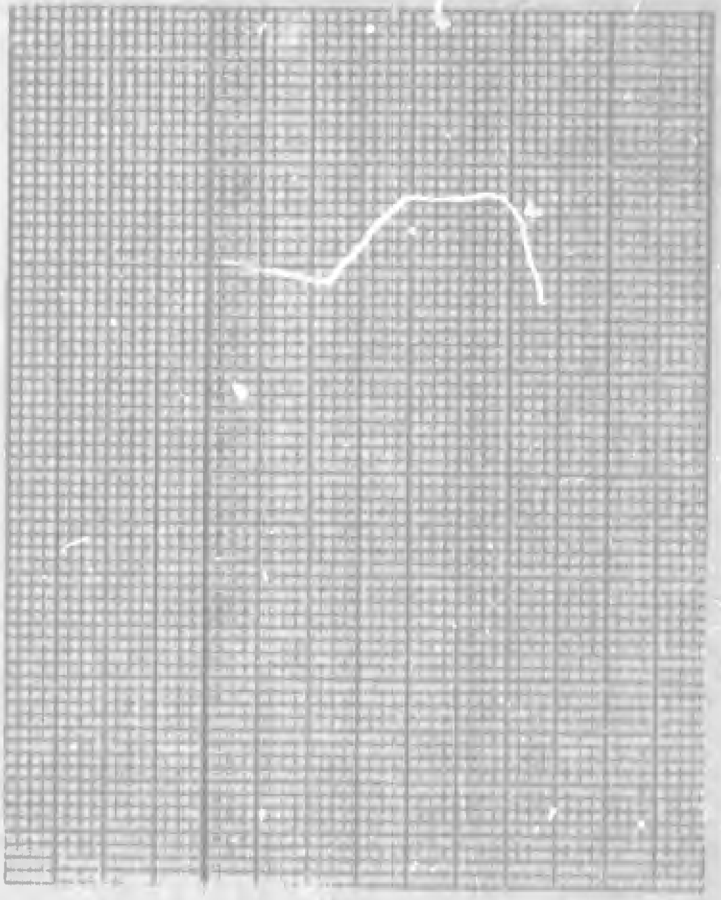
Date Sample was bonded: 6-24-66
Adhesive Used: FULLER R7007R
Curing Time and Temperature: 24 hrs at Room Temp
Clamping Pressure: 5-10 psi
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength _✓_ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other
Date Test was started: 8-4-66
Date Test was completed: 8-4-66

P	δ				



failed at 1000 lbs

Remarks:

Core failed first then bond
~~[illegible] -75°F~~
~~[illegible] -40°F~~

Test Performed By: [illegible signature]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 26- HP (3)

Fabrication Data:

Date Sample was bonded: 6-29-66

Adhesive Used: FULLER R7001C

Curing Time and Temperature: 24 Hrs at Room Temp

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ✓ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started: 8-4-66

Date Test was completed: 8-4-66

Failed at 1800 lbs.

Remarks:

Core failed first then bond

~~[illegible]~~

~~Estimated Strength of sample [illegible]~~

Test Performed By: [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 27-D(3)

Fabrication Data:

Date Sample was bonded: 6-24-66

Adhesive Used: FULLER B7007B

Curing Time and Temperature: 24 Hrs. at Room Temp.

Clamping Pressure: 5-10 PSI

Remarks:

Test Data:

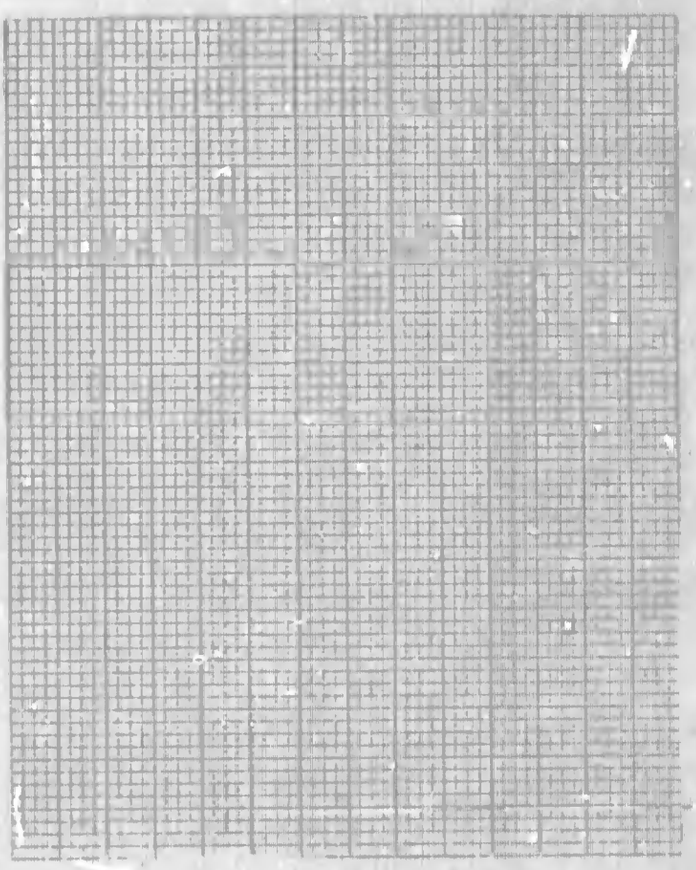
Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture ____ Water Absorption ____ Fungus ____ Beam strength ____ Shear Strength ____ Teeter Roller

Test Temperature: ____ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 8-4-66

Date Test was completed: 8-4-66

P	δ				



failed at 118 PSI

Remarks:

Core failed first then bond.

Test Performed By: [illegible]

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 28-DP (3)

Fabrication Data:

Date Sample was bonded: 6-24-66
Adhesive Used: FULLER 8700 ?Q
Curing Time and Temperature: 24 Hrs at Room Temp.
Clamping Pressure: 5-10 PSI
Remarks: ______

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ✓ Shear Strength ___ Teeter Roller

Test Temperature: ✓ 125° F ___ Room Temperature ___ -40° F ___ other
Date Test was started: 8-4-66
Date Test was completed: 8-4-66

P	S				

Failed at 1450 lbs.

Remarks:

Core failed first then bond
~~Temp. of cold box approx: 75°F~~
~~Estimated temp. of sample: -40°F~~

Test Performed By: J. [illegible]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 44R(3)

Fabrication Data:

Date Sample was bonded: _____

Adhesive Used: _____

Curing Time and Temperature: _____

Clamping Pressure: _____

Remarks: _____

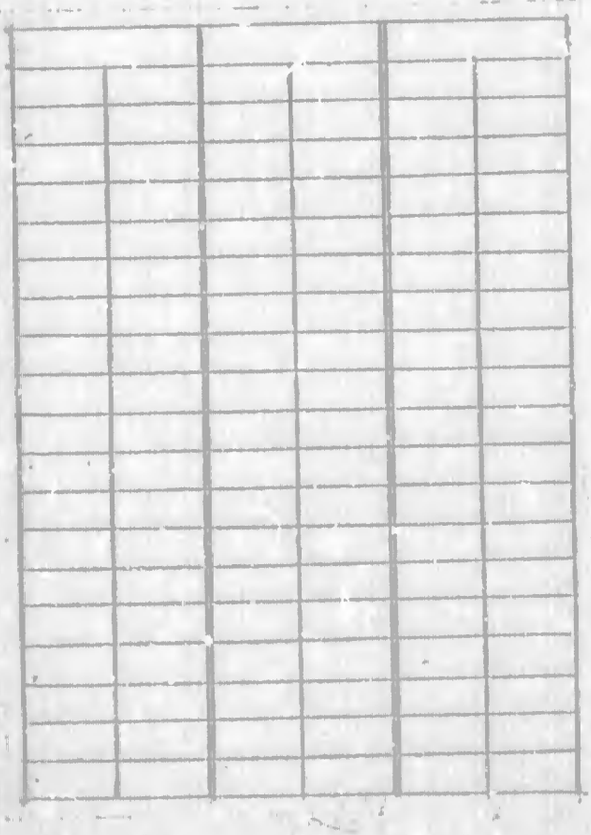
Test Data:

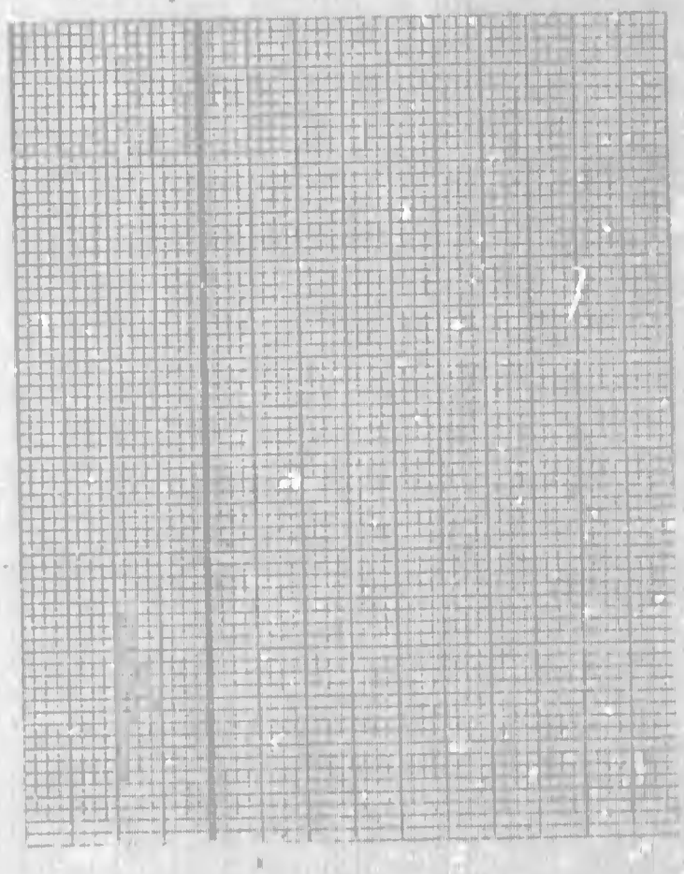
Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Beam strength ✓ Shear Strength
____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other

Date Test was started: 5-18-66

Date Test was completed: 5-18-66





Remarks: 3350 U.L.T.

Test Performed By: D. Richards

BROOKE & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 455(3)

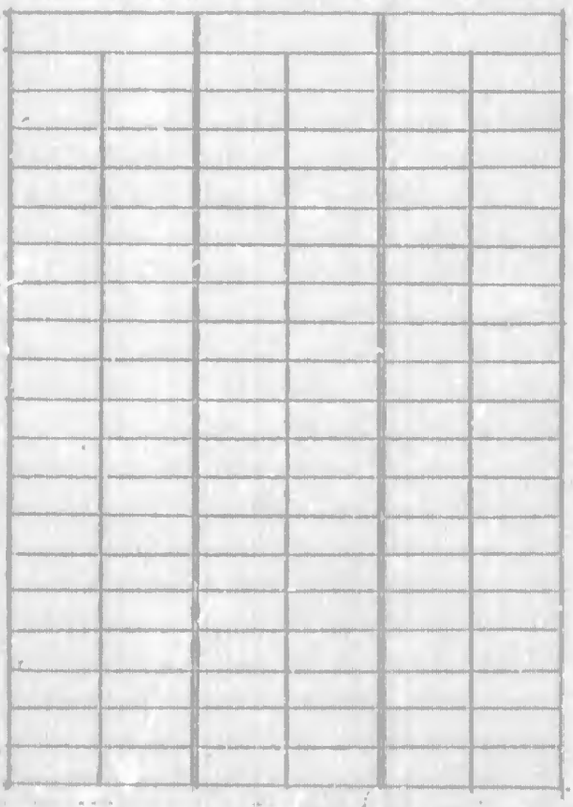
Fabrication Data:

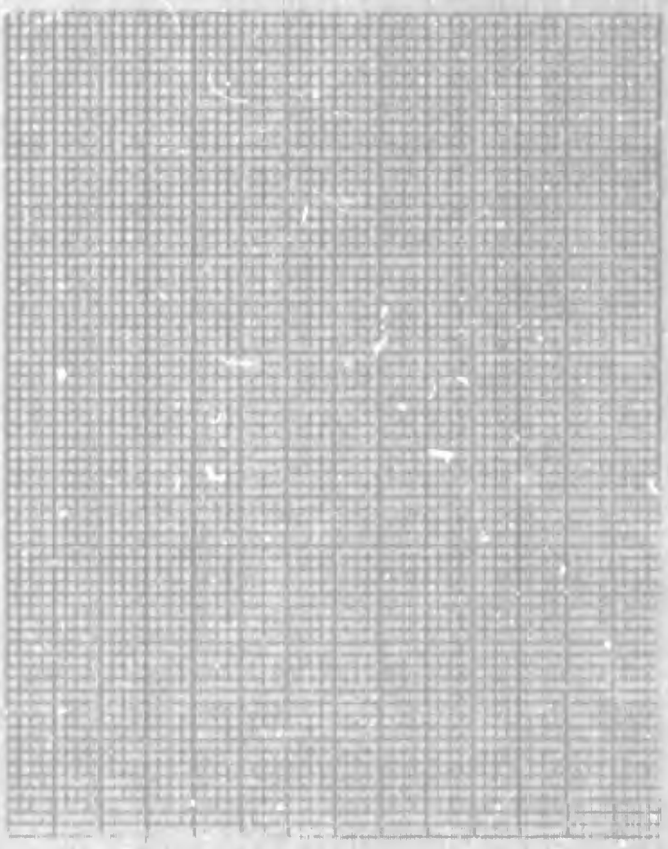
Date Sample was bonded:
Adhesive Used:
Curing Time and Temperature:
Clamping Pressure:
Remarks:

Test Data:

Type of Test: ____ Conveyor ____ Ball ____ Roller ____ Caster ____ Puncture
____ Water Absorption ____ Fungus ____ Beam strength ✓ Shear Strength
____ Teeter Roller

Test Temperature: ✓ 125° F ____ Room Temperature ____ -40° F ____ other
Date Test was started: 8-18-66
Date Test was completed: 8-18-66





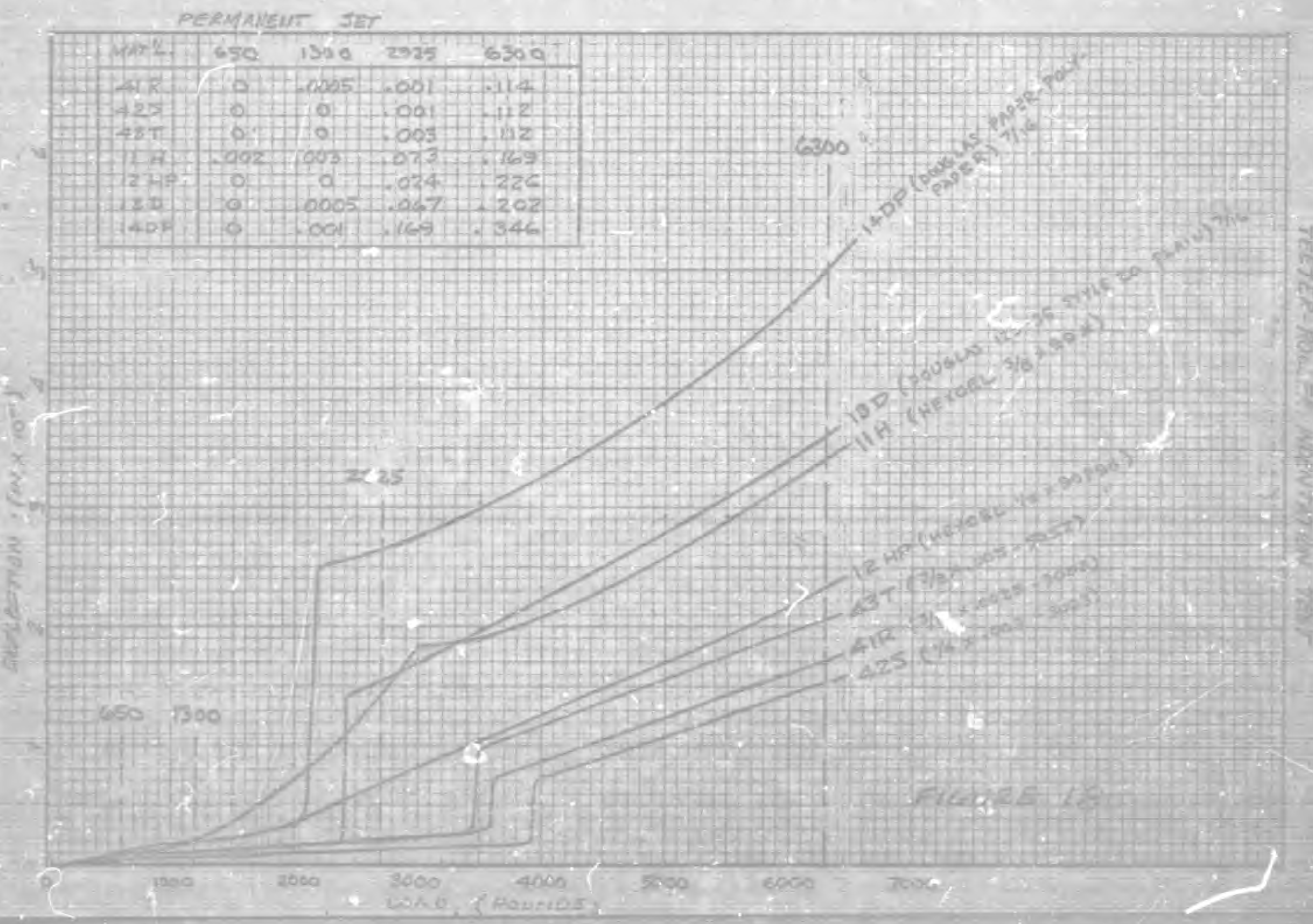
Remarks:

3700 ULT.

Test Performed By: A. Rabenhorst

BROOKS & PERKINS

NAME OF TEST:	Teeter Roller Indentation.
ITEMS TESTED:	11H(4), 12HP(4), 13D(4), 14DP(4), 41R(4), 42S(4), 43T(4), C, D, E, F, G, H, J.
PURPOSE OF TEST:	To determine the loading effect of 2 inch diameter x 3 3/4 inch long roller under various loads on each of (6) alternate core materials.
DESCRIPTION OF TEST APPARATUS:	Baldwin Tensile Test Machine, 60,000 pound capacity and dial indicator, .001" divisions.
TEST PROCEDURE:	The test specimen was placed atop a piece of 3/8" cell size 99 pound paper honeycomb 2 1/8 inches thick of the same size as the test specimen. A teeter roller, 2 1/4 inches in diameter x 3 3/4 inches long was placed atop the test specimen and the load applied to the roller. Permanent set measurements were made at loads equivalent to 650, 1300, 2925 pounds and the teetering load of 6300 pounds.
TEST RESULTS:	Two paper honeycomb specimens yielded before reaching the 2925 pounds load, one paper honeycomb specimen produced erratic results. The three aluminum honeycomb specimens and one paper honeycomb material did not yield at the 2925 pounds load level. Only the three aluminum samples had no appreciable permanent set at 4.5 g. Results plotted and shown on Figure 18.
EXHIBIT:	Figure 18.



PERMANENT SET

MAT'L.	650	1300	2925	6300
41R	0	.0005	.001	.114
42S	0	0	.001	.112
43T	0	0	.003	.112
11H	.002	.003	.073	.169
12HP	0	0	.024	.226
13D	0	.0005	.067	.202
14DP	0	.001	.169	.346

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 11 H (4)

Fabrication Data:

Date Sample was bonded:
Adhesive Used:
Curing Time and Temperature:
Clamping Pressure:
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
✓ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ___ -40° F ___ other
Date Test was started:
Date Test was completed:

P	δ				
100	0				
585	.006	.002	SET		
1170	.015	.003	SET		
1500	.037				
2000	.082				
2720	.134	.073	SET		
3000	.182				
3500	.188				
4000	.204				
4500	.233				
5000	.259				
5500	.292				
6000	.323				
6450	.355	.169	SET		

Remarks:

Test Performed By: D. Robertson

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 12 HP (4)

Fabrication Data:

Date Sample was bonded:

Adhesive Used:

Curing Time and Temperature:

Clamping Pressure:

Remarks:

Test Data:

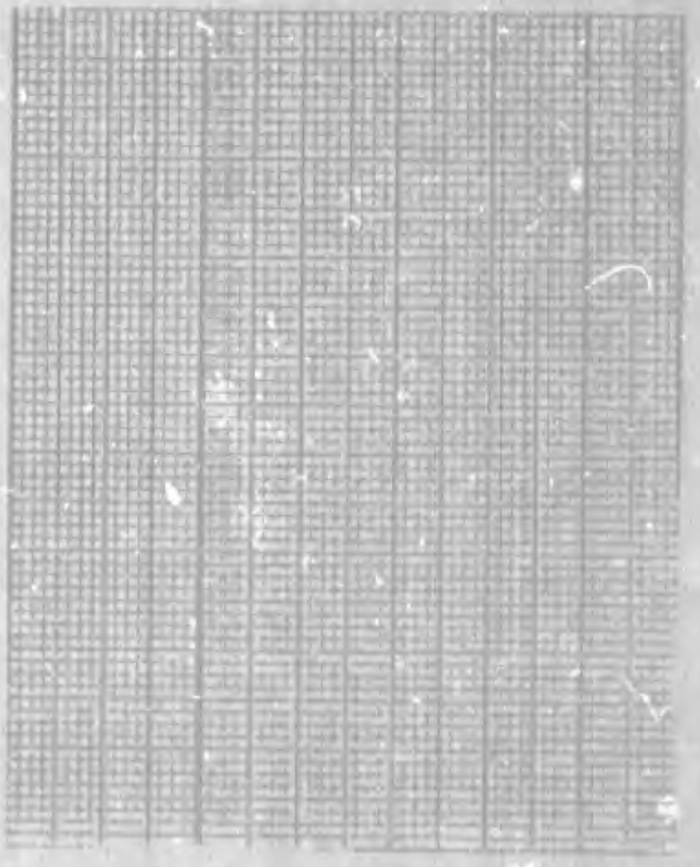
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ✓ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started:

Date Test was completed:

P	δ				
100	0				
585	.009				
1120	.016	.001	SET		
1500	.021				
2000	.032	2100	YIELD		
2630	.045				
3000	.275				
3500	.302				
4000	.328				
4500	.356				
5000	.385				
5500	.427				
6000	.463				
6450	.512	.346	SET		



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 13 D (4)

Fabrication Data:

Date Sample was bonded:

Adhesive Used:

Curing Time and Temperature:

Clamping Pressure:

Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ✓ Tecter Roller

Test Temperature: ___ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started:

Date Test was completed:

P	δ				
100	0				
585	.011				
1170	.020				
1500	.022				
2000	.032				
2630	.063	.024	SET		
3000	.084				
3500	.106				
4000	.127				
4500	.149				
5000	.171				
5500	.196				
6000	.218				
6450	.241	.226	SET		

Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 14 DP (4)

Fabrication Data:

Date Sample was bonded:

Adhesive Used:

Curing Time and Temperature:

Clamping Pressure:

Remarks:

Test Data:

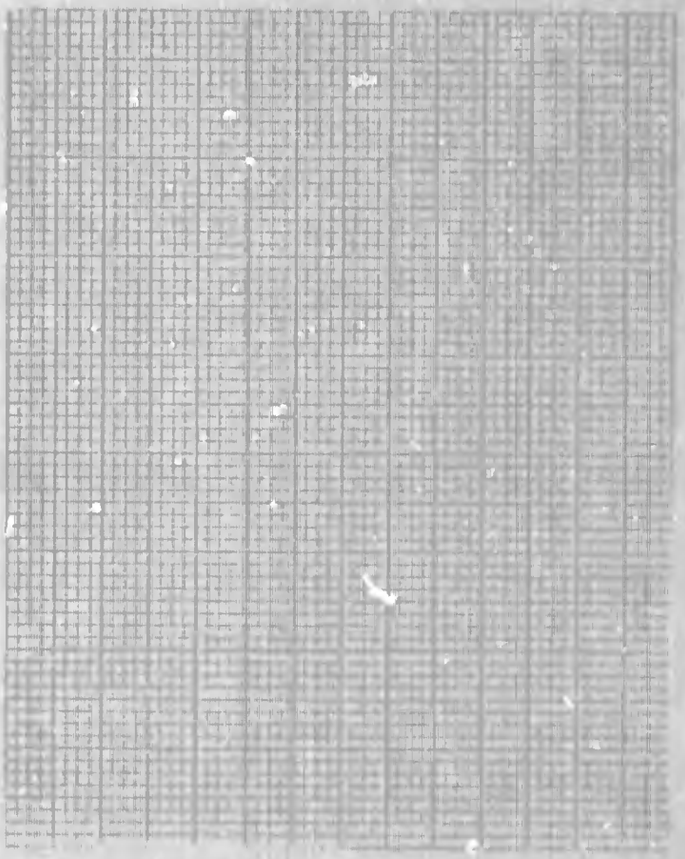
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
✓ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started:

Date Test was completed:

P	δ				
100	0				
585	.001				
1120	.007	.0005 SET			
1500	.010				
2000	.015	2400 YIELD			
2630	.144	.007 SET			
3000	.172				
3500	.200				
4000	.231				
4500	.258				
5000	.292				
5500	.312				
6000	.340				
6450	.368	.202 SET			



Remarks:

Test Performed by: [illegible]

BROOKS & PARKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORS EVALUATION

Sample Identification Code: 41 B (4)

Fabrication Data:

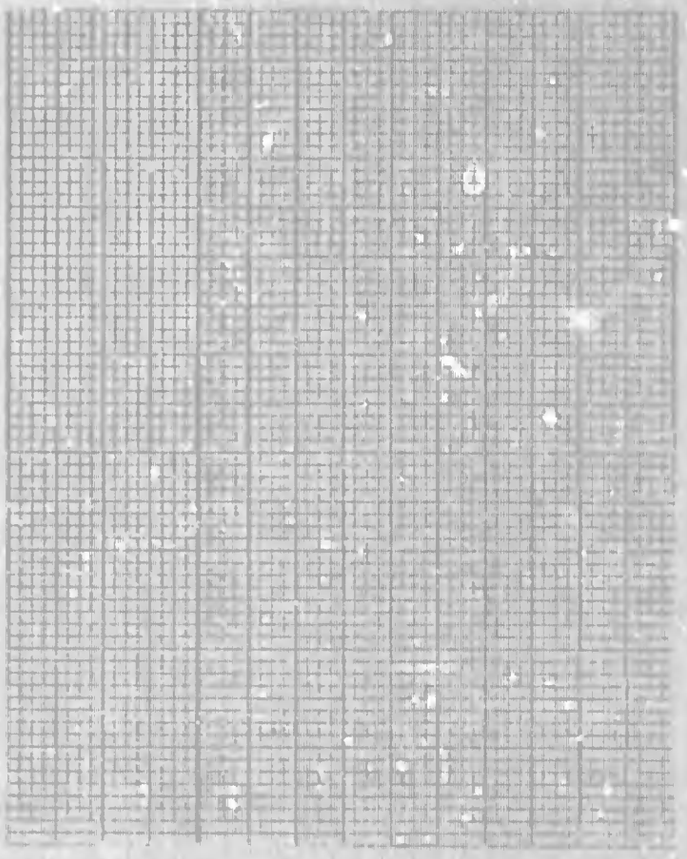
Date Sample was bonded:
Adhesive Used:
Curing Time and Temperature:
Clamping Pressure:
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
✓ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ___ -40° F ___ other
Date Test was started:
Date Test was completed:

P	S				
100	0				
585	.005				
1120	.011	.0005 SET			
1500	.014				
2000	.017				
2630	.021	.01 SET			
3000	.023				
3500	.030	34.00	YIELD		
4000	.089				
4500	.107				
5000	.124				
5500	.143				
6000	.160				
6450	.173	.114 SET			



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

"ZERO" DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 42 3(4)

Fabrication Data:

Date Sample was bonded:
Adhesive Used:
Curing Time and Temperature:
Clamping Pressure:
Remarks:

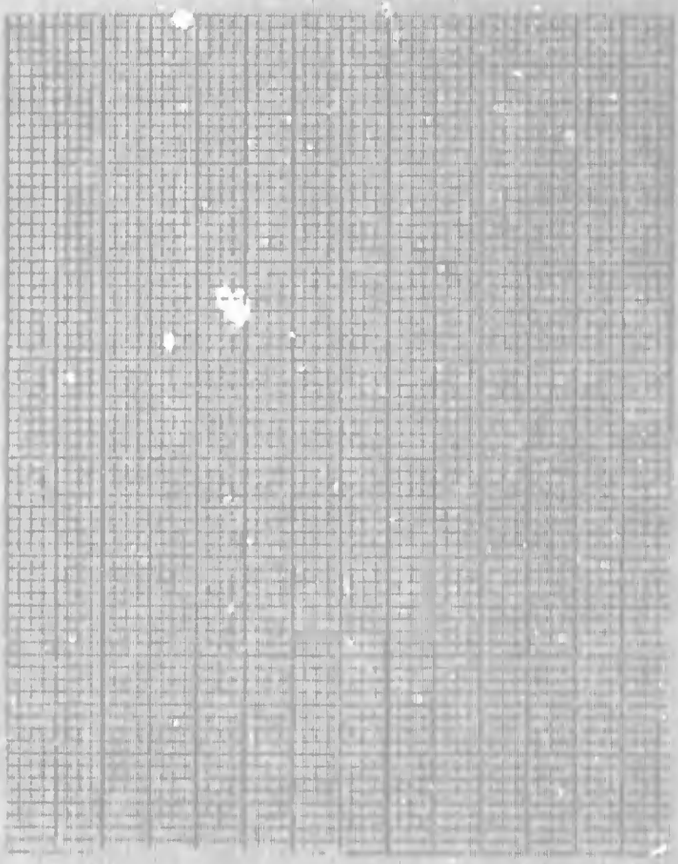
Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ✓ Teeter Roller

Test Temperature: ___ 125° F ✓ Room Temperature ___ -40° F ___ other

Date Test was started:
Date Test was completed:

P	d				
100	0				
595	.004				
1170	.007				
1500	.009				
2000	.012				
2630	.014	.20V	SET		
3000	.016				
3500	.018	3950	YIELD		
4000	.078				
4500	.093				
5000	.110				
3500	.125				
6000	.142				
6450	.157	.112			



Remarks:

Test Performed By: [signature]

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: 43 T (4)

Fabrication Data:

Date Sample was bonded:

Adhesive Used:

Curing Time and Temperature:

Clamping Pressure:

Remarks:

Test Data:

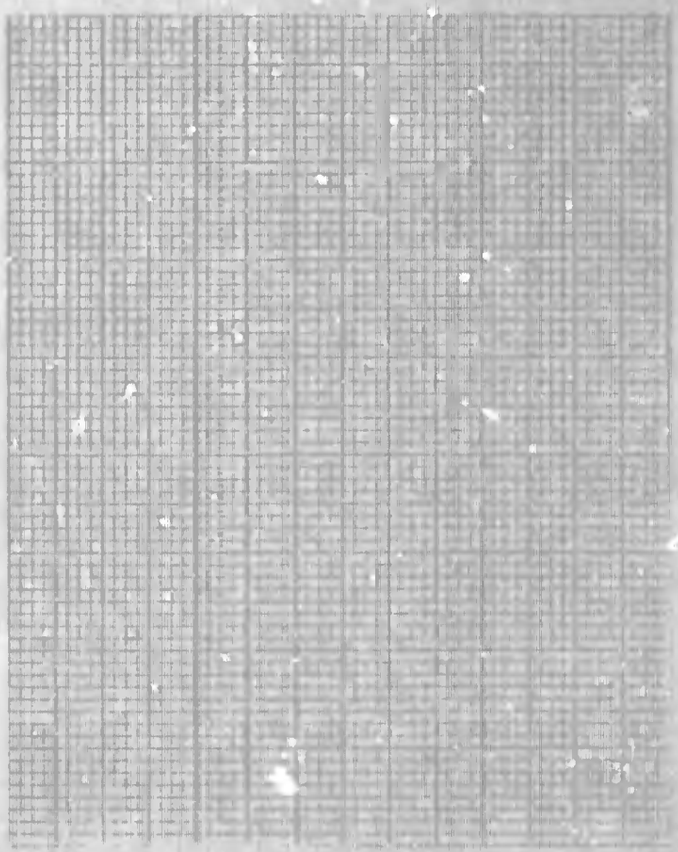
Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
✓ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started:

Date Test was completed:

P	δ				
100	0				
500	.005				
1000	.008				
1500	.015				
2000	.028				
2500	.040	.005 SET			
3000	.042	3d 50	YIELD		
3500	.052				
4000	.103				
4500	.123				
5000	.142				
5500	.161				
6000	.181				
6450	.188	.010 SET			



Remarks:

Test Performed By: A. Pellegrino

BROOKS & PERKINS INC.

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: B

Fabrication Data:

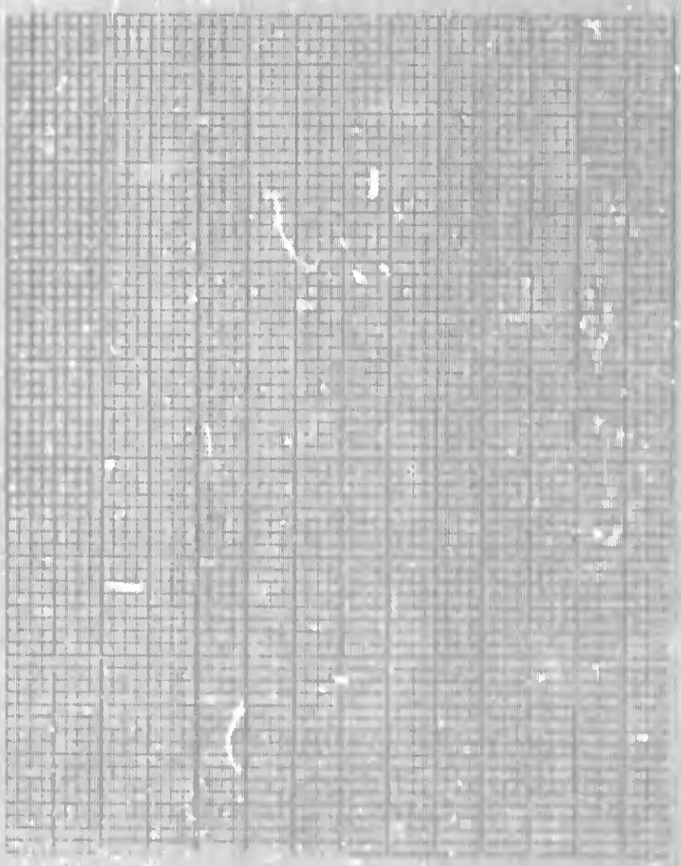
Date Sample was bonded:
Adhesive Used:
Curing Time and Temperature:
Clamping Pressure:
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture
___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength
✓ Teeter Roller

Test Temperature: ___ 125° F ___ Room Temperature ___ -40° F ___ other
Date Test was started:
Date Test was completed:

P	δ				
100	0				
585	.004	.0012 SET			
1120	.006	.001 SET			
1500	.007				
2000	.009				
2630	.011	.001 SET			
3000	.0115				
3500	.0135				
4130					
5000					
5500					
6000					
6450	.024				



Remarks:

Test Performed By: E. R. Brooks

TEST DATA

UNIVERSAL PLATFORM CORE EVALUATION

Sample Identification Code: A

Fabrication Data:

Date Sample was bonded:
Adhesive Used:
Curing Time and Temperature:
Clamping Pressure:
Remarks:

Test Data:

Type of Test: ___ Conveyor ___ Ball ___ Roller ___ Caster ___ Puncture ___ Water Absorption ___ Fungus ___ Beam strength ___ Shear Strength ✓ Tecter Roller

Test Temperature: ___ 125° F ___ Room Temperature ___ -40° F ___ other

Date Test was started:

Date Test was completed:

P	δ				
100	0				
585	0				
1120	.003	.001			
1500	.004				
2000	.006				
2550	.073	.051 SET			
6450	.245	.181 SET			

Remarks:

Test Performed By: [illegible]

APPENDIX A

Fungus Test

THE DETROIT TESTING LABORATORY, INC.

12800 NORTHEND AVE. DETROIT, MICH. [illegible] PHONE [illegible] AREA CODE [illegible]

[illegible]	[illegible]	[illegible]		[illegible]
608005 C	5749	8-2-66		9-2-66

REPORT FOR

Brooks & Perkins Inc.
1950 W. Fort Street
Detroit, Michigan 48216

Attention: Mr. L. Roever

RECEIVED
SEP [illegible]
BROOKS & PERKINS INC

SUBJECT:

Report of Fungus Resistance Test.

DESCRIPTION OF SAMPLE:

The client submitted five (5) samples of honey comb, sandwich panels, 14 inches long by 6 inches wide by 2 inches thick. The samples were identified as:
*A16HP(2) "Plastic," "19HP1", "18H1", *20D(1) "21D1", and "21DF1".

DESCRIPTION OF TEST:

One (1) specimen 2 in. by 2 in. by 3/8 in., was cut from each sample. The specimens were placed in petri dishes containing a dextrose culture medium. The specimens were innoculated by spraying them with a suspension containing the following fungi:

Chaetomium globosim, Aspergillus niger, Aspergillus flavus, and Penicillum citrimum.

The specimens were incubated for 14 days at 87°±1°F and 100% relative humidity.

APPLICABLE SPECIFICATIONS:

MIL - STD - 810 A., Method 508.1 Procedure II.

MIL - F - 8261 A

*Sample Identification corrected by Brooks & Perkins, Inc.

RESULTS:

"[illegible]" *A1-HP(2)
Showed Aspergillus flavus and Aspergillus niger growing on approximately 60 to 70 percent of the sample.

"19HP1"
Showed light growth of Aspergillus flavus and Penicillum citrinum.

"18H1"
Showed dense growth of Penicillum citrinum and Aspergillus flavus.

"21D1" *20D(1)
Showed no fungus growth.

"21DP1"
Showed very light growth of Aspergillus flavus.

THE DETROIT TESTING LABORATORY, INC.

Carl Lee Carlson
Senior Technician

Gerald M. McBean
Material Testing Supervisor

CLC:GMc:rl

*Sample Identification corrected by Brooks & Perkins, Inc.

APPENDIX B

Photographs

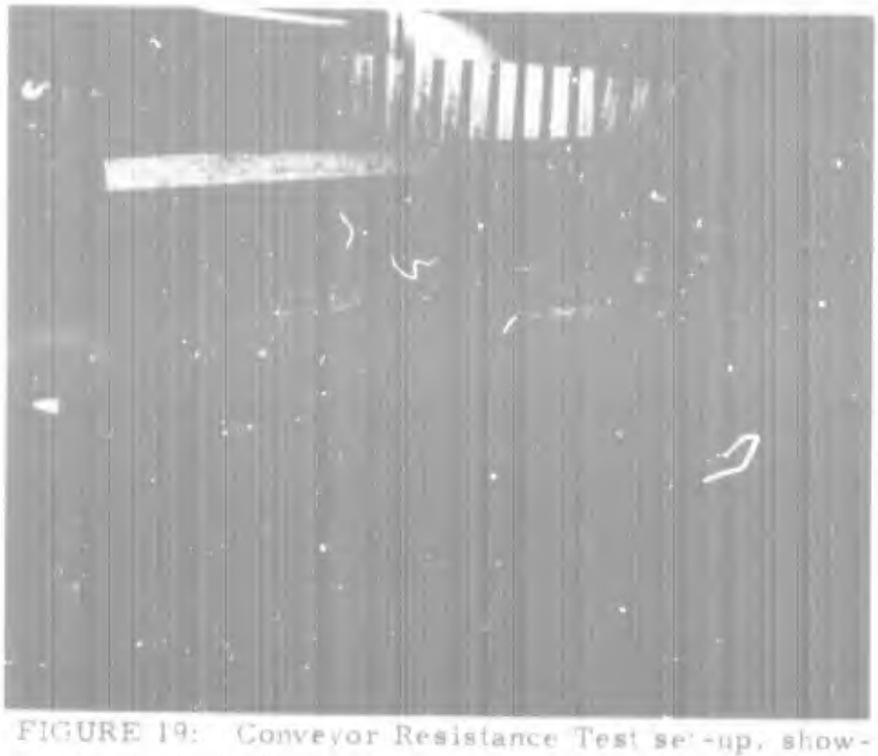


FIGURE 19: Conveyor Resistance Test set-up, showing method of adjusting forces. Caster test shown dollies for ball and roller test left and front of table respectively.

FIGURE 20: Puncture Resistance Test. 1" square mandrel center, dial indicator gage attached to upper head of Baldwin Testing Machine.

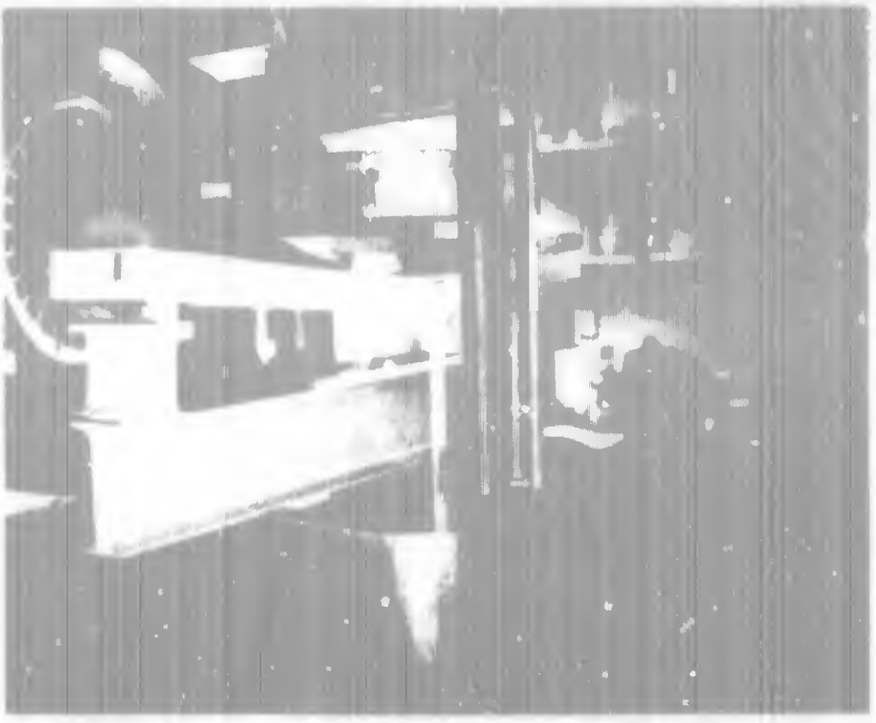


FIGURE 21: Core-to-skin Adherence (Beam) Test, showing method of loading, three equal spans.

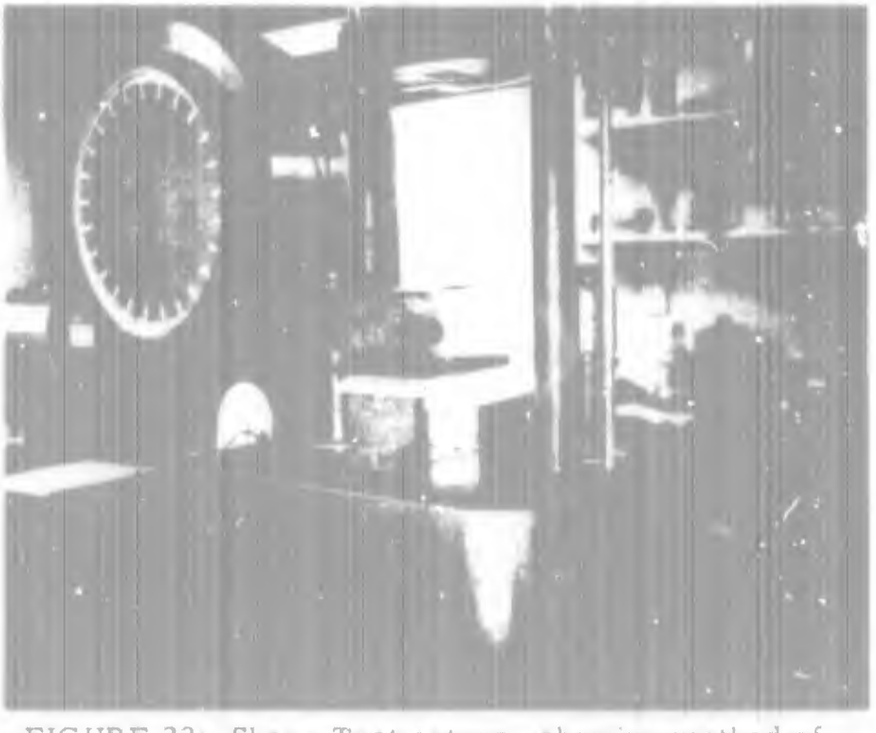


FIGURE 22: Shear Test set-up, showing method of loading in Baldwin Test Machine.

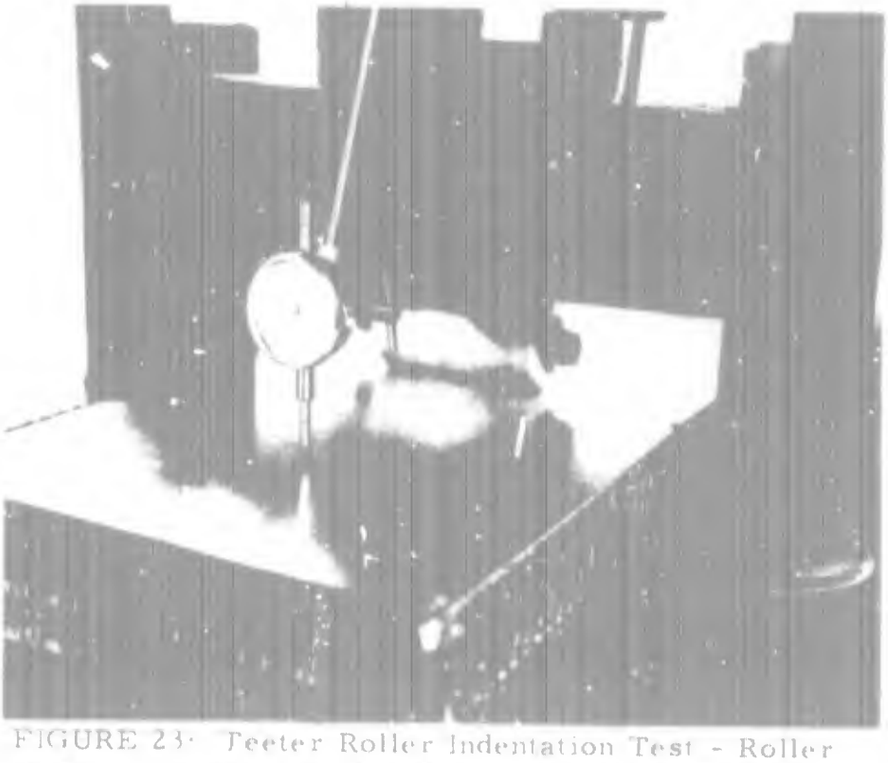


FIGURE 23. Teeter Roller Indentation Test - Roller in center on sample with dial indicator attached to Baldwin Testing Machine.

APPENDIX C

Supplemental Tester and Conveyor Roller Tests

NAME OF TEST: Supplemental Tester Roller Indentation Tests.

ITEM TESTED:

Core Material	Facing Material Top	Bottom	Adhesive
(C)1/4-5052-.003	.060-6061-T6	.080-7075-T6	[illegible]
(D)1/4-5052-.003	.060-6061-T6	.080-7075-T6	NARMCO 3[illegible]
(E)1/4-5052-.003	.060-6061-T6	.100-7075-T6	NARMCO 3[illegible]
(F)1/4-5052-.003	.060-6061-T6	.125-7075-T6	NARMCO 3[illegible]
(G)1/8-5056-.002	.060-6061-T6	.080-7075-T6	R-7047-3
(H)1/8-5056-.002	.060-6061-T6	.080-7075-T6	NARMCO 3[illegible]
(J)1/8-5056-.002	.060-6061-T6	.100-7075-T6	NARMCO 3[illegible]

PURPOSE OF TEST: To determine the facing material, core material and adhesive system required to resist the static loading caused by the reaction of the center tester roller of an equally spaced (3) row conveyor system. The test load was 6300 pounds.

DESCRIPTION OF TEST APPARATUS: Baldwin testing machine one (1) 7/8" diameter x 2 3/4" long solid aluminum alloy roller and a V-block to transmit a load from the testing machine to the roller.

TEST PROCEDURE: All samples were statically tested at 6300 pounds by means of the solid roller, V-block, and Baldwin testing machine. For samples which failed to yield at 6300 pounds, the load was increased to find its yield point. Indentation measurements were made for specimens yielding below 6300 pounds.

TEST RESULTS: The results of the 6300 pound load test were as follows:

Sample	Indentation	Yield Point (Pounds)
C	.090 - .100	6300
D	.060	6300
E	.080	6300
F	.080	6300
G	0	6570
H	.040	5500
J	0	7190

G and J were the only samples to equal or surpass the 6300 pound load test.

G was therefore selected for further testing in view of its lighter weight.

Brooks & Perkins

NAME OF TEST:	Supplemental Roller Conveyor Test.
ITEM TESTED:	J (1/8" -5056-.002 aluminum honeycomb). Facing Material: Top .06"-6061-T6 Bottom: .09"-7075-T6 Adhesive: Fuller K-7007-H(Thixotropic).
PURPOSE OF TEST:	To determine the effect of a dynamic load of 750 pounds per roller, over an extended period of cycling, on the test specimen.
DESCRIPTION OF TEST APPARATUS:	Two (2) roller conveyor dolly with rollers set at 10" spacing, (2) concrete blocks with a combined weight of 1300 pounds, apparatus to confine the dolly and blocks to 12" of travel.
TEST PROCEDURE:	The test specimen was laid on a flat section of the floor and the roller dolly placed atop and adjacent to the .09" skin of the sample. The (2) concrete blocks were stacked atop the dolly and the set up restrained laterally by the tines of a fork lift truck. The longitudinal travel of the dolly and blocks was set by means of 2 x 4's clamped across the fork lift tines. The load was cycled back and forth by and over the test sample for a total distance of 500 feet, and the specimen was inspected.
TEST RESULTS:	The sample showed no signs of indentation or delamination.