



April 28, 2015

<b>HTS Report #:</b>	<b>PLIF516.002A.doc</b>
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Mr. Steve Parks  
 Perma-Liner Industries  
 13000 Automobile Boulevard, Suite 300  
 Clearwater, FL 33762

Customer Project Name:  
 P.O. #: 14219  
 Date Sample Received: 4/21/15  
 Date Sample Tested: 4/27/15

One (1) sample of fiber glass plate was delivered to HTS' laboratory for testing. The sample was tested in accordance with ASTM D695, ASTM D638 Type II, and ASTM D790 Method I Procedure A. A Support Span-to-Depth Ratio of 16 to 1 was used as specified in the test standard ASTM D790. Thickness measurements, compressive strength, tensile strength, flexural stress and flexural modulus of elasticity tests were performed on the sample. Five (5) specimens were cut and tested from the sample. The results summarized and reported below are averages of the five (5) specimens. A test report for the sample is attached.

SAMPLE ID	COMPRESSIVE STRENGTH (psi) ASTM D 695	TENSILE STRENGTH (psi) ASTM D 638	TENSILE ELONGATION (%) ASTM D 638	FLEXURAL STRENGTH (psi) ASTM D 790	FLEXURAL MODULUS (psi) ASTM D 790
Lateral Lining, Innerseal 2.0	16,836	15,327	3.3	18,582	578,172

The following table contains the thickness measurements for each individual specimen tested.

MEASUREMENT OF THICKNESS FOR PIPE ASTM D 2122										
Sample ID	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Combined Total Average/Specimen	
									in	mm
Lateral Lining, Innerseal 2.0	.149	.148	.145	.149	.165	.160	.170	.169	0.157	4.0

Technician	E. Carrillo
Time	2 hrs

Sincerely,

  
 Rick Eastwood *KP*  
 Vice President

This test report relates only to the items tested and shall not be reproduced except in full without approval of HTS, Inc.



April 28, 2015

<b>HTS Report #:</b>	<b>PLIF516.002B.doc Revised</b>
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Mr. Steve Parks  
 Perma-Liner Industries  
 13000 Automobile Boulevard, Suite 300  
 Clearwater, FL 33762

Customer Project Name:  
 P.O #: 14219  
 Lab Temperature: 71°F  
 Lab Humidity: 50%

The following 1 sample of felt plate was delivered to our laboratory on 4/21/15.

SAMPLES RECEIVED								
	Sample I.D.	Manhole		Sample I.D.	Manhole		Sample I.D.	Manhole
1	Lateral Lining Innerseal 2.0	---	2			3		

Conformance testing was performed in accordance with the following test methods. The test results are summarized on the subsequent pages. It should be noted. The test specimens and test sample used for this work are believed to be representative of the material produced under this designation. However, these results are indicative only of the specimens that were actually tested. HTS, Inc. neither accepts responsibility for nor makes claims to the final use and purpose of the material.

TESTING PERFORMED	TESTING PERFORMED
ASTM D792 – Specific Gravity	

Sincerely,

Rick Eastwood  
 Vice President

**DENSITY – ASTM D 792 METHOD A**

Temperature (°F): 71

Date Tested: 4/27/15

Humidity (%): 50

Sample Size: 1" x 1"x.15"

Sample	Spec. #	Density 23/23°C (g/cc)
Lateral Lining	1	1.50
Innerseal 2.0	2	1.50
	Avg.	1.50
	S.D.	0.00



Monday, April 27, 2015

COMPRESSIVE PROPERTIES OF RIGID PLASTICS  
 ASTM D695

INSTRON CORPORATION  
 BLUEHILL V. 2.26

OPERATOR NAME:  
 E. CARRILLO

TEMPERATURE (F) / HUMIDITY (%)  
 71 / 50

RATE (in/min)  
 .05

SAMPLE ID:

LATERAL LINING, INNERSEAL 2.0

	WIDTH (in)	THICKNESS (in)	GUAGE LENGTH (in)
1	0.554	0.163	1.0
2	0.545	0.170	1.0
3	0.545	0.151	1.1
4	0.545	0.155	1.1
5	0.542	0.157	1.1

	COMPRESSIVE STRENGTH (psi)
1	15508
2	15633
3	17512
4	18335
5	17191
Mean	16836
Minimum	15508
Maximum	18335
Standard Deviation	1229



Monday, April 27, 2015

TENSILE PROPERTIES OF PLASTICS  
 ASTM D638  
 TYPE II

INSTRON CORPORATION  
 BLUEHILL V. 2.26.

OPERATOR NAME  
 E. Carrillo

TEMPERATURE (F) / HUMIDITY (%)  
 71 50

RATE (in/min)  
 .2

SAMPLE ID  
 LATERAL LINING, INNERSEAL 2.0

	WIDTH (in)	THICKNESS (in)	GAGE LENGTH (in)	GRIP DISTANCE (in)
1	0.233	0.144	2.0	5.3
2	0.265	0.143	2.0	5.3
3	0.276	0.145	2.0	5.3
4	0.275	0.140	2.0	5.3
5	0.283	0.155	2.0	5.3

	TENSILE STRENGTH @ MAX (psi)	ELONGATION @ MAX (%)
1	14961	3.3
2	14875	3.9
3	16294	3.3
4	14006	2.7
5	16496	3.3
Mean	15327	3.3
Standard Deviation	1047.1	0.4
Minimum	14006	2.7
Maximum	16496	3.9



Monday, April 27, 2015

FLEXURAL PROPERTIES OF PLASTICS  
 ASTM D790  
 3 POINT BEND

INSTRON CORPORATION  
 BLUEHILL V. 2.26.

OPERATOR NAME:  
 E. CARRILLO

TEMPERATURE (F) / HUMIDITY (%)  
 71 / 50

RATE (in/min)  
 .093

SAMPLE ID:

LATERAL LINING, INNERSEAL 2.0

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	0.555	0.168	2.5
2	0.554	0.170	2.5
3	0.548	0.172	2.5
4	0.554	0.176	2.5
5	0.545	0.177	2.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0500	86.8	20791	609148
2	0.0500	79.9	18723	590032
3	0.0500	77.7	17967	560758
4	0.0500	78.6	17171	554848
5	0.0500	83.1	18259	576073
Mean	0.0500	81.2	18582	578172
Standard Deviation	0.0000	3.8	1357	22090
Minimum	0.0500	77.7	17171	554848
Maximum	0.0500	86.8	20791	609148