



April 27, 2012

HTS Report #:	PLIF219.003.doc
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Mr. Steve Parks
Perma-Liner Industries
13000 Automobile Boulevard, Suite 300
Clearwater, FL 33762

Customer Project Name:
P.O. #: 9169
Date Sample Received: 4/20/12
Date Sample Tested: 4/27/12

One (1) sample of cured-in-place pipe liner 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, tensile modulus, 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
6mm Polyester	4191	3621	7.1	6891	463,544

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

MEASUREMENT OF THICKNESS FOR PIPE ASTM D 2122									
									Combined Total Average/Specimen
Sample ID	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	in mm
6mm Polyester	.256	.262	.253	.252	.258	.243	.243	.249	0.252 6.4

Technician	E. Carrillo
Time	2 hrs

Sincerely,

Rick Eastwood
Vice President

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



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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:

6mm POLYESTER

	WIDTH (in)	THICKNESS (in)	GUAGE LENGTH (in)
1	0.544	0.259	4.1
2	0.540	0.262	4.0
3	0.543	0.261	4.0
4	0.544	0.258	4.0
5	0.544	0.254	4.0

	COMPRESSIVE STRENGTH (psi)
1	4139
2	4325
3	4039
4	4398
5	4055
Mean	4191
Minimum	4039
Maximum	4398
Standard Deviation	162



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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:

6mm POLYESTER

	WIDTH (in)	THICKNESS (in)	GAGE LENGTH (in)	GRIP DISTANCE (in)
1	0.278	0.241	2.0	5.3
2	0.282	0.239	2.0	5.3
3	0.268	0.263	2.0	5.3
4	0.282	0.262	2.0	5.3
5	0.275	0.245	2.0	5.3

	TENSILE STRENGTH @ MAX (psi)	ELONGATION @ MAX (%)
1	3587	8.1
2	3593	6.0
3	3648	7.0
4	3647	8.9
5	3632	5.5
Mean	3621	7.1
Standard Deviation	29	1.4
Minimum	3587	5.5
Maximum	3648	8.9



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FLEXURAL PROPERTIES OF PLASTICS
ASTM D790
3 POINT BEND

INSTRON CORPORATION
BLUEHILL V. 2.26

OPERATOR NAME:
K. PHOUANGSAVANH

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

RATE (in/min)
.110

SAMPLE ID:

6mm POLYESTER

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	0.539	0.240	4.0
2	0.532	0.241	4.0
3	0.532	0.245	4.0
4	0.541	0.247	4.0
5	0.536	0.257	4.0

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0480	36.7	7097	448248
2	0.0500	34.7	6745	473717
3	0.0327	35.7	6704	444520
4	0.0450	38.0	6901	467222
5	0.0449	41.3	7007	484011
Mean	0.0441	37.3	6891	463544
Standard Deviation	0.0067	2.6	168	16821
Minimum	0.0327	34.7	6704	444520
Maximum	0.0500	41.3	7097	484011