



March 16, 2015

<b>HTS Report #:</b>	<b>MNF508.004.Doc</b>
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Mr. Ron McNeil  
 McNeil Technologies, Inc.  
 P.O. Box 1200  
 Destin, FL 32540

Customer Project Name:  
 Customer Project No.:  
 Date Sample Received: 3/02/15  
 Date Sample Tested: 3/12/15

Four (4) samples of fiber glass plate were delivered to HTS' laboratory for testing. The samples were 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. Compressive strength, tensile strength, thickness measurements, flexural stress and flexural modulus of elasticity tests were performed on the sample. Five (5) specimens were cut and tested from each sample. The results summarized and reported below are averages of the five (5) specimens. A test report for each sample is attached.

SAMPLE ID	MANHOLE TO MANHOLE	COMPRESSIVE STRENGTH (psi)	STRENGTH @ BREAK (psi) ASTM D 638	ELONGATION @ BREAK (%) ASTM D 638	MAXIMUM FLEXURAL FIBER STRESS (psi) ASTM D 790	FLEXURAL MODULUS OF ELASTICITY (psi) ASTM D 790
340	---	6827	27427	8.9	43282	1549382
540	---	14393	32182	10.6	51149	1423838
720	---	16536	45606	12.6	58907	1708084
1200	---	24530	49075	15.3	55774	1799323

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

MEASUREMENT OF THICKNESS FOR CURED IN PLACE PIPE LINER ASTM D 2122											
Sample ID	Manhole to Manhole	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Combined Total Average/Specimen	
										In	mm
340	---	.081	.070	.069	.080	.083	.066	.073	.065	0.073	1.9
540	---	.100	.099	.084	.104	.109	.114	.118	.105	0.104	2.6
720	---	.129	.131	.128	.110	.136	.138	.120	.113	0.126	3.2
1200	---	.204	.213	.208	.224	.208	.195	.195	.208	0.207	5.3

Technician	E. Carrillo
Time	4 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.



Thursday, March 12, 2015

COMPRESSIVE PROPERTIES OF RIGID PLASTICS  
ASTM D695

INSTRON CORPORATION  
BLUEHILL V. 2.26 (4467)

OPERATOR NAME:  
E. CARRILLO

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

RATE (in/min)  
.05

SAMPLE ID:

EPOXY GLASS RAM 340 SERIES

	WIDTH (in)	THICKNESS (in)	GAUGE LENGTH (in)
1	0.574	0.082	1.0
2	0.565	0.050	1.0
3	0.557	0.064	1.0
4	0.566	0.070	1.0
5	0.572	0.075	1.0

	COMPRESSIVE STRENGTH (psi)
1	7835
2	6306
3	7872
4	6050
5	6073
Mean	6827
Minimum	6050
Maximum	7872
Standard Deviation	942



Thursday, March 12, 2015

COMPRESSIVE PROPERTIES OF RIGID PLASTICS  
ASTM D695

INSTRON CORPORATION  
BLUEHILL V. 2.26 (4467)

OPERATOR NAME:  
E. CARRILLO

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

RATE (in/min)  
.05

SAMPLE ID:

EPOXY GLASS RAM 540 SERIES

	WIDTH (in)	THICKNESS (in)	GUAGE LENGTH (in)
1	0.564	0.100	1.0
2	0.569	0.102	1.0
3	0.555	0.097	1.0
4	0.560	0.100	1.0
5	0.572	0.094	1.0

	COMPRESSIVE STRENGTH (psi)
1	14407
2	13919
3	13022
4	15810
5	14809
Mean	14393
Minimum	13022
Maximum	15810
Standard Deviation	1035



Thursday, March 12, 2015

**COMPRESSIVE PROPERTIES OF RIGID PLASTICS  
 ASTM D695**

INSTRON CORPORATION  
 BLUEHILL V. 2.26 (4467)

OPERATOR NAME:  
 E. CARRILLO

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

RATE (in/min)  
 .05

SAMPLE ID:

EPOXY GLASS RAM 720 SERIES

	WIDTH (in)	THICKNESS (in)	GUAGE LENGTH (in)
1	0.575	0.120	1.0
2	0.574	0.129	1.0
3	0.574	0.122	1.0
4	0.580	0.138	1.0
5	0.572	0.113	1.0

	COMPRESSIVE STRENGTH (psi)
1	13335
2	16715
3	14571
4	19419
5	18638
Mean	16536
Minimum	13335
Maximum	19419
Standard Deviation	2592



Thursday, March 12, 2015

COMPRESSIVE PROPERTIES OF RIGID PLASTICS  
 ASTM D695

INSTRON CORPORATION  
 BLUEHILL V. 2.26 (4467)

OPERATOR NAME:  
 E. CARRILLO

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

RATE (in/min)  
 .05

SAMPLE ID:

EPOXY GLASS RAM 1200 SERIES

	WIDTH (in)	THICKNESS (in)	GUAGE LENGTH (in)
1	0.574	0.222	1.0
2	0.568	0.195	1.0
3	0.570	0.218	1.0
4	0.572	0.222	1.0
5	0.576	0.202	1.0

	COMPRESSIVE STRENGTH (psi)
1	24580
2	24217
3	21498
4	26633
5	25722
Mean	24530
Minimum	21498
Maximum	26633
Standard Deviation	1945



Thursday, March 12, 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:

EPOXY GLASS RAM 340 SERIES

	WIDTH (in)	THICKNESS (in)	GAGE LENGTH (in)	GRIP DISTANCE (in)
1	0.258	0.077	2.0	5.3
2	0.255	0.075	2.0	5.3
3	0.250	0.085	2.0	5.3
4	0.225	0.070	2.0	5.3
5	0.254	0.083	2.0	5.3

	TENSILE STRENGTH @ MAX (psi)	ELONGATION @ MAX (%)
1	27085	8.6
2	27851	8.4
3	26847	10.8
4	26428	7.4
5	28924	9.5
Mean	27427	8.9
Standard Deviation	984	1.3
Minimum	26428	7.4
Maximum	28924	10.8



Thursday, March 12, 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:

EPOXY GLASS RAM 540 SERIES

	WIDTH (in)	THICKNESS (in)	GAGE LENGTH (in)	GRIP DISTANCE (in)
1	0.257	0.105	2.0	5.3
2	0.221	0.105	2.0	5.3
3	0.248	0.109	2.0	5.3
4	0.239	0.110	2.0	5.3
5	0.237	0.103	2.0	5.3

	TENSILE STRENGTH @ MAX (psi)	ELONGATION @ MAX (%)
1	34271	12.7
2	30038	8.8
3	33220	11.8
4	30659	9.8
5	32723	10.1
Mean	32182	10.6
Standard Deviation	1778	1.6
Minimum	30038	8.8
Maximum	34271	12.7



Thursday, March 12, 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:

EPOXY GLASS RAM 720 SERIES

	WIDTH (in)	THICKNESS (in)	GAGE LENGTH (in)	GRIP DISTANCE (in)
1	0.230	0.136	2.0	5.3
2	0.235	0.126	2.0	5.3
3	0.249	0.131	2.0	5.3
4	0.232	0.134	2.0	5.3
5	0.248	0.121	2.0	5.3

	TENSILE STRENGTH @ MAX (psi)	ELONGATION @ MAX (%)
1	43439	11.5
2	43168	11.8
3	45680	13.9
4	46299	12.7
5	49444	13.2
Mean	45606	12.6
Standard Deviation	2542	1.0
Minimum	43168	11.5
Maximum	49444	13.9





Thursday, March 12, 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:

EPOXY GLASS RAM 1200 SERIES

	WIDTH (in)	THICKNESS (in)	GAGE LENGTH (in)	GRIP DISTANCE (in)
1	0.275	0.211	2.0	5.3
2	0.247	0.198	2.0	5.3
3	0.279	0.195	2.0	5.3
4	0.273	0.209	2.0	5.3
5	0.270	0.195	2.0	5.3

	TENSILE STRENGTH @ MAX (psi)	ELONGATION @ MAX (%)
1	50688	16.0
2	46034	13.9
3	46639	14.2
4	50691	15.6
5	51323	16.9
Mean	49075	15.3
Standard Deviation	2522	1.3
Minimum	46034	13.9
Maximum	51323	16.9



Friday, March 06, 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)  
.026

SAMPLE ID:

EPOXY GLASS RAM 340 SERIES

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	0.552	0.055	1.0
2	0.558	0.062	1.0
3	0.567	0.063	1.0
4	0.554	0.065	1.0
5	0.555	0.065	1.0

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0292	48.8	43861	1774509
2	0.0336	68.9	48156	1726160
3	0.0327	61.2	40791	1408065
4	0.0330	63.4	40630	1372374
5	0.0357	67.2	42970	1465801
Mean	0.0328	61.9	43282	1549382
Standard Deviation	0.0024	7.9	3059	187230
Minimum	0.0292	48.8	40630	1372374
Maximum	0.0357	68.9	48156	1774509

F508-4-1.is\_flex



Friday, March 06, 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)  
 .040

SAMPLE ID:

EPOXY GLASS RAM 540 SERIES

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	0.558	0.099	1.5
2	0.562	0.099	1.5
3	0.553	0.101	1.5
4	0.568	0.105	1.5
5	0.564	0.101	1.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0423	133.9	55072	1380170
2	0.0432	130.1	53127	1439398
3	0.0400	111.3	44565	1569416
4	0.0465	138.6	49809	1184289
5	0.0359	134.9	53171	1545915
Mean	0.0416	129.7	51149	1423838
Standard Deviation	0.0039	10.8	4139	154619
Minimum	0.0359	111.3	44565	1184289
Maximum	0.0465	138.6	55072	1569416

F508-4-2.is\_flex



Monday, March 09, 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)  
 .040

SAMPLE ID:

EPOXY GLASS RAM 720 SERIES

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	0.563	0.106	1.5
2	0.572	0.108	1.5
3	0.567	0.112	1.5
4	0.560	0.113	1.5
5	0.560	0.127	1.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0451	181.4	64506	1874400
2	0.0364	188.1	63420	1837235
3	0.0420	186.4	58956	1679012
4	0.0353	163.2	51349	1691701
5	0.0406	226.0	56302	1458072
Mean	0.0399	189.0	58907	1708084
Standard Deviation	0.0040	22.9	5376	164287
Minimum	0.0353	163.2	51349	1458072
Maximum	0.0451	226.0	64506	1874400

F508-4-3.is\_flex



Friday, March 06, 2015

**FLEXURAL PROPERTIES OF PLASTICS**  
**ASTM D790**  
**3 POINT BEND**

**INSTRON CORPORATION**  
**BLUEHILL V. 2.26 (#4411)**

**OPERATOR NAME:**  
**E. CARRILLO**

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

**RATE (in/min)**  
 .080

**SAMPLE ID:**

**EPOXY GLASS RAM 1200 SERIES**

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	0.538	0.162	3.0
2	0.565	0.185	3.0
3	0.575	0.188	3.0
4	0.562	0.195	3.0
5	0.577	0.198	3.0

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0321	181.7	57897	2135279
2	0.0372	216.8	50455	1720540
3	0.0357	256.0	56694	1788106
4	0.0344	276.4	58205	1787164
5	0.0376	279.6	55617	1565528
Mean	0.0354	242.1	55774	1799323
Standard Deviation	0.0023	42.0	3146	208570
Minimum	0.0321	181.7	50455	1565528
Maximum	0.0376	279.6	58205	2135279

F508-4-4.is\_flex