



**TEST REPORT**

**CLIENT:** LMK Enterprises, Inc.  
1779 Chessie Lane  
Ottawa, IL 61350  
  
Attention: Larry Kiest

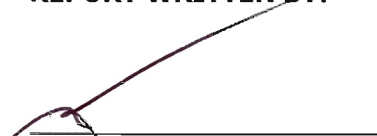
**SAMPLES:** One sample of cured in place plastic pipe was submitted by Interplastic Corporation, Thermoset Resins Division. The sample was identified by the client as LMK Knit Tube.

**TESTING:** The sample was tested in accordance with ASTM D543-06. *Evaluating the Resistance of Plastics to Chemical Reagents*, at 23°C using the guidelines set by ASTM F1216-07b, Appendix X2. Specimens cut from the sample were exposed to the reagents listed below for one month at 23°C and compared to an unexposed specimen set from the same sample.

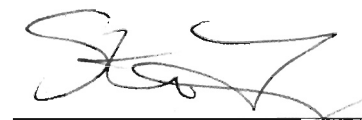
Solution	Concentration
Tap Water	100%
Nitric acid	5%
Phosphoric acid	10%
Sulfuric acid	10%
Gasoline	100%
Vegetable Oil	100%
Detergent	0.1%
Soap	0.1%

**RESULTS:** The results of the testing are presented in Table 1. All of the specimen sets passed the requirement of ASTM F1216-07b, Appendix X2, Section X.2.1, which states: "During this period, the CIPP test specimens should lose no more than 20% of their initial flexural strength and flexural modulus" in any of the eight solutions. Specimen dimensions, span length, and testing speed for flexural properties testing are presented in Table 2.

**DATA REVIEWED AND REPORT WRITTEN BY:**

  
\_\_\_\_\_  
Douglas Bert  
Scientist III

**REPORT REVIEWED BY:**

  
\_\_\_\_\_  
Steve Ferry  
Director, Hauser Laboratories

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TABLE 1  
 FLEXURAL PROPERTIES TEST RESULTS

Specimen Number	Flexural Yield Strength	Strain @ Flexural Yield Strength	Flexural Modulus (Tangent)
	psi	in	psi
<b>Control</b>			
1	9460	1.6	599000
2	8950	1.6	595000
3	9310	1.6	589000
4	8920	1.5	599000
5	9620	1.7	581000
Average	9250	1.6	593000
Std. Dev.	310	0.1	8000
<b>Tap Water</b>			
1	8890	1.6	563000
2	8460	1.6	560000
3	7340	1.4	542000
4	8250	1.5	569000
5	9190	1.7	553000
Average	8430	1.6	557000
Std. Dev.	710	0.1	10000
Difference from Control (%)	-8.9		-6.1
<b>Nitric acid</b>			
1	8580	1.6	574000
2	9180	1.7	567000
3	8760	1.6	569000
4	8640	1.6	573000
5	8670	1.6	566000
Average	8770	1.6	570000
Std. Dev.	240	0.0	3000
Difference from Control (%)	-5.2		-3.9

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TABLE 1 CONTINUED  
 FLEXURAL PROPERTIES TEST RESULTS

Specimen Number	Flexural Yield Strength	Strain @ Flexural Yield Strength	Flexural Modulus (Tangent)
	psi	in	psi
<b>Phosphoric acid</b>			
1	8380	1.5	586000
2	8870	1.6	561000
3	8480	1.5	575000
4	8320	1.5	585000
5	9380	1.7	573000
Average	8690	1.6	576000
Std. Dev.	440	0.1	10000
Difference from Control (%)	-6.1		-2.9
<b>Sulfuric acid</b>			
1	9110	1.6	563000
2	8400	1.6	560000
3	7560	1.4	542000
4	9000	1.5	569000
5	8130	1.7	553000
Average	8440	1.6	557000
Std. Dev.	640	0.1	10000
Difference from Control (%)	-8.8		-6.1
<b>Gasoline</b>			
1	10910	2.0	594000
2	10570	1.9	600000
3	10000	1.8	603000
4	9790	1.8	590000
5	10910	2.0	609000
Average	10440	1.9	599000
Std. Dev.	520	0.1	8000
Difference from Control (%)	12.9		1.0

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TABLE 1 CONTINUED  
 FLEXURAL PROPERTIES TEST RESULTS

Specimen Number	Flexural Yield Strength	Strain @ Flexural Yield Strength	Flexural Modulus (Tangent)
	psi	in	psi
<b>Vegetable Oil</b>			
1	9790	1.8	577000
2	10300	1.9	576000
3	9930	1.8	561000
4	9090	1.6	581000
5	9450	1.7	571000
Average	9710	1.8	573000
Std. Dev.	460	0.1	8000
Difference from Control (%)	5.0		-3.4
<b>Detergent</b>			
1	7920	1.4	576000
2	9700	1.7	585000
3	9820	1.8	572000
4	8500	1.6	563000
5	10180	1.9	569000
Average	9220	1.7	573000
Std. Dev.	960	0.2	8000
Difference from Control (%)	-0.3		-3.4
<b>Soap</b>			
1	8770	1.6	552000
2	9030	1.6	568000
3	8510	1.5	576000
4	8930	1.6	560000
5	7940	1.5	557000
Average	8630	1.6	563000
Std. Dev.	440	0.1	9000
Difference from Control (%)	-6.7		-5.1

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TABLE 2  
 DETAILS OF FLEXURAL PROPERTIES TESTING

Specimen Number	Width	Thickness
	in	in
<b>Control</b>		
1	0.545	0.176
2	0.532	0.177
3	0.532	0.182
4	0.535	0.175
5	0.535	0.182
Span Length (inches)		2.85
Speed of Testing (inches per minute)		0.08
<b>Tap Water</b>		
1	0.534	0.165
2	0.511	0.169
3	0.538	0.173
4	0.532	0.171
5	0.525	0.168
Span Length (inches)		2.71
Speed of Testing (inches per minute)		0.07
<b>Nitric acid</b>		
1	0.528	0.178
2	0.528	0.180
3	0.526	0.170
4	0.531	0.175
5	0.538	0.177
Span Length (inches)		2.82
Speed of Testing (inches per minute)		0.08
<b>Phosphoric acid</b>		
1	0.529	0.180
2	0.541	0.160
3	0.537	0.173
4	0.531	0.176
5	0.532	0.175
Span Length (inches)		2.76
Speed of Testing (inches per minute)		0.07

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TABLE 2 CONTINUED  
 DETAILS OF FLEXURAL PROPERTIES TESTING

Specimen Number	Width	Thickness
	in	in
<b>Sulfuric acid</b>		
1	0.539	0.175
2	0.537	0.165
3	0.536	0.182
4	0.532	0.182
5	0.534	0.165
Span Length (inches)		2.78
Speed of Testing (inches per minute)		0.07
<b>Gasoline</b>		
1	0.534	0.170
2	0.524	0.162
3	0.529	0.171
4	0.536	0.166
5	0.543	0.176
Span Length (inches)		2.70
Speed of Testing (inches per minute)		0.07
<b>Vegetable Oil</b>		
1	0.540	0.181
2	0.540	0.176
3	0.532	0.162
4	0.532	0.180
5	0.538	0.172
Span Length (inches)		2.79
Speed of Testing (inches per minute)		0.07
<b>Detergent</b>		
1	0.544	0.171
2	0.538	0.164
3	0.530	0.180
4	0.538	0.174
5	0.539	0.168
Span Length (inches)		2.74
Speed of Testing (inches per minute)		0.07

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TABLE 2 CONTINUED  
DETAILS OF FLEXURAL PROPERTIES TESTING

Specimen Number	Width	Thickness
	in	in
<b>Soap</b>		
1	0.540	0.181
2	0.547	0.176
3	0.540	0.180
4	0.533	0.175
5	0.533	0.164
Span Length (inches)		2.80
Speed of Testing (inches per minute)		0.07

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**Microbac Laboratories, Inc., Hauser Laboratories Division**

4750 Nautilus Court South, Unit A, Boulder, CO 80301 Ph: 720 406 4800 Fax: 303 581 0195

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