

**Intertek**



October 3, 2008

Mr. Elton Williams  
PolyVulc USA, Inc.  
1645 Haining Road  
Vicksburg, MS 39183-9036

**PTLI # P20082660**

Dear Mr. Williams:

Enclosed you will find results of the testing you requested.

If you have any questions regarding the data, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "James A. Koehler".

James A. Koehler  
Quality Manager

JAK/bb

Enclosures

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50 Pearl Street, Pittsfield, MA 01201  
Phone: (413) 499-0983 Fax: 499-2339  
<http://www.ptli.com>

**Testing** : **Determining The Izod Pendulum Impact Resistance Of Plastics**  
**Test Method** : ASTM D 256-06a (Method A)  
**Project Number** : P20082660  
**Customer** : PolyVulc USA, Inc.  
**Attention** : Elton Williams  
**Analyst** : S. Polastri  
**Date** : October 2, 2008



**Material** : **Polypropylene With Fiberglass - PolyVulc Material Sampling**  
**Sample Preparation** : Molded by approved outside service and notched by Intertek PTL  
**Sample Type** : Notched  
**Pendulum Capacity** : 2 ft•lb.  
**Conditioning** : 40+ hours at 23°C ± 2°C / 50% ± 5% RH  
**Test Conditions** : 23°C ± 2°C / 50% ± 5% RH

Exposure	Test Number	Width (in)	Depth Under Notch (in)	Impact Strength (ft•lb)	Impact Strength (ft•lb/in)	Break Type
<b>Controls</b>	1	0.121	0.401	0.112	0.93	Partial
	2	0.121	0.400	0.116	0.96	Partial
	3	0.121	0.402	0.102	0.84	Partial
	4	0.121	0.402	0.104	0.86	Partial
	5	0.121	0.402	0.114	0.94	Partial
	Average	0.121	0.401		<b>0.91</b>	
	Std. Dev. C.O.V. (%)				0.05 6	
<b>Freeze/Thaw cycle per ASTM D7032-08 section 4.7</b>	1	0.121	0.402	0.100	0.83	Partial
	2	0.121	0.401	0.120	0.99	Partial
	3	0.121	0.400	0.112	0.93	Partial
	4	0.121	0.402	0.114	0.94	Partial
	5	0.121	0.402	0.106	0.88	Partial
	Average	0.121	0.401		<b>0.91</b>	
	Std. Dev. C.O.V. (%)				0.06 7	
<b>21 days at 23°C in DI Water</b>	1	0.121	0.400	0.102	0.84	Partial
	2	0.121	0.402	0.102	0.84	Partial
	3	0.121	0.401	0.102	0.84	Partial
	4	0.121	0.402	0.104	0.86	Partial
	5	0.121	0.402	0.093	0.77	Partial
	Average	0.121	0.401		<b>0.83</b>	
	Std. Dev. C.O.V. (%)				0.04 4	

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**Test Conditions** : 23°C ± 2°C / 50% ± 5% RH

Exposure	Test Number	Width (in)	Depth Under Notch (in)	Impact Strength (ft•lb)	Impact Strength (ft•lb/in)	Break Type
<b>21 days at 23°C in Sodium Hydroxide and DI water solution (pH12)</b>	1	0.121	0.402	0.116	0.96	Partial
	2	0.121	0.401	0.112	0.93	Partial
	3	0.121	0.402	0.112	0.93	Partial
	4	0.121	0.400	0.102	0.84	Partial
	5	0.121	0.402	0.108	0.89	Partial
	Average	0.121	0.401		<b>0.91</b>	
	Std. Dev.				0.04	
	C.O.V. (%)				5	
<b>21 days at 23°C in Sulfuric Acid and DI water solution (pH3)</b>	1	0.121	0.399	0.108	0.89	Partial
	2	0.121	0.401	0.114	0.94	Partial
	3	0.121	0.402	0.116	0.96	Partial
	4	0.121	0.402	0.110	0.91	Partial
	5	0.121	0.402	0.121	1.00	Partial
	Average	0.121	0.401		<b>0.94</b>	
	Std. Dev.				0.04	
	C.O.V. (%)				4	

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Testing : **Flexural Properties Of Plastics**  
 Test Method : ASTM D790-07 Procedure A  
 Project Number : P20082660  
 Customer : PolyVulc USA, Inc.  
 Attention : Elton Williams  
 Analyst : S. Polastri  
 Date : October 2, 2008



Material : **Polypropylene With Fiberglass - PolyVulc Material Sampling**  
 Sample Preparation : Molded by approved outside service  
 Sample Dimensions : 0.496" x 0.121" x 5.00" (Average)  
 Sample Type : ASTM Flex Bar  
 Span Length (in) : 1.936  
 Cross-Head Speed (in/min) : 0.052  
 Span-To- Depth Ratio : 16±1:1  
 Radius Of Supports (in) : 0.197  
 Radius Of Loading Nose (in) : 0.197  
 Conditioning : 40+ hours at 23°C ± 2°C / 50% ± 5% RH  
 Test Conditions : 23°C ± 2°C / 50% ± 5% RH  
 Significance : ASTM D 790 specifies modulus and strength be reported to 3 significant figures

Exposure	Test Number	Flexural Strength (PSI)	Flexural Modulus (tangent *) (PSI)
<b>Controls</b>	1	8590	423000
	2	8670	420000
	3	8710	443000
	4	8690	410000
	5	8920	440000
	Average	<b>8720</b>	<b>427000</b>
	Std. Dev.	123	14000
<b>Freeze/Thaw cycle per ASTM D7032-08 section 4.7</b>	1	8580	453000
	2	8370	395000
	3	8930	433000
	4	8750	415000
	5	9080	457000
	Average	<b>8740</b>	<b>431000</b>
	Std. Dev.	280	26100
<b>21 days at 23°C in DI Water</b>	1	8530	409000
	2	8200	405000
	3	8660	401000
	4	8170	423000
	5	8270	388000
	Average	<b>8370</b>	<b>405000</b>
	Std. Dev.	217	12700

\* = computer generated curve fit

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Testing : **Flexural Properties Of Plastics**  
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 Project Number : P20082660  
 Customer : PolyVulc USA, Inc.  
 Attention : Elton Williams  
 Analyst : S. Polastri  
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 Radius Of Supports (in) : 0.197  
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 Conditioning : 40+ hours at 23°C ± 2°C / 50% ± 5% RH  
 Test Conditions : 23°C ± 2°C / 50% ± 5% RH  
 Significance : ASTM D 790 specifies modulus and strength be reported to 3 significant figures

Exposure	Test Number	Flexural Strength (PSI)	Flexural Modulus (tangent * ) (PSI)
<b>21 days at 23°C in Sodium Hydroxide and DI water solution (pH12)</b>	1	8690	421000
	2	8400	431000
	3	8430	390000
	4	8180	385000
	5	7980	364000
	Average Std. Dev.		<b>8340</b> 269
<b>21 days at 23°C in Sulfuric Acid and DI water solution (pH3)</b>	1	8630	440000
	2	8610	403000
	3	8240	396000
	4	8110	376000
	5	8220	380000
	Average Std. Dev.		<b>8360</b> 241

\* = computer generated curve fit

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Testing : Water Absorption  
 Test Method : ASTM D 570-98  
 Project Number : P20082660  
 Customer : PolyVulc USA, Inc.  
 Attention : Elton Williams  
 Analyst : AJ Cole  
 Date : October 2, 2008



Sample Dimensions : 2 inch diameter x 0.125" disks  
 Sample Preparation : Molded by an approved outside service  
 Sample Conditioning : 24 hours at 50°C in an air circulating oven  
 Immersion Type : **Deionized Water at 23°C**  
 Immersion Length : **21 days**  
 Significance : ASTM D570 specifies that weights be measured to 0.1 mg and change be calculated to the nearest 0.01%

Sample Name	Specimen Number	Initial Weight (g)	Final Weight (g)	Change (g)	Change (%)
<b>Polypropylene With Fiberglass PolyVulc Material Sampling</b>	1	6.8644	6.8766	0.0122	0.18
	2	6.7719	6.7822	0.0103	0.15
	3	6.8378	6.8482	0.0104	0.15
	4	6.8439	6.8551	0.0112	0.16
	5	6.8220	6.8334	0.0114	0.17
			Average	0.0111	<b>0.16</b>

$$\% \text{ Change} = [ ( \text{Final Weight} - \text{Initial Weight} ) / \text{Initial Weight} ] \times 100$$

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Testing : Density And Specific Gravity Of Plastics By Displacement  
 Test Method : ASTM D792-00 Method A  
 Project Number : P20082660  
 Customer : PolyVulc USA, Inc.  
 Attention : Elton Williams  
 Analyst : AJ Cole  
 Date : September 12, 2008



Sample Preparation : Molded by approved outside service  
 Temperature Of Water (°C) : 23.1  
 Sample Type : 2 inch disks  
 Conditioning : 40+ Hours at 23°C ± 2°C / 50% ± 5% RH  
 Significance : ASTM D792 specifies that density be reported to 4 significant digits

Sample Name	Dry Weight (g)	Wet Weight (g)	Specific Gravity (23/23°C)	Density (g/cm <sup>3</sup> )	Density (kg/m <sup>3</sup> )
<b>Polypropylene</b>	6.8532	0.5915	1.094	1.091	1090
<b>With Fiberglass</b>	6.7711	0.5710	1.092	1.089	1090
<b>PolyVulc Material Sampling</b>	6.8201	0.5970	1.096	1.093	1090
	Average		<b>1.094</b>	<b>1.091</b>	<b>1090</b>

Specific Gravity Calculation = Dry Wt. ÷ (Dry Wt. - Wet Wt.)

Where : Dry Wt. = Apparent Weight of Specimen in Air  
 Wet Wt. = Apparent Weight of Specimen in Water

Density (g/cm<sup>3</sup>) = Specific Gravity x 0.9975

Density (kg/m<sup>3</sup>) = Specific Gravity x 997.5

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