

**Intertek**



May 5, 2009

Mr. Kevin Boyce  
Grate Ideas, Inc.  
27 Berard Drive  
Suite 2701  
South Burlington, VT 05403  
USA

**PO # 4065**  
**IPTL # P20090586**

Dear Mr. Boyce:

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", written in a cursive style.

James A. Koehler  
Quality Manager

JAK/bb

Enclosures

Intertek Plastics Technology Laboratories reports are issued for the exclusive use of the clients to whom they are addressed. No quotations from reports or use of the Intertek Plastics Technology Laboratories name is permitted except as expressly authorized in writing. Letters and reports apply only to the specific materials, products or processes tested, examined or surveyed and are not necessarily indicative of the qualities identical or similar materials, products or processes. The liability of Intertek Plastics Technology Laboratories with respect to services rendered shall be limited to the amount of consideration paid for such services and not include any consequential damages.

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

Testing	: Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
Test Method	: ASTM G 154 - 06 Cycle 1
Project Number	: P20090586 <span style="float: right;">Purchase Order # : 4065</span>
Customer	: Grate Ideas, Inc.
Attention	: Kevin Boyce
Operator	: Frank Foy
Date	: May 1, 2009

Instrument	: Q-Panel Model QUV/se with Solar Eye UV Irradiance Controller
UV Source Lamps	: Q-Panel UVA-340
Cycle Used	: 8 hr UV uninsulated black panel temp at 60 ± 3°C, 4 hr condensation at 50 ± 3°C
Irradiance	: 0.89 W/m <sup>2</sup> at 340 nm

A Solar Eye precision light control system option on the equipment monitors the UV intensity via four sensors at the sample plane to maintain the correct irradiance automatically. This is performed by a four channel feedback loop system that compensates for any variability in irradiance level by adjusting the power to the lamps.

Material ID : PVC

Specimen Type : 6 ASTM Tensile Bars, 6 ASTM Izod Bars

Sample Preparation : Izod specimens notched by Intertek PTL

Sample Mounting : Standard fixtures

Exposure Time (hrs)	Lamp(s) Were Changed During Exposure Period	Sample Repositioning Schedule
750	No	None
Lamp Age at Test Start (hrs)	Lamp Age at Test End (hrs)	Type of Thermometer
1250	1750	Black Uninsulated Panel

**Results of any property tests are included as additional reports**

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Testing	:	<b>Tensile Properties</b>	
Test Method	:	ASTM D 638-08	
Project Number	:	P20090586	Purchase Order # : 4065
Customer	:	Grate Ideas, Inc.	
Attention	:	Kevin Boyce	
Analyst	:	J. McCarthy	
Date	:	May 4, 2009	

  

Material	:	<b>PVC</b>	
Sample Preparation	:	Machined by Intertek PTL	
Sample Type	:	ASTM Type I Tensile Bar	
Sample Dimensions	:	0.501" x 0.132" (Average)	
Cross-Head Speed	:	0.2 in/min	
Extensometer	:	160% based on 50mm gage length. Meets minimum requirements for Practice E 83: Modulus (Class B-2) / Elongation (Class C).	
Conditioning	:	<b>Exposed 750 hours in QUV per ASTM G154 Cycle 1</b>	
Test Conditions	:	23°C ± 2°C / 50% ± 5% RH	
Significance	:	ASTM D 638 specifies that strength and modulus be reported to 3 significant figures and elongation be reported to 2 significant figures	



Sample Identification	Test Number	Tensile Strength At Yield (PSI)	Elongation At Yield (%)	Tensile Stress At Break (PSI)	Elongation At Break (%)	Modulus Of Elasticity (PSI)
<b>Exposed</b>	1	7390	3.3	3870	17	280000
	2	7430	3.1	2950	20	302000
	3	7450	3.2	1680	11	307000
	4	7460	3.2	2070	56	305000
	5	7360	3.0	1520	22	315000
	Average	<b>7420</b>	<b>3.2</b>	<b>2420</b>	<b>25</b>	<b>302000</b>
	Std. Dev.	42	0.1	983	18	13100

Note : Specimens exhibited discoloration on the exposed side

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**Testing** : **Determining The Izod Pendulum Impact Resistance Of Plastics**  
**Test Method** : **ASTM D 256-06a (Method A)**  
**Project Number** : **P20090586** **Purchase Order # : 4065**  
**Customer** : **Grate Ideas, Inc.**  
**Attention** : **Kevin Boyce**  
**Analyst** : **D.Loehr**  
**Date** : **May 4, 2009**



**Material** : **PVC**  
**Sample Preparation** : **Machined and notched by Intertek PTL**  
**Sample Type** : **Notched**  
**Pendulum Capacity** : **2 ft•lb.**  
**Conditioning** : **Exposed 750 hours in QUV per ASTM G154 Cycle 1**  
**Test Conditions** : **23°C ± 2°C / 50% ± 5% RH**

Sample Name	Test Number	Width (in)	Depth Under Notch (in)	Impact Strength (ft•lb)	Impact Strength (ft•lb/in)	Break Type
<b>Exposed</b>	1	0.126	0.401	0.213	1.7	Complete
	2	0.128	0.400	0.178	1.4	Complete
	3	0.126	0.400	0.178	1.4	Complete
	4	0.127	0.402	0.195	1.5	Complete
	5	0.126	0.399	0.093	0.74	Complete
	Average	0.127	0.400		1.4	
	Std. Dev.				0.4	
	C.O.V. (%)				27	

Note : Specimens exhibited discoloration on the exposed side

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**Intertek**



April 2, 2009

Mr. Kevin Boyce  
Grate Ideas, Inc.  
27 Berard Drive  
Suite 2701  
South Burlington, VT 05403  
USA

PO # 4065  
IPTL # P20090586

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

Sincerely,

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James A. Koehler  
Quality Manager

JAK/bb

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<http://www.ptli.com>

Testing	:	<b>Tensile Properties</b>	
Test Method	:	ASTM D 638-08	
Project Number	:	P20090586	Purchase Order #: 4065
Customer	:	Grate Ideas, Inc.	
Attention	:	Kevin Boyce	
Analyst	:	D.Loehr	
Date	:	March 31, 2009	

  

Material	:	<b>PVC</b>
Sample Preparation	:	Machined by Intertek PTL
Sample Type	:	ASTM Type I Tensile Bar
Sample Dimensions	:	0.501" x 0.132" (Average)
Cross-Head Speed	:	0.2 in/min
Extensometer	:	160% based on 50mm gage length. Meets minimum requirements for Practice E 83: Modulus (Class B-2) / Elongation (Class C).
Conditioning	:	40+ Hours At 23°C ± 2°C / 50% ± 5% RH
Test Conditions	:	23°C ± 2°C / 50% ± 5% RH
Significance	:	ASTM D 638 specifies that strength and modulus be reported to 3 significant figures and elongation be reported to 2 significant figures



Sample Name	Test Number	Tensile Strength At Yield (PSI)	Elongation At Yield (%)	Tensile Stress At Break (PSI)	Elongation At Break (%)	Modulus Of Elasticity (PSI)
<b>Control</b>	1	7390	2.7	6670	>180	394000
	2	7260	2.7	6090	>150	396000
	3	7490	2.7	6350	>150	407000
	4	7200	2.6	6470	>160	396000
	5	7300	2.7	6100	>140	394000
	Average	<b>7330</b>	<b>2.7</b>	<b>6340</b>	<b>&gt;160</b>	<b>397000</b>
	Std. Dev.	114	0.0	248		5460

Note: "Ribbed" surface on one side of the test specimens

> = Exact Elongation at Break cannot be reported due to extensometer slippage after 140% elongation

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**Testing** : **Determining The Izod Pendulum Impact Resistance Of Plastics**  
**Test Method** : ASTM D 256-06a (Method A)  
**Project Number** : P20090586 **Purchase Order #** : 4065  
**Customer** : Grate Ideas, Inc.  
**Attention** : Kevin Boyce  
**Analyst** : D.Loehr  
**Date** : March 31, 2009



**Material** : **PVC**  
**Sample Preparation** : Machined 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

Sample Name	Test Number	Width (in)	Depth Under Notch (in)	Impact Strength (ft•lb)	Impact Strength (ft•lb/in)	Break Type
<b>Control</b>	1	0.125	0.400	0.213	1.7	Complete
	2	0.124	0.400	0.223	1.8	Complete
	3	0.124	0.399	0.215	1.7	Complete
	4	0.124	0.400	0.193	1.6	Complete
	5	0.124	0.399	0.193	1.6	Complete
	Average	0.124	0.400		1.7	
	Std. Dev.				0.1	
	C.O.V. (%)				7	

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