UL 94 - 5VA or 5VB Flammability Classification of "3 mm Palsun FR Basic/UV Polycarbonate"

A Report To: Palram Americas
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Phone: 800-999-9459

Attention: Mark Weaver
Email: mark.weaver@palram.com

Submitted By: Exova Warringtonfire North America

Report No. 15-002-736
3 Pages + Appendix

Date: January 22, 2016
ACCREDITATION  To ISO/IEC 17025 for a defined Scope of Testing by the International Accreditation Service

SPECIFICATIONS OF ORDER

Perform flammability classification in accordance with Subsection 9 of UL 94 Sixth Edition, "Test for Flammability of Plastic Materials for Parts in Devices and Appliances" - 500 W (125 mm) Vertical Burning Test; 5VA or 5VB, as per Palram Americas reference Purchase Order No. 4900081078 and Exova Warringtonfire North America Quotation No. 15-002-391,861 dated November 9, 2015.

IDENTIFICATION   (Exova sample identification number 15-002-S0736-a, b)

Polycarbonate sheet material identified as: "3mm Palsun FR Basic/UV Polycarbonate".

SUMMARY OF TEST PROCEDURE

UL 94 Sixth Edition: 500W (125 mm) Vertical Burning Test; 5VA or 5VB (ASTM 5048 or IEC 60695-11-20), subsection 9, specifies that a material must achieve a V-0 or V-1 rating on vertical bar specimens prior to the plaque specimen test (5VA or 5VB).

For this project, it was determined that the material was previously tested for UL 94 V compliance by another testing (and certification) lab. As evidence of this, a UL Yellow Card was supplied (by client) that indicated that the material is classified as UL 94 V-0 at the thicknesses of 2 mm and 3 mm. That card is appended to this report.

In addition to the vertical bar specimen test, six test specimens (3 before and 3 after oven-conditioning), each 150 x 150 mm, are suspended in the horizontal plane and are then exposed to a specified 125 ± 10 mm flame from a laboratory burner for a period of 5 seconds and then removed for 5 seconds. This process is repeated until the test specimen has been subjected to five applications of the test flame. After the fifth application, and after all flaming or glowing has ceased, observations record whether or not the flame penetrated (burned through) the plaque material.

To be classified UL 94-5VA, a material:

A. shall not have an afterflame time plus afterglow time greater than 60 seconds after the fifth flame application for each individual bar specimen,
B. shall not ignite the cotton indicator by flaming particles or drops from any bar specimen, and
C. shall not allow burn-through (maximum 3 mm hole) any plaque specimen.

To be classified UL 94-5VB, a material:

A. shall not have an afterflame time plus afterglow time greater than 60 seconds after the fifth flame application for each individual bar specimen,
B. shall not ignite the cotton indicator by flaming particles or drops from any bar specimen, and
C. may allow burn-through (hole) of any plaque specimen.
TEST RESULTS

UL 94 - Test for Flammability of Plastic Materials for Parts in Devices and Appliances
500 W (125 mm) Vertical Burning Test - Subsection 9.6

Plaque Specimen Test

Tested before Aging:
Specimen Conditioning: Minimum 48 hours at 23 ± 2°C and 50 ± 5% RH.

<table>
<thead>
<tr>
<th>Specimen</th>
<th>After Fifth Flame Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test #1</td>
<td>No</td>
</tr>
<tr>
<td>Test #2</td>
<td>No</td>
</tr>
<tr>
<td>Test #3</td>
<td>No</td>
</tr>
</tbody>
</table>

Tested After Aging:
Specimen Conditioning: 168 hours at 70 ± 1°C, cooled in desiccator at least 4 hours prior to testing.

<table>
<thead>
<tr>
<th>Specimen</th>
<th>After Fifth Flame Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test #1</td>
<td>No</td>
</tr>
<tr>
<td>Test #2</td>
<td>No</td>
</tr>
<tr>
<td>Test #3</td>
<td>No</td>
</tr>
</tbody>
</table>

CONCLUSIONS

*When tested according to the UL 94 Subsection 9 - 500 W (125 mm) Vertical Burning Test procedure, the material identified in this report qualifies for a UL 94-5VA classification.

Serap Coskunsever,
Technologist.

Ian Smith,
Technical Manager

Note: This report and service are covered under Exova Canada Inc. Standard Terms and Conditions of Contract which may be found on the Exova website (www.exova.com), or by calling 1-866-263-9268.
Appendix
(1 page)

UL 94 V-0 Certificate (supplied by client)
### IEC and ISO Test Methods

<table>
<thead>
<tr>
<th>Test Method</th>
<th>Test Method</th>
<th>Units</th>
<th>Thk (mm)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>IEC 60695-11-10</td>
<td>Class (color)</td>
<td>2.0</td>
<td>V-0 (ALL)</td>
</tr>
<tr>
<td>Glow-Wire Flammability (GWFI)</td>
<td>IEC 60695-2-12</td>
<td>C</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Glow-Wire Ignition (GWIT)</td>
<td>IEC 60695-2-13</td>
<td>C</td>
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<td>-</td>
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<tr>
<td>IEC Comparative Tracking Index</td>
<td>IEC 60112</td>
<td>Volts (Max)</td>
<td>-</td>
<td>-</td>
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<tr>
<td>IEC Ball Pressure</td>
<td>IEC 60695-10-2</td>
<td>C</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ISO Heat Deflection (1.80 MPa)</td>
<td>ISO 75-2</td>
<td>C</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ISO Tensile Strength</td>
<td>ISO 527-2</td>
<td>MPa</td>
<td>-</td>
<td>-</td>
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<tr>
<td>ISO Flexural Strength</td>
<td>ISO 178</td>
<td>MPa</td>
<td>-</td>
<td>-</td>
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<tr>
<td>ISO Tensile Impact</td>
<td>ISO 8256</td>
<td>kJ/m²</td>
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<td>-</td>
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<tr>
<td>ISO Izod Impact</td>
<td>ISO 180</td>
<td>kJ/m²</td>
<td>-</td>
<td>-</td>
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<td>ISO Charpy Impact</td>
<td>ISO 179-2</td>
<td>kJ/m²</td>
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</tbody>
</table>

**Component - Plastics**

**PALRAM INDUSTRIES LTD**

Kibbutz - Ramat, Yohanan 30035 IL

**Palsun Basic FR**

*Poly carbonate (PC), "Palsun", furnished as sheets*

<table>
<thead>
<tr>
<th>Color</th>
<th>Min Thk (mm)</th>
<th>Flame Class</th>
<th>HWI</th>
<th>HAI</th>
<th>ELEC</th>
<th>DIP</th>
<th>Imp</th>
<th>STR</th>
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<tbody>
<tr>
<td>ALL</td>
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<td>V-0</td>
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<td>4</td>
<td>125</td>
<td>115</td>
<td>125</td>
<td></td>
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<tr>
<td></td>
<td>3.0</td>
<td>V-0</td>
<td>1</td>
<td>4</td>
<td>125</td>
<td>115</td>
<td>125</td>
<td></td>
</tr>
</tbody>
</table>

**Comparative Tracking Index (CTI): 3**

**Dielectric Strength (kV/mm): -**

**High-Voltage Arc Tracking Rate (HVTR): 3**

**Dimensional Stability (%): -**

ANSI/UL 94 small scale test data does not pertain to building materials, furnishings and related contents. ANSI/UL 94 small scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-product devices and appliances, where the acceptability of the combination is determined by UL.

**Report Date: 2015-04-09**

**Last Revised: 2015-04-08**

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7/21/2015