ARGOTEK AG8451

Argotec AG8451 is an aliphatic polyurethane specifically formulated to be used as an adhesive interlayer without the need for a glass surface primer.

Argotec AG8451 contains a UV additive package to protect itself and materials below it from harmful UV radiation.

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Test Methods</th>
<th>Typical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength at 100%, psi</td>
<td>ASTM D638*</td>
<td>360</td>
</tr>
<tr>
<td>Tensile strength at 200%, psi</td>
<td>ASTM D638*</td>
<td>570</td>
</tr>
<tr>
<td>Tensile strength at 300%, psi</td>
<td>ASTM D638*</td>
<td>1022</td>
</tr>
<tr>
<td>Tensile strength at Break, psi</td>
<td>ASTM D638*</td>
<td>5800</td>
</tr>
<tr>
<td>Elongation at Break, %</td>
<td>ASTM D638*</td>
<td>540</td>
</tr>
<tr>
<td>Tear Strength, pli</td>
<td>ASTM D624</td>
<td>275</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>ASTM D792</td>
<td>1.08</td>
</tr>
<tr>
<td>DSC mid Point, T_g °C</td>
<td>N/A</td>
<td>-60</td>
</tr>
<tr>
<td>TMA Peak, °C</td>
<td>N/A</td>
<td>88</td>
</tr>
<tr>
<td>TMA Range, °C</td>
<td>N/A</td>
<td>65 – 130</td>
</tr>
<tr>
<td>Compression Set 22 hours at 22 °C, %</td>
<td>ASTM D395</td>
<td>23</td>
</tr>
<tr>
<td>Compression Set 22 hours at 70 °C, %</td>
<td>ASTM D395</td>
<td>95</td>
</tr>
<tr>
<td>Coefficient of Thermal Expansion L/Lo °C</td>
<td>N/A</td>
<td>~0.0002</td>
</tr>
</tbody>
</table>

* - Note: ASTM D638 Die IV is used with a grip separation rate of 20 in/min on SU 0.050” film

Optical Properties**

<table>
<thead>
<tr>
<th>Optical Properties**</th>
<th>Test Methods</th>
<th>Typical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haze, %</td>
<td>ASTM D1003</td>
<td>&lt; 0.5</td>
</tr>
<tr>
<td>Transmission, %</td>
<td>ASTM D1003</td>
<td>85 – 95</td>
</tr>
<tr>
<td>Yellowness Index</td>
<td>ASTM D1925</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Refractive Index</td>
<td>ASTM D542</td>
<td>1.4962</td>
</tr>
</tbody>
</table>

**Film tested between two pieces of 1/8” glass / Sample size: 4” x 4” @ 50 mils film
Lamination Temperature: 175 °F / Lamination Time and Pressure: 2 min @ 400#, 2 min @ 600#, 2 min @ 1000#

Created December 2009

All information and recommendations contained herein are based upon data believed to be correct but Argotec makes no warranty either expressed or implied, and assumes no responsibility for the accuracy of the data presented.
SECTION I – PRODUCT IDENTIFICATION

Manufacturer: ARGOTEC, LLC
53 Silvio O Conte Dr
Greenfield, MA 01301

Information Phone: 413-772-2564
Emergency Phone: 413-772-2564
CHEMTREC Phone: 800-424-9300
in Washington D.C. or International Phone: 202-483-7616

Product Class: Thermoplastic Polyurethane
Trade Name: SS-polyester and ST-polyether thermoplastic polyurethanes

Product Code: 
C.A.S. Number: N/A
D.O.T. Hazard Class: N/A
Proper Shipping Name: N/A
Technical Name: N/A

! Hazard Ratings:
  Health – 1
  Fire – 1
  Reactivity – 0

Personal Protection – none

SECTION II – HAZARDOUS INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS#</th>
<th>Weight %</th>
<th>Exposure Limits</th>
<th>VP mmHG</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE</td>
<td>MIXTURE</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

SECTION III – PHYSICAL DATA

Boiling Range: N/A
Vapor Density: N/A

Vapor Rate: N/A
Liquid Density: N/A

Appearance: Elastomeric sheets, films, tubing and profiles,
Various Colors
Spec. Gravity: >1.0

SECTION IV – FIRE AND EXPLOSION HAZARD DANGER

Flash Point (D1929-CC): greater than 390 degrees C (740 degrees F)
Flammable Limits: LEL: N/A UEL: N/A

- EXTINGUISHING MEDIA
  Water, ABC dry chemicals, protein air foam

- SPECIAL FIREFIGHTING PROCEDURES
  Wear NIOSH approved self-contained breathing apparatus by trained personnel.

- UNUSUAL FIRE & EXPLOSION HAZARDS
  These polymers are combustible when forced to burn and may emit toxic odors.
SECTION V – HEALTH HAZARD DATA

- PERMISSIBLE EXPOSURE LEVEL: See Section II.

- PRIMARY ROUTES OF EXPOSURE: are processing vapors by inhalation; neither skin nor ingestion are known to be routes of exposure

- EFFECTS OF OVEREXPOSURE
  ACUTE: heat processing at or above the decomposition point may release the products discussed in Section Six including the isocyanate MDI which may result in irritation of the respiratory tract and eyes, chest tightness, coughing, headache, and dyspnea. Sensitization with subsequent asthma-like attacks may follow.

  CHRONIC:

  Carcinogenicity: NTP?: No  IARC Monographs?: No  OSHA Regulated?: No

  Signs and Symptoms of Exposure: processing vapors above the melting point may cause irritation of respiratory tract, eyes, and skin; processing temperatures at or above the decomposition point may release products including MDI which may cause irritation of the respiratory tract, eyes, skin, chest tightness, coughing, headache, and dyspnea.

  Medical Conditions Generally Aggravated by Exposure: none known

Emergency and First Aid Procedures:

- INHALATION: of vapors, remove to fresh air. If breathing has stopped, restore breathing and get medical attention.
- SKIN CONTACT: if hot molten polyurethane contacts skin, flush immediately with water and seek medical attention for thermal burn.
- EYE CONTACT: Flush with water for at least 15 minutes. If irritation develops or persists consult a physician.

SECTION VI – REACTIVITY DATA

STABILITY: [  ] Unstable  [ X ] Stable

HAZARDOUS POLYMERIZATION: [  ] May occur  [ X ] Will not occur

- INCOMPATIBILITY:
  None known

- CONDITIONS TO AVOID:
  None known, but avoid heating to temperatures above 250 degrees C.

- SPECIFIC HAZARDS:
  Carbon monoxide, carbon dioxide, oxides of nitrogen, hydrogen cyanide, aliphatic and aromatic hydrocarbons, including MDI (methylene bisphenyl isocyanate) may be created during incomplete combustion.
SECTION VII – SPILL OR LEAK PROCEDURES

- STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
  Sweep up and place in properly marked container.

- WASTE DISPOSAL METHOD
  Dispose of in accordance with all local, state and federal regulations.

- Other Precautions:
  None known

SECTION VIII – SPECIAL PROTECTION INFORMATION

- RESPIRATORY PROTECTION
  For processing above the melting point, NIOSH approved, supplied air respirators should be used not required for
  normal ambient use.

- VENTILATION
  Local Exhaust: when melt processing to remove vapors exhaust hoods should maintain a minimum of 100 lfm face
  velocity.

- PROTECTIVE GLOVES
  Recommended when handling hot product

- EYE PROTECTION
  Safety glasses or face shield

- OTHER PROTECTIVE EQUIPMENT
  Use impermeable clothing whenever possible to prevent skin contact

- Work/HYGENIC PRATICES
  Maintain good personal hygiene as standard good work practice

SECTION IX – REGULATORY INFORMATION

- SARA TITLE III SECTION 313
  Not applicable based on article exemption

- PROPOSITION 65
  WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER: None

- PROPOSITION 65
  WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER
  REPRODUCTIVE HARM: None

SECTION X – DISCLAIMER

This information is furnished without warranty, expressed or implied, except that it is accurate to the best
knowledge ARGOTEC. The data on this sheet relates only to the specific material designated herein. ARGOTEC
assumes no legal responsibility for use or reliance upon these data.
INTRODUCTION

KRYS\textsc{TALFLEX}\textsuperscript{\textregistered} PE399 is a high performance aliphatic polyether film intended for processing by lamination with a range of glass and plastic components.

KRYS\textsc{TALFLEX}\textsuperscript{\textregistered} PE399 is part of the HUNTS\textsc{MAN} film and sheet product range for glass, polycarbonate, acrylic, CAB lamination applications. It is used in aerospace, transportation, security, and architectural markets.

PERFORMANCE FEATURES

- Excellent laminated transparency
- Excellent hydrolysis & microbial resistance
- Good low temperature flexibility
- Enhanced UV stability
- Medium durometer
- Contains adhesion promoter
- Medium modulus
- Excellent cold impact

APPLICATIONS

- Prison containment glazing
- Ballistic / Blast / Intrusion
- Vehicle armoring
- Retail kiosks
- Hurricane / Vandal glazing
- Zoos
- Liquid crystal laminates
- Computer screens

Table 1: Typical Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Key</th>
<th>DIN</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardness</td>
<td>M</td>
<td>53505</td>
<td>Shore</td>
<td>80</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>E</td>
<td>53504</td>
<td>MPa</td>
<td>45</td>
</tr>
<tr>
<td>Elongation @ break</td>
<td>E</td>
<td>53504</td>
<td>%</td>
<td>500</td>
</tr>
<tr>
<td>100% Modulus</td>
<td>E</td>
<td>53504</td>
<td>MPa</td>
<td>2</td>
</tr>
<tr>
<td>300% Modulus</td>
<td>E</td>
<td>53504</td>
<td>MPa</td>
<td>7</td>
</tr>
<tr>
<td>Tear Resistance</td>
<td>E</td>
<td>53515</td>
<td>N/mm</td>
<td>37</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>E</td>
<td>53478</td>
<td></td>
<td>1.07</td>
</tr>
<tr>
<td>Softening Range Low</td>
<td>E</td>
<td>Huntsman</td>
<td>TMA</td>
<td>80</td>
</tr>
<tr>
<td>Softening Range High</td>
<td>E</td>
<td>Huntsman</td>
<td>TMA</td>
<td>140</td>
</tr>
<tr>
<td>Midpoint Tg by DSC</td>
<td>E</td>
<td>Huntsman</td>
<td>DSC</td>
<td>-36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Property</th>
<th>Key</th>
<th>ASTM</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardness</td>
<td>M</td>
<td>D-2240</td>
<td>Shore</td>
<td>80</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>E</td>
<td>D-412</td>
<td>psi</td>
<td>6500</td>
</tr>
<tr>
<td>Elongation @ break</td>
<td>E</td>
<td>D-412</td>
<td>%</td>
<td>500</td>
</tr>
<tr>
<td>100% Modulus</td>
<td>E</td>
<td>D-412</td>
<td>psi</td>
<td>300</td>
</tr>
<tr>
<td>300% Modulus</td>
<td>E</td>
<td>D-412</td>
<td>psi</td>
<td>1000</td>
</tr>
<tr>
<td>Tear Resistance</td>
<td>E</td>
<td>D-624</td>
<td>pli</td>
<td>210</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>E</td>
<td>D-792</td>
<td></td>
<td>1.07</td>
</tr>
<tr>
<td>Softening Range Low</td>
<td>E</td>
<td>Huntsman</td>
<td>TMA</td>
<td>175</td>
</tr>
<tr>
<td>Softening Range High</td>
<td>E</td>
<td>Huntsman</td>
<td>TMA</td>
<td>285</td>
</tr>
<tr>
<td>Midpoint Tg by DSC</td>
<td>E</td>
<td>D-3418</td>
<td>°F</td>
<td>-33</td>
</tr>
</tbody>
</table>

E = 0.050” extruded film cut to ASTM requirements
M = Injection moulded parts to meet DIN & ASTM requirements
ASTM measurements were tested at 20 in/min.
DIN measurements were tested at 500 mm/min.
POLYMER SELECTION
Before selecting this product it is necessary that the user ensures the product performance will meet all operational and end use requirements. Having satisfied these requirements, should changes be contemplated in method of application, materials, service conditions or any other change that could affect the ultimate performance of the end product, then further tests and trials should be carried out. For assistance with particular problems and applications, please contact the HUNTSMAN TPU Technical Service Department listed below.

HEALTH & SAFETY ADVICE
Before undertaking any trials with this product it is essential that all personnel are aware of the necessary precautions that must be taken. These are detailed in the relevant Material Safety Data Sheet, which will be provided by HUNTSMAN.

SUPPLY & STORAGE
KRYSTALFLEX® PE399 is supplied in the form of film with interlayer in cardboard boxes. Rolls on pallets must be stacked and aligned properly so the rolls remain suspended in the box.

KRYSTALFLEX® PE399 has a minimum expected shelf life of 12 months from the date of shipment when stored in a cool and dry place in the manufacturer’s original packaging.

PHYSICAL FORM
Type: Film

The address of your nearest technical centre is:

USA
Huntsman
52 Kendall Pond Road
Derry, NH 03038 USA
Tel: +1 603 421 3500
Fax: +1 603 421 3510

EUROPE
Huntsman
Hafenringstrasse 1
49090 Osnabrück Germany
Tel: +49 541 9141 360
Fax: +49 541 9141 395

ASIA
Huntsman
Room 1708-9, Olympia Plaza
243-255 King's Road, North Point, Hong Kong
Tel: +852 2722 1111
Fax: +852 2366 0388

Web: www.huntsman.com/tpu

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KRYSTALFLEX® is a registered trademark of Huntsman International LLC in one or more countries, but not all countries.

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Material Preparation
To ensure trouble free processing, it is necessary to keep KRYSTALFLEX® film free of dust or contamination.

For further advice on the use of KRYSTALFLEX® film, please contact the HUNTSMAN TPU Technical Service Department.

PROCESSING PARAMETERS

Table 2: Typical Laminating Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultimate Temperature</td>
<td>110°C – 130°C</td>
</tr>
<tr>
<td></td>
<td>230°F – 266°F</td>
</tr>
<tr>
<td>Ultimate Pressure</td>
<td>8 bar – 12 bar</td>
</tr>
<tr>
<td></td>
<td>116 psi – 174 psi</td>
</tr>
<tr>
<td>Soaking Time</td>
<td>30 min. / 6 mm.</td>
</tr>
<tr>
<td></td>
<td>30 min. / 0.25 inch</td>
</tr>
</tbody>
</table>

Product Data
SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: KRYSTALFLEX® PE 399
Registration number: Not available.
Product code: 00025140
Product description: Thermoplastic polyurethane

1.2 Relevant identified uses of the substance or mixture and uses advised against

Product use: Thermoplastic polyurethane

1.3 Details of the supplier of the safety data sheet

Supplier: Huntsman Holland BV
Merseyweg 10
3197 KG Botlek-Rotterdam
The Netherlands
Tel: +31 181 299111
Fax: +31 181 293900

E-mail address to request full REACH registration number upon EU member State Authority request: REACH_Registration Nr_HPU@huntsman.com

1.4 Emergency telephone number

Supplier
Telephone number: EUROPE: +32 35 75 1234
USA: +1/800/424.9300
ASIA: +65 6542 9595
China: +86 20 39377888
+86 532 83889090
India +91 22 42 87 5333
Australia: 1800 786 152
New Zealand: 0800 767 437

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition: Article
Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]
Aquatic Chronic 3, H412
Ingredients of unknown toxicity:
Ingredients of unknown ecotoxicity:
Classification according to Directive 1999/45/EC [DPD]
The product is classified as dangerous according to Directive 1999/45/EC and its amendments.
Classification: R52/53
Environmental hazards: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

See Section 16 for the full text of the R phrases or H statements declared above.
See Section 11 for more detailed information on health effects and symptoms.

Date of issue / Date of revision: 1/22/2015.
SECTION 2: Hazards identification

2.2 Label elements

Signal word: No signal word.

Hazard statements: Harmful to aquatic life with long lasting effects.

Precautionary statements

General: Not applicable.
Prevention: Avoid release to the environment.
Response: Not applicable.
Storage: Not applicable.
Disposal: Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazardous ingredients:

Supplemental label elements

Special packaging requirements
Containers to be fitted with child-resistant fastenings: Not applicable.
Tactile warning of danger: Not applicable.

2.3 Other hazards

Other hazards which do not result in classification: None known.

SECTION 3: Composition/information on ingredients

3.2 Mixtures: Article

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Identifiers</th>
<th>%</th>
<th>Classification</th>
<th>Regulation (EC) No. 1272/2008 [CLP]</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol</td>
<td>CAS: 25973-55-1, EC: 247-384-8, RRN: 01-2119956688-17</td>
<td>0.1-1</td>
<td>Xn; R48/22</td>
<td>STOT RE 2, H373 (kidneys, liver and thyroid) (oral) Aquatic Chronic 4, H413</td>
<td>[1]</td>
</tr>
<tr>
<td>bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate</td>
<td>CAS: 41556-26-7, EC: 255-437-1</td>
<td>0.1-1</td>
<td>R43, N; R50/53</td>
<td>Skin Sens. 1, H317 Aquatic Acute 1, H400 Aquatic Chronic 1, H410</td>
<td>[1]</td>
</tr>
<tr>
<td>Methyl 1,2,2,6,6-pentamethyl-4-piperidyl sebacate</td>
<td>CAS: 82919-37-7, EC: 280-060-4</td>
<td>0.1-1</td>
<td>R43, N; R50/53</td>
<td>Aquatic Acute 1, H400 Aquatic Chronic 1, H410</td>
<td>[1]</td>
</tr>
</tbody>
</table>

See Section 16 for the full text of the R-phrases declared above.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Date of issue / Date of revision: 1/22/2015.
SECTION 3: Composition/information on ingredients

[1] Substance classified with a health or environmental hazard
[2] Substance with a workplace exposure limit
[5] Substance of equivalent concern

Occupational exposure limits, if available, are listed in Section 8.

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : Symptomatic treatment and supportive therapy as indicated.
SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media: None known.

5.2 Special hazards arising from the substance or mixture

Hazardous thermal decomposition products: This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products: Unlikely under normal industrial use. If the product is heated to temperatures excessively higher than those recommended on the technical data sheet, then thermal decomposition is possible*. Combustion products may include: carbon oxides (CO, CO2), nitrogen oxides (NO, NO2, etc.), hydrocarbons, HCN.

5.3 Advice for firefighters

Special precautions for fire-fighters: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders: If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

6.2 Environmental precautions: Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

6.3 Methods and material for containment and cleaning up

Small spill: Move containers from spill area. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor.

Large spill: Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor.

6.4 Reference to other sections: See Section 1 for emergency contact information. See Section 8 for information on appropriate personal protective equipment. See Section 13 for additional waste treatment information.
SECTION 7: Handling and storage

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

7.1 Precautions for safe handling

Protective measures:
- Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid release to the environment. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene:
- Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities

- Keep container tightly closed in a cool, well-ventilated place.

7.3 Specific end use(s)

Recommendations:
- Not available.

Industrial sector specific solutions:
- Not available.

SECTION 8: Exposure controls/personal protection

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

8.1 Control parameters

Occupational exposure limits
- No exposure limit value known.

Recommended monitoring procedures:
- If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Derived effect levels
SECTION 8: Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Type</th>
<th>Exposure</th>
<th>Value</th>
<th>Population</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4, 6-diterpénylphenol</td>
<td>DNEL</td>
<td>Long term Dermal</td>
<td>0.3 mg/kg bw/day</td>
<td>Workers</td>
<td>Systemic</td>
</tr>
<tr>
<td></td>
<td>DNEL</td>
<td>Long term Inhalation</td>
<td>0.7 mg/m³</td>
<td>Workers</td>
<td>Systemic</td>
</tr>
<tr>
<td></td>
<td>DNEL</td>
<td>Long term Dermal</td>
<td>0.14 mg/kg bw/day</td>
<td>Consumers</td>
<td>Systemic</td>
</tr>
<tr>
<td></td>
<td>DNEL</td>
<td>Long term Inhalation</td>
<td>0.17 mg/m³</td>
<td>Consumers</td>
<td>Systemic</td>
</tr>
</tbody>
</table>

**Predicted effect concentrations**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Type</th>
<th>Compartment Detail</th>
<th>Value</th>
<th>Method Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4, 6-diterpénylphenol</td>
<td>PNEC</td>
<td>Fresh water</td>
<td>0.01 mg/l</td>
<td>Assessment Factors</td>
</tr>
<tr>
<td></td>
<td>PNEC</td>
<td>Marine</td>
<td>0.001 mg/l</td>
<td>Assessment Factors</td>
</tr>
<tr>
<td></td>
<td>PNEC</td>
<td>Soil</td>
<td>90 mg/kg</td>
<td>Equilibrium Partitioning</td>
</tr>
<tr>
<td></td>
<td>PNEC</td>
<td>Fresh water sediment</td>
<td>451 mg/kg</td>
<td>Equilibrium Partitioning</td>
</tr>
<tr>
<td></td>
<td>PNEC</td>
<td>Marine water sediment</td>
<td>45.1 mg/kg</td>
<td>Equilibrium Partitioning</td>
</tr>
<tr>
<td></td>
<td>PNEC</td>
<td>Sewage Treatment Plant</td>
<td>1 mg/l</td>
<td>Assessment Factors</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

**Appropriate engineering controls**: No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

**Individual protection measures**

**Hygiene measures**: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection**: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

**Skin protection**

**Hand protection**: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Use gloves approved to relevant standards e.g. EN 374 (Europe), F739 (US). Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material and dexterity. Always seek advice from glove suppliers. Additional information can be found for instance at www.gisbau.de.

**Body protection**: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
SECTION 8: Exposure controls/personal protection

Other skin protection: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection: In case of inadequate ventilation wear respiratory protection. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

**Appearance**

- Physical state: Solid. [Film]
- Colour: Not available.
- Odour: Not available.
- Odour threshold: Not available.
- pH: Not available.
- Melting point/freezing point: Not available.
- Initial boiling point and boiling range: Not available.

- Flash point: Not applicable.
- Evaporation rate: Not available.
- Flammability (solid, gas): Thermal decomposition products are toxic and may include hydrocarbons, oxides of carbon and other irritating gases.
- Burning time: Not available.
- Burning rate: Not available.
- Upper/lower flammability or explosive limits: Not available.

- Vapour pressure: Not available.
- Vapour density: Not available.
- Relative density: 1.07
- Solubility(ies): Not available.

- Water solubility: Not available.

**Partition coefficient: n-octanol/water (LogK_{ow})**: Not available.

- Auto-ignition temperature: Not available.
- Decomposition temperature: Not available.
- Viscosity: Dynamic: Not available.

- Kinematic: Not available.
- Kinematic (40°C): Not available.

- Explosive properties: Not available.
- Oxidising properties: Not available.
SECTION 10: Stability and reactivity

10.1 Reactivity: No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability: The product is stable.

10.3 Possibility of hazardous reactions: Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid: No specific data.

10.5 Incompatible materials: No specific data.

10.6 Hazardous decomposition products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Endpoint</th>
<th>Species</th>
<th>Result</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4, 6-ditertpentlyphenol</td>
<td>LC50 Inhalation Dusts and mists</td>
<td>Rat</td>
<td>&gt;0.4 mg/l</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>&gt;1100 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rabbit</td>
<td>&gt;7750 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>2369 to 3920 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

Conclusion/Summary

Acute toxicity estimates: No additional information.

Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Species</th>
<th>Route of exposure</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4, 6-ditertpentlyphenol</td>
<td>OECD 404 Acute Dermal Irritation/Corrosion</td>
<td>Rabbit</td>
<td>Skin</td>
<td>Non-irritant.</td>
</tr>
<tr>
<td></td>
<td>OECD 405 Acute Eye Irritation/Corrosion</td>
<td>Rabbit</td>
<td>Eyes</td>
<td>Non-irritant.</td>
</tr>
<tr>
<td>bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate</td>
<td>-</td>
<td>Rabbit</td>
<td>Skin</td>
<td>Severe irritant</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Rabbit</td>
<td>Eyes</td>
<td>Mild irritant</td>
</tr>
</tbody>
</table>

Conclusion/Summary

Skin: Severely irritating to the skin.

Eyes: Non-irritating to the eyes.

Respiratory Sensitiser: No additional information.
SECTION 11: Toxicological information

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Route of exposure</th>
<th>Species</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate Methyl 1,2,2,6,6-pentamethyl-4-piperidyl sebacate</td>
<td>OECD 406 Skin Sensitization No official guidelines -</td>
<td>skin skin skin</td>
<td>Guinea pig Guinea pig Guinea pig</td>
<td>Not sensitizing Sensitising Sensitising</td>
</tr>
</tbody>
</table>

Conclusion/Summary
- Skin: No additional information.
- Respiratory: No additional information.

Mutagenicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Route of exposure</th>
<th>Species</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate Methyl 1,2,2,6,6-pentamethyl-4-piperidyl sebacate</td>
<td>No official guidelines No official guidelines OECD 471 Bacterial Reverse Mutation Test</td>
<td>-</td>
<td>Guinea pig Guinea pig Guinea pig</td>
<td>Negative Negative Negative</td>
</tr>
</tbody>
</table>

Conclusion/Summary
- No additional information.

Carcinogenicity
- No additional information.

Reproductive toxicity
- No additional information.

Teratogenicity
- No additional information.

Specific target organ toxicity (single exposure)
- Not available.

Specific target organ toxicity (repeated exposure)
- Not available.

Aspiration hazard
- Not available.

Information on the likely routes of exposure
- Not available.

Potential acute health effects
- Inhalation: No known significant effects or critical hazards.
- Ingestion: No known significant effects or critical hazards.
- Skin contact: No known significant effects or critical hazards.
- Eye contact: No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics
- Inhalation: No specific data.
- Ingestion: No specific data.
- Skin contact: No specific data.
- Eye contact: No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure
- Potential immediate effects: Not available.
SECTION 11: Toxicological information

Potential delayed effects: Not available.

Long term exposure

Potential immediate effects: Not available.

Potential delayed effects: Not available.

Potential chronic health effects

Conclusion/Summary: No additional information.

General: No known significant effects or critical hazards.

Carcinogenicity: No known significant effects or critical hazards.

Mutagenicity: No known significant effects or critical hazards.

Teratogenicity: No known significant effects or critical hazards.

Developmental effects: No known significant effects or critical hazards.

Fertility effects: No known significant effects or critical hazards.

Other information: Not available.

SECTION 12: Ecological information

12.1 Toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Endpoint</th>
<th>Exposure</th>
<th>Species</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol</td>
<td>OECD 202 Daphnia sp. Acute Immobilisation Test</td>
<td>Acute EC50</td>
<td>24 hours Static</td>
<td>Daphnia</td>
<td>&gt;100 mg/l</td>
</tr>
<tr>
<td></td>
<td>OECD 202 Daphnia sp. Acute Immobilisation Test</td>
<td>Acute EC50</td>
<td>48 hours Semi-static</td>
<td>Daphnia</td>
<td>&gt;0.083 mg/l</td>
</tr>
<tr>
<td></td>
<td>OECD 201 Alga, Growth Inhibition Test</td>
<td>Acute EL50</td>
<td>72 hours Static</td>
<td>Algae</td>
<td>&gt;0.1 mg/g</td>
</tr>
<tr>
<td></td>
<td>OECD 201 Alga, Growth Inhibition Test</td>
<td>Acute EC50</td>
<td>72 hours Static</td>
<td>Algae</td>
<td>&gt;10 mg/l</td>
</tr>
<tr>
<td></td>
<td>OECD 209 Activated Sludge, Respiration Inhibition Test</td>
<td>Acute IC50</td>
<td>3 hours Static</td>
<td>Bacteria</td>
<td>&gt;100 mg/l</td>
</tr>
<tr>
<td></td>
<td>OECD 203 Fish, Acute Toxicity Test</td>
<td>Acute LC50</td>
<td>96 hours Static</td>
<td>Fish</td>
<td>&gt;100 mg/l</td>
</tr>
<tr>
<td></td>
<td>No official guidelines</td>
<td>Chronic NOECr</td>
<td>72 hours Static</td>
<td>Algae</td>
<td>&lt;0.1 mg/l</td>
</tr>
<tr>
<td>bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate</td>
<td>OECD 209 Activated Sludge, Respiration Inhibition Test</td>
<td>Acute EC50</td>
<td>3 hours Static</td>
<td>Bacteria</td>
<td>&gt;100 mg/l</td>
</tr>
<tr>
<td></td>
<td>OECD 202 Daphnia sp. Acute Immobilisation Test</td>
<td>Acute EC50</td>
<td>24 hours Static</td>
<td>Daphnia</td>
<td>20 mg/l</td>
</tr>
<tr>
<td></td>
<td>OECD 203 Fish, Acute Toxicity Test</td>
<td>Acute LC50</td>
<td>96 hours Static</td>
<td>Fish</td>
<td>0.97 to 1 mg/l</td>
</tr>
</tbody>
</table>

Conclusion/Summary: No additional information.

12.2 Persistence and degradability

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Period</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol</td>
<td>OECD 301B Ready Biodegradability - CO2 Evolution Test</td>
<td>28 days</td>
<td>2 to 8 %</td>
</tr>
<tr>
<td>bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate</td>
<td>OECD 301E Ready Biodegradability - Modified OECD Screening Test</td>
<td>28 days</td>
<td>38 %</td>
</tr>
</tbody>
</table>
SECTION 12: Ecological information

12.3 Bioaccumulative potential

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP_{ow}</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4, 6-diterpentylphenol bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate</td>
<td>&gt;6.5</td>
<td>-</td>
<td>high</td>
</tr>
<tr>
<td>Methyl 1,2,2,6,6-pentamethyl-4-piperidyl sebacate</td>
<td>0.37</td>
<td>75.39</td>
<td>low</td>
</tr>
</tbody>
</table>

12.4 Mobility in soil

Mobility: Not available.

12.5 Results of PBT and vPvB assessment

Not applicable.

12.6 Other adverse effects

No known significant effects or critical hazards.

12.7 Other ecological information

SECTION 13: Disposal considerations

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

13.1 Waste treatment methods

**Product**

**Methods of disposal**: The generation of waste should be avoided or minimised wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

**Hazardous waste**: Yes.

**European waste catalogue (EWC)**: Yes.

Date of issue / Date of revision: 1/22/2015.
SECTION 13: Disposal considerations

<table>
<thead>
<tr>
<th>Waste code</th>
<th>Waste designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>07 02 13</td>
<td>waste plastic</td>
</tr>
</tbody>
</table>

Packaging

**Methods of disposal**: The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

**Special precautions**: This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

<table>
<thead>
<tr>
<th>14.1 UN number</th>
<th>14.2 UN proper shipping name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADR/RID</td>
<td>Not regulated.</td>
</tr>
<tr>
<td>IMDG</td>
<td>Not regulated.</td>
</tr>
<tr>
<td>IATA</td>
<td>Not regulated.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14.3 Transport hazard class(es)</th>
<th>14.4 Packing group</th>
<th>14.5 Environmental hazards</th>
<th>14.6 Special precautions for user</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADR/RID</td>
<td>-</td>
<td></td>
<td>Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.</td>
<td>-</td>
</tr>
<tr>
<td>IMDG</td>
<td>-</td>
<td>No.</td>
<td>Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.</td>
<td>-</td>
</tr>
</tbody>
</table>

Date of issue / Date of revision: 1/22/2015.
SECTION 14: Transport information

| IATA | - | No. | Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage. | - |

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU Regulation (EC) No. 1907/2006 (REACH)

This product is compliant with the REACH Regulation EC 1907/2006. Huntsman has pre-registered and is registering all of the substances that it manufactures in or imports into the European Economic Area (EEA) that are subject to Title II of the REACH Regulation.

Annex XIV - List of substances subject to authorisation

Annex XIV

None of the components are listed.

Substances of very high concern

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Reason</th>
<th>Status</th>
<th>Reference number</th>
<th>Inclusion date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4, 6-ditetrapentylphenol</td>
<td>PBT</td>
<td>Candidate</td>
<td>ED/108/2014</td>
<td>12/17/2014</td>
</tr>
<tr>
<td>2-(2H-benzotriazol-2-yl)-4, 6-ditetrapentylphenol</td>
<td>vPvB</td>
<td>Candidate</td>
<td>ED/108/2014</td>
<td>12/17/2014</td>
</tr>
</tbody>
</table>

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : Not applicable.

Other EU regulations

Europe inventory : All components are listed or exempted.
Black List Chemicals : Not listed
Priority List Chemicals : Not listed
Integrated pollution prevention and control list (IPPC) - Air : Not listed
Integrated pollution prevention and control list (IPPC) - Water : Not listed
KRYSTALFLEX YE399

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Date of issue: 22 January 2015
(M)SDS no.: 00025140
Version: 2

SECTION 15: Regulatory information

### National regulations

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Carcinogenic effects</th>
<th>Mutagenic effects</th>
<th>Developmental effects</th>
<th>Fertility effects</th>
</tr>
</thead>
</table>

References:

- The provision of Safety Data Sheets comes under Regulation 6 of CHIP (CHIP is the recognised abbreviation for the Chemicals Hazard Information and Packaging Regulations). This is an addition to the Health and Safety at Work Act 1974.

**Australia inventory (AICS)**: At least one component is not listed.

**Canada inventory**: At least one component is not listed.

**China inventory (IECSC)**: All components are listed or exempted.

**Japan inventory**: All components are listed or exempted.

**Korea inventory (KECI)**: Exempted

**New Zealand Inventory of Chemicals (NZIoC)**: At least one component is not listed.

**Philippines inventory (PICCS)**: Not determined.

**United States inventory (TSCA 8b)**: All components are listed or exempted.

**Chemical Weapons Convention List Schedule I Chemicals**: Not listed

**Chemical Weapons Convention List Schedule II Chemicals**: Not listed

**Chemical Weapons Convention List Schedule III Chemicals**: Not listed

15.2 Chemical Safety Assessment:

This product contains substances for which Chemical Safety Assessments are still required.

SECTION 16: Other information

- Indicates information that has changed from previously issued version.

Abbreviations and acronyms:

- ATE = Acute Toxicity Estimate
- CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
- DNEL = Derived No Effect Level
- EUH statement = CLP-specific Hazard statement
- PNEC = Predicted No Effect Concentration
- RRN = REACH Registration Number

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic Chronic 3, H412</td>
<td>Calculation method</td>
</tr>
</tbody>
</table>

Full text of abbreviated H statements:

- H317 May cause an allergic skin reaction.
- H373 May cause damage to organs through prolonged or repeated exposure if (kidneys, swallowed. (kidneys, liver and thyroid) (oral)
- H400 Very toxic to aquatic life.
- H410 Very toxic to aquatic life with long lasting effects.

Date of issue / Date of revision: 1/22/2015.
SECTION 16: Other information

Full text of abbreviations R phrases:
R48/22- Harmful: danger of serious damage to health by prolonged exposure if swallowed.
R43- May cause sensitisation by skin contact.
R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R52/53- Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R53- May cause long-term adverse effects in the aquatic environment.

Full text of classifications [CLP/GHS]:
- Xn - Harmful
- N - Dangerous for the environment
- H412 - Harmful to aquatic life with long lasting effects.
- H413 - May cause long lasting harmful effects to aquatic life.
- Aquatic Acute 1, H400 - ACUTE AQUATIC HAZARD - Category 1
- Aquatic Chronic 1, H410 - LONG-TERM AQUATIC HAZARD - Category 1
- Aquatic Chronic 3, H412 - LONG-TERM AQUATIC HAZARD - Category 3
- Aquatic Chronic 4, H413 - LONG-TERM AQUATIC HAZARD - Category 4
- Skin Sens. 1, H317 - SKIN SENSITIZATION - Category 1
- STOT RE 2, H373 - SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver and thyroid) (oral) - Category 2

Full text of classifications [DSD/DPD]:
- H412 - Harmful to aquatic life with long lasting effects.
- H413 - May cause long lasting harmful effects to aquatic life.

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THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

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Safety Data Sheet

Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name • TPU Film
Synonyms • 18103, 18104, 18125, 18127, 18212, 18215, 18235, 18236, 18240, 18242, 18244, 18245, 18304, 18305, 18403, 18404, 18411, 18415, 18422, 18423, 18492, 19104, 19204, 19206, 19426, 19252; 27370, 27303; 28622; 29100, 29102, 29213, 29214, 29216, 29222, 29300; 38214; 46510, 46510 White, 49510, 49510-60DV, AGKR; AG8451; ArgoEdgeSealPLUS; Argotec BOC Edge Seal; D7101; SS-polyester and ST-polyether thermoplastic polyurethanes; TX 1540

SDS Number/Grade • F-39

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified use(s) • Used in a broad range of industrial, commercial and consumer applications requiring one or more of the following attributes, chemical resistance, strength, resiliency and elastic recovery.

Use(s) advised against • Possible thermal decomposition products: carbon monoxide, carbon dioxide, hydrogen cyanide isocyanates, nitrogen oxides.

1.3 Details of the supplier of the safety data sheet

Manufacturer • Argotec LLC
53 Silvio O. Conte Drive
Greenfield, MA 01301
United States
www.argotec.com
info@argotec.com

Telephone (General) • 413-772-2564

1.4 Emergency telephone number

Manufacturer • 413-772-2564

Section 2: Hazards Identification

EU/EEC
According to: EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP • Not classified
DSD/DPD • Not classified

2.2 Label Elements
2.3 Other Hazards

CLP

- This material is exempt from CLP/REACH obligations as an article as specified in REACH (1907/2006) and related ECHA guidance.

DSD/DPD

- Under European Directive 1999/45/EC these product(s) are exempt and considered manufactured article(s) under stated normal conditions of use.
Section 3 - Composition/Information on Ingredients

3.1 Substances

- Material does not meet the criteria of a substance.

3.2 Mixtures

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Identifiers</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermo Plastic Polyurethane</td>
<td>NDA</td>
<td>90% TO 100%</td>
</tr>
<tr>
<td>Additives</td>
<td>NDA</td>
<td>0% TO 10%</td>
</tr>
<tr>
<td>Additives</td>
<td>NDA</td>
<td>0% TO 10%</td>
</tr>
<tr>
<td>Additives</td>
<td>NDA</td>
<td>0% TO 10%</td>
</tr>
<tr>
<td>Additives</td>
<td>NDA</td>
<td>0% TO 10%</td>
</tr>
<tr>
<td>Additives</td>
<td>NDA</td>
<td>0% TO 10%</td>
</tr>
</tbody>
</table>

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation
- First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. If signs/symptoms develop, move person to fresh air. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

Skin
- First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. If burned by contact with hot material, cool molten material adhering to skin as rapidly as possible with water. Removal of solidified molten material from skin requires medical assistance. Wash skin with soap and water. If signs/symptoms develop, get medical attention.

Eye
- First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. If contact with material occurs flush eyes with water. If signs/symptoms develop, get medical attention.

Ingestion
- First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. If signs/symptoms develop, get medical attention.

4.2 Most important symptoms and effects, both acute and delayed
- Under normal conditions of use, no health effects are expected.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician
- No specific actions or treatments recommended related to exposure to this material.

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media
- Carbon Dioxide, Foam, Dry Chemical, and Water.

Unsuitable Extinguishing Media
- No data available.
5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards

- None known.

Hazardous Combustion Products

- No data available

5.3 Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection. Use water to cool materials and containers exposed to fire.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions

- No special precautions expected to be necessary if material is used under ordinary conditions and as recommended.

Emergency Procedures

- No emergency procedures are expected to be necessary if material is used under ordinary conditions as recommended. Use normal clean up procedures.

6.2 Environmental precautions

- Avoid release to the environment.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures

- As rolled film this material should not result in spills. However, scrap and excess material should be placed in suitable containers for disposal in a licensed facility.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Use good safety and industrial hygiene practices.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Store in a cool, dry place. Keep away from incompatible materials.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines

- No applicable exposure limits available for product or components.

8.2 Exposure controls

Engineering Measures/Controls

- No special requirements under ordinary conditions of use. When product is heated local exhaust is advised.

Personal Protective Equipment

Respiratory

- No special requirements under ordinary conditions of use and with adequate ventilation.

Eye/Face

- Normal industrial eye protection practices should be employed. No special equipment is required.

Skin/Body

- Gloves as required to handle hot material. No special equipment required for cool
Environmental Exposure Controls

- Follow best practice for site management and disposal of waste.

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Appearance/Description</th>
<th>Plastic film with no odor and various colors.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form</td>
<td>Solid</td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>Various colors.</td>
<td></td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Data lacking</td>
<td></td>
</tr>
</tbody>
</table>

**General Properties**

- Boiling Point: Data lacking
- Decomposition Temperature: Data lacking
- Specific Gravity/Relative Density: > 1 Water=1
- Viscosity: Data lacking
- Odor: Odorless
- Odor Threshold: Data lacking

**Volatile**

- Vapor Pressure: Data lacking
- Evaporation Rate: Data lacking
- VOC (Vol.): 0 %

**Flammability**

- Flash Point: Data lacking
- LEL: Data lacking
- Flammability (solid, gas): Data lacking
- UEL: Data lacking

**Environmental**

- Octanol/Water Partition coefficient: Data lacking

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.

10.4 Conditions to avoid

- Excess heat.

10.5 Incompatible materials

- Strong oxidizing materials.

10.6 Hazardous decomposition products

- Unknown due to the complex nature of this material. Fumes from complete or incomplete combustion of this material may include oxides of carbon, oxides of
nitrogen, water vapor, cyanic acid, or a wide variety of innocuous or toxic fumes.

## Section 11 - Toxicological Information

### 11.1 Information on toxicological effects

<table>
<thead>
<tr>
<th>GHS Properties</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory sensitization</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
<tr>
<td>Serious eye damage/Irritation</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
<tr>
<td>Acute toxicity</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
<tr>
<td>Aspiration Hazard</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
<tr>
<td>Skin corrosion/Irritation</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
<tr>
<td>Skin sensitization</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
<tr>
<td>STOT-RE</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
<tr>
<td>STOT-SE</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
<tr>
<td>Toxicity for Reproduction</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
<tr>
<td>Germ Cell Mutagenicity</td>
<td>EU/CLP • Data lacking</td>
</tr>
<tr>
<td></td>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td></td>
<td>UN GHS • Data lacking</td>
</tr>
</tbody>
</table>

### Potential Health Effects

#### Inhalation

- **Acute (Immediate)**
  - Under normal conditions of use, no health effects are expected.

- **Chronic (Delayed)**
  - No data available

#### Skin
**Acute (Immediate)**
- Under normal conditions of use, no health effects are expected.

**Chronic (Delayed)**
- No data available

**Eye**

**Acute (Immediate)**
- Under normal conditions of use, no health effects are expected.

**Chronic (Delayed)**
- No data available

**Ingestion**

**Acute (Immediate)**
- Under normal conditions of use, no health effects are expected.

**Chronic (Delayed)**
- No data available

---

**Section 12 - Ecological Information**

12.1 **Toxicity**
- Material data lacking.

12.2 **Persistence and degradability**
- Material data lacking.

12.3 **Bioaccumulative potential**
- Material data lacking.

12.4 **Mobility in Soil**
- No data available

12.5 **Results of PBT and vPvB assessment**
- PBT and vPvB assessment has not been conducted.

12.6 **Other adverse effects**
- No studies have been found.

---

**Section 13 - Disposal Considerations**

13.1 **Waste treatment methods**

- **Product waste**
  - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

- **Packaging waste**
  - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

---

**Section 14 - Transport Information**

<table>
<thead>
<tr>
<th>14.1 UN number</th>
<th>14.2 UN proper shipping name</th>
<th>14.3 Transport hazard class(es)</th>
<th>14.4 Packing group</th>
<th>14.5 Environmental hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT</td>
<td>NDA</td>
<td>NDA</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>TDG</td>
<td>NDA</td>
<td>Not Regulated</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>IMO/IMDG</td>
<td>NDA</td>
<td>Not Regulated</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>IATA/ICAO</td>
<td>NDA</td>
<td>Not Regulated</td>
<td>NDA</td>
<td>NDA</td>
</tr>
</tbody>
</table>

14.6 **Special precautions for user**
- None specified.

14.7 **Transport in bulk**
- Data lacking.
### Section 15 - Regulatory Information

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

**SARA Hazard Classifications**  
None

**Canada**

<table>
<thead>
<tr>
<th>Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada - WHMIS - Classifications of Substances</td>
</tr>
<tr>
<td>Canada - WHMIS - Ingredient Disclosure List</td>
</tr>
</tbody>
</table>

**Environment**

| Canada - CEPA - Priority Substances List | Not Listed |

**United States**

<table>
<thead>
<tr>
<th>Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals</td>
</tr>
<tr>
<td>U.S. - OSHA - Specifically Regulated Chemicals</td>
</tr>
</tbody>
</table>

**Environment**

<table>
<thead>
<tr>
<th>U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants</th>
<th>Not Listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities</td>
<td>Not Listed</td>
</tr>
<tr>
<td>U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities</td>
<td>Not Listed</td>
</tr>
<tr>
<td>U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs</td>
<td>Not Listed</td>
</tr>
<tr>
<td>U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs</td>
<td>Not Listed</td>
</tr>
<tr>
<td>U.S. - CERCLA/SARA - Section 313 - Emission Reporting</td>
<td>Not Listed</td>
</tr>
<tr>
<td>U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

**United States - California**

<table>
<thead>
<tr>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. - California - Proposition 65 - Carcinogens List</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Developmental Toxicity</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Female</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Male</td>
</tr>
</tbody>
</table>
### 15.2 Chemical Safety Assessment

- Chemical Safety Assessment is not required.

### Section 16 - Other Information

<table>
<thead>
<tr>
<th>Key to abbreviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NDA = No Data Available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Revision Date</th>
<th>08/July/2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation Date</td>
<td>01/April/2010</td>
</tr>
<tr>
<td>Disclaimer/Statement of Liability</td>
<td>While Argotec, LLC believes the data set forth herein is accurate as the date hereof, Argotec makes no warranty with respect thereon. Such data are offered solely for consideration, investigation, and verification.</td>
</tr>
</tbody>
</table>
### General Description and Use

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argotec SKU Number</td>
<td><strong>ST-6050</strong></td>
</tr>
<tr>
<td>Typical application</td>
<td>Glass lamination optical interlayer film</td>
</tr>
<tr>
<td>Polymer</td>
<td>Thermoplastic polyurethane, aliphatic polyether</td>
</tr>
<tr>
<td>Extrusion method</td>
<td>Flat die</td>
</tr>
<tr>
<td>Gauge</td>
<td>15 - 75 mils (375 - 1875 microns)</td>
</tr>
<tr>
<td>Width</td>
<td>Up to 60 inches (1.52 meters)</td>
</tr>
<tr>
<td>Length</td>
<td>Up to 1000 non-spliced yards (914.4 meters)</td>
</tr>
<tr>
<td>Key attributes</td>
<td>■ Eliminates need for glass surface primer</td>
</tr>
<tr>
<td></td>
<td>■ Clear, non-yellowing</td>
</tr>
<tr>
<td></td>
<td>■ Contains additive package for UV resistance</td>
</tr>
</tbody>
</table>

### Typical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durometer</td>
<td>ASTM D-2240</td>
<td>70A</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>ASTM D-792</td>
<td>1.08</td>
</tr>
<tr>
<td>Tensile strength @ 100%</td>
<td>ASTM D-638</td>
<td>450 psi (3.10 MPa)</td>
</tr>
<tr>
<td>Tensile strength @ 200%</td>
<td>(Die-IV used with grip separation rate of 20-in./min. on SU 50-mil film)</td>
<td>760 psi (5.24 MPa)</td>
</tr>
<tr>
<td>Tensile strength @ 300%</td>
<td></td>
<td>1775 psi (12.24 MPa)</td>
</tr>
<tr>
<td>Tensile strength @ break</td>
<td></td>
<td>6500 psi (44.82 MPa)</td>
</tr>
<tr>
<td>Elongation @ break</td>
<td></td>
<td>400%</td>
</tr>
<tr>
<td>Tear strength</td>
<td>ASTM D-624</td>
<td>300 pli (52.50 kN/m)</td>
</tr>
<tr>
<td>DSC mid point, $T_g$°C</td>
<td>n/a</td>
<td>-57</td>
</tr>
<tr>
<td>TMA peak</td>
<td>n/a</td>
<td>223°F (106°C)</td>
</tr>
<tr>
<td>TMA range</td>
<td>n/a</td>
<td>181-266°F (83-130°C)</td>
</tr>
<tr>
<td>Coefficient of thermal expansion</td>
<td>n/a</td>
<td>~0.0002 L/Lo °C</td>
</tr>
<tr>
<td>Haze*</td>
<td>ASTM D-1003</td>
<td>&lt;0.25%</td>
</tr>
<tr>
<td>Transmission*</td>
<td>ASTM E-313</td>
<td>85-95%</td>
</tr>
<tr>
<td>Yellowness index*</td>
<td>ASTM D-542</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Refractive index*</td>
<td></td>
<td>1.40</td>
</tr>
</tbody>
</table>

*Film tested between two pieces of 1/8-in. glass; sample size 4"x4"x50-mil; lamination temp 175°F; time & pressure: 2-min. @ 400#, 2-min. @ 600#, 2-min. @ 1000#. Revised: February 18, 2015

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Certificate of Registration

This is to certify that the Quality Management System of:

Argotec, LLC
53 Silvio O Conte Drive, Greenfield, MA 01301

has been approved by ISOQAR to the following standard(s)

ISO 9001 : 2008

Certificate Number: 9112QM8001

Scope of Activities: Design and manufacture of high performance extruded polyurethane and other polymer film and sheet

Signed:
(on behalf of ISOQAR)

Andrew Smith

Initial Registration Date: 12 May 2011
Effective Date: 12 May 2014
Expiry Date: 12 May 2017

This certificate has been issued by ISOQAR Inc, 24840 Burnt Pine Drive, Suite 5, Bonita Springs, FL 34134, USA and will remain current subject to the company maintaining its system to the required standard(s). This will be monitored regularly by ISOQAR. The use of the ANAB Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate. Further clarification regarding the scope of this certificate and the applicability of the standard requirements may be obtained by consulting the organisation.

www.isoqarncc.com
Certificate of Registration

This is to certify that the Quality Management System of:

Argotec, LLC
64 Adams Road, Greenfield, MA 01301

has been approved by ISOQAR to the following standard(s)

ISO 9001 : 2008

Certificate Number: 9112QM8002

Scope of Activities:
Design and manufacture of high performance extruded polyurethane and other polymer film and sheet

Signed:
(on behalf of ISOQAR)
Andrew Smith

Initial Registration Date: 12 May 2011
Effective Date: 12 May 2014
Expiry Date: 12 May 2017

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www.isoqarinc.com

This certificate is the property of ISOQAR and must be returned on request.
Certificate of Registration

This is to certify that the Quality Management System of:

Argotec, LLC

49 Greenfield Street, Greenfield, MA 01301

has been approved by ISOQAR to the following standard(s)

ISO 9001 : 2008

Certificate Number: 9112QM8003

Scope of Activities: Manufacture of high performance extruded polyurethane and other polymer film and sheet

Signed: (on behalf of ISOQAR)

Andrew Smith

Initial Registration Date: 12 May 2011

Effective Date: 12 May 2014

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