DuPont™ Appeel® 55041

Appeel® resins Product Data Sheet

Description

Product Description
DuPont™ Appeel® 55041 is a modified polyolefin resin designed to function as a sealing layer for lidding applications, most commonly sealing to polypropylene. It is available in pellet form for use in conventional extrusion or coextrusion equipment designed to process polyethylene resins.

Restrictions

Material Status: Developmental: Active
Availability: Asia, Australia, Pacific Rim

Typical Characteristics

Uses
Lidding Sealant

Applications
- Appeel® 55041 has strong sealability to PP and allows a peelable seal from it.
- Boiling resistance. Appeel® 55041 endures boiling process.
- In the case of: OPET/ adh // Appeel® 55041, these film structures endure boiling condition at 120°C / 30min
- Appeel® 55041 conforms to Code #20 of the Ministry of Health and Welfare Japan.

Typical structures for this lidding would be:
OPET / adhesive // Appeel® 55041
OPET / adhesive // coex film with Appeel® 55041

Appeel® 55041 is used as a heat seal layer in lidding material for injection molded and vacuum molded PP containers used in the packaging of puddings, jelly, and other food items.

Typical Properties

Physical
<table>
<thead>
<tr>
<th>Property</th>
<th>Nominal Values</th>
<th>Test Method(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density ()</td>
<td>0.92 g/cm³</td>
<td>ASTM D792</td>
</tr>
<tr>
<td>Melt Flow Rate (190°C/2.16kg)</td>
<td>4 g/10 min</td>
<td>ASTM D1238 ISO 1183</td>
</tr>
</tbody>
</table>

Thermal
<table>
<thead>
<tr>
<th>Property</th>
<th>Nominal Values</th>
<th>Test Method(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Point (DSC)</td>
<td>140°C (284°F)</td>
<td>ASTM D3418 ISO 3146</td>
</tr>
<tr>
<td>Vicat Softening Point ()</td>
<td>80°C (176°F)</td>
<td>ASTM D1525 ISO 306</td>
</tr>
</tbody>
</table>

Heat Seal Evaluation

The performance of any sealant resin should be evaluated within the context of the application. The sealant is designed to bond to particular substrate(s). Many variables can affect seal strength, including the physical properties of the substrate being sealed to, thickness, flange or surface design, heat seal temperature, dwell time and pressure. The condition and type of the sealing equipment used, such as roller sealers versus platen seal mechanisms can make a significant difference.
In most cases sealant peel strength is used as a measure of performance. Although this is a convenient test, peel strength is affected not only by substrate adhesion but also by peel angle, separation rate, ambient temperature, tensile and modulus properties of the materials, and often by the time elapsed since the formation of the bond.

If sealant peel strength is used as a measure of sealant performance, it is imperative that peel strength be evaluated not only at the time of initial heat sealing the lid to the substrate, but throughout the life of the product and under all the conditions to which the sealant will be exposed. Only then does peel strength provide a reliable indication of adhesive performance in the specific application.

### Processing Information

<table>
<thead>
<tr>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Processing Temperature</td>
</tr>
</tbody>
</table>

General Processing Information:
- If the process is stopped for short periods of time, the screw for the Appeel® extruder should be kept turning at a low rpm to keep material flowing.
- After processing Appeel®, purge the material out using a polyethylene resin, preferably with a lower melt flow rate than the Appeel® resin in use. The "Disco Purge Method" is suggested as the preferred purging method, as this method usually results in a more effective purging process. Information on the Disco Purge Method can be obtained via your DuPont Sales Representative.
- Never shut down the extrusion system with Appeel® in the extruder and die. Properly purge out the Appeel® with a polyethylene, and shut down the line with polyethylene or polypropylene in the system.

#### Blown Film Processing

Blown Film Processing Information:
- Blown Film: The melt temperature of Appeel® 55041 should be maintained in the 160 - 185°C range. Selection of a specific melt temperature will depend on screw configuration, potential power limitations, and the need to match melt viscosities. However, melt temperatures above 260°C should be avoided because of possible thermal degradation of the resin.
- If the process is stopped for short periods of time, the Appeel® 55041 resin extruder should be kept turning at low rpm. For a permanent shutdown, the Appeel® 55041 resin should be purged out using an available polyethylene resin run at the same extrusion temperature used for the Appeel® 55041 resin. Never raise temperature over 260°C until Appeel® 55041 resin is completely purged out. Appeel® 55041 requires relatively low processing temperatures and cooling the bottom of hopper due to its low Vicat point and higher comonomer level.
- Following is an example for suggested temperature profile on the low side of the processing range. Higher temperatures in the final metering zone, adapter and die are suggested if compatible with the process and application.

| Feed Zone      | 135°C (275°F) |
| Second Zone    | 160°C (320°F) |
| Third Zone     | 160°C (320°F) |
| Fourth Zone    | 160°C (320°F) |
| Fifth Zone     | 160°C (320°F) |
| Adapter Zone   | 160°C (320°F) |
| Die Zone       | 160°C (320°F) |

#### Cast Film / Sheet Processing

Cast Film / Sheet Processing Information:
- Cast Film: The melt temperature of Appeel® 55041 should be maintained in the 210 - 235°C range. Selection of a specific melt temperature will depend on screw configuration, potential power limitations, and the need to match melt viscosities. However, melt temperatures above 260°C should be avoided because of possible thermal degradation of the resin.
- If the process is stopped for short periods of time, the Appeel® 55041 resin extruder...
should be kept turning at low rpm. For a permanent shutdown, the Appeel® 55041 resin should be purged out using an available polyethylene resin run at the same extrusion temperature used for the Appeel® 55041 resin. Never raise temperature over 260ºC until Appeel® 55041 resin is completely purged out. Appeel® 55041 requires relatively low processing temperatures and cooling the bottom of hopper due to its low Vicat point and higher comonomer level.

Following is an example for suggested temperature profile on the high side of the processing range. Lower temperatures in the final metering zone, adapter and die are suggested if compatible with the process and application.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Temperature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed Zone</td>
<td>160°C (320°F)</td>
<td></td>
</tr>
<tr>
<td>Second Zone</td>
<td>185°C (365°F)</td>
<td></td>
</tr>
<tr>
<td>Third Zone</td>
<td>210°C (410°F)</td>
<td></td>
</tr>
<tr>
<td>Fourth Zone</td>
<td>235°C (455°F)</td>
<td></td>
</tr>
<tr>
<td>Fifth Zone</td>
<td>235°C (455°F)</td>
<td></td>
</tr>
<tr>
<td>Adapter Zone</td>
<td>235°C (455°F)</td>
<td></td>
</tr>
<tr>
<td>Die Zone</td>
<td>235°C (455°F)</td>
<td></td>
</tr>
</tbody>
</table>

FDA Status Information
Appeel® 55041 resin complies with Food and Drug Administration Regulation 21 CFR 177.1520(c)3.2a with limitations: Final article must meet thickness limitation of 0.1 mm (4 mil) as per 177.1520(c)3.6. Final blend is restricted to food types as per 177.1520(c)3.7. This regulation describes resinous and polymeric coatings for polyolefin films that may be used in contact with food types I, II, IV-B, VI-A, VI-B, VI-C, VII-B and VIII identified in Table 21 CFR 176.170(c) under Conditions of Use A through H described in 176.170(c).

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Regulatory Information
Appeel® 55041 complies with Japan Hygienic Olefin and Styrene Plastics Association and MITI no. 20 Food regulation in Japan.

For information on regulatory compliance outside of the U.S., consult your local DuPont representative.

Safety & Handling
For information on appropriate Handling & Storage of this polymeric resin, please refer to the Material Safety Data Sheet.

A Product Safety Bulletin, Material Safety Data Sheet, and/or more detailed information on extrusion processing and/or compounding of this polymeric resin for specific applications are available from your DuPont Packaging and Industrial Polymers representative.

Read and Understand the Material Safety Data Sheet (MSDS) before using this product

Regional Centres
DuPont operates in more than 70 countries. For help finding a local representative, please contact one of the following regional customer contact centers:

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DuPont Company
Chestnut Run Plaza – Bldg. 730

**Asia Pacific**
DuPont China Holding Co., Ltd.
Shanghai Branch

**Europe / Middle East / Africa**
DuPont de Nemours Int’l. S.A.
2, Chemin du Pavillon Box 50
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This data sheet is effective as of 09/24/2009 06:01:31 PM and supersedes all previous versions.