How AFFINITY Polyolefin Plastomers Can Improve Cast Film Polypropylene Performance
MARKET OVERVIEW
To take advantage of the growing market for cast film polypropylene (CPP), converters need products that not only turn a profit, but also gain customer loyalty.

It’s nice to know that food packaging, stationery folders, lamination, textile packaging, and other CPP applications can be produced efficiently and then dropped, tossed, and jostled without puncture or tear during transportation or everyday use.

AFFINITY* Polyolefin Plastomers (POPs) from The Dow Chemical Company can deliver those benefits and more. Here’s how.

Table 1: Where AFFINITY POPs Deliver

<table>
<thead>
<tr>
<th>CPP Markets</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Packaging</td>
<td>Single cheese slice packaging</td>
</tr>
<tr>
<td></td>
<td>Hard candy twists (twist film)</td>
</tr>
<tr>
<td></td>
<td>Snack food packaging</td>
</tr>
<tr>
<td></td>
<td>Baked product packaging</td>
</tr>
<tr>
<td></td>
<td>Fresh produce packaging</td>
</tr>
<tr>
<td></td>
<td>Cracker bag wraps</td>
</tr>
<tr>
<td>Stationary</td>
<td>Folders</td>
</tr>
<tr>
<td></td>
<td>Envelope windows</td>
</tr>
<tr>
<td></td>
<td>Document envelopes</td>
</tr>
<tr>
<td>Textile Packaging</td>
<td>Shirt packaging</td>
</tr>
<tr>
<td></td>
<td>Shet packaging</td>
</tr>
<tr>
<td></td>
<td>Pillowcase packaging</td>
</tr>
</tbody>
</table>

COMPLEMENTS POLYPROPYLENE
AFFINITY POPs are high-performance sealants designed to complement and enhance the properties of your homopolymer polypropylene (PP) core layer. AFFINITY POPs, for example, are strong where PP is weak – and vice versa. In addition, the adhesion of AFFINITY POPs to PP is unique in the polyethylene family.

This synergy can help you and your customers achieve new levels of performance with CPP films.

APPLAUDABLE PERFORMANCE
When compared with other sealants, such as PP copolymers and terpolymers, AFFINITY POPs offer the following performance benefits:

- Higher impact resistance. (Fig. 1)
- Improved tear resistance that enables downgauging and improved package integrity. (Fig. 1)
- Lower heat seal and hot tack initiation temperatures for faster filling speeds and low leaker rates. (Fig. 2)
- A better balance of seal strength and tear resistance for reliable package opening with minimal zipper effect (no more catastrophic failure when opening a bag). (Fig. 3)
- Enhanced optical properties providing improved aesthetics and purchase appeal. (Fig. 4)
- Lower modulus for softer films. The PP can be engineered to raise overall stiffness while maintaining lower seal initiation temperatures.

*Trademark of The Dow Chemical Company.
How AFFINITY Polyolefin Plastomers Can Improve Cast Film Polypropylene Performance

Figure 1: Dart Impact Resistance and Tear Strength for CPP[^1-2]

AFFINITY POPs, when used as a sealant layer, offer three times the dart impact strength of copolymer and terpolymer PP sealant layers, and comparable dart impact to all-copolymer PP structures. Tear strength is up to twice that of competitive materials.

Figure 2: Hot Tack Initiation CPP[^1-2]

AFFINITY POPs offer lower hot tack initiation temperatures and comparable strength when compared with traditional sealant materials, which helps to minimise leaker rates.

Figure 3: Heat Seal Initiation for CPP[^1-2]

AFFINITY POPs seal at temperatures up to 35°C lower than traditional materials, which can yield faster line speeds.

[^1]: Based on 7-21.7 micron structures, (sealant - homopolymer PP - sealant).
[^2]: Typical properties only; not to be construed as sales specifications.

*Trademark of The Dow Chemical Company.
How AFFINITY Polyolefin Plastomers Can Improve Cast Film Polypropylene Performance

Figure 4: Gloss and Haze for CPP\textsuperscript{1,2}
AFFINITY POPs offer better optics than competitive materials, even when fully formulated (1,700 ppm of antblock; 1,250 ppm slip).

\textbf{Efficient Processing}

AFFINITY POPs comprise about 25 percent of the total CPP structure, and can be readily processed on form-fill-seal machines in sealant layers 4 microns and thicker. They can be run on existing cast coextrusion equipment with only minor modifications to operating parameters.

As shown in Table 2, although amps and pressure are higher for AFFINITY POPs versus competitive materials, their lower RPMs mean higher specific output rates.

Table 2: Processing Comparisons

<table>
<thead>
<tr>
<th>Property</th>
<th>AFFINITY 1850G POP</th>
<th>AFFINITY 1845G POP</th>
<th>Copolymer PP</th>
<th>Terpolymer PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPM</td>
<td>35</td>
<td>34</td>
<td>43</td>
<td>37</td>
</tr>
<tr>
<td>Amps</td>
<td>50</td>
<td>45</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>Pressure</td>
<td>162</td>
<td>136</td>
<td>111</td>
<td>118</td>
</tr>
<tr>
<td>Temperature</td>
<td>219</td>
<td>218</td>
<td>226</td>
<td>226</td>
</tr>
</tbody>
</table>

\textsuperscript{1}Based on 7.217 micron structures, (sealant-homopolymer PP - sealant).

\textsuperscript{2}Typical properties only; not to be construed as sales specifications.
How AFFINITY Polyolefin Plastomers Can Improve Cast Film Polypropylene Performance

**Strong Support**

Dow believes in working closely with customers to help differentiate their products, improve their productivity, and keep their operations running smoothly.

Dow technical experts have a history of providing strong support to customers across Europe and around the world. From applications development to fabrication assistance and product selection, they are committed to providing you with reliable answers as quickly as possible. With access to modern laboratories and equipment, they can also deliver solutions to more difficult challenges.

To offer even better support, Dow is supplementing these services with our Customer Technical Support Centre (CTSC). Customers can easily reach a full-time staff of technical specialists by calling +34 977-559-469. CTSC specialists have the experience and resources to answer technical questions quickly – often in just one phone call.

In addition, you can contact your local Dow representative for information.

**Dow: A Single Source**

AFFINITY POPs are one of several Dow Polyethylene products offered by Dow, and are well complemented by other plastics products in our portfolio, including polypropylene.

Dow’s entry into polypropylene offers customers a broader polymer selection. This helps many customers, especially those who require a variety of resins, to control inventory, improve quality, reduce administration, and more. A single source, particularly one with global reach and knowledge, helps customers streamline their operations.

In addition to AFFINITY POPs for your CPP requirements, talk to us about any other product needs you may have. Simply contact your nearest Dow representative, or call one of the numbers listed on the back cover of this brochure.

---

This is how AFFINITY Polyolefin Plastomers Improve Cast Film Polypropylene Performance:

1. **Improve filling speeds**
2. **Lower leaker rates**
3. **Good aesthetics**
4. **Excellent downgauging**
5. **Improve tear resistance**
6. **High overall performance**
For more information on the products, innovations, expertise, and other services available from the Polyolefins and Elastomers business group in your global region, please contact us or visit our web sites as indicated below.

<table>
<thead>
<tr>
<th>Region</th>
<th>Country</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. and Canada</td>
<td></td>
<td>1-800-441-4389</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td>+32-3-450-2240</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dowpolyolefins.com">www.dowpolyolefins.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dowpolyethylene.com">www.dowpolyethylene.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dowpolypropylene.com">www.dowpolypropylene.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dowwireandcable.com">www.dowwireandcable.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dowamplify.com">www.dowamplify.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dowinspire.com">www.dowinspire.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dowprimacor.com">www.dowprimacor.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dowsaran.com">www.dowsaran.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dowversify.com">www.dowversify.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dow.com">www.dow.com</a></td>
<td></td>
</tr>
</tbody>
</table>

Pacific Area

Australia  (61) 3-9226-3666
Hong Kong (852) 2879-7333
India (91) 22-2524-5830
Indonesia (62) 21-575-9338
Japan (81) 3-5460-2281
Korea (82) 2-551-0601
Malaysia (60) 3-7969-4216
New Zealand (64) 9-3799-664
PRC – Beijing (86) 10-8518-3399
PRC – Guangzhou (86) 20-8752-0380
PRC – Shanghai (86) 21-6336-6998
Philippines (63) 2-819-1986
Singapore (65) 9637-1329
Taiwan (886) 2-2775-6047
Thailand (66) 2-381-1038
Vietnam (84) 8-822-5808

Latin America

Argentina 54-11-4319-0100
Brazil 55-11-5188-9222
Chile 56-2-440-4800
Colombia 57-1-319-2100
Costa Rica 506-258-7090
Mexico 52-55-5201-4700
Peru 51-1-4448899
Puerto Rico 1-787-781-1122
Venezuela 58-2-265-3371/73

Africa

South Africa +27-11-267-0400

Our belief in the principles of Responsible Care® and Sustainable Development influenced the production of this literature. To help protect our environment, this document was printed in small quantities on paper containing recovered/post-consumer fiber and using 100 percent soy-based ink whenever possible.

Additional copies of this document, as well as other literature from Dow, can be downloaded at no cost from www.dowpolyolefins.com. Viewing and distributing this literature electronically will help conserve natural resources, reduce waste, and save you money.

NOTICE: No freedom from any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer’s use and for ensuring that Customer’s workplace and disposal practices are in compliance with applicable laws and other governmental enactments. Dow assumes no obligation or liability for the information in this document. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

NOTICE: If products are described as “experimental” or “developmental”: (1) product specifications may not be fully determined; (2) analysis of hazards and caution in handling and use are required; and (3) there is greater potential for Dow to change specifications and/or discontinue production.

NOTICE REGARDING MEDICAL APPLICATION RESTRICTIONS: The Polyolefins and Elastomers business group of The Dow Chemical Company will not knowingly sell or sample any product or service (“Product”) into any commercial or developmental application that is intended for: (A) contact with internal body fluids or internal body tissues regardless of the length of time involved; (B) use in cardiac prosthetic devices regardless of the length of time involved (cardiac prosthetic devices include, but are not limited to, pacemaker leads and devices, artificial hearts, heart valves, intra-aortic balloons and control systems and ventricular bypass assisted devices); (C) use as a critical component in medical devices that support or sustain human life; or (D) use specifically by pregnant women or in applications designed specifically to promote or interfere with human reproduction.

Published September 2004