



APPEEL™ 53009

Peelable Resin

General Information

Product Description APPEEL™ 53009 is a modified ethylene vinyl acetate copolymer resin designed to function as a sealing layer for lidding applications. It is most often suggested to provide strong peelable seals to polypropylene, and moderate seals to polystyrene, polyester, PVC and is available in pellet form for use in conventional extrusion or coextrusion equipment designed to process polyethylene resins.

Status

Material Status Commercial: Active

Typical Characteristics

Uses Lidding Sealant

Applications

- Low temperature heat seal. APPEEL™ 53009 offers low temperature heat seals with adequate seal strength at 90C.
- Heat sealability to various materials including PE, PP, PS, and Rigid PVC. APPEEL™ 53009 can also be sealed to paper, paperboard, woven fabrics, non-woven fabrics, wood and photographic papers.
- APPEEL™ 53009 allows a peelable seal from most plastic materials excluding PE.
- High transparency.
- Boiling resistance. APPEEL™ 53009 endures boiling process, whose conditions are 85C / 30min.

- APPEEL™ 53009 is used as a heat seal layer in lidding material for injection molded and vacuum molded plastic containers, especially HIPS and PS used in the packaging of yogurts, jams, butter and other food items.

Typical structures for this lidding would be:
 OPP/PE/ APPEEL™ 53009
 PET/PE/ APPEEL™ 53009
 Over lacquer/Print/Foil/PE/ APPEEL™ 53009
 Paper/PE/Foil/PE/ APPEEL™ 53009

APPEEL™ 53008 can also be used as a sealant in general flexible packaging. It provides low temperature seals for snacks and confectionery.

Typical Properties

Physical	Nominal Values	Test Method(s)	
*Density ()	0.94 g/cm ³	ASTM D792	ISO 1183
*Melt Flow Index (190°C/2.16kg)	5.5 g/10 min	ASTM D1238	ISO 1133
Thermal	Nominal Values	Test Method(s)	
*Melting Point (DSC)	94 °C (201.2 °F)	ASTM D3418	ISO 3146

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

*Maximum Processing Temperature 235 °C (455 °F)

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 Dow 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 Information

Nominal Values

Blown Film: The melt temperature of APPEEL™ 53009 should be maintained in the 135 - 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 238C (460F) should be avoided because of possible thermal degradation of the resin.

If the process is stopped for short periods of time, the APPEEL™ 53009 resin extruder should be kept turning at low rpm. For a permanent shutdown, the APPEEL™ 53009 resin should be purged out using an available polyethylene resin run at the same extrusion temperature used for the APPEEL™ 53009 resin. Never raise temperature over 235°C until APPEEL™ 53009 resin is completely purged out. APPEEL™ 53009 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.

Feed Zone 110 °C (230 °F)

Second Zone 135 °C (275 °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)

Extrusion Coating/Lamination

Processing Information

Nominal Values

Extrusion Coating: The melt temperature of APPEEL™ 53009 should be maintained in the 185 - 235°C range in extrusion coating processes. 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 238C (460F) should be avoided because of possible thermal degradation of the resin.

If the process is stopped for short periods of time, the APPEEL™ 53009 resin extruder should be kept turning at low rpm. For a permanent shutdown, the APPEEL™ 53009 resin should be purged out using an available polyethylene resin run at the same extrusion temperature used for the APPEEL™ 53009 resin. Never raise temperature over 235°C until APPEEL™ 53009 resin is completely purged out. APPEEL™ 53009 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.

Feed Zone	135 °C (275 °F)
Second Zone	185 °C (365 °F)
Third Zone	210 °C (410 °F)
Fourth Zone	235 °C (455 °F)
Fifth Zone	235 °C (455 °F)
Adapter Zone	235 °C (455 °F)
Die Zone	235 °C (455 °F)

FDA Status Information

APPEEL™ 53009 Lidding Resin complies with Food and Drug Administration Regulation 21 CFR 177.1350(a)(1) – Ethylene vinyl acetate copolymers, subject to the limitations and requirements therein, subject to the finished food contact article meeting the extractive limitations under the intended conditions of use, as shown in paragraph (b)(1) of the Regulation. APPEEL™ 53009 Lidding Resin may be used in contact with food types I, II, IV-B, VI-A, VI-B, VI-C, VII-B and VIII under Conditions of Use B through H* with no thickness limitation. APPEEL™ 53009 Lidding Resin may also be used for food types III, IV-A, VII-A, and IX under conditions of use B through H* provided the thickness of the final article is less than 1.2 mils (30 microns).

The information and certifications provided herein are based on data we believe to be reliable, to the best of our knowledge. The information and certifications apply only to the specific material designated herein as sold by Dow and do not apply to use in any process or in combination with any other material. They are provided at the request of and without charge to our customers. Accordingly, Dow cannot guarantee or warrant such certifications or information and assumes no liability for their use.

