



Dow Packaging & Specialty Plastics

Product Data Sheet

APPEEL™ 93D894

Peelable Resin

General Information

Product Description APPEEL™ 93D894 is a modified polyester copolymer resin designed to function as a sealing layer for lidding applications. It is most often suggested to provide seals over a broad temperature range when sealed to APET and PETG container materials.

APPEEL™ 93D894 is available in pellet form for use in conventional extrusion and coextrusion equipment designed to process polyolefin or polyester resins.

Status

Restrictions Customer Restricted

Material Status Commercial: Active

Other Restrictions Packaging: APPEEL™ 93D894 is available in 1000 kgs (2204 lbs) Super Sack.

Typical Characteristics

Uses Lidding Sealant

Features APPEEL™ 93D894 has a lower melting point than many other polyester resins, thus it is suitable for coextrusion with temperature sensitive materials.

Key attributes:

- moderate oxygen barrier properties
- heat sealable
- does not scalp most common flavorings

Characteristics / Benefits Moisture level when packed: ----- 0.2 %
Intrinsic Viscosity (dL/g): ----- 0.82 +/- 0.03

Applications Lidding and Pouches for Packaging

Typical Properties

Physical	Nominal Values	Test Method(s)	
*Density (amorphous)	1.33 g/cm ³	ASTM D1505	ISO 1183
*Intrinsic Viscosity ()	0.80	ASTM D5225	
Bulk Density	0.85 +/- 0.10 g/cc	Dow Method	
Thermal	Nominal Values	Test Method(s)	
*Melting Point(DSC)	225 °C (437 °F)	ASTM D3418	ISO 3146
*Glass Transition Temperature (DSC)	76 °C (168.8 °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 290 °C (554 °F)

General Processing Information

APPEEL™ 93D894 can be processed easily with "general purpose" or polyolefin screws, although barrier flighted screws designed for PET give higher throughput rates. For cast film or extrusion coating, a coat-hanger type die is recommended to minimize dead spots where degradation can occur.

A melt temperature of 271-282°C (520-540°F) is suggested for monolayer coating, for the best combination of melt strength and adhesion to unprimed paper or paperboard substrate. The melt temperature for coextrusion should be chosen to best match the viscosity of the adjacent layers. Processing at too low a temperature may cause the melt to be nonhomogenous, the extruder to draw excessive amperage, or the polymer to freeze off. The main barrel temperature should not be set below 232°C (450°F). Excessively high temperature will reduce melt strength and may cause the polymer to discolor. Variation from the suggested temperature profile may be appropriate, depending on the extruder and screw design, the incoming resin temperature, and the available drive power.

Drying:

In-line drying is essential for polyester resins. A moisture content of less than 0.0025% (25 ppm) is recommended to prevent viscosity degradation. Typical drying conditions are 160-170°C (320-338°F), dew point -40°C (-40°F), air flow rate 1 cbft/min per pph of resin throughput, and drying time of 5-6 hr. The resin should not be exposed to atmospheric conditions after drying.

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

Nominal Values

Processing Information

Suggested initial extruder temperature settings.

Feed Zone	245 °C (473 °F)
Second Zone	255 °C (491 °F)
Third Zone	265 °C (509 °F)
Fourth Zone	275 °C (527 °F)
Fifth Zone	280 °C (536 °F)
Adapter Zone	280 °C (536 °F)
Die Zone	280 °C (536 °F)

Extrusion Coating/Lamination

Nominal Values

Processing Information

Suggested initial extruder temperature settings.

Feed Zone	250 °C (482 °F)
Second Zone	260 °C (500 °F)
Third Zone	270 °C (518 °F)
Fourth Zone	280 °C (536 °F)
Fifth Zone	290 °C (554 °F)

Adapter Zone	290 °C (554 °F)
Die Zone	290 °C (554 °F)

FDA Status Information

APPEEL™ 93D894 may be used as films or articles intended for contact with aqueous, acidic, low alcohol (up to 50% by volume alcohol), dry, and fatty foods (Food and Drug Administration Regulation 21 CFR 176.170(c), Table 1) under conditions of use B through H as described in 21 CFR 176.170(c), Table 2.

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Regulatory Information

In Europe a diversity of regulations apply in various countries. In addition, constant changes linked to the effort of their harmonization under the umbrella of European Union Directive can be observed. This makes it impossible to accurately describe the food contact status in this brochure. Updated statements describing the situation in the various European countries can be obtained through your local sales 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 Dow representative.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

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Additional details of Dow's Medical Applications Policy are available at:

<https://www.dow.com/en-us/support/product-safety.html>

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http://www.dow.com/products_services

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P&SP Disclaimer

Additional Information

To contact Dow via Toll-Free or Local Toll phone numbers in specific countries, please see the following webpage:
<https://www.dow.com/en-us/support/contact-representative.html>

<http://www.dow.com>

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