DuPont Packaging & Industrial Polymers

DuPont™ Appeel® 52004

Appeel® resins Product Data Sheet

Description

Product Description	DuPont™ Appeel® 52004 is a modified ethylene acid terpolymer resin designed to function as a sealing layer for lidding applications, most commonly sealing to foamed polystyrene. 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	- Good heat sealability and easy peelability to foamed PS. - Excellent direct foil adhesion without the use of primers. - Appeel® 52004 conforms to Code #20 of the Ministry of Health and Welfare Japan. Typical structures for this lidding would be: Paper/PE/Foil/Appeel® 52004 Appeel® 52004 is used as a heat seal layer in lidding material for foamed PS, especially used in the packaging of instant noodle cup. Appeel® 52004 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/cm³	ASTM D792	ISO 1183
* Melt Flow Rate (190°C/2.16kg)	32 g/10 min	ASTM D1238	IS0 1133

Thermal	Nominal Values	Test Method(s)	
* Melting Point (DSC)	107°C (225°F)	ASTM D3418	ISO 3146
Vicat Softening Point ()	56°C (133°F)	ASTM D1525	ISO 306

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

General

* Maximum Processing Temperature	260°C (500°F)
General Processing Information	f 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. Transitioning from LDPE to Appeel® 52004 1) Switch from conventional LDPE to higher MFR LDPE, approximately 20 dg/min, and change temperature profile to that recommended below. 2) After temperature gets to set temperature, put Appeel® 52004 into extruder. 3) After melt web becomes clear then commence production. Transitioning from Appeel® 52004 to LDPE 1) Switch from Appeel® 52004 to LDPE, with MFR in the range of 2 to 5 dg/min 2) When LDPE is completely purged into the system, then slowly increase temperatures to 260C, purge some more, and then slowly increase to standard PE processing temperatures.

Extrusion Coating/Lamination Processing	Nominal Values
Extrusion Coating / Lamination Processing	Extrusion Coating: The melt temperature of Appeel® 52004 should be maintained in the 235 - 260ºC 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 285C should be avoided because of possible thermal degradation of the resin. If the process is stopped for short periods of time, the Appeel® 52004 resin extruder should be kept turning at low rpm. For a permanent shutdown, the Appeel® 52004 resin should be purged out using an available polyethylene resin run at the same extrusion temperature used for the Appeel® 52004 resin. Never raise temperature over 260ºC until Appeel® 52004 resin is completely purged out. Appeel® 52004 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	160°C (320°F)
Second Zone	210°C (410°F)
Third Zone	235°C (455°F)
Fourth Zone	260°C (500°F)
Fifth Zone	260°C (500°F)

Adapter Zone	260°C (500°F)
Die Zone	260°C (500°F)

FDA Status Information	Appeel® 52004 resincomplies with Food and Drug Administration Regulation 21 CFR 177.1330(b) Resinous and polymeric coatings for polyolefin films, subject to the limitations and requirements therein.Subject to extractive limitations as per 177.1330(d). Final articles must meet thickness limitation of 0.1mm (4mil) as per 177.1520(c) 3.6. 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 of 21 CFR 176.170(c) under Conditions of Use A through H described in 176.170(c). 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 DuPont 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, DuPont cannot guarantee or warrant such certifications or information and assumes no liability for their use.
Regulatory Information	Appeel® 52004 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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This data sheet is effective as of 09/24/2009 06:00:04 PM and supersedes all previous versions.