

Technical Information

NUCREL™ 3990

Acid Copolymer

Description			
Product Description	NUCREL™ 3990 is a copolymer of ethylene and acrylic acid. It is available for use in conventional extrusion coating, coextrusion coating and extrusion laminating equipment.		
Restrictions			
Material Status	Commercial: Active		
Typical Characteristics			
Composition	9.5% By Weight Acrylic Acid comonomer content		
Typical Properties			
Physical	Nominal Values		Test Method(s)
*Density ()	0.94 g/cm³	ASTM D792	ISO 1183
*Melt Flow Rate (190°C/2.16kg)	10 g/10 min	ASTM D1238	ISO 1133
Thermal	Nominal Values		Test Method(s)
*Melting Point(DSC)	97 °C (206.6 °F)	ASTM D3418	ISO 3146
Freezing Point (DSC)	78 °C (172.4 °F)	ASTM D3418	ISO 3146
Vicat Softening Point ()	79 °C (174.2 °F)	ASTM D1525	ISO 306
Processing Information			
*Maximum Processing Temperature	310 °C (590 °F)		
General Processing Information	<p>NUCREL™ 3990 is normally processed at melt temperatures ranging from 235° to 305°C (455° to 580°F) in extrusion coating equipment. Typical extruder profiles are shown below. Actual processing temperatures will usually be determined by either the specific equipment or one of the other polymers in a coextrusion. NUCREL™ 3990 can also be used in cast extrusions and coextrusions.</p> <p>Materials of construction used in the processing of this resin should be corrosion resistant. Stainless steels of the types 316, 15-5PH, and 17-4PH are excellent, as is quality chrome or nickel plating, and in particular duplex chrome plating. Type 410 stainless steel is satisfactory, but needs to be tempered at a minimum temperature of 600°C (1112°F) to avoid hydrogen-assisted stress corrosion cracking. Alloy steels such as 4140 are borderline in performance. Carbon steels are not satisfactory. While stainless steels can provide adequate corrosion protection, in some cases severe purging difficulties have been encountered. Nickel plating has been satisfactory, but experiments have shown that chrome surfaces have the least adhesion to acid based polymers. In recent years, the quality of chrome plating has been deteriorating due to environmental pressures, and the corrosion protection has not always been adequate. Chrome over top of stainless steel seems to provide the best combination for corrosion protection and ease of purging.</p> <p>If surface properties of the extruded resin require modification (such as, lower C.o.F. for packaging machine processing), refer to the CONPOL™ Processing Additive Resins product information guide.</p> <p>After processing NUCREL™, purge the material out using a polyethylene resin, preferably with a lower melt flow rate than the NUCREL™ 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.</p>		

Never shut down the extrusion system with NUCREL™ in the extruder and die. Properly purge out the NUCREL™ with a polyethylene, and shut down the line with polyethylene or polypropylene in the system.

Extrusion Coating/Lamination Processing

Nominal Values

Processing Information

A suggested extruder set temperature profile.

Feed Zone	185 °C (365 °F)
Second Zone	235 °C (455 °F)
Third Zone	260 °C (500 °F)
Fourth Zone	285 °C (545 °F)
Fifth Zone	285 °C (545 °F)
Adapter Zone	285 °C (545 °F)
Die Zone	285 °C (545 °F)

FDA Status Information

NUCREL™ 3990 complies with Food and Drug Administration Regulation 21 CFR 177.1310(a)(1) - - Ethylene-acrylic acid copolymers, subject to the limitations and requirements therein. This Regulation describes polymers that may be used in contact with food, subject to the finished food-contact article meeting the extractive limitations under the intended conditions of use, as shown in paragraph (b) of the Regulation.

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Regulatory Information

For information on regulatory compliance outside of the U.S.A., consult your local Dow 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.

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- c. use as a critical component in medical devices that support or sustain human life; or
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Published August 2019

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