**Description**

**Product Description**

Nucrel® 0403 is a copolymer of ethylene and methacrylic acid, made with nominally 4 wt% methacrylic acid. The resin is available for use in conventional blown and cast film extrusion and coextrusion equipment designed to process polyethylene resins.

**Restrictions**

**Material Status**

- Commercial: Active

**Typical Characteristics**

**Uses**

- Adhesives
- Packaging
- Sealants

**Composition**

4 % By Weight Methacrylic Acid comonomer content

**Typical Properties**

<table>
<thead>
<tr>
<th>Physical</th>
<th>Nominal Values</th>
<th>Test Method(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Density (g/cm²)</td>
<td>0.93</td>
<td>ASTM D792, ISO 1183</td>
</tr>
<tr>
<td>• Melt Flow Rate (190°C/2.16kg)</td>
<td>3 g/10 min</td>
<td>ASTM D1238, ISO 1133</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thermal</th>
<th>Nominal Values</th>
<th>Test Method(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Melting Point (DSC)</td>
<td>104°C (219°F)</td>
<td>ASTM D3418, ISO 3146</td>
</tr>
<tr>
<td>• Freezing Point (DSC)</td>
<td>92°C (198°F)</td>
<td>ASTM D3418, ISO 3146</td>
</tr>
<tr>
<td>• Vicat Softening Point ()</td>
<td>95°C (203°F)</td>
<td>ASTM D1525, ISO 306</td>
</tr>
</tbody>
</table>

**Processing Information**

**General**

- **Maximum Processing Temperature**
  
  310°C (590°F)

**General Processing Information**

Nucrel® 0403 normally is processed at melt temperatures ranging from 160°C - 235°C (320°F - 455°F) in blown film or cast film equipment. A typical blown film extruder temperature profile is given below. Actual processing temperatures will be determined by either the specific equipment or one of the other polymers in a coextrusion. Nucrel® 0403 can also be used in cast extrusions and coextrusions.

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 top of stainless steel seems to provide the best combination for corrosion protection and ease of purging.

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.

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 DuPont Sales Representative.

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.

### Blown Film Processing

<table>
<thead>
<tr>
<th>Nominal Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blown Film Processing Information</td>
</tr>
<tr>
<td>Feed Zone</td>
</tr>
<tr>
<td>Second Zone</td>
</tr>
<tr>
<td>Third Zone</td>
</tr>
<tr>
<td>Fourth Zone</td>
</tr>
<tr>
<td>Fifth Zone</td>
</tr>
<tr>
<td>Adapter Zone</td>
</tr>
<tr>
<td>Die Zone</td>
</tr>
</tbody>
</table>

### Cast Film / Sheet Processing

<table>
<thead>
<tr>
<th>Nominal Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast Film / Sheet Processing</td>
</tr>
<tr>
<td>Feed Zone</td>
</tr>
<tr>
<td>Second Zone</td>
</tr>
<tr>
<td>Third Zone</td>
</tr>
<tr>
<td>Fourth Zone</td>
</tr>
<tr>
<td>Fifth Zone</td>
</tr>
<tr>
<td>Adapter Zone</td>
</tr>
<tr>
<td>Die Zone</td>
</tr>
</tbody>
</table>

### FDA Status Information

NUCREL® 0403 complies with Food and Drug Administration Regulation 21 CFR 177.1330(a) - Ionomeric resins, 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 (c) of the Regulation.

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.
For information on regulatory compliance outside of the U.S., consult your local DuPont representative.

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:

**Americas**
DuPont Company
Chestnut Run Plaza – Bldg. 730
974 Centre Road
Wilmington, Delaware
19805 U.S.A.
Toll-Free (USA): 1-800-628-6208
Telephone: 1-302-774-1000
Fax: 1-302-355-4013

DuPont do Brasil, S.A.
Alameda Itapecuru, 506
06454-080 Barueri, SP Brasil
Telephone: +55 11 4166 8000
Fax: +55 11 4166 8736

**Asia Pacific**
DuPont China Holding Co., Ltd.
Shanghai Branch
399 Keyuan Road, Bldg. 11
Zhangjiang Hi-Tech Park
Pudong New District, Shanghai
P.R. China (Postcode: 201203)
Telephone +86 21 3862 2888
Fax +86-21-3862-2889

**Europe / Middle East / Africa**
DuPont de Nemours Int’l. S.A.
2, Chemin du Pavilion Box 50
CH-1218 Le Grand Saconnex
Geneva, Switzerland
Telephone +41 22 717 51 11
Fax +41 22 717 55 00

http://nucrel.dupont.com

The data listed here fall within the normal range of properties, but they should not be used to establish specification limits nor used alone as the basis of design. The DuPont Company assumes no obligations or liability for any advice furnished or for any results obtained with respect to this information. All such advice is given and accepted at the buyer’s risk. The disclosure of information herein is not a licence to operate under, or a recommendation to infringe, any patent of DuPont or others. Since DuPont cannot anticipate all variations in actual end-use conditions, DuPont makes no warranties and assumes no liability in connection with any use of this information.

CAUTION: Do not use DuPont materials in medical applications involving implantations in the human body or contact with internal body fluids or tissues unless the material has been provided from DuPont under a written contract that is consistent with DuPont policy regarding medical applications and expressly acknowledges the contemplated use. For further information, please contact your DuPont representative. You may also request a copy of DuPont POLICY Regarding Medical Applications H-50103-3 and DuPont CAUTION Regarding Medical Applications H-50102-3.

Copyright © 2009 DuPont. The DuPont Oval Logo, DuPont™, The miracles of science™, and trademarks designated with “®” are registered trademarks or trademarks of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

This data sheet is effective as of 08/07/2010 07:48:43 PM and supersedes all previous versions.