

# Starting Formulation

## SF 7001

### Flame Retardant Electrical Potting Compound EPON™ Resin 828 and 1163 / HELOXY™ Modifier 56

**Introduction** This general purpose electrical potting compound illustrates the use of brominated epoxy resins to achieve flame retardancy with minimal sacrifice in mechanical, thermal and electrical properties. Two filler options are presented to offer the compounder a choice of maximum flame retardance (Option A) or maximum economy (Option B).

Formula	Material	Supplier	Pounds	Gallons
Resin Portion				
	EPON Resin 828	Hexion	50.0	5.18
	HELOXY Modifier 56	Hexion	30.0	2.43
	EPON Resin 1163	Hexion	<u>20.0</u>	<u>1.32</u>
	Total Resin Portion		100.0	8.93
Converter Portion				
	Hexahydrophthalic Anhydride	Anhydrides & Chemicals, Inc.	61.5	6.21
	Diethylaminoethanol	Pennwalt Corp.	<u>0.5</u>	<u>0.07</u>
	Total Converter Portion		62.0	6.28
Filler Portion				
Option A				
	Hydrated Alumina C-331	Aluminum Company of America	162.0	8.04
Option B				
	Al-Sil-Ate NC	Freeport Kaolin Co.	152.0	7.07
	Anitmony Trioxide	PQ Corp.	<u>10.0</u>	<u>0.21</u>
	Total Filler Portion		162.0	7.28

#### Compounding Resin Portion Procedure

Mix all resin components using high speed agitation and moderate heat until a homogeneous liquid blend is attained. A maximum temperature of 93 °C should be sufficient for this operation, and a blanket of inert gas should be maintained over the resin during mixing to retard viscosity increase and color development, respectively.

#### Converter Portion

Melt the hexahydrophthalic anhydride at a temperature of approximately 65 °C. Add the diethylaminoethanol and cool.

Generated: October 21, 2021  
Issue Date:  
Revision:

© and ™ Licensed trademarks of Hexion Inc.

#### DISCLAIMER

The information provided herein was believed by Hexion Inc. ("Hexion") to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Hexion are subject to Hexion's terms and conditions of sale. HEXION MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY HEXION, except that the product shall conform to Hexion's specifications. Nothing contained herein constitutes an offer for the sale of any product.

**Application** When ready to use the compound, mix the resin and converter portions under moderate speed agitation. After mixing is complete, add the filler and continue agitation until the filler has been thoroughly dispersed. Heat to a suitable viscosity for application, apply vacuum to deaerate, and pour into preheated molds.

Typical Properties Table 1 / Physical Properties

		<u>Unfilled</u>	<u>Filler Option A</u>	<u>Filler Option B</u>
Viscosity at 25 °C	cP	7200	–	–
Density	lbs/gal	10.65	13.9	14.4
Gel Time <sup>1</sup>				
at 93 °C	min.	43	60	140
at 121 °C	min.	–	8	17

<sup>1</sup> 1/8 inch thickness.

Typical Cured State Table 2 / Cured State Properties  
Properties

	<u>Units</u>	<u>Unfilled<sup>1</sup></u>	<u>Filler Option A<sup>2</sup></u>	<u>Filler Option B<sup>2</sup></u>
Heat Deflection Temperature	°C	90	89	88
Tensile Strength	psi	12,000	6,500	7,300
Tensile Elongation at Break	%	6.5	0.6	0.6
Flexural Strength	psi	21,000	12,000	14,000
Flexural Modulus, Initial	ksi	520	1,100	1,300
Compressive Strength, Yield	psi	15,000	–	–
Izod Impact, notch	ft.·lb/in.	0.42	0.32	0.34
Hardness	Shore D	85	90	91
Water Absorption, 24 hours	%	0.07	0.04	0.05
Weight Loss, 24 hours, 150 °C	%	–	0.04	0.17
Flammability <sup>3</sup>				
Rating			Self- Extinguishing	
Time to Self-Extinguish	seconds	120	0	0
Extent of Burning	inches	1.0	0	0.4
Linear Shrinkage	inch/inch	0.017	0.012	0.008
<b>Electrical Properties</b>				
Dielectric Constant <sup>4</sup>		3.51		
Dissipation Factor <sup>4</sup>		0.015		
Volume Resistivity				

Generated: October 21, 2021  
Issue Date:  
Revision:

© and ™ Licensed trademarks of Hexion Inc.

DISCLAIMER

The information provided herein was believed by Hexion Inc. ("Hexion") to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Hexion are subject to Hexion's terms and conditions of sale. HEXION MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY HEXION, except that the product shall conform to Hexion's specifications. Nothing contained herein constitutes an offer for the sale of any product.

at 25°	ohm-cm	4.9 x 10 <sup>15</sup>
at 66°	ohm-cm	3.1 x 10 <sup>15</sup>
at 93°	ohm-cm	3.0 x 10 <sup>15</sup>
at 130°	ohm-cm	3.3 x 10 <sup>13</sup>
at 150°	ohm-cm	2.9 x 10 <sup>12</sup>
at 180°	ohm-cm	2.6 x 10 <sup>11</sup>
at 200°	ohm-cm	7.2 x 10 <sup>10</sup>

<sup>1</sup>Cured at 93 °C for 2 hours and followed by 177 °C for 4 hours.

<sup>2</sup>Cured at 120 °C for 16 hours.

<sup>3</sup>Determined per ASTM D-635.

<sup>4</sup>Determined at 100 Hertz and 25 °C.

Storage Recommendations regarding storage conditions can be obtained by visiting our web site at [www.hexion.com](http://www.hexion.com)

#### General Information

These are starting formulations and are not proven in the user's particular application but are simply meant to demonstrate the efficacy of the products and to assist in the development of the user's own formulation. It is the user's responsibility to fully-test and qualify the formulation, along with the ingredients, methods, applications or equipment identified herein ("Information"), by the user's knowledgeable formulator or scientist, and to determine the appropriate use conditions and legal restrictions, prior to use of any Information.

#### Safety, Storage & Handling

Please refer to the MSDS for the most current Safety and Handling information.

Exposure to these materials should be minimized and avoided, if feasible, through the observance of proper precautions, use of appropriate engineering controls and proper personal protective clothing and equipment, and adherence to proper handling procedures. None of these materials should be used, stored, or transported until the handling precautions and recommendations as stated in the Material Safety Data Sheet (MSDS) for these and all other products being used are understood by all persons who will work with them. Questions and requests for information on Hexion, Inc. ("Hexion") products should be directed to your Hexion sales representative, or the nearest Hexion sales office. Information and MSDSs on non-Hexion products should be obtained from the respective manufacturer.

#### Contact Information

For product prices, availability, or order placement, please contact customer service:

[www.hexion.com/Contacts/](http://www.hexion.com/Contacts/)

For literature and technical assistance, visit our website at [www.hexion.com](http://www.hexion.com)

Generated: October 21, 2021  
Issue Date:  
Revision:

© and ™ Licensed trademarks of Hexion Inc.

#### DISCLAIMER

The information provided herein was believed by Hexion Inc. ("Hexion") to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Hexion are subject to Hexion's terms and conditions of sale. HEXION MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY HEXION, except that the product shall conform to Hexion's specifications. Nothing contained herein constitutes an offer for the sale of any product.