

## Starting Formulation

### SF 7013

### Flexible Electrical Potting Compound EPON™ Resin 828

**Introduction** This general purpose electrical potting compound illustrates the use of polyethylene glycol to improve flexibility with minimal sacrifice in mechanical, thermal and electrical properties. Phthalic anhydride, used as the converter, provides acceptable cured state properties at a relatively low cost.

Formula	<u>Material</u>	<u>Supplier</u>	<u>Pounds</u>	<u>Gallons</u>
Part A				
	EPON Resin 828	Hexion	65.0	6.72
	Carbowax 600	Union Carbide Corp.	<u>35.0</u>	<u>3.73</u>
	Total Part A		100.0	10.45
Part B				
	Phthalic Anhydride	USS Chemicals Div., United States Steel	50.00	3.94
	DMP-10	Rohm & Haas Co.	<u>0.25</u>	<u>0.03</u>
	Total Part B		50.25	3.97

**Compounding Resin Portion** – Blend Carbowax 600 and EPON Resin 828. If necessary, fillers such as silica or alumina can be incorporated into the resin portion.

**Converter Portion** – Phthalic anhydride is added to the mixed resin portion. Sparging with dry inert gas during this step will minimize the hydrolysis of anhydride. Heat the mixture to 99 °C to dissolve all the anhydride. Add the DMP-10 and continue stirring until a clear solution (unfilled systems) is attained. Maintain the temperature of the compound above 93 °C to prevent phthalic anhydride from precipitating prior to use. The finished compound can be stored at room temperature for two weeks. If crystallization of phthalic anhydride occurs, stir the compound and heat to 93 °C.

**Typical Handling Properties** Table 1 / Handling and Reactivity

	<u>Units</u>	<u>Value</u>
Resin/Converter Combining Ratio	by weight	2 : 1
	by volume	2.63 : 1
Viscosity at 90 °C	cP	18
Density	lbs/gal	10.4
Pot Life at 25 °C	weeks	1-2

**Application** A typical cure schedule is 3 hours at 120 °C. Also, acceptable cures are achieved

Generated: October 19, 2021  
 Issue Date:  
 Revision:

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overnight at 90 °C or in one hour at 150 °C. Large castings should be cured at the lowest temperature. Increasing or decreasing the amount of DMP-10 will shorten or lengthen, respectively, the time necessary for complete cure. Adjustments to the DMP-10 level will also affect the pot life.

The material to be potted is placed in the mold and heated to the desired cure temperature. The potting compound is then poured into the mold and vacuum deaired, if necessary, to eliminate voids. Silicone mold releases such as Dow-Corning Compound Number 7 are the most effective.

Typical Cured State Properties Table 2 / Cured State Properties<sup>1</sup>

	<u>Units</u>	<u>Value</u>
Tensile Strength	psi	7,215
Tensile Elongation at Break	%	8.5
Initial Flexural Modulus	ksi	170
Izod Imact, notched	ft•lb/inch	1.64
Hardness	Shore D	77
Water Absorption, 24 hours	%	0.71
Weight Loss, 24 hours at 150 °C	%	0.56
Electrical Properties		
Dielectric Constant <sup>2</sup>		4.81
Dissipation Factor <sup>2</sup>		0.036
Volume Resistivity <sup>3</sup>		
at 25 °C	ohm•cm	2.7 x 10 <sup>14</sup>
at 66 °C	ohm•cm	7.7 x 10 <sup>11</sup>
at 92 °C	ohm•cm	2.0 x 10 <sup>10</sup>
Surface Resistivity at 25 °C <sup>3</sup>		7.33 x 10 <sup>14</sup>

<sup>1</sup> Cured for 3 hours at 120 °C.

<sup>2</sup> Measured at 25 °C, 50% R. H. and 106 Hertz.

<sup>3</sup> Measured at 50% R. H., 500 volts for 1 minute.

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.

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