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Scotchcast™ Electrical Resin 282

Two-Part, Oven Curing, Class F, Semiflexible, Thixotropic, Epoxy Liquid Resin

Data Sheet

Product Description

3M™ Scotchcast™ Electrical Resin 282 is buff colored, can be applied by dipping, spraying, extruding or troweling. As dipping resin, 282 provides exceptionally smooth and uniform coatings with minimal run off or sag during cure and is suggested for those applications requiring high temperature stability and permanent flexibility for thermal and mechanical shock resistance. Examples are dipping and encapsulation of coils, transformers, motors, modules, strain-sensitive circuitry and other electrical and electronic components.

- High temperature rating (155ºC)
- High thermal conductivity
- Thermal shock resistant

Handling Properties

Mix Ratio (A:B)	Wt 2:3
	Vol (%) 37:63
Viscosity	A = Thixotropic
@ 23ºC (73ºF)	B = Thixotropic
	Mixed = Thixotropic
Density	A = 1.50 kg/l (12.5 lbs/gal)
	B = 1.32 kg/l (11.0 lbs/gal)
Flash Point	A = 202°C (395°F)
	B = 188°C (370°F)
Gel Time	23 min. @ 121°C (250°F)
Curing Guide	75°C (167°F) 15-20 hrs
	95°C (203°F) 6-8 hrs
	120°C (248°F) 2-3 hrs
Potlife @ 23°C	3-4 days

Test Methods

[1]Fed. Std. No. 406, Method 1021
[2]Fed. Std. No. 406, Method 1011
[3]Fed. Std. No. 406, Method 1031
[4]MIL-I-16923E
[5]3M Test Method
[6]Fed. Std. No. 406, Method 1083
[7]Fed. Std. No. 406, Method 4021
[8]Fed. Std. No. 406, Method 4041
[9]Fed. Std. No. 406, Method 4031

Typical Data/Physical Properties

Property	Value
Color	Buff
Hardness[6] (Shore D)	65
Specific Gravity (cured)	1.43
Compressive Strength[1]	3500 psi
10% Compression	(245 kg/cm²)
Tensile Strength[2]	2100 psi
	(147 kg/cm²)
Elongation (% at break)[2]	45
Flexural Strength[3]	2000 psi
	(140 kg/cm²)
Thermal Conductivity[4]	12 x 10^{-4}
(Cal • cm/cm² • sec • °C)	
Coefficient of Linear Thermal Expansion[4]	15x10^{-5}
(23°C to 113°C) (length/unit length/°C)	
Electric Strength[9]	375 volts/mil
(1/8" [3.175 mm] Sample)	(14.8 kV/mm)
Thermal Shock[5]	Pass
10 Cycles -65°C to 130°C 1/4" (3.175 mm) Olyphant Insert	
Thermal Shock[4]	Pass
Flammability[4]	Pass
Moisture Absorption[4]	0.32
% weight increase, 240 hrs. @ 96% R.H.	
Water Immersion	
(sample cured 3 hrs. @ 120°C)	
% weight gain (1000 hrs. @ 23°C)	0.4
% weight gain (500 hrs. @ 70°C)	6.2
% weight gain (200 hrs. @ 100°C)	8.0
Thermal Aging	
(1000 hrs. @ 130°C) % weight loss	0.17
Hardness Change (Shore D)	+7
Dielectric Constant[7] (100 Hz @ 23°C)	3.56
Dissipation Factor[7] (100 Hz @ 23°C)	0.054
Volume Resistivity[8] (ohm-cm @ 23°C)	>10^{15}
Thermal Aging	
(1000 hrs. @ 155°C) % weight loss	2.2
Hardness Change (Shore D)	+15
Dielectric Constant[7] (100 Hz @ 23°C)	4.03
Dissipation Factor[7] (100 Hz @ 23°C)	0.032
Volume Resistivity[8] (ohm-cm @ 23°C)	>10^{15}
Thermal Aging	
(1000 hrs. @ 180°C) % weight loss	3.5
Hardness Change (Shore D)	+18
Dielectric Constant[7] (100 Hz @ 23°C)	4.71
Dissipation Factor[7] (100 Hz @ 23°C)	0.041
Volume Resistivity[8] (ohm-cm @ 23°C)	>10^{15}

Note: These are typical values and should not be used for specification purposes.

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Usage Information

Mixing
Mix the separate parts before removing them from their containers. They may be warmed to 60ºC (140ºF) to aid mixing. Weigh the correct proportions of the separate parts to within 2% accuracy and combine them. Thoroughly blend the mixture until the color is absolutely uniform or a homogeneous mixture is obtained.

Deaerating
Entrapped air can be removed by evacuating for 5 to 15 minutes at 5 to 10 mm of mercury (Hg) absolute pressure. Warming the mixed resin to 60ºC (140ºF) facilitates this process. Container side walls should be four times the height of 3M™ Scotchcast™ Electrical Resin to contain the foaming that takes place under vacuum.

Casting and Impregnating
Pour the warm resin into the preheated 100ºC mold. If no mold is used, dip the preheated part into the resin. Heating the resin and mold aids impregnation. For maximum impregnation, evacuate for 5 to 15 minutes at 5 mm of mercury (Hg) absolute pressure, or pour under vacuum and hold for several minutes before releasing.

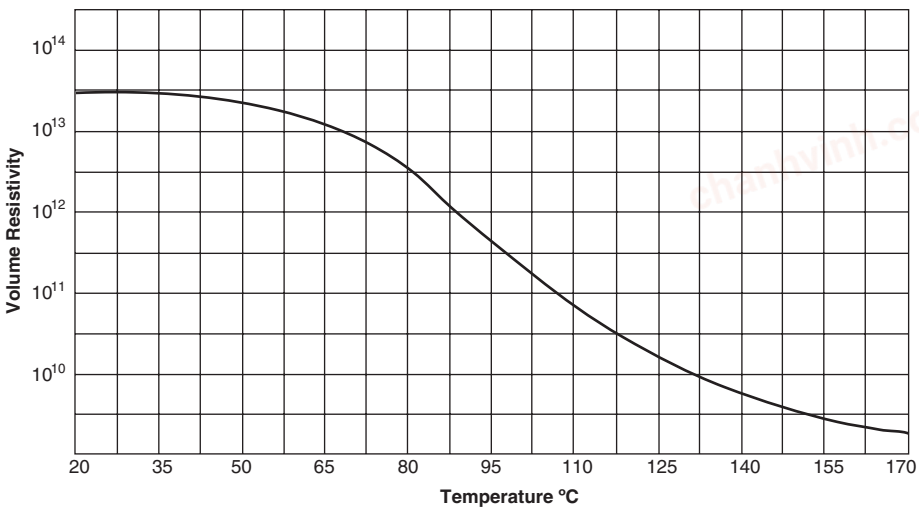
Curing
Where minimum stress and maximum thermal shock resistance are required, the lower temperature cure cycle is recommended. (See "Curing Guide" of **Handling Properties** section). Time should be added to the cure cycle to allow the resin to reach the curing temperature.

Storage
Both parts of this resin system should be stored at temperatures between 20 to 30 degrees Celsius, and 30% to 60% relative humidity. When not in use, containers should be kept tightly closed. Storage at conditions outside those suggested may compromise the performance of the resin.

Handling and Safety Precautions

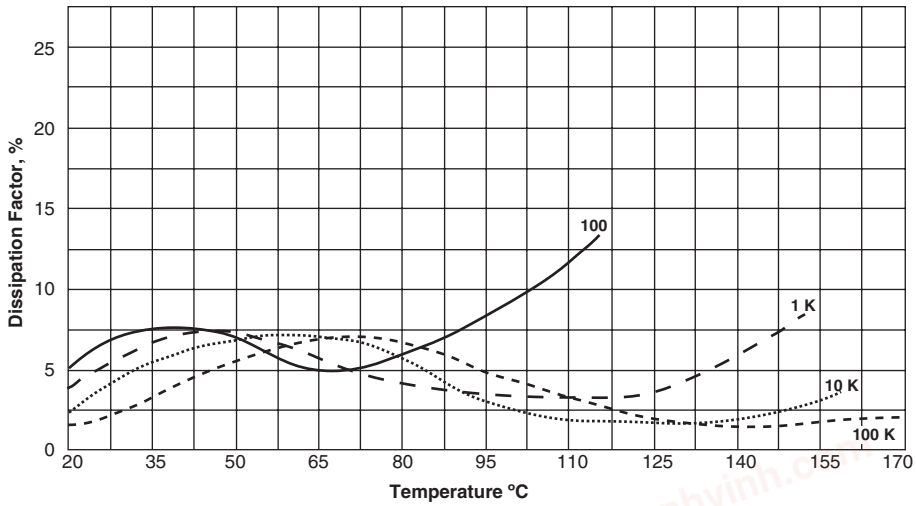
Read all Health Hazard, Precautionary and First Aid found in the material Safety Data Sheet (MSDS) and/or product label of chemicals prior to handling or use.

Volume Resistivity (ohm-cm)
Fed. Std. 406, Method 4041

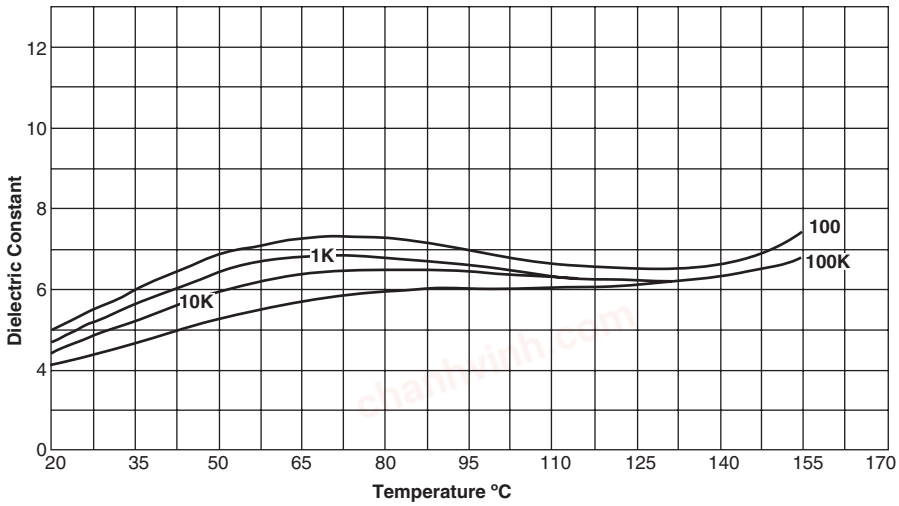


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Dissipation Factor
Fed. Std. No. 406, Method 4021
(Test Frequencies in Hertz)



Dielectric Constant
Fed. Std. No. 406, Method 4021
(Test Frequencies in Hertz)



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