Scotchcast™ Electrical Resin 3

Two-Part, Oven-Curing, Class B, Rigid, Unfilled, Epoxy Liquid Resin

Data Sheet

Product Description

3M™ Scotchcast™ Electrical Resin 3 is characterized by outstanding physical and electrical stability and superior resistance to moisture. Its low viscosity and fine wetting properties allow complete impregnation of fine wires in coils. Resin 3 is well suited to impregnating, potting and encapsulating applications such as coils, transformers, modules and other electrical and electronic components.

- Temperature rated (130°C)
- Low viscosity, general purpose
- Physically and electrically stable

Handling Properties

Mix Ratio (A:B)	Wt 2:3	
	Vol (%) 37:63	
Viscosity	A = 12,500 cps	
@ 23°C (73°F)	B = 400 cps	
	Mixed = 1,600 cps	
Density	A = 1.16 kg/l (9.71 lbs/gal)	
	B = 1.00 kg/l (8.35 lbs/gal)	
Flash Point	A = 205°C (400°F)	
	B = 174°C (345°F)	
Gel Time	21 min. @ 121°C (250°F)	
Curing Guide	120°C (248°F)	1-2 hrs.
	95°C (203°F)	6-8 hrs.
	77°C (170°F)	12-16 hrs.

Test Methods

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

Typical Properties

*Not recommended for specification purposes.
Product specifications will be provided upon request.

Property	Value*
Color	Clear Amber
Specific Gravity (Cured)	1.10
Compressive Strength[2] 10% Compression	9500 psi (670 kg/cm^2)
Tensile Strength[3]	4400 psi (310 kg/cm^2)
Elongation[3] (% @ break)	2
Flexural Strength[4]	7900 psi (557 kg/cm^2)
Electric Strength[5] 1/8" (3.175 mm) sample	300 V/mil (12 kV/mm)
Hardness (Shore D)	80
Thermal Conductivity[1] (cal · cm/cm2 · sec · °C)	4.0 x 10^{-4}
Coefficient of Linear Thermal Expansion[1] (23° C to 113°C) (length/unit length/°C)	20 x 10^{-5}
Thermal Shock[6] 10 cycles - 55C to 130°C 1/4" (6.35 mm) Olyphant Insert	Fails
Thermal Shock[1]	Fails
Moisture Absorption[1] %Weight Gain (240 hrs. @96 % R.H.)	0.5
Water Immersion[6] (Sample cured 3 hrs. @ 120°C) %Weight Gain (1000 hrs. @ 23°C)	0.8
Thermal Aging 1000 hrs. @130°C	
% Weight Loss	1.5
Hardness Change, Shore D	+3
Dielectric Constant[7] (100 Hz @ 23°C)	3.37
Dissipation Factor[7] (100 HZ @ 23 °C)	.0085
Volume Resistivity[8] (ohm-cm @ 23°C)	1.3 x 10^{15}
Thermal Aging 1000 hrs. @155°C	
% Weight Loss	.93
Hardness Change, Shore D	+7
Dielectric Constant[7] (100 Hz @ 23°C)	3.64
Dissipation Factor[7] (100 HZ @ 23 °C)	.02
Volume Resistivity[8] (ohm-cm @ 23°C)	1.9 x 10^{15}

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

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 achieved.

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

Casting and Impregnating
Pour the warm resin into the preheated 100°C 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 absolute pressure, or pour under vacuum and hold for several minutes before releasing.

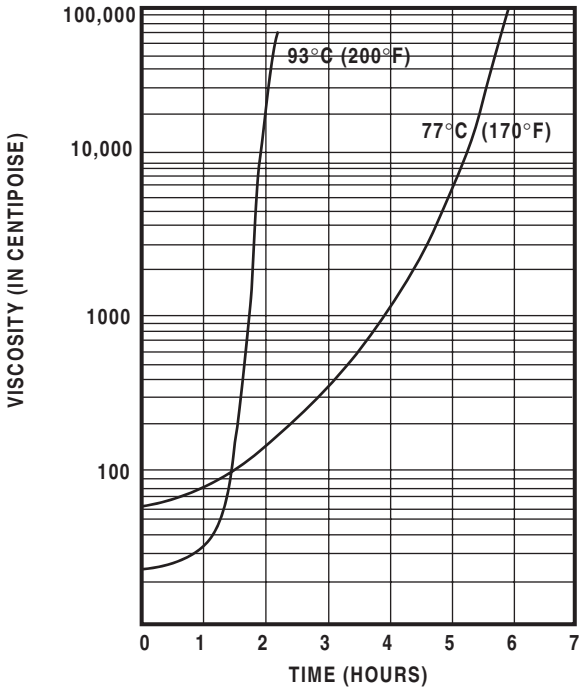
Curing
Where minimum stress and maximum thermal shock resistance are required, the lower temperature cure cycle is recommended. (See "Curing Guide" of **Handling Properties** section). Time should be added to cure cycle to allow the resin to reach curing temperature.

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.

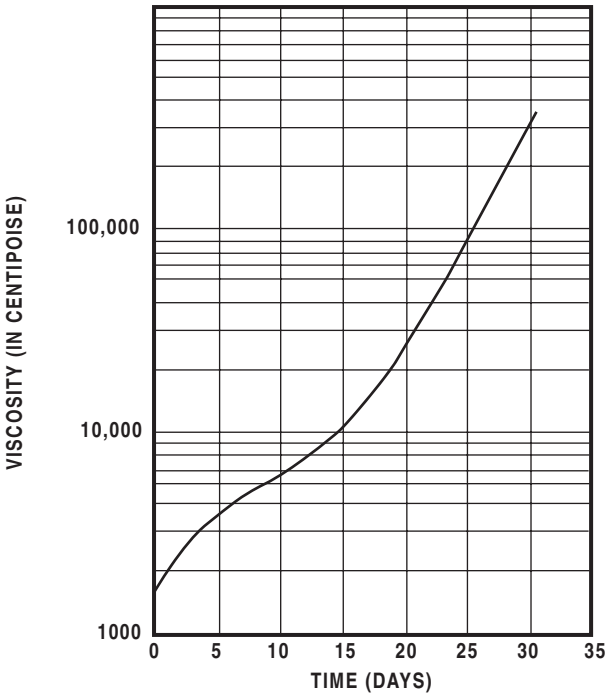
Handling and Safety Precautions

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

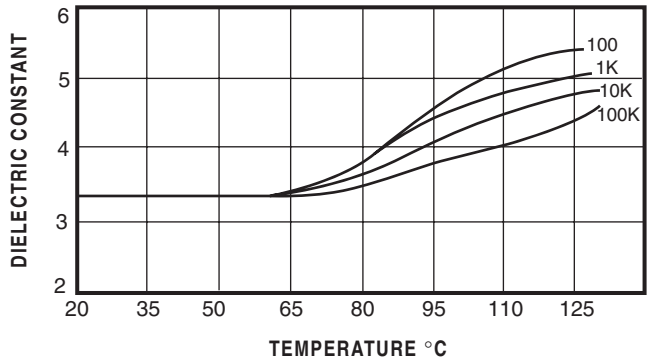
Brookfield Viscosity vs. Time
@77°C (170°F) & 93°C (200°F)



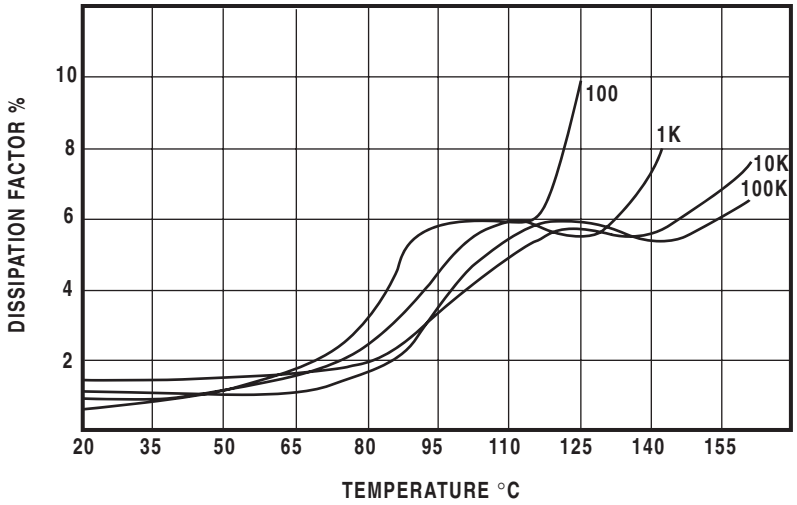
Brookfield Viscosity vs. Time
@23°C (73°F)



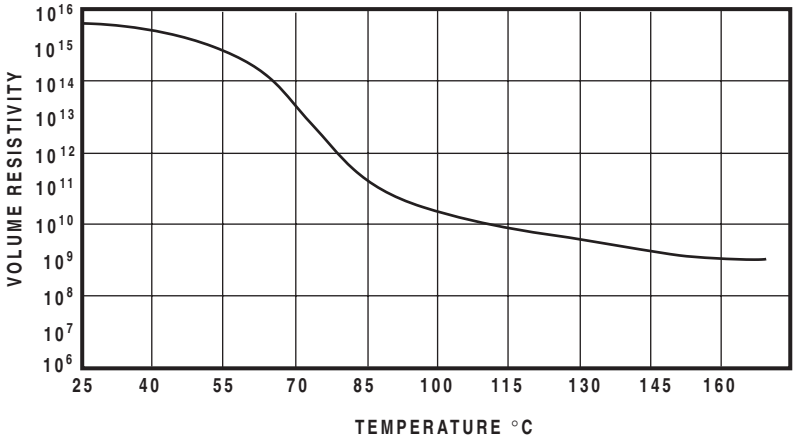
DIELECTRIC CONSTANT
Fed. Std. 406, Method 4021
(Test Frequencies in Hertz)



DISSIPATION FACTOR
Fed. Std. 406, Method 4021
(Test Frequencies in Hertz)



VOLUME RESISTIVITY
(OHM-CM)
Fed. Std. 406, Method 4041



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