Scotchcast™ Electrical Resin 250

Two-Part, Oven-Cured, Class F, Rigid, Unfilled, Epoxy Liquid Resin

Data Sheet

Product Description

The distinguishing features of 3M™ Scotchcast™ Electrical Resin 250 are its high-temperature stability, good electrical and physical properties and low viscosity. This resin is suggested for use in applications where adhesion, mechanical strength and good electrical properties at high temperatures are needed.

- High temperature rated (155°C)
- Excellent high-temperature physical strength
- Excellent high-temperature electrical properties

Handling Properties

Mix Ratio (A:B)	Wt 1:1	
	Vol (%) 1:1	
Viscosity	A = 13,000 cps	
@ 23°C (73°F)	B = 130 cps	
	Mixed = 1,800 cps	
Density	A = 1.16 kg/l (9.7 lbs/gal)	
	B = 1.15 kg/l (9.6 lbs/gal)	
Flash Point	A = 204°C (400°F)	
	B = 153°C (307°F)	
Gel Time	17 min. @ 121°C	
Curing Guide	75°C (167°F)	15-20 hrs.
	95°C (203°F)	6-8 hrs.
	120°C (248°F)	2-3 hrs.

Test Methods

[1]3M Test Method
[2]MIL-I-16923G
[3]Fed. Std. No. 406, Method 1021
[4]Fed. Std. No. 406, Method 1011
[5]Fed. Std. No. 406, Method 1031
[6]Fed. Std. No. 406, Method 4021
[7]Fed. Std. No. 406, Method 4041
[8]Fed. Std. No. 406, Method 4031
[9]ASTM D-648
[10]MIL-I-16923E

Typical Properties

*All values shown are typical. They are based on several determinations and are not intended for specification purposes. Product specifications will be provided upon request.

Property	Value*
Color	Brown
Hardness (Barcol)	25
Thermal Conductivity[2] (cal · cm/cm2 · sec · °C)	3.7 x 10^{-4}
Coefficient of Linear Thermal Expansion[2] (23° C to 113°C) (length/unit length/°C)	65 x 10^{-6}
Heat Distortion Point[9]	125°C (257°F)
Compressive Strength[3] (10% Compression)	17,500 psi (1230 kg/cm²)
Tensile Strength[4] (1/8" x 1/2" Sample)	7780 psi (548 kg/cm²)
Elongation[4] (% @ break)	2.5
Flexural Strength[5] (1/2" x 1/2" Sample)	17,000 psi (1195 kg/cm²)
Moisture Absorption[10] %Weight increase, 240 hrs. @96 % R.H.	.30
Hydrolytic Stability[2]	Passes
Electric Strength[8] (1/8" [3.175 mm] Sample)	325 V/mil (13 kv/mm)
Thermal Aging 21/4" x 21/4" x 1/8" Sample 1000 hrs. @130°C	
% Weight Loss	< 0.01
Hardness Change, Barcol[2]	+3
Dielectric Constant (100 cycles @ 23°C)[6]	3.88
Dissipation Factor (100 cycles @ 23 °C)[6]	0.009
Volume Resistivity (Ohm-cm @ 23°C)[7]	> 10^{15}
1000 hrs. @155°C	
% Weight Loss	.59
Hardness Change, Barcol[2]	+3
Dielectric Constant (100 cycles @ 23°C)[6]	3.81
Dissipation Factor (100 cycles @ 23 °C)[6]	0.010
Volume Resistivity (Ohm-cm @ 23°C)[7]	> 10^{15}
1000 hrs. @180°C	
% Weight Loss	1.57
Hardness Change, Barcol[2]	+3
Dielectric Constant (100 cycles @ 23°C)[6]	3.79
Dissipation Factor (100 cycles @ 23 °C)[6]	0.009
Volume Resistivity (Ohm-cm @ 23°C)[7]	.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 should be warmed to aid mixing. Should crystallization of the Part B occur, warm it to 95°C (203°F) and then mix to dissolve the crystals. 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
Entrained air can be removed by evacuating for 5 to 15 minutes at 5 to 10 mm of mercury (absolute pressure). Warming the mixed resin to 60°C (140°F) aids in air removal. Container side walls should be four times the height of liquid resin to contain foaming that takes place under vacuum.

Casting and Impregnating
Heating the resin, mold and/or part aids impregnation. Warming this resin to 120°C (248°F) will lower its viscosity below 200 centipoise for good impregnation of tightly wound coils. 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.

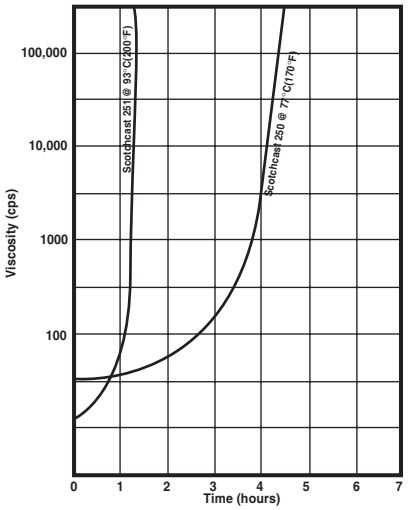
Curing
Cure using one of the cycles shown under "**Handling Properties**." Intermediate cycles may be used if desired. The time periods listed do not include those necessary to bring the part and the resin up to the cure temperature. The time should be determined and added to the cure cycle. For maximum resistance to thermal shock, the resin should be gelled at 75°C (167°F) to minimize stresses in the resin. After gelation, the resin can be postcured at any one of the curing cycles shown under "Handling Properties." For very critical applications requiring optimum physical and electrical properties, especially at elevated temperatures, a 16-hour postcure at 150°C (302°F) is recommended.

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.

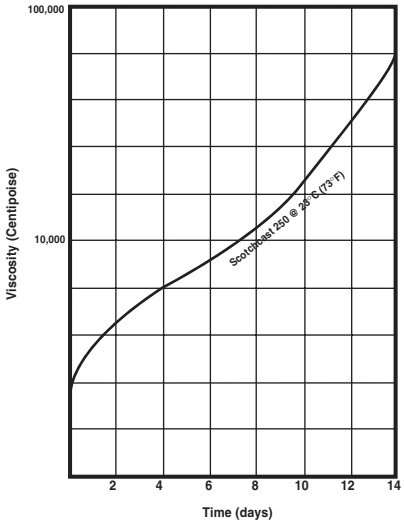
Handling and Safety Precautions

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.

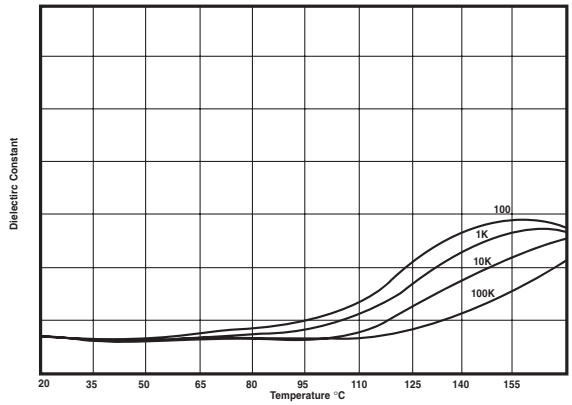
Brookfield Viscosity vs. Time
77°C and 93°C



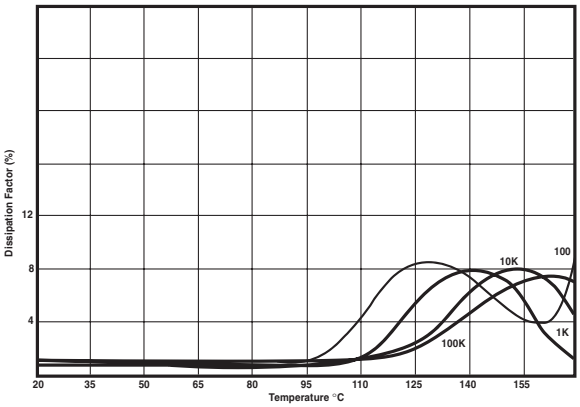
Brookfield Viscosity vs. Time
23°C



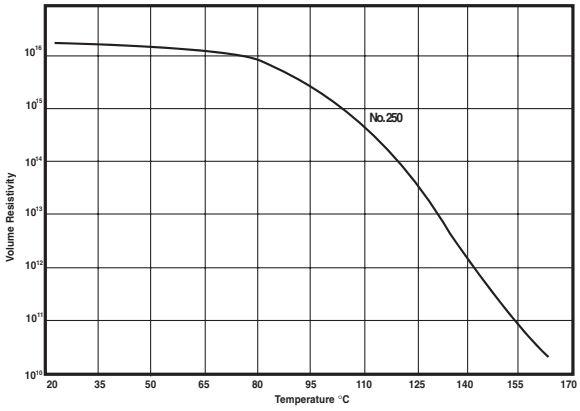
DIELECTRIC CONSTANT
Fed. Std. 406, Method 4021



DISSIPATION FACTOR
Fed. Std. 406, Method 4021
(Test Frequencies in Cycles/Sec)



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



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