Scotchcast™ Electrical Resin 253

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

Data Sheet

Product Description

3M™ Scotchcast™ Electrical Resin 253 is a 100% solids, two-part, oven-curing, semiflexible, filled, brown, epoxy resin capable of operating continuously at 130°C. The thixotropic nature of this product renders it readily applicable by dipping, extrusion or trowelling in applications where resistance to running or sagging is a requirement. The properly cured product exhibits permanent flexibility, good adhesion, good thermal and mechanical shock resistance and good thermal conductivity. Typical examples of applications where this product can be used are as a conformal coating for coils, transformers, motors, modules, electrical and electronic components or assemblies, and for buttering motor turns.

- Built-in permanent flexibility
- Good thermal and mechanical shock resistance

Handling Properties

*Time periods do not include those necessary to bring the part and resin up to curing temperature.

Mix Ratio (A:B)	Wt 1:2	
	Vol (%) 30:70	
Viscosity	A = thixotropic	
@ 23°C (73°F)	B = thixotropic	
	Mixed = thixotropic	
Density	Part A = 13.85 lbs/gal (1.66 kg/l)	
	Part B = 12.02 lbs/gal (1.44 kg/l)	
Flash Point	A = 232°C (450°F)	
	B = 177°C (350°F)	
Gel Time	23 min. @ 120°C (248°F)	
Curing Guide	95°C (203°F)	12-16 hrs.
	120°C (248°F)	2-3 hrs.

Test Methods

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

Typical Properties

*All values shown are typical. They are based on several determinations and are not intended for specification purposes.

Property	Value*
Color	Reddish-Brown
Specific Gravity (Cured)	1.50
Hardness (Shore D, immediate)	65
Compressive Strength[1] (10% Compression)	2500 psi (176 kg/cm²)
Tensile Strength[2] (1/8" x 1/2" Sample)	1300 psi (91 kg/cm²)
Elongation[2] (% @ break)	30
Flexural Strength[3] (1/2" x 1/2" Sample)	7000 psi (492 kg/cm²)
Thermal Conductivity[6] (cal · cm/cm2 · sec · °C)	8.0 x 10^{-4}
Coefficient of Linear Thermal Expansion[6] (23° C to 113°C) (length/unit length/°C)	12.6 x 10^{-5}
Electric Strength[8] (volts/mil) (1/8" [3.175 mm] Sample)	375V/mil (14.8 kv/mm)
Thermal Shock[7]	
10 cycles - 55C to 130°C	
1/8" (3.175 mm) Olyphant Inserts	Pass
1/4" (6.350 mm) Olyphant Inserts	Pass
Thermal Shock[6]	Pass
Mechanical Shock Resistance[6] (Wt. in lbs. of ball causing fracture)	7.8
Moisture Absorption[6]	
%Weight increase, 240 hrs. @96 % R.H.	.60
Water Immersion (sample cured 3 hrs. @120°C) 1000 hrs. @ 23°C % weight gain	0.85
Pot Life	4 days
Thermal Aging[6]	
21/4" x 21/4" x 1/8" (57 x57 3.2 mm) Sample	
1000 hrs. @130°C	
% Weight Loss	2.2
Hardness (Shore D) Change	0
Dielectric Constant (100 Hz @ 23°C)[4]	5.6
Dissipation Factor (100 Hz @ 23 °C)[4]	.08
Volume Resistivity (Ohm-cm @ 23°C)[5]	1.6 x 10^{15}
1000 hrs. @155°C	
% Weight Loss	9.1
Hardness (Shore D) Change	+16
Dielectric Constant (100 Hz @ 23°C)[4]	4.9
Dissipation Factor (100 Hz @ 23 °C)[4]	0.04
Volume Resistivity (Ohm-cm @ 23°C)	2.9 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 until a homogeneous mixture is attained.

Dipping
Air can be removed from 253 resin by warming the mixed product to 60°C (140°) and evacuating. Components may be dipped in the resin at this temperature, or if extended pot life is desired, the component may be warmed and dipped into room temperature resin. Optimum conditions are best determined by experimentation. The removal of excess resin can be controlled by vibrating the unit.

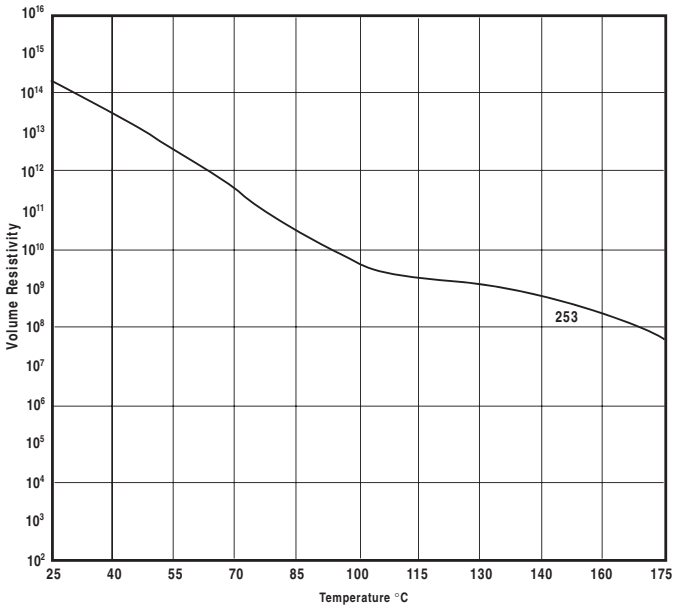
Curing
Where minimum stress and maximum thermal shock resistance are required, the lower temperature cure cycle is recommended. The optimum in physical and electrical properties is obtained when the higher temperature cure schedule is used. Time should be added to the cure cycle to allow the resin to 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.

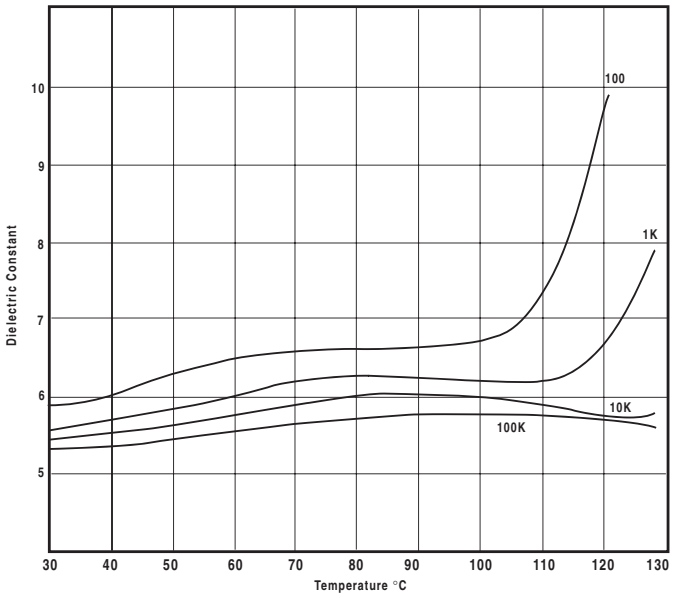
Handling and Safety Precautions

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

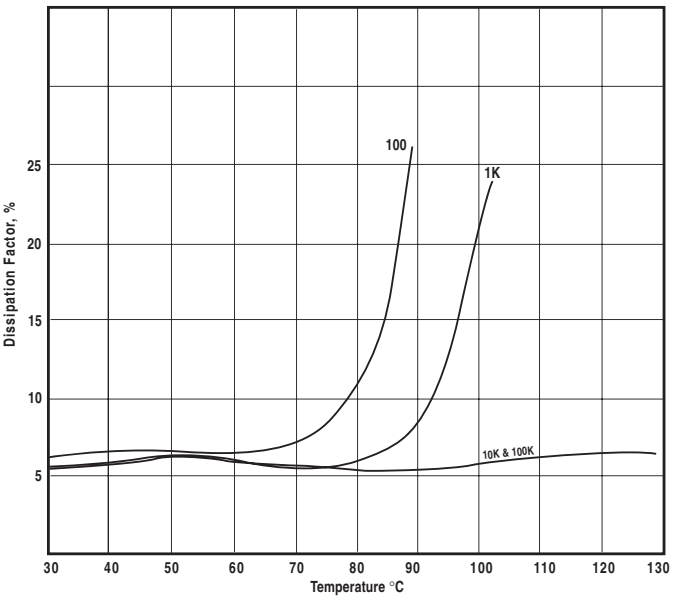
VOLUME RESISTIVITY
(OHM-CM)
Fed. Std. 406, Method 4041



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



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



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