Scotchcast™ Electrical Resin 208

Two-Part, Room-Curing, Semiflexible, Unfilled, Epoxy Liquid Resin

Data Sheet

Product Description

3M™ Scotchcast Electrical Resin 208 is a 100 percent solids epoxy resin system useful for impregnating and encapsulating U.S. Navy motors through frame size 326. Packaged in premeasured kits, Scotchcast Resin 208 protects windings against unusual environmental conditions in applications up to 130˚C. Because of the product's good wetting and impregnating properties, there is little scrap and little need for rework or patching.

- Simple one-to-one mix ratio (by weight)
- Good thermal and mechanical shock resistance
- Good moisture and chemical resistance

Handling Properties

Mix Ratio (A:B)	Wt 1:1
	Vol (%) 46:54
Viscosity	A = 12,500 cps
@ 23°C (73°F)	B = 4,000 cps
	Mixed = 7,000 cps
Density	A = 1.16 kg/l (9.7 lbs/gal)
	B = 0.995 kg/l (8.3 lbs/gal)
Flash Point	A = 204°C (400°F)
	B = 201°C (395°F)
Curing Guide	23°C (75°F) 48 hrs
	60°C (140°F) 3 hrs
Working Life	1 lb Kit @ 23°C (75°F) 70 min. 1 lb Kit @ 38°C (100°F) 30 min.
	2 lb Kit @ 23°C (75°F) 55 min. 2 lb Kit @ 38°C (100°F) 30 min.
	8 lb Kit @ 23°C (75°F) 45 min. 8 lb Kit @ 38°C (100°F) 20 min.

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]MIL-I-16923G
[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	Reddish Brown
Hardness (Shore D)	68
Specific Gravity	1.12
Compressive Strength[1] 10% Compression	700 psi (49 kg/cm^2)
Tensile Strength[2] Ultimate	1700 psi (120 kg/cm^2)
Elongation (% at break)[2]	75
Flexural Strength[3]	875 psi (62 kg/cm^3)
Thermal Conductivity[4] (Cal/sec/cm^2/°C/cm)	4.2 x 10^{-4}
Linear Thermal Expansion[4] (length/unit length/°C)	15 x 10^5
Thermal Shock[4]	Pass
Thermal Shock[5] 10 cycles - 55 to 130°C 1/8" (3.175 mm) Olyphant	Pass
Electric Strength[9]	325 V/mil
Mechanical Shock[4] Ball Drop (lbs.)	7.75 (3.5 kg)
Moisture Absorption[4] % weight increase, 240 hrs. @ 96% R.H.	1.6
Thermal Aging % weight loss	
10 days @ 105°C	1.5
1000 hrs. @ 130°C	9.2
1000 hrs. @ 155°C	12.2
Dielectric Constant[7] 1000 Hz 23°C	4.4
Dissipation Factor[7] 1000 Hz 23°C	0.09
Volume Resistivity[8] 23°C (ohm-cm)	10^{13}
Boiling Water Resistance 7 days	
- % weight gain	3.6
- Hardness Change (Shore D)	-60
Hydrolytic Stability[6] 120 days 71°C (160°F) 95% R.H. (Hardness Loss %)	13

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

Usage Information

Mixing
3M Scotchcast™ Electrical Resin 208 is supplied in one-, two-, and eight-pound premeasured kits. When the entire contents of a kit are to used for a single application all of Part B should be added to the Part A container, which has sufficient space for mixing. Resin mixing should be done at room temperature. When less than the full contents of a kit are to be used, meter separate parts into a clean container in the mixing ratio noted on the Handling Properties chart found on the previous page. Thoroughly blend Part A and Part B together for at least five minutes. Be certain to scrape side walls and the bottom of the container during mixing.

Pouring
After preparing the stator for casting with molds sealed and in place, allow the stator to cool to at least 49ºC (120ºF). Pour the freshly mixed Scotchcast Resin 208 slowly into the stator windings. Should leaking develop, apply seal quickly using Duxseal®, Scotchcaulk®, or other suitable material. If the leak is very small or inaccessible, continue pouring until the resin reaches the top of the mold, then place the mold into a low temperature oven heated to not more than 60ºC (140ºF). This will hasten the gel of the resin and stop the leak. When the leaking has ceased, add additional resin to the casting until the proper level is achieved.

Curing
The preferred curing cycle for all frame sizes is 48 hours at room temperature. Molds can be removed when the resin surface is tack free, usually after 3 to 5 hours depending on casting size and ambient temperature conditions. To speed the process, two other curing alternatives are suggested:
(1) Allow the resin to gel for 3 hours at room temperature followed by 2 to 3 hours at 60ºC (140ºF). Use this cycle on hot days with ambients at 27 to 38ºC (80 to 100ºF) and on larger frame sizes 284 and up;
(2) After pouring, cure the resin at an oven temperature of not more than 60ºC (140ºF) for a period of three hours. This procedure should be used only under moderate temperature conditions with ambients up to 27ºC (80ºF) and on frame sizes smaller than 284.

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.

Working Life
When used for motor encapsulation, the entire contents of the kit should be dispensed within the working lifetime of that kit. This will ensure that resin totally impregnates the winding before the viscosity increases and flow rate decreases.

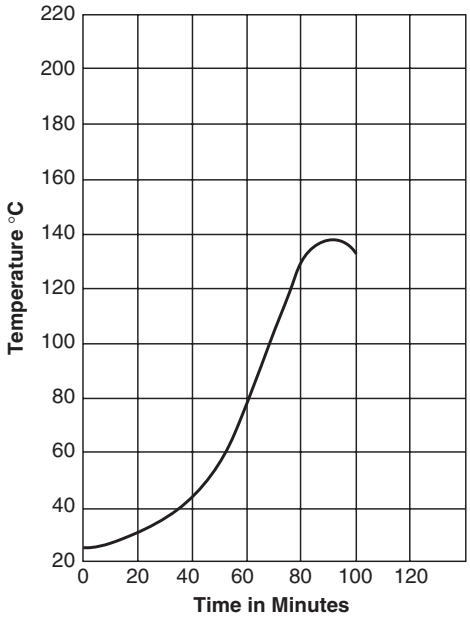
Approximate Resin Consumption By Frame Size

Scotchcast Electrical Resin 208 is suggested for encapsulation of Navy motors through frame size 326. For frame sizes larger than 326, it is suggested that an oven curing resin, such as Scotchcast Electrical Resin 241, be used.

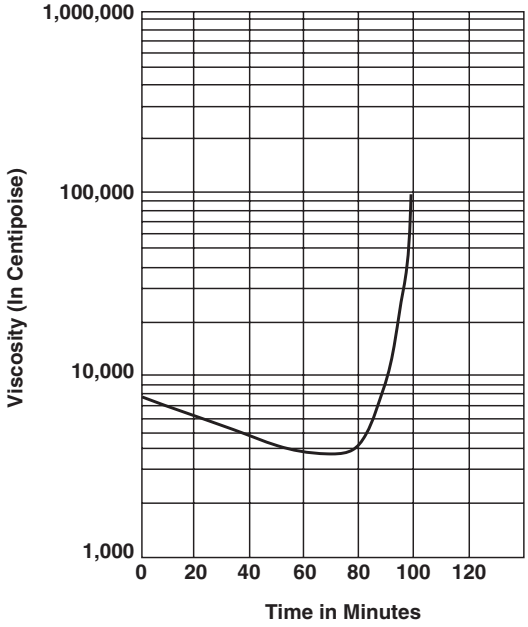
NEMA Frame	Amount of Epoxy Required
182-184	2-3 lbs.
213-215	2 1/2-4 lbs.
254-256	7 lbs.
284-286	9 lbs.
324-326	12-15 lbs.

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.

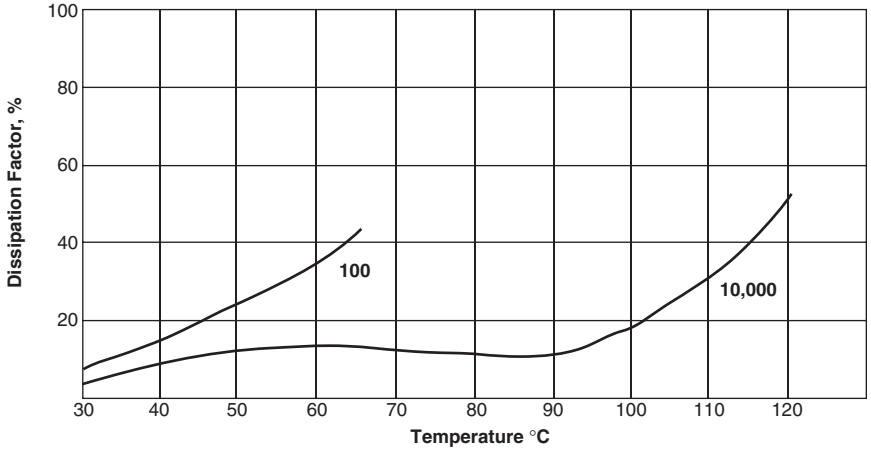


Exothermic Heat Rise for 1 lb. Sample

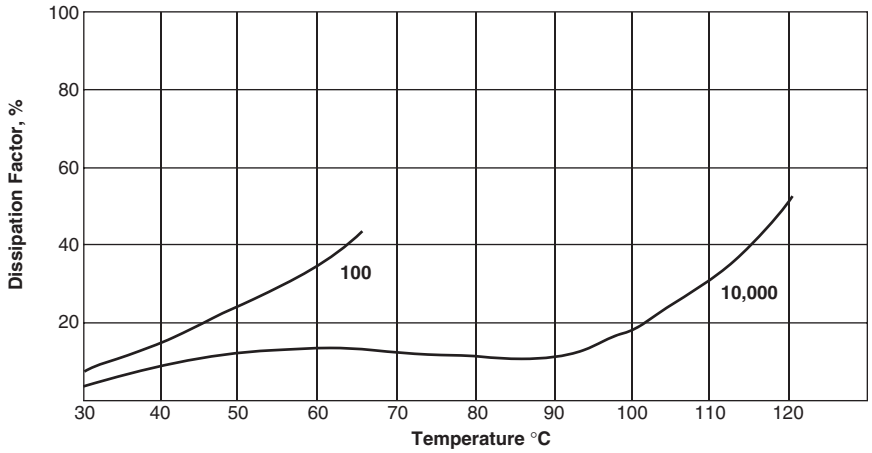


Brookfield Viscosity vs Time @ 73°F (23°C) 130 gram sample

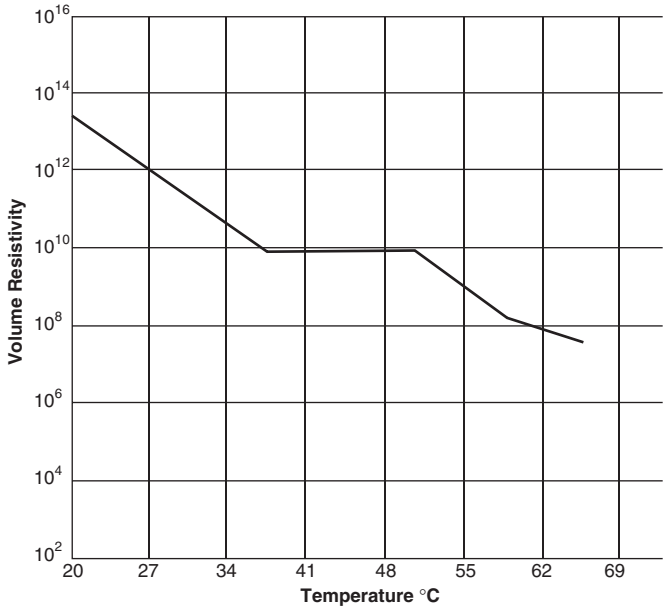
Dissipation Factor %
Fed. Std. No. 406, Method 4021
(Test Frequencies in Hertz)



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



Volume Resistivity (ohm-cm)
Fed. Std. No. 406, Method 4041



Important Notice

All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product which are not contained in 3M's current publications, or any contrary statements contained on your purchase order shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.

Warranty; Limited Remedy; Limited Liability. This product will be free from defects in material and manufacture for a period of one (1) year from the date of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any loss or damage arising from this 3M product, whether direct, indirect, special, incidental or consequential regardless of the legal theory asserted.**

3M

Electrical Markets Division

6801 River Place Blvd.
Austin, TX 78726-9000
http://www.3M.com/elpd

Litho in USA