

3M™ Scotchcast™ Electrical Resin 208N

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

Data Sheet

September 2016

Description

3M™ Scotchcast™ Electrical Resin 208N 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 208N helps protect 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 @ 23°C (73°F)	A = 12,500 cps B = 4,000 cps Mixed = 7,000 cps
Density	A = 1.6 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.

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Typical Properties

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

Physical Property (*See Test Method Table)	Typical Value US units (metric)
Color	Reddish Brown
Specific Gravity	1.12
Compressive Strength* ¹ 10% Compression	700 psi (49 kg/cm ²)
Tensile Strength* ² Ultimate	1700 psi (120 kg/cm ³)
Elongation (% at break)* ²	75
Flexural Strength* ³ (1/2" x 1/2" Sample)	875 psi (62 kg/cm ²)
Electric Strength* ⁹	325 V/mil
Hardness (Shore D)	68
Thermal Conductivity* ⁴ (Cal/sec/cm2/°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 Inserts	Pass
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 1000 hrs. @ 130°C 1000 hrs. @ 155°C	 1.5 9.2 12.2
Dielectric Constant* ⁷ 100 Hz 23°C	4.4
Dissipation Factor* ⁷ 1000 Hz 23°C	0.09
Volume Resistivity* ⁸ (ohm-cm 23°C)	10 ¹³
Boiling Water Resistance 7 Days - % weight gain - Hardness Change (Shore D)	 3.6 -60
Hydrolytic Stability* ⁶ 120 days 71°C (160°F) 95% R.H. (Hardness Loss %)	13

Test Method

¹Fed. Std. No. 406, Method 1021

²Fed. Std. No. 406, Method 1011

³Fed. Std. No. 406, Method 1031

⁴MIL-I-16923E

⁵3M 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

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Usage Information

Mixing

3M Scotchcast Electrical Resin 208N is supplied in one, two, and eight-pound premeasured kits. When the entire contents of a kit are to be 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 49°C (120°F). Pour the freshly mixed Scotchcast Resin 208N 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 60°C (140°F). 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 60°C (140°F). Use this cycle on hot days with ambients at 27 to 38°C (80 to 100°F) and on larger frame sizes 284 and up;
- (2) After pouring, cure the resin at an oven temperature of not more than 60°C (140°F) for a period of three hours. This procedure should be used only under moderate temperature conditions with ambients up to 27°C (80°F) and on frame sizes smaller than 284.

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

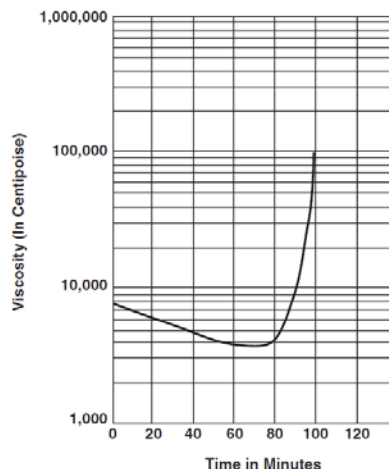
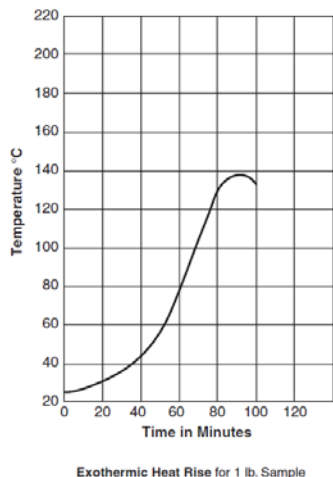
Scotchcast Electrical Resin 208N is suggested for encapsulation of Navy motors through frame size 326. For frame sizes larger than 326, it is suggested that an oven curing resin, such as Scotchcast Electrical Resin 241, be used.

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.

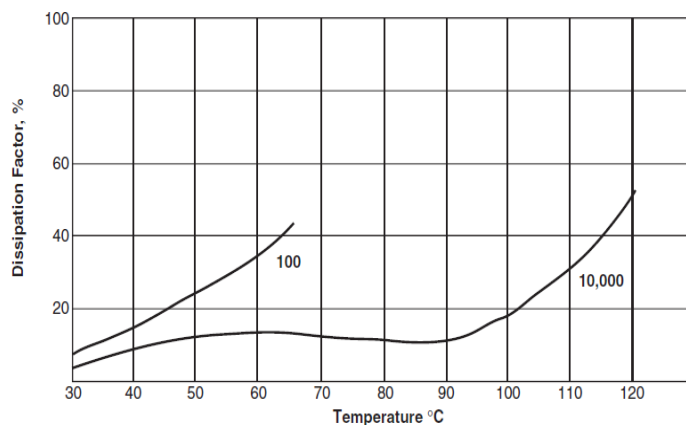
Handling and Safety Precautions

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.

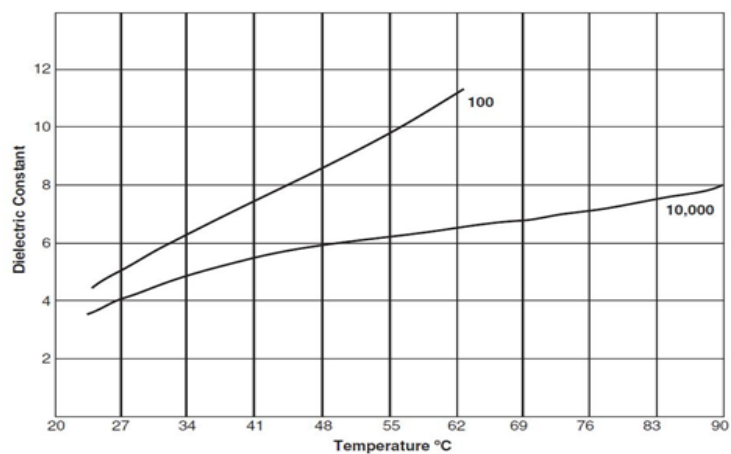
3M™ Scotchcast™ Electrical Resin 208N



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

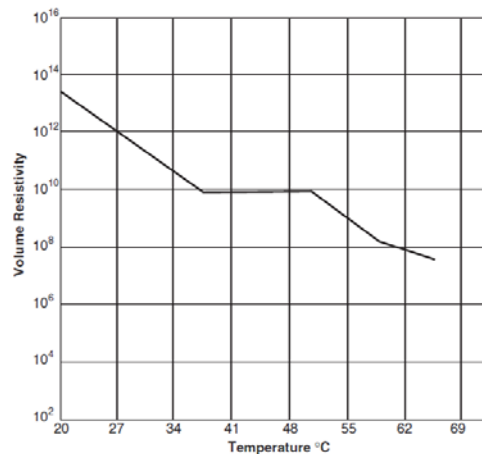


Dielectric Constant
Fed. Std. No. 406, Method 4021
(Test Frequencies in Hertz)



3M™ Scotchcast™ Electrical Resin 208N

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



Shelf Life & 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. Shelf life is 2 years from date of manufacture when stored in humidity controlled storage.
Availability	Please contact your local distributor; available from 3M.com/electrical [Where to Buy] or call 1-800-676-8381.
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Electrical Markets Division
6801 River Place Blvd.
Austin, TX 78726-9000
800.676.8381
FAX: 800.828.9329
www.3M.com/oem

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