

# 3M™ Scotchcast™

## Electrical Resin 9N

Two-Part, Room-Curing, Class B (130°C),  
Semi-flexible, Filled Epoxy Liquid Resin

Data Sheet

April 2017

### Description

3M™ Scotchcast™ Electrical Resin 9N is an easy-to-use resin system possessing medium viscosity and unique handling properties. It has a simple 1:1 mix ratio (by weight), and is frequently used in applications requiring excellent thermal shock and mechanical shock resistance. The resin's low exotherm and good pot life allow the user to mix substantial quantities at one time. High adhesion, low stress and low exotherm also reduce the effect of strain and temperature on sensitive components that have been coated with this resin.

- Good handling qualities
- Low exotherm
- Excellent thermal and mechanical shock resistance

### Handling Properties

|                                    |  |
|------------------------------------|--|
| <b>Mix Ratio (A-B)</b>             | Wt 1:1<br>Vol (%) 47:53  |
| <b>Viscosity<br/>@ 23°C (73°F)</b> | A = 90,000 cps<br>B = 20,000 cps<br>Mixed = 28,000 cps           |
| <b>Density</b>                     | A = 1.448 kg/l (12.08 lbs/gal)<br>B = 1.280 kg/l (10.68 lbs/gal) |
| <b>Flash Point</b>                 | A = 201°C (395°F)<br>B = 180°C (356°F)                           |
| <b>Gel Time</b>                    | 28 min. @ 60°C (140°F)   |
| <b>Curing Guide</b>                | 23°C (73°F) 24-48 hrs<br>60°C (140°F) 2 hrs<br>95°C (203°F) 1 hr |

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## Typical Properties

Not for specifications. Values are typical, not to be considered minimum or maximum.  
Properties measured at room temperature 73°F (~23°C) unless otherwise stated.

| Physical Property (*See Test Method Table)  | Typical Value<br>US units (metric)    |
|---|---------------------------------------|
| <b>Color</b>  | Brown                                 |
| <b>Hardness (Shore D)</b>   | 70                                    |
| <b>Specific Gravity (cured)</b>   | 1.42                                  |
| <b>Compressive Strength*<sup>1</sup></b><br>10% Compression                                 | 4400 psi<br>(309 kg/cm <sup>2</sup> ) |
| <b>Tensile Strength*<sup>2</sup></b><br>Ultimate  | 2200 psi<br>(155 kg/cm <sup>2</sup> ) |
| <b>Elongation (% at break)*<sup>2</sup></b>   | 19                                    |
| <b>Flexural Strength*<sup>3</sup></b>   | 1100 psi<br>(77 kg/cm <sup>2</sup> )  |
| <b>Thermal Conductivity*<sup>4</sup></b><br>(Cal • cm/cm <sup>2</sup> • sec • °C)           | 7.4 x 10 <sup>-4</sup>                |
| <b>Linear Thermal Expansion*<sup>4</sup></b><br>(23°C to 113°C) (length/unit length/°C)     | 13 x 10 <sup>-5</sup>                 |
| <b>Thermal Shock*<sup>4</sup></b>   | Pass                                  |
| <b>Thermal Shock*<sup>6</sup></b><br>10 cycles – 55 to 130°C ¼" (6,35 mm) Olyphant Insert   | Pass                                  |
| <b>Electric Strength*<sup>5</sup></b><br>1/8" (3,175 mm) sample                             | 350 V/mil<br>(13,8 kV/mm)             |
| <b>Mechanical Shock*<sup>4</sup></b><br>Ball Drop (lbs)                                     | 7.75<br>(3,5 kg)                      |
| <b>Moisture Absorption*<sup>4</sup></b><br>% weight increase, 240 hrs. @ 96% R.H.           | 0.8                                   |
| <b>Thermal Aging</b><br>% weight loss<br>1000 hrs. @ 130°C<br>Hardness Change (Shore D)     | 2.5<br>+13                            |
| <b>Dielectric Constant*<sup>7</sup></b><br>1000 Hz 23°C                                     | 4.6                                   |
| <b>Dissipation Factor*<sup>7</sup></b><br>1000 Hz 23°C                                      | 0.10                                  |
| <b>Volume Resistivity*<sup>8</sup></b><br>23°C (ohm-cm)                                     | 1 x 10 <sup>13</sup>                  |
| <b>Boiling Water Resistance</b><br>7 Days<br>- % weight gain<br>- Hardness Change (Shore D) | 2.5<br>-8                             |
| <b>Flammability*<sup>4</sup></b>  | Self-extinguishing                    |

### Test Methods

<sup>1</sup>Fed. Std. No. 406, Method 1021

<sup>2</sup>Fed. Std. No. 406, Method 1011

<sup>3</sup>Fed. Std. No. 406, Method 1031

<sup>4</sup>MIL-I-16923E

<sup>5</sup>Fed. Std. No. 406, Method 4031

<sup>6</sup>3M Test Method

<sup>7</sup>Fed. Std. No. 406, Method 4021

<sup>8</sup>Fed. Std. No. 406, Method 4041

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## Usage Information

### Mixing

Mix the separate parts before removing them from their containers. They may be warmed to 60°C (140°F) to aid the mixing process. Thoroughly mix parts A and B in the correct proportions. Mix until the color is uniform or a homogeneous mixture is obtained.

### De-aerating

Air introduced during mixing can be removed by evacuating at 5 to 10 mm of mercury (Hg) absolute pressure. The 3M™ Scotchcast™ Electrical Resin can be warmed to aid air removal. The container sidewall should be four times the height of the liquid resin to contain the foaming that takes place under vacuum.

### Casting and Impregnating

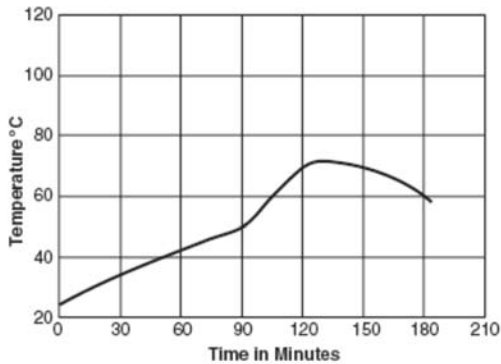
Pour the warm resin into the preheated 100°C (212°F) mold. If no mold is used, dip the preheated part into the resin. Heating the part, resin and mold aids impregnation. Evacuate at 5 mm of mercury (Hg) absolute pressure, or pour under vacuum and hold for several minutes before releasing.

### Curing

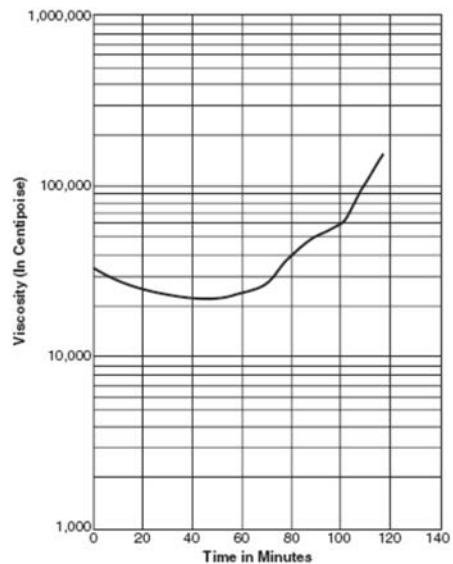
Where minimum stress and maximum thermal shock resistance are required, the ambient temperature cure cycle is recommended. If an oven cure is used, time should be added to the cure cycle to allow the resin to reach the curing temperature. Cure using cycles shown under **Handling Properties**. Where higher temperatures are not objectionable and the size of the casting not excessive, the resin can be quick-cured in one hour at 95°C (203°F).

### 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

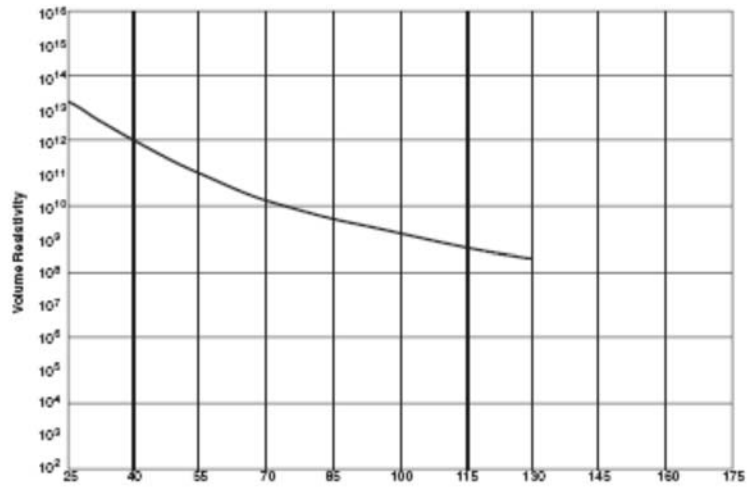


Brookfield Viscosity vs Time @ 73°F (23°C) 1 lb. sample

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## Volume Resistivity (ohm-cm)

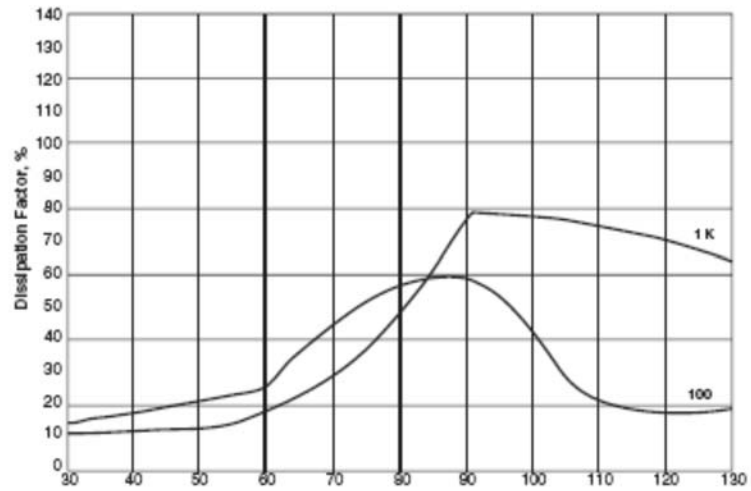
Fed. Std. No. 406, Method 4041



## Dissipation Factor %

Fed. Std. No 406

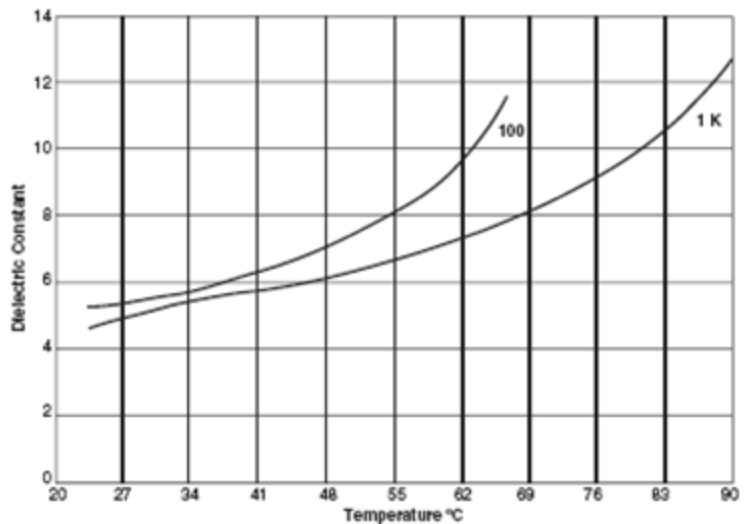
(Test Frequencies in Hertz)



## Dielectric Constant

Fed. Std. No. 406, Method 4021

(Test Frequencies in Hertz)



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**Shelf Life & Storage** These resins have a 2 year shelf life following the date of manufacture when stored in a humidity controlled storage (10°C/50°F to 27°C/80°F and <75% relative humidity). It is 3M's standard procedure to ship any resin product with at least 50% of its shelf life remaining. Any special request for a specific shelf life requirement may require a larger than stated MOQ that justifies a non-scheduled product run. Contact your 3M sale representative or Customer Service for specific shelf life MOQ requirements. No product returns will be accepted on special shelf life request orders.

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**Availability** Please contact your local distributor; available from [3M.com/electrical](http://3M.com/electrical) [Where to Buy] or call 1-800-676-8381.

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