

## HM518B & HM 518W

### PRE-MIXED & FROZEN EPOXY INK, SEALANT, & ENCAPSULANT

HM518B & HM518W are epoxy, curative, and pigment blends that are prepared, vacuum-degassed and supplied in frozen syringes that are ready for use once thawed. The cured polymers formed by these blends have excellent mechanical and electrical properties and demonstrate superior resistance to moisture and many chemicals. They also provide outstanding adhesion to many common materials including most metals, wood, rubber, glass, and many rigid plastics. They polymers system generate very little exotherm during curing and can cure fully at room temperature or more quickly if heat is applied.

The standard formula provide a tough rigid cure polymer, but the cured hardness can be modified by increasing the amount of the curative or through other modifications if needed. The standard colors are HM518B (Black) and HM518W (White), but we can supply almost 100 other colors based on our Epoxicolor "0" or Epoxicolor DE-11 series of epoxy color pastes and can provide custom colors and color matching by request.

#### SUGGESTED APPLICATIONS

- Multipurpose ink, sealant, and potting compound – excellent for many uses
- REACH & RoHS 3 (EU 2015/863) Compliant. No REACH SVHC components

#### HANDLING PROPERTIES

|  | VALUE                    | TEST METHOD       |
|--|--------------------------|-------------------|
| <u>HM518B (Black)</u>  |                          |                   |
| Visual Appearance  | Black, smooth semi-paste | Visual            |
| Density  | 1.11 g/cm <sup>3</sup>   | ASTM E-201        |
| Viscosity, at 25°C   | 58,000 cps               | ASTM D-2393       |
| Flash Point  | >100°C                   | ASTM D-92         |
| <u>M518W (White)</u>   |                          |                   |
| Visual Appearance  | White, smooth semi-paste | Visual            |
| Density,   | 1.10 g/cm <sup>3</sup>   | ASTM E-201        |
| Viscosity at 25°C  | 47,000 cps               | ASTM D-2393       |
| Flash Point  | >100°C                   | ASTM D-92         |
| Pot Life (100 g.) at 25°C  | at least 90 minutes      | Gardner Gel Timer |
| Pot Life (2 g.) at 25°C  | 2 – 4 hours              |                   |
| Cure Schedules: 24-48 hours at 25°C <b>or</b> 4 hours at 65°C <b>or</b> 2 hours at 80°C <b>or</b> 30 minutes at 100°C. <i>Note: final hardness &amp; bond strength may require additional time at room temperature to reach full strength, but these times will provide a functional cure for most applications.</i> |                          |                   |

#### PHYSICAL PROPERTIES (Tested at 25°C unless otherwise noted)

|                   |    | TEST METHOD |
|-------------------|----|-------------|
| Hardness, Shore D | 84 | ASTM D-2240 |

# Product Datasheet

|  |                         |              |
|--|-------------------------|--------------|
| Tensile Strength   | 7800 psi                | ASTM D-638   |
| Tensile Elongation   | 3.7%                    | ASTM D-638   |
| Tensile Modulus  | 3960,000 psi            | ASTM D-638   |
| Flexural Strength  | > 12,000 psi            | ASTM D-790   |
| Flexural Modulus   | 340,000 psi             | ASTM D-790   |
| Compressive Yield Strength   | >10,400 psi             | ASTM D-695   |
| Izod Impact Strength<br>notched (Ft-lb)  | 0.6                     | ASTM D-256   |
| Curing Shrinkage (linear)  | 0.005%                  | ASTM D-2566  |
| Glass Transition Temperature (T <sub>g</sub> )   | 78°C                    | ASTM D-648   |
| Coefficient of Thermal Expansion (CTE)<br>below T <sub>g</sub> / above T <sub>g</sub> (ppm/°C) | 80 / 171                | ASTM E-831   |
| Weight Loss after 48 hrs. at 150°C   | 0.05%                   | - ASTM D-495 |
| Moisture absorption<br>24 hr. immersion - % weight gain  | 0.23%                   | ASTM D-570   |
| Thermal Conductivity   | 0.18 W/mK               | ASTM D-2214  |
| Thermal Rating   | 105°C-130°C             | EIC 216      |
| Fungus Resistance  | Non-Nutrient            | ASTM G-21    |
| Insulation Resistance (ohms)   | >1.0 x 10 <sup>15</sup> | ASTM D-150   |
| Volume Resistivity (ohm-cm)<br>at 25°C   | 3.0 x 10 <sup>15</sup>  | ASTM D-150   |
| at 100°C   | 2 x 10 <sup>10</sup>    |              |
| Dielectric Strength (V/mil)  | 400                     | ASTM D-149   |
| Dielectric Constant @ 25C<br>at 60 Hz / 10 KHz / 1 MHz   | 3.5 / 3.5 / 3.1         | ASTM D-150   |
| Dissipation Factor @ 25C<br>at 60 Hz / 10 KHz / 1 MHz  | 0.02 / 0.03 / 0.04      | ASTM D-150   |

|                                 |             |                              |      |
|---------------------------------|-------------|------------------------------|------|
| Lap Shear Strength at 25C (psi) | ASTM D-1002 |                              |      |
| Various Substrates:             |             |                              |      |
| Concrete                        | 1100*       | Aluminum (etched)            | 2000 |
| FR-4 laminate                   | 3200*       | Galvanized Steel             | 1800 |
| Polyester laminate              | 2800*       | Copper                       | 1650 |
| Wood (maple)                    | 1800*       | *Indicates substrate failure |      |
| Effect of Temperature:          |             |                              |      |
| -40°F (-40°C)                   | 2800        | 105°F (40°C)                 | 1825 |
| 67°F (20°C)                     | 2500        | 150°F (65°C)                 | 1300 |
| 77°F (25°C)                     | 2000        | 180°F (82°C)                 | 1000 |

**NOTE:** Values are based on laboratory or average production results – not for specification purposes.

## NASA OUTGASSING

(After 24 hours at 125°C and 10<sup>-6</sup> torr per ASTM E-595)

# Product Datasheet

Results will vary with the cure schedule that is used.

| Cure Schedule   | Total Mass Loss (TML) % | Collectible Condensable Volatile Materials (CCVM), % | Water Vapor Release (WVR) % |
|-----------------|-------------------------|--|-----------------------------|
| 7 days at 25°C  | 0.48%                   | 0.00%  | 0.35%                       |
| 30 days at 25°C | 0.29%                   | 0.00%  | 0.20%                       |
| 4 hours at 65°C | 0.70%                   | 0.40%  | 0.30%                       |
| 1 hour at 93°C  | 0.30%                   | 0.01%  | 0.19%                       |

## CHEMICAL RESISTANCE

(Samples cured for 7 days at room temperature then soaked 30 days in the fluids indicated at 23°C (75°F))

|                                  |           |   |           |
|----------------------------------|-----------|---|-----------|
| Ammonia                          | Excellent | Rubbing Alcohol (70% Isopropyl Alcohol & 30% Water) | Fair      |
| Vinegar (5% Acetic Acid)         | Fair      | Ethanol   | Fair      |
| Hydrochloric Acid (10%)          | Fair      | Toluene   | Fair      |
| Sodium Hydroxide (10%)           | Good      | Acetone   | Fair      |
| Sodium Hydroxide (50%)           | Fair      | Paint Thinner/Mineral Spirits                       | Excellent |
| Sulfuric Acid (10%)              | Poor      | Turpentine  | Good      |
| Boric Acid                       | Excellent | Chlorinated solvent (carbon tetrachloride)          | Fair      |
| Kerosene                         | Excellent | Water   | Excellent |
| Transmission Fluid (Type A & F)  | Excellent | Mineral Oil   | Excellent |
| Power Steering Fluid             | Excellent | Corn Oil  | Excellent |
| Brake Fluid                      | Fair      | Window Washer Fluid                                 | Excellent |
| Simple Green cleaner (undiluted) | Excellent |   |           |

Excellent = Recommended for applications requiring long term immersion

Good = Recommended for applications with short term immersion or prolonged minor exposure (such as from spills, vapor, etc.)

Fair = Recommended only for short term spillage or other minor exposure applications

Poor = Not recommend (samples dissolved or dramatically weakened by exposure of more than a few minutes)

## PROCESSING AND APPLICATION INSTRUCTIONS

To use, thaw syringes for 5 – 15 minutes depending on syringe size and ambient temperature. Do not use heat to speed thawing as this may cause pre-mature gelation. A defrosting/thawing plate may be used to speed thawing without the risk of shortening the pot life as may other conductive metal surfaces. Once syringes no longer are cold to the touch they should be wiped clean of any condensation that has developed on their exterior and is they are no longer cold to the touch then the syringes are ready to use.

## PACKAGING AVAILABLE

This product is available in a range of syringes sizes, including 1cc, 3cc, 5cc, 10cc, and 30cc in both manual/thumb plunger operated styles (ex. HSW) and in air or piston operated styles (ex. EFD). SP&S stocks syringes from many manufacturers so if a particular syringe supplier is preferred please just let us know. Syringes are typically filled to their nominal full fill level, but we can fill to specified levels as well as such putting 2.5cc's in a 3cc. This typically save some costs and may reduce waste. Please contact us if a custom filler level would be helpful for one or more of your applications.

# Product Datasheet



## STORAGE GUIDELINES

Store these materials in a clean, cool, and dry environment in their tightly closed original containers. Store at -40C or longer to maintain viscosity stability. If stored at -40C or colder continuously the shelf-life will be a minimum of 6 months from the date of shipment.

## HANDLING PRECAUTIONS & PERSONAL HYGIENE

Mandatory and recommended industrial hygiene procedures should be followed whenever these products are being handled and processed. For additional information please consult the corresponding material safety data sheets.

### HM518B and HM518W

**WARNING!** May cause eye & skin irritation. Prolonged or repeated skin contact or inhalation of vapors may cause allergic skin or respiratory reactions. Harmful if inhaled or swallowed. Avoid contact with eyes, skin, or clothing. Wear eye protection and impervious gloves when handling. Wash thoroughly after handling. Avoid breathing vapor or mist. Keep containers closed when not in use. Use only with adequate ventilation. Do not take internally.

## FIRST AID

In case of contact: **Skin** – Immediately wash skin thoroughly with mild soap and water. Remove contaminated clothing and wash before reuse. Destroy contaminated shoes and other articles made of leather. **Eyes** – Immediately flush eyes with plenty of water for 15 minutes and get prompt medical attention. **Inhalation** - Remove person to fresh air. Administer oxygen or artificial respiration if necessary. Call a physician. **Ingestion** - Do not induce vomiting. Dilute with plenty of water and contact physician immediately. Never give anything by mouth to an unconscious person.

## DISCLAIMER

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