

Application of M-Coat J Protective Coating

GENERAL INFORMATION

M-Coat J is a two-part, polysulfide, liquid polymer compound for environmental protection of strain gage installations. When fully cured, it forms a rubber-like covering that provides an effective barrier against water and many other fluids. The tough coating also protects installations from mechanical damage.

M-Coat J has a paste-like consistency when mixed, and can be spread to the desired thickness with a spatula. Because it will not run or sag, M-Coat J can be applied to vertical or overhanging surfaces.

The operating temperature range is from -50° to +200°F [-45° to +95°C] for long-term service, and to +250°F [+120°C] for short-term service (less than 100 hours). It may be cured at room temperature or at a moderately elevated temperature. The elevated-temperature cure will improve moisture resistance, and is recommended for long-term applications.

For proper results, the procedures and techniques presented in this Application Note should be used with installation accessory products qualified by Micro-Measurements [refer to Catalog A-110]. Accessories used in this procedure are:

- CSM Degreaser
- M-Coat B Nitrile Rubber
- TEC-1 Tetra-Etch® Compound

Handling Precautions

This polysulfide compound is safe to use when reasonable care is observed. The user is cautioned to: (1) Avoid direct contact with resin or curing agent; (2) Avoid prolonged or repeated breathing of vapors; (3) Use only in well-ventilated areas. The use of polyethylene gloves and aprons is recommended. If skin contact does occur, thoroughly flush the contaminated area with warm water. Obtain medical attention in cases of extreme exposure or ingestion. For additional health and safety information, consult the material safety data sheet, which is available upon request.

SHELF LIFE AND POT LIFE

Shelf life is a minimum of 5 months at +75°F [+24°C]. Pot life is 30 minutes at +75°F [+24°C].

CLEAN-UP AND REMOVAL

Uncured M-Coat J can be removed from tools and working surfaces with a solvent such as CSM Degreaser. Fully cured M-Coat J can be removed with commercially available strippers or by mechanical methods.

SURFACE PREPARATION

When preparing a surface for strain gage bonding, always clean an area large enough to include the area to be covered by the protective coating. This will ensure proper adhesion at the outer edges of the coating.

A properly applied protective coating not only seals the gage installation from moisture and contaminants, but can also seal them in. Therefore, for maximum stability in moist environments, it is important to dry the gage installation with a heat gun before applying coatings. It is also important to remove oils, soldering fluxes, fingerprints and other contaminants from the prepared area. A thorough washing with a clean solvent such as CSM is normally sufficient. Use of the heat gun as a final drying step will help ensure complete evaporation of solvents, as well as moisture, prior to coating application.

GAGE PREPARATION

Prior to application of M-Coat J, exposed electrical connections and the exposed foil of open-faced gages are first covered with a layer of Teflon® tape (supplied in the M-Coat J Kit). This provides insulation against electrical leakage, and minimizes gage resistance shifts during the cure cycle.

Tetra-Etch is a registered trademark of W.L. Gore. Teflon is a registered trademark of DuPont.

LEADWIRE PREPARATION

A common cause of failure in strain gage installations is penetration by water or other fluids at the leadwire entrance to the coating. To prevent fluid migration along leadwires and into the gage installation, protective coatings must encapsulate the leadwires to a minimum distance of 1 in [25 mm] from the installation.

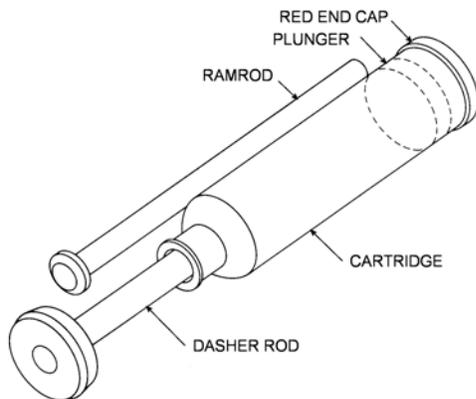
Prior to treating the leadwires for bonding to the protective coating, the individual conductors of jacketed or ribbon cable should be separated for a distance of several inches from the end.

Vinyl-insulated leadwires contain plasticizers that inhibit adhesion to the protective coating. They must be primed with a 50:50 mixture of M-Coat B and MEK, which “bites” into the vinyl insulation and provides a good bonding surface for the subsequent coating of M-Coat J. This primer coating must be air-dried for two hours or more prior to application of M-Coat J.

Teflon-insulated leadwires must also be prepared for bonding before a protective coating can be applied. TEC-1 Tetra-Etch compound should be used to treat the Teflon for bonding. M-Coat J will readily bond to treated Teflon without the use of an intermediate primer coating.

MIXING M-COAT J

M-Coat J is packaged in pre-measured plastic cartridges that allow the material to be stored and mixed in the same container. Temporary separation of unmixed resin may occur. Resin components will be recombined during Step 3 below.



1. While holding the cartridge, grasp the dasher rod and extend it fully.

2. Push the ramrod into the hollow end of the dasher rod to inject all of the curing agent (located inside the dasher rod) into the resin.

3. Thoroughly mix the resin and curing agent by moving the dasher rod back and forth, while rotating the dasher in a clockwise direction approximately one turn per stroke. Approximately 50 strokes are required to thoroughly mix the material. This procedure normally requires no more than five minutes of mixing time.

4. Pull the dasher rod outward all the way to the neck of the cartridge, and grasp the cartridge firmly. Unscrew the dasher rod by turning counterclockwise approximately three turns. Clean the end of the dasher rod with a gauze sponge saturated with CSM or a similar solvent.

5. Remove the red plastic cap from the cartridge. Dispense the mixed coating onto a clean aluminum or glass plate by pushing the dasher rod into the plunger.

APPLYING M-COAT J

1. Apply a layer of Teflon tape over the strain gage grid and exposed solder connections. Allow the tape to extend at least 1/4 in [6 mm] past the exposed surfaces and press into place.

Note: It is extremely important that the strain gage grid and solder connections be isolated from M-Coat J. If M-Coat J comes in contact with the gage, instability and low resistance-to-ground may result. Solvent-thinned coatings, such as M-Coat A or -Coat D, are not acceptable barriers, since M-Coat J can degrade these coatings. Also, use of vinyl-insulated leadwires will result in lower resistance-to-ground until M-Coat J has fully cured, which may take several days depending upon coating thickness.

2. Gently lift the leadwires and, with a spatula, apply a generous amount of coating under the leadwires and over the gage installation.

Extend the layer at least 1 in [25 mm] beyond the edges of the Teflon tape, preventing any flow into uncleaned areas of the part surface with masking tape.

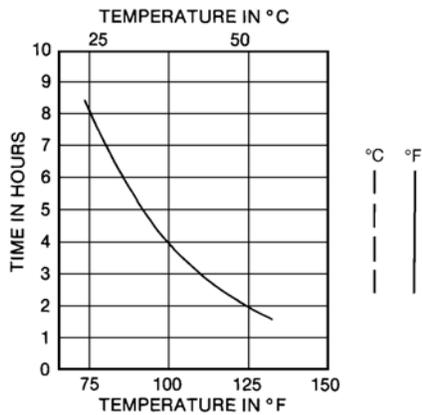
3. Press leadwires into the coating, and apply more M-Coat J over the leadwires and the entire gage installation.

4. Position the leadwires above the specimen surface so they are completely encapsulated and suspended in the coating.

Application of M-Coat J Protective Coating

CURING M-COAT J

M-Coat J will become usable in approximately eight hours at room temperature, although it will continue to harden and improve its chemical resistance over several days. Moderately elevated temperatures will reduce cure times according to the schedule shown below. Maximum recommended cure temperature is +130 °F [+55 °C].



Note: Potted connectors or coatings of M-Coat J that exceed 3/8 in [10 mm] in thickness should be air dried for 30 minutes at room temperature prior to starting an elevated-temperature cure.

Application of M-Coat J Protective Coating