

Instructions: Mounting Thermofoil™ Heaters with #15 Epoxy Adhesive

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(Supersedes EI 507)

1. Note

Minco specializes in mounting heaters to customer heat sinks. Consider having Minco install this heater using controlled thickness film adhesive instead of epoxy. High heat and pressure lamination creates strong bonds without entrapped air. Engineered solutions allow lamination to irregular shapes such as concave, convex, outside cylinders, and inside cylinders. Contact Minco Sales today.

Factory-applied aluminum backing is recommended for all heaters mounted with #15 epoxy and operated at watt densities greater than 20 watts per square inch.

2. Epoxy Description

Minco #15 adhesive is a blue two-part epoxy with resin and hardener supplied in a ready-to-mix 10-gram plastic packet, separated by a removable clamp. The adhesive is an electrical insulator, with good thermal conductivity, which bonds well to metals, ceramics, glass, and plastics. It meets NASA limits for outgassing in space vacuum, and is listed in NASA-RP-1061. Operating temperature is -70 to 115°C (-94 to 240°F). Coverage is about one square foot.

3. Warranty

When shipped, a minimum of three months shelf life remains.
Store epoxy in a dry location at approximately 46-82°F (8-28°C).

4. Safety Precautions

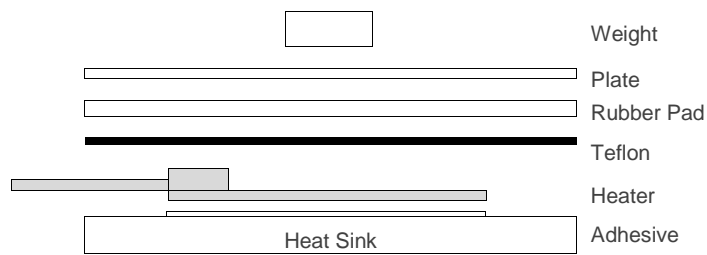
- Minco #15 is Hysol TRA-BOND 2151. View the MSDS on the Henkel website.
- Gloves and adequate ventilation are required.
- If accidental skin contact occurs, wash the exposed area immediately with mild soap and water.
- If accidental eye contact occurs, flush eyes with water immediately and seek prompt medical attention.

5. Installation Instructions

1. Prepare the surface:
 - A. Thoroughly clean the bonding surfaces, removing dirt, oil, and other contaminants using a suitable solvent such as acetone.
 - B. Follow with ethyl or isopropyl alcohol to remove residue.
 - C. Generally, an etched or slightly roughened surface permits the best bond. Use 500 grit sandpaper to lightly roughen the surface.

2. Mount heater with #15 epoxy adhesive:
 - A. Remove the clamp separating the resin from the hardener and mix the components together until the color is a uniform blue. Use the mixed epoxy within 45 minutes.
 - B. Clip a corner of the package and squeeze the mixed epoxy onto the heat sink.
 - C. Using a tool that will not damage the surface, spread epoxy in an even .003" - .005" (.08 - .12 mm) thick layer. Be very careful to avoid scratching the thin Kapton. Microscopic scratches reduce dielectric resistance and may cause an electrical short.
 - D. Apply the heater to the heat sink carefully to eliminate entrapped air, which will affect heat transfer. Trapped air may cause a hot spot in the heater that can cause heater failure.
 - E. Use a rubber roller or equivalent to apply light even pressure.

3. Cure the #15 epoxy:
 - A. While the epoxy is curing, apply light pressure (less than 10 psi) to keep parts in place. Tape can be used to secure the leadwires. A Teflon or polyethylene sheet over the heater will prevent epoxy from bonding to the clamping device. A resilient rubber pad is recommended for uniform clamping pressure.



- B. Eighteen hours at room temperature will accomplish most of the cure. Seventy-two hours is required for a complete cure. An accelerated cure can be done by exposing the epoxy to 65°C (150°F) for two to four hours. If an elevated temperature cure is used, slowly increase the heater assembly temperature (approximately 1°C per minute) to allow air and volatiles to escape.

4. Inspect the installed heater:
 - A. Inspect the installed heater for proper adhesion before applying electrical power. There should be no evidence of air bubble entrapment or non-adhesion beneath the heater. A bubble under a heater conductor may cause heater failure.

We believe this information to be reliable, but the customer must assume responsibility for heater performance in the intended application.

Minco accepts no liability beyond our standard warranty for consequences of improper installation and/or heater or adhesive failure.

If any questions or problems occur, contact your Minco sales representative or the factory for assistance.