



## *Preventive Maintenance - Technical Letters and Tips on Tubular Elements, Immersion Heaters and Cartridge Heaters*



### *How to Extend the Life of Your Immersion Heaters*

National Plastic Heater Sensor and Control Inc. has been designing, engineering and manufacturing immersion heaters for a long time. We have 38 years of combined experience and we will do our best to save you money! Of course we were referring to saving you money on the purchase of a new heater, but we simply will not stop there. **We want to save you money by extending the life of your current heaters.**

**Here are six things you can do that will make a difference in extending your immersion heaters life:**

- (1) Check your heaters regularly for coatings and corrosion and clean them if necessary. In most applications, using a high pressure sprayer does the job. However, please use caution and check with the manufacturer when the elements are being used in harmful chemicals.
- (2) The tank should be checked regularly for sediment around the heater, as sediment can act as an insulator and shorten heater life.
- (3) Remove any accumulated sludge deposits from the heater and the tank.
- (4) Check for loose electrical terminal connections and tighten if necessary. A loose connection can create resistance heat than can cause a heater terminal to melt.
- (5) If corrosion is indicated in the terminal enclosure, check the terminal enclosure gasket and replace if necessary. Check the conduit layout to correct conditions that allow corrosion to enter the terminal enclosure housing.
- (6) Clean the terminal ends of all contamination.

These six steps work best when put on a scheduled preventative maintenance program. How often depends on the amount and quickness of sludge build-up in your application. However a few minutes of checking once or twice a month could save you significantly.

### ***Pre Season Maintenance Checklist***

When bringing an idle heater back into service for the cold weather season, one of the most frequent issues our service centre deals with involves low megohm readings prior to start-up.

Low megohm readings on a heater may be due to moisture absorption by the magnesium oxide refractory insulation material that is compacted around the element's wire core. Moisture ingress can be attributed to unsealed elements in a humid environment, conduit connections that enable moisture to drain into the terminal enclosure, a gasket that needs replacing, etc. Once absorbed into the insulation, the presence of this moisture reduces its effectiveness, and results in a low value (low megohm) of the measurement of the insulation's resistance. Field evidence of this would be high leakage current to ground, and nuisance trips of ground fault protection equipment.

Upon discovery of a low megohm reading, it is standard practice to dry the elements out prior to returning to service. This involves either energizing the heater at a derated voltage for intermittent periods, or removing specific components of the heater and baking in an oven.

### ***Pre-Season Maintenance-Tech Tips***

- Check heater elements for any process fluid related build-up or corrosion.
- Check tank for sediment level in area surrounding heater. Remove any sludge deposits or sediment from heater and tank.
- Check for loose terminal connections and tighten if necessary.
- If terminal enclosure has a gasket, inspect and replace if necessary.
- Clean terminal ends of all contamination.
- Inspect all rigid conduit and sealed flex hose connections. Note: Conduit and hose connections should always slope away from the terminal enclosure.

### ***Avoiding Summer Heater Failure-Tech Tips***



These Tech Tips are about the most common type of summertime heater failure. We hope they help.

### ***Summer Heater Failure***

When process plants are in the full swing of summer, you may have noticed more than normal heater failure on startup. This article discusses the problem and provides valuable information to fix it.

**Understanding the Problem:** Factories are hot and in many cases very humid! This means there are potential problems for heating elements. The electric insulator in heaters, usually MGO (magnesium oxide), has a tendency over time to absorb moisture from the air. This occurs most often during down time on machines in damp environments or during long storage periods in stockrooms. When full voltage is

applied to a moisture laden heater, fuses blow, circuit breakers trip, and voltage arcs to the sheath and destroys the heater.

**Minimizing the Problem:** If possible it is best to store your heating elements in a humidity-controlled area. It is also advisable to spot-check elements before placing them into service.

**Testing for the Problem:** Moisture levels are measured by a Meg-ohm meter and can range from zero to infinity which is generally thought to be greater than 5,000 Meg-ohms as measured from the terminals to the sheath or casing. Meg-ohm meters are available from NPH and can be seen at [www.nphheaters.com](http://www.nphheaters.com).

**Solving the Problem:** Most manufacturers like to ship heaters at infinity. At a minimum, we recommend 10 Meg-ohms. At 10 Megs the elements are about 99% dry. If excessive moisture is detected in an element, you will want to take steps to remove it before applying power. This can be accomplished by placing the heaters in a 250 deg F oven. Most bake out times can be satisfied in 1-24 hours. Heaters with special end seals may take longer.

Another method for removing moisture is to run the heater at ½ voltage. This can work well, but make take 12-24 hours and Meg readings should always be taken before applying full voltage.

One of the relatively new devices on solid state controllers is a soft start feature. This is an excellent choice. Soft start applies varied voltage over time to slowly bring the heater up to temperature. See [www.nphheaters.com](http://www.nphheaters.com) for more information.



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