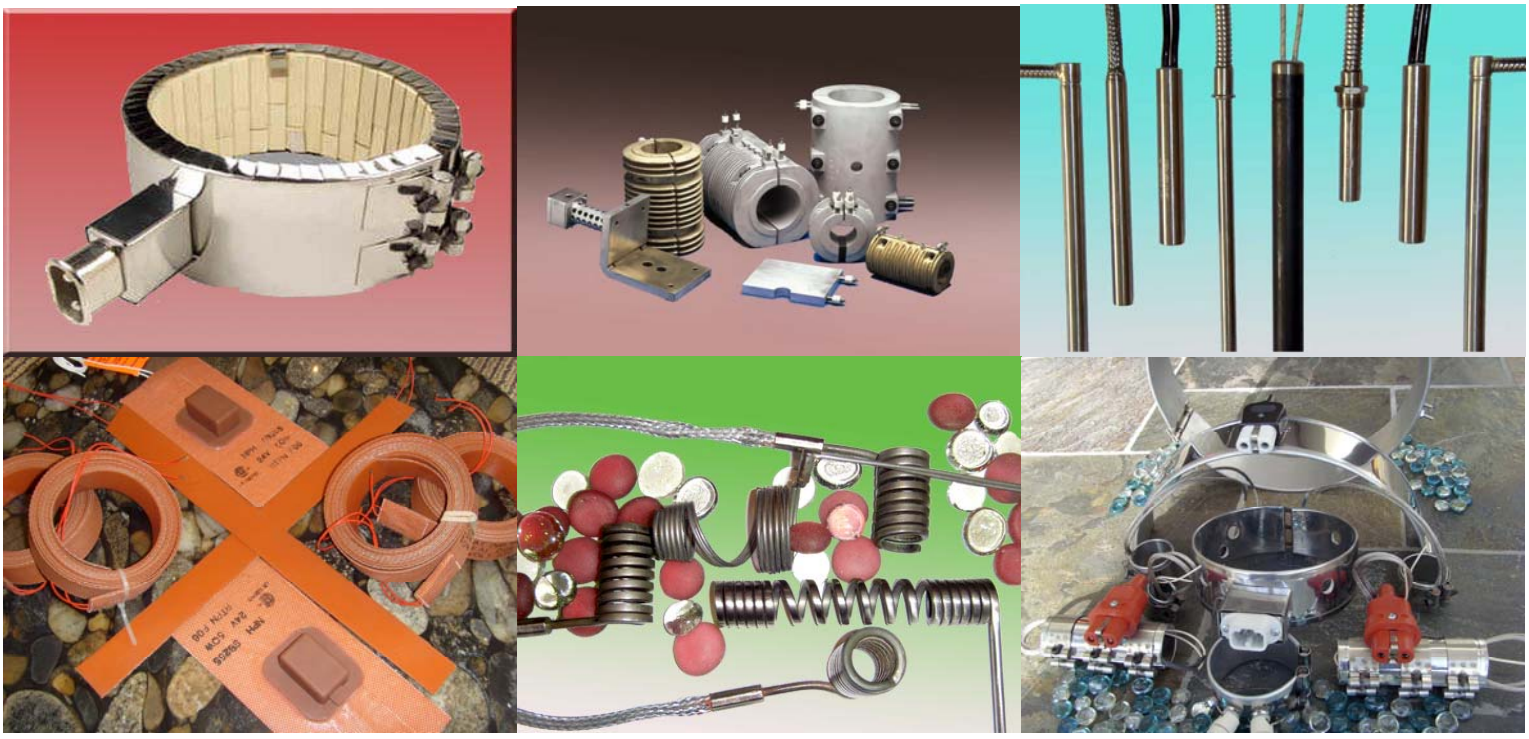
Maximizing Heater Performance- Tech. Tips



10 Tips on Maximizing Heater Performance

Most people do not give much thought to the heaters operating within their processes and applications – until those heaters fail, require significant maintenance or cause other problems. Below are 10 ways to maximize a heater's service life and performance.

Tip 1: Guard against heater contamination
Contamination is the most frequent cause of heater failure. As heaters expand and contract during cycling, they often draw in organic or conductive materials. This can lead to an arcing failure. When allowed to collect at the lead end of a heater, contaminants can also cause electrical shorts between power pins or terminals. Therefore, it is important to keep lubricants, oils, low-temperature tapes or processing materials out of contact with the lead end of the heater.

Tip 2: Protect leads and terminations from high temperatures and excessive movement
If a lead is exposed to temperatures higher than 500*F, high-temperature lead wire or ceramic bead insulation should be used.

Tip 3: Heater selection and sizing are important
A heater's wattage should be matched as closely as possible to the application's actual load requirements to limit ON/OFF cycling (see tip 6). Also, a tight fit minimizes air gaps and reduces the instances of hot spotting.

Tip 4: Ground the equipment
It is common sense and safe practice to electrically ground all equipment on which the heater is used.

Tip 5: Regulating voltage ensures the rated heater voltage matches voltage supply
It is essential to ensure a heater's rated voltage matches the available voltage supply because wattage increases (or decreases) at the square of the change in voltage applied to a heater. For example, a 120V/1000W heater connected to a 240V supply will generate 4000W.

Tip 6: Prevent excessive heater cycling
Excessive temperature cycling is very detrimental to the life of the heater. The most detrimental is the cycle rate that allows full expansion and contraction of the heater resistance wire at a high rate (30 to 60 seconds power ON and power OFF). Thermostats and mechanical relays are the worst offenders. It is best to use solid state relays (SSRs) and SCRs.

Tip 7: Sheath material and watt density ratings must be compatible with the material being heated
When heating solids, such as metals, the operating temperature and heater-to-part fit drive sheath material and watt density choices. As temperature increases, the watt density

must decrease accordingly to prevent internal resistance wires from oxidizing quickly and failing prematurely.

Tip 8: Mount immersion tank heaters horizontally near the tank bottom
Heaters should be placed horizontally and near tank bottoms to maximize convective circulation. It is essential to place the heater high enough to avoid any sludge and debris build-up in the bottom of the tank. Also, the entire heated length of the heater must be immersed at all times.

Tip 9: Prevent build-up and sludge on the heater elements
Scale, coking and sludge build-up on heater sheaths must be minimized. Any accumulation should be periodically removed or at least minimized, to avoid inhibiting heat transfer to the liquid.

Tip 10: Ensure proper, tight temperature control and safety limit protection
Matching the appropriate temperature control system to the heater is imperative to strong heater performance and life. Each process application should, at the very least, include a process temperature sensor (to sense the material being heated) and a limit sensor (to sense the heater sheath temperature).

National Plastic Heater, Sensor and Control Inc.

www.nphheaters.com

sales@nphheaters.com

Toll Free: 1-877-674-9744
Tel: 905-859-8225
Fax: 905-859-4691