

**Best Practices and Recommendations – Catalog**  
August 5, 2025

**TB25-0004 R2**

**For safe operation and long heater life, Tutco SureHeat recommends the following guidelines:**

- 1) Gas flow into the heater should be measured accurately and responsively to confirm it's adequate. If below the safe limit, it should drop out the "Okay to run" interlock to the heater if present. Additionally, it's important that the gas flow is delivered into the heater with a relatively balanced velocity across the face area of the inlet flange.
  - a. Tutco SureHeat three phase control panels have an input for an "Okay to Run" signal. This is typically tied to a flow monitoring device (flow sensor, flow switch), but can also be linked to a DCS system output that monitors multiple criteria for a system run permissive signal. This contact should be used to prevent the heater from powering on during low/no flow states or any other conditions in your system where powering the heater could damage the heater or other equipment.
- 2) Use of an exposed tip thermocouple to measure the heater exit gas temperature provides the best accuracy and highest responsiveness and is strongly recommended. If your heater does not have a built in thermocouple, the thermocouple should be located relatively close to the heater outlet, ideally  $\leq 3$  diameters away.
- 3) Power modulation should be controlled by a properly tuned PID that refrains from calling for large and rapid power increases during ramp up or when a process disturbance occurs especially if an exposed tip thermocouple is not being used. In cases where either marginal (but sufficient) gas flow is present and/or an exposed tip TC is not being used a controlled power ramp is safer to use for increasing the temperature during the heater's ramp to setpoint.
- 4) Conduct a thorough control orientated FMEA on the heating system in the context of the overall plant operation. Focus on identifying and implementing sufficient interlocks to include in the "Okay to run" circuit to the heater.

Power modulation via the SSR or SCR is controlled by a properly tuned PID that refrains from sudden increases being applied during ramp up or when a process disturbance occurs, and power should never be applied to the heater without sufficient gas flow or the plant operation is in an idle or "off" mode. When there's suboptimal conditions with one or especially a combination of these parameters, poor performance and heater damage increases substantially. Ensuring all the best practices are implemented is vital to long-term satisfactory performance and heater protection.

## Operation

- 1) Always proceed in the following order of operations:
  - a. **Start**
    - i. Turn on control panel
    - ii. Ensure heater setpoint is set to zero degrees or the lowest setpoint
    - iii. Start the gas flow (air, etc.) – **heater must not be run without gas flow**
    - iv. Press Start to power on the heater
    - v. Set the heater setpoint to your target temperature
  - b. **Stop**
    - i. Press Stop to power off the heater
    - ii. Set the setpoint to zero or the lowest setpoint
    - iii. Continue to flow gas (air, etc.) until the heater has a process temperature of 300°F/150°C/423K to reduce the residual heat in the system
    - iv. Stop the gas flow
    - v. Turn off the control panel
- 2) In the event of an emergency stop
  - a. The control panel will turn off the heater, but the setpoint should be reduced to zero or the lowest setpoint before restarting the heater after the emergency is resolved.
  - b. An emergency stop will not damage the heater as the heater power is removed by an emergency stop, so the loss of gas flow is acceptable.
  - c. After an emergency stop, the start order of operations should be followed
- 3) In the event of flow loss, the Okay to Run circuit should be utilized to disable the heater by opening the corresponding contact.

## Ramp Rate

Using a controlled ramp rate helps to minimize the chance of an overshoot which can damage the heater. Below are ramp rate guidelines, please be sure to follow the best practices above in conjunction with these guidelines.

<b>Set-Point Temperature</b>		<b>Degrees per Minute</b>	
Up to 600°F	(Up to 315°C)	360°F	(182°C)
601-1000°F	(316-537°C)	240°F	(115°C)
1001-1400°F	(538-760°C)	120°F	(49°C)
Up to 1650°F	(up to 900°C)	60°F	(16°C)