

Thermoforming Plastic Piping

Thermoforming plastic pipe demands repeatable, uniform heat delivered precisely where and when it's needed. Historically many manufacturers have relied on gas-fired systems for high-capacity heating, however electric process air heaters with closed-loop control are beginning to dominate the field. This page explains how closed-loop process air heaters are applied to thermoforming plastic pipe, the quantifiable benefits of switching away from gas, and why TUTCO Farnam's family of heaters stands out as a leading electric alternative.

A closed-loop process air heater pairs an electric heater element with a blower. Commonly fixed with sensors and a controller that continually measures temperature (often via Type K thermocouples or IR/surface sensors), the air heater can actively adjust power to hit and hold a target temperature. For thermoforming, that translates to a repeatable sheet or pipe surface temperature with minimal overshoot. This is critical when considering pipe wall thickness. The result is a reduction in scrap and consistency in parent material mechanical properties.. TUTCO Farnam explicitly markets closed-loop process air heaters designed for use with compressed or regenerative blowers, with built-in thermocouple feedback and matched control panels for precise voltage and temperature control.



Why Electric Closed-Loop Heaters for Thermoforming Pipe

Precision and Repeatability

Closed-loop electric systems respond rapidly to feedback and can maintain much tighter temperature bands than open-flame gas systems. This reduces hotspots, part warpage, and possible rework, which is especially important when forming long sections of pipe or tight-tolerance components. Emitted Energy and other suppliers emphasize that closed-loop infrared and electric control systems dramatically reduce variability and cold spots in thermoforming lines.

Energy Efficiency and Recirculation

Modern electric heaters (infrared or forced-air) paired with hot-air recirculation designs can cut energy use significantly versus gas ovens without recirculation. Industry case material and vendor whitepapers show examples of large energy savings. Projects like this show hot-air recovery projects that have saved 50–70% in some heat-treatment and thermoforming applications when recirculation and precise control were used.

Safety, Emissions, and Facility Impact

Gas heat introduces combustion by-products, flame-out risk, and additional ventilation or exhaust requirements. Electric heaters remove on-site combustion, reducing the risk of cook-off or flaring on a production floor. TUTCO Farnam's Cool Touch™ designs also minimize external surface temperature for operator safety and reduce unwanted radiant heat losses.

Faster Cycle Times and Quality Gains

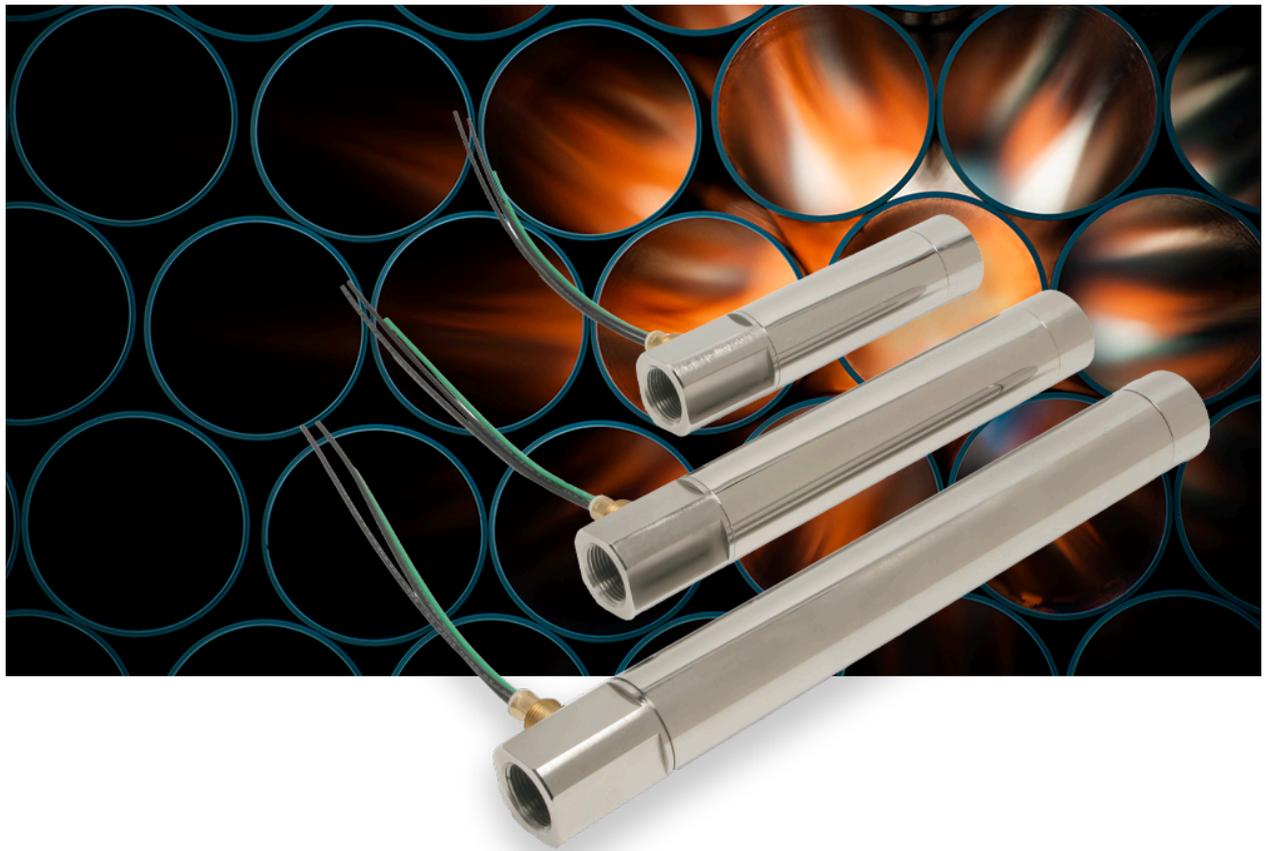
Infrared and high-power electric air heaters heat plastic surfaces faster and more uniformly than many gas systems, shortening cycle times and improving dimensional control. Multiple industry sources report measurable throughput improvements and reduced scrap after switching to electronically controlled electric heating modules.

How Process Air Heaters are Applied to Thermoforming Plastic Pipe

For thermoforming pipe, process air heaters are normally integrated in one of two ways:

- **Direct heated air recirculation:** Heated air is directed into a forming chamber around the pipe blank. Recirculation and baffles are used to maintain uniform airflow and temperature along the length of the part. This is best suited for long runs where uniform wall thickness is critical.
- **Targeted spot or zone heating:** Closed-loop spot heaters or infrared arrays are used to bring a local region to forming temperature just before a mold or mandrel. This is useful for localized features or when staged heating prevents overexposure of heat-sensitive materials.

TUTCO Farnam offers both closed-loop process air heaters sized for very high flow rates (up to tens of thousands of SCFM) and closed-loop spot/zone heaters with the sensor and controller integration needed to hold setpoints under variable loads. This flexibility lets manufacturers combine broad oven heating with localized SureHeat spot control where necessary.



Benefits Manufacturers are Already Seeing

Manufacturers who modernize their thermoforming lines with closed-loop electric heat report a combination of:

- **Lower energy per part** – through precise power modulation and heat recapture/recirculation. Some adopters have reported reductions measured in the tens of percent when replacing older calrod or gas systems with optimized electric/IR designs
- **Improved first-pass yield** – precise temperature control reduces rework and scrap caused by uneven heat, especially on thicker or multi-layer pipe walls.
- **Shorter cycle times** – faster ramping to temperature and better target accuracy increases throughput without sacrificing quality.
- **Reduced maintenance & footprint** – electric heaters eliminate burners, flues, and flame monitoring systems, simplifying maintenance and sometimes reducing the thermal footprint of the oven system.

Why TUTCO Farnam Stands Out

There are many capable suppliers of industrial heating but TUTCO Farnam's family distinguishes itself in several engineered ways that matter for thermoforming pipe:

Purpose-Built Closed-Loop Systems

TUTCO Farnam-Custom's closed-loop process heaters and spot heaters are shipped with the sensing and control logic matched to the hardware (built-in Type K thermocouples, PID control, overshoot protection), reducing integration risk and tuning time on the line. This means faster commissioning for you and more stable production for your facility.

High-Capacity, Custom Airflow Capability

TUTCO Farnam designs in-line heaters for airflow needs up to the very large scales required in industrial thermoforming (vendor specs list solutions capable of handling very high CFM at elevated temps), so the heaters fit both small lab lines and full production ovens.

Proprietary Heat-Transfer Designs and Element Life

TUTCO Farnam provides patented serpentine and multi-pass heater geometries (and the Cool Touch™ family) that deliver rapid, uniform heat transfer while protecting external surfaces. This technology improves element life and lowers heat loss compared with simpler open-coil solutions.

Full System Thinking (Controls + Heaters + Safety)

Because TUTCO Farnam supplies matched control panels (UL508A options), sensor packages, and heater modules, customers get a packaged solution rather than a shop-assembled mix of components. This directly cuts integration time and often reduces supplier ambiguity when performance tuning is required.

Contact TUTCO Farnam to get started

We collaborate with OEMs and manufacturers to design and integrate custom heating solutions that enhance precision, safety, and throughput in plastic forming, welding, and device manufacturing applications. From small-scale forming tools to high-volume production systems, our thermal expertise helps customers gain confidence in their processes and achieve repeatable quality and energy-efficient performance.

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