GET A QUOTE

Specialty Flanged Inline Heaters

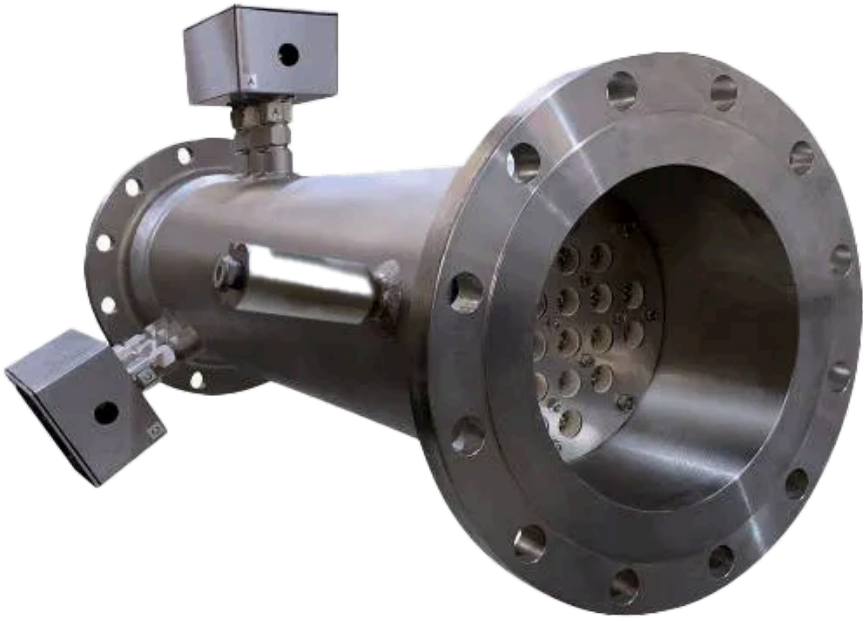
High-temperature & high-pressure custom process heating solutions for precise and durable performance.

The growing demand for efficient engines, reduced emissions, and renewable energy has driven the need for advanced testing and research involving high-temperature, high-pressure gas streams. TUTCO SureHeat's Specialty Flanged Inline (SFI) Heaters provide a reliable solution, offering safe, precise, and durable performance in demanding applications that require high temperatures, high pressures, and low flow rates. Designed to meet specific requirements, SFI heaters are fully customizable, ensuring they deliver tailored, effective heating solutions for your unique needs.

Please note, we do not sell products for any purpose connected with chemical, biological, or nuclear weapons; or missiles delivering such weapons.

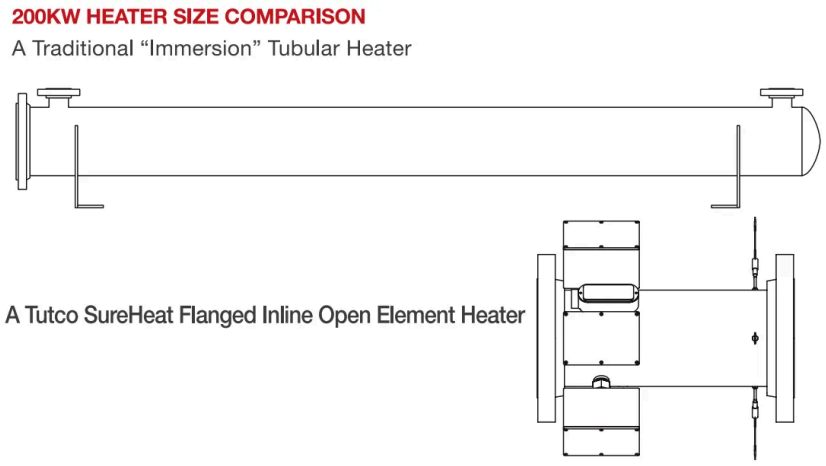
The TUTCO Advantage

TUTCO SureHeat Specialty Flanged Inline (SFI) heaters offer superior performance over conventional sheathed ("tubular" or "immersion") style heaters because they are designed specifically for air and inert gas applications, including hydrogen, CO2, steam, and syngas. Our patented SERPENTINE™ technology produces a very high power watt density creating a compact overall heater design. SFI heaters can be as much as 8-12X smaller than equivalent tubular/immersion designs. (see the diagram below) With this advantage, less space is required. With a faster heat-up and cool-down ramp time SFI electric air heaters are more cost effective to operate. Whether for a research test stand, factory production line, or key component in a product or thermal energy storage system, our Specialty Flanged Inline heater and controls are the right process heating solution for the job.

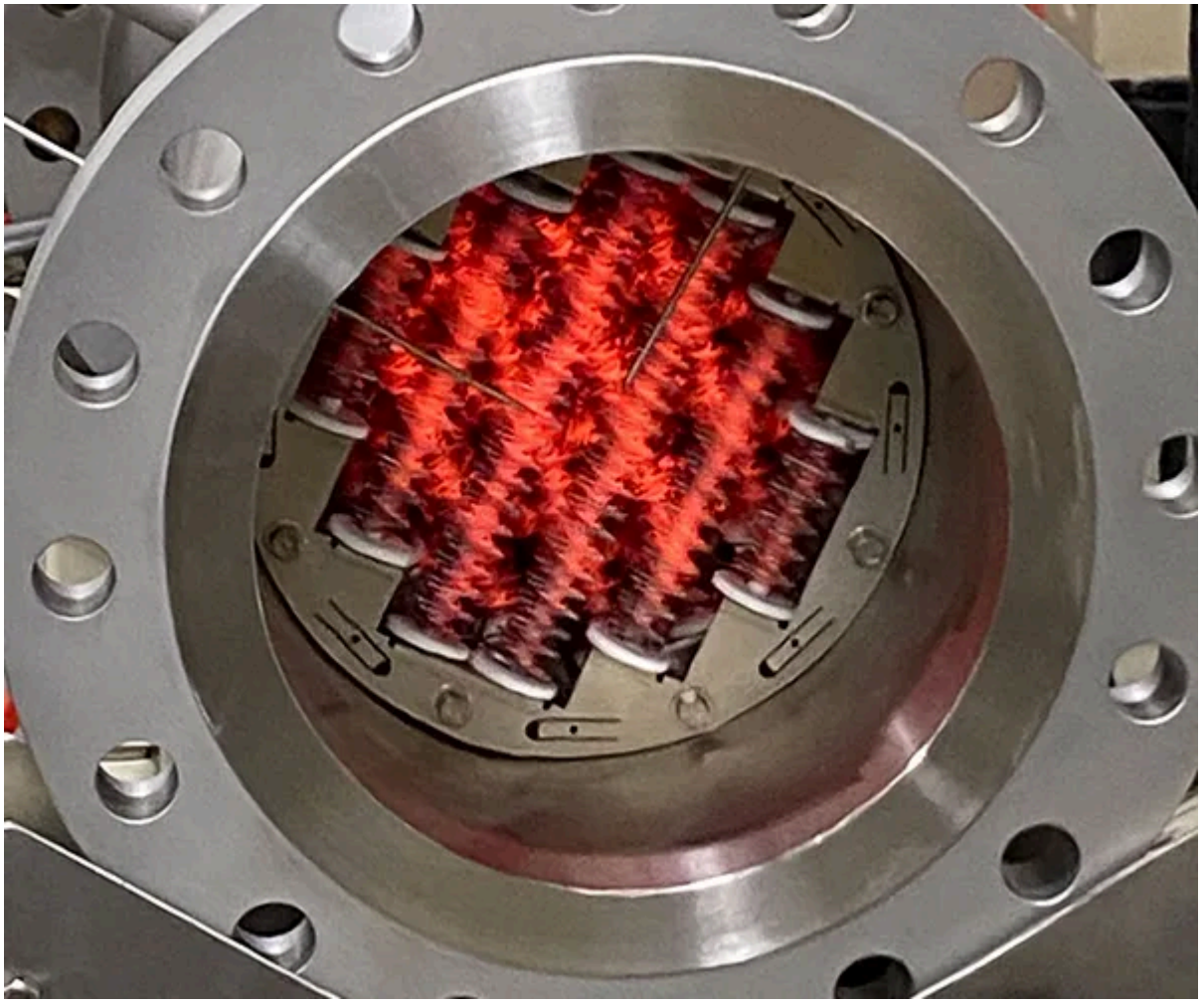


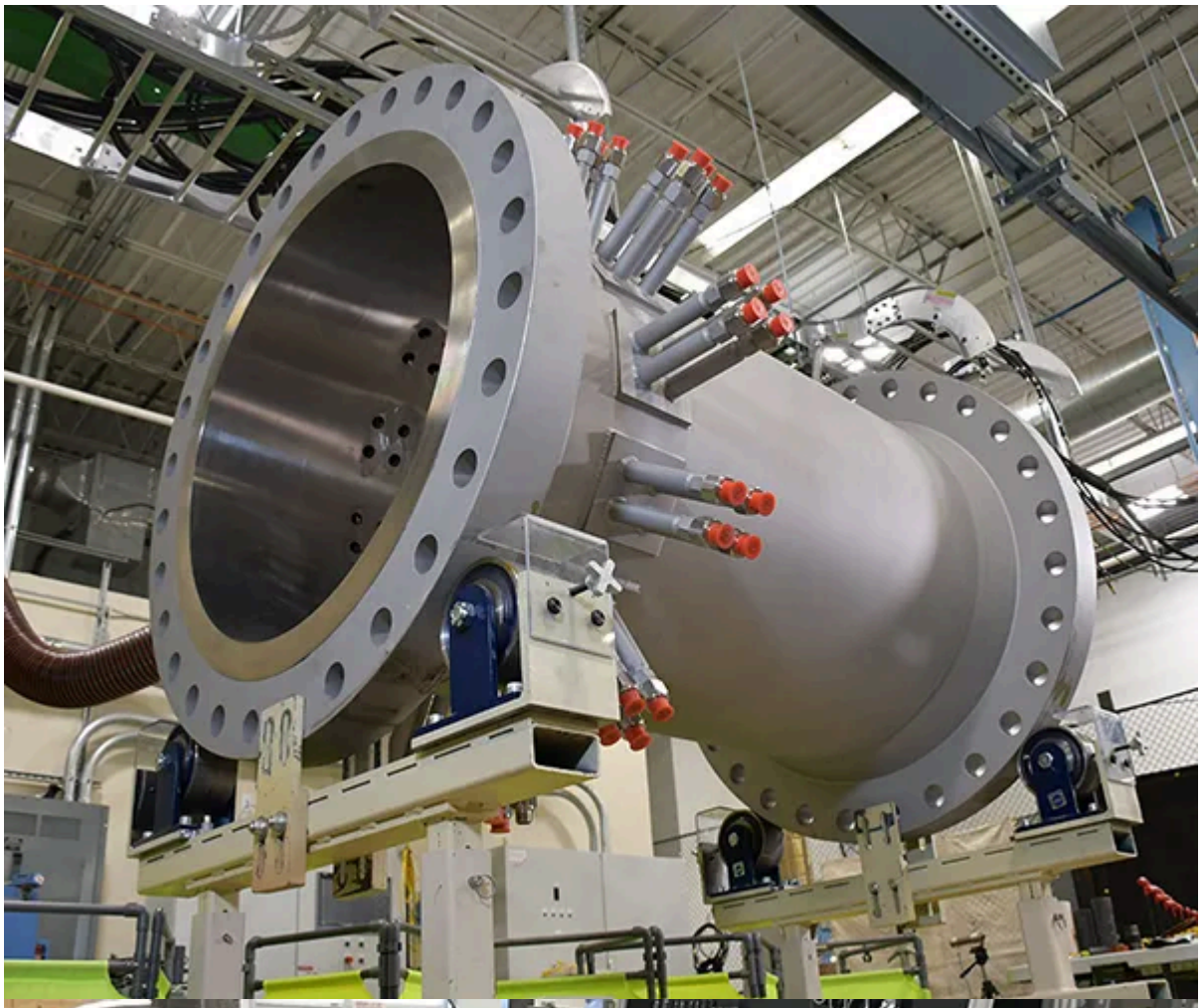
Key Features

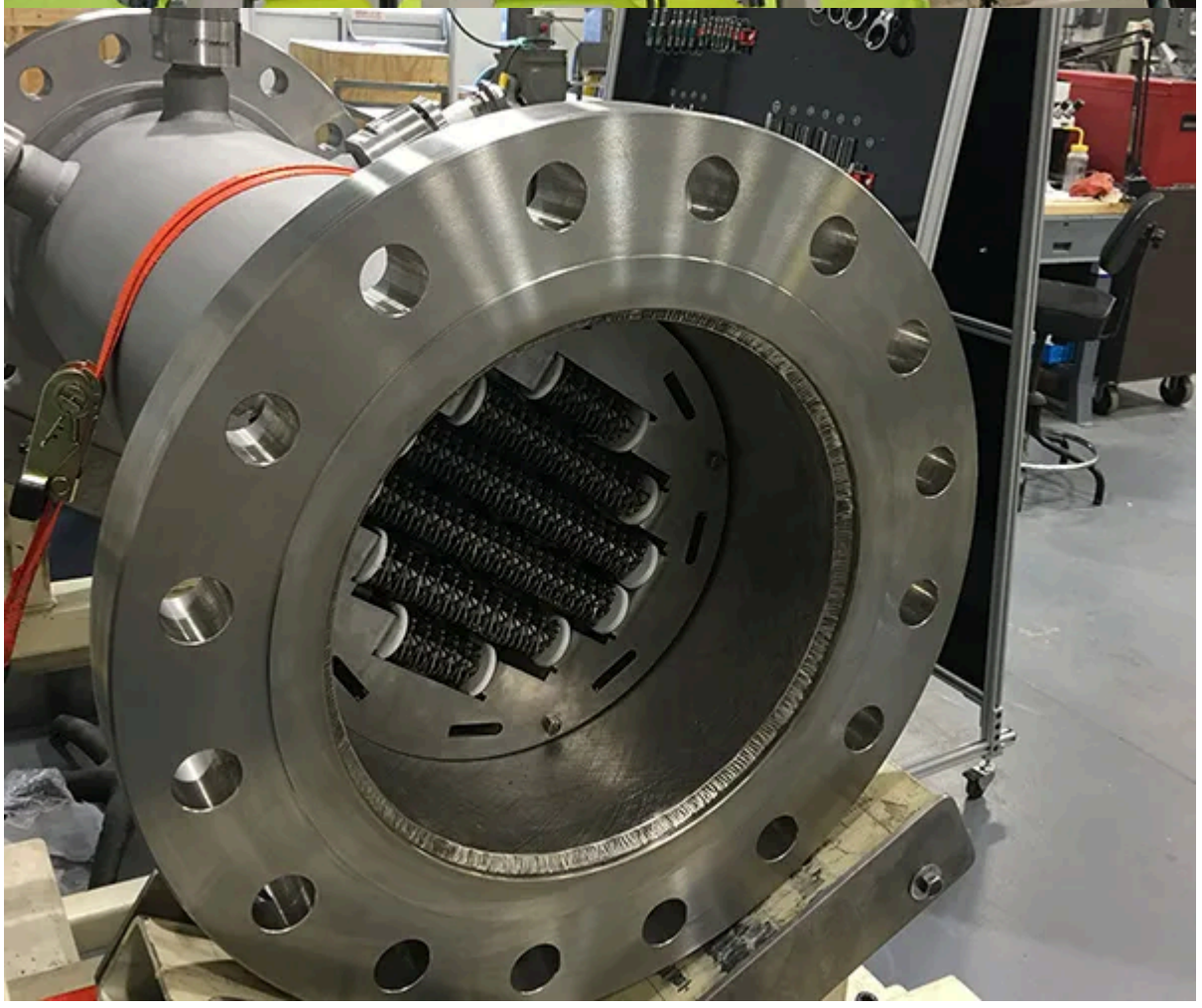
- Designed for High Temperature Process Heat Applications using Air or Inert Gases, including hydrogen, CO2, steam, and syngas.
- Compact in Size and Weight Compared to Competitive Immersion Solutions
- Faster Temperature Ramp Rates are more Cost Effective to Operate
- Electric Control Panels Engineered Specifically for Each Application



Combustion Research • Fuel Cell • R&D • Pollution Control • Renewable Energy







TUTCO SureHeat understands the importance of producing custom heater solutions that deliver safe and superior trouble-free performance. Electric process inline air heaters have ANSI standard pipe and flanges for heating high-

pressure air or inert gases to 1750°F (950°C) and higher. Our patented Serpentine™ elements allow you to reach temperature within a minute vs much slower response times of tubular element designs. Flanged Inline Air heaters use internal "K" type thermocouple sensors to measure temperature as various points - on the element, inlet and outlet. These are part of SureHeat's Over Temperature Protection (OTP). Coupled with an external limit control, OTP protects elements from premature failure if the airflow is reduced. It also protects against user error if the temperature is set to high. OTP allows our heaters to operate continuously for long periods of time without overheating.

Tutco SureHeat is focused on engineering customized solutions for demanding process heating applications

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System Overview

An SFI System consists of an open element electric heater plus a control cabinet to ensure accurate temperature control and safe operation.

The Heater

TUTCO SureHeat's SFI heater consists of a metal housing and the heating element assembly installed inside the housing. The metal housing is a round pipe with flanges for connecting to the customer's piping and fittings for the power supply feed-throughs and control instrumentation. It is custom engineered to meet the unique temperature, pressure, and mass flow rate requirements for the application. The diameter is determined by how large the heating element needs to be to meet the heat transfer demand while maintaining low pressure drop. Wall thickness, flange specifications, and material of construction are all established by ASME design principles for pressure vessels (Section VIII, Division 1).

The Control Cabinet

TUTCO provides custom control cabinets designed to work with our Serpentine elements and are guaranteed to work safely with our heater. Other control devices may not offer the responsiveness required to control Serpentine elements and are not guaranteed by TUTCO SureHeat. Control cabinets include a phase-angle fired SCR power controller, PID-Based digitial temperature controller, and a 4 input OTP limit circuit.

Heater Types

SFI-HP - High Pressure Models

High Pressure models are designed for use with high pressure air sources (> 50 psi, 3.5 Bar), and are constructed of heating elements aligned with the airflow. SFI-HP models can produce air/gas temperatures to 1652°F (900°C) or higher in custom designs.

SFI-LP Low Pressure Models

Low Pressure models are designed for use with low pressure air sources like regenerative blowers (< 50 psi, 3.5 Bar) and are constructed of low-restriction crossflow elements. SFI-LP models can produce air/gas temperatures to 1475°F (800°C).

Standard Design SFI Specifications

Maximum Static Pressure	600psi (41.37bar)
Maximum Inlet Temperature	900°F (482°C)

Maximum Static Pressure	600psi (41.37bar)
Standard Outlet Temperatures	1652°F (900°C)
Temperature Control	+/- 2°F (+/-1°C)
Ramp time	50°C per second

Custom Design SFI Specifications

Maximum Static Pressure	3000 PSI (207 Bar)
Maximum Inlet Temperature	900°F (482°C)
Standard Outlet Temperatures	1922°F (1050°C)
Temperature Control	+/- 2°F (+/-1°C)
Ramp time	100°C per second
Maximum Power Rating	1 MW and higher

Specialty Flanged Inline Solutions

Combustion Research

Today's combustion researchers are working on designing and testing new combustor shapes and configurations to improve fuel efficiency, reduce noise, and minimize pollution. Central to these efforts is the redesign of the combustor within turbofan engines.

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RIFT Iron Fuel Technology™

As a leader in electrification and decarbonization, TUTCO SureHeat has been at the forefront of developing and supplying advanced heating solutions crucial for these emerging green technologies.

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Aerospace Valve and Component Testing

TUTCO SureHeat specialty flanged inline heaters are used by the aerospace industry for the testing of valves employed throughout aircrafts. OEM manufacturers use our heaters to simulate the high heat and high-pressure

Maintenance Repair and Overhaul (MRO)

TUTCO SureHeat specialty flanged inline heaters play a vital role in the maintenance, repair, and overhaul (MRO) operations conducted at FAA repair stations. Our heaters provide the high-temperature, high-pressure solutions essential for testing pneumatic aerospace

compressed air that powers critical applications through the aircraft.

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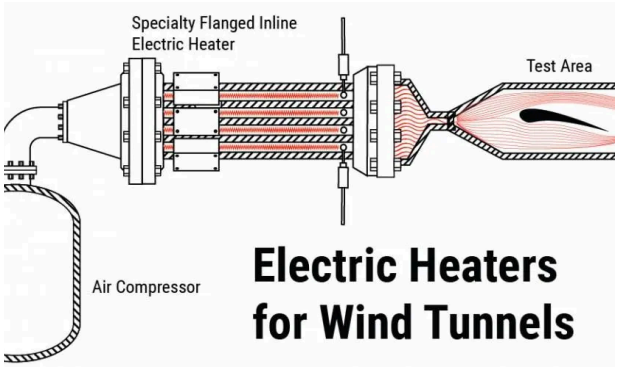

Wind Tunnel

Tutco SureHeat designed and built two powerful electric air heaters that ramp from ambient to 600C in 10 seconds, replacing gas fired heaters in a wind tunnel application.

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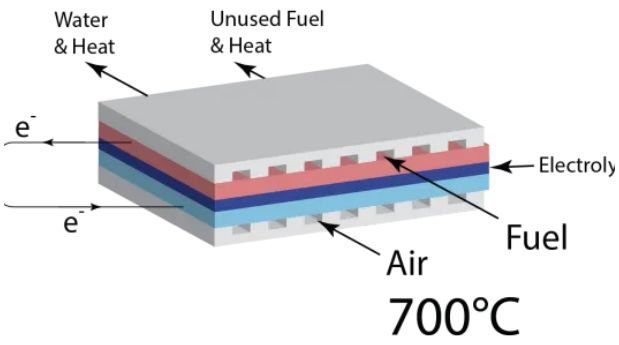

Solid Oxide Fuel Cells

High-temperature solid oxide fuel cells (SOFCs) are a clean, eco-friendly technology designed to generate electricity with impressive efficiency. To function properly, these fuel cells need to operate at elevated temperatures, typically between 500°C and 800°C, and are often used in systems producing 120kW or less.

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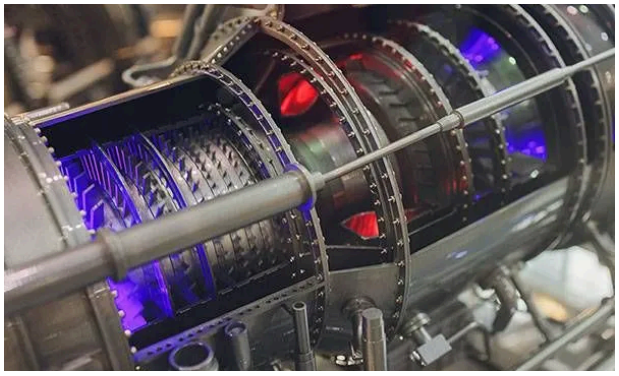

Turbo Machinery

TUTCO SureHeat's SFI High-Temperature Air Heaters play a critical role in research and innovation,

components—a critical and precise application in the aerospace industry.

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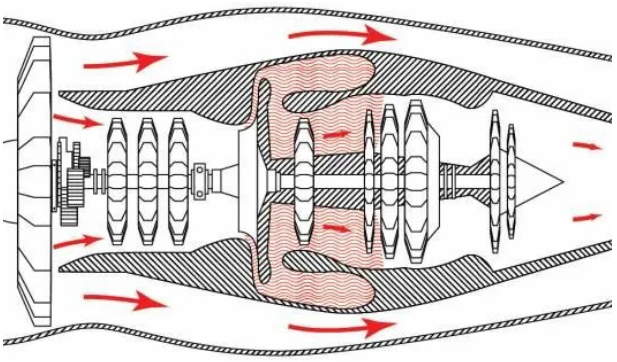

Electric Trim Heating

We worked with the largest US manufacturer of turbo fan engines to build massively powerful electric air heaters for a Unit Under Test at a combustion research facility. This was part of a large scale facility upgrade that would span many years.

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Cold Spray Research

Tutco SureHeat specializes in designing and manufacturing heaters for cold spray research. These preheaters elevate the temperature of gases like nitrogen, helium, or gas mixtures to a precise target temperature under pressure.

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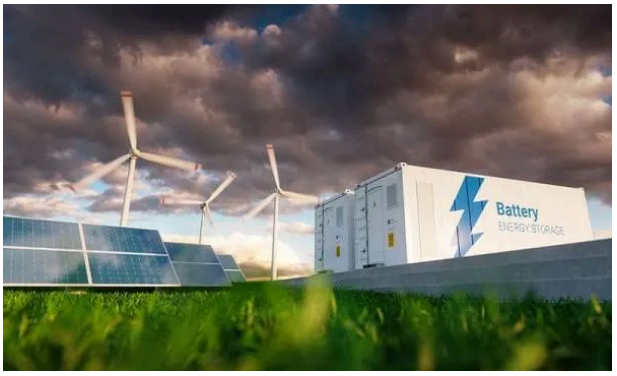

Thermal Energy Storage

In the effort to develop sustainable energy solutions, electric heat emerges as a crucial component, driving

particularly within Turbo Machinery applications.

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innovation in energy storage applications. Our heating solutions enable the utilization of thermal energy storage (TES) systems, employing heat as a medium to store and release energy efficiently.

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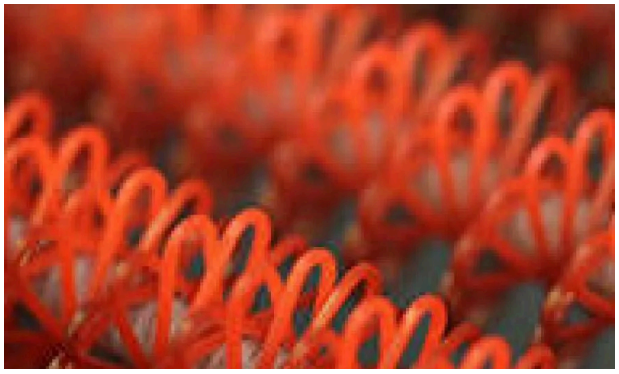

Higher heat-higher pressure SFI heaters

Tutco SureHeat's Specialty Flanged Inline (SFI) Heaters, which feature proprietary Serpentine™ Technology, deliver safe, precise, and durable performance in a wide range of extremely demanding process heat applications.

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Using Air Heaters for Pneumatic Component Testing

Tutco SureHeat specialty flanged inline (SFI) electric air heaters offer superior performance for maintenance, repair, and overhaul facilities requiring high pressure high heat testing of pneumatic valves and components.

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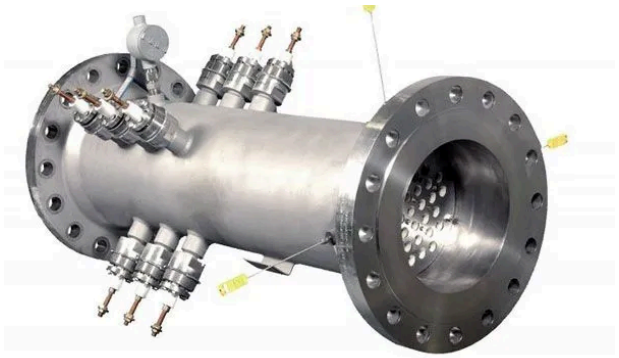

Heaters for Combustion Test Facilities

Combustion test facilities require air heater test stands that can simulate the inside of an engine to accurately measure the emissions produced. A high degree of control is required in efforts to measure and reduce the amount of Nitrogen Oxide (NOx) emissions based on the inlet air temperature. T

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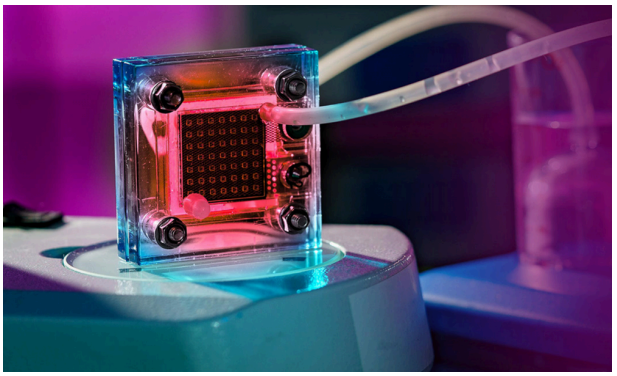

Powering Solid Oxide Fuel Cells

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