

Electrification and Decarbonization

TUTCO Heaters for Environmental Clean Up

In industrial applications dedicated to environmental cleanup, the utilization of thermal heat plays a pivotal role in achieving effective remediation. As industries embrace electrification and decarbonization, replacing technologies reliant on fossil fuels with electricity-powered alternatives, TUTCO Farnam's electric heating solutions are playing a vital role in the treatment and removal of environmental contaminants from water, soil, and air.

Using TUTCO Farnam's sustainable heating solutions, thermal heat technologies are harnessed to facilitate the treatment and removal of environmental contaminants, offering a versatile and efficient approach to address pollution challenges. Our heaters present distinct advantages over gas-fired options, including rapid and precise heating, straightforward in-situ operational capability, reliance on clean energy, and cost-effectiveness. Whether it's the targeted treatment of water pollutants, the remediation of soil contaminated with hazardous substances, or the purification of air from harmful emissions, the application of thermal heat using TUTCO Farnam heating products demonstrates a commitment to sustainable and effective environmental cleanup practices.

Environmental Water Treatment

The integration of TUTCO Farnam electric heaters in environmental water treatment processes represents a cutting-edge approach to addressing water pollution challenges. Electric thermal heat technologies offer a precise and controllable means of elevating water temperatures, a critical factor in accelerating the removal or degrada-



tion of contaminants such as Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) from water sources. In applications such as wastewater treatment, the controlled application of electric thermal heat

enhances the efficiency of biological and chemical processes, facilitating the breakdown of pollutants. Additionally, in water purification and desalination processes, electric thermal heat aids in optimizing the separation of impurities and salt from water, contributing to the production of cleaner water. The adaptability and reliability of electric thermal heat in applications, including PFAS treatment and remediation and granular activated carbon thermal reactivation, make TUTCO Farnam a valuable partner in advancing sustainable solutions for water treatment, demonstrating a commitment to environmental stewardship and the safeguarding of water resources.

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Environmental Air Applications

In Environmental Air Applications, TUTCO Farnam heating products are instrumental, particularly in conjunction with thermal oxidizers, to combat air pollution effectively. Thermal oxidizers are advanced air pollution control devices that utilize high temperatures to initiate the combustion of volatile organic compounds (VOCs) and hazardous air



pollutants. The thermal heat generated within these systems facilitates the oxidation of pollutants, transforming them into less harmful byproducts like carbon dioxide and water

vapor. This process is particularly valuable in industrial settings, where emissions of pollutants need stringent control. Thermal oxidizers, regenerative thermal oxidizers, and flameless electric catalytic oxidizers, powered by thermal heat from TUTCO Farnam, provide an efficient means of reducing air pollutants, contributing to cleaner air and aligning with environmental regulations.

Environmental Ground Applications

In Environmental Ground Applications, TUTCO Farnam heating solutions emerge as a transformative component for addressing soil contamination and environmental challenges. Thermal heat

technologies are employed in innovative ways to remediate polluted soil, particularly in processes such as thermal desorption and soil vapor extraction. These methods leverage controlled heating to



elevate soil temperatures, promoting the effective removal or degradation of hazardous substances. Our heating products help facilitate the release of contaminants from the soil, allowing for their capture or destruction. By integrating thermal heat into the environmental clean-up of the ground, TUTCO Farnam solutions are helping pave the way for efficient and sustainable approaches to soil remediation through electrification and decarbonization.

As a process heat provider for environmental applications, TUTCO Farnam recognizes the expanding role of electrification in our world. With our history of performance and unwavering reliability, TUTCO Farnam heating solutions have become indispensable tools for environmental companies addressing challenges posed by pollutants in diverse mediums.

[READ MORE ON ELECTRIFICATION](#)

Feature Application

Electric Heaters Used in Air Scrubbers

In the world of industrial air pollution control, air scrubbers play a pivotal role in ensuring environmental compliance and worker safety. Traditionally relying on gas-fired heat sources, the shift towards electric heaters is rapidly gaining momentum, spearheading a new era of enhanced control and reduced carbon footprints.



Similar to thermal oxidizers, air scrubbers are designed to eliminate hazardous air pollutants and volatile organic compounds from industrial air streams. The adoption of electric heaters,

exemplified by TUTCO SureHeat's cutting-edge family of process heaters, ensures precise and efficient destruction of contaminants and a cleaner and more sustainable industrial environment.

Their low-profile design and construction of TUTCO SureHeat process heaters, like our Jet, Max and Max HT heaters, minimizes airflow obstruction, translating to minimal pressure drop and making them

an ideal choice for systems relying on low-pressure blowers. With the capability to efficiently heat air to temperatures as high as 1652°F (900°C), these electric heaters offer unparalleled performance.

One of the key advantages of our process heaters is the seamless integration into diverse applications. These heaters are compatible with suitable flexible duct or pipe fittings, ensuring versatility in their application. Whether employed in air scrubbers for chemical processing plants or manufacturing facilities, the adaptability of electric heaters contributes to streamlined operations and enhanced efficiency.

The transition from traditional heat sources to electric heaters not only enhances control but also addresses the issue of unnecessary energy consumption. TUTCO SureHeat's commitment to sustainability is evident in this shift, as electric heaters offer a more energy-efficient solution, ultimately reducing waste and minimizing the environmental impact.

[READ MORE ON TUTCO SUREHEAT](#)

Stainless Steel Temperatures and Colors

by Ian Renwick



Stainless steel and its related superalloys are exceptional materials known for their resistance to rust, particularly when operating at room temperature or below. However, their resistance to oxidation diminishes when exposed to heat, although they still exhibit impressive resistance. This is why stainless steel and incoloy are preferred materials for the outer sheaths of our heater product lines.

When subjected to heat, the outer layer of our heaters' material oxidizes as the iron combines with oxygen from the surrounding air. This oxidation process, commonly known as rust, can be advantageous. As stainless steel oxidizes, its surface changes color, providing a visual indication of the temperature it has reached.

Here's a table illustrating the color changes stainless steel undergoes at various temperatures:

| Stainless Steel Color | Temperature |
|------------------------------|--------------------|
| Pale Yellow: | 550°F |
| Straw Yellow: | 650°F |
| Dark Yellow: | 700°F |
| Brown: | 750°F |
| Purple Brown: | 800°F |
| Dark Purple: | 850°F |
| Blue: | 1000°F |
| Dark Blue: | 1100°F |

At around 500°F, a shiny stainless steel surface will retain some shine, but beyond this point, the colors become matte.

Chromium, present in all stainless steels and incoloy, plays a crucial role in preventing oxidation. The higher the chromium content, the lower the rate of oxidation. For example, 316 stainless steel, with a lower chromium percentage, oxidizes faster than incoloy, which has a higher concentration of chromium. The amount of nickel in the alloy also influences the adhesion of the oxide layer to the underlying metal.

Unfortunately, cyclic heating, characterized by repeated on-off cycles, can crack the protective oxide layer due to thermal expansion and contraction, exposing the underlying surface to additional oxidation. This emphasizes the importance of monitoring color changes in heaters to identify potential issues.

Different spots of discoloration on heaters indicate variations in temperature, which may result from obstructions or irregularities in the application setup. Understanding these color changes can help identify and address potential issues before they escalate.

In one notable case, a customer brought a cartridge heater with a black spot along its length, indicating localized overheating. Upon investigation, it was discovered that the black spot aligned perfectly with a screw hole in their sealing bar, resulting in insufficient metal around the heater. This incident underscores the importance of interpreting discoloration in stainless steels and related alloys to troubleshoot heating issues effectively.

In conclusion, the discoloration of stainless steels and their related alloys serves as a valuable diagnostic tool in identifying and resolving heating issues, providing crucial insights for maintaining optimal performance and efficiency in heating applications.

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An Eye-Popping Heating Solution from TUTCO



TUTCO Heating Solutions Group found itself at the forefront of innovation when a customer, grappling with a challenge in the design of their large popcorn kettles, turned to us for a solution. The challenge lay in the intricate arrangement of multiple cast ring heaters within the kettles used in their popcorn production which, while effective, lacked the uniformity required for optimal popcorn popping. Seeking an alternative that could offer both versatility and efficiency, the customer approached TUTCO for a heating solution designed specifically for their application.

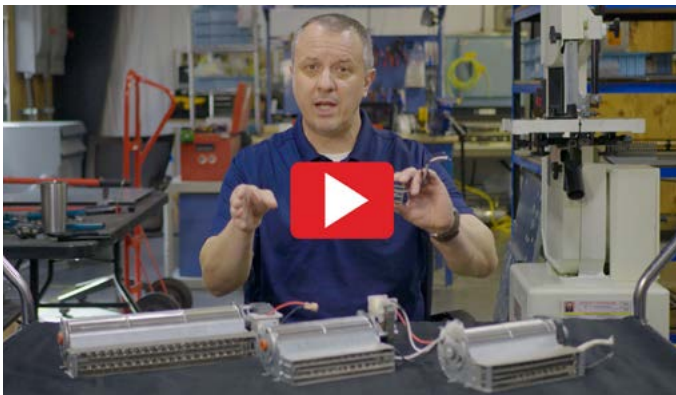
TUTCO engineers developed a solution that would surpass the limitations of conventional cast heaters with the wedge-shaped HT Mica Strip heater, a unique heater tailored to meet the customer's exact specifications. This innovative heater boasted a design meticulously crafted to cover a substantial portion of the kettle's bottom surface, strategically dividing the heating element into six distinct segments. By doing so, TUTCO ensured that heat distribution was not only uniform but also optimized for the task at hand. The implementation of this heater offered unparalleled efficiency and consistency in heat distribution. As a result, the customer experienced a dramatic improvement in their popcorn production process, with each kernel receiving the precise amount of heat needed.

Innovation, coupled with a relentless commitment to customer satisfaction, allows TUTCO to solve even the most complex heating challenges. The wedge-shaped HT Mica Strip heater used in this popcorn kettle application is just one more example of TUTCO thinking outside the box.

[MORE THINKING OUTSIDE THE BOX](#)

Feature Video

TUTCO Farnam's Crossflow Blower Heaters



The Crossflow Blower Heaters (CB Series) are engineered for maximum design flexibility and top-tier heating performance. In this month's feature video, learn all about these heaters commonly used in industrial, commercial and residential applications. What sets the CB Series apart is its dual functionality; it can function as both an exhaust heater and a stand-alone duct heater, thanks to multi-purpose mounting brackets that allow the heaters to seamlessly attach to the exhaust of a crossflow blower without the need for extra accessories. Available in various wattage and voltage combinations, with integrated over-temperature protection, these heaters are available in standard lengths ranging from 5" to 15".

[WATCH THE VIDEO](#)



TUTCO Farnam
30 Legend Drive
Arden, NC 28704
sales@farnam-custom.com
828.684.3766

TUTCO SureHeat
22 Industrial Drive
Exeter, NH 03833
support@tutcosureheat.com
603.418.7662

TUTCO Conductive
500 Gould Drive
Cookeville, TN 38506
customerservice@tutco.com
931.432.4141