TUTCONNECT

INSIDE THIS ISSUE

TUTCO Farnam excels in developing custom heat and control solutions for unique applications.

At TUTCO Farnam, every custom heater design is more than a solution—it's an opportunity to innovate. With over 2,000 unique designs, our commitment to engineering precision drives continuous advancement in heating technology. Each project challenges us to push boundaries, refine performance, and create smarter, more efficient solutions.

Some customers come to TUTCO Farnam simply for a heater. They just want to take air or a non-combustible gas flow from one temperature to another. That's why we offer standard products. Some customers want to control their heat—they want a simple plug-and-play solution with a high setpoint limit and some degree of communication. For them, we offer standard control products.

The fun for us really begins when a customer wants a custom solution. That's where TUTCO Farnam truly excels. About 80% of what we do involves custom solutions. In many cases, our standard products grew out of innovations we developed through custom solutions. Within the boundaries of science and math, we look at what can we do to push the limits and create a solution tailored specifically for your application?

Can we curve a heater? Can we make a heater longer instead of wider? Once we know the available space, we can adapt the heater to fit that space and deliver the performance you require. Maybe you want a plug-and-play assembly. If you're not comfortable handling a heater or lack the knowledge to work with it, you could damage it. In that case, we can create the entire assembly and place it in a plastic or metal enclosure. When it arrives at your facility, it's configured exactly the way you wanted—ready to use. Sometimes we need to adapt one of our existing designs or create a new one based on your process and the environment your heater must operate in. Maybe there are components within your process that we've never worked with before, and we need to adapt to make everything function together. Maybe your custom control needs to be outdoor-rated. Maybe you need a VFD to control your blower, or a valve that opens when the heater hits a specific setpoint. We can absolutely do all of those things.

When we meet with you and listen to your challenges, we're thinking about how we can evolve our products or develop new ones to provide you with the best solution for your application. Maybe you need a custom heater, custom controls, and a blower. Maybe you want a fully enclosed plug-and-play setup, or a skid-mounted solution that bolts to the ground when it arrives at your facility. Sure—why not? We can do all of those things.

Do we know what our next custom heater is going to look like? Probably not. We haven't talked to you yet. By listening, learning, and applying new insights, we don't just meet customer needs—we shape the future of process heating. Give us a call.

More on Custom Solutions

Heat Transfer: Conduction, Convection, and Radiation in Everyday Experiences

by Ian Renwick

Heat transfer is a fundamental concept in physics that describes the transfer of thermal energy from one body to another. There are three primary modes of heat transfer: conduction, convection, and radiation. In this article, we will delve into a brief explanation of each phenomenon (no math involved) and provide examples of how they can be experienced in everyday life.

Conduction

Conduction is the transfer of heat energy through direct contact between objects. This process occurs when there is a temperature difference between two materials in physical contact. The rate of heat transfer depends on the temperature difference, the area of contact, and the thermal conductivity of the materials involved.

Convection

Convection is the transfer of heat energy through the movement of fluids. Be it hot air or a liquid, heat is transferred from a moving fluid that carries heat from one place to another. That movement can occur through the change in

buoyancy of the heated fluid (such as hot air rising) or by forcing the fluid over another object. Those types of convection are called natural and forced convection, respectively.

Example: Regarding everyday examples of conduction and convection, here's a good example that combines both methods into one. Imagine you're a small child holding your hand over the kitchen stove that's just been used. You can feel the warm air rising from the stove. You probably didn't think of it as air rising, but just that it feels warm. As you lowered your hand, moving it closer to the stove, it got a little hotter and hotter. "Hey, that's neat," your young, inquisitive mind thought. You brought your hand ever closer until you accidentally touched the stove and "Ouch, that hurts", throwing your hand away from the stove, after quite possibly having burned yourself. What you experienced was convection initially, followed by conduction. That conduction was instantly painful and demonstrated how much faster conductive heat transfer occurs than convective. You probably didn't think of it that way at the time, but you experienced two types of heat transfer in very short order.

Radiation

Radiation is a different animal altogether and doesn't rely of molecular movement like conduction or convection do. It consists of the transfer of heat energy through electromagnetic waves which occur when a body emits thermal radiation. The rate of heat transfer depends on the temperature of the body and its emissivity, which is a function of the surface properties of the material emitting and absorbing the radiation. If you want to get technical, everything emits radiation that is above absolute zero (the coldest temperature there is [0 K, -273.15° C or -459.67° F]). Even a piece of dry ice emits thermal radiation, but the net radiation it receives is positive because it receives a lot more radiation from its surroundings than it emits. Electromagnetic radiation is common to all of us. Everything we see gets to us via electromagnetic radiation (light). Radio and TV waves are electromagnetic radiation but at different wavelengths. X-rays, ultraviolet radiation, gamma rays and microwaves (that you heat food with) are all forms of electromagnetic radiation too. Collectively they make up the electromagnetic spectrum. The only difference between them all is that they are at different wavelengths. The wavelength not mentioned yet is the infrared, which exists in the wavelength range of 700 nm (nanometers) to 1 mm (millimeter). The infrared range starts where the color red in the visible spectrum ends.

Here's the odd part: none of the wavelengths in the electromagnetic spectrum need anything to 'carry' them from one place to another. They are perfectly at home in a vacuum. As the name suggests, the electromagnetic spectrum consists of electrical waves and magnetic waves fluctuating perpendicularly to each other in the direction of travel. It's a good thing they work in a vacuum, otherwise, heat from the sun would never reach the earth and provide the heat we need to live. Standing outside and feeling bright sunlight hit your face is an example of radiation heat transfer. Step into the shade and you can feel the temperature drop immediately, which is because you've greatly reduced the amount of infrared radiation you're receiving.

It gets more interesting with the electromagnetic spectrum. All those types of radiation get from one place to the other at the speed of light. Light rays (obviously), radio and TV signals, X-Rays, microwaves and all the others travel at the speed of light, including infrared.

Example: The best example of this is when the author was attending a stunt show at Universal Studios Hollywood. The show consisted of several large fiery explosions. It was amazing that as soon as you could see a big explosion, you instantly felt the heat wash across your face and body. You saw and felt them at the same time. The image of the explosion and the infrared heat both traveled at the speed of light.

To wrap it all up, conduction, convection and radiation are the three types of heat transfer and you can feel them in everyday activities if you know what to look for.

Read More Ask Ians

Who We Are – Doing More and More with New Additions

Last month, we looked at some of the history of TUTCO from its humble beginnings to its growth into many more markets and technologies. Over the years TUTCO has bolted on many other companies with mergers and acquisitions. Here are some of the highlights:

1969 H.W. Tuttle Company was purchased by Gould. This led to the move from Michigan to Tennessee in 1972.

1976 While still under the Gould name, they purchased Ceil-Heat in Knoxville, TN adding a line of duct heaters.

1978 The TUTCO name was born when the company was acquired by Adams Industries.

1986 TUTCO purchased E.R. Wagner Manufacturing Company which was another electric heater manufacturer.

1990 Established the Packaged Heat Division which supplied more than just heating elements, it supplied an entire heater package with additional structure, controls and wiring along with installation kits and other value-added solutions for the Commercial HVAC industry. At this time TUTCO added the second manufacturing plant in Cookeville, TN. At that time, they were supplying Duct Heaters under the TUTCO name and the Electric Heaters Inc. name.

1994 TUTCO was purchased by Smith's Industries but continued to operate under the TUTCO name. At this time TUTCO was the world leader in Open Coil Heating Element Technology for the Appliance (Primarily Laundry) and the HVAC (Residential and Commercial) industries.

2007 TUTCO acquires Farnam Customer Products located in Arden, NC. This was the beginning of TUTCO being in Industrial process heating.

2008 TUTCO opened a manufacturing facility in Chang Shu, China. TUTCO purchased the heating elements division of Fast Heat in Elmhurst, IL, adding another industrial process heater division.

2014 TUTCO purchased BTU Electric Heaters, a duct and HVAC heater supplier.

2017 TUTCO purchased the Osram Sylvania Inc process Heat Division and rebranded it as TUTCO SureHeat and kept it in Exeter, NH. This added the third industrial process heater division.

2024 TUTCO purchased Wattco of Canada to add yet another industrial process heater division.

TUTCO also purchased Wing Industries (Draft Inducers and other HVAC Products) in 1979 and later sold it in 1987 which formed the Wing Draft Inducer company with the TUTCO company which then purchased Whitty Blower in 1989. TUTCO also purchased Aerosonics (sound attenuation products) in 2000. These companies were later sold to focus on our core business of electric heat.

Next month, we look at our capabilities within all the TUTCO Divisions.

More Thinking Outside the Box

FEATURE INDUSTRY

Laboratory Solutions

TUTCO Heaters provide the necessary heat used in laboratory applications

In laboratory settings, whether it's preparing samples, maintaining precise incubation conditions, or carrying out sterilization, precise heat plays a vital role. At TUTCO, we specialize in designing and manufacturing custom heating solutions that meet the exacting standards of modern laboratories.

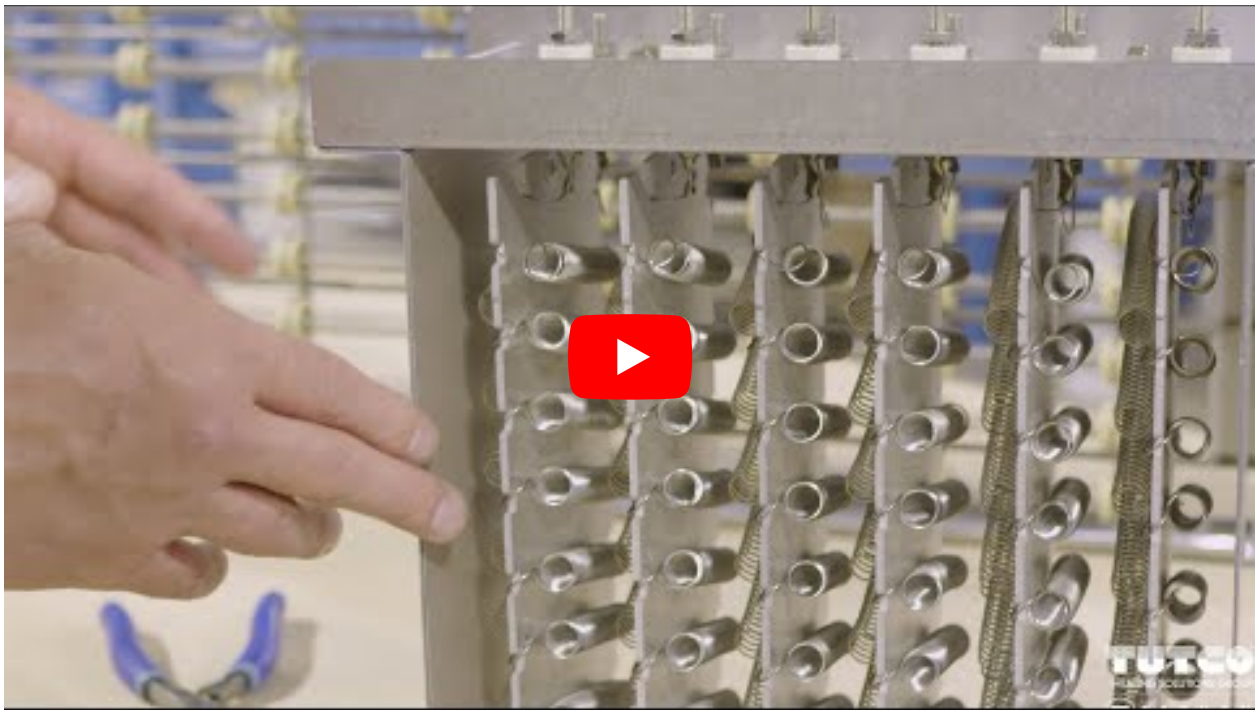
Our heaters are found in a wide range of lab equipment—from hot plates and ovens to cryogenic chambers and bath heaters. TUTCO solutions are used to heat air, nitrogen, and other inert gases in critical applications that involve hot or warm air circulation, drying, and dehumidification. In life science labs especially, our technology supports vital processes like sample prep, sterilization, and incubation.

TUTCO works directly with OEMs to build custom heaters that fit specific requirements. Whether it's a standard heater for a basic application or a custom heater for a more complex application, we develop solutions that meet the exacting needs of our clients. TUTCO heaters are used across the world in everything from lab washers and drying racks to specialty instruments and temperature-controlled storage systems. Our components help labs achieve repeatable results by delivering stable, accurate heat exactly where it's needed.

With decades of experience and a deep understanding of laboratory applications, TUTCO has developed a reputation for heating solutions designed to perform under the high-pressure demands of scientific research and

testing environments.

More Industries and Applications



FEATURE VIDEO

Custom Heater Evolutions

TUTCO Farnam standard products often evolve into custom solutions for OEMs needing a unique heater for their application. In this video, we explore custom duct heaters designed not for HVAC, but for process applications. From traditional duct heaters customized for use in shrink tunnels and environmental control units to more robust open-coil mica solutions used for dehumidification, these heaters represent an evolution of our standard products. If you have a unique need, we can create a custom product to meet your requirements.

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