TUTCONNECT

INSIDE THIS ISSUE

The Importance of Thermocouples and Flow Switches

Specifying the right heater involves more than just choosing a model. Key considerations like flow, pressure, desired temperature rise, and the available space for installation all play a critical role in ensuring optimal performance. At TUTCO Farnam, we have a wide range of configurable heating products where you are able to select your watts, your volts, and perhaps your lead lengths. Some items also allow you to select stacks and fuses. All of these things are customizable to your specific application. But, how do you know where to start when you begin configuring a heater?

If you're not sure where to begin, the Determine Your Heater tool on our website is a great place to start. By entering in a few key parameters—like your flow rate, pressure, and the temperature—you can start to get a clearer idea of what heating solution will work for your application. Once you've narrowed it down, you can customize things like wattage, voltage, or even lead lengths to fit your exact needs.

Efficiency is another factor to keep in mind. If you're looking at one of our Flow Torch™ heaters, you can add an insulation blanket to make it more energy-efficient. It's a small upgrade that can lead to significant savings over time. Read our blog on the efficiencies of insulation blankets here . And if you're working in an environment where safety is a concern—like when operators need to work close to the heater—our Cool Touch heaters are a ideal option. With their triple-pass design, the heater's exterior stays cool, reducing the risk of accidental burns and also protecting other system components. Even small details, like lead wire length, can make a big difference when configuring your heater. Think of it like going to the barber—it's easy to take more off, but you can't put it back on. So, if you think you need 6" of lead wire, order 8". It can make your like a whole lot easier.

For applications with crossflow blower heaters or axial fan heaters, our website also offers convenient calculators that take the guesswork out of figuring out wattage. We've already set theses calculators at 85% efficiency to give you a little padding. And don't overlook safety features like stats or fuses—adding a fuse for just $2 is a simple way to protect your system and give you peace of mind.

Perhaps you just need to heat up compressed air a little bit and you don't want the hassle of dealing with a controller. Our TPC 1500 and TPC Cash products are plug-and-play solutions with built-in controls. These plug-and-play solutions come with built-in controls and are often available in-stock for quick shipping.

As you can see, there are lots of options when it comes to selecting and configuring the right heater for your application. TUTCO Farnam has taken all of the guess work out of the process by providing the tools and resources to guide you through the process. To get start, visit our website at farnam-custom.com.

Configure Your Heater

Unusual Units of Measure

by Ian Renwick

There are many unusual, mostly unknown, and sometimes silly units of measure that exist. Some are used in specific fields of interest, and some are obsolete or too foolish to be taken seriously. Here's a list of some of the more interesting ones. Many might have some experience with the Scoville, but never knew how to quantify it.

The Mho: The unit of conductance, which is the inverse of resistance. The reader will notice that mho is ohm spelled backward. It gets a bit weirder still. The symbol of a mho is ℧, the Latin letter upsilon, which is an upside-down omega symbol. 1℧ = 1 / 1Ω.

If you have something measuring 5Ω of resistance, that's the same as saying it has 0.2℧ of conductance. If you have something else measuring 0.01Ω of resistance, that's equivalent to 100℧ of conductance. That all makes sense; the lower the resistance, the higher the conductance. The mho was renamed in 1881 to the Siemens, which is both singular and plural.

The Shake: In physics, it's 10 nanoseconds or 10 billionths of a second and is used to measuring nuclear reactions.

The Jiffy: In computer science, a jiffy is the time of one computer clock cycle or about 10 milliseconds. In quantum physics, however, a jiffy is the time it takes for light to travel one fermi, which is approximately the size of a nucleon (a neutron or a proton, which are about the same size). One fermi is 10−15 meters, so a jiffy is about 3×10−24 s or 0.000000000000000000000003 seconds. That's quick.

The Garn: This unit of measure is used by NASA to measure nausea and travel sickness caused by space adaptation syndrome. Suffering from one garn means the sufferer is completely incapacitated by nausea.

The Galactic Year: This is the duration of time required for the Sun to orbit once around the center of the Milky Way Galaxy. One galactic year is approximately 225 million Earth years. As a side note, the Solar System is traveling at an average speed of 514,000 mph along its trajectory around the galactic center. That speed is approximately 1/1300 of the speed of light, relative to the center of the galaxy. For anyone interested, at the center of Milky Way Galaxy is an enormous supermassive black hole named "Sagittarius A*" with a mass about 4 million times that of the sun. That's what's holding us all together!

The Dol: The dol is a unit of pain. It's from the Latin "dolor", meaning "pain or grief". One dol is defined as a "barely noticeable difference" in pain. The maximum pain a human can tolerate is about 11 dols.

The Grave: This is from Latin, meaning gravity or heavy. This was the original name first proposed for a kilogram in 1793. It didn't stick around for long as it was changed in 1795 to the kilogram.

The Light-Nanosecond: Similar to a light year that's the distance light travels in a year, a light-nanosecond is the distance light travels in a billionth of a second, which is 29.9 centimeters or 11.77 inches. I don't think it's used seriously.

Scoville = The measure of the hotness of something in terms of spiciness as the concentration of capsaicinoids. The actual unit is an SHU, meaning Scoville Heat Unit. It is named after American pharmacist Wilbur Scoville who devised this very subjective scale in 1912. The bell pepper is at the bottom of the scale at 1 SHU.

Some other 'hotnesses' are:
Jalapeno Pepper - about 8,000 SHU
Habanero Pepper - about 275,000
SHU Ghost Pepper - about 1 million
SHU Carolina Reaper Pepper - about 2.2 million SHU

For fans of hot wings (and those that might want to brag), here's a helpful scale of wing hotness:
Mild - 10,000 SHU Medium - 10,000 - 30,000 SHU
Caribbean Jerk - 30,000 - 60,000 SHU
Wild - 50,000 - 90,000 SHU
Mango Habanero - 100,000 - 180,000 SHU
Blazin' - 200,000 - 350,000 SHU

Briefly, there are lot of other units of measure that are interesting, funny, and just plain silly.

The Ligne - used to describe button sizes
The Hand - defined as 4 inches, so there are 3 hands to a foot
The Sagan - defined as at least four billion of something (named after Carl Sagan)
The Beard Second - Yes, it's the distance a beard grows in a second. How silly!
Ohnosecond - This is the time it takes to realize you've done something very wrong, like irrevocably deleted a file you shouldn't have or sent an email to the wrong person.
The Thaum - This one is totally fictional as it's a unit of magic. Specifically, it's the amount of magic needed to create one small white pigeon or three normal sized billiard balls!
The Hobbit - (so they DO exist) is an old unit used in Wales that is a volume equal to 2.5 bushels, where one bushel is (or was, to be correct) the volume of 8 dry gallons, like wheat or some other grain.
The Metric Foot - (the what?)
The Smoot - This is an interesting unit of length. Look it up. It's still in use today, but only in one very specific location.

There are many more unusual and strange units of measure to discover. A brief on-line search will keep you entertained for a good while.

Read More Ask Ians

Flat Out Heat!

The Flat Bar Tubular Heaters are one of the newest product lines for the Tutco Conductive Group but are undoubtedly among the most versatile. These tubular elements are not round in diameter, as most tubular elements are, but have been flattened to generally measure 1 inch wide by 0.275 inches thick (other widths and thicknesses may be available—consult the factory for details). They are available in a variety of shapes and lengths, with bends possible along both the width and the length, enabling basic or uniquely complex forms. This makes them ideal for fitting into unusual situations or covering larger areas of a platen or surface that needs heating. They can be used in conductive applications, fluid heating applications, and air heating applications.

In conductive applications, they are used to heat a variety of platens, vessels, and surfaces. They offer solutions that a standard strip heater often cannot provide due to the extensive customization options available with forming in virtually any direction. While most strip heaters are limited to a long, straight shape, flat bar tubular heaters can be formed to follow almost any path, from simple down-and-back designs to more intricate, multi-directional configurations. Multiple flat bar heaters can even be nested together to heat large surfaces. Additionally, they can be sealed for use in damp and wet environments.

Flat Bar Tubular Heaters are also effective for heating fluids, such as cooking oil in fryers. This is a common application where they excel due to their large surface area for efficient heat transfer and the versatility offered by various forming options. They also have the advantage of being submersible—except for the termination end—when designed for submerged applications. These features make them a reliable choice in the food service industry.

They are equally effective for heating air in a wide range of applications and industries, including industrial environments. Fins can be added to improve heat transfer to the air flowing across the elements, and the larger surface area allows for greater heat output in a given application.

If you give us the chance to review your unique applications, we can supply you with a flat bar tubular heater or one of the many other types of heaters we manufacture to meet your needs. Please give us the opportunity to assist you with all your electric heating requirements.

More Thinking Outside the Box

FEATURE PRODUCT

SureHeat Hot Air Tools

When it comes to precision heating, the TUTCO SureHeat Hot Air Tool is an ideal solution. Designed with reliability and performance in mind, this heater is perfect for industries that require accurate temperature control and durability. Whether in plastics, packaging, or any application that demands high-temperature precision, the SureHeat HAT excels.

At the heart of the SureHeat Hot Air Tool is its electric air heater with an integrated thermocouple for precise temperature regulation. This means you get consistent results, reducing the risk of overheating or damaging your materials. The compact and lightweight design makes it an excellent choice for single-phase OEM applications where space is limited but performance is essential.

Crafted from durable 304 stainless steel, the SureHeat Hot Air Tool is built to withstand tough environments. Its slotted design accommodates flared accessories, giving you added flexibility for various tasks. With the ability to handle pressures up to 60 psi (4 bar) and temperatures as high as 1400°F (760°C), this tool is a reliable solution for demanding jobs.

Top Features at a Glance

- Compact and Lightweight
- Integrated Thermocouple
- High Temperatures up to 1400°F (760°C)
- Efficient Airflow of 60 SCFH

Product Specifications

- Available in 120V and 240V versions.
- Made from high-quality 304 stainless steel.
- Minimum of 100ms for precise adjustments.
- Powered by compressed air lines for reliable performance.

To ensure your SureHeat Hot Air Tool remains in excellent condition and delivers peak performance, follow these tips: maintain proper airflow, use the potentiometer to gradually regulate the ramp-up time for AC voltage, and pair the tool with a temperature controller featuring a 100ms cycle time. The TUTCO SureHeat Hot Air Tool blends innovation, strength, and performance, making it ideal for both intricate tasks and larger projects. With its precision and reliability, the SureHeat Hot Air Tool is designed to elevate your heating applications and help you achieve exceptional results.

The TUTCO SureHeat Hot Air Tool combines innovation, strength, and performance. Whether you're handling intricate tasks or tackling larger projects, this tool offers the precision and dependability you need to get the job done right.

More on Hot Air Tools

FEATURE VIDEO

SFI Heater Used in Wind Tunnel Testing

At the forefront of innovation, Lawrence Livermore National Laboratory (LLNL) is leveraging advanced technology to explore the uncharted territory of hypersonic flight. Their Energy-Matter Interaction Tunnel (EMIT), a specialized wind tunnel, is pushing the boundaries of material testing under extreme conditions. Central to the success of this cutting-edge research is the TUTCO SureHeat Specialty Flanged Inline Heater. EMIT replicates the extreme conditions of hypersonic speeds—shear forces, pressure, and temperatures soaring into the thousands of degrees Celsius. To simulate these challenges effectively, precise heating is essential. The TUTCO SureHeat Inline Heater provides the controlled, high-temperature airflow required to mimic the catastrophic conditions materials face during hypersonic travel.

Our heater plays a pivotal role in LLNL's ability to analyze material performance under simulated insults such as shockwaves, high-velocity impacts, and chemical interactions. Its reliability and adaptability make it indispensable for EMIT's high-frequency testing, allowing researchers to conduct up to 20 runs in a single day—a pace previously unattainable in offsite facilities.

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