TUTCONNECT

INSIDE THIS ISSUE

TUTCO's Arsenal of Process Heating Solutions

At TUTCO Heating Solutions Group, one of the biggest advantages we offer our customers is the wide range of heating options available. We know every application is unique, which is why we offer a lineup that runs from ultra-compact to industrial powerhouse. Whether you're looking for a 50-watt heater the size of your thumb or a 5.4 megawatt heater the size of a small pickup truck, we've got you covered.

Let's say you need an open-loop air heater—no feedback required, but with precise heating capabilities up to 1600ºF. The TUTCO SureHeat Series line of air heaters is ideal. These heaters are perfect for applications where pinpoint accuracy at the heater exit is essential. On the other hand, if you still need an open-ended exhaust but require feedback—some way to monitor temperature for accuracy—our SureHeat Hot Air Tool, commonly referred to as HAT, is a great fit. These can handle exhaust temperatures up to 1400ºF and includes a built-in thermocouple and a port for your compressed air line.

If your setup involves heating a small volume of compressed air but you need threaded fittings, our TUTCO Farnam Heat Torch™ products are a great choice. These are available from a compact half-inch model to a 12.5 kilowatt version, with exhaust temps up to 1300ºF. Heat Torch™ heaters are available with a variety of fitting options, and you can specify one or two thermocouples and leads to whatever link you would like. For a triple-pass heaters, check out Farnam's Cool Touch™ line or SureHeat's Serpentine products.

For those needing more power—beyond 12 kilowatts—the SureHeat Jet and Max heaters offer wattages up to 36 kilowatts with even higher temperature capabilities. And if your priority is moving a higher volume of air at relatively low pressures, such as 2 psi, the Farnam Flow Torch™ family has you covered. These models range from 2" to 8" in diameter and can reach up to 75 kilowatts and 2000 SCFM.

Now, maybe you're somewhere in the middle. You need 18 kilowatts of power, but your system runs at 150 psi. Our SureHeat Threaded Inline Heaters are available in a couple of varieties. They're capable of handling up to 1400ºF and flows up to 135 SCFM.

After all of that, if you still can't find exactly what you're looking for, we're still not out of options. Our team specializes in designing custom heating solutions that solve unique, and often critical, challenges. Whether you need an off-the-shelf product or something tailor-made, the TUTCO Heating Solutions Group is ready to deliver the right solution for your specific heating application.

TUTCO SureHeat | TUTCO Farnam

Heater	Max Power	Max Temp	PSI
SureHeat			
Series	2.05 kW	1600ºF	60
Hot Air Tool	3.5 kW	1400ºF	60
Threaded Inline	8 kW	1400ºF	150
Serpentine	8 kW	1500ºF	25
Jet	8 kW	1400ºF	60
Max	18 kW	1400ºF	60
Max HT	36 kW	1652ºF	60
Farnam			
Heat Torch™	12.5 kW	1300ºF	120*
Cool Touch™	12.5 kW	1300ºF	120*
Flow Torch™	75 kW	932ºF	3*

* with minimal leakage

Unit Conversion: An Easy Way To Do It

by Ian Renwick

Unit Conversion is a good skill to have, whether you're solving a science problem, planning a trip or just need to compare numbers of two different measurement systems. Converting numbers can be as simple as using a single conversion factor or might get trickier when having to use multiple ones.

In this month's article, we'll start with a simple conversion factor example and move onto more difficult ones.

One thing to keep in mind. Anytime you multiply your number by a conversion factor, you're actually just multiplying it by one.

Here's the first example: If you have something 2 inches long and want to convert it to millimeters, the standard method is to multiply it by 25.4.
Like this: 2 in x 25.4mm/in = 50.8 in.mm/in = 50.8 mm That's simple enough, but to help keep the units clearer, it can be rewritten like this:

$$\frac{2\text{ in}}{} \times \frac{25.4\text{ mm}}{1\text{ in}}$$

It's not a bad idea to drop the multiplications signs because they can get in the way if a conversion gets long. Just remember that you have to multiply everything on the top together and everything on the bottom too.

$$\frac{2\text{ in} \mid 25.4\text{ mm}}{\mid 1\text{ in}}$$

The same units that are on top and bottom cancel each other out, so you end up with this:

$$\frac{2\text{ }\cancel{\text{in}} \mid 25.4\text{ mm}}{\mid 1\text{ }\cancel{\text{in}}} = 50.8\text{ mm}$$

It looks a bit cumbersome performing the conversion like this, and it should. When only a simple conversion factor is needed, you don't need to go to this much effort. But it's a very useful method if you've got a lot of units to consider.

Looking at a different example, let's say you want to convert 72 inches to yards, but you can't remember how many inches are in a yard, but you do know the number of feet in a yard and inches in a foot.

The conversion would look like this:

$$\frac{72\text{ in}}{} \times \frac{1\text{ foot}}{12\text{ inches}} \times \frac{1\text{ yard}}{3\text{ feet}}$$

or simply:

$$\frac{72\text{ in} \mid 1\text{ ft} \mid 1\text{ yd}}{\mid 12\text{ in} \mid 3\text{ ft}}$$

You check yourself by looking at each column and making sure they equal 1. Does 1 foot = 12 inches? Yes. Does 1 yard = 3 feet. Yes. We're good to go.

When operating this way, the cancellation of units above and below the horizontal line is critical. First, we see that there's an inch unit above and below the horizontal line, so they get canceled.

$$\frac{72\text{ }\cancel{\text{in}} \mid 1\text{ ft} \mid 1\text{ yd}}{\mid 12\text{ }\cancel{\text{in}} \mid 3\text{ ft}}$$

Next, we see that there's a foot unit above and below the line so they get canceled too.

$$\frac{72\text{ }\cancel{\text{in}} \mid 1\text{ }\cancel{\text{ft}} \mid 1\text{ yd}}{\mid 12\text{ }\cancel{\text{in}} \mid 3\text{ }\cancel{\text{ft}}}$$

You can see here that the only unit left is yards. So now multiply the top value and the bottom values, combine their units and divide them. This is a really simple example so there's no combining of units.

$$\frac{72\text{ }\cancel{\text{in}} \mid 1\text{ }\cancel{\text{ft}} \mid 1\text{ yd}}{\mid 12\text{ }\cancel{\text{in}} \mid 3\text{ }\cancel{\text{ft}}} = \frac{72\text{ yd}}{36\text{ ft}} = 2\text{ yards}$$

So 72 inches = 2 yards. We knew that going into this, but it's good to see how the method works.

Let's get a bit more complicated.

We want to convert 1200 feet / sec to miles per hour. Imagine we can't remember how many seconds are in an hour, so we do it like this with intermediate units that cancel themselves out.

$$\frac{1200\ \text{ft}}{1\ \text{sec}} \left| \frac{1\ \text{mi}}{5280\ \text{ft}} \right| \frac{60\ \text{sec}}{1\ \text{min}} \left| \frac{60\ \text{min}}{1\ \text{hr}} \right.$$

Besides the first one, every column there has a value of one.

Canceling units and multiplying gives us this:

$$\frac{1200\ \cancel{\text{ft}}}{1\ \cancel{\text{sec}}} \left| \frac{1\ \text{mi}}{5280\ \cancel{\text{ft}}} \right| \frac{60\ \cancel{\text{sec}}}{1\ \cancel{\text{min}}} \left| \frac{60\ \cancel{\text{min}}}{1\ \text{hr}} \right. = \frac{4320000\ \text{mi}}{5280\ \text{hr}} = 818.182\ \text{mi/hr (or mph)}$$

Remember, make sure that every column equals one and you'll be good to go. What happens if you get one of the columns upside down like this?

$$\frac{1200\ \text{ft}}{1\ \text{sec}} \left| \frac{1\ \text{mi}}{5280\ \text{ft}} \right| \frac{1\ \text{min}}{60\ \text{sec}} \left| \frac{60\ \text{min}}{1\ \text{hr}} \right.$$

Though the third column is equal to one, it's upside down because the units are in reversed position. You would try to cancel the units and end up with this mess.

$$\frac{1200\ \cancel{\text{ft}}}{1\ \text{sec}} \left| \frac{1\ \text{mi}}{5280\ \cancel{\text{ft}}} \right| \frac{1\ \text{min}}{60\ \text{sec}} \left| \frac{60\ \text{min}}{1\ \text{hr}} \right.$$

resulting in:

$$\frac{1200\ \cancel{\text{ft}}}{1\ \text{sec}} \left| \frac{1\ \text{mi}}{5280\ \cancel{\text{ft}}} \right| \frac{1\ \text{min}}{60\ \text{sec}} \left| \frac{60\ \text{min}}{1\ \text{hr}} \right. = \frac{20\ \text{mi}\cdot\text{min}^2}{316800\ \text{hr}\cdot\text{sec}^2} = 0.00006313\ \text{mi}\cdot\text{min}^2/\ \text{hr}\cdot\text{sec}^2$$

Oh boy! Something went wrong, very wrong. That tells you it's time to go back and check your work. Something (at least one thing) must be upside down! It can get a bit trickier with units that are squared or cubed:

Converting a density of 500 lbs/ft³ to g/cm³ might appear as a challenge but just write everything out in single units and you'll be OK. Do this first, before you begin:

$$\frac{500\ \text{lbs}}{1\ \text{ft}^3} = \frac{500\ \text{lbs}}{1\ \text{ft}} \left| \frac{1}{1\ \text{ft}} \right| \frac{1}{1\ \text{ft}}$$

That is the way of breaking apart that cubic foot unit into individual feet because it's much easier to convert feet to inches and then to centimeters instead of cubic feet to cubic inches and then to cubic centimeters. Who on earth remembers that there are 1728 cubic inches to a cubic foot? Now, since I don't know how many centimeters are in a foot, this is going to take quite a few steps.

$$\frac{500\ \text{lbs}}{1\ \text{ft}} \left| \frac{1}{1\ \text{ft}} \right| \frac{1}{1\ \text{ft}} \left| \frac{1\ \text{kg}}{2.2\ \text{lbs}} \right| \frac{100\ \text{g}}{1\ \text{kg}} \left| \frac{1\ \text{ft}}{12\ \text{in}} \right| \frac{1\ \text{ft}}{12\ \text{in}} \left| \frac{1\ \text{ft}}{12\ \text{in}} \right| \frac{1\ \text{in}}{2.54\ \text{cm}} \left| \frac{1\ \text{in}}{2.54\ \text{cm}} \right| \frac{1\ \text{in}}{2.54\ \text{cm}}$$

A B C D E

Section A is the number that needs to be converted, section 'B' converts pounds into kilograms, section 'C' converts kilograms into grams, section 'D' converts feet into inches, and section 'E' converts inches into centimeters.

Canceling units looks like this:

$$\frac{500\ \cancel{\text{lbs}}}{1\ \cancel{\text{ft}}} \left| \frac{1}{1\ \cancel{\text{ft}}} \right| \frac{1}{1\ \cancel{\text{ft}}} \left| \frac{1\ \cancel{\text{kg}}}{2.2\ \cancel{\text{lbs}}} \right| \frac{100\ \text{g}}{1\ \cancel{\text{kg}}} \left| \frac{1\ \cancel{\text{ft}}}{12\ \cancel{\text{in}}} \right| \frac{1\ \cancel{\text{ft}}}{12\ \cancel{\text{in}}} \left| \frac{1\ \cancel{\text{ft}}}{12\ \cancel{\text{in}}} \right| \frac{1\ \cancel{\text{in}}}{2.54\ \text{cm}} \left| \frac{1\ \cancel{\text{in}}}{2.54\ \text{cm}} \right| \frac{1\ \cancel{\text{in}}}{2.54\ \text{cm}}$$

And multiplying it all together results in:

$$\frac{500000\ \text{g}}{62297\ \text{cm}^3} = 8.03\ \text{g/cm}^3$$

Sure, you could write that as 8.03 g / cm.cm.cm but it's customary to write them with an exponent that matches the number of instances, i.e. cm.cm = cm^2 and cm.cm.cm = cm^3.

That means that if you had a 1 cubic foot of stainless steel weighing 500 lbs and cut a cubic centimeter from one of the corners you would know, with confidence, that it weighs 8 grams. Why you would ever want to do that, I have no idea.

To summarize:
The basic steps to modifying units associated with a number are as follows:

- If you have a simple conversion factor to get from one unit to another, use it
- If you have squared or cubed units associated with your starting number (or even 4th or 5th powers), split them apart as shown above

- Multiply by as many conversions (values of one) as you need to, keeping in mind which way you place them so that units cancel properly
- Cancel units as necessary
- Multiply your top numbers together and bottom numbers together, dividing the results
- Transfer over the units that are left from your calculation (canceling) to the new number, and there's your answer!

Hopefully this has helped you navigate the world of unit conversion. With this method you can tackle numbers and their units from the simplest to the most complex.

The Legend Begins – The Early Days of TUTCO

TUTCO is now one of the largest and most diverse electric heater companies in the world, but it started with humble beginnings and originally was not even making electric heat. Getting into electric heat came by chance. The company now known as TUTCO started in 1938 as the H.W. Tuttle Company in Adrian, Michigan, USA.

The company was founded by H.W. Tuttle Sr. and Madeline "Ma" Tuttle. Ma Tuttle was very accomplished, with a successful business in real estate, and was an amateur golfer and bridge player with two children. She had become friends with Henry Ford, where she learned of his need for an electric resistor supplier for the Ford Motor Company. After learning this, H.W. and Ma founded their company to supply Mr. Ford with resistors.

They remained a resistor company for a few years until the U.S. military contacted them during WWII to help solve a problem. They wanted large resistors, not to do the normal job of resistors, but rather to use the resistance to generate heat to solve a problem they were having. The bomb door mechanisms and hydraulic systems were freezing up at the high altitudes, and they needed to keep them heated so they would operate properly. This was the first of many times where this company would "Think Outside the Box" and offer an unconventional solution to a unique problem. After the war, the H.W. Tuttle Company shifted from resistors to appliance heating elements both small and large—this was the beginning of the company that we are today.

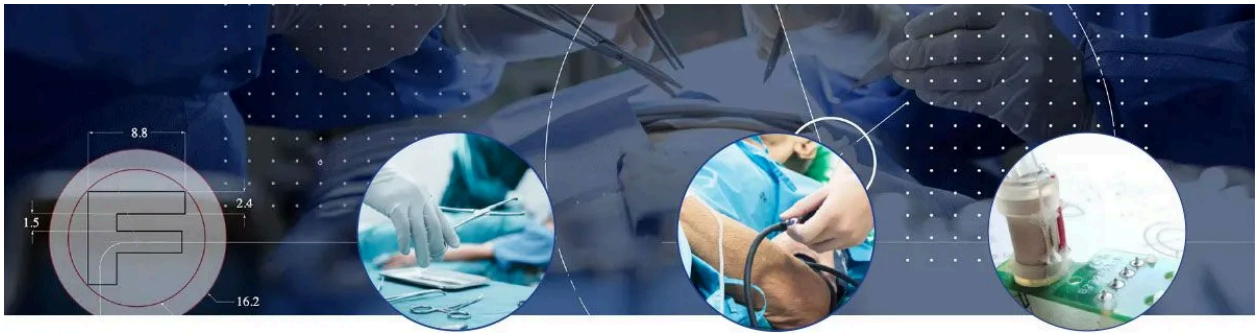
Around 1960, Harold Wesley "Tut" Tuttle Jr. became the President of the company, and Ma Tuttle became Treasurer and Chairman of the Board. The company merged with Gould Inc. in 1968 and became Gould Heating Elements. Gould moved to Cookeville, TN, USA in 1972. In 1978, Adams Industries bought the company from Gould. After the purchase, they changed the name to TUTCO, and that has been the name for over four and a half decades now. In April 1994, TUTCO became a member of the Smiths Group, of London, England and has been ever since.

TUTCO is now a major supplier to both the appliance industry—with an emphasis on electric dryer heating elements—and both the commercial and residential HVAC industries, supplying in some capacity to most of the major manufacturers in both industries. TUTCO also has a large and strong presence in the industrial market with four divisions manufacturing many different types of industrial heaters for a wide variety of processes and uses. We now have several manufacturing locations in the United States, along with manufacturing locations in Canada, Mexico,

and China. TUTCO's goal is not to be your supplier but rather to be your electric heat partner and help you come up with solutions, whether they are conventional or require us to "Think Outside the Box."

Next month we will look at the divisions TUTCO has added over the years and what they can offer you.

More Thinking Outside the Box



FEATURE INDUSTRY

Medical Solutions

TUTCO Farnam has designed hundreds of heaters for surgical, laboratory, and patient comfort applications around the world.

In healthcare, every detail matters—especially when it comes to keeping patients safe, comfortable, and supported during treatment. That's why medical equipment manufacturers around the world trust TUTCO Farnam to deliver custom heating solutions that perform with precision and reliability.

From the operating room to recovery, TUTCO Farnam's heaters play a behind-the-scenes but essential role. In fact, more than 70% of patient warming blankets in use today are powered by a custom-designed TUTCO Farnam heater. These systems help keep patients warm during surgery and recovery, reducing stress on the body and improving outcomes. But it doesn't stop there.

TUTCO Farnam's heaters are found in:

- Surgical tools and devices that keep fluids and equipment at just the right temperature
- Ventilators and oxygen systems that warm air for patient comfort
- Warming cabinets that heat blankets and fluids before use
- CPAP machines, dialysis equipment, and humidifiers that rely on steady, safe heat
- Medical imaging devices like CT scanners, where controlled temperatures help produce clearer, more accurate results

With decades of experience and a reputation for precision, TUTCO Farnam has become a trusted name in medical device innovation. Their heating solutions are built to perform reliably, day after day, in some of the most critical environments imaginable. Whether it's keeping patients warm during surgery or helping deliver life-saving

treatments, TUTCO Farnam is proud to support the people and technologies driving better healthcare around the world.

More Industries and Applications

FEATURE VIDEO

TUTCO HSG
Our Story of Transformation

For nearly 100 years, TUTCO has been a leader in electric heating technology—starting with a resistor for Henry Ford and evolving into a global powerhouse in advanced thermal solutions. From heating elements and duct heaters to integrated plug-and-play systems, TUTCO now serves industries like aerospace, green steel, medical, and more. This video dives into our legacy, our transformation into a multi-division systems provider, and how we're meeting the demands of tomorrow's industries—today. Whether you're looking for precision heating or scalable system solutions, TUTCO delivers innovation that endures.

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