



# Heat and Sensor Technology®

## Glossary



<b>\$\$\$\$\$\$:</b>	Our marking for the total selling price of the order on our design sheet.
<b>1 ph voltage:</b>	One-phase voltage.
<b>3 ph voltage:</b>	Three-phase voltage.
<b>3 phase delta:</b>	A connection type for the ceramic heater. The six wires are connected between the three positive and negative wires.
<b>ASTM:</b>	American Society for Testing and Materials, is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.
<b>Accounts payable:</b>	A/P or AP. The amount of money that the company owed to suppliers for goods and services. This money is considered a liability on the balance sheet. The Accounts Payable department receives invoices from suppliers and processes outgoing payments.
<b>Accounts Receivable:</b>	A/R or AR. The amount of money owed to the company by the customer(s) for goods or services after the invoices have been sent. This money is considered an asset on the balance sheet. The Accounts Receivable department creates and sends invoices and receives and processes incoming payments.
<b>Alloy:</b>	A metal made up of two or more metal elements to give it greater strength and resistance to corrosion. Because alloys are mix of elements, they are also referred to as impure metals. Examples are nickel, bronze, pewter, and zinc.
<b>ambient air:</b>	This refers to the state of outdoor air in a surrounding environment. This air is typically measured near ground level, and away from direct sources of pollution.
<b>Amps:</b>	The amount of current passing through the wire. The amp value in a heater is affected by the wire, turns, length, and pitch. Amps are not measured directly on the heaters but can be calculated on the computer and compared to the requirement on the design sheet if the hipot or final ohm reading is too high.
<b>Amps Per Core:</b>	The calculation of amps for each core in the heater. This value and Total Amps are specified on the design sheet.
<b>annealing:</b>	The process of heating solid metal to a high temperature, then cooling it slowly so its particles arrange into a defined lattice. <b>Bright annealing:</b> The annealing process created in a non-oxidizing atmosphere, resulting in a smooth metallic finish. This process must be requested.
<b>Armor:</b>	A tough, semi-flexible metal covering for the lead wires. It is used for H-leads.
<b>Assembly:</b>	The operation in which the core, metal, and other materials are put together. For the mica heaters, assembly follows the prepping operation. After assembly, the mica heaters are shaped.
<b>Barrel nut:</b>	A cylindrical nut with threads. The barrel nut is used with a slip (an unthreaded cylinder) to connect the two ends of a heater. The bolt is run through the slip and then screwed into the barrel nut.
<b>Bent strip:</b>	A strip heater that contains one or more bends. These bends can be solid or hinged.
<b>Black bushing:</b>	The black rubber bushing that is placed between the shaft and the clamp on the thermocouple.
<b>Braid:</b>	A flexible stainless steel covering over the lead wires. Strands of stainless steel are braided into a flexible tube. For C-leads, the braid is welded to the terminal. For E-lead, the braid is separate.
<b>Braid Ring:</b>	A small ring that helps to attach the braid to the cartridge heater. The braid is welded to the ring, and the ring is then welded to the heater. For a small ring, the braid is welded on the outside of the ring. For a larger ring, the braid is welded to the inside of the ring.
<b>Brake:</b>	A machine used to create 90° and 45° bends on the long edge of the channel.

<b>Braze:</b>	A method of joining two pieces of metal that uses a silver alloy. It uses a lower temperature than welding.
<b>Braze armor:</b>	When armor is used to enclose the wires, it is attached to the heater with brazing.
<b>Braze ring:</b>	A small metal ring that is placed between the armor and the hot end on the thermocouple when the armor is brazed to the tip.
<b>Breakdown light:</b>	The light on the hi-pot setup/meter that indicates a bad heater.
<b>Bridge:</b>	An area on the core that is not included in the winding. The wire goes diagonally across this space. The bridge is also known as a cold spot. The most common use is to provide a cold spot for the application of the leads.
<b>Built-In Strap:</b>	A strap consisting of two strap ends that are permanently attached to the plate.
<b>Bushing:</b>	Two types of rubber O-rings are used in the clamp between the tip and the plug on the thermocouple. These are called the <b>rubber bushing</b> and the <b>black bushing</b> .
<b>Button terminal:</b>	A connection method that allows the electrical source to be attached to a screw via an eyelet.
<b>Camber:</b>	A measurement of the diameter of a cartridge heater over its length. It is important that the cartridge heater has a consistent diameter to prevent air gaps that cause hot spots. The diameter is measured by passing the rod through a hole of the correct diameter. If the rod slides easily for the full length, it is acceptable.
<b>Cap:</b>	The cap provides the connection between the thermocouple and the machine. It may be a female cap that screws onto a male fitting on the machine, or it may just be a threaded piece that threads into a hole in the machine.
<b>Cartridge heater:</b>	A sturdy rod-shaped heater consisting of a stainless steel tube with a wire-wound ceramic core. After the rod is assembled into the tube, MGO is packed into the empty space and compacted in the swaging process to prevent the wire from contacting the tube.
<b>CE mark:</b>	The CE Mark is an indicates a product in in compliance with the health and safety requirements published by European Directives. Products bearing the CE Mark may therefore, be sold in countries that belong to the European Union.
<b>Ceramic block:</b>	A type of connector on the ceramic heater.
<b>Ceramic cap:</b>	A cap on the post that is used when the wires exit from the post at a 90° angle. A notch is made at the top of the post, and the ceramic cap is placed on the end, turning the notch into a hole.
<b>Ceramic heater:</b>	A heater consisting of an array of ceramic Lego-like pieces through which the heating wire is channeled. The ceramic heater is assembled with a stainless steel covering. It can be curled into a tube or used flat.
<b>Ceramic mud:</b>	The paste-like material that is smoothed over the surface of the ceramic heater core. It is then baked into a solid form.
<b>Ceramic tile:</b>	The small tiles that make up the core of the ceramic heater. The tiles are arranged in a flat rectangle, and the spring wire is threaded through the holes.
<b>Channel Strip:</b>	The channel becomes the inside surface of the mica band heater. It starts as a rectangular strip of stainless steel, galvanized steel or aluminum galvanized steel with a 90° flange along each long edge. During assembly, the core and plate are laid in the channel, and the flanges are flattened over the edges.
<b>Clamping method:</b>	Also called Lockup method. The clamping method determines how the two ends of the circular heater are joined after the heater is installed on the pipe.
<b>Crimp:</b>	Commonly the joining of two pieces of metal by deforming one or both of them to hold the other.
<b>Desicant:</b>	a substance that induces or sustains a state of dryness; a solid that can soak up water vapor from the air surrounding it.
<b>Dielectric:</b>	A medium or substance that insulates. It can be polarized by an applied electric field. with the ability of transmitting electric force without conduction. Dielectric material is insufficient in conducting electricity, but efficient in sustaining electric fields. They are used in capacitors, between adjacent wires.

<b>Dodd-Frank Act:</b>	Was signed into federal law in 2010. Per Wikipedia: an Act to promote the financial stability of the United States by improving accountability and transparency in the financial system, to end "too big to fail", to protect the American taxpayer by ending bailouts, to protect consumers from abusive financial services practices, and for other purposes.
<b>Flanged:</b>	A connection in which bolts pass through holes in a 90° flange at each end of the heater and are fastened with nuts.
<b>Full width strap:</b>	A wide strap with the same width as the heater. The full-width strap creates a tighter pressure to prevent gaps or air gaps that can cause hot spots.
<b>Cold end:</b>	The end of the thermocouple that holds the plug.
<b>Cold spot/section:</b>	An area on the mica core that is sparsely wound. A cold spot may be needed for a variety of reasons, including: to protect the leads from overheating, to reduce the heat at a bend, or to provide heat in specific areas of the heater.
<b>Compression fitting:</b>	A threaded fitting for thermocouples. The male end of the tube or pipe is slightly tapered. As it is pushed into the female end and the threaded fitting is screwed on, the material is compressed.
<b>Connection Parallel:</b>	If the cores of a heater have a parallel connection, all cores will receive the same amount of power and thus heat evenly.
<b>Connection Series:</b>	If the cores of a heater have a series connection, the terminals are connected in a continuous line.
<b>Const:</b>	Construction. A mica band heater can be constructed in one piece (a circle, or a portion of a circle), two pieces, or three pieces. The pieces can be connected using any of the standard clamping methods.
<b>Copper elbow:</b>	A rounded tube used to create a 90° connection. It is crimped to the bottom of the heater.
<b>Core:</b>	The central part of the heater that wears the wire wrapping. The electrical resistance in the core creates the heat. <b>Mica:</b> The mica core is a sheet of mica cut to a specified length and width. The wire is wound around the width of the core. <b>Cartridge:</b> The cartridge core is a ceramic rod of a specified length and diameter. The wire is wound around the diameter of the rod. <b>Ceramic:</b> The core of the ceramic heater is the spring of nichrome wire that is pulled through the tiles.
<b>Core Information:</b>	On the design sheet, the measurements and settings for the core. For <b>Cartridge heaters:</b> K (area), parallel or serial connection, grain & end disk, quantity, part number, cut length, wind length, wire size, TPI, amps per core, total amps, wraps, cycle, pitch, total turns, wind ohms, Delta R, and parts. For <b>Ceramic heaters:</b> number of tunnels, quantity, connection type, core OD, delta wind length, and stretch factor. For <b>Mica Band heaters:</b> K (area), parallel or serial connection, quantity, core width, core length, wind length, bridge, wire size, TPI (turns per inch), amps per core, total amps, cycle number, pitch, total turns, speed, and wind ohms.
<b>Core instructions (ceramic):</b>	On the Special Instructions for the ceramic heater, the core instructions specify how the core (spring) is to be marked. For example, 5.4, (10.7 x 5), 5.4 means that a mark is made 5.4 inches from the end, followed by five marks at 10.7 inches, ending with a mark at 5.4 inches. As the spring is pulled through the tunnels to the marks, the stretch factor is automatically created.
<b>Core length:</b>	The length of each individual piece of the core. When a heater has multiple cores, the cores can be constructed to provide different levels of heat for the different sections of the heater. A strip heater may contain multiple rectangular mica cores to cover the area to be heated.  For a <b>Cartridge</b> heater, the tube can contain multiple stacked cores. For a <b>Ceramic heater</b> , the core length refers to the pull length of the wire core (the spring).
<b>Core OD:</b>	On the ceramic heater, the core OD is the diameter of the wire after it has been wound into the spring.

<b>Core resistance:</b>	The measurement of resistance following completion of the wire winding operation.
<b>Core Width:</b>	Applies to band and strip heaters. The core width is the short side of the mica strip around which the wire is wound.
<b>Cust PO:</b>	Customer purchase order number.
<b>Cust. PN:</b>	Customer part number.
<b>Customer specifications:</b>	The customer specifications are listed at the top of the design sheet below the customer information. This section contains heater specifications such as diameter (ID or OD), gap, width, watts, volts, terminal length, and lockup. This information comes from the purchase order.
<b>Cut Braid:</b>	The length that the braid is to be cut to. It is normally the lead length.
<b>Cut Leads:</b>	The length that the wire is to be cut. This length is normally a few inches longer than the final lead length.
<b>Cut length:</b>	The actual length of the heater core, specified in the Core Information section of the design sheet. This length is longer than the wind length.
<b>Cycles:</b>	Multiple winding setups per piece. Each cycle can have different winding settings for pitch, total turns, and speed.
<b>Date:</b>	On the design sheet, the Date is the order entry date.
<b>Delta L:</b>	The change of length that occurs during the swaging process on a cartridge heater. On the design sheet, this value is expressed as a percent. For example, a value of 1.095 means that the length of the cartridge heater will increase by 9.5%.
<b>Delta R:</b>	The change of resistance that occurs during the swaging process on a cartridge heater. On the design sheet, this value is expressed as a percent. For example, a value of 1.31 means that the resistance of the cartridge heater will decrease by 31% when swaged.
<b>Desiccant:</b>	A material that absorbs moisture. A desiccant is placed in the shipping package to prevent the heaters or thermocouples from being damaged by humidity or moisture during shipping.
<b>Design sheet/ work order:</b>	<p>The paperwork that contains all order information, including the customer information from the purchase order and the characteristics of the heater to be made. The design order is also known as a work order. It is divided into sections:</p> <ul style="list-style-type: none"> <li>• Customer and general information</li> <li>• Shear information (Mica) or tube information (cartridge)</li> <li>• Inspection information</li> <li>• Strap information</li> <li>• Special instructions</li> </ul> <p>A separate copy is created for each section of the design sheet. For example, a mica band heater has copies marked Original, Lead, Straps, and Wind. During each of these operations, only the copy</p>
<b>Design number:</b>	The Heat and Sensor Technology part number.
<b>Due Date:</b>	The date by which the part must be completed or shipped.
<b>EH:</b>	Each half. Refers to the way that the wattage is specified for two-part or three-part construction.
<b>Elbow:</b>	A connection between the terminal and the heater that has a 90° bend.
<b>End Disk:</b>	The engraved label on the plate. The engraving includes the Customer Name, Part Number, Volts, Watts, and Date Code.
<b>Engraving:</b>	The engraved label on the plate. The engraving includes the Customer Name, Part Number, Volts, Watts, and Date Code.
<b>Erge plug:</b>	(Pronounced “ergee”) This is the same as a Euro plug, a two-prong, round-pin plug.
<b>Expandable:</b>	Expansion joint. Notches in the bend of the channel. Notches are cut in the edge of the channel of a mica heater or ceramic heater before the edges are bent up. These expansion joints may be needed for thicker, longer, wider pieces, making it easier to fold over the edges or bend the heater, if needed.
<b>Exit:</b>	The method of attaching the leads or posts. <b>Edge exit</b> brings the <b>Leads</b> directly out of the edge, side, or end of the sandwich. No holes are needed. <b>Surface exit</b> brings the <b>Leads or Posts</b> out of the surface of the heater through holes in the plate.

<b>Final QC:</b>	The final quality check performed before the product is shipped. This inspection verifies the dimensions, the marking, and all other parameters listed on the Final QC Checklist.
<b>Finish Ohms:</b>	The ohm level that is read during Final QC. This level is lower than the reading performed during manufacture. A <b>high, nom</b> (nominal), and <b>low</b> value is specified on the design sheet.
<b>Finishing:</b>	During finishing for a mica or ceramic heater, the straps, screws, and T-box are finished. Cartridge heaters are polished to a shiny finish.
<b>Flange:</b>	A connection in which bolts pass through holes in a 90° bend at each end of the heater and are fastened with nuts.
<b>Full cover strap:</b>	A strap that is as wide as the heater.
<b>GA/Gauge:</b>	Thickness of the metal. Gauge can apply to the thickness of both wire and sheet metal. Higher gauge is thinner, and lower gauge is thicker.
<b>Gap:</b>	The distance between the two ends or two sections of a band heater.
<b>Grain and end disk:</b>	The distance allowed for the disk and grain at the end of the cartridge heater.
<b>Ground order:</b>	A manufacturing priority and a shipping method. The majority of orders have the “ground” priority—it is the default unless the customer rates high-priority service. As a shipping method, it refers to UPS Ground shipping.
<b>Ground terminal:</b>	The terminal where the ground wire is connected to the heater. It can be in the form of either a wire or a post.
<b>Hand brake:</b>	A hand-operated machine used to create 90° and 45° bends on the long edge of the channel.
<b>Heat shrink:</b>	A flat or tubular plastic material that is slid onto the leads or armor. When the material is heated with a “hair dryer,” it shrinks to fit.
<b>Heater width:</b>	The width of the heater.
<b>Hinged construction:</b>	Two sections of a multi-piece construction heater (band or strip) can be joined with a piano hinge.
<b>Hi-pot:</b>	The hi-pot meter checks the insulation of the heater. This measurement is made twice—once during the manufacturing process and once when the heater is complete. The first measurement is made at 1200 volts for one second, and the second is made at 1500 watts for one second.
<b>Hot end:</b>	The end of the thermocouple with the bare tip that senses the temperature.
<b>Hygroscopic:</b>	The ability of a substance to attract and hold water molecules from the surrounding environment. This occurs when a material absorbs moisture from the air.
<b>ID:</b>	Inside diameter
<b>Incoloy®:</b>	A registered trademark of Special Metals Corporation, Incoloy metal is mostly nickel-based, excellent in corrosion resistance, and can withstand high temperatures.
<b>Inline post:</b>	Inline posts are parallel to the long edge of the plate.
<b>Inline QC:</b>	Quality checks performed by each operator as they complete an operation.
<b>Inspection information:</b>	On the design sheet, the electrical measurements. For both mica heaters and cartridge heaters, the measurements are finish ohms and hi-pot.
<b>Insulation:</b>	The insulation materials we use are one of the following: Mica, Ceramic fiber, and MGO.
<b>Invoice:</b>	An itemized bill for goods and services provided to the customer for payment. It contains a list of items and quantities plus prices, shipping charges, total owed and payment terms.
<b>Items:</b>	The total number of items on the customer purchase order. This quantity is specified on the design sheet
<b>Junction type:</b>	The type of connection between the thermocouple and the connector.
<b>K:</b>	Area in square inches. For a <b>Mica heater</b> , K is the area of the core. For a <b>Cartridge heater</b> , K is the area of the cartridge.
<b>Kilowatt:</b>	The measurement of 1,000 watts of electrical power.

<b>Latch and trunnion:</b>	A spring tension mechanism, also called a Quick Clamp. The <b>trunnion</b> at one end of the heater consists of a bolt, spring, and nut. The <b>latch</b> at the other end is on a hinge and can be flipped over the trunnion. The <b>bolt</b> is then tightened, and the <b>spring</b> maintains the tension.
<b>Lava:</b>	Also called an end seal, is this heat resistant material used to keep the wires in place as the pins are being threaded through the core of the cartridge heater. The pieces resemble a round button with two holes. It can be purchased in rod form, cut on the lathe, and drilled in its final button form.
<b>Layout:</b>	For mica heaters, after the sheet metal has been sheared, the locations of holes, welds, bends, and attachments are scratched onto the surface.
<b>Lead copy:</b>	The copy of the design sheet that is used for preparation of the leads.
<b>Lead length:</b>	The distance from the outside edge of the heater to the customer connection. <b>Wire cut length</b> is the length of wire needed to provide the lead length.
<b>Lead or post:</b>	Leads and posts are types of terminals. They provide the connection to the power source. A <b>lead</b> is flexible and consists of a wire of the required length that is wrapped in a covering, A <b>post</b> consists of a rigid screw end.
<b>Lead type:</b>	See "Terminal types."
<b>Leakage light:</b>	The light on the hi-pot meter that indicates the amount of leakage. The brighter the light the higher the leakage.
<b>Lockup method:</b>	Same as clamping method. The lock up method determines how the two ends of the circular heater are joined after the heater is installed on the pipe. <b>Built-in strap:</b> A strap consisting of a separate strap welded to each end of the circular heater. <b>Flanged:</b> A connection in which bolts pass through holes in a 90° flange at each end of the heater and are fastened with nuts. <b>Latch and trunnion:</b> A spring tension mechanism, also called a Quick Clamp. The trunnion at one end of the heater consists of a bolt, spring, and nut. The latch at the other end is on a hinge and can <b>Separate strap:</b> A one-piece strap that surrounds the entire circle of the heater. <b>Wedge lock Full width strap:</b> A wide strap with the same width as the heater. The full-width strap creates a tighter pressure to prevent gaps or air gaps that can cause hot spots.
<b>Low profile strap:</b>	A strap that is narrower than a standard strap.
<b>MgO:</b>	Magnesium oxide is a white mineral derived from magnesite. In powder form it is used to fill the empty space - commonly between the sheath and the coil in our heaters. Once heated to a high temperature, it becomes a solid that becomes a cement formation.
<b>Mica:</b>	An aluminum silicate mineral that is easily split into thin, tough, flexible, often transparent, sheets. It is heat resistant and often used in insulation and electrical equipment. Sheet mica is used in the core of the mica heaters.
<b>Mica band heater:</b>	A heater with a mica core that is wire wound. After assembly, the heater is bent into a circle.
<b>Mica Strip heater:</b>	Similar to a band heater. The strip heater is flat and fits into a slot or bolted to the side of the machine. It can have a rectangular, triangular, or circular shape.
<b>Mill slot:</b>	A slot is milled in the end of the cartridge to create a 90° angle bend.
<b>Mud:</b>	Ceramic mud is the paste-like material that is smoothed over the surface of the ceramic heater core and then baked into a solid form.
<b>Neck/groove tube:</b>	A method of connecting leads with a 90° bend on the cartridge heater. A slot is milled in the end of the tube, the wires are bent into the slot, and a cap is welded onto the end of the tube.
<b>Nichrome wire:</b>	This is high grade resistance wire, is precision wound to provide constant required heat.
<b>Nickel-chromium wire:</b>	This resistance wire evenly distributes heat to the sheath for optimum heatings.
<b>Nom:</b>	Nominal. The nominal measurement is the required measurement specified on the heater specifications. The actual measurement can fall between the high and the low setting.

<b>Notcher:</b>	The small shearing machine that removes the corners from a rectangular piece of sheet metal.
<b>Nozzle:</b>	A mica heater with a small diameter.
<b>OD:</b>	Outside diameter. The OD is specified for the cartridge heater on the design sheet
<b>Ohm:</b>	The unit of resistance. The symbol is $\Omega$ .
<b>One piece construction:</b>	A mica band that is constructed in a single piece. It may be a full circle or a partial circle (partial coverage construction).
<b>Order type:</b>	On the design sheet, the order type can be <b>Reorder</b> or <b>New Order</b> .
<b>Order/Shipping types:</b>	<p><b>Ground:</b> A manufacturing priority and a shipping method. The majority of orders have the “ground” priority—it is the default unless the customer rates high-priority service. As a shipping method, it refers to UPS Ground shipping.</p> <p><b>Pink:</b> The work/shipping priority for the top 11 customers, based on frequency of orders and on-time payment. This priority gives the shop one or two days on the delivery date.</p> <p><b>Red:</b> The work/shipping priority assigned to orders that are needed on a specific date. They are shipped via UPS Red (overnight).</p>
<b>Original copy:</b>	The copy of the design sheet that is used for preparing the metal.
<b>Packing slip:</b>	The paperwork that accompanies the package in shipment. It contains an abbreviated version of the sales order acknowledgement. When the part has been completed, the shipping person brings the design sheet to the office, and a packing slip is printed.
<b>Part number:</b>	The <b>Cust PN</b> is the customer’s part number for the heater. The <b>Design Number</b> is the Heat and Sensor part number.
<b>Partial coverage construction:</b>	In some applications, the two sections of a band heater don’t create a complete circle around the pipe to accommodate areas that are not to be heated. A single strap can go around the two sections.
<b>Patch:</b>	A small piece of mica that is inserted under the edge when the plate is folded over the sandwich.
<b>Pi tape:</b>	A flexible tape measure that has inches on one side and pi conversions on the other. When the pi tape is wrapped around the circumference of a circle, the diameter can be read.
<b>Pink order:</b>	The work/shipping priority for the top 11 customers, based on frequency of orders and on-time payment. This priority gives the shop one or two days on the delivery date.
<b>Pipe:</b>	A metal cylinder placed in the center of the ceramic heater to stabilize its shape during shipping. It is removed before the heater is installed.
<b>Pipe length:</b>	The length of the stabilizing pipe for the ceramic heater.
<b>Pitch in/ Pitch mm:</b>	The distance in inches or millimeters between the wires in the winding. One winding machine is set up using a pitch setting, while the other winding machines use TPI and speed.
<b>Pitch:</b>	The angle of the wire on the core when it is wound. The pitch is related to and dependent upon the turns per inch (TPI).
<b>Plasma cutting:</b>	The process of cutting metal with a plasma torch. In this process, inert gas is blown at a high speed through a nozzle. As an electrical arc is formed, the metal is melted and cut. Complex shapes and holes can be formed using this cutting method.
<b>Plate:</b>	The outer covering on the mica heater.
<b>Platens:</b>	is typically a flat metal plate that is pressed against a material (such as paper) to cause an impression in letterpress printing.
<b>Polishing:</b>	At completion, the cartridge heaters are polished to a shiny finish.
<b>Post or lead:</b>	Posts and leads are types of terminals. They provide the connection to the power source. A <b>post</b> consists of a rigid screw end, and a <b>lead</b> is flexible and consists of a wire of the required length that is wrapped in a covering.
<b>Post types:</b>	See “Terminal types.”
<b>Power brake:</b>	A machine used to create 90° and 45° bends on the long edge of the channel.

<b>Prepping:</b>	For mica heaters, the operation that prepares the heater for assembly. In the prepping step, the winding is checked for length and ohms. The ohm level is measured between the two ends of the winding wire. If the ohm reading is off, the computer can calculate the watts to determine whether the core is acceptable or unacceptable. The ends of the plate are wrapped around the ends of the sandwich and then laid in the channel.
<b>Pressure testing:</b>	A test performed after the welding on the cartridge to ensure that the weld is solid and there is no leakage.
<b>Purchase order:</b>	The request to purchase goods that becomes a legally binding contract between the buyer and the seller. It identifies and describes the items and quantities and specifies the delivery date, payment
<b>Quick clamp:</b>	A patented clamp for the band heater.
<b>Qty:</b>	Quantity. In the <b>Customer Information</b> section of the design sheet, Qty refers to the quantity of the heater on the design sheet. For the ceramic heater, the Qty in the Core Info section refers to the number of cores. In the Core Information section, the Qty specifies the quantity of material for each cycle.
<b>REACH Compliance:</b>	This regulation ( <b>R</b> egistration, <b>E</b> valuation, <b>A</b> uthorization, and <b>R</b> estriction of <b>C</b> hemicals) came into effect June 1 of 2007, and was established by the European Parliament and Council of 18. This regulation applies to all entities that manufacture Chemicals and fluids. At present, Heat and Sensor Technology is not obligated to demonstrate fluid substances at “do not exceed threshold limits”.
<b>RoHS compliance:</b>	This is the directive that focuses on the restriction certain dangerous substances commonly used in electronic and electronic equipment. This involves the testing of components for exceeding mandated levels of specified chemical material. See more at <a href="http://www.rohscompliancedefinition.com/">http://www.rohscompliancedefinition.com/</a>
<b>Receiver:</b>	Shipping charges are paid by the receiver and charged to the receiver’s account.
<b>Red order:</b>	The work/shipping priority assigned to orders that are needed on a specific date. They are shipped via UPS Red (overnight).
<b>Resistance:</b>	The opposition to the flow of electricity through a material. Resistance converts electricity to heat. Resistance is measured in ohms ( $\Omega$ ).
<b>Rubber bushing:</b>	The rubber O-ring that is placed at the plug end of the clamp on the thermocouple.
<b>Sales order acknowledgement:</b>	When a purchase order is received, the order information is typed onto the sales order acknowledgement. It also contains the shipping date and the due date.
<b>Sandwich:</b>	The core of the mica band or strip heater. The center of the core consists of a sheet of mica wrapped in wire. Then a piece of mica with the same dimensions is placed on each side of the wound core.
<b>Separate strap:</b>	An unattached strap that is wrapped around the heater and held in place by the lock up.
<b>Shaping:</b>	The process of bending the mica band heater into its circular shape. The shaping operation follows assembly.
<b>Shear Information:</b>	On the design sheet for mica heaters, the identifying and dimensional information for all material that must be sheared. This information includes the quantity, description, gauge and type of material, length, and width.
<b>Shearing:</b>	A process of cutting a sheet material such as mica or steel with a knife-like blade in a single stroke. Shearing is used when simple, straight cuts are needed. When complex cuts are needed, they are made by plasma cutting.
<b>Sheath:</b>	The close fitting outer part of a cartridge heater. It makes contact with the material that is to be heated. They can be made of alloys, such as Stainless Steel.
<b>Sheathing:</b>	The armor that protects the shaft of the thermocouple. It may or may not be used.
<b>Ship method:</b>	The shipper name and shipping category. The ship method also specifies whether the costs will be paid by the shipper or the receiver. If the order is shipped collect, the customer’s account number is also listed. This information is listed at the top of the design sheet.
<b>Shipper:</b>	Shipping charges are paid by either the Shipper or the Receiver.
<b>Side-by-side post:</b>	Two posts that are arranged perpendicular to the edge of the plate.
<b>Silicon Resin Seals:</b>	Protect against moisture contamination, and are rated to 221°F.



<b>Sleeving:</b>	A fiberglass or silicone fiberglass cover for the wires that protects them from excessive heat and fire and also protects the wires from being cut by the metal edge of the heater. The sleeving can go over a single wire or multiple wires.
<b>Slip:</b>	An unthreaded cylindrical nut that is used with a threaded barrel nut to connect the two ends of the heater.
<b>Slot Spacer:</b>	A disk that separates multiple cores in a cartridge heater and separates the core from the wires.
<b>Speed:</b>	The speed of the winding machine, measured in revolutions per minute or second.
<b>Spot welding:</b>	A TIG welding process that joins two pieces of metal with small welded spots.
<b>Square and rectangle band:</b>	Mica band heaters that are not bent into the common circular shape, but may require angled bends.
<b>Stake Swage:</b>	A swaging process in which each end of the cartridge is fed into the swager so that each end is swaged separately. This method is used to prevent wires from being pulled out, or to preserve a cold spot.
<b>Standard strap:</b>	A strap with a normal width, often 5/8".
<b>Std Roll Over:</b>	A type of tube end on the lead end (bottom) of a cartridge heater. It is used for a straight connection on a cartridge heater to hold the braid ring in place.
<b>Strap:</b>	The entire strip that surrounds the circular heater that connects the ends together.
<b>Strap copy:</b>	The copy of the design sheet that is used during the strap-making process.
<b>Strap ends:</b>	The short strap pieces with the loop on the end, that holds the nuts.
<b>Strap Information:</b>	A section at the bottom of the design sheet for mica heaters that provides the specifications for the straps. It also contains specifications for the strap ends. Normally it contains a drawing.
<b>Strap Type:</b>	<b>Built in:</b> Two separate strap ends welded to the ends of the mica band heater. <b>Full cover:</b> A strap that is as wide as the heater. A strap that is as wide as the heater. <b>Low profile:</b> A narrow strap. <b>Separate:</b> An unattached strap that is wrapped around the heater and held in place by the lock up. <b>Standard:</b> A strap with a normal width, often 5/8".
<b>Stretch factor</b>	The amount that the spring wire in the ceramic heater is to be stretched. This number is expressed as a percent. For example, a stretch factor of 1.98 means that the length of the spring is to be increased by 98% (almost doubled). The stretch factor is achieved automatically when the core is threaded correctly through the tunnels.
<b>Strip heater:</b>	Similar to a band heater. The strip heater is flat and can be made in various shapes such as rectangle, triangle, and circle. It can be slipped into a slot or bolted to the side of a machine.
<b>Strippet:</b>	The machine used to punch circular and oval holes.
<b>Surface exit:</b>	A terminal location away from the end of the plate. This exit requires holes.
<b>Swager:</b>	(Pronounced "swedger.") The machine that performs the swaging operation to compact the MGO in the cartridge heater.
<b>Swaging:</b>	The process of compacting the MGO filler in the cartridge heater to prevent the wire winding from contacting the outer tube. Three or four metal blocks fit into the machine to create a hole that the cartridge fits into. With a dual action, the swager spins the cartridge while beating it with the metal blocks. The result is that the MGO is compacted, the tube is lengthened, and the resistance is increased.
<b>T-box/terminal box:</b>	A metal box constructed to cover an opening in the Thinband, Mica band, Ceramic band, Mica Strip, or Channel strip, for leads and wires. It protects the leads and the operators.
<b>Terminal:</b>	The terminal provides the connection between the heater and the electrical source. The terminals can be either <b>leads</b> (wires) or <b>posts</b> (screws to which wires can be attached).
<b>Terminal Length:</b>	The finished length of the wires and braid that make up the leads.
<b>Terminal Location:</b>	The two leads or posts can be placed together or apart in various locations on the heater. The options are <b>same end</b> , <b>opposite ends</b> , <b>center</b> , or <b>other</b> location.
<b>Terminal exit:</b>	<b>Edge/side/end exit:</b> A terminal location that emerges from the sandwich. No holes are needed. This exit applies only to leads.

	<b>Surface exit:</b> A terminal location away from the end of the plate. This exit requires holes and applies to both posts and leads.
<b>Terminal orientation:</b>	<b>Parallel/inline:</b> Inline terminals are parallel to the long edge of the plate. Opposite sides of gap: One terminal is at each end of the heater. Tandem/side by side: Side by side terminals are perpendicular to the long edge of the plate.
<b>Terminal Options:</b>	<b>Built-in thermocouple:</b> A thermocouple attached directly to the heater that acts as a thermostat.  <b>Elbow:</b> An elbow provides a 90° bend at the leads exit. <b>Erge box:</b> A box that raises the erge plug above the surface of the heater. <b>Erge plug:</b> (pronounced “ergee”) A two-prong, round-pin plug. <b>Ground post:</b> A post to which the ground wire can be attached. <b>Ground wire:</b> A direct wire connection to ground. <b>Special Sleeving:</b> A fiberglass or silicone fiberglass cover for the wires that protects them from excessive heat and fire.
<b>Terminal Styles:</b>	<b>Style 1:</b> Edge exit must be at gap. <b>Style 2:</b> Edge exit, fiberglass leads covered with stainless steel braid. Must be at gap. <b>Style 3:</b> Erge plugs come in straight and 90°. They can be orientated across the width or lengthwise depending on the width of the heater. Can be located anywhere on the outer surface and be used with any clamping type. <b>Style 4:</b> Plain fiberglass, surface exit, can be anywhere along the outer surface and with any style of clamping. <b>Style 5:</b> Surface exit fiberglass leads covered with stainless steel braid, they can be located <b>Style 7:</b> Similar to Style 5 but with flex conduit.
<b>Terminal Types:</b>	<b>Armored:</b> The wires are enclosed in a semi-flexible, heavier metal sheath. <b>Built-in braid:</b> The flexible metal braid is welded to the heater terminal. <b>Post:</b> Terminals consisting of two screw ends. The customer’s wiring is brought to the posts and <b>Separate braid:</b> The flexible metal braid is attached but not welded to the terminal. <b>Sleeving:</b> A fiberglass or silicone fiberglass cover for the wires that protects them from excessive <b>Teflon:</b> K-lead. The wires are enclosed in a Teflon sheath.
<b>Testing:</b>	<b>Pressure testing:</b> A test performed after the welding on the cartridge to ensure that the weld is solid and there is no leakage. <b>Water testing:</b> A test used to check the weld on the bottom of the cartridge heater.
<b>Thermocouple:</b>	A temperature sensor that is connected between the heater and the power source. It can turn the heater off and on based on a timer or the temperature.
<b>Thinband heater:</b>	A patented mica band heater that is thinner and built with more precision. It has a thinner core and smaller fold-over. The terminals have a more finished and polished appearance. The flange connector has a small latching rod that resembles a barrel nut on each end.
<b>TIG Welding:</b>	Tungsten inert gas welding. In TIG welding, the metal to be welded is melted directly and fused together. Normally a rod isn’t used.
<b>Tile:</b>	The ceramic pieces that make up the core of the ceramic heater. The tiles are arranged in a flat rectangle, and the spring wire is threaded through the holes.
<b>Tol:</b>	Tolerance. The tolerance is specified for the OD on the design sheet for the cartridge heater as a + – value to designate the highest and lowest acceptable value.
<b>Total Amps:</b>	The total amp value for all cores on the heater. This value and amps per core are specified on the design sheet.
<b>Total Turns:</b>	The number of turns needed to achieve the wind length for a section of the core. It is dependent on the size of the wire and the pitch. Each cycle in the Core Information section of the design sheet has a specified Total Turn value. For a cold spot, it may be as low as one.
<b>TPI:</b>	Turns per inch. TPI applies to the wire winding on the heater’s core. The TPI determines the wattage of the heater. With a high TPI, the wires are wound closely together. With a low TPI, the wires are farther apart on the core. The TPI is related to the pitch.

<b>Trans fitting:</b>	A connection on the thermocouple between the thermocouple and wires. Its purpose is to block the thermocouple from grounding out.
<b>Trim wood:</b>	A special instruction to grind the wood plug out of the end of the cartridge heater. The plug is used during the swaging process to hold the inner material in place.
<b>Trunnion:</b>	The piece that the latch closes over, in a latch and trunnion clamp.
<b>Tube:</b>	The stainless steel covering on the cartridge heater.
<b>Tube End:</b>	The metal cap that is attached to the tube after it has been filled and swaged.
<b>Tubular heater:</b>	Tubular Heaters are straight, or configured with one or more bends. They are utilized for both immersion and air heating applications. More commonly, they're used in immersion applications.
<b>Tunnels:</b>	On the design sheet for the ceramic heater, the number of tunnels (or holes) that the wire core is to be threaded through. Each tile has multiple holes that make up the tunnels when they are laid next to each other.
<b>Two/three piece</b>	A mica band heater that is constructed as two or three separate sections.
<b>UL® Certification</b>	Underwriters Laboratories that tests different parts of products (i.e. AC Cords, microchips etc.) for flammability. UL certification doesn't guarantee product will function 100% properly, but the UL stamp of approval means that at the time of testing, the product had been found to be non-flammable in normal usage.
<b>Voltage:</b>	Heaters are available with 1-phase, 3-phase, and dual voltage.
<b>Volt:</b>	The voltage for the heaters can be 120, 220, 240, or 480. The selection is based on the customer's requirements.
<b>Water testing:</b>	A test used to check the weld on the bottom of the cartridge heater.
<b>Watt:</b>	The unit of power. Power is the rate of using energy or doing work. The number of watts is specified for each heater on the design sheet.
<b>Watt density:</b>	Watts per square inch. This value represents how much electricity a square inch of the core can withstand. It is related to amps, watts, and wire size. It determines whether the heater will last or burn out quickly. It is calculated by the computer.
<b>Wattage:</b>	Power. For a <b>one-piece</b> heater, the total wattage is listed. For a <b>two- or multiple-piece</b> heater, the wattage for each half and total wattage are listed.
<b>Wind copy:</b>	The copy of the design sheet that accompanies the part through the winding process. The winder must specifically refer to the wind copy for instructions.
<b>Wind length:</b>	The length measurement from where the winding starts to where it ends.
<b>Wind ohms:</b>	The reading of resistance when the core has been wound, before the heater is assembled. This reading is normally higher than the final ohm reading. A <b>high, nom</b> (nominal), and <b>low</b> value is specified on the design sheet.
<b>Winding:</b>	The winding is the source of the resistance that creates the heat. A wire of a specified size is wound around the core with a specified length and width or diameter, at a specified pitch (angle) and turns per inch (TPI).
<b>Wire calibration:</b>	A wire specification for the style of wire for thermocouple.
<b>Wire cut length:</b>	The length of wire needed to provide the lead length.
<b>Wire Size:</b>	Wire size is measured two ways. Round wire is measured as the gauge. Higher gauge wire is thinner, and lower gauge wire is thicker. Ribbon wire has two measurements, width and thickness. For example, 1/16x.005 wire is 1/16" wide and .005" thick.
<b>Work order/design sheet:</b>	The paperwork that contains all order information, including the customer information from the purchase order and the characteristics of the heater to be made. The work order is more properly known as a design order.
<b>Wraps:</b>	Wraps per inch. The wraps value is called out in the Core Information section of the design sheet.
<b>WSI:</b>	Watts per square inch, or density. This value represents how much electricity a square inch of the core can withstand. It is related to amps, watts, and wire size. It determines whether the heater will last or burn out quickly. It is calculated by the computer.