

TECHNOBEL INDIA

(AN ISO 9001-2015 AND CE CERTIFIED COMPANY)
(Mfrs: Industrial heaters, Thermocouples, Ovens, Furnaces and EPC projects.)

Tubular Heating Elements



Tubular Air Heaters

TECHNOBEL INDIA designs and manufactures industrial electric Tubular Heaters that set the industry Standard for excellence. The most versatile of all electric heating elements, the tubular heaters are capable of being formed into virtually any configuration.

Three basic tubular Air Heaters constructions are illustrated here.

- [\(Single-pass\) Tubular Heaters.](#)
- [Custom Built tubular heaters](#)
- [\(Two-Pass/Single Circuit\) Tubular Heaters](#)
- [Duct Heaters](#)
- [Finned Tubular Heaters](#)

Depending on the application different tube diameters and different tube Sheath materials are available. Heating of air requires an oxidized tube surface. The Commonly specified Sheath Materials are SS304, SS316, and SS316L & INCOLOY for high temperature applications. The range of ratings, sizes, materials and terminations available, makes the tubular heater adaptable to many industrial, commercial and scientific applications. All wattages and voltages are possible as long as the resistance is within the fixed limits and the surface load will not be exceeded.

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Features:

- Maximum Sheath Temperature: 620°C.
- Watt density : Max up to 25 w/in²
- Heating element in Copper (nickel plated), SS304, SS316, SS316L, Incoloy, and Lead/Teflon Coated Sheath Materials.
- Moisture resistant/explosion resistant terminal enclosure option.
- Tubular heaters can be factory formed to practically any shape, sometimes to bends as small as one element tube diameter.
- Magnesium Oxide, TECHNOBEL uses only 96% pure MgO, the highest grade available for electric heating elements.
- Tubular Heating elements may be Bracket Mounted, clamped, Thread Nipple fitted, Flanged, casted into metals, Fitted with terminal box or spaced away from the work as radiant heaters. Elements can also be positioned in ducts or vessels for heating air or other gases.
- Tubular Heaters can be Finned. see **Finned tubular heaters**.
- Available in **0.318" (8.1mm), 0.430" (11mm), 0.551" (14mm), 0.625" (15.8mm), 0.669" (17mm), 0.748" (19mm)** element diameter.
- Several wattage and voltage combinations are available.
- Easy to install.
- Excellent internal electrical insulation and heat conduction.
- Electrically isolated sheath.



Construction:

The cutaway view of a typical TECHNOBEL's tubular Heating element shows its basic construction. A coil of the highest-grade resistance Wire (80% nickel, 20% chromium) is precisely centered in a heavy gauge metal tube while the tube is filled with granular magnesium oxide powder. Terminal pins are Screwed / welded or silver soldered to the resistance coil at each end to provide an unheated length near the terminals and to secure the coil in the magnesium oxide. Through Swaging, the diameter of this assembly is reduced and the magnesium oxide compacted, insuring rapid heat transfer from the coil to the sheath, as well as high dielectric strength. After compaction, the element is processed in one of three Ways:

1. Straight length elements are sealed and appropriate terminals applied.
2. Formed elements are annealed and bent before they are Sealed and terminated.
3. Finned elements are wound with a helical fin before they are sealed and terminated.

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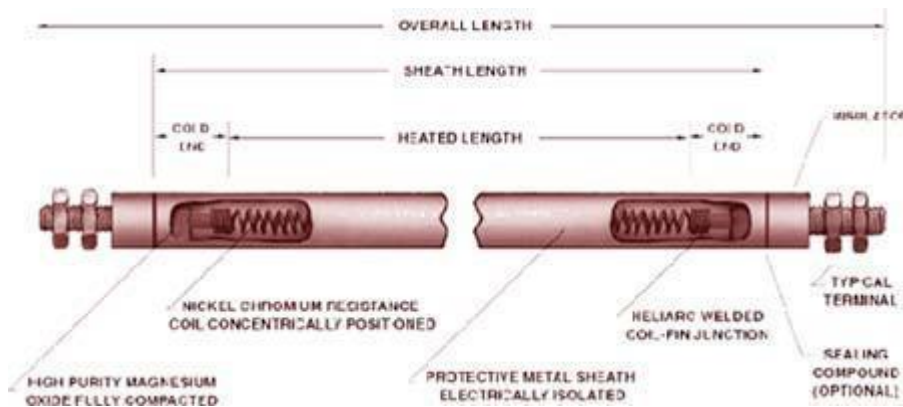
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Picture Construction:



Quality Control

From raw materials through the finished product, TECHNOBEL maintains the highest standards in the industry through a series of Quality Control/Assurance checks.

- **Magnesium Oxide** – TECHNOBEL uses only 96% pure MgO, the highest grade available for electric heating elements. Each batch is checked against two Standards that determines tap density to assure a high insulation density. and for sieve analysis. Sieves to assure a high concentration of larger grains, which have better thermal conductivity and dielectric strength. As a result, MEH's elements have extremely high MgO density.
- **Recompaction** – In the process of bending, hairline cracks can develop in the compacted magnesium oxide. These cracks, in turn, can lead to overheating and coil failure, especially at high temperatures or high watt densities. To prevent such failures, we recompress most bends with a center-to-center diameter of 2" or less, eliminating cracks in the magnesium oxide.
- **Wiring**– It is important to use the correct wire gauge to carry the Amperage required. A wire not large enough can overheat, become brittle and break. The ambient temperature must also be considered in choosing the correct type of wire and insulation. Make sure wiring to terminals is tight. Keep terminals away from heat if possible.

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Application:

There are numerous applications, mentioned above are a few..

- In Plastic industries, domestic applications, high vacuum applications
- Suitable for efficient baking.
- Curing of plants enamels, lacquers and adhesives.
- Tubular heaters are cast into aluminum for broad surface coverage and uniform heating application requirements Please refer to general application guidelines, recommended watt densities, sheath temperature limitations, corrosion guide, and other engineering data to assist you with product selection.



Finned Tubular Heaters:

Finned tubular heating elements are of the type where the surface area is enlarged by a strip in order to heat gases. At high power the surface temperature is small and the heating element is short. TECHNOBEL's Finned Tubular Heaters are manufactured with the same rugged construction as the standard Tubular Heaters except a MILD STEEL ELECTROPLATED or a corrugated 304 STAINLESS STEEL FIN is helically wound on Heater Tube diameter (304 stainless steel) element. To insure a permanent bond, each end of the fin is fully brazed to the Heater sheath, for optimum heat dissipation and efficiency, as Brazed fins transfer heat at about double the efficiency of unbrazed designs. These heaters are ideal for heating air and select gases in forced and natural convection applications.

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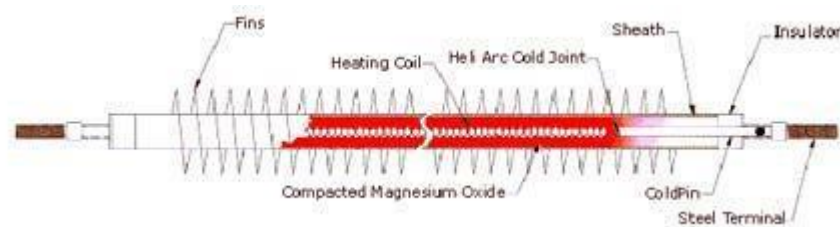
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Features:

- Possible Tube & Fin diameters:
Heater OD: 8.2mm 11.2mm
Fin OD: 28mm 30mm
- Stainless Steel (Fin) sheath models are suitable for operating temperatures to 425 °C.
- Mild Steel (Fin) sheath (Electro plated) models are suitable for operating temperatures to 300 °C.
- Watt density: Max up to 35 w/in²
- High Temperature grade magnesium oxide insulation imbeds the resistance wire coil for optimum heat transfer & Dielectric Strength.
- Mounting fitting available with Standard Bracket or Threaded Nipple arrangement.(Standard and custom options available)
- Several wattage and voltage combinations are available.



Picture Construction:



Application:

- Designed for rapid and uniform heat transfer for forced air heating.
- Temperature boosting.
- Channel air heaters for air conditioning and drying apparatus.
- Industrial Ovens and Cabinets.
- Duct Heater Assemblies.
- Resistive Load Banks.
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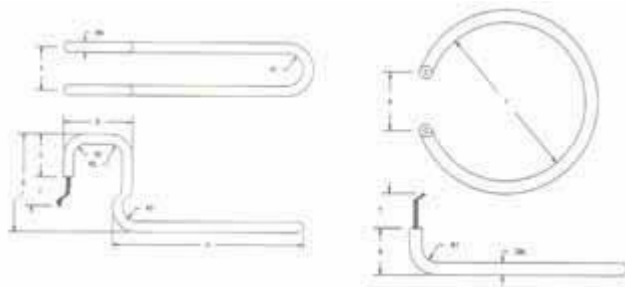
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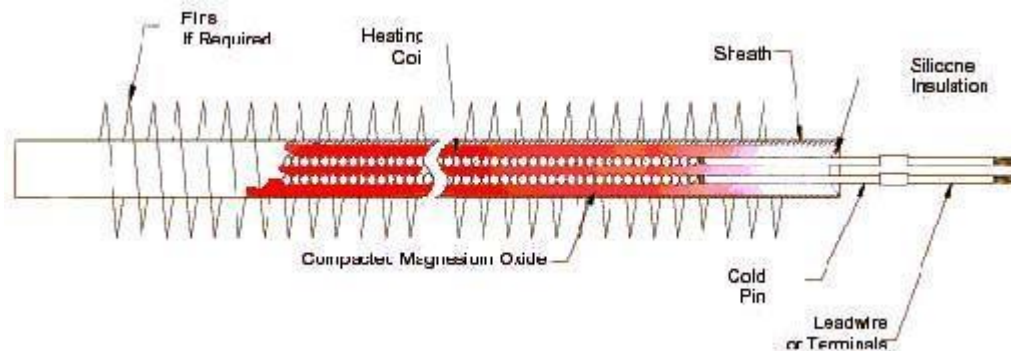
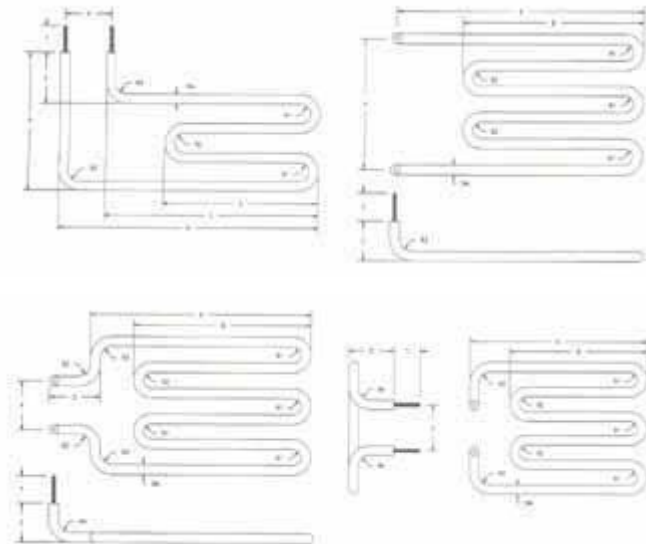
Custom Built Heaters

Standard tubular Heating elements may be bent in an infinite variety of configurations. A few Factory Bend Formations are Shown Here..



Two-Pass Construction Tubular Heaters

For applications requiring both terminations at the same end, either a U-bend or a two-pass element may be used. Two-pass elements, as shown in the cutaway view, have a U-bent coil inside the sheath and two leads or terminals at one end. Welding or silver soldering seals the opposite end. These elements are available in straight lengths, either finned or unfinned. They can be permanently mounted with a variety of factory-furnished mounting methods. By contrast, standard elements in straight lengths must have a flexible electrical connection at one end to allow for thermal expansion.



Features:

Capable of withstanding much higher operating temperatures than conventional tubular

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heaters. Available in (15.8mm), 0.669" (17mm), 0.748" (19mm) element diameter. Can be immersed in liquids, for Liquid Heating Applications. Two-Pass Heating Elements can be finned. Several wattage and voltage combinations are available.

Applications:

Inserted in machined holes to heat dies and platens. Multi zone heating. High temperature furnaces. Simulated fuel elements for nuclear reactors. Pressurizer heaters. Dry out heaters in large generators.

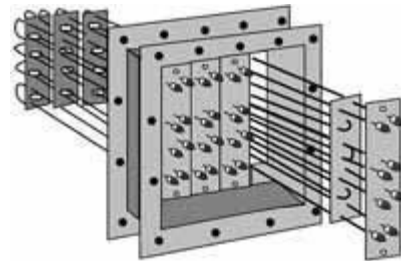
Air Duct Heaters

TECHNOBEL's Duct Heaters are constructed out of variety of tubular Heater combinations & inner mountings. While Duct heaters are easily adaptable to many non-pressurized, air-heating systems, they also offer several advantages over gas or oil fired and open coil electric heating units..

Installation flexibility.

No fuel lines necessary.

Tubular Heaters in Incoloy Sheathing protects it from corrosive environments (optional). The finned tubular element design is the most popular. It incorporates the highest wattage per cross sectional duct area thus making it more economical than the (non-finned) tubular design.



Features:

Voltage: 230/415 V

Watt Densities: Max up to 35W/In²

Field Replaceable Heating Elements.

MgO Insulation filled elements.

Available in Finned tubular element or (non-finned) tubular heating elements constructions.

3/2" thick Ceramic Fiber Insulation keeps wiring cooler and reduces heat loss. Nipples brazed to heating elements can be easily bolted to Duct walls (optional).

Application:

Air pre-heating.

Multi zone reheating.

Ovens.

Dryers.

Hot air blast.

Space heating.

Heat pump auxiliary systems.

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