



Shown with optional bulkhead fittings



Shown with optional mounting flange at end of sheath



Design Features

- * Copper brazed steel fins on steel sheath standard. Aluminum based protective coating available.
- * Stainless steel fins on stainless alloy sheath standard.
- * .315, .430, & .475 Sheath diameters standard. .260 & .375 diameters optional. .625 diameter is special order in limited lengths.
- * 5/16" fins standard on .315 diameter units, 3/8" fins on .430 & .475 diameter heaters. See physical specifications for optional sizes.
- * Monel fins on Monel sheath available on special order only. Consult Tempco for details.
- * 4.5-5 fins/in standard. 3.5-6 fins/in optional
- * Steel finned catalog heaters have brazed brass bulkheads. Welded steel or staked bulkheads available. Stainless steel welded bulkheads are standard on cataloged stainless steel finned heaters. Fittings will have UNF threads unless custom threads are specified. See page 10-16B.
- * Custom Mounting Brackets can be provided. See page 10-16C.

Construction Characteristics

THF finned heaters are constructed using Tempco's robust tubular element as the basis of construction. Fin material is continuously spiral wound tightly onto the element surface to increase the convective surface area for air and non-corrosive gas heating. Fin spacing and size have been tested and selected to optimize performance. Steel finned units are then furnace brazed, bonding the fins to the sheath to increase conductive efficiency. This allows higher wattage levels to be achieved in the same flow area and produces lower sheath temperatures prolonging heater life. For higher temperature or more corrosive applications, stainless steel fins securely wound on alloy sheath are available. Application conditions such as vibration and toxic/flammable media should be taken into consideration when installing heaters. Protective coatings are available for use on steel finned heaters for mildly corrosive or high humidity applications.

Finned tubular elements are safer to operate than open coil heaters as the risk of fire from combustible particles in the flow stream and electrical shock is minimized. Increased service life and less maintenance required due to the rugged finned element construction. Power loading (w/in) of finned tubulars can be matched to any open coil installation. Pressure drop when using finned elements will be slightly more than with open coil but normally not enough to matter. It varies with flow velocity ranging from .04"H₂O at 500 fpm to about .30"H₂O at 1500 fpm when elements are banked together in several rows for duct heaters.

- * Type T Post terminals standard. .315 dia. heaters have 8-32 threads and 10-32 threads are used on .430 & .475 dia. heaters. Full selection of tubular terminations available See page 10-4.
- * Catalog units have V2A silicon resin seals as standard. Most all other tubular seal options available. See page 10-16C.
- * Numerous factory bending formations available. Supply Tempco with dimensional sketch, drawing, or photo. See page 10-9.
- * Bright annealed, Nickel plating, Hi-heat aluminum, or Hi-heat flat black finishes available Furnace brazed Stainless Steel fins available as an option.
- * U2 & M2 formations are ideal for duct heating applications
- * Unfinned sections in bends or straight lengths of heated area can be provided on heaters up to 32wsi sheath watt density.
- * Catalog listed Steel heaters are UL recognized for use up to 750°F sheath temperature & Stainless construction up to 1000°F at a maximum of 85 wsi on sheath.

The finned tubular elements are normally used in forced or free convective air applications at low to medium temperatures. Typical applications are for heating indoor clean air from ambient conditions up to 250/275°F for steel finned units & to 550°F for stainless fins. Steel finned heaters can be operated up to 750°F on sheath and stainless steel finned heaters used up to 1200°F (1000°F UL limit) sheath temperatures. Nominal sheath watt density and recommended operating conditions for the cataloged heaters are included in the table headings & footnotes. Lower airflows will require lower watt density ratings. Consideration should be given to using un-finned alloy sheath tubular elements for heating to higher outlet air temperatures or if operating in higher ambient air. Application conditions of flow velocity and inlet/outlet temperatures will govern sheath watt density to be used. The airflow graphs and examples presented will help with determining proper heater watt density. The cataloged designs are suitable for most low temperature applications that will be encountered.

Typical Applications

- Convective air & gas heating in ducts
- Load resistor banks
- Moisture removal (dehumidification)
- Curing ovens & plastics dryers
- Low/medium temperature heat treating
- Convection ovens for food preparation
- Exhaust gas heating
- Forced air electric heaters
- Heat pump auxiliary systems
- Return air heating
- Inert Industrial process gas heating
- Organic Resins & Paint curing, baking & drying
- Autoclaves
- Film & ink drying
- Hopper heating
- Chemical processing & core drying
- Food Roasting & baking
- Textile & Varnish drying
- Heating for rail & marine applications

TUBULAR ELEMENT SIZES & MATERIALS

Sheath Diameter: .315", .375", .430" and .475"

Sheath Material: Steel, 304L SS, 316L SS, Incoloy 840 and Incoloy 800

Sheath Lengths: 12" to 196" depending on sheath diameter

Sheath Material Selection

Standard steel finned heaters are ideal for use in low temperature clean air applications not containing toxic contaminants or high humidity. When coated with one of the optional coatings available they are suitable for high humidity, organic vapors, or mildly corrosive applications. Stainless steel finned heaters should be employed for higher temperature uses or if the air/gas contains vapors known to be corrosive to steel. Optional nickel plated heaters can also be provided.

PERFORMANCE RATINGS

Maximum Temperature:

Steel fins on steel sheath—750°F (400°C)

Steel fins on Incoloy or SS sheath—750°F (400°C)

Stainless Steel fins on stainless, Incoloy 840 or Incoloy 800 sheath—1200°F (650°C)

Maximum Element Power Density Limits:

.315 dia.—84 watts/linear inch

.375 dia.—100 watts/linear inch

.430 dia.—115 watts/linear inch

.475 dia.—127 watts/linear inch

These values are for heaters with 3/8" fins at 4.5-5 fins/inch.

De-rate to 83% for heaters with 5/16" fins or that have less than 4.5 fins/inch.

ELECTRICAL RATINGS

Maximum Voltage: Up to 600VAC (480V for UL)

Resistance Tolerance: +10%, -5%

Wattage Tolerance: +5%, -10%

Sheath watt density range: 20-85 wsi (2-13 w/cm²), @ 4.5-5 fins/in

OPTIONAL FEATURES

Bulkhead Fittings: Brazed brass are standard. Welded or brazed Steel & SS optional. UNF threads standard, metric or special threads available.

Custom mounting brackets: (type MF or special). Dimensional sketch or drawing needed with material specs.

Locator washer: (type LC) specify location

Adjustable mounting collar: (type MC) w/set screw

Full selection of tubular termination options: Bulkhead fittings & type T post terminals standard.

Moisture Seals: V2A Silicon resin seal standard

SPECIFICATIONS AND PHYSICAL SIZE OF FINS

Fin Materials and Attachment Method:

Steel & 304 SS

Steel wound with copper wire between fins for oven brazing to sheath. Stainless steel is mechanically wound but can be oven brazed as an option if a bright annealing atmosphere is used.

Fin Strip Width:

5/16" on .315, .375 and .430 diameters

3/8" on .315, .375 .430 and .475 diameters

Fin Thickness:

26 Ga. (.018) for Steel and 304 SS. Optional 24 Ga. (.024) for steel only

Finned OD's:

.315" dia. with 5/16" fins—.92" OD

.315" dia. with 3/8" fins—1.05" OD

.375" dia. with 5/16" fins—.98" OD

.375" dia. with 3/8" fins—1.11" OD

.430" dia. with 5/16" fins—1.04" OD

.430" dia. with 3/8" steel fins—1.15" OD, SS fins 1.16" OD

.475" dia. with 3/8" fins—1.21" OD

Fin Pitch Standards:

5±.5 for 5/16 material, 4.5-5 for 3/8 material (up to 6 per inch maximum)

SURFACE FINISHES

Oven brazed steel finned units - standard

Copper brazed stainless steel fins using inert atmosphere - special

Bright annealed steel or stainless steel finned heaters

High heat aluminum painted steel — 700°F Maximum

High heat flat black painted surface — 1000°F Maximum

Nickel plated finish — 500°F Maximum

FORMING LIMITATIONS

Minimum Element Centerline Bend Radius:

.315" dia. with 5/16" fins 3/4"

.315" dia. with 3/8" fins 7/8"

.375" dia. with 5/16" fins 7/8"

.375" dia. with 3/8" fins 1.00"

.430" dia. with 5/16" fins 1.00"

.430" dia. with 3/8" fins 1.00"

.475" dia. with 3/8" fins 1.00"

The above values are for factory formed heaters. Consult Tempco for field bending limits.