

Please select from the Table of Contents  
All manufacturer list prices are shown in U.S. Dollars

# *Infrared Sections*



# Hi-Temperature Electric Infrared Modular Sections

Catalog 900-HTS-10



## ECONOMICAL - EFFICIENT - EASILY INSTALLED

*Designed for mounting INSIDE or outside existing ovens, or for stand-alone process ovens.*

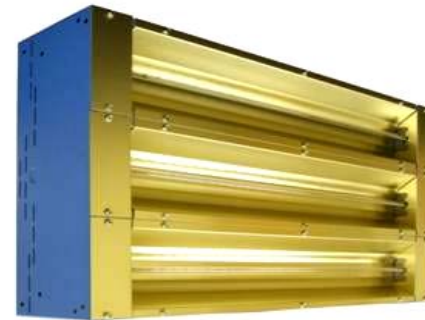
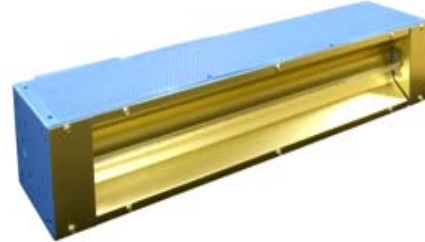
*Special Hi-Temp Modular Design, rated to 600° F.*

These standard hi-temperature rated sections are designed to withstand higher oven temperatures, up to 600° F, so they can be installed inside convection ovens as a preheat or booster prior to convection curing of powders and paints.

Hi-temp sections are also easily grouped to form IR banks for many other applications that require the benefits of short-medium-long wave infrared. Heater sections are easily bolted and wired together to form various oven configurations to fit the application. Heaters can be bolted and wired end-to-end or side-by-



Back of IR heater panels include threaded studs for mounting, and a junction box with knockouts for service connection to a hi-temp ceramic terminal block.



## Standard Model Chart

Model #	PCN	Dimensions (L x W x D) in.	Max Wattage*	Voltage	Reflectors (Gold Anodized)	Shipping Weight	Price See note below
9123101HT	3971002	31 x 5-1/2 x 7	(see below) 5 Kw	208 to 480	One 5-1/2"	14 lbs.	\$220.00
9523101HT	3971102	31 x 16-1/2 x 7	15 Kw	208 to 480	Three 5-1/2"	27 lbs.	\$396.00
9124401HT	3971202	44 x 5-1/2 x 7	7.6 KW	208 to 570	One 5-1/2"	17 lbs.	\$230.00
9524401HT	3971302	44 x 16-1/2 x 7	22.8 Kw	208 to 570	Three 5-1/2"	34 lbs.	\$459.00

**NOTE:** Heaters are priced without heating elements, which must be ordered separately, due to the many options available. Heaters accept ONE or TWO infrared elements per 5-1/2" reflector, at all voltages. Consult factory, Attn: Fostoria Process Div., 1-800-495-4525, for application assistance and for element selection and pricing.

\*Sections may require cooling blowers when operated at highest wattages and when sections are combined to form larger heat banks.

## Standard Specifications:

1. Construction: 20 ga steel housing; gold anodized aluminum reflectors and end caps
2. Ceramic socket designed to accept one or two heating elements. Elements can be wired for single or three phase operation, and may be wired in series. 450° C rated Firezone internal wiring
3. Durable powder coated finish on housing and perforated side closures
4. J-Box w/ knockouts and ceramic terminal strip mounted to the back of the heater, for easy wiring access
5. Mounting studs welded to back of heater for quick mounting to frames, walls, or other structures
6. Designed to accept a variety of IR heating elements, including short wave quartz lamps, medium wave quartz tubes, or long wave metal sheath emitters; with a choice of wattages at all standard industrial voltages
7. Heaters designed to bolt to other heaters either side-by-side or end-to-end; knockouts on heater housing to enable continuous wiring from heater-to heater
8. Models are shipped fully assembled and ready for installation, with the exception of the heating elements which are installed by customer

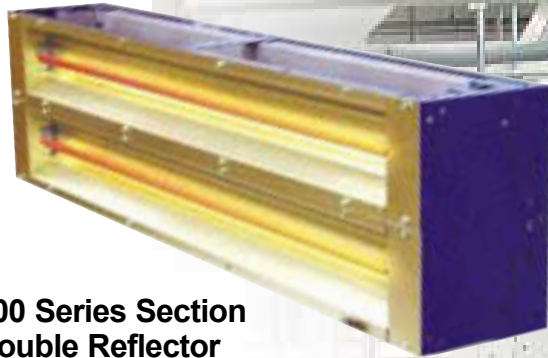


Quality Since 1917

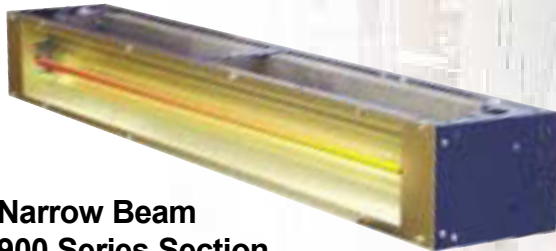
# Modular Infrared Fixtures

Process Heating Equipment for Industrial Applications

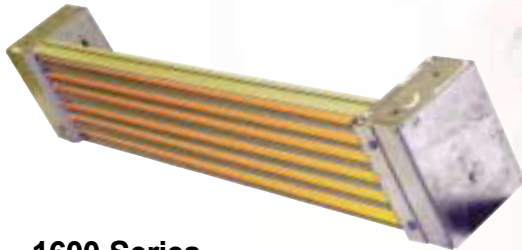
**900 Series Section  
Double Reflector**



**Narrow Beam  
900 Series Section**



**1600 Series  
High Power Density Section**



**Mitey Midget Section**

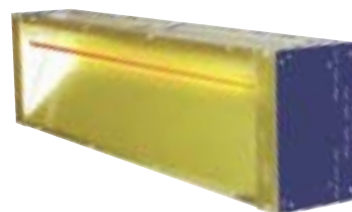
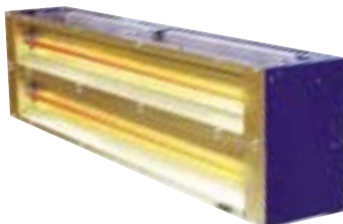
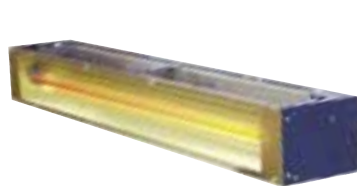






## 900 SERIES MODULAR SECTIONS

### Fostoria's 900 Series Line of Infrared Modular Sections Incorporate A Number of Advantages:



- Sections with a reflector integral to the heat source (fig. 1), disperse infrared energy across a 180 degree pattern.
- Sections with a parabolic reflector (fig. 2), deliver infrared energy across a 130 degree pattern with the reflected infrared in a tighter 65 degree pattern. More energy can be delivered to the product with the parabolic shape.
- Three different reflector widths are available: 5 ½", 11", and 16 ½" wide parabolic reflectors. This allows the customer to match the power density of the equipment (watts per square inch) to the application.
- Sections are offered in three different widths: 5 ½", 11" and 16 ½". The 11" wide sections can be purchased with one 11" reflector or two 5 ½" wide reflectors. The 16 ½" wide section can be purchased with one 16 ½" reflector or three 5 ½" wide reflectors.
- A variety of lengths are offered: 11", 16", 22", 31", 44", 55", and 66". These length are available in all section widths.
- 900 series sections are designed so they can be bolted together side by side or end to end. This makes the fabrication of large heat banks possible.
- Parabolic reflectors are formed from gold anodized aluminum. These reflectors are approximately 85% efficient when new. A normal maintenance schedule using non-abrasive liquid cleaners will keep the reflectors at a high degree of reflecting efficiency.
- For high temperature applications, gold porcelain reflectors (24K gold fired onto a porcelain coated steel reflector) are recommended.
- Quartz lamps, quartz tubes, and metal sheath rods can be used in the 900 series modular sections.
- 900 series modular sections use a sturdy ceramic SO9 socket. The socket provides an easy positive means for connecting the heat source leads.
- Heat sources can be wired in series, parallel or in any combination to suit process and control requirements.

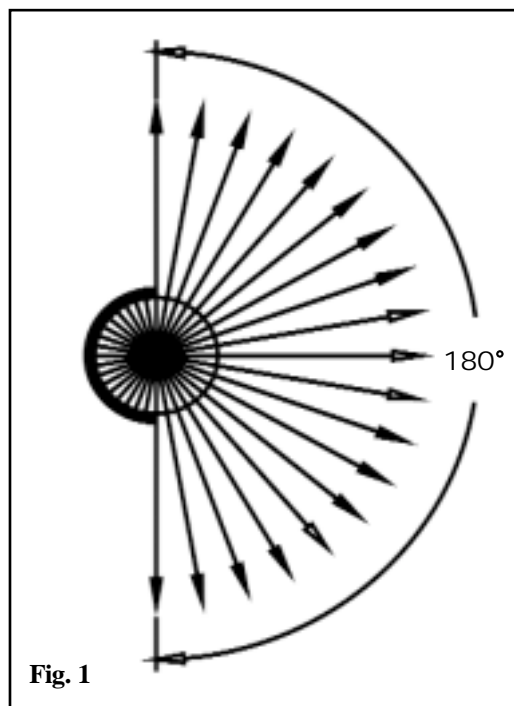


Fig. 1

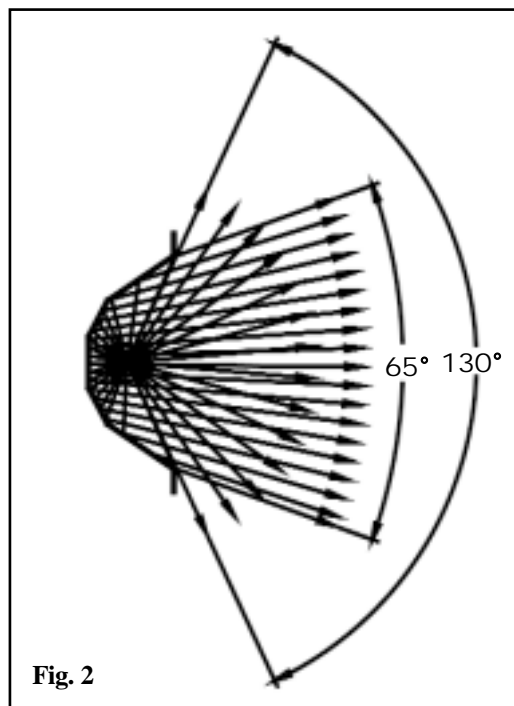


Fig. 2

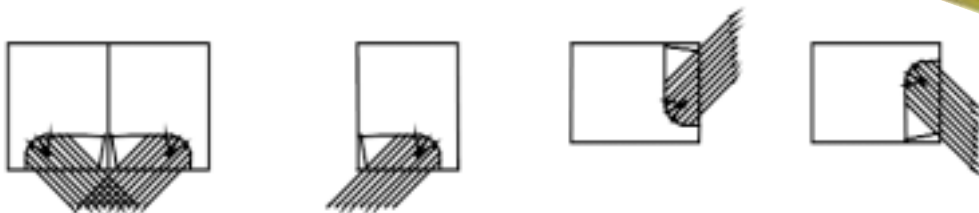
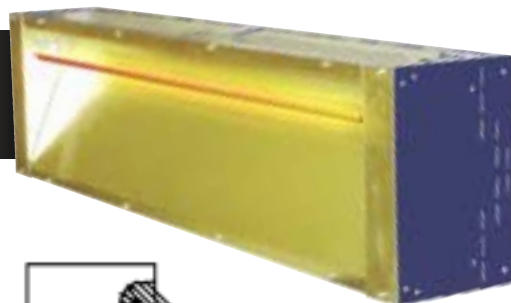


Process Heating Equipment



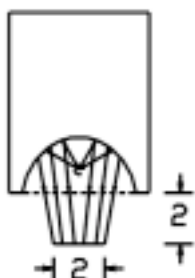
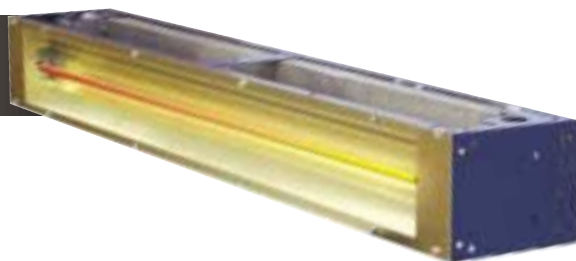
## 900 SERIES MODULAR SECTIONS

### Controlled Angular Beam Heating 5 1/2", 11", & 16 1/2" Wide Models



One of the advantages of infrared heating is the infrared energy can be directed by optically designed reflectors. Controlled angular beam reflectors are available for special heating applications. The reflectors direct the infrared energy at a 45 degree angle.

### Narrow Beam Heating 5 1/2" Wide Models



5 1/2" wide models can be supplied with a special "Narrow Beam" reflector which focuses the infrared onto a 2" wide area when positioned 2" above the target.

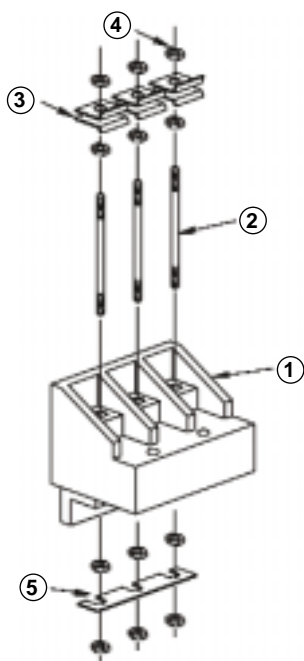
### Socket for 900 Series Sections

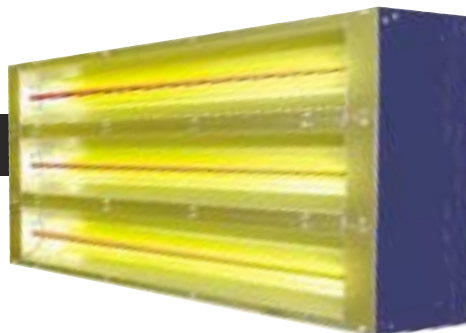
#### SO9 SOCKET ASSEMBLY

PART NO.	DESCRIPTION
9000950	COMPLETELY ASSEMBLED SO9 SOCKET WITH SOCKET STUDS AND WIRE CLIPS

#### PARTS FOR SO9 SOCKET

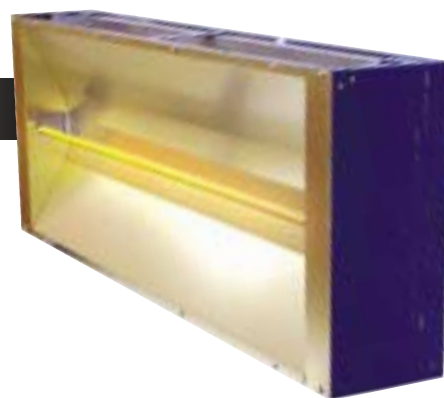
QTY.	PART NO.	DESCRIPTION	ITEM
1	900-0948	PORCELAIN SOCKET BODY	1
3	900-0947	#10-32 SOCKET STUD	2
6	900-0959	WIRE CLIP	3
12	34-052-00	#10-32 HEX NUT	4
1	900-0946	SHUNT	5



**900 SERIES MODULAR SECTIONS****16 1/2" Wide (3-Reflector) Section**

Length	Gold Anodized Aluminum Reflector	Gold Porcelain Reflector	Metal Sheath Heater
11"	9521101P	9531101P	9521111P
16"	9521601P	9531601P	9521611P
22"	9522201P	9532201P	9522211P
31"	9523101P	9533101P	9523111P
44"	9524401P	9534401P	9524411P
55"	9525501P	9535501P	9525511P
66"	9526601P	9536601P	9526611P

All 900 Series Sections will accept one or two heat sources per reflector. You **MUST** contact Fostoria Industries for cooling requirements if two heat sources per reflector are used.

**16 1/2" Wide (1-Reflector) Section**

Length	Gold Anodized Aluminum Reflector	Metal Sheath Heater	Angular Beam Reflector
11"	9321101P	9321111P	9321121P
16"	9321601P	9321611P	9321621P
22"	9322201P	9322211P	9322221P
31"	9323101P	9323111P	9323121P
44"	9324401P	9324411P	9324421P
55"	9325501P	9325511P	9325521P
66"	9326601P	9326611P	9326621P

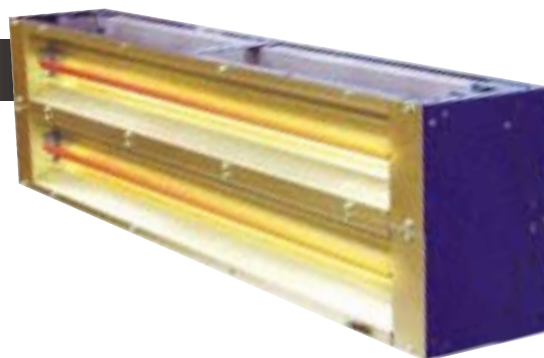
All 900 Series Sections will be supplied assembled, but not wired. Wire and wiring to be supplied by the customer in the field.



## 900 SERIES MODULAR SECTIONS

### 11" Wide (2-Reflector) Section

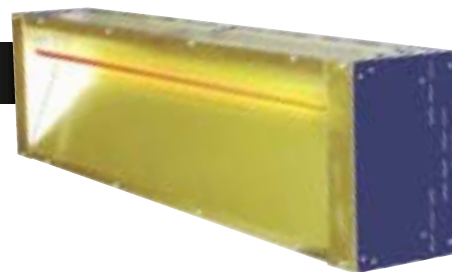
Length	Gold Anodized Aluminum Reflector	Gold Porcelain Reflector	Metal Sheath Heater
11"	9421101P	9431101P	9421111P
16"	9421601P	9431601P	9421611P
22"	9422201P	9432201P	9422211P
31"	9423101P	9433101P	9423111P
44"	9424401P	9434401P	9424411P
55"	9425501P	9435501P	9425511P
66"	9426601P	9436601P	9426611P



All 900 Series Sections will accept one or two heat sources per reflector. You **MUST** contact Fostoria Industries for cooling requirements if two heat sources per reflector are used.

### 11" Wide (1-Reflector) Section

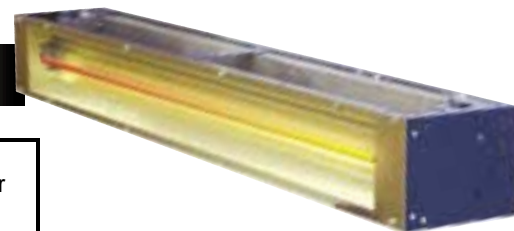
Length	Gold Anodized Aluminum Reflector	Metal Sheath Heater	Angular Beam Reflector
11"	9221101P	9221111P	9221121P
16"	9221601P	9221611P	9221621P
22"	9222201P	9222211P	9222221P
31"	9223101P	9223111P	9223121P
44"	9224401P	9224411P	9224421P
55"	9225501P	9225511P	9225521P
66"	9226601P	9226611P	9226621P



All 900 Series Sections will be supplied assembled, but not wired. Wire and wiring to be supplied by the customer in the field.

### 5 1/2" Wide (1-Reflector) Section

Length	Gold Anodized Aluminum Reflector	Gold Porcelain Reflector	Metal Sheath Heater	Narrow Beam Reflector	Angular Beam Reflector
11"	9121101P	9131101P	9121111P	9121131P	9121121P
16"	9121601P	9131601P	9121611P	9121631P	9121621P
22"	9122201P	9132201P	9122211P	9122231P	9122221P
31"	9123101P	9133101P	9123111P	9123131P	9123121P
44"	9124401P	9134401P	9124411P	9124431P	9124421P
55"	9125501P	9135501P	9125511P	9125531P	9125521P
66"	9126601P	9136601P	9126611P	9126631P	9126621P



All 900 Series Sections will accept one or two heat sources per reflector. You **MUST** contact Fostoria Industries for cooling requirements if two heat sources per reflector are used.





## MITEY MIDGET MODULAR SECTIONS



Fostoria Mitey Midget sections provide a means for applying infrared heat in confined spaces. They can be assembled side by side and end to end to form heating banks.

Mounting the Mitey Midget can be easily accomplished:

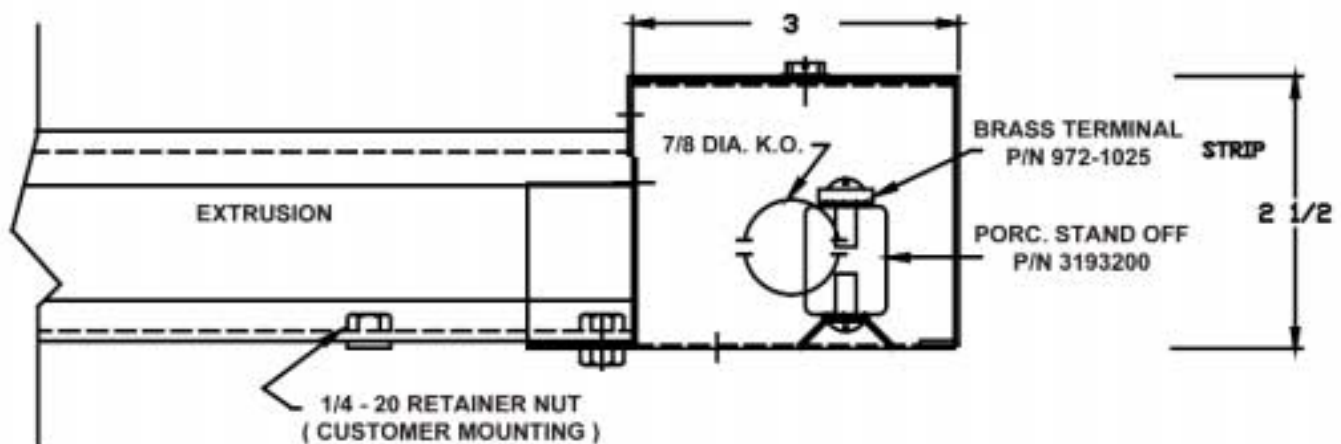
1. The top of each end box has two slotted 5/16" holes.
2. Each section has two 1/4 x 20 nuts that slide into the track extruded the full length of the section body.

Part No.	Overall Length	Overall Width	Overall Depth	Heated Length
9721061	12"	3 1/2"	2 1/2"	5"
9721561	17"	3 1/2"	2 1/2"	10"
9722161	23"	3 1/2"	2 1/2"	16"
9723061	32"	3 1/2"	2 1/2"	25"
9724361	45"	3 1/2"	2 1/2"	38"
9725461	56"	3 1/2"	2 1/2"	49"
9726561	67"	3 1/2"	2 1/2"	58"

Three 7/8" knockouts are supplied in each end of the Mitey Midget.

There is a ceramic socket in each end box for easy termination of the heat sources.

Quartz lamps, quartz tubes, and straight metal sheath rods can be used in the Mitey Midget sections.

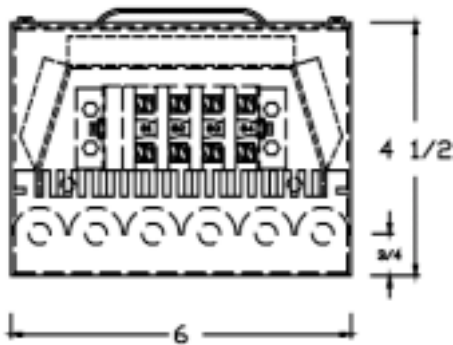
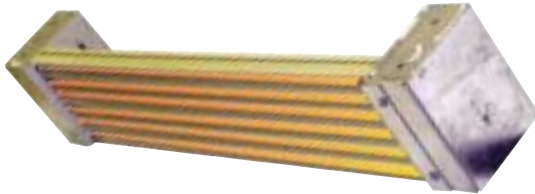






## 1600 SERIES HIGH POWER DENSITY SECTIONS

### Air Cooled Aluminum Extrusion



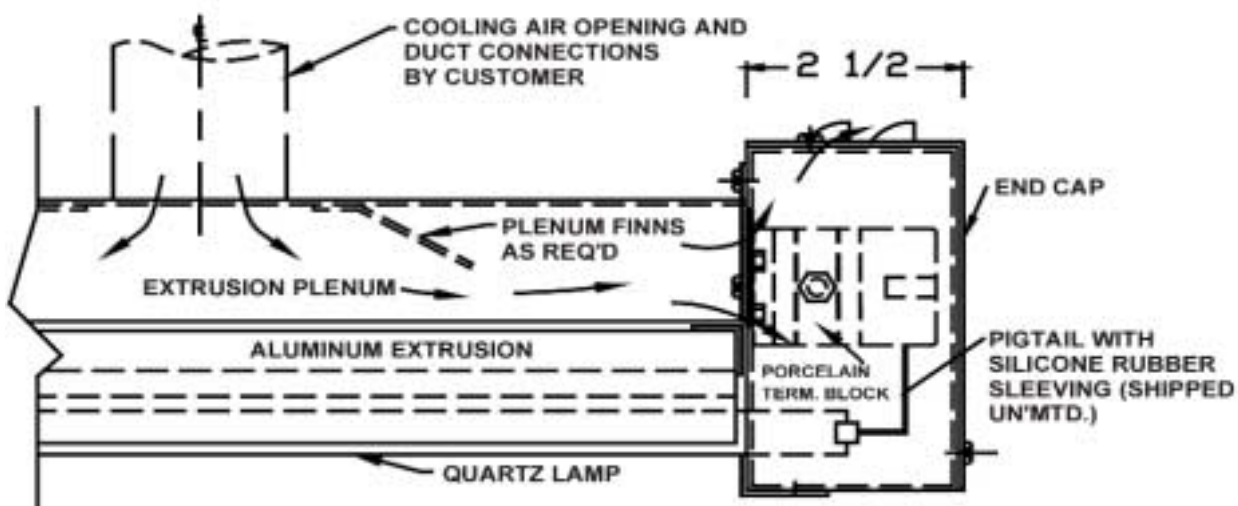
The Fostoria 1600 Series section consists of an aluminum extrusion in which a series of six reflectors are formed to accommodate a maximum of six quartz lamps (100 watts per square inch).

A cooling chamber is mounted above the extrusion to keep the section within safe operating temperatures.

Fostoria Industries must be contacted to determine the amount of cooling air needed for each application. The 1600 series sections are available as single modular units, or they can be used in multiple combinations to produce a larger heated area.

The 1600 series sections can accommodate quartz lamps and quartz tube heat sources (Fostoria Industries must be consulted if a quartz tube is required. Only certain quartz tubes will fit into the 1600 series sections).

Part No.	Overall Length	Overall Width	Overall Depth	Heated Length	Quartz Lamps Volts / Watts
9718000	11"	6"	4½"	5"	500/120
9718001	16"	6"	4½"	10"	1000 / 208 or 240
9718002	22"	6"	4½"	16"	1600 / 208 or 240
9718003	31"	6"	4½"	25"	2500 / 480 or 600
9718004	44"	6"	4½"	38"	3650 / 480 or 600
9718005	55"	6"	4½"	49"	4900 / 480
9718006	66"	6"	4½"	58"	5800 / 480





## ELECTRIC INFRARED HEAT SOURCES

Electricity is the energy of choice for many industrial infrared applications. There are many reasons for its popularity, such as: installation cost, controllability, ability to produce high temperatures quickly, and it is a clean form of heat.

Electric infrared emitters provide flexibility in producing the desired wavelength for a particular application. Fostoria offers a wide selection of electric infrared heat sources to meet the various requirements of industrial applications. Each of the different types of heat sources

has particular characteristics which determine the suitability of the heat source for a particular application.

For most applications, it is sufficient to know that short wavelength, tungsten filament sources (quartz lamps) provide high radiant efficiency, deep penetration and a fast rate of response. Medium and longer wavelength nickel chrome filament sources (quartz tubes and metal rods) are less radiant efficient, but are more rugged, less expensive, and in some cases provide the best wave length for the application.



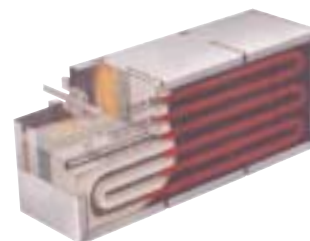
Metal Sheathed Rods



Quartz Tubes



T-3 Quartz Lamps



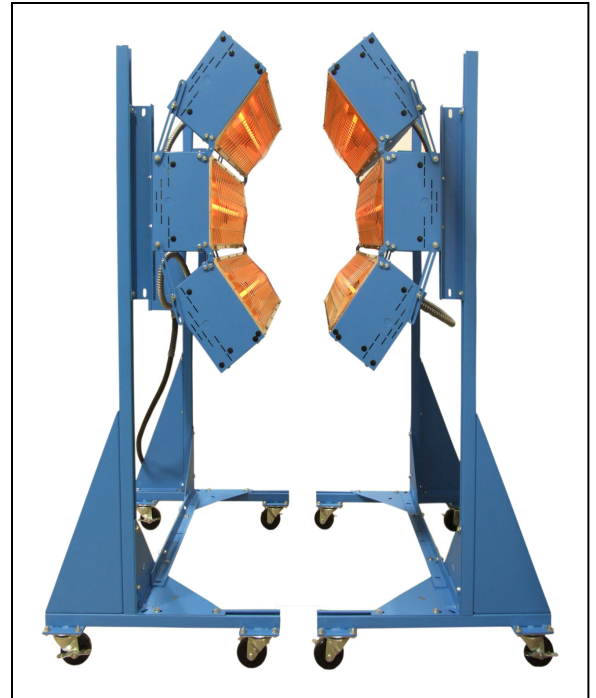
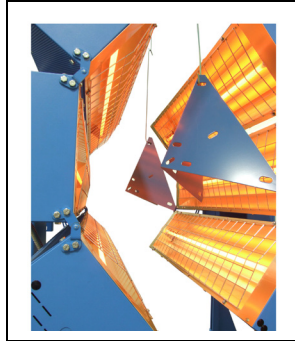
F-Series

<b>Infrared Heat Source Chart</b>	<b>Metal Sheathed Rods Long-Wave Infrared</b>	<b>Quartz Tube Medium-Wave Infrared</b>	<b>Quartz Lamp (T-3) Short-Wave Infrared</b>	<b>F-Series Panel Heater Medium-Wave Infrared</b>
<b>Construction Features</b>	Nickel chrome filament surrounded by magnesium oxide insulation, sealed in a 3/8" incoloy tube	Spiral wire nickel chrome filament wound and enclosed in a 3/8", 5/8" or 7/8" diameter translucent quartz tube enclosure. Ceramic end caps. Unsealed enclosure.	Tungsten filament supported by tantalum discs enclosed in a 3/8" diameter, clear quartz enclosure. Ceramic end caps. Sealed enclosure.	Ceramic refractory board supporting precision resistance coils welded to stainless buss bars and terminals, and bonded with high-temp cement to a quartz face.
<b>Peak Temperature</b>	1400°F	1800°F	4000°F	1800°F
<b>Peak Wavelength Range</b>	2.8 to 3.6 Microns	2.3 to 2.8 Microns	1.15 Microns	2.3 to 2.8 Microns
<b>Radiant Efficiency Avg.</b>	45 to 53%	40 to 60%	72 to 86%	80%
<b>Response Time</b>	One Min to 3 Minutes	30 Seconds	Immediate	7 Minutes
<b>Ruggedness</b>				
<b>Mechanical</b>	Excellent	Good	Good	Excellent
<b>Thermal Shock</b>	Excellent	Excellent	Excellent	Excellent
<b>Avg. Rated Life</b>	5000 Hours	5000 Hours	5000 Hours	25000 Hours
<b>Unique Features</b>	Extremely rugged. U-Shaped rods terminate at one end for easy wiring and source replacement.	Wide selection of wattages and voltages in varying lengths. Optional terminations available	High radiant efficiency. High energy output. Instant response. Controllability.	High radiant efficiency. Even heat distribution. Many sizes and watt densities. Rugged.



PROCESS EQUIPMENT DIVISION

a Division of TPI Corp.



## Modular and Portable Electric IR Bank Concept:

The "modular" portable approach to paint and powder curing creates the flexibility to apply the best infrared emitter for the dry-off, boost, flash-off, gel, pre-gel or total cure application; and this approach includes the simplicity, efficiency and quickness desired to accomplish the finishing process. These electric IR banks offer:

### ➤ Portability

- Easily set up banks to configure to the finishing process and product
- Quickly move and store the banks when not in use
- Move the banks to assist in other finishing operations

### ➤ Flexibility

- Models can be oriented to heat small-medium-large parts and can be grouped or aligned to create an infrared tunnel for use on even the longest coated parts
- Banks range from 33"H x 31"L heat patterns, up to 44"H x 66"L patterns; Fostoria will provide FREE testing and engineering to design and specify the equipment needed for the finishing operation
- The individual modular sections on the banks accept short or medium wavelength infrared emitters, in a large range of wattages and all industrial voltages (1 $\phi$  or 3 $\phi$ ), to meet the exact watt densities required for the application.

### ➤ The Advantages of Electric Infrared Heat

- Efficiency – focus the IR at the product and heat the coating, not the ambient air; instant on-off; no time wasted bringing emitters up to temperature
- Repeatable results – consistent performance through effective control of the amount of heat required, even if pass through or dwell times vary; many control options are available
- Smaller footprint – these IR banks use very little floor space, especially when compared to conventional curing ovens

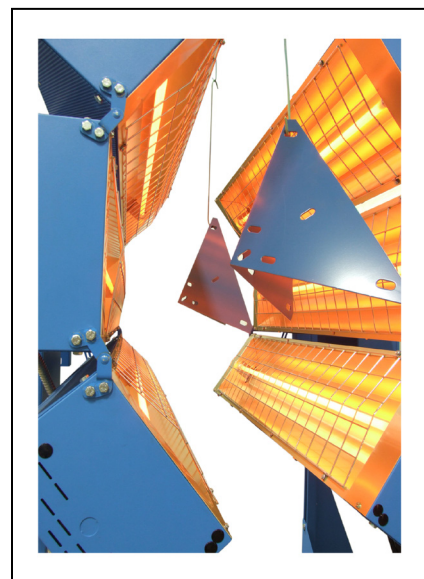
### Advantages Continued . . .

- Generally less capital expense – modular design and comparatively less component and structural costs translate into lower capital expenditures
- Clean and safe – no by-products of combustion; very little maintenance required and no moving parts on the IR banks

### Standard Models Available

Model	FPB44-H1-14.4	FPB44-H1-19.2	FPB55-H1-18	FPB55-H1-24
PCN	3972002	3971902	3972202	3972102
# Sections per bank	3	4	3	4
Emitters per bank	(3) 2400 Watt	(4) 2400 Watt	(3) 3000 Watt	(4) 3000 Watt
Wattage per bank	7.2 Kw	9.6 Kw	9 Kw	12 Kw
Voltage (1-PH)	240	240	240	240
Amperage per bank	30A	40A	37.5A	50A
Pattern per bank	33"H x 44"W	44"H x 44"W	33"H x 55"W	44"H x 55"W
Ht. (incl. stand)	75"	86"	75"	86"
Shipping Wt. (lbs)	190	210	200	220
List Price for PAIR of banks	\$ 6,720	\$ 7,420	\$ 8,120	\$ 8,820

Fostoria Engineers will assist with the design and build of many alternate heater banks



### Construction Specifications

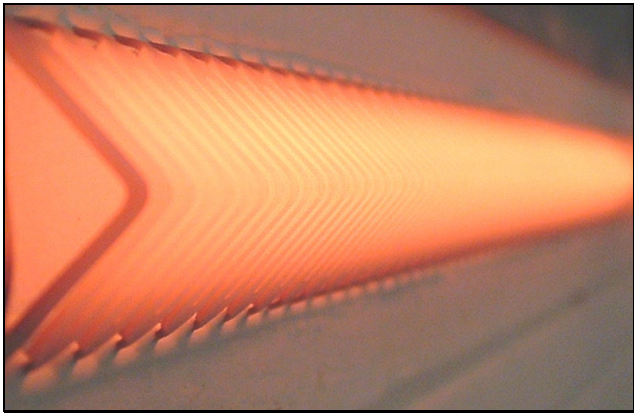
- Heat Sections consist of an integral gold anodized aluminum reflector and GAA end caps. Standard reflector disperses IR energy across a 130° pattern with the reflected IR in a tighter 65° pattern.
- Standard section is 11" wide and either 44" or 55" long; optional widths are 5-1/2" and 16-1/2"; optional lengths include 16", 22", 31" and 66" lengths.
- All sections are designed so they can be bolted together side-by-side or end-to-end; making the assembly of small, medium and large banks possible.
- Sections are designed to accept ONE or TWO short wavelength (T-3 lamps), medium wavelength (quartz tubes) or long wavelength (metal sheath) IR emitters; at a wide range of wattages at all standard industrial voltages. All sections/banks can be wired for single or 3 phase operation; and in series, parallel or combinations to suit the process and controls requirements.
- Sections are mounted to a heavy-duty steel stand with durable and lockable casters for ease of mobility and stability. Stands can be adjusted to accommodate various width heat sections.
- Optional blowers can be integrated into heat sections to add air to the finishing or dry-off process; and to wick away moisture during the cure of water based coatings.
- All standard model banks have a 100A rated disconnect, with ON/OFF switch with lockable handle.





# V-Series

## Fast Response Medium Wavelength Infrared Panel Heaters



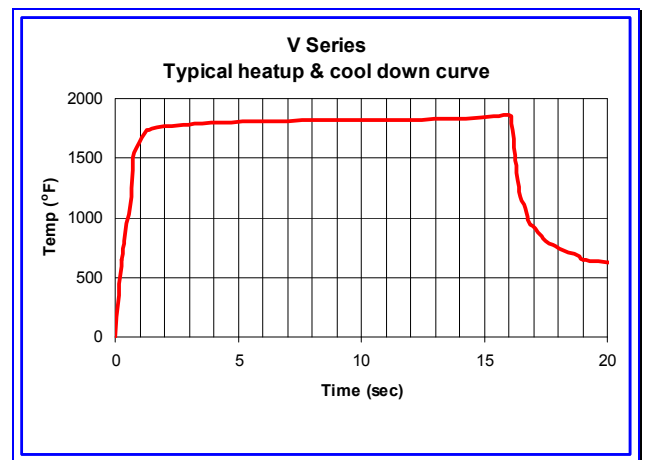
Introducing the revolutionary V-Series heater for industrial process heating applications. The V-series is perfect for applications that require high power, tight process control, and fast heat-up/cool-down.

V-shaped stamped elements have low mass for fast heating/cooling and minimal thermal lag for extremely tight process control. The elements are bonded to a high temperature insulation board having low thermal conductivity, low thermal mass, and low heat capacity to minimize stored heat so they can be switched on and off in seconds. This makes them ideal for processing heat sensitive products such as automotive components, carpeting, and other thermoforming applications.

V-Series heaters offer power densities and response times that rival those of short wavelength heaters, except they come in a very durable construction and have a medium wavelength output which is readily absorbed by most products. Therefore, they are ideally suited for drying applications, as well as heating plastics, carpet, and vinyl.

The unique V-shaped element provides numerous performance improvements over conventional stamped element heaters, including the following:

- Reduced cost
- Faster heat-up and cool-down
- Higher watt density
- Reduced thermal back-losses
- More robust construction (no need for special handling or shipping)
- More freely radiating design
- Longer life
- Elimination of hot spots
- Improved heating uniformity



### Standard Features

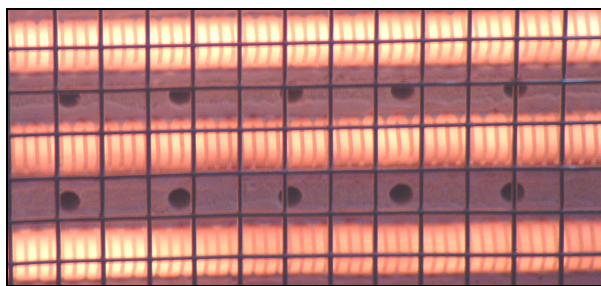
- Element temperatures up to 2,100 ° F (2 micron peak wavelength)
- Typical life expectancy of 12,000+ hrs. depending on temperature
- Heater wattages up to 100 watts per sq. in.
- Can be operated in any plane without any element sag or "coil creep"
- Stainless steel screen protects face
- Maintenance free
- Various voltages up to 600V
- Superior mechanical strength
- Rugged aluminized steel housing
- ¼-20 mounting studs
- Electrical junction box

### Optional Features

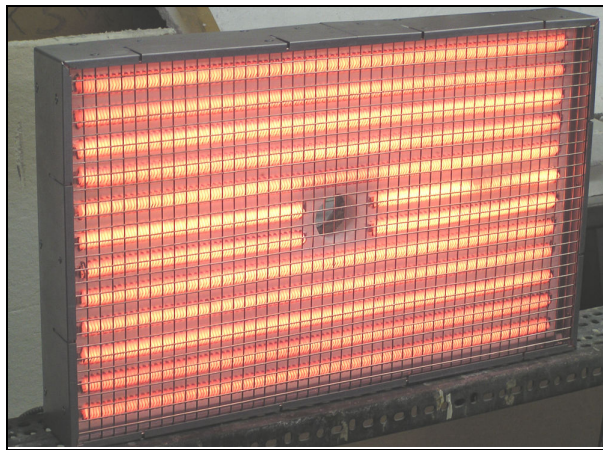
- Replaceable type K thermocouple
- Air holes for extremely fast cool down and/or to provide scrubbing action in drying applications
- Pre-mounted fans
- Multi-zone heaters
- Pyrometer view port through heater
- Stainless steel housing
- No housing (heater board only)
- Wire Leads



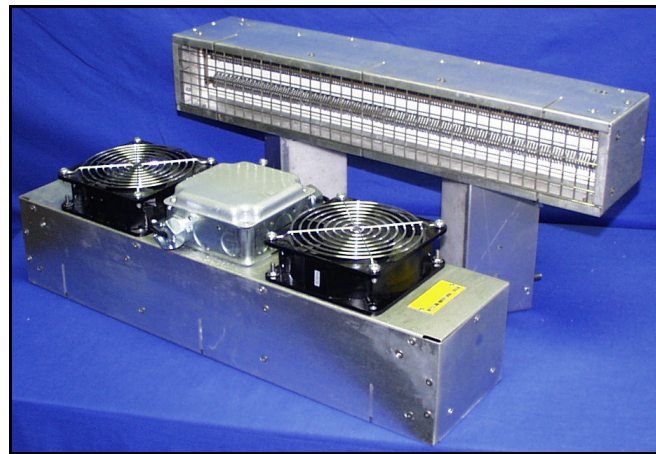
Quality Since 1917



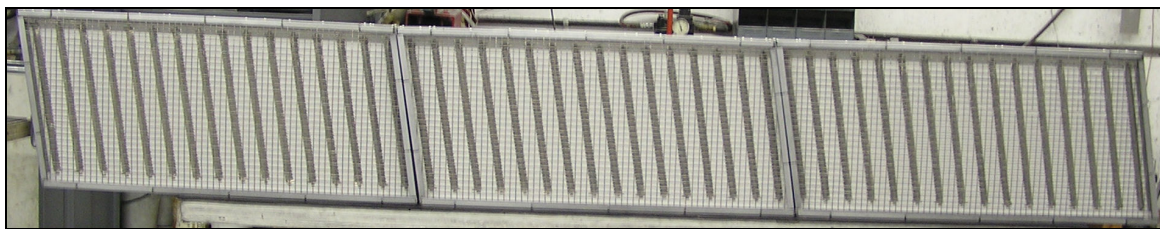
**Air holes between elements for cooling/scrubbing**



**Pyrometer View Port through heater**



**Back-mounted fans**



**Parallelogram modules for zoning across wide webs**

Fostoria Industries infrared heaters are used in many industries & applications including:

- |              |                |                      |                  |
|--------------|----------------|----------------------|------------------|
| • Adhesives  | • Electronics  | • Hose & Tubing      | • Powder Coating |
| • Annealing  | • Extrusions   | • Industrial Fabrics | • Printing       |
| • Automotive | • Fiberglass   | • Medical            | • Semiconductor  |
| • Carpeting  | • Fiber Optics | • Nonwovens          | • Textiles       |
| • Coatings   | • Films        | • Paint Finishing    | • Tubing         |
| • Composites | • Filter Media | • Paper              | • Wire & Cable   |
| • Curing     | • Foil         | • Pipe/Conduit       |                  |
| • Drying     | • Glass        | • Plastics           |                  |