**Salamander Ceramic Infrared Heating Elements**

**Infrared Salamander**

96% infrared energy efficient.
Durable, splash-proof, non-corrosive finish.
Bulk packaging available for large orders.
Ceramic tubes over lead wire within the mounting tower.
Heat sensitive color changing logo.
Maximum temperature output is 1292°F (700°C.)

UL-USA and UL-Canada listed (up to 240V only.)
Private labeling of decals with the customers logo or name and part number is available.
Available in white glaze or heat sensitive color changing yellow glaze.
1 year warranty against burnout. (Estimated life in excess of 10,000 hours.)
Watt densities from 6.5 w/in² to 38.7 w/in² (1 w/cm² to 6 w/cm².)
Spring-loaded interchangeable and cast-in thermocouples are available. (See page 6.)

**FTE - Full Trough Emitter. 150 - 1000 watts.**

Suitable for most applications.

**FFE - Full Flat Emitter. 150 - 1000 watts.**

Same size as the FTE with a flat front.
**HTE** - Half Trough Emitter. 100 - 500 watts.

**HFE** - Half Flat Emitter. 100 - 500 watts.

**HSE** - Half Square Emitter. 150 - 1000 watts.

**LTE** - Large Trough Emitter
100 - 1800 watts.

Used in the CRP panel and where a smaller number of heaters is desired.
Quartz Infrared Heating Elements
- Medium wavelength radiation.
- The most preferred source of heat when rapid heater response is needed.
- The heaters are comprised of 7-14 quartz tubes running parallel to each other within a highly reflective aluminized steel housing.
- Watt densities up to 30 w/in² (4.65 w/cm²)

HFQ - 150, 200, 250, 300 or 375 watts.

QFQ - 75, 150 or 200 watts.

HSQ - 300, 400, 500, 600 or 750 watts.

FFQ - 300, 400, 500, 600 or 750 watts.

LFQ - 750, 1000 or 1250 watts.
Thermocouples for Ceramic Elements

Spring-Loaded Interchangeable Thermocouple - Type J or K thermocouple with 24" (610 mm) leads. This ungrounded thermocouple is inserted into a bore (thermowell) in the mounting post of the Salamander ceramic elements. It is removable, which allows it to be interchanged between elements. This provides flexibility and ease of installation, maintenance, and zoning.

Order separately from elements -
Elements must have "T" suffix (thermowell).
Part#: J-24-A (Type J Thermocouple)
Part#: K-24-A (Type K Thermocouple)
Part#: J-24-A-MPJ (Includes miniature ceramic plug and jack)
Part#: K-24-A-MPJ (Includes miniature ceramic plug and jack)
See Page 11 for the miniature ceramic plug and jack.

Cast-in Thermocouple -
Permanent, fast response, cast-in thermocouple embedded in the element during manufacturing. Available only in type K.
Part#: FRK

Element Mounting

The mounting post has a channel near the top where the mounting clip secures the ceramic element to the reflector. Our single piece clip (included in the box with each element) secures the element to the reflector and allows for easy mounting. Mount elements into a 20 to 24 gauge [.036" (.9mm) to .025" (.6mm)] highly reflective aluminized steel or stainless steel reflector. See pages 7, 8 and 9 for reflectors and panels.

LTE Mounting:

FTE, FFE, HTE, HFE and HSE Mounting:
How to order elements:  
* A single piece mounting clip is automatically included with each ceramic element.

<table>
<thead>
<tr>
<th>Element Type</th>
<th>Ceramic Elements:</th>
<th>Quartz Elements:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FTE, FFE, HTE, HFE, HSE, LTE, ESE, ESES</td>
<td>FFQ, HFQ, HSQ, QFQ, LFQ</td>
</tr>
</tbody>
</table>

**Wattage:**

- **Ceramic Elements**:
  - FTE, FFE, and HSE .................. 150 to 1000
  - HTE and HFE ..................... 100 to 500
  - LTE ......................... 100 to 1800
  - ESE and ESES ................ 60 to 150

- **Quartz Elements**:
  - QFQ .......................... 75, 150, 200, 250
  - HFQ .......................... 150, 200, 250, 300, 375, 500
  - FFQ, HSQ ..................... 300, 400, 500, 600, 750, 1000
  - LFQ .......................... 500, 600, 750, 1000, 1250, 1500

**Voltage:**

- 120, 208, 220, 230, 240V UL Listed.
- 277-480V available, but not UL Listed.

Custom voltages subject to engineering approval.

**Thermocouple/Thermowell:** (Ceramic elements only, except ESE and ESES)
- None (Leave Blank), FRK (Cast-In K), T (Thermowell)

**Lead Length:**

- Ceramic: Standard 6" (152mm), Quartz: Standard 3.94" (100mm) (Leave Blank)
- All Others - Specify Length. Maximum Length is 10" (254mm)

**Glaze Color:** (Ceramic elements only)
- Wh (White), Y (Yellow), Rose, Black and other colors available.

**Terminal Options:**
- Standard Pin (Leave Blank), R (Ring), S (Spade)

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**Salamander Ceramic Emitters**

Our staff of qualified engineers designs applications using *Salamander* Ceramic Emitters.

The products in the following pages are considered necessary parts of infrared heating systems used in conjunction with *Salamander* Ceramic Emitters.

**Engineering and Design**

The versatility and flexibility of the ceramic medium allow for its adaptability to countless applications. If our standard ALEX extrusion or modular CRP panel will not work for your application, we will design and fabricate **custom infrared heating panels and reflectors** in almost any size and shape. We welcome and encourage you to consult with us in helping you to create the perfect solution for your infrared heating needs. If you are making the custom panel yourself, we provide engineering assistance and drawings. Mor Electric Heating provides engineering, laboratory testing, custom fabrication and system design.
ALEX - Aluminum Extrusion Reflector Assemblies
A complete assembly with reflector, outer case and pre-wired terminal blocks. The ALEX requires FTEs with the standard 6" (152.4mm) leads.

- Extruded aluminum outer case.
- Polished stainless steel removable reflector.
- 1/2" conduit knockout on both ends of the assembly.
- Built-in interlocking channel allows extrusions to be interlocked together.
- Wire guard protection is available to protect the heaters from damage.
- Custom assemblies are available including groupings of full and half sized emitters.

How to order:
ALEX/F (multiple F's for the number of FTE size heaters) Example: ALEX/FFF

Standard position adjustable mounting hardware permits adjustment for mounting hole spacing via 1/4-20x1.5 stud screws in a t-slot nut with ball/spring, which slides in the groove of the top terminal cover extrusion.
CRP - Ceramic Radiant Panel
These heavy duty stainless steel panels are pre-wired and assembled with 3 LTE size ceramic infrared heating elements and insulated with ceramic fiber insulation.

- 12" x 12" (305mm x 305mm)
- Made to order with your desired wattage and voltage (120 to 480 volt) for your application.
- Total available wattage: 300 to 5400 watts.
  Watt density: 2.1 to 37.5 w/in² (.3 to 5.8 w/cm²)
- The heaters are very close together virtually eliminating cold spots.
- Thermocouples available as an option.
- Can be wired as a single or three phase panel.
- Single zone or three zone available.
- The heaters can be easily replaced.

The CRP panel has a modular building block design so that many panels can be mounted next to each other to make a larger panel. It also can also be used as a stand alone unit and can be mounted on angle iron gridwork.

How to order: CRP 12x12 (Specify voltage, wattage, and phase when ordering.)
Ceramic Terminal Blocks

High quality terminal blocks available for immediate delivery from our stock shelves. They make wiring connections to heaters efficient and easy and have a touch safe design.

MG Power Wire - Very High Temperature
10, 12 or 14 gauge, 600 volt, 842°F (450°C), stranded, mica sleeving, fiberglass overbraid, sold by the foot.
Part #: Mags-X (X=gauge)

TGGT Power Wire - High Temperature
10, 12 or 14 gauge, 600 volt, 482°F (250°C), stranded, Teflon sleeving, fiberglass overbraid, sold by the foot.
Part #: TGGT-X (X=gauge)

Sil-A-Blend Power Wire - High Temperature
10, 12 or 14 gauge, 600 volt, 482°F (250°C), stranded nickel-plated copper, silicone rubber coated, sold by the foot.
Part #: Sil-A-Blend-X (X=gauge)

Thermocouple Wire
20 gauge type J or K thermocouple grade stranded wire with fiberglass overbraid and two fiberglass wire braids, sold by the foot.
Part #: J20-3-302
Part #: K20-3-302

Thermocouple Extension Grade Wire
20 gauge solid wire (PVC-PVC) sold by the foot.
Part #: J20-5-502
Part #: K20-5-502
### Porcelain Wire Connectors
High temperature electrical cone connector. Ribbed design. Large skirt opening. Rated 300 volts maximum. For joining solid and/or stranded wire.

**Part #'s:** Hi-1, Hi-5, Hi-7 and Hi-8 (Small, Medium, Large and X-Large)

### Fiberglass Cloth Tape
3/4" (19mm) wide x 108 feet (32.91m) long roll with pressure-sensitive thermosetting silicone adhesive. 365°F (185°C) rated.

**Part #:** FT-1

### Terminal Connections
High-temperature, non-insulated, nickel plated alloy steel. Ring, spade and slide terminals and butt connectors. Rated up to 900°F (482°C)

### Insulation
- Ceramic fiber blanket for infrared panels.
- 1" thick strong, flexible and lightweight.
- Rated to 2300°F (1260°C.) Sold by the square foot or the box (48"x25')
- (1.22m x 7.62m)

**Part #:** Durablanket S

### Fiberglass Protective Slewing
- Secondary insulator of electrical wires.
- Rated up to Thermal Class C for 464°F (240°C) operation. Non-coated, heat treated, braided fiberglass tubing. Maintains its basic properties in temperatures as high as 1200°F (649°C.)

**Part #'s:** F240-2 (0.263") (6.68mm), F240-3/8 (3/8") (9.49mm) and F240-1/2 (1/2") (12.7mm)

### Temperature Controls
Controls for open and closed loop process applications.

### Solid State Power Controls
SSR’s (Solid State Relays) and SCR’s (Silicone Controlled Rectifiers) for power control of process heating applications.

### Mercury Relays/Contactors
- Available only in the USA, Canada and Mexico.
  - 20, 35, 60, 80, 100 and 150 amps.
  - Highly reliable, long lasting, hermetically sealed, self-renewing contacts.
  - Standard voltages of 24, 120, 208/240, 277, and 480V, 50/60 Hz and 24V DC.

### Temperature Sensors
Thermocouples and RTD’s (Resistance Temperature Detectors)

### Non-Contact Infrared Sensors (Thermocouples)
- Pre-calibrated
- Stainless steel
- Specify range (-50 to 1200°F) (-10 to 649°C)
- Type J or K
- Built-in aircool fitting

**Part #'s:**
- IRt/c.5 (11° field of view)
- IRt/c.10 (6° field of view)

### Miniature Ceramic Plug and Jack Connectors
Type K. High temperature two-piece ceramic has a temperature rating up to 560°C (1200°F.) Stranded or solid thermocouple wires up to 20 AWG.

**Part #'s:** MPJ-K-F and MPJ-K-M

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Mor Electric Heating Assoc., Inc. - www.InfraredHeaters.com
Applications

We have expertise in these and other applications:

- **Heating**
  - Thermoforming
  - Pets and animals
  - Screen Printing
  - Heat Therapy
  - Shrink Wrapping
  - Pre-Heating - Aluminum, Rubber, Steel, etc.

- **Drying**
  - Evaporation (Water)
  - Dehydrating (Printing)

- **Cooking**
  - Food warming
  - Toasting
  - Browning
  - Melting
  - Sugar Pulling
  - Dehydrating

- **Curing**
  - Powder coating
  - Paint curing
  - Annealing
  - Laminating
  - Adhesives

Application guide with average guidelines:

<table>
<thead>
<tr>
<th>Thermoforming</th>
<th>Saunas</th>
<th>Paint Drying</th>
<th>Food Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic - 25 watts/square inch</td>
<td></td>
<td>Oil based: 10-25 watts/sq. inch</td>
<td>Cooking: 25 watts/sq. inch</td>
</tr>
</tbody>
</table>

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