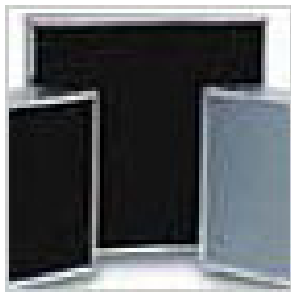


Metal/Glass face heaters (M and G series)

High-temperature, cleanable surface, and uniform coverage.



G-Series Specifications

Glass is the standard face on the G-Series panel heaters. There are two versions of this heater. The GB model makes use of a high-temperature (1202°F/ 650°C, continuously operating temperature) black glass, while the GC heater makes use of a clear (slight yellow tint), high- temperature (1292°F/700°C, continuously operating temperature) glass. The remaining construction of the G-Series heater is similar to that of the F-Series heater with the exception that glass replaces the quartz composite fabric as the face material.

The glass face G-Series heater is used for industrial applications in which there is a possibility that materials will fall onto the heater's face. A glass face allows for easy clean-up and prevents damage to the heater or heating element. Common applications for the G-Series heater include operation as the bottom oven in a thermoforming machine and as the bottom heater in a wave solder oven.

The G-Series heater can be constructed as wide as 24" (610 mm) and as long as 36" (914 mm), though not that width and length in the same heater. For example, a 36" (914 mm) long heater is commonly 12" (305 mm) wide. This heater has a maximum watt density of 20 watts/in² (31 kW/m²) and a durability defined by a typical life expectancy of 25,000 hours. It has a high radiant efficiency of 77.5%. Because the heater's design does not depend on an external reflector, the heater maintains a consistently high radiant efficiency over time. The G-Series heat transfer rate for 20 watts/in² (31 kW/m²) is 1.9 Btu/ft²/sec. delivered to the product.

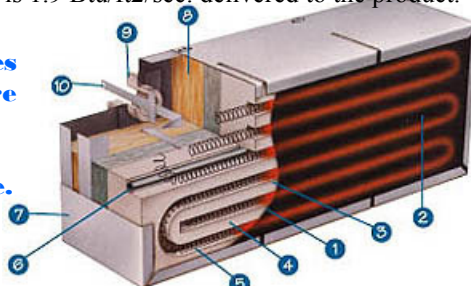
Heaters in the G-Series and M-Series product lines use a high temperature material for their surface face. All heaters provide a uniform coverage with a convenient, cleanable surface.

M-Series Specifications

Metal is the standard face on the M-Series panel heaters. The face can be manufactured using either hard-coated aluminum or porcelainized steel. The remaining construction is exactly the same as that used in the G-Series heaters. The heater's face can be provided with air holes for forced airflow, as is done in the FBA's construction.

A metal face is used for industrial applications in which there is a possibility that materials will fall onto the heater's face. Although a metal face heater is more durable than a glass face heater, a disadvantage, however, is that the radiant efficiency of metal is slightly lower than that of glass. Because a glass face heater allows a portion of the infrared energy to transmit through the glass, only a segment of the infrared energy is absorbed by the glass and re-radiated. A metal face heater, on the other hand, absorbs all of the energy and re-radiates it to the process. Especially demanding applications sometimes require a slightly different design that makes use of a hard-coated aluminum face constructed in a cap (pan) style. This design ensures that materials definitely can not penetrate the heater.

The M-Series heater can be constructed as wide as 24" (610 mm) and as long as 48" (1219 mm), though not that width and length in the same heater. For example, a 48" (1219 mm) long heater is commonly 12" (305 mm) wide. This heater has a maximum watt density of 10-15 watts/in² (15.5 - 23 kW/m²), depending on which metal face is used, and a durability defined by a typical life expectancy of 25,000 hours. It has a radiant efficiency of 64%. Because the heater's design does not depend on an external reflector, the heater maintains a consistently high radiant efficiency over time. The M-Series heat transfer rate for 10 watts/in² (15.5 kW/m²) is 0.786 Btu/ft²/sec. delivered to the product.

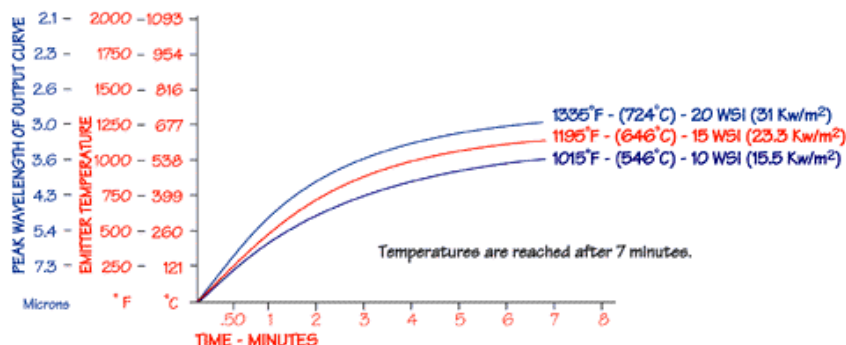


Features:

1. Glass or metal emitter surface material
2. Ceramic standoffs used to keep electrically conductive material separated from resistance wire
3. High-temperature cement bond
4. Refractory board to hold resistance wire
5. Precision-resistance wire
6. Heavy gauge aluminized steel frame
7. Blanket insulation layer
8. Ceramic bushings to insulate terminals
9. Stainless steel terminals
10. Quartz thermowell tube (optional)

Glass Face Warm-up Curve

The warm-up curves are measured from heaters running facedown in open air. The thermocouple is located in a standard location inside a thermowell behind the coil. The curves will change depending on the environment and thermocouple location.



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APPLICATIONS

Type GB Glass Front Panel Heaters are suitable for drying, baking, curing, sterilizing, and many other applications requiring contact-free heating. Long wave length is suitable for most colors. They are especially desirable if the heater must be periodically wiped clean.

STANDARD FEATURES

Panel design utilizing iron/chromium/aluminum alloy resistor element, high temperature rated internal terminal connections, thermocouple well assembly, and backed up with high temperature insulation.

ACCESSORIES

Type J(K) thermocouple suitable for field installation. Type RHTW High Temperature Wire and type RH High Temperature Terminal Connectors recommended for field installation.

M-Series Specifications

Metal is the standard face on the M-Series panel heaters. The face can be manufactured using either hard-coated aluminum or porcelanized steel. The remaining construction is exactly the same as that used in the G-Series heaters. The heater's face can be provided with air holes for forced airflow, as is done in the FBA's construction.

A metal face is used for industrial applications in which there is a possibility that materials will fall onto the heater's face. Although a metal face heater is more durable than a glass face heater, a disadvantage, however, is that the radiant efficiency of metal is slightly lower than that of glass. Because a glass face heater allows a portion of the infrared energy to transmit through the glass, only a segment of the infrared energy is absorbed by the glass and re-radiated. A metal face heater, on the other hand, absorbs all of the energy and re-radiates it to the process. Especially demanding applications sometimes require a slightly different design that makes use of a hard-coated aluminum face constructed in a cap (pan) style. This design ensures that materials definitely can not penetrate the heater.

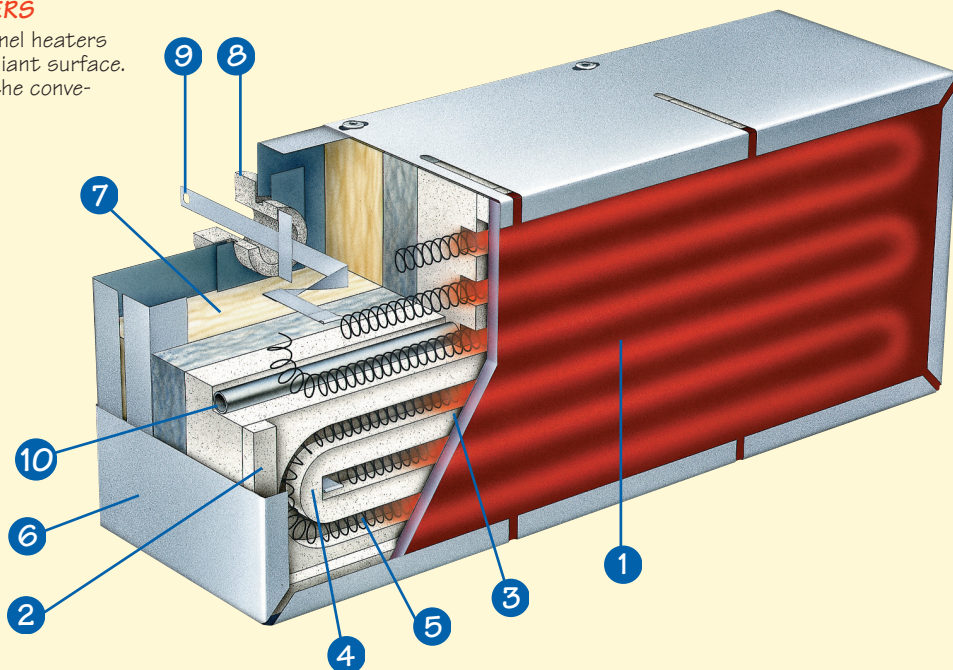
The M-Series heater can be constructed as wide as 24" (610 mm) and as long as 48" (1219 mm), though not that width and length in the same heater. For example, a 48" (1219 mm) long heater is commonly 12" (305 mm) wide. This heater has a maximum watt density of 10-15 watts/in² (15.5 - 23 kW/m²), depending on which metal face is used, and a durability defined by a typical life expectancy of 25,000 hours. It has a radiant efficiency of 64%. Because the heater's design does not depend on an external reflector, the heater maintains a consistently high radiant efficiency over time. The M-Series heat transfer rate for 10 watts/in² (15.5 kW/m²) is 0.786 Btu/ft²/sec. delivered to the product.

G-SERIES, M-SERIES PANEL HEATERS

The G-SERIES and M-SERIES line of IR panel heaters uses high temperature material as the radiant surface. All heaters provide uniform coverage with the convenience of a cleanable surface.

FEATURES:

- 1 Glass or metal emitter surface material
- 2 Ceramic standoffs; keep electrically conductive material separated from resistance wire.
- 3 High temperature cement bond
- 4 Refractory board to hold resistance wire
- 5 Precision resistance wire
- 6 Heavy gauge aluminized steel frame
- 7 Blanket insulation layer
- 8 Ceramic bushings to insulate terminals
- 9 Stainless steel terminals
- 10 Quartz thermowell tube (optional)



METAL is the standard face on the M-SERIES panel heaters. The face can be either hard-coated aluminum or porcelanized steel. The remaining construction is exactly the same as the G-Series heaters. The heater face can be provided with air holes for forced airflow as in the FBA construction.

The metal face is used when there is concern of material falling onto the heater face. The metal face is more durable than the glass face. The flip side is that the radiant efficiency is slightly lower with a metal face. A glass face heater allows a portion of the IR energy to transmit through the glass and a segment of the IR energy is absorbed by the glass and re-radiated. A metal face heater absorbs all of the energy and re-radiates that energy to the process. In some cases, applications are extremely grueling and require a slightly different design. This design makes use of the hard-coated aluminum face being constructed in a cap (pan) style. This design ensures that material cannot get inside the heater.



M-SERIES SPECIFICATIONS

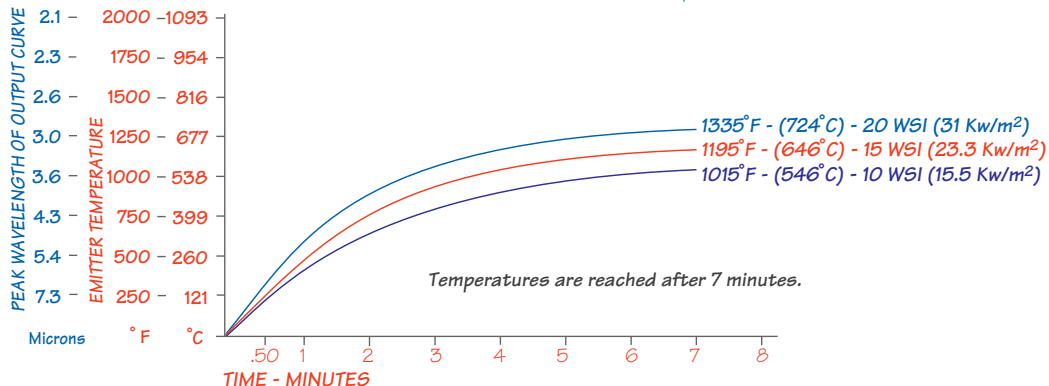
Dimensionally, the heater can be as wide as 24" (610 mm) and as long as 48" (1219 mm), though not this wide and long in the same heater. A 48" (1219 mm) long heater is more commonly 12" (305 mm) wide. This heater has a maximum watt density of 10-15 wsi (15.5 - 23 kw/m²), depending on which metal face is used. Durability is defined by a typical life expectancy of 25,000 hours. The heater has a radiant efficiency of 64%. Because the heater design does not depend on an external reflector, the heater maintains efficiency over time. The M-Series heat transfer rate at 10 wsi (15.5 kw/m²) is 0.786 Btu/sq. ft./sec. delivered to the product.

GLASS is the standard face on the G-SERIES panel heaters. There are two versions of this heater. The GB heater makes use of a high temperature (1202°F/ 650°C continuous operating temperature) black glass. The remaining construction is similar to the F-Series heater with the exception of the glass replacing the quartz fabric as the face material.

The glass face heater is used when there is concern of material falling onto the face of the heater. The glass face allows for easy clean up, without damage to the heater or heating element. Common applications are the bottom oven in a thermoforming machine or the bottom heater in a wave solder oven.

GLASS FACE WARM - UP CURVE

Warm-up curves are measured from heaters running face down in open air. The thermocouple is located in the standard location in a thermowell located behind the coil. Curves will change with environment and thermocouple location.



G-SERIES SPECIFICATIONS

Dimensionally, the heater can be as wide as 24" (610mm) and as long as 36" (914 mm), though not this wide and long in the same heater. A 36" (914mm) long heater is more commonly 12" (305mm) wide. This heater has a maximum watt density of 20 wsi (31 kw/m²). Durability is defined by a typical life expectancy of 25,000 hours. The heater has a high radiant efficiency of 77.5%. Because the heater design does not depend on an external reflector, the heater maintains that efficiency over time. The G-Series heat transfer rate at 20 wsi (31 kw/m²) is 1.9 Btu/sq. ft./sec. delivered to the product.