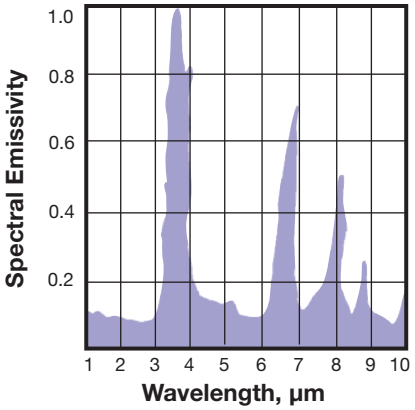
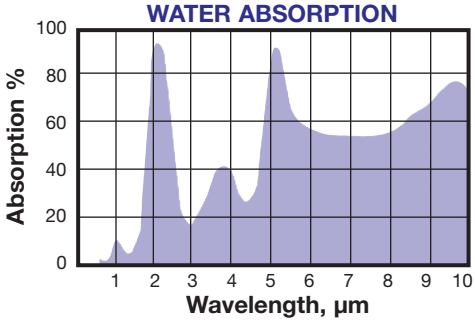
Medium Wave Infrared E-Mitters

SPECTRAL EMISSIVITY OF PET FILM



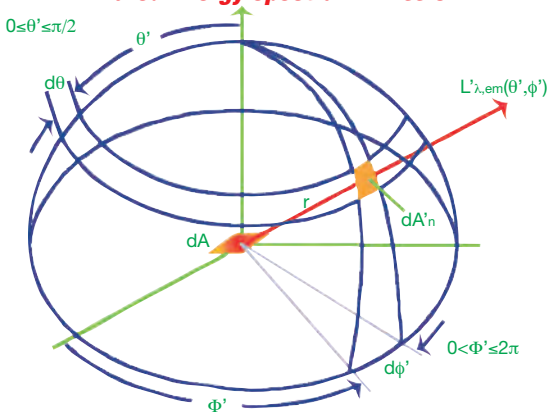
WAVELENGTH CONTROL – The very low heat transmission losses through the clear quartz material of the twin bore heaters allow Tempco's engineers to carefully design the peak emitted wavelength of these heaters to match the peak absorption wavelength for a given material or application. By modifying the temperature of the E-mitter, its peak emitted wavelength will change according to Wien's displacement law (see page 7-101). All E-mitters will emit a range of wavelengths above and below their peak value. (See spectrum graph on page 7-97.) The design of an efficient infrared heating system must consider both the spectral nature and directional properties of thermal radiation.

WATER ABSORPTION



SPECTRAL NATURE: To address this issue, heaters should be designed to emit wavelengths that closely match the absorption band of the processed material in a given application. By carefully considering the broad side-bands of the emitted radiation and absorption, it is possible to design systems that will enhance the heat transfer rates at different stages of the heating process.

Infrared Energy Spectrum Emission



Vaporization of water is best achieved in the infrared spectrum at wavelengths in the range of 3.1 and 6.1 μm (microns). After the water is removed, the infrared heating rate should match the absorption spectrum of the base material to avoid damaging it thermally. Similar approaches are used in many industries, such as automotive, glass and plastic processing, textiles, electronics and many others.

DIRECTIONAL NATURE: The directional nature of the heat distribution is dealt with by consideration of how to direct heat toward an application. The efficiency of the heating system depends strongly on the percentage of the total infrared energy generated at the resistance coil that reaches the target material. Consideration must be given to the fact that this infrared energy propagates from the E-mitter in all possible directions with a non-uniform wavelength distribution.

Design Specifications

Performance Ratings			
Reflective Backing	**Gold**	**White Ceramic**	**Clear* (no backing)**
Maximum Coil Temperature	1472ºF (800ºC)	2012ºF (1100ºC)	2012ºF (1100ºC)
Peak Emitted Wavelength Range (microns)	2.7-6.5	2.1-6.5	2.1-6.5
Radiation Pattern	180º	180º	360º
Nominal Reflected Heat Efficiency	95%	75%	0%

*Clear tubes are designed for use with external reflector.

Electrical Ratings			
Twin Bore Tube Size	**17 × 8 mm**	**23 × 11 mm**	**33 × 15 mm**
Maximum Power Density (per unit length)	42 w/in (16.5 w/cm)	51 w/in (20 w/cm)	63.5 w/in (25 w/cm)
Maximum Voltage	480V	480V	600V
Maximum Amperage per circuit	9.5A	13.5A	20A

Standard wattage tolerance is +5%, -10%; closer tolerances available upon request