



In Search of the “Best” Heater

The day has still not arrived when we can manufacture a heater that can do all things. That’s why a knowledge of the strengths and weaknesses of all types of heaters is the only way to successfully make choices for specific applications. The four major heat types to be considered are: metal sheath, quartz tube, quartz lamp, and ceramic.

Similarities in the above types of heaters are less important than the differences. They are all *good* heaters, depending on what application they are being used in. It is also important to realize that some applications may benefit most from using a combination of heat types. By having a good knowledge of the differences of the various heat types, and using a simple process of elimination, it can be easy to match the best heater for an application. Using a combination of heaters can be a little more difficult and in considering it, each phase of the process should be evaluated by the same criteria.

The following are simple explanations of the most appropriate usage for the four heater types:

Metal-sheath elements- are best used for convection heating needs, such as ovens. They are rugged, cost effective for the application, and efficient. For example, metal-sheath elements can be found in every electric household oven.

Quartz tubes- are best used for radiant applications that need instant on, instant off, such as heat sensitive materials that may have to linger in a heat source.

Quartz lamps- are also instant on and off but made in extremely high watt density. These are effective for high speed production processes.

Ceramic elements- are best used for processes requiring an even, gentle heat and where there is a need for zone control.

Wavelength and emissivity value of the material being heated are also essential for heater selection. Though emissivity charts should be used with specific formulas to calculate the wavelength requirements, a simple generality is “the hotter the heating element, the shorter the wavelength.” The absorption rate of the material would then need to be considered as to which wavelength would be appropriate. Another generality is “the higher the absorption, the longer the wavelength requirement.” A more detailed explanation of wavelength and emissivity will be covered in a future newsletter.

Continued on Back . . .

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The following chart is designed to help with the process of heater selection when asking these specific questions:

	Ceramic Emitters	Metal Tubulars	Quartz Tubes	Quartz Lamps
How quickly must the heater reach maximum temperature? Response time:				
	Slow	Slow	Fast	Excellent
How does the lifespan of the heater relate to cost of a replacement, and this cost relate to the cost of the end product? Lifespan:				
	Excellent	Excellent	Good	Good
Does the application require a durable heater? Durability:				
	Good	Excellent	Poor	Poor
How does the efficiency of the heater relate to the cost, and this cost relate to the end product? Infrared efficiency:				
	96%	56%	61%	85%
Would the application benefit from zone control? Controllability with an integral thermocouple:				
	Yes	No	No	No
What is the maximum temperature required to heat the material? Maximum operating temperature:				
	1292 °F (700 °C)	1400 °F (760 °C)	1600 °F (871 °C)	2500 °F (1371 °C)
Compare the cost of the heater with the budget of the application. Cost:				
	Medium	Low	Medium	High
Installation and replacement time must be considered as part of the “cost” of operation. Installation:				
	Moderate	Easy	Moderate	Difficult
What wavelength does the material require? Wavelength:				
	Medium	Medium	Short	Short
Which heater will work most effectively with the emissivity level of the material? Emissivity of material:				
	High	High	Low	Low

ESEasy

The convenience and versatility of the Edison Screw-base Emitter (ESE) was just expanded further by the addition of a 120V plug and cord set. Until recently, the only option was to hard-wire the fixture. The brushed aluminum reflector provides the perfect housing for our long-stemmed ESE element and now allows it to be placed or moved anywhere where needed.

The direct focus emission pattern provided by the ESE and reflector most benefit applications for animals such as, incubation, nurturing, healing, or maintaining environmental conditions. The reflector may be rested face down on the cage or aquarium, suspended, or placed on a stand. Other applications include food warming or heating, spot drying, or any process requiring an economical and flexible heat source.

The reflector comes with a 7-1/2 foot cord and is only available for use with 120V emitters at 300 watts or less. The 3-pronged plug is for use in 120V outlets only and is UL approved. Additional information may be found on our website at: www.InfraredHeaters.com/ESE.htm. The plug-in reflector is currently only available at our U.S. location. Contact any salesperson for pricing and delivery.

