

RADIANT HEAT IS THE MOST EFFICIENT TRANSFER OF HEAT ON THE PLANET

Many foundries and die casters have used radiant roof melters for many years to faithfully deliver molten metal to make castings. By utilizing double end clean out and pre-heat hearths these furnaces are some of the easiest to clean and much more efficient than just a few years ago. Advances in insulating back up linings have made these furnaces cooler to work around and more energy efficient than ever before. With numbers like 1250 BTU's/# of metal melted they challenge any furnace on the market for best value when you look at all the advantages they offer. The basic design is simple.

Radiant roof reverberatory furnaces rely on two things in the design matrix to make them most efficient

1. Distance from the heat source (the burners) to the load (the aluminum)
2. Hold to melt ratio.
3. Even charging of the load

Stephan-Boltzmann law of radiant heat states that the closer the object is to the heat source and the greater the temperature differential the faster the transfer of BTU's. This is the design criteria for radiant roof melting. By utilizing low velocity, flat flame, high thermal release burners that heat the block up to 2600 degrees F. you obtain a huge temperature differential between the aluminum and the heat source. The transfer of BTU's into the aluminum is then the best of all types of furnaces.

Radiant Heat Melting -

- a. In this type of furnace the greatest efficiency is obtained when there is the greatest temperature differential between the radiant source (the burner blocks, not the furnace upper chamber) and the receiving medium (the molten aluminum bath);
- b. The closer the radiant source is to its receiving medium; the more efficient it is;
- c. The closer the radiant heat sources, the more sources (burners) you need to obtain coverage of the medium.

The hold to melt ratio is critical as a dilution factor for the cold metal being charged into the furnace. The higher that ratio the less temperature swing you get when evenly charged. Either radiant roof or high head room side fired melters should be charged at ¼ of their hourly rated capacity every 15 minutes. This will insure you get temperature even at plus or minus 10 degrees during the melting process.

Overcharging of these furnaces can create sludge in the furnace (if the metal temperature drops below the sludge point of the alloy), result in poor quality metal and will increase dross losses.

Typically the radiant roof approach of melting everything under the surface of the bath greatly reduces metal melt loss (2-3% in gas and less than 1% in electric) and increases melt efficiencies for melting small light weight scrap.