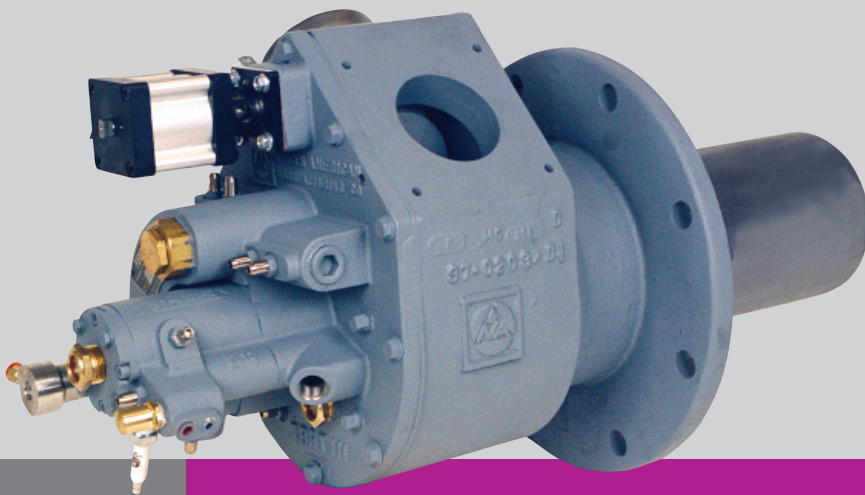




fives north american

# TBRT III

## Regenerative Radiant Tube Combustion System



TBRT III delivers superior tube uniformity by alternately firing each end of the radiant tube.

Lower total operating cost than cold air and recuperative systems.

### Improved Product Quality

Sustained, even heating is a requirement for quality heat treatment. The TBRT III delivers this uniform heating, resulting in a better product.

### Reduced Energy Consumption

At the heart of the TBRT III system is the TwinBed® regenerative burner. The high efficiency of the burner system delivers fuel savings of 15 to 25% over typical recuperative systems and as much as 50% over cold air systems.

### Reduced Emissions

The TBRT III system uses efficient staging technology to minimize NOx and CO emissions. Since the regenerative burner requires less fuel, total "stack" emissions are reduced. Using less fuel also means a reduction in CO2 emissions.

### Increased Furnace Capacity

Superior tube temperature uniformity, inherent to the TBRT III combustion system, increases heat transfer to the furnace by as much as 20% with a proportionate increase in potential furnace capacity.

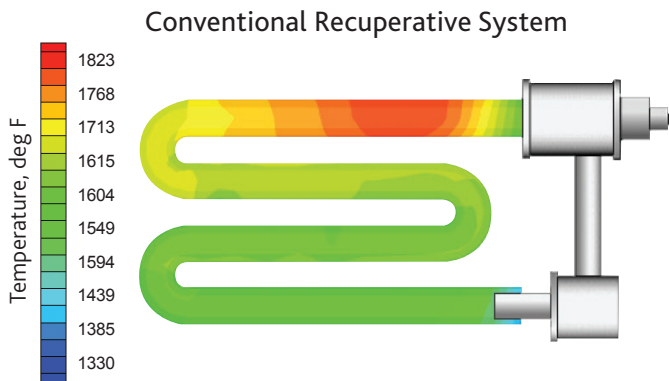
### Extended Radiant Tube Life

Since the tube temperature is uniform, "hot spots" are eliminated with the TBRT III system. As a result, radiant tube life for an existing application is typically doubled.

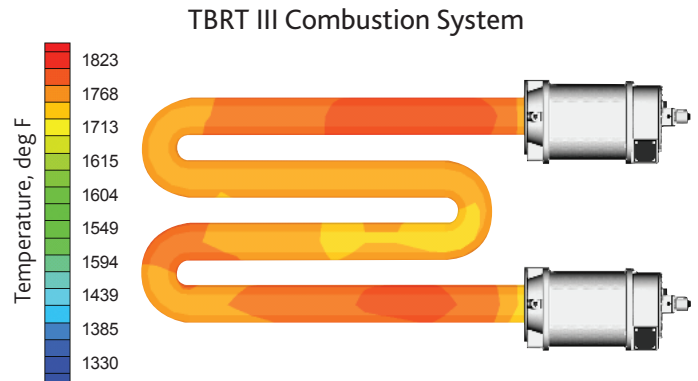
### Lower Furnace Downtime

Lost production opportunity is the major element of the costs associated with tube replacement. The increased tube life provided by the TBRT III System translates directly into increased revenue potential.

## TBRT III Combustion System vs. Conventional Recuperative Firing



Maximum Tube Temperature: 1850°F (1010°C)  
 Minimum Tube Temperature: 1329°F (721°C)  
 Average Tube Temperature: 1657°F (903°C)  
 Average Heat Flux: 41 Btu/in<sup>2</sup>-hr



Maximum Tube Temperature: 1850°F (1010°C)  
 Minimum Tube Temperature: 1641°F (893°C)  
 Average Tube Temperature: 1793°F (978°C)  
 Average Heat Flux: 79 Btu/in<sup>2</sup>-hr

	Conventional Recuperative Combustion System	TBRT III Combustion System
Firing mode	Continuous firing in one direction	Alternate firing and fluing through regenerative burner on each end of the radiant tube
Turndown	Modulated fuel and air typical limit is 3:1	Time proportioned firing allows infinite possibilities
Heat recovery type	Heat exchanger	Regenerative heat recovery bed alternately stores and releases heat
Typical thermal efficiency	55 - 60%	75 - 80%
Avg. radiant tube heat flux	Lower	Higher
Radiant tube life	Shorter	Longer



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