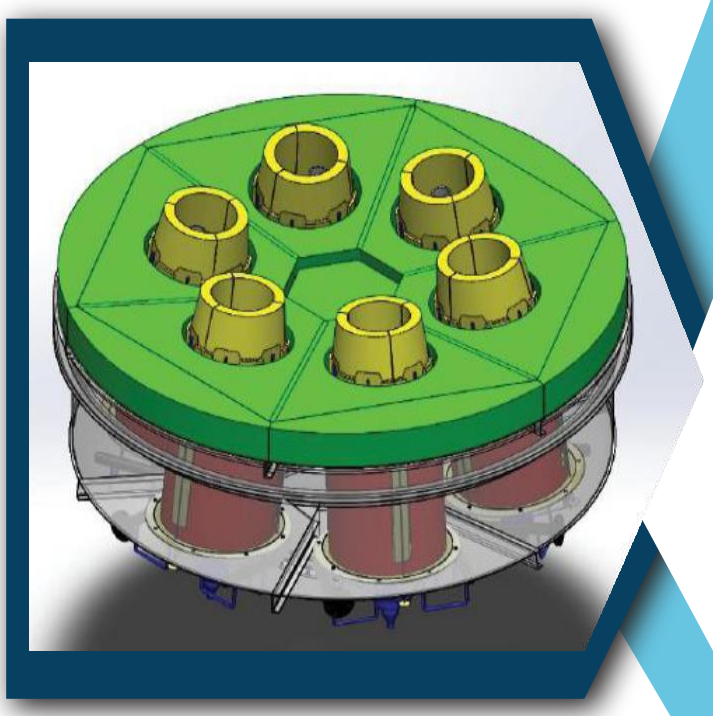
INCLINED FIRING SYSTEM

Optimum Solutions for Uniform Heat Transfer

One of the most common issues faced by operators during the heater operation is the high tube metal temperature of radiant tubes. High tube metal temperature is often caused by flame impingement due to long burner flames which may lead to tube failure.

Furnace Improvements has developed the patented Inclined Firing System (IFS) to reduce flame impingement on heater tubes.

In this arrangement, the burners are inclined to point the flames away from tubes. We have done extensive CFD modeling of the inclined firing and the results have shown a significant reduction in tube metal temperatures and hot spots.



SALIENT FEATURES

- Improved Flame Pattern
- Better Flue gas Recirculation around the Tubes
- Uniform Heating of the Tubes
- Uniform Tube Metal Temperatures
- Uniform Heat Flux Distribution
- Elimination of Hot Spots / Localized Heating
- Longer Tube Life
- Increased Heater Run Length
- Lower Coking Rate of internal tube surface

✓ Angle of Inclination is determined using CFD Analysis
✓ Optimum angle ensures uniform heating & no flame to flame interaction

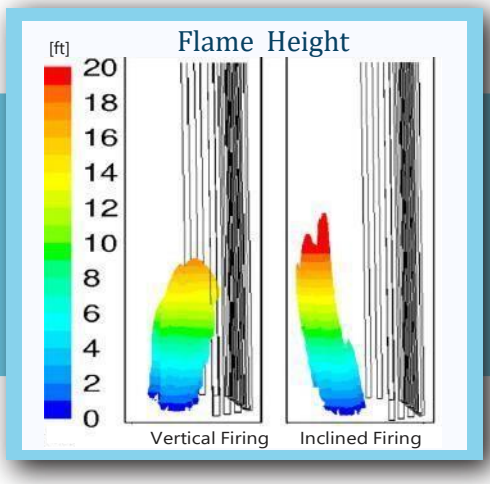
The technology is very useful for installing Ultra-Low NOx burners in very tight radiant chambers. We have installed this technology in various heaters for different clients in the USA. Our Clients are extremely satisfied with the results.

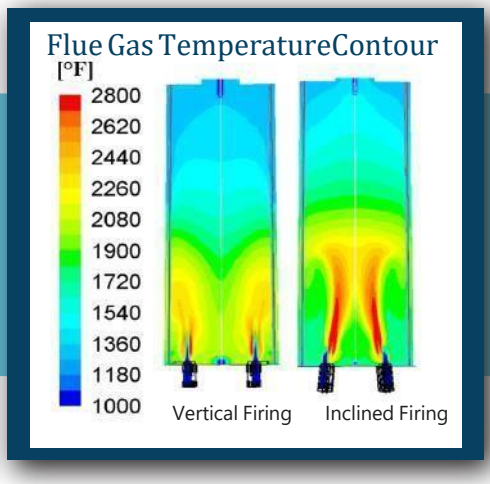
CASE STUDY: REVAMP OF CRUDE HEATER, CITGO CORPUS CHRISTI, TEXAS

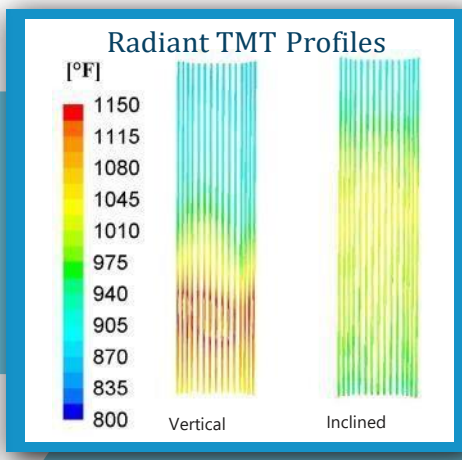
Description: Citgo Refinery has a crude heater with a design duty of 261.4MMbtu/hr. The heater consists of two radiant cells, vertical tubes in the octagonal firebox and horizontal convection section. Each radiant cell has 12 floor fired burners. The Heater was facing flame impingement and high tube metal temperatures in the radiant section.

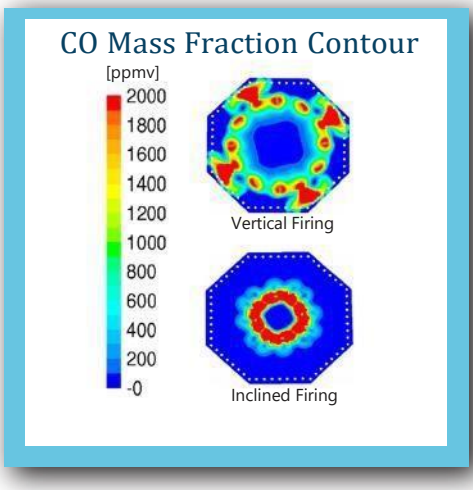
FIS recommended Inclined burner firing system for the heater to prevent the flame impingement on the tubes. FIS installed the burners using Inclined firing technology after identifying the best angle using CFD analysis. The heater was able to achieve uniform tube metal temperatures across the radiant tube length.

The heater was revamped and commissioned in 2013. The client is extremely happy with the heater after revamp.









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