

UNRIVALED COMBUSTION EXPERTISE.  
SUPERIOR HEAT TRANSFER SOLUTIONS.

Do you want to reduce tube metal temperatures, fouling,  
and barrel losses while increasing onstream time?

**Xtend™** your run length.



### Fired Heater Fouling Costs Millions

A typical 100,000 barrel per day refinery loses \$3-7 million annually because of fouling in fired heaters. Fouling overheats tubes, increases firing rate, reduces yields, and causes lost onstream days. Shutting down a crude, vacuum, or coker heater is extremely costly both in labor and throughput.

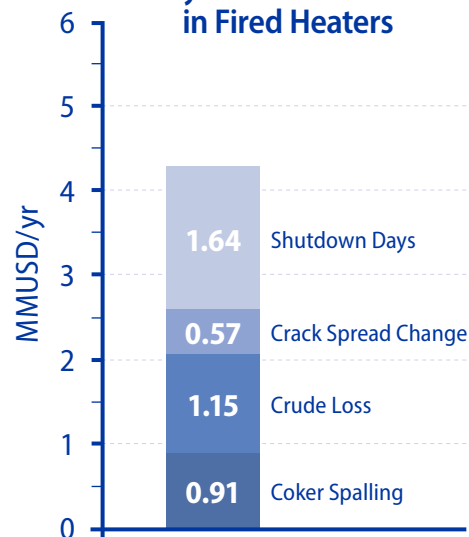
To combat these issues, **XRG Technologies** developed **Xtend** — a tube-insert to reduce fouling and increase heat transfer.

### Xtend — A Better Technology for Heat Transfer

The unique design of **Xtend** generates more swirl with less pressure drop when compared to a conventional twisted tape. Less than 3% of the flow area is used to generate swirl. The swirling flow:

- Cools the film on the tube wall
- Removes coke precursors from the film
- Increases both temperature and process uniformity within the tube

### Refinery Losses Due to Coking in Fired Heaters



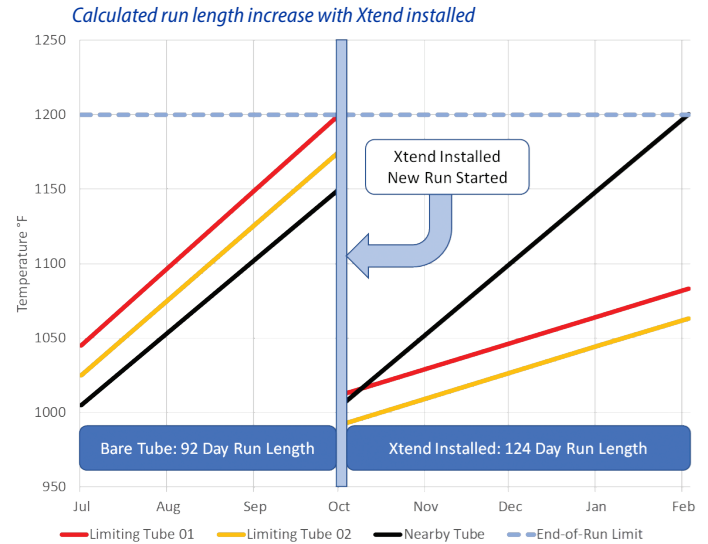
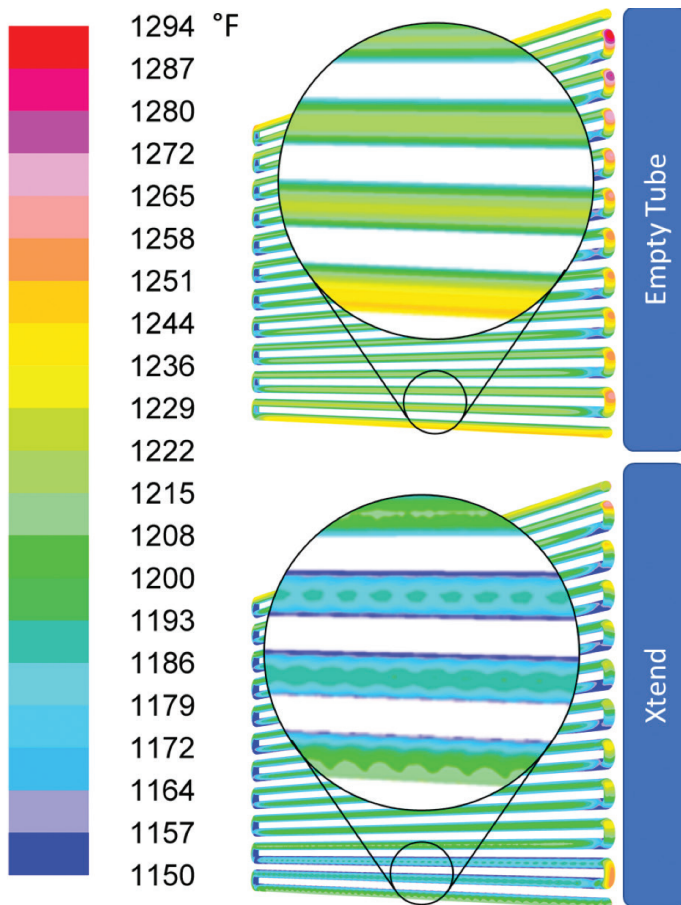
*Example distribution of losses from coking in fired heaters for a typical refinery.*

## Reduce Tube Metal Temperatures and Fouling. Increase Onstream Days.

In coker unit heater simulations, **Xtend** reduces the tube wall temperature by as much as 33° F. Lower film temperature and increased bulk flow uniformity result in up to 3x less coking in tubes equipped with **Xtend**.

Simulations show similar benefits for other services — including crude, vacuum, and pyrolysis heaters. By fixing a few problematic tubes, we can unlock the full potential of your heater.

Calculated tube wall temperature



## Smart Application

To minimize pressure drop while maximizing run length, **Xtend** only needs to be installed in the limiting tubes. The removable design does not engage with an end-of-run coke layer. If more coke builds up, **Xtend** will flex in response, allowing for insert removal. Over 97% of the tube remains open in a typical application, resulting in a low probability for additional coke blockage during spalling.

## Xtend — The Smarter Choice

Regardless of operating conditions, your heater will transfer more heat and decrease fouling with **Xtend** installed. You can prolong your heaters' tube life, reduce the decoking frequency, and increase profitability with **Xtend**.

