

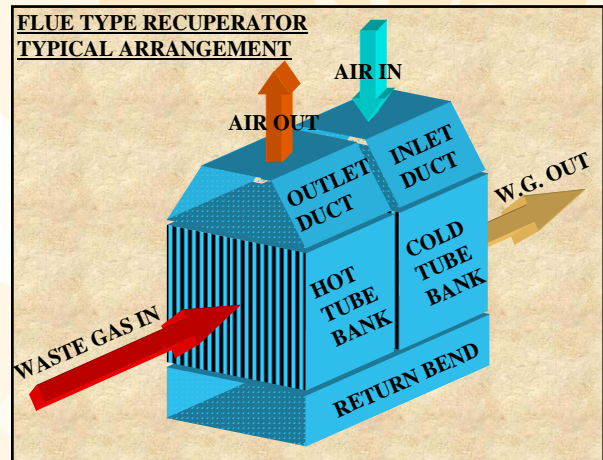
# CONVECTION RECUPERATORS

## CONVECTION RECUPERATORS

Convection recuperators (also referred to as “flue” or “canal” recuperators) are tubular heat exchangers that utilize convection heat transfer to preheat combustion air or gas for the purpose of saving fuel. These units are comprised of stainless steel tube bundles with the tubes welded to the tube sheets to assure gas tightness. Tube arrangement, tube material and flow pattern are based on the specifics of each individual application, including temperatures, compositions, pressure drop limits and space availability. In a typical design, the hot waste gas from the furnace flows horizontally through the recuperator, passing outside of vertical tubes. Combustion air en route to the burners makes two or more passes inside the tubes in a counter cross-flow pattern.

## DESIGN FEATURES

- ◆ Economical construction and compact arrangement.
- ◆ Units are supplied completely assembled and pressure tested.
- ◆ Tube materials are selected to accommodate temperature and corrosion conditions.
- ◆ All welded construction to assure gas tightness.
- ◆ Tube inserts are utilized to enhance heat transfer and reduce tube wall temperatures.
- ◆ Tube sheets and tube welds are protected by castable refractory.
- ◆ Hanging or bottom-supported designs are available.
- ◆ Bent tubes, expansion joints or flexible compensators are utilized to absorb tube growth.



- ◆ Handle hot gas temperatures to 2000°F and air preheat temperatures to 1200°F.
- ◆ Low pressure drop on hot gas side allows use with natural draft systems.
- ◆ Square pitch tube arrangement reduces fouling and provides for easier cleaning.
- ◆ Suitable for new or retrofit installations.
- ◆ Minimal maintenance required since there are no moving parts.
- ◆ Designed to fit into an insulated flue provided by Thermal Transfer or others.
- ◆ Custom designed to fit any application.
- ◆ Essentially the same design has been supplied for more than 60 years.
- ◆ Easy to install, remove and repair.
- ◆ Optional smaller shock pass units can be installed upstream of primary recuperator units to act as a protective buffer.



## **THERMAL TRANSFER CORPORATION**

50 North Linden Street  
Duquesne, PA 15110

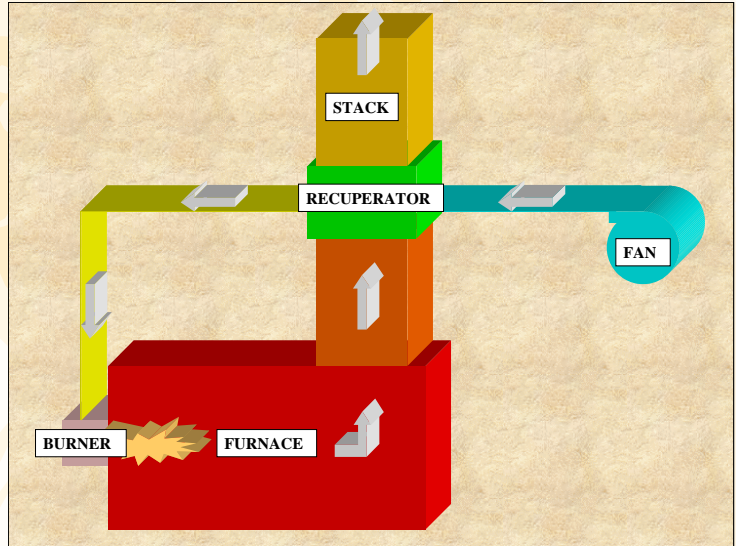
Phone: (412)460-4004  
Fax: (412)466-2899

E-mail: [info.ttc@hamon.com](mailto:info.ttc@hamon.com)  
[www.hamon-thermaltransfer.com](http://www.hamon-thermaltransfer.com)

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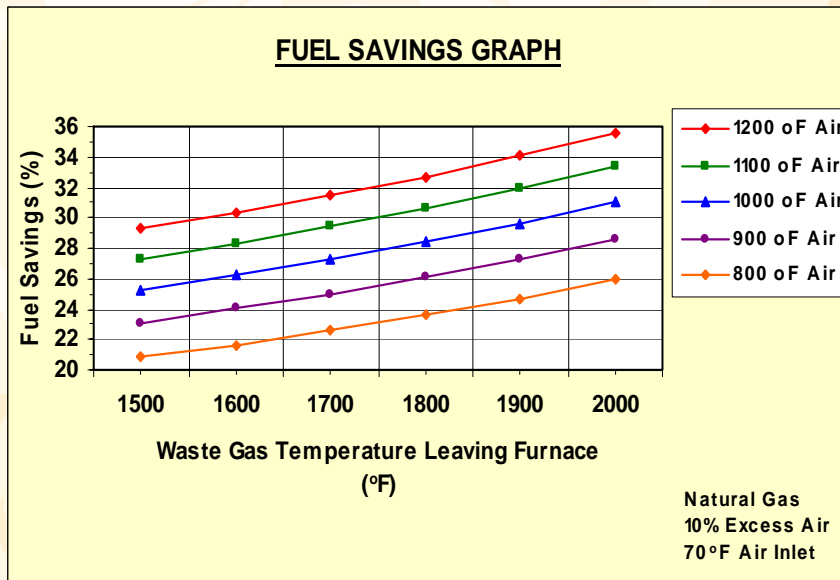
## FUEL SAVINGS

For high temperature industrial furnaces, such as steel reheat furnaces, recuperators are valuable tools for increasing furnace efficiency. Up to sixty percent (60%) of the available energy in the fuel may be carried out of the furnace in the waste gas, therefore, heat recovery is essential for fuel conservation and economical operation. With fuel costs rising, recuperation is certain to play a vital role in the future.



Convection recuperators save fuel by recovering heat from the hot waste gas exiting a furnace and transferring it to the combustion air feeding the burners. Fuel usage can be reduced by an average of twenty-five percent (25%), and in many cases, greater savings

are realized. Waste gas temperatures entering convection recuperators are usually in the 1500°F to 2000°F range, and combustion air preheat temperatures are usually in the 800°F to 1200°F range.



## APPLICATIONS

- |                               |                                |
|-------------------------------|--------------------------------|
| Steel soaking pits            | Aluminum melting furnaces      |
| Steel reheat furnaces         | Aluminum de-lacquering systems |
| Steel heat treat furnaces     | Aluminum heat treat furnaces   |
| Steel anneal and pickle lines | Ceramic and refractory kilns   |
| Steel galvanizing lines       | Thermal oxidizers              |
| Direct reduced iron furnaces  | Waste incinerators             |



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E-mail: [info.ttc@hamon.com](mailto:info.ttc@hamon.com)  
[www.hamon-thermaltransfer.com](http://www.hamon-thermaltransfer.com)