Exhaust Heat Recovery System for Hot Air Stoves

**Features**

An exhaust heat recovery system for hot stove uses the heat energy in the combustion exhaust from a hot stove to preheat fuel gas and combustion air. The exhaust heat recovery system of Nippon Steel Engineering has the following characteristics.

- Its large heat recovery capacity enables reuse of a large quantity of heat energy.
- It can be used in a high temperature range.
- The built-in auxiliary burner allows operation of a hot stove only with blast furnace gas (BFG) (mono-fuel BFG combustion).
- A single heat-receiving heat exchanger can preheat both combustion air and fuel gas.
- The modular, compact heat exchangers provide more installation flexibility (easy to install in cramped location).
- Able to control the temperature of the heat carrier to prevent acid dew-point corrosion and corrosion on the inner surfaces of pipes.
- The heat transfer carrier can deliver continuous efficiency without the problems of thermal degradation, freezing, or evaporation.
- An element of a heat exchanger can be replaced in a short period of time. (There is no need to install a bypass exhaust pipe for maintenance.)

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**Basic Concept or Summary**

![Diagram of Exhaust Heat Recovery System for Hot Air Stoves](https://www.jase-w.eccj.or.jp/technologies/index.html)
Installation in Practice or Schedule

Domestic
Nippon Steel Corporation: Oita Works (two installations), Kimitsu Works (two installations), Muroran Works and others
Kobe Steel, Nisshin Steel, and others

Overseas
POSCO, ILVA, Laiwu Steel Corporation, and others

Effects or Remarks

- Fuel gas consumption in a hot stove has been reduced significantly.
  (Approx. 10 % reduction in the energy amount equivalent in the use with a 5,000 m³ blast furnace)
- The ratio of reducing materials in a blast furnace has been reduced without changing the fuel consumption by raising the combustion temperature, temperature in the dome and ventilation air temperature.
  (Reduction of 10 kg/ton-pig in the coke ratio by raising the ventilation air temperature in a 5,000 m³ blast furnace by 100 ºC)
- Introduction of the mono-fuel BFG combustion has eliminated the need for high-calorific gases (coke oven gas and LPG).

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