

New-Generation Incineration Technology

Changeover to new-generation incinerators

There are many city incineration plants, both large and small, being operated in compliance with the strict antipollution policies implemented in Japan. While many technologies have been developed, including technology to reduce dioxin emission, remove acidic gas and recycle incinerated ash, the conventional stoker furnace has seen significant improvement. The conventional stoker furnace's highly efficient technology enables electric generation from recovered heat waste and makes it an effective measure against greenhouse emissions. Its improvement and objective are summarized in the chart below. Together with the improvement of heat recovery after incineration, this system makes it possible to efficiently generate clean electricity compared to the conventional method. These new technologies enabled Japan's incineration plants to become safe and sound while generating electricity efficiently.

New Generation Incinerator

1 Improved combustion quality

- Lowered combustion air ratio 2.0 -> 1.4 or 1.3
- Resolved uneven burns with infusion of high temperature air
- Improved mixing of combustion gas and air
- Improved oxygen-enriched combustion and combustion quality, resulting in clean incinerated ash

2 Improved quantification and control of garbage supply

3 Cooling of stoker

- Water cooling and air cooling

4 Improved durability of fire-resistant furnace wall material

- Tile cover for radiation heat transfer surface on boiler

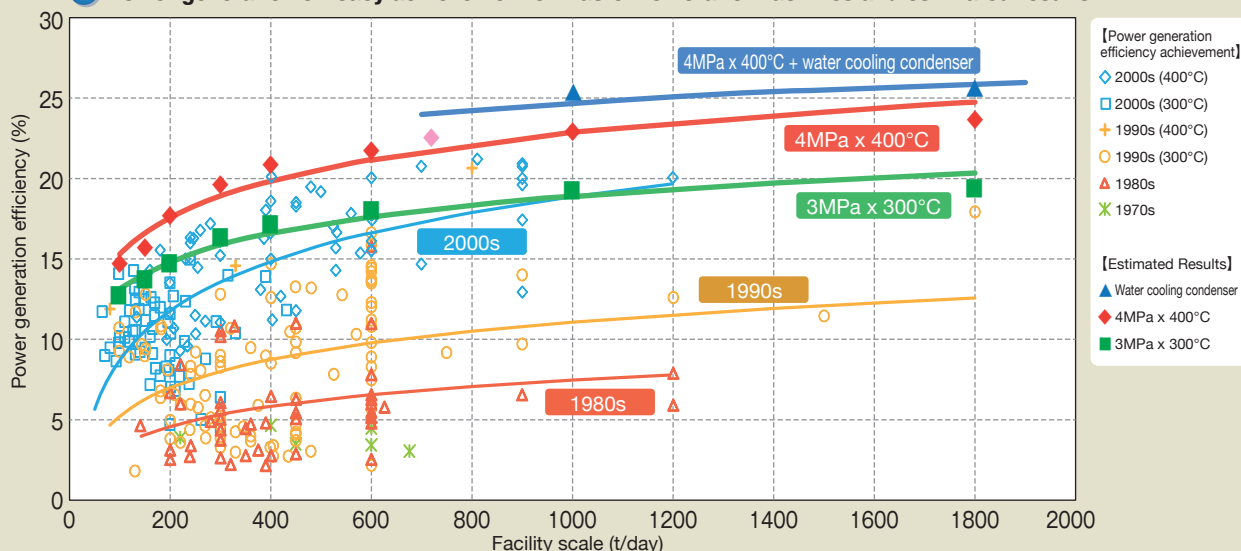
5 Recycling incinerate ash

6 Sophisticating operation control system

Status of transition to high efficiency electricity generation

In the past, the priority factor in setting up waste incineration plants was antipollution control, which resulted in a significant upgrading of facilities from this perspective; however, priority was not placed on the efficiency of energy recovery. Rising the temperature and steam pressure for electricity generation results in high efficiency; however, acid gas contained in the exhaust gas causes high temperature corrosion of the steam super heater. In recent years, research has moved forward to achieve long-service heat-transfer tubes that show resistance to high temperature corrosion. Many plants now construct highly efficient electricity generation facilities with longer operating lives as demanded by greenhouse gas emission measures.

Power generation efficacy achievement of waste incineration facilities and estimated results



*The above shows the theoretical power generation efficiency calculation according to the age and facility scale of the waste incineration and power generation in Japan. Estimation is based on feasible scenario on the premise that the incinerator is operating stably for a long period, and including factors to raise power generation efficiency.

Suitable Incineration Technology in the Asian Region

In Asia, where urbanization is progressing at a rapid speed, the volume of waste is quickly increasing along with population increase. In many Asian cities, collected garbage is transported directly to repository sites. Due to the lack of land available for repository sites and concern for environmental pollution in areas near repositories, there is a heightened interest for incineration plants.

As a solution to the increasing garbage problem, China made the decision to introduce incineration and has begun to build plants. In Singapore, Thailand and Taiwan, too, Japan's incineration technology is helping in the improvement of public sanitation and environmental conservation.

Japan is a leader in the construction and management of incinerators, realizing incineration treatment of waste with its world-class standard of technology to dispose of from low-calorie to high-calorie garbage.

Examples of some of the incineration plants delivered by Japanese enterprises



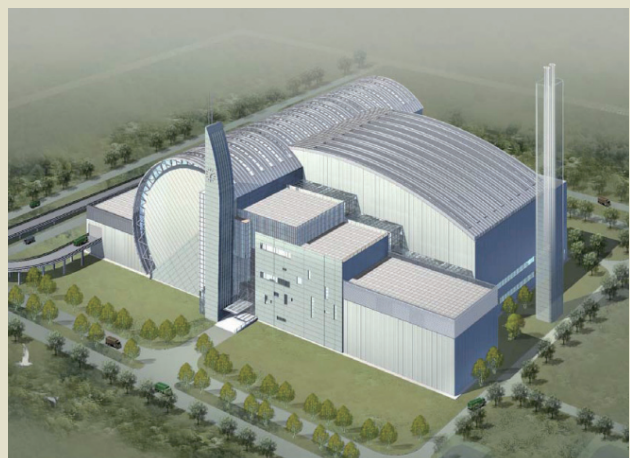
The largest scale plant with the capacity to handle 4,320t/day was built in Singapore in only 38 months
Source: Mitsubishi Heavy Industries, Environmental & Chemical Engineering Co., Ltd.



There are several incinerators operating in Taipei, and most of the garbage generated in the country is being disposed of and reduced in a sanitary manner.
Source: Hitachi Zosen Corporation



In Thailand, an industrial waste incinerator has been operating from 2006. Its treatment capacity is 100t/day.
Source: JFE Engineering Corporation



An electric generating facility with the capacity of 30,000 KW and steam condition of 4MPa and 400°C has been delivered to the incineration plant in Beijing, with capacity to handle 1,600t/day.
Source: Takuma Co., Ltd.

3 Medical waste disposal technology

Sanitary disposal technology with high-environment preservation capability

Safe and appropriate disposal of medical waste

Some waste generated from medical institutes may be contagious. In the past, Japan has experience cases of medical accidents in which medical staff were infected by hepatitis B with needles used on hepatitis patients which eventually caused death. Such accidents attracted public attention and made people aware of the need for the sterilization of medical waste. Today, there are laws regulating methods of medical waste disposal. The risk of contaminated waste being mixed with general waste and increasing the possibility of the spread of contamination highlights the need for appropriate treatment and disposal.

The number of hospitals in Asia and Africa has increased, yet there are only few treatment facilities for medical waste, causing the risk of infection through contact with contagious waste. Appropriate treatment and disposal of medical waste is strongly advised.



Medical waste discarded at open garbage dumps



Syringe needles coming out of garbage bags

Column

Containers for the disposal of medical waste (Example)

In order to avoid contamination, plastic containers, cardboard boxes and metal containers are used to dispose of medical waste to prevent contact and assure safety for workers.



Pail



Cardboard box



Bag

Source: the website of Japan Industrial Waste Information Center



Some of the containers used by medical institutes