

CASE STUDY: Hitachi Zosen

Incinerator Ash Vitrification Facility

KEY FACTS

- ✔ Type: Environmental
- ✔ Client: Hitachi Zosen
- ✔ Plant: Incinerator Ash Vitrification
- ✔ Location: Kamo City, Japan
- ✔ Dates: Commissioned in 1999
- ✔ Supply: 2 Commercial Vitrification Facilities

OVERVIEW

Hitachi Zosen has constructed over 50 Energy from Waste/incinerator plants in Japan which generate a total of over 300 MW of electricity. During their operation, these facilities generate hazardous fly ash.

Municipal waste incinerator fly ashes and (to a lesser degree) bottom ashes contain leachable levels of heavy metals, including lead, chromium, arsenic, cadmium and zinc. In addition these ashes can also contain Persistent Organic Pollutants (POPs) such as dioxins and furans that are generated in the incineration process. Environmental regulations in Japan require that the bottom and fly ash produced in the incineration of municipal wastes must be vitrified.

THE SOLUTION

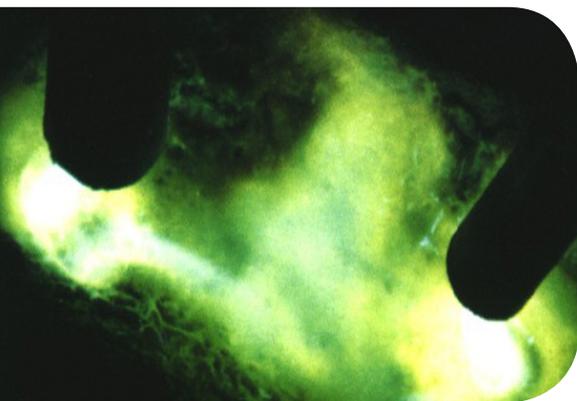
Tetronics has developed a high temperature thermal process for the treatment of incinerator ash materials that produces a dense, mechanically strong vitrified material (Plasmarok®) that is environmentally inert and can be used as an aggregate in the construction industry. The system developed for Hitachi Zosen employs a twin plasma arc melter unit. The process was extensively pilot tested in the UK during the early 1990's and subsequently at Hitachi's demonstration facility at Maizuru in 1994-1995.

“The Kamo City incinerator rated at 240 TPD, generates around 35 TPD combined fly ashes and grate ashes that are treated in the plasma unit.”

Following successful demonstration at the Maizuru facility, commercial plasma systems were installed and commissioned by Hitachi Zosen at Kamo City and Hitachi City in Japan.

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ABOUT TETRONICS' FLY ASH SOLUTION

High temperature plasma arcs are heat sources of intense power and versatility, combining the chemically inert heat of a plasma arc with the stability and control traditionally found with a gas flame. Tetronics uses its plasma arc heat sources to melt, gasify or vaporise fly ash to treat, recover and generate valuable commercial products. As the heat source is electrical, the plasma arc treatment technology does not involve any form of direct combustion or incineration. These factors make plasma an essential component of future sustainable Fly Ash waste management infrastructure.

HITACHI ZOSEN PLASMA PROCESS DESCRIPTION

The plasma vitrification furnace used by Hitachi Zosen is a vertical cylindrical refractory lined vessel that is heated by twin plasma arcs. The ash is fed at a controlled rate through reciprocating rams that discharge through the sidewall of the unit. The plasma power to the furnace is closely modulated to match the feed rate of the ash, to maintain a melt temperature in the range 1400-1500°C. The slag continuously overflows from the furnace and is rapidly cooled in a water granulation system prior to discharge to a storage hopper. The slag product has secondary use as an aggregate material. The furnace may also be tipped to permit intermittent removal of metal from the vessel.

Fly ash is an unpleasant and toxic waste, which needs to be handled with care and experience. Tetronics' plasma arc technology provides a 'future proof' and proximal solution for resolving this growing issue."

CEO, Tetronics

ABOUT TETRONICS

Tetronics is the global leader in the supply of Direct Current (DC) plasma arc systems for a wide range of Hazardous Material Treatment applications. Our plasma solutions are perfectly suited to treat a range of hazardous waste streams, including: Fly Ash and Air Pollution Control residue (APCr), Organics, Spent Potliner, Asbestos, Radioactive Wastes, Oily Sludges and Chemical and Biological warfare agents and precursors.

Our capabilities encompass everything from initial modelling/feasibility assessment, pilot testing of the process material, through to design, supply onsite installation/commissioning and on-going support of full commercial plants. Tetronics' track record in advanced environmental waste treatment and resource recovery processes for a range of toxic, hazardous/industrial wastes, as well as other resource-rich streams, has resulted in more than 95 technology references across a wide and varied range of applications.