

Environmental Engineering Consolidated Division

Contract and Delivery of Ten Sets of 3500kW Large-sized Vertical Volute Mixed Flow Pumps for Water-resource-recycling Plant in Singapore

Singapore largely depending its drinking water supply source on import from has focused the development of seawater desalination technologies as well as recycling technologies of rainwater and domestic wastewater, aiming at its drinking water self-sufficiency.

Kubota's vertical volute diagonal flow pumps (3500 kW) were selected as its main pumps for the water-resource-recycling plant for drinking and industrial water (CWRP) to be constructed next to the Changi air port .

Since the pumps are for the plant with

which Singapore, a beautiful park-and-city state, is aiming at the harmony with environment, we had to comply with its severe requirement such as vibration and so on as well as performance. And the operation cost could be largely reduced because of the accomplishment of high pump efficiency in the wide range of delivery water volume.

Pump specifications

Delivery diameter: 1200mm

Delivery volume: 400000m³/day

Total head: 59m

Vibration tolerance : amplitude (peak to peak) 90μm, vibration velocity (RMS) 4mm/sec

The pumps in the ultra-deep underground pump station (70 m in depth)are driven by 22kV-3500kW speed-control motor through the intermediate axle with 9 m in length.

Pump Division



Water Environmental Engineering Division

Advanced Wastewater-treatment Facilities for Teshima's Waste and Other Materials Countermeasure Work

The advanced wastewater treatment facilities for environmental conservation in Teshima were completed in April 2003. Hazardous substances such as volatile organic compounds, dioxins and so on in addition to BOD and COD ingredient and heavy metals are including in the leachate and groundwater which flows from the site where the industrial wastes were dumped illegally.

In the advanced wastewater facilities, we constructed the treatment system including our original technologies such as coagulation-membrane-filtration equipment, dioxins decomposition equipment using photochemical decomposition method and so on in order to treat leachate and groundwater including these hazardous substances.

The facilities will be operated until the industrial wastes are removed completely, continuing to treat leachate and polluted groundwater to conserve the environment of Teshima.



Coagulation-membrane-filtration equipment



Dioxins decomposition-and-removal equipment



Advanced wastewater treatment facilities

Solid waste treatment without land disposal

Kubota's solid waste treatment facilities have changed to the system, which can maximize recycling of wastes under the concept of "Wastes are valuable resources."

Waste Treatment Center (Gasification & Melting Facilities) of the Mie Prefecture Environmental Conservation Agency, was completed in March 2003 to treat domestic wastes (such as incineration residue) and industrial wastes discharged in Mie. The facilities make wastes harm-

less, stabilize them and turn them into resources, aiming at eliminating landfilled wastes.

High-caloric wastes such as waste plastics are treated in the indirect heating kiln for gasification. Char (carbide) and thermal cracking gas (flammable gas) are recovered in the process of gasification and are reusable as fuel. Incineration residue and char are treated in the rotating-surface-melting furnace to turn them into slag. They become glass-like substan-

Solid Waste Engineering Division

ces with stable characteristics and are reusable for construction materials. And the thermal energy of melting exhaust gas is recovered as steam in the boiler. Then electric power up to 1800kW is generated by the steam turbine generator, and is used in the facilities.

Moreover, since fly ash from melting treatment process includes a lot of valuable metals such as zinc, the material recycling can be obtained by resource recovery (smelting process).



Waste Treatment Center
(Gasification & Melting Facility)



The rotating surface melting furnace



Slag

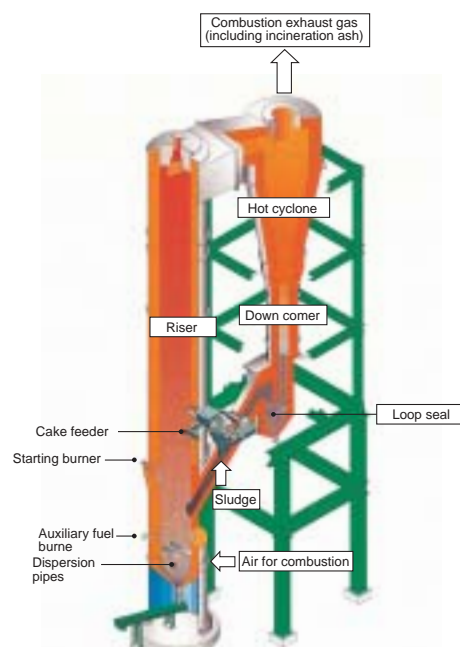
Sewage sludge circulating-fluidized-bed incineration system

The final disposal of sewage sludge is a serious problem as the construction of sewage network and its advanced treatment are promoted. In the circulating-fluidized-bed incineration system, the sewage sludge (dewatered sludge) is incinerated at the temperature of about 850 degree centigrade, to make it harmless and to stabilize it. The main part of the system is circulating-fluidized-bed furnace. This furnace is the next-generation sewage sludge incineration furnace. Clean combustion is realized in this system, in which the generation of the hazardous substances such as dioxins and so on is restrained to a minimum level, and in which extremely stable incineration performance is obtained by circulating high-temperature sand, a thermal medium, in the furnace.

The system responds well to the change of the sludge characteristics, so it is suitable for the stable incineration of high-caloric sewage sludge, and for the incineration of the mixture of sludge, screen residues and grit.

We also realized saving energy in the

system, namely the reduction of power of the blower (about 30% reduction compared with conventional system), and the reduction of auxiliary fuel by increasing combustion efficiency (about 15% reduction compared with conventional system).



Structural illustration of
circulating-fluidized-bed furnace

Water and Sewage Plant Division

The amount of carbon dioxide emission can be reduced by these effects.

We received an order of the equipment of 60 tons per day in capacity, for the Purification Center in the central part in the city of Hamamatsu, our first commercial equipment. We are now constructing the equipment which will be completed in fiscal 2005.



Test plant of circulating-fluidized-bed furnace