

The dried sludge has a solids concentration of about 90 % and is fed with a screw conveyor into a small furnace that is similar to those commonly used for biomass combustion. The hot flue gas flows through a pebble heat recuperator that transfers heat to compressed ambient air. The hot and compressed air drives a micro gas turbine and a generator. Because of direct gas-to-air heat transfer no water-vapour cycle is required. Even small systems can produce electricity with an efficiency of around 30 % and well over 50 % of the energy is recovered through heat exchangers for sludge drying.

The pebble heat recuperator consists of a pair of vessels that are filled with pebbles. Hot flue gas and compressed atmospheric air are blown sequentially through the vessels. The hot flue gas with a temperature between 900 and 1000 °C is cooled in one vessel and heats the pebbles. At the same time, in the other vessel, the pebbles are cooled and transfer their heat to the compressed atmospheric air. The air is heated to over 900 °C. When the temperature difference between the flue gas and the air exceeds a certain level, the gas and air flows are switched to the other vessels. In this way, the pebbles are sequentially heated and cooled, thereby transferring up to 98 % of the heat from the flue gas to the atmospheric air. The incoming atmospheric air is compressed by the micro-turbine to around 4 bar and heated to about 200 °C. The air is then cooled in a heat exchanger whereby the heat is recovered to pre-heat ambient air entering the sludge dryer. Alternatively, some water can be injected and evaporated, thus cooling the compressed air and increasing the flow. While the compressed air passes through the hot pebble recuperator, it is heated to over 900 °C and expands. Its now much larger volumetric flow drives the micro-turbine whereby it expands further while its pressure drops. The expanded air has now a temperature of about 600 °C and is further cooled in heat exchangers transferring heat to the sludge dryer. The still warm air is blown as combustion air into the sludge furnace.

Formation of nitroxides is prevented by staged combustion, flue gas recirculation and selective non-catalytic reduction. The flue gas, after it has been cooled and screened in the pebble recuperator, enters a further gas cleaning system. Acidic gases, such as SO₂ and HCl are neutralized and removed by addition of lime to the exhaust gas. Remaining organic components, such as dioxins and furans, as well as volatile heavy metals are removed through adsorption on activated carbon. Fly ash and other particles are finally removed with filter elements. The elements are made of a special material that is resistant to chemicals and a temperature as high as 350 °C. It is coated with an inorganic material to guarantee long life and low flow resistance. The exhaust meets the stringent German requirements. Together with the ATZ we are presently designing our first sludge2energy® demonstration plant for the Bavarian city Straubing. This first plant will have a capacity to incinerate 2,200 tons of sludge dried solids per year and will generate 100 kW of electrical power.

by HUBER Business Unit Sludge Treatment

Related Solutions:

- [HUBER Solution for On-Site Sludge Incineration](#)

Adresse / address: HUBER SE · Industriepark Erasbach A1 · 92334 Berching · Germany · Telefon / phone: + 49 - 84 62 - 201 - 0 · Fax / fax: + 49 - 84 62 - 201 - 810
e-mail: info@huber.de · Internet: <http://www.huber.de>

Sitz der Gesellschaft / Headquarters: Berching · AG Nürnberg / Register of companies: HRB 25558
Vorstand / Board: Georg Huber (Vorsitzender / CEO), Dr.-Ing. Oliver Rong (stellvertretender Vorsitzender / Vice CEO), Dr.-Ing. Johann Grienberger, Rainer Köhler
Aufsichtsratsvorsitzender / Chairman of the Supervisory Board: Alois Ponnath

USt (VAT)-IdNr.: DE 812353219

Bank: HypoVereinsbank Nürnberg (BLZ 760 200 70) 5 008 409 · SWIFT-BIC: HYVEDEMM460 · IBAN: DE 30 7602 0070 0005 0084 09

