SUPERFLOX™ LANDFILL APPLICATION

RELIABLE COMPLETE OXIDATION FOR LANDFILL GAS WITH VERY LOW METHANE CONCENTRATION

FIELD OF APPLICATION

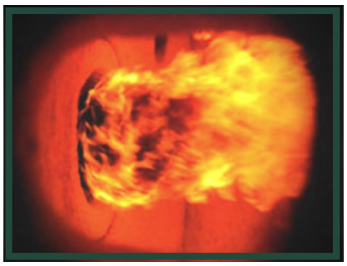
Methane concentrations in landfill gases decline significantly as the landfill matures, which leads to the discontinuation of co-generation as an economical treatment technique. As a result, the gas wells delivering low calorific value (LCV) gas are disconnected, and the residual methane emissions start to pose a health and environmental hazard.

The core elements of the Superflox technology are burners with ceramic recuperators for heat recovery, installed in a well-insulated combustion chamber.

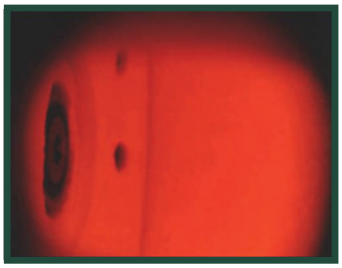
Once the furnace is pre-heated to a minimum of 850˚C (1560˚F), the plant switches to the Flameless Oxidation mode, in which gas with low methane concentration is burned without supplementary fuel.

Landfill gas and air continue to be pre-heated by means of the hot flue gas leaving the combustion chamber, using ceramic recuperators integrated in the burners. This allows to maintain high combustion temperatures despite decreasing methane concentrations.

The plant can be operated in a wide range of operating conditions. The minimum load is defined by the minimum CH4-concentration in the landfill gas required to maintain the operating temperature of the furnace, referred to as autothermal methane concentration (AMC), typically at 6 Vol% CH4 in CO2.



Traditional Combustion with a Flame Front



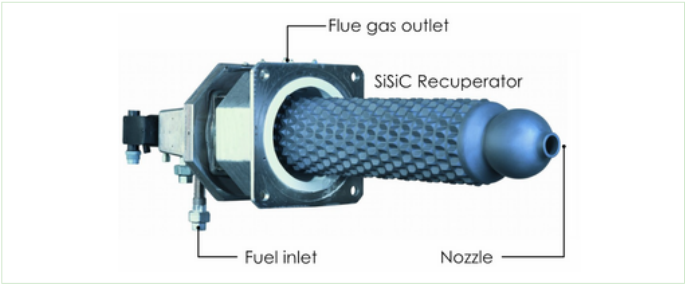
Flameless Pressurized Combustion

PROCESS OUTLINE

Superflox technology is an efficient technology to treat low calorific value gases from landfills. It can process gas with heat content as low as 6% CH4, while assuring a robust and complete combustion. This technology:

- significantly extends the economical lifetime of a landfill,
- eliminates thermal NOx formation
- eliminates the needs for additional natural gas to assist with the burning of low-methane landfill gas, thus reducing operational costs and CO2 emissions
- eliminates the environmental concerns associated with residual methane emissions

Superflox utilizes the concept of Flameless Oxidation discovered in Germany in 1989, when under optimal conditions in a self-recuperative burner, combustion took place without flame, while the fuel was fully burnt and CO and NOx emissions dropped to near zero. Without a flame, the concern of flame stability is removed, allowing for burning of gases with high CO2 and low heat content.



Superflox burner with ceramic recuperator

The recuperators are made of corrosion and thermoshock resistant high-performance ceramic material SiSiC, which is good for combustion temperatures of up to 1250˚C, (2280˚F) and corrosion resistant against H2S and halogens. As H2S concentration declines when a landfill is converted to aerobic digestion, the use of metallic recuperators becomes possible, which can lower the autothermal operating conditions to 2% CH4.

WTE USA | 708 Main Street, Houston, TX, 77002
+1 (281) 796 3369 | info@wte-usa.com | www.wte-usa.com

Superflox®
flameless thermal energy process

WTE: WHERE INNOVATION MEETS ENTREPRENEURSHIP

PLANT CONTROL

The plant is controlled with a modular PLC controller. The furnace controller ensures the optimum operating conditions, using the furnace temperature and the oxygen concentration in the flue gas as input values. Remote control of the plant from a supervising process control system is possible via digital input/output signals or the optional ProfiNet interface. A visualization is either directly installed on the switch cabinet or performed on the customer's supervising computer. The operation of the plant is completely automatic, with the manual operation is limited to starting and stopping the plant.

MODULAR SETUP

The Superflox base unit consists of a furnace and plant controller, all combined in a 20 foot container. The unit is available for landfill gas volumes of 1500, 3500, 7000 and 17500 cu ft/h. The following additions can be introduced to the base unit:

- Landfill gas compressor with flow or suction contoller, included in a separate compressor room with LEL supervision.
- Landfill gas analyzer for the safe shutdown of the plant in case of an unsafe gas composition.
- Heat utilization via a heat recovery boiler or a hot air dryer.

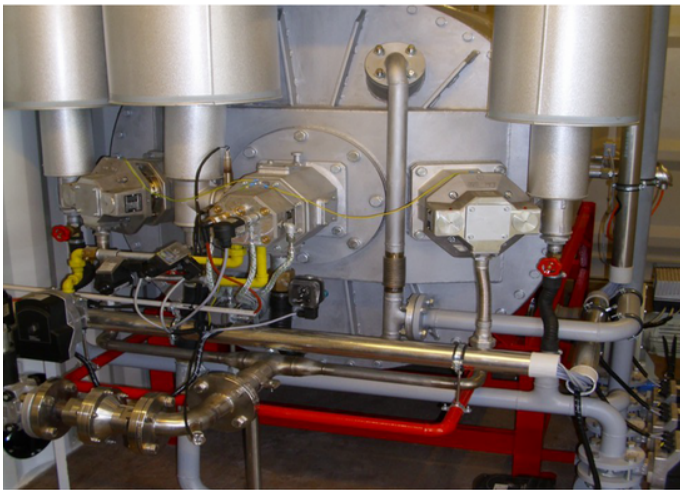
TECHNICAL DATA

Plant Type	SF LF 50	SF LF 100	SF LF 200	SF LF 500
Volume Flow, cu ft/h	280 - 2100	530 - 4200	1400 - 8800	2800 - 17600
Max. Thermal Load	250 kW	500 kW	800 kW	1500 kW
Max. Electricity Consumption	3.5 kW	5 kW	6 kW	10 kW
Autothermal Electricity Consumption	1.5 kW	2.2 kW	3.5 kW	5 kW
Size	20 foot container with switch cabinet, or 30 foot container with compressor			
Autothermal operation	> 6 Vol% CH4 (warranty 6.5 Vol%) with ceramic recuperators < 2 Vol% CH4 (warranty 2.5 Vol%) with metallic recuperators			

CUSTOM-TAILORED DESIGN

Flexibility and Adaptability

WTE's modular approach allows us to provide a flexible and site-specific solution to any landfill. We can provide individual quotes even in case existing equipment needs to be incorporated into the design, or if the plant needs to be connected to a site-specific condensate removal system. The plant interface, such as visualization, electronic interfaces and piping diameters, can be adapted to customer needs. We are happy to provide you an initial budgetary quote upon receiving your operational details and process specifications.



SF LF 100 with three burners

For more info, contact us at:

WTE USA | 708 Main Street, Houston, TX, 77002
+1 (832) 535-2475 | info@wte-us.com | www.wte-us.com

Superflox®
flameless thermal energy process