INFILCO THERMYLIS™

Thermal Oxidation

BIOSOLIDS

Thermylis™ High Temperature Fluid Bed (HTFB) Thermal Oxidation is the only final and sustainable sludge disposal method. It is highly efficient, odor free and can generate useful heat for the production of process steam or electricity. The "Green" technology is proven, safe and environmental friendly.

APPLICATIONS

» **Best Disposal method for:**
- **Municipal wastewater solids**
- **Pharmaceutical waste**
- **Chemical and paper mill waste**
- **Petrochemical waste**

MAIN FEATURES

» Autothermic Combustion / Maximum Heat Recovery

The refractory lined windbox and stress free self supporting refractory arch distributor ensures maximum heat recovery and autothermic combustion of undigested sludge dewatered to 26-28% dry solids.

» Shorter Startup and Less Fuel Usage

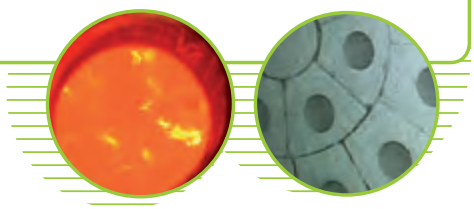
Preheat burner is installed in the windbox to facilitate cost efficient cold startups.

» High Efficiency

Sludge is directly fed into the turbulent hot sand bed enhancing combustion and reducing the emission of pollutants.

» Minimal Sand Loss and Optimal Combustion

Teardrop-shaped reactor decelerates the combustion gas, disengaging the sand and optimizing the combustion.



THERMYLIS™ SPECIFIC TECHNOLOGY

As land becomes more scarce and sludge handling regulations grow more stringent, fluid bed incineration is becoming widely accepted for sludge disposal. In a fluid bed incinerator, water is evaporated and organic materials are combusted, eliminating odors and reducing the dewatered sludge by 93% to a much smaller quantity of inert ash (as low as 7%). Land requirements and air pollution are reduced, protecting the environment.

suez environnement

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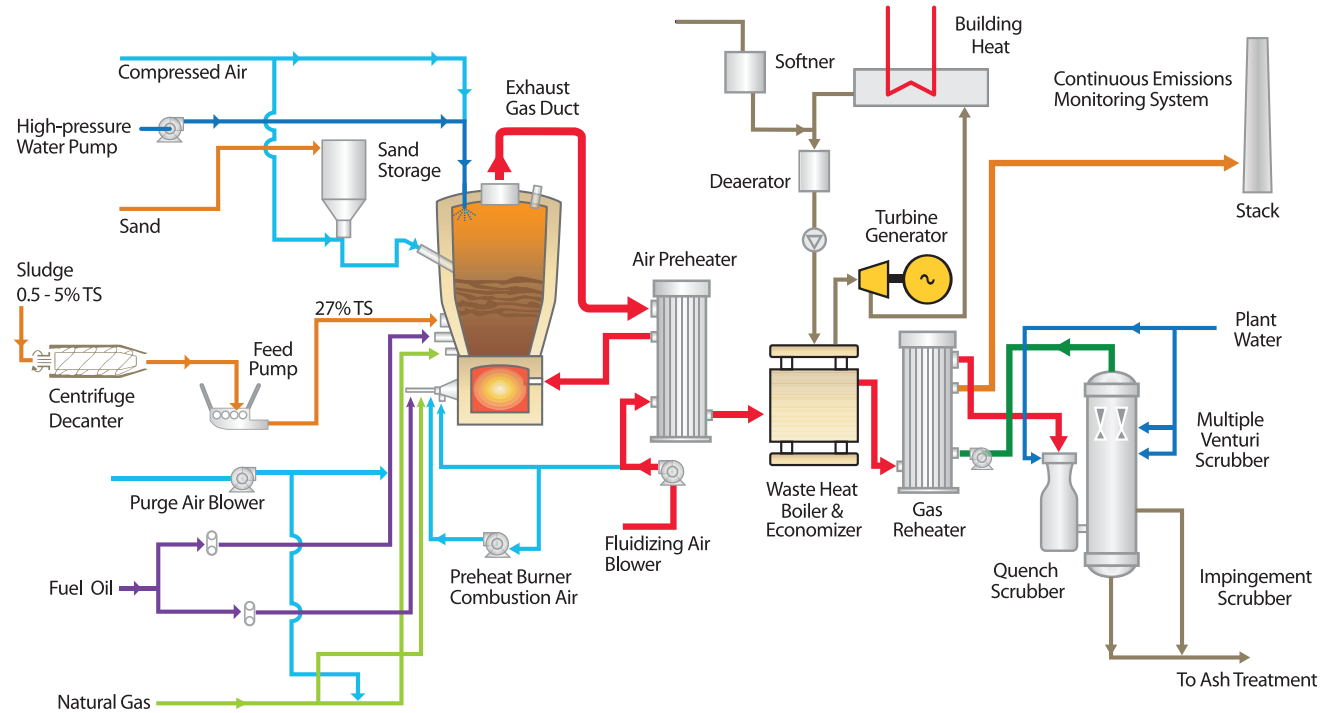
HOW IT WORKS

Thermylis™ HTFB consists of three zones: a windbox, a sand bed, and a freeboard. The term "fluid bed"refers to the violent boiling action of the sand bed, which occurs when air is blown through from below. To ensure that the air passes evenly through the sand, it must first pass through the windbox and a refractory arch distributor, where special alloy tuyeres ensure even distribution of the air. To fully take advantage of the turbulent mixing, dewatered sludge and auxiliary fuel (if required) are introduced directly into the bed, where they are instantly combusted at above 1200°F.

In the next stage, combustion gas and evaporated water flow upward into the teardrop-shaped freeboard, where the bed material is disengaged. The tear drop shape freeboard provides a gas residence time of minimum 6.5 seconds. Operating at 1550°F, the freeboard provides sufficient residence time to polish the gas and to complete the combustion. The "three T's" - turbulence, time, and temperature - make fluid bed incineration the most economical and environmentally sound method of sludge disposal. Uniform bed temperature, the result of steady turbulence, simplifies PLC/PC automation and

THERMYLIS™ HTFB Thermal Oxidation Process Flow Diagram



logic control systems. Data gathering for compliance reports becomes much easier.

Exhaust gas leaves the Thermylis™ Fluid Bed and enters the heat recovery and air pollution control systems.

The heat recovery system can be composed of a primary heat exchanger to preheat the combustion/fluidizing air to minimizing auxiliary fuel requirement, a secondary heat exchanger for stack plume suppression or a waste heat boiler for steam generation and electric production.

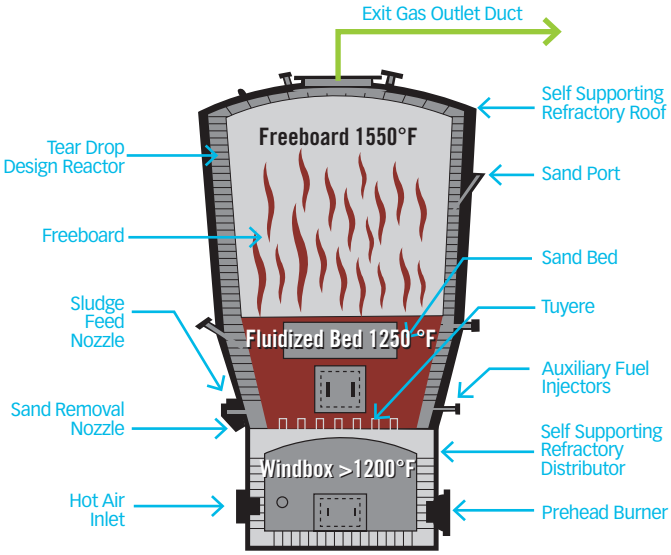
Should local requirements or regulations demand it, the Thermylis™ HTFB air pollution control system can include wet (venturi scrubber), dry (bag-filter), or semi wet (bag-filter and wet scrubber) scrubbing systems for emission control. Each can be designed to meet or exceed the most stringent air emission standards.

PRODUCT HIGHLIGHTS

- Complete and Final Disposal with 93% Sludge Reduction
- Minimum Use of Auxiliary Fuel
- Sustainable with Maximum Heat Recovery
- Tolerant of Sludge Variation
- Small Footprint
- Adaptable for Continuous or Intermittent Operation
- Safe to Operate

TECHNICAL FEATURES

- » Hot Windbox with Refractory Arch Distributor and Refractory-Lined Windbox
- » Large Freeboard with Over 6.5 Second Gas Residence Time
- » Tear Drop Shape Freeboard, with Low Exhaust Gas Velocity
- » Preheat Burner Installed in Windbox
- » Sludge Feed in the Turbulent Hot sand Bed
- » Automatic Control with Safety Interlocks
- » Baffles On Steel Shell and on All Guns and Ports To Limit Corrosion
- » Purge air On All Guns and Ports to keep them Cool and Clean.



THERMYLIS™ Reactor

TECHNICAL ARGUMENTS

FLUID BED WITH REFRACTORY ARCH DISTRIBUTOR

In contrast to the metal plate distributor, the refractory arch allows much higher heat recovery from the flue gas to preheat combustion air and minimizing auxiliary fuel consumption. In such system, the temperature of the wind-box air is typically 1200 °F or higher when compared to the windbox temperature at plants equipped with a metal plate distributor. With a combustion air temperature of 1200 °F, the combustion process is autothermic (zero auxiliary fuel) with a typical undigested sludge at 26-28% TS. Sludge dewatering by centrifuge or belt filter press suffices.

MECHANICAL ADVANTAGES

The refractory arch distributor offers the best design to resist the thermal loads. The refractory arch distributor is proven.

95% of the sludge fluid bed oxidizer in North America are of type hot windbox equipped with refractory arch distributor and refractory lined windbox.

REGULATION AND EMISSION PERFORMANCE

Pollutants	EC Directive Dry gas, 11% O^2	US EPA 503 Dry Gas, 7%O2	Typical Emission Wet Ash System *Dry gas, 7%O2 **Dry Gas, 11%O2
	mg/Nm³		
Total Dust	10	1.3 lb/dry Ton	Scrubber + wet ESP 0.024 lb/dry Ton (4mg/Nm³).**
Total Organic C	10	100 ppmv	1.95 ppmv* (0.7mg/Nm³)**
Carbon Monoxide	50	100 ppmv	7.5 ppmv * (6.7mg/Nm³) **
Hydrogen Chloride	10	35 ppmv State Req. if any	<0.002 ppmv * (<0.002mg/Nm³) **
Sulphur Dioxide	50	50 ppmv State Req. if any	22 ppmv *(44mg/Nm³) ** (without caustic)
Nitrogen Oxides as NO_2	200	80 ppmv State Req. if any	31 ppmv * (45mg/Nm³) **

COMPLETE TREATMENT SOLUTIONS

Lakeview WWTP tear-drop shape Thermylis™ – Auxiliary fuel is required only at startup

Infilco Degremont offers an array of sewage sludge treatment solutions for municipal and industrial as well as any size application. If interested in this product line, please check out some of the complimentary sludge treatment products:

- Thermylis™ - High Temperature Fluid Bed Incineration
- Cannon® Mixer - High Rate Digestion
- 2PAD - Two Phases Anaerobic Digestion
- METEOR® Activecell® - MBBR and IFAS Systems
- AquaDAF® - Tertiary Clarification
- Biofor® - Biological Aerated Filter
- DensaDeg® Clarifier/Thickener:
  - CSO
  - Primary/Tertiary Clarification

COMPUTERIZED TOOL

Our staff uses a proven computer program to determine the size of the equipment, the fuel needed, the capacities of the heat recovery and air pollution control system components, the feed rate of caustic, water and air.

All of Infilco Thermylis™ HTFB plants pass their performance test at first trial.

SERVICES - INFILCARE™

PART SALES

Infilco Degremont sells parts and components for most INFILCO brand equipment as well as parts for demineralizers, thickeners, nozzles, pressure filters, and valves. We offer reliable spare parts at competitive prices. We maintain records of previous installations to quickly identify your requirements. Many items are shipped directly from stock for quick delivery.

REBUILDS, RETROFITS AND UPGRADES

Infilco Degremont offers cost-effective rebuilds and upgrades for INFILCO provided systems, no matter what year they were built. If you are interested in an economical alternative to installing a whole new system, contact us for a proposal.

CONTACTS

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