

Hitachi Zosen
INOVA

The Inova fluid bed

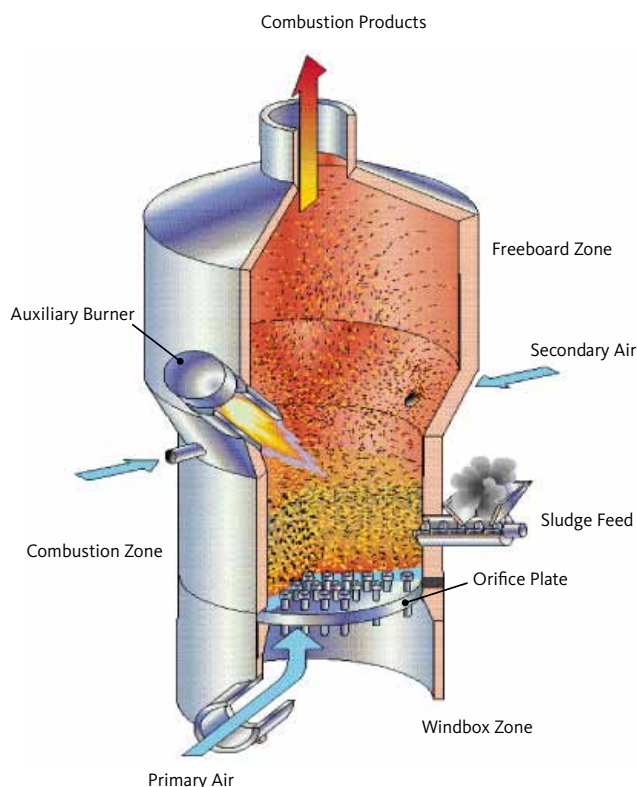
Proven standard in combustion technology



The Inova fluid bed – proven standard in combustion technology

Designed for superior cost-effectiveness and comprehensive environmental soundness, the Hitachi Zosen Inova fluid bed fulfils all customer requirements expected from an efficient, state-of-the-art combustion system for Energy-from-Biosolids applications.

Backed by the know-how and decades of experience accrued by the Hitachi Zosen Inova Group's leading combustion specialists, the Inova fluid bed defines the benchmark in combustion technology for Biosolids and Sludges.



The key enhancements at a glance

Improved cost-effectiveness thanks to optimised design and improved materials

The Inova fluid bed has many advantages compared to the multiple hearth:

- Uniform bed temperature and high bed turbulence results in low excess air requirements and low formation of pollutants
- Optimized fluidization, distribution, and residence time allows for efficient gas burnout
- Single refractory line vessels with no moving parts reduce maintenance and outage durations

The use of a customized orifice plate for each particular application (unlike its predecessor the refractory arch) allows for the ideal flow distribution within the reactor.

Thanks to these optimisation measures, the Inova fluid bed is a future-oriented, modern and effective high-performance combustion system.

The Inova fluid bed – reliable and stable in operation

The Inova fluid bed's durability and flexibility are the most commonly known advantages. This allows for maximum flexibility:

- Fuel heat input range: 5 – 150 MMBtu/hr
[1.5 – 44 MW (th)]
- Fuel moisture range: 60 – 80 %
- Steam production: < 150,000 lb/hr
[68,027 kg/hr]
- Reactor sizes: 4 – 30 ft
[1.2 – 9.1 m]

A fluidized bed is a solid-gas mixture using properly distributed gas at a velocity sufficient to maintain particle suspension. This solid-gas mixture assumes many of the hydrodynamic characteristics of a fluid and is said to be fluidized. In particular, the fluid bed will have an apparent density and viscosity and will assume the shape of its container. Objects denser than the fluid bed will sink to the bottom of the fluid bed and conversely, lighter objects will float to the top.

The Inova fluid bed takes advantage of homogeneously mixed solid particles with heated air to efficiently combust wet fuels producing extremely low emissions. The homogeneous nature leads to very even temperature profiles inside the reactor, which minimize the formation of pollutants, such as carbon monoxide and nitrogen oxides.

The Inova fluid bed reactor is a carbon steel vessel lined with refractory materials to suit the conditions of combustion and is comprised of four main components:

- Wind box zone – Insures the proper air distribution below the orifice plate.
- Orifice plate – Separates the wind box zone from the combustion zone and is constructed of special metal alloys. The fluidization air passes through the plate via nozzles which allow the passage of air but restrict the backward flow of bed material. The orifice plate maintains sufficient pressure drop in order to ensure the proper air distribution.

- Combustion zone – Contains the fluidized bed where the fuel is injected either into or above the zone. The bed material is typically sand. The height of the zone is controlled by the differential pressure. In order to avoid agglomeration, materials can be periodically or continuously removed and replaced.
- Freeboard zone – Is the largest section of the reactor, which allows for the completion of the combustion process and separation of the bed material and gases.

The design of the Inova fluid bed has been successfully demonstrated in many different industries, which includes but is not limited to the following:

- Municipal or industrial sewage sludges
- Paper mill spent liquors or waste sludges
- Petrochemical waste sludges

The Inova fluid bed is the ideal means for the thermal treatment of low heating value fuels, and with the addition of air pollution control equipment can meet all current emission regulations.



Metropolitan Council Environmental Services' Inova Fluid Bed
St. Paul, MN, USA.

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