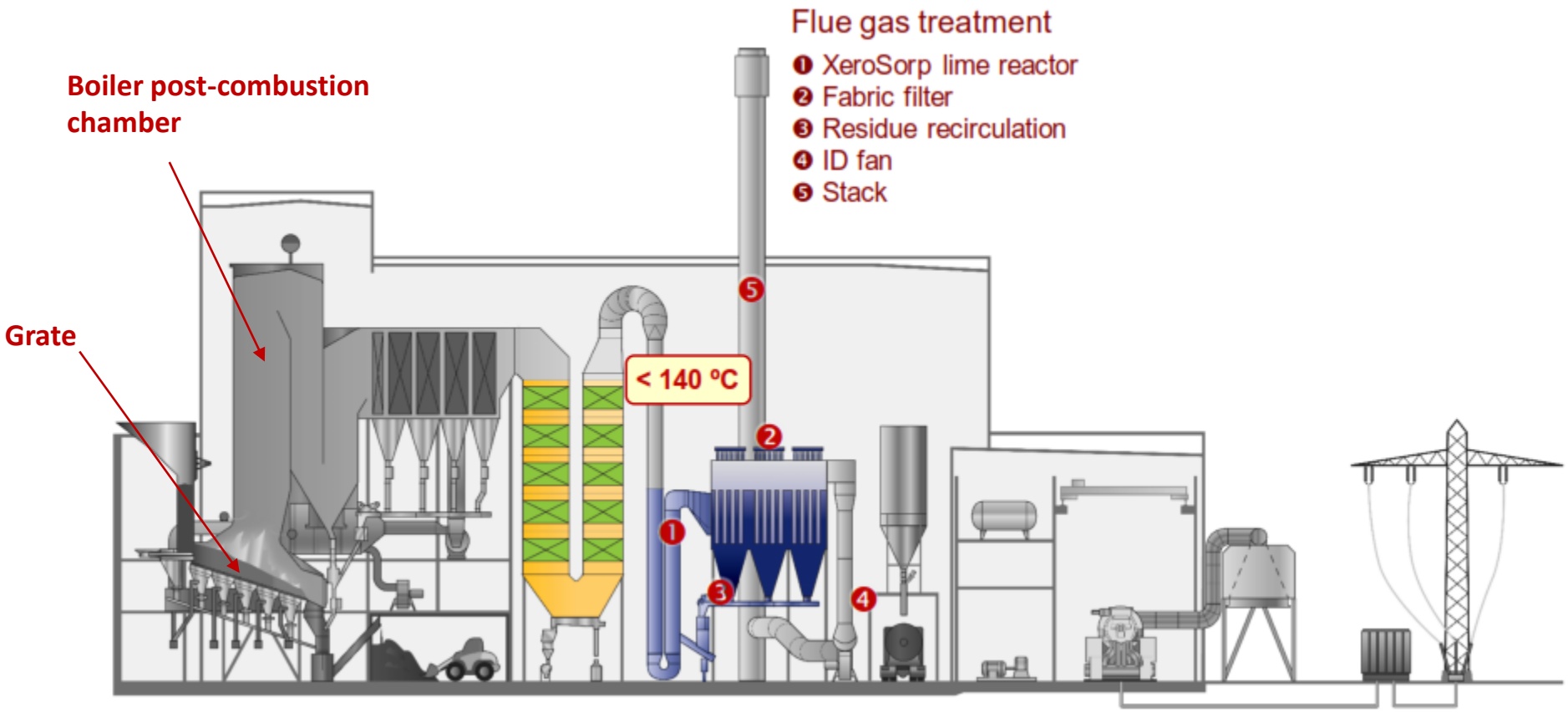
Newhurst ERF - Flue Gas Treatment

Flue Gas Treatment (FGT)

Hitachi Zosen INOVA

Newhurst ERF will incorporate state-of-the-art air pollution control technology to cool and clean the flue gas. The process is a combination of Selective Non-Catalytic Reduction (SNCR) and Dry Flue Gas Cleaning.



Sources: Hitachi Zosen Inova

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Selective Non-Catalytic Reduction (SNCR)

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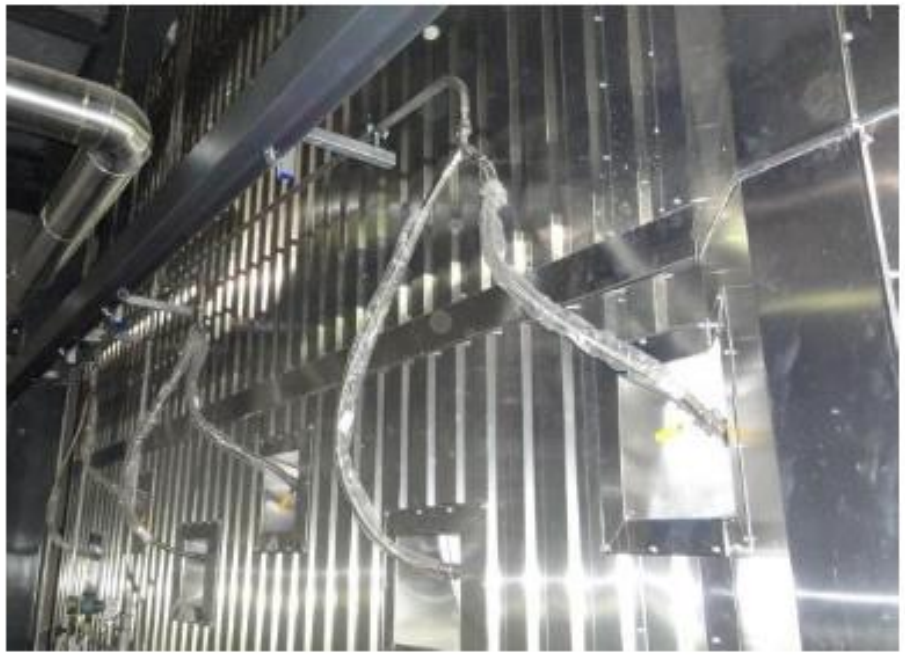

Main reactions

$4\ NO + 2\ NH_3 + O_2 \rightarrow 2\ N_2 + 6\ H_2O$

$2\ NO_2 + 4\ NH_3 + O_2 \rightarrow 3\ N_2 + 6\ H_2O$

Secondary reactions

$4\ NH_3 + 5\ O_2 \rightarrow 4\ NO + 6\ H_2O$ at temperatures > 1000° C

$4\ NH_3 + 3\ O_2 \rightarrow 2\ N_2 + 6\ H_2O$

The HZI SNCR process has been perfected through years of operating experience and extensive R&D works.

Harmful nitrogen oxides (Nox) are produced in every combustion process. However, they can be converted into their basic elements - nitrogen and water.

The reduction takes place within a temperature range of 850 to 950 C.

This range exists in the post-combustion chamber of the furnace. In this area, ammonia water is injected into the flue gas.

Sources: Hitachi Zosen Inova

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Selective Non-Catalytic Reduction (SNCR)

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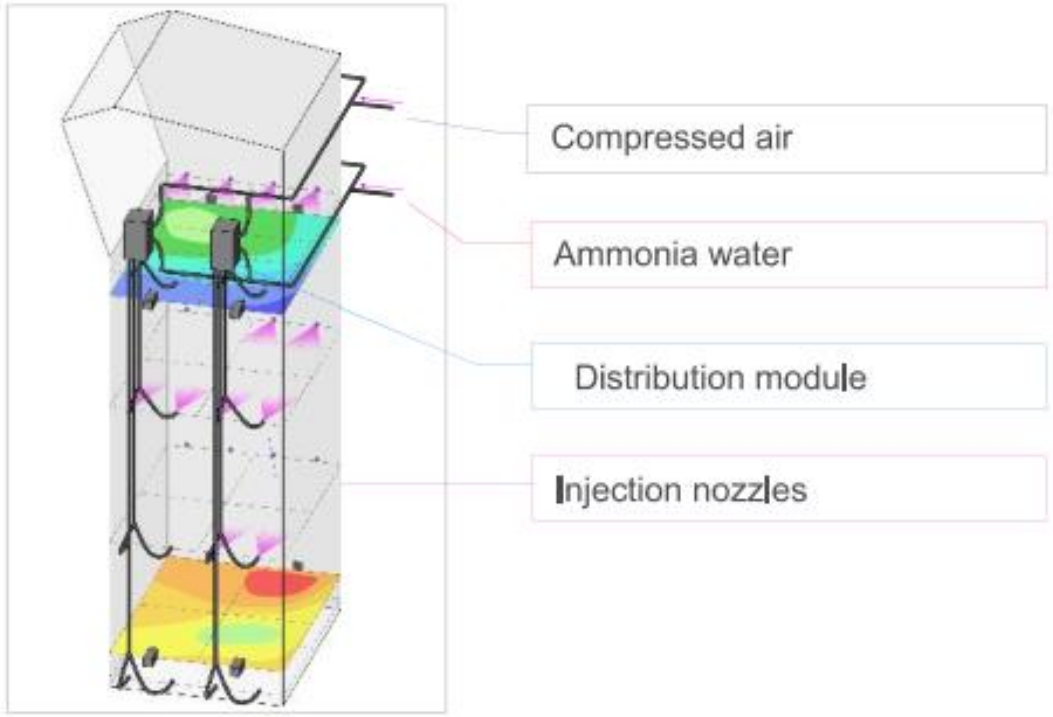

- Located in the post-combustion chamber.
- Divided virtually into several vertical segments.
- Each segment consist of:
  - Distribution module
  - Injection nozzles on several levels
- The configuration of the nozzles ensures full-area coverage of the injection medium across the entire cross section.

Sources: Hitachi Zosen Inova

Dry Flue Gas Cleaning Process

Hitachi Zosen INOVA

Purpose is to remove:

- Dust particles
- Acidic gaseous contaminants by neutralization (hydrated lime)
- Organic pollutants, mercury and other heavy metals

Main Components of system

- Reactor with additive injection
- Fabric filter for solid-gas separation
- Residue recirculation - to achieve the best adsorption performance with minimum additive consumption, solids from the fabric filter are recirculated into the reactor.

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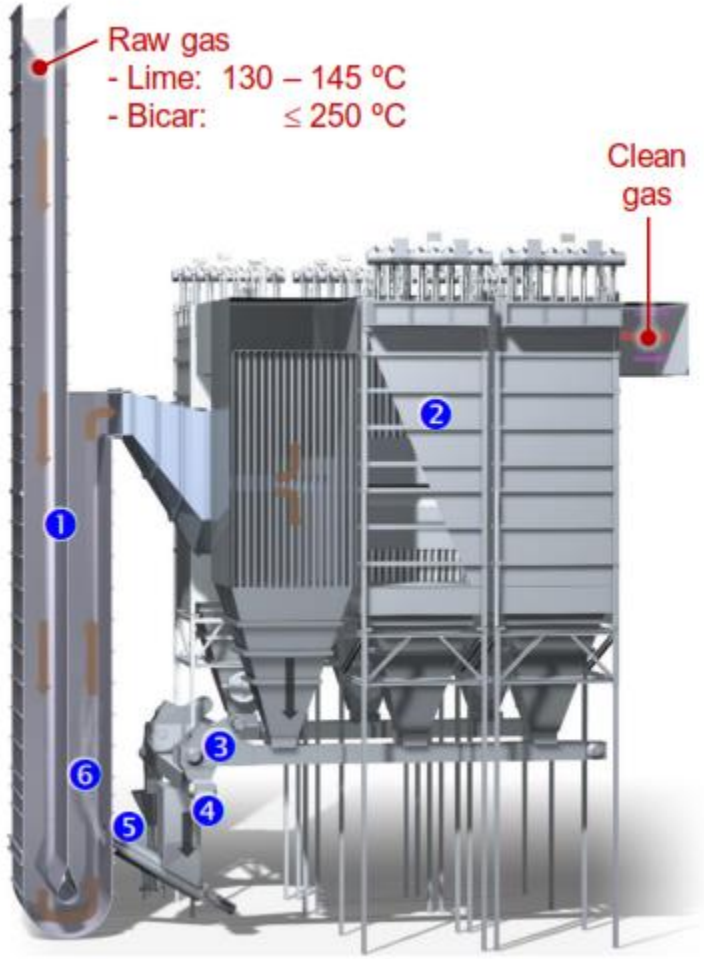
XEROSORP® Reactor

Hitachi Zosen INOVA

Main components of the *XEROSORP®* process:

1. Plug flow type **reactor with additive injection**.
2. **Fabric filter** for solid-gas separation.
3. Mechanical system for **residue recirculation.**
4. Discharge of residues into the **residue silo**.
5. **Screw conveyor** to feed resides into the reactor.
6. **Injection of additives** (pneumatic conveying):
   - Hydrated lime
   - Powdered activated carbon



Sources: Hitachi Zosen Inova

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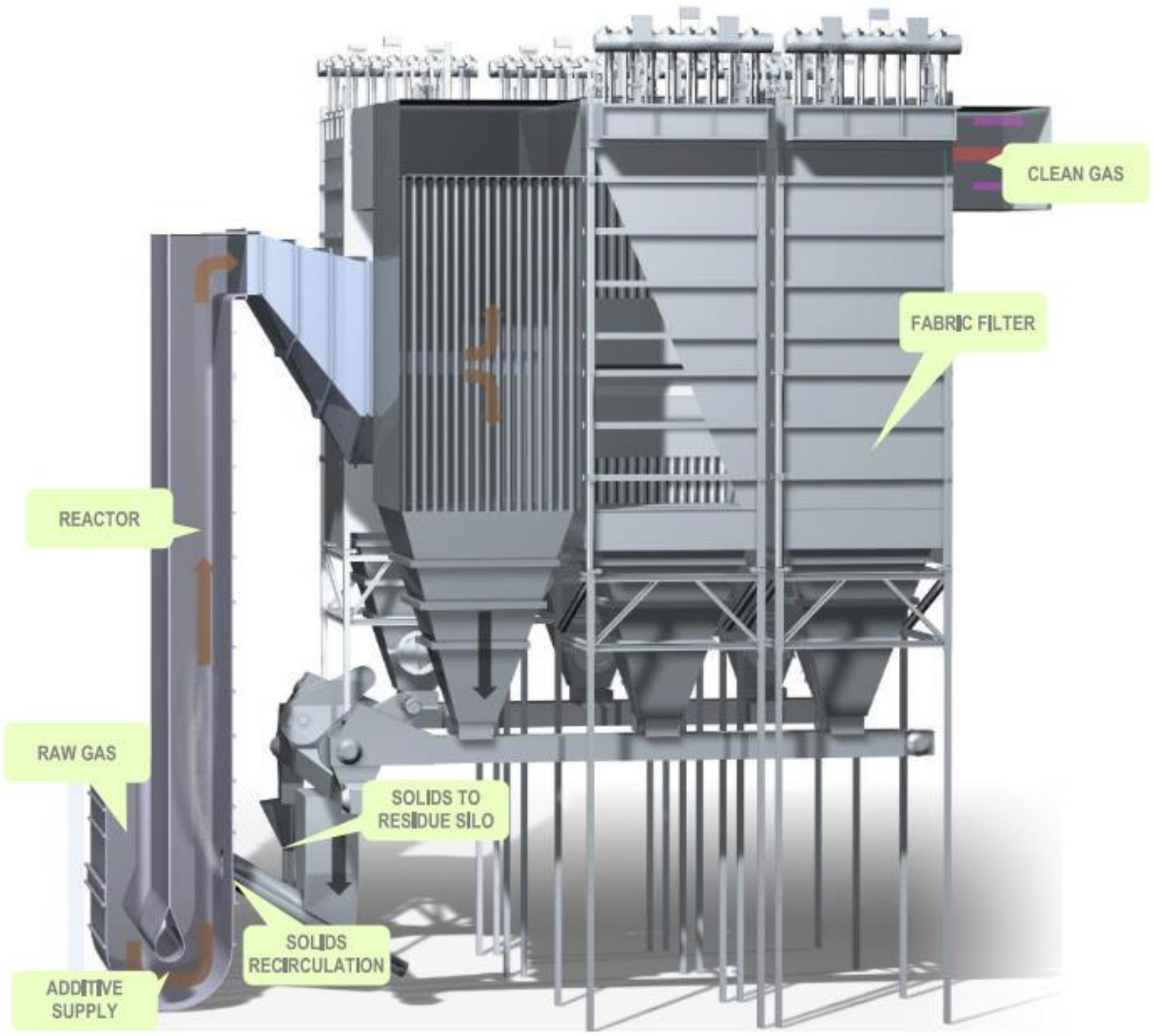
XEROSORP® Reactor

Hitachi Zosen INOVA



The dry flue gas treatment process is designed by HZI specialists to remove all dust particles, most of the acidic gaseous contaminants by neutralisation with hydrated lime and organic pollutants as well as mercury and other heavy metals by adsorption on activated carbon.

The system consists of a reactor with additive injection, fabric filter for solid-gas separation and residue recirculation.

To achieve the best adsorption performance with minimum additive consumption, solids from the fabric filter are recirculated into the reactor.

Sources: Hitachi Zosen Inova

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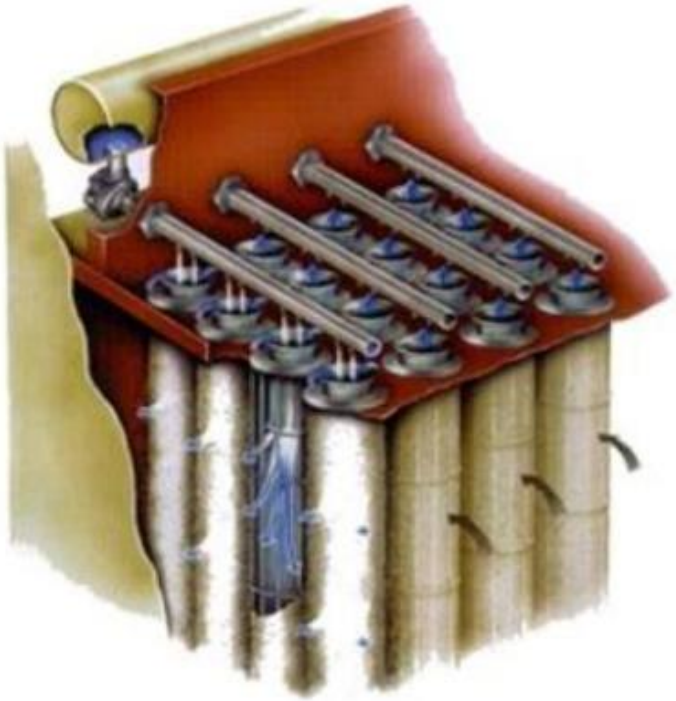

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Fabric Filter

The fabric filter is used for the separation of solids from the flue gas. In the physical process of separation, the solids are filtrated onto the surface of a gas-permeable fabric.

Due to the intensive contact of the flue gas and the adsorbents in the filter layer the removal of pollutants from the flue gas is further improved.

Sources: Hitachi Zosen Inova

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Residue Circulation

Solids collected in the filter hoppers are transported with chain conveyors to collecting bins. From the first collecting bin the solids are recirculated back to the reactor.

Overflown residues coming directly from the first to the second collecting bin are pneumatically transported to the residue silos.

Sources: Hitachi Zosen Inova

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Induced Draught Fan

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The induced draught fan (ID fan) generates the required negative pressure in the combustion chamber and is conducting the flue gas from the furnace through the flue gas cleaning system to the stack.

The ID fan rotation speed is regulated by the combustion chamber pressure controller.

Sources: Hitachi Zosen Inova and Pollrich

Stack

The stack expels the purged flue gas after the flue gas cleaning system to the atmosphere.

At Newhurst ERF, the 96.5m high freestanding stack contains a single flue.

Both the cylindrical support structure and internal pipe is made of steel. The individual stack pipe sections are joined to form a gas tight seal.

An external safety ladder provides access to the work platform for maintenance activities.

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Sources: Hitachi Zosen Inova and Dominion Steelcon

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Emissions Measurement (CEMS)

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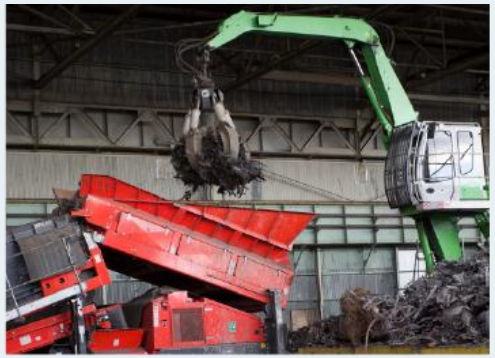
The emission measurement system monitors the flue gas properties and detects the composition in the flue gas duct after the last flue gas cleaning stage or the stack respectively.

The instruments are installed directly on the flue gas duct. For the gas concentration measurement, a small flue gas stream is extracted through a heated extraction line and conveyed to the measurement system installed in a separate emission measurement enclosure.

The emission management system is designed to meet the particular requirements of the operating permit for the plant. It complies with the applicable directives for installation and quality assurance.

Sources: Hitachi Zosen Inova and SICK GmbH

Thank You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