

Contact

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HNX: The Protective Gas Generator

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The Basic Process

The process is based on the substoichiometrical combustion of hydrocarbons with air.

Ratio Control

The ratio between combustion gas and air is kept constant by means of a fully automatic ratio control. In addition the flue gas is analysed continuously on its H₂ content by means of a H₂ analyser. In case of a deviation of the H₂ content the ratio is immediately corrected.

MEA (Mono Ethanol Amine) Boiler and CO₂ Stripper

The combustion is effected in a refractory lined reaction chamber. This chamber is equipped with an electrical ignition, an ignition burner and an automatic self-controlling UV-flame monitoring device.

The hot flue gas, generated by this process releases its heat by means of a heating register to the MEA-boiler for the generation of pressure-less regeneration-strip-steam. The flue gas leaves the MEA-boiler at approx. 300 °C and is routed to the CO-converter.

The CO₂ enriched MEA lye coming from the CO₂ scrubber is depleted in the CO₂ stripper column.

CO Converter HT-1 and LT-2 (HT/LT = High/Low Temperature)

The CO shift conversion in the reactor HT-1 and LT-2 takes place in presence of steam, produced by burning of hydrocarbons.

The reaction is effected at a temperature of 300 °C in the LT-1 reactor respectively 200 °C in the LT-2 reactor.

To achieve a reactor inlet temperature of

200 °C in the LT-2 reactor, the hot effluent of HT-1 CO-convertgas is cooled by quenching with condensate.

CO₂ Scrubber

A regenerative organic alkaline solution (MEA = Mono Ethanol Amine) is used as CO₂ absorbent.

The loaded alkaline solution is routed to the desorption tower where the CO₂ is removed by means of the strip-steam generated in the MEA-boiler.

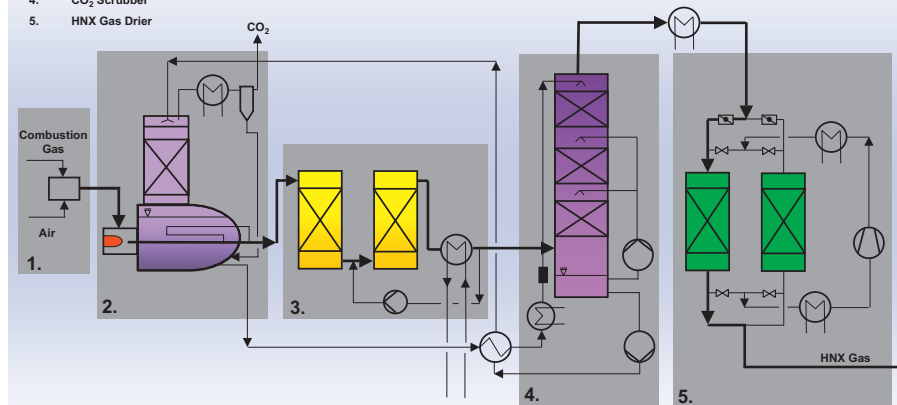
Gas Drying

The "wet" HN protection gas is dried in a thermally regenerated two bed adsorption drier. Molecular sieve is used as drying agent.

While drying takes place in the one adsorber the other is regenerated at temperatures exceeding 200 °C.

After drying the HN protection gas is provided to customers application.

1. Ratio Control
2. MEA Boiler and CO₂ Stripper
3. CO Converter HT-1 and LT-2
4. CO₂ Scrubber
5. HNX Gas Drier



Plant Features

Product flexibility

- Plant capacity up to 1000 Nm³/h
- Adjustable H₂ content between 0,5 to 15 % by volume
- Gas analysis, typical values
 - H₂: 0,5 - 15 % by vol.
 - CO: 50 - 1000 vpm
 - CO₂: 50 - 100 vpm
 - CH₄: 20 - 100 vpm
 - H₂O: 3 - 10 vpm
 - O₂: < 5 vpm
 - N₂+Ar: balance
- Dew points up to -70 °C
- Delivery pressure as required

High reliability

- Many years of experience in plant design and manufacturing guarantees high reliability of all HNX protective gas generators

Full automation

- All HNX protective gas generators are designed for unattended operation and automatic load adjustment

Independent on-site production

- Production is not affected by road transportation or prevailing weather conditions.

Cost efficiency

- Minimized maintenance and operating costs

Applications

Mahler's HNX protective gas generators can cut the production cost considerably, e.g. in the following industrial applications

- Heat Treatment of steel in the metallurgical / steel industry (e.g. bright annealing, galvanizing)
- Float glass manufacturing

Highlights

- Plants in operation for more than 20 years to full satisfaction of the customers
- Several plants in operation at leading rolling mills in Europe
- On demand hydrogen content up to 15 % by vol.

