

425 Nm³/hr (15,000 SCFH) Hydrogen Plant for Sale

Capacity

425 Nm³/hr (15,000 SCFH)

Product Specifications

Purity 99.999%

Pressure 200 psig

Temperature 100 °F

Steam 600 lb/hr, 240 psig

Plant History

Built 2016

Consumptions

Natural gas (feed, 90% methane) 163 m³/hr

Natural gas (fuel) 37 m³/hr

Electricity 5.8 KW

Major Equipment

Reformer (SMR)

Desulfurizer

HTS converter

Blowdown separator

Condensate separator

PSA adsorber

Waste gas tank

Desuperheater

Feed heater

Mixed feed heater

Waste heat boiler

BFW heater

Process gas cooler

Desuperheater pump

ID fan

Delta V PLC control system



BRIEF PLANT DESCRIPTION

The plant has a double-tube steam methane reformer that is a compact furnace enclosure with a single reaction tube fired on two sides. The furnace enclosure is wide at the bottom to accommodate the burners and tapered at a height several feet above the length of the flames to a narrow upper section. This configuration allows combustion to be completed in the lower section bringing the feed/steam mixture quickly to its reaction temperature. The intermediate side walls channel the flue gas into a turbulent flow condition at the upper section to improve heat transfer and maintain a uniform tube wall temperature along the length of the reaction tube. The reaction tube consists of an annular portion filled with catalyst and a center return tube. The reaction tube is supported from the bottom and allowed to thermally expand upward through the use of a counterweight system attached at the top of the tube. The steam/hydrocarbon feed gas mixture enters the annular section of the reformer reaction tube at the bottom. The feed gas passes upward through the catalyst bed and then downward through the center return tube. Thus, the feed gas flows through the catalyst bed in single pass, co-current heat exchange relationship with the hot combustion gas in the furnace enclosure. Then, the reformed gas flows back to the bottom of the reformer through the center return tube in single pass, countercurrent heat exchange relationship with the upward flowing feed gas in the catalyst space. The combination of the furnace enclosure geometry and a reaction tube with a center return tube results in an even temperature profile over the length of the tube while maintaining a high thermal efficiency in the furnace.

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