

870 LSG UNIT



TIER 3 UNIT (10 PPM)
BUILT IN 2004; TIER 3 REVAMP IN 2019 AND WAS NEVER
OPERATED
TECHNOLOGY: EXXONMOBIL SCANfining / AXENS Prime-G+
UNIT CAPACITY: 60,000 BPD
OPERATING PRESSURE: 310
DESIGN PRESSURE: 455
OPERATING TEMP: 540
DESIGN TEMP: 850

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870 LSG UNIT PROCESS DESCRIPTION

General

870 is an Exxon/Mobile Licensed SCANfining™ unit that upgrades FCC gasoline by catalytically hydrodesulfurizing sulfur compounds in the feed to meet low sulfur gasoline specifications. It was built in the early 2000's to meet the new gasoline sulfur specifications. It was designed specifically to limited the saturation of olefins which reduces the product quality by reducing octane.

Process

870 utilizes two parallel trains of Cold Feed/Effluent exchangers, Diolefin Saturators, Hot Feed/Effluent exchangers, SCANfining Reactors and Reactor Effluent coolers. The Fractionation and Treating sections are common to both trains.

The feed to 870 is 65,000 bpd of debutanized full range cat gasoline. The feed enters the Feed Surge Drum and is regulated by two flow controllers (one in each of the two trains) downstream of the Reactor Charge Pumps. The Reactor Charge Pump discharge stream enters the Feed Filters to remove particulate matter present in the feed. The filtered feed is split equally and is mixed with a portion of the recycled treated gas, H₂. The gasoline feed and treated gas mixture are preheated in the Cold Feed/Effluent Exchangers to the required inlet temperature for the Diolefin Saturators. The Diolefin Saturators are mixed-phase trickle bed reactors utilizing KF-840 or equivalent catalyst. KF-840 is a NiMo hydrotreating catalyst. The operating conditions of the Diolefin Saturator are maintained such that a minimum of 60% of the feed diolefins are saturated without initiating hydrodesulfurization and olefin saturation reactions.

The effluent from the Diolefin Saturator is combined with the bulk of the treat gas and heated further in the Hot Feed/Effluent Exchangers to completely vaporize it before entering the SCANfining Reactor. In the SCANfining Reactors, hydrodesulfurization (HDS), hydrodenitrogenation (HDN), and olefin saturation (OSAT) reactions occur over ExxonMobil's proprietary RT-225 catalyst. The inlet temperature to the SCANfining Reactors is controlled by controlling the firing in the Reactor Effluent Heater

The products from the two parallel SCANfining Reactors, including hydrocarbons, H₂, H₂S, and NH₃, are re-combined and then sent to the Reactor Effluent Heater. The combined reactor effluent streams are superheated in the Reactor Effluent Heater to provide sufficient duty and temperature driving force to achieve the required Diolefin Saturator and SCANfining Reactor inlet temperatures. They are cooled in the Reactor Effluent Cooler before entering the Reactor Effluent Separator. Make-up hydrogen is added upstream of the Reactor Effluent Separator to control unit pressure.

Recycle gas) from the Reactor Effluent Separator is Amine treated to remove H₂S and then recycled using a motor drive compressor back to the reactor system. The Liquid product from the Separator is sent to the Stripping Section. The Product Stripper has a fired heater reboiler and removes H₂S and light-ends. It is designed to achieve a low sulfur gasoline product H₂S concentration of less than 1 wppm.

The low sulfur gasoline product is cooled before being sent offsite to gasoline blending.



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