



SERVICE PROFILE

Hydrotreater Reactors

Hydrotreater Reactors

Hydrotreating units remove sulfur and nitrogen from the hydrocarbon feedstock and replace them with hydrogen. This is a critical step in hydrocarbon processing because subsequent catalytic reforming units can be contaminated with high sulfur content.

Chemical Treatment Chart

Vessel Contaminant	FQE Chemical Name
Light and Heavy LELs	FQE Reactor
H ₂ S	FQE H ₂ S
Pyrophoric (FeS)	FQE Reactor Pyro



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Recommended Hydrotreater Reactor Cleaning

Vapour Phase/Degassing

Regular maintenance work in a hydrotreater unit usually involves changing the catalyst during a process called catalyst regeneration. The presence of LELs in the unit poses a very high risk when accessing the unit for maintenance work. Catalyst regeneration is usually performed in the presence of a low stream of inert gas, often nitrogen. However, the fact that nitrogen is an asphyxiating agent introduces risk to the entire operation. It is also important to note that the catalyst handling process is time consuming and requires a significant amount of nitrogen. This purge of nitrogen is approximately the same amount, or more than the amount used to cool down the reactor.

The hydrotreater units operate at high pressure and temperature. In order to achieve a suitable environment in which the vessel can be opened, the shutdown process requires an extended time period to cool the units naturally. Alternatively, these vessels can undergo the accelerated cool down (ACD) process, which uses the assistance of either gaseous or liquid nitrogen for cooling. Due to the sensitivity of the catalysts inside, these units are unable to handle process steam and/or water vapour. This means that conventional steam degassing is not possible.

FourQuest Energy provides specialized chemicals, designed specifically for these hydrotreaters. These specialized chemicals are the same proven compounds that have been used in the industry for the last decade to execute a regular degassing process. However, unlike the standard compound, these chemicals are prepared concentrated, without any water, to suit this specialized application. The concentrated chemicals require a lower ratio of the carrier gas (nitrogen) and provide an easier distribution throughout the reactor.

The chemicals are stable at up to 205°C, and can therefore be injected into the nitrogen stream during an accelerated cool down at relatively high temperatures, reducing both time and nitrogen consumption. Chemical injection can be performed during accelerated cool downs when vessel temperatures drop below 205°C.



Inlet and outlet points on reactor vessel



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