



Synthetic Compressor Oil

hydrogen reciprocating compressors

Benefits of using synthetics in high pressure, reciprocating compressors in hydrogen service

Synthetic Lubricants for Hydrogen Compressors

Three factors to consider when selecting a lubricant for a *high pressure, reciprocating compressor in hydrogen service* include impact on **compressor downtime (MTBO)**, **the effect of oil carryover to downstream processes** and **cost**. The selection of the right synthetic lubricant can eliminate the issues caused by the use of petroleum oils.

Common issues when using petroleum oil in this application include:

Compressor Downtime

Unplanned shutdowns due to valve replacement, excessive ring wear and excessive packing wear

- Since a petroleum-based lubricant is normally selected based on the conditions of the final stage of compression, the compressor starts with oil that is too thick for proper flow and lubrication in the earlier stage cylinders.
- Poor low temperature characteristics resulting in no-flow shutdowns

High Feed Rates

Feed rates have to be increased to cylinders due to the high absorption of hydrogen gas into the lubricant leading to:

- Excessive oil which leads to “stiction” of the valve plates and premature valve failure
- Carbon forming tendencies at higher temperatures
- High oil carryover to downstream components

Effect of Oil Carryover Downstream

A reduction in efficiency of 1% in the catalyst would result in a \$10,000/day loss in a \$1,000,000/day process.

- Petroleum based oils naturally contain elements that may bond to downstream catalysts causing catalyst poisoning, Process contamination or plugging of formations.
- Oil carryover to a high temperature catalyst may result in carbon coating the catalyst and further reducing its efficiency and the gas flow rates.

Weighing the Cost

Cost is a matter of perspective. Too often we compare the price of one lubricant to another in terms of price/gallon. When comparing petroleum based oils to synthetic oils, the question should be **what is my cost of using petroleum compared to my cost for using synthetics?**

Reduced feed rates, improved compressor run-time and efficiency, longer component life, extended MTBOs, improved catalyst efficiency, and low carbon forming tendencies are all factors which must be considered when determining if petroleum or synthetic is the more costly choice.

hydrogen

What is it used for?

- Hydrogen for desulfurization to remove sulfur in fuels
- Hydrogen for ammonia (NH₃) production (fertilizer plants)
- Hydrogen for hydrotreating and hydrocracking processes
- Hydrogen services in petrochemical processes



Common lubricant used in this application: ISO 150 petroleum oil for frame & ISO 320 Petroleum Oil for cylinders

Recommended lubricant: Summit Synthetic DSL-XM Series

- Meets U.O.P Specifications -



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