Low Cost H_2S Removal

Parrotia Technologies, LLC - SULFEROX®

Converting hydrogen sulfide to elemental Sulphur

A Shell Global Solutions Technology

Parrotia Technologies, LLC is the licensee of the Shell SulFerox technology focused on the installation of environmentally-friendly projects converting hydrogen sulfide into elemental sulfur obviating the need for sour natural gas flaring or other forms of expensive disposal. Once sour gas is processed, the natural gas stream can be sold into the normal supply pipelines at commercially attractive prices or used for other value-added products. Parrotia is the sole licensee for the Shell SulFerox technology.

Parrotia has a proven track record with over thirty installation word wide for over the past twenty five years. In its niche market of between 0.05 and 20 metric tons per day (t/d) concentration, Sulferox is generally the most cost effective and environmentally friendly solution for removing H_2S. In many cases, SulFerox is also very competitive in lower and higher concentrations.

AT A GLANCE

Customer driver: The need for an effective treatment of gases containing any level of Sulphur

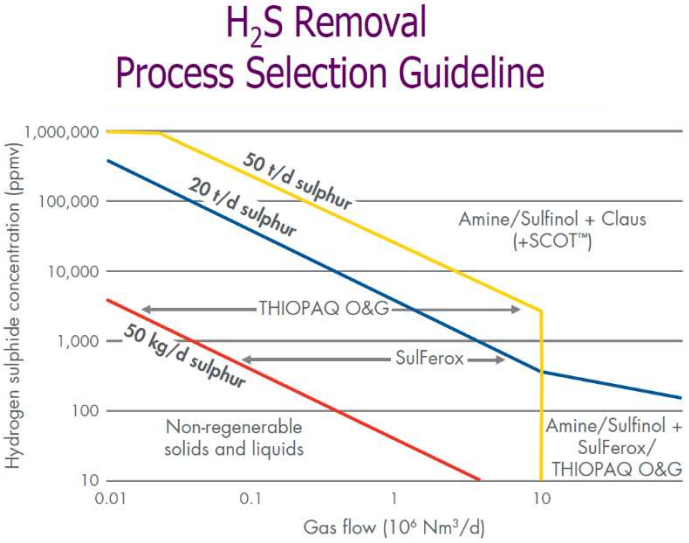
Solution: SulFerox process for the treatment of natural gas, refinery gas, syngas and other gas streams

Value delivered: Cost advantages in treating gases containing a wide range hydrogen sulphide levels

Proof point: More than 30 plants worldwide operating the SulFerox process

ABOUT THE TECHNOLOGY

There are numerous methods for reducing hydrogen sulfide in process streams and each has a specific application range (see below figure). Extensive pilot plant testing and commercial operations show that the SulFerox process is very well suited for handling gas streams that yield between 0.05 and 20 t/d of Sulphur.



PROCESS DESCRIPTION

SulFerox is a redox-based process that converts the hydrogen sulfide in sour gas to elemental Sulphur through reaction with aqueous ferric iron. The process forms solid Sulphur particles that are easily filtered out.

There are three steps in the process: absorption, regeneration and Sulphur recovery. During absorption, the sour gas stream comes into contact with a liquid containing soluble iron (III), and hydrogen sulfide is selectively oxidized to form elemental Sulphur.

Regeneration involves re-oxidation of the iron (II) to maintain a supply of active iron (III). To maximize Sulphur recovery, the elemental Sulphur formed in the first reaction is concentrated in a surge tank and then filtered out. The filtrate is returned to the process for maximum ferric iron solution recovery.

BUSINESS VALUE

In addition to the value add for treating the sour gas for sale, another driver in the marketplace is the reduction of flaring the sour gas and impact on the environment. The EPA has started to rigorously regulate the emissions of methane and is proposing huge penalties. The market in North America is a huge opportunity. In Texas alone, there are over 160,000 licensed sour gas wells, many of which flare their methane to maintain the oil production.

The SulFerox process has since been used worldwide for applications including (i) refinery hydrotreater off-gas; (ii) amine off-gas: (iii) refinery process streams; (iv) coke oven gas; (v) primary natural gas treating; and (vi) associated gas (onshore and offshore). Based on volumes and content characteristics, stand-alone (build-own-operated) projects can be provided ranging from a few hundred thousand to over 300 million scfd.

Figure 2 below provides a graph of the typical cost per pound of H_2S removal.

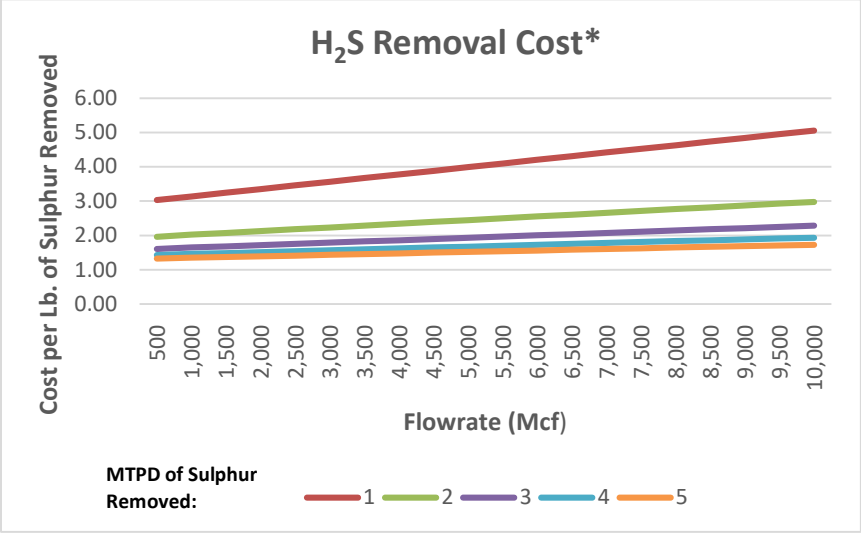


Figure 2

Parrotia will provide a complete system installed and commissioned to meet the client's specific site, environmental and other local conditions.

Whether large or small volumes, Parrotia would be very pleased to evaluate your gas analysis and provide a very quick assessment and confirmation of the indicative budgetary pricing and provide additional information on the SulFerox system for removing the H_2S from any gas stream.

***Notes:**

1. Figure 1 Indicates typical budgetary costs (+/- 25%), final cost may vary based on gas analysis, location, special conditions and will be confirmed with a detailed FEED and Cost analysis.
2. Cost includes supply of a complete system and a minimum five year operating agreement.
3. Costs do not include Operations and Maintenance. If client elects, a proposal for O & M Services will be provided
4. MTPD of Sulphur Removed is the plot of a typical cost per lb at a specific flowrate for a plant removing 1,2 3, 4, or 5 metric tons per day (MTPD) of Sulphur.

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