Eos H_2S Removal System

Simple, Cost Effective, & Good for the Environment

Theia Air is proud to introduce the Eos Sulfide removal and conversion system. Eos has the high removal efficiency and low operating costs required to take on these applications without the high price tag of competitive technologies.

The Eos system is a relatively new treatment system but it utilizes a number of well known and established technologies to offer a simple treatment system. This is not a black box but rather an innovative combination of proven technologies to make a simple but robust and reliable treatment technology.

The system utilizes standard components and requires no proprietary chemicals, catalysts or bacterial products. While the Theia team will be there to support you for years to come, you will not need to purchase anything from us to keep the system running.

Eos offers the following advantages:

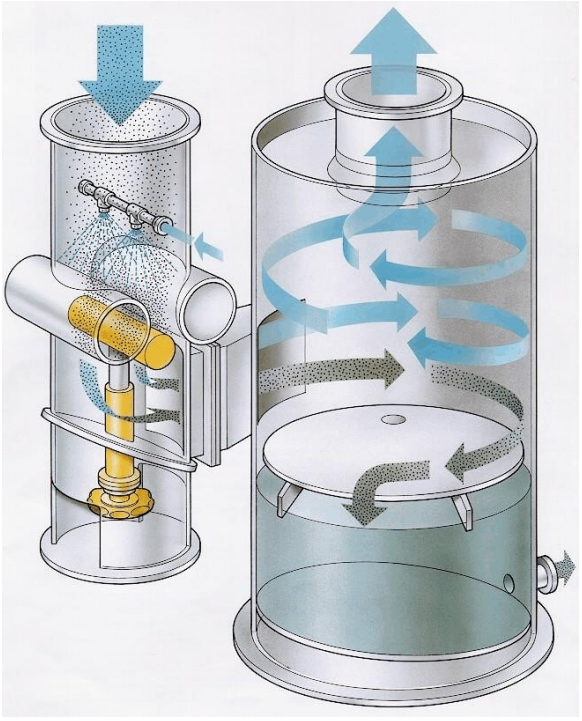
- Lowest capital costs of any H2S Treatment System
- Low operating costs. Among the lowest in the industry
- Simplicity: the system consists of 3 simple steps, each of which is easy to operate Robust Design: System has built in redundancy at all potential failure points.
- Very low maintenance and operator attention
- Can handle wide fluctuations in gas flow and H2S loading without an issue
- No proprietary chemicals, catalysts or bacteria
- No Black Box Technology: system uses standard equipment
- Low water use
- Safe for operators
- No chemical oxidants
- Byproduct is Calcium Sulfate or Sulfur - a recognized soil amendment and not classified as waste.

Step 1: Remove the Sulfides from the Gas

The EOS accomplishes this task through a simple phase transfer of the sulfides from the gas to the scrubbing fluid via a wet scrubbing technology. The EOS scrubbing process represents the next generation scrubbing process, highly efficient, effective, and non fouling.

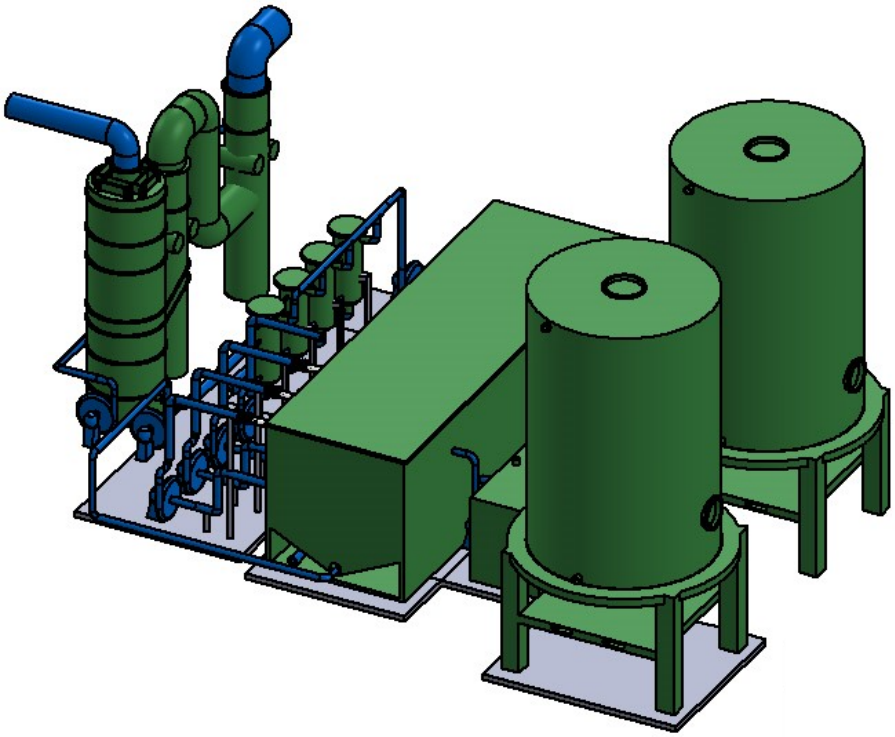
The system differs from traditional scrubbers in the following ways:

- This advanced technology utilizes high shear to atomize the scrubbing fluid to force exceptionally high contact between the gas and the resulting aerosol.
- Extremely high removal efficiencies for H2S with a very short contact time
- Nothing to clog or foul
- Allows the use of a course spray nozzle that will pass solids without clogging
- Low maintenance
- Small footprint and relatively short tower
- Scrubbing takes place at a pH of 7.5 to 8.0 instead of the higher pH designs typically utilized
- Lower chemical use
- Little or no chemistry lost to CO2 conversion
- Safer environment
- Lower corrosivity
- EOS uses Calcium as its pH adjustment chemistry.
- Creates a precipitated solid that has beneficial reuse value
- No chemical oxidant required



Step 2: Treat and Reuse the Water

The second main piece of the EOS system is the water processing system. The EOS system is designed to continuously recycle the process water such that little water is consumed in the process. This step greatly mitigates the need for fresh water while eliminating the creation of wastewater to be discharged.



The first process directly oxidizes and converts the sulfides to sulfates using oxygen derived from atmospheric air. This step utilizes the Oxygenator Nozzle, a well established technology.

The next step is the introduction of calcium. Calcium can be provided via hydrated lime or from our ***Icarus Media.*** For Lime systems, we offer a simple redundant feed system that automatically meters the lime including arch breaking and monitoring system to avoid any issues that people normally associate with feeding lime.

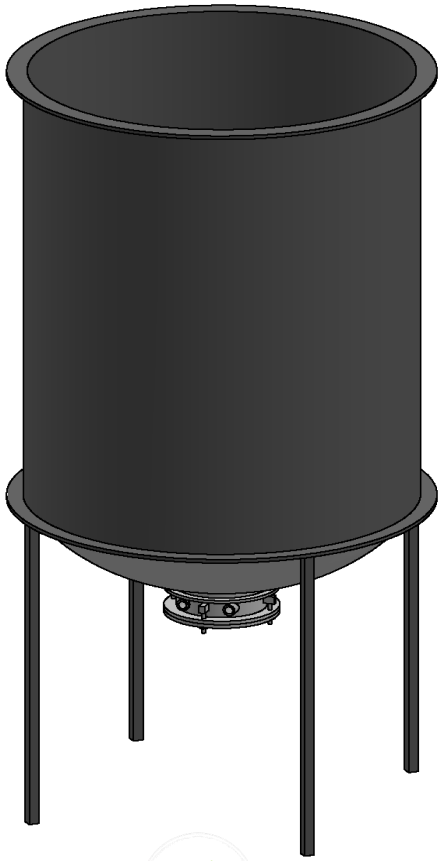
Treated water from the process tank is sent through a set of automatic filters before being sent to the scrubber and the process is repeated. The filters remove any non-dissolved particles and, when backwashed, send them to the solids handling system.

The tank that is utilized has a hopper along its entire length with a sludge collection and withdraw system.

Step 3: Handle the Solids/Byproduct

All sulfide removal processes generate a byproduct that is formed from the sulfur removed from the process. The EOS process typically generates calcium sulfate($CaSO_4$) This product dewaters quite readily and is considered insoluble in water. While the EOS system can be combined with any traditional sludge dewatering technology, the primary option offered is the EZ Sludge System. The EZ Sludge System utilizes a well known and established technology that has been dewatering sludge all around the world for many years.

This system utilizes gravity and time and does not require any labor or regular attention from the operator. We offer a range of sizes and designed ranging from the vertical units which will allow the operator to dump the sludge directly into a dump truck or long haul bulk carrier to the large filters that allow several months of sludge to be accumulated and then removed using an excavator.



EZ Sludge systems operate automatically and only require personnel involved to remove the sludge once it is dewatered. They can dump sludge directly into rolloffs or Dump Trucks.

Sludge will be 45-55% dry solids and can be land applied or utilized as a soil amendment.