

CASE: Chemical Cleaning of Heatric Cooler

- with a high level of expertise

A clogged up cooler will never be a troubling issue for Ocean Teams group's workshop. In corporation with their customer, they achieve their goal, exceeding all expectations while saving both time & money.



▲ Heatric Cooler - ready to be cleaned

Our customer arrives at Ocean Team Scandinavia with a clogged Heatric cooler containing too many particles and deposits from their gasproduction. It therefore needs a good cleaning in order to get the flow through the gaschannels back to its true performance level.

Cleaning of heatric coolers are one of Ocean Team In-house workshop's main expertises.

The Teampayer is No Longer in Game

The delivered cooler serves as a part of the process, where gas is extracted from the subsoil. Cooler water and gas are transported, however, independently of oneanother, through the compressed blocks of corridors while the gas is cooled down for further course.

A particular type of contamination might be the root for troubles regarding these Heatric coolers is scavenger. An economically viable additive supplied gas used in order to soften in the extraction process while avoiding corrosion.

This H₂S (Hydrogen Sulfide) scavenger, among others, increases efficiency in production, but also provides a form of waste product secreted as particles. These particles will, after

prolonged production, end up clogging the gascorridors, creating a higher differential pressure across the cooler, which then eventually give up.

The Alternative Solutions

The customer's Heatric cooler is constructed as a closed box and it is hard to penetrate in order to mechanically clean it. It could be an alternative to clean mechanically as a first, yet the result will, in many cases, not meet any of the customer's desired results. Meanwhile, the gas and cooler water corridors are different for each cooler, making another alternative, "puffing with Nitrogen" in combination with chemical and mechanical cleaning a solution, but only if the chemistry doesn't clean properly or the dp measurements doesn't move.

Ocean Teams Solution: True Value of Chemical Cleaning

In close corporation with our customer, Ocean Team identify the type of contamination followed by a decision on how to clean most effectively = chemical cleaning. The right mixture of chemistry is then prepared.



▶ This plate illustrates the inside of a heatric cooler. A huge amount of plates similar to this one are compressed. During production, gas and coolerwater navigate through the tiny corridors independently from eachother until clogged.

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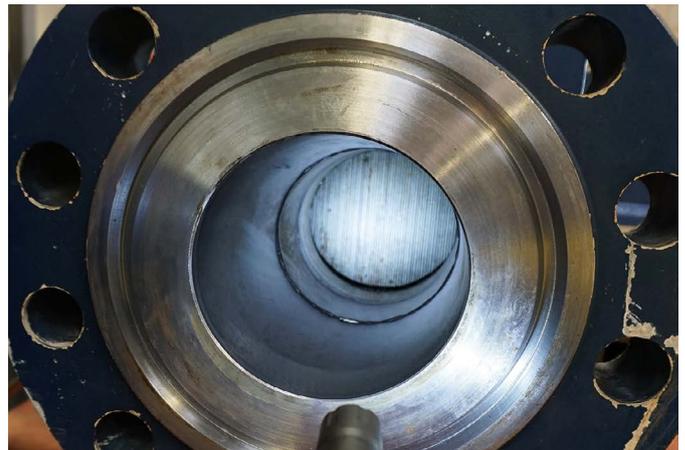
In order to identify the contamination quantity, Ocean Team measures the differential pressure continuously through out the entire cleaning process. Our customer's cooler was clogged cocurrent by 2,5 bar - A level between 0,3 - 0,5 bar - i.e. 1/5 is considered normal and indicates free passage.

The cleaning procedure starts. 2000 liters of water per minute circulate through the cooler, further through the mixture tank with chemistry, and back to the pump - cocurrent and countercurrent. The pump capacity is 3600 meters per minute. The detergent used is the most economically and environmentally sound for the result, the customer desires to end up with. In order to achieve the most effective cleaning, and to capture the particles, which can be wedged inside the cooler, it is important to circulate in both directions and measure the pressure a constant temperature continuously.

Effective Thinking - also through the night!

There is a certain temperature that allows the chemistry to work around the clock, even when the circulation is shut down for the night. Instead of cooling it down, the cooler is left to soak in chemistry with this constant temperature. It is pure advantage to keep track of the process during the day, while the chemistry works miracles throughout the night.

▼ *The visible result of a chemical cleaning in shape of contaminating particles caught in the filter.*



▲ *A heatric cooler after a chemical cleaning.*

Result of Great Value to the Customer

Ocean Team Scandinavia obtains the customer's desired outcome. The Heatric arrived with a differential pressure at 2.5 bar. After the procedure, it was measured at 0.3 bar, which means, a power increase of more than 80% and approximately an equally efficient gas permeation as the procurement of a new Heatric cooler.

Back in the game

The Heatric cooler plays a part of a team where several coolers succeed one another. Therefore, it is ok, to dismantle one in case of breakdown - although not too long. It is important for the customer that it gets back in the game as fast as possible. A new Heatric cooler takes months to build and at a great cost. Whereas, a chemical cleaning at Ocean Team Scandinavia is done fast within 14 days and to a percentage of the purchase price. The purified Heatric quickly serves its salary back through production.

Ocean Team's specialists, equipment, effective ideas and services within the field of chemical cleaning of Heatric coolers are in the far front, with competitive expertise, and not least "Cost effective" in the long run.