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AMMO LASER Leak Detection System

The #1 Safety Measure for Urea Plants with a Guaranteed Pay Back

Question 10: What is reason number 4 to choose for a vacuum system ?

High pressure urea equipment consists of a carbon steel pressure bearing wall, which is protected against corrosion by a protective layer. This protective layer is typically an overlay welding or a loose liner. Any leak in a loose liner will lead to a dangerous situation in that a large surface of the carbon steel pressure bearing wall underneath the leaking loose liner compartment will be exposed to the extremely corrosive ammonium carbamate. Experience has shown that ammonium carbamate can corrode carbon steels with very high corrosion rates up to 1,000 mm (40 inch) per year.

When talking about active leak detection systems, one can distinguish a pressurized system, in which an inert carrier gas stream flows through the leak detection circuits and a vacuum based system, where one pulls vacuum pressure behind the liner.

It is a real challenge to avoid clogging as urea easily crystallises at any temperature even above its melting point due to its polymerisation behaviour forming biuret, triuret etc. with high melting points. This is the main reason that we strongly recommend to upgrade any passive leak detection system (FAQ 3).

Active leak detection systems can either be a pressurised or a vacuum based system (refer to FAQ 5). We recommend to use a vacuum based leak detection system for several important reasons.

Reason #1 is: No risk of liner bulging (refer to FAQ 6)

Reason #2 is: Direct coverage of the complete carbon steel surface of a compartment (refer to FAQ 7)

Reason #3 is: A vacuum system is less prone to clogging (refer to FAQ 9)

Reason #4 is: A vacuum system does not restrict the leaking flow and does not built-up pressure or introduce risks for backflow

But why is that ?

The validity of this fourth reason has been proven by Incident 19-005, details about this incident can be found via the following link:
https://ureaknowhow.com/wp-content/uploads/2017/08/2020141_UKH_FIORDA_04.pdf

In case of a large liner leak and operating a vacuum system, the vacuum pump of the leak detection system will pull the leaking fluid without any restrictions to the ammonia analyser.

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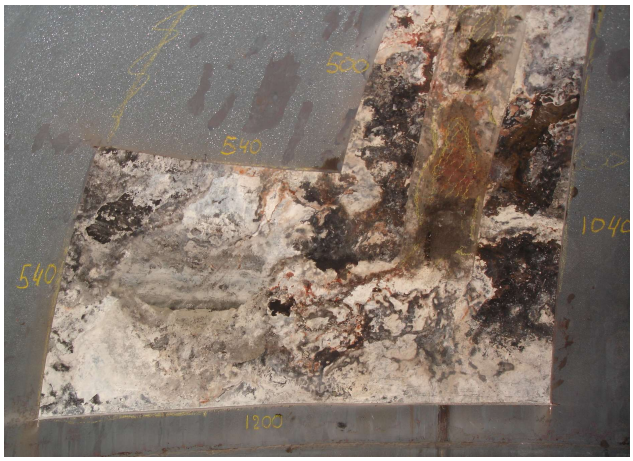
However with a pressurised system, each leak detection circuit contains a flowmeter. This flowmeter needs to be installed in order to ensure that there is flow through the circuit. However, in the event of a major spill due to a liner leak, the flowmeter will act as a restriction with the consequence that there will be a pressure build up in the leak detection circuit and backflow will occur leading to clogging of this



leak detection circuit, clogging of other leak detection circuits and even of other high pressure equipment items connected to the same leak detection system. Find below pictures of such cases.

Pictures: Clogging behind a liner (left) and clogging of leak detection circuit tubing (right)