

# AMMO LASER Leak Detection System

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

### Question 6: What is reason #1 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 stainless, titanium or duplex steel layer. This protective layer can be an overlay welding, an explosive cladded layer 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. We recommend a vacuum based leak detection system for several reasons:

#### Reason #1: No risk of liner bulging

A first reason is that when using a vacuum system there will be no risk for liner bulging and damage due a to too high pressure in the leak detection system behind the liner. Figure 1 shows a bulged liner compartment in the top of a CO<sub>2</sub> stripper.

Be aware that the relatively large liner compartments are welded to the carbon steel pressure bearing wall. These large areas allow only a very limited pressure difference between each side of the liner.



Figure 1 : Example of a bulged liner

Some vendors try to avoid this risk of bulging by switching off the leak detection system when the pressure in the synthesis section is below a certain value. In our view this is not a good solution because during these situations (heating up and cooling down of the synthesis section) one puts the highest (tensile) stresses on the liner welds and during this phase one for sure needs a properly working leak detection system.

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