

# AMMO LASER Leak Detection System

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

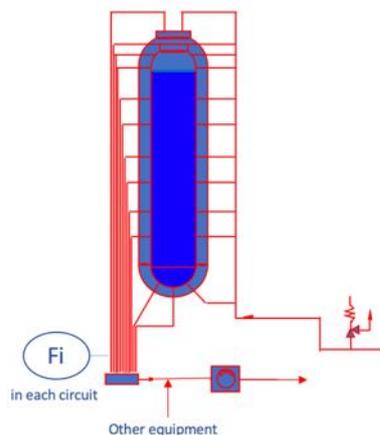
### Question 5: Which kind of active leak detection systems exist?

High pressure urea equipment consist of a heavy carbon steel pressure bearing wall, which is protected against corrosion by a thin corrosion resistant layer; this layer is in the most cases made out of stainless steel or a duplex. This protective layer can be an overlay welding, an explosive cladded layer but is in most cases a loose liner.

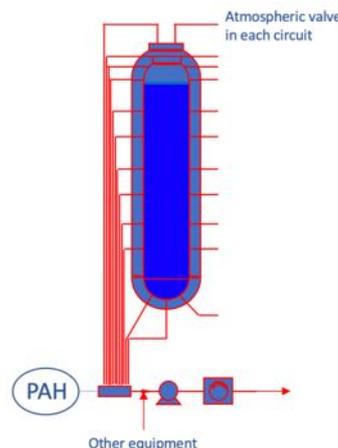
Any leak in a loose liner will lead to a dangerous situation because a potentially corrosive fluid can be spread and trapped in the gap between the carbon steel pressure bearing wall and the loose liner. This area will then be exposed to the extremely corrosive ammonium-carbamate.

Real situations have proven that ammonium-carbamate can corrode carbon steels with very high corrosion rates up to 1,000 mm (40 inch) per year. But also stainless steels will show accelerated corrosion because of lack of oxygen. That means that it is an absolute must to have a detection system present that already warns for al leak in an early stage. Then one can only conclude that an active leak detection system is required.

**Pressurized system**  
circulating an inert gas  
behind loose liner



**Vacuum system**  
pulling vacuum  
behind loose liner



**Figure 1: Pressurized (left) and vacuum (right) based active leak detection systems.**

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When talking about active leak detection systems, one can distinguish a pressurized system, in which an inert carrier gas flows through the gaps underneath the liner and a vacuum based system, where one pulls vacuum pressure behind the liner. Figure 1 shows the schematics of both these systems.

In a pressurized system an inert carrier gas circulates via machined grooves through the various leak detection circuits (compartments). Typically each circuit includes a flow indicator with a low flow alarm. All circuits of one equipment item are combined on an equipment header.

Sometimes the grooves are machined in a stainless steel buffer-layer. In our opinion this does not provide a solution as also stainless steels can show accelerated corrosion rates as described above. Plus one cannot be assured the corrosion ammonium-carbamate fluid will not be present outside the grooves and this still corrode the carbon steel pressure bearing wall.

A vacuum system pulls vacuum behind the liner by means of a vacuum pump. That means that the whole area underneath the liner is under vacuum pressure. In the suction side of the vacuum pump a pressure transmitter with a high pressure DCS alarm is present. Also here all circuits of one equipment item are combined on an equipment header.

In our next FAQs we will discuss the various advantages of a vacuum system compared to a pressurized system.