

Optimization of Pressure Swing Adsorption Operation with Rosemount Gas Analyzer Solution

Rosemount continuous gas analyzer technology can detect impurities with lowest detection limits improving operation of pressure swing adsorption

Pressure Swing Adsorption (PSA) is a well-established process commonly used for separation and purification of a wide range of industrial gases in a variety of industries.

It is often found in hydrogen production plants where hydrogen is produced from synthesis gas originating from steam-methane reforming, partial oxidation or gasification. PSA can also be used in hydrogen recovery from refinery off-gases, in the fractionation train of ethylene plants behind the cold box of the de-methanizer, separation of ambient air into nitrogen and oxygen and upgrading of biogas to biomethane.

What if you could ...

Measure impurities in PSA operation with:

- Lowest detection limit
- Fast response time
- Best-in-class stability
- Autonomous operation
- Compact size with minimum footprint
- Easy installation and commissioning

In hydrogen plants, reliable operation of the pressure swing adsorption process is critical for subsequent hydrogen consuming processes. Product quality and availability are key requirements, however recently, flexibility, modular design and pre-fabricated equipment have become more important.

HIGH PRECISION MONITORING OF IMPURITIES

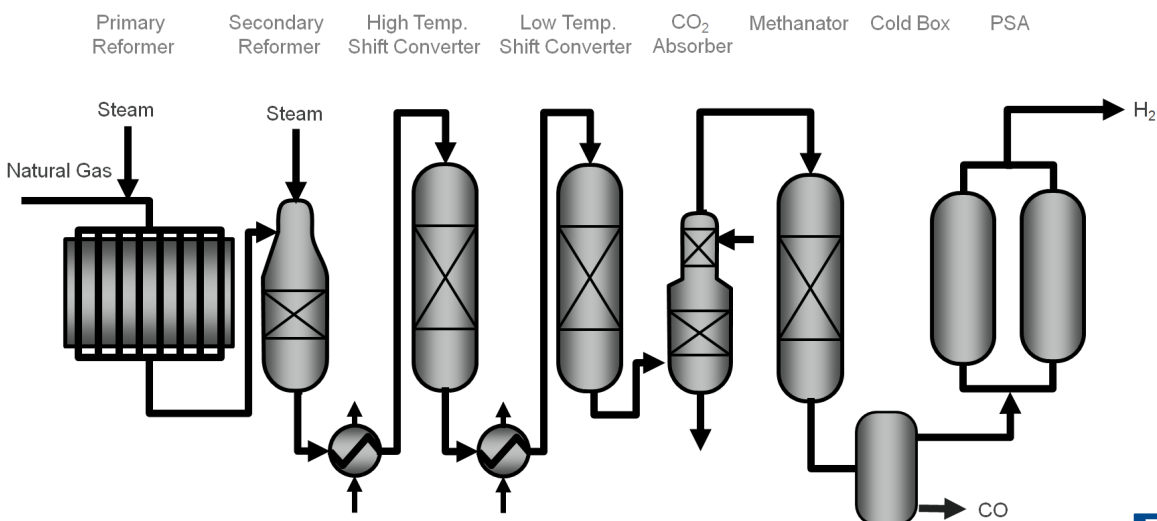
Operators of pressure swing adsorption have to ensure a certain product quality. Depending on the process different impurities in the bulk gas have to be measured. In hydrogen plants the most critical parameter is carbon monoxide concentration.

FAST ONLINE MONITORING

As pressure swing adsorption is a process with cycle times in terms of minutes, fast online monitoring is needed to ensure product quality over the complete operation time of the process.

HIGH AVAILABILITY

Hydrogen plants with pressure swing adsorption purification have to guarantee hydrogen supply as needed by the subsequent processes. Therefore the pressure swing adsorption has to operate reliably with low maintenance efforts and there is also often the need for flexible operation.



PRESSURE SWING ADSORPTION - INDUSTRIAL GASES

ENSURING HIGH PRECISION MONITORING

- X-STREAM Process Gas Analyzer with patented **INTRINZ^X** photometer technology
- Lowest detection limits
- Up to four components in one analyzer
- Best-in-class dynamic ranges for monitoring of mole sieve break-through
- Smallest micro-flow detector on the market with measurement frequencies up to 154 Hz for proven vibration resistance
- Precise pressure controller and as an option, backpressure regulator to provide excellent stability in sample gas conditions



GETTING FAST ON-LINE RESPONSE

Fast bypass can be easily adjusted to the pressure swing adsorption operating cycle times without affecting the analyzer performance.

Component	Range	Detection limit
CO	0-10 ppm vol	0.2 ppm vol
CH ₄	0-100 ppm vol	1.0 ppm vol
CO ₂	0-5 ppm vol	0.1 ppm vol

HIGH AVAILABILITY

- The analyzer gas detector is sealed with glass soldering technology for long lifetime of detector
- Ambient air analyzer purge to protect analyzer electronic boards
- Solenoid valves for automatic calibration allowing autonomous operation

Technical specification cabinet
Ex d protection concept for Zone 1 and Zone 2 installation: 2140 x 1350 x 700 (H x W x D)
Structure material: GRP, stainless steel
Protection degree of electrical components: IP55

