



**Application**

Continuous hydrogen measurement in recycle gas in refineries and chemical plants

**Background**

Hydrogen is one of the most widely used feed stocks in the refining process. Hydrogen is also used in chemical plants to control the polymer manufacturing process.

In the catalytic reforming processes used for the refining of petroleum products, the measurement of hydrogen in recycle gas is critical to ensure the efficient operation of the plant. Continuous measurement of hydrogen in reformer recycle gas ensures the proper efficiency of the catalyst. The process stream is a multi-component including a variety of hydrocarbons, carbon dioxide and trace amounts of carbon monoxide and chlorides. Currently, traditional process analyzers like gas chromatographs (GC), thermal conductivity meters and density analyzers are used to measure the hydrogen content in the reformer recycle gas. Additional hydrogen measurements are needed in hydrotreaters and reformers where hydrogen is produced for the refining process.



Figure 1: Catalytic reformer in a refinery

Reference Users  
ConocoPhillips, UOP

**Measurement Technique**

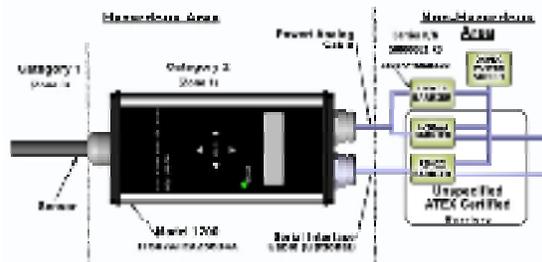
H2scan analyzers employ a solid-state hydrogen specific technology based on palladium alloys that requires no sample gas, reference cell or everyday calibration. The sensing material is inherently specific to hydrogen and has the capability to operate in a variety of multi-component gas backgrounds. H2scan analyzers are adaptable to conventional or NeSSI type sample systems and provides direct hydrogen measurements.

**Advantages**

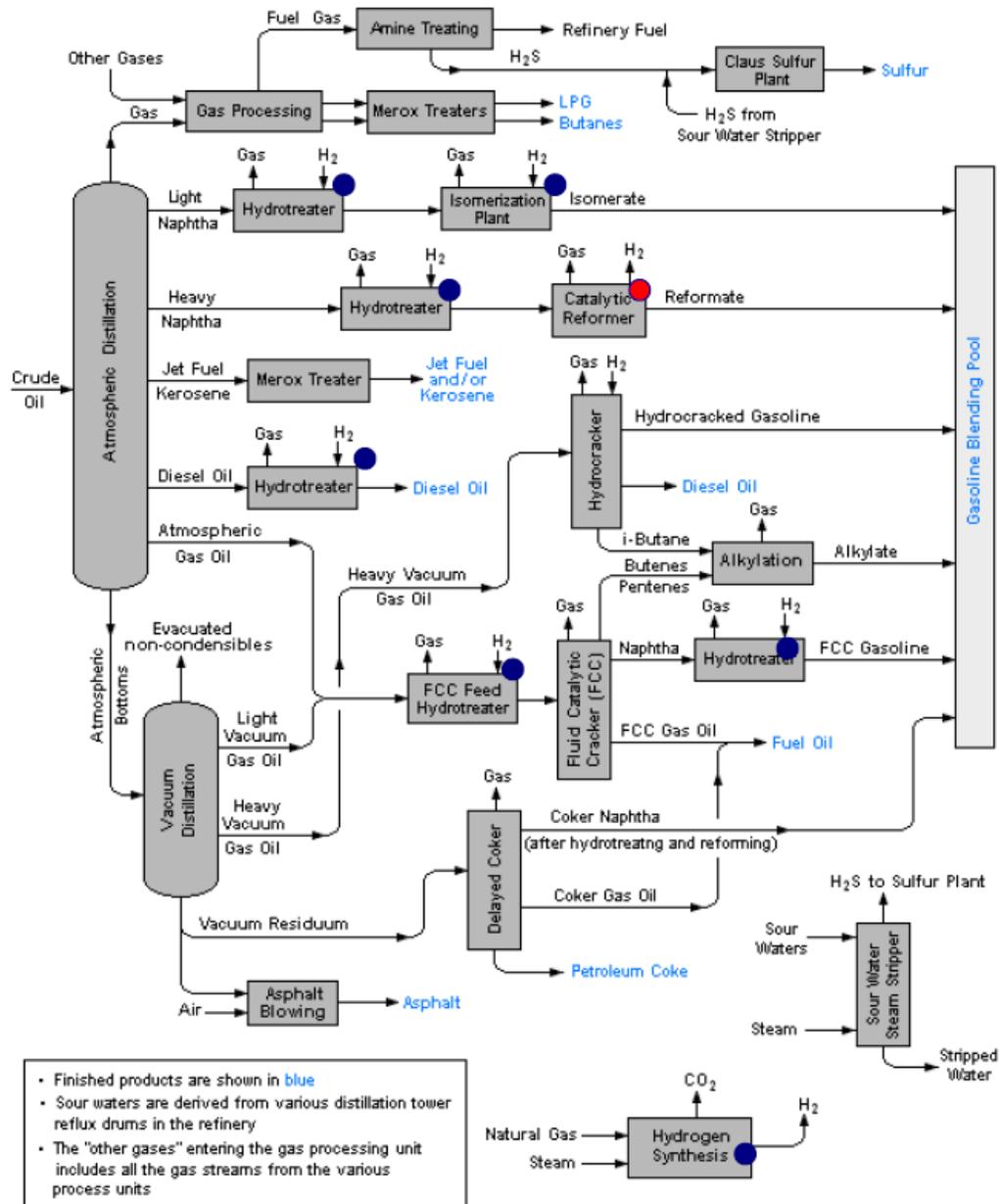
Traditional analyzers require regular maintenance, long sampling times and analyzer housings increasing the overall cost to buy, install and maintain. H2scan's HY-OPTIMA™ 1700 in-line, real-time hydrogen-specific process monitors are designed for ease of use, interface flexibility and true process control. The HY-OPTIMA™ 1700 is an intrinsically safe, solid state sensor that is configured to operate in process gas streams with up to 95% relative humidity and temperatures up to 100°C. H2scan's in-line analyzers can be easily installed using a standard Swagelok connection much closer to the process or in sample housing. Field calibration is possible with standard calibration gases on site.



Model HY-OPTIMA™ 1700



Hazardous Area Installation and Attachment



- Current test point in reformer recycle
- Possible H2 monitoring points (2x reformer recycle possible in some refineries)

Figure 2: Monitoring points for Inline H2 analyzer