H2S in Liquids Analysis

For the measurement of H2S in Hydrocarbon Liquids the Hilase Hobré – H2S serie analysers is available for the following applications:

- Crude Oil
- Gas Oil
- Condensate
- Fuel Oil

In liquid streams like Crude Oil, direct measurement of H2S is not possible. Hobré Instruments has designed a complete sample solution, based on stripping the H2S from the liquid by the use of a stripper column. Using this method allows H2S measurement in gaseous phase.

The Hilase Hobré – H2S contains the following functionalities:

- **Fixed Volume Injection System**
  The fixed volume injection method is available in three different versions. Selection between loop type injection, low pressure sampler type or high pressure sampler type is depending on process pressure and type of sample.

  Using the fixed volume injection method makes the instrument independent of fluid characteristics like viscosity and temperature. A fast loop which will be scaled on the application is integral part of the system. The sample will directly be retracted from the fast loop on which the sample characteristics are identical to the process.
• **Counter Current Flow Stripper System**
  The design of the counter current flow stripper system results in a combination of fast response on a H2S break-through together with a better stripper efficiency of the column than 98%.

The stripper column which is filled with glass beads is designed in such a way it is easy to clean. This design minimizes service and reduces down time of the analyser.

• **Liquid Sample Return Pump**
  For return of the stripped sample to the fast loop, a liquid sample return pump is integrated into the analyser system.

• **Liquid Filtration**
  Protection of the Hilase Hobré – H2S gas analyser against any liquid carry over is realized by the use of a dual coalescer in combination with a membrane filter. Using two coalescers reduces downtime of the analyser, as the second coalescer with membrane filter can take over during maintenance or service activities.

• **Sample Handling and Analyser Cabinet**
  All items like fixed volume injection system, stripper column, sample return point and liquid filtration are installed in an insulated and heated Stainless Steel 316 cabinet. The sample wetted parts are heated and temperature controlled at an adjustable temperature between +30°C and +100°C. Temperature set point is depending on the initial boiling point and viscosity of the product.

• **Hilase Hobré – H2S Gas Analyser**
  The H2S analysis in gas phase is realized with the Hilase Tunable Diode Laser with photo acoustic detection. This analyser has some unique features:
  1. No interference of Aromatic Hydrocarbons from the oil. Benzene, toluene and xylenes will come along with the stripping process, but the infrared TDL technology is not affected by these aromatics compared to other technologies (UV).
  2. Photo acoustic cell is heated above the stripper column temperature, to avoid condensation of water and hydrocarbons inside the cell.
  3. Fully separation of the photo acoustic cell and electronics, which allows field service without the need for turning down the analyser electronics.
  4. The infrared light source has a much longer life time compared to UV light sources. Expected life time of an infrared laser is more than 10 years.
  5. Moving parts of the complete system limited to the fixed volume injector and liquid sample return pump. The analyser does not contain any other moving parts.
**Calibration**

Till now accurate and stable calibration standards for H2S in liquids analysis are not available on the market. The Hilase Hobre – H2S gas analyser is calibrated in gas phase. In combination with measured liquid and stripper gas volume, together with a > 98% stripper efficiency results in a better accuracy than experiments of calibration in liquid phase.

The Hobré Instruments design for H2S in liquids is the result of an extensive field experience with H2S analysers in the oil and gas industry for many years.

**Customer Benefits:**

1. Correlates well with most accepted laboratory methods based on head space analysis.
2. Eliminates the risk for loss of volatile H2S in sampling and laboratory analysis.
3. Flexibility for installation. The H2S in liquid measurement can be installed in different ways. From a free standing dual compartment SS316 cabinet with separation between sample handling and analyser compartment to a complete analyser shelter.
4. Low installation cost because of integrated fast loop, sampling system, sample return and analyser. Also functional responsibility is with one manufacturer / supplier.
5. Online measurement in combination with high accuracy.

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*Block Diagram H2S in Liquid Analysis*
Please consult factory for special applications such as:

- **Multiphase Crude Oil Samples**
  For multiphase Crude Oil applications, special sampling techniques are required.

- **Water Samples**
  Distribution of H2S and Sulfide ions is pH dependent.

- **Hydrocarbon Liquid Samples**
  Hydrocarbon samples for Hydrotreaters contain high levels of dissolved Hydrogen.

- **Water in Hydrocarbon Liquid Samples**
  The Hilase TDL with photo acoustic detection is able to measure water vapor as well, in combination with the same stripper technology the H2O content can be analysed.

For a full description and specification of the Hilase TDL Gas Analyser, please refer to our brochure Hilase High Sensitivity Monitoring System.