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HYGROPHIL F 5674

Product Presentation

Summary

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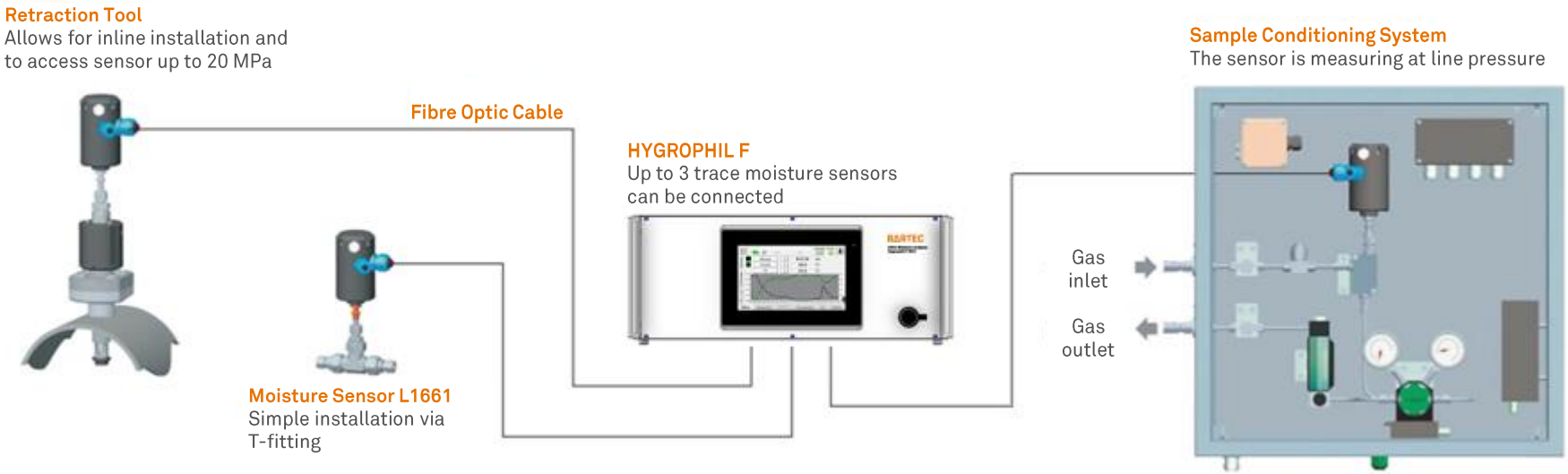
Technology overview

HYGROPHIL F 5674

Process Trace Moisture Analyzer

- Unique optical measurement principle: **Fabry-Pérot Interferometer**
- First prototype of the HYGROPHIL F 5672 was installed in 1995
  - Model Update to HYGROPHIL F 5673 in 2010
  - Model Update to HYGROPHIL F 5674 in 2023
- Installed base of >2000 Evaluation Units and >3000 sensors
- Overview of typical process integrations:



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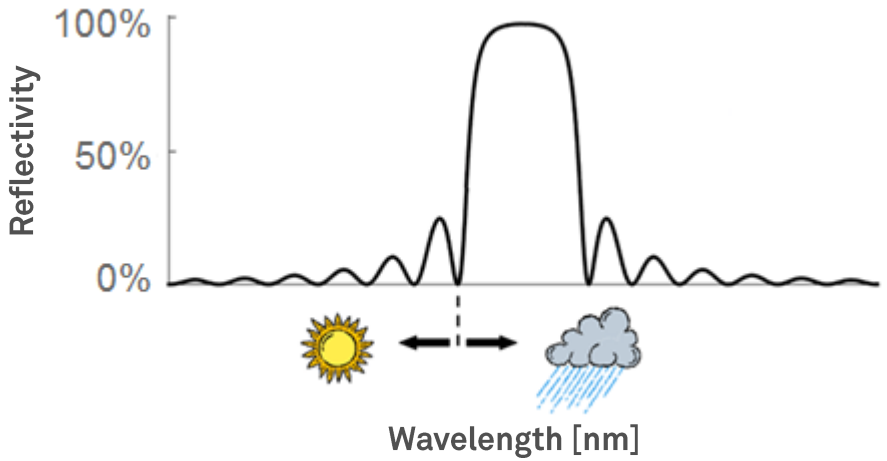
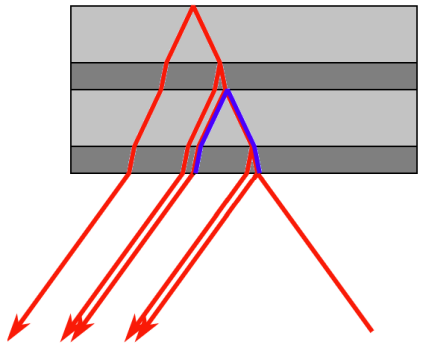
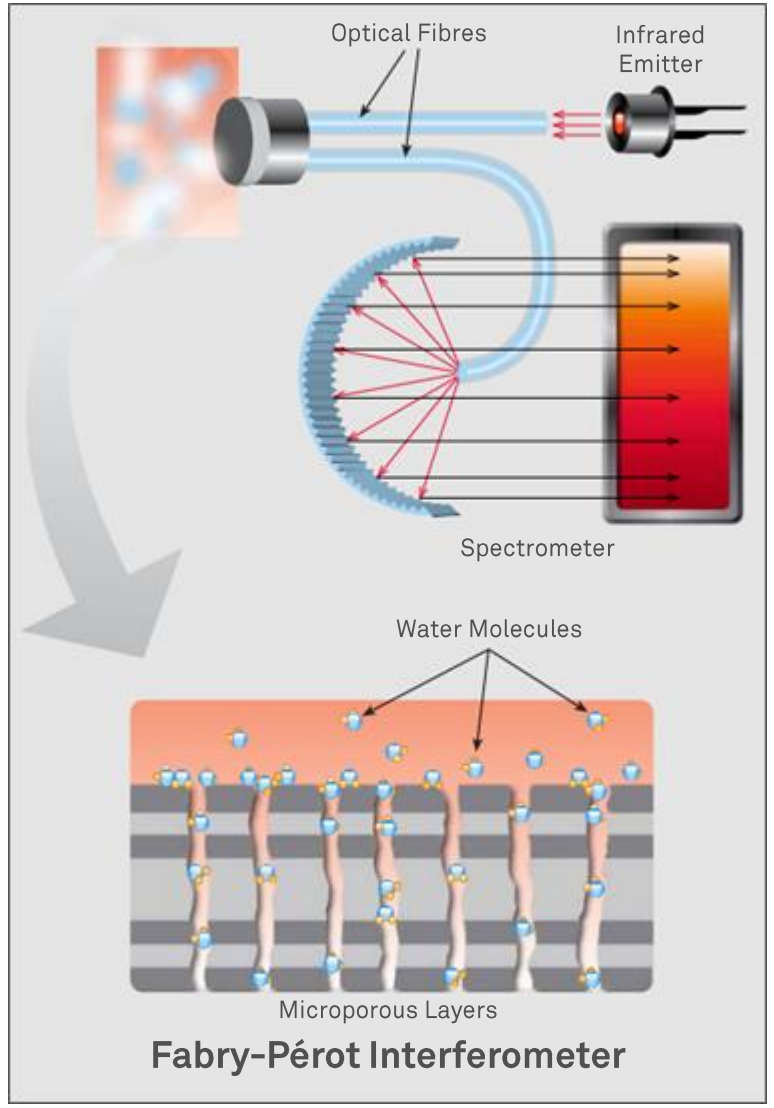
Principle of Operation

Fabry-Pérot Interferometer

- Moisture sensitive sensor consists of a series of alternating high and low refracting **microporous layers**
- **Fabry-Pérot Interferometer** is an optical resonator with two reflective thin mirrors
- **Porous layers** made of ZrO2 and SiO2 with pores diameters of 0.3 nm
- **Water molecules** adsorb and desorb in the porous layers depending on the present water partial vapour pressure which **changes the refractive index**
- The **peak wavelength** will be **monitored** with a compact Polychromator unit







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Applications

Applications

Fuels and Hydrocarbons

1. **Fuels (Gasoline, Jet Fuel, Diesel)**
   - Monitoring of ppm level water
   - Liquid phase, mostly finished product for QA/QC

2. **Refinery Gases**
   - Fuel gas, stacks and flares
   - Hydrogen from reformer and for unit feeds
   - Isom and Alky feeds

3. **LNG/LPG**
   - Measurement at inlet/outlet of dryer – common ranges 0-1 ppm to 0-10 ppm
   - Glycol/Desiccant dryers, Safety/Quality (prevention of crystals in LNG and QC in LPG)

4. **Natural Gas**
   - Upstream (onshore/offshore) to downstream applications
   - All sort of ranges from 0-1 ppm to 0-1,000 ppm
   - Vary wide range of applications: dryers, wellhead, biogas, …

HYGROPHIL Applications

Chemicals and Petrochemicals

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1. **Ethylene, Propylene, Butylene and related**
   - Liquid and gas phase
   - Splitters (C2/C3/C4/mixes), dryers, polymerization, blending

2. **Acids**
   - CO_2, SO_2, H_2S, HCl
   - Dehydration processes, used as medium for dehydration (sour gas)

3. **Chlorine and Chlorinated components**
   - Chlorine
   - Ethylene Dichloride
   - Methyl Chloride
   - VCM

Applications

Summary

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GAS

- Natural Gas Fiscal Metering
- Glycol Dehydration
- Silica Gel and Molecular Sieve Dehydration Units
- Moisture in Biogas from renewable sources
- Landfill Gas
- Hydrogen Production and Metering
- Gas Separation Plants
- ...

OIL (Refining)

- Recycle Gas of Catalytic Reformers
- Light Naphtha as Isomerization Feed
- Lift Gas for Enhanced Oil Recovery
- Moisture in Aromatics
- Moisture in (Ultra Low Sulfur) Diesel Dehydration
- ...

CHEMICAL

- Moisture in Hexane in HDPE Production
- Moisture in Co-Monomers 1-Hexene, 1-Butene and Vinyl Acetate for LDPE Production
- Moisture in D4 to D6 Siloxanes
- Syndiotactic Polystyrene Production
- Moisture in TEOS
- ...

The HYGROPHIL F is also suitable for many other applications.
Feel free to contact our application specialists for further information and application check.

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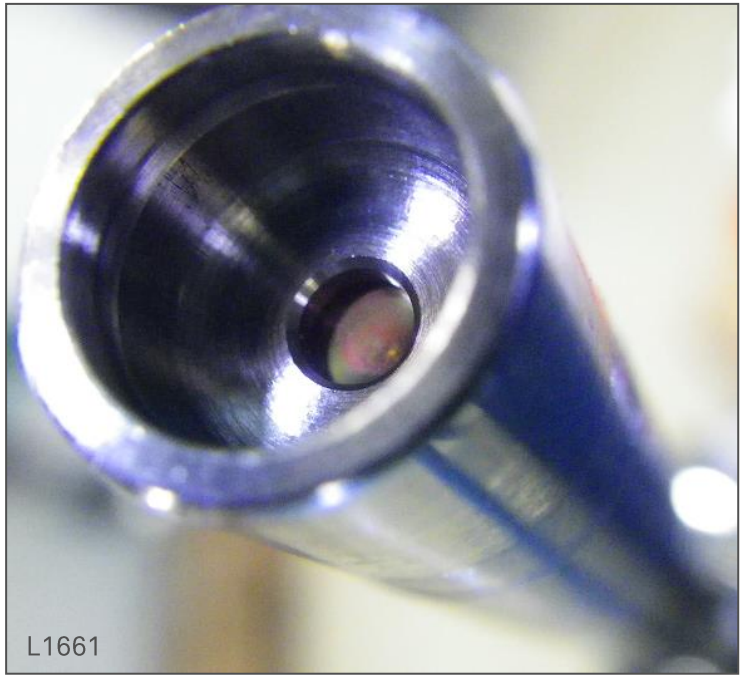
Main Components

Main Components

Moisture Sensor L1661

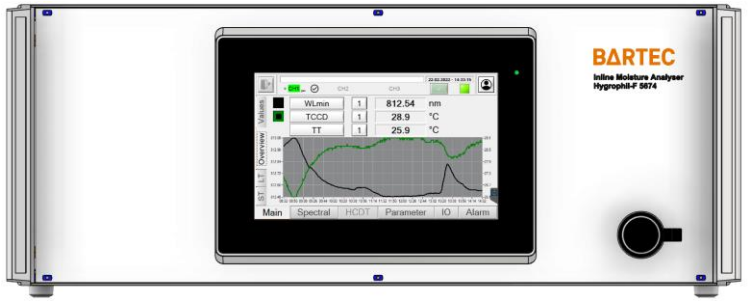
- **Wetted parts** of the **moisture sensor** model 316L SS:
  - Sensor shaft: 316L Stainless steel or Alloy C-276
  - Optical multi-layer (SiO2 and ZrO2)
- **Combined moisture** and Pt100-**temperature sensor** (4-wire class A)
- Calibrated dew point range: -80 °C to +20 °C / -110 °F to +70 °F
- In-line and in-situ **up to 200 bar / 2,900 psi**
- Long term stable, reproducible, accurate ± 1C/2F
- Moisture **measuring** in **gases** and in **liquid phases**
- **Operating temperature** range: -30 °C to +60 °C / -20 °F to +140 °F
- Class 1 Division 1 rating



Main Components

Evaluation and Control Unit

- **Evaluation and control unit for trace moisture measurement in gases and liquids**
- MACS – Moisture Analyzer Control Software (Windows based)
- Full remote access (VPN connection)
- 7” Touch display (800 x 480 dots)
- Up to 3 measurement channels
- Measurement every 10 seconds
- Moisture Calculator for different humidity units with several methods built-in
- Modbus RTU and TCP/IP
- 6 x 0/4-20mA current outputs, USB 3.0, relay contacts
- Installation with Z-purged enclosure for Class 1 Division 2 areas
- Power supply: DC (10-32 VDC) or AC (110-230 VAC 50/60 Hz)
- 19“-Rack version (4U) / feet for tabletop use included



Main Components

Fibre Optic Cable

- Suitable for **field installation**
- Shielded, protected and flame-retardant
- Tray installation
- 2 optical fibers including ST-connectors
- 6 copper wires for Pt100 and pressure transmitter (if required)
- Standard Temperature range -20 °C to +70 °C / -5 °F to +160 °F
- Low Temperature range -55 °C to +70 °C /-70 °F to +160 °F
- Cable length **up to 800 m / 2600 feet**

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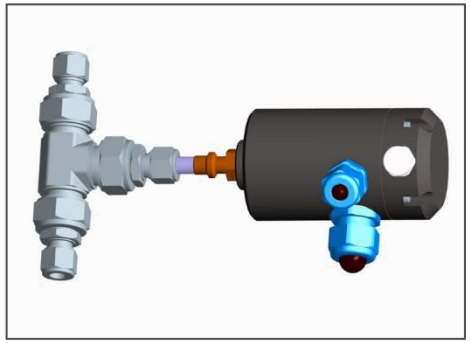
Process Connections and Solutions

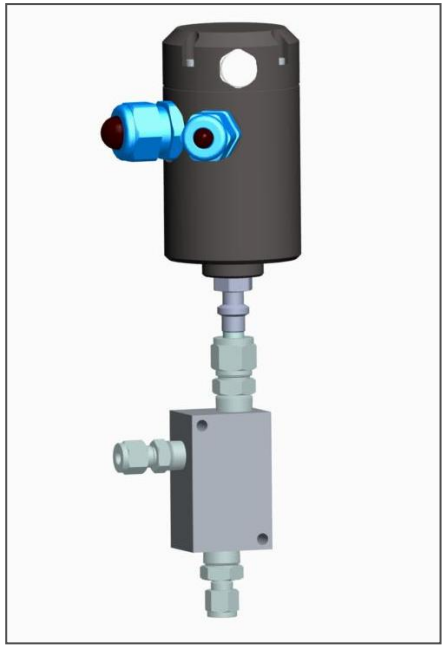
Process Connections and Solutions

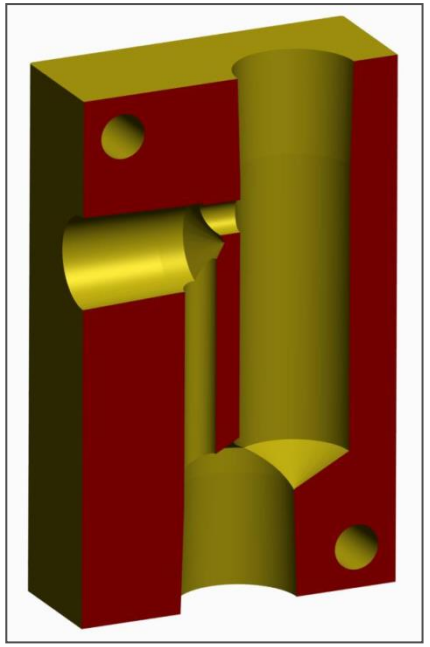
Union-T and Sample cell



- **Union-T**
  - Available in different connection sizes
  - Easiest integration into existing sampling systems

- **Sample cell (Gas / Liquid Separator)**
  - Protects the sensor from contamination
  - Commonly used in gaseous sampling systems





Process Connections and Solutions

Retraction Armature

- **Retraction Armature PN250**
  - Mounting and dismounting of the sensor is possible without interruption of the process
  - Retraction tool simplifies many processes such as sensor cleaning and replacement
  - Pipelines from DN50 to DN1400
  - Direct measurement in the main flow guarantees exact measurement results and offers a higher precision than indirect measurement in the bypass
  - Manual operation up to 20 MPa (2900 PSI)
  - Welding socket available in steel and stainless steel

Process Connections and Solutions

Sample Conditioning Systems

- **Sample Conditioning Systems**
  - Depending on application
  - Customized solutions on request
  - Solutions from tap-off to return

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