YOUR PARTNER FOR CUSTODY TRANSFER MEASUREMENT

EXIMP

Engineering eXcellence In Measurement Packages

EXIMP specializes in offering complete turnkey metering systems for liquid & gas custody transfer applications using state-of-the-art measurement technologies

Offshore | Onshore | Upstream | Midstream | Downstream

VYMPEL

GAS QUALITY ANALYZERS

Most innovative product 2015
Hygrovision mini
by VYMPEL GmbH

TargiKielce
EXHIBITION & CONFERENCE CENTRE

Hygrovision mini
VYMPEL

reddot award 2015
honourable mention industrial design

VYMPEL

CONDENSATE RE

CONDENSATE REGISTRATION TECHNIQUE

Vympel hygrometers are based on the condensation method of measurement (chilled mirror principle). The key feature of condensate registration on the chilled mirror surface is the use of the total refraction effect.

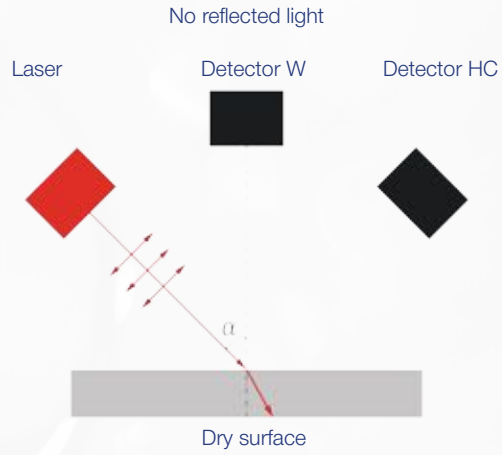
Total refraction is the effect that occurs during the transmission of linearly-polarized waves on the interface between dissimilar media, concluding with the absence of the reflected wave. The effect is only possible when vertically polarized waves fall on the interface between media at Brewster's angle.

When the mirror is clean, the laser beam falls on the mirror's surface at Brewster's angle and is fully refracted. As a result, a zero signal is obtained at the photosensor output. The registration system reacts to the condensation by increasing the photoelectric signal.

Hygrovision hygrometers provide an option of visual observation of processes on the mirror's surface using a licensed two-channel optical system with a 40-fold increase (microscope).

Different illumination technologies (optical channels) are utilized for visual recording of moisture condensation with the use of a dielectric condensation mirror and different illumination sources:

- For water condensate – laser with vertically polarized waves (lateral illumination);
- For hydrocarbon and water condensate – visible non-polarized light source (white light-emitting diode), being part of the optical system (vertical illumination).



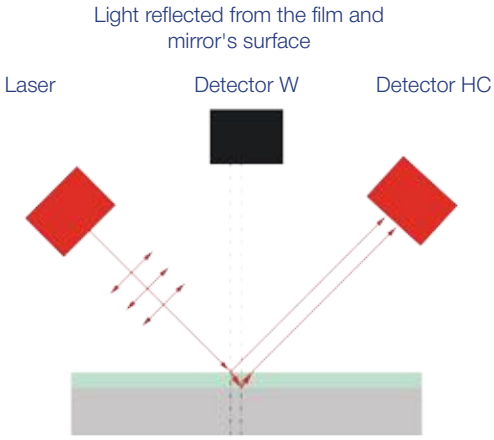
Vertical illumination

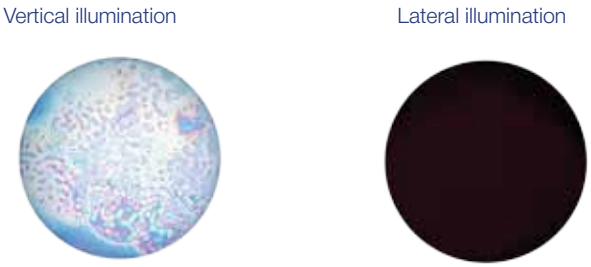
Lateral illumination

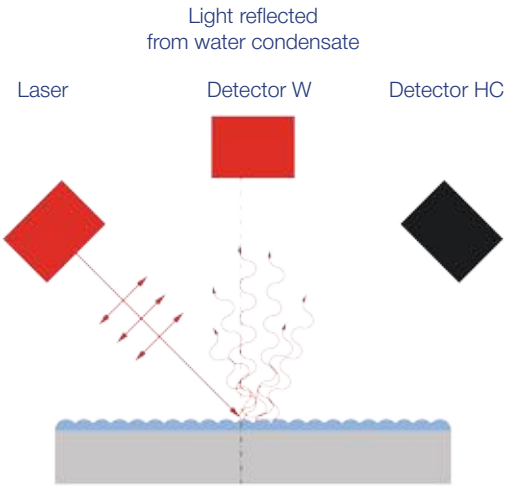
HYDROCARBON CONDENSATE

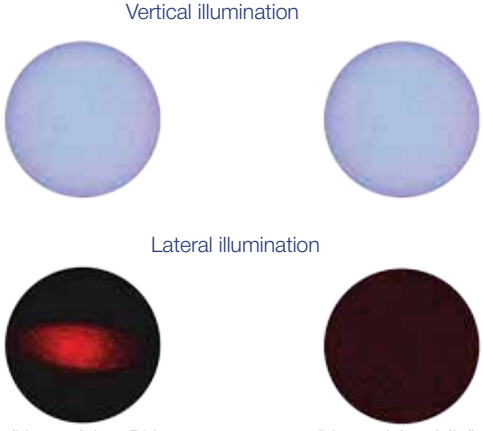
When a thin hydrocarbon film with a different refraction index forms on the mirror's surface, the total refraction conditions are not met, and a new wave reflected from the gas-film media boundary is formed. Moreover, due to the optical transparency of the condensed film, another wave reflected from the film-mirror media boundary is formed as well. As a result, the photosensor captures two reflected beams which then combine to form the interferometric result. The hydrocarbon dew point measurement occurs when the thickness of the film is about 5 - 10 nm.

Hydrocarbons condensation can be observed only when the surface of the chilled mirror is vertically illuminated.









WATER CONDENSATE

When the mirror cools and condensed water vapor droplets appear on the mirror's surface, intense light diffusion occurs. The registration system reacts to the condensation of water vapor by increasing the photoelectric signal. The signal level of the photosensor depends on the amount of water condensed on the chilled mirror's surface.

Water condensation can be observed when the surface of the chilled mirror is illuminated both vertically or laterally. A red light-emitting diode is used in Hygrovision-Mini for the lateral illumination, which leads to a completely different image of water condensation.

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COMPARISON CHART OF TEC

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	Hygrovision-mini	Hygrovision-BL (all versions)	CONG-Prima-2M flow-through
Type	Condensation, manual, portable	Condensation, automatic, flow-through with an option of manual measurements, portable or fixed	Condensation, automatic, flow-through, fixed
Dew point temperature measurement range (for water and hydrocarbons)	from -30 °C to temperature of surrounding media from -50 °C to temperature of surrounding media	from -30 °C to temperature of surrounding media from -60 °C to temperature of surrounding media	from -30 °C to +30 °C
Error rate limits for dew point measurements	±1°C	±0.25 °C ±0.5 °C ±1 °C in the range from -30 °C to surrounding media temperature ±1.5 °C in the range from -60 °C to -30 °C	±1°C
Measurement chamber gas flow rate	0.2...2 dm^3/min	0.2…5 dm^3/min	0.2…2 dm^3/min
Maximum pressure of target medium	up to 10 MPa	up to 16 MPa up to 30 MPa	up to 16 MPa
Enclosure protection rating per IEC 60529	IP54	IP67	IP54
Enclosure protection	1 Ex d[ib] IIB+H2T5	1 Ex d[ib] IIA T5 X	1 Ex d IIB T5 X II 2 G Ex d IIA T5 Gb
Connection to supply line of target gas	Swagelok connector (DK-Lok) for a pipe with outside diameter of 6 mm	Swagelok connector (DK-Lok) for a pipe with outside diameter of 6 mm	Swagelok connector (DK-Lok) for a pipe with outside diameter of 3 mm
Power supply	Self-contained 9.0...12.6 W 4 A•h/15 W	Self-contained (8.4:12.6) W, 4 A•h/15 W External power source (12:32) V / 15 W	External power source (20 – 27)B V, 15 W
Interface	No	Analogue RS-485, Modbus/RTU, infrared port, IRDA adapter	Analogue RS-485, Modbus/RTU or analogue (4–20) mA
Measuring run duration	No	5-10 minutes	5-10 minutes
Internal data store	No	Yes	No
Dimensions	253x120x110 mm	165x204x257 mm	207x112x235 mm
Weight	4 kg	7.5 kg	6 kg

HNICAL CHARACTERISTICS

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CONG-Prima-2M submersible version	CONG-Prima-2M submersible with filtration	CONG-Prima-10 flow-through
Condensation, automatic, flow-through, fixed	Condensation, automatic, flow-through, fixed	Condensation, automatic, flow-through, fixed
from -30 °C to +30 °C	from -30 °C to +30 °C	from -30 °C to +30 °C from -50 °C to +10 °C
±1°C	±1°C	±0.25 °C ±1°C
0.2…2 dm^3/min	0.2…2 dm^3/min	1…2 dm^3/min
up to 16 MPa	up to 16 MPa	up to 16 MPa up to 25 MPa
IP54	IP54	IP54
1 Ex d IIB T5 X II 2 G Ex d IIA T5 Gb	1 Ex d IIB T5 X II 2 G Ex d IIA T5 Gb	1 Ex d IIA T5Gb II 2 G EEx d IIA T5
Directly on a pipeline via welded sleeve (M33x2, female-threaded)	Directly on a pipeline via welded sleeve (M33x2, female-threaded)	Swagelok connector for a pipe with outside diameter of 6 mm
External power source (20 – 27)B V, 15 W	External power source (20 – 27)B V, 15 W	External power source (20 – 27)B V, 15 W
Analogue RS-485, Modbus/RTU or analogue (4–20) mA	Analogue RS-485, Modbus/RTU or analogue (4–20) mA	Analogue RS-485, Modbus/RTU and analogue (4–20) mA
5-10 minutes	5-10 minutes	5-10 minutes
No	No	Yes
207x133x475 mm	207x133x800 mm	207x112x235 mm
8.5 kg	9 kg	6.5 kg

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