



OPERATING PRINCIPLE

The Mirmorax Subsea Multiphase Sampling System provides the operator with a sample that, independent of flow regime and compositional mix, is a true volumetric representation of the flow. By taking the multiphase sample in-line the main pipe and maintaining original process pressures, the system avoids the errors and limitations of side branch sampling points and delivers true volumetric, representative multiphase sampling.

A highly reliable shutter system isolates the sample from the main flow without affecting the composition or pressure. The sample is then transported under isobaric conditions into a sampling bottle that maintains stable pressure conditions all the way to the laboratory.

Based on a large number of small samples, the sampling system produces a sample representative for the duration of the time the sample was taken with this time series then directly compared to fractional values from water cuts, multiphase, wet-gas or test separators. In this way, the Mirmorax Subsea Multiphase Sampling System is a high quality calibration or verification tool.

MODEL FEATURES

The Mirmorax Subsea Multiphase Sampling System enables volumetric sampling at any point on the subsea production system. This makes it possible to obtain reliable samples on fluids from each well, either for metering verification, for reliable pr-well PVT analysis or as input to reservoir simulations. The system has HP/HT capabilities that make it possible to select locations for the sampling without having to consider pressure and temperatures.

A benefit of sampling at higher pressures is obtaining line condition samples and higher accuracies for PVT analysis.

The system is non-intrusive and installed as part of the main piping system, reducing footprint and making sure production is uninterrupted during the whole sampling process.

The Mirmorax Subsea Multiphase Sampling System comes with double pressure barriers, sour service compliant alloys and metal seals for optimal safety. The system comes in two versions - one modular design for installation in a choke module with a separate retrievable electronics module and a stand-alone system that can be fully retrieved and replaced by ROV.

DESIGN

The Mirmorax Subsea Multiphase Sampling System includes three modules; the in-line sampling system integrated directly into the production system, the sample extraction manifold with the sampling bottles, and the electronics canister with retrievable electronics. This modularization allows for flexibility in integration by maintaining a small footprint and light weight for the in-line sampling module and enables a distance to be set between the sampling bottle and the electronics. The system is supplied as an automated system with pre-programmed sampling sequences and is operated from a touch display panel on the Operators Control Console. It also has a manual override functionality allowing single samples to be manually taken at any time.

FACTS

Key features for the Mirmorax Subsea Multiphase Sampling System are:

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| Retrievable by ROV | Modular design fitting both choke modules, pipelines and manifolds | High-pressure, High-temperature design | Volumetric representation of each phase |
| Isobaric sampling process and transport | Directly or remotely controlled | In-line, non-intrusive system | Reliable and robust |
| Accurate and high resolution time series samples | Low maintenance | Direct read-out of oil, gas and water fractions | The best possible samples for full compositional |

GENERAL

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| Type: Multiphase Sampling System | Manufacturer model no: Subsea Retrievable | Operating Temp. Limit: 0-180 °C | Operating Press. Limit: 15 kPSI |
| Mounting: Flanged or welded | Weight: 420 kg | | |

SAMPLER CHARACTERISTICS

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| Nominal uncertainty | Liquid fraction: ±1.5 % rel | Gas fraction: ±2.0 % rel | Water cut: ±0.5 % abs |
| Sampling time: From 60 sec | Adjustable range: Independent | Grab size: 5 cl to 20 cl | Liquid type: 17-34 API |
| Pressure rating: 5000 PSI / 10 000 PSI | | | |
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MECHANICAL PROPERTIES

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| Bore sizes available: 3" to 6" | Connections: Flanged 2" API | Sampling line size: 1/4" Swagelok | Design codes: ASME B31.3 / ASME IX |
| Sour service spec.: MR0175 / ISO15156 | Material body: ISI316L or UNS S31803 Duplex | | |

SAMPLING BOTTLE

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|--|---|--|--------------------------------------|
| Mounting: Retrievable manifold | Dimension: 800mm Long x Ø120mm | Material: AISI 316 L or Titanium Gr2 | Volume: 1000 or on request |
| Pressure qualification: 5000 / 10k / 15k PSI | Manufactur model: Isobaric/ Ni Balanced | | |

SAMPLER POWER AND COMM

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|---------------------------------------|--|-------------------------------------|----------------------------|
| Function: On line | Output signal: RS485 Modbus/4-20 mA/ Ethernet | Output action: Continuous | Consumption: 30W |
| Load limitation: min. 2.8 A | Power supply: 24VDC/11-230 AC | | |