

CleanPhase Well Test Separator

Reduce cleanup time, improve safety, and minimize environmental risk

APPLICATIONS

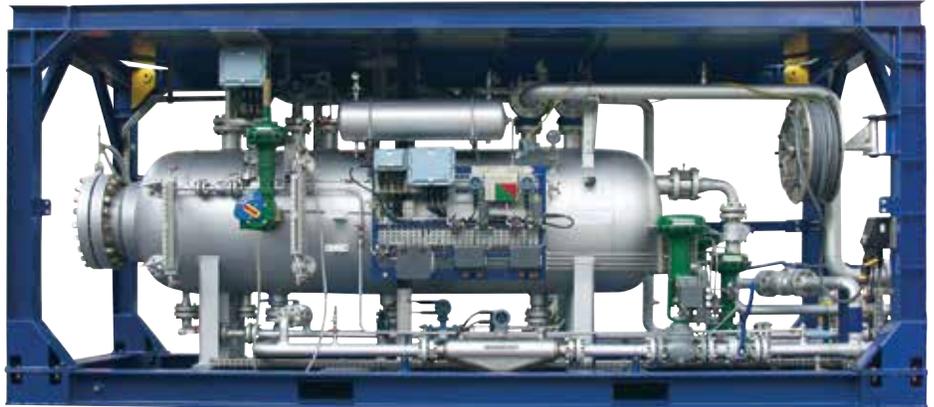
- Onshore and offshore oil and gas well testing and cleanup
- Operations with strict environmental requirements for water and hydrocarbon disposal

BENEFITS

- Improve safety by flowing the initial cleaned-up fluid into a separator instead of low-pressure tanks
- Reduce cleanup time by allowing higher flow rates and monitoring cumulative volumes of nonhydrocarbon fluids
- Minimize environmental risk by eliminating disposal of unseparated fluids
- Make better decisions with reliable flow rate data, even for foaming or low-API oils

FEATURES

- SmartWeir* phase separation technology to optimize water retention time during cleanup
- Enhanced mist extractor to reduce liquid carryover
- Accommodation of fluctuating water flow rates during well test cleanup
- Adjustable liquid level and adjustable oil-layer thickness
- Oil-layer thickness measurement using time domain reflectometry technology (radar)
- Compartment to capture solids during cleanup
- Optional Coriolis meters and electromagnetic meters for quality checking or operations when no PhaseTester* portable multiphase well testing equipment is available or when conditions fall outside the operating envelope



CleanPhase well test separator.

The CleanPhase* well test separator is a new-generation horizontal separator that can operate as a stand-alone unit or in a combination. The combination configuration includes PhaseTester equipment and Vx* multiphase well testing technology. With this setup, high-quality flow measurements are unaffected by separation issues such as foaming oil (carryover), emulsions, and gas carryunder (gas in the oil line).

The CleanPhase separator uses SmartWeir technology, which accommodates fluctuating water flow rates and high water cuts. The SmartWeir technology enables the separator to be on line during the cleanup phase. The liquid level is adjustable from 40 to 65% and the oil-layer thickness from 0 to 65% of the vessel ID.

This well test separator can also handle limited amounts of solids, so it eliminates the need to flow through a low-pressure surge tank or gauge tank during cleanup and reduces HSE hazards. Faster cleanup operations are possible because the effluents can still be processed when the well is cleaned up on large chokes. Environmental risks are reduced dramatically because there is no need to dispose of unseparated fluids during cleanup periods. The optimized liquid-liquid separation results in less water in the oil line (optimizing the burning process) and less oil in the water line (conditioning the water to be treated for disposal).

The CleanPhase separator can be equipped with an optional single-phase flowmetering (SPFM) system using Coriolis meters for all three phases or Coriolis meters for oil and gas and an electromagnetic meter for water. This option enables flowmetering of each phase at the separator outlets. It is useful in operations in which no PhaseTester equipment is available or when the Vx Advisor* multiphase metering advisory software indicates that well conditions fall outside the operating envelope.

All CleanPhase separators are manufactured under appropriate Type Approval and are provided with a Certificate of Conformity and a full quality file.

CleanPhase Well Test Separator

Specifications

	SEPL-A	SEPL-B
Vessel size, horizontal, in × ft [cm × m]	42 × 10 [100 × 3.05]	42 × 10 [100 × 3.05]
Working pressure, psi [kPa] at degF [degC]	1,440 [9,930] at 100 [37.8] or 1,330 [9,170] at 125 [257]	1,440 [9,930] at 100 [37.8] or 1,315 [9,067] at 300 [149]
Min. operating temperature, degF [degC]	32 [0]	-4 [-20]
Max. operating temperature, degF [degC]	257 [125]	300 [149]
Safety valve set pressure, psi [kPa]	1,315 [9,066]	1,315 [9,066]
Skid and frame certification	DNV [†] 2.7-1	DNV 2.7-1
Max. gas flow rate		
Low-liquid level	61.5 MMcf/d [1.66 million m ³ /d] at 1,440 psi [9,930 kPa]	61.5 MMcf/d [1.66 million m ³ /d] at 1,440 psi [9,930 kPa]
High-liquid level	43.0 MMcf/d [1.16 million m ³ /d] at 1,440 psi [9,930 kPa]	43.0 MMcf/d [1.16 million m ³ /d] at 1,440 psi [9,930 kPa]
Max. oil flow rate		
Low-liquid level	7,900 bbl/d [1,255 m ³ /d]	7,900 bbl/d [1,255 m ³ /d]
High-liquid level	14,500 bbl/d [2,304 m ³ /d]	14,500 bbl/d [2,304 m ³ /d]
Max. water flow rate		
Low interface level	4,150 bbl/d [659 m ³ /d]	4,150 bbl/d [659 m ³ /d]
High interface level	10,550 bbl/d [1,676 m ³ /d]	10,550 bbl/d [1,676 m ³ /d]
Hazardous area certification	Zone 1, gas IIB, T3 ($T_{\text{ambient}} = 131 \text{ degF [55 degC]}$), ATEX [‡] 94/9 from serial number 710 and above Zone 1, gas IIB, T4 ($T_{\text{ambient}} = 131 \text{ degF [55 degC]}$), ATEX 94/9 from serial number 701 to 709	Zone 1, gas IIB, T3 ($T_{\text{ambient}} = 131 \text{ degF [55 degC]}$), ATEX 94/9, CE [§] marked
Overall dimensions (L × W × H), ft [m]	19.7 × 8.1 × 8.9 [6.00 × 2.46 × 2.70]	19.7 × 8.1 × 8.9 [6.00 × 2.46 × 2.70]
Weight, lbm [kg]	33,069 [15,000]	33,069 [15,000]
Connections		
Inlet	3-in, Fig 602, female	3-in, Fig 602, female
Gas outlet	3-in, Fig 602, male	3-in, Fig 602, male
Oil outlet	3-in, Fig 602, male	3-in, Fig 602, male
Water outlet	3-in, Fig 602, male	3-in, Fig 602, male
Sand jet	3-in, Fig 602, female	3-in, Fig 602, female
Pressure safety valve outlet	4-in, Fig 602, male	4-in, Fig 602, male
Solids disposal	3-in, Fig 602, male	3-in, Fig 602, male
Codes and standards	ASME ^{††} VIII Div. 1, ANSI/ASME B31.3, API RP 520/521, NACE MR0175, DNV 2.7-1	ASME VIII Div. 1, ANSI/ASME B31.3, API RP 520/521, NACE MR0175, DNV 2.7-1, CE marked
Certifications	Third-party certifications for vessel, skid, frame, and electrical parts	Third-party certifications for vessel, skid, frame, and electrical parts

[†] Det Norske Veritas

[‡] Complies with ATmospheres EXplosives directive

[§] Conformité Européene

^{††} American Society of Mechanical Engineers

SPFM Specifications

Fluid	Meter Type	Flow Range	Accuracy
Gas	Coriolis	0.5 to 65 MMcf/d [0.014 to 1.84 million m ³ /d]	Better than 5% from 0.5 to 5 MMcf/d [0.014 to 0.14 million m ³ /d] Better than 0.5% from 5 to 65 MMcf/d [0.14 to 1.84 million m ³ /d]
Oil	Coriolis	100 to 20,000 bbl/d [15.9 to 3,178 m ³ /d]	Better than 4% from 100 to 1,000 bbl/d [15.9 to 158.9 m ³ /d] Better than 0.4% from 1,000 to 20,000 bbl/d [158.9 to 3,178 m ³ /d]
Water	Electromagnetic (SEPL-A)	15 to 11,800 bbl/d [2.4 to 1,875 m ³ /d]	Better than 12% from 15 to 200 bbl/d [2.4 to 31.8 m ³ /d] Better than 0.8% from 200 to 11,800 bbl/d [31.8 to 1,875 m ³ /d]
Water	Coriolis (SEPL-B)	100 to 20,000 bbl/d [15.9 to 3,178 m ³ /d]	Better than 4% from 100 to 1,000 bbl/d [15.9 to 158.9 m ³ /d] Better than 0.4% from 1,000 to 20,000 bbl/d [158.9 to 3,178 m ³ /d]

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