

Fluid preconditioning



Trailer-mounted packages provide a rapid response for underbalanced drilling projects

Applications

Underbalanced drilling operations where field reservoir pressure is depleted below hydrostatic pressure

Benefits

- Optimized space and rig-up time
- H₂S environment risk mitigation
- Zero-flaring production and well testing
- Easy mobility with trailer-mounted design
- Robust control and safety system
- Remote real-time control and process monitoring
- Data integration between drilling, coiled tubing, and surface equipment
- Solids management capability (includes debris catcher, settling tanks, and flushing systems)
- Multistage separation with high- and low-pressure separators, tanks, and knockout drums
- Coriolis liquid and gas flowmeters, level radars, and high- and low-level switches
- Condensate export capability
- Chemical injection capability for H₂S neutralization
- Dedicated automated emergency shutdown system

Options

- Dual chokes on choke manifold
- Remote-controlled choke change
- Remote-controlled separator liquid levels
- Remote startup and shutdown of pumps
- Remote-controlled rig-up and rig-down of flare stack
- EverGreen™ minimal environmental impact well effluent burner

Trailer-mounted solutions produce rapid response

Production ExPRESS™ rapid production response solutions provide a number of trailer-mounted fluid preconditioning packages for underbalanced drilling applications. In fields where reservoir pressure is depleted below hydrostatic pressure, underbalanced drilling methods are required for operations such as

- reentering existing wellbores in underbalanced conditions to increase recovery from the mature depleted fields
- adding laterals to existing wells to maximize production without killing the well
- removing the wellhead.

Separator Specifications

Separator Type	Option	Liquid Rate, Low Level, bbl/d [m ³ /d]	Liquid Rate, High Level, bbl/d [m ³ /d]	Gas Rate, Low Level, MMcf/d [m ³ /d]	Gas Rate, High Level, MMcf/d [m ³ /d]
Low-pressure separator (three-phase)	Option 1	3,000 [477]	10,000 [1,590]	16 [453,070]	8 [226,535]
	Option 2	22,458 [3,570]	31,506 [5,009]	3.4 [96,277]	2.5 [70,792]
High-pressure separator (two-phase)	Option 1	10,000 [1,590]	20,000 [3,180]	92 [2.6 million]	60 [1.7 million]
	Option 2	27,000 [4,293]	35,000 [5,565]	92 [2.6 million]	60 [1.7 million]

All specifications are subject to change without notice.



Example of a trailer-mounted underbalanced drilling package.

Fluid preconditioning packages used in conjunction with underbalanced drilling units can control, separate, measure, and redirect both the drilling and produced hydrocarbon fluids. These packages use engineered solutions to prevent, detect, and mitigate potential well control events and optimize wellbore stability while flowing through an underbalanced drilling flowback package.

Remote-controlled choke maintains stable pressure

With the push of a button, you can remotely control the choke size to maintain stable pressure required by drilling operations. Other remote-controlled operations include starting pumps, monitoring and regulating separators, and operating the flare stack hydraulic system to minimize human intervention.

Trailer-Mounted Equipment Specifications

Trailer Name	Equipment	Max. Allowable Working Pressure, psi [kPa]	Max. Allowable Working Temperature, degF [degC]	Details
Underbalance manifold and solids management (UMST)	Junk catcher	10,000 [68,948]	-20 to 350 [-29 to 177]	4 1/16-in debris catcher double-barrier manifold
	Drilling choke manifold	10,000 [68,948]	-20 to 350 [-29 to 177]	4 1/16-in double-barrier choke manifold
	Kill choke manifold	10,000 [68,948]	-20 to 350 [-29 to 177]	3 1/16-in double-barrier choke manifold
	Sample catcher	2,160 [14,893]	-20 to 250 [-29 to 121]	Geological sample collection Double chambers
Underbalance low-pressure separator (UBLS)	Low-pressure separator	250 [1,724]	-20 to 300 [-29 to 149]	Three-phase separation system (see "Separator Specifications")
Underbalance high-pressure separator (UBHS)	High-pressure separator	2,160 [14,893]	-20 to 300 [-29 to 149]	Two-phase vertical separator (see "Separator Specifications")
Underbalance settling tank unit (UBSU)	Settling tank	250 [1,724]	-20 to 250 [-29 to 121]	Condensate skimming and water separation
				Solids settling and H ₂ S scavenger treatment Wastewater disposal
Underbalance condensate tank (UBCU)	Condensate storage tank	380 bbl: atm to 250 [1,724]	-20 to 250 [-29 to 121]	Condensate skimming and water separation Additional retention time feature
		500 bbl: 250 [1,724]	-20 to 250 [-29 to 121]	
Underbalance export trailer (UBET)	Export pump	1,400 [9,653]	-20 to 250 [-29 to 121]	REDA HPS™ horizontal multistage surface pumping system
		2,000 [13,790]	-20 to 250 [-29 to 121]	SPM™ TWS 600S HD pump with 132-kW variable frequency drive, Ex d Zone-II-rated pumping systems
	Precharge pump	300 [2,068]	-20 to 250 [-29 to 121]	KSB MegaCPK centrifugal pump
		300 [2,068]	-20 to 250 [-29 to 121]	FET™ MUD HOG® with 37-kW ATEX electric motor
	Spurge pump	300 [2,068]	-20 to 200 [-29 to 93]	PCM 35120 pump with 37-kW Ex d electric motor
		2,000 [13,790]	-20 to 250 [-29 to 121]	TechnipFMC M18 Horizontal Triplex Plunger pump
Underbalance flare stack system (UBFS)	Knockout drums (x2)	3 bbl: 100 [689] 19 bbl: 250 [1,724]	-20 to 230 [-29 to 110]	Liquid carryover mitigation system
	Flare stack	250 [1,724]		90-ft hydraulic flare stack Max. gas rate: 90 MMcf/d
Underbalance acquisition trailer (UBAT)	Acquisition cabin and motor control center			Acquisition cabin Power provided for pumps
Stand-alone equipment	EverGreen burner	960 [6,619]		Max. flow rate: 12,000 bbl/d Water cut tolerance: 30%