AccessESP

GoRigless™ ESP System

Unmatched technology reduces risk, lowers cost, cuts GHG and maximizes recovery

The AccessESP GoRigless ESP System is an advanced technology that significantly reduces intervention costs, maximizes well productivity and enhances reservoir recovery rates by achieving the technical limit in ESP performance. With several years of failure-free performance, the technology is field proven to reduce risk, lower total cost of operations and cut carbon emissions in high-value offshore and onshore wells. Operators who replace conventional tubing-deployed ESP and gas lift completions with the GoRigless ESP System have gained tens of millions of dollars in added value over the life of the well.

Fifth-generation innovation

The latest upgrade to the GoRigless ESP System is the A450 1,200-hp permanent magnet motor (PMM)—the industry's only single-section high-horsepower motor that will fit in a wireline lubricator to enable slickline retrievability. This unique design uses materials, design enhancements and advanced testing protocols to achieve unmatched power density and reliability. Conventional induction and permanent magnet motors cannot achieve the same level of power density in a single section. To achieve high horsepower, conventional motors are stacked in tandem or triple configurations, which make them longer, heavier and much less reliable due to the significant increase in connections, parts and fatigue points. The A450 and A375 PMMs are ultra-long-life, single-section models with high power density ratings from 130 to 1,200 hp.

The A375 and A450 PMMs also significantly reduce logistics and inventory costs because six horsepower ratings and two motor materials (carbon steel and Inconel) offer a full range of lift capabilities; major service companies must field 54 different induction motors to deliver equivalent lift options.

Heavy workovers with rigs are not required with a GoRigless ESP System because downhole components can be slickline retrieved and replaced.

For more information
+1 (713) 589 2599 | UpCable@accessesp.com | accessesp.com

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Truly unique

The flexibility, efficiency and value that derive from the many unique capabilities of the GoRigless System are clearly unmatched in the industry. For 4.5-, 5.5- and 7-in. tubing or larger, no other system features a side pocket downhole wet mate cable connector that allows fullbore access, high debris tolerance, and inline and annular flow options. In addition, the A375 and A450 PMMs deliver five times the power output of conventional induction motors with very high efficiency in a lighter, smaller and easier-to-handle single section.

The ability to resize pumps or replace failed equipment in four slickline runs means the upfront incremental investment to adopt GoRigless technology provides a return on investment that often exceeds 200 percent because high intervention costs are avoided and deferred production minimized. Engineers who compare the GoRigless ESP System to competing rigless and tubing-deployed systems agree there is no industry equal to the well performance and economic value gained.

	GoRigless ESP	Alternate rigless ESP	Tubing-deployed ESP
OPEX/bbl	Lowest	Medium	Highest
Intervention cost	Lowest	Medium	Highest
NPV	Highest	Medium	Lowest
CO_2 emissions	Lowest	Medium	Highest
HSE risk	Lowest	Medium	Highest
Slickline retrievable	Yes	No	No
100% retrievable track record	Yes	No	No
Retrieve/replace pump without motor	Yes	No	No
Highest power density single-section motor	Yes	No	No
UpCable Power Delivery System option*	Yes	No	No
Live well intervention	Yes	No	No
Fullbore access	Yes	No	No
Simplified completion design**	Yes	No	No
Inline and annular flow options	Yes	No	No
Optimized for all major VSDs	Yes	No	No
Optimized for all major pumps	Yes	No	No
High-volume gas lift replacement	Excellent	Good	Fair

*Although GoRigless equipment can be powered by standard, high-voltage ESP cables, most completions benefit from adopting the UpCable™ Power Delivery System because it is designed to outlast the production tubing and it eliminates cable splices.

**Completion designs do not have to be changed to accommodate GoRigless technology.

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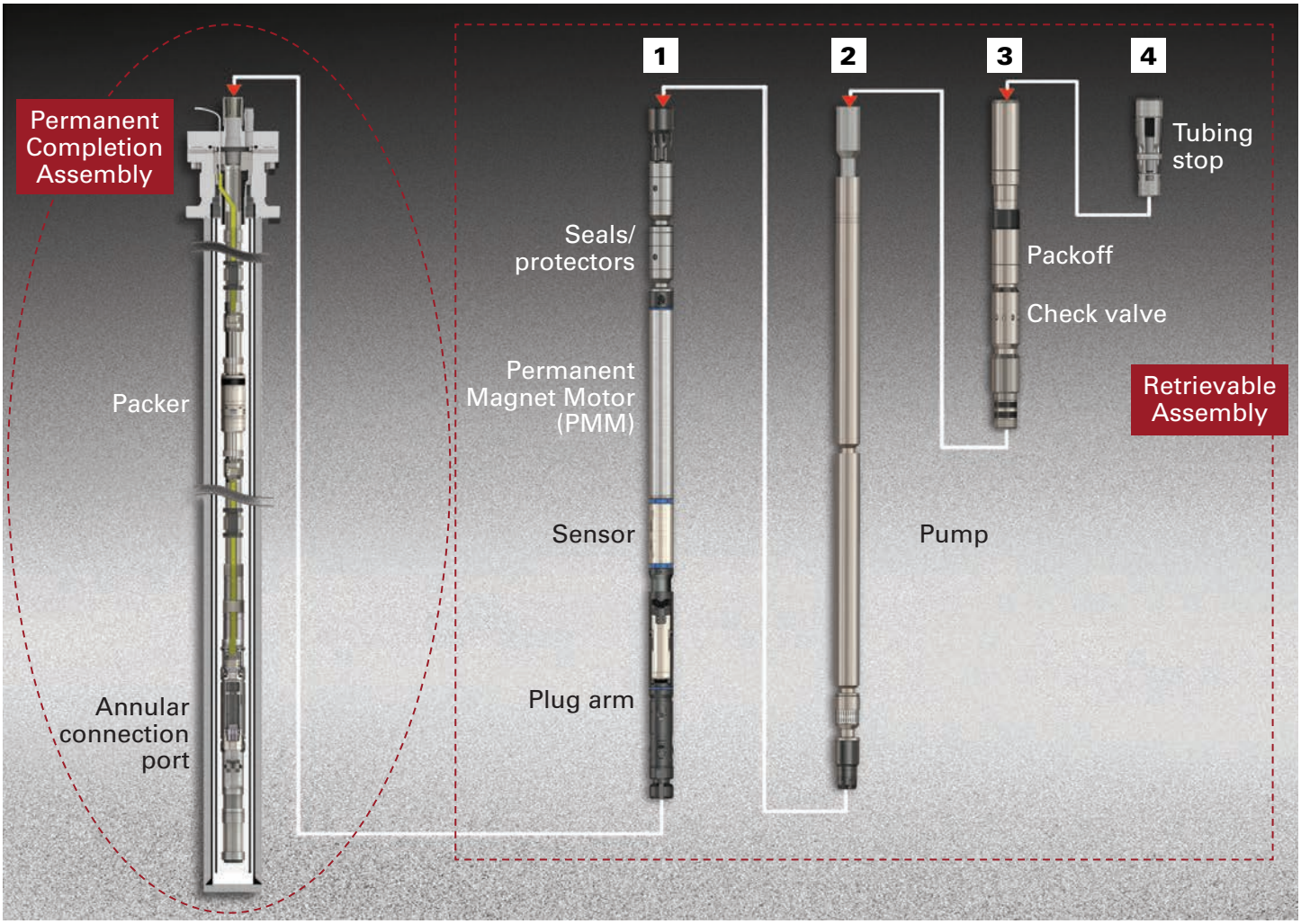

The Permanent Completion Assembly is installed with the production tubing to offer life-of-well flexibility for well cleanup and optimized drawdown. The Retrievable Assembly can be removed and redeployed through tubing with four slickline runs. The ability to selectively change out the entire assembly or the pump alone without pulling tubing saves millions in workover costs.

		AccessESP PMM Motor		Conventional ESP Induction Motor	
	Power	Length (ft)	Weight (lbm)	Length (ft)	Weight (lbm)
A375 3.75 in. OD 4.5/5.5-in. tubing	130 hp	9.1	235	51.2	1,980
	250 hp	16.4	424	84.0	3,400
	400 hp	23.7	614	Not Available	Not Available
A450 4.5-in. OD 5.5-in. tubing and larger	400 hp	16.4	611	55.6	1,4
	600 hp	23.7	884	70.6	3,770
	800 hp	35.1	1,165	Not Available	Not Available
	1,000 hp	38.8	1,445	Not Available	Not Available
	1,200 hp	38.8	1,445	Not Available	Not Available

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GoRigless ESP Retrievable Assembly

Technical specifications

	A375	A450
Tubing Stop		
OD (in.)	3.72	4.50
Length (ft)	1.57	1.57
Tubing Packoff		
OD (in.)	3.72	4.50
Length (ft)	2.83	2.88
Standing Valve		
OD (in.)	3.72	4.50
Length (ft)	1.32	2.00
Stinger		
OD (in.)	3.72	4.50
Length (ft)	0.88	1.00
PBR		
OD (in.)	3.72	4.50
Length (ft)	2.10	3.00
Pump and Intake (depending on application)		
OD (typical, in.)	3.75	4.50
Length (ft)[1,2]	varies	varies
Seal (Protector) (depending on application)		
OD (in.)	3.38 or 3.75	4.50
Length (typical, ft)[1]	6.50	6.50
Permanent Magnet Motor (PMM)		
OD (in.)	3.75	4.50
Horsepower (see PMM section)	130 to 400	400 to 1000
Length (ft)[1]	hp dependent	hp dependent
Gauge		
OD (in.)	3.75	4.50
Length (ft)	2.50	3.00
Plug Arm Assembly		
OD (in.)	3.75	4.50
Length (ft)	11.83	12.50
Motor Guide		
OD (in.)	3.75	4.50
Length (ft)	0.50	0.50

Notes

1–Depends on well application

2–When casing sizes permit, larger tubing can be run allowing larger OD pumps, hence flow rate (estimated maximum range: 7,500 bbl/d with 4.5-in. tubing, 12,000 bbl/d with 5.5-in. tubing, 30,000 bbl/d with 7-in. tubing)

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GoRigless ESP Permanent Completion Assembly

Technical specifications

	A375	A450
Retrievable Assembly		
Pump size (nominal)	3.75 in.	4.50 in.
Conveyance options	Slickline, Braided Line, Coiled Tubing, Tractor	
Typical system length[1]	85 ft	85 ft
Typical system weight[1]	1,900 lbm	3,300 lbm
Typical deployment length[2]	40 ft	40 ft
Typical deployment weight[2]	1,000 lbm	1,500 lbm
Environmental Specifications		
Maximum winding operating temperature	400°F	400°F
Maximum work ambient temperature	350°F	350°F
Pressure	7,500 psi	7,500 psi
Performance		
Maximum horsepower	400 hp	1,000 hp
Maximum flow[3,4]	7,500 bbl/d	20,000 bbl/d
Annular Connection Port (ACP)		
Minimum tubing size	4.5 in.	5.5 in.
Minimum casing size	7 in.	8.625 in.
Length	8.5 ft	10 ft
Maximum OD	5.85 in.	6.50 in.
Throughbore diameter	3.83 in.	4.62 in.
Burst pressure with isolation sleeve[5]	10,000 psi	10,000 psi
Collapse pressure with isolation sleeve[5]	6,000 psi	6,000 psi
In-Line Connection Port (ICP)		
Minimum tubing size	4.5 in.	5.5 in.
Minimum casing size	9.625 in.	9.625 in.
Length	14 ft	18 ft
Maximum OD	7.63 in.	8.25 in.
Throughbore diameter	3.83 in.	4.62 in.
Burst pressure with isolation sleeve[5]	7,000 psi	10,000 psi
Collapse pressure with isolation sleeve[5]	7,000 psi	10,000 psi

Notes

1–Depends on well application

2–Excludes running tools (above length, estimated typical per run section)

3–Based on ESP pump design

4–When casing sizes permit, larger tubing can be run allowing larger OD pumps, hence flow rate (estimated maximum range: 7,500 bbl/d with 4.5-in. tubing, 12,000 bbl/d with 5.5-in. tubing, 30,000 bbl/d with 7-in. tubing)

5–Based on 80-kpsi material; higher ratings available upon request

Annular Connection Port (ACP)

In-line Connection Port (ICP)