



Hydro-Helical[®] gas separator

Superior separation efficiency in extreme gas applications



Hydro-Helical® gas separator

The Hydro-Helical® gas separator, available in two sizes, 4-inch and 5.38-inch, sets a new industry standard for flow rate, performance, and reliability. The first new downhole dynamic gas separator design in decades, the Hydro-Helical gas separator achieves extreme separation efficiency at high flow rates up to 40% greater than conventional separators. This new gas separator translates to more oil production in higher gas applications.

The Hydro-Helical gas separator harnesses the kinetic energy of fluid using proprietary technologies designed for stability, efficiency, and reliability. This innovative new gas separator represents the latest computational fluid dynamics design vetted on our fully instrumented, transparent two-phase test system.

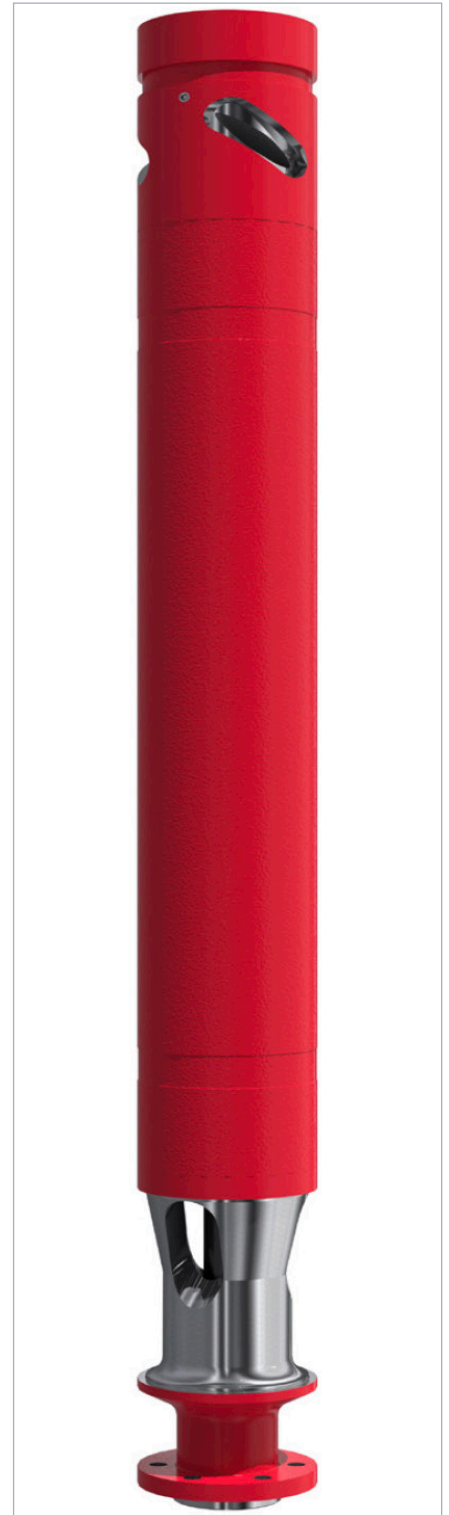
Innovative ideas, rigorous testing

Our two-phase test system uses transparent components that visually examine gas and liquid flow conditions, internal and external to the gas separator. Multiple instrumentations, designed within the gas separator and throughout the system, collect pressure and flow data.

This empirical testing concept shows that the Hydro-Helical gas separator consistently outperforms conventional designs. Studies indicate that a single Hydro-Helical gas separator's performance exceeds conventional tandem gas separators.

The Hydro-Helical gas separator solves complex problems that plague conventional systems, including:

- Fluid remixing and inefficient separation due to regions of turbulent flow
- Ineffective fluid separation patterns due to a high-pressure differential across the separator
- Limited maximum flow rate and pump compatibility from ingestion of fluid through exit ports
- Flow losses, recirculation, and gas ingestion in tandem configurations



FEATURES & BENEFITS

Aerospace technology in the crossover enables maximum throughput efficiency of rotating fluids, maximum retention of kinetic energy, optimum directional transfer of liquid to the pump, and increased erosion protection.

Erosion Buster® protection design throughout reduces erosion and wear and provides greater reliability.

Optimized intake provides maximum and streamlined intake of fluids.

Innovative fluid moving stages in a 4-inch diameter produce 25% greater flow rate than conventional separators and 50% greater flow rate in integral tandem configuration.

Innovative fluid moving stages in a 5.38-inch diameter produce 33% greater flow rate than conventional separators and 60% greater flow rate in integral tandem configuration.

Anti-gas lock technology results in zero gas lock within the separator, improving gas slug ride-through.

Superior thrust protection reduces erosion and wear between the impeller and diffuser on running surfaces

A stationary helix inducer creates a vortex that achieves 98% separation efficiency because it contacts 100% of the two-phase fluids, causing consistent separation of fluids at higher velocities and gas volume fractions. It eliminates erosion characteristics common in traditional paddle wheel vortex separators.



Top tier technology

Stationary helix inducer

The stationary helix creates a two-phase vortex that creates separation without a spinning paddle wheel, enabling separation efficiency that increases with the flow rate. The helix entry and exit angles, tapering cross-section, and pitch minimize erosion and direct flow for significantly improved separation efficiency.

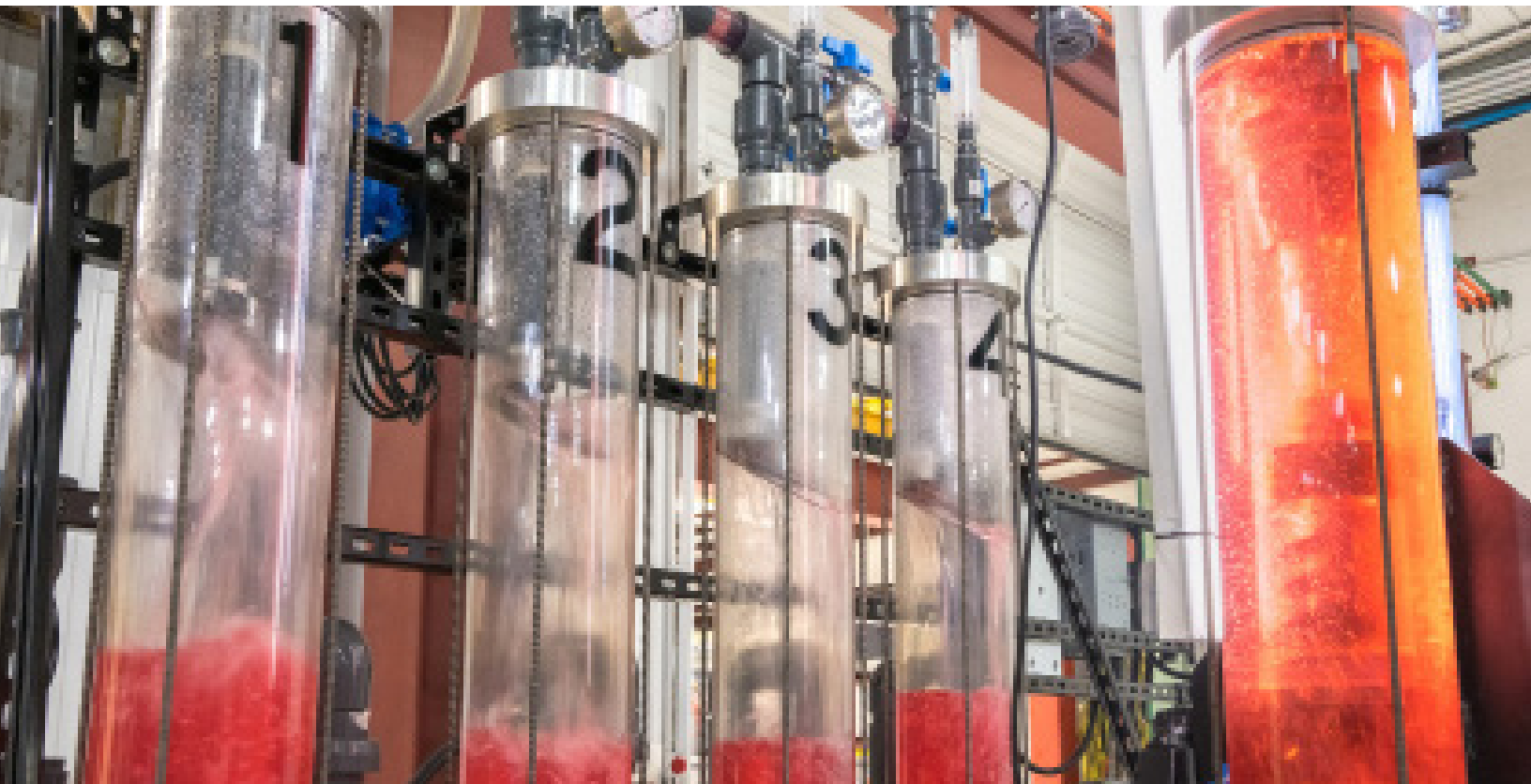
Fluid moving stages

Our stage design avoids pressure differentials that cause gas locking. Modular stages support adjustable flow rates and feature abrasion-resistant bearings with proprietary thrust protection technology. This bearing system increases reliability through greater torsional rigidity and shaft support.

Intake, crossover, and exit ports

Critical components in the Hydro-Helical® separation chamber minimize flow losses and reduce erosion. The intake, crossover, and exit ports are individually optimized, creating superior overall performance.

The enlarged intake creates flow paths that enable fluid moving stages to ingest large volumes of fluid with minimal deviation in the flow direction. Precisely directed fluid-phase streams from the Hydro-Helical separation chamber into the crossover gyratory pathways minimize recirculation and erosion while reducing fluid ingestion through the gas exit ports. The crossover also redirects the fluid at the pump's intake to reduce prerotation for enhanced pump performance.



Research and development

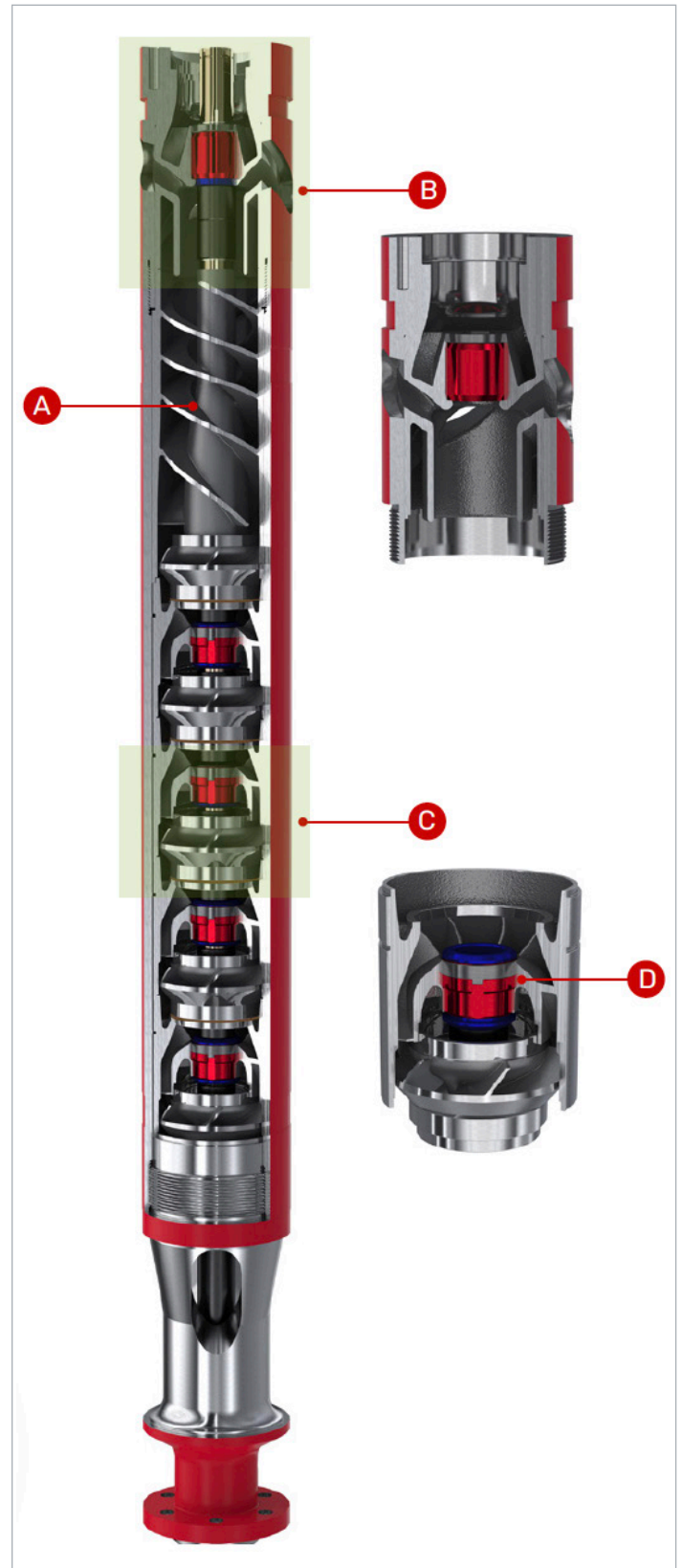
The Summit ESP® — A Halliburton Service Research and Technology Center brings together product engineers, R&D engineers, manufacturing, reliability, and quality teams focused on innovation and reliability. Our state-of-the-art facility is fundamental to continuous performance improvement in harsh environments. Test loops and wells allow system integration testing before field development and validate operation in extreme conditions.

- A. Stationary Helix Inducer :** Stationary helix inducer creates a vortex that achieves 98% separation efficiency.
- B. Intake, Crossover, and Exit Ports :** Individually optimized, creating superior overall performance.
- C. Fluid Moving Stages :** Proprietary stage design avoids pressure differentials that cause gas locking.
- D. XRange® Xtreme (XRX) :** Advanced bearing system provides upthrust and down thrust protection.



DuraHard® 7 and 15 : Exclusive harden coating throughout the entire system.

Erosion Buster® : Unique design redirects fluid path inward and into the primary flow path, reducing erosion and wear on critical areas.





Gas separator comparison

	HALLIBURTON	COMPETITOR A	COMPETITOR B	COMPETITOR C
400 Single Flow Range (BPD)	Up to 10,000	Up to 8,000	Up to 6,000	180 - 3,000
400 Tandem Flow Range (BPD)	Up to 12,000	Up to 8,000	2,000 - 6,000	180 - 3,000
538 Single Flow Range (BPD)	Up to 20,000	Up to 15,000	2,000 - 15,000	1,050 - 9,600
538 Tandem Flow Range (BPD)	Up to 24,000	Up to 15,000	2,000 - 15,000	1,050 - 9,600
% Gas Handling	98%	75%	80%	72% Max
AR Bearings	Up to 7	3	3	3
Erosion Protection	+++	++	++	++



Well monitoring and optimization

Our well applications engineers have a 360° view of every well's operational information, downhole equipment, application design, and field service history. This access allows the engineers to analyze and understand each well's operating conditions and identify an issue.



Unparalleled service

Top performance requires great technology plus an unwavering commitment to customer service. We combine best-in-class product performance and service excellence to deliver a level of service that sets Halliburton apart. While many pump providers focus on product line management, Halliburton's Artificial Lift team has a different approach. We focus on customers and their needs, first and foremost, and hold ourselves to the highest standard.



For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

H013750 11/24 © 2024 Halliburton. All Rights Reserved.

halliburton.com

HALLIBURTON