



Artificial Lift Services

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WhaleShark™ Stainless Gas-Solids Separator

USE IN WELLS WITH

- excessive pump gas interference and inconsistent pump fillage
- low rod/pump reliability
- solids or corrosion risks
- sluggy flow conditions
- vertical or high inclination pump placements

VALUE FEATURES

- See **SPE Paper 209755**; a simple patented design, achieves the highest possible downhole gas separation efficiency
- No packer or cup seals reduces operational risk
- Efficiently separates free gas from produced fluids
- Maximizes pump fillage and consistency to protect pump and rods from damaging erratic stress loadings
- Efficiently separates solids (for containment into mud joints) using a swirl vane solids separation feature
- Compatible with the **SharkNET™** self-cleaning solids filtering control system for enhanced solids separation
- **SharkTAC™** high annular flowby eccentric tubing anchor is recommended above separator
- Achieves high pump fillage when flumping up annulus
- Optional 20' (6.1m) collector extension for enhanced slug flow tolerance

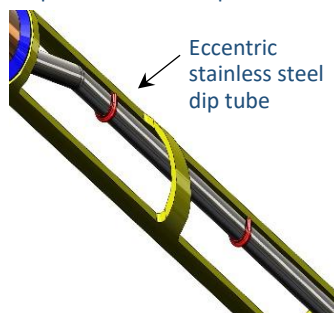


Separator Specifications

Series Model Name	35ss	40ss	50ss
Outside Diameter, in [mm]	3.5 [101.6]	4.0 [101.6]	5.0 [127.0]
Length, feet [m]	19.2 [5.8]	19.2 [5.9]	19.3 [5.9]
Top Connection (box)	2-3/8" EUE	2-7/8" EUE	3-1/2" EUE
Bottom Connection (box)	2-3/8" EUE	2-7/8" EUE	3-1/2" EUE
SharkNET Screen Conn	1.0" NPT	1.25" NPT	1.25" NPT
Tensile Rating, klbs _f [kdaN]	52 [23]	60 [26]	60 [26]
Torque Rating, ftlbs [Nm]	500 [678]	500 [678]	500 [678]
Maximum Capacities (at gas volume fractions >20% and non-foamy fluids)			
liquid bbl/day [m ³ /day]	2,000 [318]	3,000 [477]	4,000 [636]
gas mscf/day [e ³ m ³ /day]	2,000 [56]	3,000 [85]	4,000 [113]
Separator Material	L-80 body and 316 stainless dip tube High corrosion and H ₂ S tolerance		

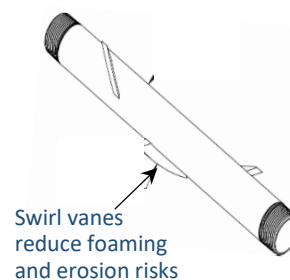
Gas Separation Region

Eccentric dip tube and large open space maximizes liquid fallback



Swirl Vane Solids Separator

Shaped vanes cyclonically swirl fluids over a broad range of liquid rates



WhaleShark™ Packerless Gas and Solids Separator – the highest performing downhole separator for both gas and solids. It offers low downhole operational risk with no packer or cup seals required. It avoids limitations of legacy poor-boy and packer-style separators.

Liquid Fallback Gas Separation Technology – the separator uses an upward facing “no annulus, large open-mouth” collector intake that takes advantage of multiphase fluid flow liquid reversals or liquid fallback, common in the slug and churn flow regimes. The gas separation region above the collector intake uses an eccentric (i.e., positioned to the side) pump intake dip tube that is designed to slow fluid velocities down and maximizes liquid fallback downward into the collector body. This unique engineered design has greatly improved separation efficiency, capacity, and slug flow tolerance for sustaining consistent high pump fillage under all downhole flow conditions. This is the only downhole separator not governed and limited by gas bubble rise velocity.

Swirl Vane Solids Separation Technology – rod pump plunger velocities vary 3 to 4 times their average velocity during a pump’s upstroke. Swirl vanes allow fluid flow slippage past the vanes and do not force fluids down a fixed rate range cyclonic auger channel (a limitation common with legacy desanders). This slippage increases solids separation efficiency over a broad rate range with avoidance of erosion and foam generation.