

# GASAL SEPARATION TECHNOLOGY

An optimized gas and solids separator designed for oil/water applications including light oil, heavy foamy oil and gas well dewatering.

## PRODUCT OVERVIEW

The LS GasAL™ separator is designed to enhance pump efficiency in applications where high free gas is present at the pump intake. It includes an integrated plate style tagbar and a self-orientating dip tube that sags to the bottom in horizontal applications. The outer housing is comprised of a strong, slotted separator tube that is designed to minimize flow restrictions and maximize separation cross the sectional area while maintaining integrity of the system to allow strategic positioning of the torque anchor to prevent gas flow restrictions and promote separation.

## CHALLENGE

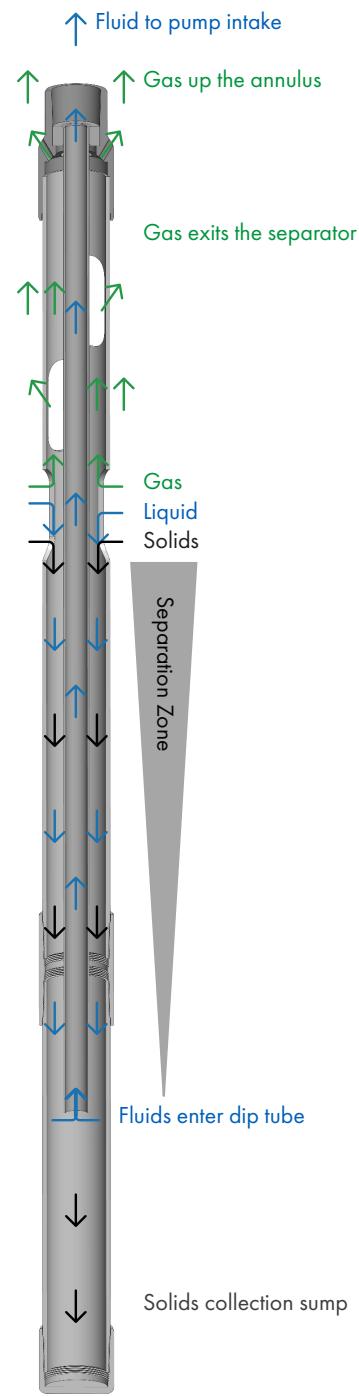
Oil under pressure in the reservoir often contains dissolved gasses. This solution gas evolves as free gas when pressure drops in the wellbore as it approaches the pump intake. Progressing Cavity Pumps (PCP's) are capable of producing this multiphase emulsion; free gas at the pump intake impacts the PCP by reducing its volumetric efficiency in terms of moving liquids. The GasAL is designed to enable better separation of free gas at the intake providing a more efficient pumping system in terms of ability to produce liquids at reduced speed, torque and power.

## PROGRESSING CAVITY PUMPS THAT OUTPERFORM

When used in conjunction with our Progressing Cavity Pump (PCP) lineup including the Lifting Solutions TaperAL PCP, improved performance and efficiency can be expected. GasAL is a low-cost modular assembly with a robust structural design. The innovative solids dump valve option and self-orienting dip tube provide unique benefits for gas separation and solids handling.

## PRODUCT FEATURES AND BENEFITS

- Simple cost effective design with no moving components, easy assembly and disassembly.
- Modular design can be broken down for transportation and installation.
- Robust structural design allows the torque anchor to be installed above or below the gas exit path.
- Self-orientating dip tube ensures intake is always oriented to the bottom of the assembly.
- Uses gravitational separation to exclude gas from the PCP intake improving overall operating efficiency.
- Enables the use of a smaller nominal pump displacement operating at a lower overall speed and torque.
- Lower PCP speed and torque contribute to lower stress on the drivehead and rod string system components.
- Smoother PCP operation including a reduction in torque and associated torque fluctuations.
- Innovative solids dump valve option designed to self-activate on flush, shutdown, or solids buildup.
- Available in coated for corrosion resistance and an uncoated economical configuration.



## GAS SEPARATOR PRODUCT LINE OVERVIEW

Series	Min Casing Size in (mm)	Top Connection in (mm)	Separator Dimensions		Gas Separation Zone				Solids Collection Zone		Bottom Connection in (mm)
			OD in (mm)	Length ft (m)	Separator Tube ID in (mm)	Dip Tube OD in (mm)	Length ft (m)	Flow Area in <sup>2</sup> (mm <sup>2</sup> )	ID in (mm)	Length ft (m)	
GS412	4-1/2 (114.3)	2-7/8 (73.0) EUE BOX	3.75 (95.3)	27.8 (8.48)	3.13 (79.4)	1.32 (33.4)	13.6 (4.14)	6.3 (4072)	2.50 (63.5)	6.3 (1.93)	2-7/8 (73.0) EUE BOX
GS512	5-1/2 (139.7)	3-1/2 (88.9) EUE BOX	4.50 (114.3)	27.5 (8.37)	3.50 (88.9)	1.66 (42.2)	13.5 (4.11)	7.5 (4811)	3.13 (79.4)	6.2 (1.88)	3-1/2 (88.9) EUE BOX
GS700	7 (177.8)	3-1/2 (88.9) EUE BOX	5.56 (141.3)	26.2 (7.98)	4.38 (111.1)	1.90 (48.3)	13.5 (4.11)	12.2 (7869)	4.38 (111.1)	4.5 (1.37)	3-1/2 (88.9) EUE BOX
GS858	8-5/8 (219.1)	4-1/2 (114.3) EUE BOX	6.50 (165.1)	28.6 (8.71)	6.00 (152.4)	2.88 (73.0)	13.3 (4.06)	21.8 (14053)	4.38 (111.1)	6.8 (2.06)	3-1/2 (88.9) EUE BOX

## GAS SEPARATOR MINIMUM SIZING GUIDELINES

Category	Range (cp)	Typical Application	Target Flow Rate (m <sup>3</sup> /day) **						
			5	10	20	40	80	160	320
Low	up to 250	Light oil, dewatering gas wells, emulsion with low oil content	✓	✓	✓	✓	✓	✓	GS412
Med-Low	Up to 500	Light to medium oil, higher water cut, with slight viscosity increase	✓	✓	✓	✓	✓	✓	GS412 GS512
Med-Low	Up to 1,000	Light to medium oil, increasing viscosity with good overall mobility	✓	✓	✓	✓	GS412	GS512	GS700
Med-Low	Up to 2,500	Light to medium oil, increasing viscosity and foaming tendency	✓	✓	✓	GS412	GS512	GS700	GS858
Medium	Up to 5,000	Medium crude oil, increasing viscosity and foaming tendency	✓	✓	GS412	GS512	GS700	GS858	✗
Medium	Up to 10,000	Medium to heavy crude oil, increasing viscosity and foaming tendency	✓	GS412	GS512	GS700	GS858	✗	✗
Heavy	Up to 20,000	Heavy crude oil, moderate viscosity with high foaming tendency	GS412	GS512	GS700	GS858	✗	✗	✗
Heavy	Up to 40,000	Heavy crude oil, high viscosity, increasing separation difficulty	GS512	GS700	GS858	✗	✗	✗	✗
Heavy	Up to 80,000	Heavy to extra-heavy crude oil, challenging to separate oil/gas	GS700	GS858	✗	✗	✗	✗	✗
Extra-Heavy	Up to 160,000	Extra heavy crude oil, extreme viscosity, very hard to separate	GS858	✗	✗	✗	✗	✗	✗

\*Viscosity profiles above and \*\*Target flow rates to the left of a given separator size are considered acceptable for simplified application conditions.

## OPERATION AND PRODUCTION OPTIMIZATION

The GasAL is an optimized gas and solids separator designed for oil/water applications including light oil, heavy foamy oil and gas well dewatering. The functionality of this type of gravity separator is highly dependent on the oil viscosity and ability of the gas to break out, coalesce into larger bubbles and rise up out of the separator to the casing annulus resulting in higher liquid percentage at the dip tube entry feeding the pump intake. There are numerous other variables that will affect separator functionality including flow rate, percentage of free gas, fluid level (intake pressure), inclination and casing size. Flow modeling is required to evaluate the potential effectiveness of the GasAL under accurate application conditions.