

# MGH

## Multiphase gas-handling system

### APPLICATIONS

- Oil wells with excessive free gas volume for conventional gas-handling equipment
- Oil wells with nonvented packers
- Subsea oil wells
- Conversions from gas lift to ESP
- Shale oil applications
- Gas well dewatering

### BENEFITS

- Increases production and recovery from reservoirs with high GOR
- Stabilizes pump operation and increases drawdown at lower intake pressure
- Maximizes production with fewer gas-locking production shutdowns
- Improves ESP run life with stabilized motor current

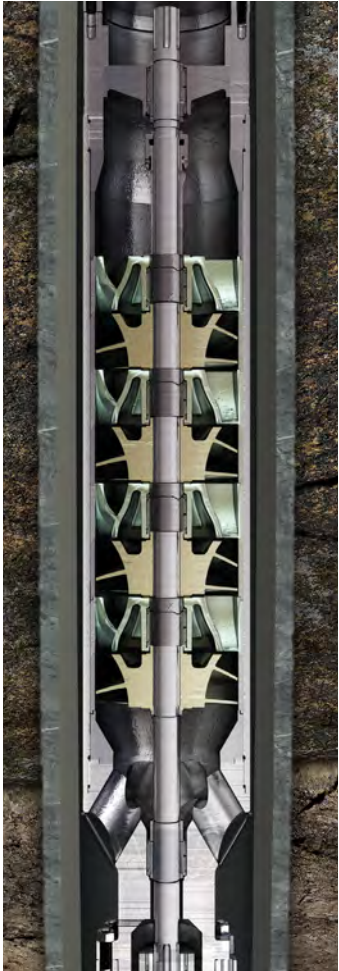
### FEATURES

- Helicoaxial, multiphase stage design capable of handling extremely high gas volume fractions (GVF)
- Special hydraulic design to minimize liquid-gas separation
- Abrasion-resistant construction suitable for sandy applications
- Tungsten carbide or self-lubricating silicon carbide radial bearings in every stage, capable of handling 100% gas slugs

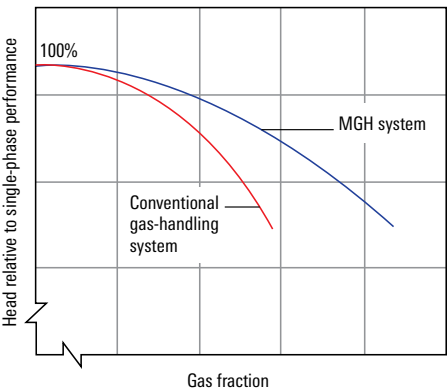
The MGH\* multiphase gas-handling system enables efficient handling of higher percentages of free gas. The system can be installed in conjunction with a gas separator when gas can be vented into the casing, or it can be installed with a standard intake if all the produced gas must go through the pump.

The MGH system is designed to increase production and extend the use of ESPs in oil wells with high gas cut in which production is limited by the centrifugal pump's ability to handle gas.

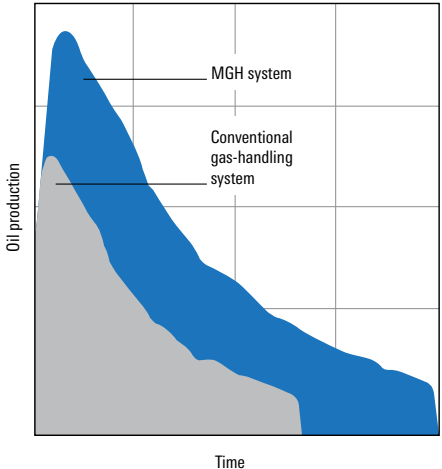
Laboratory tests and field trials have shown that the MGH system can successfully operate at lower intake pressures with GVF in the pump up to 75%, far exceeding the 40–45% GVF limitations of conventional gas-handling devices. The MGH system maintains high boost pressure with increasing amounts of inlet gas fraction. It is designed to improve ESP operational stability in gassy wells, provide better slug handling in horizontal wells, and increase the production rate and reserves recovery. The MGH system can also be used in subsea wells and wells with nonvented packers where separating the free gas into the annulus is not possible.



*The MGH multiphase gas-handling system increases production and improves ESP performance in oil wells with extremely high gas cut.*



*MGH system technology enables ESP operation in wells with GVF up to 75%.*



*The MGH multiphase system delivers incremental production and improved reserves recovery compared with conventional equipment.*

MGH system pumps are available in various series to match the well conditions for combined gas and liquid downhole flow rates from 500–47,000 bbl/d [74–7,472 m<sup>3</sup>/d]. Advanced metallurgy options for stages and housings are available for abrasive and corrosive environments. All MGH system pumps are built in full bearing housing configuration with a hard ceramic radial bearing at every stage to improve abrasion resistance and ensure ultimate shaft stability during operations with extremely high GVF.

Self-lubricating, graphitized silicon carbide radial bearings enable continuous and reliable operation, even when the gas slug is passing through the pump with essentially no liquid to lubricate the bearings. This allows the ESP system to “ride through” the gas-locking situation and resume production when the inflow conditions stabilize. Proper motor winding temperature monitoring is critical to ensure the safe working temperature limit is never breached during such periods.

#### MGH Multiphase Gas-Handling System Specifications

	338 Series (A5-20)	400 Series (D5-20)	400 Series (D8-42)
Outside diameter, in [mm]	3.38 [85.9]	4.00 [101.6]	4.00 [101.6]
Length, ft [m]	7.70 [2.3]	7.75 [2.36]	6.9 [2.1]
Weight, lbm [kg]	147 [66.7]	240 [108.9]	182 [82.6]
Power consumption, at 60 Hz and 1.0 g/cm <sup>3</sup> , hp	7.6	7.6	16
Housing material	Carbon steel, Redalloy* high-nickel alloy (9 Cr:1 Mo)	Carbon steel, Redalloy alloy (9 Cr:1 Mo)	Carbon steel, Redalloy alloy (9 Cr:1 Mo)
Stage metallurgy	Ni-Resist™	Ni-Resist	Ni-Resist, 5530 corrosion- and abrasion-resistant alloy
Radial bearing system	Full bearing housing (FBH), 1 bearing per every stage	FBH, 1 bearing per every stage	FBH, 1 bearing per every stage
Radial bearing material	Tungsten carbide (TC)	TC	TC or self-lubricating silicon carbide graphitized (SICG)
Shaft material	INCONEL® 718	INCONEL 718	High-strength MONEL®, INCONEL 718
Shaft diameter, in [mm]	0.68 [17.4]	0.68 [17.4]	0.87 [22.2]
Shaft power rating at 60 Hz, hp	240 (INCONEL 718)	240 (INCONEL 718)	316 (high-strength MONEL), 492 (INCONEL 718)
Liquid and gas rate at 60 Hz, bbl/d [m <sup>3</sup> /d]	500–2,000 [74–318]	500–2,000 [74–318]	800–4,200 [127–668]
GVF capability	Up to 75%	Up to 75%	Up to 75%
Stage type	Helicoaxial	Helicoaxial	Helicoaxial

#### MGH Multiphase Gas-Handling System Specifications

	538 Series (S50-90)	862 Series (M90-470)
Outside diameter, in [mm]	5.38 [136.7]	8.62 [219]
Length, ft [m]	6.3 [1.9]	5 [1.5]
Weight, lbm [kg]	350 [159]	392 [178]
Power consumption, at 60 Hz and 1.0 g/cm <sup>3</sup> , hp	50	200
Housing material	Carbon steel, Redalloy alloy (9 Cr:1 Mo)	Carbon steel, Redalloy alloy (9 Cr:1 Mo)
Stage metallurgy	Ni-Resist, 5530 corrosion- and abrasion-resistant alloy	Ni-Resist, 5530 corrosion- and abrasion-resistant alloy
Radial bearing system	FBH, 1 bearing per every stage	Full bearing housing keyless sleeve (FBH-KS), 1 bearing per every stage
Radial bearing material	TC or self-lubricating SICG	TC
Shaft material	High-strength MONEL, INCONEL 718	High-strength MONEL, INCONEL 718
Shaft diameter, in [mm]	1.00 [25.4]	1.37 [34.8]
Shaft power rating at 60 Hz, hp	463 (high-strength MONEL), 720 (INCONEL 718)	988 (high-strength MONEL), 1,536 (INCONEL 718)
Liquid and gas rate at 60 Hz, bbl/d [m <sup>3</sup> /d]	5,000–9,000 [795–1,431]	9,000–47,000 [1,431–7,472]
GVF capability	Up to 75%	Up to 75%
Stage type	Helicoaxial	Helicoaxial

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