



GAS-HANDLING SYSTEMS

Gas-handling systems (Gas separators, gas handlers, gas separator-handlers and multiphase gas handler) are designed to ensure the stable operation of submersible pumps in wells with a high content of gas.

APPLICATION

- Wells with high GOR;
- Wells with unstable inflow;
- Shale wells.

FEATURES & BENEFITS

- Gas-handling systems have a corrosion-wear-resistant design;
- The liner of the separation chamber is made of thick-walled chromium-nickel stainless steel;
- The rotor is stabilized by wear-resistant radial bearings;
- The radial bearings are made of hard alloy;
- Head, base and liner are made of stainless steel;
- Internal components are made of corrosion-resistant steel and/or of Ni-resist cast iron Type 1;
- Gas separator ensures separation and removal of gas from the fluid into the annulus;
- Gas-handler and Multiphase gas-handler reduce bubble size, put gas back into solution and homogenize the mixture;
- Gas-handling systems with inlets are installed instead of an intake or as the lower section of a tandem gas-handling system. Gas-handling systems with no inlets are installed above the device with inlets.

RECOMMENDED GAS-HANDLING SYSTEM

Free gas at pump intake (after separation), %	Gas-handling system
0 to 10	Radial/mixed flow stage
10 to 25	Mixed flow stage
25 to 55	Gas-handler
55 to 75	Multiphase gas-handler

To increase the efficiency of ESP operation in wells with a particularly high content of gas, gas-handling systems are installed according to the following arrangements:

- At the top: multiphase gas handler/gas handling device;
- At the bottom: gas separator and gas handling device.



GAS SEPARATORS

EXAMPLE

GS-A V 338-950 CT STD CR1 AFL

GS-	A	V	338-	950	CT	STD	CR1	HSN
1	2	3	4	5	6	7	8	9
1	Gas separator							
2	Symba design							
3	Gas Separator type V – vortex R – rotary							
4	Gas separator series							
5	Maximum capacity, bpd@60Hz							
6	Gas separator configuration CT – central tandem LT – lower tandem (can be used as single)							
7	Shaft rating STD – standard strength shaft HSS – high strength shaft USS – Ultrahigh strength shaft							
8	Corrosion resistance design: CR0 – carbon steel head, base and housing, carbon steel fasteners CR1 – stainless steel head and base, carbon steel housing with anti-corrosion coating (super stainless flame coating), monel fasteners CR2 – stainless steel head, base and housing, monel fasteners							
9	Elastomers material: HSN – highly saturated nitrile AFL – high temperature fluoroelastomer							

ROTARY GAS SEPARATORS

The principle of operation of a rotary gas separator is based on the centrifugal force arising in the separation chamber to remove free gas into the annulus, thereby ensuring stable operation of the pump and increasing MTBF.

APPLICATION

- Wells with increased fluid viscosity;
- Wells with low and medium solids content;

FEATURES & BENEFITS

- The liner of the separation chamber is made of thick-walled chromium-nickel stainless steel;
- The rotor is stabilized by wear-resistant radial bearings;
- The base of the gas separator is made of stainless steel.

A rotary gas separator with intake holes is installed instead of an intake section or as the lower section of a tandem rotary gas separator/gas-handling system.

A rotary gas separator without intake holes is installed above the device with intake holes or as the upper section of a tandem rotary gas separator.



Recommended	Operating Range		Housing diameter		Shaft		Length		Weight	
	bpd @ 60 Hz	m ³ /d @ 50 Hz	in.	mm	in.	mm	ft	m	lb	kg
GS-A R 338-1500 CT	151 – 1,509	20 – 200	3.39	86	0.67	17	2.2	0.7	46	21
GS-A R 338-1500 LT	151 – 1,509	20 – 200	3.39	86	0.67	17	2.6	0.8	53	24
GS-A R 362-500 CT	60 – 453	8 – 60	3.62	92	0.787	20	2.4	0.7	60	27
GS-A R 362-500 LT	60 – 453	8 – 60	3.62	92	0.787	20	2.8	0.9	64	29
GS-A R 362-1300 CT	377 – 1,283	50 – 170	3.62	92	0.787	20	2.4	0.7	60	27
GS-A R 362-1300 LT	377 – 1,283	50 – 170	3.62	92	0.787	20	2.8	0.9	64	29
GS-A R 362-2100 CT	113 – 2,113	15 – 280	3.62	92	0.787	20	2.4	0.7	60	27
GS-A R 362-2100 LT	113 – 2,113	15 – 280	3.62	92	0.787	20	2.8	0.9	64	29
GS-A R 406-4500 CT	189 – 4,528	25 – 600	4.06	103	0.866	22	3.2	1.0	78	36
GS-A R 406-4500 LT	189 – 4,528	25 – 600	4.06	103	0.866	22	3.6	1.1	87	39

VORTEX GAS SEPARATORS

The principle of operation of the vortex gas separator is based on the effect of a free vortex arising in the vortex chamber and providing phase separation under the action of centrifugal forces. The vortex gas separator is less susceptible to cyclic circular wear of the liner by solids due to the absence of separation drums. It is used in wells with a high content of solids.

APPLICATION

- Wells with a high GOR;
- Wells with a high content of solids.

FEATURES AND BENEFITS:

- The Liner of the separation chamber is made of thick-walled chromium-nickel stainless steel;
- The rotor is stabilized by wear-resistant radial bearings;
- End pieces are made of stainless steel;
- A vortex gas separator with intake holes is installed instead of an intake section or as the lower section of a tandem vortex gas separator/gas-handling system.
- A vortex gas separator without intake holes is installed above the device with intake holes or as the upper section of a tandem vortex gas separator.



Description	Recommended Operating Range		Housing diameter		Shaft		Length		Weight	
	bpd @ 60 Hz	m ³ /d @ 50 Hz	in.	mm	in.	mm	ft	m	lb	kg
GS-A V 362-500 CT	60 – 453	8 – 60	3.62	92	0.787	20	2.4	0.7	55	25
GS-A V 362-500 LT	60 – 453	8 – 60	3.62	92	0.787	20	2.8	0.9	60	27
GS-A V 362-2100 CT	113 – 2,113	15 – 280	3.62	92	0.787	20	2.4	0.7	55	25
GS-A V 362-2100 LT	113 – 2,113	15 – 280	3.62	92	0.787	20	2.8	0.9	60	27
GS-A V 362-1300 CT	377 – 1,283	50 – 170	3.62	92	0.787	20	2.4	0.7	55	25
GS-A V 362-1300 LT	377 – 1,283	50 – 170	3.62	92	0.787	20	2.4	0.7	55	25
GS-A V 406-2100 CT	113 – 2,114	15 – 280	4.06	103	0.984	25	3.36	1.0	80	37
GS-A V 406-2100 LT	113 – 2,114	15 – 280	4.06	103	0.984	25	2.94	0.9	69	32
GS-A V 406-7200 CT	189 – 7,173	25 – 950	4.06	103	0.984	25	3.36	1.0	80	37
GS-A V 406-7200 LT	189 – 7,173	25 – 950	4.06	103	0.984	25	3.36	1.0	80	37

VORTEX GAS SEPARATORS

The principle of operation of the vortex gas separator is based on the effect of a free vortex arising in the vortex chamber and providing phase separation under the action of centrifugal forces. The vortex gas separator is less susceptible to cyclic circular wear of the liner by solids due to the absence of separation drums. It is used in wells with a high content of solids.

APPLICATION

- Wells with a high GOR;
- Wells with a high content of solids.

FEATURES AND BENEFITS:

- The Liner of the separation chamber is made of thick-walled chromium-nickel stainless steel;
- The rotor is stabilized by wear-resistant radial bearings;
- End pieces are made of stainless steel;
- A vortex gas separator with intake holes is installed instead of an intake section or as the lower section of a tandem vortex gas separator /gas-handling system.
- A vortex gas separator without intake holes is installed above the device with intake holes or as the upper section of a tandem vortex gas separator.



Description	Recommended Operating Range		Housing diameter		Shaft		Length		Weight	
	bpd @ 60 Hz	m3/d @ 50 Hz	in.	mm	in.	mm	ft	m	lb	kg
GS-A V 362-500 CT	60 – 453	8 – 60	3.62	92	0.787	20	2.4	0.7	55	25
GS-A V 362-500 LT	60 – 453	8 – 60	3.62	92	0.787	20	2.8	0.9	60	27
GS-A V 362-2100 CT	113 – 2,113	15 – 280	3.62	92	0.787	20	2.4	0.7	55	25
GS-A V 362-2100 LT	113 – 2,113	15 – 280	3.62	92	0.787	20	2.8	0.9	60	27
GS-A V 362-1300 CT	377 – 1,283	50 – 170	3.62	92	0.787	20	2.4	0.7	55	25
GS-A V 362-1300 LT	377 – 1,283	50 – 170	3.62	92	0.787	20	2.4	0.7	55	25
GS-A V 406-2100 CT	113 – 2,114	15 – 280	4.06	103	0.984	25	3.36	1.0	80	37
GS-A V 406-2100 LT	113 – 2,114	15 – 280	4.06	103	0.984	25	2.94	0.9	69	32
GS-A V 406-7200 CT	189 – 7,173	25 – 950	4.06	103	0.984	25	3.36	1.0	80	37
GS-A V 406-7200 LT	189 – 7,173	25 – 950	4.06	103	0.984	25	3.36	1.0	80	37



Description	Recommended Operating Range		Housing diameter		Shaft		Length		Weight	
	bpd @ 60 Hz	m ³ /d @ 50 Hz	in.	mm	in.	mm	ft	m	lb	kg
AGH-A 362-2100 CT	- 2,113	- 280	3.62	92	0.787	20	2.2	0.7	53	24
AGH-A 362-2100 LT	- 2,113	- 280	3.62	92	0.787	20	2.6	0.8	57	26
AGH-A 406-4500 CT	- 4,528	- 600	4.06	103	0.866	22	2.2	0.7	44	20
AGH-A 406-4500 LT	- 4,528	- 600	4.06	103	0.866	22	2.6	0.8	51	23

GAS SEPARATOR-HANDLER

A rotary gas separator and handler are installed in tandem at the pump intake in wells with a particularly high GOR where neither a gas separator nor a gas handler can ensure stable operation of a submersible centrifugal pump.

A rotary gas separator-handler is a system in which a gas separator is installed at the bottom, while the gas handler is installed on the top.

FEATURES AND BENEFITS:

- The one-piece liner of the separation chamber is made of thick-walled chromium-nickel stainless steel;
- The dispersing chamber contains a special designed inducer and stages for mixing dissolved gas in the formation fluid, preparing a homogeneous gas-liquid mixture;
- An additional liner is pressed inside the gas separator-handler housing;
- The supercavitating wheel has additional housing protection against solids;
- The rotor is stabilized by wear-resistant radial bearings;
- The base of the gas separator-handler is made of stainless steel.
- A gas separator-handler with intake holes is installed instead of an intake section or as the lower section of a tandem gas-handling system.
- A gas separator-handler without intake holes is installed above the device with intake holes or as the upper section of a tandem gas-handling system.



EXAMPLE

GSH-A 362-1300 LT STD CR1 HSN

GSH-	A	362-	1300	LT	STD	CR1	HSN
1	2	3	4	5	6	7	8
1	Gas Separator-Handler (GSH)						
2	Symba design						
3	GSH series						
4	Maximum flow rate@60Hz, bpd						
5	Gas separator configuration CT – Cental tandem LT – Lower tandem (can be used as single)						
6	Shaft rating STD – Standard strength shaft HSS – High strength shaft USS – Ultrahigh strength shaft						
7	Corrosion resistance design: CRO – carbon steel head, base and housing, carbon steel fasteners CR1 – stainless steel head and base, carbon steel housing with anti-corrosion coating (super stainless flame coating), monel fasteners CR2 – stainless steel head, base and housing, monel fasteners						
8	Elastomers material: HSN – highly saturated nitrile AFL – high temperature fluoroelastomer						



Description	Recommended Operating Range		Housing diameter		Shaft		Length		Weight	
	bpd @ 60 Hz	m ³ /d @ 50 Hz	in.	mm	in.	mm	ft	m	lb	kg
GSH-A 338-1500 CT	- 1,509	- 200	3.39	86	0.669	17	3.0	0.9	64	29
GSH-A 338-1500 LT	- 1,509	- 200	3.39	86	0.669	17	3.4	1.0	71	32
GSH-A 362-2100 CT	- 2,113	- 280	3.62	92	0.787	20	4.1	1.3	93	42
GSH-A 362-2100 LT	- 2,113	- 280	3.62	92	0.787	20	4.3	1.3	95	43
GSH-A 406-7200 CT	- 7,170	- 950	4.06	103	0.984	25	4.9	1.5	106	48
GSH-A 406-7200 LT	- 7,170	- 950	4.06	103	0.984	25	4.4	1.3	88	40
GSH-A 449-11700 CT	- 11,698	- 1,550	4.49	114	1.102	28	5.3	1.6	154	70
GSH-A 449-11700 LT	- 11,698	- 1,550	4.49	114	1.102	28	5.3	1.6	154	70

MULTIPHASE GAS-HANDLER

Multiphase gas-handler (MGH), as well as the gas handler, is designed to prepare a homogeneous gas-liquid mixture.

MGH working parts are designed on the basis of serial radial stages with a cut lower impeller disk (multiphase stages) intended for dispersion, compression, and dissolution of free gas in the pumped fluid.

FEATURES AND BENEFITS:

- The gas lift effect increases the efficiency of well operation;
- Stabilized characteristics of the pump and prevented gas lock;
- Reduced pulsation and vibration of the fluid flow in the tubing with a high gas content at the inlet;
- Prevented gas accumulation in the annulus;
- Working stages are designed on the basis of serial stages.

MGH with intake holes is installed instead of intake or as the lower section of a tandem MGH.

MGH without intake holes is installed above the device with intake holes or as the upper section of a tandem MGH/gas-handling system.



EXAMPLE

MGH-A 406-1900 LT HSS CR1 AFL

MGH-	A	406-	1900	LT	HSS	CR1	AFL
1	2	3	4	5	6	7	8
1	Multiphase Gas-Handler						
2	Symba design						
3	MGH series						
4	Maximum flow rate@60Hz, bpd						
5	AGH configuration CT – central tandem LT – lower tandem						
6	Shaft rating STD – Standard strength shaft HSS – High strength shaft USS – Ultrahigh strength shaft						
7	Corrosion resistance design CR0 – carbon steel head, base and housing, carbon steel fasteners CR1 – stainless steel head and base, carbon steel housing with anti-corrosion coating (super stainless flame coating), monel fasteners CR2 – stainless steel head, base and housing, monel fasteners						
8	Elastomers material: HSN – Highly saturated nitrile AFL – high temperature fluoroelastomer						



Description	Recommended Operating Range		Housing diameter		Shaft		Length		Weight	
	bpd @ 60 Hz	m ³ /d @ 50 Hz	in.	mm	in.	mm	ft	m	lb	kg
MGH-A 272-1200 CT	- 1,164	- 185	2.72	69	0.55	14	2.8	0.9	44	20
MGH-A 319-800 CT	- 755	- 100	3.19	81	0.55	14	2.5	0.8	51	23
MGH-A 319-800 LT	- 755	- 100	3.19	81	0.55	14	3.0	0.9	77	35
MGH-A 362-600 CT	- 604	- 80	3.62	92	0.669	17	2.6	0.8	55	25
MGH-A 362-600 LT	- 604	- 80	3.62	92	0.669	17	3.0	0.9	62	28
MGH-A 362-1500 CT	- 1,509	- 200	3.62	92	0.787	20	2.6	0.8	55	25
MGH-A 362-1500 LT	- 1,509	- 200	3.62	92	0.787	20	3.0	0.9	62	28
MGH-A 406-1900 CT	- 1,887	- 250	4.06	103	0.87	22	2.6	0.8	55	25
MGH-A 406-1900 LT	- 1,887	- 250	4.06	103	0.87	22	3.0	0.9	62	28