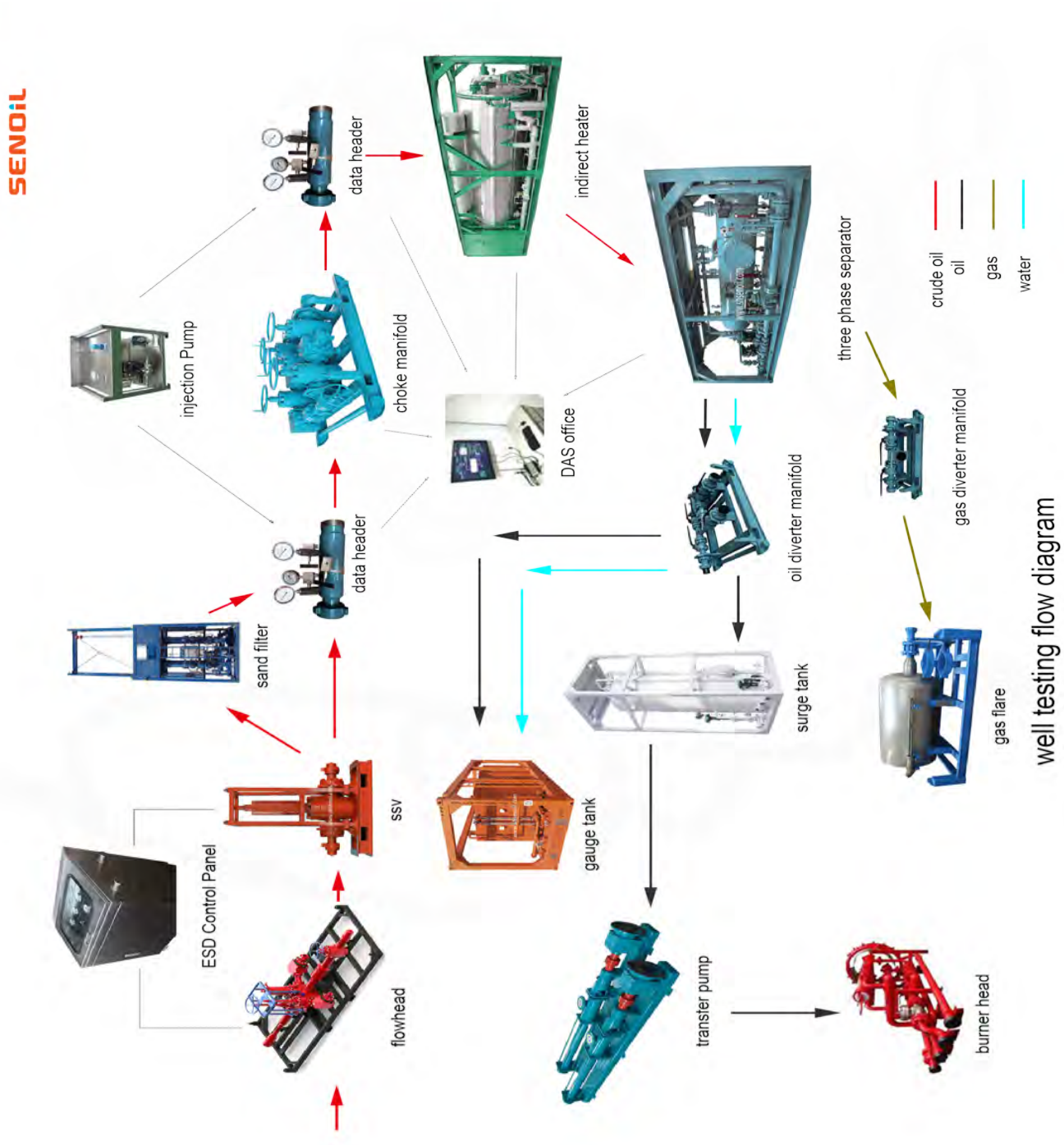
Well Testing Equipment

SENOIL

Outstanding Product and Service



if there is request, please contact with our sales people (contact@shsenoil.com).

Flowhead

–Surface Test Tree

Flowhead, is located at the top of testing string to control the flow of fluid from the well and is the first piece of surface test equipment. It consist of four gate valves; one master valve, two wing valves (flowline & kill line), and one swab valve. A swivel below the main block of flowhead allows drill stem to rotate freely, while the test tree remains stationary. And there is another type which mater valve below swivel.

APPLICATION

- Onshore operation
- Pre-completion testing
- Drill Stem Testing
- Well Cleanup

FEATURES & BENEEFITS

- Support the weight of test string
- Protection frame on main block improves durability
- Flapper or dart check valve is set on inlet of killing line
- Master valve can be located below swivel or integrated in main block

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Flowhead

Main Sepcification

Model	FLH-80-35	FLH -78-70	FLH -78-105	FLH-103-70
Service	Oil & Gas, H_2S Service			Sweet Service
W. P(psi)	5000	10,000	15,000	10,000
Bore Size	3 - 1/8”	3 - 1/16”	3 - 1/16”	4-1/16”
Load Capacity	490,000 lb			
Flow Line	3” Fig 602 M	3” Fig 1502 M	3” Fig 2202 M	4” Fig 1002 M
Kill Line	3” Fig 602 F	3” Fig 1502 F	3” Fig 2202 F	4” Fig 1002 F
Top	5-3/4” - 4 Stub Acme Box			
Bottom	4-1/2” IF Pin			
Kill Line Check	Dart or flipper type			
Design Codes	API 6A (PR1, PSL3)			
	NACE MR0175			
	Temperature Class: PU			
	Material Class: EE			
	DNV 2.7.1			

Options

other sizes and specification available on request

if there is request, please contact with our sales people (contact@shsenoil.com).

Surface Safety Valve -SSV

Surface Safety Valve is a kind of hydraulic actuated fail safe gate valve for high pressure flowline with H2S. SSV is used to fast shut down on the upstream of flowline in case of overpressure, failure, leakge or any other emergency situation, which is located in front of choke manifold.

APPLICATION

- onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing

FEATURES & BENEEFITS

- Relief valve supply quick shutdown in 2 seconds
- Metal-to-matal seal improves reliability
- frame supply enhanced safety and durability
- Fail-safe and remote activation and automatic well closure

Main Sepcification

Model	SSV-80-35	SSV-78-70	SSV-78-105	SSV-103-70
Service	Oil & Gas, H_2S Service			Sweet Service
Shut Down Time	Less than 2 seconds			
W P (psi)	5000	10,000	15,000	10,000
T.P (psi)	7500	15,000	22,500	15,000
Bore Size	3 - 1/8”	3 - 1/16”	3 - 1/16”	4-1/16”
Inlet	3” Fig.602 M	3” Fig1502 M	3” Fig.2202 M	4” Fig.1002 M
Outlet	3” Fig.602 F	3” Fig1502 F	3” Fig.2202 F	4” Fig.1002 F
Design Codes	API 6A (PR1, PSL3)			
	NACE MR0175			
	Temperature Class: PU			
	Material Class: EE			
	DNV 2.7.1			

Options

flanged end connection is available
other sizes and specification available on request

if there is request, please contact with our sales people (contact@shsenoil.com).

ESD Control Panel

Emergency Shut Down Control Panel is used to generate signal to pneumatically control the hydraulic actuated flowhead and other fail safe hydrauli actuated valve including SSV and SCSSV).
ESD system is designed to remote or manual control in response to any leakage , equipment failure or other emergency situation.

APPLICATION

- onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing

FEATURES & BENEEFITS

- Supply 4 or 5 station to realize remote control
- pnuematic actuated hydraulic pump is adopted
- able to control several valves at same time
- manual pump is used as back up

ESD Control Panel

Main Sepcification

Design Code	API Spec. 14C, 14D, 14F & API 550
Discharge Pressure (psi)	2,000 to10,000
Max. Air Supply Pressure (psi)	120
Pilot Operating Pressure (psi)	40-145
Pump (Air Driven)	Maximator Pump or Equivalent
Pump Manual	Hand Level Operated
Tank Capacity	8 US gallons
Hydraulic Fluid	Any mineral based hydraulic oil
Assembly Material	stainless Steel

Options

remote control station and safety valve NO. is upon request

if there is request, please contact with our sales people (contact@shsenoil.com).

Dual Pot Sand Filter

Senoil's Dual Pot Sand Filter is skid unit which is used to remove sand or other solid in well fluid to protect down stream equipment.
Dual Pot Sand Filter consists of two vertical vessels which holiding sand screen.Two filtration pots are individually controlled which allows single or dual pot operation. Normally, one is working, the other is clean up.

APPLICATION

- Onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing

FEATURES & BENEEFITS

- 100, 200, 500 mircon filter cartridge are available
- Water flushing system is adopted to realize quick sand screen clean
- Back up valves are adopted to improve durablity
- Rugged and modular filter design

Dual Pot Sand Filter

Main Sepcification

Model	DPSF35-79	DPSF70-78	DPSF105-78
Service	Oil & Gas, H_2S Service		
Working pressure (psi)	5,000	10,000	15,000
Gas (MMscf/d)	25	35	50
Liquid (bbl/d)	5,000	5,000	5,000
Flowline Bore	3 1/8”	3 1/16”	3 1/16”
Filter Size (um)	200	200	200
Oil Inlet	3” Fig. 602 M	3”Fig.1502 M	3” Fig. 2202 M
Oil Outlet	3” Fig. 602 F	3”Fig.1502 F	3” Fig. 2202 F
Design Codes	API 6A (PR1, PSL3)		
	NACE MR0175		
	Temperature Class: PU		
	Material Class: EE		
	DNV 2.7.1		

Options

Single pot is also avaible
other sizes and specification available on request

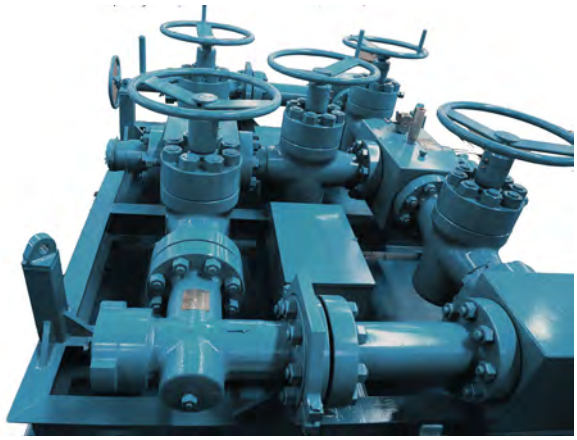
if there is request, please contact with our sales people (contact@shsenoil.com).

Choke Manifold

Choke Manifold consisits of four manual gate valves, one fixed choke, and one needle adjustable choke, which is used to control flowreate and reduce fluid pressure to protect down steam process equipment.
Fixed Choke can be replaeced choke bean offline that adjustable choke is working when choke bean changed.

APPLICATION

- Onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing



FEATURES & BENEEFITS

- Full bore bypass is allowed to use
- Choke bean can be changed fastly when adjustable choke working
- four point lift sling supply safe operation
- many kinds of gate valves can be adopted

Choke Manifold

Main Sepcification

Model	CMF -78-70	CMF -78-105	CMF-103-70
Service	Oil & Gas, H_2S Service		Sweet Service
Gate Valve Type	FC Type / Magnum Type		
Number of Valves	4 or 5		
Working Pressure (psi)	10,000	15,000	10,000
Bore Size (in)	3 - 1/16	3 - 1/16	4-1/16
Inlet Connection	3” Fig. 1502 M	3” Fig. 2202 M	4” Fig. 1002 M
Outlet Connection	3” Fig. 1502 F	3” Fig. 2202 F	4” Fig. 1002 F
Needle Type Adjustable Choke Size (in)	8/64-128/64		
Choke Bean Size (in)	Size 4/64ths-64/64ths, in 4/64ths Increments Size 70/64ths-128/64ths, in 8/64ths Increments		
Applied Code	API 6A, 16C (PR1, PSL3)		
	NACE MR0175		
	Material Class: EE		
	Temperature Class: PU		
	DNV 2.7.1		

Options

Sampling and chemical injection ports
other sizes and specification available on request

if there is request, please contact with our sales people (contact@shsenoil.com).

Data Header

Data header is located between SSV and choke manifold. If need, data header also be used between choke manifold and heater. Data header provides access to high pressure fluid to monitor fluid temperature and pressure, also provides chemical injection port and sampling port.

APPLICATION

- Onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing

SPECIFICATION

Design Code	API 16C
Working Pressure (psi)	10K, 15K
Bore Size (in)	2 or 3
Port No.:	4 to 7

FEATURES & BENEEFITS

- Port No. is desinged according to customer need
- Block and bleed needle valve is adopted
- end connection for hub type and flanged available on request

Chemical Injection Pump

Chemical Injection Pump is used to inject chemicals including methanol into upstream of choke manifold through data header port. One important purpose is to increase flow ability of fluid which will freeze cause to pressure drop after choke.

APPLICATION

- Onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing

SPECIFICATION

Medium	Methanol
Working Pressure (psi)	10K, 15K
Air Supply Pressure	100-120 psi
Inject Capacity(L/hr)	10-19

FEATURES & BENEEFITS

- Volume discharge can be designed according to request
- Pnuematic actuated hydraulic pump make operate silently
- All wetted parts are made by stainless steel

if there is request, please contact with our sales people (contact@shsenoil.com).

Steam Heat Exchanger

Steam Heat Exchanger is one uint which transmit steam heat value to fluid by mode of hex exchange. After heat exchange, fluid liquidity enhancement. Normally, fluid go through high and low pressure coil loacted in vessel which is full of steam.

APPLICATION

- Onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing

FEATURES & BENEEFITS

- Adjustable choke to realise secondary pressure drop
- Check valve set on steam inlet to prevent steam return
- Insulation aluminum/stainless steel jacket for heat preservation

Steam Heat Exchanger

Main Sepcification

Service	Sour, Crude Oil, Mud, Gas Service
Heating Capacity	4 MMBTU/hr
Working Pressure (upstream coil) (psi)	5,000 -1000
Working Pressure (downstream coil) (psi)	2,500 psig
Working Pressure (vessel) (psi)	350 psig
Working Temperature up to	160 C
Maximum Temperature rating (vessel)	180 C
Adjustable Choke Type	3-1/8” 5K flanged Needle Type
By pass	Full bore 3 1/8” 5K Manual Gate Valve
Inlet Connection	3”Fig.602 Hammer union Female
Outlet Connection	3”Fig.602 Hammer union Male
Relief Line	4”Fig.206 Hammer union Male
Steam Supply Connection	2”Fig.206 Hammer union Female
Condensate Resume Connection	2”Fig.206 Hammer union Male
Applied Code	ASME VIII div.1
	NACE MR 0175
	ASME B31.3
	API 6A
	DNV 2.7-1

Options

customerzied heating capacity is available

if there is request, please contact with our sales people (contact@shsenoil.com).

Indirect Heater

Senoil's indirect heater is designed to break down emulsions prior to processing. The indirect heater consists of upstream and down stream coil which is for fluid flow, contained within an atmospheric, water-filled vessel. Water is heated by dual burner, diesel for starting, and gas from separator is main source. Coils heat change surface is designed to reduce hydrate formation in gas or high-GOR fluid.

APPLICATION

- Onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing
- Early Production

FEATURES & BENEEFITS

- Adjustable choke to realise bypass choke manifold
- Dual burner supply operational flexibility
- PLC singal can be tranfered to DAS room and be controlled remotely by operator

Indirect Heater

Main Sepcification

Service	Sour, Crude Oil, Mud, Gas Service
Heating Capacity	2.5 MMBTU/hr
Working Pressure (upstream coil) (psi)	5,000
Working Pressure (downstream coil) (psi)	2,500
MAWP choke (psi)	5,000
Adjustable Choke Type	3-1/8” 5K flanged Needle Type
Choke Size (inch)	8/64 to128/64
Approximate Empty Weight (kg)	16,000
By pass	Full bore 3 1/8” 5K Manual Gate Valve
Burner Fuel	Diesel & gas
Inlet Connection	3”Fig.1502 Hammer union female
Outlet Connection	3”Fig.602 Hammer union male
Applied Code	ASME VIII div.1
	NACE MR 0175
	ASME B31.3
	API 6A
	DNV 2.7-1

Options

customerzied heating capacity is available

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Three Phase Separator

-Test Separator

Senoil's well test separator is desinged to efficiently separate well fluid into oil, gas and water to enable these fluids to be individually measured. Test separator is self-contained unit with valves, control valves, pnuematic controller, and safety valve which will control vessel pressure and filuid level.

APPLICATION

- Onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing
- Early Production

FEATURES & BENEEFITS

- Nuflo meters enable analog and digital recording
- Daniel orifice meter enable orifice change online
- Fitted with deflector plate, colascing plate, form breaker, vortex breaker, weir plate, and mix extractor to ensure efficient separation
- Double safety valve or one safety valve with one rupture disk ensure vessel no overpressure
- Full-bore bypass manifold with isolation valves enables routing of inlet effluent to gas, oil, and water outlets.
- Internally coated for protection and extended vessel life.

Test Separator

Typical Sepcification

Nominal vessel size	42” x 10’
Process design pressure at 122° F	1440
Process design temperature (c degree)	-29 to 50
Maximum Gas Capacity (MMscfd)	75
Maximum Liquid Capacity (bbl/d)	10,000
Outside dimensions (L × W × H) (m)	5.95 × 2.4 × 2.59
Approximate empty weight (kg)	15,000
PVT fluid sampling points	Gas and oil lines
Liquid Sampling Points	Inlet, oil and water lines
Gas measurement equipment	4” Daniel orifice meter with 3-pen Barton recorder
Oil measurement equipment	2” and 1” Nu-Flo turbine meter with shrinkage tester
Water measurement equipment	1” Nu-Flo turbine meter
Safety Devices	3 × 4-in. pilot operated pressure safety valves
Internal coating	Available
Fluid Inlet	3” FIG 602 F
Oil Outlet	3” FIG 602 M
Gas Outlet	4” FIG 602 M
Water Outlet	3” FIG 602 M
Vent Outlet	4” FIG 602 M
Full bore valve and bypass manifold	YES
Vessel manway	18-in. diameter, ANSI 600RF flange
Applied Codes	API 12J
	ASME VIII Div I
	ANSI B31.3
	NACE MR0175
	DNV 2.7.1

Options

other size and specification available upon request

if there is request, please contact with our sales people (contact@shsenoil.com).

Surge Tank

Senoil surge tank is a H2S resistant dual compartment vertical pressurized vessel. It is used to calibrate oil flow. The surge tank can also be used as two phase separator. The vessel is protected from overpressure by independent safety relief valve on a contained vent line.

APPLICATION

- Onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing
- Early Production

FEATURES & BENEEFITS

- Back Pressure Control on gas outlet
- High - low level alarm with horns to ensure safety operation
- Pressure, temperature, and sampling ports located on vessel to maximize phase measurement and sampling.
- Safety valve ensure vessel no overpressure
- Full-bore bypass manifold with isolation valves enables routing of inlet effluent to gas and oil outlets.

Surge Tank

Typical Sepcification

Vessel Size	76”IDx18’ High Seam to Seam
Service	H2S
Temperature (c degree)	-29 to +50
Design Pressure(psi)	50
Capacity (bbl)	100
Compartment	Dual
Safety Device	3 x 4 safety valve
Inlet	3” Fig 602 Hammer Union female
Oil Outlet	3” Fig 602 Hammer Union male
Gas Outlet	4” Fig 602 Hammer Union male
Safety Relief Outlet	3” Fig 602 Hammer Union male
Drain Outlet	2” Fig 206 Hammer Union male
Bypass Manifold	Yes
Design Codes	ASME Section VIII, Div. 1
	ASME B31.3
	NACE MR 0175
	DNV 2.7-1

Options

other size and specification available upon request

if there is request, please contact with our sales people (contact@shsenoil.com).

Gauge Tank

Senoil Gauge Tank is atmospheric vessel designed to store liquid after seperation. Gauge Tank is also can be used to calibrate liquid flow as well as shrinkage tester.

APPLICATION

- Onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing
- Early Production

FEATURES & BENEEFITS

- Sight-glass level on each tank compartment
- Flame arrestors on each gas vent line
- Sampling points and temperature port

Typical Sepcification

Model	GT-100	GT-50 x 2
Working Pressure	Atmospheric	Atmospheric
Working Temperature(c degree)	-29 to +100	-29 to +100
Capacity	1*100 bbl	2*50bbl
Inlet, in	3” Fig 602, Female	3” Fig 602, Female
Outlet, in	3” Fig 602, Male	3” Fig 602, Male
Corrosion Allowance (mm)	3 mm	3 mm
Thickness (mm)	10 mm	10 mm
Material of Tank	Q245R	Q245R

Diverter Manifold

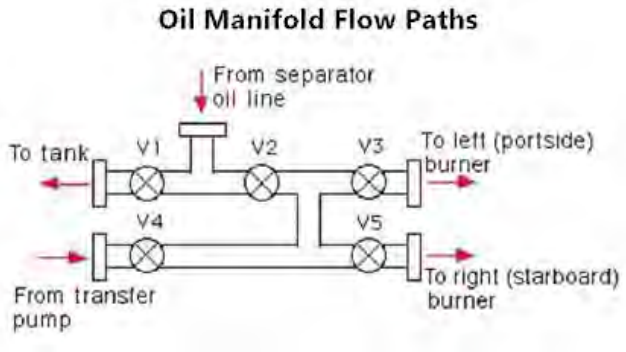
Oil and gas manifold is designed to divert the flow of oil and gas from the separator to crude oil burner or gas flare for disposal, to surge tank or gauge tank for measurement or storage, or to a production line. Typically, the oil manifold is composed of 5 ball valves, and gas manifold consists of 3 ball valves.

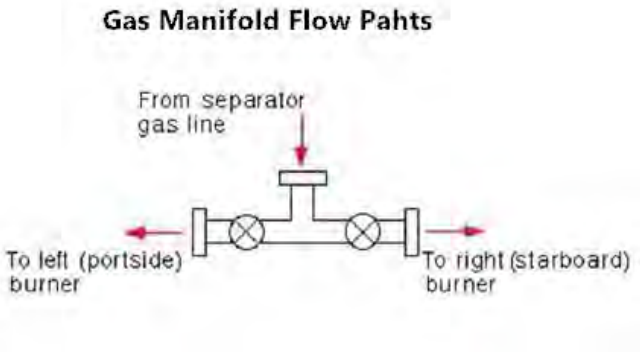
APPLICATION

- Onshore operation
- Drill Stem Test
- Well Cleanups
- Well/Production Testing
- Early Production

FEATURES & BENEEFITS

- Balon Ball valves are adopted.





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Oil Transfer Pump

Oil Transfer Pumps are designed to pump oil from a tank to burner, to pipeline or to truck tank. Oil Transfer pump can be classified as screw pump and centrifugal pump which are adopted acccording to specific gravity of oil.

Screw Pump

Screw pump is well adapted to handling viscous fluids. The single-screw pump mainly consists of a stator with dual spiral chambers and a rotor engaged with the stator in the shaft sleeve. When the rotor turns in the stator chamber, the sealed chamber formed between the rotor and stator will make axial movement along the spiral line of the rotor, oil will be conveyed evenly, continuously, and constantly from the suction side to the discharge side.

FEATURES

- Steady and continuous flow
- Low fluid speed at inlet
- Used for heavy oil

Centrifugal Pump

Centrifugal pump is suitable for high speed fluid, mainly composed by impeller which produces liquid velocity and volute which forces the liquid to discharge from the pump. Centrifugal pump operates at relatively high rotation speeds (e.g. 3,000 rpm), it uses centrifugal force to impart high velocity to the liquid, and then converts most of this velocity to pressue.

FEATURES

- Small space required relative to flow rate capacity
- Simple construction and quiet operatio
- Low maintenance requirement

Main Specification

	Single Screw Pump	Centrifugal Pump
Flow (m^3/h)	0.2~130	100~1500
Operation Pressure(MPa)	<=1.2	2.5~13.5
Viscosity (cp)	50~1500	<750

if there is request, please contact with our sales people (contact@shsenoil.com).

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