

PRODUCTION SOLUTIONS

Mission Products



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Legend:

The pumpjack and FPSO icons throughout the catalog identify whether a product or solution is for a land or offshore application.

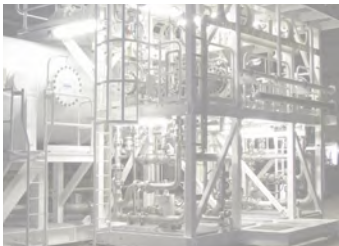


MISSION PRODUCTS INTRODUCTION

National Oilwell Varco (NOV) Mission Products has an extensive offering of onshore and offshore production solutions based on proven products and proprietary technologies. NOV Mission's expertise in engineering and project management allow it to deliver quality products manufactured to meet the most demanding customer production requirements.

NOV Mission's global footprint allows it to be close to every production site and support any requirements for sales and aftermarket services.

MISSION PRODUCTS



ENGINEERED
PRODUCTS
AND SOLUTIONS



PRODUCTION MANIFOLDS



NOV Mission offers a comprehensive range of equipment for production manifolds that meets all operating conditions, be they high pressure or containing an aggressive medium, providing a solution for production fluid control. The system is centered on Mission valves and chokes which provide a safe, cost effective, and efficient design for maximum reliability.



Production Manifold



Production Manifold

MISSION PRODUCTS

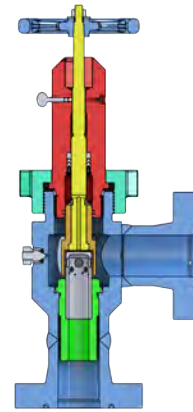
ENGINEERED CHOKES

NOV Mission offers highly engineered, field-proven, globally recognized brands such as the Mission MPC series chokes and the T3™ CVC series chokes. These are designed for production christmas trees, manifold services and other production needs.

T3™ CVC CHOKES



- Knife-edge sleeve-over-cage design directs flow jets inside the cage to minimize erosion
- Dual redundant stem packing
- Metal bonnet seal
- Hammer nut or bolted bonnet
- Fire-safe design
- Manual or actuated operation
- Forged body and bonnet
- Pressure rating up to 20,000 psi
- PR-2 tested
- Available 4130, 410 stainless, F22, duplex stainless body and bonnet
- Inconel cladding available in seal areas or across all wetted surfaces

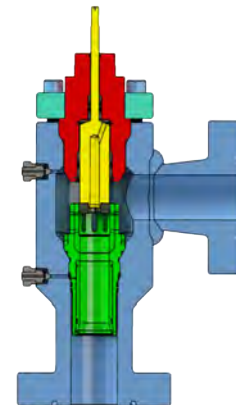


T3 CVC Choke

MPC SERIES CHOKES



- Seat wear monitor (patented design) detects washout in the wear sleeve before erosion damage can occur in the body
- Closed and internal cage option that completely encloses the area of the cage that is exposed to the turbulence created by the pressure drop
- Pressure balanced trim for low operating torque under all flow conditions
- Bolted bonnet design for added safety
- Large body reservoir reduces body erosion
- Extended seat length provides added wear protection in the outlet bore to increase service life
- Cage design reduces noise levels to operate under 85 dBA level
- Easy conversion from manual to actuated for remote/automation applications

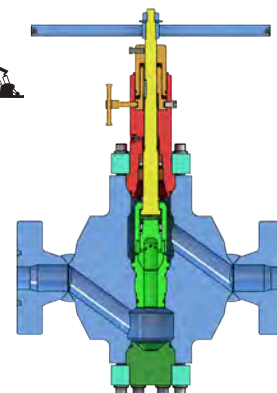


MPC-30 Choke

MPC INLINE ADJUSTABLE CHOKES



- Large body annulus reduces body erosion
- Downstream end cap design permits inspection without removing choke from flow line and eliminates body wear under severe erosive conditions
- Tungsten carbide throttling components
- Interchangeable internal components with standard MPC series angle body chokes

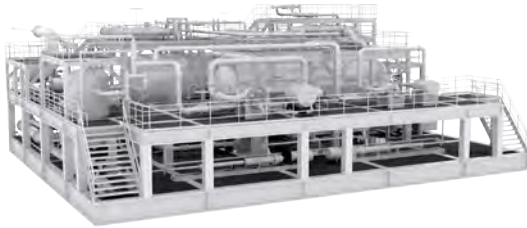


MPC-20 Inline Adjustable Choke

PRIMARY SEPARATION



NOV Mission offers compact crude oil separation packages to match required operating regimes. With long proven field experience, the four phase separator with the Merpro™ Tore™ Online Vessel Desanding technology offers the best in class solution for handling sandy production fluids. The Tore fluidizer is a unique device for solids transportation that operates with no moving parts.



Primary Separation Unit

SAND HANDLING



The Merpro line of equipment addresses demanding issues by efficiently separating and removing sand and other sediments from the hydrocarbon production stream while protecting downstream equipment, resulting in more uptime and production. The cost effective sand handling equipment is able to manage and remove sand from well streams, production separators, and other areas, controlling and conditioning the sand for transport into desanders and sand wash systems. Merpro sand handling equipment features Tore fluidizing technology to remove sand from tanks and vessels without upsetting the separation process.



Tore OVD Installation

MERPRO TORE™ ONLINE VESSEL DESANDER (OVD)



The Tore Online Vessel Desander (OVD) involves a number of Tore fluidizers with interconnecting pipework installed within separators to ensure solids removal. The Tore OVD provides guaranteed and cost effective sand removal from tanks and vessels where solids accumulate.

- Keeps separators effectively free of solids, thus maximizing residence time and reducing solids carryover
- Enables solids to be removed whenever required, while the separators remain online
- Provides controlled discharge of slurry, thus preventing erosion and blockages in pipelines and downstream equipment such as sand cleaning units



Tore Scrub Sand Handling System

MERPRO TORE SCRUB SAND HANDLING SYSTEMS



The Tore Scrub sand handling system is a compact sand washing system incorporating a vessel containing a combination of Tore fluidizers and solid/liquid cyclones to accomplish the washing cycle.

Sand with crude oil or other contaminants requires washing prior to the sand being disposed of or recycled. The Tore Scrub sand handling system is designed to carry out this process and uses the combination of solid/liquid cyclones with Tore fluidizers and a jet pump to remove the contaminants from the sand. An example would be the cleaning of sand contaminated with oil to allow the sand to be discharged to sea within the current environmental regulations/constraints.

WATERWOLF™ DYNAMIC OIL RECOVERY SYSTEM

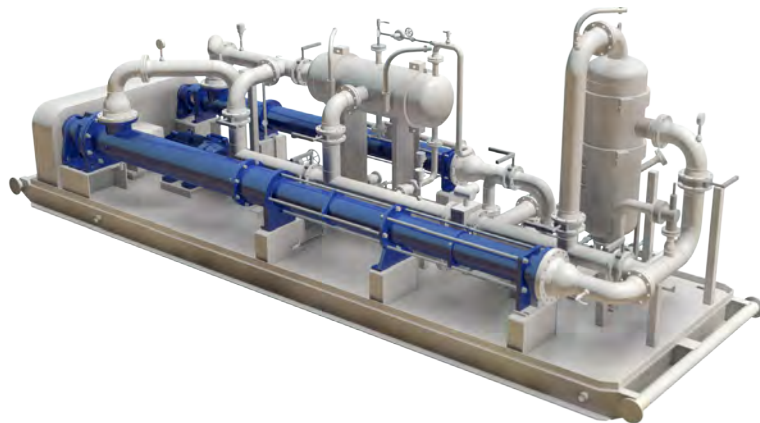


The WaterWolf Dynamic Oil Recovery (DOR) system is a complete water treatment system that recovers oil and removes suspended solids from produced water in a single stage of treatment without the use of chemicals. Effluent water quality from the WaterWolf DOR meets or exceeds the quality produced from most conventional gas flotation systems and it can handle produced water directly from separators and crude treaters with no intermediate oil skimming step.

Since solids are removed from the water separately from the oil, the discharged solids are practically oil free, eliminating the oil contaminated, chemical sludge that is produced by the gas flotation process. The recovered oil is also uncontaminated by chemicals or solids and can be returned directly to the separation process, bypassing a closed drains or slops handling system.



WaterWolf DOR System Installation



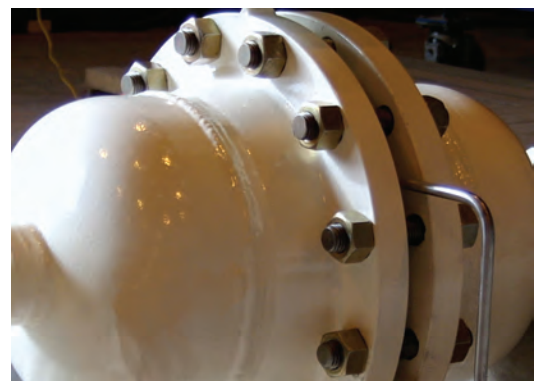
WaterWolf DOR System

INLINE PRESSURE REDUCING CARTRIDGE



Pressure is a major cause of problems when discharging slurry to the atmosphere. The Inline Pressure Reducing Cartridge (IPRC) provides a tried and tested solution by 'burning' pressure so that slurry can be discharged at a manageable speed. Once in service, the number of cartridges used in each assembly can be changed depending on the need to burn more or less pressure.

- Reduces pressure, enabling slurry to be discharged at a controlled rate
- Facilitates the discharge of slurry, while maintaining upstream pressure
- Unique design avoids blockages and serious abrasion



Inline Pressure Reducing Cartridge

CRUDE DEHYDRATION



Petrex™ electrostatic crude oil dehydrators treat oil to ensure pipeline quality crude. These packages are designed to meet the most demanding environments, have a proven track record, and include horizontal-grid or vertical-grid configurations, with and without internal heating. Heating options include direct-fired, internal tube bundle or external heat exchanger. Direct-fired units are offered with either natural draft or forced draft burners.

- Optional burner management systems with PLC and touch-screen HMI are offered.
- Systems are available in horizontal grid or vertical grid configurations
- Various heating options are available including:
 - Direct-fired
 - Steam
 - Heat medium fluids
 - Electric elements



Crude Dehydration Unit

GAS DEHYDRATION



Petrex gas dehydration systems cover a wide range of gas flows and conditions. Gas dehydration systems are field-proven and are in service onshore and on offshore platforms and FPSOs around the globe. Technology is based on TEG and utilizes proven low maintenance processes to ensure gas export requirements are achieved.

- Triethylene glycol process
- Glycol regeneration systems include full flow cartridge filters and carbon adsorbers
- Dependable NOV Mission plunger pumps are used to circulate glycol through the system



Gas Dehydration Unit

FUEL GAS CONDITIONING

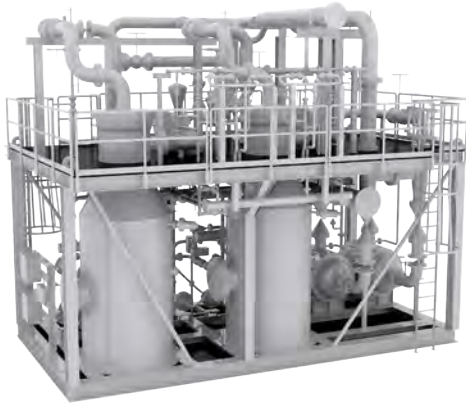


Petrex fuel gas conditioning units are designed to efficiently remove liquid and solid contaminants from the raw fuel gas and to regulate the pressure, temperature and BTU content of the gas to meet the engine manufacturer's fuel gas specification. Typical components include gas scrubbers, filter-separators, and heat exchangers configured into a fully integrated and instrumented module.



Fuel Gas Conditioning Unit

PRODUCED WATER TREATMENT



Produced Water Treatment Unit

Customers can rely on NOV Mission to provide complete produced water treatment and injection solutions to manage increasing levels of water production. These solutions include:

- Bulk oil water separation
- Hydrocyclone packages to remove oil from produced water
- Produced water treatment, including fine filtration

The onset of increased water cut is often a trigger for increased sand production and with extensive knowledge and experience in these fields, NOV Mission is well positioned to provide holistic produced water treatment and desanding systems.

PETREX PETRO-PILE™



The Petro-Pile open drain sump pile is the most effective device available today for collection, treatment, and discharge of wastewater from offshore platforms. Over thirty years of field experience and design improvements have culminated in the patented Petro-Pile sump pile design.

Sump tanks accumulate sand build up and must be periodically shut down for cleaning, including transportation and disposal of contaminated sand. The Petro-Pile sump pile is equipped with non-clogging baffles which help remove oil from the sand which then exits the pile without any build up. The Petro-Pile sump pile is operating successfully on tension leg, semi-submersible, and spar platforms unaffected by the motion of the platform.



Petro-Pile Open Drain Sump Pile

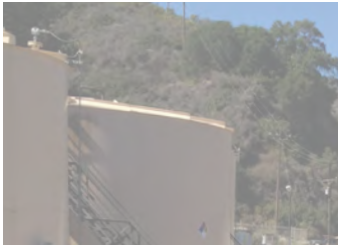


Seawater Treatment Unit

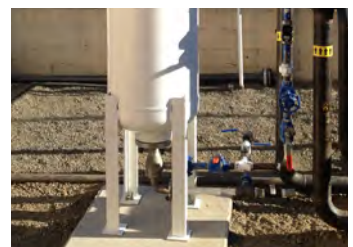
SEAWATER TREATMENT



NOV Mission seawater treatment solutions provide compact systems for seawater injection to meet reservoir pressure maintenance requirements. The package features technology to allow cost effective solutions to be provided. These include Merpro media filtration, vacuum strip deoxygenation towers, and Mission centrifugal pumps.



STANDARD PRODUCTS



MISSION PRODUCTS

RECIPROCATING PUMPS



National™ • Oilwell™ • Wheatley™ • Gaso™ • Bear™ • MSW™

Reciprocating pumps are available as continuous and intermittent duty pumps in single-acting and double-acting models with input horsepower ranges from 2 to 2600. Pumps are available as simplex, duplex, triplex, and quintuplex designs with the industry's largest array of single-acting quintuplex models available anywhere. Value added unitization services, global technical support, and the world's largest distribution network provide unmatched value in the industry.

Applications:

Buildings

- Boiler Feed
- Hydraulic Elevator
- Masonry Cleaning

Chemical Plants

- Process Charge
- Filter Presses
- Transfer
- Cleaning Tube Bundles, Piping Tanks, Mixers, etc.
- Reverse Osmosis

Construction

- Cement/Grout

Desalination

- Sea Water Reverse Osmosis

Die Casting

- Central Accumulator Systems

Fertilizer Plants

- Urea Carbamate Service
- High Pressure and Corrosive Services

Foundries

- Casting Cleaning
- Accumulator Service

Hydraulic Machinery Builders

- Forging and Extrusion Presses
- Shears
- Stretchers
- Roll Balance

Lumber

- Plywood Presses
- Composition Board Presses
- Hydraulic Debarking

Marine Service

- Boiler Feed
- Sanitary Service
- Drinking Water
- Jet Cleaning Hulls

Manufacturing Plants

- Water Supply
- Hydraulic Presses and Cylinders
- Central Hydraulic Systems
- Hydrostatic Testing
- High-Pressure Water Cutting
- Boiler Feed
- Atomizing
- Liquid CO₂

Mining

- Dewatering
- Water Supply
- Cleaning Ore Buckets
- Boiler Feed
- Slurry Pipeline Transportation
- Dust Suppression

Oilfield

- Waterflood
- Salt Water Disposal
- Surface Unit for Hydraulic Jet Pump
- Amine / Glycol Treating
- Pipeline
- Acidizing
- CO₂ Injection
- Steam Injection
- Riser Boost
- Cuttings Reinjection

Pulp and Paper

- High Pressure Shower

Refineries and Gasoline Plants

- Process Charge
- Recycling
- Transfer
- Loading
- Lean Oil
- LPG Products
- Reflux
- Cleaning Tube Bundles, Piping, Tanks, etc.
- Coal Gasification

Rubber and Plastics

- Compression Molding Presses
- Extrusion Presses
- Belt Presses
- Hydrostatic Hose Testing

Sewer Cleaning

- Combination Truck Pump
- Jetting
- Hydro-Excavation

Steel Mills

- Roll Balance
- Descaling
- Mill-Roll Lifting
- Waste Disposal
- Hydraulic Presses
- Accumulator Pressurization
- Boiler Feed

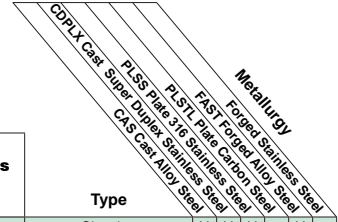
RECIPROCATING PUMPS



National • Oilwell • Wheatley • Gaso • Bear • MSW

Single-Acting, Continuous Duty Pumps

Steel fluid ends are the standard material for primary pumps. Other metallurgies are available, subject to application.



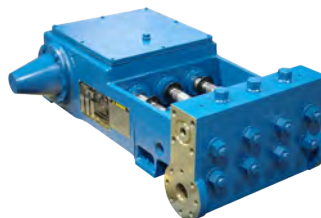
Rated Horsepower (KW)	Pump Model No.	Maximum Displacement				Maximum Pressure		Type	Metallurgy				
		Gallons per minute (USGPM)	Liters per second (l/s)	Barrels per Day (BPD)	Cubic Meters per Hour (m³/hr)	Pounds per Square Inch (PSI)	Kilopascals (kPa)		CDPLX Cast	PLSB Plate 316 Stainless Steel	CAS Cast Alloy Steel	F451 Forged Alloy Steel	F451 Forged Carbon Steel
6 (4)	MX-3M & MC	7.07	0.45	243	1.61	2,012	13,873	Simplex	X	X	X	X	
	MX-3H	2.34	0.19	81	0.69	6,000	41,369						
13 (10)	CX-5M & MC	16.16	1.02	555	3.67	2,012	13,873	Duplex	X	X	X	X	
	CX-5H	6.88	0.43	237	1.56	8,500	58,606						
19 (14)	BX-10L & LC	45.90	2.90	1,574	10.42	832	5,733	Triplex	X	X	X	X	
	BX-10M & MC	30.30	1.91	1,039	6.88	2,012	13,873		X	X	X	X	
	BX-10H	11.47	0.72	394	2.61	8,500	58,606						X
29 (22)	BD-28L & LC	45.90	2.90	1,574	10.42	1,247	8,600	Triplex	X	X	X	X	
	BD-28M & MC	30.30	1.91	1,039	6.88	3,018	20,809		X	X			X
	BD-28H	11.47	0.72	394	2.61	10,000	68,948				X	X	X
	BD-28UH	4.48	0.28	154	1.02	20,000	137,896						X
40 (30)	BD-28UHI	4.93	0.31	170	1.12	20,000	137,896	Triplex					X
33 (25)	BD-30L	71.00	4.48	2,435	16.12	1,362	9,392	Triplex	X	X	X	X	
	BD-30M	31.56	1.99	1,082	7.17	3,597	24,800		X	X	X		
69 (51)	BD-60LC	137.70	8.69	4,722	31.27	1,364	9,407	Triplex	X	X			
	BD-60L	95.62	6.03	3,279	21.72	1,965	13,547				X	X	
	BD-60MC	69.09	4.36	2,369	15.69	3,070	21,167		X	X			
	BD-60M	46.86	2.96	1,607	10.64	4,421	30,480				X	X	
	BD-60H	19.36	1.22	664	4.40	6,907	47,625				X	X	
	BD-60UH	11.70	0.74	402	2.66	17,601	121,357						X
89 (66)	BD-60UHI	11.70	0.74	402	2.66	20,000	137,896	Triplex					X
80 (60)	BD-85LC	160.65	10.14	5,508	36.48	1,364	9,407	Triplex	X	X			
	BD-85L	111.56	7.04	3,825	25.34	1,965	13,547				X	X	
	BD-85MC	80.60	5.09	2,764	18.31	3,070	21,167		X	X			
	BD-85M	54.67	3.45	1,875	12.41	4,421	30,480				X	X	
	BD-85H	22.59	1.43	775	5.13	6,907	47,625				X	X	
	BD-85UH	13.70	0.90	469	3.10	17,601	121,357						X
104 (78)	BD-85UHI	13.70	0.90	469	3.10	20,000	137,896	Triplex					X
115 (86)	BQ-100L	159.37	10.05	5,465	36.19	1,965	13,547	Quintuplex	X	X	X	X	
	BQ-100M	78.09	4.93	2,678	17.74	4,421	30,480		X	X	X	X	
	BQ-100H	32.27	2.04	1,107	7.33	6,900	47,574				X	X	
124 (92)	BQ-124L	172.66	10.89	5,920	39.21	1,965	13,547	Quintuplex	X	X	X	X	
	BQ-124M	84.60	5.34	2,901	19.21	4,421	30,480		X	X	X	X	
	BQ-124H	34.96	2.21	1,199	7.94	6,900	47,574				X	X	
192 (143)	BD-120LC	351.13	22.15	12,039	79.74	1,615	11,137	Triplex	X	X			
	BD-120L	277.44	17.50	9,513	63.01	2,256	15,555				X	X	
	BD-120MC	169.34	10.68	5,806	38.46	3,370	23,237		X	X			
	BD-120M	119.48	7.54	4,097	27.13	6,461	44,548				X	X	
	BD-120H	39.01	2.46	1,338	8.86	10,000	68,948						X
226 (168)	BD-165LC	413.10	26.06	14,164	93.81	1,615	11,137	Triplex	X	X			
	BD-165L	326.40	20.59	11,191	74.13	2,256	15,555				X	X	
	BD-165MC	199.22	12.57	6,831	45.24	3,370	23,237		X	X			
	BD-165M	140.57	8.87	4,820	31.92	6,461	44,548				X	X	
	BD-165H	45.90	2.90	1,574	10.42	10,000	68,948						X

- Applications at pressures above 15,000 PSIG must be approved by NOV Mission's Engineering Department.
- The maximum displacement (volume) values listed assume 100% volumetric efficiency. Actual "in service" displacement will vary depending on the inlet piping and the fluid being pumped.
- The rated horsepower listed includes allowances for mechanical efficiencies and is the maximum horsepower allowed for the pump model.
- Pumps will not produce the maximum displacement listed at the maximum pressure listed. Consult our sales and service location for details.
- An auxiliary lubrication system may be required for operating speeds below 200 RPM. Consult your NOV Mission sales and service location for details.

Black: Primary models
 Red: Secondary models (typically have longer lead time)
 X: Available, P: Available in plate, F: Available forged



BD-28 Triplex Plunger Pump



60T-3H Triplex Plunger Pump



110Q-3 Quintuplex Plunger Pump

MISSION PRODUCTS

RECIPROCATING PUMPS

National • Oilwell • Wheatley • Gaso • Bear • MSW



Single-Acting, Continuous Duty Pumps

Cast Nickel Aluminum Bronze is the most common stocked cylinder. Other metallurgies may be stocked based on market demands. Secondary models include all other metallurgies aside from Cast Nickel Aluminum Bronze. These pumps will typically have a longer lead time.

Rated Horse-power	Pump Model No.		Maximum Displacement				Maximum Pressure			Type	Metallurgy				
	New	Old	Gallons per minute (USGPM)	Liters per second (l/s)	Barrels per Day (BPD)	Cubic Meters per Hour (m³/hr)	Pounds per Square Inch (PSI)	Kilopascals (kPa)	Cast Nickel Aluminum Bronze		Cast Stainless Steel	Cast Carbon Steel	Forged Duplex Stainless Steel	Forged Carbon Steel	Forged Duplex Stainless Steel
2	2S-1L	P50BLS	4.80	0.30	164	1.08	1,149	7,920	Simplex	X	X	X	P		
	2S-1M	P50B	3.60	0.23	125	0.83	2,042	14,081		X	X	X	P		
	2S-1H	P50BH	1.20	0.08	41	0.27	4,595	31,681						X	X
5	5S-2L	P50ALS	10.41	0.66	357	2.36	1,149	7,920	Simplex	X	X	X	P		
	5S-2M	P50A	7.97	0.50	274	1.81	2,042	14,081		X	X	X	P		
	5S-2H	P50H	2.60	0.16	90	0.59	4,595	31,681						X	X
11	11D-2L	P100ALS	23.80	1.50	816	5.40	1,149	7,920	Duplex	X	X	X	P		
	11D-2M	P100A	18.24	1.15	626	4.14	2,042	14,081		X	X	X	P		
	11D-2H	P100H	5.96	0.38	205	1.35	4,595	31,681						X	X
22	22T-2L	T225LS	42.70	2.69	1,464	9.69	1,443	9,949	Triplex	X	X	X	P		
	22T-2M	T225M	32.70	2.06	1,121	7.42	2,565	17,688		X	X	X	P		
	22T-2H	T225H	10.70	0.67	366	2.42	4,660	32,130						X	X
30	30T-2L	J-30-L	51.65	3.26	1,771	11.73	2,000	13,790	Triplex	X	X	X	P		
	30T-2H	J-30-H	22.95	1.45	787	5.21	5,000	34,474		X	X	X	P		
31	31Q-2L	5P200A	57.40	3.62	1,968	13.04	2,042	14,081	Quintuplex	X	X	P		X	
32	32T-2L	T225LS	42.69	2.69	1,464	9.69	2,037	14,046	Triplex	X	X	X	P		
	32T-2M	T225M	32.68	2.06	1,121	7.42	2,565	14,134		X	X	X	P		
	32T-2H	T225H	10.67	0.67	366	2.42	4,600	31,716						X	X
55	55T-3L	3364-7	95.62	6.03	3,279	21.72	1,391	9,591	Triplex	X	X	X	P		
	55T-3SC	3365-5SC	77.46	4.89	2,656	17.59	1,817	12,527		X	X	X	P		
	55T-3LS	3364-6	95.62	6.03	3,279	21.72	1,480	10,204						X	X
59	59T-3L	T365AL	134.90	8.51	4,627	30.65	970	6,686	Triplex	X	X	X	P		
	59T-3M	T365AM	93.71	5.91	3,213	21.28	2,295	15,825		X	X	X	P		
	59T-3MS	T365MS	33.74	2.13	1,157	7.66	4,789	33,017						X	X
60	60T-3L	J-60-L	137.7	8.69	4,722	31.27	1,500	10,342	Triplex	X	X	X	P		
	60T-3M	J-60-M	61.2	3.86	2,099	13.90	3,200	22,063		X	X	X	P		
	60T-3H	J-60-H	28.95	1.82	992	6.57	5,000	34,474		X	X	X	P		
80	80T-3L	80T-3L	174.3	11.00	5,976	42.07	2,017	13,906	Triplex	X	X	X	P		
	80T-3M	80T-3M	61.2	3.86	2,099	13.90	4,267	29,420		X	X	X	P		
	80T-3H	80T-3H	28.9	1.82	992	6.57	5,161	35,584		X	X	X	P		
100	100T-4L	J-100-L	209.1	13.19	7,171	47.49	1,659	11,436	Triplex	X	X	X	P		
	100T-4M	J-100-M	82.9	5.23	2,843	18.83	3,180	21,925		X	X	X	P		
	100T-4H	J-100-H	56.2	3.55	1,928	12.77	5,000	34,474		X	X	X	P		
101T	101T-4L	T100-4	209.1	13.2	7,171	47.5	1,220	8,408	Triplex	X	X	X	P		
	101T-4M	T100-3	114.7	7.2	3,935	26.1	2,744	18,919		X	X	X	P		
	101T-4H	T100-2	48.5	3.1	1,663	11.0	5,378	37,081						X	X
103	103Q-3L	Q3115AL	232.9	14.70	7,987	52.9	970	6,686	Quintuplex	X	X	X	P		
	103Q-3M	Q3115AM	161.8	10.21	5,547	36.7	2,295	15,825		X	X	X	P		
	103Q-3MS	Q3115MS	58.2	3.67	1,997	13.2	4,789	33,017						X	X
110	110Q-3L	HP125AL	235.6	14.9	8,079	53.5	1,037	7,149	Quintuplex	X	X	X	P		
	110Q-3M	HP125AM	163.6	10.3	5,610	37.2	2,454	16,922		X	X	X	P		
	110Q-3MS	HP125MS	58.9	3.7	2,020	13.4	5,121	35,306						X	X
125	125T-4L	A344-H	293.8	18.5	10,072	66.7	1,500	10,342	Triplex	X	X	X	P		
	125T-4M	A334-H	165.2	10.4	5,666	37.5	3,180	21,925		X	X	X	P		
	125T-4H	A324-H	92.9	5.9	3,187	21.1	5,000	34,474		X	X	X	P		
130	130T-4L	130T-4L	241.3	15.2	8,272	54.8	1,750	12,065	Triplex	X	X	X	P		
	130T-4M	130T-4M	103.6	6.5	3,551	23.5	3,111	21,450		X	X	X	P		
	130T-4H	130T-4H	56.2	3.5	1,928	12.8	5,000	34,474		X	X	X	P		
133	133T-4L	T140-4	209.1	13.2	7,171	47.5	1,440	9,929	Triplex	X	X	X	P		
	133T-4M	T140-3	114.7	7.2	3,935	26.1	3,600	24,821		X	X	X	P		
	133T-4H	T140-2	48.5	3.1	1,663	11.0	6,000	41,369						X	F
163	163Q-4L	HP165AL	339.8	21.4	11,652	77.2	1,220	8,408	Quintuplex	X	X	X	P		
	163Q-4M	HP165AM	186.5	11.8	6,394	42.3	2,744	18,919		X	X	X	P		
	163Q-4H	HP165MS	78.8	5.0	2,702	17.9	5,378	37,081						X	F
165	165T-5L	J-165-L	326.4	20.6	11,191	74.1	1,650	11,376	Triplex	X	X	X	P		
	165T-5M	J-165-M	154.3	9.7	5,290	35.0	3,120	21,512		X	X	X	P		
	165T-5H	J-165-H	81.6	5.1	2,798	18.5	5,000	34,474		X	X	X	P		
184	184T-7XL	HP250XL	636.7	40.2	21,832	144.6	728	5,020	Triplex	X	X	X	P		
	184T-7L	HP250BL	347.9	21.9	11,927	79.0	1,204	8,299		X	X	X	P		
	184T-7M	HP250BM	203.4	12.8	6,975	46.2	2,912	20,081		X	X	X	P		
	184T-7H	HP250BH	87.0	5.5	2,982	19.7	6,000	41,369						X	F
200	200T-5L	J-200-L	326.4	20.6	11,191	74.1	1,680	11,583	Triplex	X	X	X	P		
	200T-5M	J-200-M	154.3	9.7	5,290	35.0	3,349	23,097		X	X	X	P		
	200T-5H	J-200-H	81.6	5.1	2,798	18.5	5,000	34,474		X	X	X	P		
202	202T-6L	A346-H	353.7	22.3	12,127	80.3	1,500	10,342	Triplex	X	X	X	P		
	202T-6M	A336-H	176.3	11.1	6,045	40.0	3,180	21,925		X	X	X	P		

Black: Primary models

Red: Secondary models (typically have longer lead time)

X: Available, P: Available in plate, F: Available forged

Standard Products

RECIPROCATING PUMPS

National • Oilwell • Wheatley • Gaso • Bear • MSW



Single-Acting, Continuous Duty Pumps

Cast Nickel Aluminum Bronze is the most common stocked cylinder. Other metallurgies may be stocked based on market demands. Secondary models include all other metallurgies aside from Cast Nickel Aluminum Bronze. These pumps will typically have a longer lead time.

Rated Horsepower	Pump Model No.		Maximum Displacement				Maximum Pressure			Type	Metallurgy				
	New	Old	Gallons per minute (USGPM)	Liters per second (l/s)	Barrels per Day (BPD)	Cubic Meters per Hour (m³/hr)	Pounds per Square Inch (PSI)	Kilopascals (kPa)	CDPL Cast Duplex Stainless Steel		FSS Forged 1.5 Stainless Steel	FCSTL Forged Carbon Steel	CS Cast Stainless Steel	CS Cast Nickel Aluminum Bronze	CD Cast Ductile Iron
217	217Q-4L	HP200AL	339.8	21.4	11,652	77.2	1,440	9,929	Quintuplex	X	X		P		X
	217Q-4M	HP200AM	186.5	11.8	6,394	42.3	3,600	24,821		X	X		P		X
	217Q-4H	HP200MS	78.8	5.0	2,702	17.9	6,000	41,369							X
250	250T-5L	250T-5L	368.5	23.2	12,634	83.7	1,544	10,646	Triplex	X			X		
	250T-5M	250T-5M	215.5	13.6	7,388	48.9	3,026	20,865		X			X		
	250T-5H	250T-5H	103.3	6.5	3,541	23.5	5,000	34,474		X			X		
267	267Q-6L	A-546	663.3	41.8	22,741	150.7	1,420	9,791	Quintuplex	X					
	267Q-6M	A-536	330.5	20.9	11,331	75.1	3,180	21,925		X					
300	300Q-5L	J-275-L	544.0	34.3	18,651	123.6	1,650	11,376	Quintuplex	X					
	300Q-5M	J-275-M	257.1	16.2	8,816	58.4	3,000	20,684		X	X			X	
	300Q-5H	J-275-H	136.0	8.6	4,663	30.9	5,000	34,474		X	X			X	
308	308T-7XL	HP360XL	636.7	40.2	21,832	144.6	1,220	8,410	Triplex				X		X
	308T-7L	HP360AL	347.9	21.9	11,927	79.0	2,169	14,952		X			P		X
	308T-7M	HP360AM	203.4	12.8	6,975	46.2	3,600	24,821		X			P		X
	308T-7H	HP360H	87.0	5.5	2,982	19.7	6,170	42,542						X	X
350	350Q-5L	Q350-4	489.6	30.9	16,787	111.2	1,670	11,511	Quintuplex	X			P		X
	350Q-5M	Q350-3	323.2	20.4	11,082	73.4	3,483	24,017		X			P		X
	350Q-5H	Q350-2	154.9	9.8	5,312	35.2	6,000	41,369		F				X	
430	430T-7L		535.5	33.8	18,360	121.6	1,550	10,687	Triplex	X	X		X		
	430T-7M		301.2	19.0	10,328	68.4	3,150	21,719		X	X				
	430T-7H		192.8	12.2	6,610	43.8	5,000	34,474		X	X			X	
543	543Q-7XL	HP600XL	1121.3	70.7	38,445	254.6	1,220	8,410	Quintuplex				X		X
	543Q-7L	HP600AL	612.6	38.6	21,003	139.1	2,169	14,952		X			P		X
	543Q-7M	HP600AM	358.2	22.6	12,283	81.4	3,600	24,821		X			P		X
	543Q-7H	HP600H	153.1	9.7	5,251	34.8	6,170	42,542						X	X
550	550T-7D		612	38.6	20,983	139.0	5,000	34,474	Triplex-Piston					X	
622	622T-8XL	T600-7	1039.6	65.6	35,643	236.1	1,640	11,307	Triplex	X			X		X
	622T-8L	T600-5	530.4	33.5	18,186	120.5	2,220	15,307		F			X		F
	622T-8M	T600-4	339.5	21.4	11,639	77.1	3,705	25,546		F			X		F
	622T-8MS	T600-3	190.9	12.0	6,547	43.4	6,170	42,542		F			X		F
625	625Q-7L	J-625-L	850.8	53.7	29,172	193.2	1,550	10,686	Quintuplex	X	X		X		
	625Q-7M	J-625-M	544.5	34.4	18,671	123.7	3,150	21,719		X	X				
	625Q-7H	J-625-H	306.3	19.3	10,502	69.6	5,000	34,474		X	X			X	
750	D-750LA		560	35.3	19,200	127.2	5,000	34,474	Triplex-Piston					X	
1069	C-1000*	C-1000	929	58.6	31,851	211.0	3,705	25,545	Triplex					X	

*C-1000 is also available in Forged Bronze and Forged Duplex SS

Double-Acting, Continuous Duty Piston Pumps

Rated Horsepower	Pump Model No.	Maximum Displacement				Maximum Pressure			Type	Metallurgy				
		Gallons per minute (USGPM)	Liters per second (l/s)	Barrels per Day (BPD)	Cubic Meters per Hour (m³/hr)	Pounds per Square Inch (PSI)	Kilopascals (kPa)	CDPL Cast Duplex Stainless Steel		FSS Forged 1.5 Stainless Steel	FCSTL Forged Carbon Steel	CS Cast Stainless Steel	CS Cast Nickel Aluminum Bronze	CD Cast Ductile Iron
12.4	535	69.6	4.4	2,387	15.8	796	5,487	Duplex	X					
33	1847-A	160.0	10.1	5,487	36.3	990	6,826	Duplex	X			X		
38	SP4560	161.0	10.2	5,525	36.6	789	5,449	Duplex	X					
37	SP4560P	57.6	3.6	1,976	13.1	1,420	9,807	Duplex	X					
66	SP5080	233.0	14.7	7,992	53.0	1,138	7,859	Duplex	X					
74	1550	281.7	17.8	9,658	64.0	1,440	9,929	Duplex	X			X		
104	1654	233.8	14.7	8,016	53.1	1,800	12,411	Duplex	X			X		
107	SP50100	271.0	17.1	9,297	61.6	1,507	10,407	Duplex	X					
109	SP70100	547.9	34.6	18,797	124.6	469	3,239	Duplex	X					
127	1757	336.8	21.2	11,547	76.5	1,750	12,066	Duplex	X			X		
130	1759	637.2	40.2	21,849	144.7	1,042	7,184	Duplex	X			X		
140	SP50100P	271.1	17.1	9,301	61.6	1,775	12,258	Duplex	X					
140	SP70100P	548.4	34.6	18,815	124.6	678	4,685	Duplex	X					
240	SP75120	793.4	50.1	27,219	180.4	1,065	7,355	Duplex	X					
250	2651	391.9	24.7	13,434	89.0	1,760	12,135	Duplex				X		
258	2652	702.3	44.3	24,079	159.5	1,125	7,757	Duplex				X		

- Applications at pressures above 15,000 PSIG must be approved by NOV Mission's Engineering Department.
- The maximum displacement (volume) values listed assume 100% volumetric efficiency. Actual "in service" displacement will vary depending on the inlet piping and the fluid being pumped.
- The rated horsepower listed includes allowances for mechanical efficiencies and is the maximum horsepower allowed for the pump model.
- Pumps will not produce the maximum displacement listed at the maximum pressure listed. Consult our sales and service location for details.
- An auxiliary lubrication system may be required for operating speeds below 200 RPM. Consult your NOV Mission sales and service location for details.

Black: Primary models
 Red: Secondary models (typically have longer lead time)
 X: Available, P: Available in plate, F: Available forged

MULTISTAGE SURFACE PUMP (MSP)



The Multistage Surface Pump is a cost effective, low maintenance solution for high volume and high pressure fluid movement.

Thrust Chamber

The thrust chamber of the MSP is field repairable and does not require pump or motor removal for maintenance. It is designed with proven bearing arrangements used in the established Magnum™ I centrifugal pump line. The dual bearing systems provide a minimum L10 life rating of 25,000 hours at all thrust loads up to 20,000 lbf. The standard Mission thrust chamber configuration includes oil level sight glass with an oil temperature gauge. The thrust chamber is specifically designed to handle maximum thrust loads in surface pump operations.

Seal System

The MSP pump seal system uses standard Type 1, balanced Type 1, or cartridge mechanical seals. The seal face materials are chosen to optimize the seal life according to specific applications. The mechanical seal (located in the fluid end) is completely separated from the thrust chamber which prevents any cross contamination should seal leakage occur. The mechanical seal is field replaceable and can be changed in one hour without disturbing any piping or motor connections.

Skid

The modular skid is a universal design that offers significant cost savings and shorter lead times while maintaining motor torque to stabilization requirements. The MSP modular skid was designed using the latest 3D modeling software and finite element analysis tools to ensure a rigid foundation and effective vibration control for extended pump life at the lowest possible cost.

Performance Control and Monitoring

Standard packages include pressure, oil level, and vibration sensors as specified by the customer to meet critical application requirements.

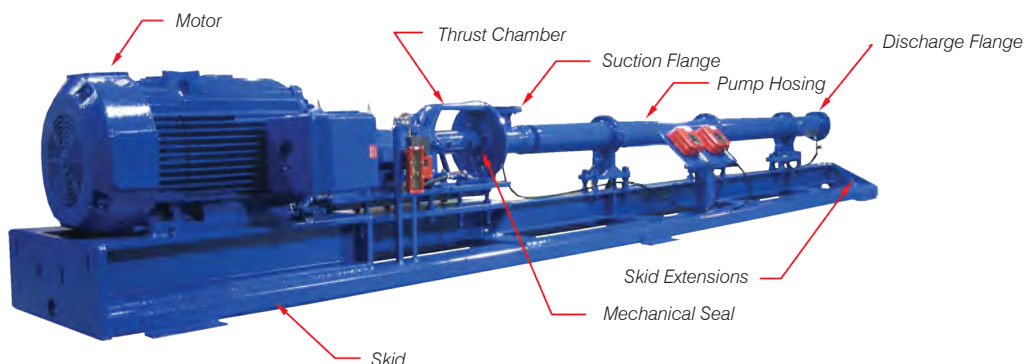
Features and Benefits:

- Field repairable thrust chamber
 - No pump or motor removal for maintenance
- Field replaceable mechanical seal
 - Can be completed in one hour without disturbing any piping or motor connection
- Mechanical seal separated from thrust chamber
 - No cross contamination in case of seal leakage
- Reduced maintenance
 - Minimal site preparation and reduced downtime
- Minimal lead time
 - Short construction phase

Specifications:

- Standard material for impeller and diffuser:
 - ASTM A436 Type 1 or 2205 Duplex Stainless Steel
 - Additional materials and coating options are available
- Shaft: *Inconel or *Monel alloy K500
- Maximum suction pressure: 1000 psi
- Maximum discharge pressure: 3600 psi

*Inconel and Monel are trademarks of Huntington Alloys Corporation.



CENTRIFUGAL PUMPS



The centrifugal pump line offers a broad selection of innovative features for a variety and or routine, demanding, and general applications. These pumps are designed for a wide range of flow rates, from a few gallons per minute to thousands of gallons per minute.

Centrifugal Pump Offerings

- Magnum
- 2500 Supreme™
- Sandmaster™
- Magnum XP™
- Magnum Vortex
- Shear pumps
- Close coupled centrifugal pumps
- 1180 Type "S"
- 1780 Type "W"
- Versatile drive and mounting options

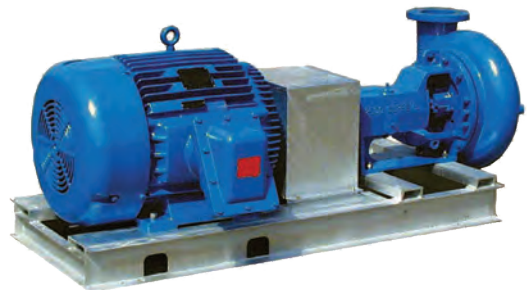
Unitization services and options compliment the centrifugal pump line. Centrifugal pumps are available as horizontal electric, vertical electric, close coupled electric, horizontal diesel, overhead belt, side belt, and hydraulic driven pumping units.



*Vertical Close Coupled
Magnum (4x3 to 10x8)*



2500 Supreme



Magnum Direct Connect



Magnum



Magnum Belt-Driven

MERPRO TORE™ FLUIDIZER



The Merpro Tore fluidizer is a unique, patented component for solids transportation which operates with no moving parts. By introducing a liquid or gas as motive fluid, the Tore fluidizer generates a vortex which fluidizes the solids immediately around it. This vortex attracts solid particles to the foot of the Tore fluidizer from where they are transported as a slurry (or gas suspension) through a pipeline at controlled concentrations.

The following products include the Tore fluidizing technology:

- **Tore Online Vessel Desander (OVD)** – The combination of a number of Tore fluidizers with interconnecting pipework to ensure large area solids removal from vessels and tanks
- **Tore Trap** – A desander which separates sand from oil and gas well streams and produced water streams on-line
- **Tore Scrub** – A sand washing system utilizing a combination of Tore fluidizers and solid/liquid cyclones
- **Tore Lance** – A portable device for removal of solids, sludge, and slurries from tanks, pits, and vessels
- **Tore Sep** – A rapid bulk oil/water separator using vortex forces
- **Tore Hydrohoist** – A long distance sand slurry hydrotransportation and lifting system



Tore Fluidizer

MERPRO TORE TRAP DESANDER



The Tore Trap single vessel desander and accumulator is designed to remove sand from an inlet fluid stream with minimal disruption to the flow. Solid/liquid hydrocyclones deposit sand within the accumulation section whereupon the Tore fluidizer installed in the base of the accumulation section allows on-line sand discharge. The Tore Trap desander can be used in conjunction with a sand cleaning unit, such as a Tore Scrub, to allow sand to be cleaned to meet current environmental standards for disposal.

- Allows sand removal from a fluid stream without the need to take the Tore Trap desander offline
- Single vessel for desander and accumulator - reduced space requirements and weight compared with other solutions
- No moving parts in contact with sand which result in low maintenance
- Removal of sand by a Tore Trap desander prevents sand from reaching production equipment, eliminating erosion problems and improving production efficiency



Tore Trap Desander

PORTABLE HYDROSTATIC TEST UNITS

- Pressure range from 3,000 to 15,000 psi
- Nominal low rates up to 4 GPM
- Lightweight, self-contained cart with pneumatic tires
- Single air-operated hydraulic pump
- Optional chart recorder mounted on cart
- Optional low pressure gauge for accurate low pressure testing
- Cart-mounted hose rack with standard 50-foot hose
- Air regulator to control hydraulic pressure
- Check valve for back pressure protection
- Safety relief valve set to prevent overpressuring test vessels



Portable Hydrostatic Test Unit

STANDARD CHOKES BEST™ AND T3 CHOKES



Best and T3 needle and seat and cage trim chokes can be used in multiple types of applications. The Best and T3 choke line covers a complete range of severe service chokes with adjustable or positive designs and come in 2" to 10" nominal sizes.

- 2,000 psi to 20,000 psi API
- 150 to 2,500 class ANSI

Chokes are engineered and manufactured in compliance with applicable industry standards including:

- API Specification 6A
- ANSI B16.5 and NACE Mr0175
- ISO 9001
- CE / PED and ABS/DNV marking available on request
- Independent design certification available on request (e.g., ABS, DNV, Lloyd's, BV)



Best C-H2 Choke

Type B-36X Adjustable Choke

Flange Size	CWP	A"	B"	D"
3"	150 ANSI R.F.	7.75	5.25	15.38
3"	150 ANSI R.J.	8.00	5.50	15.63
3"	300 ANSI R.F.	8.13	5.63	15.75
3"	300 ANSI R.J.	8.44	5.94	16.06
3"	400 ANSI R.F.	8.50	6.00	16.13
3"	400 ANSI R.J.	8.56	6.06	16.19
3"	600 ANSI R.F.	8.50	6.00	16.13
3"	600 ANSI R.J.	8.56	6.06	16.19
3"	900 ANSI R.F.	9.25	6.75	16.88
3"	900 ANSI R.J.	9.31	6.81	16.94
3"	1,500 ANSI R.F.	9.88	7.38	17.50
3"	1,500 ANSI R.J.	9.94	7.44	17.56

Also available in 4" flange size. Please contact your sales representative for more information.

Type C-H2 Positive Choke

Flange Size	Trim Size	CWP	A"	B"
3"	1"	3,000 API	8.50	7.00
	2"		11.38	8.88
2-9/16"	1"	5,000 API	8.25	6.94
	2"		11.38	8.88
3"	1"	5,000 API	9.50	8.00
	2"		11.38	8.88
2-9/16"	1"	10,000 API	9.31	8.19
	2"		11.75	10.38
3-1/16"	1"	10,000 API	9.31	8.19
	2"		11.75	10.38
4-1/16"	1"	10,000 API	11.00	9.50
	2"		11.75	11.50
3-1/16"	1"	15,000 API	11.63	10.34
	2"		11.75	10.38
3"	1"	600 ANSI RJ	7.50	6.50
	2"		10.75	8.88

Custom AB available

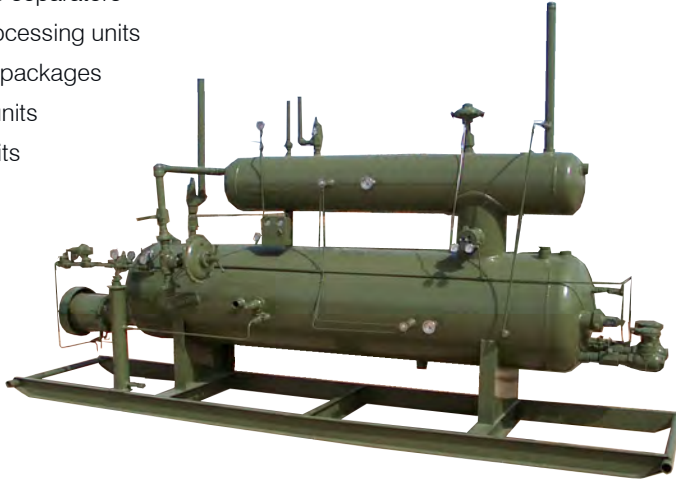
MISSION PRODUCTS

SEPARATORS



Separators are used to separate the different fluids into the proper components. Vertical and horizontal separators can be customized in a variety of units:

- Free water knockouts
- BC-HLP units (patented)
- 3 phase separators
- Gas processing units
- Testing packages
- Cabin units
- HLP units



HLP Separator Unit



Vertical Separator

HEATER TREATERS



Three-phase separators effectively separate and remove free water from the well stream. Removal of emulsified water, however, requires the application of heat and demulsifying chemicals to break the emulsion. Vertical and horizontal direct-fired heater treaters are used to accomplish this.



Horizontal Direct-Fired Heater Treater



Vertical Direct-Fired Heater Treater

SAND TRAPS



High pressure well head/well stream sand traps allow wells to be flowed under sand producing conditions that would normally damage standard production equipment. The sand traps capture sand upon:

- Start-up when stimulated wells produce proppant until the well stabilizes
- Rock/formation failure where wells produce sand

The sand trap allows well operation with less than perfect well cleanup, saving on-site well cleanup costs. Sand production causes erosion of standard well site equipment:

- Compromising field staff safety
- Possibly resulting in uncontrolled emissions, lost production, and regulatory reporting issues
- Requiring downtime, expensive cleanup and repairs

How it Works:

The sand traps may be installed close to the wellhead to remove solids upstream of surface equipment. The well fluid flow is directed into the sand trap where solids are disengaged from the gas stream. The removed solids accumulate in the bottom of the vessel, while the solids free gas overflows the outlet. Periodically the vessel may be isolated from the incoming well fluids flow and the accumulated solids flushed out.

Features and Benefits:

- ASME pressure vessels
- Skid mounted for ease of transport
- Inlet and outlets 2" or 3"
- Standard pressure rating 5,000 psi
- Standard 20" and 24" OD vertical sand traps
- Standard 36" and 48" spherical sand traps
- Low back pressure design allowing high flow rate
- Compact size
- Minimal service/cleanout time
- Drain line can be fitted with NOV adjustable choke or inline pressure reducing cartridge
- Allows monitoring of sand production



Vertical Sand Trap



Spherical Sand Trap

STORAGE TANKS

FIBERGLASS TANKS



Fiberglass tanks are manufactured by a skilled group of operators and technicians using the standards that are set forth in ASTM 3299, ASTM 4097, ASME RTP1, and API 12P. These tanks should be used to temporarily hold fresh or salt water.

Isophalic and vinyl ester resins are available upon request, either as a liner for a normal fiberglass tank or with the tank being built 100% of specialized resins. All tanks can be built to most specs requested by the customer and can have any combination of Victaulic, flanged, or threaded connections.

Gun barrels can also be built to these sizes:

- 300 bbl
- 400 bbl
- 500 bbl
- 750 bbl
- 1000 bbl



Fiberglass Tank

STEEL TANKS



Steel tanks are built to API specs and are API 12F monogrammed and non-monogrammed. These steel tanks are primarily used to temporarily store oil and salt water at customer lease sites and are provided in the standard sizes below:

- 300 bbl
- 400 bbl
- 500 bbl
- 750 bbl
- 1000 bbl

All steel tanks are sub-arc'ed and internal coating is available upon request. NOV Mission also manufactures stairways, walkways and other customized products to be used with its tanks at lease sites.



Steel Tank

TANK PEDESTALS



Tank pedestals are built to accommodate both 12' and 15'-6" diameter tanks. The 12' pedestals support over 288,000 lbs., while the 16' pedestals can support up to 492,000 lbs. before they compress 5/8". The pedestals can be installed quickly and adjusted by a two-man team saving both time and labor. Tank pedestals can be easily cleaned, offer less disturbance to production site, and may be reused.

Product Benefits:

- Easily cleaned - Eliminates ground contact
- Quickly installed and adjusted by a two-man team, less man hours on location
- Insulating and nonconductive
- Non-corrosive - rot and mold resistant

Environmental Benefits:

- Less disturbance to site
- Easy cleanup
- May be reused



Tank Pedestals

ENCLOSED VAPOR COMBUSTOR



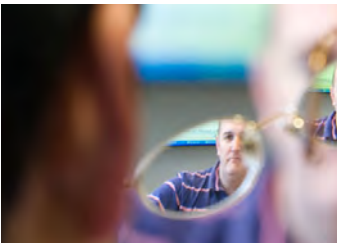
NOV Mission offers a full line of reliable enclosed combustors for the ever changing requirements of today's regulation filled oil and gas industry. Mission's MEVC design incorporates years of experience with tank vapors with a combustor design which is highly effective, tested and certified "99% plus" for destruction of vent emissions from oil and condensate tank batteries, loading operations and storage facilities. NOV's stainless steel enclosed flare design is capable of meeting industry regulations while offering significant cost savings. Scalable to customer application, this combustor is field-proven throughout the world.

- BC-HLP units (patented)
- Meets EPA 40 CFR 60.00 regulations
- Remote location solar panel option available
- 99%+ destruction efficiency (independent 3rd party tested)
- Flexible, fully automated and programmable system (additional parameters optional)
- Quad O compliant ready
- Special custom application larger units available
- Low capital and operating costs
- Very high turndown ratio
- Scalable flow rates
- Field proven design

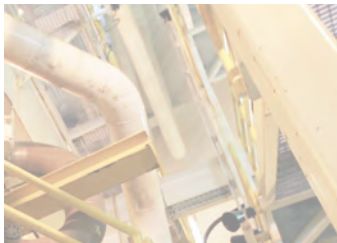


Enclosed Vapor Combustor

MISSION PRODUCTS



SERVICE AND PARTS



MISSION SERVICE



NOV Mission offers aftermarket services to ensure customer production systems are performing as they were designed and providing maximum value. The Mission Service specialists and support teams of engineers and technicians are available to assist whenever and wherever they are needed.

What the Mission Service team can provide:

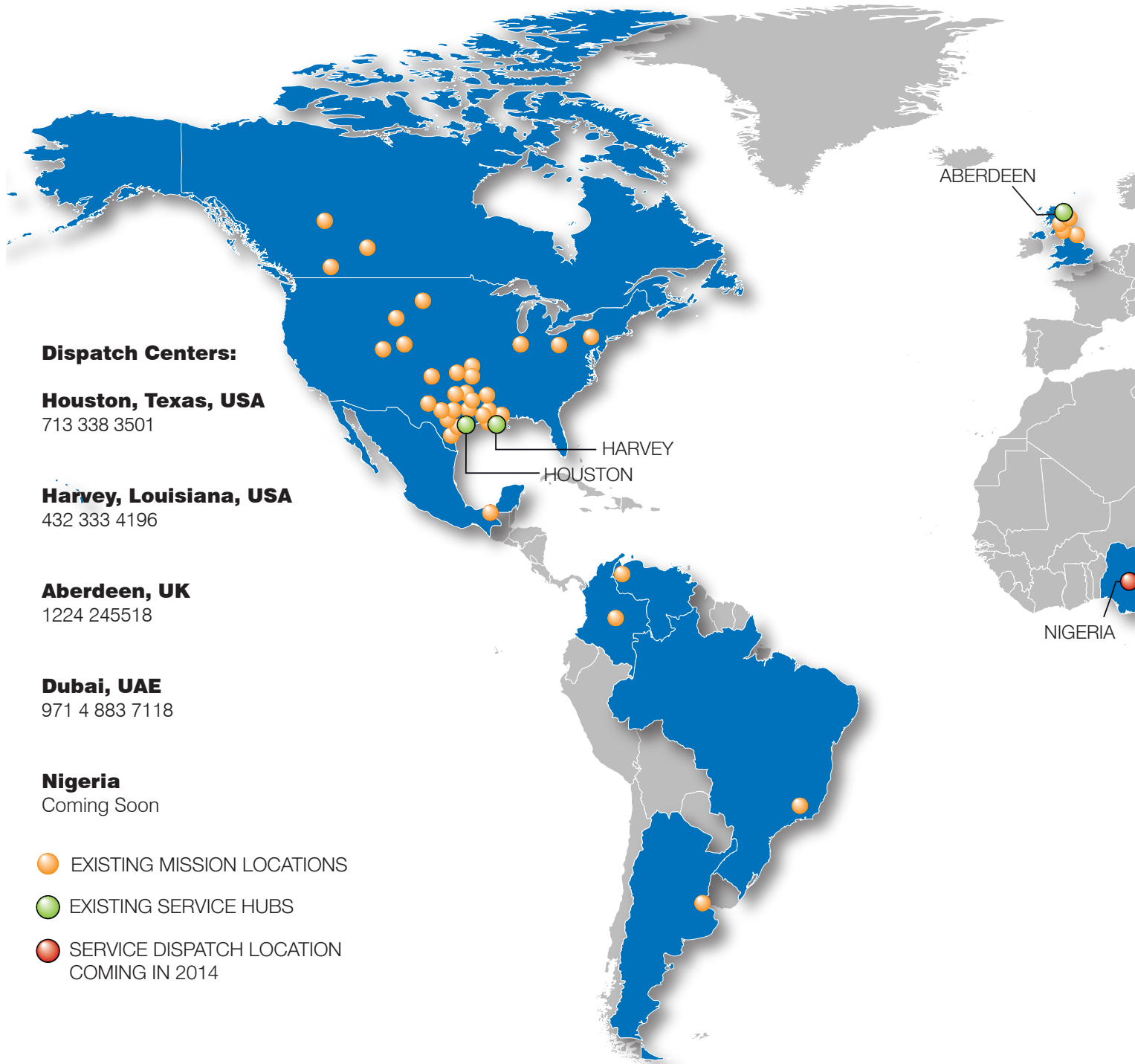
- Installation and commissioning support and supervision
- Professional, technical advice to optimize current process package operation
- Onsite support to production operations teams
- A comprehensive process review of the process package and its integration into the production facility
- Functional health checks of current process packages
- Fit-for-purpose assessments of package capability for current and near-future production scenarios
- Training and troubleshooting support for customer operations team



MISSION PRODUCTS

DISPATCH SERVICE CENTERS

NOV Mission has dispatch service centers that send out highly trained service and repair personnel all around the world. These dispatch centers are strategically placed for ease of access to the different hemispheres.



Dispatch Centers:

Houston, Texas, USA

713 338 3501

Harvey, Louisiana, USA

432 333 4196

Aberdeen, UK

1224 245518

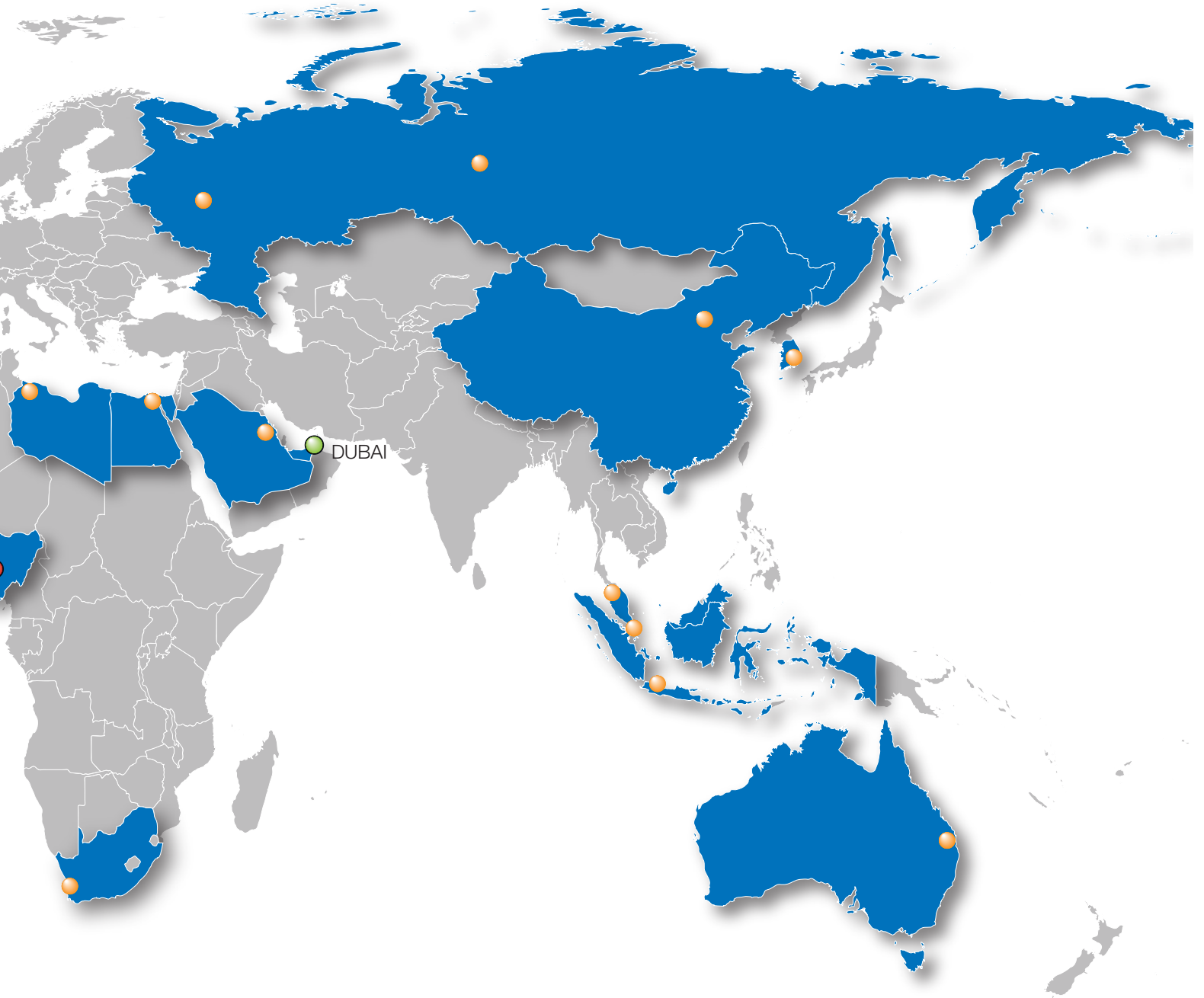
Dubai, UAE

971 4 883 7118

Nigeria

Coming Soon

- EXISTING MISSION LOCATIONS
- EXISTING SERVICE HUBS
- SERVICE DISPATCH LOCATION COMING IN 2014



MISSION PRODUCTS

FLUID KING PUMP EXPENDABLES



NOV Mission manufactures fluid end expendables for all pump manufactures. All fluid end expendables are manufactured from high quality materials to provide extended run times and longer service life.



Fluid King Expendables Family

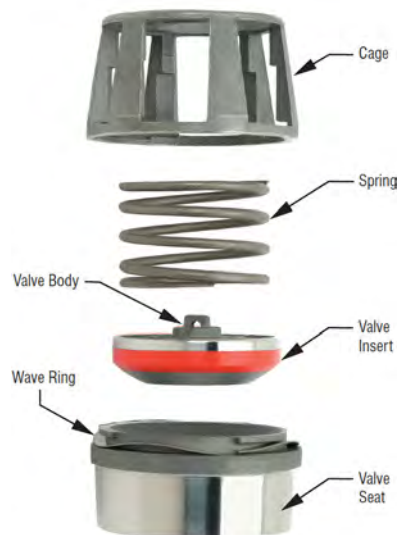
SPHERICAL VALVES



The unique design of NOV Mission spherical valves utilizes the positive characteristics of a traditional ball valve. The patented design of spherical valves provides significant flow improvement while optimizing plunger/piston pump performance. In addition, its unique construction provides more contact area without all of the weight usually associated with a ball valve.

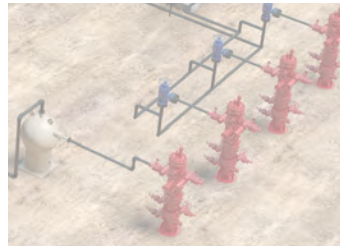
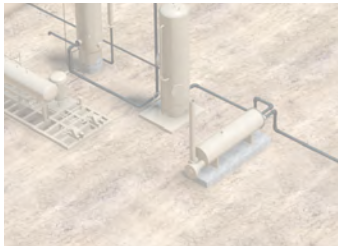
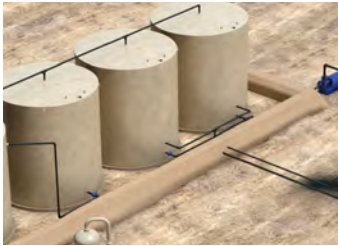
Spherical valves are available in two different designs. The standard duty wave ring design is used in general and corrosive applications. Severe duty designs are used in low concentration slurry and solid-laden liquid applications.

- **Spherical Surface**
 - Reliable sealing
 - More load bearing area
- **Full Open Bore**
 - Low pressure loss
 - Superior flow characteristics
 - Volumetric efficiency
 - Reduced NPSH
 - Eliminates cavitation
- **Quick Twist Lock Spring Retainer**
 - Easy installation and maintenance
 - No threads to corrode and fuse



Spherical Valve Diagram

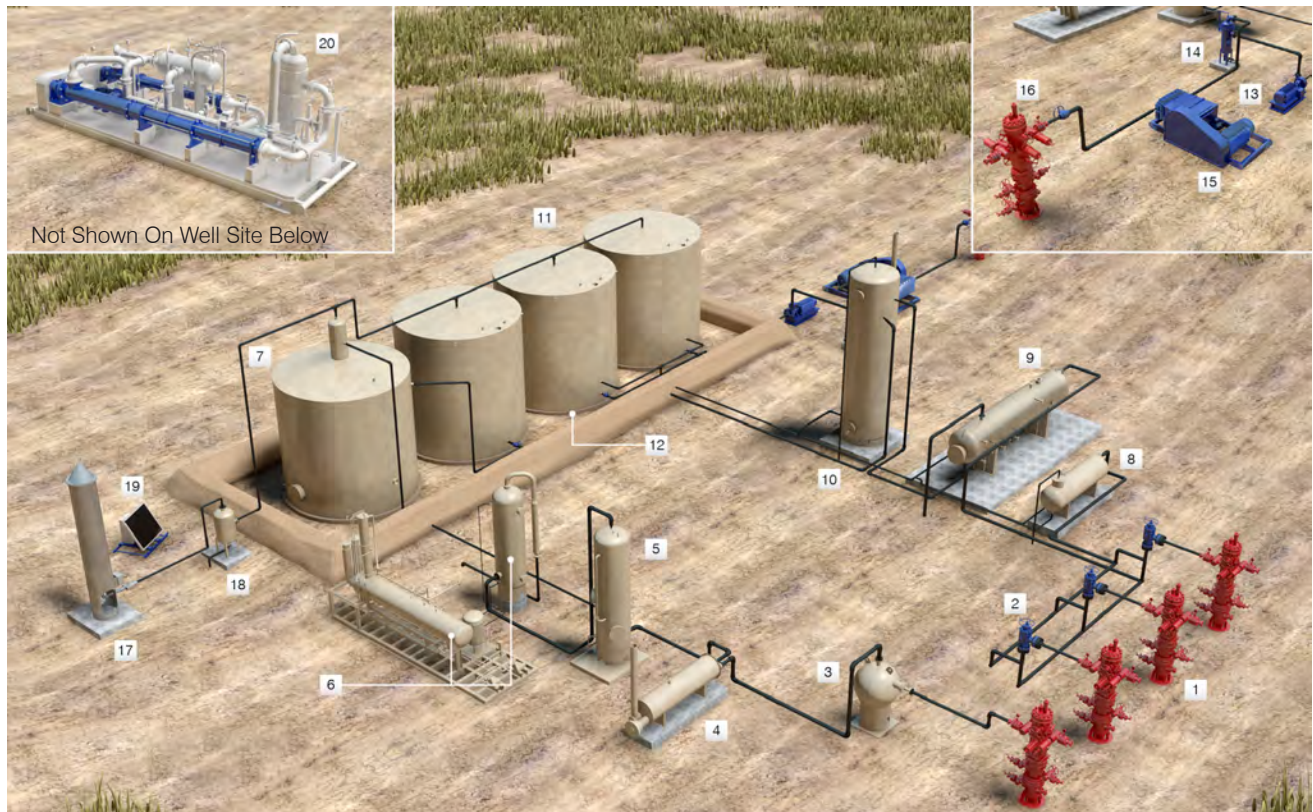
Service and Parts



VISUALS

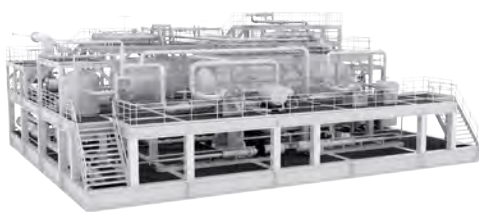
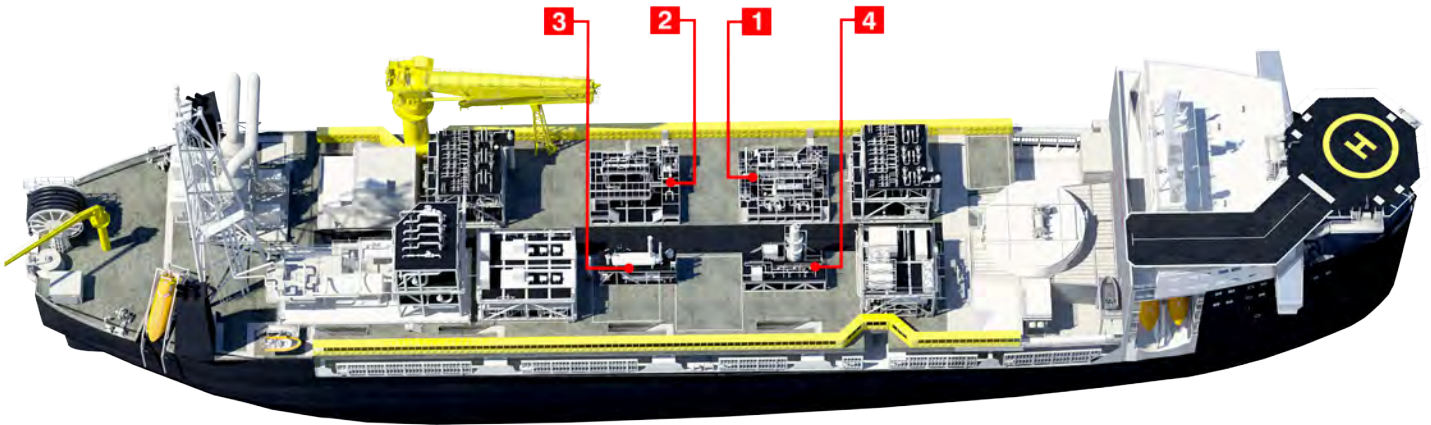


ONSHORE PRODUCTION EQUIPMENT



- | | |
|--|--|
| 1. Wellheads | 11. Steel and Fiberglass Storage Tanks |
| 2. Production Chokes | 12. Tank Pedestals |
| 3. Spherical Sand Trap | 13. Centrifugal Charge Pump Unit |
| 4. Indirect Line Heater | 14. ToreTrap Desander |
| 5. Vertical Two Phase Separator | 15. High Pressure Injection Pump |
| 6. Glycol Regeneration Skid/Gas Dehydration | 16. Injection Wellhead |
| 7. Gun Barrel | 17. Enclosed Vapor Combustor |
| 8. Test Separator | 18. Knock-out Pot |
| 9. Production Separator | 19. Solar Panel Package |
| 10. Heater Treater | 20. WaterWolf Dynamic Oil Recovery System |

FPSO TOPSIDES MODULES



1 Primary Separation



2 Crude Dehydration



3 Gas Dehydration



4 Seawater Treatment

Downhole Solutions

Drilling Solutions

Engineering and Project Management Solutions

Industrial Solutions

Lifting and Handling Solutions

Production Solutions

Supply Chain Solutions

Tubular and Corrosion Control Solutions

Well Service and Completion Solutions

Corporate Headquarters

7909 Parkwood Circle Drive, Houston, Texas 77036 United States
Phone: 713 375 3700 • Toll-Free: 800 324 9478

Mailing Address: P. O. Box 4638, Houston, Texas 77210 United States

For a complete list of NOV Mission locations, visit us online:

<http://www.nov.com/MissionLocations>

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