



# Oil and Gas Innovation:

Upstream. Worldwide.

aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
hydraulics  
pneumatics  
process control  
sealing & shielding



ENGINEERING YOUR SUCCESS.

# Your Needs:

Deeper. Hotter. Higher. Better. Lighter. Safer. Greener.



# Our Advantages:

Bigger. Broader. Smarter. Leaner. Connected. Available. Reliable.

Parker has been an integral part of oil and gas exploration and production for over five decades. This experience has made us valued partners and technology experts, leading the way with the engineered solutions today's energy companies are looking for. From deepwater mooring systems, advanced filtration and particle detection systems and custom umbilicals to dynamic metal seals, stainless steel piston accumulators, sub-sea cylinders, and literally hundreds of other certified, advanced technology components, Parker can help you keep exploring and producing at peak efficiency.

## Worldwide availability.

With 50,000 employees serving 500,000 customers in almost 50 countries, Parker is literally everywhere you need us to be. By working with us, you have access to an integrated network of 316 manufacturing plants, as well as 13,000 distributors and MRO outlets, and over 1,500 ParkerStores. That's the kind of global network global businesses demand.



## Flexibility.

As the world's motion control expert, Parker offers you a complete range of proven, off-the-shelf products. These products deliver streamlined systems and subsystems with exceptional quality and durability, reducing costs and advancing performance. Not only that: our technicians and market-specific engineers are ready to help you with system or subsystem design, on- or off-site.

## Innovation.

Nobody knows it better than Parker. Our mandate for continuous improvement drives us to partner with our customers to create solutions that are smaller, lighter, sustainable, more energy efficient, and highly reliable.



## Reliability.

National and international certifications verify that our systems and solutions offer the highest possible quality for the most efficient performance. These include the following:

<b>ABS</b>	<b>DOSH</b>
<b>A.S.1210</b>	<b>GOST</b>
<b>ASME</b>	<b>KHK</b>
<b>ATEX/IECEX</b>	<b>NACE</b>
<b>B31.1/B31.3</b>	<b>NORSOK</b>
<b>CE</b>	<b>PED</b>
<b>CRN</b>	<b>PM</b>
<b>DNV</b>	<b>SELO</b>



## Material Handling Equipment:

ASME/PED/DNV/ABS  
multi-certified vessels

ATEX-approved solenoid valves

Cam-Lok discharge hoses

Compact Spiral™ hydraulic hose

Custom HPUs

EO/EO-2 metric bite type  
stainless steel adapters

Explosion-proof servo valves

Filters and elements

Floating and sub-marine hose

Fluid filtration cartridges  
and ASME-certified vessels

Gas bottles

Gold Cup series pumps  
and motors

Large-bore tank hoses

Lokomec valves

On-engine air filtration

On-engine crankcase  
ventilation filtration

On-engine/frame rail  
fuel filtration

On-engine oil filtration

Parflange® F37 non-welded  
piping systems

Parker Tracking System (PTS)

Plastic air cleaners

Pure-water filtration systems

Quick disconnects

Reverse osmosis saltwater  
desalination systems

Seal-Lok™ O-ring face  
seal adapters

Seal sub, box and pin protectors

Stainless steel adapters  
and fittings

Tank hoses

Tie-rod and custom cylinders  
with ABS, DNV, and other  
certifications available

Triple-Lok® 2 soft seal JIC  
stainless steel connections

Washdown hoses

WorldPressure filters



## Well Control & Stimulation:

- Acidizing hoses
- Adapter spools
- Closed crankcase ventilation systems – diesel or natural gas
- Fluid filtration cartridges and ASME-certified vessels
- Fuel additives
- Fuel polishing cart
- Fuel recycling units
- Gask-O-Seals®
- High-pressure fittings (Autoclave style)
- High-temperature, high-pressure packer elements
- Homogeneous packer elements
- Hydraulic oil purification system with explosion-proof electronics (PVS)
- icount Particle Detector for hydraulic oil
- Metal seals and gaskets
- Needle valves
- Positioning and surveying services
- Shear seal valves (Lo Torq)
- Stainless steel control valves
- Stainless steel filters
- Surface BOP control hose
- Valves and ball valves
- Welded cylinders
- Wireline hoses (long lengths)

## Floating Production Storage Offloading (FPSO) Vessel:

### Hundreds of Parker components and systems can be found on FPSOs:

- Gas dehydration
- HP and HHP gas compression
- LLP gas compression
- LP and MP gas compression
- Main E&I building
- Oil dehydration
- Oil offloading
- Power generation
- Power generation (3 trains)
- Production manifolds
- Seawater deaeration
- Seawater filtration and utilities
- Seawater water injection

# UNDER THE SEA . . . Parker is there.



## Drilling Systems:

Accumulators – piston, bladder, composite, and stainless steel capacities larger than 303 liters (80 gallons) and greater than 1,379 bar (20,000 psi)

A-LOK® titanium fittings

A-TEX rated explosion-proof directional valves

Backup rings

Cable and flowline protectors

Connector plates

Custom molded or machined shapes

Divertor flowline seals

Engineered laminated elastomeric flexible bearings

Extruded and precision machined packer elements

Flexible joint and components

Fluid filtration cartridges and ASME-certified vessels

Full flange fittings

Gimbal bearing assemblies

High-temperature, high-pressure O-rings

Hotlines

Integral Seals™

Mud motor seal boots

Multi-couplers

Oilfield rubber products

O-rings

Phastite® fittings

PolyPak® seals

PTFE FlexiLip and FlexiCase rotary seals

PTFE FlexiSeals

Radial-seal flange adapters (seal-sub)

Riser adapters

Riser clamps

Riser control line protectors and shims

Riser flange protectors

Riser flexible joint

Rod and piston seals

Seal sub, box and pin protectors

Sub-sea hydraulic cylinders

Telescoping joint packers

Tri-plex pumps

Wellhead connector seals

## Blow Out Preventer (BOP):

Bundles

Collapse-resistant hoses (HCR)

Control hoses

Fittings and small valves

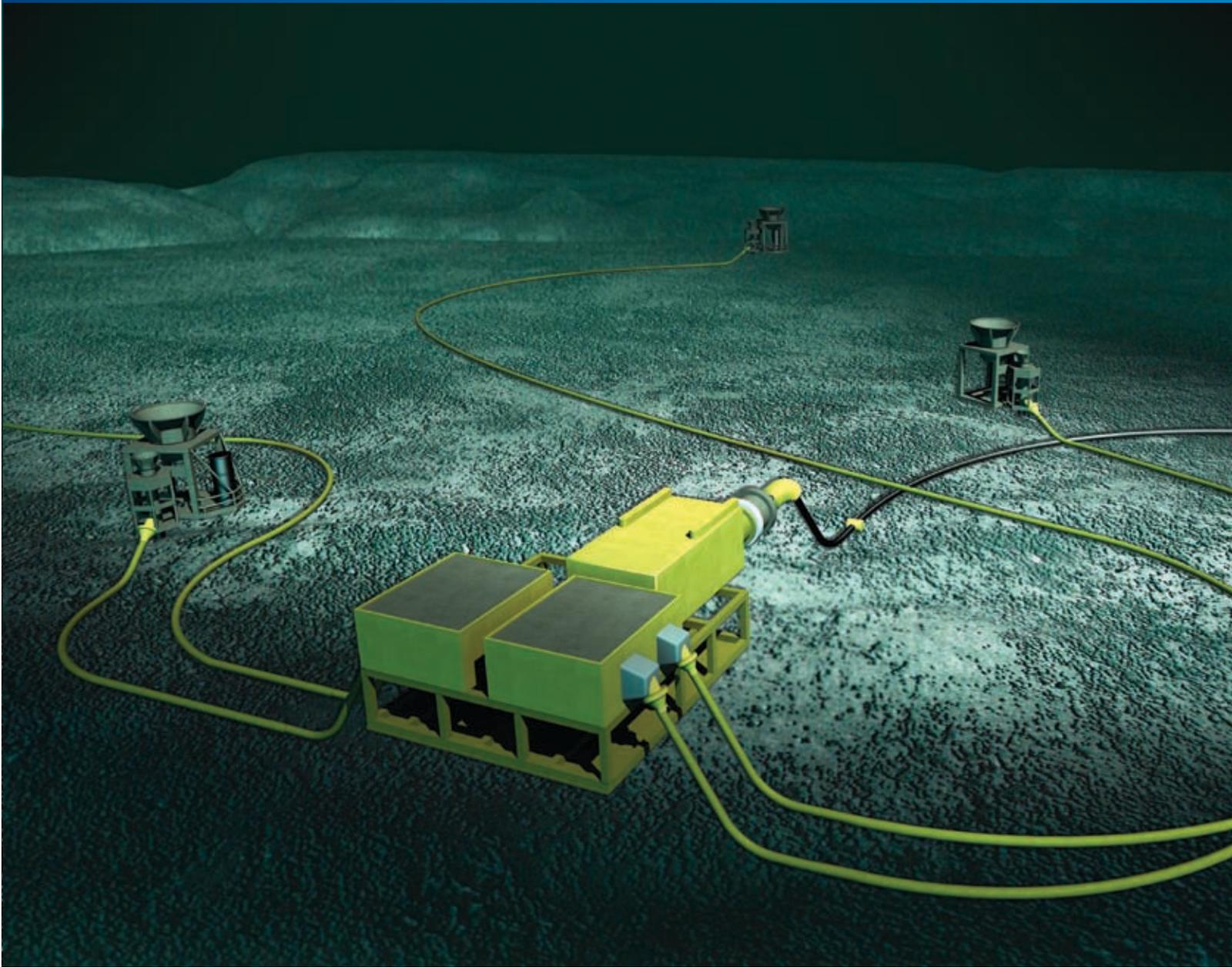
High-pressure test hoses

Orifice fittings

Seals and components

Splice and repair kits and service

Thermoplastic hoses



### Sub-sea Production & Transportation:

3-D structural scanning

BlomPMS (vessel positioning monitoring system)

Chemical injection hoses (ChemJec)

Christmas tree flex joints

Christmas tree gimbal mount

Code 62 double-seal deep-sea adapters

Collec connector seals

Control umbilicals

Custom sub-sea hydraulic cylinders

Dynamic metal seals and sealing systems

High-temperature, high-pressure sealing systems

Hydraulic and electrical flying leads

IWOC – bundles

Metallic and non-metallic high-pressure and collapse-resistant hoses

MICAMS (multi-camera sub-sea metrology)

Polyester and spiral strand steel long-term mooring

Quick couplings

Seal boots

SICAMS (sub-sea metrology)

Six-strand steel temporary mooring

Stab plates (multi-couplers)

Stainless steel high-pressure filtration (689 – 1,379 bar/10,000 – 20,000 psi)

Steel tube and thermoplastic umbilicals

Ultra-high-temperature metallic seals

# Your Needs: Deeper. Hotter. Higher. Better.

## INNOVATION

### Case study:

#### **Parker helps well service companies bring old wells back to life**

When worldwide demand for petroleum raises prices at service stations, it also inspires creative approaches to increase the flow from oil wells. Working with well service companies, Parker developed an economic way to get more oil from existing sub-sea wells.

In general, oilmen get 57 percent of the oil from an onshore well, stimulating production by pumping down cocktails of chemicals like scale inhibitors, scale solvers, and acid treatments. However, they usually get only 45 percent out of sub-sea wells because using the kind of rigid superstructure that is possible on land would be exorbitantly expensive in the sea.

Parker's customer had the idea that with a dynamically-positioned vessel in a relatively calm sea, a flexible hose could be used to force chemicals into the well. Parker had the hose for the job: Polyflex 2" Black Eagle with its working pressure of 689 bar (10,000 psi) and produced in working lengths up to 600 meters (1,969 feet).

A system of floats and weights allows the deep seas hose to form a "lazy S". The slack handles the ocean swells that push the vessel constantly.

The Black Eagle well intervention system can help recover up to 20 percent of oil from existing wells worldwide.



## SAFETY

#### **Oil and gas elastomers tested and certified to Norsok standards**

Developed by the Norwegian Petroleum Industry, Norsok M-710 specifies standards for rapid gas decompression (RGD), also known as explosive decompression (ED), and sour gas (H<sub>2</sub>S) aging on elastomers and thermoplastics. These tests give insight regarding the performance and life expectancy of a seal in various oil and gas applications. Parker's materials passed the challenging expectations and requirements set by the Norsok standard.



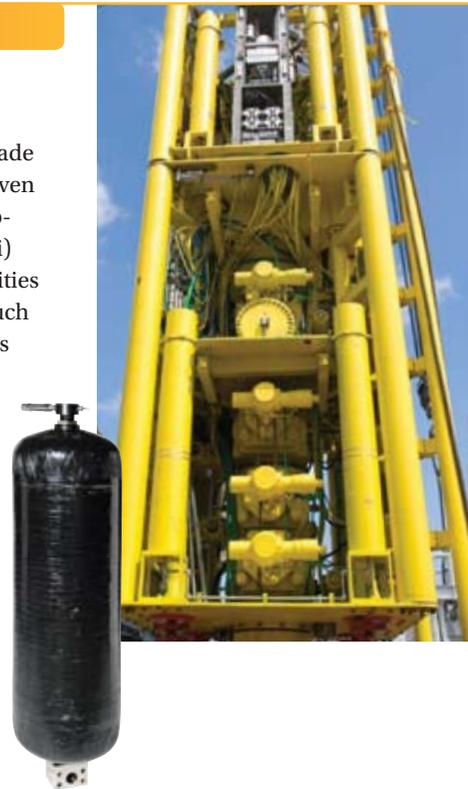
## DRILL DEEPER

#### **The largest installed base of large bore accumulators**

Want to drill deeper? Think Parker. Our special-grade stainless steel piston accumulators have been proven in 3,048 to 3,658 meters (10,000 to 12,000 feet) sub-sea depths. With pressures of 1,379 bar (20,000 psi) and up, bore sizes of 64 cm (25") and larger, capacities up to 2,271 liters (600 gallons), and fabrications such as stainless steel and composite, our accumulators are oil and gas industry-perfect, requiring far fewer connections and less maintenance than traditional bladder types. The end result? Reduced downtime, and increased uptime.

Currently, Parker has the largest installed base of large bore accumulators for oil exploration in the world.

Our composite accumulators can eliminate up to 80 percent of the weight of traditional steel types used on blow out preventer control units and tensioner systems, increasing offshore drilling rig payloads.



# Lighter. Safer. Greener.

## WITHSTAND HIGHER PRESSURES

### Cylinders with impressive pressure ratings

The deeper the drilling, the longer the chain reaction. Deeper drilling means longer drill strings – and that means heavier drill strings, higher force and torque, and larger and higher pressure cylinders required.

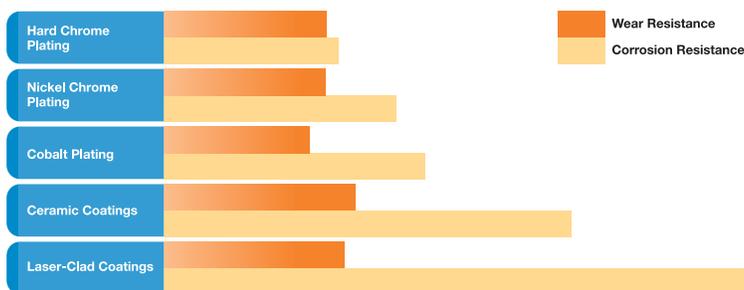
As the world's largest manufacturer of hydraulic, pneumatic, electro-hydraulic, and electric cylinders, Parker's got it covered.

Online tools are available for cylinder configuration, 2D/3D CAD files, pricing, order entry, and order status.

## COST-EFFECTIVE CORROSION RESISTANCE

### Withstanding salts and acids

As alternatives to high cost materials for corrosion resistance, Parker offers proprietary coatings (painted, plated, or laser-clad) for cylinder interiors, exteriors, and piston rods. These coatings are qualified substitutes for stainless steel, and maintain the strength of the base material. Today, many tensioner and riser cylinder piston rods are laser-clad with a proprietary cobalt alloy. Especially for large diameter rods, this greatly reduces the material expense.



## INNOVATION

### Sealing application with severe shock and momentary pressure spikes?

Think Resilon™ HT high performance polyurethane. The temperature resistance, compression set resistance, and rebound/resilience of this compound give it major advantages over other urethane formulations; and clear benefits for oil and gas applications. Right now, Resilon™ is being used for injection-molded mud piston cups; a capability unique to Parker. Resilon™ is also being used for flexible boots on drilling tools to increase service life.



## LIGHTER

### Losing the weight

Time may be money in the oil and gas industry, but so is weight. That's why Parker's custom shapes, sealing systems, and components in nitriles, fluorocarbons, perfluoroelastomers, advanced polyurethanes, PTFEs, and thermoplastics are in such high demand. For instance:

- Lighter, more buoyant HPDE riser clamps and riser shims are replacing heavier metal or urethane clamps
- Our flowline seals offer a 40 percent weight reduction by replacing steel backup rings with a unique system
- Using an engineered thermoplastic material, telescoping joint packers are now replacing steel ring inserts for 50 percent less weight



# Our Advantages: Bigger. Broader. Smarter.

## FASTER REPAIR

### Case study:

#### Speedy repairs on BP's Bruce platform

When important hydraulic services in the drilling area of BP's Bruce platform were damaged, many of the one-inch tubing lines were impossible to repair with traditional methods. Both twin-ferrule compression tube fittings and welding were deemed impractical due to the crowded lines and costly downtime involved.

Phastite® fittings offered a high-pressure connection system that slid over the tubing and could be compressed onto the lines using a portable hydraulic tool. Phastite® is a new, push-fit (no ferrule) connector system for pressures up to 1,379 bar (20,000 psi) that provides a permanent, leak-free connection without threaded components.

After a risk assessment, third-party inspection and certification, and a training course, repairs were completed quickly on BP Bruce without disrupting production. Welding and hot work permits were avoided and component costs were greatly reduced.



## TEAMWORK

#### Locking up hot water on North Sea platforms

When a national oil company encountered water problems on their platform in the North Sea a few years back, they solved the problems by turning to Parker A-LOK® double-ferrule fittings in titanium. When the same problems came up on a newer platform, Parker worked with the engineering company to study the problem onsite. By teaming up with the piping engineers, Parker provided the backup needed and delivered titanium fittings when the specified manufacturer couldn't. The end result? Our teamwork and performance paid off and the platform's hot water system continues to run strong with Parker A-LOK®.



## GOING GREEN

#### The mission: cleaner air and water

Parker is doing its part to help clean up the environment by creating innovative solutions that eliminate contaminants in oil and gas discovery and production. For example:

- The latest in a series of oil-absorbent cartridges, Parker TruBind 300 removes free, emulsified, and dissolved oil and hydrocarbon contaminants in produced water streams to meet regulatory requirements under Environmental Protection Agency (EPA) and Oil Pollution Prevention and Control (OPPC) standards. TruBind 300 cartridges remove these contaminants by chemically binding them into an environmentally sound polymer-based media.
- Engines operating on oil and gas platforms will benefit from Parker Racor's crankcase ventilation system (CCV). Developed in conjunction with the Environmental Protection Agency (EPA), the Racor CCV prevents oily aerosols from reaching the environment. Its superior protection from contaminated crankcase blow-by provides engine operators with a compact and highly effective solution that's easy to install and maintain, delivering superior oil coalescence and crankcase pressure control under the most severe conditions.



# Leaner. Connected. Available. Reliable.

## MORE GLOBAL CONNECTIONS

### Service Centers offer customized, turnkey piping system solutions

Parflange® F-37 components for non-welded hydraulic piping systems are key to our global Piping Systems Solution and Marine Centers, which have been established in Norway, Korea, Singapore/Vietnam, China, and the United States. Additional Centers will soon be in place in Europe, South America, and the Middle East. Utilizing Parker's breadth of product, the Centers offer single-source system solutions that include our Parker hydraulic hose, hydraulic and instrumentation fittings and valves, power units, and filtration systems. They also provide customized, turnkey solutions that include consultation, design, pre-engineered piping assemblies, and installation for oil and gas applications on land and offshore.



Parker recently worked with one of its customers on one of the most advanced diving support vessels in the world. Parker's non-welded solution for the vessel included 190 x 20 mm (7.5" x .8") pipe spools, which reduced flushing time by 50 percent, provided system pressure of 350 bar (5,076 psi), and produced zero leakage at start-up.

## RELIABLE

### Code 62 Double-Seal deep-sea adapters

The new sealing technology of our Code 62 Double-Seal flange adapters provides major advantages in pressure capability, vibration resistance, impulse resistance, reduced side-loading sensitivity, and increased ingress pressure resistance over standard Code 62 adapters. The only manufacturer to offer both an adapter line and complementary hose assembly with this technology, Parker's unique design and metallurgy of the 90- and 45-degree adapters, as well as the direct crimp hose end, provide increased strength, pressure, safety, and reliability. Because of this improved non-weld design, all fittings and adapters in sizes -8 (1/2") through -24 (2") are certified to 517 bar (7,500 psi) and NACE-compliant for H<sub>2</sub>S environments.

## CLEAN WATER

### For quality of life – and quality of operations

Operating a drill site includes the effective delivery of clean water for the many uses of the team – from drinking, cooking, and cleaning to wash down and drilling mud water. Transporting this fresh water from long distances is expensive. An effective alternative solution is a saltwater desalination system using proven Parker filtration and reverse osmosis technologies. Self-contained units from Racor Village Marine can produce up to 757,082 liters (200,000 gallons) per day at a low cost-per-liter. Parker also supplies pre-filtration cartridges for protection of reverse osmosis membranes.

## CORROSION RESISTANCE

### Modular ATEX- and IECEx-certified electrical parts

Parker has developed a wide range of ATEX electrical parts covering all ATEX zone applications. This includes a stainless steel chemical, petrochemical, refinery (CPR) range of "ia" and "d mb" parts for more aggressive applications prone to corrosion. Designed for process actuator and valve control, the modular parts are fully interchangeable with a wide variety of current Parker valves, and offer a lightweight and compact design.



## INNOVATION

### Laser-based cleanliness monitoring

Parker's new icount Particle Detector represents the most advanced technology in solid particle contamination monitoring and analysis for critical hydraulic and lubrication systems on mobile rigs and oil platforms. It offers a remarkable, cost-effective solution that prolongs fluid life and reduces machine downtime. With continuous monitoring and both visual and electrical notification of cleanliness levels, the on-line particle detector is programmable with user ISO cleanliness levels. Optional moisture-sensing technology is also available.





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