Mud Pump
Parts and Service

It is all about performance.

Pump and Fluid Systems
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Introduction

Weatherford now offers a full line of premium expendables and service parts for all well-known makes and models of mud pumps that are currently in operation worldwide. These items include various styles of valves, pistons, liners, piston rods, and wear plates, as well as all fluid end seals and gaskets. We also offer a complete selection of fluid cylinder modules and major service components, such as crankshaft assemblies, gear sets, bearings, and connecting rods.

These parts combine the finest materials and manufacturing expertise, including the premium service and support that Weatherford has historically provided all our clients. The result is the best performing products available from any manufacturer. Whether you are running Brewster, Emsco, Ideco, Gardner-Denver, National, Oilwell, LEWCO, or Wirth pumps in your rig fleet, Weatherford is now a one-stop shop that can supply all the parts needed to keep these pumps running daily.

When you have questions pertaining to the parts and service offered in this catalog, we are ready to address your needs and welcome your call.
The premium valve for today’s most demanding drilling conditions

Weatherford’s full-open valve is the best performing valve available for the tough conditions seen in today’s drilling environment. The single-piece, solid-body construction of this valve provides the strength and rigidity needed for high-pressure drilling operations in the 5,000- to 7,500-psi (34.5- to 51.7-MPa) range. Both the valve and the seat are manufactured from heat-treated, forged-alloy steel.

The fully open seat design enables removal of suction-valve seats without first removing the discharge valve seats for easy access on valve-over-valve-style fluid ends. This process can result in significant time and labor savings when only a suction-valve seat requires replacement. The seat does not have the three or four internal support webs that are common on other valve styles, and the result is a uniform distribution of pressure across the entire diameter of the fluid-cylinder valve taper, which reduces the chance of seat washout and prolongs the life of the module.

The snap-on, polyurethane insert on the standard valve is field replaceable. For the most demanding high-pressure conditions, a nonreplaceable bonded insert upgrade is available that better resists extrusion and minimizes any chance for lost-circulation material or other debris to breach the seal cavity. All standard inserts are available in polyurethane and are good for 170°F to 180°F (77°C to 82°C) drilling temperatures. We also offer a special, high-temperature compound for drilling-mud temperatures to 200°F (93°C) and higher.

Features, Advantages and Benefits

- The forged, solid valve-body construction, of this valve, with thick, rigid seat, provides durability at high pressures.
- The streamlined valve guide legs reduce turbulent flow through the valve for improved performance.
- The seat design simplifies maintenance and evenly distributes pressure loads around the fluid-cylinder valve taper.
- Various insert styles and materials are available to suit any drilling condition.
- Carbon-steel valve springs are standard. A long-life, stainless-steel upgrade is available.
- Large metal-bearing area on the valve seat seal surface promotes longer service life.
Three-Web, Center-Guided Valves

A popular, proven valve for a wide range of drilling conditions

The three-web, center-guided valve has historically been one of the most popular valve styles in the oil field. The center-guided design enables the valve flange to be supported under pressure loads by the top of the center support webs in addition to the seating taper on the inside of the valve seat. This process allows for a large bearing area for the valve that minimizes stress and promotes a long service life.

The single-piece, solid-body construction of this valve provides the strength and rigidity needed for high-pressure drilling operations. Both the valve and seat are manufactured from heat-treated, forged-alloy steel.

The unique design of the insert helps seal fluid above the valve, even when the pump is not in operation and pressure is not available to energize the seal. This design helps to maintain prime and ensures that a good supply of mud is available to the piston—even on the first stroke of operation after extended shutdown periods. Special lips in the insert groove of the valve body lock the lip in place, eliminate washout potential, and minimize any chance for loss-circulation or other foreign materials to breach the seal cavity.

The snap-on, polyurethane insert can be replaced in the field; however, Weatherford recommends that our special insert installation tool be used to facilitate this process. The valve is offered standard with a polyurethane insert suitable for mud service between 170° and 180°F (77° and 82°C). A high-temperature polyurethane insert is available as an option for mud temperatures to 200°F (93°C) and higher.

Features, Advantages and Benefits

- The forged, solid-body construction provides durability at high pressures.
- The large bearing area on the valve seat webs promotes a long service life.
- Various insert styles and materials are available to suit any drilling condition.
- Carbon-steel valve springs are standard. A long-life, stainless-steel upgrade is available.
A cost-effective valve for low- and medium-pressure drilling applications

The key feature of the four-web, center-guided valve is the preloaded polyurethane insert secured with a threaded retainer plate with knock-off lugs for easy disassembly. This design enables drillers to change valve inserts quickly and minimizes downtime. The valve is best suited for low- to medium-pressure drilling operations because of the two-piece assembly of the valve body.

The center-guided design enables the valve flange to be supported under pressure loads by the top of the center-support webs in addition to the seating taper on the inside of the valve seat. This allows for a large bearing area for the valve that minimizes stress and promotes a long service life.

Our standard valve is offered with polyurethane inserts rated for 170° to 180°F (77° to 82°C) drilling-mud temperatures. We also offer a special high-temperature urethane compound as an option for high-temperature drilling conditions to 200°F (93°C) and higher.

Features, Advantages and Benefits

- The threaded retainer plate with knock-off lugs enables fast insert change-out.
- The large bearing area on the valve promotes a long service life.
- Various insert materials are available to meet standard and high-temperature drilling conditions.
- Carbon-steel valve springs are standard, with a long-life, stainless-steel upgrade available.
Chrome-Iron Liners

Cost-effective combination of performance and durability

Weatherford’s chrome-iron liner is the most popular style of liner used by drillers today. Available in sizes to fit well-known mud pumps that are currently in service, the cost-effective chrome-iron liner offers outstanding durability. The hybrid design of this liner combines the strength and toughness of a forged-steel outer hull with the hardness and corrosion resistance of a centrifugally cast, high-chrome-iron inner sleeve.

The inner sleeve is made from a special, high-chrome-iron material that provides a consistent hardness in the range of 58 to 62Rc. The bore is honed to tight tolerances, with close attention paid to the concentricity of the inner bore in relationship to the outer guide diameters on the hull. Our rigid quality-control standards ensure that these features are consistent, liner after liner.

All Weatherford chrome-iron liners are precision honed with a surface finish engineered to promote maximum piston life. The proper surface finish and the techniques used to achieve it are critical to the life of the piston. Rough finishes can be abrasive to the piston and reduce performance, while finishes that are too smooth can eliminate any chance for tiny pockets of fluid to adhere to the walls that offer beneficial lubrication to the piston.

Features, Advantages and Benefits

• Tight quality control ensures consistent durability and value.
• The hybrid design offers strength and toughness of a steel outer hull with the durability and corrosion resistance of a chrome-iron inner sleeve.
• The chrome-iron liner has a precision-honed ID with a hardness of 58 to 62Rc.
• The bore surface finish promotes a long piston life.
The ultimate in liner performance and durability

Weatherford’s Zirconia-ceramic liner is our premium liner product offering. It offers unmatched durability and promotes the longest piston life in the most demanding drilling conditions. Effectively impervious to heat, pressure, and corrosion, it is the ultimate in liner technology that is available today. While initial costs are higher than traditional chrome-iron liners, the durability of the liner and the longer run times it promotes on pistons translates into lower overall ownership costs and reduced risk of exposure for the driller.

The first generation of ceramic liners that were introduced to the oil field were made from Alumina ceramic. Alumina-ceramic liners offered several performance advantages over traditional chrome-plated or chrome-iron liners and were relatively inexpensive to produce; however, most drillers overlooked these liners. Alumina ceramic is very brittle; and after it was found to be easily cracked by even moderately rough handling during transportation and installation, many deemed it too fragile for mainstream use in mud pumps.

Weatherford’s Zirconia-ceramic liner is produced from a unique Zirconium-based ceramic compound that is extremely pure and has been stabilized by the addition of magnesia (Mg) to the matrix. This process promotes a tough, fine-grain structure that is free of the voids and impurities that affect lesser products. No other ceramic-liner material has better fraction toughness, which enables Weatherford to offer a ceramic liner that is hard and long lasting, tough, crack resistant, and not susceptible to thermal shock.

Features, Advantages and Benefits

• Mg partially stabilized Zirconia is harder and tougher and can be more highly polished than standard Alumina ceramics.
• This liner offers unmatched durability and overall life.
• The tough, impact-resistant material is resistant to corrosion.
• During high-temperature drilling, this liner provides excellent performance.
• Zirconia offers the lowest overall cost of ownership of any liner style.
• Zirconia liners are much more resistant to glazing after contact with the piston hub than the lower grade Alumina ceramics.
The best choice for today’s oil-based and synthetic drilling fluids

Weatherford’s bonded-polyurethane piston offers superior design and the highest-quality materials available—enabling us to outperform the leading competitor. The bonded design provides this piston with the strength to handle drilling pressures to 7,500 psi (51.7 MPa) and resists damage and fatigue during millions of operating cycles.

The heart of the Weatherford piston is the proprietary polyurethane compound, which is stronger and more chemically resistant than others in the industry. We use only the finest base materials to ensure consistent performance. Our dual-durometer design features a tough, high-durometer base near the piston hub to resist extrusion under even the highest pressure loads. A softer upper layer provides a bubble-tight seal, even at low pressures, and excels at wiping the liner wall clean of debris on the suction stroke.

Our seal design is unique. The enhanced bullnose design moves the sealing area farther away from the hub base than do traditional designs. This feature forces the piston hub away from the liner wall to prevent contact, heat, and the damage it causes. Our standard bonded-polyurethane piston is suitable for operation up to 220°F (104°C). We offer an optional high-temperature version with a friction-reducing additive that is suitable for up to 300°F (149°C). The standard and high-temperature pistons can be operated at pressures up to 7,500 psi (51.7 MPa).

Features, Advantages and Benefits

• This piston is the best choice for oil-based and synthetic drilling fluids.
• The piston is bonded to the hub for optimal strength and extrusion resistance.
• The improved seal design centers the piston and promotes longer piston life with reduced liner wear.
• The cut-back hub protects the liner from damage.
• The dual-durometer elastomeric compound resists extrusion while ensuring a tight seal and improved wiping action.
• The piston comes complete with a hub O-ring and sleeve.
The best choice for high-pressure drilling with water-based fluids

Weatherford offers the benefits of our bonded-piston design with a nitrile-based elastomer compound for water-based drilling fluids. While polyurethane pistons can be used in water-based muds, they perform best in oil-based and synthetic fluids. The best option for water-based drilling fluids is the nitrile-rubber compound.

Bonding the piston to the metal hub provides the strongest, most extrusion-resistant style of piston available and also minimizes any leak paths from forming on the inner diameter of the piston. The bonded-lip design has an open inner sealing lip that also enables the rubber to expand inward as a result of thermal expansion without excess loading of the sealing lip.

With proper cooling and lubrication from the liner-wash system, the bonded-nitrile piston can be used successfully at temperatures up to 250°F (121°C).

Features, Advantages and Benefits

• This piston is the best choice for all types of water-based drilling fluids.
• The piston is bonded to the hub for optimal strength and extrusion resistance.
• The open inner lip allows for thermal expansion without overloading the seal lip.
• The piston comes complete with hub O-ring and sleeve.
Replaceable Nitrile Pistons

An economical alternative for low- to medium-pressure, water-based drilling

Weatherford’s replaceable nitrile piston is one of the oldest and most widely used piston styles worldwide. It offers an economical option for drilling low- to medium-pressure wells with water-based fluids. All Weatherford pistons are fully compatible with API standards.

Our proven rubber piston is the heart of this design. Only the finest raw materials are used to ensure optimal performance, and our rigid quality-control standards ensure consistent, repeatable performance—piston after piston. The design of the seal has been refined over many years to deliver optimal field performance. The fabric-backed heel provides additional stiffness and acts as a reservoir to hold and distribute liner-wash fluid to the piston-seal area.

The piston hub is manufactured from high-grade steel, and extra care is taken to ensure concentricity. Replacement rubber assemblies come complete with rubber, snap ring, and washer plate.

Features, Advantages and Benefits

• This piston is an economical choice for all types of water-based drilling fluids.
• Piston rubber can be easily replaced, and the piston hub can be reused.
• The piston assembly comes complete with hub O-ring and sleeve.
High-quality, fluid-end parts from a trusted supplier

In addition to a full line of valves, liners, and pistons, Weatherford can provide most of the other fluid-end parts that require replacement for all major brands of mud pumps currently in service. These parts include:

- Piston Rods
- Sub Rods
- Piston Clamps
- Extension Rods
- Rod Nuts
- Valve and Cylinder-Head Lock
- Seals and Gaskets
- Valve and Cylinder-Head Plugs
- Wear Plates
- Valve and Cylinder-Head Ring
- Studs
- Valve Guides
Fluid-End Modules

Time-tested, multistep manufacturing process provides unsurpassed durability

Weatherford offers premium fluid-end modules for all well-known makes and models of mud pumps in service today. All Weatherford modules are made using a time-tested, multistep manufacturing and heat-treatment process that, while costly and time consuming to produce, ensures that we can deliver modules that outperform all competitors in overall life and resistance to cracking and washout.

Our modules feature premium AISI 4130 forged-steel construction and are fully interchangeable with standard OEM modules from most major pump manufacturers; however, our modules offer improved performance and durability that results from our specialized heat treatment and machining process. Other extra-value features include tapered-end studs, which promote more reliable engagement and better endurance to repeated change-outs—without the thread damage that eventually affects most standard studs.

We offer valve-over-valve designs and premium, two-piece L-shaped designs. Valve-over-valve fluid ends are available up to 5,000 psi (34.5 MPa), and two-piece L-shaped designs are available in both 5,000- and 7,500-psi (34.5- and 51.7-MPa) rated versions. Weatherford supplies the modules, studs, all covers, caps, and liner-retention hardware necessary to complete any retrofit job.

Whether the requirement is for a replacement fluid cylinder module for a conventional 5,000-psi (34.5-MPa) mud pump or a complete fluid-end replacement to upgrade a 5,000-psi (34.5-MPa) pump to 7,500 psi (51.7 MPa), Weatherford is your one-stop shop for the equipment and advice you need to maintain your pump fleet.

Features, Advantages and Benefits

• Weatherford’s premium heat treatment and machining process ensure durability.
• The fluid-end modules feature 4130 alloy-steel construction and can be field repaired in certified machine shops, if necessary.
• Weatherford’s parts are fully interchangeable with OEM equipment.
• Designs for 5,000 psi (34.5 MPa) and for 7,500 psi (51.7 MPa) are available.
• Valve-over-valve and two-piece L-shaped modules are available to suit a range of needs.
OEM quality replacement gears for all major manufacturers’ pumps

Weatherford continues to deliver value to our clients by providing them a single source for OEM-quality gear sets to fit all the brands of pumps that make up their fleets. Our gear sets are precision machined and rigorously inspected to ensure proper fit and performance in your pump.

We supply all styles of gears, including helical, double helical, and herringbone. All gear sets feature precision machining and heat treatments that ensure long life in the most demanding operating conditions. All meet or exceed all OEM standards and are offered with attractive, highly competitive prices and deliveries.

Features, Advantages and Benefits

- Weatherford’s high-quality products ensure full compatibility with OEM pump designs.
- Helical, double-helical, and herringbone styles are available.
- Quality and durability meet or exceed OEM standards.
Aftermarket Crankshafts

Weatherford’s Ellis-Williams™ style crankshaft—the premium product on the market today

Weatherford’s Ellis-Williams product line offers more experience with high-performance crankshafts than any of its competitors. In addition, Weatherford now offers a way for owners of other manufacturers’ pumps to experience these same benefits.

Unlike most OEM crankshafts, the Ellis-Williams style crankshaft is inherently balanced. Its design eliminates the unbalanced loads created by most typical crankshaft designs, which must be supported by the pump frame. By eliminating these forces, the stress applied to the power frame and bearings are reduced, resulting in longer service life for the pump power end, reduced maintenance, and lower overall cost of ownership for the operator. An added benefit of the balanced crankshaft is that it promotes a smoother-running, quieter pump.

All Ellis-Williams style crankshafts use a high-strength 4130 alloy-steel forged core. The eccentric crescents and gear flanges are fabricated at our Houston, Texas, USA, facility by experienced, highly trained workers, who ensure the finest quality available. Our unique core design locates fabrication points away from high-stress areas to reduce the overall stress on the crankshaft—reducing the chance of fatigue failure. After fabrication, our crankshafts are carefully stress relieved, finish machined to precise tolerances, then carefully inspected to ensure compliance to our rigorous standards. The result is the finest crankshaft available for mud pumps today.

Features, Advantages and Benefits

- The inherently balanced Ellis-Williams crankshaft reduces loads applied to the power frame and bearings and provides a smooth-running, quieter power end.
- The forged-alloy steel core is stress relieved for durability.
- The Ellis-Williams crankshaft improves performance and durability of existing pumps with unbalanced crankshaft designs.
Weatherford—your single source for quality and value in replacement power-end parts for most major brands of mud pumps

Expanding on our mud-pump experience and unsurpassed reputation for quality and service, Weatherford now offers a full line of aftermarket power-end parts designed to fit most major brands of mud pumps currently in service today. All Weatherford parts are fully interchangeable with the original parts they are replacing and offer performance and value that meet or exceed OEM standards. Our aftermarket power-end components offering includes:

- Bearings
- Crossheads
- Crosshead Guides
- Connecting Rods
- Extension Rods
- Oil Seals
Service and Support

24/7 support for all your mud-pump needs

Weatherford’s pumps and our packaging capabilities, expendables, and power-end service parts provide an array of products that few companies can match.

In addition to these products, we also offer:

- Technical Assistance and Advice
- Service and Repair Capabilities
- Onsite Commissioning and Repair Capabilities
- Complete Pump Packages for Rent or Lease
Mud Pump Parts and Service

For additional information about Weatherford’s mud-pump parts and services, contact your local Weatherford representative, e-mail pumps@weatherford.com, or visit weatherford.com/mudpumpparts.