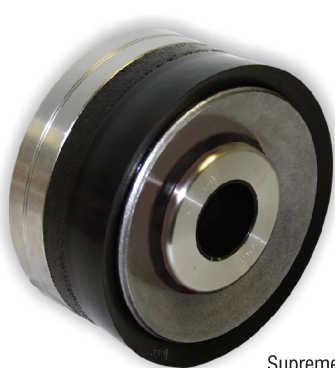


Supreme Pump Expendables



Supreme Piston



Supreme Liner



White Lightning™
Supreme Valve
and Seat

MUD PUMP EXPENDABLE SOLUTIONS:

Supreme Piston

The Supreme Piston is designed for use in the most demanding applications. The replaceable seal element is manufactured from a specially formulated elastomeric compound designed to be resistant to most chemical compounds found in the drilling industry today. This compound can also be utilized in conditions where elevated temperatures can be problematic to other types of pistons on the market. The maximum operational temperature rating for continuous use is 225°F (107°C). The fabric anti-extrusion device on this rubber is constructed from proprietary materials utilizing a patented process to reduce extrusion of the rubber even at the pump's maximum pressure rating.

The Supreme piston body is manufactured from a high strength alloy steel forging and heat-treated for durability. Supreme piston bodies feature two wear indication grooves located on the flange to provide the customer with the information needed when rubber kits are installed on the used body. The deeper wear groove is for pressures up to 1500 psi, the shallow wear groove is for pressures from 1500 to 2500 psi. If any portion of the flange is not worn past these indicator marks for the respective pressure, a new rubber kit can be installed on the piston hub. NOV does not recommend changing rubber kits on piston bodies when the operating pressures exceed 2500 psi. Changing rubber kits on pistons that operate over the 2500 psi threshold has historically proved to be cost prohibitive.

White Lightning™ Piston

The White Lightning Piston is manufactured from a proprietary urethane compound that is highly resistant to abrasion. The patented design utilizes the same piston body as the Supreme Piston. The White Lightning Piston reduces liner wear over traditional pistons, and has a maximum operational temperature rating of 200°F (93°C).

Supreme Liner

The Supreme Liner is manufactured using only the highest-grade materials. The outer section, or shell, is manufactured from high strength carbon or alloy steel and heat-treated to provide optimum mechanical properties. It is precision machined to exacting tolerances to keep the liner concentric to the liner guide and flat to the fluid end (or wear plate). This reduces the possibility of misalignment on installation and provides the end user with longer liner and piston life.

The inner section of the liner, or the liner sleeve, is manufactured from a proprietary high chrome content iron alloy that offers excellent resistance to wear. The high percentage and thorough distribution of chrome carbides in conjunction with controlled heat treatment for maximum metallurgical properties, prior to assembly in the shell, gives a very high degree of uniformity in microstructure and wall section hardness. This results in a sleeve that has excellent abrasion, erosion and corrosion resistance. The sleeve is through hardened during heat treat to provide high material hardness at all depths throughout the material. This material and process allows the end user to have basically the same surface hardness of the sleeve in the new condition and throughout the product life. The sleeve is manufactured to the bore tolerances specified by API or better to provide longer life by reducing gaps between the liner bore and piston.

Supreme Valve and Seat

The Supreme Valve and Seat is designed to meet all the demanding drilling conditions in use today. The proven design allows its use in pump maximum pressures and strokes; in water, oil or synthetic based muds. The Supreme valve with the standard polyurethane insert is designed for temperatures up to 180°F (82°C). The Supreme valve with the White Lightning insert is suitable for elevated temperatures up to 200°F (93°C). Both the standard polyurethane insert and the White Lightning insert are highly resistant to tear, abrasion, extrusion and are compatible with most of the chemistry in the drilling industry today.

The valve body and seat are precision machined to exacting tolerances from high strength alloy steel and heat treated to provide a very high surface hardness. This high surface hardness provides excellent resistance to abrasion and erosion from solids found in the drilling industry. The valve body is equipped with a removable knock-on nut so that the insert can be changed if pressures are below 2500 psi. National Oilwell Varco does not recommend the changing of their Mission® inserts at operating pressures over the 2500 psi threshold since historical data suggests it is not cost effective.

The design of the Supreme valve and seat offers maximum flow characteristics. The four-web design of the seat offers additional bearing area so the valve weight can be held to a minimum. The steep bevel angle of the seat allows quick flushing of solid matter and additional metal-to-metal strike area plus a generous sealing area.

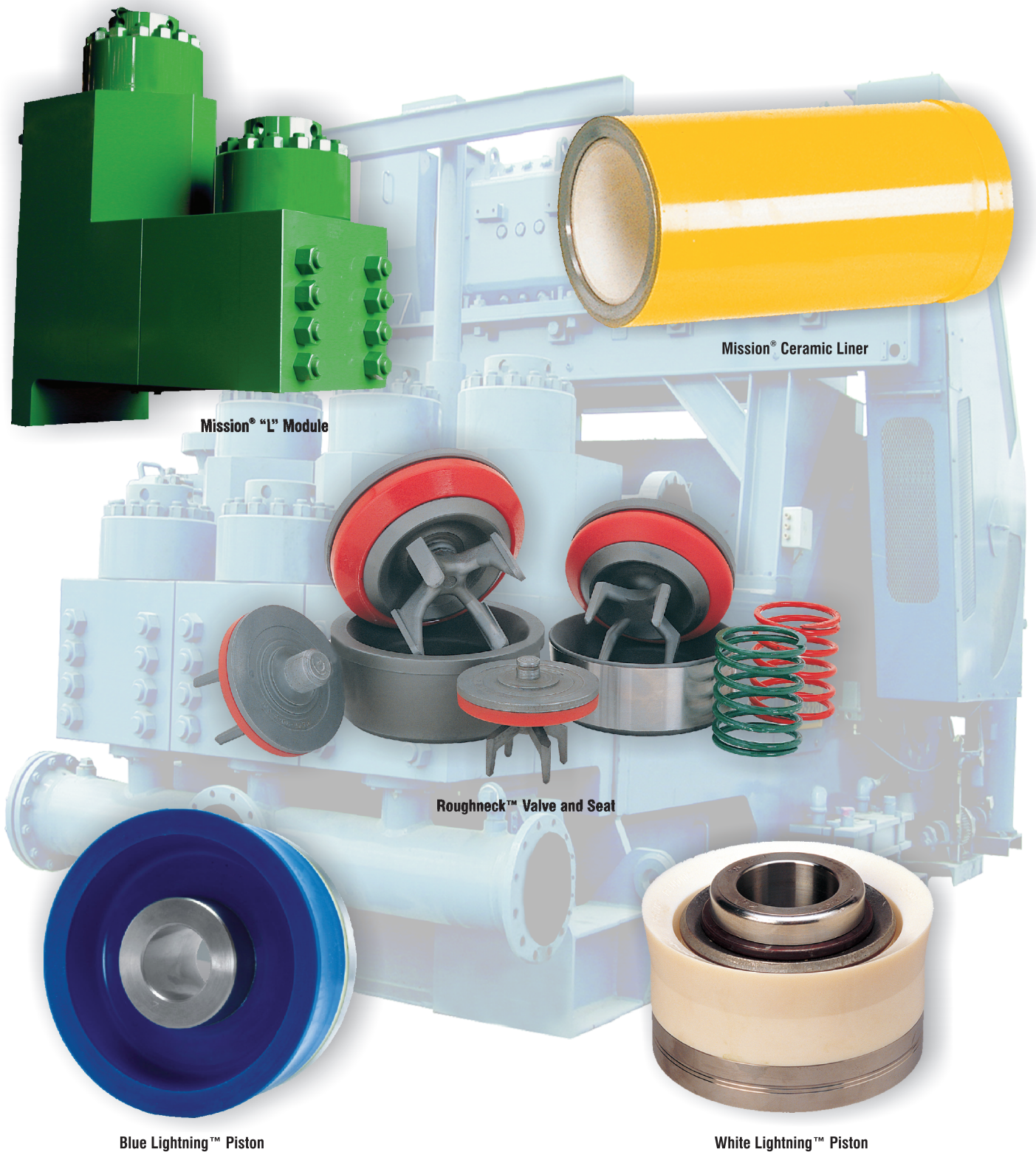
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