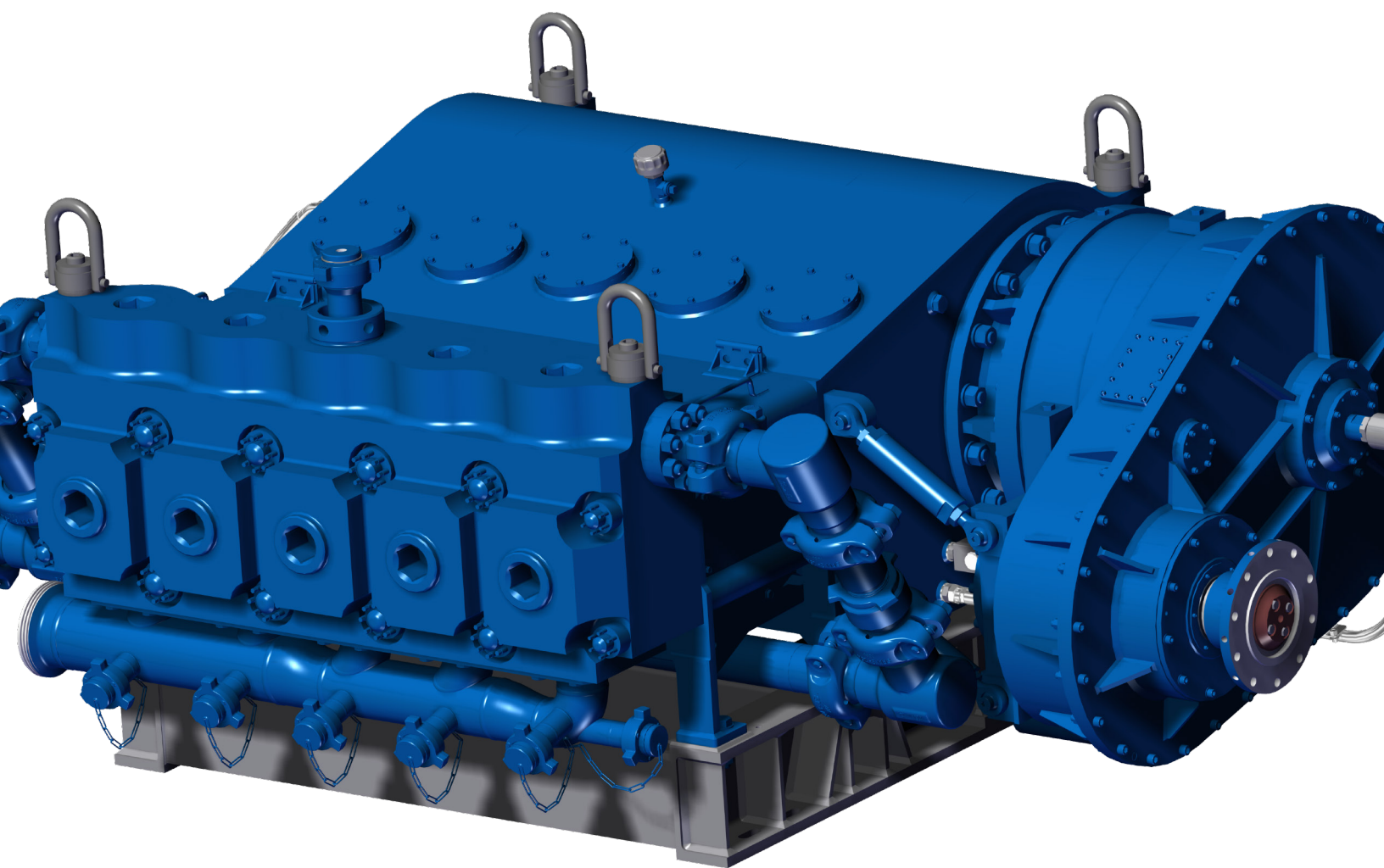


SPM™ Oil & Gas

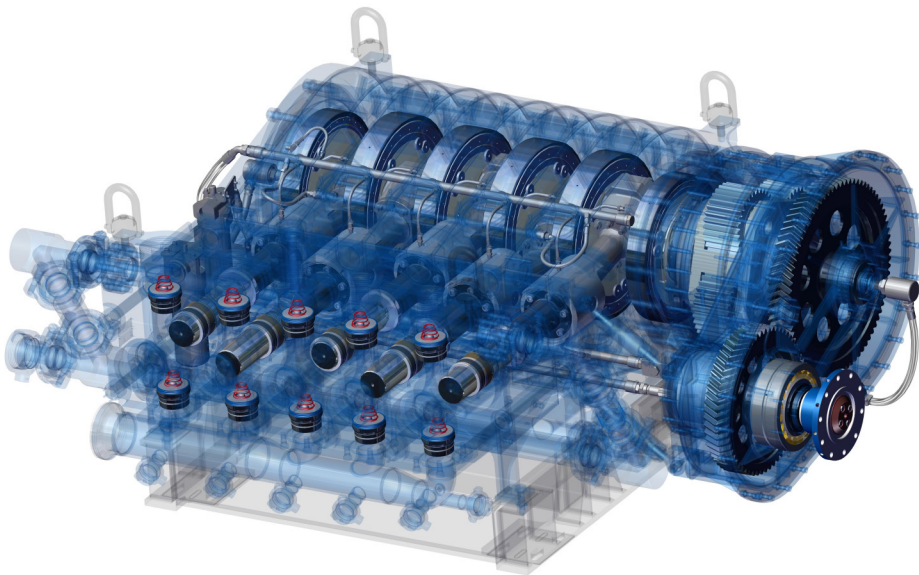
A Caterpillar Company

**SPM® OEM 3000
Frac Pump**



The SPM® QEM 3000 Frac Pump Redefines Continuous Duty

Increasing demands caused by longer horizontals and harsher hydraulic fracturing environments require a higher level of performance from pressure pumping equipment. Delivering a market-leading solution, the SPM® QEM 3000 pump is the industry's first high horsepower frac pump designed for continuous duty operation at 275,000 lbf rod load—all the time. Validated through a thirteen million cycle test at the SPM Oil & Gas Research and Development Center, this durable pump is designed to offer synchronized maintenance schedules with the engine and transmission to decrease downtime and reduce total cost of ownership.



Industry Challenges Solved

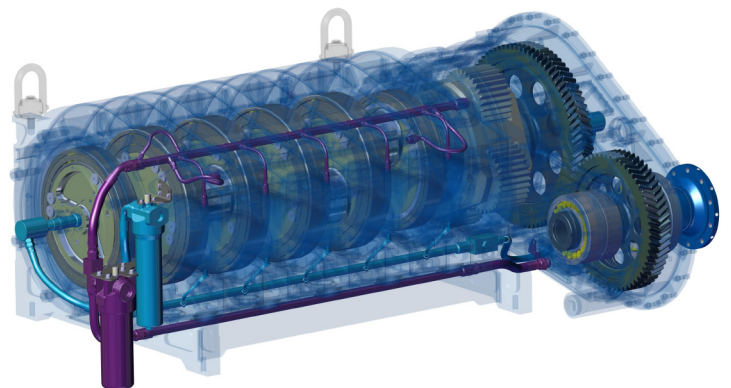
SPM Oil & Gas recognizes that required operating hours and increasing rod loads are exceeding the capabilities of intermittent duty frac pumps.

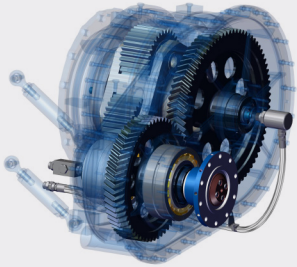
- Longer hours and increasing loads can cause more vibration and movement during operations, making the pump's frame more susceptible to cracking
- Pumping at higher pressures with more aggressive fluids can reduce fluid end life and increase cost
- Insufficient lubrication can lead to premature pump failure
- Unproductive downtime when pump maintenance intervals are out of sync with the engine and transmission

The SPM® QEM 3000 pump solves these issues.

Optimized Lubrication System

The dual-line lubrication system of the SPM® QEM 3000 pump provides the right amount of pressure and flow for each pump component and excellent lube flow in cold starts. On Board Filtration reduces lubricant contamination to optimize pump performance. This patent-pending lubrication system is designed to deliver clean lubricant to prevent premature failure to all bearings. Its high-pressure lubrication is for crankshaft shell bearings, knuckle bearings and crosshead bearings; the low-pressure lubrication supports gears, roller bearings and crosshead bearings.



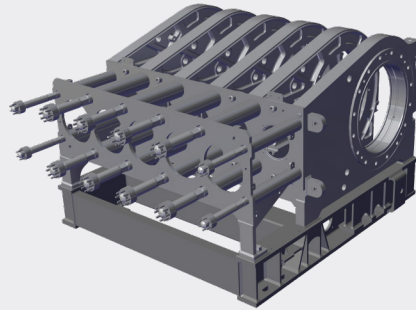


Continuous Duty Gearbox

The patent-pending gearbox of the SPM® QEM 3000 pump can withstand continuous duty operations at 275,000 lbf rod load with minimal maintenance.

There are 5 key features:

- Double helical gears reduce thrust load and decrease noise
- Engineered housing lowers deflection under load
- Torque arms are mounted to frame to reduce deflection
- Input shaft bearings have been selected and sized for driveshaft thrust loading due to Cardan motion
- Manufactured in compliance with AGMA Quality Class 11



Structural Rigidity

The SPM® QEM 3000 pump provides patent-pending structural rigidity that can withstand continuous duty operations in harsh shale play pumping environments. Its power frame design is optimized to increase pump life and lower maintenance costs. Other features include:

- Optimized design locates welding in low-stress areas
- Precision fabrication technology optimizes bearing alignment
- Engineered skid protects the pump from externally induced deflection
- Structural mounting reduces pump deflection and maximizes fatigue life



Standard industry bearing

SPM® QEM 3000 bearing

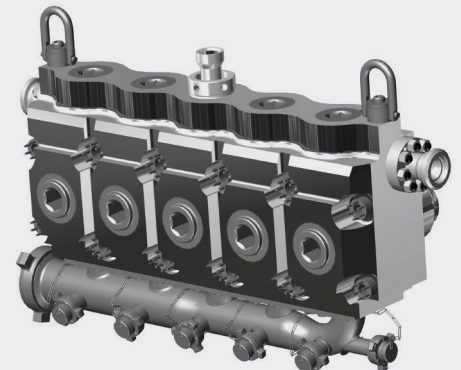
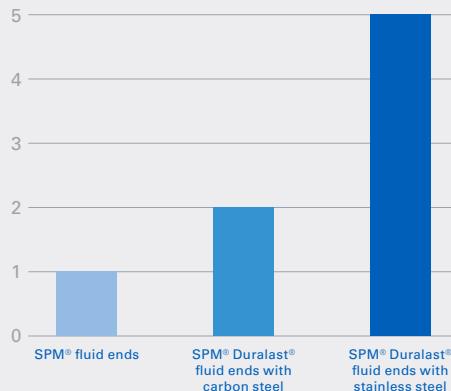
Largest Frac Pump Bearing on the Market

To increase component life and better align it with maintenance intervals of the engine and transmission, the SPM® QEM 3000 pump utilizes the largest frac pump bearing on the market. The proprietary 25" diameter bearing design reduces roller contact loads and lessens the impact of shock loading. Its high-quality bearing steel resists damage from lube contaminants, and its durability was tested and proven at the SPM Oil & Gas Research and Development Center.

Longer Power End and Fluid End Life

The SPM® QEM 3000 pump is built with features for both the power end and fluid end that extend the overall operating life of the pump. It includes SPM® Duralast® fluid end technology to withstand the operating conditions of shale play pressure pumping with maximum life. The patented geometry of the SPM® Duralast® fluid end lowers cross bore stresses by 30% or more, doubling the life compared to conventional SPM® fluid ends.* Its angled seat integrates with the fluid end to resist seat deck cracking. Proprietary stainless steel resists corrosion to deliver up to 5x the life of conventional fluid ends.

Fluid End Operational Life



Certain features of the SPM® Duralast® fluid ends are protected by patents pending and granted in the name of S.P.M. Flow Control, Inc.
 *When compared with conventional SPM® fluid ends that do not feature SPM® Duralast® technology.

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