

BORETS WR2 PUMP

Wear Resistant Wide Range ESP for operation in ultra demanding applications

APPLICATIONS

- Unconventional oil & gas wells
- Wells with unstable flow
- Highly abrasive wells
- Gassy wells
- Tight Oil Wells
- Wells with rapid decline in production
- Wells after hydraulic fracturing

FEATURES & BENEFITS

- New stage manufacturing process:
 - Up to 55 % gas handling without a gas separator
 - Unlimited geometrical capability for complex stage design
 - Unmatched stage performances for extended pump run life and stable operating parameters
- High operating speeds up to 6,000 rpm:
 - Increase production with a shorter overall system length
- High pump efficiency (up to 75 %):
 - Cost-effective production across a wide operating range
- Extremely high strength stage material with a hardness similar to Tungsten Carbide:
 - Ultra-abrasion resistant material for extended run life in sandy and gassy wells
- Over 2.5 times wider operating range compared to conventional ESPs:
 - Ability to adapt to changing well conditions to maximize recovery while minimizing well intervention and nonproductive time

The innovatively designed Borets Wide Range Wear Resistant (WR2) pump exploits new technologies, manufacturing process and materials to expand the ESP system capabilities. The WR2 pump is designed to handle harsh well conditions including high amounts of gas and sand produced through the pump. The pump is ideally suited for a wide range of production with the goal of extending run life and minimizing well interventions.

The WR2 utilizes a Metal Injection Molding (MIM) manufacturing process never before used in the ESP industry. MIM provides precise dimensional tolerances, enhanced surface finishes and no undersurface cavities.

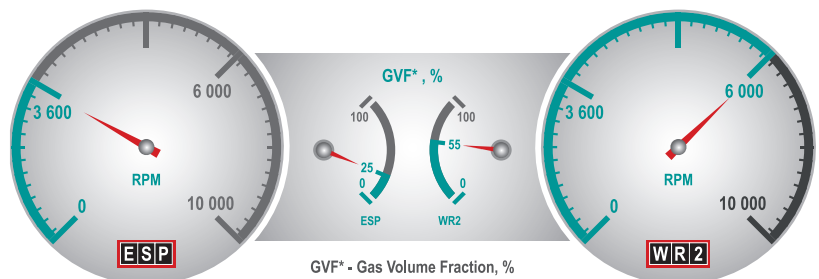
The WR2 incorporates a superior hydraulic design for improved efficiency over a wider flow range thus reducing operating costs and improving reliability while optimizing production under dynamic downhole conditions.

The operating range is greatly enhanced as compared to the conventional ESP designs, since the hydraulically balanced stages reduce thrust wear at boundary conditions. This results in higher reliability, less stress on the system, and longer operating life. The mixed-flow design allows gas to pass more easily through the pump compared to a radial-flow stage, mitigating gas locking and well cycling conditions that can cause electrical shorts and other issues reducing ESP system run life.

Borets R&D engineers have developed two alloys to dramatically improve stage material hardness. Typical stage hardness of 57 HRC is met with high tensile strength limit of 2,100 MPa (304.5 Ksi).

The WR2 is designed for flow rates: 125 - 440 bpd (20 - 70 m³/d), 250 - 1,000 bpd (40 - 160 m³/d) and 560-1,900 bpd (90 - 300 m³/d).

The Borets WR2 pump mixed-flow design provides increased efficiency and reduced gas locking.



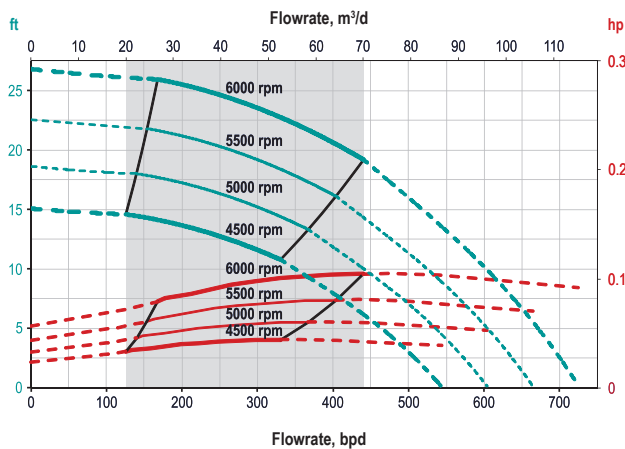
COMPETITOR

BORETS

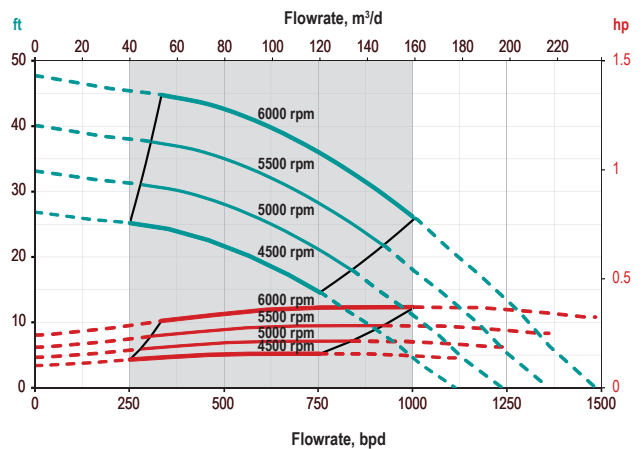
Borets WR2 Pump Specifications			
Flow range, bpd (m ³ /d)	125 – 440 (20 – 70) *	250 – 1,000 (40 – 160)	560 – 1,900 (90 – 300)
Pump OD, in. (mm)	2.60 (66)	3.38 (86)	3.38 (86)
Stage alloy	MIM alloy	MIM alloy	MIM alloy
Stage geometry	Advanced Mixed Flow	Advanced Mixed Flow	Advanced Mixed Flow
Head per stage at BEP, ft (m) @ 100 Hz	17.4 (5.3)	30.7 (9.4)	37.4 (11.4)
Power per stage at BEP, hp (kW) @ 100 Hz	0.105 (0.079)	0.37 (0.276)	0.59 (0.44)
Efficiency at BEP, %	59	60	63
Standard shaft alloys	Inconel	Inconel	Inconel
Shaft diameter, in. (mm)	0.504 (12.8)	0.5906 (15.0)	0.5906 (15.0)
Radial and axial bearing material	Tungsten carbide	Tungsten carbide	Tungsten carbide
Pump Construction	Packet (no shimming required)	Packet (no shimming required)	Packet (no shimming required)

* In development

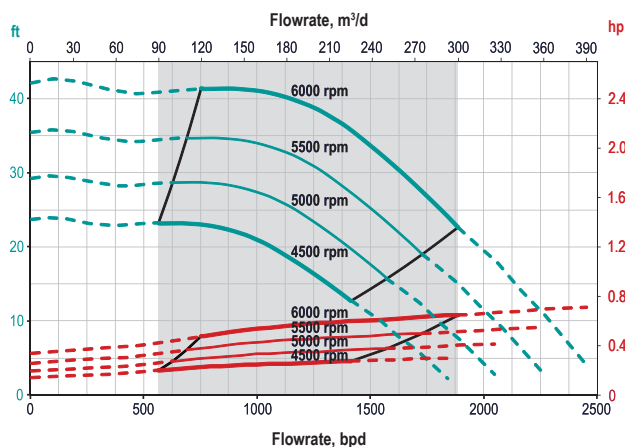
WR2 125-440 (20-70)



WR2 250-1000 (40-160)



WR2 560-1900 (90-300)



Borets WR2 Pump Specification		
WR2 Pump series	338	
Adapter WR2	338 Pump x WR2 362 Intake	
Intake series	400/362	
Motor Seal	400 PB102/406	400 PB102
PMM Motor, ESPHS	406 PL200P	456 PL200P
Downhole Sensor	ViewPoint	
VSD	Axiom II	