BORETS

ELECTRICAL SUBMERSIBLE PUMPS

Borets centrifugal pumps for ESP systems to maximize run life and enhance oil production

APPLICATIONS

- Centrifugal pumps used in an ESP system for a wide range of conventional and unconventional oil and water applications

FEATURES & BENEFITS

- A fully integrated pump technology process from design and manufacture to delivery and installation:
  - Ensures consistent quality & design improvement
- Borets unique in-house manufacturing capability, with capacity of more than 10,000 ESP systems per year:
  - Quality Control using ISO 9001:2008
  - Ensures field proven consistent ESP quality & improves ESP system run life
  - Various stages capabilities: Ni-resist type1, Ni-resist type 4 and MIM
- Innovative Metal Injection Molding (MIM) technology applied in Wide Range Wear Resistant (WR2) pump manufacturing:
  - Enables Borets to manufacture complex geometry stages with high-grade finish for better gas handling and wear resistance
- Floater, packet and compression pump designs:
  - Deliver maximum well performance in a variety of applications
- Wide range of bearing materials and configurations, including an ultra-wear resistant option with a bearing within each stage:
  - Increases run life in challenging applications while reducing well intervention cost and deferred production
- Complete range of centrifugal pumps:
  - Fit in well with casing ID from 4.08 inches (103.6 mm) and produce from 96 BPD to 57,800 BPD (15 m^3/day to 9,192 m^3/day) @45-75Hz
  - Produce wells as deep as 13,000 feet (4,000 m) with the ability to adapt to changing well conditions

Centrifugal pumps are an integral part of Borets electrical submersible pumping systems designed to enhance production over the life of a well or a field and improve overall lift profitability for our clients. Borets has become a market leader by manufacturing centrifugal pumps and other system components to a high quality standard. Over 10,000 ESP systems are produced annually using this consistent high standard at 10 manufacturing facilities in 5 countries.

In addition to typical applications in oil, water, and brine production, Borets pumps are used for booster service, ballast transfer, waterfloods, direct injection, cavern storage, mine dewatering, fire protection, irrigation & commercial water systems.

Borets pump stage manufacturing processes range from conventional high-efficiency sand casting to mix flow stage casting and metal injection molding. Borets stage metallurgy includes grey iron and Ni-Resist for standard applications with different nickel content and special alloys to handle abrasive, corrosive and other challenging environments.

While Borets centrifugal pumps rotate at industry standard speeds, the innovative Wide Range Wear Resistant (WR2) pump operates at a rotational speed of 6,000 rpm.

Borets radial-flow stages are designed for efficiency at flow rates less than 1,000 BPD while mixed-flow stages are more efficient at higher flow rates. Besides, the mixed flow stages improve gas handling characteristics.

Constructed of iron with high nickel content, Borets pump stages are extremely resistant to wear and corrosion. The pumps have tungsten carbide radial bearings in the head and base to ensure stability. For abrasive environments Borets offers stage bearings with hardened inserts, which are strategically located within the pump. The stages are available in radial or mixed-flow design and can be assembled in a floater, packet or compression configuration, depending upon the well conditions.

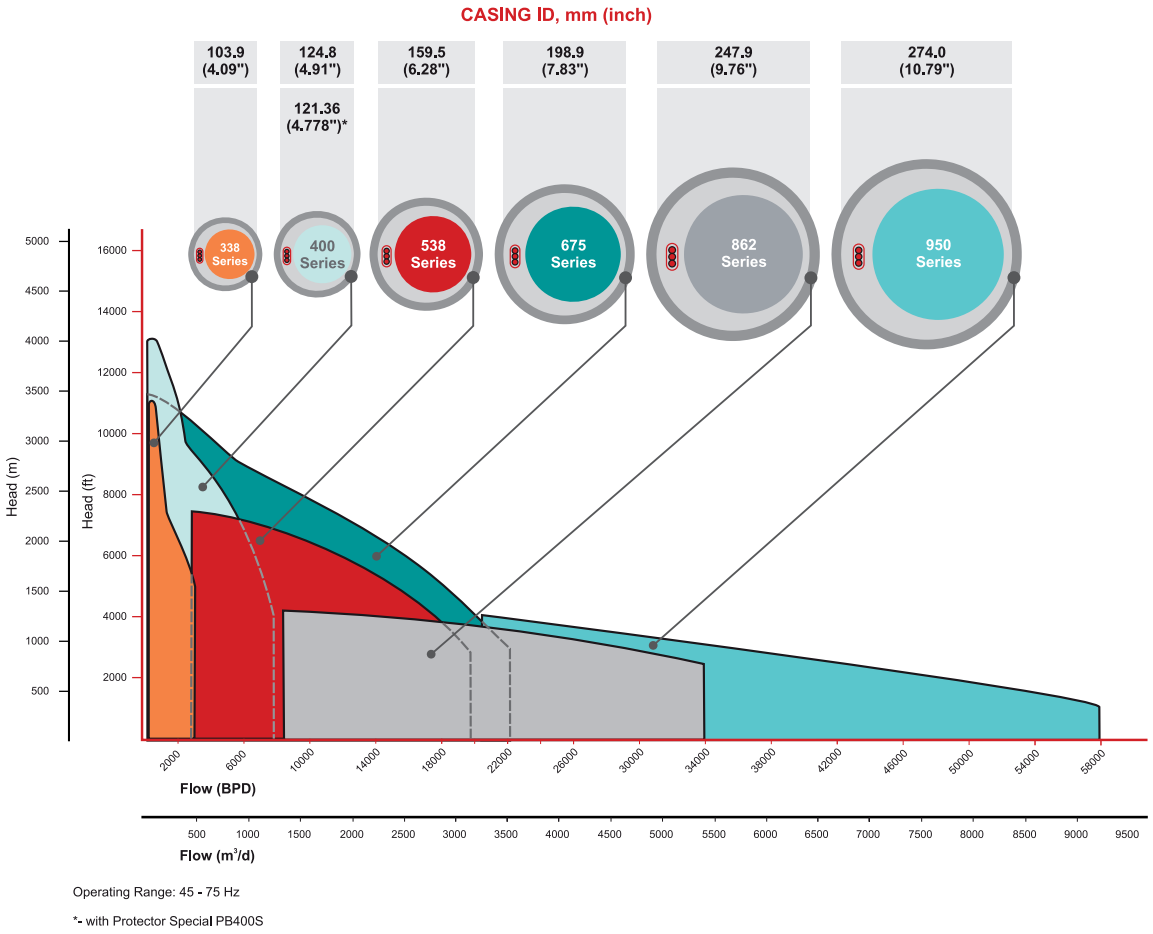
Compression pumps cover a wider range of flow rates which is especially important to support the rapid decline curves associated with unconventionals. When a centrigual pump begins to operate in a downthrust environment,

compression pumps transfer the downthrust force to the thrust bearing in the motor seal. Extended run life results from downthrust loads carried in the clean environment of the seal section rather than thrust washers in the centrifugal pump that are exposed to well fluids. Borets specifies a recommended operating range for all pumps to ensure optimal efficiency and to maximize run life.

All Borets pumps are built to ISO 9001:2008 standards and are tested to API-RP-11S2.

SERIES AND FLOW RANGES

Borets offers ESP systems in housings with outside diameters (OD) from 3.38 to 9.50 inches (85.8 to 241.3 mm) and lengths determined by the number of stages required to pump fluid to the surface.



Operating Range: 45 - 75 Hz

*- with Protector Special PB400S

BORETS PUMPS SPECIFICATIONS

MIN. CASING ID		PUMP SIZE	PUMP OD		RECOMMENDED OPERATING RANGE (ROR) **			
					50 HZ		60 HZ	
MM	IN.		MM	IN.	M³/DAY	BPD	M³/DAY	BPD
103.9	4.09	338	85.8	3.38	30 – 370	189 – 2,327	36 – 445	226 – 2,800
124.0	4.88	400	101.6	4.00	17 – 994	107 – 6,252	20 – 1,193	128 – 7,500
159.5	6.28	538	136.7	5.38	106 – 2,120	667 – 13,333	127 – 2,544	800 – 16,000
198.8	7.83	675	171.5	6.75	530 – 2,253	3,333 – 14,166	636 – 2,703	4,000 – 17,000
247.9	9.76	862	218.9	8.62	1,590 – 4,305	10,000 – 27,083	1,908 – 5,168	12,000 – 32,500
274.0	10.79	950	241.3	9.50	3,640 – 6,128	22,917 – 38,542	4,273 – 7,354	27,500 – 46,250

** ESP ROR ranges from 96 to 57, 800 bpd (15 m³/day to 9, 192 m³/day) when ESP is operated by VSD at 45 to 75 Hz.

Borets offers corrosion and wear-resistant metal coatings applied to ESP housings, heads and bases that effectively address aggressive well conditions. Increased hardness and ductility of these coatings prevent their flex cracking during tripping.

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