

# Electric Submersible Pumps

Maximize ESP system run life and enhance production

## Applications

- Conventional and unconventional oil wells
- Wells having technically demanding challenges such as:
  - Higher viscosity oil
  - High GOR
  - Scale and solids
  - High temperature
- SAGD wells
- Geothermal wells

## Benefits

- Increased production even in challenging environments
- Longer ESP run life improves ROI
- Wider pump operating range helps reduce intervention costs

## Features

- Floater and compression pumps
- Packet pumps including:
  - Robust tungsten carbide (T) bearing design
  - Large shaft diameter (higher load capacity)
- Radial, mixed-flow, and advanced mixed-flow pump stage
- Wide range of stage materials: Ni-Resist Type 1, Ni-Resist Type 4, MIM, and other special alloys
- Complete range of ESPs:
  - Flow rates: 190 bpd to 48,000 bpd (30 m<sup>3</sup>/d to 7,627 m<sup>3</sup>/d) @ 60 Hz
  - Well depth: up to 13,000 ft (4,000 m)

Borets began manufacturing electric submersible pumps (ESPs) for the oil industry in 1952.

Today, Borets manufactures more than 12,000 ESP systems annually in support of our global customer base and is the largest global supplier of ESPs by volume.

Borets ESP systems are available for both standard (3,600 rpm) and high-speed (6,000 rpm) applications. In addition to typical applications in oil, water, and brine production, Borets ESPs are used for geothermal service, water injection and disposal, mine dewatering and salt dome leaching.

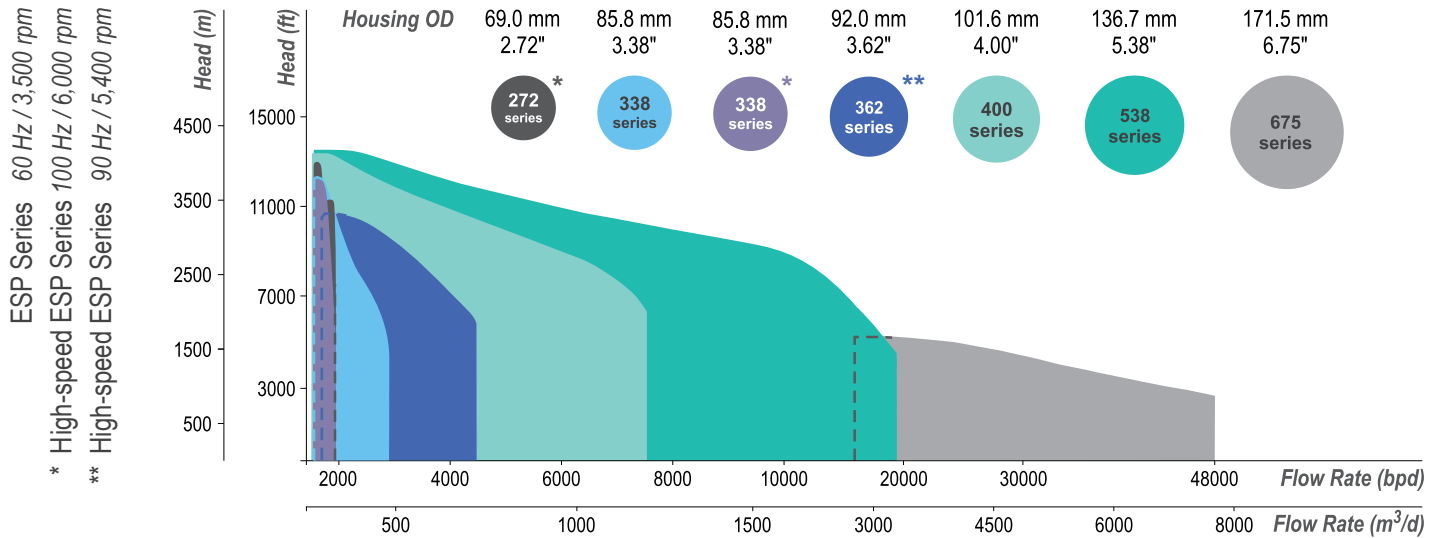
Pump stage types available include radial flow designs for maximum efficiency at flow rates less than 1,000 bpd and mixed flow stages for greater efficiency at higher flow rates. Proprietary high-speed stages, designed to accommodate higher amounts of free gas over a wider operating range, are also available through the utilization of innovative stage manufacturing process.

Borets pump stage manufacturing processes range from conventional sand casting to Cold-Box-Amin investment casting and the innovative Metal Injection Molding (MIM) technique never before used in the ESP industry. Stage metallurgies available include grey iron and Ni-Resist for standard applications and special alloys to handle abrasive, corrosive, and other challenging environments.

To serve the needs and range of customer applications, Borets supplies a complete range of ESP types and constructions that include conventional floater pumps, compression pumps, Packet pumps, and WR2 pumps. All Borets pumps are manufactured at facilities certified to API Spec Q1 and ISO 9001:2015.



## ESP Product Line



## ESP Types and Constructions

**Borets compression pumps** cover a wide range of flow rates and are very tolerant to higher thrust loads and abundant solids in the produced fluids. Unlike floater pumps, compression pumps are better able to manage varying thrust loads in rapidly changing flow conditions as is often experienced with gas slugging. When a compression pump begins to operate in down thrust, the force is transferred and managed at the thrust bearing in the motor seal. Absorbing this down thrust force in the clean oil environment of the seal section helps extend pump run life.

**Borets Packet pump** is better able to withstand prolonged down thrust and abrasive production typically experienced by ESPs in unconventional well applications. The Packet pump is constructed such that as mechanical wear progresses, stage impellers will lock together in groups (configurable packets) so as to limit the axial movement of the packet along the shaft. Down thrust is then dynamically managed through a tungsten carbide (T) bearing in the diffuser at the base of each packet.

**Borets WR2 wide range wear resistant ESP system** uses a high-speed (6,000 rpm) permanent magnet motor with an innovative pump stage design to achieve longer run life and reduced intervention cost in rapidly declining wells. Utilizing a unique Metal Injection Molding (MIM) pump stage manufacturing process, complex geometry stages with high-grade finish for better gas handling, and unlimited stage material composition options, yield best-in-class abrasion and corrosion resistance properties of stage alloys for operation in demanding applications.