



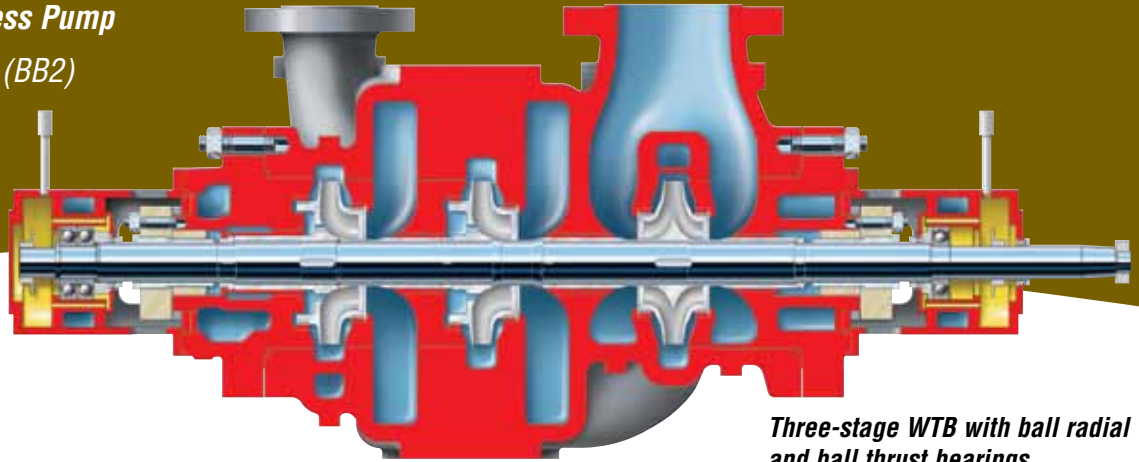
WTB
***Between Bearings, Two- and Three-Stage,
Radially Split Process Pump***

ISO 13709/API 610 (BB2)



Experience In Motion

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Three-stage WTB with ball radial and ball thrust bearings

Made in two- and three-stage designs with top/top nozzles, the Flowserve WTB pump is a between bearings, radially split, volute type process pump engineered to provide safe, reliable operation at elevated temperatures and pressures. To reduce NPSHr, a double-suction, first-stage impeller is standard on all but the two smallest sizes. Featuring hydraulics that fall between that of a typical two-stage BB2 pump and a typical multistage BB5 barrel pump, the unique three-stage WTB is a reliable solution for niche applications in refineries, chemical and petrochemical operations, and power plants.

The two-stage WTB is fully compliant with ISO 13709/API 610 (BB2). And though ISO13709/API 610 (BB2) does not specifically address three-stage machines, the three-stage WTB meets all the key ISO/API requirements:

- Nozzle loads
- Centerline-supported casing
- API 682 seal chambers
- Seal flush plans
- Materials
- Bearing options
- Low NPSH capabilities
- Shaft deflection
- Vibration levels
- Metal-to-metal gasket fits

Typical Applications

- Heater charge
- Decoking heater charge
- Hot oil
- High-temperature bottoms
- HF acid
- Fluids with coke fines
- Lean and semi-lean solutions
- Low specific gravity fluids
- Boiler feed
- Fertilizer plant services
- Industrial plant services

Operating Parameters

- Flows to 1400 m³/h (6165 gpm)
- Heads to 1100 m (3610 ft)
- Pressures to 108 bar (1565 psi)
- Temperatures from -45°C (-49°F) to 430°C (800°F)
- Speeds to 3600 rpm

Features and Benefits

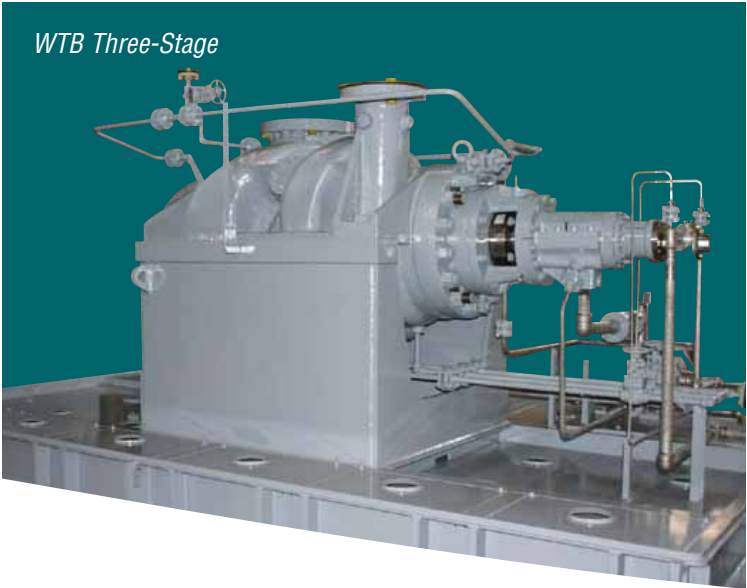
Heavy-Duty, Dual Volute Casing With an Integral Crossover ensures radial hydraulic balance and stable performance over the pump's full operating range. Shaft deflection and vibration are virtually eliminated while bearing and seal longevity is increased.

Centerline Supported, Radially Split Design prevents distortion at high temperatures and pressures. Fully confined gasket fits provide superior sealing versus horizontally split case pumps.

Dynamically Balanced Impellers ensure hydraulic efficiency and are positively locked to the shaft to eliminate vibration.

Double-Suction First-stage Impeller minimizes axial thrust and significantly reduces NPSHr, often eliminating the need for booster units. Rotor hydraulic balance is achieved by using an inherently hydraulically balanced double-suction impeller in tandem with second- and third-stage impellers with balance holes.

Renewable Casing and Impeller Wear Rings are secured by locking pins or threaded dowels. Wear rings economically restore pump efficiency and maintain operational stability.



Raised Face Flanges meet ASME B16.5 criteria for Class 600. Surface finish is in accordance with ISO 13709/API 610. Class 300 and 900 flanges are available.

ISO 21049/API 682 Seal Chamber accommodates a wide variety of seal configurations, including dual pressurized and unpressurized cartridge types for the most severe services. A full complement of seal flush plans is available.

Spacer Type Coupling permits inspection and dismantling without disturbing the driver or the pipe connections

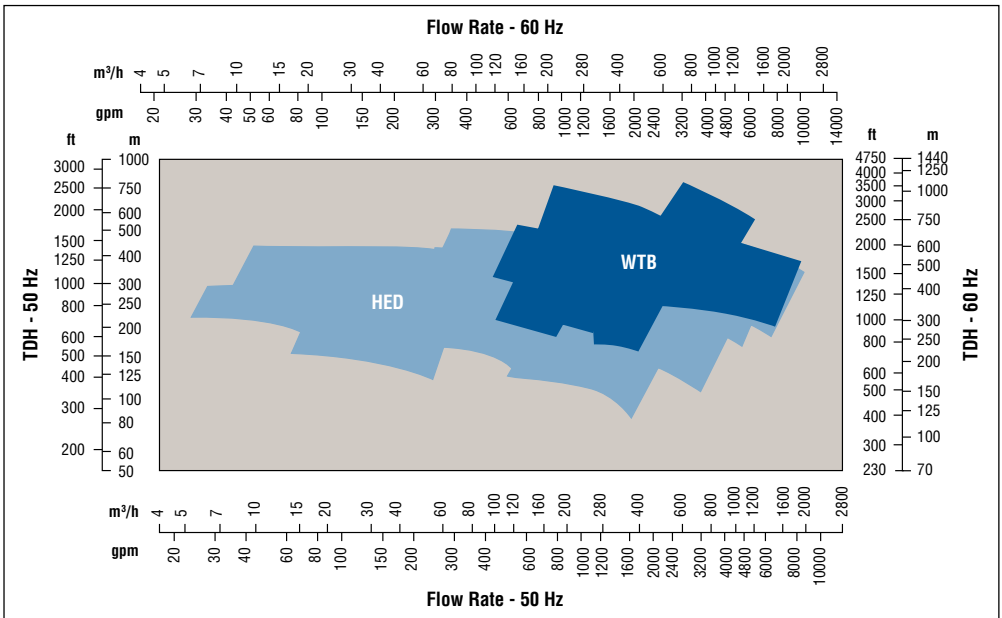
Carbon Steel Bearing Housing with 360° bolting provides added stiffness and reduces vibration. Labyrinth type oil seals standard. Fan cooling optional.

Standard Bearing System consists of dual single row, angular contact antifriction thrust bearings installed back-to-back and a single row, deep groove antifriction radial bearing. Tilting pad axial thrust bearings and sleeve type radial bearings are available.

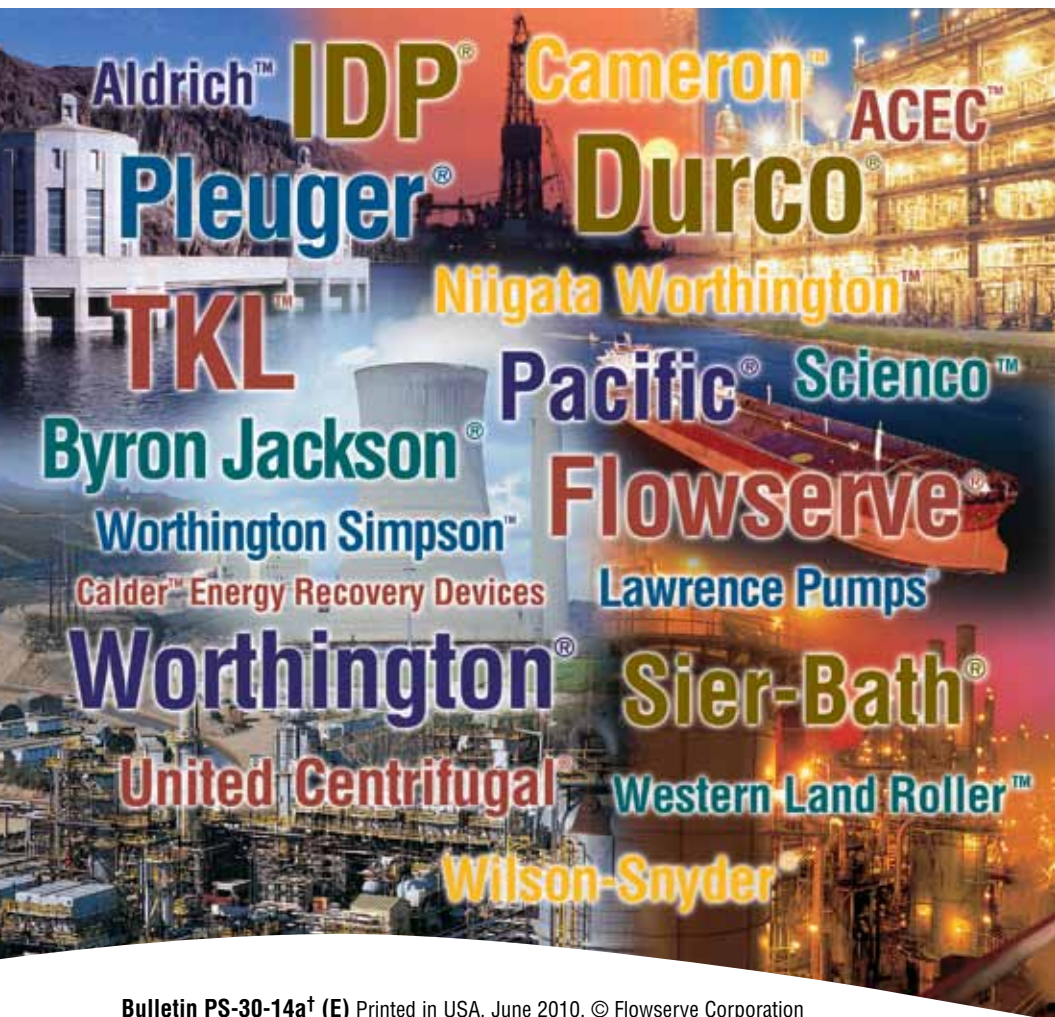
Additional Options

- Bearing isolators
- Coke crusher
- Choice of lubrication systems
 - Purge or pure oil mist for antifriction bearings
 - ISO 13709/API 610 lube oil system for sleeve and tilting pad bearings

WTB Hydraulic Coverage*



* Shown in comparison with the BB2 HED two-stage pump hydraulic coverage.



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