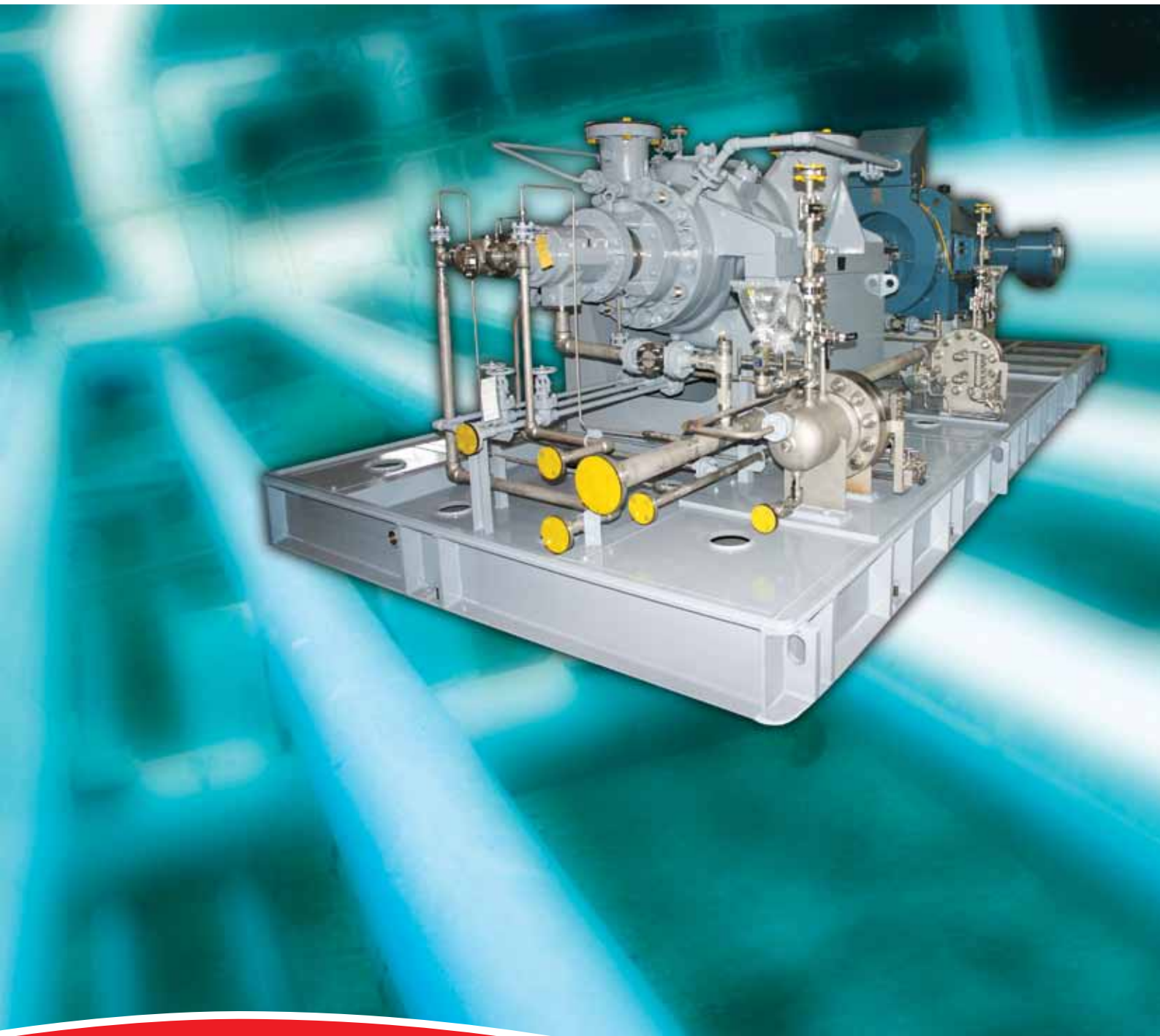
FLOWSERVE

# WTB

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

ISO 13709/API 610 (BB2)



*Experience In Motion*

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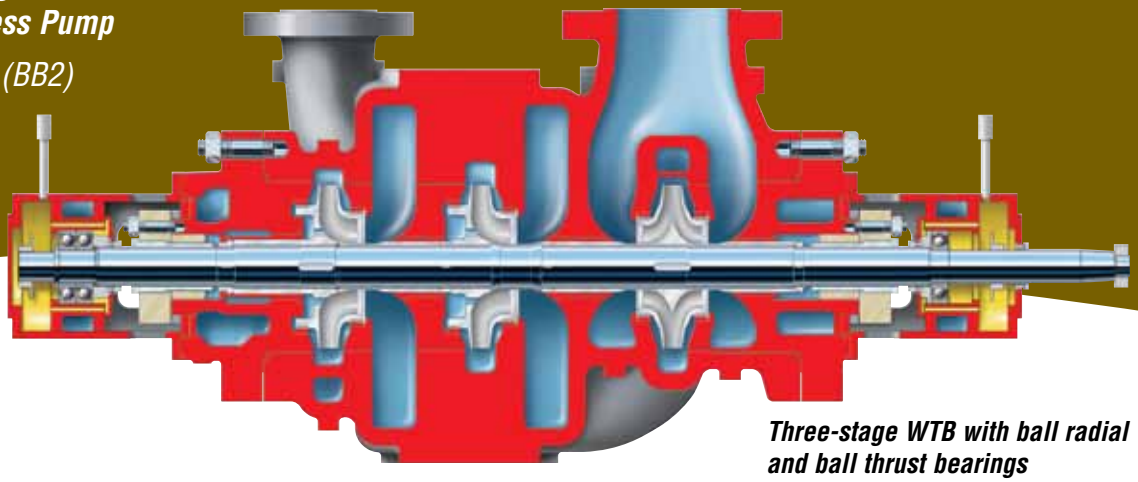


***Three-stage WTB with ball radial and ball thrust bearings***

*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 $m^3/h$ (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*

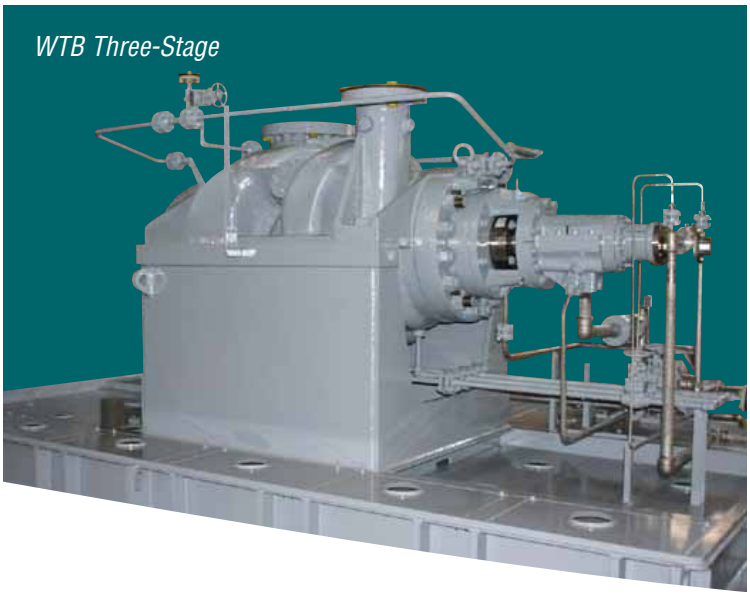
***Heavy-Duty, Dual Volute Casing With an Integral Crossover*** *ensures radial hydraulic balance and stable performance over the pump's full operating range. Shaft deflection and vibration are virtually eliminated while bearing and seal longevity is increased.*

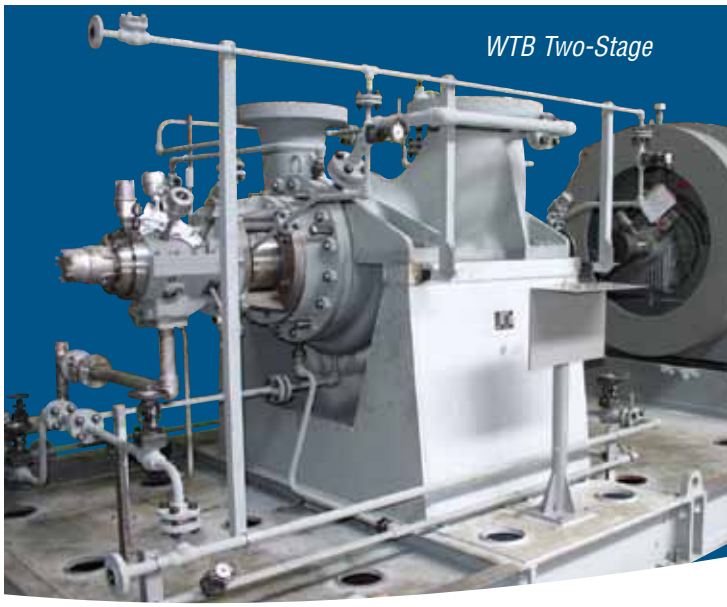
***Centerline Supported, Radially Split Design*** *prevents distortion at high temperatures and pressures. Fully confined gasket fits provide superior sealing versus horizontally split case pumps.*

***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*

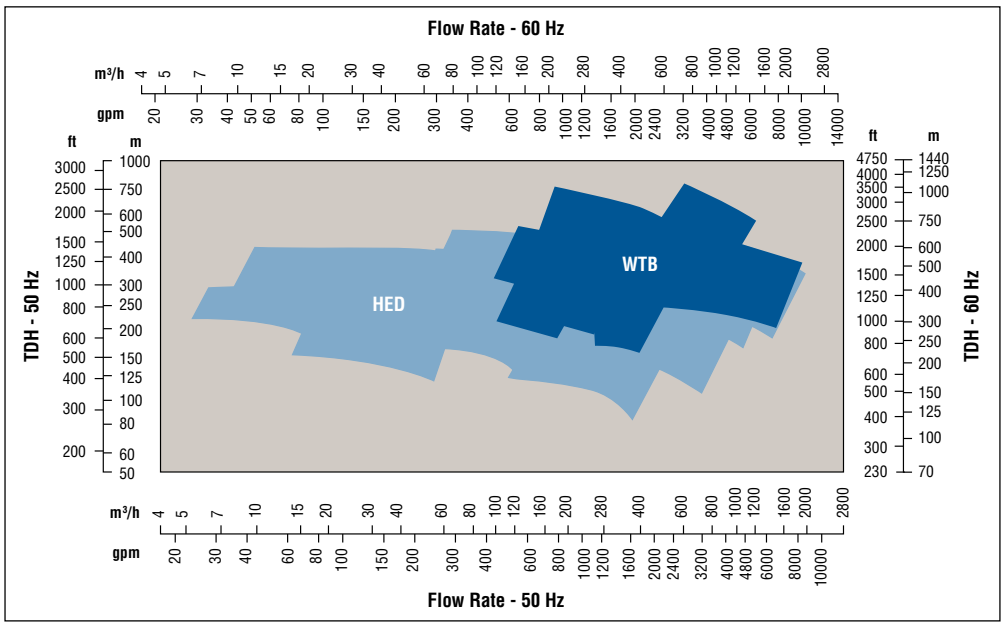
***Carbon Steel Bearing Housing*** *with 360° bolting provides added stiffness and reduces vibration. Labyrinth type oil seals standard. Fan cooling optional.*

***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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