



# **WXH and WXM Utility-Grade Multistage Ring Section Pumps**



***Experience In Motion***

# High reliability and performance in rapid-cycling applications

The WXH and WXM multistage ring section pumps are specifically designed for utility power generation. These heavy-duty, between bearings pumps are highly reliable and very well suited for combined cycle plants where severe cycling, cold startup and thermal transient conditions are common. They are frequently used in boiler feed and startup boiler feed service in conventional power stations as well as concentrated solar power, biomass and WTE (waste-to-energy) plants.

In addition to power generation, the WXH can be configured for high-pressure descaling service in steel mills as well as applications in the broader chemical processing industries.

## Typical applications

- Power generation
  - Combined cycle heat recovery steam generator (HRSG) feedwater
  - Conventional boiler feed and startup boiler feedwater
  - Thermal solar power
  - Biomass
  - Industrial applications
  - Waste to energy
  - Turbine cooling air
- Steel mill descaling
- Chemical processing





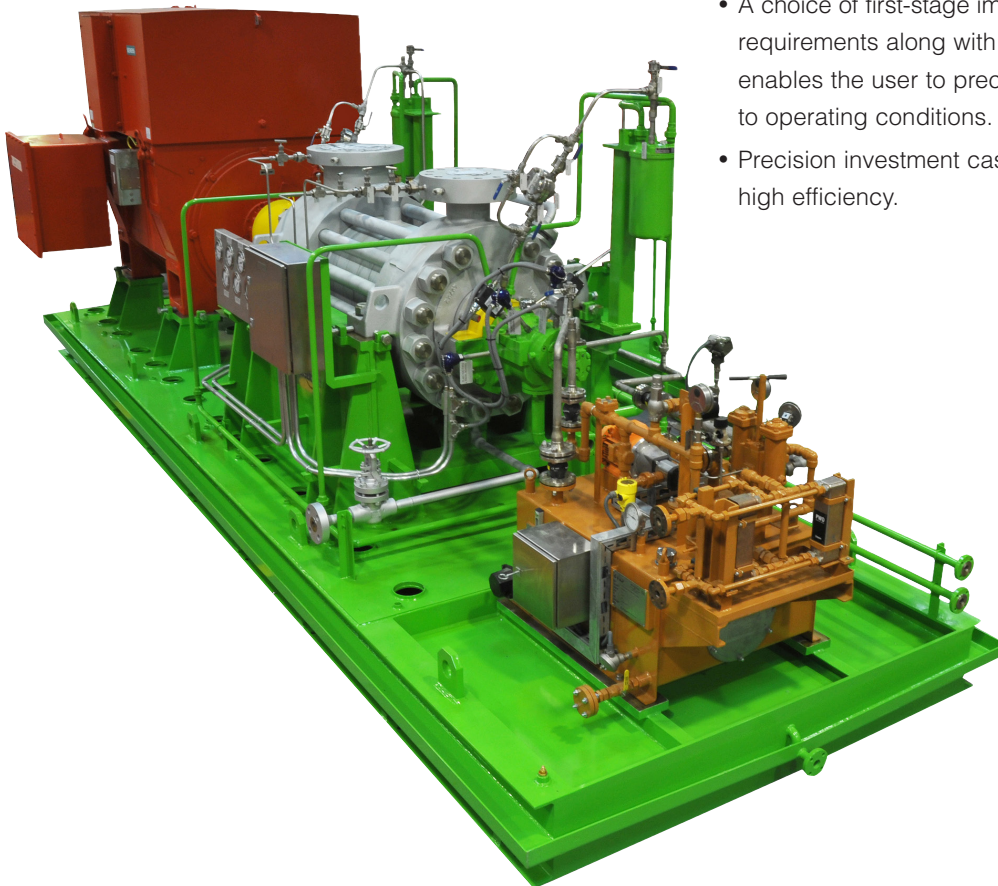
## Operating parameters

### WXH

- Flows to 900 m<sup>3</sup>/h (4000 gpm)
- Heads to 2650 m (8700 ft)
- Pressures to 350 bar (5076 psi)
- Temperatures to 232°C (450°F)
- Speeds to 5000 rpm

### WXM

- Flows to 400 m<sup>3</sup>/h (1761 US gpm)
- Heads to 1800 m (5900 ft)
- Pressure up to 170 bar (2466 psi)
- Temperatures up to 232°C (450°F)
- Speeds up to 3560 rpm



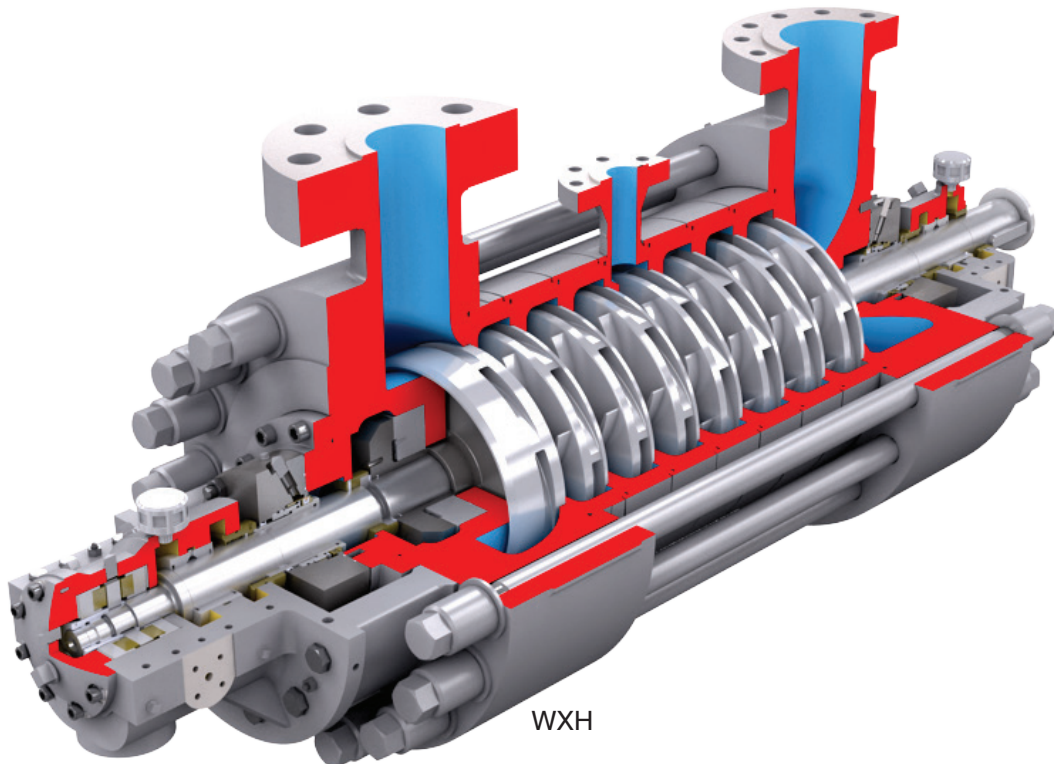
## Engineered to perform

The segmental ring design of the WXH and WXM offers many practical application advantages:

- The modular design, wide range of sizes plus hydraulics and materials options provide with broad pump configuration flexibility.
- The inherent balance of radial forces in these diffuser-type pumps results in significant performance, reliability and efficiency benefits.
- A self-compensating, one-piece flanged balance drum minimizes residual axial thrust.
- Integral balance line minimizes customer piping around equipment.
- Hydraulic coverage is excellent, providing a wide range of overall efficiency within each pump size.
- A choice of first-stage impeller designs to address NPSH requirements along with the ability to mix hydraulics enables the user to precisely match pump performance to operating conditions.
- Precision investment cast diffusers and impellers ensure high efficiency.

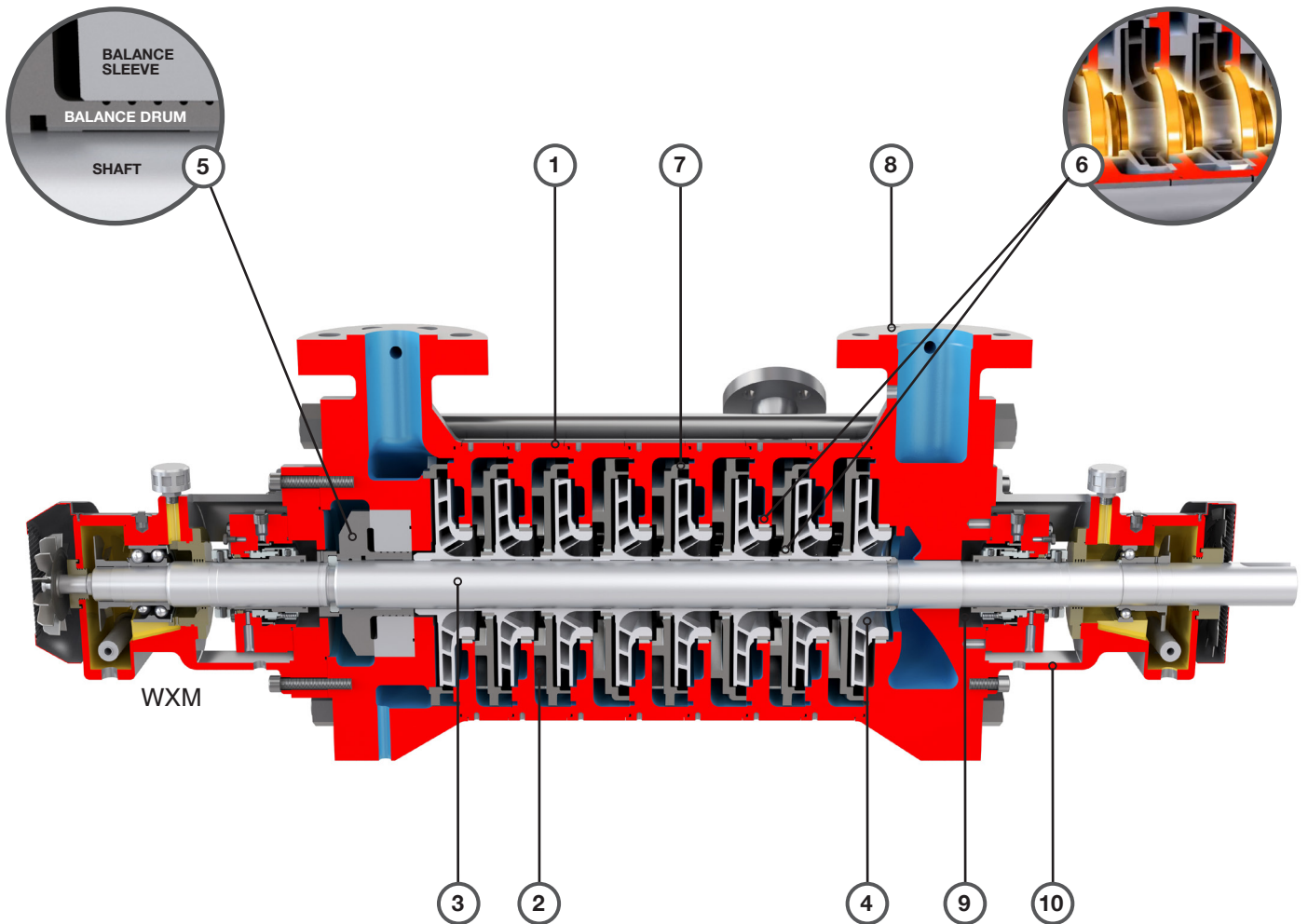
## Utility-grade construction

The WXH and WXM are radially split, centerline mounted, ring section pumps expressly designed for reliable performance in high cycle services. The balance of radial forces of the diffuser design and the modularity of the segmental ring diffuser design means its hydraulics can be mixed to precisely match pump performance to process conditions. A full complement of options is available, including interstage take-off, to ensure extensive pump configuration flexibility.



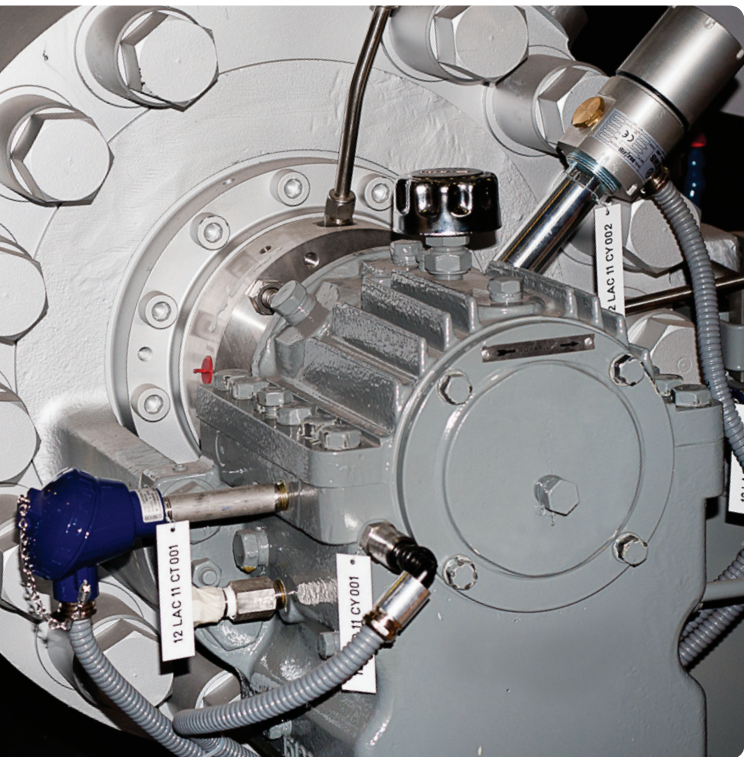
### Features and benefits

- 1. Radially split pressure casings** are positively located by interstage rabbit fits to ensure overall pump concentricity and rotor alignment. Non-shear, compression-type O-rings positively seal channel rings.
- 2. Precision-cast diffusers** create symmetrical passageways around the impellers to equalize radial loads, resulting in increased bearing, wear ring and seal life plus tolerance to transient conditions.
- 3. Heavy-duty rotors** with short bearing spans minimizes deflection and prolongs bearing and seal life. Tight tolerances and precision fit impellers ensure proper clearance, concentricity and runout. Shrink-fit impellers are available for high-speed or high-horsepower applications.
- 4. First-stage impellers** may be single- or double-suction design (WXH only), depending upon NPSH available. All impellers are precision cast, individually balanced, and mounted with keys in a staggered orientation to prevent vibration amplification due to vane pass frequency excitation.



- 5. **Self-adjusting flanged balance drum** eliminates residual axial thrust across the operating range. Running clearances are grooved to reduce drum leakage and optimize efficiency. Grooves improve hydrodynamic behavior between stationary and turning parts. DLD (direct laser deposition) coating extends service life. A straight balance drum is available for solids-containing service (available on the WXH only).
- 6. **Laser-hardened wear rings and DLD surfaces** protect casings and impellers from abrasion, minimize interstage leakage, and reduce sensitivity to thermal transients. Optional DLD coating can be applied to the hubs instead of wear rings.
- 7. **Optimized A and B gap control** minimizes pressure pulsation and vane pass vibration while reducing interstage leakage and efficiency losses.
- 8. **Raised face flanges** are integrally cast into suction and discharge heads. Ratings range from ASME 16.5 Class 600 to Class 2500 for the WXH and Class 600 to Class 1500 for the WXM. Other types are available.
- 9. **Seal chambers** are amply sized to fit cartridge seals.
- 10. **Split-flanged bearing housing extensions** enable quick access to bearing assemblies and mechanical seals without disturbing piping connections.



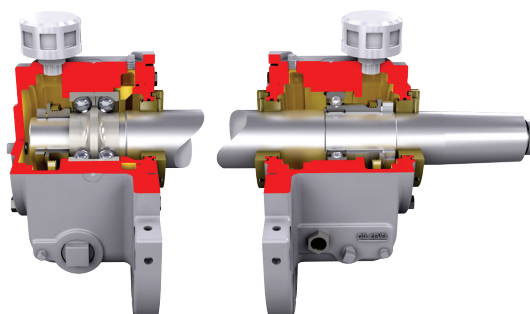


## Bearing options

Flowserve offers several bearing options to ensure long-lasting and reliable performance.

These include:

- Bearing Cooling — air or water cooling systems
- Bearing Lubrication — ring oil and force feed systems
- Bearing Isolation — Inpro/Seal VBX bearing isolators
- Bearing Monitoring Instrumentation



*Ball Radial and Ball Thrust*

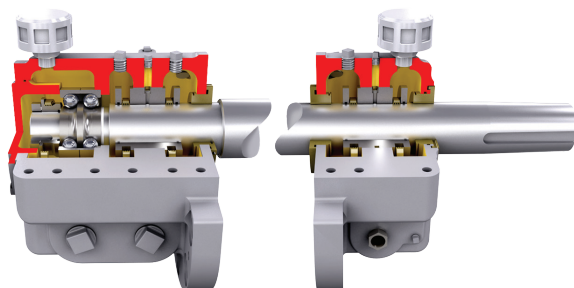
## Choice of bearing configurations

Three bearing designs are available to meet application requirements. For low-horsepower applications, the standard design incorporates a self-aligning antifriction radial bearing and two single-row, angular contact antifriction thrust bearings.

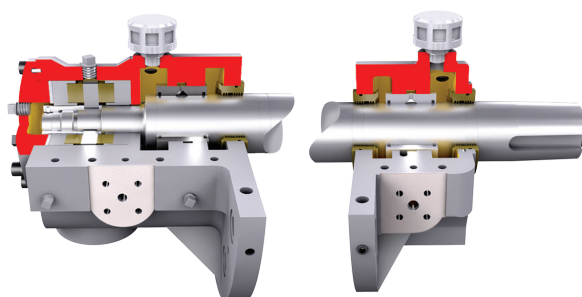
Standard bearing lubrication is via an oil ring system and incorporates a constant level oiler and a sight glass. This system prolongs bearing life by ensuring oil penetrates the bearings without foaming. Labyrinth-type bearing isolators are standard.

Other available bearing designs include:

- Split sleeve radial and ball thrust
- Split sleeve radial and tilting pad thrust (tilting pad options available only in the WXH)



*Split Sleeve Radial and Ball Thrust*



*Split Sleeve Radial and Tilting Pad Thrust*

## Available interstage take-off

The WXH and WXM can be furnished with an interstage take-off connection to provide a portion of the pump flow at a pressure lower than the pump discharge. This is most commonly applied to boiler feed (HRSG) pumps in combined cycle plants equipped with intermediate-pressure feedwater drums.

## Mechanical seal flush systems

The WXH and WXM may be supplied with ISO 13709/API 610 seal flush piping plan 11 or seal flush piping plan 23 with cooled recirculation from seal chambers.

## Drivers

Direct or variable-speed drives are available. Variable-speed control can be achieved with fluid couplings or variable-frequency drive equipment.

## Baseplates

Engineered to contract requirements, options include conventional welded steel construction to non-grouted skid types. Facilitates easy pump removal for maintenance while minimizing impact on supporting equipment.

## Instrumentation and control

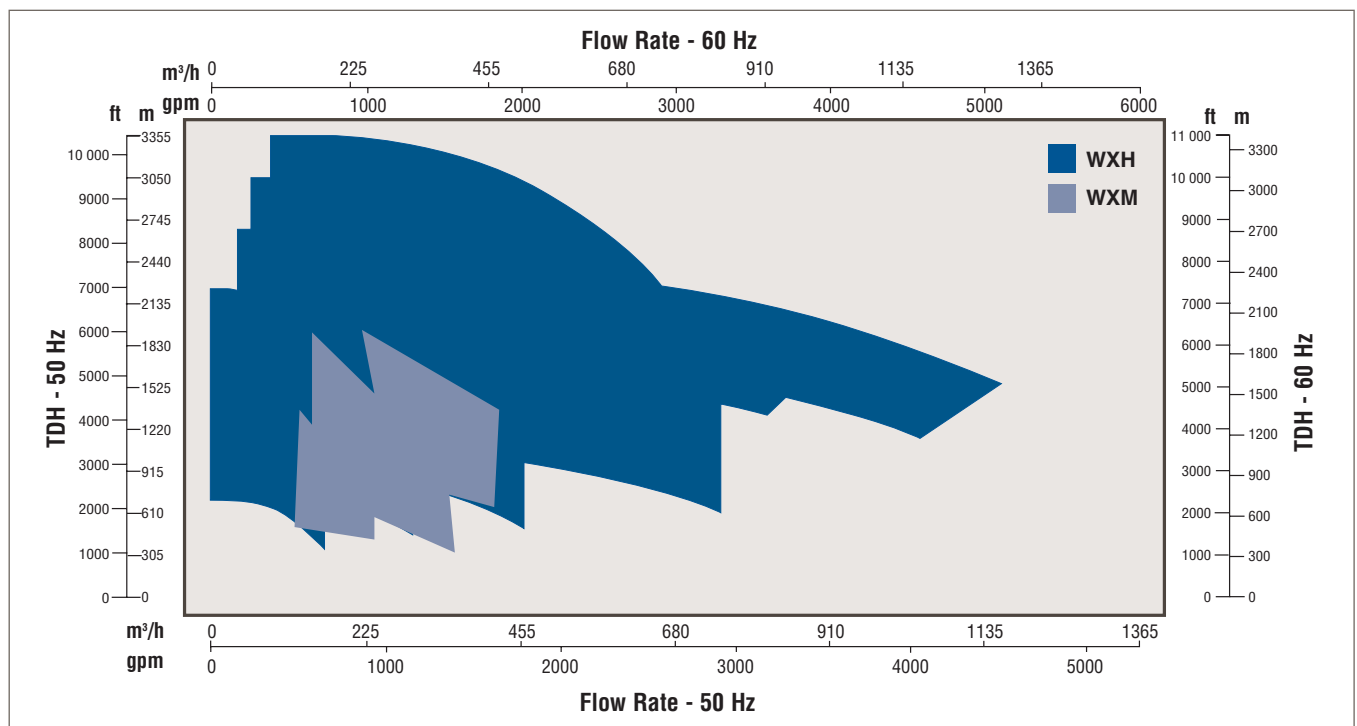
Flowserve Intelligent Process Solutions (IPS) offers a wide range of monitoring and diagnostic equipment. Wired or wireless data acquisition systems capture key operating parameters affecting bearings, mechanical seals and casings. Advanced diagnostic systems use intelligent algorithms to protect against high-risk conditions.

## WXH descaling configuration

The heavy-duty WXH is well suited for descaling service in steel mills, an application requiring high flow rates with entrained solids and rapid cycling. To maximize efficiency and service life, the following changes are recommended:

- 12% chrome steel and suction and discharge heads
- Shrink-fit impeller construction
- Straight balance drum
- Tilting pad thrust bearing assembly
- Hardened hubs and casing wear rings

## Range chart





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