



# HPX Centerline Mounted Process Pump

API 610 (OH2)



*Experience In Motion*



## Number one OH2 process pump

The Flowserve HPX pump is the workhorse of the process industries. Fully compliant with API 610 (OH2) latest edition design criteria and featuring an API 682 compliant seal chamber, the HPX centerline-mounted pump provides reliable, safe performance in high-pressure, high-temperature applications with optimal emissions containment. Furthermore, the HPX pump represents the most comprehensive range of hydraulic coverage available to the industry, thereby permitting precise selection for best operating efficiency.

### Industry-leading design and performance with low lifecycle costs

The HPX pump delivers what OH2 pump users need.

- **Energy costs are minimized** due to its comprehensive hydraulic coverage and numerous specialty configurations that permit precise selection for best operating efficiency.
- **Longer service life** is made possible by its centerline-mounted casing that withstands nozzle loads beyond API 610 requirements and minimizes shaft misalignment, thereby extending rotor, bearing and seal life.
- **Stringent emissions containment** is achieved with its API 682 seal chamber, which accommodates all seal models and styles, including advanced gas barrier technologies.
- **Reliability is improved** with the redesigned bearing housing that provides superior bearing lubrication and heat dispersion, both of which extend bearing life and mean time between repair.
- **Maintenance is made easier** thanks to its simplified skid design that minimizes cooling, piping and instrumentation. Plus its back pullout design enables the pump to be serviced without disturbing motor or casing connections.
- **Lower operating costs** are possible because the improved cooling capability of the redesigned bearing housing may eliminate the need for water cooling.
- **Optimal performance and low total cost of ownership** are made possible with available IoT solutions that monitor equipment performance and predict maintenance issues before they happen. Read more about RedRaven equipment monitoring solutions on page 8.

## Versatility for wide-ranging application

With more than a dozen specialty configurations (see pages 7, 10 and 11) and options as well as an extensive hydraulic range, the HPX pump delivers efficient operation in numerous applications within the process industries and beyond.

### Typical industries and applications

- Petroleum refining, production and distribution
- Petrochemical and chemical processing
- Gas industry services
- Boiler circulation
- Water
- Reverse osmosis desalination
- Biofuels
- Solar
- High-temperature applications
- General industrial

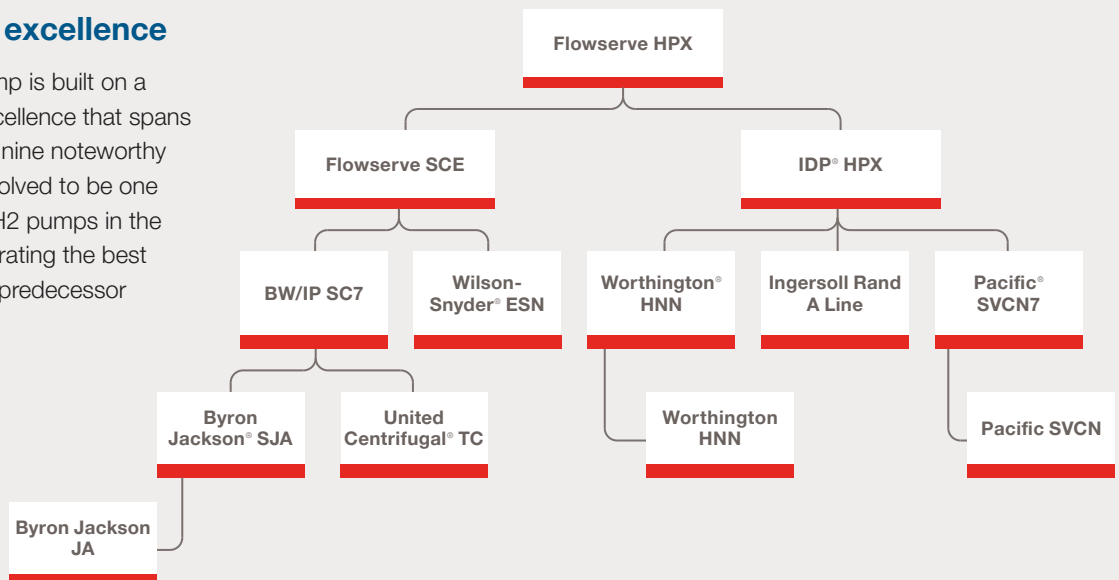
### Typical operating parameters

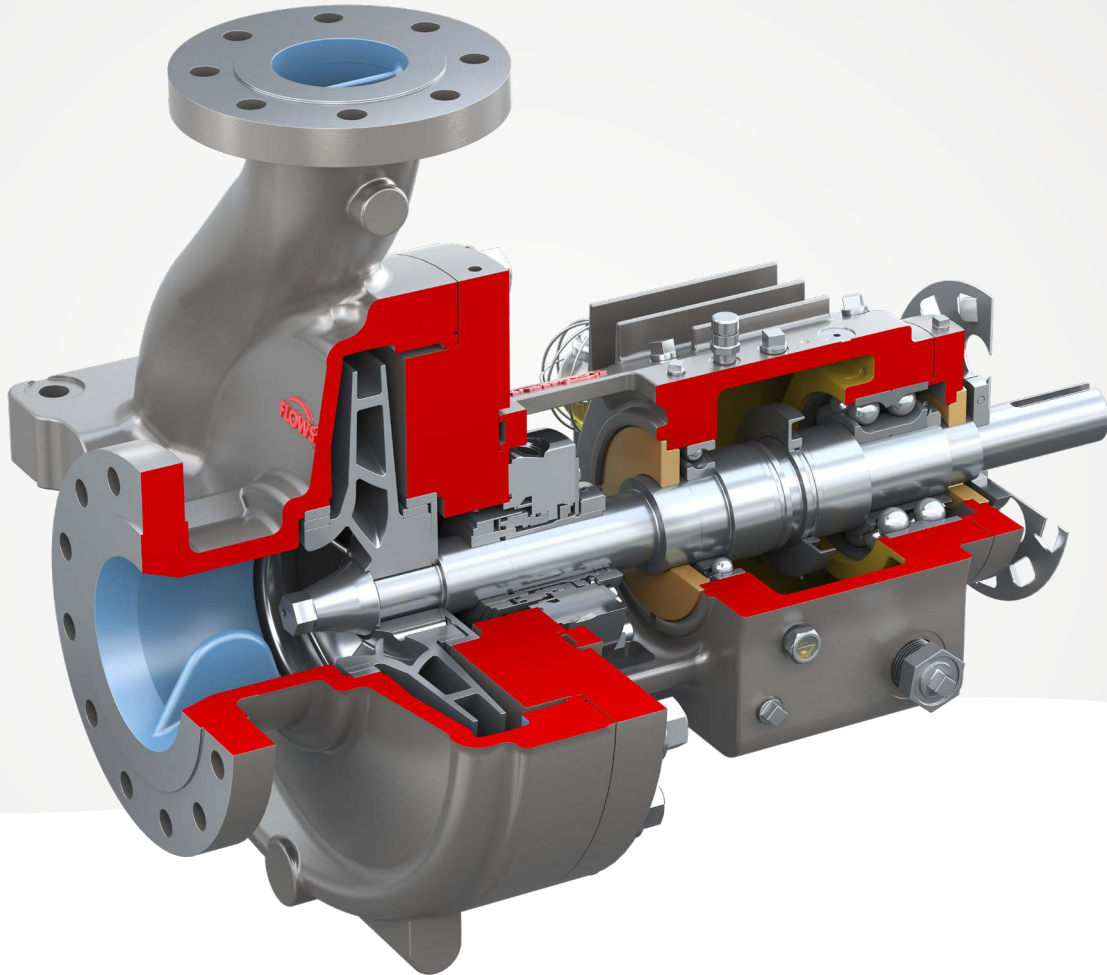
- Rated flows to 5,000 m<sup>3</sup>/h (22,014 gpm)
- Heads to 350 m (1,148 ft)
- Standard pressure limits in accordance with API 610 latest edition
- Temperatures to 450°C (842°F)
- Discharge sizes from 25 to 457 mm (1 to 18 in.)



## A legacy of excellence

Today's HPX pump is built on a foundation of excellence that spans six decades and nine noteworthy brands. It has evolved to be one of the leading OH2 pumps in the industry, incorporating the best features of each predecessor along the way.





## Engineering OH2 pump users need

**Centerline supported pump casing** withstands nozzle loads beyond API 610 design requirements and minimizes shaft misalignment, extending rotor, bearing and seal life.

**Pump casing and cover** feature metal-to-metal fit with a fully confined, controlled compression gasket to ensure proper sealing and alignment.

**Raised face flanges** are to ASME B16.5 criteria for Class 300 or 600. Surface finish meets API 610 standard. ISO and JIS flanges are available.

**Back pullout design** simplifies maintenance, as neither the motor or the piping is disturbed.

**Precision cast impeller** is dynamically balanced to limit vibration and assure smooth operation over a wide flow range. Impeller is positively secured by means of a set screw and a locknut.

**Renewable wear rings** for both the casing and impeller reduce replacement parts cost. Secured by set screws or tack welds. Back wear ring is standard on all pump sizes. Optional arrangements are available depending on specific hydraulic/service conditions. Non-metallic wear rings are available.

**Redesigned bearing housing** provides improved reliability and mean time between repair (MTBR) at higher process temperatures due to superior bearing lubrication and heat dispersion.

**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 API 610 seal flush piping plans is available.

**Rugged shaft design** is well within API shaft deflection and run-out criteria.

# Advanced bearing housing

## Superior performance and value

With its redesigned bearing housing, the HPX pump provides even better performance and lower lifecycle costs.

- **Improved performance, reliability and service life** from superior bearing lubrication and heat dispersion that enables the pump to better withstand higher process temperatures.
- **Reduce water cooling** and associated costs in many applications due to improved heat dispersion.
- **Simplified installation** thanks to our skid design that minimizes cooling, piping and instrumentation and reduces capital expenditures.
- **Lower maintenance costs** due to extended MTBR, ample sump volume, reduced cooling water usage and simpler skid design.
- **Faster delivery** due to streamlined manufacturing process.

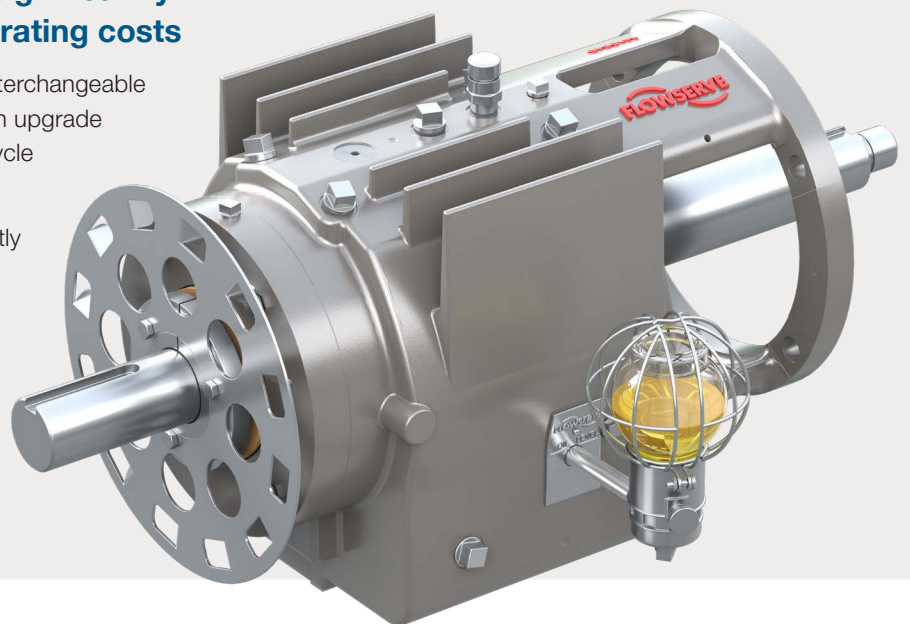
## Key features and benefits

- **Optimized inner slinger** effectively lubricates bearings.
- **Finned upper surface** improves heat dispersion.
- **Ample oil sump** extends maintenance intervals and improves cooling capability.
- **Simplified oil collectors** ensure adequate oil flow.
- **Top-side oil passage** further improves lubrication and heat dispersion.
- **Optional dual temperature sensors** are available for each bearing to ensure data accuracy.
- **Multiple collectors** support CW or CCW rotation, enabling retrofits of competitor pumps.

## Backward compatibility can significantly reduce maintenance and operating costs

The redesigned HPX bearing housing is interchangeable with previous models. That means you can upgrade your existing HPX pumps to reap the lifecycle cost savings of the improved design.

What's more, you may be able to significantly reduce operating costs: many existing pumps that require water cooling may no longer need it with the redesigned bearing housing. Flowserve engineering can help you identify opportunities where water cooling can be eliminated.



# Options

## Bearing arrangements

The HPX pump is available with numerous bearing arrangements and options. Flowserve engineering can help you select the most appropriate arrangement for your specific applications.

- Standard single row, deep groove, radial bearing and duplex, single row, 40° angular contact thrust bearings provide a minimum system bearing life of 25,000 hours uninterrupted service, as required by API 610.
- Special bearing arrangements are available for high suction pressures.

## Oil seals

- Standard labyrinth-type oil seals retain oil and exclude atmospheric contaminants and moisture.
- Bearing isolators are available.

## Lubrication methods

- Oil slinger
- Purge oil mist
- Pure oil mist

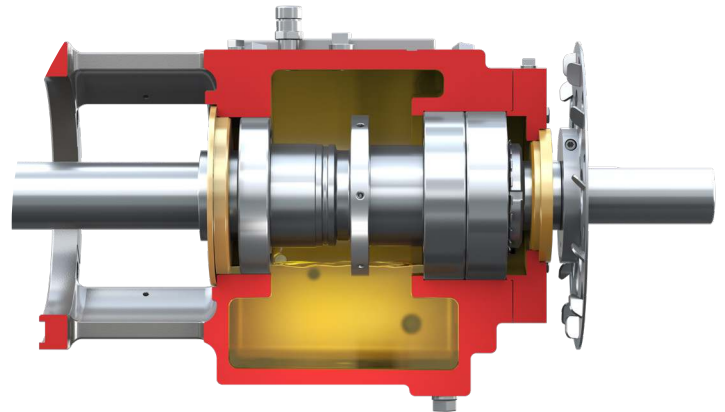
## Cooling methods

- Standard cooling method is natural convection provided by the finned bearing housing surface.
- Fan cooling option uses forced convection between upper fins and surrounding atmosphere to improve heat dispersal.
- Available cooling water option is required for hot stand-by conditions only.

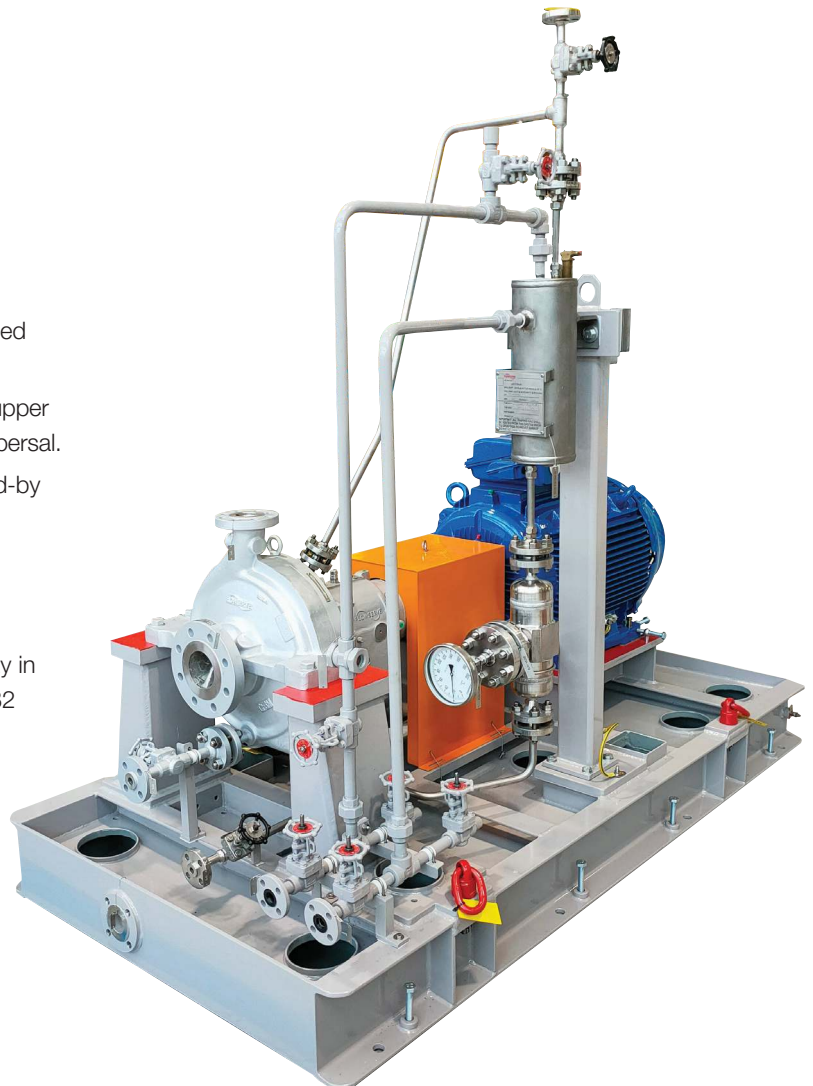
## Seals, seal plans and seal systems

The HPX pump provides significant application flexibility in regard to sealing systems. It accommodates all API 682 seal plans and a wide variety of seals, including dual pressurized and unpressurized cartridge types for the most severe services.

Flowserve engineering can help you select the optimal seal system for your specific applications.



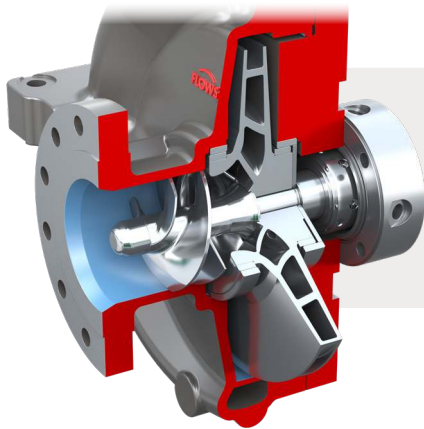
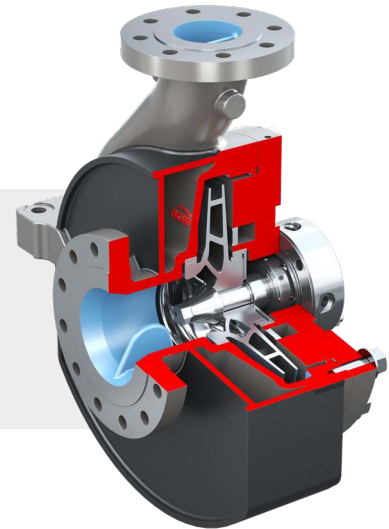
*Side view cut of bearing housing*



## Application-specific options

### Jacketed casings and covers

The HPX pump is available with jacketed casings and covers to provide process temperature control and safety. Whether for heating or cooling, jacketed casings and covers ensure maximum uptime in applications wherein the process fluid can solidify and lock up rotating equipment.

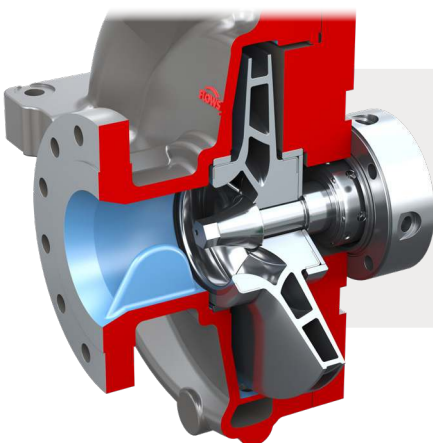
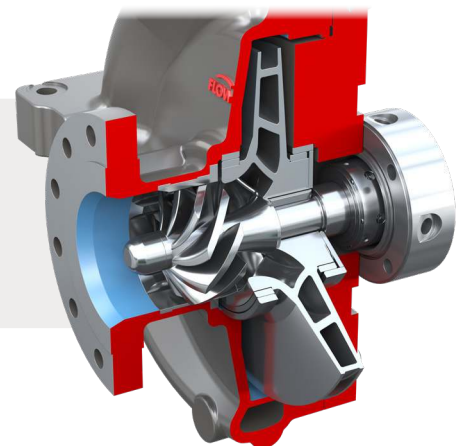


### Inducer

For applications with low NPSHA, the HPX pump can be fitted with an optional inducer. This high-suction specific speed, axial flow pumping device provides significant improvement in suction performance by reducing pump NPSHR.

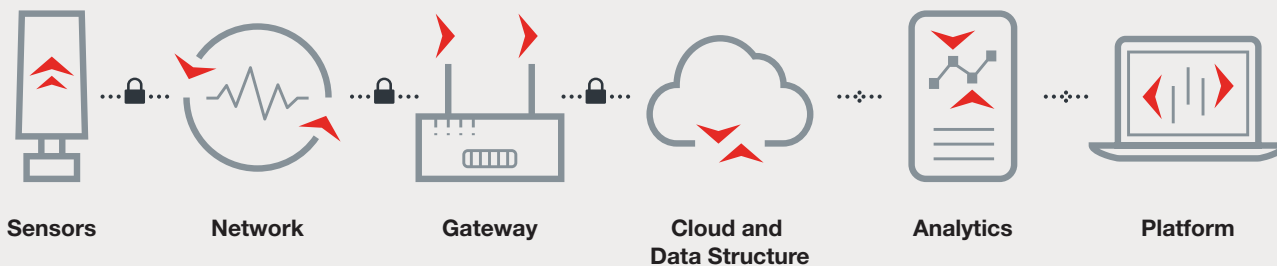
### Coke crusher

Incorporating a special cutter screw, the coke crusher facilitates the handling of coke particles in suspension. By reducing their size, the cutter screw enables the coke particles to easily pass through the impeller.



### Ringless impeller

For applications that cause significant impeller wear, the HPX pump can be supplied with a specialized impeller design that forges wear rings and incorporates a rotating wear surface embedded on the impeller hub. This design typically includes a surface hardening treatment as well.



## Improve uptime and TCO with predictive maintenance

Flowserve HPX pumps are RedRaven Ready. RedRaven is a predictive maintenance service from Flowserve that improves plant performance by detecting anomalies in pumps, valves and seals. It enables you to predict when and why your critical assets may experience issues so you can take preventive action.

RedRaven is a complete end-to-end proactive maintenance solution. It enables you to leverage the internet of things (IoT) for a connected platform of smart products, software and services. It gives you the tools you need to monitor, analyze and predict the performance of your pumps, seals and valves, as well as the insights you need to make more informed decisions for improving your plant's reliability, efficiency, productivity and bottom line.



### A ready-to-deploy, scalable solution

Most Flowserve fluid motion and control equipment is RedRaven Ready. That means it's designed and built to accept RedRaven wired or wireless sensors using cloud architecture for condition monitoring and predictive analytics services.

RedRaven Ready pumps, seals and valves securely connect to an IoT platform that includes hazardous area-certified equipment sensors, secure communication, performance analytics and trend reporting tools — all tailored to your plant's unique needs.

Options include:

**Condition monitoring:** Enables you to capture asset performance data for analysis

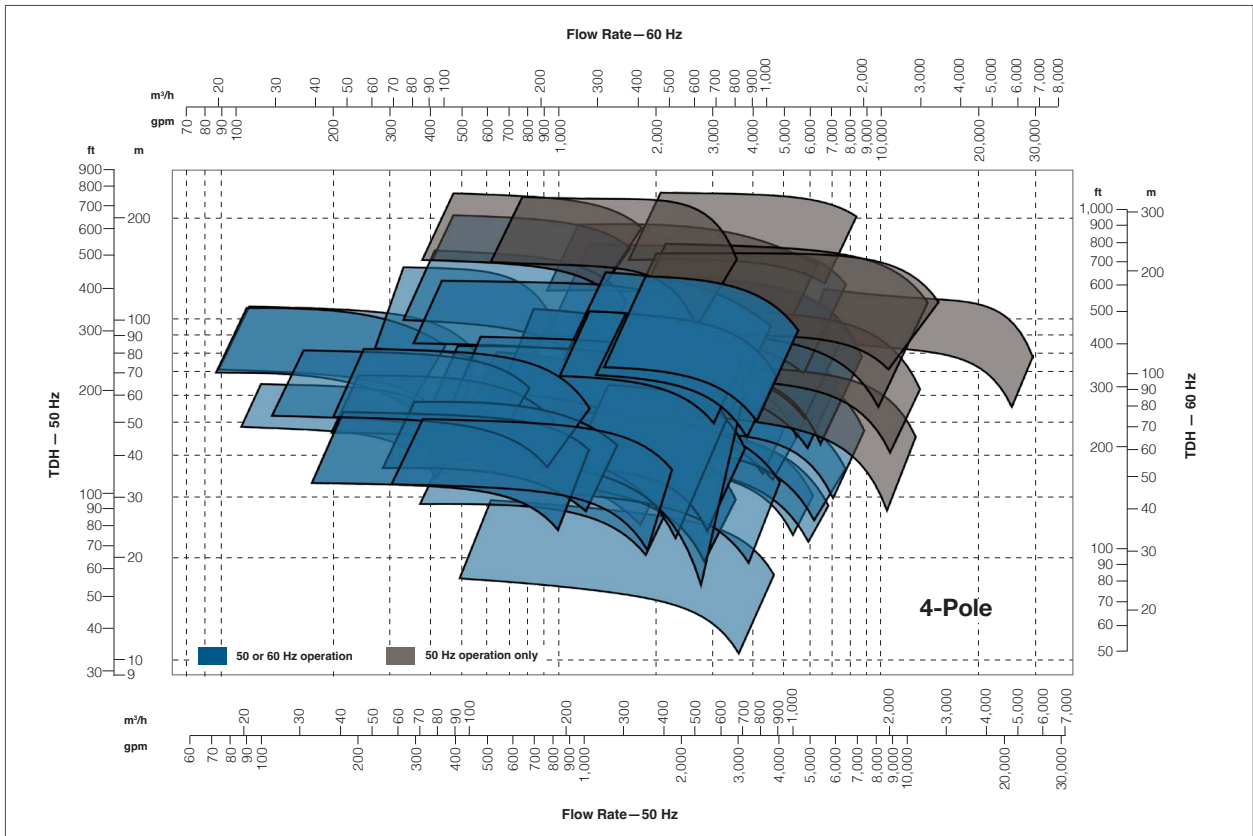
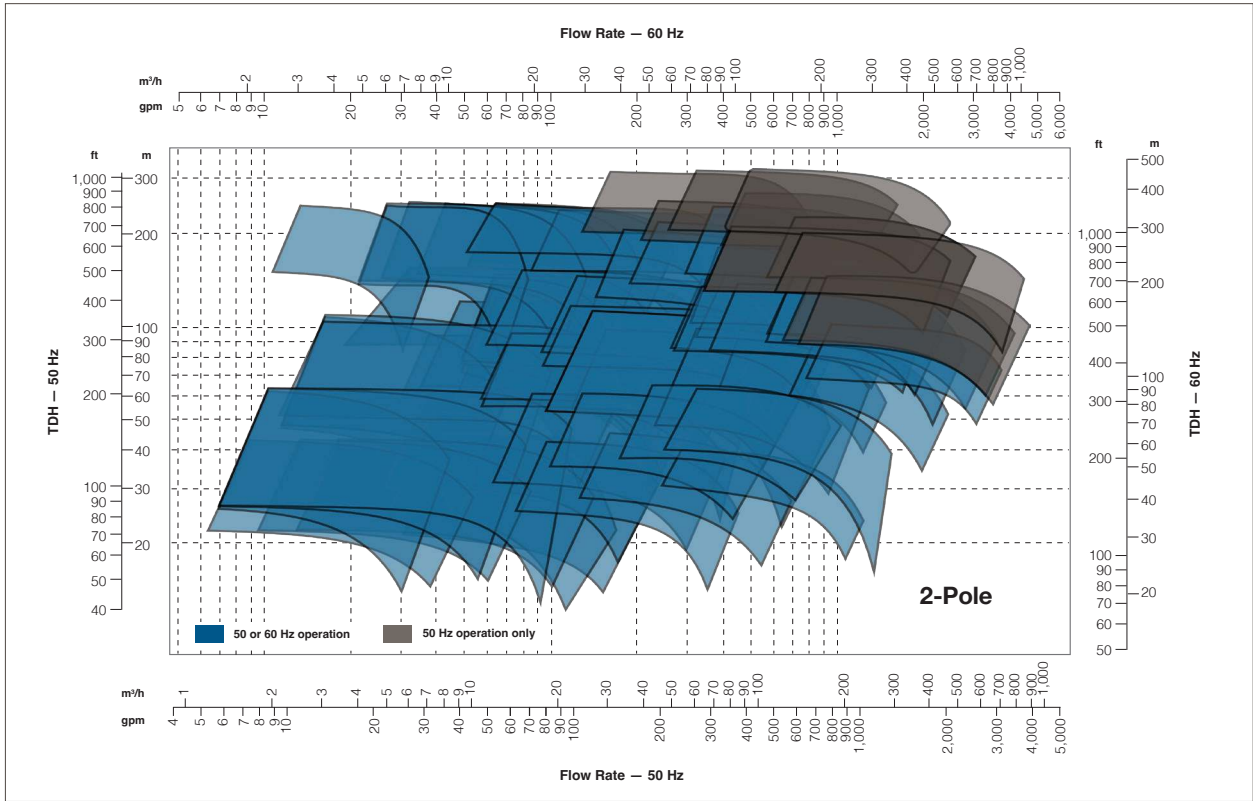
**Predictive analytics:** Applies data analysis software and algorithms to help you identify and diagnose equipment problems

For more information on RedRaven, contact your Flowserve representative or visit [www.flowserve.com/redraven](http://www.flowserve.com/redraven)





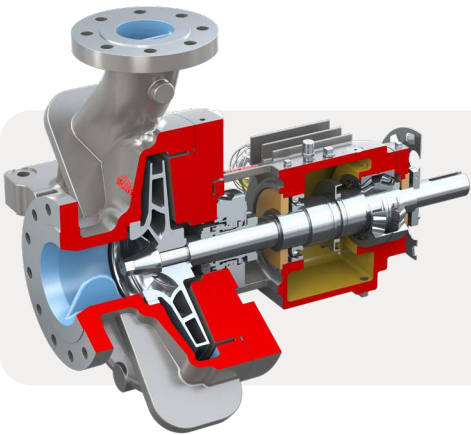
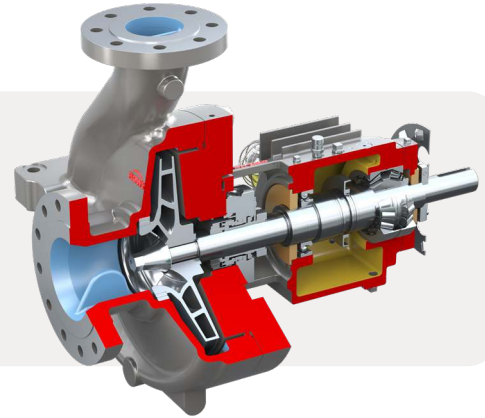
# Hydraulic coverage



## Specialty configurations

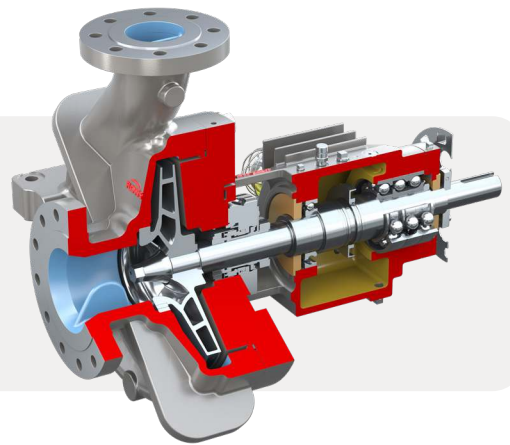
### HPX-MP – Medium-pressure design

The HPX-MP pump incorporates a special bearing arrangement with tapered thrust roller bearings. This design supports suction pressures up to 35 bar (500 psi) and maximum working pressures in accordance to API limits.



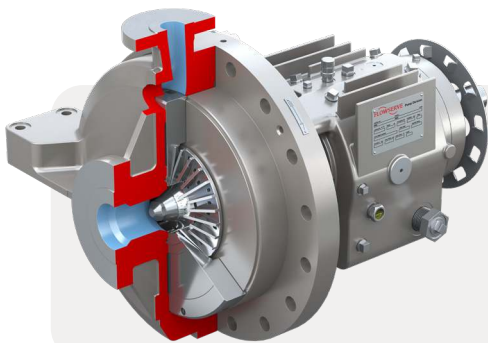
### HPX-H – High-pressure design

Engineered for discharge pressures to 150 bar (2,175 psi), the HPX-H pump features a heavy-duty casing capable of handling suction pressures to 75 bar (1,088 psi) and a high axial thrust rotor with anti-friction roller bearings that are reliable for 25,000 hours of operation.



### HPX-HX – Triplex design

For applications involving both high speed and high pressure, the HPX-HX pump is the solution. It incorporates three angular contact ball bearings at the drive end to ensure proper handling of axial loads.

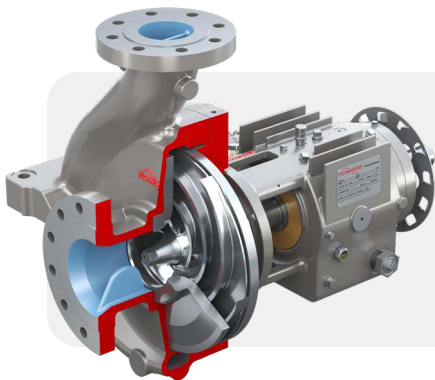


### HPXM – Low-flow, high-head design

With a multiple radial blade impeller and a custom machined casing or volute insert the HPXM pump provides best efficiency point hydraulic fits. Custom-tuned hydraulic deliver a stable, rising performance curve to minimum continuous flow. It is often specified for viscous process fluids.

### HPX-V — OH3 vertical in-line design

The HPX-V vertical in-line pump allows you to save space without giving up performance. Its compact API 610 (OH3) construction makes it ideal for high-pressure, high-temperature applications where installation space is limited.

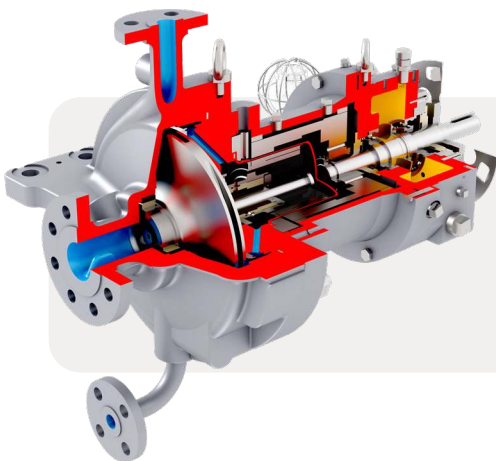
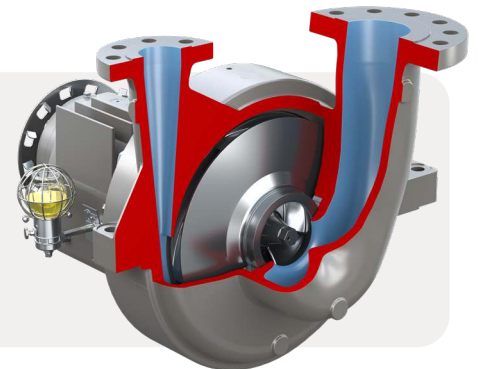


### HPX-SL — Slurry design

The HPX-SL pump is equipped with a semi-open impeller suitable for handling slurries and long chain hydrocarbons that tend to polymerize and clog closed impellers.

### HPX-TOP — Top-top nozzle design

The HPX-TOP pump features a special casing design with top suction and top discharge nozzles. The top-top nozzle arrangement simplifies piping layout and generally reduces the installation footprint.



### HPX-MAG — Magnetic drive design

The HPX-MAG sealless pump provides outstanding leakage protection and can handle the high pressures, temperatures and aggressive/toxic media often found in the process industries. It is fully compliant with the API 685.



Flowserve Corporation  
5215 North O'Connor Blvd.  
Suite 700  
Irving, Texas 75039-5421 USA

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