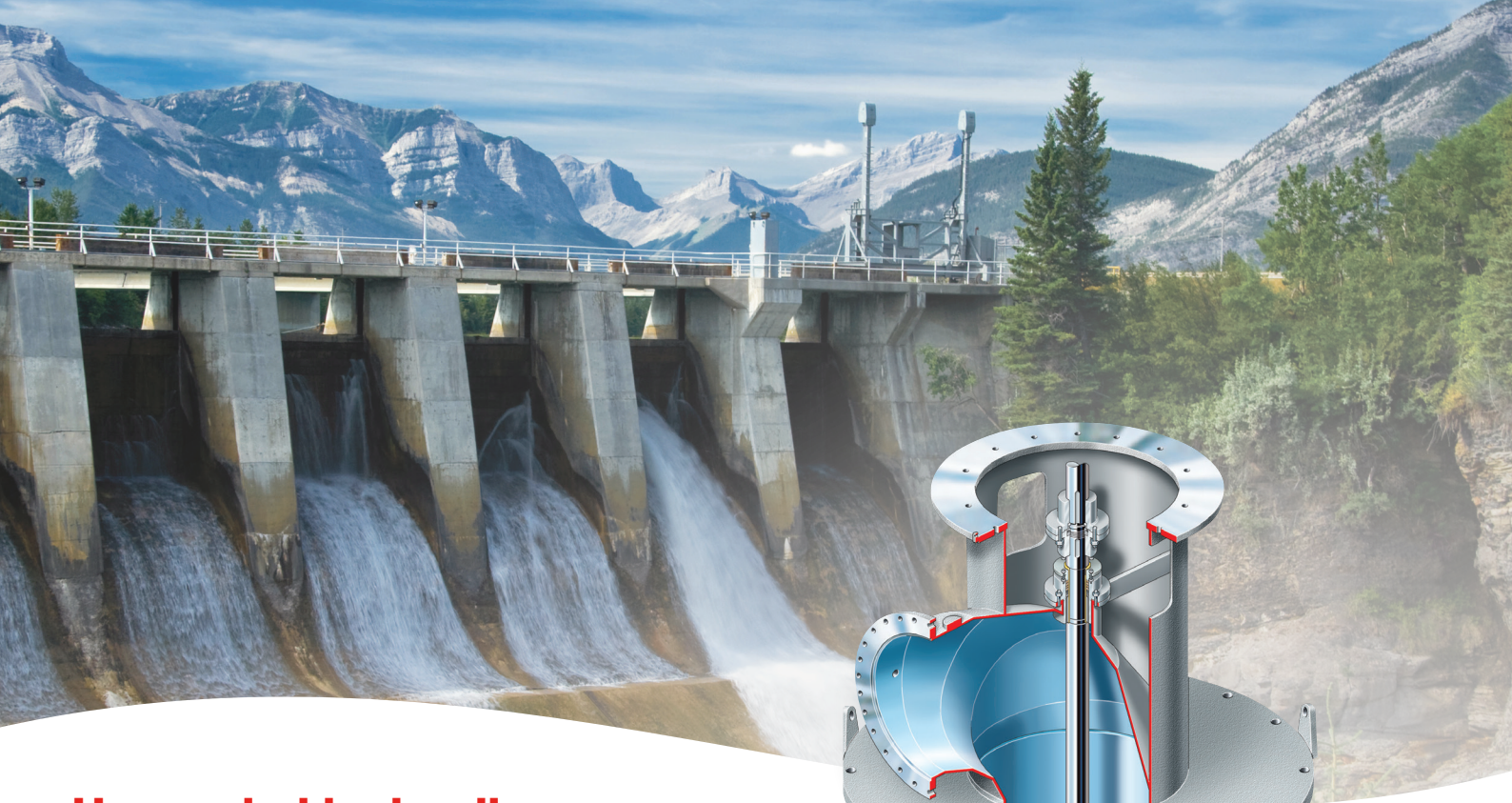




# **VCT** **Vertical Mixed Flow Circulating Pump**



*Experience In Motion*



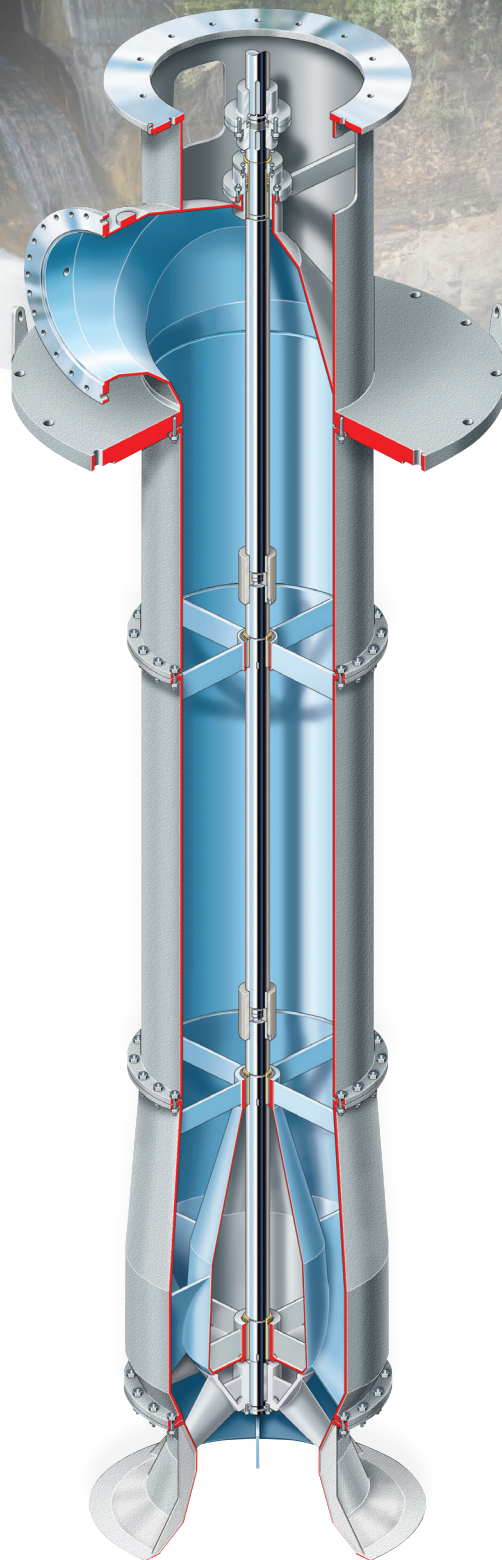
## Unequaled hydraulic coverage and design flexibility

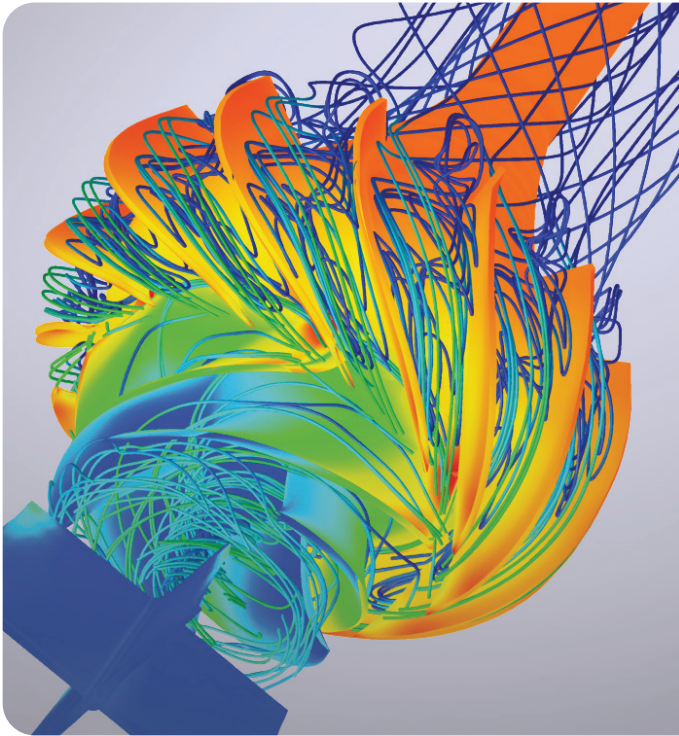
The Flowserve VCT mixed-flow circulating pump is designed for continuous duty in wet-pit applications requiring high capacities at relatively low pressures.

Flowserve designed the VCT pump to provide outstanding reliability and extended service life across a broad range of industries and applications. Available in single-stage and multistage units, it is engineered in accordance with Hydraulic Institute and AWWA standards. Multiple hydraulic combinations enable precise configuration to match unique requirements and maximize efficiency.

### Trouble-free, high-capacity operation

- **Enhance flow:** The five-mitered elbow discharge head is designed to accept the continuous, system reaction forces and reduce friction loss.
- **Prevent shaft and bearing damage:** The inner column (enclosing tube) is internally pressurized to lubricate bearings during operation.
- **Maximize performance:** Shafting is designed for maximum torque and horsepower conditions.
- **Optimize efficiency:** The semi-open impeller and shroud design offer easily renewable clearances for optimum efficiency. Dynamic balancing of the finish-machined impeller ensures low vibration levels. Optional enclosed impeller design and multistage configurations are available.





## Proven design and options to meet unique requirements

Flowserve VCT pumps are designed for extended operation in services where large capacities are required at relatively low pressures. Ideal for wet-pit installations, they offer a high degree of design flexibility to meet installation requirements, such as:

- Above- or below-grade discharge configurations
- Self-lubricated, fresh water injection or oil-lubricated column construction
- Multi-floor mounting
- Pullout and non-pullout construction

To ensure proper pump design, Flowserve offers extensive testing and analytical capabilities, including computational fluid dynamics (CFD), finite element analysis (FEA) as well as torsional, lateral, seismic and vibrational modeling.

## Application versatility

Flowserve VCT pumps are engineered to perform in a wide range of industries and applications. Broad hydraulic coverage is combined with numerous configurations, materials of construction and options to provide the best pump selection for a wide variety of services.

### Principle industries and applications

- Power
  - Circulating water
  - Condenser cooling
- Desalination
  - Source water intake
  - Screening
- Water resources
  - Water supply
  - Wastewater treatment
  - Drainage
  - Flood control
  - Irrigation
- Oil and gas
- General industries

### Operating parameters

- Flows to 181,700 m<sup>3</sup>/h (800,000 gpm)
- Heads to 110 m (350 ft)
- Sizes from 1,200 to 3,380 mm (48 to 133 in.)

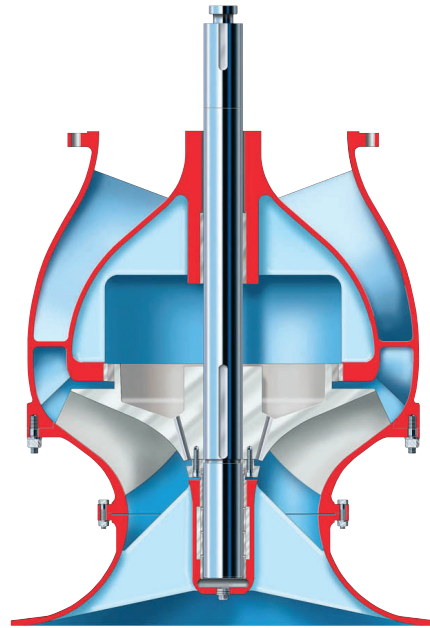


# Configurations and options

## Liquid end configurations

Flowserve offers numerous performance and reliability enhancing features for the VCT pump casings and suction bells, including:

- Cast or fabricated bowl assembly
- Axially balanced wear rings for reduced thrust loads
- Enclosed impeller designs
- Integrated suction bell bearing bracket
- Multiple stages
- Conservative design stresses to enable extended pump life



*Liquid end with optional back rings and bottom bearings*

## Outer column designs

The outer column is fabricated in a wide variety of materials and is designed for optimum sealing between flange faces to reduce corrosion. Column flanges employ precision rabbet fits and positioning pins to ensure proper alignment and orientation of each section. Where necessary, support feet for blocking are provided at proper locations to simplify assembly and disassembly.

The column diameter is designed for a maximum fluid velocity of 4.6 m/s (15 ft/s). Maximum column length is 6 m (20 ft).

The VCT pump is available with multiple outer column designs:

- Straight and tapered
- With or without bearing holders, which can also be removable
- With or without centering dowel pins

## Lineshaft bearing lubrication options

Extend bearing and pump life with proper lubrication — particularly in applications with solids and abrasives. Flowserve engineering will help select the optimal lubrication system for your application. Options include:

- Self-lubricated
- Fresh water injection
- Oil lubricated
- Grease lubricated



*Pullout design with below-ground discharge*

## Axial thrust bearing assembly

Axial thrust bearings withstand the total pump hydraulic thrust as well as the rotor weight. Self-lubricating, anti-friction bearings are utilized for standard applications.

- NEMA applications include a thrust bearing within the motor.
- IEC applications require the thrust bearing to be integral to the pump.

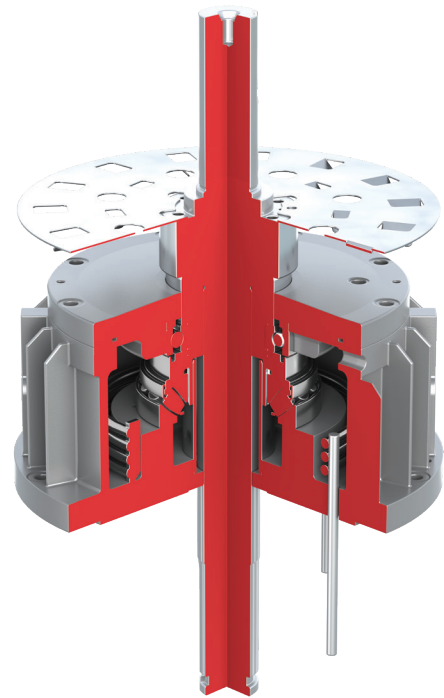
## Sealing configurations

Sealing configurations include packed box with flexible graphite packing and mechanical seals. Mechanical seals provide increased reliability and functionality for VCT pumps:

- Easy access for maintenance and parts replacement
- Single and dual arrangements available
- Multiple seal piping plans available

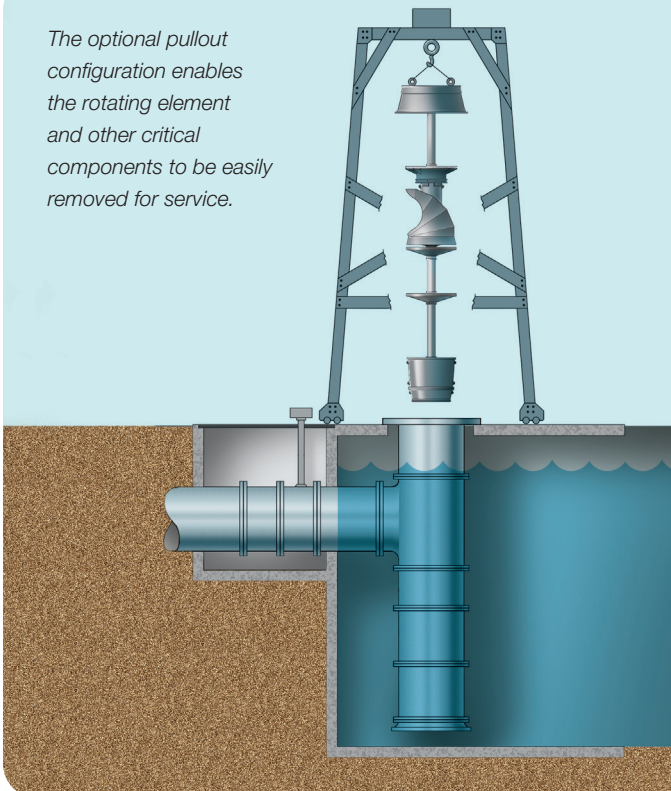
## Multiple driver options

Flowserve VCT pumps are available with multiple driver options, including electric motors, diesel engines with right-angle gears and steam turbines.



*Integral thrust bearing design*

*The optional pullout configuration enables the rotating element and other critical components to be easily removed for service.*



## Specialty configuration: Optional pullout unit

In addition to above- and belowground discharge configurations, VCT pumps are available in an optional pullout design. This option enables the rotating element and critical non-rotating wear components to be quickly and easily removed without disconnecting the discharge pump or removing the column assembly and bell.

This option is recommended for belowground discharge installations and pump settings greater than 8 m (25 ft).

The pullout element includes:

- Impeller and shroud
- Bowl
- Bearings
- Wear rings
- Turning vane assembly
- All rotating components



## Intake arrangements

Multiple intake arrangements are available:

- Open pit
- Formed suction intake (FSI)
- Suction elbow
- Vortex suppression basket
- Suction barrel

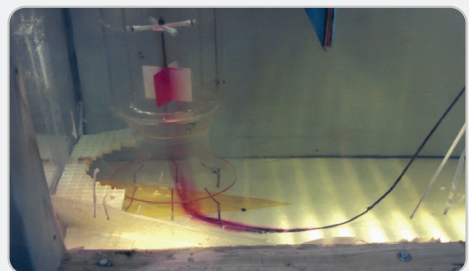
## Intake model studies

The Hydraulic Institute recommends a physical model study be conducted for pumps with flows greater than 2,520 l/s (40,000 gpm) or stations with a total flow greater than 6,310 l/s (100,000 gpm).

Flowserve can perform optional intake model tests to verify and optimize pump performance in simulated application conditions. Testing is conducted by third-party laboratories specializing in model studies.

Intake studies using physical models can:

- Identify and correct unacceptable flow patterns, such as vortices, pre-swirl, flow separation and non-uniform fluid velocity
- Save significant time and costs by optimizing the sump prior to pump installation and operation
- Avoid on-site performance issues, which are more difficult and expensive to resolve

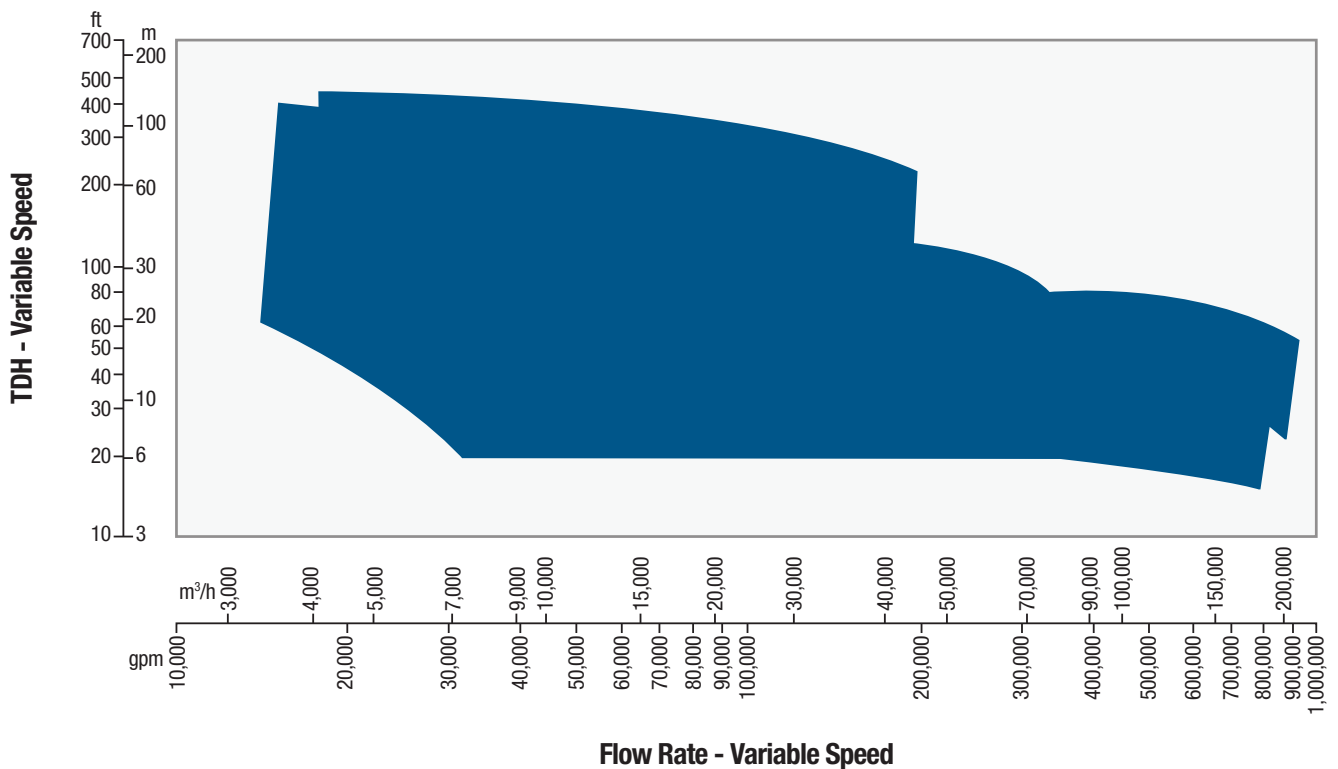


# Performance capability

## Operating parameters

- Flows to 181,700 m<sup>3</sup>/h (800,000 gpm)
- Heads to 110 m (350 ft)
- Sizes from 1,200 to 3,380 mm (48 to 133 in.)

## Range chart



## Maximize performance with IoT condition monitoring and predictive analytics

VCT pumps are compatible with advanced internet of things (IoT) solutions such as RedRaven condition monitoring from Flowserve. Flowserve RedRaven IoT solutions give you the insights and tools you need to monitor, analyze and predict equipment performance — so you can respond to problems quickly and minimize disruptions and downtime.



Ask your Flowserve representative about optional RedRaven IoT monitoring packages or visit [flowserve.com/iot](https://flowserve.com/iot) to learn more.





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