

WUC
API 610 (VS6)
Vertical
Multistage
Double Casing
Process Pumps

Pump Supplier To The World

Flowserve is the driving force in the global industrial pump marketplace. No other pump company in the world has the depth or breadth of expertise in the successful application of pre-engineered, engineered and special purpose pumps and systems.

Pumping Solutions

Flowserve is providing pumping solutions which permit customers to continuously improve productivity, profitability and pumping system reliability.

Market Focused Customer Support

Product and industry specialists develop effective proposals and solutions directed toward market and customer preferences. They offer technical advice and assistance throughout each stage of the product life cycle, beginning with the inquiry.



Dynamic Technologies

Flowserve is without peer in the development and application of pump technology, including:

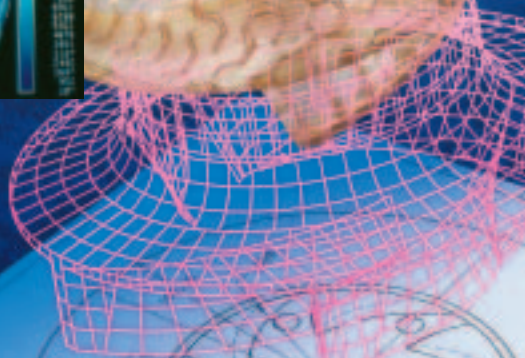
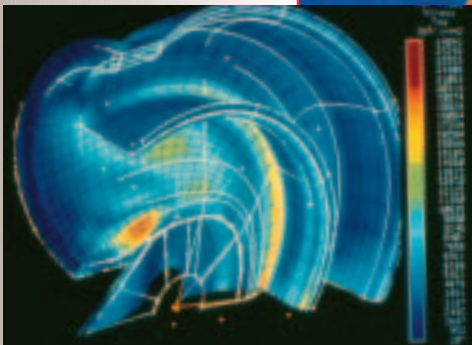
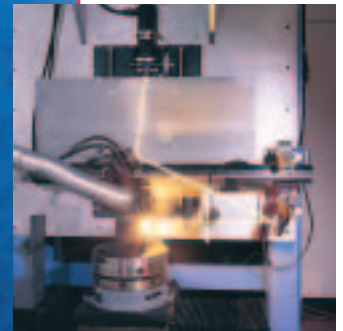
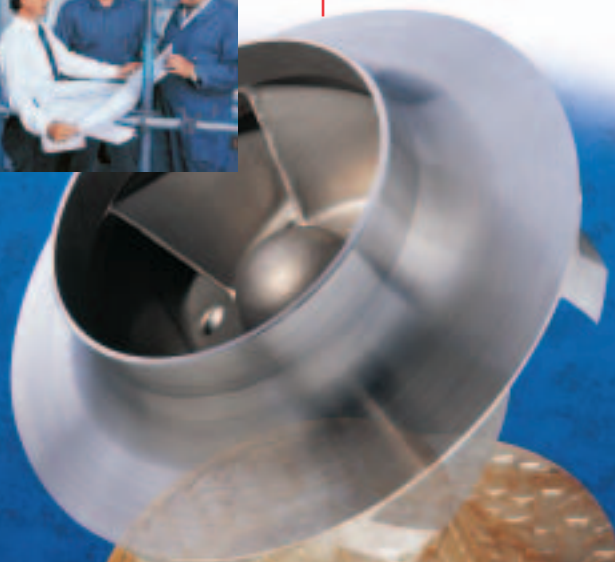
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

Broad Product Lines

Flowserve offers a wide range of complementary pump types, from pre-engineered process pumps, to highly engineered and special purpose pumps and systems. Pumps are built to recognized global standards and customer specifications.

Pump designs include:

- Single stage process
- Between bearing single stage
- Between bearing multistage
- Vertical
- Submersible motor
- Rotary
- Reciprocating
- Nuclear
- Specialty



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The Ultimate Double Casing Vertical Pump

The model WUC covers the highly engineered specialty end of the Flowserve family of double casing vertical pumps. The pump line is based on a modular system, thus providing maximum design and operating flexibility. This is combined with specific design features, including stiff shaft construction, a self-contained axial thrust bearing housing and pressure containing parts certified to various international standards. Altogether, this makes the WUC the pump of choice for the most critical applications where space considerations or marginal NPSHA values preclude the use of a horizontal multistage pump.

Choice of Hydraulic Design

to best meet service requirements

- Radial flow hydraulics for low flow, high head applications, and featuring:
 - Stage casings with separate diffusers
 - Casings retained by tie-bolts
 - Interstage bushings and sleeves
- Mixed flow hydraulics for high flow, low head applications, and featuring:
 - Integral diffuser design bowls
 - Individually bolted bowls connected to column pipe
 - Fluid lubricated line bearings, located between each stage

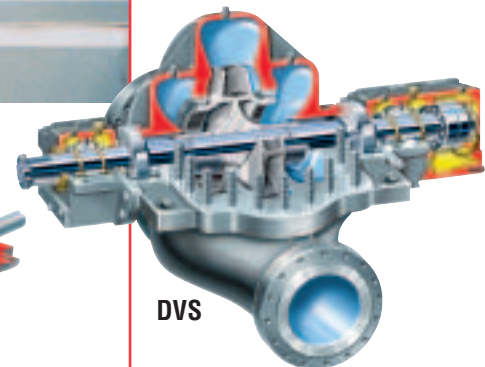
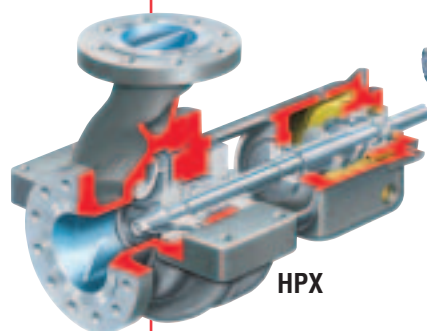
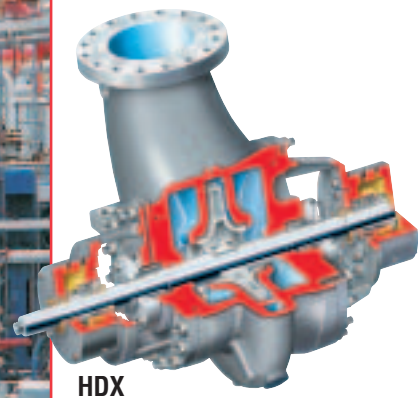
Broad Application

- Hydrocarbon booster and transfer
- Pipeline booster
- Chemical and petrochemical transfer
- Condensate
- Brine injection
- Heater drain
- Crude oil loading
- Condensate extraction
- Snowmaking
- Cryogenic service

Complementary Pump Designs

Depending upon application requirements, Flowserve can also provide these designs:

- Single stage, axially and radially split between bearing pumps
- Multistage, axially and radially split between bearing pumps
- Overhung, centerline mounted process pumps



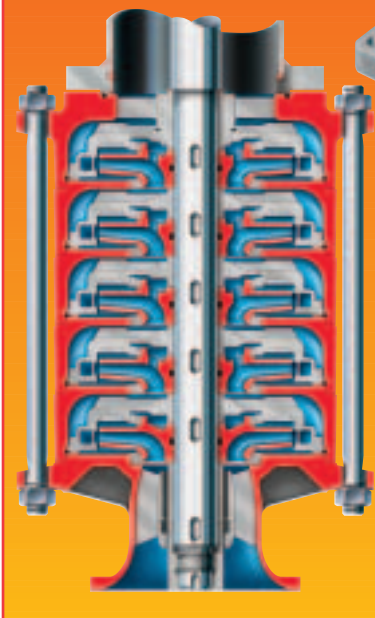
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Flowserve's WUC vertical turbine is a radial flow or axial flow type, multistage, heavy-duty double casing pump. It is designed for continuous unspared duty at a variety of high pressure services, operating at temperature extremes and handling difficult liquids.

Designed to International Standards

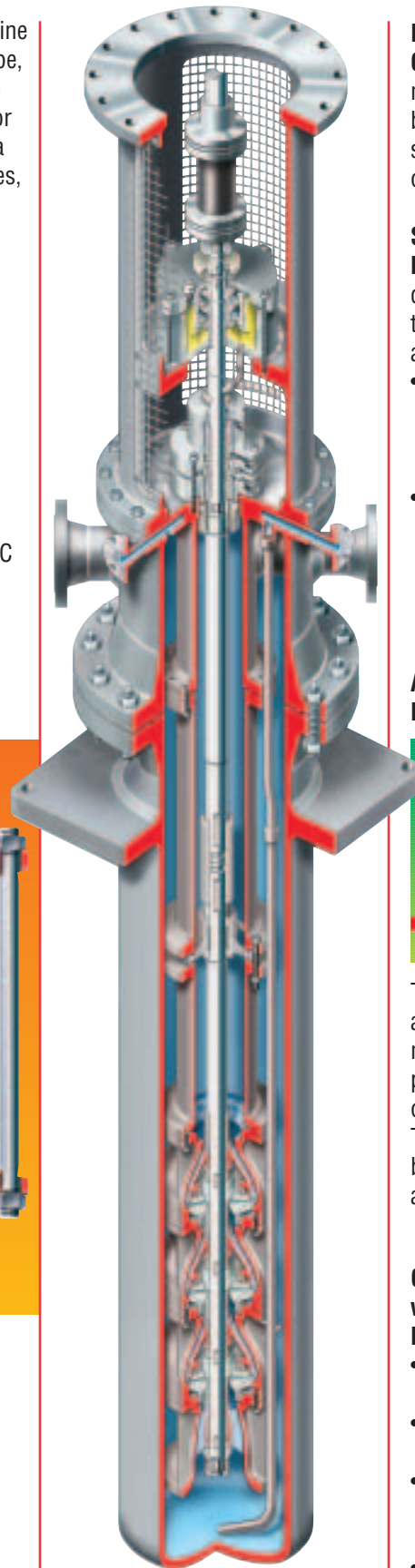
- API 610, latest edition
- ASME Sections VIII and IX
- German Pressure Vessel Association (AD)
- British Standard BS 5500
- Compliance with Pressure Equipment Directive 97/23/EC

Radial Flow Hydraulics and Tie-Bolt Design



Operating Parameters with Radial Flow Hydraulics

- Flows to 500 m³/h (2200 gpm)
- Heads to 2000 m (6500 ft)
- Temperatures from -200°C (-325°F) to 200°C (400°F)
- Pressures to 200 bar (3000 psi)



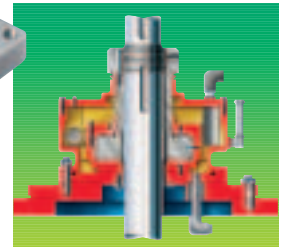
Mixed Flow Hydraulics and Integral Diffuser Design
API 610 (VS6)

Flanged Spacer Type Coupling permits easy maintenance of thrust bearings and mechanical seals without disturbing or removing driver.

Separate Axial Thrust Bearing Assembly

- designed to withstand total hydraulic thrust and rotor weight
- Self-contained oil lubricated, anti-friction bearings for standard applications
 - Tilting pad thrust bearings for high horsepower or high thrust applications

Axial Thrust Tilting Pad Bearing



This bearing configuration allows use of standard motors for high horsepower or ultra-high thrust operating conditions. The bearings lubricated by oil and controlled by a lube oil system.

Operating Parameters with Mixed Flow Hydraulics

- Flows to 3000 m³/h (13 000 gpm)
- Heads to 600 m (1950 ft)
- Temperatures from -200°C (-325°F) to 350°C (660°F)
- Pressures to 64 bar (900 psi)



Reinforced Motor Stand ensures rigid structural design

Screen-type Non-sparking Coupling Guard provides safety while allowing visual inspection of coupling and mechanical seal areas

Stiff Shaft Design ensures stable operation under all service conditions

Discharge Head, with in-line flanges in any required rating, incorporates all gauge, vent and drain connections

Inside Drain Line permits complete draining of suction barrel

Low Suction Velocity Can Design results in optimum hydraulic inlet conditions at suction bowl inlet

Centerline Aligned and Flanged Columns ensure total indicator readings well within API 610 limits

API 682 Compliant Mechanical Seal Chamber accommodates all cartridge mounted seal designs, including: single and dual pressurized or unpressurized liquid; and gas designs

Engineered gas coffer dam seal system available for cryogenic services

Guide Bushing and Bearing Material selected to meet fluid requirements

Casing and Impeller Wear Rings, with a minimum 50 Brinell hardness difference between them, prevent galling, allow economical retention of operating efficiency, and maintain mechanical stability

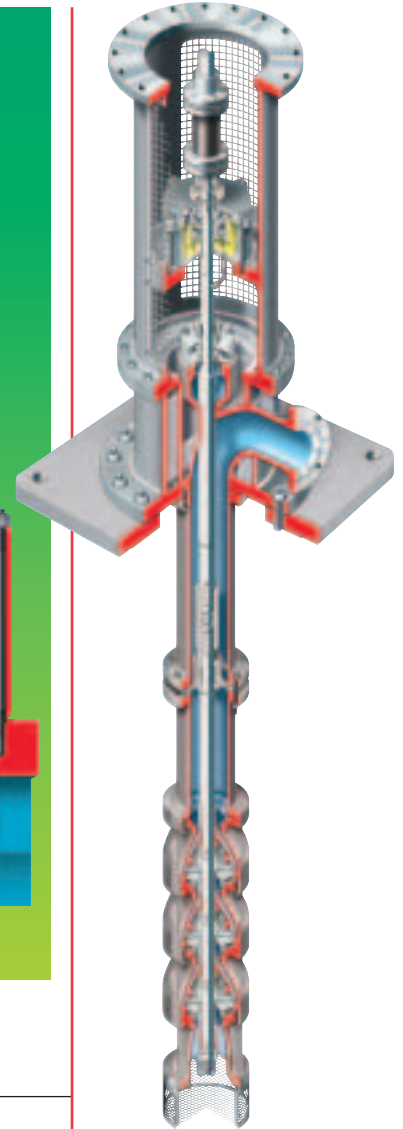
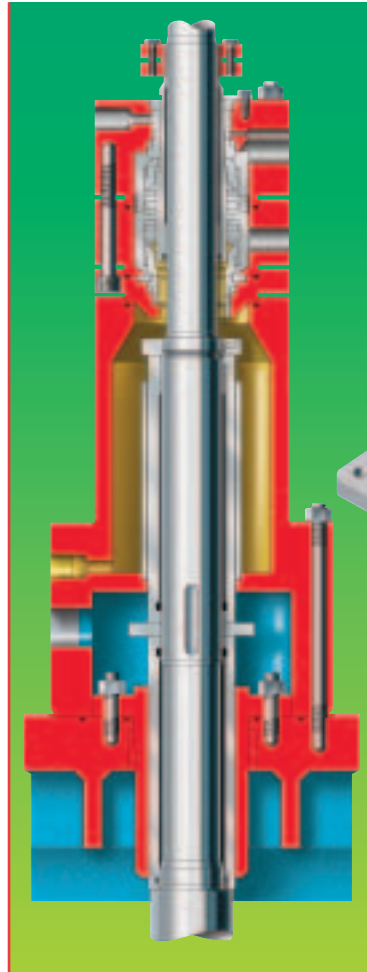
Options and Technical Data

Coffer Dam System

This highly engineered design for cryogenic applications provides for a gas barrier between the pumped fluid and the mechanical seal. The seal, with back-to-back seal face arrangement, results in the inner seal being subjected only to gas at 2 bar (30 psi) above suction pressure. Therefore, no icing can occur and the barrier fluid can be pressurized with nitrogen at low pressure. Due to the low pressure and the ice-free seal environment, standard mechanical seals can be used.

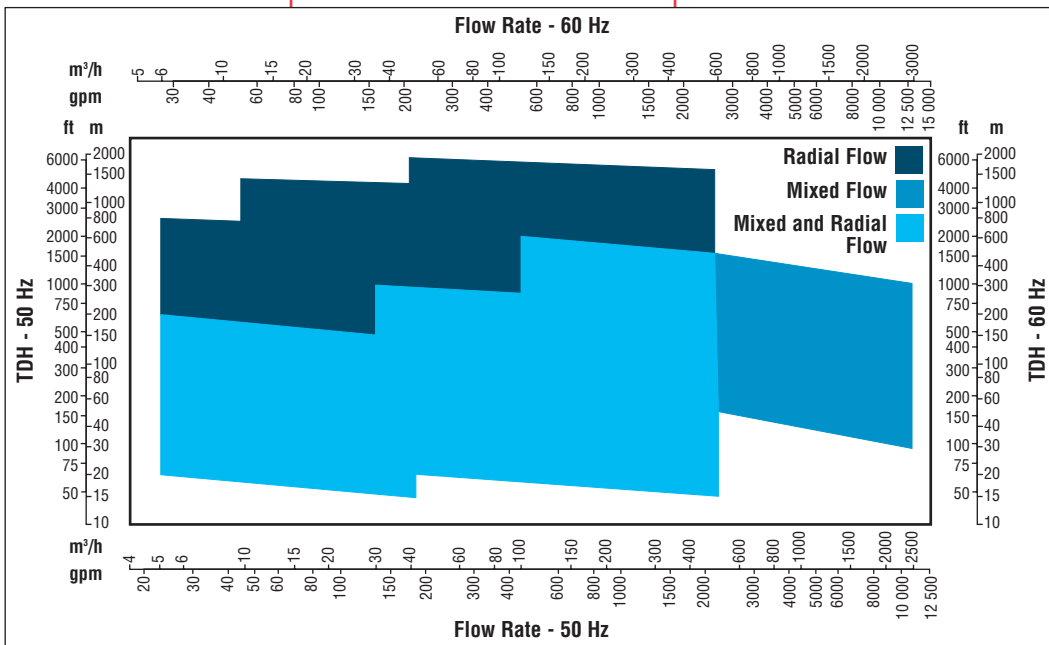
Inducer

A special axial flow pumping device, an inducer provides significant improvement in suction performance by reducing pump NPSHR. This results in a reduced suction barrel length and a more compact, less expensive installation. A special inducer design reduces the back-flow and guarantees trouble-free operation over a wide flow range.



Inducer

WUC Range Chart



WUJ Single Casing API 610 (VS1) Model

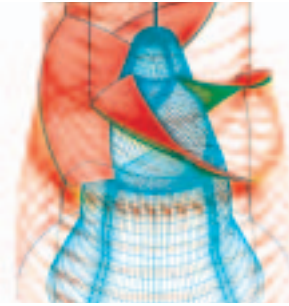
Designed for wet pit or deep well applications, the WUJ offers all of the unique mechanical and design features of the WUC.

Global Service and Technical Support

Advanced Technologies

Few if any pump companies can match Flowserve's capabilities in hydraulic and mechanical design or in materials engineering. These capabilities include:

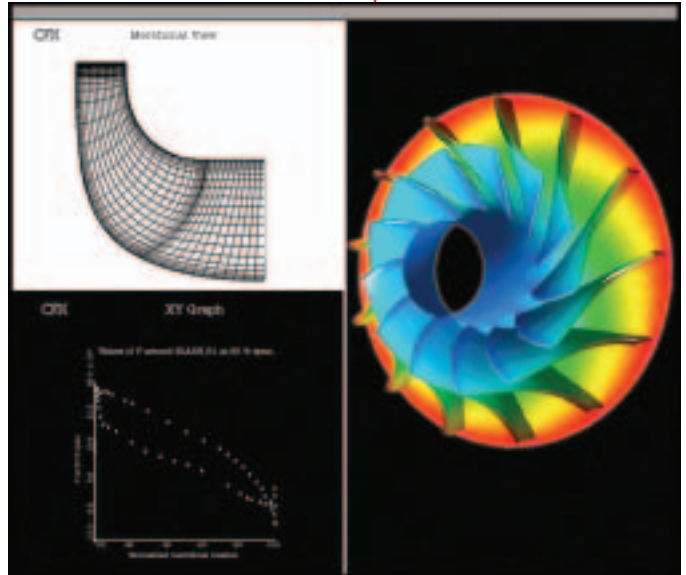
- Computational fluid dynamics
- Flow visualization
- Cavitation studies
- Efficiency optimization
- Finite element analysis
- Rapid prototyping
- Captive high nickel alloy and light reactive alloy foundries
- Non-metallic materials processing and manufacturing



Service and Repair Group

Flowserve's Service and Repair Group is dedicated to maximizing equipment performance and reliability-centered maintenance programs. Pump related services include:

- Startup and commissioning
- Diagnostics and prognostics
- Routine and repair maintenance
- ANSI and ISO power end exchange program
- Re-rates, upgrades and retrofits
- Spare parts inventory and management programs
- Training



Pump Improvement Engineering Services

Flowserve is committed to helping customers obtain the best possible return on their pump equipment investment. Engineering assistance and technological solutions for pumping problems are readily available.

These services include:

- Field performance testing
- Vibration analysis
- Design analysis and root-cause problem solving
- Material improvements
- Pump and system audit
- Advanced technology solutions
- PumpTrac™ remote pump monitoring and diagnostic services
- Instruction manual updates
- Training courses

**Flowserve... Supporting Our Customers
With The World's Leading
Pump Brands**



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