



WUC

***ISO 13709/
API 610 (VS6)
Vertical
Multistage
Double Case
Process Pump***

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 that 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:

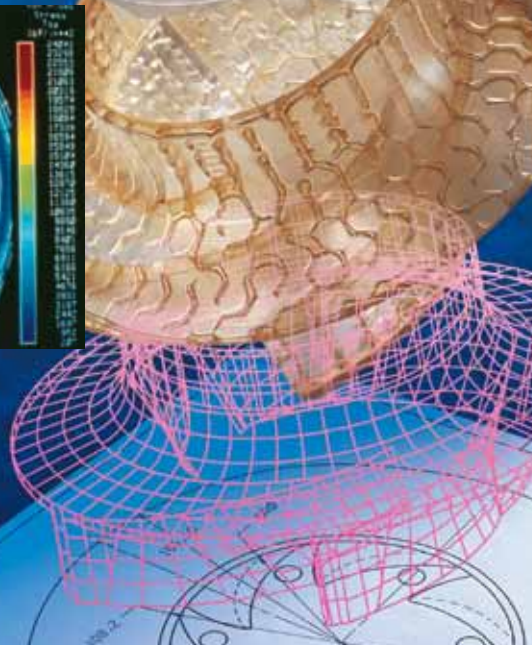
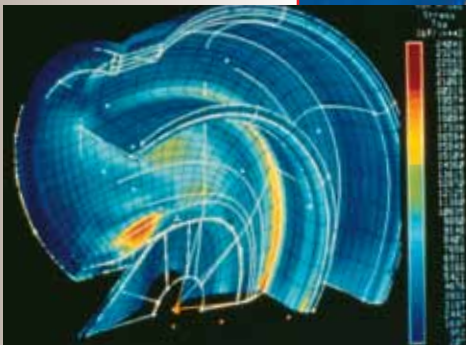
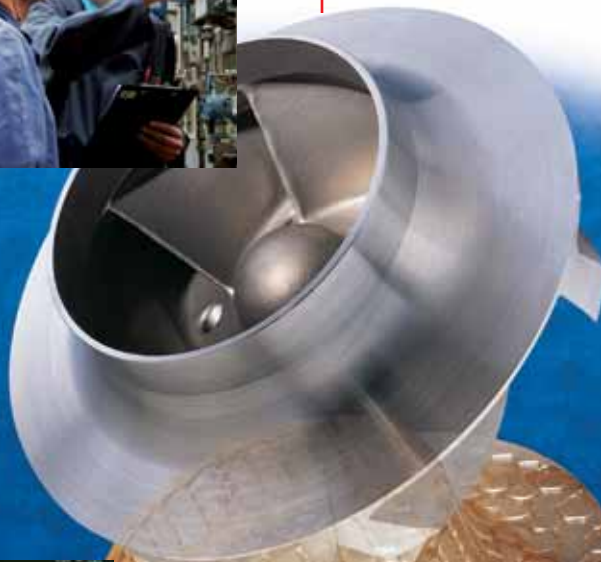
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

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
- Positive displacement
- Nuclear
- Specialty



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Vertical
Multistage
Double Case
Process Pump

The Ultimate Double Case 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

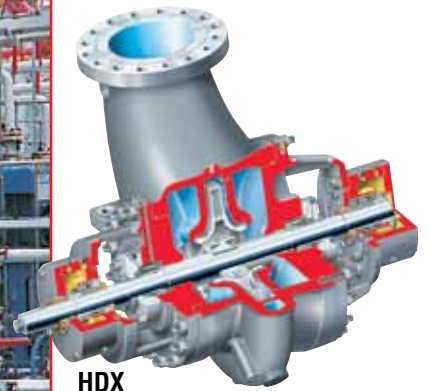
Broad Application

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

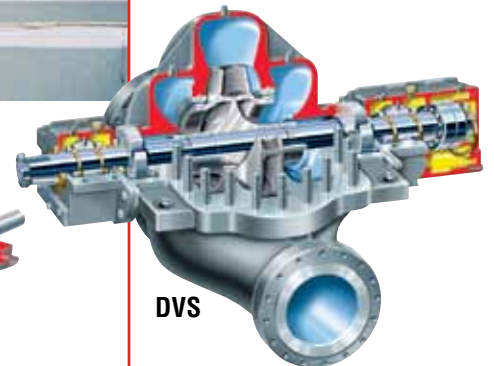
Complementary Pump Designs

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

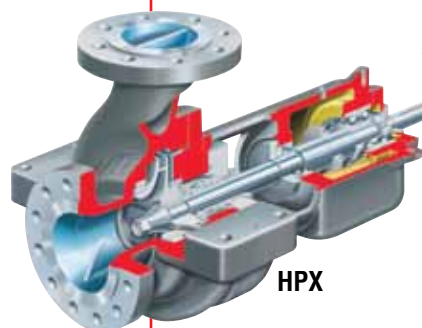
- Single-stage, axially and radially split between bearing pumps
- Multistage, axially and radially split between bearing pumps
- Overhung, centerline mounted process pumps



HDX



DVS



HPX

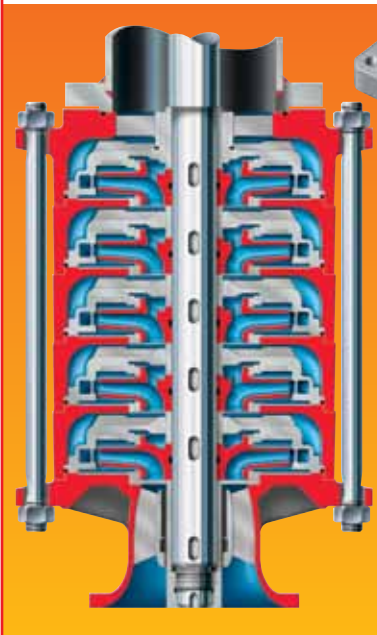
WUC
**ISO 13709/
 API 610 (VS6)**
**Vertical
 Multistage
 Double Casing
 Process Pumps**

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

Designed to International Standards

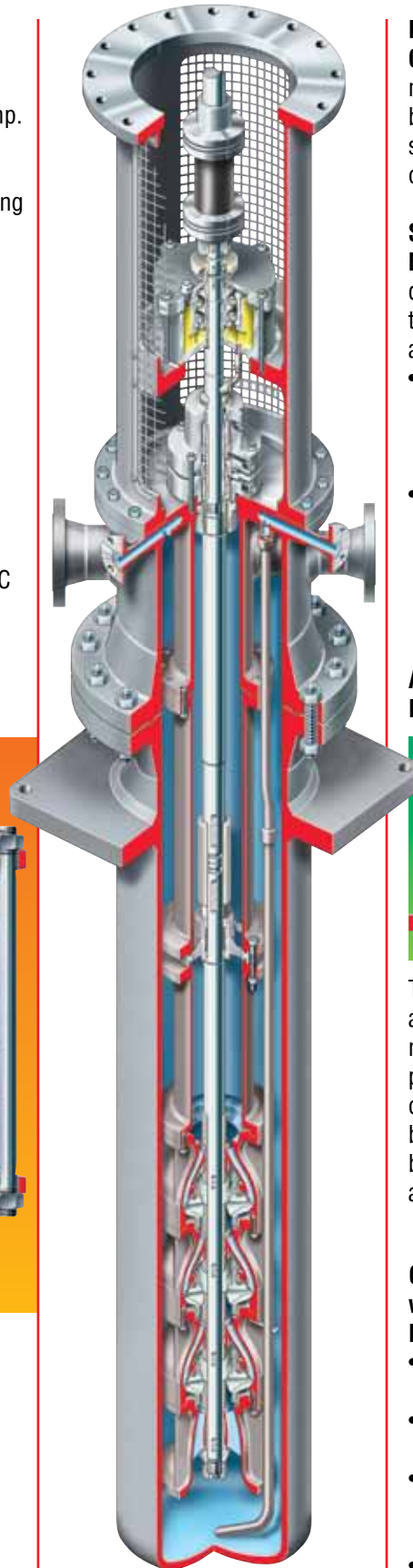
- ISO 13709/API 610, latest edition
- ASME Sections VIII and IX
- German Pressure Vessel Association (AD)
- British Standard BS 5500
- Compliance with Pressure Equipment Directive 97/23/EC

Radial Flow Hydraulics and Tie-Bolt Design



Operating Parameters with Radial Flow Hydraulics

- Flows to 500 m³/h (2200 gpm)
- Heads to 2000 m (6560 ft)
- Temperatures from -200°C (-328°F) to 200°C (400°F)
- Pressures to 200 bar (2900 psi)



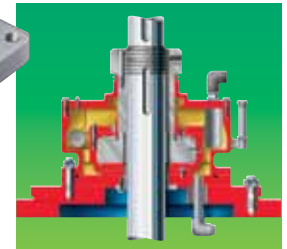
Mixed Flow Hydraulics and Integral Diffuser Design
 ISO 13709/API 610 (VS6)

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, antifriction 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 are lubricated by oil and controlled by a lube oil system.

Operating Parameters with Mixed Flow Hydraulics

- Flows to 3000 m³/h (13 200 gpm)
- Heads to 600 m (1950 ft)
- Temperatures from -200°C (-328°F) to 350°C (660°F)
- Pressures to 64 bar (928 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 ISO 13709/API 610 limits.

ISO 21049/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.

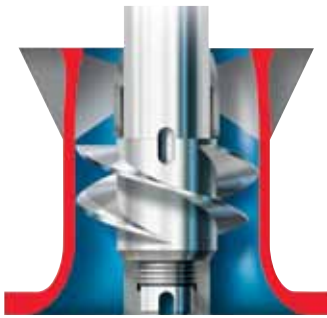
Options and Technical Data

Coffer Dam System

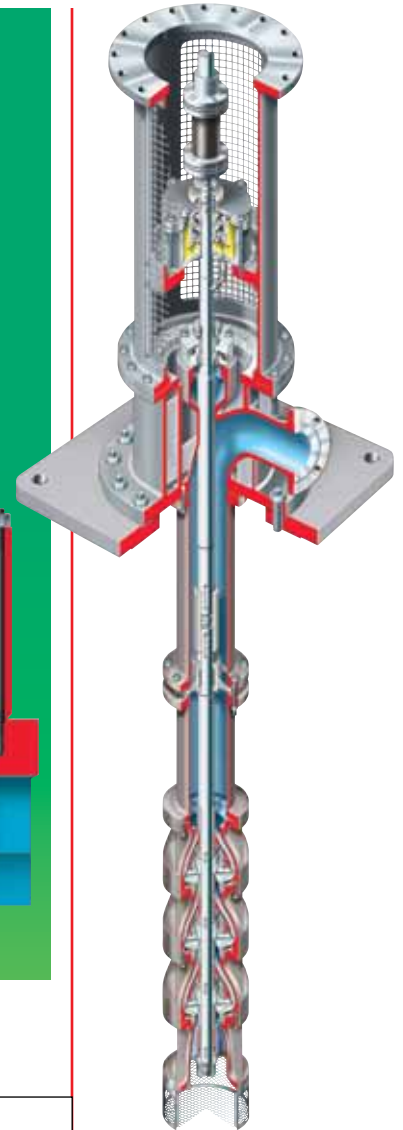
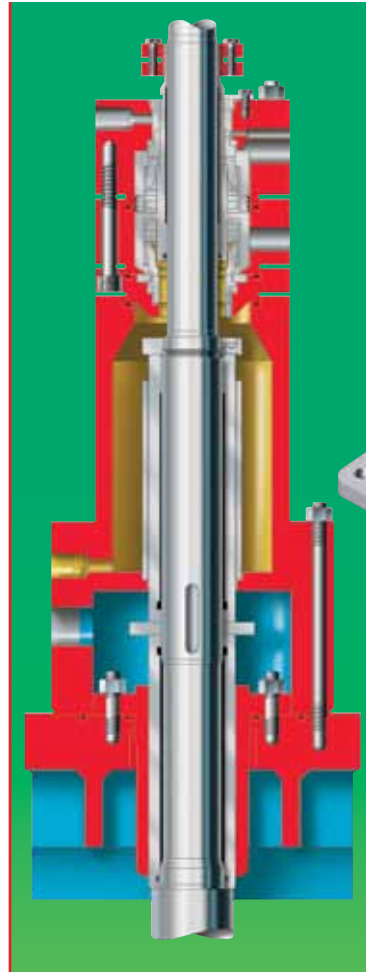
This highly engineered design for cryogenic applications provides for a gas barrier between the pumped fluid and the mechanical seal. The seal, with back-to-back seal face arrangement, results in the inner seal being subjected only to gas at 2 bar (30 psi) above suction pressure. Therefore, no icing 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

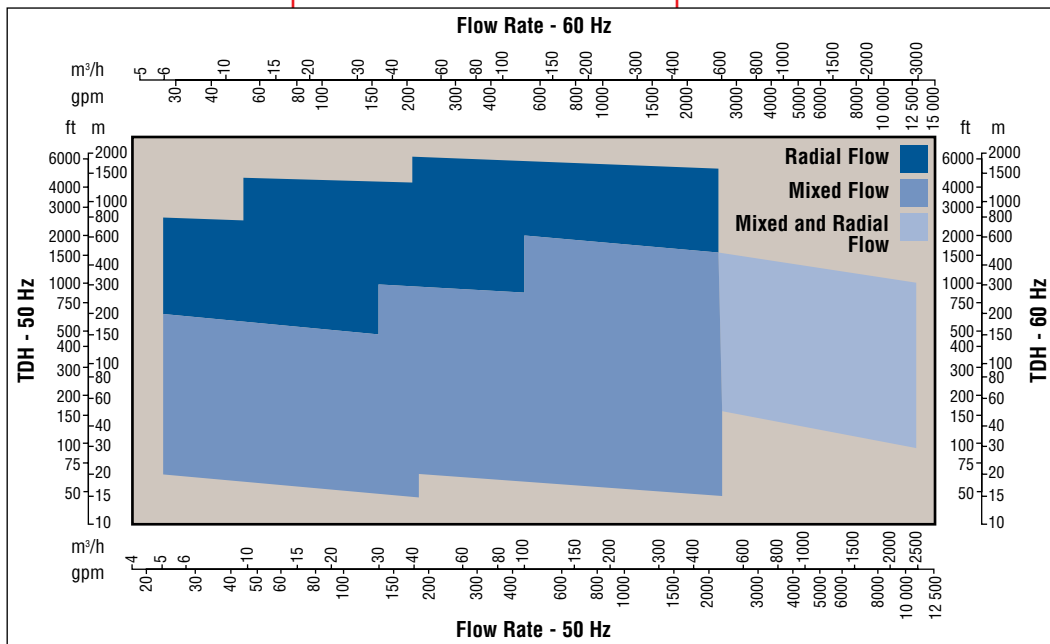
A special axial flow pumping device, an inducer provides significant improvement in suction performance by reducing pump NPSHR. This results in a reduced suction barrel length and a more compact, less expensive installation. A special inducer design reduces the back-flow and guarantees trouble-free operation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



Inducer



WUC Range Chart



WUJ Vertical Line Shaft, Multistage ISO 13709/API 610 (VS1)

Designed for wet pit or deep well applications, the WUJ offers all of the same mechanical and design features of the WUC in a single case configuration.

**Global
Engineered Services
and Support**

- Total Cost Reduction*
- Asset Management*
- Product Life Cycle*
- Performance Re-rates*
- Site Diagnostics*
- Repair Services*
- Energy Management*
- Spare Parts*
- Maintenance Contracts*
- Materials Upgrades*
- Turnkey Services*
- Field Repairs*
- Installation*
- Project Supervision*
- Commissioning*
- Equipment Upgrades*
- Condition Monitoring*
- Systems Analysis*
- Field Machining*

Service Dedication

Flowserve Engineered Services is focused on providing customers with uncompromising service and support, where and when needed. Dedicated to delivering the highest quality support, Engineered Services integrates its extensive pump and materials engineering knowledge with creative service solutions. Engineered Services fully understands the business challenges facing customers and is prepared to manage solutions to succeed as a team.

A worldwide network of service and repair centers staffed by highly skilled engineers and technicians is available around the clock, seven days a week to respond to customer queries, evaluate and troubleshoot problems and provide reliable solutions.



**Strength of Experience,
Commitment to Excellence**

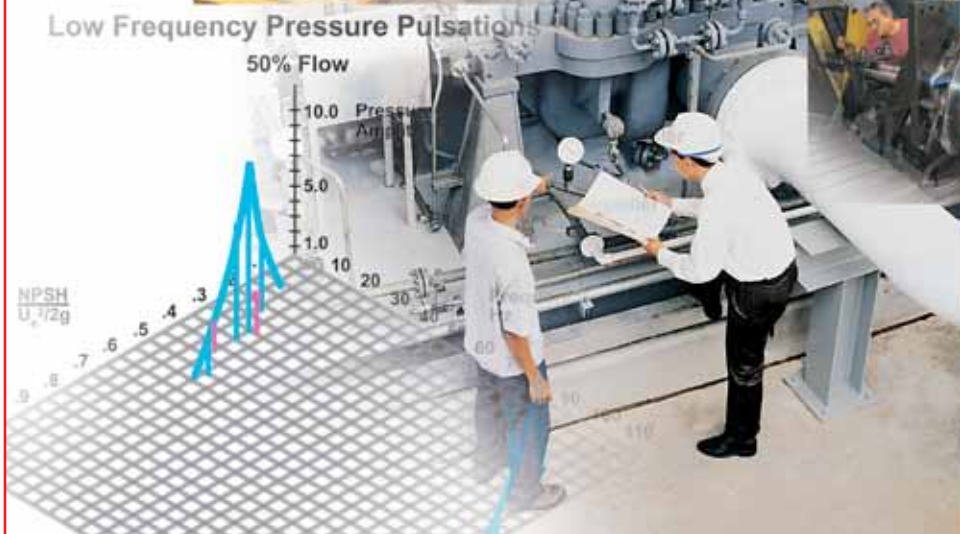
Flowserve has long served industries requiring superior equipment performance and service life.

- Oil and gas production
- Hydrocarbon processing
- Chemical processing
- Water resources
- Power generation
- Nuclear
- Mining and mineral processing
- Pulp and paper
- General industry

Engineered Services is dedicated to maximizing equipment performance and providing reliability-centered maintenance programs for pumps and related equipment, regardless of manufacturer. Using the FlowStar™ asset management software, Engineered Services tracks performance and supports improvement programs using a service life cycle cost business approach. The results are improved reliability and increased profitability.

Business Partner

Flowserve partners with customers to respond to the dynamic business conditions that affect them. Flowserve will work with customers to drive efficiency, maximize throughput and control process quality. Whether user needs involve on-site technical assistance or broader project planning with full turnkey responsibility, Flowserve Engineered Services will deliver professional, reliable results.



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



Cameron™

Pleuger®

Durco®

Niigata Worthington®

TKL™

IDP®

Pacific®

Scienco™

Byron Jackson®

Worthington Simpson™

Flowserve®

Calder™ Energy Recovery Devices

Worthington®

Sier-Bath®

United Centrifugal®

Western Land Roller™

Wilson-Snyder®

Aldrich™

ACEC™

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