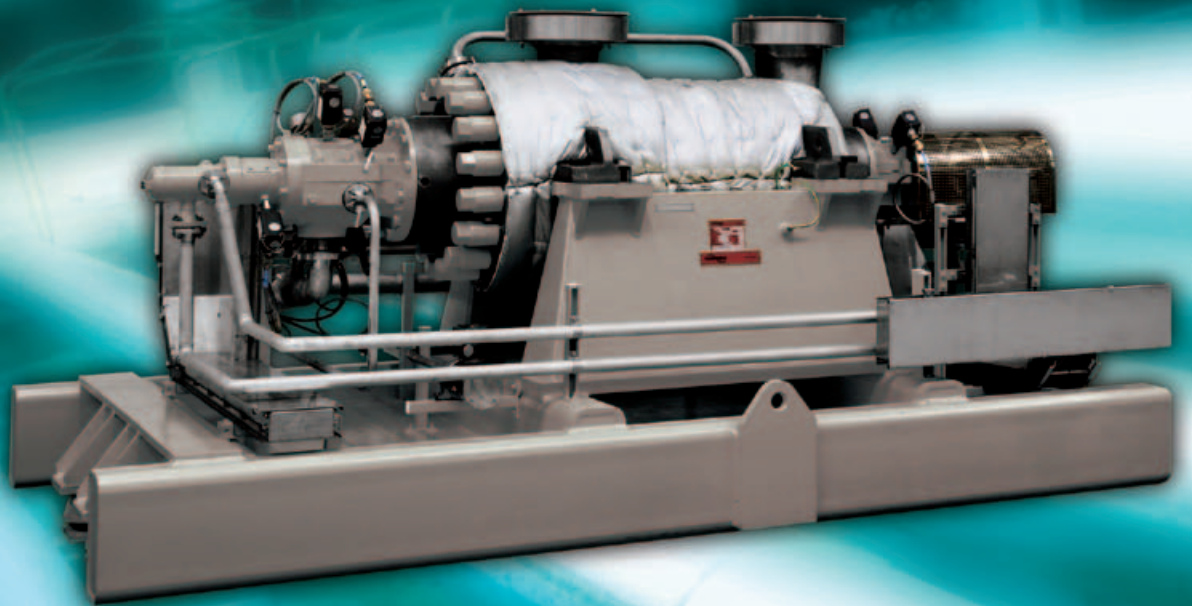


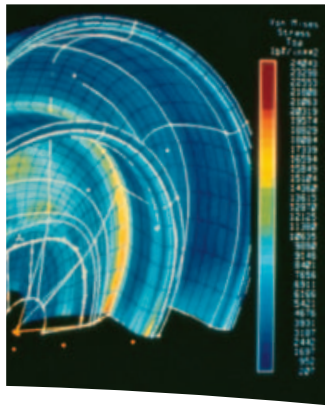


WCC
General Purpose Barrel Pump
for the Oil and Gas Industry

ISO 13709/API 610 (BB5)



Experience In Motion



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.

Life Cycle Cost Solutions

Flowserve is providing pumping solutions which permit customers to reduce total life cycle costs and 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.

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

Product Brands of Distinction

ACEC™ Centrifugal Pumps

Aldrich™ Pumps

Byron Jackson® Pumps

Calder™ Energy Recovery Devices

Cameron™ Pumps

Durco® Process Pumps

Flowserve® Pumps

IDP® Pumps

Lawrence Pumps®

Niigata Worthington™ Pumps

Pacific® Pumps

Pleuger® Pumps

Scienco™ Pumps

Sier-Bath® Rotary Pumps

TKL™ Pumps

United Centrifugal® Pumps

Western Land Roller™ Irrigation Pumps

Wilson-Snyder® Pumps

Worthington® Pumps

Worthington Simpson™ Pumps

WCC
General Purpose
Barrel Pump for the
Oil and Gas Industry
 ISO 13709/API 610 (BB5)



The Preferred Supplier for Oil and Gas Barrel Pumps

For over 150 years, Flowserve has pioneered virtually every significant advancement in petroleum-related pumping technology. Its ability to understand the industry's high pressure pumping needs is evidenced by its numerous innovative barrel pump designs and the WCC is no exception.

Rated for discharge pressures to 270 bar (4000 psi), the WCC is a pre-engineered process barrel pump meeting ISO 13709/API 610 (BB5), latest edition. The design configuration can be customized with numerous options to meet customer specifications.

A Foundation of Innovation and Leadership

Since 1926 when it developed the first double-case pump for hot oil, Flowserve has been in the vanguard of pump development for the oil and gas industry. This leadership position was reinforced in 1934 with the introduction of high-pressure water and CO₂ injection pumps and cemented in 1982 when it built the world's largest water injection pump – a 17 900 kW (24 000 hp) behemoth.

Reflecting its leadership position, Flowserve was heavily involved in establishing the API 610 (BB5) standard governing the construction of double-case pumps. From water injection and pipeline to charge and decoking, Flowserve is the preferred provider of double-case pump technology worldwide.

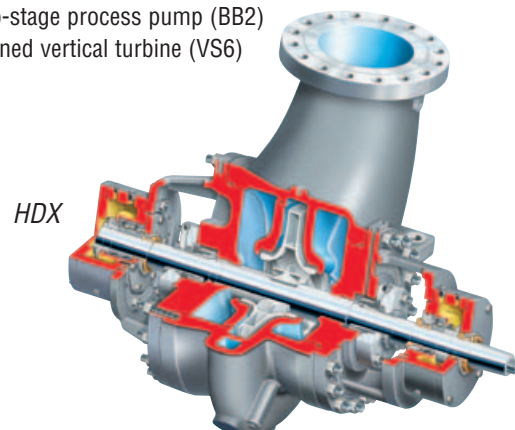
Typical Applications

- Water or CO₂ injection
- Pipeline
- Amine feed
- Hydrocarbon charge
- Ethylene feed
- Acid gas reinjection
- Hydraulic power recovery turbine
- Boiler feedwater

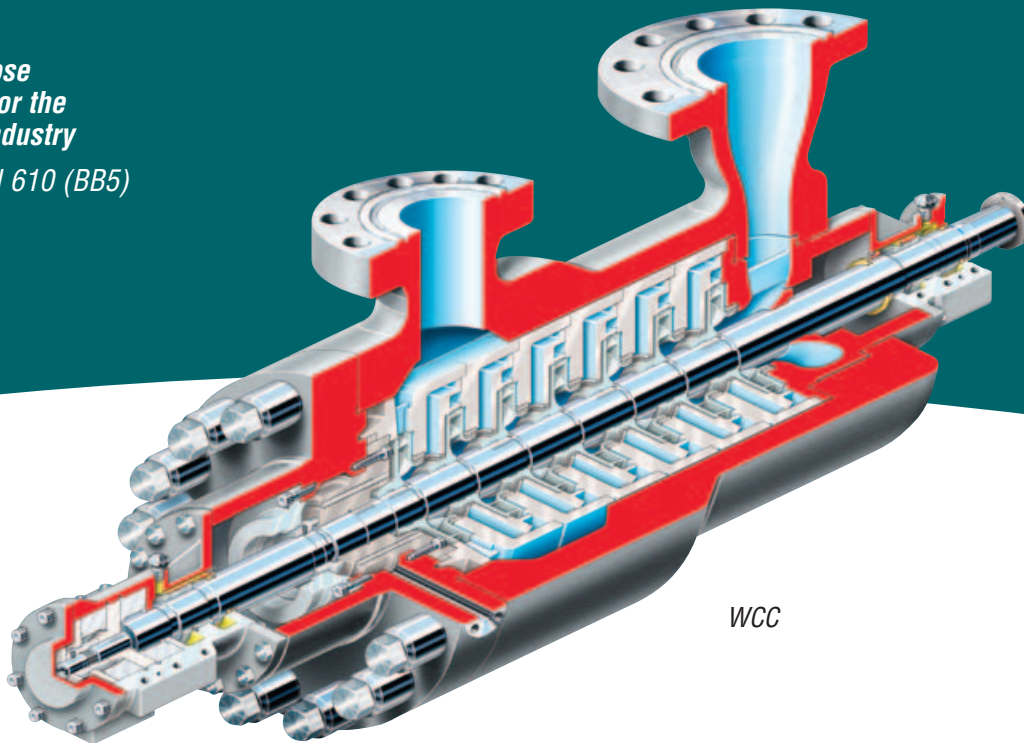
Complementary Pump Designs

Flowserve offers a full range of horizontal and vertical process pumps for the oil and gas industries. These pumps are CE compliant and meet or exceed the criteria of ISO 13709/API 610, latest edition. Examples include:

- HPX overhung process pump (OH2)
- HDX double-suction process pump (BB2)
- HED two-stage process pump (BB2)
- VPC canned vertical turbine (VS6)



WCC
General Purpose
Barrel Pump for the
Oil and Gas Industry
 ISO 13709/API 610 (BB5)



The WCC is a multistage, diffuser-type barrel pump with a tandem impeller rotor and a single-diameter balance drum to compensate for residual axial thrust. The standard cartridge type construction facilitates rapid changeout with a spare to minimize lost production. When process requirements demand a fully compliant, API 610/ISO 13709 pump but also call for a flexible, cost-efficient solution, the WCC is the optimum choice. With its extensive list of options and metallurgical choices, it can fit almost any oil and gas application.

Classified as a General Purpose barrel pump, the WCC conforms to ISO 13709/API 610 (BB5), latest edition, and is CE and ATEX compliant. Pressure-containing elements are designed to ASME Pressure Vessel Code Section VIII, Div. 1. Moreover, Flowserve engineers will work with users to address and incorporate site-specific requirements, while, at minimum, meeting the specifications for:

- Mechanical seals to ISO 21049/API 682
- Lubrication systems to API 610 or API 614

Operating Parameters

- Flows to 1020 m³/h (4500 US gpm)
- Heads to 4270 m (14 000 ft)
- Pressure ratings to 270 bar (4000 psi)
- Temperatures from -5°C (-20°F) to 430°C (800°F)
- Speeds to 7000 rpm

For parameters outside these limits contact Flowserve.

Features and Benefits

Wrought Shafts are incrementally stepped at each impeller fit for ease of assembly. Shafting is generously sized and machined to tight tolerances to minimize harmful vibrations. The standard shaft extension is a NEMA taper

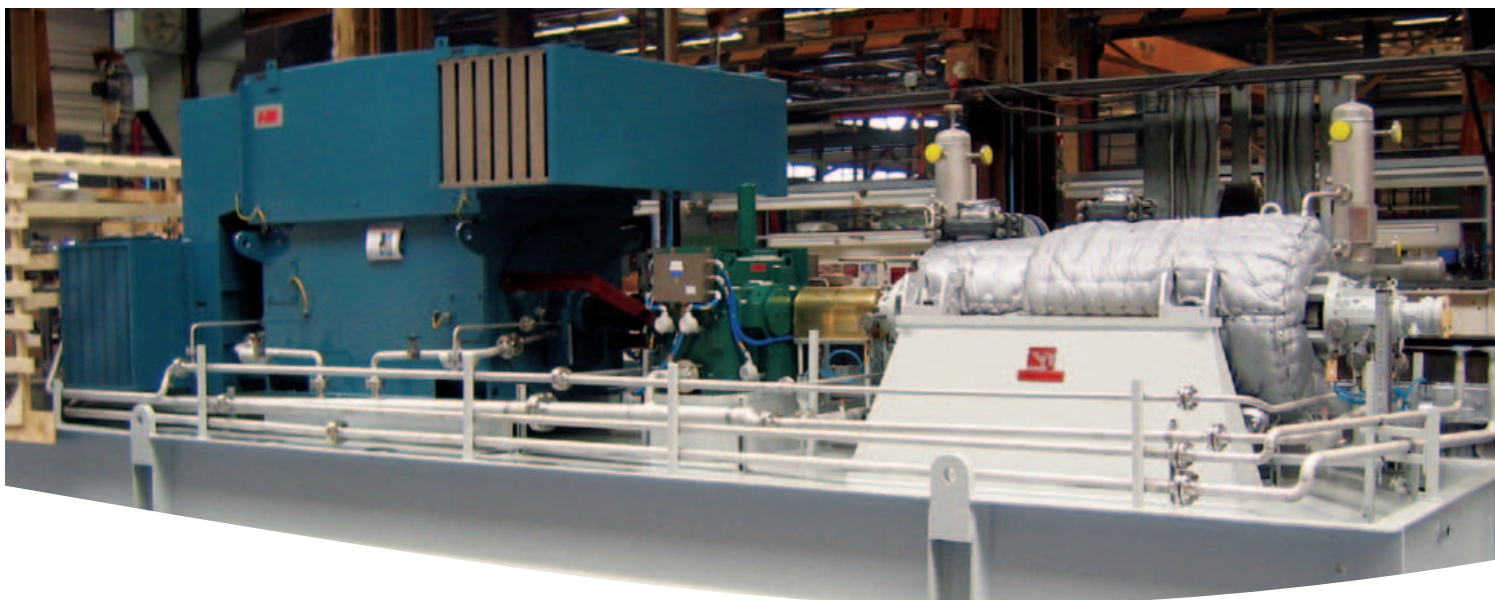
Precision-Cast Impellers ensure optimum hydraulic efficiency and repeatability of performance. Available with integral or optional separate wear rings, impeller wear surfaces are engineered for the best possible performance. Standard materials can be upgraded with overlay materials like Stellite® or surface treatments like laser hardening for better durability

Optional Grooved Impeller Running Fits increase the pump's tolerance to foreign materials and desensitizes it during start-up, stopping and system transients

Multivane Diffusers balance radial loads over the operating range, while maximizing efficiencies at the duty condition. A continuous metal-to-metal seal between stage pieces minimizes risk of internal leakage

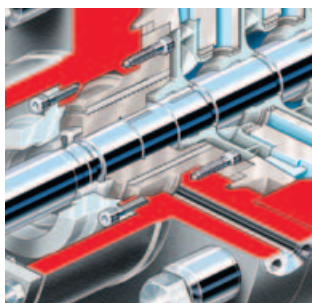
Optional Flanged Balance Drum is available to ensure the ability to operate the pump over a wider range of duty conditions

© Stellite is a registered trademark of Deloro Stellite



Single-Diameter Balance Drum

A single-diameter balance drum compensates for residual axial thrust produced by the tandem impeller arrangement. The drum is designed to be plain or serrated as appropriate for the application to reduce leakage and optimize reliability and efficiency. It is installed via an interference fit against a step in the shaft and located axially with a split ring. A flanged drum design is optional.



Robust Bearing System

The standard bearing system on the WCC pump consists of heavy-duty journal type radial bearings and self-equalizing, tilting pad thrust bearings due to their reliability and versatility.

The following optional bearing arrangements are available:

- In lower energy applications, anti-friction bearings can be supplied as a cost-saving alternative either in conjunction with self-lubricated sleeve bearings or as a complete antifriction configuration, as permitted by ISO 13709/API 610 (BB5). Air, fan or water cooling is available as needed to suit the application requirements.
- When space is at a premium, an integral lubrication circulation system can be supplied. This system offers the benefits of circulation while maintaining a compact size and minimizing maintenance demands.

Materials of Construction

The materials of construction of the WCC's barrel casing and discharge head meet ISO 13709/API 610, latest edition, Column S-6 and above. They include:

- Carbon steel
- High chrome steel
- Austenitic stainless steel
- Duplex stainless steel
- Super duplex stainless steel

Special materials are available to meet customer requests or specific application requirements.

Barrel Pressure Rating

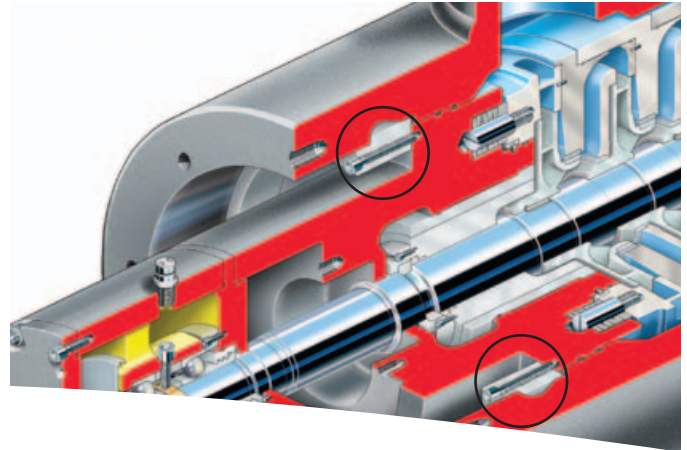
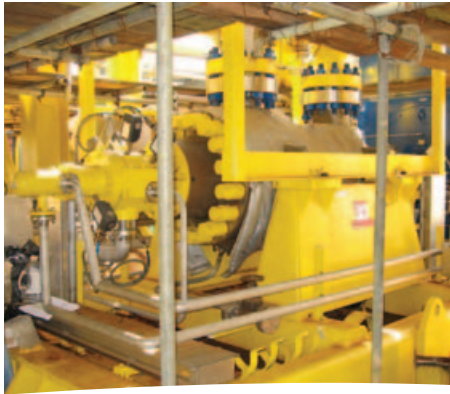
All pressure boundary components are designed in accordance with ASME standards to meet the application requirements. The suction portion of the WCC barrel is engineered as a split pressure rated design. Sealing is metal-to-metal with fully confined, controlled compression gaskets that ensure proper sealing and alignment when handling hot liquids.

Numerous Nozzle Configurations

The standard nozzle configuration on the WCC is top suction, top discharge. It may be configured side suction, side discharge as an alternative.

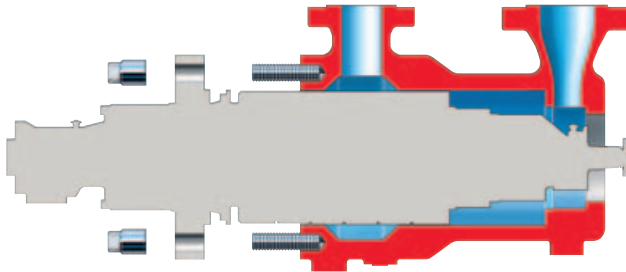
Flange facing is raised face as standard with ring-type joint optional. Flange ratings range from 600 lb to 2500 lb to suit the application.

Options and Technical Data



Cartridge-Type Inner Element

The WCC pump features a standard cartridge-type inner element. In this design, the inner element includes the rotor, diffusers, discharge head, suction head and bearing assembly, allowing the entire assembly to be removed as a single unit. This configuration eases maintenance and reduces downtime, allowing major assembly and disassembly in the workshop rather than in the field.



Optional Shear Ring Closure System

A shear ring closure system replaces the traditional bolting on the discharge cover. In this configuration, the high-strength split seal ring is locked into the barrel body by cap nuts. This design maintains cartridge integrity but still allows maintenance with conventional tooling. The shear ring design is more compact and boasts one of the quickest maintenance turnarounds in the industry.

Tested To Ensure Performance

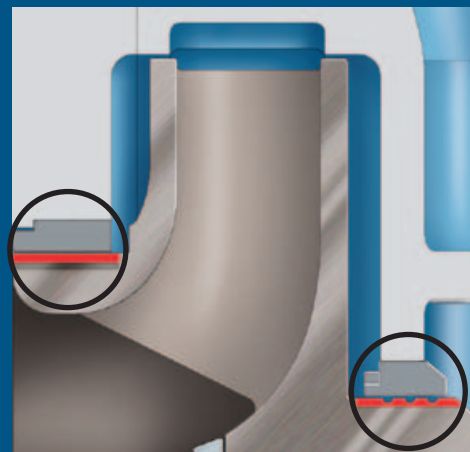
Each WCC pump is performance tested in accordance with API and Hydraulic Institute testing standards to ensure the unit meets the specified design conditions. Pumps can be tested at full flow, pressure and speed, up to 18 650 kW (25 000 hp).

Advanced Close Clearance Technologies

For severe services the WCC is available with state-of-the-art erosion- and abrasion-resistant materials in the running fits. These materials are applied by various processes to ensure the ultimate in reliability for even the harshest environments:

- Through hardening: Metallurgically alters the micro-structure of the metal component, resulting in a solid hard wearing part.
- Super hard overlay: A second material possessing the desired wear characteristics, like tungsten carbide or Stellite® 6, is overlaid onto the base metal via the HVOF or Direct Laser Deposit processes.
- Non-metallic and ceramic materials.

Flowserve will advise which materials and processes are recommended based on the specifics of the actual application.



Optional grooved wear surface shown on impeller hub.

**Global Service
and Technical
Support**



Life Cycle Cost Solutions

Typically, 90% of the total life cycle cost (LCC) of a pumping system is accumulated after the equipment is purchased and installed. Flowserve has developed a comprehensive suite of solutions aimed at providing customers with unprecedented value and cost savings throughout the life span of the pumping system. These solutions account for every facet of life cycle cost, including:

Capital Expenses

- Initial purchase
- Installation

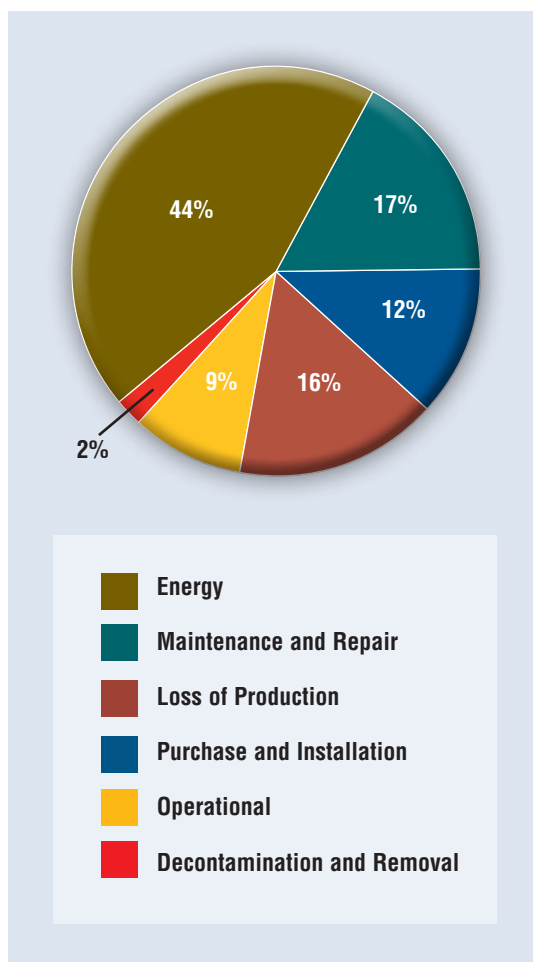
Operating Expenses

- Energy consumption
- Maintenance
- Production losses
- Environmental
- Inventory
- Operating
- Removal

Innovative Life Cycle Cost Solutions

- New Pump Selection
- Turnkey Engineering and Field Service
- Energy Management
- Pump Availability
- Proactive Maintenance
- Inventory Management

Typical Pump Life Cycle Costs¹



¹ While exact values may differ, these percentages are consistent with those published by leading pump manufacturers and end users, as well as industry associations and government agencies worldwide.



USA and Canada

Flowserve Corporation
5215 North O'Connor Blvd.
Suite 2300
Irving, Texas 75039-5421 USA
Telephone: 1 937 890 5839

Europe, Middle East, Africa

Flowserve Corporation
Gebouw Hagepoint
Westbroek 39-51
4822 ZX Breda
Netherlands
Telephone: 31 76 502 8920

Latin America

Flowserve Corporation
Boulevard del Cafetal
Edificio Ninina, Local 7
El Cafetal - Caracas
Venezuela 1061
Telephone: 58 212 985 3092
Telefax: 58 212 985 1007

Asia Pacific

Flowserve Pte. Ltd.
200 Pandan Loop #06-03/04
Pantech 21
Singapore 128388
Telephone: 65 6775 3003
Telefax: 65 6779 4607

Bulletin PS-30-7† (E/A4) Printed in USA. December 2007. © Flowserve Corporation

To find your local Flowserve representative:

For more information about Flowserve Corporation,
visit www.flowserve.com or call USA 1 800 728 PUMP (7867)