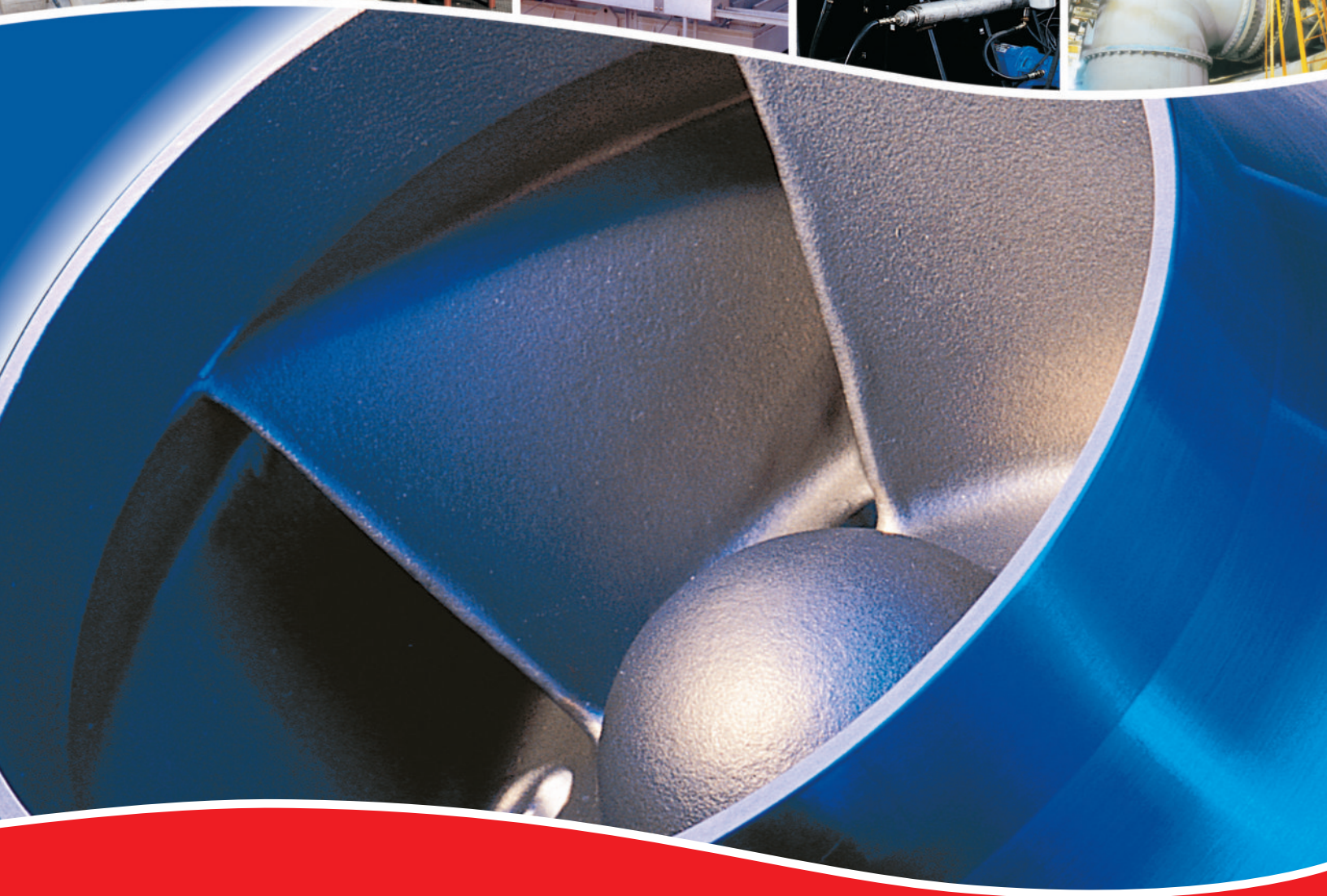
FLOWSERVE

Pump Product Catalog



Experience In Motion

Pump Product Catalog

Flowserve Corporation is one of the world's leading providers of fluid motion and control products and services. Operating in 56 countries, the company produces engineered and industrial pumps, seals and valves as well as a range of related flow management services.

Flowserve works closely with customers and partners to deliver best-in-class solutions that leverage our considerable application experience, our advanced technical services and our extensive product portfolio. In this way, Flowserve provides solutions that enable our customers to improve productivity, reliability and profitability.

Flowserve Pumps are comprised of the brands listed at right. This is our heritage and the basis for the respect and trust we enjoy in the global marketplace.

Heritage Names of Distinction

ACEC™ Centrifugal Pumps

Aldrich® Pumps

Byron Jackson® Pumps

Cameron® Pumps

Durco® Pumps

Flowserve® Pumps

IDP® Pumps

Jeumont-Schneider™ Pumps

Pacific® Pumps

Pleuger® Pumps

Scienco® Pumps

Sier-Bath® Rotary Pumps

TKL™ Pumps

United® Centrifugal Pumps

Western Land Roller® Irrigation Pumps

Wilson-Snyder® Pumps

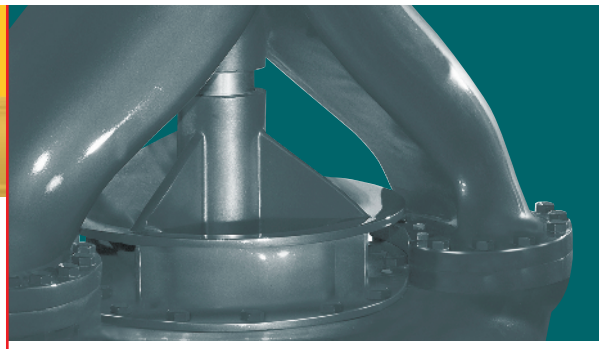
Worthington® Pumps

Worthington Simpson® Pumps

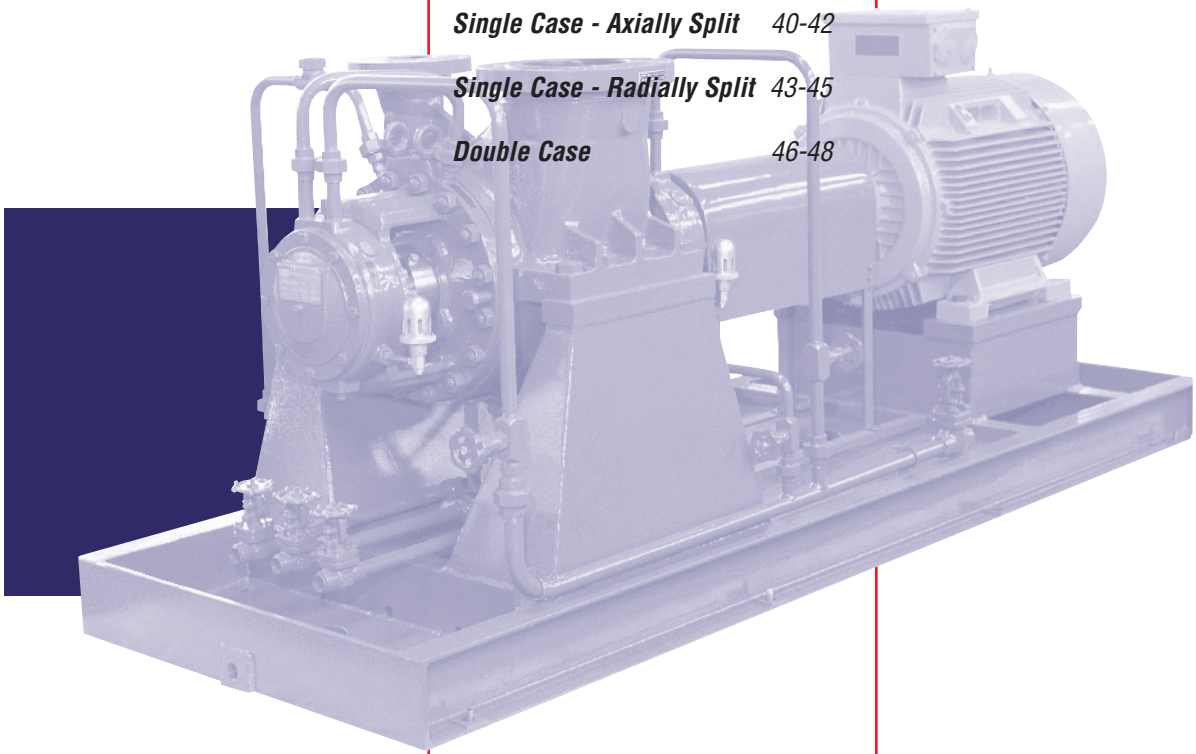
Table of Contents

Overhung Pumps

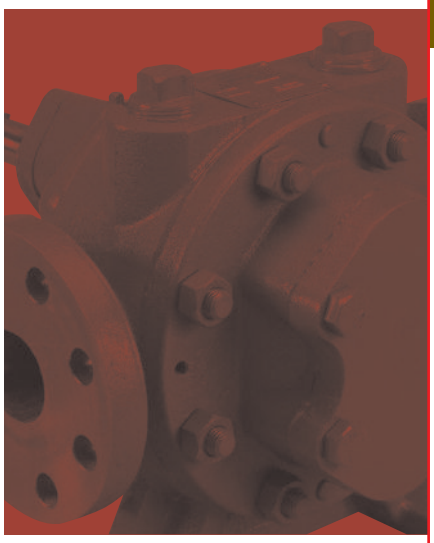
Between Bearings Pumps



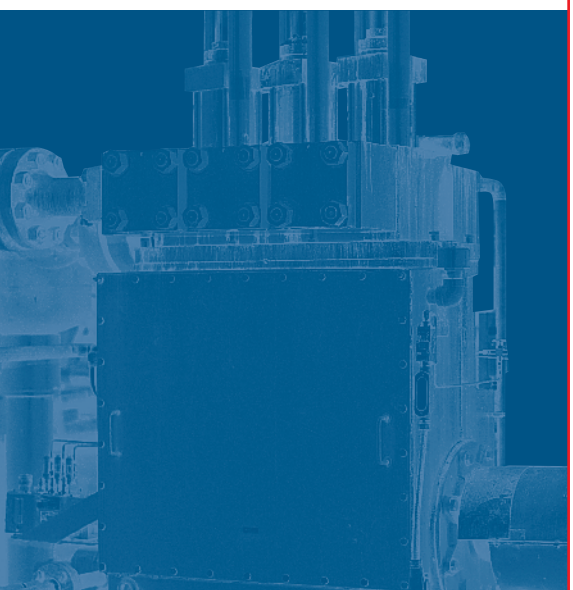
Vertical Pumps



Rotary Pumps



Reciprocating Pumps



Specialty Pumps

1K3x2V-7	3
2K3x2V-10	3
2K4x3V-10	3
2K3x2V-13	3
2K4x3V-13/11*	3
2K6x4V-13	1

Additional Information

Flowserve Pumps Introduction

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 successful application of pre-engineered, engineered and special purpose pumps and systems.

Tracing its history to 1790 and the earliest days of steam pumping engines for municipal waterworks, Flowserve focuses on these industrial sectors:

- *Power generation*
- *Oil and gas production and transportation*
- *Hydrocarbon processing*
- *Chemical and petrochemical processing*
- *Water resources and desalination*
- *Mining and mineral processing*
- *Steel and primary metals*
- *Pulp and paper*
- *Nuclear*
- *General industry*
- *Specialty products*

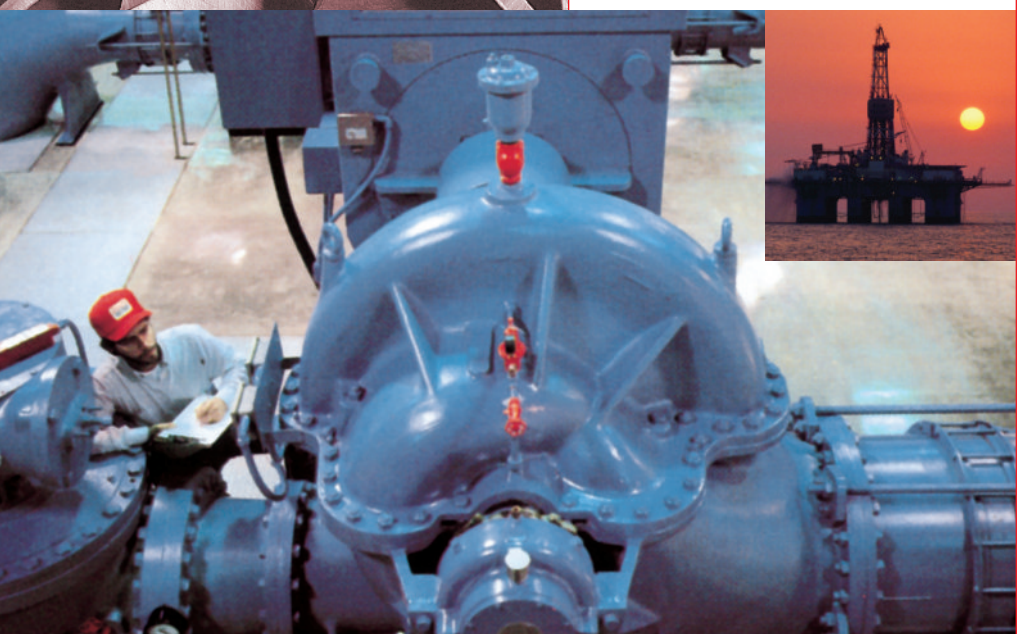
Pump Designs

Flowserve pump product lines are extensive with more than 100 distinct models and thousands of optional configurations. These are largely complementary pump types built to global standards and customer specifications, including:

- *Overhung process*
- *Between bearing axially split*
- *Between bearing radially split*
- *Vertical*
- *Submersible motor*
- *Rotary*
- *Reciprocating*
- *Nuclear*
- *Specialty*

Optional configurations include:

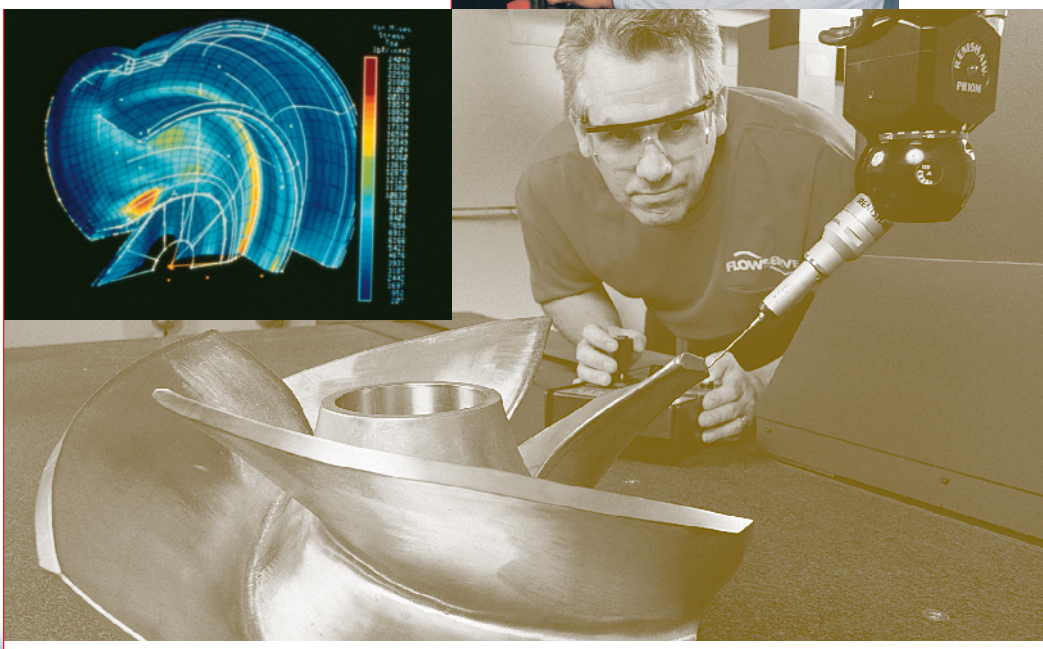
- *Sealed and sealless*
- *Volute and diffuser*
- *Close and long coupled*
- *Single and double casing*
- *Foot or frame mounted*



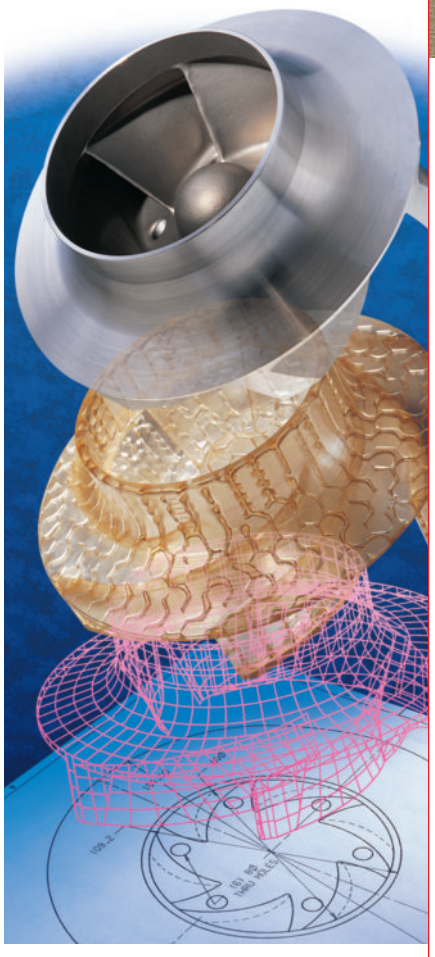
Flowserve Capabilities

Dynamic Technologies

Few, if any, pump companies can match the capabilities of Flowserve in hydraulic and mechanical design or in materials engineering. Among these capabilities are:



- *Computational fluid dynamics*
- *Flow visualization*
- *Cavitation studies*
- *Efficiency optimization*
- *Finite element analysis*
- *Rapid prototyping*
- *Materials development, processing and manufacturing*



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. Benefits of a pumping partnership with Flowserve include:

- *Technology innovation*
- *Applications expertise*
- *Advanced engineering solutions*
  - *– Order engineering*
  - *– Hydraulic engineering*
- *Proven product reliability*
- *Worldwide service and support*
- *Competitive price and delivery*

The purpose of this publication is to provide a brief summary of the hundreds of pumps which comprise the Flowserve product line. Pump models are divided into six sections, beginning with overhung pumps and continuing through specialty pumps. (See Table of Contents, pp. 4-5 and Index pg. 82.)

Each pump is identified by its formal designation and accompanied by a full-color cutaway illustration. Applicable engineering standards are listed along with performance characteristics and key features. The symbols shown at right are used to identify each pump's primary market applications.

For complete information about Flowserve Pumps, visit:
www.flowserve.com

Oil and Gas

Hydrocarbon Processing

Chemical

Power

Nuclear

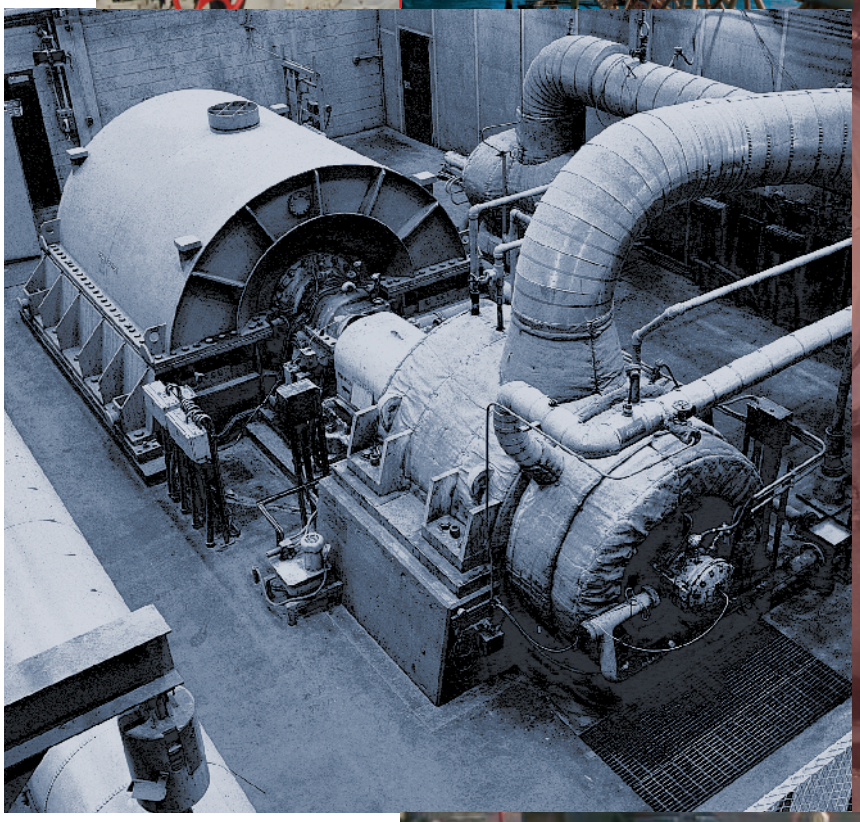
Water Resources

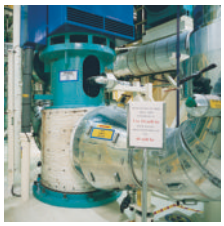
Mining

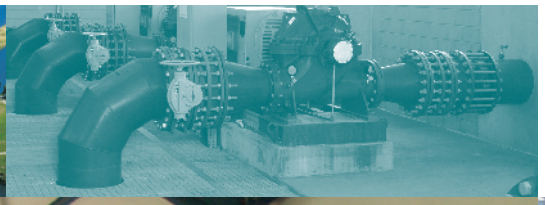
Pulp and Paper

Primary Metals

General Industry

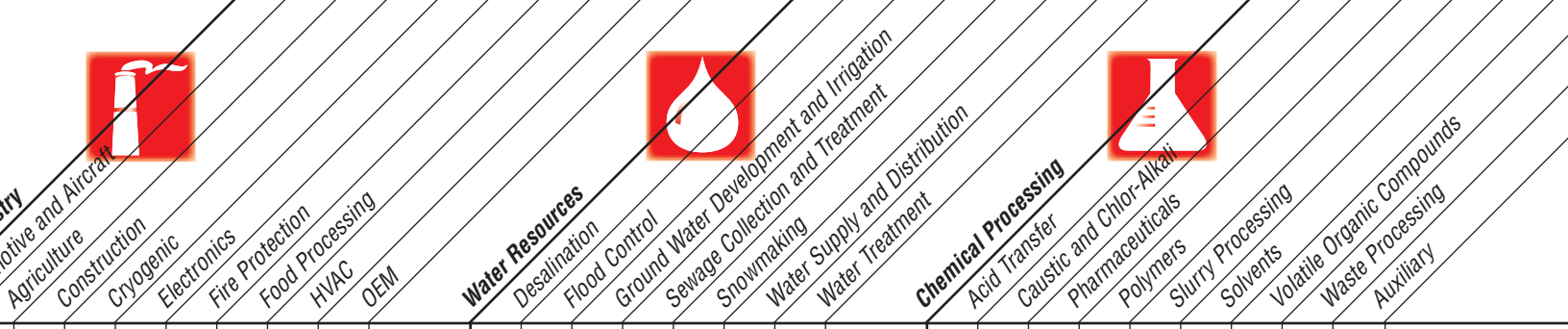


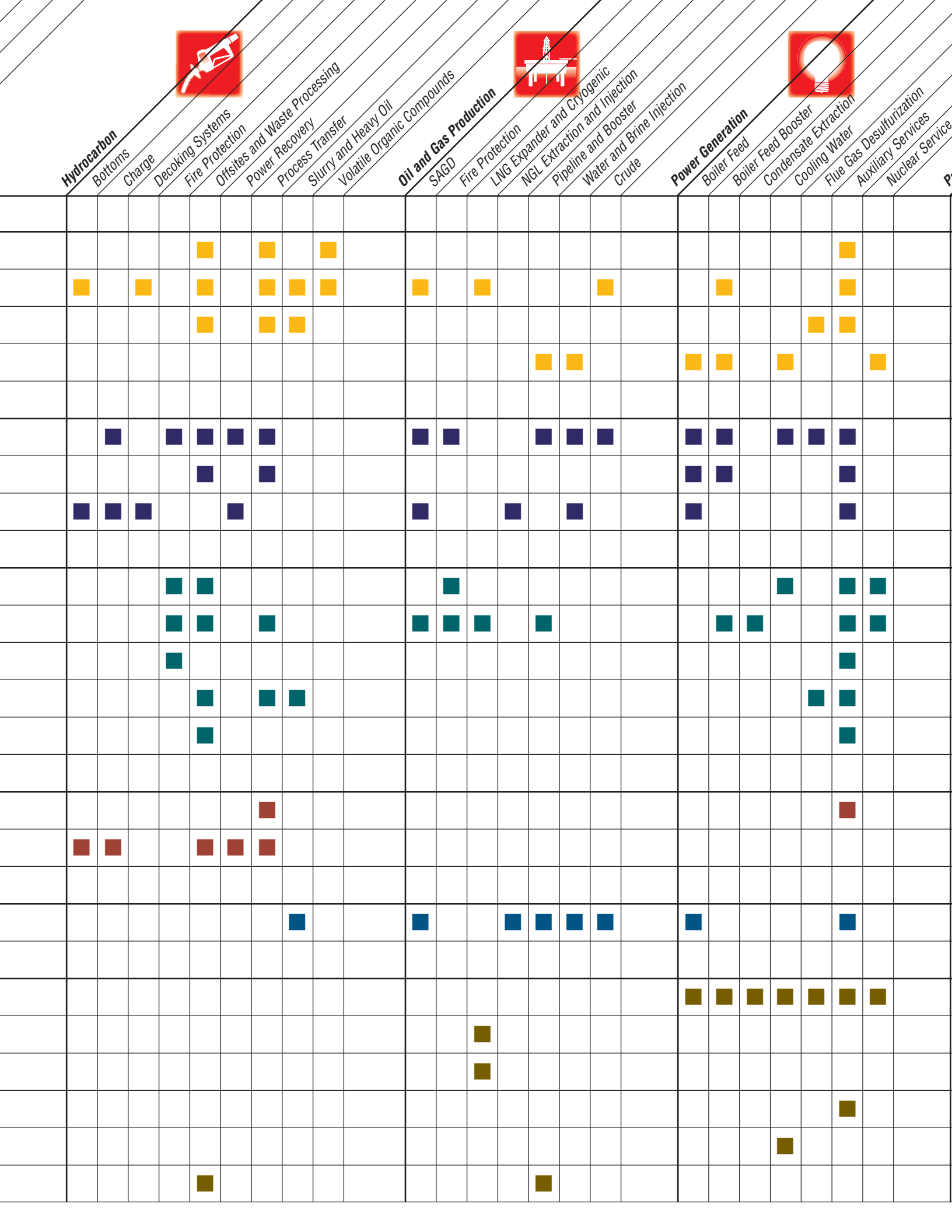


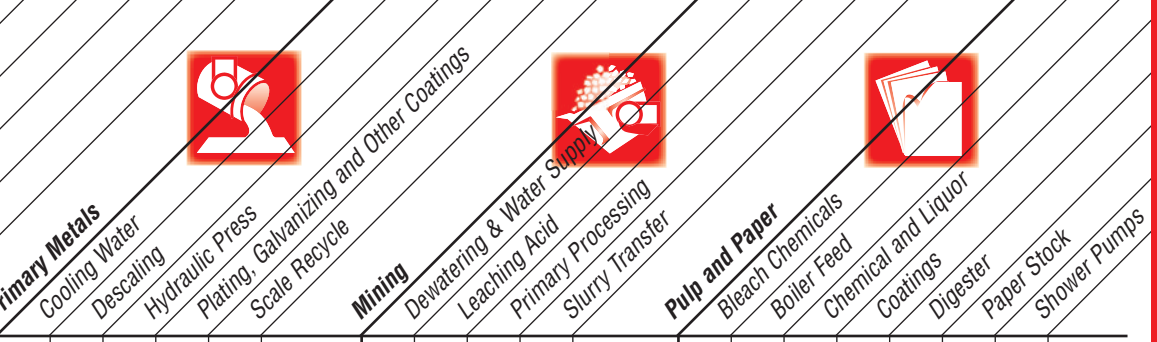


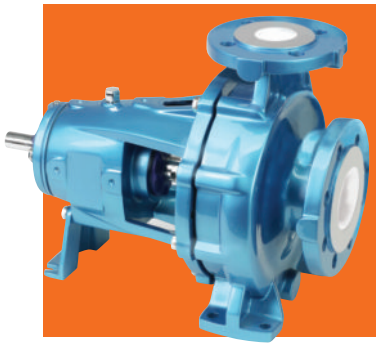
Pump Selection Guide

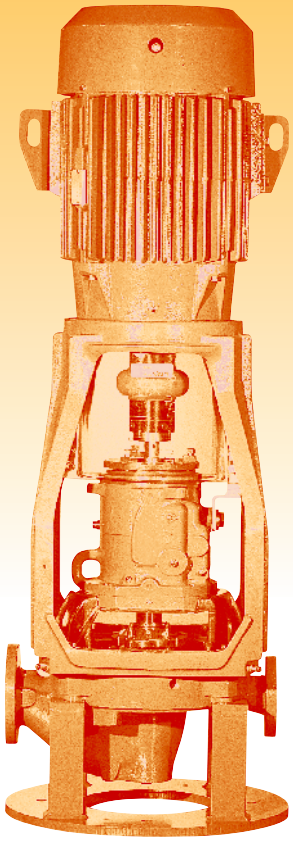
Pump Category	Sub-Category	Begins on page	General Indus	Autom
Overhung	Chemical Process	18	■	■
	API Process	24		■
	Slurry and Solids Handling	30	■	■
	General Industry	35	■	■
Between Bearings	Single Case - Axially Split	40	■	■
	Single Case - Radially Split	43	■	■
	Double Case	46		
Vertical	Wet Pit	52	■	■
	Double Case	54	■	
	Submersible Motor	56	■	■
	Slurry and Solids Handling	57	■	■
	Sump	60	■	■
Rotary	Gear	64	■	■
	Screw	65	■	
Reciprocating		68	■	
Specialty	Nuclear	72		
	Cryogenic	74		
	Liquid Expander	74		
	Hydroturbine	75		
	Concrete Volute	75		
	Barge	75		


Agriculture
Construction
Cryogenic
Electronics
Fire Protection
Food Processing
HVAC
OEM
Water Resources
Desalination
Flood Control
Ground Water Development and Irrigation
Sewage Collection and Treatment
Snowmaking
Water Supply and Distribution
Water Treatment
Chemical Processing
Acid Transfer
Caustic and Chlor-Alkali
Pharmaceuticals
Polymers
Slurry Processing
Solvents
Volatile Organic Compounds
Waste Processing
Auxiliary


Hydrocarbon
Bottoms
Charge
Decoking Systems
Fire Protection
Offsites and Waste Processing
Power Recovery
Process Transfer
Slurry and Heavy Oil
Volatile Organic Compounds
Oil and Gas Production
SAGD
Fire Protection
LNG Expander and Cryogenic
NGL Extraction and Injection
Pipeline and Booster
Water and Brine Injection
Crude
Power Generation
Boiler Feed
Boiler Feed Booster
Condensate Extraction
Cooling Water
Flue Gas Desulfurization
Auxiliary Services
Nuclear Service

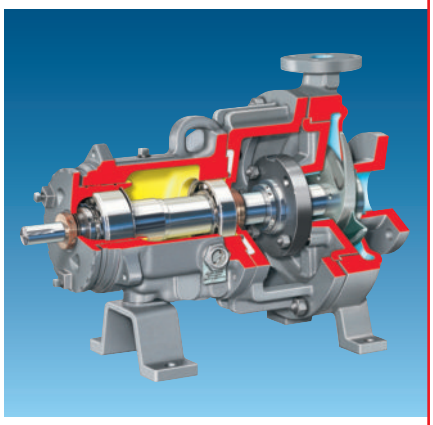

Primary Metals
Cooling Water
Descaling
Hydraulic Press
Plating, Galvanizing and Other Coatings
Scale Recycle
Mining
Dewatering & Water Supply
Leaching Acid
Primary Processing
Slurry Transfer
Pulp and Paper
Bleach Chemicals
Boiler Feed
Chemical and Liquor
Coatings
Digester
Paper Stock
Shower Pumps





Overhung Pumps

Mark 3 ANSI Standard



Standards
- ASME (ANSI) B73.1

Operating Parameters
- Flows to 1680 m³/h (7400 gpm)
- Heads to 215 m (700 ft)
- Pressures to 27 bar (400 psi)
- Temperatures from -75°C (-100°F) to 370°C (700°F)

Features
- Exclusive reverse vane impeller
- Standard Mark 3A power end
  - External micrometer impeller adjustment
  - Double row angular contact outboard bearings
  - Single row, deep groove inboard bearings
  - Double lip oil seals
  - Constant level oiler
  - Large, reflective sight glass
- Choice of lubrication systems
- Optional ANSI 3A power end with lifetime warranty
  - Certified clean room assembly
  - Inpro/Seal's VBXX isolators
  - Magnetic drain plug
- SealSentry™ seal chambers
- Largest shaft and bearing components in standard ANSI pumps

Other Configurations
- Mark 3 Lo-Flo
- Mark 3 unitized self-primer
- Mark 3 recessed impeller
- Mark 3 Sealmatic dynamically sealed

See Bulletin PS-10-13

Mark 3 Lo-Flo

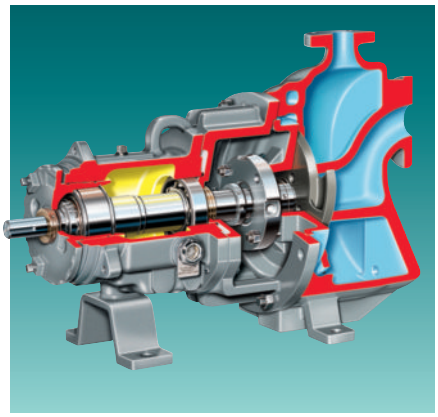
Standards
- ASME (ANSI) B73.1

Operating Parameters
- Flows to 50 m³/h (220 gpm)
- Heads to 300 m (1000 ft)
- Pressures to 30 bar (450 psi)
- Temperatures from -75°C (-100°F) to 370°C (700°F)

Features
- Circular, concentric casing
- Radial vane impeller
- Mark 3A power end
  - External micrometer impeller adjustment
  - Double row angular contact outboard bearings
  - Single row, deep groove inboard bearings
  - Double lip oil seals
  - Constant level oiler
  - Large, reflective sight glass
- Choice of lubrication systems
- Optional ANSI 3A power end with lifetime warranty
  - Certified clean room assembly
  - Inpro/Seal's VBXX isolators
  - Magnetic drain plug
- SealSentry seal chambers with flow modifiers
- Oversized shaft and bearing components

See Bulletin PS-10-13

Mark 3 Unitized Self-Primer



Standards
- Flowserve

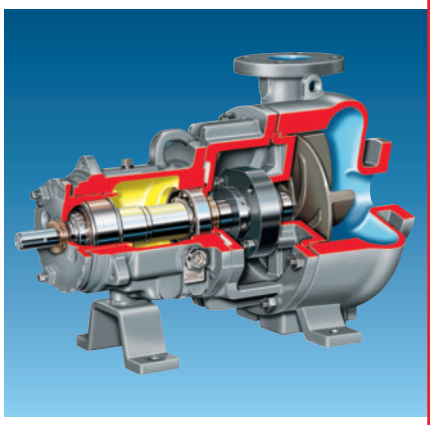
Operating Parameters
- Flows to 320 m³/h (1400 gpm)
- Heads to 120 m (400 ft)
- Pressures to 20 bar (285 psi)
- Temperatures to 370°C (700°F)
- Static suction lift to 6 m (20 ft)

Features
- Unitized casing with large priming chamber, air separator and volute
- Exclusive reverse vane impeller
- Mark 3A power end
  - External micrometer impeller adjustment
  - Double row angular contact outboard bearings
  - Single row, deep groove inboard bearings
  - Double lip oil seals
  - Constant level oiler
  - Large, reflective sight glass
- Choice of lubrication systems
- Optional ANSI 3A power end with lifetime warranty
  - Certified clean room assembly
  - Inpro/Seal's VBXX isolators
  - Magnetic drain plug
- Oversized shaft and bearing components

Other Configurations
- Mark 3 recessed impeller, self-primer

See Bulletin PS-10-13

Mark 3 Recessed Impeller



Standards
- Flowserve

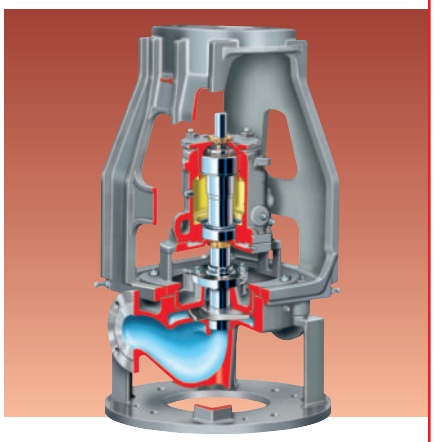
Operating Parameters
- Flows to 455 m³/h (2000 gpm)
- Heads to 120 m (400 ft)
- Pressures to 20 bar (285 psi)
- Temperatures from -75°C (-100°F) to 370°C (700°F)

Features
- Low shear vortex pumping action
- Fractional media contact with the impeller
- Thick-wall wet end components suitable for light slurries
- Mark 3A power end
  - External micrometer impeller adjustment
  - Double row angular contact out-board bearings
  - Single row, deep groove inboard bearings
  - Double lip oil seals
  - Constant level oiler
  - Large, reflective sight glass
- Optional ANSI 3A power end with lifetime warranty
  - Certified clean room assembly
  - Inpro/Seal's VBXX isolators
  - Magnetic drain plug
- SealSentry seal chambers
- Oversized shaft and bearing

Other Configurations
- Mark 3 ANSI standard
- Mark 3 Sealmatic recessed impeller

See Bulletin PS-10-13

Mark 3 In-Line



Standards
- ASME (ANSI) B73.2

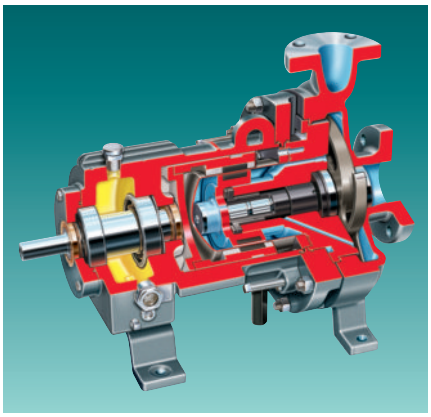
Operating Parameters
- Flows to 370 m³/h (1630 gpm)
- Heads to 230 m (760 ft)
- Pressures to 24 bar (350 psi)
- Temperatures from -75°C (-100°F) to 370°C (700°F)

Features
- Exclusive reverse vane impeller
- Mark 3A power end
  - External micrometer impeller adjustment
  - Double row angular contact out-board bearings
  - Single row, deep groove inboard bearings
  - Double lip oil seals
- Optional ANSI 3A power end with lifetime warranty
  - Certified clean room assembly
  - Inpro/Seal's VBXX isolators
- SealSentry seal chambers
- Unique C-plus motor and pump shaft alignment system
- Choice of bearing lubrication
  - Regreasable bearings
  - Oil mist
  - Permanently lubricated bearings

Other Configurations
- Mark 3 in-line, recessed impeller

See Bulletin PS-10-15

Guardian Magnetic Drive



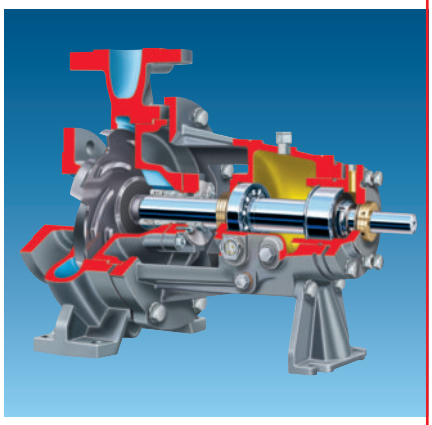
Standards
- ASME (ANSI) B73.1 dimensions

Operating Parameters
- Flows to 375 m³/h (1650 gpm)
- Heads to 215 m (705 ft)
- Pressures to 24 bar (350 psi)
- Temperatures from -75°C (-100°F) to 290°C (550°F)

Features
- Magnetic drive design
- Alloy C-276 containment shell
- Rare earth magnets
- Low NPSHR, reverse vane impeller
- Casings and impellers interchangeable with sealed configuration
- Optimized internal lubrication path
- Silicon carbide bushings and journals with double spiral grooves
- Standard and contained back pullout
- Configurations
  - G-Series (-75°C [-100°F] to 120°C [250°F])
  - H-Series (-120°C [-250°F] to 290°C [550°F])
- Options
  - Fiber-optic leak detection
  - Containment shell temperature probes
  - Process temperature probes
  - External flush plans

See Bulletin P-10-14

CPX ISO Standard



Standards
- ISO 2858
- ISO 5199

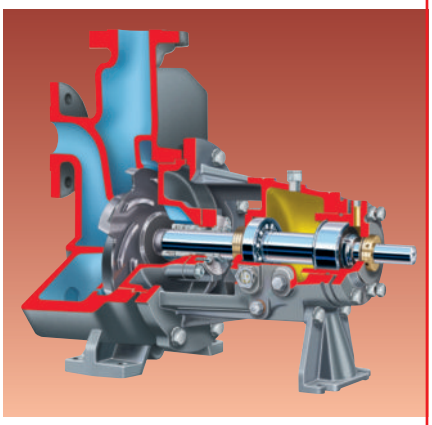
Operating Parameters
- Flows to 1400 m³/h (6160 gpm)
- Heads to 250 m (820 ft)
- Pressures to 25 bar (365 psi)
- Temperatures from -80°C (-110°F) to 350°C (660°F)

Features
- 45° conically shaped seal chamber with integral flow modifiers
- External impeller adjustment
- High efficiency, low NPSHR, precision cast semi-open impeller
- Less than 0.05 mm (0.002 in) deflection at the seal face
- Accepts multiple seal arrangements
- Standard non-contacting labyrinth seal
- Back pull-out design
- Double row, angular contact thrust bearings standard
  - Duplex, back-to-back angular contact thrust bearing optional
- CE marked and compliant with applicable European directives, such as ATEX

Other Configurations
- Low flow, high head design
- CPXM close coupled
- CPXP self-primer
- CPXR recessed impeller
- CPXV chemical sump
- CPXN centerline mounted

See Bulletin PS-10-30

CPXP Self-Primer



Standards
- ISO 2858
- ISO 5199

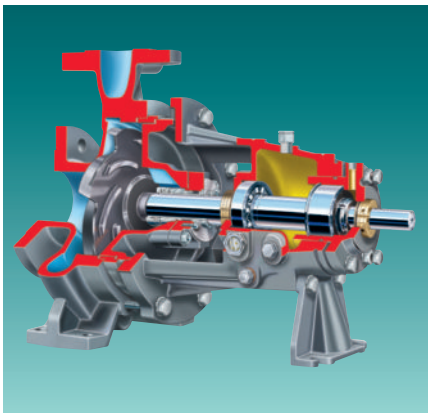
Operating Parameters
- Flows to 250 m³/h (1100 gpm)
- Heads to 130 m (425 ft)
- Pressures to 25 bar (365 psi)
- Temperatures from -80°C (-110°F) to 350°C (660°F)

Features
- Reflux priming principle
- One-piece casing with large priming chamber, air separator and volute
- 45° conically shaped seal chamber with integral flow modifiers
- External impeller adjustment
- High efficiency, low NPSHR, precision cast semi-open impeller
- Accepts multiple seals
- Suction run-dry capability
- Standard non-contacting labyrinth seal
- Back pull-out design
- Double row, angular contact thrust bearings standard
  - Duplex, back-to-back angular contact thrust bearing optional
- CE marked and compliant with applicable European directives, such as ATEX

Other Configurations
- CPXPM close coupled, self-primer
- CPXPS magnetic drive, self-primer
- CPXPSM close-coupled magnetic drive self-primer

See Bulletin PS-10-30

CPXR Recessed Impeller



Standards
- ISO 2858
- ISO 5199

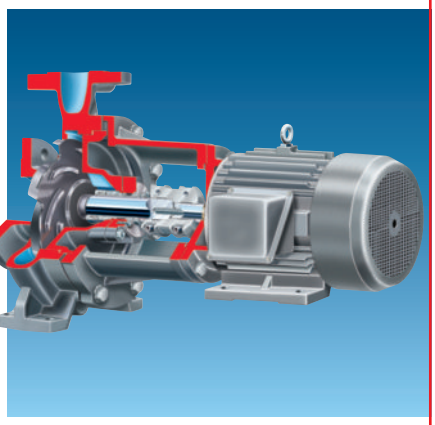
Operating Parameters
- Flows to 750 m³/h (3300 gpm)
- Heads to 100 m (330 ft)
- Pressures to 25 bar (365 psi)
- Temperatures from -80°C (-110°F) to 350°C (660°F)

Features
- Vortex action
- Semi-open recessed impeller with wide font clearance provides low-shear pumping
- 45° conically shaped seal chamber with integral flow modifiers
- Standard non-contacting labyrinth seals
- Less than 0.05 mm (0.002 in) deflection at the seal face
- External impeller adjustment
- Back pull-out design
- Double row, angular contact thrust bearings standard
  - Duplex, back-to-back angular contact thrust bearing optional
- CE marked and compliant with applicable European directives, such as ATEX

Other Configurations
- CPXVR recessed impeller sump
- CPXRM close coupled, recessed impeller

See Bulletin PS-10-30

CPXM Close Coupled



Standards
- ISO 2858
- ISO 5199

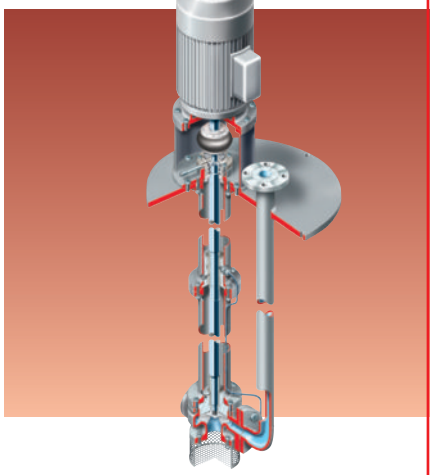
Operating Parameters
- Flows to 570 m³/h (2500 gpm)
- Heads to 125 m (400 ft)
- Pressures to 25 bar (365 psi)
- Temperatures from -20°C (-5°F) to 160°C (320°F)

Features
- Compact, space-saving configuration
- 45° conically shaped seal chamber with integral flow modifiers
- External impeller adjustment
- High efficiency, low NPSHR, precision cast semi-open impeller
- Less than 0.05 mm (0.002 in) deflection at the seal face
- Radiating surfaces
- Accepts multiple seals
- Optional secondary seal
- Standard non-contacting labyrinth seal
- Back pull-out design
- CE marked and compliant with applicable European directives such as ATEX

Other Configurations
- CPXPM close coupled, self-primer
- CPXSM close coupled, magnetic drive
- CPXRM close coupled, recessed impeller

See Bulletin PS-10-30

CPXV Chemical Sump



Standards
- API 610, 8th edition
- ISO 5199

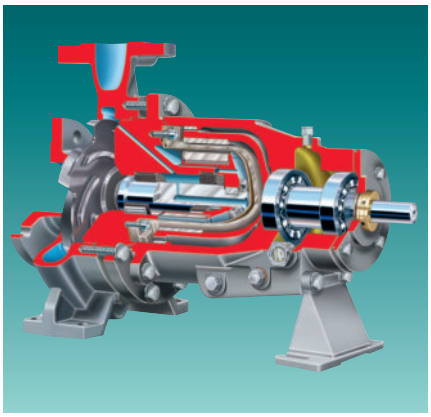
Operating Parameters
- Flows to 1400 m³/h (6160 gpm)
- Heads to 250 m (820 ft)
- Pressures to 25 bar (365 psi)
- Temperatures from -40°C (-40°F) to 350°C (660°F)
- Speeds to 4700 rpm

Features
- Heavy-duty casing with multi-ribbed discharge flange
- High efficiency, low NPSHR, precision cast semi-open impeller
- Column lengths to 10 m (33 ft)
- Heavy-duty, sealed for life, double thrust bearings
- Options
  - Spacer or flexible coupling
  - Rectangular or circular soleplates
  - Jacketed body
  - Recessed impeller
  - Oil lubrication
  - Non-spacer coupling
  - Suction strainer
- CE marked and compliant with applicable European directives, such as ATEX

Other Configurations
- CPXVR recessed impeller sump

See Bulletin PS-10-30

CPXS Magnetic Drive



Standards
- ISO 2858
- ISO 5199

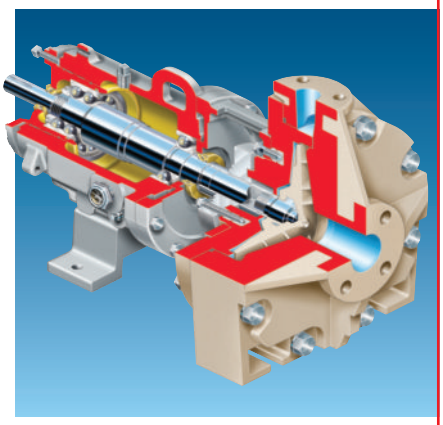
Operating Parameters
- Flows to 420 m³/h (1850 gpm)
- Heads to 160 m (525 ft)
- Pressures to 25 bar (365 psi)
- Temperatures from -40°C (-40°F) to 250°C (480°F)
- Discharge sizes to 100 mm (4 in)

Features
- Reinforced PEEK or Alloy C-276 primary containment shell
- Secondary containment shell optional
- High performance rare earth magnets
- Low NPSHR open impeller
- Advanced sintered silicon carbide bushings and journal bearings
- Standard and contained back pull-out design
- Non-contacting labyrinth seals
- CE marked and compliant with applicable European directives, such as ATEX

Other Configurations
- CPXSM ISO close coupled, magnetic drive
- CPXPSM ISO close coupled, magnetic drive, self-primer

See Bulletin PS-10-30

PolyChem GRP Engineered Polymer Composite



Standards
- ASME (ANSI) B73.5

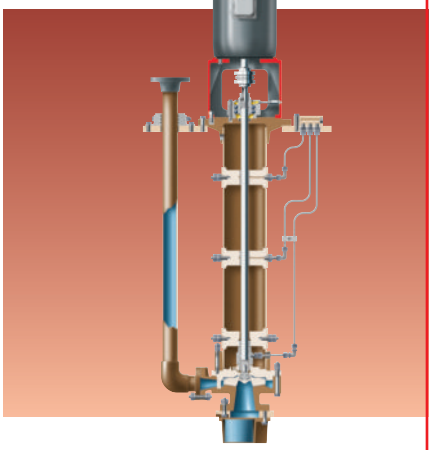
Operating Parameters
- Flows to 2050 m³/h (9000 gpm)
- Heads to 150 m (500 ft)
- Pressures to 17 bar (250 psi)
- Temperatures from -45°C (-50°F) to 120°C (250°F)

Features
- Glass reinforced vinyl ester
- Unitized casing with integrally molded, fully gusseted suction and discharge flanges
- Tapered polygon impeller drive
- Stuffing box accommodates multiple seals, glands and flush arrangements
- Standard Mark 3A power end
  - External micrometer impeller adjustment
  - Double row angular contact outboard bearings
  - Single row, deep groove inboard bearings
  - Double lip oil seals
  - Constant level oiler
- Optional ANSI 3A power end with lifetime warranty
  - Certified clean room assembly
  - Inpro/Seal's VBXX isolators
  - Magnetic drain plug

Other Configurations
- VGRP engineered polymer composite sump
- Self-primer

See Bulletin PS-10-17

PolyChem VGRP Engineered Polymer Composite Sump



Standards
- Flowserve

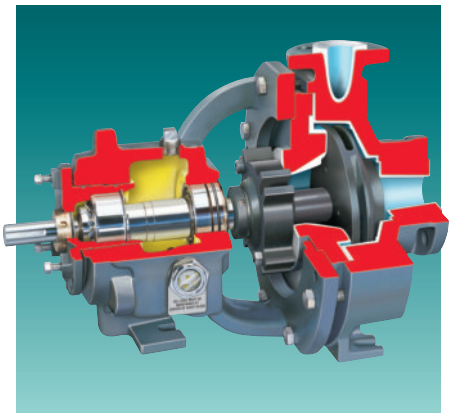
Operating Parameters
- Flows to 565 m³/h (2500 gpm)
- Heads to 110 m (350 ft)
- Pressures to 17 bar (250 psi)
- Temperatures from -30°C (-20°F) to 90°C (200°F)

Features
- Glass reinforced vinyl ester
- Unitized casing with integrally molded, fully gusseted suction and discharge flanges
- Externally adjustable, semi-open impeller
- Shaft and bearing system operates well below the first critical speed
- Self-lubricated or external flush bearings
- Single-piece, lightweight, filament-wound, reinforced fiberglass composite column
- Single and duplex configurations
- Full basket strainer
- NEMA in-line motor
- Fiberglass mounting plate
- Tapered polygon impeller drive
- Pull-out bearing retainers
- Level controls
- Choice of shaft metallurgy

Other Configurations
- GRP engineered polymer composite

See Bulletin PS-10-17

PolyChem S-Series Fluoropolymer Lined



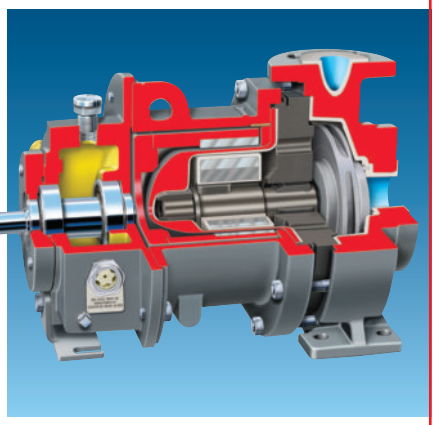
Standards
- ASME (ANSI) B73.1
- ISO 2858
- JIS drilling

Operating Parameters
- Flows to 420 m³/h (1860 gpm)
- Heads to 145 m (480 ft)
- Pressures to 17 bar (250 psi)
- Temperatures from -30°C (-20°F) to 150°C (300°F)

Features
- PFA lined wet end
- Metal armor meets material specifications of ASTM A395 and GGG 40.3
- Standard Mark 3A power end
- SealSentry seal chamber
- Accommodates multiple seal types
- Shaft options
  - Standard silicon carbide shaft sleeve
  - Alloy shaft sleeves
  - Solid shafts
- Bearing housing options
  - Labyrinth oil seals
  - Oil slinger
  - Regreasable or double shielded bearings
  - Oil mist lubrication
- Optional ANSI 3A power end with lifetime warranty
  - Certified clean room assembly
  - Inpro/Seal's VBXX isolators
  - Magnetic drain plug

See Bulletin PS-10-17

PolyChem M-Series Fluoropolymer Lined, Magnetic Drive



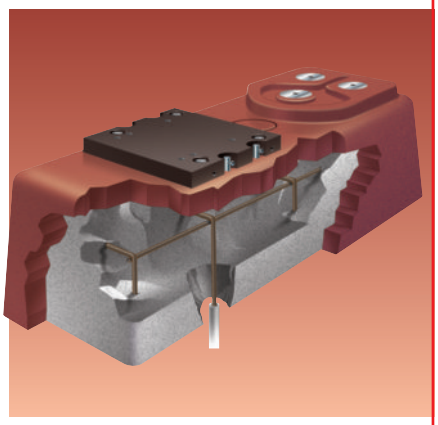
Standards
- ASME (ANSI) B73.1
- ISO 2858
- JIS drilling

Operating Parameters
- Flows to 135 m^3/h (600 gpm)
- Heads to 145 m (480 ft)
- Pressures to 17 bar (250 psi)
- Temperatures from -30°C (-20°F) to 150°C (300°F)

Features
- PFA lined wet end
- Casing is ductile cast iron with 3 mm (0.1 in) minimum PFA liner thickness
- PFA lined fiberglass containment shell
- Enclosed PFA lined impeller
- Rare earth magnets in synchronous drive
- Metal armor meets material specifications of ASTM A395 and GGG40.3
- Separate inner magnet and impeller components
- Rotating shaft design
- Silicon carbide radial and axial thrust bearings
- Choice of bearing lubrication
- Options
  - Long and close coupled
  - Open impeller
  - ANSI 3A power end

See Bulletin PS-10-17

Polyshield Baseplate and Foundation System



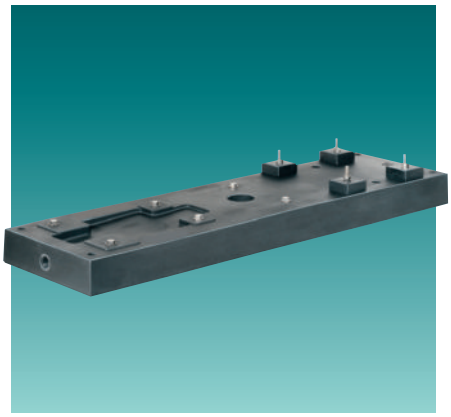
Standards
- Flowserve

Operating Parameters
- Temperatures to 260°C (500°F)

Features
- Combines non-metallic baseplate and formed concrete foundation for pump-driver in one complete unit
- Excellent corrosion resistance
- Improved vibration dampening
- Reduced installation costs and time
- Solid one-piece polymer motor mounting block with four 304 SS transverse motor block adjusters
- Self-venting design with grout hole and plug
- Standard 316 SS inserts
- Integral catch basin with NPT connection
- Uses 200 bar (3000 psi) concrete
- Suitable with ANSI, ISO, API and other foot-mounted and centerline mounted pumps
- Outstanding flatness
- Options
  - Choice of three polymer materials
  - Alloy 20 and Alloy C-276 inserts available
  - CPVC drain connection

See Bulletin PS-90-2

Polybase Polymer Concrete Baseplate

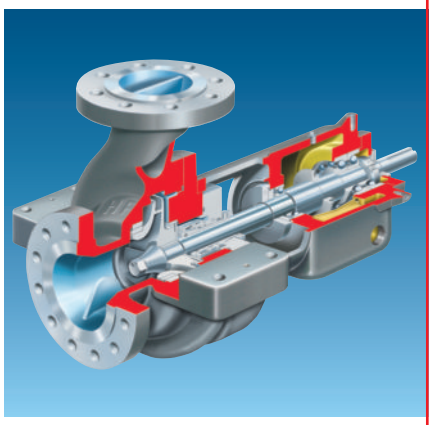


Standards
- ANSI and ISO standard designs

Features
- Solid polymer concrete construction
- Low installed cost
- Superior flatness
- Enhanced vibration dampening
- Excellent corrosion resistance
- Outstanding resistance to twisting or diaphragming
- 8-point™ adjuster alignment system
- Options
  - Polyboc™ motor mounting blocks
  - Catch basins
  - Grout holes
  - Alternate equipment inserts

See Bulletin PS-10-13

HPX (OH2) Centerline Mounted



Standards
- API 610 (OH2), latest edition

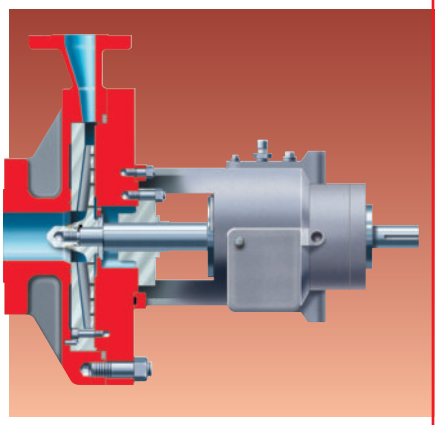
Operating Parameters
- Flows to 2000 m³/h (9000 gpm)
- Heads to 350 m (1100 ft)
- Pressures to 80 bar (1160 psi)
- Temperatures from -160°C (-250°F) to 450°C (840°F)

Features
- Centerline supported casing
- Nozzle loading capability beyond API 610 design requirements
- Dynamically balanced impeller
- Rugged shaft design
- API 682 seal chamber accommodates multiple seal types
- Choice of bearings
  - Standard single row, deep groove, radial bearing and duplex, single row 40° angular contact thrust bearings
  - Special bearing arrangements for high suction pressures
- Bearing lubrication and cooling options
  - Oil mist and oil purge
  - Fan cooling
  - Finned cooling insert
- Options
  - Top suction nozzle
  - Inducer

Other Configurations
- HPXM centerline mounted, low flow

See Bulletin PS-10-5

HPXM (OH2) Centerline Mounted, Low Flow



Standards
- API 610 (OH2), latest edition

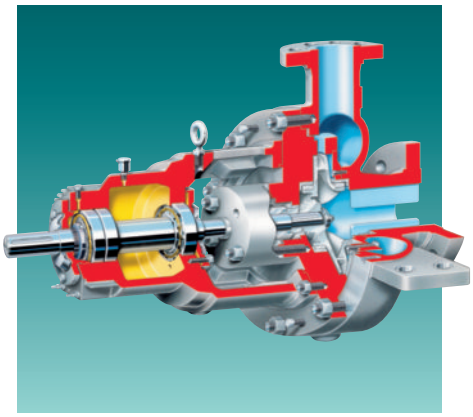
Operating Parameters
- Flows to 30 m³/h (130 gpm)
- Heads to 215 m (700 ft)
- Pressures to 80 bar (1160 psi)
- Temperatures from -160°C (-250°F) to 450°C (840°F)

Features
- Low flow, high head design
- Replaceable volute inserts
- High efficiency patented design radial blade impeller
- Full interchangeability with HPX bearing assembly and mechanical seals
- Choice of bearings
  - Standard single row, deep groove, radial bearing and duplex, single row 40° angular contact thrust bearings
  - Special bearing arrangements for high suction pressures
- Bearing lubrication and cooling options
  - Oil mist and oil purge
  - Fan cooling
  - Finned cooling insert
- Optional inducer

Other Configurations
- HPX centerline mounted

See Bulletin PSS-10-5.1

PHL (OH2) Centerline Mounted



Standards
- API 610 (OH2), latest edition

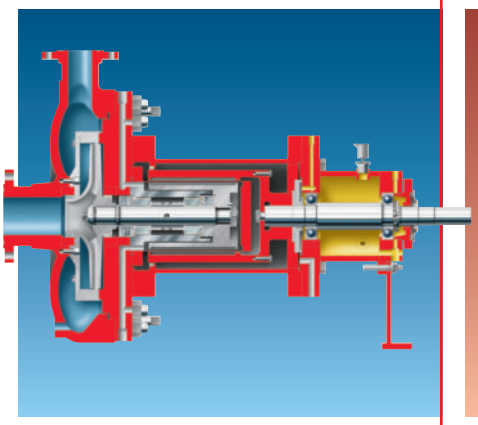
Operating Parameters
- Flows to 900 m³/h (4000 gpm)
- Heads to 400 m (1300 ft)
- Pressures to 40 bar (600 psi)
- Temperatures to 450°C (840°F)
- Motor sizes to 110 kW (150 hp)

Features
- Centerline supported casing
- Custom-tuned hydraulics
- State-of-the-art diffuser technology
  - Project-specific designs
- Low shaft deflection at any flow
- API 682 seal chamber accommodates multiple seal types
- Bearing housing cooling options
  - Air fan
  - Water jacket
- Replaceable diffusers

Other Configurations
- Top suction nozzle
- PHL-Mag centerline mounted, magnetic drive

See Bulletin PSS-10-5.2

PHL-Mag Centerline Mounted, Magnetic Drive



Standards
- API 685, latest edition

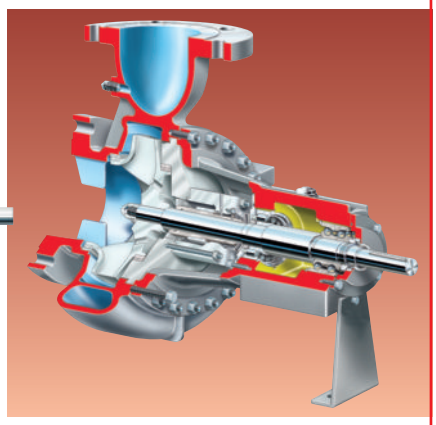
Operating Parameters
- Flows to 900 m³/h (4000 gpm)
- Heads to 400 m (1300 ft)
- Pressures to 40 bar (600 psi)
- Temperatures to 200°C (400°F)
- Motor sizes to 130 kW (175 hp)

Features
- Magnetic drive design
- 100% leak-free sealless design
- Custom-tuned hydraulics
- State-of-the-art diffuser technology
  – Project-specific designs
- Alloy C-276 containment shell hydrotested to 60 bar (900 psi)
- Product lubricated silicon carbide bearings
- Replaceable diffusers

Other Configurations
- Top suction nozzle
- PHL centerline mounted

See Bulletin PSS-10-5.2

ERPN Centerline Mounted



Standards
- Flowserve
- API 682 seal chamber

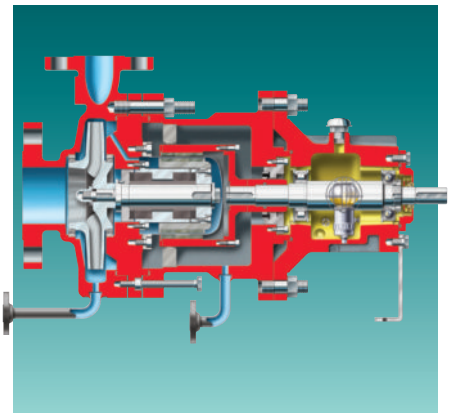
Operating Parameters
- Flows to 1100 m³/h (4800 gpm)
- Heads to 230 m (750 ft)
- Pressures to 60 bar (850 psi)
- Temperatures to 350°C (660°F)

Features
- Critical parameters meet API 610
  – Vibration limits
  – Deflection limits at seal faces
  – Nozzle loading capabilities
  – Balancing grades
- API 682 seal chamber accommodates multiple seal types
- Dynamically balanced, high efficiency impeller
- Centerline supported casing
- Double volute design for discharge flanges 80 mm (3 in) and larger
- Renewable wear rings for casing and cover
- Back pull-out design
- Options
  – Non-clogging recessed impeller
  – ERPN-O semi-open impeller
  – Inducer
  – Choice of API materials

Other Configurations
- ERPN-Mag centerline mounted, magnetic drive

See Bulletin PS-10-20

ERPN-Mag Centerline Mounted, Magnetic Drive



Standards
- Flowserve
- ASME (ANSI) B16.5 flanges

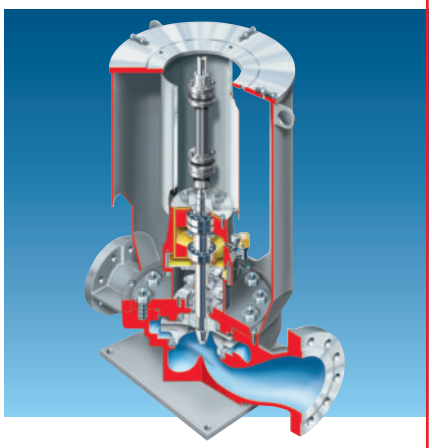
Operating Parameters
- Flows to 1100 m³/h (4800 gpm)
- Heads to 230 m (750 ft)
- Working pressures to 60 bar (850 psi)
- Suction pressures to 50 bar (750 psi)
- Temperatures to 350°C (660°F)

Features
- Magnetic drive design
- Critical parameters meet API 685
  – Vibration limits
  – Nozzle loading capabilities
  – Balancing grades
- Dynamically balanced, high efficiency semi-open impeller
- Casing and cover with metal-to-metal fit and fully confined, controlled compression gasket
- Standard roller type radial bearing
- Duplex, single row 40° angular contact back-to-back mounted thrust bearings
- Renewable wear rings
- ASME B16.5 Class 300 RF standard; Class 600 RF flanges optional
- Standard temperature probe
- Pressure switch
- Options
  – Secondary containment
  – Inducer
  – Choice of API materials

Other Configurations
- ERPN centerline mounted

See Bulletin PS-10-20

HWX (OH3) Vertical In-Line



Standards
- API 610 (OH3), latest edition

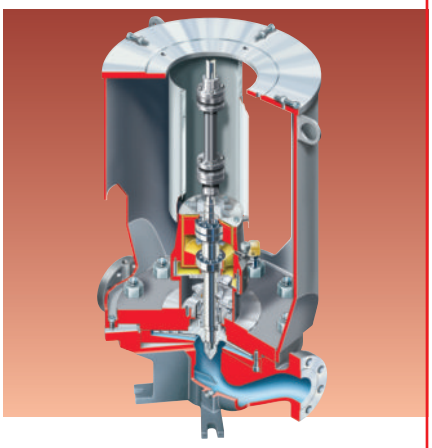
Operating Parameters
- Flows to 1500 m³/h (6600 gpm)
- Heads to 300 m (1000 ft)
- Pressures to 80 bar (1160 psi)
- Temperatures from -160°C (-250°F) to 400°C (750°F)

Features
- Space saving design
- API 682 seal chamber accommodates multiple seal types
- Stiff shaft design
  - Limits maximum deflection at seal faces to 0.05 mm (0.002 in)
  - Superior shaft stiffness factors (L3/D4)
- Dynamically balanced impeller
- Motor support head accommodates NEMA, IEC, C-face and P-base field drivers
- Bearing lubrication options
  - Oil cascade (patented)
  - Oil mist
  - Grease lube
- Options
  - Inpro top bearing isolator
  - Inducer
  - Double suction impeller

Other Configurations
- HWM vertical in-line, low flow
- HWM2 vertical in-line, low flow, two stage

See Bulletin PS-10-27

HWM (OH3) Vertical In-Line, Low Flow



Standards
- API 610 (OH3), latest edition

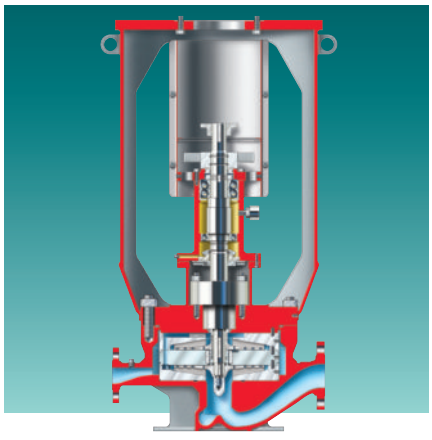
Operating Parameters
- Flows to 30 m³/h (130 gpm)
- Heads to 220 m (725 ft)
- Pressures to 50 bar (750 psi)
- Temperatures from -185°C (-300°F) to 400°C (750°F)

Features
- Low flow, high head design
- Patented modular design
- More than 100 BEP fits in one pump size
- Replaceable volute inserts
- Patented radial blade impeller
- Space saving design
- API 682 seal chamber accommodates multiple seal types
- Dynamically balanced impeller
- Motor support head accommodates NEMA, IEC, C-face and P-base field drivers
- Bearing lubrication options
  - Oil cascade (patented)
  - Oil mist
  - Grease lube
- Options
  - Inpro top bearing isolator
  - Inducer

Other Configurations
- HWM2 vertical in-line, low flow, two stage
- HWX vertical in-line

See Bulletin PS-10-25

HWM2 (OH3) Vertical In-Line, Low Flow, Two Stage



Standards
- API 610 (OH3), latest edition

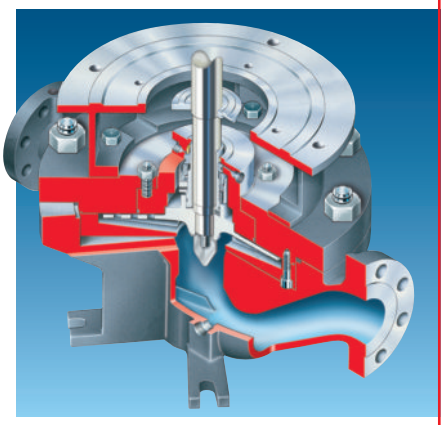
Operating Parameters
- Flows to 30 m³/h (130 gpm)
- Heads to 440 m (1450 ft)
- Pressures to 60 bar (850 psi)
- Temperatures from -185°C (-300°F) to 400°C (750°F)

Features
- Low flow, high head design
- Patented modular design
- More than 100 BEP fits in one pump size
- Replaceable volute inserts
- Patented radial blade impeller
- Space saving design
- API 682 seal chamber accommodates multiple seal types
- Dynamically balanced impeller
- Motor support head accommodates NEMA, IEC, C-face and P-base field drivers
- Bearing lubrication options
  - Oil cascade (patented)
  - Oil mist
  - Grease lube
- Options
  - Inpro top bearing isolator
  - Inducer

Other Configurations
- HWM vertical in-line, low flow
- HWX vertical in-line

See Bulletin PS-10-25

WM (OH5)
Close Coupled, Vertical In-Line, Low Flow



Standards
- API 610 (OH5), latest edition

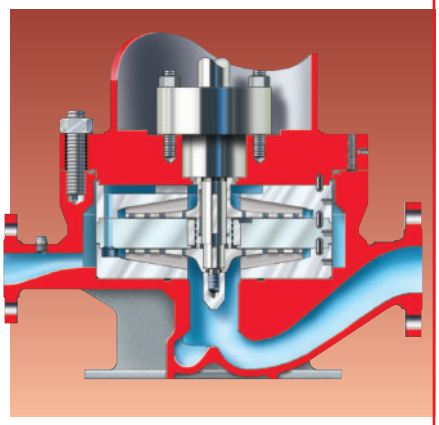
Operating Parameters
- Flows to 30 m^3/h (130 gpm)
- Heads to 220 m (725 ft)
- Pressures to 50 bar (750 psi)
- Temperatures from -45°C (-50°F) to 260°C (500°F)

Features
- Close coupled design
- Low flow, high head design
- Patented modular design
- More than 100 BEP fits in one pump size
- Less than 0.05 mm (0.002 in) maximum deflection at seal faces
- Replaceable volute inserts
- Patented radial blade impeller
- Continuously rising performance curve with low flow stability
- API 682 seal chamber accommodates multiple seal types
- Motor support head accommodates NEMA, IEC, C-face and P-base field drivers
- Dynamically balanced impeller
- Options
  - Inpro top bearing isolator
  - Inducer

Other Configurations
- WM2 close coupled, vertical in-line, low flow, two stage
- HWM vertical in-line, low flow

See Bulletin PS-10-25

WM2 (OH5)
Close Coupled, Vertical In-Line, Low Flow, Two Stage



Standards
- API 610 (OH5), latest edition

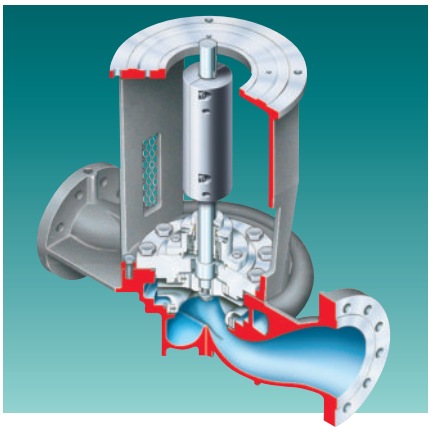
Operating Parameters
- Flows to 30 m^3/h (130 gpm)
- Heads to 440 m (1450 ft)
- Pressures to 60 bar (850 psi)
- Temperatures from -45°C (-50°F) to 260°C (500°F)

Features
- Close coupled design
- Low flow, high head design
- Patented modular design
- More than 100 BEP fits in one pump size
- Less than 0.05 mm (0.002 in) maximum deflection at seal faces
- Replaceable volute inserts
- Patented radial blade impeller
- Continuously rising performance curve with low flow stability
- API 682 seal chamber accommodates multiple seal types
- Motor support head accommodates NEMA, IEC, C-face and P-base field drivers
- Dynamically balanced impeller
- Options
  - Inpro top bearing isolator
  - Inducer

Other Configurations
- WM close coupled, vertical in-line, low flow
- HWM vertical in-line, low flow

See Bulletin PS-10-25

W (OH4)
Vertical In-Line



Standards
- API 610 (OH4), latest edition

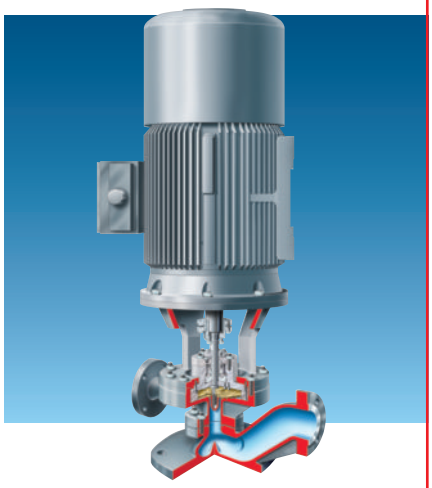
Operating Parameters
- Flows to 1500 m^3/h (6600 gpm)
- Heads to 300 m (1000 ft)
- Pressures to 80 bar (1160 psi)
- Temperatures from -160°C (-250°F) to 400°C (750°F)

Features
- Space saving design
- API 682 seal chamber
- Back pull-out design
- Stiff shaft design
  - Limits maximum deflection at seal faces to 0.05 mm (0.002 in)
  - Superior shaft stiffness factors (L3/D4)
- Dynamically balanced impeller
- Renewable casing and impeller rings
- Motor support head accommodates NEMA, IEC, C-face and P-base field drivers
- Rigid spacer-type coupling
- Steel coupling guard

Other Configurations
- HWX vertical in-line
- HWM vertical in-line, low flow
- HWM2 vertical in-line, low flow, two stage

See Bulletin PS-10-27

MSP Vertical In-Line, Medium Speed



Standards
- Flowserve

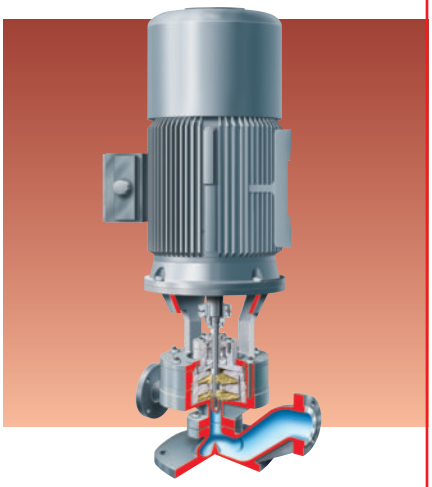
Operating Parameters
- Flows to 27 m³/h (120 gpm)
- Heads to 600 m (1970 ft)
- Pressures to 100 bar (1450 psi)
- Maximum suction pressure to 40 bar (580 psi)
- Temperatures from -40°C (-40°F) to 350°C (660°F)
- Speeds from 2000 rpm to 8000 rpm

Features
- Closely following API 610, 8th edition
- Modified concentric volute
- Open impeller with balance holes and scallops
- Variable frequency drive
- Rigid coupling
- Single or dual cartridge mechanical seals
- Options
  – Inducer
  – Choice of materials

Other Configurations
- Horizontal configuration
- MSP2 vertical in-line, medium speed, two stage

See Bulletin PS-10-1

MSP2 Vertical In-Line, Medium Speed, Two Stage



Standards
- Flowserve

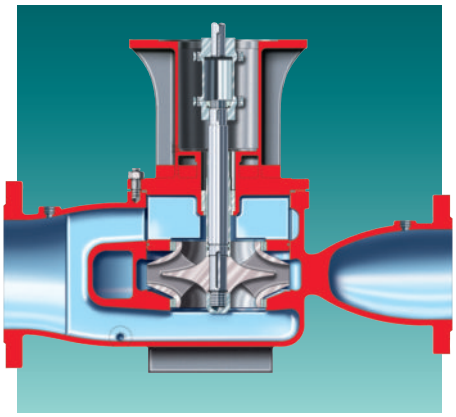
Operating Parameters
- Flows to 25 m³/h (110 gpm)
- Heads to 900 m (2955 ft)
- Pressures to 100 bar (1450 psi)
- Maximum suction pressure to 10 bar (150 psi)
- Temperatures from -40°C (-40°F) to 200°C (390°F)

Features
- Closely following API 610, 8th edition
- Two stage opposed impeller configuration
- Modified concentric volute
- Open impeller with balance holes and scallops
- Variable frequency drive
- Rigid coupling
- Single or dual cartridge mechanical seals
- Options
  – Inducer
  – Choice of materials

Other Configurations
- MSP vertical in-line, medium speed

See Bulletin PS-10-1

DSVP (OH4) Vertical In-Line

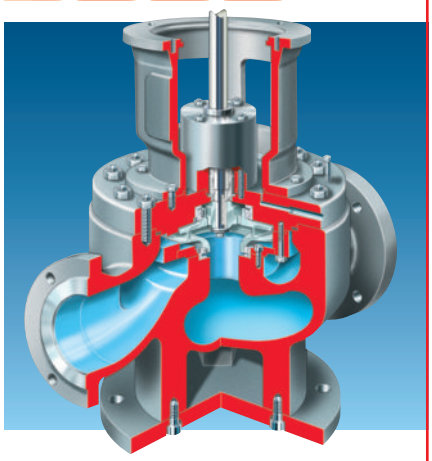


Standards
- API 610 (OH4), latest edition

Operating Parameters
- Flows to 3400 m³/h (15 000 gpm)
- Heads to 85 m (275 ft)
- Pressures to 40 bar (600 psi)
- Temperatures to 340°C (650°F)
- Motor ratings to 895 kW (1200 hp)

Features
- Space-saving design
- API 682 seal chamber accommodates multiple seal types
- Double suction enclosed impeller
- Double volute case design
- Standard case wear rings
- Optional impeller wear rings
- Metal-to-metal case to cover sealing with confined gasket
- Rigid spacer type coupling
- Impeller nut design, threaded to tighten with rotation

PVML (OH5) Vertical In-Line



Standards
- API 610 (OH5), latest edition
- BS 4082R

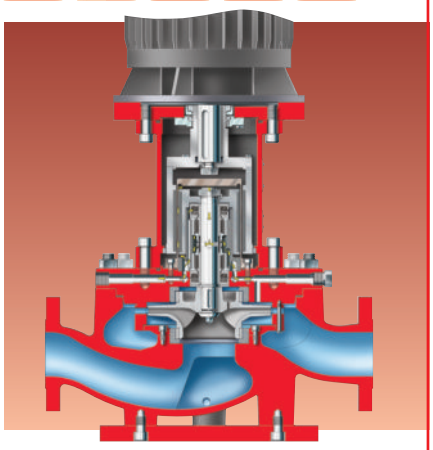
Operating Parameters
- Flows to 500 m^3/h (2200 gpm)
- Heads to 275 m (900 ft)
- Pressures to 40 bar (600 psi)
- Temperatures to 250°C (480°F)

Features
- Space-saving, alignment-free design
- Custom-tuned hydraulics
- State-of-the-art diffuser technology
  – Project-specific designs
- API 682 seal chamber accommodates multiple seal types
- Dynamically balanced impeller
- Positively locked, anti-rotation impeller nut with threads unexposed to pumped fluid

Other Configurations
- PVML-Mag vertical in-line, magnetic drive

See Bulletin PS-10-28

PVML-Mag Vertical In-Line, Magnetic Drive



Standards
- API 685, latest edition

Operating Parameters
- Flows to 500 m^3/h (2200 gpm)
- Heads to 275 m (900 ft)
- Pressures to 40 bar (600 psi)
- Temperatures to 200°C (400°F)

Features
- Permanent magnetic drive design
- 100% leak-free sealless operation
- Contamination-free pumpage without use of external fluid
- Custom tuned hydraulics
- State-of-the-art diffuser technology
  – Project-specific designs
- Dynamically balanced impeller
- Product lubricated silicon carbide radial and axial thrust slide bearings
- Patented venting of slide bearings area
- Positively locked, anti-rotation impeller nut with threads unexposed to pumped fluid

Other Configurations
- PVML vertical in-line

See Bulletin PS-10-28

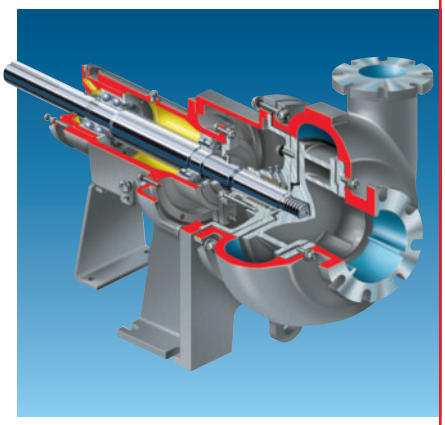
Pump Power Monitor

Standards
- Flowserve

Features
- Monitors and displays power to the pump
- Protects pump from underload and overload operating conditions
- Eliminates costly downtime and expensive pump repairs caused by:
  – Dry running
  – Pump overloads
  – Cavitation
  – Blocked lines
  – Closed suction or discharge valves
  – Excessive wear or rubbing
- Works on all pumps having steady (non-pulsating) loads
  – Centrifugal, gear or turbine
  – ANSI, API or ISO
  – Sealed or sealless
- Push button display of horsepower or kilowatts
- Adjustable low power and high power set points
- Adjustable trip delay timers
- Adjustable start-up delay timer for self-priming applications
- 4 to 20 milliamp analog output facilitates remote displays, operator interface and output to PLC or DCS
- Two form C relay outputs for low and high power trips
- Automatic, manual and remote reset options

See Bulletin PM-1

M Hard Metal, Abrasive Slurry



Standards
- Flowserve

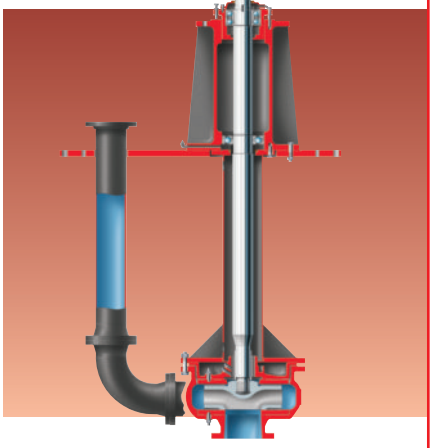
Operating Parameters
- Flows to 10 000 m³/h (44 000 gpm)
- Heads to 90 m (300 ft)
- Pressures to 10 bar (150 psi)
- Temperatures to 120°C (250°F)
- Solids from 2% to 70% by weight

Features
- One-piece high chrome iron, concentric casing with replaceable gland and suction side wear plates
- Closed impeller with pump-out vanes on front and rear shroud
- Standard packing-type stuffing box with replaceable wear plate
  - Full and low flow flush connections
  - Optional 316 SS, Alloy 20 or duplex stainless steel
- Heavy-duty bearing frame designed for V-belt loads
- Cartridge style bearings
- Parts interchangeable with R pump
- Three-point external end clearance adjustment
- Options
  - Vortex semi-recessed impeller
  - Hard metal expeller
  - Mechanical seal housing

Other Configurations
- Severe-duty configuration
- High pressure configuration
- MJ slurry sump
- MJC cantilever slurry sump

See Bulletin PS-10-19

MJ and MJC Hard Metal Slurry Sump



Standards
- Flowserve

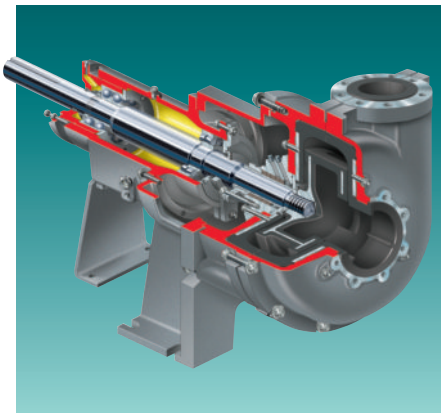
Operating Parameters
- Flows to 225 m³/h (1000 gpm)
- Heads to 30 m (100 ft)
- Pressures to 10 bar (150 psi)
- Temperatures to 110°C (225°F)
- Solids from 2% to 70% by weight
- Speeds to 1780 rpm

Features
- MJ - Submerged bearing and lineshaft design for deep setting
- MJC - Cantilever design with no submerged bearings
- Abrasion and corrosion resistant high chrome iron concentric casing
- Integrally cast straightening vanes in the suction nozzle
- Closed impeller with pump-out vanes on front and rear shrouds
- MJ has fluted “Cutlass” rubber bearings
- MJC has “Thordon” restriction bushing
- Directly coupled or V-belt driven
- Options
  - Hard metal expeller
  - Open and recessed impellers
  - Choice of materials

Other Configurations
- M horizontal hard metal, abrasive slurry

See Bulletin PS-10-19

R Horizontally Split, Rubber Lined Slurry



Standards
- Flowserve

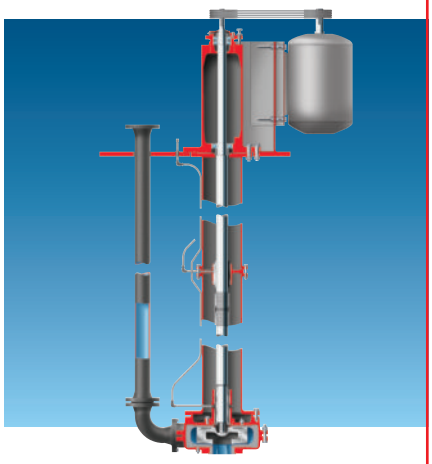
Operating Parameters
- Flows to 10 000 m³/h (44 000 gpm)
- Heads to 50 m (160 ft)
- Pressures to 10 bar (150 psi) standard; 35 bar (500 psi) optional
- Temperatures to 110°C (225°F)
- Solids from 2% to 70% by weight

Features
- Concentric, cast iron casing with replaceable, abrasion resistant rubber liner
- Rubber lined, closed impeller with front and rear pump-out vanes
- Standard packing type stuffing box with replaceable wear plate
  - Full and low flow flush connections
  - Optional 316 SS, Alloy 20, or Alloy C-276 materials
- Heavy-duty bearing frame
- Three-point external end clearance adjustment
- Parts interchangeable with M pump
- Directly coupled or V-belt driven
- Options
  - Acid-resistant stuffing box kits
  - Hard metal expeller
  - Mechanical seal housing
  - Choice of liner materials

Other Configurations
- RJ rubber lined slurry
- RJC cantilever rubber lined slurry sump

See Bulletin PS-10-18

RJ and RJC Rubber Lined Slurry Sump



Standards
- Flowserve

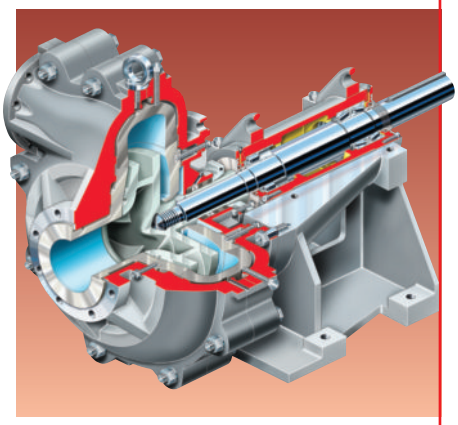
Operating Parameters
- Flows to 225 m³/h (1000 gpm)
- Heads to 30 m (100 ft)
- Pressures to 10 bar (150 psi)
- Temperatures to 110°C (225°F), depending on material
- Solids from 2% to 70% by weight
- Speeds to 1780 rpm

Features
- RJ - Submerged bearing and lineshaft design for deep setting
- RJC - Cantilever design with no submerged bearings
- Radically split casing with anti-prerotation vanes in suction nozzle
- Casing liners pressure molded on steel backing plates
  – Multiple materials available
- Pressure molded closed impeller with pump-out vanes on front and rear shrouds
- RJ has fluted “Cutlass” rubber bearings
- RJC has “Thordon” restriction bushing
- Directly coupled or V-belt driven
- Options
  – Hard metal expeller
  – Choice of liner materials

Other Configurations
- R horizontally split rubber lined slurry

See Bulletin PS-10-18

Titan Slurry Heavy-Duty, Radially Split, Lined



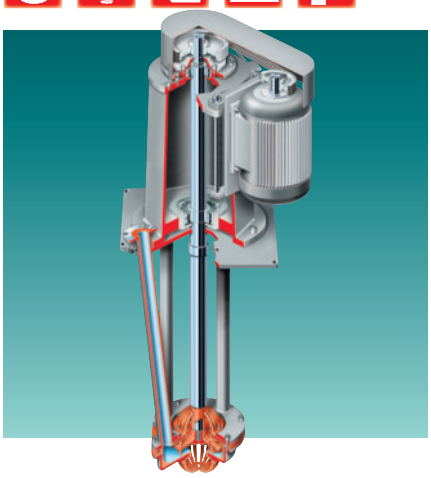
Standards
- Flowserve

Operating Parameters
- Flows to 3600 m³/h (16 000 gpm)
- Heads to 90 m (300 ft)
- Sizes from 50 mm (2 in) to 350 mm (14 in)

Features
- Fully interchangeable elastomeric or hard metal liners
- Radially split casing
- High efficiency, closed impeller
- Ample seal chamber accommodates a variety of packing and seal types
- Heavy-duty bearing frame sized to handle belt loads
- Bearing cartridge with back-to-back angular contact thrust bearings
- Roller type radial bearings
- Contact lip seals
- Dimensionally compatible with the industry’s most widely used pumps
- Optional expeller for dynamic sealing

See Bulletin PS-10-8

Terra-Titan Vertical Cantilever Sump



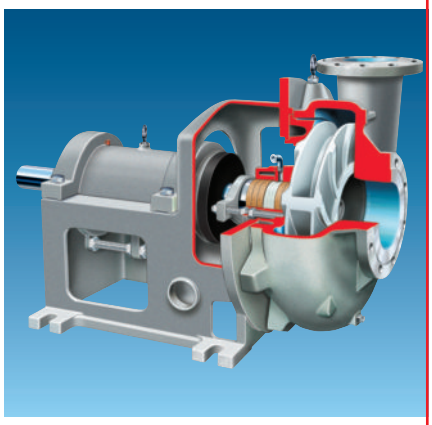
Standards
- Flowserve

Operating Parameters
- Flows to 250 m³/h (1100 gpm)
- Heads to 45 m (150 ft)
- Pressures to 5 bar (70 psi)
- Temperatures to 100°C (212°F)
- Sizes from 40 mm (1.5 in) to 125 mm (5.0 in)
- Sump depths from 700 mm (28 in) to 1800 mm (72 in)

Features
- One-piece suspended, oversized cantilever shaft construction
- Interchangeable urethane or hard metal wetted parts
- Concentric casing design
- Double suction, hydraulically balanced open impeller
- External impeller adjustment
- Renewable Terraprene urethane shaft sleeve
- Greased for life, heavy-duty, self-aligning roller bearings
- Upper and lower strainers
- Run-dry capability
- ANSI and ISO configurations
- Portable
- Lifting lugs
- Rigid motor mount pivot bar
- Available bottom suction tailpipe
- Multiple drive options

See Bulletin PS-10-7

LC Chemical Slurry



Standards
- Flowserve

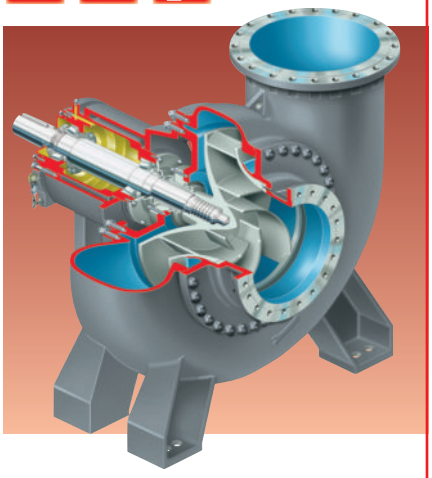
Operating Parameters
- Flows to 8000 m³/h (35 200 gpm)
- Heads to 100 m (325 ft)
- Pressures to 25 bar (365 psi)
- Temperatures to 140°C (285°F)
- Specific gravities to 1.7

Features
- Concentric casing with tangential discharge
- Rigid, one-piece bearing frame with two angular contact outboard bearings and roller inboard bearings
- Large diameter, heavy-duty shaft
- Choice of shaft sealing options
  - Wet gland packing
  - Single or double mechanical seal
  - High pressure double mechanical seal
  - Special high solids seals
  - Alumina industry seal
- Choice of materials of construction
- Multiple impeller designs
- Direct coupled or belt driven
- Choice of six drive arrangements
- Options
  - Inducer
  - Stuffing box cooling system

Other Configurations
- PL-C cantilever chemical slurry sump
- LC-S lineshaft chemical slurry sump

See Bulletin PS-10-11

MND Hard Metal Absorber Recirculation



Standards
- Flowserve

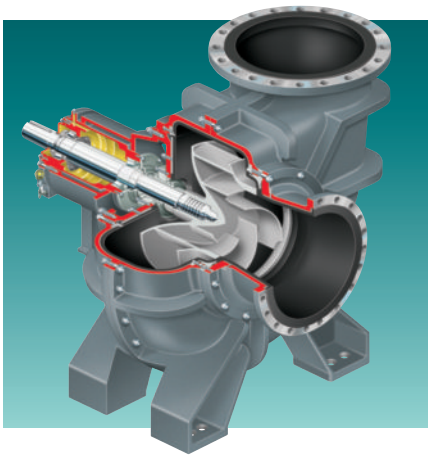
Operating Parameters
- Flows to 17 500 m³/h (77 000 gpm)
- Heads to 40 m (130 ft)
- Sizes from 600 mm (24 in) to 1000 mm (40 in)

Features
- One-piece, high efficiency impeller with mixed flow vane design
- Multiple materials of construction
- Replaceable casing wear ring
- Opposed tapered roller bearings designed for a minimum B10 life of 100 000 hours
- Product flush slurry seal
- External end clearance adjustment
- Front and back pullout

Other Configurations
- Vertical configuration
- MNR rubber lined absorber recirculation

See Bulletin PS-10-32

MNR Rubber Lined Absorber Recirculation



Standards
- Flowserve

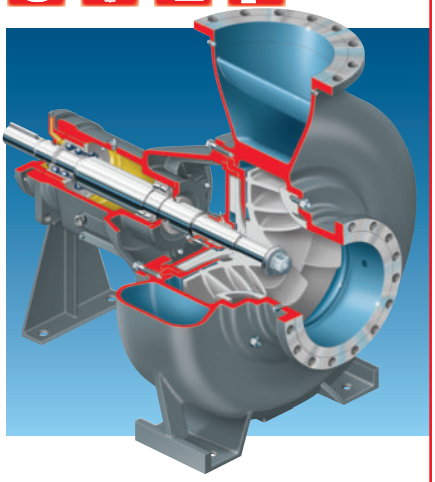
Operating Parameters
- Flows to 17 500 m³/h (77 000 gpm)
- Heads to 40 m (130 ft)
- Sizes from 600 mm (24 in) to 1000 mm (40 in)

Features
- One-piece, high efficiency impeller with mixed flow vane design
- Removable one-piece elastomeric casing liner
- Radially split casing
- Multiple materials of construction
- Replaceable casing wear ring
- Opposed tapered roller bearings designed for a minimum B10 life of 100 000 hours
- Product flush slurry seal
- External end clearance adjustment
- Front and back pullout

Other Configurations
- Vertical configuration
- MND hard metal absorber recirculation

See Bulletin PS-10-32

FRBH Heavy-Duty Paper Stock and Process



Standards
- Flowserve

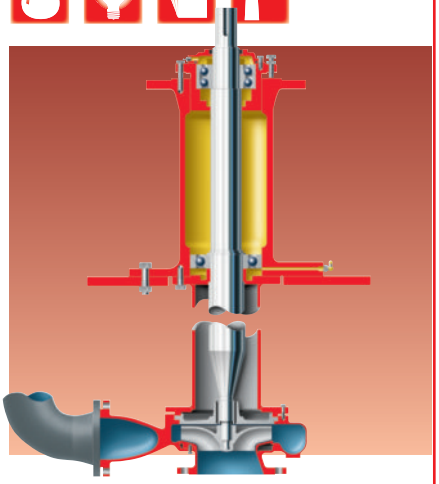
Operating Parameters
- Flows to 6500 m³/h (30 000 gpm)
- Heads to 100 m (325 ft)
- Temperatures to 150°C (300°F)

Features
- Self-venting, top centerline discharge casing
- Semi-open, full vane impeller with back pump-out vanes
- Large suction inlet
- Seal chamber accepts packing or mechanical seal
- Three-point end clearance adjustment
- Back pull-out design
- Heavy-duty, oil-lubricated bearings
- Fully split interlocking glands
- Extra heavy-duty alloy steel shaft
- Contoured wearplate match machined with impeller
- Dry shaft construction with sealed impeller nut and stainless steel hook sleeve
- Rigid, one-piece bearing frame
- Options
  - Large conical seal housing
  - Inducer
  - Expeller
  - Recessed impeller

Other Configurations
- FRBHJC cantilever sump
- FRBHJ sump

See Bulletin PS-10-16

FRBHJC Cantilever Sump



Standards
- Flowserve

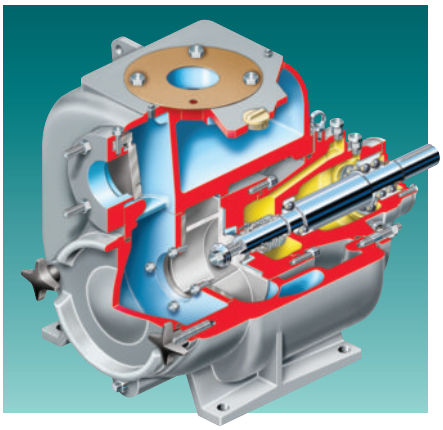
Operating Parameters
- Flows to 2700 m³/h (12 000 gpm)
- Heads to 100 m (325 ft)
- Temperatures to 150°C (300°F)
- Speeds to 1780 rpm

Features
- True stiff shaft cantilever design, without bottom bearing or flushing water
- Steep head-capacity
- Semi-open, full vane impeller with back pump-out vanes
- Stuffing box accommodates multiple seal types
- Direct coupled or V-belt driven
- Extra heavy-duty alloy steel shaft

Other Configurations
- FRBH heavy-duty paper stock and process
- FRBHJ vertical lineshaft sump

See Bulletin PS-10-16

Primo-Titan Self-Priming, Solids Handling



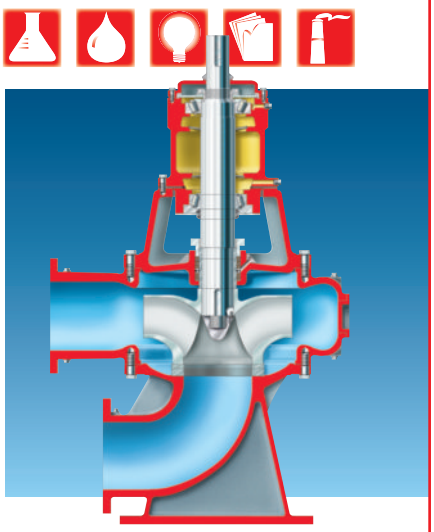
Standards
- Flowserve

Operating Parameters
- Flows to 600 m³/h (2650 US gpm)
- Heads to 35 m (115 ft)
- Temperatures to 75°C (165°F)
- Working pressures to 5 bar (72 psi)
- Sizes 50 to 200 mm (2 to 8 in)
- Solids to 75 mm (3 in) diameter

Features
- Two-vane, semi-open, solids handling impeller
- External impeller adjustment
- Abrasion-resistant double mechanical seal
- Quick-disconnect cover plate
- Heavy-duty, volute casing
- Replaceable seal housing
- Replaceable and reversible wear plate
- Solid one-piece flap valve
- Back pull-out design
- Trailer mounting capability
- Multiple drive options
- Extra large diameter shaft

See Bulletin PS-10-9

MN Large Capacity, Solids Handling



Standards
- Flowserve

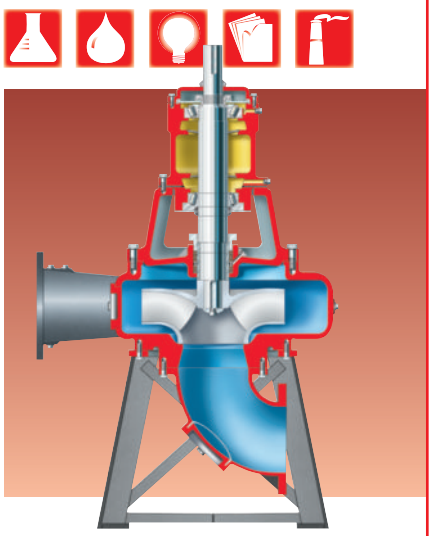
Operating Parameters
- Flows to 45 500 m³/h (200 000 gpm)
- Heads to 90 m (300 ft)
- Sizes to 1800 mm (72 in)

Features
- Variety of nozzle position options
- Direct or independent motor mounting
- Minimal shaft deflection
- Oversized shaft and reduced overhang
- Hardened chrome steel wear rings
- Stuffing box accommodates packing or mechanical seals
- Adjustable wear ring clearance
- Shaft sleeve options
  - 316 stainless steel
  - Hardened chrome steel
- Bearing housing features
  - Tapered roller bearings
  - Integral jacking bolts for wear ring adjustment
  - Accessible lubrication points

Other Configurations
- MN horizontal, end-suction
- MNF vertical, bottom suction, direct connected motor
- MNZ vertical, bottom suction, motor on separate floor
- MNC vertical with base elbow, direct connected motor
- MNV vertical with base elbow, motor on separate floor (shown above)

See Bulletin PS-10-4

MF Solids Handling



Standards
- Flowserve

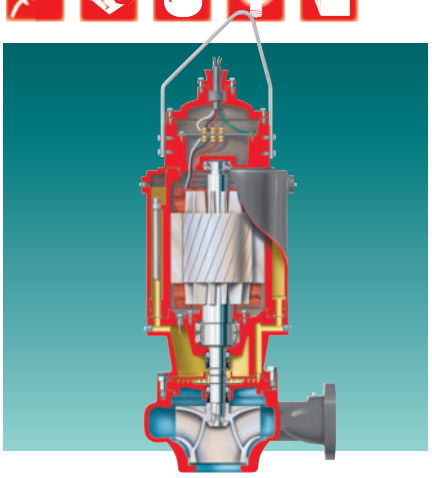
Operating Parameters
- Flows to 2275 m³/h (10 000 gpm)
- Heads to 90 m (300 ft)
- Sizes to 400 mm (16 in)

Features
- Variety of nozzle position options
- Direct or independent motor mounting
- Minimal shaft deflection
- Oversized shaft and reduced overhang
- Hardened chrome steel wear rings
- Stuffing box readily accommodates packing or mechanical seals
- Shaft sleeve options
  - 316 stainless steel
  - Hardened chrome steel
- Bearing housing features
  - Ball or tapered roller bearings
  - Integral jacking bolts for wear ring adjustment
  - Accessible lubrication points

Other Configurations
- MF horizontal, end-suction
- MFV vertical with motor on separate floor (shown above)
- MFC vertical with direct connected motor

See Bulletin PS-10-3

MSX Solids Handling, Submersible



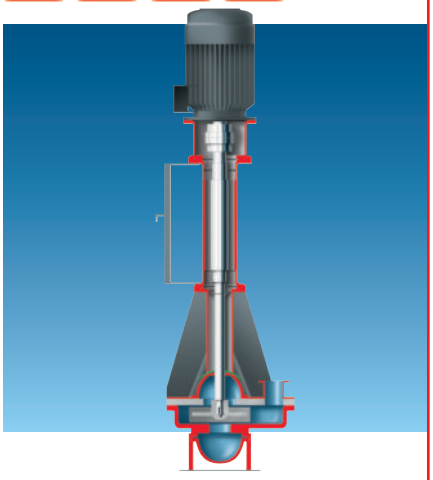
Standards
- Flowserve

Operating Parameters
- Flows to 4550 m³/h (20 000 gpm)
- Heads to 90 m (300 ft)
- Sizes to 500 mm (20 in)
- Motor to 300 kW (400 hp)
- Solids handling to 80 mm (3 in) spherical

Features
- High efficiency hydraulics
- EPACT rated motor
- Spike-resistant windings
- Class H rated insulation system
- Dynamically balanced shaft and rotor
- Available configurations
  - MSX Series 1 – Sizes from 75 mm (3 in) to 150 mm (6 in)
  - MSX Series 2/3 – Sizes to 500 mm (20 in)
- Mounting options
  - Wet pit
  - Dry-pit
  - Transportable

See Bulletin PS-50-2

Drain-Titan Double Suction, Urethane Lined Sump



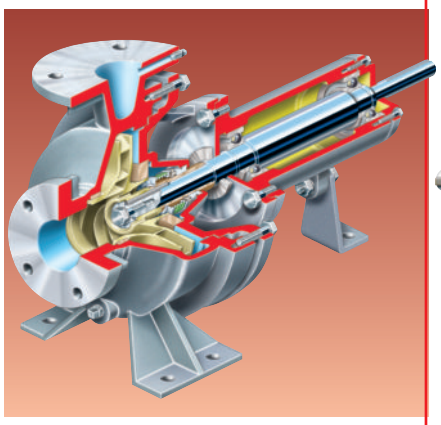
Standards
- Flowserve

Operating Parameters
- Flows to 160 m³/h (700 gpm)
- Heads to 40 m (130 ft)
- Pressures to 4 bar (55 psi)
- Sizes from 40 mm (1.5 in) to 100 mm (4 in)
- Solids to 15 mm (0.5 in)

Features
- Double suction, urethane coated wet-end
- Robust, integral unit construction
- Large diameter, stiff cantilever drive shaft
- No submerged bearings or seals
- Double sided impeller with pre-set clearance
- Keyed and bored shaft coupling
- Standard single lip oil seal
- Urethane lined, slotted outlet pipe flange
- Grease lubricated, single row, deep groove ball bearings
- No priming required
- Run-dry capability

See Bulletin PS-10-7

D800 Series Cast Iron



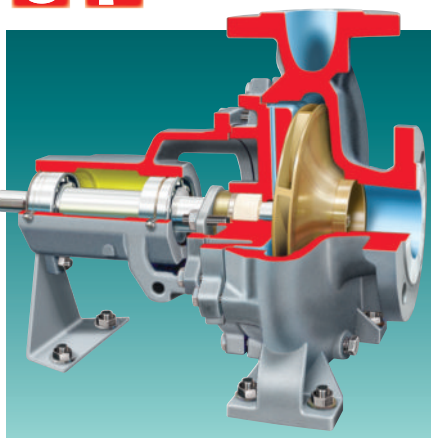
Standards
- Flowserve

Operating Parameters
- Flows to 340 m³/h (1500 gpm)
- Heads to 120 m (395 ft)
- Pressures to 15 bar (220 psi)
- Temperatures to 120°C (250°F)

Features
- High efficiency closed impeller
- Centerline discharge
- Sealed-for-life pre-lubricated motor bearings with two-year minimum life
- Renewable wear rings and shaft sleeves
- Pre-set mechanical seal assembly
- Bell type mechanical seal cover
- Standard NEMA C-face motor
- Back pull-out design
- Threaded and flanged connections
- Configuration options
  - Type D-814 - Frame mounted
  - Type D-824 - Close-coupled
  - Type D-834 - Vertical in-line

See Bulletin PS-10-6

MEN and MEN-SP End-Suction



Standards
- DIN 24255
- EN 733
- Flowserve

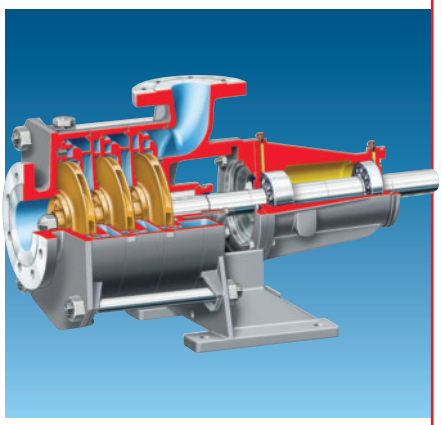
Operating Parameters
- Flows to 700 m³/h (3080 gpm)
- Heads to 100 m (330 ft)
- Pressures to 16 bar (230 psi)
- Temperatures to 120°C (250°F)

Features
- Modular design concept
- 33 sizes available
- Top discharge casing
- Fully machined, high efficiency, shrouded impeller
- Impeller balance holes for reduced thrust
- Open seal chamber with integral vortex breaking ribs
- Stainless steel shaft
- Oversized bearings
- Standard case wear rings
- Back pull-out design

Other Configurations
- MHP high-pressure water pump
- MENBLOC close coupled water pump
- ME high capacity, vertical water pump
- MEV high capacity, vertical water pump

See Bulletin PS-10-2

F-Line End-Suction, Multistage



Standards
- Flowserve

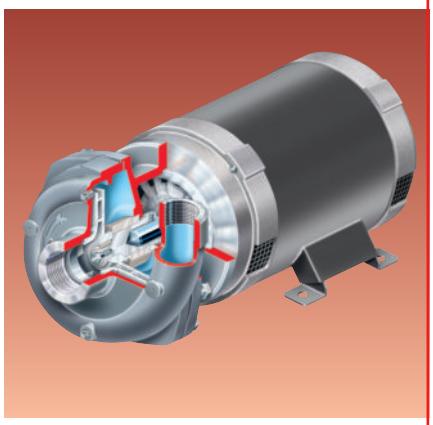
Operating Parameters
- Flows to 500 m³/h (2200 gpm)
- Heads to 250 m (820 ft)
- Discharge pressures to 25 bar (365 psi)
- Temperatures to 105°C (220°F)

Features
- Modular design
  - – 8 sizes
  - – 15 hydraulics
  - – 2 impeller types
- To 9 stages, depending on model and operating speed
- Sleeved shaft under sealing system
- Cast iron EN-GJL 250 pressure casings
- Cast iron EN-GJL 250 or NORYL® impellers and diffusers, depending upon model
- Steel grade C 35 E shaft
- 13% chromium steel sleeve

Configurations
- FP horizontal, overhung impeller
- FM horizontal, close coupled
- FD and FS verticals
- FAD and FMD vertical, close coupled

® NORYL is a registered trademark of General Electric Company

SMP Standard Motor



Standards
- Flowserve

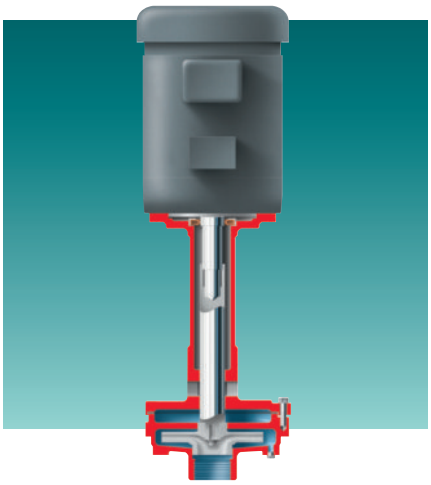
Operating Parameters
- Flows to 135 m³/h (600 gpm)
- Heads to 70 m (220 ft)
- Pressures to 12 bar (175 psi)
- Temperatures from -40°C (-40°F) to 120°C (250°F)

Features
- Glass reinforced polymer, high efficiency, semi-open or closed impellers standard
- Industry standard NEMA motors
- Stainless steel, self-aligned mechanical seal
- Back pull-out design
- Clamp-type mounting plate
- Options
  - – Cast iron, bronze or 316 SS impellers
  - – Stub shaft design

Other Configurations
- SMX non-metallic standard motor pump
- VSMP vertical standard motor pump

See Bulletin PS-10-26

VSMP Vertical, Standard Motor



Standards
- Flowserve

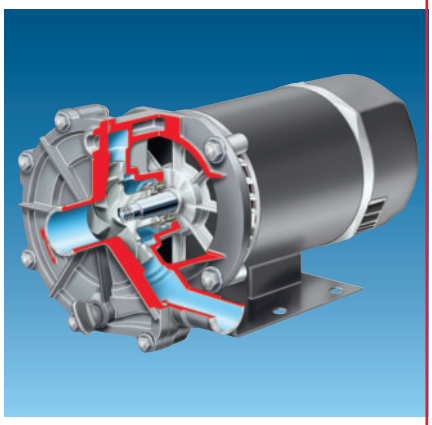
Operating Parameters
- Flows to 135 m³/h (600 gpm)
- Heads to 70 m (220 ft)
- Pressures to 12 bar (175 psi)
- Temperatures from -40°C (-40°F) to 120°C (250°F)

Features
- Glass reinforced polymer, high efficiency, semi-open or closed impellers standard
- Industry standard NEMA motors
- Stainless steel, self-aligned mechanical seal
- Back pull-out design
- Clamp-type mounting plate
- Options
  - – Cast iron, bronze or 316 SS impellers
  - – Stub shaft design

Other Configurations
- SMP standard motor pump
- SMX non-metallic standard motor pump

See Bulletin PS-10-26

SMX Non-Metallic Standard Motor



Standards
- Flowserve

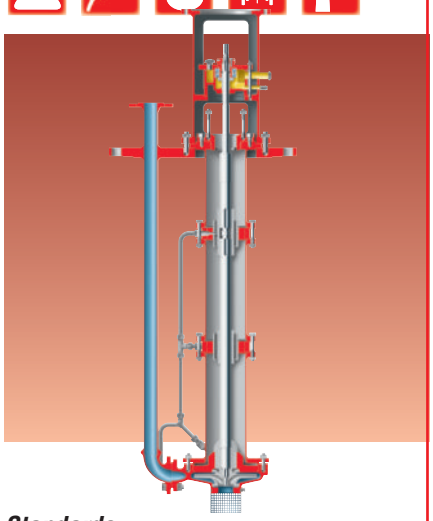
Operating Parameters
- Flows to 25 m³/h (100 gpm)
- Heads to 20 m (60 ft)
- Pressures to 12 bar (175 psi)
- Temperatures to 80°C (180°F)

Features
- Polyphenylene sulfide (PPS) casing, adapter and impeller
- Standard NEMA 56J frame C-faced motor
- Stainless steel, self-aligned mechanical seal
- Back pull-out design
- 40 mm (1.5 in) port size for hose connection

Other Configurations
- SMP standard motor pump
- VSMP vertical standard motor pump

See Bulletin PS-10-26

ECPJ (VS4 and VS5) Sump



Standards
- API 610 (VS4 and VS5), latest edition

Operating Parameters
- Flows to 500 m³/h (2200 gpm)
- Heads to 150 m (500 ft)
- Pressures to 16 bar (230 psi)
- Temperatures to 350°C (660°F)
- 42 sizes available

Features
- Lineshaft (VS4) and cantilever (VS5) configurations available
- Four impeller designs to suit hydraulic requirements
  - Closed multivane impeller with front wear rings and back vanes
  - Closed multivane impeller with front and rear wear rings
  - Open multivane impeller with back vanes
  - Free flow impeller with back vanes
- Multiple shaft sealing options
  - V-ring
  - Throttle bushing
  - Lip seal with grease-filled stuffing box
  - Soft packing
- API 682 seal chamber accommodates multiple seal types
- Column lengths to 6 m (22 ft)
  - Suction pipe available
- Choice of API materials
- NACE MR0175 materials available
- Internal or external bearing flushing
- Bearing cooling
- Suction strainer

ESP2 Vertical Immersion Sump

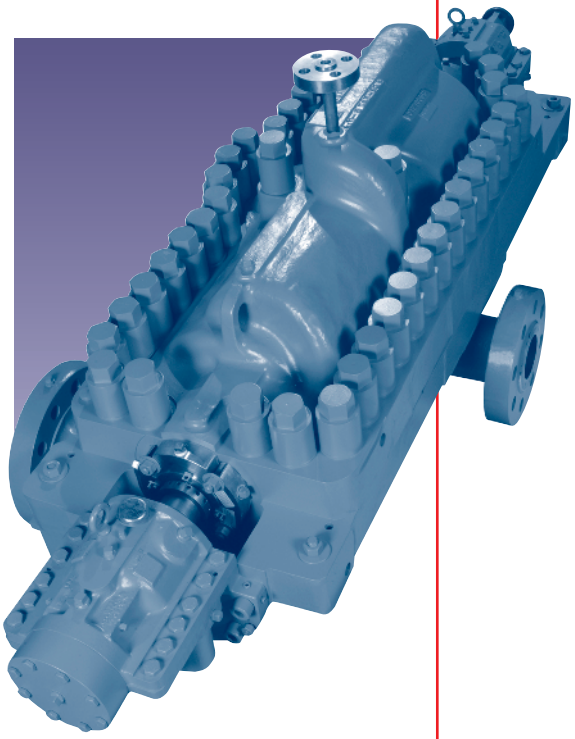
Standards
- Flowserve

Operating Parameters
- Flows to 800 m³/h (3500 gpm)
- Heads to 90 m (300 ft)
- Pressures to 12 bar (175 psi)
- Temperatures to 180°C (350°F)

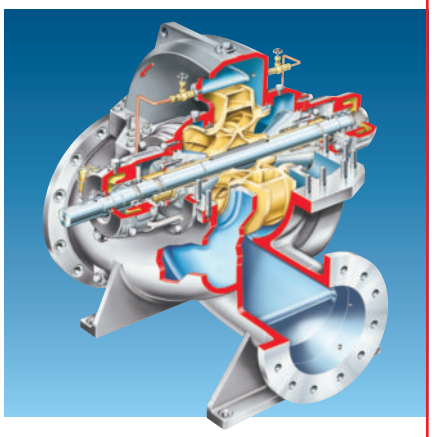
Features
- Optimized lineshaft bearing design to API 610 spacing requirements
- Double row external thrust bearings
- Single and duplex configurations
- Flanged discharge
- Large basket strainer
- Industry standard TCV motors
- Lubrication options
  - Product lube design for clear liquids
  - Dual particle separator for light solids
  - Grease lubrication
- Mounting plate sealing options
  - Vapor tight
  - Vapor proof
  - Pressurized design
- Options
  - Upper stuffing box
  - Sealing ring
  - Suction tailpipes
  - Level controls

See Bulletin PS-10-24

Between Bearings Pumps



LNN Axially Split, Single Stage



Standards
- Flowserve

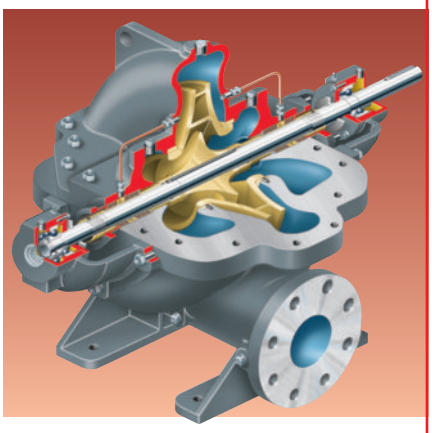
Operating Parameters
- Flows to 51 000 m³/h (225 000 gpm)
- Heads to 300 m (980 ft)
- Pressures to 30 bar (435 psi)
- Temperatures to 150°C (300°F)

Features
- Hydraulically balanced, double suction impeller
- Dynamically balanced to ISO 1940 tolerances
- Heavy-duty double volute casing with suction and discharge flanges to ANSI, DIN and ISO standards
- Optimum axial and radial thrust balance
- Seal chamber accommodates packing and mechanical seals
- Choice of bearings
  - Antifriction ball bearings standard
  - Double row, angular contact thrust bearings option
  - Sleeve radial and hydrodynamic thrust bearings option
- Choice of lubrication options

Other Configurations
- LNNV axially split, vertical in-line
- LNNC axially split, bottom suction, side discharge

See Bulletin PS-20-1

LR Axially Split, Single Stage



Standards
- Flowserve

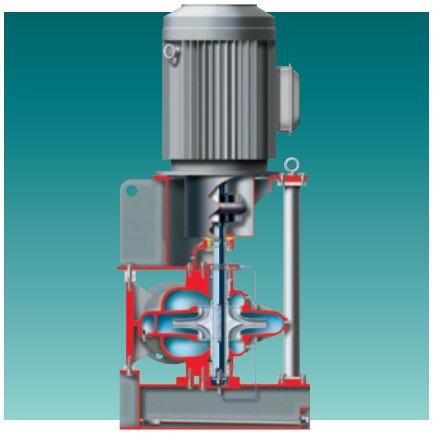
Operating Parameters
- Flows to 2000 m³/h (8800 gpm)
- Heads to 170 m (560 ft)
- Pressures to 21 bar (300 psi)
- Temperatures from -30°C (-20°F) to 150°C (300°F)

Features
- Split case design with lifting lugs
- Low NPSH enclosed double suction impeller
- Flat or raised face suction and discharge flanges to ANSI, DIN and ISO standards
- Oil or grease lubricated radial and thrust bearings
  - Single row, deep groove ball bearings or duplex thrust ball bearings
  - 100 000 hours typical L10 bearing life
- Seal chamber accommodates multiple seal types
- Standard case wear rings
  - Optional serrated groove designs
- Optional impeller wear rings
- Available high performance coatings

Other Configurations
- LRV vertical, axially split, single stage
- LLR axially split, two stage

See Bulletin PS-20-3

LRV Vertical, Axially Split, Single Stage



Standards
- Flowserve

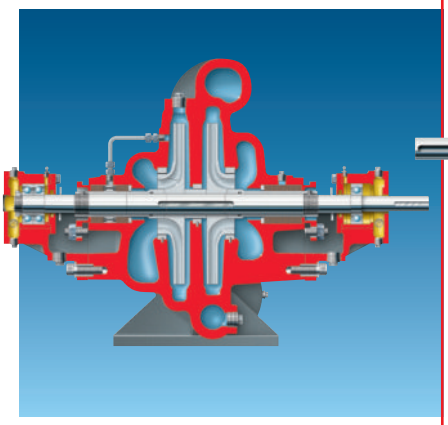
Operating Parameters
- Flows to 2000 m³/h (8800 gpm)
- Heads to 137 m (450 ft)
- Pressures to 21 bar (300 psi)
- Temperatures from -30°C (-20°F) to 150°C (300°F)

Features
- Split case design with lifting lugs
- Low NPSH enclosed double suction impeller
- Small footprint reduces floor space requirement
- Flat or raised face suction and discharge flanges to ANSI, DIN and ISO standards
- Product-lubricated bottom bearing
- Seal chamber accommodates multiple seal types
- Standard case wear rings
- Optional impeller wear rings
- Available high performance coatings

Other Configurations
- LR axially split, single stage
- LLR axially split, two stage

See Bulletin PS-20-3

LLR Axially Split, Two Stage



Standards
- Flowserve

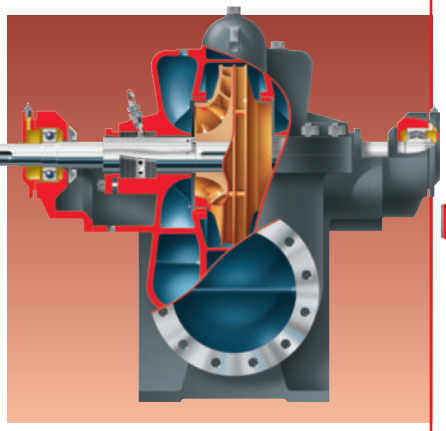
Operating Parameters
- Flows to 295 m³/h (1300 gpm)
- Heads to 290 m (950 ft)
- Pressures to 31 bar (450 psi)
- Temperatures from -30°C (-20°F) to 150°C (300°F)

Features
- Split case design with wear rings
- Back-to-back mounted, single suction impellers
- First and second stage volutes spaced 180° apart
- Crossover cast-in upper casing half
- Flat or raised face suction and discharge flanges to ANSI, DIN and ISO standards
- Oil or grease lubricated radial and thrust bearings
  - Single row, deep groove ball bearings or duplex thrust ball bearings
  - 100 000 hours typical L10 bearing life
- Seal chamber accommodates multiple seal types
- Interstage bushing
- Optional impeller wear rings

Other Configurations
- LR axially split, single stage
- LRV vertical, axially split, single stage

See Bulletin PS-20-3

LNGT Axially Split, Single Stage

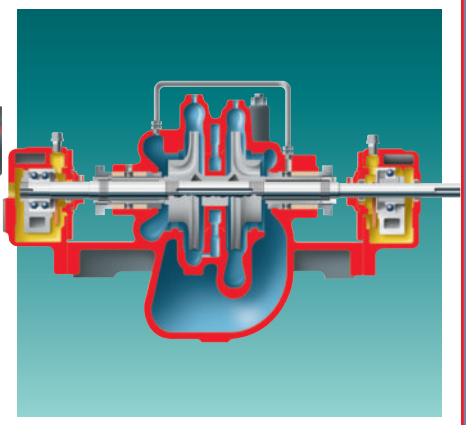


Standards
- Flowserve

Operating Parameters
- Flows to 14 000 m³/h (61 600 gpm)
- Heads to 260 m (850 ft)
- Pressures to 150 bar (2175 psi)
- Temperatures to 105°C (220°F)
- Speeds to 3600 rpm

Features
- Double suction radial impeller
- Double volute configurations
- Special hydraulic design suction boxes
- Modular design
- In-line suction and discharge nozzles
- ANSI, DIN or ISO flanges
- Replaceable casing rings
- Optional impeller rings
- Ball bearings or double row roller bearings
- Oil or grease lubrication
- Choice of materials
  - Cast iron
  - Ni-Resist
  - Gunmetal bronze
  - Nickel-aluminum bronze

GT Axially Split, Two Stage

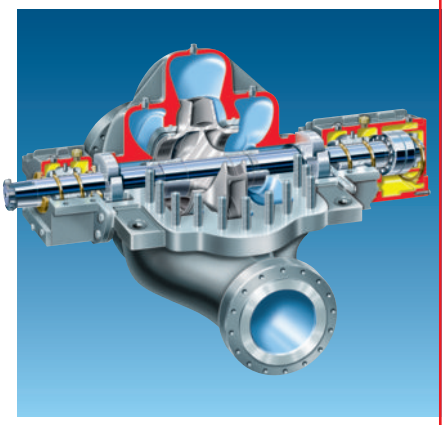


Standards
- Flowserve

Operating Parameters
- Flows to 840 m³/h (3700 gpm)
- Heads to 380 m (1250 ft)
- Pressures to 34 bar (500 psi)
- Temperatures from -30°C (-20°F) to 150°C (300°F)

Features
- Horizontally split case with semi-centerline support
- Back-to-back mounted, single suction impellers
- Flange mounted bearing housings
- Ring-oil lubricated ball bearings
- Carbon steel shaft
- Deep stuffing boxes
- Renewable stationary wear parts
- Formed steel baseplate
- Standard flexible, on-spacer type coupling
- Cast iron casing, bronze or cast iron fitted

DVSH (BB1)
Axially Split, Single Stage



Standards
- API 610 (BB1), latest edition

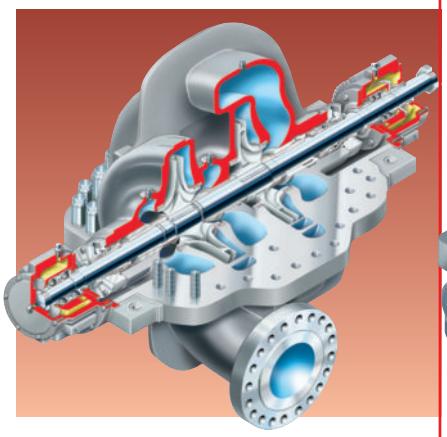
Operating Parameters
- Flows to 22 700 m³/h (100 000 gpm)
- Heads to 510 m (1500 ft)
- Pressures to 150 bar (2175 psi)
- Temperatures to 200°C (400°F)
- Speeds to 6000 rpm

Features
- Double volute casing
- Hydraulically balanced double suction impeller
- API 682 seal chambers
- Stiff shaft design
- Baseplates designs and pump packages engineered to contract requirements
- Choice of bearings
  - Ball radial and thrust
  - Sleeve radial and ball thrust
  - Sleeve radial and tilting pad thrust
  - Tilting pad radial and tilting pad thrust
- Choice of materials
  - Carbon steel
  - 12% chrome
  - Austenitic and duplex stainless steels
  - Monel®

See Bulletin PS-20-2

® Monel is a registered trademark of International Nickel Co

UZDL (BB1)
Axially Split, Two Stage

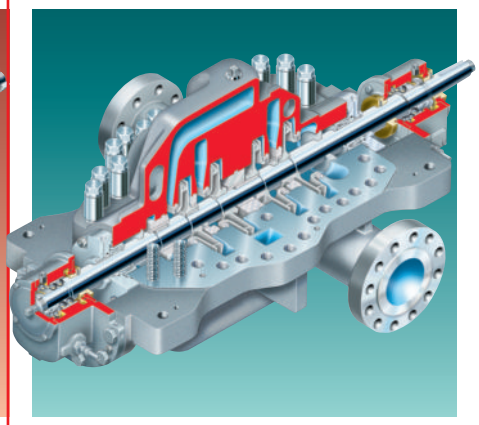


Standards
- API 610 (BB1), latest edition

Operating Parameters
- Flows to 2950 m³/h (13 000 gpm)
- Heads to 685 m (2250 ft)
- Pressures to 64 bar (910 psi)
- Temperatures to 200°C (400°F)

Features
- Double volute hydraulic passages
- API 682 seal chambers
- Shaft options
  - Double extension for connection to auxiliary pumps or hydraulic turbines
  - Special shaft end machining for hydraulic fitted couplings
- Baseplate designs and pump packages engineered to contract requirements
- Dynamic balancing and TIR verifications on assembled rotors
- Choice of bearings
  - Ball radial and thrust
  - Sleeve radial and ball thrust
  - Sleeve radial and tilting pad thrust
  - Tilting pad radial and tilting pad thrust
- Choice of materials
  - Carbon steel
  - 12% chrome
  - Austenitic and duplex stainless steels
  - Monel

DMX (BB3)
Axially Split, Multistage



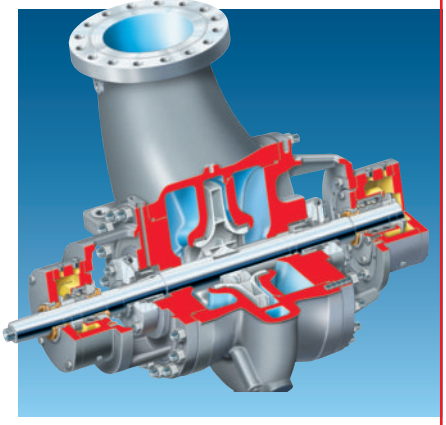
Standards
- API 610 (BB3), latest edition

Operating Parameters
- Flows to 2950 m³/h (13 000 gpm)
- Heads to 2130 m (7000 ft)
- Pressures to 275 bar (4000 psi)
- Temperatures to 200°C (400°F)
- Speeds to 8000 rpm

Features
- Double volute hydraulic passages
- API 682 seal chambers
- Shaft options
  - Double extension for connection to auxiliary pumps or hydraulic turbines
  - Special shaft end machining for hydraulic fitted couplings
- Baseplate designs and pump packages engineered to contract requirements
- Dynamic balancing and TIR verifications on assembled rotors
- Choice of bearings
  - Ball radial and thrust
  - Sleeve radial and ball thrust
  - Sleeve radial and tilting pad thrust
  - Tilting pad radial and tilting pad thrust
- Choice of materials

See Bulletin PS-30-3

HDX (BB2) Radially Split, Double Suction



Standards
- API 610 (BB2), latest edition

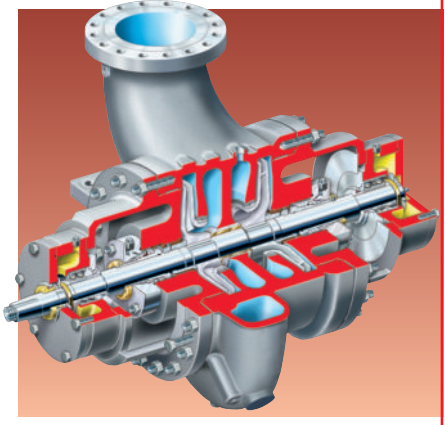
Operating Parameters
- Flows to 4100 m³/h (18 000 gpm)
- Heads to 450 m (1500 ft)
- Pressures to 100 bar (1500 psi)
- Temperatures to 450°C (850°F)

Features
- Double-volute, centerline supported, self-venting casing
- Minimum ANSI B16.5 Class 300 suction and discharge flanges
  - Optional Class 600 and 900 flanges
- Dynamically balanced, double suction impeller
- Stiff shaft design
- API 682 seal chambers
- Standard dual, single-row, back-to-back mounted, angular contact type thrust bearing
- Bearing options
  - Sleeve radial and ball thrust
  - Sleeve radial and tilting pad thrust
  - Lubrication systems available
- 360° supported bearing housing
- Double casing covers

Other Configurations
- In-line side nozzles
- Side-side nozzles

See Bulletin PS-20-4

HED (BB2) Radially Split, Two Stage



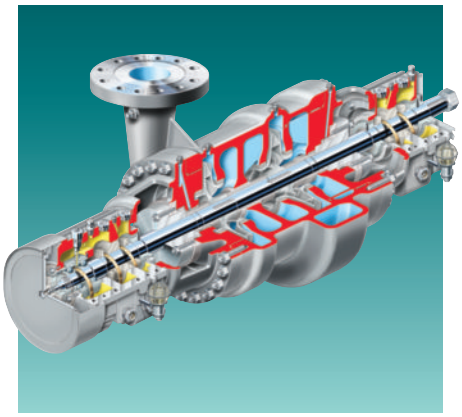
Standards
- API 610 (BB2), latest edition

Operating Parameters
- Flows to 1000 m³/h (4400 gpm)
- Heads to 650 m (2100 ft)
- Pressures to 80 bar (1160 psi)
- Temperatures to 450°C (850°F)

Features
- Heavy-duty double-volute, casing with 180° staggered volutes
- Suction and discharge nozzles available in top-top, in-line side or same side configurations
- First and second stage volutes spaced 180° apart
- API 682 seal chambers
- Dynamic balancing and TIR verifications on assembled rotating element
- Baseplate designs and pump packages engineered to contract requirements
- Choice of bearings
  - Ball radial and thrust
  - Sleeve radial and ball thrust
  - Sleeve radial and tilting pad thrust
- Choice of materials
  - Carbon steel
  - 12% chrome
  - Austenitic and duplex stainless steels
  - Monel lining

Other Configurations
- HED-DS radially split, double suction, two stage

HED-DS (BB2) Radially Split, Double Suction, Two Stage



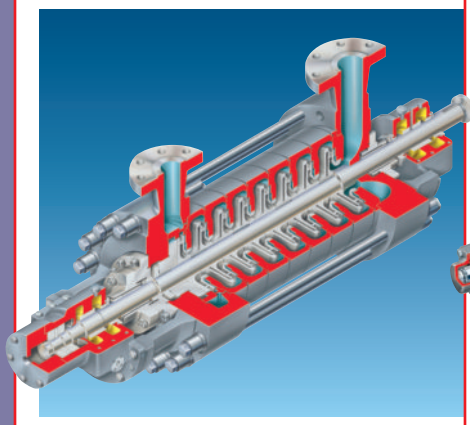
Standards
- API 610 (BB2), latest edition

Operating Parameters
- Flows to 2000 m³/h (8500 gpm)
- Heads to 750 m (2500 ft)
- Pressures to 80 bar (1160 psi)
- Temperatures to 450°C (850°F)

Features
- Double suction first stage impeller
- Heavy-duty double-volute casing with 180° staggered volutes
- Suction and discharge nozzles available in top-top, in-line side or same side configurations
- First and second stage volutes spaced 180° apart
- API 682 seal chambers
- Dynamic balancing and TIR verifications on assembled rotating element
- Baseplate designs and pump packages engineered to contract requirements
- Choice of bearings
  - Ball radial and thrust
  - Sleeve radial and ball thrust
  - Sleeve radial and tilting pad thrust
- Choice of materials
  - Carbon steel
  - 12% chrome
  - Austenitic and duplex stainless steels
  - Monel lining

Other Configurations
- HED radially split, two stage

WXH Radially Split, Multistage, High Pressure, Ring Section



Standards
- Flowserve

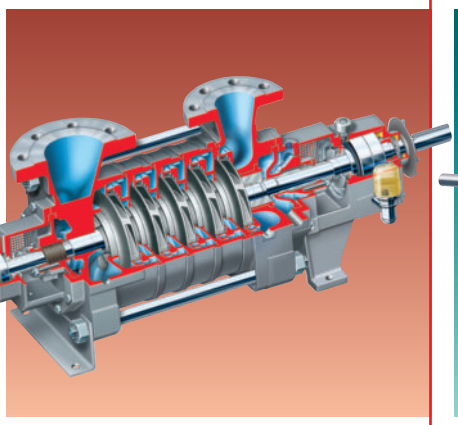
Operating Parameters
- Flows to 1160 m³/h (5100 gpm)
- Heads to 2750 m (9000 ft)
- Pressures to 310 bar (4500 psi)
- Temperatures to 200°C (400°F)

Features
- Cast suction and discharge heads with integral nozzles
- Single or double suction first stage impeller designs
- Investment cast diffusers and return channel hydraulic passages
- Compression type interstage O-ring
- Separate, high strength sub-base
- Replaceable stationary wear parts mounted in the diffusers
- Standard flanged balance drum with serrated running clearances
  – Optional straight balance drum
- Seal chamber accepts single, double and tandem mechanical seals
- Large diameter shaft with staggered impeller and balancing device keyways
- No pre-warming required
- Chrome steel nozzles
- Choice of bearings

Other Configurations
- WXL heavy-duty, radially split, high pressure, ring section pump
- WXM heavy-duty, radially split, high pressure, ring section pump

See Bulletin PS-30-1

WDX and WD Radially Split, Multistage, Ring Section

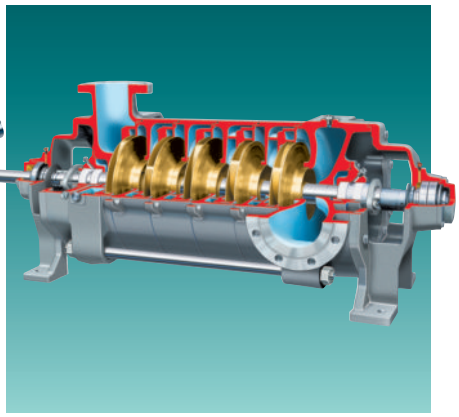


Standards
- Flowserve

Operating Parameters
- Flows to 190 m³/h (800 gpm)
- Heads to 700 m (2300 ft)
- Pressures to 75 bar (1090 psi)
- Temperatures to 210°C (410°F)

Features
- Multivane diffusers
- Identical radially-split ring section sets
- O-ring interstage sealing arrangement
- Deep-groove ball bearing design
- Angular contact, double row thrust bearing
- 360° machine registered bearing housing fits
- Dynamically balanced, precision machined enclosed impellers
- Packing or mechanical sealing
- Options
  – Multiple flange orientations
  – End suction design with product lubricated sleeve bearing
  – Radial suction design with product lubricated sleeve bearing
  – Inducer

NM Radially Split, Multistage, Ring Section



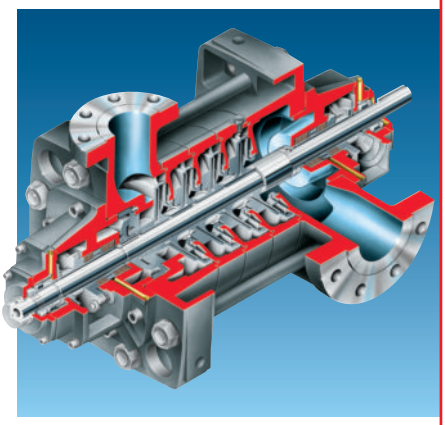
Standards
- Flowserve

Operating Parameters
- 850 m³/h (3740 gpm)
- 700 m (2300 ft)
- Discharge pressures to 60 bar (870 psi)
- Temperatures to 140°C (285°F)

Features
- Modular design
  – 10 sizes
  – 12 hydraulics
- Radial thrust balanced by diffusers
- Two to 12 stages, depending on model and operating speed
- Cast iron EN-GJL 250 pressure casings, with EN-GJS 400-15 optional
- Cast iron EN-GJL 250 impellers and diffusers
- Steel grade C 35 E or stainless steel X30Cr13 shaft, depending on size and model
- Stainless steel X30Cr13 sleeves
- Packing gland or mechanical sealing

Other Configurations
- NM-V vertical model with supported motor stand
- NM-Y vertical model with Cardan transmission and upper level motor mounting
- NM-S vertical wet pit suspended shaft

CS Radially Split, Multistage, Ring Section

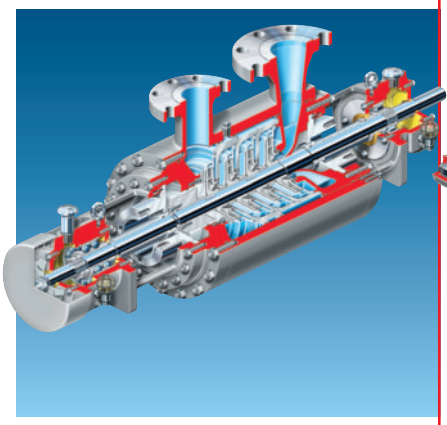


Standards
- Flowserve

Operating Parameters
- Flows to 615 m^3/h (2700 gpm)
- Heads to 1465 m (4800 ft)
- Pressures to 125 bar (1800 psi)
- Temperatures from -30°C (-20°F) to 165°C (330°F)

Features
- Separate cast diffusers and channel rings
- Secondary O-ring seals
- Complete radial balance
- Press fit stationary wear parts
- Balance disc wear indicator
- Flanged or straight balance drum available to suit the application
- Centerline mounted casing
- Optional nozzle orientation
- Choice of bearings
  - Ball radial and thrust
  - Sleeve radial and ball thrust
  - Sleeve radial and tilting pad thrust

WXB Multistage, Diffuser Casing, Utility Barrel



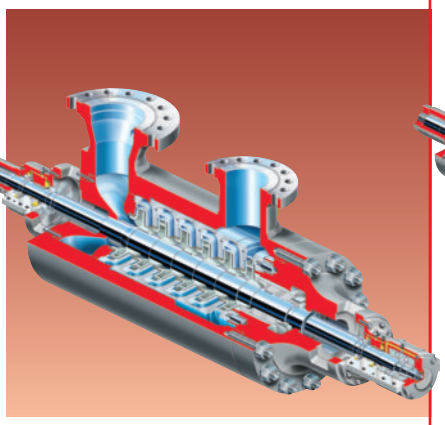
Standards
- ASME Section VIII

Operating Parameters
- Flows to 300 m³/h (1320 gpm)
- Pressures to 150 bar (2175 psi)
- Temperatures to 200°C (390°F)

Features
- Diffuser case construction
- Removeable cartridge type inner case sub-assembly
- Large eye first stage impeller
- Patented balancing device
- Sleeve mounted deep groove radial and back-to-back mounted angular contact bearings
- Bearing lubrication system
  - Oil bath
  - Constant level oiler
  - Oil sight glass
- High capacity antifriction type thrust bearing
- Renewable casing and impeller rings
- High shaft diameter to bearing span ratio
- Options
  - Hydrodynamic sleeve type radial bearings
  - Air fan thrust bearing cooling system
  - Labyrinth type end seals

See Bulletin PS-30-12

WNC-HP High Pressure Multistage, Diffuser Casing, Utility Barrel



Standards
- ASME Section VIII

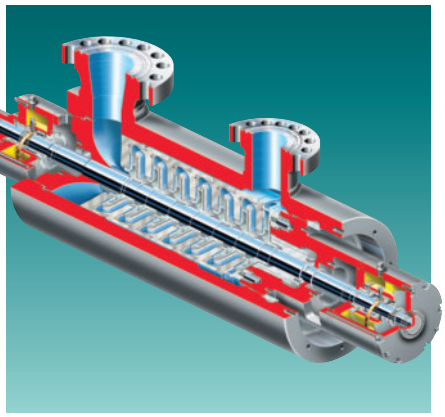
Operating Parameters
- Flows to 2500 m³/h (11 000 gpm)
- Pressures to 400 bar (5850 psi)
- Temperatures to 250°C (480°F)
- Speeds to 8000 rpm

Features
- Internal casing with segmented stage elements
- Diffuser guide vane construction
- Removable cartridge type inner case sub-assembly
- Precision cast chrome steel in-line impellers
- Single or double suction first stage impeller
- Heavy duty barrel with discharge cover
  - Forged steel
- Fully enclosed or shrouded precision cast diffusers on high energy applications
- Tilt pad thrust and Tri-Land radial bearings
- Serrated running fits
- Renewable casing rings
- Straight balance drum design
- Chrome plated shafting under journal bearings
- Ground forged steel shafting

Other Configurations
- WNC multistage utility

See Bulletin PS-30-12

WNC Multistage, Diffuser Casing, Utility Barrel



Standards
- ASME Section VIII

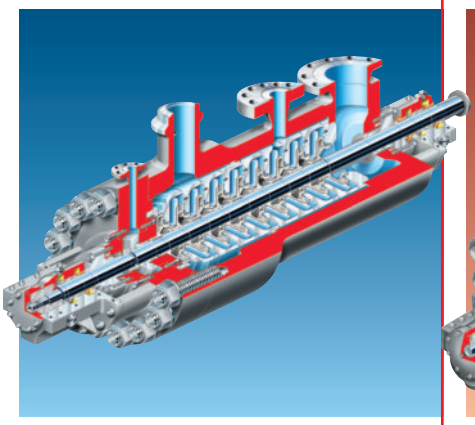
Operating Parameters
- Flows to 1400 m³/h (6200 gpm)
- Pressures to 250 bar (3600 psi)
- Temperatures to 200°C (390°F)

Features
- Diffuser case construction
- Shear ring design
- High strength forged steel barrel,
  - Alloy barrels available
- Removable cartridge type inner case sub-assembly
- Shear ring barrel closing system
- Single or double suction first stage impeller
- Standard antifriction or sleeve type radial bearings
- High capacity antifriction type thrust bearing
  - Tilting pad thrust bearing available
- Renewable casing rings
- Straight balance drum forged from hardened stainless steel
- Chrome plated shafting under journal bearings
- Ground forged steel shafting

Other Configurations
- WNC-HP high pressure multistage utility

See Bulletin PS-30-12

CSB
Multistage, Diffuser Casing, Utility Barrel



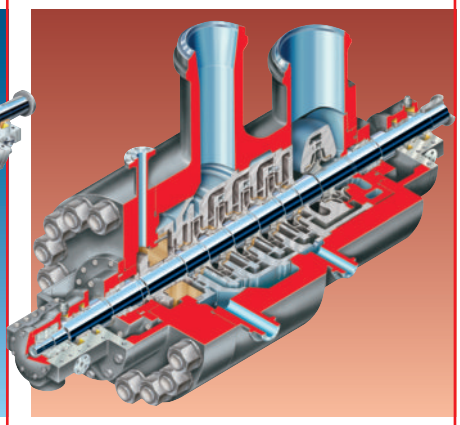
Standards
- ASME Section VIII

Operating Parameters
- Flows to 1500 m³/h (6600 gpm)
- Discharge pressures to 300 bar (4400 psi)
- Temperatures to 250°C (480°F)
- Speeds to 8000 rpm

Features
- Internal casing with segmented stage elements
- Diffuser-guide vane construction
- Precision cast in-line impellers of high quality chrome steel
- Heavy-duty barrel with forged steel discharge cover
- Fully enclosed or shrouded precision cast diffusers on high energy applications
- Tilt pad thrust and Tri-Land radial bearings
- Renewable casing rings and sleeves
- Flanged balance drum forged from hardened stainless steel – Straight drum optional
- Chrome plated shafting under journal bearings
- Ground forged steel shafting

See Bulletin PS-30-12

CHTA
Multistage, Diffuser Casing, Utility Barrel



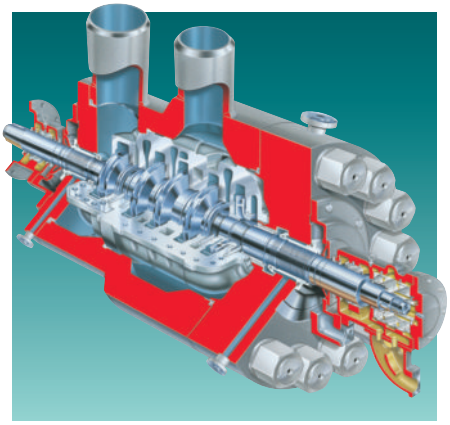
Standards
- ASME Section VIII

Operating Parameters
- Flows to 5250 m³/h (23 000 gpm)
- Discharge pressures to 450 bar (6500 psi)
- Temperatures to 250°C (480°F)
- Speeds to 6000 rpm

Features
- Internal casing with segmented stage elements
- Diffuser-guide vane construction
- Precision cast in-line impellers of high quality chrome steel
- Heavy-duty barrel with forged steel discharge cover
- Fully enclosed or shrouded precision cast diffusers on high energy applications
- Balance drum and sleeve, made from hardened stainless forgings
- Tilt pad thrust and Tri-Land radial bearings
- Serrated running fits
- Renewable casing rings and sleeves
- Flanged balance drum design
- Chrome plated shafting under journal bearings
- Ground forged steel shafting

See Bulletin PS-30-12

HDB and HSB
Multistage, Volute Casing, Utility Barrel



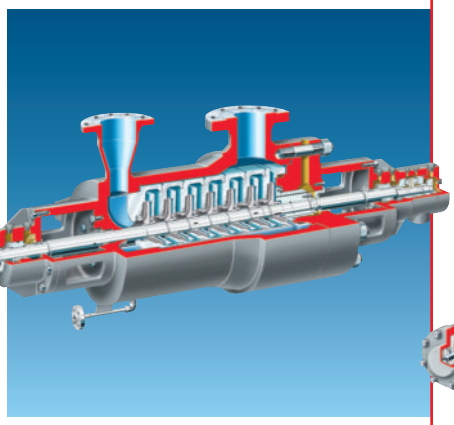
Standards
- ASME Section VIII

Operating Parameters
- Flows to 4000 m³/h (17 600 gpm)
- Discharge pressures to 350 bar (5100 psi)
- Temperatures to 250°C (480°F)
- Speeds to 8000 rpm

Features
- Double volute design
- Axially split inner casing
- Opposed impellers
- Heavy-duty forged steel barrel and discharge cover
- Symmetrical upper and lower half inner volutes
- Individually mounted and secured impellers
- Dynamic balancing and TIR verifications on assembled rotor
- One full pressure sealing to atmosphere and one full pressure sealing to suction
- Minimal pressure breakdowns across running clearances
- Sleeve radial and tilting pad thrust bearings
- Baseplate designs and pump packages engineered to contract requirements

See Bulletin PS-30-12

WIK (BB5) Multistage, Diffuser Casing, Process Barrel



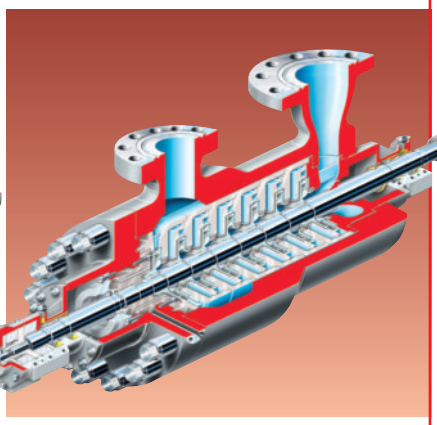
Standards
- API 610 (BB5), latest edition

Operating Parameters
- Flows to 4000 m³/h (17 600 gpm)
- Discharge pressures to 450 bar (6550 psi)
- Temperatures to 450°C (840°F)
- Speeds to 7600 rpm

Features
- Tandem impeller, diffuser-guide vane style, radially split inner casing
- Inner casing normally provided with a bolted head at one end
  – Optional cartridge element design
  – Optional shear ring design
- Heavy-duty barrel with forged steel discharge cover
- Radially split inner casings
- Multi-vane diffuser and channel ring design
- Precision cast and milled diffusers
- Straight style balance drum
- Tilt pad thrust and sleeve radial bearings
- Forged shafts, stepped at each impeller and balance drum
- NEMA taper shaft extension
- Large diameter shaft
- Precision cast keyed impellers
- Shrink fit impellers
- Coke crusher option for most sizes

See Bulletin PS-30-11

WCC (BB5) Multistage, Diffuser Casing, Process Barrel



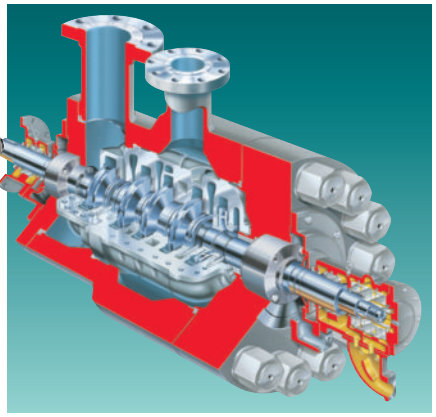
Standards
- API 610 (BB5), latest edition

Operating Parameters
- Flows to 1020 m³/h (4500 gpm)
- Heads to 3050 m (10 000 ft)
- Discharge pressures to 270 bar (4000 psi)
- Temperatures from -30°C (-20°F) to 425°C (800°F)
- Speeds to 7000 rpm

Features
- Internal casing with segmented stage elements
- Diffuser-guide vane construction
- Multi-vane diffuser-channel ring collectors
- Precision cast chrome steel in-line impellers
- Single or double suction first stage impeller
- Heavy-duty barrel with discharge cover
- Removeable cartridge type inner case sub-assembly
- Straight or flanged balance drum with serrated running surfaces
- Tilt pad thrust and heavy-duty journal bearings
- Force feed lubricated bearings
- Precision ground forged steel shafting

See Bulletin PS-30-11

HDO and HSO (BB5) Multistage, Volute Casing, Process Barrel



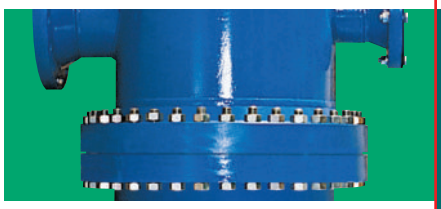
Standards
- API 610 (BB5), latest edition

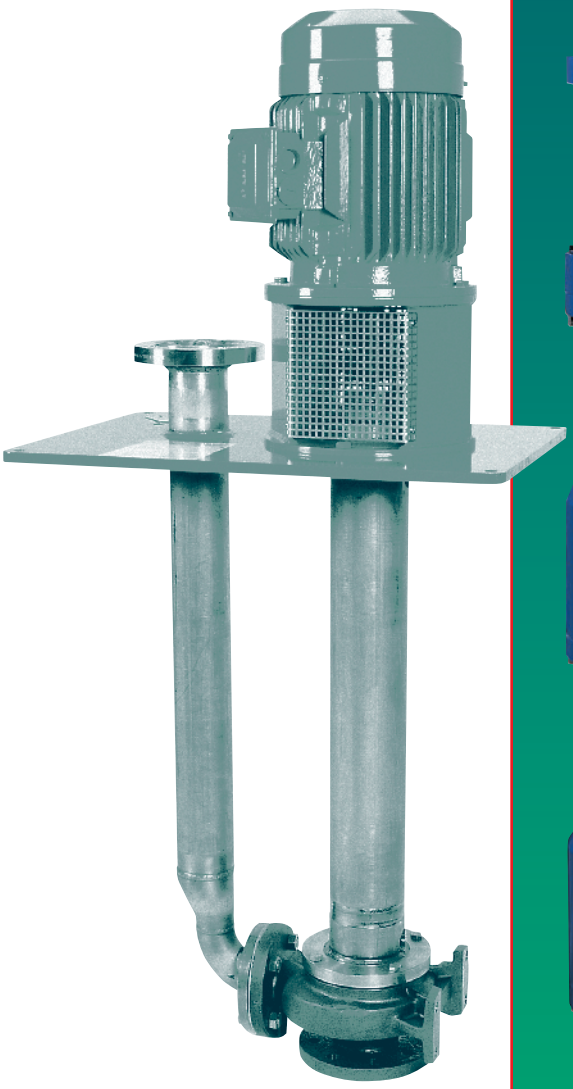
Operating Parameters
- Flows to 4000 m³/h (17 600 gpm)
- Discharge pressures to 400 bar (5800 psi)
- Temperatures to 400°C (750°F)
- Speeds to 9000 rpm

Features
- Volute design axially split inner casing with opposed grouped impellers
- Heavy-duty barrel with forged steel discharge cover
- Symmetrical upper and lower half inner volutes
- Individually mounted and secured impellers
- Dynamic balancing and TIR verifications on assembled rotor
- Double volute
- One full pressure sealing to atmosphere and one full pressure sealing to suction
- Sleeve radial and tilting pad thrust bearings
- Baseplate designs and pump packages engineered to contract requirements

See Bulletin PS-30-11

Vertical Pumps





WUJ (VS1) Wet Pit

Standards
- API 610 (VS1), latest edition
- ASME Sections VIII and IX
- Directive 94/9/EC (ATEX 100)

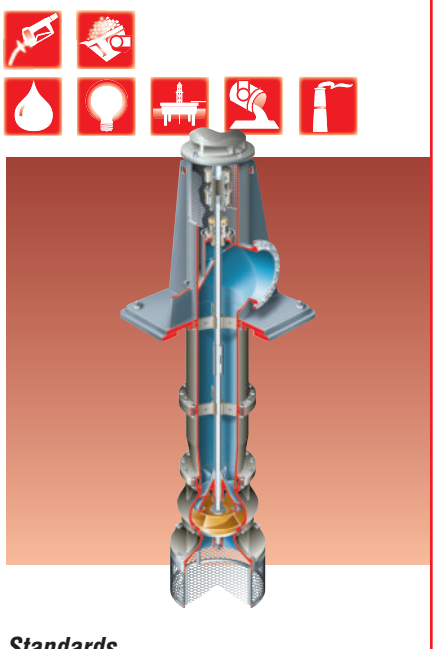
Operating Parameters
- Flows to 3000 m³/h (13 000 gpm)
- Heads to 2000 m (6500 ft)
- Pressures to 200 bar (3000 psi)
- Temperatures from -200°C (-325°F) to 350°C (660°F)

Features
- Choice of radial or mixed flow hydraulics
- Optional axial thrust tilting pad bearing configuration
- Stiff shaft design
- API 682 seal chamber accommodates multiple seal types
- Flanged spacer type coupling
- Screen-type, non-sparking coupling guard
- Casing and impeller wear rings
- Reinforced motor stand
- Optional inducer

Other Configurations
- WUC (VS6) double casing, multistage

See Bulletin PS-40-8

VTP Vertical Turbine



Standards
- Flowserve

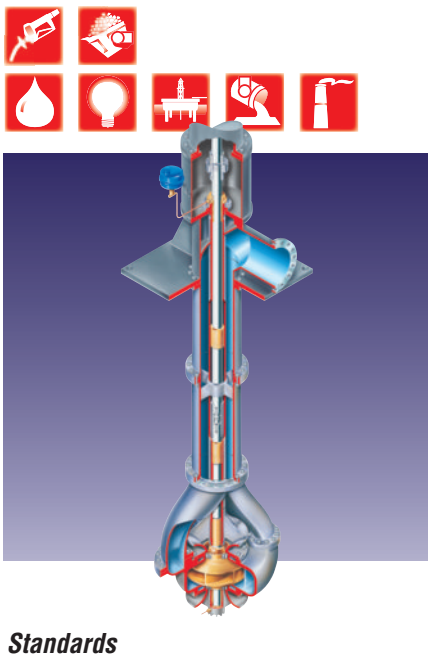
Operating Parameters
- Flows to 13 600 m³/h (60 000 gpm)
- Heads to 700 m (2300 ft)
- Pressures to 150 bar (2175 psi)
- Temperatures from -200°C (-330°F) to 300°C (570°F)
- Sizes from 150 mm (6 in) to 1375 mm (55 in)
- Settings to 365 m (1200 ft)

Features
- Above- or below-grade discharge
- Enclosed, open or semi-open impellers
- Open or enclosed lineshaft construction
- Product or oil bearing lubrication
- Flanged or threaded column pipe
- High pressure stuffing box
- Rigid, adjustable coupling
- Drive options
  - Vertical hollow shaft or solid shaft motor design
  - Dry or submersible electric motors
  - Variable speed drives
  - Engine with right angle gear
  - Steam turbine
- Options
  - Thrust balanced impeller
  - O-ring bowl
  - Adjustable flanged coupling

Other Configurations
- VPC vertical turbine, double casing

See Bulletin PS-40-7

QL and QLQ Double Suction, Twin Volute



Standards
- Flowserve

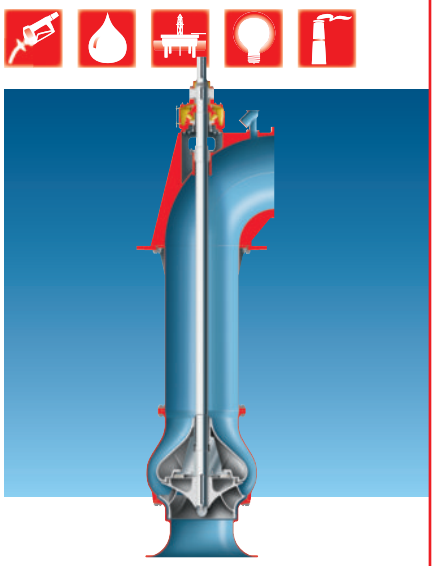
Operating Parameters
- Flows to 20 000 m³/h (90 000 gpm)
- Heads to 610 m (2000 ft)
- Pressures to 70 bar (1000 psi)
- Temperatures from -45°C (-50°F) to 200°C (400°F)
- Column sizes to 1200 mm (48 in)

Features
- QL - Single stage
- QLQ - Multistage
- Enclosed lineshaft construction
- Heavy-wall twin-volute casing
- Double suction impeller
- Enclosed lubrication stuffing box
- Heavy-duty discharge head
- Options
  - Vertical solid motors or hollow shaft motors with thrust bearing
  - Oiler and solenoid switch for pump bearing lubrication
  - Water, grease or oil low pressure lubricant
  - Open lineshaft for clean liquids
  - Lubrication lines for bottom bearing
  - Rigid, adjustable spacer coupling

Other Configurations
- QLC double casing, double suction, twin volute, single stage wet pit
- QLQC double casing, double suction, twin volute, multistage wet pit

See Bulletin PS-40-4

VOP (VS3) Axial Flow and VOA (VS2) Mixed Flow



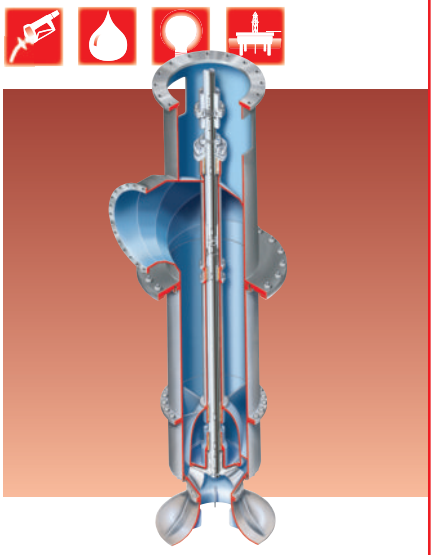
Standards
- API 610 (VS3 and VS2), latest edition
- Flowserve

Operating Parameters
VOA:
- Flows to 32 000 m³/h (140 000 gpm)
- Heads to 100 m (325 ft)
- Speeds to 1800 rpm
- Impeller sizes from 300 mm (12 in) to 1625 mm (65 in)

VOP:
- Flows to 50 000 m³/h (220 000 gpm)
- Heads to 14 m (45 ft)
- Speeds to 1000 rpm
- Impeller sizes from 350 mm (14 in) to 2000 mm (80 in)

Features
- Above- or below-grade discharge available
- Cast or fabricated discharge head depending on pump size
- Cast bowl assembly
- Impeller wear rings standard on VOP and optional on VOA
- Mechanically and hydraulically balanced design
- Independent pump axial bearing
- Tooth or flexible coupling
- Engine or steam turbine drive options
- Options
  - Pullout design available on VOA model
  - Case wear rings
  - Packed gland or mechanical seal

VCT Mixed Flow

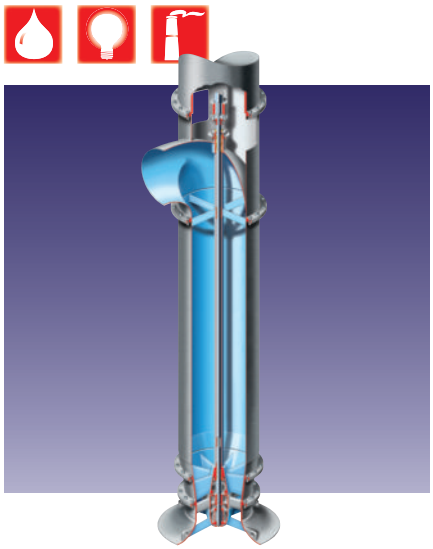


Standards
- Flowserve

Operating Parameters
- Flows to 113 550 m³/h (500 000 gpm)
- Heads to 110 m (350 ft)
- Sizes from 500 mm (20 in) to 3000 mm (120 in)

Features
- Above- or below-grade discharge available
- Non pull-out design or space-saving, pull-out construction
- Open, semi-open and closed impellers available
- Oil, fresh water or self-lubricating column construction
- Integral bearing retainer
- Packed stuffing box or mechanical seal
- Rigid, adjustable coupling
- Shaft sleeves under the bearings and stuffing box
- Options
  - Thrust collar
  - Sand cap
  - Thrust bearing in the motor or pump support head
- Engineered to customer specifications

AFV Axial Flow



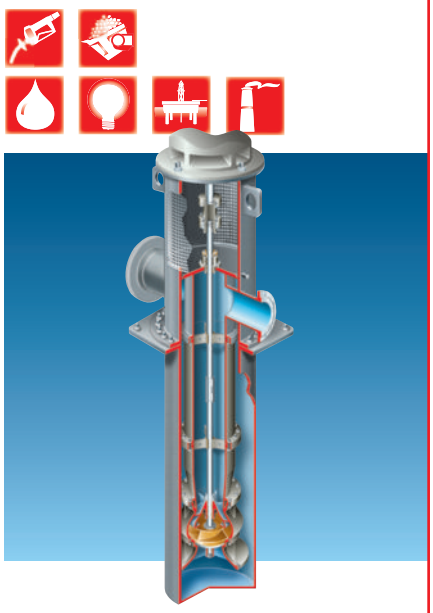
Standards
- Flowserve

Operating Parameters
- Flows to 180 000 m³/h (800 000 gpm)
- Heads to 11 m (35 ft)
- Speeds to 1770 rpm
- Sizes from 200 mm (8 in) to 3.1 m (123 in)
- Settings to 8 m (25 ft)

Features
- Above- or below-grade discharge available
- Discharge head cast for sizes to 500 mm (20 in)
  - Larger sizes are fabricated
- Bowl assembly cast for sizes 200 mm (8 in) to 685 mm (27 in)
  - Larger sizes fabricated
- Mechanically and hydraulically balanced axial flow design impeller
- Drive options
  - Vertical hollow shaft motor
  - Vertical solid shaft motor. Rigid coupling provided between motor and pump for shaft diameters greater than 75 mm (3 in)
  - Engine or steam turbine drive options
- Options
  - Pull-out design
  - Casing and impeller wear rings

See Bulletin PS-40-3

VPC (VS6) Vertical Turbine, Double Casing



Standards
- API 610 (VS6), latest edition
- ASME Sections VIII and IX

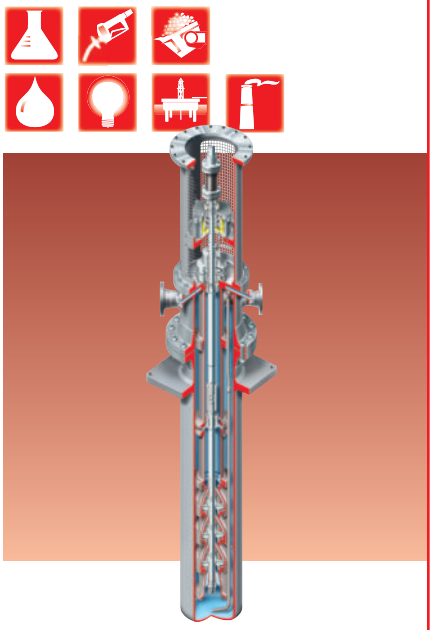
Operating Parameters
- Flows to 13 600 m³/h (60 000 gpm)
- Heads to 1070 m (3500 ft)
- Pressures to 150 bar (2175 psi)
- Temperatures from -45°C (-50°F) to 232°C (450°F)

Features
- Diffuser design
- Above- or below-grade discharge available
- Single or multistage designs
- Large eye first stage impeller
- Product or oil bearing lubrication
- Flanged column pipe
- High pressure stuffing box
- Rigid, adjustable flanged spacer type coupling
- Drive options
  - Standard solid shaft motor design; hollow shaft available
  - Variable speed drives
  - Engine with right angle gear
  - Steam turbine
- Other options
  - Thrust balanced impeller
  - O-ring bowl
  - Key and thrust ring construction for impellers

Other Configurations
- VTP vertical turbine

See Bulletin PS-40-7

WUC (VS6) Double Casing, Multistage



Standards
- API 610 (VS6), latest edition
- ASME Sections VIII and IX
- German Pressure Vessel Association (AD)
- British Standard BS 5500
- Compliance with Pressure Equipment Directive 97/23/EC

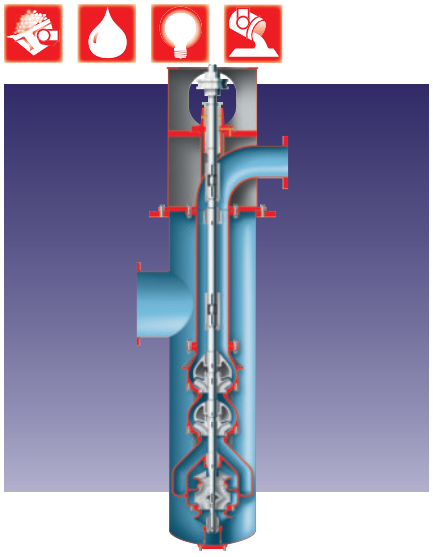
Operating Parameters
- Flows to 3000 m³/h (13 000 gpm)
- Heads to 2000 m (6500 ft)
- Pressures to 200 bar (3000 psi)
- Temperatures from -200°C (-325°F) to 350°C (660°F)

Features
- Radial or mixed flow hydraulics
- Low suction-velocity can design
- Optional axial thrust tilting pad bearing configuration
- Stiff shaft design
- API 682 seal chamber accommodates multiple seal types
- Flanged spacer type coupling
- Screen-type, non-sparking coupling guard
- Inside drain line
- Casing and impeller wear rings
- Reinforced motor stand
- Optional inducer

Other Configurations
- WUJ (VS1) wet pit
- WUC-LNG cryogenic (VS6) double casing, multistage

See Bulletin PS-40-9

QLC and QLQC Double Casing, Double Suction, Twin Volute



Standards
- Flowserve

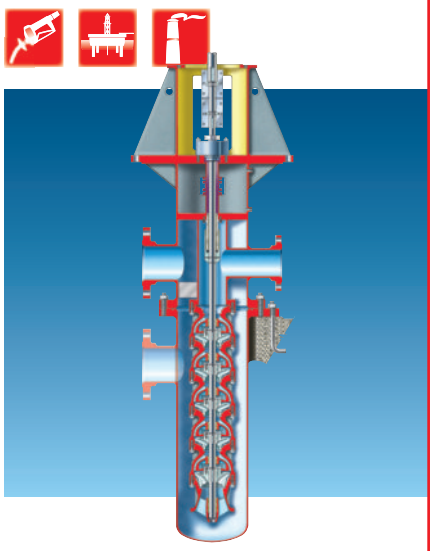
Operating Parameters
- Flows to 20 000 m³/h (90 000 gpm)
- Heads to 610 m (2000 ft)
- Pressures to 70 bar (1000 psi)
- Temperatures from -45°C (-50°F) to 200°C (400°F)

Features
- QLC - Single stage
- QLQC - Multistage
- Enclosed lineshaft construction
- Double case construction
- Heavy-wall twin-volute casing
- Double suction impeller
- Enclosed lubrication stuffing box
- Heavy-duty discharge head
- Options
  - Vertical solid motors or hollow shaft motors with thrust bearing
  - Oiler and solenoid switch for pump bearing lubrication
  - Water, grease, or oil low pressure lubricant
  - Open lineshaft for clean liquids
  - Lubrication lines for bottom bearing
  - Rigid, adjustable spacer coupling

Other Configurations
- QL double suction, twin volute, single stage, wet pit
- QLQ double suction, twin volute, multistage, wet pit

See Bulletin PS-40-4

VPC Cryogenic (VS6) Double Casing, Multistage

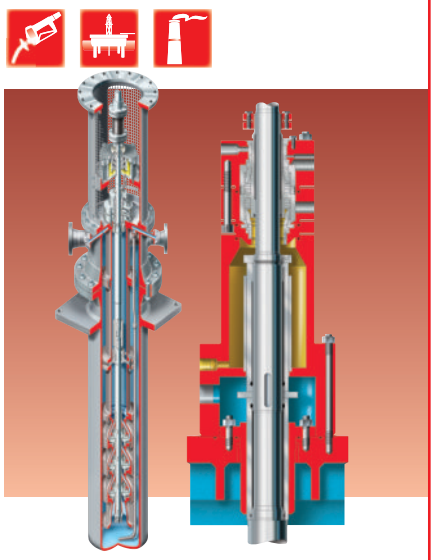


Standards
- API 610 (VS6), latest edition
- ASME Sections VIII and IX

Operating Parameters
- Flows to suit site requirements
- Heads to suit site requirements
- Discharge pressures to 148 bar (2160 psi)
- Temperatures from -200°C (-325°F) to -46°C (-50°F)

Features
- Designed for use in a cold box
- Nozzle head with integral warming chamber
- Metal backed PTFE coated bearings
- Close clearance for high efficiency
- LOX and LIN compatible materials conforming to industry standards
- High pressure breakdown bushing
- Stand pipe bellows
- Optional below grade suction flange
- Sealing options
  - Dual wet seals
  - Dry gas seals
  - Gas injection labyrinth seal
- Reinforced motor stand

WUC-LNG Cryogenic (VS6) Double Casing, Multistage



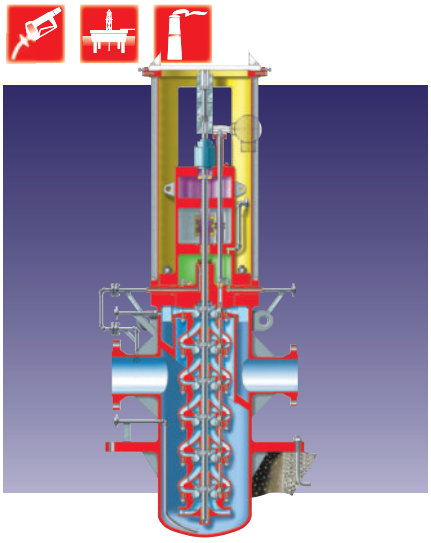
Standards
- API 610 (VS6), latest edition
- ASME Sections VIII and IX
- German Pressure Vessel Association (AD)
- British Standard BS 5500
- Compliance with Pressure Equipment Directive 97/23/EC

Operating Parameters
- Flows to 3000 m^3/h (13 000 gpm)
- Heads to 2000 m (6500 ft)
- Pressures to 200 bar (3000 psi)
- Temperatures from -200°C (-325°F)

Features
- Coffer dam system
- Radial or mixed flow hydraulics
- Low suction velocity can design
- Optional axial thrust tilting pad bearing configuration
- Stiff shaft design
- API 682 compliant mechanical seal chamber
- Flanged spacer type coupling
- Screen-type, non-sparking coupling guard
- Inside drain line
- Casing and impeller wear rings
- Reinforced motor stand
- Optional inducer

Other Configurations
- WUC (VS6) double casing multistage

VKW and TKW Cryogenic Liquid Expander (VS6) Double Casing, Multistage, Electric Generator



Standards
- API 610 (VS6), latest edition
- ASME Sections VIII and IX
- Shell DEP
- NEMA MG1, latest edition
- Hazardous area classification (EExe) to the site country

Operating Parameters
- Expander flows to 1800 m^3/h (7900 gpm)
- Inlet pressures to 65 bar (940 psi)
- Temperatures to -170°C (-275°F)
- Power to 1750 kW (2350 hp)
- Runaway speed to 8300 rpm

Features
- Variable (TKW) or fixed (VKW) geometry
- Externally driven remote and local controlled variable wickets
- Optimal isentropic efficiency
- Overall improvement of compressor power efficiency
- Air cooled generator
- Temperature reduction through liquid expansion
- Additional electric generation
- Low vibration
- Low noise level
- State-of-the-art gas seal
- Optimum specific speed selection

Pleuger SUBM Deep-Well Submersible (Water-Filled Design)

Standards
- Flowserve
- CSA, WIMES 3.03, EMV, KTV, CE, VDE and other certifications

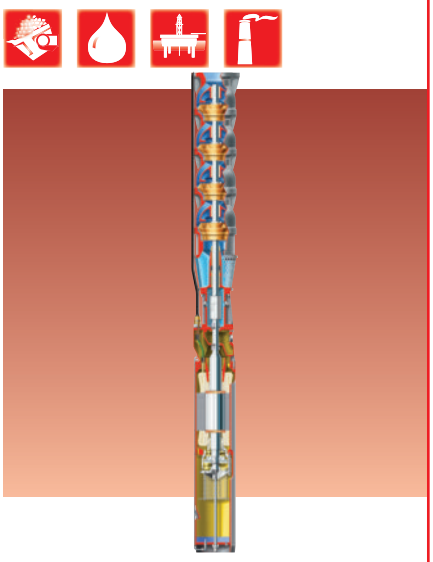
Operating Parameters
- Flows to 4500 m³/h (19 800 gpm)
- Heads to 800 m (2600 ft)
- Motor sizes to 5000 kW (6700 hp)
- Speeds from 200 to 3600 rpm

Features
- Wet type motors with water tight insulated windings
- Dynamically balanced impellers
- Prefilled motors with food grade additives
- Heavy-duty, adjustable, self-aligning thrust bearings
- Friction welded shafts
- Non-toxic Class Y winding insulation for potable water services
- Variable frequency drive and high temperature options
- Choice of materials
  - Cast iron
  - Bronze
  - Stainless and duplex stainless steels
  - Reinforced composite

Other Configurations
- Byron Jackson SUBM deep-well submersible (oil-filled design)

See Bulletin PS-50-3

Byron Jackson SUBM Deep-Well Submersible (Oil-Filled Design)



Standards
- Flowserve
- NSF Standard 61 Certification
- Certification program accredited by RvA, Dutch Council for Accreditation

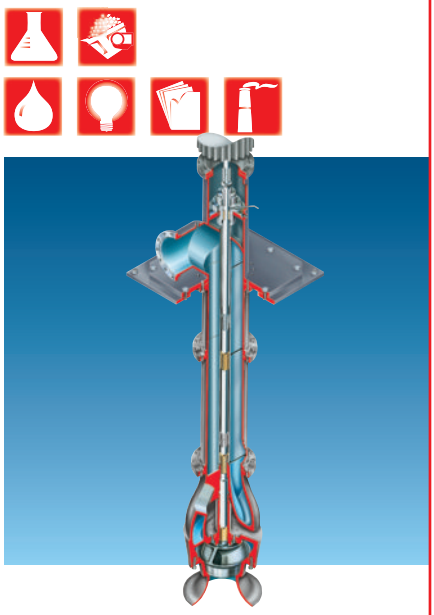
Operating Parameters
- Flows to 4500 m³/h (19 800 gpm)
- Heads to 800 m (2600 ft)
- Motor sizes to 1500 kW (2000 hp)
- Speeds from 1000 to 3600 rpm

Features
- Oil-filled motors with self-contained force feed, filtered, cooled oil circulation system
- Vacuum pressure impregnated (VPI) epoxy, class F insulation system
- Double-acting thrust bearing system
- Dynamically balanced heavy-duty, high efficiency impellers
- Variable frequency drive and high temperature options
- Accredited for water handling services
- Choice of materials
  - Cast iron
  - Bronze
  - Stainless and duplex stainless steels
  - Reinforced composite
- Choice of seals
  - Mercury seal
  - Double mechanical seal
  - Single, pressurized mechanical seal

Other Configurations
- Pleuger SUBM deep-well submersible (water-filled design)

See Bulletin PS-50-3

QMN Solids Handling, Wet Pit



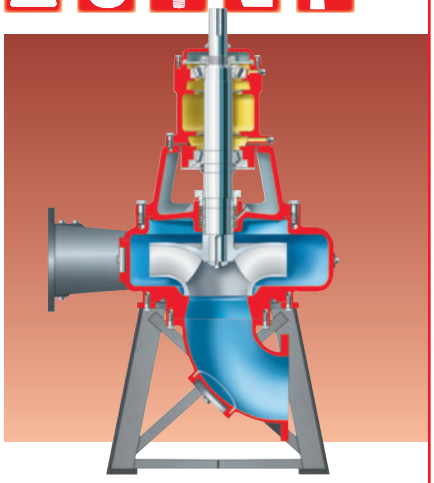
Standards
- Flowserve

Operating Parameters
- Flows to 17 000 m³/h (75 000 gpm)
- Heads to 40 m (130 ft)
- Sizes 250 mm (10 in) to 1200 mm (48 in)
- Drivers to 950 kW (1250 hp)
- Solids up to 150 mm (6 in)

Features
- Heavy-duty fabricated discharge head designed with fabricated flange and splitter vane
- Symmetrical bowl with twin volute
- Hydraulically balanced design
- Enclosed non-clog impeller
- Enclosed lineshaft
- Splitter vanes in the column and discharge head
- Mechanical seal or soft packing shaft sealing options
- Hollow or solid shaft motor style
- 416 SS lineshafts
- Separate steel soleplate
- Bronze lineshaft bearings
- Suction bell guide vanes
- Standard suction bell wear rings
- Optional impeller wear rings

See Bulletin PS-40-5

MFV Solids Handling



Standards
- Flowserve

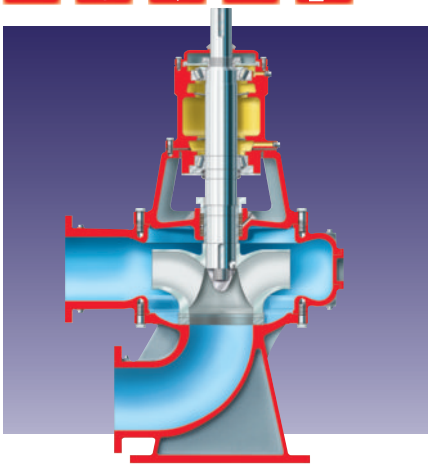
Operating Parameters
- Flows to 2275 m³/h (10 000 gpm)
- Heads to 90 m (300 ft)
- Sizes to 400 mm (16 in)

Features
- Variety of nozzle position options
- Direct or independent motor mounting
- Minimal shaft deflection
- Oversized shaft and reduced overhang
- Hardened chrome steel wear rings
- Stuffing box readily accommodates packing or mechanical seals
- Shaft sleeve options
  - 316 stainless steel
  - Hardened chrome steel
- Bearing housing features
  - Ball or tapered roller bearings
  - Integral jacking bolts for wear ring adjustment
  - Accessible lubrication points

Other Configurations
- MF horizontal, end-suction
- MFV vertical with motor on separate floor (shown above)
- MFC vertical with direct connected motor

See Bulletin PS-10-3

MNV Large Capacity, Solids Handling



Standards
- Flowserve

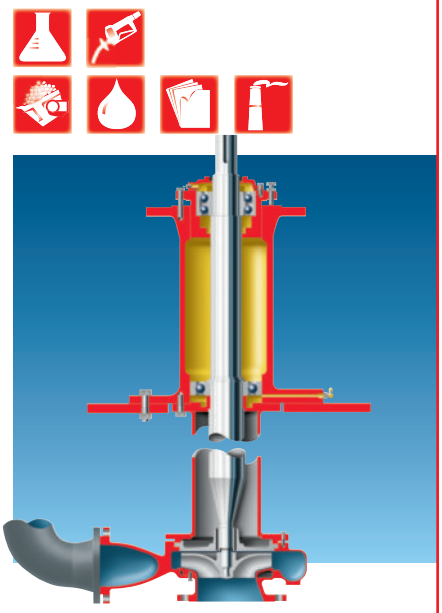
Operating Parameters
- Flows to 45 500 m³/h (200 000 gpm)
- Heads to 90 m (300 ft)
- Sizes to 1800 mm (72 in)

Features
- Variety of nozzle position options
- Direct or independent motor mounting
- Minimal shaft deflection
- Oversized shaft and reduced overhang
- Hardened chrome steel wear rings
- Stuffing box accommodates packing or mechanical seals
- Adjustable wear ring clearance
- Shaft sleeve options
  - 316 stainless steel
  - Hardened chrome steel
- Bearing housing features
  - Tapered roller bearings
  - Integral jacking bolts for wear ring adjustment
  - Accessible lubrication points

Other Configurations
- MN horizontal, end-suction
- MNF vertical, bottom suction, direct connected motor
- MNZ vertical, bottom suction, motor on separate floor
- MNC vertical with base elbow, direct connected motor
- MNV vertical with base elbow, motor on separate floor (shown above)

See Bulletin PS-10-4

FRBHJC Cantilever Sump



Standards
- Flowserve

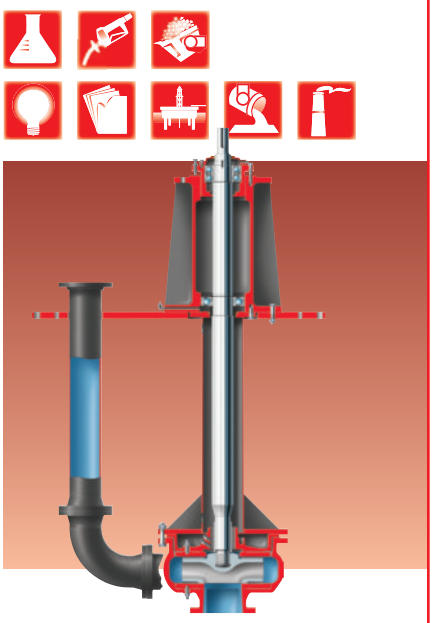
Operating Parameters
- Flows to 2700 m³/h (12000 gpm)
- Heads to 100 m (325 ft)
- Temperatures to 150°C (300°F)
- Speeds to 1780 rpm

Features
- True stiff shaft cantilever design, without bottom bearing or flushing water
- Steep head capacity
- Semi-open, full vane impeller with back pump-out vanes
- Stuffing box accommodates multiple seal types
- Direct coupled or V-belt driven
- Extra heavy-duty alloy steel shaft

Other Configurations
- FRBH heavy-duty paper stock and process
- FRBHJ vertical lineshaft sump

See Bulletin PS-10-16

MJ and MJC Hard Metal Slurry Sump



Standards
- Flowserve

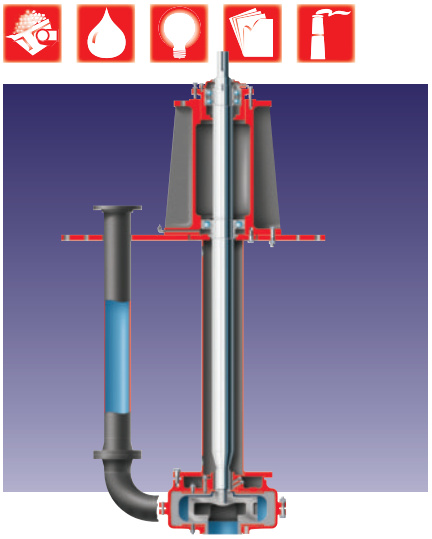
Operating Parameters
- Flows to 225 m³/h (1000 gpm)
- Heads to 30 m (100 ft)
- Pressures to 10 bar (150 psi)
- Temperatures to 110°C (225°F)
- Solids from 2% to 70% by weight
- Speeds to 1780 rpm

Features
- MJ - Submerged bearing and lineshaft design for deep setting
- MJC - Cantilever design with no submerged bearings
- Abrasion and corrosion-resistant high chrome iron concentric casing
- Integrally cast straightening vanes in the suction nozzle
- Closed impeller with pump-out vanes on front and rear shrouds
- MJ has fluted “Cutlass” rubber bearings
- MJC has “Thordon” restriction bushing
- Directly coupled or V-belt driven
- Options
  - Hard metal expeller
  - Open and recessed impellers
  - Choice of materials

Other Configurations
- M horizontal hard metal abrasive slurry

See Bulletin PS-10-19

RJ and RJC Rubber Lined Slurry Sump



Standards
- Flowserve

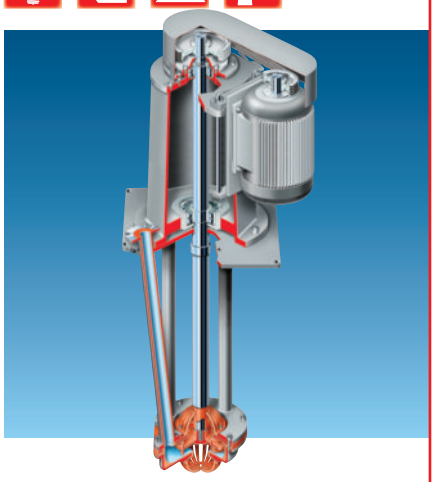
Operating Parameters
- Flows to 225 m³/h (1000 gpm)
- Heads to 30 m (100 ft)
- Pressures to 10 bar (150 psi)
- Temperatures to 110°C (225°F), depending on material
- Solids from 2% to 70% by weight
- Speeds to 1780 rpm

Features
- RJ - Submerged bearing and lineshaft design for deep setting
- RJC - Cantilever design with no submerged bearings
- Radially split casing with anti-prerotation vanes in suction nozzle
- Casing liners pressure molded on steel backing plates
  - Multiple materials available
- Pressure molded rubber closed impeller with pump-out vanes on front and rear shrouds
- RJ has fluted “Cutlass” rubber bearings
- RJC has “Thordon” restriction bushing
- Directly coupled or V-belt driven
- Options
  - Hard metal expeller
  - Choice of liner materials

Other Configurations
- R horizontally split rubber lined slurry

See Bulletin PS-10-18

Terra-Titan Cantilever Sump



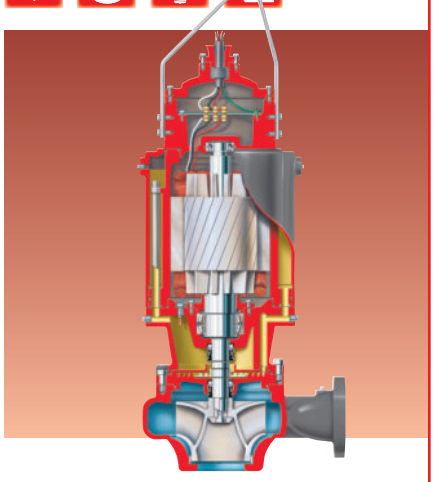
Standards
- Flowserve

Operating Parameters
- Flows to 250 m³/h (1100 gpm)
- Heads to 45 m (150 ft)
- Pressures to 5 bar (70 psi)
- Temperatures to 100°C (212°F)
- Sizes from 40 mm (1.5 in) to 125 mm (5.0 in)
- Sump depths from 700 mm (28 in) to 1800 mm (72 in)

Features
- One-piece suspended, oversized cantilever shaft construction
- Interchangeable urethane or hard metal wetted parts
- Concentric casing design
- Double suction, hydraulically balanced open impeller
- External impeller adjustment
- Renewable Terraprene urethane shaft sleeve
- Greased for life, heavy-duty, self-aligning roller bearings
- Upper and lower strainers
- Run-dry capability
- ANSI and ISO configurations
- Portable
- Lifting lugs
- Rigid motor mount pivot bar
- Available bottom suction tailpipe
- Multiple drive options

See Bulletin PS-10-7

MSX Solids Handling, Submersible



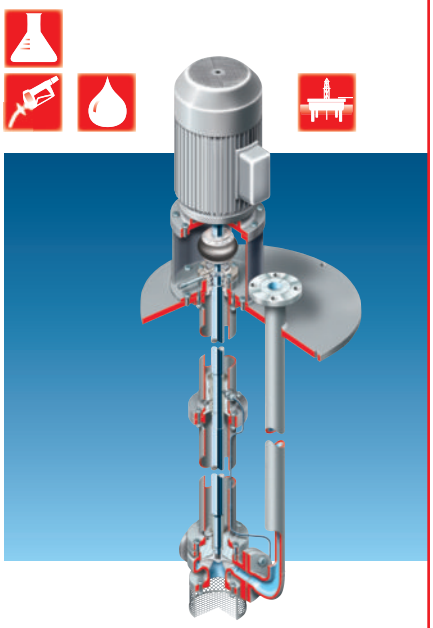
Standards
- Flowserve

Operating Parameters
- Flows to 4550 m³/h (20 000 gpm)
- Heads to 90 m (300 ft)
- Sizes to 500 mm (20 in)
- Motor to 300 kW (400 hp)
- Solids handling to 80 mm (3 in) spherical

Features
- High efficiency hydraulics
- EPACT rated motor
- Spike-resistant windings
- Class H rated insulation system
- Dynamically balanced shaft and rotor
- Available configurations
  - MSX Series 1 – Sizes to 150 mm (6 in)
  - MSX Series 2/3 – Sizes to 500 mm (20 in)
- Mounting options
  - Wet pit
  - Dry pit
  - Transportable

See Bulletin PS-50-2

CPXV (VS4) Chemical Sump



Standards
- API 610 (VS4), 8th edition
- ISO 5199

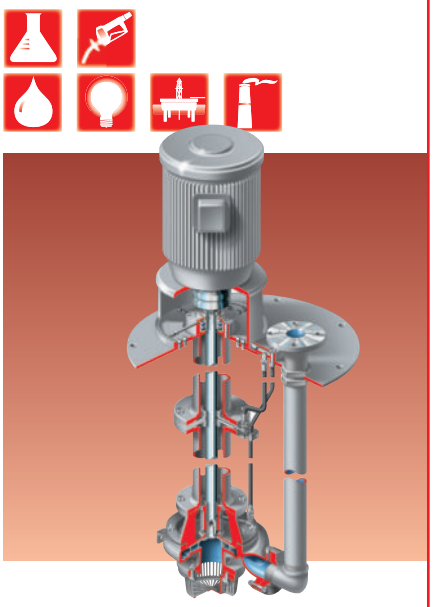
Operating Parameters
- Flows to 1400 m³/h (6160 gpm)
- Heads to 250 m (820 ft)
- Pressures to 25 bar (365 psi)
- Temperatures from -40°C (-40°F) to 350°C (660°F)
- Speeds to 4700 rpm

Features
- Heavy-duty casing with multi-ribbed discharge flange
- High efficiency, low NPSHR, precision cast open impeller
- Column lengths to 10 m (33 ft)
- Heavy-duty, sealed for life, double thrust bearings
- Options
  - Spacer or flexible coupling
  - Rectangular or circular soleplates
  - Jacketed body
  - Recessed impeller
  - Oil lubrication
  - Non-spacer coupling
  - Suction strainer
- CE marked and compliant with applicable European directives, such as ATEX

Other Configurations
- CPX ISO standard
- CPXVR recessed impeller sump

See Bulletin PS-10-30

ESP2 Vertical Immersion Sump



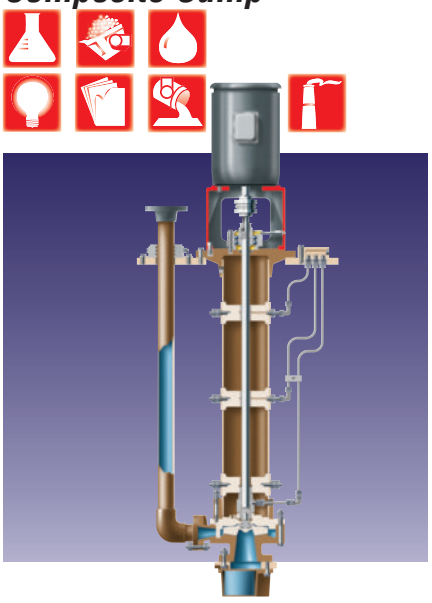
Standards
- Flowserve

Operating Parameters
- Flows to 800 m³/h (3500 gpm)
- Heads to 90 m (300 ft)
- Pressures to 12 bar (175 psi)
- Temperatures to 180°C (350°F)

Features
- Optimized lineshaft bearing design to API 610 spacing requirements
- Double row external thrust bearings
- Single and duplex configurations
- Flanged discharge
- Large basket strainer
- Industry standard “TCV” motors
- Lubrication options
  - Product lube design for clear liquids
  - Dual particle separator for light solids
  - Grease lubrication
- Mounting plate sealing options
  - Vapor tight
  - Vapor proof
  - Pressurized design
- Options
  - Upper stuffing box
  - Sealing ring
  - Suction tailpipes
  - Level controls

See Bulletin PS-10-24

PolyChem VGRP Vertical, Engineered Polymer Composite Sump



Standards
- Flowserve

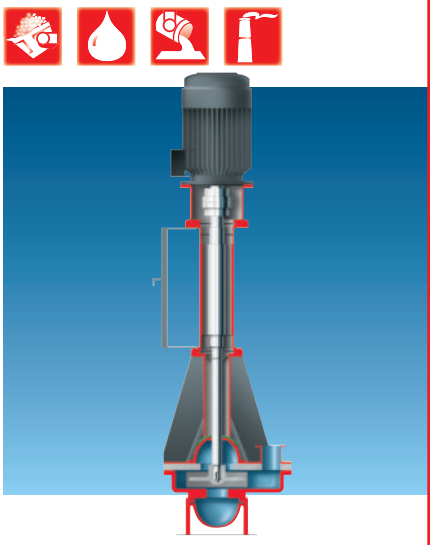
Operating Parameters
- Flows to 565 m³/h (2500 gpm)
- Heads to 110 m (350 ft)
- Pressures to 17 bar (250 psi)
- Temperatures from -30°C (-20°F) to 90°C (200°F)

Features
- Glass reinforced vinyl ester
- Unitized casing with integrally molded, fully gusseted suction and discharge flanges
- Externally adjustable, semi-open impeller
- Shaft and bearing system operates well below the first critical speed
- Self-lubricated or external flush bearings
- Single-piece, lightweight, filament-wound, reinforced fiberglass composite column
- Single and duplex configurations
- Full basket strainer
- NEMA in-line motor
- Fiberglass mounting plate
- Tapered polygon impeller drive
- Pull-out bearing retainers
- Level controls
- Choice of shaft metallurgy

Other Configurations
- GRP engineered polymer composite

See Bulletin PS-10-17

Drain-Titan Double Suction, Urethane Lined Sump



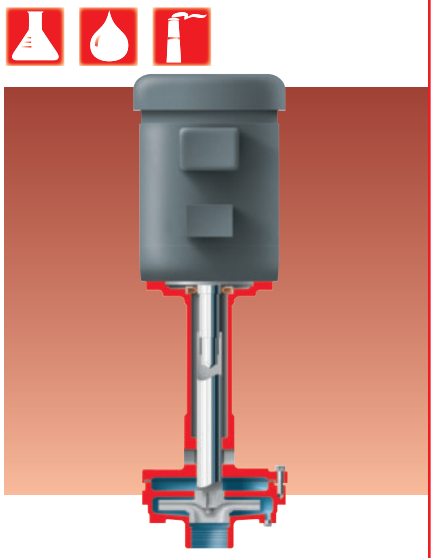
Standards
- Flowserve

Operating Parameters
- Flows to 160 m³/h (700 gpm)
- Heads to 40 m (130 ft)
- Pressures to 4 bar (55 psi)
- Sizes from 40 mm (1.5 in) to 100 mm (4 in)
- Solids to 15 mm (0.5 in)

Features
- Double suction, urethane coated wet-end
- Robust, integral unit construction
- Large diameter, stiff cantilever drive shaft
- No submerged bearings or seals
- Double sided impeller with pre-set clearance
- Keyed and bored shaft coupling
- Standard single lip oil seal
- Urethane lined, slotted outlet pipe flange
- Grease lubricated, single row, deep groove ball bearings
- No priming required
- Run-dry capability

See Bulletin PS-10-7

VSMP Standard Motor



Standards
- Flowserve

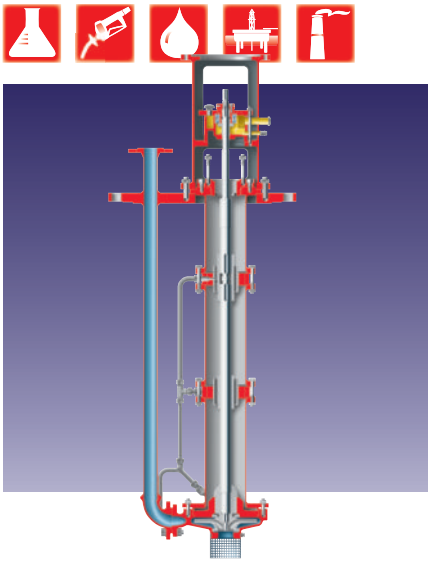
Operating Parameters
- Flows to 135 m³/h (600 gpm)
- Heads to 70 m (220 ft)
- Pressures to 12 bar (175 psi)
- Temperatures from -40°C (-40°F) to 120°C (250°F)

Features
- Glass reinforced polymer, high efficiency, semi-open or closed impellers standard
- Industry standard NEMA motors
- Stainless steel, self-aligned mechanical seal
- Back pull-out design
- Clamp-type mounting plate
- Options
  - Cast iron, bronze or 316 SS impellers
  - Stub shaft design

Other Configurations
- SMP standard motor pump
- SMX non-metallic standard motor pump

See Bulletin PS-10-26

ECPJ (VS4 and VS5) Sump

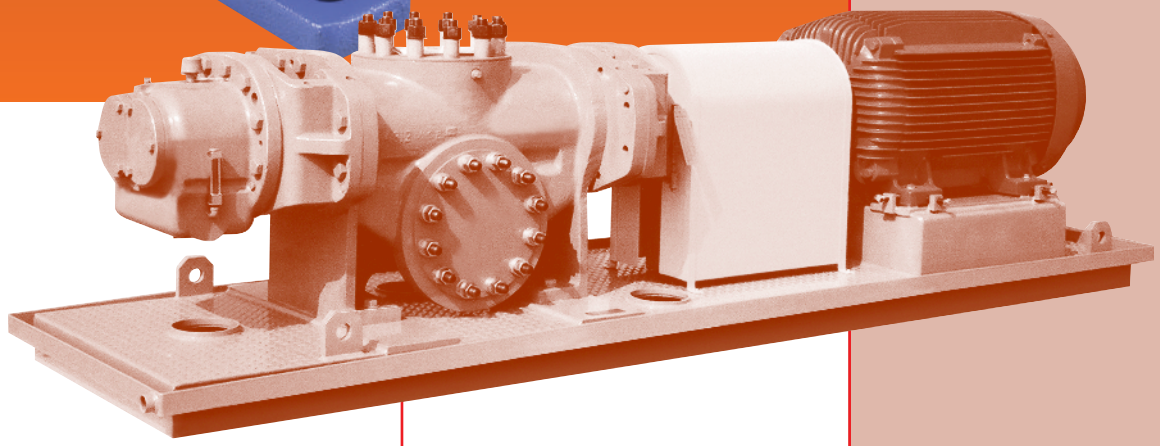


Standards
- API 610 (VS4 and VS5), latest edition

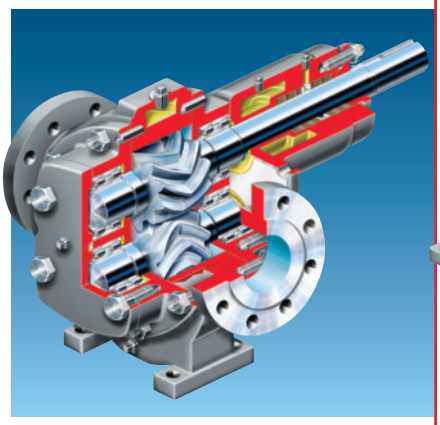
Operating Parameters
- Flows to 500 m³/h (2200 gpm)
- Heads to 150 m (500 ft)
- Pressures to 16 bar (230 psi)
- Temperatures to 350°C (660°F)
- 42 sizes available

Features
- Lineshaft (VS4) and cantilever (VS5) configurations available
- Four impeller designs to suit hydraulic requirements
  - Closed multivane impeller with front wear rings and back vanes
  - Closed multivane impeller with front and rear wear rings
  - Open multivane impeller with back vanes
  - Free flow impeller with back vanes
- Multiple shaft sealing options
  - V-ring
  - Throttle bushing
  - Lip seal with grease-filled stuffing box
  - Soft packing
- API 682 seal chamber accommodates multiple seal types
- Column lengths to 6 m (22 ft)
  - Suction pipe available
- Choice of API materials
- NACE MR0175 materials available
- Internal or external bearing flushing
- Bearing cooling
- Suction strainer

Rotary Pumps



GR Double Helical, Gear



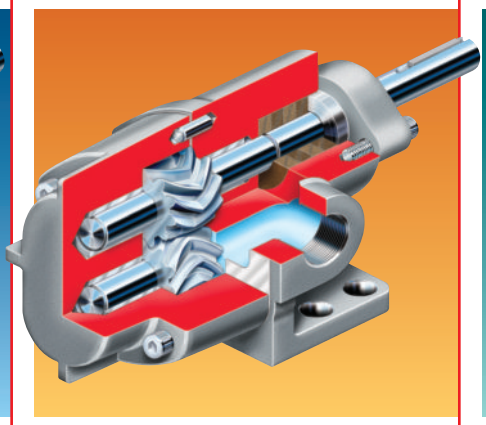
Standards
- Flowserve

Operating Parameters
- Flows to 275 m³/h (1200 gpm)
- Pressures to 35 bar (500 psi)
- Temperatures to 350°C (650°F)
- Speeds to 1800 rpm
- Viscosities to 100 000 ssu

Features
- Double helical, herringbone gears
- Quiet, pulse-free flow
- High speed pump capability
- Between bearing design
- Hydraulically balanced design
- Stuffing box accommodates packing or mechanical seals
- High-capacity, double row roller bearing
- Self-priming
- Run dry capability
- Low NPSHR
- Back pull-out design
- Options
  - Mechanical seal
  - Direct V-belt drive
  - Extra deep jacketed stuffing box
  - Jacketed body
  - Babbitted carbon sleeve bushing
  - INSUROCK wearplates
  - Integral safety relief valve

See Bulletin PS-60-3

GAX Series Cast Iron, Double Helical, Gear



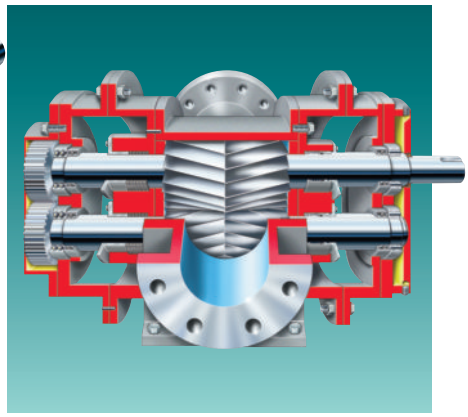
Standards
- Flowserve

Operating Parameters
- Flows to 30 m³/h (120 gpm)
- Pressures to 17 bar (250 psi)
- Temperatures to 175°C (350°F)
- Speeds to 1800 rpm
- Viscosities to 25 000 ssu

Features
- Double helical, herringbone gears
- Quiet, pulse-free flow
- High speed pump capability
  - Off-the-shelf motors
- Between bearing design
- Self-lubricated babbitted carbon sleeve bearings standard
  - Bronze bearings optional
- Hydraulically balanced design
  - No thrust bearings
- Convertible stuffing box accommodates packing or mechanical seals
- Threaded ports
- Back pull-out design
- Available integral safety relief valve
- Multiple mounting configurations
  - Foot mounting (GAS) - standard
  - Flange mounting (GAF)
  - Close coupled (GAC)

Other Configurations
- GSX series stainless steel, double helical, rotary gear pumps

Gearex Double Helical, Timed Gear

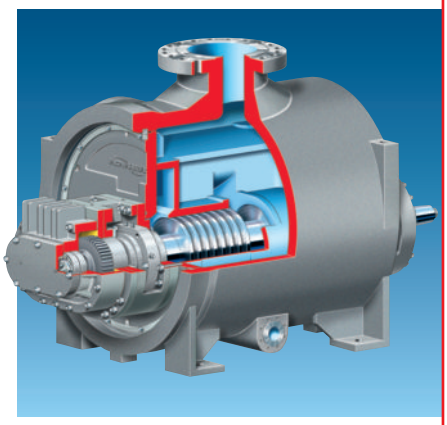


Standards
- Flowserve

Operating Parameters
- Flows to 180 m³/h (800 gpm)
- Pressures to 24 bar (350 psi)
- Temperatures from -50°C (-60°F) to 450°C (850°F)
- Viscosities to 1 million ssu

Features
- Double helical, herringbone gears
- Quiet, pulse-free flow
- Timing gears
- Between bearing design
- Heavy-duty, double row roller bearings
- Direct coupled
- Options
  - Water cooled bearings
  - Steam or water jacketed bodies
  - Vertical mounting configuration
  - Mechanical seals
  - Lantern rings
  - Shaft slingers
  - Split bearing brackets
  - Flange mounting brackets
  - Jackshafts for V-belt drives

MPP Multiphase Screw

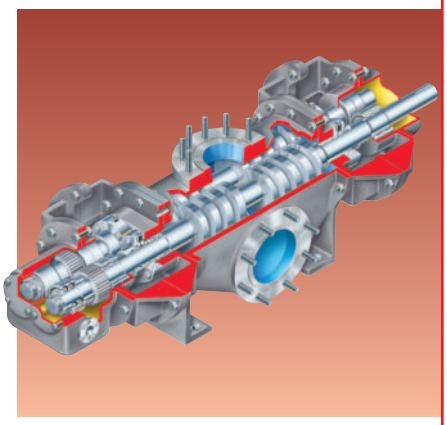


Standards
- Flowserve
- API 682 seal chamber

Operating Parameters
- Flows to 1520 m^3/h (6700 gpm)
- Pressures to 100 bar (1450 psi)
- Temperatures from -50°C (-60°F) to 150°C (300°F)
- Viscosities to 5 million ssu
- Multiphase pumping to 100% GVF (gas void fractions)

Features
- Non-contacting design with one-piece pump shafts
- Three pumping locks for varying gas-to-liquid ratios
- Through bolt bracket design
- API 682 seal chamber with split brackets accommodates single and double cartridge seals
- Smooth, pulse-free flow
- Slow speed operation
- Double suction design with low NPSH capability
- AGMA 11 spur timing gears
- Wide range of pitch choices for operation without speed reducers
- Optional hard coating for body bores and screws

Sier-Bath Two-Screw



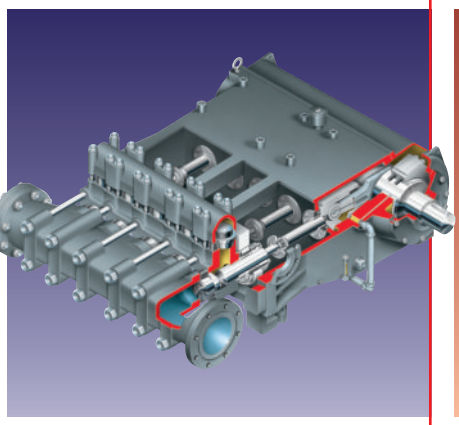
Standards
- Flowserve
- API 682 seal chamber

Operating Parameters
- Flows to 3400 m^3/h (15 000 gpm)
- Pressures to 240 bar (3500 psi)
- Temperatures from -50°C (-60°F) to 450°C (850°F)
- Speeds to 1800 rpm
- Viscosities to 200 million ssu
- Slurry concentrations to 70% by weight
- Multiphase pumping to 100% GVF (gas void fractions)

Features
- Positive displacement timed two-screw
- Double suction design
- Versatile API 682 compliant stuffing box design
- Integral or pinned screw elements
- Spur-tooth timing gears
- Chrome-plated pump bores
- Options
  - Fully external bearings and timing gears
  - Internal bearings and timing gears
  - Temperature control packages
  - Hopper-top construction
  - Vertical barge configuration
  - Choice of materials

Reciprocating Pumps

YHT and HS Multiplunger, Horizontal Reciprocating

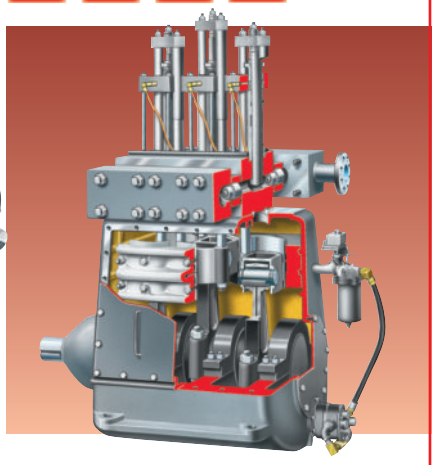


Standards
- Flowserve

Performance
- 75 mm (3 in) to 250 mm (10 in) stroke
- Flows to 775 m³/h (3400 gpm)
- Power to 2560 kW (3430 hp)
- Standard pressures to 554 bar (8030 psi)
- Custom pressures to 2070 bar (30 000 psi)
- Temperatures from -40°C (-40°F) to 350°C (650°F)
- Speeds to 530 rpm

Features
- Self-aligning plungers
- Sectionalized fluid end components
- Fully enclosed power end with generous oil reservoir
- Independent crosshead extension rod
- Integrally cast and precision machined cylindrical crosshead guides
- Triple lip seal at the crosshead extensions
- Fully reversible crankshaft for V-belt drive or direct coupling
- Stuffing box assemblies individually bolted to fluid cylinder
- Four precision-type main bearings
- Splash-type or full pressure lubrication system
- Threaded primary drain
- Options
  - Overhead motor mounting
  - Spring loaded stuffing box
  - Discharge pulsation dampeners

VTE, VQE and V Vertical Reciprocating

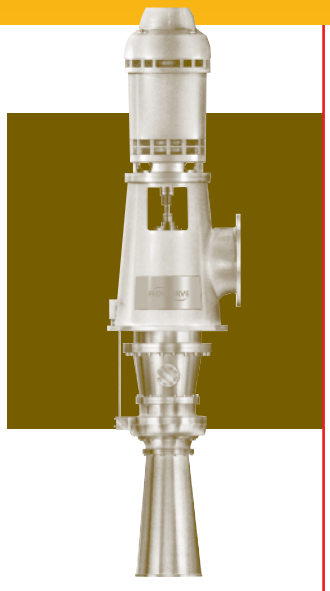


Standards
- Flowserve

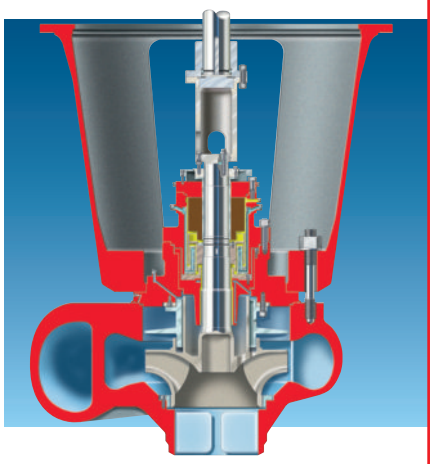
Performance
- 140 mm (5.5 in) to 225 mm (9 in) stroke
- Flows to 1140 m³/h (5000 gpm)
- Power to 3450 kW (4625 hp)
- Standard pressures to 619 bar (8975 psi)
- Custom pressures to 2070 bar (30 000 psi)
- Temperatures from -40°C (-40°F) to 350°C (650°F)
- Speeds to 360 rpm

Features
- Outboard packed inverted design
- Easily accessible stuffing box
- Integrated suction and discharge manifold
- Complete separation of liquid end from power end
- Cartridge type plate valve
- Spherical feature for plunger alignment
- Power-end maintenance inspection covers
- Forced feed lubrication

Specialty Pumps



DFSS and DVSS Nuclear Radially Split, Single Stage



Standards
ASME Section III, Class 1 Nuclear

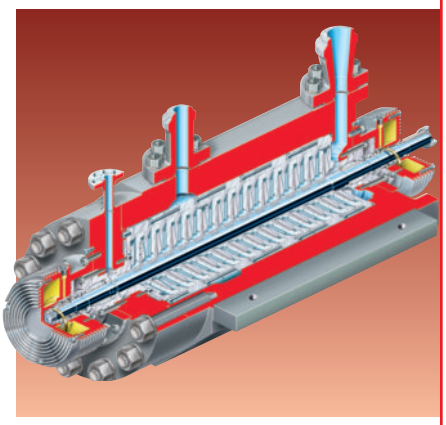
Operating Parameters
- Flows to 24 500 m³/h (108 000 gpm)
- Heads to 250 m (815 ft)
- Pressures to 170 bar (2500 psi)
- Temperatures to 300°C (580°F)
- Speeds to 1800 rpm
- Power rating to 9400 kW (12 600 hp)

Services
- Primary coolant
- Reactor coolant
- Primary heat transport

Features
- Fourth generation design
- One-piece cast pump casing
- Double volute design case for BWR and PHWR
- Diffuser with torus-type design casing for PWR
- Upgraded rotating element
  - One-piece welded shaft-impeller-journal assembly
  - Fully machined and balanced as single rotating unit
- Hydrostatic-pressurized radial bearing
  - Operates submerged in radioactive system water at loop temperature of approximately 300°C (580°F)

See Bulletin FPD-2

CAM Nuclear Between Bearings, Radially Split, Multistage



Standards
- ASME Section III, Class 2 Nuclear

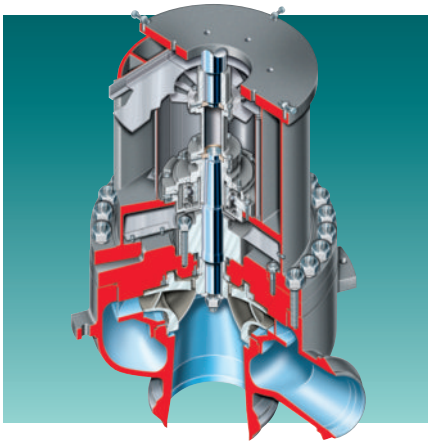
Operating Parameters
- Flows to 45 m³/h (200 gpm)
- Heads to 1920 m (6300 ft)
- Pressures to 200 bar (3000 psi)
- Temperatures to 120°C (250°F)

Services
- CVCS charge
- Safety injection
- Control rod drive

Features
- Multistage, double casing design
- Unique, compact design patented modular impellers
  - Low-flow stability and reliability over a wide range of flows
  - No surging or pulsations
- Ball-ball construction
- Dry disk spacer coupling
- Flanged axial thrust-balancing device
- Modularized assembly and disassembly may be conducted without the use of a torch
- Forged barrel with no attachment welds
- Cartridge mechanical seals with no attachment welds

See Bulletin FPD-2

WDF Nuclear Vertical Single Stage



Standards
- ASME Section III, Class 2 and 3 Nuclear

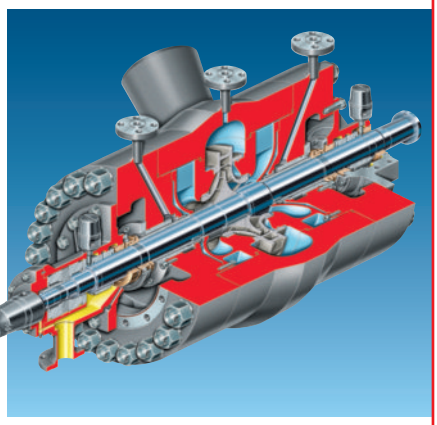
Operating Parameters
- Flows to 900 m³/h (4000 gpm)
- Heads to 245 m (800 ft)

Services
- Containment spray
- Low pressure safety injection
- Residual heat removal
- Pressurized and boiling water reactors for N-stamp safety applications

Features
- Vertical, single stage design
- Bottom suction, horizontal discharge
- Forged diffuser casing design
- Optimized hydraulic performance
- Unique spacer coupling design
- Mechanical seal replacement without motor or casing cover removal
- Upgraded rotor design
  - Radial bearing located between coupling and seal
  - Reduced shaft deflection
  - Improved pump and mechanical seal life and reliability
- Cartridge mechanical seal
- Reduced assembly time

See Bulletin FPD-2

CN Nuclear Radially Split, Diffuser Casing, Single Stage



Standards
- ASME Section III, Class 3 Nuclear

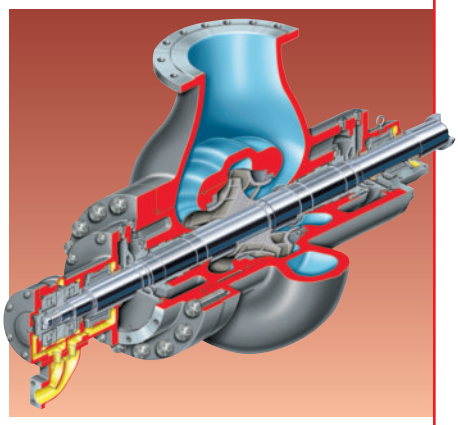
Operating Parameters
- Flows to 5065 m³/h (22 300 gpm)
- Heads to 800 m (2630 ft)
- Pressures to 87 bar (1265 psi)
- Temperatures to 200°C (400°F)
- Power to 11 200 kW (15 000 hp)
- Speeds to 6000 rpm

Services
- Reactor and steam feedwater

Features
- Diffuser casing configuration
- Forged barrel
- High speed pump design
- Double suction impeller
- Centerline mounted
- Pressure breakdown bushing or conventional mechanical service

See Bulletin FPD-2

DVSR Nuclear Radially Split, Volute Casing, Single Stage



Standards
- ASME Section III, Class 3 Nuclear

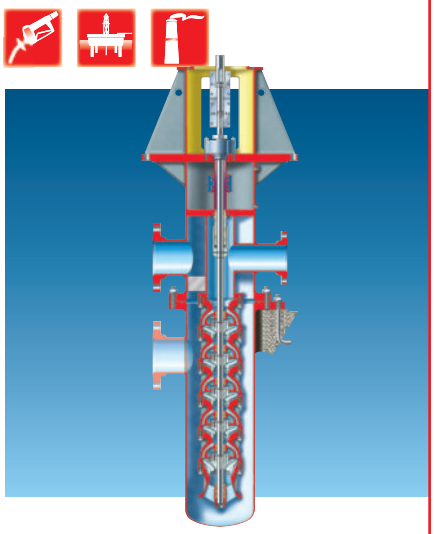
Operating Parameters
- Flows to 5065 m³/h (22 300 gpm)
- Heads to 800 m (2630 ft)
- Pressures to 87 bar (1265 psi)
- Temperatures to 200°C (400°F)
- Power to 11 200 kW (15 000 hp)
- Speeds to 6000 rpm

Services
- Reactor and steam feedwater

Features
- Cast volute casing configuration
- High speed pump design
- Double suction impeller
- Centerline mounted
- Pressure breakdown bushing or conventional mechanical service

See Bulletin FPD-2

VPC Cryogenic (VS6) Vertical, Double Casing, Multistage

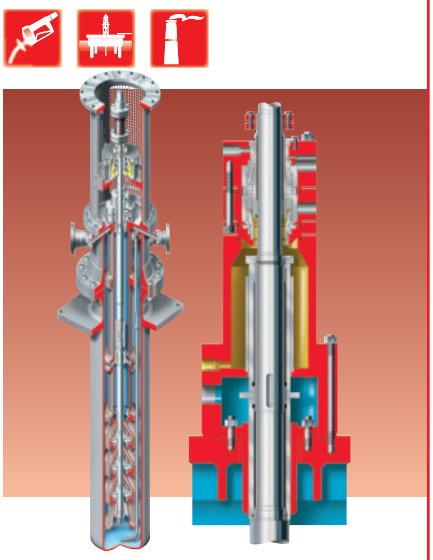


Standards
- API 610 (VS6), latest edition
- ASME Sections VIII and IX

Operating Parameters
- Flows to suit site requirements
- Heads to suit site requirements
- Discharge pressures to 148 bar (2160 psi)
- Temperatures from -200°C (-325°F) to -45°C (-50°F)

Features
- Designed for use in a cold box
- Nozzle head with integral warming chamber
- Metal backed PTFE coated bearings
- Close clearance for high efficiency
- LOX and LIN compatible materials conforming to industry standards
- High pressure breakdown bushing
- Stand pipe bellows
- Optional below grade suction flange
- Sealing options
  - Dual wet seals
  - Dry gas seals
  - Gas injection labyrinth seal
- Reinforced motor stand

WUC-LNG Cryogenic (VS6) Vertical, Double Casing, Multistage



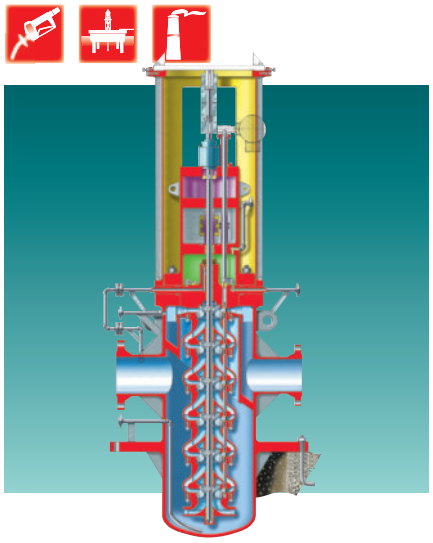
Standards
- API 610 (VS6), latest edition
- ASME Sections VIII and IX
- German Pressure Vessel Association (AD)
- British Standard BS 5500
- Compliance with Pressure Equipment Directive 97/23/EC

Operating Parameters
- Flows to 3000 m^3/h (13 000 gpm)
- Heads to 2000 m (6500 ft)
- Pressures to 200 bar (3000 psi)
- Temperatures from -200°C (-325°F) to -45°C (-50°F)

Features
- Coffer dam system
- Radial or mixed flow hydraulics
- Low suction velocity can design
- Optional axial thrust tilting pad bearing configuration
- Stiff shaft design
- API 682 compliant mechanical seal chamber
- Flanged spacer type coupling
- Screen-type, non-sparking coupling guard
- Inside drain line
- Casing and impeller wear rings
- Reinforced motor stand
- Optional inducer

Other Configurations
- WUC (VS6) double casing, multistage

VKW and TKW Cryogenic Liquid Expander (VS6) Double Casing, Multistage, Electric Generator

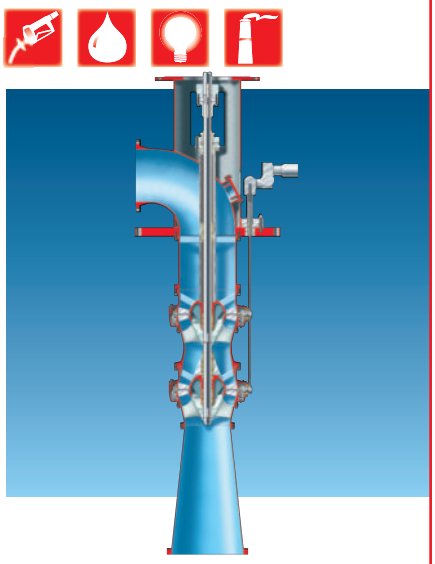


Standards
- API 610 (VS6), latest edition
- ASME Sections VIII and IX
- Shell DEP
- NEMA MG1, latest edition
- Hazardous area classification (EExe) to the site country

Operating Parameters
- Expander flows to 1800 m^3/h (7900 gpm)
- Inlet pressures to 65 bar (940 psi)
- Temperatures to -170°C (-275°F)
- Power to 1750 kW (2350 hp)
- Runaway speed to 8300 rpm

Features
- Variable (TKW) or fixed (VKW) geometry
- Externally driven remote and local controlled variable wickets
- Optimal isentropic efficiency
- Overall improvement of compressor power efficiency
- Air cooled generator
- Temperature reduction through liquid expansion
- Additional electric generation
- Low vibration
- Low noise level
- State-of-the-art gas seal
- Optimum specific speed selection

TKW Vertical Hydroturbine



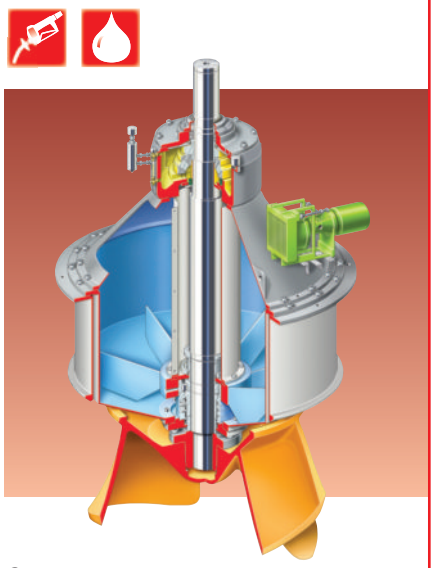
Standards
- Flowserve

Operating Parameters
- For sites of 50 kW (65 hp) to 3000 kW (4000 hp)
- 50 kW (65 hp) to 1000 kW (1350 hp) per unit
- 12 m (40 ft) to 45 m (150 ft) per stage

Features
- Semi-axial flow runner
- Adjustable rotor clearance
- Wicket gates, adjustable during operation
- Optimized draft tube design
- Bearing options
  - Self-lube, open shaft
  - Oil-lube, enclosed shaft
- Control options
  - Manual
  - Automatic
  - Alternative mechanisms
- Materials
  - Stainless steel shaft
  - Nickel-aluminum bronze wicket gates
  - Nickel-aluminum bronze runner and runner case

See Bulletin PS-90-1

BSV and BCV Vertical Concrete Volute



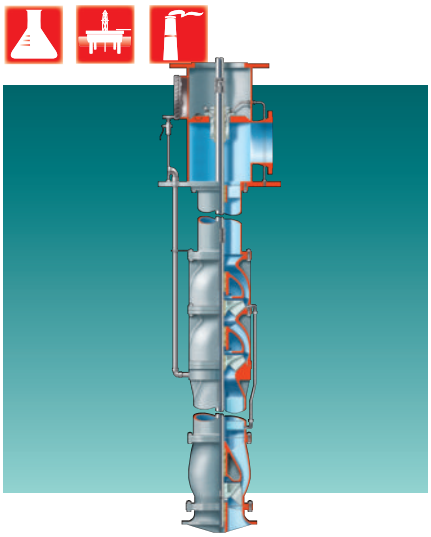
Standards
- Flowserve

Operating Parameters
- Flows to 115 000 m³/h (500 000 gpm)
- Heads to 22 m (72 ft)

Features
- Removable metallic pump pull-out unit within a concrete volute
- Suction bell connected to preformed intake suction box
- Open mixed flow (BSV) and closed mixed flow (BCV) impeller options
- Bearings and sealing systems easily accessible
- Prefabricated concrete segments
- Highly corrosion and erosion resistant
- Liquidyne shaft seal
- Inflatable static seal

See Bulletin PS-40-1

Barge Unloading



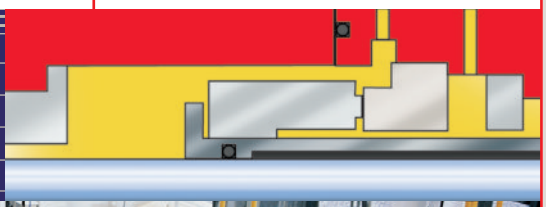
Standards
- Flowserve

Operating Parameters
- Flows to 1320 m³/h (5800 gpm)
- Heads to 185 m (600 ft)
- Temperatures from -30°C (-20°F) to 230°C (450°F)

Features
- Pollution prevention design
- Discharge head with access ports
- Rabbeted fit motor shaft to headshaft
- 1.5 m (5 ft) column pieces with integrally fabricated bearing support
- Automatic stuffing box bleed-off and valved drain line
- Special low NPSH priming stage impeller
- Semi-open series stage impeller
- Automatic air separation chamber with continuous seal

Additional Information

		(% of BE
1K3x2V-7	3500	25
2K3x2V-10	3500	30
2K4x3V-10	3500	33
2K3x2V-13	3500	50
X4x3V-13/11*	3500	50

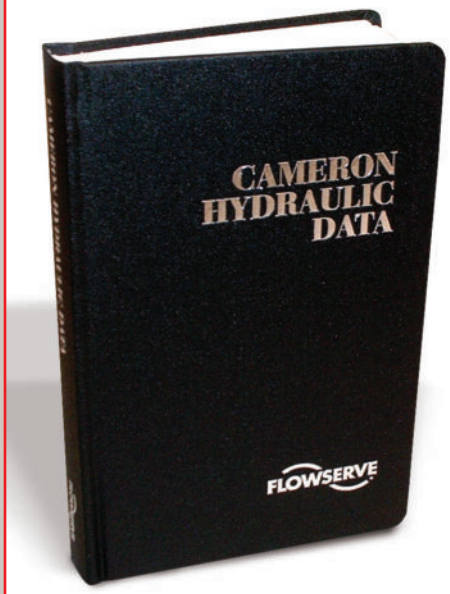


Reference Sources

Pump Industry Standards

To learn about industry standards pertaining to the design and performance of pumps contact the following organizations:

- American Petroleum Institute (API)
  www.api.org
- American Society of Mechanical Engineers (ASME – ANSI)
  www.asme.org
- American Society of Testing and Materials (ASTM)
  www.astm.org
- European Sealing Association (ESA)
  www.europeansealing.com
- Europump
  www.europump.org
- Deutsches Institut für Normung (DIN)
  www.2.din.de/
- Fluid Sealing Association (FSA)
  www.fluidsealing.com
- Hydraulic Institute (HI)
  www.pumps.org
- International Standards Organization (ISO)
  www.iso.ch/iso/en/ISOonline.openpage



PROS+

PROS+ proposal and order system is the most comprehensive and user friendly pump selection program in the industry. This software ensures correct sizing and selection of Flowserve pumps to best suit your process application needs.

PROS+ is available from your local sales representative or on-line at www.flowserve.com.

Cameron Hydraulic Data

First published in 1926 and now in its 19th edition, the Cameron Hydraulic Data book is an indispensable aid to engineers involved with the specification, selection and application of pumping equipment. This comprehensive reference tool includes:

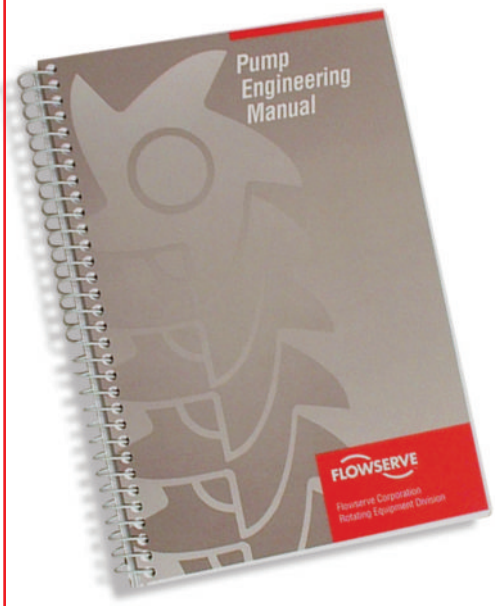
- hydraulic principles
- formulae
- friction
- liquids
- steam and electrical data
- pipe flanges and fittings
- metric conversions

To obtain a copy of the Cameron Hydraulic Data book visit: www.cameronbook.com.

Pump Engineering Manual

This publication is devoted to explaining centrifugal pump principles. It covers the basics from application analysis and affinity laws through hydraulics and mechanical phenomena to troubleshooting.

To obtain a copy of the Pump Engineering manual visit: www.flowserve.com.



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, to evaluate and troubleshoot problems and to provide reliable solutions.

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.

Training

Flowserve Educational Services (FES)
The mission of FES is to provide companies around the world with innovative and comprehensive training focused on effective solutions. A wide range of technical and maintenance training courses is available to deepen participants' understanding of fluid management systems and critical equipment. The objective is to teach best practices to maximize reliability and minimize total life cycle cost.

Learning Resource Center (LRC)
Located in Irving, Texas, the LRC contains state-of-the-art classrooms and hydraulics labs for both theoretical and practical instruction.

On-Site Training
On-site training programs are tailored to the people, equipment and process at the plant level. This is a convenient, time-efficient way of training employees on the equipment they use day in and day out.

For more information about Flowserve Educational Services visit www.flowserve.com.

Providing Complete Fluid Motion Control Equipment and Services

Flowserve Seals
Flowserve manufactures and markets highly engineered mechanical shaft seals for containing corrosive, volatile, abrasive, precious or flammable fluid. They are used on pumps and other rotating equipment.

The complete seal line includes cartridge, dry-running, metal or elastomer bellows, split and zero emission gas barrier seals. Offering innovative seal design and service on demand, Flowserve is committed to the development of new technologies to further reduce maintenance and operating costs for its customers.

Flowserve Valves
Flowserve has the systems, products and experience to help processes run smarter, safer and more efficiently. With the industry's most complete range of valves, actuators, positioners controls, switches and steam systems, Flowserve provides customers a one-stop solution for their flow control needs.

With comprehensive research and development, engineering and global support, Flowserve Valves can offer applications solutions from simple isolation service to intelligent process control.

To learn more about Flowserve Valves and Seals, visit www.flowserve.com.

Product Index

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Bulletin FPD-100 (E) Printed in USA. November 2004.

To find your local Flowserve representative:

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