

VERTICAL, MULTISTAGE HIGH-PRESSURE PUMPS

**HPTV
HPV**

API 610 CAN-TYPE DESIGN / TYPE VS6
WITHOUT CAN / TYPE VS1



- High-pressure pump in a vertical can-type design for critical applications
- Very good NPSH values
- Hydraulically well-balanced field performance
- High reliability in operation and customer-specific design

Range of Applications

Based on vertical can-type design and modern structural design according to API 610 latest edition, the pumps are suitable for applications such as:

- offshore applications
- liquefied gas applications
- pumping of condensate
- as booster and forwarding pumps
- crude oil applications
- water injection

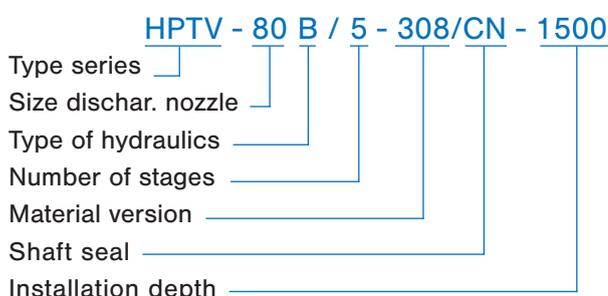
Design

- HPTV – vertical high-pressure pump of can-type design – VS6
- HPV – vertical high-pressure pump – submersible pump – VS1
- HPVX – vertical high-pressure pump suspended impeller – VS1
- NPSH impeller of single-flow or double-flow version, version with inducer available
- bearing types: upper bearing as combined radial-axial plain bearing with oil bath lubrication or anti-friction bearings for radial and axial load. Pumped liquidlubricated radial bearings within the pump
- Axial thrust compensation by piston or double piston
- Nozzle position: horizontally according to the customer's requirements at the outlet casings
- Flanges according to ASME or DIN EN

Shaft seal

Separate seal chamber suitable for a variety of mechanical seals – from single and double mechanical seals up to cartridge mechanical seals and stuffing-box seals – all variants are available. Pumps of this version have a standard design with cartridge mechanical seal. Assembly space according to API 610/682.

Designation



Operating data

Nozzle size (mm)	from 40 to 200
Capacity	up to 550 m ³ /h
Head	up to 1400 m
Design pressure	up to 140 bar
Speed	up to 3000 rpm
Temperature limits	from -140 °C up to 160 °C

Materials

	S-1	S-5	S-6	C-6	A-8	D-1	D-2
Inlet/Outlet casing	Carbon steel	Carbon steel	Carbon steel	12 % Chromium steel	316AUS	Duplex	Super duplex
Jacket casing	Carbon steel	Carbon steel	Carbon steel	12 % Chromium steel	316AUS	Duplex	Super duplex
Internal casing parts	Cast iron	Carbon steel	12 % Chromium steel	12 % Chromium steel	316AUS	Duplex	Super duplex
Shaft	12 % Chromium steel	Duplex	Duplex	Super duplex			
Bearing housing	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel
Impeller	Cast iron	12 % Chromium steel	12 % Chromium steel	12 % Chromium steel	316AUS	Duplex	Super duplex
Suction Impeller	12 % Chromium steel	316AUS	Duplex	Super duplex			

Materials according to API, NORSOK, NACE and special alloys are available.



HPTV Version

Design

- solid lantern design for maximum run smoothness
- very low vibration values

Bearings

- oil-lubricated anti-friction bearings or combined axial-radial plain bearings
- forced oil lubrication and bearing cooling possible

Axial thrust compensation

- axial thrust compensation by balancing piston or double piston

Flanges

- ASME or DIN EN

Hydraulics

- various hydraulics per type size
- best adaptation to customer's requirements ensured

Wear and split rings

- replaceable wear rings
- clearances according to API 610
- different material options and coatings possible
- PEEK version with reduced clearances

Shaft

- one-piece shafts up to 3.5 m in length
- on higher suspension depths shafts consisting of several parts with intermediate coupling

Suction stage

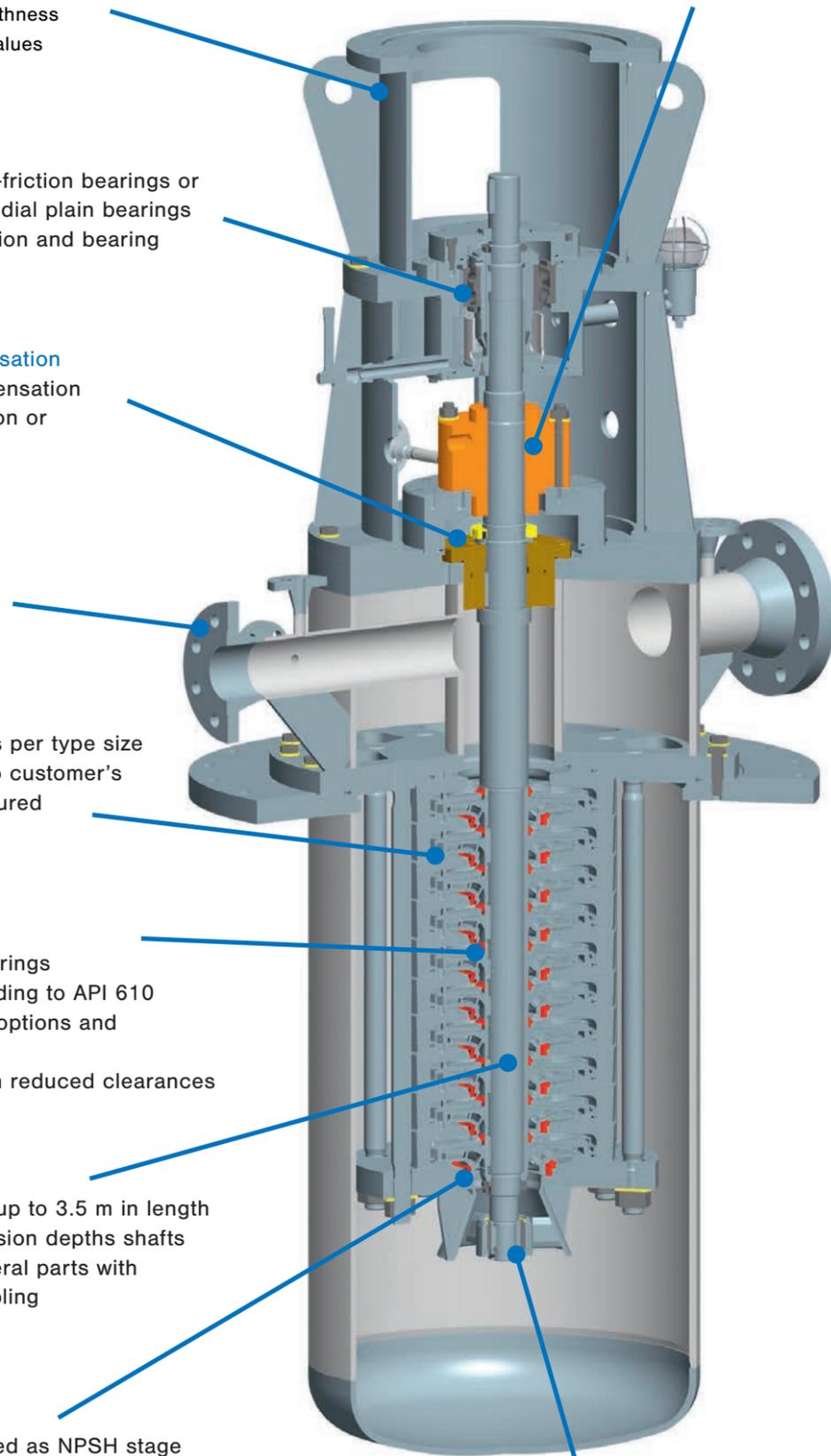
- first stage designed as NPSH stage for lowest NPSH values
- suction impeller as single-flow or double-flow impeller or with inducer

Seal chamber

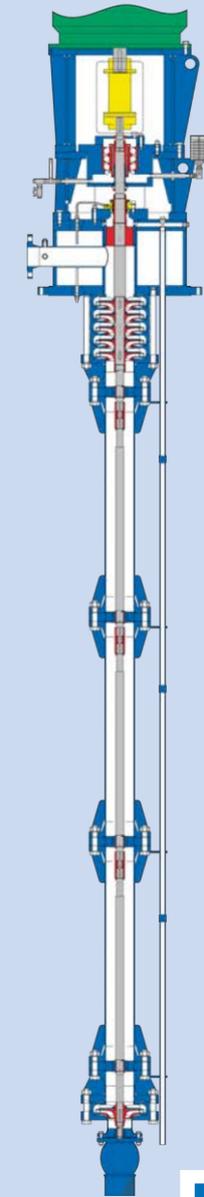
- separate sealing chamber acc. to API 610
- installation of various mechanical seals possible
- all API piping plans are possible
- version with gland packing available

Bearing

- liquid-lubricated plain bearing
- plain bearing materials adapted to process requirements



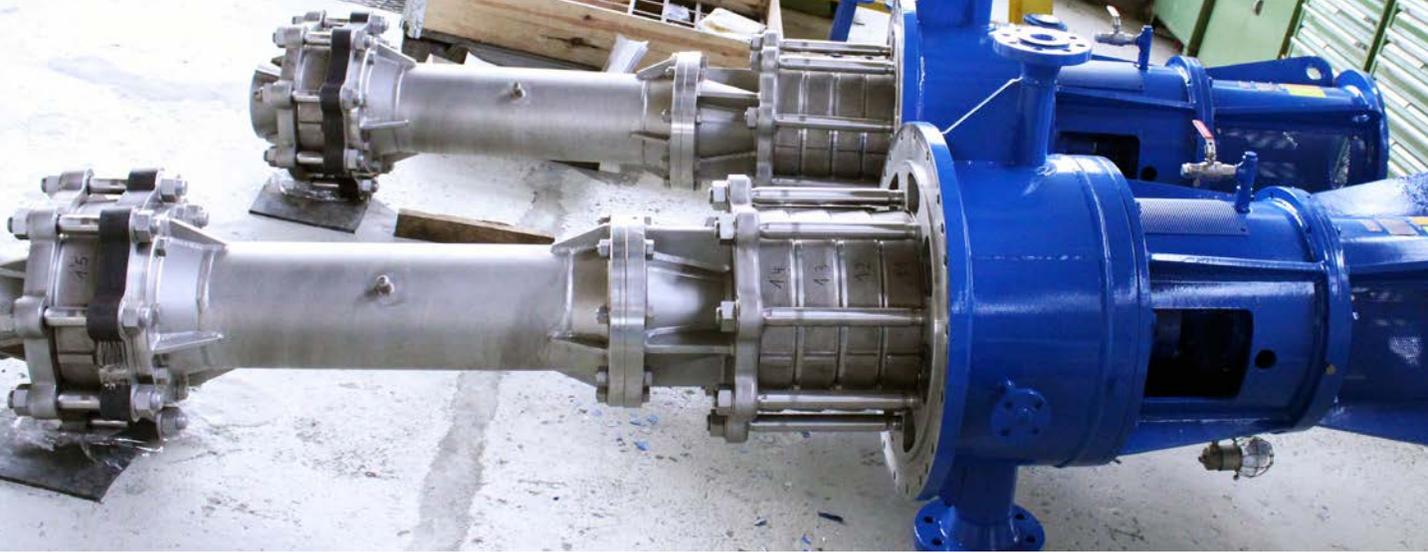
■ HPV - VS1 Version



■ HPVX version

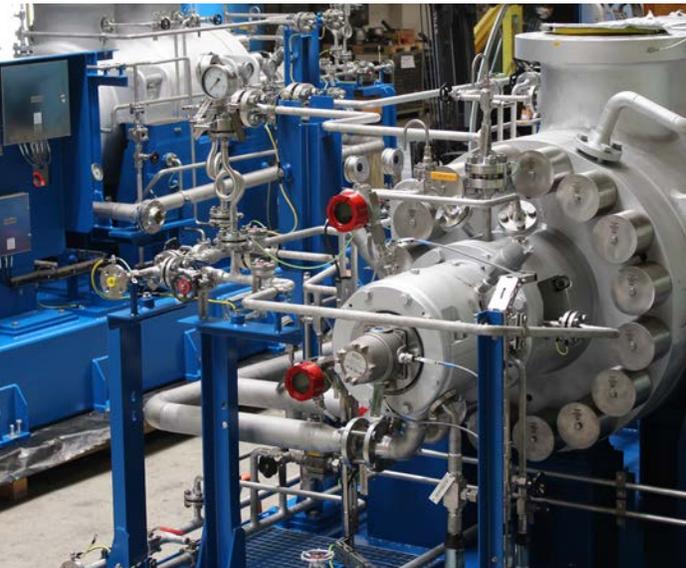
Performance range





Since more than 100 years APOLLO in Goessnitz has been developing and producing pumps for different applications with most different operating principles.

In continuation of this history Apollo has developed to a Manufacturer of high quality heavy-duty Process Pumps – especially according to API 610 Standard.



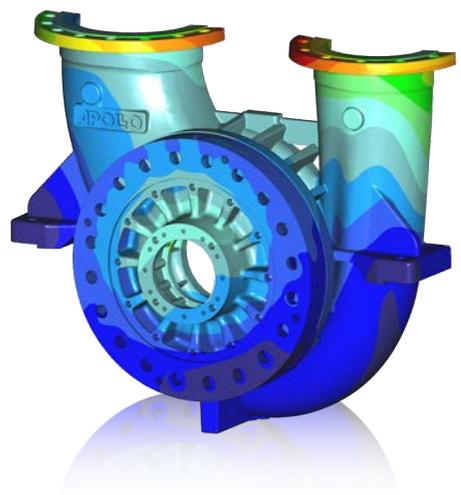
20 years ago, the business Division „System Engineering & System Technology“ was founded. With this division we can offer our Customers complete solutions from a single source. Apollo has high-killed Personnel for Pumps and Pumping Systems up to Specialists for Electrical and Control Engineering. By taking advantage of these synergies, of short lines of communication, of optimized process

chains and of high Flexibility of our company, we provide our Customers with best support in solving their problems and tasks worldwide.

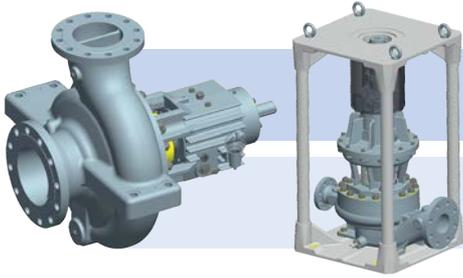
Our production methods and systems meet the highest level of quality and allow the implementation of orders according to different standards and regulations.

The Quality Assurance in all areas of the company, including suppliers and cooperation partners, is the top priority and is consistently implemented. The most up-to-date test fields provide realistic test conditions.

Today we develop and manufacture with the most modern methods – from the hydraulic design over to 3D CAD design and engineering, FEM calculation to the casting patterns and parts manufacture via CAD -CAM Interfaces.

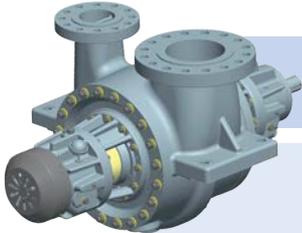


PROCESS PUMPS | API 610



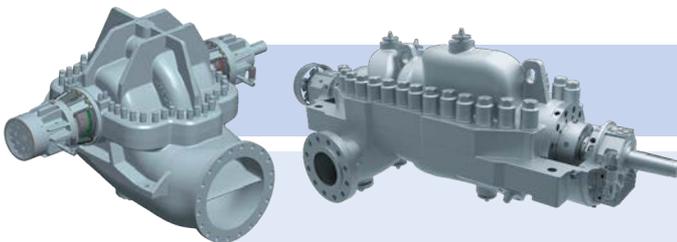
Single stage pumps: **OH1, OH2, OH3**

■ KRH ■ KRHA ■ KRHL / KRPO ■ KRP / KRPH ■ KRI / KRIL



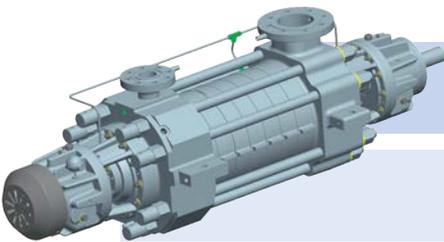
Single and two-stage between bearings pumps: **BB2**

■ ZPR ■ ZPRA ■ KGR / KGRD



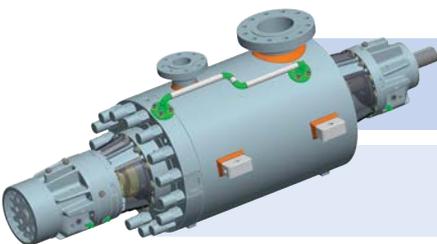
Axial split between bearings pumps: **BB1, BB3**

■ ZMK ■ ZMKV ■ AMG



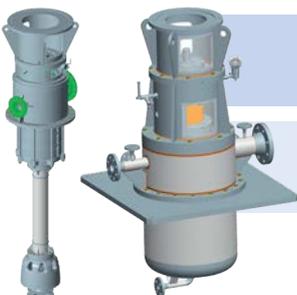
Multistage high-pressure pumps, ring sections type: **BB4**

■ HP ■ GP „back-to-back“ ■ GMHD



Multistage high-pressure barrel pumps: **BB5**

■ TL ■ TG „back-to-back“ ■ TGDX



Single and multistage, vertical pumps: **VS1, VS4, VS6**

■ HPTV ■ HPV ■ HPVX ■ GSTV