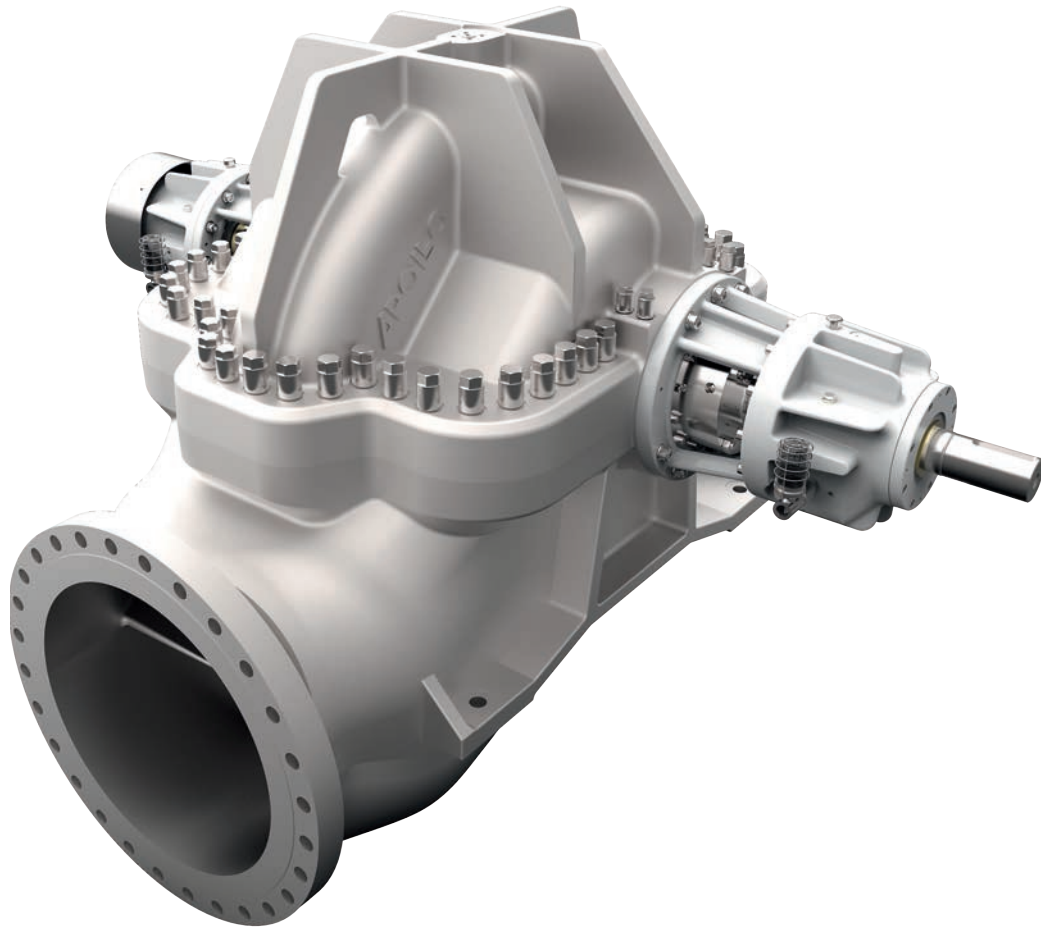


# HEAVY-DUTY, AXIALLY SPLIT, SINGLE-STAGE PROCESS PUMP

BETWEEN BEARINGS VERSION  
API 610 / TYPE BB1

**ZMK**



- Heavy-duty process design for highest reliability
- Low NPSH values and highest efficiency
- Process-safe sealing
- Most simple assembly and maintenance

# Range of Application

Due to heavy-duty between bearings design, lowest NPSH values and highest energy efficiency the pumps of this range are suitable for a variety of applications:

- Power Plants
- Offshore
- Oil and Gas Industry
- Refineries
- Water supply and waste-water disposal

## Design

- Single-stage, axially split heavy-duty process pump, between bearings version
- Thrust compensation by double suction impeller design
- Double-volute design
- Replaceable wear and split rings ensure maximum maintainability
- Flanges according to ASME or DIN EN
- Process-safe sealing under various conditions of application
- Most simple assembly and maintenance, short standstill time due to axially split casing
- Compensation of high nozzle loads by means of casing support near the flanges
- Bearing versions: antifriction bearings with oil ring lubrication, combined bearings or complete sliding bearings

## Shaft Seal

A usage of single and double mechanical seal and stuffing box is possible. Pumps of this version have a standard design with cartridge mechanical seal. Assembly space according to API 610/682.

## Designation

**ZMK – 400/630 – 508/CN**

Type series \_\_\_\_\_  
Size - discharge nozzle \_\_\_\_\_  
Impeller diameter \_\_\_\_\_  
Material version \_\_\_\_\_  
Shaft seal \_\_\_\_\_

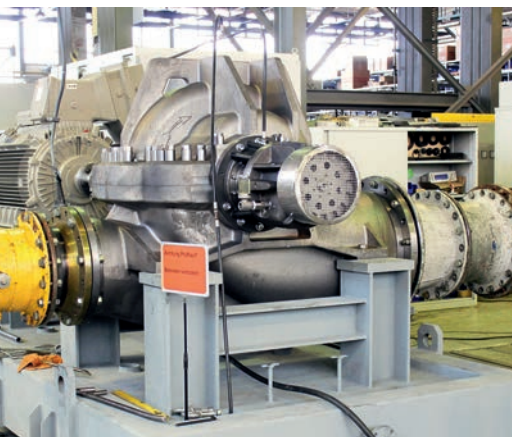
## Operating data

Nozzle size (mm)	200 up to 600
Capacity	up to 10000 m <sup>3</sup> /h
Head	up to 140 m
Pressure design	up to 25 bar
Operating temperature	up to 150 °C

## Materials

	S-1	S-5	S-6	C-6	A-8	D-1	D-2
Casing	Carbon steel	Carbon steel	Carbon steel	12 % Chromium steel	316 AUS	Duplex	Super duplex
Casing of shaft sealing	Carbon steel	Carbon steel	12 % Chromium steel	12 % Chromium steel	316 AUS	Duplex	Super duplex
Impeller	Cast iron	Carbon steel	12 % Chromium steel	12 % Chromium steel	316 AUS	Duplex	Super duplex
Shaft	Carbon steel	12 % Chromium steel	12 % Chromium steel	12 % Chromium steel	Duplex	Duplex	Super duplex
Bearing housing	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel

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



#### Casing of shaft seal

- separate casing for shaft seal ensures
- process-safe sealing in the area, where
- axially split volute casing goes over to mechanical seal

#### Slinging points

- at upper part of casing
- designed for lifting of total pump

#### Hydraulics

- double-flow impeller
- optimized suction chambers for low NPSH values
- various hydraulics versions per casing for optimum adaptation to operating conditions

#### Mechanical seal

- seal according to API 610 / API 682
- all the usual variations of sealings and API piping schemes are possible
- equipped with a cartridge mechanical seal as standard
- stuffing box versions are possible

#### Wear rings and split rings

- replaceable wear and split rings
- different material options and coatings available

#### Solid bearing housing

- 360° mounting for high rigidity
- antifriction bearings as standard / sliding bearings as option
- sump or fan cooling is possible
- metallic bearing seals (bearing isolators)
- connections for various instruments available

#### Flanges

- ASME or DIN EN
- version: Class 300

#### Volute casing

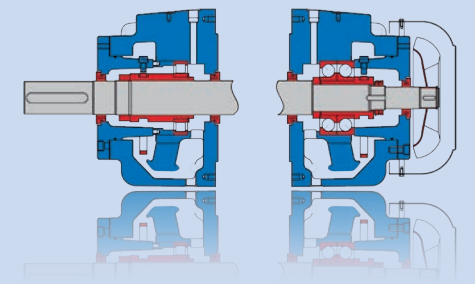
- double volute as standard
- robust casing feet at centre of flanges for compensation of high nozzle loads
- 2x API nozzle loads

#### Venting - Drainage

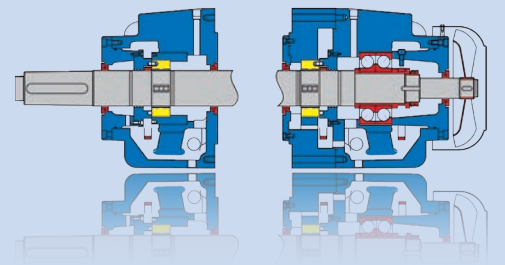
- via integral flanges
- welding on casing not necessary

#### Casing seal

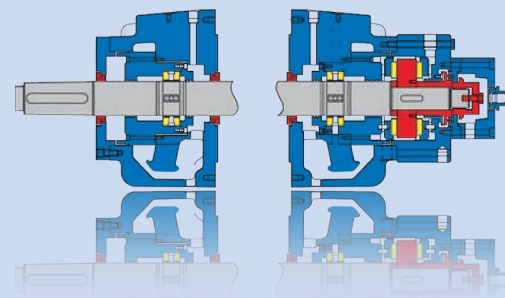
- process-safe seal also under critical conditions



■ Antifriction bearings with oil-ring lubrication

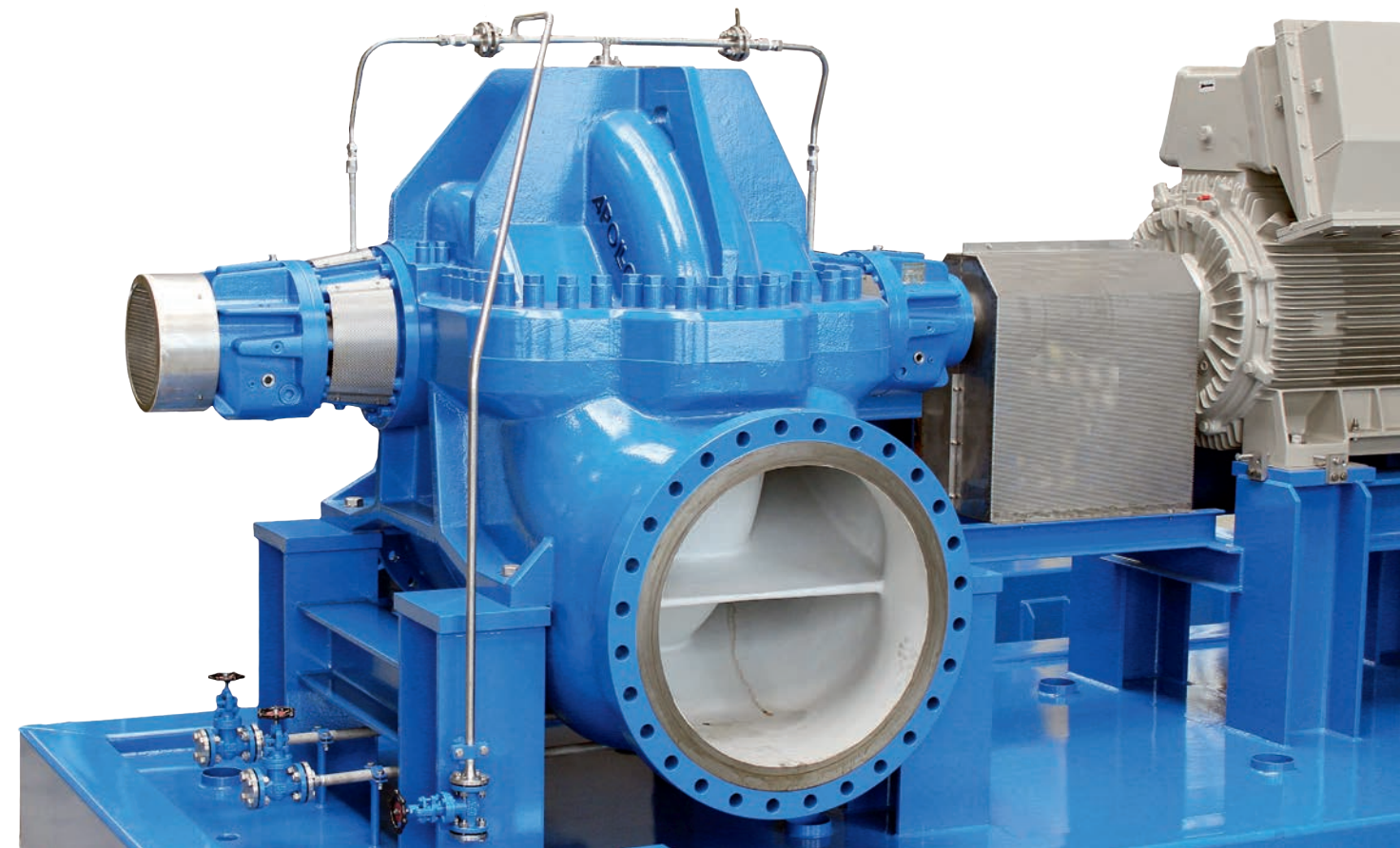
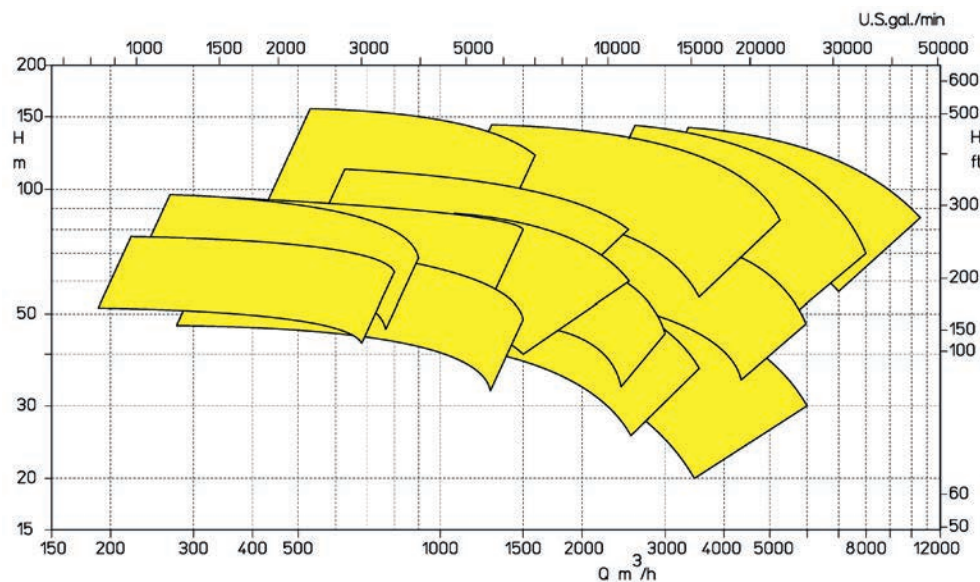


■ Mixed bearings: radial sliding bearings, axial antifriction bearings with oil-ring lubrication



■ Sliding bearings axial, radial with forced oil lubrication

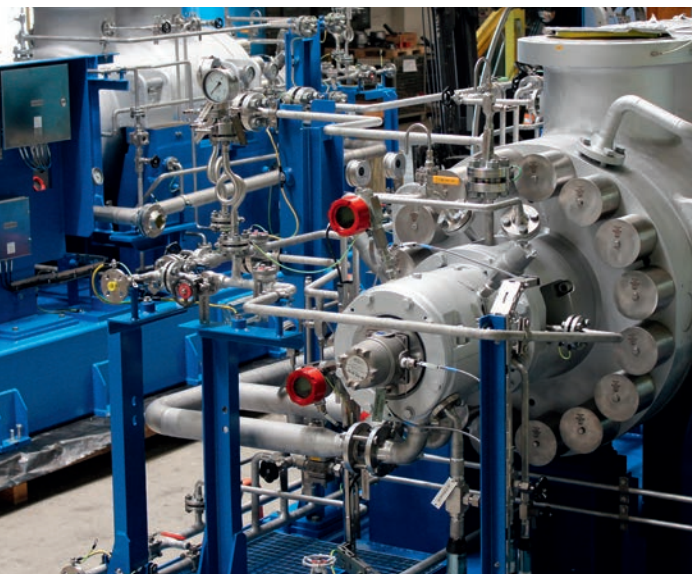
### Performance range





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-skilled 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

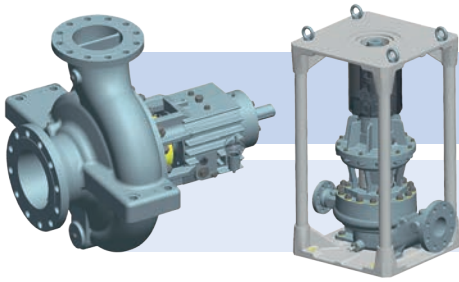
and of high Flexibility of our company, we provide our Customers with best support in solving their problems and tasks worldwide.

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.

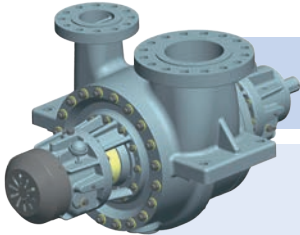


# PROCESS PUMPS | API 610



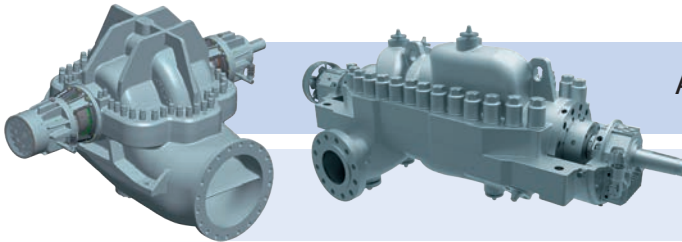
Single stage pumps: **OH1, OH2, OH3**

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



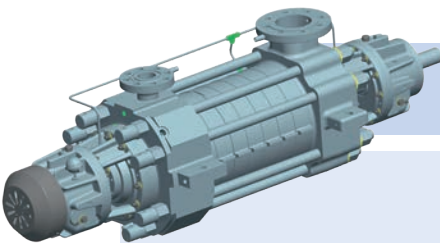
Single and two-stage between bearings pumps: **BB2**

■ ZPR ■ ZPRA ■ KGR / KGRD



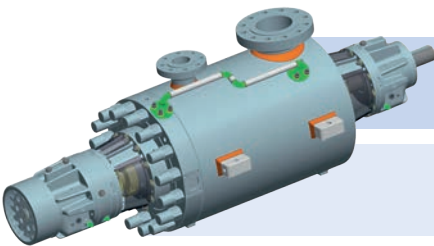
Axial split between bearings pumps: **BB1, BB3**

■ ZMK ■ ZMKV ■ AMG



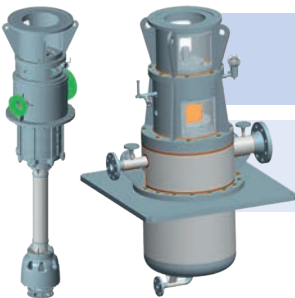
Multistage high-pressure pumps, ring sections type: **BB4**

■ 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