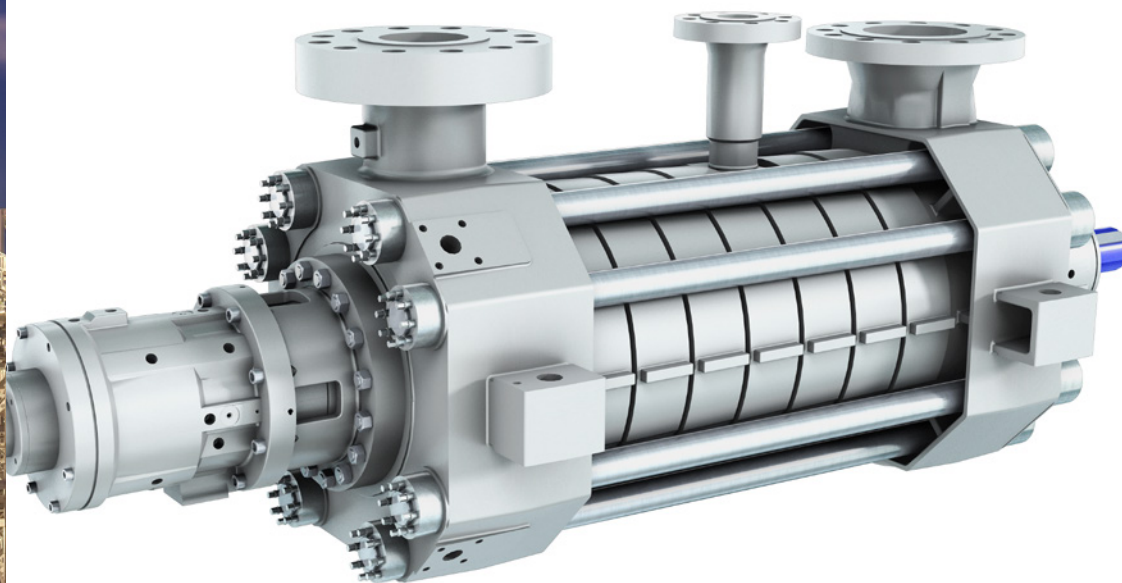


Flow Equipment

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## MD high pressure stage casing pump



# Main industries and applications

The MD pumps are suitable for pumping clean or slightly polluted, hot or cold water. They have been specifically designed for applications such as:

- Main boiler feed in captive, independent, combined-cycle, concentrated solar, biomass and industrial power plants
- Start-up boiler feed in utility thermal power plant
- High pressure water in the general industry



# Features and benefits

## 1 Casing support

- Centerline mounting absorbs high forces and moments
- Pre-warming not required

## 2 Impeller

- Several hydraulic sets per pump size guarantee high efficiencies and low operating costs over a wide operating range

## 3 Shaft

- Transmits the required torque and minimizes deflection

## 4 Rotor design

- Stacked rotor with staggered keyways to transmit torque

## 5 Intermediate take-off

- Reduces head losses; large take-off flow is available on certain sizes

## 6 Balance drum

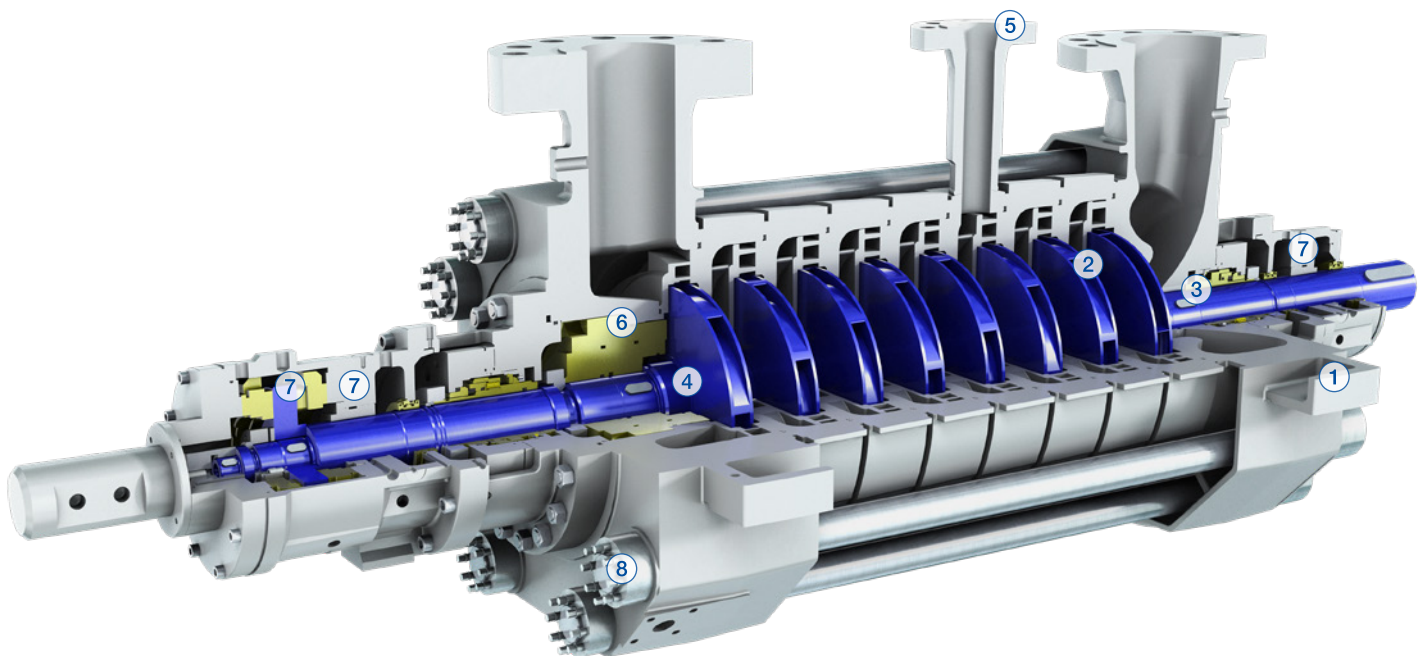
- Balance drum and axial thrust bearing designed for long life under extreme operating conditions

## 7 Bearings and lubrication

- Sleeve radial and tilting pad thrust bearings are optional for high power and thrust duties
- External lube oil supply can be provided for high power and thrust duties

## 8 Discharge casing and nuts

- Mechanical tensioners allow simple tightening and loosening and provide high security against loosening (no special tooling required)
- High pressure version available up to 350 bar MAWP (5 080 psi) and able to accept downward thermal transients



# Specifications

## Materials

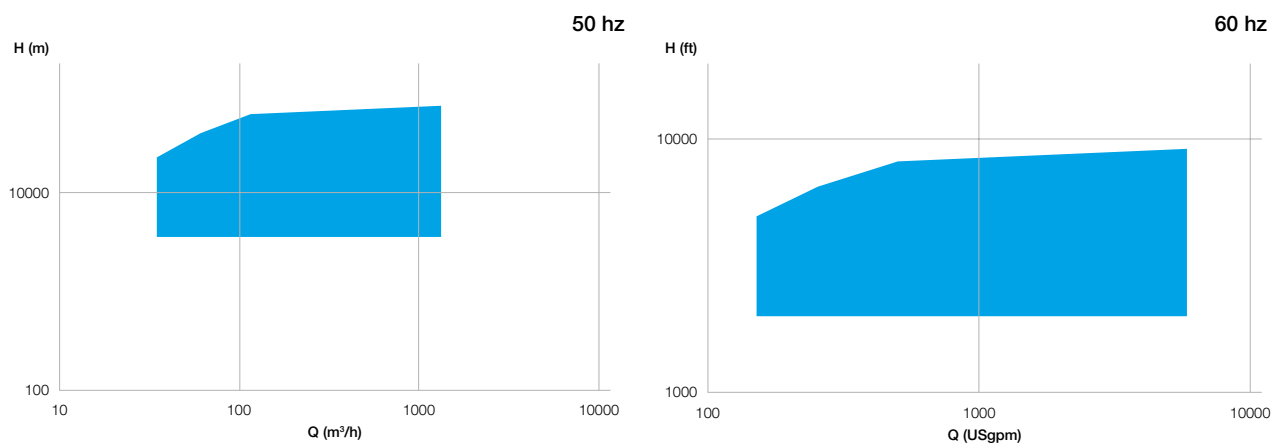
Pump part	Material
Suction, stage and discharge casings	Chrome steel
Impellers and diffusers	Chrome steel
Shaft	Chrome steel
Balancing system	Chrome steel

## Operating data

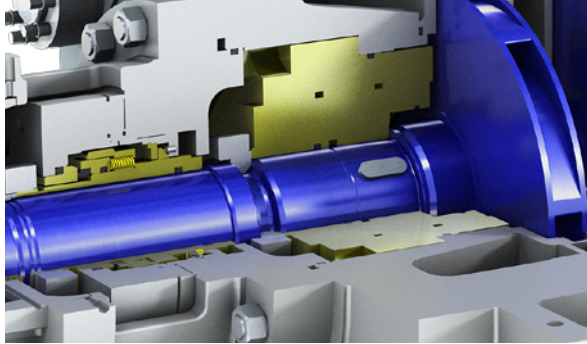
	50 Hz	60 Hz
Pump sizes	up to 200 mm	up to 8 in.
Capacities	up to 1'200 m <sup>3</sup> /h	up to 5'300 USgpm
Heads	up to 2'800 m	up to 9'200 ft.
Suction pressures	up to 50 bar	up to 725 psi
Discharge pressures	up to 350 bar	up to 5'080 psi
Temperatures	up to 210°C	up to 410°F

Higher temperatures upon request

## Performance range



# Alternative thrust bearing arrangements



## Non-Drive End (NDE) bearing arrangement with balance drum

The balance drum device carries the major proportion of the hydraulic thrust. The drum diameters are chosen to minimize the thrust at normal operating point. The residual and additional thrust loads occurring above/below the normal operating point are carried by the thrust bearing, typically a tilting pad.

The balance drum is suitable for:

- Long life under extreme operating conditions
- Frequent start-stop applications thanks to nearly wear-free device

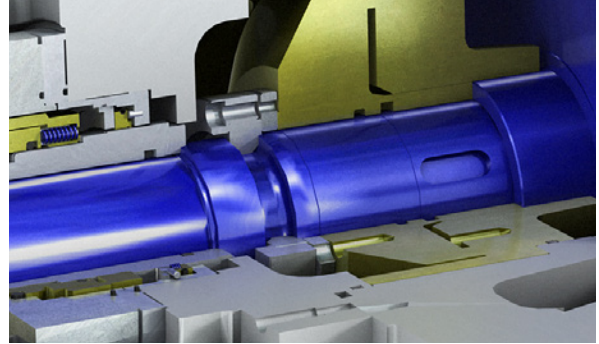
## Mechanical or magnetic (Permavor) lift-off devices

Advantages:

- Prevent touching and wearing of disc/ counter disc operation at low speed such as start-up and shut-down
- Self-controlling passive systems
- Reduce load on balance disc under normal operation
- Offer long service life

## High pressure design

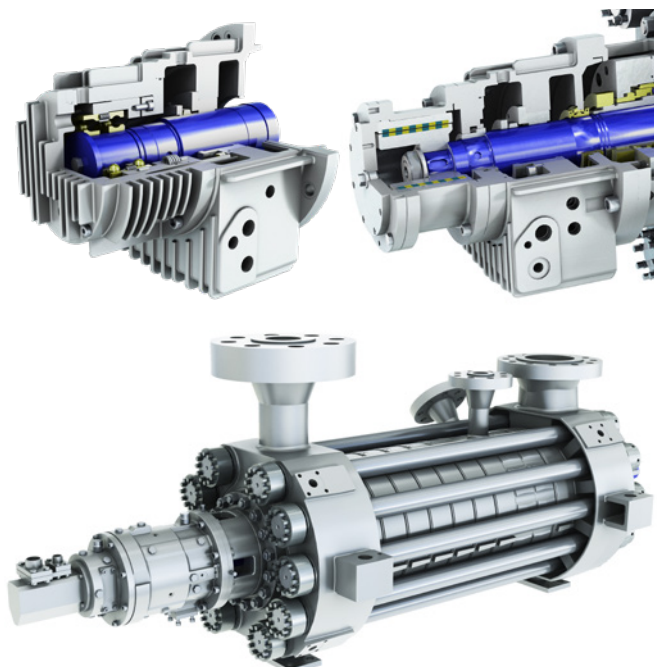
- Design pressure (MAWP) up to 350 bar
- Extended flow and head range suitable to meet the requirements in the steam-water cycle of latest developments of heavy duty high output gas turbines
- Advanced design to accommodate steep thermal transient conditions (upwards and downwards)

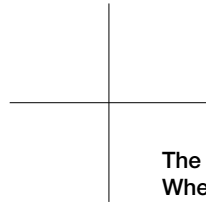


## NDE bearing arrangement with balance disc

With a balance disc, the axial force is completely compensated, therefore no axial thrust bearing is required. The disc designs are optimized for each hydraulic and size.

For operation with frequent start and stops, the installation of a lift-off device is available (either mechanical or magnetic).





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