



Engineering Flow Solutions

## PROCESS PUMPS AND SYSTEMS IN ACCORDANCE WITH API 610



- OIL & GAS PRODUCTION INCLUDING OFFSHORE PLATFORMS
- OIL & GAS PROCESSING AND PETROCHEMISTRY
- THERMAL ENERGY



**HMS Group is a major diversified corporation affiliating large engineering and manufacturing companies in production of pumps, compressors, modular and skid-mounted process equipment as well as integrated solutions for oil & gas, nuclear & thermal energy, water & utilities.**

### KEY FACTS AND FIGURES

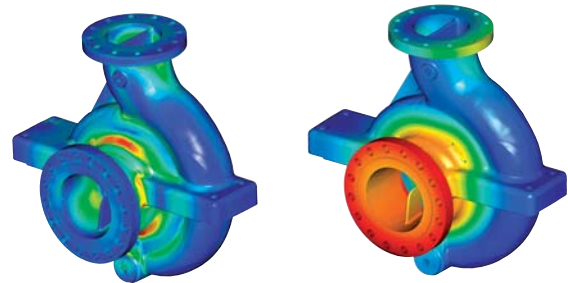
- Year of foundation: 1993
- One of the leaders in Russia and CIS in production of pumps, compressors, and skid-mounted equipment for oil & gas
- Manufacturing facilities in Russia, Ukraine, Belarus and Germany
- Over 16 500 employees

HMS Group has significant experience in engineering, manufacturing, and supplies of the integrated solutions based on the pumping equipment for production, transportation and refining of oil, petroleum products, and gas condensate.

The products are developed using contemporary engineering methods including CFD software for continuous hydraulic design: SolidWorks, ANSYS CFX and other 3D-CAD/CAM software platforms.

High quality and short lead time are ensured by the production facilities with the modern manufacturing equipment:

- Processing centers and NC machine tools by Schiess, Skoda, Doosan, Demag, and the other manufacturers
- Modern machining and assembly centers
- Four large foundries with up-to-date molding lines and induction furnaces made in Great Britain, Germany, and Turkey.



FEM analysis of the KRH type volute casing heavy duty process pump



Processing center by Doosan



Processing center by Schiess



GSTV pump is being prepared for shipment

The pumping systems parameters are confirmed at the unique testing facilities providing the in-situ test conditions of up to 25 000 m<sup>3</sup>/h capacity range and up to 14 MW drive power.



14 MW test stand

One of the main tasks is a quality assurance at every stage of manufacturing. The Quality Management System at every manufacturing facility corresponds to ISO 9001 requirements.

HMS Group is able to supply its standard pumps and pumping systems as well as provide the integrated solutions developed under specific customer requirements.

The customer is provided with a full range of related services for the pump skids and systems including installation and commissioning, maintenance, repair, supply of original spare parts, integrated retrofit, and technical support.

The pumps and pumping systems presented in the catalogue are produced at the major pump manufacturing plant – APOLLO Goessnitz (Germany).

The pumps by APOLLO Goessnitz are successfully operated at many objects of energy complex including offshore oil and gas production platforms in Russia, Europe, Middle East, and Africa.

The equipment is predominantly characterized by its high reliability, productivity and manufacturability. Its design and construction materials correspond to the main international and industry standards: ISO, API, DIN, ANSI, NORSOK.



High-quality and timely service

# HORIZONTAL, SINGLE-STAGE, RADIALLY SPLIT, HEAVY-DUTY PROCESS PUMPS

**KRH, KRHA**  
API 610, Type OH2

## RANGE OF APPLICATION

- Offshore
- Refineries
- Petrochemical plants
- High-temperature applications
- Power plant engineering

## DESIGN FEATURES

- Pump meets all requirements of API 610
- Horizontal, single-stage, radially split, heavy-duty design
- Axial suction nozzle, radial discharge nozzle
- Center-supported
- Back pull-out version
- Design with inducer

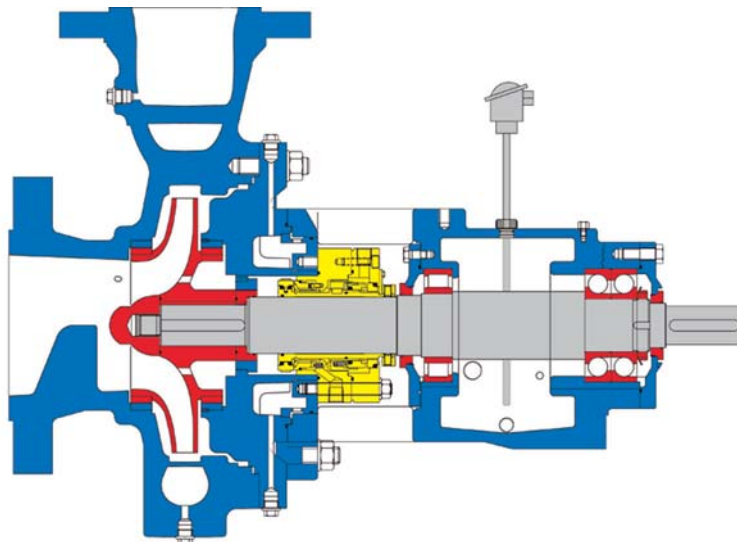
## MATERIALS

- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Titanium
- Special alloys according to NORSOK, NACE

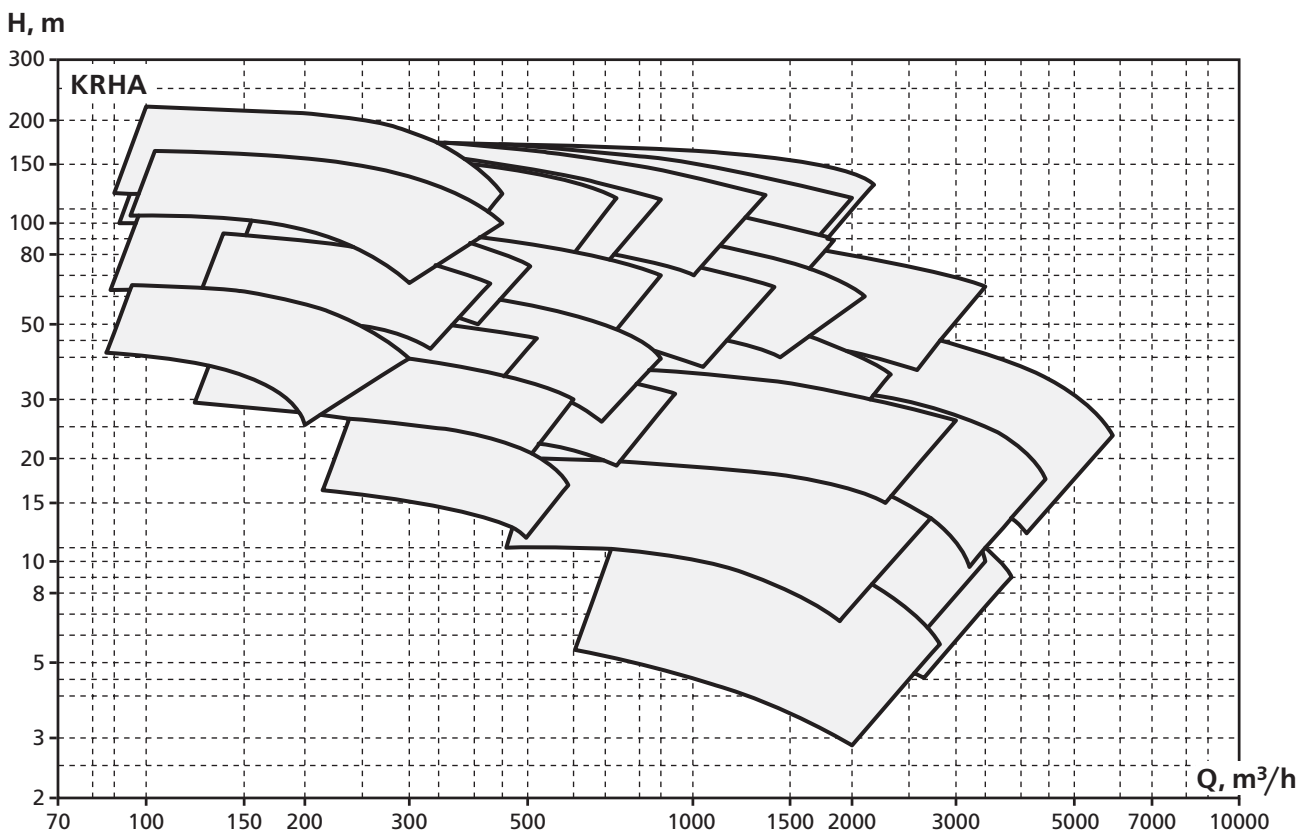
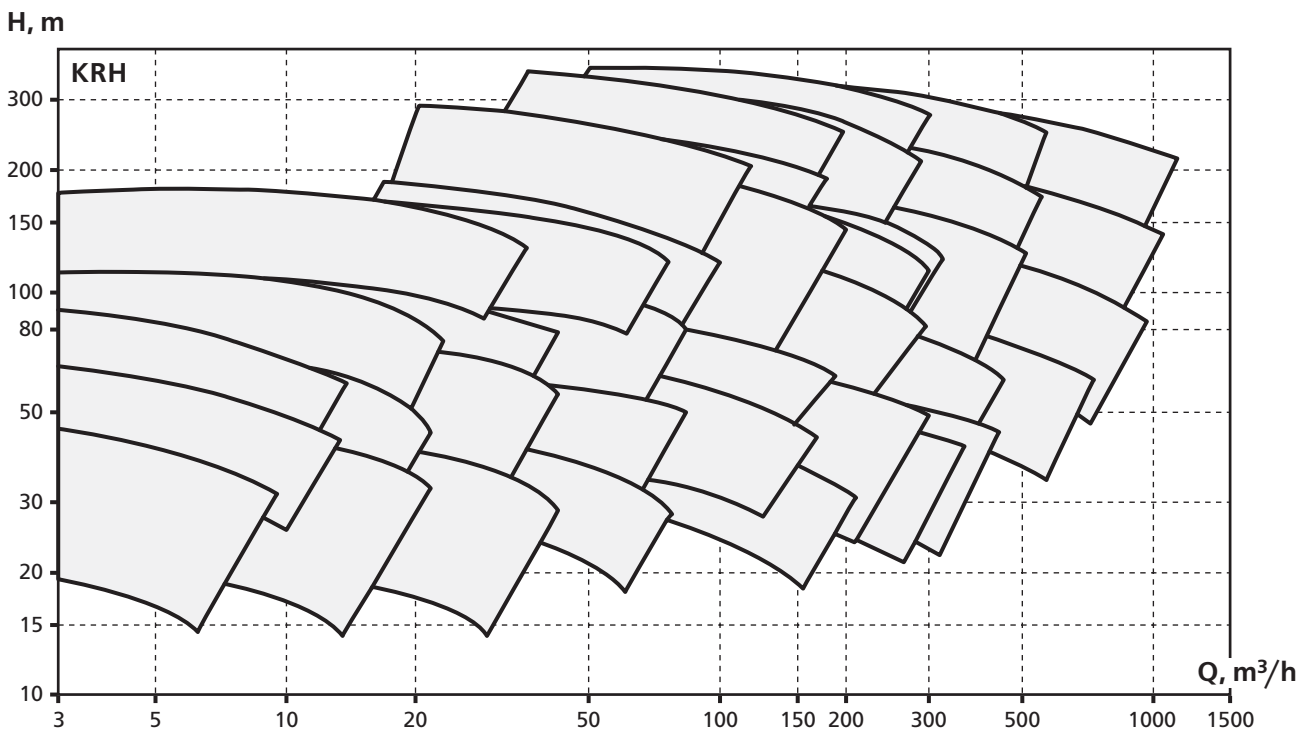


## OPERATING DATA

	KRH	KRHA
Capacity, m <sup>3</sup> /h	1000	5000
Head, m	320	220
Pressure, bar	55 / 90	55
Temperature, °C	+450	+450



PERFORMANCE CURVES



# HORIZONTAL, SINGLE-/TWO-STAGE PROCESS PUMPS WITH SEMIOPEN IMPELLER

# KRHL, KRPO, KGHL API 610, Type OH2

## RANGE OF APPLICATION

- Offshore
- Refineries
- Petrochemical plants
- High-temperature applications
- Power plant engineering

## DESIGN FEATURES

- Pump meets all requirements of API 610
- Horizontal, single-stage, radially split, heavy-duty design
- One-flow, normal priming ring-section pump; two-stage KGHL version
- Semiopen impeller with straight vanes
- Optionally: replaceable wear plate and inducer
- Antifriction bearings with oil lubrication

## MATERIALS

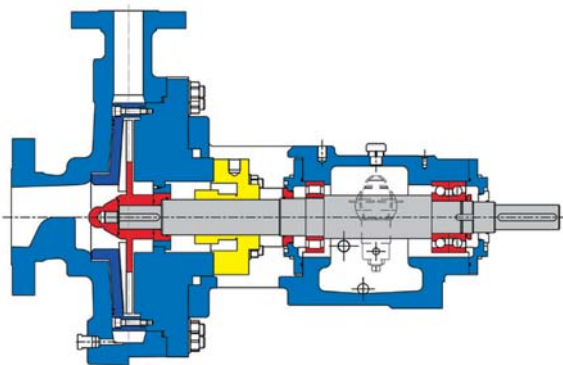
- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Titanium
- Special alloys according to NORSOK, NACE



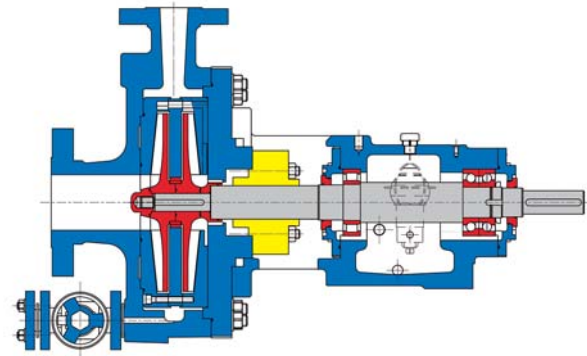
## OPERATING DATA

	KRHL	KRPO	KGHL
Capacity, m <sup>3</sup> /h	45	25	45
Head, m	270	210	350
Pressure, bar	50	50	50
Temperature, °C	+450	+450	+450

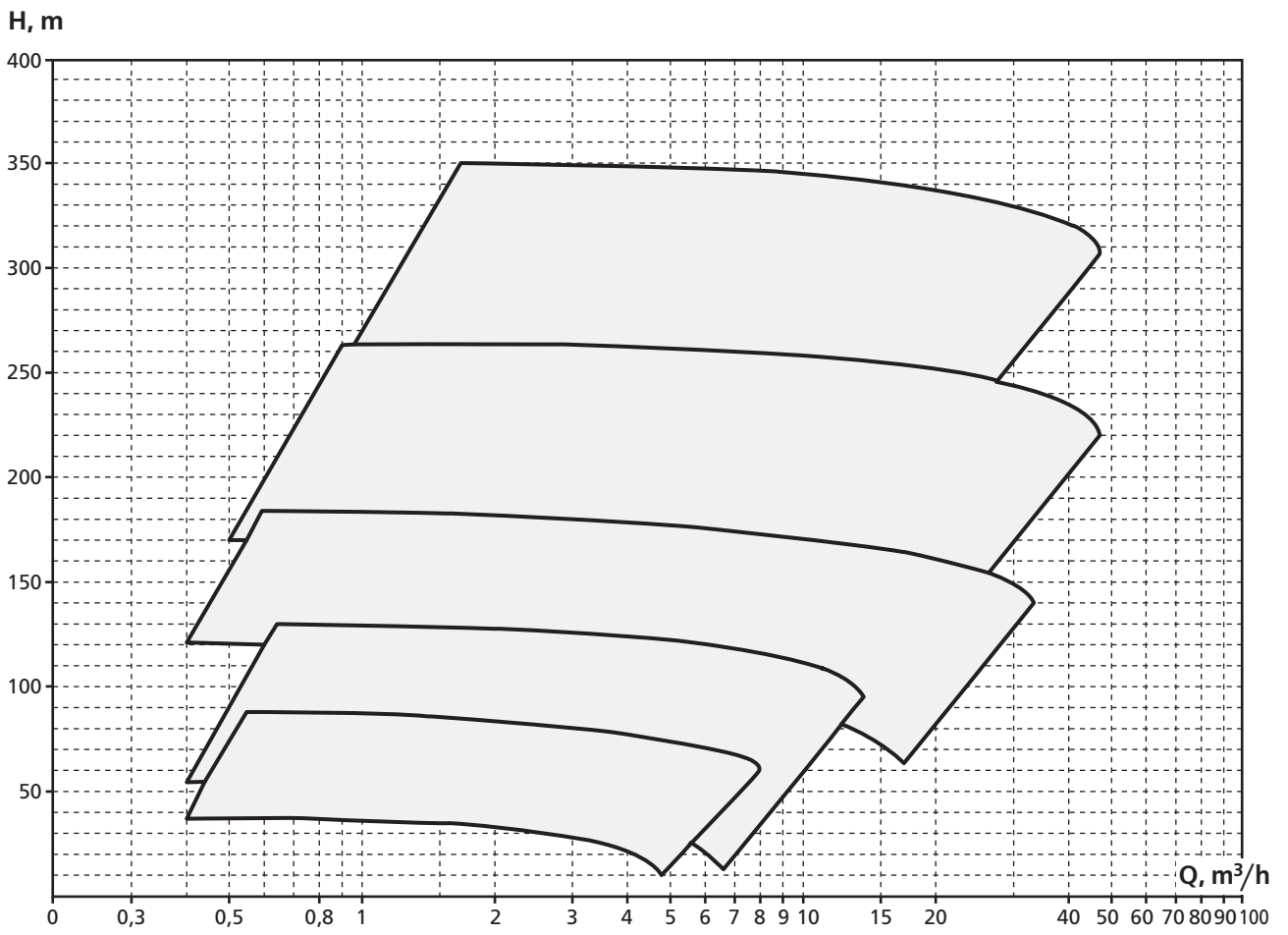
KRHL, KRPO



KGHL



PERFORMANCE CURVES



# VERTICAL, SINGLE-STAGE, RADIALLY SPLIT PROCESS PUMP, IN-LINE VERSION

**KRI, KRIL**  
API 610, Type OH3

## RANGE OF APPLICATION

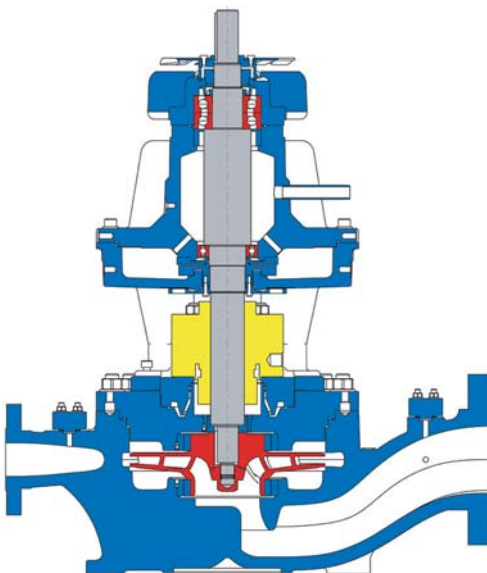
- Offshore
- Refineries
- Petrochemical plants
- Gas processing plants
- Power plants

## DESIGN FEATURES

- Pump meets all requirements of API 610
- Vertical, normal priming, single-stage pump of process design
- Discharge and suction nozzles are in-line arranged
- KRIL is a low capacity version with grease or oil lubrication

## MATERIALS

- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Titanium
- Special alloys according to NORSOK, NACE

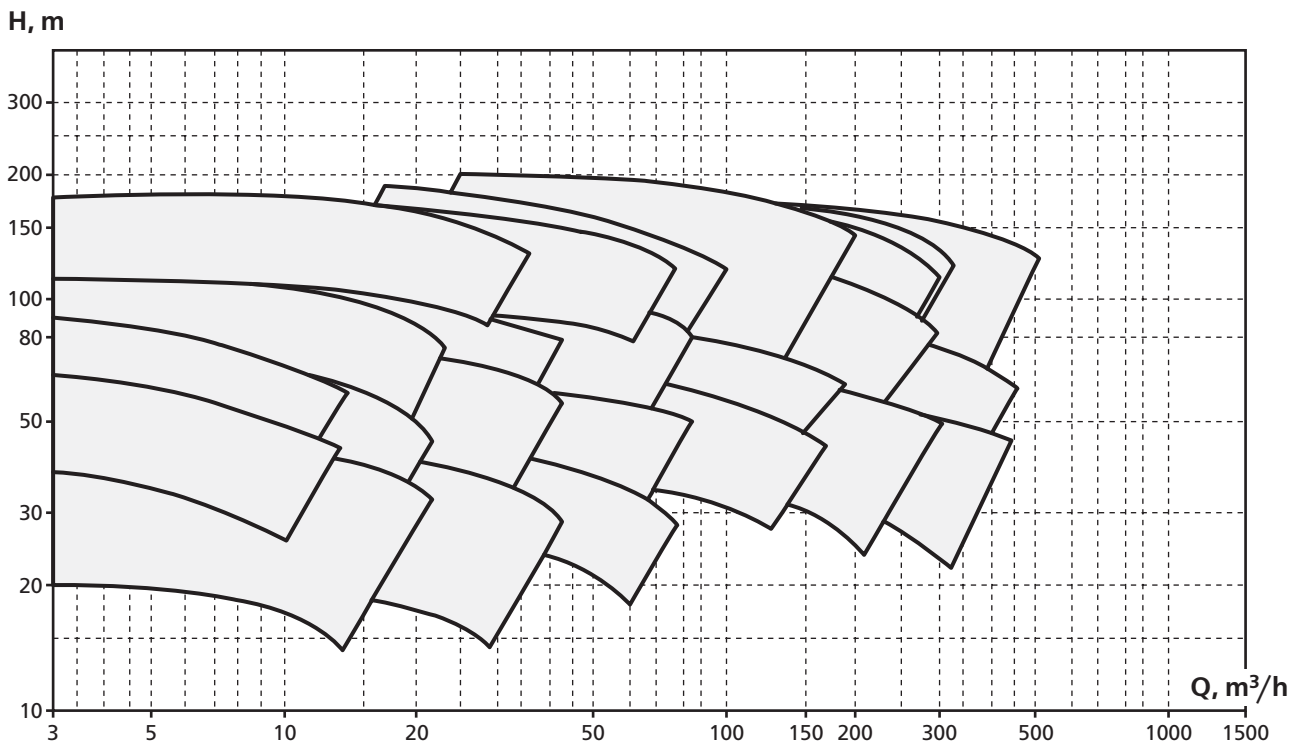


## OPERATING DATA

	KRI	KRIL
Capacity, m <sup>3</sup> /h	600	45
Head, m	320	270
Pressure, bar	55	50
Temperature, °C	+385	+385



## PERFORMANCE CURVES



# HEAVY-DUTY, AXIALLY SPLIT, SINGLE-STAGE PROCESS PUMP, BETWEEN-BEARINGS VERSION

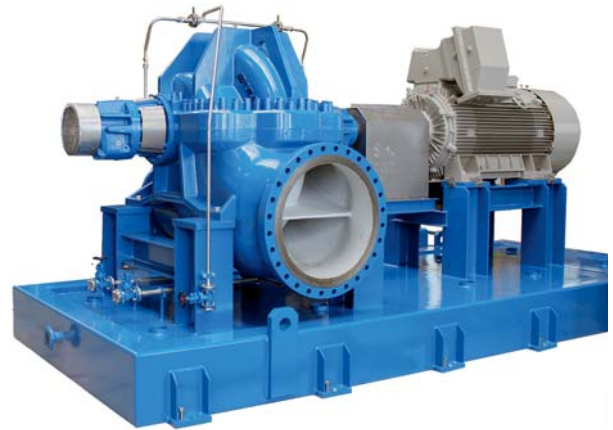
**ZMK, ZMKV**  
API 610, Type BB1

## RANGE OF APPLICATION

- Oil and Gas industry
- Offshore
- Refineries
- Power plant engineering
- Water supply and sewage disposal

## DESIGN FEATURES

- Pump meets all requirements of API 610
- Thrust load compensation by double suction impeller design
- Double-volute casing
- Replaceable wear and split rings ensure maximum maintainability and high operating safety

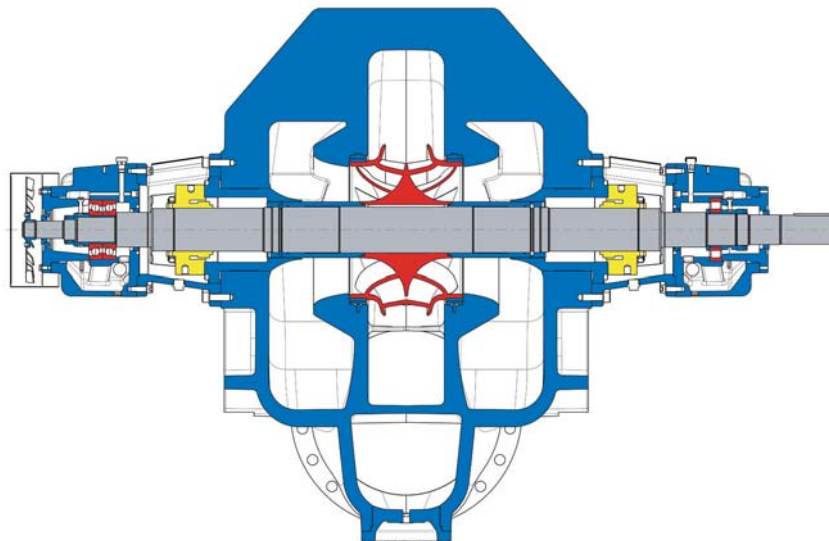


## MATERIALS

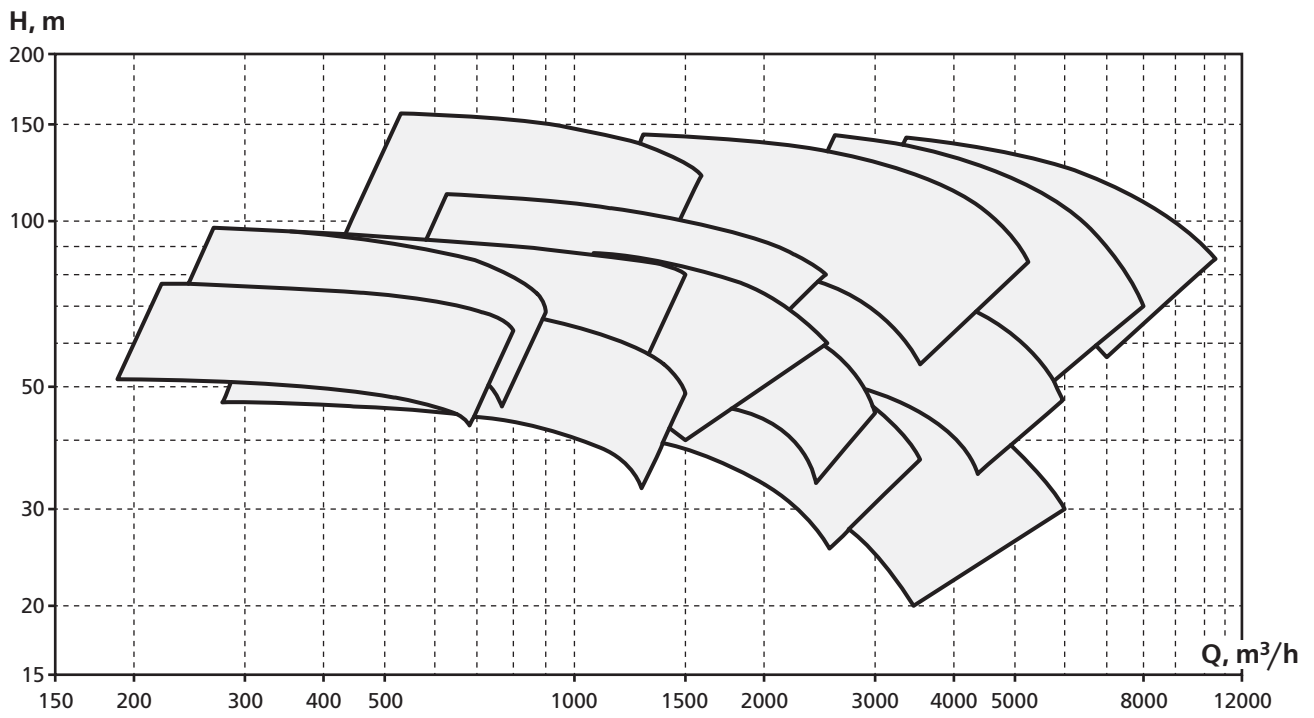
- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Titanium
- Special alloys according to NORSOK, NACE

## OPERATING DATA

	ZMK	ZMKV
Capacity, m <sup>3</sup> /h	10000	5500
Head, m	140	140
Pressure, bar	25 / 40	25 / 40
Temperature, °C	+150	+150



## PERFORMANCE CURVES



# HORIZONTAL, SINGLE-STAGE, DOUBLE SUCTION PROCESS PUMP, BETWEEN-BEARINGS VERSION

**ZPR, ZPRA**  
API 610, Type BB2

### RANGE OF APPLICATION

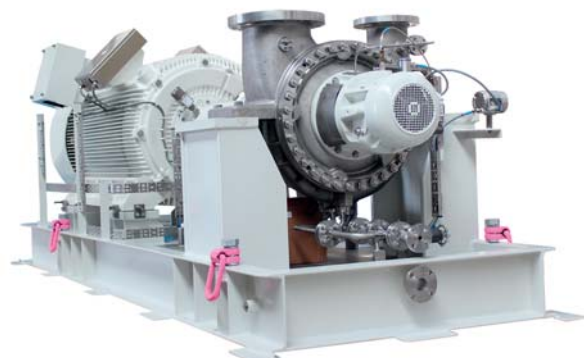
- Offshore
- Refineries
- Petrochemical plants
- Power plants

### DESIGN FEATURES

- Pump meets all requirements of API 610
- Double suction impeller
- Bearings on both sides
- Radially split casing
- Center-supported
- Bearings design: antifriction or slide ones

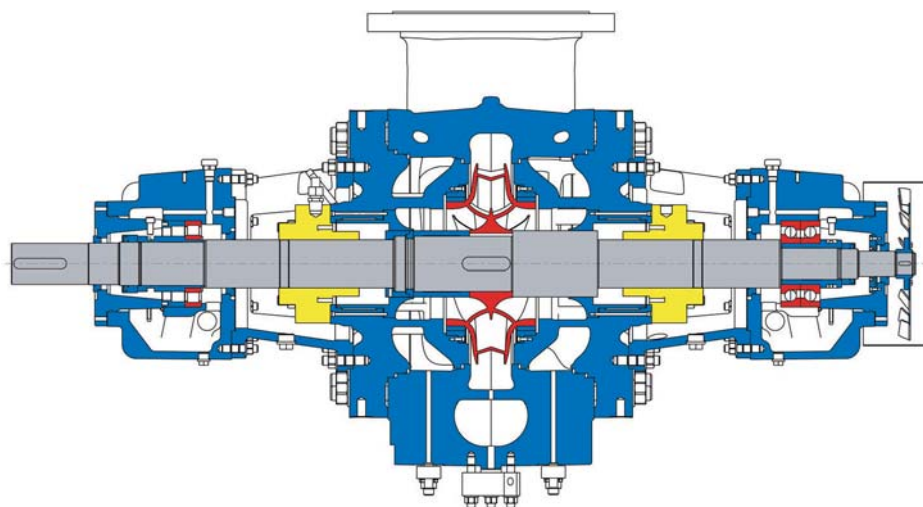
### MATERIALS

- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Titanium
- Special alloys according to NORSOK, NACE

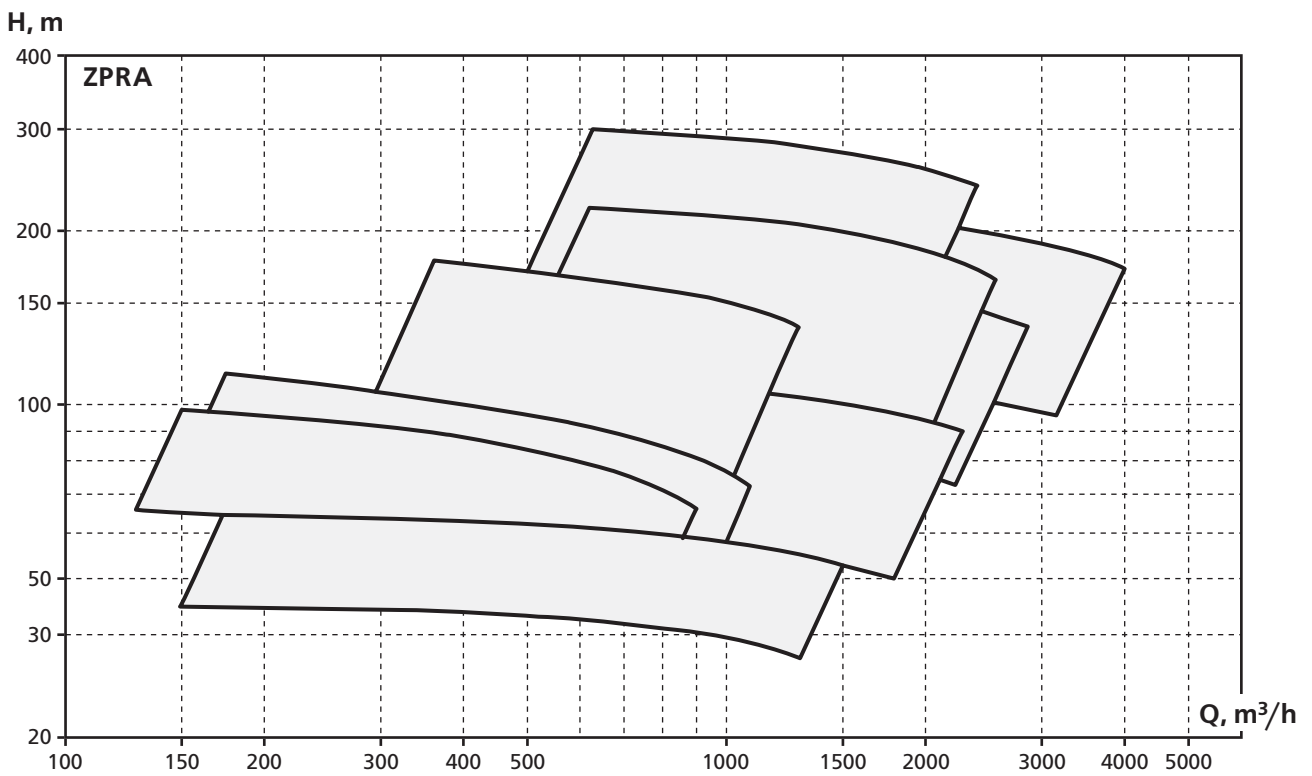
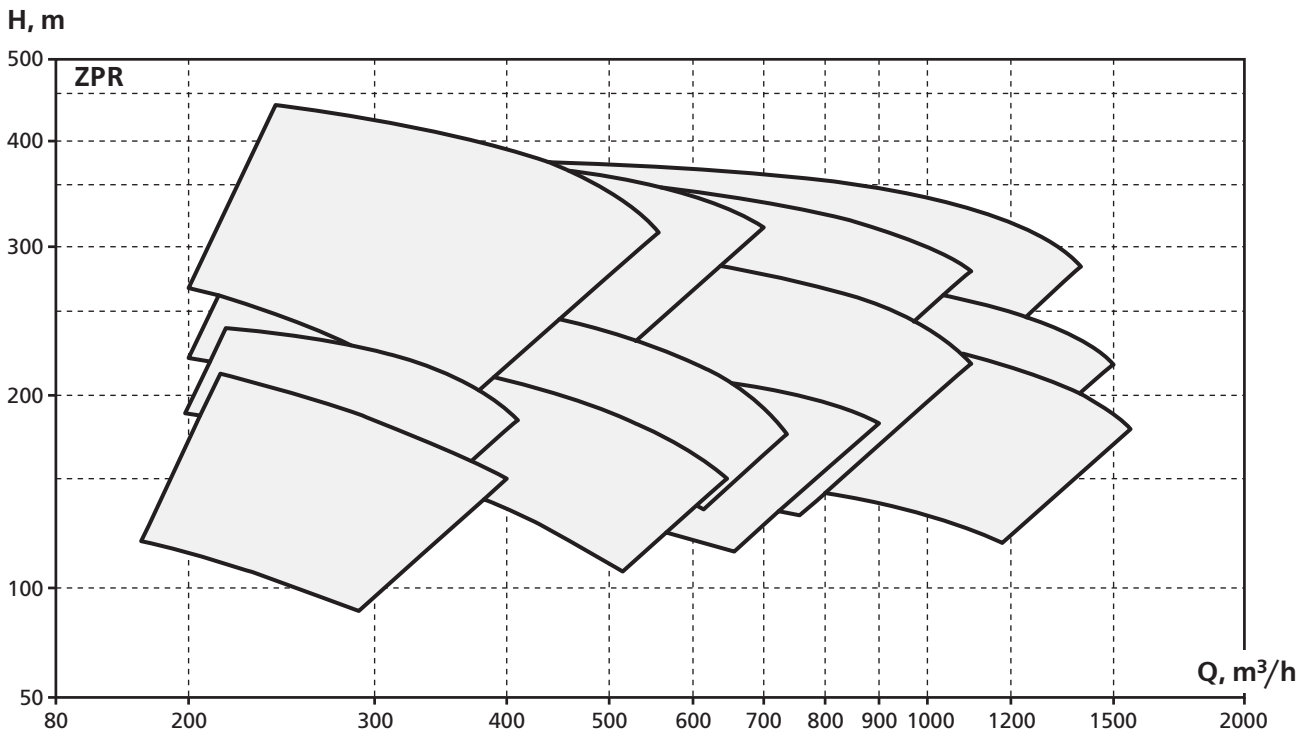


### OPERATING DATA

	ZPR	ZPRA
Capacity, m <sup>3</sup> /h	1500	4000
Head, m	400	300
Pressure, bar	160	55
Temperature, °C	+450	+450



PERFORMANCE CURVES



# HEAVY-DUTY, RADIALY SPLIT, TWO-STAGE PROCESS PUMP, BETWEEN-BEARINGS VERSION

**KGR, KGRD**  
API 610, Type BB2

## RANGE OF APPLICATION

- Offshore
- Refineries
- Petrochemical plants
- Power plants

## DESIGN FEATURES

- Pump meets all requirements of API 610
- Axial thrust compensation by back-to-back arrangement of impellers
- Radially split center-supported casing
- First impeller in single-flow or double-flow version
- Bearings design: antifriction or slide ones

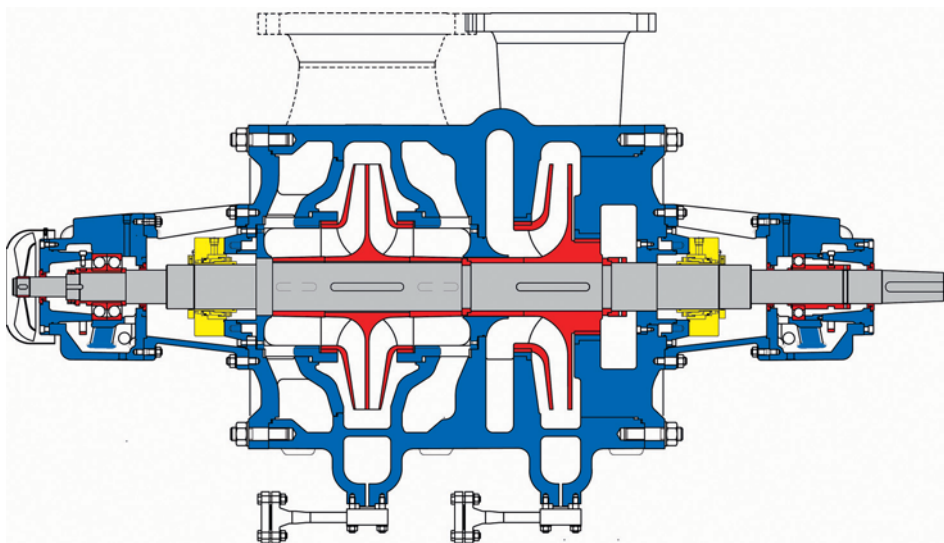
## MATERIALS

- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Titanium
- Special alloys according to NORSOK, NACE

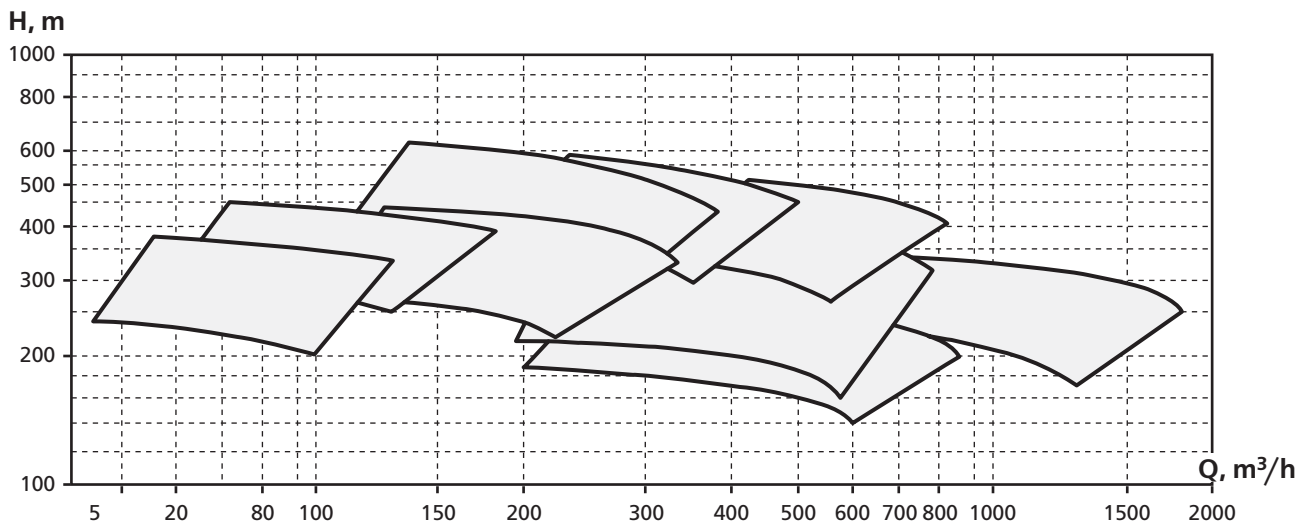


## OPERATING DATA

	KRG / KGRD
Capacity, m <sup>3</sup> /h	1600
Head, m	600
Pressure, bar	80
Temperature, °C	+400



## PERFORMANCE CURVES



# HORIZONTAL, MULTISTAGE, AXIALLY SPLIT HIGH-PRESSURE PUMP, BETWEEN-BEARINGS VERSION

**AMG**  
API 610, Type BB3

## RANGE OF APPLICATION

- Offshore
- Refineries
- Power plants

## DESIGN FEATURES

- Pump meets all requirements of API 610
- Radially split center-supported casing
- Axial thrust compensation by back-to-back arrangement of impellers
- Special NPSH impeller at the first stage
- Bearings design: antifriction or slide ones

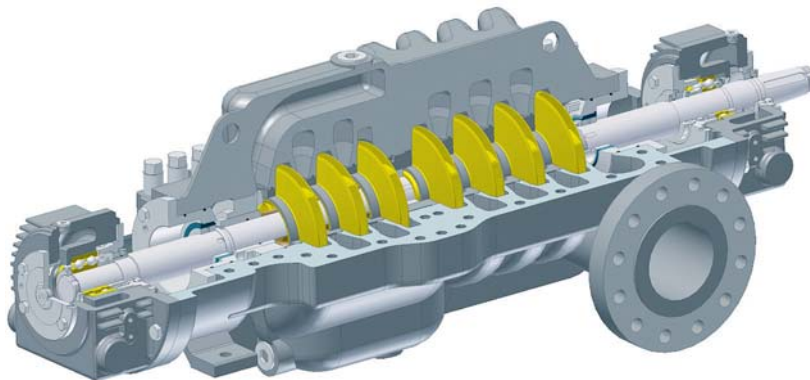
## MATERIALS

- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Special alloys according to NORSOK, NACE



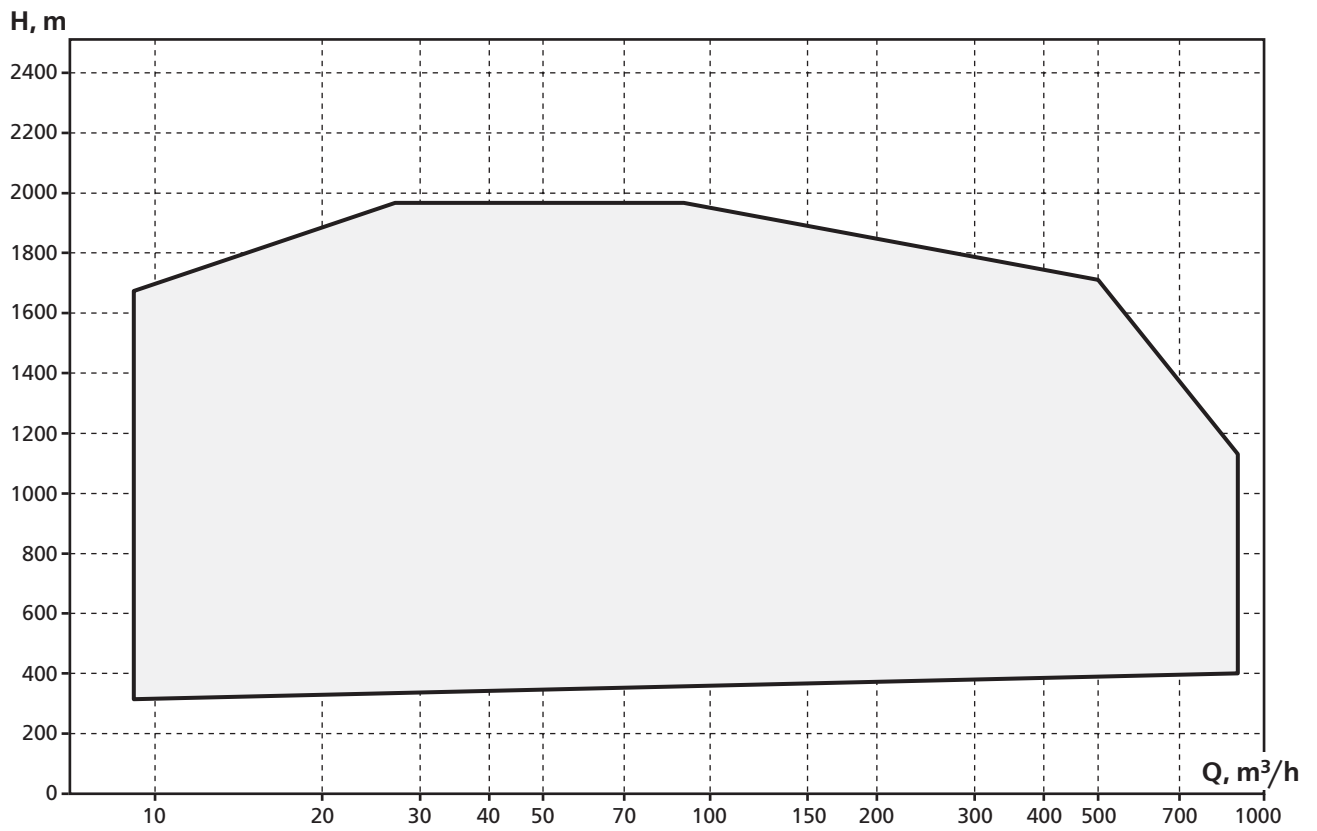
## OPERATING DATA

	AMG
Capacity, m <sup>3</sup> /h	800
Head, m	1600
Pressure, bar	160
Temperature, °C	+200





## PERFORMANCE CURVES



# HORIZONTAL, MULTISTAGE HIGH-PRESSURE PUMP OF RING-SECTION DESIGN

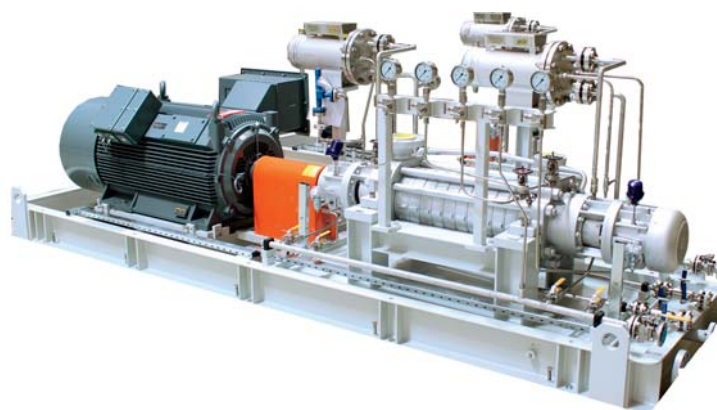
**HP**  
API 610, Type BB4

## RANGE OF APPLICATION

- Refineries
- Power plants
- Pumping of feed water and condensate

## DESIGN FEATURES

- Pump meets all requirements of API 610
- Designed with intermediate take-off and optimized pressure within the pump
- Version with NPSH impeller
- Axial thrust compensation by balance piston, double piston or balance disk
- Low vibration values
- Bearings design: antifriction or slide ones

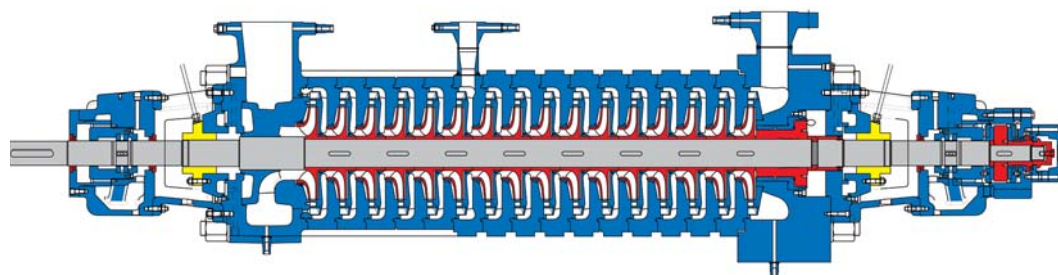


## MATERIALS

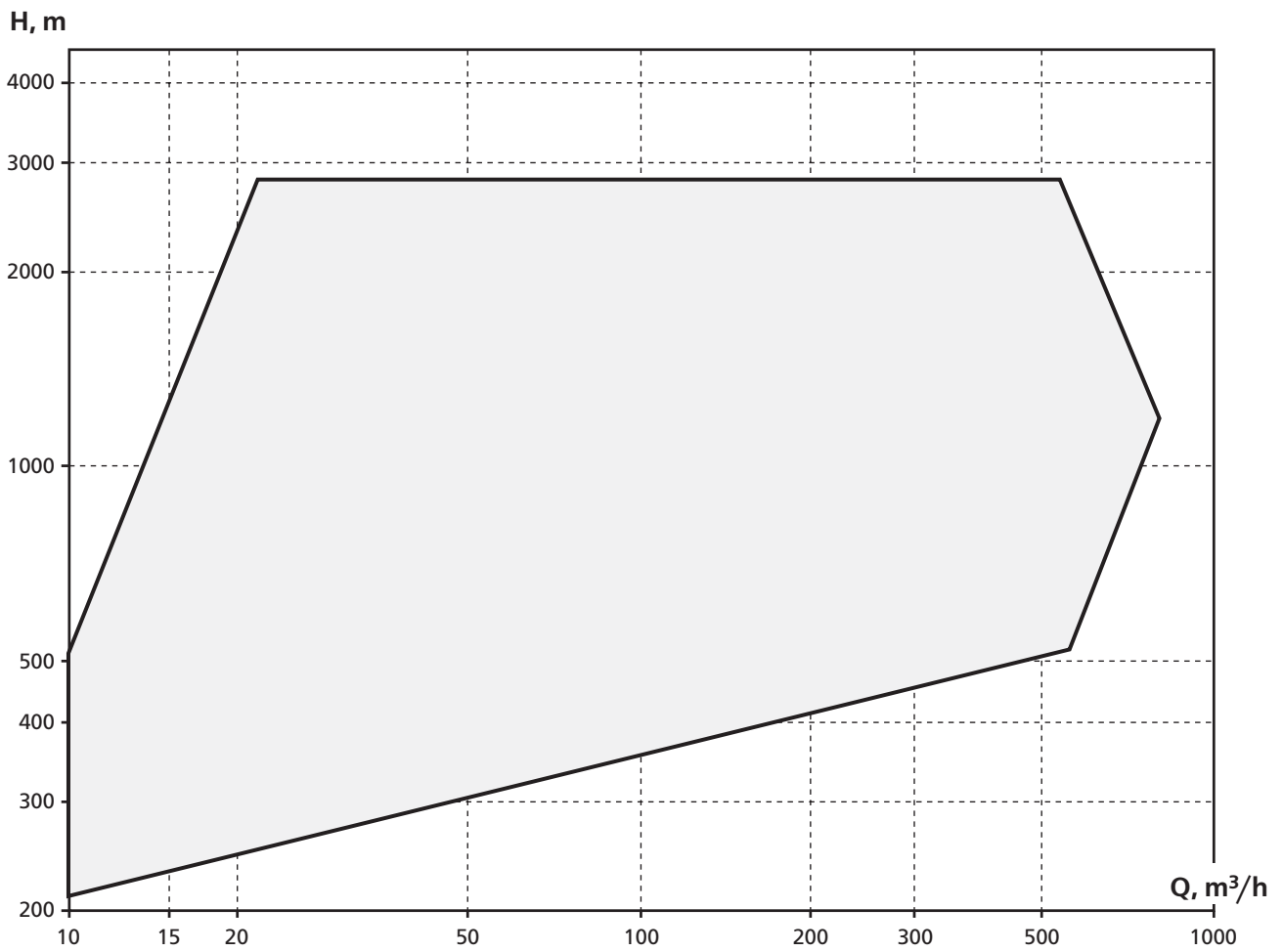
- Cast Steel
- Chrome Steel
- Ductile iron / ADI - material
- Austenitic Steel
- Duplex and Super Duplex Steel
- Special alloys according to NORSOK, NACE

## OPERATING DATA

	HP
Capacity, m <sup>3</sup> /h	900
Head, m	2800
Pressure, bar	300
Temperature, °C	+200



## PERFORMANCE CURVES

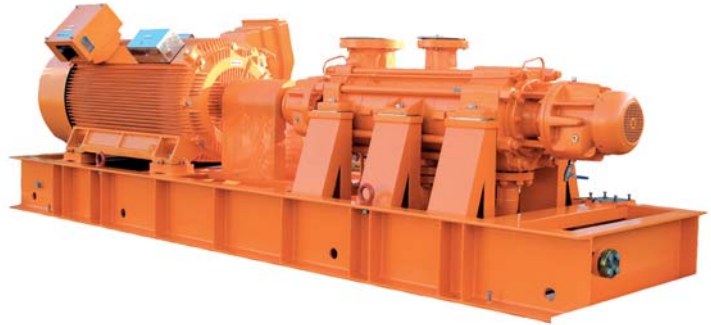


# HORIZONTAL, MULTISTAGE HIGH-PRESSURE PUMP WITH BACK-TO-BACK IMPELLERS

**GP**  
API 610, Type BB4

## RANGE OF APPLICATION

- Offshore
- Water injection
- Brine feed
- Refineries
- Industrial application



## DESIGN FEATURES

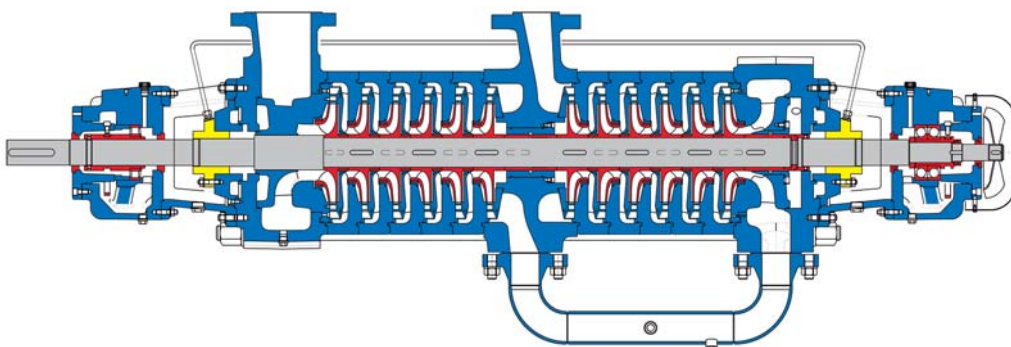
- Pump meets all requirements of API 610
- Multistage radially split high-pressure pump
- First stage designed with NPSH impeller
- Center-supported
- Bearings design: antifriction or slide ones

## MATERIALS

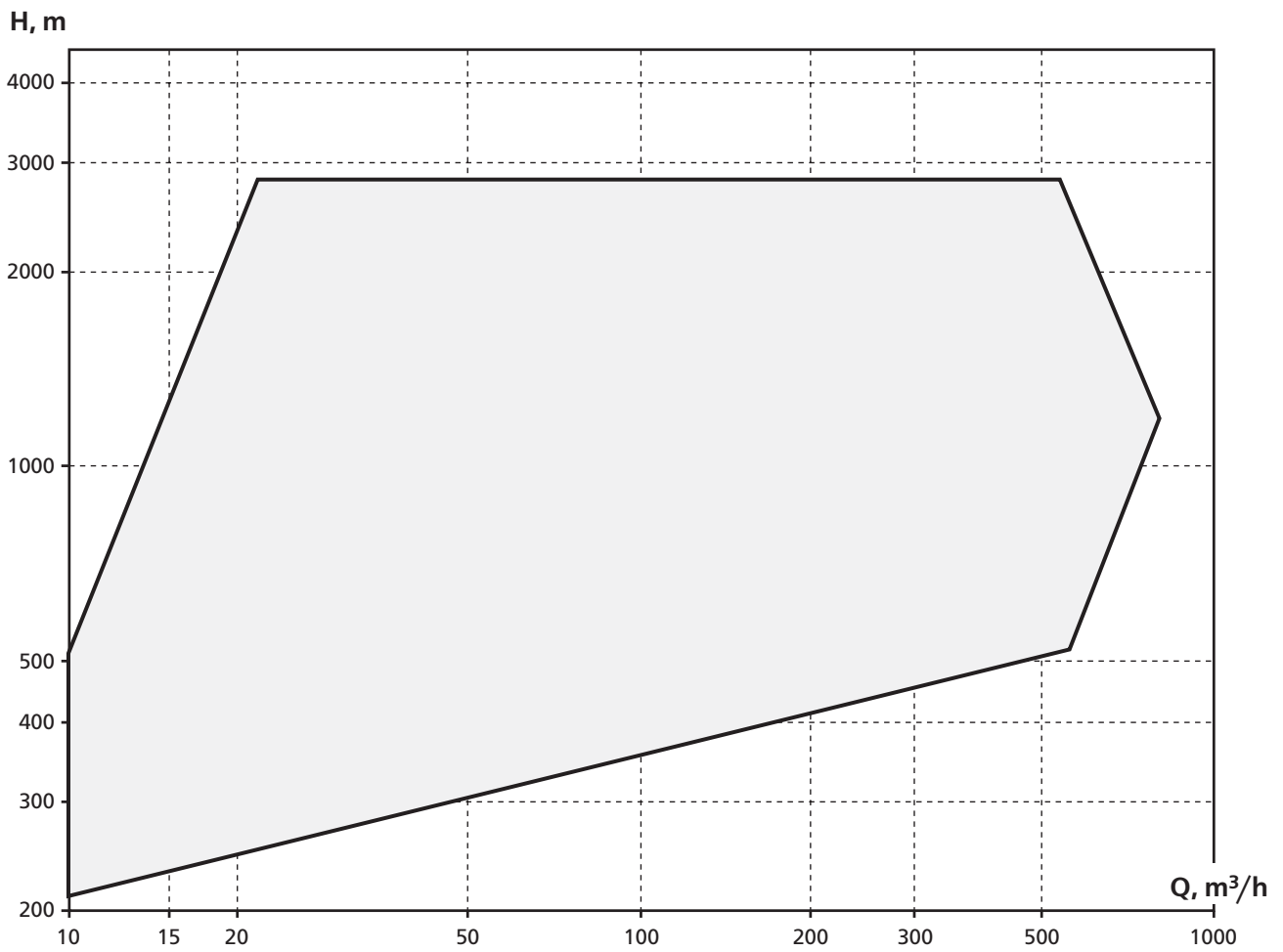
- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Special alloys according to NORSOK, NACE

## OPERATING DATA

	GP
Capacity, m <sup>3</sup> /h	600
Head, m	2800
Pressure, bar	250
Temperature, °C	+180



## PERFORMANCE CURVES



# HORIZONTAL, MULTISTAGE HIGH-PRESSURE DOUBLE CASING PUMP WITH IN-LINE IMPELLERS

**TL**  
API 610, Type BB5

## RANGE OF APPLICATION

- Water injection
- Refineries
- Hydrocarbons handling
- Brine feed
- Gas washing systems
- Boiler feed water application



## DESIGN FEATURES

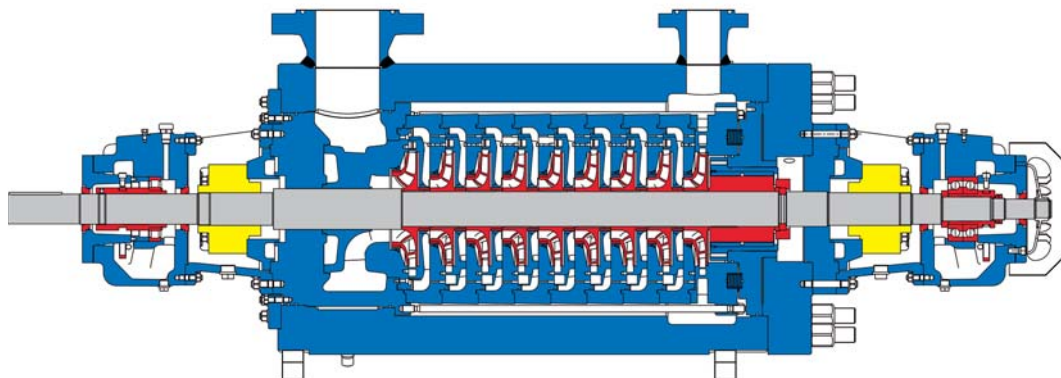
- Pump meets all requirements of API 610
- Design with a pull-out part
- In-line arrangement of impellers
- Axial thrust compensation by balance piston, double piston or balance disk
- First stage designed with NPSH impeller
- Center-supported
- Bearings design: antifriction or slide ones

## MATERIALS

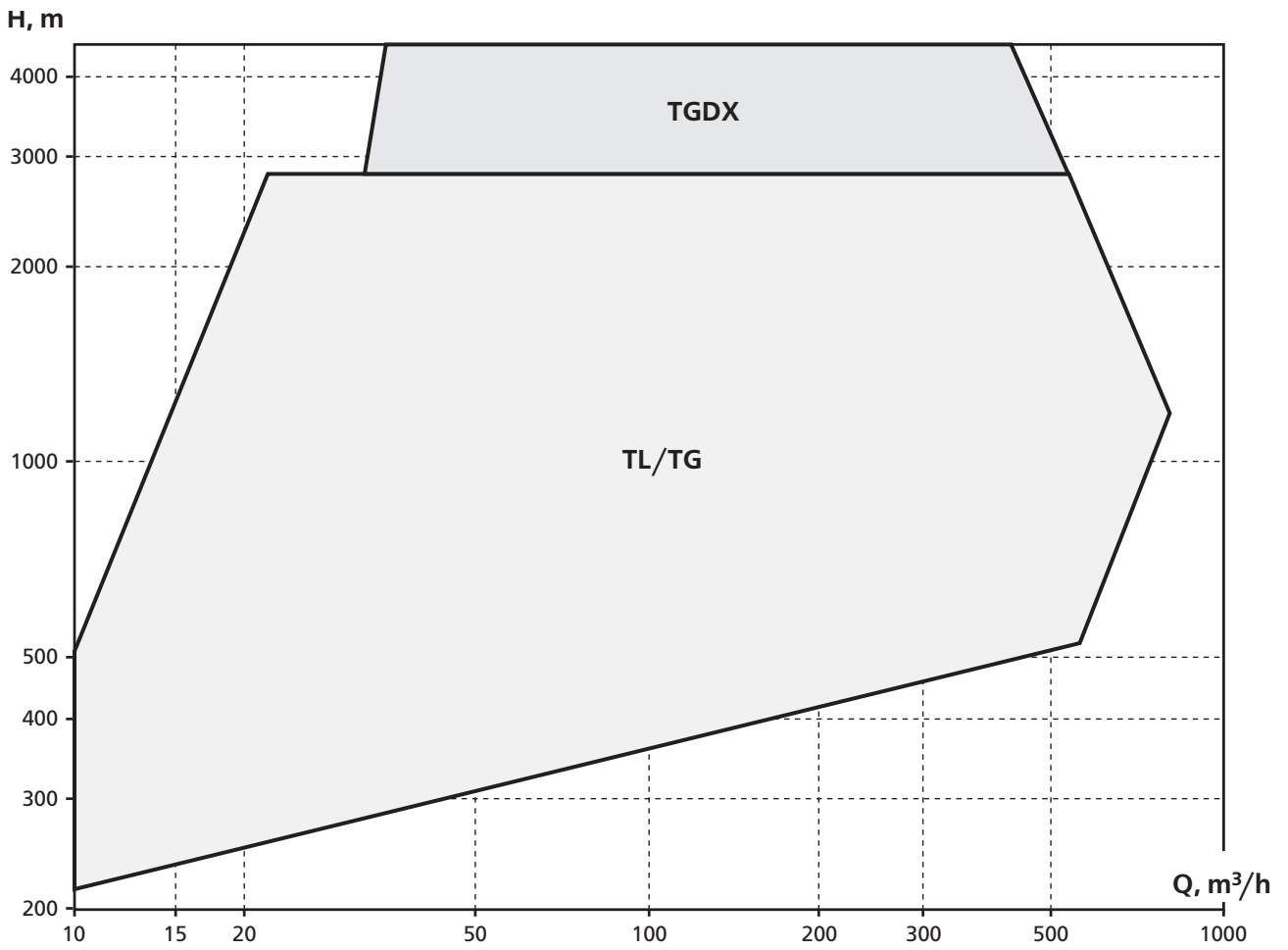
- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Special alloys according to NORSOK, NACE

## OPERATING DATA

	TL
Capacity, m <sup>3</sup> /h	900
Head, m	2800
Pressure, bar	250
Temperature, °C	+400



PERFORMANCE CURVES



# HORIZONTAL, MULTISTAGE HIGH-PRESSURE DOUBLE CASING PUMP WITH BACK-TO-BACK IMPELLERS

**TG, TGDX**  
API 610, Type BB5

## RANGE OF APPLICATION

- Water injection
- Refineries
- Brine feed
- Hydrocarbons handling
- Gas washing systems
- Boiler feed water application



## DESIGN FEATURES

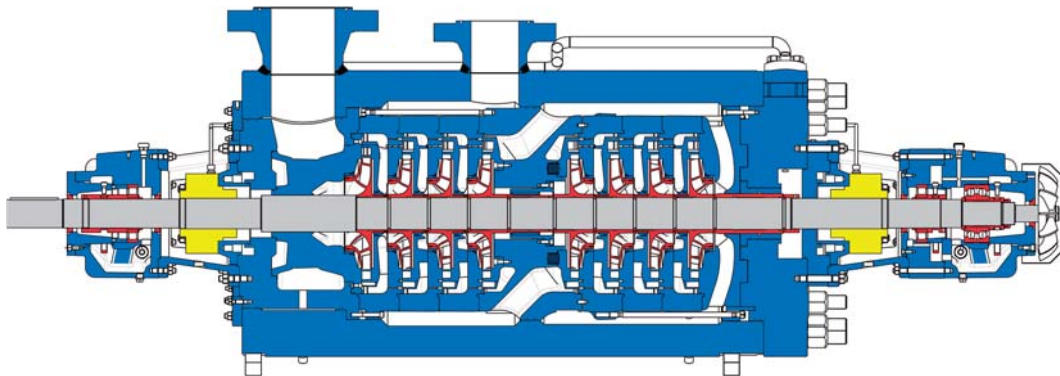
- Pump meets all requirements of API 610
- Design with a pull-out part
- Back-to-back arrangement of impellers provides the smallest axial forces and very smooth running
- First stage designed with NPSH impeller
- Center-supported
- Bearings design: antifriction or slide ones

## MATERIALS

- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Special alloys according to NORSOK, NACE

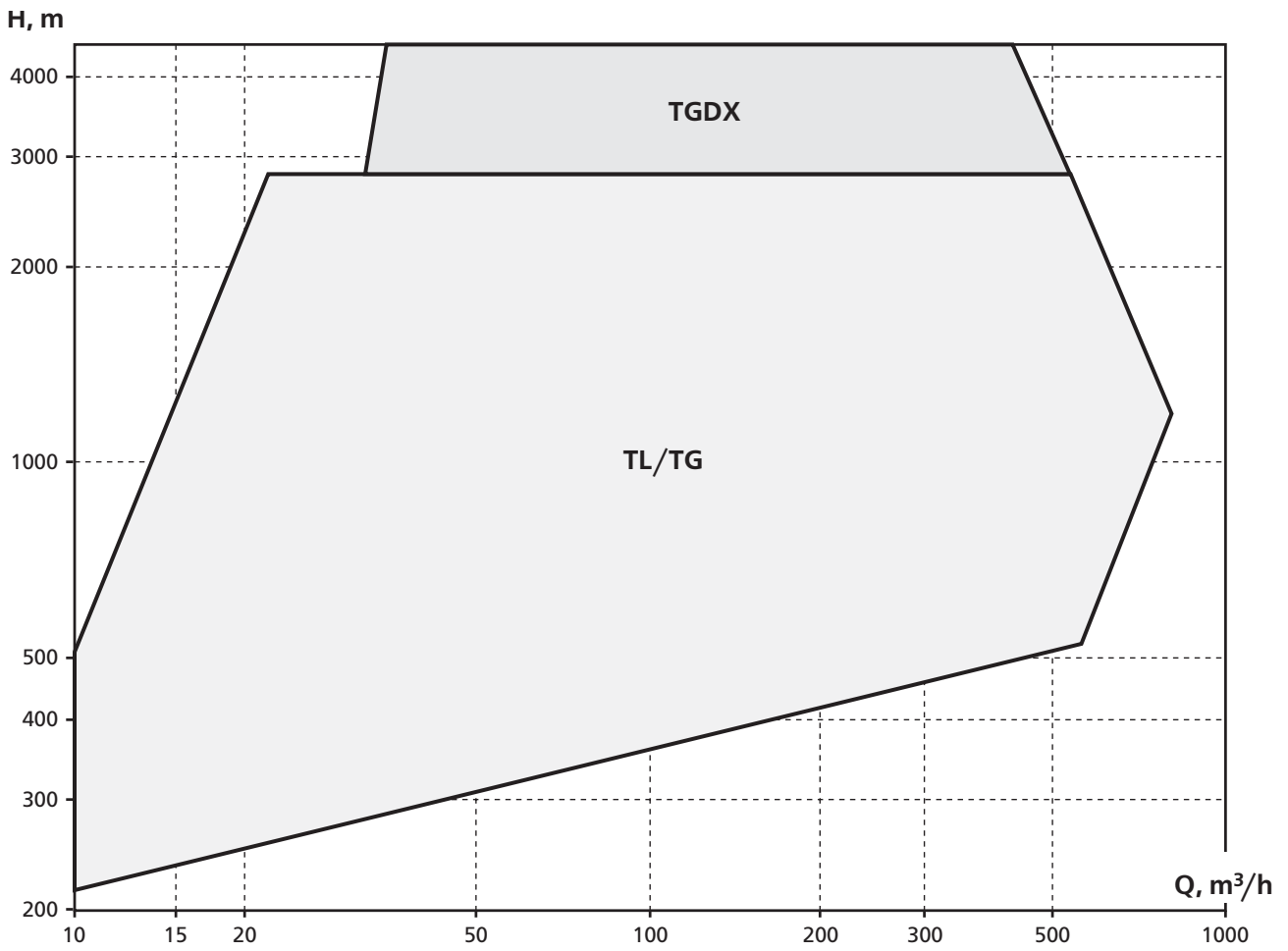
## OPERATING DATA

	TG	TGDX
Capacity, m <sup>3</sup> /h	900	700
Head, m	2800	4200
Pressure, bar	250	450
Temperature, °C	+420	+360





## PERFORMANCE CURVES



# MULTISTAGE HIGH-PRESSURE PUMP 100-BAR-VERSION

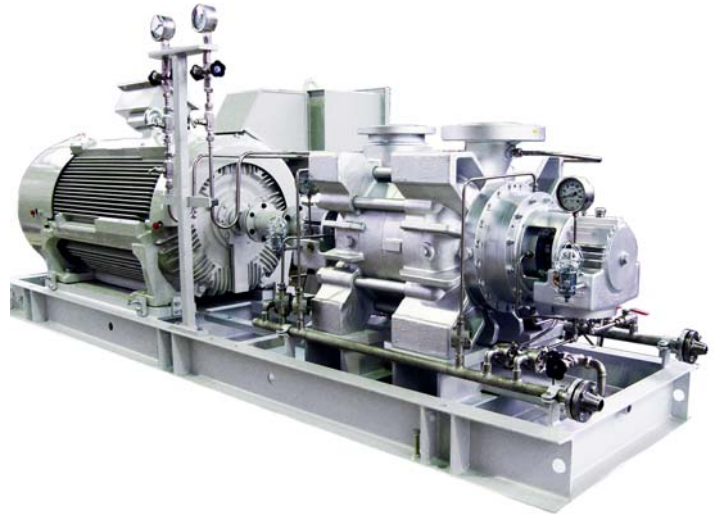
**GH**

## RANGE OF APPLICATION

- Refineries
- Power plant
- Booster applications
- Sea water desalination

## DESIGN FEATURES

- Variable arrangement of nozzles
- Compact design with short bearings span
- Ring-section type
- First stage designed with NPSH impeller
- Version with axial inlet
- Antifriction bearings on both sides with oil sump lubrication

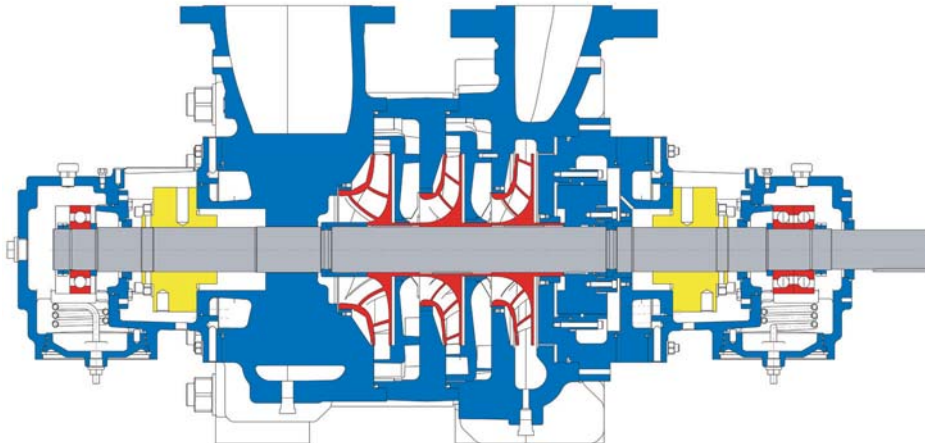


## MATERIALS

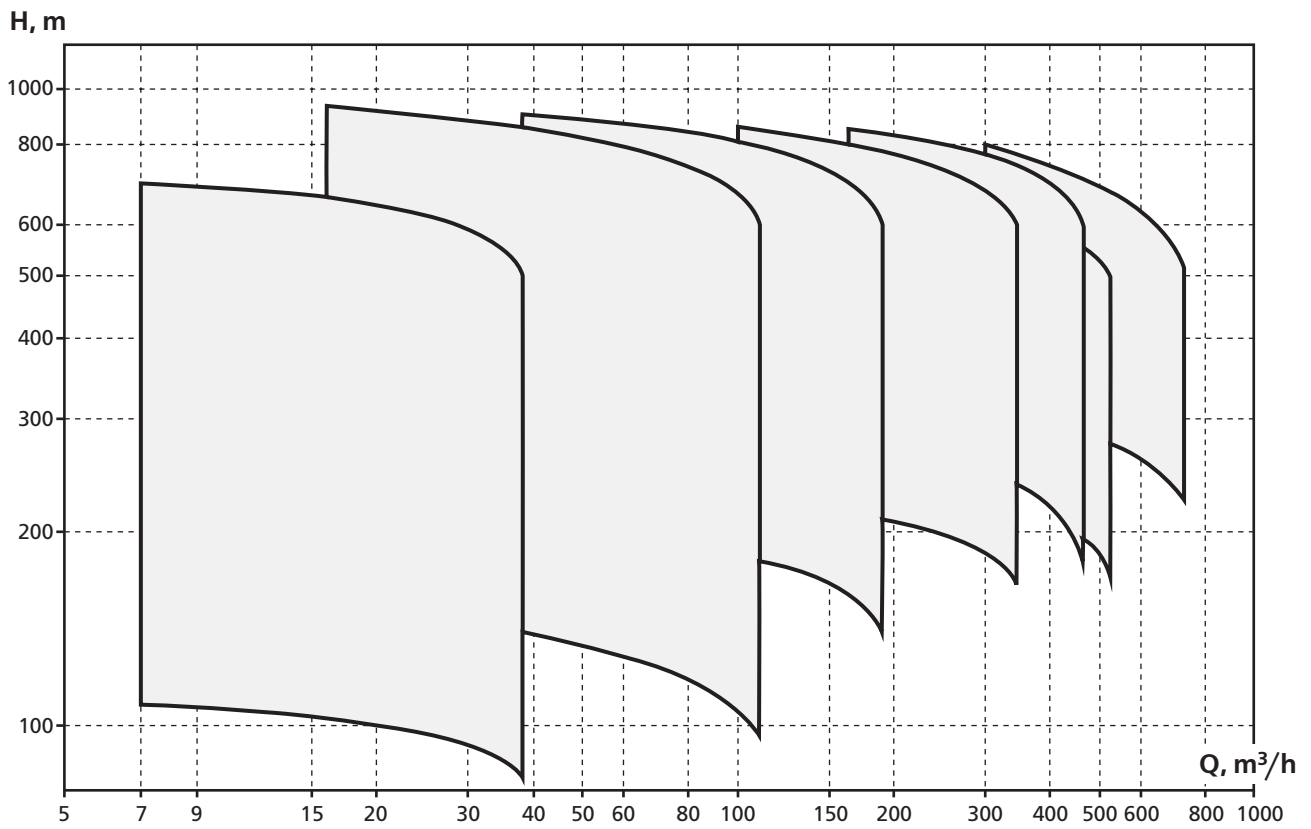
- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Special alloys according to NORSOK, NACE

## OPERATING DATA

	<b>GH</b>
Capacity, m <sup>3</sup> /h	720
Head, m	900
Pressure, bar	100
Temperature, °C	+180



## PERFORMANCE CURVES



# HORIZONTAL, MULTISTAGE, HIGH-PRESSURE PUMP WITH DOUBLE-FLOW NPSH IMPELLER

**GMHD**  
API 610, Type BB4

## RANGE OF APPLICATION

- Oil and gas industry
- Offshore
- Power plants
- Pumping of condensate

## DESIGN FEATURES

- Pump meets all requirements of API 610
- First stage designed with NPSH impeller
- Axial thrust compensation by means of balance piston
- Center-supported
- Low vibration values
- Bearings design: antifriction or slide ones

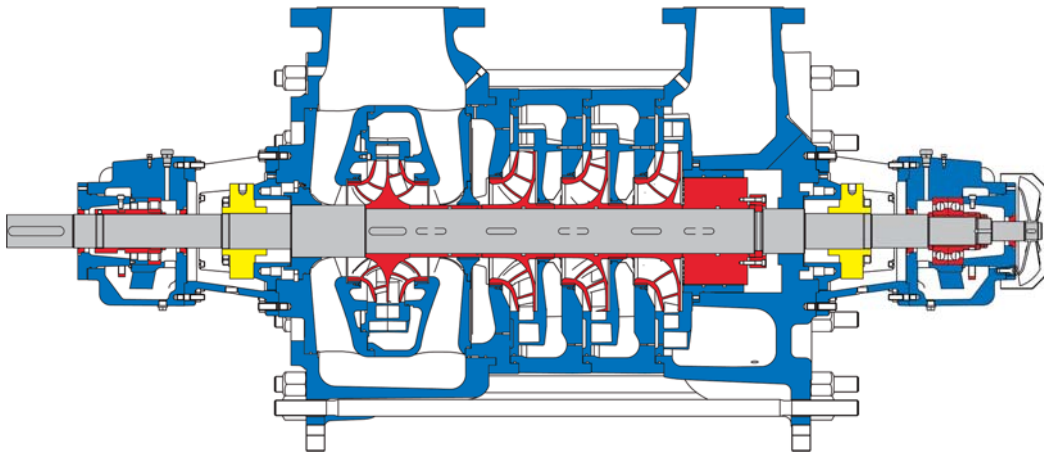
## MATERIALS

- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Special alloys according to NORSOK, NACE

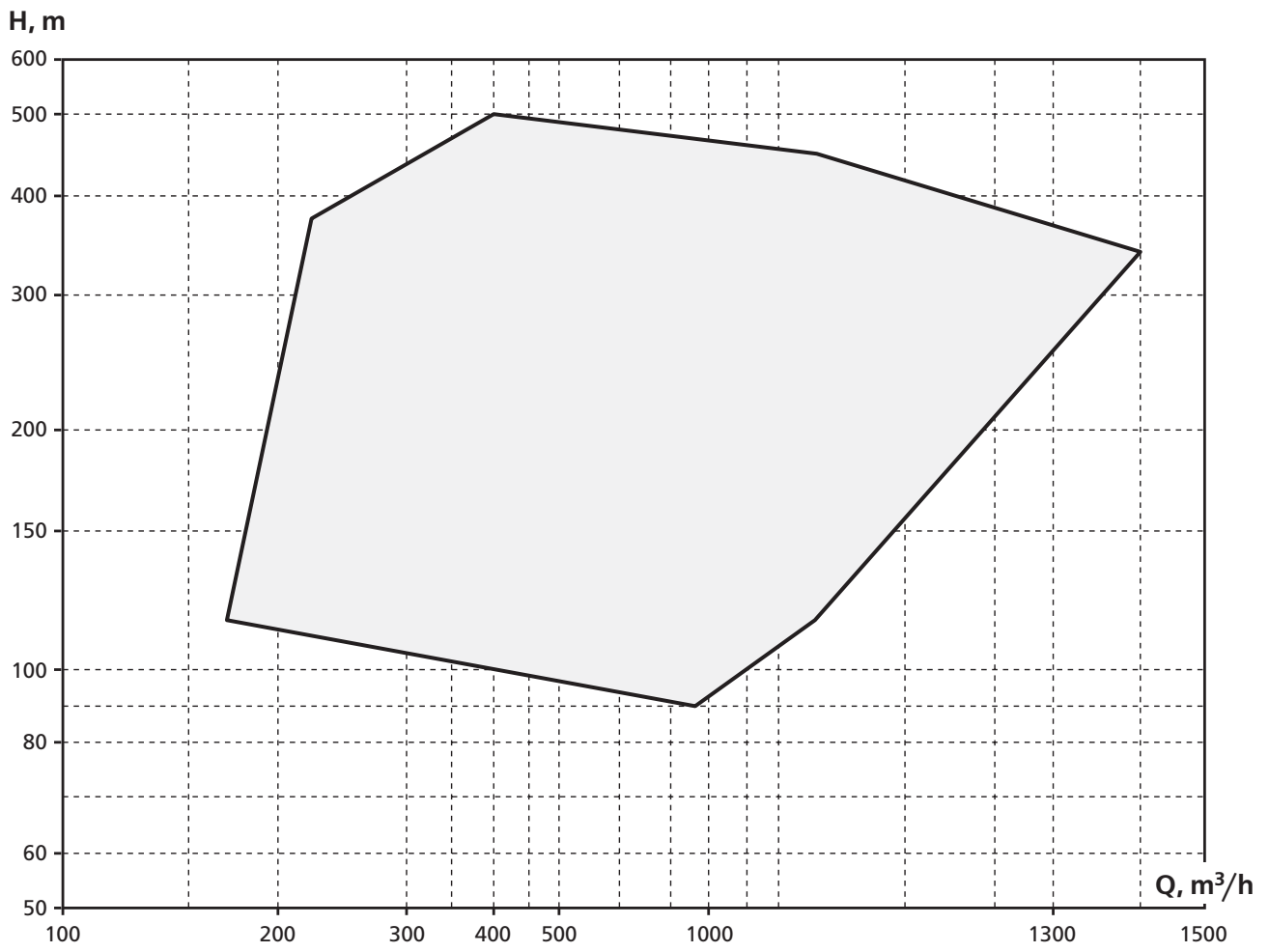


## OPERATING DATA

	GMHD
Capacity, m <sup>3</sup> /h	1100
Head, m	320
Pressure, bar	63
Temperature, °C	+180



## PERFORMANCE CURVES



# VERTICAL, MULTISTAGE, HIGH-PRESSURE DOUBLE CASING PUMP

**GSTV, GLKV**  
API 610, Type VS6

## RANGE OF APPLICATION

- Oil and gas industry
- Refineries
- Pumping of condensate at power stations
- Industrial applications

## DESIGN FEATURES

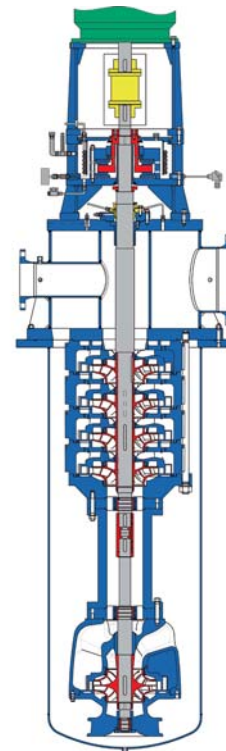
- Pump meets all requirements of API 610
- Axial thrust compensation by means of balancing piston
- NPSH impeller in single-flow and double-flow version
- High capacity version with diagonal impellers
- Bearings design: antifriction bearings or combined axial-radial slide ones

## MATERIALS

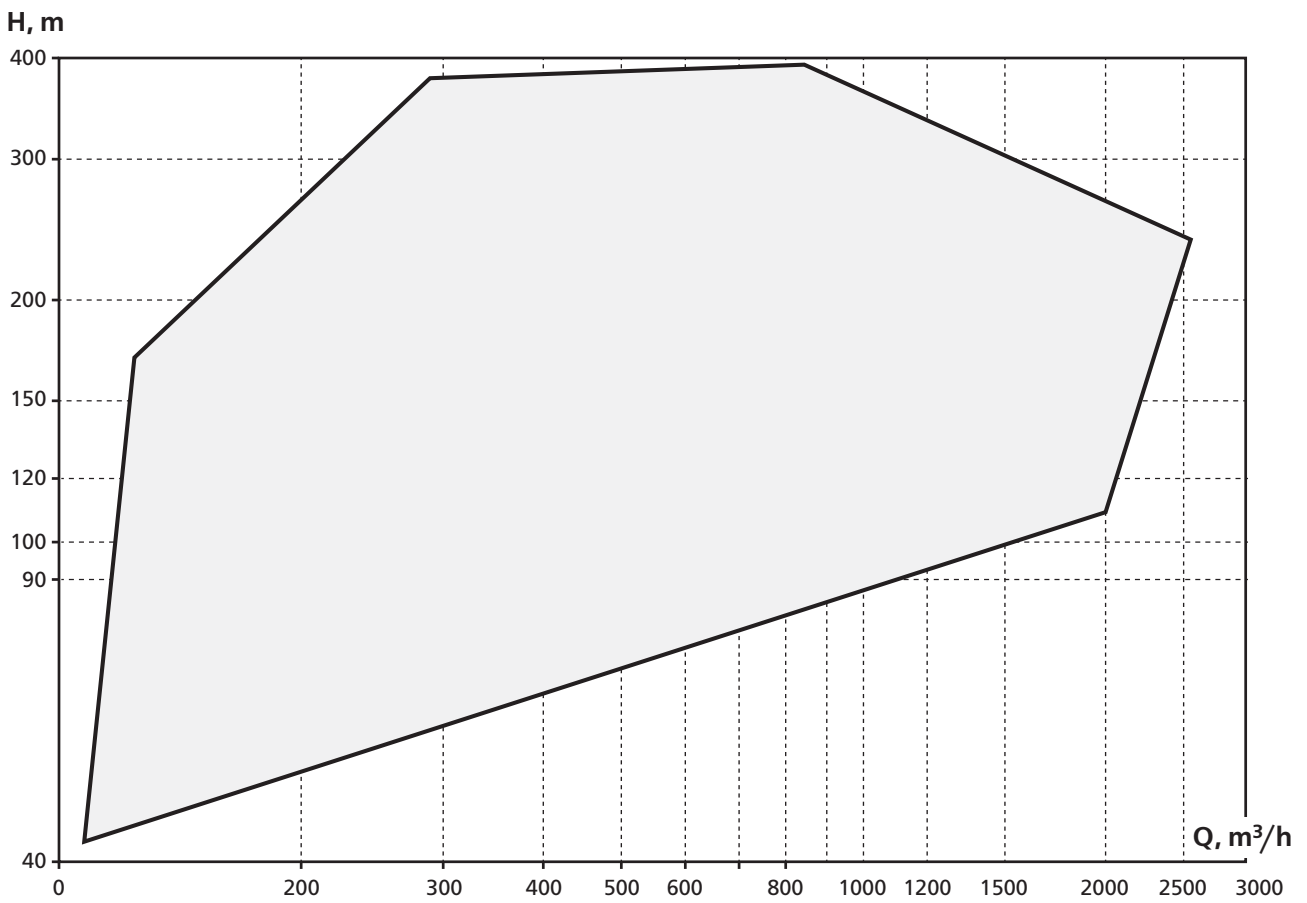
- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Special alloys according to NORSOK, NACE

## OPERATING DATA

	GSTV	GLKV
Capacity, m <sup>3</sup> /h	3000	400
Head, m	360	250
Pressure, bar	40 / 63	40
Temperature, °C	+160	+160



## PERFORMANCE CURVES



# VERTICAL, MULTISTAGE, HIGH-PRESSURE DOUBLE CASING PUMP

**HPTV**  
API 610, Type VS6

## RANGE OF APPLICATION

- Offshore
- Refineries
- Condensate removal
- Liquid gas / hydrocarbons handling
- Booster and transfer pumps

## DESIGN FEATURES

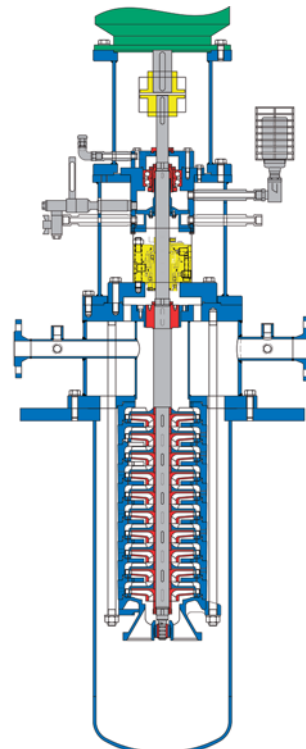
- Pump meets all requirements of API 610
- Axial thrust compensation by means of balance piston
- NPSH impeller in single-flow and double-flow versions
- Version with suspended suction impeller
- Bearings design: antifriction bearings or combined axial-radial slide ones

## MATERIALS

- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Special alloys according to NORSOK, NACE

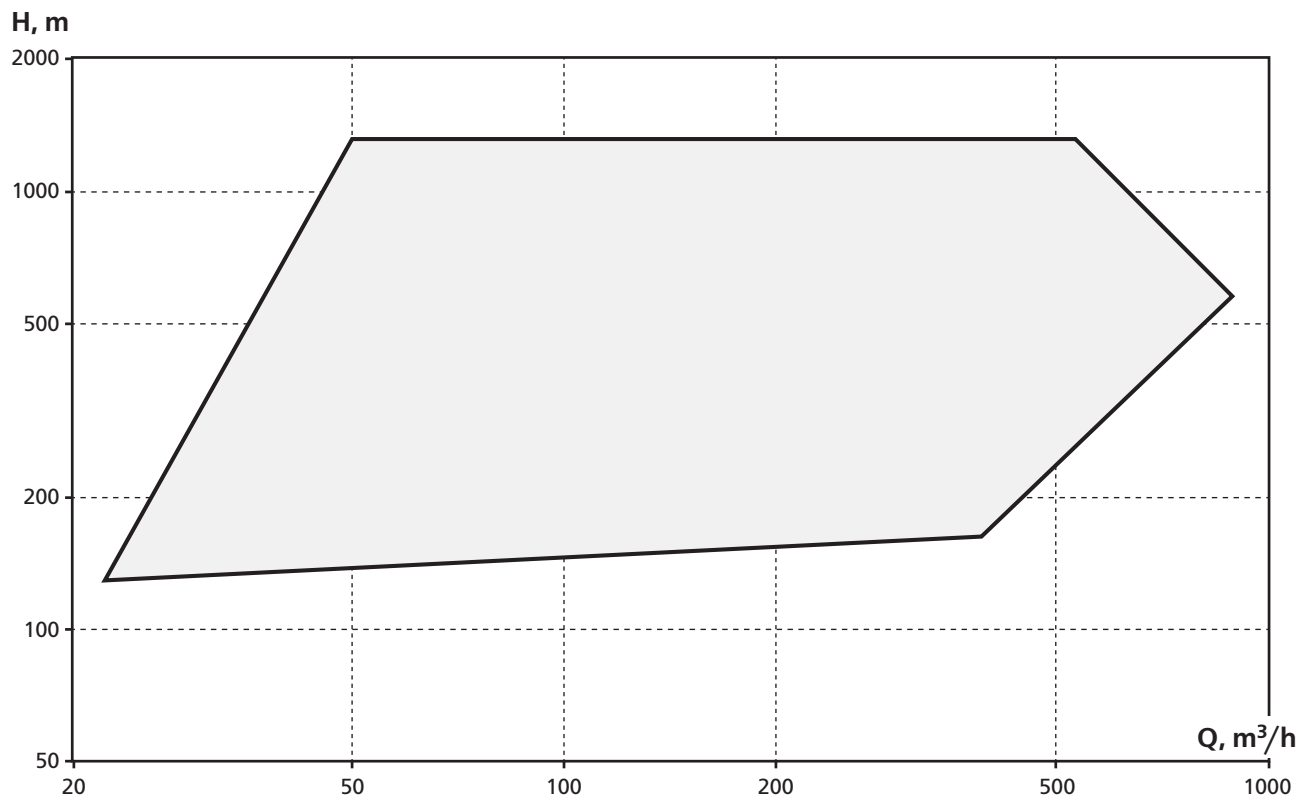
## OPERATING DATA

	HPTV
Capacity, m <sup>3</sup> /h	550
Head, m	1400
Pressure, bar	140
Temperature, °C	-180 / +260





## PERFORMANCE CURVES



## VERTICAL, MULTISTAGE HIGH-PRESSURE SINGLE CASING PUMP

**HPV, HPVX**  
API 610, Type VS1

### RANGE OF APPLICATION

- Refineries
- Fuel handling
- Crude oil booster and transfer pumps
- High-temperature applications
- Tank installation

### DESIGN FEATURES

- Pump meets all requirements of API 610
- ATEX version
- Radial centrifugal pump with suspended NPSH impeller (option)
- Axial thrust compensation by means of balance piston
- Liquid-lubricated slide bearings in submersible part of the pump
- Upper part bearings: antifriction bearings or combined axial-radial slide ones

### MATERIALS

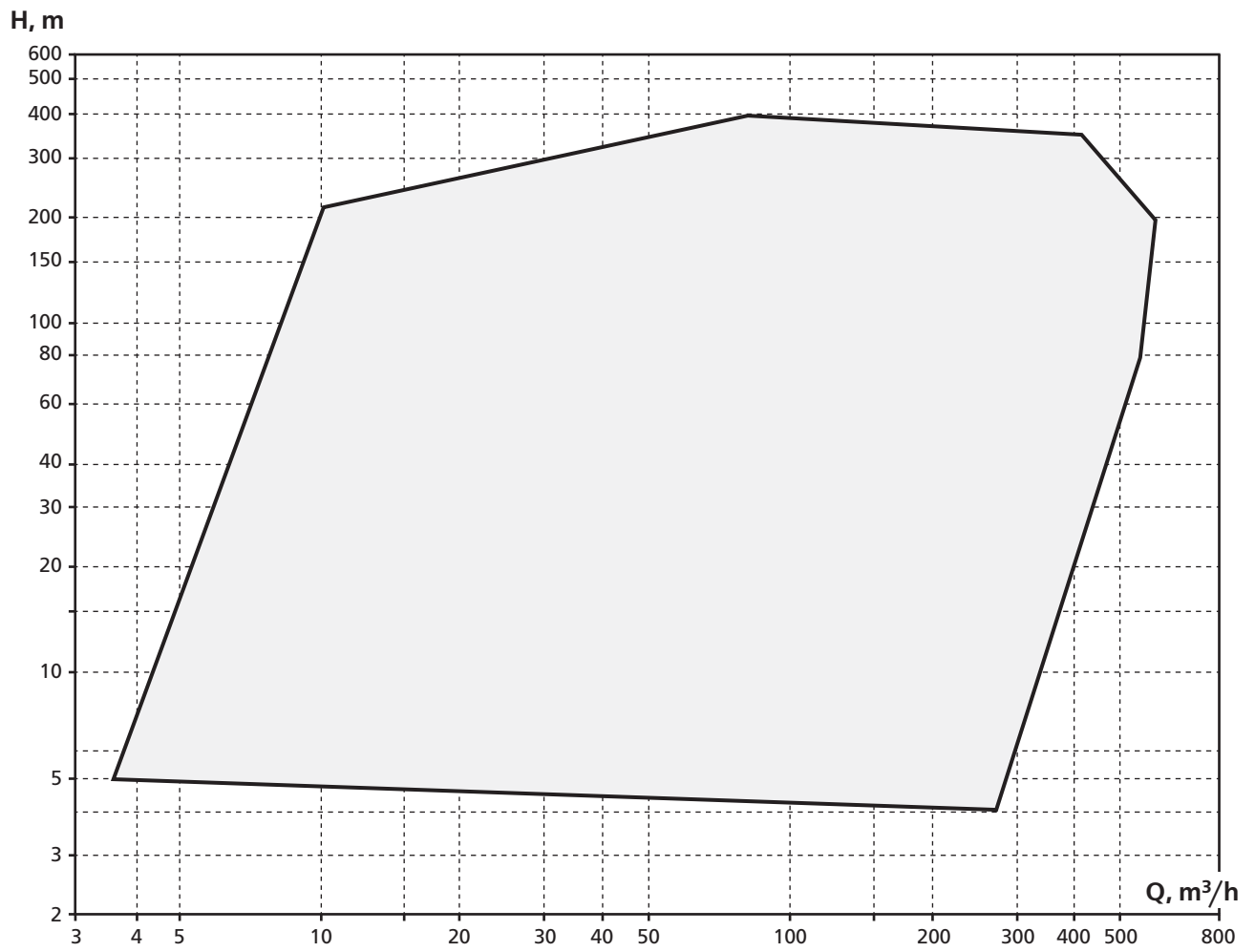
- Cast Steel
- Chrome Steel
- Austenitic Steel
- Duplex and Super Duplex Steel
- Special alloys according to NORSOK, NACE

### OPERATING DATA

	HPV/HPVX
Capacity, m <sup>3</sup> /h	600
Head, m	600
Pressure, bar	63
Temperature, °C	+180



## PERFORMANCE CURVES



## CUSTOMIZED SOLUTIONS



### Pump type: TGD-80C/12-308/CN

Multistage high-pressure double casing process pump with gear box, motor and lube oil system

Liquid	Paraffin products
Capacity	98.5 m <sup>3</sup> /h
Head	2 620 m
Rotation speed	4 400 rpm
Material	acc. to API 610, S-6
Skid weight	25 000 kg



### Pump type: TGD-100/12-508/CN

12-stage BB5 process pump with a special heating jacket

Liquid	Carbamate
Capacity	150 m <sup>3</sup> /h
Head	1 576 m
Suction pressure	5 bar up to 73 bar
Design pressure	242 bar at 130 °C
Rotation speed	2 980 rpm
Skid weight	19 200 kg



### Pump type: KRGZ-150/450-399/CN

Double-stage process pump with axial inlet and open impellers

Liquid	Shale oil
Capacity	210 m <sup>3</sup> /h
Head	215 m
Design pressure	30 bar at 375 °C
Design temperature	375 °C
Solids content	up to 15% (rock ash)
Material	Special wear-resistant cast iron

## PUMPING SYSTEMS

### TRANSFER PUMP SKIDS

- Used for circulation and transfer of all kinds of liquids
- High operation safety is ensured by a special pump design series



Transfer pump skid

### INJECTION PUMP SKIDS

- Designed especially for supply of liquid fuel to gas turbines
- Usually supplied as redundant pumps
- Ensure high operation safety



High-pressure pump skid with vertical double casing pump



High-pressure injection skid with horizontal multistage pump



Lube oil skid of type ACS according to API 614

## SYSTEM ENGINEERING PROJECTS

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### HEAVY FUEL OIL PUMPING STATION

Complete prefabricated stations for supply of burners with heavy fuel oil including auxiliary steam and condensate processes.



### INJECTION PUMP MODULE

Complete prefabricated pump modules for high-pressure fuel supply to the gas turbines; applicable with various fuel types and operation pressure



### CIRCULATION PUMP SYSTEMS

Complete prefabricated pumping systems for circulation of heat transfer liquids, for example air preheating of gas turbines.



## ADDITIONAL STANDARD PUMP SERIES

Type, series	Pump designation	Design data		
		Capacity, m <sup>3</sup> /h	Head, m	Pressure, bar

### Single-stage centrifugal pumps

<b>KRC</b>	Chemical process pumps series, includes additional sizes	1200	170	16 / 25
<b>KRP / H</b>	Average heavy-duty process pumps according to API 610	2800	250	25 / 35

### Multistage horizontal high-pressure pumps

<b>GL / GLZ</b>	Multistage centrifugal pumps with or w/o NPSH impeller (Optionally with axial inlet)	600	250	16 / 25
<b>GM / GMZ</b>		800	600	64

### Multistage vertical high-pressure pumps

<b>GLV / X</b>	Vertical pumps for tank-installation	500	420	25 / 40
<b>GLVB</b>	Vertical multistage centrifugal pumps with or w/o NPSH impeller	600	250	16 / 25

### Centrifugal double-suction split-casing pumps

<b>ZMLK</b>	Horizontal version	6000	330	up to 40
	Vertical version	5000	320	up to 40

### Self-priming centrifugal pumps

<b>KSD / KCD</b>	Self-priming pumps with a side-channel	30	300	25 / 40
<b>KRE / S</b>	Self-priming volute-casing pumps	100	60	16

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