PRODUCT CATALOGUE

INDUSTRIAL PUMPS

ENGINEERING, EQUIPMENT AND CONSULTING

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ENEQ Overview

With nine years of solid performance and a project portfolio exceeding €20 million, ENEQ Consult Ltd. is a trusted partner in the power industry. We deliver cost-effective, high-quality mechanical equipment for the nuclear, conventional power, oil & gas, and petrochemical sectors.

Our expertise spans the entire project lifecycle, from **equipment supply** and turn-key delivery to critical **engineering analyses** (including FEA & CFD) and comprehensive **service** from production to commissioning and after-sales support. Through exclusive partnerships with 15 global manufacturers, we provide a wide range of equipment compliant with international standards such as ASME, EN, N Stamp, DIN, and ISO.

This catalogue details our extensive range of industrial pumps (energy industry and other heavy industrial applications), engineered for reliability and performance in the most demanding environments.

ENEQ Pump Portfolio Overview

No.	Pump Category	Detailed Specs Page	Model / Series	Application Summary	Key Feature	Capacity Range	Head Range	Temp. Range
1	**Axial Flow (Propeller)**	13	AVZ, AVZR	High-volume irrigation, drainage	Vertical propeller pump	90 to 10,000 l/s	0.5 to 18 m	-
2	**Condensate (Centrifugal)**	79	KVL, KVLv	Condensate, clean/impure water	Vertical multistage, can-type	2.5 to 130 l/s	8 to 380 m	Up to 130°C
3	**Condensate (Centrifugal)**	313	**КсВ Series**	Condensate extraction in power stations	Vertically suspended, multistage	90–1600 m^3/h	40–260 m	-
4	**Condensate (Centrifugal)**	308	**Кс, Ксг Series**	Condensate transfer in power stations	Horizontal, segmental, between bearings	32–1500 m^3/h	55–240 m	-
5	**Condensate (Centrifugal)**	304	**КсД Series**	Condensate transfer in power stations	Horizontal, 3-stage, cross-over, axially split	125–230 m^3/h	95–140 m	-
6	**Condensate (Centrifugal)**	300	**КО, КОШ Series**	Condensate pumping in power and heating plants	Horizontal, end-suction, overhung impeller (1, 2, or 3-stage)	32–125 m^3/h	41–200 m	-

No.	Pump Category	Detailed Specs Page	Model / Series	Application Summary	Key Feature	Capacity Range	Head Range	Temp. Range
7	**Condensate (Centrifugal)**	218	**КсВА Series**	Condensate extraction (NPP)	Vertically suspended, multistage, diffuser can	125–663 m^3/h	55–260 m	-
8	**Horizontal Centrifugal**	50	IN	Chemical plants, refineries	Back pull-out process pump	Up to 500 m^3/h	Up to 150 m	-40°C to +350°C
9	**Horizontal Centrifugal**	60	КК	Hot/cooling water circulation	Single-stage low-pressure unit	Up to 180 l/s	Up to 75 m	Up to 150°C
10	**Horizontal Centrifugal**		NK	General water service, irrigation	Single-stage, low-pressure unit	Up to 300 l/s	Up to 80 m	Up to 100°C
11	**Horizontal Centrifugal**	117	NN	General water service, industry	Standardized low-pressure centrifugal "back pull-out" pump	Up to 700 m^3/h	Up to ~120 m	Up to 140°C
12	**Horizontal Centrifugal**	188	**К, КШ Series**	Water supply for industry, public utilities, and irrigation	End-suction, overhung impeller	200–315 m^3/h	21–125 m	-
13	**Horizontal Centrifugal**	252	**ХБ, ХБЕ-М Series**	Amine solutions in natural gas cleaning plants	Between-bearings, barrel-insert or single casing	160–1050 m^3/h	210–650 m	-

No.	Pump Category	Detailed Specs Page	Model / Series	Application Summary	Key Feature	Capacity Range	Head Range	Temp. Range
14	**Multistage (Centrifugal)**	79	VS, KV, KVL	Boiler feed, condensate	High-pressure, sectional (horizontal & vertical)	0.5 to 210 l/s	8 to 600 m	Up to 130°C
15	**Multistage (Centrifugal)**	173	VSN	Power plant feed water	Horizontal boiler feed pump	2 to 120 l/s	50 to 1000 m	Up to 180°C
16	**Multistage (Centrifugal)**	322	**ПЭ Series**	Boiler feed water for thermal power stations	Horizontal, segmental or barrel type	20–872 m^3/h	172–3670 m	Max 165°C
17	**Multistage (Centrifugal)**	318	**ЦНСг Series**	Hot water for heating/water supply, small boiler feed	Horizontal, ring-section	16–60 m^3/h	44–340 m	-
18	**Multistage (Centrifugal)**	246	**ЦНС, ЦНСз, НР, GP**	High-pressure water injection (balance disc)	Horizontal, segmental, single-body, balance disc	10–720 m^3/h	200–2370 m	-
19	**Multistage (Centrifugal)**	244	**ЦНСп Series**	High-pressure water injection	Horizontal, segmental, back-to-back impellers for thrust balance	-	-	-
20	**Multistage (Centrifugal)**	240	**ЦНС(н) Series**	Crude oil and product pipeline transport	Horizontal, multistage segmental	105–500 m^3/h	85–880 m	-

No.	Pump Category	Detailed Specs Page	Model / Series	Application Summary	Key Feature	Capacity Range	Head Range	Temp. Range
21	**Multistage (Centrifugal)**	283	**ЦН Series**	Water supply for industry & communities	Horizontal, 2 or 4-stage, axially split	400–1000 m^3/h	105–210 m	-
22	**Multistage (Centrifugal)**	283	**14M-8x4-1 Series**	Water supply for industry & communities	Horizontal, 4-stage, axially split	300-500 m^3/h	280-420 m	-
23	**Multistage (Centrifugal)**	279	**ПД Series**	Boiler feed booster pumps for TPS	Horizontal, single-stage, split-case	650–1660 m^3/h	158–194 m	Max 165°C
24	**Oil & Gas (API/Process)**	138	RPP	Refineries, petrochemicals	Heavy-duty horizontal process pump (API 610)	1 to 700 m^3/h	4 to 240 m	-70°C to +300°C
25	**Oil & Gas (API/Process)**	185	**AMG (BB3)**	Waterflooding, crude oil transport, refineries	Multistage, axially split casing (API 610 BB3)	40–1500 m^3/h	200–1500 m	-
26	**Oil & Gas (API/Process)**	272	**НМ Series**	Crude oil and refined product pipeline transport	Multistage segmental, barrel, or single-stage split-case	65–12,500 m^3/h	177–800 m	-
27	**Oil & Gas (API/Process)**	269	**НГПН-М Series**	Booster pumps for main pipeline pumps	Horizontal, axially split, double entry impeller with inducer	750–4000 m^3/h	60–160 m	-

No.	Pump Category	Detailed Specs Page	Model / Series	Application Summary	Key Feature	Capacity Range	Head Range	Temp. Range
28	**Oil & Gas (API/Process)**	266	**НЦН-Е Series**	Booster pumps for oil-field water injection, loading	Horizontal, axially split, double entry impeller	341–1800 m^3/h	70–150.4 m	-
29	**Oil & Gas (API/Process)**	266	**20НДСН-М Series**	Booster pumps for main pipeline pumps, oil transfer	Horizontal, axially split, double entry impeller	2200–3200 m^3/h	45–75 m	-
30	**Oil & Gas (API/Process)**	255	**НГ, НМФ Series**	Heavy pyrolysis tar, asphalt flux removal in refineries	Single-stage split-case or multistage barrel-insert	182–800 m^3/h	250–600 m	Up to 400°C
31	**Oil & Gas (API/Process)**	234	**ЦНСДп (BB5)**	Water injection, high-pressure refining, gas processing	Double-casing (barrel), multistage (API 610 BB5)	45–315 m^3/h	700–2200 m	-
32	**Oil & Gas (API/Process)**	232	**TG, TL (BB5)**	Feed water, oil, hot oil products in refineries	Double-casing (barrel), multistage (API 610 BB5)	55–800 m^3/h	415–2430 m	-
33	**Specialty (Industrial)**	164	KPP, VKPP	High solids/fiber content	Channel impeller process pump	3 to 800 m^3/h	6 to 90 m	Up to 200°C
34	**Specialty (Industrial)**	182	**НМВ Series**	Crude oil and product pipeline transport	Vertically suspended, in-line, can,	200–1800 m^3/h	75–330 m	-

No.	Pump Category	Detailed Specs Page	Model / Series	Application Summary	Key Feature	Capacity Range	Head Range	Temp. Range
					multistage diffuser (API 610)			
35	**Specialty (Industrial)**	287	**Desum Series**	Flue gas desulphurisation (FGD), circulation in absorbers	Single-stage, double-suction, axially split casing	2850–9700 m^3/h	27–180 m	-
36	**Specialty (NPP Service)**	203	**ЦНСА, ЦНР, ЦНА**	Emergency Core Cooling (ECCS), residual heat removal, auxiliary systems in Nuclear Power Plants (NPP)	Multistage barrel-casing or single-stage split-case for NPP	150–3600 m^3/h	12–980 m	-
37	**Specialty (NPP Service)**	230	**ПЭА, ПТА Series**	Boiler feed pumps for Nuclear Power Plants (NPP)	Horizontal, centrifugal, plain bearings, mechanical seals	250–3800 m^3/h	134–2190 m	Max 165°C
38	**Split-Case (Centrifugal)**	34	DH, DHv	Power plants, waterworks	Axially split, double suction	Up to 15,000 m^3/h	Up to ~180 m	Up to 150°C
39	**Split-Case (Centrifugal)**	291	**Д, ДВ Series**	Water supply, irrigation and drainage	Single-stage, double suction, axially split	960–12,500 m^3/h	10–180 m	-

No.	Pump Category	Detailed Specs Page	Model / Series	Application Summary	Key Feature	Capacity Range	Head Range	Temp. Range
40	**Split-Case (Centrifugal)**	296	**СЭ Series**	Hot water circulation in district heating systems	1 or 2-stage, double suction, axially split	500–5000 m^3/h	45–180 m	-
41	**Vertical Centrifugal**	262	**НПВ-М, НПВ Series**	Booster pumps for main pipeline pumps, oil transfer	Vertically suspended, single or multistage, can-type	150–5000 m^3/h	30–150 m	-
42	**Vertical Centrifugal**	257	**НОУ Series**	Pumping out crude oil/product leaks	Vertically suspended, wet-pit, multistage segmental	12.5–50 m^3/h	60–900 m	-
43	**Vertical Centrifugal**	194	**МВ, МКВ Series**	Turbine oil supply and control systems	Vertically suspended, submerged, cantilever, 1 or 3-stage	60–200 m^3/h	23–220 m	-
44	**Vertical Centrifugal**	190	**7НМ-32, 3НМ-32, МКГ**	Turbine oil supply and control systems	Vertical immersed & horizontal, 1 or 2-stage	10-35 m^3/h	20-112 m	-

In addition to the specialized industrial pumps detailed in this catalogue, a comprehensive range of general service pumps is also available. These versatile pumps are suitable for a wide variety of standard applications.

While not included in this catalogue, detailed technical specifications, performance curves, and dimensional drawings for our general service pumps can be provided upon request.

General Service Pumps - Overview

Pump Type	Key Feature	Common Applications
End-Suction	Simple, efficient single-stage design.	Water circulation, HVAC, general water transfer.
Submersible	Hermetically sealed for underwater operation.	Drainage, sump emptying, wastewater management.
Split-Case	Axially split casing for easy maintenance.	Firefighting, high-flow water supply, industrial services.
Booster Sets	Multi-pump systems for pressure boosting.	Residential and commercial building water pressure.

Attachment 1

ENEQ Consult – Propeller Pumps Type AVZ, AVZR

ENEQ Consult Ltd. delivers cost-effective mechanical equipment for nuclear, conventional, oil & gas, and petrochemical industries.

- **9 years** of solid performance
- **> 20 M€** project portfolio
- **> 50** completed projects, **> 10** in progress
- Exclusive partnerships with **5 manufacturers worldwide**
- Equipment compliant with **ASME, EN, N Stamp, DIN, ASTM, ISO, GOST**

Expertise:

- **Equipment Supply** – high-quality OEMs, cost-effective modernization and new-build solutions, turnkey delivery
- **Engineering** – design critical analyses, FEA & CFD calculations, technical consulting
- **Service** – full project support from production to installation, commissioning, and after-sales

Propeller Pumps Type AVZ, AVZR

Application

Propeller pumps are designed for the supply of capacious quantities of water at low heads, being thus very economically applied in the systems of irrigation and drainage, industry and others.

Technical Description

Propeller pumps are of an axial type, i.e. water flows into a suction bell mouth axially passing via impeller and stator diffuser, being further directed through a discharge pipe to the piping. The pump itself is of a simple and solid construction Bell mouth, stator diffuser, tube casing, discharge elbow and electro-motor pedestal are made of qualitative grey cast. Rotor blades can be of alloyed steel or bronze. A shaft is of alloyed steel as well.

A normal design of blades is executed so to enable adjusting of a blade angle of attack as required for an adequate working point during erection in the works. Upon a customer's requirement, the pumps provided with deflecting blades in operation, are also produced. Such design ensures deflection of blades by means of a special device. If necessary, the blades can be deflected during operation, for an adequate angle to achieve as much as better efficiency. Upon requirement, we supply pumps of a such design, which enables axial removing, of rotating parts out of the casing. Pumps with deflecting blades in operation are manufactured only from the size 80-100 onwards.

The shaft consists of two or more parts, reciprocally joined by a rigid coupling. Bearings are of a slide type, either of bronze, grease lubricated from an additional lubricating pump mounted on a motor pedestal, or of water lubricated non-metal materials. Main axial bearing is a roller or slide one and it is lubricated by oil. The shaft is by means of a flexible coupling joined with an electro-motor. Sealing of pump is carried out by ordinary packings or labyrinth ones, however, upon requirement other various packings can be installed.

Capacities

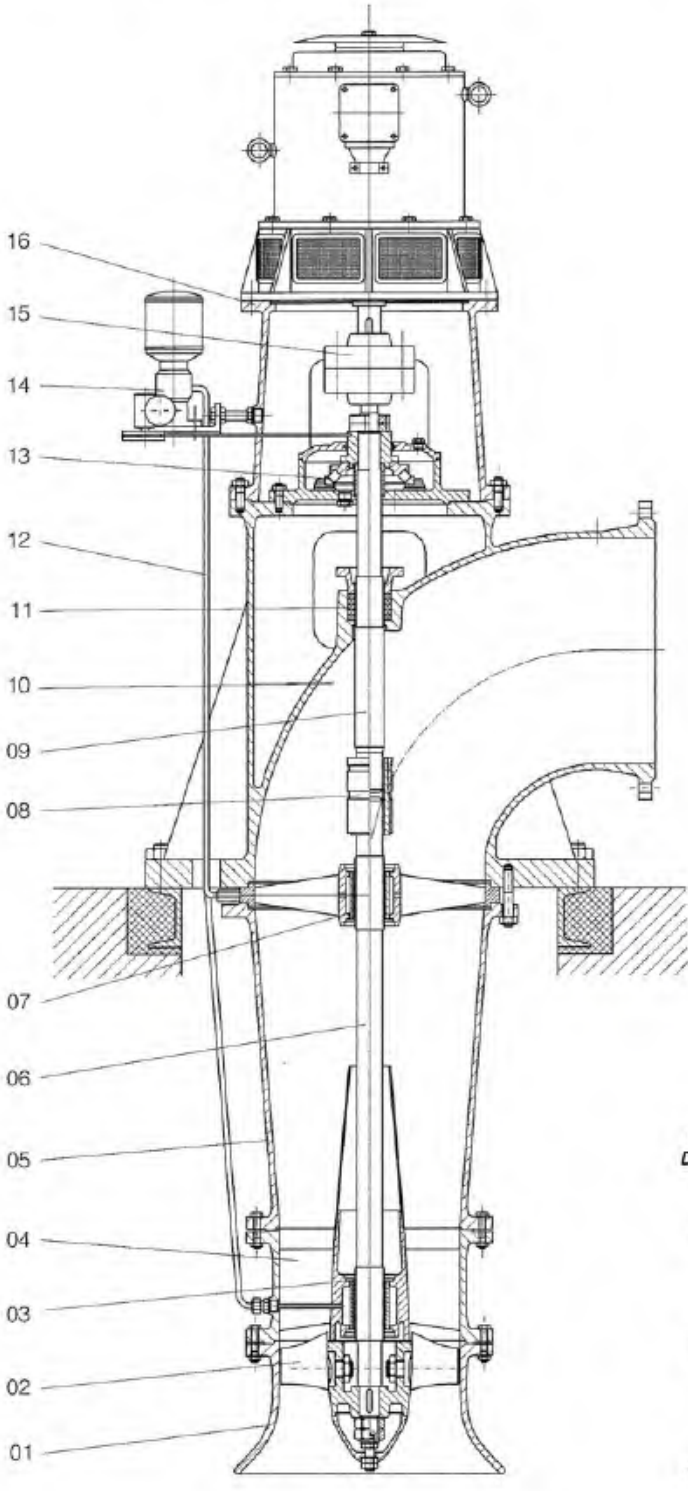
Capacities of propeller pumps start from 90 liters up to 10 000 liters per second at a manometric head from 0,5 to 18 meters of water column. We also offer pumps out of this range, if specially required. Ranges of their capacities are shown on a diagram. Full efficiency for an adequate capacity and head depends upon a size of chosen pump and a blade angle of attack, as shown on the diagram. Capacities of some pumps are diagrammatically given, therewith covering a degree of their efficiency of than 75% up to 88% as well as showing a corresponding type of pump and speed and number of detailed diagram of pump to be got on the special request.

Design

A complete design of pumping plants and stations together with their erection or a supervision of erection only, is available. Our experienced and highly skilled staff is always ready to give the fullest and closest attention to any requirement of our customers regarding these pumps and their application.

Presjek pumpe tipa AVZ

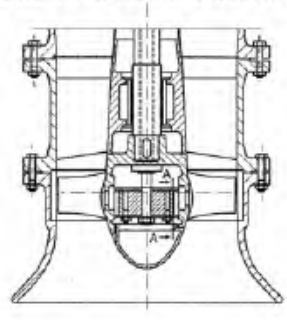
AVZ Type Pump Cross Section



Glavni dijelovi pumpe
Pump Main Parts

01 - Usisna zvono / *Bell Mouth*
02 – Propeler / *Propeller*
03 - Donji ležaj / *Bottom Bearing*
04 – Stator / *Stator*
05 - Cijevni nastavak / *Tube Casting*
06 - Vratilo pumpe / *Pump Shaft*
07 – Međuležaj / *Intermediate Bearing*
08 – Spojka / *Rigid Coupling*
09 - Pogonsko vratilo / *Driving Shaft*
10 - Tlačno koljeno / *Discharge Toggle*
11 - Brtvenica vratila / *Shaft Packing*
12 - Cijev za mazivo / *Lubricant Pipe*
13 - Aksijalni ležaj / *Axial Bearing*
14 - Pumpa za mast / *Grease Feed Pump*
15 - Elastična spojka / *Flexible Coupling*
16 - Lanterna motora / *Motor Pedistal*

Detalj propelera pumpe tipa AVZR
Detail of Propeller Pump Type AVZR



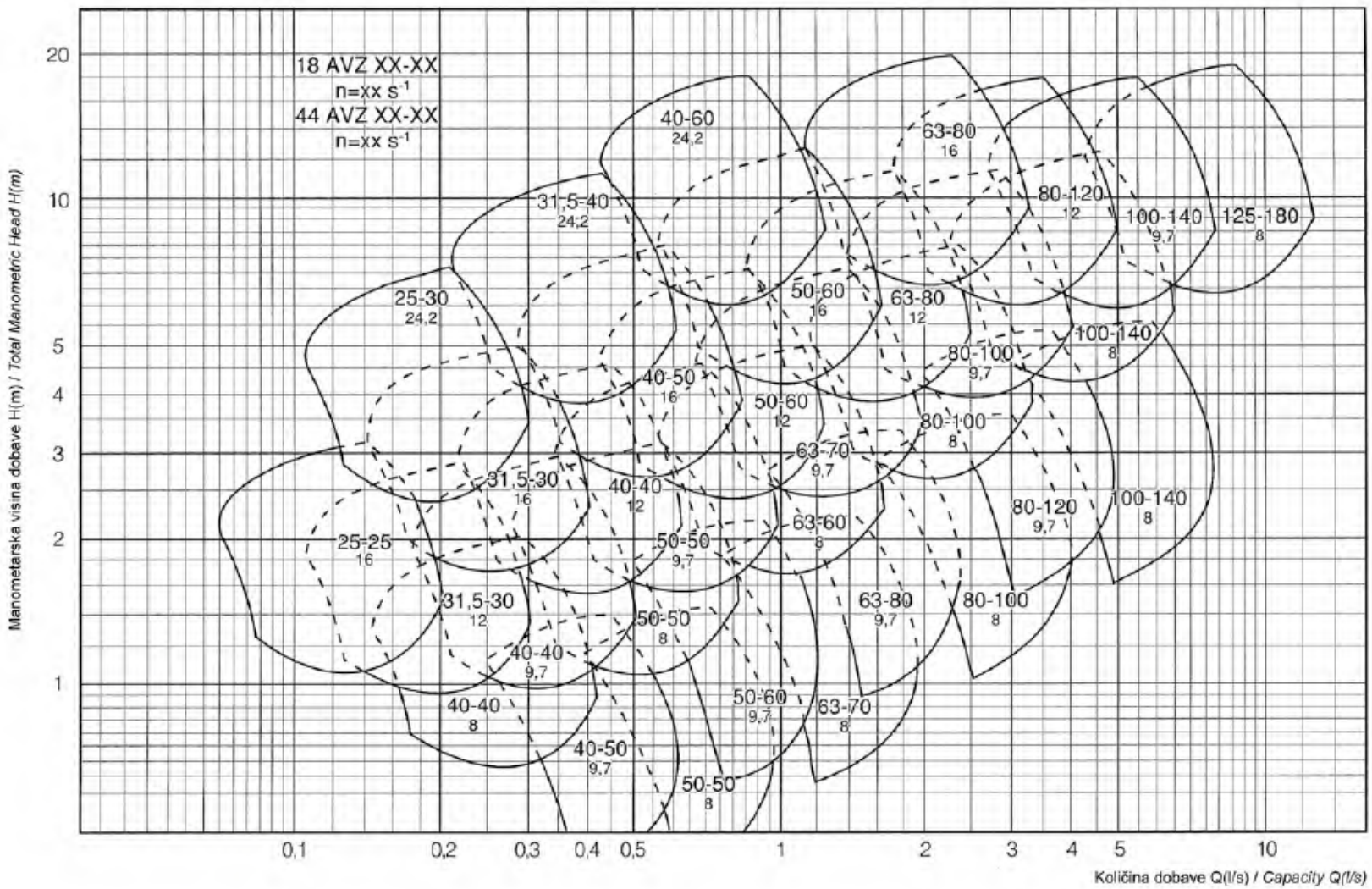
Presjek A-A
Cross-section A-A

Design of propeller pumps

An ordinary design of this type of pumps is marked with AVZ, in addition of its size being also marked, such a AVZ 50-50; the first number shows a diameter of rotor, the second one is a diameter of discharge flange (in cm). If the Pump is provided with deflecting blades during run, it is marked with AVZR at which R shows this feature.

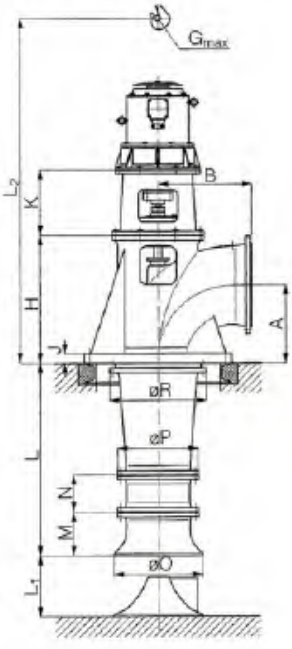
Depending on design four executions of pumps are available. A normal design is shown on A sketch. An electro-motor is by means of its pedestal directly fastened to the pump. At very capacious pumping units. the motor is fixed to the engine-room floor (B.. sketch). If necessary, the complete pump can be hung upon the motor pedestal (C sketch). If the lift between the pump discharge elbow and the engine-room floor is large, the execution D is recommended to be applied. All pump elements are identical for these four designs, except in the C execution, at which the discharge elbow has no support. Unless an access to the lower pump space is not provided from a side, the upper opening in the engine- room floor has to be large enough to enable the pump discharge elbow to pass through it. Measuring data for the A execution are given on the sketch and they can be also applied to all other executions, but dimensions L, L_1, H_1, H_2 and H_3 which are directed by design itself.

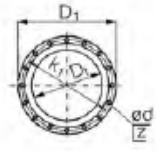
Područja dobave pumpi tipa AVZ i AVZR ***Ranges Of Supply – Pumps Type AVZ and AVZR***

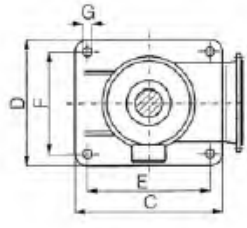


Mjerna skica pumpi tipa AVZ i AVZR
Measuring Sketch Of Pumps Type AVZ and AVZR

(Crtano za A izvedbu)
(Drawn for A execution)







Kote L, L_2 i težina najtežeg komada G_{max} ovise o projektu, dok kota L_1 mora biti najmanje ½ promjera O.

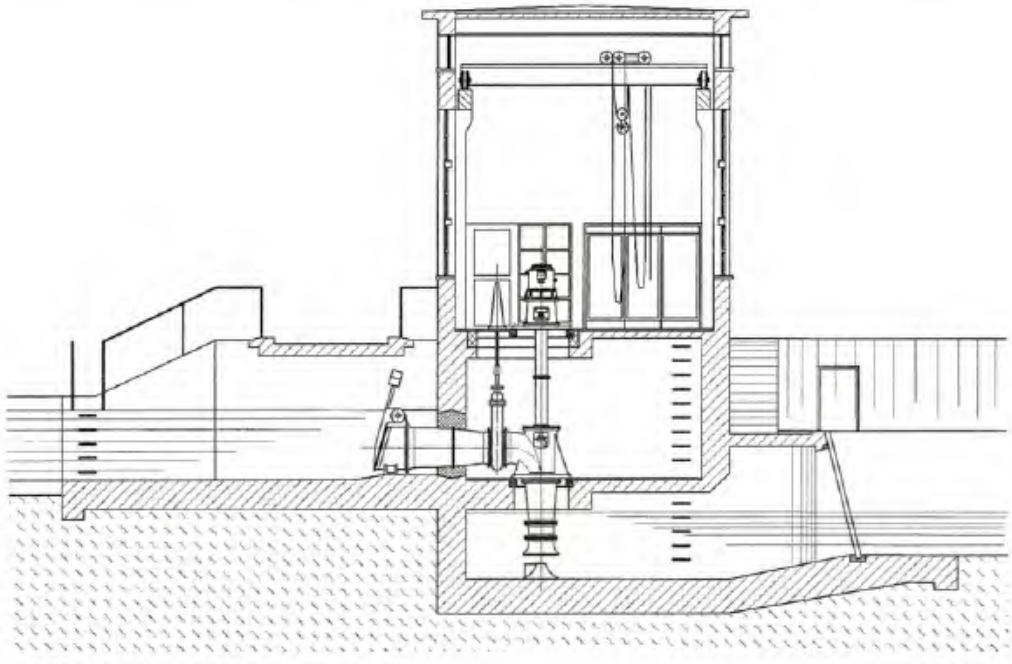
Dimensions L, L_2 and weight of the heaviest piece Gmax depend upon design required, since the dimension L_1 has to be at least ½ of diameter O.

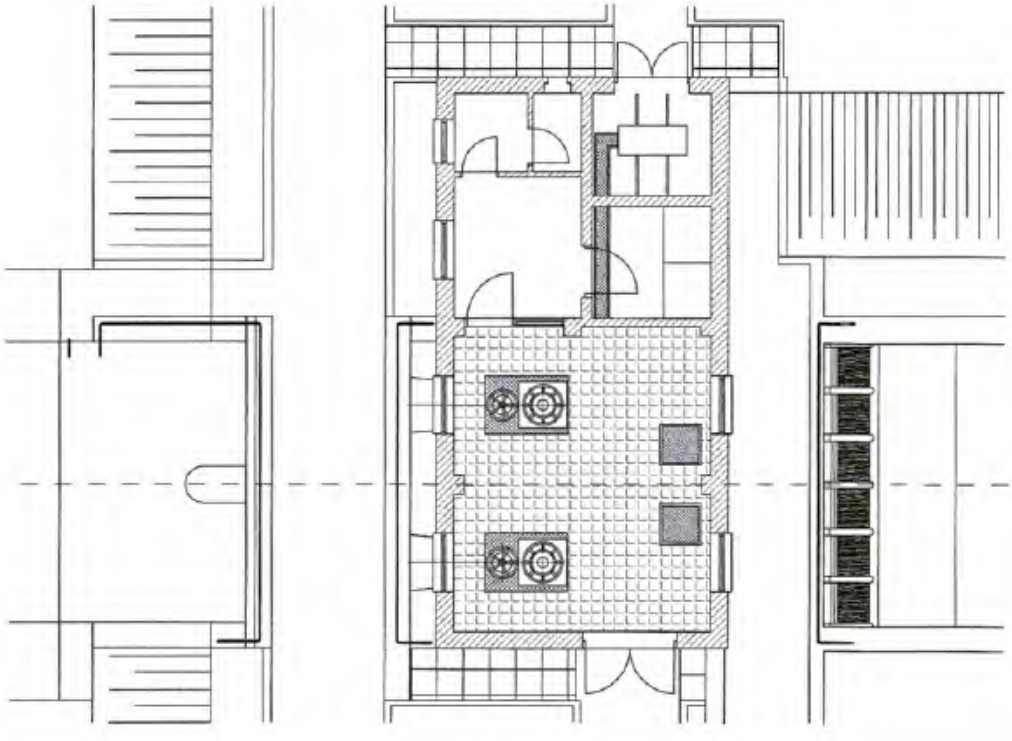
		AVZ													AVZ i AVZR			
		25-25	25-30	31,5-30	31,5-40	36-40	40-40	40-50	40-60	50-50	50-60	63-60	63-70	63-80	80-100	80-120	100-140	125-180
Dimenzije pumpe *Pump Dimensions*	A	250	300	300	400	400	400	500	600	500	600	620	715	800	1000	1200	1400	1800
	B	300	400	400	500	500	450	500	600	500	600	620	700	800	1000	1200	1400	1800
	C	620	700	700	550	550	800	1050	1050	1050	1050	1130	1180	1400	1600	1800	2100	2500
	D	620	700	700	780	780	800	1015	920	1015	920	1130	1180	1050	1600	1800	2100	2500
	E	560	600	600	450	450	720	970	950	970	950	1070	1080	1280	1500	1680	1950	2340
	F	560	600	600	720	720	720	935	860	935	860	1070	1080	930	1500	1680	1950	2340
	G	27	27	27	27	27	27	33	27	27	27	27	33	39	33	39	45	45
	H	500	600	600	670	670	700	920	980	900	980	980	1350	1300	1750	1850	2200	2500
	J	30	30	30	35	35	40	45	50	40	50	40	40	45	45	45	50	60
	K	295	325	444	474	364	373	480	615	480	560	600	600	600	752	800	850	1000
	M	195	195	230	230	260	300	300	300	365	365	445	445	445	650	650	880	980
	N	150	150	200	200	220	240	240	240	285	285	400	400	400	440	440	620	810
	O	380	380	480	480	550	620	620	620	760	760	980	980	980	1250	1250	1500	1880
	P	370	370	430	430	480	535	535	535	640	640	810	810	810	1000	1000	1190	1500
	R	370	445	430	530	520	535	630	755	670	755	780	860	970	1175	1455	1650	2115
Prirubnica Flange	Dt	250	300	300	400	400	400	500	600	500	600	600	700	800	1000	1200	1400	1800
	D1	395	445	445	565	565	565	670	780	670	780	780	895	1015	1230	1455	1675	2115
	k1	350	400	400	515	515	515	620	725	620	725	725	840	950	1160	1380	1590	2020
	d	23	23	23	27	27	27	27	30	27	30	30	30	33	36	39	42	48
	z	12	12	12	16	16	16	20	20	20	20	20	24	24	28	32	36	44

Dimenzije u mm (neobavezne)
Dimensions in mm (non-compulsory)

Idejni projekt melioracione pumpne stanice
s dvije ugrađene propelerne pumpe

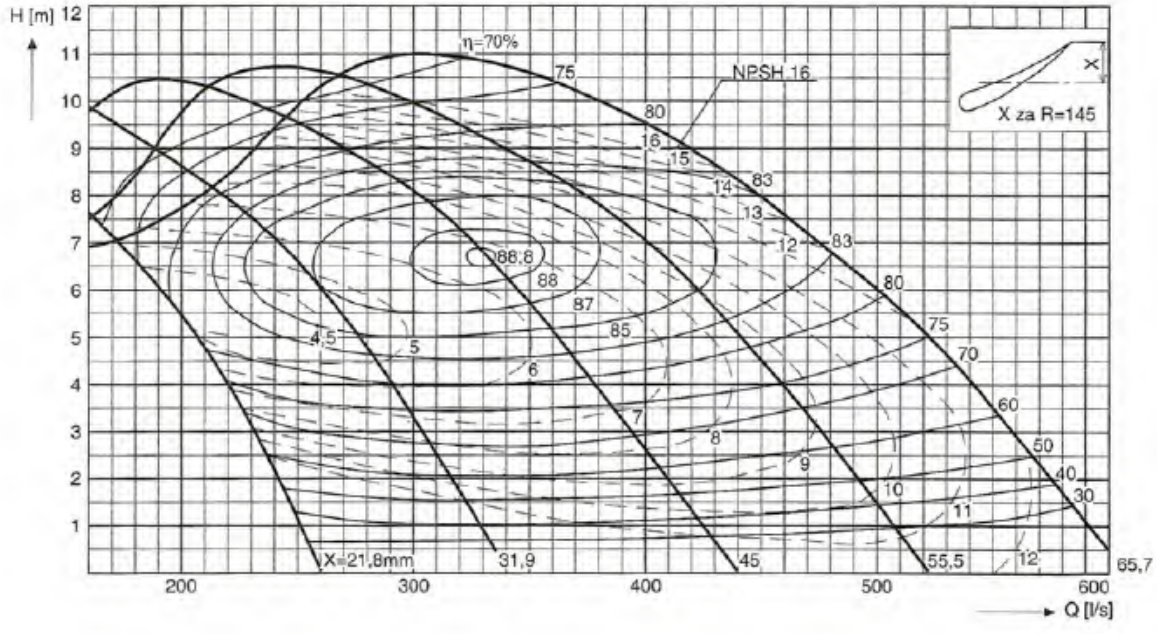
Disposition Of An Irrigation Pump Plant
With Two Propeller Pumps Installed





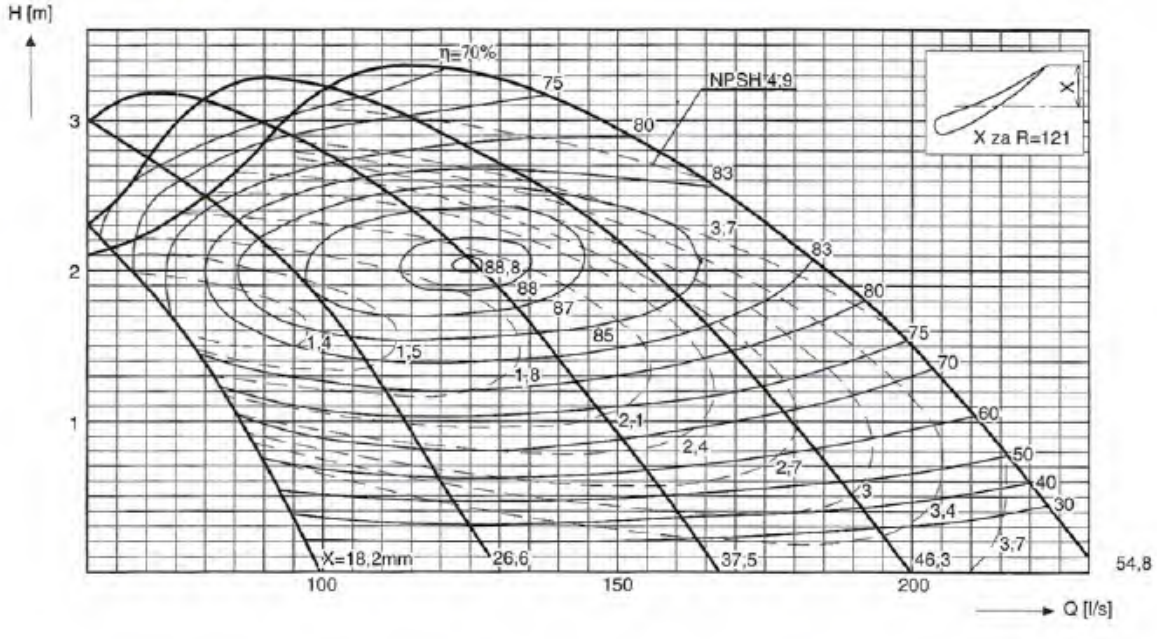
18 AVZ 30-30

n=24,2s^{-1}



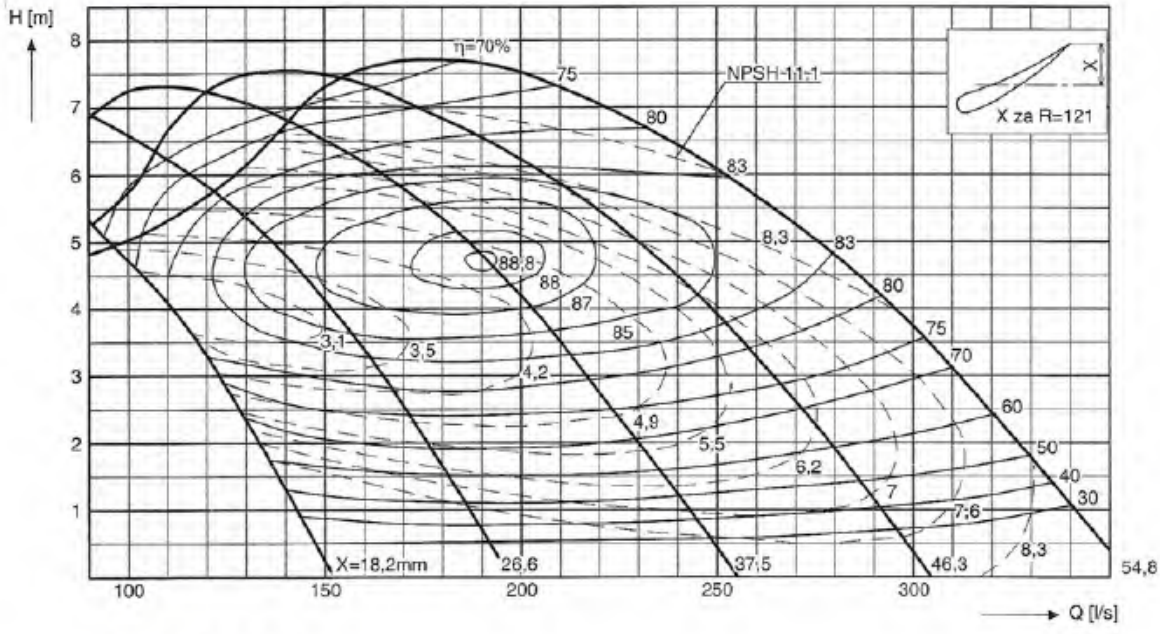
18 AVZ 25-25

n=16s^{-1}



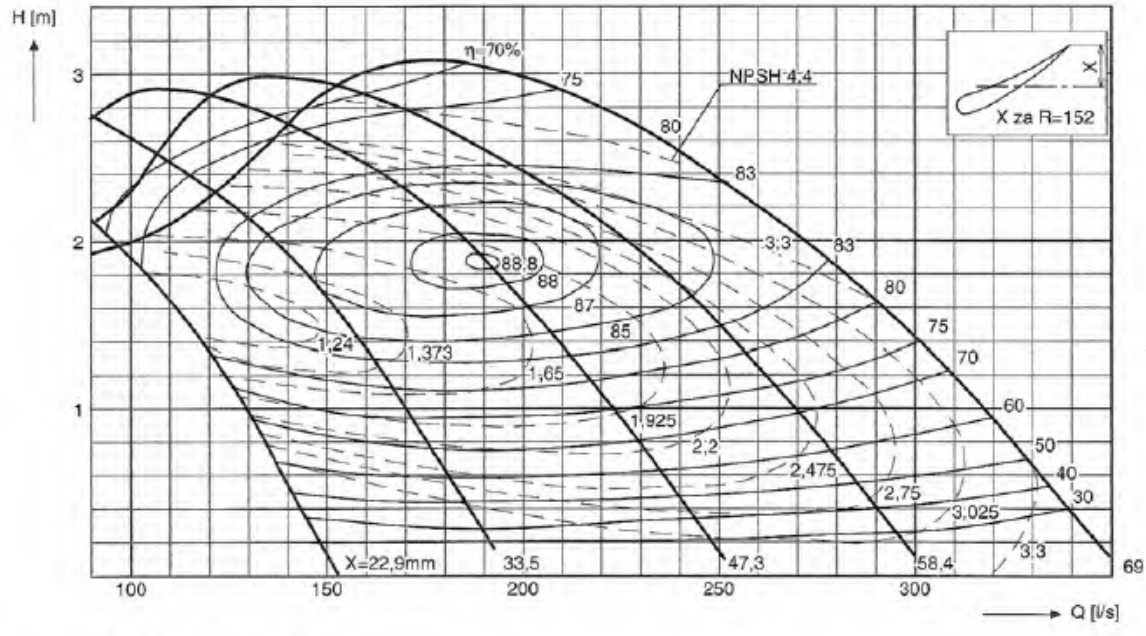
18 AVZ 25-30

n=24,2s^{-1}



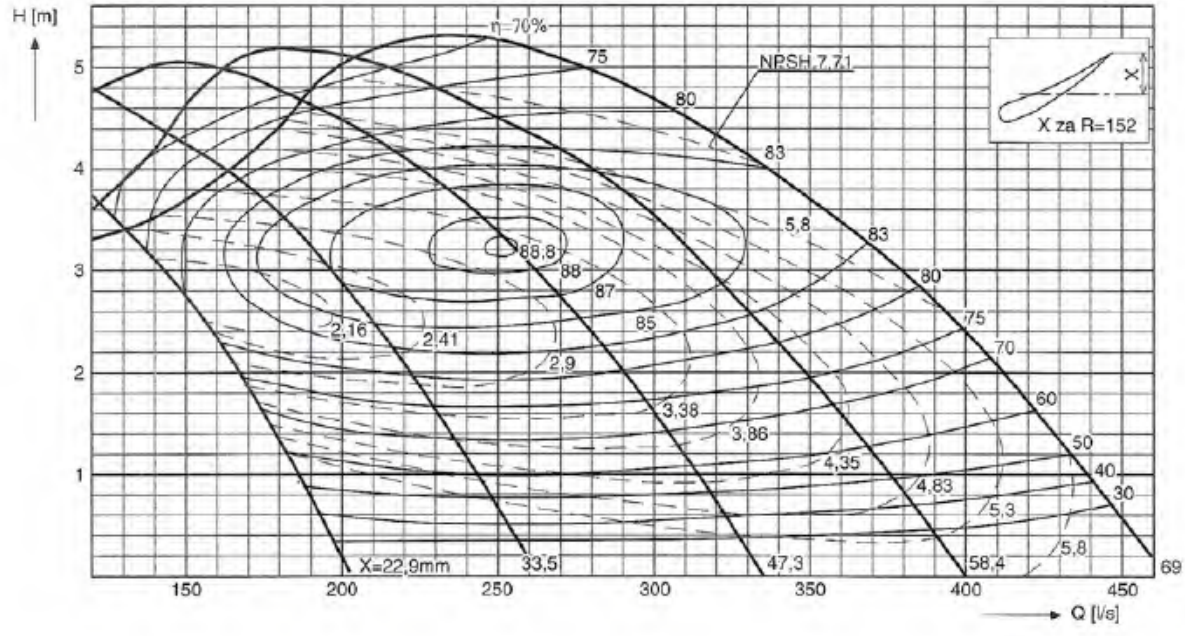
18 AVZ 31,5-30

n=12s^{-1}



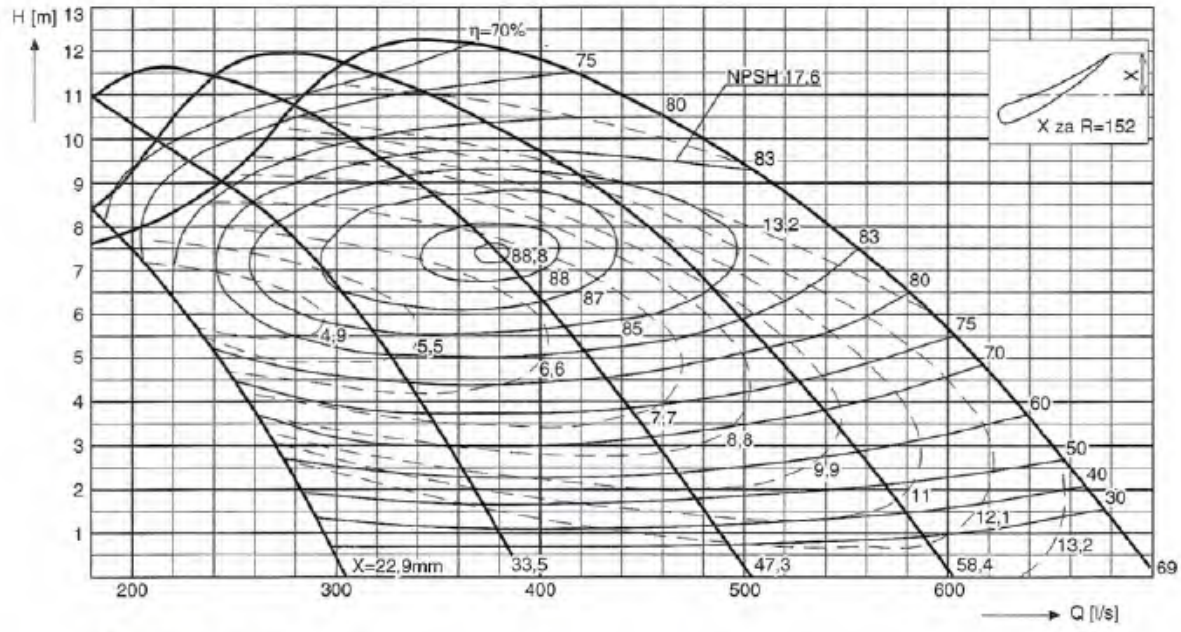
18 AVZ 31,5-30

n=16s^{-1}



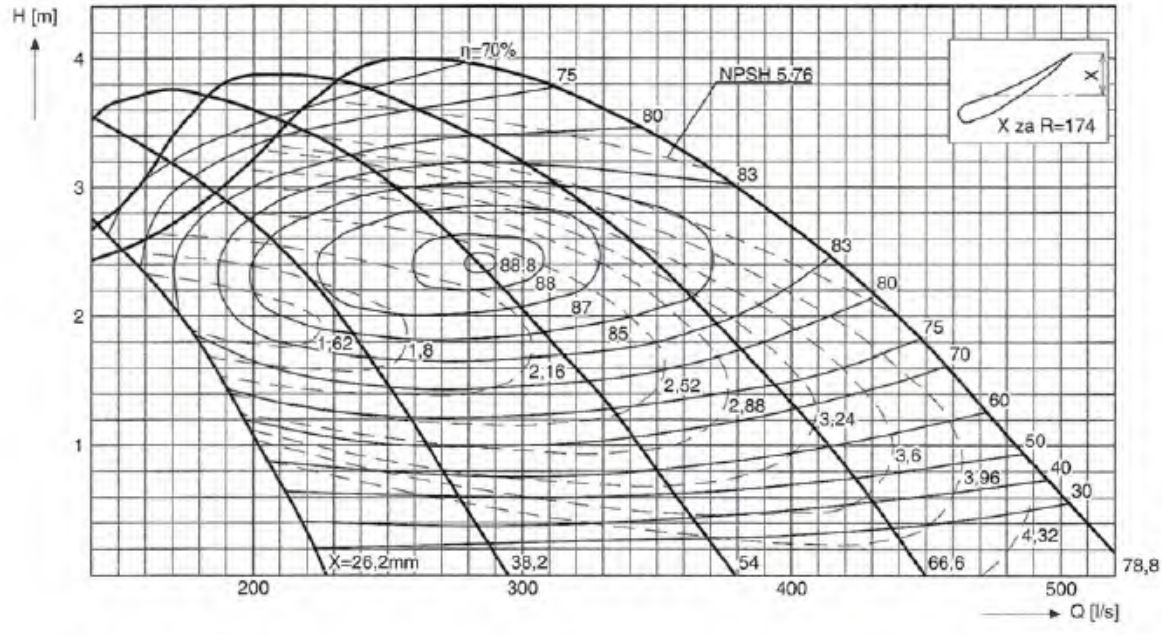
18 AVZ 31,5-40

$n=24{,}2s^{-1}$



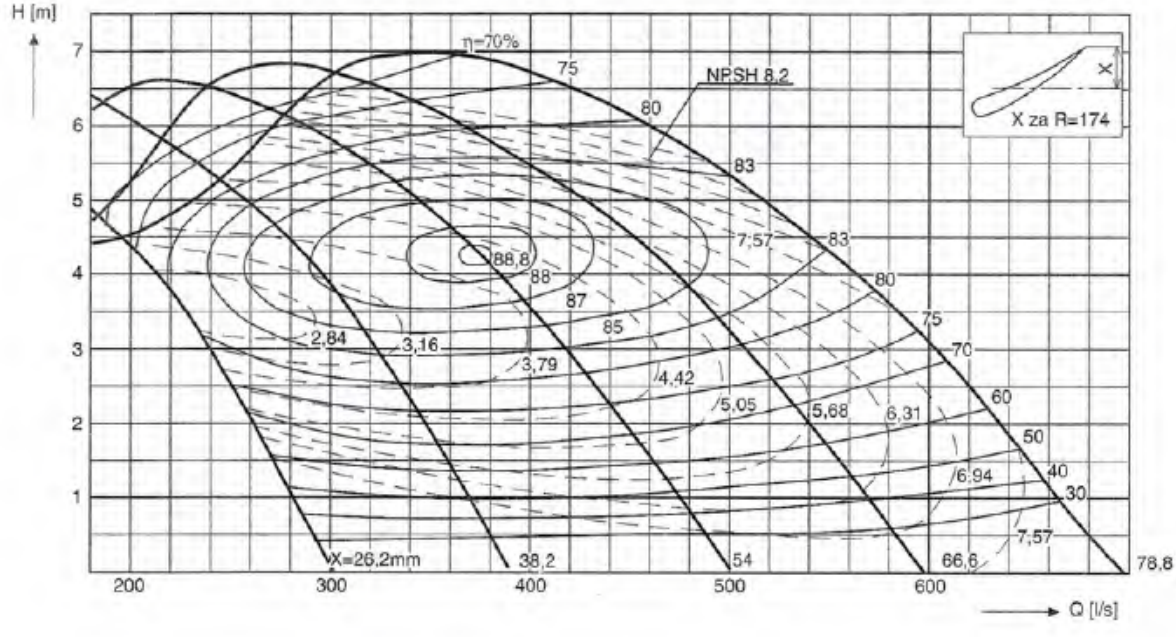
18 AVZ 36-40

$n=12s^{-1}$



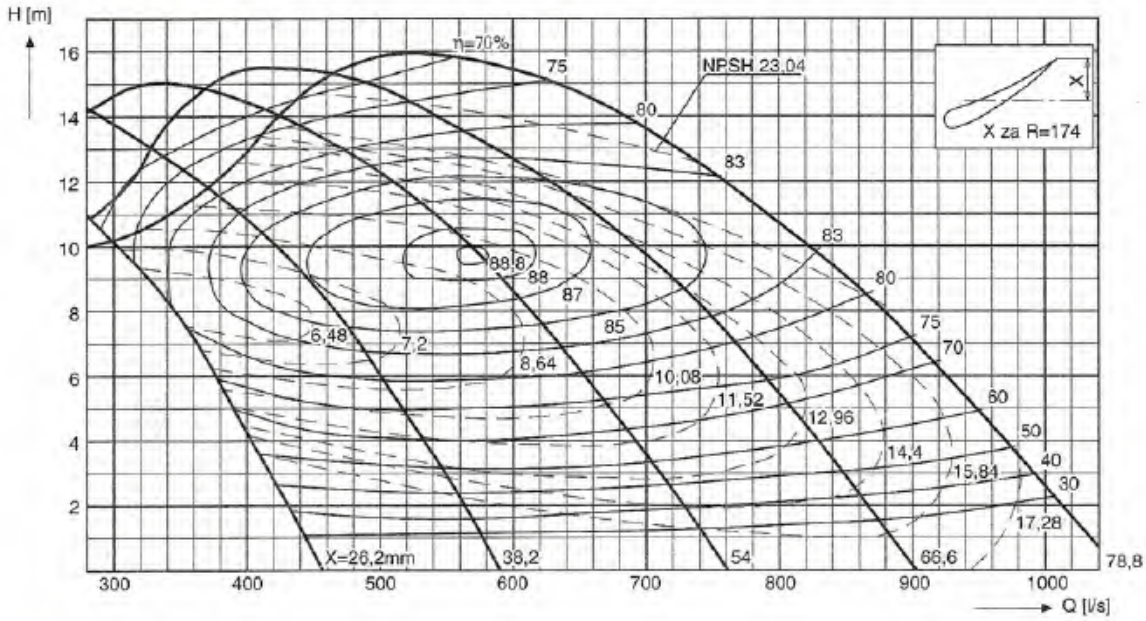
18 AVZ 36-40

$n=16s^{-1}$



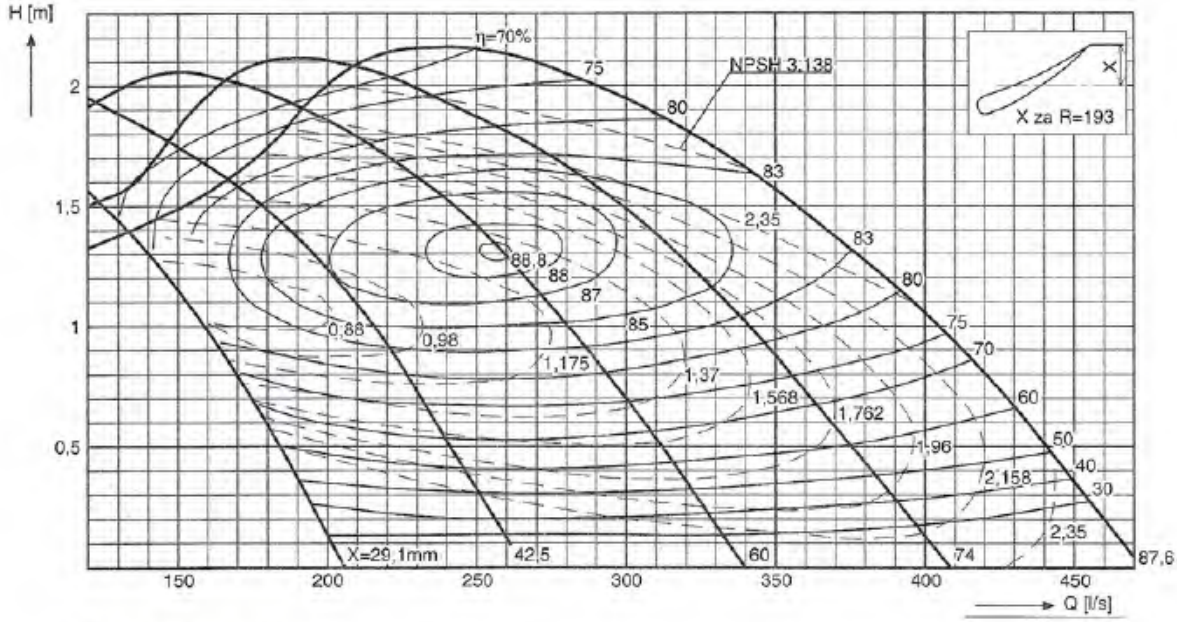
18 AVZ 36-40

n=24,2s^{-1}



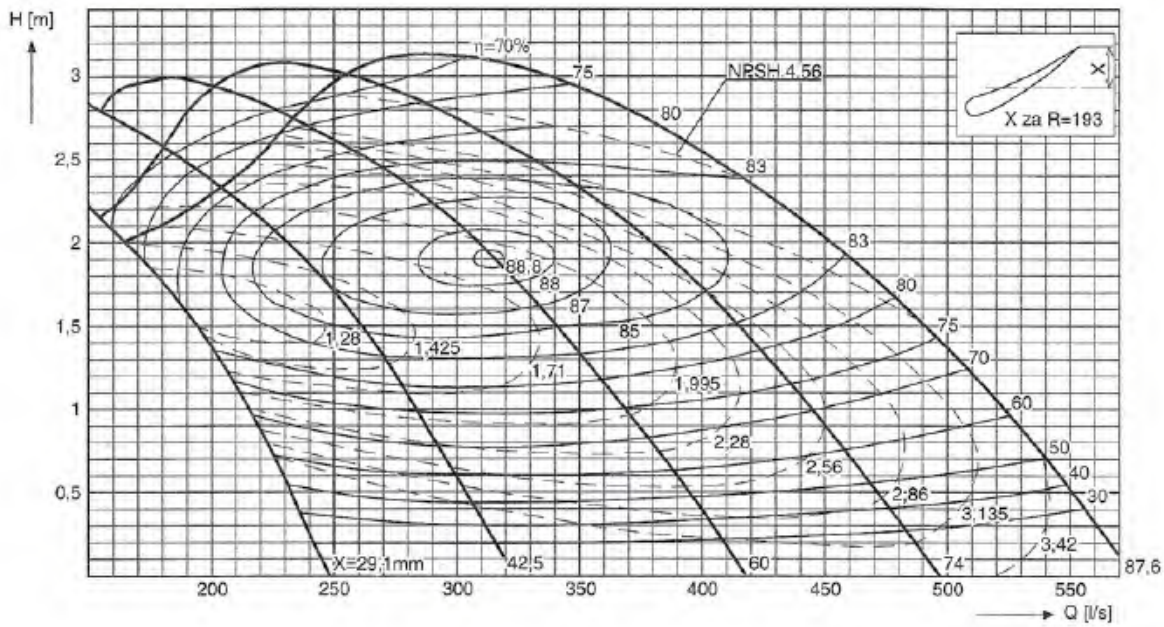
18 AVZ 40-40

n=8s^{-1}



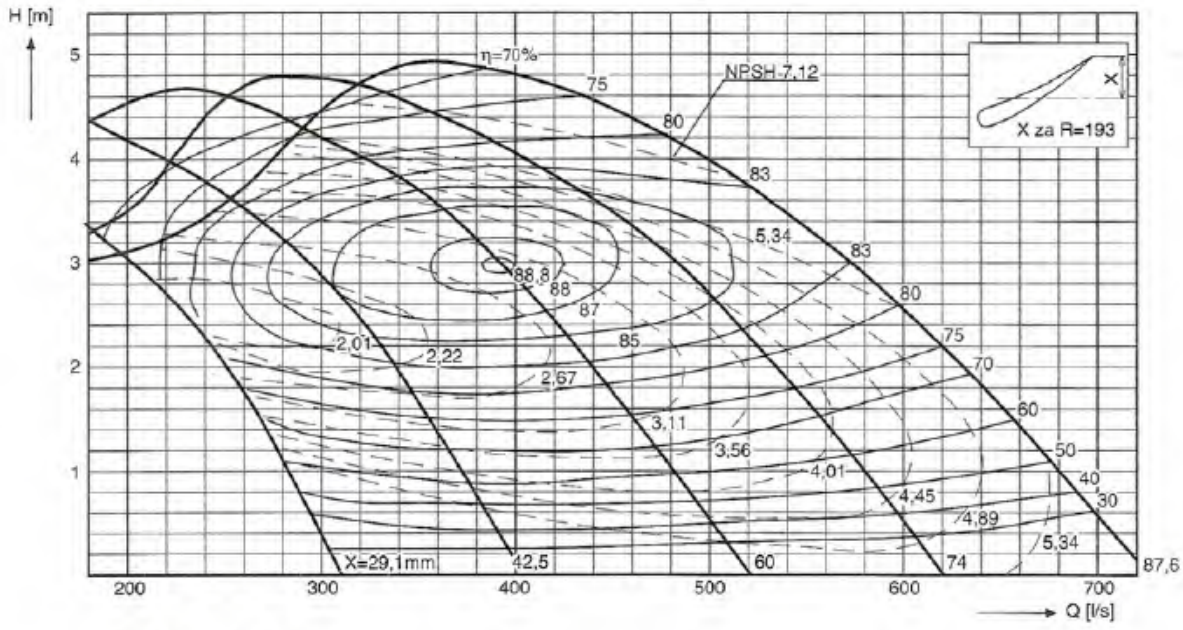
18 AVZ 40-40

n=9,7s^{-1}



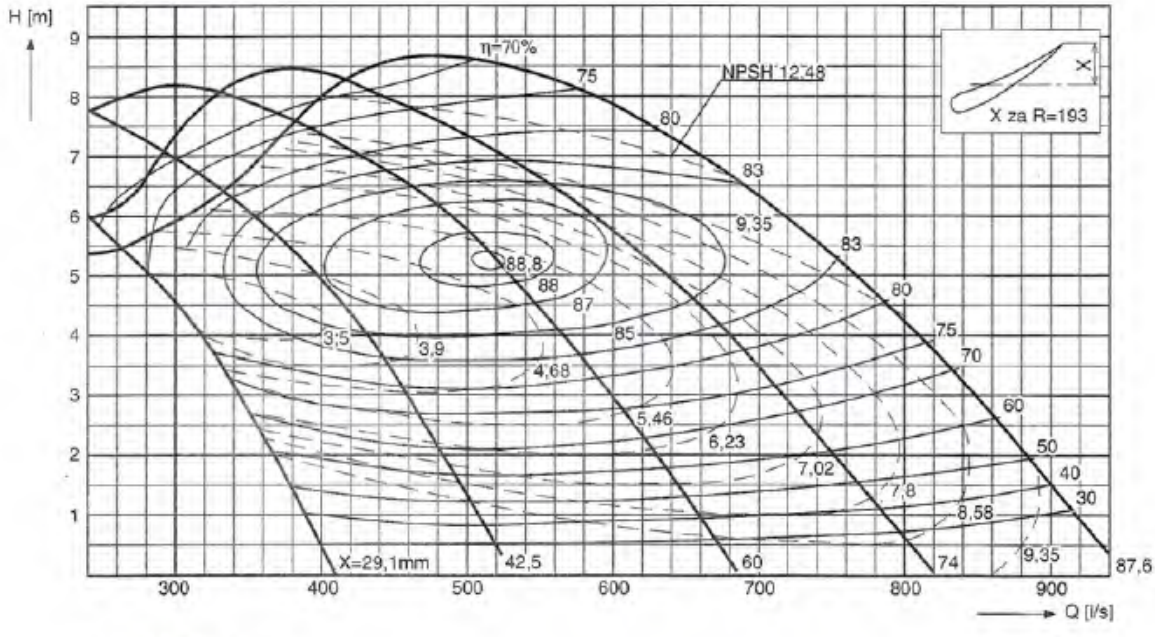
18 AVZ 40-40

n=12s^{-1}



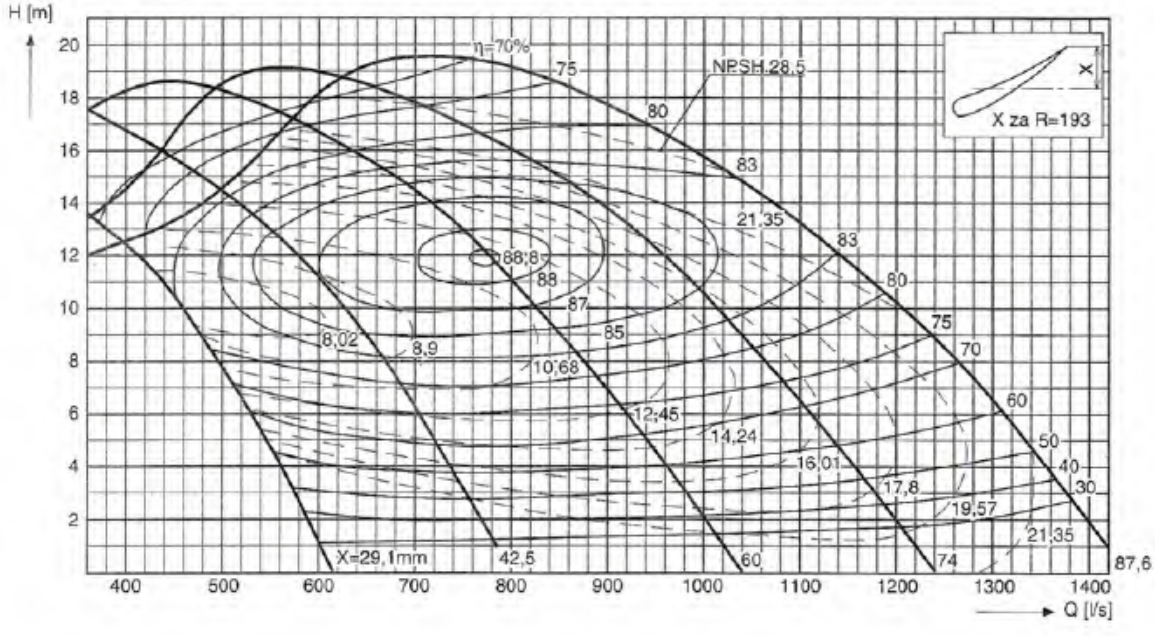
18 AVZ 40-50

n=16s^{-1}



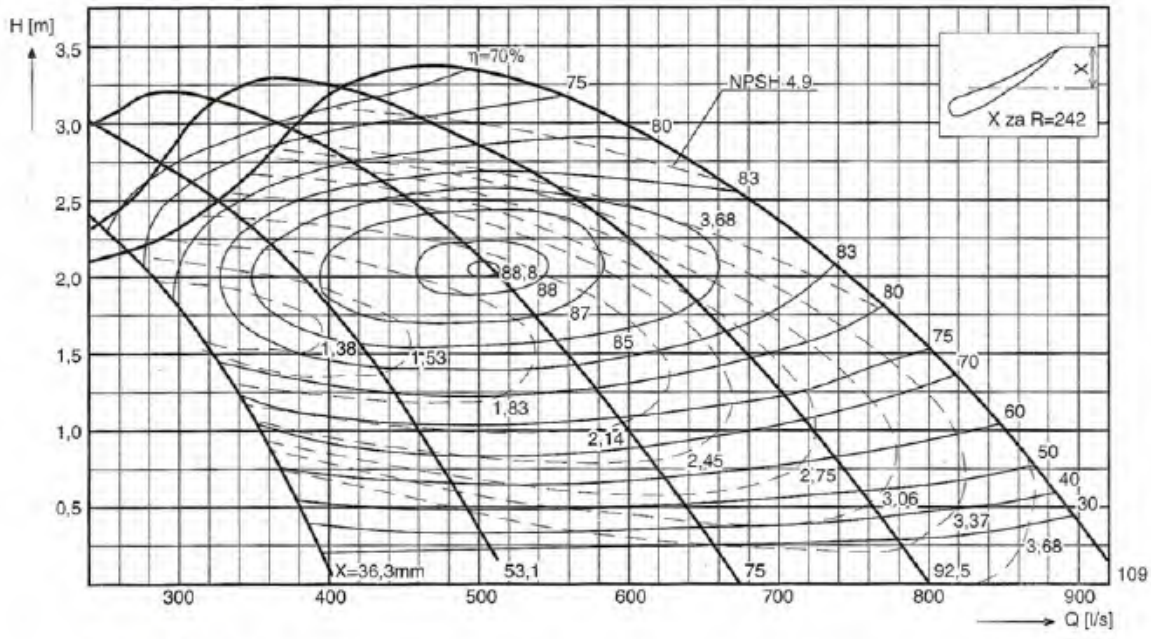
18 AVZ 40-60

n=24,2s^{-1}



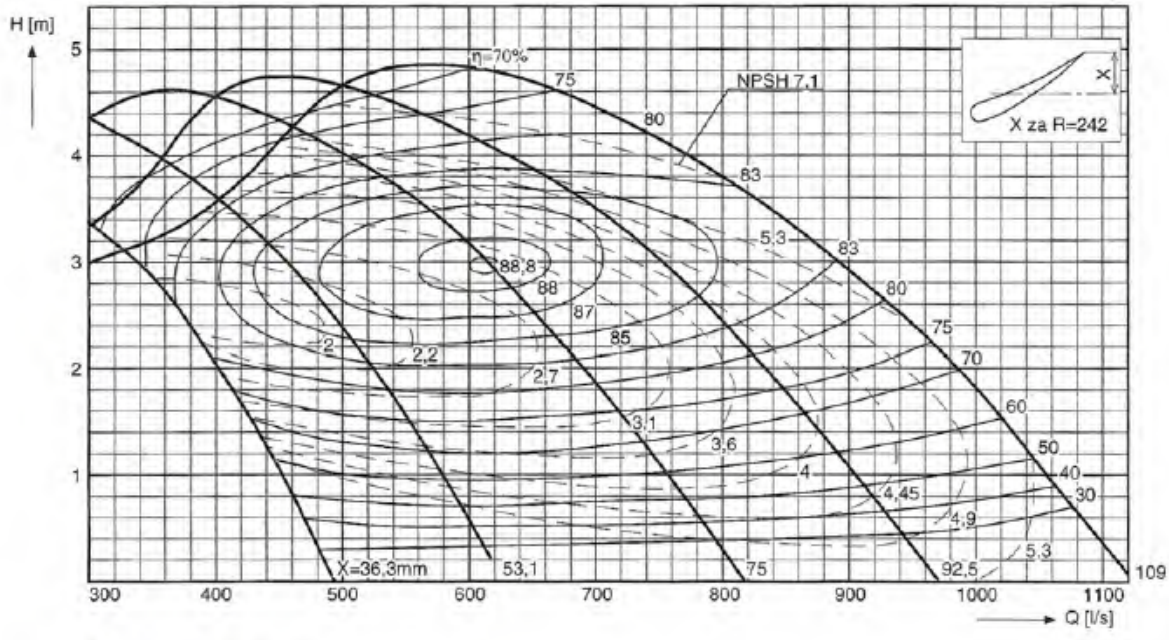
18 AVZ 50-50

$n=8s^{-1}$



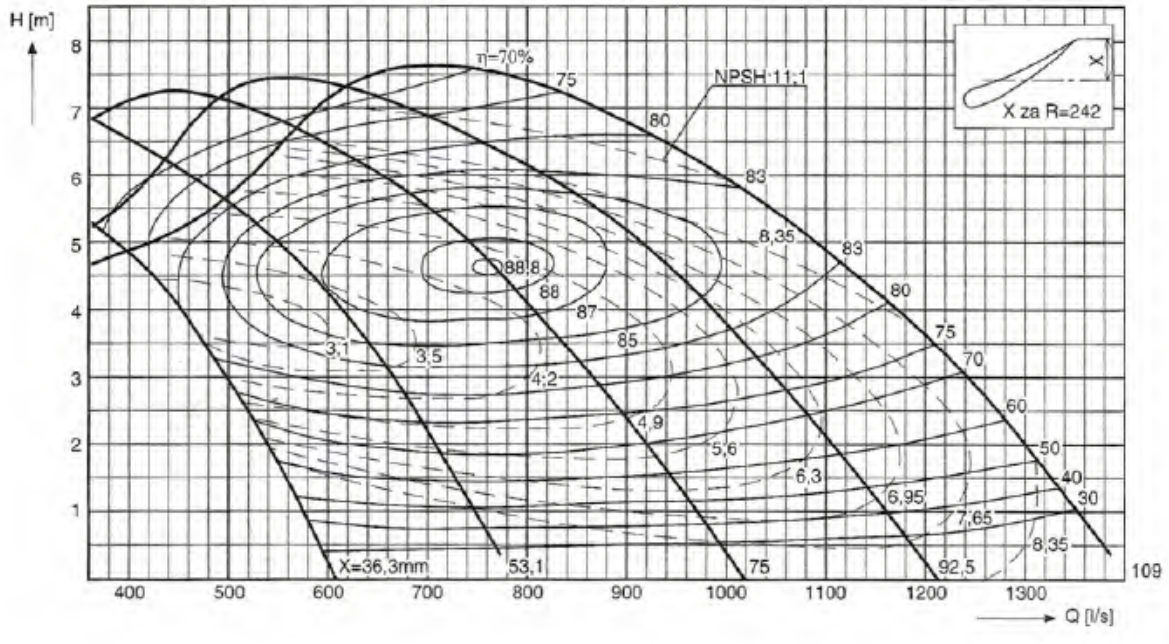
18 AVZ 50-50

$n=9,7s^{-1}$



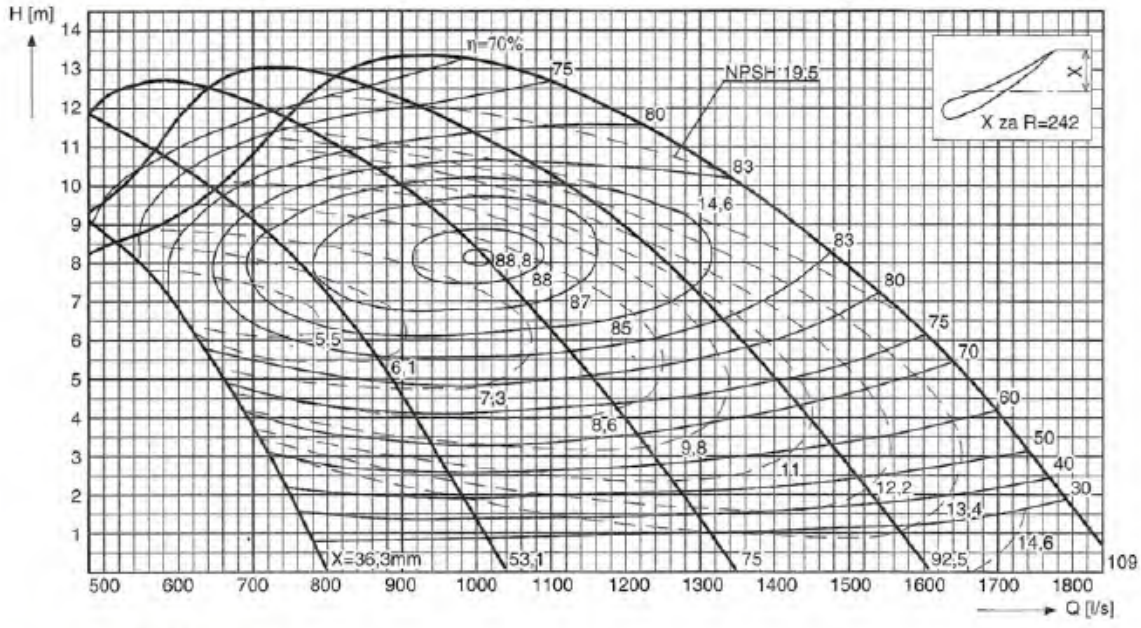
18 AVZ 50-60

$n=12s^{-1}$



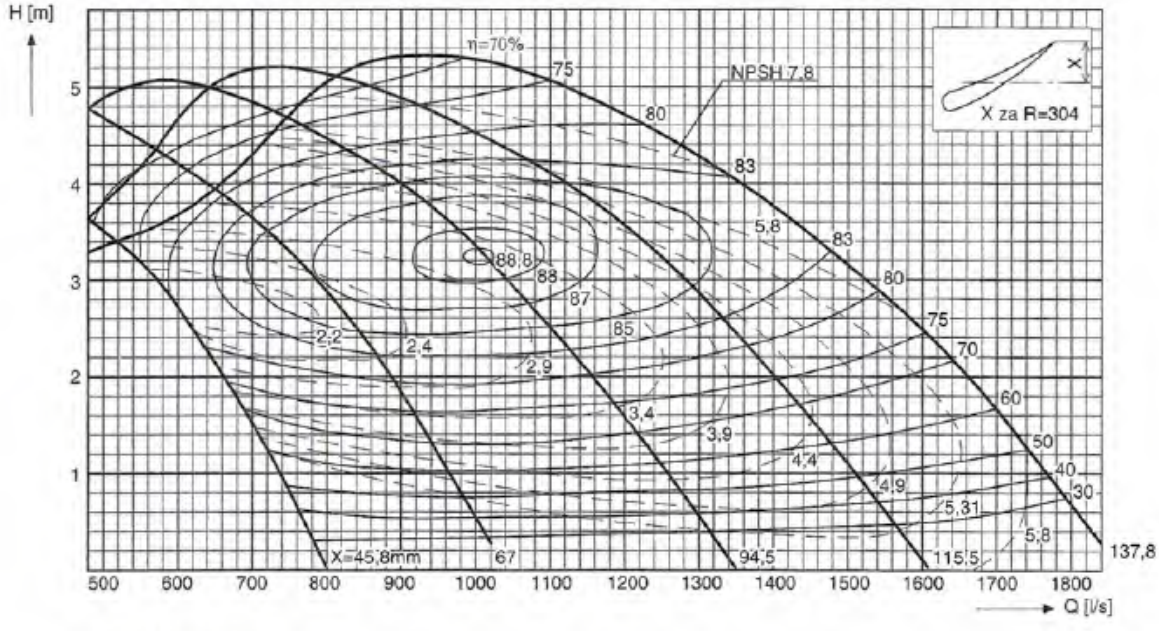
18 AVZ 50-60

n=16s^{-1}



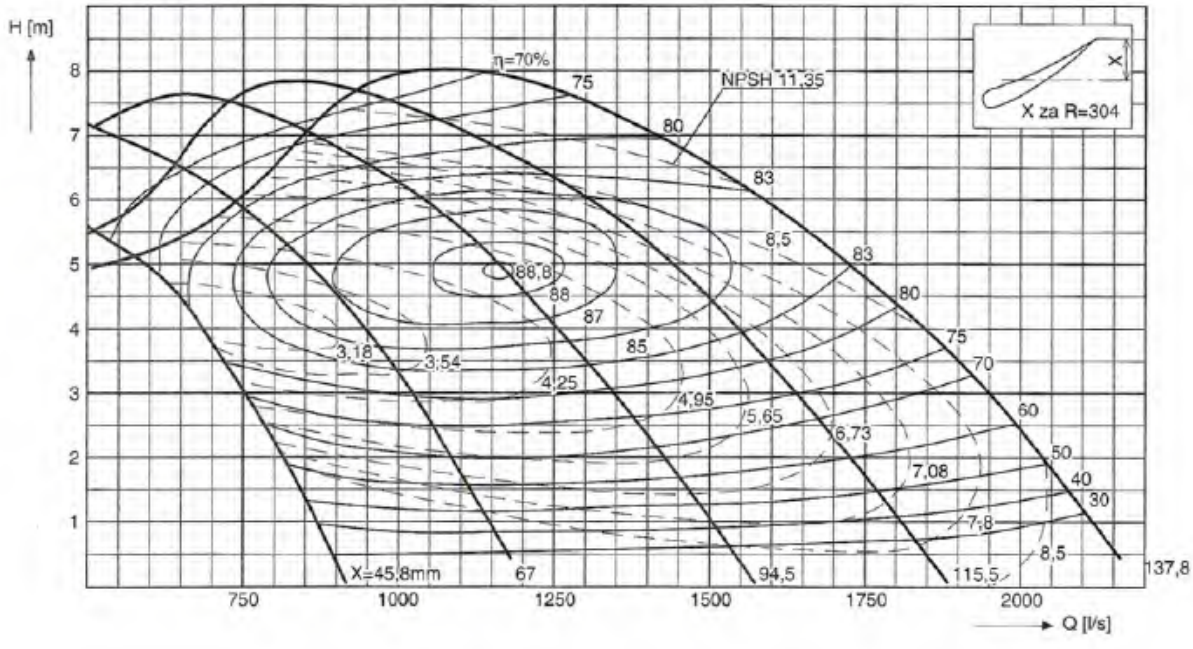
18 AVZ 63-60

n=8s^{-1}



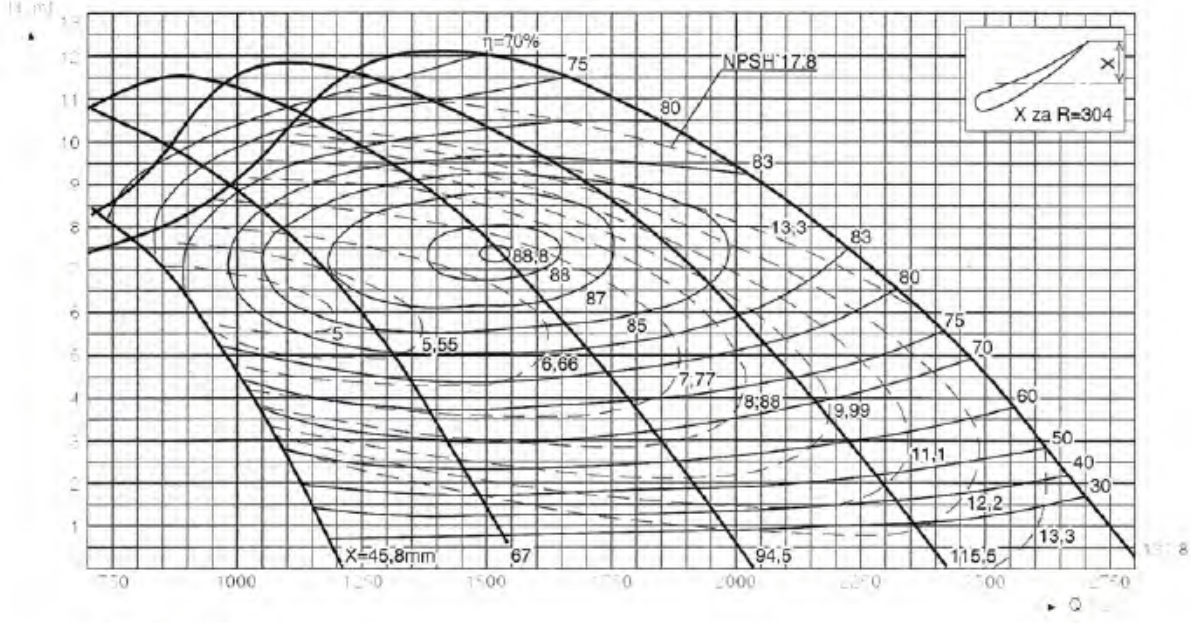
18 AVZ 63-70

n=9,7s^{-1}



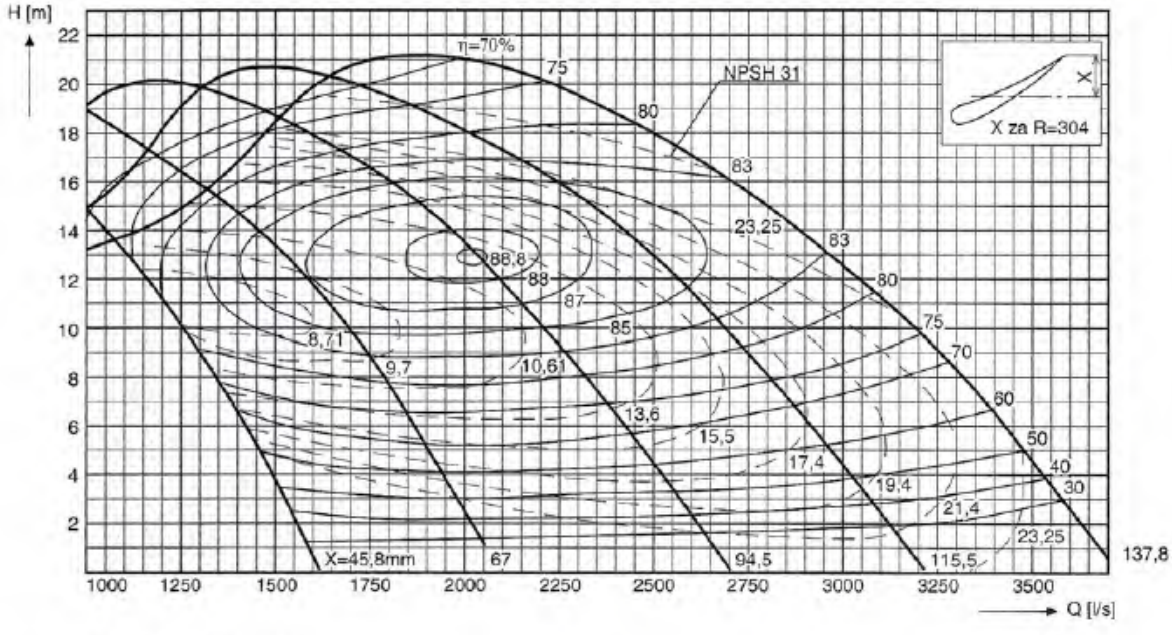
18 AVZ 63-80

n=12s^{-1}



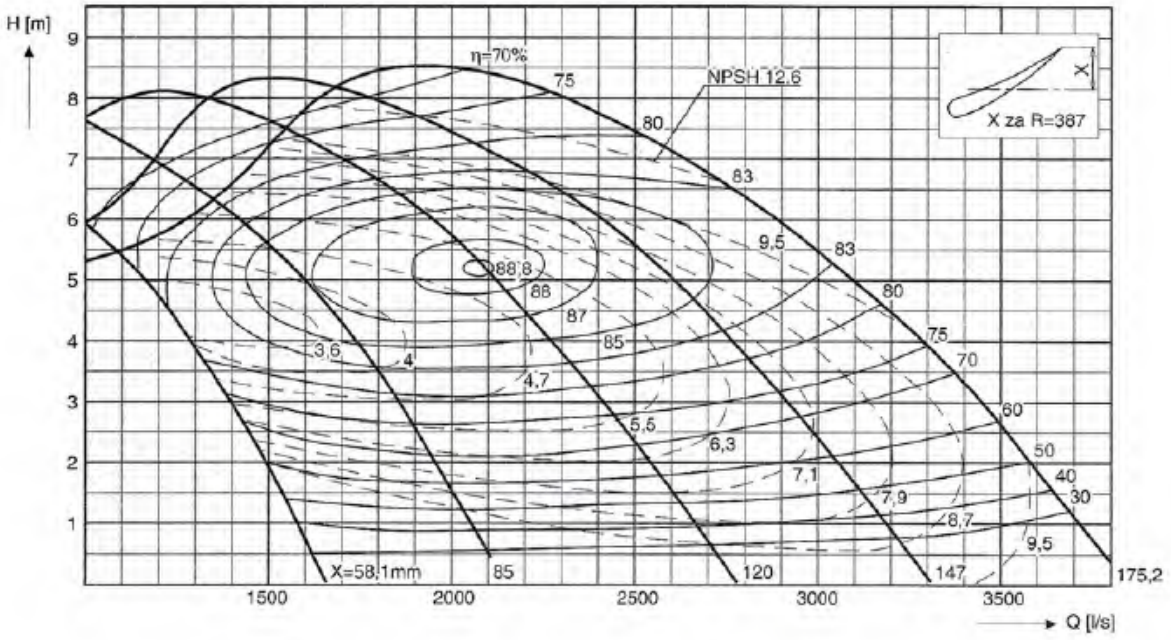
18 AVZ 63-80

n=16s^{-1}



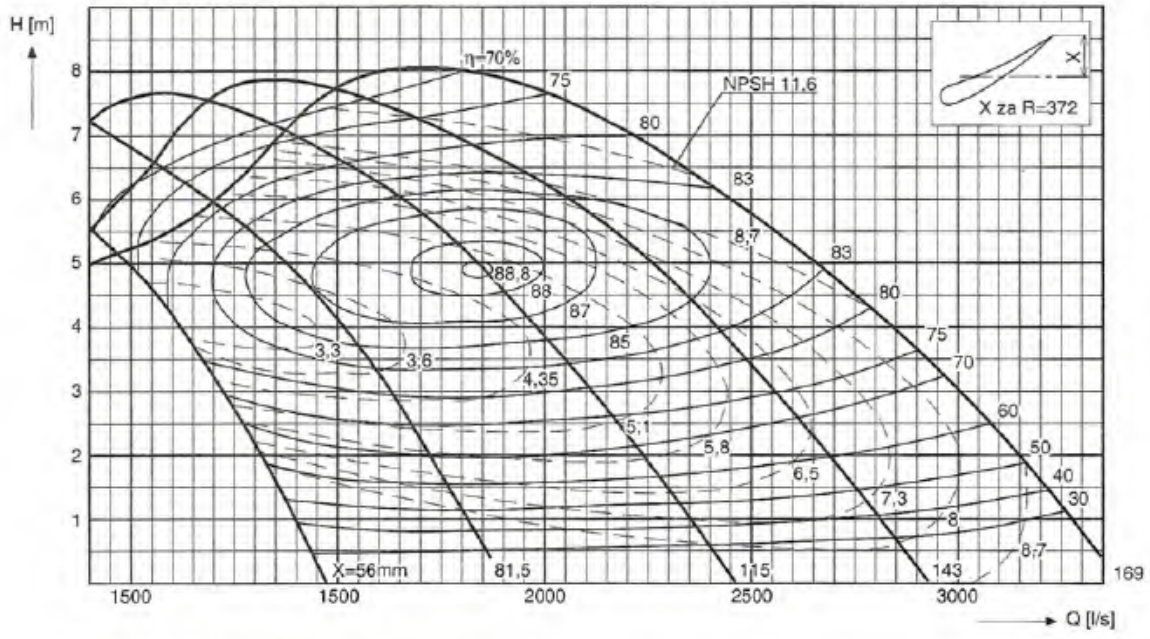
18 AVZ 80-100

n=8s^{-1}



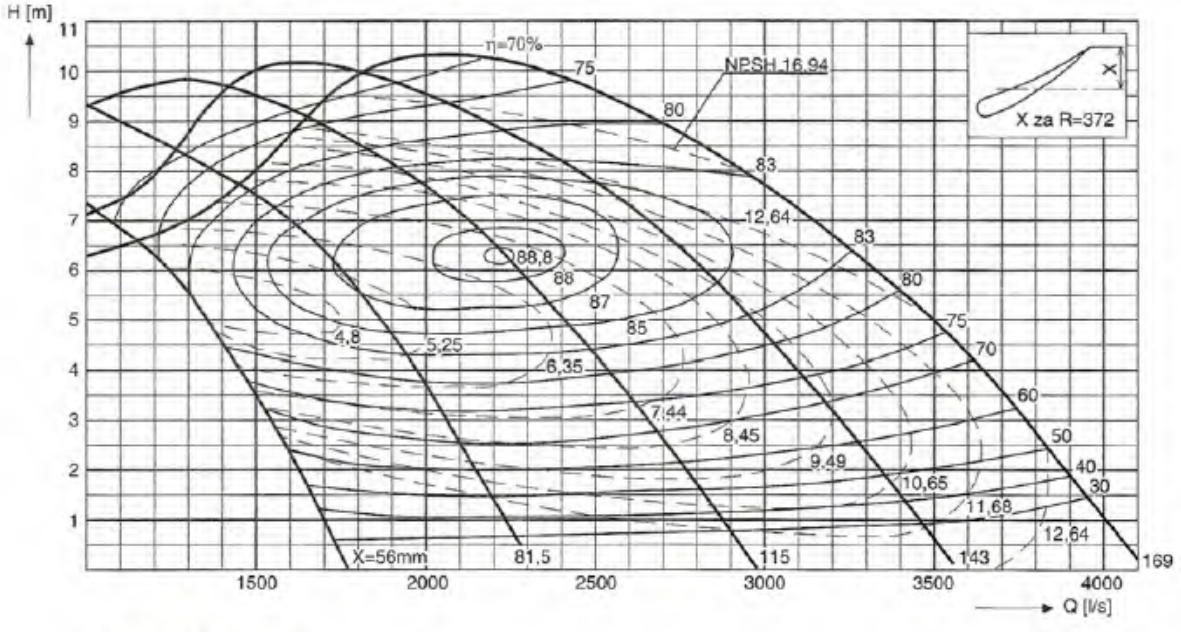
18 AVZ 80*-100 (Rotor 770)

n=8s^{-1}



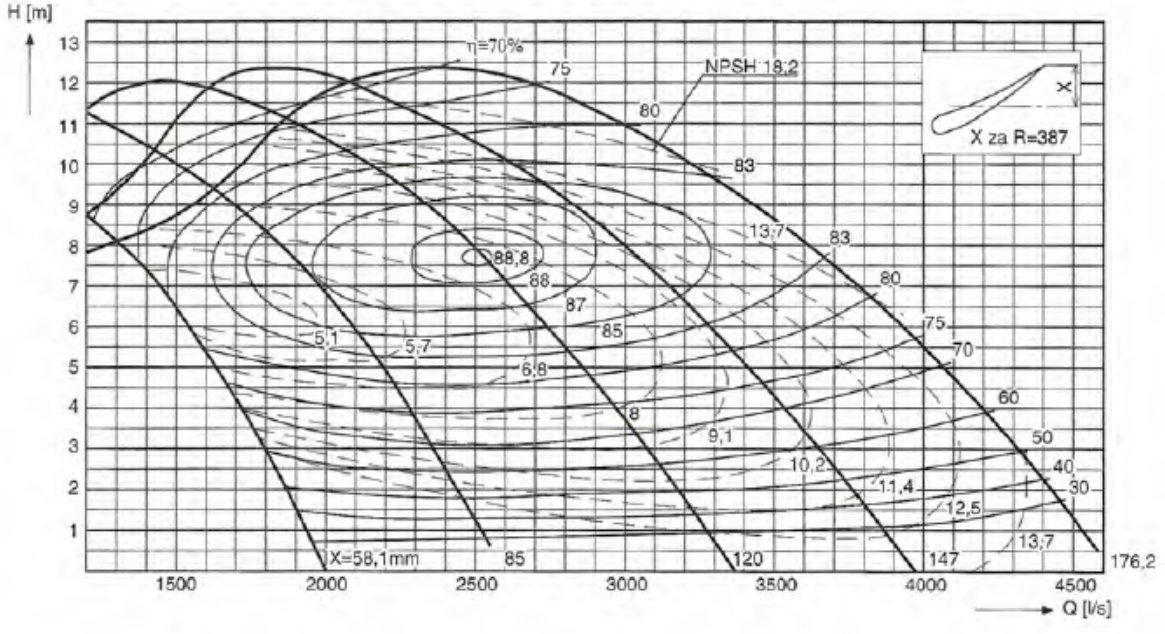
18 AVZ 80*-100 (Rotor 770)

n=9,7s^{-1}



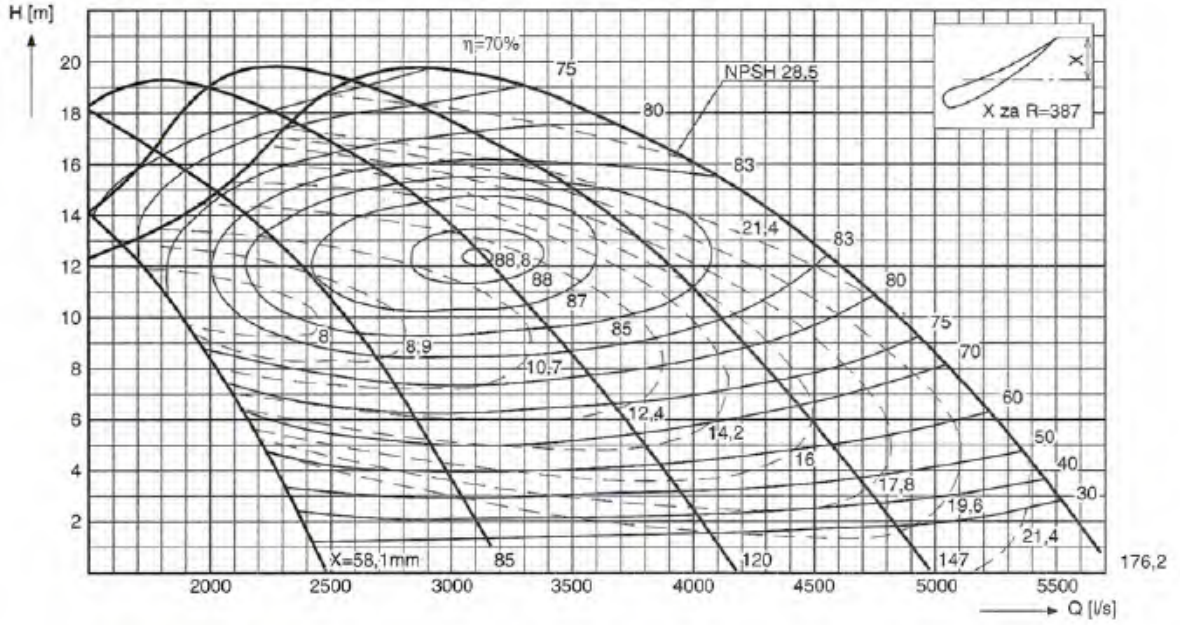
18 AVZ 80-100

n=9,7s^{-1}



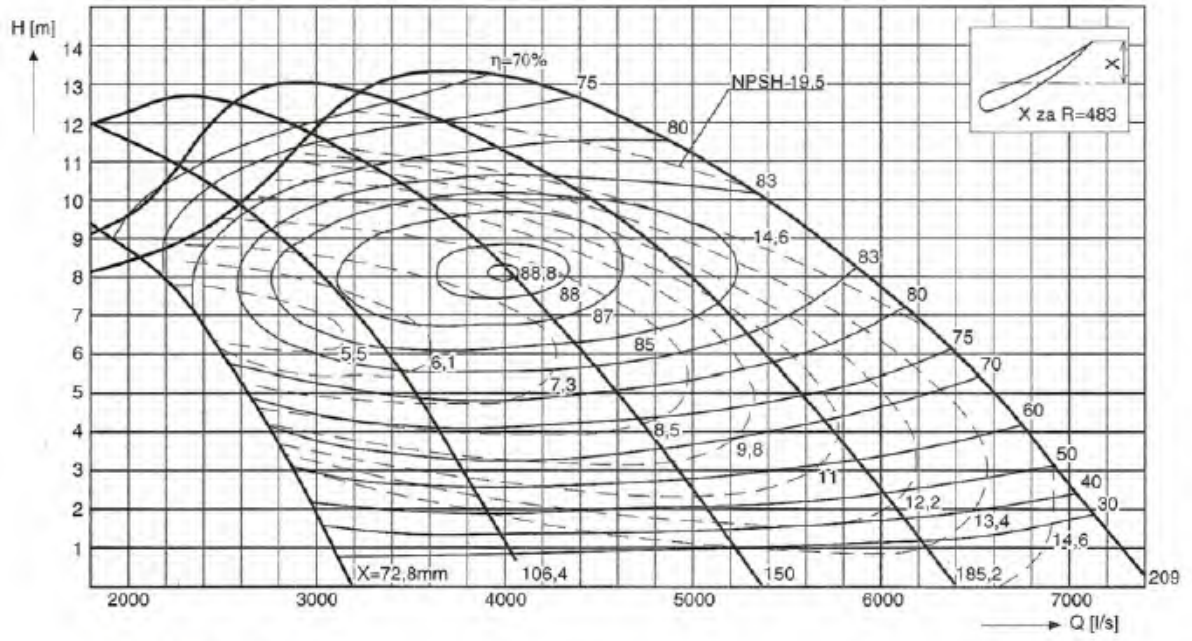
18 AVZ 80-120

n=12s^{-1}



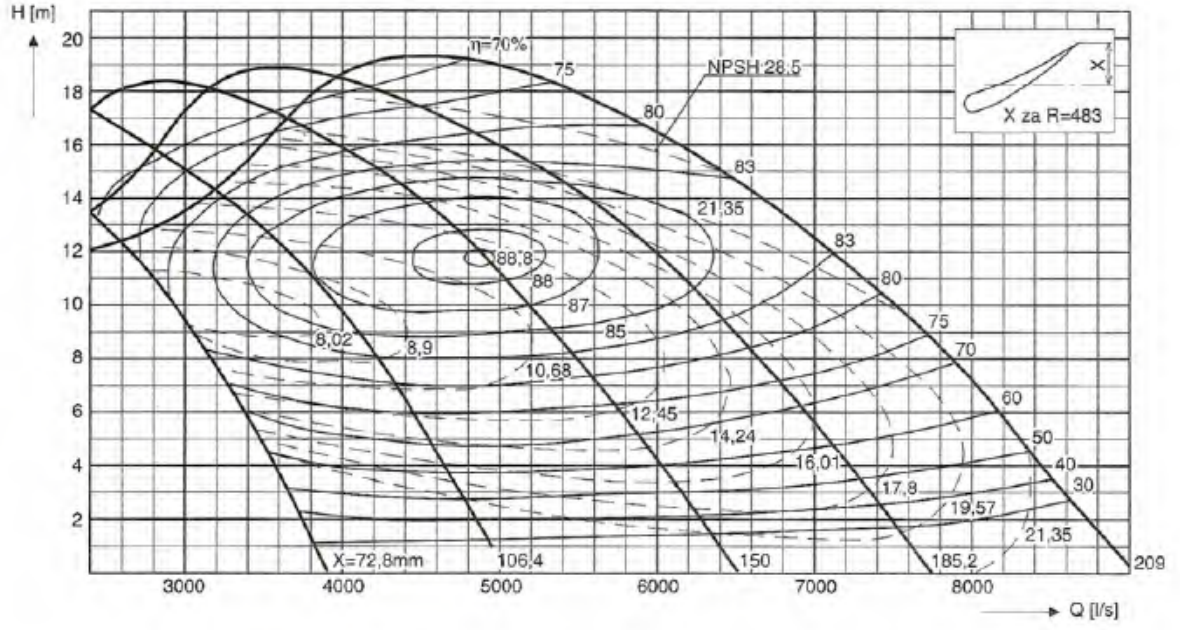
18 AVZ 100-140

n=8s^{-1}



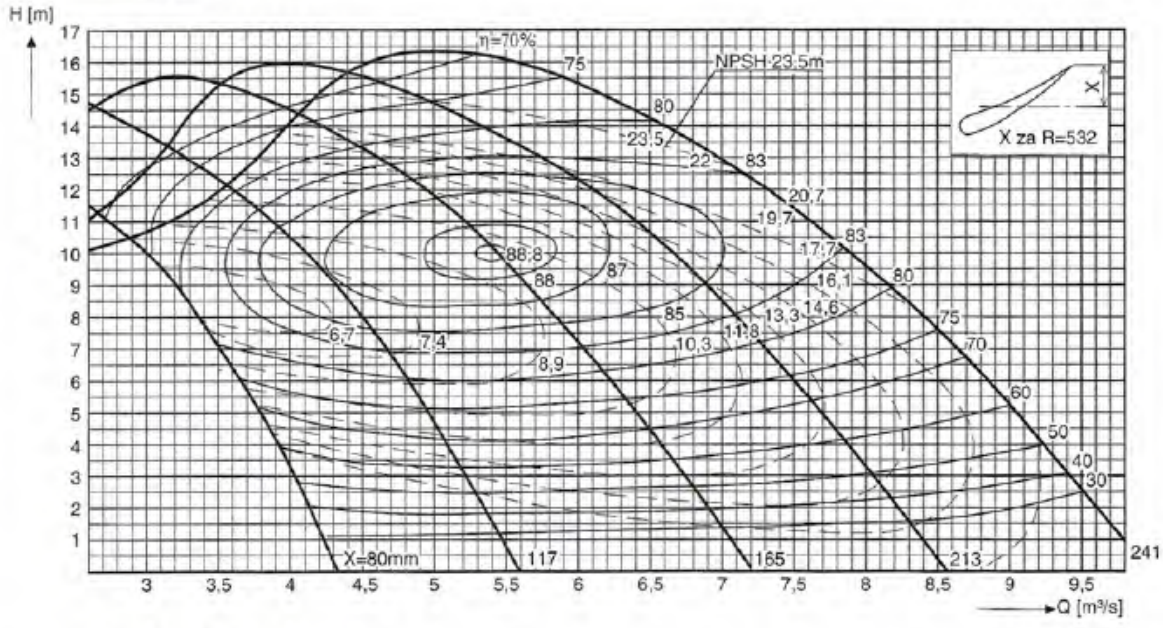
18 AVZ 100-140

n=9,7s^{-1}



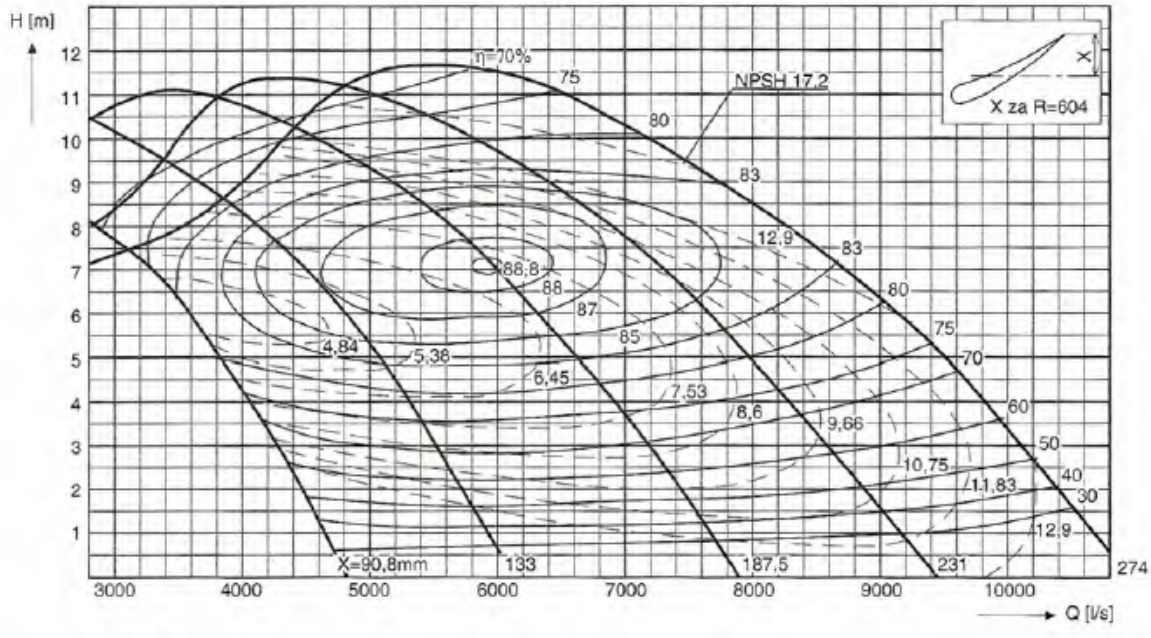
18 AVZ 110-140

n=8s^{-1}



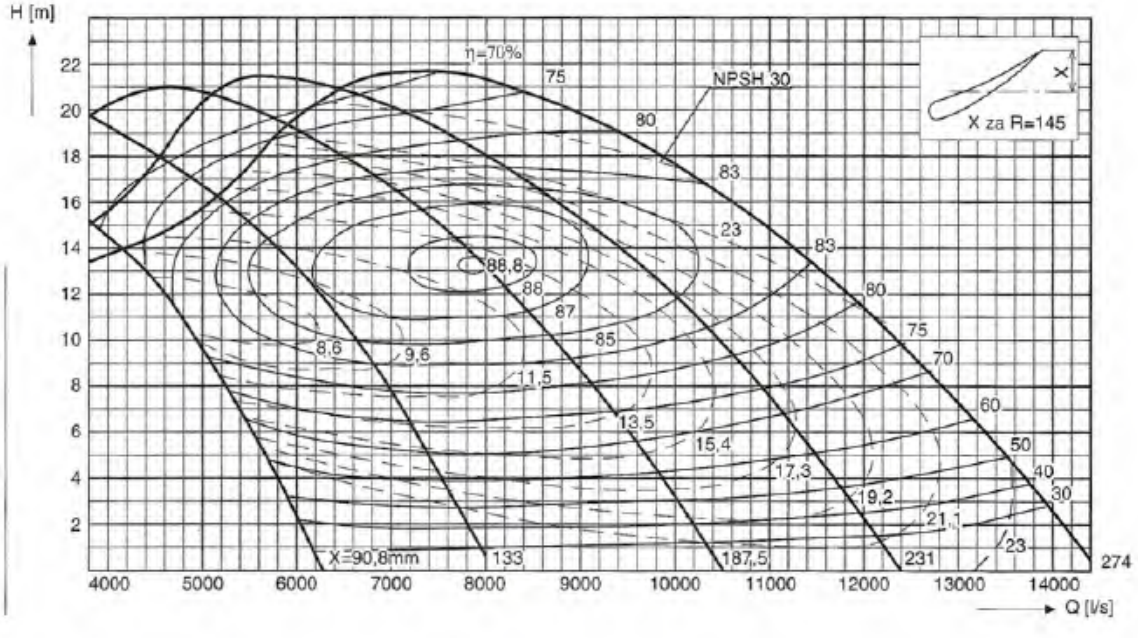
18 AVZ 125-180

n=6s^{-1}



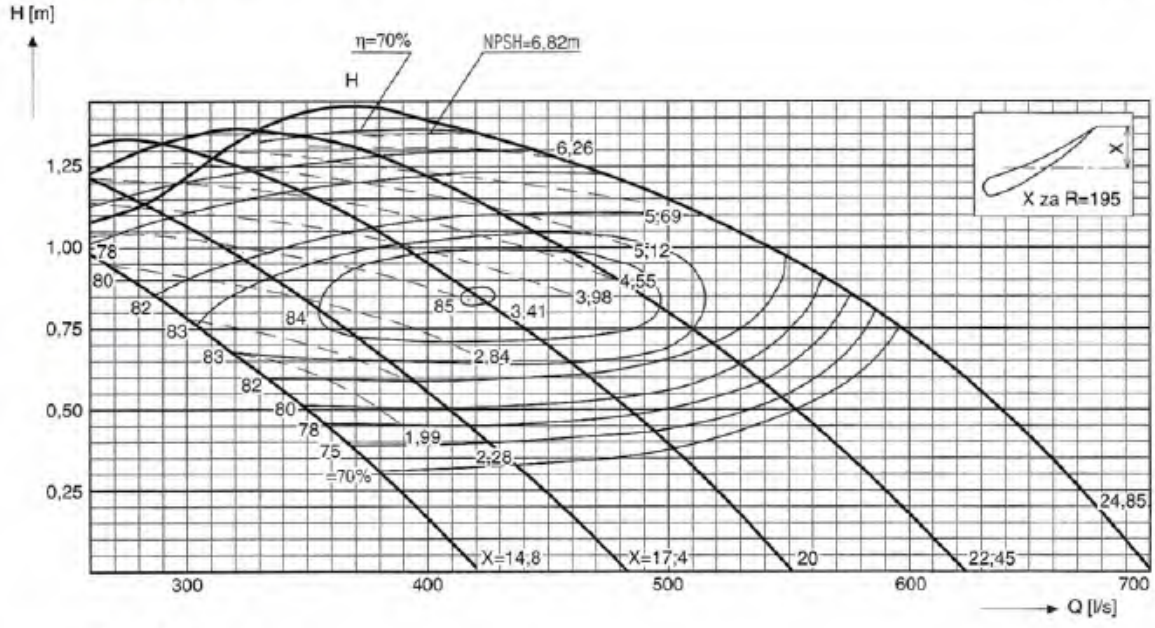
18 AVZ 125-180

n=8s^{-1}



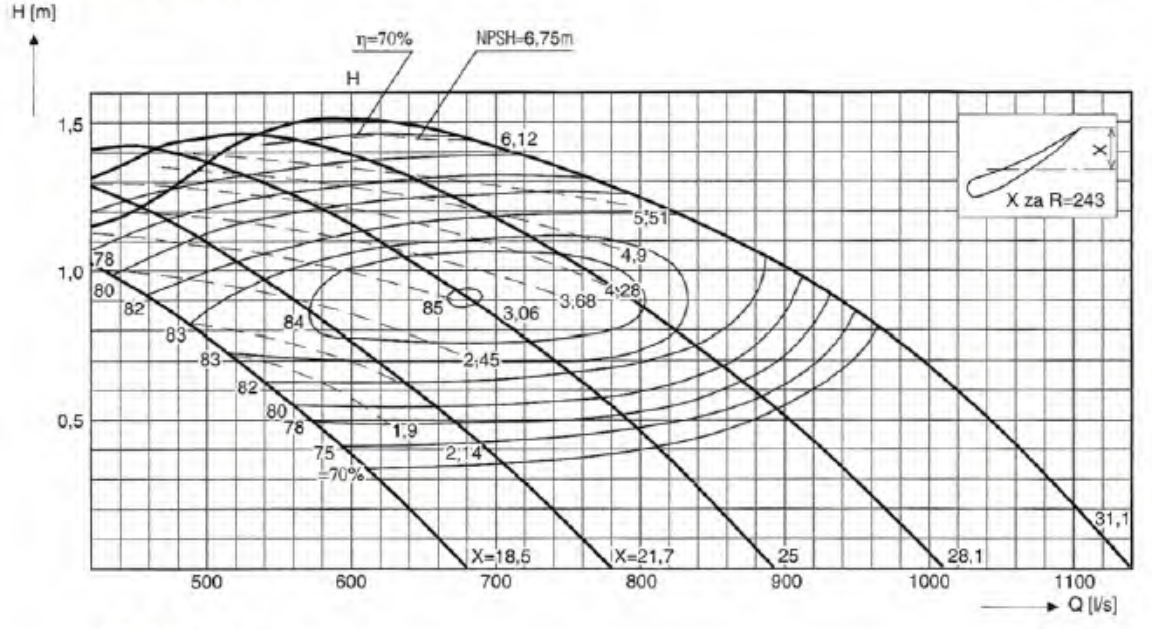
44 AVZ 40-50

$n=9{,}7s^{-1}$



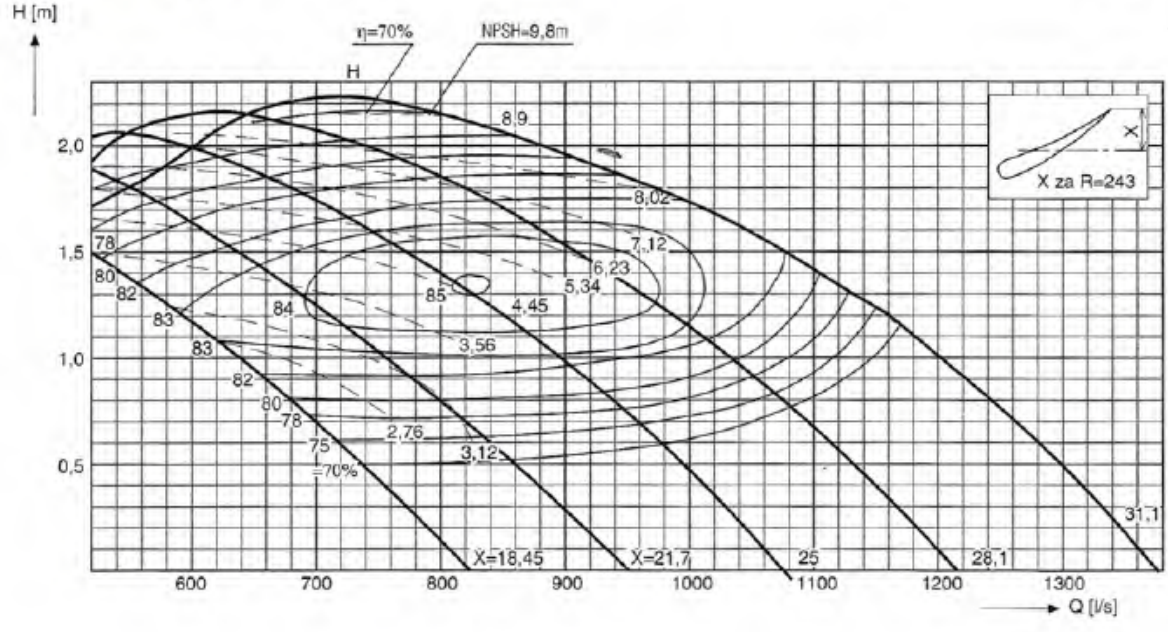
44 AVZ 50-50

$n=8s^{-1}$



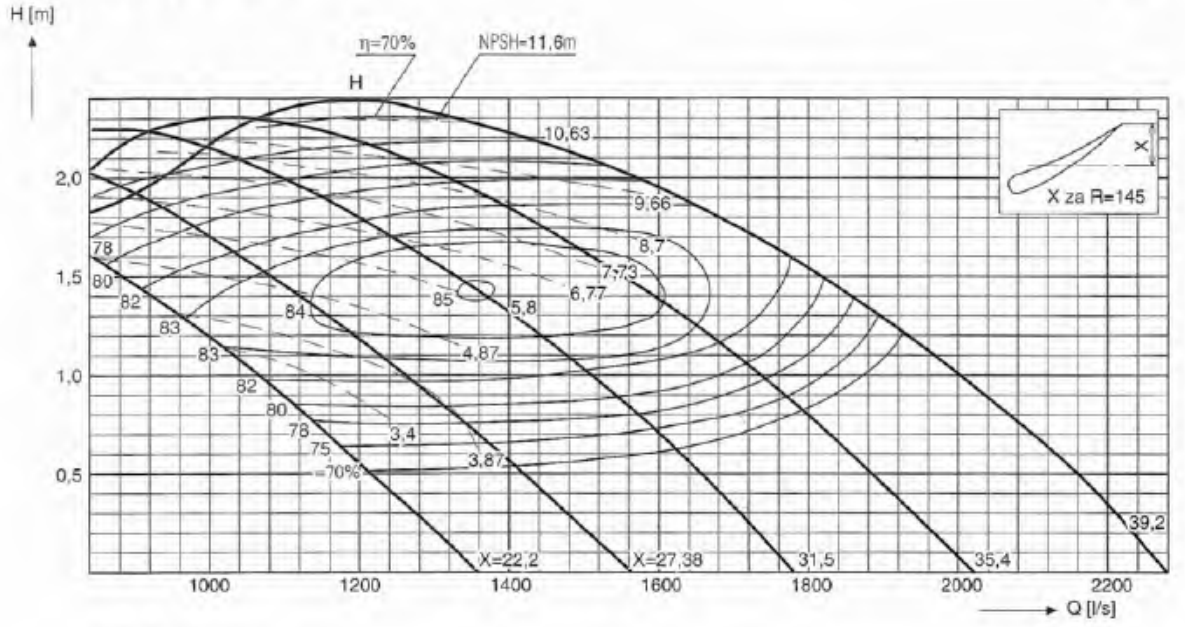
44 AVZ 50-60

$n=9{,}7s^{-1}$



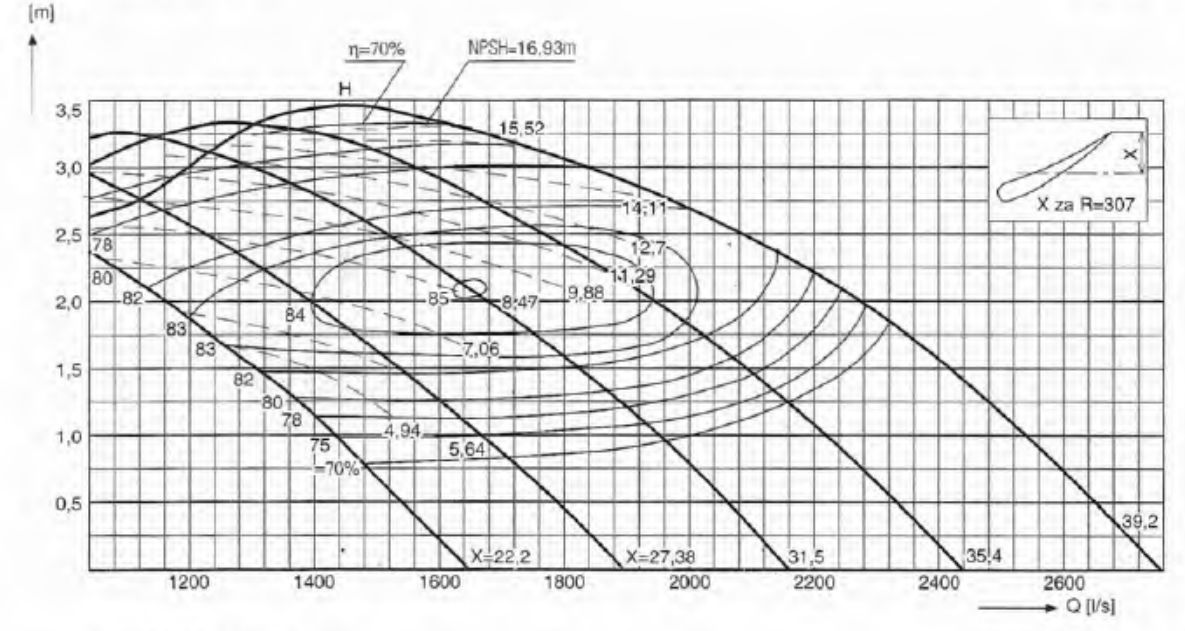
44 AVZ 63-70

n=8s^{-1}



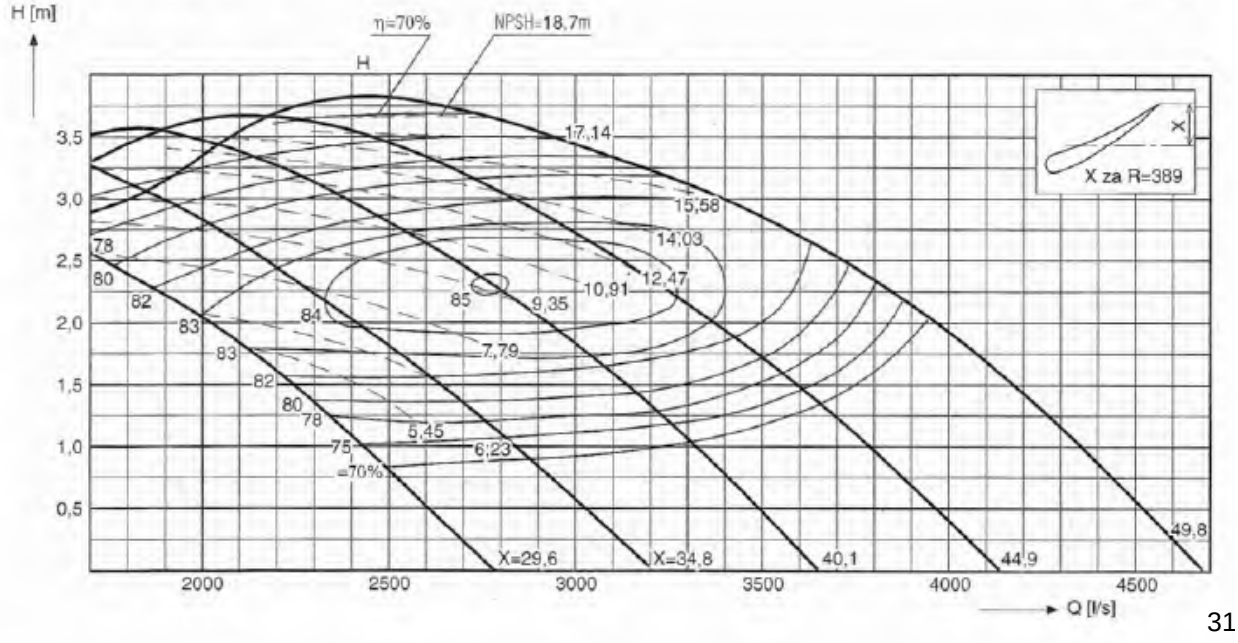
44 AVZ 63-80

n=9,7s^{-1}



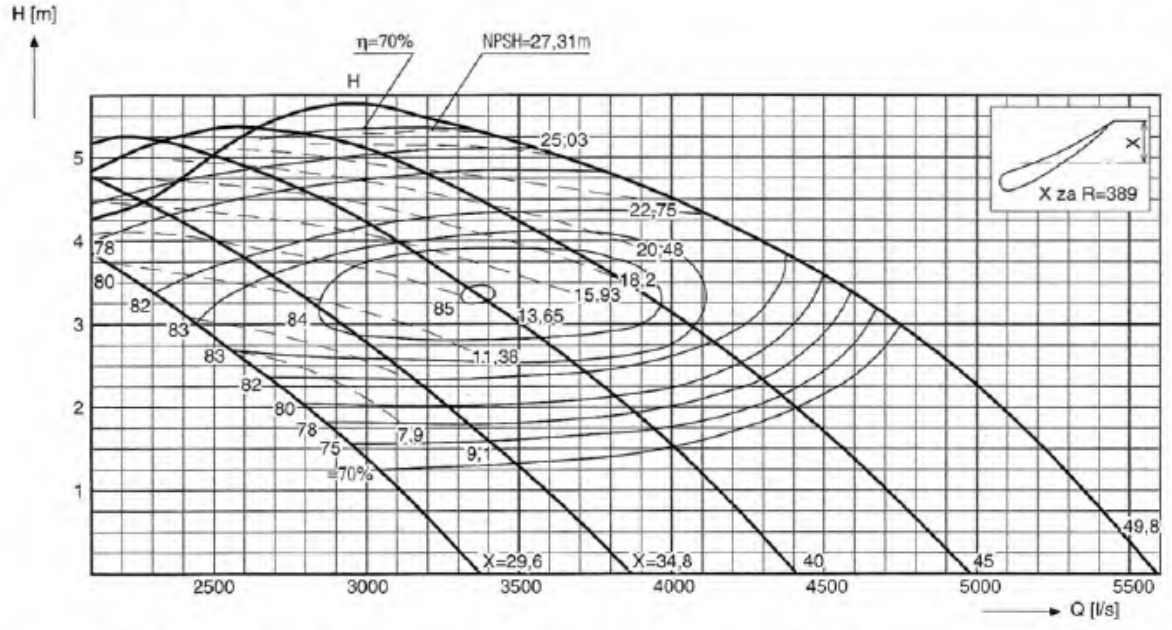
44 AVZ 80-100

n=8s^{-1}



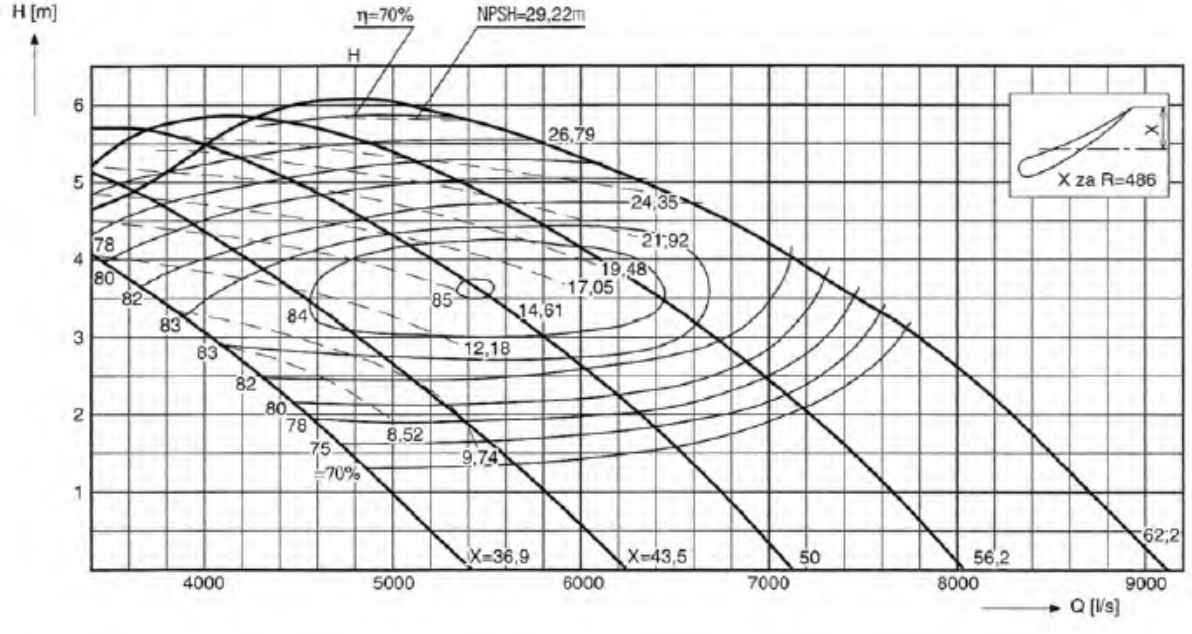
44 AVZ 80-120

n=9,7s^{-1}



44 AVZ 100-140

n=8s^{-1}



Attachment 2

ENEQ Consult – Double Suction DH and DHv Type Pumps

ENEQ Consult Ltd. delivers cost-effective mechanical equipment for nuclear, conventional, oil & gas, and petrochemical industries.

- **9 years** of solid performance
- **> 20 M€** project portfolio
- **> 50** completed projects, **> 10** in progress
- Exclusive partnerships with **5 manufacturers worldwide**
- Equipment compliant with **ASME, EN, N Stamp, DIN, ASTM, ISO, GOST**

Expertise:

- **Equipment Supply** – high-quality OEMs, cost-effective modernization and new-build solutions, turnkey delivery
- **Engineering** – design critical analyses, FEA & CFD calculations, technical consulting
- **Service** – full project support from production to installation, commissioning, and after-sales

Double Suction DH and DHv Type Pumps

Although outstanding by the simplicity of their maintenance and control during operation, double inlet single stage nonself-priming DH and self-priming DHs pumps, as such, represent a kind of highly serviceable, long-life and tested pump devices. DHv pumps adaptable from DH pumps are used for temperature of 100 to 150∘C. It means that each of the mentioned DH pumps - on the purchaser's wish can be used in DHv design.

These pumps are mostly applicable to:

- clean
- raw water
- oils
- cellulose masses
- chemicals
- liquids containing impure ingredients

Also suitable for:

- waterworks,
- pumping stations,
- mining,
- power plants,
- sugar mills,
- shipbuilding,
- paper industries.

Features Of Construction

Being axially split in a shaft axis, a volute casing is provided with suction and delivery flanges at its lower part, thus enabling an easy dismantling of rotor without disconnecting pipe lines. No axial thrust is practically formed by a double suction impeller. The space between rotor and casing is sealed by means of very easily replaceable wearing rings. A shaft, covered with replaceable sleeves ensures a proper protection against liquids being supplied. Very serviceable ball bearings, grease lubricated are normally installed. Oil lubricated slide bearings can be, however, installed upon application. Packings are very accessibly installed. If particularly required, adequate mechanical seals can be fitted instead of ordinary gaskets.

Materials

Pumps, casing and impellers, when designed as standard equipment are made of qualitative cast iron; wearing rings and protecting sleeves of bronze and shafts are made of steel. The selection of materials is however made for naphtha refineries, cellulose, paper and chemical industries and shipbuilding, depending on pump applications and variety of mediums being supplied.

Ranges Of Supply

Ranges of supply of our standard pump sizes are shown on a diagram. Each pump size covers an adequate range within which an optional choice of supply is available. All other ranges out of

these diagrammatically presented ones, as well as some special pump designs, can be obtained upon an individual customer's application.

Installation Of Pump Units

Depending on a customer's requirement, pumps can be combined with electro-motors, diesel and petrol motors steam turbines and other machinery. Such pump sets are installed on single or double, either cast or welded, profile base plates. Pumps are also provided with adequate fittings.

Design

Complete pump plants and stations are planned in our own Design Department and their performance and control are cared for by our highly experienced Technical Staff who will readily provide all information, particularly that regarding the most suitable pump sizes to be used to ensure their successful construction and operation.

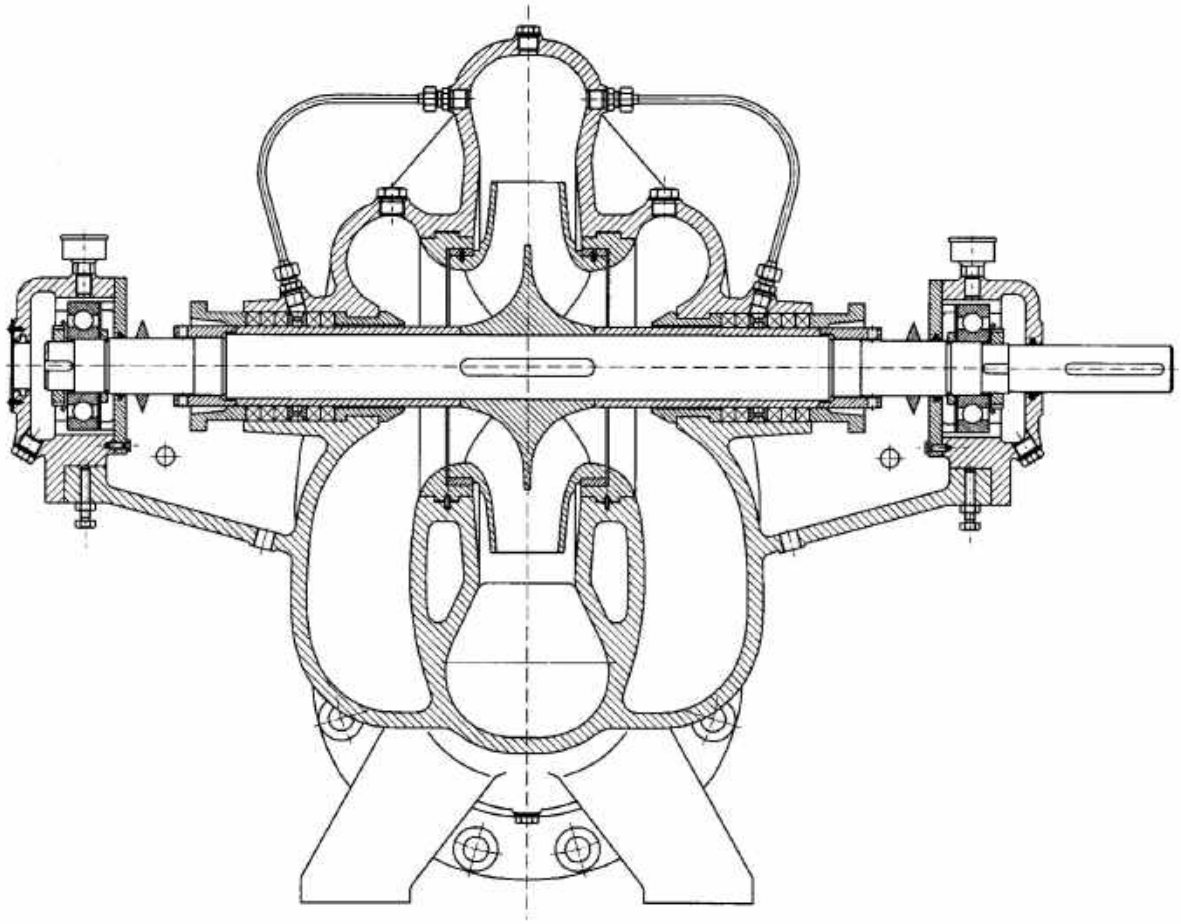
Order Of The Pumps

The following to be mentioned at order:

- fluid characteristics
- capacity
- total head
- NPSH or necessary suction head
- pump inlet pressure
- fluid temperature

Presjek pumpe tipa DH

DH Type Pump Cross Section

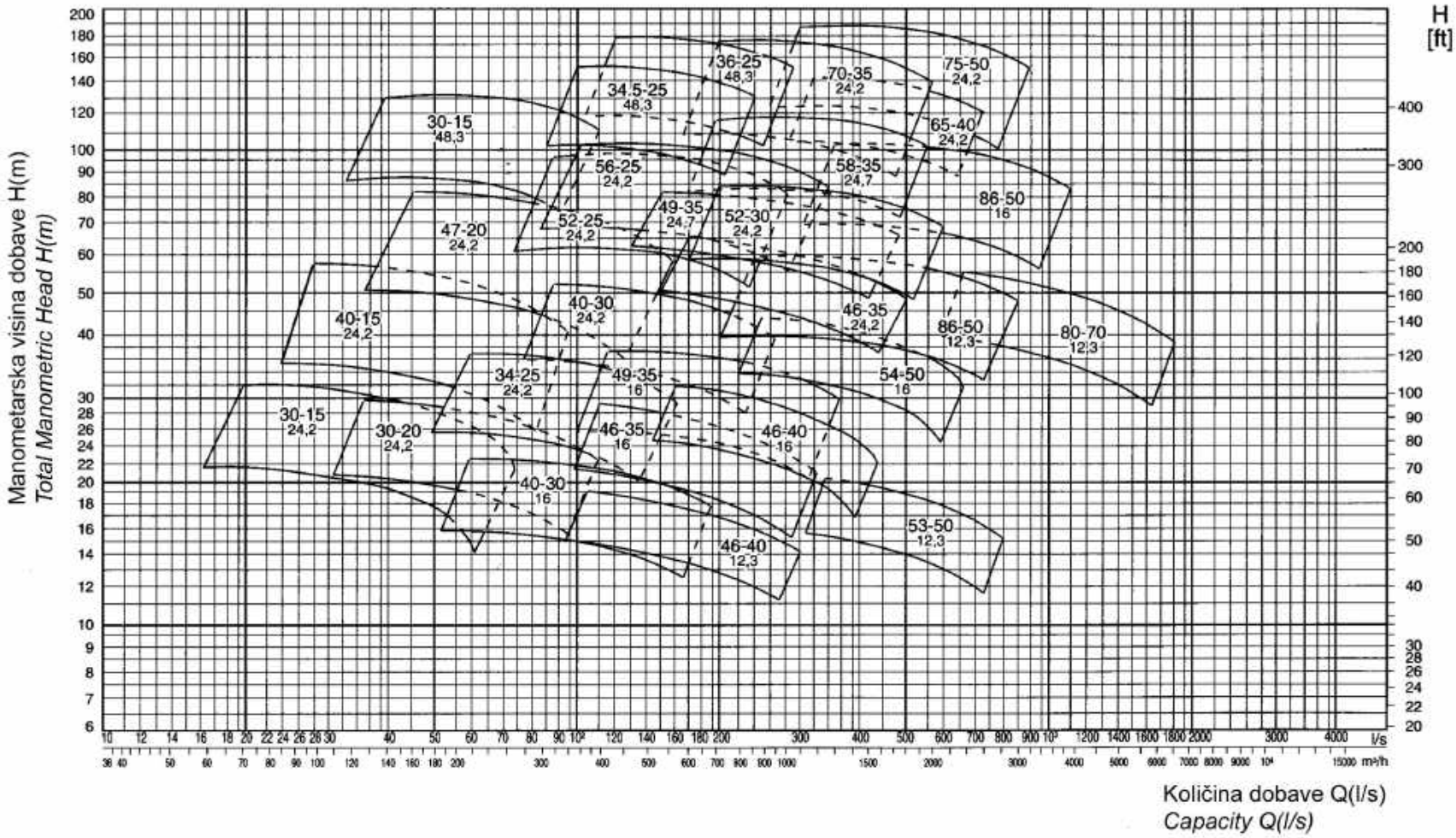


Presjek pumpe tipa DH *DH Type Pump Cross Section*	30-15	40-15	30-20	47-20	34-25	34,5-25	52-25	56-25	40-30	46-35	49-35	58-35
G (kg)	300	555	310	580	600	610	860	936	850	1070	1075	1320
GD^2 (kgm²)	0,54	1,37	0,52	2,81	0,86	1,12	1,9	2,25	1,8	4,9	5,5	3,8

Presjek pumpe tipa DH *DH Type Pump Cross Section*	46-40	48-50	53-50	54-50	86-50	80-70	36-25	52-30	70-35	75-50	65-40	60-30
G (kg)	1350	2150	2440	2030	3200	6000	580	1350	1850	2850	2150	1150
GD^2 (kgm²)	4,6	5,6	15,8	11,5	58	84,2	0,92	4,35	16	35	16	15

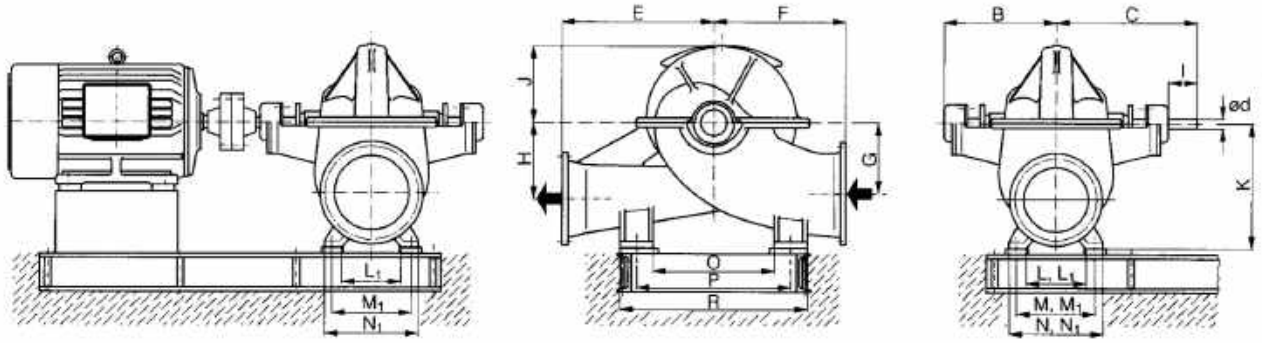
Područja dobave pumpi tipa DH

Ranges Of Supply – Pumps Type DH



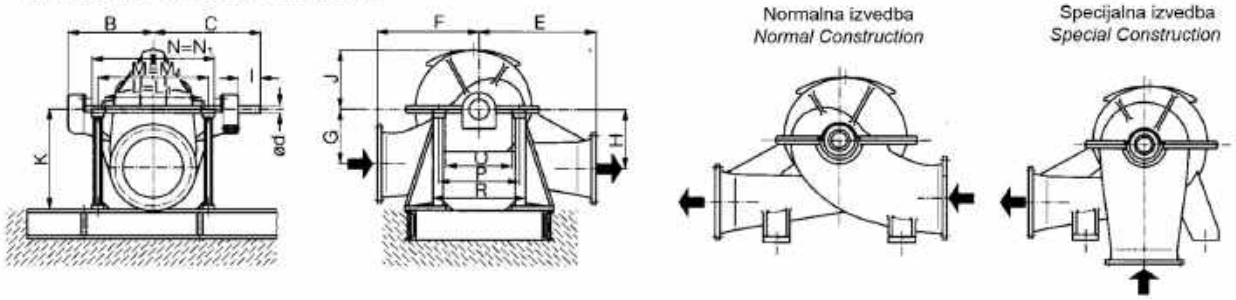
Mjerna skica DH pumpe

DH Type Pump Sketch With Dimensions



Tip pumpe / Pump Type	Dimenzije pumpe / Pump Dimensions																			Usisna prirubnica / Discharge Flange			Tlačna prirubnica / Pressure Flange		
	B	C	E	F	G	H	J	K	L	L_1	M	M_1	N	N_1	O	P	R	d	I	NO	NP	DIN	NO	NP	DIN
DH 30-15	405	540	450	450	161	190	228	280	190	190	280	280	350	350	460	560	660	48	139	200	10	2532	150	16	2533
DH 40-15	443	557	450	450	220	260	305	400	190	260	280	350	350	420	350	480	610	50	121	250	10	2532	150	10	2532
DH 30-20	405	490	450	450	230	240	266	425	200	200	290	290	360	360	380	490	600	40	92	250	10	2532	200	16	2533
DH 47-20	445	565	500	500	230	310	360	460	190	250	330	390	380	440	500	600	700	50	124	250	10	2532	200	10	2532
DH 34-25	463	582	550	550	270	270	315	500	230	320	320	410	410	500	480	620	760	50	122	300	10	2532	250	10	2532
DH 34,5-25	463	582	550	550	270	270	315	500	230	320	320	410	410	500	480	620	760	50	118	300	10	2532	250	16	2533
DH 52-25	526	680	650	600	300	350	370	560	300	380	400	480	480	560	460	640	820	65	160	350	10	2532	250	10	2532
DH 56-25	558	733	650	600	310	350	410	550	130	350	260	480	330	550	460	640	820	70	180	350	10	2532	250	16	2533
DH 40-30	528	658	650	650	320	320	370	560	310	310	400	400	470	470	540	700	860	55	133	350	10	2532	300	10	2532
DH 46-35	586	740	800	700	370	400	420	660	350	350	450	450	530	530	620	800	980	65	165	400	10	2532	350	10	2532
DH49-35	586	740	800	700	370	400	420	660	350	350	450	450	530	530	620	800	980	65	157	400	10	2532	350	10	2532
DH 58-35	594	806	850	700	350	400	562	680	350	450	450	550	550	650	700	900	1100	85	209	400	10	2532	350	16	2533
DH 46-40	656	814	800	800	400	380	420	670	340	480	460	600	540	680	580	760	940	70	165	500	10	2532	400	10	2532
DH 48-50	810	1000	900	900	470	470	520	830	550	550	700	700	800	800	1000	1200	1400	85	200	600	10	2532	500	10	2532
DH 53-50	810	955	900	900	550	600	660	930	550	550	700	700	800	800	1000	1200	1400	75	145	ANSI B 16.5 150 lb. 24" RF			ANSI B 16.5 150 lb. 20" RF		
DH 54-50	710	926	900	900	470	480	590	850	410	550	560	700	660	800	1000	1200	1400	85	126	600	10	2532	500	10	2532
DH 86-50	835	1050	1100	1000	520	600	672	950	560	660	700	800	820	920	950	1200	1450	100	210	600	10	2532	500	10	2532
DH 80-70	1050	1300	1300	1200	600	650	790	1150	760	760	900	900	1020	1020	1070	1320	1570	125	250	API 605 150 lb. 32" FF			API 605 150 lb. 28" FF		
DHv 36-25	488	638	540	540	276	288	310	575	560	560	640	640	720	720	400	520	600	65	150	300	16	2543	250	25	2544
DHv 52-30	633	809	570	580	370	400	460	650	680	680	820	820	880	880	470	600	680	75	175	350	16	2533	300	16	2533
DHv 70-35	715	945	850	800	400	480	520	715	710	710	820	820	920	920	600	760	860	95	230	400	10	2532	350	25	2534
DHv 75-50	765	1020	1050	900	450	510	600	755	835	835	940	940	1040	1040	660	800	920	100	260	600	25	2544	500	25	2544
DH 65-40	788	1000	950	800	400	450	525	760	480	480	620	620	730	730	750	1000	1250	100	215	ANSI B 16.5 150 lb. 20" RF			ANSI B 16.5 300 lb. 16" RF		
DH 60-30	701	898	650	650	350	400	470	750	620	620	720	720	820	820	600	700	800	75	200	400	16	2533	300	25	2534

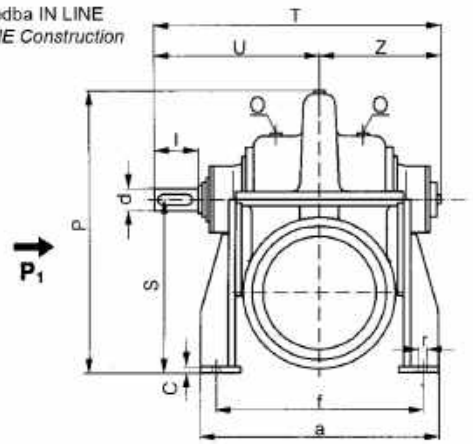
Mjerna skica DH pumpe
DH Type Pump Sketch With Dimensions



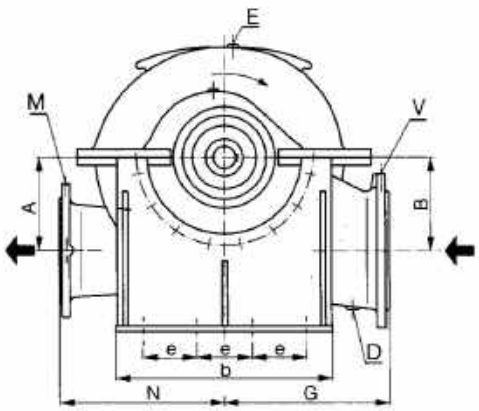
Mjerne skice

Pump Sketch With Dimensions

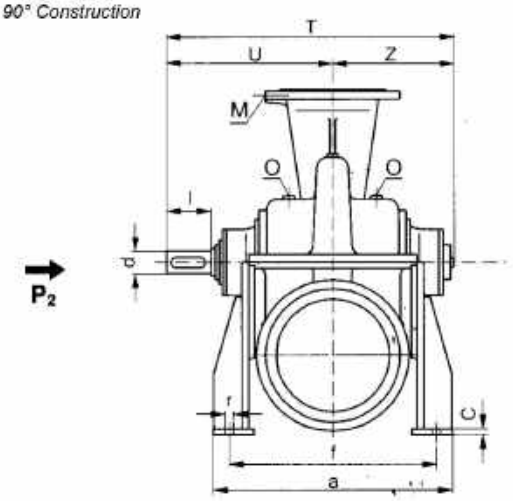
izvedba IN LINE
IN LINE Construction



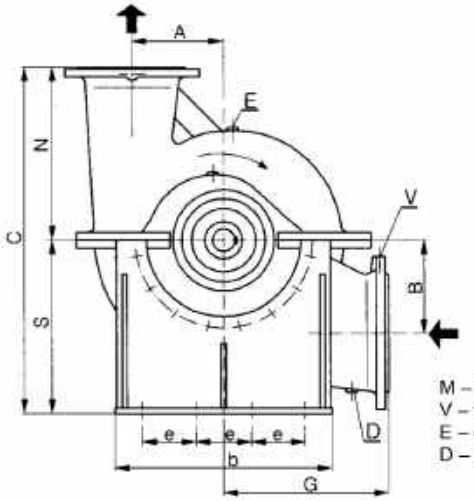
Pogled P_1
View P_1



izvedba 90°
90° Construction



Pogled P_2
View P_2



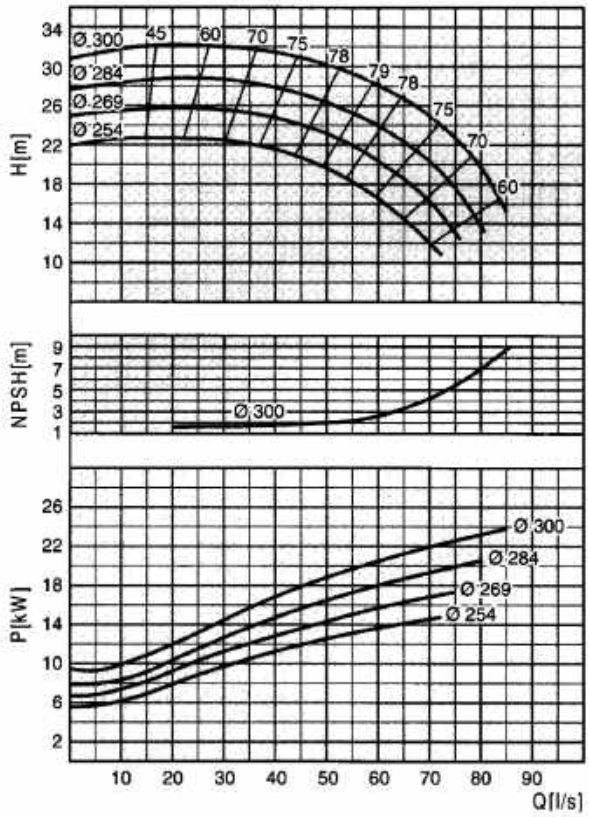
M – manometer / *air gauge*
V – vakuumetar / *vacuum meter*
E – evakuacija / *evacuation*
D – drenaža / *drainage*

Tip pumpe / *Pump Type*	Dimenzije pumpe / *Pump Dimensions*																					Usisna prirubnica / *Discharge Flange*			Tlačna prirubnica / *Pressure Flange*		
	A	a	B	b	C	d	e	F	f	G	H	K	L	I	N	P	r	S	T	U	Z	NO	NP	DIN	NO	NP	DIN
CH 46-40	380	1040	400	920	23	80	240	–	940	800	1540	–	–	150	800	1100	23	740	1335	740	595	500	6	2531	400	6	2531
CH 52-30	320	590	350	820	35	75	520	–	640	600	1205	–	–	140	650	960	35	565	1343	758	585	400	16	2533	300	16	2533
CH 60-25	375	870	350	800	23	85	300	–	770	600	1070	–	–	160	650	830	23	420	1075	610	465	350	16	2533	250	16	2533
CH 60-30	350	890	350	820	23	85	200	–	770	600	1300	–	–	160	650	1060	23	650	1075	610	465	400	16	2533	300	25	2534
CH 60-60	650	1580	600	1100	30	90	300	–	1460	1000	2160	–	–	180	1100	1680	30	1060	1785	980	805	700	10	2532	600	10	2532
CH 73-40	510	1120	510	880	23	95	230	–	1010	850	1780	–	–	235	900	1821	33	880	1307	832	575	500	16	2533	400	16	2533
CV 46-40	380	1000	400	850	30	80	750	800	860	800	1470	475	330	150	740	350	33	730	–	–	–	500	6	2531	400	6	2531
CV 52-30	380	1000	310	750	40	75	–	650	930	600	1270	370	230	150	620	690	22	650	–	–	–	350	16	2533	300	16	2533
CV 60-25	375	800	350	750	30	80	650	650	700	600	1160	260	310	160	810	410	33	550	–	–	–	350	16	2533	250	16	2533
CV 60-30	350	800	350	750	30	85	650	650	700	600	1160	260	310	160	610	500	33	550	–	–	–	400	16	2533	300	25	2534
CV 60-60	650	1200	600	1050	35	90	950	1100	1100	1000	1900	500	530	180	980	620	33	920	–	–	–	700	10	2532	600	10	2532
CV 73-40	510	950	510	1130	35	95	1030	900	810	850	1658	300	510	235	832	941	33	826	–	–	–	500	16	2533	400	16	2533

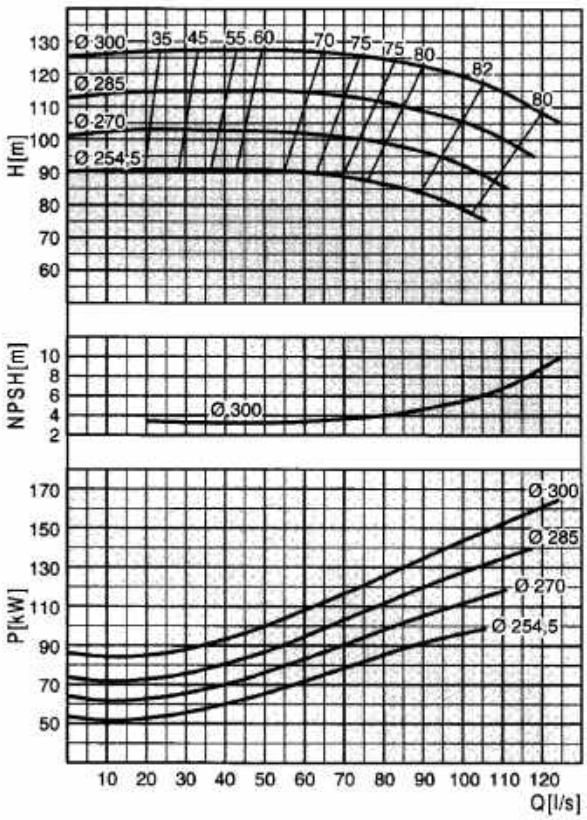
Pojedinačni dijagrami

Single Diagrams

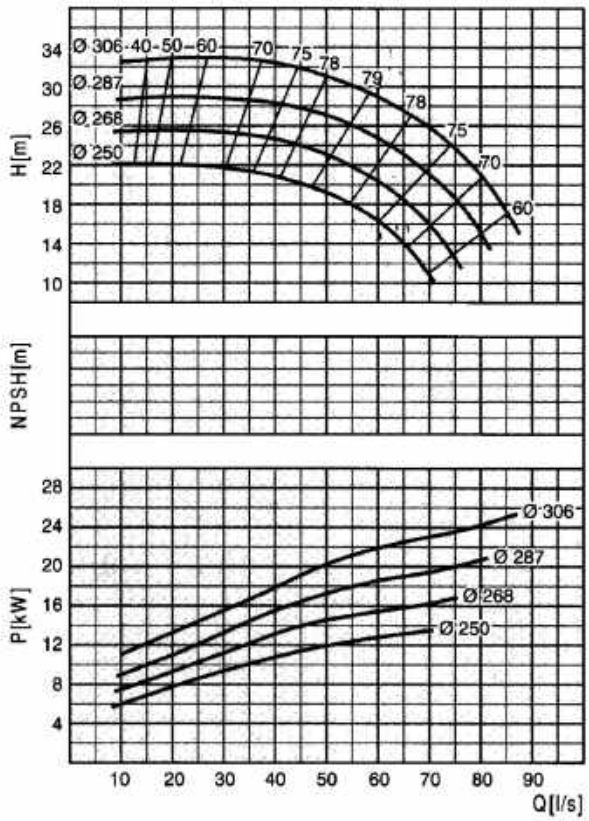
DH 30-15 n=24,2s^{-1}



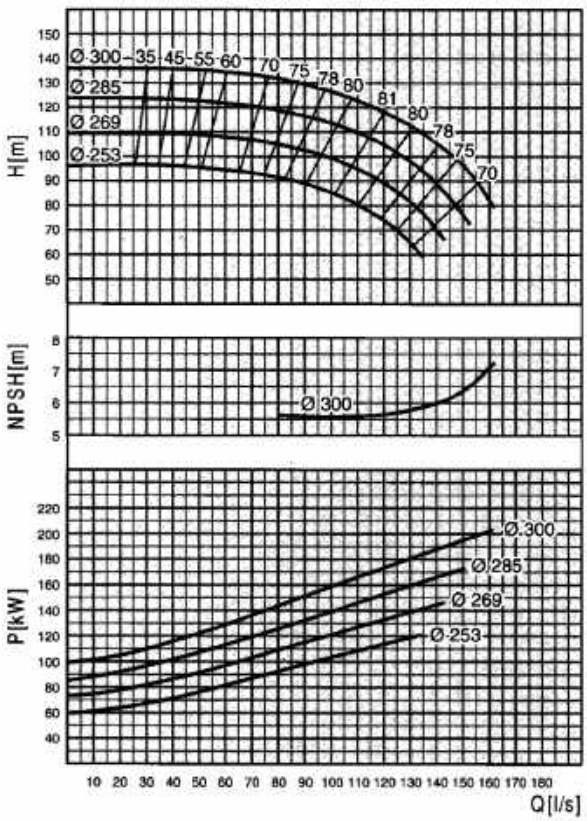
DH 30-15 n=48,3s^{-1}



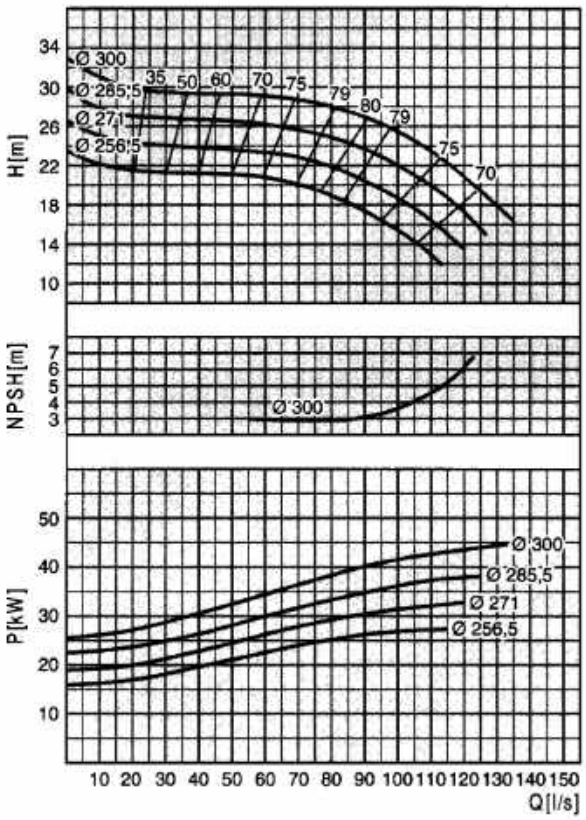
DH 30-15/A n=24,2s^{-1}



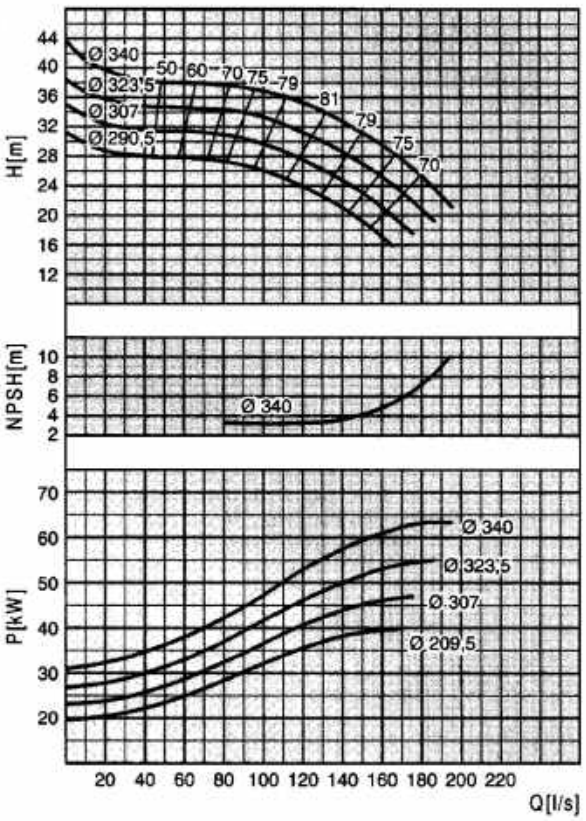
DH 30-15/A n=49,7s^{-1}



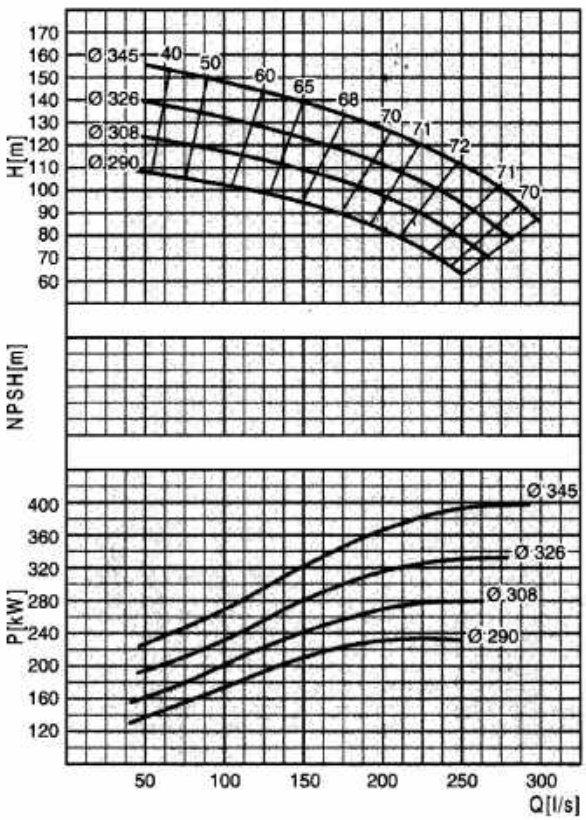
DH 30-20 $n=24{,}2s^{-1}$



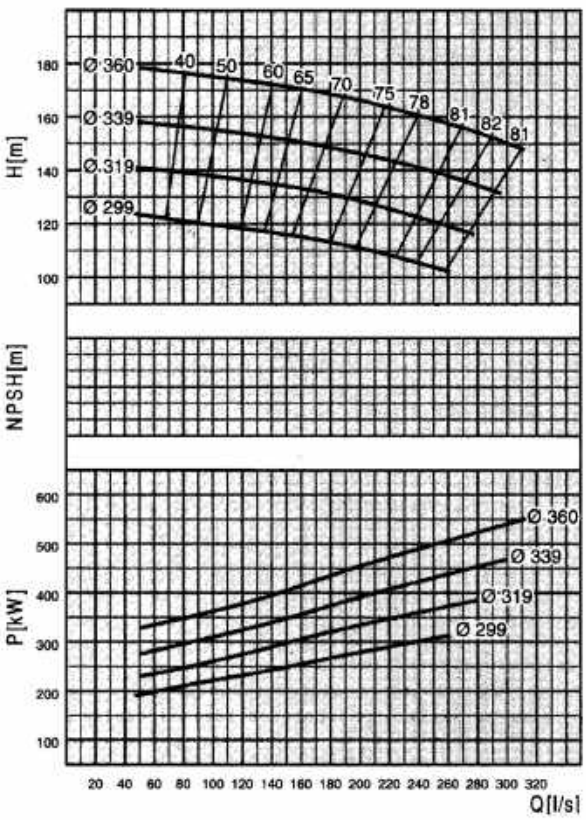
DH 34-25 $n=24{,}2s^{-1}$



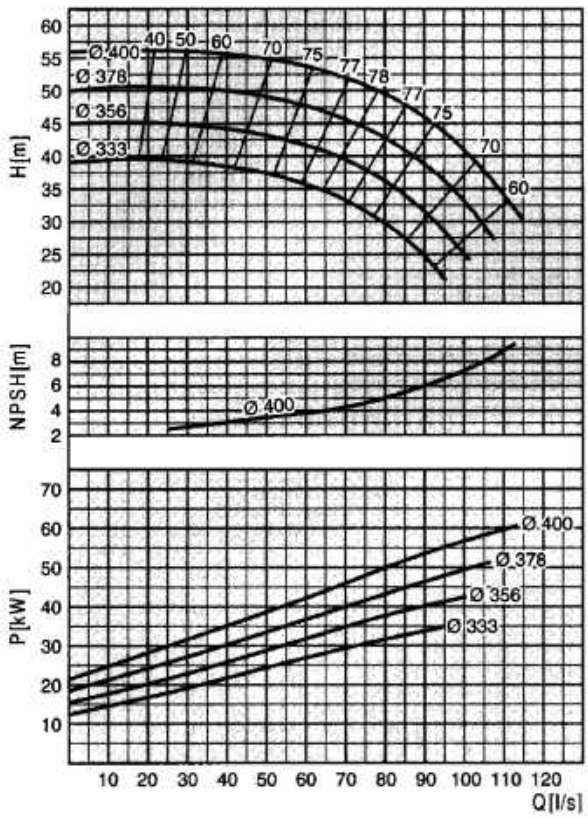
DH 34,5-25 $n=48{,}3s^{-1}$



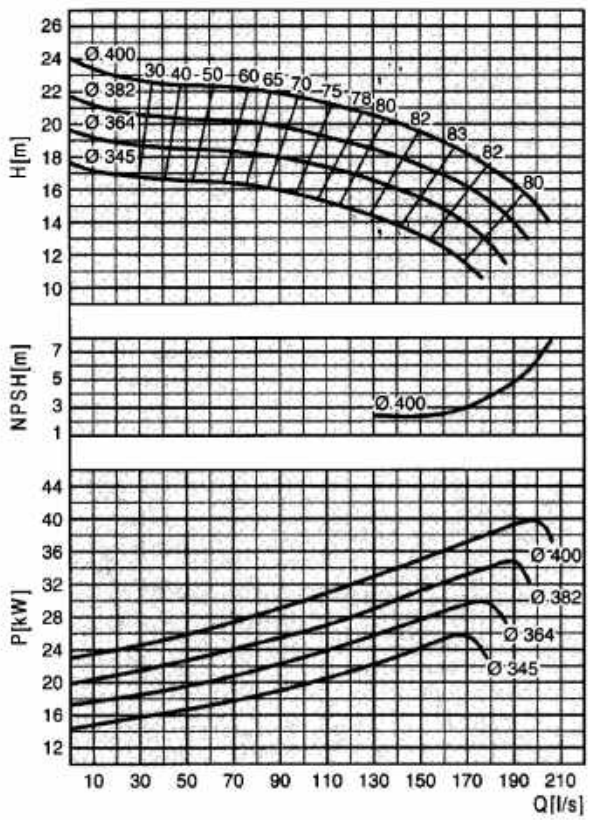
DHv 36-25 $n=48{,}3s^{-1}$



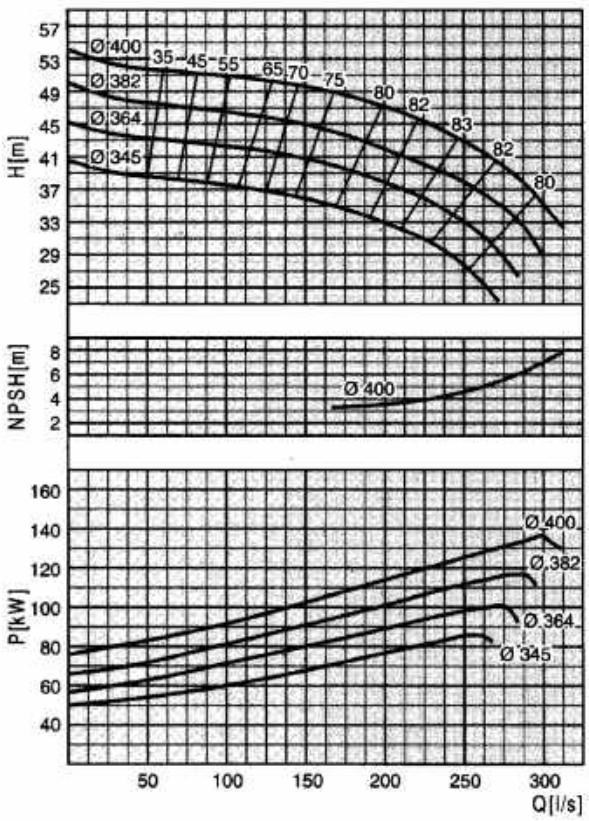
DH 40-15 $n=24{,}2s^{-1}$



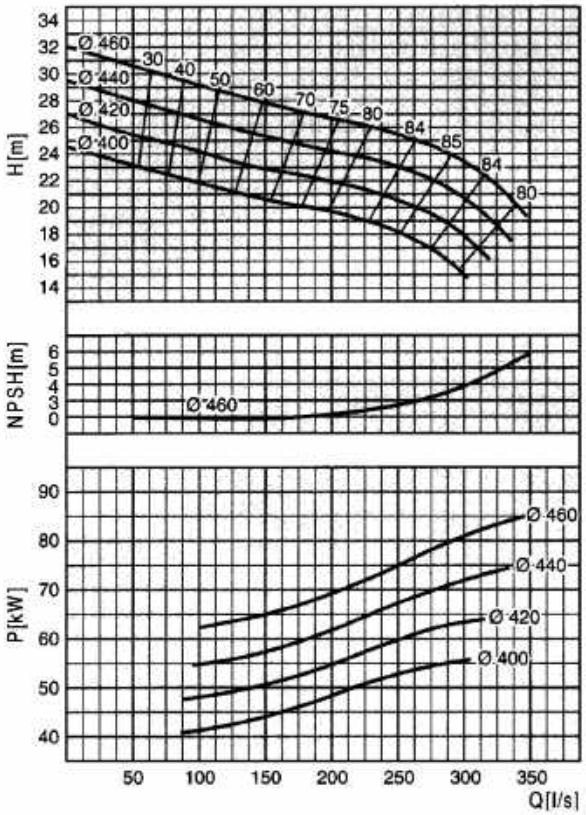
DH 40-30 $n=16s^{-1}$



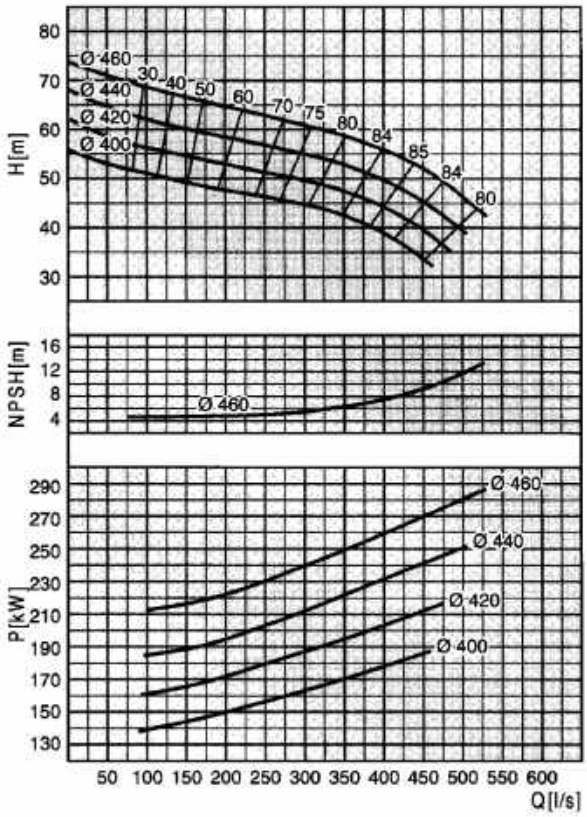
DH 40-30 $n=24{,}2s^{-1}$



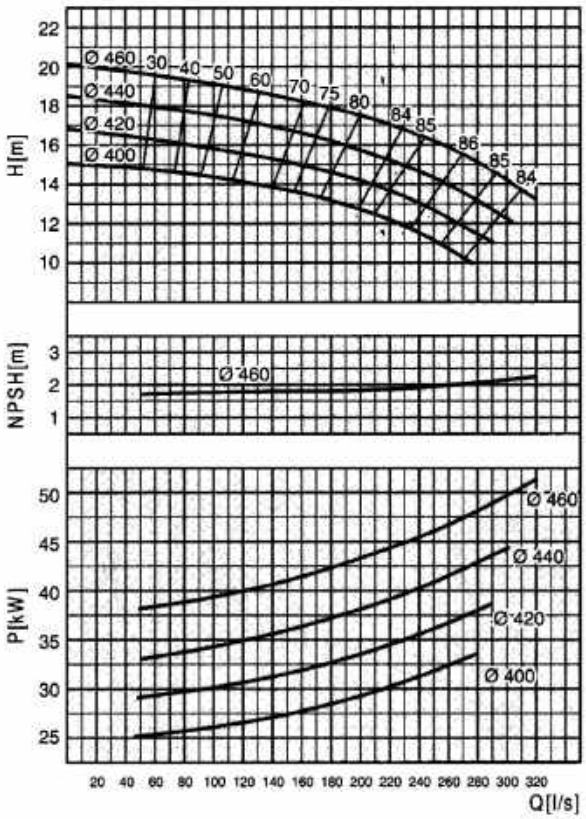
DH 46-35 $n=16s^{-1}$



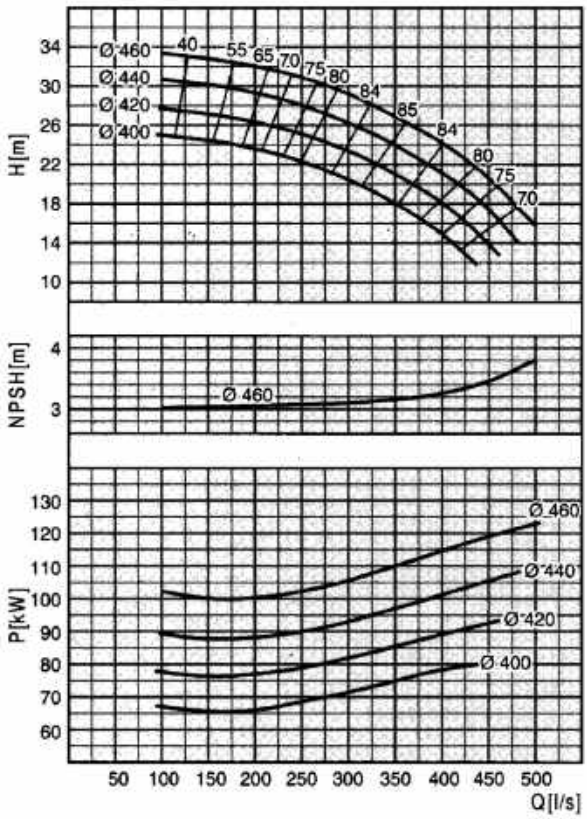
DH 46-35 $n=24,2s^{-1}$



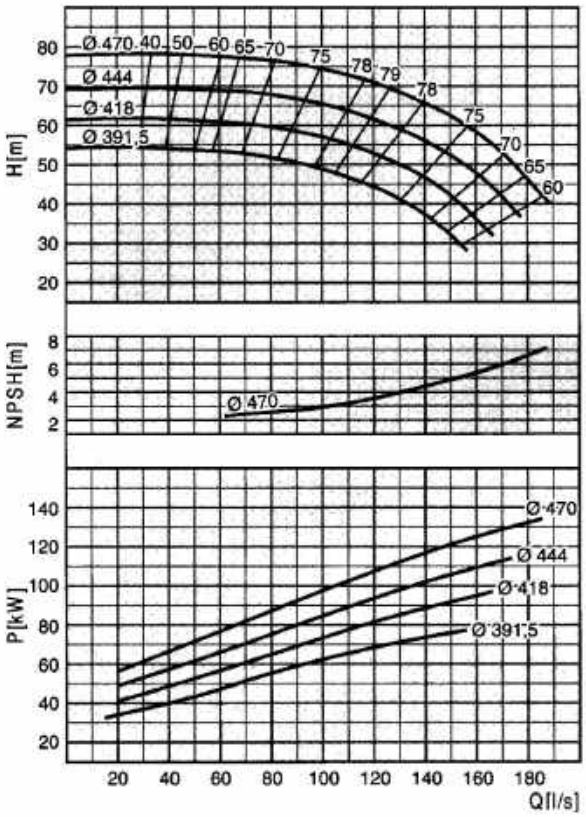
DH 46-40 $n=12,3s^{-1}$



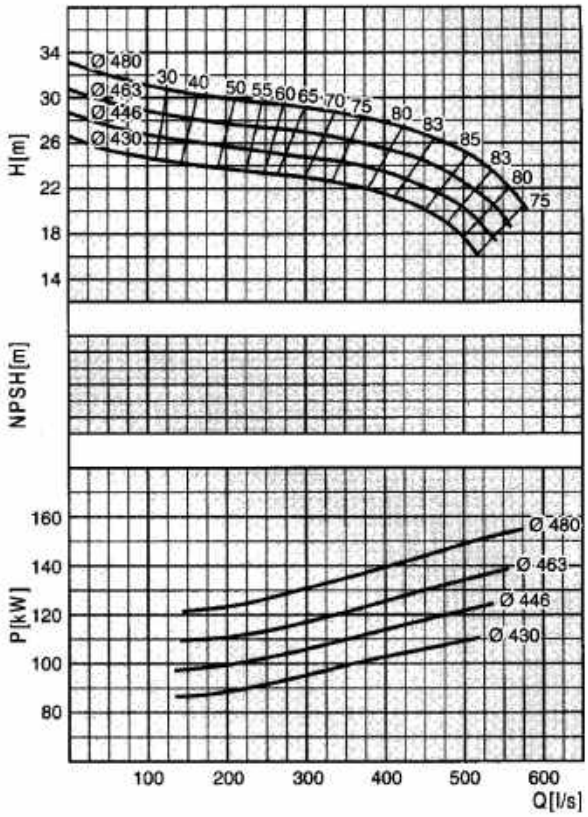
DH 46-40 $n=16s^{-1}$



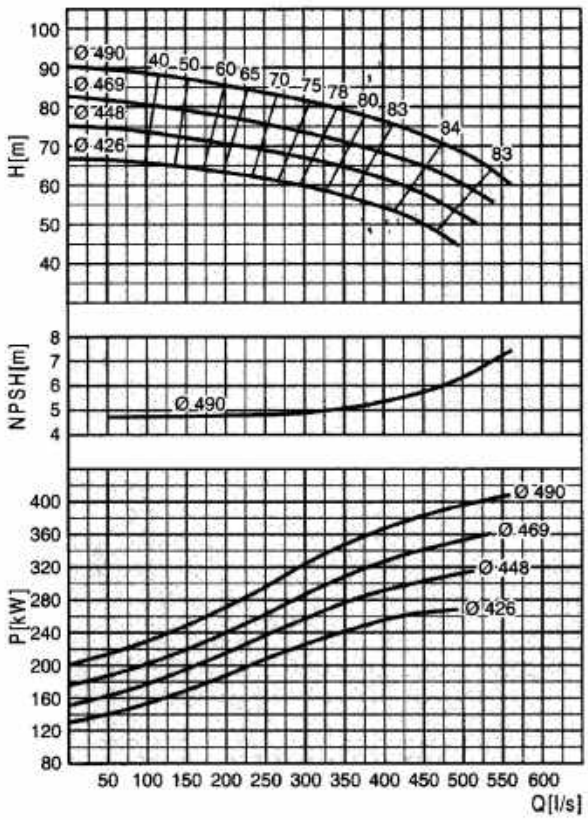
DH 47-20 n=24,2s^{-1}



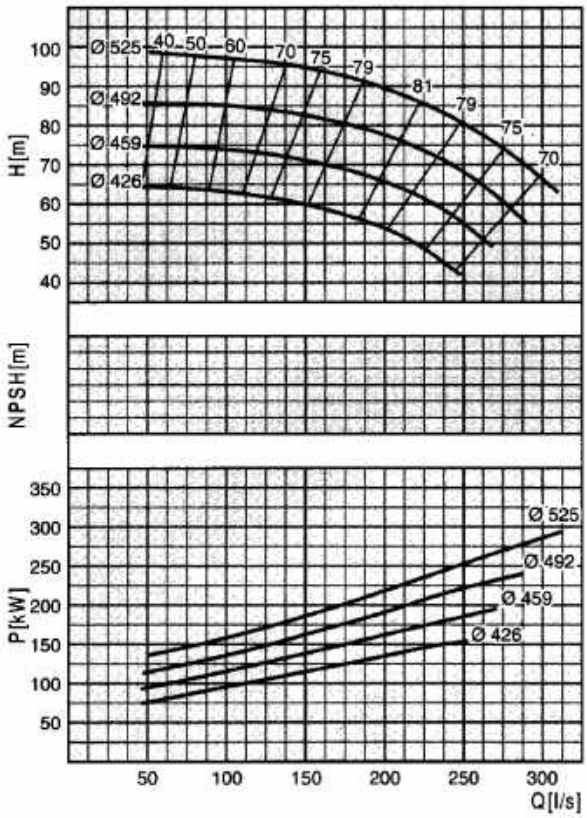
DH 48-50 n=16s^{-1}



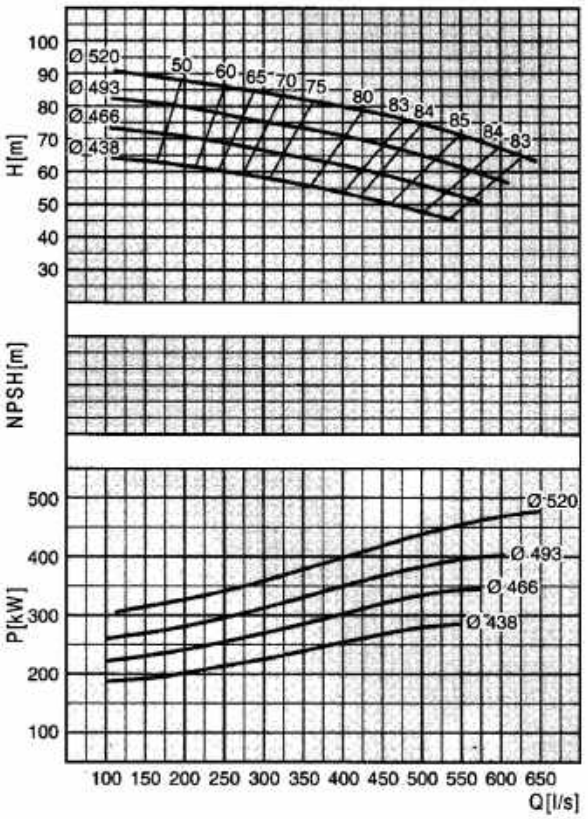
DH 49-35 n=24,7s^{-1}



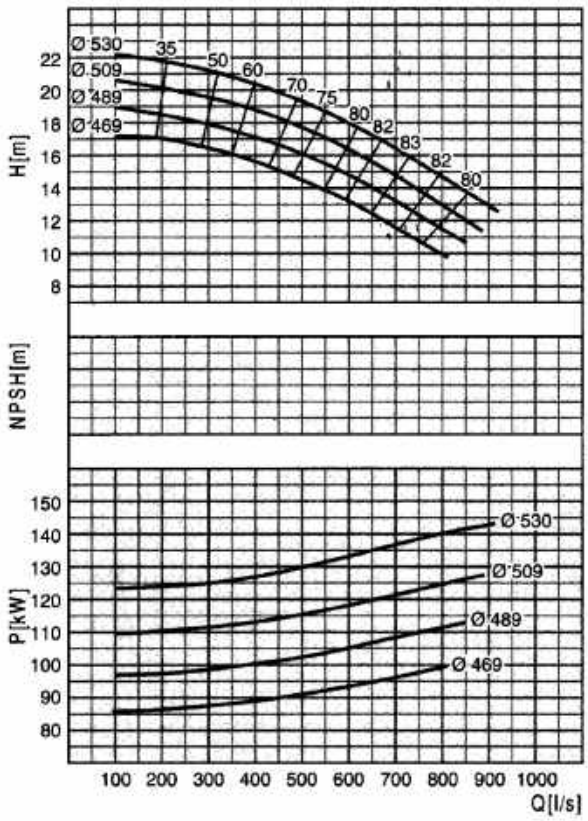
DH 52-25/A n=24,2s^{-1}



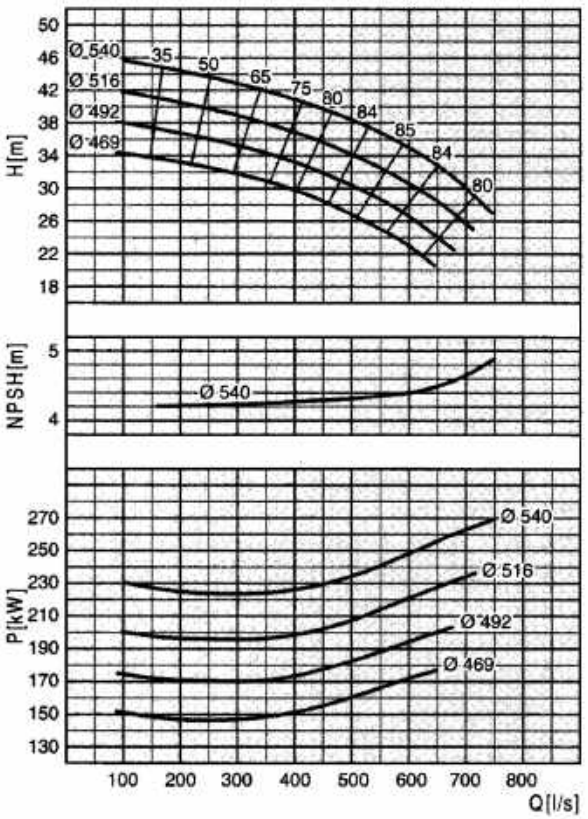
DHv 52-30 n=24,2s^{-1}



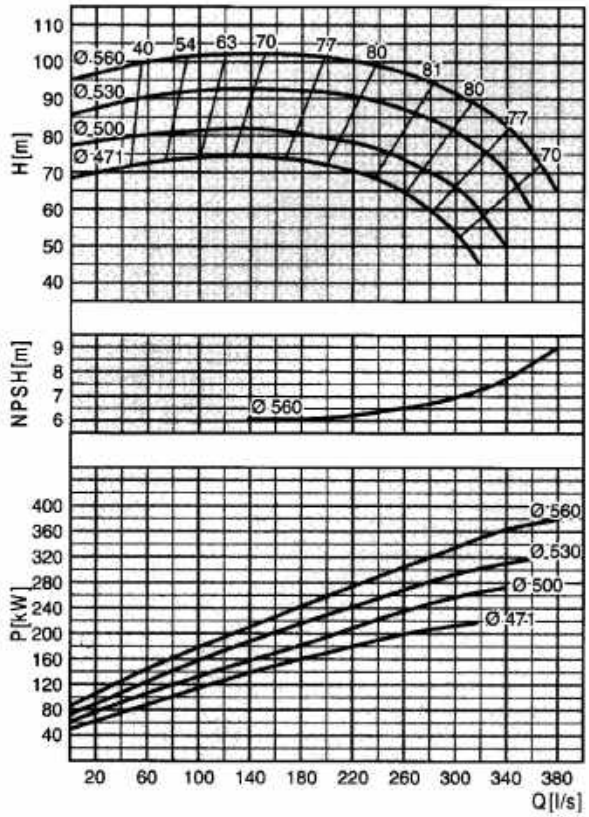
DH 53-50 n=12,3s^{-1}



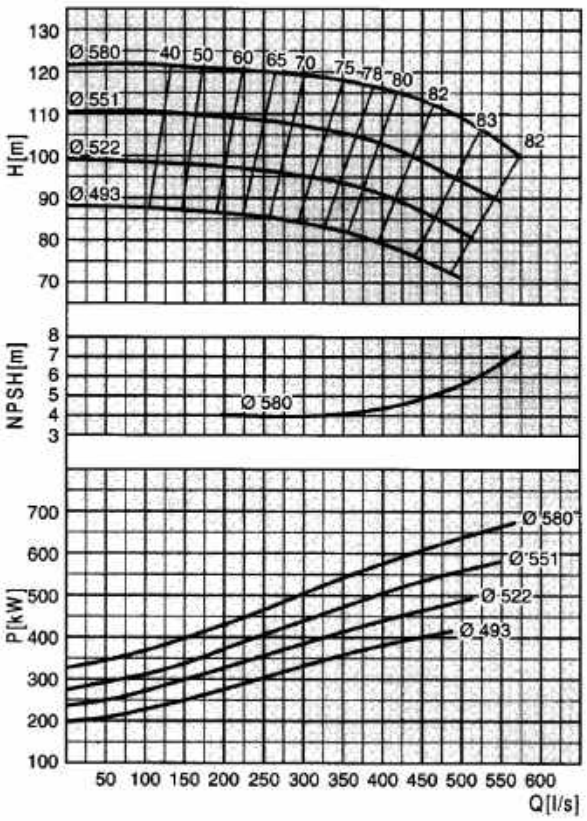
DH 54-50 n=16s^{-1}



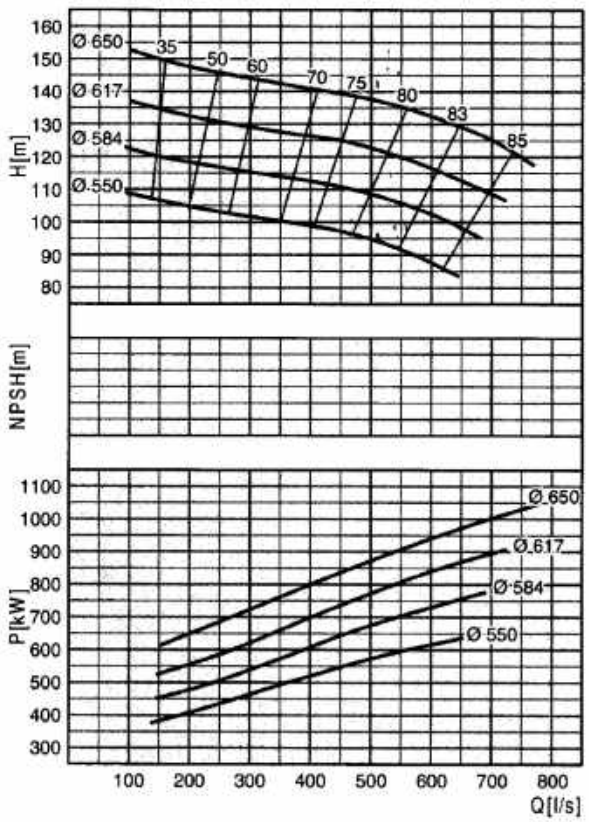
DH 56-25 n=24,2s^{-1}



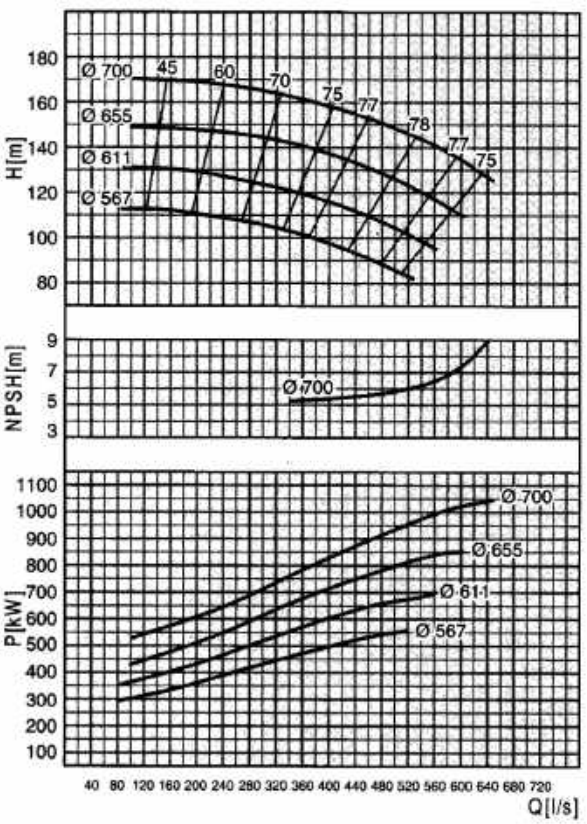
DH 58-35 n=24,7s^{-1}



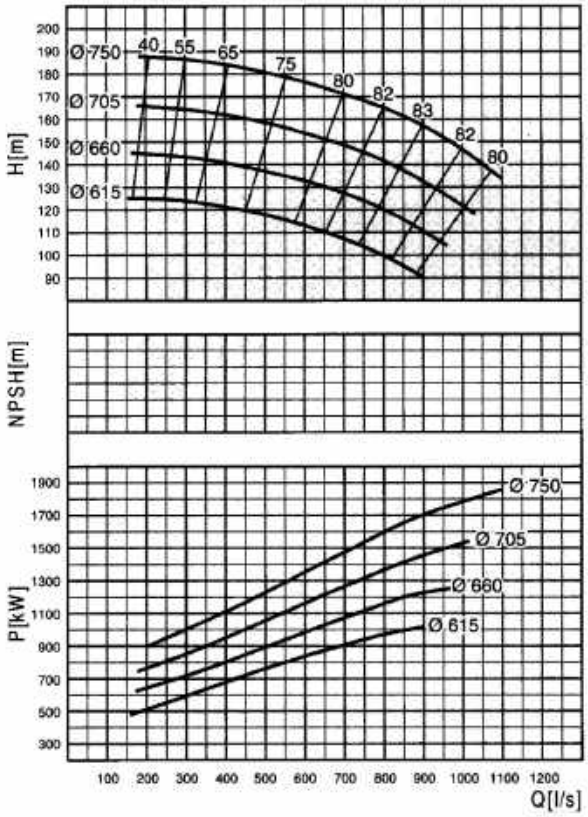
DH 65-40 n=24,2s^{-1}



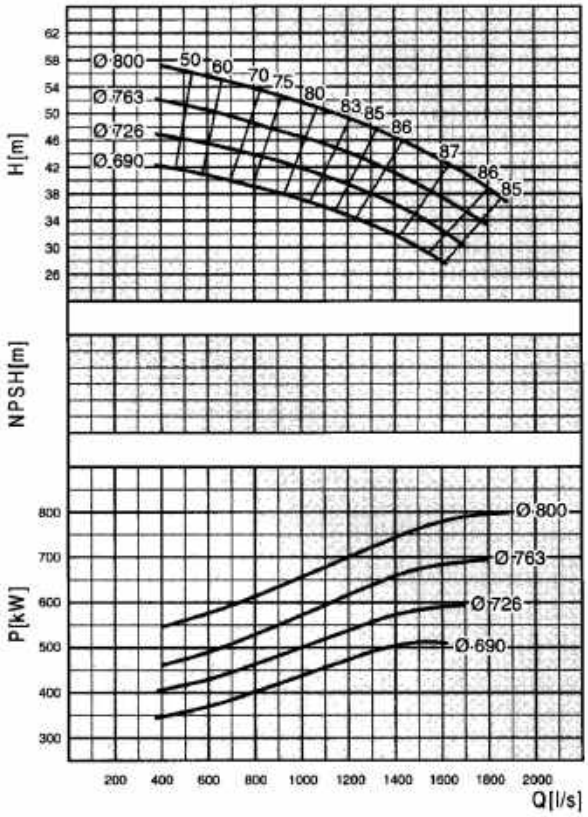
DHv 70-35 n=24,2s^{-1}



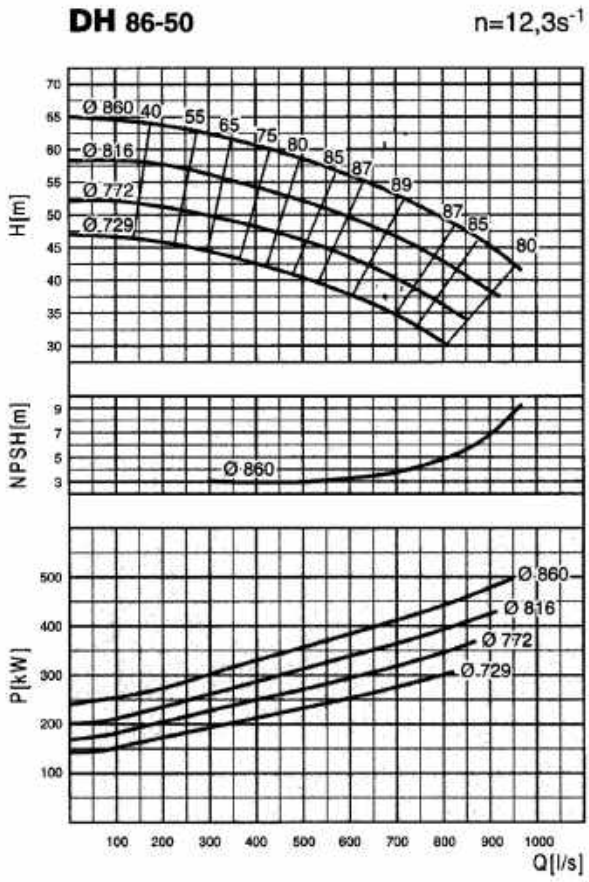
DHv 75-50 n=24,2s^{-1}



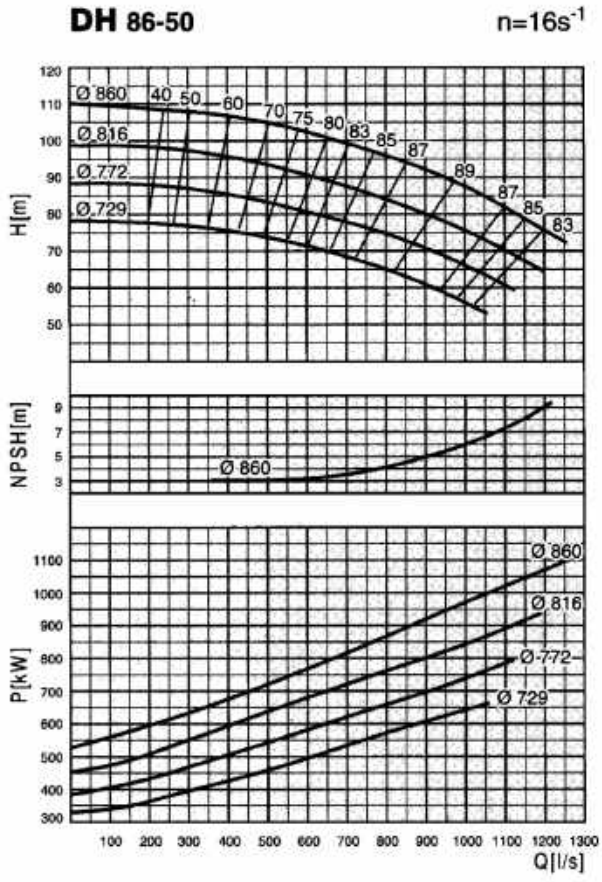
DH 80-70 n=12,3s^{-1}



DH 86-50 n=12,3s^{-1}



DH 86-50 n=16s^{-1}



Attachment 3

ENEQ Consult – CENTRIFUGAL PUMPS Type IN

ENEQ Consult Ltd. delivers cost-effective mechanical equipment for nuclear, conventional, oil & gas, and petrochemical industries.

- **9 years** of solid performance
- **> 20 M€** project portfolio
- **> 50** completed projects, **> 10** in progress
- Exclusive partnerships with **5 manufacturers worldwide**
- Equipment compliant with **ASME, EN, N Stamp, DIN, ASTM, ISO, GOST**

Expertise:

- **Equipment Supply** – high-quality OEMs, cost-effective modernization and new-build solutions, turnkey delivery
- **Engineering** – design critical analyses, FEA & CFD calculations, technical consulting
- **Service** – full project support from production to installation, commissioning, and after-sales

CENTRIFUGAL PUMPS

Type IN

According with EN 22858 / ISO 2858 / ISO 5199

Standard centrifugal Pumps type IN

Fields of Application

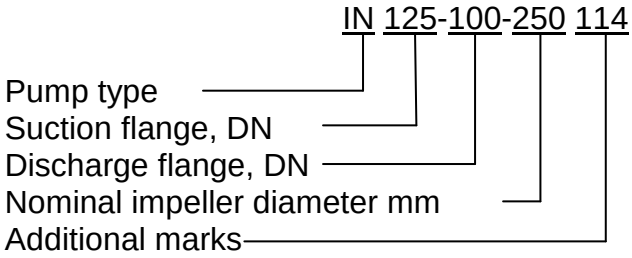
Pumps type IN are suitable for all kinds of non-agresive and agresive liquids, chemicals including oil and oil products and liquid gases with solid particles up to 0,2% per mass to size 0,2 mm. These pumps can be used in water supply, Industry and Power plants, on ships and sailing vessels, chemical plants, refineries etc.

Design

Horizontal Pump with radialy split volute casing in “back pull-out” design has single inlet, singlestage radial impeller in accordance with standard:

EN 22858 / ISO 2858 / ISO 5199.

Designation



Technical characteristics

Capacity: do 500 m^3/h
Head: do 150 m
Upišite tekst ili adresu web-lokacije ili prevedite dokument.
OpoOoooOOperating pressure: do 16 (25) bar
Operating temperature:od -40 do+350°C
Velocity: do 3600 o/min

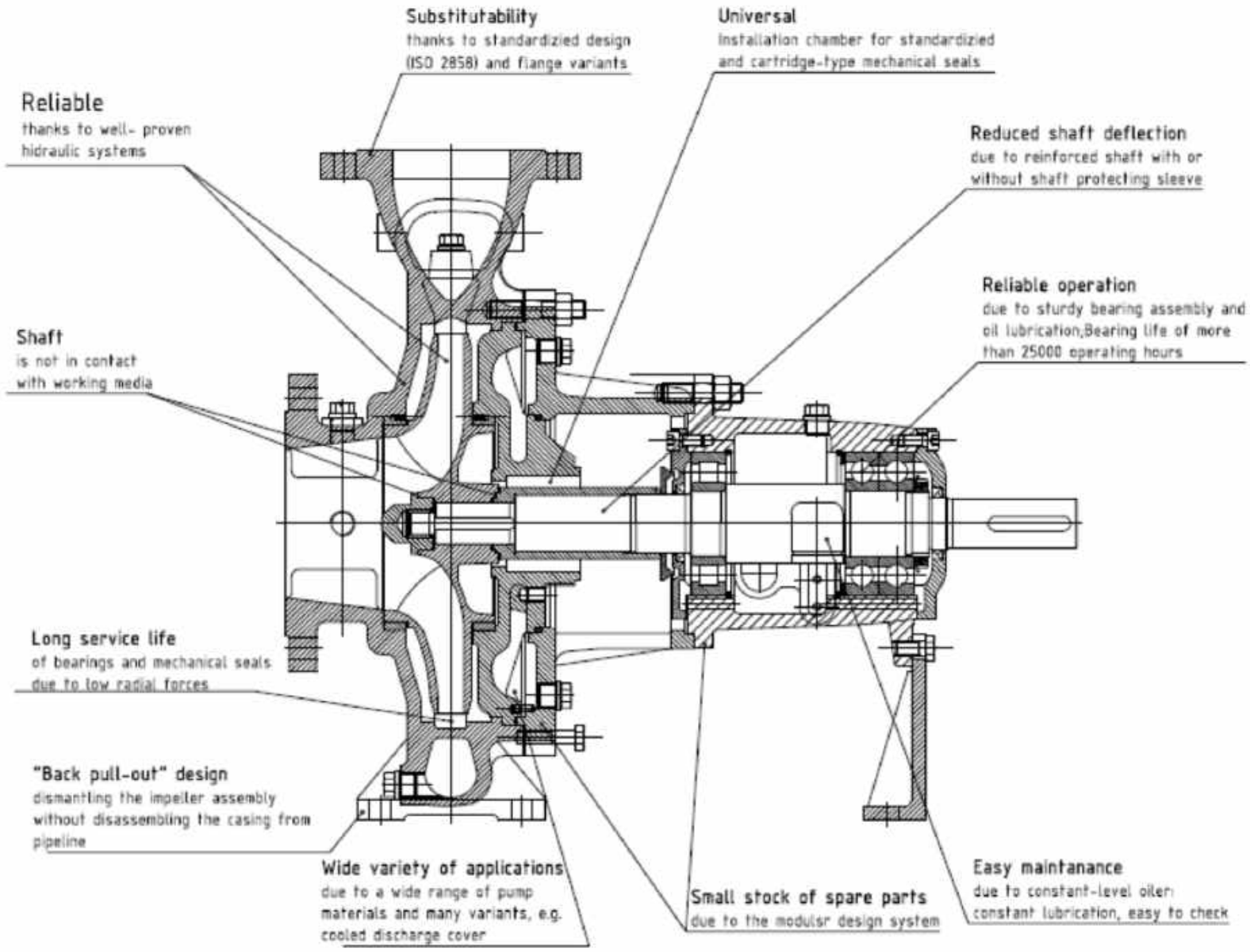
Certification

Certified quality management ISO 9001

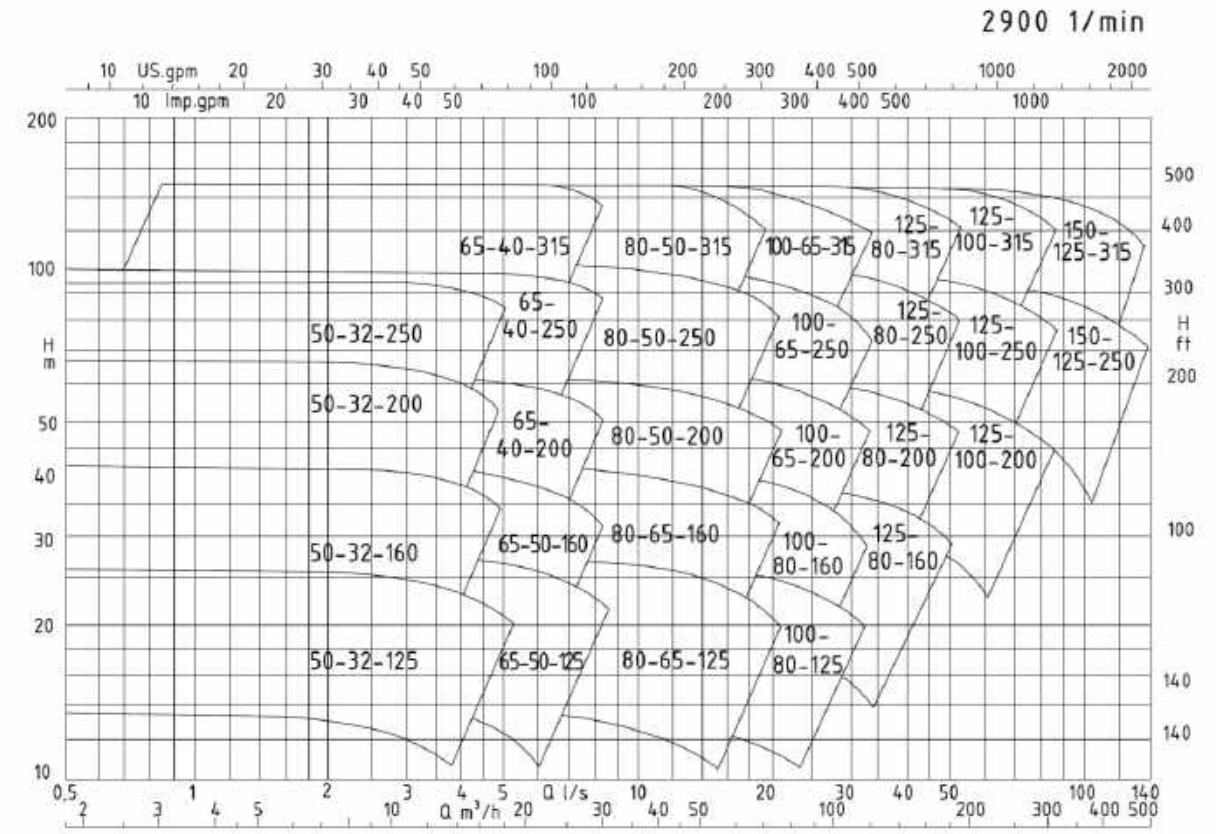
Materials (EN standard):

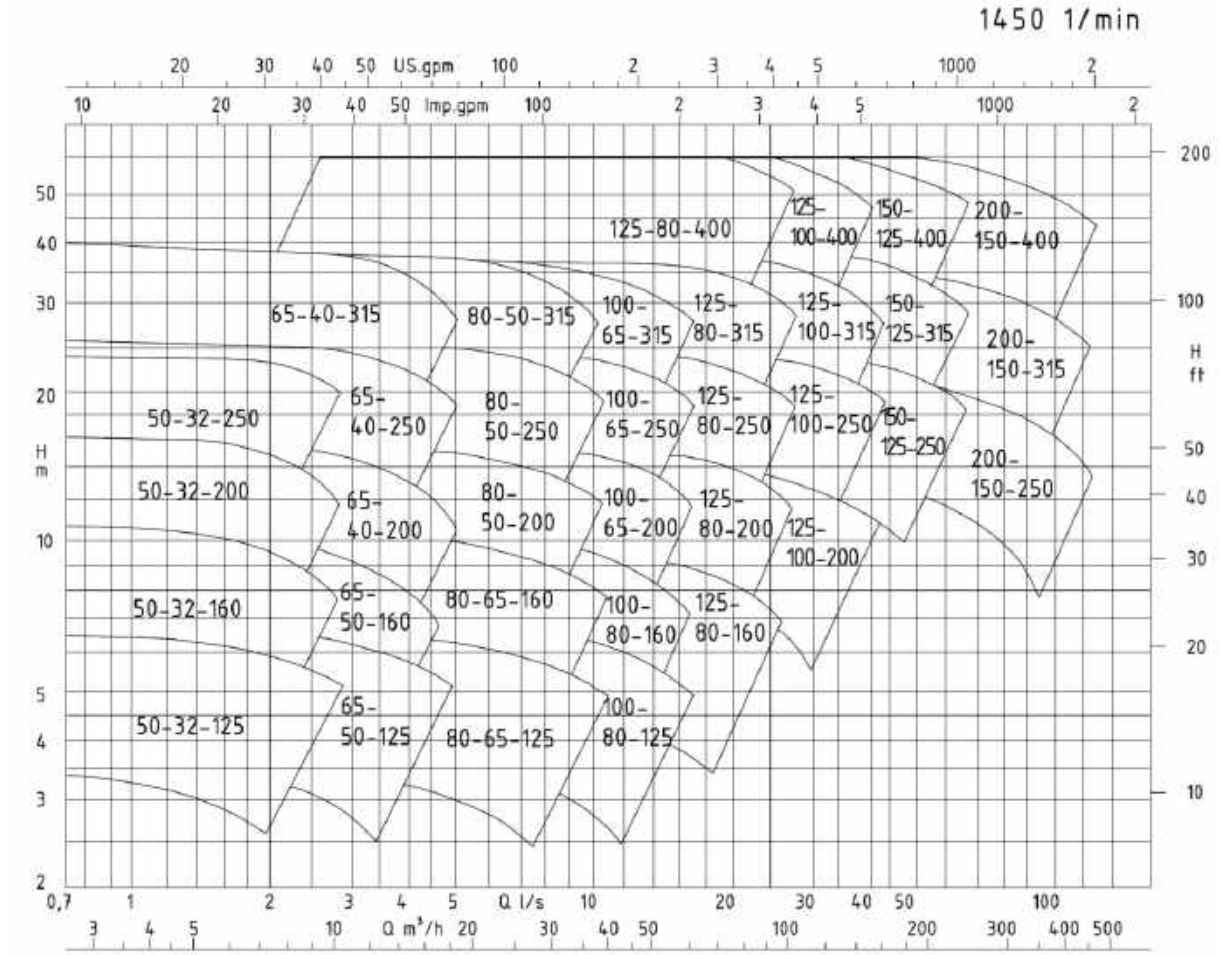
Part description	Material variant – standard programme			
	1	2	3	4
Volute casing	EN-GJL-250	CuAl10Fe5Ni5-C	GP240GH	GX5CrNiMoNb19-11-2
Casing cover	EN-GJL-250	CuAl10Fe5Ni5-C	GP240GH	GX5CrNiMoNb19-11-2
Impeller	EN-GJL-250	CuAl10Fe5Ni5-C	GP240GH	GX5CrNiMoNb19-11-2
Shaft	42CrMo4			X17CrNi16-2
Wearing ring	EN-GJL-250	CuAl10Fe5Ni5-C	GP240GH	GX5CrNiMoNb19-11-2
Shaft sleeve	X20Cr13			GX5CrNiMoNb19-11-2
Housing support	EN-GJL-250			
Bearing housing	EN-GJL-250			
Mech.seal cover	X17CrNi16-2			
Impeller nut	X17CrNi16-2			
Pedestal foot	EN-GJL-250			

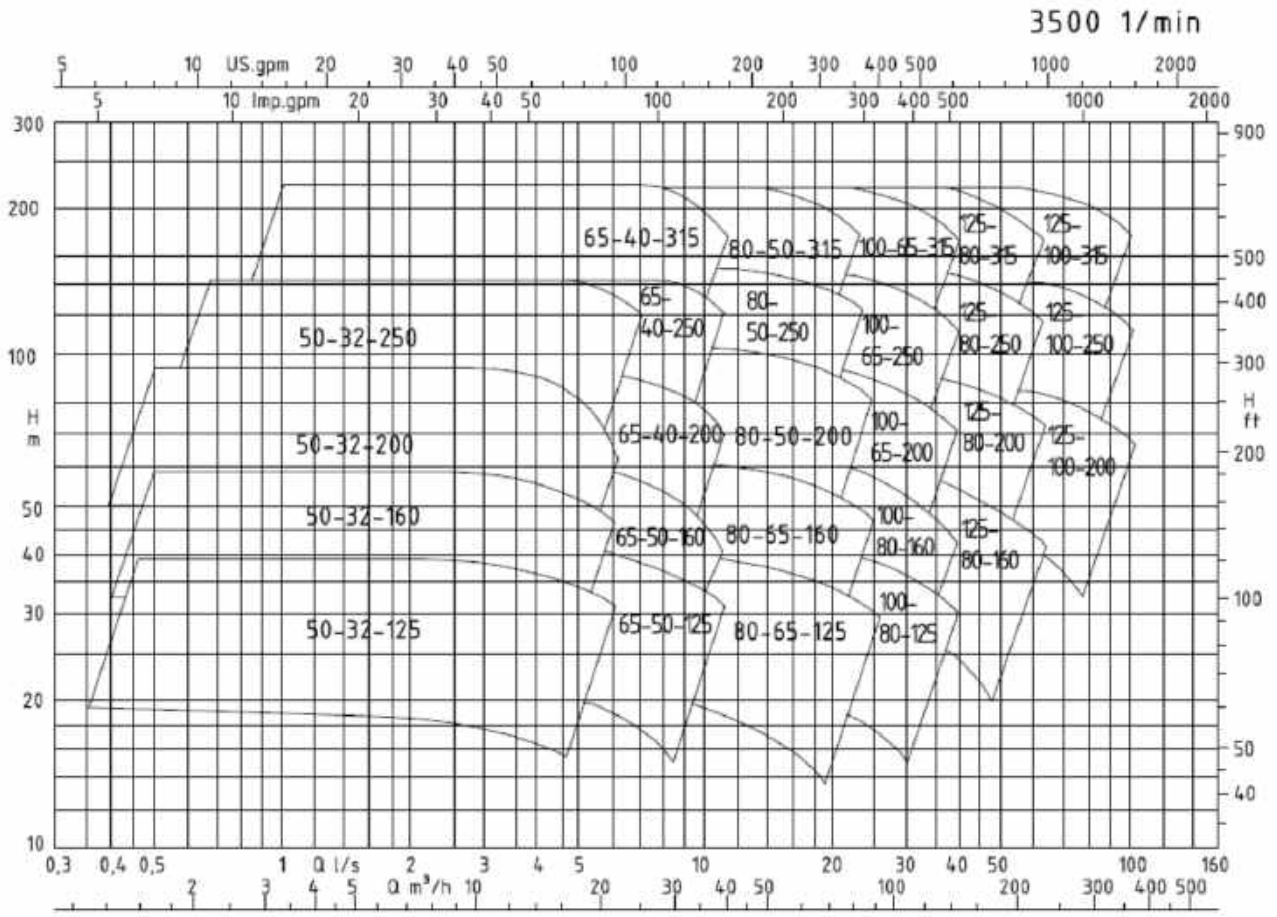
Another combination of material are supplied at the customer's request.


Substitutability
thanks to standardizied design
(ISO 2858) and flange variants
Universal
Installation chamber for standardizied
and cartridge-type mechanical seals
Reliable
thanks to well- proven
hidraulic systems
Reduced shaft deflection
due to reinforced shaft with or
without shaft protecting sleeve
Reliable operation
due to sturdy bearing assembly and
oil lubrication,Bearing life of more
than 25000 operating hours
Shaft
is not in contact
with working media
Long service life
of bearings and mechanical seals
due to low radial forces
"Back pull-out" design
dismantling the impeller assembly
without disassembling the casing from
pipeline
Wide variety of applications
due to a wide range of pump
materials and many variants, e.g.
cooled discharge cover
Small stock of spare parts
due to the modulsr design system
Easy maintanance
due to constant-level oiler:
constant lubrication, easy to check

Selection Charts






3500 1/min
US.gpm
Imp.gpm
H m
H ft
Q l/s
Q m³/h
65-40-315
80-50-315
100-65-315
125-80-315
125-100-315
65-40-250
80-50-250
100-65-250
125-80-250
125-100-250
50-32-250
50-32-200
50-32-160
50-32-125
65-40-200
80-50-200
100-65-200
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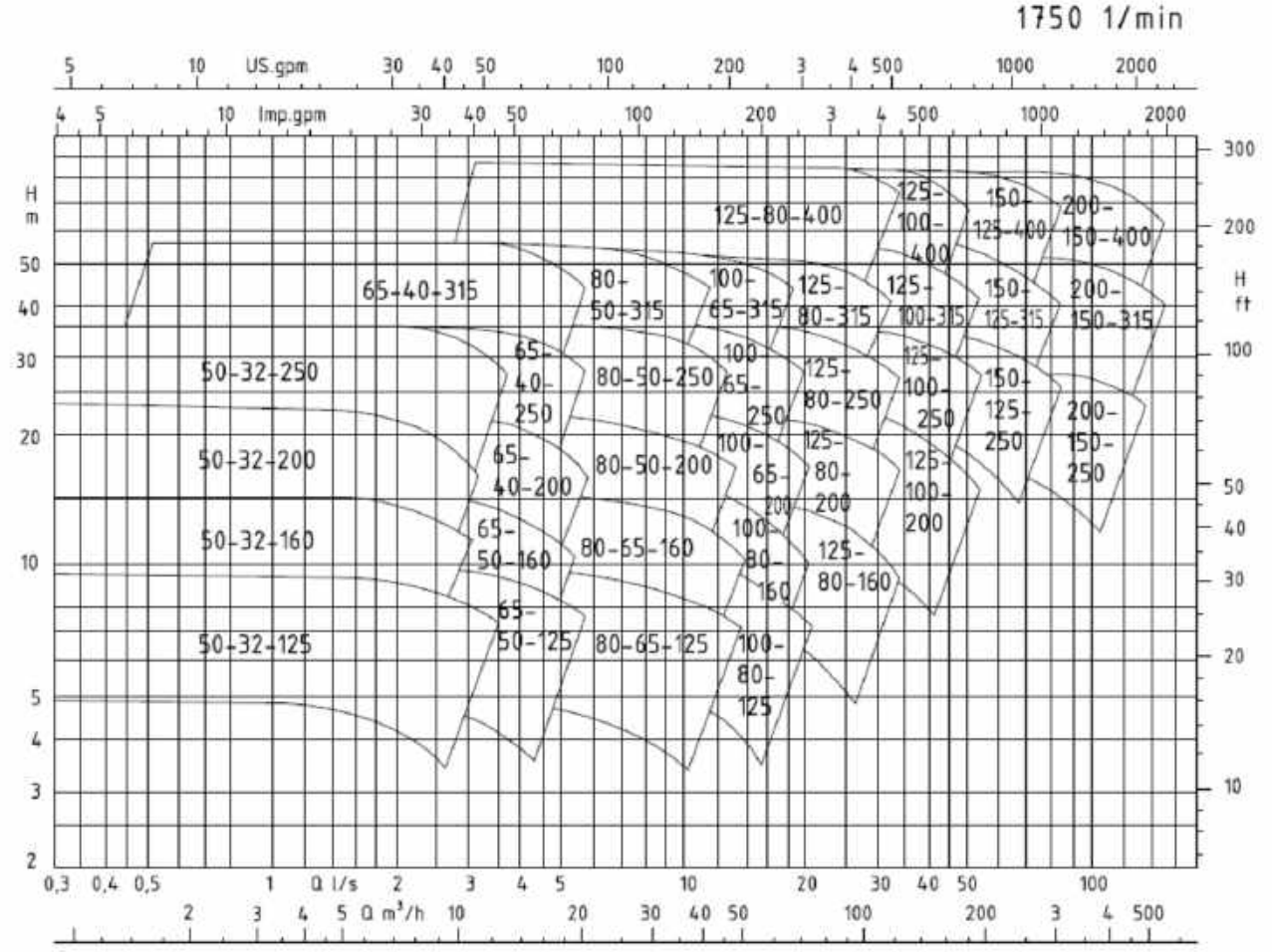
80-65-125
100-80-125


1750 1/min
US.gpm
Imp.gpm
H m
H ft
Q l/s
Q m³/h
125-80-400
125-100-400
150-125-400
200-150-400
65-40-315
80-50-315
100-65-315
125-80-315
125-100-315
150-125-315
200-150-315
50-32-250
65-40-250
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50-32-200
65-40-200
80-50-200
100-65-200
125-80-200
125-100-200
50-32-160
65-50-160
80-65-160
100-80-160
125-80-160
50-32-125
65-50-125
80-65-125
100-80-125

IN pumps benefits

Technical datas

Casing

Radially split, consisting of volute casing and casing cover.
The casing cover and the bearing bracket lantern form a chamber which can be used for heating and cooling depending of pump purpose.

Impeller

Impeller is keyed between two support roller bearings. Front support is one cylindrical roller bearing, and back supports are two ball bearings with obliquely contacts facing one to another.
Axial force is balanced with unburdening holes and wearing rings.

Shaft Seal

The shaft seal can be designed as a gland packing or a mechanical seal.
Conversion from gland to mechanical seal and vice versa is possible without any rework on the casing cover.
Mechanical seal are standard single and double seals according to standard DIN 24960.

Recommended Spare Parts Stock for Two years`operation

Acceptance Tests / Guarantees

- **Material tests**
  Test report 2.2 on request
- **Product tests**
  Inspection certificate 3.1, on request,for:
  pressure test of complete pump as per EN 10204
- **Hydraulic tests**
  Each pump is subjected to a performance test run, and its duty point is guaranteed according toISO 9906 / 2A.
- **NPSH test**

Warranties are given within he scope of valid delivery conditions.

Forces and moments

IN pumps are designed for handling forces and moments in accordance with ISO 5199

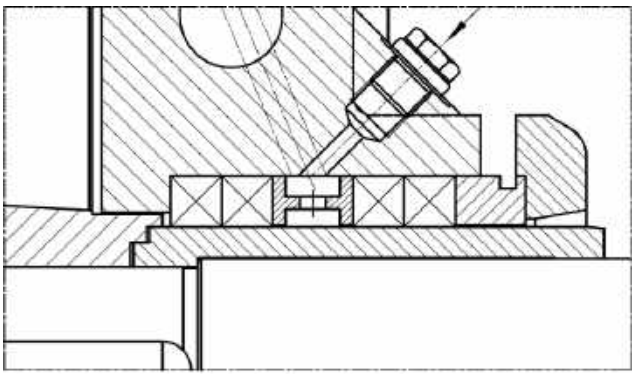
Documentation

Delivered documentation with pump:
- Sectional drawing whit list of component
- Technical data sheet
- Installation plan / Measuring sketch
- Operating instructions

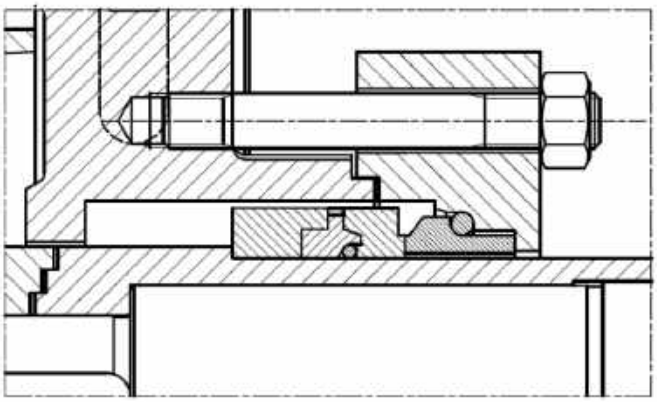
Pos. Nr.	Part Description	Number of pumps (including standby pumps)						
		2	3	4	5	6+7	8+9	10 and more
		Quantity of spare parts						
	Shaft	1	1	1	2	2	2	20%
	Impeller	1	1	1	2	2	2	20%
	Bearings with obliquely contact (set)	1	1	2	2	2	3	25%
	Roller bearing	1	1	2	2	2	3	25%
	Mechanical seal, set	1	1	2	2	2	3	25%
	Sealing ring	1	1	2	2	2	3	25%
	Gland packing	4	4	6	6	6	8	100%
	Casing wearing ring	2	2	2	3	3	4	50%
	Shaft sleeve	2	2	2	3	3	4	50%
	Sealing for pump casing (set)	4	6	8	8	9	12	150%
	Coupling (set)	1	1	2	2	3	4	30%

Example of Seal Arrangements:

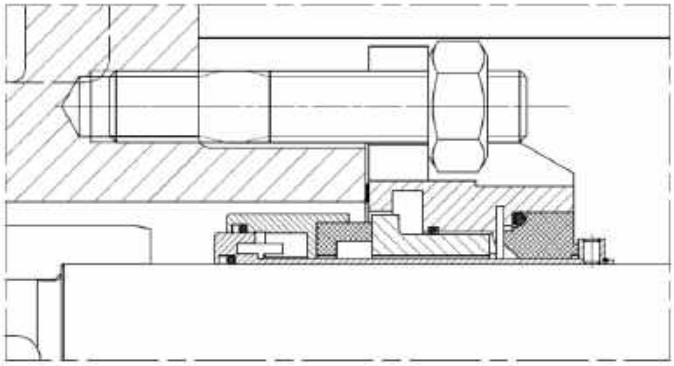
1. **Gland packing**



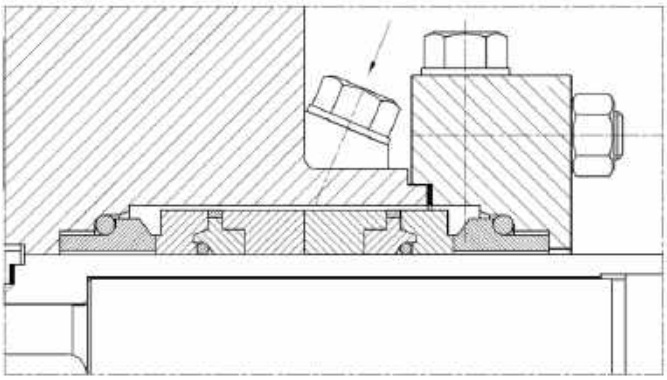
2. **Cylinrical seal chamber**



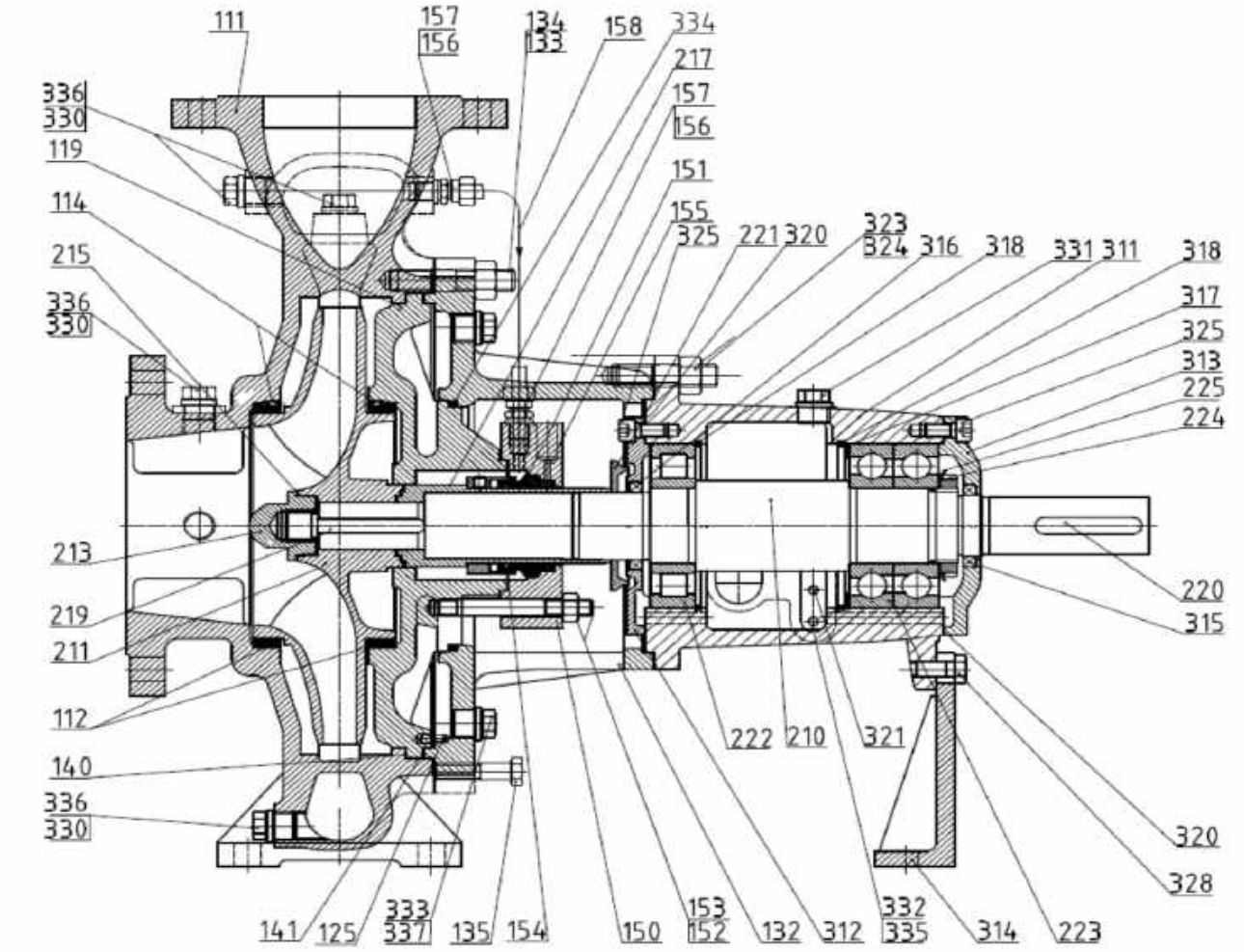
3. **Cartridge seal**



4. **Double-acting mechanical seal**



Pumps section view with part list



IN Pumps Part list

111	Volute casing
112	Wearing ring
114	Screw
119	Casing cover
125	Pin
132	Housing support
133	Screw
134	Nut
135	Screw
140	Seal
141	Seal
150	Mechanical seal cover
151	Mechanical seal
152	Nut
153	Screw
154	Seal
155	Pin
156	Connection
157	Sealing ring
158	Pipe
210	Shaft
211	Impeller
213	Impeller nut
215	Sealing ring
217	Mechanical seal sleeve
219	Shaft key
220	Shaft key
221	Centrifugalni odvajač
222	Bearing
223	Bearing
224	Nut
225	Lock washer
311	Bearing housing
312	Bearing cover
313	Bearing cover
314	Pump foot
315	Shaft seal
316	Shaft seal
317	Distant ring
318	Circlip
320	Seal
321	Oil level regulator
323	Screw
324	Nut
325	Screw
328	Screw
330	Plug
331	Plug
332	Plug
334	O-ring
333	Plug
335	Sealing ring
336	Sealing ring
337	Sealing ring

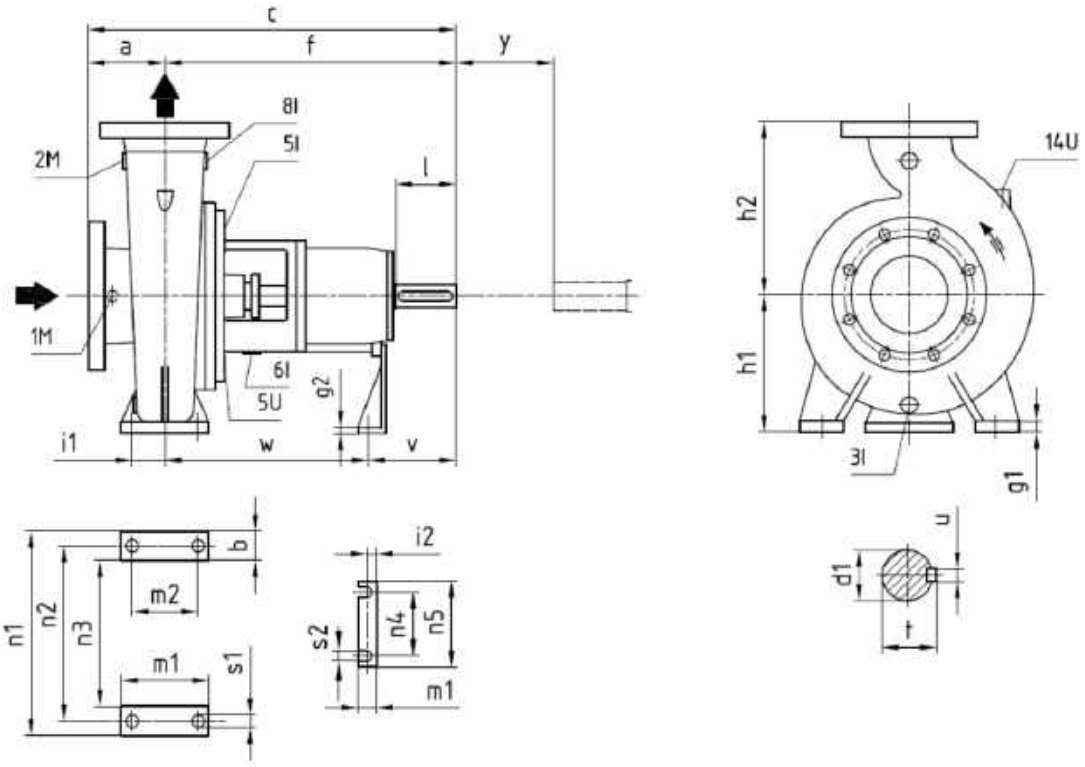
Technical Data sheet

Technical dana sheet

Pump sizes

			Units	50-32-125	50-32-160	50-32-200	50-32-250	65-50-125	65-50-160	65-40-200	80-65-125	80-65-160	80-50-200	100-80-125	65-40-250	65-40-315	80-50-250	80-50-315	100-65-200	100-65-250	100-80-160	125-80-200	125-80-250	125-100-200	100-65-315	125-80-315	125-80-400	125-100-250	125-100-315	125-100-400	150-125-250	150-125-315	150-125-400	200-150-250	200-150-315	200-150-400	250-200-400	300-250-500
Impeler	impeller outlet width b2		mm	5,5	4	5,6	6,4	8	6,7	7,5	18	10	10	23	7	8	9,5	9	17	12	18	27	22	18	29	12	13	10	21,5	22	15	35	27	19	45	34	35	49
	impeller inlet diameter		mm	50	50	52	52	65	61	75	74	82	77	90	65	65	93	80	99	96	100	100	114	118	122	115	113	123	123	151	146	148	151	150	180	198	197	280
	max.impeller diameter		mm	135	165	209	254	130	165	209	135	164	209	135	260	320	260	320	209	260	164	169	209	260	209	320	320	409	260	320	408	260	320	404	260	324	409	519
	min.impeller diameter		mm	See individual curve																																		
Shaft diameter	in stuffing box housing		mm	28	28	28	38	28	28	28	28	28	28	28	38	38	38	38	38	38	38	38	38	38	38	48	48	45	48	48	48	48	48	48	48	58	58	58
	at bearings	pump end	mm	35	35	35	35	35	35	35	35	35	35	35	40	40	40	40	40	40	40	40	40	40	40	55	55	55	55	55	55	55	55	55	55	65	65	75
	standard shaft	motor end	mm	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	55	55	55	55	55	55	55	55	55	55	65	65	80
	at coupling		mm	24	24	24	32	24	24	24	24	24	24	24	32	32	32	32	32	32	32	32	32	32	32	42	42	42	42	42	42	42	42	42	42	48	48	65
Shaft protective sleeve	packing		mm	38	38	38	45	38	38	38	38	38	38	38	45	45	45	45	45	45	45	45	45	45	45	60	60	60	60	60	60	60	60	60	60	70	70	90
	mechanical seal		mm	Depends of pump construction type																																		
Bearings	standard	pump end		NU 307															NU 308						NU 311									NU 313			NU 415	
		motor end		2x 7307 BUA															2x7307BUA						2x7311BUA									2x7313BUA			2x7316 BE	
Stuffing box housing	hole diameter		mm	58	58	58	65	58	58	58	58	58	58	58	65	65	65	65	65	65	65	65	65	65	65	80	80	80	80	80	80	80	80	80	80	95	95	122
	hole lenght		mm	62	62	60	63	62	62	60	62	62	62	62	63	62	63	62	64	65	64	64	65	65	64	63	63	63	63	63	60	63	63	63	63	74	77	97
	stuffing box ring width		mm	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	12	12,5	15
Shaft deflection				At 0,05mm at the shaft seal, max shaft deflection is in compliance with ISO 5199																																		
Presure limit	max.opperating pressure		bar	Depends on material																																
	max.test pressure		bar	1,5x max. Permissible pump discharge pressure																																
Temp.limitation	max.product temperature			Depends on material																																
Drive				Depends on material and temperature on request																																

Dimensions and Connections



y=distance required for dismantling of the rotor without removing el.motor

Dimensions

Veličina pumpe	Naz.otvor		Dimenzije pumpe (mm)																										
	Usis	Tlak	a	b	c	f	g1	g2	h	h2	m	m3	n	n3	n5	d1/d	l	t	u	y	i1	i2	m2	n2	n4	s1	s2	v	w
50-32-125	50	32	80	50	465	385	12	8	112	140	100	45	190	90	160	24	50	27	8	100	35	28	70	140	110	14	14	100	285
50-32-160			80	50	465	385	14	8	132	160	100	45	240	140	160	24	50	27	8	100	35	28	70	190	110	14	14	100	285
50-32-200			80	50	465	385	14	8	160	180	100	45	240	140	160	24	50	27	8	100	35	28	70	190	110	14	14	100	285
50-32-250			100	65	600	500	16	8	180	225	125	47	320	190	160	32	80	35	10	100	42,5	30	95	250	110	14	14	130	370
65-50-125	65	50	80	50	465	385	12	8	112	140	100	45	210	110	160	24	50	27	8	100	35	28	70	160	110	14	14	100	285
65-50-160			80	50	465	385	14	8	132	160	100	45	240	140	160	24	50	27	8	100	35	28	70	190	110	14	14	100	285
65-40-200		40	100	50	485	385	14	8	160	180	100	45	265	165	160	24	50	27	8	100	35	28	70	212	110	14	14	100	285
65-40-250			100	65	600	500	16	8	180	225	125	47	320	190	160	32	80	35	10	100	47,5	30	95	250	110	14	14	130	370
65-40-315			125	65	625	500	18	8	200	250	125	47	345	215	160	32	80	35	10	100	47,5	30	95	280	110	14	14	130	370
80-65-125	80	65	100	50	485	385	14	8	132	160	100	45	240	140	160	24	50	27	8	100	35	28	70	190	110	14	14	100	285
80-65-160			100	50	485	385	14	8	160	180	100	45	265	165	160	24	50	27	8	100	35	28	70	212	110	14	14	100	285
80-50-200		50	100	50	485	385	14	8	160	200	100	45	265	165	160	24	50	27	8	100	35	28	70	212	110	14	14	100	285
80-50-250			125	65	625	500	16	8	180	225	125	47	320	190	160	32	80	35	10	100	47,5	30	95	250	110	14	14	130	370
80-50-315			125	65	625	500	18	8	225	280	125	47	345	215	160	32	80	37	10	100	47,5	30	95	280	110	14	14	130	370
100-80-125	100	80	100	65	485	385	14	8	160	180	125	45	280	150	160	24	50	27	8	100	47,5	28	95	212	110	14	14	100	285
100-80-160			100	65	600	500	15	8	160	200	125	47	280	150	160	32	80	35	10	100	47,5	30	95	212	110	14	14	130	370
100-65-200		65	100	65	600	500	16	8	180	225	125	47	320	190	160	32	80	35	10	140	47,5	30	95	250	110	14	14	130	370
100-65-250			125	80	625	500	18	8	200	250	160	47	360	200	160	32	80	35	10	140	60	30	120	280	110	18	14	130	370
100-65-315			125	80	625	530	18	12	225	280	160	52	400	240	160	42	110	45	12	140	60	33	120	315	110	18	14	160	370
125-80-160	125	80	125	65	625	500	15	8	180	225	125	47	320	190	160	32	80	35	10	140	47,5	30	95	250	110	14	14	130	370
125-80-200			125	65	625	500	16	8	180	250	125	47	345	215	160	32	80	35	10	140	47,5	30	95	280	110	14	14	130	370
125-80-250			125	80	625	500	18	8	225	280	160	47	400	240	160	32	80	35	10	140	60	30	120	315	110	18	14	130	370
125-80-315			125	80	655	530	18	12	250	315	160	52	400	240	160	42	110	45	12	140	60	33	120	315	110	18	14	160	370
125-80-400			125	80	655	530	20	12	280	355	160	52	435	275	160	42	110	45	12	140	60	33	120	355	110	18	14	160	370
125-100-200	125	100	125	80	625	500	16	8	200	280	160	47	360	200	160	32	80	35	10	140	60	30	120	280	110	18	14	130	370
125-100-250			140	80	670	530	18	12	225	280	160	52	400	240	160	42	110	45	12	140	60	33	120	315	110	18	14	160	370
125-100-315			140	80	670	530	18	12	250	315	160	52	400	240	160	42	110	45	12	140	60	33	120	315	110	18	14	160	370
125-100-400			140	100	670	530	20	12	280	355	200	52	500	300	160	42	110	45	12	140	75	33	150	400	110	23	14	160	370
150-125-250	150	125	140	80	670	530	18	12	280	355	160	52	400	240	160	42	110	45	18	140	60	33	120	315	110	18	14	160	370
150-125-315			140	100	670	530	20	12	280	355	200	52	500	300	160	42	110	45	12	140	75	33	150	400	110	23	14	160	370
150-125-400			140	100	670	530	20	12	315	400	200	52	500	300	160	42	110	45	12	140	75	33	150	400	110	23	14	160	370
200-150-250	200	150	160	100	690	530	20	12	280	375	200	52	500	300	160	42	110	45	12	180	75	33	150	400	110	23	14	160	370
200-150-315			160	100	830	670	22	12	315	400	200	60	550	350	200	48	110	51	14	180	75	39	150	450	140	23	18	170	500
200-150-400			160	100	830	670	22	12	315	450	200	60	550	350	200	48	110	51	14	180	75	39	150	450	140	23	18	170	500

Attachment 4

ENEQ Consult – Single-stage low-pressure pump units Type KK

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- **9 years** of solid performance
- **> 20 M€** project portfolio
- **> 50** completed projects, **> 10** in progress
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- Equipment compliant with **ASME, EN, N Stamp, DIN, ASTM, ISO, GOST**

Expertise:

- **Equipment Supply** – high-quality OEMs, cost-effective modernization and new-build solutions, turnkey delivery
- **Engineering** – design critical analyses, FEA & CFD calculations, technical consulting
- **Service** – full project support from production to installation, commissioning, and after-sales

Single-stage low-pressure pump units Type KK

Application

For clean and highly contaminated water, for heavy-duty operating conditions on the suction side, circulation of hot water up to

150∘C and system pressure up to 16 bar, condensate, etc.

They are intended for use in thermal power plants, industry, agriculture, utilities, water management, and elsewhere.

Bearings

Two roller bearings are lubricated with oil and operate very quietly.

Base plate

Made of gray cast iron or a welded construction from steel profiles.

Cross-section of the pump

Flange position

Suction flange: horizontal - axial

Discharge flange: normally vertical upwards. On request, it can be supplied in a horizontal right position or diagonally downwards at a

45∘ angle, and other required flange positions are possible upon special request.

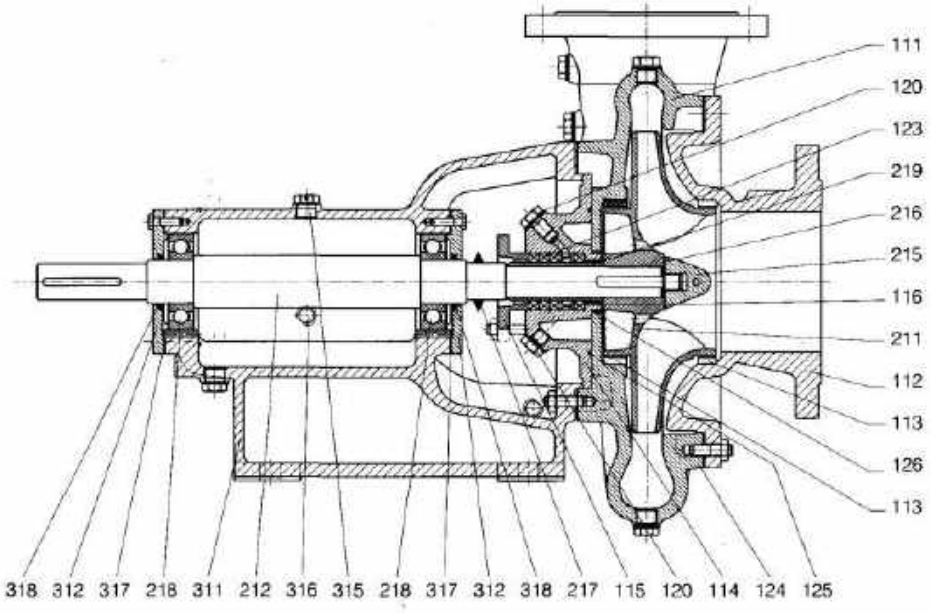
Coupling

Flexible with a protective guard.

Electric motor

Exclusively squirrel-cage motors, B3 form, IP 54 protection.

Cross-section of the pump



List of main pump parts

111 – Volute casing	124 – Casing cover gasket	218 – Roller bearing
112 – Casing cover	125 – Cooling casing gasket - large	219 – Shaft sleeve
113 – Spacer ring	126 – Cooling casing gasket - small	311 – Bearing bracket
114 – Cooling casing	211 – Impeller	312 – Bearing cover

115 – Wear ring	212 – Shaft	315 – Air vent
116 – H-ring	215 – Impeller nut	316 – Oil level indicator
120 – Plug	216 – Nut lock	317 – Bearing cover gasket
123 – Gland packing	217 – Centrifugal separator	318 – Sealing ring

Materials

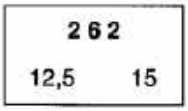
Position	Name	Materials
111	Volute casing	Gray cast iron
112	Casing cover	Gray cast iron
113	Spacer ring	Gray cast iron or bronze
114	Cooling casing	Gray cast iron
115	Wear ring	Gray cast iron
116	H-ring	Gray cast iron or bronze
211	Impeller	Bronze
212	Shaft	Steel
219	Shaft sleeve	Bronze
311	Bearing bracket	Gray cast iron

From our extensive production program of pumps, here we present the types that are most commonly used, i.e., for flow rates up to 180 l/s (648 m3/h) and delivery heads up to 75 m.

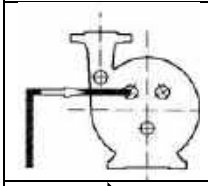
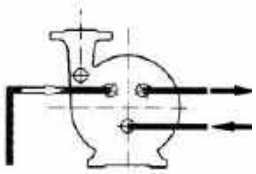
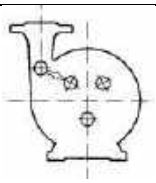
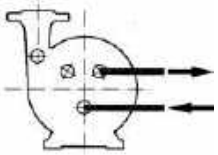
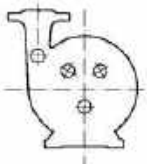
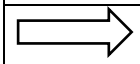
We also produce pumps for larger flow rates and special designs, including those with plain bearings, grease-lubricated roller bearings, mechanical seals, and for special operating conditions. We especially emphasize that we produce hot water circulation pumps for the highest system pressures.

In all such cases, please contact ENEQ, which will provide you with an offer with all the necessary technical data in the shortest possible time.

Example for pump unit selection A pump with a flow rate of 40 l/s (144 m3/h) is required for a system. In the system, upstream of the pump's suction flange, water up to 120∘C is under a pressure of 10 bar. The total required delivery head is 20 m. Since the total pressure at the pump outlet is 12 bar, and the water temperature is 120∘C, our pump is suitable. For a flow rate	1. **Pump type**: KK 31.5-15 2. **Electric motor power**: 15 kW; 1450 min−1 3. **Data** on weights and dimensions of the pump and unit The required power for the pump is valid for water with a density of 1000 kg/m3. All motors are selected with a sufficient power reserve.

Q=40 l/s, H=20 m, we find the field in the table: **Serial number 262**. Required power for the pump (kW)  Installed motor power (kW) 	

Schemes for connecting sealing and cooling water

For condensate and impure water	For condensate, impure water and water above 80° C	For clean cold water	For hot water with pre-pressure in the system	For cold water with pre-pressure in the system
				
 Sealing water, Cooling water				

Note: Connect sealing water after the non-return valve for condensate, and for impure water, connect to the water supply or filtered water.

Table Summary

This is a large pump selection chart that spans two pages. It allows users to find a suitable pump model based on the required head and flow rate at two different operating speeds.

Table Headers and Content

- **Vertical Axis:** Visina dobave H (m) -> **Delivery Head H (m)**
- **Horizontal Axis:** Količina dobave Q (l/s) -> **Flow Rate Q (l/s)**
- **Operating Speeds:** The chart provides data for two speeds:
    - n = 2900 min^{-1} -> **n = 2900 RPM**
    - n = 1450 min^{-1} -> **n = 1450 RPM**
- **Table Body:** The cells contain pump model codes (e.g., 287, 247) and the required vs. installed motor power in kW (e.g., 12.8 15) for a given duty point.

Količina

Višina dobave H (m)

n = 2900 min^{-1}

H (m)	1	2	3	4	5	6	7	8	10	12	14	16	18	20	24
80					242 13,6 18,5	242 13,9 18,5	242 14,9 18,5		246 19,6 22	247 20,9 30	247 22,4 30	287 30,6 37	287 30,7 37	287 32 37	288 34,8 45
75					241 12,4 15	241 12,8 15	242 13,7 18,5	242 14,3 18,5	242 16 18,5	246 19,2 22	247 20,6 30	247 21,6 30	247 23,4 30	247 24,5 30	287 32,7 37
70					241 11,2 15	241 11,6 15	241 12,5 15	242 13,2 18,5	242 14,7 18,5	246 17,5 22	246 18,9 22	246 19,9 22	247 21,3 30	247 22,9 30	247 27,4 30
65					241 10,1 15	241 10,5 15	241 11,3 15	241 12,1 15	242 13,5 18,5	242 15,9 18,5	246 17,3 22	246 18,2 22	246 19,4 22	247 21,2 30	247 25,5 30
60					240 9 11	240 9,5 11	241 10,2 15	241 11 15	241 12,3 15	242 14,7 18,5	245 15,6 18,5	245 16,6 18,5	246 18 22	246 19,6 22	247 23,5 30
55					240 7,98 11	240 8,48 11	222 9,45 11	223 9,85 15	223 10,8 15	223 11,7 15	245 14 18,5	245 15 18,5	245 16,4 18,5	246 18 22	247 21,8 30
50			215 4,25 5,5	216 4,6 7,5	216 5,2 7,5	240 7,5 11	222 8,35 11	222 8,7 11	222 9,45 11	223 10,4 15	223 11,5 15	223 12,6 15	245 14,8 18,5	245 16,3 18,5	274 20 30
45			215 3,6 5,5	215 4 5,5	216 4,62 7,5	216 5,4 7,5	222 7,29 11	222 7,6 11	222 8,32 11	222 9,2 11	223 10,3 15	223 11,4 15	229 12,4 15	229 13,8 15	273 17,5 22
40			213A 3 4	215 3,44 5,5	215 4,09 5,5	216 4,92 7,5	221 6,28 7,5	221 6,56 7,5	222 7,16 11	222 8 11	222 9,04 11	223 10,3 15	229 11 15	229 12,2 15	272 15 18,5
38			213A 2,81 4	213A 3,23 4	215 3,88 5,5	216 4,56 7,5	221 5,81 7,5	221 6,16 7,5	222 6,76 11	222 7,57 11	222 8,56 11	222 9,8 11	229 10,5 15	229 11,6 15	272 14,7 18,5
36			213A 2,63 4	213A 3,02 4	215 3,6 5,5	215 4,5 5,5	221 5,36 7,5	221 5,76 7,5	221 6,37 7,5	222 7,13 11	222 8,07 11	222 9,35 11	229 10,2 15	229 11 15	272 13,9 18,5
34			213A 2,45 4	213A 2,82 4	215 3,4 5,5	215 4,28 5,5	216 5,3 7,5	227 5,33 7,5	227 6,06 7,5	222 6,7 11	222 7,6 11	222 8,9 11	228 9,7 11	229 10,7 15	271 12,8 15
32			202 2,4 3	213A 2,63 4	213A 3,2 4	215 4,06 5,5	211 5,22 7,5	211 5,06 7,5	211 5,92 7,5	227 6,28 7,5	222 7,1 11	222 8,45 11	228 8,9 11	229 10,4 15	260 12,4 15
30			202 2,22 3	203 2,55 4	203 2,94 4	215 3,84 5,5	211 4,9 7,5	211 4,68 7,5	211 5,42 7,5	211 6 7,5	211 6,54 7,5	222 7,99 11	228 8,3 11	228 9,5 11	260 11,3 15
28			202 2,04 3	202 2,35 3	203 2,75 4	207 3,5 5,5	207 3,7 5,5	210 4,31 5,5	211 4,95 7,5	211 5,5 7,5	211 6,05 7,5	211 6,55 7,5	228 7,8 11	228 9,1 11	260 10,5 15
26			202 1,87 3	202 2,16 3	203 2,55 4	206 3,17 4	207 3,38 5,5	207 3,77 5,5	210 4,5 5,5	211 5 7,5	211 5,56 7,5	211 6,09 7,5	212 6,7 11	228 8,9 11	259 9,5 11
24			201A 1,71 2,2	202 1,97 3	202 2,35 3	206 2,86 4	206 3,07 4	207 3,46 5,5	207 4,27 5,5	210 4,51 5,5	211 5,09 7,5	211 5,61 7,5	211 6,2 7,5	212 6,9 11	259 8,5 11
22			201A 1,54 2,2	202 1,79 3	202 2,16 3	206 2,55 4	206 2,77 4	206 3,15 4	207 3,92 5,5	210 4,05 5,5	210 4,62 5,5	211 5,15 7,5	211 5,7 7,5	211 6,4 7,5	
20			238 1,8 3	201A 1,6 2,2	202 1,96 3	205 2,26 3	244 2,8 4	206 2,84 4	249 3,33 5,5	249 3,68 5,5	210 4,16 5,5	210 4,68 5,5	211 5,2 7,5	211 5,85 7,5	
19			237 1,67 2,2	238 1,84 3	238 2,01 3	205 2,13 3	244 2,62 4	244 2,77 4	248 3,16 4	249 3,48 5,5	249 3,86 5,5	210 4,45 5,5	252 6,3 7,5	253 6,65 11	253 7,8 11
18			237 1,55 2,2	237 1,71 2,2	238 1,89 3	205 2 3	244 2,45 4	244 2,59 4	244 3 4	248 3,28 4	249 3,64 5,5	249 4,08 5,5	249 4,5 5,5	252 6,2 7,5	253 7,35 11
17			237 1,43 2,2	237 1,58 2,2	237 1,77 2,2	238 2,08 3	243 2,28 3	243 2,41 3	244 2,82 4	248 3,07 4	249 3,43 5,5	249 3,85 5,5	249 4,3 5,5	250 4,8 7,5	253 6,8 11
16			237 1,31 2,2	237 1,46 2,2	237 1,65 2,2	238 1,96 3	243 2,11 3	243 2,24 3	244 2,66 4	244 3,17 4	248 3,22 4	249 3,63 5,5	249 4 5,5	249 4,5 5,5	252 6,4 7,5
15			237 1,2 2,2	237 1,34 2,2	237 1,53 2,2	238 1,84 3	243 1,95 3	243 2,07 3	244 2,49 4	244 3 4	248 3,02 4	248 3,4 4	249 3,8 5,5	249 4,3 5,5	252 5,9 7,5
14			218 1,18 1,5	219 1,26 2,2	219 1,37 2,2	237 1,72 2,2	243A 1,79 2,2	243 1,9 3	243 2,32 3	244 2,83 4	248 2,8 4	248 3,17 4	249 3,5 5,5	249 4 5,5	252 5,5 7,5
13	213 0,51 1,1	213 0,61 1,1	218 1,06 1,5	218 1,14 1,5	219 1,25 2,2	225 1,39 2,2	243A 1,64 2,2	243A 1,74 2,2	243 2,16 3	244 2,65 4	248A 2,63 3	248 2,95 4	248 3,3 4	249 3,7 5,5	252 5,1 7,5
12	213 0,45 1,1	213 0,55 1,1	218 0,98 1,5	218 1,03 1,5	218 1,13 1,5	225 1,26 2,2	225 1,37 2,2	225 1,51 2,2	231 1,99 3	244 2,47 4	248A 2,39 3	248 2,72 4	236 3,5 5,5	236 3,7 5,5	236 4,2 5,5
11	213 0,4 1,1	213 0,49 1,1	213 0,68 1,1	218 0,93 1,5	218 1,01 1,5	224 1,13 1,5	225 1,24 2,2	225 1,37 2,2	225 1,7 2,2	231 2,15 3	231 2,35 3	248A 2,49 3	235 3,1 4	235 3,3 4	236 3,8 5,5
10	213 0,35 1,1	213 0,44 1,1	213 0,63 1,1	217 0,82 1,1	218 0,9 1,5	224 1,01 1,5	224 1,12 1,5	225 1,24 2,2	225 1,56 2,2	231 1,92 3	231 2,12 3	131 2,38 3	231 2,6 3	235 2,9 4	236 3,5 5,5
9	213 0,3 1,1	213 0,38 1,1	213 0,59 1,1	217 0,72 1,1	217 0,79 1,1	224 0,89 1,5	222 1 1,5	224 1,11 1,5	225 1,42 2,2	231A 1,69 2,2	231 1,89 3	131 2,14 3	231 2,4 3	235 2,6 4	235 3,1 4
8	201 0,29 1,1	213 0,33 1,1	213 0,52 1,1	208A 0,68 1,1	208A 0,74 1,1	224 0,78 1,5	224 0,86 1,5	224 0,98 1,5	225 1,28 2,2	231A 1,47 2,2	231A 1,67 2,2	131 1,91 3	231 2,1 3	231 2,4 3	235 2,7 4
7	201 0,24 1,1	201 0,29 1,1	204 0,42 1,1	208A 0,58 1,1	208A 0,63 1,1	208A 0,67 1,1	208A 0,76 1,1	208A 0,82 1,1	224 1,13 1,5	225 1,53 2,2		131A 1,67 2,2	231A 1,8 2,2	231 2,1 3	
6	201 0,2 1,1	201 0,25 1,1	204 0,35 1,1	204 0,43 1,1	204 0,54 1,1	208A 0,59 1,1	208A 0,63 1,1	208A 0,7 1,1	208 0,88 1,5	225 1,43 2,2				231 1,9 3	
5	201 0,15 1,1	201 0,2 1,1	204 0,28 1,1	204 0,36 1,1	204 0,45 1,1	204 0,59 1,1	208A 0,51 1,1	208A 0,59 1,1	208A 0,75 1,1	225 1,28 2,2					
4			201 0,26 1,1	204 0,28 1,1	204 0,36 1,1	204 0,5 1,1			208A 0,62 1,1	208A 0,81 1,1					
H (m)	1	2	3	4	5	6	7	8	10	12	14	16	18	20	24

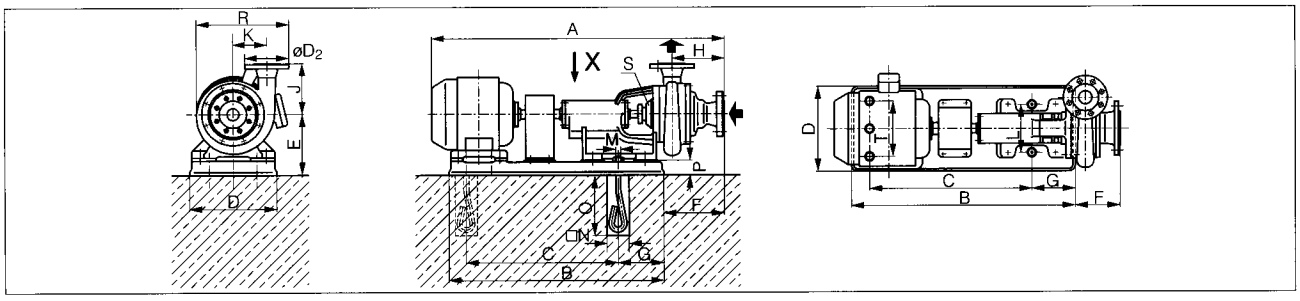
dobave Q (l/s)																
28	**32**	**36**	**40**	**45**	**50**	**60**	**70**	**80**	**90**	**100**	**120**	**140**	**160**	**180**	**200**	
288 38 45	288 41,2 45	289 44,8 55	292 54,2 75	292 57,5 75	292 60,4 75	292 67,2 75	296 100 110	297 106,2 132	297 112 132	297 119 132						**80**
288 35,2 45	288 38,4 45	289 42,2 55	289 46,8 55	292 52,9 75	292 55,7 75	292 61,3 75	293 70 90	296 96,2 110	297 104 132	297 110,5 132	298 128 160					**75**
287 32,6 37	288 35,8 445	288 39,6 45	289 44,2 55	291 48,5 55	292 51 75	292 57,2 75	292 64 75	293 73,3 90	296 94,2 110	297 103 132	297 119 132	298 139 160				**70**
287 29,9 37	287 33,1 37	288 37 45	289 41,6 55	291 44,2 55	291 46,5 55	292 52,4 75	292 59,4 75	293 68 90	296 87,5 110	296 94,5 110	297 111 132	298 129 160	298 150 160			**65**
286 27,3 30	287 30,4 37	287 34,4 37	288 38,9 45	291A 40,1 45	291 42,2 45	291 47,7 55	292 55 75	292 62,8 75	295 79 90	296 85,7 110	297 102 132	297 119 132	298 140 160			**60**
286 24,8 30	287 27,8 37	287 31,6 37	288 36,1 45	291A 36,1 45	291A 37,9 45	291 43,7 55	292 50,2 75	292 57,5 75	295 72 90	295 78,5 90	296 93,5 110	297 109,5 132	298 129 160	298 150 160		**55**
274 21,5 30	274 23,4 30	287 28,9 37	287 33,2 37	297 35,4 45	279 37,7 45	280 42,6 55	284 60,1 75	284 65,4 75	295 65,5 90	295 71,5 90	296 85 110	296 99,5 110	297 120 132	298 142 160		**50**
273 19 22	274 20,8 30	274 22,7 30	274 25,6 30	278 31,5 37	278 33,4 37	279 38,4 45	284 53,2 75	284 58,8 75	284 65 75	285 72,3 90	295 76,5 90	296 89,5 100	297 107,6 132	298 128 160		**45**
272 16,5 18,5	273 18,3 22	274 20,4 30	274 23,1 30	278 27,6 37	278 29,3 37	279 34,1 45	283 46,5 55	284 52,3 75	284 57,8 75	284 64,7 75	285 80 90	296 86 110	296 100 110	297 120 132		**40**
272 15,6 18,5	273 17,3 22	273 18,9 22	274 22,2 30	277 25,8 30	277 26,9 30	278 32,4 37	283 43,5 55	283 49,7 55	284 55 75	284 61,5 75	285 78,5 90	295 79,5 90	296 95 110			**38**
272 14,6 18,5	272 16,3 18,5	273 18,5 22	274 21,2 30	277 24,2 30	277 26 30	278 30,7 37	283 41,2 55	283 47 55	284 52 75	284 58,3 75	285 74,4 90		296 90 110			**36**
272 13,7 18,5	272 15,3 18,5	273 17,6 22	274 20,2 30	277 22,5 30	277 24,4 30	278 29 37	282 38,2 45	283 44,5 55	284 49,1 55	284 55 75	285 70,2 90		296 89 110			**34**
260 13 15	272 14,3 18,5	272 16,6 18,5	273 19,2 22	274 23,2 30	277 22,8 30	278 27,3 37	282 36 45	283 41,8 55	283 46,3 55	284 52,6 75	285 68,5 90		296 89 110			**32**
260 12 15	260 13,1 15	261 14,3 18,5	273 18,1 22	265 21,3 30	277 21,2 30	277 25,6 30	278 30,8 37	279 36 45	283 43,4 55	283 49,4 55	284 64,3 75		295 78,5 90			**30**
260 11,1 15	260 12,1 15	260 13,3 15	261 14,4 18,5	265 20,6 30	265 22,9 30	269 27,2 37	269 29,1 37	269 31,4 37	269 40,5 55	283 46,1 55	284 60 75					**28**
260 10,2 15	260 11,2 15	260 12,3 15	260 13,4 15	261 15,2 18,5	265 21,3 30	268 24,5 30	268 26,4 30	269 28,5 37	269 31,2 37	269 33,5 37	284 59,5 75					**26**
259 9,26 11	260 10,3 15	260 11,3 15	260 12,4 15	261 14,2 18,5	264 19,6 22	268 22 30	268 23,9 30	269 26,4 37	269 28,5 37	269 30,8 39	284 55 75					**24**
259 8,38 11	259 9,33 11	260 10,3 15	260 11,4 15	260 13,1 15	264 18 22	267 19,4 22	268 21,9 30	268 23,6 30	268 25,8 30	269 28,2 37	269 33,6 37					**22**
		259 9,25 11	260 10,3 15	260 12 15	263 16,4 18,5	265 20,4 30	268 20,3 30	268 21,2 30	268 23 30	268 25,5 30	269 30,5 37					**20**
			260 9,8 15	260 11,4 15	263 15,5 18,5	265 19,8 30			268 21,9 30	268 24,2 30	269 29 37					**19**
253 7,82 11	257 10 15	257 10,2 15	257 11,3 15	260 10,9 15	260 12,6 15	264 19,1 22				268 22,9 30	269 28 37	269 33,6 37				**18**
253 7,4 11	253 8,32 11	256 9,6 11	257 10,7 15	257 11,4 15	257 12,1 15	264 18,5 22					268 26,3 30	269 32,9 37				**17**
253 6,95 11	253 7,88 11	256 8,95 11	257 9,8 15	257 10,5 15	257 11,1 15	257 12,9 15					268 24,8 30	269 31 37				**16**
252 6,59 7,5	253 7,44 11	253 8,4 11	256 9 11	257 9,85 15	257 10,4 15	257 12 15	255A 13,9 18,5				268 23,8 30					**15**
252 6,09 7,5	253 6,98 11	253 7,98 11	256 8,4 11	256 8,95 11	257 9,6 15	257 11,2 15	257 13 15				268 22,2 30					**14**
252 5,65 7,5	252 6,52 7,5	253 7,54 11	256 7,65 11	256 8,3 11	256 8,95 11	257 10,4 15	257 12,1 15	255A 14,4 18,5								**13**
252 5,22 7,5	252 6,06 7,5	253 7,09 11	253 9,3 11		256 8,15 11	257 9,6 15	257 11,2 15	255A 13,3 15								**12**
236 4,2 5,5	252 5,6 7,5	252 6,6 7,5	253 8,6 11			256 8,8 11	257 10,4 15	257 12,5 15								**11**
236 3,81 5,5	236 4,35 5,5	252 6,1 7,5	253 8,3 11				257 9,6 15	257 11,5 15								**10**
236 3,43 5,5	236 4 5,5	236 4,6 5,5	253 7,33 11				256 8,7 11	257 10,7 15				**n = 1450 min^{-1}**				**9**
235 3,05 4	236 3,64 5,5	236 4,24 5,5	252 6,28 7,5					257 9,6 15								**8**
235 2,67 4	235 3,26 4	236 3,85 5,5						256 9,3 11								**7**
	235 2,85 3	236 3,42 5,5														**6**
																5
																4
28	**32**	**36**	**40**	**45**	**50**	**60**	**70**	**80**	**90**	**100**	**120**	**140**	**160**	**180**	**200**	

Table Summary

This table provides detailed specifications, including mass and principal dimensions, for various pump models and their complete units (aggregates).

Column Headers

- Tip pumpe -> **Pump Type**
- Broj okretaja min^{-1} -> **Revolutions per minute (RPM)**
- Snaga motora (kW) -> **Motor Power (kW)**
- Masa (kg) -> **Mass (kg)**, with sub-columns for:
    - Pumpa -> **Pump**
    - Motor KONČAR -> **KONČAR Motor**
    - Agregat KONČAR -> **KONČAR Unit**
- Dimenzije -> **Dimensions**, with sub-columns corresponding to the letters in the diagram: A, B, C, D, E, F, G, H, J.



Broj agregata	Tip pumpe	Broj okretaja min^{-1}	Snaga motora (kW)	Masa (kg) Pumpa	Motor KONČAR	Agregat KONČAR	Dimenzije A	B	C	D	E	F	G	H	J
201		1450	1,1		16,5	93	887								
201 A	**KK 16-5**		2,2	53	19	94	915	735	525	290	210	157	150	125	160
202		2900	3,0		28,5	104	951								
203			4,0		38	113	963								
204		1450	1,1		16,5	98	883								
205	**KK 16-6,5**		3,0	58	28,5	109	953	735	525	290	210	159	150	125	160
206		2900	4,0		38	118	965								
207			5,5		53	138	1032	890	680	342					
208			1,5		19	104	933								
208A		1450	1,1		16,5	101	911	735	525	290					
209	**KK 16-8**		2,2	62	27,5	112	972				210	178	150	140	160
210			5,5		53	143	1051								
211		2900	7,5		61	150		890	680	342					
212			11		100	186	1196								
213		1450	1,1		16,5	97	887								
213 A		2900	4,0		38	117	779	735	525	290					
214	**KK 20-5**	1450	1,5	57	19	100	912				210	157	150	125	200
215		2900	5,5		53	137	1030	890	680	342					
216			7,5		61	145									
217			1,1		16,5	107	903								
218		1450	1,5		19	109	928	735	525	290					
219			2,2		27,5	117	967								
220	**KK 20-6,5**		5,5	67	53	147	1046				210	173	150	140	200
221		2900	7,5		61	155		890	680	342					
222			11		100	191	1191								
223			15		110	201									
224			1,5		19	144	1009								
225		1450	2,2		27,5	151	1048	810	565	290					
226			3,0		32	155									
227	**KK 20-8**		7,5	87	61	185	1127				230	179	175	140	200
228		2900	11		100	219	1272	967	730	345					
229			15		110	229									
230			18,5		130	267	1316	1015	760	375					
231			3,0		32	173	1068								
231 A	**KK 20-10**	1450	2,2	105	27,5	168,5	866	810	565	290	230	200	175	159	200
232			4,0		42	181	1080								
233			5,5		58	200	1147	967	730	345					
234			3,0		32	217	1116								
235	**KK 20-12,5**	1450	4,0	135	42	225	1128	970	710	340	292	250	200	174	225
236			5,5		58	239	1195								
237			2,2		27,5	152	1045								
238		1450	3,0		32	156		810	565	290					
239	**KK 25-6,5**		4,0	88	42	164	1057				230	175	175	140	250
240			11		100	220									
241		2900	15		110	230	1269	967	730	345					
242			18,5		130	268	1313	1015	760	375					
243			3,0		32	161	1047								
243 A		1450	2,2		27,5	156,5	846	810	565	290					
244	**KK 25-8**		4,0	93	42	169	1059				230	178	175	140	250
245			18,5		130	273	1315	1015	760	375					
246		2900	22		160	302	1331								
247			30		335	487	1430	1110	835	400	320				
248			4,0		42	244	1188								
248 A	**KK 25-10**	1450	3,0	154	32	334	866	970	710	340	292	225	200	177	225
249			5,5		58	258	1255								
250			7,5		72	272	1293								
251			5,5		58	272	1275	970	710	340					
252	**KK 25-12,5**	1450	7,5	168	72	286	1313				292	245	200	168	250
253			11		106	341	1420	1135	850	380					
254			15		130	365	1464								
255			7,5		72	303	1356	970	710	340					
255 A	**KK 25-15**	1450	18,5	185	145	380	1156								
256			11		106	358	1463	1135	850	380	292	288	200	225	280
257			15		130	382	1507								
258			7,5		72	278	1301	970	710	340					
259	**KK 31,5-12,5**	1450	11	160	106	333	1408								
260			15		130	357	1452	1135	850	380	292	233	200	180	280
261			18,5		145	366	1468								
262			15		130	434	1565								
263	**KK 31,5-15**	1450	18,5	208	145	448	1581	1225	900	385	360	260	225	200	315
264			22		175	478	1619								
265			30		255	540	1253	1280	820	440	370	254	240		
266			18,5		145	468	1627								
267			22		175	498	1665	1225	900	385	360	312	225		
268	**KK 31,5-20**	1450	30	228	255	560	1299	1280	820	440	370	297	240	225	350
269			37		320	672	1337	1435	915	605	435	310	235		
270			45		360	668									
271			15		130	472	1560								
272	**KK 40-12,5**	1450	18,5	245	145	482	1585	1225	900	385	360	273	225	200	360
273			22		175	512	1623								
274			30		255	577	1257	1280	820	440	370	258	240		
275			18,5		145	498	1582	1225	900	385	360	270	225		
276			22		175	555	1620								
277	**KK 40-15**	1450	30	258	255	605	1254	1280	820	440	370	255	240	200	360
278			37		320	702	1292								
279			45		360	742	1292	1435	915	605	435	268	235		
280			55		415	797	1342								
281			37		320	781	1472								
282			45		360	821	1472	1535	990	540		287			
283	**KK 40-20**	1450	55	330	415	868	1522				435		285	220	400
284			75		535	1055	1573	1750	1090	660		282			
285			90		605	1125	1573								
286			30		255	692	1430	1280	820	440	370	280	240		
287			37		320	804	1468								
288	**KK 50-12,5**	1450	45	360	360	844	1468	1435	915	605	434	293	235	220	450
289			55		415	899	1518								
290			75		535	1019	1569								
291			55		415	938	1518								
291 A			45		360	891	1468	1535	990	540		283			
292	**KK 50-15**	1450	75	400	535	1125	1569				435		285	220	450
293			90		605	1195	1569	1750	1090	660		278			
294			110		795	1362	1620								
295			90		605	1260	1605								
296	**KK 50-20**	1450	110	465	795	1427	1656	1750	1090	660	435	314	285	250	500
297			132		900	1532	1656								
298			160		1435	2130	1758	1910	1200	795		315			

Table Summary

This table lists the dimensions for the dimensional drawing shown on the same page, with a focus on flange specifications and connection points.

Column and Section Headers

- **Main Title:** Prirubnice -> **Flanges**
- **Dimensional Key:** Letters corresponding to the drawing on the left side of the table: K, L, M, N, P, R, T.
- **Suction Flange Section:**
    - Usisna prirubnica -> **Suction flange**
    - Sub-columns:

Ds, D_1, K_1, Z_1 x ød_1.

- **Discharge Flange Section:**
    - Tlačna prirubnica -> **Discharge flange**
    - Sub-columns:

D, D_2, K_2, Z_2 x ød_2.

- **Connections Section:**
    - Priključak za brtvenu i rashladnu vodu -> **Connection for sealing and cooling water**
    - Column header: S.
- **Flange Position Diagram:**
    - Oznaka položaja tlačne prirubnice -> **Designation of discharge flange position**
    - Note 1:

(Gledano od spojke) -> **(Viewed from the coupling)**

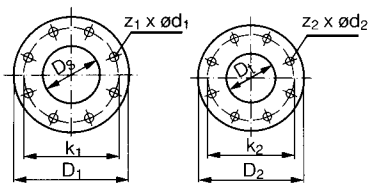
    - Note 2:

Na poseban upit mogući su i drugi položaji prirubnice -> **Other flange positions are possible upon special request**

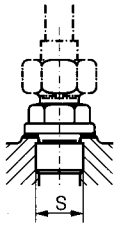
Prirubnice

Usisna

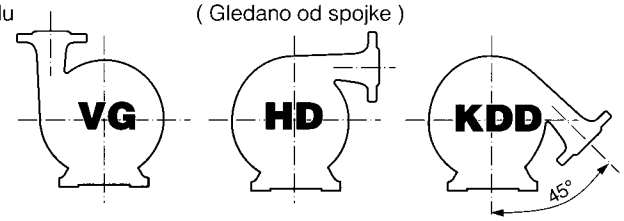
Tlačna



Priključak
Za brtvenu i rashladnu vodu



Oznaka položaja tlačne prirubnice
(Gledano od spojke)

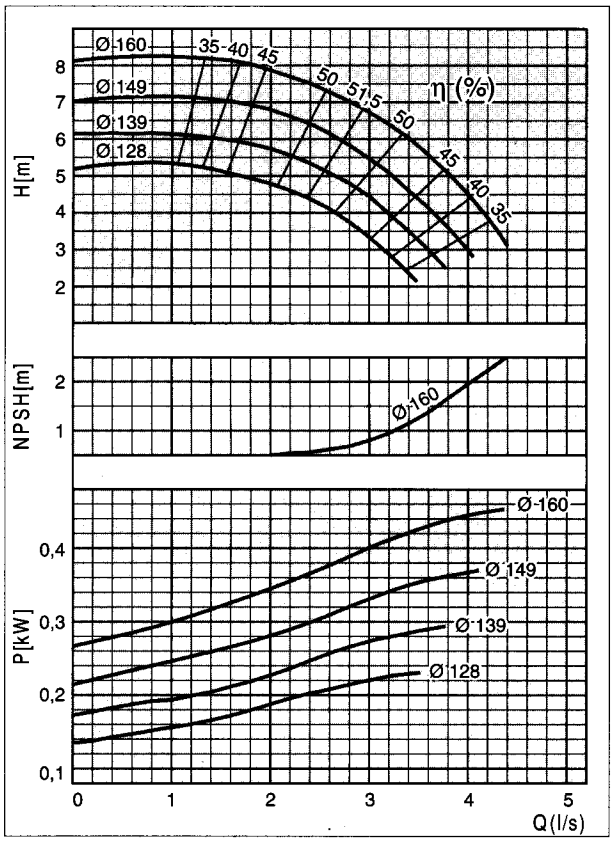


Na poseban upit mogući su i drugi položaji prirubnice

agregata								Usisna prirubnica					Tlačna prirubnica						Broj agregata
K	L	M	N	O	P	R	T	D_S	D_1	K_1	d_1	z_1	D_1	D_2	k_2	d_2	z_2	S	
100	160	M20	80	300	50	293	–	65	185	145	18	4	50	165	125	18	4	R 1/4"	201
																			201 A
																			202
																			203
110	160	M20	80	300	50	324	–	80	200	160	18	8	65	185	145	18	4	R 1/4"	204
																			205
																			206
																			207
120	160	M20	80	300	50	359	–	100	220	180	18	8	80	200	160	18	8	R 1/4"	208
																			208A
																			209
																			210
																			211
																			212
115	160	M20	80	300	50	324	–	65	195	145	18	4	50	165	125	18	4	R 1/4"	213
																			213 A
																			214
																			215
																			216
125	160	M20	80	300	50	356	–	80	200	160	18	8	65	185	145	18	4	R 1/4"	217
																			218
																			219
																			220
																			221
																			222
																			223
140	180	M20	80	300	50	394	–	100	220	180	18	8	80	200	160	18	8	R 1/4"	224
																			225
																			226
																			227
																			228
																			229
																			230
155	180	M20	80	300	50	442	–	125	250	210	18	8	100	220	180	18	8	R 1/4"	231
																			231 A
																			232
																			233
170	220	M24	80	300	80	485	–	150	285	240	23	8	125	250	210	18	8	R 1/4"	234
																			235
																			236
145	180	M20	80	300	50	395	–	80	200	160	18	8	65	185	145	18	4	R 1/4"	237
																			238
																			239
																			240
																			241
																			242
155	180	M20	80	300	50	426	–	100	220	180	18	8	80	200	160	18	8	R 1/4"	243
																			243 A
																			244
																			245
	190			350	120		300												246
																			247
162	220	M24	80	300	80	462	–	125	250	210	18	8	100	220	180	18	8	R 1/2"	248
																			248 A
																			249
																			250
190	220	M24	80	300	80	531	–	150	285	240	23	8	125	250	210	18	8	R 1/2"	251
																			252
																			253
																			254
220	220	M24	80	300	80	660	–	200	340	295	23	12	150	285	240	23	8	R 1/2"	255
																			255 A
																			256
																			257
210	220	M24	80	300	80	574	–	150	285	240	23	8	125	250	210	18	8	R 1/2"	258
																			259
																			260
																			261
240	240	M24	80	300	80	652	–	200	340	295	23	12	150	285	240	23	8	R 1/2"	262
																			263
	250			350	90		340												264
																			265
			80	300	80		–												266
265	240	M24			90	734	340	200	340	295	23	12	200	340	295	23	12	R 1/2"	267
			120	350															268
					155		–												269
																			270
250	240	M24	120	350	80	648	–	150	285	240	23	8	125	250	210	18	8	R 1/2"	271
																			272
	250				90		340												273
																			274
	240				80		–												275
275	250	M24	120	400	90	117	340	200	340	295	23	12	150	285	240	23	8	R 1/2"	276
																			277
	250				155		520												278
																			279
																			280
310	350	M24	120	500	120	829	440	250	405	355	27	12	200	340	295	23	12	R 1/2"	281
																			282
							560												283
																			284
					90		340												285
315	350	M24	120	500	155	800	520	150	285	240	23	8	125	250	210	18	8	R 1/2"	286
																			287
																			288
																			289
																			290
315	350	M24	120	500	120	800	440	200	340	295	23	12	150	285	240	23	8	R 1/2"	291
																			291 A
							560												292
																			293
																			294
345	350	M30	120	600	120	896	560	250	405	355	27	12	200	340	295	23	12	R 1/2"	295
																			296
							610												297
																			298

Pojedinačni dijagrami

KK 16-5 n=24,2s^{-1}



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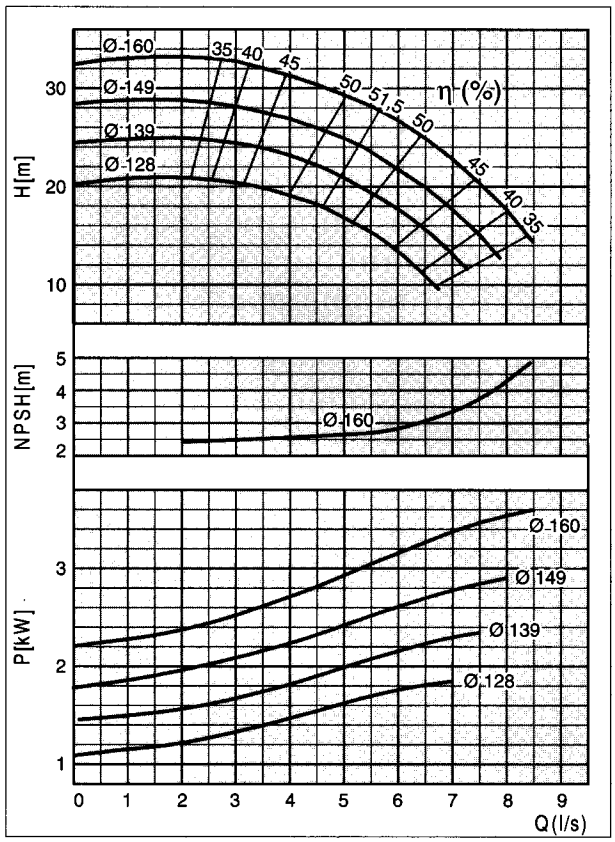

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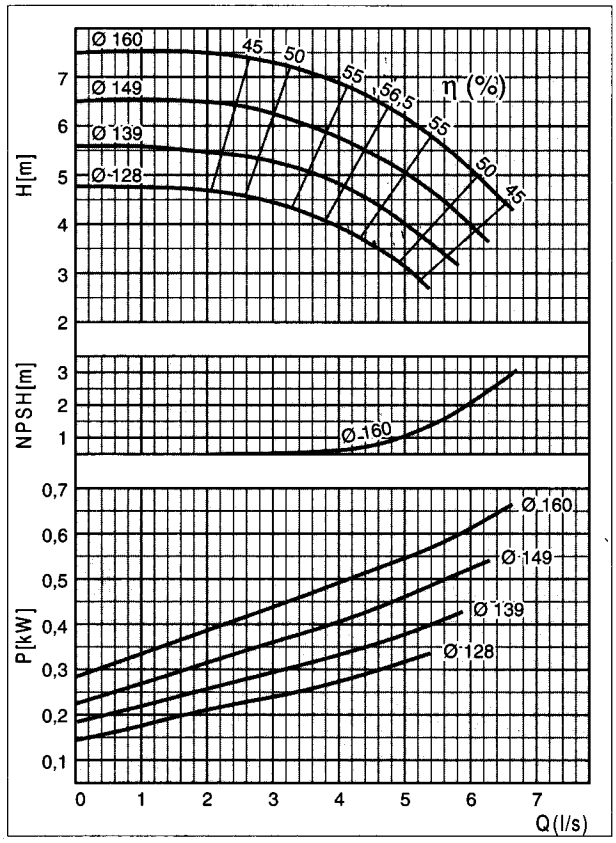

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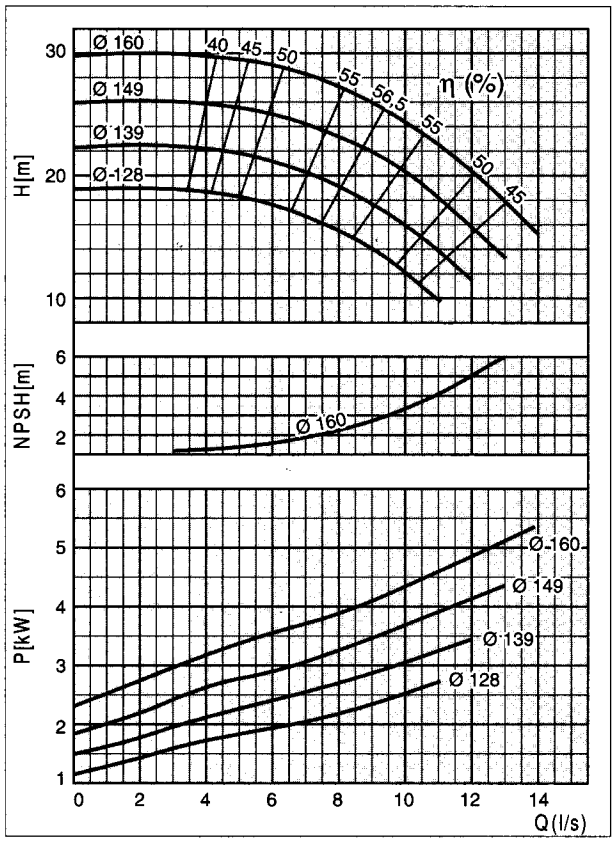

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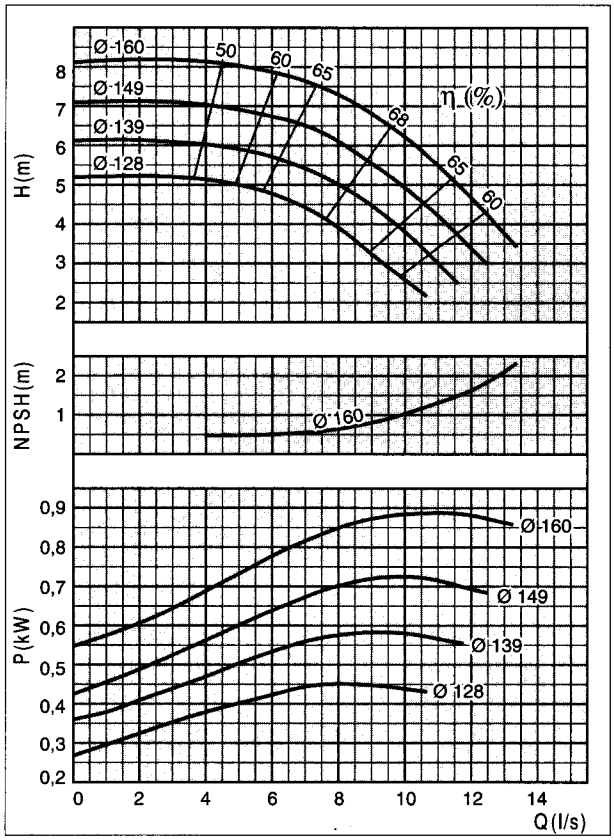

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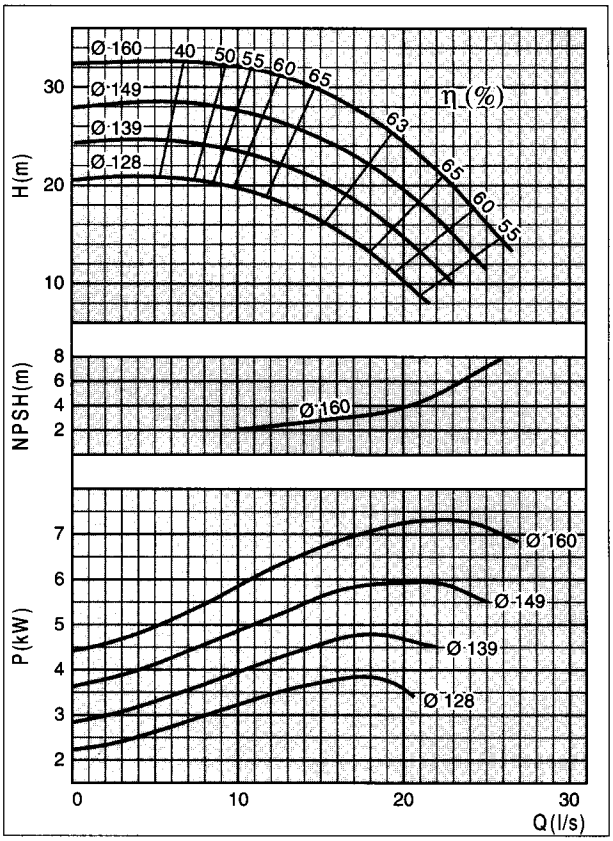

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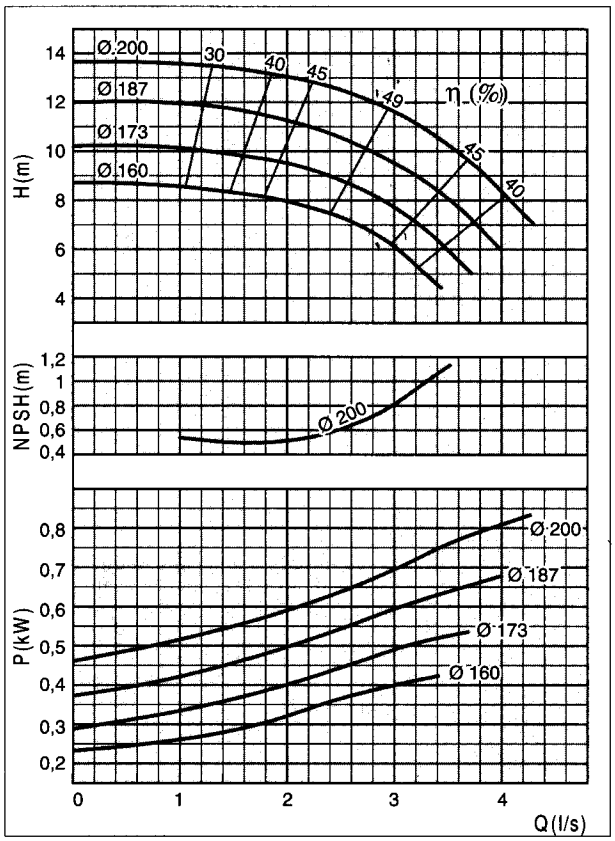

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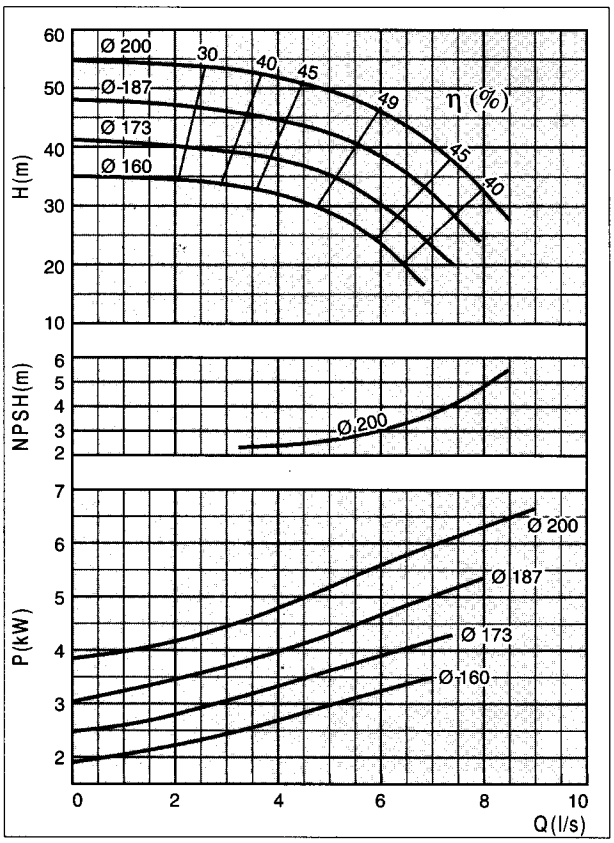

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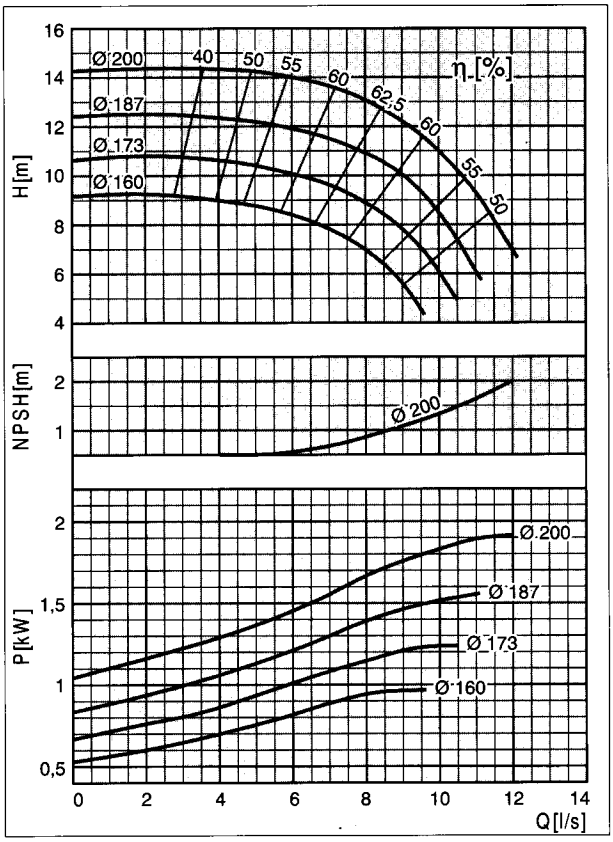

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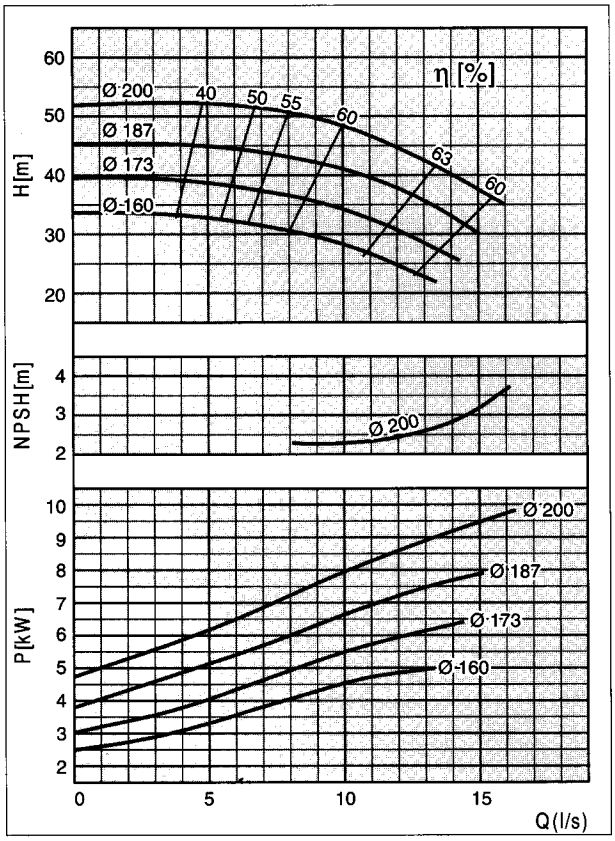

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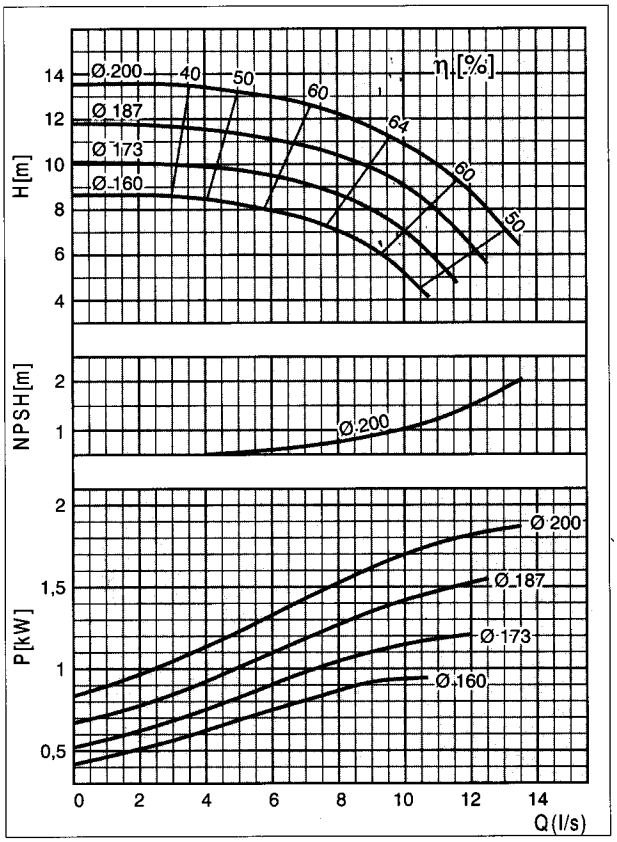
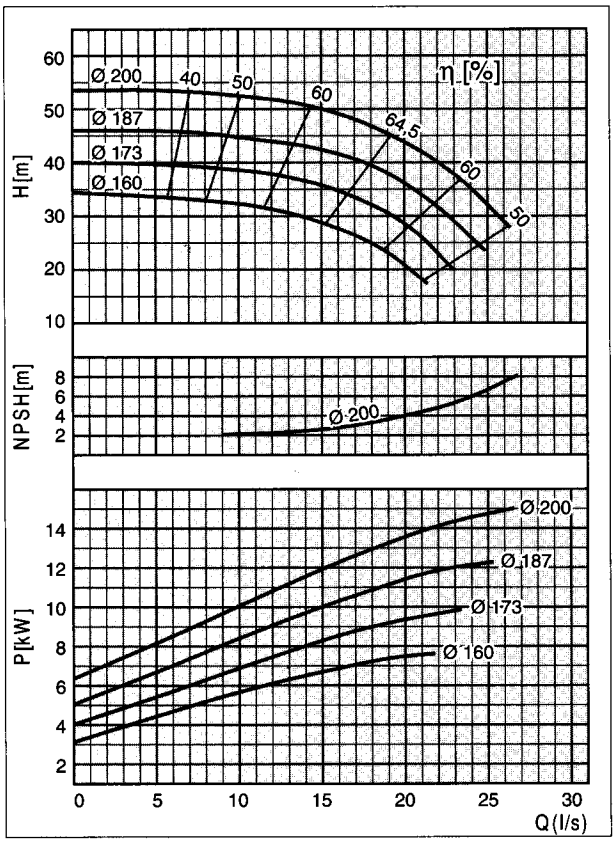


KK 20-8 n=48,4s^{-1}



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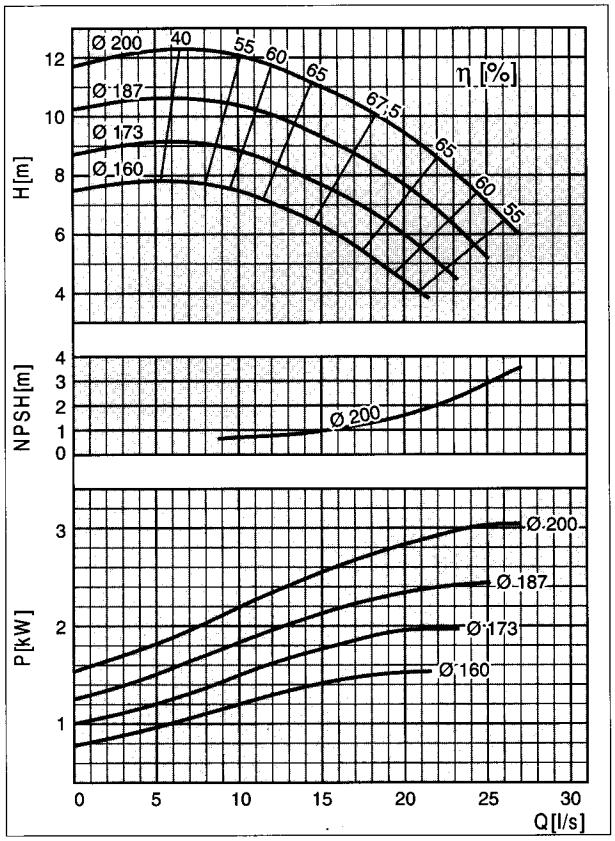
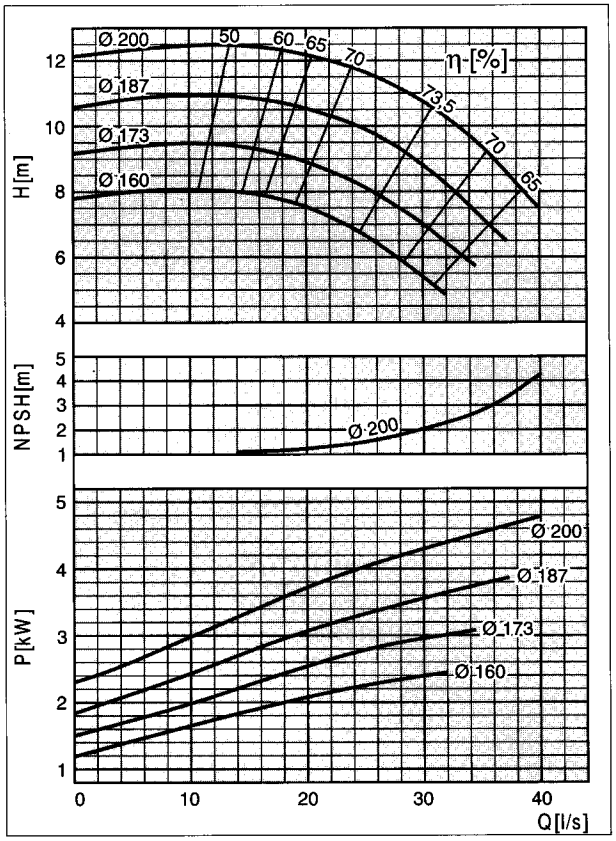
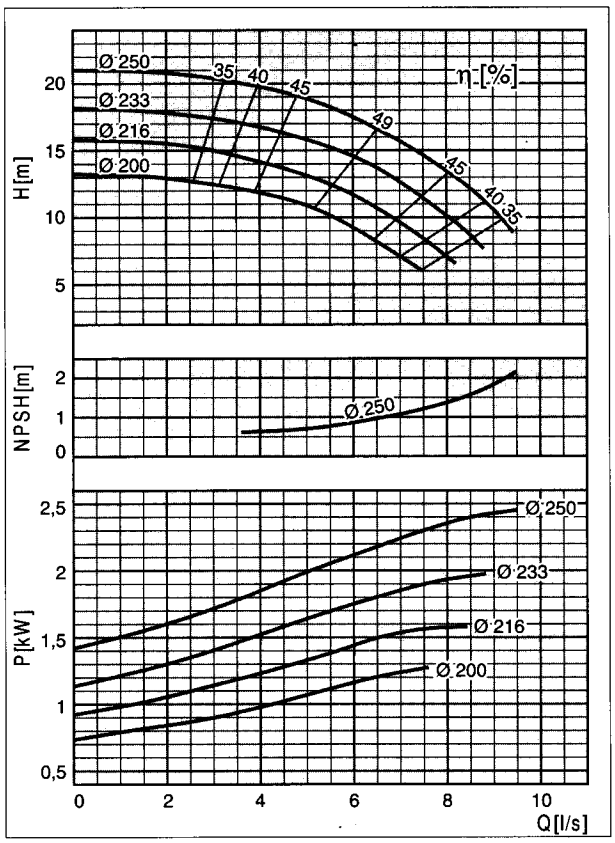


KK 20-12,5 n=24,2s^{-1}



KK 25-6,5 n=24,2s^{-1}



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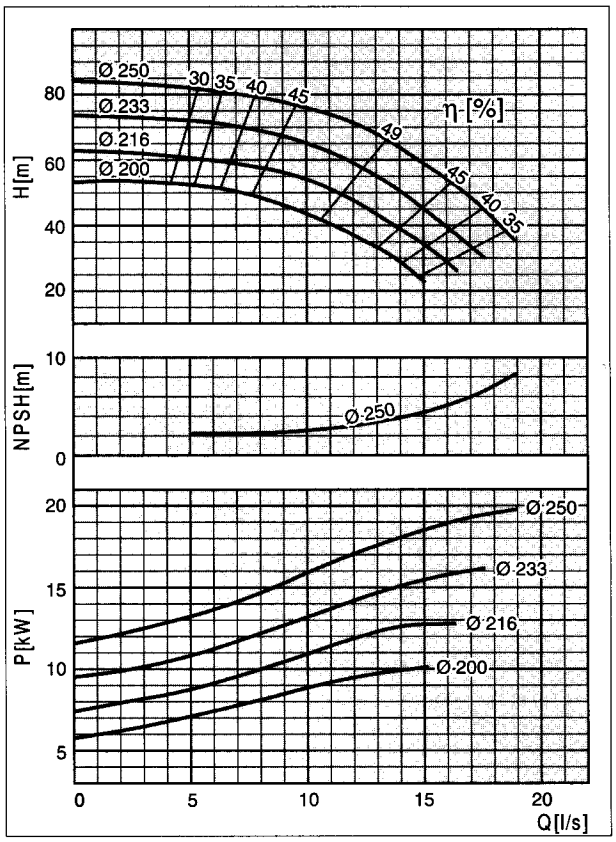

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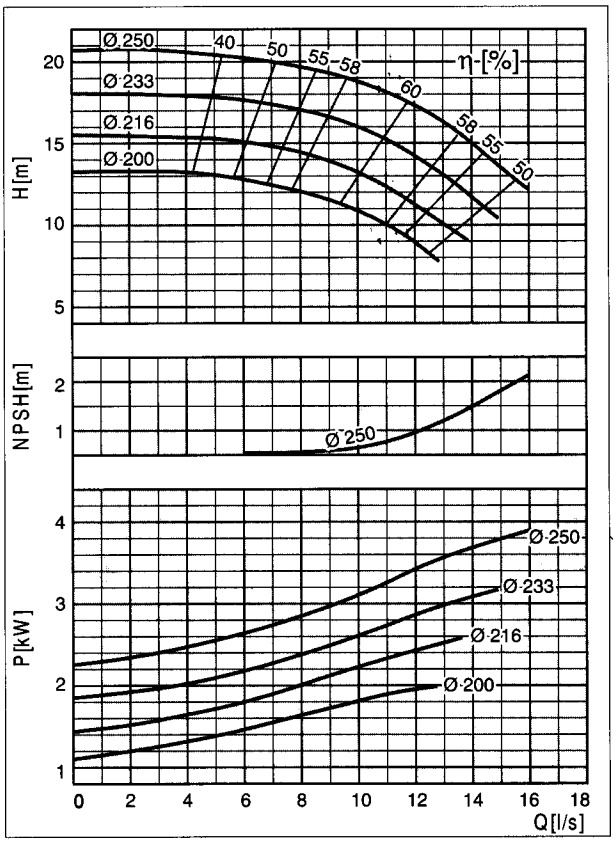

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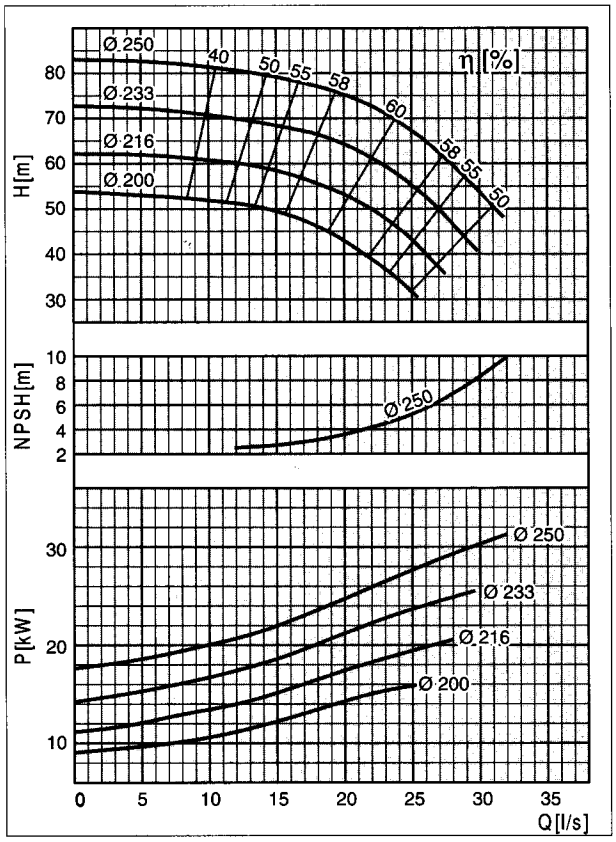

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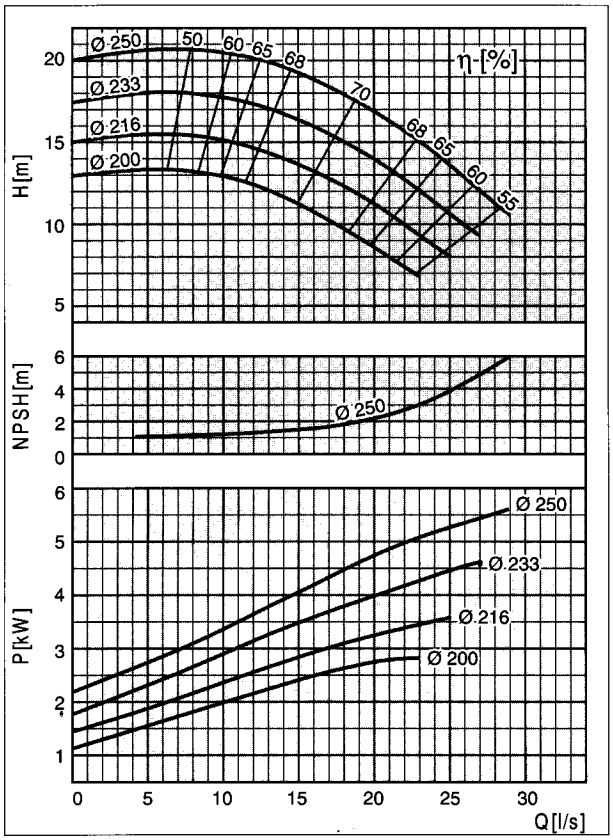

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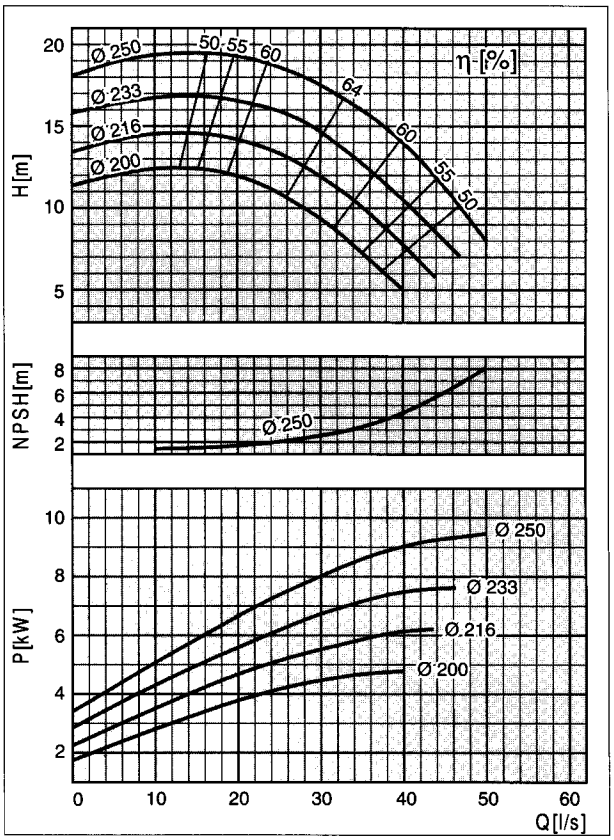

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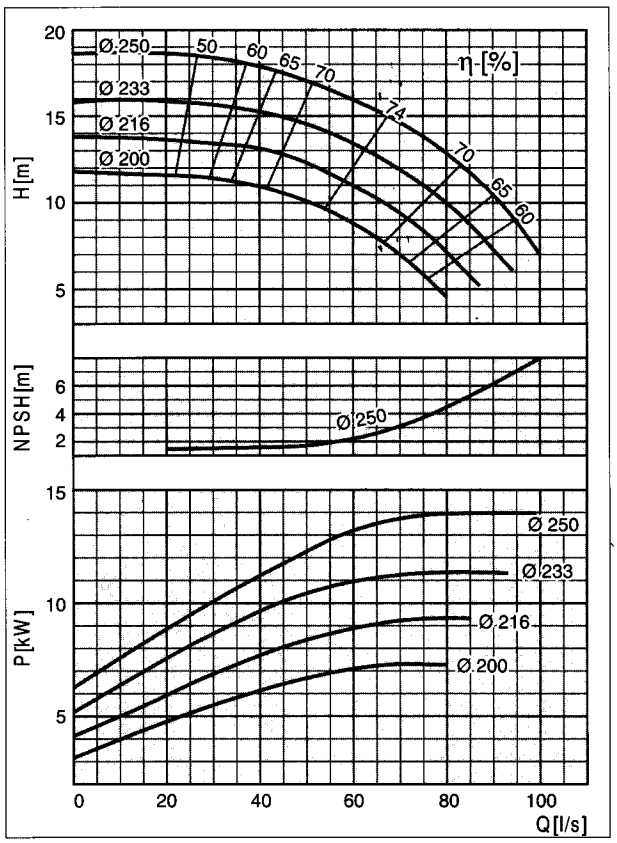

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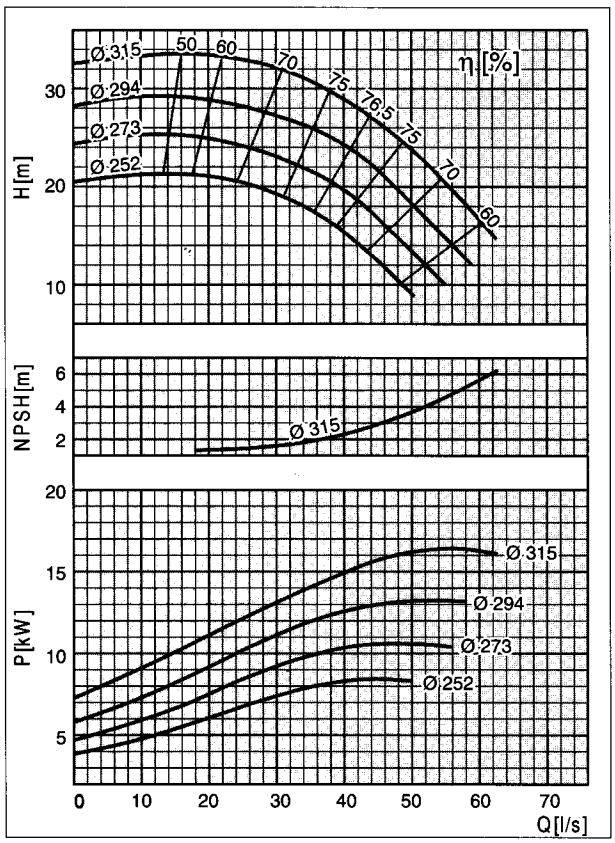

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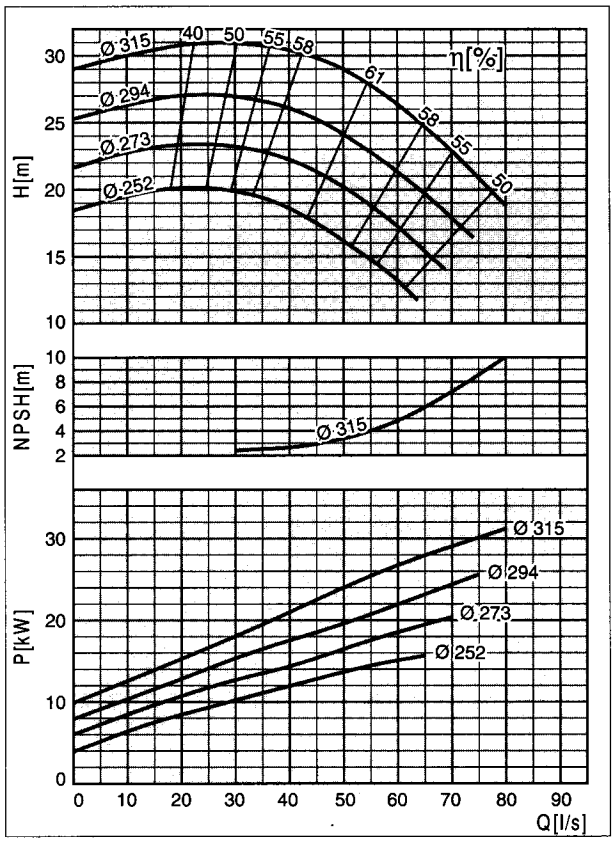

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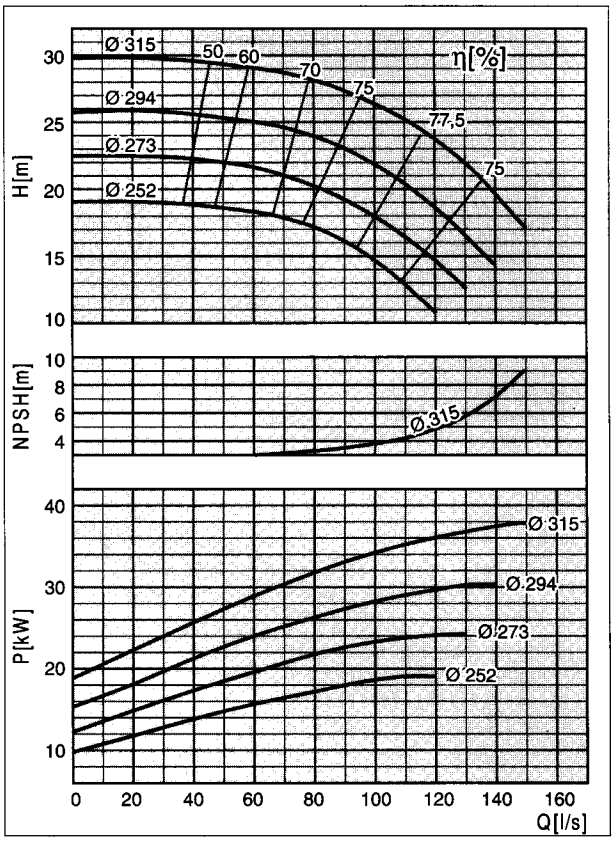

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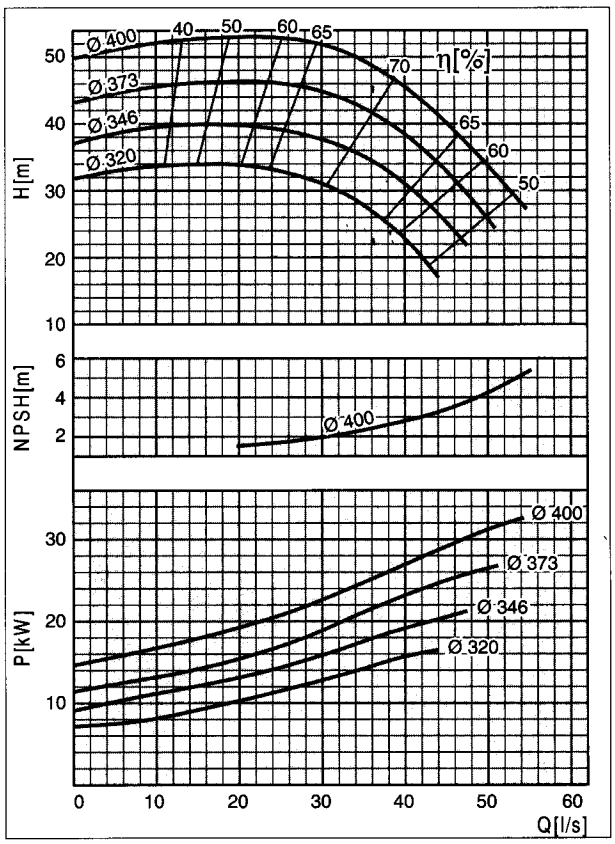

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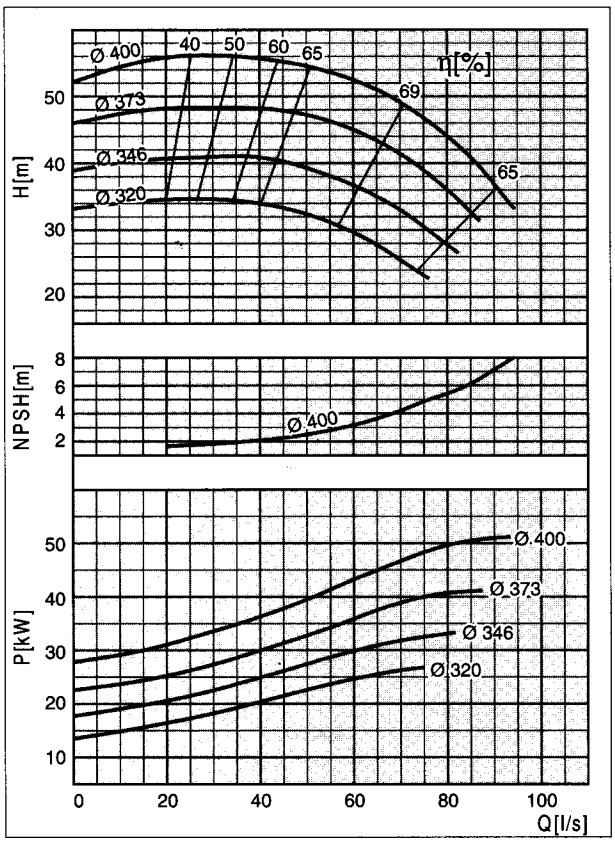

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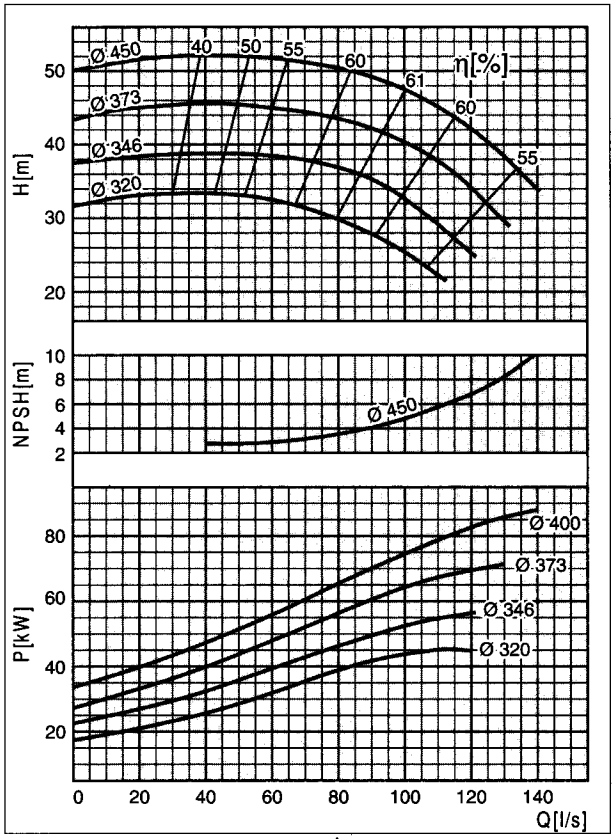

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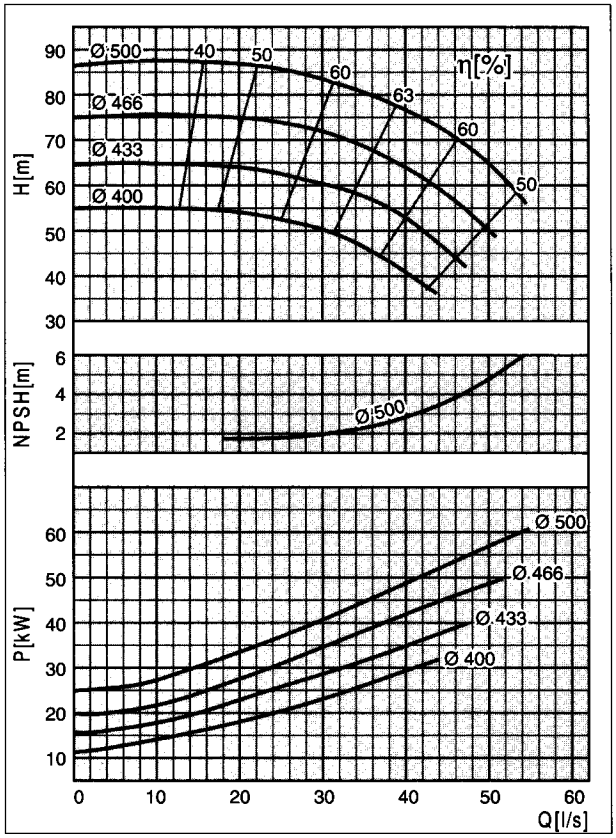

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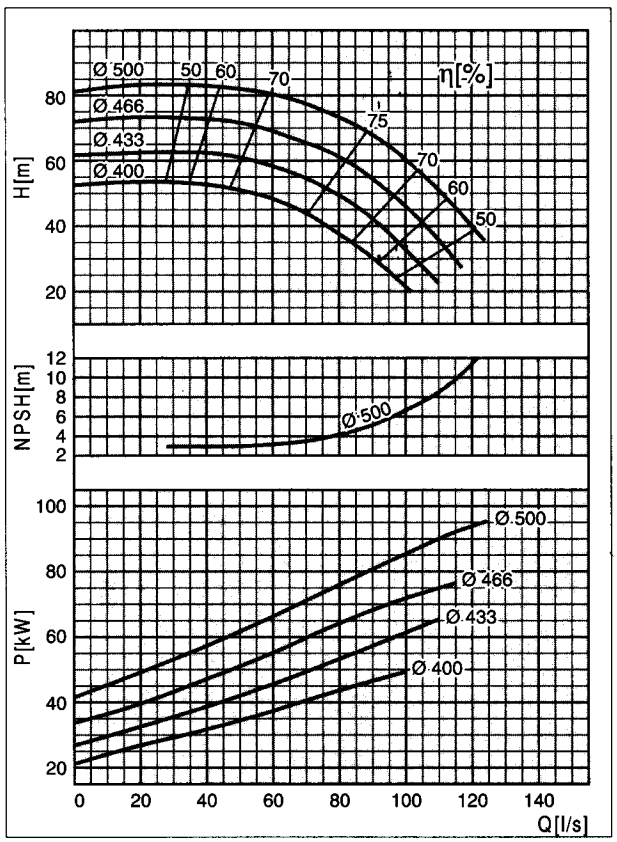

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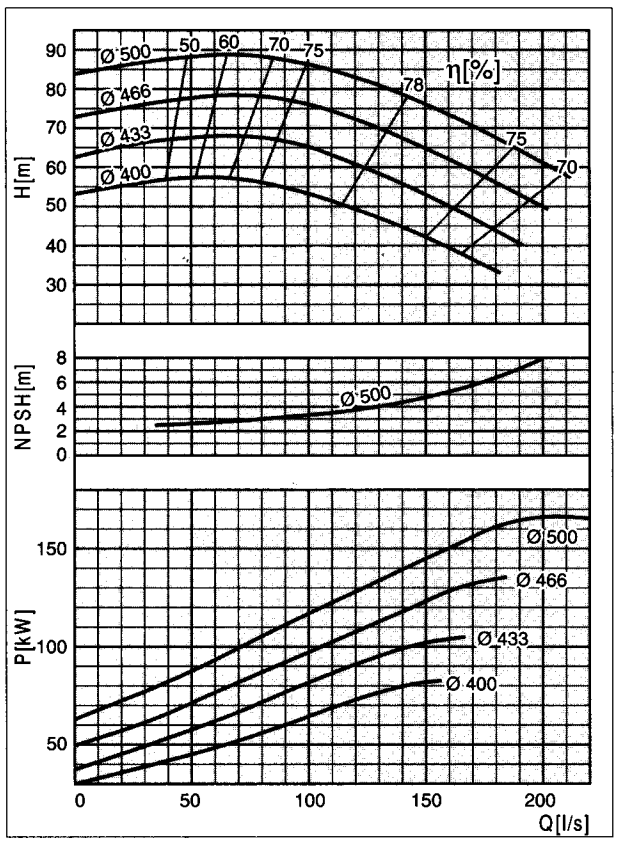

Attachment 5

ENEQ Consult – HIGH-PRESSURE PUMPS VS, VSv, KV, KVv, KVL, KVLv

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ENEQ Consult Ltd. delivers cost-effective mechanical equipment for nuclear, conventional, oil & gas, and petrochemical industries.

- **9 years** of solid performance
- **> 20 M€** project portfolio
- **> 50** completed projects, **> 10** in progress
- Exclusive partnerships with **5 manufacturers worldwide**
- Equipment compliant with **ASME, EN, N Stamp, DIN, ASTM, ISO, GOST**

Expertise:

- **Equipment Supply** – high-quality OEMs, cost-effective modernization and new-build solutions, turnkey delivery
- **Engineering** – design critical analyses, FEA & CFD calculations, technical consulting
- **Service** – full project support from production to installation, commissioning, and after-sales

HIGH-PRESSURE PUMPS VS, VSv, KV, KVv, KVL, KVLv

Application

A row of VS pumps is arranged to suit all requirements regarding supply of clean and slightly turbid water, cold oils, liquid fuels etc. It is also serviceable at civil and industrial waterworks, artificial rain, fire-fighting purposes, for the production of delivery water in hydraulic water plants etc. These pumps can supply medium of temperature up to

105∘C. VSv pumps are applied for hot water supply up to 130∘C because packings can be cooled. They are equally adapted as feed water pumps and condensate supply pumps. VS design is adapted for temperatures lower than 105∘C.

KV pumps are fit for the pumping of clean water and the water containing substantial amount of impurities. Range of these pumps is suitable for particularly heavy suction conditions, then at the condensate supply, higher geodetic suction head and resistances in a suction pipe etc. They can supply medium of temperature up to 80∘C. KVv and KV pumps with packings cooling chamber are applied to supply hot water up to 105∘C.

KVL and KVLv pumps are adapted for the pumping of condensate, clean water and the water containing substantial amount of impurities. These pumps are adapted for water supply up to 105∘C. Application of these pumps to hot water supply up to 130∘C is also obtainable by the cooling of packings. Range of these pumps is suitable for particularly heavy suction conditions. Their vertical desing makes possible safety operation and a very little space is necessary for their assembly.

Range Of Supply

VS pumps, at the speed of 1450 r.p.m. and 60-400 m.w.c. manometric heads, deliver 6-210 l/s. VSv pumps, at the speed of 2900 r.p.m. and 35-600 m.w.c. manometric heads, deliver 0,5-36 l/s. KV and KVv pumps, at the speed of 1450 r.p.m. and 35-330 m.w.c. manometric heads; deliver 5-120 l/s. KVL and KVLv pumps, deliver 2,5-130 l/s. at 8-380 m.w.c. manometric heads. Range of supply for each particular type and size is shown in the respective diagrams. Pumps for other speed as well as pumps out of the mentioned range are made on the special request.

Design Features

Casing

High-pressure pump is of a sectional design, thus having each diffuser built into the sectional interstage casing, which comprehensively, with and impeller, being affixed on the shaft, forms one stage. Adequate number of stages together with a suction and delivery casing is tightened over joint tightening bolts. KVL pump is installed in a vessel of welded construction with constant water supply. Vessel height varies depending on the designer requests.

Impellers And Diffusers

Impellers are of the single-suction design with double wearing rings. Axial thrusts are at the pumps VS and VSv taken by a disc serving to gain their equilibration. Types KV and KVv are characterized by bores existing on the impellers, which practically equalize thrusts in an axial direction. Wearing rings installed in casing are replaceable. Diffusers are separate very easy mantling and dismantling parts.

Shafts And Bearings

High-pressure pump shafts are placed into two oil lubricated roller bearings, provided for the continuous life of 40000-60000 hours of operation. One of these bearings at the pumps KV and KVv limits axial displacement of the shaft, taking the unbalanced axial thrust, which can occur, either due to insufficient equilibration of thrusts in the pump or unequal run out of wearing rings. At the pumps VS and VSv axial thrusts are taken by a disc thus enabling displacement of both roller bearings. Bearings are lubricated by oil or grease and can be cooled at medium high temperatures. KVL pump shaft is installed in one or more slide journal bearings lubricated by water and one roller bearing transmitting axial thrust. In a case of dirty water slide bearings are grease lubricated with a separate grease pump. Distance sleeves are installed in the pump interior, protecting the shaft and completely preventing it from the medium being handled.

Packings

Access to packings is provided on both sides. Should sub pressure in a suction casing occur, sealing water is to be connected to the first pump stage. Mechanical seals with slide rings can be fitted instead of packings, upon customer's requirements.

Materials

Casing of a standard design is made of qualitative cast iron; whilst an impeller and diffuser of cast iron or bronze depending on customers' requirements. Wearing rings, distance and protecting sleeves are made of bronze; shaft of SM steel. Pumps and accessory parts can be made of other materials as per customers' requirements.

Position Of The Flanges

Positions of a suction and delivery flanges can be directed vertically upwards, horizontally left or right, thus being independent of each other. Pumps having the flange position vertically downwards are made on a special requirement. Flange position is defined, taking a view from a pump driving side i.e. coupling side. Diagrammatic drawing of flange positions is given below the measuring sketches.

KVL pumps have suction and delivery flange above the engine room floor in the same axis under angle of 180°. We deliver these pumps also with the other flange positions.

Installation Of Units

On a customer's requirement there is a possibility of an aggregation by joining pumps with electro-motors, diesel and petrol motors, steam turbines and other driving engines. Such units are installed on single or double, either cast or profiled weld bedplates. Pumps are also accompanied by adequate fittings.

Design

Complete design of pump stations and plants together with a performance and inspection of the assembling concerned is available. Taking part in the construction of pump plants and selection of their most convenient types and sizes from the point of economic reliability, our experienced and eminent. Technical Staff will readily give the fullest and closest attention regarding these pumps and their applications.

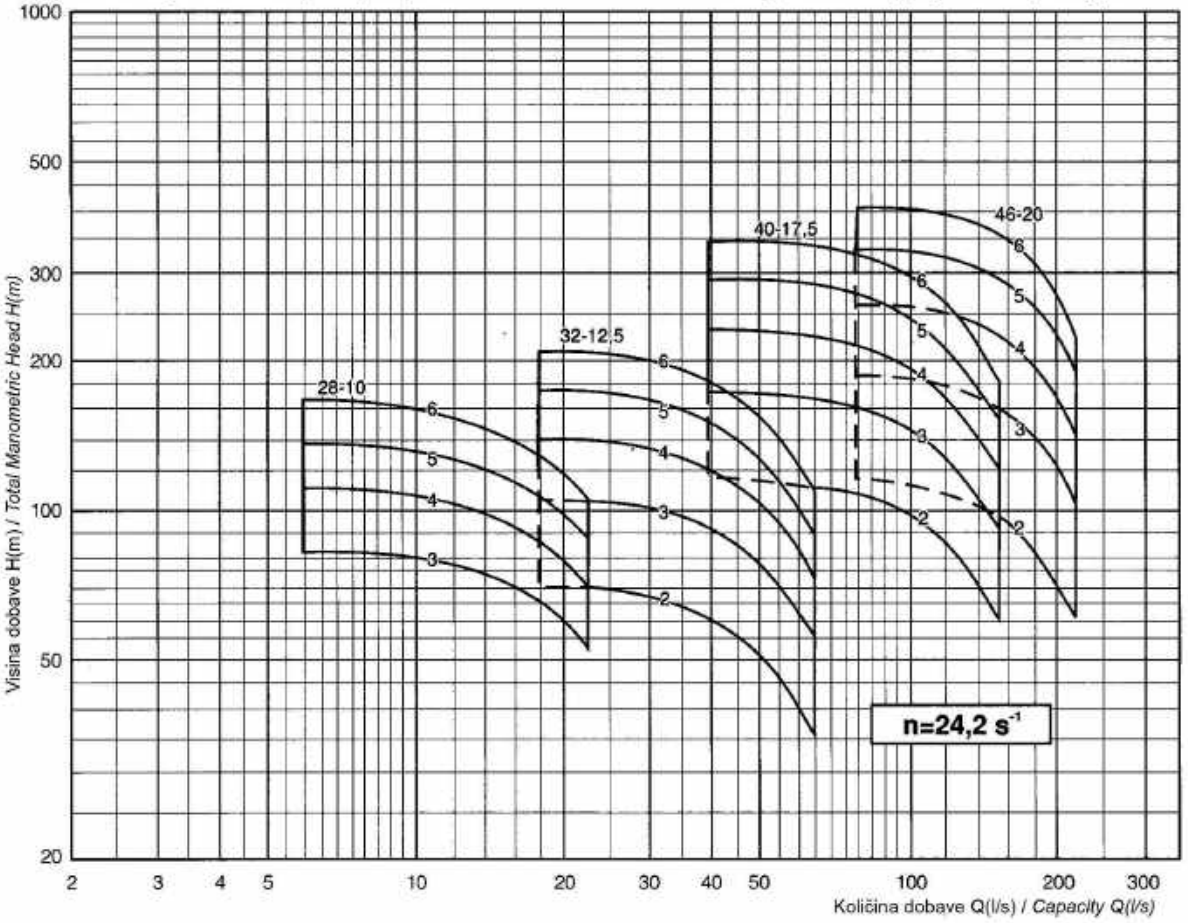
Order

The following is to be mentioned at ordering:

- kind of medium
- capacity
- total head
- NPHS of plant or necessary suction head
- pump inlet pressure
- medium temperature
- if a medium is water the following must be mentioned: is it sea or fresh water, is it aggresive (pH value, chemical composition), clean or dirty water, degree of impurity (mad, sand, etc.)
- position of flanges
- necessary cote "L at KVL pumps

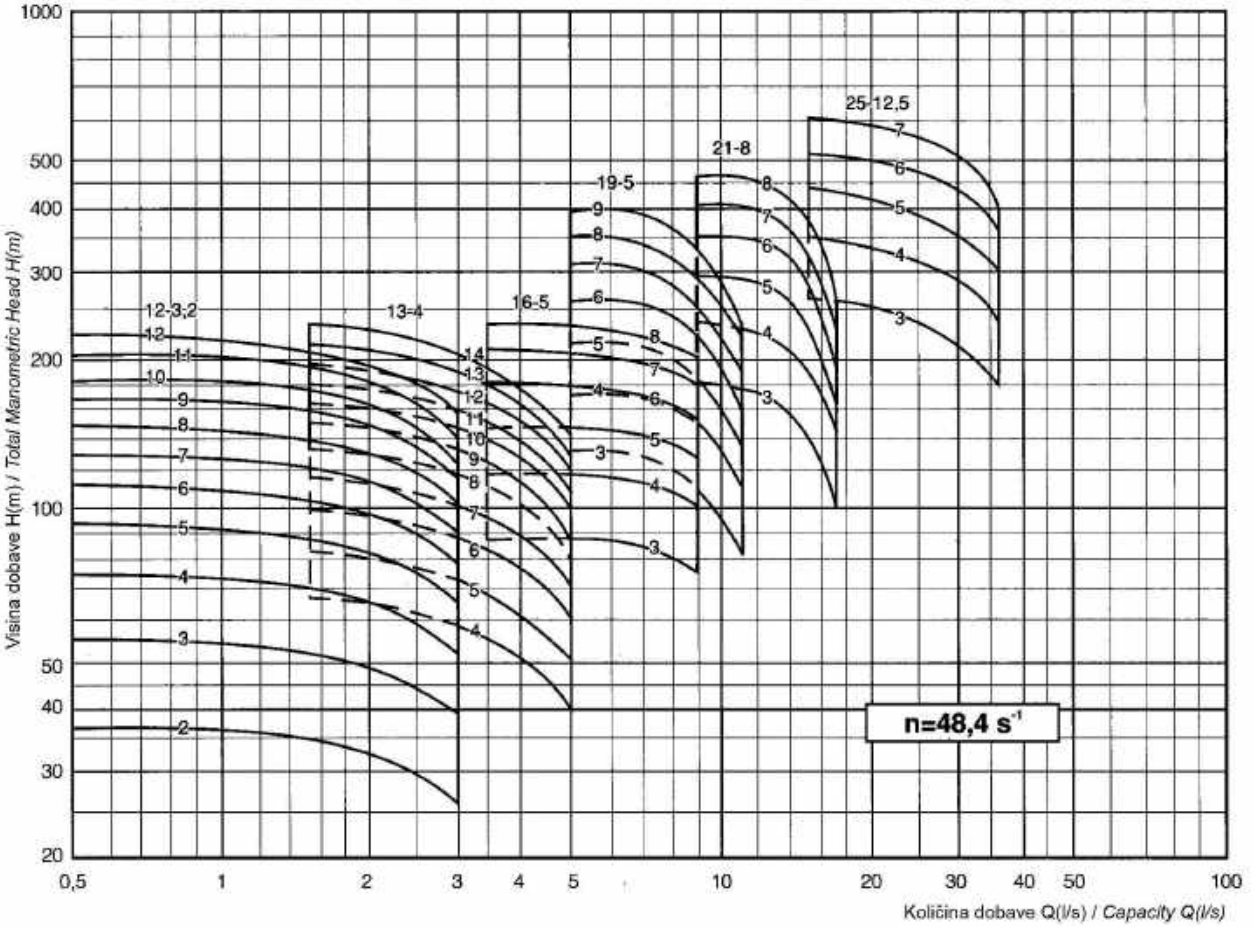
Područja dobave pumpi tipa VS

Ranges Of Supply – Pumps Type VS



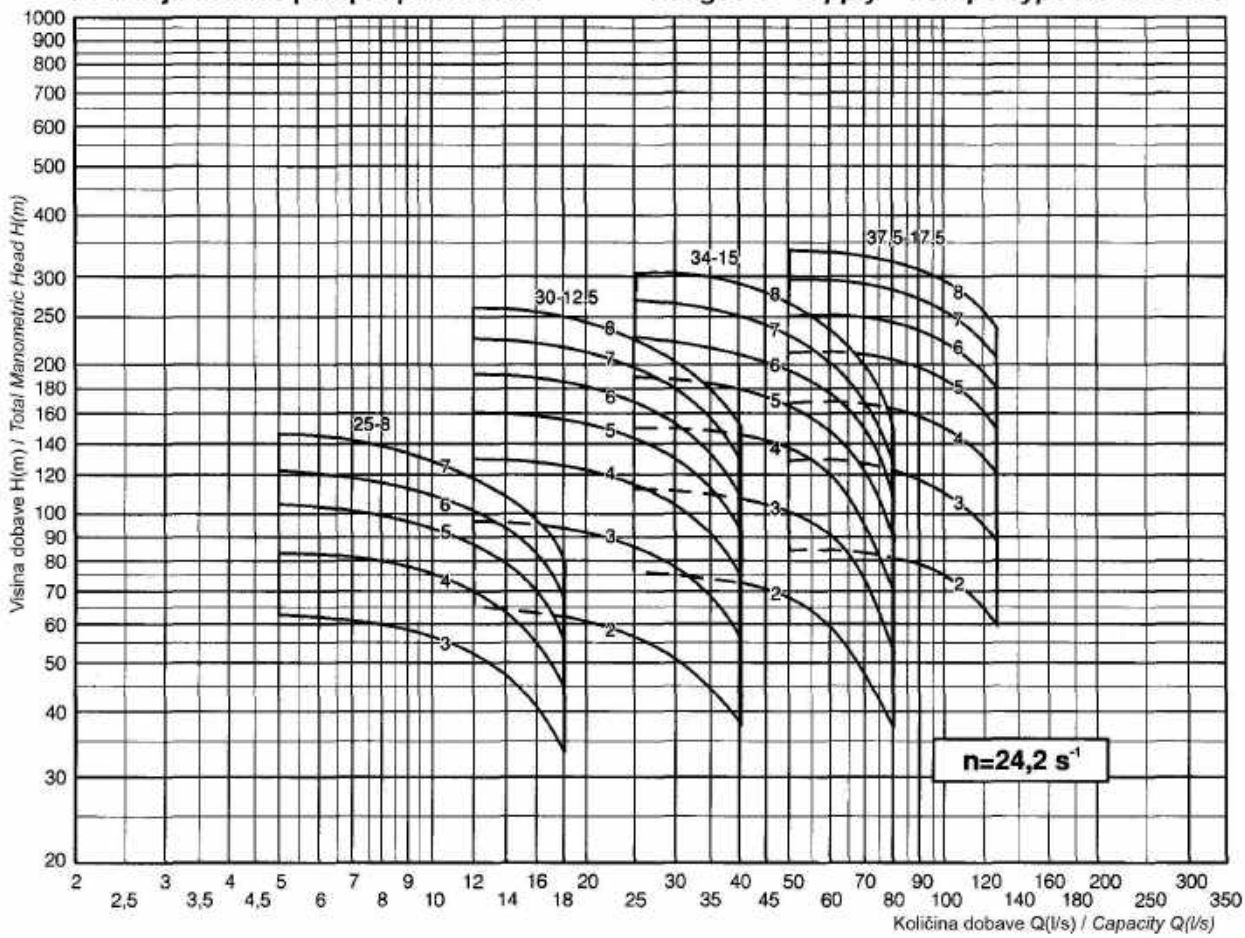
Područja dobave pumpi tipa VSv

Ranges Of Supply – Pumps Type VSv



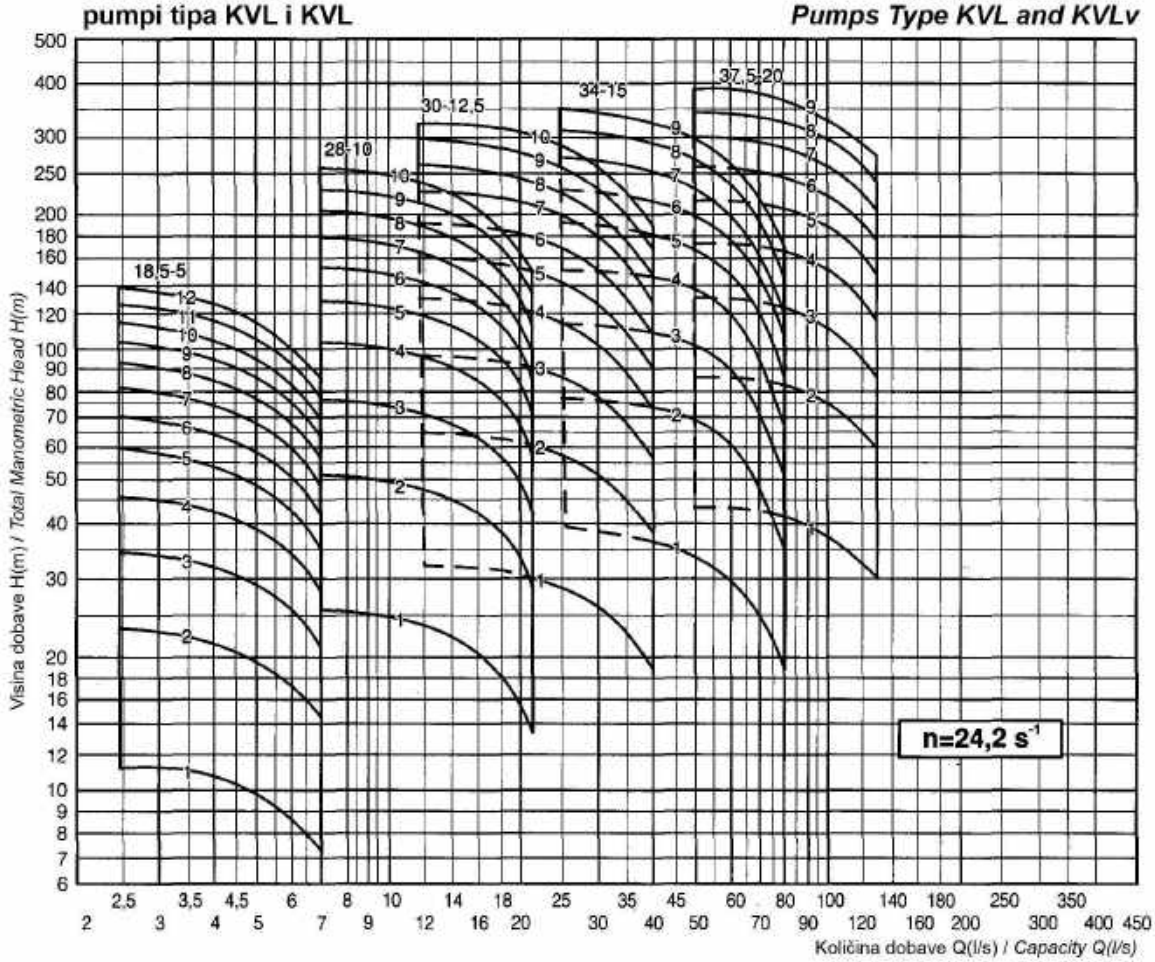
Područja dobave pumpi tipa KV i KVv

Ranges Of Supply – Pumps Type KV and KVv

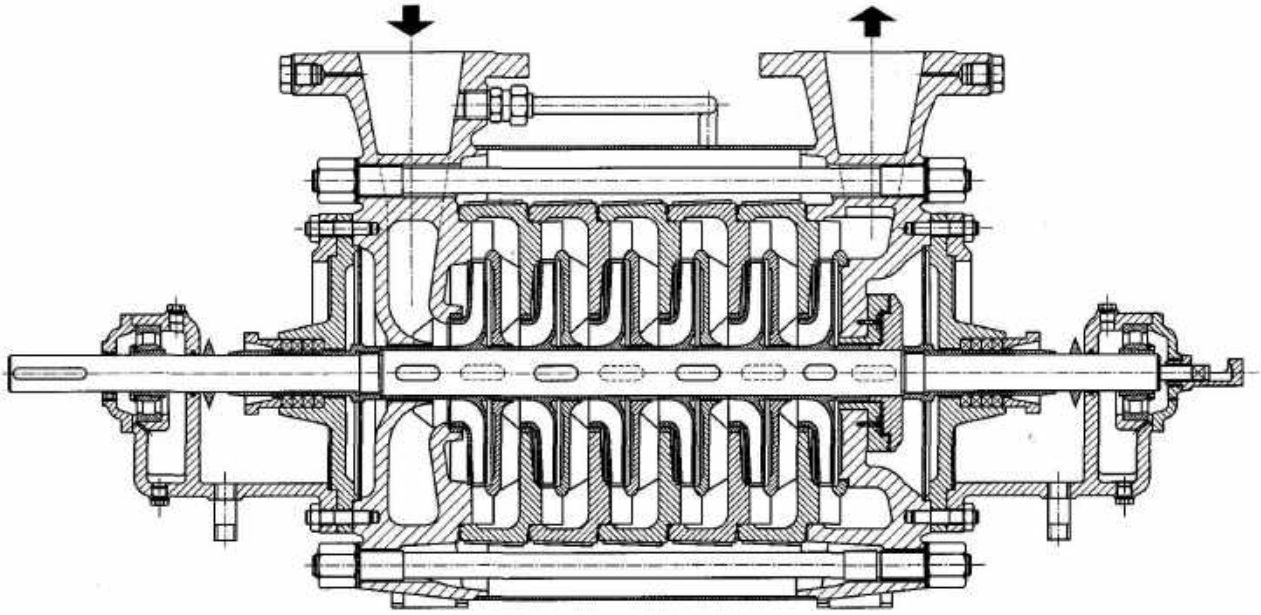


Područja dobave pumpi tipa KVL i KVL

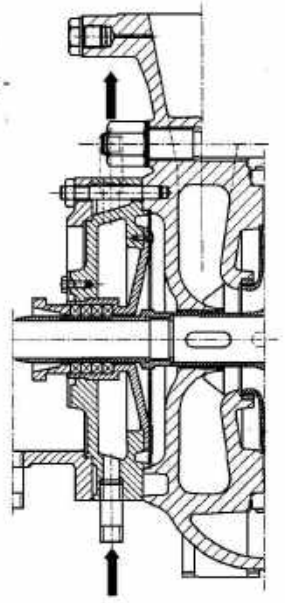
Ranges Of Supply – Pumps Type KVL and KVLv



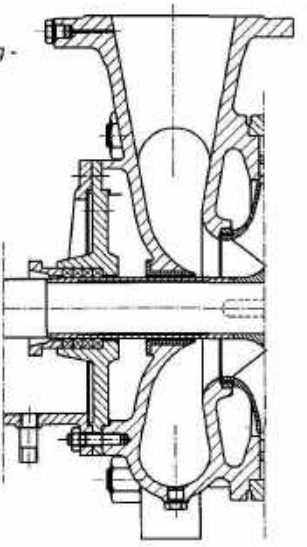
Presjek pumpe tipa VS ***VS Pump Cross Section***



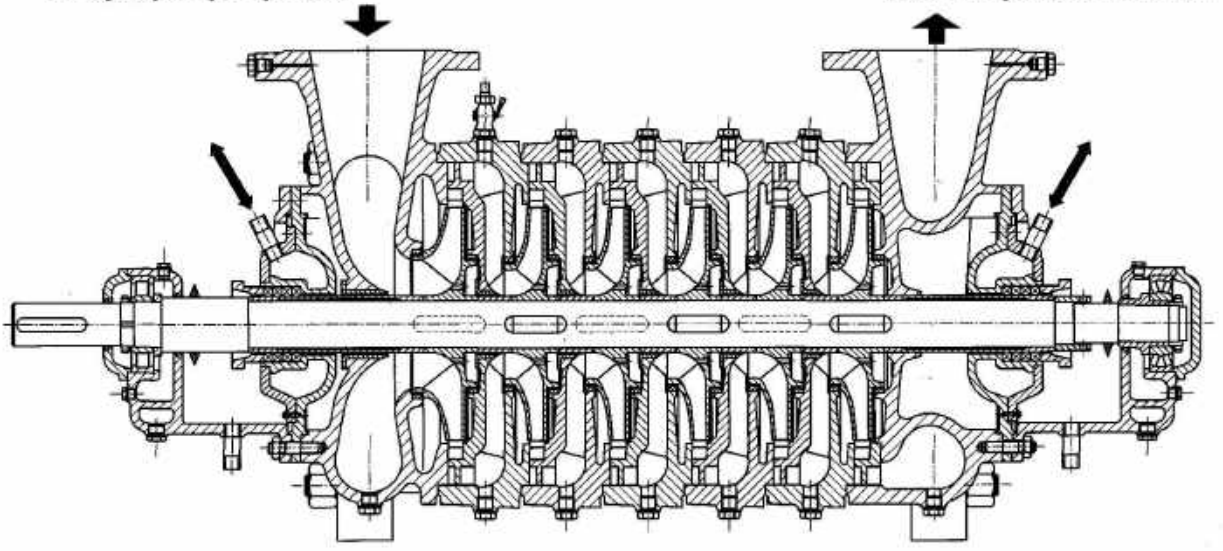
Detalj brtvenice vratila pumpe tipa VSv
Detail Of Shaft Packing - Pump VSv Type



Detalj brtvenice vratila pumpe tipa KV
Detail Of Shaft Packing - Pump KV Type

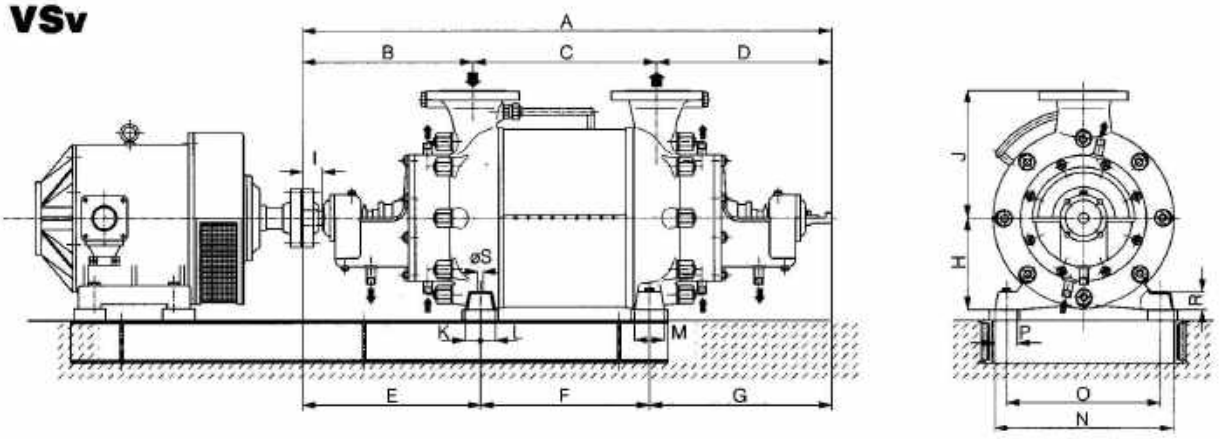


Presjek pumpe tipa KVv ***KVv Pump Cross Section***

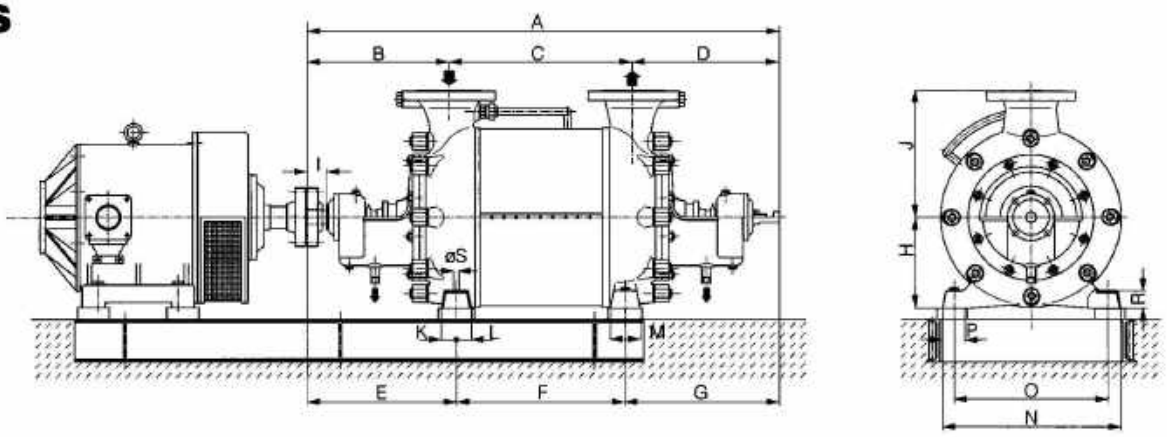


Mjerne skice ***Pump Sketch With Dimensions***

VSv

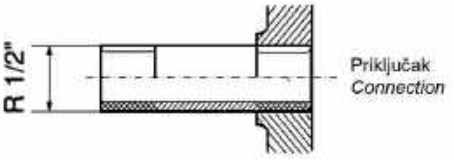


VS



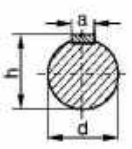
Odvod i dovod vode za hlađenje brtvenica
Supply And Discharge Of Water For The Cooling Of Packings

Drenaža brtvene vode
Sealing Water Drainage

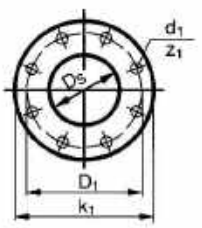


Prirubnice
Flanges

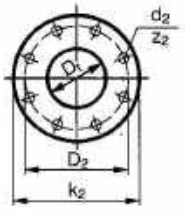
Vratilo
Shaft



Usisna
Discharge



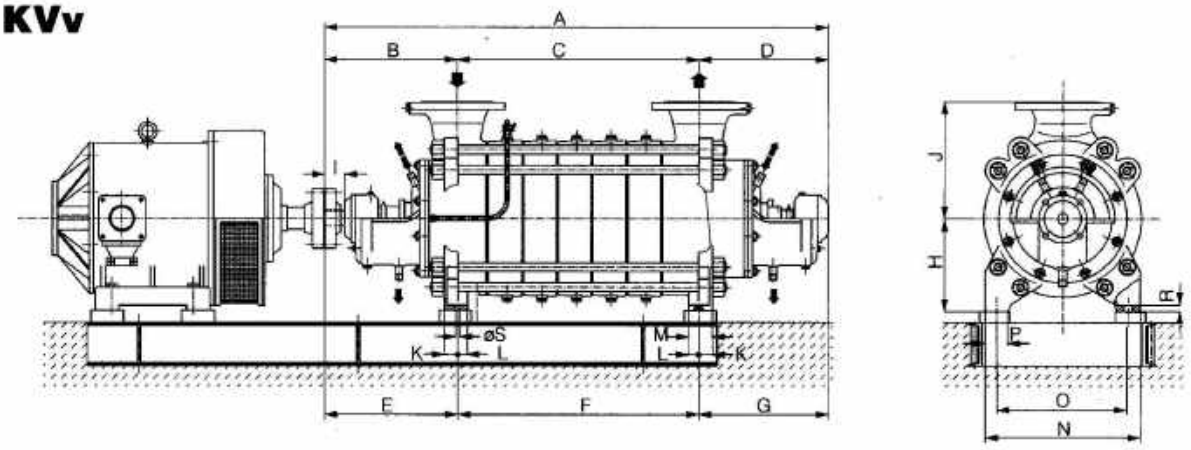
Tlačna
Pressure



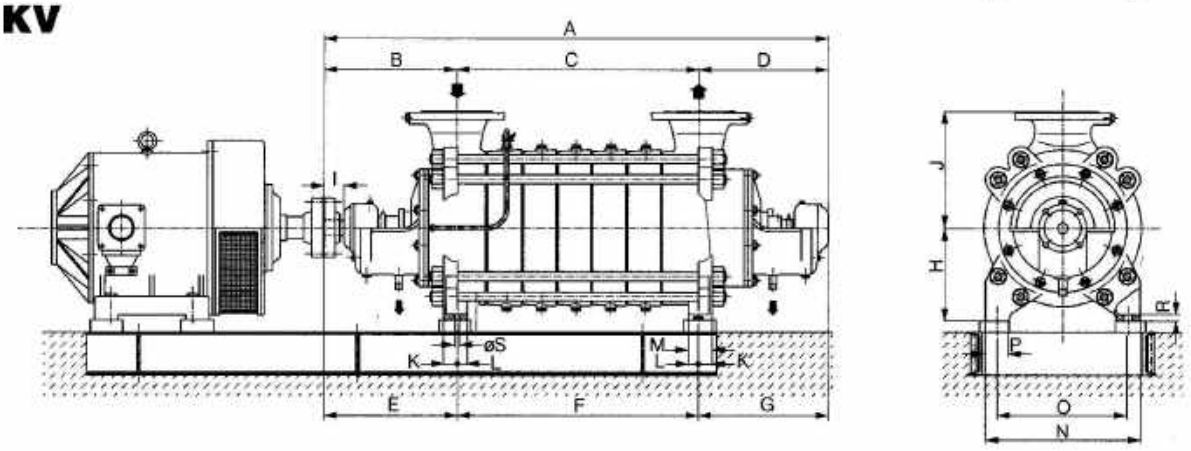
Mjerne skice

Pump Sketch With Dimensions

KVv

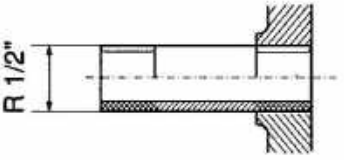


KV



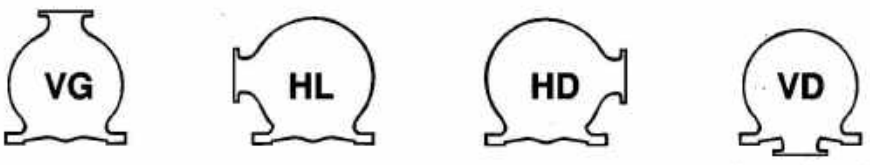
Odvod i dovod vode za hlađenje brtvenica
Supply And Discharge Of Water For The Cooling Of Packings

Drenaža brtvene vode
Sealing Water Drainage



Priključak
Connection

Oznaka položaja usisne i tlačne prirubnice (gledano od spojke)
Discharge And Pressure Flange Position Marks (View From Coupling)



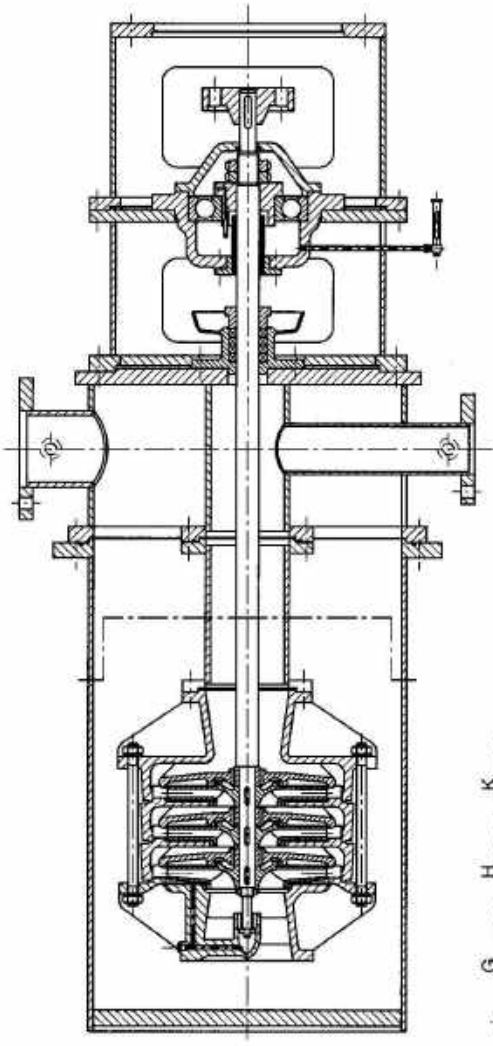
Na poseban upit
Upon Special Application

				VSv					VS					KV KVv			
				13-4	16-5	19-5	21-8	25-12,5	12-3,2	28-10	32-12,5	40-17,5	46-20	25-8	30-12,5	34-15	37,5-17,5
Pump Dimensions / Dimenzije pumpe	A	Za broj stupnjeva / No. of Stages	2	604,5	741	796,5	925	1020	457	939	1013	1450	1517	796	1195	1262	1328
			3	645,5	791	851,5	985	1110	502	1019	1113	1580	1667	877	1200	1387	1468
			4	686,5	841	906,5	1050	1200	547	1099	1213	1710	1817	958	1305	1512	1608
			5	727,5	895	961,5	1115	1290	592	1179	1313	1840	1967	1039	1410	1637	1748
			6	768,5	947	1016,5	1180	1380	637	1259	143	1970	2117	1120	1515	1762	1888
			7	809,5	999	1071,5	1245	1470	682			2100		1201	1620	1887	2028
			8	850,5	1051	1126,5	1310		727			2230			1725	2012	2168
			9	891,5		1181,5			772								
			10	932,5					817								
			11	973,5					862								
			12	1014,5					907								
			13	1056,5													
			14	1097,5													
	B			206,5	315	335	390	426	262	382	426	595	601	358	453	520	573
	C	Za broj stupnjeva / No. of Stages	2	112	222	147	165	150	121	210	252	330	400	197	285	357	355
			3	153	190	202	230	340	166	290	352	460	550	278	390	482	495
			4	194	242	257	295	430	211	370	452	590	700	359	495	607	635
			5	235	294	312	360	520	256	450	552	720	850	440	600	732	775
			6	276	346	367	425	610	301	530	652	850	1000	521	705	857	915
			7	317	398	422	490	700	346			980		602	910	982	1055
			8	358	450	477	555		391			1110			1015	1107	1195
			9	399		532			436								
			10	440					481								
			11	481					526								
			12	522					571								
			13	563													
			14	645													
	D			232	286	314,5	365	344	195	347	335	525	516	241	335	385	400
	E			252,5	335	351	410	436	282	392	446	615	631	394	453	550	593
	F	Za broj stupnjeva / No. of Stages	2	110	92	107	140	230	79	195	213	300	358	131	280	297	335
			3	151	144	162	205	320	124	275	313	430	308	212	385	422	475
			4	192	196	217	270	410	169	355	413	560	658	293	490	547	615
			5	233	248	272	335	500	214	435	513	690	808	374	595	672	755
			6	274	300	327	400	590	259	515	613	820	958	455	700	797	895
			7	315	352	382	465	680	304			950		536	805	922	1035
			8	356	404	437	530		349			1080			910	1047	1175
			9	397		492			394								
			10	438					439								
			11	479					484								
			12	520					529								
			13	561													
			14	602													
	G			242	312	338,5	370	354	217	352	354	535	528	271	362	415	400
	H			120	150	170	220	265	110	245	300	400	480	200	280	300	400
	J			150	200	230	300	340	150	350	380	500	580	260	350	440	500
	K			50	40	56	35	50	45	35	60	70	100	25	40	90	70
	L			25	20	24	35	50	15	35	60	70	100	55	30	30	70
	M			75	60	80	70	100	60	70	120	140	200	80	70	120	140
	N			220	230	330	450	630	220	500	600	800	1050	355	480	560	840
	O			190	170	280	400	560	190	450	520	700	940	300	420	480	740
	P			65	60	50	80	100	50	80	100	150	250	78	90	110	150
	R			12	10	15	55	60	12	55	60	100	140	15	25	20	100
	S			18	18	18	18	22	18	16	18	27	26	23	22	23	27
Vratilo / Shaft	d			22k6	28k6	30k6	30k6	45k6	22k6	35k6	50k6	65m6	75m6	35k6	50k6	60m6	65m6
	a			8	8	10	10	14	6	10	14	18	20	10	14	18	18
	h			25,1	30,9	33,3	38,3	48,5	24,6	38,3	53,5	69,2	79,6	33,3	53	63,6	69,2
	l			60	77	70	90	110	59	90	105	150	150	90	110	120	140
Usisna prirubnica / Discharge Flange	NP			10	10	16	16	10	16	10	10	16	16	10	10	16	16
	D_s			50	65	65	100	150	40	125	150	200	250	100	150	200	200
	D_1			125	145	145	180	240	110	210	240	290	355	180	240	295	295
	k_1			165	180	185	220	285	150	250	285	340	405	220	285	340	340
	d_1			18	18	18	18	23	18	18	23	23	25	18	23	23	23
	z_1			4	4	4	8	8	4	8	8	12	12	8	8	12	12
Tlačna prirubnica / Pressure Flange	NP			25	25	64	64	64	25	25	25	40	40	25	25	40	40
	D_t			40	50	50	80	125	32	100	125	175	200	80	125	150	175
	D_2			110	125	135	170	240	100	190	220	285	320	160	220	250	285
	k_2			150	165	180	215	295	140	235	270	335	375	200	270	300	335
	d_2			18	18	22	22	30	18	23	25	27	28	18	27	27	27
	z_2			4	4	4	8	8	4	8	8	8	12	8	8	8	8

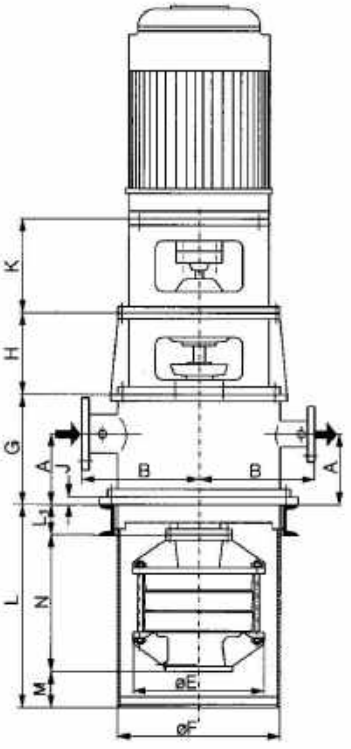
Mjere u mm (neobavezno)

Presjek i mjerna skica pumpe tipa KVL

Cross Section and Sketch with Dimensions of KVL Type Pump



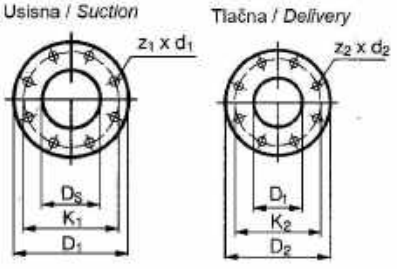
Presjek pumpe tipa KVL
KVL Pump Cross-section

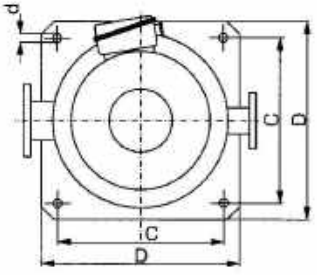


			KVL 18,5-5	KVL 28-10	KVL 30-12,5	KVL 34-15	KVL 37,5-20
Dimenzije pumpe / *Pump Dimensions*	A		215	245	270	300	320
	B		350	400	500	550	625
	C		520	640	720	890	1000
	D		600	720	800	980	1100
	d		30	33	33	39	39
	E		370	450	570	670	750
	F		450	550	700	800	900
	G		300	380	430	480	550
	H		250	300	350	400	450
	J		30	35	40	45	50
	K		300	350	400	450	500
	M		130	150	170	200	220
	N	1	320	360	450	540	715
		2	375	440	555	665	855
		3	430	520	660	790	995
		4	485	600	765	915	1135
		5	540	680	870	1040	1275
		6	595	760	975	1165	1415
		7	650	840	1080	1290	1555
		8	705	920	1185	1415	1695
		9	760	1000	1290	1540	1835
		10	815	1080	1395		
		11	870				
		12	925				
Prirubnice / *Flange* — Usisna / *Suction*	NP		16	16	16	16	16
	D_S		65	125	150	200	250
	D_1		185	250	285	340	405
	k_1		145	210	240	295	355
	d_1		18	18	23	23	27
	Z_1		4	8	8	12	12
Prirubnice / *Flange* — Tlačna / *Delivery*	NP		25	25	40	40	40
	D_T		50	100	125	150	200
	D_2		165	235	270	300	375
	k_2		125	190	220	250	320
	d_2		18	23	27	27	30
	Z_2		4	8	8	8	12

Kote L i L1 određuje projektant prema projektu
Designer Determines Dimensions L and L1 Per Object

Prirubnice / *Flange*

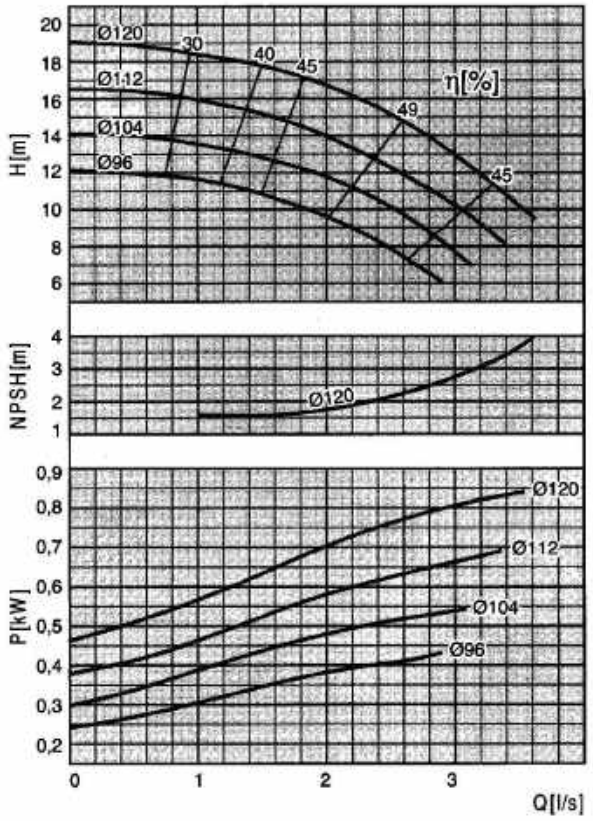




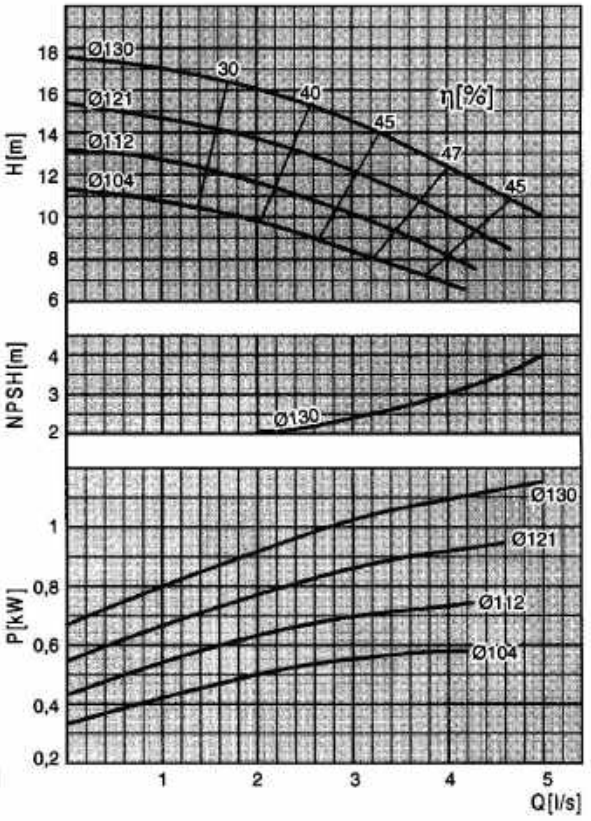
Pojedinačni dijagrami

Single Diagrams

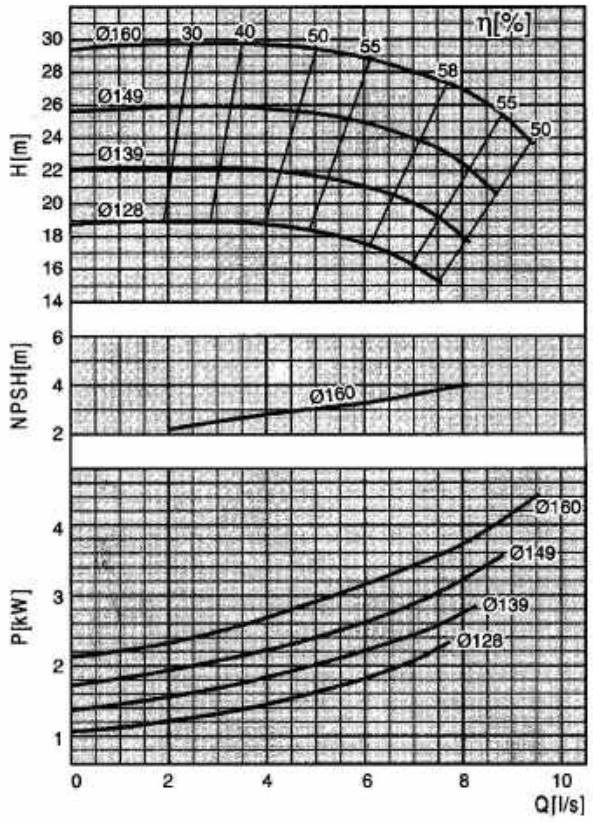
VS 12-3,2/1 (2-12) n=48,4 s^{-1}



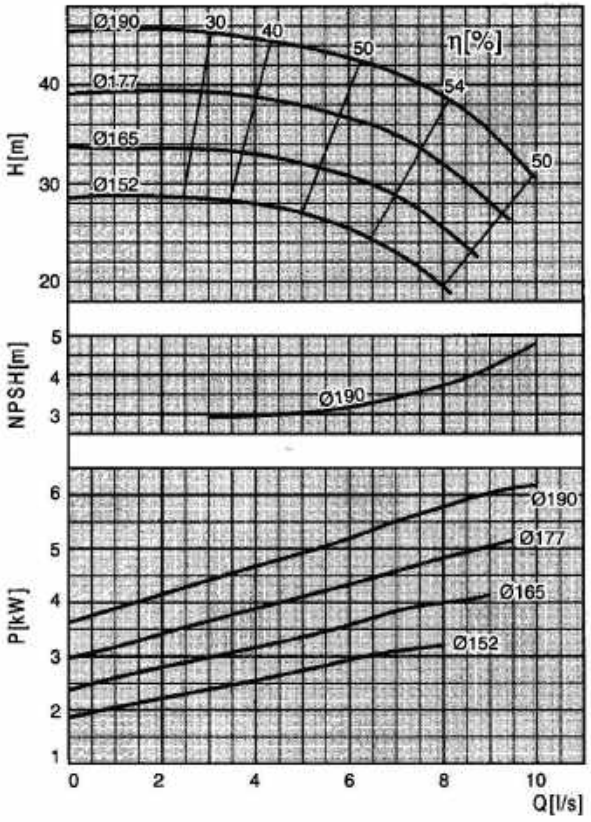
VS 13-4/1 (4-14) n=48,4 s^{-1}



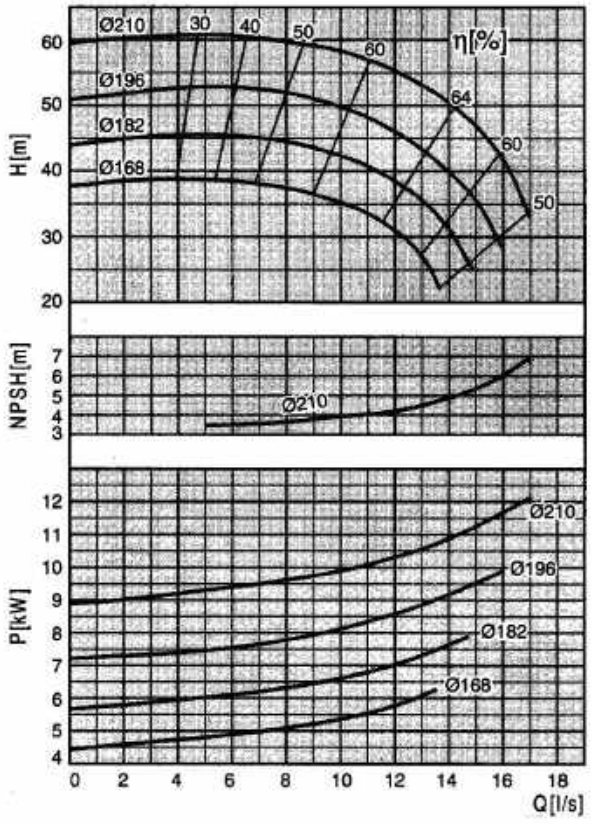
VS 16-5/1 (3-8) n=48,4 s^{-1}



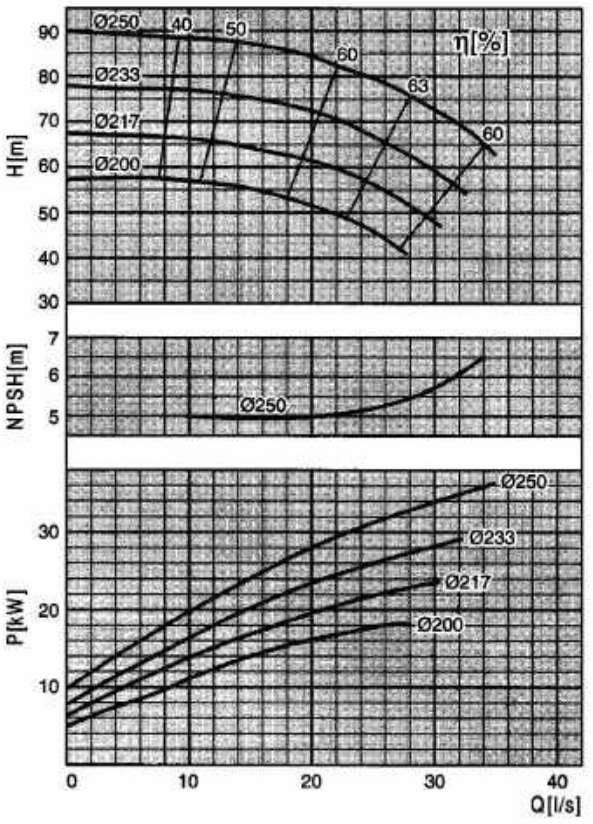
VS 19-5/1 (3-9) n=48,4 s^{-1}



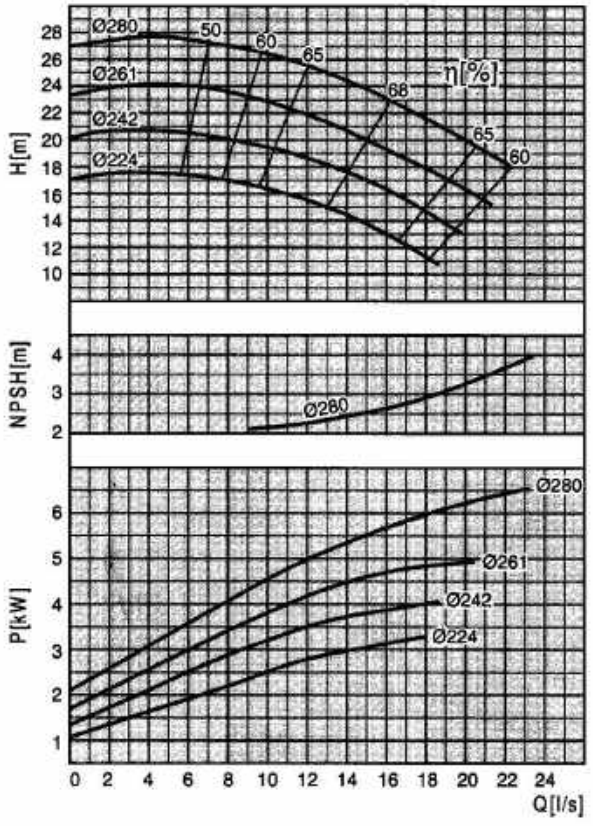
VS 21-8/1 (3-8) n=48,4s^{-1}



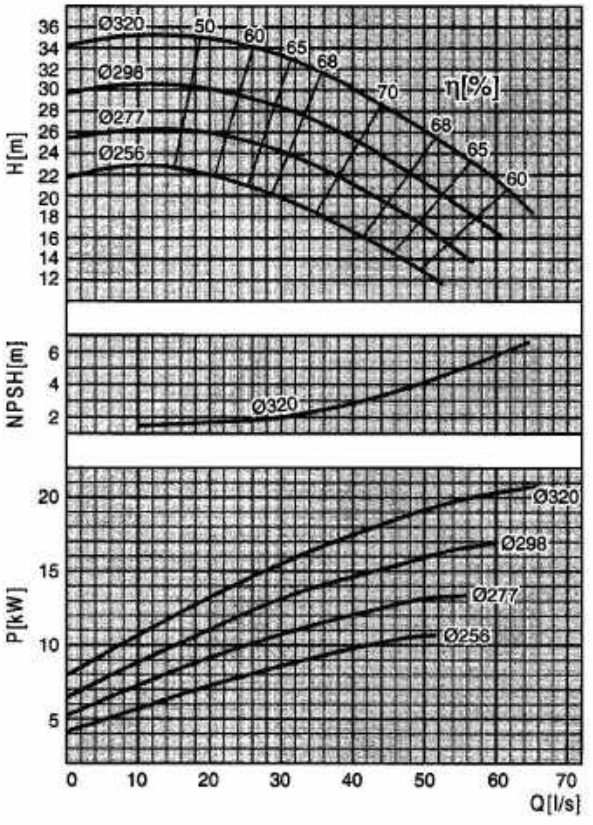
VS 25-12,5/1(3-7) n=48,4s^{-1}



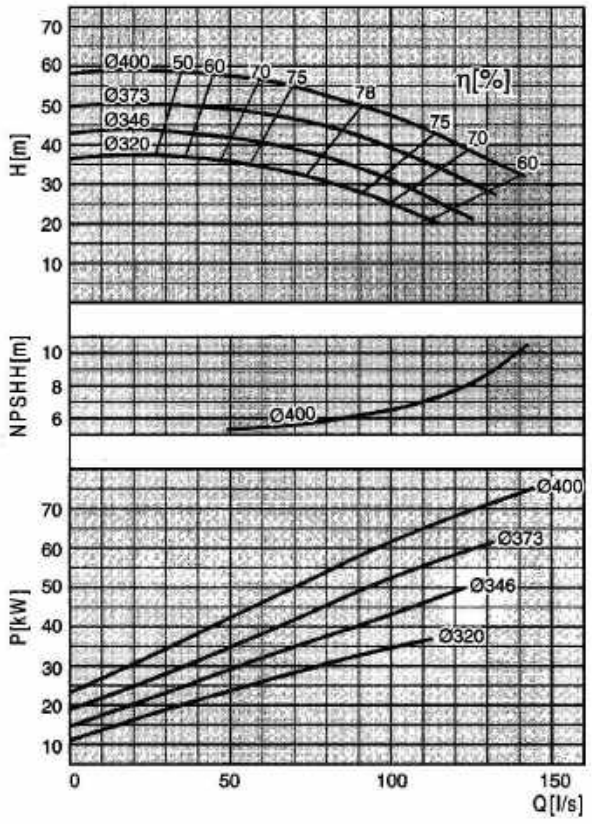
VS 28-10/1(3-6) n=24,2s^{-1}



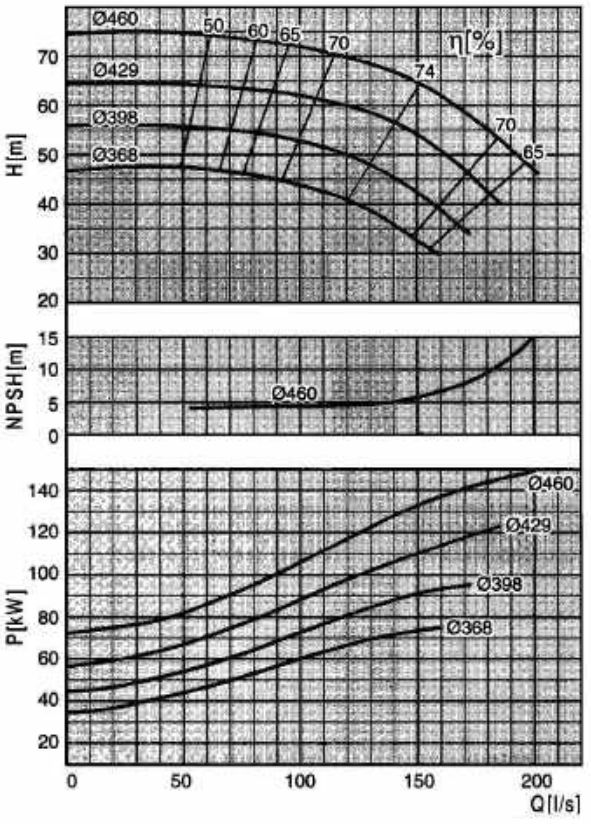
VS 32-12,5/1(2-6) n=24,2s^{-1}



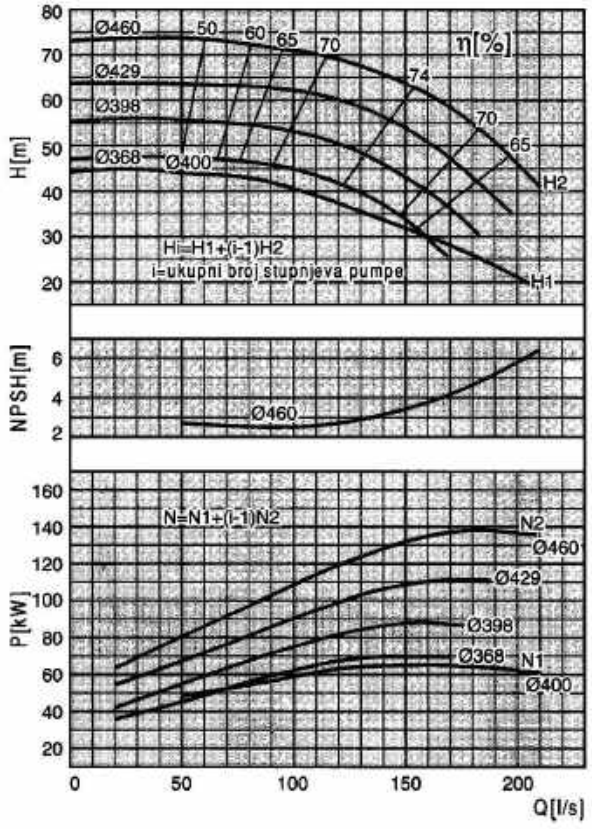
VS 40-20/1 (2-6) n=24,2s^{-1}



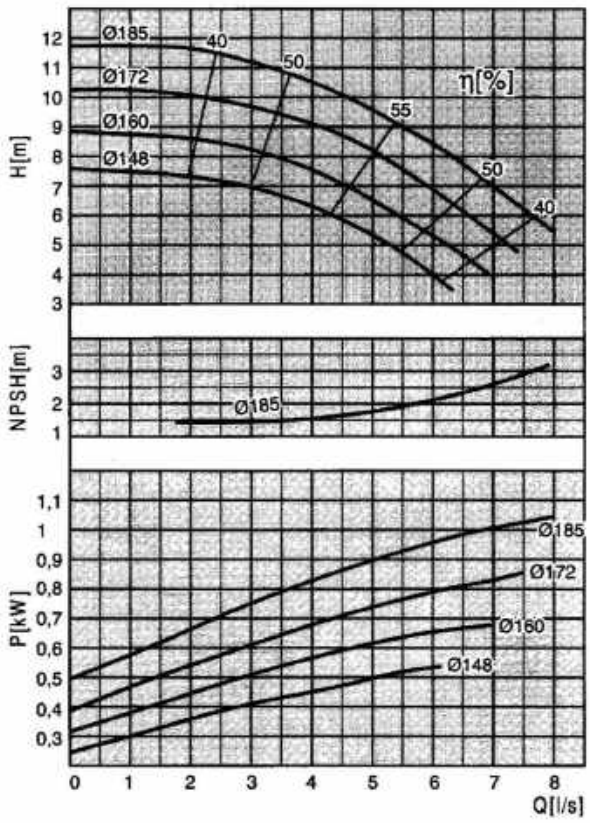
VS 46-20/1 (2-6) n=24,2s^{-1}



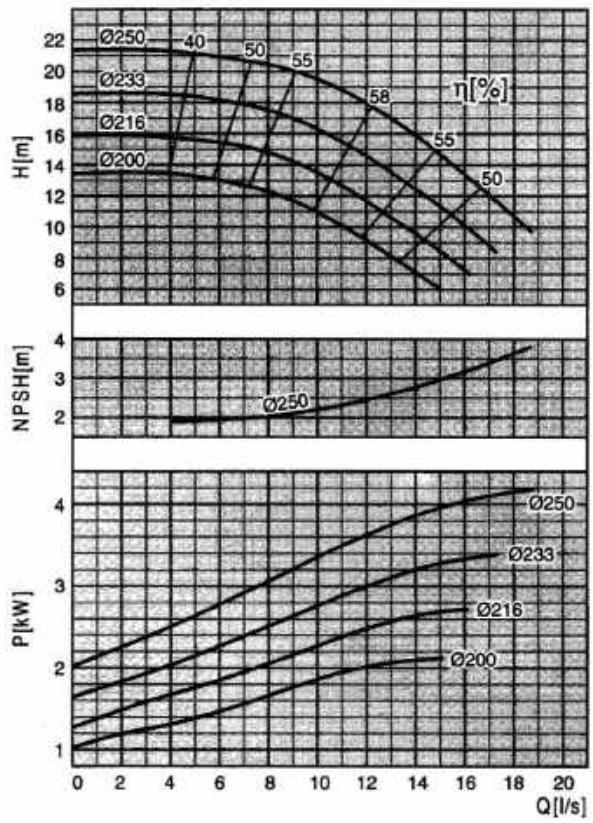
VS 46-20/ (3-6) s poboljšanim usisom *with improved suction* n=24,2s^{-1}



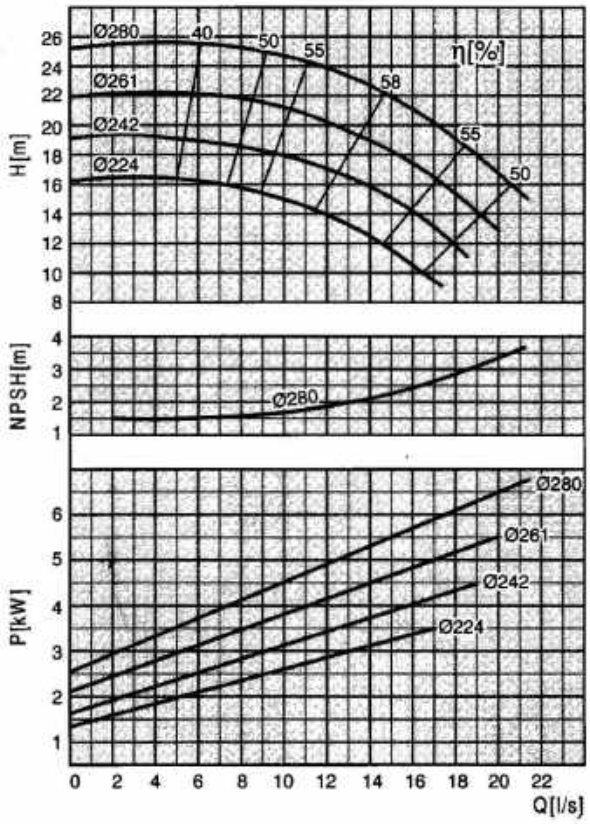
KV 18,5-5/1 (1-6) n=24,2s^{-1}



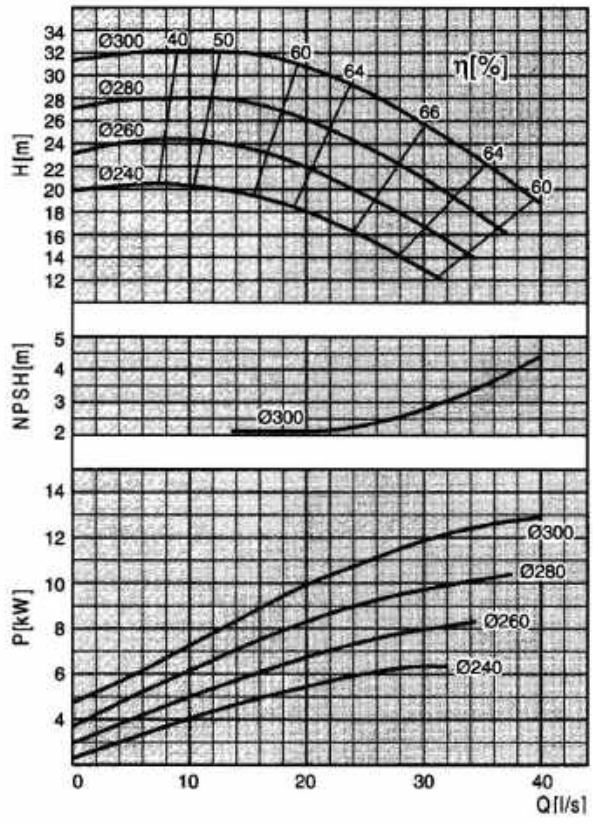
KV 25-8/1 (3-7) n=24,2s^{-1}



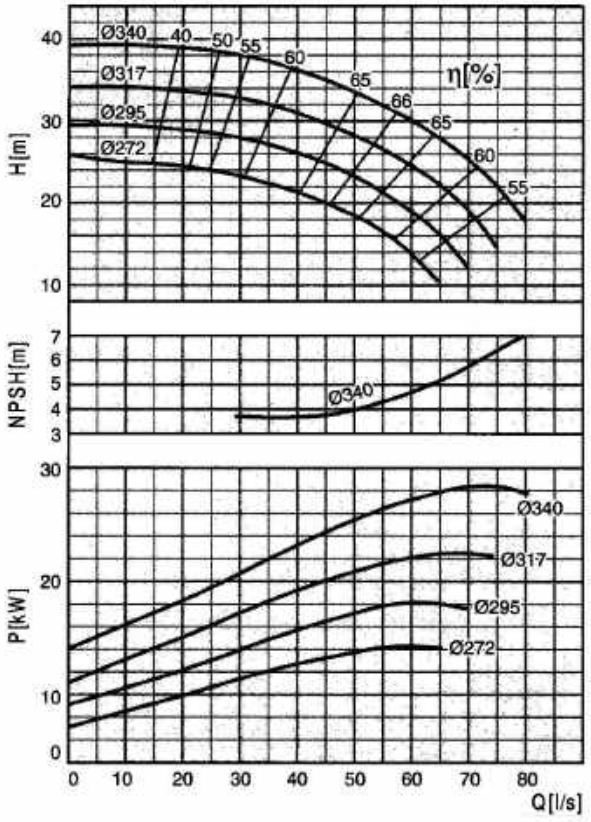
KV 28-10/1 (1-10) n=24,2s^{-1}



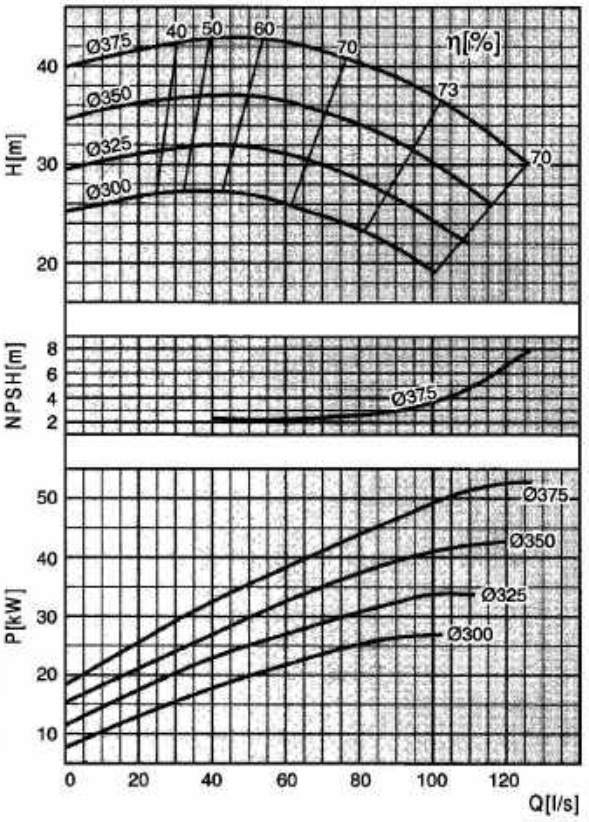
KV 30-12,5 (2-8) n=24,2s^{-1}



KV 34-15/1 (2-8) n=24,2s^{-1}



KV 37,5-20/1 (2-8) n=24,2s^{-1}



Attachment 6

ENEQ Consult – Low-pressure pump units Type NK

ENEQ Consult Ltd. delivers cost-effective mechanical equipment for nuclear, conventional, oil & gas, and petrochemical industries.

- **9 years** of solid performance
- **> 20 M€** project portfolio
- **> 50** completed projects, **> 10** in progress
- Exclusive partnerships with **5 manufacturers worldwide**
- Equipment compliant with **ASME, EN, N Stamp, DIN, ASTM, ISO, GOST**

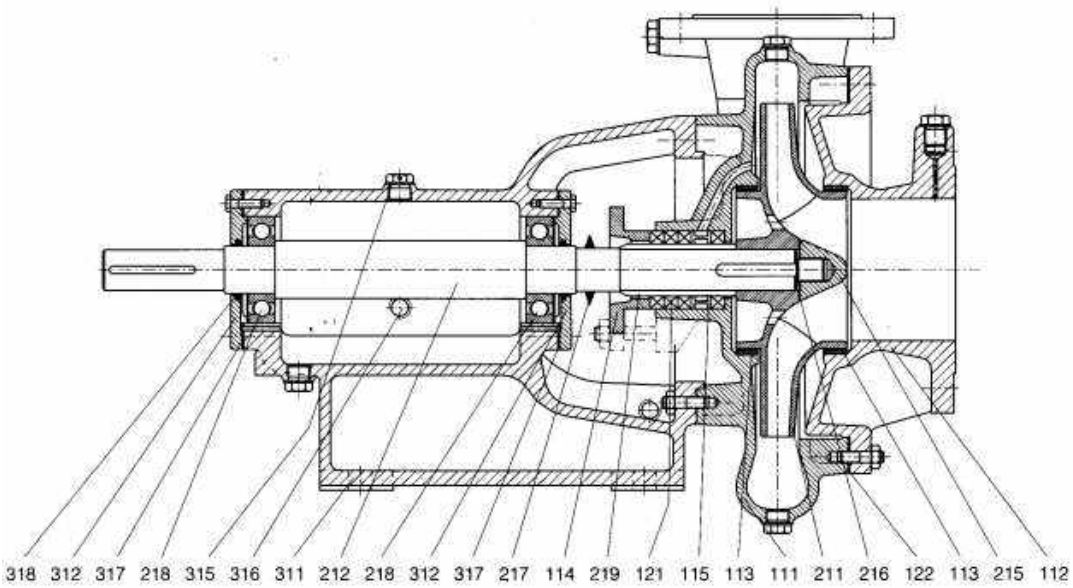
Expertise:

- **Equipment Supply** – high-quality OEMs, cost-effective modernization and new-build solutions, turnkey delivery
- **Engineering** – design critical analyses, FEA & CFD calculations, technical consulting
- **Service** – full project support from production to installation, commissioning, and after-sales

Low-pressure pump units Type NK

Application For **clean and slightly turbid liquids** with temperatures up to 100∘C. They're used for the circulation of hot and cooling water, in water supply systems, industry, agriculture, for artificial rain, irrigation, drainage, and more. **Bearings** Two **roller bearings** are lubricated with oil and operate very quietly. **Base plate** Made of **gray cast iron** or a **welded construction** from steel profiles.	**Flange position** **Suction flange**: horizontal - axial. **Discharge flange**: normally vertical upwards. On request, it can be supplied in a horizontal right position or diagonally downwards at a 45∘ angle. Other required flange positions are possible upon special request. **Coupling** Flexible with a protective guard. **Electric motor** Exclusively **squirrel-cage motors**, B3 form, IP 54 protection.

Cross-section of the pump



List of main pump parts

111 – Volute casing	**211** – Impeller	**311** – Bearing bracket
112 – Casing cover	**212** – Shaft	**312** – Bearing cover
113 – Spacer ring	**215** – Impeller nut	**315** – Air vent
114 – Wear ring	**216** – Nut lock	**316** – Oil level indicator
115 – H-ring	**217** – Centrifugal separator	**317** – Bearing cover gasket
121 – Gland packing	**218** – Roller bearing	**318** – Sealing ring
122 – Casing cover gasket	**219** – Shaft sleeve	

Materials

Position	Name	Materials
111	Volute casing	Gray cast iron
112	Casing cover	Gray cast iron
113	Spacer ring	Gray cast iron or bronze
114	Wear ring	Gray cast iron
115	H-ring	Bronze
211	Impeller	Gray cast iron or bronze
212	Shaft	Steel
219	Shaft sleeve	Bronze
311	Bearing bracket	Gray cast iron

From our extensive production program of **NK pumps**, here we present the pump types that are most commonly used, i.e., for flow rates up to about **300 l/s** (1080m˜3/h) and delivery heads up to about **80 m**.

We also produce NK pumps for larger flow rates and special designs, including those with plain bearings, grease-lubricated roller bearings, mechanical seals, bronze casings for seawater supply, vertical pumps for wall mounting, with pipe extensions, or for special operating conditions.

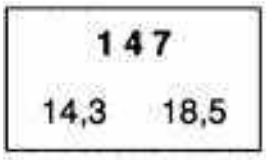
In all such cases, please contact our factory, which will provide you with an offer with all the necessary technical data in the shortest possible time.

Example for pump unit selection

For a water supply network, we need a pump with a flow rate of **20 l/s** (72m^3/h). It needs to draw water from a well and pump it into a reservoir. The total delivery head of **H = 50 m** is calculated as follows:

Geodetic suction head	4.0 m
Losses in the suction line	1.5 m
Geodetic discharge head	39.0 m
Losses in the discharge line	5.5 m
Total head H =	**50.0 m**

Required power for the pump (kW)



Installed motor power (kW)

In the dimensional drawing under serial number 147, you will find:

1. **Pump type**: NK 25-6.5
2. **Electric motor power**: 18.5 kW, 2900min^{-1}
3. **Data** on the weights and dimensions of the pump and unit

For a flow rate Q = 20 l/s, H = 50 m, in the table we find the field:	The required power for the pump is valid for water with a density of 1000kg/m3. All motors are selected with a sufficient power reserve.

Table : Pump Selection Chart (at 2900 RPM) This chart is for selecting a pump model based on performance requirements.

- **Vertical Axis**: Visina dobave H (m) which is **Delivery Head H (m)**.
- **Horizontal Axis**: Količina dobave Q(l/s) which is **Flow Rate Q (l/s)**.
- **Operating Speed**: The chart is for an operating speed of **n = 2900 RPM** (n = 2900 min^{-1}).
- **Content**: The cells contain pump model codes and the required power ratings in kW.

Table : Pump Selection Chart (at 1450 RPM) This chart is for selecting a pump model based on performance requirements.

- **Vertical Axis**: Visina dobave H (m) which is **Delivery Head H (m)**.
- **Horizontal Axis**: dobave Q(l/s) which is **Flow Rate Q (l/s)**.
- **Operating Speed**: The chart is for an operating speed of **n = 1450 RPM** (n=1450 min^{-1}).
- **Content**: The cells contain pump model codes and the required power ratings in kW.

Količina

Višina dobave H(m)

H(m)	1	1,5	2	3	4	5	6	7	8	9	10	12	14	16	18	20	25
85																	
80					139 11,4 15					147 14,3 18,5	147 15,1 18,5	148 16,8 22	148 18,3 22	149 20,1 30	149 21,7 30	155 28,5 37	155 31,9 37
75					139 10,5 15	139 11,1 15	139 12,1 15	140 13,2 18,5		147 13,2 18,5	147 13,9 18,5	147 15,5 18,5	148 16,9 22	148 18,5 22	149 20,2 30	149 22,0 30	155 29,4 37
70	n = 2900 min^{-1}				139 9,45 15	139 10,2 15	138 11,1 15	139 12,3 15	140 13,4 18,5	146 12,3 15	147 12,9 18,5	147 14,2 18,5	148 15,5 22	148 17,2 22	148 18,7 22	149 20,4 30	149 24,9 30
65					138 8,50 11	139 9,23 15	139 10,1 15	139 11,2 15	139 12,4 15	146 11,3 15	146 11,7 15	147 13,0 18,5	147 14,2 18,5	148 15,8 22	148 17,2 22	149 18,9 22	149 23,3 30
60					138 7,60 11	138 8,50 11	139 9,16 15	139 10,2 15	139 11,3 15	146 10,1 15	146 10,6 15	146 11,8 15	147 13,0 18,5	147 14,4 18,5	148 15,8 22	148 17,3 22	149 21,7 30
55					138 6,75 11	138 7,50 11	138 8,29 11	139 9,20 15	139 10,3 15	146 9,10 15	146 9,53 15	146 10,7 15	146 11,8 15	147 13,0 18,5	147 14,3 18,5	148 15,9 22	149 20,1 30
50			114 3,5	114 5,5 4,08	138 5,5 5,95	119 11 6,05	119 11 6,26	119 11 6,49	119 11 6,90	119 11 7,27	119 11 7,80	124 11 11,0	124 15 11,9	146 15 11,7	147 15 12,9 18,5	147 14,3 18,5	148 18,4 22
48			114 3,36	114 5,5 3,98	138 5,5 5,7	118 11 5,60	118 7,5 5,87	119 7,5 6,10	119 11 6,50	119 11 6,90	119 11 7,48	119 11 8,69	119 11 11,3	124 15 13,0 18,5	121A 12,4 15	146 13,7 18,5	147 17,8 22
46			114 3,22	114 5,5 3,71	115 5,5 4,62	118 7,5 5,30	118 7,5 5,53	118 7,5 5,79	119 7,5 6,22	119 11 6,60	119 11 7,10	119 11 8,36	119 11 10,7	124 15 12,3	124 15 12,8 18,5	121A 14,1 18,5	148 17,2 22
44			113 3,08	114 4 3,50	115 5,5 4,43	118 7,5 5,01	118 7,5 5,22	118 7,5 5,49	118 7,5 5,85	119 7,5 6,30	119 11 6,80	119 11 8,05	119 11 10,1	124 15 11,6	124 15 12,2	124 15 13,5 18,5	121A 17,9 22
42			113 2,94	114 4 3,34	114 5,5 4,22	118 5,5 4,68	118 7,5 4,89	118 7,5 5,19	118 7,5 5,55	118 7,5 6,02	119 7,5 6,48	119 11 7,72	119 11 9,63	124 15 10,9	124 15 11,6	124 15 12,9 18,5	121A 16,9 22
40			113 2,62	114 4 3,15	114 5,5 4,02	118 5,5 4,36	118 7,5 4,57	118 7,5 4,85	118 7,5 5,23	118 7,5 5,60	119 7,5 6,13	119 11 7,40	119 11 9,12	124 15 10,3	124 15 11,1	124 15 12,3	121A 15,9 22
38			113 2,5	113 4 2,98	114 4 3,82	118 5,5 4,05	116B 7,5 4,26	118 5,5 4,58	118 7,5 4,98	118 7,5 5,32	118 7,5 5,82	119 7,5 7,07	123 11 8,59	124 15 9,66	124 15 10,5	124 15 11,6	128 15 15,0 18,5
36			112A 2,36	113 3 2,78	114 4 3,62	115 5,5 4,90	116B 7,5 4,00	116B 5,5 4,26	118 5,5 4,60	118 7,5 4,98	118 7,5 5,52	119 7,5 6,74	123 11 8,10	124 11 9,00	124 15 9,88	124 7,5 11	128 15 14,1 18,5
34			112A 2,22	113 3 2,6	114 4 3,42	115 5,5 4,62	107 7,5 4,70	116B 7,5 3,95	116B 5,5 4,27	118 5,5 4,68	118 7,5 5,2	119 7,5 6,45	119 11 8,16	123 11 8,40	124 11 9,30	124 15 10,4	124A 15 13,4 18,5
32				103 2,52	114 4 3,22	115 5,5 4,35	107 7,5 4,33	107 7,5 4,63	107 7,5 4,92	107 7,5 5,28	118 7,5 4,0	119 11 6,30	119 11 7,79	123 11 8,25	123 11 8,7	124 15 9,8	121A 15 12,9 18,5
30				102 2,2	103 3 2,45	103 4 2,74	106 4 3,96	106 5,5 4,24	107 5,5 4,57	107 7,5 4,9	107 7,5 5,25	118 7,5 5,88	119 7,5 7,35	111B 11 8,32	111B 11 8,51	111C 11 9,30	124 15 12,3 15
28				102 2,01	102 3 2,23	103 3 2,52	103 4 2,89	106 4 3,92	106 5,5 4,19	107 5,5 4,45	107 7,5 4,86	107 7,5 5,59	107 7,5 5,91	119 7,5 7,6	111B 11 7,84	111B 11 8,55	111C 11 9,8 15
26				102 1,82	102 3 2,04	102 3 2,3	103 3 2,64	103 4 3,02	106 4 3,85	106 5,5 4,09	107 5,5 4,47	107 7,5 5,19	109 7,5 5,46	110 7,5 6,18	110 11 6,85	111B 11 7,80	111C 11 9,03 15
24				101A 1,64	102 2,2 1,83	102 3 2,1	103 3 2,43	103 4 2,79	104 4 3,21	106 5,5 3,75	106 5,5 4,06	107 5,5 4,79	109 7,5 5,02	109 7,5 5,7	110 7,5 6,36	111B 11 7,08	111B 11 8,3 11
22				101A 1,44	101A 2,2 1,66	102 2,2 1,91	102 3 2,21	103 3 2,6	103 4 2,97	106 4 3,44	106 5,5 3,72	107 5,5 4,39	109 7,5 4,58	109 7,5 5,23	109 7,5 5,89	111B 7,5 6,39	111B 11 7,52 11
20			136 1,46	101A 2,2 1,25	101A 2,2 1,48	102 2,2 1,72	102 3 2,01	103 3 2,36	144 4 2,51	144 4 2,72	151 4 3,54	106 5,5 3,99	152 5,5 4,28	152 7,5 4,72	152 7,5 5,19	110 7,5 6,32	111B 11 6,8 11
19			136 1,33	136 2,2 1,55	101A 2,2 1,41	101A 2,2 1,63	102 2,2 1,9	143 3 2,16	144 3 2,34	144 4 2,57	144 4 2,78	106 4 3,79	151 5,5 4,02	152 5,5 4,44	152 7,5 4,92	152 7,5 5,48	111B 7,5 6,46 11
18			136 1,22	136 2,2 1,45	137 2,2 1,72	142 3 1,65	102 2,2 1,8	143 3 2,02	143 3 2,2	144 3 2,44	144 4 2,63	145 4 3,14	151 5,5 3,78	151 5,5 4,19	152 5,5 4,66	152 7,5 5,19	158 7,5 6,12 11
17			135 1,15	136 1,5 1,35	136 2,2 1,63	142 2,2 1,45	102 2,2 1,7	143 3 1,88	143 3 2,07	143 3 2,3	144 3 2,48	144 4 2,97	151 4 3,54	151 5,5 3,93	152 5,5 4,4	152 7,5 4,9	157 7,5 5,8 7,5
16			135 1,05	136 1,5 1,25	136 2,2 1,53	142 2,2 1,43	142 2,2 1,6	143 2,2 1,74	143 3 1,93	143 3 2,11	144 3 2,3	144 3 2,82	151 4 3,32	151 5,5 3,68	151 5,5 4,15	152 5,5 4,61	157 7,5 5,47 7,5
15			135 0,97	135 1,5 1,16	136 1,5 1,41	142 2,2 1,31	142 2,2 1,47	142 2,2 1,62	143 2,2 1,8	143 3 1,97	143 3 2,16	144 3 2,63	151A 4 3,09	151 4 3,44	151 5,5 3,89	152 5,5 4,32	157 7,5 5,14 7,5
14	112 0,53 1,1		135 0,86 1,5	135 1,07 1,5	136 1,31 2,2	136 1,63 2,2	142 1,35 2,2	142 1,49 2,2	142 1,66 2,2	143 1,84 3	143 2,02 3	144 2,46 4	151A 2,86 4	151 3,19 5,5	151 3,63 5,5	157 4,03 5,5	157 4,82 7,5
13	112 0,47 1,1	112 0,55 1,1	135 0,8 1,5	116A 0,81 1,1	116 0,89 1,5	116 1,01 1,5	142 1,29 2,2	142 1,37 2,2	142 1,53 2,2	143 1,71 3	143 1,87 3	143 2,28 3	144 2,79 4	151A 2,95 4	151 3,37 5,5	151 3,74 5,5	157 4,18 7,5
12	112 0,42 1,1	112 0,49 1,1	135 0,77 1,5	116A 0,73 1,1	116A 0,81 1,1	116 0,94 1,5	116 1,09 1,5	121 1,40 2,2	121 1,52 2,2	121 1,67 2,2	143 1,73 3	126 2,4 4	126 2,63 4	132 3,34 5,5	151 3,11 5,5	132 3,67 5,5	157 4,15 7,5
11	112 0,38 1,1	112 0,44 1,1	112 0,54 1,1	116A 0,66 1,1	116A 0,73 1,1	116A 0,85 1,1	116 1,01 1,5	121 1,27 2,2	121 1,38 2,2	121 1,52 2,2	121 1,68 2,2	125 2,16 3	126 2,4 4	126 2,65 4	126 2,94 4	132 3,3 5,5	132 3,8 5,5
10	112 0,34 1,1	112 0,4 1,1	112 0,49 1,1	116A 0,58 1,1	116A 0,65 1,1	116A 0,77 1,1	116 0,93 1,5	116 1,14 1,5	121 1,24 2,2	121 1,38 2,2	121 1,53 2,2	122 1,84 3	125 2,14 3	126 2,41 4	126 2,7 4	131 2,94 4	132 3,42 5,5
9	112 0,29 1,1	112 0,35 1,1	112 0,44 1,1	116A 0,5 1,1	116A 0,58 1,1	116A 0,69 1,1	116 0,85 1,5	116 1,08 1,5	121 1,11 2,2	121 1,24 2,2	121 1,38 2,2	121 1,68 2,2	125 1,92 3	125 2,17 3	126 2,44 4	131 2,59 4	131 3,05 4
8		101 0,31 1,1	112 0,39 1,1	105 0,51 1,1	105 0,59 1,1	116A 0,61 1,1	116A 0,77 1,1	116 1,06 1,5	111A 1,16 1,5	121 1,09 2,2	121 1,23 2,2	121 1,52 2,2	122 1,88 3	125 1,93 3	125 2,19 3	126 2,53 4	131 2,69 4
7		101 0,26 1,1	101 0,28 1,1	101 0,36 1,1	105 0,53 1,1	105 0,6 1,1	105 0,71 1,1	108A 0,74 1,1	108A 0,83 1,1	111A 1,0 1,5	111A 1,04 1,5	111 1,18 2,2	111 1,33 2,2	125 1,75 3	125 1,96 3	125 2,29 3	
6		101 0,21 1,1	101 0,23 1,1	101 0,3 1,1	101 0,41 1,1	105 0,51 1,1	105 0,61 1,1	108A 0,63 1,1	108A 0,71 1,1	118A 0,8 1,1	111A 0,88 1,5	111A 0,99 1,5	111A 1,14 1,5	111 1,31 2,2	111 1,54 2,2	125 2,14 3	
5		101 0,17 1,1	101 0,19 1,1	101 0,25 1,1	101 0,34 1,1		105 0,51 1,1	108A 0,52 1,1	108A 0,59 1,1	108A 0,69 1,1	108A 0,8 1,1		111A 0,95 1,5	111A 1,12 1,5	111 1,34 2,2	111 1,56 2,2	
4					101 0,29 1,1			105 0,49 1,1	105 0,62 1,1	108A 0,58 1,1	108A 0,68 1,1			111A 0,92 1,5	111A 1,13 1,5		
	1	1,5	2	3	4	5	6	7	8	9	10	12	14	16	18	20	25

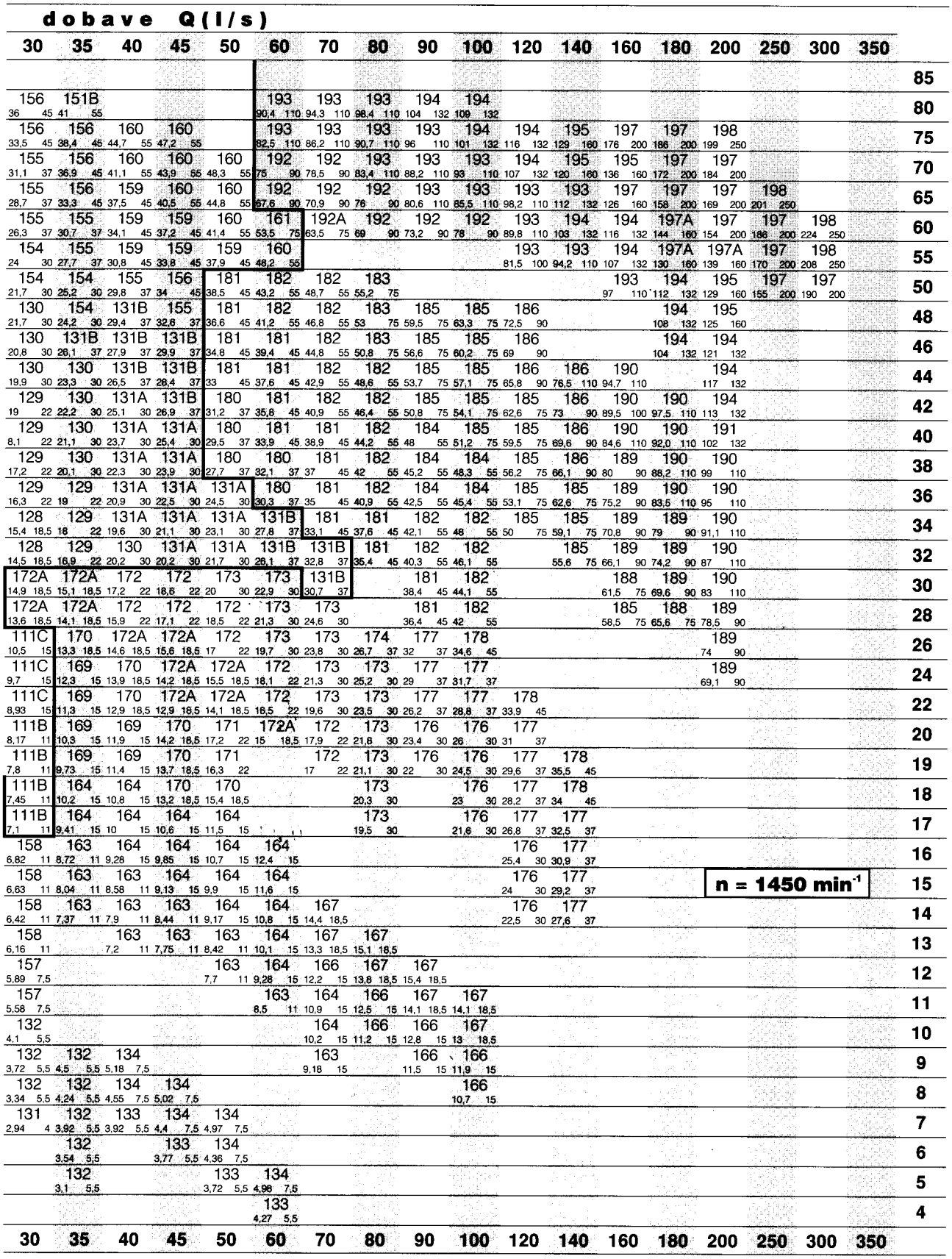
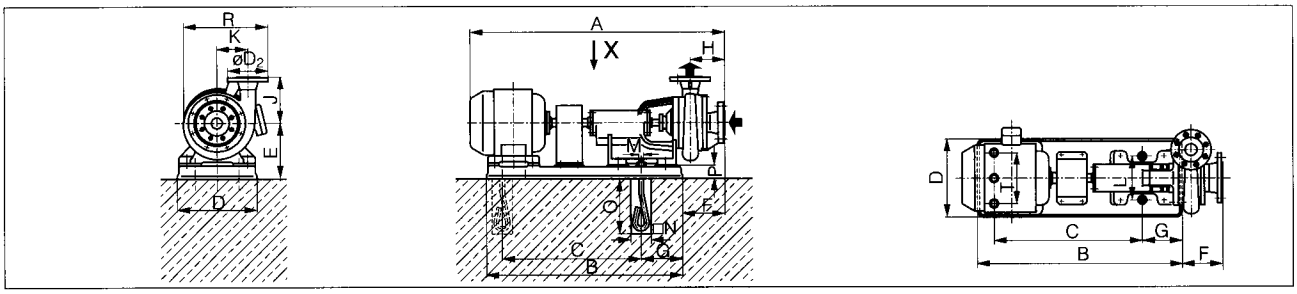

dobave Q(l/s)
30 35 40 45 50 60 70 80 90 100 120 140 160 180 200 250 300 350
n = 1450 min-1

Table 1: Pump and Unit Specifications

- Tip pumpe: **Pump Type**
- Broj okretaja: **Revolutions per minute (RPM)**
- Snaga motora (kW): **Motor Power (kW)**
- Masa (kg): **Mass (kg)**, which is divided into sub-columns for the **Pump**, **KONČAR Motor**, and the complete **KONČAR Unit**.
- Dimenzije: **Dimensions**, with sub-columns corresponding to letters in the technical drawing (A, B, C, D, E, F, G, H).



Broj agregata	Tip pumpe	Broj okretaja min^{-1}	Snaga motora (kW)	Masa (kg)			Dimenzije							
				Pumpa	Motor KONČAR	Agregat KONČAR	A	B	C	D	E	F	G	H
101		1450	1,1		16,5	88	893							
101A			2,2		19	89	921	735	525	290	210	168	150	130
102	**NK 16-4**	2900	3,0	48	28,5	99	957							
103			4,0		38	107	969							
104			5,5		53	127	1036	890	680	342				
105		1450	1,1		16	93	867	735	525	290				
106	**NK 16-5**	2900	5,4	54	53	133	1010	890	680	342	210	142	150	109
107			7,5		61	142								
108		1450	1,5		19	98	908	735	525	290				
108A	**NK 16-6,5**		1,1	56	16,5	96	886				210	158	150	113
109		2900	7,5		61	143	1026	890	680	342				
110			11		100	180	1171							
111		1450	2,2		27,5	108	988	735	525	290				
111A	**NK 16-10**		1,5	58	19	99	952				210	200	150	145
111B		2900	11		100	182	1213	890	680	342				
111C			15		110	192								
112		1450	1,1		16,5	93	908	735	525	290				
112A	**NK 20-4**		3,0	54	28,5	105	984				210	183	150	150
113		2900	4,0		38	114								
114			5,5		53	133	1151	890	680	342				
115			7,5		61	141								
116		1450	1,5		19	102	926	735	525	290				
116A	**NK 20-5**		1,1	60	16,5	100	904				210	176	150	138
116B		2900	5,5		53	139	1044	890	680	342				
117		1450	2,2		27,5	110	945	735	525	290				
118			7,5		61	148	1044							
119		2900	11		100	194	1189	890	680	342				
120			15		110	203								
121		1450	2,2		27,5	127	1039	810	565	290				
121A	**NK 20-6,5**	2900	18,5	63	130	243	1310	1015	760	375				
122		1450	3,0		32	131	1039	810	565	290	230	175	175	137
123		2900	11		100	195	1263	967	730	345				
124			15		110	205								
125		1450	3,0		32	134	1069	810	565	290				
126	**NK 20-10**		4,0	66	42	142	1081							
127			5,5		58	161	1148	967	730	345	230	205	175	153
128		2900	18,5		130	246	1337	1015	760	375				
129			22		160	275	1353							
130			30		230	345	1452	1105	740	425	300			
131		1450	4,0		42	171	1106	810	565	290	230			
131A	**NK 20-12,5**	2900	30	95	230	377	1477	1105	740	425	300	230	175	170
131B			37		250	397								
132		1450	5,5		58	190	1173	967	730	345	230			
133	**NK 20-15**	1450	5,5	108	58	203	1193	967	730	345	230	250	175	190
134			7,5		72	214								
135		1450	1,5		19	129	1020	810	567	290				
136			2,2		27,5	136	1059							
137	**NK 25-5**		3,0	72	32	140								
138			11		100	204	1281	967	730	345	230	195	175	150
139		2900	15		110	214								
140			18,5		130	257	1327	1015	760	375				
141			22		160	281	1343							
142			2,2		27,5	142	1059	810	565	290				
143		1450	3,0		32	146								
144			4,0		42	154	1071							
145			5,5		58	173	1138	967	730	345	230	195	175	150
146	**NK 25-6,5**		15	78	110	220	1281							
147			18,5		130	258	1327	1015	760	375				
148		2900	22		160	287	1343							
149			30		230	360	1442	1105	740	425	300			
150			37		250	380								
151			5,5		58	206	1235	970	710	340	292	210		
151A		1450	4,0		42	190	1168							
151B		2900	55		390	595	1699	1335	880	600	400	215		
152	**NK 25-10**		7,5	102	72	220	1235	972	210	340	292		200	165
153		1450	11		106	275	1380	1135	850	380		210		
154			30		230	416	1539	1200	790	475	332			
155		2900	37		250	436								
156			45		330	516	1579							
157		1450	7,5		72	233	1238	970	710	340	292			
158			11		106	288	1383	1135	850	380				
159	**NK 25-12,5**		45	115	330	531	1582	1200	790	475	332	225	200	163
160		2900	55		390	614	1698	1335	880	600	400			
161			45		495	719	1463				430			
162			90		555	795	1814	1400						
163	**NK 25-15**	1450	11	125	106	298	1642	1135	850	380	292	293	200	228
164			15		130	322	1506							
165			11		106	310	1548							
166	**NK 25-20**	1450	15	137	130	334	1592	1135	850	380	292	380	200	300
167			18,5		145	342	1608							
168			11		106	294	1388							
169	**NK 31,5-10**	1450	15	121	130	318	1432	1135	850	380	292	219	200	166
170			18,5		145	326	1448							
171			22		175	360	1480							
172			22		175	435	1633	1225	900	385	360	280	225	210
172A	**NK 31,5-15**	1450	18,5	182	145	405	1595							
173			30		255	515	1691	1280	820	440	370	265	240	
174			37		320	631	1736	1435	915	605	435	278	235	
175			22		175	481	1679	1225	900	385	360	324	225	240
176	**NK 31,5-20**	1450	30	232	255	565	1737	1280	820	440	370	309	240	
177			37		320	681	1782	1432	915	605	435	322	235	
178			45		360	721	1807							
179			30		255	555	1714	1280	820	440	370	286	240	
180			37		320	661	1759							
181	**NK 40-15**	1450	45	222	360	711	1784	1435	915	605	435	299	235	225
182			55		415	756	1870							
183			75		535	866	1935							
184			55		415	769	1887	1435	915	605	435			
185	**NK 40-20**	1450	75	235	535	879	1952					316	235	240
186			90		605	991	2004	1500	940	620	400			
187			110		795	1181	2089							
188			75		535	1039	2153							
189	**NK 40-25**	1450	90	302	605	1109	2204	1750	1090	660	435	349	285	272
190			110		795	1276	2289							
191			132		900	1381	2340							
192			90		605	1121	2179	1750	1090	660	435	324	285	265
192A			75		535	1051	2128							
193	**NK 50-20**	1450	110	314	795	1288	2264							
194			132		900	1393	2315							
195			160		1435	2003	2468	1910	1200	795		325		
196			200		1600	2168	2498							
197	**NK 50-25**	1450	200	324	1600	2178	2512	1910	1200	795	435	325	285	265
197A			160		1435	2013	2482							

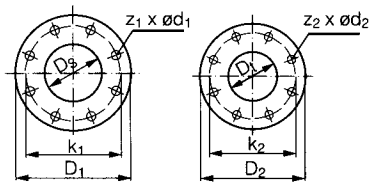
Table : Dimensional Drawing Data and Flange Details

- Prirubnice: **Flanges**, divided into:
  - Usisna prirubnica: **Suction flange**
  - Tlačna prirubnica: **Discharge flange**
- Priključak: **Connection**
- Oznaka položaja tlačne prirubnice: **Designation of discharge flange position**, which includes a diagram and the note (Gledano od spojke) or **(Viewed from the coupling)**.
- The table also contains various

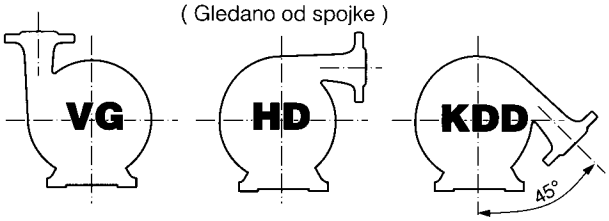
dimensional keys corresponding to the technical drawings (J, K, L, M, N, O, P, R, T).

Prirubnice

Usisna Tlačna



Oznaka položaja tlačne prirubnice
(Gledano od spojke)



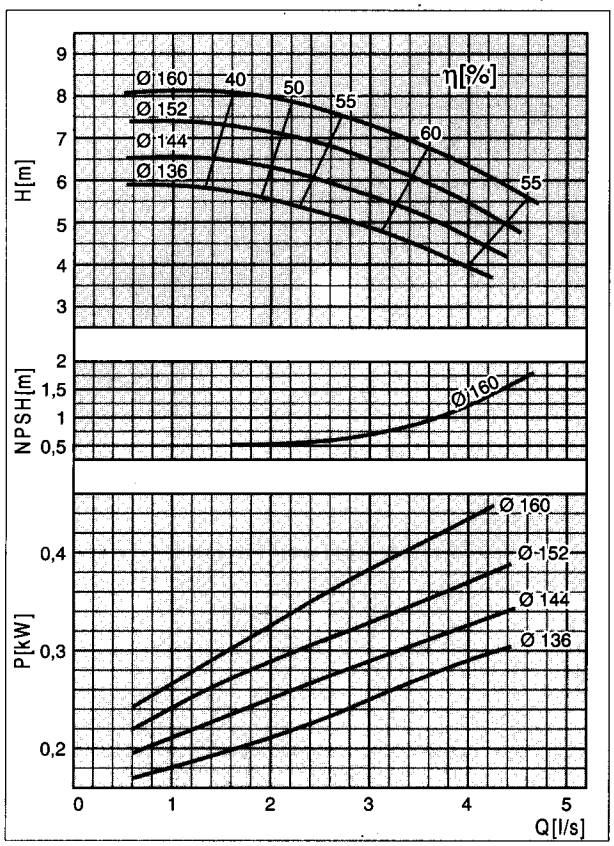
Na poseban upit mogući su i drugi položaji prirubnice

agregata									Usisna prirubnica					Tlačna prirubnica					Broj agregata
J	K	L	M	N	O	P	R	T	D_S	D_1	K_1	d_1	z_1	D_t	D_2	K_2	d_2	z_2	
130	98	160	M20	80	300	50	265	–	50	165	125	18	4	40	150	110	18	4	101 101A 102 103 104
155	105	160	M20	80	300	50	305	–	65	185	145	18	4	50	165	125	18	4	105 106 107
150	115	160	M20	80	300	50	330	–	80	200	160	18	4	65	185	145	18	4	108 108A 109 110
200	132	160	M20	80	300	50	405	–	125	250	210	18	4	100	220	180	18	8	111 111A 111B 111C
160	112	160	M20	80	300	50	310	–	50	165	125	18	4	40	150	110	18	4	112 112A 113 114 115
170	115	160	M20	80	300	50	330	–	65	185	145	18	4	50	165	125	18	4	116 116A 116B 117 118 119 120
180	135	180	M20	80	300	50	375	–	80	200	160	18	4	65	185	145	18	4	121 121A 122 123 124
200	145	180	M20	80	300	50	420	–	125	250	210	18	8	100	220	180	18	8	125 126 127 128 129
		190				2		300											130
		180				50		–											131
225	170	190	M20	80	300	12	485	300	150	285	240	23	8	125	250	210	18	8	131A 131B
		180				50		–											132
250	200	180	M20	80	300	50	550	–	200	340	295	23	8	150	285	240	23	8	133 134
200	140	180	M20	80	300	50	372	–	65	185	145	18	4	50	165	125	18	4	135 136 137 138 139 140 141
200	145	180	M20	80	300	50	400	–	80	200	160	18	4	65	185	145	18	4	142 143 144 145 146 147 148
		190				120		300											149 150
		220	M24		350	85		–											151
		230	M30		400	188		450											151A 151B
250	165	220	M24	120	350	80	455	–	125	250	210	18	8	100	220	180	18	8	152 153
		230				120		400											154 155 156
		220	M24		350	80		–											157
235	190			120		120	520	400	150	285	240	23	8	125	250	210	18	8	158 159
		230	M30		400	188 248		450											160 161
280	220	220	M24	120	350	80	600	–	200	340	295	23	8	150	285	240	18	8	162 163
330	250	220	M24	120	350	80	700	–	250	395	350	23	12	200	340	295	23	8	164 165
240	210	220	M24	120	350	80	545	–	150	285	240	23	8	100	220	180	18	8	166 167 168
		240				80		–											169
290	230		M24	120	350	96	625	340	200	340	295	23	8	150	285	240	23	8	170 171 172
		250				155		520											172A 173
		240				80		–											174 175
350	265		M24	120	350	90	730	340	250	395	350	23	12	200	340	295	23	8	176
		250				155		520											177 178
						90		340											179
350	255	250	M24	120	350	155	675	520	200	340	295	23	8	150	285	240	23	8	180 181 182 183
						155													184
380	285	250	M24	120	350		775	520	250	395	350	23	12	200	340	295	23	8	185 186 187
						120													188
450	335	350	M30	120	400	120	905	560	300	445	400	23	12	250	395	350	23	12	189 190 191
440	330	350	M30	120	400	120	850	560	250	395	350	23	12	200	340	295	23	8	192 192A 193 194 195 196
								610											
500	360	358	M30	120	400	120	952	610	300	445	400	23	12	250	395	350	23	12	197 197A

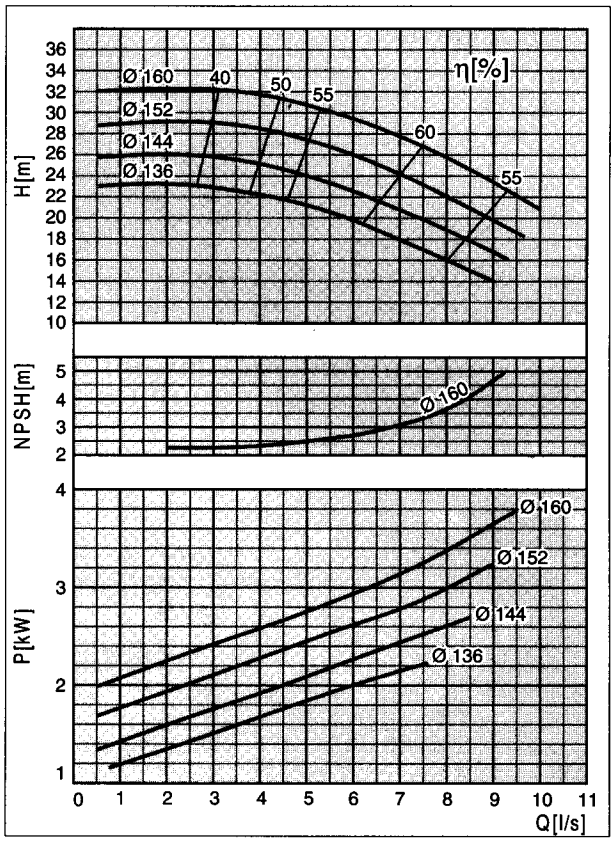
Pojedinačni dijagrami, which translates to **Single Diagrams**. It displays graphical performance curves (H vs. Q, NPSH vs. Q, and P vs. Q) for the **NK 16-4** and other pump models at different operating speeds.

Pojedinačni dijagrami

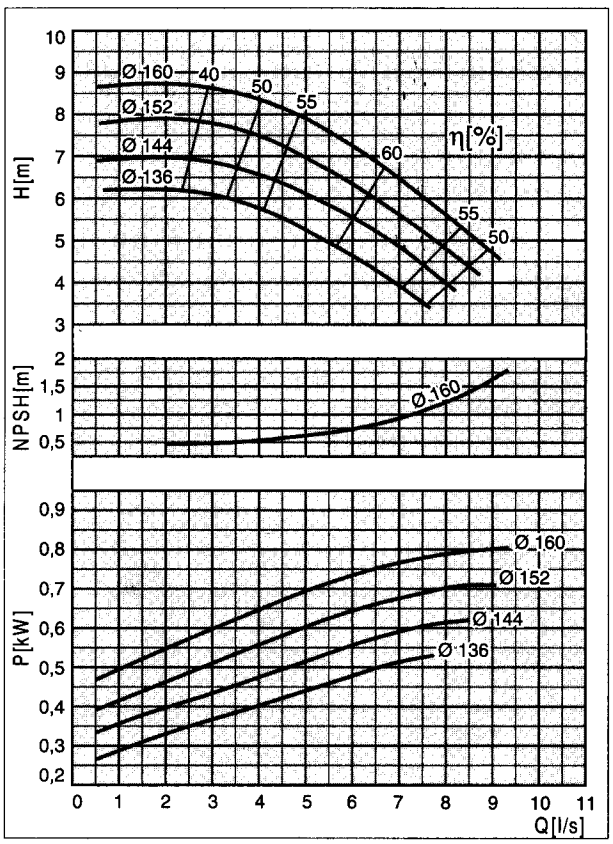
NK 16-4 n=24,2s^{-1}



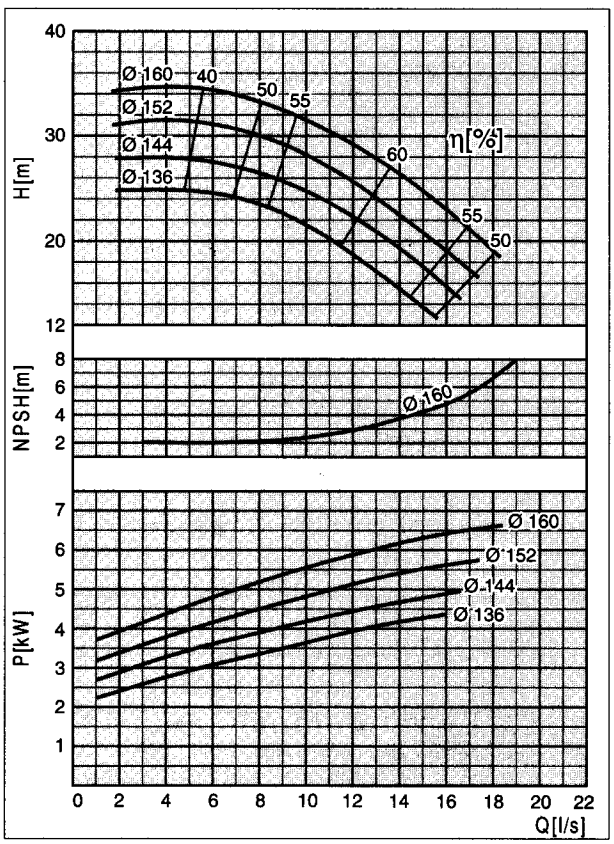
NK 16-4 n=48,3s^{-1}



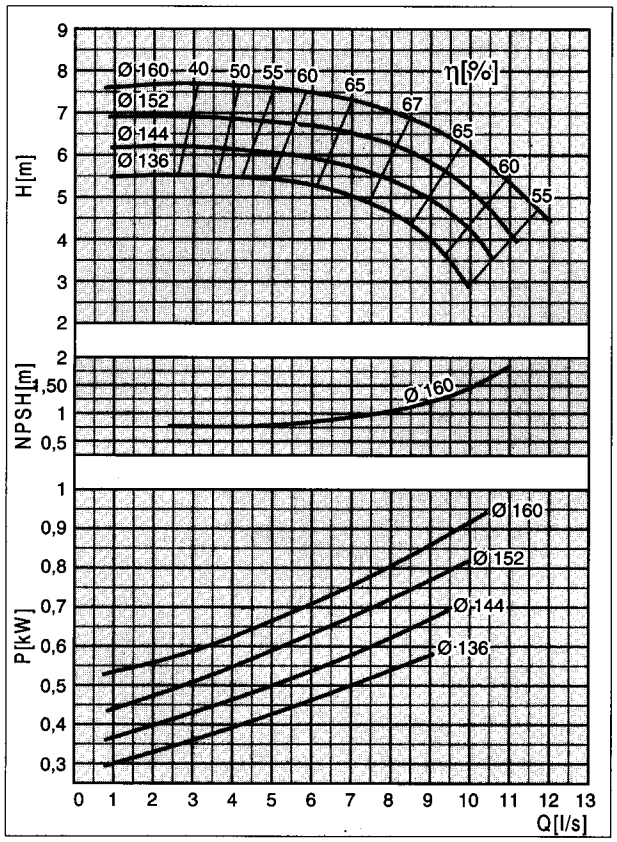
NK 16-5 n=24,2s^{-1}



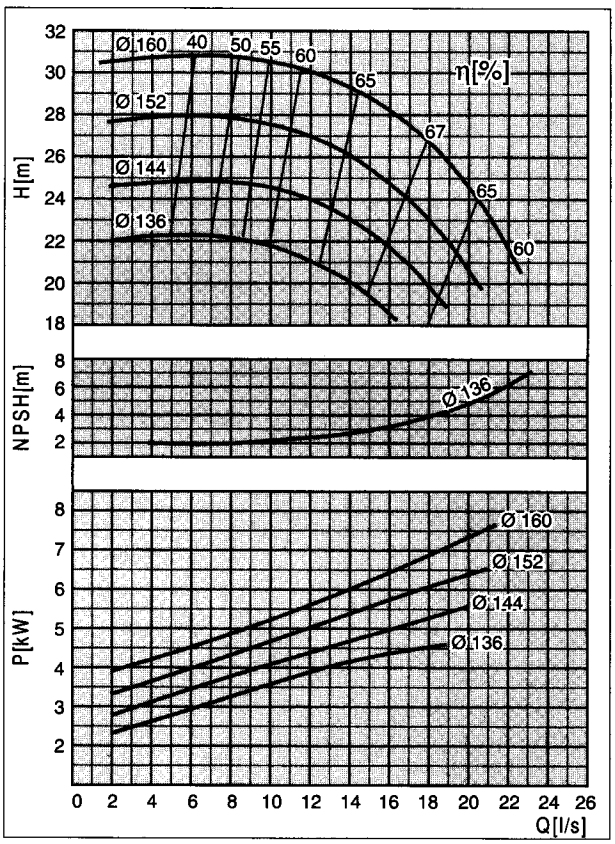
NK 16-5 n=48,3s^{-1}



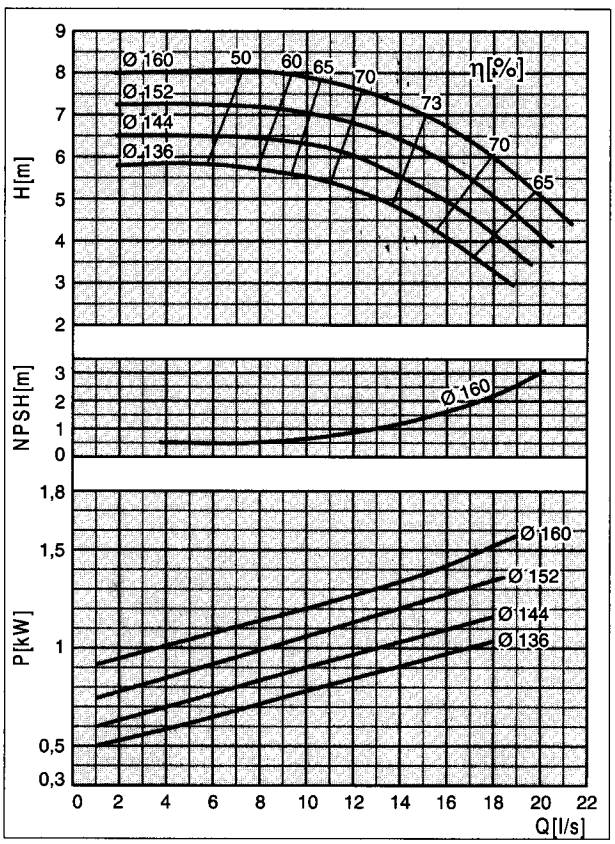
NK 16-6,5 n=24,2s^{-1}



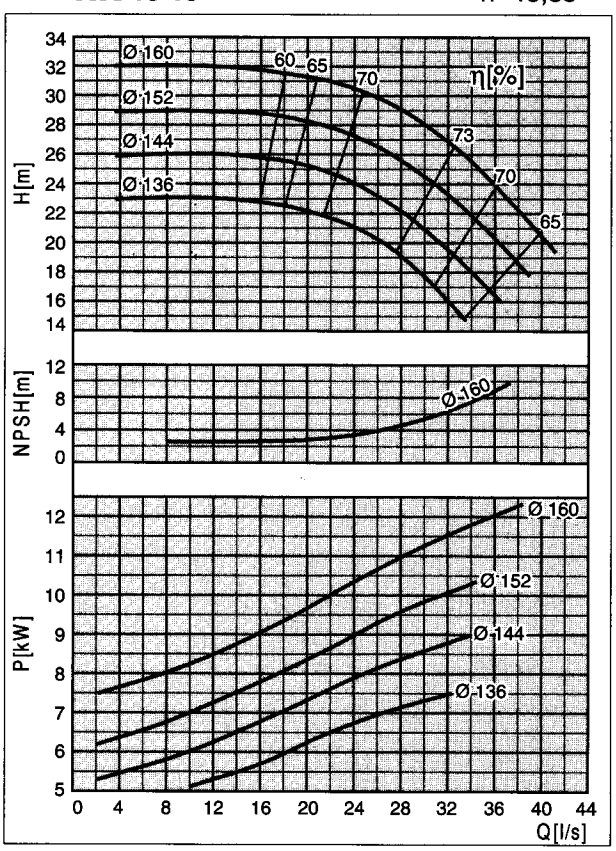
NK 16-6,5 n=48,3s^{-1}



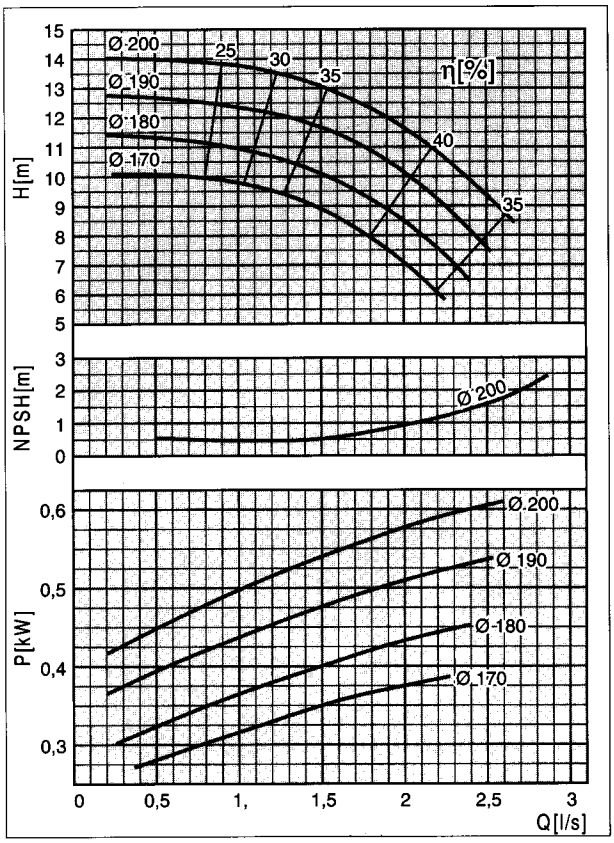
NK 16-10 n=24,2s^{-1}



NK 16-10 n=48,3s^{-1}



NK 20-4 n=24,2s^{-1}



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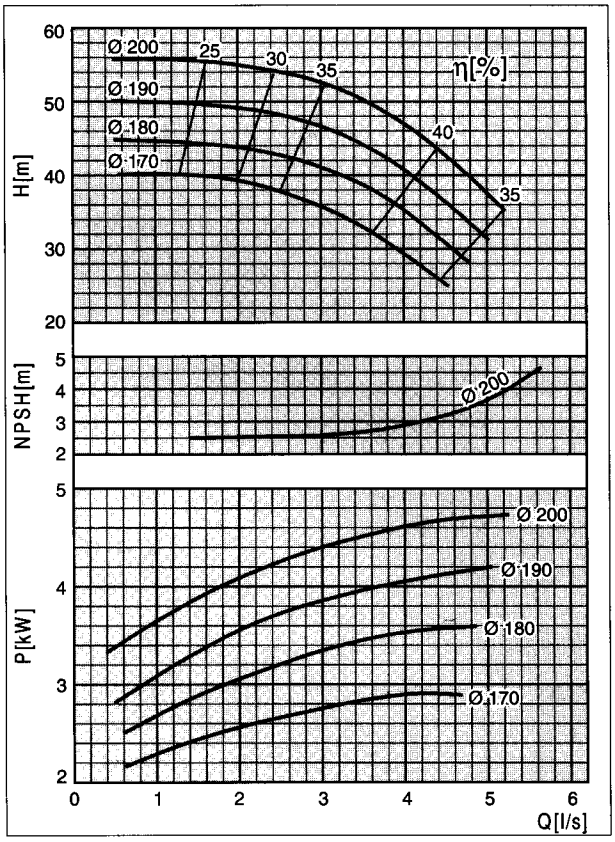
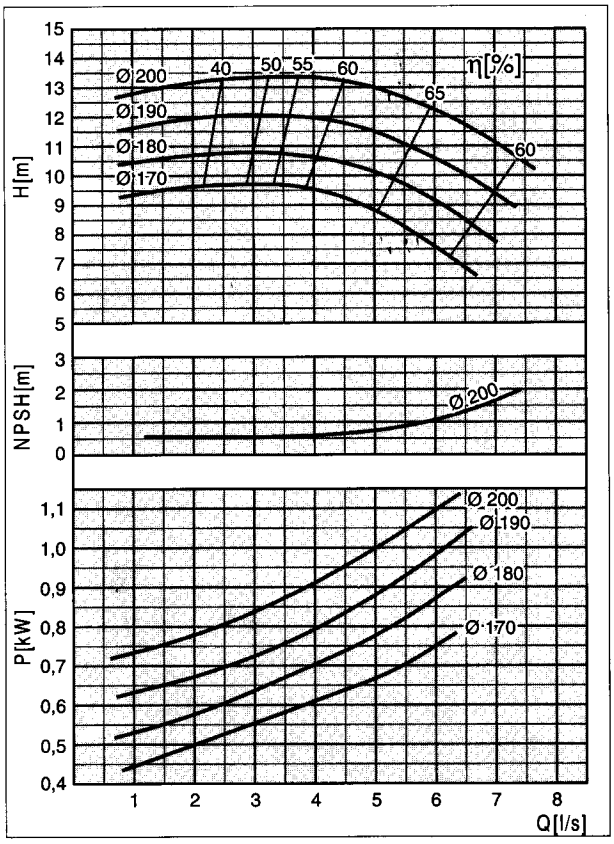
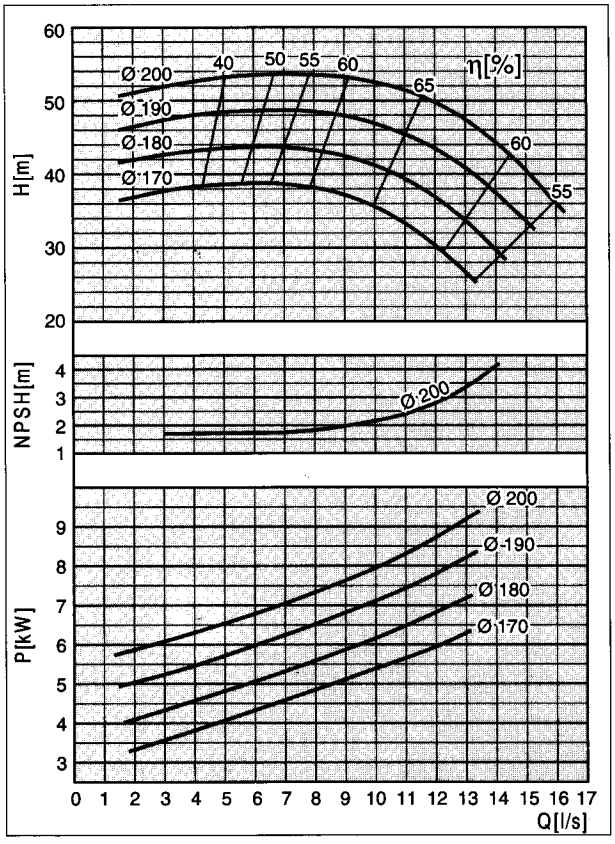


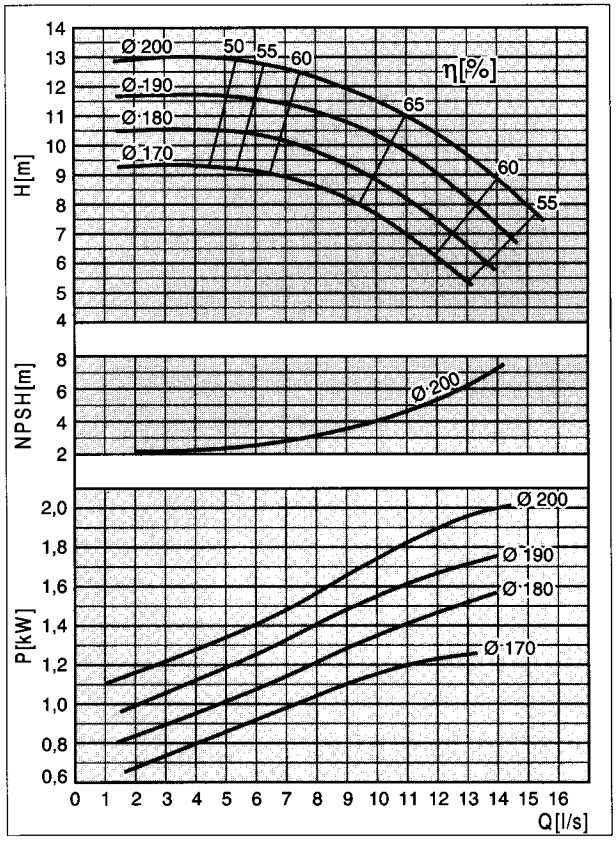
NK 20-5 n=24,2s^{-1}



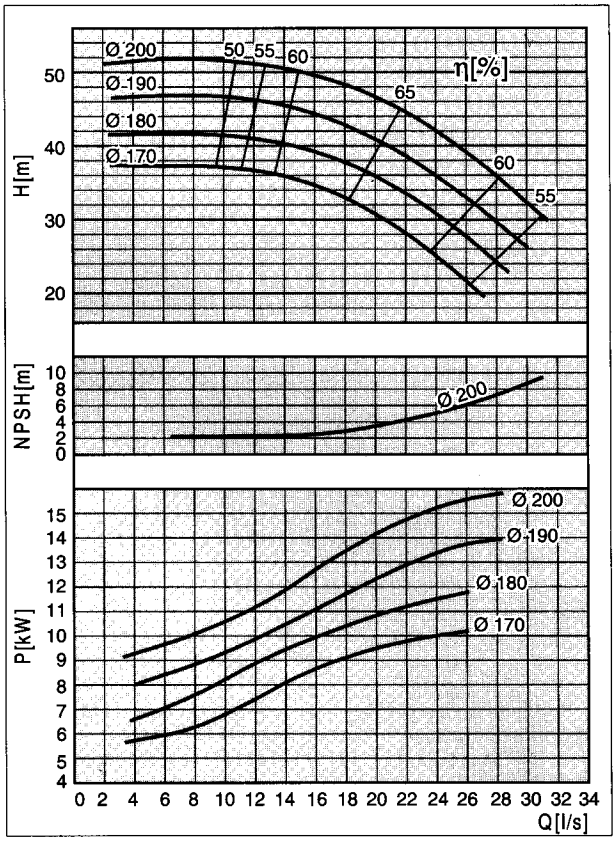
NK 20-5 n=48,3s^{-1}



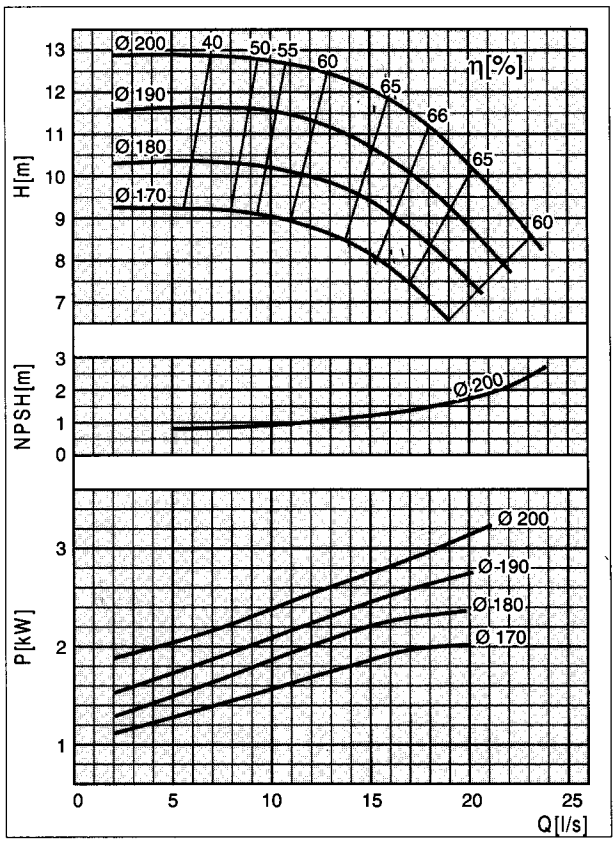
NK 20-6,5 $n=24{,}2s^{-1}$



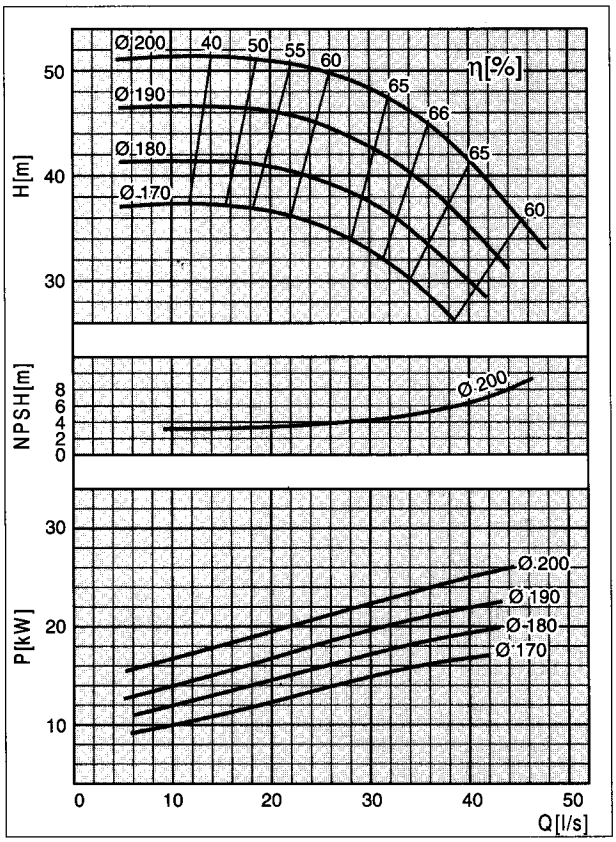
NK 20-6,5 $n=48{,}3s^{-1}$



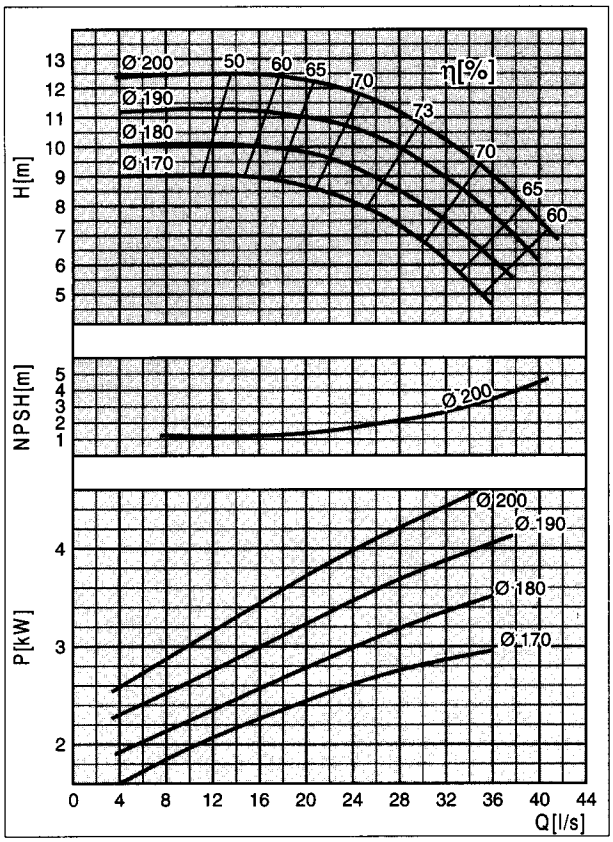
NK 20-10 $n=24{,}2s^{-1}$



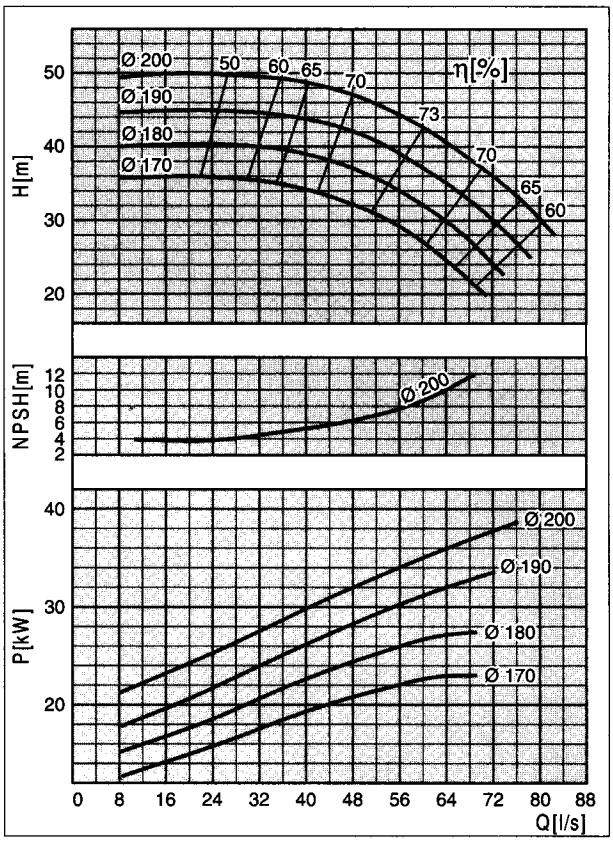
NK 20-10 $n=48{,}3s^{-1}$



NK 20-12,5 $n=24,2s^{-1}$



NK 20-12,5 $n=48,3s^{-1}$



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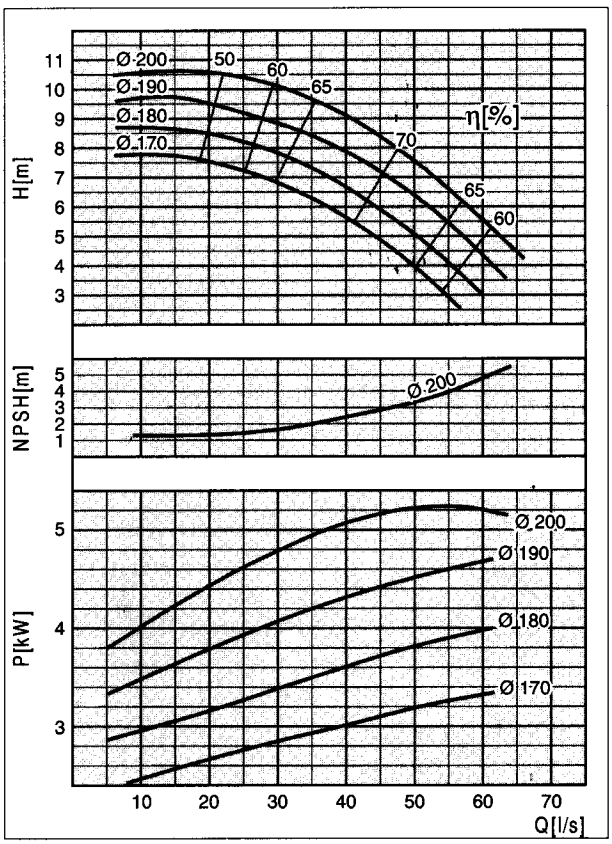

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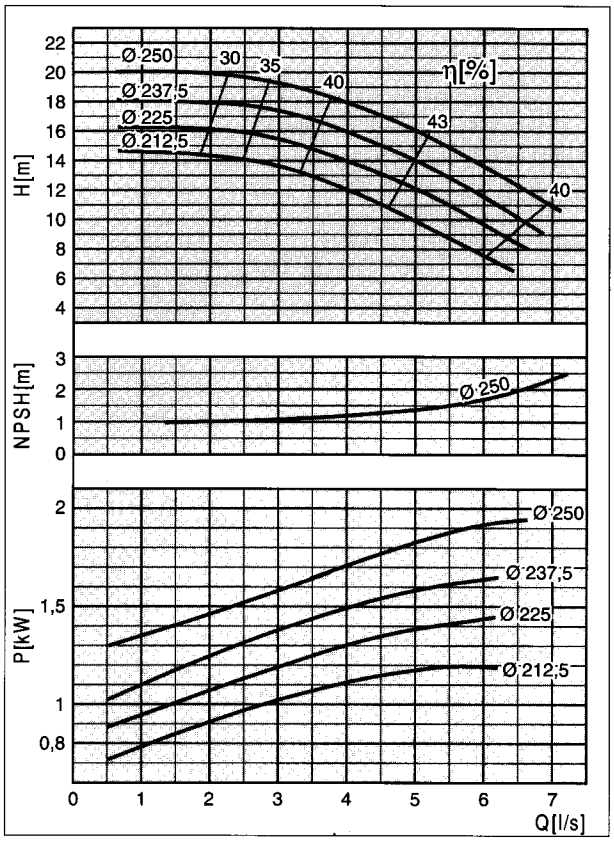

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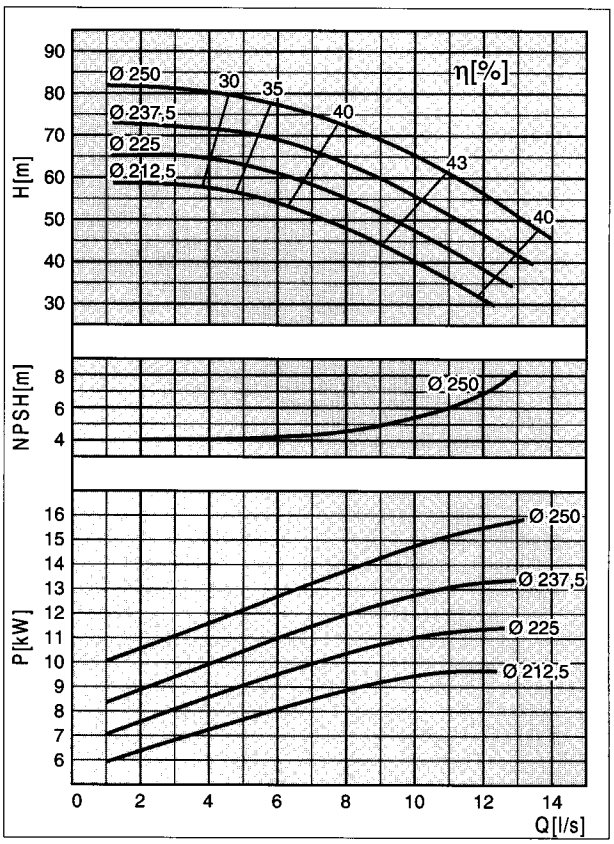
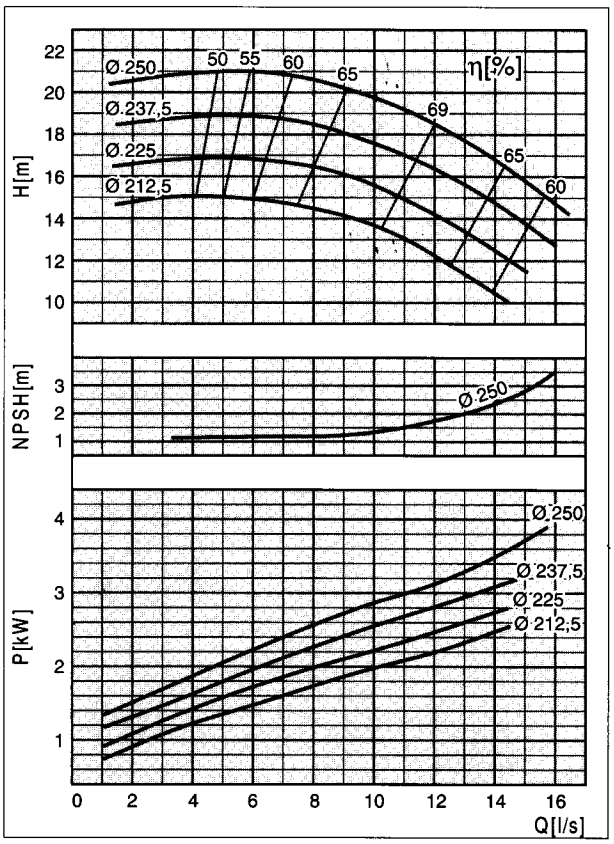


NK 25-6,5 n=24,2s^{-1}



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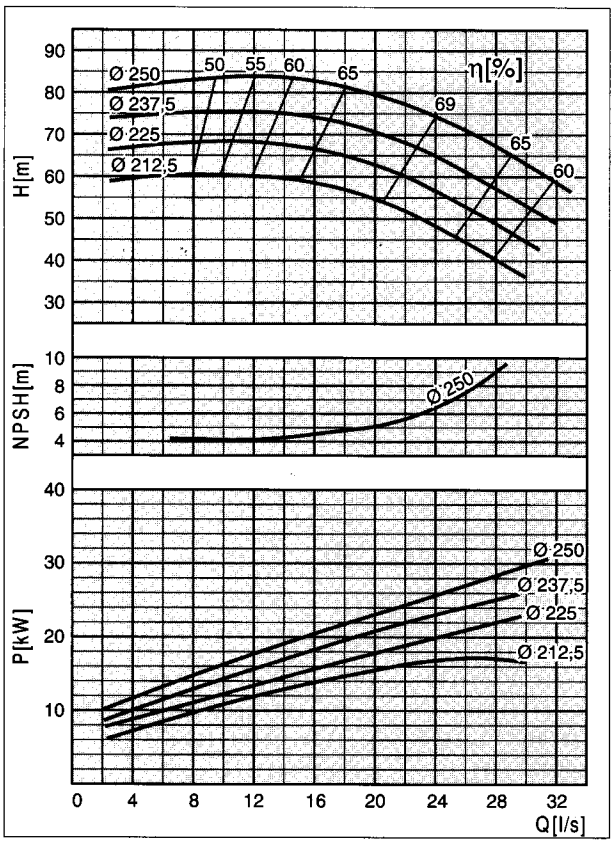

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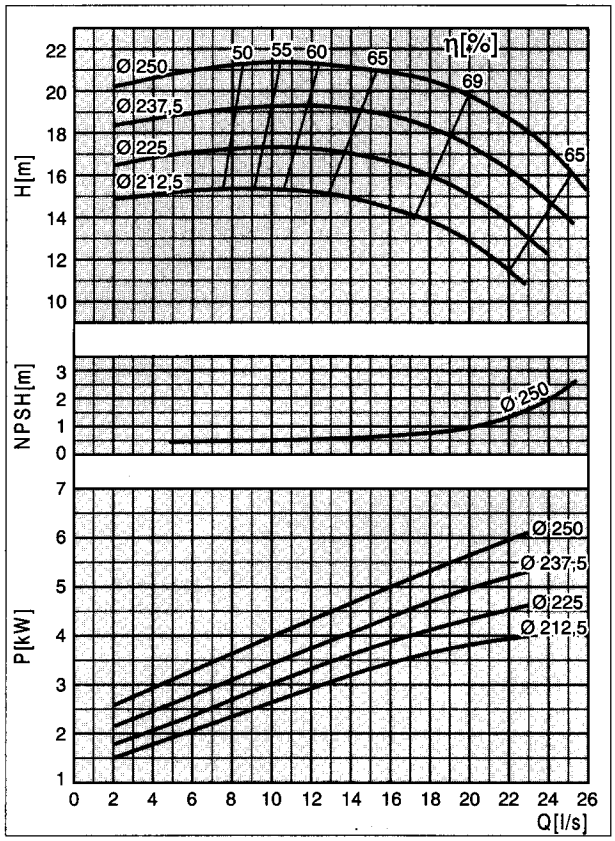

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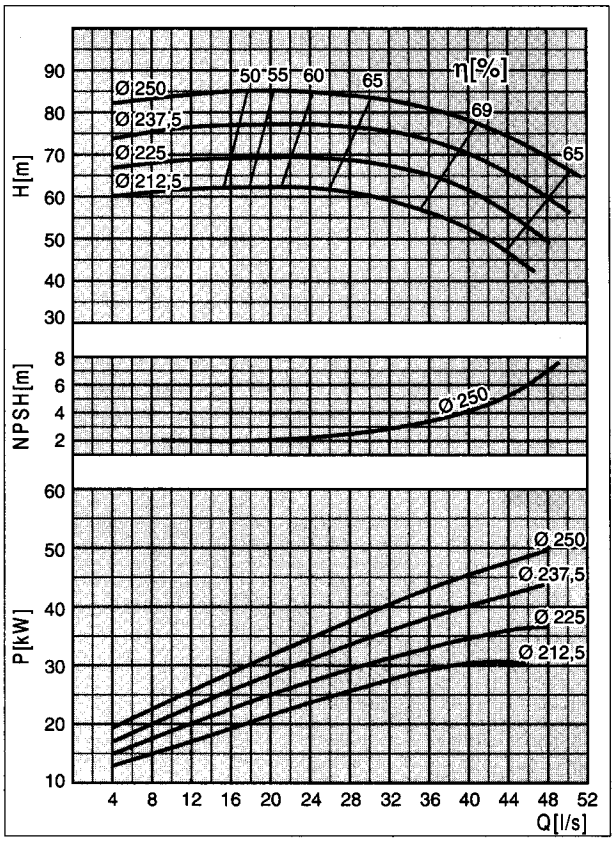
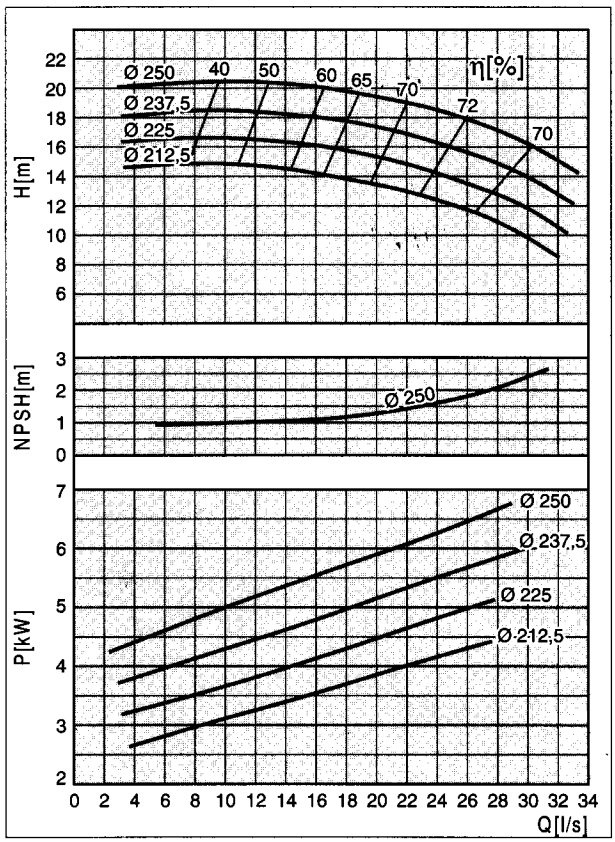


NK 25-12,5 n=24,2s^{-1}



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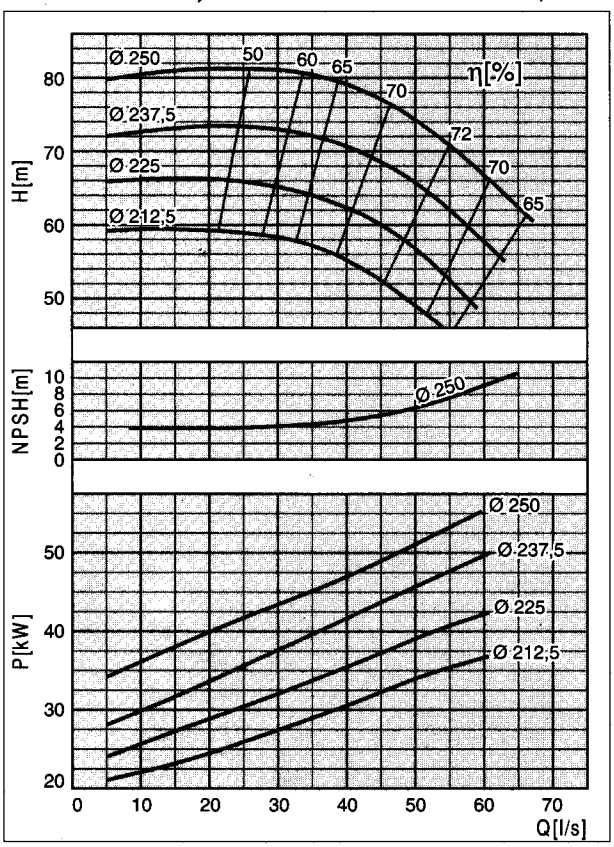
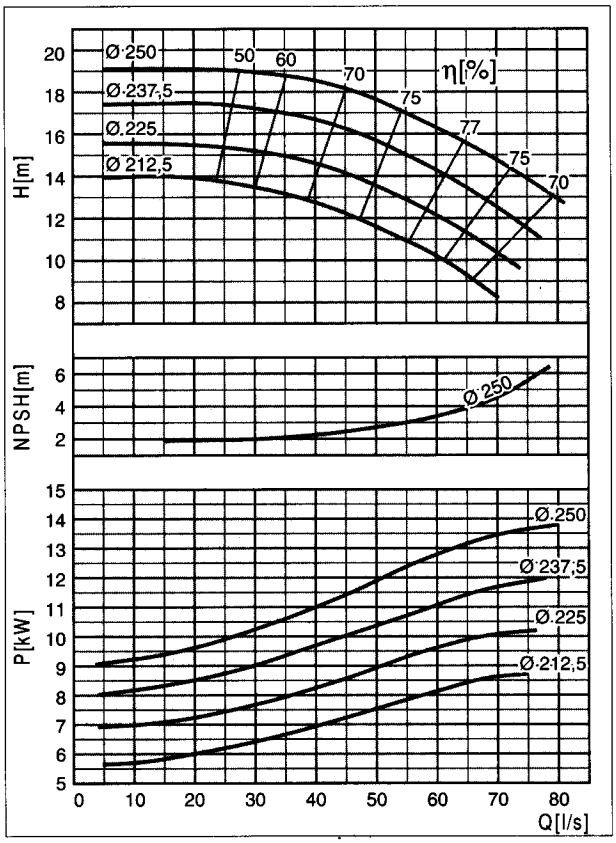


NK 25-15

n=24,2s^{-1}



NK 25-20

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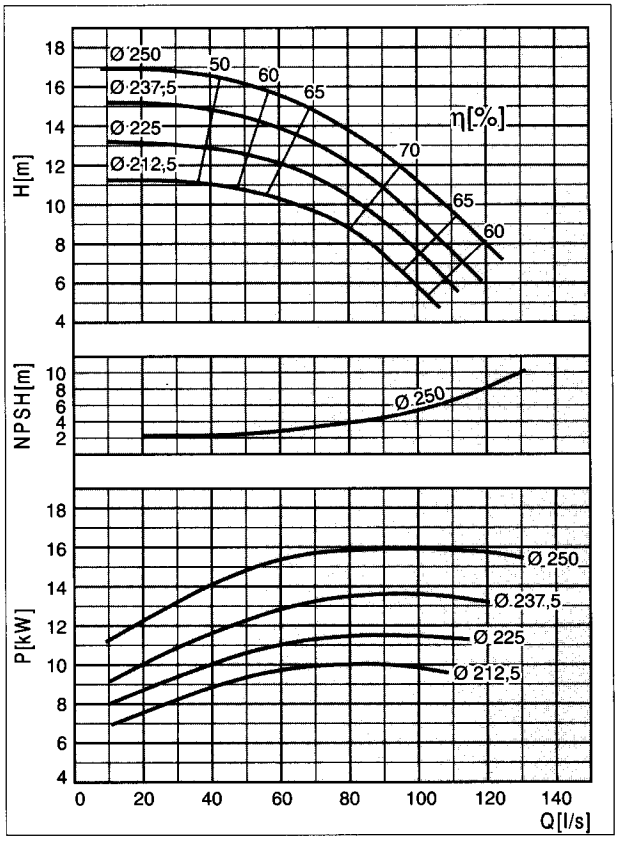

NK 31,5-10

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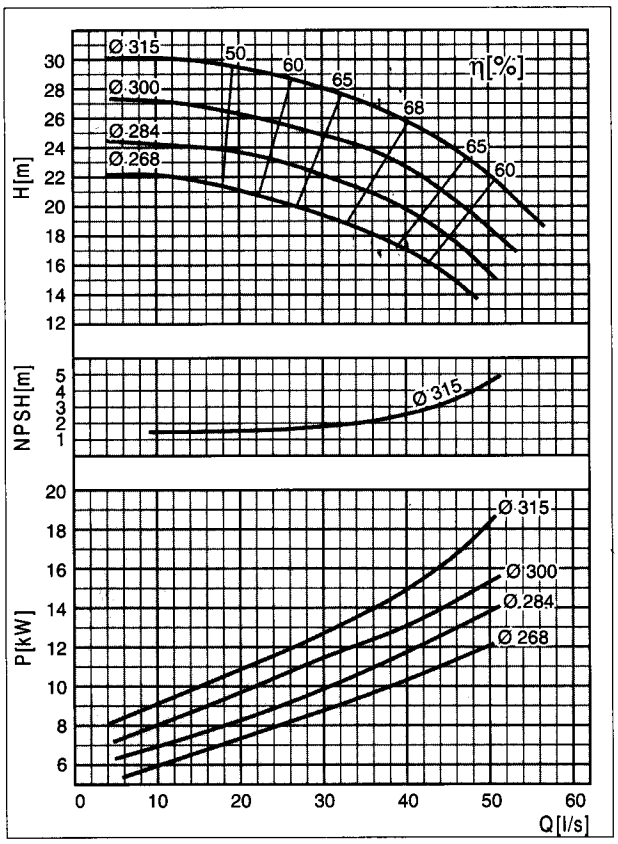

NK 31,5-15

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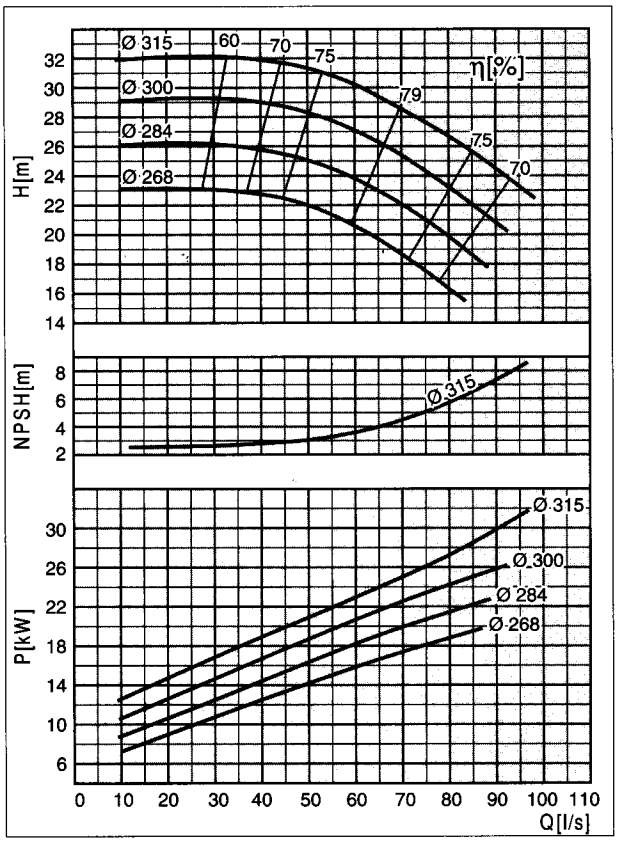
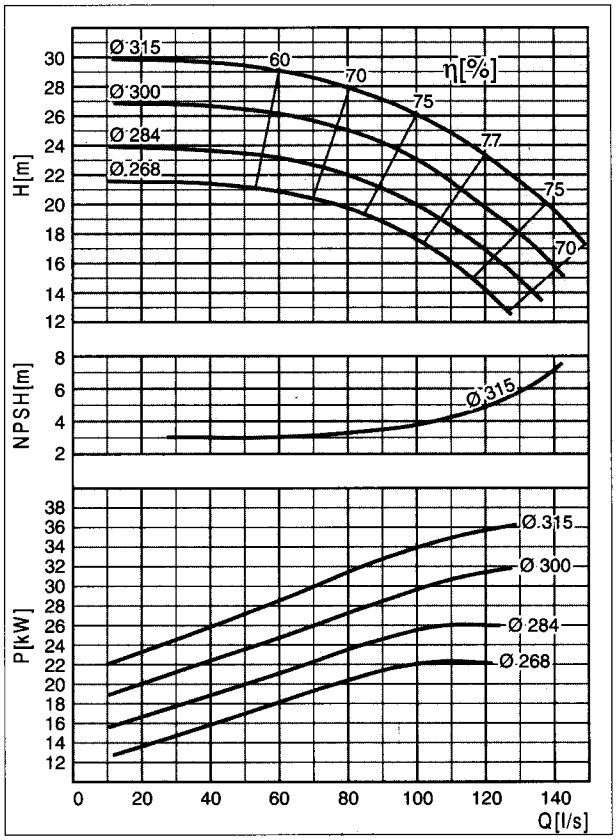


NK 31,5-20 n=24,2s^{-1}



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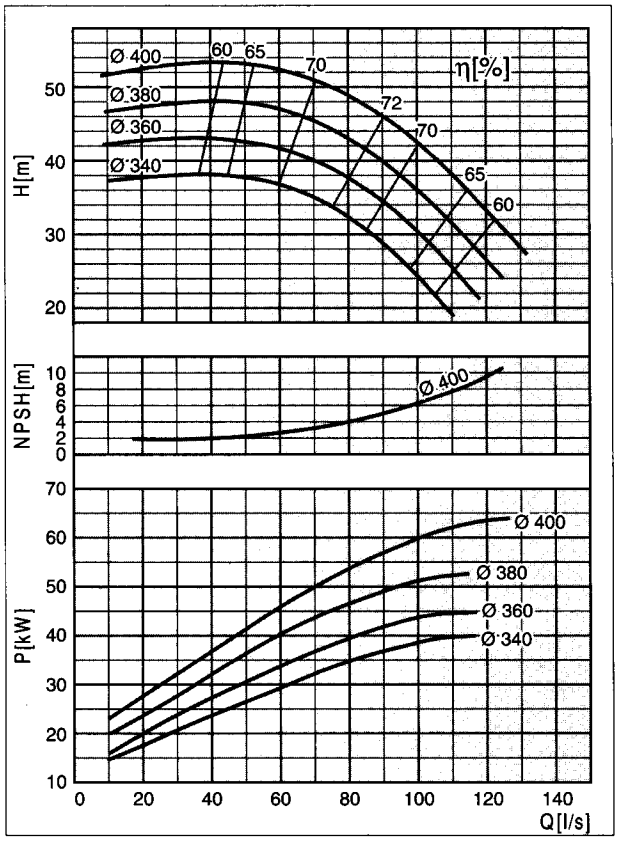

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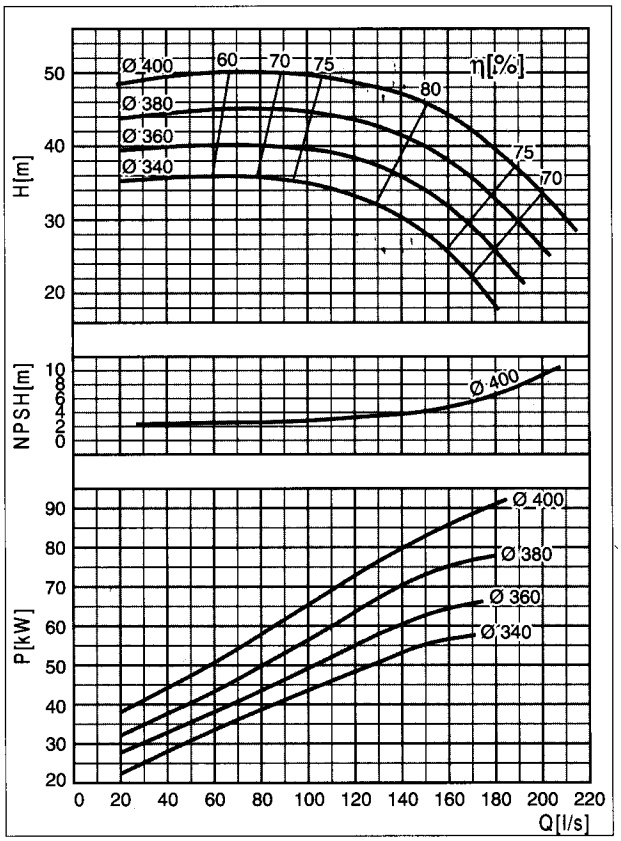

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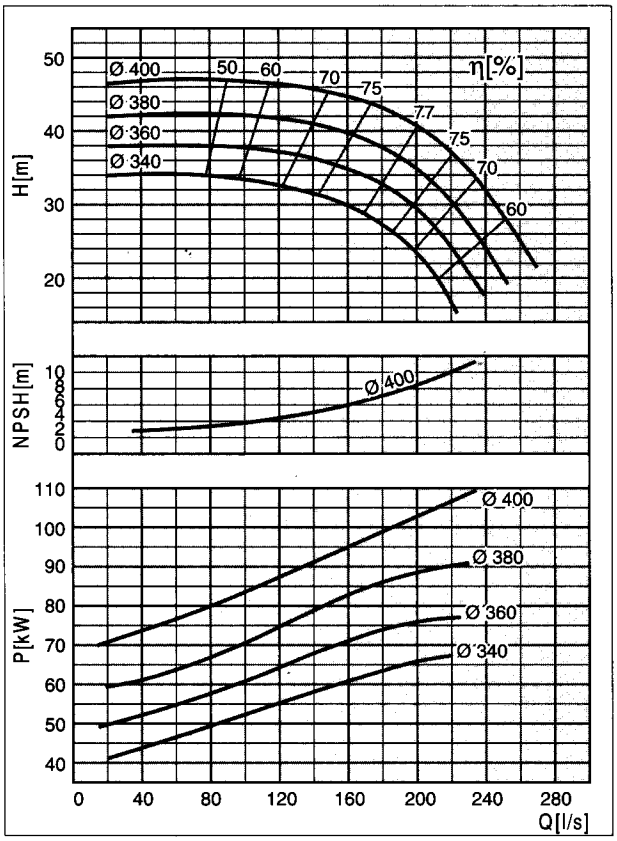
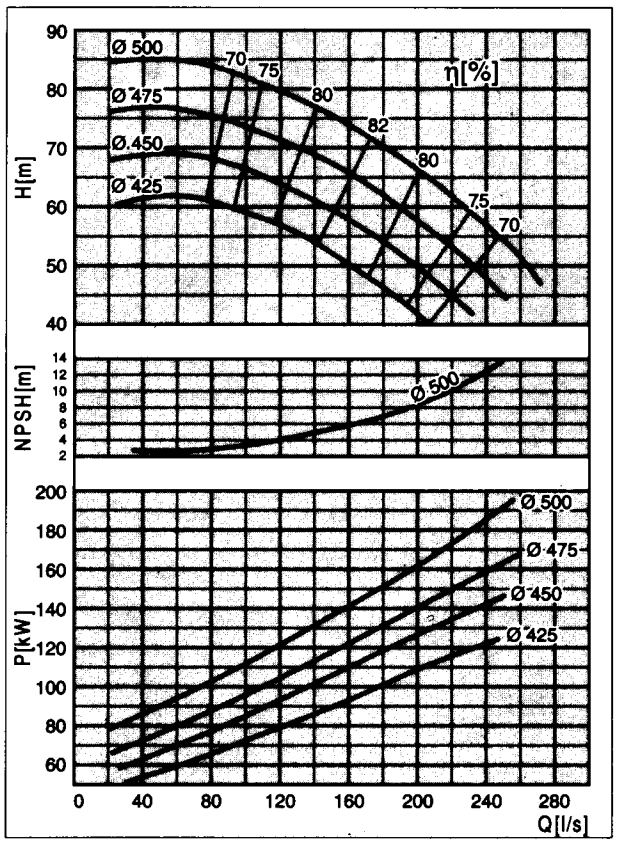
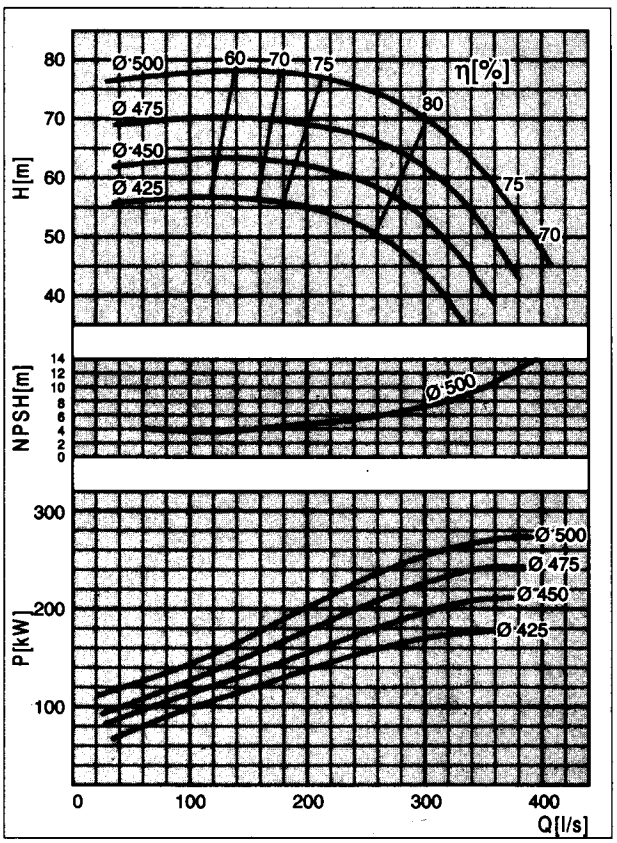


NK 50-20 $n=24,2s^{-1}$



NK 50-25 $n=24,2s^{-1}$



Attachment 7

ENEQ Consult – STANDARD LOW-PRESSURE CENTRIFUGAL PUMPS-DIN 24255, Type NN

ENEQ Consult Ltd. delivers cost-effective mechanical equipment for nuclear, conventional, oil & gas, and petrochemical industries.

- **9 years** of solid performance
- **> 20 M€** project portfolio
- **> 50** completed projects, **> 10** in progress
- Exclusive partnerships with **5 manufacturers worldwide**
- Equipment compliant with **ASME, EN, N Stamp, DIN, ASTM, ISO, GOST**

Expertise:

- **Equipment Supply** – high-quality OEMs, cost-effective modernization and new-build solutions, turnkey delivery
- **Engineering** – design critical analyses, FEA & CFD calculations, technical consulting
- **Service** – full project support from production to installation, commissioning, and after-sales

STANDARD LOW-PRESSURE CENTRIFUGAL PUMPS-DIN 24255, Type NN

STANDARD LOW-PRESSURE CENTRIFUGAL PUMPS-DIN 24255, Type NN

Standard pumps are designed in compliance with the DIN 24255 standard. They are of standardized dimensions and interchangeable regardless of the pump manufacturer, without changes in connections and supports, while their hydraulic characteristics are approximately identical with equal dimensions. The pump impeller is disassembled in the direction of the electro motor without disconnecting the piping or moving the motor. The wide scope of interchangeability of components of these pumps provides for a safe and reliable service life with a minimum stock of spare parts.

Field Of Application

The NN pumps are suitable for handling liquids which are either non-aggressive chemical or mechanical. Furthermore, they are also used for fluids with high (up to 140°C) or low (up to 90°C) temperatures, brackish waters, sea water, various industrial and power generating plants. These pumps can be used for all aggressive and abrasive fluids in process industry at usage of the adequate materials.

Rating Chart

The NN pumps delivery areas are shown on diagrams for r.p.m. 1450 and 2900.

Design

The NN pumps are designed as single entry, single stage horizontal pumps with axial fluid inlet and radial fluid outlet directed upwards. The impeller is attached to the end of the shaft by a key and an impeller nut. The shaft with impeller is supported by two antifriction bearings lubricated by oil. Built between the volute casing and the bearing pedestal is the pump casing cover housing the stuffing box.

Pump Casing

The pump is housed in an integral volute casing with legs to be secured to the base plate. Located on the casing are connections for pressure gauge, vacuum gauge, filling with water or evacuating air and drainage.

Flanges are made to standards:

- DIN 2533 for DIN up to 150 mm
- DIN 2532 for DIN up to 200 mm

Casing Cover

The pump casing cover is in the same time the stuffing box support. Depending on the fluid handled, the pump is designed with various models of casing cover, accordingly, with an identical bearing pedestal and pump casing several models of the pump can be set up which is a great advantage of the NN pumps. By combining various models of casing cover with various stuffing boxes and various materials of components will be obtained several models of NN pumps which makes them both multiple-purpose and economical.

NN Pump Models

- **Model 01** - casing cover with soft packing. Fluid: clean fresh water up to the temperature of 363 K
- **Model 02** - same design as 01 but of other materials. Fluid: sea water or a similar fluid
- **Model 03** - casing cover in combination with soft packing. Fluid: brackish water
- **Model 04** - casing cover in combination with mechanical seal. Fluid: pure, fresh cold water
- **Model 05** - same design as 04 but made of other materials. Fluid: sea water or a similar fluid
- **Model 06** - casing cover in combination with soft packing. Fluid: warm water with operating pressure and saturation pressure <1MPa.
- **Model 07** - same design as 06 but made of other materials. Fluid: warm water with operating pressure and saturation pressure >1MPa, with total pressure not exceeding 1.6 MPa.

Impeller

The standard impeller is of the closed radial type with several curved blades. The carefully designed suction eye assures high suction capacity; the blades are designed so as to obtain, with the given external diameter of the impeller and the choosen speed, optimum head at high efficiency which retains a good value over a wide capacity range.

Shaft And Bearings

Shaft is supported on two ball bearings which are installed in bearing support. Shaft is protected by means of shaft sleeve and the bearings are lubricated with one-shot lubrication without greaser. The shaft is with a gasket of an appropriate quality, with or without cooling, or a mechanical seal, depending on the fluid supplied by the pump.

Sealing

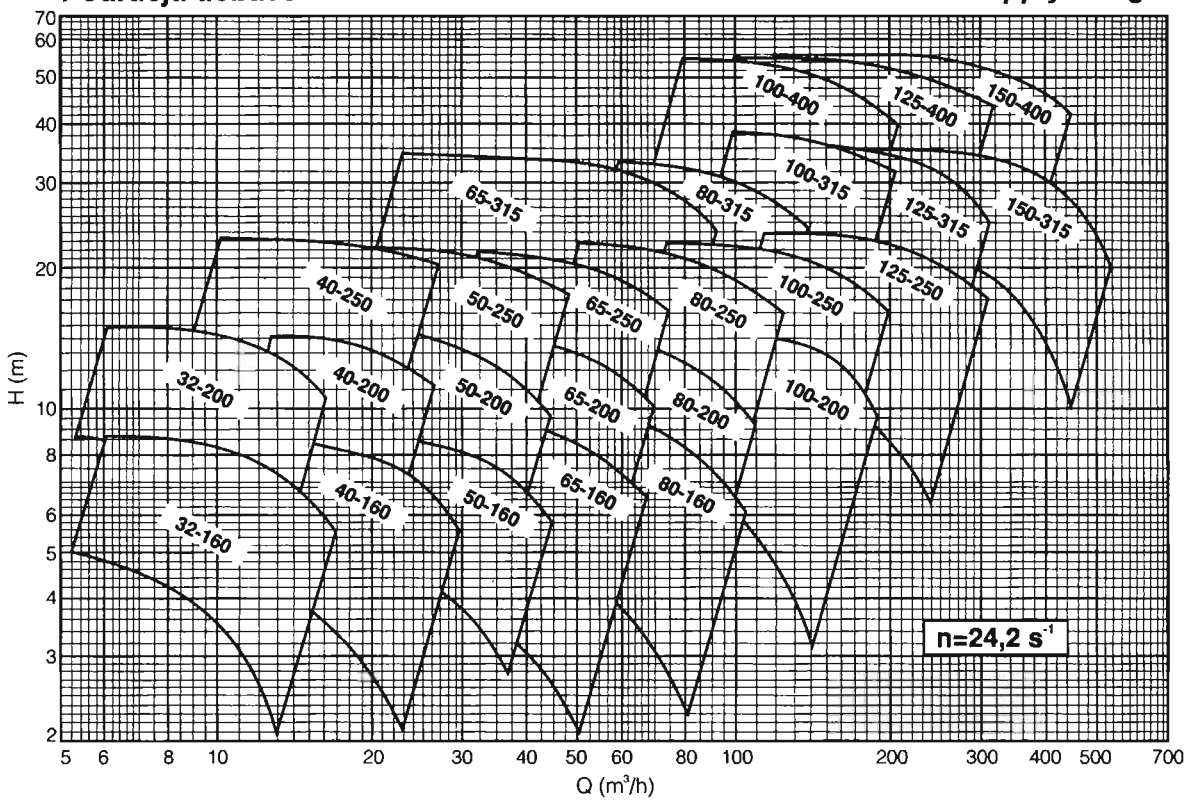
Sealing of the shaft is possible by means of a stuffing box or mechanical seal, depending on fluid, operating conditions and the purchaser's requirement. Mechanical seals are supplied by the well known world producers such as CRANE, FLEXIBOX, BURGMANN, PACIFIC, SEALOL. We prefer the installation of standard mechanical seals as per DIN 24 296 if the operating conditions do not require the installation of special mechanical seals. Scavenging, cooling and lubrication of seals are made as per API 610. The products of all known manufacturers are used in the shape of balanced or loaded, single acting or double acting seals. The pumps are provided with or can be equipped with all the connections necessary for the circulation of liquid handled or flushing liquid from an external source, for quenching or admission of the sealing liquid. Material is given as per DIN 610 depending on material combination and fluid.

Material

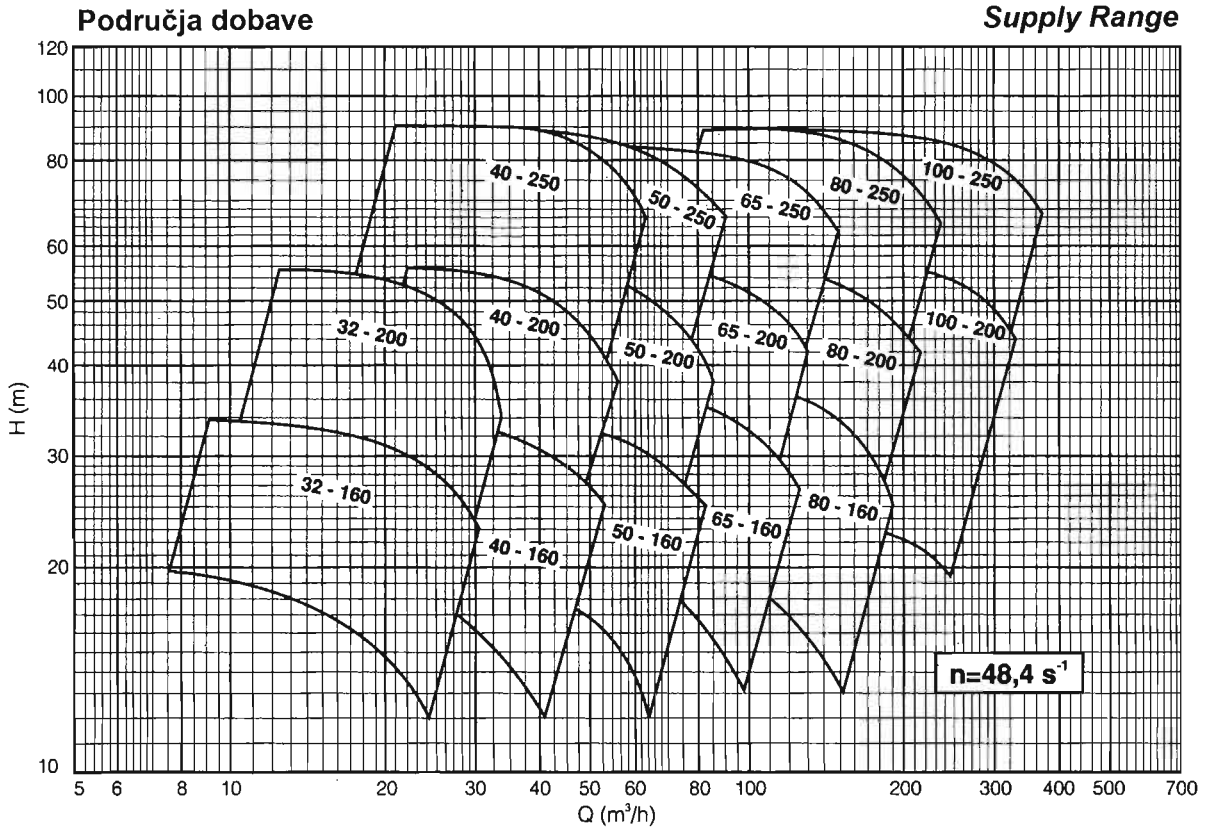
By means of a various material combination pump type NN can supply almost all abrasive and aggressive fluids. The used materials are grouped in 5 groups:

- **a) Grey and steel casting (SI 25 and CL 0445)** For water and neutral fluids without abrasive matters
- **b) Bronze P.CuSn 10** For sea water, in food industry and for aggressive fluids on which bronze is resistant
- **c) Stainless steel casting for aggressive fluids (CL. 4574, and CL. 4580, a change for AISI 316 and AIS 1304)** For aggressive fluids with a very small quantity of abrasive matters.
- **d) Chrome steel casting for abrasive and partial aggressive fluids (CL. 4171, CL. 4783, CL. 41702).**
- **e) Special steel casting with a high percentage of nickel and chrome, 30% Ni, 20% Cr (JGT 29.21)** For sulphuric acid of very high temperature and very aggressive fluids.

Područja dobave ***Supply Range***

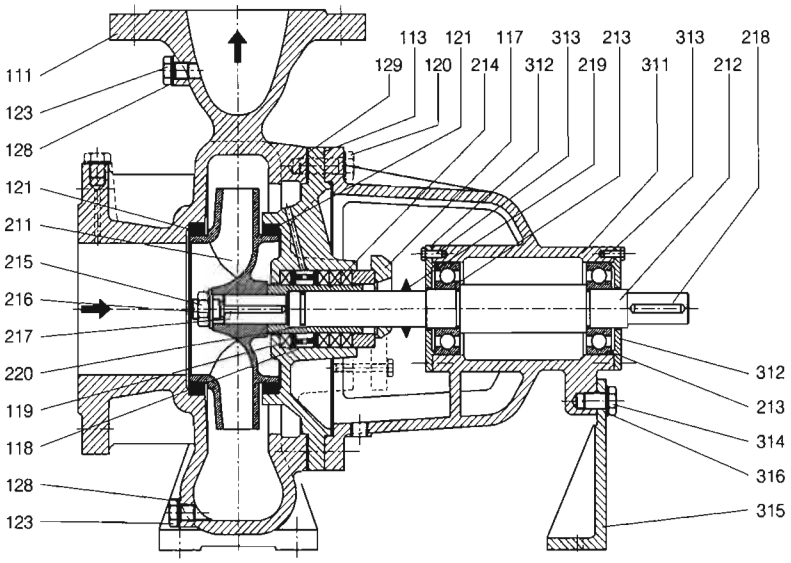


Područja dobave ***Supply Range***



Presjek pumpe

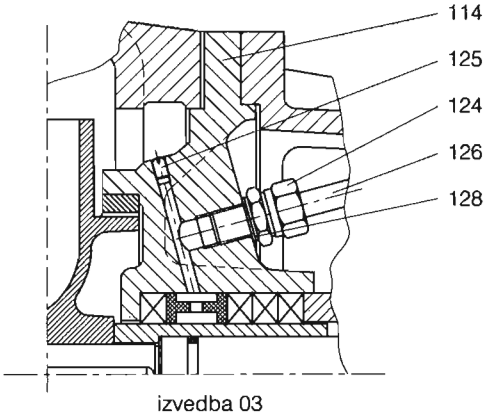
Pump Cross-Section



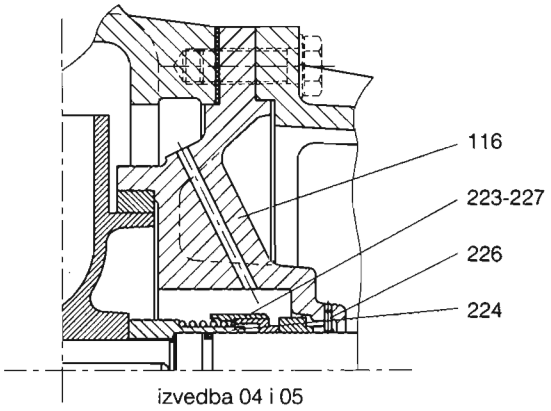
izvedba 01 i 02
Models 01 and 02

Naziv	Pozicija
Spiralno kućište	111
Poklopac kućišta	113
Poklopac kućišta	114
Poklopac kućišta	115
Poklopac kućišta	116
Brtvenica	117
H-prsten	118
Brtvilo	119
Vijak	120
Rasporni prsten	121
Čep	123
Priključak	124
Vijak	125
Cijev	126
Brtveni prsten	128
Brtva	129
Brtva	130
O-prsten	131
Nosač brtvenice	132
Brtvilo	136
Kolo rotora	211
Vratilo	212
Ležaj	213
Zaštitni tuljak	214
Matica	215
Podloška	216
Uložno pero	217
Uložno pero	218
Centrifugalni odvajač	219
O-prsten	220
Mehanička brtva	223
Zaštitni tuljak	224
Zatik	226
Mehanička brtva	227
O-prsten	228
Nosač ležaja	311
Poklopac ležaja	312
Vijak	313
Vijak	314
Noga nosača ležaja	315
Podloška	316

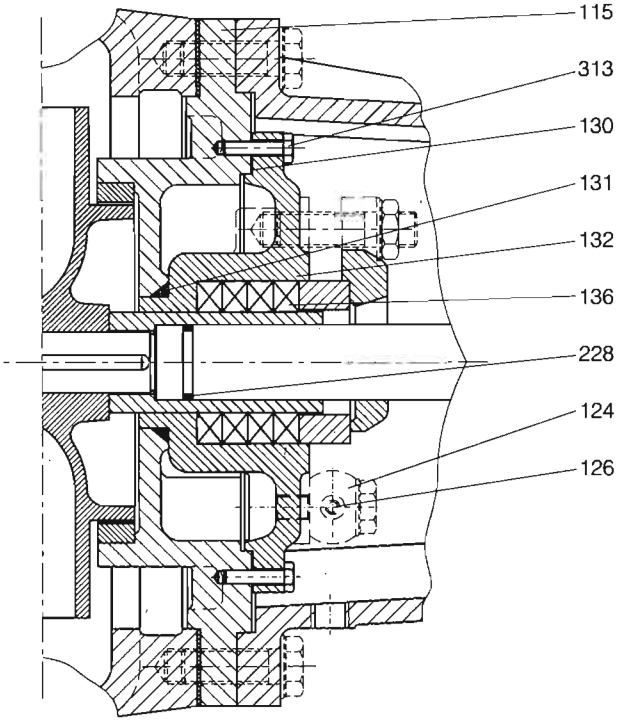
Denomination	Item
Volute casing	111
Casing cover	113
Casing cover	114
Casing cover	115
Casing cover	116
Stuffing box	117
H-ring	118
Packing	119
Bolt	120
Split ring	121
Plug	123
Connection	124
Bolt	125
Pipe	126
Packing ring	128
Packing	129
Packing	130
O-ring	131
Stuffing box pedestal	132
Packing	136
Impeller blade	211
Shaft	212
Bering	213
Protection sleeve	214
Nut	215
Washer	216
Insert spring	217
Insert spring	218
Centrifugal separator	219
O-ring	220
Mechanical seal	223
Protection sleeve	224
Pin	226
Mechanical seal	227
O-ring	228
Bearing pedestal	311
Bearing cover	312
Bolt	313
Bolt	314
Bearing pedestal foot	315
Washer	316



izvedba 03
Model 03



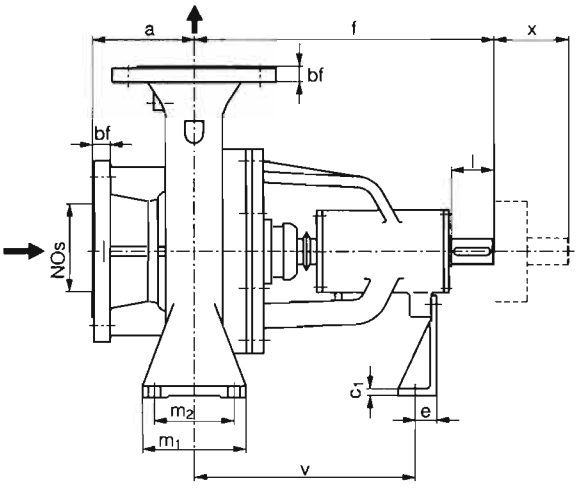
izvedba 04 i 05
Models 04 and 05

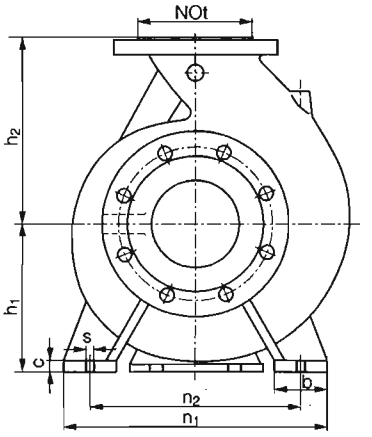


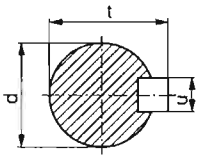
izvedba 06 i 07
Models 06 and 07

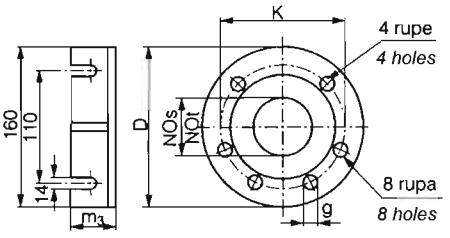
Mjerna skica

Measuring Sketch









Prirubnice do NO 150 DIN 2533 od NO 200 DIN 2532 *Flanges up to 150 DIN 2533 from 200 DIN 2532*

NOs NOt	D	bf	K	g	Broj rupa *Number of holes*
32	140	18	100	18	4
40	150	18	110	18	4
50	165	20	125	18	4
65	185	20	145	18	4
80	200	22	160	18	8
100	220	24	180	18	8
125	250	26	210	18	8
150	285	26	240	23	8
200	340	26	295	23	8

Tip i veličina pumpe *Pump type and size*	Usisna prirubnica *Suction Flange*	Tlačna prirubnica *Delivery Flange*	dimenzije pumpe *pump dimensions*																				
	NOs	NOt	a	f	h_1	h_2	b	c	c_1	e	m_1	m_2	m_3	n_1	n_2	v	s	x	d	l	u	t
NN 32-160	50	32	80	360	132	160	50	15	10	30	100	70	47	240	190	260	14	80	24	50	8	26,9
NN 32-200	50	32	80	360	160	180	50	15	10	30	100	70	47	240	190	260	14	80	24	50	8	26,9
NN 40-160	65	40	80	360	132	160	50	15	10	30	100	70	47	240	190	260	14	80	24	50	8	26,9
NN 40-200	65	40	100	360	160	180	50	15	10	25	100	70	47	265	212	265	14	80	24	50	8	26,9
NN 40-250	65	40	100	360	180	225	65	15	10	25	125	95	47	320	250	265	14	80	24	50	8	26,9
NN 50-160	65	50	100	360	160	180	50	15	10	30	100	70	47	265	212	260	14	80	24	50	8	26,9
NN 50-200	65	50	100	360	160	200	50	15	10	25	100	70	47	265	212	265	14	80	24	50	8	26,9
NN 50-250	65	50	100	360	180	225	65	15	10	25	125	95	47	320	250	265	14	80	24	50	8	26,9
NN 65-160	80	65	100	360	160	200	65	15	10	25	125	95	47	280	212	265	14	80	24	50	8	26,9
NN 65-200	80	65	100	360	180	225	65	15	10	25	125	95	47	320	250	265	14	100	24	50	8	26,9
NN 65-250	80	65	100	470	200	250	80	18	10	30	160	120	47	360	280	340	18	100	32	80	10	35,3
NN 65-315	80	65	125	470	225	280	80	25	10	30	160	120	47	400	315	340	18	100	32	80	10	35,3
NN 80-160	100	80	125	360	180	225	65	15	10	25	125	95	47	320	250	265	14	100	24	50	8	26,9
NN 80-200	100	80	125	470	180	250	65	18	10	30	125	95	47	345	280	340	14	100	32	80	10	35,3
NN 80-250	100	80	125	470	200	280	80	18	10	30	160	120	47	400	315	340	18	100	32	80	10	35,3
NN 80-315	100	80	125	470	250	315	80	25	10	30	160	120	47	400	315	340	18	100	32	80	10	35,3
NN 100-200	125	100	125	470	200	280	80	18	10	30	160	120	47	360	280	340	18	120	32	80	10	35,3
NN 100-250	125	100	140	470	225	280	80	18	10	30	160	120	47	400	315	340	18	120	32	80	10	35,3
NN 100-315	125	100	140	470	250	315	80	25	10	30	160	120	47	400	315	340	18	120	32	80	10	35,3
NN 100-400	125	100	140	530	280	355	100	27	12	33	200	150	52	500	400	370	23	140	42	110	12	45,1
NN 125-250	150	125	140	470	250	355	80	18	10	30	160	120	47	400	315	340	18	120	32	80	10	35,3
NN 125-315	150	125	140	530	280	355	100	27	12	33	200	150	52	500	400	370	23	140	42	110	12	45,1
NN 125-400	150	125	140	530	315	400	100	27	12	33	200	150	52	500	400	370	23	140	42	110	12	45,1
NN 150-315	200	150	160	530	280	400	100	27	12	33	200	150	52	550	450	370	23	140	42	110	12	45,1
NN 150-400	200	150	160	530	315	450	100	27	12	33	200	150	52	550	450	370	23	140	42	110	12	45,1

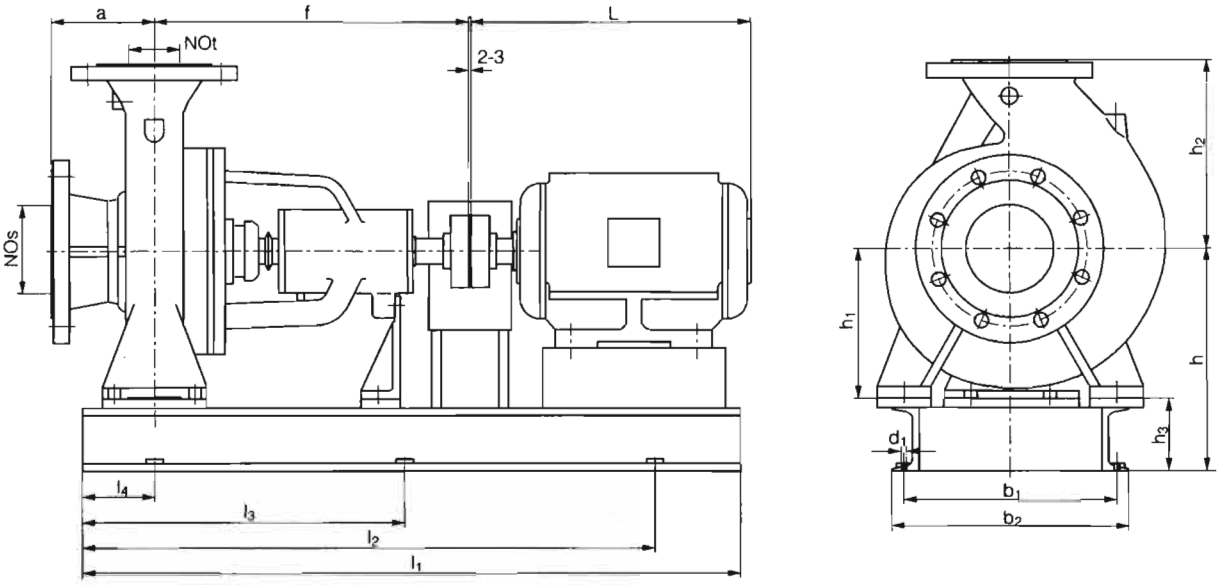
Dimenzije u mm
Dimensions in mm

Tip i veličina pumpe *Pump type and size*	Dimenzije agregata *Pump Set Dimensions*																				Veličina elastične spojke *Elastic coupling size*
	Elektromotor				Pumpa *Pump*						Temeljna ploča *Base Plate*										
	s^{-1}	kW	Vel.	L cca	NOs	NOt	a	f	h_1	h_2	b_1	b_2	d_1	l_1	l_2	l_3	l_4	h_3	h	ES
NN 32-160	24,2	0,37	71	237	50	32	80	360	132	160	200	240	14	640	570	–	70	80	212	2
		0,55	80	272							200	240	14	660	580	–	80	80	212	2
		0,75	80	272							200	240	14	660	580	–	80	80	212	2
	48,4	1,5	90S	300							210	250	14	670	585	–	85	80	212	2
		2,2	90L	325							210	250	14	700	600	–	100	80	212	2
		3	100L	365							200	240	14	740	620	–	120	85	217	2
		4	112M	385							200	240	14	740	620	–	120	80	212	2
NN 32-200	24,2	0,75	80	272	50	32	80	360	160	180	200	240	14	660	580	–	80	80	240	2
		1,1	90S	300							210	250	14	670	585	–	85	80	240	2
	48,4	2,2	90L	325							210	250	14	700	600	–	100	80	240	2
		3	100L	365							200	240	14	740	620	–	120	80	240	2
		4	112M	385							200	240	14	740	620	–	120	80	240	2
		5,5	132S	437							230	270	14	780	640	–	140	77	237	3
		7,5	132S	437							230	270	14	780	640	–	140	77	237	3
NN 40-160	24,2	0,37	71	237	65	40	80	360	132	160	200	240	14	640	570	–	70	80	212	2
		0,55	80	272							200	240	14	660	580	–	80	80	212	2
		0,75	90	272							200	240	14	660	580	–	80	80	212	2
		1,1	90S	300							210	250	14	670	585	–	85	80	212	2
	48,4	2,2	90L	325							210	250	14	700	600	–	100	80	212	2
		3	100L	365							200	240	14	740	620	–	120	85	217	2
		4	112M	385							200	240	14	740	620	–	120	80	212	2
		5,5	132S	437							230	270	14	760	635	–	125	80	212	3
NN 40-200	24,2	1,1	90S	300	65	40	100	360	160	180	230	270	14	670	585	–	85	80	240	2
		1,5	90L	325							230	270	14	700	600	–	100	80	240	2
	48,4	5,5	132S	437							230	270	14	780	640	–	140	77	237	3
		7,5	132S	437							230	270	14	780	640	–	140	77	237	3
		11	160M	587							270	310	14	900	700	–	200	80	240	4
NN 40-250	24,2	1,5	90L	325	65	40	100	360	180	225	270	310	14	710	610	–	100	80	260	2
		2,2	100L	365							280	320	14	740	620	–	120	80	260	2
		3	100L	365							280	320	14	740	620	–	120	80	260	2
	48,4	11	160M	587							270	310	14	930	730	–	200	80	260	4
		15	160M	587							270	310	14	930	730	–	200	80	260	4
		18,5	160L	631							270	330	14	950	750	–	200	80	260	4
NN 50-160	24,2	0,55	80	272	65	50	100	360	160	180	225	265	14	660	580	–	80	80	240	2
		0,75	90	272							225	265	14	660	580	–	80	80	240	2
		1,1	90S	300							230	270	14	670	585	–	85	80	240	2
	48,4	3	100L	365							230	270	14	740	620	–	120	80	240	2
		4	112M	385							230	270	14	740	620	–	120	80	240	2
		5,5	132S	437							230	270	14	780	640	–	140	77	237	3
		7,5	132S	437							230	270	14	780	640	–	140	77	237	3
		11	160M	587							270	310	14	900	700	–	200	80	240	4
NN 50-200	24,2	1,1	90S	300	65	50	100	360	160	200	230	270	14	670	585	–	85	80	240	2
		1,5	90L	325							230	270	14	700	600	–	100	80	240	2
		2,2	100L	365							230	270	14	740	620	–	120	80	240	2
	48,4	4	112M	385							230	270	14	740	620	–	120	80	240	2
		5,5	132S	437							230	270	14	780	640	–	140	77	237	3
		7,5	132S	437							230	270	14	780	640	–	140	77	237	3
		11	160M	587							270	310	14	900	700	–	200	80	240	4
		15	160M	587							270	310	14	900	700	–	200	80	240	4
NN 50-250	24,2	1,5	90L	325	65	50	100	360	180	225	270	310	14	710	610	–	100	80	260	2
		2,2	100L	365							280	320	14	740	620	–	120	80	260	2
		3	100L	365							280	320	14	740	620	–	120	80	260	2
		4	112M	385							230	270	14	740	620	–	120	80	260	2
	48,4	15	160M	587							270	310	14	930	730	–	200	80	260	4
		18,5	160L	631							270	330	14	950	750	–	200	80	260	4
		22	180M	660							330	370	14	970	770	–	200	85	265	4
		30	200L	820							360	400	14	1060	910	530	150	100	280	5
NN 65-160	24,2	0,75	80	272	80	65	100	360	160	200	230	270	14	670	590	–	80	80	240	2
		1,1	90S	300							250	290	14	680	595	–	85	80	240	2
		1,5	90L	325							250	290	14	710	610	–	100	80	240	2
		2,2	100L	365							230	270	14	740	620	–	120	80	240	2
	48,4	4	112M	385							230	270	14	760	635	–	125	80	240	2
		5,5	132S	437							230	270	14	800	650	–	150	77	237	3
		7,5	132S	437							230	270	14	800	650	–	150	77	237	3
		11	160M	587							260	300	14	850	725	–	125	80	240	4
		15	160M	587							260	300	14	850	725	–	125	80	240	4
NN 65-200	24,2	1,5	90L	325	80	65	100	360	180	225	270	310	14	710	610	–	100	80	260	2
		2,2	100L	365							280	320	14	740	620	–	120	80	260	2
		3	100L	365							280	320	14	740	620	–	120	80	260	2
		4	112M	385							230	270	14	740	620	–	120	80	260	4
	48,4	11	160M	587							270	310	14	930	730	–	200	80	260	4
		15	160M	587							270	310	14	930	730	–	200	80	260	4
		18,5	160L	631							270	330	14	950	750	–	200	80	260	4
		22	180M	660							330	370	14	970	770	–	200	85	265	4
NN 65-250	24,2	4	112M	385	80	65	100	470	200	250	300	340	14	870	730	–	140	80	280	4
		5,5	132S	437							300	340	14	910	710	–	200	80	280	4
		7,5	132M	475							300	340	14	950	750	–	200	80	280	4
	48,4	22	180M	660							300	340	14	1080	930	540	150	80	280	4
		30	200L	820							360	400	14	1180	1030	590	150	85	285	5
		37	200L	820							360	400	14	1180	1030	590	150	85	285	5
NN 65-315	24,2	5,5	132S	437	80	65	125	470	225	280	330	370	14	910	710	–	200	84	309	4
		7,5	132M	475							330	370	14	950	750	–	200	80	305	4
		11	160M	587							340	380	14	1020	870	510	150	85	310	4
		15	160L	631							330	370	14	1050	900	525	150	85	310	4

Tip i veličina pumpe *Pump type and size*	Dimenzije agregata *Pump Set Dimensions*																				Veličina elastične spojke *Elastic coupling size*
	Elektromotor				Pumpa *Pump*						Temeljna ploča *Base Plate*										
	s^{-1}	kW	Vel.	L cca	NOs	NOt	a	f	h1	h_2	b_1	b_2	d_1	l_1	l_2	l_3	l_4	h_3	h	ES
		1,1	90S	300							270	310	14	680	595	–	85	80	260	2
	24,2	1,5	90L	325							270	310	14	710	610	–	100	80	260	2
		2,2	100L	365							280	320	14	740	620	–	120	80	260	2
		3	100L	365							280	320	14	740	620	–	120	80	260	2
NN 80-160		5,5	132S	437	100	80	125	360	180	225	270	310	14	800	650	–	150	80	260	3
		7,5	132S	437							270	310	14	800	650	–	150	80	260	3
	48,4	11	160M	587							270	310	14	930	730	–	200	80	260	4
		15	160M	587							270	310	14	930	730	–	200	80	260	4
		18,5	160L	631							270	330	14	950	750	–	200	80	260	4
		22	180M	660							330	370	14	970	770	–	200	85	265	4
		3	100L	365							300	340	14	850	725	–	125	80	260	4
	24,2	4	112M	385							300	340	14	850	725	–	125	80	260	4
		5,5	132S	437							300	340	14	900	700	–	200	77	257	4
		15	160M	587							300	330	14	1000	800	–	200	80	260	4
NN 80-200		18,5	160L	631	100	80	125	470	180	250	300	340	14	1040	890	520	150	80	260	4
	48,4	22	180M	660							310	350	14	1050	900	525	150	85	265	4
		30	200L	820							340	380	14	1160	1010	580	150	100	280	5
		37	200L	820							340	380	14	1160	1010	580	150	100	280	5
		5,5	132S	437							330	370	14	910	710	–	200	80	280	4
	24,2	7,5	132M	475							330	370	14	950	750	–	200	80	280	4
		11	160M	587							330	370	14	1040	890	520	150	85	285	4
NN 80-250		30	200L	820	100	80	125	470	200	280	340	380	14	1160	1010	580	150	100	300	5
	48,4	37	200L	820							340	380	14	1160	1010	580	150	100	300	5
		45	225M	875							370	410	14	1220	1070	610	150	120	320	6
		55	250M	950							460	510	18	1260	1110	630	150	180	380	6
		7,5	132M	475							330	370	14	940	740	–	200	80	330	4
NN 80-315	24,2	11	160M	587	100	80	125	470	250	315	340	380	14	1020	870	510	150	85	335	4
		15	160L	631							330	370	14	1070	920	535	150	85	335	4
		2,2	100L	365							300	340	14	880	740	–	140	80	280	4
		3	100L	365							300	340	14	880	740	–	140	80	280	4
	24,2	4	112M	385							300	340	14	870	730	–	140	80	280	4
		5,5	132S	437							300	340	14	910	710	–	200	80	280	4
		7,5	132M	475							300	340	14	950	750	–	200	80	280	4
NN 100-200		18,5	160L	631	125	100	125	470	200	280	300	340	14	1080	980	540	100	82	282	4
		22	180M	660							300	340	14	1080	930	540	150	80	280	4
	48,4	30	200L	820							360	400	14	1180	1030	590	150	85	285	5
		37	200L	820							360	400	14	1180	1030	590	150	85	285	5
		45	225M	875							370	410	14	1220	1070	610	150	120	320	6
		55	250M	950							460	510	18	1260	1110	630	150	180	380	6
		7,5	132M	475							330	370	14	950	750	–	200	80	305	4
	24,2	11	160M	587							340	380	14	1020	870	510	150	85	310	4
		15	160L	631							330	370	14	1050	900	525	150	85	310	4
		37	200L	820							330	370	14	1150	1000	575	150	80	305	5
NN 100-250		45	225M	875	125	100	140	470	225	280	380	420	14	1210	1060	605	150	95	320	6
	48,4	55	250M	950							460	510	18	1150	1000	575	150	154	379	6
		75	280S	1040							510	560	18	1350	1200	675	150	185	410	7
		90	280M	1030							510	560	18	1400	1250	700	150	185	410	7
		110	315S	1075							590	630	18	1460	1310	630	150	220	445	7
		15	160L	631							330	370	14	1070	920	535	150	85	335	4
NN 100-315	24,2	18,5	180M	660	125	100	140	470	250	315	330	370	14	1100	950	550	150	85	335	4
		22	180L	698							330	370	14	1120	970	560	150	85	335	4
		30	200L	820							330	370	14	1170	1020	585	150	85	335	5
		15	160L	631							330	370	14	1130	980	565	150	80	360	5
		18,5	180M	660							420	470	14	1180	1030	590	150	125	405	5
NN 100-400	24,2	22	180L	698	125	100	140	530	280	355	440	480	14	1250	1100	625	150	85	365	5
		30	200L	820							420	460	14	1260	1110	630	150	85	365	5
		37	225S	810							430	470	18	1290	1140	645	150	125	405	5
		7,5	132M	475							330	370	14	940	740	–	200	80	330	4
	24,2	11	160M	587							340	380	14	1020	870	510	150	85	335	4
		15	160L	631							330	370	14	1070	920	535	150	85	335	4
		18,5	180M	660							330	370	14	1100	950	550	150	85	335	4
NN 125-250		37	200L	820	150	125	140	470	250	355	330	370	14	1170	1020	585	150	85	335	5
	48,4	45	225M	875							380	420	18	1210	1060	605	150	98	348	6
		55	250M	950							470	510	14	1260	1110	630	150	95	345	6
		75	280S	1040							510	560	18	1340	1190	670	150	160	410	7
		22	180L	698							440	480	14	1250	1100	625	150	85	365	5
NN 125-315	24,2	30	200L	820	150	125	140	530	280	355	420	460	14	1260	1110	630	150	85	365	5
		37	225S	810							430	470	18	1290	1140	645	150	125	405	5
		30	200L	820							420	460	14	1260	1110	630	150	90	405	5
NN 125-400	24,2	37	225S	810	150	125	140	530	315	400	430	470	18	1290	1140	645	150	125	440	5
		45	225M	875							440	480	18	1300	1050	650	150	100	415	6
		55	250M	955							460	510	18	1360	1210	680	150	130	445	6
		22	180L	698							440	480	14	1250	1100	625	150	85	365	5
		30	200L	820							470	510	14	1260	1110	630	150	85	365	5
NN 150-315	24,2	37	225S	810	200	150	160	530	280	400	430	470	18	1290	1140	645	150	125	405	5
		45	225M	875							440	480	14	1310	1160	655	150	82	362	6
		55	250M	955							460	510	18	1365	1215	670	150	120	400	6
		45	225M	875							490	530	18	1300	1050	650	150	100	415	6
NN 150-400	24,2	55	250M	955	200	150	160	530	315	450	500	550	18	1360	1210	680	150	130	445	6
		75	280S	1040							510	560	18	1520	1320	760	200	127	442	7
		90	280M	1090							510	560	18	1570	1370	785	200	127	442	7

Skica agregata s normalnom spojkom

Sketch Of Pump Set With Normal Coupling



Zamjenjivost dijelova

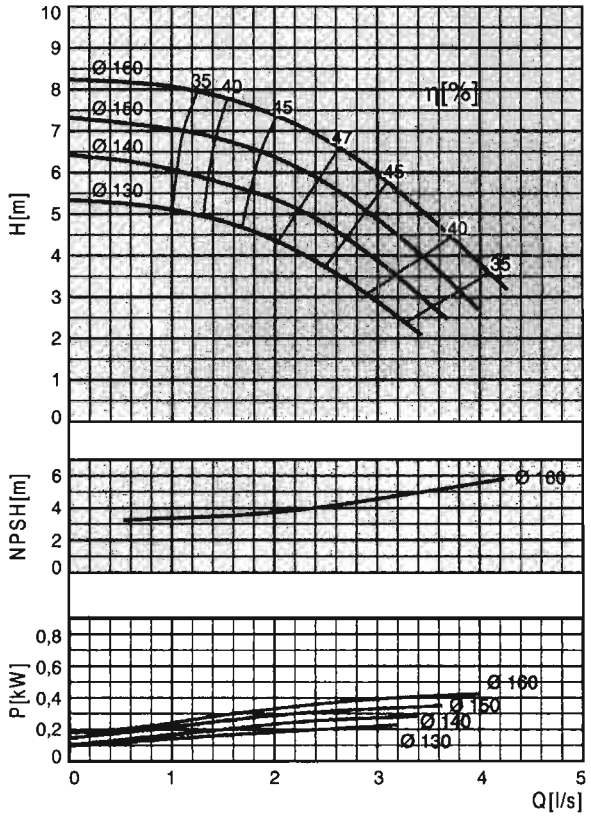
Parts Substitution

Pumpa NN *NN Pump*	Tip dijela / *Spare Part Type*															
	Kolo rotora *Impeller*	Spiralno kućište *Volute Casing*	Poklopac kućišta *Casing Cover*	Rasporni prsten *Wearing Ring*	Noga nosača ležaja *Bearing Support's Leg*	Nosač brtvenice *Gasket Support*	Nosač ležaja *Bearing Support*	Ležaj *Bearing*	Poklopac ležaja *Bearing Cover*	Vratilo *Shaft*	Zaštitni tuljak *Security Sleeve*	Brtvenica *Stuffing Box*	H – prsten *H – ring*	Brtvilo *Packing*	Centrifugalni odvajač *Centrifugal Separator*	Matica *Nut*
32-160	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
32-200	2	2	2	2	2											
40-160	3	3	3	3	1	2										
40-200	4	4	4	4	2	1										
40-250	5	5	5	5	3											
50-160	6	6	6	6	2	2										
50-200	7	7	7	7		1										
50-250	8	8	8	8	3											
65-160	9	9	9	9	2	3										
65-200	10	10	10	10	3	4										
80-160	11	11	11	11		5										
65-250	12	12	12	12	4	6	2	2	2	2	2	2	2	2	2	2
65-315	13	13	13	13	5											
80-200	14	14	14	14	3											
80-250	15	15	15	15	4											
80-315	16	16	16	16	6											
100-200	17	17	17	17	4											
100-250	18	18	18	18	5											
100-315	19	19	19	19	6											
125-250	20	20	20	20												
100-400	21	21	21	21	7	7	3	3	3	3	3	3	3	3	3	3
125-315	22	22	22	22												
125-400	23	23	23	23	8											
150-315	24	24	24	24	7											
150-400	25	25	25	25	8											

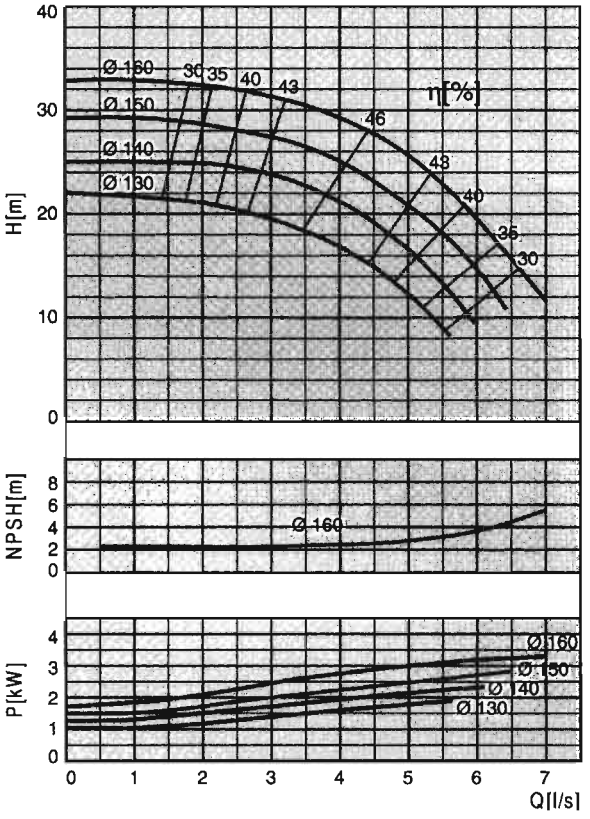
Pojedinačni dijagrami

Sole diagrams

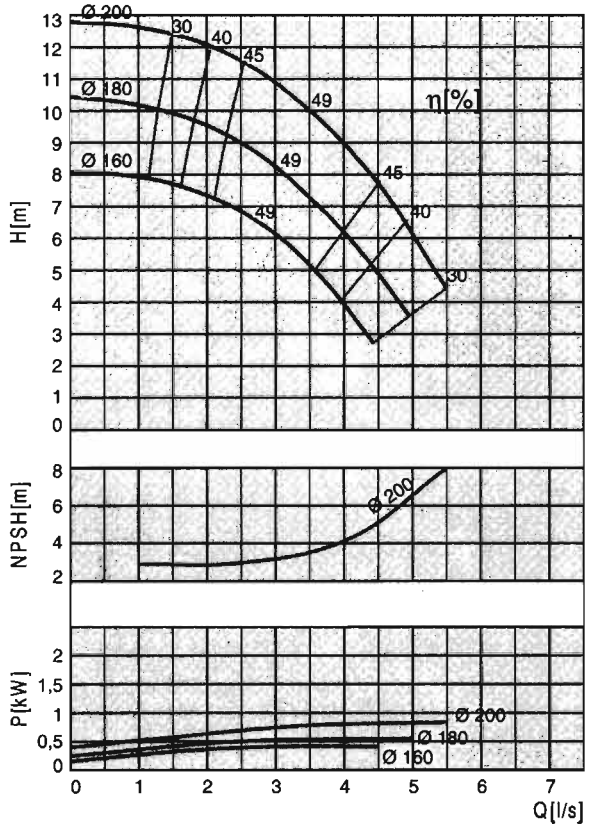
NN 32-160 n=24,2s^{-1}



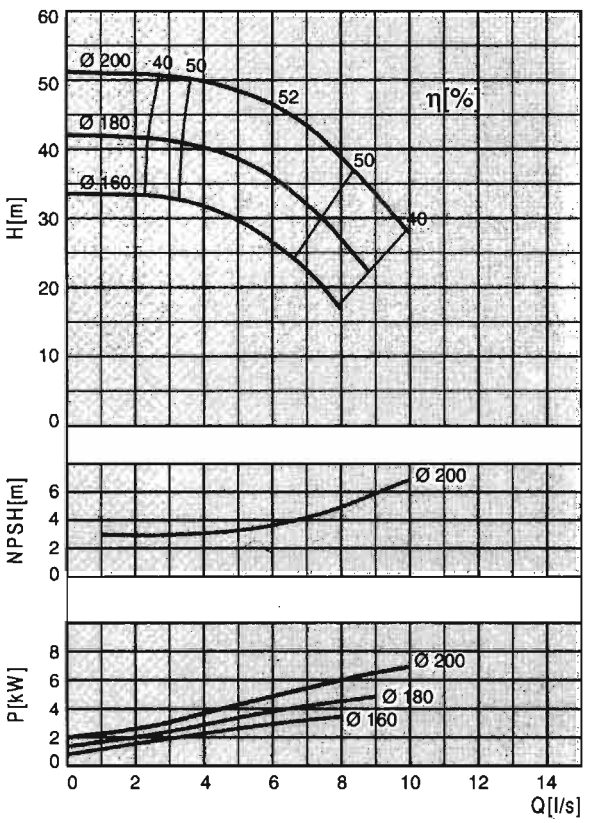
NN 32-160 n=48,4s^{-1}



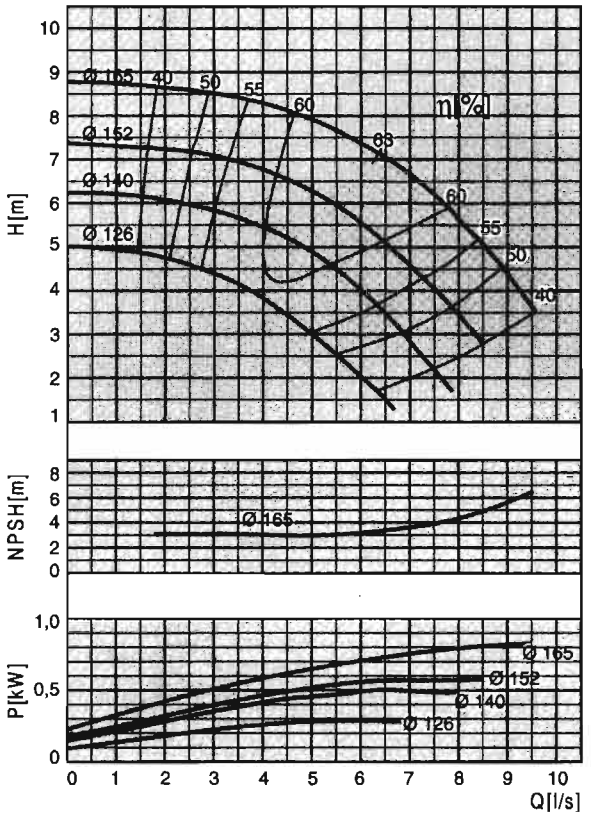
NN 32-200 n=24,2s^{-1}



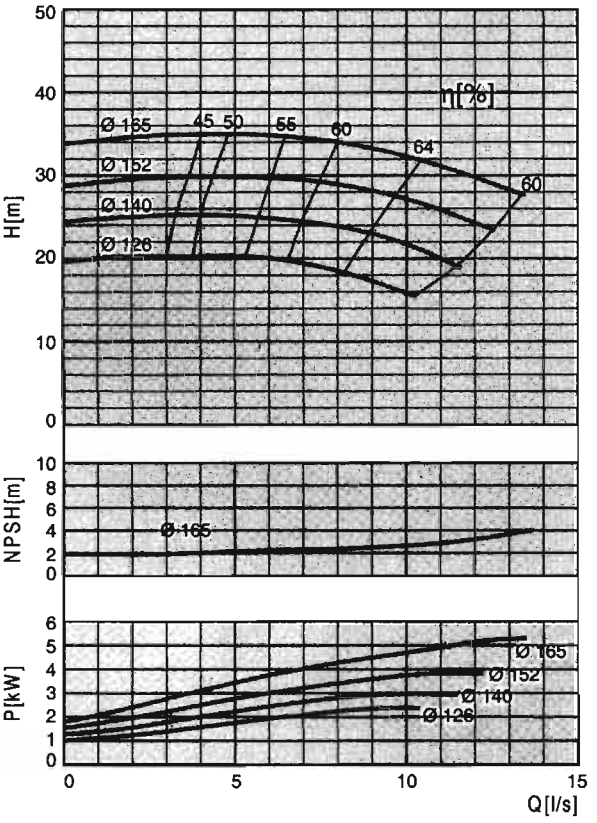
NN 32-200 n=48,4s^{-1}



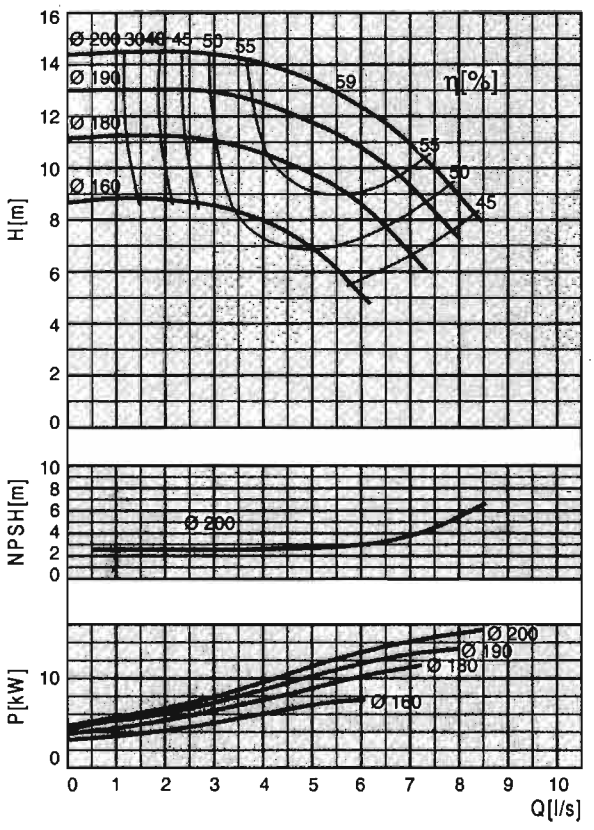
NN 40-160 $n=24{,}2s^{-1}$



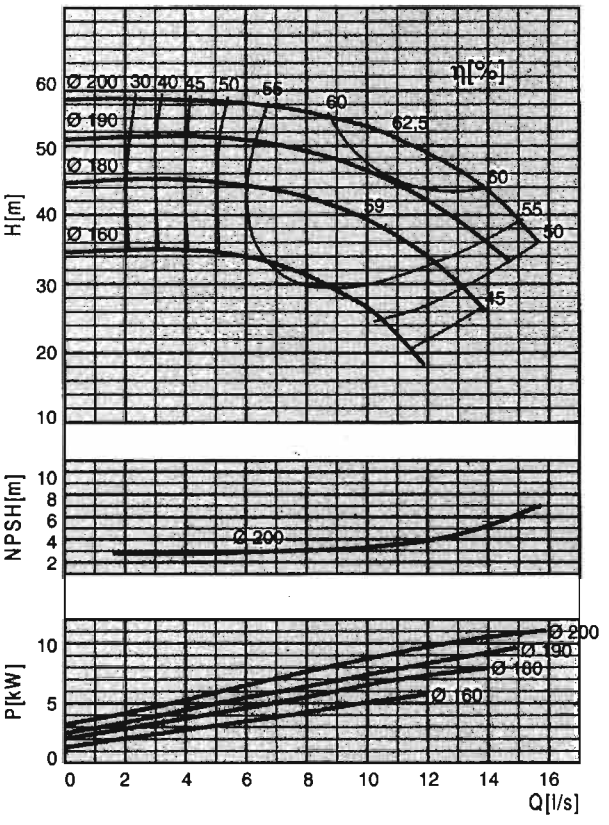
NN 40-160 $n=48{,}4s^{-1}$



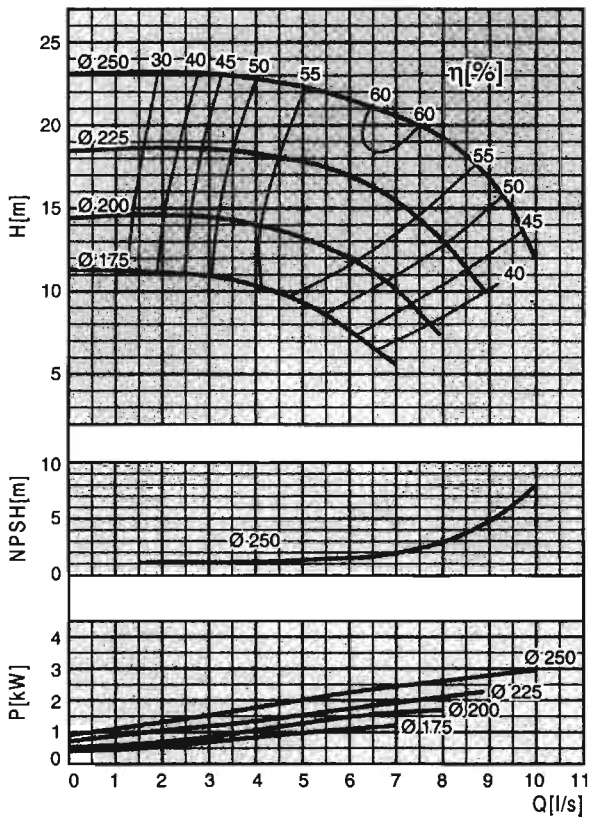
NN 40-200 $n=24{,}2s^{-1}$



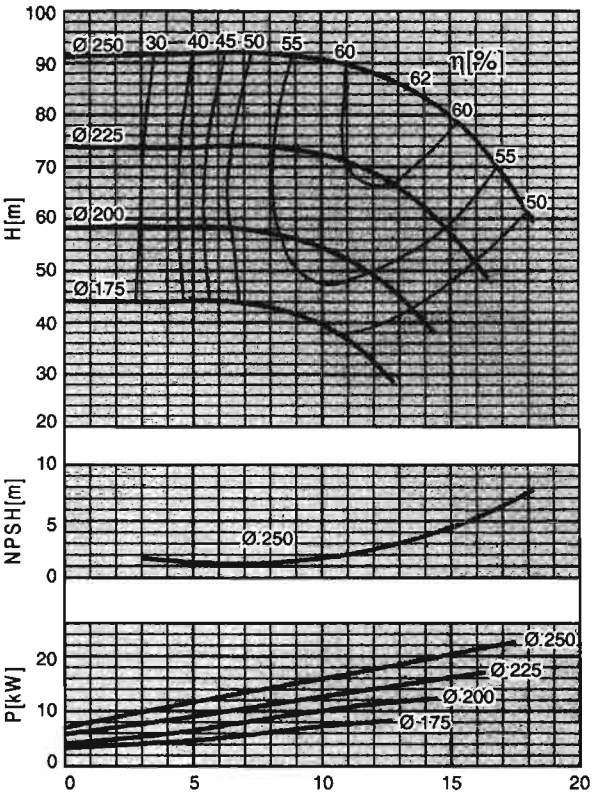
NN 40-200 $n=48{,}4s^{-1}$



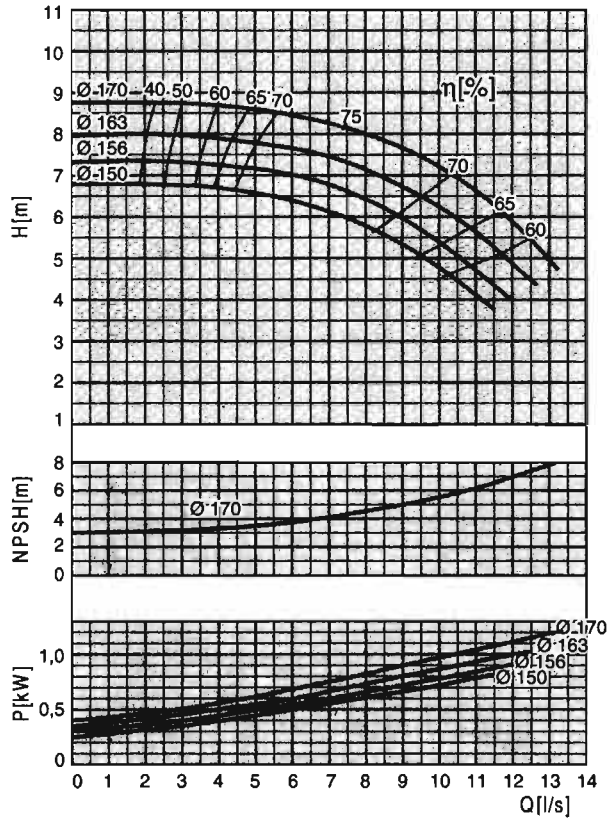
NN 40-250 n=24,2s^{-1}



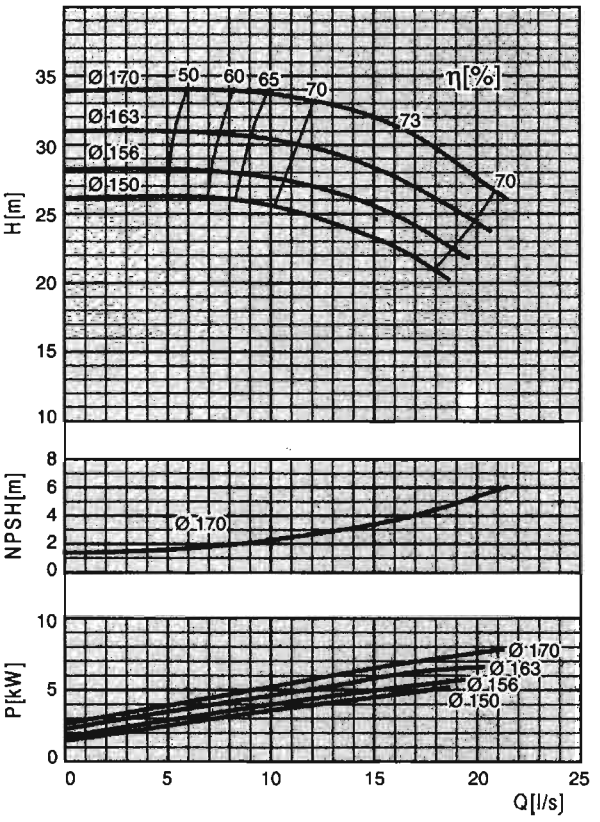
NN 40-250 n=48,4s^{-1}



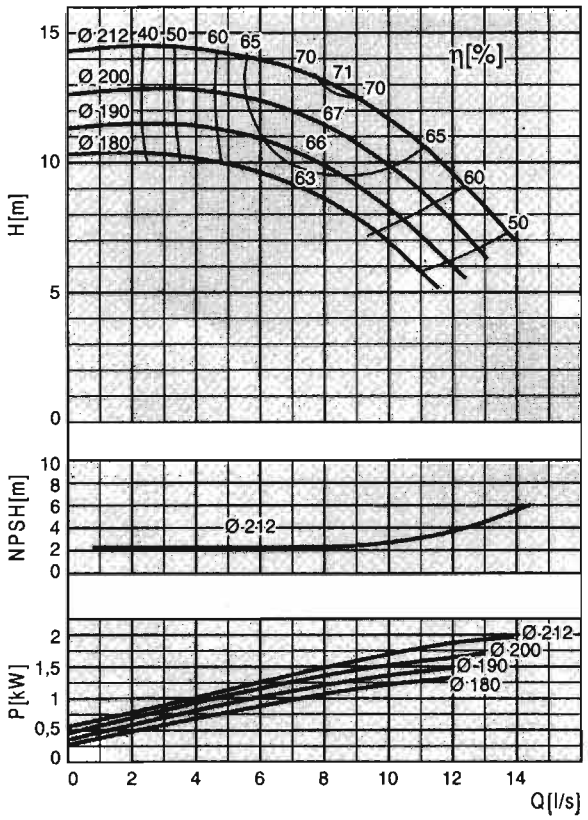
NN 50-160 n=24,2s^{-1}



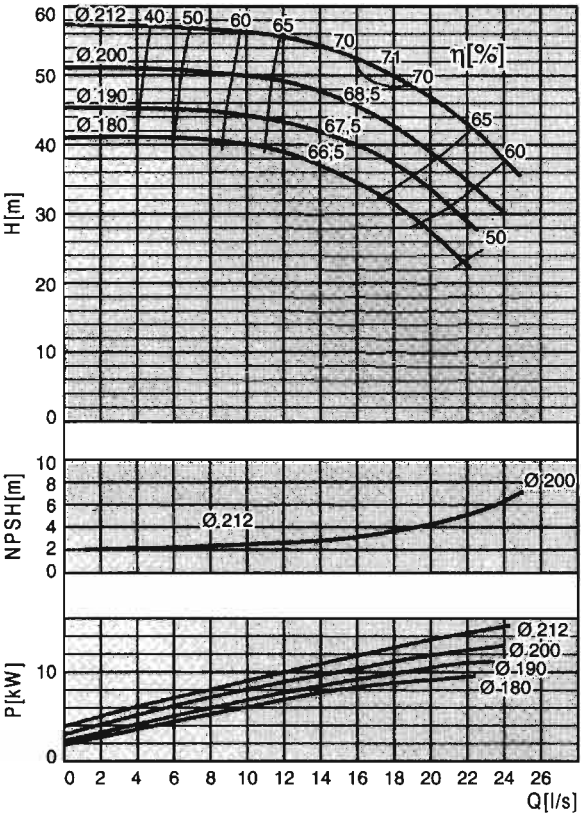
NN 50-160 n=48,4s^{-1}



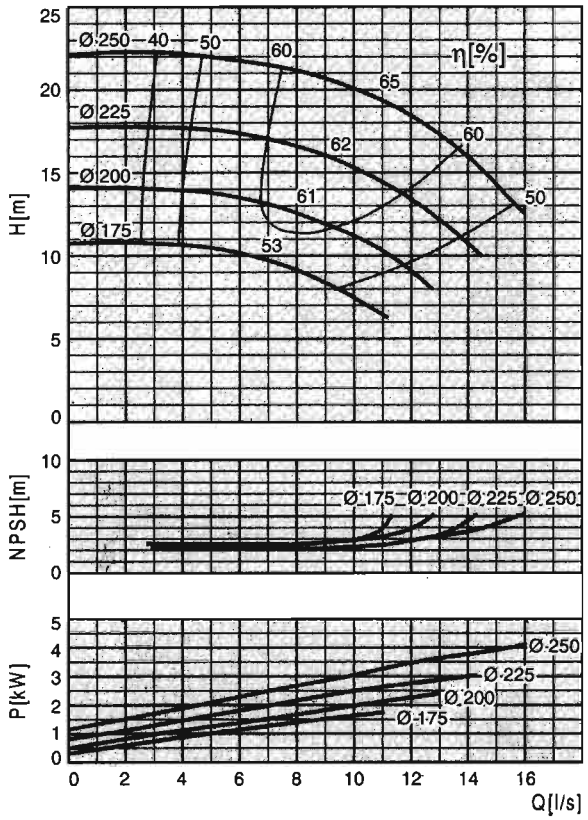
NN 50-200 n=24,2s^{-1}



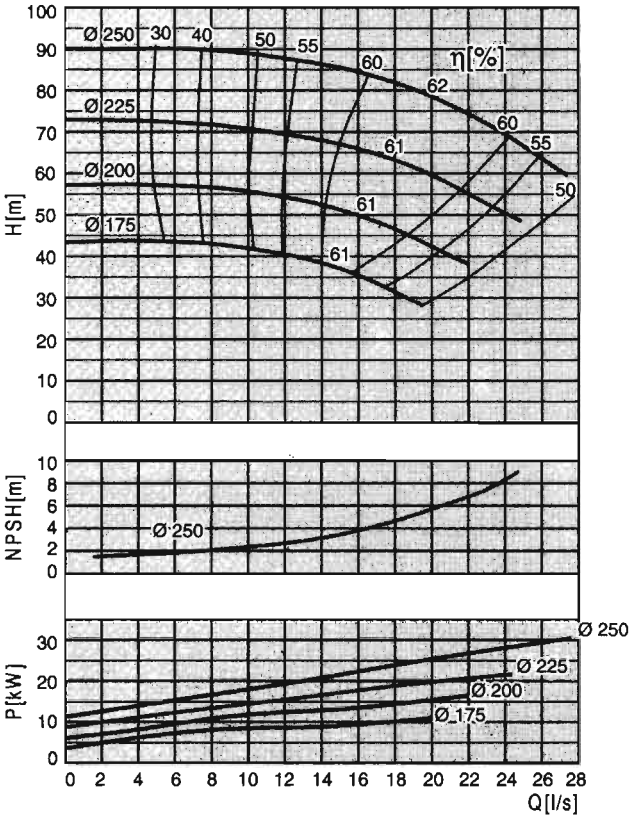
NN 50-200 n=48,4s^{-1}



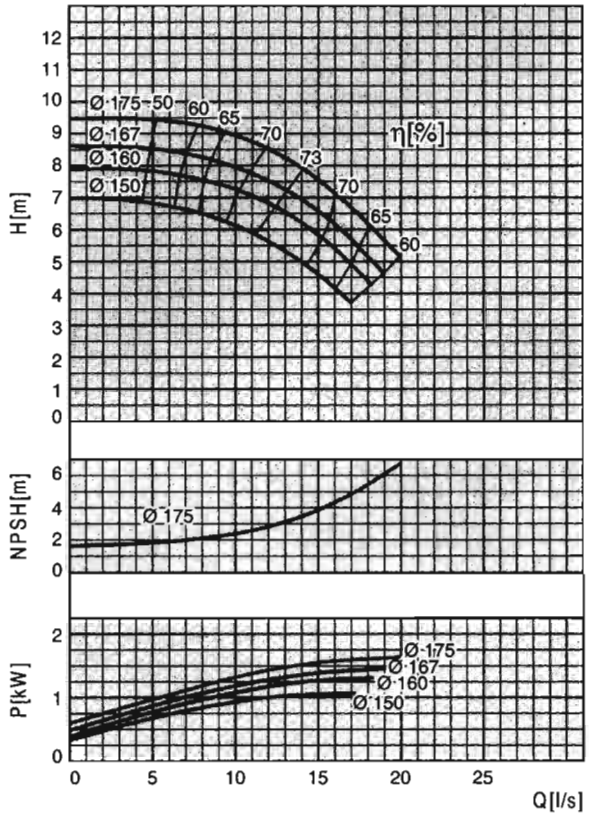
NN 50-250 n=24,2s^{-1}



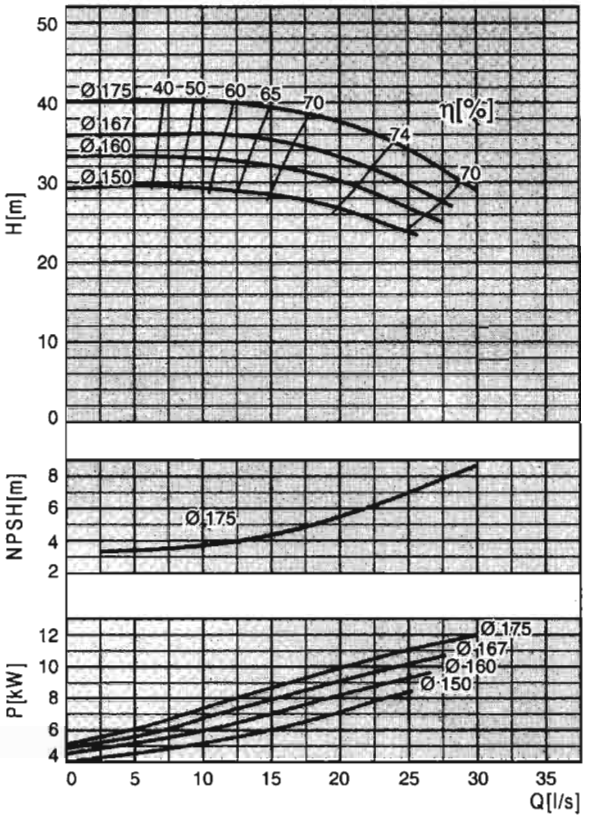
NN 50-250 n=48.4s^{-1}



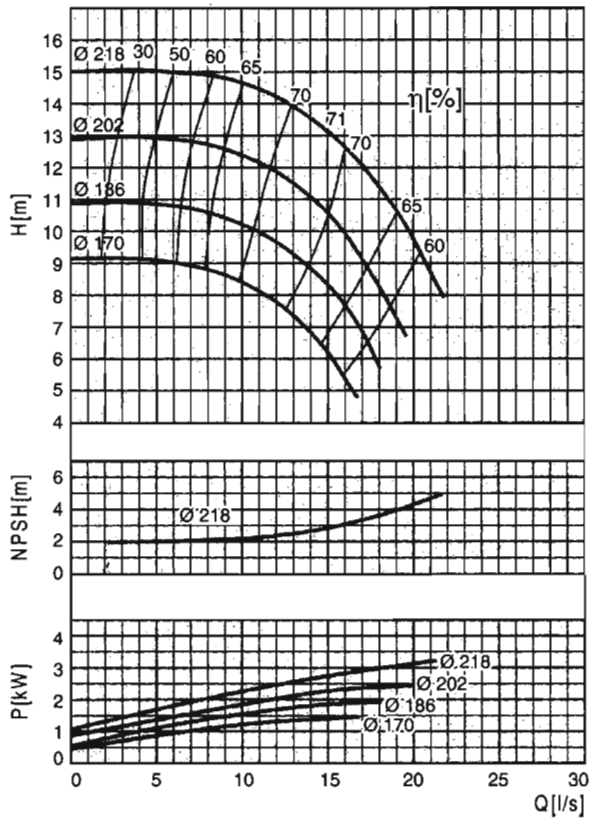
NN 65-160 $n=24,2s^{-1}$



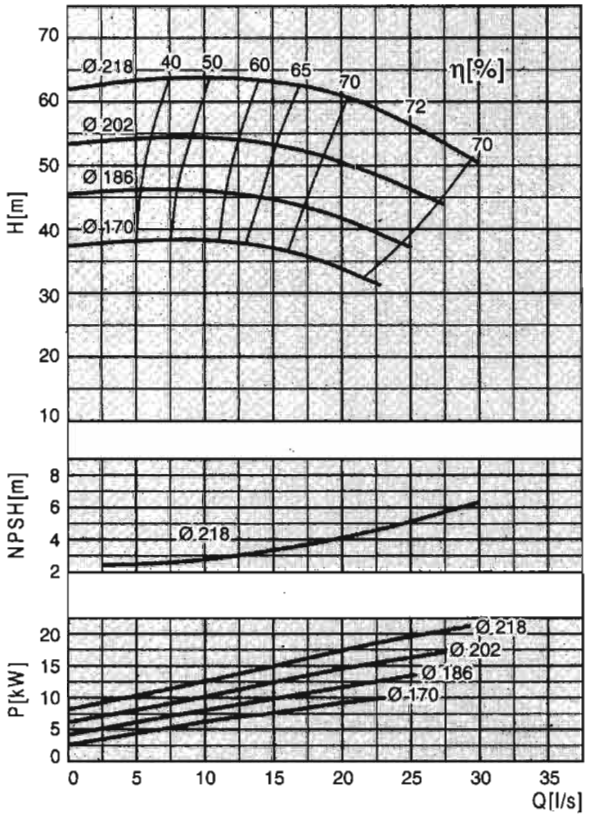
NN 65-160 $n=48,4s^{-1}$



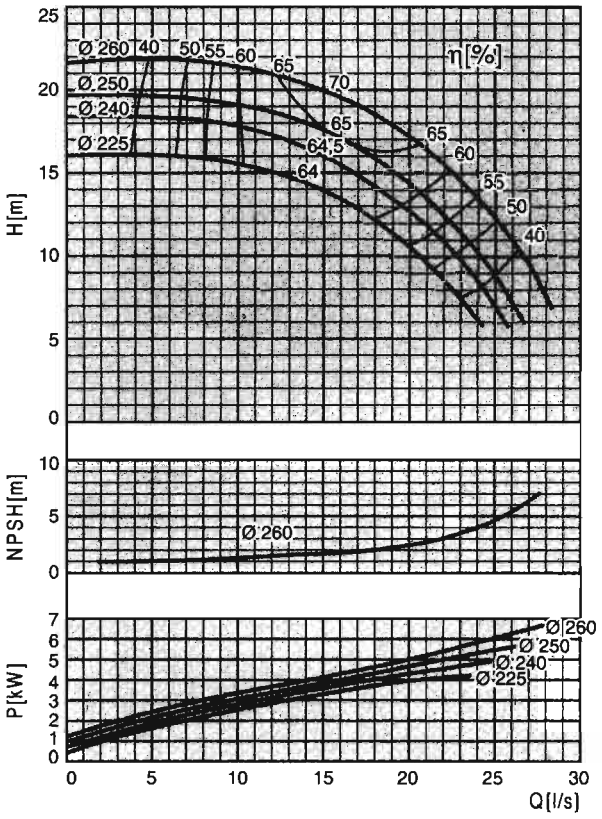
NN 65-200 $n=24,2s^{-1}$



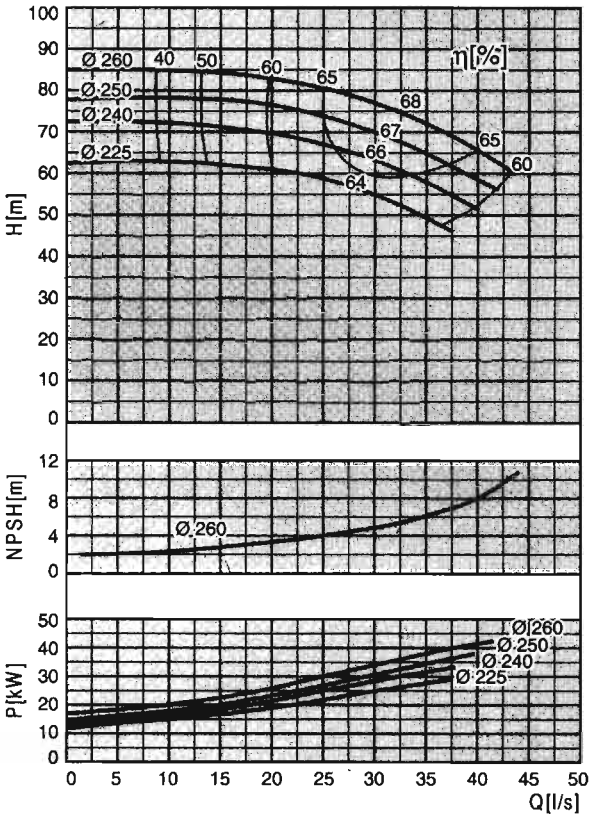
NN 65-200 $n=48,4s^{-1}$



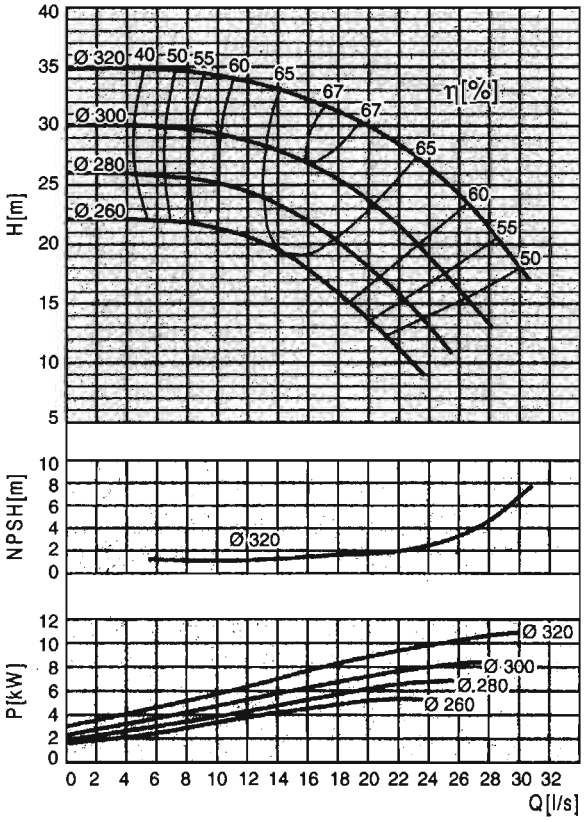
NN 65-250 n=24,2s^{-1}



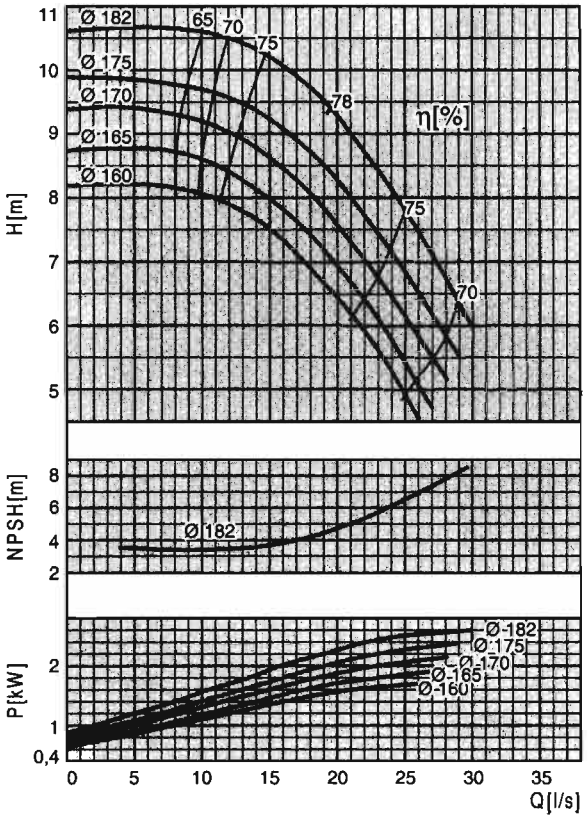
NN 65-250 n=48,4s^{-1}



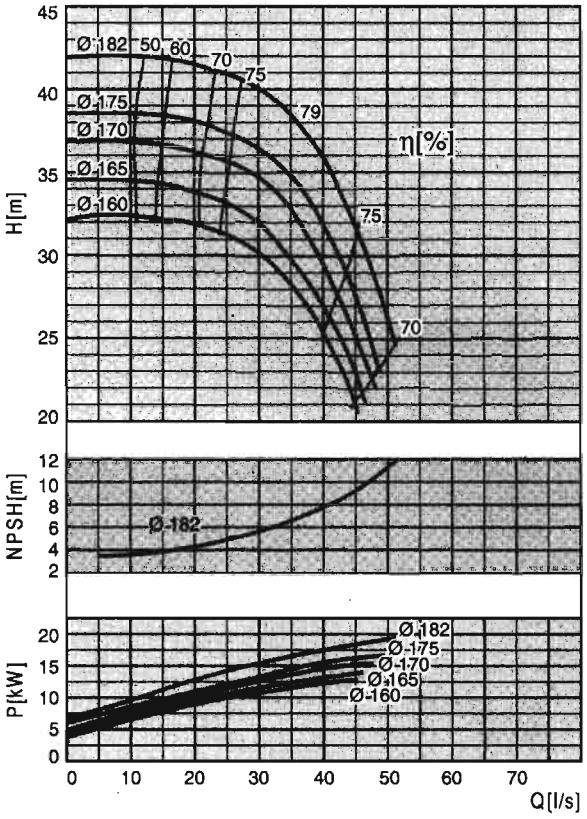
NN 65-315 n=24,2s^{-1}



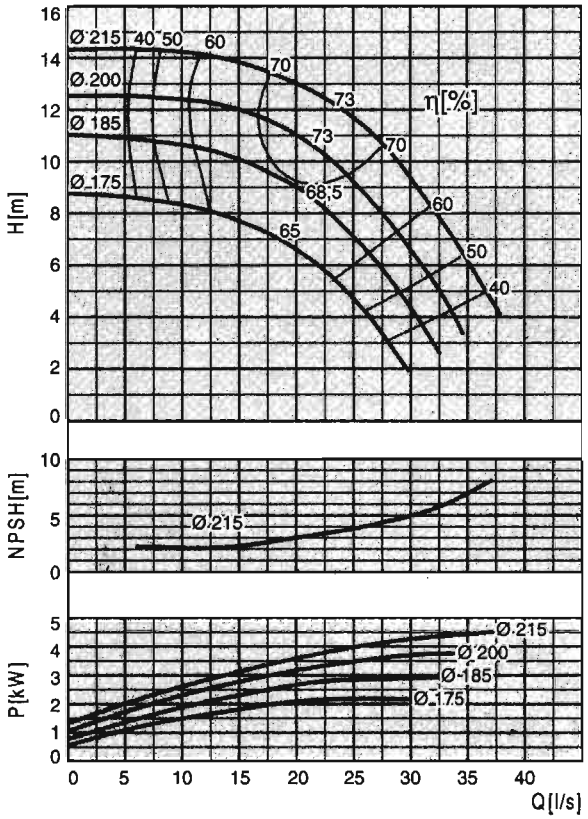
NN 80-160 n=24,2s^{-1}



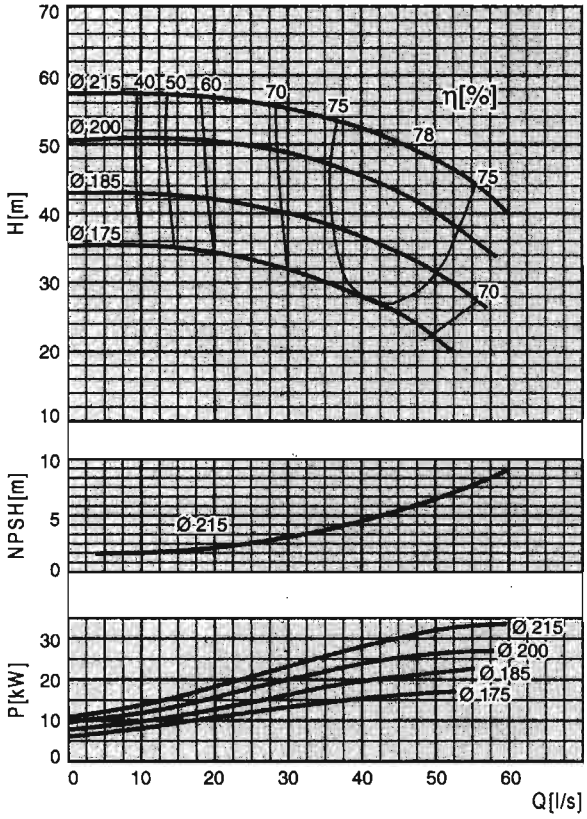
NN 80-160 n=48,4s^{-1}



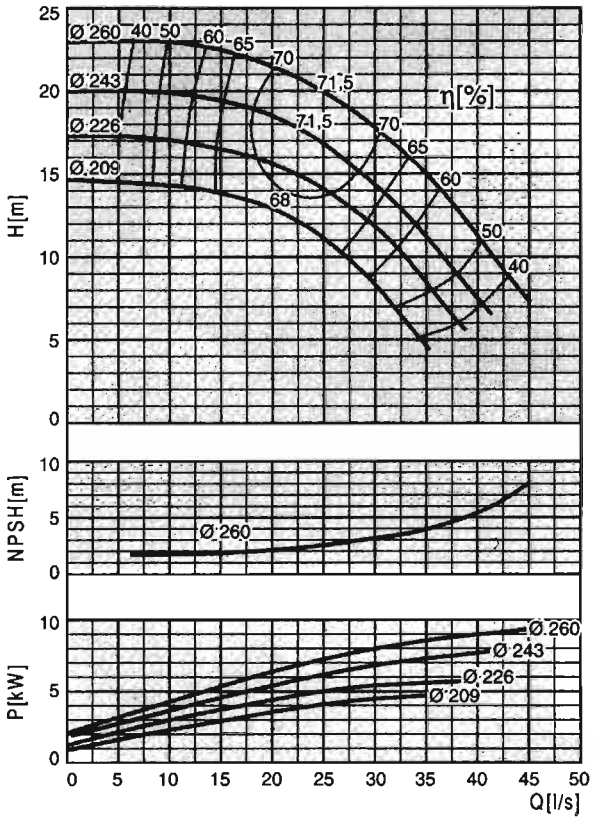
NN 80-200 n=24,2s^{-1}



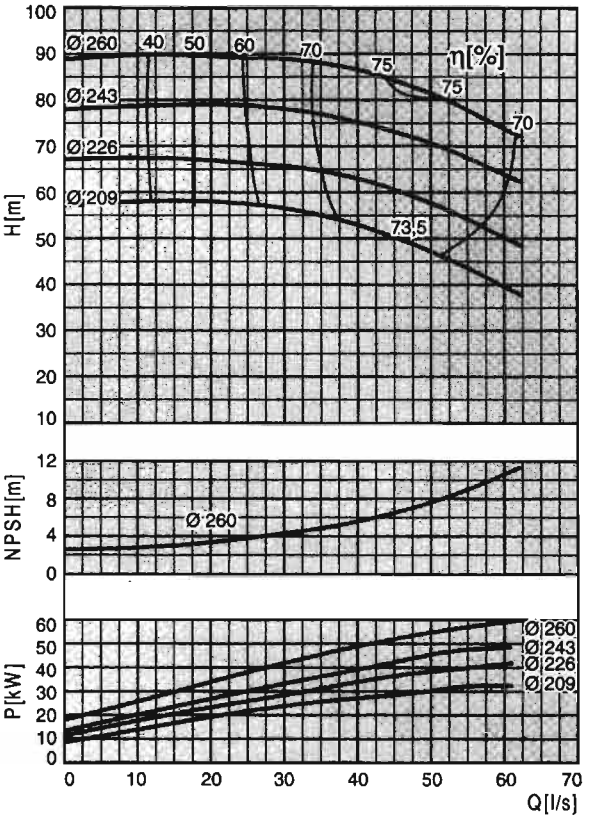
NN 80-200 n=48,4s^{-1}



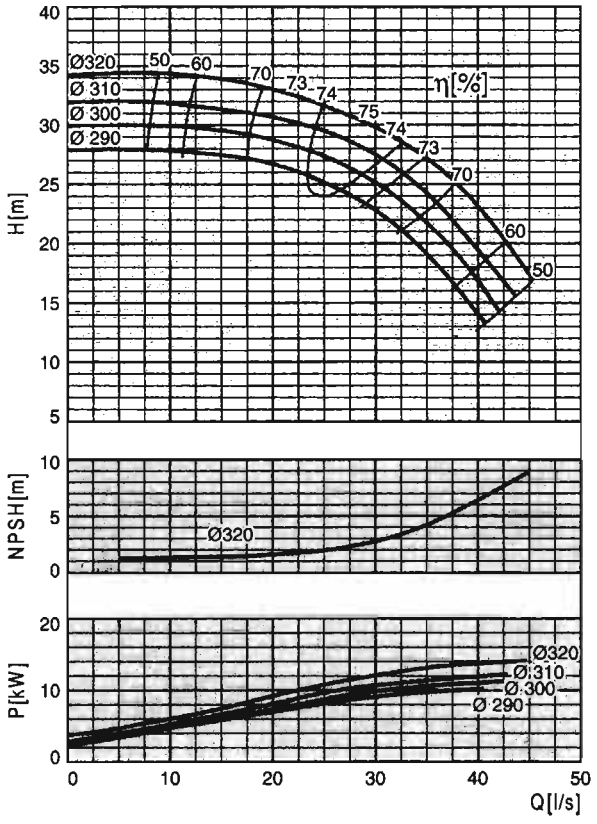
NN 80-250 n=24,2s^{-1}



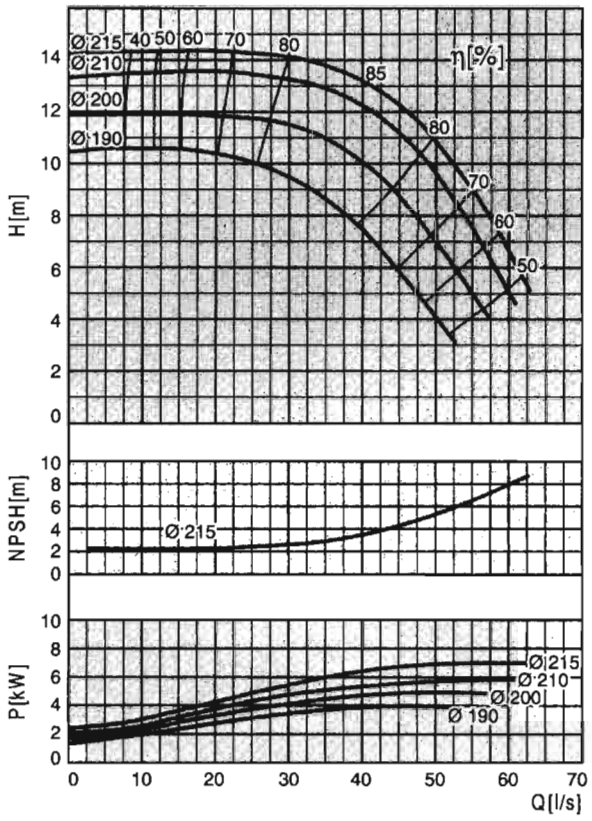
NN 80-250 n=48,4s^{-1}



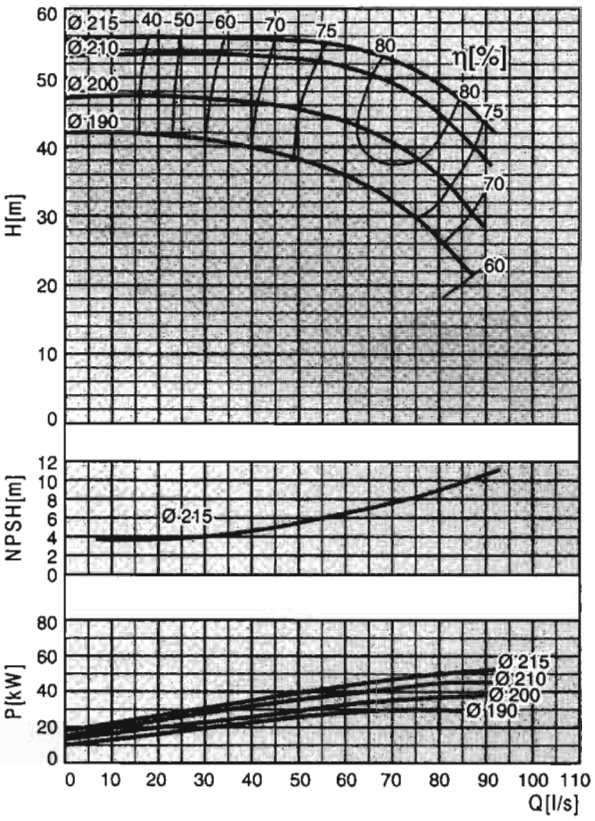
NN 80-315 n=24,2s^{-1}



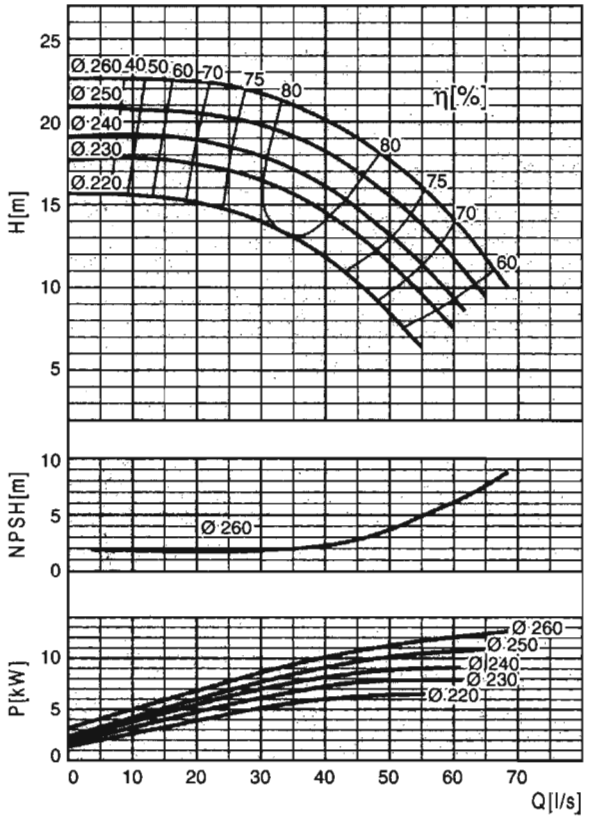
NN 100-200 n=24,2s^{-1}



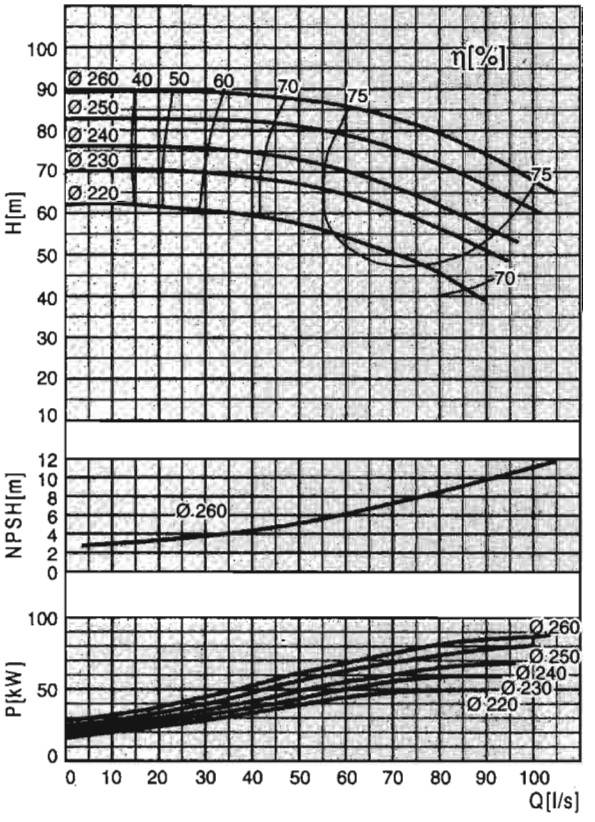
NN 100-200 n=48,4s^{-1}



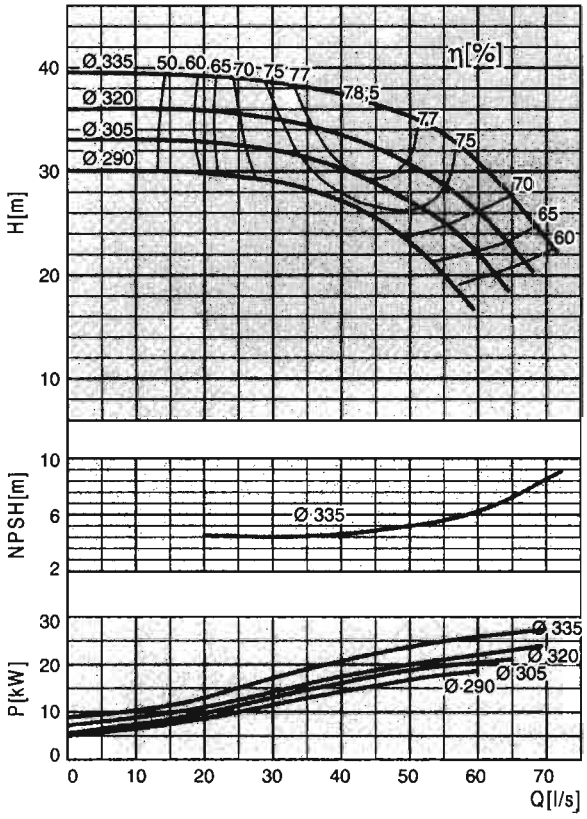
NN 100-250 n=24,2s^{-1}



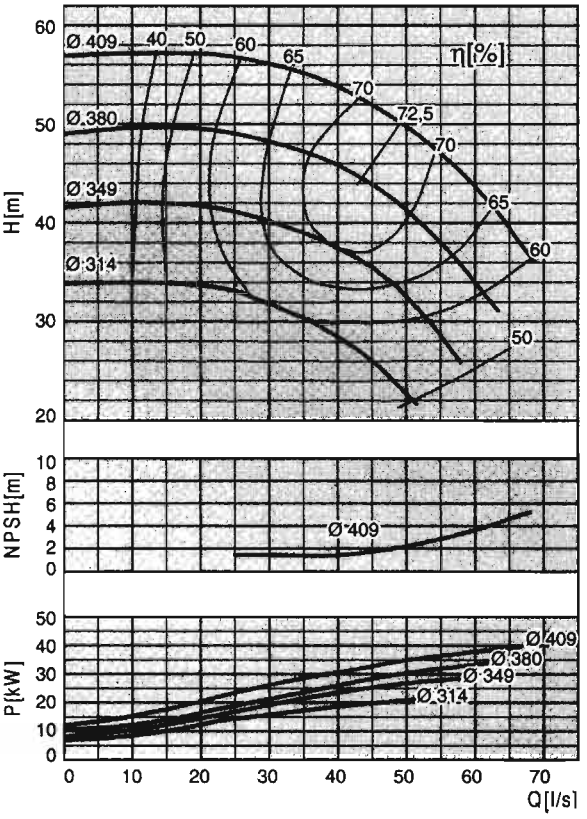
NN 100-250 n=48,4s^{-1}



NN 100-315 n=24,2s^{-1}



NN 100-400 n=24,4s^{-1}



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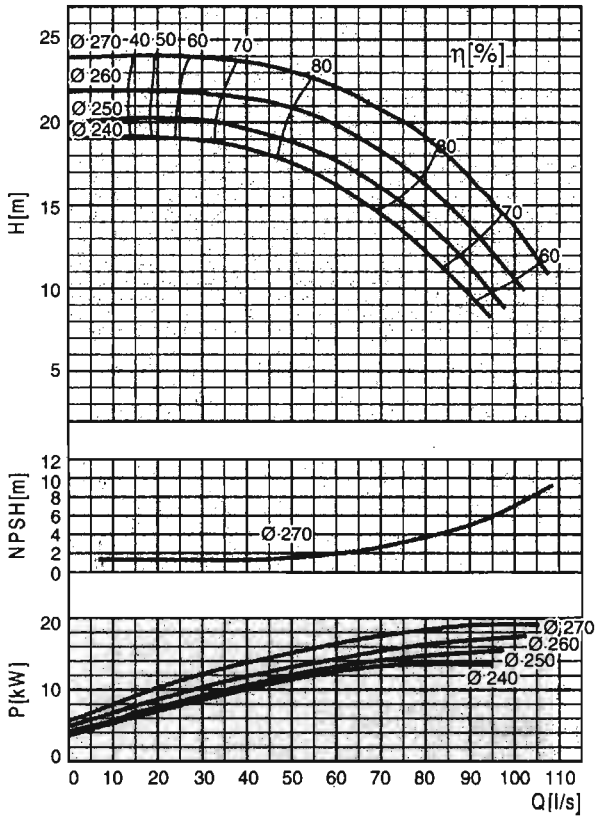

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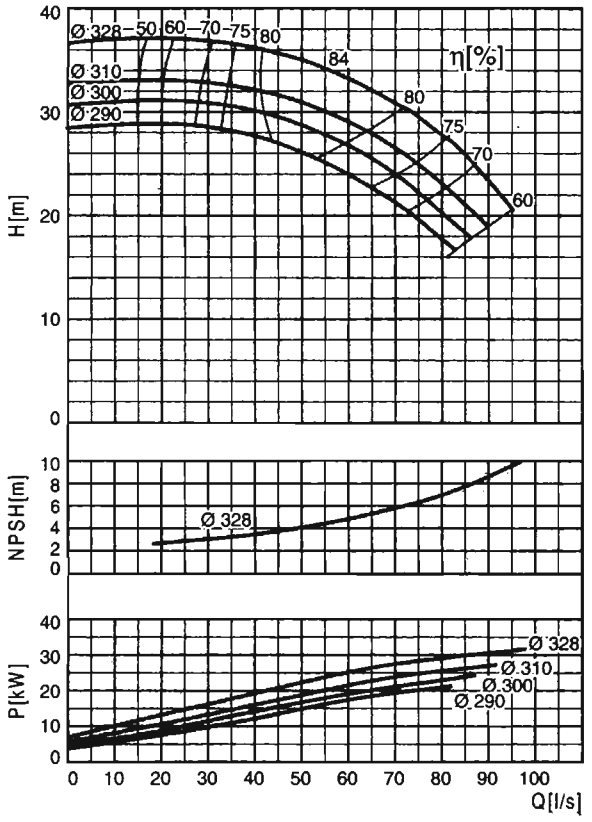
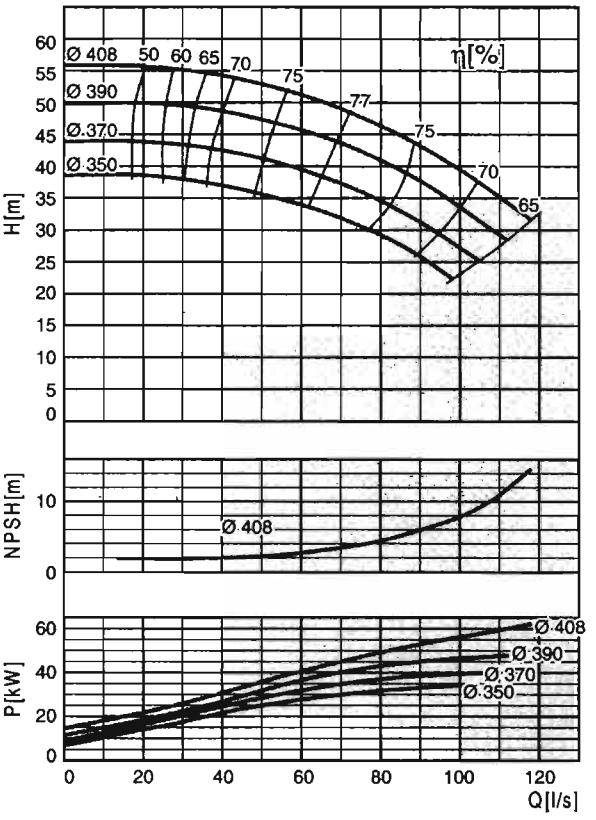
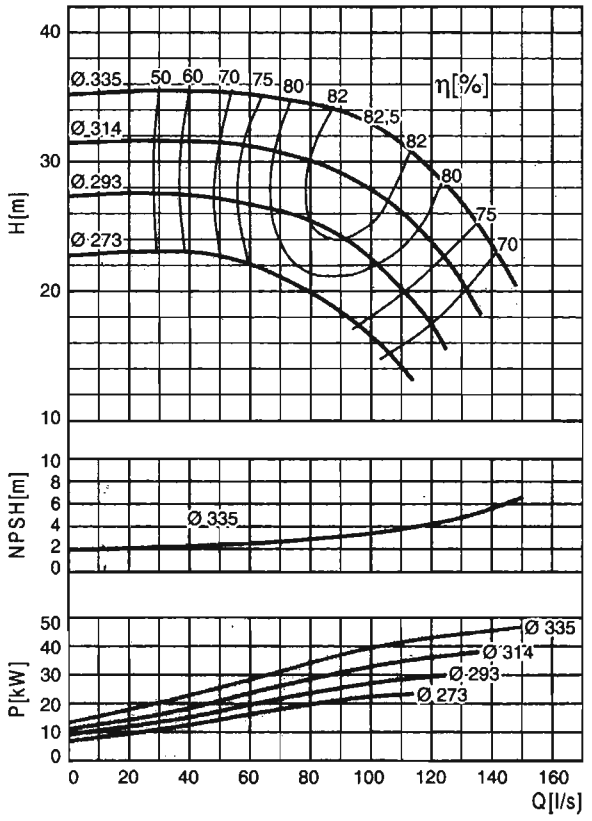


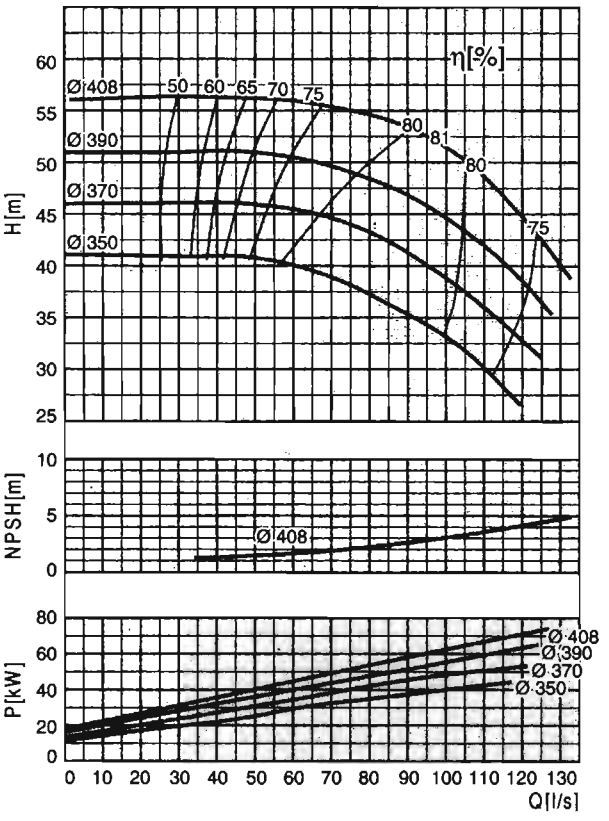
NN 125-400 n=24,2s^{-1}



NN 150-315 n=24,2s^{-1}



NN 150-400 n=24,2s^{-1}



Attachment 8

ENEQ Consult – Process Pump Type RPP

ENEQ Consult Ltd. delivers cost-effective mechanical equipment for nuclear, conventional, oil & gas, and petrochemical industries.

- **9 years** of solid performance
- **> 20 M€** project portfolio
- **> 50** completed projects, **> 10** in progress
- Exclusive partnerships with **5 manufacturers worldwide**
- Equipment compliant with **ASME, EN, N Stamp, DIN, ASTM, ISO, GOST**

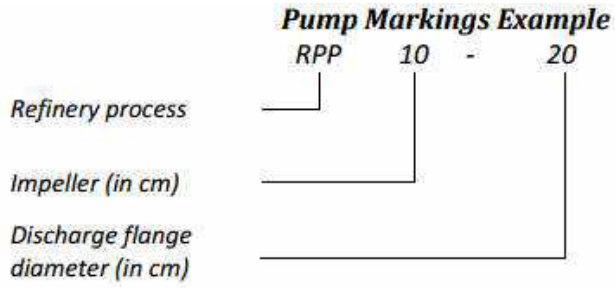
Expertise:

- **Equipment Supply** – high-quality OEMs, cost-effective modernization and new-build solutions, turnkey delivery
- **Engineering** – design critical analyses, FEA & CFD calculations, technical consulting
- **Service** – full project support from production to installation, commissioning, and after-sales

Process Pump Type RPP

Application

RPP pumps are designed as process pumps for very rigorous working conditions in process industry. They are made as per API610 standard, 7th edition (API = American Petroleum Institute). These pumps are delivered on the purchaser's special request and as spare part for delivered pumps. They are used for transport of all media in refineries, petrochemical industry, chemical and pharmaceutical industry, food industry, thermal power plants and everywhere where working conditions are such that can be realized by these pumps. The adequate choice of material enables transport of abrasive and aggressive media at very high temperatures and pressures.



Technical Data (Characteristics)

- Capacity: from 1 to 700 m^3/h
- Total head: from 4 to 240 m
- Max. working pressure: 35 bar dependant on the material
- Working temperature: from -70 °C to +300 °C

Design Pumps are designed as per API 610 standard, 6th edition. RPP pump is designed as single suction, single stage, horizontally pump with liquid axial inlet and radial outlet directed upwards. Impeller is keyed on the shaft. Shaft is supported on two ball bearings. Pump casing is installed between pump volute casing and bearing support. Stuffing box is provided on the pump casing cover. By means of spacer-type flexible coupling pumps can be dismantled and rotating parts can be pulled out without electromotor dismantling. Pump has one-part, single inlet volute casing which is separated by means of thicker walls (addition on corrosion 3 mm). Flanges are designed as per N ANSI standard. Impeller is radial, single flow, closed type.

Shaft is supported by standard oil lubricated and cooled bearings.

Axial thrust balancing

At these pumps axial thrust balancing is achieved by a wearing ring and pressure equalisation cores. (API 610, 7th edition)

At AP1610, 5th edition axial thrust balancing is achieved by impeller back-to-back vanes.

Sealing Sealing is normally made by soft packing or mechanical seal depending on media, working conditions and purchaser's request. Mechanical seals are supplied by the well known world producers like CRANE, FLEXIBOX, BURGMANN, PACIFIC, SEALOL. We prefer the installment of standard mechanical seals as per DIN 24 296 if the working conditions do not request special mechanical seals. Scavenging, cooling and lubrication of mechanical seals are performed as per Pl plans, in accordance with Pl 610. Mechanical seals can be arranged in

different ways; single or multiple acting, face to face, back to back, balanced or unbalanced, with or without injection of sealing liquid etc. Special high sealing arrangements are available upon request. Material is given as per Pl 610.

Materials

In various material combination the pumps type RPP can transport almost all sorts of abrasive and aggressive media. Materials are grouped in 5 main groups:

a) **Cast iron and cast steel (SL 25 and CL. 0445)**
   For water and neutral media in which there are no the abrasive particles.
b) **Bronze P. Cu Sn 10**
   For sea water, in food industry and aggressive media on which bronze is resistant.
c) **Stainless steel for aggressive media (CL. 4574 and CL. 4580, change for AISI 316 and AISI304)**
   For aggressive media in which a content of abrasive particles is not essential.
d) **d) Chromium cast steel for abrasive and aggressive media (CL. 417 1, CL. 4783, CL. 41702).**
   Mostly used for paper mass, aluminium oxide, sand, etc.
e) **e) Special cast steel with high percentage of nickel and chromium, 30% Ni, 20% Cr (JGT 29.21.)**
   For sulphuric acid at high temperatures and for other very aggressive fluids.

Aggregation

Pumps are coupled with electromotors on common bed plate by means of flexible coupling. Upon the purchaser's request the aggregating can be performed with best transmission for required speed. Apart from electrical drive, KPP pumps could be driven by other types of prime movers.

Popis materijala za procesne pumpe ***List Of Materials For PPR Pumps***

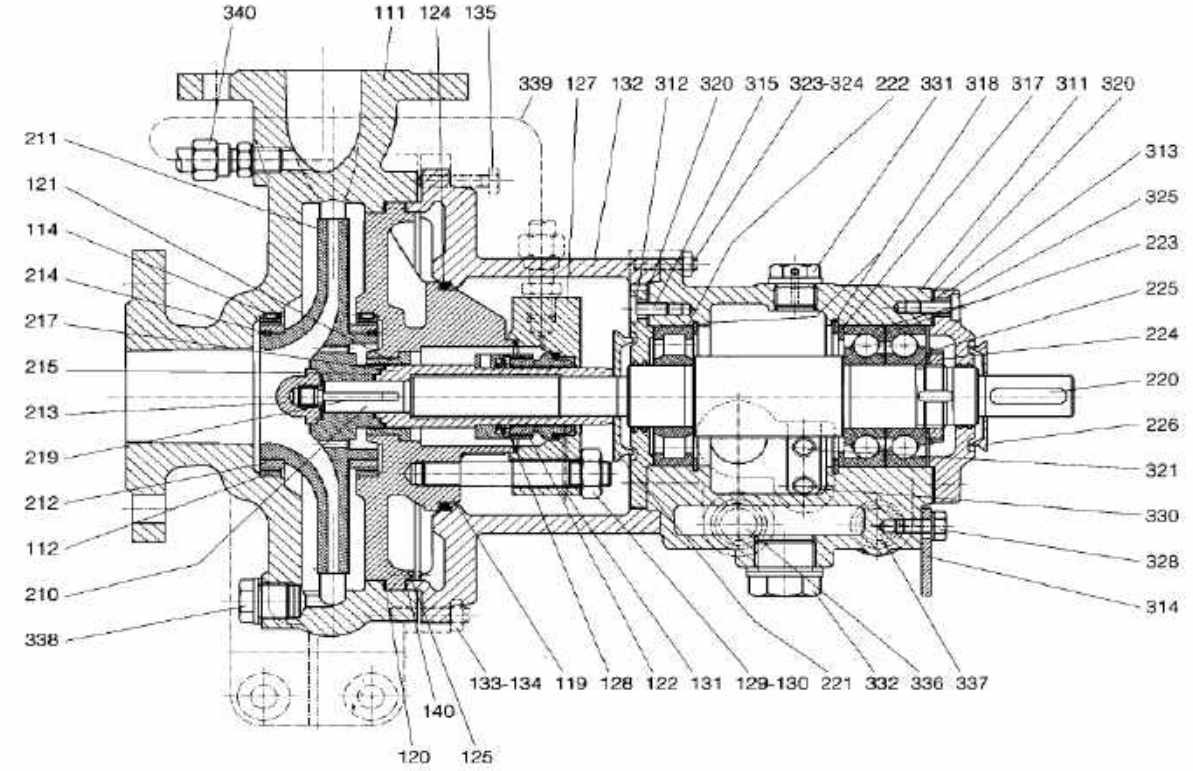
Naziv dijela		***Part***		Sastav i primjena *Composition and Application*
Kućište *Casing*	Kolo rotora *Impeller*	Rasporni prsten	Vratilo Axel	
SL 25	SL 25	SL 25	ČL. 1730	Za vodu i neutralne medije do 90°C *For water and neutral mediums (up to 90°C)*
ČL. 0445	SL 25	SL 25	ČL. 1730	Za naftu, naftne derivate, ugljikovodike, za vruću vodu *For oil, oil derivatives, carbohydrates, hot water*
	ČL. 4580	ČL. 4580	ČL. 4570	
Bronca Bronze	Bronca Bronze	Bronca Bronze	ČL. 4570	Za morsku vodu, prehrambene proizvode, I agresivne medije bez abrazije *For sea water, food industry and aggressive mediums without abrasion*
ČL. 4574	ČL. 4574	ČL. 4574	ČL. 4570	Za izrazito agresivne medije. Zamjena za AISI 316 i AISI 304. *For extremely aggressive mediums. Substitute for AISI 316 I AISI 304.*
ČL. 4580	ČL. 4580	ČL. 4580		
ČL. 4171	ČL. 4171	ČL. 4171	ČL. 4570	Za abrazivne i agresivne medije (papirna masa i sl.) *For abrasive and aggressive mediums (paper pulp etc.)*
ČL. 4771	ČL. 4771	ČL. 4771		
ČL. 41702	Č. 41702	Č. 41702	ČL. 4570	Za abrazivne i agresivne medije *For abrasive and aggressive mediums*
ČL. 4783	ČL. 4783	ČL. 4783	ČL. 4570	Za izrazito abrazivne medije (glinica, kvarcni pijesak, itd.) *For extremely abrasive mediums (quartz sand, etc)*
CP 29,21	CP 29,21	CP 29,21	Č. 4570	Odgovara WNR 1.4500 za 30% H_2SO_4, t=90°C (30% Ni, 20% Cr) *Matches WNR 1.4500 for 30% H_2SO_4, t=90°C (30% Ni, 20% Cr)*
CP 39,21	CP 39,21	CP 39,21	Č. 4570	Odgovara Hastelloy C za HCl (40% Ni, 20% Cr) *Matches Hastelloy C za HCl (40% Ni, 20% Cr)*
CP 27.6	CP 27.6	CP 27.6	Č. 4570	Odgovara WNR 9.4460 (NORIDUR) za H_3PO_4 s krutinama otporan na abraziju i koroziju Matches WNR 9.4460 (NORIDUR) for H_3PO_4 with strengtheners resistant on abrasion and corrosion
Hastelloy B	Hastelloy B	Hastelloy B	Č. 4570	(60 % Ni, 30% Mb) za HCl, F, HF
Hastelloy C	Hastelloy C	Hastelloy C		(60 % Ni, 20% Mb, 15%Cr) *(60 % Ni, 30% Mb) for HCl, F, HF* *(60 % Ni, 20% Mb, 15%Cr)*

Nosač ležaja uglavnom izvodimo iz SL 25 ukoliko nema specijalnih zahtjeva i ukoliko uvjeti rada to ne zahtijevaju. Osim navedenih materijala može se izvesti pumpa iz SL 25 s specijalnim zaštitnim premazom otpornim na abrazive i agresivne medije

Bearing support is mainly manufactured out of Gray iron (SL25) if there are no special demands and if working conditions don't require different material.
Besides aforementioned materials pump can be manufactured out of Gray iron (SL25) with special application resistant to abrasives and aggressive mediums.

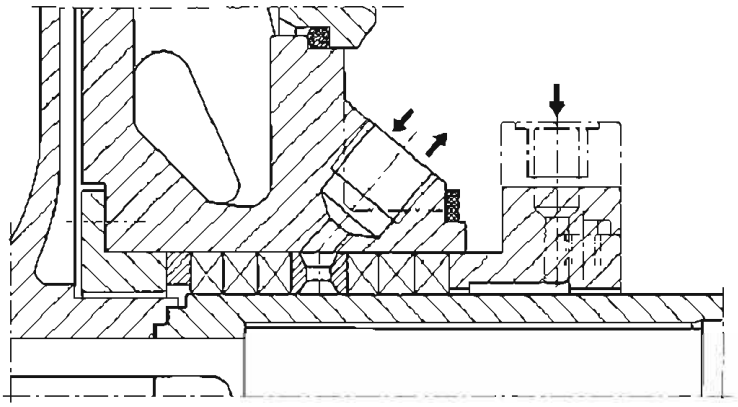
Prijedlog rezervnih dijelova za dvogodišnji rad			***Suggested Spare Parts For Two Years Period***						
Pozicija br. ***Position No.***	**Naziv dijela** ***Part***		**Broj ugrađenih pumpi** ***Number of installed pumps***						
			2	3	4	5	6	8	10
			Broj komada rezervnih dijelova ***Number Of Spare Parts***						
212	Vratilo / *Axel*		1	1	2	2	2	3	30%
211	Kolo rotora / *Impeller*		1	1	1	2	2	3	30%
222	Kotrljajući ležaj (par) / *Rolling Bearing (pair)*		1	1	2	2	3	4	50%
223	Kotrljajući ležaj / *Rolling Bearing*		1	1	2	2	3	4	50%
311	Nosač ležaja, komplet s vratilom i ležajima / *Bearing Support with Axel and Bearings*		-	-	-	-	-	-	2
140	Mehanička brtva / Mechanical Gasket	Rotacioni prsten / Rotating Ring	2	3	4	4	4	6	90%
		Stacionarni prsten / Stationary Ring	2	3	4	4	4	6	90%
		O-Prsten / O-Ring	2	3	6	8	8	10	150%
		Osovinska brtva /*Shaft's Gasket*	2	3	6	8	8	10	150%
		Opruga / Spring	1	1	1	1	2	2	20%
120	Prednji tuljak brtve / *Front Gasket Sleeve*		1	1	2	2	2	3	30%
112	Rasporni prsten kućišta / Casing's *Wearing Ring*		2	2	2	3	3	4	50%
213	Rasporni prsten rotora / *Impeller's Wearing Ring*		2	2	2	3	3	4	50%
218	Zaštitni tuljak vratila / *Shaft's Security Sleeve*		1	1	1	2	2	2	20%
115	Brtve kućišta (komplet) / *Casing's Packing (set)*		4	6	8	8	9	12	150%
321,324, 329,331	Ostale brtve (komplet) / *Other Packing (set)*		4	6	8	8	9	12	150%
Brojke u % znače odnos broja komada rezervnih dijelova prema broju komada ugrađenih pumpi iste veličine.									
Percentages stated represent the number of spare parts in respect to number of identical pumps installed									

Presjek pumpe tipa RPP *RPP pump cross-section*



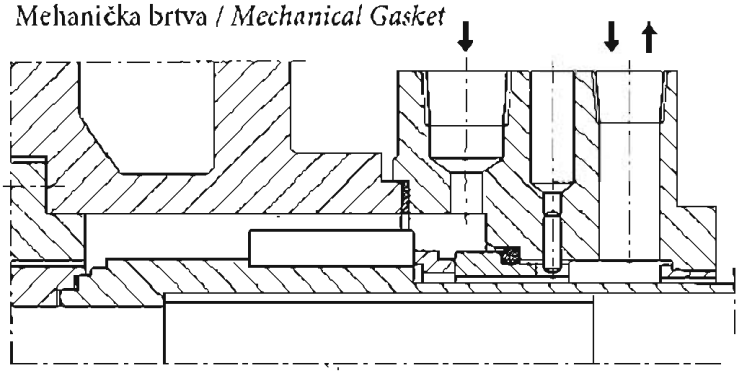
Popis dijelova pumpi tipa RPP					***RPP Pump Parts List***
111	Spiralno kućište / *Volute Casing*	135	Vijak / *Bolt*	312	Poklopac ležaja / *Bearing Cover*
112	Rasporni prsten / *Wearing Ring*	136	Vijak / *Bolt*	313	Poklopac ležaja / *Bearing Cover*
114	Vijak / *Bolt*	140	Brtva / *Packing*	314	Noga / *Leg*
119	Poklopac kućišta / *Casing Cover*	210	Vratilo / *Shaft*	317	Distantni prsten / *Distance Ring*
120	Brtva / *Packing*	211	Kolo rotora / *Impeller*	318	Uskočnik / *Trip Unit*
121	Brtveni tuljak / Packing *Sleeve*	212	Rasporni prsten / *Wearing Ring*	320	Brtva / *Packing*
122	Mehanička brtva / *Mechanical Seal*	213	Vijak kola rotora / *Impeller Screw*	321	Regulator nivoa ulja / *Oil Level Control*
123	Prsten / *Ring*	214	Vijak / *Bolt*	323	Vijak / *Bolt*
124	Prsten / *Ring*	215	Brtveni prsten / *Packing Ring*	324	Matica / *Nut*
125	Zatik / *Pin*	217	Tuljak vratila / *Shaft Screw*	325	Vijak / *Bolt*
126	Zatik / *Throttle Sleeve*	219	Uložno pero / *Insertion Spring*	328	Vijak / *Bolt*
127	Poklopac meh. brtve / *Mechanical Seal Casing*	220	Uložno pero / *Insertion Spring*	330	Vijak / *Bolt*
128	Brtva / *Packing*	221	Centrifugalni odvajač / *Centrifugal Separator*	331	Vijak / *Bolt*
129	Vijak / *Bolt*	222	Ležaj / *Bearing*	332	Vijak / *Bolt*
130	Matica / *Nut*	223	Ležaj / *Bearing*	336	Vijak / *Bolt*
131	Zatik / *Pin*	224	Matica / *Nut*	337	Vijak / *Bolt*
132	Nosač kućišta / Casing Support	225	Sigurnosni lim / *Safety Sheet Metal*	338	Vijak / *Bolt*
133	Vijak / *Bolt*	226	Centrifugalni odvajač / *Centrifugal Separator*	339	Cijev / Hose
134	Matica / *Nut*	311	Nosač ležaja / *Bearing Support*	340	Priključak / *Fitting*

Brtvena pletenica / *Stuffing*

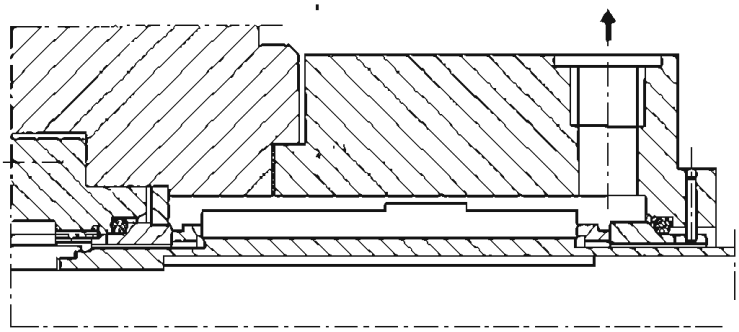


Način brtvljanja brtvenom pletenicom / *Sealing With Stuffing*

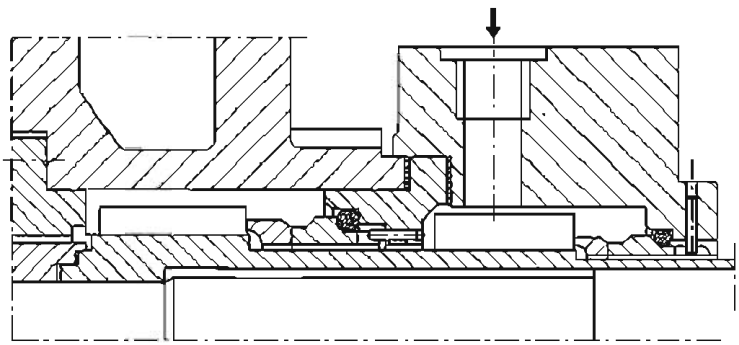
Mehanička brtva / *Mechanical Gasket*



Način brtvljenja jednostrukom mehaničkom brtvom / *Sealing With Single Mechanical Gasket*



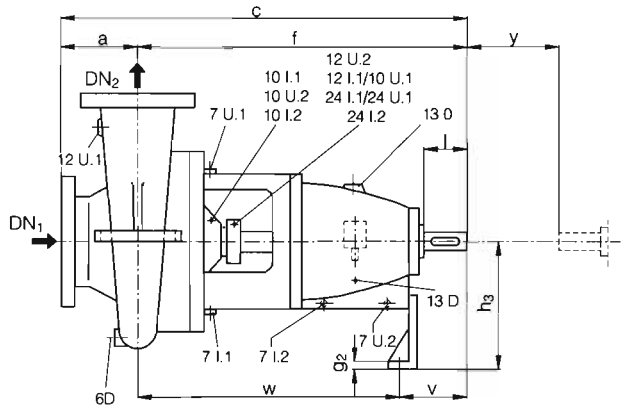
Način brtvljenja dvostrukom mehaničkom brtvom / *Sealing With Double Mechanical Gasket*

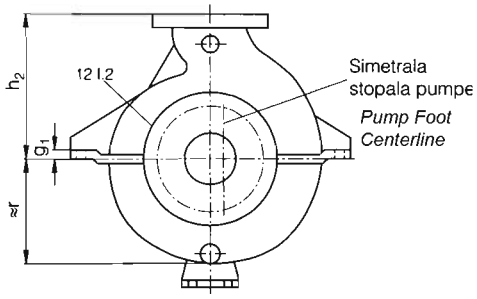


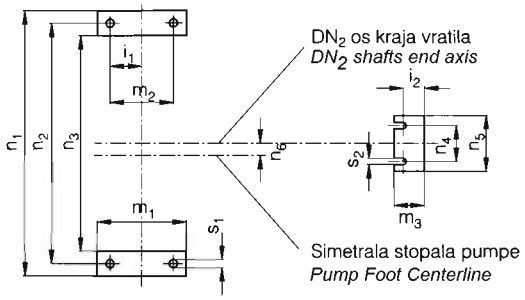
Način brtvljenja tandem mehaničkom brtvom / *Sealing With Tandem Mechanical Gasket*

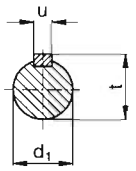
Mjerna skica pumpe

Pump Sketch With Dimensions









Kraj vratila / *Shaft End*

Klin po DIN 6885
Shaft Key - DIN 6885

Vel. pumpe *Pump Size*	Dimenzije pumpe / *Pump Dimensions*																Kraj vratila / *Shaft End*					Spojni vijci / *Bolts*								
	DIN_1	DN_2	a[2]	c[2]	f	g_1	g_2	h_2[2]	h_3	m_1	m_3	n_1	n_3	n_5	n_6	≈r	d_1 k_6	l	t	u	y	i_1	i_2	m_2	n_2	n_4	s_1	s_2	v	w
16-2,5	40	25	95	480	385	15	8	160	160	90	45	315	235	160	–	115	24	50	26,9	8	100	28,5	28	54	280	110	14	14	100	285
20-2,5	40	25	95	480	385	15	8	160	160	90	45	375	290	160	–	115	24	50	26,9	8	100	28,5	28	54	340	110	14	14	100	285
16-4	50	40	95	480	385	15	8	165	160	90	45	315	235	160	–	120	24	50	26,9	8	100	28,5	28	54	280	110	14	14	100	285
20-4	50	40	100	485	385	15	8	185	160	90	45	375	290	160	–	135	24	50	26,9	8	100	28,5	28	54	340	110	14	14	100	285
25-4	50	40	115	615	500	19	8	230	180	130	47	460	360	160	–	160	32	80	35,3	10	120	52,5	30	90	420	110	18	14	130	370
31,5-4	50	40	125	625	500	19	8	255	255	130	47	500	400	160	–	190	32	80	35,3	10	120	52,3	30	90	460	110	18	14	130	370
16-5	80	50	105	490	385	15	8	180	160	90	45	375	290	160	–	140	24	50	26,9	8	100	28,5	28	54	340	110	14	14	100	285
20-5	80	50	105	490	385	15	8	200	160	90	45	425	345	160	–	150	24	50	26,9	8	100	28,5	28	54	390	110	14	14	100	285
25-5	80	50	130	630	500	19	8	225	225	130	47	460	360	160	–	170	32	80	35,3	10	120	52,5	30	90	420	110	18	14	130	370
35,5-5	80	50	130	630	500	19	8	280	260	130	47	540	440	160	–	200	32	80	35,3	10	120	52,5	30	90	500	110	18	14	130	370
40-5	80	50	140	670	530	25	12	315	315	150	52	690	590	160	–	250	42	110	45,1	12	120	72	33	110	650	110	18	14	160	370
16-5	100	80	135	635	500	19	8	230	225	130	47	460	360	160	–	170	32	80	35,3	10	120	58,5	30	90	420	110	18	14	130	370
20-8	100	80	135	635	500	19	8	255	225	130	47	500	400	160	–	190	32	80	35,3	10	120	58,5	30	90	460	110	18	14	130	370
25-8	100	80	135	635	500	19	8	285	260	130	47	580	480	160	–	210	32	80	35,3	10	120	52	30	90	540	110	18	14	130	370
31,5-8	100	80	140	670	530	21	12	320	280	130	52	640	540	160	–	230	42	110	45,1	12	140	51	33	90	600	110	18	14	160	370
40-8	100	80	150	820	670	25	12	360	355	150	60	690	590	200	–	270	48	110	51,5	14	180	55	39	110	650	140	18	18	170	500
20-10	150	100	135	635	500	19	8	290	260	130	47	540	440	160	–	195	32	80	35,3	10	120	58,5	30	90	500	110	18	14	130	370
25-10	150	100	150	680	530	19	12	290	290	130	52	640	540	160	–	210	42	110	45,1	12	140	52,5	33	90	540	110	18	14	160	370
32,5-10	150	100	150	680	530	21	12	325	315	130	52	640	540	160	–	240	42	110	45,1	12	140	52	33	90	600	110	18	14	160	370
40-10	150	100	150	820	670	25	12	365	355	150	60	740	640	200	–	280	48	110	51,5	14	180	55	39	110	700	140	18	18	170	500
31,5-15	200	150	170	840	670	25	12	410	355	150	60	690	590	200	–	260	48	110	51,5	14	180	55	39	110	650	140	18	18	170	500
40-15	200	150	170	700	530	25	12	460	355	150	60	820	720	100	–	310	48	110	51,5	14	180	55	39	110	780	140	18	18	170	500
50-15	200	150	180	850	670	30	12	500	375	180	60	960	820	200	–	360	48	110	51,5	14	180	65	39	130	910	140	22	18	170	500
25-20	250	200	190	860	670	25	12	435	355	150	60	690	590	200	–	275	48	110	51,5	14	180	55	39	110	650	140	18	18	170	500
31,5-20	250	200	210	930	720	30	12	460	355	180	60	790	650	200	–	290	60[1]	140	64,2	18	180	65	39	130	740	140	22	18	205	515
40-20	250	200	190	910	720	30	12	510	355	180	60	900	760	200	–	320	60[1]	140	64,2	18	180	65	39	130	850	140	22	18	205	515
50-25	300	250	200	920	720	30	12	670	475	210	60	1200	1040	200	–	470	60[1]	140	64,2	18	180	75	39	150	1120	140	28	18	205	515
40-30	350	300	300	1200	900	30	12	630	500	310	60	1200	1020	200	–	445	75[1]	150	79,5	20	250	130	39	210	1120	140	28	18	220	680
50-30	350	300	300	1200	900	30	12	750	560	310	60	1360	1180	200	–	495	75[1]	150	79,5	20	250	130	39	210	1280	140	28	18	220	680
40-35	350	350	350	1280	930	30	12	750	600	310	60	1460	1280	200	–	550	75[1]	150	79,5	20	250	105	39	210	1380	140	28	18	220	710
50-35	350	350	300	1200	900	40	12	850	670	400	70	1560	1320	240	90	630	75[1]	150	79,5	20	250	150	48	300	1460	184	35	20	268	632

Dimenzije u mm *Dimensions in mm*

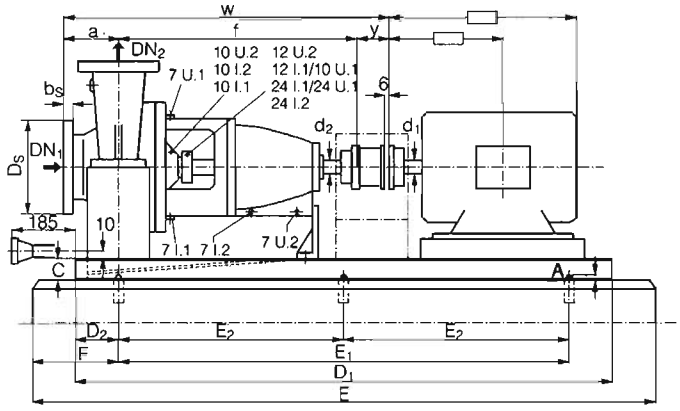
[1] d_1 n_6

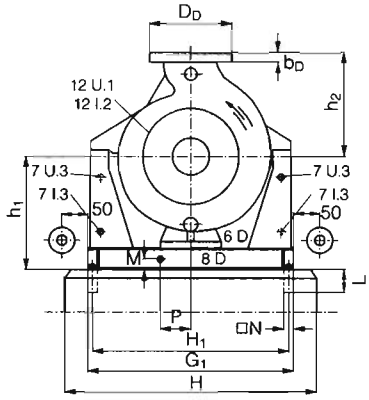
[2] Ako su prirubnice po ANSI 300 lbs (RTJ) dodati 8 mm
If Flanges Are As Per ANSI 300 lbs Add 8 mm

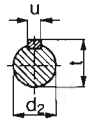
Sve mjere su informativne i proizvođač zadržava pravo izmjene
All measurements are for information purposes and manufacturer retains the right to change them.

Mjerna skica agregata po ISO 3661 i DIN 24259

Generator Sketch With Dimensions As Per ISO 3661 and DIN 24259







Kraj vratila
Shaft end

Dimenzije temeljne ploče i temelja

Base and Base Plate Dimensions Dimensions

	kg	D_1	G_1	C	D_2	E_1	E_2	H_1	A	E	H	L	M	N□	P	Temeljni vijci DIN 529 *Foundation Bolts DIN 529*
3 S	60	900	390	95	150	600	90	350	12	1020	500	180	35	70	100	M 16 x 200
4 S	78	1000	445	115	170	660	110	400	13	1130	580	220	40	85	100	M 20 x 250
5 S	112	1120	485	120	190	740	130	440	13	1250	620	220	40	85	100	M 20 x 250
6 S	128	1250	535	120	205	840	135	490	13	1380	670	220	40	85	100	M 20 x 250
7 S	188	1400	600	143	230	940	160	550	15	1540	750	220	55	100	150	M 24 x 250
8 S	231	1600	650	143	270	1060	180	600	15	1740	800	220	55	100	150	M 24 x 250
9 S	281	1800	720	143	300	1200	210	670	15	1940	870	220	55	100	150	M 24 x 250
10 S[1)]	410	2000	890	203	330	1340	210	830	17	2140	1030	350	60	100	120	M 30 x 400

[1)] Veličine koje nisu uključene u ISO 3661
Values Not Included In ISO 3661

Mjere su u (mm) i informativne; proizvođač zadržava pravo izmjene.
All measurements are in mm and for information purposes.
Manufacturer retains the right to change them.

Dimenzije pumpe

Pump Dimensions

Veličina pumpe *Pump Size*	Težina *Weight*	Dimenzije pumpe *Pump Dimensions*							Usisna prirubnica *Discharge Flange*		Tlačna prirubnica *Pressure Flange*		Za prirubnice / *For Flanges* ANSI 150/300-RF PN 16/25/40			ANSI/300-RTJ		
	kg	DN_1	DN_2	d_2	f	y	u	t	D_S[1)]	b_S[1)]	D_D[1)]	b_D[1)]	a	w	h_2	a	w	h_2
16-2,5	62	40	25	24	385	100	8	26,9	156	25	124	20	95	580	160	102	587	167
16-4	69	50	40	24	385	100	8	26,9	165	25	156	25	95	580	165	103	588	172
20-2,5	68	40	25	24	385	100	8	26,9	156	25	124	20	95	580	180	102	587	187
20-4	73	50	40	24	385	100	8	26,9	165	25	156	25	100	585	185	108	593	192
16-5	72	80	50	24	385	100	8	26,9	210	31	165	25	105	590	180	113	598	188
20-5	79	80	50	24	385	100	8	26,9	210	31	165	25	105	590	200	113	598	208
25-4	102	50	40	32	500	140	10	35,3	165	25	156	25	115	755	230	123	763	237
25-5	106	80	50	32	500	140	10	35,3	210	31	165	25	130	770	225	138	778	233
16-8	96	100	80	32	500	140	10	35,3	254	36	210	31	135	775	230	143	783	283
31,5-4	131	50	40	32	500	140	10	35,3	165	25	156	25	125	765	255	143	773	262
31,5-5	131	80	50	32	500	140	10	35,3	210	31	165	25	130	770	280	138	778	288
20-8	111	100	80	32	500	140	10	35,3	254	36	210	31	135	775	225	143	783	263
25-8	126	100	80	32	500	140	10	35,3	254	36	210	31	135	775	283	143	783	293
20-10	132	150	100	32	500	140	10	35,3	318	40	254	36	135	775	290	143	793	298
25-10	166	150	100	42	530	140	12	45,1	318	40	254	36	150	820	290	158	828	298
31,5-8	176	100	80	42	530	140	12	45,1	524	36	210	31	140	810	320	148	818	328
31,5-10	220	150	100	42	530	140	12	45,1	318	40	254	36	150	820	325	158	828	333
40-8	257	100	80	48	670	180	14	51,5	254	36	210	31	150	1000	360	158	1008	368
40-10	282	150	100	48	670	180	14	51,5	318	40	254	36	150	1000	365	158	1008	373
31,5-15	315	200	150	48	670	180	14	51,5	381	46	318	40	170	1020	410	178	1028	418
40-15	355	200	150	48	670	180	14	51,5	381	46	318	40	170	1020	460	178	1028	468
25-20	362	250	200	48	670	180	14	51,5	450	50	381	46	190	1040	435	198	1048	443

[1)] U skladu s vrijedećim standardima.
In accordance with current standards

Mjere su u (mm) i informativne, proizvođač zadržava pravo izmjene.
All measurements are in mm and for information purposes.
Manufacturer retains the right to change them.

Odnos pumpa / temeljna ploča / veličina h1 (informativna)

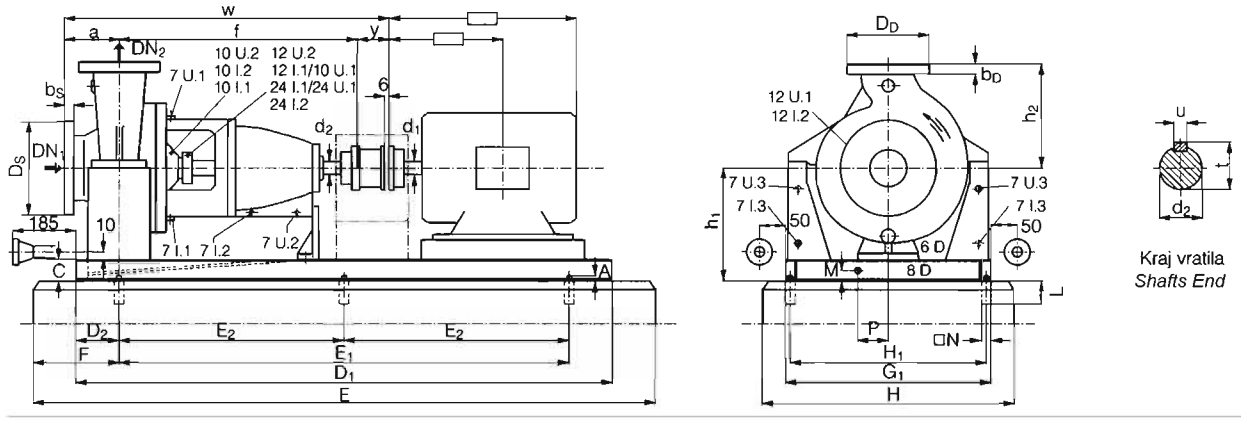
Relationship Pump / Base Plate / Value h1 (informative)

Veličina pumpe *Pump Size*	IEC	80	90 S	90 L	100 L	112 M	132 S	132 M	160 M	160 L	180 M	180 L	200 L	225 S	225 M	250 M	280 S	280 M	315 S	315 S	315 M	355 S	355 M
	d' 4-pola *4-pole's*	19	24	24	28	28	38	–	42	42	48	48	55	60	60	65	75	75	–	80	80	90	90
	d' 2-pola *2-pole's*	19	24	24	28	28	–	38	42	42	48	–	55	–	55	60	65	65	65	–	65	70	70
16 - 2,5		255	255	255	255	255	255																
16 - 4		255	255	255	255	255	255																
Temeljna ploča / *Base Plate*				3 S																			
20 - 2,5		275	275	275	275	275	275	275															
20 - 4		275	275	275	275	275	275	275	285														
16 - 5		295	295	295	295	295	295	295	300														
Temeljna ploča / *Base Plate*				4 S					5 S														
20 - 5		300	300	300	300	300	300	300	300	300	305	305											
Temeljna ploča / *Base Plate*							5 S																
25 - 4					300	300	300	300	300	323	328												
25 - 5					345	345	345	345	345	368	368	368	368	373	373								
16 - 8					345	345	345	345	345	368	368	368	368										
Temeljna ploča / *Base Plate*							6 S			7 S													
31,5 - 4					368	368	368	368	368	368	368	368	368	373	398								
31,5 - 5					423	423	423	423	423	423	423	423	423	423	423	423	428						
20 - 8					368	368	368	368	368	368	368	368	368	373	373	398							
Temeljna ploča / *Base Plate*										7 S						8 S							
25 - 8					423	423	423	423	423	423	423	423	423	423	423	423	428	428					
Temeljna ploča / *Base Plate*												8 S											
20 - 10					423	423	423	423	423	423	423	423	423	423	423	423	428	428					
Temeljna ploča / *Base Plate*										7 S							8 S						
25 - 10									448	448	448	448	448	448	448	448	448	448	463	463			
Temeljna ploča / *Base Plate*												8 S							9 S				
31,5 - 8									448	448	448	448	448	448	448	448	448	448	463	463	463		
31,5 - 10									503	503	503	503	503	503	503	503	503	503	503	503			
Temeljna ploča / *Base Plate*															9 S								
40 - 8													563	563	563	563	563	563	563	563	563		
40 - 10													563	563	563	563	563	563	563	563	563		
31,5 - 15													563	563	563	563	563	563	563	563	563		
40 - 15													563	563	563	563	563	563	563	563	563		
25 - 20													563	563	563	563	563	563	563	563	563		
Temeljna ploča / *Base Plate*																	10 S						

Mjere su u (mm) i informativne, proizvođač zadržava pravo izmjene.
All measurements are in mm and for information purposes. Manufacturer retains the right to change them.

Mjerna skica agregata po JGT standard

Pump Set Sketch With Dimensions As Per JGT Standards



Dimenzije temeljne ploče i temelja

Base and Base Plate Dimensions

Veličina *Size*	Težina (kg) *Weight (kg)*	A	C	D_1	d_2	E	E_1	E_2	F	G_1	H	H_1	L	M	N□	P	Temeljni vijci DIN 529 *Base Bolts DIN 529*
11	296	18	223	1500	210	1740	1050	–	330	770	1010	712	350	80	90	150	M 30 x 400
12	323	18	223	1800	210	2040	1280	–	330	770	1010	712	350	80	90	150	M 30 x 400
13	425	18	223	2120	210	2360	1580	–	240	900	1140	842	350	80	90	150	M 30 x 400
14	480	20	243	120	280	2360	1500	–	400	980	1220	914	350	100	90	200	M 30 x 400
15	518	20	243	2500	280	2740	1940	–	400	980	1220	914	350	100	90	200	M 30 x 400
16	545	20	243	2120	290	2360	1490	–	410	1180	1420	1116	350	100	90	200	M 30 x 400
17	585	20	243	2500	290	2740	1870	935	410	1180	1420	1116	350	100	90	200	M 30 x 400
18	685	20	263	2500	400	2740	1700	850	520	1320	1560	1245	350	100	90	250	M 30 x 400
19	745	20	263	2800	400	3040	2000	1000	520	1320	1560	1245	350	100	90	250	M 30 x 400
20	787	20	263	2500	290	2740	1870	935	410	1320	1560	1245	350	100	90	250	M 30 x 400
21	765	20	263	2500	400	2740	1700	850	520	1500	1740	1425	350	100	90	250	M 30 x 400
22	833	20	263	2800	400	3040	2000	1000	520	1500	1740	1425	350	100	90	250	M 30 x 400

Mjere su u (mm) i informativne; proizvođač zadržava pravo promjene.
All measurements are in mm and for information purposes.
Manufacturer retains the right to change them.

Dimenzije pumpe

Pump Dimensions

Veličina pumpe *Pump Size*	Težina *Weight*	Dimenzije pumpe *Pump Dimensions*							Usisna prirubnica *Discharge Flange*		Tlačna prirubnica Pressure Flange		Za prirubnice / *For Flanges* ANSI 150/300-RF PN 16/25/40			ANSI/300-RTJ		
	kg	DN_1	DN_2	d_2	f	y	u	t	D_S [1]	b_S [1]	D_D [1]	b_D [1]	a	w	h_2	a	w	h_2
40-5	220	80	50	42	530	140	12	45,1	210	31	165	25	140	810	315	148	818	323
40-8	257	100	80	48	670	180	14	51,5	254	36	210	31	150	1000	360	158	1008	368
40-10	282	150	100	48	670	180	14	51,5	318	40	254	36	150	1000	365	158	1008	373
25-15	230	200	150	42	530	140	12	45,1	381	46	318	40	170	840	385	178	848	393
31,5-15	315	200	150	48	670	180	14	51,5	381	46	318	40	170	1020	410	178	1028	418
40-15	355	200	150	48	670	180	14	51,5	381	46	318	40	170	1020	460	178	1028	468
50-15	430	200	150	48	670	180	14	51,0	381	46	318	40	180	1030	500	188	1038	508
25-20	362	250	200	48	670	180	14	51,5	450	50	381	46	190	1040	435	198	1048	443
31,5-20	380	250	200	60	720	180	18	64,2	450	50	381	46	210	1110	460	218	1118	468
40-20	473	250	200	60	720	180	18	64,2	450	50	381	46	190	1090	510	198	1098	518
50-25	851	300	250	80	720	180	18	64,2	320	51	450	50	200	1100	670	208	1108	678
40-30	850	350	300	75	900	250	20	79,5	585	54	520	51	300	1450	630	308	1458	638
50-30	900	350	300	75	900	250	20	79,5	585	54	520	51	300	1450	750	308	1458	758
40-35	1250	350	350	75	930	250	20	79,5	585	54	585	54	350	1530	750	358	1538	758
50-35	1600	350	350	75	900	250	20	79,5	585	54	584	54	300	1450	850	308	1458	858

[1] U skladu s vrijedećim standardima.
In accordance with current standards

Mjere su u (mm) i informativne, proizvođač zadržava pravo izmjene.
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Manufacturer retains the right to change them.

Odnos pumpa / temeljna ploča / veličina h1 (informativna)

Relationship Pump / Base Plate / / Value h1 (informative)

Veličina pumpe *Pump Size*	IEC		132 S	132 M	160 M	160 L	180 M	180 L	200 L	225 S	225 M	250 M	280 S	280 M	315 S	315 S	315 M	355 S	355 M	355 L	400 S	400 M
	d'	4-pola *4-pole's*	38	-	42	42	48	48	55	60	60	65	75	75	-	80	80					
		2-pola *2-pole's*	-	38	42	42	48	-	55	-	55	60	65	65	65	-	65					
40-5					583	583	583	583	583	583	583	583	583	583	583	583	583					
25-15					583	583	583	583	583	583	583	583	583	583	583	583	583	583				
Temeljna ploča / *Base Plate*						11							12							13		
40-8																		583	583	583	583	
40-10																		583	583	583	583	
31,5-15																		583	583	583	583	
40-15																		583	583	583	583	
Temeljna ploča / *Base Plate*													13								15	
50-15							688	668	668	668	668	668	668	668	668	668	668	668				
31,5-20									608	608	608	608	608	608	608	608	608	608	608	608	608	608
40-20									608	608	608	608	608	608	608	608	608	608	608	608	608	608
Temeljna ploča / *Base Plate*												14								15		
50-25													738	738	738	738	738	738	738	738		
Temeljna ploča / *Base Plate*																17						
40-30														763	763	763	763	763	763	763		
Temeljna ploča / *Base Plate*															18				19			
50-30															823	823	823	823	823	823		
Temeljna ploča / *Base Plate*																21			22			
40-35																						
Temeljna ploča / *Base Plate*																						
50-35																						
Temeljna ploča / *Base Plate*																						

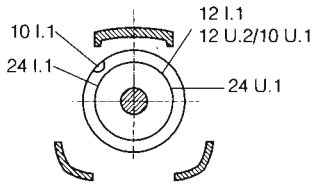
Neupisane na poseban zahtjev.
Not stated can be delivered upon request.

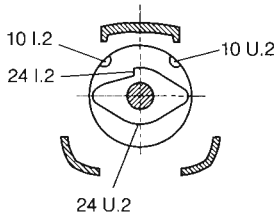
Mjere su informativne u (mm), proizvođač zadržava pravo izmjene.
All measurements are in mm and for information purposes.
Manufacturer retains the right to change them.

Pomoćni priključci

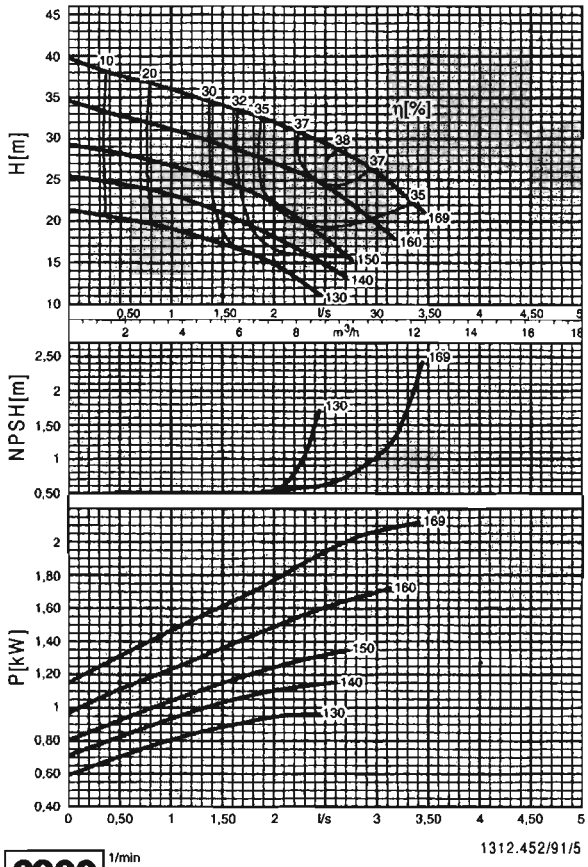
Additional Fittings

Priključak *Fitting*	Do / *Up to* DN_2 50 NPT	Preko / *Over* DN_2 80 NPT	Naziv priključka *Name Of The Fitting*
6 D	1/2	3/4	Drenaža / *Derange*
7U.1/7I.1	1/2	3/4	Ulaz-izlaz tekućine za hlađenje / *Cooling Fluid Inlet-Outlet*
7U.2/7I.2	1/2	3/4	Ulaz-izlaz tekućine za hlađenje / *Cooling Fluid Inlet-Outlet*
7U.3/7I.3	1/2	3/4	Ulaz-izlaz tekućine za hlađenje / *Cooling Fluid Inlet-Outlet*
7U.5/7I.5			Ulaz-izlaz tekućine za hlađenje / *Cooling Fluid Inlet-Outlet*
8 D	1	1	Drenaža temeljne ploče / *Base Plate Drainage*
10U.1/10I.1	1/2	1/2	Ulaz-izlaz brtvenog medija / *Sealing Medium Inlet-Outlet*
10U.2/10I.2	1/2	1/2	Ulaz-izlaz brtvenog medija / *Sealing Medium Inlet-Outlet*
12U.1/12I.1	1/2	1/2	Ulaz-izlaz cirkularnog medija / *Circular Medium Inlet-Outlet*
12U.2/12I.2	1/2	1/2	Ulaz-izlaz cirkularnog medija / *Circular Medium Inlet-Outlet*
13 D	1/4	1/4	Drenaža ulja / *Oil Drainage*
13 O	20 Ø	20 Ø	Čep za odzračivanje / *Deairing Plug*
24I.1	1/2	1/2	Izlaz za quench / *Quench Outlet*
24U.1	1/2	1/2	Ulaz za quench / *Quench Inlet*
24U.2	1/4	1/4	Ulaz za quench / *Quench Inlet*
24I.2	6 Ø	6 Ø	Izlaz za quench / *Quench Outlet*





RPP 16-2,5



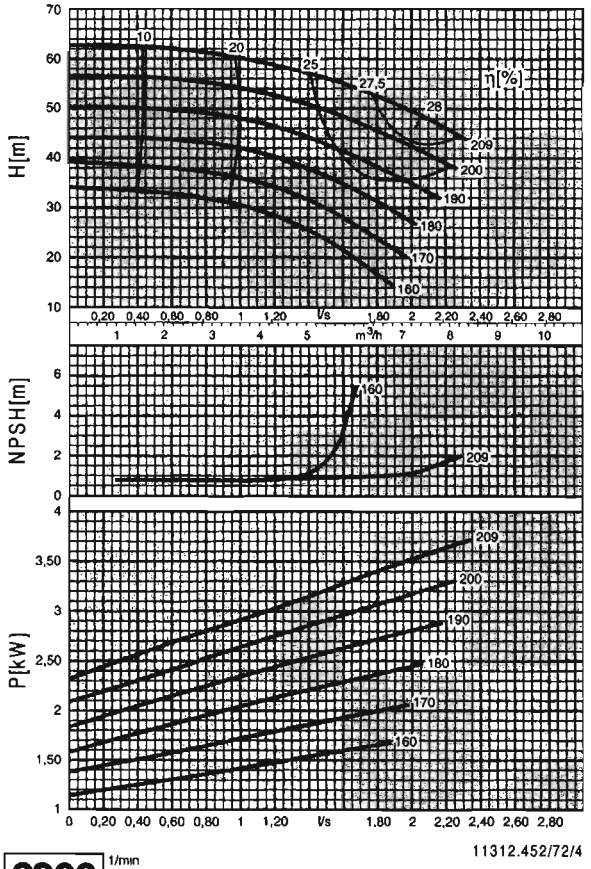
1312.452/91/5

2900 1/min

Promjer rotora 130-169 mm Širina rotora >>b_2<< 8 mm

Impeller diameter 130-169 mm Impeller width >>b_2<< 8 mm

RPP 20-2,5



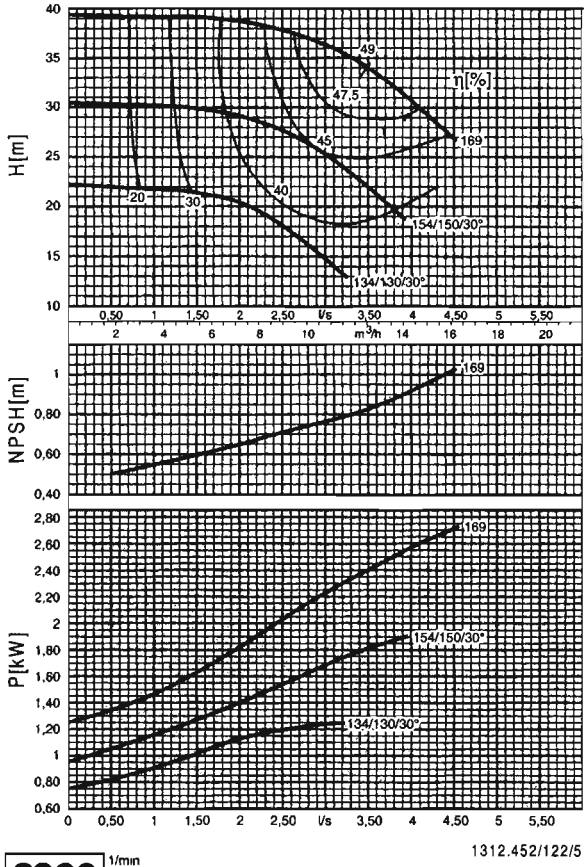
11312.452/72/4

2900 1/min

Promjer rotora 160-209 mm Širina rotora >>b_2<< 8 mm

Impeller diameter 160-209 mm Impeller width >>b_2<< 8 mm

RPP 16-4



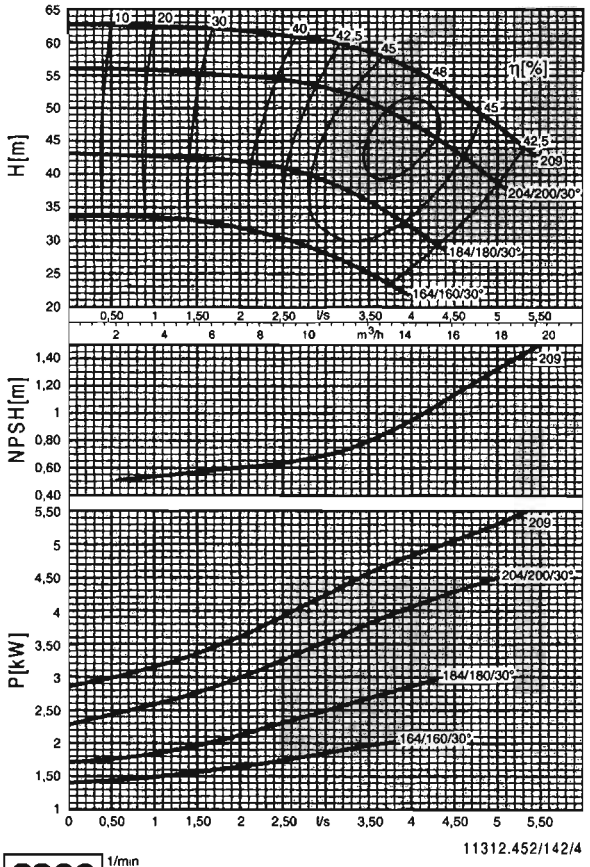
1312.452/122/5

2900 1/min

Promjer rotora 134-169 mm Širina rotora >>b_2<< 7 mm

Impeller diameter 134-169 mm Impeller width >>b_2<< 7 mm

RPP 20-4



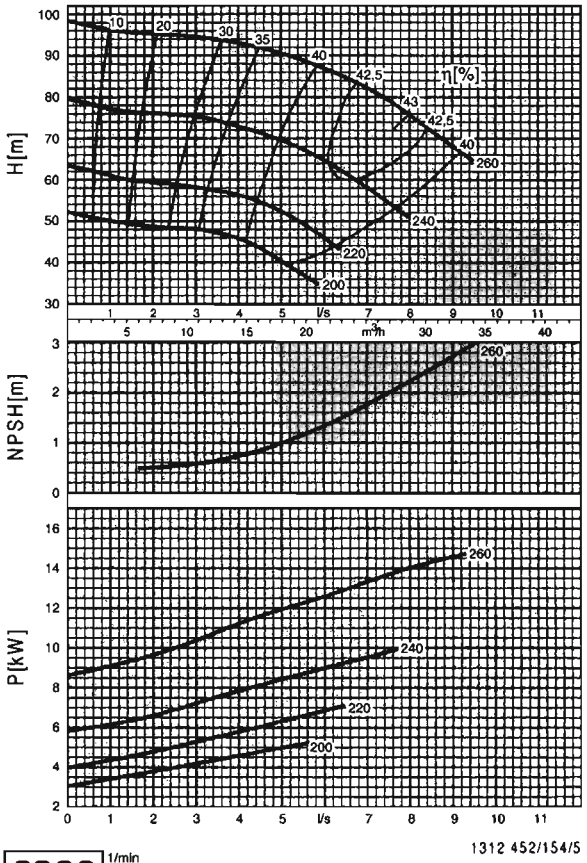
11312.452/142/4

2900 1/min

Promjer rotora 164-209 mm Širina rotora >>b_2<< 7 mm

Impeller diameter 164-209 mm Impeller width >>b_2<< 7 mm

RPP 25-4



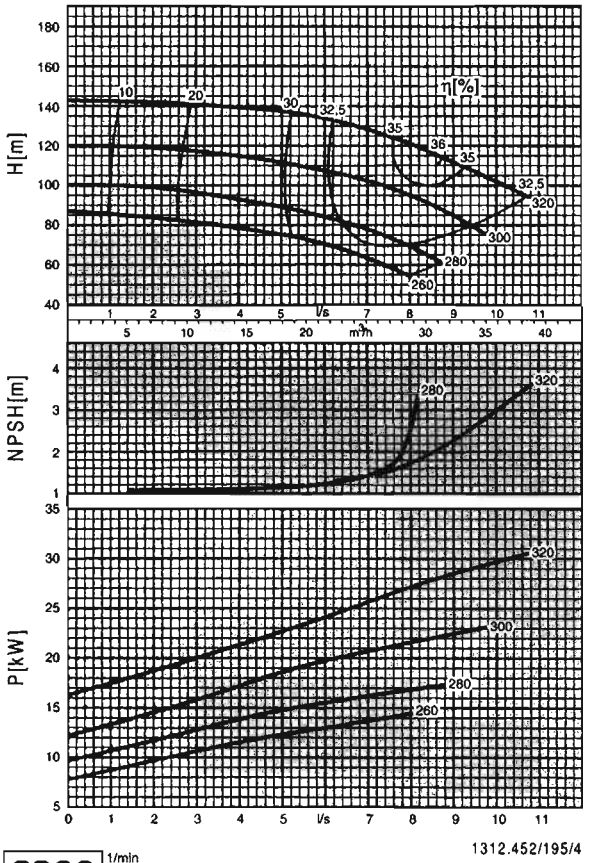
1312 452/154/5

2900 1/min

Promjer rotora 200-260 mm Širina rotora >>b_{2}<< 14 mm

Impeller diameter 200-260 mm Impeller width >>b_{2}<< 14 mm

RPP 31,5-4



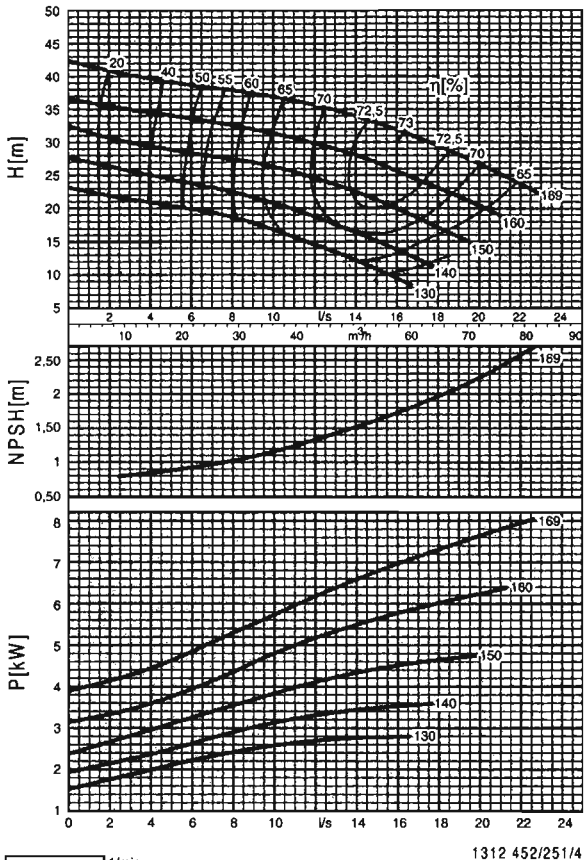
1312.452/195/4

2900 1/min

Promjer rotora 260-320 mm Širina rotora >>b_{2}<< 10,5 mm

Impeller diameter 260-320 mm Impeller width >>b_{2}<< 10,5 mm

RPP 16-5



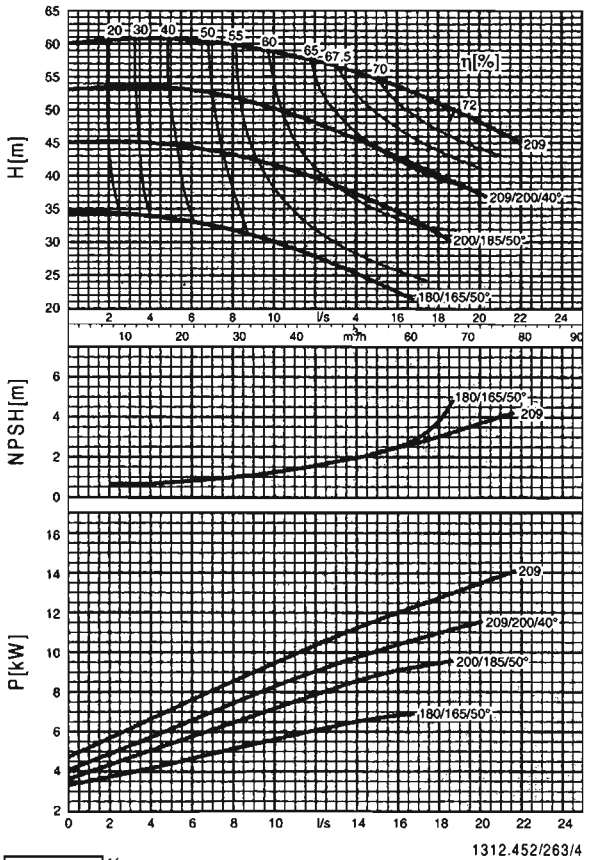
1312 452/251/4

2900 1/min

Promjer rotora 130-169mm Širina rotora >>b_{2}<< 21 mm

Impeller diameter 130-169 mm Impeller width >>b_{2}<< 21 mm

RPP 20-5



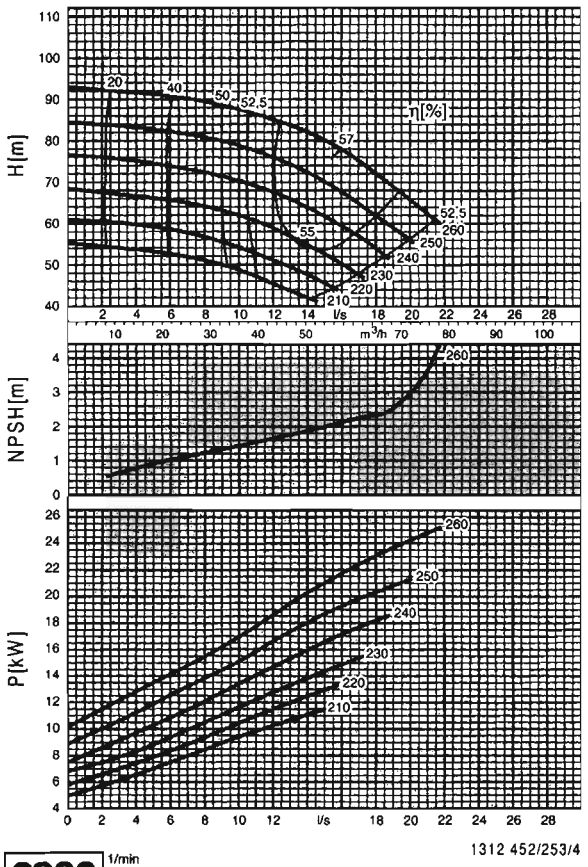
1312.452/263/4

2900 1/min

Promjer rotora 180-209 mm Širina rotora >>b_{2}<< 12 mm

Impeller diameter 180-209 mm Impeller width >>b_{2}<< 12 mm

RPP 25-5



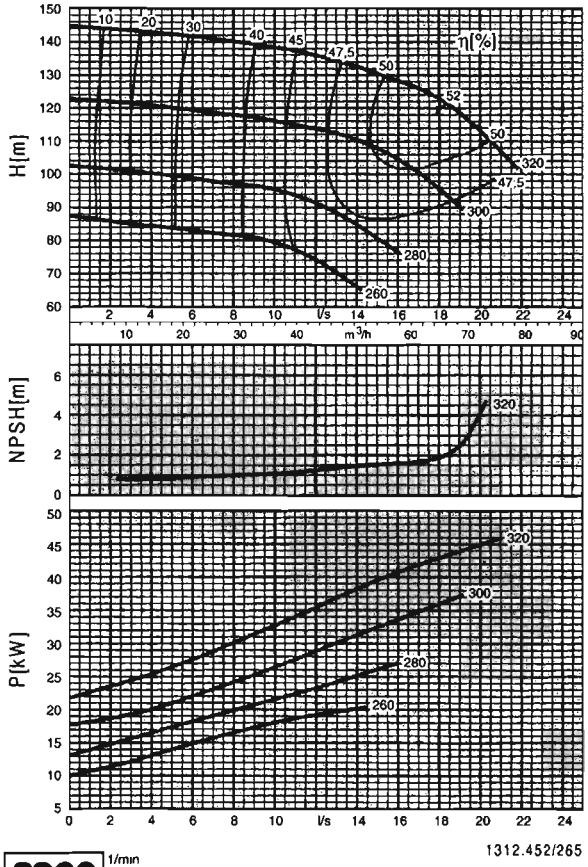
1312 452/253/4

2900 1/min

Promjer rotora 210-260mm Širina rotora >>b2<< 15 mm

Impeller diameter 210-260 mm Impeller width >>b2<< 15 mm

RPP 31,5-5



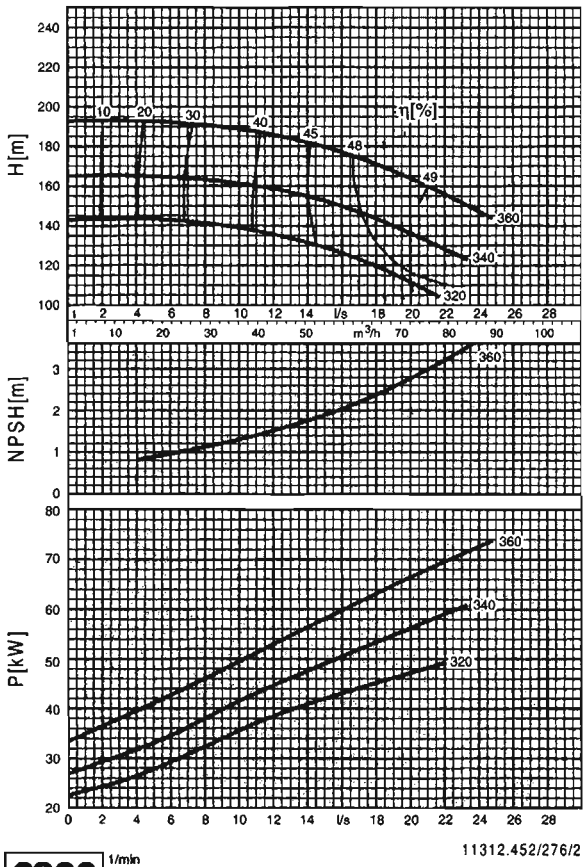
1312.452/265

2900 1/min

Promjer rotora 260-320 mm Širina rotora >>b2<< 13 mm

Impeller diameter 260-320 mm Impeller width >>b2<< 13 mm

RPP 40-5



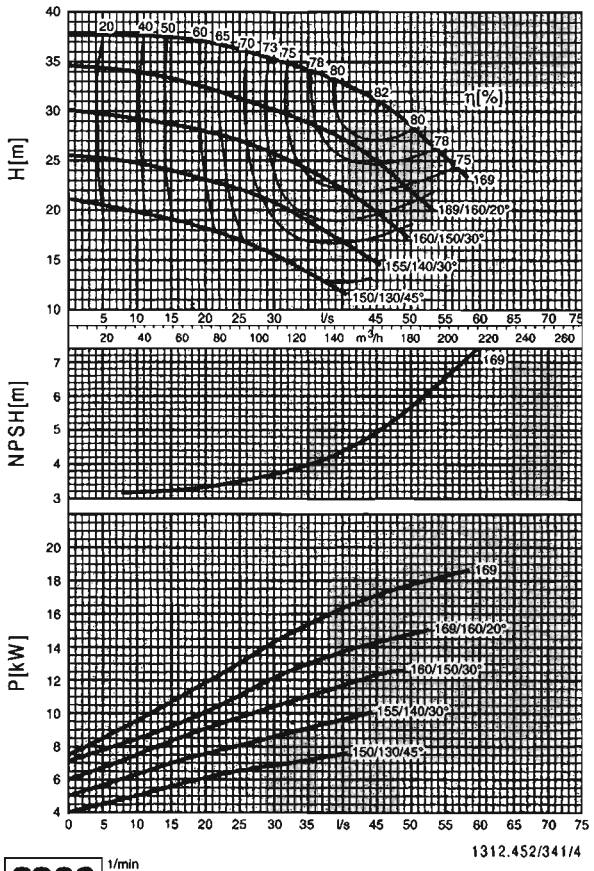
11312.452/276/2

2900 1/min

Promjer rotora 320-360 mm Širina rotora >>b2<< 8 mm

Impeller diameter 320-360 mm Impeller width >>b2<< 8 mm

RPP 16-8



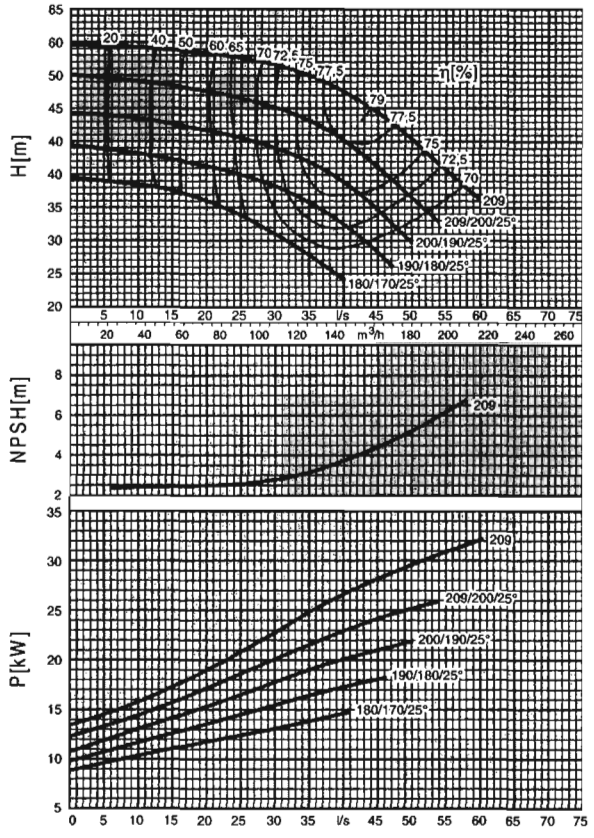
1312.452/341/4

2900 1/min

Promjer rotora 150-169 mm Širina rotora >>b2<< 27 mm

Impeller diameter 150-169 mm Impeller width >>b2<< 27 mm

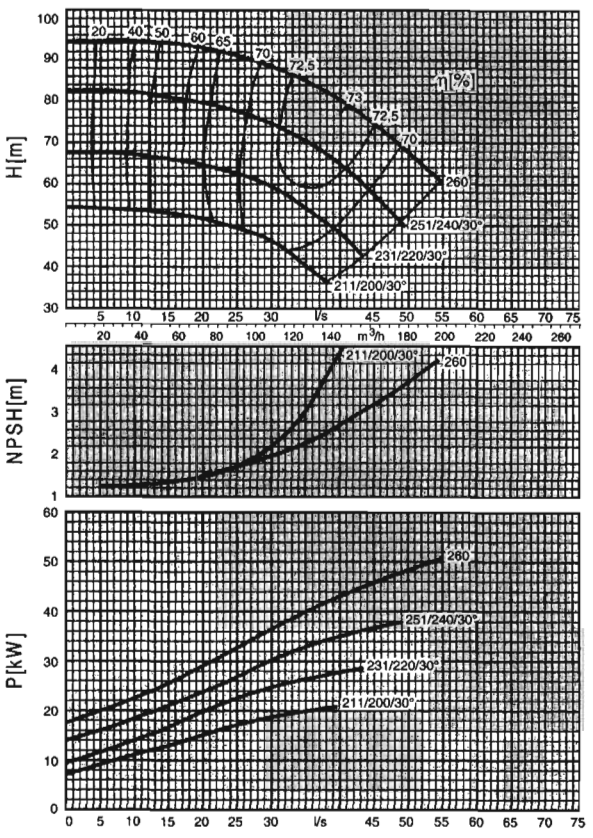
RPP 20-8



2900 1/min

Promjer rotora 180-209 mm Širina rotora >>b_2<< 22 mm
Impeller diameter 180-209 mm Impeller width >>b_2<< 22 mm

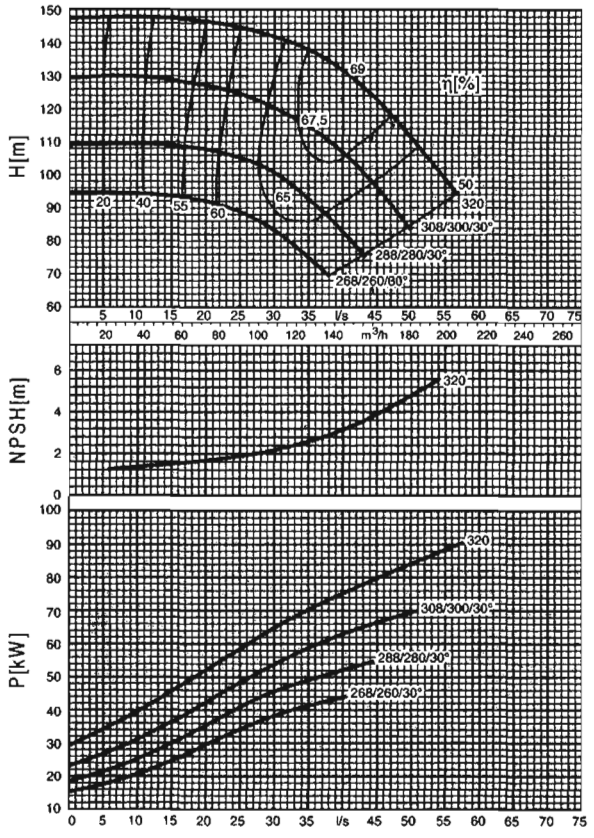
RPP 25-8



2900 1/min

Promjer rotora 211-260 mm Širina rotora >>b_2<< 18 mm
Impeller diameter 211-260 mm Impeller width >>b_2<< 18 mm

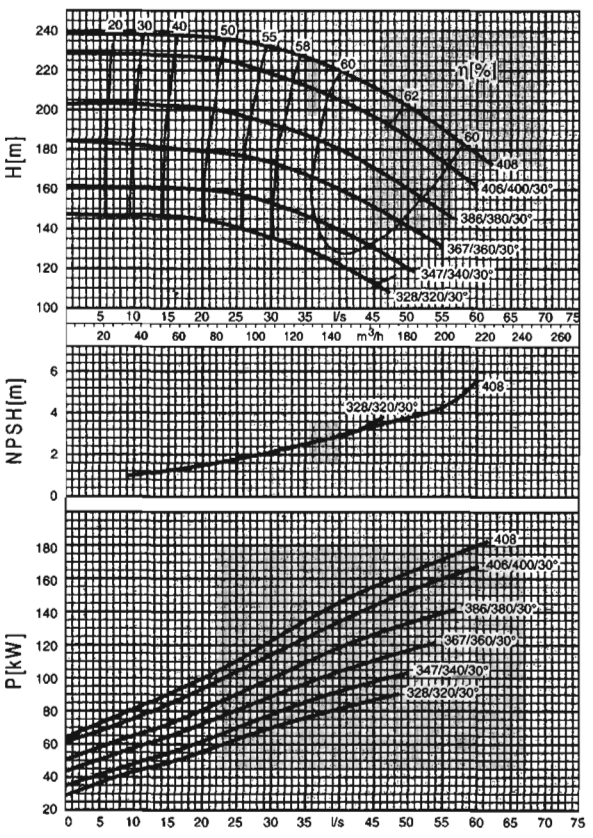
RPP 31,5-8



2900 1/min

Promjer rotora 268-320 mm Širina rotora >>b_2<< 14 mm
Impeller diameter 268-320 mm Impeller width >>b_2<< 14 mm

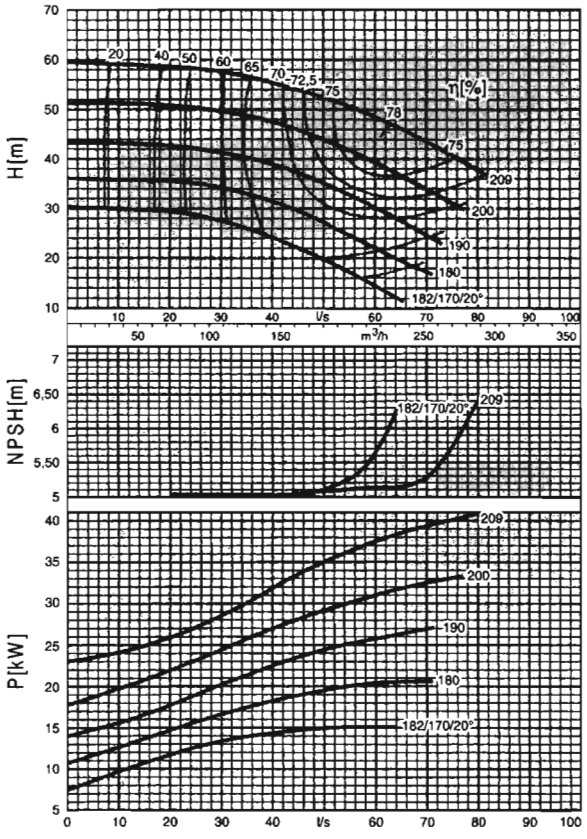
RPP 40-8



2900 1/min

Promjer rotora 328-408 mm Širina rotora >>b_2<< 11 mm
Impeller diameter 328-408 mm Impeller width >>b_2<< 11 mm

RPP 20-10

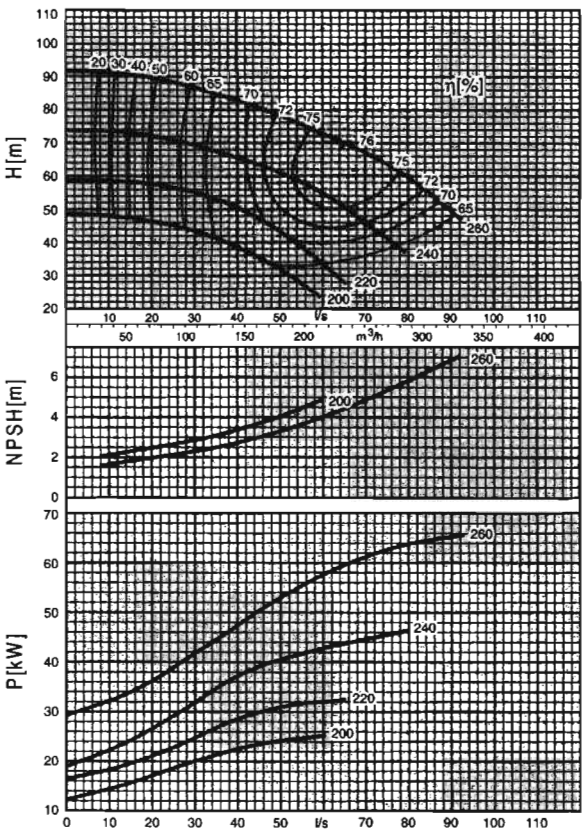


11312.452/382/4

2900 1/min

Promjer rotora 200-260 mm Širina rotora >>b2<< 30 mm
Impeller diameter 200-260 mm Impeller width >>b2<< 30 mm

RPP 25-10

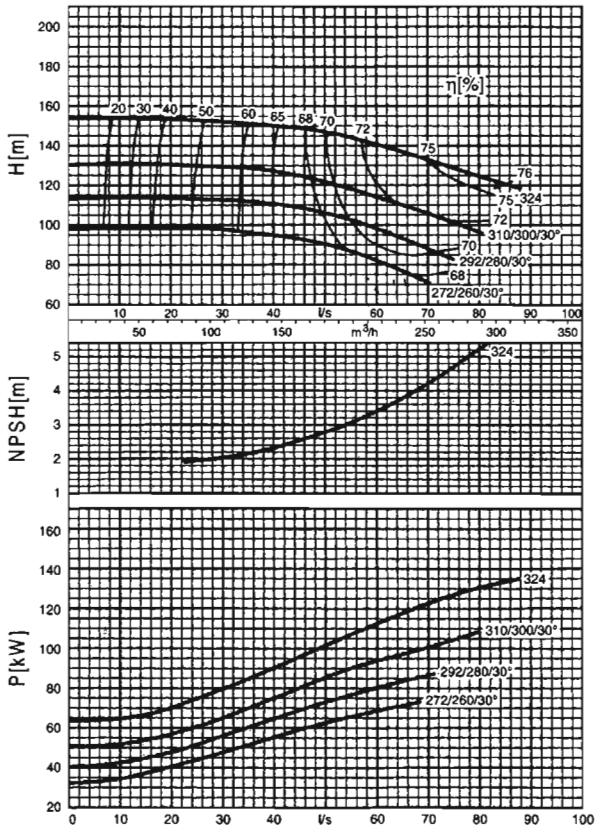


1312 452/373/4

2900 1/min

Promjer rotora 200-260mm Širina rotora >>b2<< 28 mm
Impeller diameter 200-260 mm Impeller width >>b2<< 28 mm

RPP 31,5-10

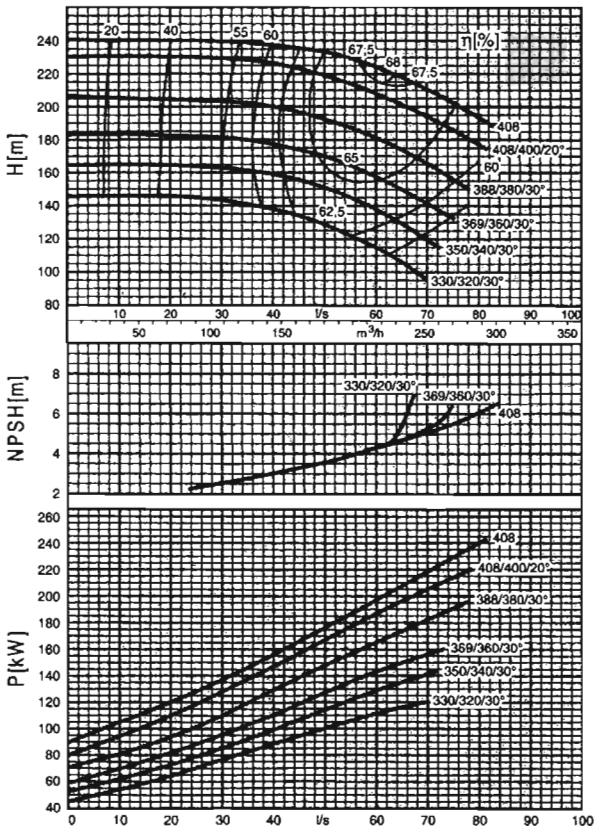


1312.452/375/4

2900 1/min

Promjer rotora 272-324 mm Širina rotora >>b2<< 19,5 mm
Impeller diameter 272-324 mm Impeller width >>b2<< 19,5 mm

RPP 40-10

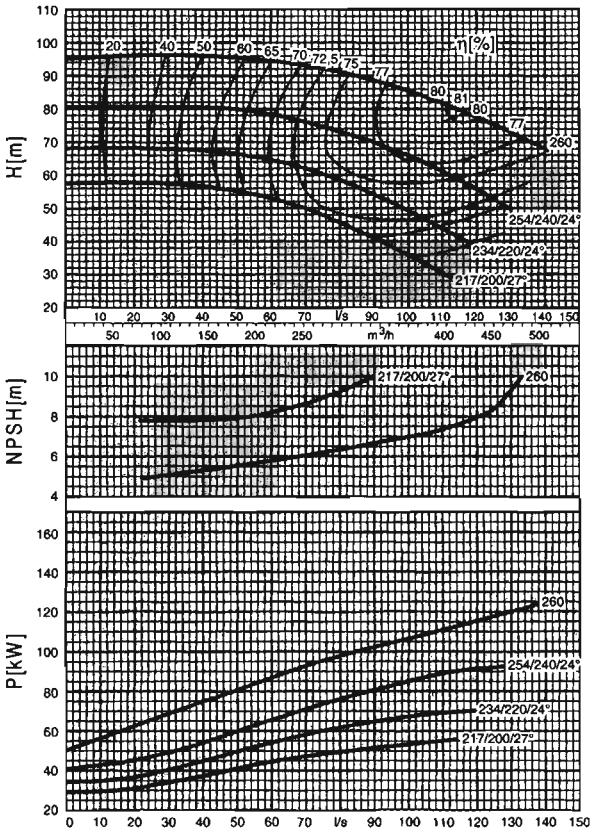


1312.452/376/3

2900 1/min

Promjer rotora 330-408 mm Širina rotora >>b2<< 15 mm
Impeller diameter 330-408 mm Impeller width >>b2<< 15 mm

RPP 25-15

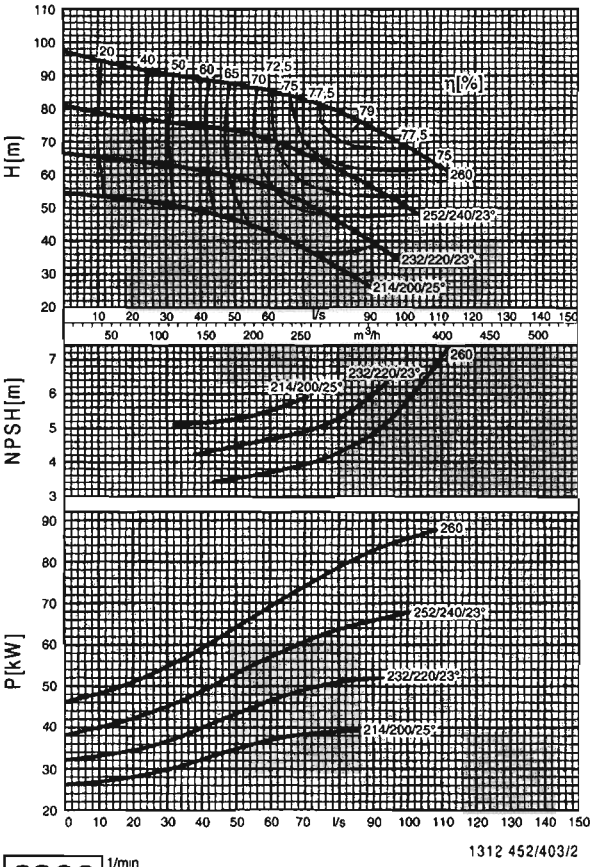


2900 1/min

Promjer rotora 217-260 mm Širina rotora >>b2<< 32 mm

Impeller diameter 217-260 mm Impeller width >>b2<< 32 mm

RPP 25-15

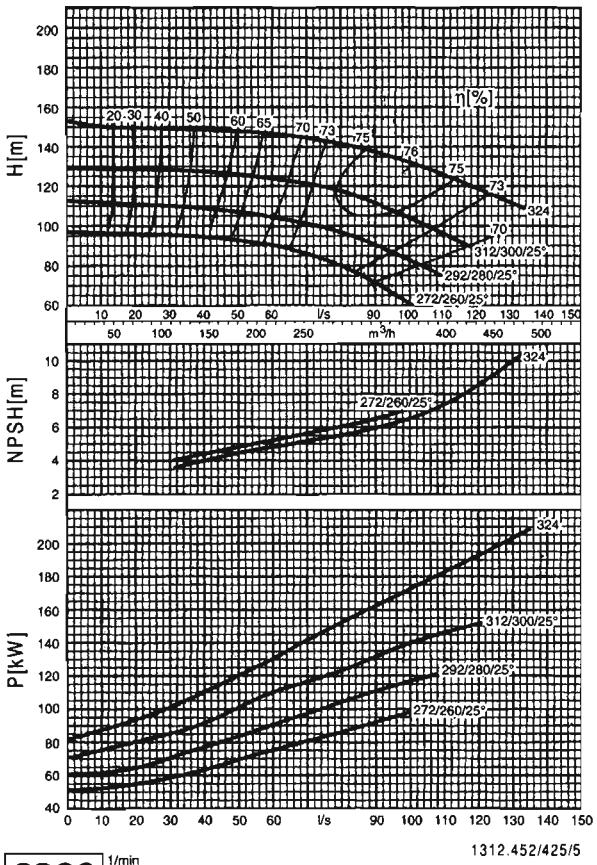


2900 1/min

Promjer rotora 214-260 mm Širina rotora >>b2<< 30 mm

Impeller diameter 214-260 mm Impeller width >>b2<< 30 mm

RPP 31,5-15

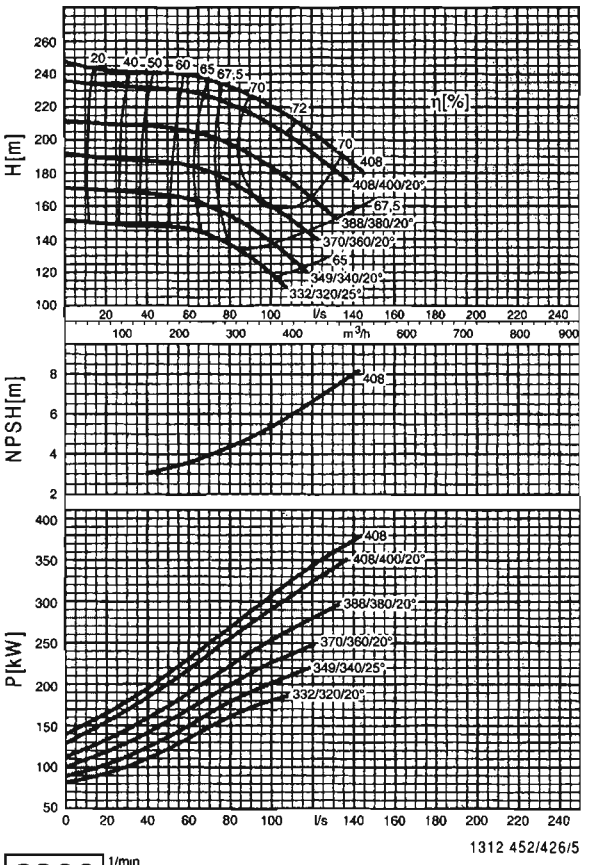


2900 1/min

Promjer rotora 272-324 mm Širina rotora >>b2<< 26 mm

Impeller diameter 272-324 mm Impeller width >>b2<< 26 mm

RPP 40-15

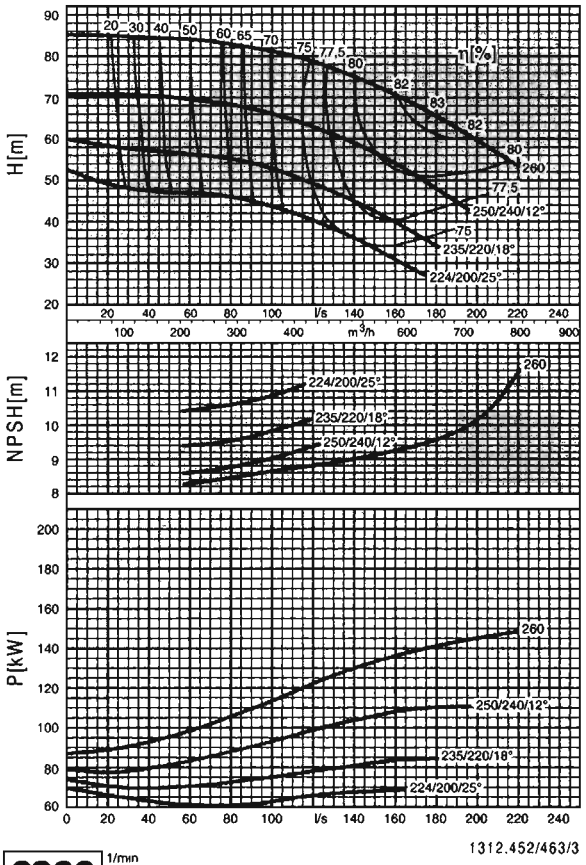


2900 1/min

Promjer rotora 332-408 mm Širina rotora >>b2<< 23 mm

Impeller diameter 332-408 mm Impeller width >>b2<< 23 mm

RPP 25-20

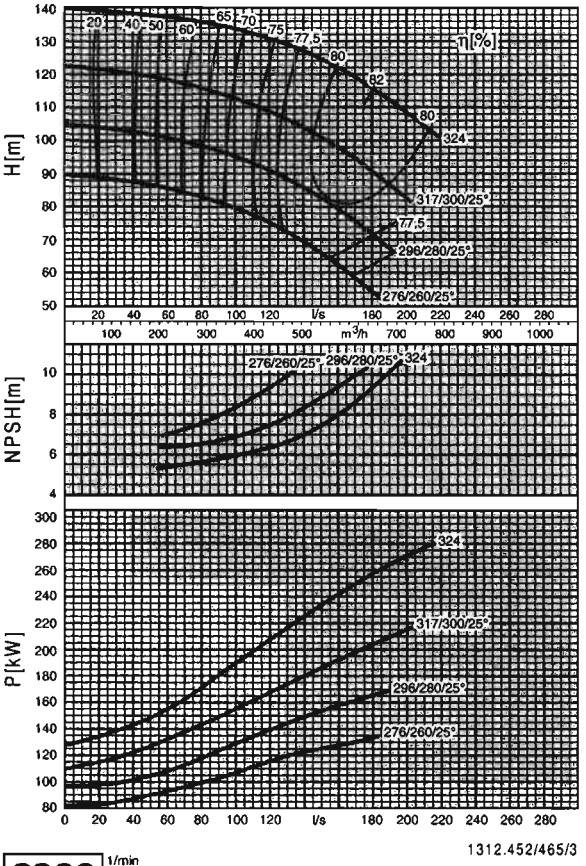


2900 1/min

Promjer rotora 224-260 mm Širina rotora >>b2<< 46 mm

Impeller diameter 224-260 mm Impeller width >>b2<< 46 mm

RPP 31,5-20

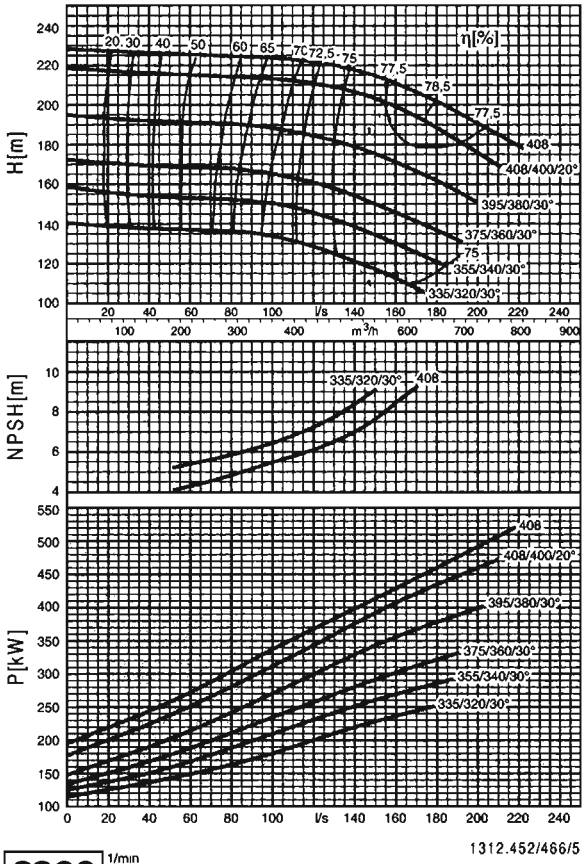


2900 1/min

Promjer rotora 276-324 mm Širina rotora >>b2<< 34 mm

Impeller diameter 276-324 mm Impeller width >>b2<< 34 mm

RPP 40-20

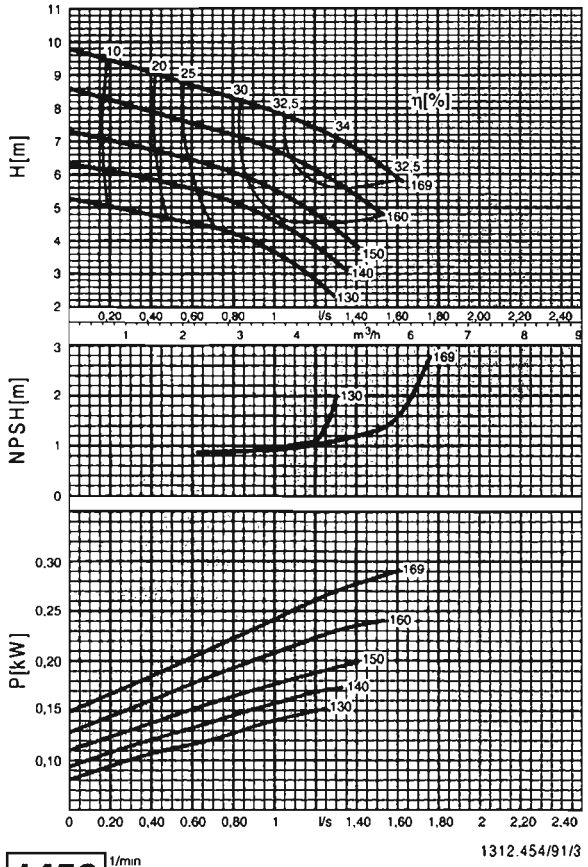


2900 1/min

Promjer rotora 335-408 mm Širina rotora >>b2<< 26 mm

Impeller diameter 335-408 mm Impeller width >>b2<< 26 mm

RPP 16-2,5

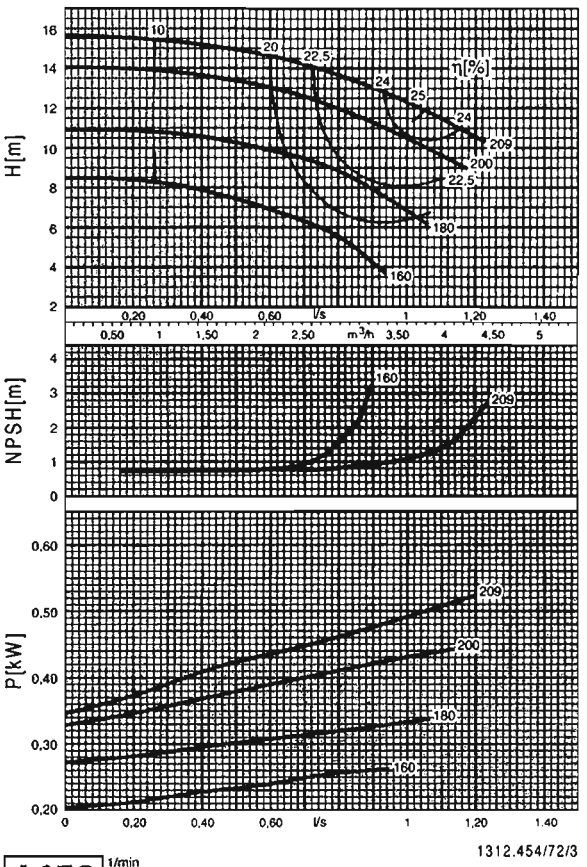


1450 1/min

Promjer rotora 130-169 mm Širina rotora >>b2<< 8 mm

Impeller diameter 130-169 mm Impeller width >>b2<< 8 mm

RPP 20-2,5

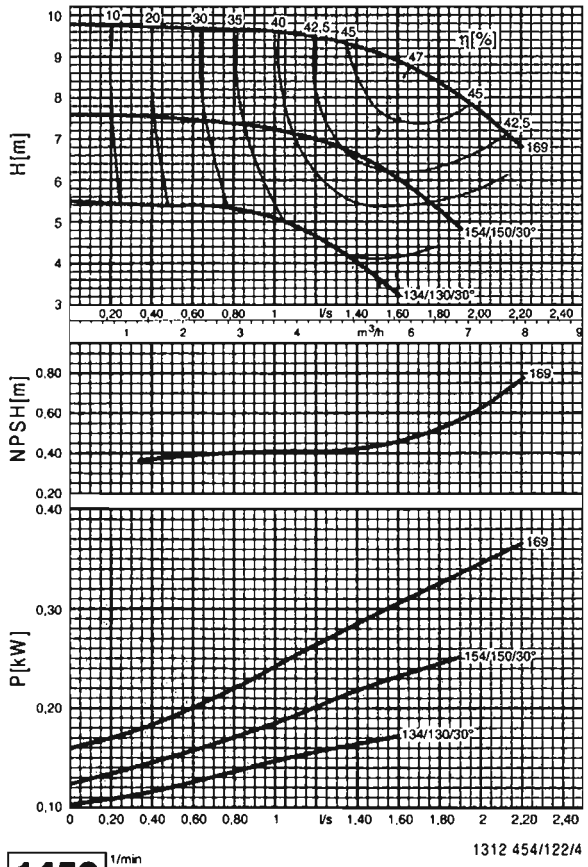


1450 1/min

Promjer rotora 160-209 mm Širina rotora >>b2<< 8 mm

Impeller diameter 160-209 mm Impeller width >>b2<< 8 mm

RPP 16-4

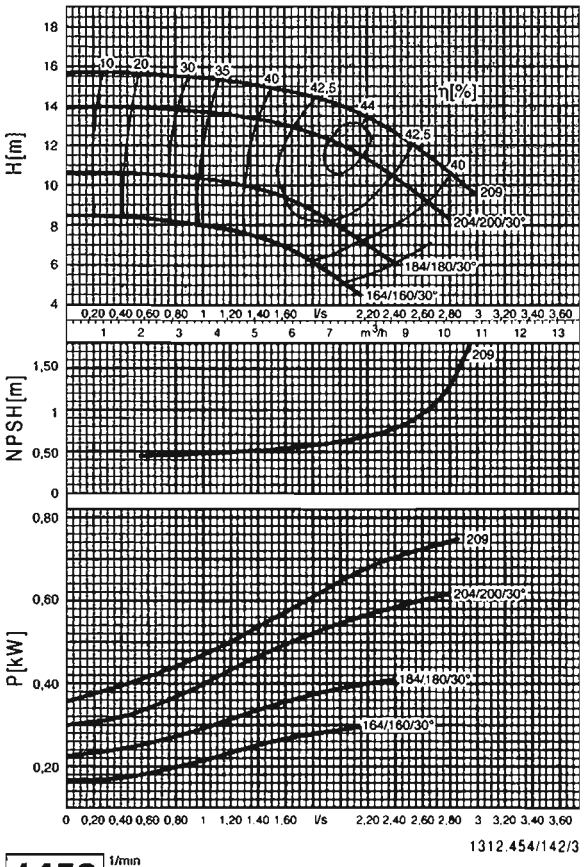


1450 1/min

Promjer rotora 134-169 mm Širina rotora >>b2<< 7 mm

Impeller diameter 134-169 mm Impeller width >>b2<< 7 mm

RPP 20-4

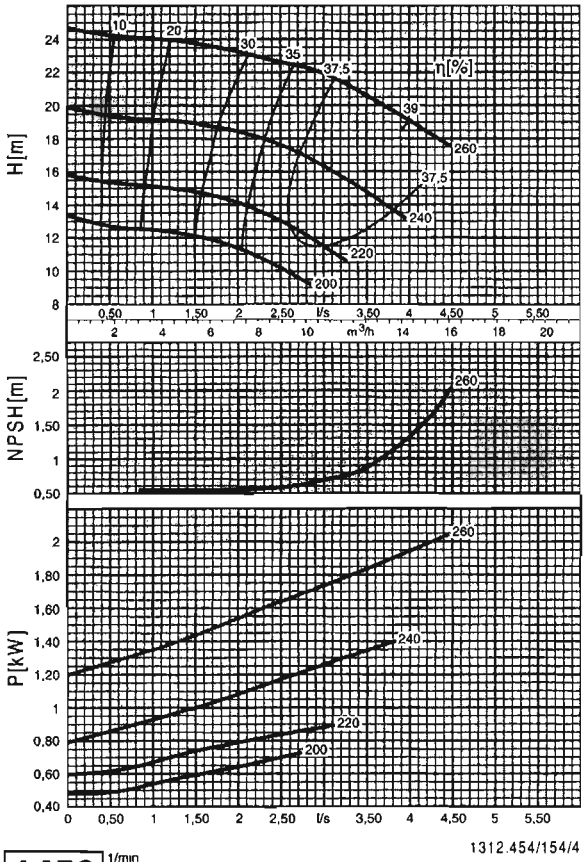


1450 1/min

Promjer rotora 164-209 mm Širina rotora >>b2<< 7 mm

Impeller diameter 164-209 mm Impeller width >>b2<< 7 mm

RPP 25-4



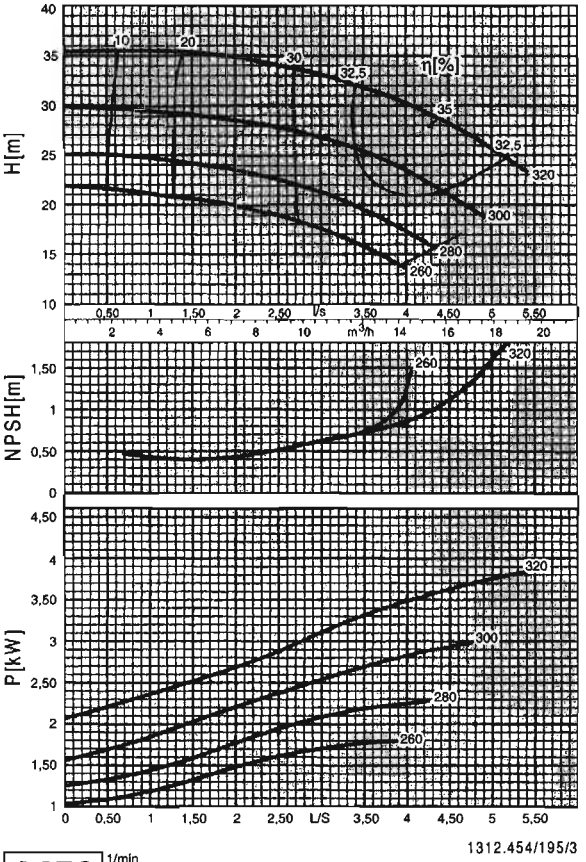
1312.454/154/4

1450 1/min

Promjer rotora 200-260 mm Širina rotora >>b2<< 14 mm

Impeller diameter 200-260 mm Impeller width >>b2<< 14 mm

RPP 31.5-4



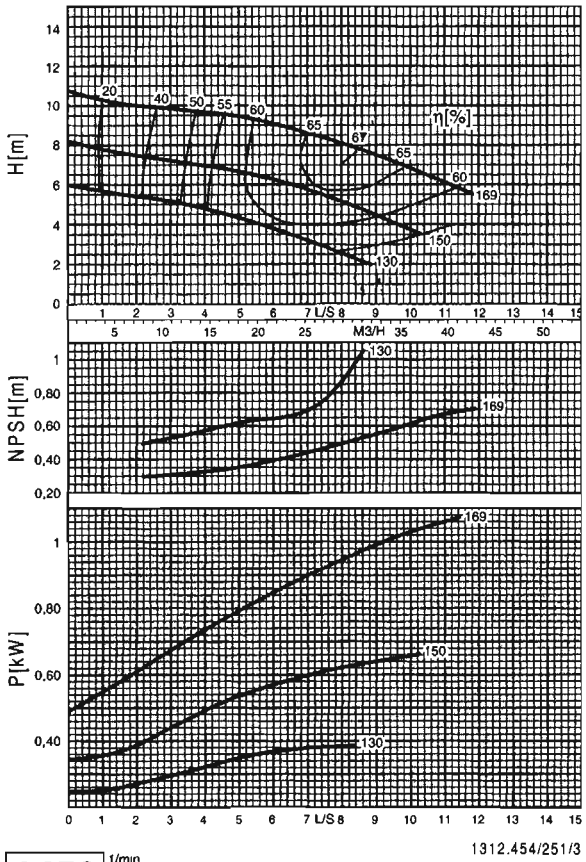
1312.454/195/3

1450 1/min

Promjer rotora 260-320 mm Širina rotora >>b2<< 10,5 mm

Impeller diameter 260-320 mm Impeller width >>b2<< 10,5 mm

RPP 16-5



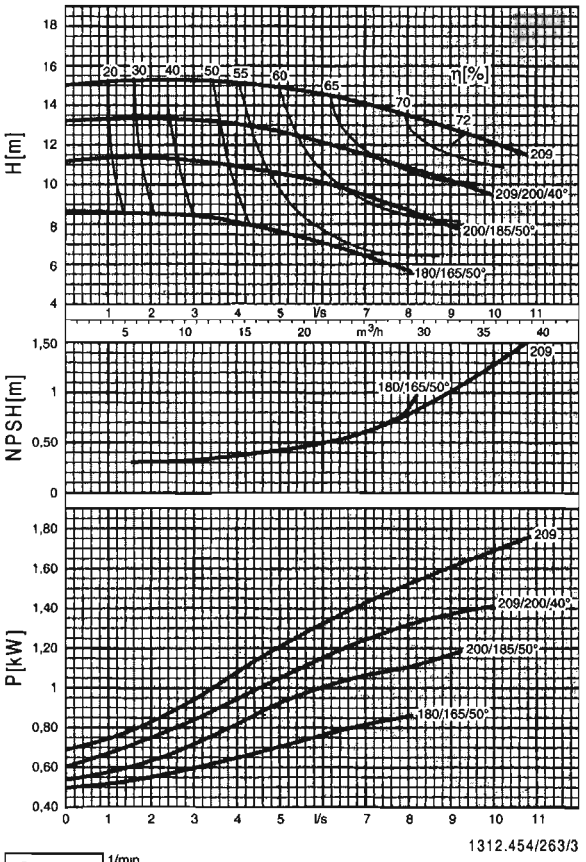
1312.454/251/3

1450 1/min

Promjer rotora 130-169 mm Širina rotora >>b2<< 21 mm

Impeller diameter 130-169 mm Impeller width >>b2<< 21 mm

RPP 20-5



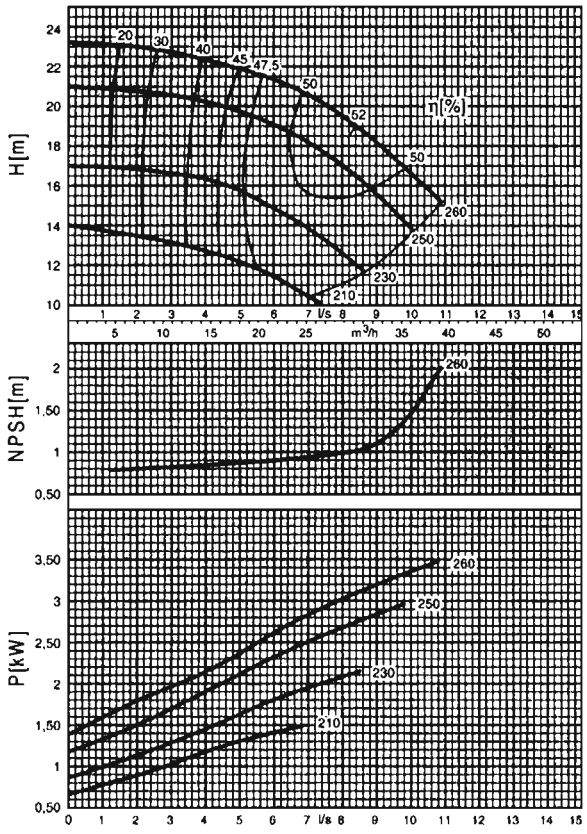
1312.454/263/3

1450 1/min

Promjer rotora 180-209 mm Širina rotora >>b2<< 12 mm

Impeller diameter 180-209 mm Impeller width >>b2<< 12 mm

RPP 25-5

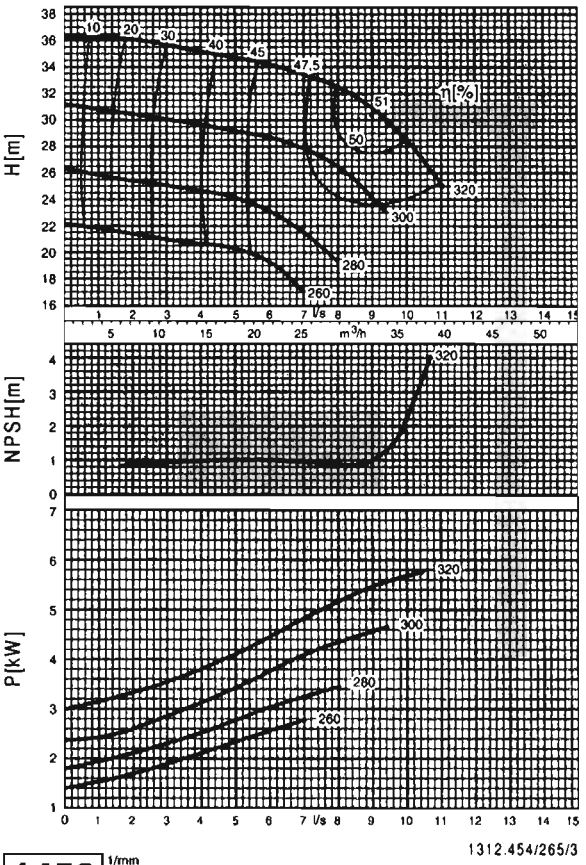


1450 1/min

Promjer rotora 210-260 mm Širina rotora >>b2<< 15 mm

Impeller diameter 210-260 mm Impeller width >>b2<< 15 mm

RPP 31,5-5

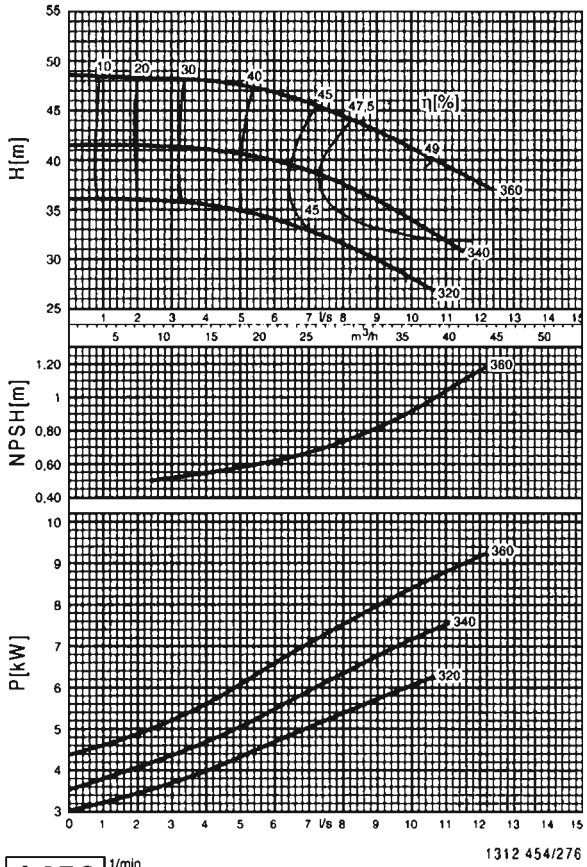


1450 1/min

Promjer rotora 260-320 mm Širina rotora >>b2<< 13 mm

Impeller diameter 260-320 mm Impeller width >>b2<< 13 mm

RPP 40-5

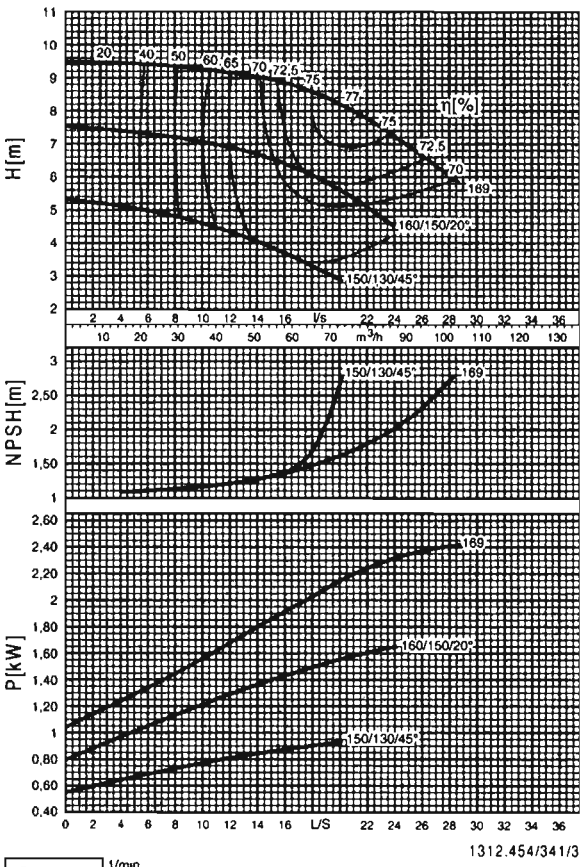


1450 1/min

Promjer rotora 320-360 mm Širina rotora >>b2<< 8 mm

Impeller diameter 320-360 mm Impeller width >>b2<< 8 mm

RPP 16-8

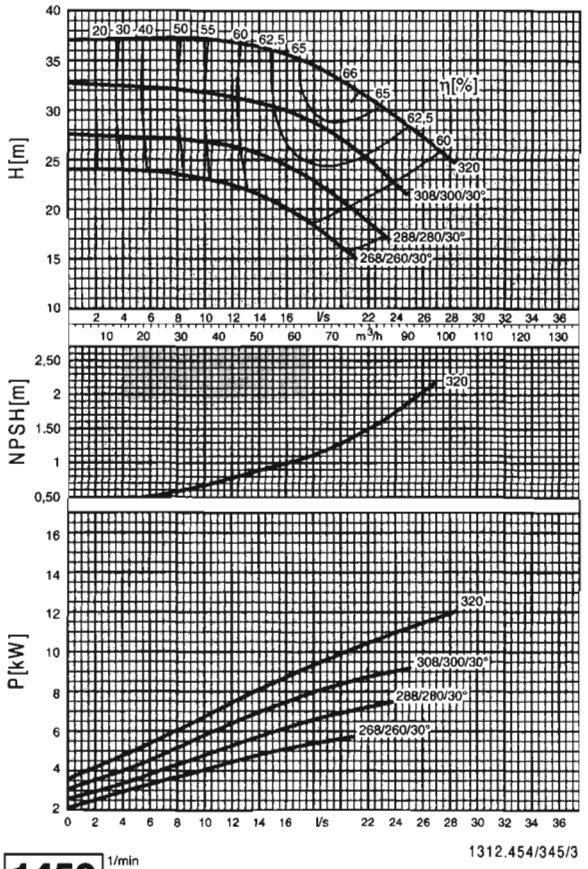


1450 1/min

Promjer rotora 150/169 mm Širina rotora >>b2<< 27 mm

Impeller diameter 150/169 mm Impeller width >>b2<< 27 mm

RPP 31,5-8



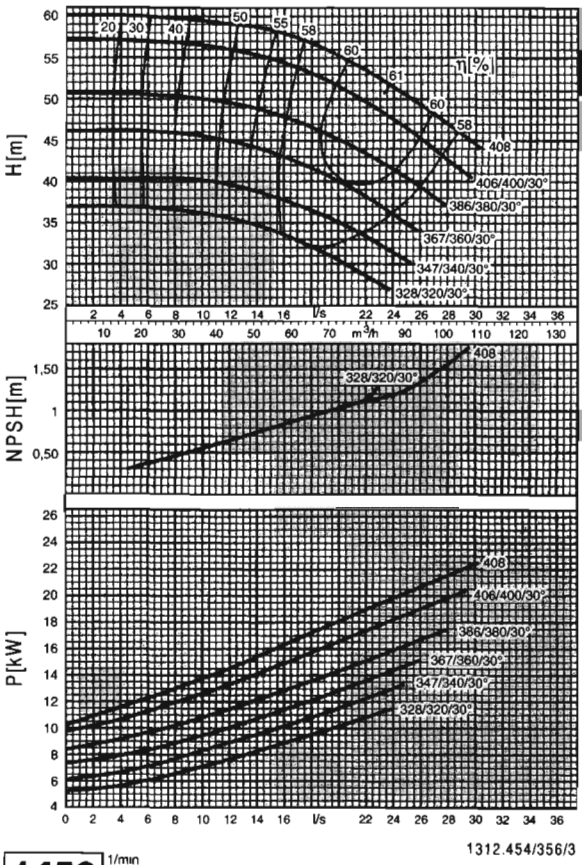
1312.454/345/3

1450 1/min

Promjer rotora 180-209 mm Širina rotora >>b_2<< 22 mm

Impeller diameter 180-209 mm Impeller width >>b_2<< 22 mm

RPP 40-8



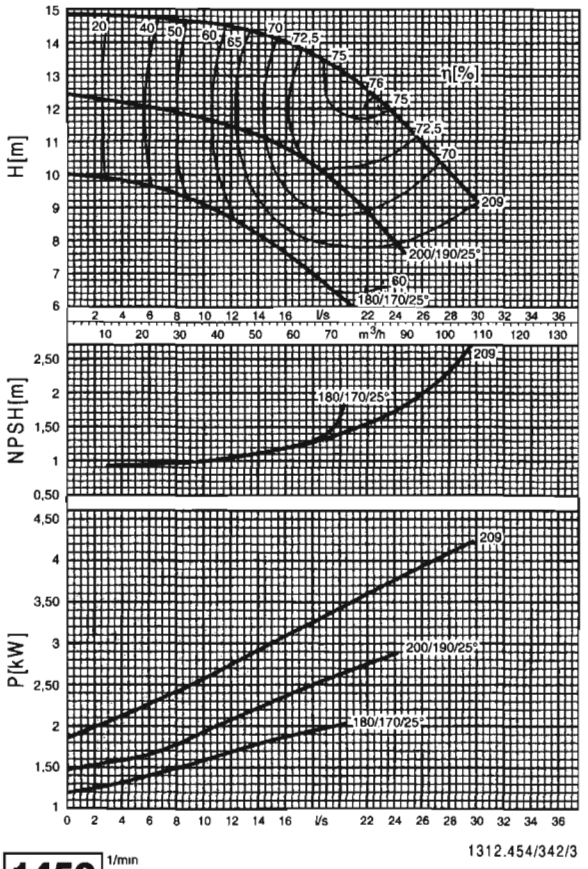
1312.454/356/3

1450 1/min

Promjer rotora 211-260 mm Širina rotora >>b_2<< 18 mm

Impeller diameter 211-260 mm Impeller width >>b_2<< 18 mm

RPP 20-8



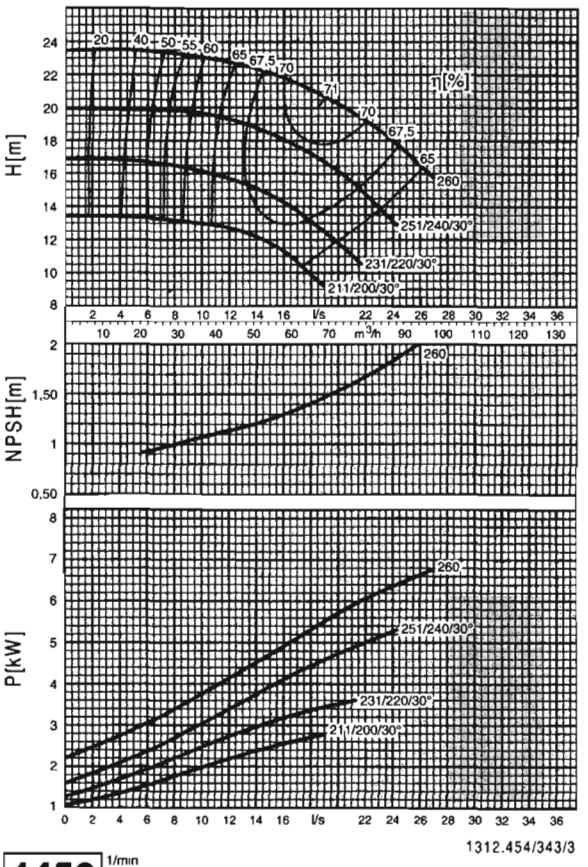
1312.454/342/3

1450 1/min

Promjer rotora 268-320 mm Širina rotora >>b_2<< 14 mm

Impeller diameter 268-320 mm Impeller width >>b_2<< 14 mm

RPP 25-8



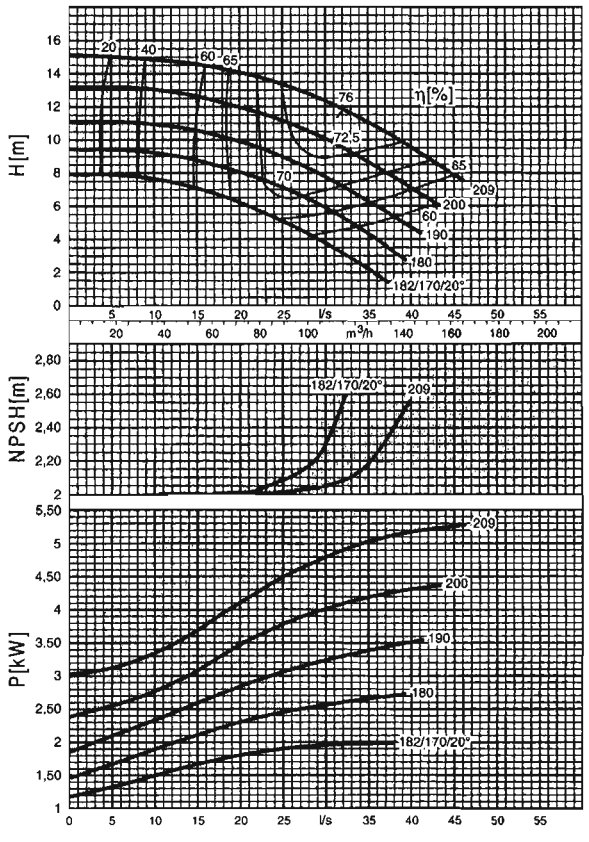
1312.454/343/3

1450 1/min

Promjer rotora 328-408 mm Širina rotora >>b_2<< 11 mm

Impeller diameter 328-408 mm Impeller width >>b_2<< 11 mm

RPP 20-10



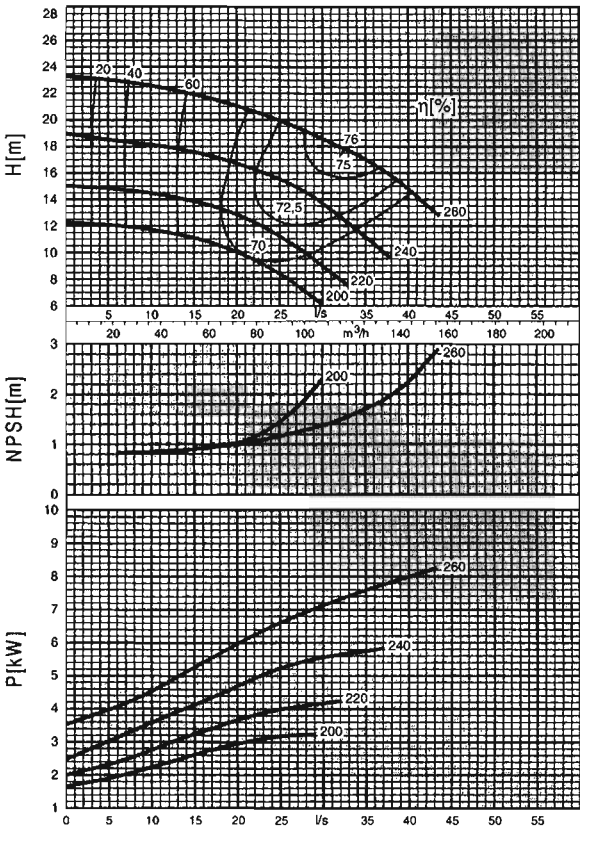
1312 454/382/3

1450 1/min

Promjer rotora 182-209 mm Širina rotora >>b2<< 30 mm

Impeller diameter 182-209 mm Impeller width >>b2<< 30 mm

RPP 25-10



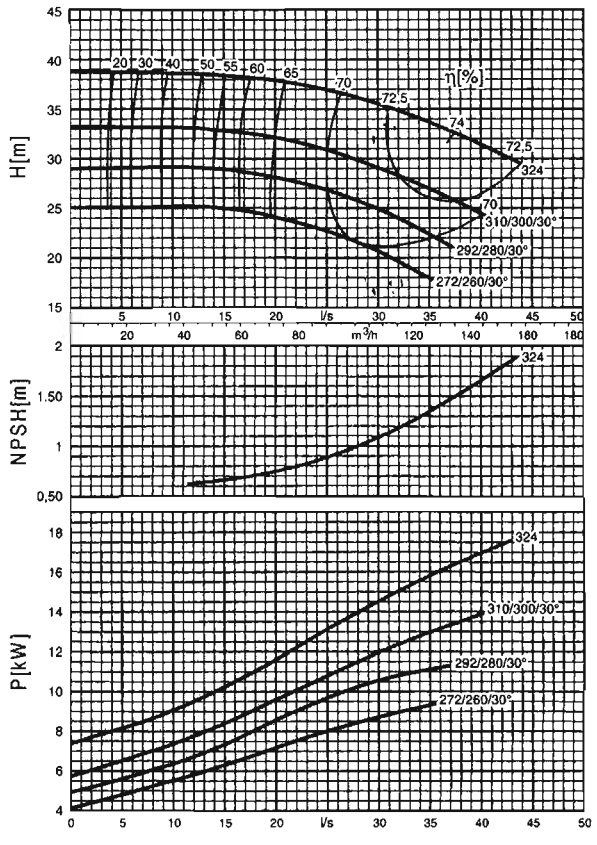
1312.454/373/3

1450 1/min

Promjer rotora 200-260 mm Širina rotora >>b2<< 28 mm

Impeller diameter 200-260 mm Impeller width >>b2<< 28 mm

RPP 31,5-10



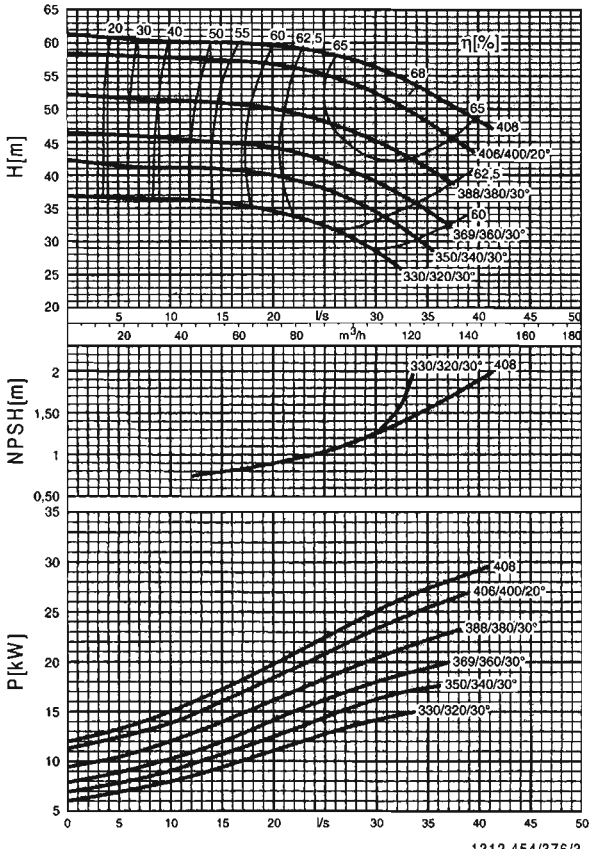
1312 454/375/3

1450 1/min

Promjer rotora 272-324 mm Širina rotora >>b2<< 19,5 mm

Impeller diameter 272-324 mm Impeller width >>b2<< 19,5 mm

RPP 40-10



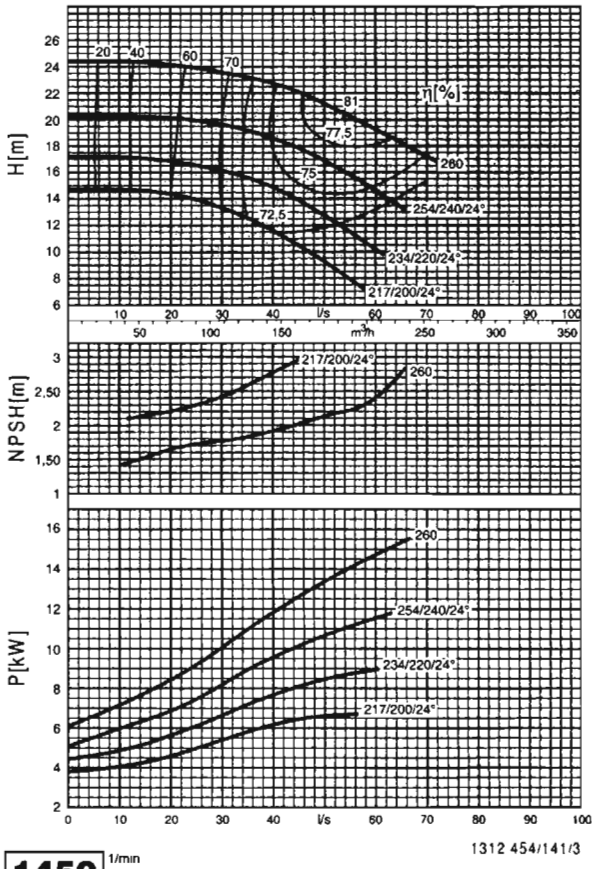
1312 454/376/3

1450 1/min

Promjer rotora 330-408 mm Širina rotora >>b2<< 15 mm

Impeller diameter 330-408 mm Impeller width >>b2<< 15 mm

RPP 25-15

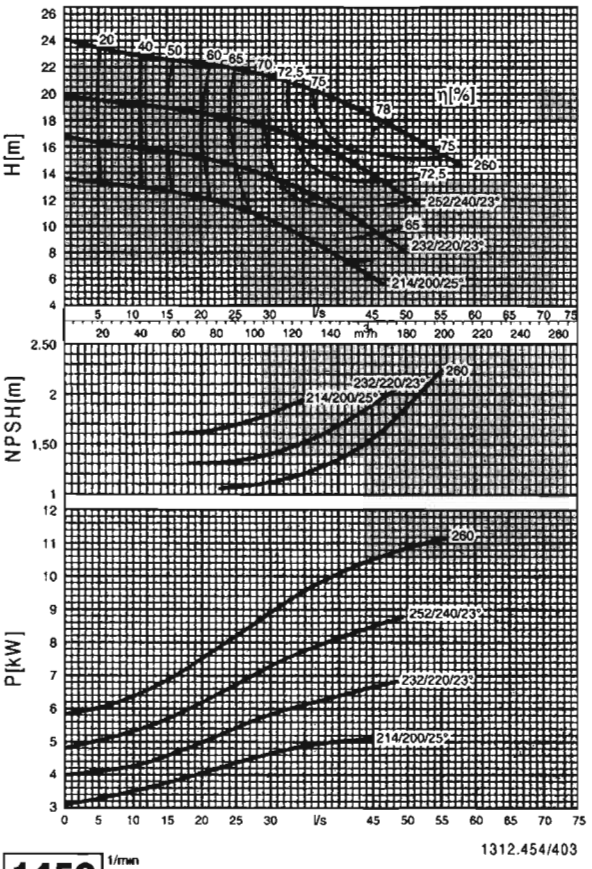


1450 1/min

Promjer rotora 217-260 mm Širina rotora >>b2<< 32 mm

Impeller diameter 217-260 mm Impeller width >>b2<< 32 mm

RPP 25-15

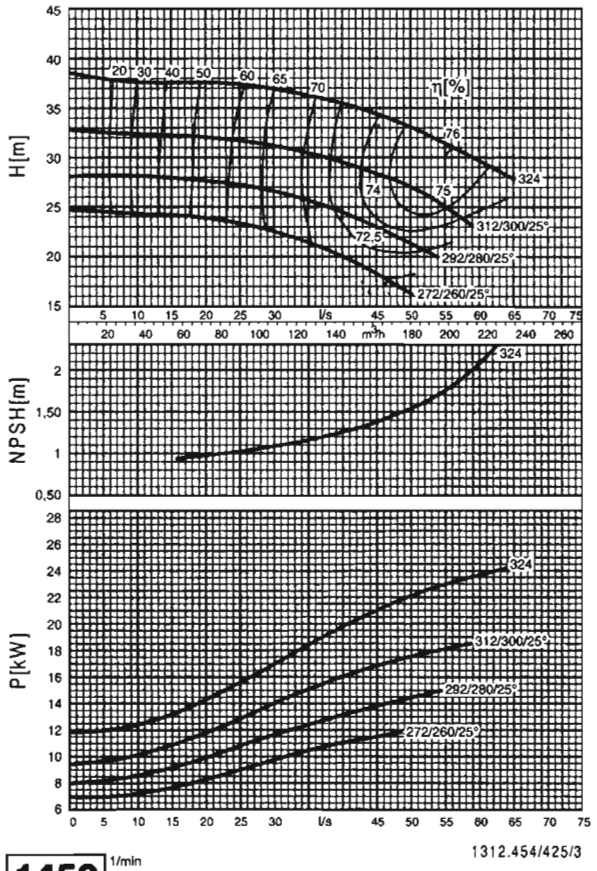


1450 1/min

Promjer rotora 214-260 mm Širina rotora >>b2<< 30 mm

Impeller diameter 214-260 mm Impeller width >>b2<< 30 mm

RPP 31,5-15

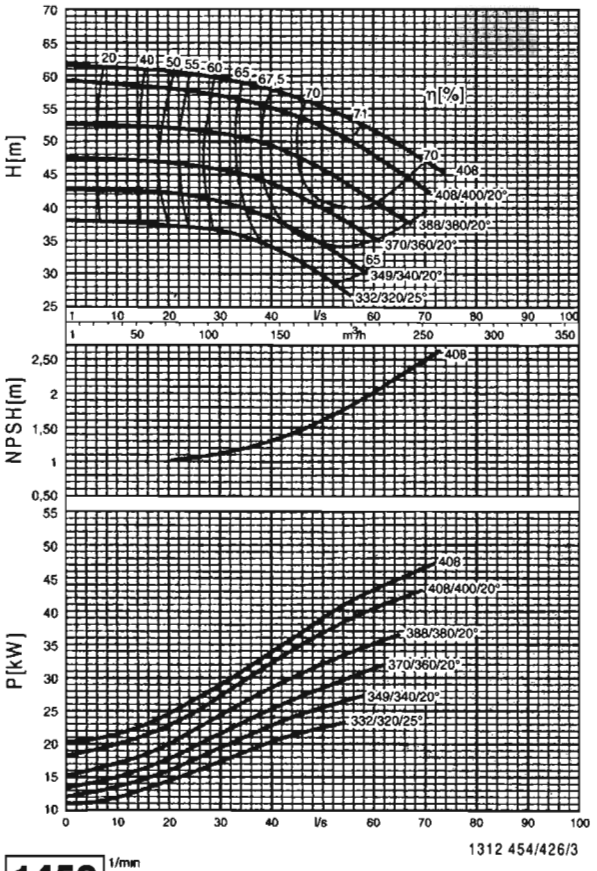


1450 1/min

Promjer rotora 272-324 mm Širina rotora >>b2<< 26 mm

Impeller diameter 272-324mm Impeller width >>b2<< 26 mm

RPP 40-15

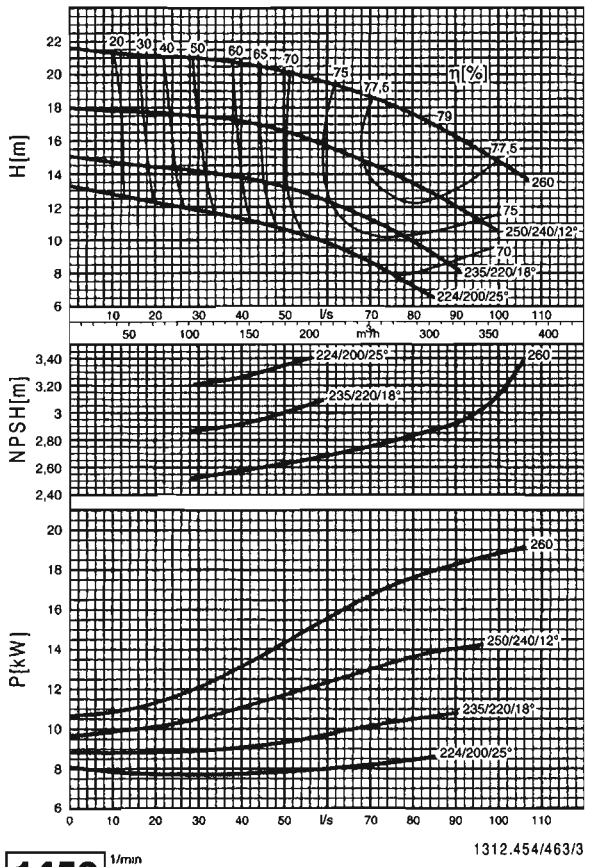


1450 1/min

Promjer rotora 332-408 mm Širina rotora >>b2<< 23 mm

Impeller diameter 332-408 mm Impeller width >>b2<< 23 mm

RPP 25-20

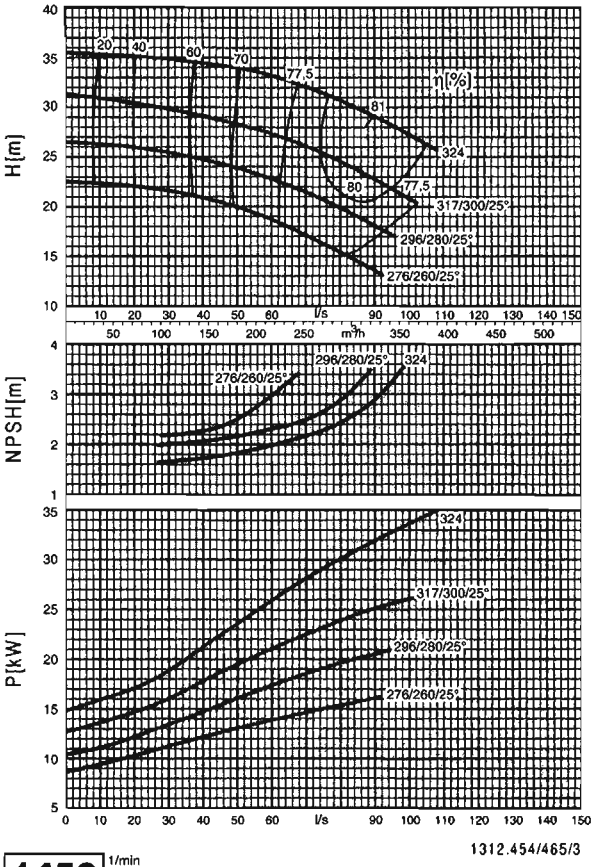


1450 1/min

Promjer rotora 224-260 mm Širina rotora >>b2<< 46 mm

Impeller diameter 224-260 mm Impeller width >>b2<< 46 mm

RPP 31,5-20

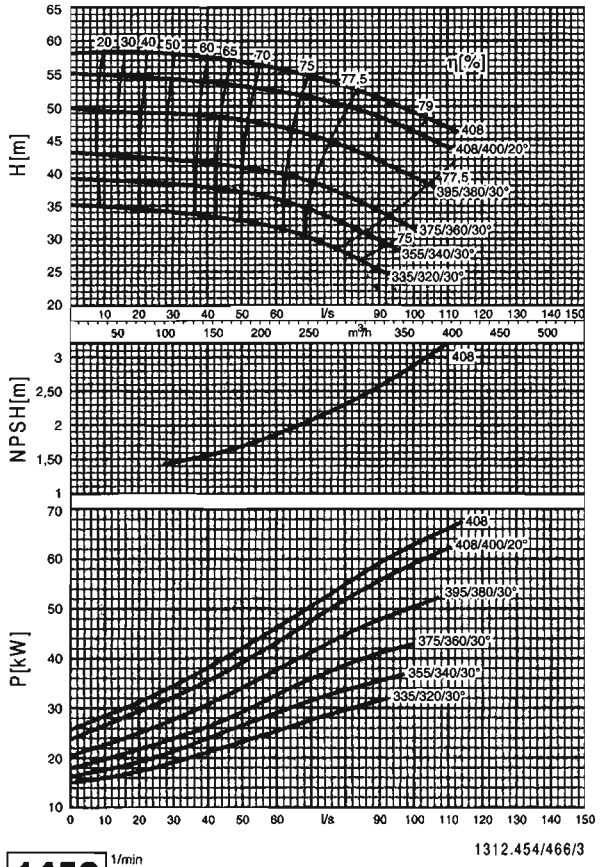


1450 1/min

Promjer rotora 276-324 mm Širina rotora >>b2<< 34 mm

Impeller diameter 276-324 mm Impeller width >>b2<< 34 mm

RPP 40-20



1450 1/min

Promjer rotora 335-408 mm Širina rotora >>b2<< 26 mm

Impeller diameter 225-408 mm Impeller width >>b2<< 26 mm

Attachment 9

ENEQ Consult – Channel Process Pumps Type KPP and VKPP

ENEQ Consult Ltd. delivers cost-effective mechanical equipment for nuclear, conventional, oil & gas, and petrochemical industries.

- **9 years** of solid performance
- **> 20 M€** project portfolio
- **> 50** completed projects, **> 10** in progress
- Exclusive partnerships with **5 manufacturers worldwide**
- Equipment compliant with **ASME, EN, N Stamp, DIN, ASTM, ISO, GOST**

Expertise:

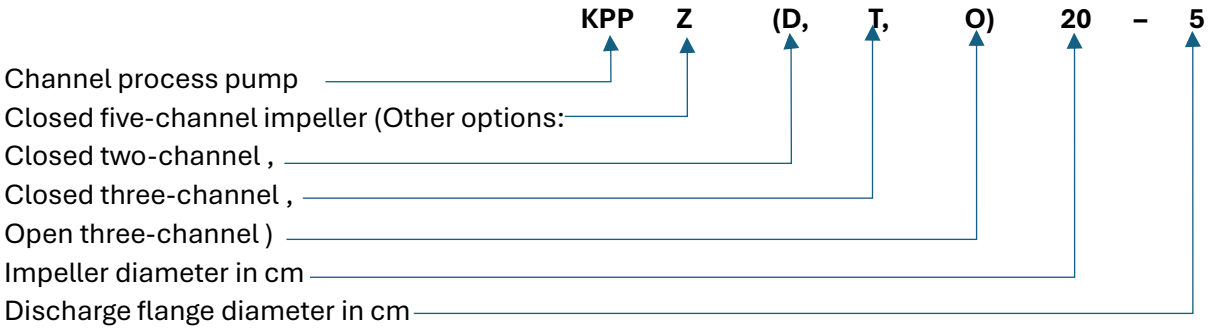
- **Equipment Supply** – high-quality OEMs, cost-effective modernization and new-build solutions, turnkey delivery
- **Engineering** – design critical analyses, FEA & CFD calculations, technical consulting
- **Service** – full project support from production to installation, commissioning, and after-sales

Channel Process Pumps Type KPP and VKPP

Application

KPP pumps are defined as channel process pumps for dirty water and all types of aggressive and abrasive media with a high percentage of solid particles, fibers, waste, and other impurities. They are used in the paper industry for paper pulp, in sugar factories, alumina plants, for wastewater and dirty water, and wherever their operating characteristics can meet the requirements. With the appropriate choice of material, they can deliver all types of abrasive and aggressive media up to a temperature of 200°C. The pumps are available with 4 impeller designs (closed with 2, 3, and 5 vanes, and open with 3 vanes). The choice of impeller depends on the type of medium, specifically the content and properties of solid and fibrous materials.

Marking Example



As explained, the letter in the fourth position changes depending on the impeller design.

Characteristics

- **Flow rate**: from 3 to 800 m^3/h
- **Delivery head**: from 6 to 90 m
- **Max. working pressure**: 10 bar
- **Working temperature**: -30 to +250°C

Construction

The KPP pump is a single-entry, single-stage, horizontal, radially-split pump with a horizontal fluid inlet and a radial outlet directed upwards. An impeller is keyed onto the shaft and secured with a nut within the volute casing. Since the pump is intended for delivering abrasive media, KPP pumps are constructed with front and rear wear plates that can be replaced as needed without damaging the casing. The pump is designed so that by using a spacer coupling, the pump can be disassembled and the rotor assembly removed without dismantling the electric motor. On the suction side, a suction pipe section with a cleaning port can be supplied as needed, allowing for periodic inspection and removal of accumulated impurities. In addition to the horizontal version, KPP pumps can also be supplied in a vertical configuration (designated as **VKPP**) with the same impeller variations. KPP pumps have a single-inlet volute casing with feet for mounting on a base plate. The flanges are designed according to DIN standards.

The impeller is a radial, single-entry type with wide channels and a small number of vanes to allow for the transport of dirty media with large solids. The impeller can be made in the following variants:

- **a) Closed design with 5 vanes (Z design)**, Pump type designation **KPPZ**. Used for media with relatively low impurity content and smaller solid particles (alumina, sand, etc.).
- **b) Closed design with 2 vanes (D design)**. Used for media with a somewhat higher content of impurities that do not stick or adhere to the vanes. Can transport larger solid particles.
- **c) Closed design with [3] vanes (T design)**, Pump type designation **KPPT**. Used for media with slightly lower impurity content than the "D" design.
- **d) Open design with 3 vanes (O design)**, Pump type designation **KPPO**. Used for media with a high content of impurities, especially fibrous materials (paper pulp, hair, etc.) and impurities that stick to the vanes, posing a risk of clogging. This design allows for the periodic removal of impurities from the impeller vanes through the cleaning port.

Bearings

The shaft is supported in two locations by standard rolling bearings, which are oil-lubricated and cooled as needed.

Axial Thrust Balancing

Axial thrust is balanced by back vanes on the impeller.

Sealing

Sealing is generally done with gland packing. The most common arrangement is with a water supply from an external source, as the pumped media are usually dirty and cannot be used to lubricate the seal. If the media and operating conditions require higher quality seals, mechanical seals from well-known world manufacturers are installed, such as: CRANE, FLEXIBOX, PACIFIC, BURGMANN, SEALOL, and others. Mechanical seals are usually single and unbalanced but can also be double upon special customer request. For high temperatures, we provide special cooling for the seal area.

Material

With various material combinations, KPP pumps can deliver almost all types of abrasive and aggressive media. The materials we use are classified into 5 basic groups:

a) **Gray and cast steel (SL 25 and ČL 0445)**

   For water and neutral media without abrasive particles.

b) **Bronze P. Cu Sn 10**

   Used for seawater, in the food industry, and for aggressive media to which bronze is resistant.

c) **Stainless cast steel for aggressive media (ČL 4574 and ČL 4580, substitutes for AISI 316 and AISI 304).**

   For aggressive media in which the content of abrasive particles is not significant.

d) **Chrome cast steel for abrasive and partially aggressive media (ČL 4171, ČL 4783, ČL 41702).**

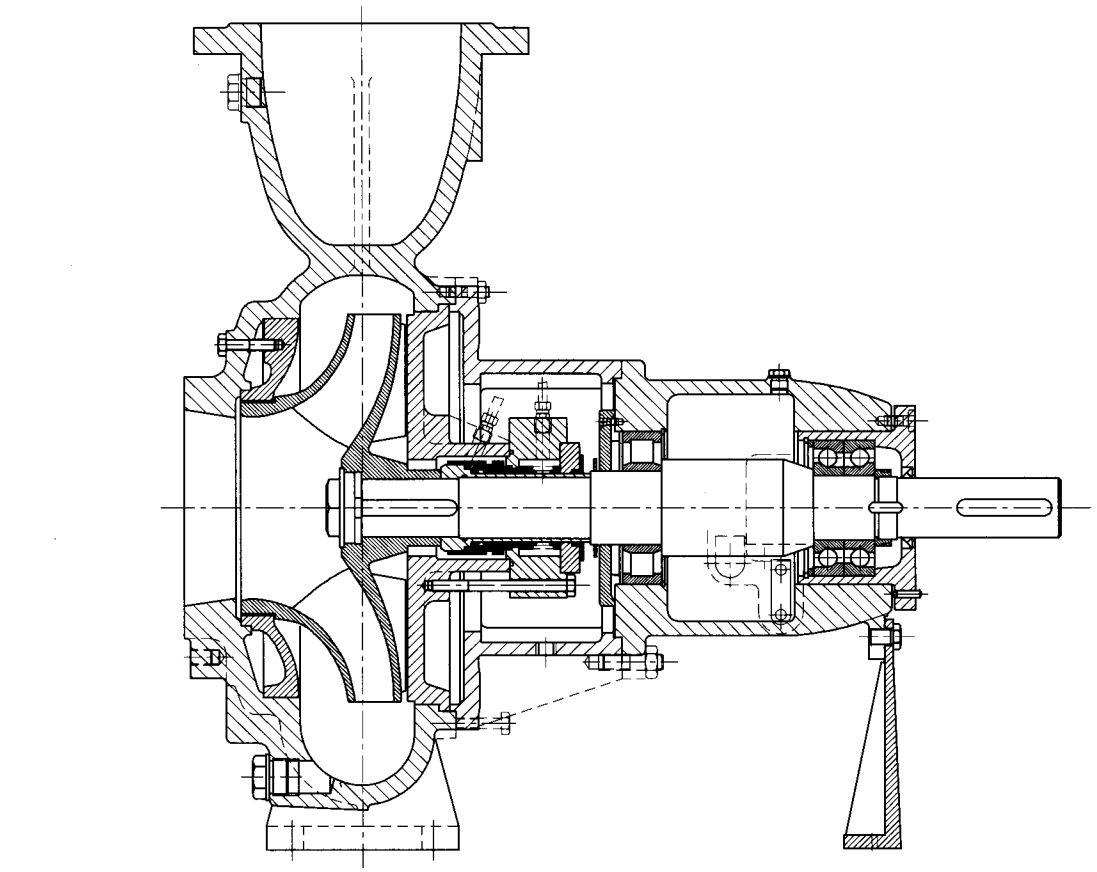
e) **Special cast steel with a high percentage of nickel and chrome, 30% Ni, 20% Cr (JGT 29.21.)**

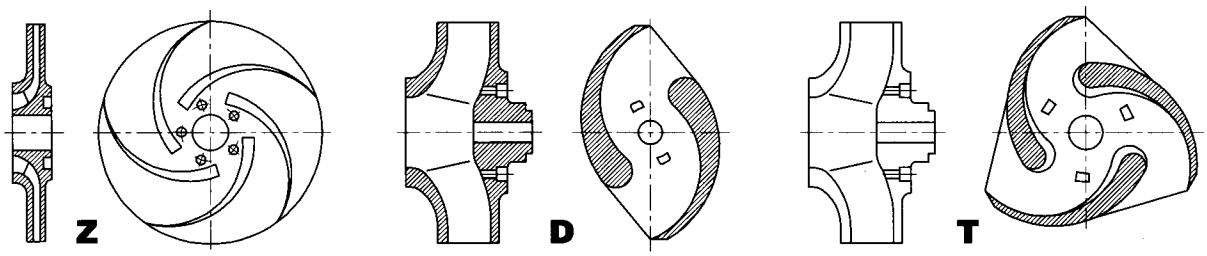
   Used for sulfuric acid at high temperatures and for highly aggressive media.

Aggregation

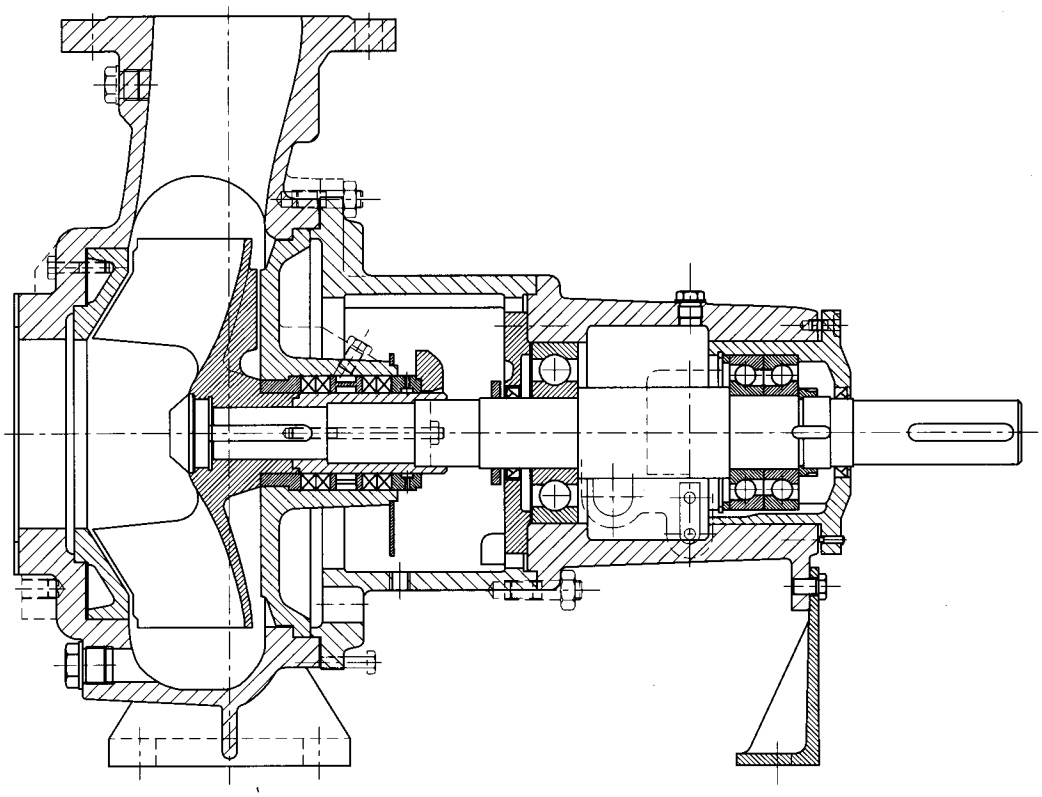
In normal cases, the pumps are aggregated with electric motors on a common base plate, connected by a flexible coupling. Upon special customer request, we can perform aggregation with a belt drive for the required number of revolutions. We can also aggregate the pumps with other types of drives.

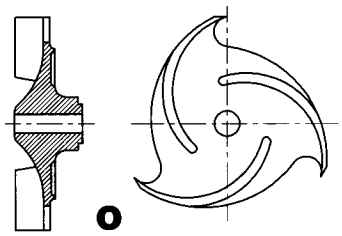
Presjek pumpe Tip KPPZ, KPPD i KPPT





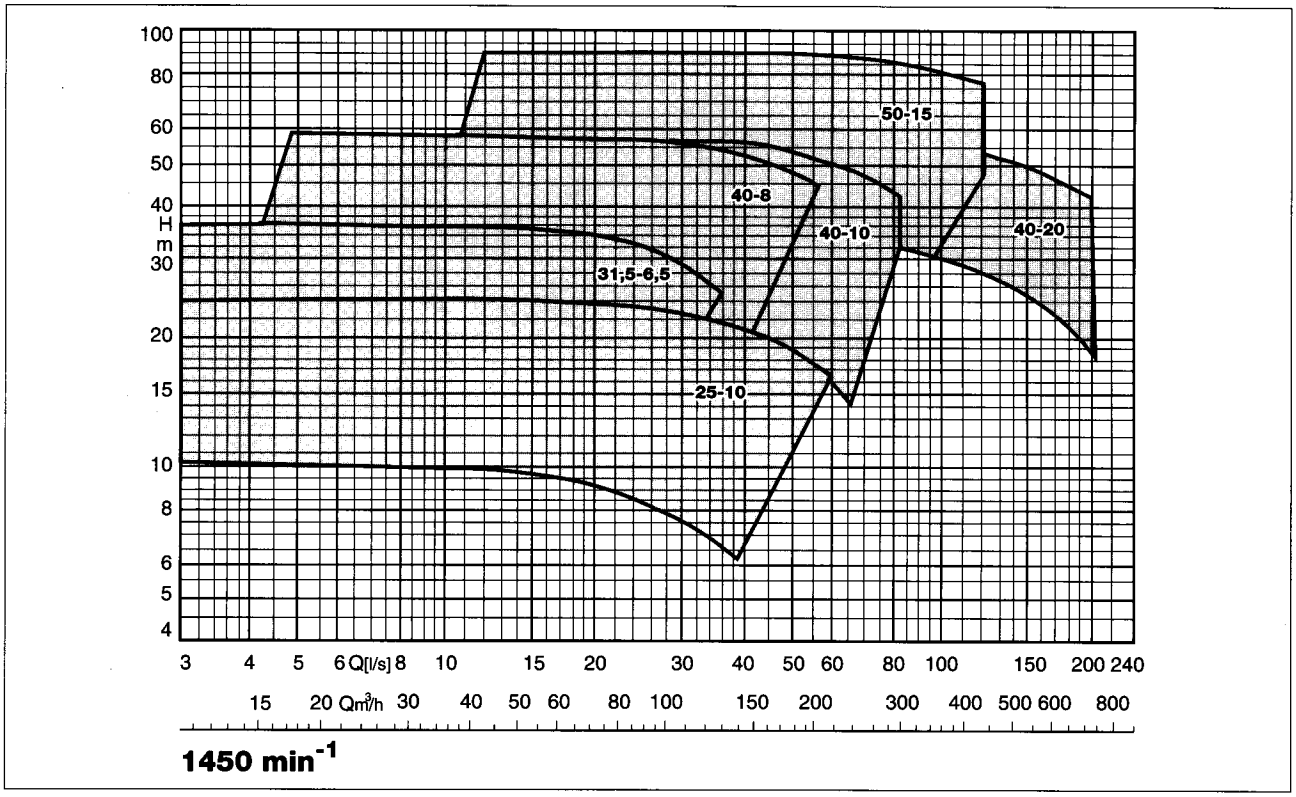
Presjek pumpe Tip KPPO



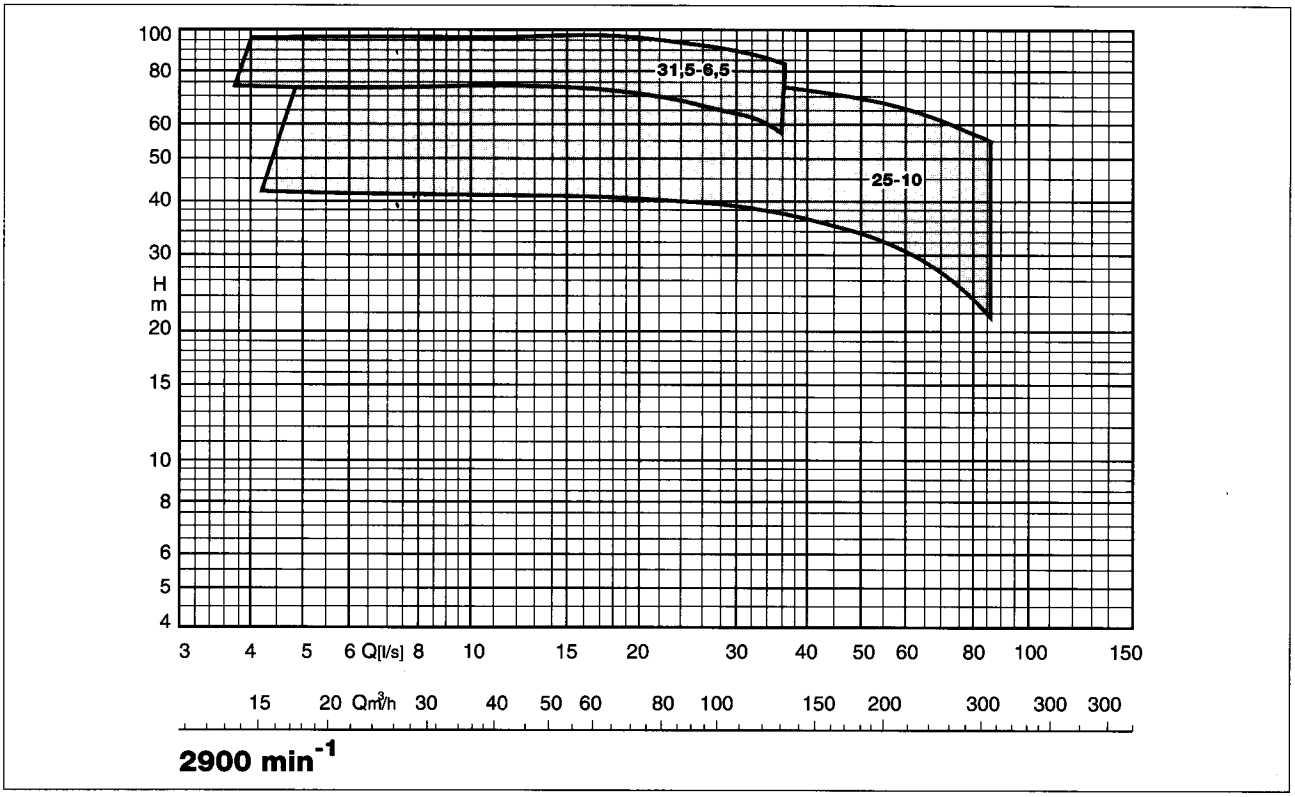


o

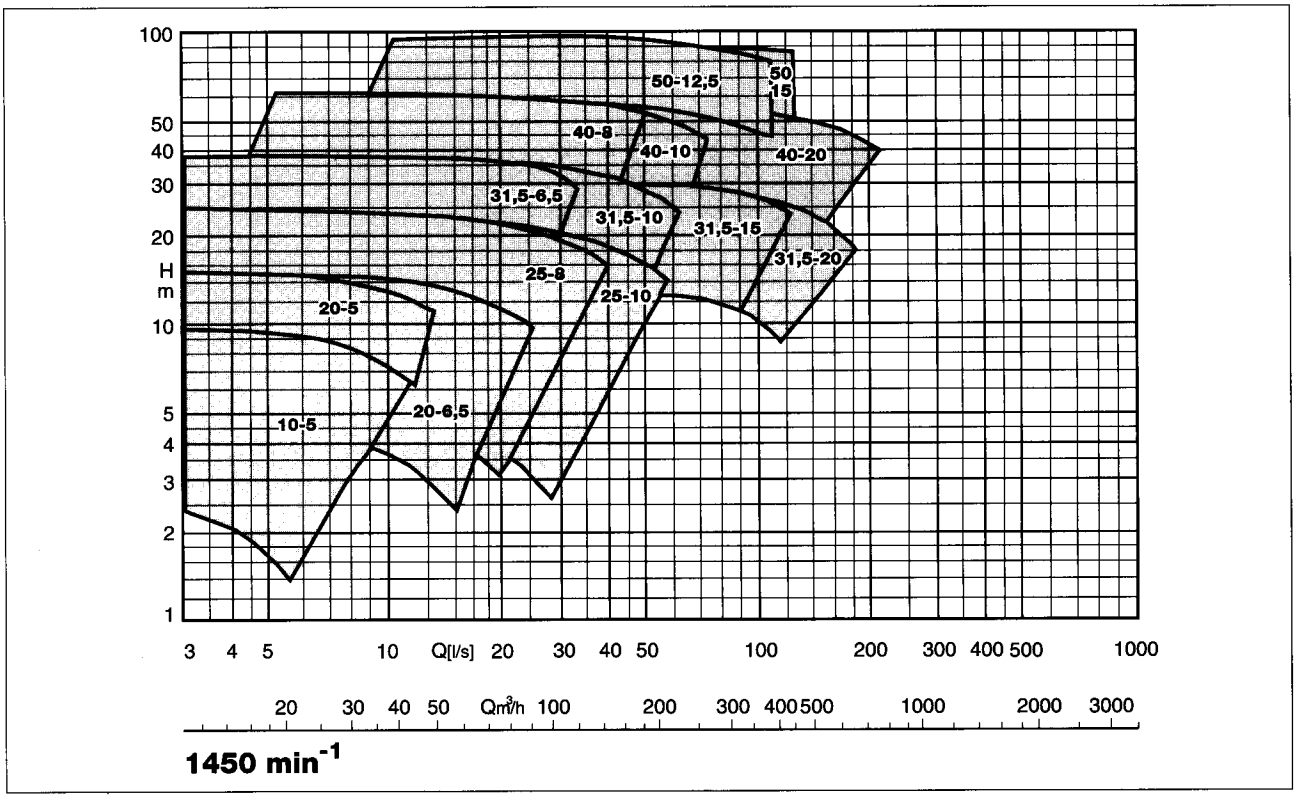
KPPZ


100
80
60
50
40
H
m
30
20
15
10
8
6
5
4
50-15
40-8
40-10
40-20
31,5-6,5
25-10
3 4 5 6 Q[l/s] 8 10 15 20 30 40 50 60 80 100 150 200 240
15 20 Qm³/h 30 40 50 60 80 100 150 200 300 400 500 600 800
1450 min-1

KPPZ

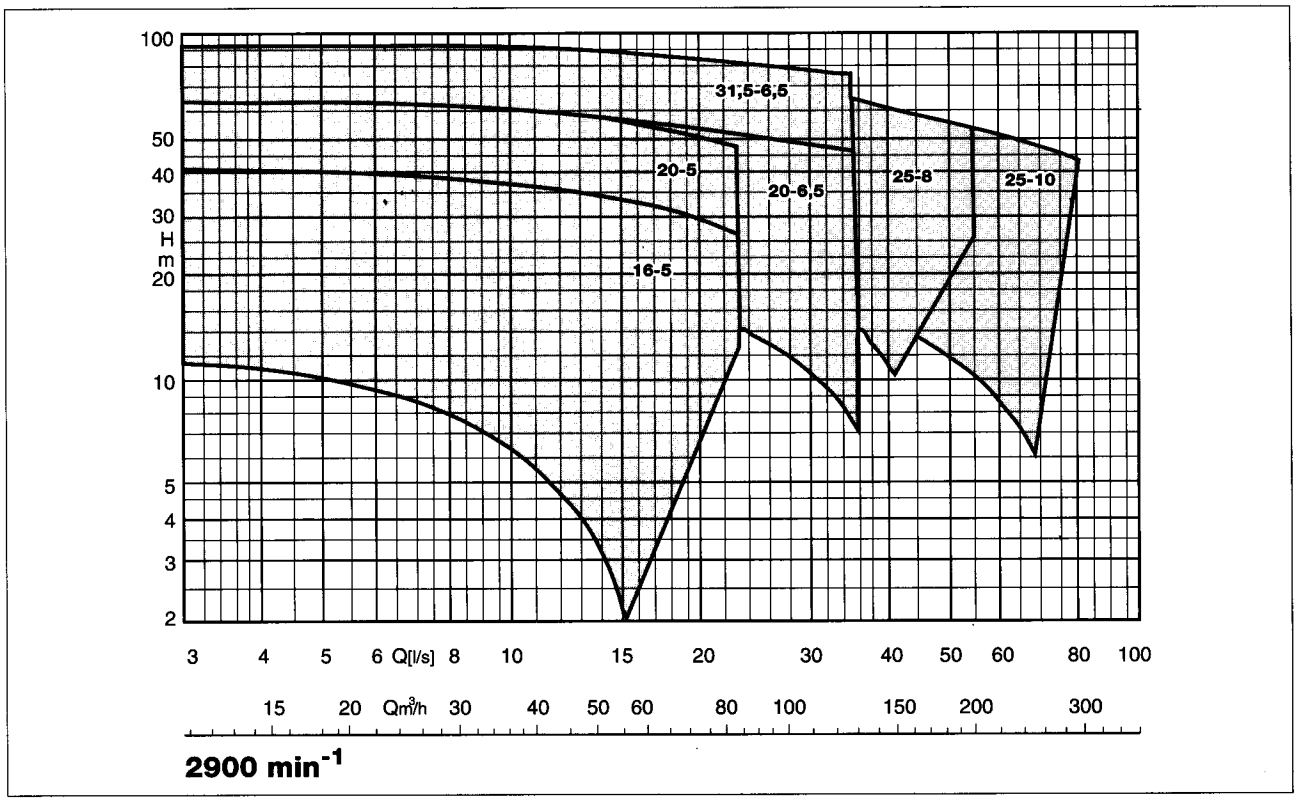

100
80
60
50
40
30
H
m
20
15
10
8
6
5
4
31,5-6,5
25-10
3 4 5 6 Q[l/s] 8 10 15 20 30 40 50 60 80 100 150
15 20 Qm³/h 30 40 50 60 80 100 150 200 300 300 300
2900 min-1

KPPD i KPPT



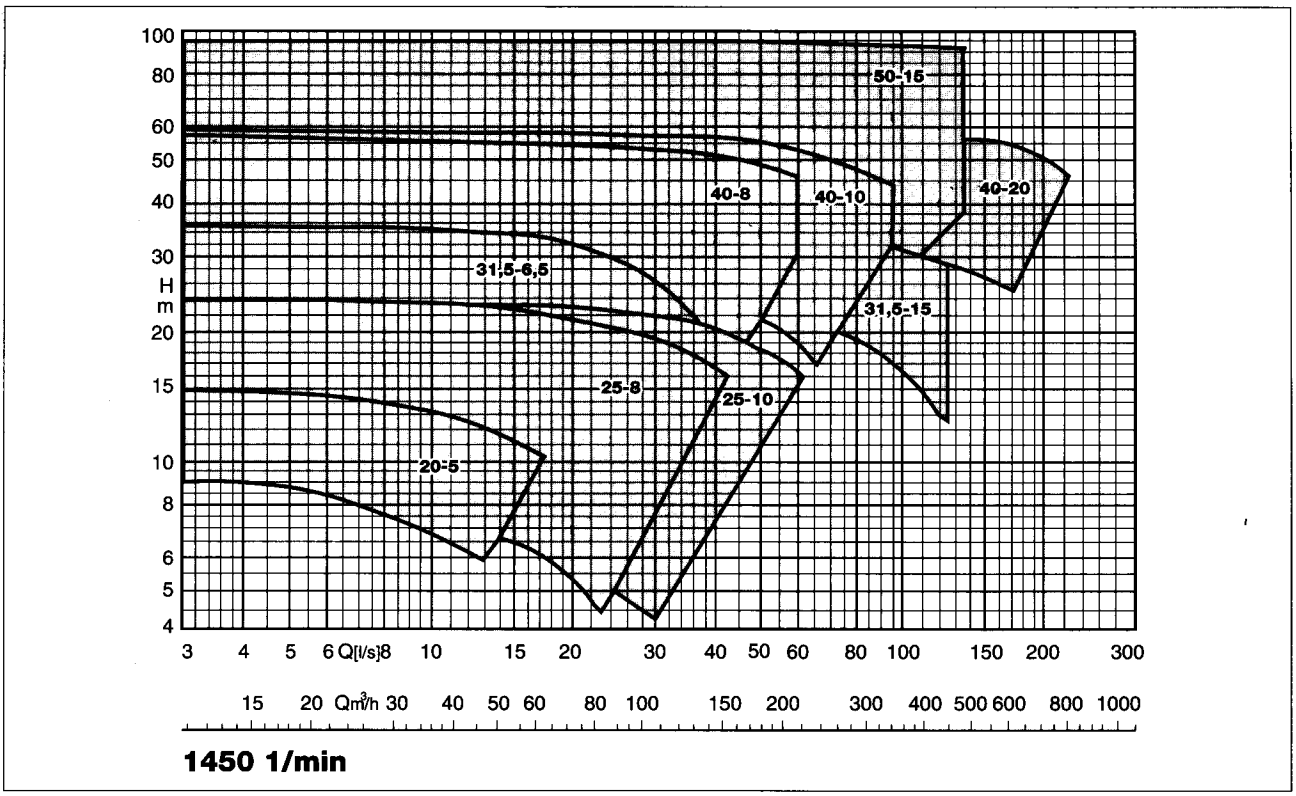
1450 min^{-1}

KPPD i KPPT



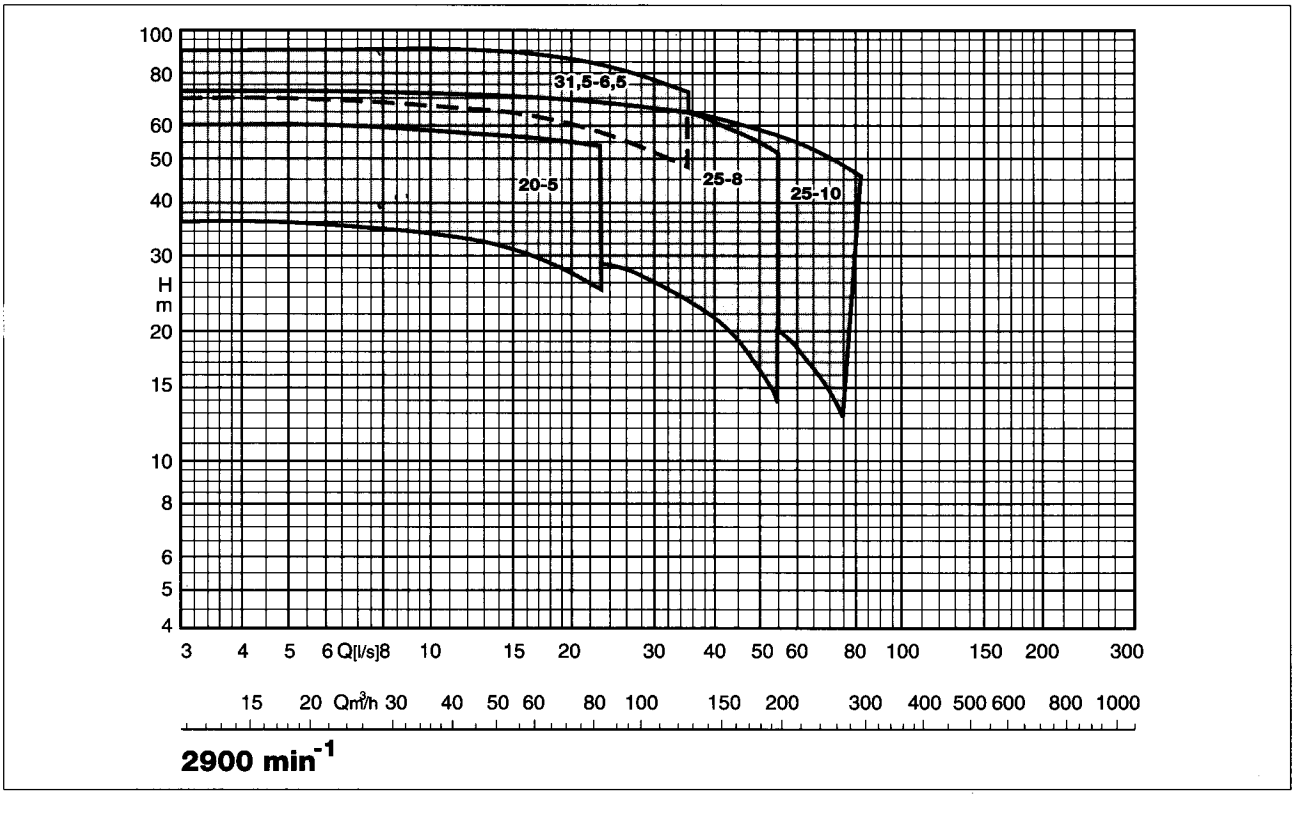
2900 min^{-1}

KPPO



1450 1/min

KPPO



2900 min^{-1}

Attachment 10

ENEQ Consult – Boiler Feed Pumps Type VSN

ENEQ Consult Ltd. delivers cost-effective mechanical equipment for nuclear, conventional, oil & gas, and petrochemical industries.

- **9 years** of solid performance
- **> 20 M€** project portfolio
- **> 50** completed projects, **> 10** in progress
- Exclusive partnerships with **5 manufacturers worldwide**
- Equipment compliant with **ASME, EN, N Stamp, DIN, ASTM, ISO, GOST**

Expertise:

- **Equipment Supply** – high-quality OEMs, cost-effective modernization and new-build solutions, turnkey delivery
- **Engineering** – design critical analyses, FEA & CFD calculations, technical consulting
- **Service** – full project support from production to installation, commissioning, and after-sales

Boiler Feed Pumps Type VSN

Application

VSN pumps are centrifugal, multi-stage pumps in a horizontal design. They are intended for delivering feed water in power plants, at temperatures up to 180°C.

Delivery Range

At 2900 RPM, these pumps cover a range from 2 to 120 l/s at manometric heads from 50 to 1000 m. The delivery ranges for individual sizes and types are shown in the diagram.

Constructive Characteristics

Casings The pumps have a sectional design, which means that each diffuser is installed in its own interstage casing and, together with the impeller, forms one stage. The required number of stages, along with the suction and discharge casings, are clamped together by common tie bolts.

Rotors and Stators The impellers are single-suction with one wear ring located in the casing. The wear rings are easily replaceable. The diffusers are separate parts that can be easily assembled and disassembled. Details can be seen in the pump cross-section.

Shafts and Bearings The shaft is supported by two oil-lubricated slide bearings. The oil in the bearing is cooled from an external source. Inside the pump, the shaft is protected by sleeves so that it does not come into contact with the transported water.

Sealing At the pump outlets, the shaft is sealed by packing rings located in stuffing boxes. The stuffing boxes are cooled by cooling water from an external source. Instead of packing rings, mechanical seals are installed upon special request.

Materials

Part	Temperature ≤120°C	Temperature >120°C
Suction casing	Cast Steel (ČL 1330)	Cast Steel (ČL 1330)
Discharge casing	Cast Steel (ČL 1330)	Cast Steel (ČL 1330)
Interstage casing	Steel (Č 1531)	Steel (Č 1531)
Rotors and diffusers	Gray Cast Iron (SL 25)	Cast Steel (ČL 4171)
Shaft	Steel (Č 4732)	Steel (Č 4732)
Disc	Cast Steel (Č 4171)	Cast Steel (Č 4171)

Equivalents are based on similar chemical compositions and mechanical properties.

JUS Standard (Original)	EN (European) Equivalent	AISI/ASTM (American) Equivalent
SL 25 (Gray Cast Iron)	EN-GJL-250	ASTM A48 Class 40
ČL 1330 (Cast Steel)	GP240GH (1.0619)	ASTM A216 Grade WCB

Č 1531 (Steel)	C45E (1.1191)	AISI 1045
Č 4171 (Stainless Steel)	X20Cr13 (1.4021)	AISI 420
Č 4732 (Alloy Steel)	21CrMoV5-7 (1.7709)	Comparable to ASTM A193 B16

Aggregation

Upon the customer's request, we assemble the pumps together with steam turbines, electric or Diesel motors. Aggregation is done on base frames. To protect the pump from overheating at zero flow, a minimum flow valve must be installed.

Engineering

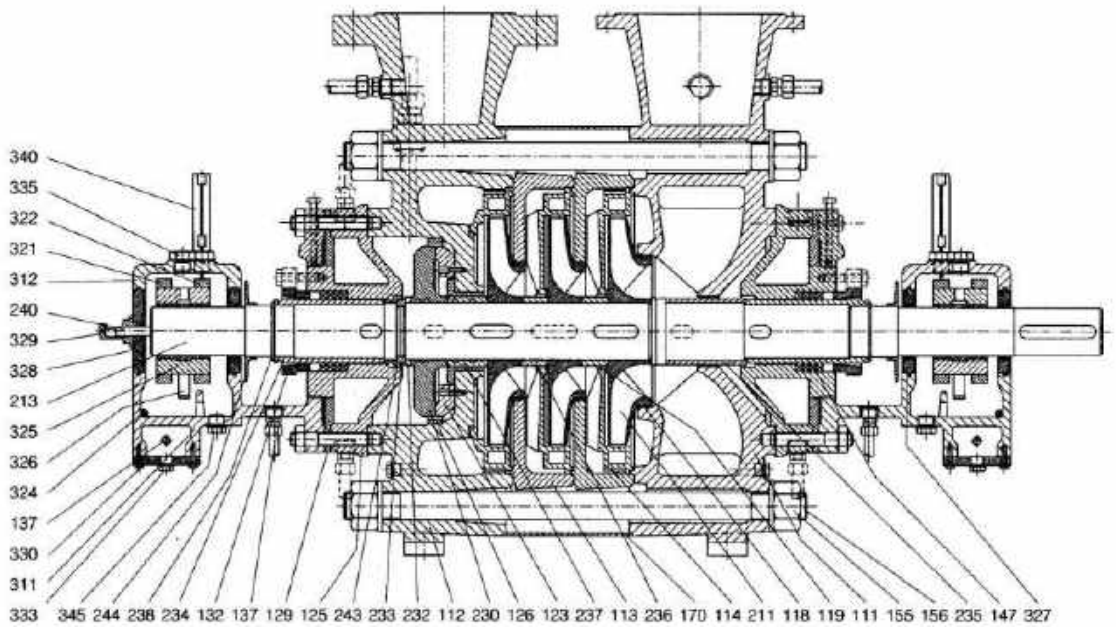
We design pumping plants and complete pump stations. We undertake the execution and supervision of the installation. We participate in the design of pumping plants. When selecting the most economically favorable pump sizes and designs, our experienced engineering staff is always at our customers' service.

Pump Order

It is recommended to specify the following when ordering:

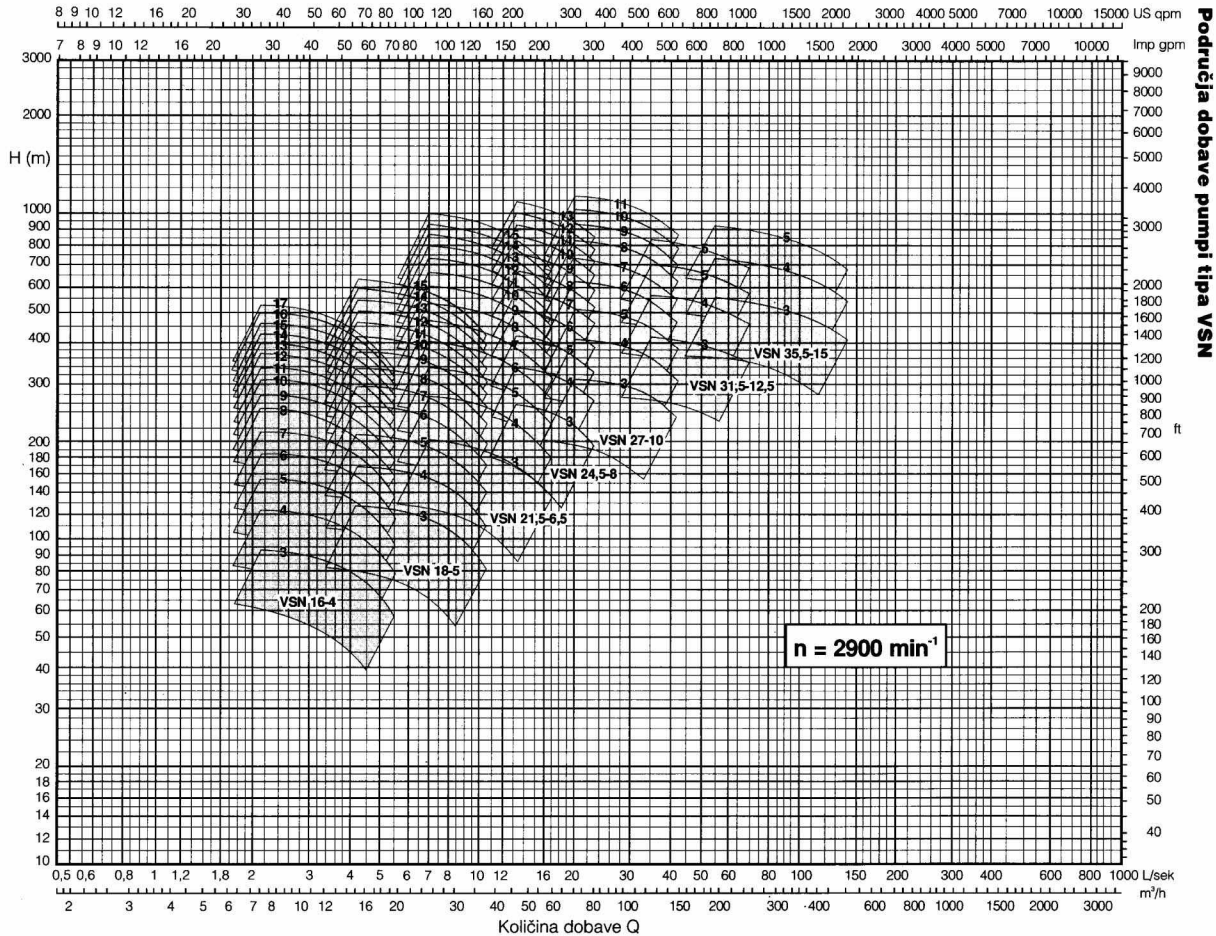
- characteristics of the medium
- flow rate
- delivery head
- NPSH of the plant or required suction head
- pressure at the pump inlet
- temperature of the medium

Pump Cross-section



Main pump parts

111 - Suction casing
112 - Discharge casing
113 - Interstage casing
114 - Diffuser
118 - Wear ring
119 - Wear ring
123 - Disc plate
125 - Stuffing box support
126 - Ring
129 - Cover
132 - Stuffing box
137 - Connection
147 - Sealing ring
155 - Nut
156 - Tie bolt
170 - Sheet metal casing
211 - Impeller
213 - Shaft
230 - Disc
232 - Distance ring
233 - Two-part ring
234 - Protective sleeve
235 - Protective sleeve
236 - Distance sleeve
237 - Distance sleeve
238 - Snap ring
240 - Axial indicator
243 - Ring
244 - Centrifugal separator
259 - Bearing support
312 - Bearing cover
321 - Yoke
322 - Yoke
324 - Oil level indicator
325 - Two-part slide bearing
326 - Lubricating ring
327 - Two-part seal
328 - Seal
329 - Axial indicator guard
330 - Cover
333 - Plug
335 - Plug
340 - Thermometer
345 - Plug


Područja dobave pumpi tipa VSN
US gpm
Imp gpm
H (m)
ft
VSN 35,5-15
VSN 31,5-12,5
VSN 27-10
VSN 24,5-8
VSN 21,5-6,5
VSN 18-5
VSN 16-4
n = 2900 min-1
L/sek
m3/h
Količina dobave Q

Here are the translated headings from the technical drawings and tables on next page.

Headings for the Technical Drawings

- **Main Title**: Mjerna skica pumpe translates to **Pump Dimensional Sketch**.
- **Subtitle**: Prirubnice translates to **Flanges**.
    - **Label**: Tlačna translates to **Discharge**.
    - **Label**: Usisna translates to **Suction**.
- **Note**: Mjere u mm (neobavezne) translates to **Dimensions in mm (non-binding)**.

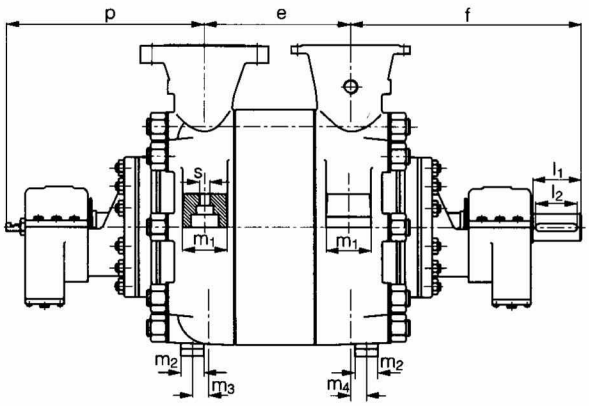
Headings for the Table

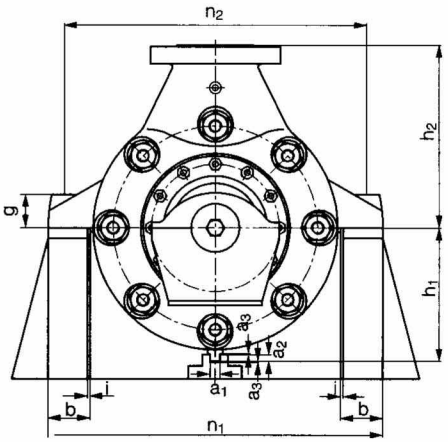
- **Main Title**: Masa i zamašni moment pumpe translates to **Mass and Moment of Inertia of the Pump**.
- **Column 1**: Tip pumpe translates to **Pump Type**.
- **Column 2**: G/GD^2 za broj stupnjeva translates to **G/GD^2 per number of stages**.

Table Footnotes

- G (kg)-masa pumpe bez spojke i temeljnog okvira translates to **G (kg) - mass of the pump without coupling and base frame**.
- GD^2 (kgm^2) - zamašni moment pumpe bez spojke i pogonskog stroja translates to **GD^2 (kgm^2) - moment of inertia of the pump without coupling and drive machine**.

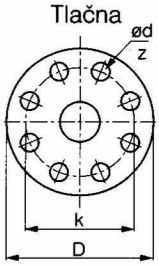
Mjerna skica pumpe



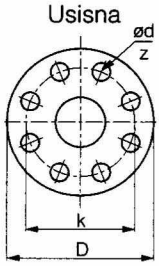


Prirubnice

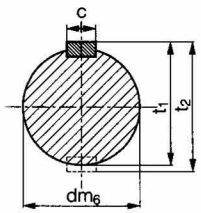
Tlačna



Usisna



Vratilo



Mjere u mm (neobavezne)

Tip pumpe	Dimenzije pumpe																								
	b	e za broj stupnjeva															f	g	h_1	h_2	i	m_1	m_2	a_1 h_6	a_2	a_3
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17										
VSN 16-4	65	186	234	282	330	378	426	474	522	570	618	666	714	762	810	858	400	50	180	250	5	60	60	15	15	5
VSN 18-5	65	204	256	308	360	412	464	516	568	620	672	724	776	828	—	—	415	50	200	275	5	70	35	15	15	5
VSN 21,5-6,5	70	240	300	360	420	480	540	600	660	720	780	840	900	960	—	—	490	60	220	325	5	70	25	25	15	5
VSN 24,5-8	80	240	305	370	435	500	565	630	695	760	825	890	—	—	—	—	460	60	245	350	5	80	60	25	15	5
VSN 27-10	90	290	360	430	500	570	640	710	780	850	—	—	—	—	—	—	540	60	270	400	5	90	40	25	15	5
VSN 31,5-12,5	125	335	4220	505	590	—	—	—	—	—	—	—	—	—	—	—	570	80	320	450	5	120	60	40	20	5
VSN 35,5-15	120	402	498	594	—	—	—	—	—	—	—	—	—	—	—	—	630	90	360	500	5	120	60	30	20	5

Tip pumpe	Dimenzije pumpe						Vratilo						Prirubnica											
	m_3	m_4	n_1	n_2	p	s	c	d m_6	l_1	l_2	t_1	t_2	Usisna						Tlačna					
													NT	D_S	D	k	d	z	NT	D_S	D	k	d	z
VSN 16-4	15	20	435	395	329	17	10	34	85	70	37,3	—	40	50	165	125	18	4	160	40	170	125	22	4
VSN 18-5	17	17	490	440	378	18	10	34	85	70	37,3	—	16	65	185	145	18	4	160	50	190	145	26	4
VSN 21,5-6,5	15	25	530	470	400	22	12	44	130	110	47,1	—	16	80	200	160	18	8	160	65	220	170	26	8
VSN 24,5-8	26	25	605	545	370	22	12	44	117	112	47,1	—	16	100	220	180	18	8	160	80	230	180	26	8
VSN 27-10	25	25	680	620	420	22	14	48	140	125	51,5	—	16	125	250	210	18	8	160	100	265	210	30	8
VSN 31,5-12,5	10	10	840	750	462	24	14	48	140	125	51,5	—	16	150	235	240	23	8	160	125	315	250	33	8
VSN 35,5-15	40	40	920	840	550	33	20	74	140	125	—	83,2	16	200	340	295	23	12	160	150	355	290	33	12

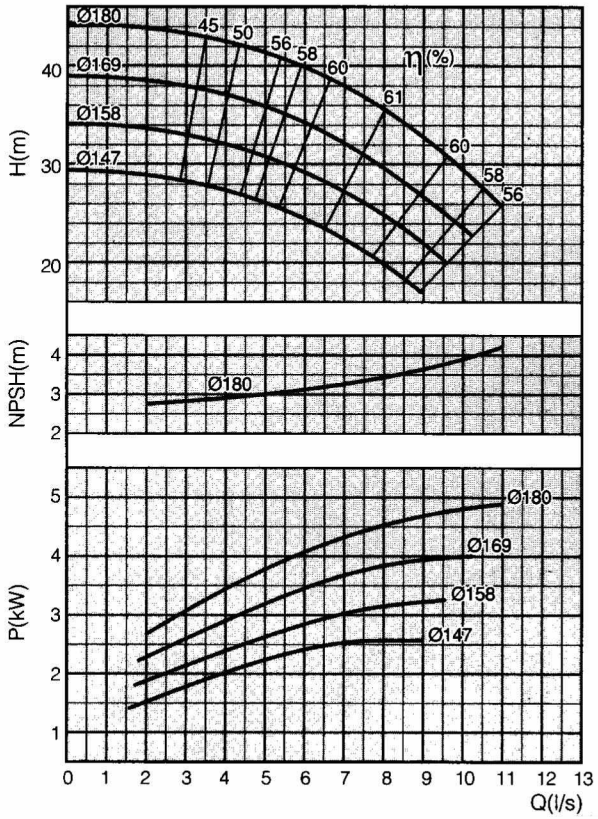
Masa i zamašni moment pumpe

Tip pumpe	G / GD^2 za broj stupnjeva														
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
VSN 16-4	210 0,08	225 0,09	240 0,10	255 0,11	270 0,12	285 0,13	300 0,14	315 0,15	330 0,16	345 0,17	360 0,18	375 0,19	390 0,20	405 0,21	420 0,22
VSN 18-5	260 0,13	277 0,16	294 0,19	311 0,22	328 0,25	345 0,28	362 0,31	379 0,34	396 0,37	413 0,4	430 0,43	447 0,46	464 0,49	—	—
VSN 21,5-6,5	312 0,26	347 0,32	382 0,38	417 0,44	452 0,5	487 0,56	522 0,62	557 0,68	592 0,74	627 0,8	662 0,86	697 0,92	732 0,98	—	—
VSN 24,5-8	370 0,4	400 0,5	430 0,6	460 0,7	490 0,8	520 0,9	550 1,0	580 1,1	610 1,2	640 1,3	670 1,4	—	—	—	—
VSN 27-10	610 0,72	645 0,9	680 1,08	715 1,26	750 1,44	785 1,62	820 1,8	855 1,98	890 2,16	—	—	—	—	—	—
VSN 31,5-12,5	880 1,32	910 1,64	980 1,96	1030 2,28	—	—	—	—	—	—	—	—	—	—	—
VSN 35,5-15	1150 2,7	1240 3,23	1330 3,76	—	—	—	—	—	—	—	—	—	—	—	—

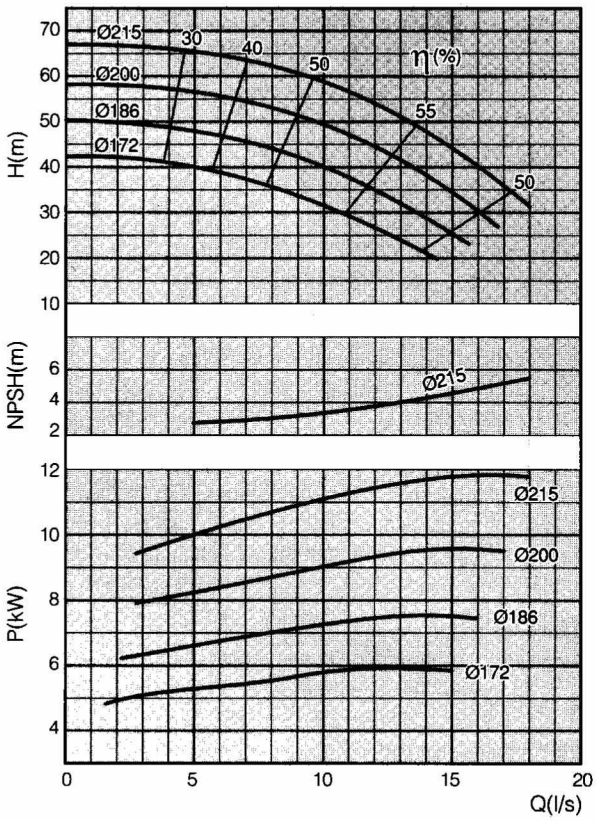
G (kg) - masa pumpe bez spojke i temeljnog okvira
GD^2 (kgm^2) - zamašni moment pumpe bez spojke i pogonskog stroja

Pojedinačni dijagrami

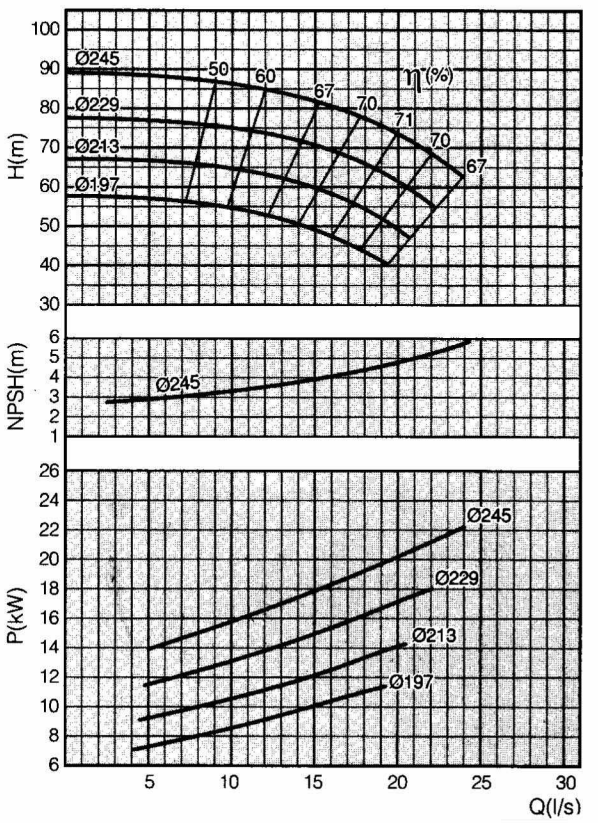
VSN 18-5/1 (3-15) b_2=7mm;n=48,4 s^{-1}



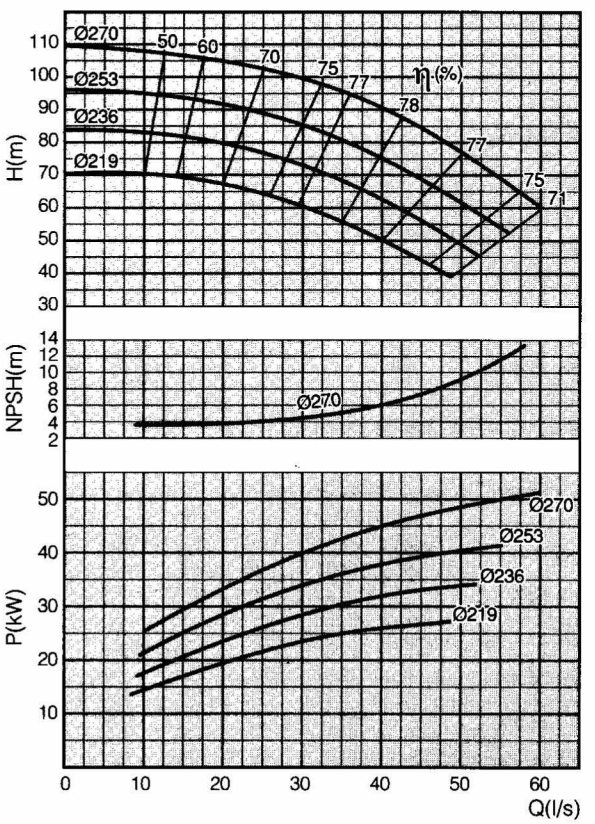
VSN 21,5-6,5/1 (3-15) b_2=9mm;n=48,4 s^{-1}



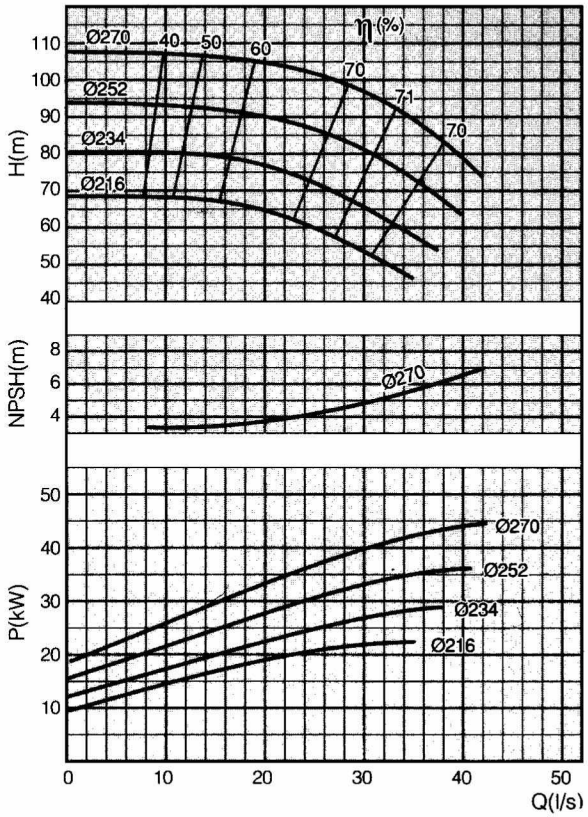
VSN 24,5-8/1 (3-13) b_2=11mm;n=48,4 s^{-1}



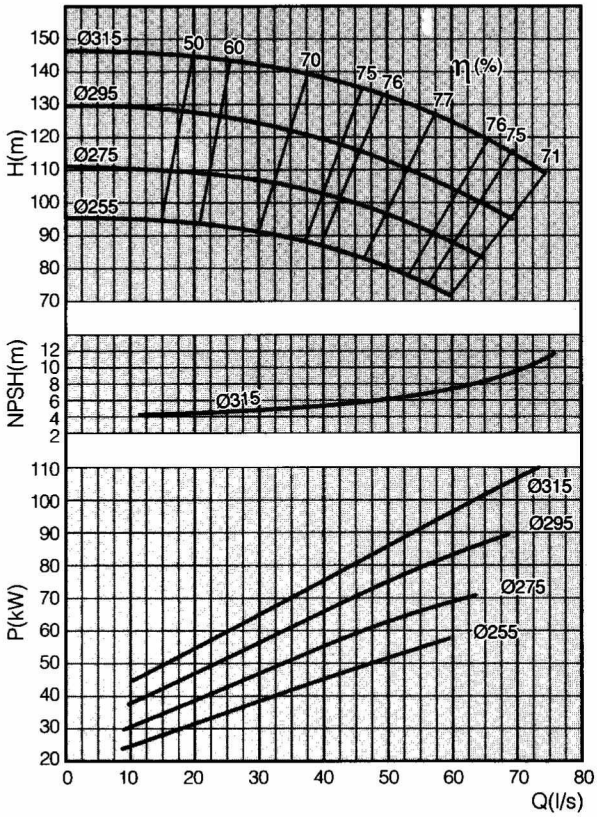
VSN 27-10(A)/1 (3-11) b_2=15mm;n=48,4 s^{-1}



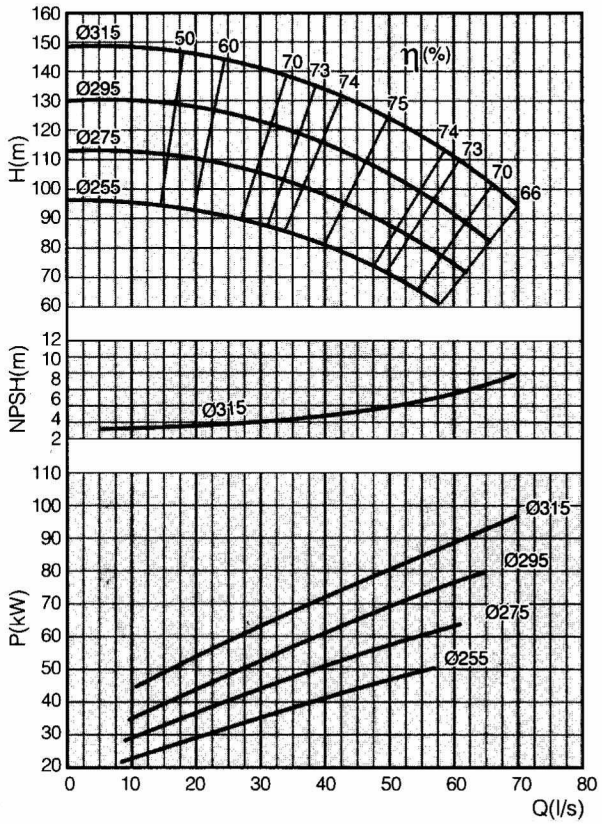
VSN 27-10/1 (3-11) b_2=12mm;n=48,4 s^{-1}



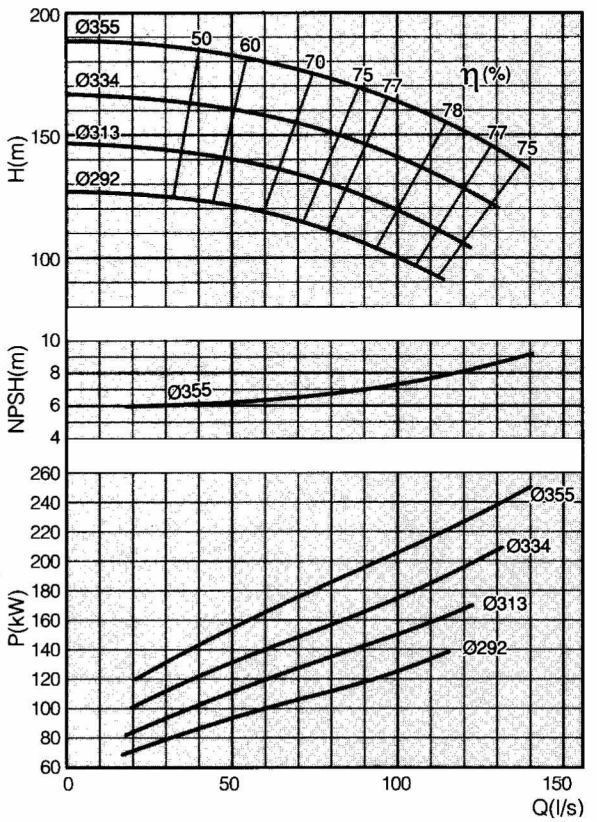
VSN 31,5-12,5/1 (3-6) b_2=18mm;n=48,4 s^{-1}



VSN 32-12,5/1 (3-8) b_2=14mm;n=48,4 s^{-1}



VSN 35,5-15/1 (3-5) b_2=22mm;n=48,4 s^{-1}



HMB Series In-Line Vertical Multistage Can

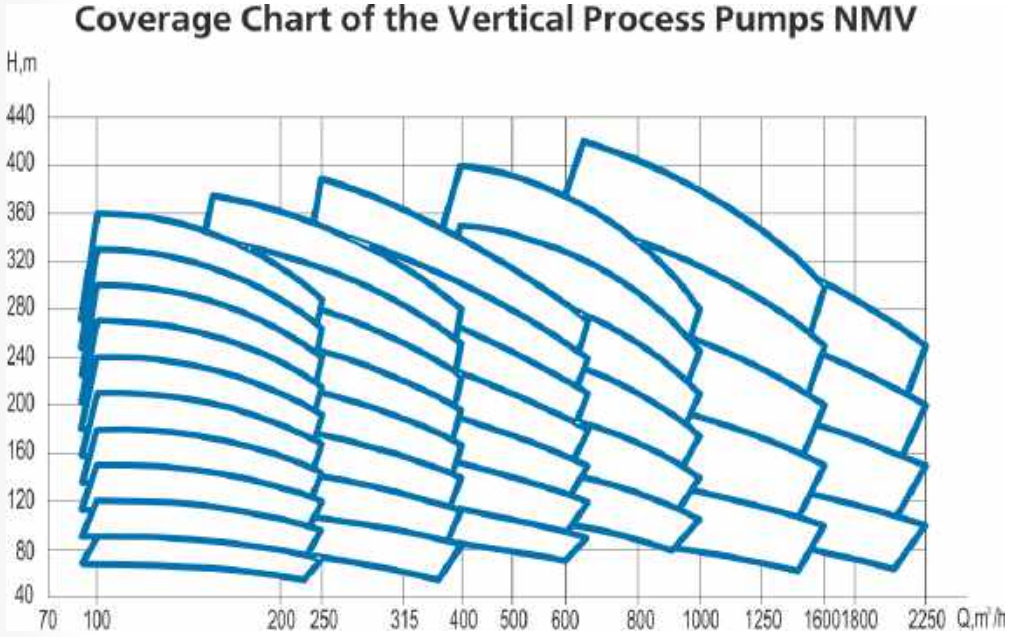
Designed for transporting crude oil through long-distance pipelines and end products (diesel fuel, motor petrol, jet engine fuel) through product pipelines.

Vertically suspended, in-line, can, end-suction multistage diffuser centrifugal pumps with the first stage double flow impeller, provided with inducers. Driven by induction motors by means of a spacer-type diaphragm flexible coupling. The pump rotor is carried by the top thrust and radial antifriction bearing and the bottom medium lubricated hydrodynamic plain bearing. Shaft sealing: by mechanical seal. Designed in compliance with API Standard 610 requirements.

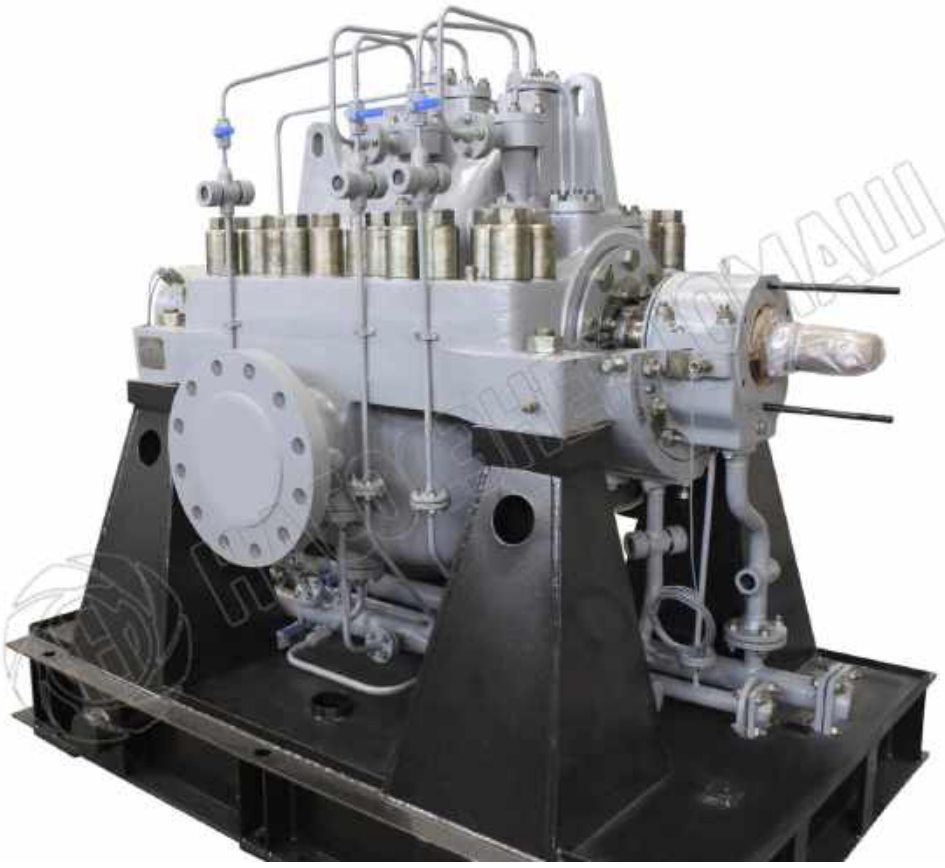
Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed,rpm
HMB 200-75	200	75	1500
HMB 200-100	200	100	1500
HMB 200-125	200	125	1500
HMB 200-150	200	150	1500
HMB 200-175	200	175	1500
HMB 200-200	200	200	1500
HMB 200-225	200	225	1500
HMB 200-250	200	250	1500
HMB 200-275	200	275	1500
HMB 200-300	200	300	1500
HMB 315-90	315	90	1500
HMB 315-120	315	120	1500
HMB 315-150	315	150	1500
HMB 315-180	315	180	1500
HMB 315-210	315	210	1500
HMB 315-240	315	240	1500
HMB 315-270	315	270	1500
HMB 315-300	315	300	1500
HMB 500-105	500	105	1500
HMB 500-140	500	140	1500
HMB 500-175	500	175	1500
HMB 500-210	500	210	1500
HMB 500-245	500	245	1500
HMB 500-280	500	280	1500
HMB 500-315	500	315	1500
HMB 800-120	800	120	1500
HMB 800-160	800	160	1500
HMB 800-200	800	200	1500
HMB 800-240	800	240	1500

Pump make	Capacity, m^3/h	Head, m	Rotational speed,rpm
HMB 800-280	800	280	1500
HMB 800-320	800	320	1500
HMB 1250-110	1250	110	1500
HMB 1250-165	1250	165	1500
HMB 1250-220	1250	220	1500
HMB 1250-275	1250	275	1500
HMB 1250-330	1250	330	1500
HMB 1800-110	1800	110	1500
HMB 1800-165	1800	165	1500
HMB 1800-220	1800	220	1500
HMB 1800-275	1800	275	1500



AMG (BB3)

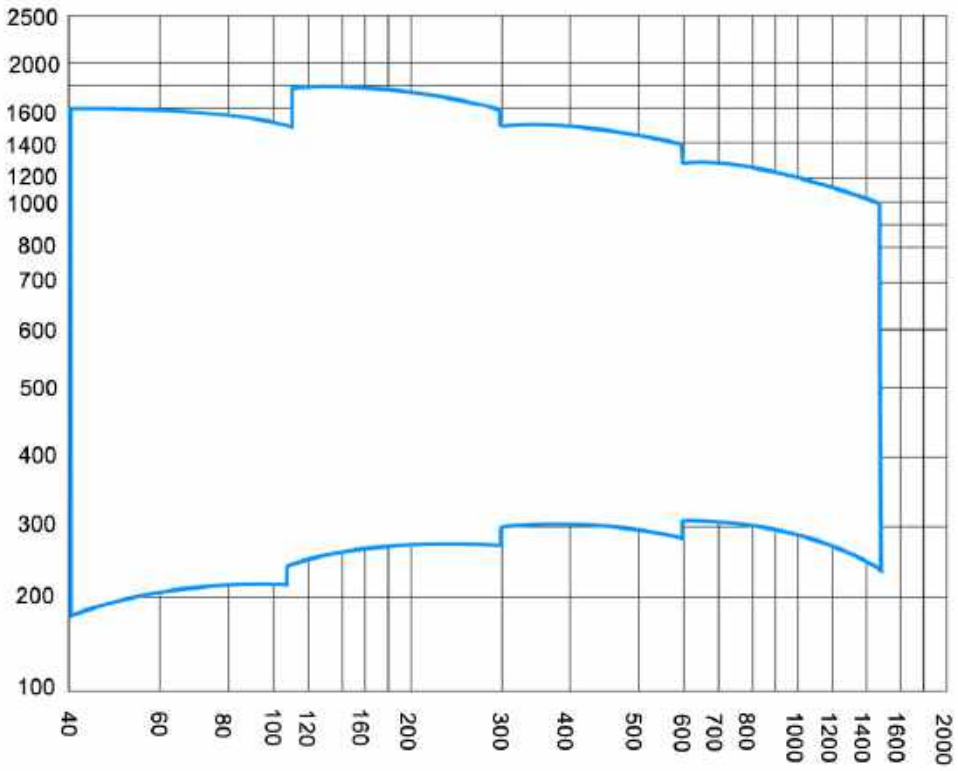


AMG Series pump: Horizontal, centrifugal, multistage, between bearings, axial split casing pumps
Application area: The pumps are used for waterflooding of oil-bearing formations, pumping of crude oil, pipeline transportation of oil, petroleum products, and liquefied hydrocarbon gas, pumping of supercritical ethylene and carbon dioxide.Pumps (type BB3 according to API 610 / ISO 13709) are among the most widely used in the oil and gas industry for the production of oil, gas and gas condensate onshore and offshore.The pumps are widely used in crude oil supply systems, vaporization plants, amine recovery plants in gas and oil refineries, petrochemical plants.This is the most common type of pump used in systems for emergency feedwater supply to nuclear power plant reactors and for condensate pumping, as well as in start-up systems for supplying feedwater to CHP boilers.

Additional and technical information

Pump make	Hydraulic part design	Capacity, m^3/h	Head max, m	Head min, m	Rotation speed, rpm
AMG 80	Min	40	1300	200	3000
	Max	130	1300	200	3000
AMG 100	Min	140	1500	200	3000
	Max	270	1500	200	3000
AMG 150	Min	300	1500	250	3000
	Max	550	1500	250	3000
AMG 200	Min	600	1300	250	3000
	Max	850	1300	250	3000
AMG 250	Min	900	1200	250	3000
	Max	1500	1200	250	3000

Coverage Chart of AMG Series pumps



K, КШ Series End Suction, with Overhung Impeller

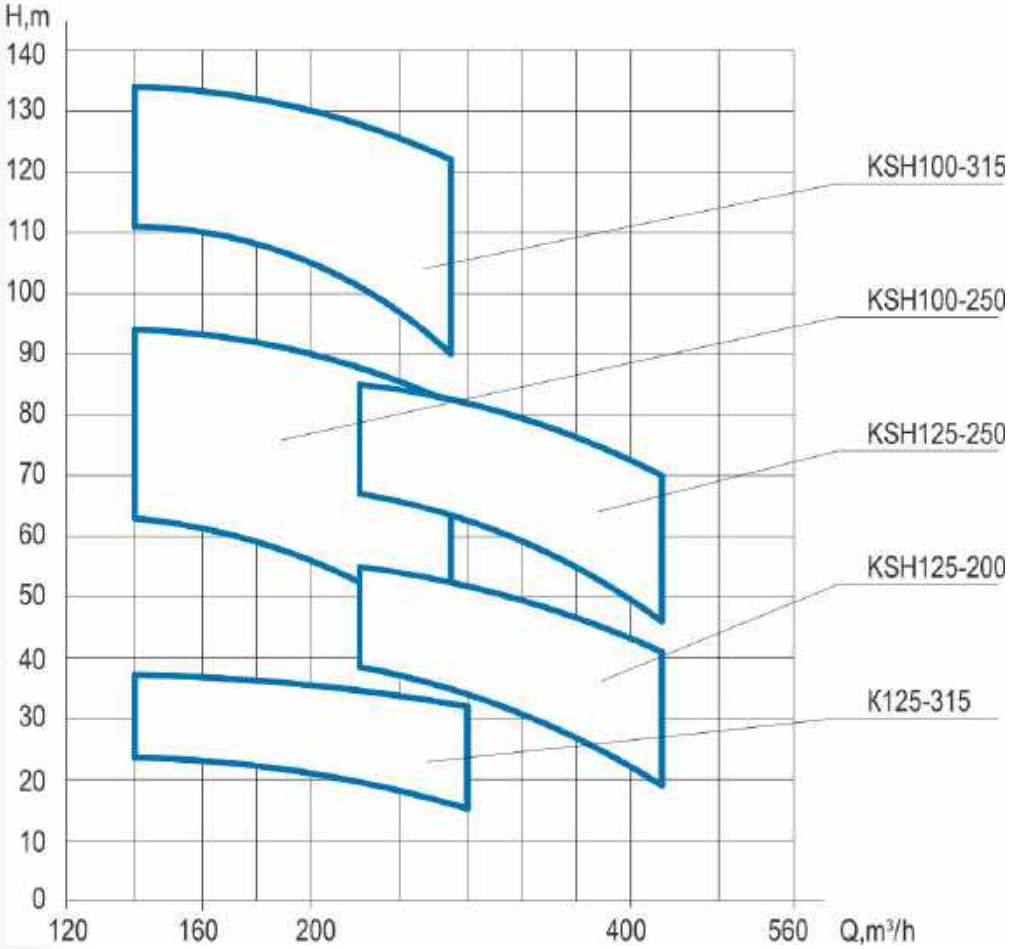
Designed for handling water in water supply systems of industrial projects and public utilities. Used also for agricultural land irrigation and drainage.

Electrically driven horizontal end-suction single-stage volute casing centrifugal pumps with overhung impeller and bearing bracket. KSh series pumps have an optimized-NPSH impeller design with blades extending well into the suction chamber. The rotor is carried by grease-lubricated or oil-ring lubricated (in case of KSH series pumps) antifriction bearings. Shaft sealing: packed gland.

Additional and technical information

Nos	Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
1	К 125-315	200	32	1500	30
2	К 125-315а	200	26	1500	30
3	К 125-315б	200	21	1500	22
4	К 125-315д	200	35.5	1500	37
5	КШ 100-250	200	80	3000	75
6	КШ 100-250а	200	71	3000	75
7	КШ 100-250б	200	56	3000	55
8	КШ 100-250д	200	90	3000	90
9	КШ 100-315	200	125	3000	132
10	КШ 100-315а	200	105	3000	110
11	КШ 100-315д	250	125	3000	132
12	КШ 125-200	315	50	3000	75
13	КШ 125-200а	315	42	3000	55
14	КШ 125-200б	315	31.5	3000	45
15	КШ 125-250	315	80	3000	110
16	КШ 125-250а	315	71	3000	90
17	КШ 125-250б	315	60	3000	75

Coverage Charts of the Water-Works Pumps K and KSH



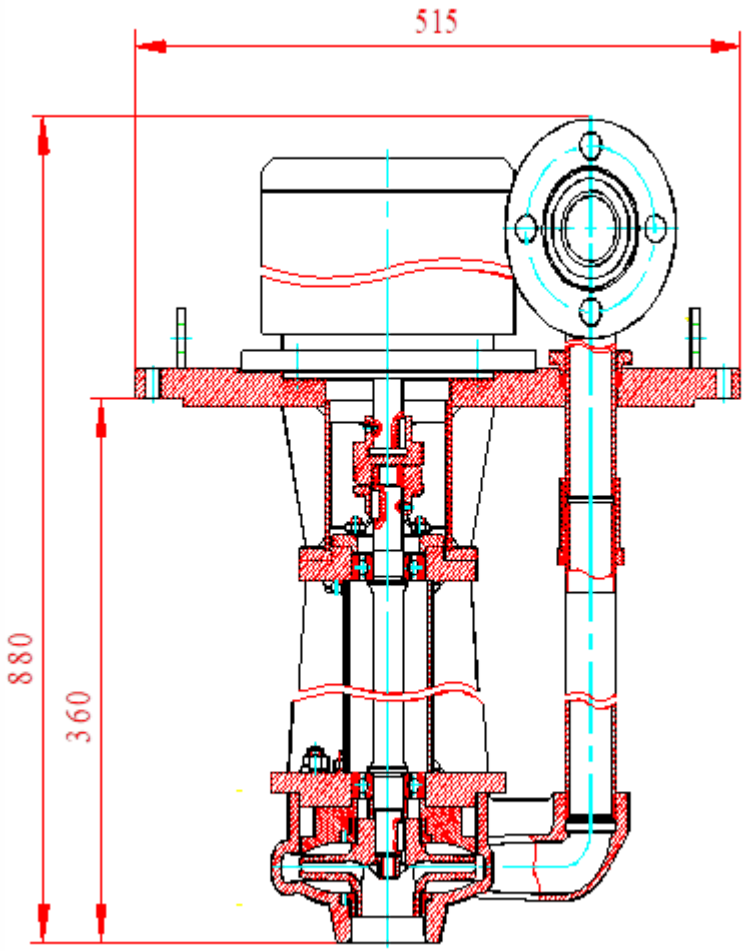
7HM-32, 3HM-32

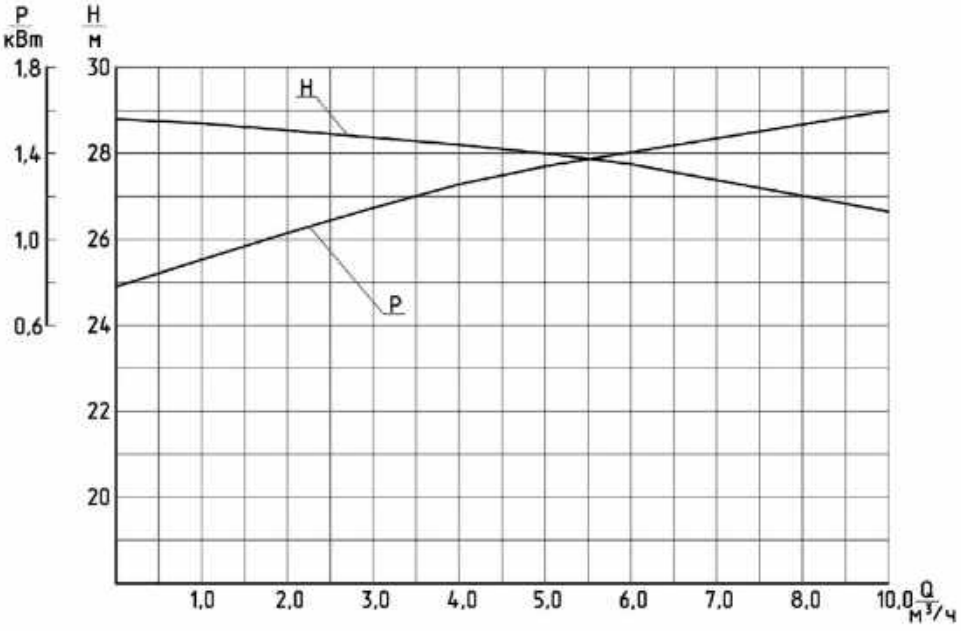
– oil pumps vertical centrifugal pumps built into the oil tank and immersed in oil (oil pump motors are located on the oil tank cover); there are no rubbing elements in the oil pumps and external oil leakage to the foundation is excluded, which occurs when gear pumps (through a mechanical seal) standing on a separate foundation are operating;

– due to the absence of rubbing elements in centrifugal pumps, their overhaul period is significantly increased: as more than 10 years of experience in their operation in various pumping units shows, no shortcomings in the operation of oil pumps have been identified;

– the use of centrifugal pumps with a gentle (“soft”) characteristic eliminates the increase in pressure in the oil system when operating on cold oil, which occurs when gear pumps are used; this eliminates the possibility of oil entering the motor stator and the need for a bypass line from the pressure oil manifold to regulate the pressure in the lubrication system depending on the oil temperature.

Additional and technical information

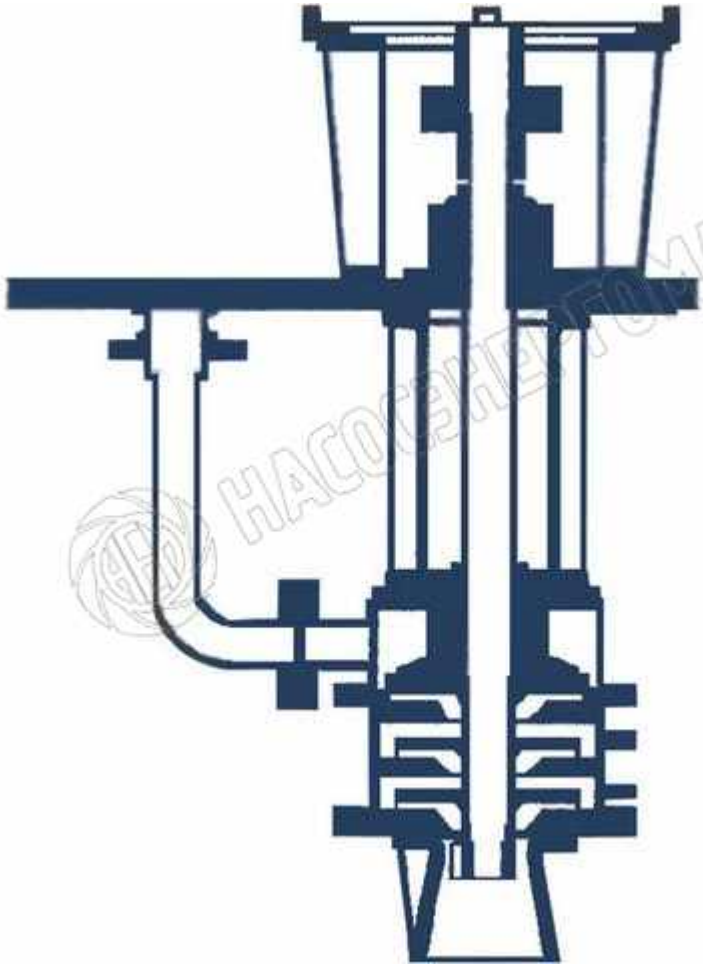




Характеристика насоса 7НМ 32-1

Приведена: t=50°C; ρ=875,4кг/м³; n=47,55 с⁻¹ (2853 об/мин)

MB Cantilever, Diffuser Three-Stage Ring-Section

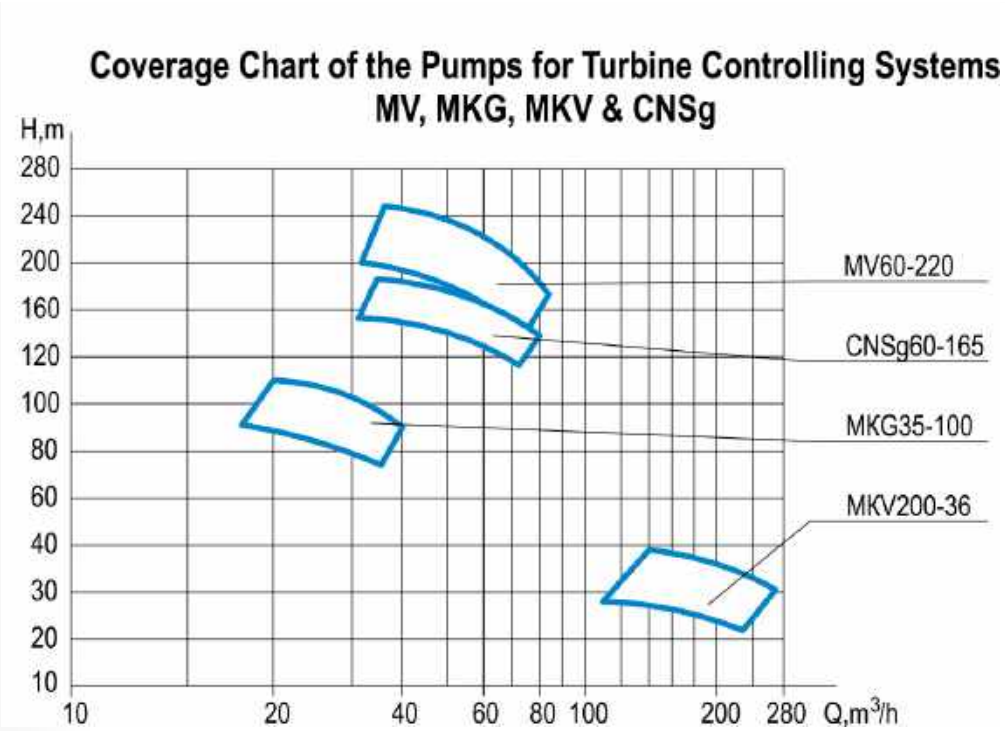


Designed to deliver turbine oil into the oil supply and control systems for turbine plants. They can be also used in stationary installations for handling various lube oils similar to turbine oil in their physical and chemical properties.

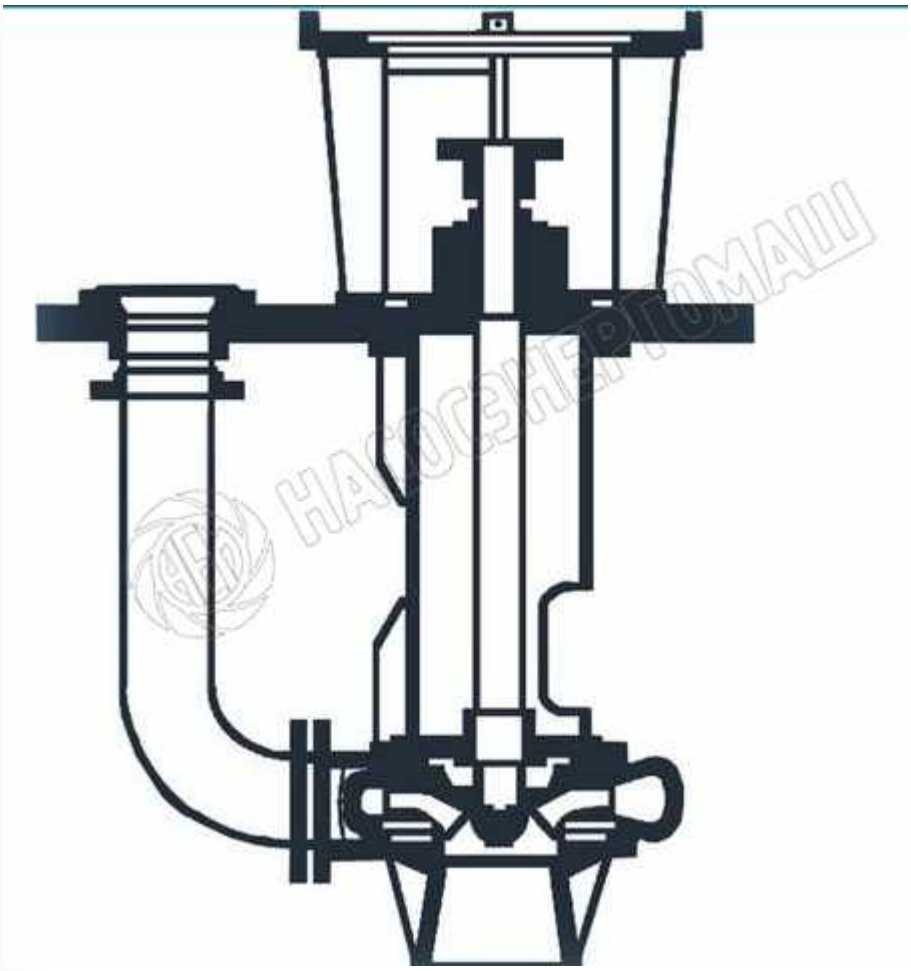
MB Model Pump: a motor driven, vertically suspended, cantilever, diffuser three-stage ring-section wet sump (submerged) centrifugal pump with a separate discharge. Single entry radial impeller arrangement, with all the impellers facing the same way. The pump rotor is carried by the lower plain bearing and upper antifriction bearing. Shaft sealing: slit seal. The cover plate of an oil inlet sump serves as support plate for the pump.

Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
MB 60-220	60	220	3000	75


Coverage Chart of the Pumps for Turbine Controlling Systems
MV, MKG, MKV & CNSg
H,m
280
240
200
160
120
100
80
60
40
30
20
10
10
20
40
60
80
100
200
280
Q,m3/h
MV60-220
CNSg60-165
MKG35-100
MKV200-36

MKB Cantilever Single-Stage Volute-Casing



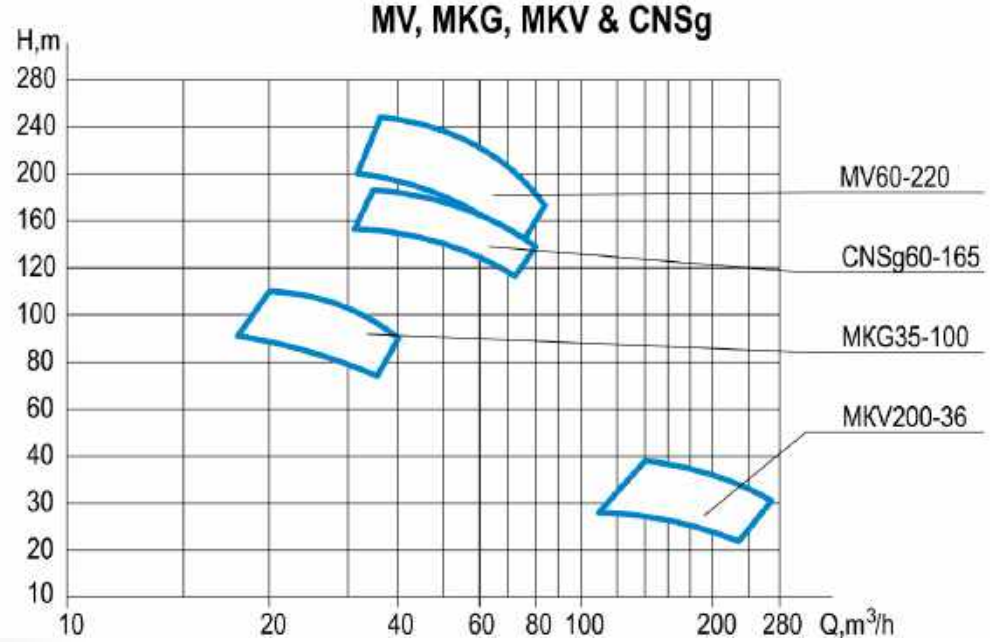
Designed to deliver turbine oil into the oil supply and control systems for turbine plants. They can be also used in stationary installations for handling various lube oils similar to turbine oil in their physical and chemical properties.

MKB Series Pumps: motor driven, vertically suspended, cantilever single-stage volute-casing wet sump centrifugal pump with a separate discharge and a single entry radial impeller. The pump rotor is carried by the lower plain bearing and upper anti-friction bearing. Shaft sealing: slit seal. The cover plate of an oil inlet sump serves as support plate for the pump.

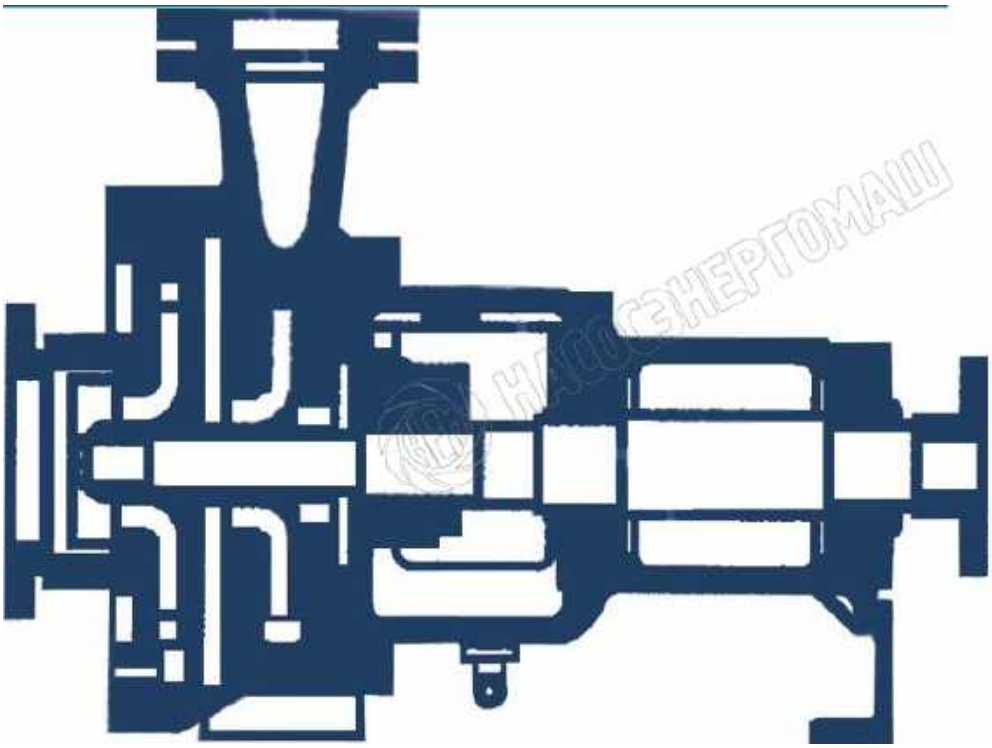
Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
МКВ 200-36	200	36	1500	45
МКВ 200-36а	190	29	1500	30
МКВ 200-36б	180	25	1500	30
МКВ 200-36в	120	23	1500	16

Coverage Chart of the Pumps for Turbine Controlling Systems
MV, MKG, MKV & CNSg



МКГ Pumps for Turbine Controlling Systems

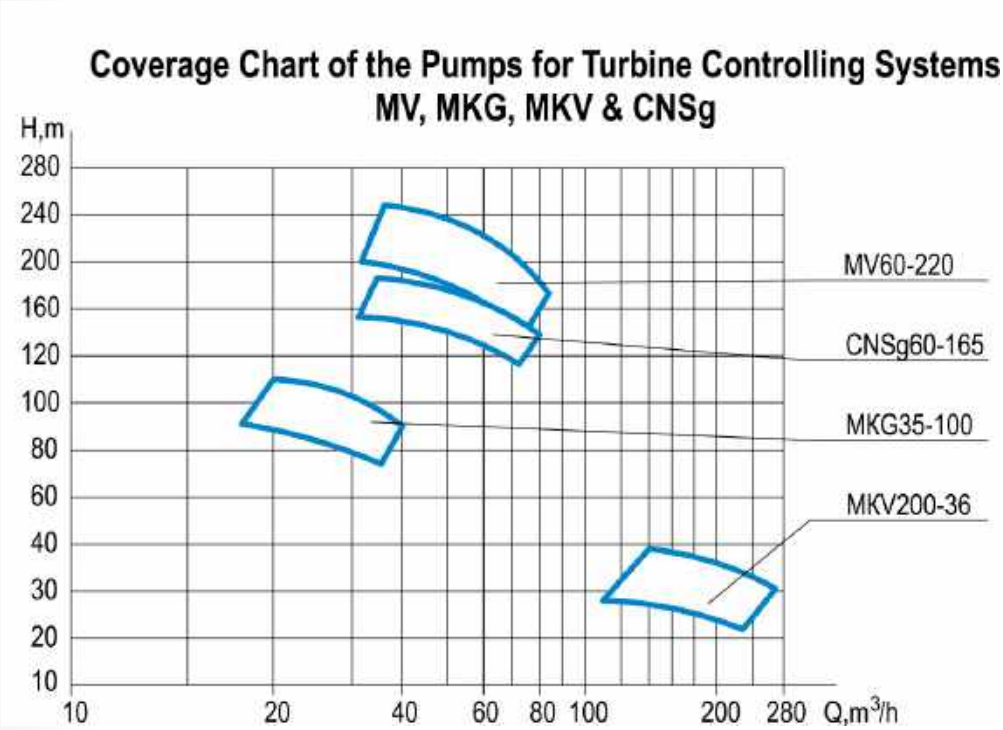


Designed to deliver turbine oil into the oil supply and control systems for turbine plants. They can be also used in stationary installations for handling various lube oils similar to turbine oil in their physical and chemical properties.

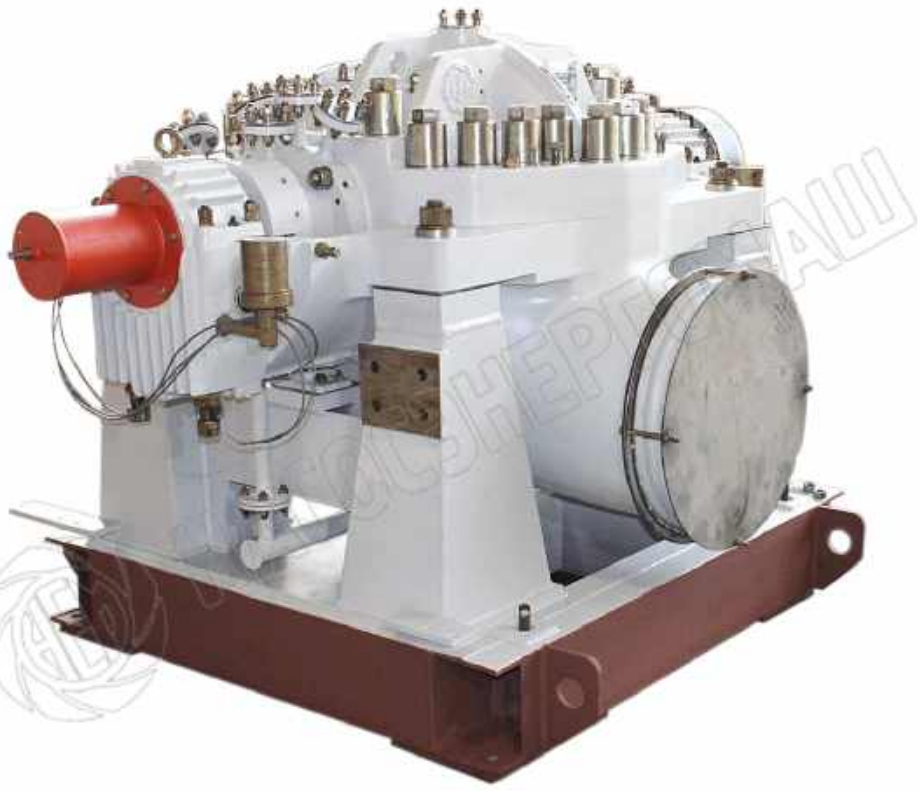
МКГ Series Pumps: motor driven, foot mounted, horizontal, end-suction two-stage volute-casing centrifugal pumps with overhung impellers and bearing bracket. Shaft sealing: mechanical seal. The pump rotor is carried by the grease lubricated antifriction bearings.

Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
МКГ 35-100	35	100	3000	18.5
МКГ 35-100а	35	85	3000	18.5
МКГ 35-100д	35	112	3000	22



ЦНСА, ЦНР, ЦНА



Low Pressure Emergency Core Cooling System (ECCS) Pumps:

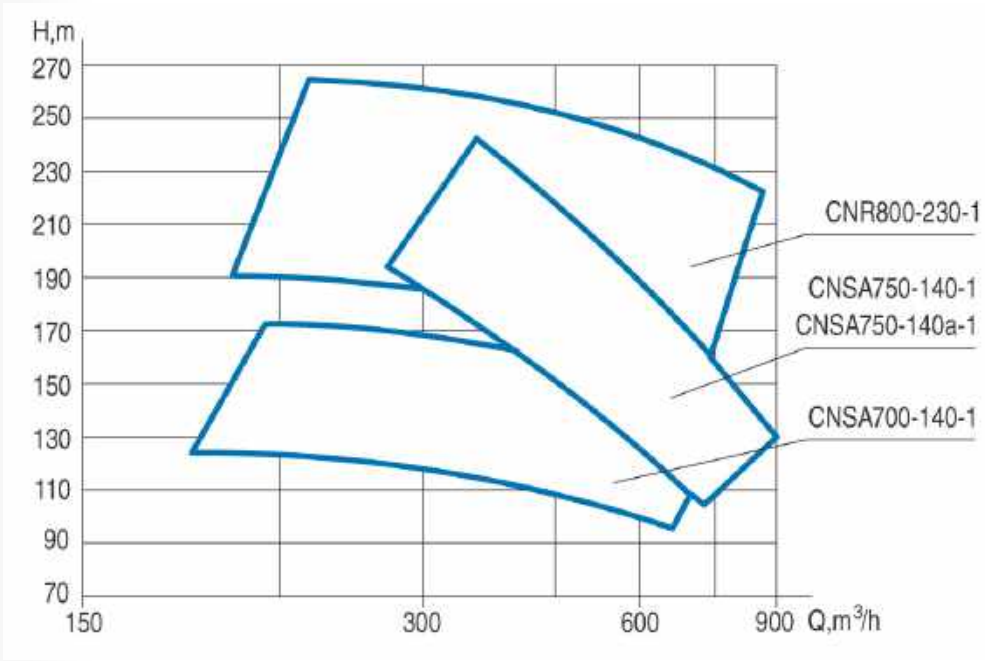
Horizontal, centerline-supported, between-bearings, single-stage axially split volute casing centrifugal, with a double entry radial impeller, plain bearings and shaft sealing by means of mechanical seals.

Unified with respect to each other and differ only in the impeller diameter.

Additional and technical information

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
ЦНР 800-230-1	Used as a residual heat removal (RHR) pump for injection of boric acid solution into the reactor	800	230	Electric motor n = 3000 rpm P nom. = 800	2/УХЛ4

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
	coolant circuit with the purpose of essential cooling service of the fuel core following a scheduled reactor shutdown and emergency cooldown in the event of failure.			kW U = 6000 V	
ЦНСА 700-140-1	Used as a sprinkler system supply pump (containment spray pump) taking suction from the emergency boron storage tank to supply boric acid solution for spray nozzles of a sprinkler system to cool the air space of the safety shell (containment) in case of a significant malfunction.	700	140	Electric motor n = 3000 rpm P nom. = 500 kW U = 6000 V	2/УХЛ4



Residual Heat Removal Pumps

Horizontal centreline mounted, inducer multistage, barrel-casing centrifugal, with a withdrawable cartridge of ring-section type, plain bearings and shaft sealing by means of mechanical seals.

Additional and technical information

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
ЦНСА 750-140	Designed for injection of boric acid solution into the reactor coolant circuit during predictable emergency operations, at which the safety injection system is to be automatically actuated, and to cool down the fuel core following a scheduled reactor shutdown.	750	140	Electric motor n = 1500 rpm P nom. = 500 kW U = 6000 V	2/I/M4
ЦНСА 750-140-1					2/I/ТВ4
ЦНСА 750-140-2					2/I/M4
ЦНСА 750-140a	Designed for injection of boric acid solution into the reactor coolant circuit during predictable emergency operations, at which the safety injection system is to be automatically actuated, and to cool down the fuel core following a scheduled reactor shutdown.	800	150	Electric motor n = 1500 rpm P nom. = 630 kW U = 6000 V	2/I/M4
ЦНСА 750-140a-1					2/I/M4
ЦНСА 750-140a-2				Electric motor n = 1500 rpm P nom. = 630 kW U = 10000 V	2/I/ТВ4
ЦНСА 750-140a-3					2/I/УХЛ4
ЦНСА 750-140a-4				Electric motor n = 1500 rpm P nom. = 630 kW U = 6000 V	2/I/M4

ЦНА High Pressure Emergency Core Cooling System (ECCS) Pumps

Horizontal centreline mounted, multistage, barrel-casing centrifugal, with a withdrawable cartridge of ring-section type, plain bearings and shaft sealing by means of mechanical seals.

Additional and technical information

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
ЦНА 150-60	Used as a charging pump for injection of boric acid solution into the reactor coolant system (primary circuit) during a failure at the NPS units equipped with VVER-91 pressurized water reactor	150	650	Electric motor n = 2973 rpm P nom. = 630 kW U = 6000 V	23/I/M4
ЦН 150-60-1	Designed for injection of boric acid solution into the reactor coolant system: – to replenish liquid losses in the primary circuit (as a volume control pump) and to remove the fission product decay heat from the reactor core following a loss-of-coolant accident (as a result of rupture of small pipes of up to 100 mm inclusive in diameter) as a charging pump; – to make up the reactor coolant circuit in the emergency situation associated with a loss-of-coolant accident (leakage through rupture of pipes of more than 100 mm in diameter) as a safety injection pump; – to maintain the reactor core in the subcritical condition (as a RHR pump)	153	708	Electric motor n = 2973 rpm P nom. = 630 kW U = 6000 V	2/I/ТВ4
ЦНА 150-60-2	Designed for injection of boric acid solution into the primary circuit during predictable emergency operations, at which the safety injection system is	150	650	Electric motor n = 2979 rpm P nom. = 630 kW U = 10000 V	2/I/УХЛ4

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
	to be automatically actuated				
ЦНА 150-60-3	Designed for injection of boric acid solution into the primary circuit during predictable emergency operations, at which the safety injection system is to be automatically actuated	150	650	Electric motor n = 3000 rpm P nom. = 630 kW U = 10000 V	2/I/УХЛ4
ЦНА 150-60-4	Designed for injection of boric acid solution into the primary circuit during predictable emergency operations, at which the safety injection system is to be automatically actuated	150	650	Electric motor n = 3000 rpm P nom. = 630 kW U = 6000 V	2/I/М4
ЦНА 150-110-2	Designed for injection of boric acid solution from the emergency storage tank into the primary circuit of the NPS power units equipped with VVER-1000 PWR during cooldown of the reactor coolant system following a failure	150	980	Electric motor n = 3000 rpm P nom. = 800 kW U = 6000 V	2/I/УХЛ4

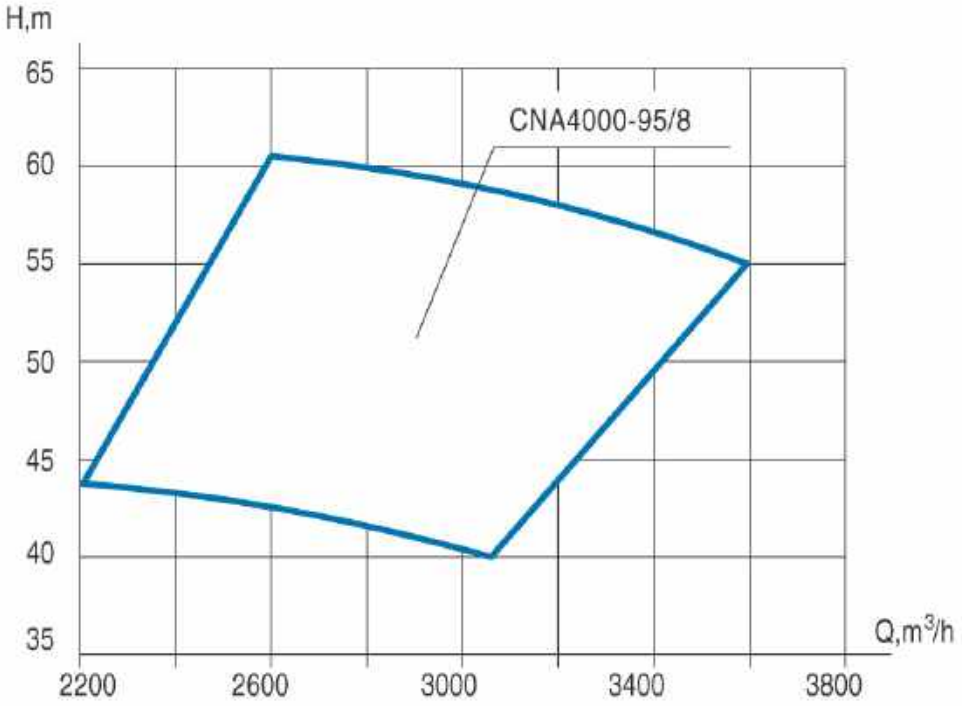
ЦНА Pumps fot Support Auxiliary Systems

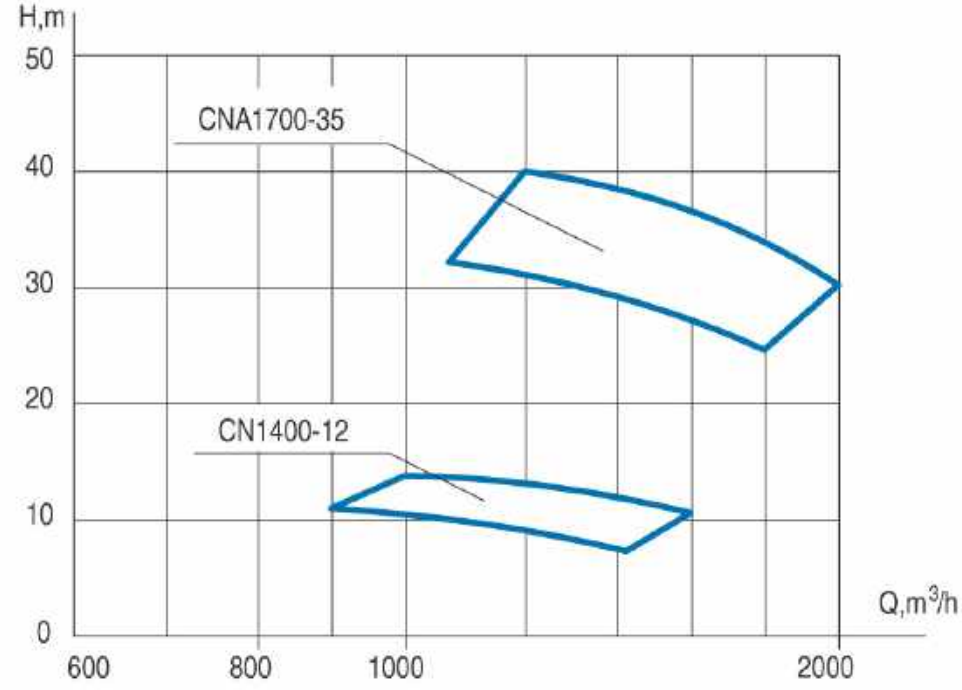
Pumps for Support Auxiliary Systems

Horizontal, foot-mounted, between-bearings, single-stage, axially split volute casing centrifugal, with a double entry radial impeller, antifriction bearings and shaft sealing by means of mechanical seals.

Additional and technical information

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
ЦНА 1400-12	Used to boost cooling water pressure at the inlet of the generator gas coolers	1400	12	Electric motor n = 750 rpm P nom. = 75 kW U = 380 V	4/IIб/ТВ4
ЦНА 1700-35	Designed for handling demineralized water in the intermediate loop	1700	35	Electric motor n = 1500 rpm P nom. = 250 kW U = 6000 V	2/I/М4
ЦНА 2000-40	Designed for handling demineralized water in the intermediate loop	2000	40	Electric motor n = 1500 rpm P nom. = 330 kW U = 6000 V	2/I/М4
ЦНА 4000-95/8	Used as a component cooling water pump for circulation of clean water through essential components to provide the requirements of critical using equipment / services in cooling water under all the operating conditions of the power unit, including emergency situation	3600	55	Electric motor n = 750 rpm P nom. = 630 kW U = 6000 V	2/I/УХЛ4
ЦНА 1400-12					3/I/УХЛ4


H,m
65
60
55
50
45
40
35
CNA4000-95/8
Q,m3/h
2200
2600
3000
3400
3800


H,m
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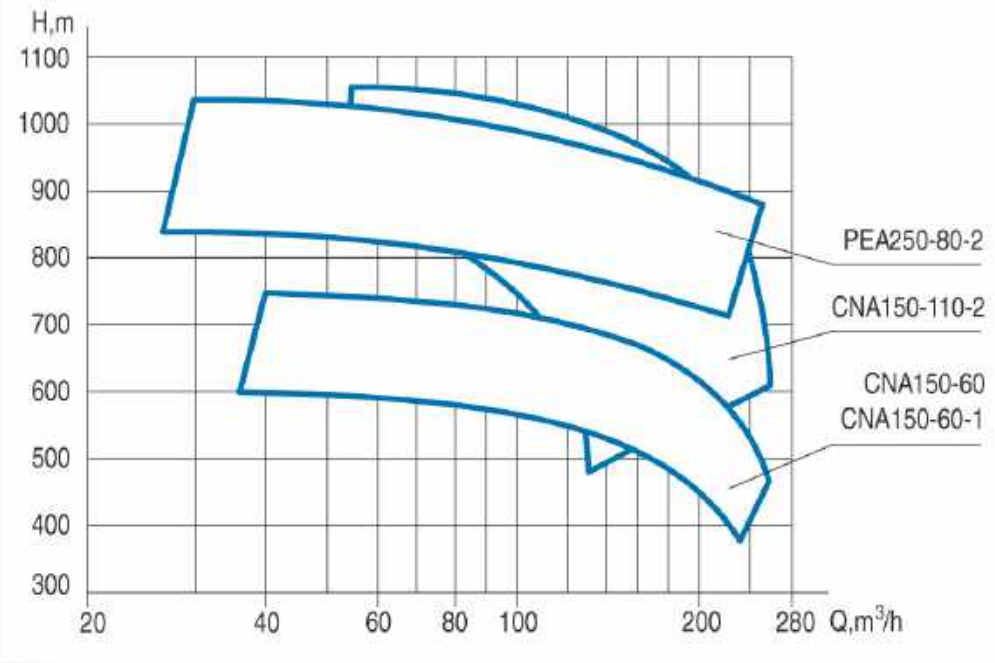
40
30
20
10
0
CNA1700-35
CN1400-12
Q,m3/h
600
800
1000
2000


H,m
1100
1000
900
800
700
600
500
400
300
20
40
60
80
100
200
280
Q,m³/h
PEA250-80-2
CNA150-110-2
CNA150-60
CNA150-60-1

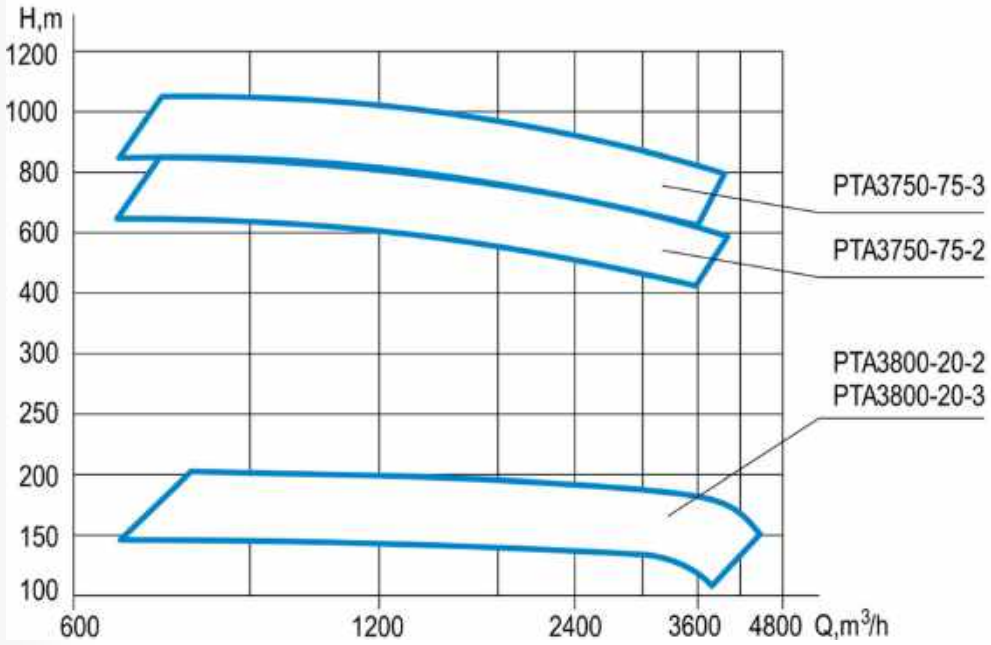
ПТА Horizontal, Centrifugal

Boiler feed pumps

horizontal, centrifugal, with plain bearings and shaft sealing by means of mechanical seals (in case of ПЭА 250-80-3: horizontal, ring-section, centrifugal, with oil-bath lubricated plain bearings and shaft sealing by means of single mechanical seals; axial thrust compensation by balance disc; flanged nozzles).

Additional and technical information

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
ПТА 3750-75-2	Designed as a boiler feed pump to deliver de-aerated water from gas-extractors (degasers) to steam generators in NPS power units equipped with a VVER-1000 PWR and turbine K-1000-60/3000-2	3400	635	Turbine n=3114 rpm P nom.=6285 kW	3 / II6 / ТВ3
ПТА 3750-75-3	Designed as a boiler feed pump to deliver de-aerated water from gas-extractors (degasers) to steam generators in NPS power units equipped with a VVER-1000 PWR and turbine K-12-1,0 ПА-1, ОК-12А, K-10-0,5 ПА-1	3750	860	Turbine n=3409 rpm P nom.=9603 kW	3 / II / УХЛ4
ПТА 3800-20-2	Used as a boiler feed booster pumps to deliver feed water from the de-aerator (gas extractor) to ПТА 3750-75-2 and ПТА 3750-75-3 BFPs respectively for providing a greater available NPSH to the main pumps for their cavitation-free operation	3450	134	Turbine n=1602 rpm P nom.=1280 kW	3 / II6 / ТВ3
ПТА 3800-20-3		3800	160	Turbine n=1753 rpm P nom.=1680 kW	II /УХЛ4


H,m
1200
1000
800
600
400
300
250
200
150
100
600
1200
2400
3600
4800
Q,m3/h
PTA3750-75-3
PTA3750-75-2
PTA3800-20-2
PTA3800-20-3

KcBA Vertically Suspended Multistage Diffuser Can

Condensate Pumps: vertically suspended multistage diffuser can, with an inner casing of ring section type, shaft sealing by means of a mechanical seal. The pump rotor is carried by the bottom medium lubricated plain bearing and the top thrust and radial antifriction bearing.

Additional and technical information

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
КсВА 125-55-1	Designed for condensate extraction from the condenser of TPN drive turbine to delivery either to the main turbine condenser or to the drainage tank.	125	55	Electric motor n = 3000 rpm P nom. = 37 kW U = 220/380 V	3/II/УХЛ4
КсВА 200-220	Used for handling waste steam condensate of the stationary steam turbines of the secondary circuit at the NPP units.	200	220	Electric motor n = 1480 rpm P nom. = 200 kW U = 6000 V	3Н/-/ УХЛ4
КсВА 650-135-8	Used for pumping moisture separator drains and heating steam condensate from the moisture separator trap into the turbine condensate line downstream of the LP heater No.4 to deliver the mixture into the deaerator for the turbo-installations K-1200-6,8/50 forming part of 1200 MW PWR power unit at the Belarusian NPP-2006 project.	663	141	Electric motor n = 1500 rpm P nom. = 400 kW U = 10000 V	4/II/УХЛ4
КсВА 360-160-1	Designed as a heater drain pump for pumping heating steam condensate from the heat exchangers of the secondary circuit at the power units of nuclear power stations (NPS) and nuclear heat electropower stations.	360	160	Electric motor n = 1480 rpm P nom. = 250 kW U = 6000 V	3Н/-/ УХЛ4
КсВА 360-160-2	Used for drawing water from ECCS (emergency core cooling system) container to boost the inlet pressure of the auxiliary BFPs in case	360	160	Electric motor n = 1485 rpm P nom. = 250 kW U = 6000 V	3О/I/УХЛ3

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
	of loss-of-coolant accident at the NPS power units.				
КсВА 360-160-3	Designed as a heater drain pump for pumping heating steam condensate from the LP heater No. 1 back into the main condensate line downstream of the LP heater No. 1 in the turbo-installations K-1000-60/1500-2 at the NPS power units equipped with VVER-1000 PWR.	360	160	Electric motor n = 1480 rpm P nom. = 250 kW U = 6000 V	3/II/УХЛ4
КсВА 500-220	Used for handling waste steam condensate of the stationary steam turbines of the secondary circuit at the NPP units.	500	220	Electric motor n = 1480 rpm P nom. = 500 kW U = 6000 V	3Н/-/ УХЛ4
КсВА 630-125-1	Designed as a heater drain pump for pumping heating steam condensate from the heat exchangers of the secondary circuit at the NPP units.	630	125	Electric motor n = 1480 rpm P nom. = 315 kW U = 6000 V	3Н/-/ УХЛ4
КсВА 630-125-2	Designed as a heater drain pump for pumping heating steam condensate from the LP heater No. 3 back into the main condensate line downstream of the LP heater No. 3 in the turbo-installations K-1000-60/1500-2 at the NPS power units equipped with VVER-1000 PWR.	630	125	Electric motor n = 1480 rpm P nom. = 315 kW U = 6000 V	3/II/УХЛ4

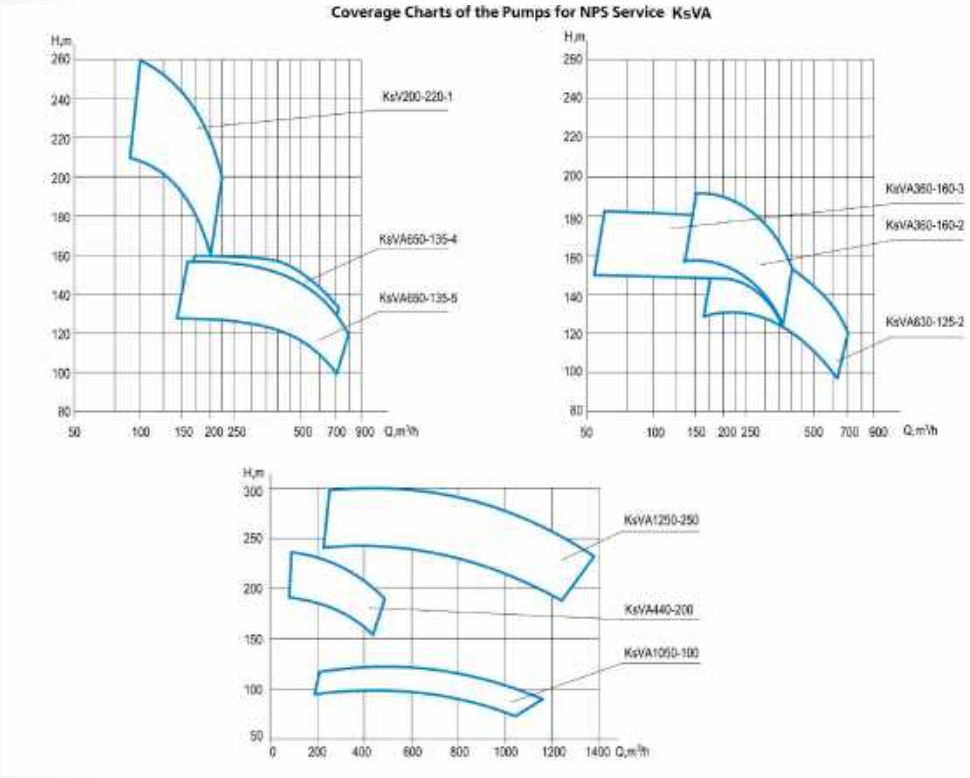
Condensate Pumps:

vertically suspended multistage diffuser can, with an inner casing of ring section type, shaft sealing by means of a mechanical seal. The pump rotor is carried by the bottom medium lubricated plain bearing and the top oil-bath lubricated thrust and radial plain bearing.

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
КсВА 650-135-1	Used for pumping waste steam condensate of the stationary steam turbines and heating steam condensate from the heat exchangers at the power units of nuclear power stations (NPS) and nuclear heat electropower stations.	650	135	Electric motor n = 1480 rpm P nom. = 500 kW U = 6000 V	-/-/УХЛ4
КсВА 650-135-2	Used for pumping heating steam condensate from the LP heater No. 4 and superheater-separator trap in the turbo-installations at the NPS power units equipped with VVER-91 pressurized water reactors.	650	135	Electric motor n = 1485 rpm P nom. = 500 kW U = 6000 V	4Н/II/М3
КсВА 650-135-3	Designed as a heater drain pump for removal of heating steam condensate from the LP heater No. 4 and superheater-separator trap in the turbo-installations K-1000-60/3000-2 at the VVER-1000 PWR power units.	663	141	Electric motor n = 1489 rpm P nom. = 400 kW U = 6000 V	3/IIб/Тв3
КсВА 650-135-4	Used for evacuation of a mixture of superheated steam moisture separator drains and heating steam condensate from the LP heater No.4 hotwell to transfer it to the feedwater deaerator in the turbo-installations K-1000-60/3000-3 at the NPPs.	582	146	Electric motor n = 1485 rpm P nom. = 400 kW U = 10000 V	3Н/IIб/ ТВ4
КсВА 650-135-5	Designed as a heater drain pump for recycling waste steam moisture separator drains from the HP cylinder trap into the turbine	650	135	Electric motor n = 1485 rpm P nom. = 400	3/II/УХЛ4

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
	condensate line downstream of the LPH's in the turbo-installations K-1000-60/1500-2M and K-1100-60/1500-2M at the NPS power units equipped with VVER-1000 PWR.			kW U = 6000 V	
КсВА 650-135-6	Used for drawing moisture separator drains and condensate, piped to the moisture separator trap, and for transferring water to the deaerator through the main condensate line downstream of the LP heater No.4 in case of the turbo-installations K-1200-6,8/50 at the NPS-2006 project equipped with the VVER-1200 pressurized water reactor.	663	141	Electric motor n = 1500 rpm P nom. = 400 kW U = 10000 V	3/II/ УХЛ3.1
КсВА 650-135-7	Used for pumping moisture separator drains and condensate from the moisture separator trap into the turbine condensate line downstream of the LP heater No.4 to deliver further to the deaerator for the turbo-installations K-1200-6,8/50 at the AES-2006 project Leningrad NPP-2 units.	663	141	Electric motor n = 1500 rpm P nom. = 400 kW U = 10000 V	4/II/УХЛ4
КсВА 650-135-8	Used for pumping moisture separator drains and condensate from the moisture separator trap into the turbine condensate line downstream of the LP heater No.4 to deliver further to the deaerator for the turbo-installations K-1200-6,8/50 forming	663	141	Electric motor n = 1500 rpm P nom. = 400 kW U = 10000 V	4/II/УХЛ4

Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
	part of 1200 MW PWR power unit at the Belarusian NPP-2006 project.				



ЦНА

High Pressure Emergency Core Cooling System (ECCS) Pumps

Horizontal centreline mounted, multistage, barrel-casing centrifugal, with a withdrawable cartridge of ring-section type, plain bearings and shaft sealing by means of mechanical seals.

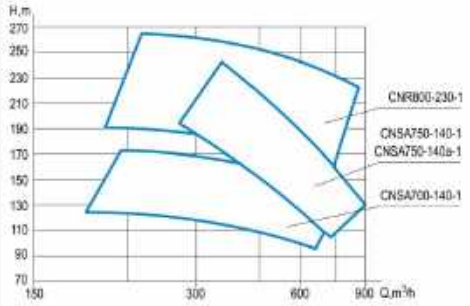
Additional and technical information

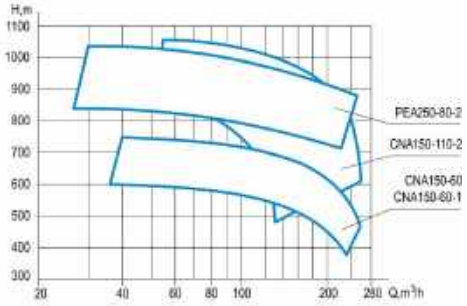
Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
ЦНА 150-60	Used as a charging pump for injection of boric acid solution into the reactor coolant system (primary circuit) during a failure at the NPS units equipped with VVER-91 pressurized water reactor	150	650	Electric motor n = 2973 rpm P nom. = 630 kW U = 6000 V	23/I/M4

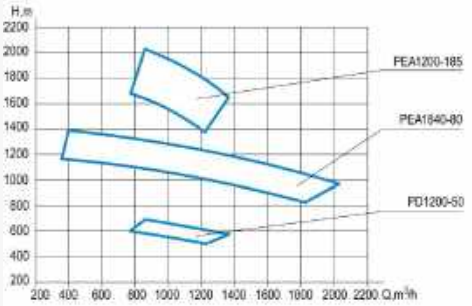
Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
ЦН 150-60-1	Designed for injection of boric acid solution into the reactor coolant system: – to replenish liquid losses in the primary circuit (as a volume control pump) and to remove the fission product decay heat from the reactor core following a loss-of-coolant accident (as a result of rupture of small pipes of up to 100 mm inclusive in diameter) as a charging pump; – to make up the reactor coolant circuit in the emergency situation associated with a loss-of-coolant accident (leakage through rupture of pipes of more than 100 mm in diameter) as a safety injection pump; – to maintain the reactor core in the subcritical condition (as a RHR pump)	153	708	Electric motor n = 2973 rpm P nom. = 630 kW U = 6000 V	2/I/ТВ4
ЦНА 150-60-2	Designed for injection of boric acid solution into the primary circuit during predictable emergency operations, at which the safety injection system is to be automatically actuated	150	650	Electric motor n = 2979 rpm P nom. = 630 kW U = 10000 V	2/I/УХЛ4
ЦНА 150-60-3	Designed for injection of boric acid solution into the primary circuit during predictable emergency operations, at which the safety injection system is	150	650	Electric motor n = 3000 rpm P nom. = 630 kW U = 10000 V	2/I/УХЛ4

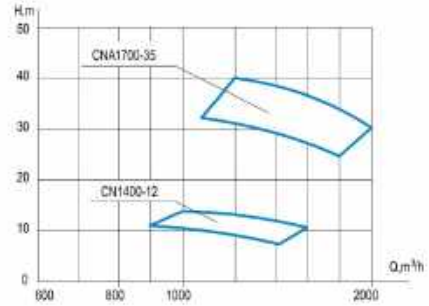
Pump make	Equipment applications	Technical data			Safety class / Seismic stability category / Climatic version
		Capacity, m^3/h	Head, m	Type of drive & its parameters	
	to be automatically actuated				
ЦНА 150-60-4	Designed for injection of boric acid solution into the primary circuit during predictable emergency operations, at which the safety injection system is to be automatically actuated	150	650	Electric motor n = 3000 rpm P nom. = 630 kW U = 6000 V	2/I/М4
ЦНА 150-110-2	Designed for injection of boric acid solution from the emergency storage tank into the primary circuit of the NPS power units equipped with VVER-1000 PWR during cooldown of the reactor coolant system following a failure	150	980	Electric motor n = 3000 rpm P nom. = 800 kW U = 6000 V	2/I/УХЛ4

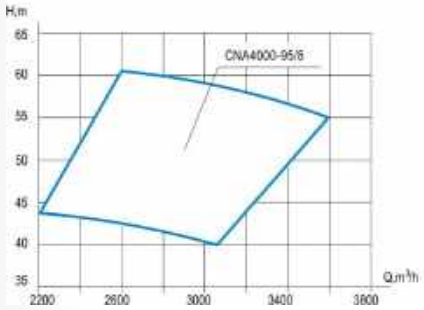
Coverage Charts of the Pumps for NPS Service

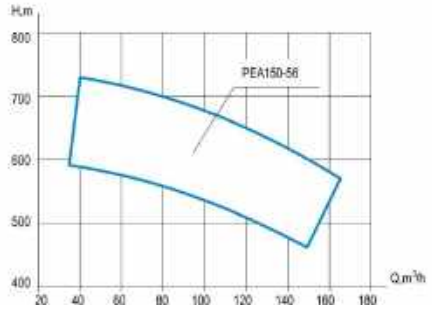












ПЭА Horizontal, Centrifugal

Used for delivering feedwater to the steam generator at the NPS.

Bolier feed pumps: horizontal, centrifugal, with plain bearings and shaft sealing by means of mechanical seals.

ПЭА 250-80-2 and ПЭА 250-80-3 used as an auxiliary start and shut-down pumps for delivering feedwater from the deaerator to the steam generator during heating-up and cool-down conditions of the primary circuit of NPS power units equipped with VVER-91 pressurized water reactors.

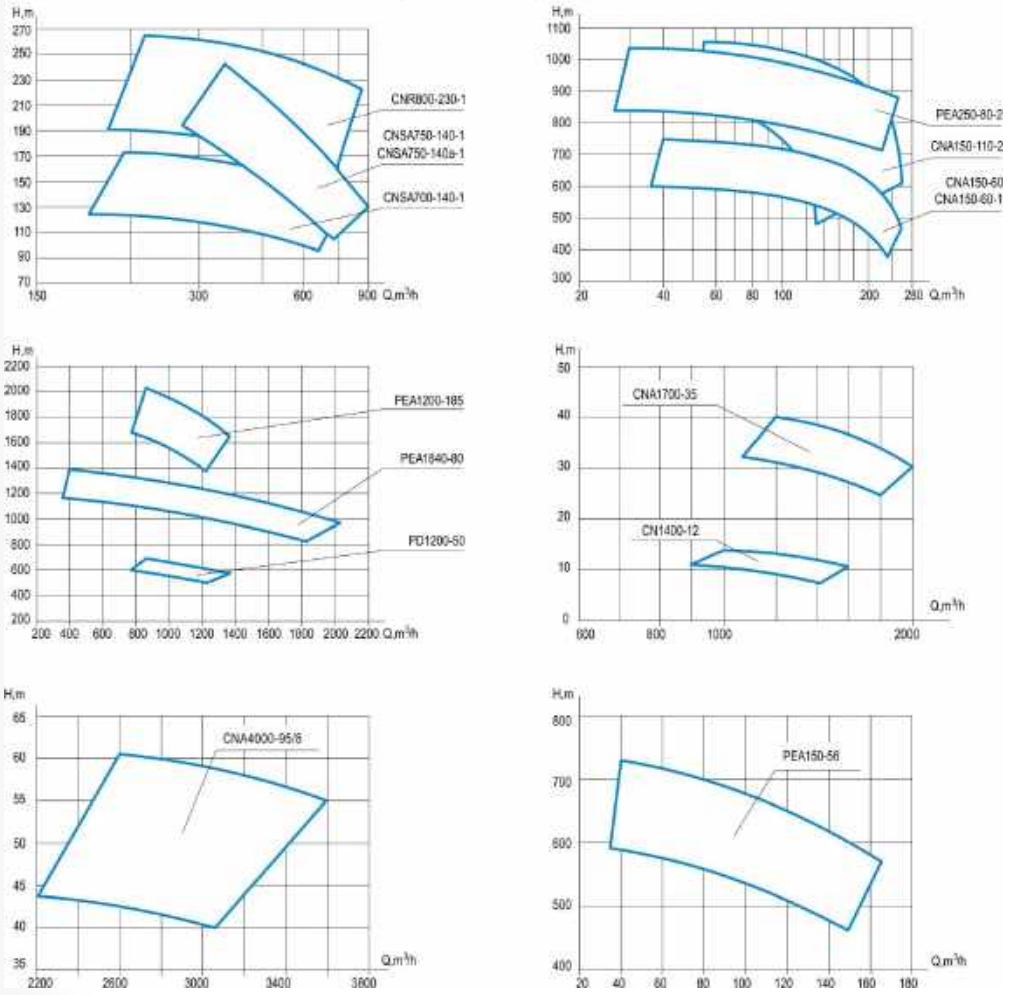
ПЭА 1200-185 designed as a boiler feed pump to deliver feed water from a high pressure heater to the steam generator in NPS power units equipped with a reactor facility of BN-800 (fast breeder) type.

ПЭА 1840-80 designed as a boiler feed pump to deliver feed water from the deaerator to the steam generator at the NPS projects equipped with the VVER-1200 pressurized water reactors.

Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed, rpm	Motor nominal power, kW
ПЭА 250-80-2	250	880	3000	800
ПЭА 250-80-3	250	880	3000	800
ПЭА 1200-185	1231	1581	3800	6300
ПЭА 1840-80	2050	850	3000	6300

Coverage Charts of the Pumps for NPS Service



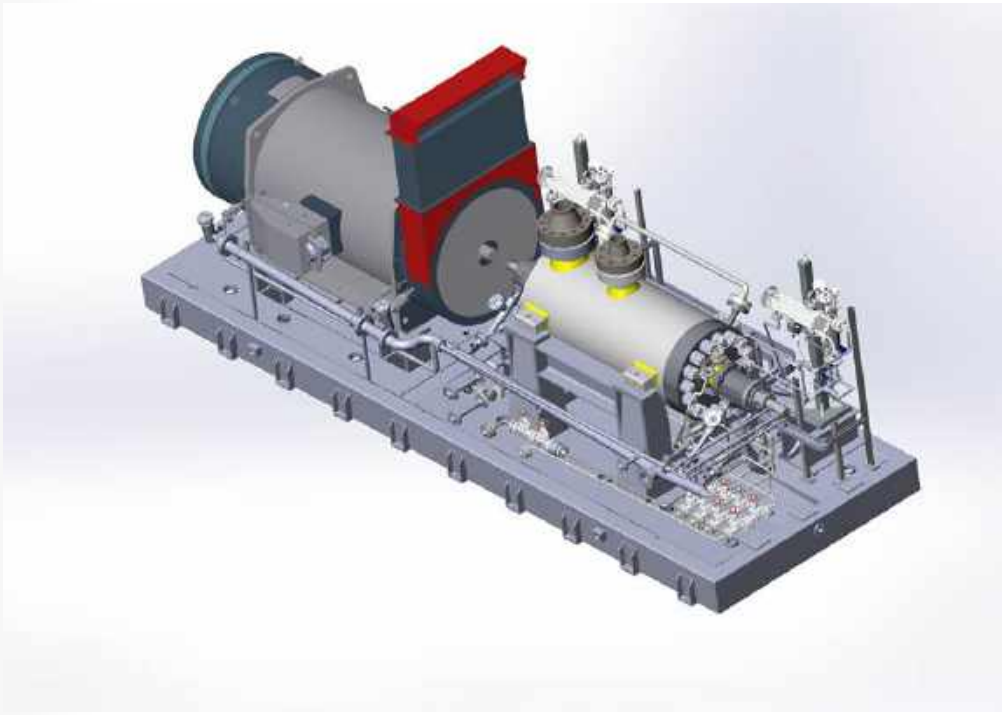
TG, TL

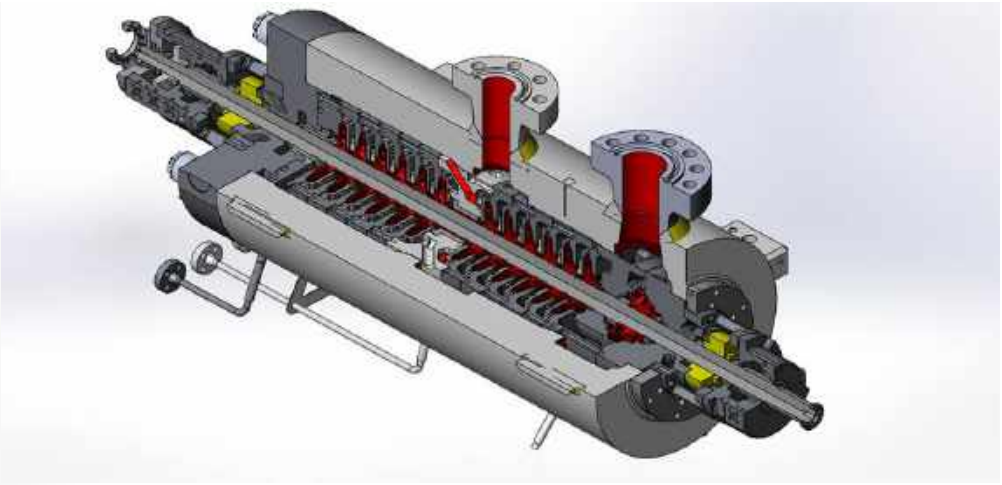
TL, TG models pumps are new generation double-casing (barrel), multi-stage centrifugal pumps with cartridge-type internal casing, designed in accordance with the requirements of international industry standards; TL – impellers placed in series (one-by-one), TG – impellers placed opposite (back-to-back). The most powerful models develop pressure up to 2500m. A special flow part with a double-suction first-stage impeller provides a low NPSHr, which significantly expands the use of the pump and ensures cavitation-free operation with minimal capital costs on site.

Designed for pumping feed water, oil, cold and hot oil products, used in harsh conditions of oil refineries processes.

Additional and technical information

Pump model	Capacity, m^3/h	Head, m	Rotational speed, rpm	NPSH, м
TG-50B/14	55	875	3000	2,32
TL-80C/6	100	500	3000	3,3
TL-80C/5	120	415	3000	3,8
TG-80B/7	150	600	3000	4,86
TL-100/5	240	600	3000	4,75
TG-150B/13	800	2325	3000	5,29
TG-150B/13	725	2430	3000	4,9





ЦНСДп

Double-casing, radially split, multistage between-bearings pumps, BB5 type (API 610)

ЦНСДп pumps are horizontal, double-casing, radially split, multistage, between-bearings pumps of a BB5 type (barrel pumps), in full compliance with ANSI/API standard 610 (ISO 13709:2009).

APPLICATION

- Water injection into reservoirs to maintain formation pressure
- High-pressure oil refining processes

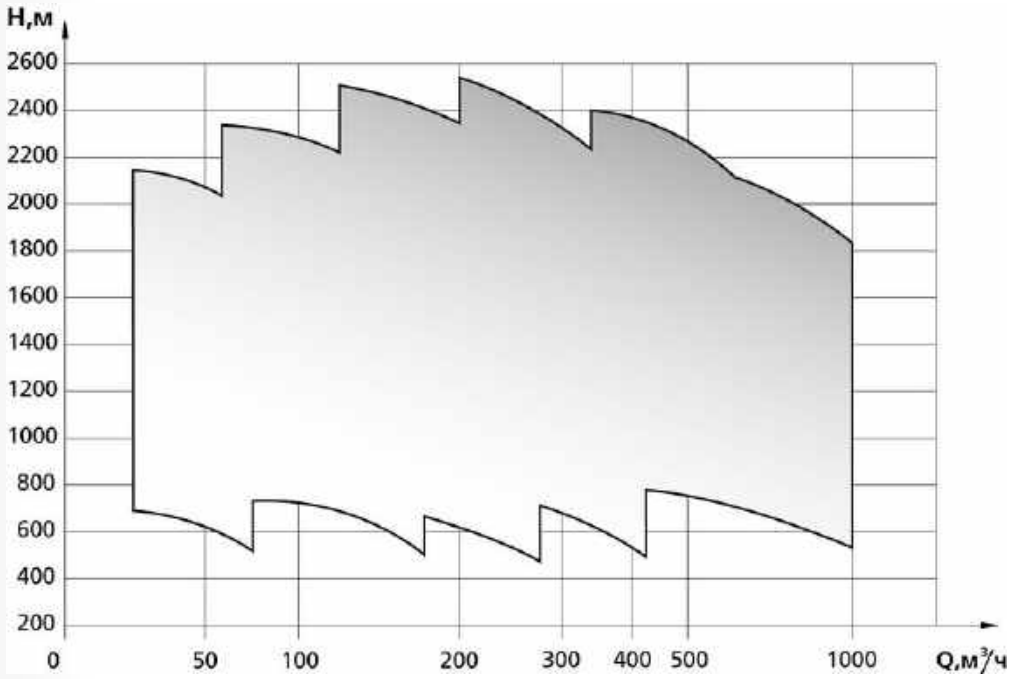
- Various applications in petrochemical and gas processing industry
- Gas condensate treatment units

Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
ЦНСДп 45-700	45	700	3000	315
ЦНСДп 45-900	45	900	3000	315
ЦНСДп 45-1050	45	1050	3000	500
ЦНСДп 45-1150	45	1150	3000	500
ЦНСДп 45-1275	45	1275	3000	500
ЦНСДп 45-1422	45	1422	3000	630
ЦНСДп 45-1525	45	1525	3000	630
ЦНСДп 45-1650	45	1650	3000	630
ЦНСДп 45-1775	45	1775	3000	800
ЦНСДп 45-1900	45	1900	3000	800
ЦНСДп 45-2100	45	2100	3000	800
ЦНСДп 63-700	63	700	3000	500
ЦНСДп 63-900	63	900	3000	500
ЦНСДп 63-1050	63	1050	3000	500
ЦНСДп 63-1150	63	1150	3000	500
ЦНСДп 63-1275	63	1275	3000	630
ЦНСДп 63-1422	63	1422	3000	630
ЦНСДп 63-1525	63	1525	3000	630
ЦНСДп 63-1650	63	1650	3000	800
ЦНСДп 63-1775	63	1775	3000	1000
ЦНСДп 63-1900	63	1900	3000	1000
ЦНСДп 63-2100	63	2100	3000	800
ЦНСДп 90-700	90	700	3000	500
ЦНСДп 90-900	90	900	3000	500
ЦНСДп 90-1050	90	1050	3000	630
ЦНСДп 90-1150	90	1150	3000	630

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
ЦНСДп 90-1275	90	1275	3000	630
ЦНСДп 90-1422	90	1422	3000	800
ЦНСДп 90-1525	90	1525	3000	800
ЦНСДп 90-1650	90	1650	3000	800
ЦНСДп 90-1775	90	1775	3000	1000
ЦНСДп 90-1900	90	1900	3000	1000
ЦНСДп 90-2100	90	2100	3000	1000
ЦНСДп 120-750	120	700	3000	800
ЦНСДп 120-900	120	900	3000	1000
ЦНСДп 120-1050	120	1050	3000	1000
ЦНСДп 120-1150	120	1150	3000	1000
ЦНСДп 120-1275	120	1275	3000	1000
ЦНСДп 120-1422	120	1422	3000	1250
ЦНСДп 120-1525	120	1525	3000	1250
ЦНСДп 120-1650	120	1650	3000	1600
ЦНСДп 120-1775	120	1775	3000	1600
ЦНСДп 120-1900	120	1900	3000	1600
ЦНСДп 120-2100	120	2100	3000	1250
ЦНСДп 180-700	180	700	3000	800
ЦНСДп 180-900	180	900	3000	800
ЦНСДп 180-1050	180	1050	3000	100
ЦНСДп 180-1150	180	1150	3000	1000
ЦНСДп 180-1275	180	1275	зооо	1000
ЦНСДп 180-1422	180	1422	3000	1250
ЦНСДп 180-1525	180	1525	3000	1250
ЦНСДп 180-1650	180	1650	3000	1600
ЦНСДп 180-1775	180	1775	3000	1600
ЦНСДп 180-1900	180	1900	3000	1600
ЦНСДп 180-2100	180	2100	3000	1600
ЦНСДп 200-2050	200	2050	3000	1600
ЦНСДп 200-2200	200	2200	3000	2000
ЦНСДп 240-700	240	700	3000	800
ЦНСДп 240-900	240	900	3000	1000
ЦНСДп 240-1050	240	1050	3000	1000

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
ЦНСДп 240-1150	240	1150	3000	1250
ЦНСДп 240-1275	240	1275	3000	1250
ЦНСДп 240-1422	240	1422	3000	1250
ЦНСДп 240-1525	240	1525	3000	1600
ЦНСДп 240-1650	240	1650	3000	1600
ЦНСДп 240-1775	240	1775	3000	1600
ЦНСДп 240-1900	240	1900	3000	2000
ЦНСДп 240-2100	240	2100	3000	2000
ЦНСДп 315-1050	315	1050	3000	1600
ЦНСДп 315-1422	315	1422	3000	2000
ЦНСДп 315-1900	315	1900	3000	2500



ЦНС(н), HP Series

Designed for transporting crude oil and end products through long-distance, process and auxiliary pipelines.

Electrically driven horizontal multistage segmental centrifugal pumps, with all impellers facing the same way and automatic balancing of the rotor axial thrust by balance disc and balance disc

seat. The suction nozzle horizontally sideward, the discharge nozzle vertically to the top. Radial forces and unbalanced axial thrust load of the pump rotor are taken up by the grease-lubricated antifriction bearings. Shaft sealing: by dual mechanical seals or single mechanical seals, each provided with an auxiliary (safety) seal on the atmosphere side. Cartridge type design of the mechanical seals allows their installation and removal as an assembly unit. Cyclone separators for cleaning liquid supplied to the mechanical seal chambers can be mounted on the pumps for their reliability improvement. For applications with low NPSH available existing at the installation, the ЦНС(н) 500 model pumps can be equipped with an inducer to ensure NPSH required equal to 3 m.

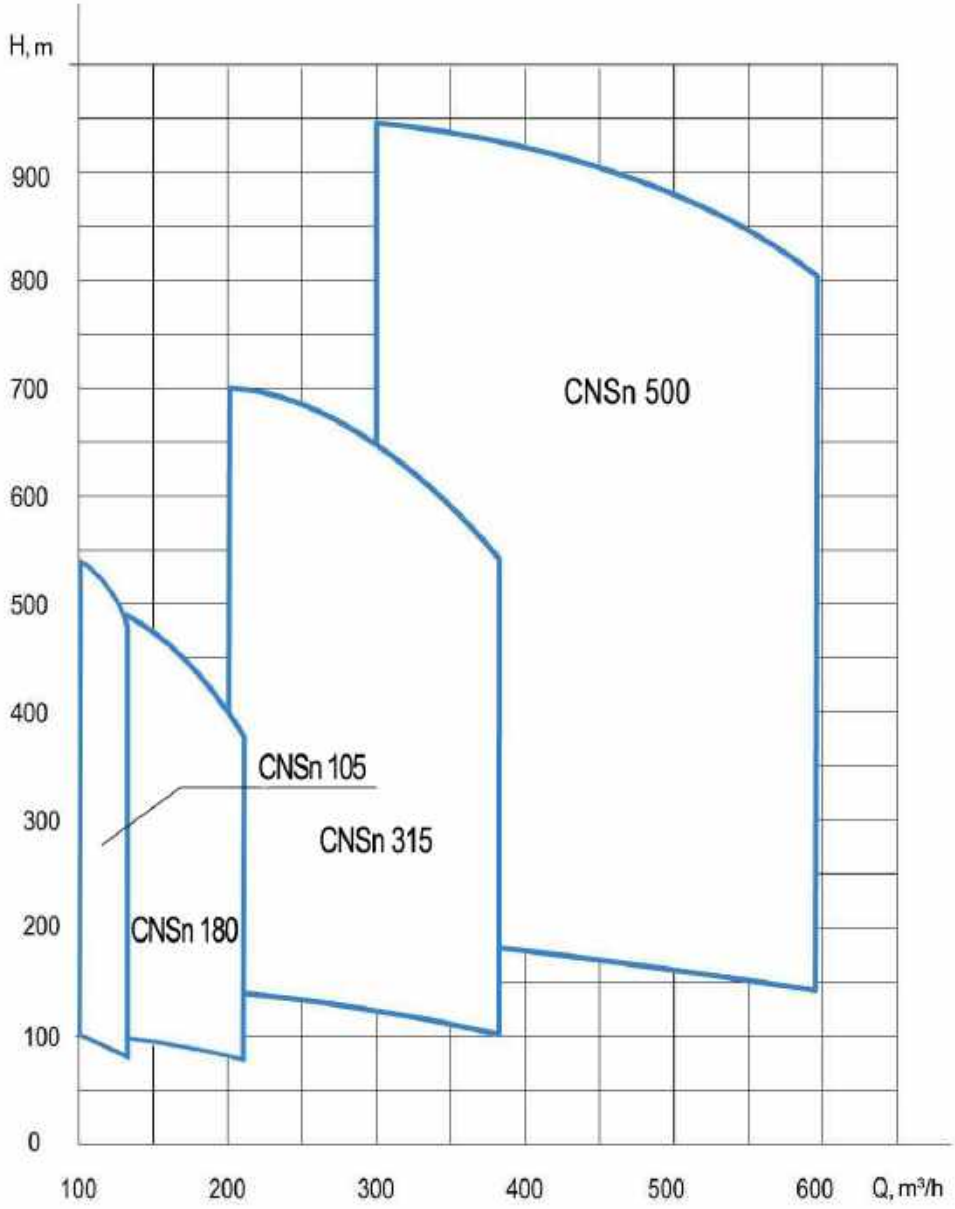
HP Series pumps are multistage centrifugal pumps of a new generation, designed to replace ЦНС and ЦНС(н) pumps. They provide interchangeability in terms of pumping technology and the size of the connection to the foundation and pipelines. Designed in accordance with the requirements of international industry standards; have improved efficiency and reliability.

Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotation speed rpm (synchr.)	Motor nominal power, kW
ЦНСн 105-98	105	98	3000	55
ЦНСн 105-147	105	147	3000	75
ЦНСн 105-196	105	196	3000	110
ЦНСн 105-245	105	245	3000	132
ЦНСн 105-294	105	294	3000	160
ЦНСн 105-343	105	343	3000	160
ЦНСн 105-392	105	392	3000	200
ЦНСн 105-441	105	441	3000	250
ЦНСн 105-490	105	490	3000	250
ЦНСн 180-85	180	85	1500	75
ЦНСн 180-128	180	128	1500	90
ЦНСн 180-170	180	170	1500	132
ЦНСн 180-212	180	212	1500	160
ЦНСн 180-255	180	255	1500	200
ЦНСн 180-297	180	297	1500	250
ЦНСн 180-340	180	340	1500	250
ЦНСн 180-383	180	383	1500	315

Pump make	Capacity, m^3/h	Head, m	Rotation speed rpm (synchr.)	Motor nominal power, kW
ЦНСн 180-425	180	425	1500	315
ЦНСн 315-126	315	126	1500	200
ЦНСн 315-189	315	189	1500	250
ЦНСн 315-252	315	252	1500	315
ЦНСн 315-315	315	315	1500	400
ЦНСн 315-378	315	378	1500	450
ЦНСн 315-441	315	441	1500	630
ЦНСн 315-504	315	504	1500	630
ЦНСн 315-567	315	567	1500	800
ЦНСн 315-630	315	630	1500	800
ЦНСн 500-160	500	160	1500	400
ЦНСн 500-240	500	240	1500	630
ЦНСн 500-320	500	320	1500	800
ЦНСн 500-400	500	400	1500	1000
ЦНСн 500-480	500	480	1500	1000
ЦНСн 500-560	500	560	1500	1250
ЦНСн 500-640	500	640	1500	1600
ЦНСн 500-720	500	720	1500	1600
ЦНСн 500-800	500	800	1500	2000
ЦНСн 500-880	500	880	1500	2000

Coverage Chart of the CNSn Series pumps



ЦНС, ЦНСп, ЦНСз, HP, GP

Designed for creating high pressure (up to 250 bar) in various technological and production systems. They have become most widespread in systems of artificial pressure increase (PPD) during oil production in oil fields, where they are used to pump water into oil-bearing

formations. They are also used to beat down scale with water at rolling mills of metallurgical plants (combinations).

CNS pumps – centrifugal, horizontal, multi-stage, single-body, sectional type; variations of constructive designs are described below.

Pumps ЦНС … – 2,

The pump rotor is carried by the oil-bath or pressure oil lubricated plain bearings. Shaft sealing: soft packed glands (C) or mechanical seals (T). The suction nozzle horizontally sideward, the discharge nozzle vertically to the top.

Pumps ЦНСз … – 2

In order to enhance a cumulative reliability and entire life of the pumps if frequently started and stopped, their design features **a balance disc-from-seat separation device**. It is intended for ensuring the guaranteed axial gap between the balance disc and balance disc seat.

Pumps ЦНСп …

With back-to-back impeller arrangement that makes an axial thrust balancing device unnecessary in the pump design and significantly improves the reliability of pump operation. The residual axial thrust is absorbed by a thrust bearing.

Pumps ЦНС…–3

The pump rotor is carried by the medium-lubricated plain bearings. Shaft sealing: soft packed glands (C) or mechanical seals (T). The suction nozzle horizontally sideward, the discharge nozzle vertically to the top.

According to the dimensions of the connecting pipes and installation on the foundation (frame), all pumps of the group (ЦНС 45, ЦНС 63, ЦНС 90, ЦНС 120, ЦНС 180, ЦНС 240) are unified with pumps of the ЦНС 180 type in all relevant constructions.

Design by materials

Ordinary (general service) version

Handled media: clean water and oil-field produced waters free from hydrogen sulfide.

Corrosion-resistant material construction

Handled media in case of corrosion-resisting and wear- and corrosion-resisting constructions: aggressive sewage and formation oil-field produced waters including those that contain hydrogen sulfide.

Duplex steel construction

Handled media in case of duplex steel construction: aggressive sewage and formation and cenomanian oil-field produced waters including those that contain hydrogen sulfide (H2S up to 400mg/l).

The Manufacturer shall select appropriate material construction according to handled medium characteristics specified by the Purchaser.

HP, GP pumps are multistage centrifugal pumps of a new generation, designed to replace CNS and CNSp pumps. They provide interchangeability in terms of pumping technology and the size of the connection to the foundation and pipelines. Designed in accordance with the requirements of international industry standards; have improved efficiency and reliability.

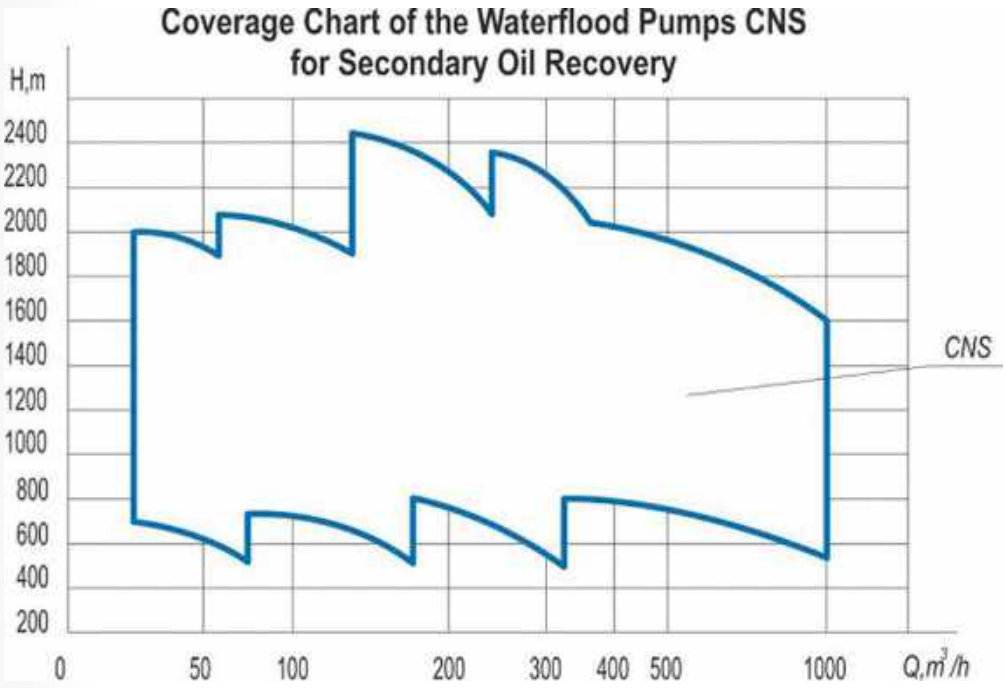
Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
ЦНС 10-200	10	200	3000	22
ЦНС 10-480	10	480	3000	55
ЦНС 10-700	10	700	3000	90
ЦНС 30-800	30	800	3000	315
ЦНС 30-1050	30	1050	3000	315
ЦНС 30-1422	30	1250	3000	315
ЦНС 40-800	40	800	3000	315
ЦНС 40-1050	40	1050	3000	315
ЦНС 40-1422	40	1250	3000	315
ЦНС 45-700	45	700	3000	315
ЦНС 45-900	45	900	3000	315
ЦНС 45-1050	45	1050	3000	500
ЦНС 45-1150	45	1150	3000	500
ЦНС 45-1275	45	1275	3000	500
ЦНС 45-1422	45	1422	3000	630
ЦНС 45-1525	45	1525	3000	630
ЦНС 45-1650	45	1650	3000	630
ЦНС 45-1775	45	1775	3000	800
ЦНС 45-1900	45	1900	3000	800
ЦНС 45-2100	45	2100	3000	800
ЦНС 63-700	63	700	3000	500
ЦНС 63-900	63	900	3000	500
ЦНС 63-1050	63	1050	3000	500
ЦНС 63-1150	63	1150	3000	500
ЦНС 63-1275	63	1275	3000	630
ЦНС 63-1422	63	1422	3000	630
ЦНС 63-1525	63	1525	3000	630
ЦНС 63-1650	63	1650	3000	800
ЦНС 63-1775	63	1775	3000	1000
ЦНС 63-1900	63	1900	3000	1000
ЦНС 63-2100	63	2100	3000	800
ЦНС 90-700	90	700	3000	500

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
ЦНС 90-900	90	900	3000	500
ЦНС 90-1050	90	1050	3000	630
ЦНС 90-1150	90	1150	3000	630
ЦНС 90-1275	90	1275	3000	630
ЦНС 90-1422	90	1422	3000	800
ЦНС 90-1525	90	1525	3000	800
ЦНС 90-1650	90	1650	3000	800
ЦНС 90-1775	90	1775	3000	1000
ЦНС 90-1900	90	1900	3000	1000
ЦНС 90-2100	90	2100	3000	1000
ЦНС 120-750	120	700	3000	800
ЦНС 120-900	120	900	3000	1000
ЦНС 120-1050	120	1050	3000	1000
ЦНС 120-1150	120	1150	3000	1000
ЦНС 120-1275	120	1275	3000	1000
ЦНС 120-1422	120	1422	3000	1250
ЦНС 120-1525	120	1525	3000	1250
ЦНС 120-1650	120	1650	3000	1600
ЦНС 120-1775	120	1775	3000	1600
ЦНС 120-1900	120	1900	3000	1600
ЦНС 120-2100	120	2100	3000	1250
ЦНС 180-700	180	700	3000	800
ЦНС 180-900	180	900	3000	800
ЦНС 180-1050	180	1050	3000	800
ЦНС 180-1150	180	1150	3000	1000
ЦНС 180-1275	180	1275	3000	1000
ЦНС 180-1422	180	1422	3000	1250
ЦНС 180-1525	180	1525	3000	1250
ЦНС 180-1650	180	1650	3000	1600
ЦНС 180-1775	180	1775	3000	1600
ЦНС 180-1900	180	1900	3000	1600
ЦНС 180-2100	180	2100	3000	1600
ЦНС 200-2050	200	2050	3000	1600

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
ЦНС 200-2200	200	2200	3000	2000
ЦНС 240-700	240	700	3000	800
ЦНС 240-900	240	900	3000	1000
ЦНС 240-1050	240	1050	3000	1000
ЦНС 240-1150	240	1150	3000	1250
ЦНС 240-1275	240	1275	3000	1250
ЦНС 240-1422	240	1422	3000	1250
ЦНС 240-1525	240	1525	3000	1600
ЦНС 240-1650	240	1650	3000	1600
ЦНС 240-1775	240	1775	3000	1600
ЦНС 240-1900	240	1900	3000	2000
ЦНС 240-2100	240	2100	3000	2000
ЦНС 315-700	315	700	3000	1250
ЦНС 315-900	315	900	3000	1250
ЦНС 315-1050	315	1050	3000	1250
ЦНС 315-1150	315	1150	3000	1600
ЦНС 315-1275	315	1275	3000	1600
ЦНС 315-1422	315	1422	3000	2000
ЦНС 315-1525	315	1525	3000	2000
ЦНС 315-1650	315	1650	3000	2000
ЦНС 315-1775	315	1775	3000	2500
ЦНС 315-1900	315	1900	3000	2500
ЦНС 315-2100	315	2100	3000	2500
ЦНС 315-2200	315	2200	3000	3150
ЦНС 500-1050	500	1050	3000	2500
ЦНС 500-1422	500	1422	3000	3150
ЦНС 500-1900	500	1900	3000	4000
ЦНС 630-1050	630	1050	3000	2500
ЦНС 630-1422	630	1422	3000	3150
ЦНС 630-1900	630	1900	3000	4000
ЦНС 720-1050	720	1050	3000	2500
ЦНС 720-1422	720	1422	3000	3150
ЦНС 720-1900	720	1900	3000	4000

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
ЦНС 300-1800	300	1575	3000	3150
ЦНС 300-1800	300	1800	3000	3150
ЦНС 360-2000	360	2000	3000	3150
ЦНС 360-2000	250	2370	3000	2500
ЦНС 360-2000	341	1891	3000	3150
ЦНС 500-1900	500	1900	3000	5000
ЦНС 500-1900	567	2000	3000	5000
ЦНС 500-1900-1	800	1390	3000	5000
ЦНС 630-1700	630	1700	3000	4000



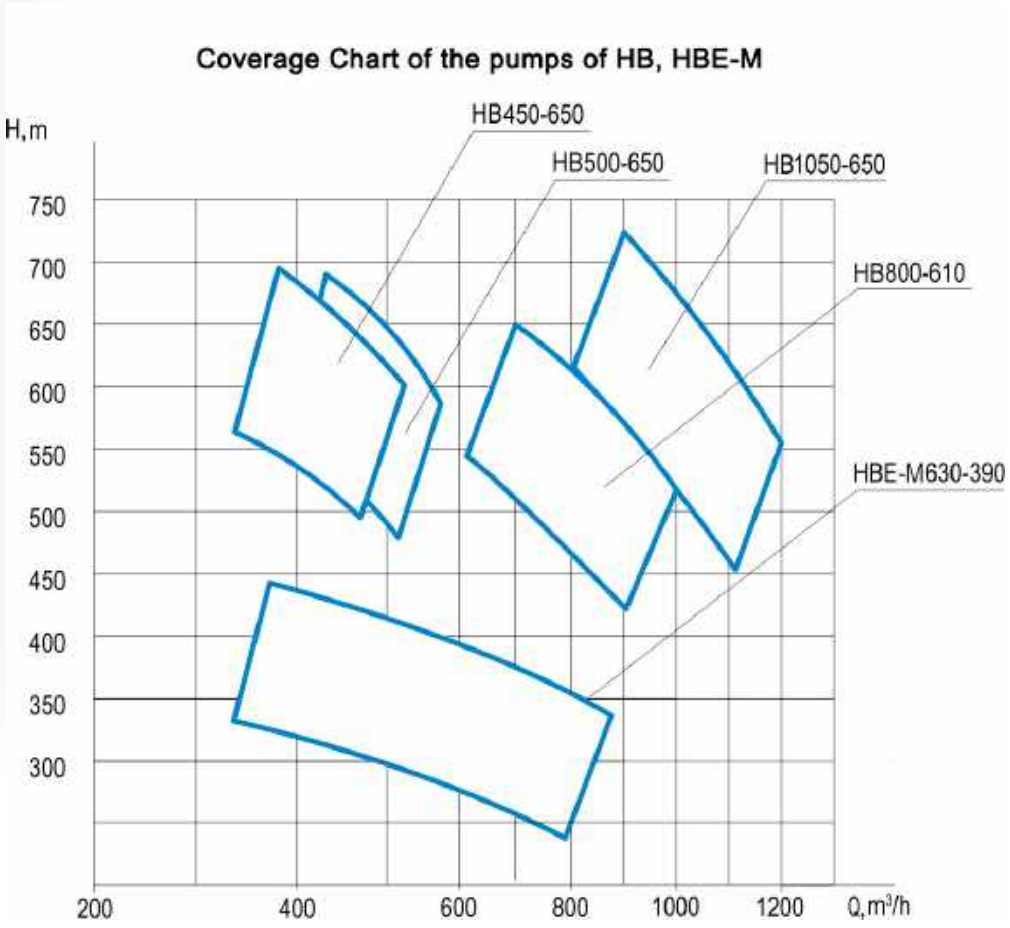
ХБ, ХБЕ-М Series

Designed for handling aqueous solutions of mono- or diethanolamines in the plants for cleaning of natural gas from hydrogen sulphide and carbon dioxide.

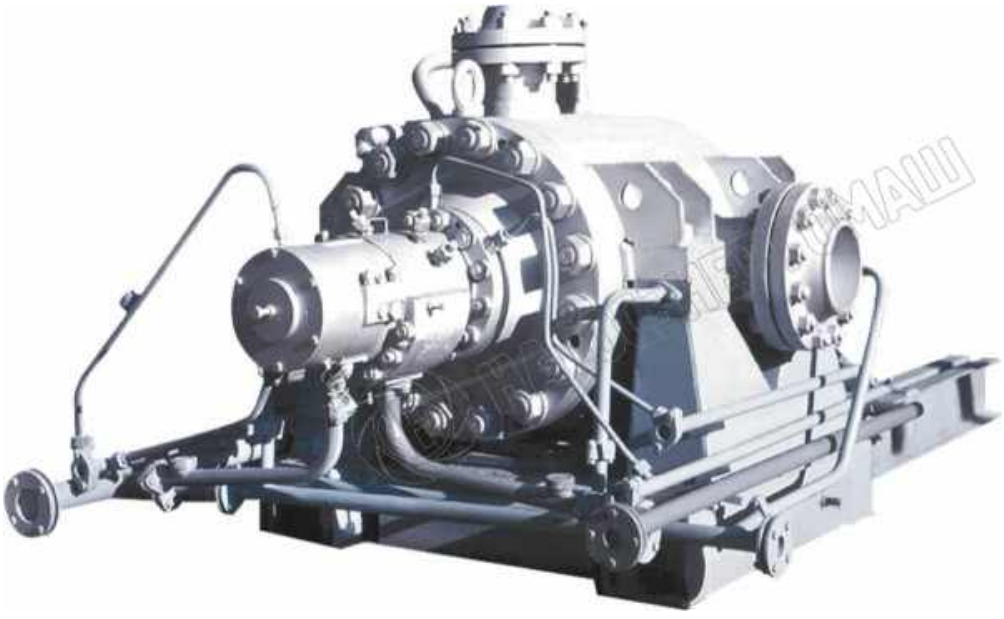
Electrically driven, horizontal, between-bearings, barrel-insert (single casing in case of ХБЕ-М 630-390) centrifugal pump with single entry radial impellers. The pump rotor is carried by the pressure lubricated plain bearings. Shaft sealing: mechanical seals.

Additional and technical information

№	Pump make	Capacity, m^3/h	Head, m	Rotation speed rpm (synchr.)	Motor nominal power, kW
1	ХБ 450-650	450	650	3000	1250
2	ХБ 500-650	500	650	3000	1250
3	ХБ 800-610	800	610	3000	2000
4	ХБ 1050-650	1050	650	3000	2500
5	ХБЕ 160-210	160	210	1500	160
6	ХБЕ-М 630-390	630	390	1500	1250



НГ, НМФ Model Double Flow Axially Split / Radially Split Barrel



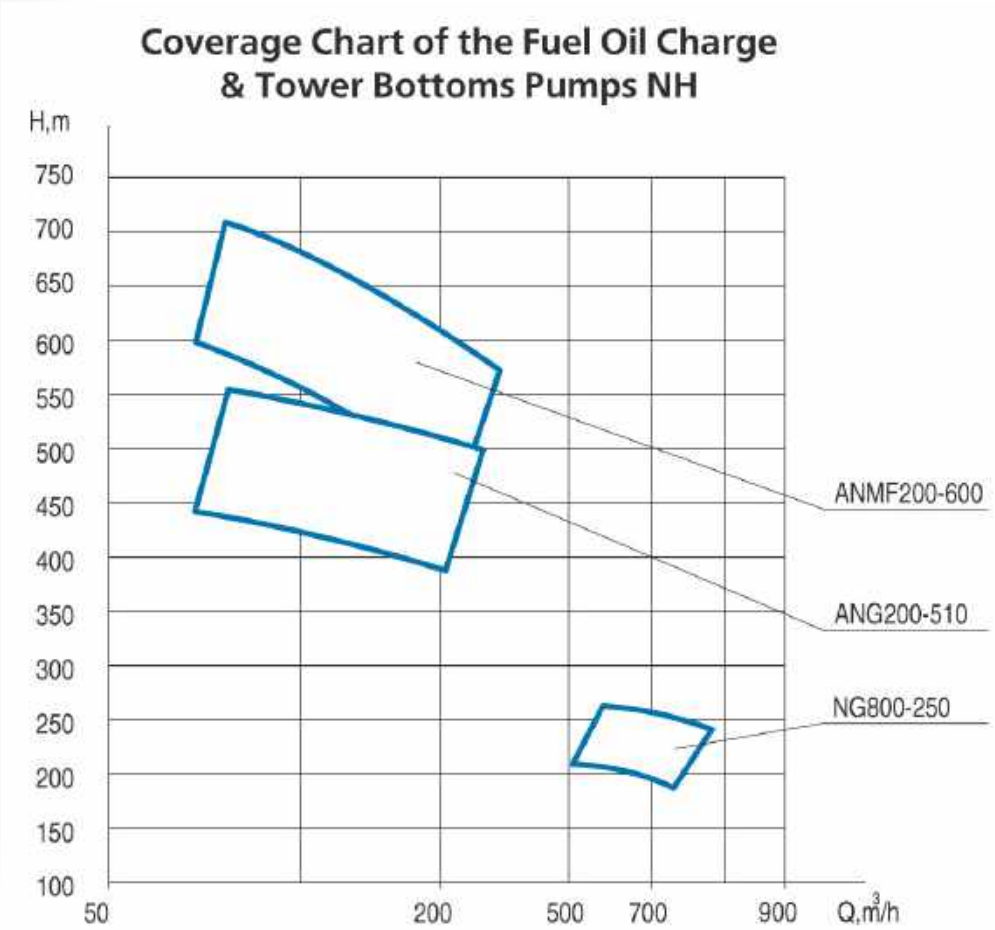
The fuel oil charge pump НГ 800-250 is designed for delivering fuel oil (a heavy pyrolysis tar) into the high-pressure polyethylene production plants. Electrically driven horizontal single-stage axially split volute casing centrifugal pump with a double entry impeller. The pump rotor is carried by the plain bearings with forced oil lubrication. Shaft sealing: by mechanical seals.

The tower bottoms pump НГ 200-510 is designed for handling tar (asphalt flux removal) in the slow coking process units at the petroleum refineries. Electrically driven horizontal multistage ring-section barrel-insert centrifugal pump. The pump rotor is carried by the pressure oil lubricated plain bearings. Shaft sealing: by mechanical seals.

The pumps НГ 200-510 and НМФ 200-600 are designed for handling tar (asphalt flux removal) in the slow coking process units and other oil products at the temperature of 4000°C. Designed for handling aqueous solutions of mono- or diethanolamines in the plants for cleaning of natural gas from hydrogen sulphide and carbon dioxide.

Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power,kW
НГ 200-510	182	410	3000	400
НГ 200-510	200	510	3000	400
НГ 800-250	800	250	3000	1000
НМФ 200-600	200	600	3000	500



HOУ Series

Designed for pumping out crude oil and oil products that leak out of pipeline pumps and for their injection into the suction pipeline of an oil pumping station.

Electrically driven, vertically suspended, wet-pit end-suction diffuser multistage segmental centrifugal pumps in cantilever design, with single flow radial impellers, a separate discharge pipe, a motor stool and a can (outer casing). The inner casing (a withdrawable rotating assembly) of ring-section design may be installed in an existing vessel or a sump* to be submerged in the medium pumped. The rotor is carried by medium-lubricated radial plain bearing at the balance drum and intermediate bearing and a grease-lubricated top thrust and radial antifriction bearing (of two ball bearings). No shaft sealing is required. NOTE: *Overall and mounting dimensions of

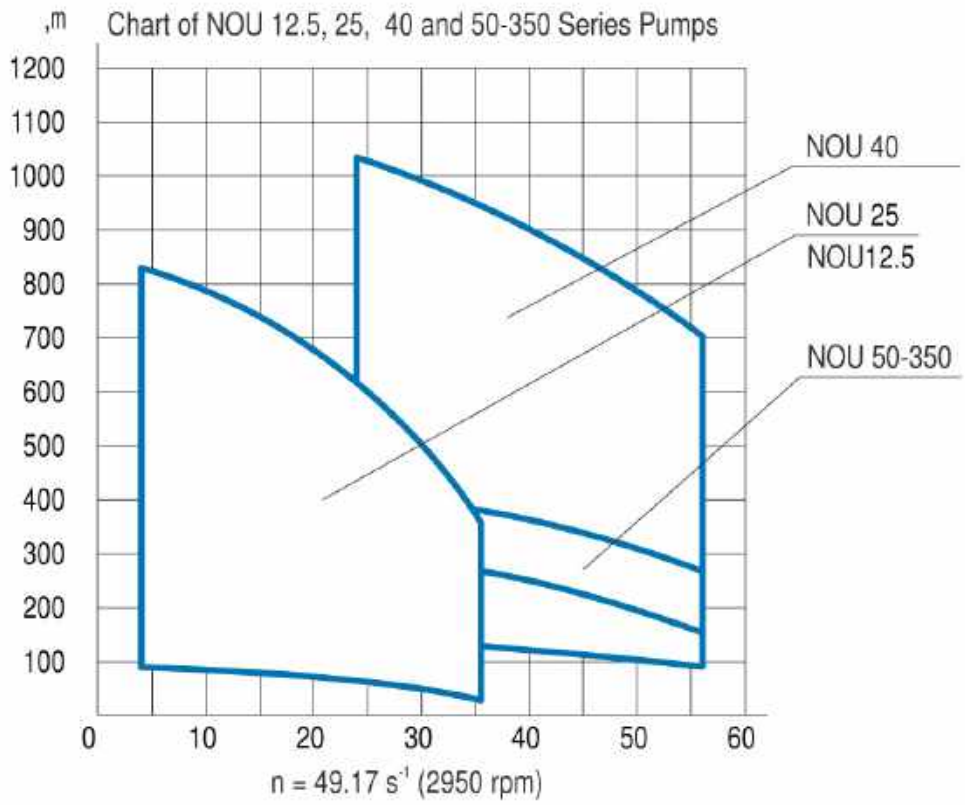
the withdrawable element mounting plate (pump cover plate) are made specific after the Customer's submittal of data on fitting dimensions of a tank mouth flange.

Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power
HOY 12.5-80	0.0035 (12.5)	80	3000	To be determined by the manufacturer according to kinematic viscosity of handled medium
HOY 12.5-120		120		
HOY 12.5-160		160		
HOY 12.5-200		200		
HOY 12.5-240		240		
HOY 12.5-280		280		
HOY 12.5-320		320		
HOY 12.5-360		360		
HOY 12.5-400		400		
HOY 12.5-440		440		
HOY 12.5-480		480		
HOY 12.5-520		520		
HOY 12.5-560		560		
HOY 12.5-600		600		
HOY 12.5-640		640		
HOY 12.5-680		680		
HOY 12.5-720		720		
HOY 12.5-760		760		
HOY 12.5-800		800		
HOY 25-60	0.007 (25)	60	3000	To be determined by the manufacturer according to kinematic viscosity of handled medium
HOY 25-90		90		
HOY 25-120		120		
HOY 25-150		150		
HOY 25-180		180		
HOY 25-210		210		
HOY 25-240		240		

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power
НОУ 25-270		270		
НОУ 25-300		300		
НОУ 25-330		330		
НОУ 25-360	0.007 (25)	360	3000	To be determined by the manufacturer according to kinematic viscosity of handled medium
НОУ 25-390		390		
НОУ 25-420		420		
НОУ 25-450		450		
НОУ 25-480		480		
НОУ 25-510		510		
НОУ 25-540		540		
НОУ 25-570		570		
НОУ 25-600		600		
НОУ 40-120	0.011 (40)	120	3000	To be determined by the manufacturer according to kinematic viscosity of handled medium
НОУ 40-180		180		
НОУ 40-240		240		
НОУ 40-300		300		
НОУ 40-380		380		
НОУ 40-420		420		
НОУ 40-460		460		
НОУ 40-540		540		
НОУ 40-600		600		
НОУ 40-660		660		
НОУ 40-730		730		
НОУ 40-780		780		
НОУ 40-840		840		
НОУ 40-900		900		
НОУ 50-350	0.014 (50)	350		

Coverage Chart of the Oil Leakage Drain Pumps NOU



НПВ, НПВ-М Series Vertical Can, Diffuser

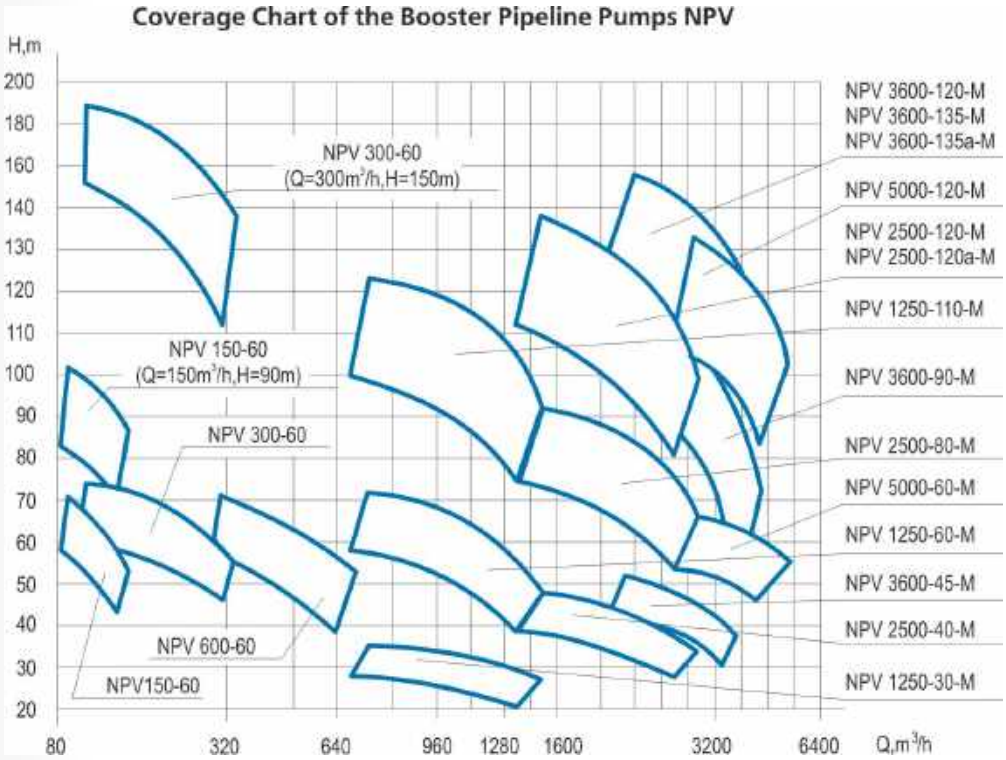
Designed for delivering crude oil or oil products to the main pipeline pumps to ensure their satisfactory suction performance (cavitation-free operation). Suitable also as mixing pumps to transfer oil in tank farms and as loading pumps to fill end products into tank wagons at the oil refineries.

Electrically driven vertically suspended, end-suction single- or multistage (according to the required head) diffuser centrifugal pumps equipped with an inducer. The major pump components are a can (outer casing) and a withdrawable rotating assembly with a motor stool. Upgraded versions (identified with “M”) feature a barrel-shaped delivery casing. The pump rotor is carried by the top thrust and radial bearing (comprising two ball bearings) and the bottom medium lubricated plain bearing. Shaft sealing: by mechanical seal.

Additional and technical information

Nos	Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
1	НПВ 150-60	150	60	3000	90
2	НПВ 150-60	150	90	3000	90
3	НПВ 300-60-С	300	40	3000	90
4	НПВ 300-60	300	60	3000	90
5	НПВ 300-60	300	150	3000	200
6	НПВ 600-60	600	60	1500	200
7	НПВ 1250-30-М	1250	30	1000	160
8	НПВ 1250-60-М	1250	60	1000	315
9	НПВ 1250-110-М	1250	110	1000	630
10	НПВ 2500-40-М	2500	40	1000	400
11	НПВ 2500-80-М	2500	80	1000	800
12	НПВ 2500-120-М	2400	103	1000	800
13	НПВ 2500-120-М	2500	120	1000	1250
14	НПВ 2500-120а-М	2500	110	1000	1000
15	НПВ 3600-45-М	3600	45	1000	630
16	НПВ 3600-90-М	3600	90	1000	1250
17	НПВ 3600-90-М	4500	80	1000	1600
18	НПВ 3600-120-М	3600	120	1000	1600
19	НПВ 3600-135-М	3600	135	1000	2000
20	НПВ 3600-135а-М	3600	120	1000	1600

Nos	Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
21	НПВ 5000-60-М	5000	60	1000	1250
22	НПВ 5000-120-М	5000	120	1000	2000
23	НПВ 5000-120-М1	5000	120	1000	2000
24	НПВ 5000-120-М2	5000	120	1000	2000



НЦН-Е, 20НДсН-М

Applications of the pumps НЦН-Е: for boosting the pressure of oil-field produced (formation) water to be injected into the petroliferous pools (for secondary oil recovery) as booster waterflood pumps; for handling triethylene glycol; for loading mazout (fuel oil) and light oil (motor gasoline, kerosene and diesel fuel) into tank wagons at the oil refinery terminals. May be

used as booster pipeline pumps for HM series pipeline pumps used for handling crude oil; for drawing off crude oil from the flow tanks (oil treating vessels) of the central process facility.

Electrically driven, horizontal foot- or semicentreline-mounted, between-bearings, single-stage, axially split volute casing centrifugal pumps with a double entry radial impeller. The rotor is carried by the grease-lubricated or oil-bath lubricated antifriction bearings. Shaft sealing: by mechanical seals

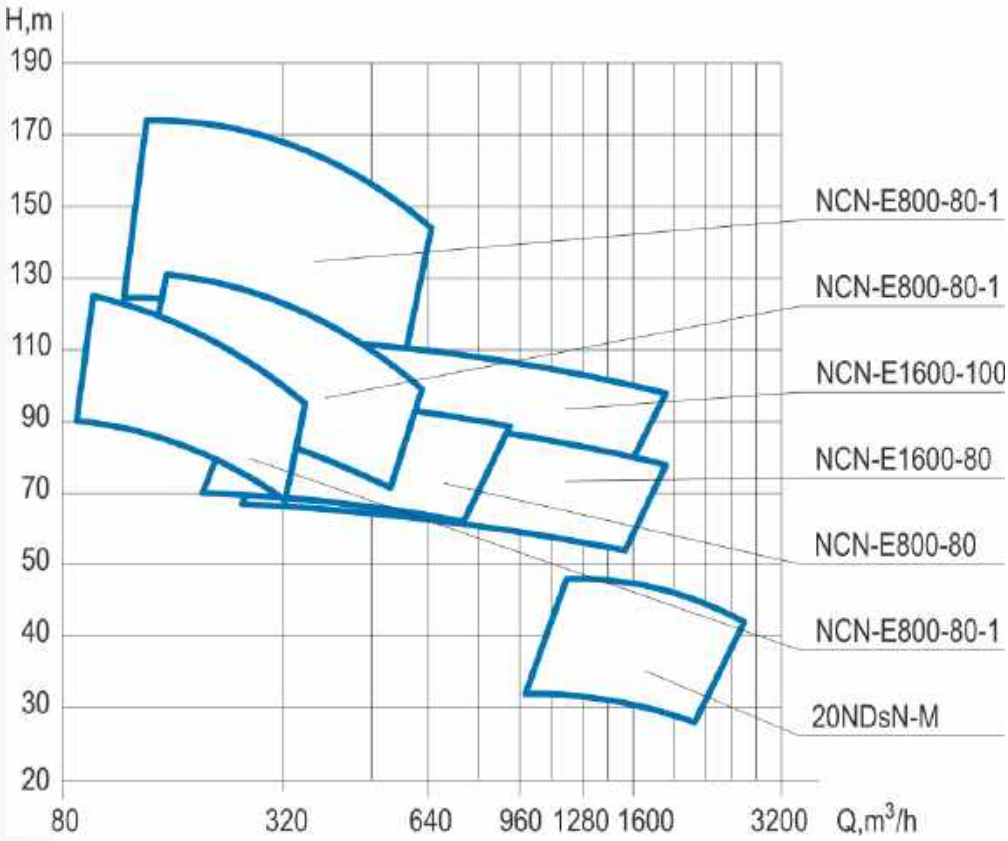
20 НДсН-М designed for delivering crude oil to the main pipeline pumps as booster pumps to ensure their cavitation-free operation. Suitable also as a loading pump for filling light products into tank wagons at the refineries and as an oil transfer pump in the tank farms.

Electrically driven, horizontal foot-mounted, between-bearings, single-stage, axially split volute casing centrifugal pump with a double entry radial impeller. The rotor is carried by grease-lubricated spherical roller bearings. Shaft sealing: mechanical seals with organized leakage drain.

Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
НЦН-Е 800/0.6-80-1	341	101.6	3000	160
НЦН-Е 800-80б-1	567	106	3000	315
НЦН-Е 800-80-1	571	150.4	3000	400
NНЦ-Е 800-80б-1	618	136.5	3000	400
НЦН-Е 800-80	800	80	1500	315
НЦН-Е 800-80	808	90.4	1500	315
НЦН-Е 1600-80	1600	80	1500	630
НЦН-Е 1600-80а	1800	70	1500	630
НЦН-Е 1600-100	1600	100	1500	630
НЦН-Е 1600-100	1487	111	1500	800
20НДсН-М	2200	45	750	315
20НДсН-М	3200	75	1000	800

Coverage Chart of the Loading / Booster Pipeline Pumps NCN-E and 20 NDsN-M



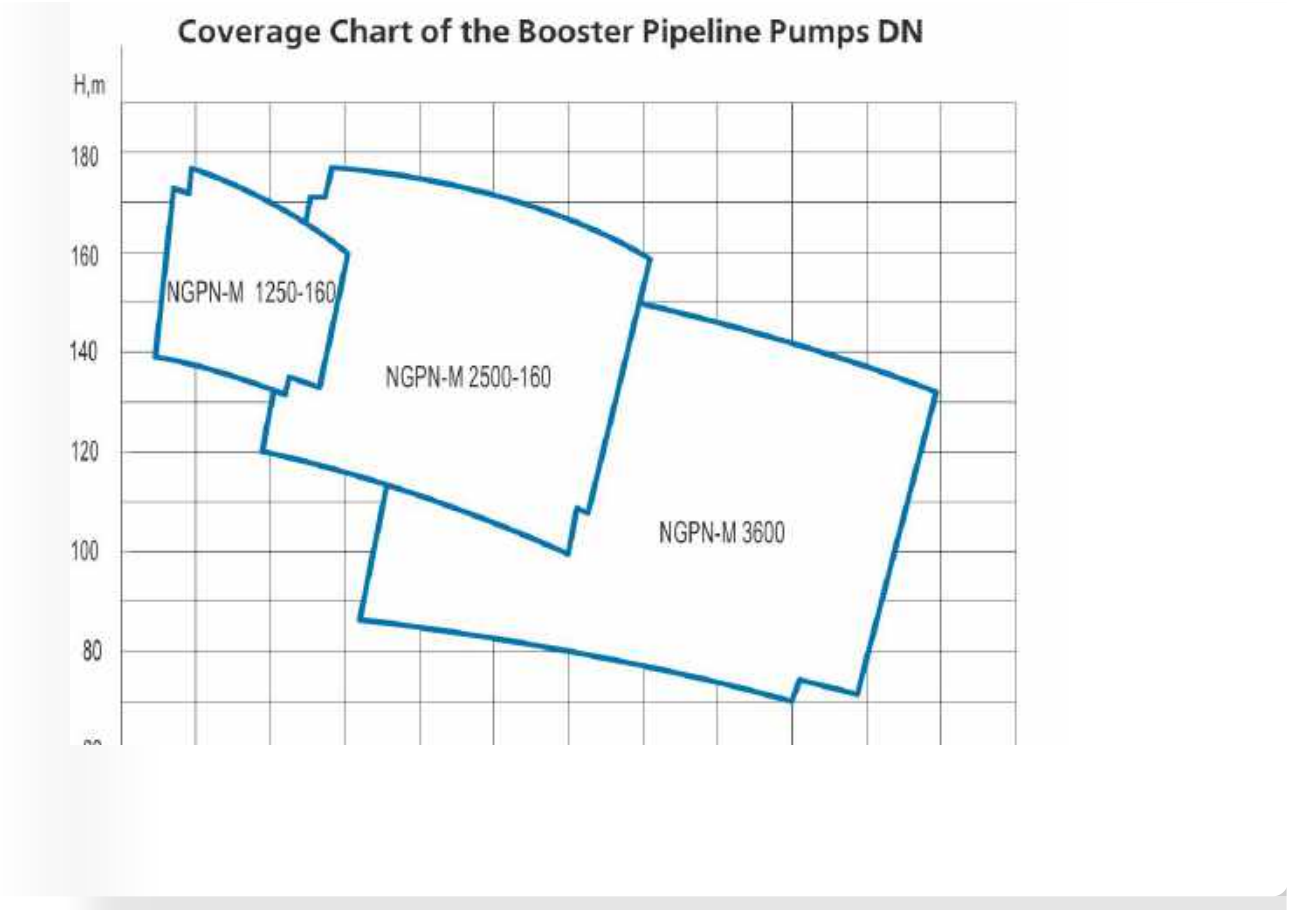
НГПН-М Series

Designed to ensure the necessary suction head (a greater NPSH available) for the main pipeline pumps. May be used also for pumping crude oil in other process systems at the pump stations or at other industrial projects.

Electrically driven, horizontal foot-mounted, between-bearings, single-stage, axially split volute casing centrifugal pumps with a double entry radial impeller and an inducer on each side to reduce the NPSH value. Rotor radial forces are taken up by the radial antifriction bearings with self-contained oil-ring lubrication. The residual axial thrust of the rotor is absorbed by two single row angular-contact antifriction bearings mounted back to back. Shaft sealing: by single mechanical seals, each provided with an auxiliary (safety) seal on the atmosphere side. Cyclone separators are employed to clean handled oil extracted at the top connection from contaminants and solids and to supply cleaned liquid for sealing the mechanical seals.

Additional and technical information.

Nos	Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power,kW	NPSHR
1	НГПН-М 1250-160	1250	160	1500	1000	1.8
2	НГПН-М 1250/0.5-160	750	160	1500	800	1.9
3	НГПН-М 1250-160	1500	160	1500	1250	2.0
4	НГПН-М 2500-160	2500	160	1500	1800	2.5
5	НГПН-М 2500-160	3000	160	1500	2000	2.7
6	НГПН-М 3600-120	3600	110	1000	1600	2.5
7	НГПН-М 3600-120	3600	120	1000	1600	2.5
8	НГПН-М 3600-120	4000	125	1000	2000	3.0
9	НГПН-М 3600-120	2500	60	1000	1000	2.5
10	НГПН-М 3600-78	3600	78	1000	1000	2.5
11	НГПН-М 3600-78	3600	90	1000	1250	2.5


Coverage Chart of the Booster Pipeline Pumps DN
H,m
180
160
140
120
100
80
NGPN-M 1250-160
NGPN-M 2500-160
NGPN-M 3600

HM Series

BB4/5

Designed for transporting crude oil and refined oil products through long-distance pipelines. HM 65...HM 1250-400 –electrically driven, horizontal, between-bearings, multistage diffuser centrifugal pumps of segmental or barrel (in case of HM 500-800 and HM 1250-400) type with a withdrawable cartridge of ring-section type. Single flow impeller arrangement, with all the impellers facing the same way. The pump rotor is carried by the plain bearings with forced oil lubrication. Shaft sealing: by mechanical seals. The pumps can be arranged both in series and in parallel.

BB1

Designed for transporting crude oil through long-distance pipelines. HM 1250-260...HM 10000 – electrically driven, horizontal foot-mounted, between-bearings, single-stage, axially split volute casing centrifugal pumps with a HM 10000-210-21double entry radial impeller. The rotor is carried by the pressure oil lubricated plain bearings. The residual rotor axial thrust is absorbed by an angular-contact ball bearing (optional hydrodynamic axial plain bearing). Shaft sealing: basically by single mechanical seals, each provided with an auxiliary (safety) seal (a floating throttle bushing) on the atmosphere side; optional dual mechanical seals with a barrier fluid sealing system.

Additional and technical information.

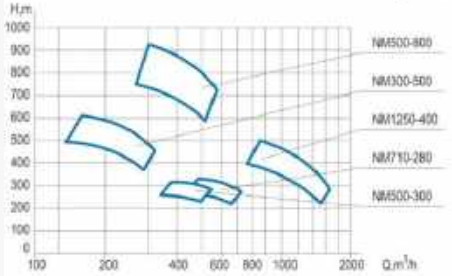
Pump make	**Capacity, m^3/h**	**Head, m**	**Rotational speed (synchr.), rpm**	**Motor nominal power, kW**
HM 65-550	65	550	3000	200
HM 125-550	125	185	3000	110
HM 125-550	125	183.6	3000	200
HM 125-550	125	550	3000	315, 400
HM 125-550	149	218	3000	200
HM 180-500	163.9	256.6	3000	315

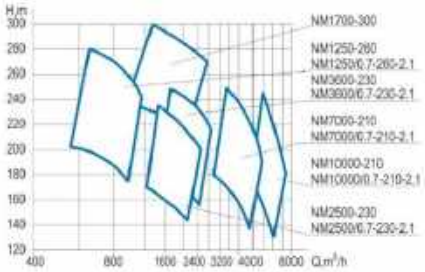
HM 180-500	180	500	3000	400, 500
HM 180-500-M	180	500	3000	400
HM 250-475	250	475	3000	500, 630
HM 300-500	250	550	3000	630, 800, 1000
HM 360-460	360	780	3000	1000
HM 360-460	360	460	3000	630, 800
HM 360-460a	360	405	3000	500
HM 500-300	500	300	3000	630, 800
HM 500-300a	500	260	3000	500
HM 500-800	500	800	3000	1600
HM 500-800	500	670	3000	1250
HM 710-280	710	280	3000	800,1000
HM 1250-400	1250	400	3000	1600
HM 1250-260	900	255	3000	800
HM 1250-260	1250	260	3000	1250
HM 1250-260	1565	250	3000	1600
HM 1700-300	1700	300	3000	1600
HM 2500-230	1250	220	3000	1250
HM 2500-230	1800	225	3000	1600
HM 2500-230	2500	230	3000	2000
HM 2500-230	3150	220	3000	2500
HM 3600-230	1800	225	3000	1600
HM 3600-230	2500	225	3000	2000
HM 3600-230	3600	230	3000	2500
HM 3600-230	4500	220	3000	3150
HM 7000-210	3500	205	3000	2500
HM 7000-210	5000	210	3000	3150
HM 7000-210	6300	195	3000	5000
HM 7000-210	7000	210	3000	5000
HM 7000-210	8750	205	3000	6300
HM 10000-210	5000	205	3000	4000
HM 10000-210	7000	200	3000	5000
HM 10000-210	10000	177	3000	5000
HM 10000-210	10000	210	3000	6300
HM 10000-210	12500	210	3000	8000
HM 1250-260-2.1	1250	260	3000	1250

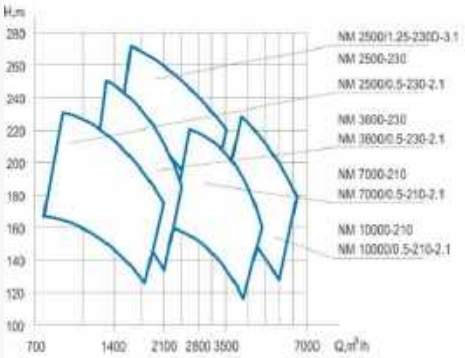
НМ 1250-260а-2.1	1135	215	3000	1250
НМ 1250-2606-2.1	1070	192	3000	1250
НМ 1250/0.7-260-2.1	900	265	3000	1250
НМ 1250/125-260-2.1	1565	270	3000	1600
НМ 2500-230-2.1	2500	230	3000	2000
НМ 2500-230а-2.1	2300	195	3000	2000
НМ 2500-2306-2.1	2190	176	3000	2000
НМ 2500/0.5-230-2.1	1250	220	3000	1250
НМ 2500/0.7-230-2.1	1800	225	3000	1600
НМ 2500/1.25-230-2.1	3150	225	3000	2500
НМ 3600-230-2.1	3600	230	3000	2500
НМ 3600-230а-2.1	3325	196	3000	2500
НМ 3600-2306-2.1	3230	185	3000	2500
НМ 3600/0.5-230-2.1	1800	230	3000	1600
НМ 3600/0.7-230-2.1	2500	230	3000	2000
НМ 3600/1.25-230-2.1	4500	220	3000	3150
НМ 7000-210-2.1	7000	210	3000	5000
НМ 7000-210а-2.1	6630	188	3000	5000
НМ 7000-2106-2.1	6340	172	3000	5000
НМ 7000/0.5-210-2.1	3500	205	3000	2500
НМ 7000/0.7-210-2.1	5000	210	3000	4000
НМ 7000/1.25-210-2.1	8750	210	3000	6300
НМ 10000-210-2.1	10000	210	3000	6300
НМ 10000-210а-2.1	9600	194	3000	6300
НМ 10000-210б-2.1	9300	182	3000	6300
НМ 10000/0.5-210-2.1	5000	210	3000	4000
НМ 10000/0.7-210-2.1	7000	210	3000	5000
НМ 10000/1.25-210-2.1	12500	210	3000	8000
НМ 10000/1.2-380-2	12000	380	3000	14000
НМ 10000-380а-2	9600	380	3000	14000
НМ 10000/0.5-380-2	4500	350	3000	14000
НМ 10000/0.7-380ж-2	7003/11654*	207	3000	12000
НМ 10000/0.7-380е-2	7003/11654*	224	3000	12000
НМ10000/0,7-380в-2	7003/11654*	250	3000	12000
НМ 10000/0.7-380э-2-С	7003/11654*	283	3000	12000
НМ 10000/0.7-380г-2-С	7003/11654*	233	3000	12000

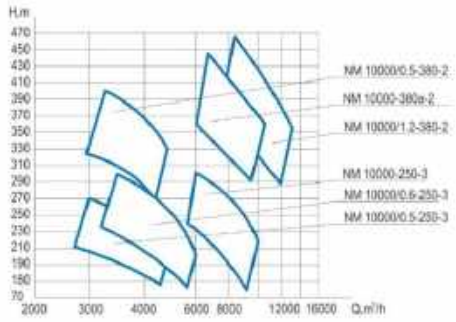
HM 10000-250-3-C	9150	245	3000	8000
HM 10000/0.6-250-3-C	5250	251	3000	8000
HM 10000/0.5-250a-3-C	5250	223	3000	8000
HM 7000/1.1-250-3-C	7500	249	3000	6300
HM 7000/0.7-250-3-C	5250	247	3000	6300
HM 7000/0.6-250-3-C	4500	247	3000	6300
HM 7000/0.5-250a-3.1	3660	202	3000	6300
HM 7000/0.4-250a-3.1	2786	238	3000	6300
HM 7000/0.85-250-3.2	1800	250	3000	5500
HM 7000/0.85-250-3.2	6000	250	3000	5500
HM 7000/0.85-250-3.2	3300	250	3000	5500
HM 2500/1.25-250-3.2	2900	240	3000	2500
HM 2500/1.25-250-3.2	1250	240	3000	2500

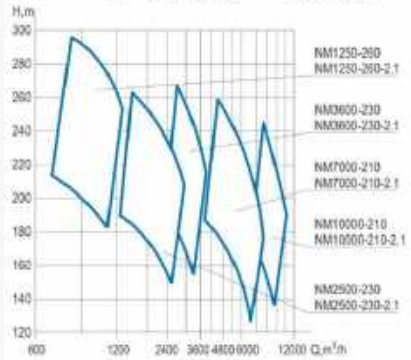
Coverage Chart of the Pipeline Pumps NM

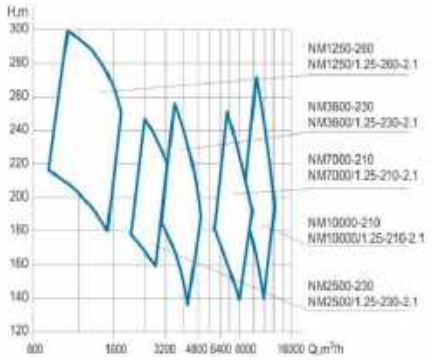


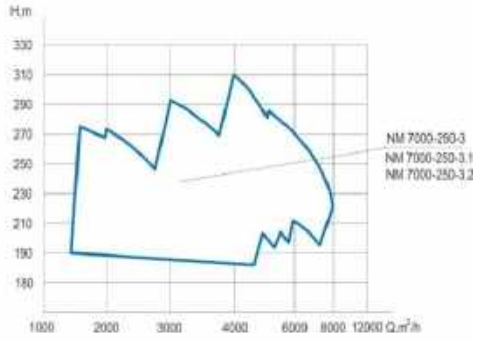




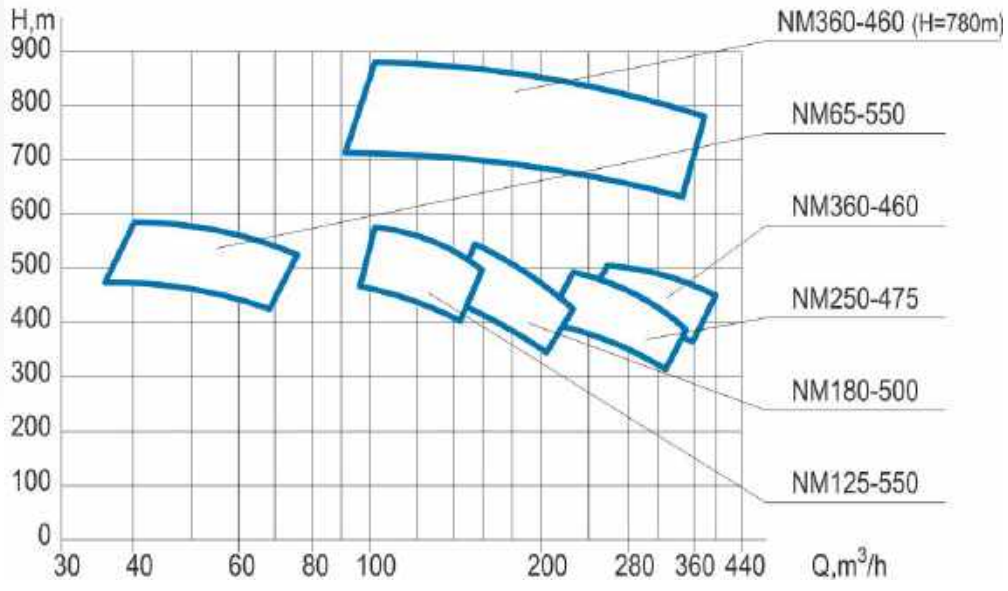








Coverage Chart of the Pipeline Pumps NM



ПД Series Double Flow Axially / Radially Split

The boiler feed booster pumps are installed upstream of boiler feed pumps to deliver feed water with the pumping temperature of max. 165°C at the power units in TPS's to ensure a cavitation-free operation of the main pumps.

ПД 650-160: motor-driven horizontal single-stage axially split (radially split in case of ПД 650-160-2) volute-casing centrifugal pumps with a double entry radial impeller. Pump nozzles oriented horizontally to the opposite sides. The pump rotor is carried by the oil-ring lubricated plain bearings. Shaft sealing: packed glands.

ПД 1600-180-2: turbine-driven horizontal single-stage radially split volute-casing centrifugal pumps with a double entry radial impeller. The discharge nozzle horizontally sideward, the suction nozzle vertically to the bottom. The pump rotor is carried by the pressure lubricated plain bearings. Shaft sealing: mechanical seals.

Additional and technical information

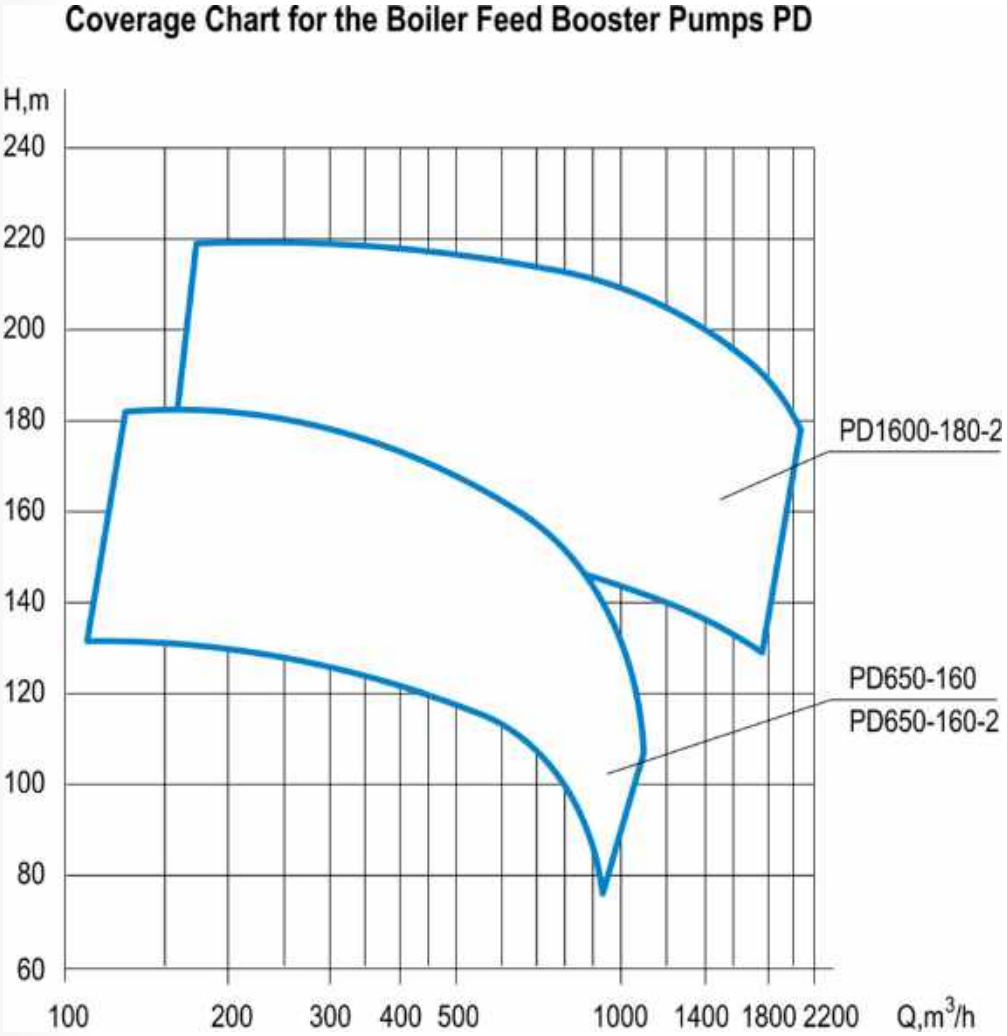
Pump make	Capacity, m^3/h	Head, m	Ratational speed, rpm	Motor nominal power, kW
ПД 650-160	650	158	3000 (synchr.)	324
ПД 650-160-2	650	158	3000	303

Pump make	Capacity, m^3/h	Head, m	Ratational speed, rpm	Motor nominal power, kW
ПД 1600-180-2*	1660	194	2100	954
ПД 1600-180-2а**	1050	184	2100	633
ПД 1600-180-2а***	1240	158	2000	618

* for TPS 800 MW power units

** for TPS 500 MW power units

*** for TPS 320 MW power units



ЦН, 14М-8х4-1 Series

ЦН: designed for the water supply to industrial plants and communities. Applied also for agricultural land irrigation and drainage. Horizontal foot-mounted, cross-over, two-stage or four-stage (ЦН 400-210), axially split volute casing centrifugal pumps between bearings, with single entry radial impellers mounted back-to-back. Driven by an electric motor or a diesel engine (in case of ЦН 400-105). The rotor is carried by grease-lubricated antifriction bearings. Shaft sealing: packed glands.

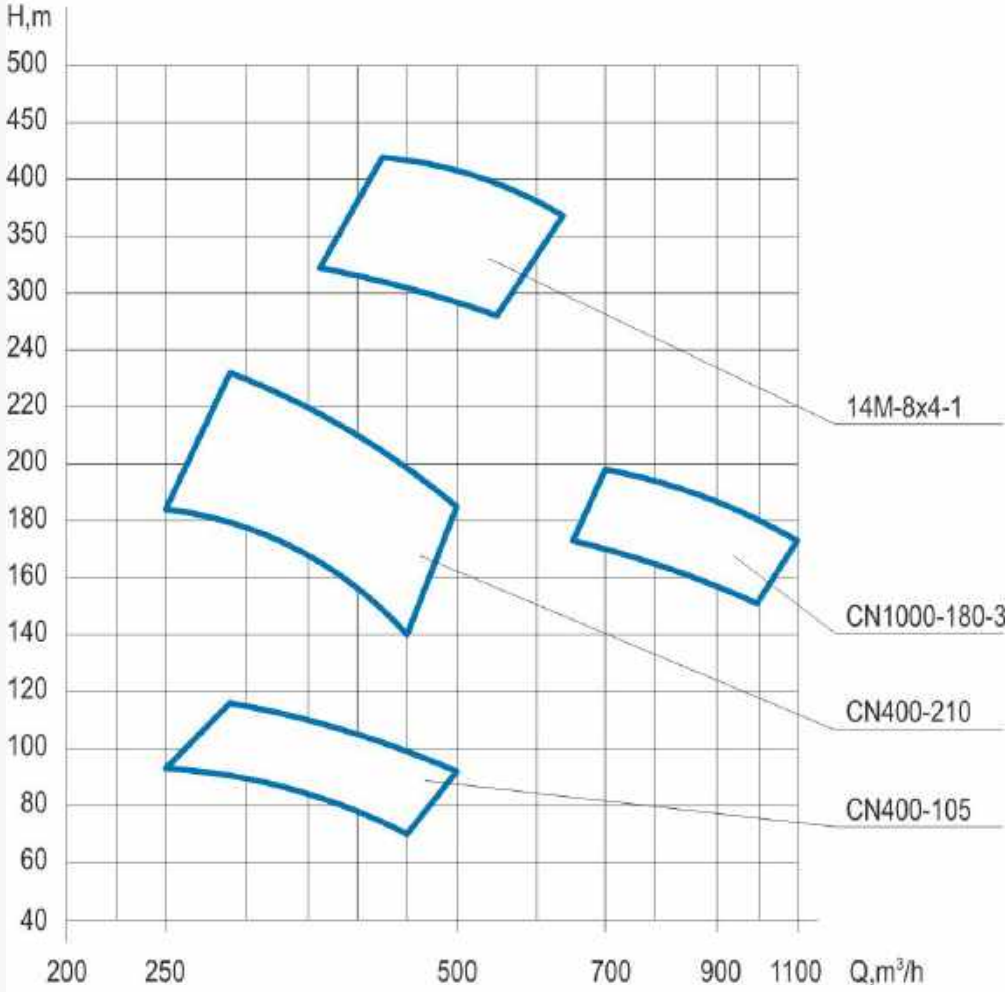
14М-8х4-1: designed for the water supply to industrial plants and communities.

Electrically driven, horizontal foot-mounted, cross-over, four-stage, axially split volute casing centrifugal pumps between bearings, with single entry radial impellers mounted back-to-back. The rotor is carried by grease-lubricated antifriction bearings. Shaft sealing: packed glands.

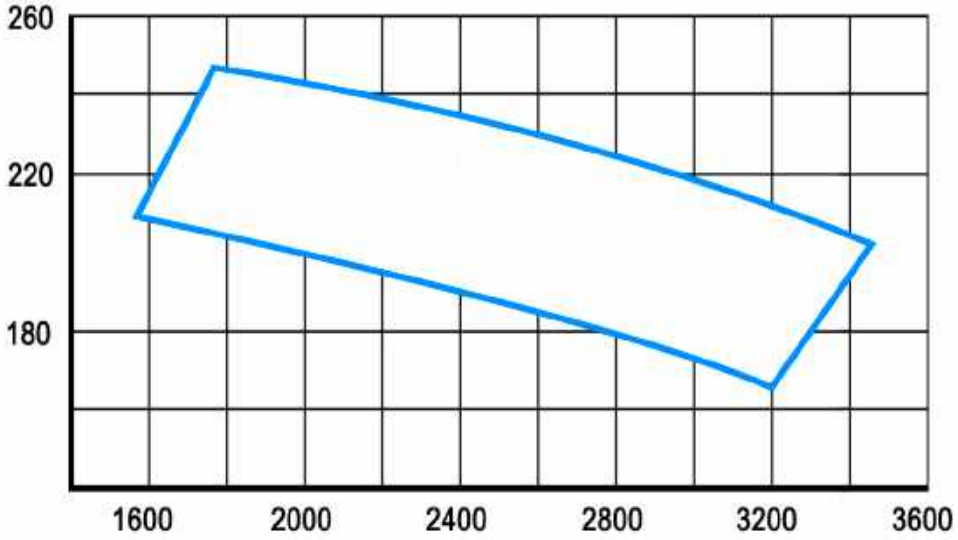
Additional and technical information.

Pump make	Capacity, м^3/г	Head, м	Rotation speed, rpm (synchr.)	Motor nominal power, kW
ЦН 400-105	400	105	1500	200
ЦН 400-105а	380	96	1500	160 (200)
ЦН 400-105b	360	83	1500	132 (200)
ЦН 400-210	400	210	1500	400
ЦН 400-210а	380	192	1500	315
ЦН 400-210b	360	166	1500	250
ЦН 1000-180-3	1000	180	1500	630
ЦН 1000-180а-3	900	157	1500	500
ЦН 3000-197-2	3000	197	1000	2500
14М-8×4-1	600	380	1500	1000

Coverage Charts of the Water-Works Pumps CN and 14M-8x4-1



Coverage Chart of the pumps CN 3000-197-2



D (DV) – Desum Series

Д (ДВ) range is a new generation of Д series pumps.

Electrically driven, foot-mounted, between-bearings, in-line, single-stage, double-suction, axially split volute casing, heavy-duty industrial pumps with a basically horizontal shaft. Available with optional vertical mounting (ДВ-configurations). Accurate positioning of the upper-to-lower casing halves with pins for ease of assembly. The rotor is carried by grease-lubricated or oil-bath lubricated antifriction bearings (in the latter case a cooling system is provided). Shaft sealing: packed glands or API 682 single / double mechanical seals. The pump is designed to be capable of remaining functional in the areas of seismic hazard of magnitude up to 9 (MSK-64 scale). Nozzle flanges are made according to DIN / ANSI /ISO. The pump shaft is completely protected against handled medium.

Impeller material options:

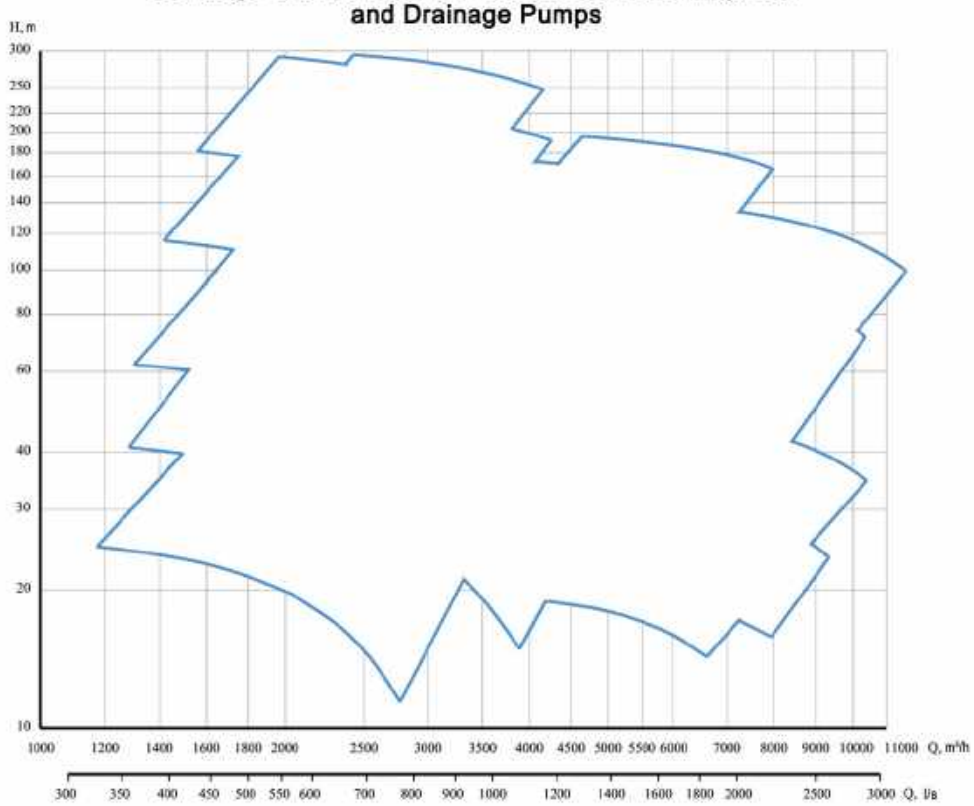
- cast iron;
- steel;
- bronze.

The pump casing is basically made of high-strength cast iron.

Additional and technical information.

Pump make	Capacity, m^3/h	Head, м	Rotation speed, rpm (synchr.)
Д (ДВ) 350-580	2 850	105	1 500
	2 500	110	1 500
Д (ДВ) 350-725d	2 900	180	1 500
	2 500	180	1 500
Д (ДВ) 400-660	4 300	140	1 500
	2 850	60	1 000
	2 150	36	750
Д (ДВ) 400-990	3 200	130	1 000
	2 700	100	1 000
Д (ДВ) 500-735	4 400	75	1 000
	3 600	70	1 000
Д (ДВ) 500-875	5 000	110	1 000
Д (ДВ) 500-875A	6 000	105	1 000
Д (ДВ) 500-875B	5 000	100	1 000
	4 000	110	1 000
Д (ДВ) 500-1050	4 000	160	1 000
	3 500	140	1 000
Д (ДВ) 600-720	5 900	70	1 000
	4 500	40	750
	3 500	40	750
	4 000	40	750
Д (ДВ) 700-1000A	9 700	120	1 000
	8 500	115	1 000
	5 000	40	600
Д (ДВ) 700-1000B	8 000	72	750
	7 400	72	750
Д (ДВ) 700-700	8 500	27	750
	7 250	27	750

Coverage Chart of the New Generation Land Irrigation and Drainage Pumps



Д Series

Designed for agricultural land irrigation and drainage, as well as for handling water in water supply systems of industrial projects and public utilities.

Electrically driven, horizontal foot-mounted, between-bearings, single-stage, axially split volute casing centrifugal pumps with a double entry radial impeller. The rotor is carried by grease-lubricated or oil-ring lubricated (in case of Д 6300-80-2 model pump) antifriction bearings. Shaft sealing: packed glands.

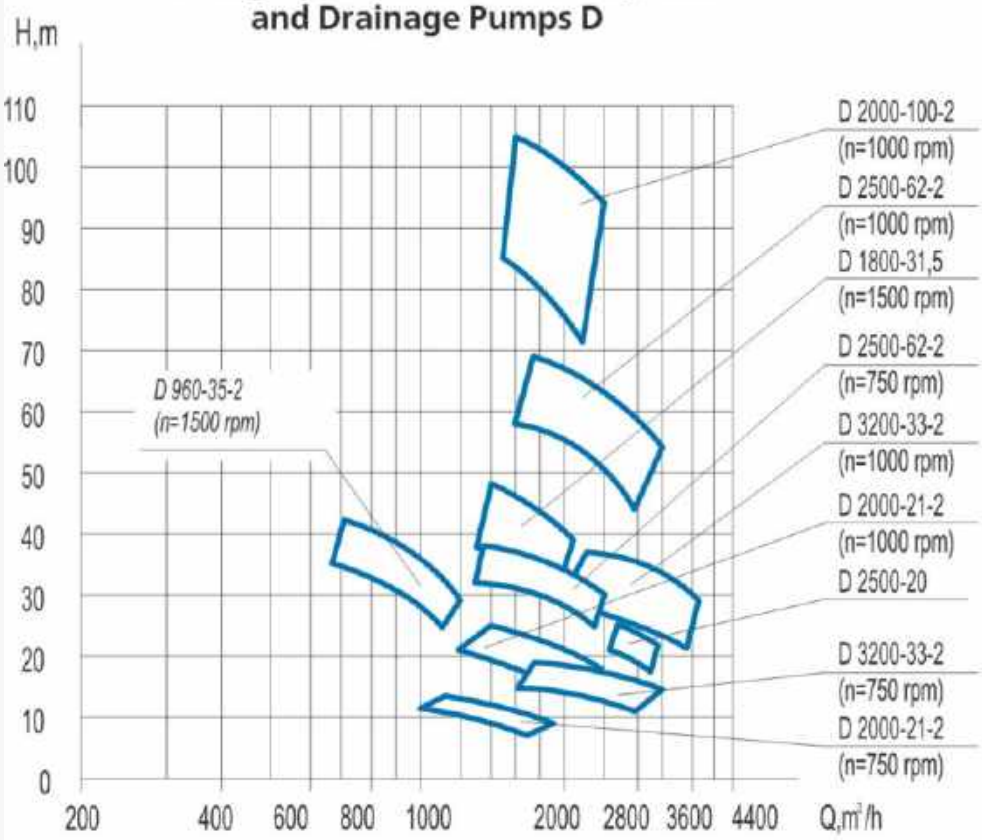
Additional and technical information.

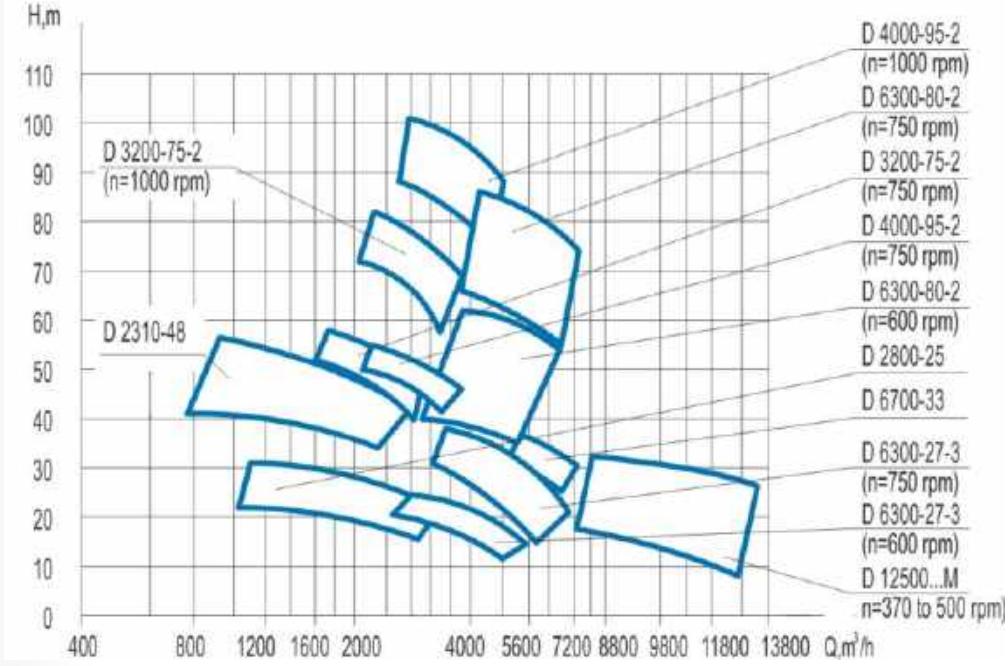
Pump make	Capacity, m^3/h	Head, m	Rotational speeД (synchr.), rpm	Motor nominal power, kW
Д 960-35	960	36	1500	132
Д 1800-31.5	1800	31,5	1500	315
Д 2000-21-2	2000	21	1000	160
Д 2000-21-2	1600	11	800	75
Д 2000-21a-2	1850	19	1000	132
Д 2000-21a-2	1500	10	800	55
Д 2000-216-2	1700	17	1000	110
Д 2000-216-2	1400	9	800	55
Д 2000-100-2	2000	100	1000	800
Д 2000-100a-2	1900	88	1000	630
Д 2000-1006-2	1800	80	1000	630
Д 2310-48Т3*	2310	48	100	500
Д 2500-62-2	2500	62	1000	630
Д 2500-62-2	2000	34	800	250
Д 2500-62a-2	2300	52	1000	500
Д 2500-62a-2	1900	29	800	250
Д 2800-25Т3*	2800	25	1000	315
Д 3200-33-2	3200	33	1000	400
Д 3200-33-2	2500	17	800	160
Д 3200-33a-2	3000	29	1000	315
Д 3200-33a-2	2400	15	800	132
Д 3200-336-2	2800	25	1000	315
Д 3200-336-2	2300	13	800	110

Pump make	Capacity, m^3/h	Head, m	Rotational speeД (synchr.), rpm	Motor nominal power, kW
Д 3200-75-2	3200	75	1000	1000
Д 3200-75-2	2500	42	800	400
Д 3200-75а-2	3000	65	1000	800
Д 3200-75а-2	2300	35	800	400
Д 4000-95-2	4000	95	1000	1600
Д 4000-95-2	3200	50	800	630
Д 4000-95а-2	3700	82	1000	1250
Д 4000-95а-2	3000	45	800	630
Д 6300-27-3	6300	27	800	630
Д 6300-27-3	5000	17	600	315
Д 6300-27-3-1	5000	32	800	630
Д 6300-27-3-1	4000	20	600	315
Д 6300-27а-3	5800	24	800	500
Д 6300-27а-3	4620	15	600	250
Д 6300-27б-3	5450	22	800	400
Д 6300-27б-3	4350	14	600	200
Д 6300-80-2	6300	80	800	2000
Д 6300-80-2	5000	50	600	1000
Д 6300-80а-2	5900	70	800	1600
Д 6300-80а-2	4700	45	600	800
Д 6300-80б-2	5500	60	800	1250
Д 6300-80б-2	4400	38	600	630
Д 6700-33	6700	33	800	800
Д 12500-10 М	12500	10	400	500
Д 12500-24 М	9300	32	500	1250
Д 12500-24 М	12500	24	500	1250

* – Tropicalized version

Coverage Chart of the Land Irrigation and Drainage Pumps D





CƎ Series Double Flow Axially Split

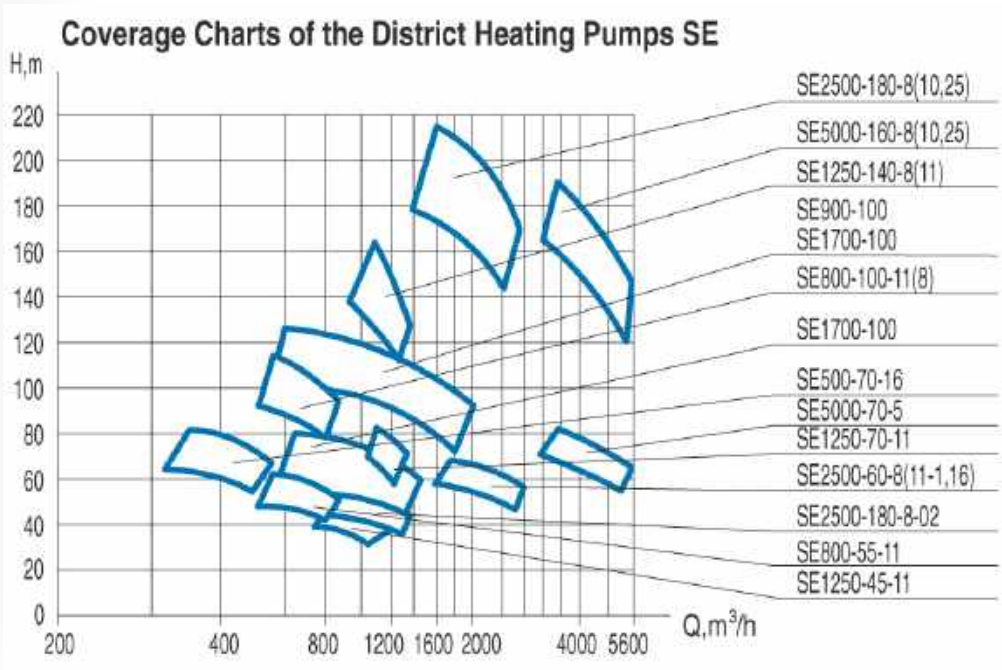
Installed in main plants for hot water circulation in the heating circuit systems within a whole district.

Electrically driven horizontal single stage or two-stage (with an interstage crossover for СЭ 800-100-11, СЭ 1250-140-11) axially split volute process centrifugal pumps between bearings, with one or two (in case of two-stage pumps) double entry radial impellers. Semicenterline casing support. The pump rotor is carried by the oil-ring or pressure lubricated plain or antifriction bearings. Shaft sealing: packed glands or mechanical seals.

Additional and technical information

Pump make	Capacity, m^3/h	Head,m	Rotational speed (synchr.), rpm	Motor nominal power, kW
СЭ 500-70-16	500	70	3000	160
СЭ 800-55-11	800	55	1500	200
СЭ 800-100-8	800	100	3000	315
СЭ 800-100-11	800	100	1500	315

Pump make	Capacity, m^3/h	Head,m	Rotational speed (synchr.), rpm	Motor nominal power, kW
СЭ 900-100	900	100	3000	250
СЭ 1250-45-11	1500	45	1500	200
СЭ 1250-70-11	1250	70	1500	315
СЭ 1250-140-8	1250	140	3000	800
СЭ 1250-140-11	1250	140	1500	630
СЭ 1700-100	1500	70	1500	600
СЭ 1700-100	1700	110	1500	600
СЭ 2500-60-8	2500	60	1500	630
СЭ 2500-60-11-1	2500	60	1500	630
СЭ 2500-60-16	2500	60	1500	630
СЭ 2500-160-8	2500	160	1500	1600
СЭ 2500-180-8	2500	180	3000	1600
СЭ 2500-180-8-02	1250	45	1500	250
СЭ 2500-180-10	2500	180	3000	1600
СЭ 2500-180-25	2500	180	3000	1600
СЭ 5000-70-5	5000	70	1500	1250
СЭ 5000-160-8	5000	160	3000	3150
СЭ 5000-160-10	5000	160	3000	3150
СЭ 5000-160-25	5000	160	3000	3150



КО, 2КО, 3КО, КОШ, 2КОШ

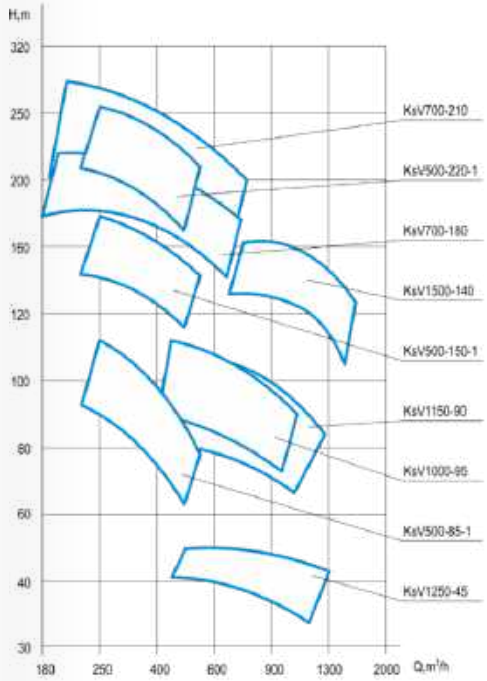
Used for pumping condensate in the steam and water circuit systems of the thermal power stations that burn organic fuel and to transfer water in heating plants and water supply systems.

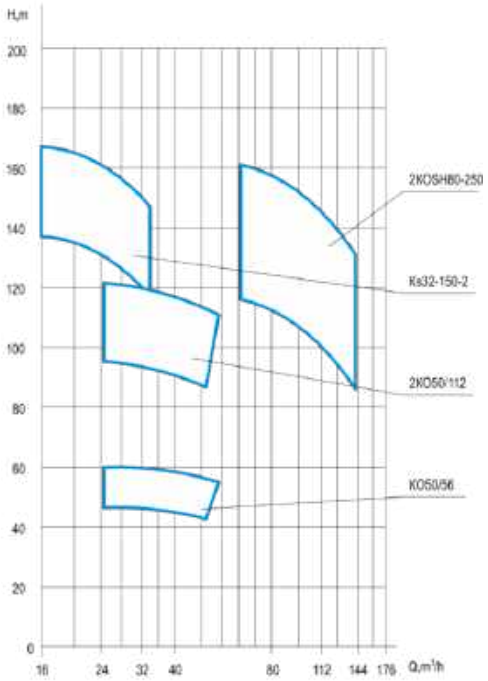
Flexibly coupled, electrically driven horizontal foot-mounted single-stage (КО, КОШ), double-stage (2КО, 2КОШ) or three-stage (3КО) end suction volute-casing centrifugal pumps with overhung impeller(s) and bearing bracket. КОШ, 2КОШ – pumps, equipped with inducers for low NPSHr value. The pump rotor is carried by grease-lubricated antifriction bearings. Shaft sealing: by a soft-packed gland or a mechanical seal.

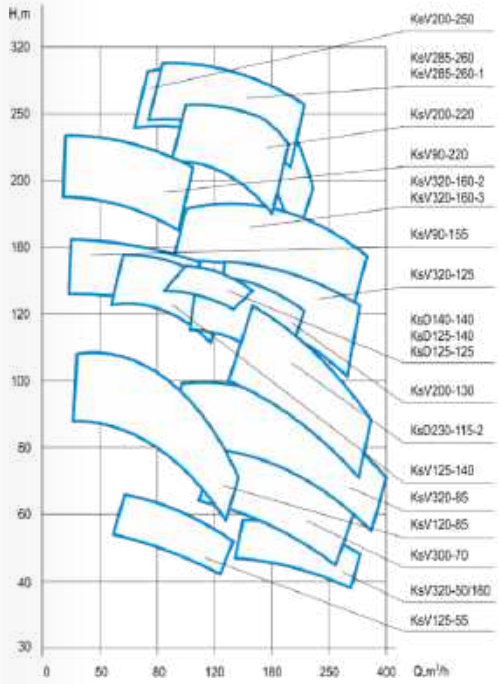
Additional and technical information

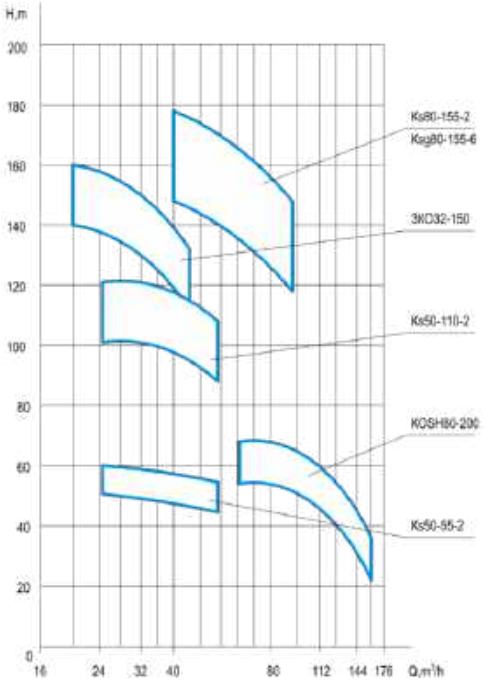
Pump make	Capacity, m^3/h	Head, m	Rotational speed, (synchr.), rpm	Motor nominal power, kW
КО 50/56	50	56	3000	15
КО 50/56а	50	48	3000	15
КО 50/56б	50	41	3000	15
2КО 50/112	50	112	3000	30
2КО 50/112а	50	97	3000	30
2КО 50/112б	50	80	3000	30
3КО32/150	32	150	3000	30
КОШ 80-200	125	55	3000	30
2КОШ 80-250	125	140	3000	75

Coverage Charts of the Condensate Extraction & Heater Drain Pumps
Ks, KsV, KO, KOSH and KsD









КсД

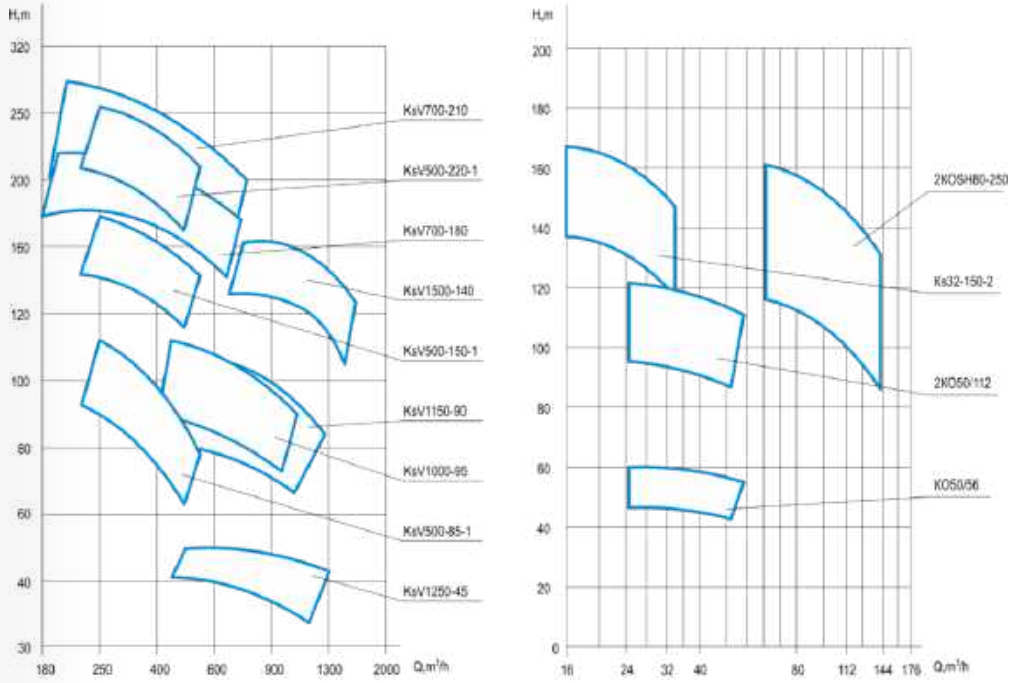
Designed for handling condensate in the steam and water circuit systems of the power stations that burn organic fuel, as well as liquids similar to condensate in viscosity, chemical activity and solid content.

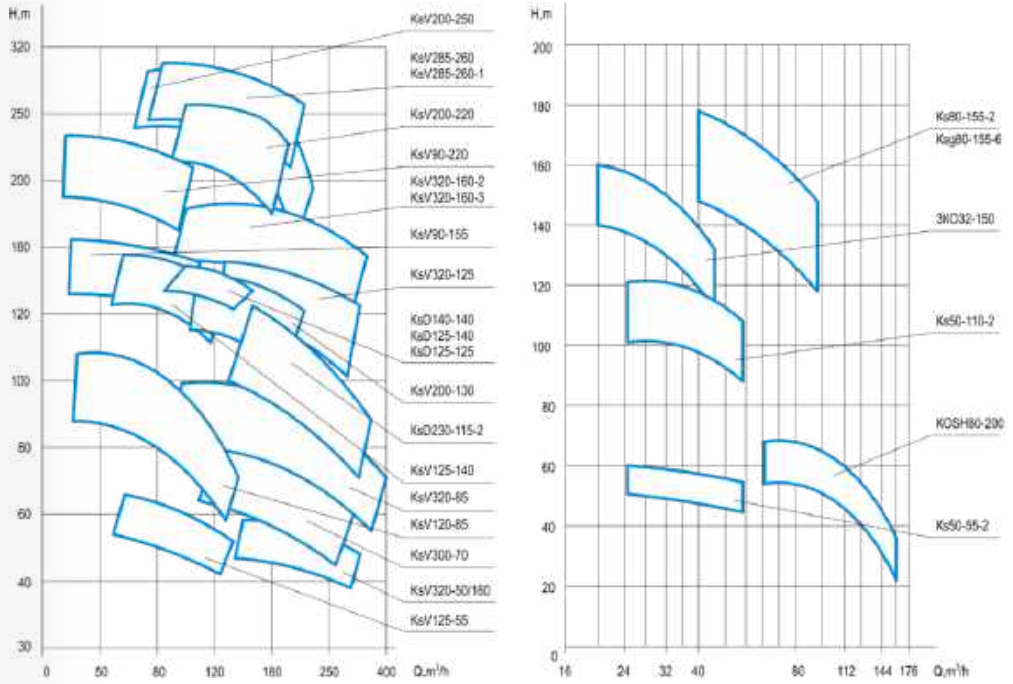
Electrically driven, horizontal three-stage, cross-over, axially split volute-casing centrifugal pumps between bearings, with the first-stage double-entry impeller and single-entry radial impellers in back-to-back arrangement. The pump rotor is carried by the anti-friction bearings. Shaft sealing: soft packed glands or mechanical seals.

Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed, (synchr.), rpm	Motor nominal power, kW
КсД 140-140	140	140	1500	110
КсД 125-140	125	140	1500	110
КсД 125-125	125	125	1500	90
КсД 230-115-2	230	115	1000	160
КсД 230-115а-2	210	95	1000	160

Coverage Charts of the Condensate Extraction & Heater Drain Pumps
Ks, KsV, KO, KOSH and KsD





Kc, Kcr

KC, KCr Series Inducer Horizontal Segmental, Between Bearings

Used for pumping condensate in the steam and water circuit systems of the thermal power stations that burn organic fuel and to transfer water in heating plants and water supply systems.

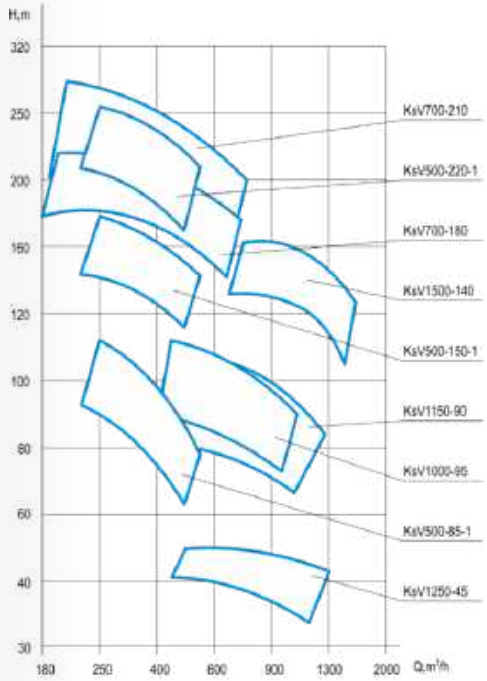
KC, KCr: Electrically driven horizontal single-stage (KC 50-55-2) or multistage ring section centrifugal pumps between bearings, with inducer and single entry impeller or impellers arranged one behind the other. Rotor axial thrust balancing by drum. The pump rotor is carried

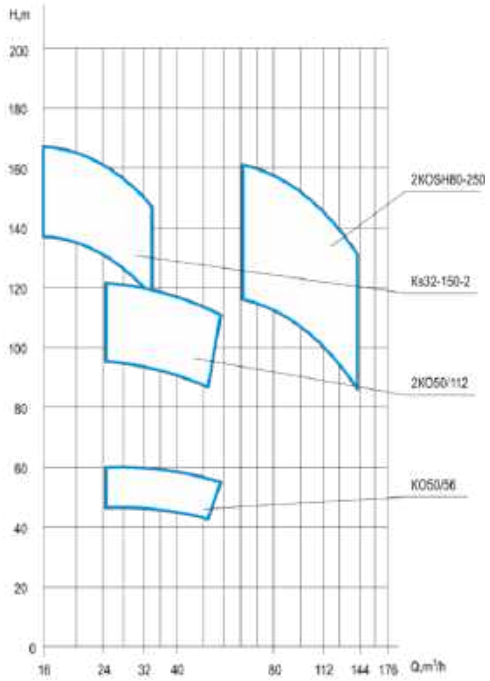
by the antifriction bearings (medium-lubricated internal plain bearings in case of KCr pump). Rotor axial thrust balancing by balance disc and balance disc seat Shaft sealing: packed glands or mechanical seals. Kc 1500-240-2: horizontal centerline-mounted, single-stage axially split volute casing centrifugal pump with a double entry impeller and horizontal nozzles located opposite inline. Radial forces and the residual rotor axial thrust are absorbed by forced oil lubricated plain bearings (one segmental thrust bearing and two radial bearings). Shaft sealing: by single mechanical seals.

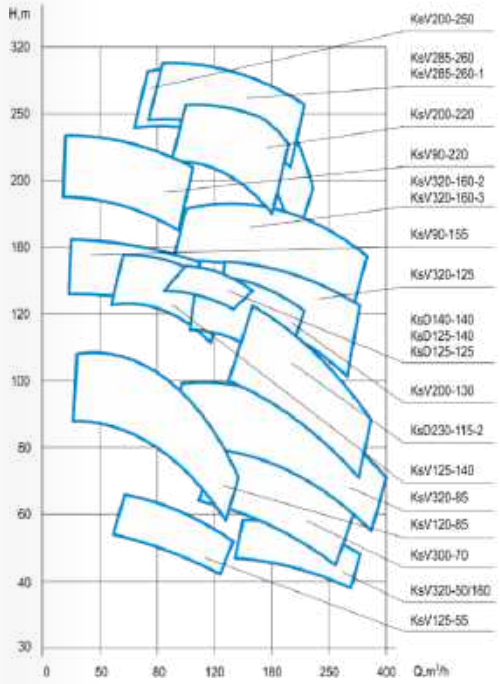
Additional and technical information

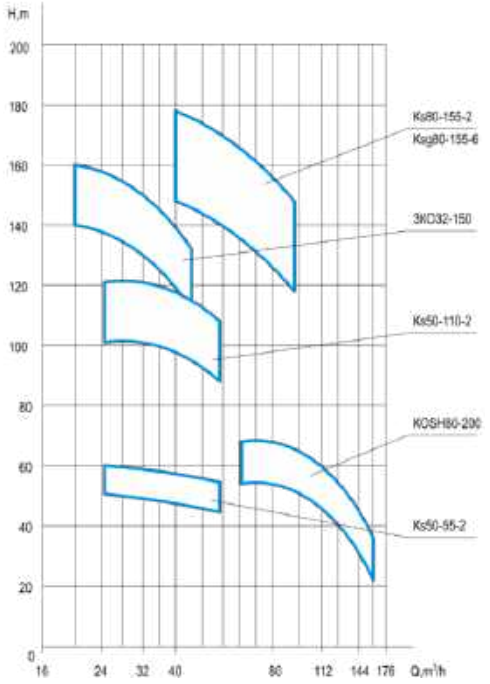
Pump make	Capacity, m3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
Kc 32-150-2	32	150	3000	22
Kc 50-55-2	50	55	3000	15
Kc 50-110-2	50	110	3000	30
Kc 80-155-2	80	155	3000	55
Kc 1500-240-2	1500	240	3000	1250
Kcr 80-155-6	80	155	2940	55

Coverage Charts of the Condensate Extraction & Heater Drain Pumps
Ks, KsV, KO, KOSH and KsD





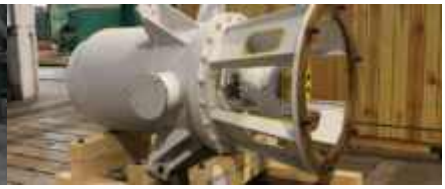




KcB

Used for pumping condensate in the steam and water circuit systems of the thermal power stations that burn organic fuel and to transfer water in heating plants and water supply systems .

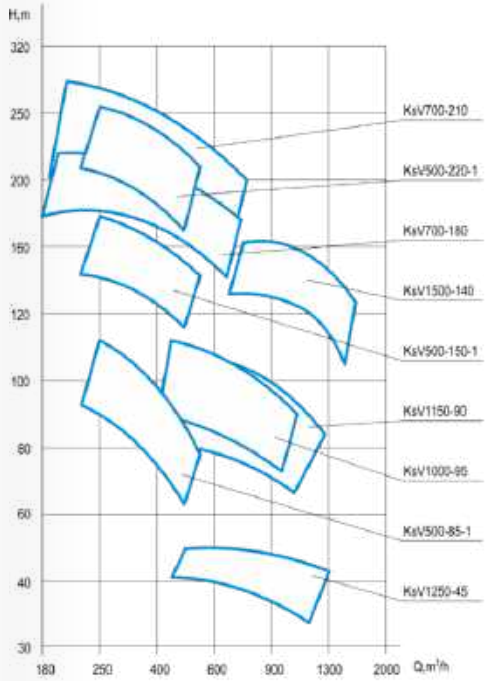
Additional and technical information

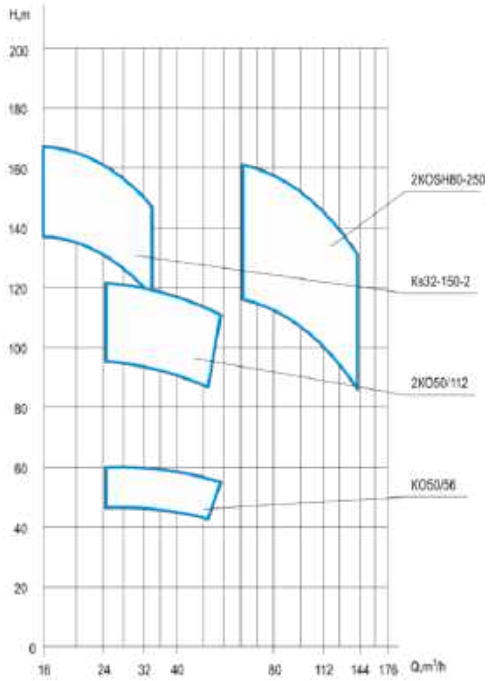


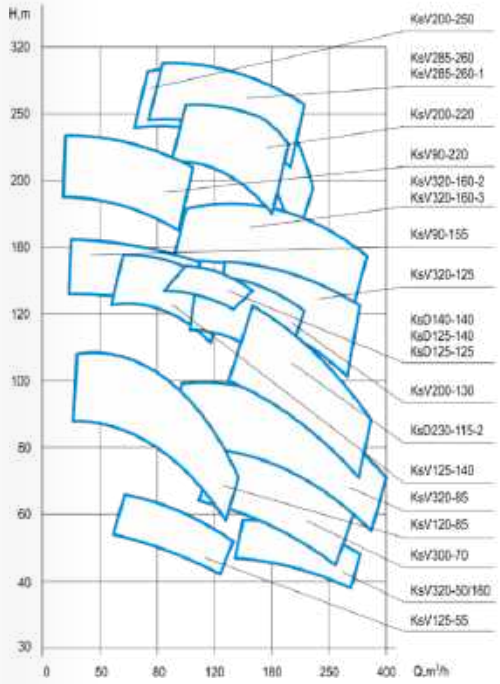
Pump make	Capacity, m^3/h	Head, m	Rotational speed, rpm	Motor nominal power, kW
KcB 90-155	90	155	3000	75
KcB 90-220	90	220	3000	110
KcB 120-85	120	85	3000	55
KcB 125-55-2	125	55	3000	30
KcB 125-55-2a	125	45	3000	30
KcB 125-55-2b	125	40	3000	30
KcB 125-55-2b	125	70	3000	30
KcB 125-55-2.4	125	55	3000	30
KcB 125-55a-2.4	125	45	3000	30
KcB 125-55b-2.4	125	40	3000	30
KcB 125-140-1	125	140	3000	75
KcB 125-140-2	125	140	3000	75
KcB 125-140-2a	125	125	3000	75
KcB 125-140-2b	125	100	3000	55
KcB 125-140-2.4	125	140	3000	75
KcB 125-140a-2.4	125	125	3000	75
KcB 125-140b-2.4	125	100	3000	55
KcB 200-130	200	130	3000	110
KcB 200-130a	200	115	3000	110
KcB 200-130b	200	99	3000	110
KcB 200-220	200	220	1500	250
KcB 200-220	145	203.4	1500	132
KcB 200-220	200	180	1500	250
KcB 200-220	150	180	1500	132
KcB 200-220	180	220	1500	250
KcB 200-220	200	190	1500	160
KcB 200-220-1	200	220	1500	250
KcB 285-260	336	260	1500	400
KcB 285-260-1	335	238	1500	400
KcB 300-70	230	70	1000	75
KcB 320-85	320	85	1500	132
KcB 320-85	200	100	1500	132
KcB 320-125	320	125	1500	160

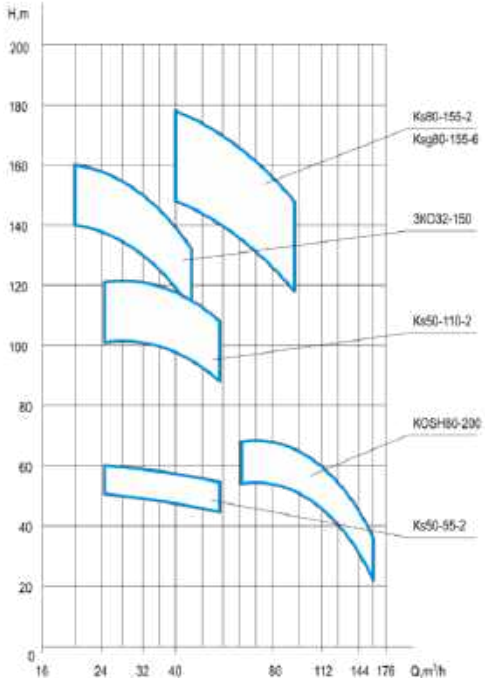
Pump make	Capacity, m^3/h	Head, m	Rotational speed, rpm	Motor nominal power, kW
KcB 320-50/160	320	50/160	1500	315
KcB 320-160-2	320	160/100	1500	250
KcB 320-160-3	320	160/100	1500	250
KcB 320-160-4	320	160/100	1500	250
KcB 500-85-1	500	85	1000	200
KcB 500-85-1	475	115	1000	250
KcB 500-150-1	500	150	1500	315
KcB 500-220-1	500	220	1500	500
KcB 700-180	700	180	1500	500
KcB 700-210	700	210	1500	630
KcB 1000-95	1000	95	1000	400
KcB 1150-90	1150	90	1500	500
KcB 1150-90a	925	90	1500	500
KcB 1250-45	1250	45	1500	250
KcB 1250-45a	975	45	1500	250
KcB 1500-140	1500	140	1500	100
KcB 1600-90	1000	90	1000	630

Coverage Charts of the Condensate Extraction & Heater Drain Pumps
Ks, KsV, KO, KOSH and KsD









ЦНСг, ЦНСгМ

Designed for handling water in hot water heating and water supply systems of industrial projects and public utilities (including the delivery of feed water into the small-size boilers).

Electrically driven horizontal ring-section multistage centrifugal pumps. The pump rotor is carried by the grease-lubricated antifriction bearings. Shaft sealing: packed glands.

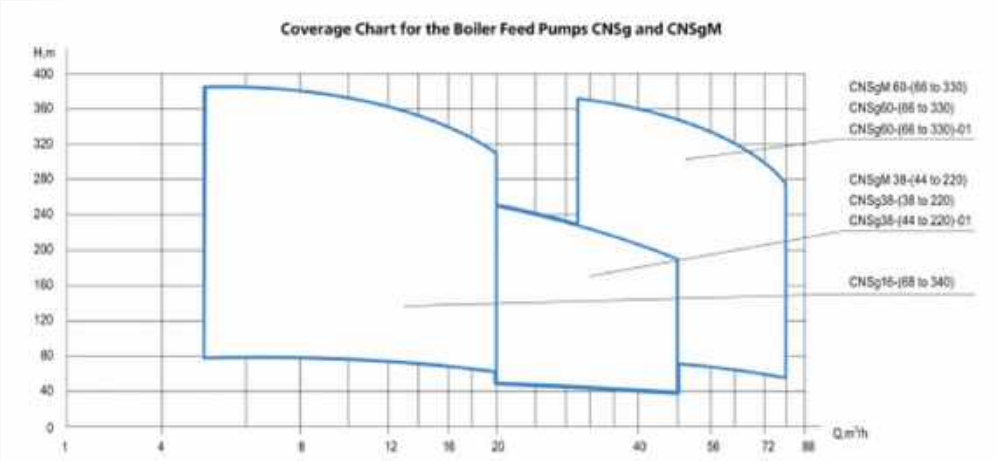
Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
ЦНСг 16-68	16	68	3000	7.5 (11)
ЦНСг 16-102	16	102	3000	11
ЦНСг 16-136	16	136	3000	15
ЦНСг 16-170	16	170	3000	18.5
ЦНСг 16-204	16	204	3000	22
ЦНСг 16-238	16	238	3000	30
ЦНСг 16-272	16	272	3000	30
ЦНСг 16-306	16	306	3000	37
ЦНСг 16-340	16	340	3000	37
ЦНСгМ 38-44	38	44	3000	11
ЦНСгМ 38-66	38	66	3000	15
ЦНСгМ 38-88	38	88	3000	22
ЦНСгМ 38-110	38	110	3000	22
ЦНСгМ 38-132	38	132	3000	22
ЦНСгМ 38-154	38	154	3000	30
ЦНСгМ 38-176	38	176	3000	30
ЦНСгМ 38-198	38	198	3000	37 (55)
ЦНСгМ 38-220	38	220	3000	37 (55)
ЦНСгМ 60-66	60	66	3000	22
ЦНСгМ 60-99	60	99	3000	30
ЦНСгМ 60-132	60	132	3000	55
ЦНСгМ 60-165	60	165	3000	55
ЦНСгМ 60-198	60	198	3000	55
ЦНСгМ 60-231	60	231	3000	75
ЦНСгМ 60-264	60	264	3000	75
ЦНСгМ 60-297	60	297	3000	110

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
ЦНСгМ 60-330	60	330	3000	110
ЦНСг 38-44	38	44	3000	11
ЦНСг 38-66	38	66	3000	15
ЦНСг 38-88	38	88	3000	18,5
ЦНСг 38-110	38	110	3000	22
ЦНСг 38-132	38	132	3000	30
ЦНСг 38-154	38	154	3000	30
ЦНСг 38-176	38	176	3000	30
ЦНСг 38-198	38	198	3000	37
ЦНСг 38-220	38	220	3000	45
ЦНСг 60-66	60	66	3000	22
ЦНСг 60-99	60	99	3000	30
ЦНСг 60-132	60	132	3000	45
ЦНСг 60-165	60	165	3000	55
ЦНСг 60-198	60	198	3000	55
ЦНСг 60-231	60	231	3000	75
ЦНСг 60-264	60	264	3000	75
ЦНСг 60-297	60	297	3000	90
ЦНСг 60-330	60	330	3000	110
ЦНСг 38-44-01*	38	44	3000	11
ЦНСг 38-66-01*	38	66	3000	15
ЦНСг 38-88-01*	38	88	3000	18,5
ЦНСг 38-110-01*	38	110	3000	22
ЦНСг 38-132-01*	38	132	3000	30
ЦНСг 38-154-01*	38	154	3000	30
ЦНСг 38-176-01*	38	176	3000	30
ЦНСг 38-198-01*	38	198	3000	37
ЦНСг 38-220-01*	38	220	3000	45
ЦНСг 60-66-01*	60	66	3000	22
ЦНСг 60-99/4	27	25	1500	4
ЦНСг 60-99-01*	60	99	3000	30
ЦНСг 60-132-01*	60	132	3000	45
ЦНСг 60-165-01*	60	165	3000	55
ЦНСг 60-198-01*	60	198	2940	55

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power, kW
ЦНСг 60-231-01*	60	231	3000	75
ЦНСг 60-264-01*	60	264	3000	75
ЦНСг 60-297-01*	60	297	3000	90
ЦНСг 60-330-01*	60	330	3000	110

* Explosion-proof version



ПЭ Series

Designed for delivering treated water (feed water) into stationary steam boilers of the conventional (fossil-fueled) thermal power stations as well as to supply feedwater into waste-heat boilers at the power stations with combined-cycle and steam power plants.

Motor driven horizontal multistage diffuser centrifugal pumps of segmental or barrel type with a withdrawable cartridge of ring-section type. Single flow impeller arrangement, with all the impellers facing the same way. May be operated both at the constant and variable speed of rotation. The pump rotor is carried by the oil-ring or pressure lubricated plain bearings. Shaft sealing: packed glands or mechanical seals.

At the Customer's request, the following options can be provided:

- Such a construction of studs for casing main joint that enables the use of hydraulic jacks (wrenches) for pre-tensioning the studs by making them only elongate before nuts screwing-on, thus avoiding torsional stresses arisen and ensuring their accurate and even tightening-up;
- Equipping with a balance disc-from-seat separation device to ensure the guaranteed axial gap in the balancing device, thus holding pump rotor unbound both during standstill and at start-ups.

Additional and technical information

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power,kW
ПЭ 20-16	20	172	3000	30
ПЭ 50-70	35	530	3000	160
ПЭ 63-90	60	930	3000	250
ПЭ 65-28	65	290	2900	110
ПЭ 65-40	65	440	3000	132
ПЭ 65-40	25	480	3000	110
ПЭ 65-40-1	51	425	3000	132
ПЭ 65-40-1	65	580	3000	200
ПЭ 65-40-1	70	501	3000	160
ПЭ 65-40-1	80	580	3000	250
ПЭ 65-53	65	580	3000	200
ПЭ 65-53	54.14	617.83	3000	200
ПЭ 65-53	51.7	615.4	3000	200
ПЭ 65-53	80	500	3000	200
ПЭ 90-110	90	1100	3000	500
ПЭ 90-110	100	1100	3000	500
ПЭ 90-180	90	1900	3000	1000
ПЭ 100-32	100	330	3000	160
ПЭ 100-53	80	580	3000	315
ПЭ 145-30	145	293	3000	200
ПЭ 150-53	150	580	3000	500
ПЭ 150-63	150	700	3000	500
ПЭ 160-140	160	1400	3000	1000
ПЭ180-80	180	887	3000	630
ПЭ 180-140	180	1450	2900	1000
ПЭ 240-105	240	1140	3000	1250
ПЭ 240-110	240	1210	3000	1250
АПЭ 260-100	260	960	3000	1000
ПЭ 250-190	250	1950	3000	2000
ПЭ 270-150-3	270	1650	3000	2000
ПЭ 270-150-4	250	1850	3000	2000
ПЭ 270-150-4	248	1524	3000	1600
ПЭ 275-100	275	1100	2970	1250

Pump make	Capacity, m^3/h	Head, m	Rotational speed (synchr.), rpm	Motor nominal power,kW
ПЭ 310-100	310	1100	3000	2000
ПЭ 310-110	310	1200	3000	2000
ПЭ 310-140	310	1550	3000	2000
ПЭ 310-160	310	1750	3000	2000
ПЭ 315-130	315	1394	3000	1600
ПЭ 315-140	315	1520	3000	2000
ПЭ 315-150	315	1647	3000	2000
ПЭ 315-175	315	1900	3000	2500
ПЭ 350-45	350	460	3000	630
ПЭ 380-185-5	380	2030	3000	3150
ПЭ 380-200-5	380	2190	3000	3150
ПЭ 400-185	400	1900	3000	3150
ПЭ 500-180-5	500	1950	3000	4000
ПЭ 560-315-1	560	3500	6000	8000
ПЭ 580-185-5	580	2030	3000	4000
ПЭ 580-195-5	580	2150	3000	5000
ПЭ 600-300-4	600	3290	6300	8000
ПЭ 600-300-5	600	3290	6300	8000
ПЭ 640-360	640	3670	6000	7000
ПЭ 710-280	710	280	3000	800
ПЭ 720-185-3	720	2030	3000	5000
ПЭ 720-185-4	780	2030	4500	6300
ПЭ 720-185-4	735	2030	3000	6300
ПЭ 720-185-4	740	2250	3000	6300
ПЭ 720-185-4	872	2052	3000	6300
ПЭ 720-185-6	720	2030	3000	5000
ПЭ 720-185-7	720	2030	3000	5000

Coverage Chart for the PE Series Boiler Feed Pumps