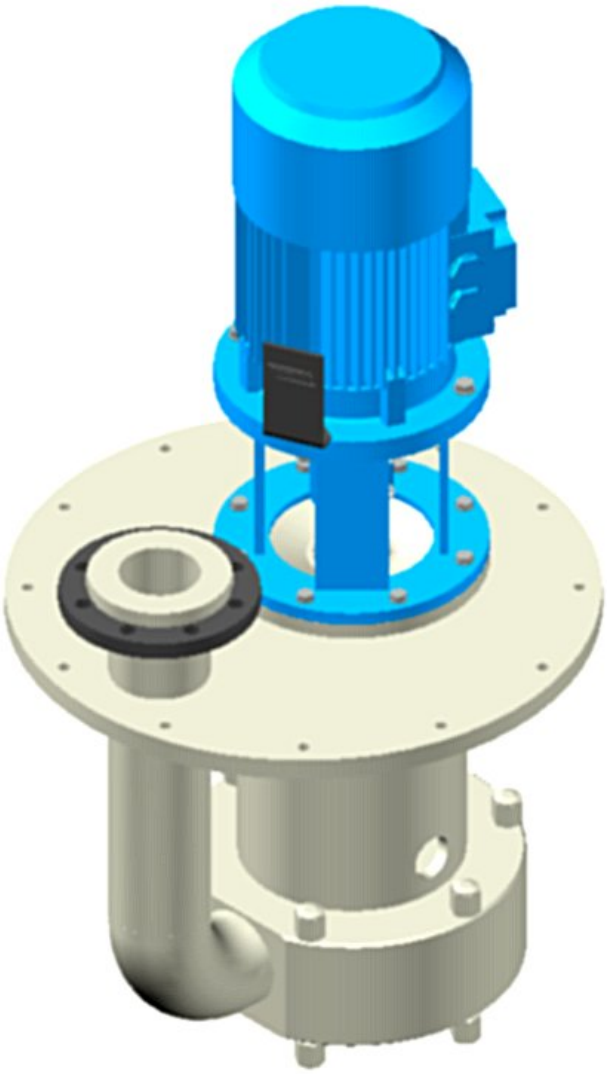
Chemical immersion pumps series D4 in PP

Operation and maintenance manual



CE

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14. Declaration of conformity

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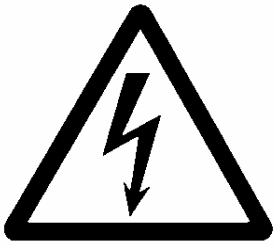
1. Safety Instructions

This manual contains safety instructions that have to be noticed before mounting, operation and maintenance of the pump.
Therefore it is necessary that this manual has to be read first before mounting and using the pump. The manual should be right in place of the pump.

1.1 Notices of safety instructions in this manual

Safety notices which could injure **human health** are marked in this manual with the following symbols:

General Symbol for Danger



Symbol for Electrical Danger (High Voltage)

Safety notices which could **damage the pump and the correct function** are marked with the word:

Attention!

Signs/Markings like:

- Marking of rotation direction (directional arrow)
- Type designation sign

Have to be always mounted on the pump and must be readable.

1.2 User qualification and training

Users must be qualified for operation, maintenance, inspection and mounting. If necessary don't hesitate to contact us for any questions in service or for training mechanics. Furthermore it must be sure that this manual is understood by the user.

1.3 Danger by non-observance of the safety instructions

Non-observance of the safety instructions could injure human health and also damage the pump and the correct function of it. In some cases (if running the pump with aggressive media) the environment could also be damaged. Non-observance could be a reason for no guarantee in the guarantee-period.

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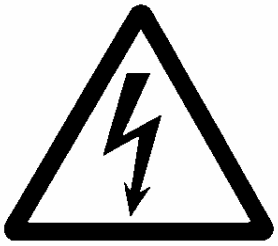
1.4 Secure working

All in these manual mentioned safety instructions have to receive attention. Especially if there are special safety instructions of the client and the plant where the pump is operating.

1.5 Safety notices for the user

- It is not allowed to remove the PVC-Transparent-Cover mounted on the motor flange that protects the coupling and lip-sealing of the pump during operation.
- By any leakage of the pump (e.g. at the lip-sealing or any pipe) the pump has to be stopped immediately.
- It has to be sure that there is no danger of high voltage at the three-phase motor (open connection box etc.)



The three-phase-motor contains during operation dangerous electric and turning parts. Always take care of the proper installation and the manual of the manufacturer.

1.6 Safety notices for maintenance, control and mounting

The owner has to take care that all maintenance, control and mounting operations has to be done by qualified technicians.
These technicians must read this manual first before executing any service at the pump.
Generally any service concerning the pump must be done when the pump is turned off and is secure not to be turned on during inspection.
Pumps that are working with aggressive media must be cleaned up before any service. After working on the pump all security equipment has to be mounted on the pump again.

1.7 Unauthorized modification and spare parts

Any modifications or changes to the pump are not allowed without a written permission of the manufacturer. Always use original spare parts of the manufacturer. Also standard parts have special requirements in some cases.

The usage of other parts could damage the pump and human health and is a reason for no guarantee in the guarantee-period.

1.8 Improper operation

To ensure safety operation it must be sure that the pump is operating with the correct media and operation data. It has to be sure that flow rate and head of the pump does not exceed the data stated in the performance curves. If the three-phase motor contains thermistors they should be connected to ensure the maximum of safety.

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2. Guarantee

2.1 Guarantee conditions

Guarantee can only be ensured if the following conditions are fulfilled:

- Correct mounting and installation, usage and operation as stated in this manual
- Usage of the pump only in the allowed operation area and performance data
- Direct announcement to the manufacturer of any damage concerning the pump
- The pump is only used for the purposes it is defined for
- Any change of the performance data are not allowed
- Only original spare parts have to be used
- It must be sure that this manual is understood by the operator / user
- Technical modifications are subject to change
- This manual must be always in place of the pump
- The immersion pump must be safe from frosty areas
- All turning parts of the pump like the motor, slidering-sealing, shaft and impeller are excluded from the guarantee

2.2 Copyright

2.3 Guarantee

We can only give guarantee for the durability of the materials, if we know the exact operational conditions. The guarantee period for the pump itself is 24 months after delivery, all rotating parts like the motor, the shaft, V-Ring Seal and the impeller are excluded from the guarantee. We ask you to make yourselves conversant with these operation instructions prior to assembly and the start up operations. We cannot assume any responsibility for damage caused by negligence. Modifications and repairs can only be undertaken during guarantee period by our fitters or if we give our written consent.

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3. General and range of application

3.1 Range of application

Immersion pumps series D4 are single stage pumps for vertical usage. They are suitable for the handling of aggressive, low viscosity liquids such as acids, alkaline solutions, solvents, sea water, demineralised water and many others.

These pumps can be run dry safely and are not sensitive to fluids containing solids. They can be used under highly corrosive conditions wherever conventional materials like e.g. stainless steel only permit a short working life. The pumps are used as feed pumps, recirculation pumps, filtration pumps and discharge pumps.

Attention! **The working temperature of the pump is maximum +80 °C**

Attention! **By working with a different liquid as known please contact us immediately.**

3.2 Structure and mode of action

The impeller is made as closed impeller as standard. The impeller is driven by a pump shaft which is covered with PVC or PP. All other parts in plastic are made of PP as standard. The motor flange, coupling and shaft are made of steel, painted/covered with chemical resistant color. All boltings are made of A2-70 (stainless steel) as standard. All parts are welded together or fixed with boltings.

3.3 Impeller

The immersion pumps series D4 can be delivered with different impeller diameters, according to the performance which is needed (see also performance curves):

Type	Impeller diameter [mm]					
	a Ø	b Ø	c Ø	d Ø	e Ø	f Ø
D4 32-125	100	110	115	-	-	-
D4 32-200	-	-	180	190	200	-
D4 50-160	140	155	-	-	-	-
D4 50-200	-	170	180	195	-	-
D4 65-250	220	230	240	250	-	-
D4 50-315	260	270	280	290	300	315
D4 80-315	260	270	280	290	300	315

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3.4 Sealings

The shaft is sealed with a nearly maintenance free lip seal made of FPM, which is sliding on a slide ring made of 1.4571 (stainless steel). This slide ring is also available in highly resistant synthetic carbon.

All other sealings are O-Ring sealings also made of FPM as standard. EPDM sealings available on request.

3.5 Motor

Motor drives are mainly three phase motors from ABB Motors. If the motor is provided by the client, we take over no responsibility for the proper work of the pump and its safety, especially if the motor is mounted by the client by self.

By replacing the motor or bearings it must be ensured that the bearings are axially locked. Further, bearings have to be with the extension “C3” (higher bearing clearance). For assistance don’t hesitate to contact our customer service to avoid problems.

3.6 Accessories

3.6.1 Suction pipe extension

The pumps can be equipped with a suction pipe extension for e.g. deep containers, sumps etc. Extensions can reach up to 1500 mm without any loss of performance. Larger extensions need to be confirmed and calculated by the manufacturer.

Always take care of the minimum liquid level at start of the pump. (See the desired dimension sheet for data)

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4. Description

4.1 Description

The Hendor immersion pumps series D4 is signed with the European safety mark **CE**, according to the following European guidelines:

- **89/392/EWG** dated 14.06.1989
- **91/368/EWG** dated 20.06.1991
- **93/44/EWG** dated 14.06.1993
- **98/37/EG** dated 22.06.1998

HENDOR immersion pumps series D4 are available in the following executions:

Type	rpm [min^{-1}] 50 Hz / 60 Hz	Motor power [kW] 50 Hz / 60 Hz
D453	1450 / 1740	7,5 / 8,6
D455-D456	1450 / 1740	11,0 - 15,0 / 12,5 - 17,0
D465-D466	1450 / 1740	11,0 - 15,0 / 12,5 - 17,0
D467-D468-D469	1450 / 1740	18,5 - 30,0 / 25,3 - 34,5

4.2 Properties

- No sealings or bearings in the liquid area (pump is able to operate dry without liquid)
- Pump shaft sealed against aggressive vapors with maintenance lip seal made of FPM.
- Impellers made injection molded as enclosed impellers as standard
- No special drive motors needed
- Independent in the direction of rotation (no damages to the pump)

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5. Mounting

5.1 Transport

Transport must be done with care – the pump is top-heavy on the motor side. If moving the pump with a crane, you should use the lifting eyes of the motor.

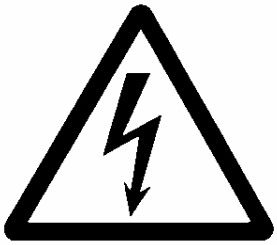
5.2 Examination

On receipt of the pump we ask you to examine whether any damage has been caused during transit. If damage has taken place in transit, even if the packing is not damaged, you should immediately request a claim form from the rail- or post-office or forwarder and send this to us with the original consignment note and declaration of assignment. Otherwise a replacement cannot be provided.

5.3 Storage

Storage of the pump must be in an area that is free of frost. Cover the pump with suitable material like film etc. Further it must be sure that pump is totally cleaned up from the media that has been feed.

5.4 Mounting



If the pump is operating in an outside area, the motor must be covered with a motor-cover which is available by the manufacturer of the motor to protect from rain.

5.4.1 Pump

Dimensions of the built-in opening as stated in the dimensions sheets.

Attention! **By mounting it must be sure that the pump can always operate smoothly and without any vibration.**

The pump flange and the built-in opening are to be fixed with suitable boltings and sealed with a suitable sealing, for e.g. O-Ring sealing or flat gasket.

The distance between suction side or suction extension to the bottom of the container / sump must be at least one dimension of the suction nominal size.

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5.4.2 Piping

Pressure pipelines must be laid in such way that there is no danger whatsoever of straining the pump. They must be supported in such way by mounting that they neither strain the pumps nor cause them to vibrate during operation. Special care must be taken to see that the flange nuts are tightened uniformly.

5.4.3 Pressure pipe

In the pressure line immediately behind the pump a control valve has to be fitted, with this the flow rate can be regulated and the required pressure obtained. Please note that the pressure piping should be at least one nominal size larger then the discharge size of the pump to avoid pressure losses.

Into long pressure lines an installation of a return check valve between pump and regulation valve should be mounted.

5.4.4 Examination of the piping

Before setting to operation of the pump the pipelines should be cleaned of foreign bodies which may have entered the pipe lines during assembly. Afterwards the pipe lines should be tested in accordance with the safety regulations.

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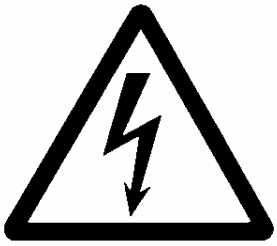
6. Electric Connection

6.1 General / Prerequisite



The connection must be done by an authorized electrician only. All local guidelines need to be noticed. The connection is to be executed according to the manual of the motor manufacturer. The motor type label is located on the motor, or inside the terminal box. Before connecting the electric motor, the supply voltage at the place of installation must be switched off completely.

Attention must be given to the following:

- Connection only according to the local guidelines
- The stipulations of guideline VDE 0100
- The applicable regulations of the public provider of electricity
- The work may be done only by a recognized, trained and authorized electrician in compliance with the instructions provided by the motor manufacturer.
- The mains voltage and frequency at the place of installation must correspond to the specifications on the motor type label.
- The power supply cable must be protected against damage and dimensioned correctly according to the relevant power rating
- The motor must be protected against damage which may occur due to short circuit, overload or single-phase operation, by connecting sufficiently dimensioned motor protective switches or contactors with thermal overload relay. The thermal overload relay must be adjusted for the current rating specified on the motor type

6.2 PTC Thermistors

If the motor is equipped with thermistor protection, note that the thermistor protection consists of three or six PTC resistor temperature sensors, which are integrated in the motor stator winding. The PTC resistor temperature sensors are connected in series.
Connection to the on-site tripping unit is either at two additional terminals marked accordingly on the terminal board, or at a luster terminal in the terminal box.

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7. Startup

7.1 Before the test start

Before starting the correct rotational direction should be tested by switching-on the motor for a short Period (1-2 seconds). The direction is indicated by a directional arrow on the pump and/or the motor. A wrong rotational direction causes no damage to the pump.

When starting, the following should be attended:

- The valve on the pressure side should be left slightly open
- Switch on the motor
- Open the regulating valve on the pressure side until the wished operational point is reached

7.2 Operation

Generally the following is to be attended:

- The pump should always operate smoothly and without vibration.
- The minimum feed level of the pump may not be lowered when starting
- The motor must not be allowed to operate under the nominal overload conditions; the nominal load capacity is indicated on the name plate
- Care must be taken to ensure that the liquid does not exceed the max. operational temperatures specified for the materials being used. Max. operational temperature for D4-immersion pumps from PP: +80°C.
- D4 pumps are able to run dry without liquid media

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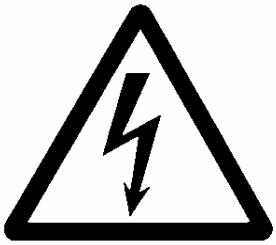
8. Maintenance

8.1 General Notices



Attention to Chapter 7.1

Attention!

All maintenance must be done by switched-off motor !

Exception: Control of smooth running of the motor

8.2 Maintenance

In accordance to the liquid the pump comes in contact with it could be necessary to clean the pump by time. This interval must be experienced. We recommend checking up the pump monthly for the first time in operation to set an interval for cleaning. The pumps are not sensitive to fluids containing solids.

8.3 Maintenance of the sealings

Sealings are normally maintenance-free, but should be checked once a year for possible damages caused from aggressive media. Attention must be given especially the V-Ring Lip-Seal, in accordance to the liquid and vapors it could be that it is needed to exchange the seal after years of operation.

8.4 Impeller

The impeller should be inspected once a year for possible cracks. A cracked impeller has to be exchanged at once, because this could cause more damage on the pump case and all related parts to the pump.

8.5 Three phase motor

For maintenance of the bearings see the manual of the motor-manufacturer.

8.6 Mounting flange with support pipe and pump housing

These parts should be inspected once a year for possible cracks. Damaged piping or wildings have to be repaired or exchanged immediately.

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9. Repair

9.1 General

If there is any malfunction during operation of the pump, we recommend the "First Check Up List" (see **9.2**).

If the fault can not be solved, we would welcome to contact our service for further assistance.

Attention!

Faulty mounting and maintenance could cause damage and loss of performance of the pump.

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9.2 First Check up List

Malfunction	Possible reason	Solution
Pump running noisy	Impeller damaged	Check the impeller, if damaged contact our service
	Layer of dirt on the impeller	Remove the dirt smoothly
	Impeller cracked	Contact our service
	Deforming of impeller due to overheat	Contact our service
Motor-Bearings running noisy	Motor-Bearings damaged or worn out	Exchange the bearings, or contact the manufacturer or exchange the motor
Low Flow rate and Head	Wrong rotational direction of the impeller	Change the rotational direction
	Foreign bodies in the pump like paper, dusters etc.	Remove foreign bodies
	Valves not fully opened	Control the valves
Motor does not reach full rotation	Motor possibly damaged / faulty connection of the motor	Check the electric connection
Motor automatically switched off by Motor-Protection switch	Wrong rotational direction of the impeller	Change the rotational direction
	Motor running only on 2 phases	Check the electric connection
	Impeller fixed in pump case	Check the impeller, contact our service

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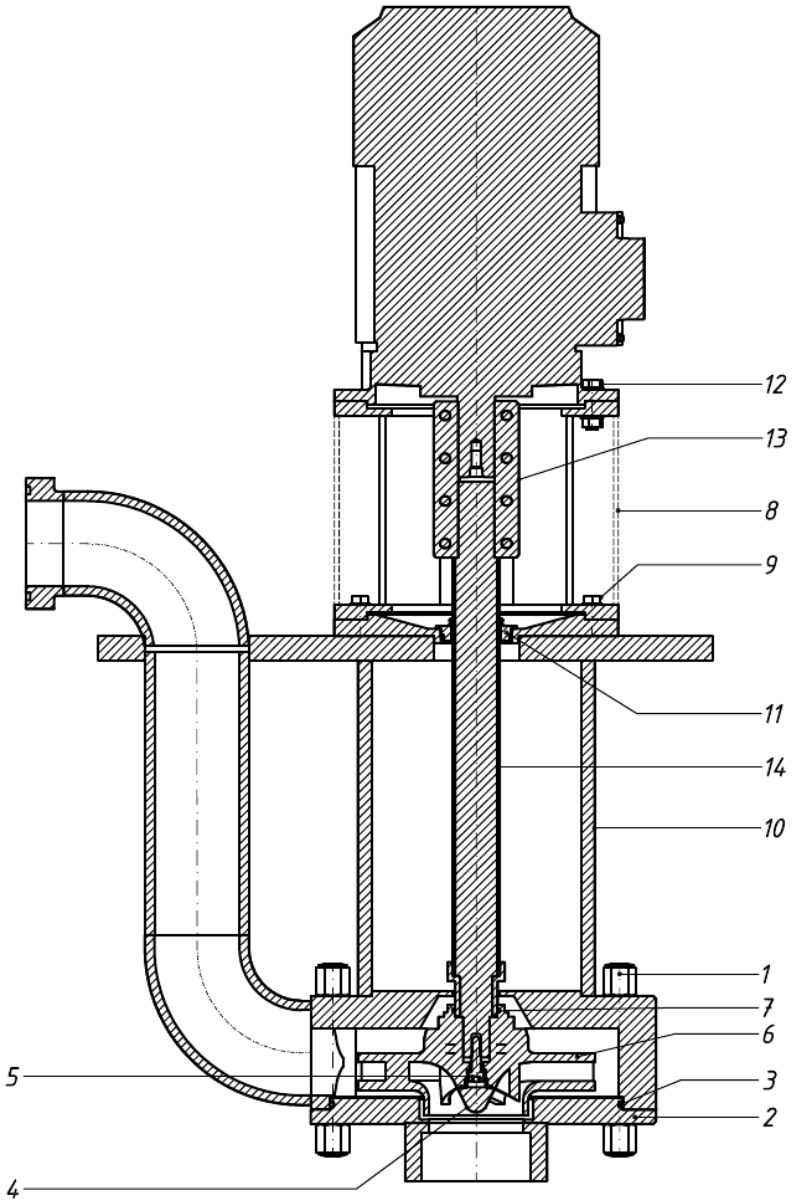
9.3 Dismantling pump Type D453



1 Remove pump cover bolting (1)
2 Remove pump cover (2) smoothly
3 Check O-Ring-Sealing (3)
4 Remove impeller cap (4) and check O-Ring-Sealing
5 Remove bolt (5)
6 Remove impeller (6) smoothly
7 Check O-Ring-Sealing (7)
8 Remove protective cover (8)
9 Remove bolting of the motor flange (9)
10 Remove motor with motor flange and shaft (14) including the slide ring and lip seal (11) (motor on bottom)
11 Remove bolting of the motor/motor flange (12)
12 Remove bolting of the coupling (13)
13 Remove shaft (14) smoothly

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9.4 Dismantling pump Type D455 - D456

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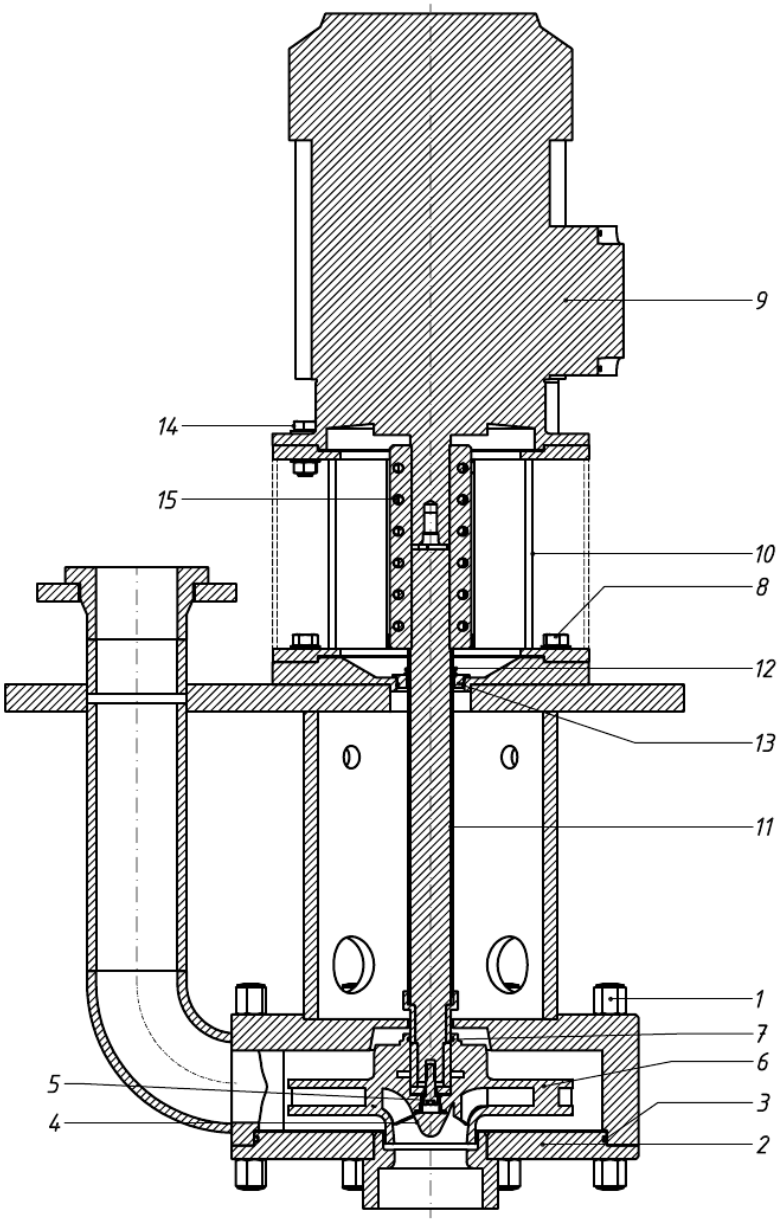
9.5 Dismantling pump Type D465 - D466



1 Remove pump cover bolting (1)
2 Remove pump cover (2) smoothly
3 Check O-Ring-Sealing (3)
4 Remove impeller cap (4) and check O-Ring-Sealing
5 Remove bolt (5)
6 Remove impeller (6) smoothly
7 Check O-Ring-Sealing (7)
8 Remove protective cover from the motor flange
9 Remove bolting of the motor flange (8)
10 Remove motor (9) with motor flange (10) and shaft (11) including the slide ring (13) and lip seal (12) (motor on bottom)
11 Remove bolting of the motor/motor flange (14)
12 Remove bolting of the coupling (15)
13 Remove shaft (11) smoothly

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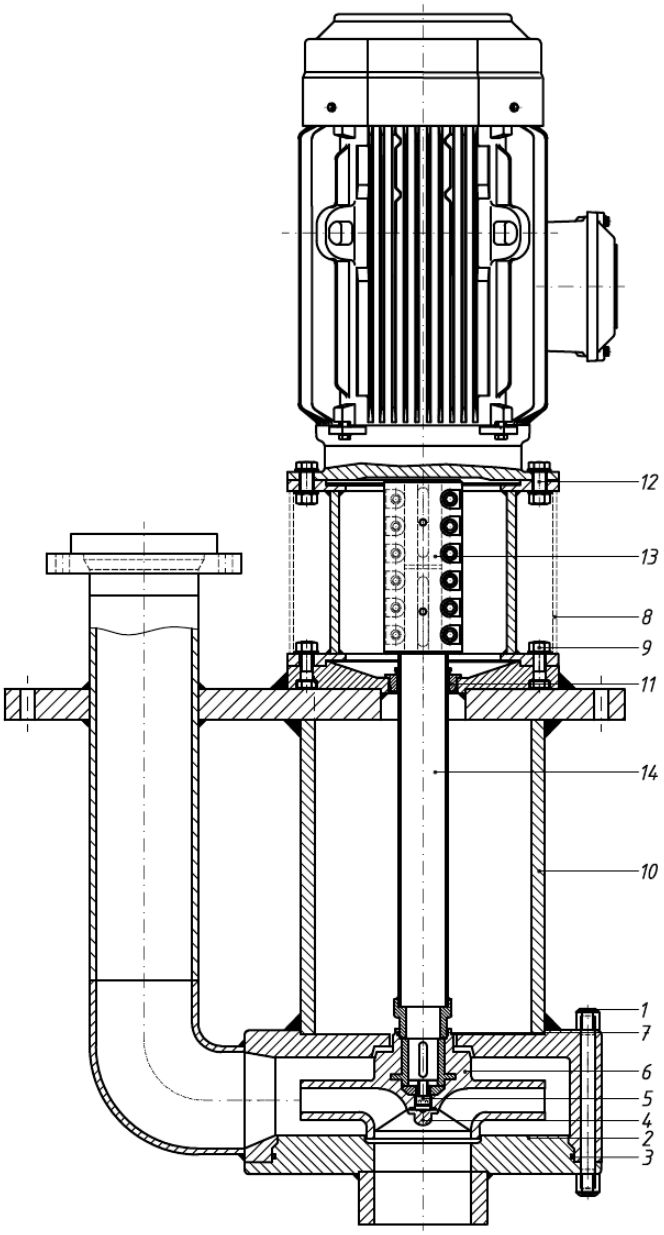
9.6 Dismantling pump Type D467 - D468 - D469



1 Remove pump cover bolting (1)
2 Remove pump cover (2) smoothly
3 Check O-Ring-Sealing (3)
4 Remove impeller cap (4) and check O-Ring-Sealing
5 Remove bolt (5)
6 Remove impeller (6) smoothly
7 Check O-Ring-Sealing (7)
8 Remove protective cover (8) from the motor flange
9 Remove bolting of the motor flange (9)
10 Remove motor with motor flange and shaft (14) including the slide ring and lip seal (11) (motor on bottom)
11 Remove bolting of the motor/motor flange (12)
12 Remove bolting of the coupling (13)
13 Remove shaft (14) smoothly

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9.7 Re-Assembling the parts

The re-assembling of the parts must be done in reverse order.

9.8 Recycling

In case of using aggressive liquid with the pump damaged parts are possibly special waste and must be recycled in accordance to the local guidelines.

10. Standards and noise emission

10.1 Standards

EG-Guideline for Machines:

89/392/EWG
91/368/EWG (Revision 1)
93/44/EWG (Revision 2)
98/37/EG (Revision 3)

EG-Guideline Low Voltage:

73/23/EWG
93/68/EWG (Revision 1)

EG-EMV-Guideline:

89/336/EWG
92/31/EWG (Revision 1)
93/68/EWG (Revision 2)

Centrifugal Pumps and plants:

DIN 24 260

Centrifugal Pumps – Technical Information:

DIN 24 293

10.2 Noise emission

The following values are in accordance to the noise emission resulting of the three phase motor. The loudness of the pump can not be generally emitted because every different liquid, art of piping, art of assembly has a strong influence on the emission.

Noise levels for motors (LpA):

D453	61 dB(A)
D455 - D456	
D465 - D466	66 dB(A)
D467 - D468 - D469	71 dB(A)

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11. Service

11.1 Storage of spare parts

Storage of spare parts will increase readiness for use. We recommend storing spare parts if continuous operation is needed, in urgent cases a complete spare pump should be available. Guarantee can only be granted for original spare parts. Also standard parts must have special properties in some cases.

If no experienced mechanics are available when repairs are required, we will supply a fitter upon your request or alternatively you can send the pump to our factory.

By ordering spare parts we need the following information:

Pump series
Spare part description / Pos.-No.

Serial-No. (see nameplate on the pump).

11.2 Contact address for service

For all queries relating to repairs or supply of spare parts, please contact our service-department:

HENDOR BV
Leemskuilen 15
5531 NK Bladel
the Netherlands
Phone: +31 497 339 389
Fax: +31 497 381 593
E-Mail: info@hendor.com

11.3 Spare part lists

Type : **D453**

Pos.	Amount	Description	Notes
1.0	1	Pump case cover	please state serial no.
1.1	6	Bolt	
1.2	1	O-Ring pump case cover	
1.3	12	Hexagon Nut	
2.0	1	Impeller	please state serial no.
2.1	1	Hexagon socket screw for impeller with lock washer	
2.2	1	Impeller cap	
2.3	1	O-Ring impeller cap	
2.4	1	O-Ring impeller	
3.0	1	Mounting flange including support pipe, pump case, pressure piping	please state serial no.
3.1	1	Slide ring	please state serial no.
3.2	1	O-Ring slide ring	
4.0	1	Shaft with cover	
4.1	1	V-Ring lip seal	
4.2	8	Disc	
4.3	8	Hexagon nut	
5.0	1	Coupling	
5.1	8	Hexagon socket screw with lock washer	
5.2	1	Protective cover PVC-Transparent	
6.0	1	Motor flange	
7.0	1	Motor	please state serial no.
7.1	4	Hexagon screw	
7.2	8	Disc	
7.3	4	Hexagon nut	
8.0	1	O-Ring pressure pipe	

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Type : **D455 - D456**

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Type : **D465 - D466**

Pos.	Amount	Description	Notes
1.0	1	Pump case cover	please state serial no.
1.1	8	Bolt	
1.2	1	O-Ring pump case cover	
1.3	16	Hexagon nut	
2.0	1	Impeller	please state serial no.
2.1	1	Hexagon socket screw for impeller with lock washer	
2.2	1	Impeller cap	
2.3	1	O-Ring impeller cap	
2.4	1	O-Ring impeller	
3.0	1	Mounting flange including support pipe, pump case, pressure piping	please state serial no.
3.1	1	Slide ring	please state serial no.
3.2	1	O-Ring slide ring	
4.0	1	Shaft with cover	
4.1	1	V-Ring lip seal	
4.2	1	Coupling complete incl. hexagon socket screws with lock washers and stub screws	
5.0	1	Motor flange	
5.1	1	Protective cover PVC-Transparent	
5.2	8	Hexagon nut	
5.3	8	Disc	
6.0	4	Hexagon screw	
6.1	8	Disc	
6.2	4	Hexagon nut	
7.0	1	Motor	please state serial no.

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Type : **D467 - D468 - D469**

Pos.	Amount	Description	Notes
1.0	1	Pump case cover	please state serial no.
1.1	14	Bolt	
1.2	1	O-Ring pump case cover	
1.3	28	Hexagon cap	
2.0	1	Impeller	please state serial no.
2.1	1	Hexagon socket screw for impeller with lock washer	
2.2	1	Impeller cap	
2.3	1	O-Ring impeller cap	
2.4	1	O-Ring impeller	
3.0	1	Mounting flange including support pipe, pump case, pressure piping	please state serial no.
3.1	1	Slide ring	please state serial no.
3.2	1	O-Ring slide ring	
4.0	1	Shaft with cover	please state serial no.
4.1	1	V-Ring lip seal	
4.2	1	Coupling complete incl. hexagon socket screws with lock washers and stub screws	please state serial no.
5.0	1	Motor flange	please state serial no.
5.1	1	Protective cover PVC-Transparent	
5.2	8 / 12	Hexagon nut	please state serial no.
5.3	8 / 12	Disc	please state serial no.
6.0	4	Hexagon screw	
6.1	8	Disc	
6.2	4	Hexagon nut	
7.0	1	Motor	please state serial no.

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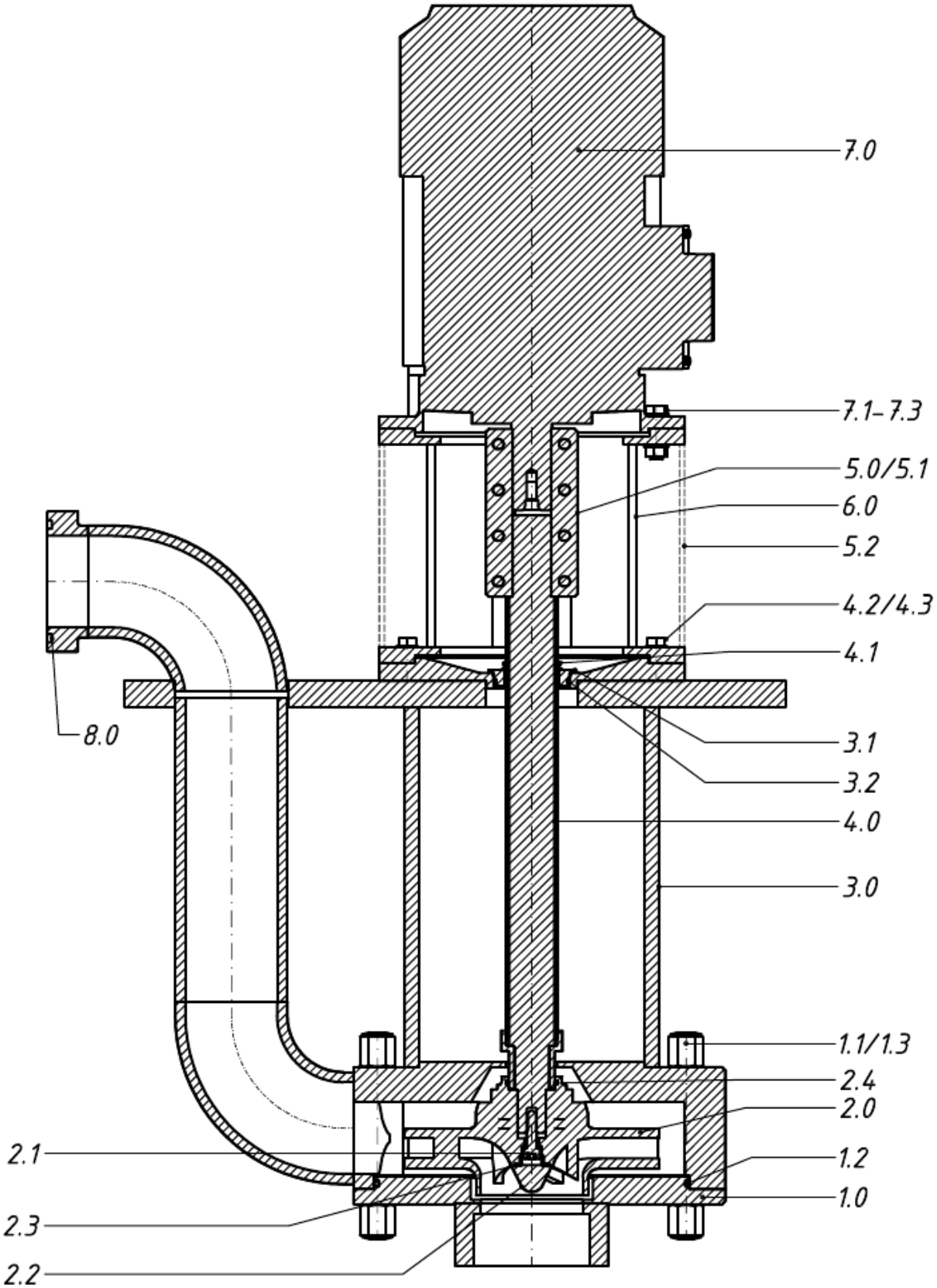
11.4 Spare part drawings

Type : **D453**



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Type : **D455 - D456**

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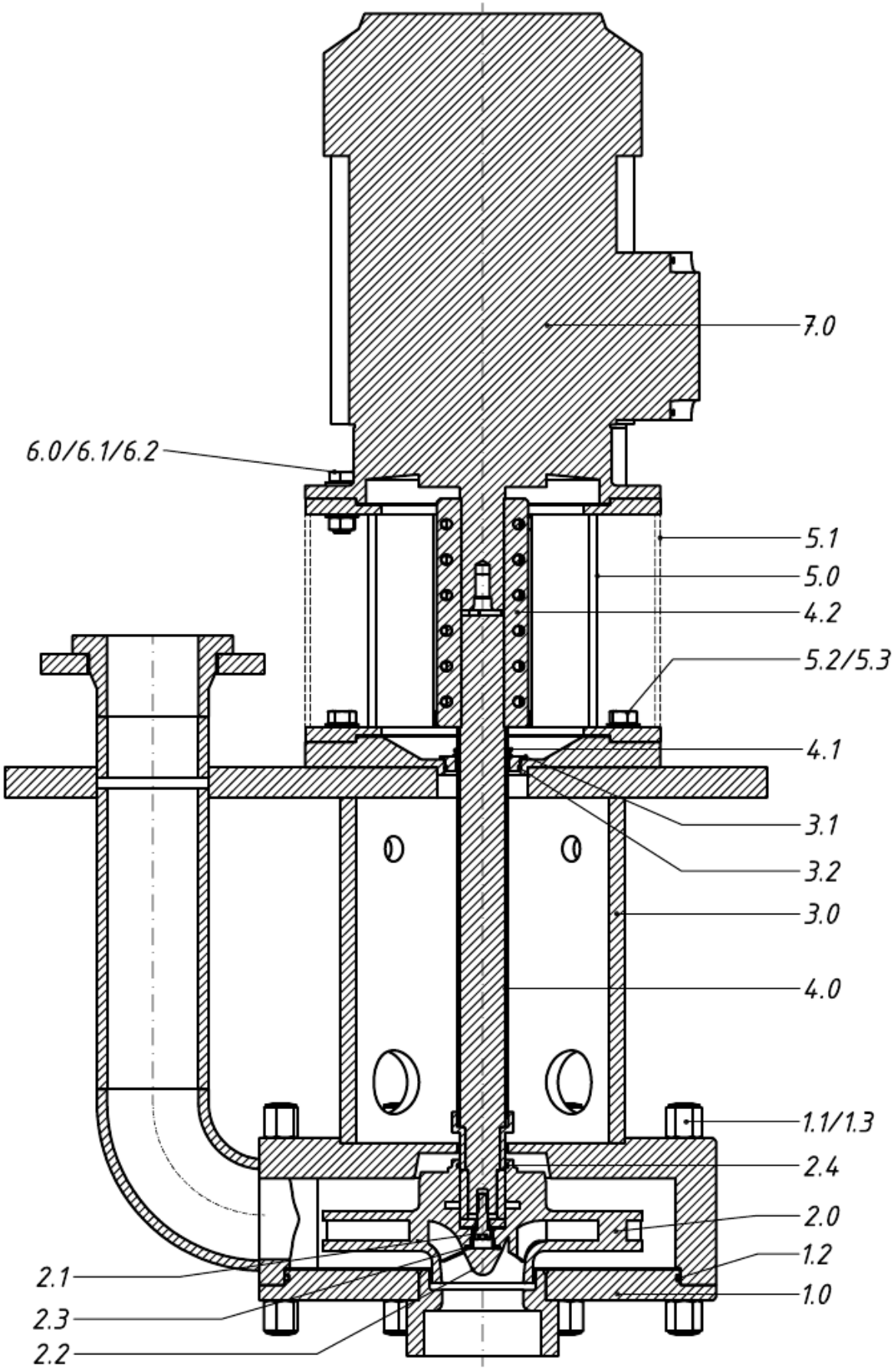
Type : **D465 - D466**



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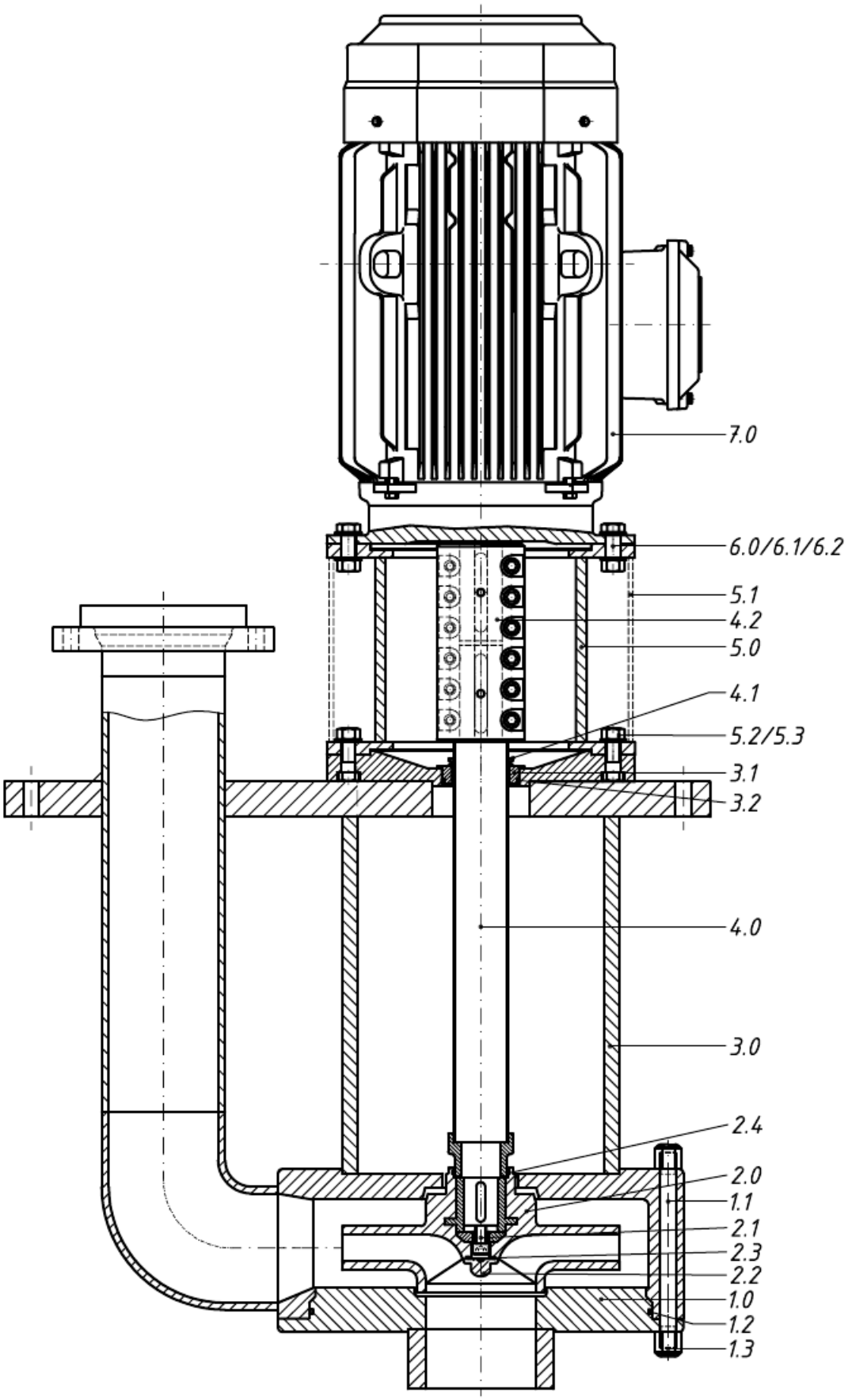
Type : **D467 - D468 - D469**



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11.5 Motor

Please note the enclosed manual of the motor manufacturer !

Hendor chemical immersion pumps series D4 are equipped with ABB Motors as standard.

For further information please note the specified motor data sheet as well as the manual for further information.

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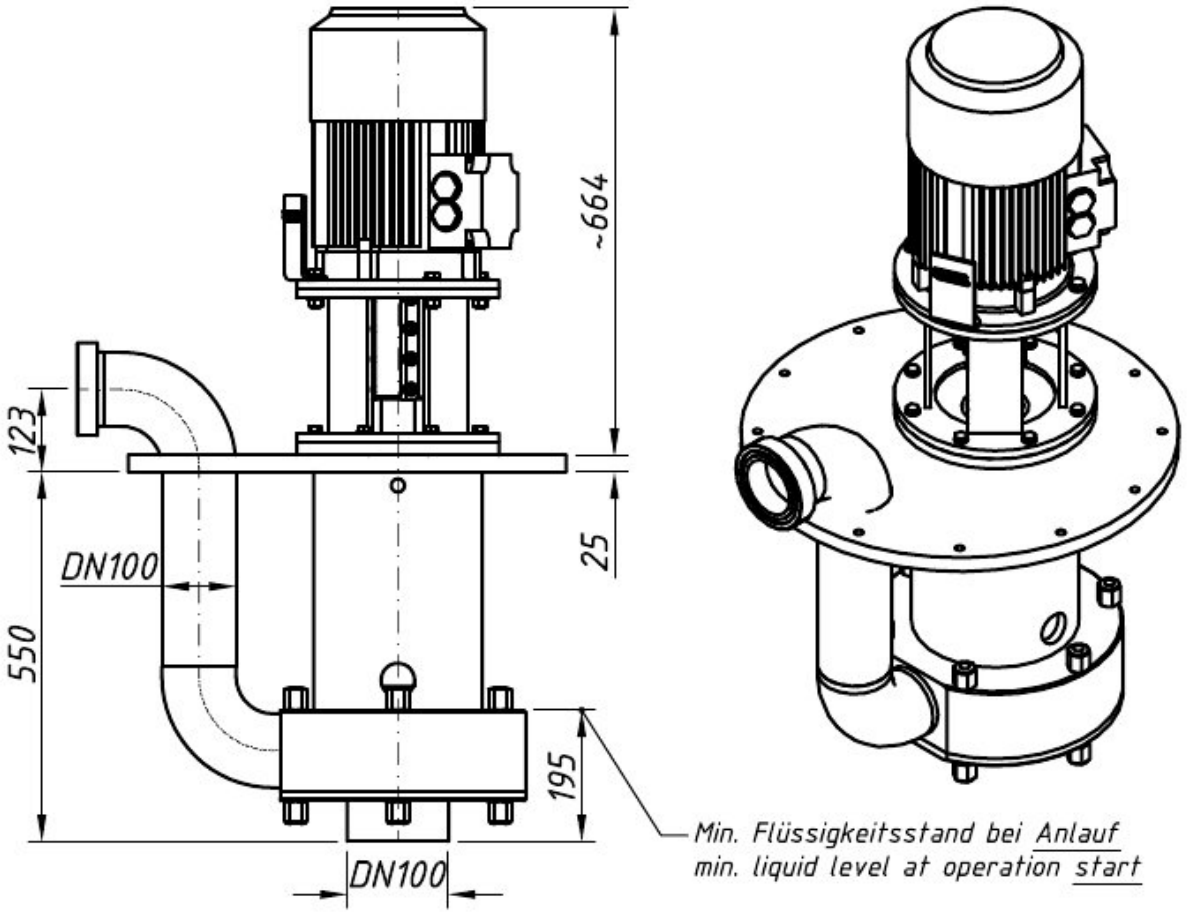
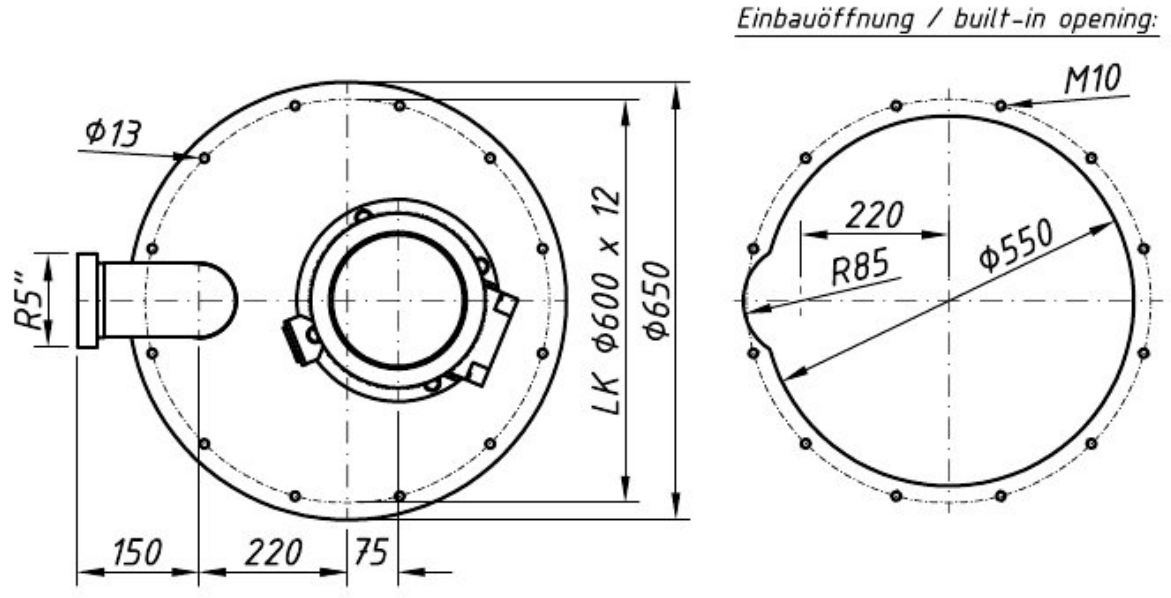
12. Dimension sheets

12.1 Type: D453





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12.2 Type: D455 - D456

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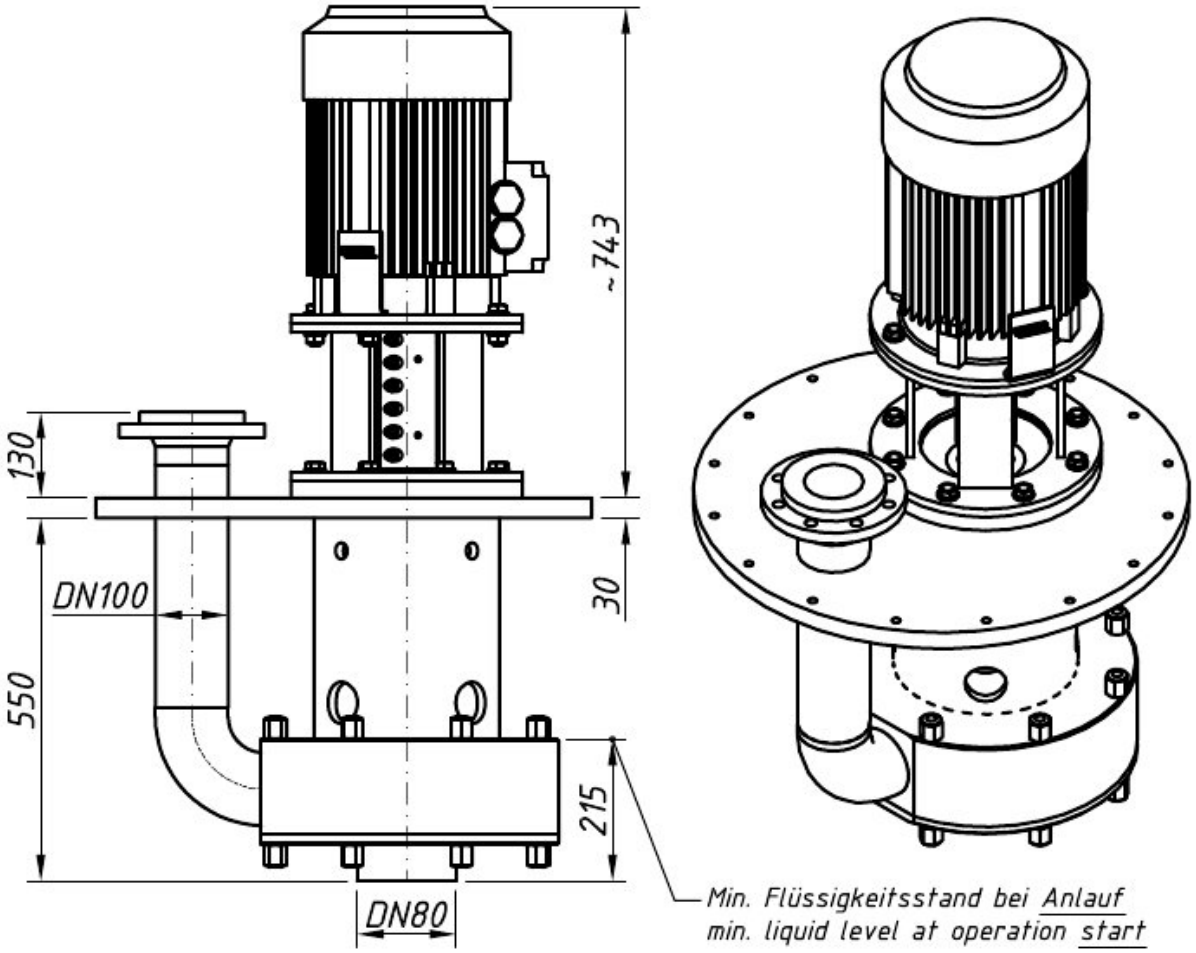
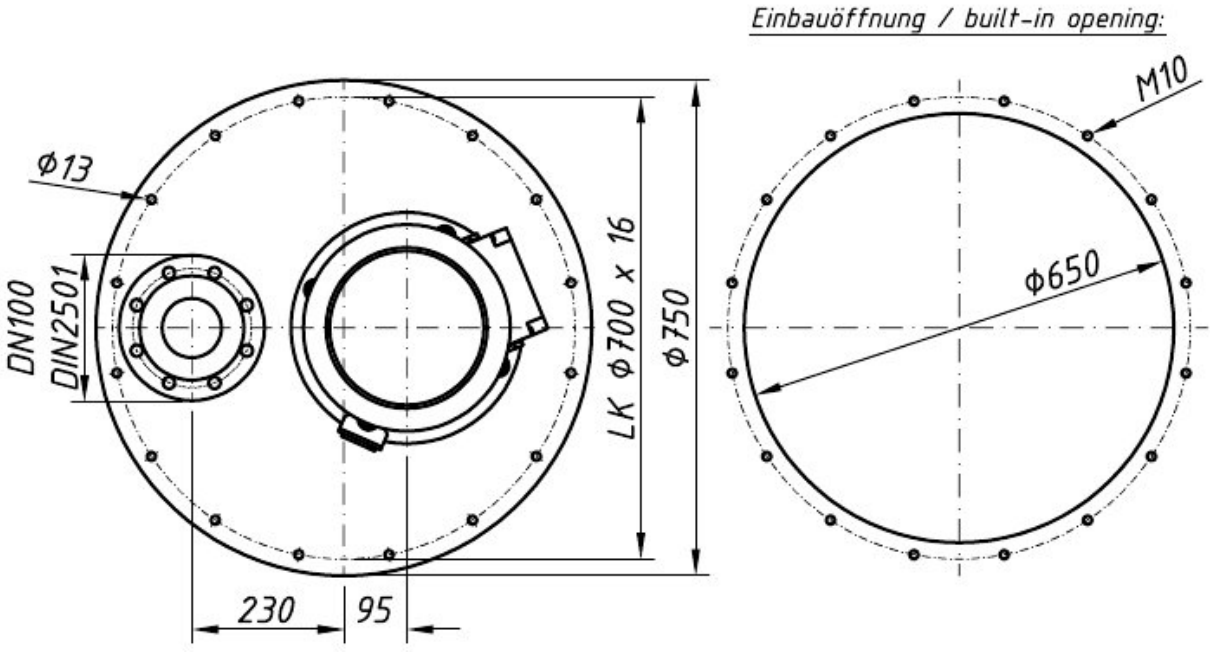
12.3 Type: D465 - D466





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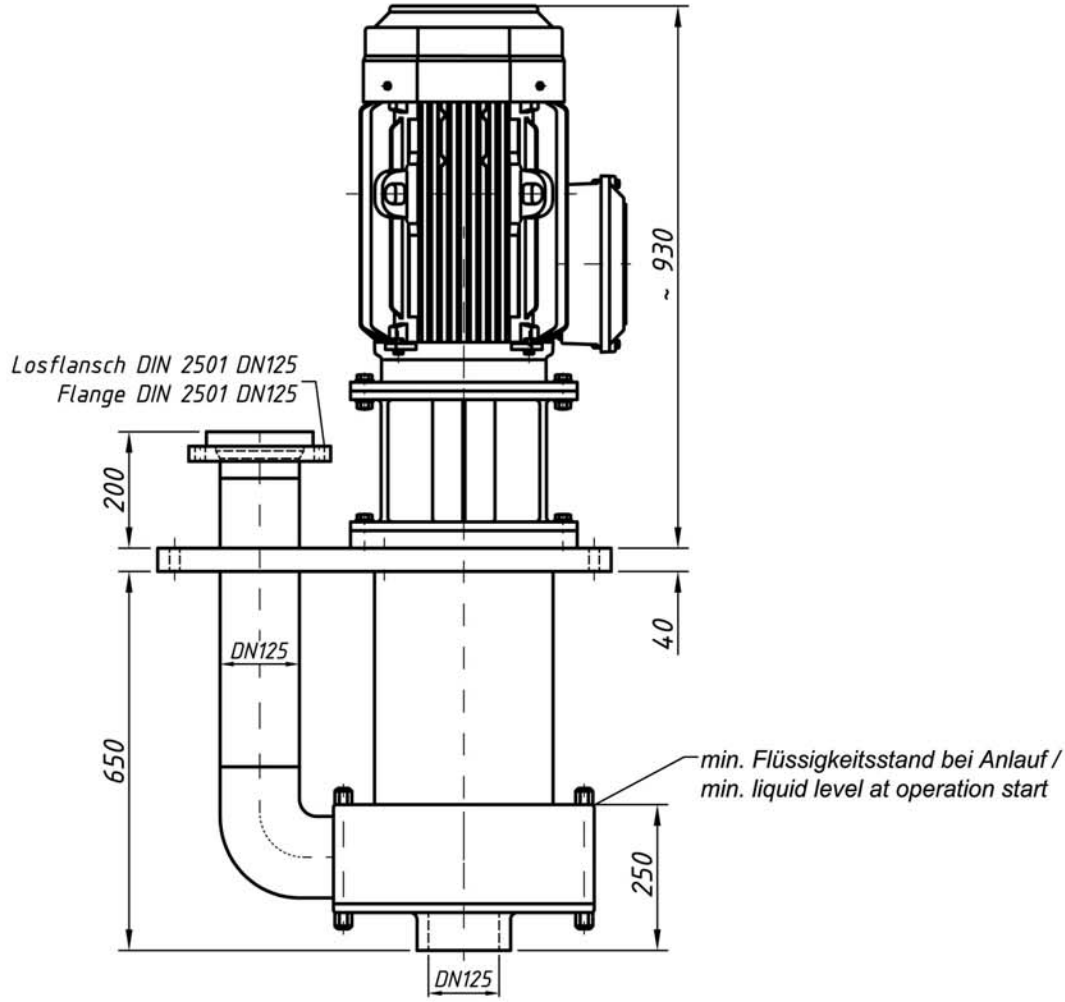
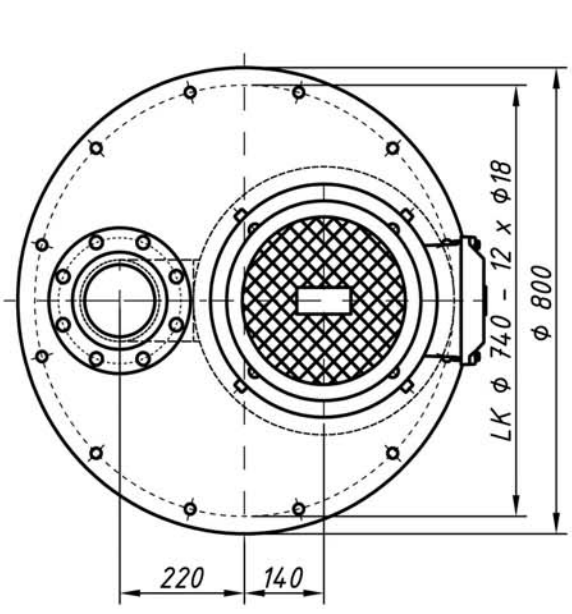
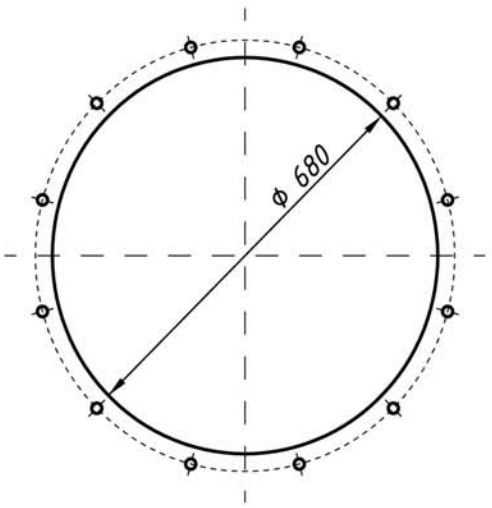
12.4 Type: D467 - D468 - D469





Einbauöffnung / built-in opening



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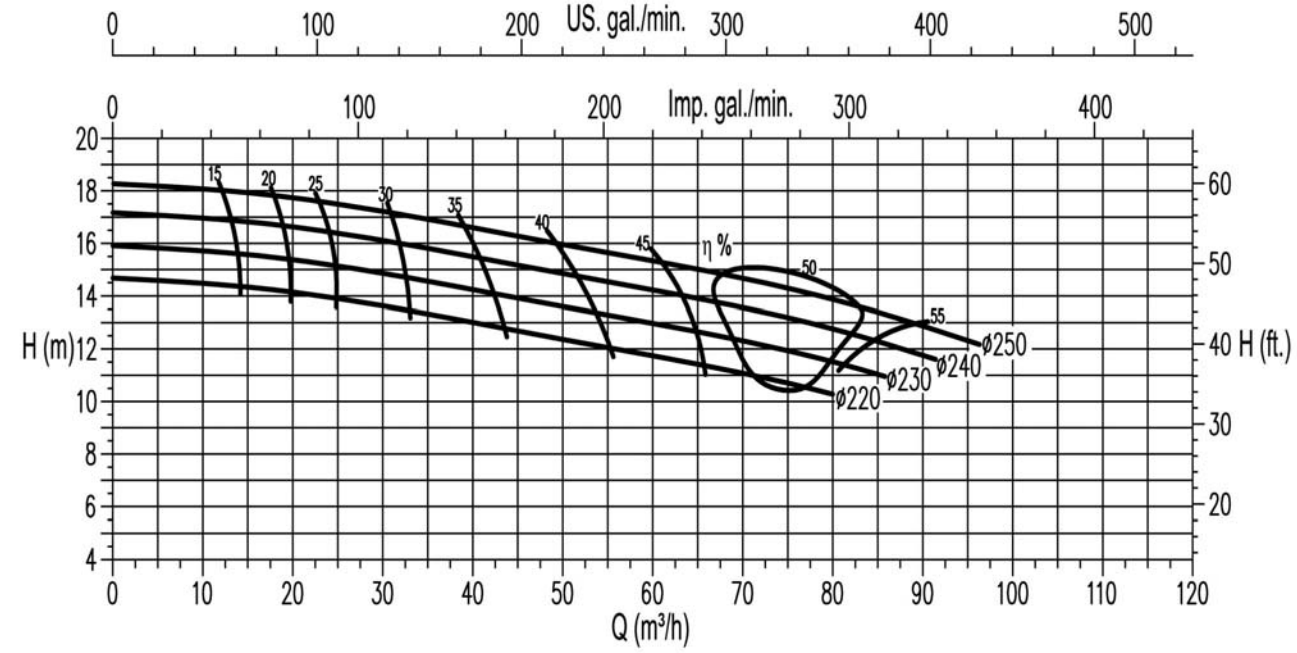
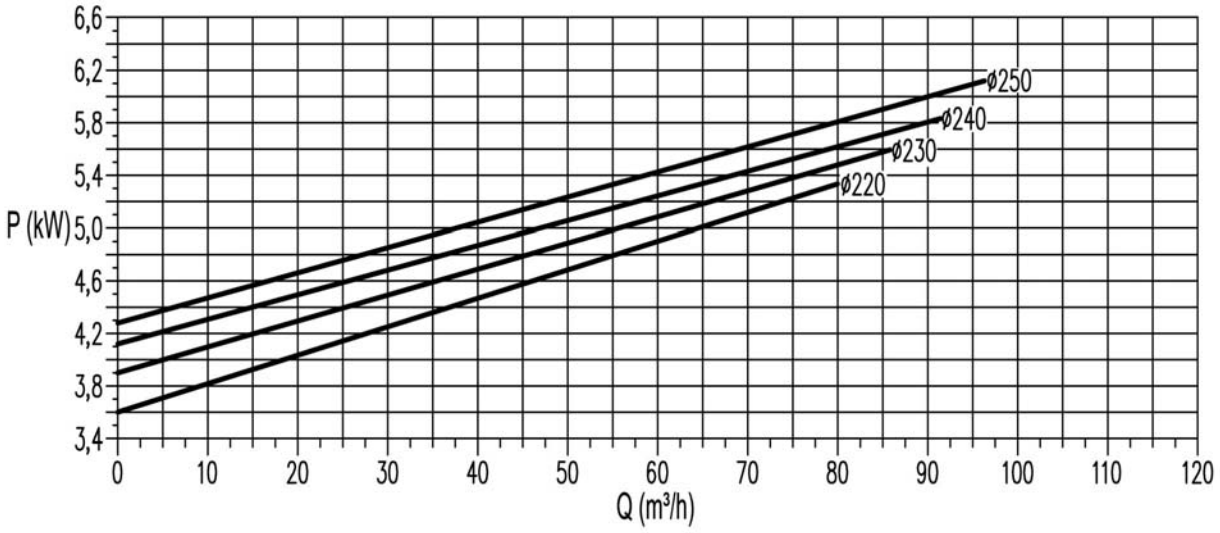
13. Performance curves

13.1 Type: D453, 50 Hz.





Performance depends on H_2O = 1 kp/dm^3 at Δt = 20°C and 1°E 760 Torr

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13.2 Type: D455 - D456, 50 Hz.

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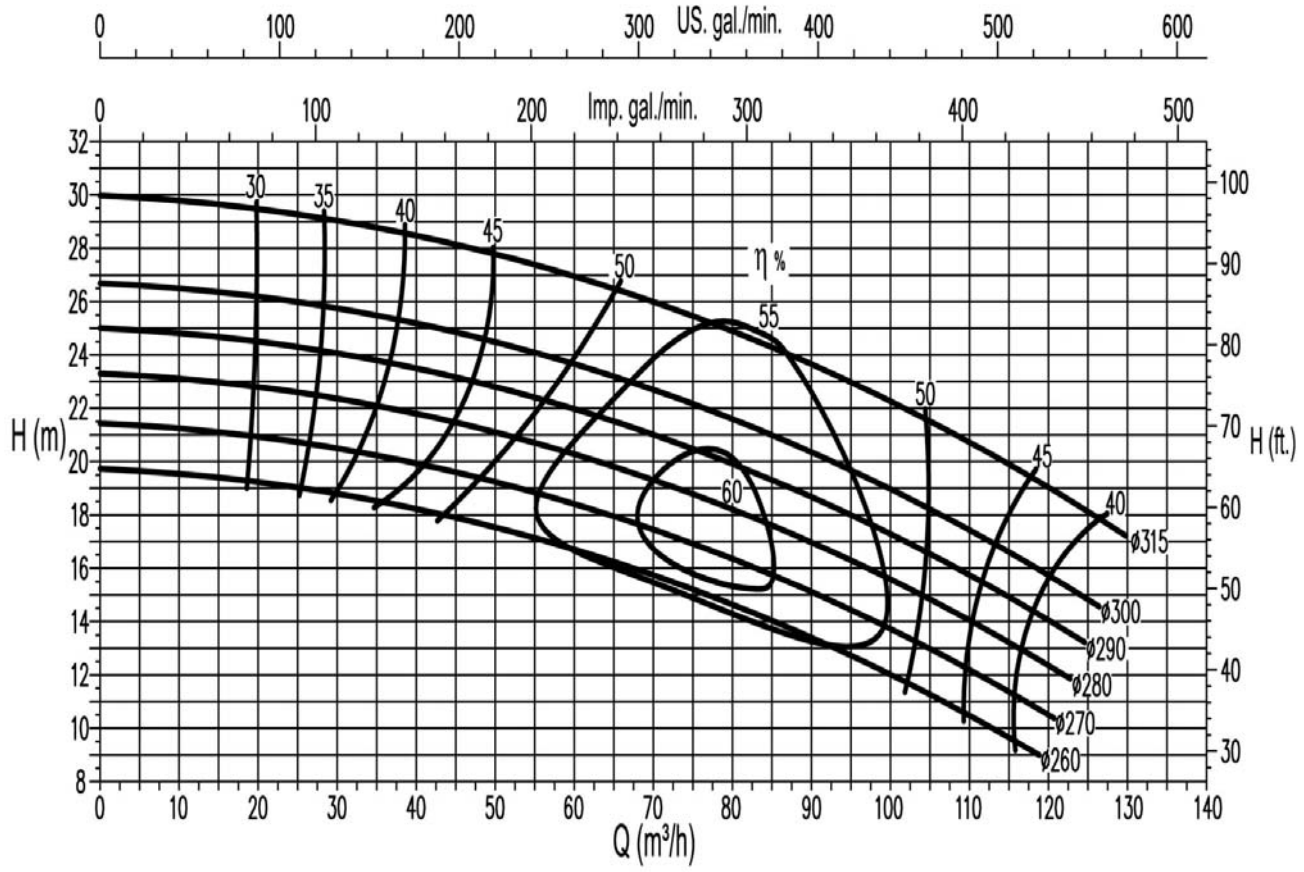
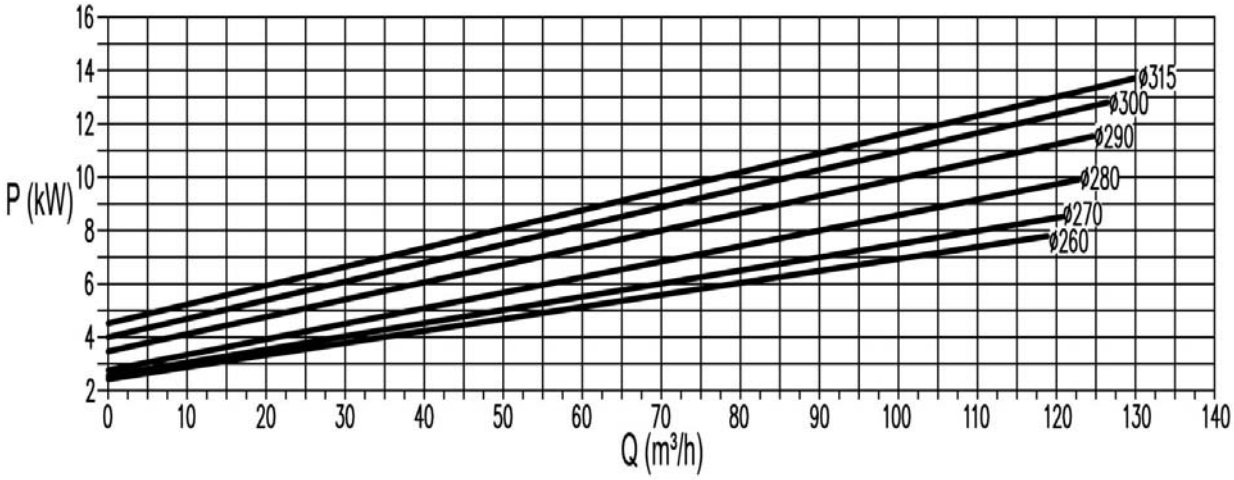
13.3 Type: D465 - D466, 50 Hz.





Performance depends on H_2O = 1 kp/dm^3 at Δt = 20°C and 1°E 760 Torr

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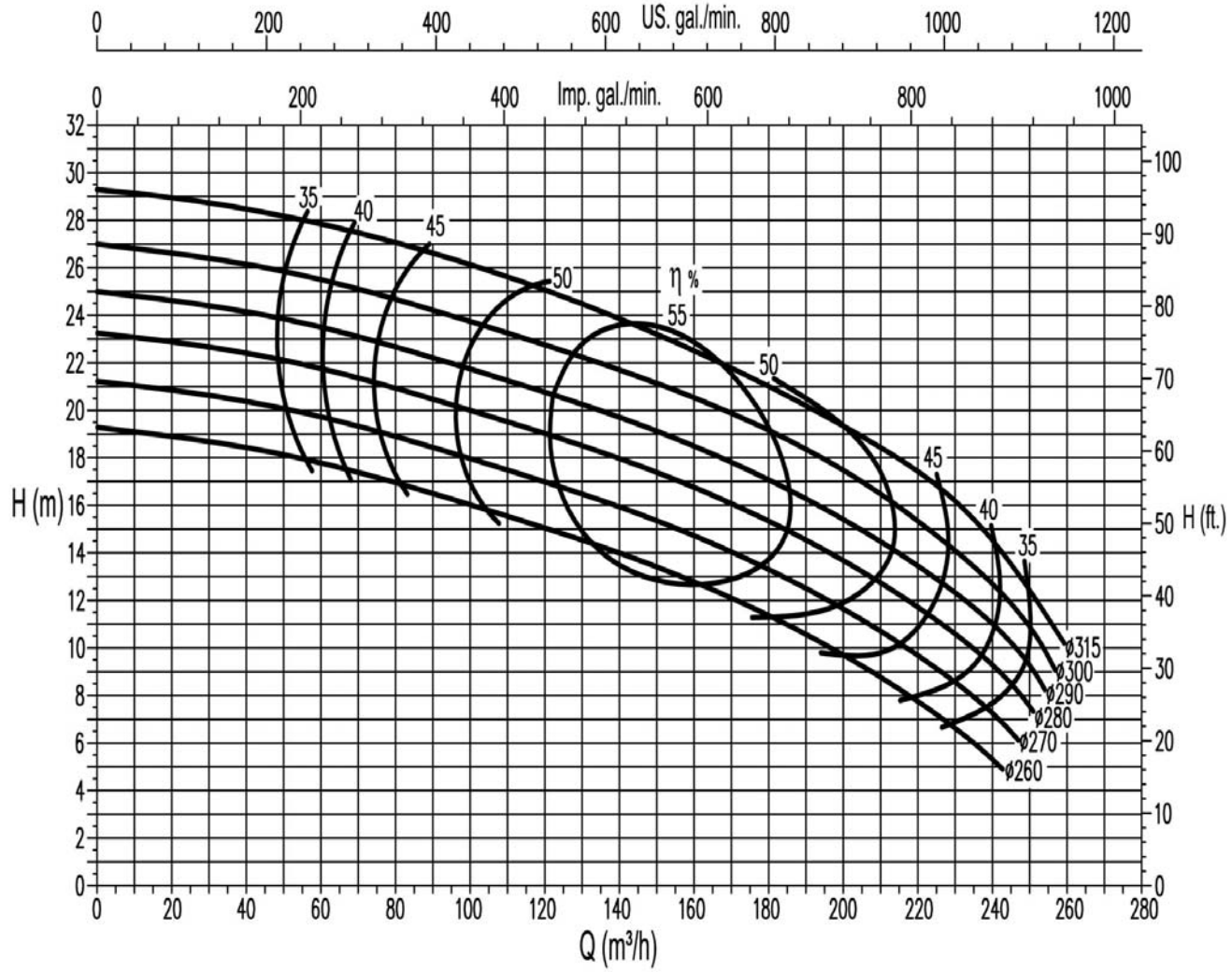
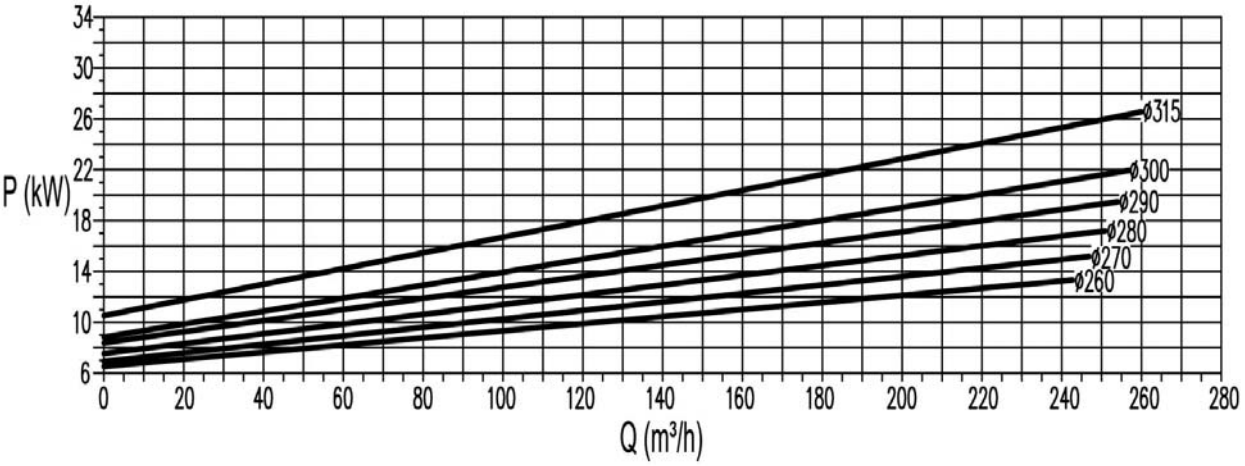
13.4 Type: D467 - D468 - D469, 50 Hz.





Performance depends on H_2O = 1 kp/dm^3 at Δt = 20°C and 1°E 760 Torr

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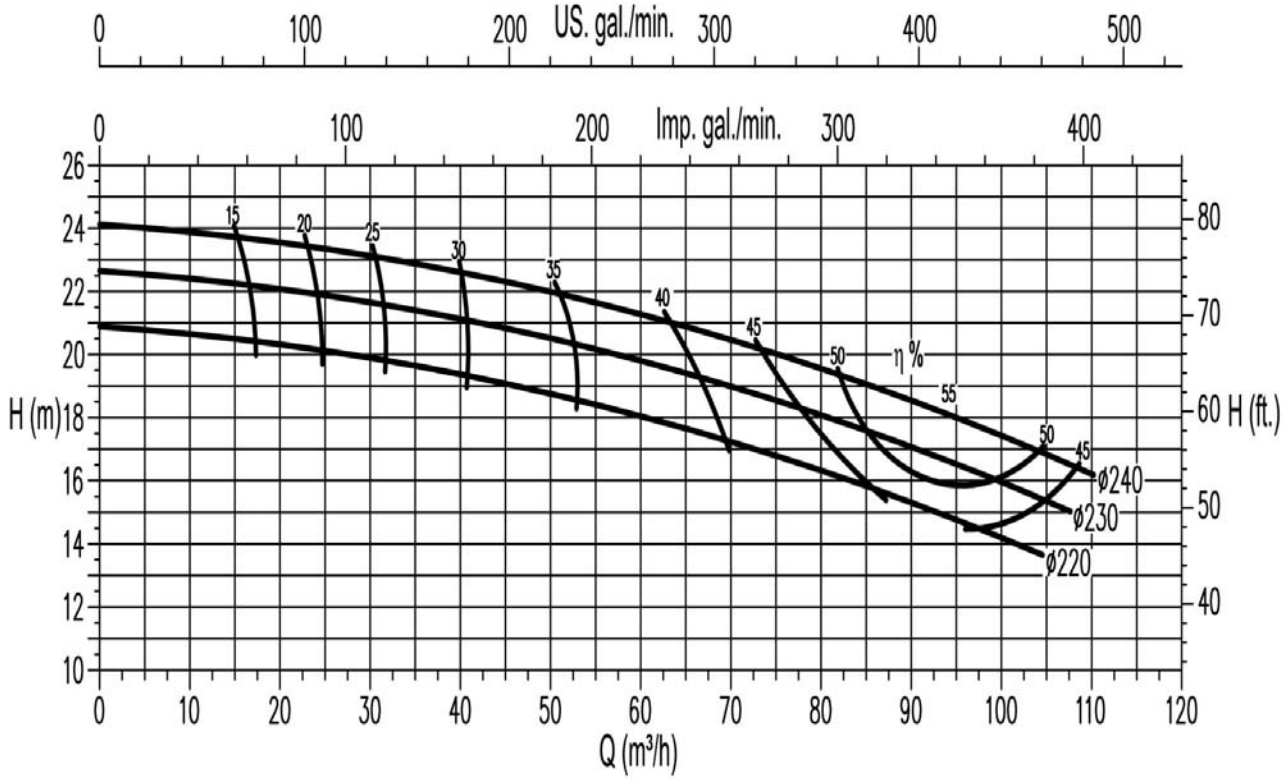
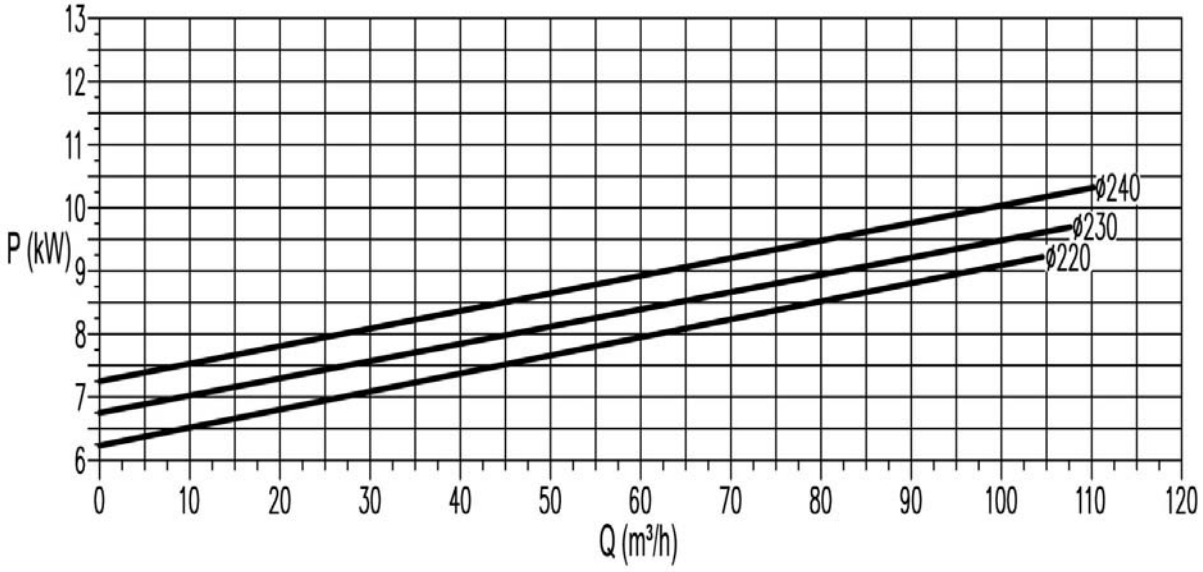
13.5 Type: D453, 60 Hz.





Performance depends on H_2O = 1 kp/dm^3 at Δt = 20°C and 1°E 760 Torr

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13.6 Type: D455 - D456, 60 Hz.

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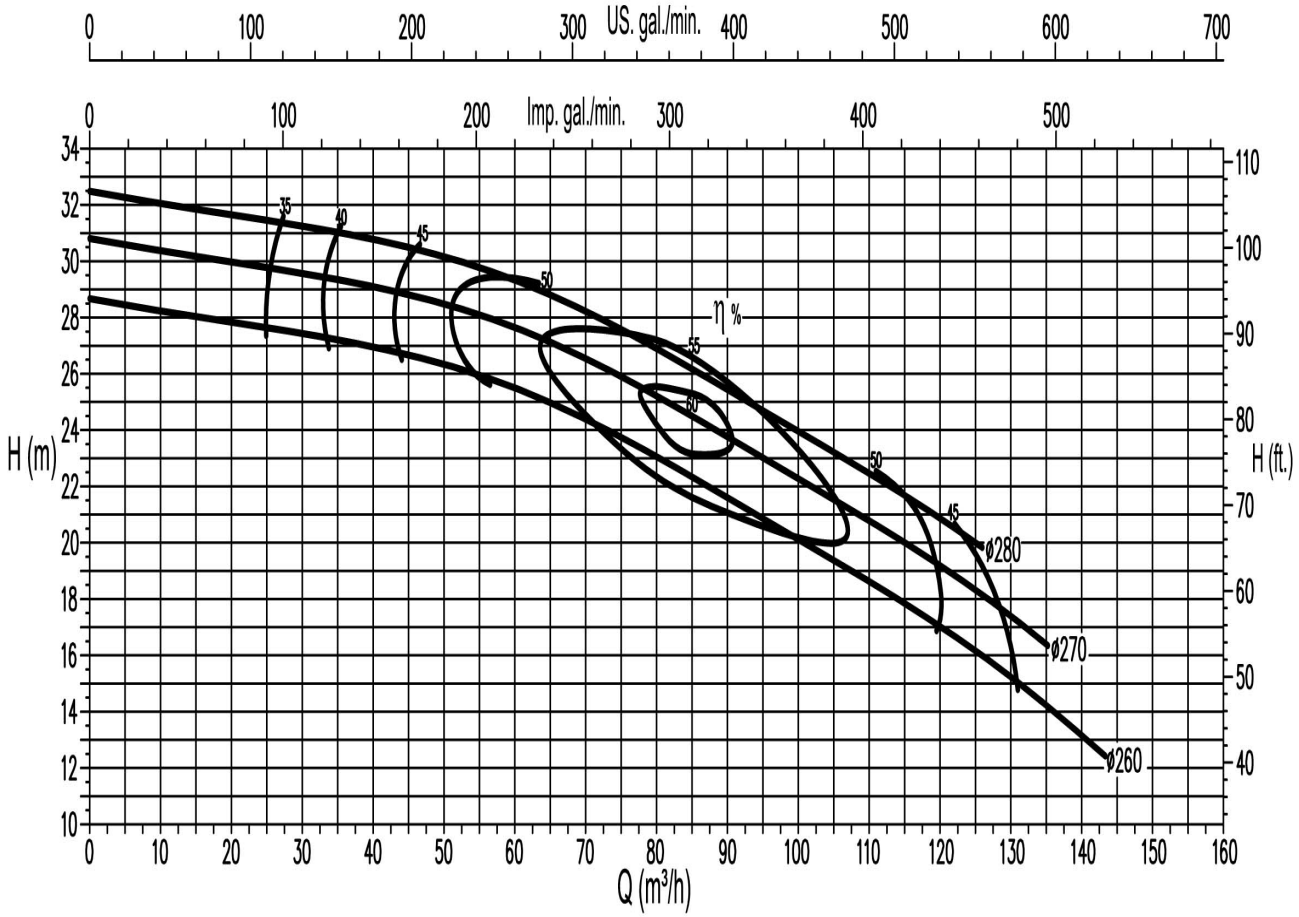
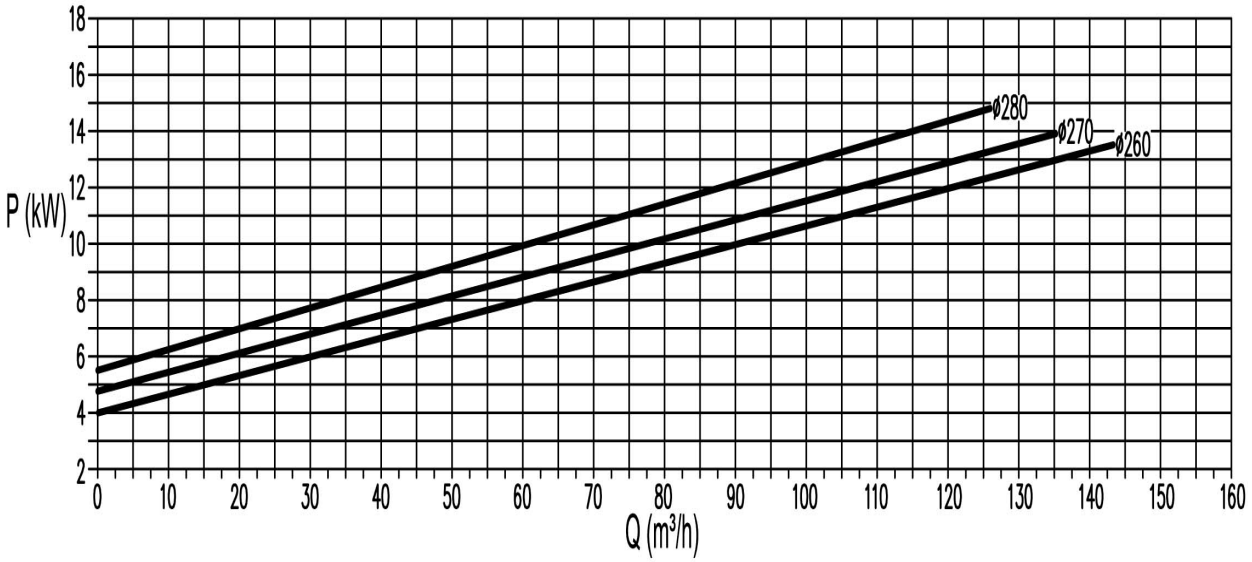
13.7 Type: D465 - D466, 60 Hz.





Performance depends on H_2O = 1 kp/dm^3 at Δt = 20°C and 1°E 760 Torr

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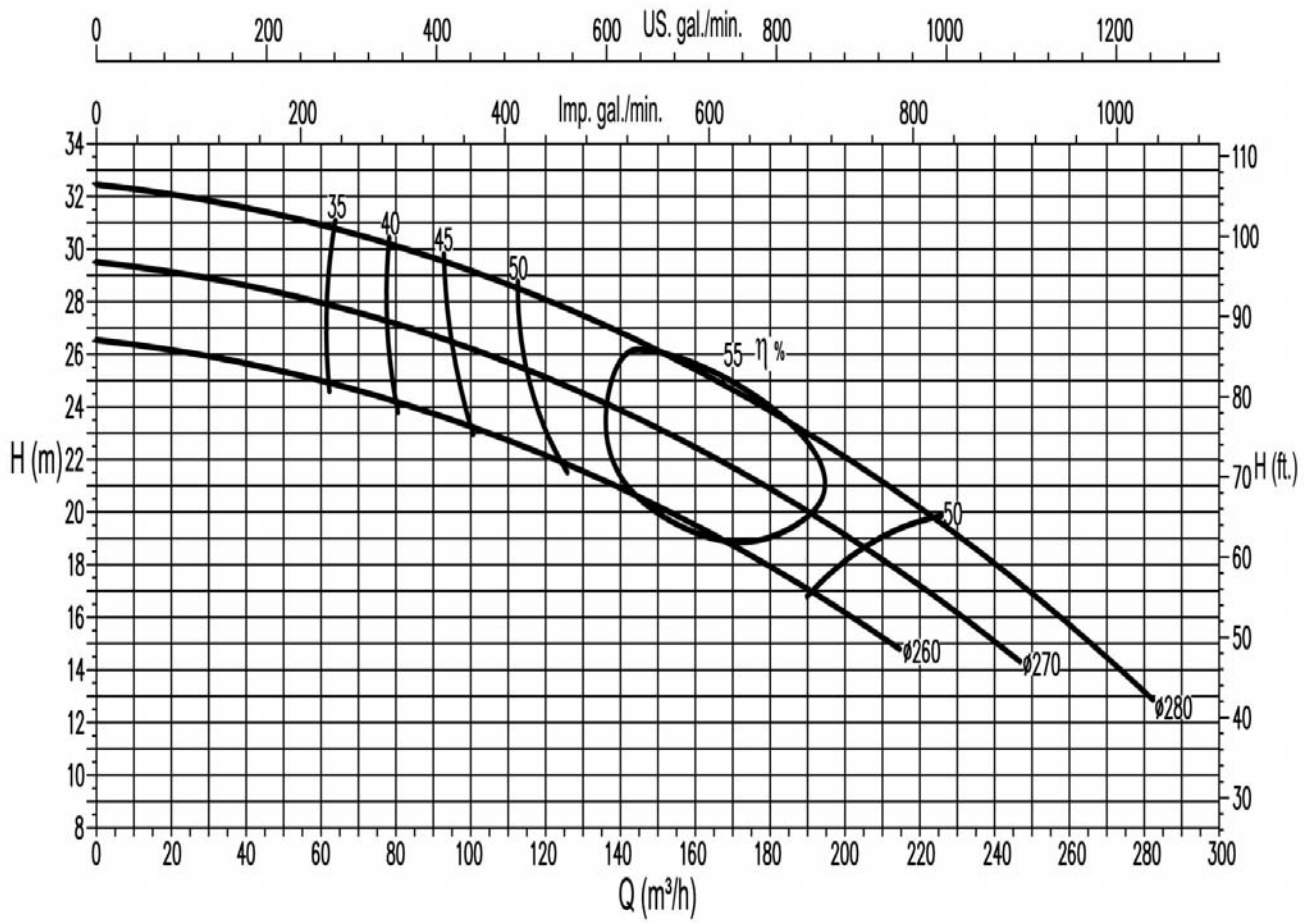
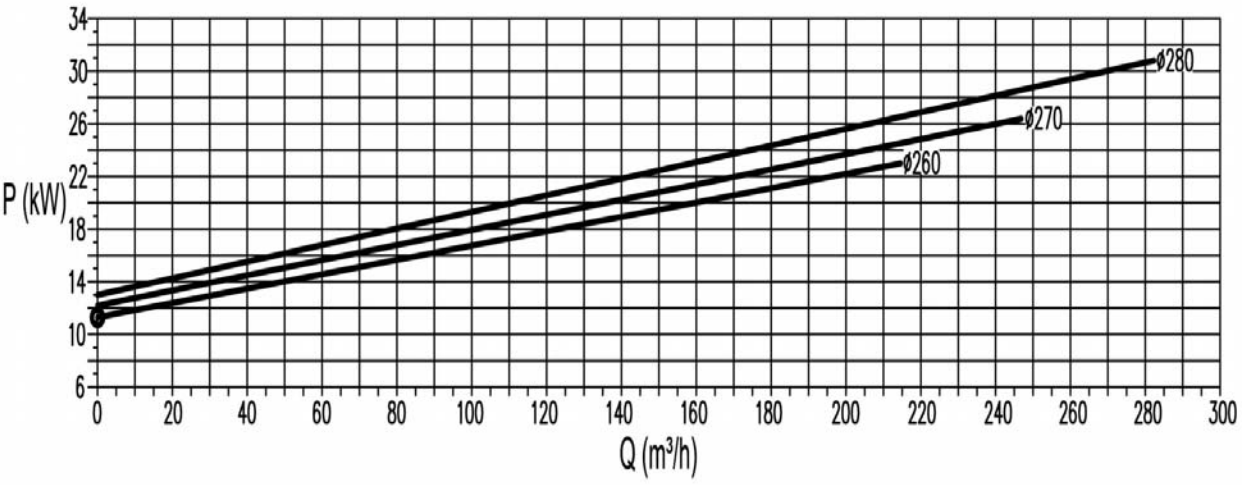
13.8 Type: D467 - D468 - D469, 60 Hz.





Performance depends on H_2O = 1 kp/dm^3 at Δt = 20°C and 1°E 760 Torr

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14. Declaration of conformity

We **HENDOR BV**
Bladel, the Netherlands

declare under our sole responsibility, that the product **Immersion Pump Series:**

D453
D455 - D456
D465 - D466
D467 - D468 - D469

to which this declaration relates corresponds to the relevant basic safety and health requirements of the directives:

DIN EN 292-1
DIN EN 292-2

and to the requirements of other relevant directives:

89/392/EWG

91/368/EWG (Revision 1)

93/44/EWG (Revision 2)

98/37/EG (Revision 3)

EG-Guideline for Low Voltage

73/23/EWG

93/68/EWG (Revision 1)

EG-EMV-Guideline:

89/336/EWG

92/31/EWG (Revision 1)

93/68/EWG (Revision 2)

This declaration excludes mounted parts on the machine of the client by self.

HENDOR BV

Bladel / the Netherlands, July 2010

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