
**ISTRUZIONI PER L'INSTALLAZIONE E LA MANUTENZIONE
INSTRUCTIONS DE MISE EN SERVICE ET D'ENTRETIEN
INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE
INSTALLATIONSANWEISUNG UND WARTUNG
INSTRUCTIES VOOR INGEBRUIKNAME EN ONDERHOUD
INSTRUCCIONES PARA LA INSTALACION Y EL MANTENIMIENTO
ИНСТРУКЦИИ ПО МОНТАЖУ И ТЕХНИЧЕСКОМУ ОБСЛУЖИВАНИЮ
INSTRUCȚIUNI PENTRU INSTALARE ȘI ÎNTREȚINERE**

**KC
KCV**



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1. GENERAL



Read this documentation carefully before installation.

Installation, electrical connection and commissioning must be carried out by specialised personnel, in compliance with the general and local safety regulations in force in the country in which the product is installed. Failure to respect these instructions not only causes risk to personal safety and damage to the equipment, but invalidates every right to assistance under guarantee.

The appliance is not intended to be used by persons (including children) with reduced physical, sensory or mental capacities, or who lack experience or knowledge, unless, through the mediation of a person responsible for their safety, they have had the benefit of supervision or of instructions on the use of the appliance. Children must be supervised to ensure that they do not play with the appliance. (EN 60335-1: 02).



Ensure that the product has not suffered any damage during transport or storage. Check that the outer casing is unbroken and in excellent conditions.

1.1 Safety

Use is allowed only if the electric system is in possession of safety precautions in accordance with the regulations in force in the country where the product is installed (for Italy CEI 64/2).

1.2 Responsibility

The Manufacturer does not vouch for correct operation of the machine or for any damage that it may cause if it has been tampered with, modified and/or run outside the recommended work range or in contrast with other indications given in this manual.

2. PUMPED LIQUIDS

KC – KCV pumps are horizontal single-stage centrifugal pumps for pumping clean liquid, non explosive fluids, without solid particles or fibres that can attack the pump mechanically or chemically.



The pumps must not be used for the transfer of inflammable or toxic liquids.

If ethylene glycol or propylene is added to the pumped liquid, the concentration must not exceed 45%.

3. TECHNICAL DATA

3.1 Electrical data

Supply voltage: 1 x 220-240 V 50Hz
 1 x 220-230 V 60Hz
 3 x 230-400 V 50Hz
 3 x 220-277/380-480 60Hz

Absorbed power: see electrical data plate
 Maximum current: see electrical data plate
 Protection rating: IP54

3.2 Operating conditions

Flow rate: Page 50
 Head: see table

MODEL	Head H max (m)
KC - KCV 100	10.5 m
KC/KCE - KCV/KCVE 150	13 m
KC/KCE - KCV/KCVE 200	16 m
KC/KCE - KCV/KCVE 250	22 m
KCV/KCVE 300	23 m

Maximum working pressure: 6.5 bar
 Motor construction: CEI 2-3 – CEI 61-69
 (EN 60335-2-41)

Noise production:

MODEL	Noise Level
KC - KCV 100	≤ 59 dB (A)
KC/KCE - KCV/KCVE 150	≤ 59 dB (A)
KC/KCE - KCV/KCVE 200	≤ 59 dB (A)
KC/KCE - KCV/KCVE 250	≤ 62 dB (A)
KCV/KCVE 300	≤ 62 dB (A)

3.3 Temperature

Environment temperature: -20 ÷ +65°C
 -20 ÷ +50°C
 (only single-phase versions)

Storage temperature: -40 ÷ +65°C

Liquid temperature: -10 ÷ +55°C

4. MANAGEMENT

4.1 Storage

All the pumps must be stored in a dry covered place, with possible constant air humidity, free from vibrations and dust.

They are supplied in their original pack in which they must remain until the time of installation.

If this is not the case, accurately close the suction and delivery mouth.

4.2 Transport

Avoid subjecting the products to needless impacts and collisions. To lift and transport the pump use lifting devices with the aid of the pallet supplied with it (if contemplated).

4.3 Weight

The adhesive plate on the packaging indicates the total weight of the pump.

5 INSTALLATION

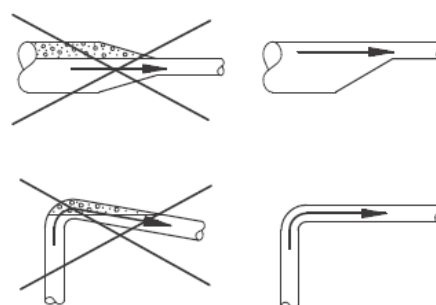
5.1 Pump installation

- The pump must be installed in a horizontal position with the suction manifold as short as possible and with minimum suction height.
- The pump must be installed in a well ventilated place, protected from unfavourable weather conditions, and with an environment temperature not higher than 65°C (50°C for single-phase versions).
- The pump may be installed outdoors, but it must be protected against atmospheric agents with a suitable cover.

5.2 Pipes

- Interception valves must be fitted upstream and downstream from the pump.
- The pump must not be subject to mechanical stresses by the pipes.
- The pipes must be correctly sized, also taking the suction pressure into account.
- If the pump is installed in the lowest point of the system, residue and impurities may build up inside it.
- Install the pump so as to avoid air pockets, especially on the suction side of the pump.

Fig. 1



5.3 Connecting the pipes

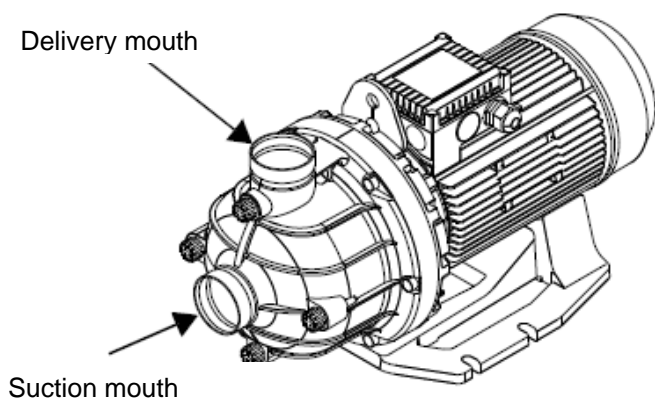
5.3.1 Suction pipe

- If the pump is installed above the level of the liquid, a foot valve or non return valve must be installed in the suction manifold below the level of the liquid.
- Connect the suction pipe to the suction mouth of the pump. (Fig. 2).
- Each coupling of the suction manifold must be well tightened and completely watertight.
- If a hose is used as the suction pipe, it must be of a non collapsible type. It is recommended to use a grid or filter if there is a possibility of solids getting into the suction pipe and blocking the pump.

5.3.2 Delivery pipe

- Connect the delivery pipe to the delivery mouth of the pump (Fig. 2).
- The delivery pipe must be at least of the same diameter as the pump delivery mouth so as to minimise load losses and decrease the flow rate and the noise production.

Fig. 2



5.3.3 Connecting the by-pass

- The pump must not be run with the interception valves closed, since in these conditions there would be an increase in temperature of the liquid and the formation of vapour bubbles inside the pump with consequent mechanical damage. If possible, provide a by-pass circuit or a discharge leading to a liquid recovery tank..

5.4 Minimum pressure at intake

The minimum pressure at intake “H” in metres of head, required during operation to avoid cavitation of the pump, may be calculated using the following formula:

$$H = p_b \times 10,2 - NPSH - H_f - H_v - H_s$$

p_b Barometric pressure in bar.
(The barometric pressure may be set at 1 bar).
In closed systems p_b indicates the preload pressure of the system in bar.

$NPSH$ NPSH (Net Positive Suction Head) expressed in metres of head (to be read in the NPSH curves on pages 50-51 at the maximum flow rate supplied by the pump).

H_f Load loss in the suction manifolds expressed in metres of head.

H_v Vapour pressure in metres of head, see Fig. E on page 52.

t_m = temperature of the liquid.

H_s Safety margin = min. 0.5 metres of head.

If the resulting value “H” is positive, the pump can work with a max. suction height of “H” metres of head.

If the calculated value “H” is negative, a minimum suction pressure of “H” metres is required to avoid cavitation.

For example:

- $P_b = 1\text{bar}$
- Type of pump: KC – KCV 200
- Flow rate: $24\text{m}^3/\text{h}$.
- NPSH (from Fig.B on page 50): 1.7 metres of head.
- $H_f = 3.0$ metres of head
- Liquid temperature: 20°C
- H_v (from Fig. E on page 52): 0.24 metres of head.
- $H = p_b \times 10.2 - NPSH - H_f - H_v - H_s$ (metres of head).
- $H = 1 \times 10.2 - 1.7 - 3.0 - 0.24 - 0.5 = 4.8$ metres of head .

This means that the pump can work with a lift on intake equal to a maximum of 4.8 metres of head.

Pressure calculated in bar: $4.8 \times 0.0981 = 0.47$ bar

Pressure calculated in kPa: $4.8 \times 9.81 = 47.1$ kPa

5.5 Maximum pressure at intake

The actual suction pressure added to the pressure of the pump running with the delivery valve closed must always be lower than the max. working pressure.

6. ELECTRICAL INSTALLATION



**ATTENTION!
ALWAYS RESPECT THE SAFETY
REGULATIONS!!**

Electrical installation must be carried out by an expert, authorised electrician, who takes on all responsibility.



**THE SYSTEM MUST BE
CORRECTLY AND SAFELY
EARTHED!!**

Always switch off the mains power supply before working on the electrical or mechanical part of the system and make sure it cannot be switched on again accidentally.

- Ensure that the mains voltage and frequency are the same as the values indicated on the electrical data plate.
- In the electrical connection to the power supply line, fit a two-pole switch with contact opening distance of at least 3 mm on all poles.

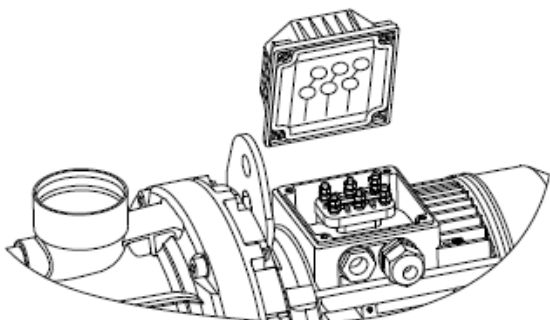
6.1 Motor protection

The motor must be connected to a manually resettable motor protector. Set the motor protector according to the rated current of the motor ($I_{1/1}$). See the identification plate.

6.2 Electrical connection

Make the electrical connections as indicated in the wiring diagram inside the cover of the terminal board.

Fig. 3



6.3 Operation with a frequency converter

- All three-phase motors can be connected to a frequency converter. The recommended frequency range with the standard pump motor is between 30 and 50 Hz, that is between 60 and 100% of the rated speed.
- The maximum length of the cable between the motor and the frequency converter is 5 metres.
- Depending on the type of frequency converter, there may be an increase in motor noise. The motor may also be subject to dangerous voltage peaks.
- Problems such as voltage peaks or increased noise may be eliminated by fitting a suitable LC filter between converter and motor.

7. START-UP



**DO NOT START THE PUMP WITHOUT
HAVING COMPLETELY FILLED IT
WITH LIQUID.**

7.1 Filling with liquid



ATTENTION!

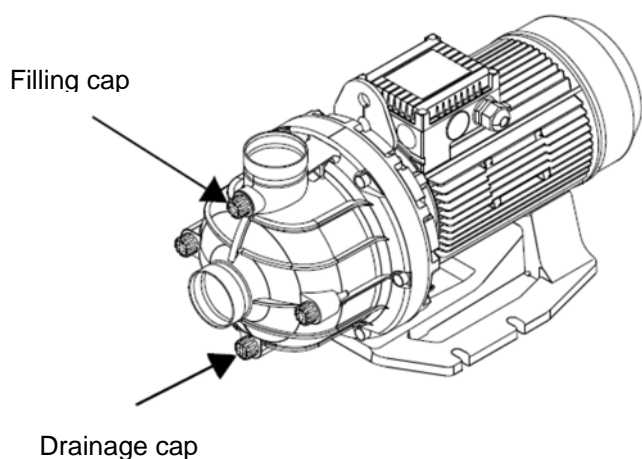
The system might be under pressure and the liquid coming out might have a very high temperature. Take the necessary precautions to ensure that the liquid does not cause personal injuries or damage to other components.

- 1 Close the interception valve on the delivery side of the pump.
- 2 Completely open the interception valve on the suction side before starting the pump.
- 3 Remove the filling cap. Fig. 4.
- 4 Completely fill the pump body and the suction pipe with liquid until a constant flow of liquid comes out of the filling hole.
- 5 Fit the filling cap and tighten it.
- 6 Slowly open the interception valve on the delivery side while the pump is running to ensure the venting and build-up of pressure during starting.



The discharge valve must be opened as soon as the pump is started to avoid the excessive increase in temperature of the pumped liquid and consequent damage of the materials.

Fig. 4



If the pump has difficulty in accumulating pressure it may be necessary to repeat steps 1 to 6.

7.2 Checking the direction of rotation



ONLY FOR THREE-PHASE

An arrow on the cover of the motor fan indicates the correct direction of rotation.

The pump should turn in a clockwise direction, viewed from the motor.

If it is turning in the wrong direction, disconnect the power supply and exchange any two leads of the power supply at input.

8. MAINTENANCE

ATTENTION!

The pump may not be dismantled except by skilled and qualified personnel, in possession of the qualifications required by the specific regulations on the subject. In any case, all repair and maintenance work must be carried out only after having disconnected the pump from the supply mains. Ensure that the power cannot be switched on accidentally.



- The internal parts of the pump do not require maintenance.
- It is important to keep the motor clean to ensure that it is correctly cooled.
- If the pump is installed in a dusty environment, the motor must be cleaned and checked regularly.
- Bear in mind the motor protection rating when performing cleaning operations.
- The motor is equipped with permanently lubricated bearings that require no maintenance.

8.1 Anti-frost protection

- To avoid damage, pumps left inactive during periods of frost must be emptied.
- Remove the filling and drainage caps. Fig.4
- Do not replace the caps until the pump is put back into service.

Before starting after a period of inactivity, completely fill the pump and the suction pipe with liquid. Paragraph 7.1 “Filling with liquid”.



8.2 Cleaning

Before a period of prolonged inactivity, the pump must be flushed with clean water to prevent corrosion and the formation of deposits inside the pump itself.

9. TROUBLESHOOTING



ATTENTION!

Before opening the terminal board cover, ensure that the electric power supply has been disconnected.

The pumped liquid may be at a very high temperature and high pressure. Before removing or dismantling the pump, the system must be emptied or the interception valves on both sides of the pump must be closed.

Error conditions		
FAULTS	CHECKS (possible causes)	REMEDIES
1. The pump is not working.	<ul style="list-style-type: none"> A. Interruption in the power supply. B. Burnt out fuses or motor protection tripped. C. Fault in the control current circuit. D. Fault in the contacts of the motor protection switch or the magnet coil. 	<ul style="list-style-type: none"> A. Restore the power supply. Check that the cables and their connections are not faulty or loose. B. Check that the cables and their connections are not faulty, then change the fuses. C. Repair or replace the control current circuit. D. Replace the contacts of the automatic motor protection switch, the magnet coil, or the entire automatic motor protection switch.
2. Tripping of the automatic motor protection switch (it trips immediately when power is turned on).	<ul style="list-style-type: none"> A. Burnt out fuses. B. Loose or faulty connection of the cables. C. Faulty motor winding. D. Mechanical blockage of the pump. E. Setting of the automatic motor protection switch is too low. 	<ul style="list-style-type: none"> A. Check that the cables and their connections are not faulty, then change the fuses. B. Check that the cables and their connections are not faulty, then change the fuses. C. Repair or replace the motor. D. Switch off the power and clean or repair the pump. E. Set the motor protector according to the rated current of the motor ($I_{1/1}$). See the identification plate.
3. The motor protection switch trips occasionally.	<ul style="list-style-type: none"> A. Setting of the automatic motor protection switch is too low. B. Periodic interruption in the power supply. C. Periodically low voltage. 	<ul style="list-style-type: none"> A. See 2. B B. See 2. B C. Check that the cables and their connections are not faulty or loose. Check that the pump power cable has the correct section.

Error conditions		
FAULTS	CHECKS (possible causes)	REMEDIES
4. Unstable pump performance.	<ul style="list-style-type: none"> A. Pressure at pump intake too low. B. Suction pipe partly clogged by impurities. C. Leak in the suction pipe. D. Air in the suction pipe or in the pump. 	<ul style="list-style-type: none"> A. Check the pump suction conditions. B. Remove and clean the suction pipe. C. Remove and repair the suction pipe. D. Vent the suction pipe or the pump. Check the pump suction conditions.
5. The pump is working but not supplying water.	<ul style="list-style-type: none"> A. Pressure at pump intake too low. B. Suction pipe partly blocked by impurities. C. Foot valve or non return valve blocked in closed position. D. Leaks in the suction pipe. E. Air in the suction pipe or in the pump. 	<ul style="list-style-type: none"> A. See 4. A B. See 4. B C. Remove and clean, repair or replace the valve. D. See 4. C E. See 4 D
6. The pump turns backwards when power is turned off.	<ul style="list-style-type: none"> A. Leak in the suction pipe. B. Faulty foot valve or non return valve. C. Foot valve completely or partly blocked in open position. 	<ul style="list-style-type: none"> A. See 4. C B. See 5. C C. See 5. C
7. Pump working with reduced performance.	<ul style="list-style-type: none"> A. Wrong direction of rotation. B. See 4. A, B, C, D 	<ul style="list-style-type: none"> A. Only for three-phase pumps: Switch off the electric power supply with the external circuit switch and exchange two phases in the terminal board. See also paragraph 7.2 "Checking the direction of rotation".

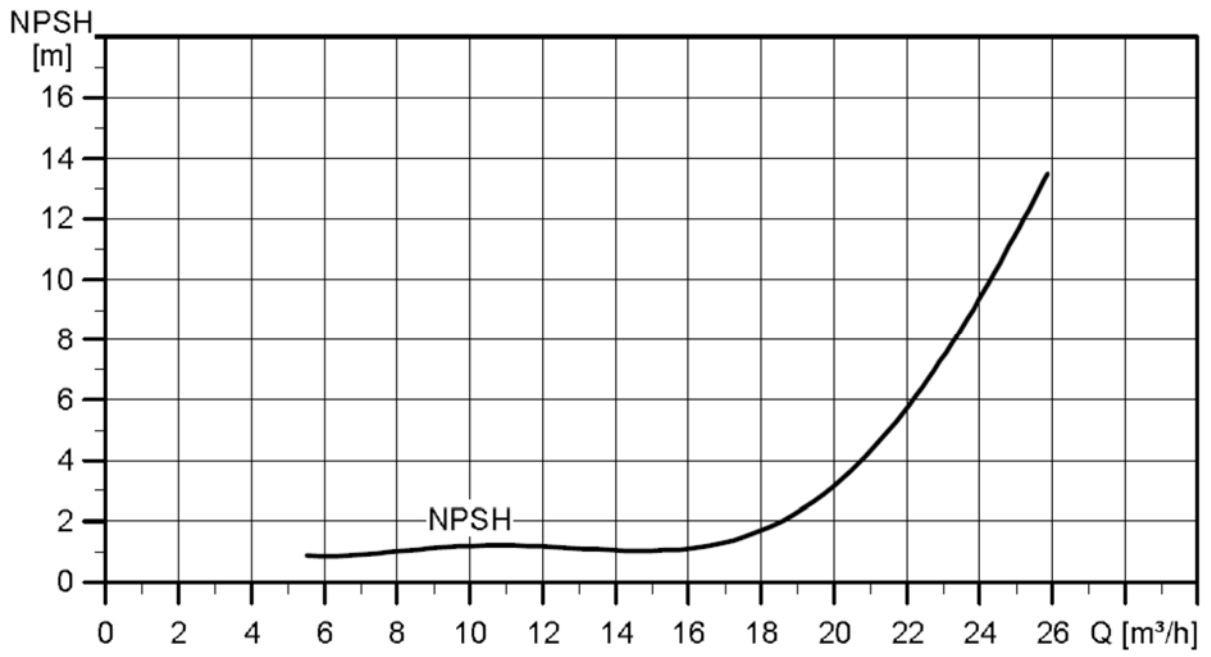


FIG. A NPSH KC – KCV 100/150

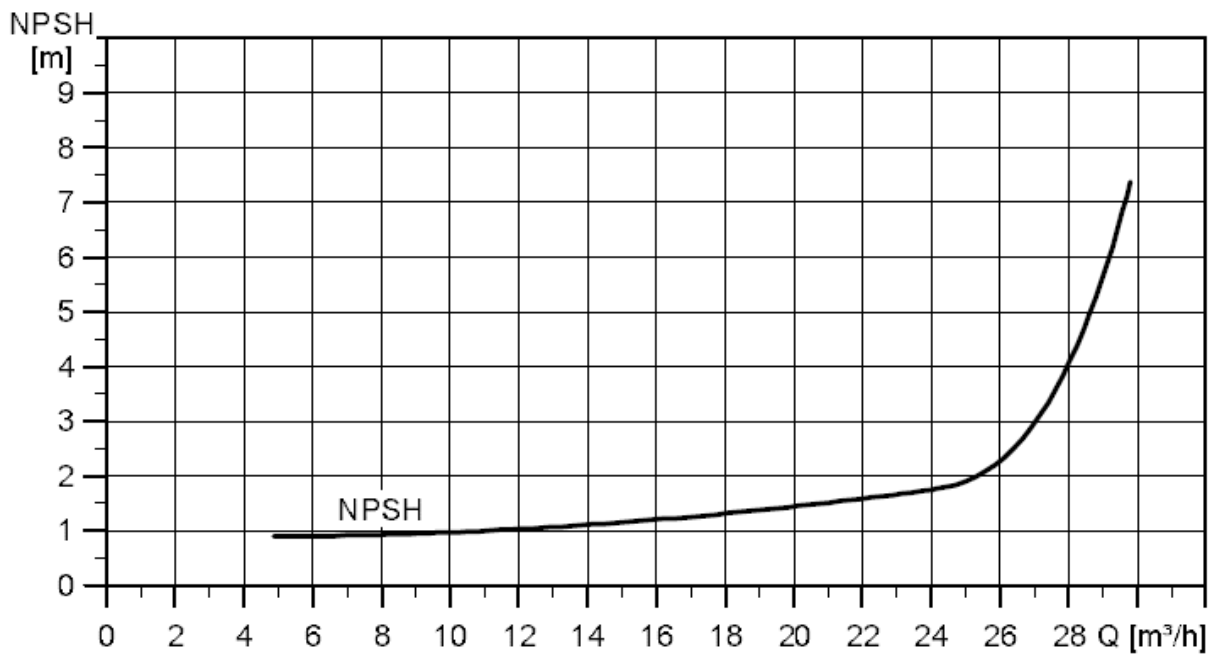


FIG. B NPSH KC – KCV 200

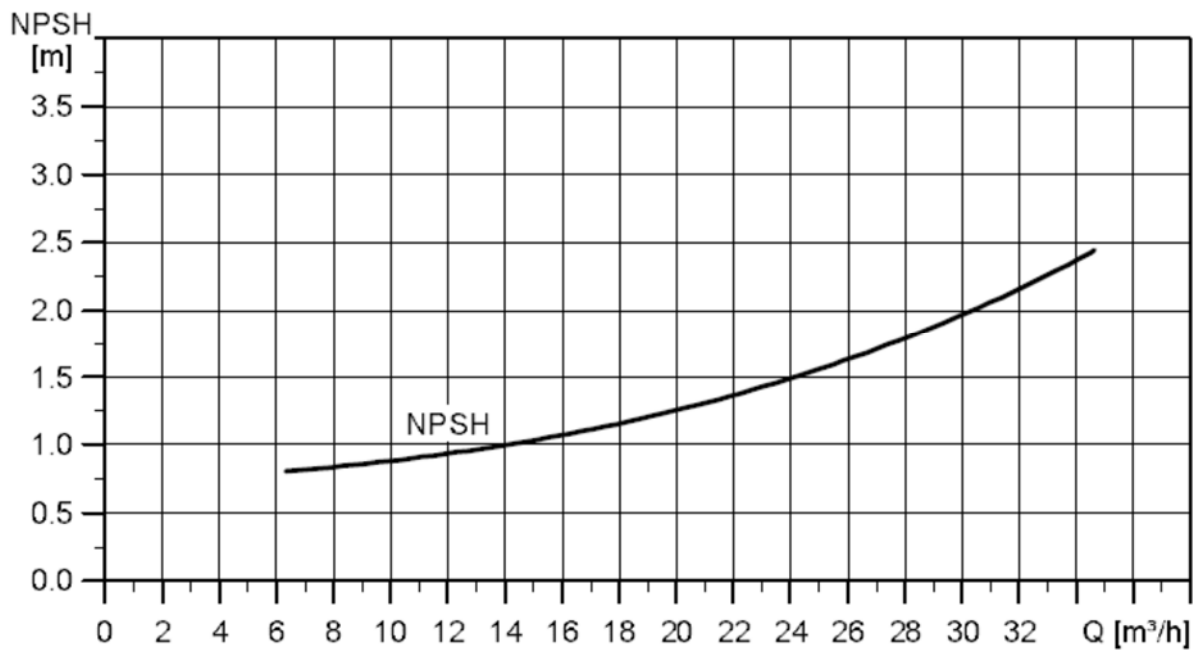


FIG. C NPSH KC – KCV 250

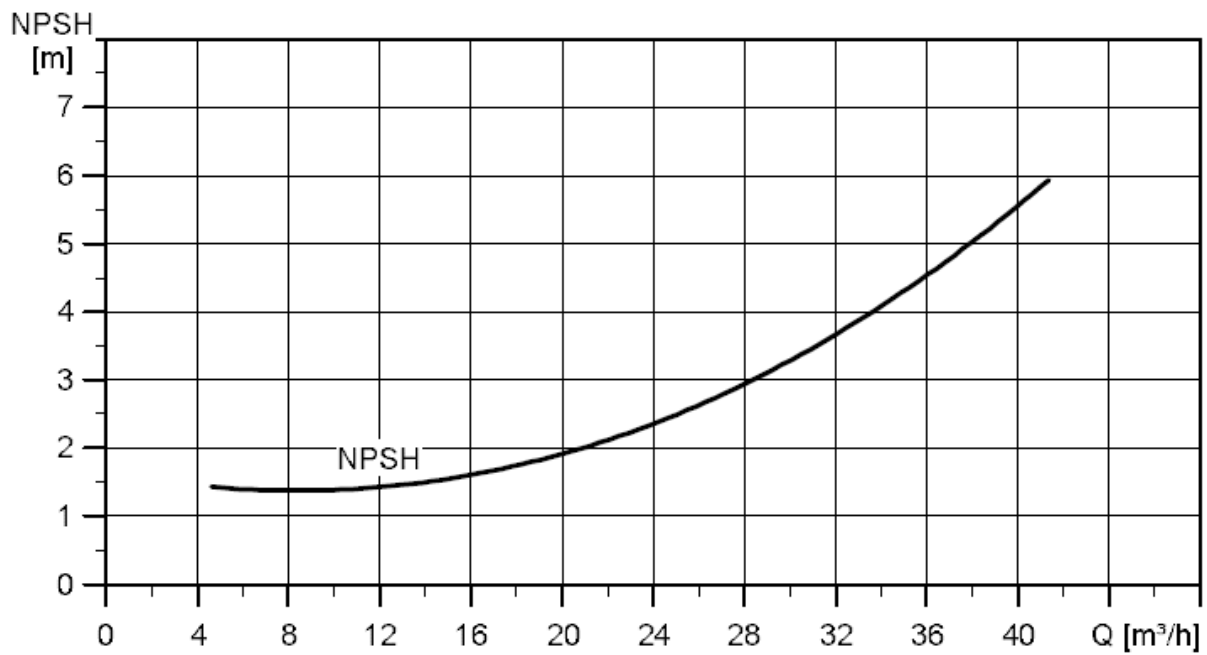


FIG. D NPSH KCV 300

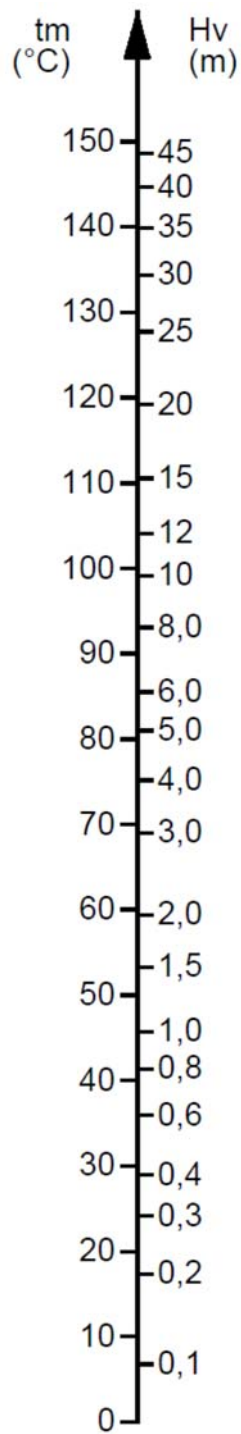


FIG. E Vapour pressure