CM-L

Leakage-free CM model

50/60 Hz

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GRUNDFOS

Table of contents

1. Introduction

This data booklet is a supplement to the CM, CME data booklet. It describes all the features and characteristics specific to the new CM Leakage-free (CM-L) model. For more detailed information about CM pumps, follow the link below to open the relevant data booklet:

TM05 8814 2713

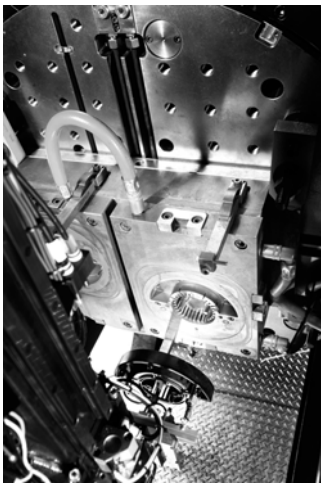
Product presentation

TM06 9639 2717

Fig. 1 Grundfos CM-L pump

Grundfos CM-L pumps are compact, horizontal pumps with a canned liquid-cooled motor. The hydraulics are from the well-known CM pump, and the pump is close-coupled non-self-priming. CM-L pumps have stainless steel hydraulics (EN 1.4301/AISI 304), with the exception of one wetted pump flange which is in EN-GJL-200. The canned motor is mains-operated and well-known from the Grundfos UPS. The motor has a stainless steel (EN 1.4301/AISI 304) rotor can. bearing plate and rotor cladding. The canned motor eliminates the need for a shaft seal and does not have mechanical ball-bearings or a motor-fan. CM-L pumps are available in various sizes and numbers of stages to provide the required flow and pressure. The pumps come in several voltages and with different approvals, making them suitable for use globally.

Applications



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CM-L pumps are designed for applications where leakage cannot be accepted, such as:

Delicate temperature control

- Cooling of equipment in server rooms
- Cooling of medical and laboratory equipment
- Cooling of industrial equipment like laser welders and injection moulding tools.

Temperature control units where maintenance is inconvenient

- Cooling of solar panels in remote areas
- Cooling of wind turbines.

Pumping of liquids at temperatures down to -20 °C

When pumping liquids at temperatures down to -20 °C, it is crucial that the pump parts are made of the correct materials and dimensioned correctly. At these temperatures, selecting wrong materials or dimensions may cause deformation in the pump due to thermal expansion which may eventually lead to stoppage. Max temperature of fluids is 60 °C

Pumping of high-viscous liquids

In applications where high-viscous liquids are pumped, the motor of the pump can be overloaded and the pump performance will be reduced. The viscosity of a pumped liquid strongly depends on the type of media pumped and its temperature. To meet the above-mentioned requirements, we offer

CM-L pumps with oversize motors.

2. Features and benefits

CM-L pumps offer the following benefits:

Compact design

The pump and motor are integrated in a compact, user-friendly design. The pump is fitted on a low-profile base plate, making it ideal for installation in systems where compactness is important.

Leakage-free

CM-L pumps are designed for delicate temperature control applications where leakage is not an option. The pumps are hermetically closed due to their canned motor and are therefore designed without a shaft-seal. This means that there is no dripping or risk of shaft seal breakage. Since there is no leakage, there is no need to refill the system which reduces the need for maintenance and removes the cost of refilling new liquid.

Ideal for use in cabinets

CM-L pumps enable the building of even more compact systems as the motor does not have a motor fan which eliminates the need for extra space between the pump and wall of the cabinet. A further advantage is that no dust will be blown around in the cabinet which could potentially damage the electrical components.

Customised solutions

It is easy to create variants for specific needs, for example:

- Pumping cold glycol by creating a pump with an oversize motor
- Make even more compact units by turning the pump outlet.

Maintenance free

The pumps are maintenance free if used for clean liquids without particles as the pumps are fitted with high quality liquid-cooled radial bearings which will last the lifetime of the pump.

Worldwide usage

With different voltage and frequency combinations, as well as CE and cURus approvals, the CM-L product ranges cover markets worldwide. The pumps are currently exempted from the MEPS marking.

Easy installation and commissioning

CM-L pumps enable easy installation and commissioning. Detailed multilingual installation and operating instructions are supplied with each pump.

Service-friendly

- No special service tools are required.
- Spare parts are in stock for quick delivery.
- Service parts are available as kits, single parts or bulks.
- Service instructions makes it simple to dismantle and assemble the pump.
- Service kit instructions are available where estimated as necessary.

Low sound pressure level

CM-L pumps offer very silent operation, as they do not have a motor fan which is the primary source of noise.

High-performance hydraulics

Pump efficiency is maximised by optimised hydraulics and carefully crafted production technology.

Electrocoated cast-iron parts

Electrocoated cast-iron parts for optimised corrosion resistance

Data and literature about the CM-L pumps

All literature, CAD drawings and technical data related to CM-L pumps are available online in Grundfos Product Center.

High reliability

CM-L pumps are built on thoroughly tested and reliable components. The hydraulics are from the well-known CM pump, while the motor comes from the UPS motor.

3. Type key

Example	CM	3	- 4	L	- F	- I1	- E	F	- K	- D	- N

Type range

CM Centrifugal Modular

Rated flow rate

Rated flow rate at 50 Hz [m^3/h]

Number of impellers

Pump version

LB: Oversize motors (1 kW size larger)

LE: Pumps with certificates/approvals

L: Leakage-free

LX: Special pump

Pipe connection

C: Tri-Clamp®

F: DIN/ANSI/JIS flange

P: Victaulic® coupling

R: Rp thread

S: NPT thread

Materials in contact with pump media

I1:	Sleeve	EN 1.4301/AISI 304
	Pump shaft	EN 1.4301/AISI 304
	Impellers/chambers	EN 1.4301/AISI 304
	Intermediate flange	EN-GJL-200

Rubber parts in pump and motor

E: EPDM (ethylene propylene)

V: FKM (Viton)

Supply voltage

F: 3 x 220-240/380-415 V, 50 Hz

O: 3 x 220-240/380-415 V, 50 Hz;
3 x 220-255/380-440 V, 60 Hz

W: 3 x 460 V, 60 Hz

Motor information

K: IP X4D, canned rotor motor

Mains plug

D: Cable gland included

Sensor

N: No sensor

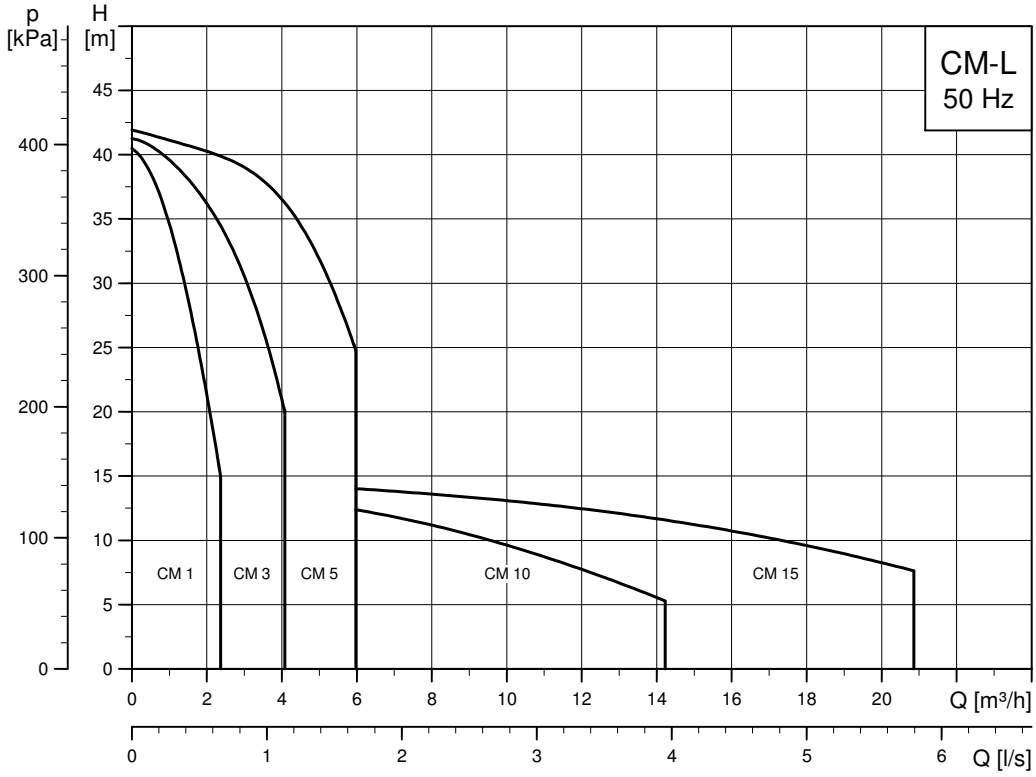
4. Product range

Pump type	Voltage		
	50 Hz	60 Hz	50/60 Hz
	3 x 220-240/380-415 V (supply voltage F)	3x460 V (supply voltage W)	3 x 220-240/380-415 V, 50Hz; 3x220-255/380-440 V, 60Hz (supply voltage O)
CM-L 1-2	•	•	•
CM-L 1-3	•	•	•
CM-L 1-4	•	•	•
CM-L 1-5	•	-	-
CM-L 3-2	•	•	•
CM-L 3-3	•	•	•
CM-L 3-4	•	•	•
CM-L 3-5	•	-	-
CM-L 5-2	•	•	•
CM-L 5-3	•	•	•
CM-L 5-4	•	•	•
CM-L 5-5	•	-	-
CM-L 10-1	-*	•	•
CM-L 15-1	•	•	•

• Available as standard
- Not available
* CM-L 10-1 is available as a 50/60 Hz version.

5. Performance range

CM-L, 50 Hz



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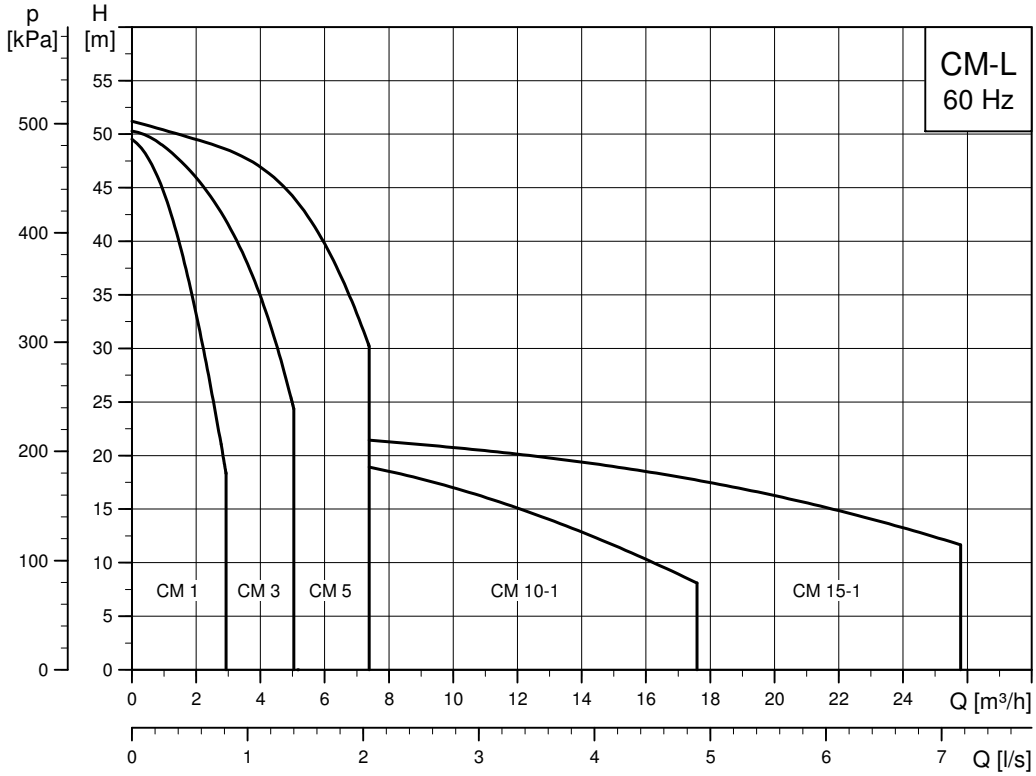
CM-L, 60 Hz



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6. Operating conditions

Ambient temperature

Ambient temperature: -20 °C to 55 °C.

Avoid condensing conditions. If the liquid temperature is lower than the ambient temperature, condensation can occur. Insulation covers must not cover the drain holes in the motor.

Liquid temperature

-20 °C to 60 °C.

Storage temperature

-30 °C to 55 °C.

Pumped liquids

Grundfos CM-L pumps are suitable for clean, thin, non-aggressive and non-explosive liquids without solid particles or fibres.

The pumps can be used for following liquids:

- Water at pH above 6.5 and chlorides below 300 mg/l (low residual concentration of disinfectants (like chlorine) are acceptable).
- Collants (see table below)
- Mineral and vegetable oils (non-flammable)
- Neutral salt solutions.

We do not recommend pumping acidic or alkaline liquids. Sulfur-containing oils must be properly inhibited to avoid corrosion of copper components. Also note that copper (from Rotor) in certain circumstances can cause catalytic degradation of oils (for example by presence of oxygen). Do not pump liquids containg additives that can disturb the functionality of the pump. The pumps must not be used to transfer flammable liquids such as diesel oil and petrol.

Coolants	Max. temperature (°C)	Max. concentration (%)	Elastomers	Trade name (examples)	Comments
Salt-based brines					
CaCl2	5	35	EPDM/FKM		Must be inhibited. Avoid air ingress.
NaCl	5	30	EPDM/FKM		Must be inhibited. Avoid air ingress.
K2CO3			EPDM		Must be inhibited. Avoid air ingress.
Ammonium hydroxide	Not suitable as copper is present in the pump				
Potassium format-based	30	30-50	EPDM	Freezium	Avoid air ingress.
Potassium acetate-based	30	30-50	EPDM	Tyfoxit	Avoid air ingress.
Glycols					
Propylene glycol-based	60	50	EPDM/FKM	Tyfocor-L, Antifrogen-L	Must be inhibited. Avoid air ingress.
Ethylene glycol-based	60	50	EPDM/FKM	Tyfocor	Must be inhibited. Avoid air ingress.
Alcohols					
Ethanol-based	25	30	EPDM		Must be inhibited. Avoid air ingress. Flash point 29 °C.
Methanol-based	25	30	EPDM		Must be inhibited. Avoid air ingress. Flash point 35 °C.
Oils					
Hydrocarbon-based	60	100	FKM	Dowtherm Q	
Silicone-based	60	100	EPDM/FKM	Syltherm XLT	
Fluorocarbon-based			EPDM	Galden, Fluorinert	
Engine/car coolants					
Glycols with AOT inhibitors	60	50	EPDM		Must be inhibited. Avoid air ingress.
Glycols with silicates	60	50	EPDM		Must be inhibited. Avoid air ingress.
Ammonia	Not suitable as copper is present in the pump				

Particles

Only liquids with a maximum of 50 ppm may be pumped. Only liquids with a maximum particle size of 0.25 mm may be pumped.

Viscosities

Pumping liquids with densities or kinematic viscosities higher than those of water will cause a considerable pressure drop, a drop in the hydraulic performance and a rise in power consumption. For example, at liquid temperatures below 0 °C (32 °F), higher motor outputs may be needed due to increased viscosity if glycol has been added to the water. In such cases, the CM-L pump can be fitted with an oversize motor. If in doubt, contact Grundfos or visit Grundfos Product Center.

Sound pressure

The sound pressure of CM-L pumps is significantly lower than that of traditional pumps due to their liquid-cooled motor.

Min. inlet and max. operating pressure

To avoid caviation noise and damage to the pump bearings, minimum 1 bar inlet pressure is required at the pump inlet port.

Maximum operating pressure is 10 bar.

7. Installation of pump

Install the pump according to the following instructions:

- Install the pump on a plane surface using the mounting holes in the motor base plate and a minimum of four bolts.
- Fix the pump so that it cannot be displaced during startup and operation.
- Install the pump inlet horizontally to avoid air pockets in the pump housing and pipes.
- Ensure easy access for inspection, maintenance and service.
- Install the pump in a well-ventilated location.

Figure 2 shows the permissible pump position (4).

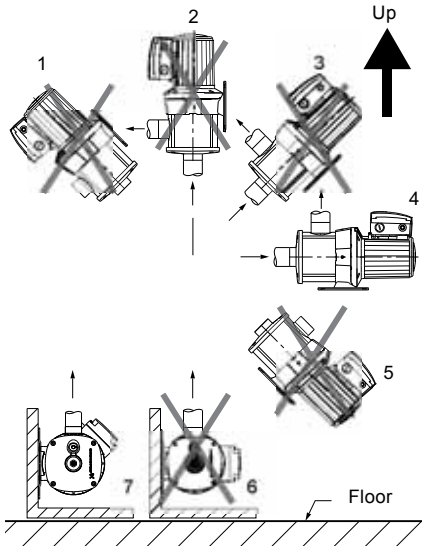

Fig. 2 Permissible pump position

Pump position	CM-L
1	-
2	-
3	-
4	●
5	-
6	-
7	❍

● Mounting in this position is allowed.

❍ Mounting in this position is allowed if the terminal box is set to an angle of 45 ° pointing upwards.

8. Construction

Pump

CM-L pumps are leakage-free, horizontal, multistage centrifugal pumps. The pumps have an axial inlet port, radial outlet port and are mounted on a baseplate. All movable parts are made of stainless steel. The pumps are fitted with canned type motors.

Sectional drawing

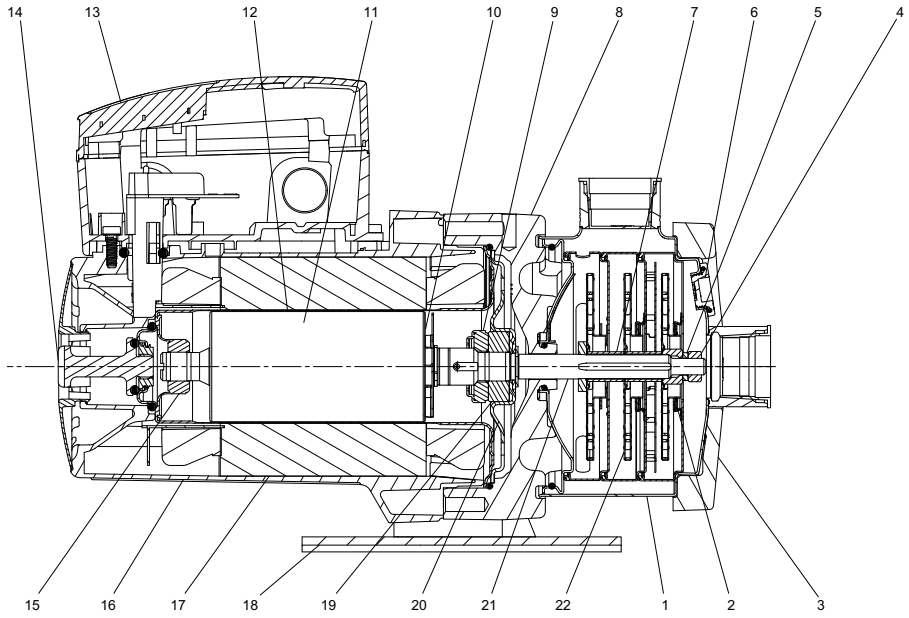

Fig. 3 CM-L 1-3 (non-self-priming version)

Components

Pos.	Description	Material	EN/DIN
1	Pump Sleeve	Stainless steel	EN 1.4301/AISI 304
2	Chamber with neck ring (PTFE)	Stainless steel	EN 1.4301/AISI 304
3	Retainer flange	Cast Iron CED painted	EN-GJL-200
4	Nut	Stainless steel A4	
5	Washer Nordlock	Stainless steel	EN 1.4547
6	Plug	Stainless steel	EN 1.4404
7	Spacing pipe	Stainless steel	EN 1.4401/AISI 316
8	Motor flange	Cast Iron CED painted	EN-GJL-200
9	Thrust axial bearing, rotating	Carbon-Graphite CY103	
10	Rotor ends	Cobber	
11	Rotor with shaft	Stainless steel	EN 1.4301/AISI 304
12	Rotor can	Stainless steel	EN 1.4301/AISI 304
13	Terminal box	Ultramide A3XZG5 PA66	
14	Inspection screw	Brass with Nickel	
15	Radial bearing, NDE	Ceramic Alumina	
16	Stator housing	AISI 10Cu2 CED painted AlCi10Cu2 2K paint	
17	Stator windings	Copper wire	
18	Base plate	Steel CED painted	EN 1.0330.3
19	Radial bearing, DE Thrust axial bearing, stationary	Ceramic Alumina (UP40), SIC (UP80)	
20	Bearing plate	Stainless steel	EN 1.4301/AISI 304
21	Pump shaft	Stainless steel	EN 1.4301/AISI 304
22	Impeller	Stainless steel	EN 1.4301/AISI 304

Two types of O-rings are available: EPDM (standard) and FKM (variant).

Motor data

The motor is a 2-pole asynchronous squirrel-cage motor. The motor is cooled by the pumped liquid and does not have a motor-fan. The motor has liquid-cooled radial and thrust bearings instead of ball-bearings.

Standard voltages

- 3 x 220-240/380-415 V, 50 Hz (supply voltage F)
- 3 x 460 V, 60 Hz (supply voltage W)
- 3 x 220-240/380-415 V, 50 Hz; 220-255/380-440 V, 60 Hz (supply voltage O)

Voltage tolerance: ± 5 %.

Electrical tolerances according to EN 60034.

Enclosure class: IP X4D.

Insulation class: F.

Maximum number of start and stop: 100 per hour.

Motor protection

The motor does not have internal protection and must be used with external protection.

Frequency converter drive

CM-L pumps cannot be used with an external frequency converter.

The terminal box is made of black composite material. and it is equipped with M20 x 1.5 screwed cable entry for mains connection.

Customisation

Although the Grundfos CM product range offers a number of pumps for different applications, customers require specific pump solutions to satisfy their needs. Below are the options available for customising CM-L pumps.

Contact Grundfos for detailed information or for requests other than the ones mentioned below.

Motors

Oversize motors

The available motor sizes are shown in section *18. Motor data* on page 32.

Oversize motors are defined as the next kW size above the fitted standard motor.

We recommend that you use an oversize motor if the operation conditions fall outside the standard conditions.

We especially recommend oversize motors in if the viscosity or density of the pumped liquid is higher than that of water.

Terminal box positions

As standard, the terminal box is mounted in 12 o'clock position. CM-L pumps are available with terminal box positions 10 and 2 o'clock on special request.

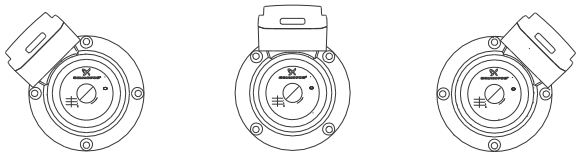

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Fig. 4 Possible positions for the terminal box

Alternative outlet positions

The pumps are available with various connection positions on special request. See fig. 5.

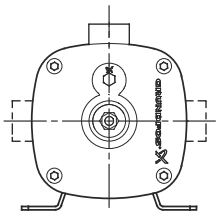

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Fig. 5 Alternative connection positions seen from pump inlet side

9. Approvals and markings

The following approvals and markings are available as standard.

Approvals

- cURus

cURus

The cURus approval covers the standard product range within the following supply voltages:

- 3 x 220-255/380-440 V, 60 Hz (supply voltage O)
- 3 x 460 V, 60 Hz (suply voltage W).

Markings

CE

cURus

10. Certificates

Certificate	Description
Certificate of compliance with the order	According to EN 10204. 2.1. Grundfos document certifying that the pump supplied is in compliance with the order specifications.
Test certificate. Non-specific inspection and testing	According to EN 10204. 2.2. Certificate with inspection and test results of a non-specific pump.
Standard test report	Certifies that the main components of the specific pump are manufactured by Grundfos. and that the pump has been QH-tested. inspected and conforms to the full requirements of the appropriate catalogues. drawings and specifications.
Material specification report	Certifies the material used for the main components of the specific pump.

11. Selection and sizing

Selection of pumps

Select pumps based on these elements:

- the duty point of the pump
- dimensional data such as pressure loss as a result of height differences. friction loss in the pipes and pump efficiency.

Duty point

From a duty point, it is possible to select a pump on the basis of the curve charts starting on page 19.

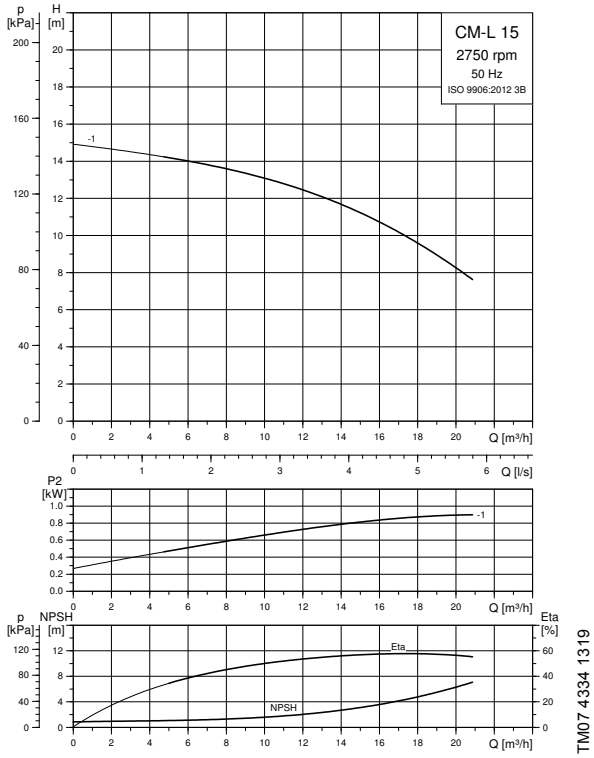

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Fig. 6 Example of a curve chart

Pump efficiency

When sizing the pump, the efficiency (eta) must be considered so that the pump will operate at or near its maximum efficiency, for instance on the right-hand side in the curve example in fig. 7.

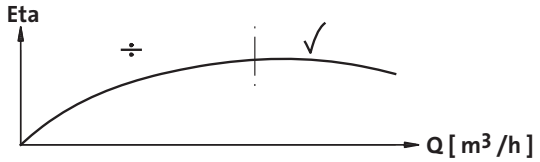

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Fig. 7 Best efficiency

Before determining the best efficiency point, the operation pattern of the pump needs to be identified. If the pump is expected to operate at the same duty point, then select a CM-L pump which is operating at a duty point corresponding to the best efficiency of the pump. The example in fig. 8 shows how to check the pump efficiency when selecting a CM-L pump.

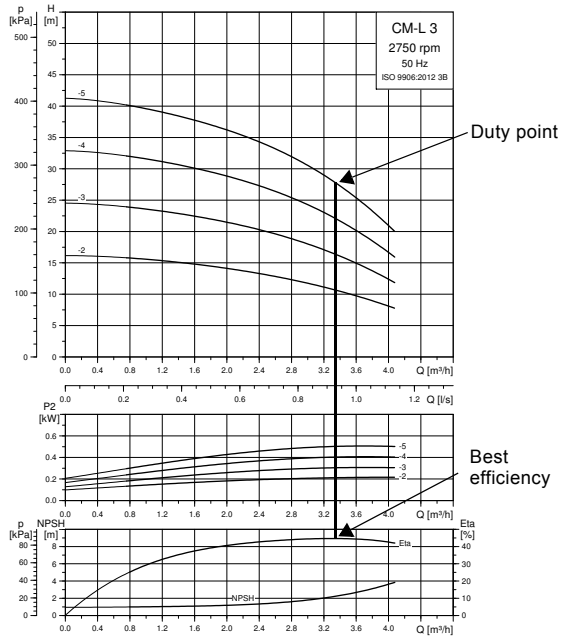

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Fig. 8 Example of a CM-L pump's duty point

Pump connections

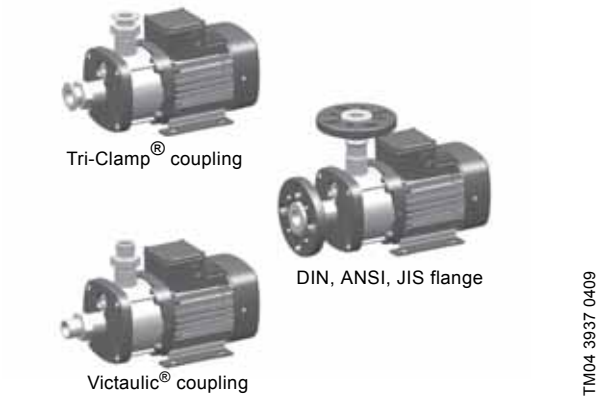


Fig. 9 Examples of pump connections

Selection of pump connection depends on the rated pressure and pipes. To meet any requirement, the CM-L pumps offer a wide range of flexible connections such as:

- Tri-Clamp® coupling
- DIN flange
- ANSI flange
- Victaulic® coupling.

For further information on pump connections. see *Accessories* on page 33.

12. How to read the curve charts

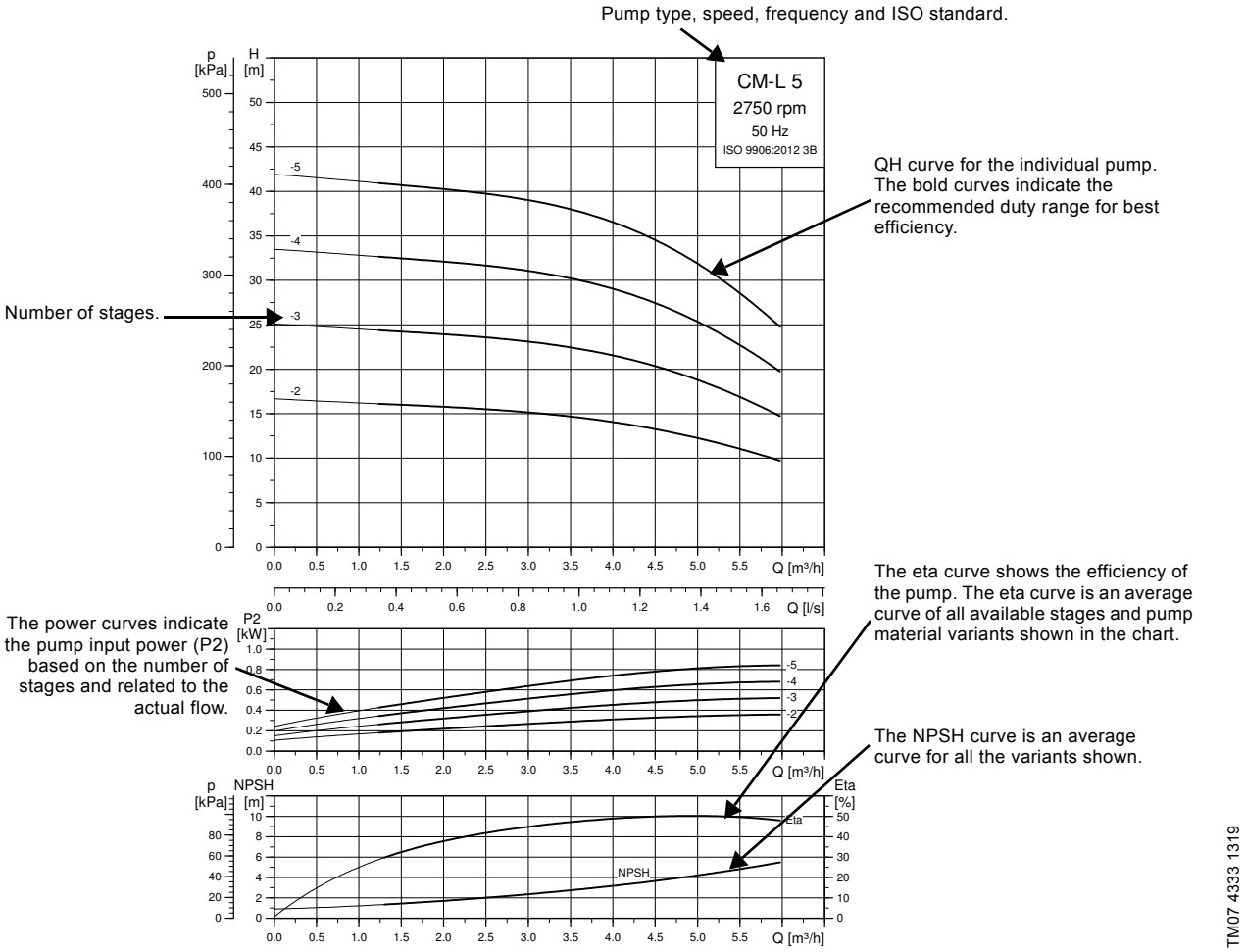


Fig. 10 Example of how to read the curve charts

Guidelines for performance curves

The guidelines below apply to the curves shown on the following pages:

- Tolerances to ISO 9906:2012 3B, if indicated.
- Measurements have been made with airless water at a temperature of +20 °C.
- The curves apply to the following kinematic viscosity: υ = 1 mm^2/s (1 cSt).
- The QH curves apply to fixed speeds of 2750 min^{-1} (50 Hz) and 3400 min^{-1} (60 Hz).
  Note: The actual speed will in most cases deviate from the above-mentioned speeds. So for realistic curves, please refer to Grundfos Product Center where the pump curves include the characteristics of the selected motor and therefore show curves at actual speeds. In Grundfos Product Center, it is also possible to adjust the curves depending on the density and viscosity.
- The conversion between head H (m) and pressure p (kPa) applies to a water density of ρ = 1000 kg/m^3.
- **Note:** The NPSH curve is given for reference only as 1 bar inlet pressure is always needed on CM-L pumps.
- Due to the risk of overheating, the pumps must not be used continuously at a flow below the minimum flow rate. The curve in fig. 11 shows the minimum flow rate as a percentage of the rated flow rate in relation to the liquid temperature.

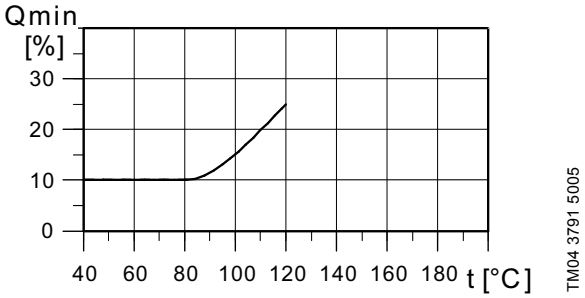
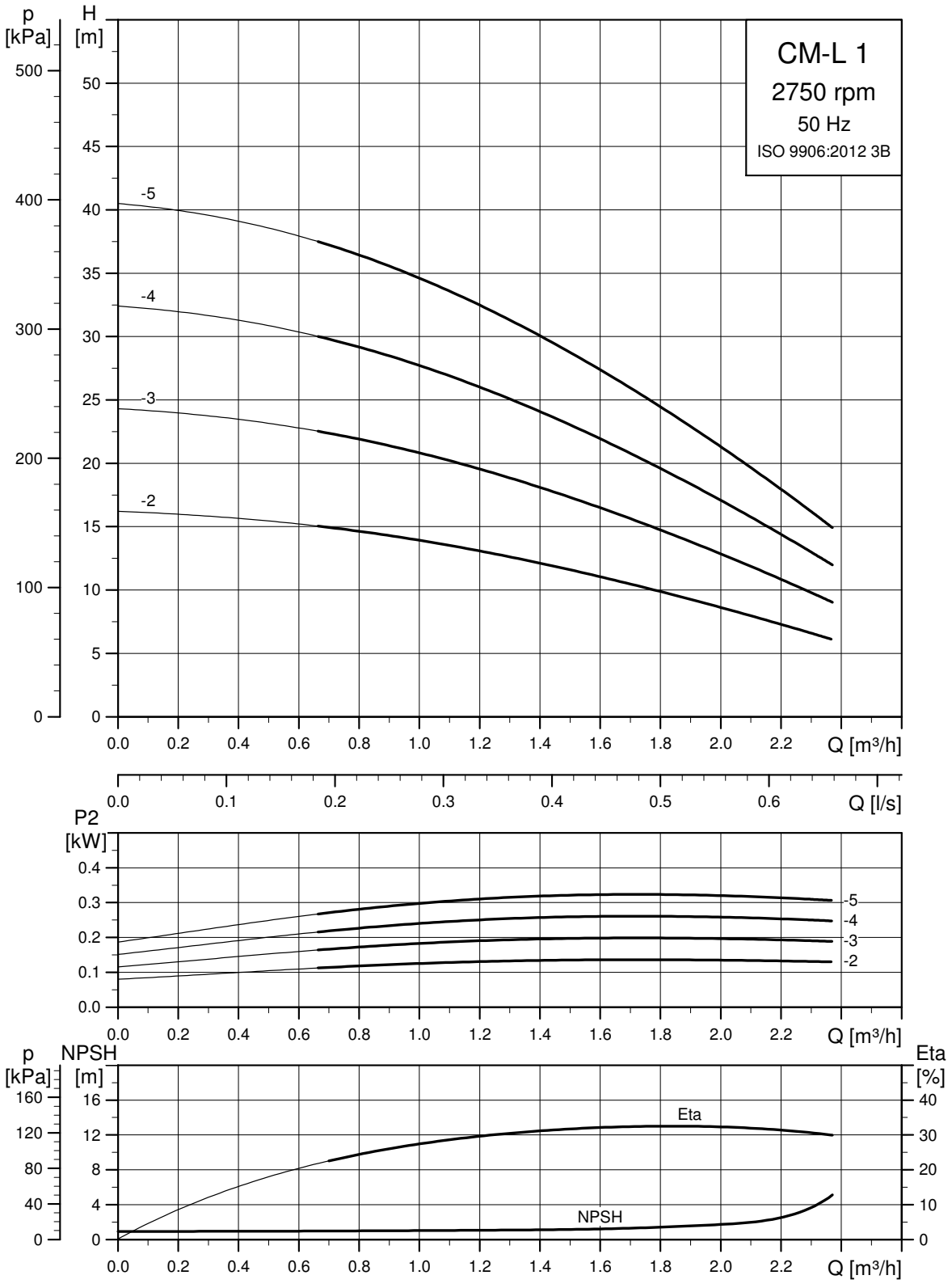


Fig. 11 Minimum flow rate

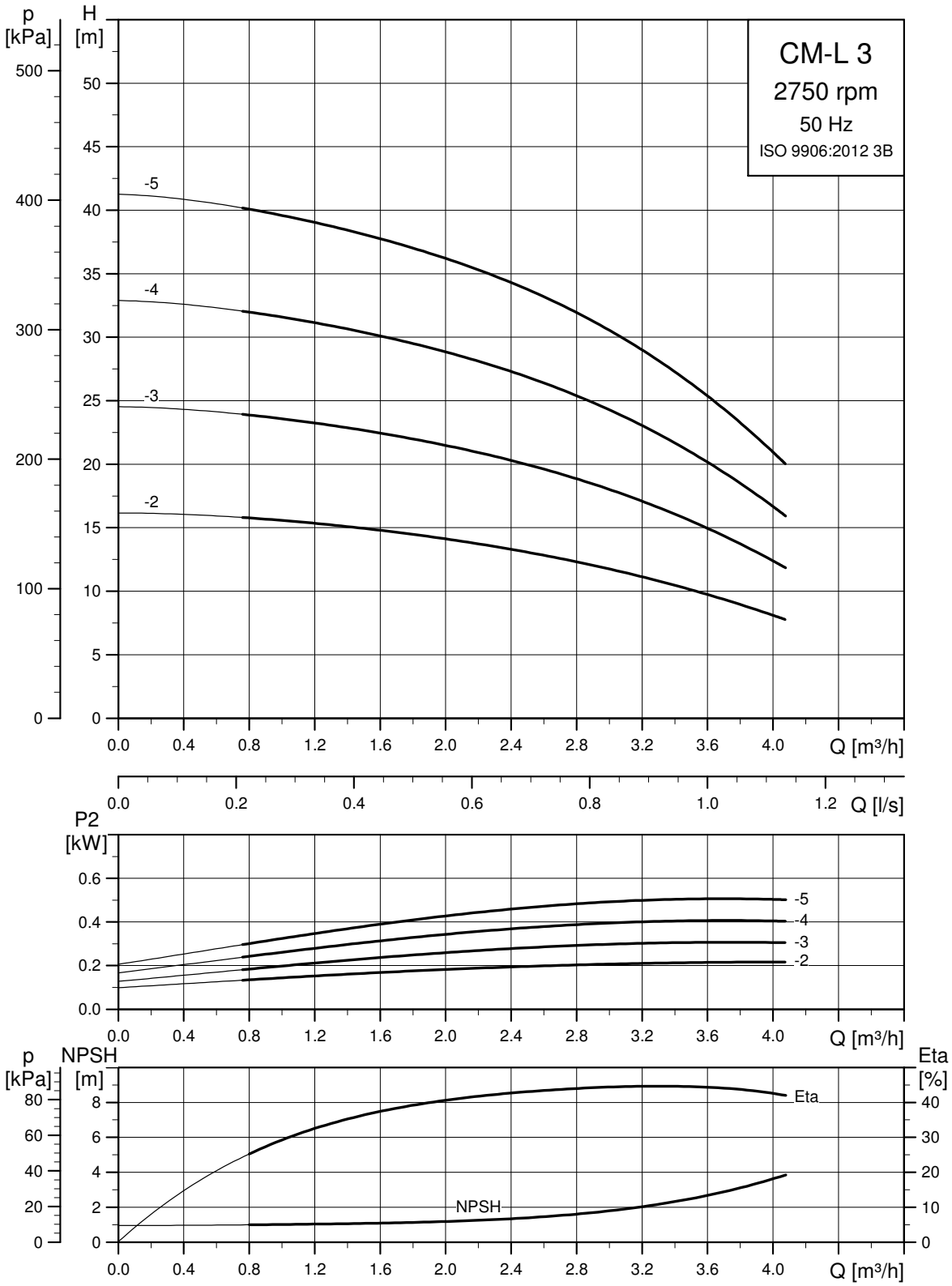
13. Performance curves, CM-L, 50 Hz

CM-L 1



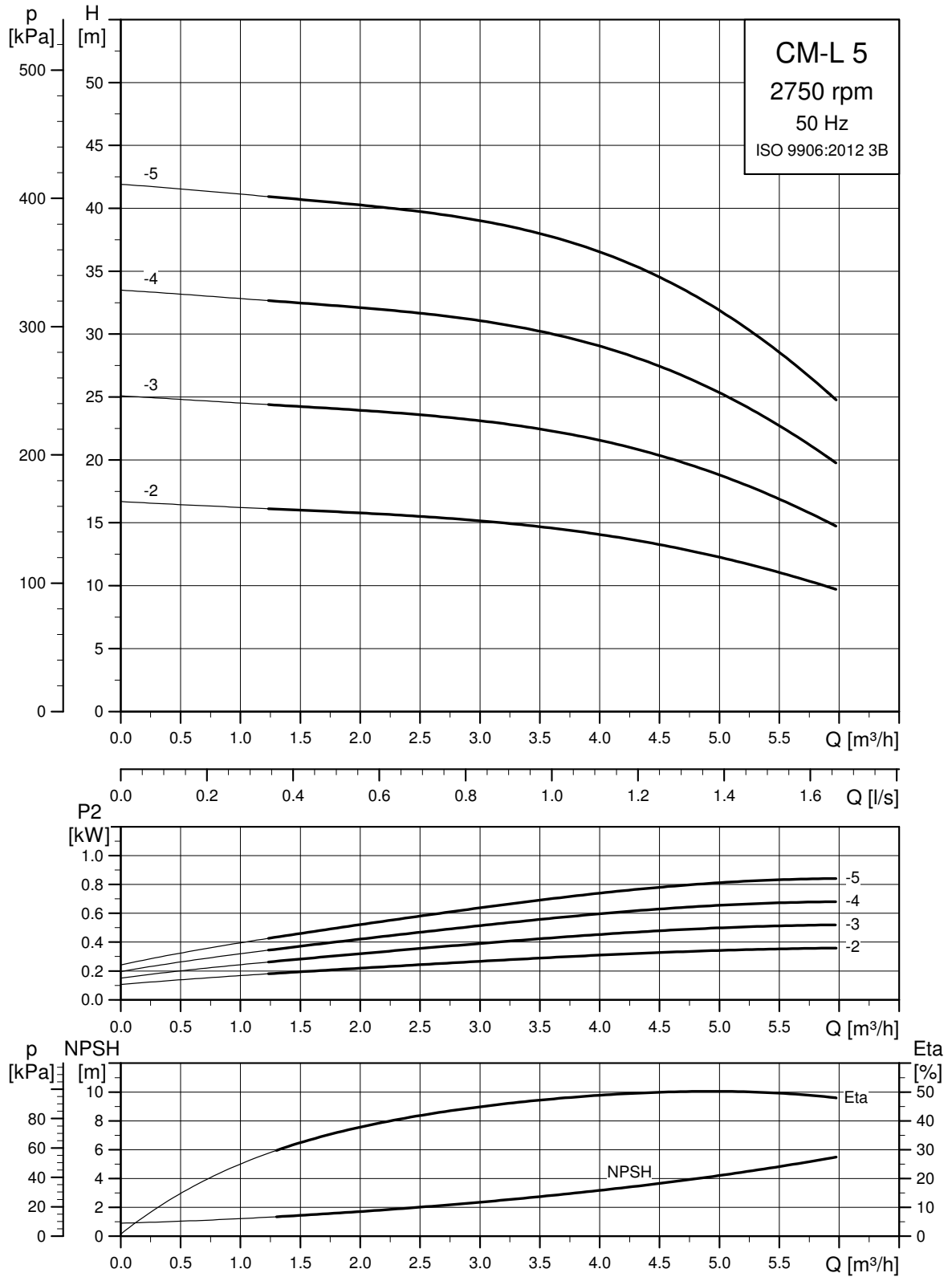
Note: The QH curves apply to fixed speeds of 2750 min^{-1} (50 Hz) and 3400 min^{-1} (60 Hz).

CM-L 3



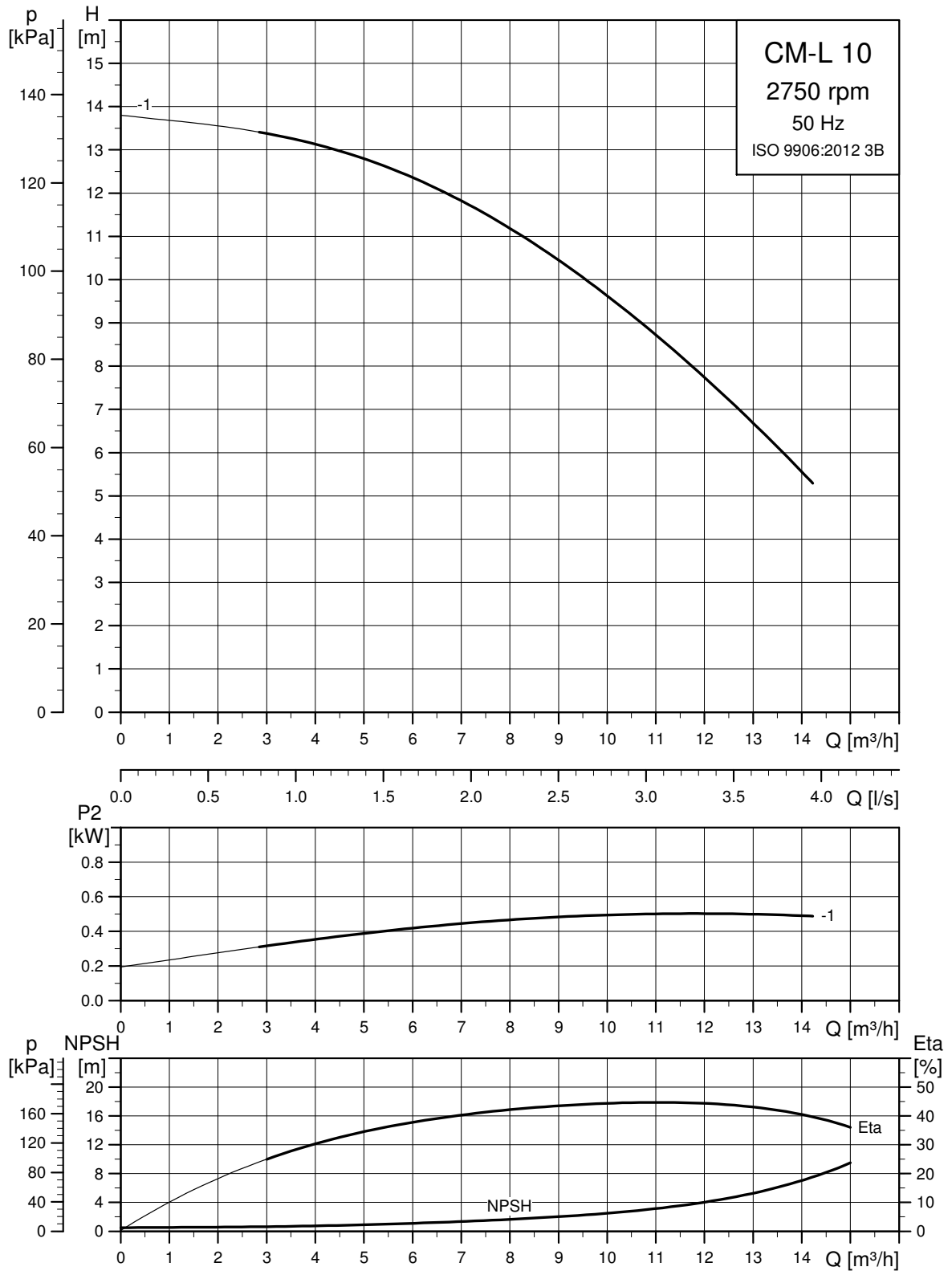
Note: The QH curves apply to fixed speeds of 2750 min^{-1} (50 Hz) and 3400 min^{-1} (60 Hz).

CM-L 5



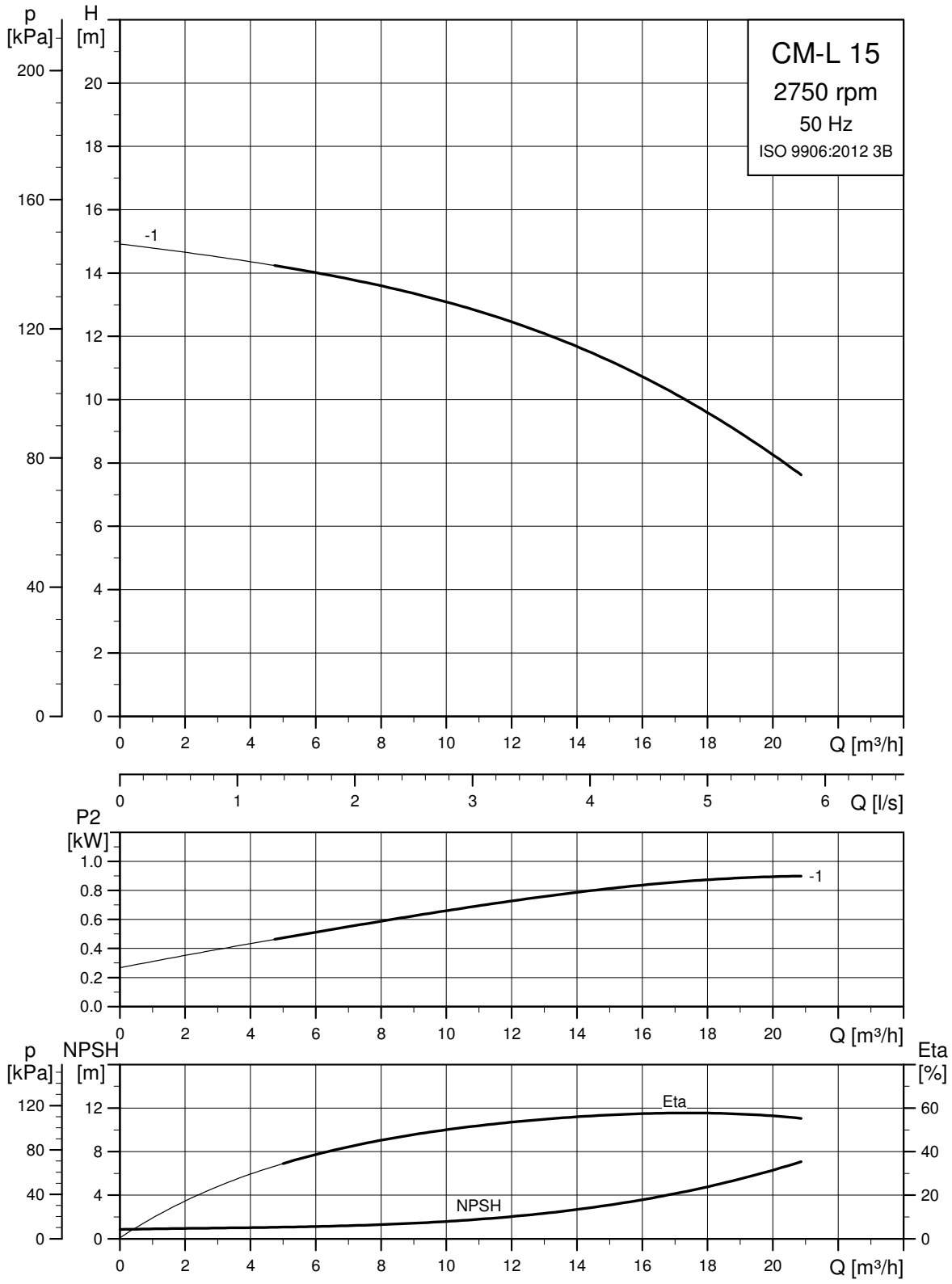
Note: The QH curves apply to fixed speeds of 2750 min^{-1} (50 Hz) and 3400 min^{-1} (60 Hz).

CM-L 10



Note: The QH curves apply to fixed speeds of 2750 min^{-1} (50 Hz) and 3400 min^{-1} (60 Hz).

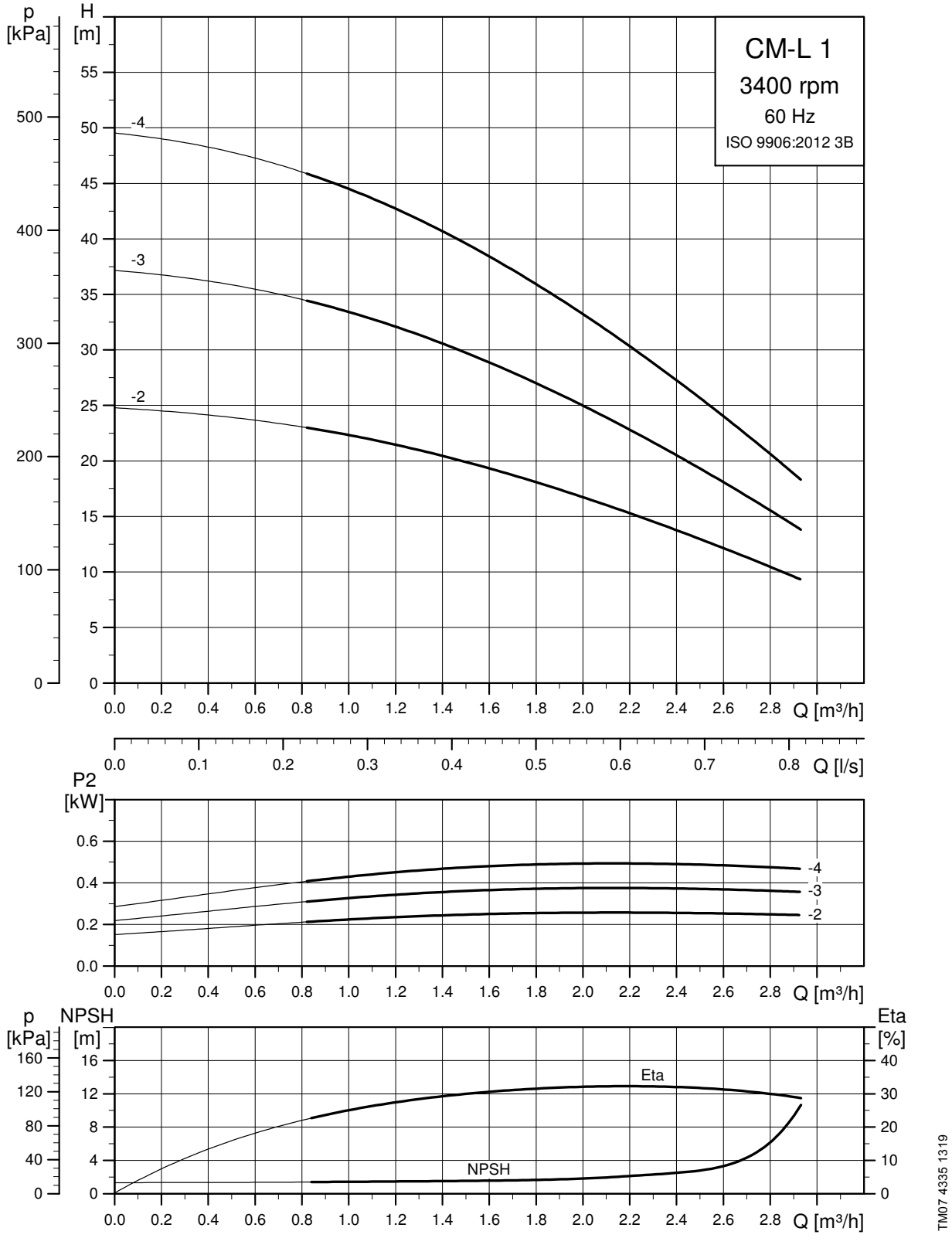
CM-L 15



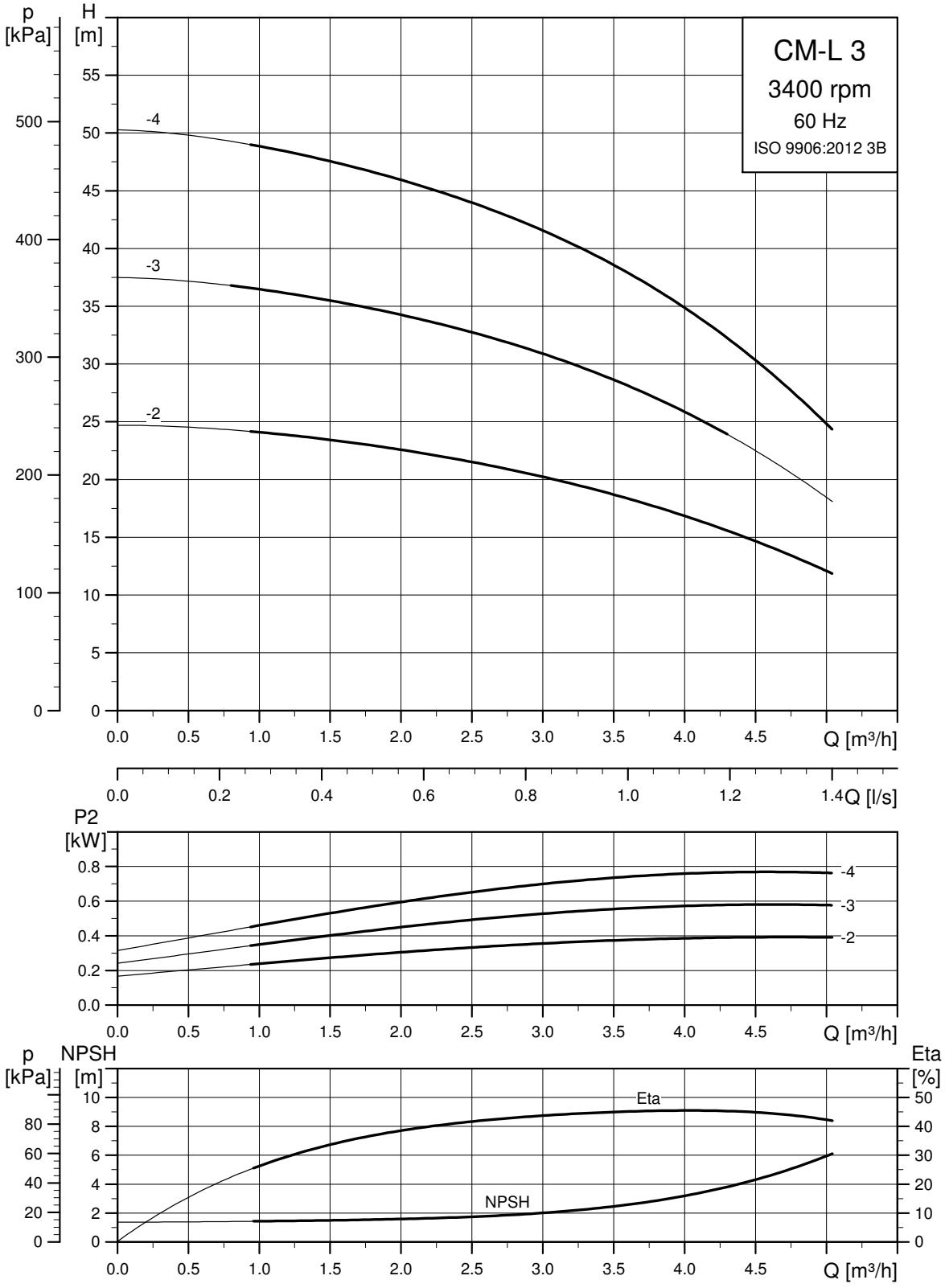
Note: The QH curves apply to fixed speeds of 2750 min^{-1} (50 Hz) and 3400 min^{-1} (60 Hz).

14. Performance curves, CM-L, 60 Hz

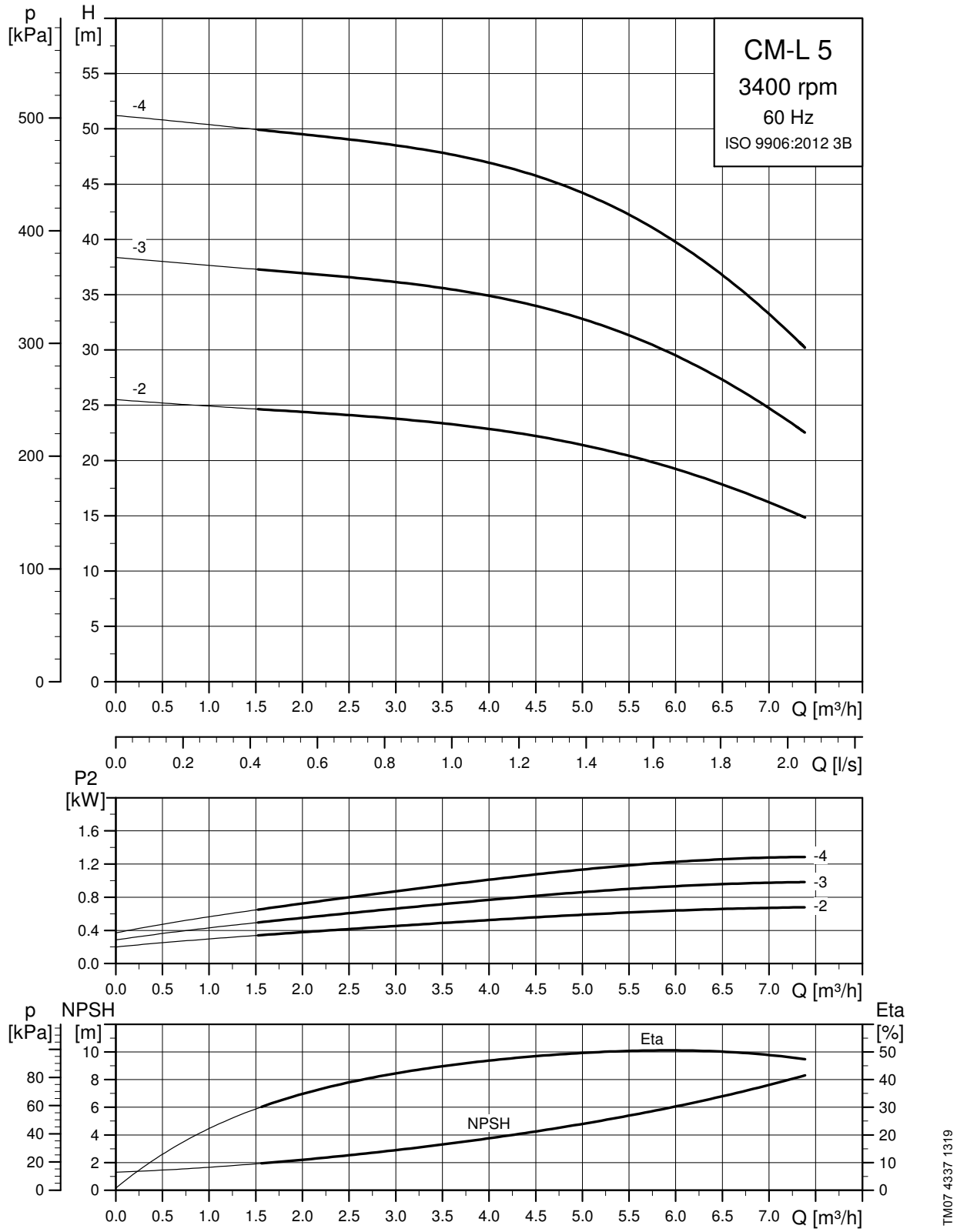
CM-L 1



CM-L 3

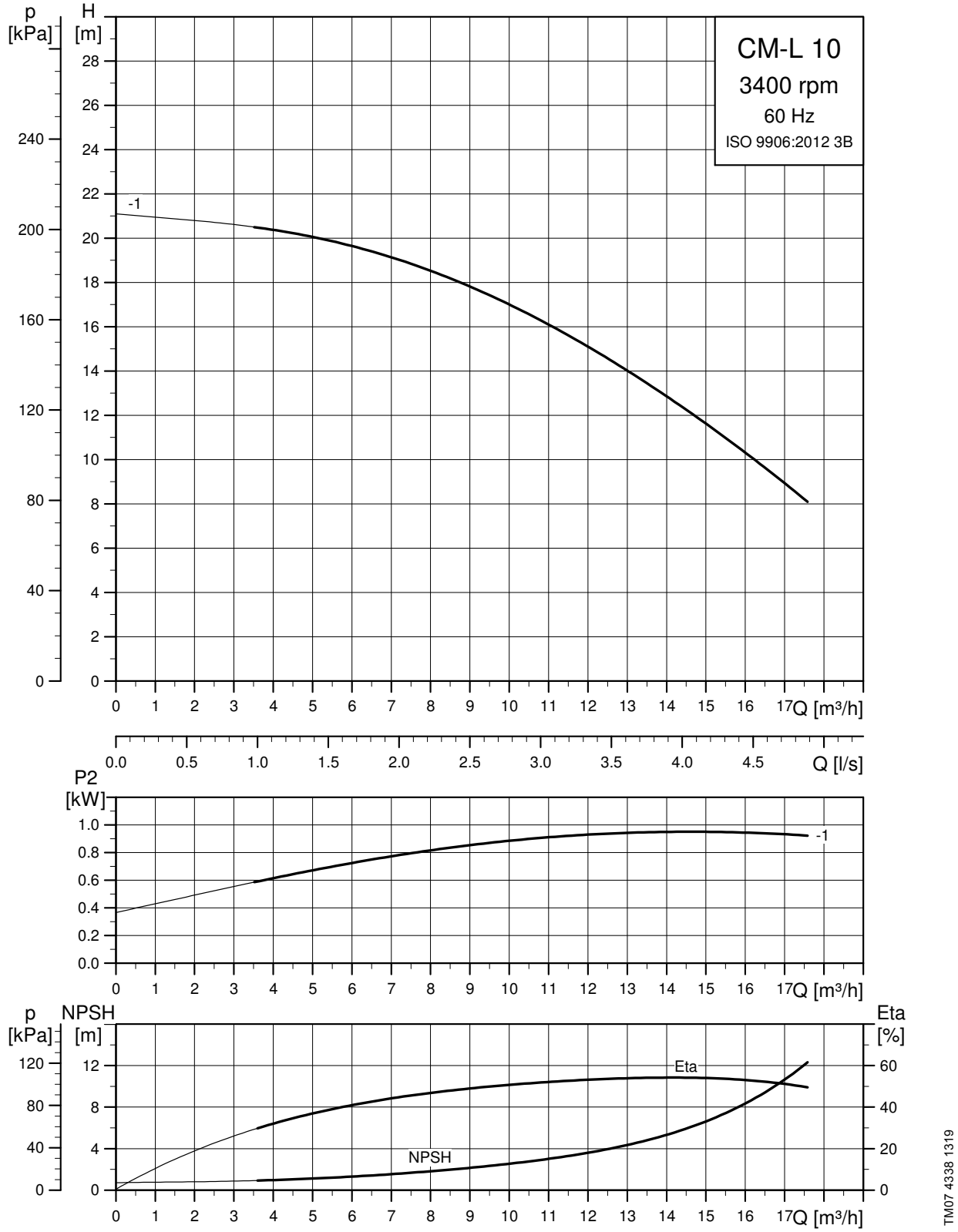

CM-L 3
3400 rpm
60 Hz
ISO 9906:2012 3B
p [kPa]
H [m]
-4
-3
-2
Q [m³/h]
Q [l/s]
P2 [kW]
p [kPa]
NPSH [m]
Eta [%]
Eta
NPSH
TM07 4336 1319

CM-L 5

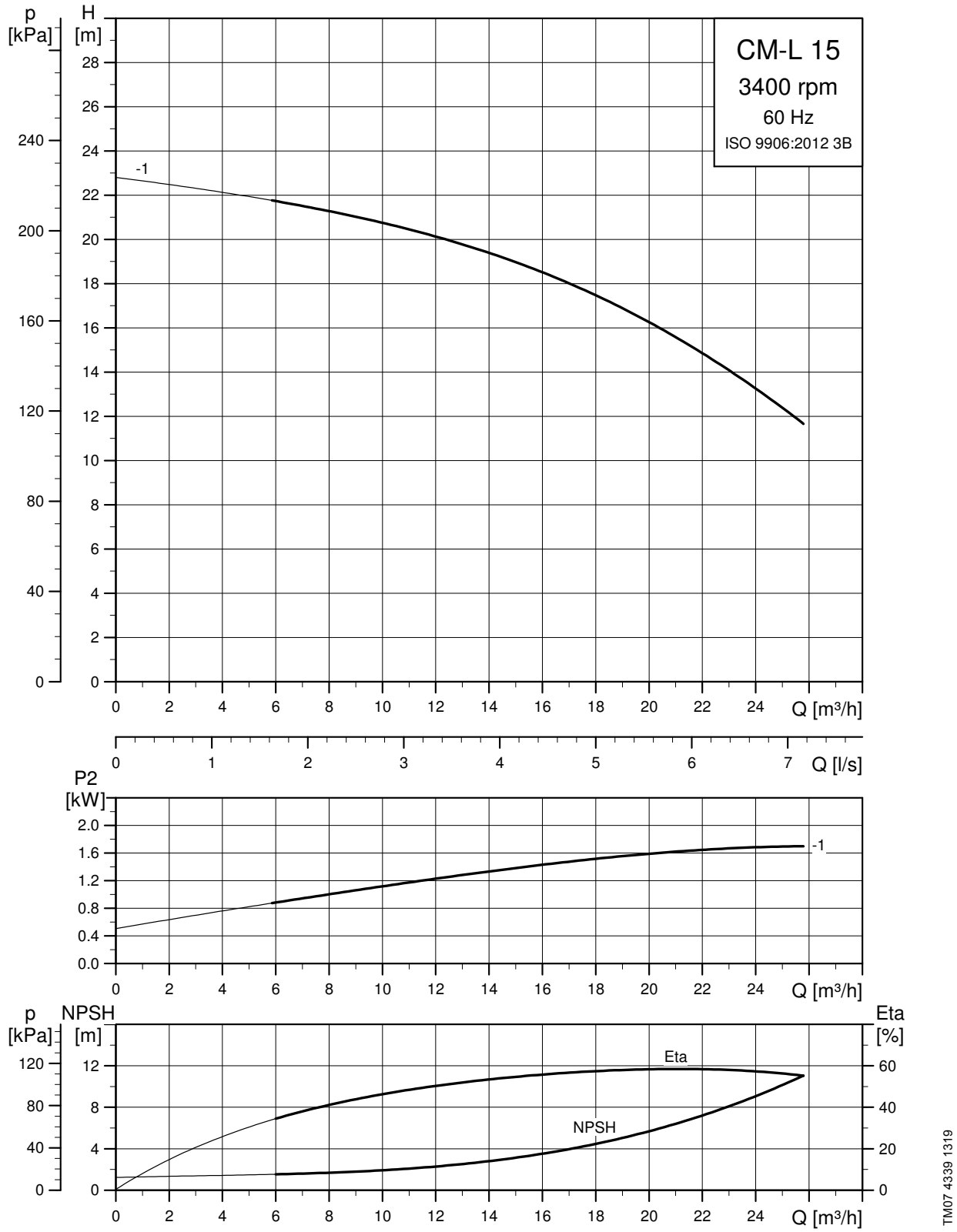


Note: The QH curves apply to fixed speeds of 2750 min^{-1} (50 Hz) and 3400 min^{-1} (60 Hz).

CM-L 10

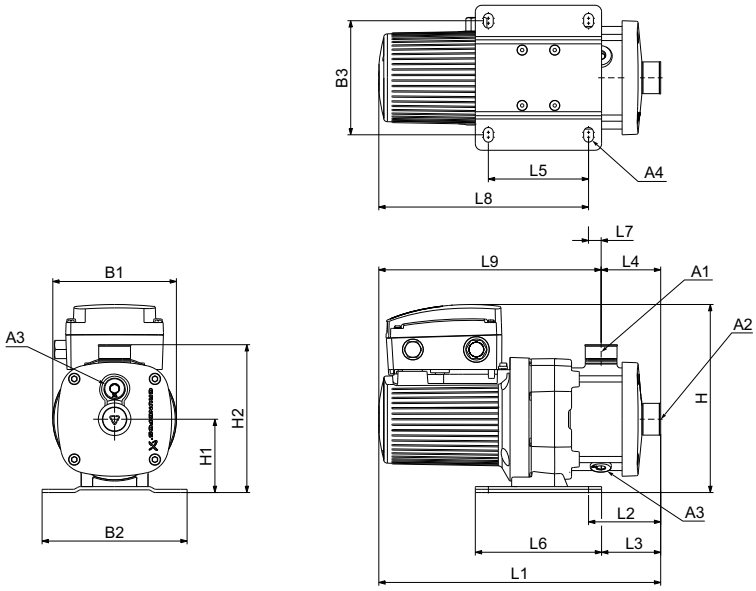

CM-L 10
3400 rpm
60 Hz
ISO 9906:2012 3B
p [kPa]
H [m]
-1
Q [m³/h]
Q [l/s]
P2 [kW]
-1
p [kPa]
NPSH [m]
Eta [%]
Eta
NPSH
Q [m³/h]
TM07 4338 1319

CM-L 15



Note: The QH curves apply to fixed speeds of 2750 min^{-1} (50 Hz) and 3400 min^{-1} (60 Hz).

15. Dimensions, CM-L, 50 Hz



TM07 4119 1019

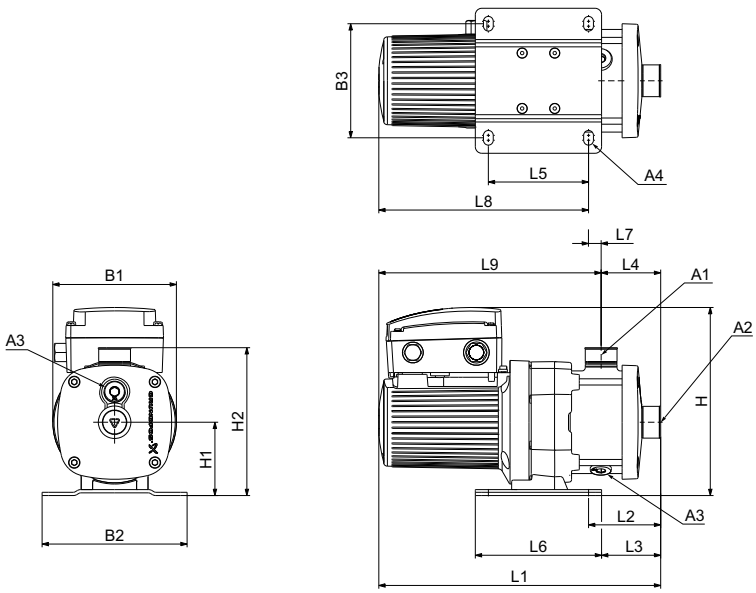
3 x 220-240/380-415 V, 50 Hz (supply voltage F)

Pump type	Motor type	P_2 [kW]	Dimensions																		
			A1	A2	A3	A4	B1	B2	B3	H	H1	H2	L1	L2	L3	L4	L5	L6	L7	L8	L9
CM-L 1-2	UP40/75	0.4	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 1-3	UP40/75	0.4	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 1-4	UP40/75	0.4	1"	1"	3/8"	12	152	178	141	231	90	180	363	107	90	90	123	155	16	257	273
CM-L 1-5	UP40/75	0.4	1"	1"	3/8"	12	152	178	141	231	90	180	381	125	108	108	123	155	16	257	273
CM-L 3-2	UP40/75	0.4	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 3-3	UP40/75	0.4	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 3-4	UP40/75	0.4	1"	1"	3/8"	12	152	178	141	231	90	180	363	107	90	90	123	155	16	257	273
CM-L 3-5	UP40/100	0.5	1"	1"	3/8"	12	152	178	141	231	90	180	381	125	108	108	123	155	16	257	273
CM-L 5-2	UP40/75	0.4	1"	1 1/4"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 5-3	UP40/100	0.5	1"	1 1/4"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 5-4	UP80/55	0.7	1"	1 1/4"	3/8"	12	202	228	190	268	112	203	350	94	78	90	140	172	4	272	260
CM-L 5-5	UP80/75	1.1	1"	1 1/4"	3/8"	12	202	228	190	268	112	203	413	112	96	108	140	172	8	301	305
CM-L 15-1	UP80/75	1.1	2"	2"	3/8"	12	202	228	190	268	112	231	427	113	97	105	140	172	8	314	322

For CM-L 10-1 dimensions, please see page 30.

All dimensions are in mm unless otherwise stated.

16. Dimensions, CM-L, 60 Hz and 50/60 Hz



TM07 4119 1019

3 x 220-240/380-415 V, 50 Hz; 3 x 220-255/380-440 V, 60 Hz (supply voltage O)

Pump type	Motor type	P_2 [kW]	Dimensions																		
			A1	A2	A3	A4	B1	B2	B3	H	H1	H2	L1	L2	L3	L4	L5	L6	L7	L8	L9
CM-L 1-2	UP40/75	0.5	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 1-3	UP40/75	0.5	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 1-4	UP40/75	0.5	1"	1"	3/8"	12	152	178	141	231	90	180	363	107	90	90	123	155	16	257	273
CM-L 3-2	UP40/75	0.5	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 3-3	UP40/100	0.6	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 3-4	UP80/55	0.8	1"	1"	3/8"	12	202	228	190	268	112	203	350	94	78	90	140	172	4	272	260
CM-L 5-2	UP40/100	0.6	1"	1 1/4"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 5-3	UP80/75	1.2	1"	1 1/4"	3/8"	12	202	228	190	268	112	203	377	76	60	72	140	172	8	301	305
CM-L 5-4	UP80/75	1.2	1"	1 1/4"	3/8"	12	202	228	190	268	112	203	395	94	78	90	140	172	8	301	305
CM-L 10-1	UP80/75	1.2	1 1/2"	1 1/2"	3/8"	12	202	228	190	268	112	231	427	113	97	105	140	172	8	301	322
CM-L 15-1	UP80/100	1.7	2"	2"	3/8"	12	202	228	190	268	112	231	427	113	97	105	140	172	8	314	322

3 x 460 V, 60 Hz (supply voltage W)

Pump type	Motor type	P_2 [kW]	Dimensions																		
			A1	A2	A3	A4	B1	B2	B3	H	H1	H2	L1	L2	L3	L4	L5	L6	L7	L8	L9
CM-L 1-2	UP40/75	0.5	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 1-3	UP40/75	0.5	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 1-4	UP40/75	0.5	1"	1"	3/8"	12	152	178	141	231	90	180	363	107	90	90	123	155	16	257	273
CM-L 3-2	UP40/75	0.5	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 3-3	UP40/100	0.6	1"	1"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 3-4	UP80/55	0.8	1"	1"	3/8"	12	202	228	190	268	112	203	350	94	78	90	140	172	4	272	260
CM-L 5-2	UP40/100	0.6	1"	1 1/4"	3/8"	12	152	178	141	231	90	180	345	89	72	72	123	155	16	257	273
CM-L 5-3	UP80/75	1.2	1"	1 1/4"	3/8"	12	202	228	190	268	112	203	377	76	60	72	140	172	8	301	305
CM-L 5-4	UP80/75	1.2	1"	1 1/4"	3/8"	12	202	228	190	268	112	203	395	94	78	90	140	172	8	301	305
CM-L 10-1	UP80/75	1.2	1 1/2"	1 1/2"	3/8"	12	202	228	190	268	112	231	427	113	97	105	140	172	8	301	322
CM-L 15-1	UP80/100	1.7	2"	2"	3/8"	12	202	228	190	268	112	231	427	113	97	105	140	172	8	314	322

All dimensions are in mm unless otherwise stated.

17. Weights and shipping volume

All weights and volumes refer to CM-L pumps with standard pipe connections.

3 x 220-240/380-415 V, 50 Hz (supply voltage F)

Pump type	Net weight [kg]	Gross weight [kg]	Shipping volume [m^3]
CM-L 1-2	17.2	18.7	0.0387
CM-L 1-3	17.2	18.6	0.0387
CM-L 1-4	17.5	18.9	0.0387
CM-L 1-5	17.8	19.2	0.0387
CM-L 3-2	17.2	18.6	0.0387
CM-L 3-3	17.1	18.5	0.0387
CM-L 3-4	16.2	17.6	0.0387
CM-L 3-5	19.2	20.6	0.0387
CM-L 5-2	17.2	18.6	0.0387
CM-L 5-3	18.6	20	0.0387
CM-L 5-4	20	21.4	0.0387
CM-L 5-5	22.4	23.9	0.0387
CM-L 15-1	25.5	26.9	0.0387

3 x 220-240/380-415 V, 50 Hz; 3 x 220-255/380-440 V, 60 Hz (supply voltage O)

Pump type	Net weight [kg]	Gross weight [kg]	Shipping volume [m^3]
CM-L 1-2	17.2	18.7	0.0387
CM-L 1-3	17.2	18.6	0.0387
CM-L 1-4	17.5	18.9	0.0387
CM-L 3-2	17.2	18.6	0.0387
CM-L 3-3	18.6	20	0.0387
CM-L 3-4	20	21.4	0.0387
CM-L 5-2	17.1	18.6	0.0387
CM-L 5-3	21.8	23.2	0.0387
CM-L 5-4	22.1	23.6	0.0387
CM-L 10-1	25.5	27	0.0387
CM-L 15-1	27.9	29.3	0.0387

3 x 460 V, 60 Hz (supply voltage W)

Pump type	Net weight [kg]	Gross weight [kg]	Shipping volume [m^3]
CM-L 1-2	17.2	18.7	0.0387
CM-L 1-3	17.2	18.6	0.0387
CM-L 1-4	17.5	18.9	0.0387
CM-L 3-2	17.2	18.6	0.0387
CM-L 3-3	18.6	20	0.0387
CM-L 3-4	20	21.4	0.0387
CM-L 5-2	18.6	20.1	0.0387
CM-L 5-3	21.8	23.3	0.0387
CM-L 5-4	22.1	23.6	0.0387
CM-L 10-1	25.5	27	0.0387
CM-L 15-1	27.9	29.3	0.0387

18. Motor data

Mains-operated motors, 50 Hz

3 x 220-240/380-415 V, 50 Hz (supply voltage F)

Motor type	P_2 [kW]	$I_{1/1}$ [A]
UP40/75	0.4	1.9/1.1
UP40/100	0.5	2.3/1.3
UP80/55	0.7	2.8/1.6
UP80/75	1.1	4.3/2.5

Mains-operated motors, 50/60 Hz

3 x 220-240/380-415 V, 50 Hz; 3 x 220-255/380-440 V, 60 Hz (Supply voltage O)

Motor type	P_2 [kW]	Frequency [Hz]	$I_{1/1}$ [A]
UP40/75	0.4	50	1.9/1.1
	0.5	60	1.9/1.1
UP40/100	0.5	50	2.3/1.3
	0.6	60	2.4/1.4
UP80/55	0.7	50	2.8/1.6
	0.8	60	2.9/1.7
UP80/75	1.1	50	4.3/2.5
	1.2	60	4.7/2.7
UP80/100	1.3	50	5.7/3.3
	1.7	60	6.2/3.6

Mains-operated motors, 60 Hz

3 x 460, 60 Hz (Supply voltage W)

Motor type	P_2 [kW]	$I_{1/1}$ [A]
UP40/75	0.5	1.9/1.1
UP40/100	0.6	2.3/1.3
UP80/55	0.8	2.8/1.6
UP80/75	1.2	4.3/2.5
UP80/100	1.7	6.1/3.5

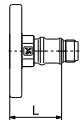
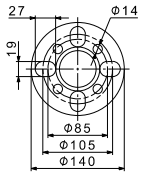
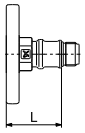
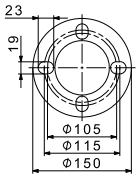
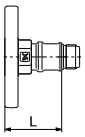
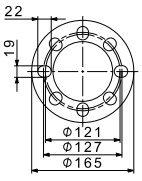
19. Accessories

Pipe connections

Various sets of flanges and couplings are available for pipe connection.

Flange sets for CM-L (DIN/ANSI/JIS)

All materials in contact with the pumped liquids are made of stainless steel EN 1.4408/AISI 316. The pipe stub is made of stainless steel EN 1.4408/AISI 316 and the flange part is made of cast iron EN-GJL-200.The flange comes with rubber O-rings in both EPDM and FKM to avoid using packaging material in the threads.

Flange		Pump type	Pipe connection	Pump thread	L* [mm]		Product number
					Flange mounted on pump inlet	Flange mounted on pump outlet	
		CM-L 1 CM-L 3	DN 32	Rp	49.0	78.0	96904693
				NPT			96904705
		CM-L 5		Rp			96904696
				NPT			96904708
TM04 3867 0309							
		CM-L 10	DN 40	Rp	44.0	68.0	96904699
				NPT			96904711
TM04 3869 0309							
		CM-L 15	DN 50	Rp	48.0	68.0	96904702
				NPT			96904714
TM04 3868 0309							

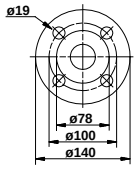
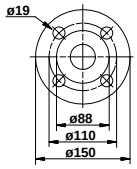
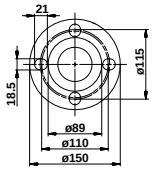
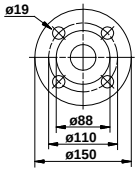
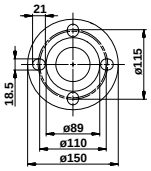
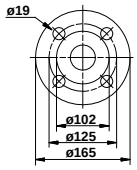
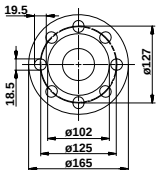
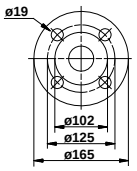
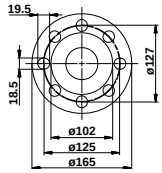
* Length from outer edge of flange to pump inlet or outlet port.

Pump compatibility with DIN/ANSI/JIS flanges

All CM-L pumps are compatible with flanges mentioned in this databooklet.

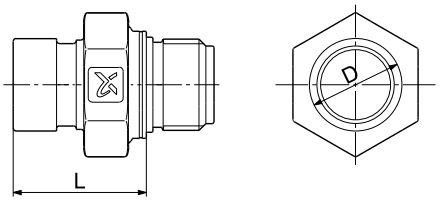
Counterflanges for CM-L

Counterflanges for CM-L-I pumps are made of stainless steel EN 1.4401/AISI 316. A counterflange set consists of one counterflange, one gasket, bolts and nuts.

Counterflange	Pump type	Description	Rated pressure	Pipe connection	Product number
 TM03 0400 3705	CM-L 1-I CM-L 3-I CM-L 5-I	Threaded	16 bar, EN 1092-2	Rp 1 1/4	00415304
		For welding	25 bar, EN 1092-2	32 mm, nominal	00415305
 TM03 0401 3705		Threaded	16 bar, EN 1092-2	Rp 1 1/2	00425245
 TM02 7202 2803	CM-L 10-I	Threaded	16 bar, EN 1092-2	Rp 2	96509570
 TM03 0401 3705		For welding	25 bar, EN 1092-2	40 mm, nominal	00425246
 TM02 7202 2803		For welding	25 bar, special flange	50 mm, nominal	96509571
 TM00 0402 3705		Threaded	16 bar, EN 1092-2	Rp 2	00335254
 TM02 7203 2803		Threaded	16 bar, special flange	Rp 2 1/2	96509575
	CM-L 15-I	Threaded	16 bar, special flange	Rp 2 1/2	96509579
 TM03 0402 3705		For welding	25 bar, EN 1092-2	50 mm, nominal	00335255
 TM00 7203 2803		For welding	25 bar, special flange	65 mm, nominal	96509573

Victaulic® connections for CM-L

The flange comes with rubber O-rings in both EPDM and FKM to avoid using packaging material in the threads.

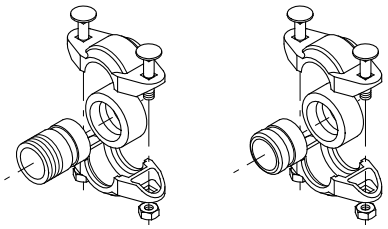
Victaulic® connection	Pump type	Pump thread	D [mm]	L* [mm]	Product number
 TM04 3865 0309	CM-L 1 CM-L 3	Rp	33.7	48.5	96904694
		NPT			96904706
	CM-L 5	Rp	33.7 / 42.4	48.5	96904697
		NPT			96904709
	CM-L 10	Rp	48.3	48.5	96904700
		NPT			96904712
	CM-L 15	Rp	60.3	50.1	96904703
		NPT			96904715

* Length from outer edge of connection to pump inlet or outlet port.

Coupling, pipe stub and gasket for Victaulic® connections

Parts in contact with the pumped liquid are made of stainless steel EN 1.4401/AISI 316 and rubber.

A Victaulic® coupling set consists of two coupling halves (Victaulic, type 77), one gasket, one pipe stub (for welding or threaded), bolts and nuts.

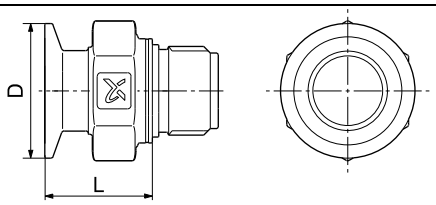
Coupling and pipe stub	Pump type	Pipe stub	Pipe connection	Rubber parts	Number of coupling sets required	Product number
 TM00 3808 1094	CM-L 1 CM-L 3 CM-L 5*	Threaded	R 1	EPDM	2	97575245
				FKM	2	97575246
		For welding	DN 25	EPDM	2	97575247
				FKM	2	97575248
	CM-L 5**	Threaded	R 1 1/4	EPDM	1	00419911
				FKM	1	00419905
		For welding	DN 32	EPDM	1	00419912
				FKM	1	00419904
	CM-L 10	Threaded	R 1 1/2	EPDM	2	97575249
				FKM	2	97575250
		For welding	DN 40	EPDM	2	97575251
				FKM	2	97575252
	CM-L 15	Threaded	R 2	EPDM	2	00339911
				FKM	2	00339918
		For welding	DN 50	EPDM	2	00339910
				FKM	2	00339917

* For outlet port. **Note:** Only one coupling set is required for the outlet port.

** For inlet port.

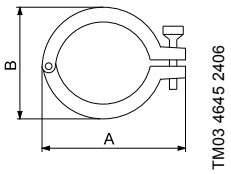
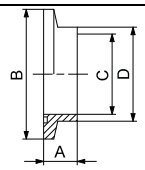
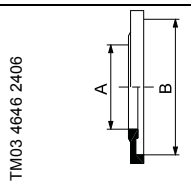
Tri-Clamp® connections for CM-L

The flange comes with rubber O-rings in both EPDM and FKM to avoid using packaging material in the threads.

Tri-Clamp®	Pump type	Pump thread	D [mm]	L* [mm]	Product number
	CM-L 1 CM-L 3	Rp	50.4	40.3	96904695
		NPT			96904707
	CM-L 5	Rp	50.4	35.3	96904698
		NPT			96904710
	CM-L 10	Rp	50.4	37.4	96904701
		NPT			96904713
	CM-L 15	Rp	63.9	37.4	96904704
		NPT			96904716

* Length from outer edge of Tri-Clamp® connection to pump inlet or outlet port.

Clamping ring, pipe stub and gasket for Tri-Clamp® connections

	Clamping ring			Pipe stub				Gasket	
									
Pump type	Nominal diameter [mm]	A [mm]	B [mm]	A [mm]	B [mm]	C [mm]	D [mm]	A [mm]	B [mm]
CM-L 1, 3, 5, 10	38.0	92.0	59.5	21.5	50.5	35.6	38.6	35.3	50.5
CM-L 15	51.0	104.4	74.0	21.5	64.0	48.6	51.6	48.0	64.0

The clamping ring is made of stainless steel EN 1.4301/AISI 304.

The pipe stub is made of stainless steel EN 1.4401/AISI 316.

The gasket is made of PTFE or EPDM.

Pump type	Pipe connection	Connection material	Gasket	Pressure [bar]	Number of coupling sets required	Product number
CM-L 1, 3, 5, 10	DN 32	Stainless steel	EPDM	16	2	96515374
			PTFE		2	96515375
CM-L 15	DN 50		EPDM		2	96515376
			PTFE		2	96515377

MP 204 motor protector

TM03 1471 2205

Fig. 12 MP 204

The MP 204 is an electronic motor protector and data collecting unit. Apart from protecting the motor, it can also send information to a control unit via GENIbus, like for instance:

- trip
- warning
- energy consumption
- input power
- motor temperature.

MP 204 protects the motor primarily by measuring the motor current by means of a true RMS measurement.

The pump is protected secondarily by measuring the temperature with a Tempcon sensor, a Pt100/Pt1000 sensor and a PTC sensor/thermal switch.

MP 204 is designed for single- and three-phase motors.

Note: MP 204 must not be used together with frequency converters.

Features

- Phase-sequence monitoring
- indication of current or temperature
- input for PTC sensor/thermal switch
- indication of temperature in °C or °F
- 4-digit, 7-segment display
- setting and status reading with Grundfos GO Remote
- setting and status reading via the Grundfos GENIbus fieldbus.

Tripping conditions

- Overload
- underload (dry running)
- temperature
- missing phase
- phase sequence
- overvoltage
- undervoltage
- power factor (cos φ)
- current unbalance.

Warnings

- Overload
- underload
- temperature
- overvoltage
- undervoltage
- power factor (cos φ)
- run capacitor (single-phase operation)
- starting capacitor (single-phase operation)
- loss of communication in network
- harmonic distortion.

Learning function

- Phase sequence (three-phase operation)
- run capacitor (single-phase operation)
- starting capacitor (single-phase operation)
- identification and measurement of Pt100/Pt1000 sensor circuit.

Product number

Description	Product number
MP 204 motor protector	96079927

20. Grundfos Product Center

Online search and sizing tool to help you make the right choice.

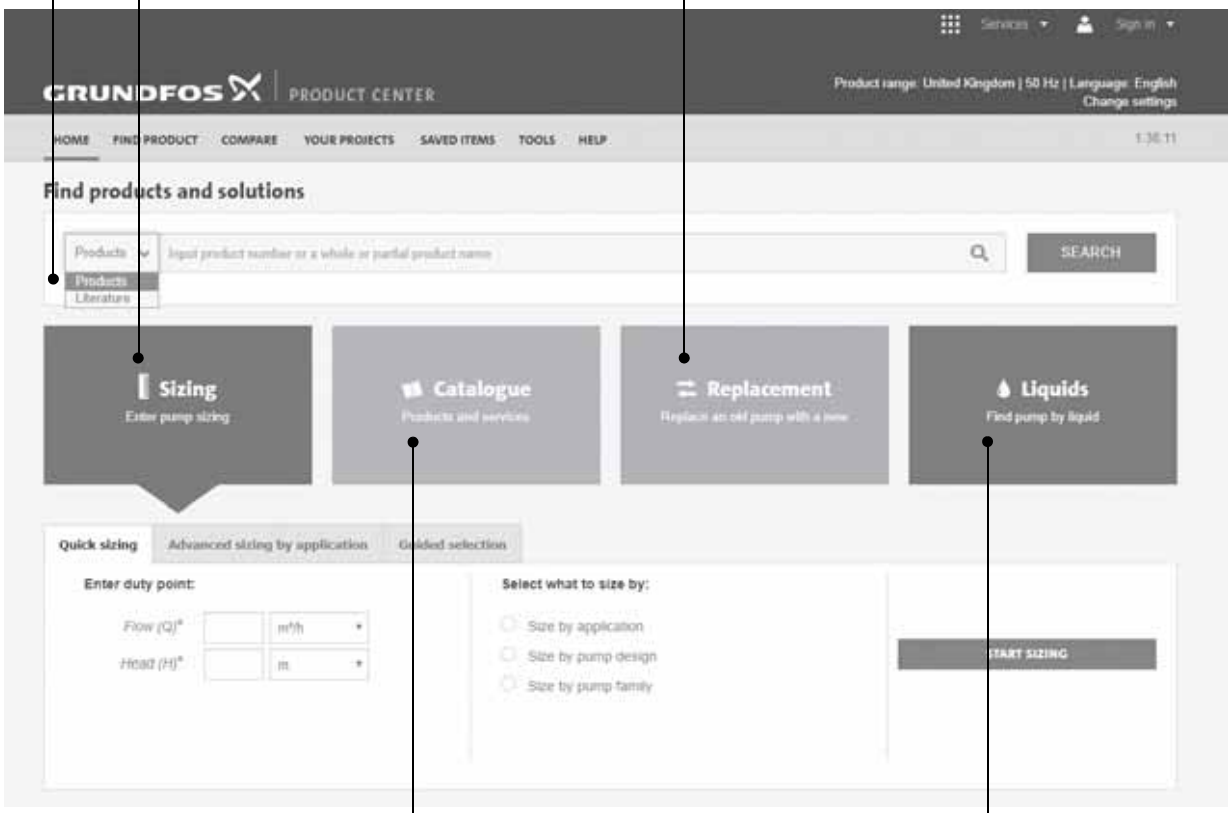
http://product-selection.grundfos.com

This drop-down menu enables you to set the search function to "Products" or "Literature".

"SIZING" enables you to size a pump based on entered data and selection choices.

"REPLACEMENT" enables you to find a replacement product. Search results will include information on the following:

- the lowest purchase price
- the lowest energy consumption
- the lowest total life cycle cost.



"CATALOGUE" gives you access to the Grundfos product catalogue.

"LIQUIDS" enables you to find pumps designed for aggressive, flammable or other special liquids.

All the information you need in one place

Performance curves, technical specifications, pictures, dimensional drawings, motor curves, wiring diagrams, spare parts, service kits, 3D drawings, documents, system parts. The Product Center displays any recent and saved items - including complete projects - right on the main page.

Downloads

On the product pages, you can download installation and operating instructions, data booklets, service instructions, etc. in PDF format.

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