General data

Applications

The CHI and CHIE pumps are primarily designed for industrial applications:

Typical applications	CHI	CHIE
Water treatment	●	❍
Industrial washing and dish-washing machines	●	❍
Pressure boosting of process water	●	❍
Heating and cooling in industrial processes	●	❍
Air-conditioning	●	
Airwashing, moisturization, humidification (softened water)	●	❍
Water supply and pressure boosting (potable water, also slightly chlorinated).	●	❍
Fertilizer/dosing systems	●	
Aquafarming	●	

In addition, the CHI, CHIE pump is suitable for many specialized applications.

● Recommended

❍ Applicable

Pumped liquids

Thin, clean, non-aggressive and non-explosive liquids without solid particles or fibers.

The pumps are able to pump liquids such as demineralised water, softened water, cleaning solutions, light oils and other light chemicals.

When pumping liquids with a density and/or viscosity higher than that of water, motors with correspondingly higher outputs must be used, if required.

Whether a pump is suitable for a particular liquid depends on a number of factors of which the most important are chloride content, pH value, temperature and content of solvents, oils, etc.

Operating conditions*

Liquid temperature:	+5°F to +230°F (–15°C to +110°C)
Maximum ambient temperature:	+104°F (+40°C)
Maximum operating pressure:	145 psi (10 bar)
Sound pressure level:	<70 dB(A)

Minimum inlet pressure accoding to the NPSHR curve + a safety margin of two feet of head.

Maximum inlet pressure is limited by maximum operating pressure.

* **CHIE-Plus:**
Maximum liquid temperature: +176°F (80°C)
Maximum operating pressure: 125 psi (8.6 bar)

Models:
Maximum liquid temperature: 248° F (120°C)

Maximum operating pressure and liquid temperature

The actual operating range depends on the operating pressure, the pump type, the type of shaft seal, the pumped liquid and the liquid temperature.

Shaft seal

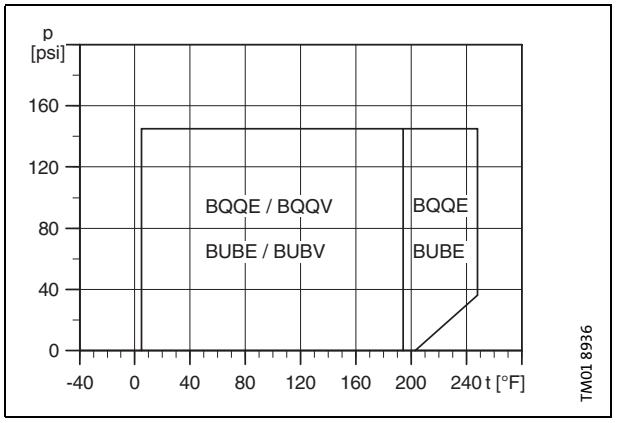
The shaft seal is to be selected on the basis of liquid temperature and type of liquid.

For other liquids than water, the chemical resistance of the materials - incl. seal face, seat and rubber components of the shaft seal - must be taken into account.

The following table shows available shaft seal types.

Pump type	Shaft seal type	Material	Rubber parts
CHI/CHIE	BQQE BQQV	Silicon carbide (Q)/ Silicon carbide (Q)	EPDM (E) FKM (V)
	BUBE BUBV	Tungsten carbide (U)/ Carbon (B)	

The following curves apply to clean water and water-containing antifreeze additives.



Approvals

	on	1 x 115/230 V (CHI) 1 x 208 - 230 V (CHIE) 3 x 208 - 230/460 V (CHI)
	on	3 x 208 - 230/460 V (CHI 12-20) 1 x 208 - 230/2800 rpm (CHIE 4-60)
	on	3 x 575 V (CHI)

Official UL approval has been given for CHI pumps mounted indoors and pumping water only.

E-pumps

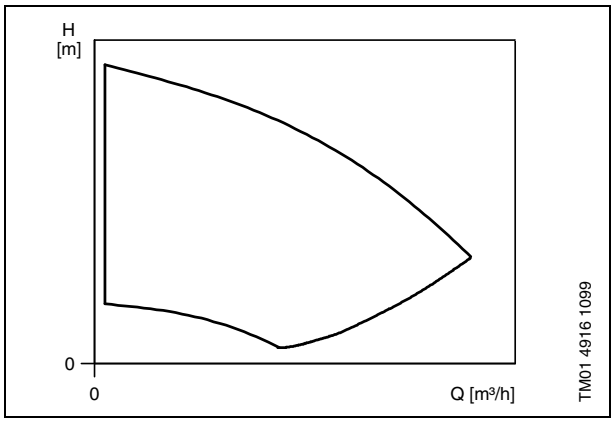
Grundfos pumps equipped with Grundfos MLE motors are called E-pumps. CHIE pumps belong to the E-pumps family.

The pumps are fitted with the single-phase Grundfos MLE motor with built-in PI-controller enabling connection to external control signals.

The MLE motor offers the following features:

- Built-in PI-controller,
- optional connection to external control signals,
- setpoint setting on the unit itself, and
- communication with the Grundfos remote control R100.

Through frequency control the MLE motor enables continuously variable control of the motor speed. Thus the pump can operate in any duty point in the range between pump min. and max. performance curves.



CHIE Pumps

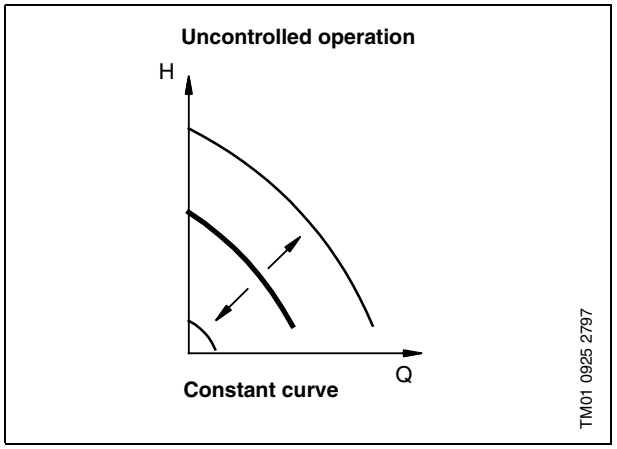
CHIE is a unique product combining stainless steel materials in all parts in contact with the pumped liquid with a compact design and an MLE motor.

This makes CHIE very suitable for industrial applications requiring a stainless steel product combined with the variable pump performance feature.

CHIE can operate in uncontrolled operating mode enabling pump performance control by an external signal.

Alternatively, the pump can operate in controlled operating mode enabling e.g. a constant pressure to be established by means of the built-in PI-controller and a connected sensor.

Other sensor types such as flow, temperature, differential temperature or differential pressure can also be connected.

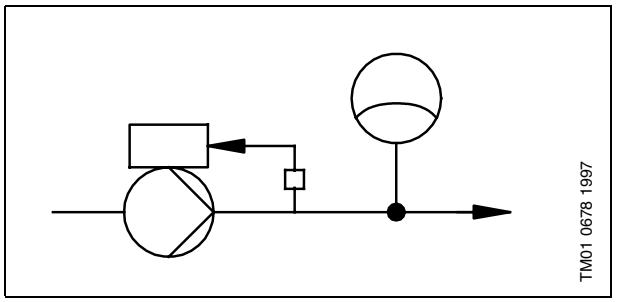


The fitting of a sensor at a later stage opens the possibility of control on the basis of pressure, differential pressure, temperature, differential temperature or flow.

The CHIE pumps are the ideal solution in a number of applications characterized by a need for variable flow at constant pressure. Depending on the nature of the application, the pumps offer energy savings, increased comfort or improved processing.

CHIE-Plus—a compact one-pump booster

With CHIE-Plus, a pressure sensor and a small diaphragm tank are added to build a complete, compact pressure booster supplying constant pressure.



CHIE incorporates a stop function ensuring that the pump automatically stops if the water demand drops to a very low level or disappears altogether. The method gives good total operating economy irrespective of the water demand, and the pump is not subjected to overheating and the subsequent risk of damage to the shaft seal.

E-pumps in industrial applications

Today many pumps are used in industrial applications, and in many of them speed control is an advantage. Within industrial cleaning and the like the advantage of a constant supply pressure is also gained.

Water treatment systems

Water treatment is an obvious area for speed-controlled CHIE pumps. Combining stainless steel materials and speed control makes it possible to meet material requirements as well as the need for optimum operating conditions, minimum energy consumption etc.

Due to the small dimensions of the CHIE pump it is suited for the pumping of clean water in compact water treatment systems.

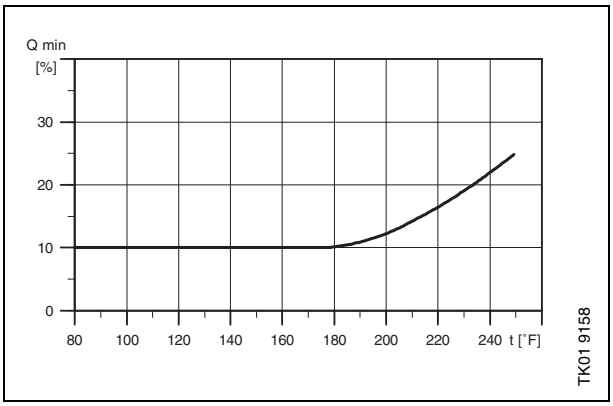
The pump can supply the processed water at a constant pressure to the consumer.

Curve conditions

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

1. 1. The motors used for the measurements are standard Grundfos MG and MLE motors.
2. Measurements were made with airless water at a temperature of +68°F (+20°C).
3. The curves apply to a kinematic viscosity of υ=1cSt (mm^2/s)
4. The bold curves indicate the full performance range. The thin curves are only a guide.
5. Due to the risk of overheating, the pumps should not be used a a flow below the minimum flow rate.

   The curve below shows the minimum flow rate as a percentage of the nominal flow rate in relation to the liquid temperature.



Pump, CHI

The CHI pump is a non self-priming, compact horizontal multistage centrifugal pump fitted with a Grundfos motor including an extended motor/pump shaft. All parts in contact with the pumped liquid are made of 316 stainless steel. The pump bearings are self lubricated by the pumped liquid.

The pump has a maintenance-free mechanical shaft seal. The seal is a 16mm, unbalanced shaft seal with material options; BQQE, BQQV, BUBE, and BUBV .

The compact pump unit has small physical dimensions and an end suction type axial suction port and radial discharge port. The pump sleeve is drawn of 316 stainless steel sheet and has a threaded hole (G 3/8) with priming plug at the top and a threaded hole (G 3/8) with drain plug at the bottom.

Connections	CHI 2	CHI 4	CHI 8	CHI 12
Axial suction port	1" NPT	1 1/4" NPT	1 1/2" NPT	1 1/2" NPT
Radial discharge port	1" NPT	1 1/4" NPT	1 1/2" NPT	1 1/2" NPT

Motor, CHI

The pump is coupled with a totally enclosed, fan-cooled Grundfos squirrel-cage motor.

Enclosure class: TEFC
Insulation class: F
Standard voltages: 1 x 115/230 V, 60 Hz
3 x 208-230/460 V, 60 Hz
3 x 575 V, 60 Hz
Sound-pressure level: ≤ 64 dB(A)

Single-phase motors do not have built-in thermal overload protection and therefore require external motor protection.

Three-phase motors must be connected to a motor starter in accordance with local regulations.

CHI single-phase are also available with variable speed motors, type MLE. See CHIE section.

Materials, CHI

Pos.	Description	Materials	AISI, ASTM
1	Pump sleeve	Stainless steel	316
2	Intermediate chamber/ guide vanes	Stainless steel	316
3	Impeller	Stainless steel	316
4	Suction interconnector	Stainless steel	316
5	Spline shaft	Stainless steel	316
6	Cover plate	Stainless steel	316
7	Shaft seal faces	BQQE, BQQV, BUBE, and BUBV	
8	Base plate	Painted steel plate	
9	Motor flange	Cast iron	
		Silumin	
10	Ball bearing		
	O-rings	EPDM or FKM	D1418

Sectional drawing, CHI