



THE ULTIMATE

The Grundfos CRE series provides the ultimate in intelligent pump technology

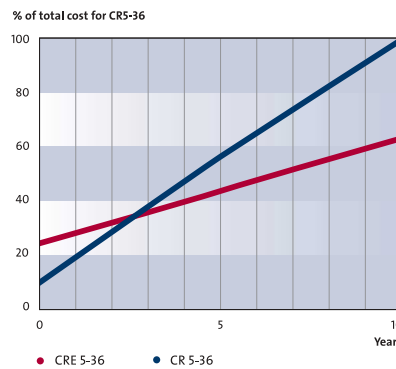
The Grundfos CRE series of multistage centrifugal pumps combine state-of-the-art pumping technology with highly efficient frequency converter-controlled motors. The Grundfos CR pumps are renowned throughout the world for their efficiency, reliability and low cost of ownership. Combined with Grundfos' own advanced frequency converter-controlled motors these models provide the ultimate in pumping technology available on the market today.

E-pumps reduce Life Cycle Costs

Life Cycle Cost is a vital and decisive consideration when choosing a pump for any application. As a general rule, the purchase price of a fixed speed pump accounts for less than 8% of the total Life Cycle Cost. Roughly 7% of the costs relate to maintenance while the rest – some 85% – is accounted for by energy consumption! In a time and age when energy prices are increasing and emphasis is on environmental impact, this is food for thought. With a Grundfos E-pump energy consumption can be reduced to about half the consumption of a fixed speed pump, depending on the type of application.



The diagram clearly illustrates the advantages of choosing an E-pump instead of a fixed speed pump. In an average application, already after 2.3 years of service the additional investment of the E-pump has been fully retrieved.



The required flow and pressure vary over time in most applications and full pump performance is rarely needed all the time. This is where the variable speed CRE pumps come into the picture. A CRE pump saves energy, increases user comfort, offers long operating life – and provides an alternative yet very efficient way of solving application problems.

Suitable for an array of applications

The CRE pump series is ideal for a wide range of applications in water supply, pressure-boosting systems, and for hot or cold liquid circulation. In industrial applications, where maintaining a constant pressure is essential or beneficial, the Grundfos CRE pumps offer substantial advantages. With a CRE pump costly and complicated control devices can be avoided. These pumps provide it all, in one integrated unit.

Remote control

All Grundfos motors are able to communicate via the Grundfos remote control unit R100, which offers a number of special control features and status messages. Bus communication to the Grundfos Pump Management System 2000, or to Building Management Systems, is also possible.

Integrated sensor

The CRE pumps are available with factory-fitted pressure sensor offering constant pressure control. In most applications an integrated sensor brings substantial benefits. Where an external sensor gives the best results, the CRE pumps can be supplied without a sensor.





Grundfos CRE pumps offer unique user benefits

- **Energy savings during operation:**
Energy is saved when pump speed is varied according to demand. Using a CRE pump results in savings of between 20 – 50 % energy.
- **Constant pressure provides user comfort:**
CRE pumps can keep a constant pressure in water supply systems providing increased user comfort.
- **All components from one supplier:**
Pump, motor, frequency converter, controller and sensors are supplied as one complete, optimised and tested unit. Total product service offered.
- **Easy to install and operate:**
The CRE pumps are built for “plug-and-pump”. User interface and functions are alike regardless of pump size.
- **Remote control and supervision:**
The CRE pumps can be remote-controlled and supervised via the Grundfos remote control unit R100 or via Bus communication.
- **Reduction of system wear:**
In some systems, keeping a constant pressure will minimise mechanical stress. In other systems, adjusting speed according to constant flow or temperature will improve performance of system components.
- **Versatility:**
The performance range of a CRE pump is wide and provides for multiple uses. Therefore, few models replace many fixed speed versions.

Range overview

Grundfos offers a comprehensive range of in-line, multistage centrifugal pumps with integrated frequency converter and, if required, a factory-fitted pressure sensor. All models combine the well-known high quality of the Grundfos CR/CR1/CRN pump range with the benefits provided by variable speed motors.

The CRE, CRIE, CRNE pumps cover a flow up to 120 m³/h and pressure up to 250 m head.



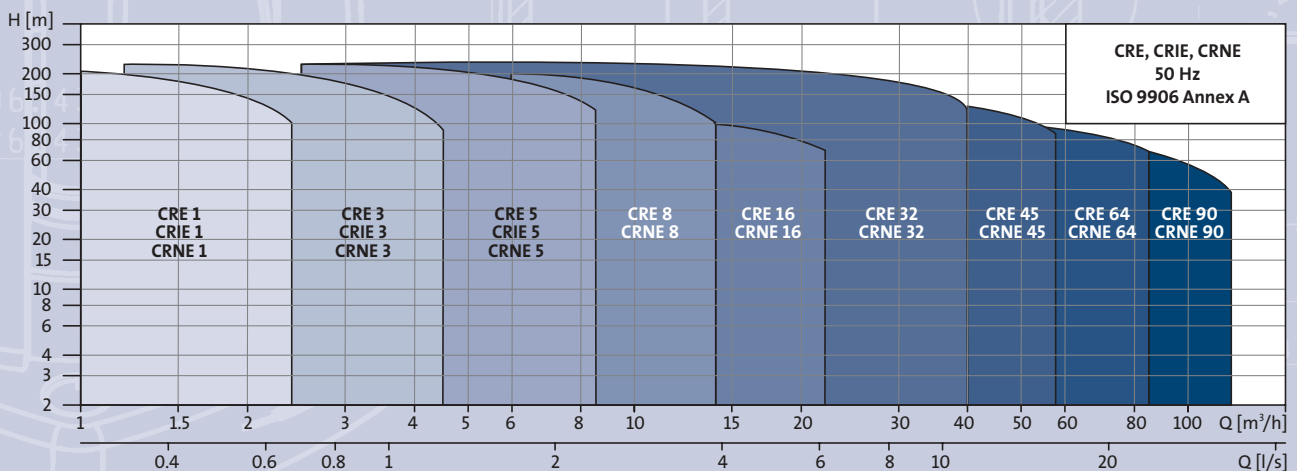
Technical data

The CRE pump range comprises single-phase or three-phase motors.

	Single-phase motors	Three-phase motors
Power supply	1x200-240 V, 50/60 Hz	3x380-415 V, 50/60 Hz
Power range	0.37 - 1.1 kW	1.1 - 22 kW
External Setpoint signal	10 kOhm potentiometer 0-10 V 0-20 mA or 4-20 mA	
Built-in PI-controller	Yes	
Sensor input signal	0-20 mA or 4-20 mA 0-10 V 24 V supply for sensor included	
Start/stop input	Input for external contact	
Signal relay	Potential-free signal relay is included	
Interface to R100	All pumps can communicate with the Grundfos IR remote control unit R100	
RS485 Bus interface	A RS485 Grundfos GENIbus is included. Provides for communication via Grundfos Pump Management System 2000 or other Building Management Systems	
EMC	All pumps comply with "The Electromagnetic Compatibility Directive 89/336/EEC" EN61800-3	
Enclosure class	IP55 (IEC 34-5)	

Range	CRE 1	CRE 3	CRE 5	CRE 8	CRE 16	CRE 32	CRE 45	CRE 64	CRE 90
Rated flow rate [m³/h]	1	3	5	8	16	32	45	64	90
Flow range [m³/h]	0.1 - 2	0.3 - 4	0.5 - 7.5	0.8 - 12	1.6 - 22	3.2 - 40	4.5 - 58	6.4 - 85	9.0 - 120
Max. pressure [bar]	22	24	25	22	11	23	15	11	10
Motor power [kW]	0.37 - 2.2	0.37 - 3.0	0.37 - 5.5	0.37 - 7.5	2.2 - 7.5	1.5 - 22	3 - 22	4 - 22	5.5 - 22
Temperature range [°C]	-20 to +120					-30 to +120			
Max. pump efficiency [%]	48	58	66	64	70	78	79	80	81
Version									
CRE: Cast iron and stainless steel EN 1.4301/AISI 304	•	•	•	•	•	•	•	•	•
CRIE: Stainless steel EN 1.4301/AISI 304	•	•	•						
CRNE: Stainless steel EN 1.4401/AISI 316	•	•	•	•	•	•	•	•	•
CRE pipe connection									
Oval flange (BSP)	Rp 1	Rp 1	Rp 1¼	Rp 1½					
Oval flange (BSP) – on request	Rp 1¼	Rp 1¼	Rp 1	Rp 2					
Flange	DN 25/ DN 32	DN 25/ DN 32	DN 25/ DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 100
Flange - on request						DN 80	DN 100	DN 125	DN 125
CRIE pipe connection									
Oval flange (BSP)	Rp 1	Rp 1	Rp 1¼						
Oval flange (BSP) – on request	Rp 1¼	Rp 1¼	Rp 1						
Flange	DN 25/ DN 32	DN 25/ DN 32	DN 25/ DN 32						
PJE coupling (Victaulic)	•	•	•						
Clamp coupling	•	•	•						
CRNE pipe connection									
Flange	DN 25/ DN 32	DN 25/ DN 32	DN 25/ DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 100
Flange - on request						DN 80	DN 100	DN 125	DN 125
PJE coupling (Victaulic)	•	•	•	•	•				
Clamp coupling	•	•	•	•	•				

The Grundfos CRE range is also available in a titanium version

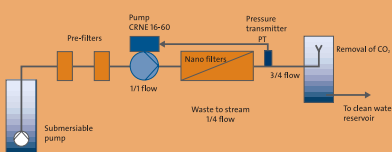


Grundfos CRE pumps provide vast improvements to pumping systems

A variable speed CRE pump offers many benefits in terms of pumping efficiency, user comfort, and – not least – operating costs. The following examples briefly describe some of these benefits.

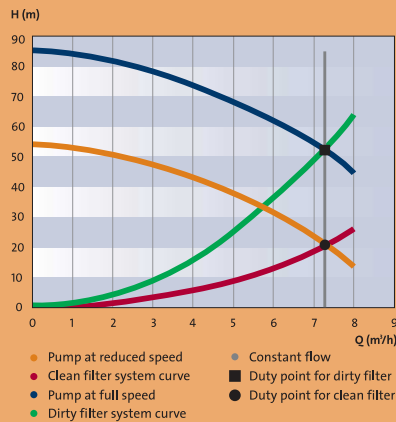
Constant flow in nano-filtration system

The drawing shows a waterworks nano-filtration system. To improve the performance of the filters and to prolong system life the flow must be kept constant.



The water is pumped through pre-filters before the pressure is boosted by a CRE pump in order to force the water through the nano-filters. CO₂ is removed in a degasifier before the water is pumped into a clean water reservoir. The CRE pump is set to keep the pressure to the degasifier constant, as this equals a constant flow in this system.

As the nano-filters gradually block up, additional pressure is required to maintain a constant flow. The pump speed is adjusted automatically thus providing a constant flow through the system



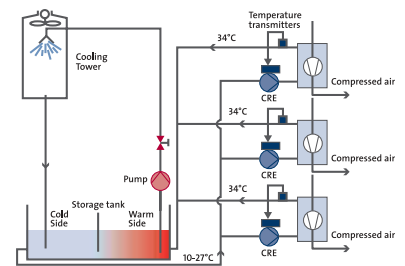
The CRNE 16-60 pump installed in the filter plant. The stainless steel grade of the CRNE pump makes it especially suitable for corroding liquids, or for liquids, which must be kept absolutely particle-free.

The energy consumption of the CRNE pump is minimised as the speed is adjusted according to need. The results are improved filter performance and prolonged system life. The CRNE pump offers a simple and compact installation.

Grundfos CRE circulates Cooling water for compressed-air plant in brewery

The drawing shows a cooling system for three water-cooled air compressors in a brewery.

The system removes heat generated in the air compressors via cooling water. 90% of the energy consumption of the compressors is removed as generated heat.

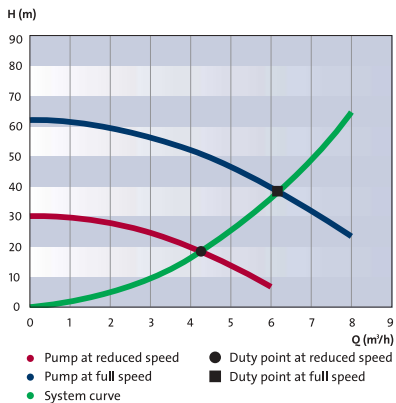


The CRE pumps are speed-controlled via a temperature transmitter measuring the returning temperature of the cooling water from the compressors. As the cooling water temperature varies, so does the need for flow through the compressors. The temperature must be kept constant. If the temperature rises, the CRE pump will speed up and consequently increase flow and heat transfer.

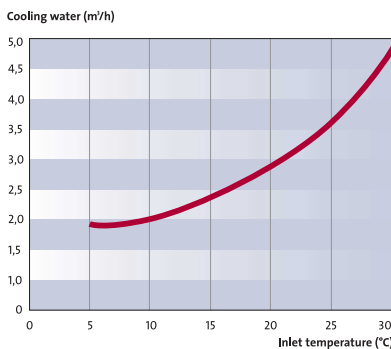
The heated water is cooled down in a cooling tower.

When the flow through the system increases, so does the pressure loss and vice versa. The blue curve in the diagram (next column) indicates full pump speed while the red curve indicates reduced speed. The duty points of the different situations are located where the pump curves cross the system curve (green curve).

The curve indicates how the need for flow in one air compressor (12.4 m³/min.) changes with changing tempe-



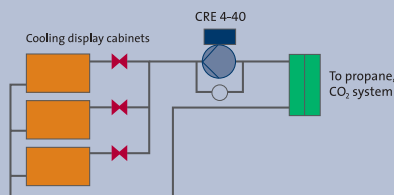
ratures of the cooling water. The lower the cooling water temperature is, the lower the required pump performance will be.



The Grundfos CRE pumps in this system provide exactly the required flow at all times, so that the return temperature of the cooling water from the air compressors is kept constant. In addition, the cooling effect of the open air cooling tower is optimised, as the temperature of the water to be cooled is kept as high as possible. Furthermore, the CRE pumps provide energy savings, both indirectly as a result of the changed design of the cooling system and directly as a result of energy savings of the pumps as these CRE pumps use less energy than the fixed-speed pumps previously installed.

Refrigeration system in supermarket

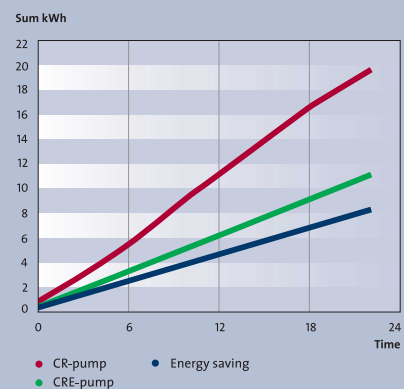
The use of natural refrigerants like propane and CO₂ in refrigeration systems contributes to preventing depletion of the ozone layer.



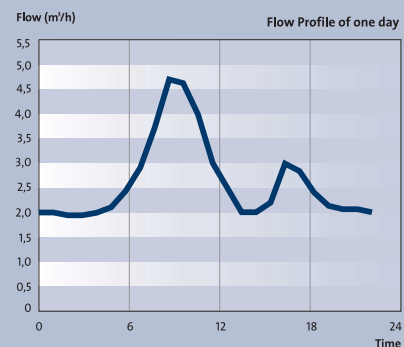
This example describes a supermarket where propane and CO₂ are used in the refrigeration system. The freezers are cooled directly from the CO₂-system. The refrigerated display units are cooled by a secondary refrigerant, a brine, consisting of water and glycol.



A CRE pump circulates the brine for the refrigerated display units. A valve that operates in accordance with the temperature in the unit controls the flow to each unit. By controlling the CRE pump according to a constant differential pressure, the pump automatically adapts its performance to the varying needs.




Using a CRE pump results in considerable energy savings. The above diagram shows the power consumption of a fixed-speed CR pump compared to that of a CRE pump maintaining a constant differential pressure of 20 m head.



The need for cooling varies during the day resulting in a variable flow. As the CRE pump is able to adapt its performance to the varying needs, it consumes less energy. Compared to a fixed-speed CR pump, the energy savings obtained with the CRE pump may amount to as much as 43%. The refrigerated display units are cooled by a secondary refrigerant, a brine, consisting of water and glycol.

The Grundfos E-pump range is more than CRE

Grundfos offers a wide range of E-pumps – pumps with variable speed motors and integrated control features. The range comprises pumps for almost any conceivable type of application. Whether the system is for heating, air conditioning, water supply, pressure boosting, or processing systems in an industrial plant, a Grundfos E-pump will be able to improve the cost-effectiveness of the system. The following is an overview of other E-pump types offered by Grundfos:

TPE series 2000 – single-stage pump with integrated differential pressure sensor																											
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LME, LPE, TPE, CLME – single-stage pump. LME, LPE, TPE are also available as twin-head pumps																											
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SPKE, CRKE – multistage immersible pumps																											
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CHIE – compact horizontal multistage pump																											
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