UPSIZING ENERGY EFFICIENCY
GRUNDFOS CR SOLUTIONS

BE > THINK > INNOVATE >

GRUNDFOS

Innovation Inside the CR

Motor
Grundfos provides many motor solutions depending upon the application and demand. In addition, Grundfos makes its own motors to ensure maximum performance. The ML motors* are remarkably quiet and highly efficient. They are also available in the self-regulating MLE configuration, featuring an integrated variable frequency drive.

Cartridge seal
The specially designed cartridge seal increases reliability, ensures safe handling and enables easy service and access.

Shaft seal solutions
The cartridge shaft seal configuration comes in a wide choice of materials. It is available in flushed seal and double seal configurations as well as a Cool-top version that can handle temperatures up to +356°F (+180°C).

Connection options
The Grundfos CR can be connected to any piping system.

Dry-running sensor
The patented Grundfos LiqTec™ system eliminates the risk of breakdowns due to dry running. If there is no liquid in the pump, the LiqTec will immediately stop it.

High-performance hydraulics
Pump efficiency is maximized by state-of-the-art hydraulic design and carefully crafted production technology.

Durable bearings
The CR bearings are remarkably long-lived thanks to hardwearing materials and a wide range of options for difficult liquids.

Material options
The CR is available in four different materials: AISI 304/ cast iron, stainless steel AISI 304, stainless steel AISI 316, and titanium.

Wide range of sizes
The CR comes in 13 hydraulic sizes and hundreds of pressure sizes, ensuring that you can always find exactly the right pump for the job.

CR, CRN 120 and 150
The newest addition to the CR family nearly doubles our maximum Hp adding 75 and 100 Hp models. Its maximum flow is nearly 800 gpm.

To many, innovation is just a buzzword. At Grundfos, innovation is an integrated feature of all our products. After all, it's what's inside that matters.

* Grundfos ML motors are not available in Canada.

A Smart Way to Save

COOL AND CONVINCING

Grundfos CRE-pumps are your all-in-one energy saving solution: a pump and motor with an integrated frequency converter, controller and sensor.

Grundfos CRE-pumps offer all the advantages of a total system integration. They come with an integrated frequency converter, PID controller and, in some models, pressure or differential pressure sensor.

The pump, motor, frequency converter, PID controller and sensor are perfectly matched, tested and configured at the factory, which greatly facilitates the subsequent installation and commissioning.

An E-pump solution constitutes the ideal variable-speed solution for all types of industry and building applications.

GRUNDFOS CRE-PUMP FEATURES

- Compact plug-and-pump solution
- Factory configured and tested units
- Limited on-site settings
- Easy installation and commissioning
- User-friendly interface
- Advanced features and functionality
- Remote control and monitoring via bus interface and R100 control

E-PUMP AVAILABILITY

Pumps
Grundfos multi-stage pumps: CRE/CRNE/CRIE
Range
1-phase, 1x208-230V+/-10%, 60 Hz, 0.5-1.5 Hp for 2-pole motors and 0.33-1.0 Hp for 4-pole motors
3-phase, 3x208-230V+/-10%, 60 Hz, 1.50-7.5 Hp for 2-pole motors
3-phase, 3x460-480V+/-10%, 60 Hz, 1.0-10 Hp for 2-pole motors
Enclosure Class
TEFC, IP55

FLEXIBILITY AND FUNCTIONALITY

The Grundfos CUE is your ideal solution: a wall-mounted frequency converter, which has E-pump functionality.

CUE solutions cover most pump types, application areas, and power ranges outside the E-pump range.

A CUE solution is a great fit in situations where an integrated solution is either undesirable or prohibited - such as sanitary and hazardous areas.

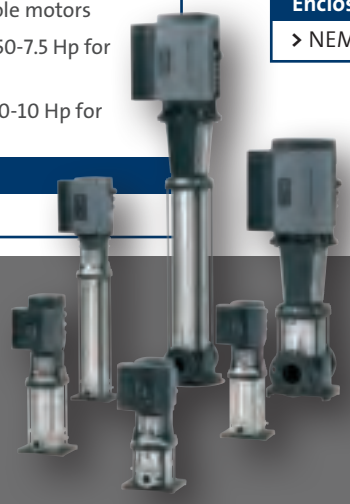
The CUE solution offers you a space-saving installation, the freedom of choice, and speed-control functionality with new or existing Grundfos pumps.

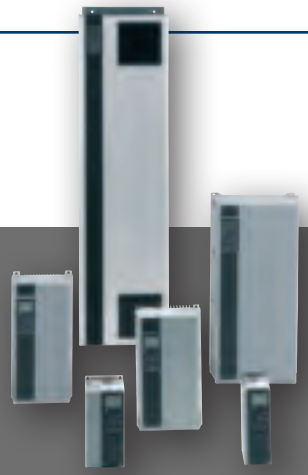
GRUNDFOS CUE FEATURES

- E-pump functionality
- Start-up installation guide
- Automatic setting of rotation direction during installation
- Integrated display with an easy-to-use R100 style menu
- Constant pressure or level control with stop function
- Dedicated functions for groundwater applications
- Remote control and monitoring via bus interface

CUE AVAILABILITY

Pumps
Applicable for Grundfos fixed-speed pumps
Range
1-phase, 1x200-240+/-10%, 60Hz, 1.5-10 Hp
3-phase, 3x200-240+/-10%, 60Hz, 1.0-60 Hp
3-phase, 3x380-500+/-10%, 60Hz, 0.75-300 Hp
3-phase, 3x525-600+/-10%, 60Hz, 1-10 Hp
3-phase, 3x525-690+/-10%, 60Hz, 15-300 Hp
Enclosure Class
NEMA 1 / NEMA 12





The complete Grundfos CR range: The last word in multi-stage pump technology

Grundfos was the first pump manufacturer ever to create a multi-stage in-line pump. Known as the CR pump, this innovative design has inspired followers all over the world. Even so, continuous development and innovation ensure that the Grundfos CR remains unmatched.

The CR of today reflects the needs and requirements of customers worldwide. We know this, because we asked you first! Read on to learn about our comprehensive CR range, including our new extra-large CR featured on pages 6 and 7.

CRN 5 installed in a water treatment plant

The CR range has the right pump for the job

Choosing the right pump can be difficult. It may be easy enough to find a pump that will do the job, but it gets trickier when you want an *exact* match. There are many good reasons to avoid over-capacity, with energy conservation at the top of the list. The CR range lets you choose pumps which exactly match your system demands.

The CR is available in 13 hydraulic sizes, four basic materials and over one million configurations. For more information on the many options to provide you with the right solution for your system demands, see pages 12 and 13.

CR pumps installed in a dairy plant

Extra-large CR Pumps for your extra-large system demands CR(N) 120 and CR(N) 150

To meet the growing demand of customers requiring a pumping system to handle higher flow rates for vast system demand, Grundfos now offers the renowned CR in a “super-sized” capacity. With nearly double the horsepower, the new extra-large CR offers extended efficiency to meet your high-flow system demands.

With a maximum flow of nearly 800 gpm, the scope of the Grundfos CR range now provides the pump industry with the most comprehensive flow range on the market today. When coupled with CR reliability, the extra-large CR rounds out the range with a high flow solution second-to-none.

> Nearly double the CR horsepower range

> Flows up to 792 gpm

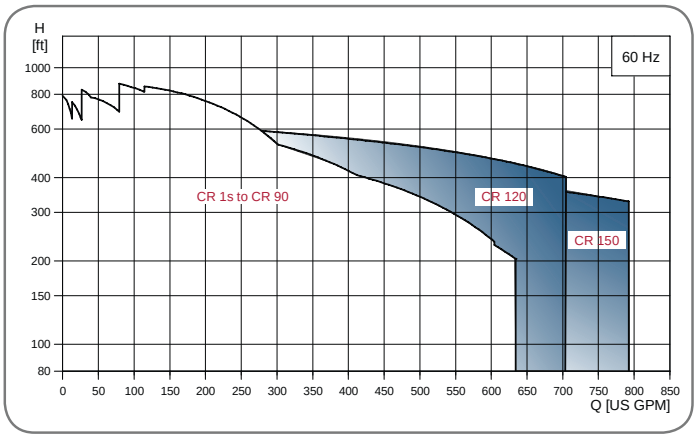
> Spacer coupling on full range (seal changes without disturbing motor)

> Standard 22 mm cartridge shaft seal on models up to 60 Hp (32 mm cartridge shaft seal on 75 Hp and 100 Hp models)

> Custom-built solutions

Greatly expanded range

At Grundfos, innovation is about making things better, and even bigger if that is what our customers require! To that end, the CR and CRN 120 and 150 provide extended flow ranges at the best possible efficiencies up to 100 Hp.



Superior reliability

Unmatched cost efficiency

The most extensive range on the market

Performance curves and technical data

The new generation of Grundfos CR pumps features a full range of sizes and limitless scope for combinations to suit your specific needs.

Reliability in real life

The CR is well known for its reliability. And rightly so. The CR design has all the durability that customers expect from a high-quality multistage pump — and then some. We have added unique features to ensure unsurpassed reliability: dry-running protection, a unique cartridge seal, and a full-titanium variant.

The virtually endless range of standard and customized CR pumps means that you can find the right CR to provide reliable operation for most any requirement.

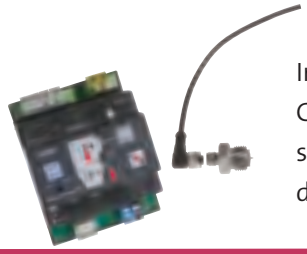
Superior dry-running protection
Dry running is the most common cause of pump failure. In most pumps, the shaft seal and bearings will burn out almost immediately if liquid stops flowing in the pump.

The Grundfos CR is different. As part of our constant dedication to innovation, we have tested new and alternative materials to bring you the best possible solution.

This means that we can equip CR pumps with a shaft seal and bearing system that can withstand extreme heat and friction for longer periods of time. This makes them more forgiving if the pump does run dry.

Grundfos LiqTec™ checks for liquid 24 hours a day
For those who need to avoid dry-running altogether, the Grundfos LiqTec is the answer. Available with all CR pumps, the LiqTec is plug-and-play technology at its very best. Ever vigilant, the LiqTec constantly checks that there is liquid in the pump. If there isn't, it stops the pump immediately.

It's reliable. And we can prove it.



In the event of dry running, the Grundfos LiqTec™ immediately shuts down the pump before damage occurs.

Unique cartridge seal design
The seal used in the CR line combines the best features of standard seals, wrapped up in an ingenious cartridge design. All of these ensure extra reliability.

The durable seal is made from hardwearing materials which prevent downtime and extend the lifetime of the seal. All axial movement has been eliminated, preventing wear of the shaft and rubber parts – a problem for traditional seals. The cartridge seal is a balanced type seal, which makes it less sensitive to pressure.

We know, however, that even the best of materials are subject to wear. That is why the innovative team at Grundfos sets out to eliminate the small, yet crucial, factors that can have a negative impact on pump reliability. Many of these have to do with handling, assembly and service.

The cartridge design ensures that the seal components will never be assembled incorrectly, the spring will never be incorrectly preloaded, and that sensitive surfaces will never be subjected to greasy fingers or dirt. These factors are common causes of short seal life in other pumps.

The cartridge design also enables rapid replacement when the seal ultimately does need changing. All in all, downtime is minimized, which translates into significant savings for your business.

Spacer coupling minimizes downtime too
Minimizing downtime is part of a reliable operation. That is why Grundfos has eliminated a major nuisance for owners of large pumps. Now, it is no longer necessary to remove heavy motors to replace the seal. With the innovative spacer coupling, motors 15 hp and larger can be left in place during seal replacement.

With unfailing attention to reliability, Grundfos engineers have designed an innovative cartridge seal that can be replaced within minutes — just one of the remarkable benefits it offers.

The cartridge design allows you to replace the seal in minutes without special tools and without dismantling the pump.

Reduce the real costs

Electricity is the most expensive part of any pump—a simple fact that is often overlooked when pumps and prices are compared.

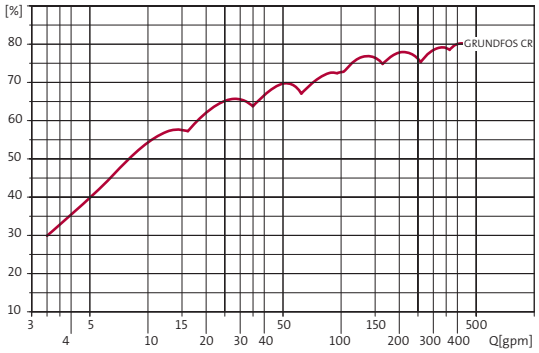
It may be surprising that the purchase price and maintenance costs account for less than 15% of the total lifetime cost of a pump. Electricity accounts for a staggering 85% or more of the total costs. So if you want to save money, that's where you should look.

The Grundfos CR makes a real difference; the table below shows just how much electricity a CR can save you annually.

These savings will continue for years and years – for every pump you own. Its low lifetime cost makes a CR pump a very sensible investment.

The table at right shows the unique efficiency of the Grundfos CR range.

CR pump efficiency



Let's talk money.

How much difference does a CR make?

Application type	Typical duty point	Operating hours per day	Average kWh reduction per year with CR
Water supply	350 gpm @ 85 psi	24 hours	18,500 kWh
Boiler feed	175 gpm @ 225 psi	15 hours	12,700 kWh
Water treatment	10 gpm @ 225 psi	15 hours	3,200 kWh
Industrial washing and cleaning	25 gpm @ 225 psi	5 hours	1,600 kWh
General industrial pump task	25 gpm @ 145 psi	10 hours	2,200 kWh

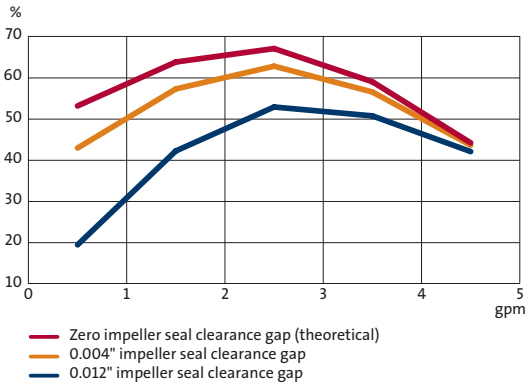
Efficiency saves money year after year

Getting the best possible overall efficiency out of your pump makes financial sense. The narrow interval between CR pump sizes allows you to eliminate the efficiency drop associated with over-sized pumps.

By minimizing the difference between pump capacity and the required pressure and volume, you get a pump which runs as close to its optimum duty point as possible. That makes it as cost-efficient as possible.

The result of years of Grundfos development work is a 10% increase in pump efficiency. This translates into a power reduction of 15-20% for the CR pumps. When pumps are in operation many hours a day, such improvements provide substantial savings – year in and year out.

Good things come in threes

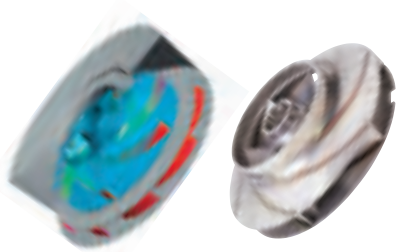


Grundfos achieved a 10% increase in pump efficiency through three innovative improvements to the impeller and seal. These improvements also mean a smaller motor can often be used to power the pump—and that equals savings on both initial investment and running costs.

1

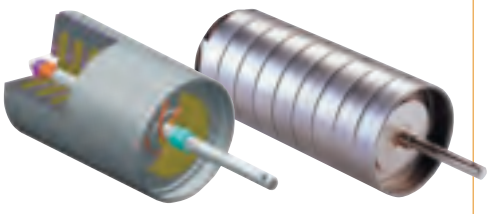
Internal leakage caused by pressure differentials within the pump was minimized. Tests have shown that an impeller seal clearance gap of just 0.016" between the impeller and the chamber causes a 5% drop in efficiency. When liquid seeps out into the pump, precious energy is wasted on circulating that liquid. Grundfos uses a floating seal ring between chambers, providing a nearly perfect seal.

2



An enhanced impeller design reduces eddy flow and friction losses. We developed a highly specialized laser-welding technology which brings you impellers of truly superior design and construction.

3



State-of-the-art production technology guarantees the best possible results and gives CR pumps the final edge. At Grundfos, we develop our own tools and processes to ensure a perfect match between what we want to do and the tools we use to do it. The final outcome is products with near-perfect geometries and tolerances, reflecting the care that has gone into the research and development stages.

We've got **solutions** — wide-ranging, specific to your needs and superior in reliability

From magnetic drives or air-cooled shaft seal chambers and double shaft seals to special pumps for high-pressure performance and aggressive liquids, there is a CR for your unique requirements.

Our custom solutions engineering department works exclusively to custom design pumps for industry. Every day Grundfos customers order pumps that will handle:

- extreme temperatures
- extreme pressures
- aggressive/hazardous liquids
- vaporous liquids
- low NPSH level
- belt drive
- paints
- varnishes
- high viscosity liquids
- explosive liquids
- horizontal mounting

What can you pump with a CR?

Aggressive or corrosive liquids	Seawater, hypochlorites, hydrochloric acid, ferric chloride, nitric acid, chromic acid, phosphoric acid
Abrasive liquids	Metasilicate-containing cleaning agents, abrasive alkaline cleaners, phosphates
Toxic or explosive liquids	Trichlorethylene, toluene, petroleum , ethyl alcohol, methyl alcohol
High-viscosity liquids	Glycols, carboxylates (for cooling), lubricating oils, rapeseed oil
Hardening liquids	Water-based paint, glue, vegetable oils
Crystallizing liquids	Glycol additives, naphthalene, sugar products (e.g. dextran), salts
High pressures	Water treatment, cleaning/washing
Extreme temperatures	Petrochemicals, oils, boiler feed, secondary coolants

The CR range is available in four different basic materials:

CR
AISI 304 stainless steel with a cast iron top and base

CRI
AISI 304 stainless steel throughout

CRN
AISI 316 stainless steel throughout

CRT
Titanium throughout

Customized Solutions — over a million combinations for CR

Grundfos CR has the most extensive range on the market, but standard pump ranges can't match all conceivable applications. Customers needing a non-standard solution are able to pick and choose pump elements or "modules" to cover nearly any situation.

Working in close cooperation with you, our skilled specialists carefully analyze the situation to make sure the solution fully meets your expectations. If you do not find a suggestion to suit your particular problem in our brochure, contact Grundfos with your requirements, and we will do everything we can do to provide a solution.

Full range of motor variants available

While the standard range of Grundfos motors will cover most application demands, customized solutions are available for special needs. Contact Grundfos if you have specific requirements. Integrated variable frequency drives ("smart" pumps) are included in our standard range of pumps.

Specialized seals for unique situations

Most pumps are used for watery liquids at temperatures below +248°F (+120°C) and pressures lower than 362 psi (25 bar). When the pumped liquid goes beyond these limits, special solutions are required, and our modular approach offers wide-ranging solutions to handle the challenge.

CRN 3 Cool-top

Grundfos CRN MAGdrive solution eliminates the need for shaft seals via a patent pending magnetic-drive system where the power from the motor is transmitted to the pump by magnetic force. Combined with a hermetically-sealed liquid end, the pump is totally leak free, and offers the best solution for pumping dangerous, aggressive, or volatile liquids.

CRN MAGdrive

Rugged pump modules

The CR range is available in 13 flow sizes and various grades of corrosion-resistant stainless steel, as well as corrosion-free titanium. Contact Grundfos for help in selecting the right CR components for your customized pump.

CRN 3 double shaft seal

CR high-pressure

Motor options

- Special supply voltages and protection methods
- Non-standard motor size (e.g. for pumping high or low viscosities)
- Explosion-proof, dust ignition-proof
- For extreme temperatures, humidity, or altitudes
- Specific approval requirements
- Non-Grundfos motor

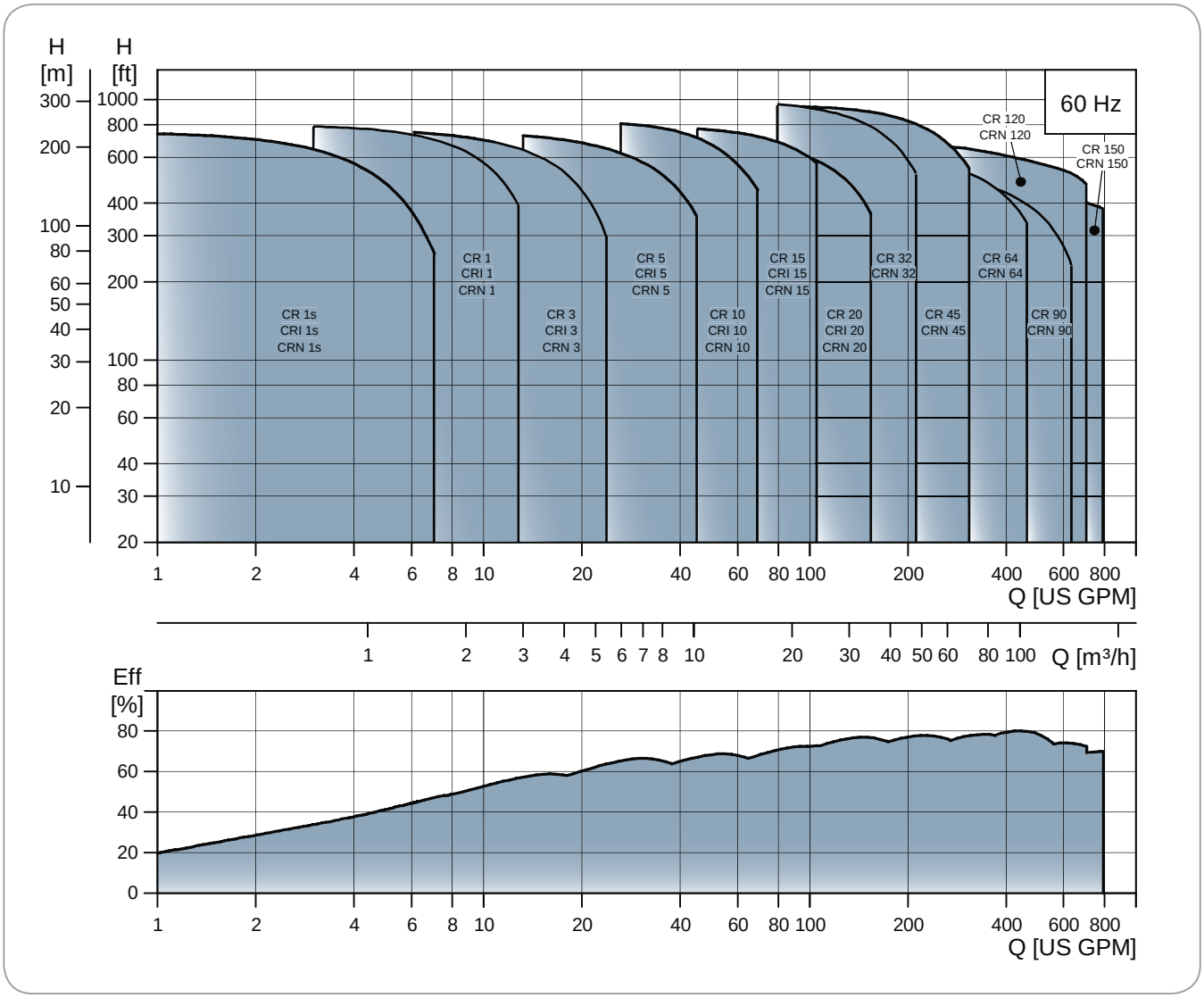
Shaft seal options

- Chemical resistant O-rings for aggressive chemicals
- Special seal face or LiqTec™ run-dry sensor to protect against dry running
- Balanced high-pressure shaft seal for 362 to 580 psi
- Air-cooled shaft seal system for extreme high temperatures
- Double shaft seal with pressure chamber for pumping explosive or poisonous liquids

Pump options

- Horizontal position for height limitations
- Low NPSH pumps
- High-pressure pumps
- Special surface treatments or approvals
- Pumps for extreme temperatures
- Silicone-free pumps
- Corrosion-free titanium CRT pumps for seawater or highly corrosive liquids
- Wide variety of connections

PERFORMANCE CURVES AND TECHNICAL DATA




Boiler feed


CR in production


CR pumps in reliability test

CR Product Range

Range:	CR 1s	CR, CRE 1	CR, CRE 3	CR, CRE 5	CR, CRE 10	CR, CRE 15	CR, CRE 20	CR, CRE 32	CR, CRE 45	CR, CRE 64	CR 90	CR 120	CR 150
Nominal flow rate (US GPM)	4.5	8.5	15	30	55	95	110	140	220	340	440	610	750
Temperature range (°F)	-4 to +250							-22 to +250 1) & 2)					
Temperature range (°F) - on request	-40 to +356							-40 to +435				-	-
Max. working pressure (psi)	360	360	360	360	360	360	360	435	435	435	435	435	435
Max. working pressure (psi) - on request	-	725	725	725	725	725	725	580	580	580	580	580	580
Max. pump efficiency (%)	35	49	59	67	70	72	72	76	78	79	80	75	73
CR pumps													
CR: Flow range (US GPM)	0.5 - 5.7	1 - 12.8	1.5 - 23.8	3 - 45	5.5 - 70	9.5 - 125	11 - 155	14 - 210	22 - 310	34 - 450	44 - 630	61 - 700	75 - 792
CR: Max. pump pressure (H[ft])	760	790	790	780	865	800	700	995	940	565	595	685	570
CR: Motor power (HP)	1/3 - 2	1/3 - 3	1/3 - 5	3/4 - 7 1/2	3/4 - 15	2 - 25	3 - 25	3 - 40	7 1/2 - 60	7 1/2 - 60	15 - 60	20 - 100	25 - 100
CRE pumps													
CRE: Flow range (US GPM)	-	0 - 12.8	0 - 23.8	0 - 45	0 - 70	0 - 125	0 - 155	0 - 210	0 - 310	0 - 450	-	-	-
CRE: Max. pump pressure (H[ft])	-	790	790	780	665	390	270	240	120	100	-	-	-
CRE: Motor power (HP)	-	1/3 - 3	1/3 - 5	3/4 - 7 1/2	3/4 - 10	2 - 10	3 - 10	3 - 10	7 1/2	7 1/2	-	-	-
Version:													
CR, CRE: Cast Iron and stainless steel AISI 304	•	•	•	•	•	•	•	•	•	•	•	•	•
CRI, CRIE: Stainless steel AISI 304	•	•	•	•	•	•	•	-	-	-	-	-	-
CRN, CRNE: Stainless steel AISI 316	•	•	•	•	•	•	•	•	•	•	•	•	•
CRT, CRTE: Titanium	-	-	CRT 2 CRTE 2	CRT 4 CRTE 4	CRT 8 CRTE 8	CRT 16 CRTE 16	-	-	-	-	-	-	-
CR, CRE pipe connection:													
Oval Flange (NPT)	1"	1"	1"	1 1/4"	2"	2"	2"	-	-	-	-	-	-
Oval Flange (NPT) - on request	1 1/4"	1 1/4"	1 1/4"	1"	1 1/2"	2 1/2"	2 1/2"	-	-	-	-	-	-
ANSI Flange Size	1 1/4"	1 1/4"	1 1/4"	1 1/4"	2"	2"	2"	2 1/2"	3"	4"	4"	5"	5"
ANSI Flange Size - on request	-	-	-	-	-	-	-	3"	4"	5"	5"	6"	6"
ANSI Flange Class	300 lb.	300 lb.	300 lb.	300 lb.	250 lb.	250 lb.	250 lb.	125/250 lb.	125/250 lb.	125/250 lb.	125/250 lb.	125/250 lb.	125/250 lb.
CRI, CRIE pipe connection:													
Oval Flange (NPT)	1"	1"	1"	1 1/4"	2"	2"	2"	-	-	-	-	-	-
Oval Flange (NPT) - on request	1 1/4"	1 1/4"	1 1/4"	1"	1 1/2"	-	-	-	-	-	-	-	-
ANSI Flange Size	1 1/4"	1 1/4"	1 1/4"	1 1/4"	2"	2"	2"	-	-	-	-	-	-
ANSI Flange Class	300 lb.	300 lb.	300 lb.	300 lb.	300 lb.	300 lb.	300 lb.	-	-	-	-	-	-
Clamp coupling (NPT) - on request	1", 1 1/4"	1", 1 1/4"	1", 1 1/4"	1", 1 1/4"	1 1/2", 2"	1 1/2", 2"	2", 2 1/2"	-	-	-	-	-	-
Union (NPT ext. thread) - on request	2"	2"	2"	2"	-	-	-	-	-	-	-	-	-
CRN, CRNE pipe connection:													
PJE (Victaulic)	1 1/4"	1 1/4"	1 1/4"	1 1/4"	2"	2"	2"	-	-	-	-	-	-
PJE (Victaulic) - on request	-	-	-	-	-	-	-	3"	4"	4"	4"	4"	4"
ANSI Flange Size	1 1/4"	1 1/4"	1 1/4"	1 1/4"	2"	2"	2"	2 1/2"	3"	4"	4"	5"	5"
ANSI Flange Size - on request	-	-	-	-	-	-	-	3"	4"	5"	5"	6"	6"
ANSI Flange Class	300 lb.	300 lb.	300 lb.	300 lb.	300 lb.	300 lb.	300 lb.	150/300 lb.	150/300 lb.	150/300 lb.	150/300 lb.	150/300 lb.	150/300 lb.
Clamp coupling (NPT) - on request	1", 1 1/4"	1", 1 1/4"	1", 1 1/4"	1", 1 1/4"	1 1/2", 2"	1 1/2", 2"	2", 2 1/2"	-	-	-	-	-	-
Union (NPT ext. thread) - on request	2"	2"	2"	2"	-	-	-	-	-	-	-	-	-
CRT pipe connection:													
PJE coupling (Victaulic)	-	-	1 1/4"	1 1/4"	2"	2"	-	-	-	-	-	-	-
ANSI Flange Size - on request	-	-	-	-	2"	2"	-	-	-	-	-	-	-

• :Available

- :Not available

1) CRN 32 to CRN 90 with HQQE shaft seal: –40 °F to +250 °F

2) CR, CRN 120 and 150 with 75 or 100 Hp motors with HBQE shaft seal: 0 °F to +250 °F

BE > THINK > INNOVATE >

Being responsible is our foundation
Thinking ahead makes it possible
Innovation is the essence

The CR range from Grundfos

Grundfos was the first company to develop a multi-stage in-line pump, and today the CR remains second to none. It is the most extensive in-line pump program on the market, matching customer requirements with many innovative features unique to Grundfos. CR provides superior reliability and the lowest possible cost of ownership to customers worldwide.

Impressive as the CR range is, Grundfos offers much more. Our complete range of pump solutions means that you can rely on Grundfos know-how and our complete dedication to quality and service for all pump applications — industrial and domestic.

L-CR-SL-010	Rev. 10/11
PRINTED IN USA	

U.S.A.
GRUNDFOS Pumps Corporation
17100 West 118th Terrace
Olathe, Kansas 66061
Phone: (913) 227-3400
Telefax: (913) 227-3500

Canada
GRUNDFOS Canada Inc.
2941 Brighton Road
Oakville, Ontario
L6H 6C9
Phone: (905) 829-9533
Telefax: (905) 829-9512

Mexico
Bombas GRUNDFOS de Mexico S.A. de C.V.
Boulevard TLC No. 15
Parque Industrial Stiva Aeropuerto
C.P. 66600 Apodaca, N.L. Mexico
Phone: 011-52-81-8144 4000
Telefax: 011-52-81-8144 4010

www.grundfos.us/industry

GRUNDFOS®