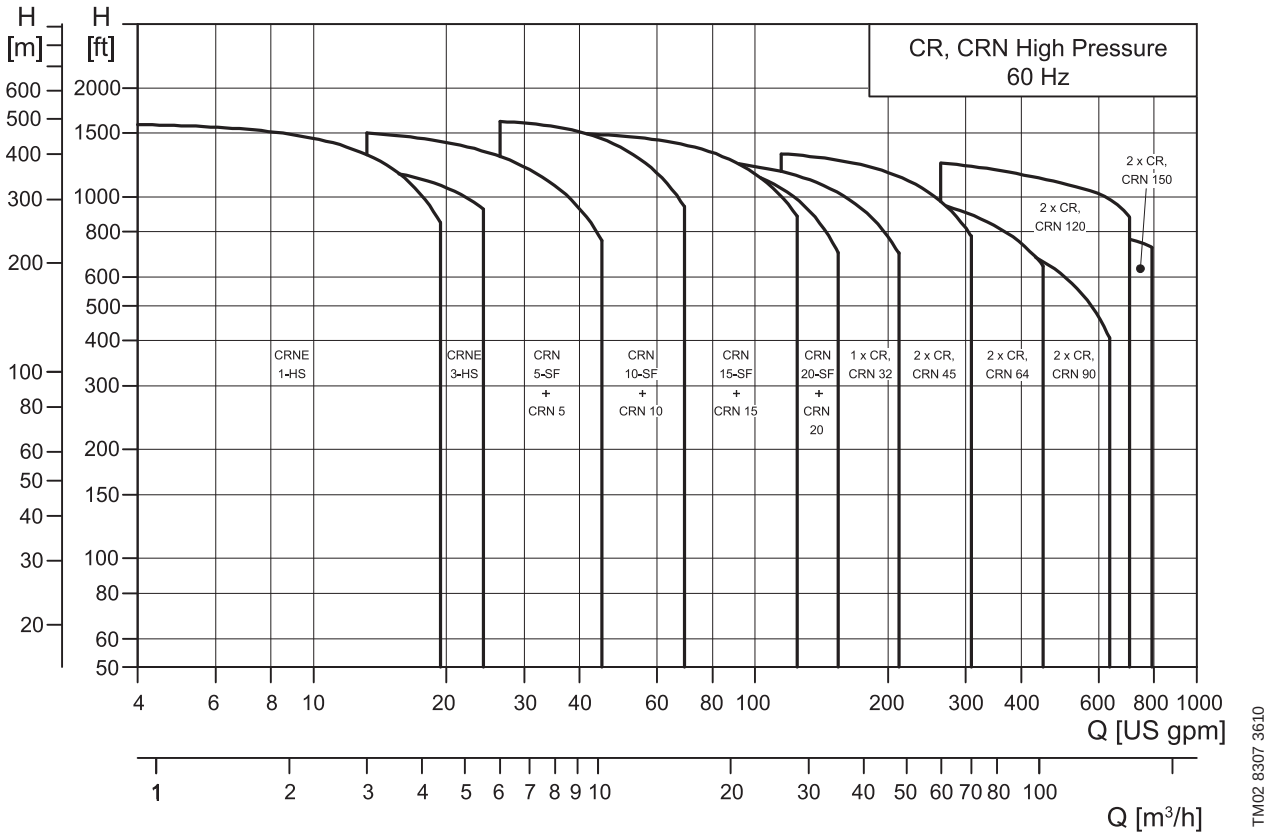
Performance range



Product range

Range	CRNE 1 HS	CRNE 3 HS	CRN 5 SF	CRN 10 SF	CRN 15 SF	CRN 20 SF	CR(N) 32	2 x CR(N) 45	2 x CR(N) 64	2 x CR(N) 90	2 x CR(N) 120	2 x CR(N) 150
Nominal flow rate [US gpm]	13	16	30	55	95	110	140	220	340	440	610	750
Flow range [US gpm]	1.3 - 19.3	1.6 - 24	3 - 45	5.5 - 70	9.5 - 125	11 - 155	14 - 210	22 - 310	34 - 450	44 - 630	61 - 700	75 - 790
Max. working pressure [psi]	725	725	725	725	725	725	580	580	580	580	580	580
Motor power [Hp]	6.2 - 10	6.2 - 10	1.5 - 7.5	3 - 15	5 - 25	5 - 25	50 - 60	15 - 60	25 - 60	25 - 60	20 - 100	25 - 100
Temperature range [°F]	-4 to +248			-4 to +248			-22 to +248				-22 to 248 [1) 2)]	
Version												
CR: Ductile iron and stainless steel AISI 304	-	-	-	-	-	-	●	●	●	●	●	●
CRN, CRNE: Stainless steel AISI 316	●	●	●	●	●	●	●	●	●	●	●	●
CR, CR pipe connection												
ANSI flange size	-	-	-	-	-	-	2 1/2"	3"	4"	4"	5"	5"
ANSI flange class	-	-	-	-	-	-	300 lb.	150/300 lb.	150/300 lb.	150/300 lb.	150/300 lb.	150/300 lb.
CRN, CRNE pipe connection												
PJE (Victaulic)	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	-	-	-	-	-	-	2 1/2"	3"	4"	4"	5"	5"
ANSI flange class	-	-	-	-	-	-	300 lb.	150/300 lb.	150/300 lb.	150/300 lb.	150/300 lb.	150/300 lb.
System												
One pump with TEFC/ODP motor	-	-	-	-	-	-	●	-	-	-	-	-
One pump with high speed motor	●	●	-	-	-	-	-	-	-	-	-	-
Two pumps in series	-	-	●	●	●	●	●	●	●	●	●	●

● Available

'' - '' Not available

1) CR, CRN 120 and 150 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

Applications

The CR, CRN high pressure series is a multi-purpose pump range suitable for a variety of different applications demanding reliable and cost-efficient supply. CR, CRN handles a variety of liquids from potable water to industrial liquids within a very wide temperature, flow and pressure scale. Below is a list representing some general examples of applications requiring a high pressure:

Industry

Pressure boosting

- process water systems
- washing and cleaning systems
- high-pressure washdown systems
- boiler feed and condensate systems

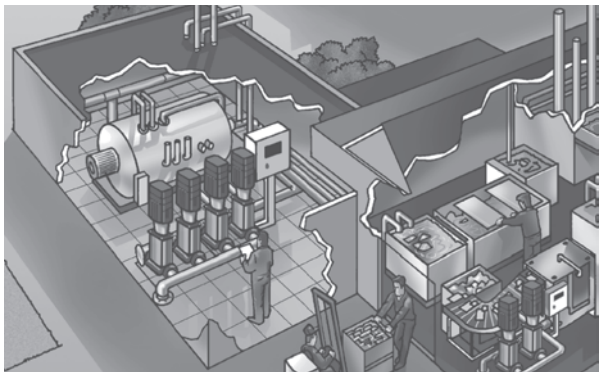


Fig. 1 Industrial application

Water treatment

- Ultra-filtration systems
- Reverse osmosis systems

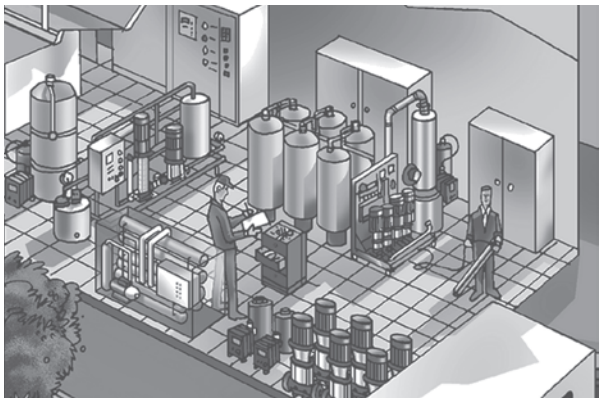
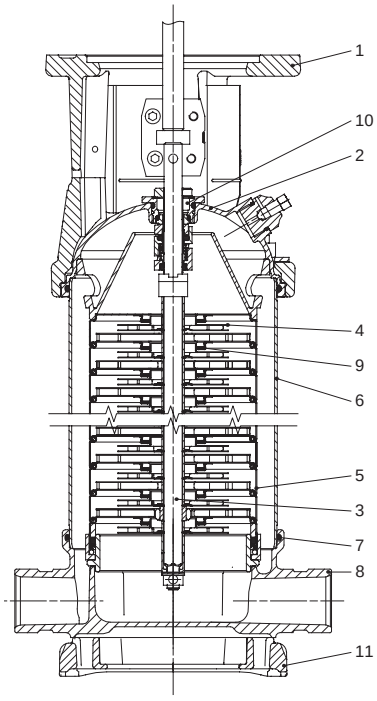


Fig. 2 Process water treatment

CRNE 1 and 3 HS

TM02 8470 0204

Fig. 3 CRNE 3-HS pump



TM02 1688 2803

Fig. 4 Sectional drawing of CRNE 1 and 3-HS

Pump

CRNE-HS is a single pump solution capable of generating up to 692 psi.

The CRNE-HS pump is a non self-priming, vertical multistage centrifugal pump fitted with a high speed Grundfos motor with integrated frequency converter, type MLE.

The direction of rotation is the opposite of that of standard pumps, and the chamber stack is turned upside-down, resulting in the pumped liquid flowing in the opposite direction.

This design ensures that the shaft seal is not affected by the pump discharge pressure.

The base, the pump head cover as well as vital pump components are made from stainless steel. The base has in-line suction and discharge ports.

The pump has a maintenance-free mechanical cartridge shaft seal.

Operating conditions

Liquid temperature:	–4°F to +248°F.
Maximum ambient temperature:	+104°F.
Minimum inlet pressure:	29 psi.
Maximum inlet pressure:	218/362 psi. (static/operation).
Maximum operating pressure:	725 psi.

Materials

Pos.	Description	Materials	AISI/ASTM
1	Pump head	Cast iron EN-GJL-200	ASTM 25 B
2	Pump head cover	Stainless steel	CF8M [1]
3	Shaft	Stainless steel	AISI 316 AISI 329
4	Impeller	Stainless steel	AISI 316
5	Chamber	Stainless steel	AISI 316
6	Outer sleeve	Stainless steel	AISI 316
7	O-ring for outer sleeve	EPDM or FKM	
8	Base	Stainless steel	CF8M [1]
9	Neck ring	PTFE	
10	Shaft seal	Cartridge type	
11	Base plate	Cast iron EN-GJL-200 [2]	ASTM 25B
	Other rubber parts	EPDM, FKM, FXM and FFKM	

[1] CF8M is cast equivalent of AISI 316 stainless steel.

[2] Stainless steel is available on request.

CRN 5, 10, 15, 20 SF

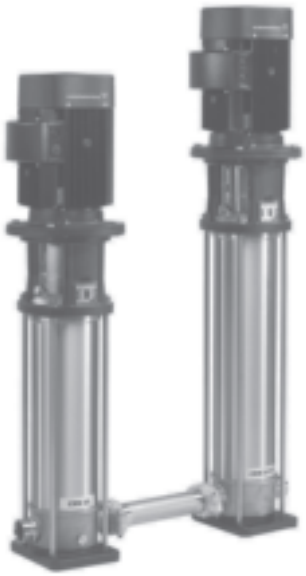


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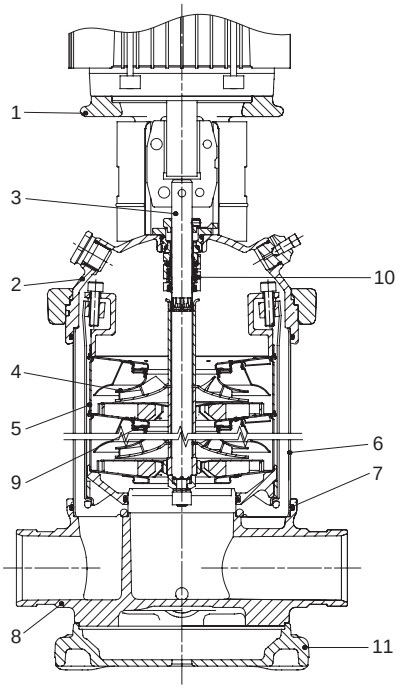
Fig. 5 CRN 15 SF



TM02 7336 3203

Fig. 6 Sectional drawing of CRN 5, 10, 15, 20 SF

Pump

CRN-SF is a double pump system capable of generating up to 696 psi.

The system consists of two pumps in series. The first pump is a standard pump for feeding. The second pump is a high pressure pump especially designed for high pressures. This data booklet covers technical information about the high pressure pump.

The CRN-SF pump is a non self-priming, vertical multistage centrifugal pump fitted with a Grundfos specified TEFC-motor.

The pump consists of a base and a pump head. The pump body and the outer sleeve are secured between the base and the pump head by means of staybolts.

The direction of rotation is the opposite of that of standard pumps, and the chamber stack is turned upside-down, resulting in the pumped liquid flowing in the opposite direction.

The base, the pump head cover as well as vital pump components are made from stainless steel. The base has in-line suction and discharge ports.

The pump has a maintenance-free mechanical cartridge shaft seal.

Operating conditions

Liquid temperature:	–4°F to +248°F.
Maximum ambient temperature:	+104°F.
Minimum inlet pressure:	29 psi.
Maximum inlet pressure:	
CRN 5SF	218/362 psi.
CRN 10, 15, 20	145/362 psi (static/operation).
Maximum operating pressure:	725 psi.

Materials

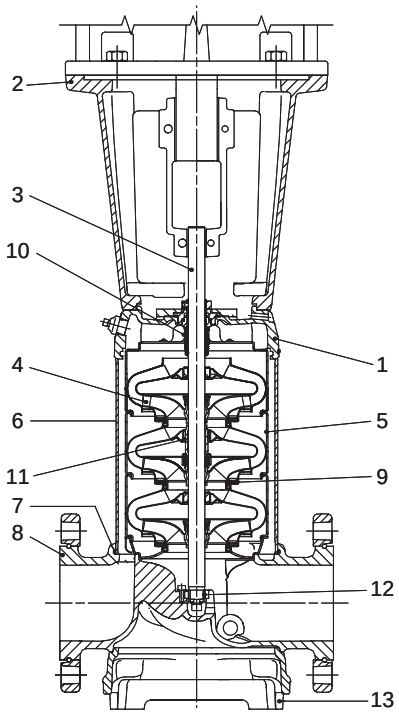
Pos.	Description	Materials	AISI/ASTM
1	Pump head	Cast iron	
2	Pump head cover	Stainless steel	CF8M [1]
3	Shaft	Stainless steel	AISI 329
4	Impeller	Stainless steel	AISI 316
5	Chamber	Stainless steel	AISI 316
6	Outer sleeve	Stainless steel	AISI 316
7	O-ring for outer sleeve	EPDM, FKM, FXM and FFKM	
8	Base	Stainless steel	CF8M [1]
9	Neckring	PTFE	
10	Shaft seal	Cartridge type	
11	Base plate	Cast iron EN-GJL-200 [2]	ASTM 25 B
	Other rubber parts in pump	EPDM, FKM, FXM and FFKM	

[1] CF8M is cast equivalent of AISI 316 stainless steel.

[2] Stainless steel is available on request.

CR 32, CRN 32

Fig. 7 CR, CRN pump



TM01 1837 1403

Fig. 8 Sectional drawing of a CR(N) 32 pump

Pump

CR, CRN is a pump capable of generating up to 568 psi. The pump is a high pressure pump specially designed for high pressures. This product guide covers technical information about the high pressure pump.

The CR, CRN high pressure pump is a non-self-priming, vertical multistage centrifugal pump fitted with a Grundfos specified motor and a specially developed high-pressure shaft seal. When necessary it includes a special pump sleeve and a bearing flange which make the pump capable of handling higher pressures.

CRN

The base, the pump head cover and all components in contact with the pumped liquid are made of stainless steel.

CR

The base and the pump head are made of ductile cast iron.

Operating conditions

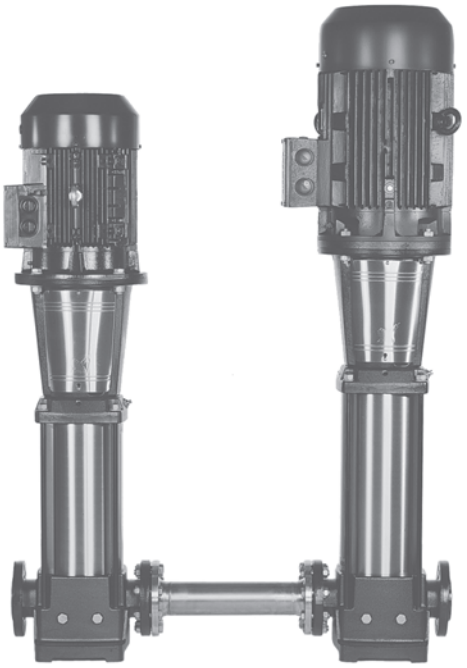
Liquid temperature:	–22°F to +248°F.
Maximum ambient temperature:	+104°F.
Maximum inlet pressure:	218 psi.
Maximum operating pressure:	580 psi.

Materials

Pos.	Description	Materials	AISI/ASTM
1	Pump head	CR: Ductile iron EN-GJS-500-7	ASTM 80-55-06
		CRN: Stainless steel	CF8M [1]
2	Motor stool	Cast iron EN-GJL-200	ASTM 25B
3	Shaft	Stainless steel	AISI 431 [3] SAF 2205 [4]
4	Impeller	Stainless steel	AISI 316
5	Chamber	Stainless steel	AISI 316
6	Outer sleeve	Stainless steel	AISI 316
7	O-ring for outer sleeve	EPDM or FKM	
8	Base	CR: Ductile iron EN-GJS-500-7	ASTM 80-55-06
		CRN: Stainless steel	CF8M [1]
9	Neck ring	Carbon-graphite filled PTFE	
10	Shaft seal	Cartridge type	
11	Bearing ring	Bronze/carbon- graphite filled PTFE	
12	Bottom bearing ring	TC/TC	
13	Base plate	Ductile iron [2] EN-GJS-500-7	ASTM 80-55-06
	Rubber parts	EPDM or FKM	

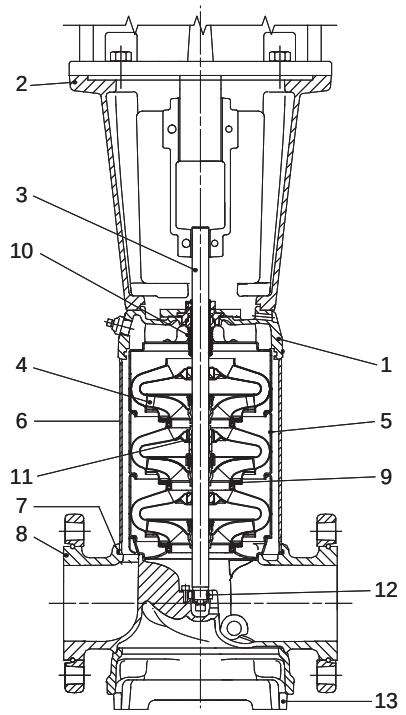
[1] CF8M is cast equivalent of AISI 316 stainless steel.
[2] Stainless steel is available on request.
[3] CR 32.
[4] CRN 32.

2 x CR 45, 64 and 90
2 x CRN 45, 64 and 90



TM02 1724 1801

Fig. 9 2 x CR, CRN double pump system



TM01 1837 1403

Fig. 10 Sectional drawing of a CR(N) 45, 64, 90 pump

Pump

2 x CR, CRN is a double pump system capable of generating up to 557 psi. The system consists of two pumps in series. The first pump is a standard pump for feeding. The second pump is a high pressure pump and can be a specially designed pump for high pressures. This product guide covers technical information about the high pressure pump.

The CR, CRN high pressure pump is a non-self-priming, vertical multistage centrifugal pump fitted with a Grundfos specified motor and a specially developed high-pressure shaft seal. When necessary it includes a special pump sleeve and a bearing flange which make the pump capable of handling higher pressures.

CRN

The base, the pump head cover and all components in contact with the pumped liquid are made of stainless steel.

CR

The base and the pump head are made of ductile cast iron.

Operating conditions

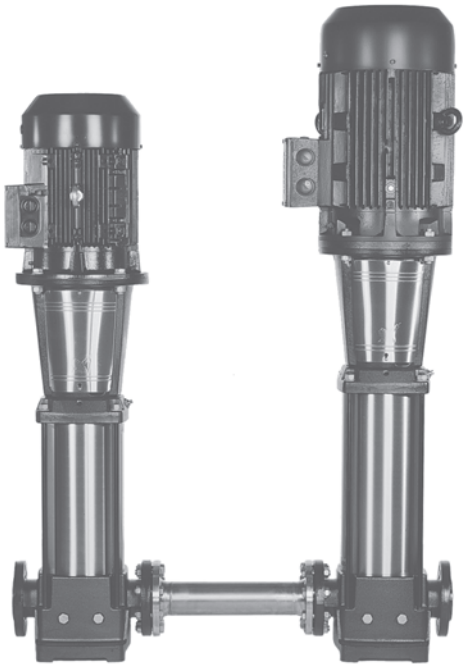
Liquid temperature:	–22°F to +248°F.
Maximum ambient temperature:	+104°F.
Maximum inlet pressure:	218/362 psi.
(with bearing flange if necessary)	(static/operation)
Maximum operating pressure:	580 psi.

Materials

Pos.	Description	Materials	AISI/ASTM
1	Pump head	CR: Ductile iron EN-GJS-500-7	ASTM 80-55-06
		CRN: Stainless steel	CF8M [1]
2	Motor stool	Cast iron EN-GJL-200	ASTM 25B
3	Shaft	Stainless steel	AISI 431 [3] SAF 2205 [4]
4	Impeller	Stainless steel	AISI 316
5	Chamber	Stainless steel	AISI 316
6	Outer sleeve	Stainless steel	AISI 316
7	O-ring for outer sleeve	EPDM or FKM	
8	Base	CR: Ductile iron EN-GJS-500-7	ASTM 80-55-06
		CRN: Stainless steel	CF8M [1]
9	Neck ring	Carbon-graphite filled PTFE	
10	Shaft seal	Cartridge type	
11	Bearing ring	Bronze/carbon- graphite filled PTFE	
12	Bottom bearing ring	TC/TC	
13	Base plate	Ductile iron [2] EN-GJS-500-7	ASTM 80-55-06
	Rubber parts	EPDM or FKM	

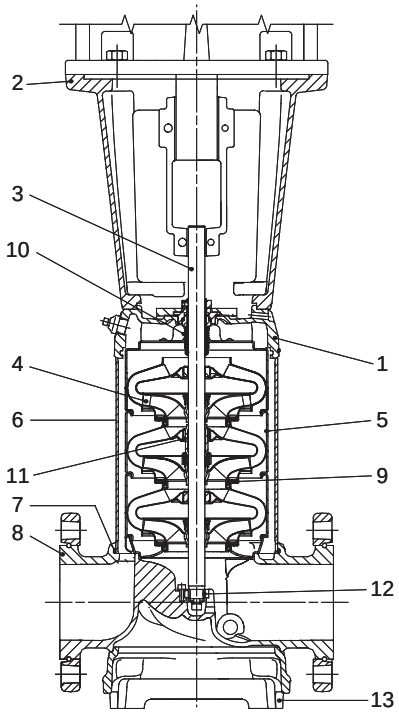
[1] CF8M is cast equivalent of AISI 316 stainless steel.
[2] Stainless steel is available on request.
[3] CR 45, 64, 90.
[4] CRN 45, 64, 90.

2 x CR 120 and 150
2 x CRN 120 and 150



TM02 1724 1801

Fig. 11 2 x CR, CRN double pump system



TM01 1837 1403

Fig. 12 Sectional drawing of a CR(N) 120, 150 pump

Pump

2 x CR, CRN is a double pump system capable of generating up to 550 psi.

The system consists of two pumps in series. The first pump is a standard pump for feeding. The second pump is a high pressure pump.

The CR, CRN high pressure pump is a non-self-priming, vertical multistage centrifugal pump fitted with a Grundfos standard motor.

CRN

The base, the pump head cover and all components in contact with the pumped liquid are made of stainless steel.

CR

The base and the pump head are made of cast iron.

Operating conditions

Liquid temperature, HBQE:	0 °F to +248°F.
Liquid temperature, HQQE:	-22 °F to +248 °F.
Maximum ambient temperature:	+104°F.
Maximum inlet pressure:	290 psi.
Maximum operating pressure:	580 psi.

Materials

Pos.	Description	Materials	AISI/ASTM
1	Pump head	CR: Ductile iron EN-GJS-500-7	A 536 65-45-12
		CRN: Stainless steel	CF 8M
2	Motor stool 15 hp - 60 hp	Cast iron EN-GJL-200	A48-30 B
	Motor stool 75 hp - 100 hp	cast iron EN-GJS-500-7	A 536 65-45-12
3	Shaft	Stainless steel	CR: AISI 431 CRN: SAF 2205
4	Impeller	Stainless steel	CR: AISI 304 CRN: AISI 316
5	Chamber		
6	Outer sleeve	Stainless steel	AISI 316
7	O-ring for outer sleeve	EPDM, FKM, FFKM and FXM	
8	Base	CR: Cast iron EN-GJS-500-7	A 536 65-45-12
		CRN: Stainless steel	CF 8M
9	Base plate	Cast iron EN-GJS-500-7 [1)]	A536 65-45-12
10	Neck ring	PTFE	
11	Shaft seal [2)]	SiC/SiC (∅ 22) Carbon/SiC (∅ 32)	
12	Support bearing	PTFE	
13	Bearing ring	SiC/SiC	
14	Base plate, CRN only	Cast iron EN-GJS-500-7 [1)]	A536 65-45-12
	Other rubber parts	EPDM, FKM, FFKM, and FXM	

[1)] Stainless steel is available on request.

[3)] ∅ 22mm shaft 15 hp - 60 hp. ∅ 32mm shaft 75 hp - 100 hp

Product overview

Type key

CR, CRN(E)

Example	CR	E	32	(s)	-4	-2	-A	-F	-G	-E	-H	QQ	E
Type range: CR, CRN													
Pump with integrated frequency control													
Flow rate [m^3/h]													
All impellers with reduced diameter (applies only to CR, CRN 1s)													
Number of impellers													
Number of reduced diameter impellers (CR(E), CRN(E) 32, 45, 64, 90)													
Code for pump version													
Code for pipe connection													
Code for materials													
Code for rubber parts													
Code for shaft seal													

Codes

Example	A	-F	-A	-E	-H	QQ	E
Pump version							
A Basic version [1]							
B Oversize motor							
E Certificate/approval							
F CR pump for high temperatures (air-cooled top assembly)							
H Horizontal version							
HS High-pressure pump with high speed MLE motor							
I Different pressure rating							
J Pump with different max speed							
K Pump with low NPSH							
M Magnetic drive							
N Fitted with sensor							
P Undersize motor							
R Horizontal version with bearing bracket							
SF High pressure pump							
T Over size motor (two flange sizes bigger)							
U NEMA version [1]							
X Special version							
Pipe connection							
A Oval flange							
B NPT thread							
CA FlexiClamp (CRI(E), CRN(E) 1, 3, 5, 10, 15, 20)							
CX Triclamp (CRI(E), CRN(E) 1, 3, 5, 10, 15, 20)							

Example	A	-F	-A	-E	-H	QQ	E
F DIN flange							
G ANSI flange							
J JIS flange							
N Changed diameter of ports							
P Victaulic (PJE) coupling							
X Special version							
Materials							
A Basic version							
D Carbon-graphite filled PTFE (bearings)							
G Wetted parts AISI 316							
GI All parts stainless steel, wetted parts AISI 316							
I Wetted parts AISI 304							
II All parts stainless steel, wetted parts AISI 304							
K Bronze (bearings)							
S SiC bearings + PTFE neck rings							
X Special version							
Code for rubber parts							
E EPDM							
F FXM							
K FFKM							
V FKM							
Shaft seal							
A O-ring seal with fixed driver							
B Rubber bellows seal							
E Cartridge seal with O-ring							
H Balanced cartridge seal with O-ring							
K Metal bellows cartridge seal							
O Double seal, back-to-back							
P Double seal, tandem							
X Special version							
B Carbon, synthetic resin-impregnated							
H Cemented tungsten carbide, embedded (hybrid)							
Q Silicon carbide							
U Cemented tungsten carbide							
X Other ceramics							
E EPDM							
F FXM							
K FFKM							
V FKM							

[1] In August 2003 the NEMA version pump code was discontinued for all material numbers created by Grundfos manufacturing companies in North America. The NEMA version pump code will still remain in effect for existing material numbers. NEMA version pumps built in North America after this change will have either an A or U as the pump version code depending on the date the material number was created.

Operating range of the shaft seal for the high pressure pump

The actual operating range of the shaft seal for the high pressure pump depends on operating pressure, type of shaft seal and liquid temperature. The following temperature ranges apply to clean water.

Operating conditions of the shaft seal for the CR high pressure pump

Shaft seal	Description	Max. temp. range [°F]
HQQE	O-ring (cartridge) (balanced seal), SiC/SiC, EPDM	–22 to +248
HQQV	O-ring (cartridge) (balanced seal), SiC/SiC, FKM	–4 to +194
HUBE	O-ring (cartridge) (balanced seal), TC/carbon, EPDM	+32 to +248
HUBV	O-ring (cartridge) (balanced seal), TC/carbon, FKM	+32 to +194

Pumped liquids

Thin, non-explosive liquids, not containing solid particles or fibers. The liquid must not chemically attack the pump materials.

When pumping liquids with a density and/or viscosity higher than that of water, oversized motors 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 the chloride content, pH value, temperature and content of chemicals, oils, etc.

Please note that aggressive liquids (e.g. sea water and some acids) may attack or dissolve the protective oxide film of the stainless steel and thus cause corrosion.

Performance curves

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

1. The motors used for the measurements are standard TEFC or MLE motors.
2. Measurements have been made with airless water at a temperature of 68°F.
3. The curves apply to a kinematic viscosity of υ = 1 cSt (1 mm^2/s).
4. Due to the risk of overheating, the pumps should **not** be used at 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.

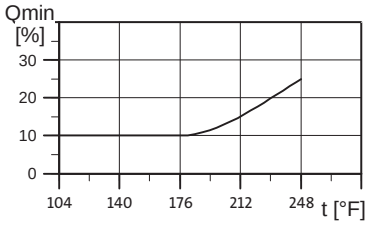


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Fig. 13 Minimum flow rate