

CR, CRN 95-185

Vertical, multistage centrifugal pumps

60 Hz

(NEMA)



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1. Product introduction

This data booklet covers Grundfos CR and CRN pumps with these nominal flow sizes:

- CR, CRN 95
- CR, CRN 125
- CR, CRN 155
- CR, CRN 185.

Options for smaller flow sizes are described in the data booklet for CR, CRI, CRN, 60 Hz available on Grundfos Product Center at <http://net.grundfos.com/qr/i/98446676>



TM06 9062 1617

Fig. 1 CR, CRN 95-185

The CR, CRN range is suitable for numerous applications. The following applications are some typical examples.

Water supply:

- Filtration and transport waterworks
- Distribution from waterworks
- Pressure boosting of mains.

Industrial:

- Pressure boosting
- Process water transfer
- Boiler feed
- Cooling and air conditioning
- Firefighting systems
- District energy systems
- Special liquids transfer.

Water treatment:

- Filtration
- Brackish water reverse osmosis.

Pump Energy Index

Pump Energy Index (PEI) was established by the U.S. Department of Energy (DOE) and adopted by Canada as the standard metric used to evaluate pump efficiency. The value is the ratio of the pump efficiency rating (PER) divided by the calculated minimally compliant PER (PER_{STD}) for the pump type. This provides a representation of a pump's actual performance compared to the minimal standard performance required by regulation. The lower the PEI value, the more efficient a pump is at the tested operating points.

PER is determined by defined testing parameters required by the DOE. This includes testing a particular pump model at its best efficiency point (BEP).

For PEI values, there are two different versions:

- PEI_{CL} (constant load): Applies to a bare-shaft pump and a pump sold with a motor
- PEI_{VL} (variable load): Applies to pumps sold with a motor and controller (such as VFD, VSD)

The DOE has set the maximum PEI value as 1.00. Any pump, pump and motor, or pump, motor and controller that exceeds a PEI value of 1.00 can no longer be manufactured after January 26, 2020.

PEI is a generalized efficiency value. PEI cannot be used to determine the efficiency of a pump in a specific application.

Product type	Poles	PEI _{CL} bare- shaft pump	PEI _{CL} pump with motor	PEI _{VL} pump with motor plus controller*	Impeller diameter [(in / mm)]
CR, CRN 95	2	0.92	0.93	0.45	6.07 (154)
	4	0.94	0.94	0.47	
CR, CRN 125	2	0.92	0.93	0.59	6.38 (162)
	4	0.94	0.94	0.47	
CR, CRN 155	2	0.93	0.93	0.59	6.64 (169)
	4	0.95	0.95	0.47	

* Grundfos CUE continuous controls.

Features and benefits

CR, CRN pumps are vertical multistage, centrifugal pumps. The in-line design of the pumps enables installation in a horizontal one-pipe system where the inlet and outlet ports are in the same horizontal level and have the same pipe dimensions. This design provides a more compact pump design.

The pumps are available in various sizes and various numbers of stages to deliver the flow and pressure required.

CR, CRN pumps are designed for a variety of applications ranging from the pumping of potable water to the pumping of chemicals. The pumps are therefore suitable for a wide diversity of pumping systems where the performance and material of the pump meet specific demands.

A CR, CRN pump consists of two main components: the motor and the pump unit.

The pump unit consists of optimized hydraulics, various types of connections, a sleeve, a pump head and various other parts. See *Identification*, page 9.

CR, CRN pumps are available in various material versions according to the pumped liquid.

CR pumps fitted with EPDM elastomers are compliant with ANSI/NSF 61 and ANSI/NSF 372. See UL file MH26400 or contact Grundfos.

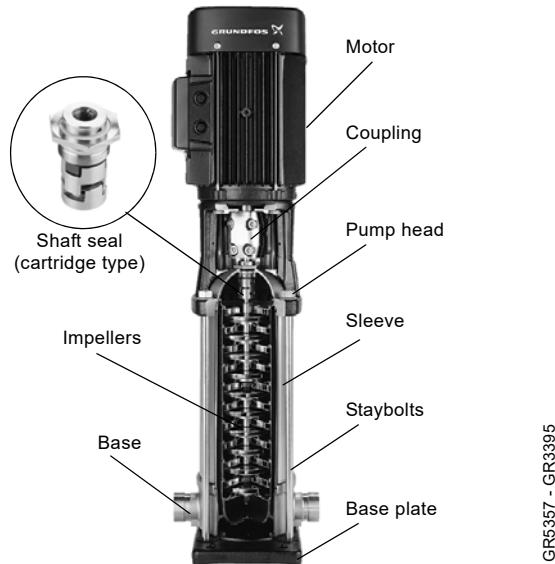


Fig. 2 CR pump

Pump

The CR pumps are non-self-priming, vertical multistage centrifugal pumps.

The pumps are available with a Grundfos or WEG standard motor.

The pump consists of a base and a pump head. Staybolts secure the chamber stack and sleeve between the pump head and base. The base has inlet

and outlet ports on the same level (in line). All pumps are fitted with a maintenance-free mechanical shaft seal of the cartridge type.

Motors

CR and CRN pumps are fitted with a Grundfos specified motor. The motors are all heavy-duty 2-pole, NEMA C-face motors. The pumps are supplied with WEG motors as standard. Grundfos ML motors (15 to 30 HP, TEFC three-phase) are available on request. Angular contact bearings are fitted to the drive end on motors up to 75 HP (55 kW). This ensures that the motor bearing life (L10) is extended to match that of the pump.

Electrical data

Mounting designation	NEMA
Insulation class	F
Efficiency	Premium efficiency - EISA compliant
Enclosure	IP55 TEFC - Totally Enclosed Fan Cooled.
60 Hz standard voltages	3 x 208-230/460 V 3 x 575 V
Number of poles	2

Approvals, WEG



Approvals, Grundfos ML



WEG motors 0.25 to 20 HP

- rolled steel construction
- service factor 1.15
- suitable for VFD operation per NEMA MG 1 part 31.4.4.2
- certified Class I Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G (three phase only).

WEG motors 25 to 300 HP

- cast iron frame
- rated for severe duty
- service factor 1.25 (25 to 100 HP)
- service factor 1.15 (125 to 300 HP)
- Inverter rated per NEMA MG 1 part 31
- certified Class I Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G (three phase only).

Grundfos E-motors

We also offer frequency-controlled CRE, CRNE pumps which are the ideal choice for a number of applications characterized by a demand for variable flow at constant pressure. These pumps are suited for water supply systems and pressure boosting as well as for industrial applications. Depending on the application, the pumps offer energy savings, increased comfort and improved processing.

Optional motors

The Grundfos standard range of motors covers a wide variety of application demands. However, for special applications or operating conditions, custom-built motor solutions can be provided.

For special applications or operating conditions, Grundfos offers custom-built motors such as:

- explosion-proof motors
- motors with anti-condensation heating unit
- motors with thermal protection.

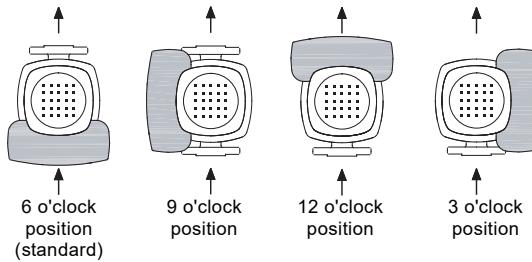
Motor protection

Three-phase motors must be connected to a motor-protective circuit breaker according to local regulations.

Three-phase Grundfos ML motors 5 HP (3.7 kW) and larger have a built-in thermistor (PTC) according to DIN 44082 (TP 211 according to IEC 34-11).

Terminal box positions

As standard, the terminal box is fitted on the inlet side of the pump.



TM03 3658 0606

Fig. 3 Terminal box positions

Viscosity

The pumping of 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 the power consumption. In such situations, the pump must be fitted with a larger motor. If in doubt, contact Grundfos.

2. Applications

Application	CR	CRN
Water supply		
Filtration and transfer at waterworks	•	○
Distribution from waterworks	•	○
Pressure boosting in mains	•	○
Pressure boosting in high-rise buildings, hotels, etc.	•	○
Pressure boosting for industrial water supply	•	○
Industry		
Pressure boosting		
Process-water systems	•	•
Washing and cleaning systems*	•	•
Vehicle-washing tunnels	•	○
Firefighting systems	•	-
Liquid transfer		
Cooling and air-conditioning systems (refrigerants)	•	○
Boiler feed and condensate systems	•	○
Machine tools (cooling lubricants)	•	•
Aquafarming	•	○
Special transfer duties		
Oils and alcohols	•	•
Acids and alkalis	-	•
Glycol and coolants	•	-
Water treatment		
Ultra-filtration systems	-	•
Reverse osmosis systems	-	•
Softening, ionizing, demineralizing systems	-	•
Distillation systems	-	•
Separators	•	•
Swimming pools	-	•
Irrigation		
Field irrigation (flooding)	•	○
Sprinkler irrigation	•	○
Drip-feed irrigation	•	○

• Recommended version.

○ Alternative version.

* For applications involving CIP (clean-in-place) and motors above 75 HP (55 kW) a bearing flange must be used and a base without thrust handling device or blind flange.

3. Performance range

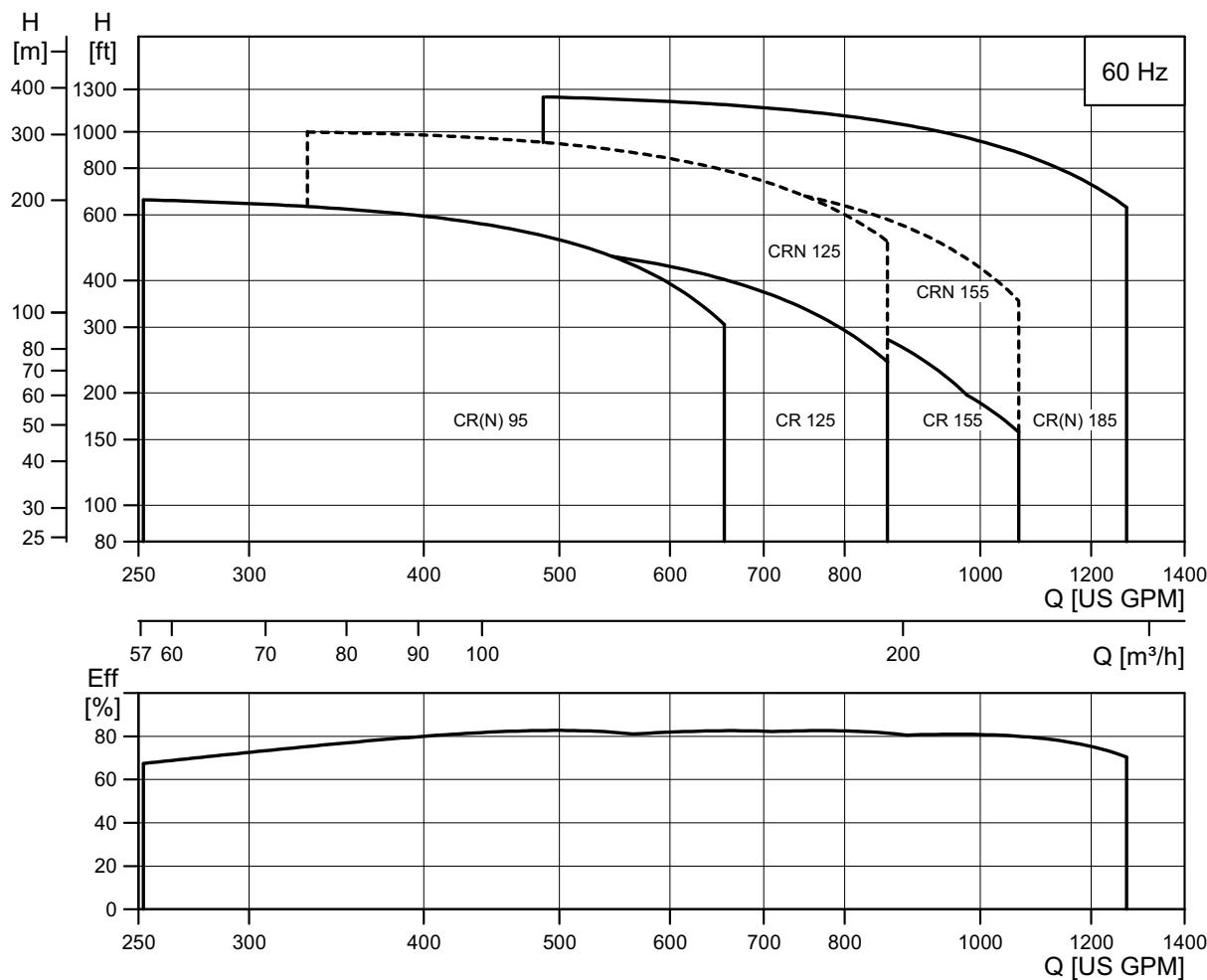


Fig. 4 Performance range, CR, CRN

TM06 5583 2720

4. Product range

Range	CR, CRN 95	CR, CRN 125	CR, CRN 155	CR, CRN 185
Rated flow rate [US gpm (m ³ /h)]	500 (114)	660 (150)	820 (186)	980 (222)
Liquid temperature [°F (°C)]		-4 to 248 ¹⁾ (-20 to +120)		
Maximum pump efficiency [%]	81	82	82	82
CR, CRN pumps				
Flow rate [US gpm]	255-660	330-860	410-1060	480-1240
Maximum developed pressure (at shut off) [psi (bar)]	300 ²⁾ (21)	435 ²⁾ (30)	370 ²⁾ (26)	560 (39)
Motor power [HP (kW)]	20-75 (15-55)	20-150 (15-111)	25-150 (18-111)	40-300 (30-224)
Version				
CR: Cast iron and stainless steel EN 1.4301/AISI 304	•	•	•	•
CRN: Stainless steel EN 1.4401/AISI 316	•	•	•	•
CR pipe connection				
Flange	4" ANSI	6" ANSI	8" ANSI	
CRN pipe connection				
Flange	4" ANSI	6" ANSI	8" ANSI	
PJE coupling (Victaulic type)	4"	6"	8"	

¹⁾ CRN 95 to 185 with HQQE shaft seal: -40 to +248 °F (-40 to +120 °C).

²⁾ CR pumps: Maximum operating pressure is 363 psi (25 bar).

5. Identification

Type key

Example	CR	E	95	-2	-2	-A	-G	-H	-E	-HQQE	P	C	B
Type range CR, CRN													
Pump with integrated frequency converter													
Flow rate [gpm (m³/h)]													
Number of impellers													
Number of reduced-diameter impellers CR, CRE, CRN, CRNE 95, 125, 155, 185													
Code for pump version													
Code for pipe connection													
Code for materials													
Code for rubber parts													
Code for shaft seal													
Code for motors [HP (kW)]													
Code for phase and voltage [V]													
Code for speed variant [rpm]													

Key to codes

Code	Description
Pump version	
A	Basic version
B	Oversized motor
E	Pump with certificate
G	E-pump without operating panel
J	E-pump with a different maximum speed
N	E-pump with sensor
P	Undersized motor
V	Cascade function
X	Special version
Pipe connection	
F	DIN flange
FC	DIN 11853-2 flange (collar flange)
G	ANSI flange
J	JIS flange
P	PJE coupling (Victaulic type)
X	Special version
Materials	
A	Basic version
H	All parts stainless steel, wetted parts EN10088 1.4401 ≈ AISI 316/ASTM 351 - CF8M
R	Silicon carbide/Silicon carbide bearing
X	Special version
Rubber parts in pump	
E	EPDM
V	FKM (Viton®)
Shaft seal type designation	
H	Balanced cartridge seal with O-ring
X	Special version*
Seal face material	
B	Carbon, synthetic resin-impregnated
U	Cemented tungsten carbide
Q	Silicon carbide
X	Other ceramics*
Secondary seal material (rubber parts)	
E	EPDM
V	FKM (Viton®)

Code	Description
Motors [HP (kW)]	
C	0.33 (0.25)
D	0.5 (0.37)
E	0.75 (0.55)
F	1 (0.75)
G	1.5 (1.1)
H	2 (1.5)
I	3 (2.2)
K	5 (4)
L	7.5 (5.5)
M	10 (7.5)
N	15 (11)
O	20 (15)
P	25 (18.5)
Q	30 (22)
R	40 (30)
S	50 (37)
T	60 (45)
U	75 (55)
V	100 (75)
W	120 (90)
1	150 (110)
2	175 (132)
3	215 (160)
4	270 (200)
5	335 (250)
Phase and voltage (V)	
A	1 x 200-240 V
B	3 x 200-240 V
C	3 x 440-480 V
D	3 x 380-500 V
X	Not defined
Speed variant (rpm)	
A	1450-2000
B	2900-4000
C	4000-5900
2	2-pole
4	4-pole

* Option. See the CR "Custom-built pumps" data booklet available on Grundfos Product Center. See QR code or link below.



<http://net.grundfos.com/qr/i/96486346>

Shaft seal

Example	-H -Q -Q -E
Shaft seal type designation	
Material of rotating seal face	
Material of stationary seal face	
Material of secondary seal (rubber parts)	

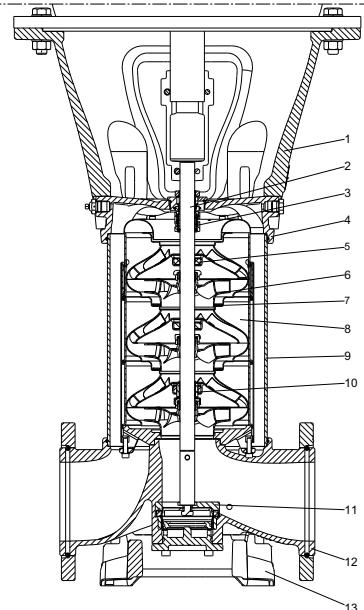
6. Construction

CR 95, 125, 155 and 185



ANSI flange

TM06 9206 1917



TM06 5161 1917

Materials, CR

Pos.	Designation	Materials	DIN/EN	≈ AISI/ASTM
1	Motor stool	Ductile cast iron	EN-GJS-500-7	ASTM A536-84 70-50-05
2	Shaft	Stainless steel	EN10088 1.4057 ¹⁾ EN10088 1.4462 ²⁾	EN10088 1.4057 = 311 EN10088 1.4462 = 318 LN
3	Shaft seal (seal faces)	Silicon carbide/Silicon carbide	-	-
4	Pump head	Ductile cast iron	EN-GJS-500-7	ASTM A536-84 70-50-05
5	Support bearing (bush)	Carbon-graphite filled PTFE		
6	Impeller	Stainless steel	EN10088 1.4301 EN10088 1.4401 ³⁾	AISI 304 AISI 316 ³⁾
7	Neck ring	PEEK	-	-
8	Chamber	Stainless steel	EN10088 1.4301 EN10088 1.4401 ³⁾	AISI 304 AISI 316 ³⁾
9	Sleeve	Stainless steel	EN10088 1.4301 ¹⁾ EN10088 1.4404 ²⁾	AISI 304 ¹⁾ AISI 316 L ²⁾
10	Bearing ring	Tungsten carbide/Tungsten carbide	-	-
11	Thrust handling device ⁴⁾	Stainless steel Silicon carbide/Tungsten carbide	EN10088 1.4401 EN10283 1.4408 - -	AISI 316/CF 8M - -
12	Base	Ductile cast iron	EN-GJS-500-7	ASTM A536-84 70-50-05
13	Base plate	Ductile cast iron	EN-GJS-500-7	ASTM A536-84 70-50-05
	Rubber parts	EPDM or FKM	-	-

¹⁾ Applies to CR 95.²⁾ Applies to CR 125 to CR 185.³⁾ Applies to CR 185.⁴⁾ Only fitted on pumps with 100 HP (75 kW) motors or larger.

CRN 95, 125, 155 and 185

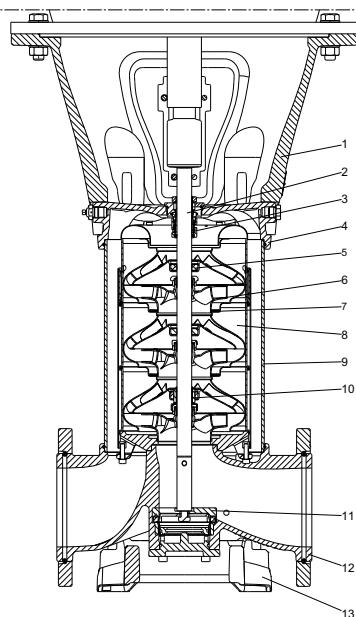


ANSI flange



PJE (Victaulic type)

TM06 9203 1917 - TM06 9208 1917 - TM06 9210 1917



TM06 9191 1917

Materials, CRN

Pos.	Designation	Materials	DIN/EN	≈ AISI/ASTM
1	Motor stool	Ductile cast iron	EN-GJS-500-7	ASTM A536-84 70-50-05
2	Shaft	Stainless steel	EN10088 1.4462	318 LN
3	Shaft seal (seal faces)	Silicon carbide/Silicon carbide	-	-
4	Pump head	Stainless steel	EN10283 1.4408	CF 8M
5	Support bearing (bush)	Carbon-graphite filled PTFE	-	-
6	Impeller	Stainless steel	EN10088 1.4401	AISI 316
7	Neck ring	PEEK	-	-
8	Chamber	Stainless steel	EN10088 1.4401	AISI 316
9	Sleeve	Stainless steel	EN10088 1.4404	AISI 316 L
10	Bearing ring	Tungsten carbide/Tungsten carbide	-	-
11	Thrust handling device ¹⁾	Stainless steel Silicon carbide/Tungsten carbide	EN10088 1.4401 EN10283 1.4408 - -	AISI 316/CF 8M - -
12	Base	Stainless steel	EN10283 1.4408	CF 8M
13	Base plate	Ductile cast iron	EN-GJS-500-7	ASTM A536-84 70-50-05
	Rubber parts	EPDM or FKM	-	-

¹⁾ Only fitted on pumps with 100 HP (75 kW) motors or larger.

7. Operating conditions

Pumped liquids

The pumps are suitable for pumping thin, non-explosive liquids, not containing solid particles or fibers. The liquid must not attack the pump materials.

CR pumps are suitable for non-corrosive liquids and are to be used for liquid transfer, circulation and pressure boosting of cold or hot clean water.

CRN pumps are suitable for industrial liquids and are to be used in systems where all parts in contact with the liquid must be made of high-grade stainless steel.

List of pumped liquids

A number of typical liquids are listed below.

Other pump versions may be applicable, but those stated in the list are considered to be the best choices.

The table is intended as a general guide only and cannot replace actual testing of the pumped liquids and pump materials under specific working conditions.

Therefore, use the list with some caution. Factors such as those mentioned below may affect the chemical resistance of a specific pump version:

- concentration of the pumped liquid
- liquid temperature
- pressure.

Take safety precautions when pumping dangerous liquids.

Notes

D Often with additives.

The density and/or viscosity differ from that/those of water.

E Take this factor into account when calculating motor output and pump performance.

F Pump selection depends on many factors. Contact Grundfos.

H Risk of crystallization/precipitation in shaft seal.

1 Highly flammable liquid.

2 Combustible liquid.

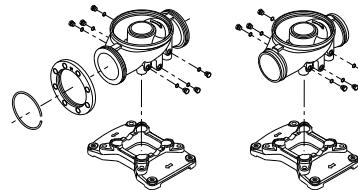
3 Insoluble in water.

4 Low self-ignition point.

Pumped liquid	Chemical formula	Note	Liquid concentration, liquid temperature	CR	CRN
Acetic acid	CH ₃ COOH	-	5 %, 68 °F (20 °C)	-	HQQE
Acetone	CH ₃ COCH ₃	1, F	100 %, 68 °F (20 °C)	-	HQQE
Alkaline degreasing agent		D, F		HQQE	-
Ammonium bicarbonate	NH ₄ HCO ₃	E	20 %, 86 °F (86 °F (30 °C))	-	HQQE
Ammonium hydroxide	NH ₄ OH	-	20 %, 104 °F (40 °C)	HQQE	-
Aviation fuel		1, 3, 4, F	100 %, 68 °F (20 °C)	HQBV	-
Benzoic acid	C ₆ H ₅ COOH	H	0.5 %, 68 °F (20 °C)	-	HQQV
		-	< 248 °F (120 °C)	HQQE	-
Boiler water		F	248-356 °F (120-180 °C)	-	-
Calcareous water		-	< 194 °F (90 °C)	HQQE	-
Calcium acetate (as coolant with inhibitor)	Ca(CH ₃ COO) ₂	D, E	30 %, 122 °F (50 °C)	HQQE	-
Calcium hydroxide	Ca(OH) ₂	E	Saturated solution, 122 °F (50 °C)	HQQE	-
Chloride-containing water		F	< 86 °F (30 °C), maximum 500 ppm	-	HQQE
Chromic acid	H ₂ CrO ₄	H	1 %, 68 °F (20 °C)	-	HQQV
Citric acid	HOC(CH ₂ CO ₂ H) ₂ COOH	H	5 %, 104 °F (40 °C)	-	HQQE
Completely desalinated water (demineralized water)		-	248 °F (120 °C)	-	HQQE
Condensate		-	248 °F (120 °C)	HQQE	-
Copper sulphate	CuSO ₄	E	10 %, 122 °F (50 °C)	-	HQQE
Corn oil		D, E, 3	100 %, 176 °F (80 °C)	HQQV	-
Diesel oil		2, 3, 4, F	100 %, 68 °F (20 °C)	HQBV	-
Domestic hot water (potable water)		-	< 248 °F (120 °C)	HQQE	-
Ethanol (ethyl alcohol)	C ₂ H ₅ OH	1, F	100 %, 68 °F (20 °C)	HQQE	-
Ethylene glycol	HOCH ₂ CH ₂ OH	D, E	50 %, 122 °F (50 °C)	HQQE	-
Formic acid	HCOOH	-	5 %, 68 °F (20 °C)	-	HQQE
Glycerine (glycerol)	OHCH ₂ CH(OH)CH ₂ OH	D, E	50 %, 122 °F (50 °C)	HQQE	-
Hydraulic oil (mineral)		E, 2, 3	100 %, 212 °F (100 °C)	HQQV	-
Hydraulic oil (synthetic)		E, 2, 3	100 %, 212 °F (100 °C)	HQQV	-
Isopropyl alcohol	CH ₃ CHOHCH ₃	1, F	100 %, 68 °F (20 °C)	HQQE	-
Lactic acid	CH ₃ CH(OH)COOH	E, H	10 %, 68 °F (20 °C)	-	HQQV
Linoleic acid	C ₁₇ H ₃₁ COOH	E, 3	100 %, 68 °F (20 °C)	HQQV	-
Methanol (methyl alcohol)	CH ₃ OH	1, F	100 %, 68 °F (20 °C)	HQQE	-
Motor oil		E, 2, 3	100 %, 176 °F (80 °C)	HQQV	-
Naphthalene	C ₁₀ H ₈	E, H	100 %, 176 °F (80 °C)	HQQV	-
Nitric acid	HNO ₃	F	1 %, 68 °F (20 °C)	-	HQQE
Oil-containing water		-	< 212 °F (100 °C)	HQQV	-
Olive oil		D, E, 3	100 %, 176 °F (80 °C)	HQQV	-
Oxalic acid	(COOH) ₂	H	1 %, 68 °F (20 °C)	-	HQQE
Ozone-containing water	(O ₃)	-	< 212 °F (100 °C)	-	HQQE
Peanut oil		D, E, 3	100 %, 176 °F (80 °C)	HQQV	-
Petrol		1, 3, 4, F	100 %, 68 °F (20 °C)	HQBV	-
Phosphoric acid	H ₃ PO ₄	E	20 %, 68 °F (20 °C)	-	HQQE
Propanol	C ₃ H ₇ OH	1, F	100 %, 68 °F (20 °C)	HQQE	-
Propylene glycol	CH ₃ CH(OH)CH ₂ OH	D, E	50 %, 194 °F (90 °C)	HQQE	-
Potassium carbonate	K ₂ CO ₃	E	20 %, 122 °F (50 °C)	HQQE	-
Potassium formate (as coolant with inhibitor)	KOOCH	D, E	30 %, 122 °F (50 °C)	HQQE	-
Potassium hydroxide	KOH	E	20 %, 122 °F (50 °C)	-	HQQE
Potassium permanganate	KMnO ₄	-	5 %, 68 °F (20 °C)	-	HQQE
Rape seed oil		D, E, 3	100 %, 176 °F (80 °C)	HQQV	-
Salicylic acid	C ₆ H ₄ (OH)COOH	H	0.1 %, 68 °F (20 °C)	-	HQQE
Silicone oil		E, 3	100 %	HQQV	-
Sodium bicarbonate	NaHCO ₃	E	10 %, 140 °F (60 °C)	-	HQQE
Sodium chloride (as coolant)	NaCl	D, E	30 %, < 41 °F (5 °C), pH > 8	HQQE	-
Sodium hydroxide	NaOH	E	20 %, 122 °F (50 °C)	-	HQQE
Sodium hypochlorite	NaOCl	F	0.1 %, 68 °F (20 °C)	-	HQQV
Sodium nitrate	NaNO ₃	E	10 %, 140 °F (60 °C)	-	HQQE
Sodium phosphate	Na ₃ PO ₄	E, H	10 %, 140 °F (60 °C)	-	HQQE
Sodium sulphate	Na ₂ SO ₄	E, H	10 %, 140 °F (60 °C)	-	HQQE
Softened water		-	< 248 °F (120 °C)	-	HQQE
Soya oil		D, E, 3	100 %, 176 °F (80 °C)	HQQV	-
Sulphuric acid	H ₂ SO ₄	F	1 %, 68 °F (20 °C)	-	HQQV
Sulphurous acid	H ₂ SO ₃	-	1 %, 68 °F (20 °C)	-	HQQE
Unsalted swimming-pool water		-	Approx. 2 ppm free chlorine (Cl ₂)	HQQE	-

Maximum operating pressure and liquid temperature

ANSI, PJE (Victaulic type)



TM06 9402 2417

Pump type	Flange class	Maximum permissible operating pressure in standard configuration [psi (bar)]	Liquid temperature [°F (°C)]
CR 95-1-1 → 95-4-1	150	232 (16)	
CR 95-4 → 95-5-1	300	580 (40)	
CR 125-1-1 → 125-3	150	232 (16)	
CR 125-4-2	300	580 (40)	
CR 155-1-1 → 155-3-2	150	232 (16)	-22 to 248 (-30 to 120)
CR 185-1-1 → 185-2	150	232 (16)	
CR 185-3-3 → 185-6	300	580 (40)	
CRN 95-1-1 → 95-4-1	150	232 (16)	
CRN 95-5-2 → 95-5-1	300	580 (40)	
CRN 125-1-1 → 125-3	150	232 (16)	
CRN 125-4-2 → 125-7-2	300	580 (40)	
CRN 155-1-1 → 155-3-2	150	232 (16)	-40 to 248 (-40 to 120)*
CRN 155-3-1 → 155-5-1	300	580 (40)	
CRN 185-1-1 → 185-2	150	232 (16)	
CRN 185-3-3 → 185-6	300	580 (40)	

* For operating pressures above 435 psi (30 bar) the liquid temperature limits are -40 to 176 °F (-40 to 80 °C).

Operating range of the shaft seal

All pumps will be delivered with a HQQE/V cartridge shaft seal as standard.

The operating range of the shaft seal depends on operating pressure, pump type, type of shaft seal and liquid temperature. The range shown in figs 5 and 6 applies to clean water and water with anti-freeze liquids. For selection of the right shaft seal, see *Pumped liquids*, page 13. If the operating range is exceeded, the life of the shaft seal may be reduced.

CR, CRN 95-185

\varnothing 22 shaft seals for 15-75 HP (11-55 kW)

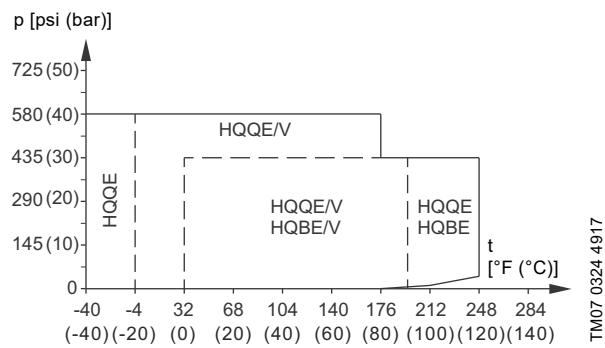


Fig. 5 Operating range of standard shaft seals for CR, CRN 95-185, 15-75 HP (11-55 kW)

Standard shaft seal	Motor size [HP (kW)]	Description	Liquid temperature [$^{\circ}$ F ($^{\circ}$ C)]
HQQE		O-ring (cartridge) (balanced seal), Silicon carbide/Silicon carbide, EPDM	-40 - +248 (-40 - +120)
HQQV	15-75 (11-55)	O-ring (cartridge) (balanced seal), Silicon carbide/Silicon carbide, FKM	-4 - +194 (-20 - +90)
HQBE		O-ring (cartridge) (balanced seal), Silicon carbide/carbon, EPDM	32 - +248 (0 - +120)
HQBV		O-ring (cartridge) (balanced seal), Silicon carbide/carbon, FKM	32 - +194 (0 - +90)

\varnothing 28 and \varnothing 36 shaft seals for 100-300 HP (75-224 kW)

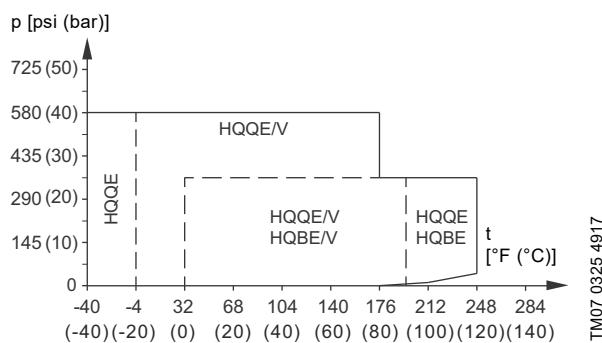


Fig. 6 Operating range of standard shaft seals for \varnothing 28 and \varnothing 36 for CR 125-185, 100-300 HP (75-224 kW)

Standard shaft seal	Motor size [HP (kW)]	Description	Liquid temperature [$^{\circ}$ F ($^{\circ}$ C)]
HQQE		O-ring (cartridge) (balanced seal), Silicon carbide/Silicon carbide, EPDM	-40 - +248 (-40 - +120)
HQQV	100-300 (75-224)	O-ring (cartridge) (balanced seal), Silicon carbide/Silicon carbide, FKM	-4 - +194 (-20 - +90)
HQBE		O-ring (cartridge) (balanced seal), Silicon carbide/carbon, EPDM	32 - +248 (0 - +120)
HQBV		O-ring (cartridge) (balanced seal), Silicon carbide/carbon, FKM	32 - +194 (0 - +90)

Maximum inlet pressure

The following table shows the maximum permissible inlet pressure when the pump is at rest, vertically mounted, and fitted with a standard NEMA 60 Hz motor. Contact Grundfos to determine the maximum inlet pressure under operating conditions or pumps operating at lower rpm with additional stages. However, the actual inlet pressure plus the pressure against a closed valve must always be lower than the maximum permissible operating pressure. If the maximum permissible operating pressure is exceeded, the angular contact bearing in the motor may be damaged and the life of the shaft seal reduced.

Pump type	Maximum inlet pressure [psi (bar)]
CR, CRN 95	
CR, CRN 95-1-1 → CR, CRN 95-2-2	145 (10)
CR, CRN 95-2-1 → CR, CRN 95-5-1	218 (15)
CR, CRN 125	
CR, CRN 125-1-1 → CR, CRN 125-1	145 (10)
CR, CRN 125-2-2 → CR, CRN 125-4-2	218 (15)
CR, CRN 125-4-1 → CR, CRN 125-7-2	145 (10)
CR, CRN 155	
CR, CRN 155-1-1	145 (10)
CR, CRN 155-1 → CR, CRN 155-3-2	218 (15)
CR, CRN 155-3-1 → CR, CRN 155-5-1	145 (10)
CR, CRN 185	
CR, CRN 185-1-1 → 185-1	218 (15)
CR, CRN 185-2-2 → 185-6	290 (20)

Examples of operating and inlet pressures

The values for operating and inlet pressures shown in the table must not be considered individually and must comply with the below statement.

The outlet pressure must be equal to or lower than the maximum operating pressure.

See the following definitions and examples.

Definitions

Pressure type	Definition
Maximum operating pressure	The maximum pressure is stated on the nameplate.
Pump differential pressure	The difference between the outlet pressure and inlet pressure.
Inlet pressure	The pressure measured at the pump inlet.
Outlet pressure	The inlet pressure added to the pump differential pressure.

Example

The following pump type has been selected: CR 95-3.

Maximum operating pressure: 363 psi (25 bar).

Maximum inlet pressure: 218 psi (15 bar).

Pump differential pressure when operating against a closed outlet valve (flow = 0 GPM (0 m³/h)):

436 ft head = 190 psi (133 m head = 13.07 bar).

See page 22.

This pump is not allowed to start at an inlet pressure of 218 psi (15 bar). Start this pump at an inlet pressure of 363 - 190 = 173 psi (25 - 13.07 = 11.93 bar).

8. Selection and sizing

Selection of pump

Base the selection of pump on these parameters:

- Duty point of the pump. See page 18.
- Sizing data such as pressure loss as a result of height differences, friction loss in the pipes, pump efficiency. See page 18.
- Pump materials. See page 19.
- Pump connections. See page 19.
- Shaft seal. See page 19.

Duty point of the pump

From a duty point, you can select a pump on the basis of the curve charts in section *Performance curves and technical data*, page 22. Ideally, the duty point should match the best efficiency point on the pump curve. See example in fig 8.

Sizing data

When sizing a pump, take these parameters into account:

- Required flow rate and pressure at the draw-off point.
- Pressure loss as a result of height differences (H_{geo}).
- Friction loss in the pipes (H_f). It may be necessary to account for pressure loss in connection with long pipes, bends, valves, and similar.
- Best efficiency at the estimated duty point.
- NPSH value.

For calculation of the NPSH value, see *Minimum inlet pressure, NPSH*, on page 20.

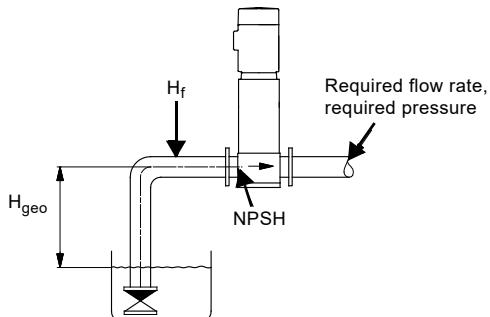


Fig. 7 Sizing data

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Pump efficiency

Before determining the best efficiency point, identify the operation pattern of the pump. If the pump is expected to always operate at the same duty point, select a pump which is operating at a duty point corresponding to the best efficiency of the pump.

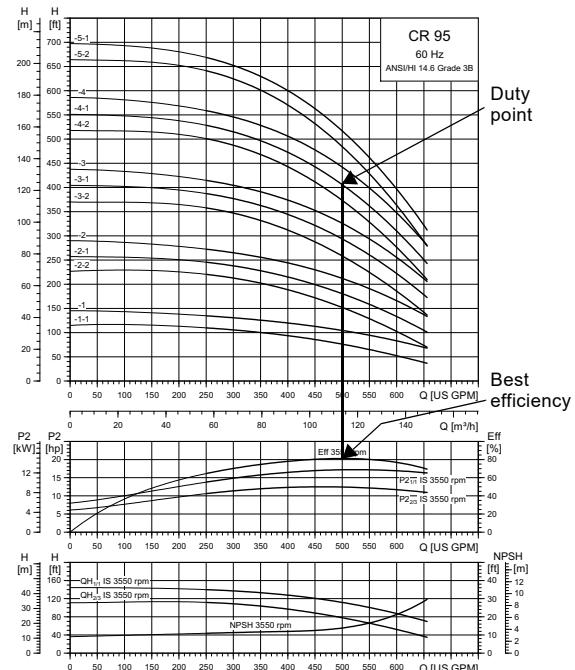


Fig. 8 Example of a CR pump's duty point

As the pump is sized on the basis of the highest possible flow rate, it is important to always have the duty point to the right of the best efficiency point on the efficiency curve (Eff). This must be considered in order to keep the efficiency high when the flow rate drops.

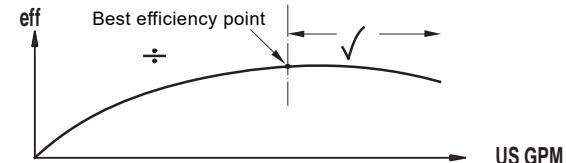


Fig. 9 Best efficiency

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Grundfos Product Center

We recommend that you size your pump in Grundfos Product Center, which is a selection program offered by Grundfos.

Grundfos Product Center features a user-friendly and easy-to-use virtual guide which leads you through the selection of the pump for the application in question. For further information, see *Grundfos Product Center* on page 41.

Pump material

Select the material variant on the basis of the liquid to be pumped.

The product range covers the following basic types.

- CR
Use CR, CRI pumps for clean, non-aggressive liquids, such as potable water and oils.
- CRN
Use CRN pumps for industrial liquids and acids. See *Pumped liquids* on page 13, or contact Grundfos.

Pump connection

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

- ANSI flange
- DIN flange
- PJE coupling (Victaulic type)
- other connections on request.

Shaft seal



GR7386

Fig. 10 Shaft seal (cartridge type)

As standard, the CR range is fitted with a Grundfos shaft seal (cartridge type) suitable for the most common applications.

The following key parameters must be taken into account when selecting the shaft seal:

- type of pumped liquid
- liquid temperature
- maximum pressure.

Grundfos offers a wide range of shaft seal variants to meet specific demands. See *Pumped liquids* on page 13.

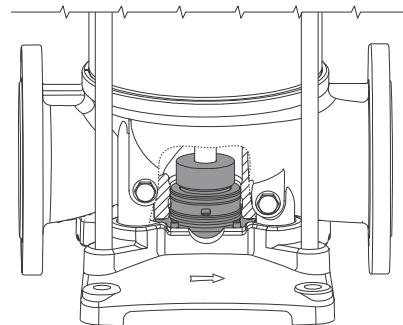
Servicing shaft seals

Replacement shaft seals are available as complete service kits.

Shaft seals fitted on CR, CRN 95-185 pumps with Ø28 mm or Ø36 mm shaft ends are serviceable. This means that the wear parts in these shaft seals are available as service kits and can be replaced without having to renew the complete shaft seal.

All service kits include detailed instructions on how to carry out the replacement.

Thrust handling device



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Fig. 11 Thrust handling device

A thrust handling device (THD) is factory-fitted on pumps with 100 HP (75 kW) motors or larger. The system consists of two parts. A rotating part mounted on the shaft end below the first impeller as well as a non-rotating part mounted in or on the pump base. The THD absorbs the main part of the thrust force generated by the impellers and thereby reduces the resulting axial force the motor bearings must absorb. This enables the use of standard ball bearings in the motor instead of special angular contact ball bearings. Note: For applications involving CIP (clean-in-place) and motors above 75 HP (55 kW), use a bearing flange and a base without THD.

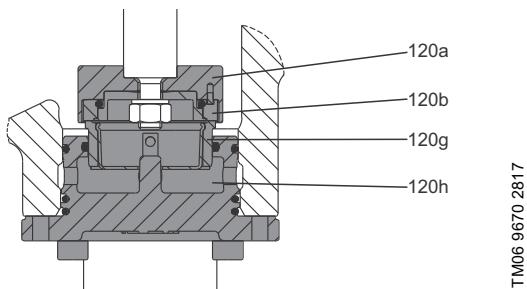


Fig. 12 Position numbers for THD parts

Pos.	Description	Material
120a	Thrust disc	Stainless steel
120b	Rotating ring	Silicon carbide
120g	Stationary ring	Silicon carbide* Tungsten carbide
120h	Lifting plate	Stainless steel
-	O-rings	EPDM/FKM

* On request for CRN.

Operating pressure and inlet pressure

Do not exceed the limit values for these pressures:

- maximum operating pressure
- maximum inlet pressure.

Minimum inlet pressure, NPSH

We recommend that you calculate the inlet pressure "H" in these situations:

- The liquid temperature is high.
- The flow rate is significantly higher than the rated flow rate.
- Water is drawn from depths.
- Water is drawn through long pipes.
- Inlet conditions are poor.

To avoid cavitation, make sure that there is a minimum pressure on the inlet side of the pump.

Calculate the maximum suction lift "H" in feet of head as follows:

$$H = p_b \times 2.31 - NPSH - H_f - H_v$$

p_b = Barometric pressure in psi.

p_b can be set to 14.7 psi at sea level.

In closed systems, p_b indicates the system pressure in psi.

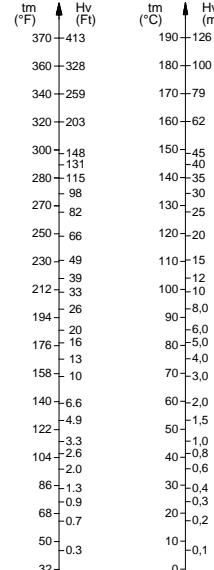
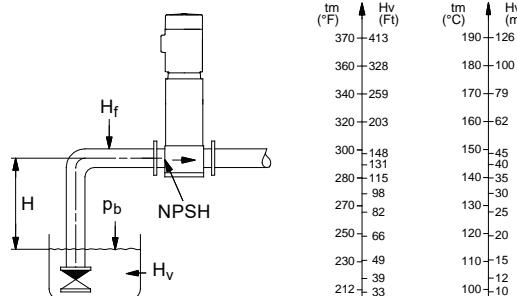
NPSH = Net Positive Suction Head in feet of head.
To be read from the NPSH curve at the highest flow the pump will be delivering.

H_f = Friction loss in inlet pipe in feet of head at the highest flow the pump will be delivering.

H_v = Vapor pressure in feet of head.
To be read from the vapor pressure scale.
 H_v depends on the liquid temperature t_m .

If the calculated "H" is positive, the pump can operate at a suction lift of maximum "H" feet of head.

If the calculated "H" is negative, an inlet pressure of minimum "H" feet of head is required.



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Fig. 13 Minimum inlet pressure, NPSH

Note: To avoid cavitation, never select a pump with a duty point too far to the right on the NPSH curve.

Always check the NPSH value of the pump at the highest possible flow rate.

How to read the curve charts

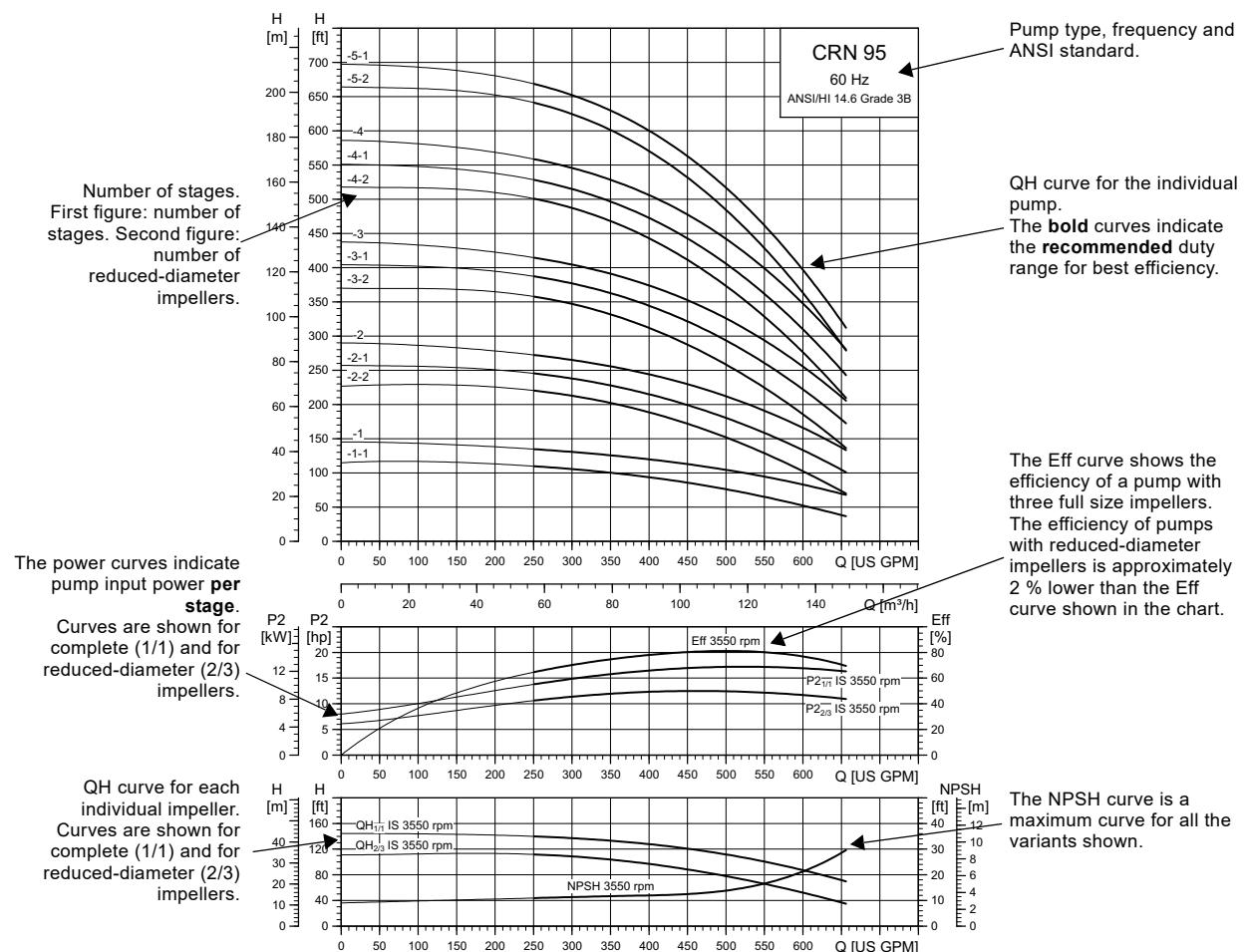


Fig. 14 How to read the curve charts

Guidelines to performance curves

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

- Tolerances to ANSI or ISO standards, if indicated on the curve chart.
- The motors used for the measurements are standard Grundfos motors.
- Measurements have been made with airless water at a temperature of 68 °F (20 °C).
- The curves apply to the following kinematic viscosity: $\nu = 1 \text{ mm}^2/\text{s}$ (1 cSt).
- Due to the risk of overheating, the pumps must not be used at a flow rate below the minimum flow rate.
- The QH curves apply to a rated motor speed of a three-phase mains-operated motor. For realistic curves, go to Grundfos Product Center (<http://product-selection.grundfos.com>) and insert data.

The curve below shows the minimum flow rate as a percentage of the rated flow rate in relation to the liquid temperature. The dotted line shows a CR pump fitted with an air-cooled top assembly.

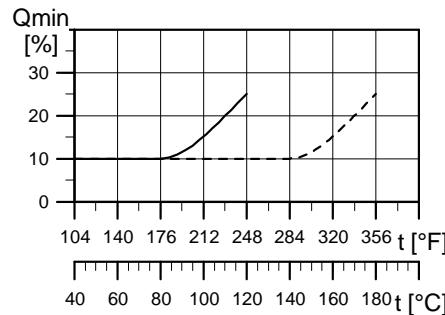


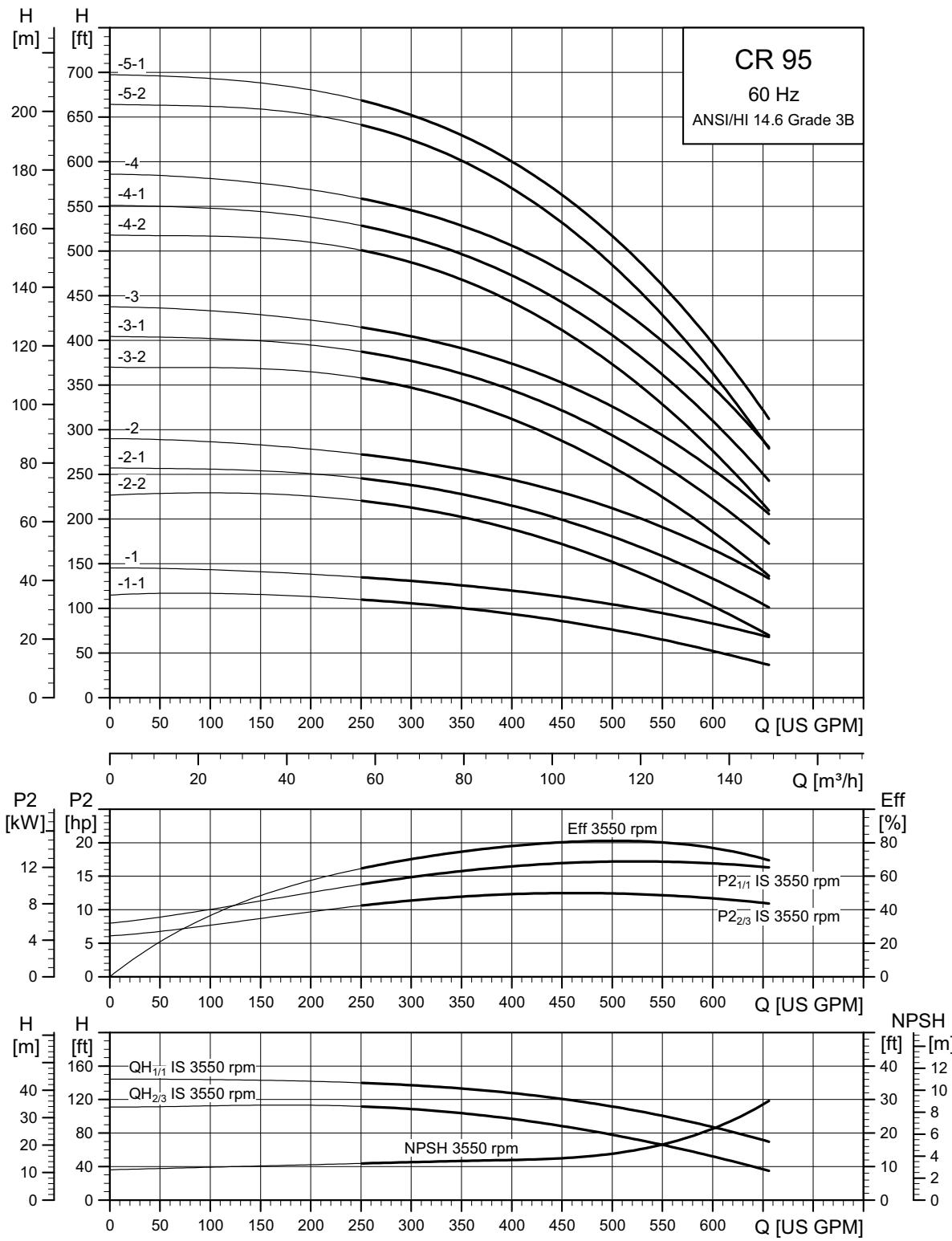
Fig. 15 Minimum flow rate

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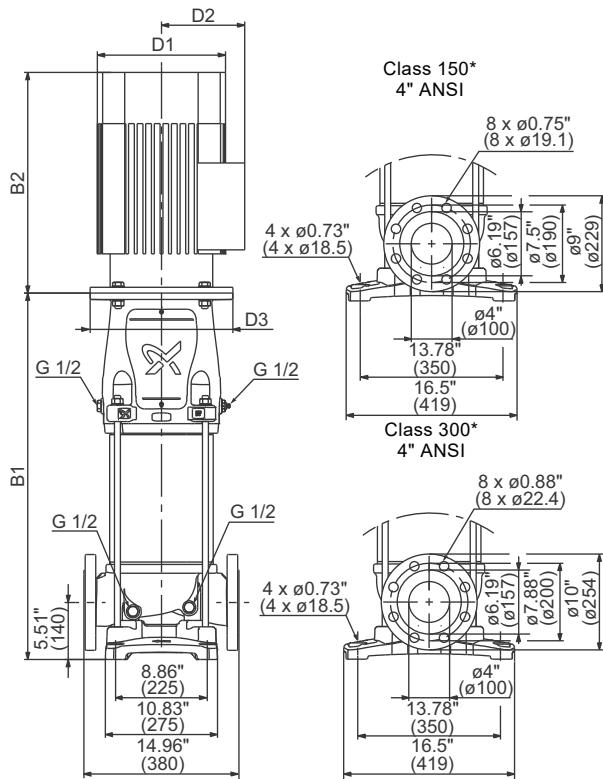
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9. Performance curves and technical data

CR 95



The maximum pump efficiency (Eff) is based on a three-stage pump.



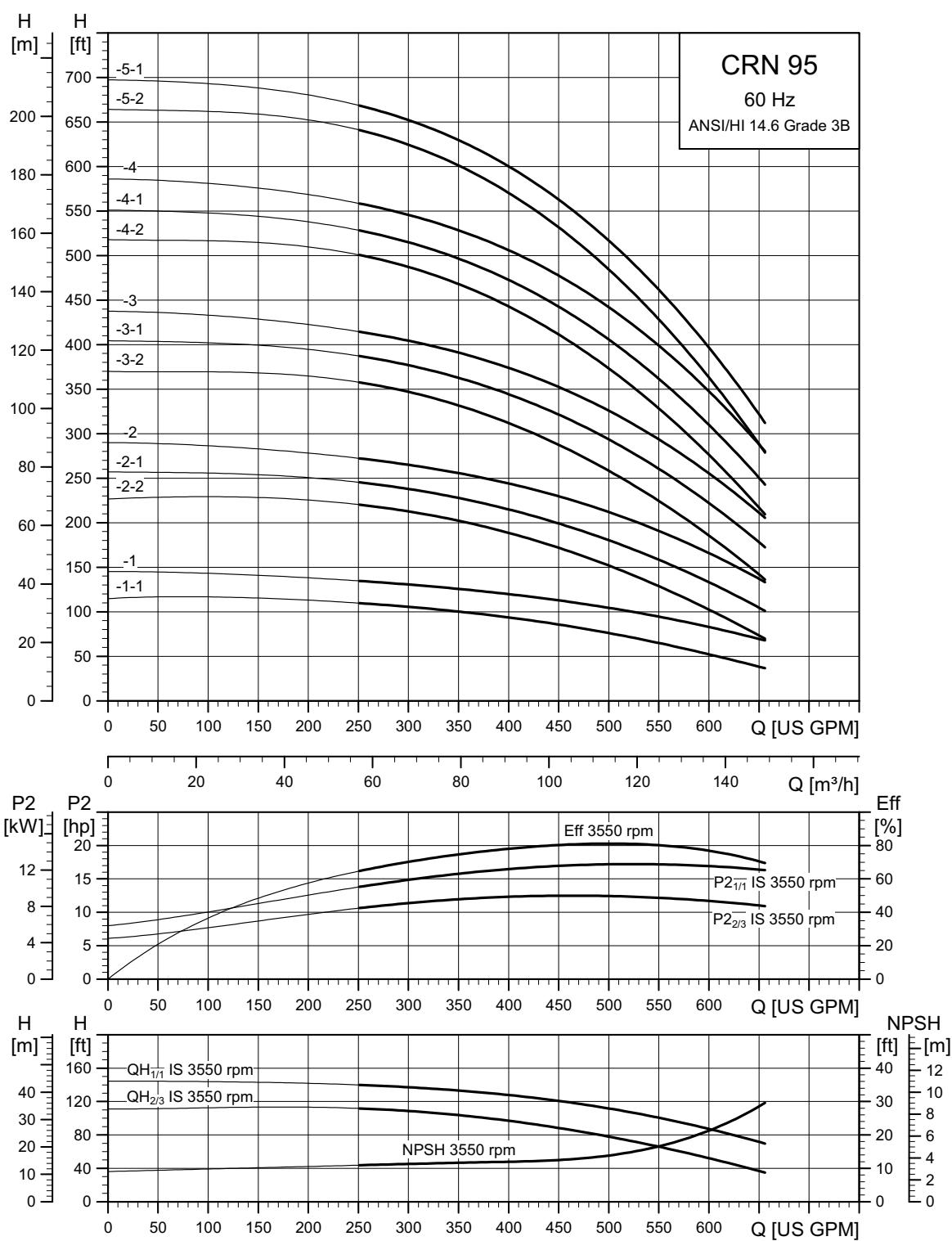
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* CR, CRN 95 pumps with up to four stages (with one reduced diameter impeller) are fitted with class 150 flanges as standard. Class 300 flanges are available on request.

CR, CRN 95 pumps with four or more full diameter impellers are fitted with class 300 flanges as standard.

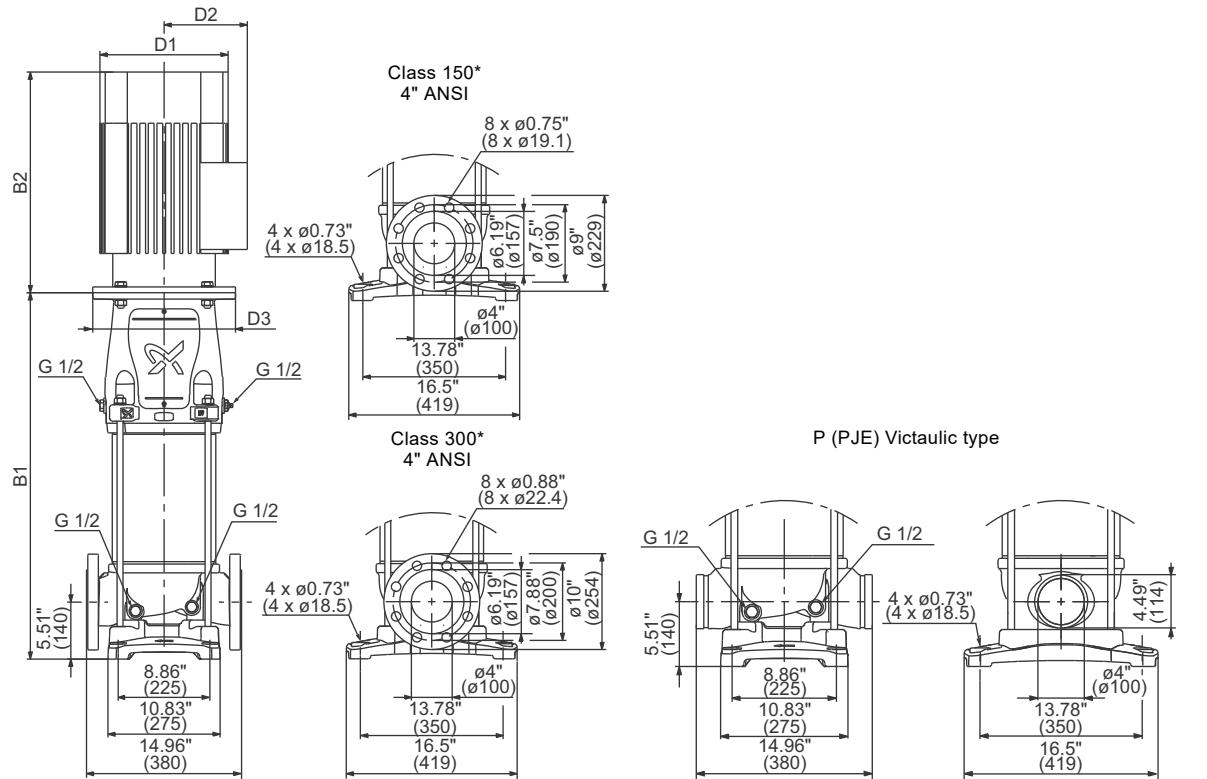
Dimensions and weights

Pump type	Motor P_2 [HP (kW)]	Dimensions [inch (mm)]					Net weight [lbs (kg)]
		B1	B1+B2	D1	D2	D3	
CR 95-1-1	15 (11)	27.4 (696)	46.2 (1174)	13.2 (335)	9.4 (240)	8.9 (225)	483 (219)
CR 95-1	20 (15)	27.4 (696)	47.0 (1194)	13.2 (335)	9.4 (240)	8.9 (225)	487 (221)
CR 95-2-2	25 (18.5)	31.5 (800)	55.1 (1399)	14.2 (360)	11.1 (282)	11.0 (280)	619 (281)
CR 95-2-1	30 (22)	31.5 (800)	55.1 (1399)	14.2 (360)	11.1 (282)	11.0 (280)	650 (295)
CR 95-2	30 (22)	31.5 (800)	55.1 (1399)	14.2 (360)	11.1 (282)	11.0 (280)	650 (295)
CR 95-3-2	40 (30)	36.4 (925)	62.5 (1588)	15.8 (402)	12.6 (320)	13.2 (335)	833 (378)
CR 95-3-1	50 (37)	36.4 (925)	62.5 (1588)	15.8 (402)	12.6 (320)	13.2 (335)	871 (395)
CR 95-3	50 (37)	36.4 (925)	62.5 (1588)	15.8 (402)	12.6 (320)	13.2 (335)	871 (395)
CR 95-4-2	60 (45)	40.5 (1029)	69.3 (1761)	17.9 (455)	16.0 (407)	15.6 (395)	1133 (514)
CR 95-4-1	60 (45)	40.5 (1029)	69.3 (1761)	17.9 (455)	16.0 (407)	15.6 (395)	1133 (514)
CR 95-4	75 (55)	40.5 (1029)	69.3 (1761)	17.9 (455)	16.0 (407)	15.6 (395)	1166 (529)
CR 95-5-2	75 (55)	44.6 (1134)	73.5 (1866)	17.9 (455)	16.0 (407)	15.6 (395)	1179 (535)
CR 95-5-1	75 (55)	44.6 (1134)	73.5 (1866)	17.9 (455)	16.0 (407)	15.6 (395)	1179 (535)

CRN 95

The maximum pump efficiency (Eff) is based on a three-stage pump.

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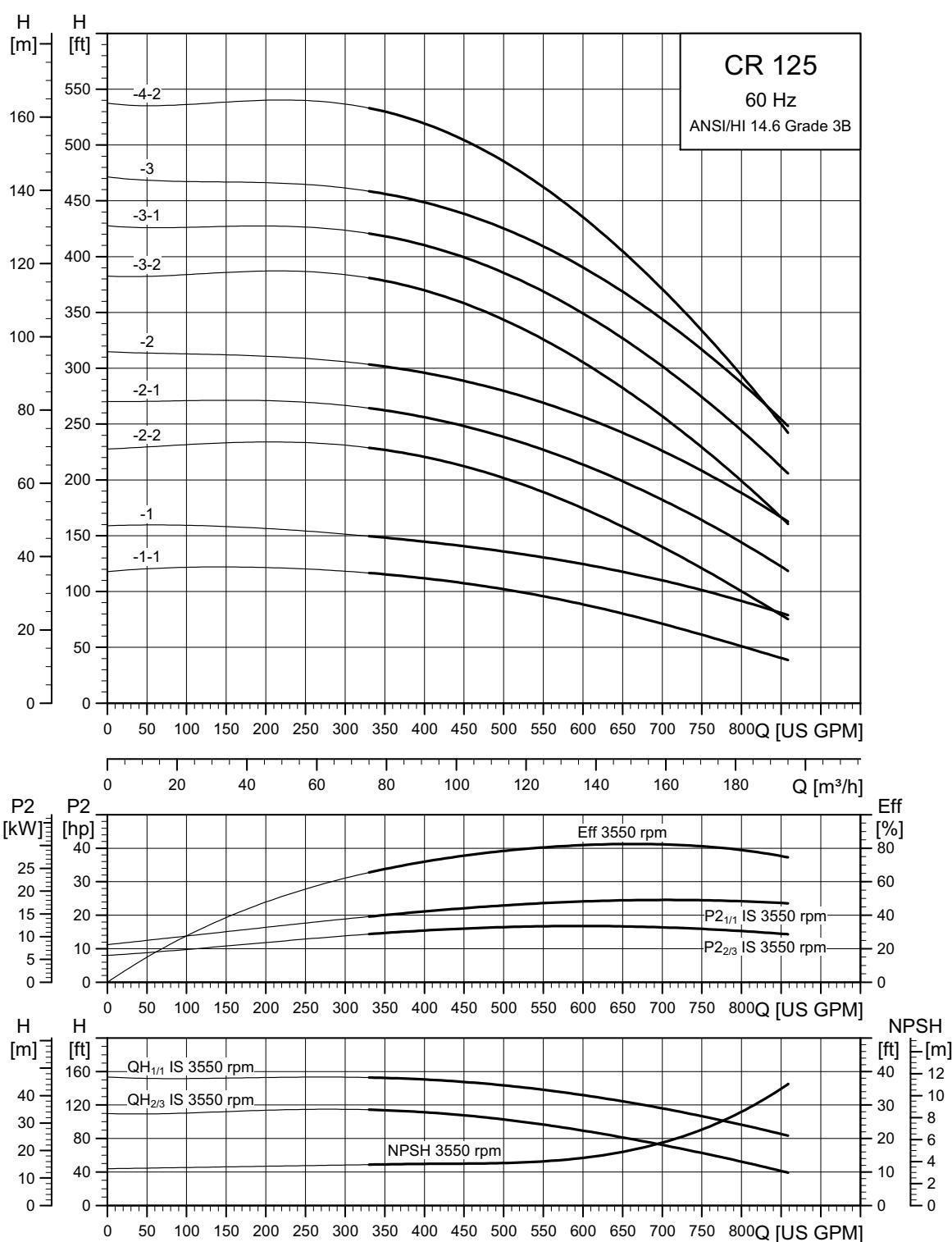
* CR, CRN 95 pumps with one to four stages (with one reduced diameter impeller) are fitted with class 150 flanges as standard. Class 300 flanges are available on request.

CR, CRN 95 pumps with four or more full diameter impellers are fitted with class 300 flanges as standard.

Dimensions and weights

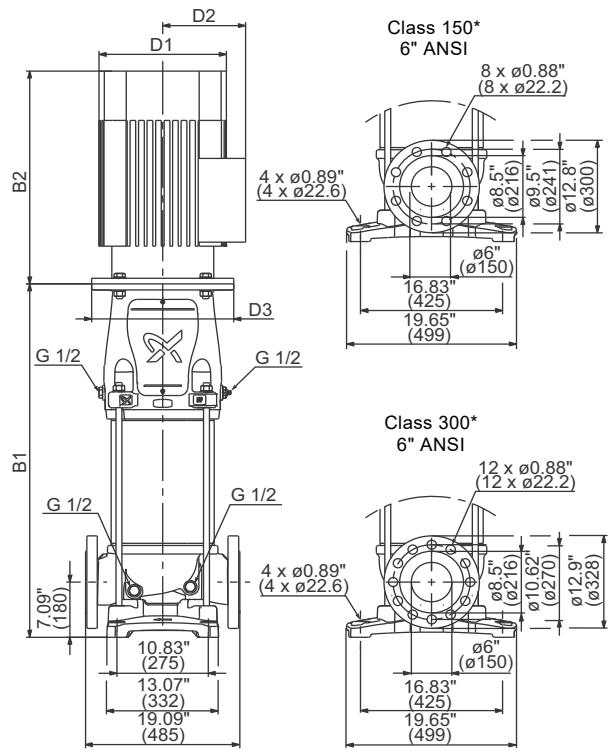
Pump type	Motor P_2 [HP (kW)]	Dimensions [inch (mm)]					Net weight [lbs (kg)]
		B1	B1+B2	D1	D2	D3	
CRN 95-1-1	15 (11)	27.4 (696)	46.2 (1174)	13.2 (335)	9.4 (240)	8.9 (225)	483 (219)
CRN 95-1	20 (15)	27.4 (696)	47.0 (1194)	13.2 (335)	9.4 (240)	8.9 (225)	487 (221)
CRN 95-2-2	25 (18.5)	31.5 (800)	55.1 (1399)	14.2 (360)	11.1 (282)	11.0 (280)	619 (281)
CRN 95-2-1	30 (22)	31.5 (800)	55.1 (1399)	14.2 (360)	11.1 (282)	11.0 (280)	650 (295)
CRN 95-2	30 (22)	31.5 (800)	55.1 (1399)	14.2 (360)	11.1 (282)	11.0 (280)	650 (295)
CRN 95-3-2	40 (30)	36.4 (925)	62.5 (1588)	15.8 (402)	12.6 (320)	13.2 (335)	833 (378)
CRN 95-3-1	50 (37)	36.4 (925)	62.5 (1588)	15.8 (402)	12.6 (320)	13.2 (335)	871 (395)
CRN 95-3	50 (37)	36.4 (925)	62.5 (1588)	15.8 (402)	12.6 (320)	13.2 (335)	871 (395)
CRN 95-4-2	60 (45)	40.5 (1029)	69.3 (1761)	17.9 (455)	16.0 (407)	15.6 (395)	1133 (514)
CRN 95-4-1	60 (45)	40.5 (1029)	69.3 (1761)	17.9 (455)	16.0 (407)	15.6 (395)	1133 (514)
CRN 95-4	75 (55)	40.5 (1029)	69.3 (1761)	17.9 (455)	16.0 (407)	15.6 (395)	1166 (529)
CRN 95-5-2	75 (55)	44.6 (1134)	73.5 (1866)	17.9 (455)	16.0 (407)	15.6 (395)	1179 (535)
CRN 95-5-1	75 (55)	44.6 (1134)	73.5 (1866)	17.9 (455)	16.0 (407)	15.6 (395)	1179 (535)

CR 125



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The maximum pump efficiency (Eff) is based on a three-stage pump.



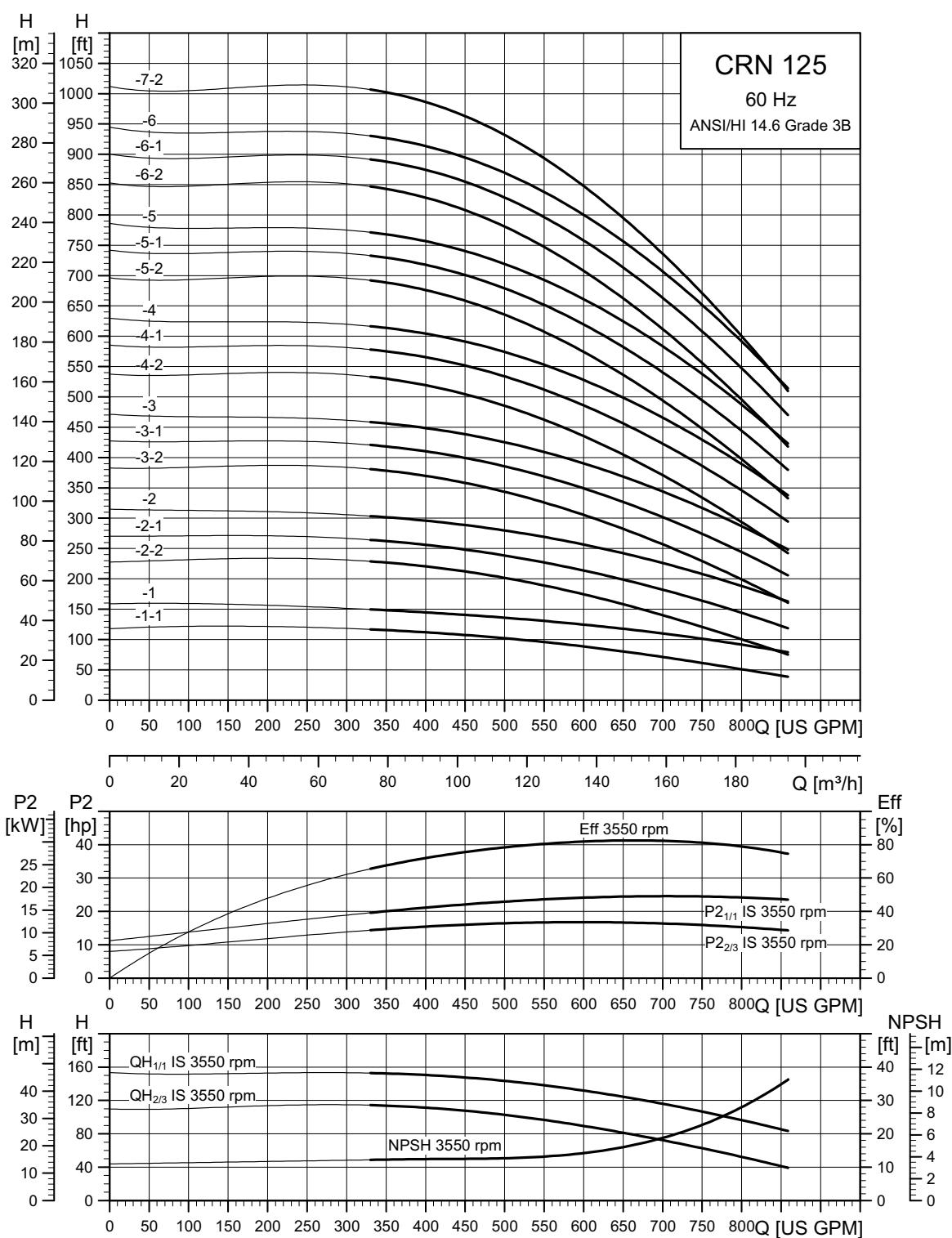
* CR, CRN 125 pumps with up to three stages are fitted with class 150 flanges as standard. Class 300 flanges are available on request.
CR, CRN 125 pumps with four or more stages are fitted with class 300 flanges as standard.

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Dimensions and weights

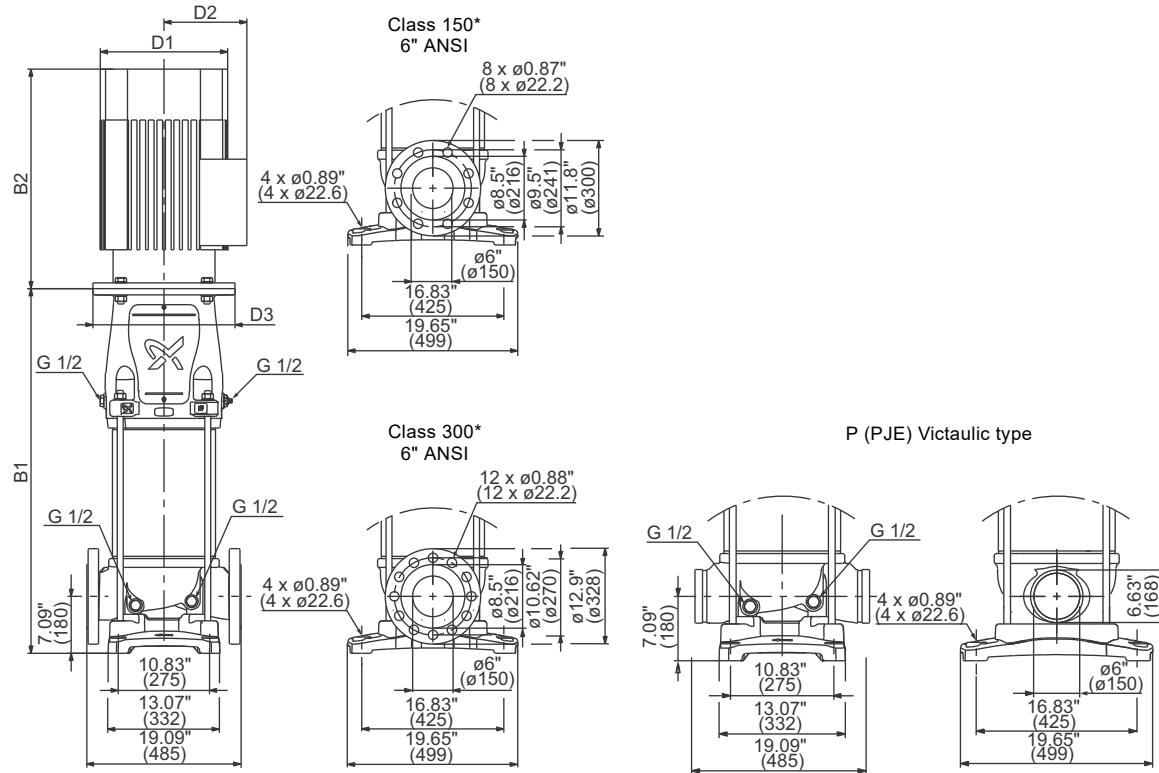
Pump type	Motor P ₂ [HP (kw)]	Dimensions [inch (mm)]					Net weight [lbs (kg)]
		B1	B1+B2	D1	D2	D3	
CR 125-1-1	20 (15)	30.8 (783)	50.4 (1281)	13.2 (335)	9.4 (240)	8.9 (225)	564 (256)
CR 125-1	25 (18.5)	30.9 (785)	54.5 (1384)	14.2 (360)	11.1 (282)	11.0 (280)	697 (316)
CR 125-2-2	30 (22)	35.7 (907)	59.3 (1506)	14.2 (360)	11.1 (282)	11.0 (280)	752 (341)
CR 125-2-1	40 (30)	36.6 (930)	62.7 (1593)	15.8 (402)	12.6 (320)	13.2 (335)	924 (419)
CR 125-2	50 (37)	36.6 (930)	62.7 (1593)	15.8 (402)	12.6 (320)	13.2 (335)	961 (436)
CR 125-3-2	60 (45)	41.4 (1052)	70.2 (1784)	17.9 (455)	16.0 (407)	15.6 (395)	1235 (560)
CR 125-3-1	75 (55)	41.4 (1052)	70.2 (1784)	17.9 (455)	16.0 (407)	15.6 (395)	1257 (570)
CR 125-3	75 (55)	41.4 (1052)	70.2 (1784)	17.9 (455)	16.0 (407)	15.6 (395)	1257 (570)
CR 125-4-2	75 (55)	46.2 (1174)	75.0 (1906)	17.9 (455)	16.0 (407)	15.6 (395)	1299 (589)

CRN 125



The maximum pump efficiency (Eff) is based on a three-stage pump.

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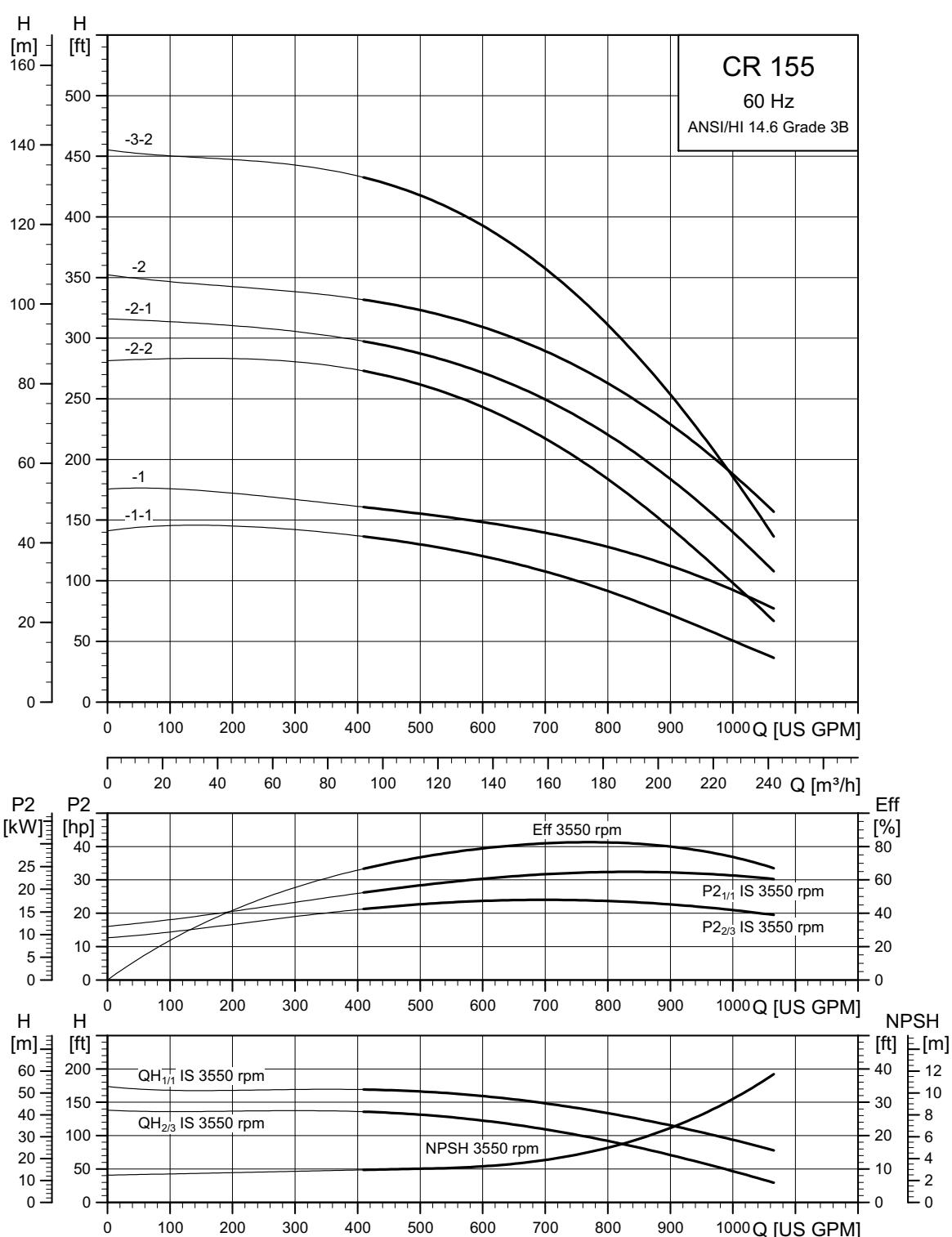
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* CR, CRN 125 pumps with up to three stages are fitted with class 150 flanges as standard. Class 300 flanges are available on request.
CR, CRN 125 pumps with four or more stages are fitted with class 300 flanges as standard.

Dimensions and weights

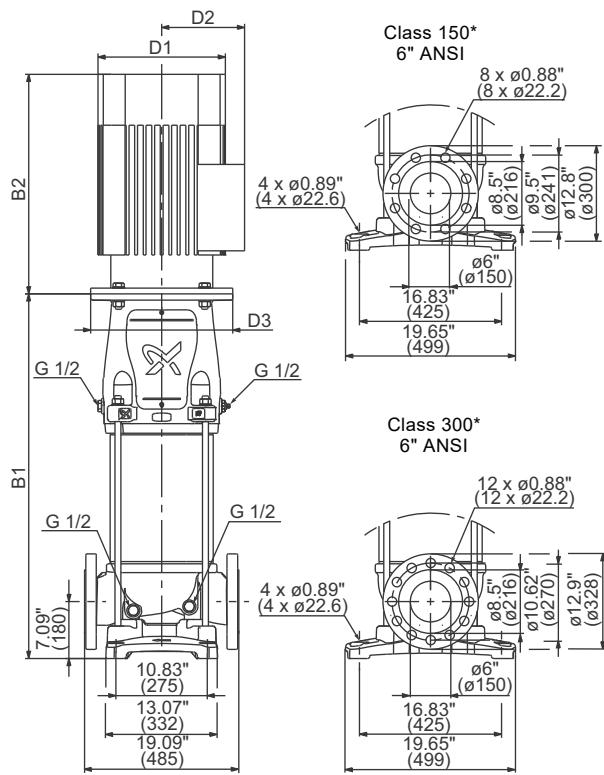
Pump type	Motor P ₂ [HP (kW)]	Dimensions [inch (mm)]					Net weight [lbs (kg)]
		B1	B1+B2	D1	D2	D3	
CRN 125-1-1	20 (15)	30.8 (783)	50.4 (1281)	13.2 (335)	9.4 (240)	8.9 (225)	564 (256)
CRN 125-1	25 (18.5)	30.9 (785)	54.5 (1384)	14.2 (360)	11.1 (282)	11.0 (280)	697 (316)
CRN 125-2-2	30 (22)	35.7 (907)	59.3 (1506)	14.2 (360)	11.1 (282)	11.0 (280)	752 (341)
CRN 125-2-1	40 (30)	36.6 (930)	62.7 (1593)	15.8 (402)	12.6 (320)	13.2 (335)	924 (419)
CRN 125-2	50 (37)	36.6 (930)	62.7 (1593)	15.8 (402)	12.6 (320)	13.2 (335)	961 (436)
CRN 125-3-2	60 (45)	41.4 (1052)	70.2 (1784)	17.9 (455)	16.0 (407)	15.6 (395)	1235 (560)
CRN 125-3-1	75 (55)	41.4 (1052)	70.2 (1784)	17.9 (455)	16.0 (407)	15.6 (395)	1257 (570)
CRN 125-3	75 (55)	41.4 (1052)	70.2 (1784)	17.9 (455)	16.0 (407)	15.6 (395)	1257 (570)
CRN 125-4-2	75 (55)	46.2 (1174)	75.0 (1906)	17.9 (455)	16.0 (407)	15.6 (395)	1299 (589)
CRN 125-4-1	100 (74)	46.2 (1173)	78.7 (1998)	19.1 (486)	16.0 (407)	21.6 (550)	1649 (748)
CRN 125-4	100 (74)	46.2 (1173)	78.7 (1998)	19.1 (486)	16.0 (407)	21.6 (550)	1649 (748)
CRN 125-5-2	100 (74)	51.0 (1295)	83.5 (2120)	19.1 (486)	16.0 (407)	21.6 (550)	1671 (758)
CRN 125-5-1	125 (92)	51.0 (1295)	87.6 (2226)	23.6 (599)	18.6 (472)	21.6 (550)	2202 (999)
CRN 125-5	125 (92)	51.0 (1295)	87.6 (2226)	23.6 (599)	18.6 (472)	21.6 (550)	2202 (999)
CRN 125-6-2	125 (92)	55.8 (1417)	92.4 (2348)	23.6 (599)	18.6 (472)	21.6 (550)	2224 (1009)
CRN 125-6-1	150 (110)	55.8 (1417)	92.4 (2348)	23.6 (599)	18.6 (472)	21.6 (550)	2299 (1043)
CRN 125-6	150 (110)	55.8 (1417)	92.4 (2348)	23.6 (599)	18.6 (472)	21.6 (550)	2299 (1043)
CRN 125-7-2	150 (110)	60.6 (1539)	97.2 (2470)	23.6 (599)	18.6 (472)	21.6 (550)	2321 (1053)

CR 155



The maximum pump efficiency (Eff) is based on a three-stage pump.

TM06 55414619

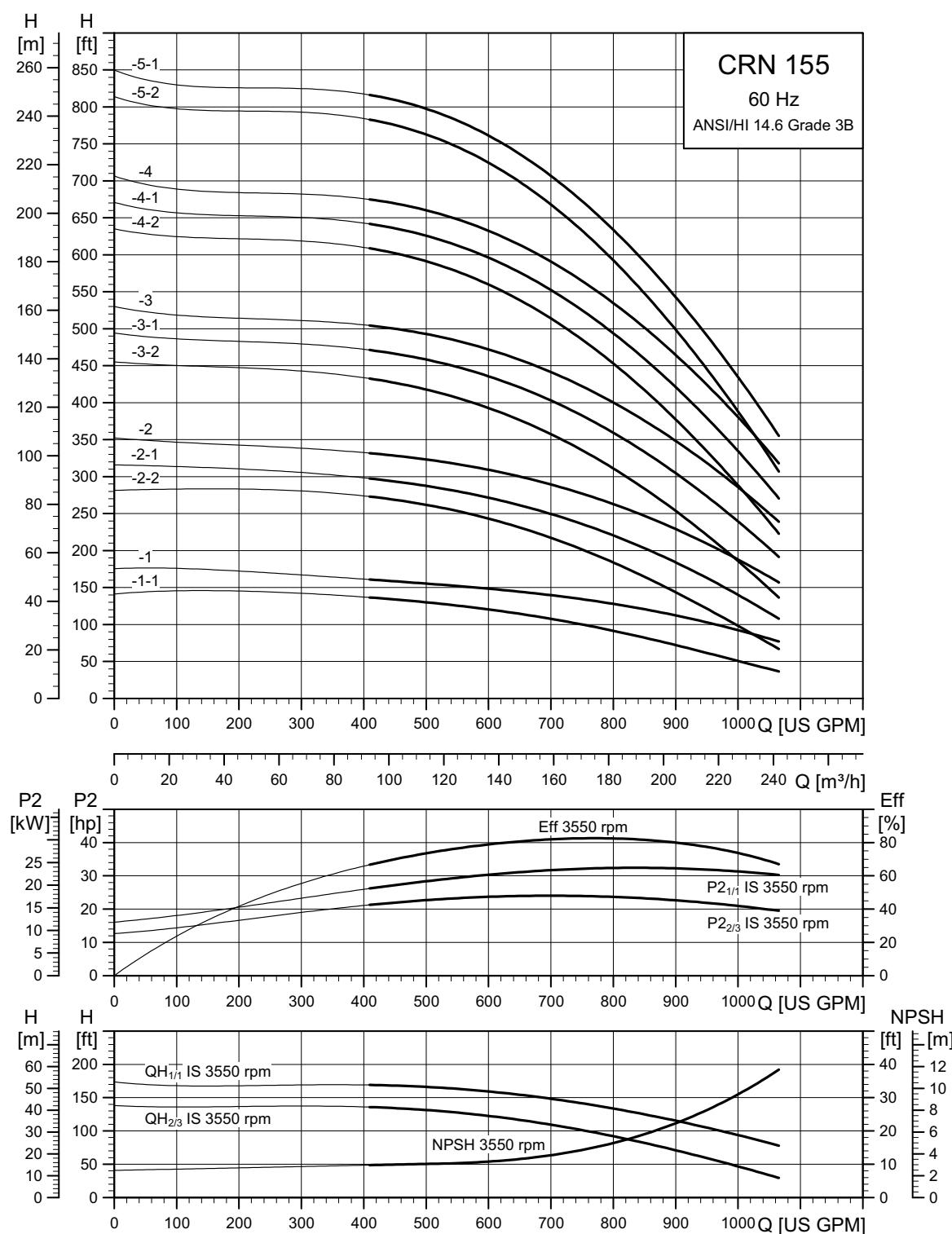


* CR, CRN 155 pumps with up to three stages (with one reduced diameter impeller) are fitted with class 150 flanges as standard. Class 300 flanges are available on request.

Dimensions and weights

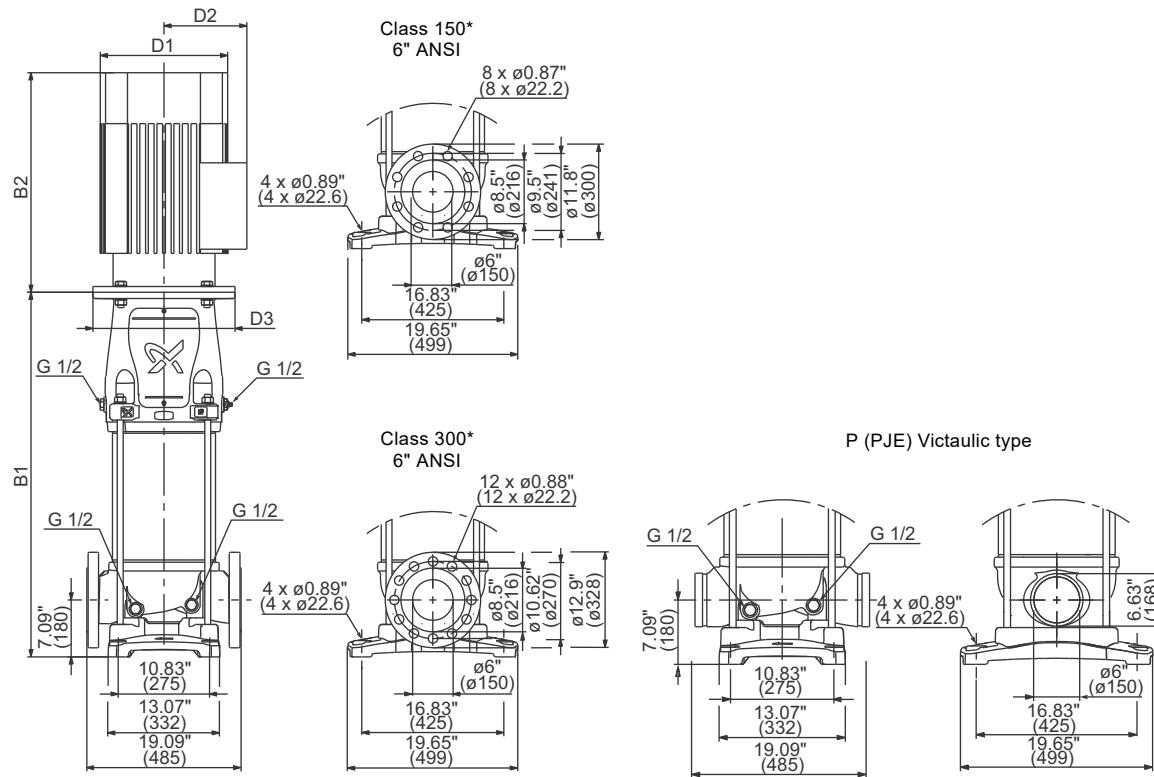
TM06 6061 0218

Pump type	Motor P ₂ [HP (kW)]	Dimensions [inch (mm)]					Net weight [lbs (kg)]
		B1	B1+B2	D1	D2	D3	
CR 155-1-1	25 (18.5)	30.9 (785)	54.5 (1384)	14.2 (360)	11.1 (282)	11.0 (280)	699 (317)
CR 155-1	40 (30)	31.8 (808)	57.9 (1471)	15.8 (402)	12.6 (320)	13.2 (335)	904 (410)
CR 155-2-2	50 (37)	36.6 (930)	62.7 (1593)	15.8 (402)	12.6 (320)	13.2 (335)	963 (437)
CR 155-2-1	60 (45)	36.6 (930)	65.4 (1662)	17.9 (455)	16.0 (407)	15.6 (395)	1215 (551)
CR 155-2	75 (55)	36.6 (930)	65.4 (1662)	17.9 (455)	16.0 (407)	15.6 (395)	1237 (561)
CR 155-3-2	75 (55)	41.4 (1052)	70.2 (1784)	17.9 (455)	16.0 (407)	15.6 (395)	1261 (572)

CRN 155

TM06 552459

The maximum pump efficiency (Eff) is based on a three-stage pump.



TM06 6062 0218

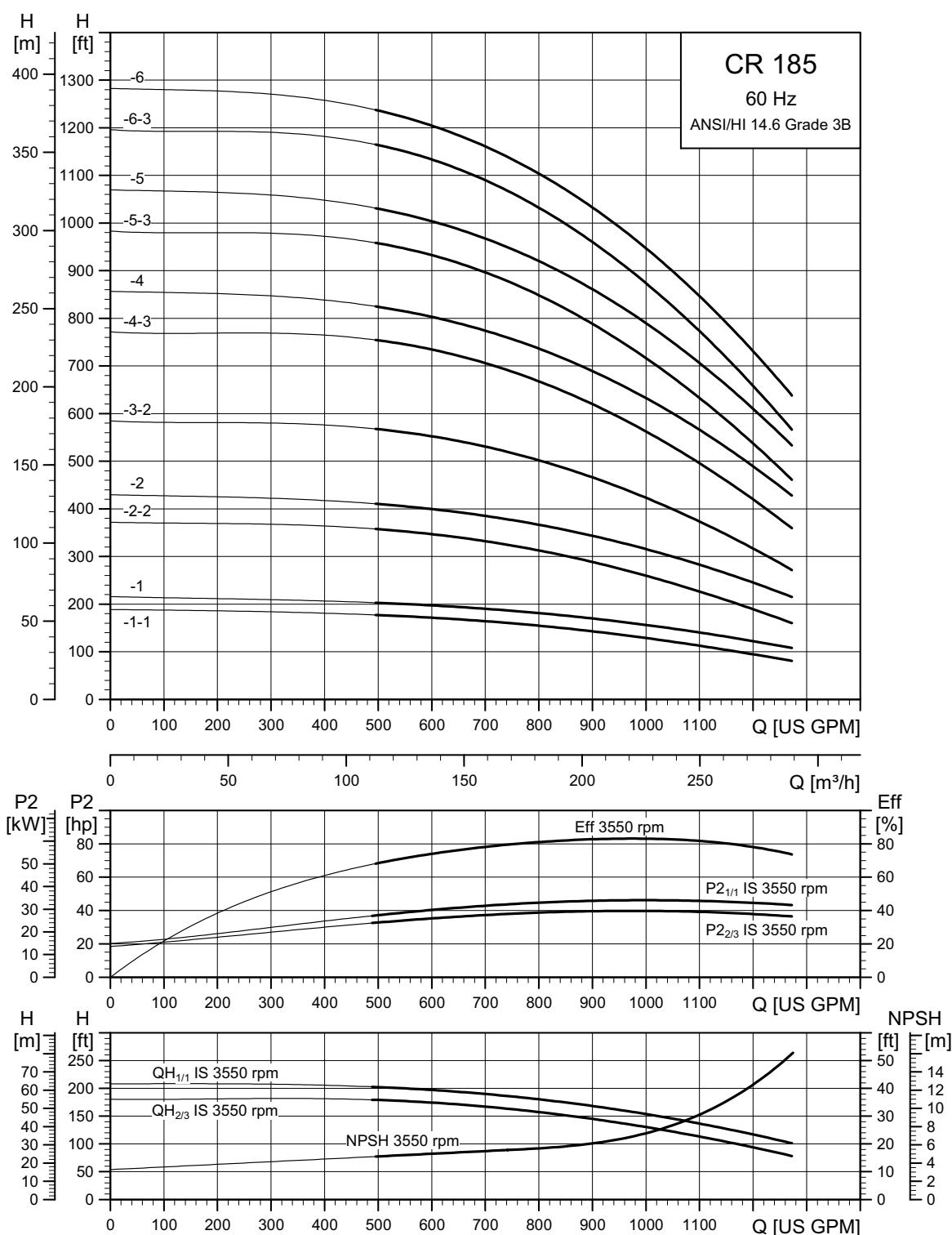
* CR, CRN 155 pumps with up to three stages (with two??? reduced diameter impellers) are fitted with class 150 flanges as standard. Class 300 flanges are available on request.

CRN 155 pumps with three or more full diameter impellers are fitted with class 300 flanges as standard.

Dimensions and weights

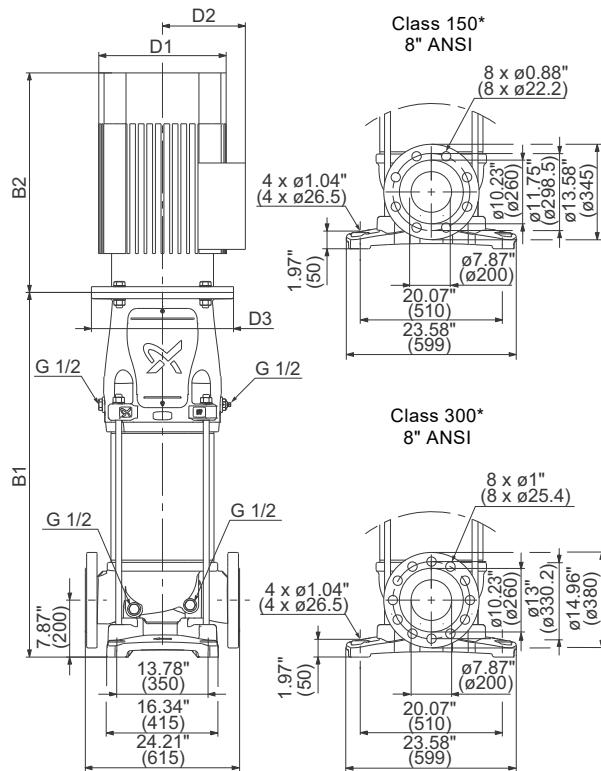
Pump type	Motor P_2 [HP (kW)]	Dimensions [inch (mm)]					Net weight [lbs (kg)]
		B1	B1+B2	D1	D2	D3	
CRN 155-1-1	25 (18.5)	30.9 (785)	54.5 (1384)	14.2 (360)	11.1 (282)	11.0 (280)	699 (317)
CRN 155-1	40 (30)	31.8 (808)	57.9 (1471)	15.8 (402)	12.6 (320)	13.2 (335)	904 (410)
CRN 155-2-2	50 (37)	36.6 (930)	62.7 (1593)	15.8 (402)	12.6 (320)	13.2 (335)	963 (437)
CRN 155-2-1	60 (45)	36.6 (930)	65.4 (1662)	17.9 (455)	16.0 (407)	15.6 (395)	1215 (551)
CRN 155-2	75 (55)	36.6 (930)	65.4 (1662)	17.9 (455)	16.0 (407)	15.6 (395)	1237 (561)
CRN 155-3-2	75 (55)	41.4 (1052)	70.2 (1784)	17.9 (455)	16.0 (407)	15.6 (395)	1261 (572)
CRN 155-3-1	100 (74)	41.4 (1051)	73.9 (1876)	19.1 (486)	16.0 (407)	21.6 (550)	1629 (739)
CRN 155-3	100 (74)	41.4 (1051)	73.9 (1876)	19.1 (486)	16.0 (407)	21.6 (550)	1629 (739)
CRN 155-4-2	125 (92)	46.2 (1173)	82.8 (2104)	23.6 (599)	18.6 (472)	21.6 (550)	2185 (991)
CRN 155-4-1	125 (92)	46.2 (1173)	82.8 (2104)	23.6 (599)	18.6 (472)	21.6 (550)	2185 (991)
CRN 155-4	125 (92)	46.2 (1173)	82.8 (2104)	23.6 (599)	18.6 (472)	21.6 (550)	2185 (991)
CRN 155-5-2	150 (110)	51.0 (1295)	87.6 (2226)	23.6 (599)	18.6 (472)	21.6 (550)	2282 (1035)
CRN 155-5-1	150 (110)	51.0 (1295)	87.6 (2226)	23.6 (599)	18.6 (472)	21.6 (550)	2282 (1035)

CR 185



The maximum pump efficiency (Eff) is based on a three-stage pump.

TM06 5543 3440



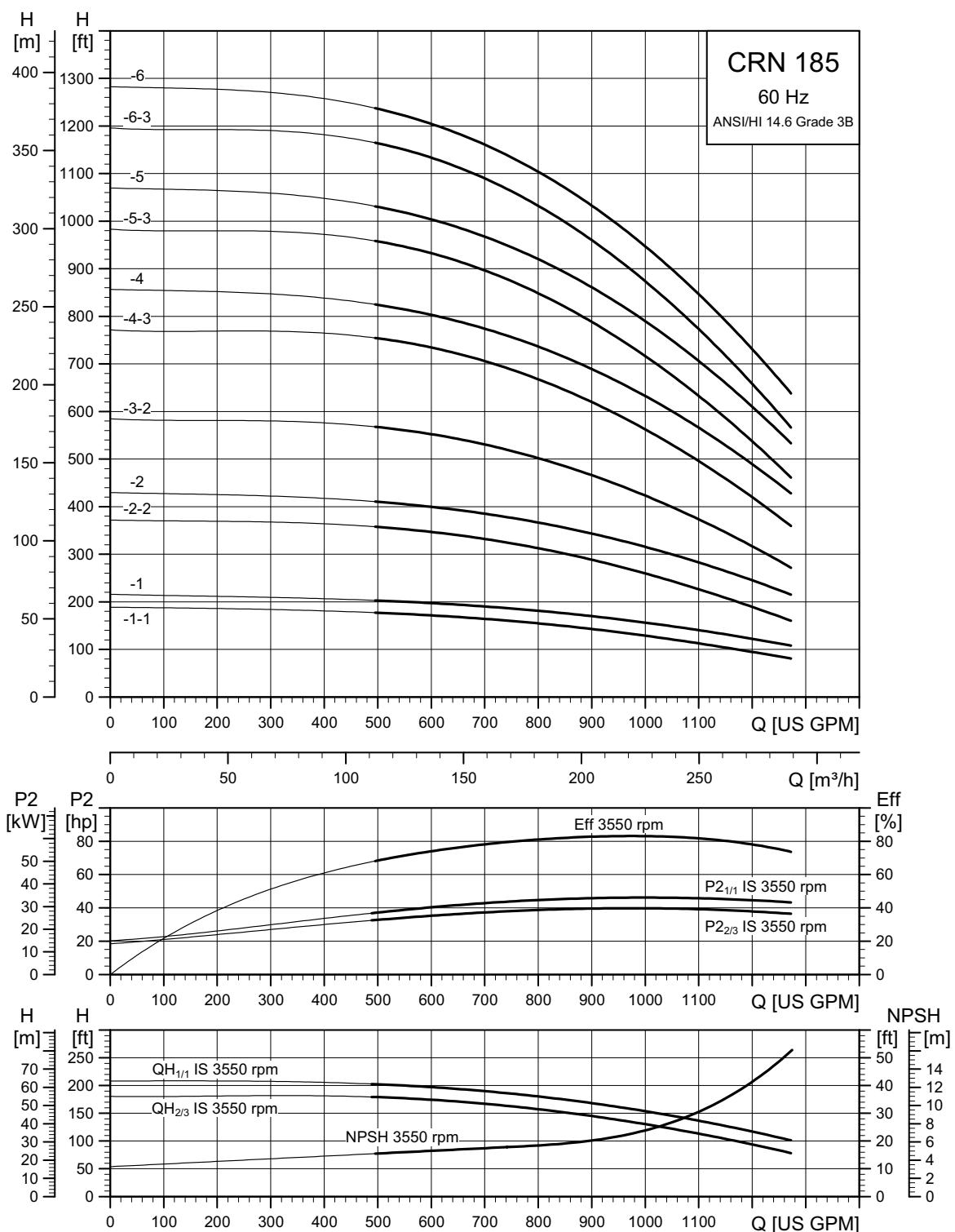
* CR, CRN 185 pumps with up to two stages are fitted with class 150 flanges as standard. Class 300 flanges are available on request.
CR, CRN 185 pumps with three or more stages are fitted with class 300 flanges as standard.

TM07 7445 4020

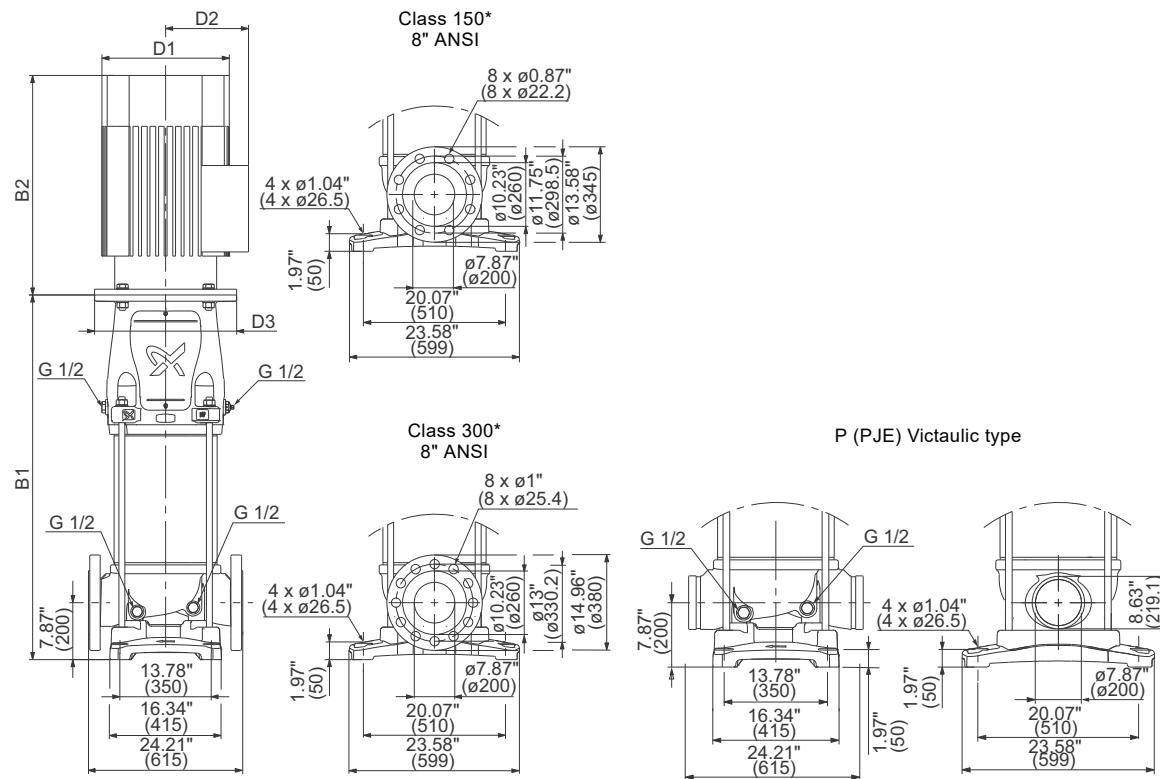
Dimensions and weights

Pump type	Motor P ₂ [HP (kW)]	Dimensions [inch (mm)]					Net weight [lbs (kg)]
		B1	B1+B2	D1	D2	D3	
CR 185-1-1	40 (30)	34.6 (878)	60.7 (1541)	15.8 (402)	12.6 (320)	13.2 (335)	1100 (499)
CR 185-1	50 (37)	34.6 (878)	60.7 (1541)	15.8 (402)	12.6 (320)	13.2 (335)	1138 (516)
CR 185-2-2	75 (55)	39.6 (1006)	68.4 (1738)	17.9 (455)	16.0 (407)	15.6 (395)	1433 (650)
CR 185-2-1	100 (74)	39.8 (1012)	72.3 (1837)	19.1 (486)	16.0 (407)	21.6 (550)	1786 (810)
CR 185-2	100 (74)	39.8 (1012)	72.3 (1837)	19.1 (486)	16.0 (407)	21.6 (550)	1786 (810)
CR 185-3-3	125 (92)	44.9 (1140)	81.5 (2071)	23.6 (599)	18.6 (472)	21.6 (550)	2381 (1080)
CR 185-3-2	125 (92)	44.9 (1140)	81.5 (2071)	23.6 (599)	18.6 (472)	21.6 (550)	2381 (1080)
CR 185-3-1	150 (110)	44.9 (1140)	81.5 (2071)	23.6 (599)	18.6 (472)	21.6 (550)	2456 (1114)
CR 185-3	150 (110)	44.9 (1140)	81.5 (2071)	23.6 (599)	18.6 (472)	21.6 (550)	2456 (1114)
CR 185-4-4	150 (110)	49.9 (1268)	86.6 (2199)	23.6 (599)	18.6 (472)	21.6 (550)	2489 (1129)
CR 185-4-3	200 (147)	49.9 (1268)	97.9 (2486)	23.6 (599)	20.6 (522)	21.6 (550)	2694 (1222)
CR 185-4-2	200 (147)	49.9 (1268)	97.9 (2486)	23.6 (599)	20.6 (522)	21.6 (550)	2694 (1222)
CR 185-4-1	200 (147)	49.9 (1268)	97.9 (2486)	23.6 (599)	20.6 (522)	21.6 (550)	2694 (1222)
CR 185-4	200 (147)	49.9 (1268)	97.9 (2486)	23.6 (599)	20.6 (522)	21.6 (550)	2694 (1222)
CR 185-5-4	200 (147)	55.0 (1396)	102. (2614)	23.6 (599)	20.6 (522)	21.6 (550)	2725 (1236)
CR 185-5-3	200 (147)	55.0 (1396)	102. (2614)	23.6 (599)	20.6 (522)	21.6 (550)	2725 (1236)
CR 185-5-2	250 (184)	55.0 (1396)	102. (2614)	23.6 (599)	20.6 (522)	21.6 (550)	2970 (1347)
CR 185-5-1	250 (184)	55.0 (1396)	102. (2614)	23.6 (599)	20.6 (522)	21.6 (550)	2970 (1347)
CR 185-5	250 (184)	55.0 (1396)	102. (2614)	23.6 (599)	20.6 (522)	21.6 (550)	2970 (1347)
CR 185-6-4	250 (184)	60.0 (1524)	108. (2742)	23.6 (599)	20.6 (522)	21.6 (550)	3003 (1362)
CR 185-6-3	250 (184)	60.0 (1524)	108. (2742)	23.6 (599)	20.6 (522)	21.6 (550)	3003 (1362)
CR 185-6-2	300 (221)	60.0 (1524)	108. (2742)	23.6 (599)	20.6 (522)	21.6 (550)	3389 (1537)
CR 185-6-1	300 (221)	60.0 (1524)	108. (2742)	23.6 (599)	20.6 (522)	21.6 (550)	3389 (1537)
CR 185-6	300 (221)	60.0 (1524)	108. (2742)	23.6 (599)	20.6 (522)	21.6 (550)	3389 (1537)

CRN 185



The maximum pump efficiency (Eff) is based on a three-stage pump.



* CR, CRN 185 pumps with up to two stages are fitted with class 150 flanges as standard. Class 300 flanges are available on request.

CR, CRN 185 pumps with three or more stages are fitted with class 300 flanges as standard.

TM07 7446 4020

Dimensions and weights

Pump type	Motor P_2 [HP (kW)]	Dimensions [inch (mm)]					Net weight [lbs (kg)]
		B1	B1+B2	D1	D2	D3	
CRN 185-1-1	40 (30)	34.6 (878)	60.7 (1541)	15.8 (402)	12.6 (320)	13.2 (335)	1100 (499)
CRN 185-1	50 (37)	34.6 (878)	60.7 (1541)	15.8 (402)	12.6 (320)	13.2 (335)	1138 (516)
CRN 185-2-2	75 (55)	39.6 (1006)	68.4 (1738)	17.9 (455)	16.0 (407)	15.6 (395)	1433 (650)
CRN 185-2-1	100 (74)	39.8 (1012)	72.3 (1837)	19.1 (486)	16.0 (407)	21.6 (550)	1786 (810)
CRN 185-2	100 (74)	39.8 (1012)	72.3 (1837)	19.1 (486)	16.0 (407)	21.6 (550)	1786 (810)
CRN 185-3-3	125 (92)	44.9 (1140)	81.5 (2071)	23.6 (599)	18.6 (472)	21.6 (550)	2381 (1080)
CRN 185-3-2	125 (92)	44.9 (1140)	81.5 (2071)	23.6 (599)	18.6 (472)	21.6 (550)	2381 (1080)
CRN 185-3-1	150 (110)	44.9 (1140)	81.5 (2071)	23.6 (599)	18.6 (472)	21.6 (550)	2456 (1114)
CRN 185-3	150 (110)	44.9 (1140)	81.5 (2071)	23.6 (599)	18.6 (472)	21.6 (550)	2456 (1114)
CRN 185-4-4	150 (110)	49.9 (1268)	86.6 (2199)	23.6 (599)	18.6 (472)	21.6 (550)	2489 (1129)
CRN 185-4-3	200 (147)	49.9 (1268)	97.9 (2486)	23.6 (599)	20.6 (522)	21.6 (550)	2694 (1222)
CRN 185-4-2	200 (147)	49.9 (1268)	97.9 (2486)	23.6 (599)	20.6 (522)	21.6 (550)	2694 (1222)
CRN 185-4-1	200 (147)	49.9 (1268)	97.9 (2486)	23.6 (599)	20.6 (522)	21.6 (550)	2694 (1222)
CRN 185-4	200 (147)	49.9 (1268)	97.9 (2486)	23.6 (599)	20.6 (522)	21.6 (550)	2694 (1222)
CRN 185-5-4	200 (147)	55.0 (1396)	102. (2614)	23.6 (599)	20.6 (522)	21.6 (550)	2725 (1236)
CRN 185-5-3	200 (147)	55.0 (1396)	102. (2614)	23.6 (599)	20.6 (522)	21.6 (550)	2725 (1236)
CRN 185-5-2	250 (184)	55.0 (1396)	102. (2614)	23.6 (599)	20.6 (522)	21.6 (550)	2970 (1347)
CRN 185-5-1	250 (184)	55.0 (1396)	102. (2614)	23.6 (599)	20.6 (522)	21.6 (550)	2970 (1347)
CRN 185-5	250 (184)	55.0 (1396)	102. (2614)	23.6 (599)	20.6 (522)	21.6 (550)	2970 (1347)
CRN 185-6-4	250 (184)	60.0 (1524)	108. (2742)	23.6 (599)	20.6 (522)	21.6 (550)	3003 (1362)
CRN 185-6-3	250 (184)	60.0 (1524)	108. (2742)	23.6 (599)	20.6 (522)	21.6 (550)	3003 (1362)
CRN 185-6-2	300 (221)	60.0 (1524)	108. (2742)	23.6 (599)	20.6 (522)	21.6 (550)	3389 (1537)
CRN 185-6-1	300 (221)	60.0 (1524)	108. (2742)	23.6 (599)	20.6 (522)	21.6 (550)	3389 (1537)
CRN 185-6	300 (221)	60.0 (1524)	108. (2742)	23.6 (599)	20.6 (522)	21.6 (550)	3389 (1537)

10. Motor data

Standard motors, 60 Hz

Motors used in the CR pump range are:

- Grundfos-specified WEG motors
- Grundfos ML motors.

Type	Phase	Motor range [HP]	Cooling method
WEG	3	15 - 300	TEFC
ML	3	15- 30	TEFC

WEG motors 0.25 to 20 HP

- rolled steel construction
- service factor 1.15
- suitable for VFD operation per NEMA MG 1 part 31.4.4.2
- certified Class I Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G (three phase only).

ODP motors

Open Drip Proof, constant speed

WEG motors

HP (kW)	Ph	Frame	Service factor	Voltage [V]	Motor eff. η [%]	Full-load current I _{1/1} [A]	Service-factor current [A]	Starting current I _{start} [A]	Power factor Cos φ _{1/1}	Speed [rpm]
15 (11)	3	254TC	1.15	208-230/460	90.2	38.0-34.4 / 17.2	38.0-39.6 / 19.8	258-234 / 117	0.89	3545
	3	254TC	1.15	575	90.2	14.1	16.2	106	0.87	3545
20 (15)	3	256TC	1.15	208-230/460	91.0	52.6-47.6 / 23.8	52.6-54.7 / 27.4	316-286 / 143	0.87	3525
	3	256TC	1.15	575	91.0	19	21.9	114	0.87	3525
25 (18.5)	3	284TSC	1.25	208-230/460	91.7	63.7-57.6 / 28.8	63.7-72 / 36	414-374 / 187	0.88	3535
	3	284TSC	1.25	575	91.7	23.3	29.1	154	0.87	3544
30 (22)	3	284TSC	1.25	208-230/460	91.7	77.4-70.0 / 35	77.4-87.5 / 43.8	488-441 / 221	0.86	3545
	3	284TSC	1.25	575	91.7	28	35.0	176	0.86	3550
40 (30)	3	324TSC	1.25	208-230/460	92.4	104-93.6 / 46.8	104-117 / 58.5	655-590 / 295	0.86	3545
	3	324TSC	1.25	575	92.4	37.5	46.9	229	0.87	3557
50 (37)	3	324TSC	1.25	208-230/460	93.0	130-117 / 58.7	130-146 / 73.4	819-737 / 370	0.85	3560
	3	324TSC	1.25	575	93.0	47.5	59.4	299	0.85	3560
60 (45)	3	326TSC	1.25	208-230/460	93.6	157-142 / 71	157-178 / 88.8	989-895 / 447	0.85	3560
	3	326TSC	1.25	575	93.6	56.8	71.0	358	0.85	3560
75 (55)	3	365TSC	1.25	208-230/460	93.6	188-170 / 84.8	188-213 / 106	1241-1122 / 560	0.87	3555
	3	365TSC	1.25	575	93.6	67.8	84.8	447	0.87	3555
100 (75)	3	404TSD	1.25	460	93.6	115	144	782	0.87	3557
125 (93)	3	405TSD	1.25	460	94.1	136	170	925	0.88	3557
150 (110)	3	444TSD	1.15	460	94.1	169	194	1099	0.86	3570
200 (150)	3	444TSD	1.15	460	95.0	225	259	1463	0.88	3570
250 (187)	3	445TSD	1.15	460	95.0	278	320	1863	0.88	3570
300 (224)	3	445TSD	1.15	460	95.4	329	378	2139	0.88	3570

Note: Motors with a nameplate stating 230/460 V are suitable for operation at 208 V.

WEG motors 25 to 300 HP

- cast iron frame
- rated for severe duty
- service factor 1.25 (25 to 100 HP)
- service factor 1.15 (125 to 300 HP)
- Inverter rated per NEMA MG 1 part 31
- certified Class I Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G (three phase only).

TEFC motors**Totally Enclosed Fan Cooled, constant speed****WEG motors**

TM077440 3820

HP (kW)	Ph	Frame	Service factor	Voltage [V]	Motoreff. η [%]	Full-load current I _{1/1} [A]	Service-factor current [A]	Starting current I _{start} [A]	Power factor Cos φ _{1/1}	Speed [rpm]
15 (11)	3	254TC	1.15	208-230/460	91.0	37.6-34.0 / 17	37.6-39.1 / 19.6	308-279 / 139	0.89	3520
	3	254TC	1.15	575	91.0	13.9	16.0	114	0.89	3520
20 (15)	3	256TC	1.15	208-230/460	91.0	50.2-45.4 / 22.7	50.2-52.2 / 26.1	331-300 / 150	0.91	3515
	3	256TC	1.15	575	91.0	18.2	20.9	120	0.91	3515
25 (18.5)	3	284TSC	1.25	208-230/460	91.7	63-57.0 / 28.5	63-71.3 / 35.6	397-359 / 180	0.89	3535
	3	284TSC	1.25	575	91.7	23	28.8	145	0.88	3545
30 (22)	3	286TSC	1.25	208-230/460	91.7	73.8-67.6 / 33.8	73.8-84.5 / 42.3	465-426 / 213	0.89	3535
	3	286TSC	1.25	575	91.7	27	33.8	170	0.89	3540
40 (30)	3	324TSC	1.25	208-230/460	92.4	101-91.6 / 45.8	101-115 / 57.3	636-577 / 289	0.89	3555
	3	324TSC	1.25	575	92.4	37	46.3	233	0.88	3560
50 (37)	3	326TSC	1.25	208-230/460	93.0	124-112 / 56.1	124-140 / 70.1	769-694 / 348	0.89	3550
	3	326TSC	1.25	575	93.0	44.9	56.1	278	0.89	3550
60 (45)	3	364TSC	1.25	208-230/460	93.6	148-134 / 67	148-168 / 83.8	977-884 / 442	0.90	3560
	3	364TSC	1.25	575	93.6	53.6	67.0	354	0.90	3560
75 (55)	3	365TSC	1.25	208-230/460	93.6	181-164 / 81.9	181-205 / 102	1213-1099 / 549	0.90	3555
	3	365TSC	1.25	575	93.6	65.6	82.0	440	0.90	3555
100 (75)	3	405TSD	1.25	460	94.1	112	140	728	0.89	3545
	3	405TSD	1.25	575	94.1	89.6	112	582	0.89	3545
125 (93)	3	444TSD	1.15	460	95.0	134	154	884	0.89	3570
	3	444TSD	1.15	575	95.0	107	123	706	0.89	3570
150 (110)	3	445TSD	1.15	460	95.0	163	187	1060	0.89	3570
	3	445TSD	1.15	575	95.0	130	150	845	0.89	3570
200 (150)	3	447TSD	1.15	460	95.4	222	255	1443	0.89	3570
	3	447TSD	1.15	575	95.4	178	205	1157	0.89	3570
250 (187)	3	447TSD	1.15	460	95.8	269	309	1802	0.90	3573
	3	447TSD	1.15	575	95.8	215	247	1441	0.90	3573
300 (224)	3	449TSD	1.15	460	95.8	320	368	2176	0.90	3570
	3	449TSD	1.15	575	95.8	256	294	1741	0.90	3570

Note: Motors with a nameplate stating 230/460 V are suitable for operation at 208 V.

Grundfos ML motors

GR 7845

HP (kW)	Ph	Frame	Service factor	Voltage [V]	Motor eff. η [%]	Full-load current I _{1/1} [A]	Starting current I _{start} [A]	Power factor Cos φ _{1/1}	Speed [rpm]
15 (11)	3	254TC	1.15	208-230 / 460	91.0	37.5-34 / 17	255-306 / 153	0.91-0.89	3490-3530
20 (15)	3	254TC	1.15	208-230 / 460	91.0	50.5-46 / 23	308-373 / 186	0.92-0.90	3490-3530
25 (18.5)	3	284TSC	1.15	208-230 / 460	91.7	62-56 / 28	341-420 / 210	0.92-0.91	3490-3530
30 (22)	3	286TSC	1.15	208-230 / 460	91.7	74-67 / 33.5	400-489 / 245	0.92-0.91	3490-3530

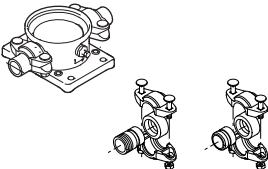
Note: The nameplate on 208-230/460 V motors states 230/460 V, but they also operate at 208 V.

11. Accessories

PJE couplings for CRN

Materials in contact with the pumped liquid are made of stainless steel AISI 316 and rubber.

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

Coupling	Pump type	Pipe stub	Max. pressure [psi (bar)]	Pipe connection	Rubber parts	Number of coupling sets required
	CRN 95	For welding	1000 (69)	4"	EPDM	2
					FKM	

12. Grundfos Product Center

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

<http://product-selection.grundfos.com>

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.



TM07-2384

The screenshot shows the Grundfos Product Center homepage. At the top, there's a navigation bar with links for HOME, FIND PRODUCT, COMPARE, YOUR PROJECTS, SAVED ITEMS, TOOLS, and HELP. To the right, it shows 'Product range: USA | 60 Hz | Language: English (USA)' and a 'Change settings' link. Below the navigation, there's a search bar with a dropdown menu set to 'Products'. The main area is titled 'Find products and solutions' and features five main sections: 'Sizing' (circled 2), 'Catalog' (circled 3), 'Replacement' (circled 4), and 'Liquids' (circled 5). Below these are three tabs: 'Quick sizing' (selected), 'Advanced sizing by application', and 'Guided selection'. Under 'Quick sizing', there are fields for 'Flow (Q)*' and 'Head (H)*' with dropdown menus for units ('US gpm' and 'ft'). To the right, there's a section titled 'Select what to size by:' with three radio button options: 'Size by application', 'Size by pump design', and 'Size by pump family'. A 'START SIZING' button is at the bottom right of this section. The TM07-2383 code is located on the right side of the page.

TM07-2383

Pos. Description

- 1 This drop-down menu enables you to set the search function to "Products" or "Literature".
- 2 **SIZING** enables you to size a pump based on entered data and selection choices.
- 3 **CATALOGUE** gives you access to the Grundfos product catalogue.
- 4 **REPLACEMENT** enables you to find a replacement product.
Search results will include information on
 - the lowest purchase price
 - the lowest energy consumption
 - the lowest total life cycle cost.
- 5 **LIQUIDS** enables you to find pumps designed for aggressive, flammable or other special liquids.

Grundfos GO

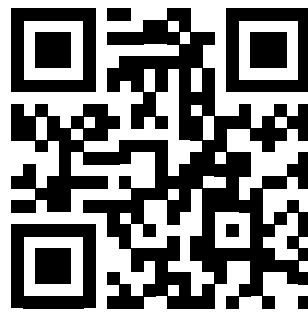
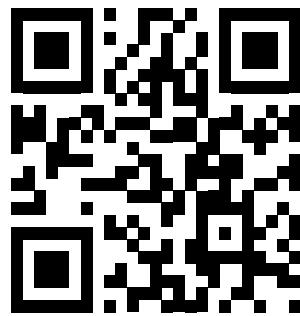
Mobile solution for professionals on the GO!

Grundfos GO is the mobile tool box for professional users on the go. It is the most comprehensive platform for mobile pump control and pump selection including sizing, replacement and documentation. It offers intuitive, handheld assistance and access to Grundfos online tools, and it saves valuable time for reporting and data collection.



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