

Performance range

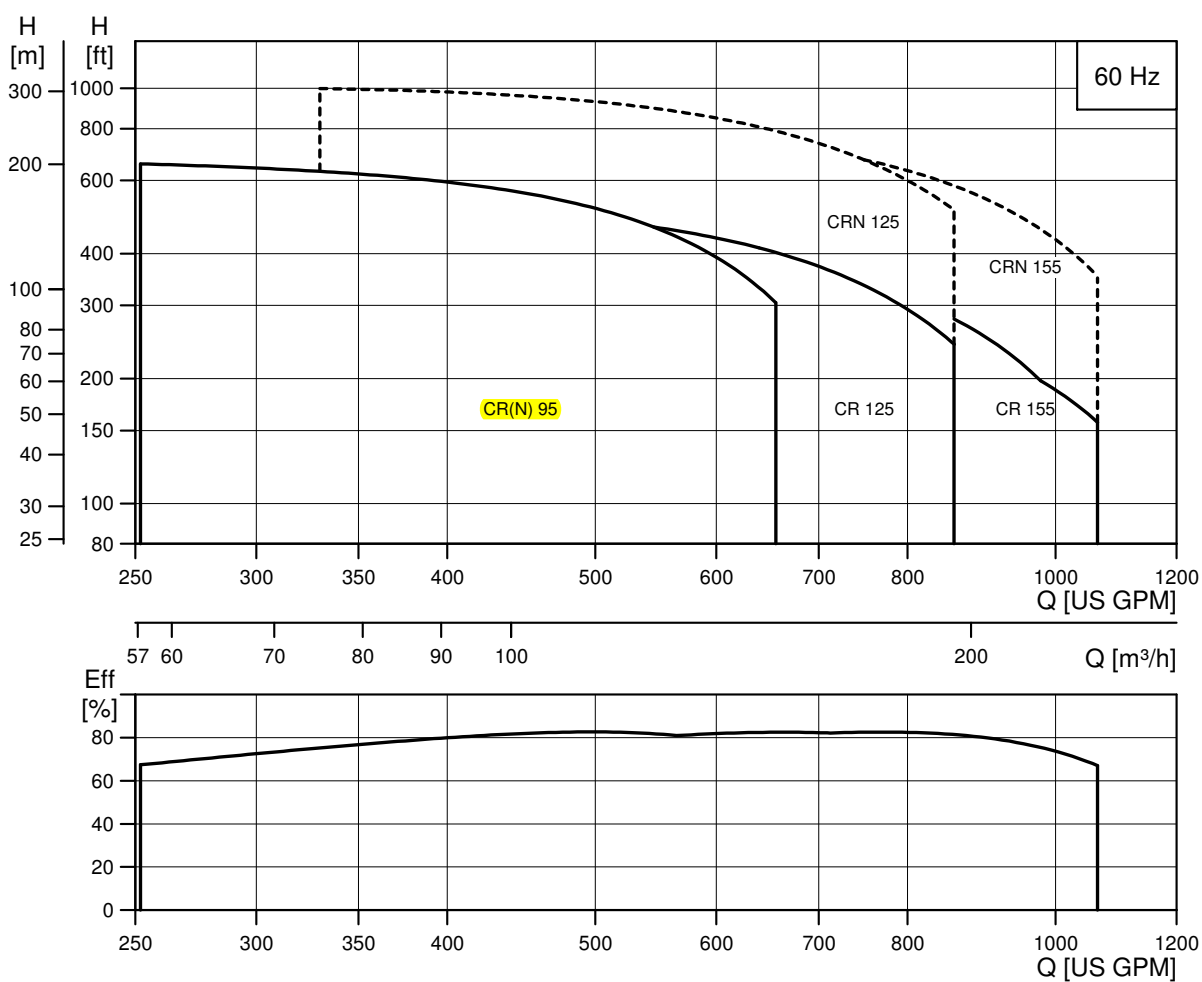


Fig. 2 Performance range, CR, CRN

TM06 5583 3718

Product range

Range	CR, CRN 95	CR, CRN 125	CR, CRN 155
Rated flow rate [US gpm (m ³ /h)]	500 (114)	660 (150)	820 (186)
Liquid temperature [°F (°C)]	-22 to +248 ¹⁾ (-30 to +120)		
Maximum pump efficiency [%]	82.5	82.5	82.5
CR, CRN pumps			
Flow rate [US gpm]	255-660	330-860	410-1060
Maximum pressure [psi (bar)]	537 ²⁾ (37)	566 ²⁾ (39)	580 ²⁾ (40)
Motor power [Hp (kW)]	20-75 (15-55)	20-150 (15-111)	25-150 (18-111)
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	
CRN pipe connection			
Flange	4" ANSI	6" ANSI	
PJE coupling (Victaulic type)	4"	6"	

¹⁾ CRN 95 to 155 with HQQE shaft seal: -40 to +248 °F (-40 to +120 °C).

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

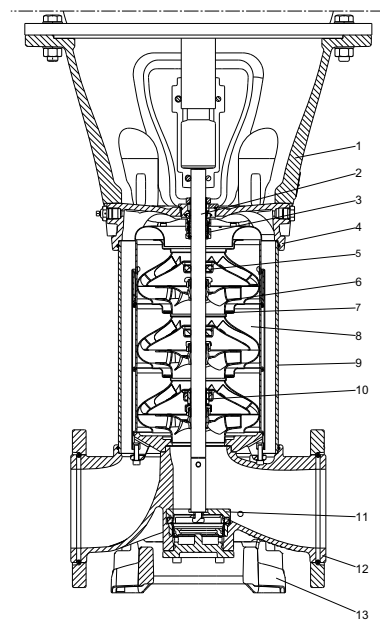
2. Construction

CR 95, 125 and 155



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=431 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	AISI 304
7	Neck ring	PEEK	-	-
8	Chamber	Stainless steel	EN10088 1.4301	AISI 304
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 ³⁾	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 155.

³⁾ Only fitted on pumps with 100 Hp (75 kW) motors or larger.

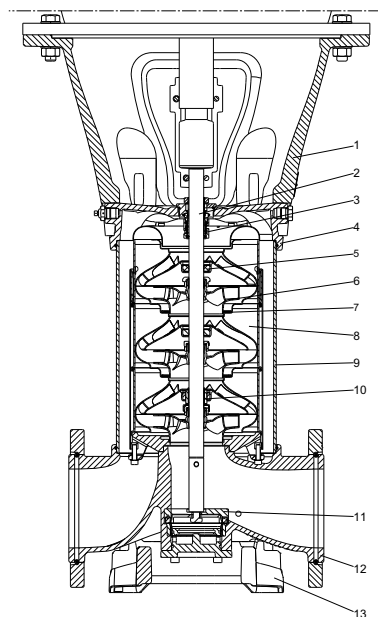
CRN 95, 125 and 155

ANSI flange



PJE (Victaulic type)

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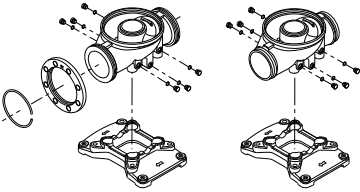
Materials, CRN

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	EN10088 1.4401	AISI 316/CF 8M
		Silicon carbide/Tungsten carbide	-	
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.

3. Operating and inlet pressures

Max. operating pressure and liquid temperature

Pump type	ANSI, PJE (Victaulic type)		
			
	Pressure class	Maximum permissible operating pressure in standard configuration [psi (bar)]	Liquid temperature [°F (°C)]
CR 95-1-1 → 95-4-1	150	363 (25) Note: CRN models may be configured for up to 580 psi (40 bar) (depending on model). Please contact Grundfos.	-22 to 248 (-30 to 120)
CR 95-4 → 95-5-1	300		
CR 125-1-1 → 125-3	150		
CR 125-4-2	300		
CR 155-1-1 → 155-3-2	150		
CRN 95-1-1 → 95-4-1	150		-40 to 248 (-40 to 120)*
CRN 95-5-2 → 95-5-1	300		
CRN 125-1-1 → 125-3	150		
CRN 125-4-2 → 125-7-2	300		
CRN 155-1-1 → 155-3-2	150		
CRN 155-3-1 → 155-5-1	300		

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* 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 *List of pumped liquids*, page 31. If the operating range is exceeded, the life of the shaft seal may be reduced.

CR, CRN 95-155

Shaft seals for Ø22 mm shafts (15 to 75 Hp (55 kW))

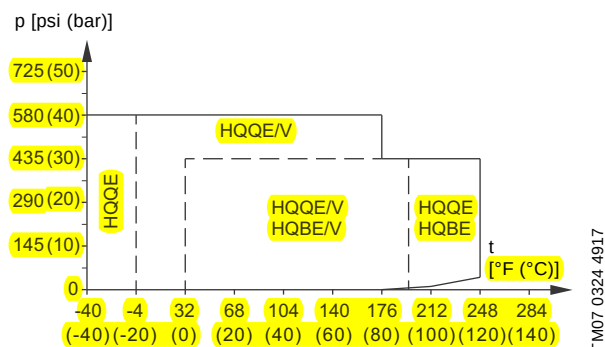


Fig. 5 Operating range of standard shaft seals for CR, CRN 95-155

Standard shaft seal	Motor size [Hp (kW)]	Description	Liquid temperature [°F (°C)]
HQQE	15-75 (11-55)	O-ring (cartridge) (balanced seal), Silicon carbide/Silicon carbide, EPDM	-40 - +248 (-40 - +120)
HQQV		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)

Shaft seals for Ø28 mm (100-150 Hp (75-110 kW)) and Ø36 mm (200-300 Hp (132-200 kW)) shaft ends

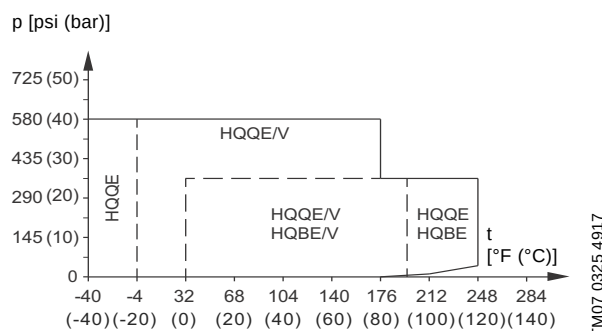


Fig. 6 Operating range of standard shaft seals for Ø28 mm shaft ends (100-150 Hp (75-110 kW)) and Ø36 mm shaft ends (200-300 Hp (132-200 kW))

Standard shaft seal	Motor size [Hp (kW)]	Description	Liquid temperature [°F (°C)]
HQQE	100-300 (75-200)	O-ring (cartridge) (balanced seal), Silicon carbide/Silicon carbide, EPDM	-40 - +248 (-40 - +120)
HQQV		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. 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 95-4-2	218 (15)
CR, CRN 95-4 → CR, CRN 95-8	290 (20)
CR, CRN 125	
CR, CRN 125-1-1 → CR, CRN 125-1	145 (10)
CR, CRN 125-2-2 → CR, CRN 125-3-1	218 (15)
CR, CRN 125-3 → CR, CRN 125-9-3	290 (20)
CR, CRN 155	
CR, CRN 155-1-1	145 (10)
CR, CRN 155-1 → CR, CRN 155-2	218 (15)
CR, CRN 155-3 → CR, CRN 155-8-3	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 18.

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

4. Selection and sizing

Selection of pumps

Selection of pumps must be based on these parameters:

- the duty point of the pump (see below)
- sizing data such as pressure loss as a result of height differences, friction loss in the pipes, pump efficiency (see below)
- pump materials (see page 15)
- pump connections (see page 15)
- shaft seal (see page 15).

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.

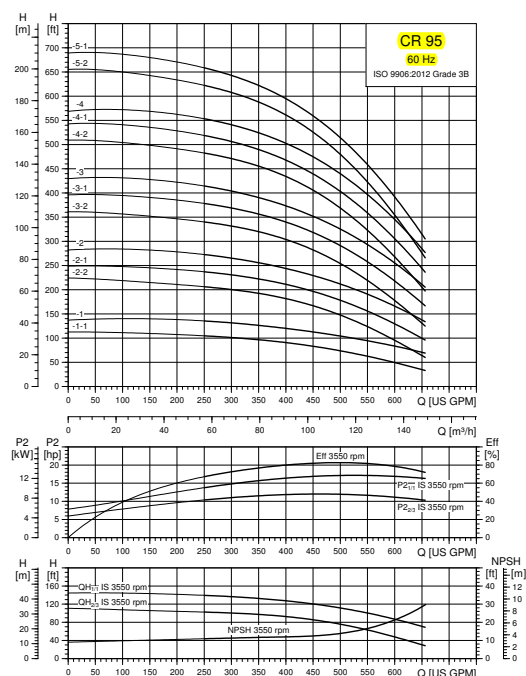


Fig. 7 Example of a curve chart

Sizing data

When sizing a pump, take these parameters into account:

- Required flow 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 or valves, etc.
- Best efficiency at the estimated duty point.
 - NPSH value.

For calculation of the NPSH value, see *Minimum inlet pressure, NPSH*, page 16.

Pump efficiency

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

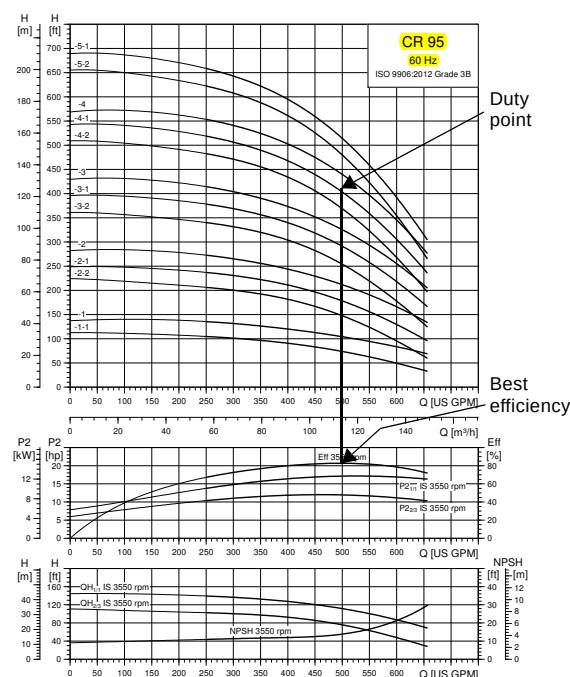
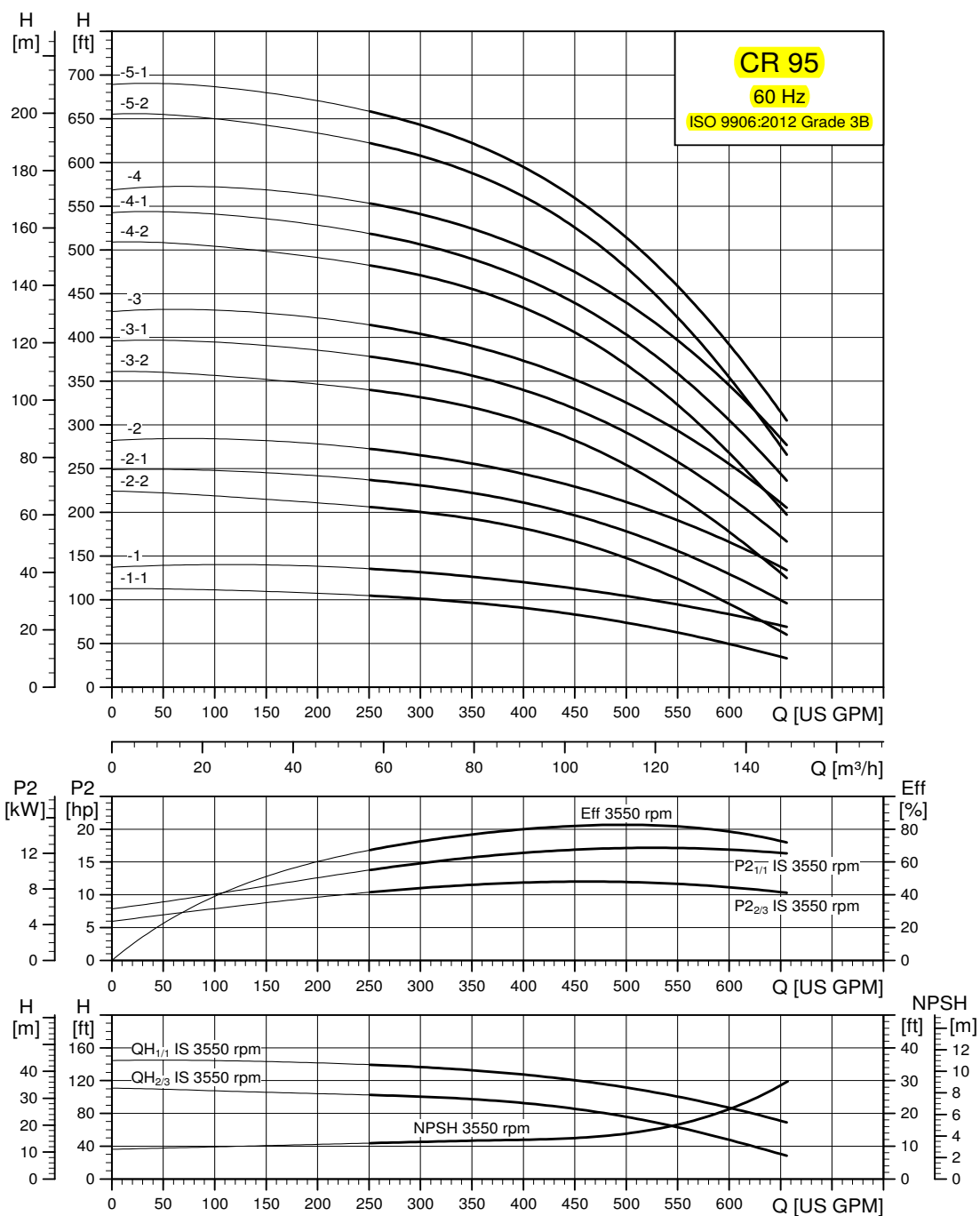


Fig. 8 Example of a CR pump's duty point

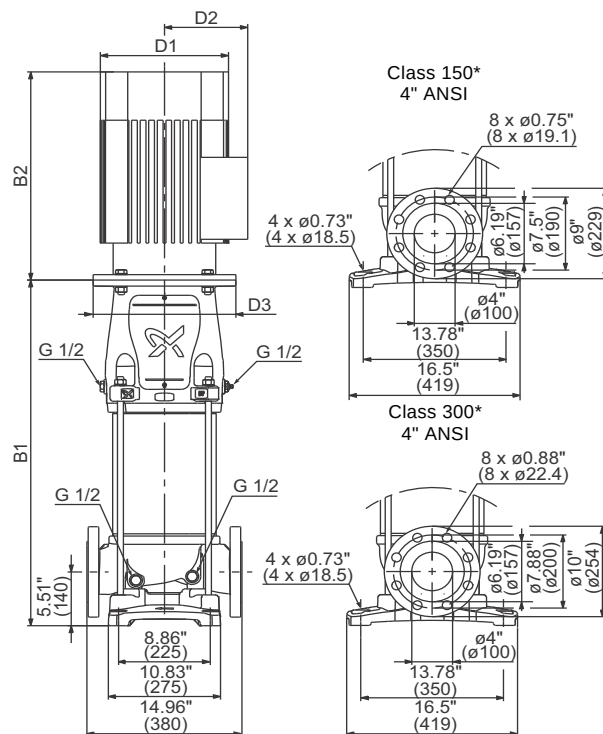
5. Performance curves and technical data

CR 95



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

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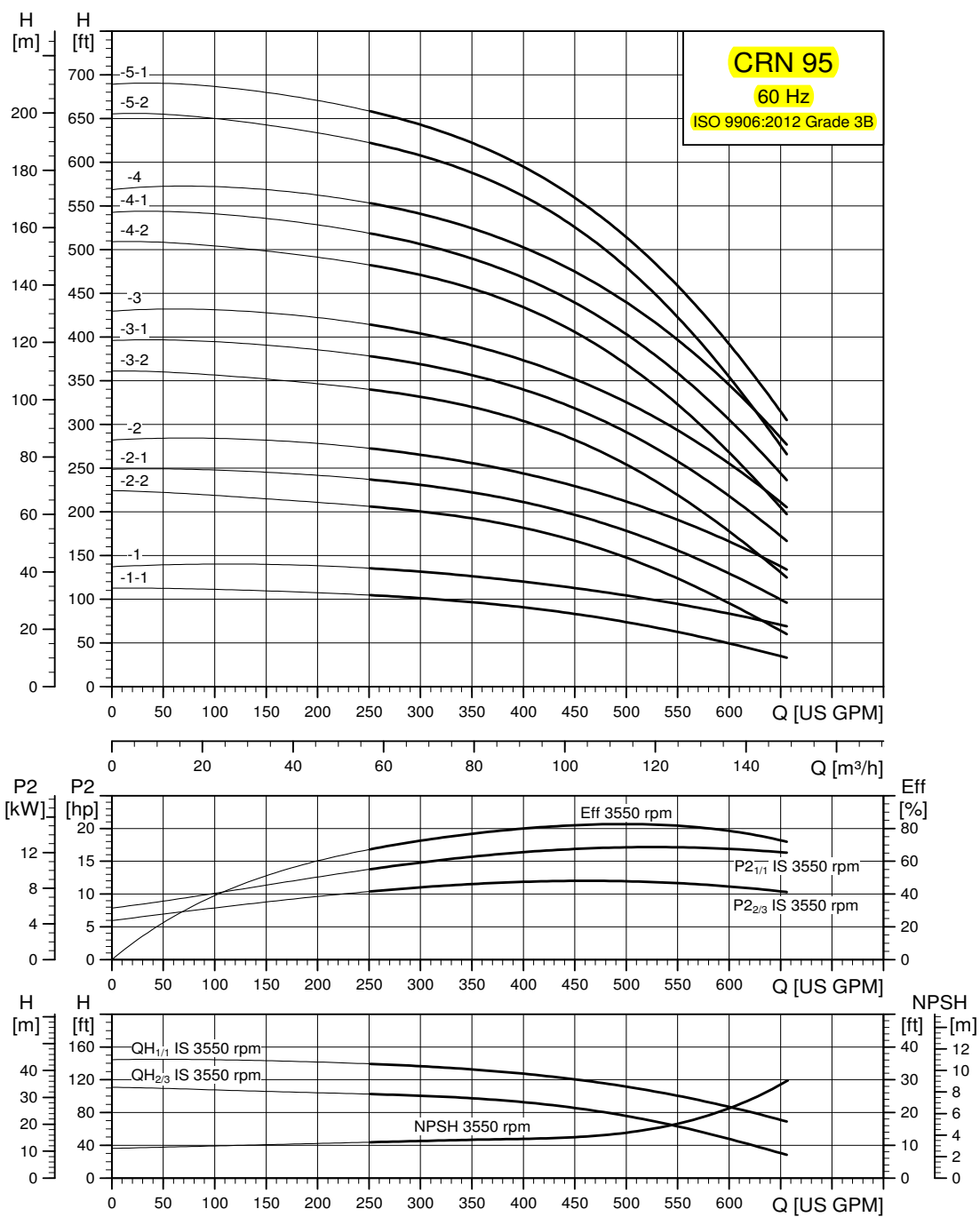
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* CR, CRN 95 pumps with 1 to 4 stages (with 1 reduced diameter impeller) are fitted with 150 lb. (68 kg) flanges as standard. 300 lb. (136 kg) flanges are available on request.

CR, CRN 95 pumps with 4 or more full diameter impellers are fitted with 300 lb. (136 kg) flanges as standard.

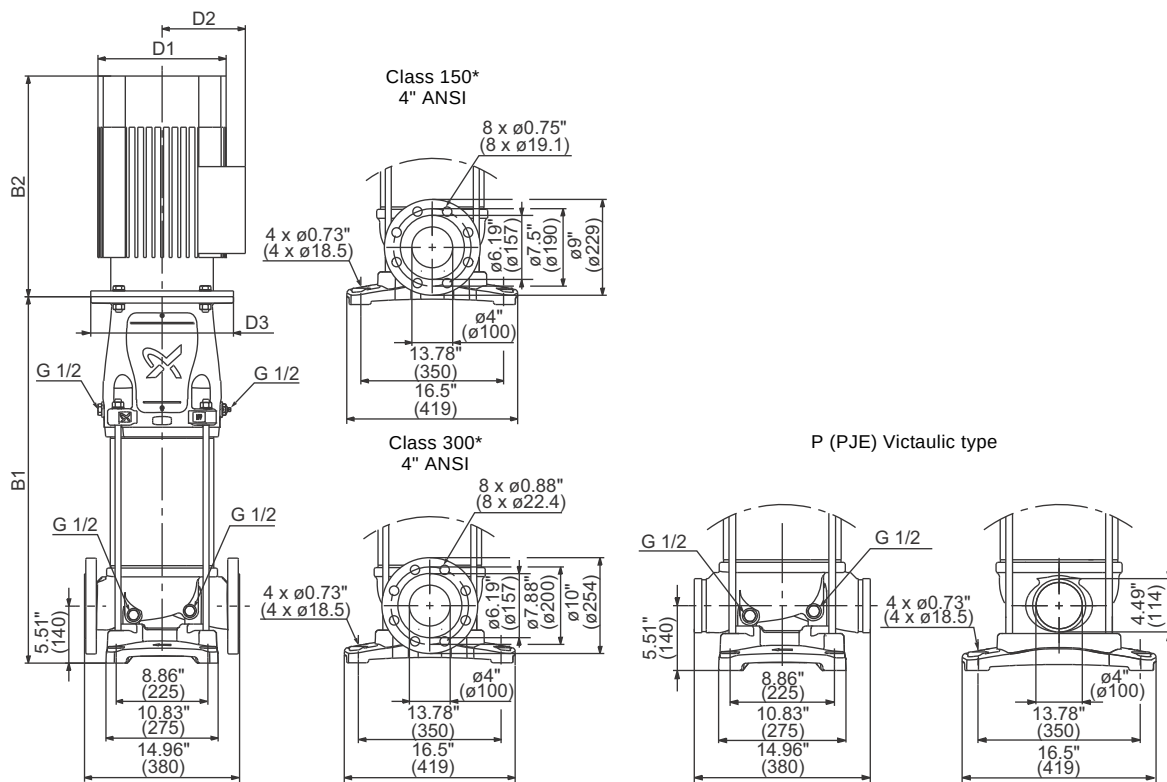
Dimensions and weights

Pump type	Motor P ₂ [Hp (kW)]	Dimension [inch (mm)]					Net weight [lbs (kg)]
		B1	B1+B2	D1	D2	D3	
CR 95-1-1	15 (11)	27.4 (696)	46.2 (1174)	12.4 (314)	8 (204)	8.5 (216)	412 (187)
CR 95-1	20 (15)	27.4 (696)	46.2 (1174)	12.4 (314)	8 (204)	8.5 (216)	412 (187)
CR 95-2-2	25 (18)	31.5 (800)	54.3 (1378)	12.4 (314)	8 (204)	10.5 (267)	452 (205)
CR 95-2-1	30 (22)	31.5 (800)	54.3 (1378)	12.4 (314)	8 (204)	10.5 (267)	478 (217)
CR 95-2	30 (22)	31.5 (800)	54.3 (1378)	12.4 (314)	8 (204)	10.5 (267)	478 (217)
CR 95-3-2	40 (30)	36.4 (925)	64 (1625)	16.9 (429)	14.1 (359)	12.5 (318)	739 (335)
CR 95-3-1	50 (37)	36.4 (925)	64 (1625)	16.9 (429)	14.1 (359)	12.5 (318)	807 (366)
CR 95-3	50 (37)	36.4 (925)	64 (1625)	16.9 (429)	14.1 (359)	12.5 (318)	807 (366)
CR 95-4-2	60 (45)	40.5 (1029)	67.6 (1716)	16.9 (429)	14.1 (359)	12.5 (318)	871 (395)
CR 95-4-1	60 (45)	40.5 (1029)	67.6 (1716)	16.9 (429)	14.1 (359)	12.5 (318)	871 (395)
CR 95-4	75 (56)	40.5 (1029)	68.1 (1729)	19.7 (500)	18.1 (460)	12.5 (318)	1190 (540)
CR 95-5-2	75 (56)	44.6 (1134)	72.2 (1834)	19.7 (500)	18.1 (460)	12.5 (318)	1204 (546)
CR 95-5-1	75 (56)	44.6 (1134)	72.2 (1834)	19.7 (500)	18.1 (460)	12.5 (318)	1204 (546)

CRN 95

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

TM06 5538 3718



* CR, CRN 95 pumps with 1 to 4 stages (with 1 reduced diameter impeller) are fitted with 150 lb. (68 kg) flanges as standard. 300 lb. (136 kg) flanges are available on request.

CR, CRN 95 pumps with 4 or more full diameter impellers are fitted with 300 lb. (136 kg) flanges as standard.

Dimensions and weights

Pump type	Motor P ₂ [Hp (kW)]	Dimension [inch (mm)]					Net weight [lbs (kg)]
		B1	B1+B2	D1	D2	D3	
CRN 95-1-1	15 (11)	27.4 (696)	46.2 (1174)	12.4 (314)	8 (204)	8.5 (216)	412 (187)
CRN 95-1	20 (15)	27.4 (696)	46.2 (1174)	12.4 (314)	8 (204)	8.5 (216)	412 (187)
CRN 95-2-2	25 (18)	31.5 (800)	54.3 (1378)	12.4 (314)	8 (204)	10.5 (267)	452 (205)
CRN 95-2-1	30 (22)	31.5 (800)	54.3 (1378)	12.4 (314)	8 (204)	10.5 (267)	478 (217)
CRN 95-2	30 (22)	31.5 (800)	54.3 (1378)	12.4 (314)	8 (204)	10.5 (267)	478 (217)
CRN 95-3-2	40 (30)	36.4 (925)	64 (1625)	16.9 (429)	14.1 (359)	12.5 (318)	739 (335)
CRN 95-3-1	50 (37)	36.4 (925)	64 (1625)	16.9 (429)	14.1 (359)	12.5 (318)	807 (366)
CRN 95-3	50 (37)	36.4 (925)	64 (1625)	16.9 (429)	14.1 (359)	12.5 (318)	807 (366)
CRN 95-4-2	60 (45)	40.5 (1029)	67.6 (1716)	16.9 (429)	14.1 (359)	12.5 (318)	871 (395)
CRN 95-4-1	60 (45)	40.5 (1029)	67.6 (1716)	16.9 (429)	14.1 (359)	12.5 (318)	871 (395)
CRN 95-4	75 (56)	40.5 (1029)	68.1 (1729)	19.7 (500)	18.1 (460)	12.5 (318)	1190 (540)
CRN 95-5-2	75 (56)	44.6 (1134)	72.2 (1834)	19.7 (500)	18.1 (460)	12.5 (318)	1204 (546)
CRN 95-5-1	75 (56)	44.6 (1134)	72.2 (1834)	19.7 (500)	18.1 (460)	12.5 (318)	1204 (546)

6. Motor data

Standard motors, 60 Hz



Baldor motor



Grundfos motor

TM06 6898 2616 - GR7845

Motor P2 [Hp (kW)]	Frame size	Standard voltage [V]	$I_{1/1}$ [A]	Service factor	Cos $\Phi_{1/1}$	Efficiency class	η [%]	I_{start} [A]	Speed [rpm]	Motor brand
15 (11)	254TC	208-230DD/ 460D	37.5-34/17	1.15	0.91-0.89	NEMA Premium / IE3 60Hz	IE3 91.0%	255-306/153	3490-3530	Grundfos
20 (15)	254TC	208-230DD/ 460D	50.5-46/23	1.15	0.92-0.90	NEMA Premium / IE3 60Hz	IE3 91.0%	308-373/186	3490-3530	
25 (19)	284TSC	208-230DD/ 460D	62-56/28	1.15	0.92-0.91	NEMA Premium / IE3 60Hz	IE3 91.7%	341-420/210	3490-3530	
30 (22)	286TSC	208-230DD/ 460D	74-67/33.5	1.15	0.92-0.91	NEMA Premium / IE3 60Hz	IE3 91.7%	400-489/245	3490-3530	
40 (30)	324TSC	230/460	90/45	1.15	0.86	NEMA Premium / IE3 60Hz	IE3 92.4%	564/326	3540	Baldor
50 (37)	326TSC	230/460	112/56	1.15	0.87	NEMA Premium / IE3 60Hz	IE3 93.0%	688/398	3540	
60 (45)	364TSC	230/460	132/66	1.15	0.87	NEMA Premium / IE3 60Hz	IE3 93.6%	989/572	3550	
75 (56)	365TSC	230/460	166/83	1.15	0.87	NEMA Premium / IE3 60Hz	IE3 93.6%	1210/700	3550	
100 (75)	405TSD	460	110	1.15	0.90	NEMA Premium / IE3 60Hz	IE3 94.1%	695	3565	
125 (93)	444TSD	460	137	1.15	0.90	NEMA Premium / IE3 60Hz	IE3 95.0%	848	3565	
150 (112)	445TSD	460	166	1.15	0.89	NEMA Premium / IE3 60Hz	IE3 95.0%	978	3575	

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
Boiler water		-	< 248 °F (120 °C)	HQQE	-
		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	-