ITT

Lowara

Circulators
TCR, TCB-TCS, TC-FC, ETCR, ETC-EFC Series

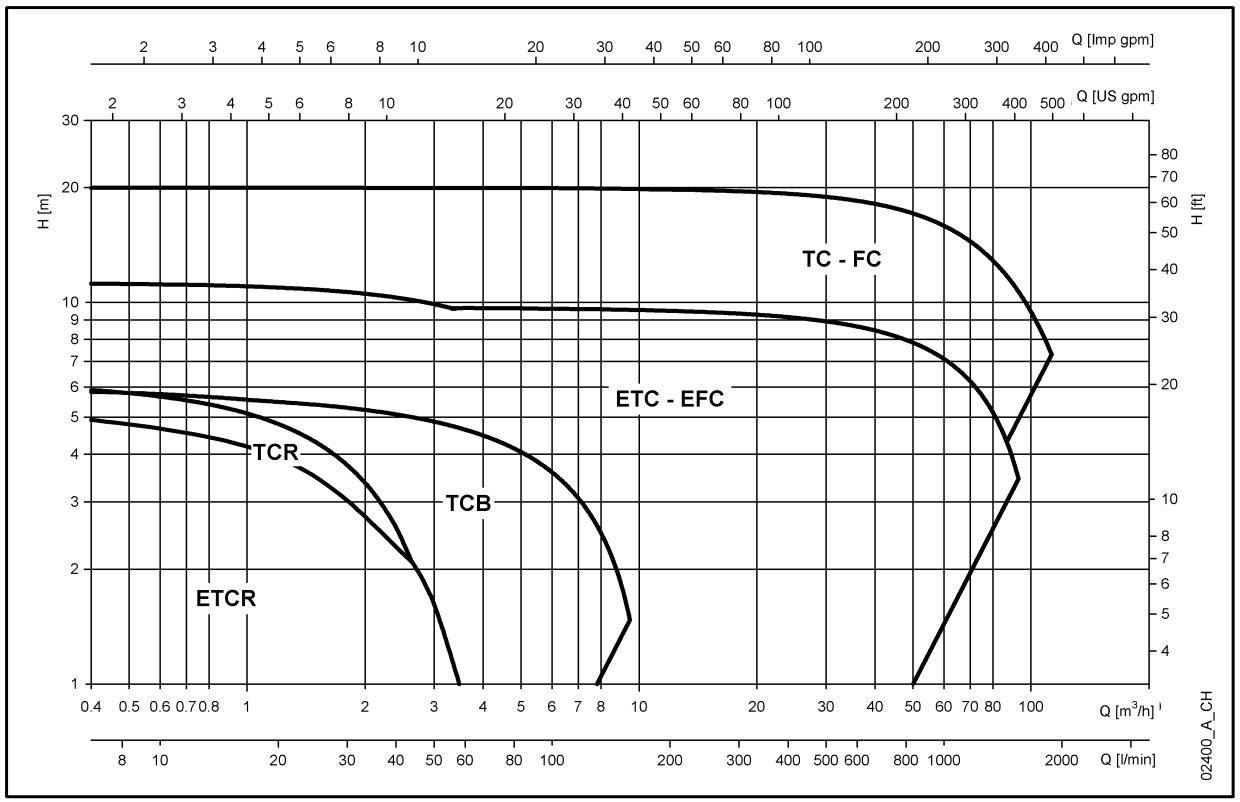
Single and twin wet rotor circulators, fixed and variable speed versions

50 Hz

EDITION 06-2006

Engineered for life

TCR, TCB-TCS, TC-FC, ETCR, ETC-EFC SERIES
HYDRAULIC PERFORMANCE RANGE AT 50 Hz



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ETC-EFC Series 49

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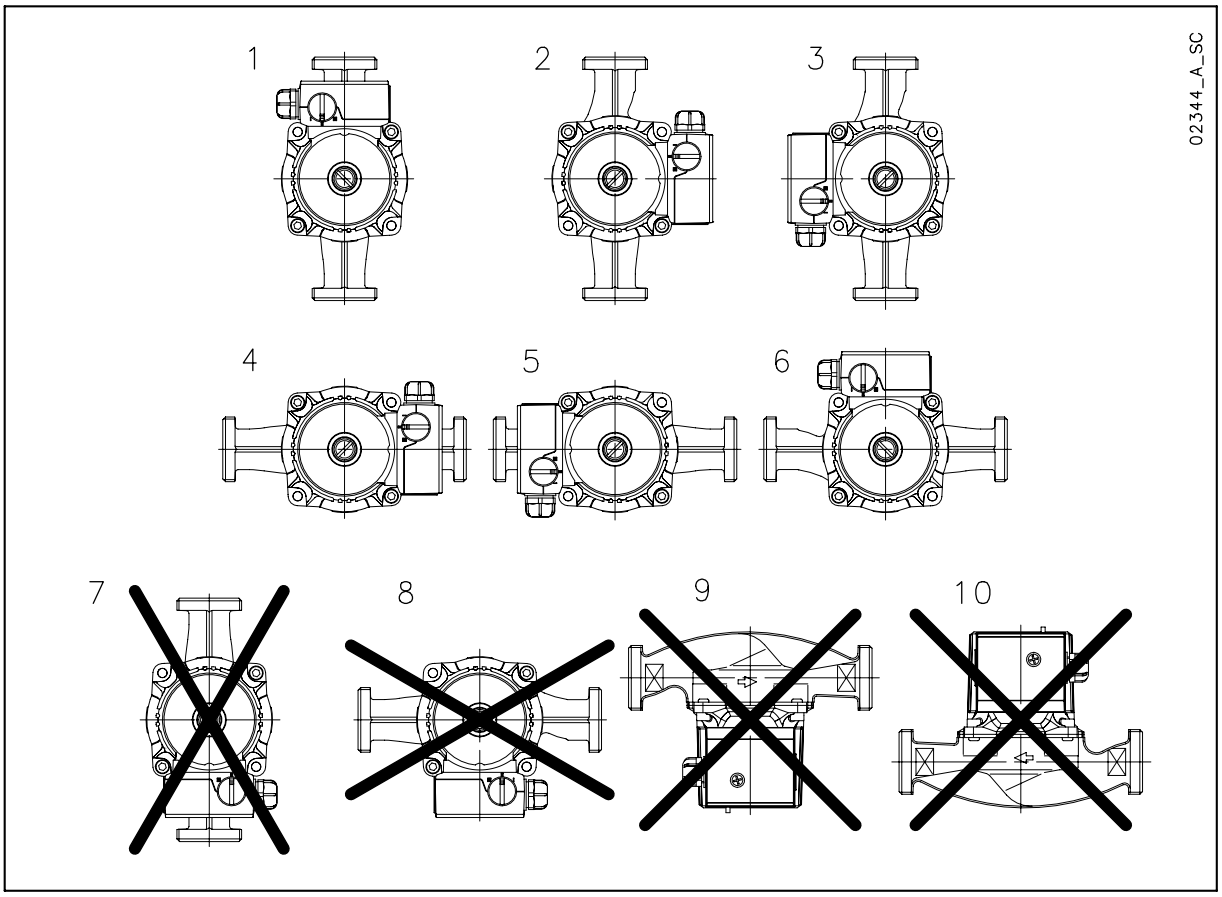
TCR, TCB-TCS, TC-FC, ETCR, ETC-EFC SERIES
PRODUCT RANGE CHART

TYPE	Version		Power supply		Pump coupling		Temperature of pumped liquid					Ambient temperature		Protection class		
	Single	Twin	Single-phase 230 V 50 Hz	Three-phase 230 - 400 V 50 Hz	Threaded	Flanged	+20°C ÷ +110°C	+2°C ÷ +95°C	0°C ÷ +110°C	-10°C ÷ +110°C	-20°C ÷ +130°C	Max 40°C	Max 50°C	IP 42	IP 43	IP 44
RESIDENTIAL																
TCR 15-4	•		•		•					•		•		•		
TCR 15-5	•		•		•					•		•		•		
TCR 15-6	•		•		•					•		•		•		
TCR 25-4	•		•		•					•		•		•		
TCR 25-4L	•		•		•					•		•		•		
TCR 25-5	•		•		•					•		•		•		
TCR 25-5L	•		•		•					•		•		•		
TCR 25-6	•		•		•					•		•		•		
TCR 32-4L	•		•		•					•		•		•		
TCR 32-5L	•		•		•					•		•		•		
TCR 32-6L	•		•		•					•		•		•		
SANITARY																
TCB 15-1	•		•		•				•			•		•		
TCB 15-2	•		•		•				•			•		•		
TCB 15-3	•		•		•				•			•		•		
TCB 20-5	•		•		•				•			•		•		
TCB(G) 25-6L	•	•	•		•				•			•		•		
TCS 25-6L	•		•		•				•			•				•
COMMERCIAL																
TC 32-4	•		•		•						•	•				•
TCG 32-4		•	•		•					•		•		•		
TC(G) 32-5	•	•	•		•						•	•				•
TC(G) 32-8	•	•	•		•						•	•				•
TC 32-10 (T)	•		•	•	•						•		•			•
FCG 40-4		•	•			•					•	•				•
FC(G) 40-7 (T)	•	•	•	•		•					•		•			•
FC(G) 40-10 (T)	•	•	•	•		•					•		•			•
FC(G) 50-4 (T)	•	•	•	•		•					•		•			•
FC(G) 50-8 (T)	•	•	•	•		•					•		•			•
FC(G) 50-11 (T)	•	•	•	•		•					•		•			•
FC(G) 65-7 (T)	•	•	•	•		•					•		•			•
FC(G) 65-10 (T)	•	•	•	•		•					•		•			•
FC(G) 65-14 T	•	•		•		•					•		•			•
FC(G) 80-7 (T)	•	•	•	•		•					•		•			•
FC(G) 80-12 T	•	•		•		•					•		•			•
FC(G) 80-14 T	•	•		•		•					•		•			•
FC(G) 80-19 T	•	•		•		•					•		•			•
RESIDENTIAL ELECTRONIC																
ETCR 25-4L	•		•		•			•				•		•		
ETCR 32-5L	•		•		•			•				•		•		
COMMERCIAL ELECTRONIC																
ETC 32-11	•		•		•		•					•			•	
EFC(G) 40-10	•	•	•			•	•					•			•	
EFC(G) 50-10	•	•	•			•	•					•			•	
EFC(G) 65-8	•	•	•			•	•					•			•	
EFC(G) 80-10	•	•	•			•	•					•			•	

circ-modelli_a_sc

TCR, TCB-TCS, TC-FC, ETCR, ETC-EFC SERIES INSTALLATION POSITIONS (SINGLE CIRCULATORS)

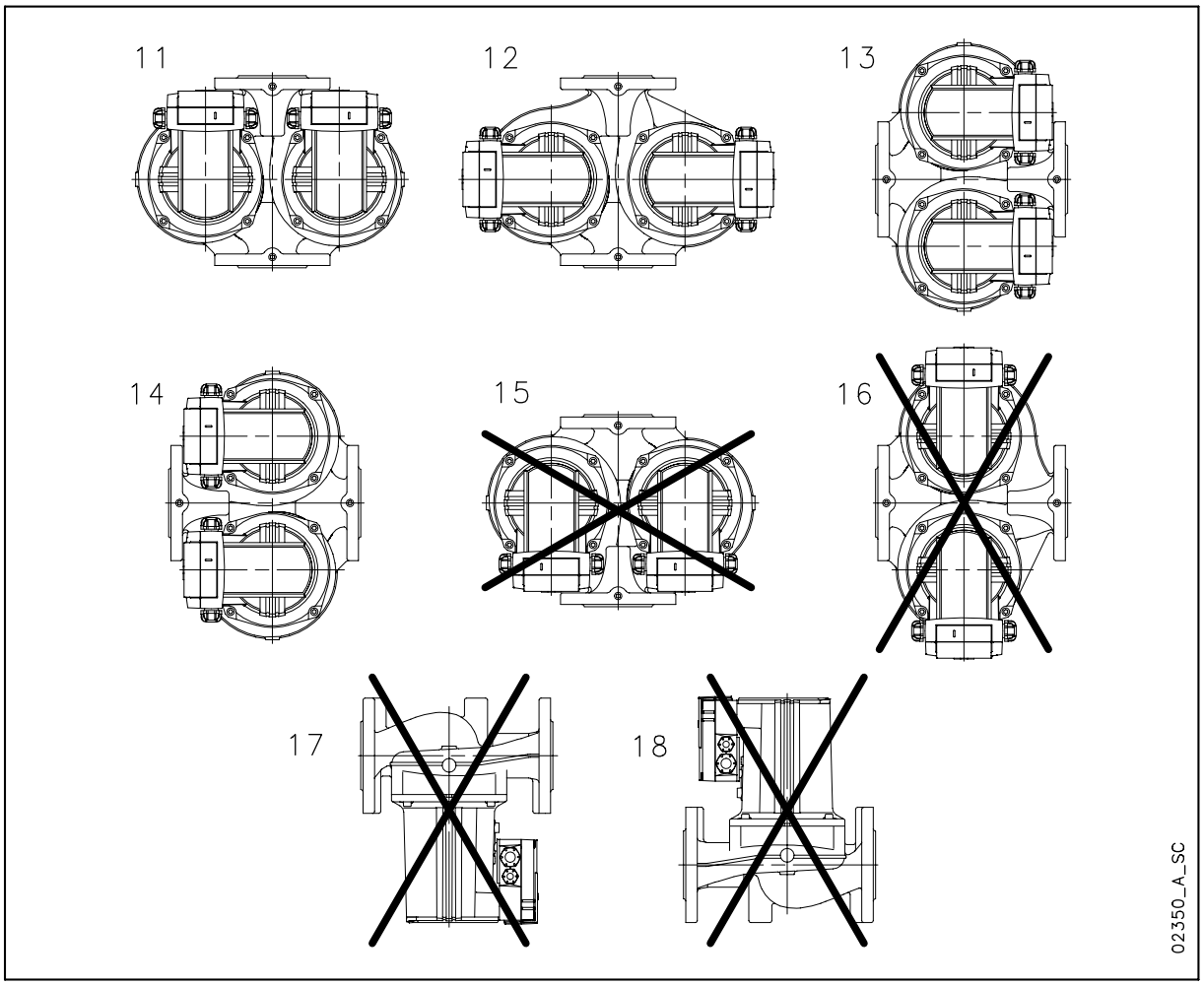


Ref	Motor axis	Flow	Terminal board	TCR	TCB TCS	TC FC	ETCR	ETC	EFC
1	Horizontal	Vertical	Up	o	o	o	o	o	o
2	Horizontal	Vertical	Right	o	o	o	o	o	x
3	Horizontal	Vertical	Left	o	o	o	o	o	x
4	Horizontal	Horizontal	Right	o	o	o	o	o	x
5	Horizontal	Horizontal	Left	o	o	o	o	o	x
6	Horizontal	Horizontal	Up	o	o	o	o	o	x
7	Horizontal	Vertical	Under	x	x	x	o	x	x
8	Horizontal	Horizontal	Under	x	x	x	o	x	x
9	Vertical	Horizontal	Under	x	x	x	x	x	x
10	Vertical	Horizontal	Over	x	x	x	x	x	x

Legend: "0" = Proper position, "x" = Improper position

cir-sing-2p50_a_tpm

TCBG, TCG-FCG, EFCG SERIES
INSTALLATION POSITIONS (TWIN CIRCULATORS)



Ref.	Motor axis	Flow	Terminal board	TCBG	TCG FCG	EFCG
11	Horizontal	Vertical	Over	o	o	o
12	Horizontal	Vertical	Side	o	o	x
13	Horizontal	Horizontal	Right	o	o	x
14	Horizontal	Horizontal	Left	o	o	x
15	Horizontal	Vertical	Under	o	x	x
16	Horizontal	Horizontal	Over-Under	o	x	x
17	Vertical	Horizontal	Under	x	x	x
18	Vertical	Horizontal	Over	x	x	x

Legend: "0" = Proper position, "x" = Improper position

cir-gem-2p50_a_tpm

Circulators for residential systems

TCR Series

MARKET SECTORS

RESIDENTIAL.

APPLICATIONS

- Water circulation in heating and air conditioning systems
- Pumping of hot/cold, chemically and mechanically non-aggressive liquids.

SPECIFICATIONS

PUMP

- **Flow rate**: up to 4 m^3/h.
- **Head**: up to 6,5 m.
- **Temperature of pumped liquid**: -10°C ÷ +110°C. With over 50% water and glycol mixture.
- **Maximum operating pressure**: 10 bar (PN 10).
- **Impeller**: made of corrosion-proof, composite material.
- **Wear ring**: stainless steel.

MOTOR

- Wet rotor type, with bearings lubricated by the pumped liquid. The rotor chamber is protected by a bronze filter.
- Single-phase 230 V 50 Hz power supply. Capacitor integrated in the terminal board.
- 2-pole, three-speed motor, with manual speed selection.
- According to EN standards 60335-1 and 2.51.
- Class F **insulation** (155°C)
- **Protection class**: IP 42.

CONSTRUCTION CHARACTERISTICS

- Electric circulator pumps with in-line suction and discharge ports, designed for direct installation onto piping, with 1", 1"¼ e 1"½ and 1-1/2" threaded connections.

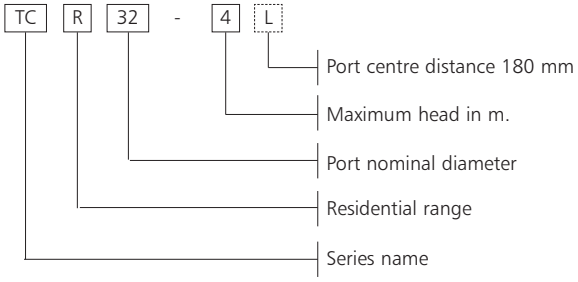
ACCESSORIES

- Pipe unions.

INSTALLATION

- Suitable for installation on horizontal or vertical piping, in any position provided that motor axis is horizontal.

TCR SERIES
IDENTIFICATION CODE



EXAMPLE: TCR 32-4L
TCR series circulator for residential applications, port nominal diameter = 32, max head = 4 m, with port centre distance of 180 mm.

TABLE OF MATERIALS

PART	MATERIAL
Pump body	Cast iron
Impeller	Composite material
Shaft	Stainless steel
Inner jacket	Stainless steel
Wear ring	Stainless steel
Bearings	Graphite
Gaskets	EPDM

tcr-2p50_a_tm

MINIMUM PRESSURE SUCTION TABLE

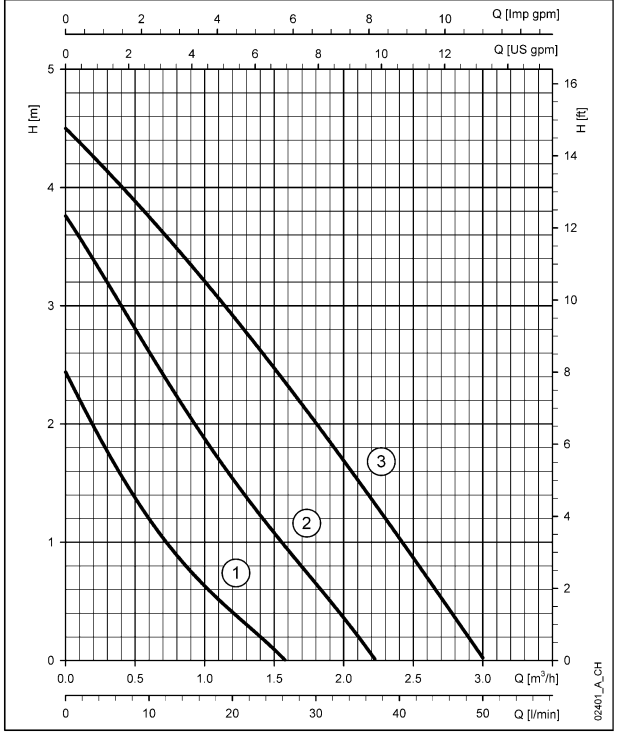
PUMP TYPE	OPERATING TEMPERATURE		
	82°C	95°C	110°C
ALL MODEL	1.5 m	3.0 m	10 m

10.2 m = 1 bar

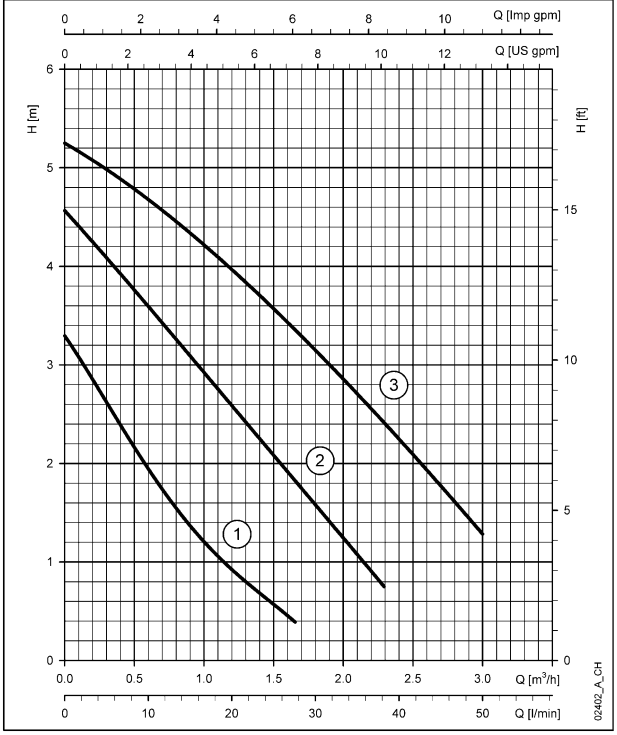
tcr-2p50_a_tpm

TCR SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

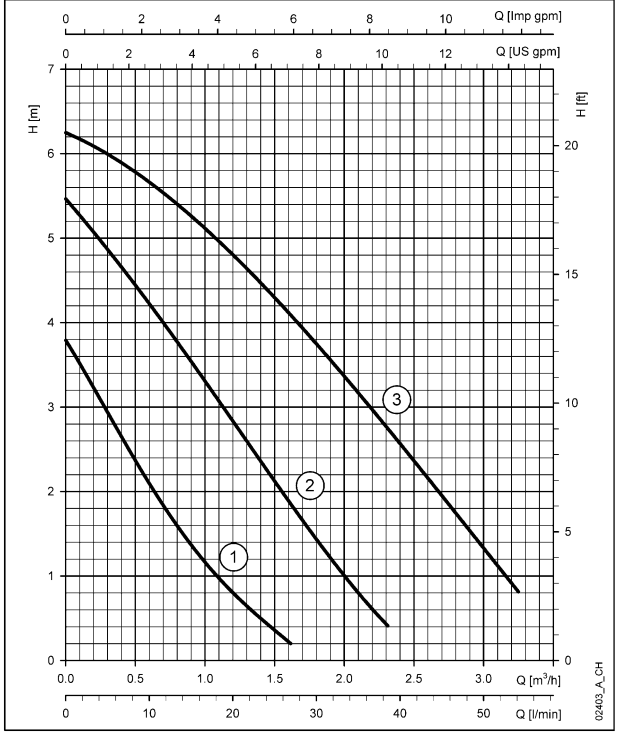
TCR 15-4 TCR 25-4 TCR 25-4L TCR 32-4L	① 1000 [rpm] ② 1400 [rpm] ③ 1900 [rpm]	ISO 9906 - Annex A



TCR 15-5 TCR 25-5 TCR 25-5L TCR 32-5L	① 1050 [rpm] ② 1450 [rpm] ③ 1950 [rpm]	ISO 9906 - Annex A

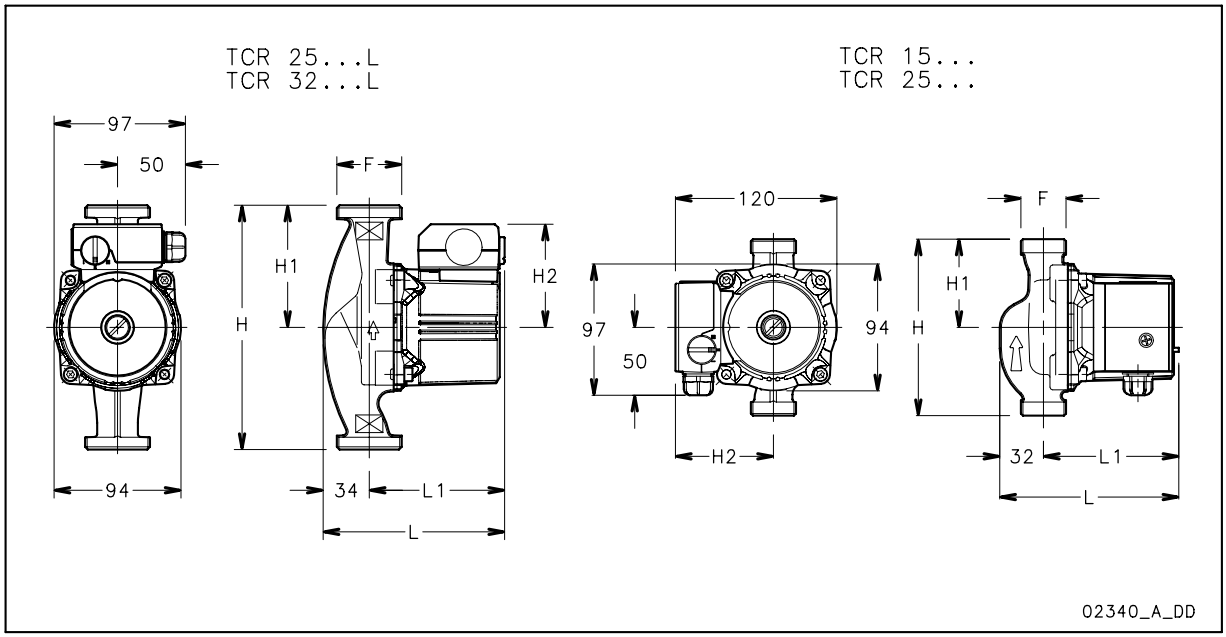


TCR 15-6 TCR 25-6 TCR 32-6L	① 950 [rpm] ② 1300 [rpm] ③ 1850 [rpm]	ISO 9906 - Annex A



These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

TCR SERIES
DIMENSIONS AND WEIGHTS



DIMENSIONS AND WEIGHTS TABLE

PUMP TYPE	DIMENSIONS (mm)							WEIGHT
	H	H1	H2	L	L1	F	DN	kg
TCR 15-4	130	65	74	133	101	G 1"	15	2,6
TCR 25-4	130	65	74	133	101	G 1"1/2	25	2,6
TCR 25-4L	180	90	73	137	103	G 1"1/2	25	2,4
TCR 32-4L	180	90	73	137	103	G 2"	32	2,4
TCR 15-5	130	65	74	133	101	G 1"	15	2,6
TCR 25-5	130	65	74	133	101	G 1"1/2	25	2,6
TCR 25-5L	180	90	73	137	103	G 1"1/2	25	2,6
TCR 32-5L	180	90	73	137	103	G 2"	32	2,6
TCR 15-6	130	65	77	133	101	G 1"	15	2,6
TCR 25-6	130	65	77	133	101	G 1"1/2	25	2,6
TCR 32-6L	180	90	77	135	101	G 2"	32	2,6

tcr-2p50_b_td

HYDRAULIC PERFORMANCE TABLE

PUMP TYPE	POWER NOMINAL	POWER ABSORBED	NOMINAL INTENSITY	CAPACITOR		SPEED	Q = DELIVERY								
							l/min 0	5	15	25	30	35	40	45	50
							m^3/h 0	0,3	0,9	1,5	1,8	2,1	2,4	2,7	3
230V 50Hz	W	W	A	µF	V	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER								
TCR 15-4	20	30	0,13	2,0	400	1 - 1000	2,4	1,7	0,7	0,1					
TCR 25-4	20	46	0,20	2,0	400	2 - 1400	3,7	3,2	2,0	1,1	0,6	0,2			
TCR 25-4L															
TCR 32-4L	20	65	0,28	2,0	400	3 - 1900	4,4	4,1	3,3	2,5	2,0	1,5	1,0	0,5	
TCR 15-5	35	40	0,18	2,6	400	1 - 1050	3,3	2,7	1,4	0,6					
TCR 25-5	35	60	0,27	2,6	400	2 - 1450	4,6	4,1	3,1	2,1	1,6	1,1			
TCR 25-5L															
TCR 32-5L	35	90	0,38	2,6	400	3 - 1950	5,3	5,0	4,4	3,6	3,2	2,7	2,3	1,8	1,3
TCR 15-6	40	46	0,21	2,6	400	1 - 950	3,8	2,9	1,4	0,4					
TCR 25-6	40	67	0,31	2,6	400	2 - 1300	5,5	4,9	3,5	2,1	1,4	0,8			
TCR 32-6L	40	93	0,41	2,6	400	3 - 1850	6,2	6,0	5,3	4,3	3,7	3,2	2,6	2,0	1,3

Performances according to ISO standards 9906 - Annex A.

tcr-2p50_a_th

Sanitary Circulators

TCB-TCS Series

MARKET SECTORS

RESIDENTIAL AND CIVIL.

APPLICATIONS

- Circulation of sanitary hot water.

SPECIFICATIONS

PUMP

- **Flow rate**: up to 6 m³/h.
- **Head**: up to 6,5 m.
- **Temperature of pumped liquid**: 0°C ÷ +110°C.
- **Maximum operating pressure**: 10 bar (PN 10).
- **Impeller**: made of corrosion-proof, composite material.
- **Wear ring**: stainless steel.

MOTOR

- Wet rotor type, with bearings lubricated by the pumped liquid. The rotor chamber is protected by a bronze filter. Integrated automatic motor protection with isothermal probes (on TCS model).
- Single-phase 230 V 50 Hz power supply. Capacitor integrated in the terminal board.
- Three-speed motor with manual selection (except for model TCB 15-1 which is single-speed).
- According to EN standards 61000-6-2 (immunity) and 61000-6-3 (emissions).
- Class F **Insulation** (155°C).
- **Protection class**: IP 42 (IP 44 for TCS models).

CONSTRUCTION CHARACTERISTICS

- Electric circulator pumps for sanitary hot water circulation, at a maximum temperature of 60°C and maximum hardness of 35°F.
- Single or twin pump design (with automatic switchover valve for the twin version). The two pumps can operate separately or in parallel.
- Pump body designed for direct installation onto piping, with 1", 1"¼ and 1"½ threaded connections.
  – bronze for installation on copper piping (TCB models);
  – stainless steel for installation on copper piping (TCS model).

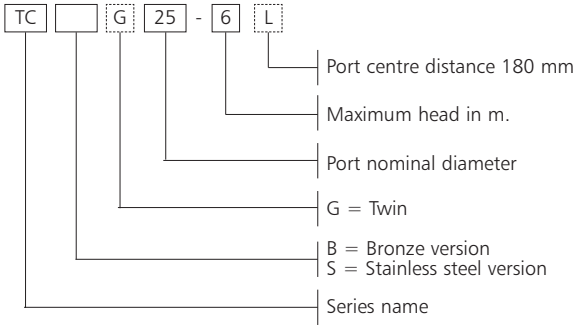
ACCESSORIES

- Pipe unions.

INSTALLATION

- Suitable for installation on horizontal or vertical piping, in any position provided that motor axis is horizontal.

TCB- TCS SERIES IDENTIFICATION CODE



EXAMPLE: TCBG 25-6L
TCB series circulator, bronze version, twin design, port nominal diameter = 25, max head = 6 m, with port centre distance of 180 mm.

TABLE OF MATERIALS

PART		MATERIAL
Pump body	TCB	Bronze
	TCS	Stainless steel
	TCBG	Bronze
Impeller		Composite material
Shaft		Ceramic
Jacket		Stainless steel
Bearings		Graphite
Gaskets		EPDM

tcb-tcs-2p50_a_tm

MINIMUM PRESSURE SUCTION TABLE

PUMP TYPE	OPERATING TEMPERATURE 82°C	95°C	110°C
ALL MODEL	1.5 m	3.0 m	10 m

10.2 m = 1 bar

tcb-2p50_a_tpm

TCB-TCS SERIES
HYDRAULIC PERFORMANCE TABLE

PUMP TYPE	POWER NOMINAL	POWER ABSORBED	NOMINAL INTENSITY	CAPACITOR		SPEED	Q = DELIVERY								
							l/min 0	10	20	30	40	50	60	70	90
							m^3/h 0	0,6	1,2	1,8	2,4	3	3,6	4,2	5,4
230V 50Hz	W	W	A	µF	V	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER								
TCB 15-1	10	30	0,15	1,6	400	1850	0,9	0,6	0,4						
TCB 15-2	10	20	0,10	1,6	400	1 - 1000	0,5	0,4	0,1						
	10	32	0,15	1,6	400	2 - 1600	1,1	0,9	0,6	0,2					
	10	48	0,22	1,6	400	3 - 2000	1,4	1,3	1,1	0,7	0,1				
TCB 15-3	20	27	0,12	2,0	400	1 - 1700	1,3	1,1	0,7	0,3					
	20	39	0,18	2,0	400	2 - 2200	1,8	1,6	1,4	1,0	0,5				
	20	56	0,24	2,0	400	3 - 2500	1,9	1,9	1,7	1,4	0,9	0,2			
TCB 20-5	35	45	0,20	2,6	400	1 - 1000	2,7	1,7	0,9	0,5	0,1				
	35	66	0,29	2,6	400	2 - 1450	3,9	3,2	2,4	1,7	1,1	0,5			
	35	89	0,39	2,6	400	3 - 1950	4,6	4,3	3,8	3,2	2,7	2,0	1,4	0,7	
TCB 25-6L	50	70	0,32	2,6	400	1 - 1150	3,9	2,7	1,6	0,8	0,3				
	50	102	0,46	2,6	400	2 - 1650	5,2	4,6	3,7	2,8	1,9	1,2	0,6		
	50	114	0,50	2,6	400	3 - 2300	5,9	5,5	5,1	4,7	4,2	3,7	3,0	2,3	0,8
TCS 25-6L	100	120	0,65	5,0	400	1 - 1260	3,8	2,8	2,0	1,2	0,5				
	100	175	0,90	5,0	400	2 - 1810	5,3	4,8	4,2	3,5	2,7	1,9	1,1		
	100	200	1,00	5,0	400	3 - 2390	6,0	5,7	5,5	5,1	4,6	4,0	3,3	2,5	0,9
(1) TCBG 25-6L	50	70	0,32	3,5	400	1 - 1400	3,7	2,7	1,7	1,0	0,4				
	50	101	0,46	3,5	400	2 - 2000	5,2	4,6	3,8	3,1	2,3	1,5	0,8		
	50	128	0,56	3,5	400	3 - 2500	5,8	5,5	5,1	4,6	4,1	3,6	3,0	2,2	
PUMP TYPE	POWER NOMINAL	POWER ABSORBED	NOMINAL INTENSITY	CAPACITOR		SPEED	Q = DELIVERY								
							l/min 0	10	20	40	60	80	100	120	150
				2x			m^3/h 0	0,6	1,2	2,4	3,6	4,8	6	7,2	9
230V 50Hz	W*	W*	A*	µF	V	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER								
(2) TCBG 25-6L	50	70	0,32	3,5	400	1 - 1400	3,7	3,2	2,7	1,7	1,0				
	50	101	0,46	3,5	400	2 - 2000	5,2	4,9	4,6	3,8	3,1	2,3	1,5		
	50	128	0,56	3,5	400	3 - 2500	5,8	5,7	5,5	5,1	4,6	4,1	3,6	3,0	1,8

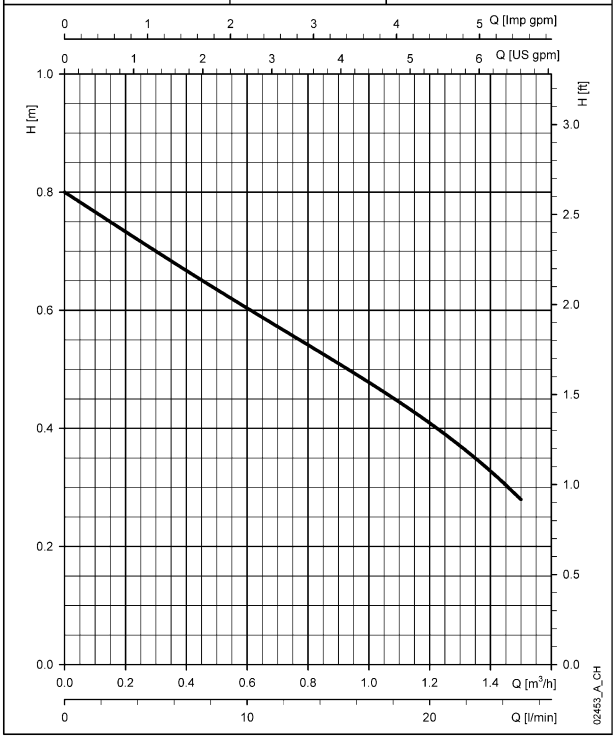
tcb-2p50_a_th

* electrical data refer to single motor.
(1) Performances refer to single operation
(2) Performances refer to parallel operation

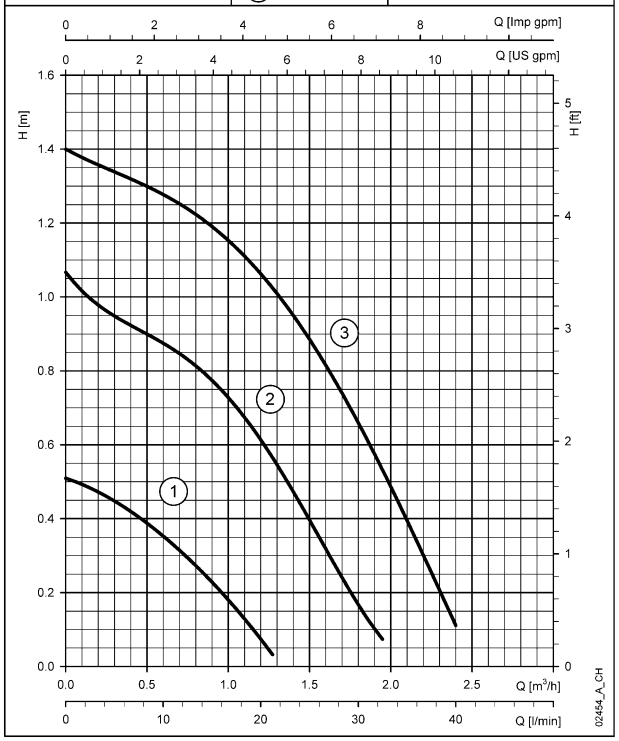
Performances according to ISO standards 9906 – Annex A

TCB SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

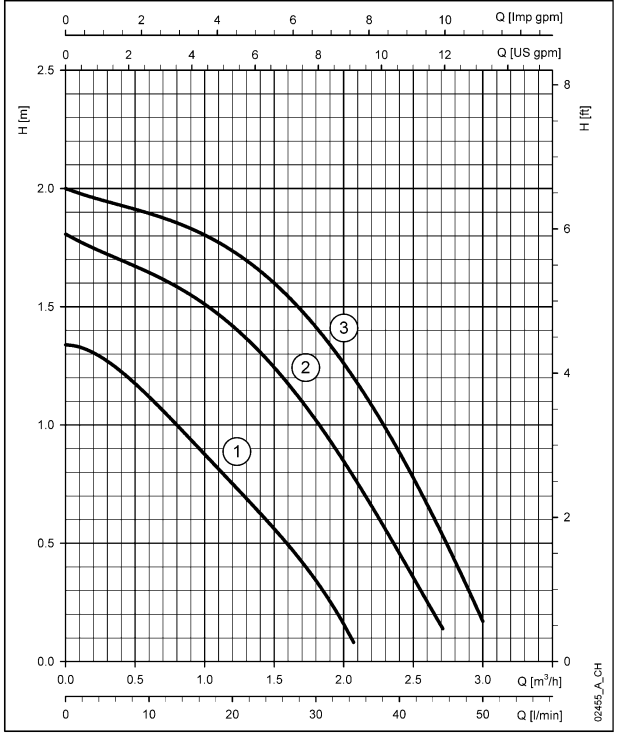
TCB 15-1	1850 [rpm]	ISO 9906 - Annex A



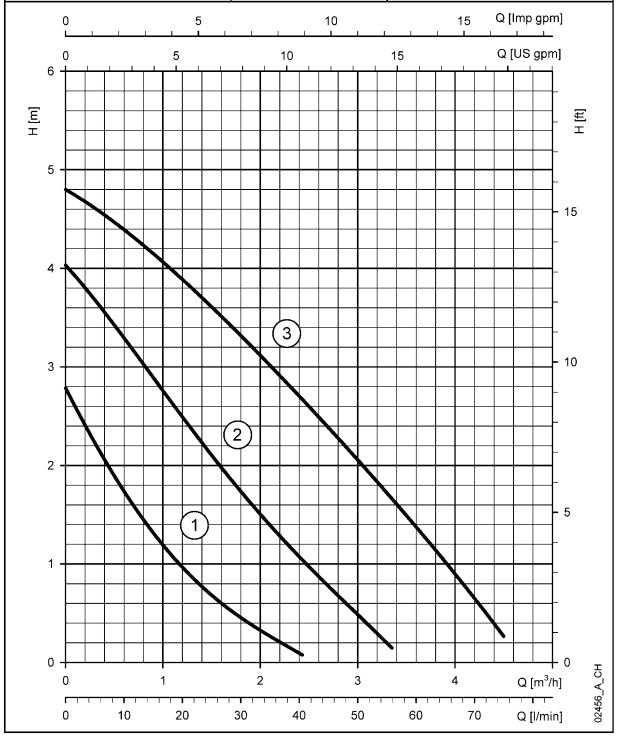
TCB 15-2	① 1000 [rpm] ② 1600 [rpm] ③ 2000 [rpm]	ISO 9906 - Annex A



TCB 15-3	① 1700 [rpm] ② 2200 [rpm] ③ 2500 [rpm]	ISO 9906 - Annex A



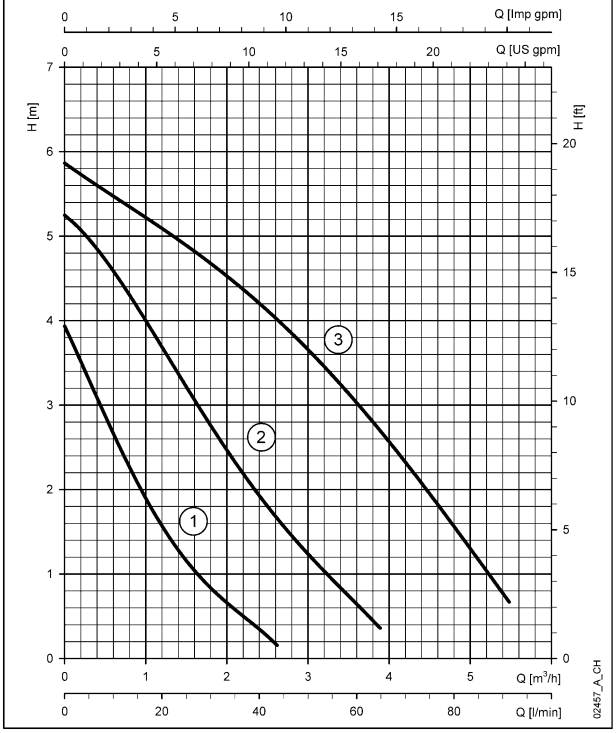
TCB 20-5	① 1000 [rpm] ② 1450 [rpm] ③ 1950 [rpm]	ISO 9906 - Annex A



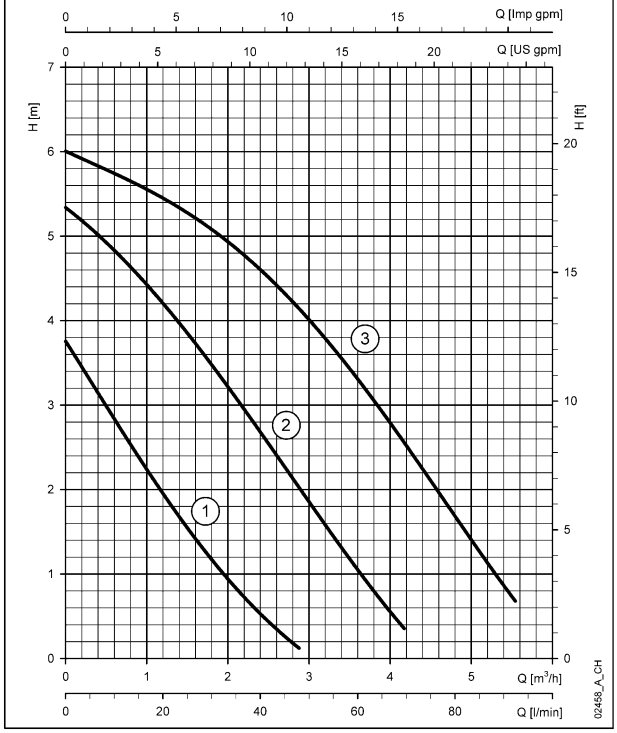
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

TCB-TCS SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

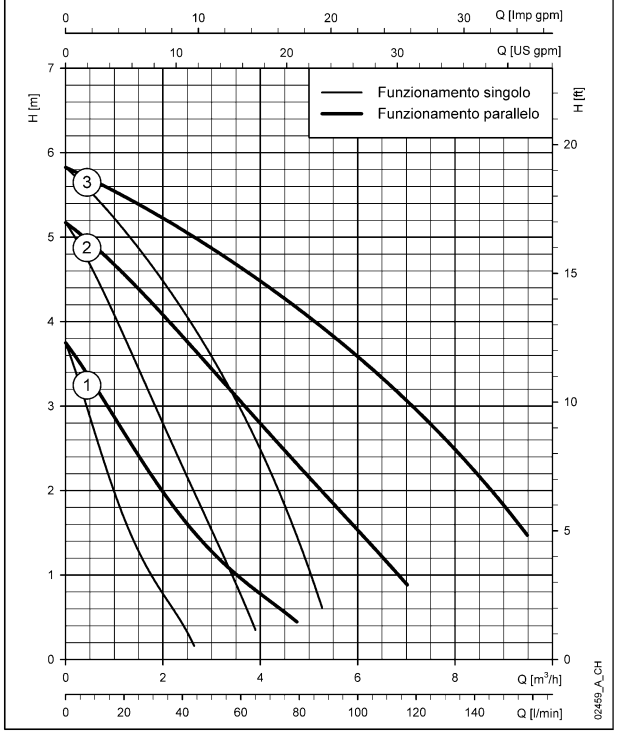
TCB 25-6L	① 1150 [rpm] ② 1650 [rpm] ③ 2300 [rpm]	ISO 9906 - Annex A



TCS 25-6L	① 1260 [rpm] ② 1810 [rpm] ③ 2390 [rpm]	ISO 9906 - Annex A

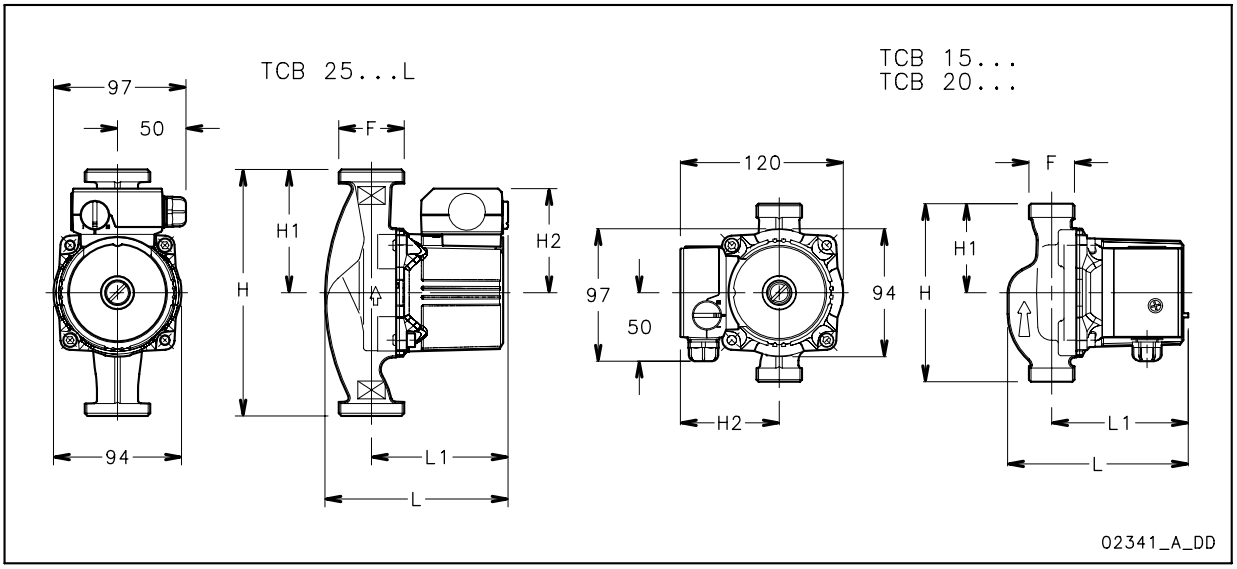


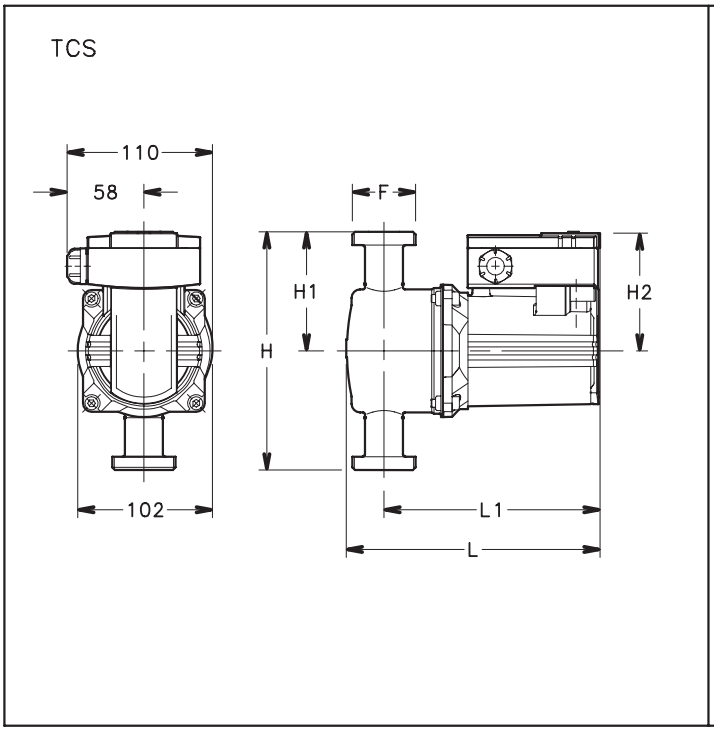
TCBG 25-6L	① 1400 [rpm] ② 2000 [rpm] ③ 2500 [rpm]	ISO 9906 - Annex A

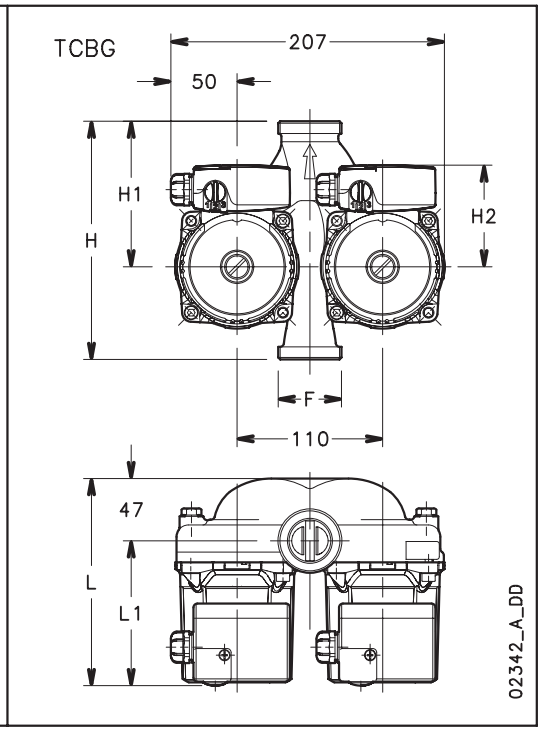


These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

TCB-TCS SERIES
DIMENSIONS AND WEIGHTS







DIMENSIONS AND WEIGHTS TABLE

PUMP TYPE	DIMENSIONS (mm)							WEIGHT
	H	H1	H2	L	L1	F	DN	kg
TCB 15-1	130	65	73	129	96	G 1"	15	2
TCB 15-2	130	65	74	130	96	G 1"	15	2
TCB 15-3	130	65	74	130	96	G 1"	15	2
TCB 20-5	158	79	77	132	96	G 1"¼	20	2,4
TCB 25-6L	180	90	77	145	109	G 1"½	25	2,8
TCS 25-6L	180	90	90	191	163	G 1"½	25	3,4
TCBG 25-6L	180	90	77	157	110	G 1"½	25	6,7

tcb-2p50_a_td

Circulators for commercial systems

TC-FC Series

MARKET SECTORS

COMMERCIAL AND INDUSTRIAL.

APPLICATIONS

- Water circulation in heating, air conditioning and cooling systems.
- Pumping of hot/cold, chemically and mechanically non-aggressive liquids.

SPECIFICATIONS

PUMP

- **Flow rate**: up to 70 m³/h (130 m³/h with both pumps running).
- **Head**: up to 20 m.
- **Temperature of pumped liquid**: -20°C ÷ +130°C.
- **Maximum operating pressure**: 10 bar (PN 10).
- **Impeller**: made of corrosion-proof, composite material.

MOTOR

- Wet rotor type, with bearings lubricated by the pumped liquid. The rotor chamber is protected by a bronze filter. Integrated automatic motor protection with isothermal probes (with external relay, terminals accessible from the terminal board).
- Power supply: either single-phase 220 V 50 Hz (with integrated capacitor) or three-phase 230/400 V 50 Hz.
- 2-pole motor:
  - with three speeds and manual selector in the terminal board for sizes up to 32-8 and for 40-4 (all single-phase);
  - with two speeds and manual selector in the terminal board for sizes from 32-10 up (both single and twin, single-phase);
  - with three speeds and manual selector in the terminal board for sizes from 32-10 up (both single and twin, three-phase);
  - with two speeds and manual selector in the terminal board for sizes 80-14 and 80-19 (both single and twin, three-phase);
- Terminal board with:
  - cable connection on two sides (from size 32-10 up, 40-4 excluded);
  - set speed display
  - rotation direction and voltage display (from size 32-10 up, 40-4 excluded);
  - According to EN standards 61000-6-2 (immunity) and 61000-6-3 (emissions).
- Class F **insulation** (155°C).
- **Protection class**: IP 44(except for model TCG 32-4, IP 42).

ITT

Lowara

Circulators for commercial systems

TC-FC Series

CONSTRUCTION CHARACTERISTICS

- Electric circulator pumps with in-line suction and discharge ports, designed for direct installation onto piping, with 1"¼ threaded connections and DN 40, 50, 65 and 80 mounting flanges (with pressure gauge connections).
- Single or twin pump design (with automatic switchover valve for the twin version). The two pumps can operate separately or in parallel.
- Models with mounting flanges with hole on back for wall mounting.
- Rotor shaft made of perforated stainless steel (from size 32-10 up, 40-4 excluded). By enabling water circulation this design ensures:
  - continuous degassing of the rotor chamber, with no need to perform this operation manually during startup;
  - bearing lubrication.

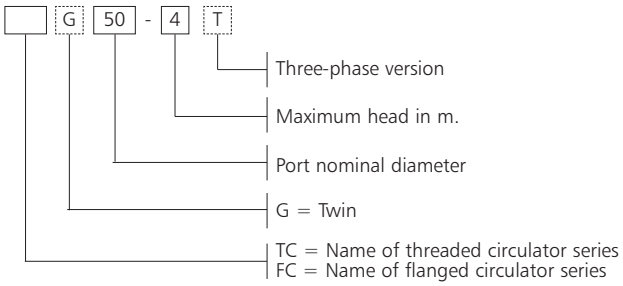
ACCESSORIES

- Pipe unions.
- Blind flanges.
- Counterflanges.

INSTALLATION

- Suitable for installation on horizontal or vertical piping, in any position provided that motor axis is horizontal.
- For applications with chilled water, do not install with the terminal boards under the motor (i).
- For the twin design installed on horizontal piping, periodic changeover is recommended in order to prevent the formation of water pockets at the top; as an alternative, install an air bleed valve on the flange.

TC, FC SERIES
IDENTIFICATION CODE



EXAMPLE: FCG 50-4T
FC series circulator, twin version, port nominal diameter = 50,
max head = 4 m, three-phase version.

TABLE OF MATERIALS

PART	MATERIALS
Pump body	Cast iron
Impeller	Composite material
Shaft	Stainless steel
Jacket	Stainless steel
Bearings	Graphite
Gaskets	EPDM

fc-fcg-2p50_a_tm

MINIMUM PRESSURE SUCTION TABLE

PUMP TYPE	OPERATING TEMPERATURE 50°C	70°C	82°C	90°C	95°C	110°C	130°C
TC 32-4 / TC 32-5 / TC 32-8 TC 32-10 / TCG 32-5 / TCG 32-8	0.5 m	-	-	-	5.0 m	11 m	24 m
TCG 32-4	-	-	-	-	3.0 m	10 m	-
TC 32-10 / FC 50-11 / FCG 50-11	-	8.0 m	-	12 m	-	19 m	32 m
FC 40-7 / FCG 40-7 FC 65-10 / FCG 65-10	-	5.0 m	-	9.0 m	-	16 m	29 m
FC 40-10 / FCG 40-10	-	9.0 m	-	13 m	-	20 m	33 m
FC 50-4 / FCG 50-4 FC 65-7 / FCG 65-7	-	3.0 m	-	7.0 m	-	14 m	27 m
FC 50-8 / FCG 50-8 FC 80-7 / FCG 80-7	-	7.0 m	-	11 m	-	18 m	31 m
FC 65-14 / FCG 65-14	-	12 m	-	16 m	-	23 m	36 m
FC 80-12 / FCG 80-12	-	10 m	-	14 m	-	21 m	34 m
FC 80-14 / FCG 80-14 FC 80-19 / FCG 80-19	-	12 m	-	16 m	-	23 m	36 m

10.2 m = 1 bar

tc-fc-2p50_a_tpm

TC-FC SERIES (SINGLE BODY, SINGLE-PHASE)
HYDRAULIC PERFORMANCE TABLE

PUMP TYPE	POWER NOMINAL	POWER ABSORBED	NOMINAL INTENSITY	CAPACITOR		SPEED	Q = DELIVERY									
							l/min 0	25	50	100	150	200	300	400	600	800
							m^3/h 0	1,5	3	6	9	12	18	24	36	48
230V 50Hz	W	W	A	µF	V	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER									
TC 32-4	70	107	0,54	5,0	400	1 - 1713	3,3	2,7	1,8							
	70	146	0,73	5,0	400	2 - 2339	3,8	3,6	3,1	1,8						
	70	177	0,85	5,0	400	3 - 2661	3,9	3,8	3,6	2,7	1,3					
TC 32-5	50	72	0,35	3,7	400	1 - 1195	3,8	0,9								
	50	106	0,51	3,7	400	2 - 1636	4,9	3,1	0,9							
	50	136	0,65	3,7	400	3 - 2323	5,3	4,5	3,2							
TC 32-8	80	113	0,57	5,0	400	1 - 1352	5,7	2,4	0,5							
	80	164	0,80	5,0	400	2 - 1954	7,0	5,3	3,0							
	80	201	0,96	5,0	400	3 - 2420	7,5	6,7	5,4	1,8						
TC 32-10	180	315	1,45	8	400	1 - 1950	9,0	7,4	5,3	0,5						
	180	340	1,50	8	400	2 - 2680	10,4	9,9	8,7	5,4						
FC 40-7	180	405	1,80	8	400	1 - 1470	5,7	5,4	4,3	1,7	0,2					
	180	410	1,80	8	400	2 - 2530	6,8	6,8	6,8	6,3	5,3	3,7				
FC 40-10	350	590	2,95	16	400	1 - 2010	8,4	7,8	7,0	5,3	3,3	1,6				
	350	665	3,05	16	400	2 - 2730	10,1	10,0	9,9	9,1	7,9	6,2	1,5			
FC 50-4	180	345	1,60	8	400	1 - 1660	2,9	2,9	2,7	2,3	1,8	1,2				
	180	385	1,70	8	400	2 - 2600	3,7	3,7	3,7	3,6	3,4	3,2	2,5	1,5		
FC 50-8	350	480	2,50	16	400	1 - 2360	6,5	6,3	6,1	5,3	4,3	3,4	1,7			
	350	590	2,75	16	400	2 - 2800	7,7	7,7	7,6	7,2	6,7	5,9	3,9			
FC 50-11	450	760	3,65	25	400	1 - 1960	9,9	9,5	9,0	7,7	6,2	4,8	2,5			
	450	895	3,90	25	400	2 - 2720	11,4	11,3	11,1	10,7	10,2	9,5	7,7	5,1		
FC 65-7	350	580	2,80	16	400	1 - 2090	4,3	4,1	3,8	3,5	3,2	2,9	2,2	1,4		
	350	675	3,15	16	400	2 - 2730	6,9	6,9	6,9	6,6	6,3	5,8	4,5	3,1		
FC 65-10	570	820	3,80	25	400	1 - 2290	8,0	7,8	7,6	7,1	6,5	5,9	4,6	3,3		
	570	950	4,10	25	400	2 - 2775	9,4	9,3	9,2	8,9	8,6	8,2	7,2	5,9		
FC 80-7	570	840	4,10	25	400	1 - 2060	4,4	4,4	4,4	4,3	4,2	4,0	3,6	3,1	1,9	
	570	1040	4,60	25	400	2 - 2720	7,6	7,6	7,5	7,4	7,2	6,9	6,2	5,4	3,7	1,8

Performances according to ISO standards 9906 – Annex A.

tc-fcm-2p50_a_th

TC-FC SERIES (SINGLE BODY, THREE-PHASE)
HYDRAULIC PERFORMANCE TABLE

PUMP TYPE 230 / 400V 50Hz	NOMINAL POWER W	ABSORBED POWER MIN W	ABSORBED POWER MAX W	NOMINAL INTENSITY 230V A	NOMINAL INTENSITY 400V A	SPEED min^{-1}	Q = DELIVERY l/min 0	25	50	100	150	200	300	400	600	800	1000
							m^3/h 0	1,5	3	6	9	12	18	24	36	48	60
							H = TOTAL HEAD METERS COLUMN OF WATER										
TC 32-10T	180	121	190	0,40	0,35	1 - 1900	7,4	5,8	4,2								
	180	140	250	0,65	0,45	2 - 2280	8,9	7,8	6,3	2,4							
	180	180	325	1,15	0,65	3 - 2665	10,4	9,9	8,8	5,6							
FC 40-7T	180	135	210	0,40	0,35	1 - 1700	4,5	4,0	3,5	2,5	1,2						
	180	165	285	0,70	0,50	2 - 2060	5,6	5,2	4,9	4,0	2,7	1,1					
	180	205	390	1,30	0,75	3 - 2580	6,8	6,7	6,6	6,2	5,3	3,9					
FC 40-10T	350	225	350	0,70	0,60	1 - 2050	7,6	7,1	6,5	5,2	3,6	1,8					
	350	270	440	1,15	0,75	2 - 2390	8,8	8,6	8,3	7,2	5,6	3,8					
	350	340	550	1,95	1,10	3 - 2730	10,2	10,1	9,9	9,1	7,9	6,2	1,6				
FC 50-4T	180	150	200	0,40	0,35	1 - 1800	2,3	2,2	2,1	1,9	1,6	1,3	0,4				
	180	180	270	0,70	0,45	2 - 2130	2,9	2,9	2,8	2,6	2,4	2,0	1,2				
	180	230	360	1,20	0,70	3 - 2620	3,6	3,6	3,6	3,5	3,3	3,1	2,5	1,5			
FC 50-8T	350	225	315	0,70	0,55	1 - 2180	5,7	5,5	5,2	4,6	3,8	3,0	1,2				
	350	270	390	1,05	0,70	2 - 2480	6,7	6,6	6,4	5,8	5,1	4,3	2,4				
	350	355	485	2,00	1,15	3 - 2770	7,6	7,6	7,5	7,1	6,5	5,8	3,8				
FC 50-11T	450	300	475	0,95	0,80	1 - 1930	8,1	7,6	7,0	6,1	5,1	4,2	2,3				
	450	360	620	1,60	1,05	2 - 2260	9,6	9,2	8,9	8,1	7,2	6,3	4,3	1,9			
	450	455	810	2,55	1,50	3 - 2660	11,1	11,0	10,8	10,4	9,8	9,1	7,2	4,7			
FC 65-7T	350	285	345	0,75	0,60	1 - 2020	4,1	4,0	3,9	3,6	3,3	2,9	2,0				
	350	365	440	1,20	0,75	2 - 2350	5,3	5,3	5,2	5,0	4,5	4,1	3,0	1,8			
	350	435	570	2,00	1,15	3 - 2720	7,0	7,1	7,0	6,8	6,4	5,8	4,5	3,1			
FC 65-10T	570	460	610	1,25	1,05	1 - 2200	7,2	7,0	6,8	6,3	5,7	5,2	4,0	2,9			
	570	540	750	2,05	1,30	2 - 2510	8,5	8,3	8,1	7,7	7,3	6,8	5,8	4,6			
	570	640	870	2,90	1,65	3 - 2810	9,5	9,4	9,2	8,9	8,6	8,2	7,3	6,1			
FC 65-14T	1100	660	1000	2,25	1,75	1 - 2240	10,8	10,4	10,1	9,4	8,8	8,2	6,9	5,5			
	1100	770	1230	3,30	2,10	2 - 2510	12,3	12,0	11,8	11,3	10,8	10,3	9,2	7,9	4,9		
	1100	900	1470	4,75	2,75	3 - 2800	13,7	13,5	13,3	13,0	12,7	12,3	11,5	10,4	7,4		
FC 80-7T	570	510	650	1,35	1,15	1 - 2060	4,1	4,1	4,0	3,9	3,8	3,7	3,2	2,7	1,3		
	570	620	850	2,30	1,50	2 - 2370	5,7	5,7	5,7	5,5	5,4	5,2	4,6	4,0	2,5	0,9	
	570	720	1040	3,25	1,85	3 - 2740	7,3	7,3	7,2	7,0	6,8	6,5	5,9	5,2	3,5	1,6	
FC 80-12T	1100	830	980	2,25	1,75	1 - 2240	7,7	7,7	7,6	7,4	7,1	6,8	6,1	5,4	3,8	2,2	
	1100	1000	1260	3,35	2,15	2 - 2490	9,8	9,7	9,5	9,3	9,0	8,7	8,1	7,4	5,7	3,7	1,7
	1100	1180	1530	5,00	2,90	3 - 2780	11,8	11,7	11,6	11,3	11,1	10,8	10,2	9,6	7,9	5,8	3,3
FC 80-14T	2200	1150	1900	5,60	3,25	1 - 2480	12,8	12,7	12,6	12,4	12,1	11,7	10,8	9,7	7,1		
	2200	1650	2600	10,7	6,20	2 - 2880	14,7	14,7	14,8	14,8	14,7	14,6	14,1	13,4	11,1	7,9	
FC 80-19T	2500	1550	2600	7,80	4,50	1 - 2500	17,2	17,1	16,9	16,5	16,1	15,7	14,6	13,3	10,2	6,8	
	2500	2250	3550	12,7	7,30	2 - 2900	19,5	19,5	19,5	19,5	19,4	19,3	18,8	18,0	15,3	11,5	

Performances according to ISO standards 9906 – Annex A.

tc-fct-2p50_a_th

TCG-FCG SERIES (TWIN, SINGLE-PHASE) HYDRAULIC PERFORMANCE TABLE (SINGLE OPERATION)

PUMP TYPE	POWER NOMINAL	POWER ABSORBED	NOMINAL INTENSITY	CAPACITOR		SPEED	Q = DELIVERY										
							l/min 0	25	50	75	100	150	200	300	400	600	800
							m^3/h 0	1,5	3	4,5	6	9	12	18	24	36	48
230V 50Hz	W	W	A	µF	V	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER										
TCG 32-4	20	31	0,14	2	400	1 - 1050	1,8	0,2									
	20	47	0,21	2	400	2 - 1520	3,1	1,1									
	20	67	0,29	2	400	3 - 1980	4,1	2,5	0,7								
TCG 32-5	50	72	0,35	3,7	400	1 - 1195	4,1	0,8									
	50	106	0,51	3,7	400	2 - 1636	5,1	3,2	0,7								
	50	136	0,65	3,7	400	3 - 2323	5,5	4,8	3,5	1,5							
TCG 32-8	80	113	0,57	5	400	1 - 1352	5,4	2,4	0,6								
	80	164	0,80	5	400	2 - 1954	6,9	5,5	3,2	1,1							
	80	201	0,96	5	400	3 - 2420	7,4	6,9	5,6	3,7	1,4						
FCG 40-4	70	107	0,54	5	400	1 - 1713	2,8	2,1	1,4	0,9	0,5						
	70	146	0,73	5	400	2 - 2339	3,4	3,2	2,8	2,3	1,6						
	70	177	0,85	5	400	3 - 2661	3,7	3,6	3,4	3,0	2,4	0,9					
FCG 40-7	180	425	1,90	8	400	1 - 1470	5,6	5,0	4,3	2,8	1,1						
	180	430	1,90	8	400	2 - 2530	6,7	6,6	6,5	6,3	6,0	4,9	3,2				
FCG 40-10	350	600	3,00	16	400	1 - 1990	8,5	8,0	7,2	6,3	5,4	3,3	1,5				
	350	680	3,20	16	400	2 - 2720	10,1	10,0	9,8	9,5	9,0	7,7	6,0	1,7			
FCG 50-4	180	360	1,70	8	400	1 - 1660	2,8	2,7	2,5	2,3	2,0	1,4	0,7				
	180	405	1,80	8	400	2 - 2600	3,5	3,5	3,4	3,3	3,3	3,0	2,7	1,9	0,8		
FCG 50-8	350	520	2,50	16	400	1 - 2270	6,3	6,1	5,7	5,3	4,9	3,9	2,8	0,9			
	350	595	2,90	16	400	2 - 2780	7,5	7,4	7,3	7,1	6,9	6,3	5,6	3,3			
FCG 50-11	450	805	3,90	25	400	1 - 1800	9,2	9,0	8,4	7,7	6,9	5,1	3,4	1,2			
	450	935	4,10	25	400	2 - 2700	11,1	11,0	10,8	10,6	10,4	9,9	9,1	6,9	4,1		
FCG 65-7	350	595	3,00	16	400	1 - 2080	4,5	4,2	4,0	3,7	3,5	3,0	2,5	1,7			
	350	675	3,15	16	400	2 - 2740	7,2	7,1	6,9	6,8	6,5	6,1	5,5	4,3	3,0		
FCG 65-10	570	790	3,85	25	400	1 - 2245	7,9	7,6	7,4	7,1	6,8	6,2	5,6	4,2	2,8		
	570	950	4,10	25	400	2 - 2765	9,3	9,2	9,0	8,8	8,7	8,3	7,9	7,0	5,7		
FCG 80-7	570	810	3,95	25	400	1 - 2110	4,5	4,5	4,5	4,4	4,4	4,2	4,0	3,4	2,7	1,4	
	570	975	4,40	25	400	2 - 2735	7,3	7,3	7,3	7,3	7,2	7,0	6,8	6,1	5,3	3,5	1,4

Performances according to ISO standards 9906 – Annex A.

tcg-fcgm-2p50S_a_th

TCG-FCG SERIES (TWIN, SINGLE-PHASE) HYDRAULIC PERFORMANCE TABLE (PARALLEL OPERATION)

PUMP TYPE	POWER NOMINAL	POWER ABSORBED	NOMINAL INTENSITY	CAPACITOR 2x		SPEED	Q = DELIVERY										
							l/min 0	45	100	150	250	350	500	700	900	1200	1500
							m^3/h 0	2,7	6	9	15	21	30	42	54	72	90
230V 50Hz	W*	W*	A*	µF	V	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER										
TCG 32-4	20	31	0,14	2	400	1 - 1050	1,8	0,3									
	20	47	0,21	2	400	2 - 1520	3,1	1,3									
	20	67	0,29	2	400	3 - 1980	4,1	2,7									
TCG 32-5	50	72	0,35	3,7	400	1 - 1195	4,1	1,0									
	50	106	0,51	3,7	400	2 - 1636	5,1	3,5	0,7								
	50	136	0,65	3,7	400	3 - 2323	5,5	4,9	3,5								
TCG 32-8	80	113	0,57	5	400	1 - 1352	5,4	2,7									
	80	164	0,80	5	400	2 - 1954	6,9	5,7	3,2								
	80	201	0,96	5	400	3 - 2420	7,4	7,0	5,6	3,7							
FCG 40-4	70	107	0,54	5	400	1 - 1713	2,8	2,2	1,4	0,9							
	70	146	0,73	5	400	2 - 2339	3,4	3,2	2,8	2,3							
	70	177	0,85	5	400	3 - 2661	3,7	3,6	3,4	3,0	1,7						
FCG 40-7	180	425	1,90	8	400	1 - 1470	5,6	5,1	4,3	2,8							
	180	430	1,90	8	400	2 - 2530	6,7	6,6	6,5	6,3	5,5	4,1	1,2				
FCG 40-10	350	600	3,00	16	400	1 - 1990	8,5	8,0	7,2	6,3	4,3	2,3					
	350	680	3,20	16	400	2 - 2720	10,1	10,0	9,8	9,5	8,4	6,9	4,0				
FCG 50-4	180	360	1,70	8	400	1 - 1660	2,8	2,7	2,5	2,3	1,7	1,1					
	180	405	1,80	8	400	2 - 2600	3,5	3,5	3,4	3,3	3,1	2,9	2,4	1,4			
FCG 50-8	350	520	2,50	16	400	1 - 2270	6,3	6,1	5,7	5,3	4,4	3,4	1,8				
	350	595	2,90	16	400	2 - 2780	7,5	7,4	7,3	7,1	6,6	6,0	4,5	2,0			
FCG 50-11	450	805	3,90	25	400	1 - 1800	9,2	9,0	8,4	7,7	6,0	4,2	2,1				
	450	935	4,10	25	400	2 - 2700	11,1	11,0	10,8	10,6	10,2	9,5	8,1	5,5	2,6		
FCG 65-7	350	595	3,00	16	400	1 - 2080	4,5	4,2	4,0	3,7	3,2	2,8	2,1				
	350	675	3,15	16	400	2 - 2740	7,2	7,1	6,9	6,8	6,3	5,8	4,9	3,7	2,2		
FCG 65-10	570	790	3,85	25	400	1 - 2245	7,9	7,7	7,4	7,1	6,5	5,9	4,9	3,5			
	570	950	4,10	25	400	2 - 2765	9,3	9,2	9,0	8,8	8,5	8,1	7,5	6,4	5,0		
FCG 80-7	570	810	3,95	25	400	1 - 2110	4,5	4,5	4,5	4,4	4,3	4,1	3,7	3,1	2,4	1,4	
	570	975	4,40	25	400	2 - 2735	7,3	7,3	7,3	7,3	7,1	6,9	6,5	5,8	4,9	3,5	2,0

Performances according to ISO standards 9906 – Annex A.

tcg-fcgm-2p50P_a_th

FCG SERIES (TWIN, THREE-PHASE) HYDRAULIC PERFORMANCE TABLE (SINGLE OPERATION)

PUMP TYPE 230 / 400V 50Hz	NOMINAL POWER	ABSORBED POWER		NOMINAL INTENSITY		SPEED	Q = DELIVERY										
							l/min 0	50	100	150	200	300	400	550	700	850	1000
		MIN	MAX	230V	400V		m^3/h 0	3	6	9	12	18	24	33	42	51	60
	W	W	W	A	A	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER										
FCG 40-7T	180	140	220	0,45	0,40	1 - 1700	4,2	3,3	2,1	0,8							
	180	175	300	0,75	0,50	2 - 2060	5,5	4,9	3,9	2,5	0,9						
	180	215	410	1,35	0,80	3 - 2580	6,6	6,4	5,9	5,0	3,6						
FCG 40-10T	350	240	360	0,75	0,60	1 - 2000	7,2	6,1	4,7	3,3	1,7						
	350	285	460	1,20	0,80	2 - 2330	8,7	7,9	6,7	5,2	3,5						
	350	360	590	2,00	1,15	3 - 2710	10,1	9,8	9,0	7,7	6,0	1,9					
FCG 50-4T	180	160	210	0,45	0,40	1 -1800	2,1	1,8	1,5	1,1	0,7						
	180	190	285	0,75	0,50	2 - 2130	2,7	2,5	2,2	1,9	1,5	0,5					
	180	240	380	1,25	0,75	3 - 2620	3,4	3,3	3,1	2,8	2,5	1,7	0,6				
FCG 50-8T	350	225	325	0,70	0,55	1 - 2140	5,5	4,9	4,2	3,4	2,5						
	350	265	405	1,10	0,70	2 - 2450	6,5	6,1	5,5	4,7	3,8	1,7					
	350	340	510	1,85	1,05	3 - 2760	7,4	7,2	6,8	6,2	5,4	3,2					
FCG 50-11T	450	300	490	0,95	0,80	1 - 1890	7,8	6,7	5,7	4,6	3,6	1,6					
	450	370	650	1,60	1,05	2 - 2220	9,3	8,6	7,7	6,8	5,7	3,5					
	450	470	825	2,65	1,55	3 - 2650	10,9	10,6	10,2	9,5	8,7	6,6	3,8				
FCG 65-7T	350	310	345	0,75	0,60	1 - 2020	4,1	3,8	3,4	3,0	2,6	1,6					
	350	390	435	1,20	0,75	2 - 2350	5,4	5,1	4,7	4,3	3,8	2,7	1,6				
	350	490	560	2,00	1,15	3 - 2720	7,0	6,8	6,4	6,0	5,4	4,2	2,9				
FCG 65-10T	570	470	630	1,30	1,10	1 - 2120	6,6	6,1	5,6	5,1	4,5	3,4	2,3				
	570	555	790	2,20	1,35	2 - 2460	8,1	7,7	7,2	6,7	6,2	5,2	3,9				
	570	660	915	3,00	1,75	3 - 2800	9,0	8,8	8,6	8,3	7,9	6,8	5,4	3,1			
FCG 65-14T	1100	670	1020	2,35	1,75	1 - 2180	10,4	9,7	9,0	8,3	7,6	6,3	5,0				
	1100	780	1260	3,35	2,15	2 - 2490	12,0	11,5	11,0	10,5	9,9	8,7	7,4	5,1			
	1100	910	1520	5,10	2,95	3 - 2780	13,5	13,2	12,9	12,5	12,1	11,2	10,0	7,7	4,7		
FCG 80-7T	570	520	650	1,40	1,20	1 - 2050	4,2	4,3	4,2	4,0	3,8	3,3	2,6	1,5			
	570	630	860	2,35	1,50	2 - 2360	5,8	5,8	5,7	5,6	5,3	4,7	4,0	2,8	1,5		
	570	730	1050	3,30	1,95	3 - 2730	7,0	6,9	6,8	6,7	6,5	6,0	5,2	3,9	2,3	0,8	
FCG 80-12T	1100	840	1050	2,30	1,80	1 - 2230	7,5	7,3	7,0	6,6	6,3	5,6	4,8	3,7	2,5	1,3	
	1100	1020	1300	3,40	2,20	2 - 2480	9,6	9,4	9,1	8,9	8,6	7,9	7,2	5,9	4,4	2,8	1,3
	1100	1215	1700	5,35	3,10	3 - 2770	11,6	11,4	11,2	10,9	10,7	10,1	9,4	8,2	6,7	4,9	3,0
FCG 80-14T	2200	1350	1900	5,60	3,25	1 - 2480	12,5	12,3	12,0	11,5	10,9	9,7	8,4	6,7	4,8		
	2200	2000	2700	11,0	6,40	2 - 2870	15,2	15,2	15,1	14,8	14,5	13,5	12,4	10,5	8,2		
FCG 80-19T	2500	2000	2700	8,10	4,70	1 - 2470	16,4	16,2	15,8	15,3	14,7	13,4	11,9	9,7	7,5		
	2500	2700	3600	13,0	7,50	2 - 2890	20,0	19,9	19,8	19,5	19,3	18,5	17,3	15,1	12,2	9,1	

Performances according to ISO standards 9906 – Annex A.

tcg-fcgt-2p50S_a_th

FCG SERIES (TWIN, THREE-PHASE) HYDRAULIC PERFORMANCE TABLE (PARALLEL OPERATION)

PUMP TYPE 230 / 400V 50Hz	POWER NOMINAL W*	POWER ABSORBED MIN W*	POWER ABSORBED MAX W*	NOMINAL INTENSITY 230V A*	NOMINAL INTENSITY 400V A*	SPEED min^{-1}	Q = DELIVERY l/min 0	100	200	300	400	500	600	800	1100	1400	1700
							m^3/h 0	6	12	18	24	30	36	48	66	84	102
							H = TOTAL HEAD METERS COLUMN OF WATER										
FCG 40-7T	180	140	220	0,45	0,40	1 - 1700	4,2	3,3	2,1	0,8							
	180	175	300	0,75	0,50	2 - 2060	5,5	4,9	3,9	2,5							
	180	215	410	1,35	0,80	3 - 2580	6,6	6,4	5,9	5,0	3,6						
FCG 40-10T	350	240	360	0,75	0,60	1 - 2000	7,2	6,1	4,7	3,3							
	350	285	460	1,20	0,80	2 - 2330	8,7	7,9	6,7	5,2	3,5						
	350	360	590	2,00	1,15	3 - 2710	10,1	9,8	9,0	7,7	6,0	4,1					
FCG 50-4T	180	160	210	0,45	0,40	1 -1800	2,1	1,8	1,5	1,1	0,7						
	180	190	285	0,75	0,50	2 - 2130	2,7	2,5	2,2	1,9	1,5	1,0					
	180	240	380	1,25	0,75	3 - 2620	3,4	3,3	3,1	2,8	2,5	2,2	1,7				
FCG 50-8T	350	225	325	0,70	0,55	1 - 2140	5,5	4,9	4,2	3,4	2,5						
	350	265	405	1,10	0,70	2 - 2450	6,5	6,1	5,5	4,7	3,8	2,8					
	350	340	510	1,85	1,05	3 - 2760	7,4	7,2	6,8	6,2	5,4	4,4					
FCG 50-11T	450	300	490	0,95	0,80	1 - 1890	7,8	6,7	5,7	4,6	3,6	2,6					
	450	370	650	1,60	1,05	2 - 2220	9,3	8,6	7,7	6,8	5,7	4,7	3,5				
	450	470	825	2,65	1,55	3 - 2650	10,9	10,6	10,2	9,5	8,7	7,7	6,6				
FCG 65-7T	350	310	345	0,75	0,60	1 - 2020	4,1	3,8	3,4	3,0	2,6	2,1					
	350	390	435	1,20	0,75	2 - 2350	5,4	5,1	4,7	4,3	3,8	3,2	2,7				
	350	490	560	2,00	1,15	3 - 2720	7,0	6,8	6,4	6,0	5,4	4,8	4,2				
FCG 65-10T	570	470	630	1,30	1,10	1 - 2120	6,6	6,1	5,6	5,1	4,5	3,9	3,4				
	570	555	790	2,20	1,35	2 - 2460	8,1	7,7	7,2	6,7	6,2	5,7	5,2				
	570	660	915	3,00	1,75	3 - 2800	9,0	8,8	8,6	8,3	7,9	7,4	6,8	5,4			
FCG 65-14T	1100	670	1020	2,35	1,75	1 - 2180	10,4	9,7	9,0	8,3	7,6	6,9	6,3				
	1100	780	1260	3,35	2,15	2 - 2490	12,0	11,5	11,0	10,5	9,9	9,3	8,7	7,4			
	1100	910	1520	5,10	2,95	3 - 2780	13,5	13,2	12,9	12,5	12,1	11,7	11,2	10,0			
FCG 80-7T	570	520	650	1,40	1,20	1 - 2050	4,2	4,3	4,2	4,0	3,8	3,6	3,3	2,6	1,5		
	570	630	860	2,35	1,50	2 - 2360	5,8	5,8	5,7	5,6	5,3	5,0	4,7	4,0	2,8		
	570	730	1050	3,30	1,95	3 - 2730	7,0	6,9	6,8	6,7	6,5	6,3	6,0	5,2	3,9		
FCG 80-12T	1100	840	1050	2,30	1,80	1 - 2230	7,5	7,3	7,0	6,6	6,3	6,0	5,6	4,8	3,7		
	1100	1020	1300	3,40	2,20	2 - 2480	9,6	9,4	9,1	8,9	8,6	8,3	7,9	7,2	5,9		
	1100	1215	1700	5,35	3,10	3 - 2770	11,6	11,4	11,2	10,9	10,7	10,4	10,1	9,4	8,2		
FCG 80-14T	2200	1350	1900	5,60	3,25	1 - 2480	12,5	12,3	12,0	11,5	10,9	10,3	9,7	8,4	6,7		
	2200	2000	2700	11,0	6,40	2 - 2870	15,2	15,2	15,1	14,8	14,5	14,0	13,5	12,4	10,5	8,2	
FCG 80-19T	2500	2000	2700	8,10	4,70	1 - 2470	16,4	16,2	15,8	15,3	14,7	14,1	13,4	11,9	9,7	7,5	
	2500	2700	3600	13,0	7,50	2 - 2890	20,0	19,9	19,8	19,5	19,3	18,9	18,5	17,3	15,1	12,2	9,1

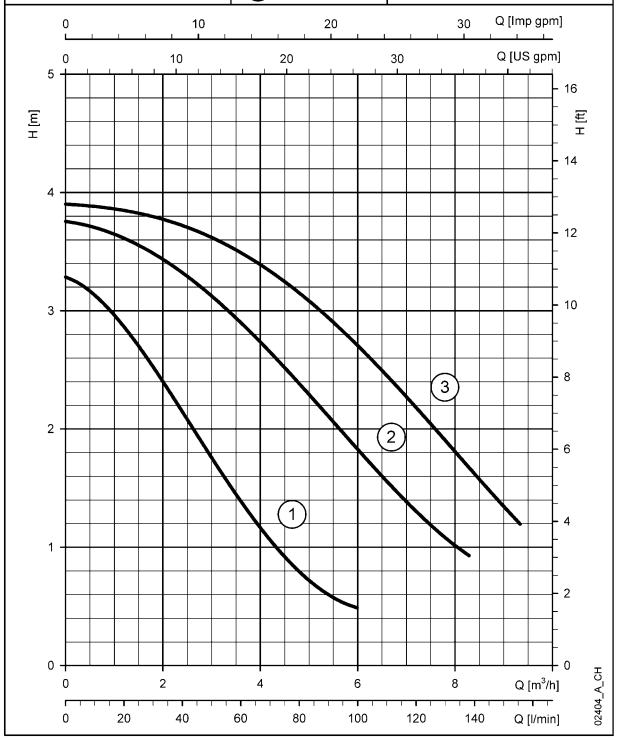
* Electric data refer to single motor.

tcg-fcgt-2p50P_a_th

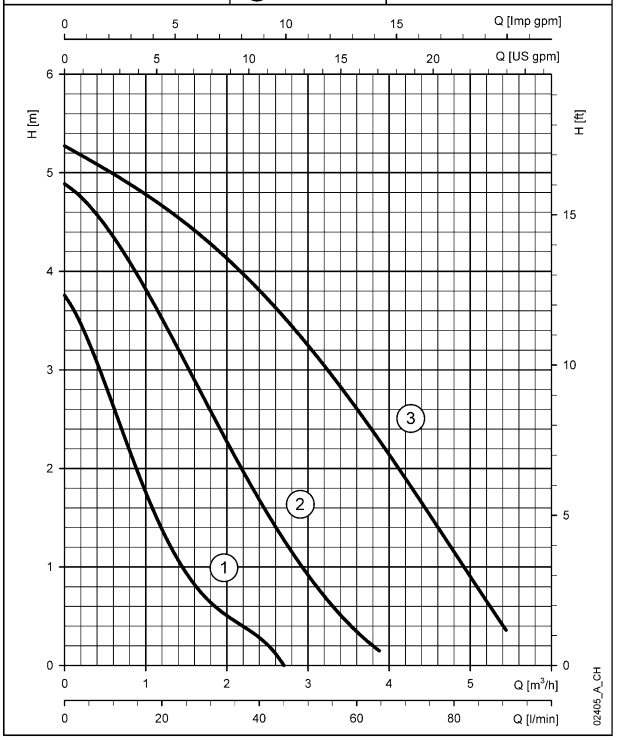
Performances according to ISO standards 9906 – Annex A.

TC SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

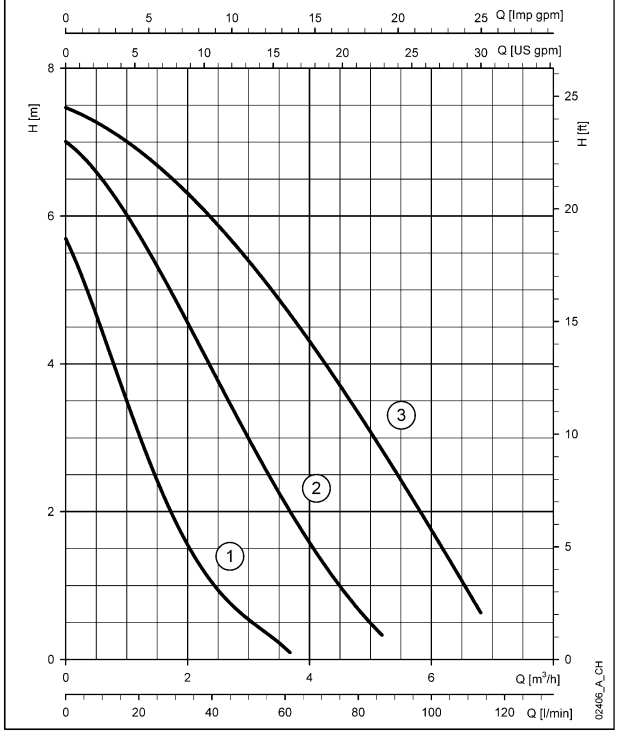
TC 32-4	① 1713 [rpm] ② 2339 [rpm] ③ 2661 [rpm]	ISO 9906 - Annex A



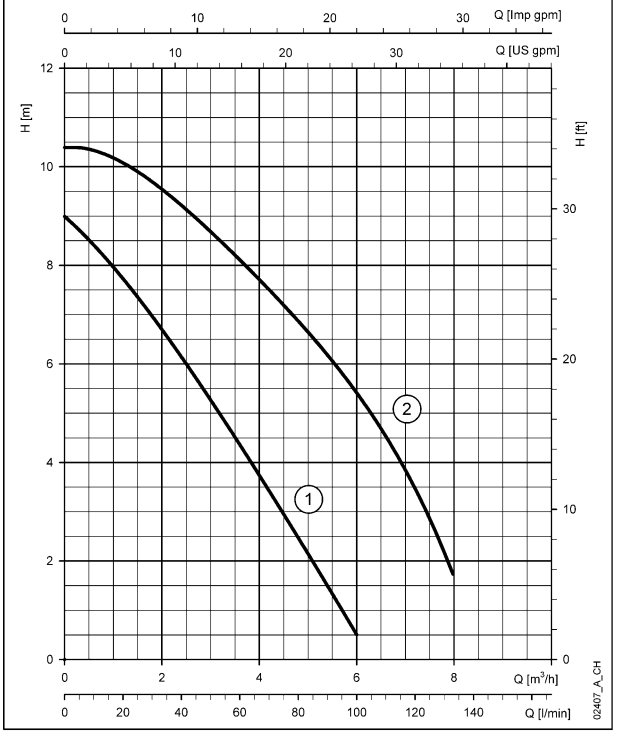
TC 32-5	① 1195 [rpm] ② 1636 [rpm] ③ 2323 [rpm]	ISO 9906 - Annex A



TC 32-8	① 1352 [rpm] ② 1954 [rpm] ③ 2420 [rpm]	ISO 9906 - Annex A



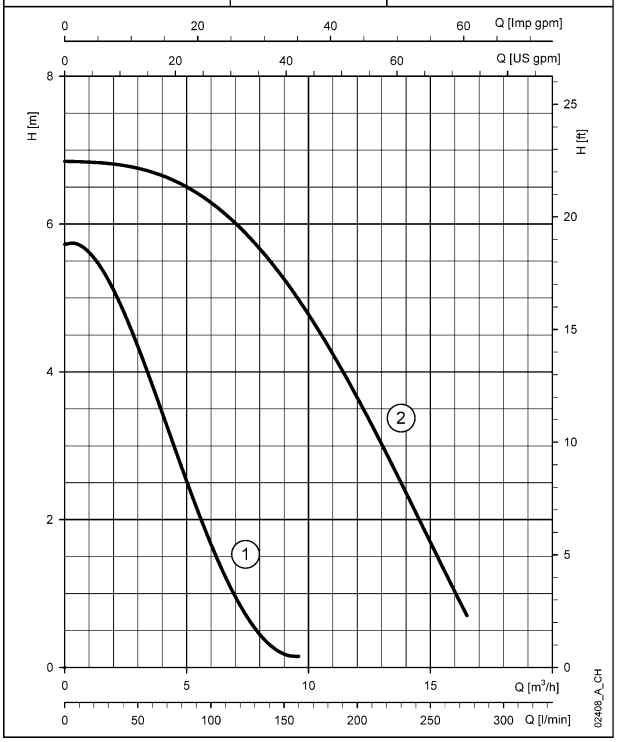
TC 32-10	① 1950 [rpm] ② 2680 [rpm]	ISO 9906 - Annex A



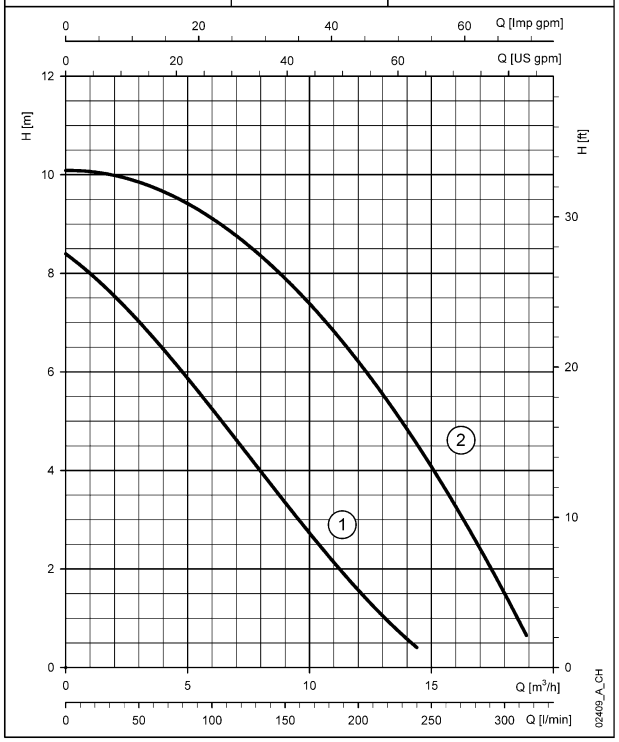
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

FC SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

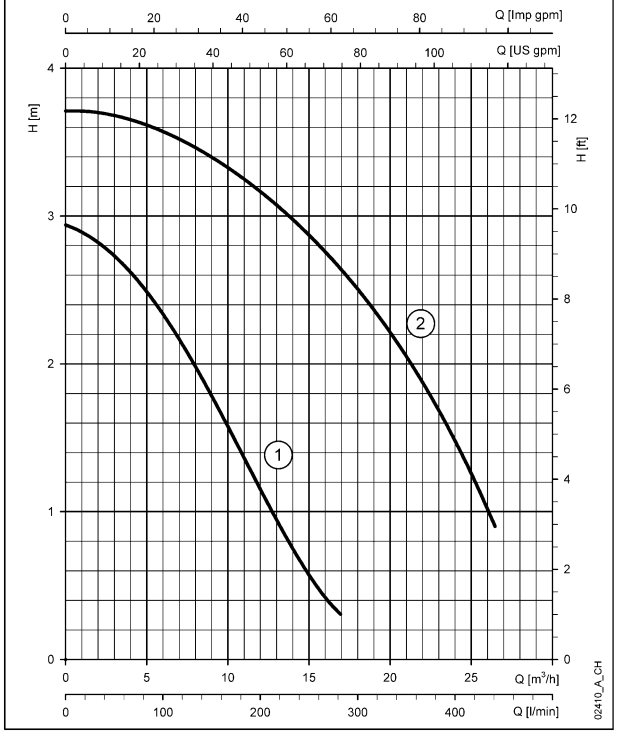
FC 40-7	① 1470 [rpm] ② 2530 [rpm]	ISO 9906 - Annex A



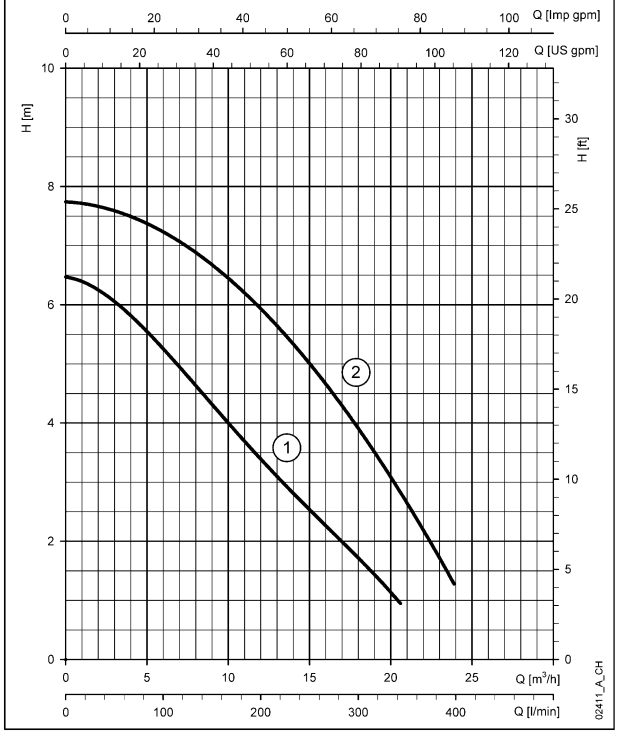
FC 40-10	① 2010 [rpm] ② 2730 [rpm]	ISO 9906 - Annex A



FC 50-4	① 1660 [rpm] ② 2600 [rpm]	ISO 9906 - Annex A



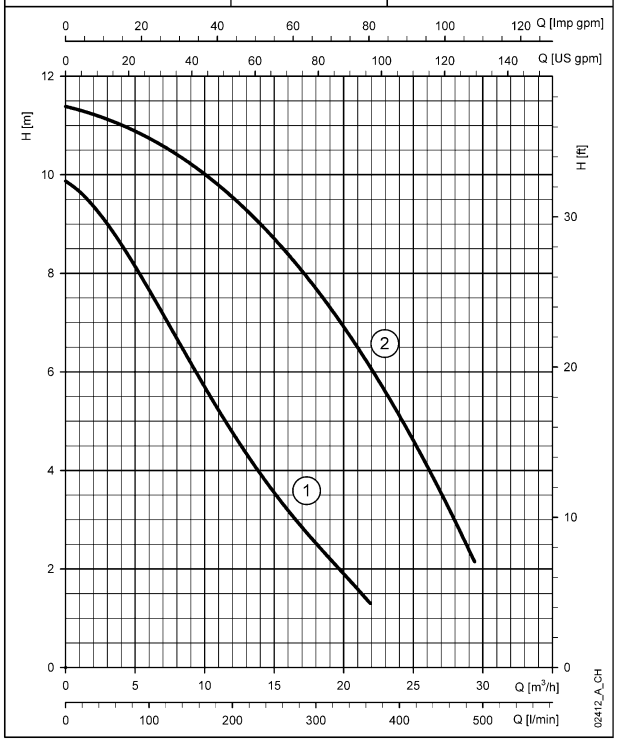
FC 50-8	① 2360 [rpm] ② 2800 [rpm]	ISO 9906 - Annex A



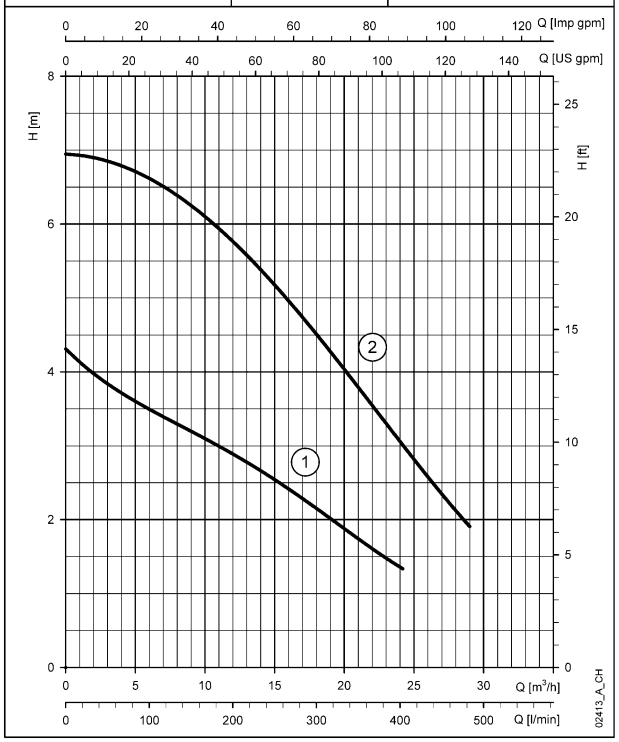
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

FC SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

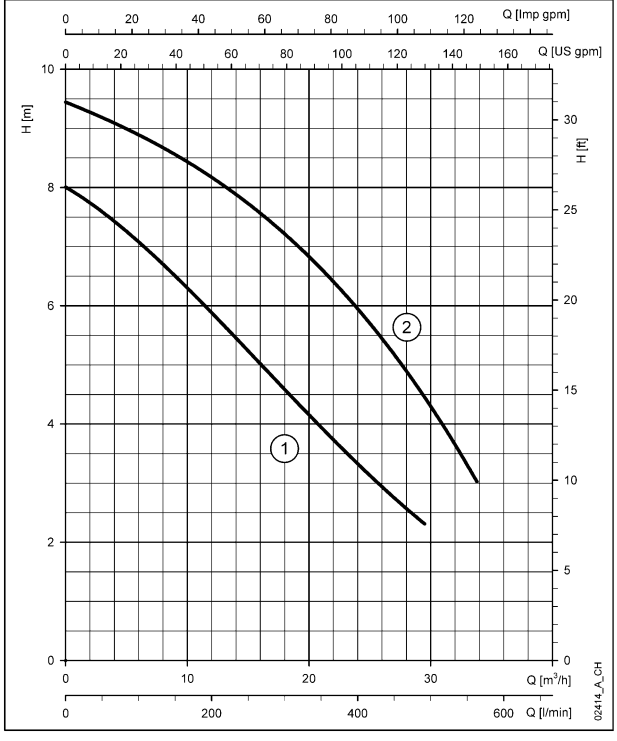
FC 50-11	① 1960 [rpm] ② 2720 [rpm]	ISO 9906 - Annex A



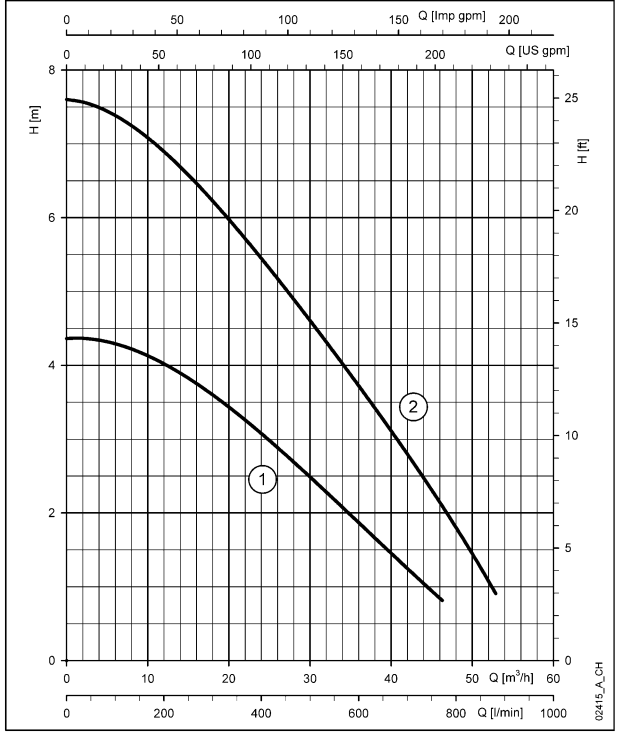
FC 65-7	① 2090 [rpm] ② 2730 [rpm]	ISO 9906 - Annex A



FC 65-10	① 2290 [rpm] ② 2775 [rpm]	ISO 9906 - Annex A



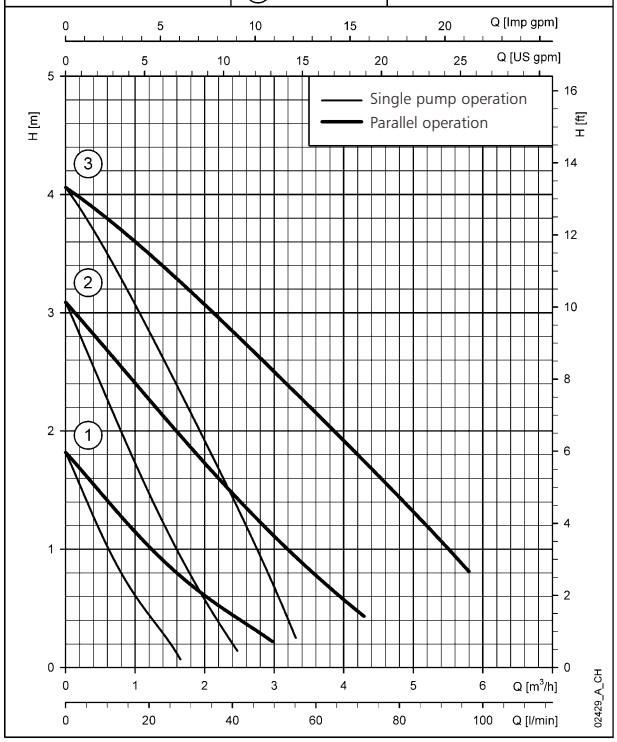
FC 80-7	① 2060 [rpm] ② 2720 [rpm]	ISO 9906 - Annex A



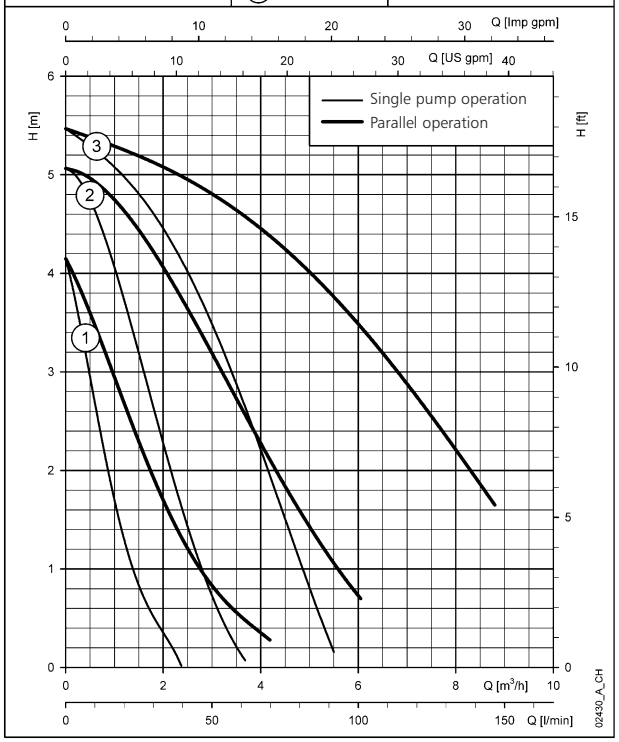
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

TCG-FCG SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

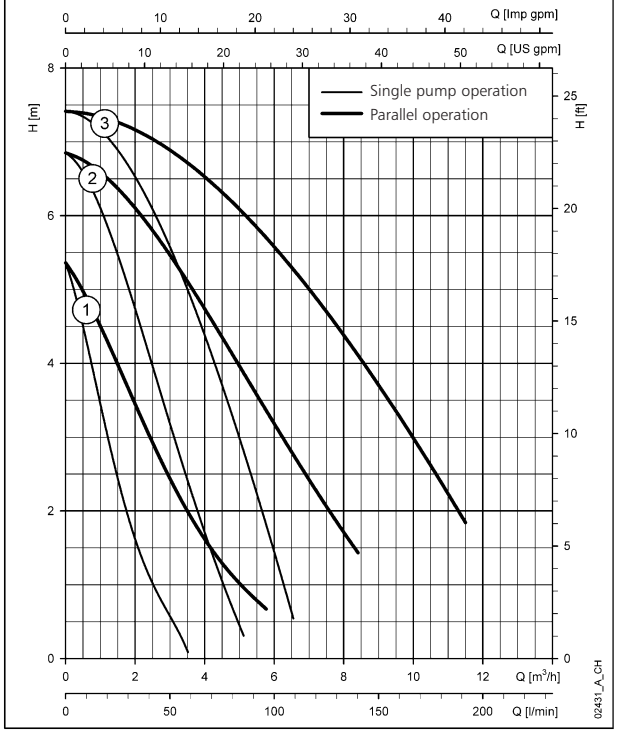
TCG 32-4	① 1050 [rpm] ② 1520 [rpm] ③ 1980 [rpm]	ISO 9906 - Annex A



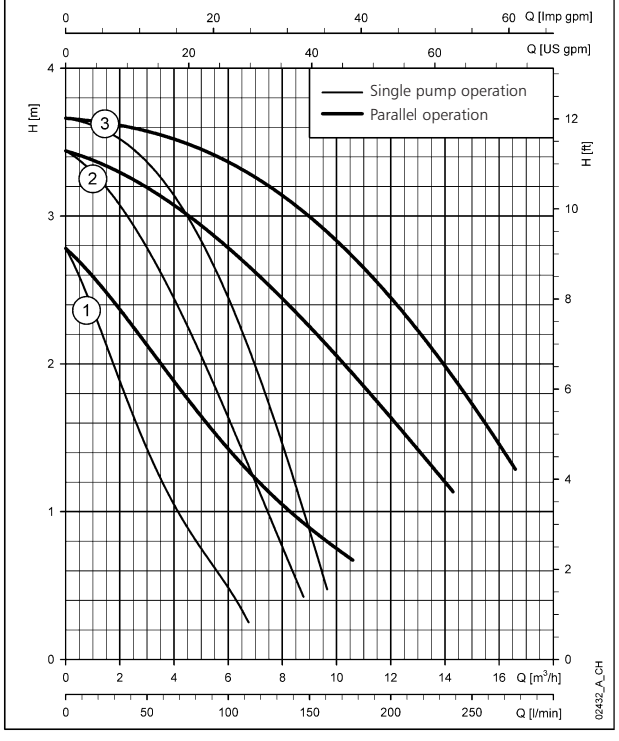
TCG 32-5	① 1195 [rpm] ② 1636 [rpm] ③ 2323 [rpm]	ISO 9906 - Annex A



TCG 32-8	① 1352 [rpm] ② 1954 [rpm] ③ 2420 [rpm]	ISO 9906 - Annex A



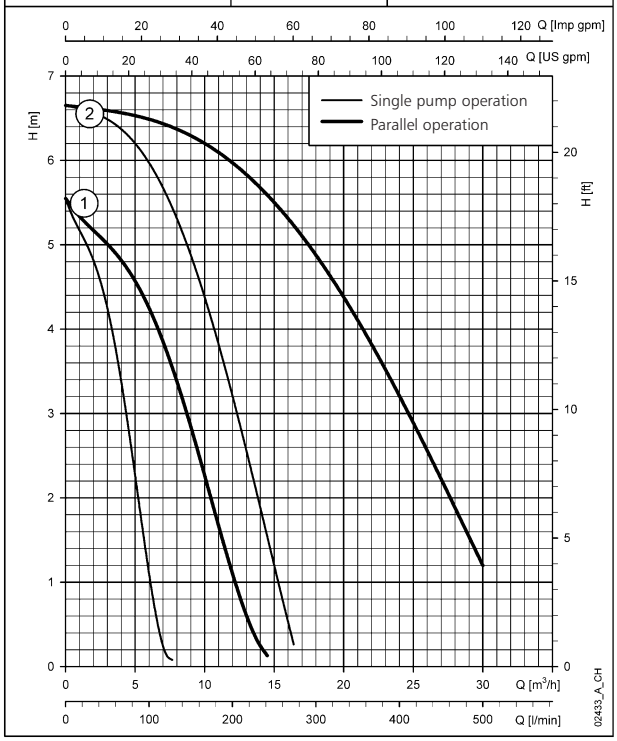
FCG 40-4	① 1713 [rpm] ② 2339 [rpm] ③ 2661 [rpm]	ISO 9906 - Annex A



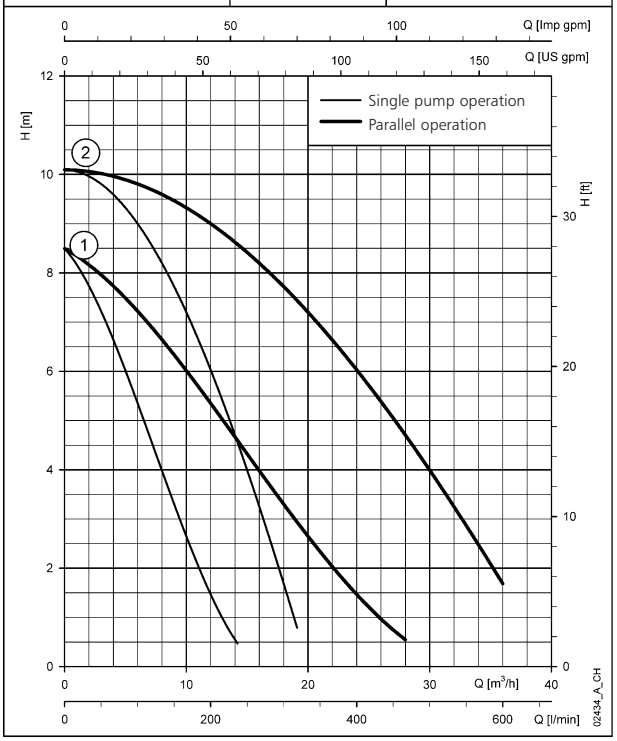
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

FCG SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

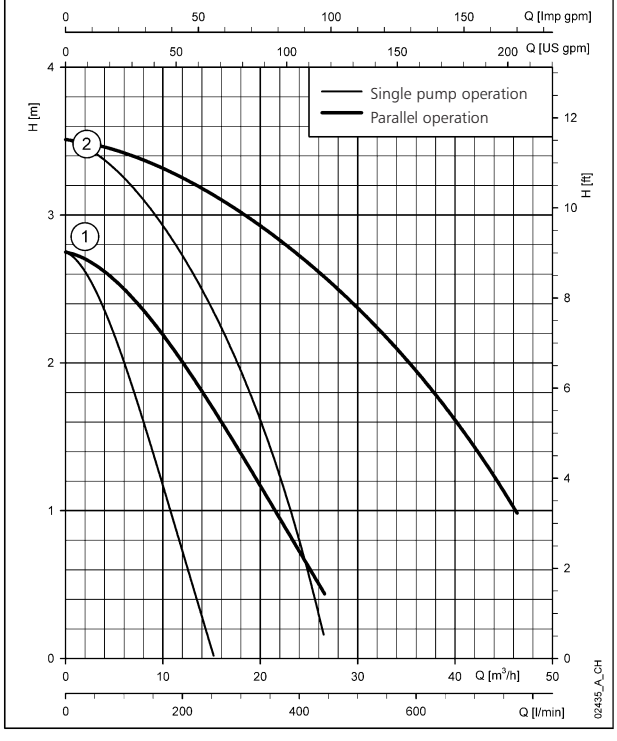
FCG 40-7	① 1470 [rpm] ② 2530 [rpm]	ISO 9906 - Annex A



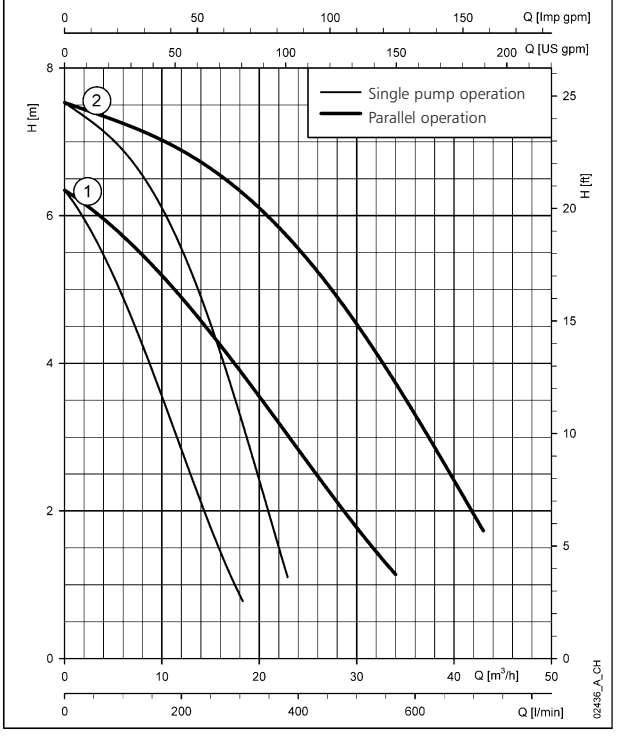
FCG 40-10	① 1990 [rpm] ② 2720 [rpm]	ISO 9906 - Annex A



FCG 50-4	① 1660 [rpm] ② 2600 [rpm]	ISO 9906 - Annex A



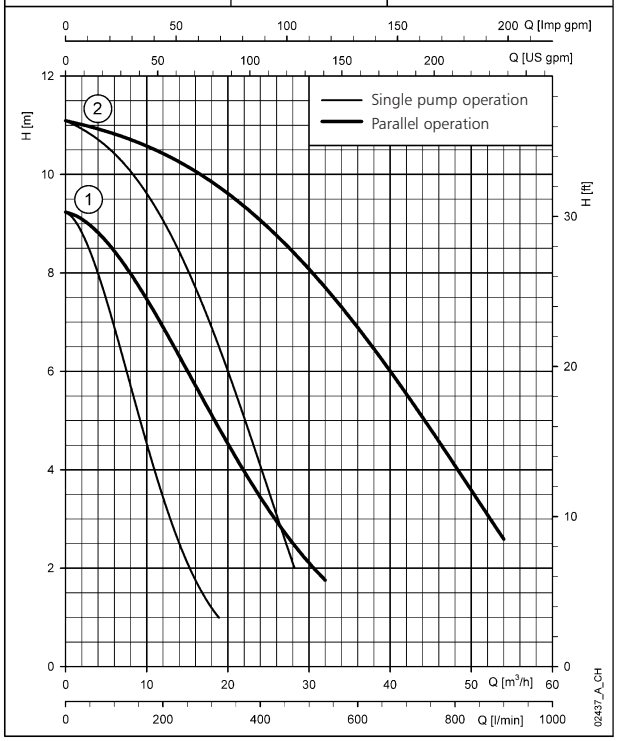
FCG 50-8	① 2270 [rpm] ② 2780 [rpm]	ISO 9906 - Annex A



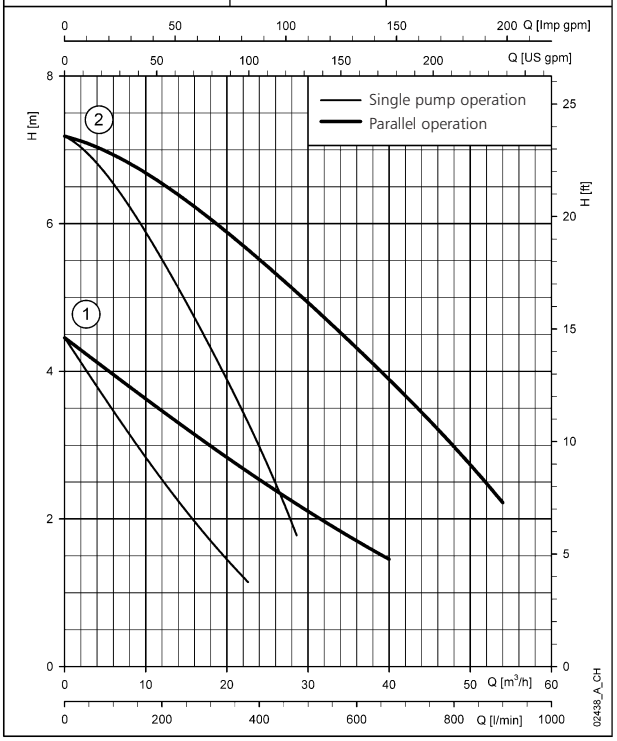
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

FCG SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

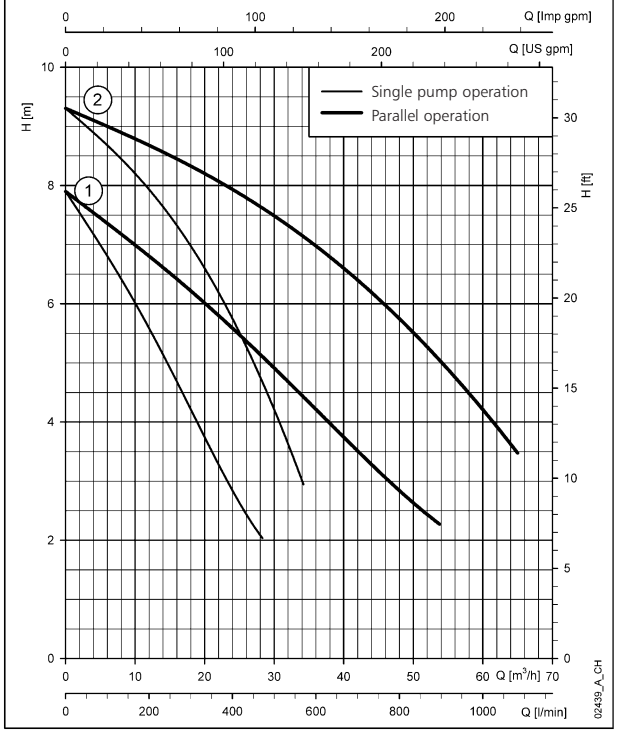
FCG 50-11	① 1800 [rpm] ② 2700 [rpm]	ISO 9906 - Annex A



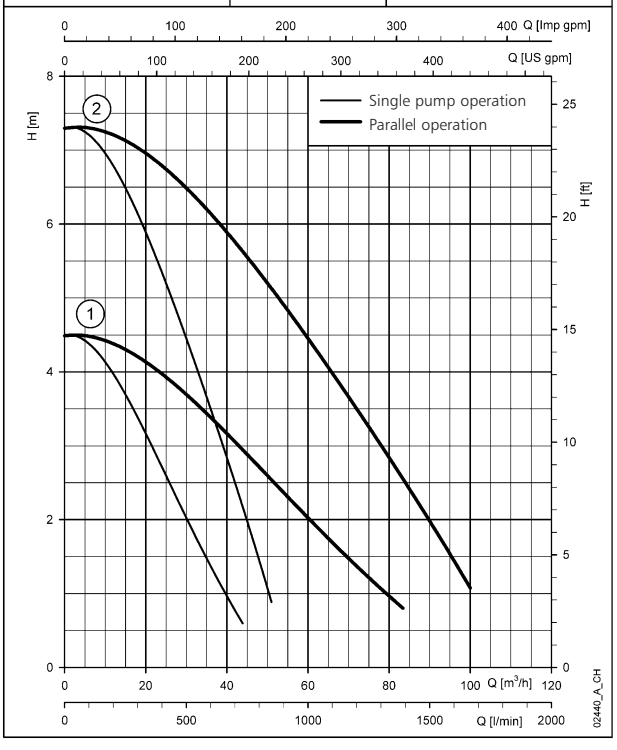
FCG 65-7	① 2080 [rpm] ② 2740 [rpm]	ISO 9906 - Annex A



FCG 65-10	① 2245 [rpm] ② 2765 [rpm]	ISO 9906 - Annex A



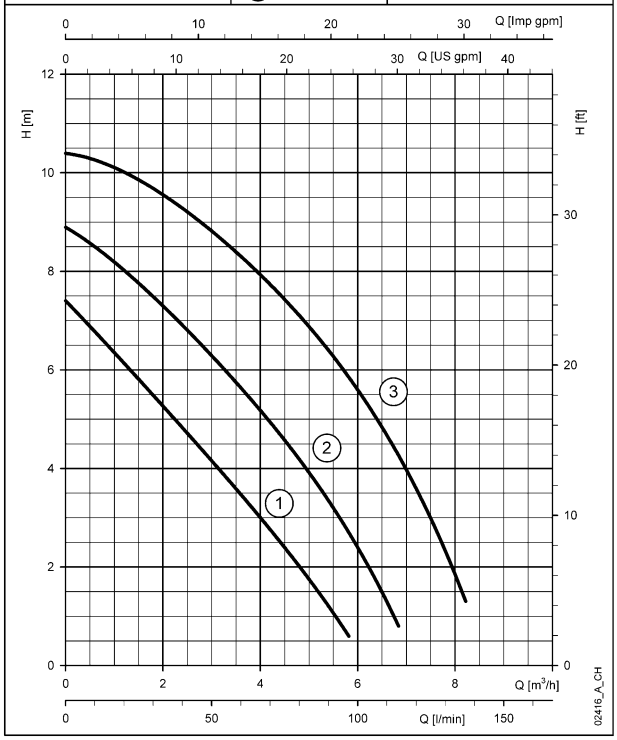
FCG 80-7	① 2110 [rpm] ② 2735 [rpm]	ISO 9906 - Annex A



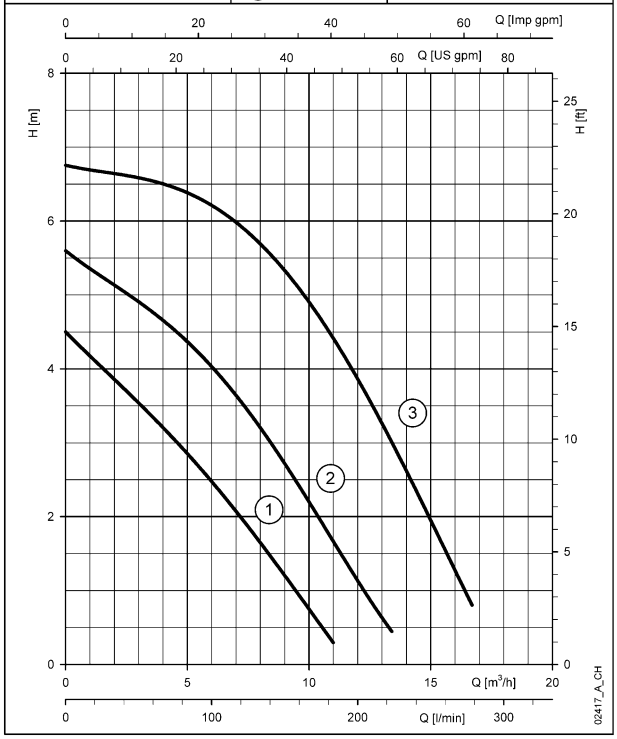
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

TC-FC SERIES
THREE-PHASE OPERATING CHARACTERISTICS

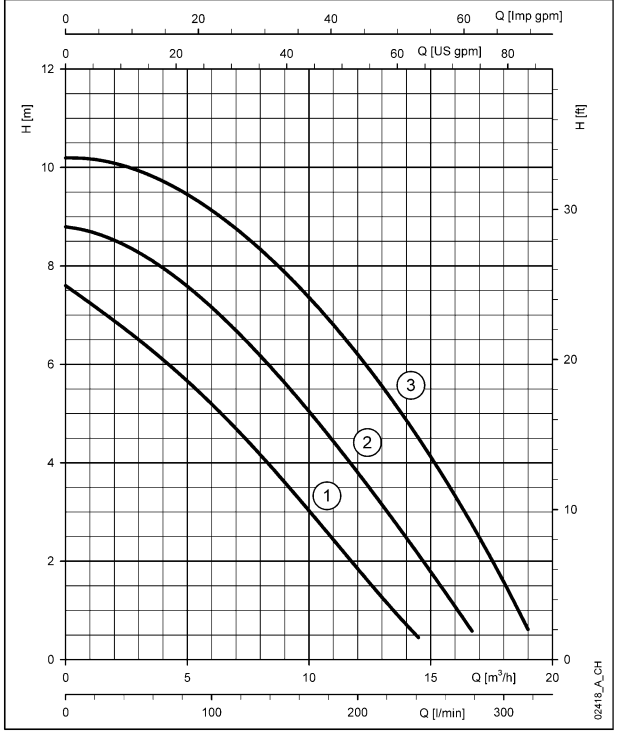
TC 32-10T	① 1900 [rpm] ② 2280 [rpm] ③ 2665 [rpm]	ISO 9906 - Annex A



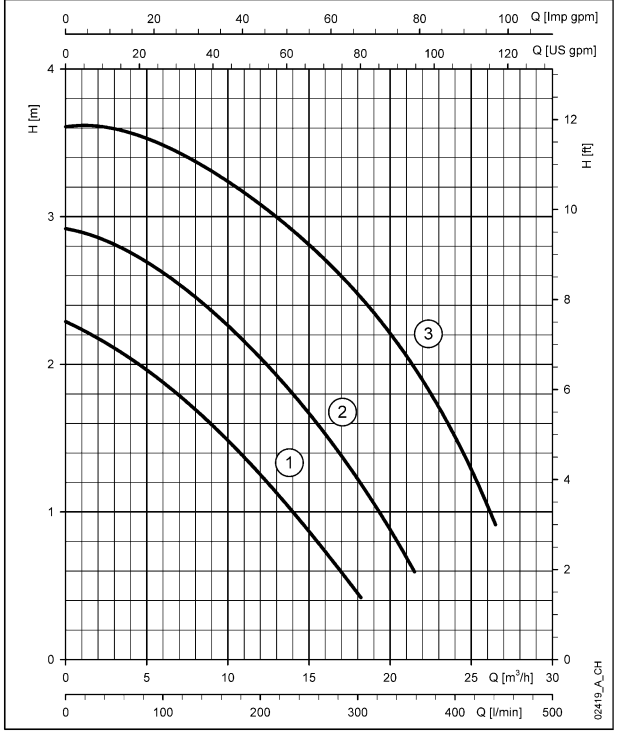
FC 40-7T	① 1700 [rpm] ② 2060 [rpm] ③ 2580 [rpm]	ISO 9906 - Annex A



FC 40-10T	① 2050 [rpm] ② 2390 [rpm] ③ 2730 [rpm]	ISO 9906 - Annex A



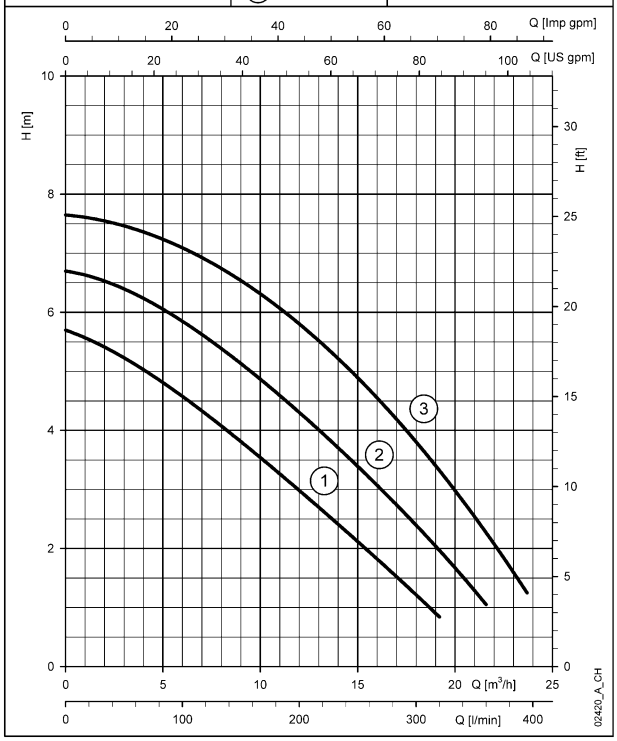
FC 50-4T	① 1800 [rpm] ② 2130 [rpm] ③ 2620 [rpm]	ISO 9906 - Annex A



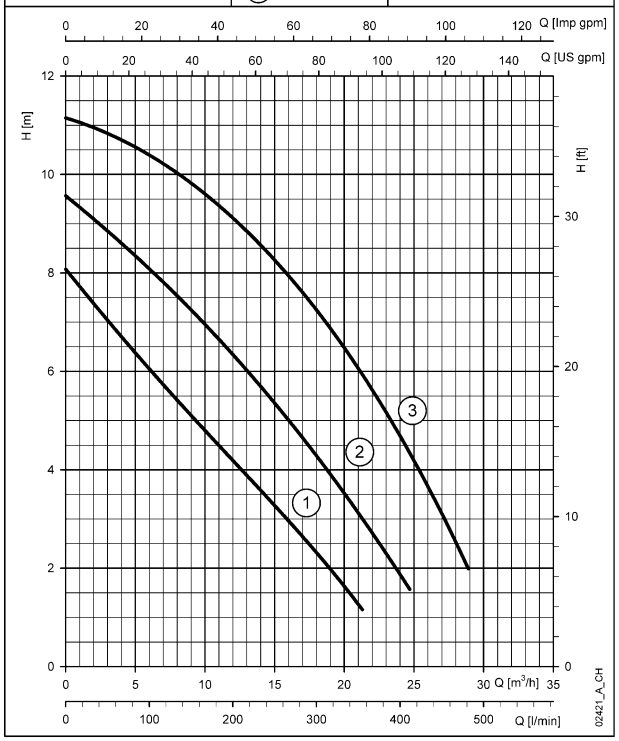
These performances are valid for liquids with density ρ=1,0 kg/dm^3 and kinematic viscosity υ =1 mm^2/sec.

FC SERIES
THREE-PHASE OPERATING CHARACTERISTICS

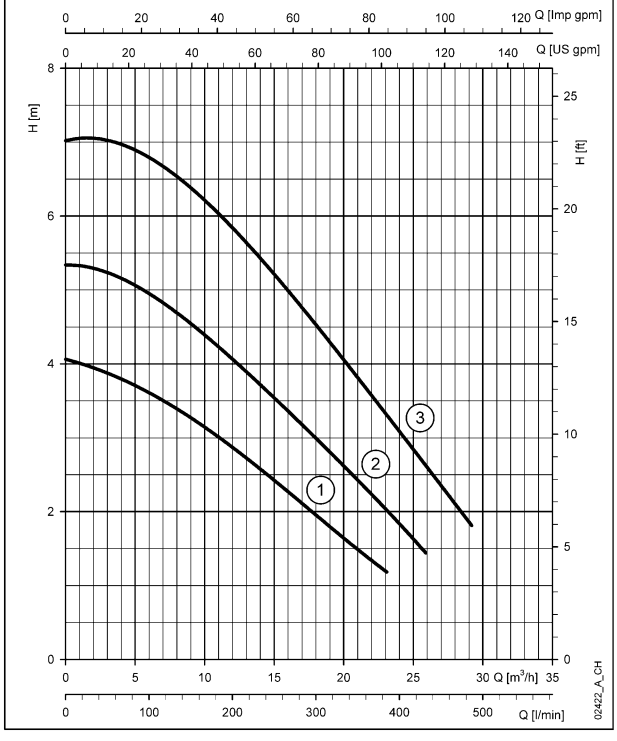
FC 50-8T	① 2180 [rpm] ② 2480 [rpm] ③ 2770 [rpm]	ISO 9906 - Annex A



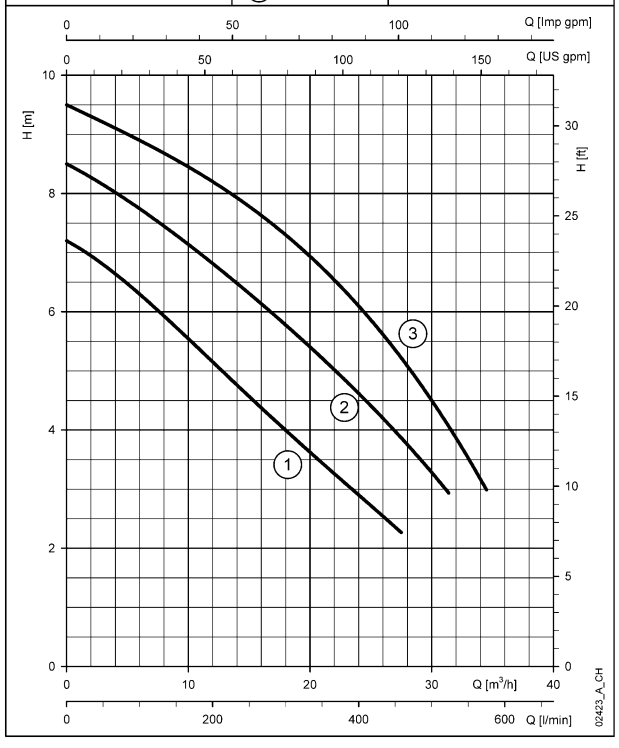
FC 50-11T	① 1930 [rpm] ② 2260 [rpm] ③ 2660 [rpm]	ISO 9906 - Annex A



FC 65-7T	① 2020 [rpm] ② 2350 [rpm] ③ 2720 [rpm]	ISO 9906 - Annex A



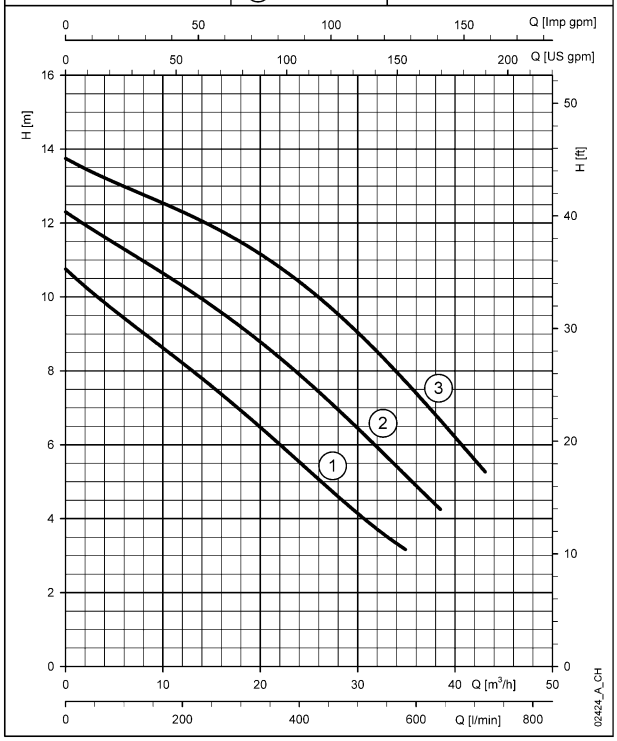
FC 65-10T	① 2200 [rpm] ② 2510 [rpm] ③ 2810 [rpm]	ISO 9906 - Annex A



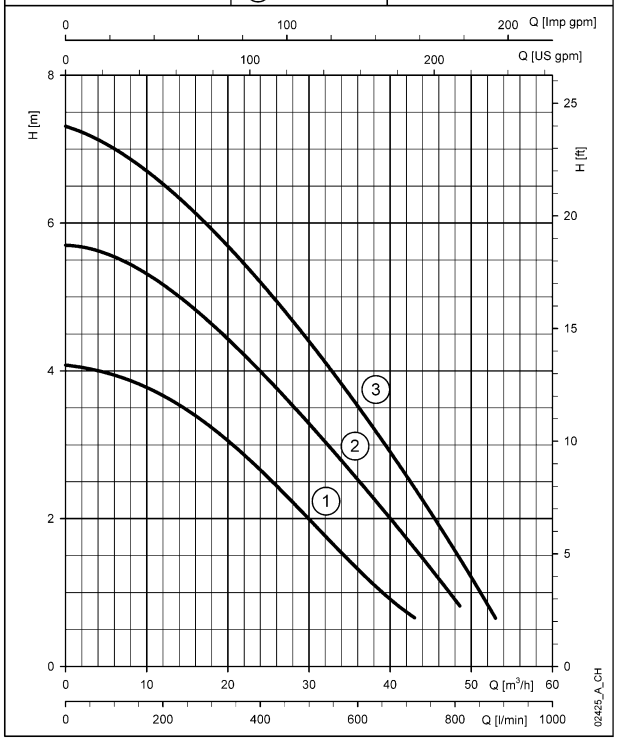
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

FC SERIES
THREE-PHASE OPERATING CHARACTERISTICS

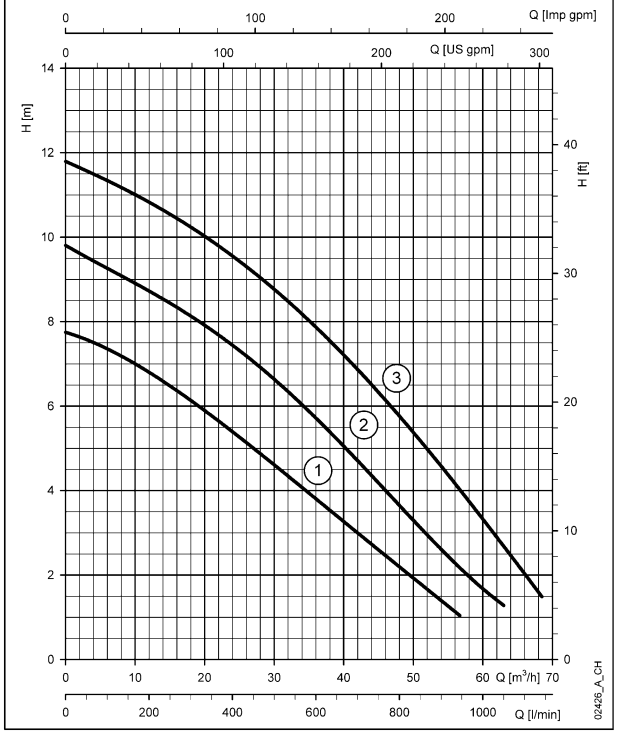
FC 65-14T	① 2240 [rpm] ② 2510 [rpm] ③ 2800 [rpm]	ISO 9906 - Annex A



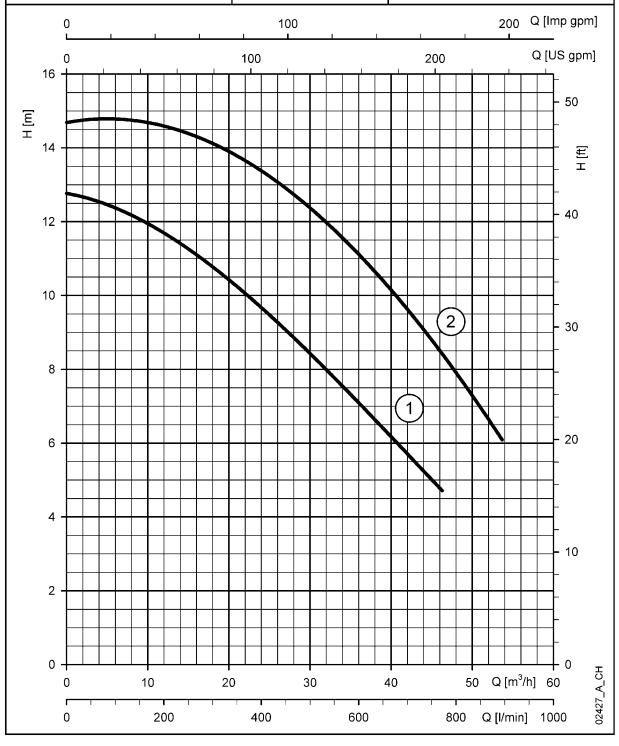
FC 80-7T	① 2060 [rpm] ② 2370 [rpm] ③ 2740 [rpm]	ISO 9906 - Annex A



FC 80-12T	① 2240 [rpm] ② 2490 [rpm] ③ 2780 [rpm]	ISO 9906 - Annex A



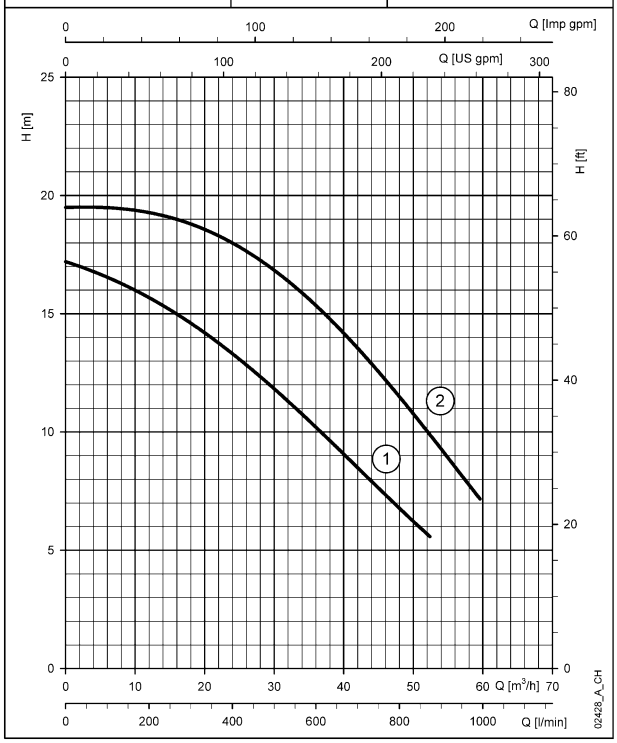
FC 80-14T	① 2480 [rpm] ② 2880 [rpm]	ISO 9906 - Annex A



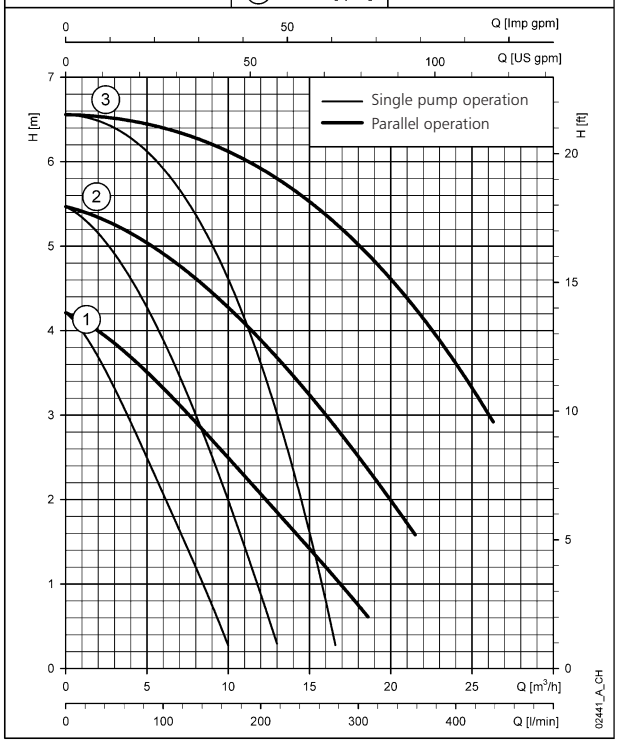
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

FC-FCG SERIES
THREE-PHASE OPERATING CHARACTERISTICS

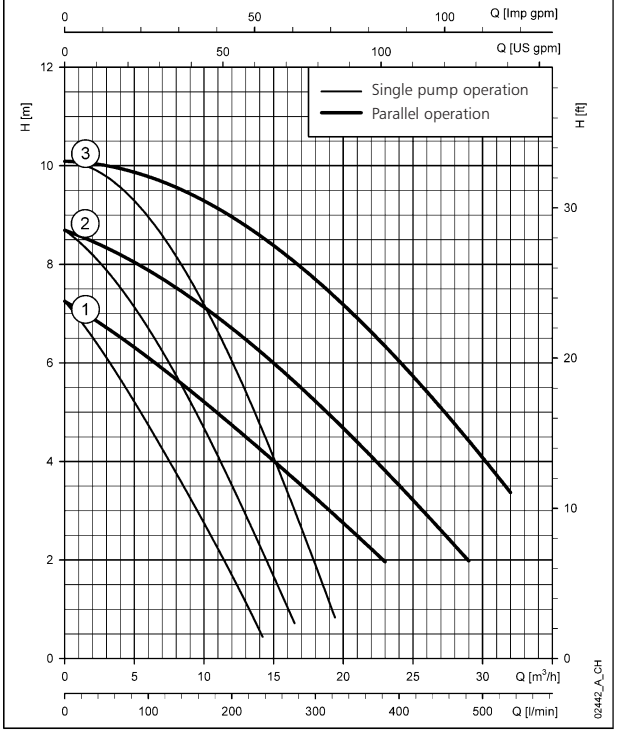
FC 80-19T	① 2500 [rpm] ② 2900 [rpm]	ISO 9906 - Annex A



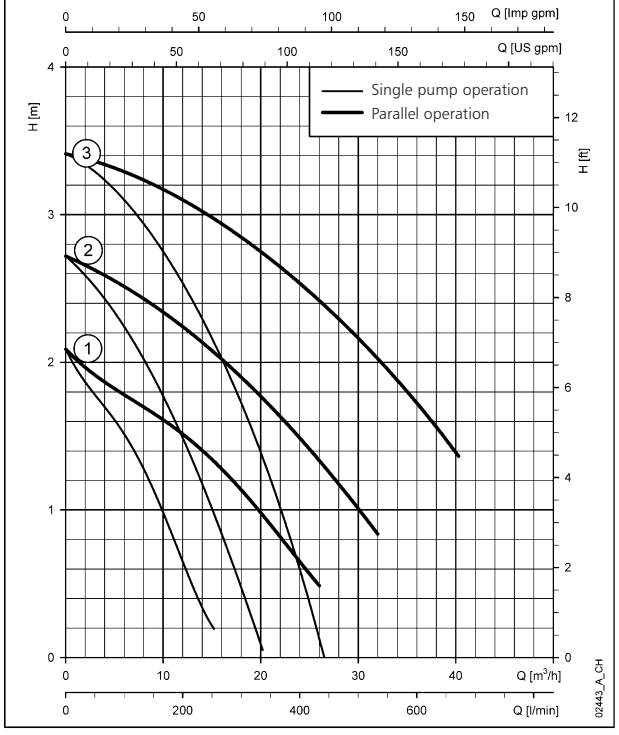
FCG 40-7T	① 1700 [rpm] ② 2060 [rpm] ③ 2580 [rpm]	ISO 9906 - Annex A



FCG 40-10T	① 2000 [rpm] ② 2330 [rpm] ③ 2710 [rpm]	ISO 9906 - Annex A



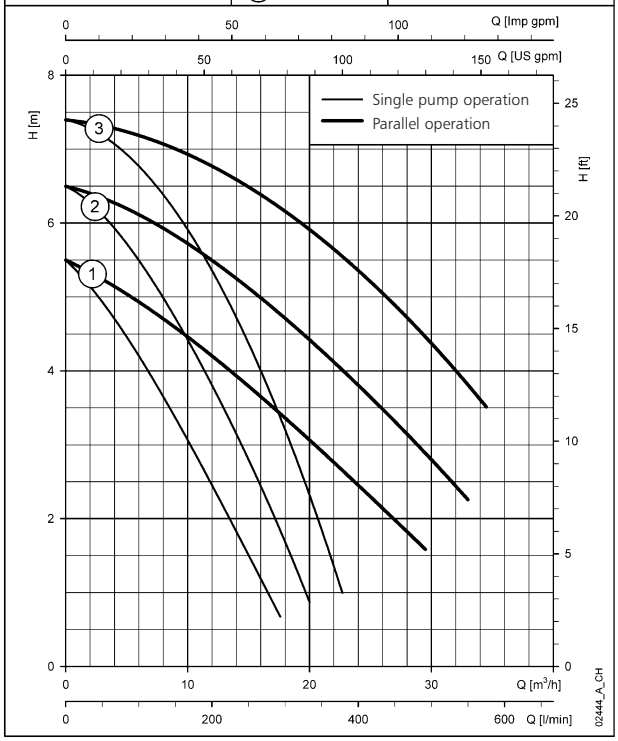
FCG 50-4T	① 1800 [rpm] ② 2130 [rpm] ③ 2620 [rpm]	ISO 9906 - Annex A



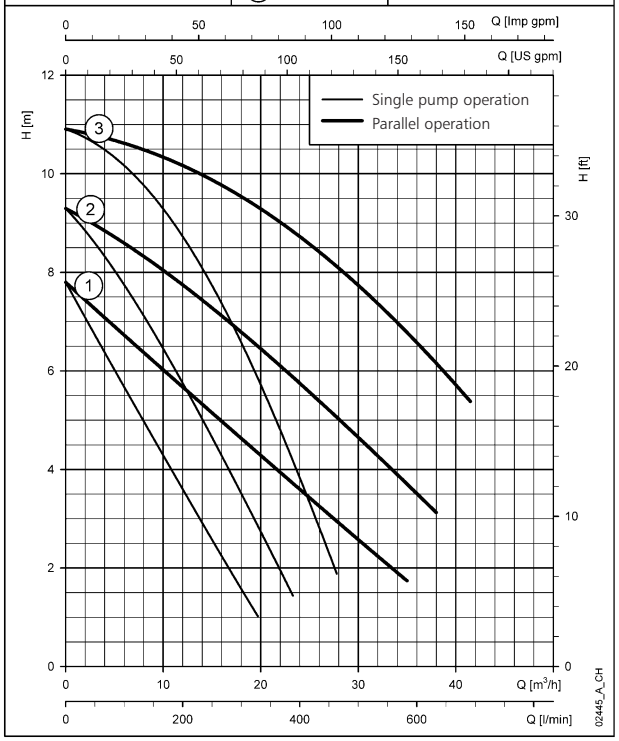
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

FCG SERIES
THREE-PHASE OPERATING CHARACTERISTICS

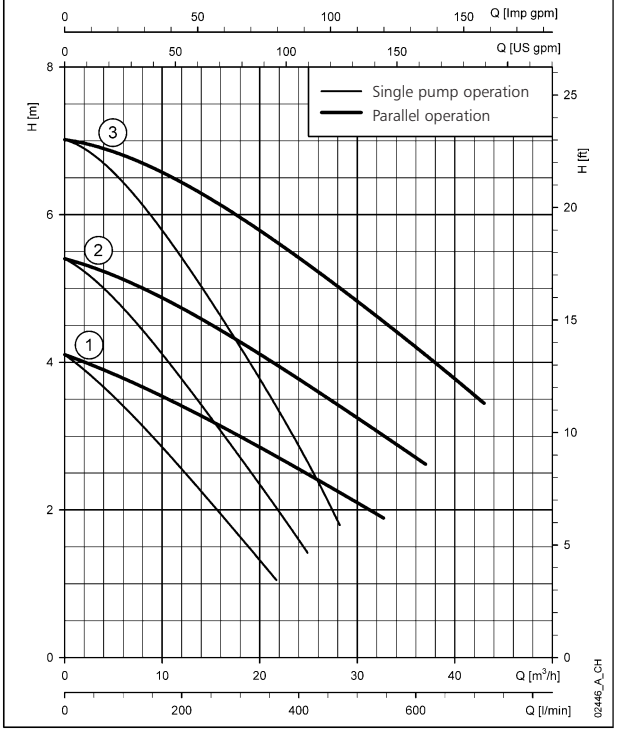
FCG 50-8T	① 2140 [rpm] ② 2450 [rpm] ③ 2760 [rpm]	ISO 9906 - Annex A



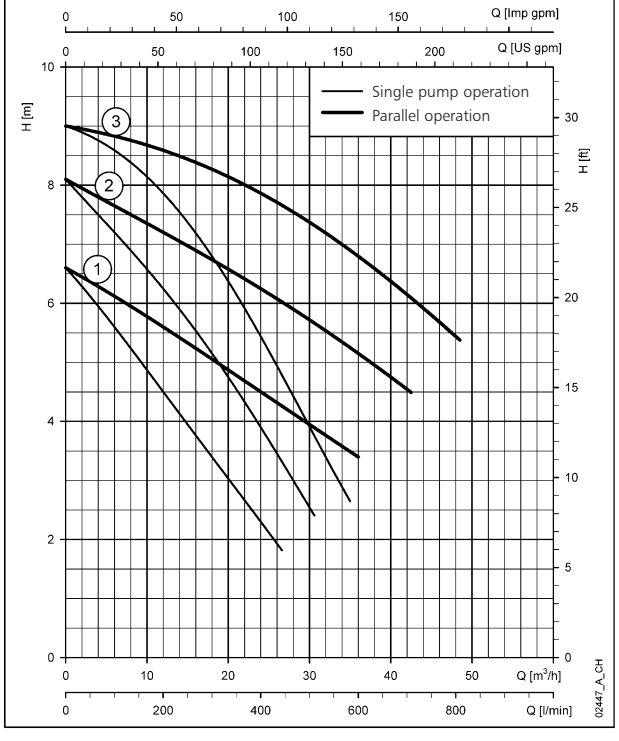
FCG 50-11T	① 1890 [rpm] ② 2220 [rpm] ③ 2650 [rpm]	ISO 9906 - Annex A



FCG 65-7T	① 2020 [rpm] ② 2350 [rpm] ③ 2720 [rpm]	ISO 9906 - Annex A



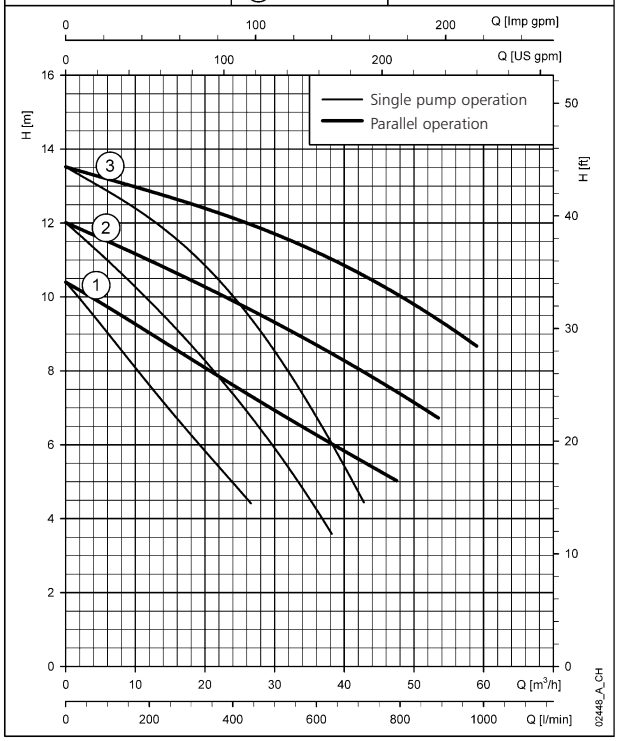
FCG 65-10T	① 2120 [rpm] ② 2460 [rpm] ③ 2800 [rpm]	ISO 9906 - Annex A



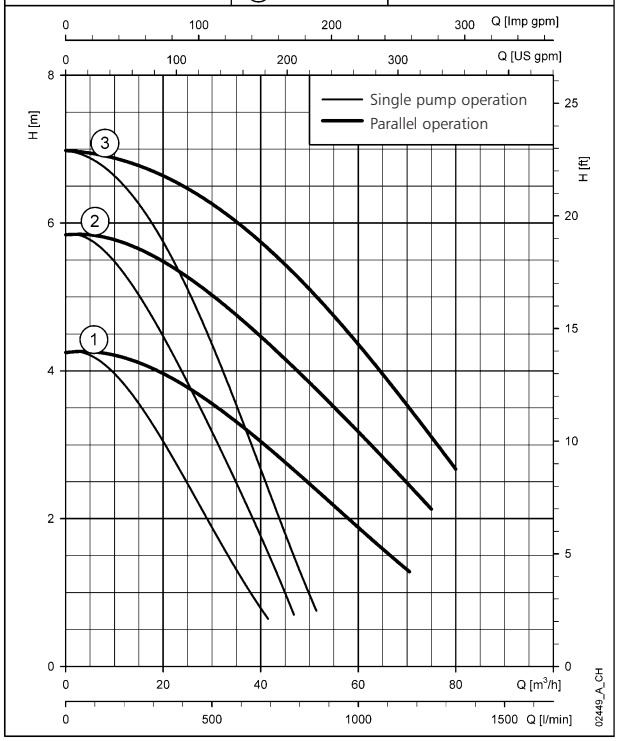
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

FCG SERIES
THREE-PHASE OPERATING CHARACTERISTICS

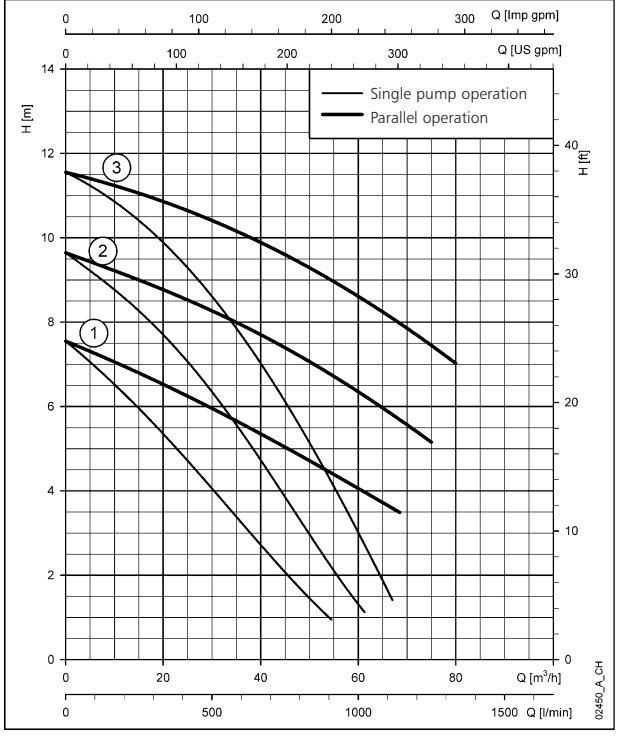
FCG 65-14T	① 2180 [rpm] ② 2490 [rpm] ③ 2780 [rpm]	ISO 9906 - Annex A



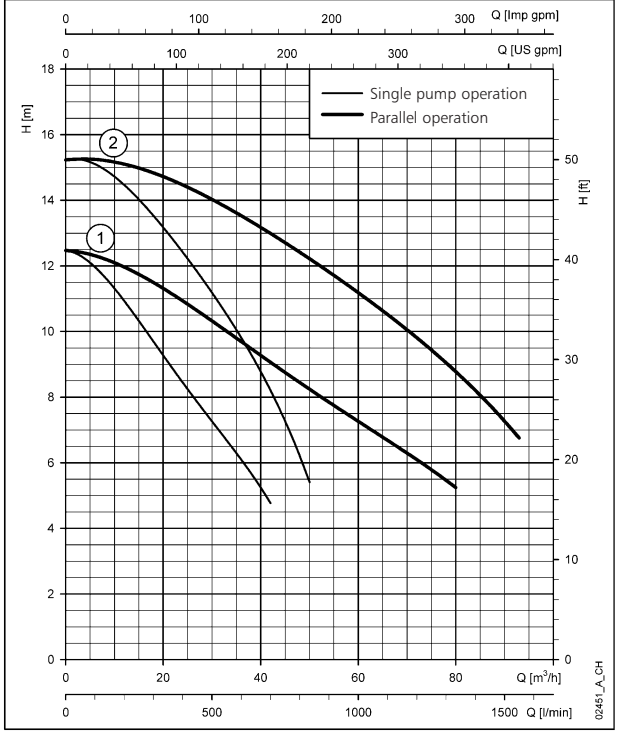
FCG 80-7T	① 2050 [rpm] ② 2360 [rpm] ③ 2730 [rpm]	ISO 9906 - Annex A



FCG 80-12T	① 2230 [rpm] ② 2480 [rpm] ③ 2770 [rpm]	ISO 9906 - Annex A

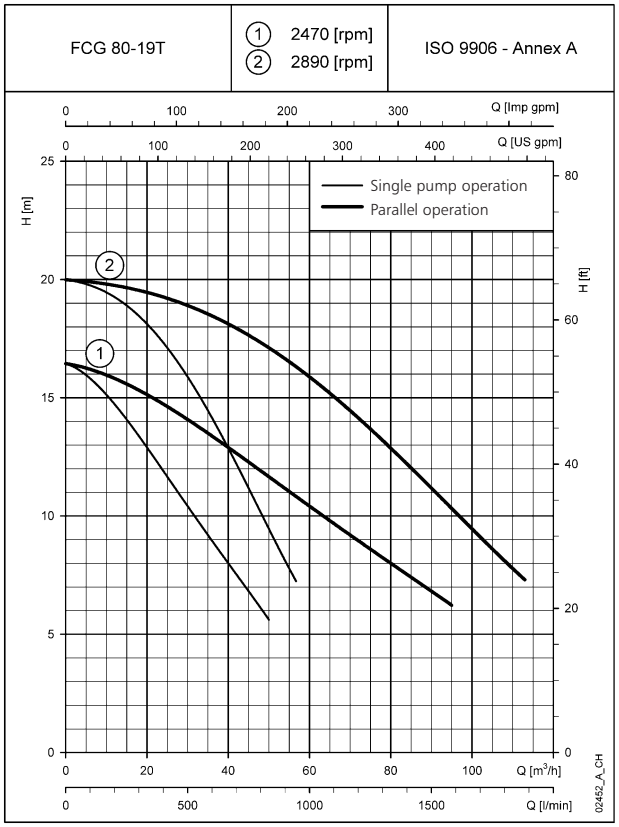


FCG 80-14T	① 2480 [rpm] ② 2870 [rpm]	ISO 9906 - Annex A



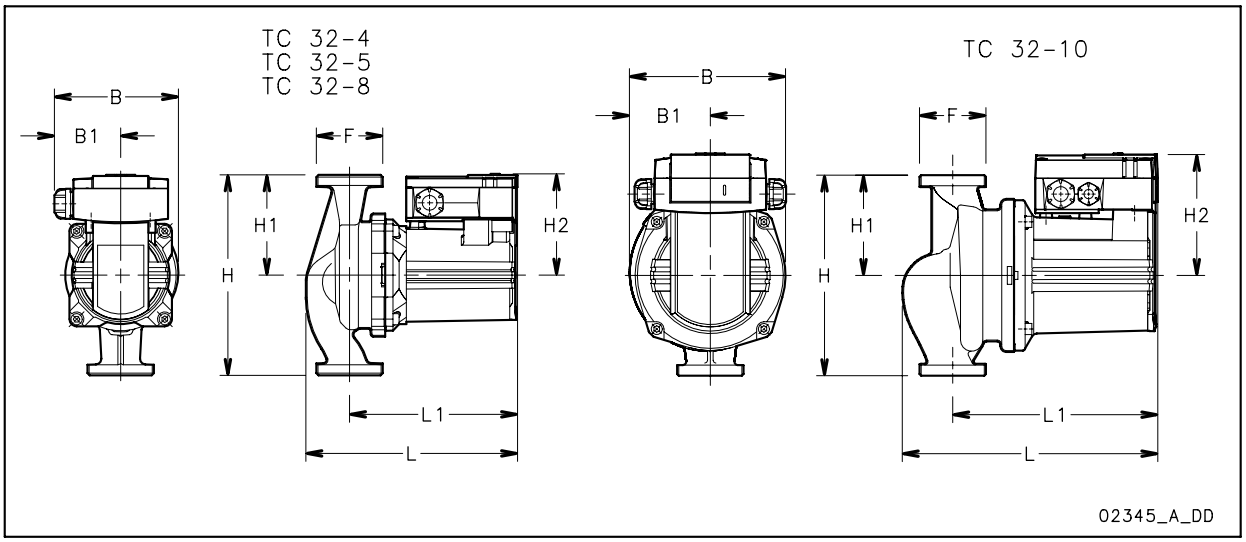
These performances are valid for liquids with density ρ=1,0 kg/dm^3 and kinematic viscosity υ =1 mm^2/sec.

FCG SERIES
THREE-PHASE OPERATING CHARACTERISTICS



These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

TC SERIES
DIMENSIONS AND WEIGHTS

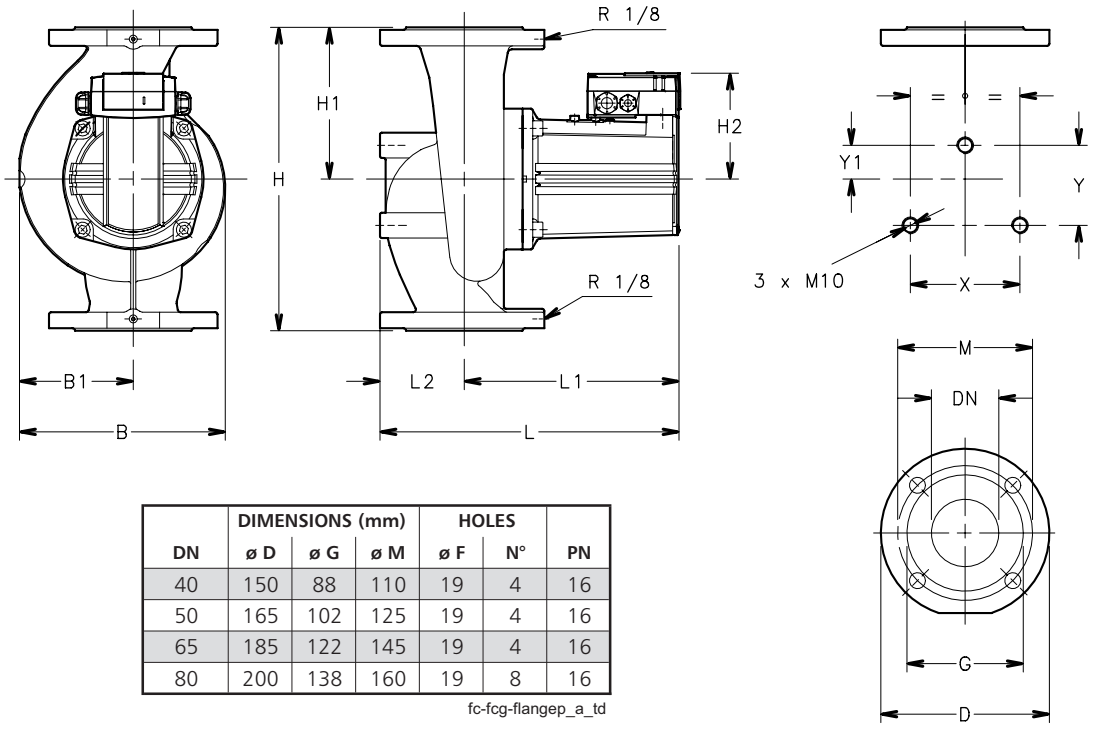


DIMENSIONS AND WEIGHTS TABLE

PUMP TYPE		DIMENSIONS (mm)									WEIGHT
SINGLE-PHASE	THREE-PHASE	B	B1	H	H1	H2	L	L1	F	DN	kg
TC 32-4	-	116	60	180	90	90	204	158	G 2"	32	4,2
TC 32-5	-	110	60	180	90	90	189	150	G 2"	32	4
TC 32-8	-	110	60	180	90	90	189	150	G 2"	32	3,8
TC 32-10	TC 32-10T	142	73	180	90	108	229	185	G 2"	32	7

tc-2p50_a_td

FC SERIES
DIMENSIONS AND WEIGHTS



DN	DIMENSIONS (mm) ø D	ø G	ø M	HOLES ø F	N°	PN
40	150	88	110	19	4	16
50	165	102	125	19	4	16
65	185	122	145	19	4	16
80	200	138	160	19	8	16

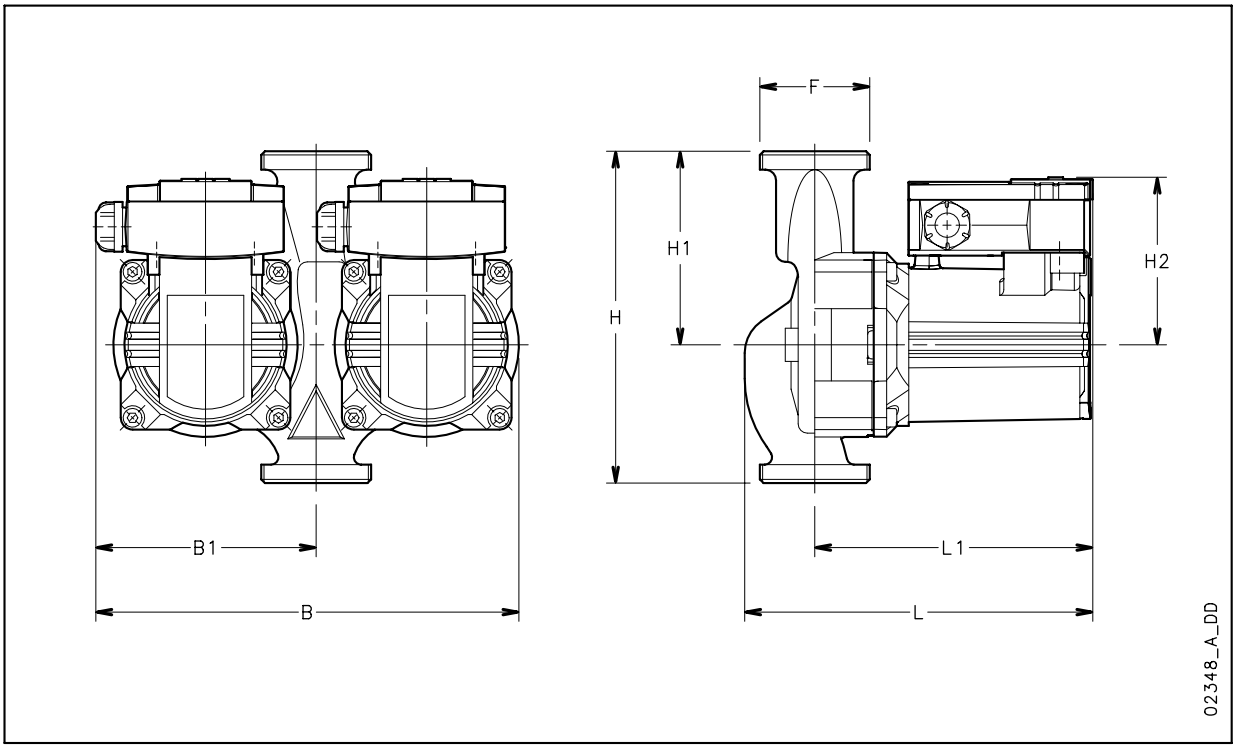
fc-fcg-flangep_a_td

DIMENSIONS AND WEIGHTS TABLE

PUMP TYPE		DIMENSIONS (mm)												WEIGHT
SINGLE-PHASE	THREE-PHASE	B	B1	H	H1	H2	L	L1	L2	X	Y	Y1	DN	kg
FC 40-7	FC 40-7T	155	80	250	125	108	269	194	75	75	147	38	40	12
FC 40-10	FC 40-10T	171	90	250	125	115	292	217	75	90	90	40	40	16
FC 50-4	FC 50-4T	178	95	280	140	108	283	200	83	85	162	125	50	14
FC 50-8	FC 50-8T	174	91	280	140	115	308	225	83	90	90	40	50	18
FC 50-11	FC 50-11T	190	101	280	140	115	306	223	83	90	90	40	50	19
FC 65-7	FC 65-7T	204	111	340	170	115	327	234	93	104	90	40	65	22
FC 65-10	FC 65-10T	218	118	340	170	125	349	256	93	104	90	40	65	26
-	FC 65-14T	218	118	340	170	125	349	256	93	104	90	40	65	28
FC 80-7	FC 80-7T	244	135	360	180	125	358	258	100	135	95	40	80	29
-	FC 80-12T	244	135	360	180	125	358	258	100	135	95	40	80	31
-	FC 80-14T	275	147	360	170	-	403	294	-	-	-	-	80	46
-	FC 80-19T	275	147	360	170	-	403	294	-	-	-	-	80	48

fc-2p50_a_td

TCG SERIES
DIMENSIONS AND WEIGHTS



DIMENSIONS AND WEIGHTS TABLE

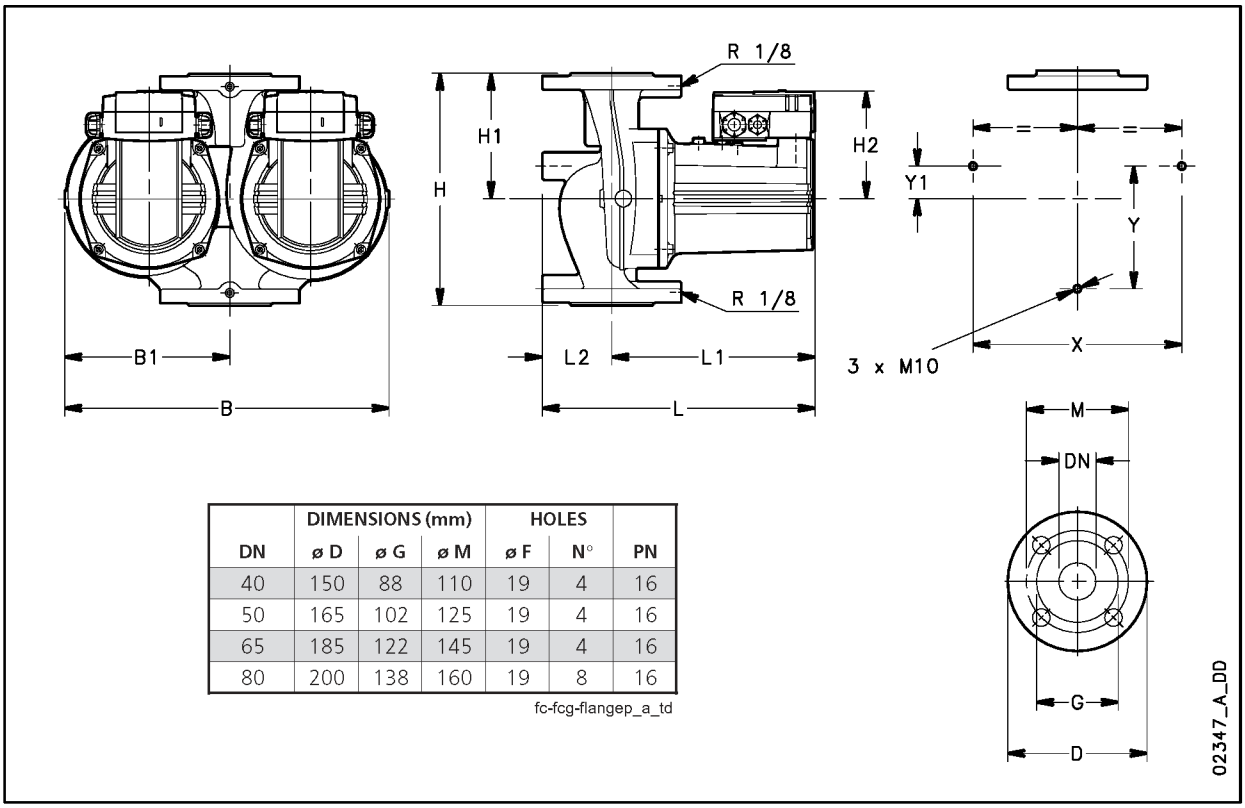
PUMP TYPE	DIMENSIONS (mm)									WEIGHT
	B	B1	H	H1	H2	L	L1	F	DN	kg
TCG 32-4	207	-	180	110	74	142	95	G 2"	32	5,5
TCG 32-5	228	120	180	105	90	188	150	G 2"	32	7,8
TCG 32-8	228	120	180	105	90	188	150	G 2"	32	7,8

tcg-2p50_a_td

ITT

Lowara

FCG SERIES
DIMENSIONS AND WEIGHTS



DN	DIMENSIONS (mm) ø D	ø G	ø M	HOLES ø F	N°	PN
40	150	88	110	19	4	16
50	165	102	125	19	4	16
65	185	122	145	19	4	16
80	200	138	160	19	8	16

fc-fcg-flangep_a_td

DIMENSIONS AND WEIGHTS TABLE

PUMP TYPE		DIMENSIONS (mm)												WEIGHT
SINGLE-PHASE	THREE-PHASE	B	B1	H	H1	H2	L	L1	L2	X	Y	Y1	DN	kg
FCG 40-4	-	259	126	250	135	90	231	156	75	154	108	14	40	15
FCG 40-7	FCG 40-7T	297	154	250	135	108	269	194	75	173	108	11	40	20
FCG 40-10	FCG 40-10T	350	178	250	135	115	292	217	75	225	132	35	40	29
FCG 50-4	FCG 50-4T	336	178	280	155	108	283	200	83	225	132	25	50	23
FCG 50-8	FCG 50-8T	348	179	280	160	115	308	225	83	225	132	30	50	31
FCG 50-11	FCG 50-11T	390	198	280	155	115	306	223	83	228	157	50	50	33
FCG 65-7	FCG 65-7T	414	215	340	185	115	327	234	93	225	162	25	65	37
FCG 65-10	FCG 65-10T	432	223	340	185	125	349	256	93	225	162	25	65	45
-	FCG 65-14T	432	223	340	185	125	349	256	93	225	162	25	65	49
FCG 80-7	FCG 80-7T	480	249	360	205	125	358	258	100	240	180	43	80	51
-	FCG 80-12T	480	249	360	205	125	358	258	100	240	180	43	80	55
-	FCG 80-14T	600	300	360	190	-	394	294	-	358	196	44	80	86
-	FCG 80-19T	600	300	360	190	-	394	294	-	358	196	44	80	90

fcg-2p50_b_td

Variable speed circulators for residential systems

ETCR Series

MARKET SECTORS

RESIDENTIAL.

APPLICATIONS

- Water circulation in heating and air conditioning systems.

SPECIFICATIONS

PUMP

- **Flow rate**: up to 4 m^3/h.
- **Head**: up to 5 m.
- **Temperature of pumped liquid**: +2°C ÷ +95°C.
- **Maximum operating pressure**: 10 bar (PN 10).
- **Impeller**: made of corrosion-proof, composite material.
- **Wear ring**: stainless steel.

MOTOR

- Wet rotor type, with bearings lubricated by the pumped liquid. The rotor chamber is protected by a bronze filter. Integrated motor protection (impedance); no external protection is required.
- Single-phase 230 V 50 Hz power supply.
- 2-pole, variable-speed motor, with automatic speed adjustment based on system requirements. Capacitor integrated in the terminal board.
- According to EN 60335-2-51 standards.
- VDE approved.
- Class F **Insulation** (155°C).
- **Protection class**: IP 42.

ITT

Lowara

Variable speed circulators for residential systems

ETCR Series

SERIES CHARACTERISTICS

- Electric circulator pumps with in-line suction and discharge ports, designed for direct installation onto piping, with 1"and 1"½ threaded connections.
- Rotor shaft made of perforated stainless steel. By enabling water circulation this design ensures:
  - continuous degassing of the rotor chamber, with no need to perform this operation manually during startup;
  - bearing lubrication.
- Automatic adjustment by setting a single selector switch positioned on the terminal board. This ensures considerable energy savings and low noise during operation.
  The circulator is self adjusting, i.e. its running speed varies automatically based on load fluctuations.
  Three settings are available:
  - "icon ", suitable for new systems with floor heating.
  - "icon ": suitable for standard systems, i.e. the great majority of existing installations.
  - "icon ": suitable for older systems (with large-sized pipings).
- Automatic release: shutdowns are detected automatically, causing a restart at maximum static torque in order to restore normal operating conditions.

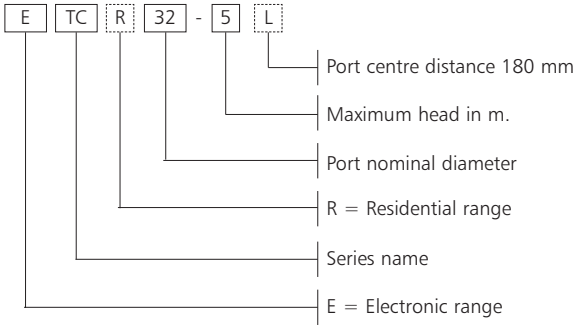
ACCESSORIES

- Pipe unions

INSTALLATION

- Suitable for installation on horizontal or vertical piping, in any position provided that motor axis is horizontal.

ETCR SERIES
IDENTIFICATION CODE



EXAMPLE: ETCR 32-5L
Electronic circulator of the TC residential series, port nominal diameter = 35, max head = 5 m, with port centre distance of 180 mm.

TABLE OF MATERIALS

PART	MATERIAL
Pump body	Cast iron
Impeller	Composite material
Shaft	Stainless steel
Motor jacket	Aluminium
Wear ring	Stainless steel
Bearings	Graphite
Gaskets	EPDM

etcr-2p50_a_tm

MINIMUM PRESSURE SUCTION TABLE

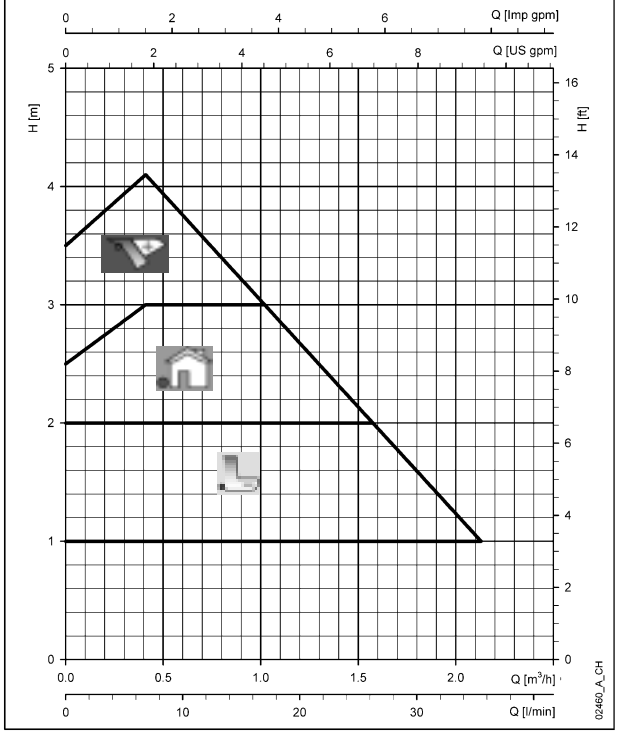
PUMP TYPE	OPERATING TEMPERATURE 82°C	95°C	110°C
ALL MODELS	1.5 m	3.0 m	10 m

10.2 m = 1 bar

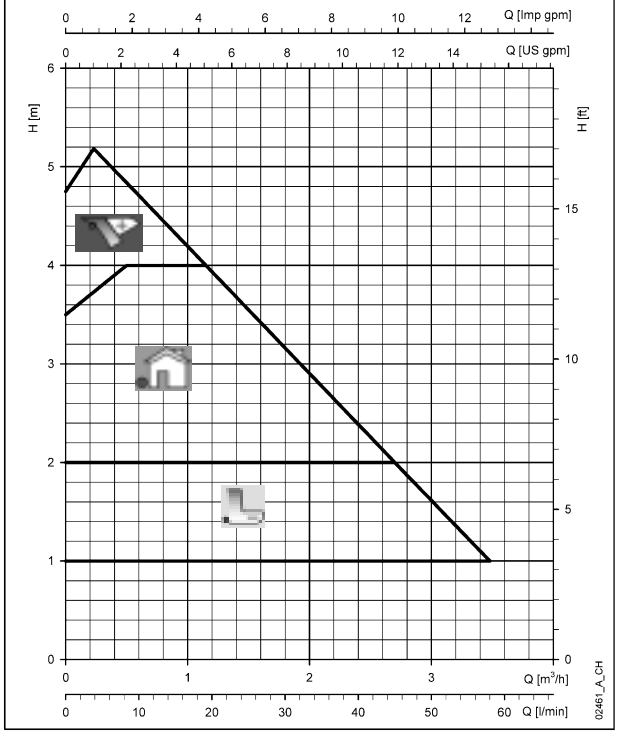
etcr-2p50_a_tpm

ETCR SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

ETCR 25-4L	min 950 [rpm] max 1850 [rpm]	ISO 9906 - Annex A

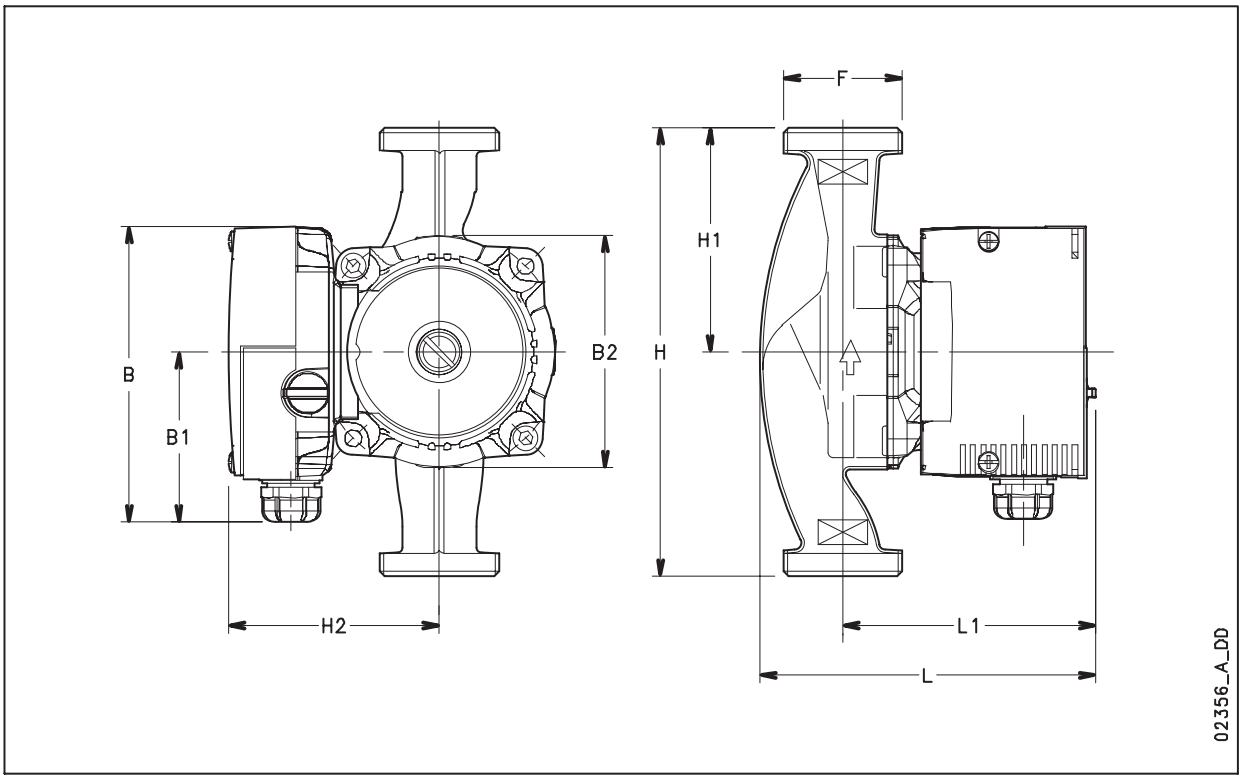


ETCR 32-5L	min 950 [rpm] max 1900 [rpm]	ISO 9906 - Annex A



These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

ETCR SERIES
DIMENSIONS AND WEIGHTS



DIMENSIONS AND WEIGHTS TABLE

PUMP TYPE	DIMENSIONS (mm)										WEIGHT
	B	B1	B2	H	H1	H2	L	L1	F	DN	kg
ETCR 25-4L	118	68	94	180	90	88	135	102	G 1"1/2	25	2,4
ETCR 32-5L	118	68	94	180	90	88	135	102	G 2"	32	2,9

etcr-2p50_b_td

HYDRAULIC PERFORMANCE TABLE

PUMP TYPE	POWER NOMINAL	POWER ABSORBED	MAXIMUM INTENSITY	CAPACITOR		SPEED	Q = DELIVERY								
							l/min 0	8	17	25	29	33	42	50	58
							m^3/h 0	0,5	1	1,5	1,75	2	2,5	3	3,5
230V 50Hz	W	W	A	µF	V	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER								
ETCR 25-4L	20	65	0,28	2,0	400	950-1850		3,9	3,0	2,1	1,7	1,2			
ETCR 32-5L	40	93	0,40	2,6	400	950-1900		4,8	4,2	3,5	3,2	2,9	2,3	1,6	1,0

Performances according to ISO standards 9906 - Annex A.

etcr-2p50_a_th

Variable speed circulators for commercial systems

ETC-EFC Series

MARKET SECTORS

COMMERCIAL AND INDUSTRIAL.

APPLICATIONS

- Water circulation in heating and cooling systems.
- Pumping of hot/cold, chemically and mechanically non-aggressive liquids.

SPECIFICATIONS

PUMP

- **Flow rate**: up to 65 m^3/h (100 m^3/h with both pumps running)
- **Head**: up to 11 m.
- **Temperature of pumped liquid**: +20°C ÷ +110°C.
- **Maximum operating pressure**: 10 bar (PN 10).
- **Girante**: made of corrosion-proof, composite material.

MOTOR

- Wet rotor type, with bearings lubricated by the pumped liquid. The rotor chamber is protected by a bronze filter. Built-in automatic motor protection with isothermal probes (with external relay, terminals accessible from the terminal board).
- Single-phase 230 V 50 Hz power supply.
- Three-phase 230 V 50 Hz 2-pole motor, with inverter.
- Motor-mounted inverter , with selector switch for mode and operating parameter selection, with display and terminal board for cable connection.
- According to EN standards 61000-6-2 (immunity) and 61000-6-3 (emissions).
- Class F **insulation** (155°C).
- **Protection clas**: IP 43.

Variable speed circulators for commercial systems

ETC-EFC Series

SERIES CHARACTERISTICS

- Electric circulator pumps with in-line suction and discharge ports, designed for direct installation onto piping, with 2" threaded connections and DN 40, 50, 65 and 80 mounting flanges.
- Single or twin pump design (with automatic switchover valve for the twin version). The two pumps can operate separately or in parallel (when equipped with the IF communication module) in the following manner:
  - Standard operation: one pump running, the second is activated in the event the first one shuts down or after the first one has been running for 24 hours;
  - Cascade operation: one pump running to meet demand; if delivery requirements increase the second pump is also activated. If requirements keep increasing, the running speed is accelerated in a synchronous manner. After 24 hours of operation, there is a changeover of the pumps.
- Hole on back of pump for wall mounting.
- Rotor shaft made of perforated stainless steel. By enabling water circulation this design ensures:
  - continuous degassing of the rotor chamber, with no need to perform this operation manually during startup;
  - bearing lubrication.
- Regolazione automatica, basata sull'impostazione di un unico selettore presente sul frontale dell'inverter. Ciò consente una rilevante riduzione del consumo di energia e della rumorosità durante il funzionamento.
  Automatic adjustment by setting a single selector switch positioned on the inverter front panel. This ensures considerable energy savings and low running noise.
  The circulator is self adjusting, i.e. its running speed varies automatically based on load fluctuations. There are two operating modes:
  - manual, with subsequent constant pressure , variable pressure , or controlled speed setting;
  - external, i.e. based on an external signal.
- Sblocco automatico: l'eventuale blocco viene rilevato Automatic release: shutdowns are detected automatically, causing a restart at maximum static torque in order to restore normal operating conditions.

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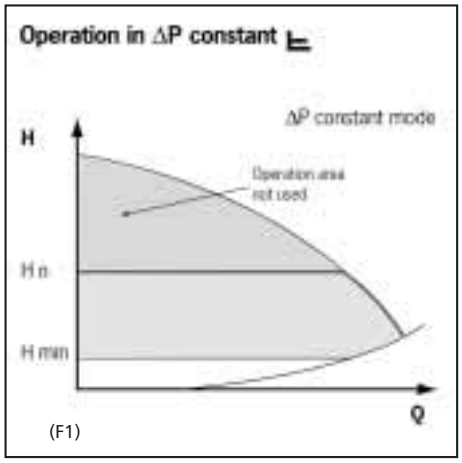
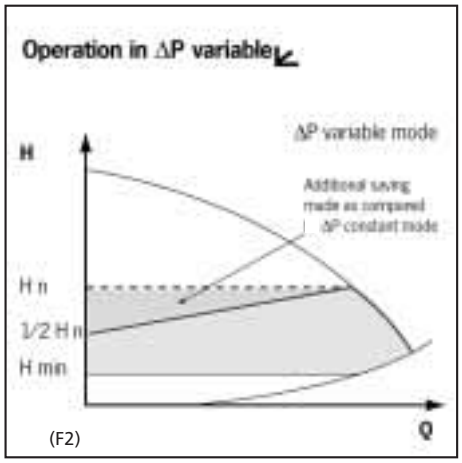
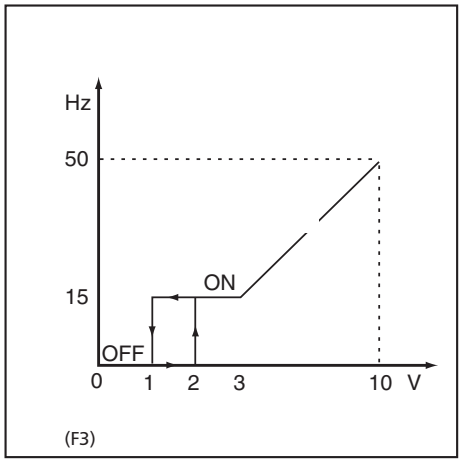
Lowara

Variable speed circulators for commercial systems

ETC-EFC Series







FUNCTIONS AVAILABLE AND CONTROL MODES

Control:

1. Constant pressure
   As the flow rate varies, the controller adjusts the circulator's differential pressure to match the "Hn" value previously set on the display, until it meets the characteristic curve (F1).
2. Variable pressure
   As the flow rate decreases, the controller reduces the circulator's differential pressure linearly (hydraulic pressure head) from the "Hn" value previously set on the display down to Hn/2 (F2).
3. Controlled speed
   The motor running speed is fixed at the value previously set on the display within a range of 850 to 2850 rpm.

Night-time operation:

When the boiler is off and the temperature of the water in the system (detected by the probe) is lower, the circulator speed is set to match the night-time operating curve (the speed is reduced). This prevents the circulation of cold water when it is not required, enabling considerable energy savings. When the probe detects an increase in the water temperature (which indicates that the boiler has been switched on) the running speed of the circulator is increased to match the previous characteristic curve.

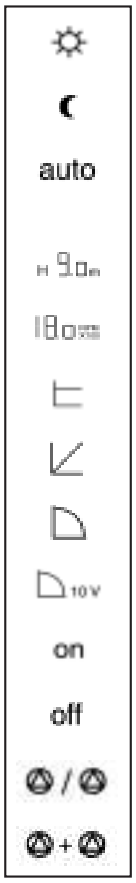
External setting mode

Control: the starting, stopping and running speed of the circulator are controlled based on an external voltage signal within the 0 to 10 V range (F3).
Diagnostics: in case of malfunctions, a message is displayed, with a code referring to the type of problem.

Variable speed circulators for commercial systems

ETC-EFC Series

FUNCTIONS AVAILABLE AND CONTROL MODES



- "Sun" icon: "normal" operation.
- "Moon" icon: "night-time" operation.
- "Auto" symbol on: enables automatic changeover in "night-time" operating mode.
- Desired differential pressure setting (e.g. 9 m).
- Running speed setting (e.g. 1800 rpm).
- Constant pressure adjustment operation logo.
- Variable pressure adjustment operation logo.
- Controlled speed logo: control speed operation.
- External signal adjustment operation logo.
- Circulator on.
- Circulator off.
- Twin circulator in Standard operating mode.
- Twin circulator in Cascade operating mode.

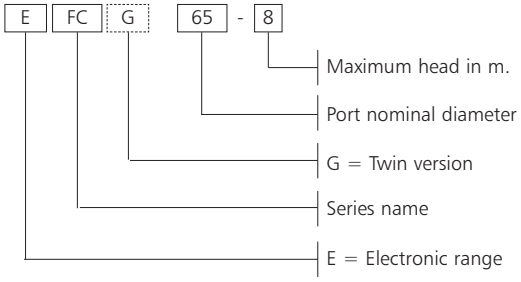
ACCESSORIES AVAILABLE ON REQUEST

- Pipe unions.
- Blind flanges.
- IF modules.
- Counterflanges.

INSTALLATION

- Suitable for installation on horizontal or vertical piping, in any position provided that motor axis is horizontal.
- For the twin design installed on horizontal piping, periodic changeover is recommended in order to prevent the formation of water pockets at the top; as an alternative, install an air bleed valve on the flange.

ETC-EFC SERIES IDENTIFICATION CODE



EXAMPLE: EFCG 65-8
FC series electronic circulator, twin version, port nominal diameter = 65, max head = 8 m.

TABLE OF MATERIALS

PART	MATERIAL
Pump body	Ft25
Impeller	Cast iron
	Composite material
Shaft	Stainless steel
Jacket	Stainless steel
Bearings	Carbon + Metal

efc-efcg-2p50_a_tm

MINIMUM PRESSURE SUCTION TABLE

PUMP TYPE	70°C	90°C	110°C
ETC 32-11	5.0 m	9.0 m	16 m
EFC 40-10 / EFCG 40-10	9.0 m	13 m	20 m
EFC 50-10 / EFCG 50-10	8.0 m	12 m	19 m
EFC 65-8 / EFCG 65-8	5.0 m	9.0 m	16 m
EFC 80-10 / EFCG 80-10	10 m	14 m	21 m

10.2 m = 1 bar

efc-2p50_a_tpm

ETC-EFC SERIES (SINGLE VERSION, SINGLE-PHASE) HYDRAULIC PERFORMANCE TABLE

PUMP TYPE	ABSORBED POWER		INTENSITY		SPEED	Q = DELIVERY										
						l/min 0	25	50	100	150	200	300	400	500	750	1000
	MIN	MAX	MIN	MAX		m^3/h 0	1,5	3	6	9	12	18	24	30	45	60
230V 50Hz	W	W	A	A	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER										
ETC 32-11	55	400	0,30	1,9	min - 900	2,0	1,9	1,4								
					max - 2600	11,3	10,8	9,9	7,3	4,0						
EFC 40-10	30	570	0,45	4,8	min - 850	2,4	2,3	2,2	1,4							
					max - 2850	9,7	9,7	9,5	8,7	7,4	5,8					
EFC 50-10	30	920	0,45	7,2	min - 850	2,5	2,5	2,5	2,2	1,8	1,1					
					max - 2850	9,7	9,7	9,6	9,4	8,9	8,3	6,7	4,6			
EFC 65-8	70	910	0,70	7,8	min - 850	2,0	1,9	1,9	1,7	1,6	1,4					
					max - 2850	8,2	8,1	8,0	7,8	7,5	7,2	6,2	5,0	3,6		
EFC 80-10	100	1650	0,50	7,5	min - 850	2,5	2,5	2,4	2,4	2,3	2,2	1,9	1,4			
					max - 2850	9,6	9,6	9,6	9,6	9,5	9,4	9,0	8,5	7,9	6,0	3,6

Performances according to ISO standards 9906 – Annex A.

efc-2p50_a_th

EFCG SERIES (TWIN VERSION, SINGLE-PHASE) HYDRAULIC PERFORMANCE TABLE (SINGLE OPERATION)

PUMP TYPE	ABSORBED POWER		INTENSITY		SPEED	Q = DELIVERY										
						l/min 0	25	50	100	150	200	300	400	500	650	850
	MIN	MAX	MIN	MAX		m^3/h 0	1,5	3	6	9	12	18	24	30	39	51
230V 50Hz	W	W	A	A	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER										
EFCG 40-10	30	570	0,45	4,8	min - 850	2,6	2,4	2,2	1,3							
					max - 2850	10,0	9,8	9,4	8,4	6,9	5,0					
EFCG 50-10	30	920	0,45	7,2	min - 850	2,3	2,3	2,2	1,9	1,4						
					max - 2850	9,5	9,5	9,3	8,9	8,3	7,6	5,7				
EFCG 65-8	70	910	0,70	7,8	min - 850	2,1	2,0	1,9	1,7	1,4	1,0					
					max - 2850	8,3	8,1	7,9	7,4	7,0	6,5	5,4	4,2			
EFCG 80-10	100	1650	0,50	7,5	min - 850	2,5	2,5	2,4	2,3	2,2	2,1	1,7	1,3			
					max - 2850	9,5	9,5	9,5	9,5	9,4	9,2	8,8	8,1	7,3	5,9	4,1

Performances according to ISO standards 9906 – Annex A.

efcg-2p50S_a_th

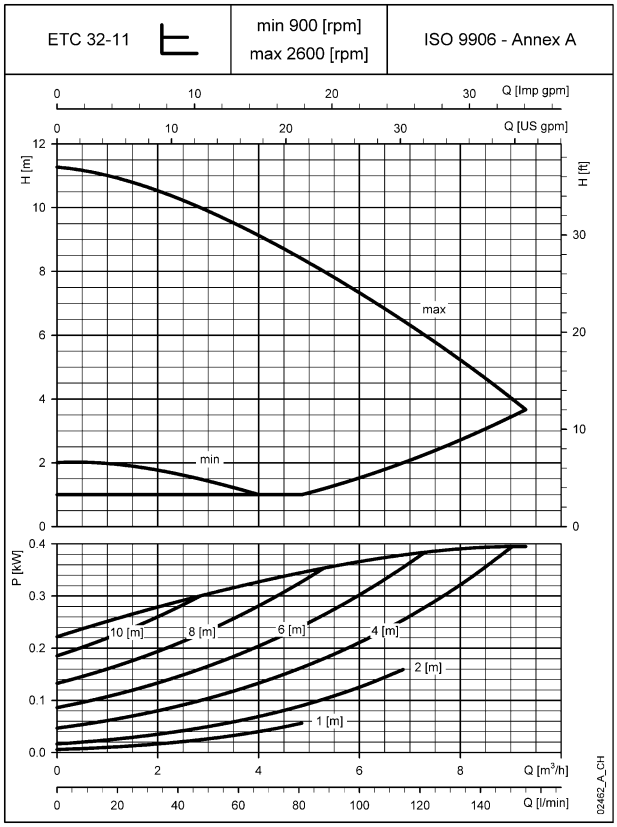
EFCG SERIES (TWIN VERSION, SINGLE-PHASE) HYDRAULIC PERFORMANCE TABLE (PARALLEL OPERATION)

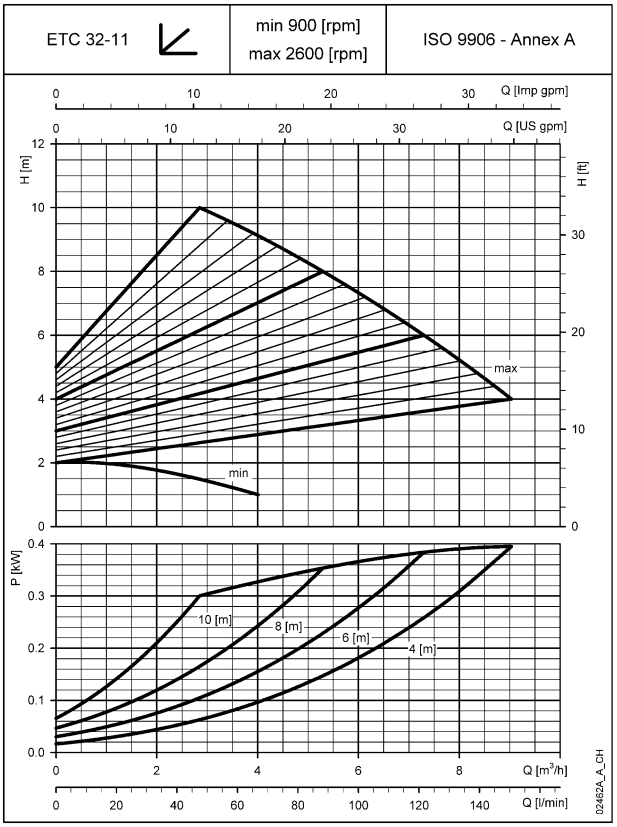
PUMP TYPE	ABSORBED POWER		INTENSITY		SPEED	Q = DELIVERY										
						l/min 0	100	200	300	400	500	600	800	1000	1200	1500
	MIN	MAX	MIN	MAX		m^3/h 0	6	12	18	24	30	36	48	60	72	90
230V 50Hz	W*	W*	A*	A*	min^{-1}	H = TOTAL HEAD METERS COLUMN OF WATER										
EFCG 40-10	30	570	0,45	4,8	max - 2850	10,0	9,4	8,2	6,6							
EFCG 50-10	30	920	0,45	7,2	max - 2850	9,5	9,2	8,8	8,1	7,2	6,1	4,6				
EFCG 65-8	70	910	0,70	7,8	max - 2850	8,3	8,0	7,6	7,1	6,6	6,1	5,5	4,0			
EFCG 80-10	100	1650	0,50	7,5	max - 2850	9,5	9,5	9,4	9,3	9,1	8,8	8,4	7,6	6,5	5,4	3,8

* Electric data refer to single motor.
Performances according to ISO standards 9906 – Annex A.

efcg-2p50P_a_th

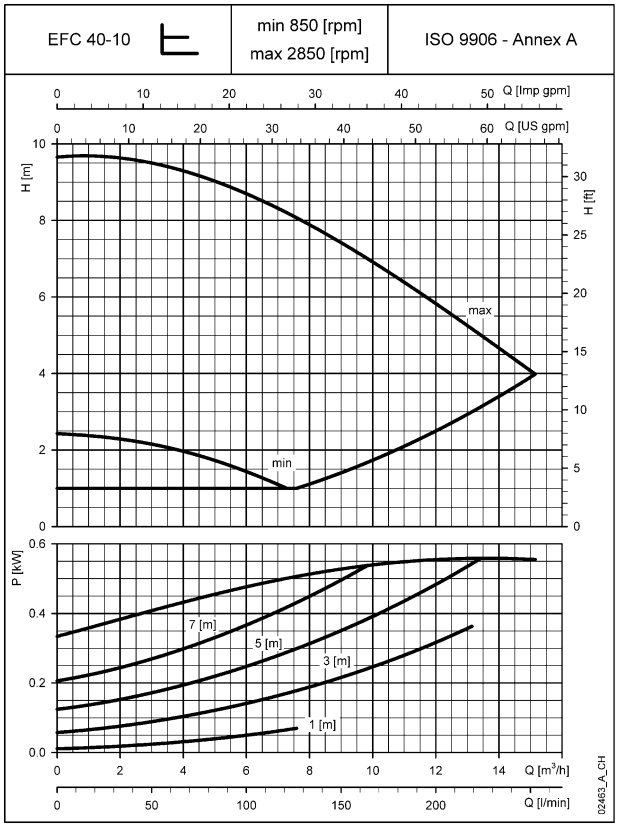
ETC SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

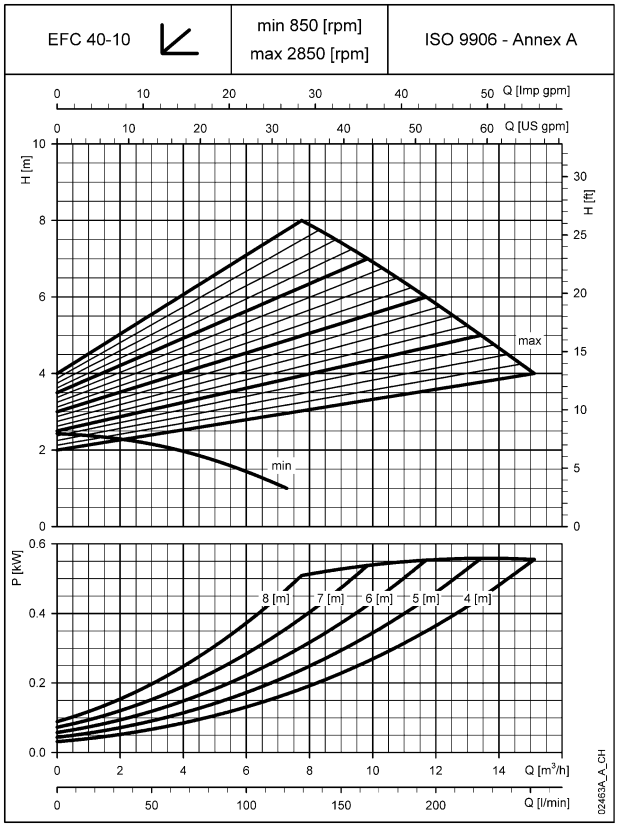


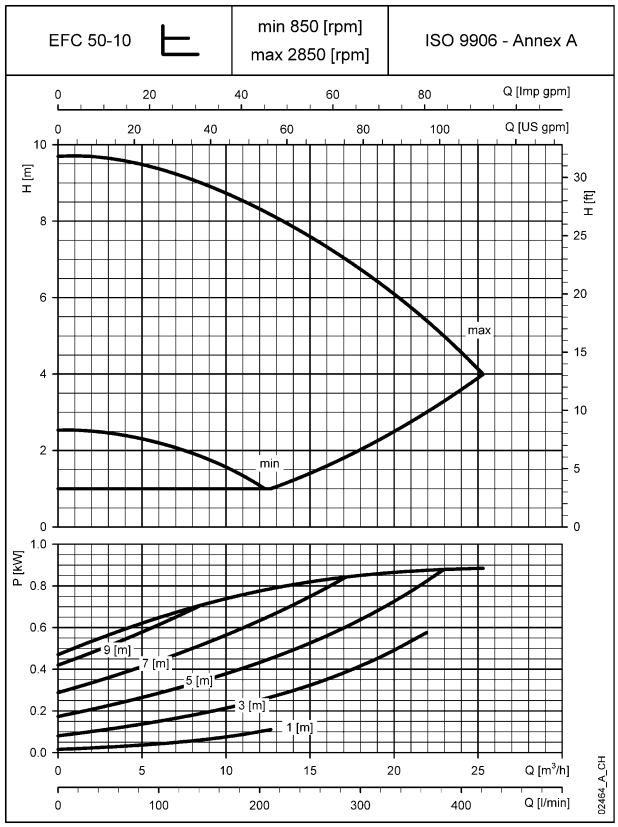


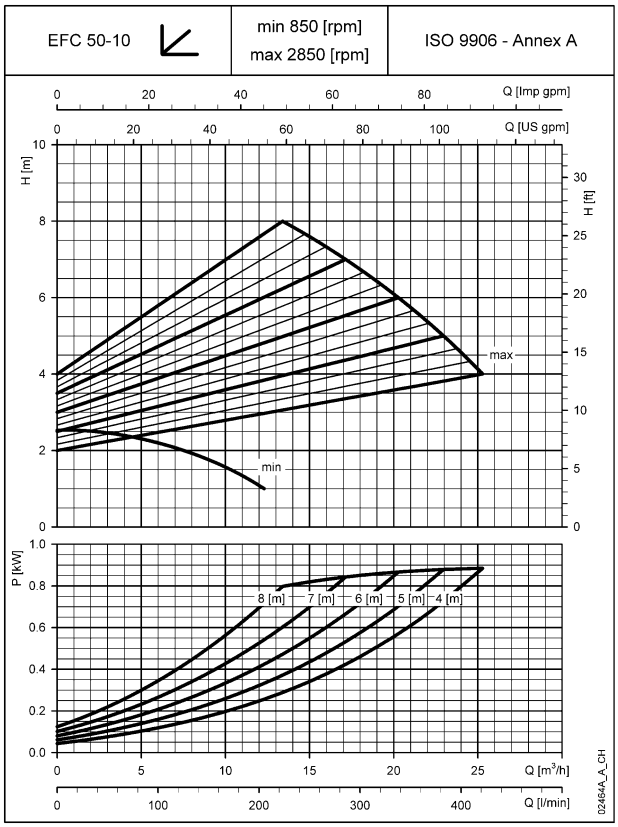
These performances are valid for liquids with density ρ=1,0 kg/dm^3 and kinematic viscosity υ =1 mm^2/sec.

EFC SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS





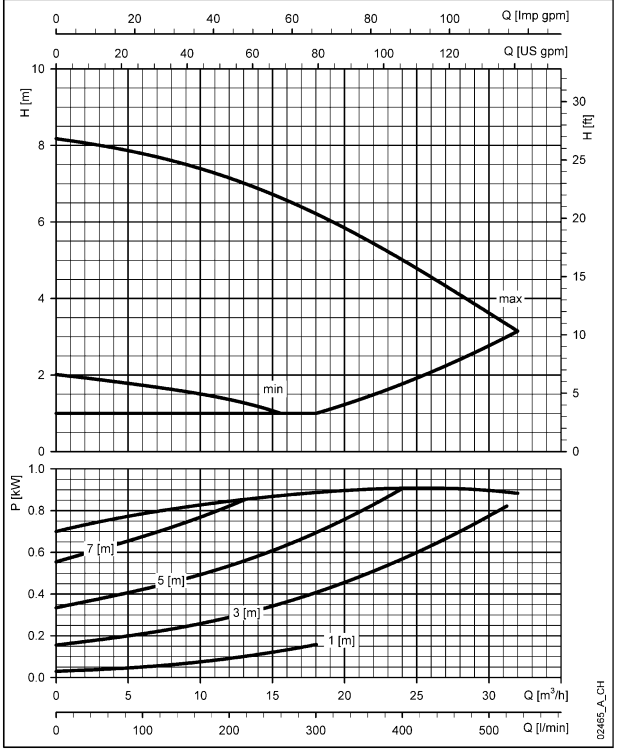




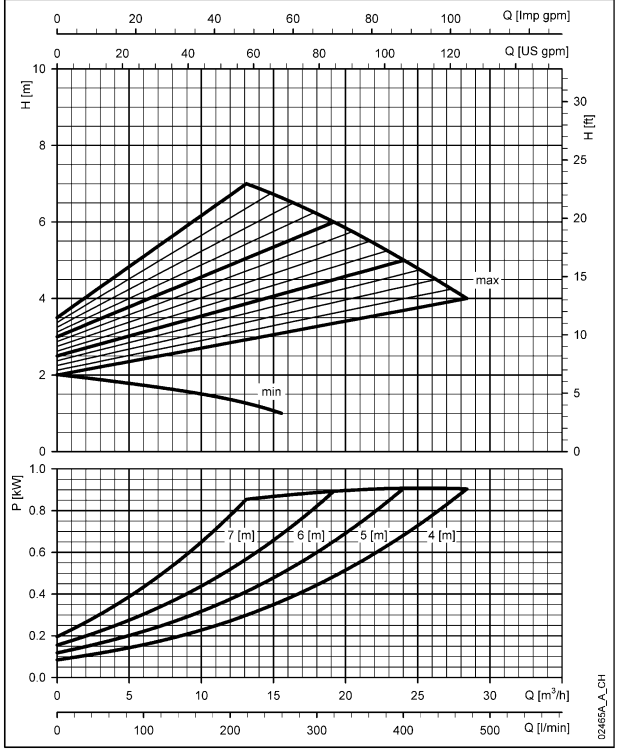
These performances are valid for liquids with density ρ=1,0 kg/dm^3 and kinematic viscosity υ =1 mm^2/sec.

EFC SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

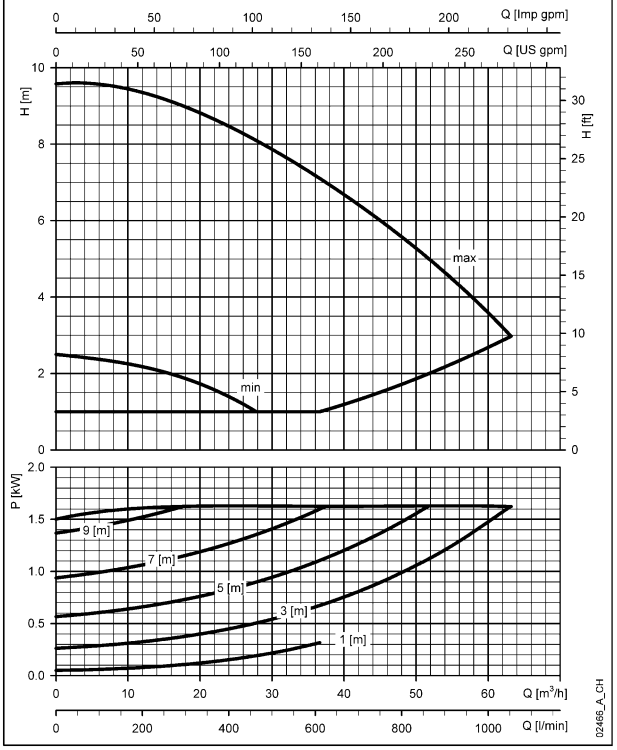
EFC 65-8 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



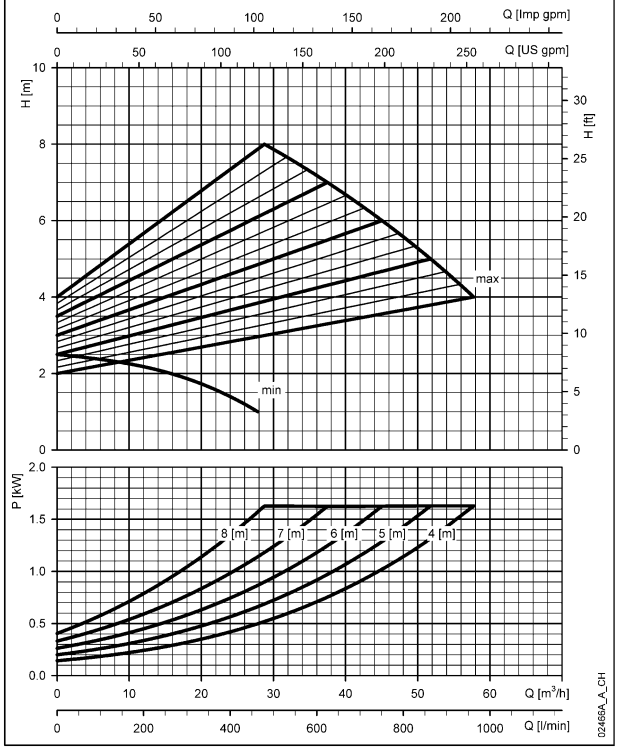
EFC 65-8 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



EFC 80-10 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



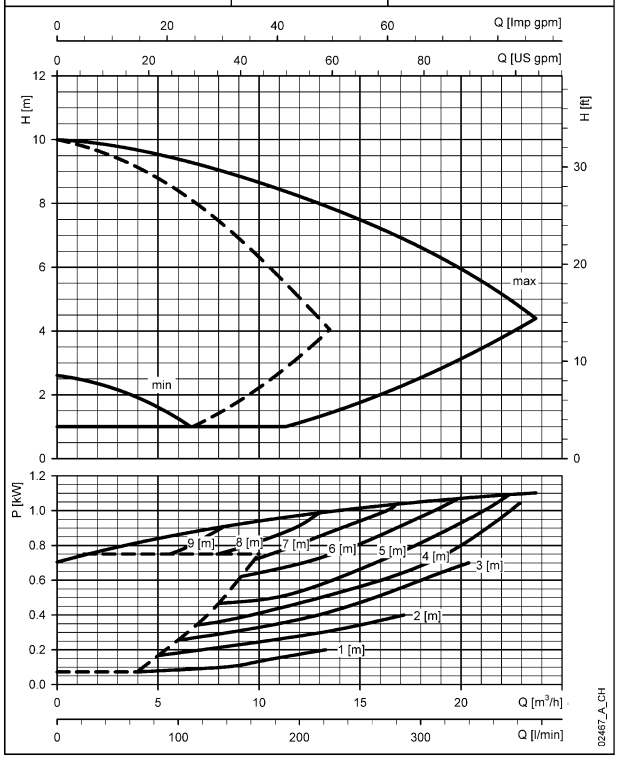
EFC 80-10 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



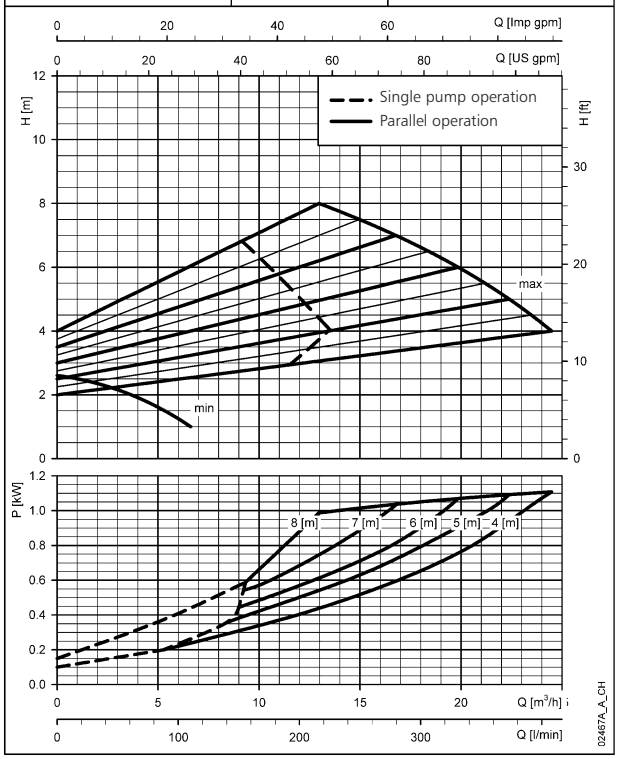
These performances are valid for liquids with density ρ=1,0 kg/dm^3 and kinematic viscosity υ =1 mm^2/sec.

EFCG SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

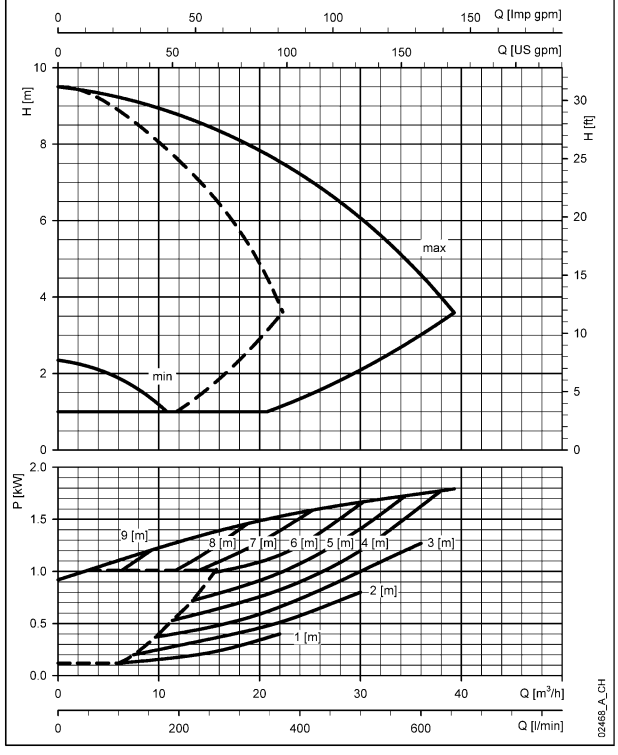
EFCG 40-10 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



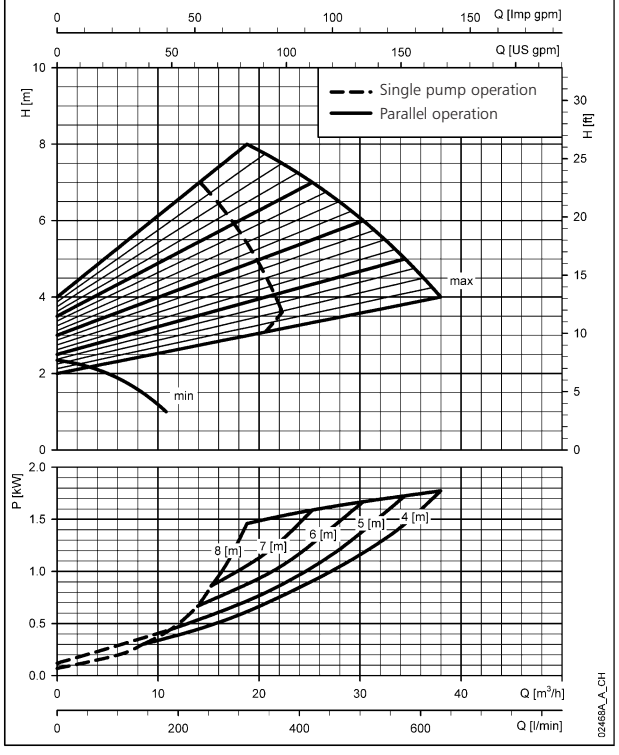
EFCG 40-10 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



EFCG 50-10 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



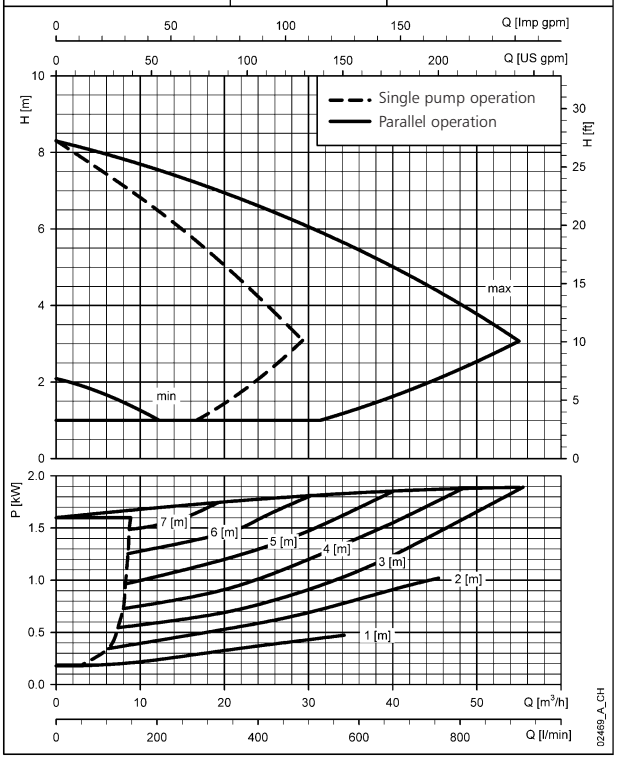
EFCG 50-10 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



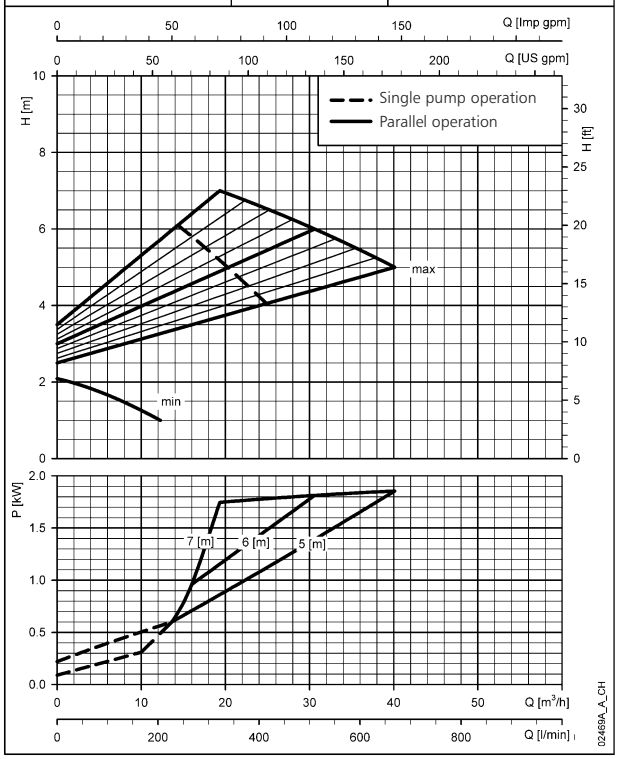
These performances are valid for liquids with density ρ=1,0 kg/dm³ and kinematic viscosity υ =1 mm²/sec.

EFCG SERIES
SINGLE-PHASE OPERATING CHARACTERISTICS

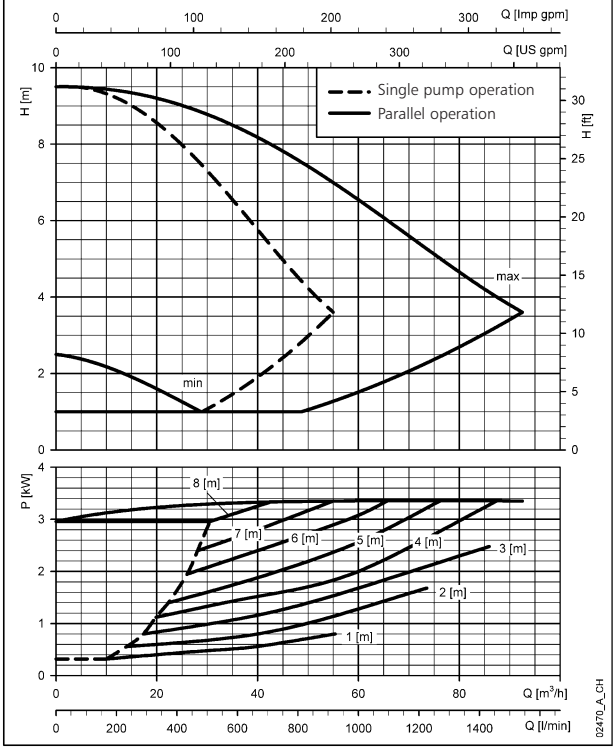
EFCG 65-8 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



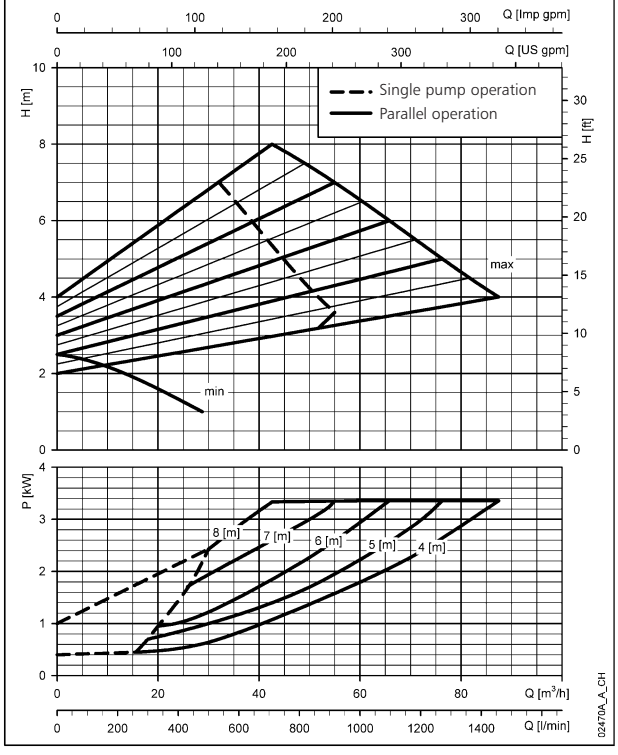
EFCG 65-8 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



EFCG 80-10 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A

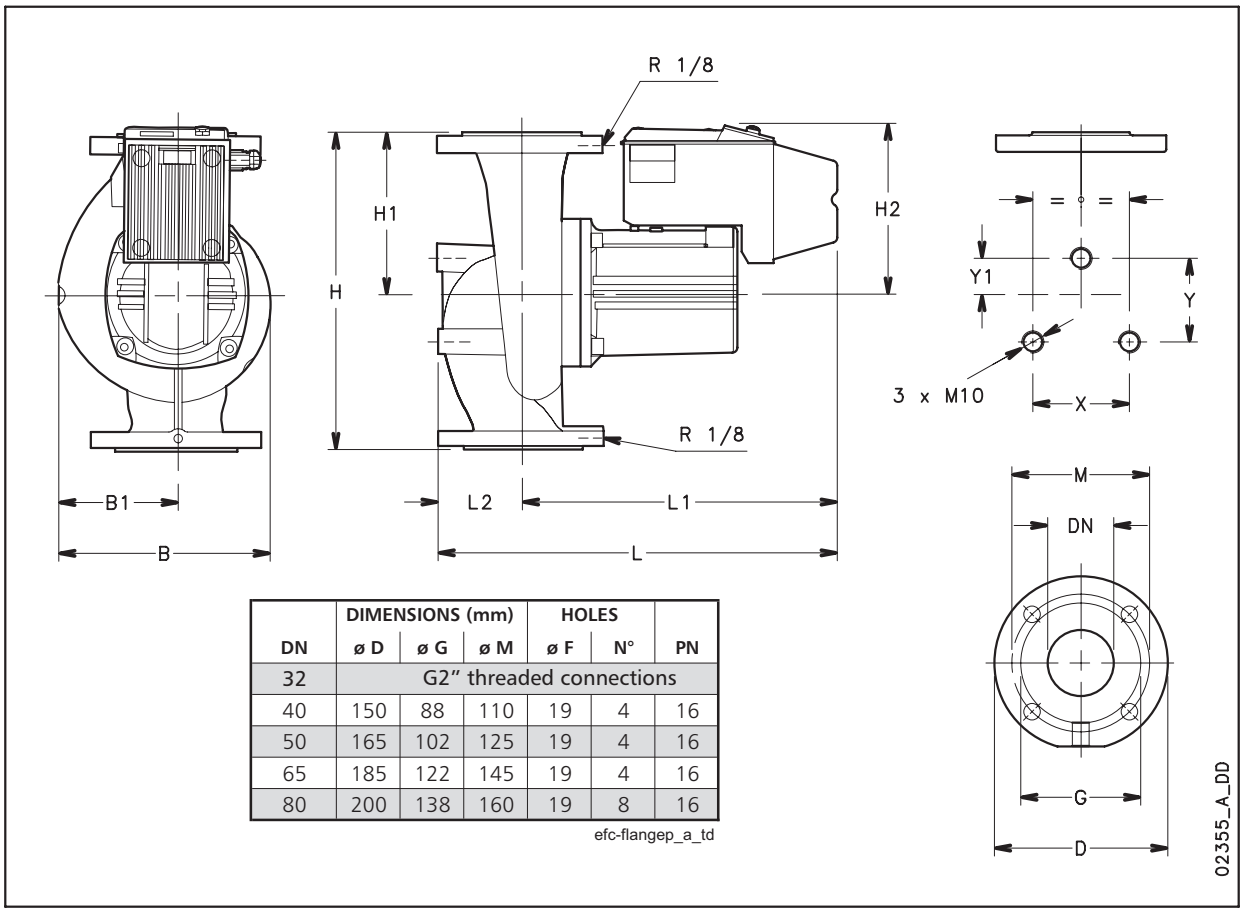


EFCG 80-10 | min 850 [rpm] max 2850 [rpm] | ISO 9906 - Annex A



These performances are valid for liquids with density ρ=1,0 kg/dm^3 and kinematic viscosity υ =1 mm^2/sec.

ETC-EFC SERIES
DIMENSIONS AND WEIGHTS



DN	DIMENSIONS (mm) ø D	ø G	ø M	HOLES ø F	N°	PN
32	G2" threaded connections					
40	150	88	110	19	4	16
50	165	102	125	19	4	16
65	185	122	145	19	4	16
80	200	138	160	19	8	16

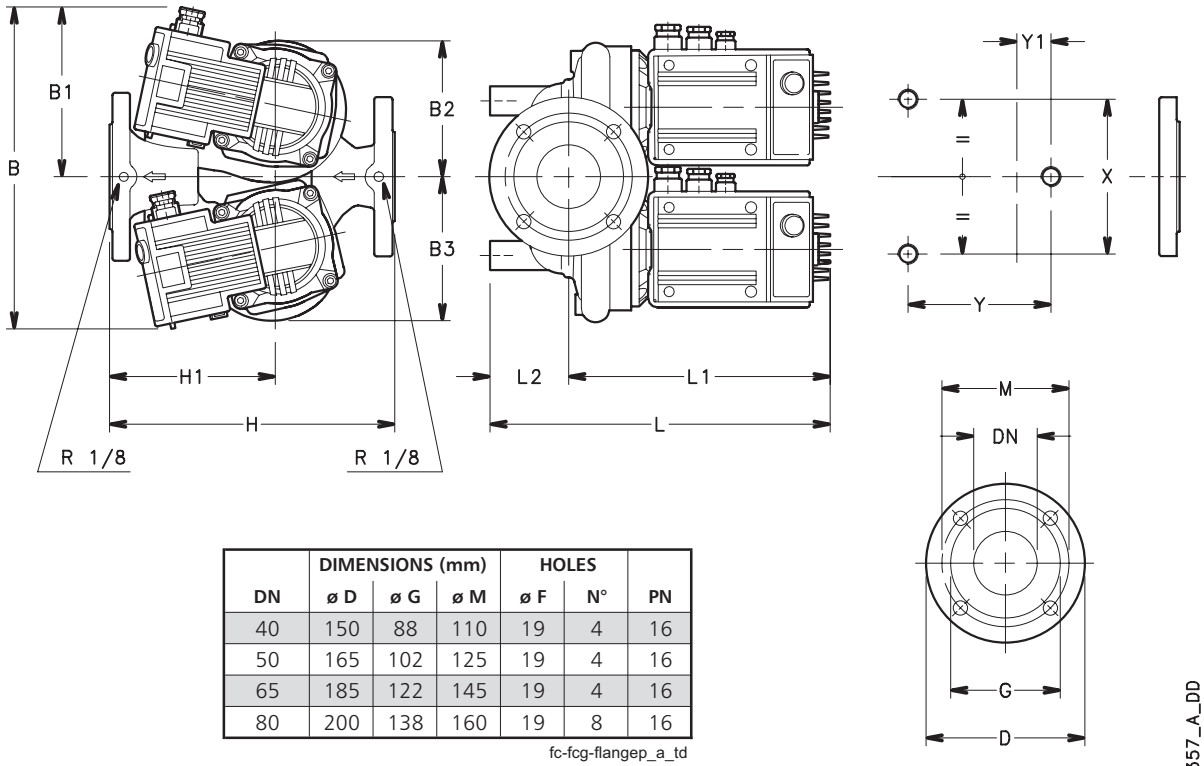
efc-flangep_a_td

DIMENSIONS AND WEIGHTS TABLE

PUMP TYPE	DIMENSIONS (mm)												WEIGHT
SINGLE-PHASE	B	B1	H	H1	H2	L	L1	L2	X	Y	Y1	DN	kg
ETC 32-11	182	73	180	90	133	305	260	45	-	-	-	32	7,5
EFC 40-10	171	90	250	125	178	385	310	75	90	90	40	40	18
EFC 50-10	190	101	280	140	178	399	316	83	90	90	40	50	21
EFC 65-8	218	118	340	170	188	440	347	93	104	90	40	65	28
EFC 80-10	244	135	360	180	188	466	371	95	135	95	40	80	36

efc-2p50_a_td

EFCG SERIES
DIMENSIONS AND WEIGHTS



DN	DIMENSIONS (mm) ø D	ø G	ø M	HOLES ø F	N°	PN
40	150	88	110	19	4	16
50	165	102	125	19	4	16
65	185	122	145	19	4	16
80	200	138	160	19	8	16

fc-fcg-flangep_a_td

DIMENSIONS AND WEIGHTS TABLE

PUMP TYPE	DIMENSIONS (mm)													WEIGHT
	B	B1	B2	B3	H	H1	L	L1	L2	X	Y	Y1	DN	kg
EFCG 40-10	383	198	172	178	250	135	381	306	75	225	132	35	40	32
EFCG 50-10	403	208	192	198	280	155	395	312	83	228	157	50	50	36
EFCG 65-8	432	218	209	223	340	185	436	343	93	225	162	25	65	49
EFCG 80-10	496	256	231	249	360	205	471	371	100	240	180	43	80	61

efcg-2p50_a_td

TECHNICAL APPENDIX

VAPOUR PRESSURE
PS VAPOUR PRESSURE AND ρ DENSITY OF WATER TABLE

t	T	ps	ρ
°C	K	bar	kg/dm³
0	273,15	0,00611	0,9998
1	274,15	0,00657	0,9999
2	275,15	0,00706	0,9999
3	276,15	0,00758	0,9999
4	277,15	0,00813	1,0000
5	278,15	0,00872	1,0000
6	279,15	0,00935	1,0000
7	280,15	0,01001	0,9999
8	281,15	0,01072	0,9999
9	282,15	0,01147	0,9998
10	283,15	0,01227	0,9997
11	284,15	0,01312	0,9997
12	285,15	0,01401	0,9996
13	286,15	0,01497	0,9994
14	287,15	0,01597	0,9993
15	288,15	0,01704	0,9992
16	289,15	0,01817	0,9990
17	290,15	0,01936	0,9988
18	291,15	0,02062	0,9987
19	292,15	0,02196	0,9985
20	293,15	0,02337	0,9983
21	294,15	0,24850	0,9981
22	295,15	0,02642	0,9978
23	296,15	0,02808	0,9976
24	297,15	0,02982	0,9974
25	298,15	0,03166	0,9971
26	299,15	0,03360	0,9968
27	300,15	0,03564	0,9966
28	301,15	0,03778	0,9963
29	302,15	0,04004	0,9960
30	303,15	0,04241	0,9957
31	304,15	0,04491	0,9954
32	305,15	0,04753	0,9951
33	306,15	0,05029	0,9947
34	307,15	0,05318	0,9944
35	308,15	0,05622	0,9940
36	309,15	0,05940	0,9937
37	310,15	0,06274	0,9933
38	311,15	0,06624	0,9930
39	312,15	0,06991	0,9927
40	313,15	0,07375	0,9923
41	314,15	0,07777	0,9919
42	315,15	0,08198	0,9915
43	316,15	0,09639	0,9911
44	317,15	0,09100	0,9907
45	318,15	0,09582	0,9902
46	319,15	0,10086	0,9898
47	320,15	0,10612	0,9894
48	321,15	0,11162	0,9889
49	322,15	0,11736	0,9884
50	323,15	0,12335	0,9880
51	324,15	0,12961	0,9876
52	325,15	0,13613	0,9871
53	326,15	0,14293	0,9862
54	327,15	0,15002	0,9862

t	T	ps	ρ
°C	K	bar	kg/dm³
55	328,15	0,15741	0,9857
56	329,15	0,16511	0,9852
57	330,15	0,17313	0,9846
58	331,15	0,18147	0,9842
59	332,15	0,19016	0,9837
60	333,15	0,1992	0,9832
61	334,15	0,2086	0,9826
62	335,15	0,2184	0,9821
63	336,15	0,2286	0,9816
64	337,15	0,2391	0,9811
65	338,15	0,2501	0,9805
66	339,15	0,2615	0,9799
67	340,15	0,2733	0,9793
68	341,15	0,2856	0,9788
69	342,15	0,2984	0,9782
70	343,15	0,3116	0,9777
71	344,15	0,3253	0,9770
72	345,15	0,3396	0,9765
73	346,15	0,3543	0,9760
74	347,15	0,3696	0,9753
75	348,15	0,3855	0,9748
76	349,15	0,4019	0,9741
77	350,15	0,4189	0,9735
78	351,15	0,4365	0,9729
79	352,15	0,4547	0,9723
80	353,15	0,4736	0,9716
81	354,15	0,4931	0,9710
82	355,15	0,5133	0,9704
83	356,15	0,5342	0,9697
84	357,15	0,5557	0,9691
85	358,15	0,5780	0,9684
86	359,15	0,6011	0,9678
87	360,15	0,6249	0,9671
88	361,15	0,6495	0,9665
89	362,15	0,6749	0,9658
90	363,15	0,7011	0,9652
91	364,15	0,7281	0,9644
92	365,15	0,7561	0,9638
93	366,15	0,7849	0,9630
94	367,15	0,8146	0,9624
95	368,15	0,8453	0,9616
96	369,15	0,8769	0,9610
97	370,15	0,9094	0,9602
98	371,15	0,9430	0,9596
99	372,15	0,9776	0,9586
100	373,15	1,0133	0,9581
102	375,15	1,0878	0,9567
104	377,15	1,1668	0,9552
106	379,15	1,2504	0,9537
108	381,15	1,3390	0,9522
110	383,15	1,4327	0,9507
112	385,15	1,5316	0,9491
114	387,15	1,6362	0,9476
116	389,15	1,7465	0,9460
118	391,15	1,8628	0,9445

t	T	ps	ρ
°C	K	bar	kg/dm³
120	393,15	1,9854	0,9429
122	395,15	2,1145	0,9412
124	397,15	2,2504	0,9396
126	399,15	2,3933	0,9379
128	401,15	2,5435	0,9362
130	403,15	2,7013	0,9346
132	405,15	2,867	0,9328
134	407,15	3,041	0,9311
136	409,15	3,223	0,9294
138	411,15	3,414	0,9276
140	413,15	3,614	0,9258
145	418,15	4,155	0,9214
155	428,15	5,433	0,9121
160	433,15	6,181	0,9073
165	438,15	7,008	0,9024
170	433,15	7,920	0,8973
175	448,15	8,924	0,8921
180	453,15	10,027	0,8869
185	458,15	11,233	0,8815
190	463,15	12,551	0,8760
195	468,15	13,987	0,8704
200	473,15	15,550	0,8647
205	478,15	17,243	0,8588
210	483,15	19,077	0,8528
215	488,15	21,060	0,8467
220	493,15	23,198	0,8403
225	498,15	25,501	0,8339
230	503,15	27,976	0,8273
235	508,15	30,632	0,8205
240	513,15	33,478	0,8136
245	518,15	36,523	0,8065
250	523,15	39,776	0,7992
255	528,15	43,246	0,7916
260	533,15	46,943	0,7839
265	538,15	50,877	0,7759
270	543,15	55,058	0,7678
275	548,15	59,496	0,7593
280	553,15	64,202	0,7505
285	558,15	69,186	0,7415
290	563,15	74,461	0,7321
295	568,15	80,037	0,7223
300	573,15	85,927	0,7122
305	578,15	92,144	0,7017
310	583,15	98,70	0,6906
315	588,15	105,61	0,6791
320	593,15	112,89	0,6669
325	598,15	120,56	0,6541
330	603,15	128,63	0,6404
340	613,15	146,05	0,6102
350	623,15	165,35	0,5743
360	633,15	186,75	0,5275
370	643,15	210,54	0,4518
374,15	647,30	221,20000	0,3154

G-at_npsh_a_sc

TABLE OF FLOW RESISTANCE IN 100 M OF A NEW AND STRAIGHT CAST IRON PIPELINE (HAZEN-WILLIAMS FORMULA C=100)

FLOW RATE			NOMINAL DIAMETER IN mm AND INCHES																
m^3/h	l/min		15 1/2"	20 3/4"	25 1"	32 1 1/4"	40 1 1/2"	50 2	65 2 1/2"	80 3"	100 4"	125 5"	150 6"	175 7"	200 8"	250 10"	300 12"	350 14"	400 16"
0,6	10	v hr	0,94 16	0,53 3,94	0,34 1,33	0,21 0,40	0,13 0,13												
0,9	15	v hr	1,42 33,9	0,80 8,35	0,51 2,82	0,31 0,85	0,20 0,29												
1,2	20	v hr	1,89 57,7	1,06 14,21	0,68 4,79	0,41 1,44	0,27 0,49	0,17 0,16											
1,5	25	v hr	2,36 87,2	1,33 21,5	0,85 7,24	0,52 2,18	0,33 0,73	0,21 0,25											
1,8	30	v hr	2,83 122	1,59 30,1	1,02 10,1	0,62 3,05	0,40 1,03	0,25 0,35											
2,1	35	v hr	3,30 162	1,86 40,0	1,19 13,5	0,73 4,06	0,46 1,37	0,30 0,46											
2,4	40	v hr		2,12 51,2	1,36 17,3	0,83 5,19	0,53 1,75	0,34 0,59	0,20 0,16										
3	50	v hr		2,65 77,4	1,70 26,1	1,04 7,85	0,66 2,65	0,42 0,89	0,25 0,25										
3,6	60	v hr		3,18 108	2,04 36,6	1,24 11,0	0,80 3,71	0,51 1,25	0,30 0,35										
4,2	70	v hr		3,72 144	2,38 48,7	1,45 14,6	0,93 4,93	0,59 1,66	0,35 0,46										
4,8	80	v hr		4,25 185	2,72 62,3	1,66 18,7	1,06 6,32	0,68 2,13	0,40 0,59										
5,4	90	v hr			3,06 77,5	1,87 23,3	1,19 7,85	0,76 2,65	0,45 0,74	0,30 0,27									
6	100	v hr			3,40 94,1	2,07 28,3	1,33 9,54	0,85 3,22	0,50 0,90	0,33 0,33									
7,5	125	v hr			4,25 142	2,59 42,8	1,66 14,4	1,06 4,86	0,63 1,36	0,41 0,49									
9	150	v hr				3,11 59,9	1,99 20,2	1,27 6,82	0,75 1,90	0,50 0,69	0,32 0,23								
10,5	175	v hr				3,63 79,7	2,32 26,9	1,49 9,07	0,88 2,53	0,58 0,92	0,37 0,31								
12	200	v hr				4,15 102	2,65 34,4	1,70 11,6	1,01 3,23	0,66 1,18	0,42 0,40								
15	250	v hr				5,18 154	3,32 52,0	2,12 17,5	1,26 4,89	0,83 1,78	0,53 0,60	0,34 0,20							
18	300	v hr					3,98 72,8	2,55 24,6	1,51 6,85	1,00 2,49	0,64 0,84	0,41 0,28							
24	400	v hr					5,31 124	3,40 41,8	2,01 11,66	1,33 4,24	0,85 1,43	0,54 0,48	0,38 0,20						
30	500	v hr					6,63 187	4,25 63,2	2,51 17,6	1,66 6,41	1,06 2,16	0,68 0,73	0,47 0,30						
36	600	v hr						5,10 88,6	3,02 24,7	1,99 8,98	1,27 3,03	0,82 1,02	0,57 0,42	0,42 0,20					
42	700	v hr						5,94 118	3,52 32,8	2,32 11,9	1,49 4,03	0,95 1,36	0,66 0,56	0,49 0,26					
48	800	v hr						6,79 151	4,02 42,0	2,65 15,3	1,70 5,16	1,09 1,74	0,75 0,72	0,55 0,34					
54	900	v hr						7,64 188	4,52 52,3	2,99 19,0	1,91 6,41	1,22 2,16	0,85 0,89	0,62 0,42					
60	1000	v hr							5,03 63,5	3,32 23,1	2,12 7,79	1,36 2,63	0,94 1,08	0,69 0,51	0,53 0,27				
75	1250	v hr							6,28 96,0	4,15 34,9	2,65 11,8	1,70 3,97	1,18 1,63	0,87 0,77	0,66 0,40				
90	1500	v hr							7,54 134	4,98 48,9	3,18 16,5	2,04 5,57	1,42 2,29	1,04 1,08	0,80 0,56				
105	1750	v hr							8,79 179	5,81 65,1	3,72 21,9	2,38 7,40	1,65 3,05	1,21 1,44	0,93 0,75				
120	2000	v hr								6,63 83,3	4,25 28,1	2,72 9,48	1,89 3,90	1,39 1,84	1,06 0,96	0,68 0,32			
150	2500	v hr								8,29 126	5,31 42,5	3,40 14,3	2,36 5,89	1,73 2,78	1,33 1,45	0,85 0,49			
180	3000	v hr									6,37 59,5	4,08 20,1	2,83 8,26	2,08 3,90	1,59 2,03	1,02 0,69	0,71 0,28		
210	3500	v hr									7,43 79,1	4,76 26,7	3,30 11,0	2,43 5,18	1,86 2,71	1,19 0,91	0,83 0,38		
240	4000	v hr									8,49 101	5,44 34,2	3,77 14,1	2,77 6,64	2,12 3,46	1,36 1,17	0,94 0,48		
300	5000	v hr										6,79 51,6	4,72 21,2	3,47 10,0	2,65 5,23	1,70 1,77	1,18 0,73		
360	6000	v hr										8,15 72,3	5,66 29,8	4,16 14,1	3,18 7,33	2,04 2,47	1,42 1,02		
420	7000	v hr											6,61 39,6	4,85 18,7	3,72 9,75	2,38 3,29	1,65 1,35	1,21 0,64	
480	8000	v hr											7,55 50,7	5,55 23,9	4,25 12,49	2,72 4,21	1,89 1,73	1,39 0,82	
540	9000	v hr											8,49 63,0	6,24 29,8	4,78 15,5	3,06 5,24	2,12 2,16	1,56 1,02	1,19 0,53
600	10000	v hr												6,93 36,2	5,31 18,9	3,40 6,36	2,36 2,62	1,73 1,24	1,33 0,65

The hr values must be multiplied by:
0.71 for galvanized or painted steel pipes
0.54 for stainless steel or copper pipes
0.47 for PVC or PE pipes

G-at-pct_a_th

hr = flow resistance in 100 m of straight pipeline (m)
V = water speed (m/sec)

FLOW RESISTANCE

TABLE OF FLOW RESISTANCE IN BENDS, VALVES AND GATES

Flow resistance is determined using the equivalent pipe length method according to the following table.

PIPE FITTING TYPE	DN											
	25	32	40	50	65	80	100	125	150	200	250	300
	Equivalent pipe length, m											
45° bend	0,2	0,2	0,4	0,4	0,6	0,6	0,9	1,1	1,5	1,9	2,4	2,8
90° bend	0,4	0,6	0,9	1,1	1,3	1,5	2,1	2,6	3,0	3,9	4,7	5,8
Smooth 90° bend	0,4	0,4	0,4	0,6	0,9	1,1	1,3	1,7	1,9	2,8	3,4	3,9
T union	1,1	1,3	1,7	2,1	2,6	3,2	4,3	5,3	6,4	7,5	10,7	12,8
Gate valve	-	-	-	0,2	0,2	0,2	0,4	0,4	0,6	0,9	1,1	1,3
Non-return valve	1,1	1,5	1,9	2,4	3,0	3,4	4,7	5,9	7,4	9,6	11,8	13,9

G-a-pcv_a_th

The table is valid according to the Hazel Williams coefficient C = 100 (cast iron pipe fittings). For steel pipe fittings, multiply the values by 1.41. For stainless steel, copper or coated cast iron pipe fittings, multiply the values by 1.85.
Once the **equivalent pipe length** has been calculated, the flow resistance can be determined by referring to the pipeline flow resistance table.
The given values are guideline values which can vary according to the model, especially as regards gate valves and non-return valves for which you should refer to the values provided by the manufacturer.

VOLUMETRIC TABLE

Litres per minute l/min	Cubic metres per hour m^3/h	Cubic feet per hour ft^3/h	Cubic feet per minute ft^3/min	Imp. gal. per minute Imp. gal/min	US gal. per minute Us gal./min
1,0000	0,0600	2,1189	0,0353	0,2200	0,2640
16,6670	1,0000	35,3147	0,5886	3,6660	4,4030
0,4720	0,0283	1,0000	0,0167	0,1040	0,1250
28,3170	1,6990	60,0000	1,0000	6,2290	7,4800
4,5460	0,2728	9,6326	0,1605	1,0000	1,2010
3,7850	0,2271	8,0209	0,1337	0,8330	1,0000
0,1100	0,0066	0,2339	0,0039	0,0240	0,0290

PRESSIONE E PREVALENZA

Newton per square metre N/m^2	kilopascal kPa	bar bar	Pound force per square inch psi	metre of water m H_2O	millimetre of mercury mm Hg
1,0000	0,0010	1 x 105	$1,45 \times 10^{-4}$	$1,02 \times 10^{-4}$	0,0075
1000,0000	1,0000	0,0100	0,1450	0,1020	7,5000
100000,0000	100,0000	1,0000	14,5000	10,2000	750,1000
98067,0000	98,0700	0,9810	14,2200	10,0000	735,6000
6895,0000	6,8950	0,0690	1,0000	0,7030	51,7200
2984,0000	2,9840	0,0300	0,4330	0,3050	22,4200
9789,0000	9,7890	0,0980	1,4200	1,0000	73,4200
133,3000	0,1330	0,0013	0,0190	0,0140	1,0000
3386,0000	3,3860	0,0338	0,4910	0,3450	25,4000

LUNGHEZZA

millimetre mm	centimetre cm	metre m	inch in	foot ft	yard yd
1,0000	0,1000	0,0010	0,0394	0,0033	0,0011
10,0000	1,0000	0,0100	0,3937	0,0328	0,0109
1000,0000	100,0000	1,0000	39,3701	3,2808	1,0936
25,4000	2,5400	0,0254	1,0000	0,0833	0,0278
304,8000	30,4800	0,3048	12,0000	1,0000	0,3333
914,4000	91,4400	0,9144	36,0000	3,0000	1,0000

VOLUME

cubic metre m^3	litre litre	millilitre ml	imp. gallon imp. gal.	US gallon US gal.	cubic foot ft^3
1,0000	1000,0000	1 x 106	220,0000	264,2000	35,3147
0,0010	1,0000	1000,0000	0,2200	0,2642	0,0353
1 x 10-6	0,0010	1,0000	2,2 x 10-4	2,642 x 10-4	3,53 x 10-5
0,0045	4,5460	4546,0000	1,0000	1,2010	0,1605
0,0038	3,7850	3785,0000	0,8327	1,0000	0,1337
0,0283	28,3170	28317,0000	6,2288	7,4805	1,0000

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