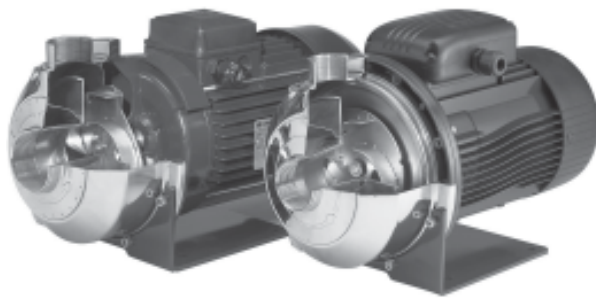


## Open impeller centrifugal electric pumps and threaded connections

### CO-COM Series



### MARKET SECTORS

CIVIL, INDUSTRIAL.

### APPLICATIONS

- Washing of metal parts and/or surface treatment.
- Washing of produce in the packaging industry.
- Food industry washing equipment and systems.
- Dyeing plant and textile industry.
- Plants for the circulation and transfer of moderately viscous liquids, with light chemical aggressiveness.
- Industrial washing machines and commercial dishwashers.

### CONSTRUCTION FEATURES

- Close-coupled, single-impeller centrifugal pump with axial suction and radial delivery.
- Threaded suction and delivery ports (Rp ISO 7).
- Compact construction; adaptor for motor/pump coupling; the impeller is keyed directly to the motor shaft extension.
- Back pull-out design; no need to disconnect the pump body from the system pipes.
- **AISI 316L** stainless steel open impeller with four pressed vanes welded onto base disk.
- Impeller's front **wear surface** consists of a study **AISI 316L** stainless steel plate welded onto the suction port.
- **AISI 316L** stainless steel pump body and seal housing disk, with no diffusers or cavities for easier cleaning and maintenance.
- Pump body tightened by 8 screws allowing rotation of the discharge head.
- **Mechanical seal:**  
**Standard version: Carbon/Ceramica** faces, **FPM** elastomers. The other parts are made of AISI 316L stainless steel.  
**"K" version :** faces are made of **Silicon Carbide and Tungsten Carbide.** **FPM** Elastomers. The other parts are made of AISI 316L stainless steel.
- **FPM O-Rings.**

### SPECIFICATIONS

#### PUMP

- **Delivery** up to 900 l/min (54 m<sup>3</sup>/h).
- **Head** up to 24 m.
- **Temperature** of pumped liquid: -10°C to +110°C for standard version.
- Maximum working **pressure** : 8 bar (PN 8).
- **Suspended solids** handled up to: CO350: 11 mm. CO500: 20 mm.

#### MOTOR

- Asynchronous, squirrel cage rotor, enclosed construction in aluminium casing, external ventilation.
- **Protection:** IP55.
- Class 155 (F) **insulation.**
- Performances according to EN 60034-1.
- Maximum ambient **temperature:** 40°C.
- **Standard voltage:**  
- **Single-phase** version: 220-240 V 50 Hz, 2 poles with built-in automatic reset overload protection up to 1,5 kW. For higher powers the protection must be provided by the user.  
- **Three-phase** version: 220-240/380-415 V 50 Hz, 2 poles; overload protection to be provided by the user.
- Condensate drain plugs on all motors.

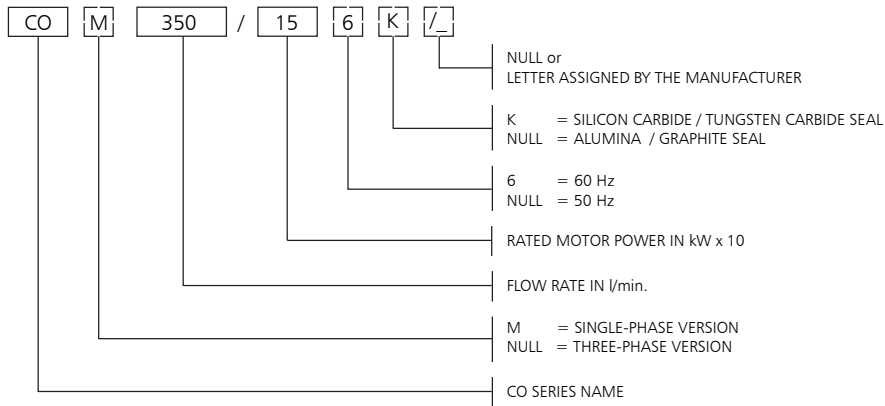
☐ **All components in contact with pumped liquid are made of AISI 316L stainless steel**

☐ **Mechanical seal made of Silicon carbide/tungsten carbide/FPM in the "K" version**

### OPTIONAL FEATURES

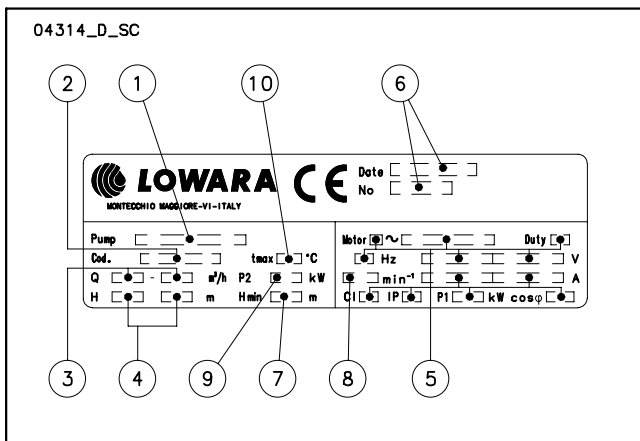
- Different voltages and frequencies.
- Different materials for the mechanical seal and O-rings.

## CO - COM SERIES IDENTIFICATION CODE



EXAMPLE : COM 350/156K  
 CO series electric pump, single-phase, flow rate 350 l/min,  
 rated power 1,5 kW, 60 Hz version, Silicon Carbide / Tungsten Carbide seal.

## RATING PLATE

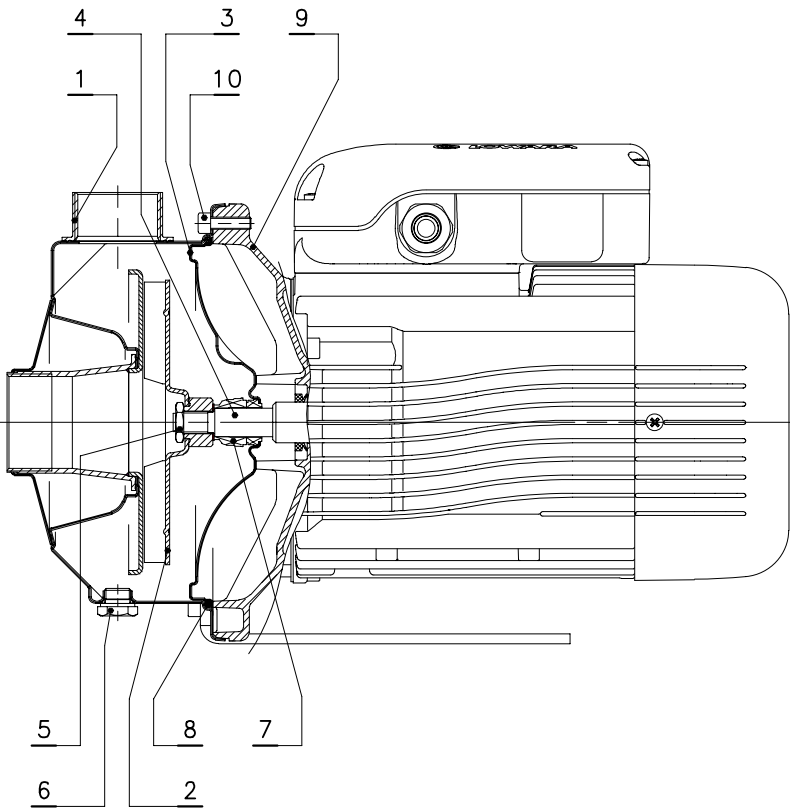


## LEGEND

- 1 - Electric pump type
- 2 - Code
- 3 - Delivery range
- 4 - Head range
- 5 - Motor type
- 6 - Date of manufacture and serial number
- 7 - Minimum head
- 8 - Speed
- 9 - Rated output
- 10 - Maximum operating temperature

## CO - COM SERIES LIST OF MODELS AND TABLE OF MATERIALS

04309\_A\_DS



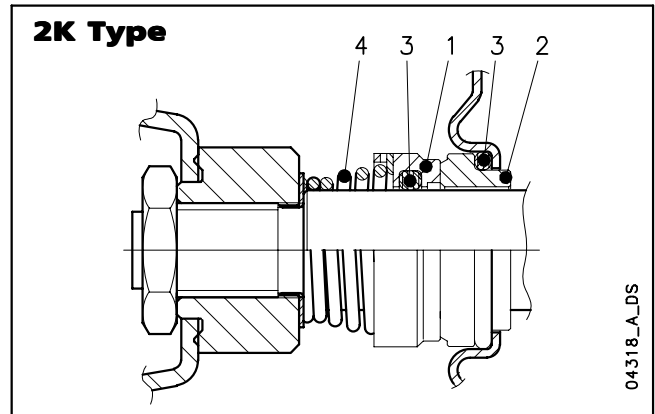
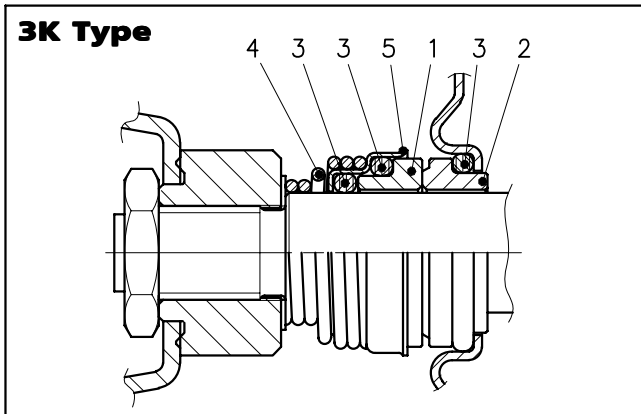
VERSIONS	
SINGLE-PHASE	THREE-PHASE
COM 350/03	CO 350/03
COM 350/05	CO 350/05
COM 350/07	CO 350/07
COM 350/09	CO 350/09
COM 350/11	CO 350/11
COM 350/15	CO 350/15
COM 500/15	CO 500/15
COM 500/22	CO 500/22
	CO 500/30

co-en\_a\_mo

REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Pump body	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
2	Impeller	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
3	Seal housing	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
4	Shaft extension	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
5	Impeller locknut and washer	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
6	Fill/drain plugs	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
7	Mechanical seal	Ceramic / resin impregnated Carbon / FPM (standard version)		
8	Elastomers	FPM (standard version)		
9	Adapter	Aluminium	EN 1706-AC-AISi11Cu2(Fe)DF	ASTM Class 25
10	Pump body fastening bolts & screws	Galvanized steel		

co-en\_a\_tm

## CO - COM SERIES MECHANICAL SEAL



04318\_A\_DS

### LIST OF MATERIALS

POSITION 1 - 2	POSITION 3	POSITION 4 - 5
B : Resin impregnated carbon	E : EPDM	G : AISI 316
C : Special resin impregnated carbon	V : FPM	
V : Ceramic		
Q <sub>1</sub> : Silicon Carbide		
U <sub>3</sub> : Tungsten Carbide		

### SEAL TYPES

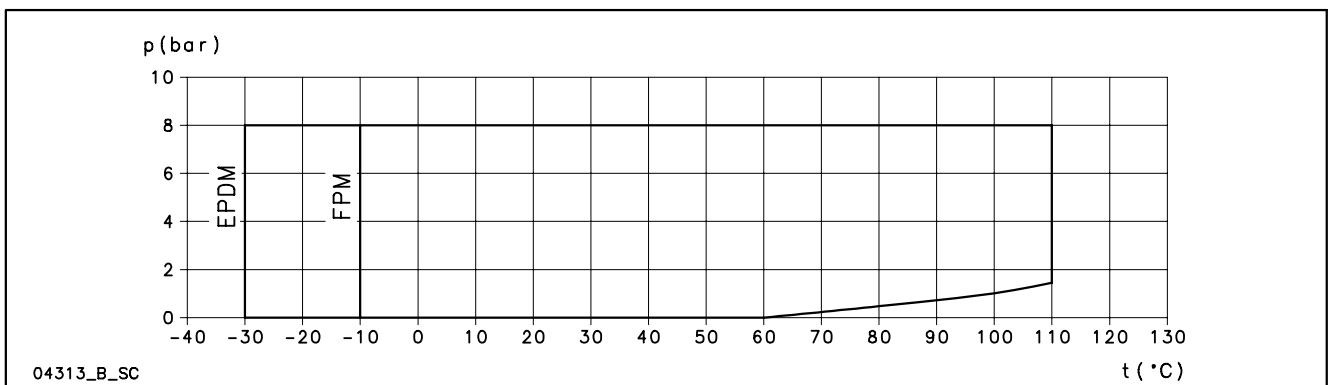
co\_ten-mec-3-en\_a\_tm

TYPE	POSITION					TEMPERATURE (°C)
	1 ROTATING ASSEMBLY	2 FIXED ASSEMBLY	3 ELASTOMERS	4 SPRINGS	5 OTHER COMPONENTS	
<b>STANDARD MECHANICAL SEAL</b>						
3K - VB V G G	V	B	V	G	G	-10 +110
<b>OTHER MECHANICAL SEAL TYPES</b>						
3K - VC V G G	V	C	V	G	G	-10 +110
3K - Q <sub>1</sub> CVGG	Q <sub>1</sub>	C	V	G	G	-10 +110
3K - Q <sub>1</sub> Q <sub>1</sub> VGG	Q <sub>1</sub>	Q <sub>1</sub>	V	G	G	-10 +110
2K - U <sub>3</sub> Q <sub>1</sub> VGG	U <sub>3</sub>	Q <sub>1</sub>	V	G	G	-10 +110
2K - U <sub>3</sub> U <sub>3</sub> VGG *	U <sub>3</sub>	U <sub>3</sub>	V	G	G	-10 +110
3K - VBEGG	V	B	E	G	G	-30 +110
3K - VCEGG	V	C	E	G	G	-30 +110
3K - Q <sub>1</sub> CEGG	Q <sub>1</sub>	C	E	G	G	-30 +110
3K - Q <sub>1</sub> Q <sub>1</sub> EGG	Q <sub>1</sub>	Q <sub>1</sub>	E	G	G	-30 +110
2K - U <sub>3</sub> Q <sub>1</sub> EGG	U <sub>3</sub>	Q <sub>1</sub>	E	G	G	-30 +110
2K - U <sub>3</sub> U <sub>3</sub> EGG *	U <sub>3</sub>	U <sub>3</sub>	E	G	G	-30 +110

\* Version with anti-rotation lockpin available on request.

co\_tipi-ten-mec-3-en\_b\_tc

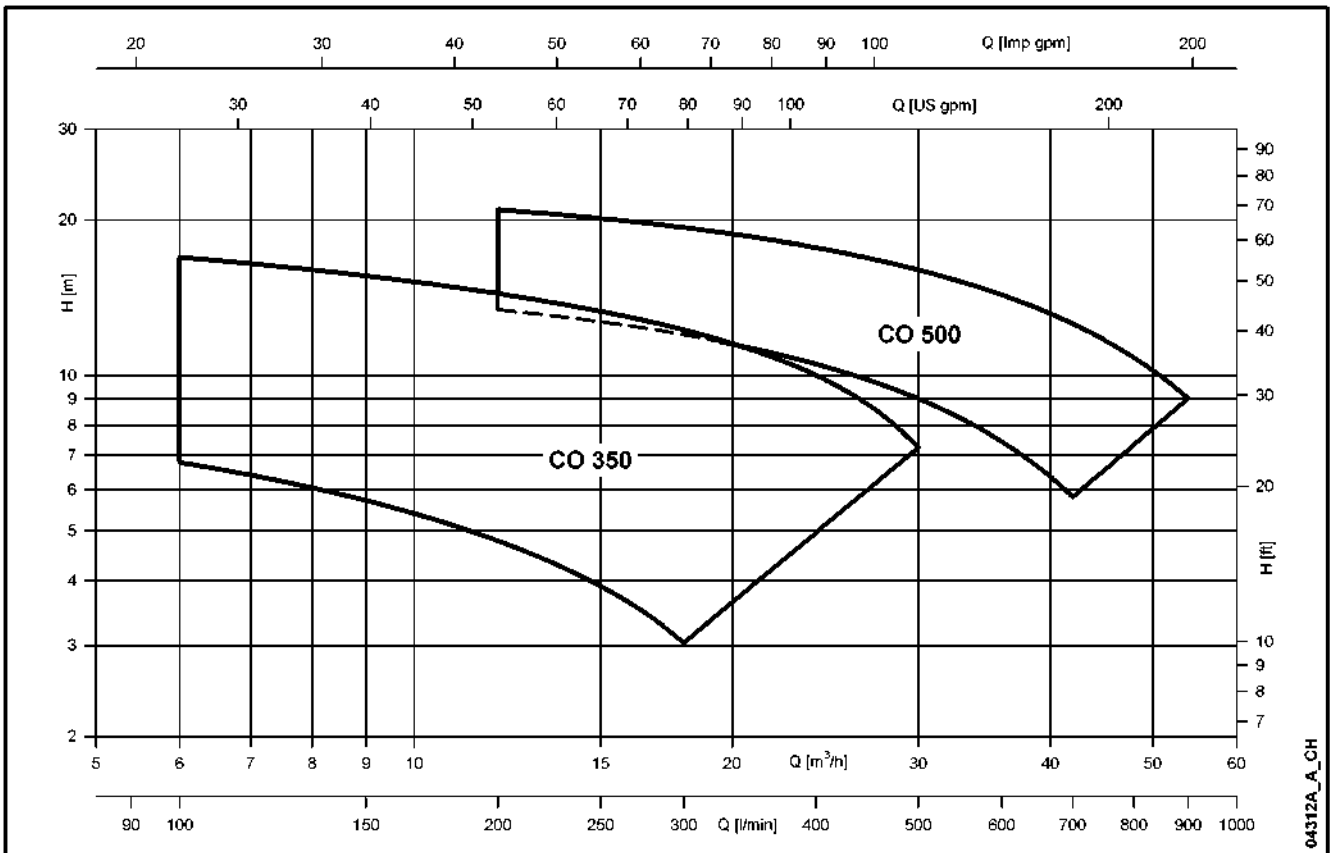
### COMPLETE PUMP PRESSURE / TEMPERATURE OPERATING LIMITS (WITH ANY OF THE SEALS LISTED ABOVE)



04313\_B\_SC

t (°C)

## CO - COM SERIES HYDRAULIC PERFORMANCE RANGE AT 50 Hz, 2 POLES



**TABLE OF HYDRAULIC PERFORMANCES AT 50 Hz, 2 POLES**

ELECTRIC PUMP TYPE	RATED POWER		Q = DELIVERY																			
			l/min	0	100	120	160	200	240	280	300	350	375	400	450	500	600	650	700	800	900	
			m³/h	0	6	7,2	9,6	12	14,4	16,8	18	21	22,5	24	27	30	36	39	42	48	54	
		kW		HP		H = TOTAL HEAD METRES COLUMN OF WATER																
CO(M) 350/03	0,37	0,5	9,5	6,8	6,3	5,5	4,8	4,1	3,4	3,0												
CO(M) 350/05	0,55	0,75	12,0	9,2	8,8	7,9	7,1	6,3	5,5	5,1	4,0											
CO(M) 350/07	0,75	1	13,7	11,2	10,8	9,9	9,1	8,2	7,4	6,9	5,8	5,3										
CO(M) 350/09	0,9	1,2	15,7	12,7	12,2	11,3	10,5	9,6	8,8	8,3	7,2	6,6	5,9									
CO(M) 350/11	1,1	1,5	17,3	14,3	13,8	12,9	12,0	11,2	10,5	10,1	9,1	8,6	8,0	6,8								
CO(M) 350/15	1,5	2	20,3	16,9	16,4	15,3	14,4	13,5	12,7	12,2	11,2	10,6	10,0	8,7	7,2							
CO(M) 500/15	1,5	2	16,0				13,4	12,8	12,3	12,0	11,3	10,9	10,5	9,8	9,0	7,4	6,6	5,8				
CO(M) 500/22	2,2	3	19,6				17,3	16,7	16,2	15,9	15,2	14,9	14,5	13,7	13,0	11,3	10,4	9,6	7,7			
CO 500/30	3	4	24,1				20,9	20,3	19,7	19,3	18,5	18,1	17,7	16,9	16,0	14,3	13,5	12,6	10,8	9,0		

co-2p50-en\_d\_th

PUMP TYPE	MOTOR TYPE	INPUT POWER*	INPUT CURRENT*	CAPACIT.	PUMP TYPE	MOTOR TYPE	INPUT POWER*	INPUT CURRENT*	INPUT CURRENT*
		kW	A				kW	A	A
COM350/03	SM63BG/1045	0,63	2,82	14	CO350/03	SM63BG/304	0,64	2,53	1,46
COM350/05	SM71BG/1055	0,88	4,25	16	CO350/05	SM71BG/305	0,79	2,70	1,56
COM350/07	SM71BG/1075	1,02	4,67	20	CO350/07	SM80BG/307PE	0,92	2,96	1,71
COM350/09	SM71BG/1095	1,21	5,46	25	CO350/09	SM80BG/311PE	1,08	3,72	2,15
COM350/11	SM80BG/1115	1,75	7,85	30	CO350/11	SM80BG/311PE	1,61	4,87	2,81
COM350/15	SM80BG/1155	2,04	9,21	40	CO350/15	SM80BG/315PE	1,87	5,75	3,32
COM500/15	SM80BG/1155	2,02	9,12	40	CO500/15	SM80BG/315PE	1,84	5,70	3,29
COM500/22	PLM90BG/1225	2,72	12,7	70	CO500/22	PLM90BG/322	2,66	8,27	4,78
-	-	-	-	-	CO500/30	PLM90BG/330	3,80	11,4	6,57

\*Maximum value in specified range.

co-2p50-en\_f\_te

## MOTORS FOR CO SERIES

Standard supplied IE2/IE3 three-phase surface motors  $\geq 0,75$  kW are compliant with Regulation (EC) no. 640/2009 and IEC 60034-30.

Electrical performances according to EN 60034-1.

Insulation class 155 (F). IP55 protection. Condensate drain plugs on standard version.

Cooling by fan according to EN 60034-6.

Cable gland metric size according to EN 50262. Standard voltage:

- **Single-phase** version: 220-240 V 50 Hz (incorporated automatic-reset overload protection).
- **Three-phase** version: 220-240/380-415 V 50 Hz (overload protection to be provided by the user).

### SINGLE-PHASE MOTORS AT 50 Hz, 2 POLES

P <sub>N</sub> kW	MOTOR TYPE	IEC SIZE	Construction Design	INPUT		CAPACITOR		DATA FOR 230 V 50 Hz VOLTAGE						
				CURRENT I <sub>n</sub> (A)	220-240 V	μF	V	n <sub>N</sub> min <sup>-1</sup>	I <sub>s</sub> / I <sub>n</sub>	η %	cosφ	T <sub>N</sub> Nm	T <sub>s</sub> /T <sub>N</sub>	T <sub>m</sub> /T <sub>N</sub>
0,4	SM63BG/1045	63	SPECIAL	2,79-2,85	14	450	2745	2,64	65,1	0,96	1,39	0,68	1,63	
0,55	SM71BG/1055	71		3,76-3,99	16	450	2820	3,72	68,9	0,91	1,86	0,61	2,00	
0,75	SM71BG/1075	71		4,90-4,85	20	450	2765	3,42	70,1	0,96	2,59	0,58	1,75	
0,95	SM71BG/1095	71		6,25-5,89	25	450	2740	3,39	71,1	0,98	3,31	0,58	1,66	
1,1	SM80BG/1115	80		6,88-6,65	30	450	2800	3,89	74,7	0,96	3,75	0,46	1,72	
1,5	SM80BG/1155	80		9,21-8,58	40	450	2810	4,00	76,1	0,98	5,09	0,39	1,74	
2,2	PLM80BG/1225	90		12,5-11,6	70	450	2825	4,47	82,4	0,97	7,43	0,53	1,87	

### THREE-PHASE MOTORS AT 50 Hz, 2 POLES

co-motm-2p50-en\_a\_te

P <sub>N</sub> kW	Efficiency η <sub>N</sub>																		IE	Year of manufacture
	%																			
	Δ 220 V Y 380 V			Δ 230 V Y 400 V			Δ 240 V Y 415 V			Δ 380 V Y 660 V			Δ 400 V Y 690 V			Δ 415 V				
	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4		
0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0,55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0,75	82,5	83,1	81,3	82,8	82,7	80,1	82,6	82,0	78,9	82,5	82,0	78,9	82,5	82,0	78,9	82,5	82,0	78,9	-	3
0,9	84,0	84,7	83,4	84,4	84,5	82,5	84,3	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	-	
1,1	84,0	84,7	83,4	84,4	84,5	82,5	84,3	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	-	
1,5	85,6	86,5	85,8	85,9	86,4	84,9	86,0	86,0	84,0	85,6	86,0	84,0	85,6	86,0	84,0	85,6	86,0	84,0	-	
2,2	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	-	
3	85,5	86,8	85,6	86,1	86,8	85,6	86,3	86,8	85,6	85,5	86,8	85,6	85,5	86,8	85,6	85,5	86,8	85,6	-	

P <sub>N</sub> kW	Manufacturer		IEC SIZE	Construction Design	N. of Poles	f <sub>N</sub> Hz	Data for 400 V / 50 Hz Voltage				
	Lowara srl Unipersonale Reg. No. 341820260 Montecchio Maggiore Vicenza - Italia						cosφ	I <sub>s</sub> / I <sub>N</sub>	T <sub>N</sub> Nm	T <sub>s</sub> /T <sub>N</sub>	T <sub>m</sub> /T <sub>N</sub>
	Model										
0,4	SM63BG/304		63	SPECIAL	2	50	0,66	4,32	1,38	4,14	3,13
0,55	SM71BG/305		71				0,74	5,97	1,85	3,74	3,56
0,75	SM80BG/307PE		80				0,78	7,38	2,48	3,57	3,75
0,9	SM80BG/311PE		80				0,79	8,31	3,63	3,95	3,95
1,1	SM80BG/311PE		80				0,79	8,31	3,63	3,95	3,95
1,5	SM80BG/315PE		80				0,80	8,80	4,96	4,31	4,10
2,2	PLM90BG/322		90				0,80	8,63	7,25	3,74	3,71
3	PLM90BG/330		90				0,82	8,39	9,96	3,50	3,32

P <sub>N</sub> kW	Voltage U <sub>N</sub>											n <sub>N</sub> min <sup>-1</sup>	Operating conditions **			
	Δ			Y			Δ			Y			Altitude Above Sea Level (m)	T. amb min/max °C	ATEX	
	220 V	230 V	240 V	380 V	400 V	415 V	380 V	400 V	415 V	660 V	690 V					
0,4	2,20	2,34	2,51	1,27	1,35	1,45	-	-	-	-	-	2740 ÷ 2790	See note.	≤ 1000	-15 / 40	No
0,55	2,56	2,56	2,62	1,48	1,48	1,51	-	-	-	-	-	2825 ÷ 2850				
0,75	2,96	2,94	2,96	1,71	1,70	1,71	1,70	1,69	1,70	0,98	0,98	2875 ÷ 2895				
0,9	4,19	4,14	4,16	2,42	2,39	2,40	2,41	2,38	2,38	1,39	1,37	2870 ÷ 2900				
1,1	4,19	4,14	4,16	2,42	2,39	2,40	2,41	2,38	2,38	1,39	1,37	2870 ÷ 2900				
1,5	5,56	5,49	5,51	3,21	3,17	3,18	3,21	3,18	3,19	1,85	1,84	2870 ÷ 2895				
2,2	8,05	8,04	8,09	4,65	4,64	4,67	4,62	4,61	4,63	2,67	2,66	2885 ÷ 2900				
3	10,8	10,6	10,6	6,23	6,14	6,12	6,18	6,10	6,06	3,57	3,52	2850 ÷ 2885				

Note: Observe the regulations and codes locally in force regarding sorted waste disposal.

co-ie2-mott-2p50-en\_b\_te

\*\* Operating conditions to be referred to motor only. About electric pump, refer to limits in user's manual.

## AVAILABLE VOLTAGES MOTORS FOR CO SERIES

P <sub>N</sub> kW	IEC SIZE	SINGLE-PHASE							
		50 Hz				60 Hz			
		1 x 220-240							
		1 x 100							
		1 x 110-120							
		1 x 220-230							
		1 x 100							
		1 x 110-115							
		1 x 120-127							
		1 x 200-210							
0,4	63	s	o	o	s	-	o	-	-
0,55	71	s	o	o	s	o	o	o	o
0,75	71	s	o	o	s	o	o	o	o
0,95	71	s	o	o	s	o	o	o	o
1,1	80	s	-	o	s	-	o	-	o
1,5	80	s	-	-	s	-	o	-	o
2,2	90	s	-	-	s	-	-	-	-

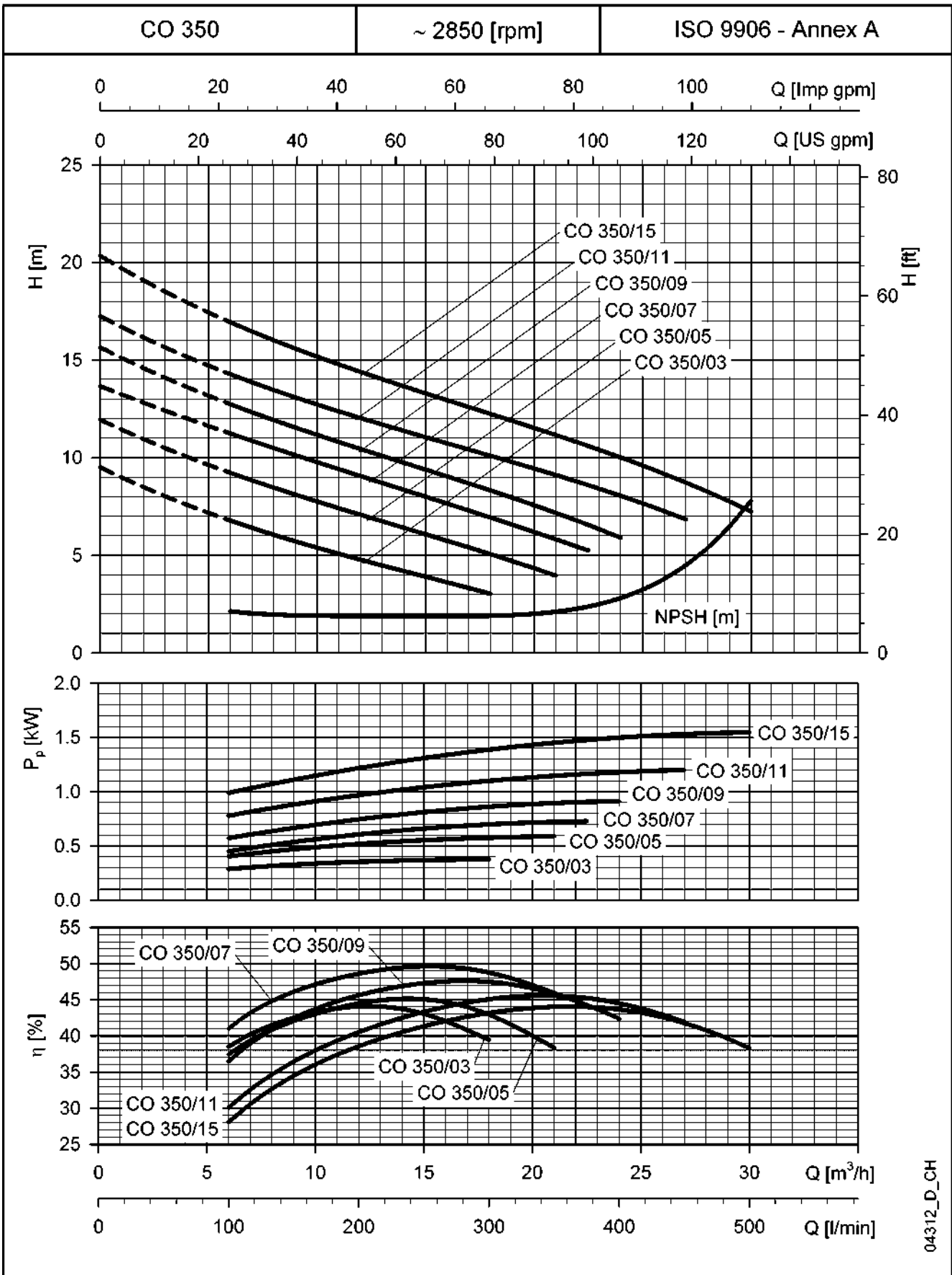
s = Standard voltage      o = Optional voltage

P <sub>N</sub> kW	THREE-PHASE - 2 POLES													
	50 Hz						60 Hz						50/60 Hz	
	3 x 220-230-240/380-400-415													
	3 x 380-400-415/660-690													
	3 x 200-208/346-360													
	3 x 255-265/440-460													
	3 x 290-300/500-525													
	3 x 440-460/-													
	3 x 500-525/-													
	3 x 220-230/380-400													
	3 x 255-265-277/440-460-480													
	3 x 380-400/660-690													
	3 x 440-460-480/-													
	3 x 110-115/190-200													
	3 x 200-208/346-360													
	3 x 330-346/575-600													
	3 x 575/-													
	3 x 230/400 50 Hz													
	3 x 265/460 60 Hz													
	3 x 400/690 50 Hz													
	3 x 460/- 60 Hz													
0,4	s	o	o	o	o	s	o	o	o	o	o	o	o	
0,55	s	o	o	o	o	s	o	o	o	o	o	o	o	
0,75	s	o	o	o	o	s	o	o	o	o	o	o	o	
0,95	s	o	o	o	o	s	o	o	o	o	o	o	o	
1,1	s	o	o	o	o	s	o	o	o	o	o	o	o	
1,5	s	o	o	o	o	s	o	o	o	o	o	o	o	
2,2	s	o	o	o	o	s	o	o	o	o	o	o	o	
3	s	o	o	o	o	s	o	o	o	o	o	o	o	

- = Not available

co-volt-low-a-en\_a\_te

**CO350 SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES**

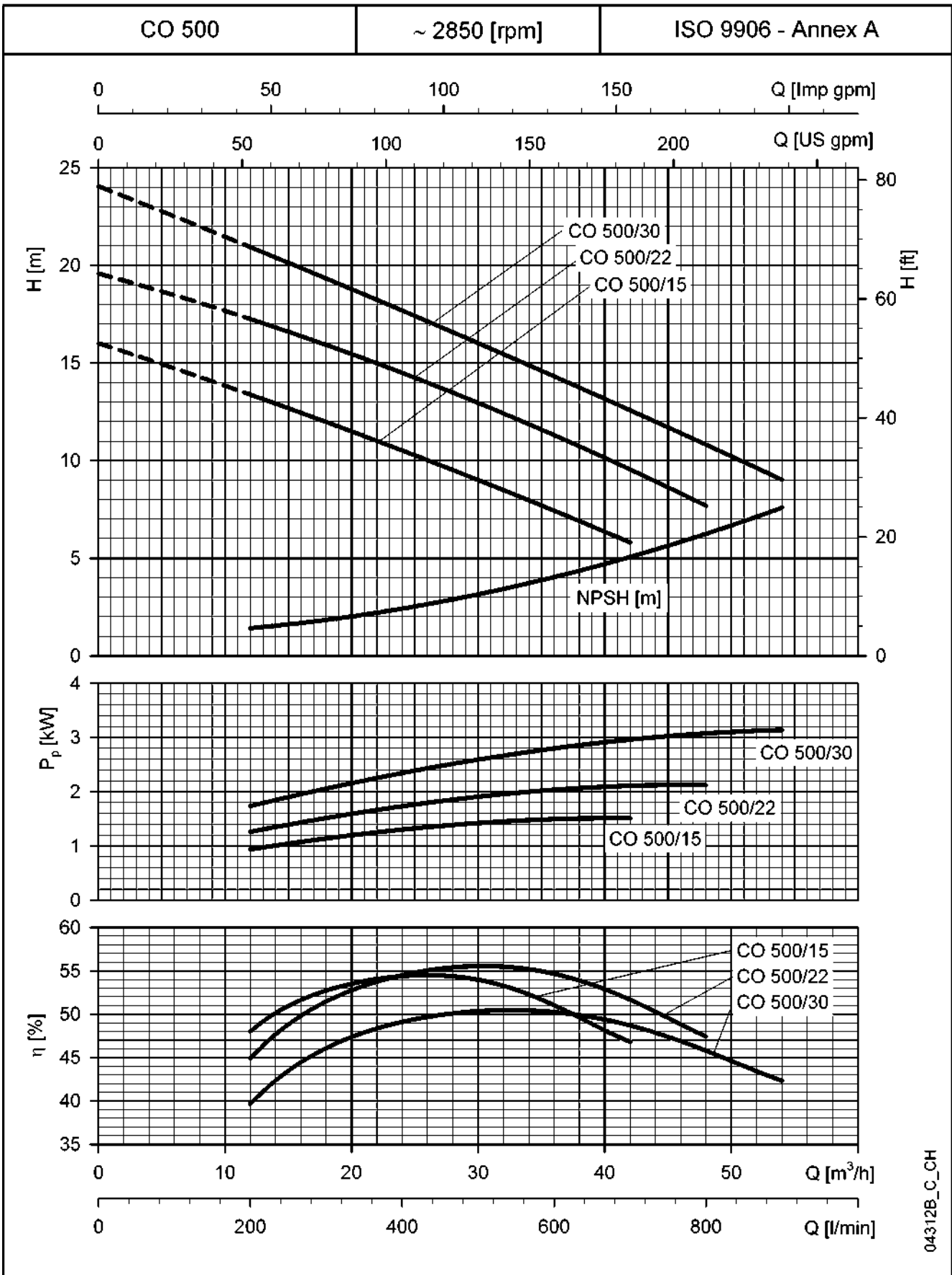


04312\_D\_CH

The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .



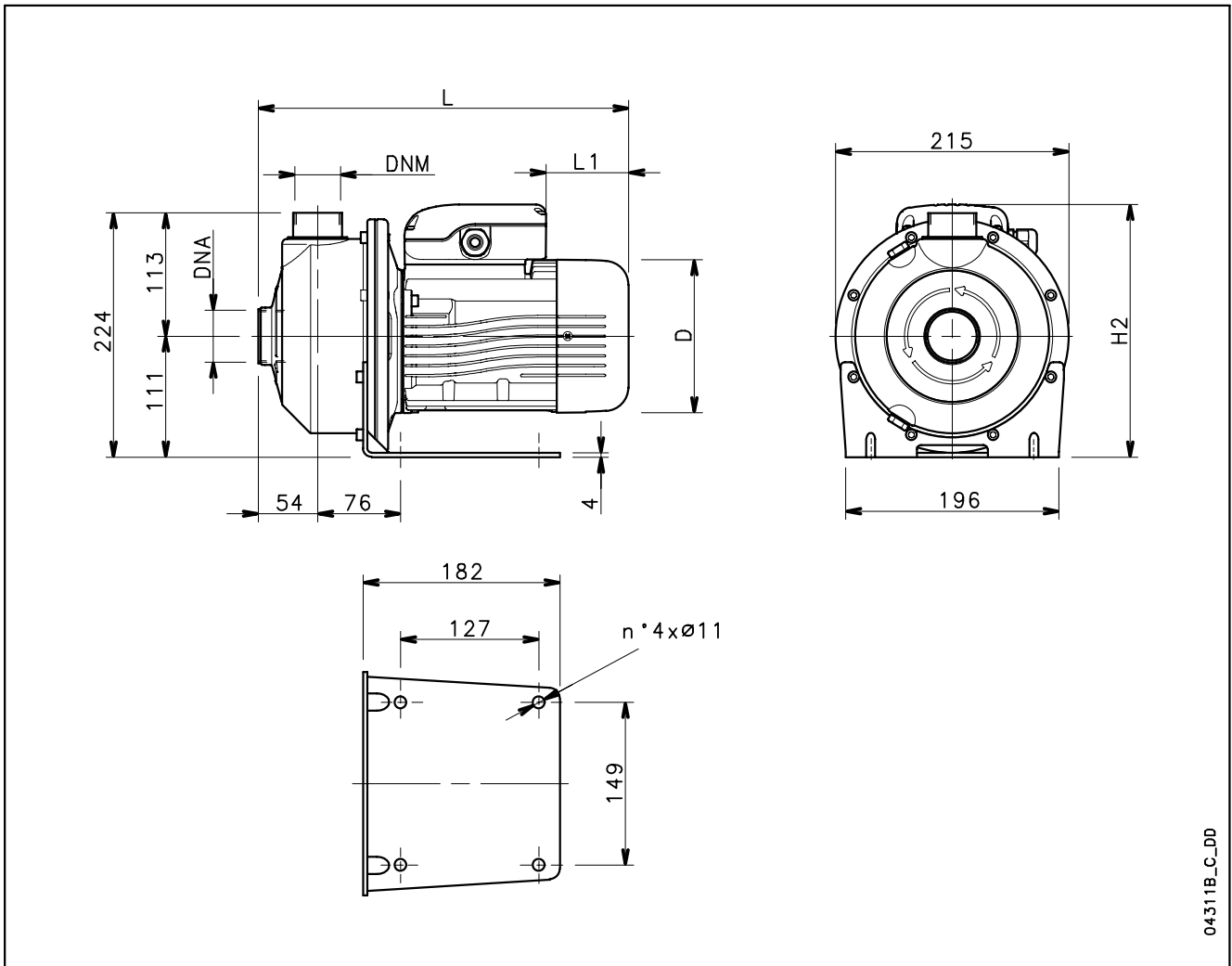
**CO500 SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES**



04312B\_C\_CH

The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
 These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

## CO SERIES DIMENSIONS AND WEIGHTS AT 50 Hz, 2 POLES



04311B\_C\_DD

PUMP TYPE	DIMENSIONS (mm)				DNA	DNM	WEIGHT kg
	D	H2	L	L1			
COM 350/03/A	120	222	325	62	Rp 1½	Rp 1¼	10
COM 350/05/A	140	232	339	76	Rp 1½	Rp 1¼	11,9
COM 350/07/A	140	232	339	76	Rp 1½	Rp 1¼	12,6
COM 350/09/A	140	241	339	31	Rp 1½	Rp 1¼	13,2
COM 350/11/A	156	248	385	69	Rp 1½	Rp 1¼	14,5
COM 350/15/A	156	248	385	69	Rp 1½	Rp 1¼	16,2
COM 500/15/A	156	248	385	69	Rp 2	Rp 1½	16,2
COM 500/22/P	174	262	429	84	Rp 2	Rp 1½	20
CO 350/03/A	120	222	325	62	Rp 1½	Rp 1¼	10
CO 350/05/A	140	232	339	76	Rp 1½	Rp 1¼	11,9
CO 350/07/D	155	240	385	114	Rp 1½	Rp 1¼	14,1
CO 350/09/D	155	240	385	114	Rp 1½	Rp 1¼	16
CO 350/11/D	155	240	385	114	Rp 1½	Rp 1¼	16,3
CO 350/15/D	155	240	385	114	Rp 1½	Rp 1¼	17,8
CO 500/15/D	155	240	385	114	Rp 2	Rp 1½	17,8
CO 500/22/C	174	245	429	172	Rp 2	Rp 1½	23
CO 500/30/P	174	245	429	172	Rp 2	Rp 1½	25

**Bare shaft centrifugal pumps with closed impeller (CEF series) and open impeller (COF series)**

**MARKET SECTORS**

CIVIL, AGRICULTURAL, INDUSTRIAL.

**APPLICATIONS**

- Pumping of moderately viscous water and liquids (COF series) with moderate chemical aggressiveness (CEF, COF series).
- Water supply.
- Irrigation.
- Water circulation (cold, hot, refrigerated).
- Washing in the packaging, textile and food industries (COF series).

\* For aggressive liquids, please contact our sales network.

**CEF-COF Series**



- In the standard version, all parts in contact with pumped liquid are made of **AISI 316 stainless steel**
- Suspended solids handled up to **11 mm (COF350) and 20 mm (COF500)** in the open impeller version (COF)
- Sturdy support with permanently lubricated bearings
- Flexible couplings available for connection to motor shaft of various sizes

**SPECIFICATIONS**

**POMP**

- **Delivery** up to 500 l/min (30 m<sup>3</sup>/h) at 2900 rpm (CEF series).
- **Delivery** up to 900 l/min (54 m<sup>3</sup>/h) at 2900 rpm (COF series).
- **Head** up to 29 m at 2900 rpm (CEF series).
- **Head** up to 24,5 m at 2900 rpm (COF series).
- **Temperature** of pumped liquid: -10°C to +110°C standard version.
- Maximum operating **pressure** : 8 bar (PN 8).
- Counterclockwise rotation facing the pump from the suction port.
- **Standard supplied IE2/IE3 motors are compliant with Regulation (EC) no. 640/2009 and IEC 60034-30.**

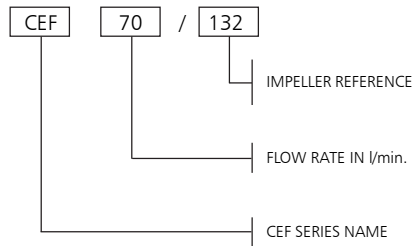
**CONSTRUCTION FEATURES**

- Close-coupled, single-impeller centrifugal pump featuring axial intake and radial discharge.
- Pump coupled by adapter to the bare shaft support; special shaft extension in common with pump are supported by ball bearing.
- Back pull-out design; no need to disconnect the pump body from the system pipes.
- Threaded suction and delivery ports (Rp ISO 7).
- High performance closed **impeller** made of **AISI 316** stainless steel (CEF series).
- High performance open **impeller** made of **AISI 316** stainless steel (COF series).
- **Mechanical seal** with **Ceramic/Carbon** faces, **FPM** elastomers, other parts are made of **AISI 316** stainless steel (CEF series).
- **Mechanical seal** with **Ceramic/Carbon** faces (**Silicon Carbide** and **Tungsten Carbide** in the "K" version), **FPM** elastomers, other parts are made of **AISI 316** stainless steel (COF series).
- **FPM O-rings.**

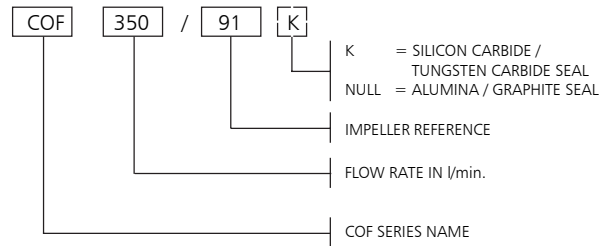
**OPTIONAL FEATURES**

- Different materials for the mechanical seal and O-rings.
- Electric pump unit (pump, motor, coupling, base).

## CEF - COF SERIES IDENTIFICATION CODE (PUMP)

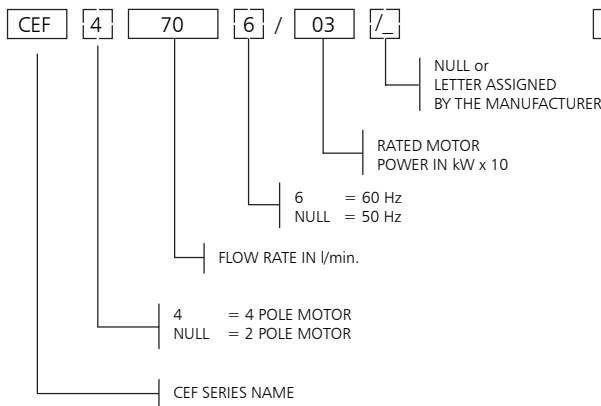


EXAMPLE : CEF 70/132  
CEF pump series, flow rate 70 l/min, impeller reference 132.

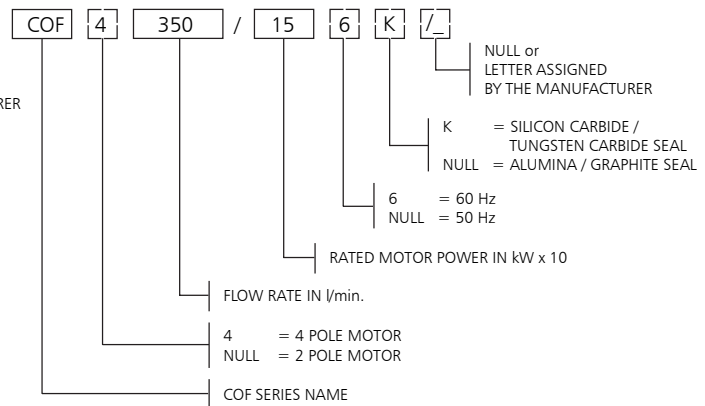


EXAMPLE : COF 350/91K  
COF pump series, flow rate 350 l/min, impeller reference 91, Silicon Carbide / Tungsten Carbide seal.

## IDENTIFICATION CODE (ELECTRIC PUMP)

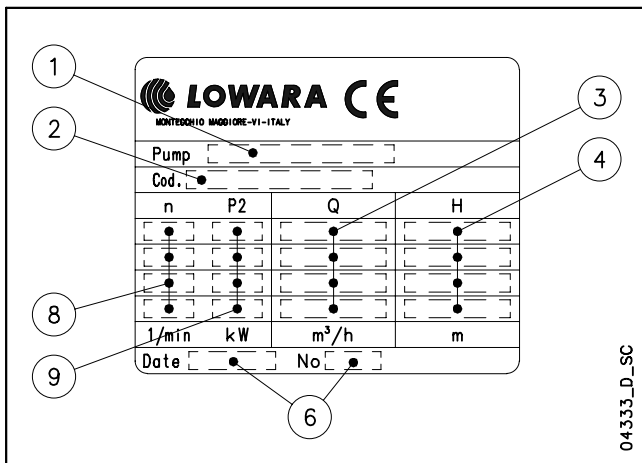


EXAMPLE : CEF 70/03  
CEF electric pump series, flow rate 70 l/min, 0,37 kW rated motor power, 50 Hz version.

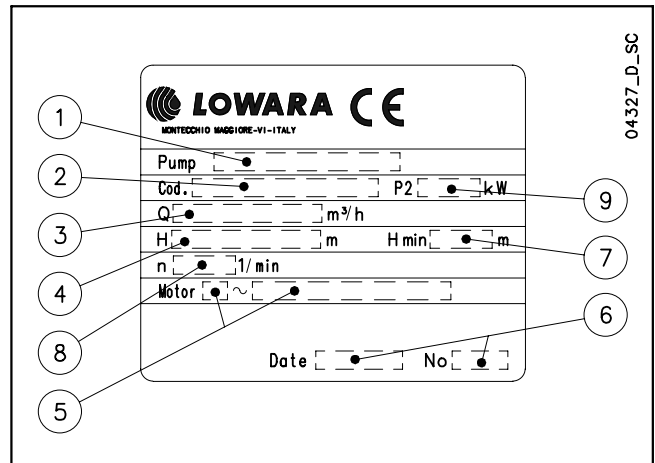


EXAMPLE : COF 350/15K  
COF electric pump series, flow rate 350 l/min, 1,5 kW rated motor power, 50 Hz version, Silicon Carbide / Tungsten Carbide seal.

## RATING PLATE (PUMP)



## (ELECTRIC PUMP)

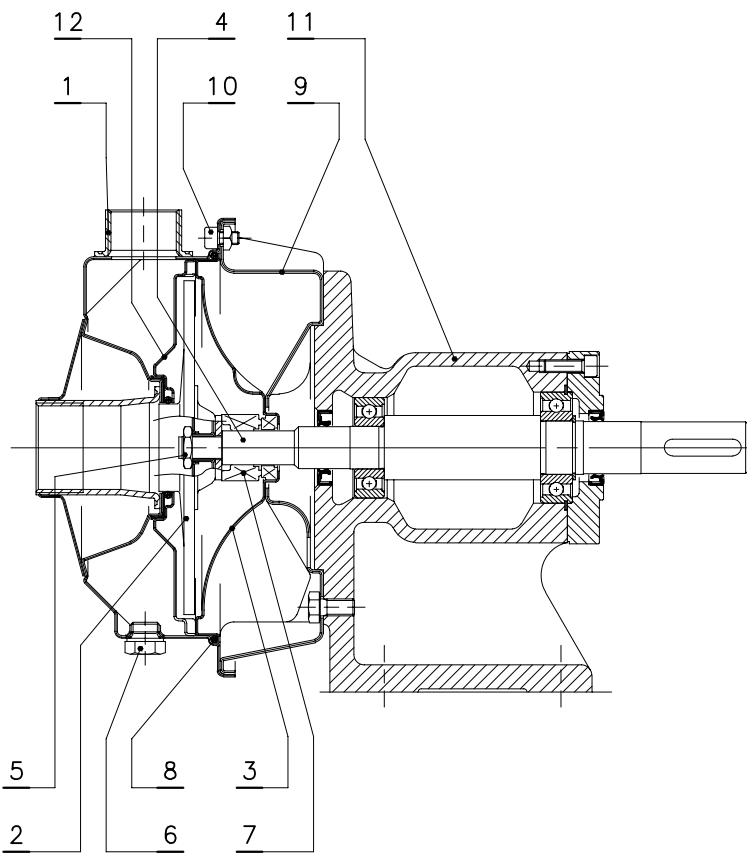


### LEGEND

- 1 - Electric pump type
- 2 - Code
- 3 - Delivery range
- 4 - Head range
- 5 - Motor type
- 6 - Date of manufacture and serial number
- 7 - Minimum head
- 8 - Speed
- 9 - Rated output
- 10 - Maximum operating temperature

## CEF SERIES LIST OF MODELS AND TABLE OF MATERIALS

04329\_A\_DS



VERSIONS	
	CEF 70
	CEF 80
	CEF 120
	CEF 210
	CEF 370

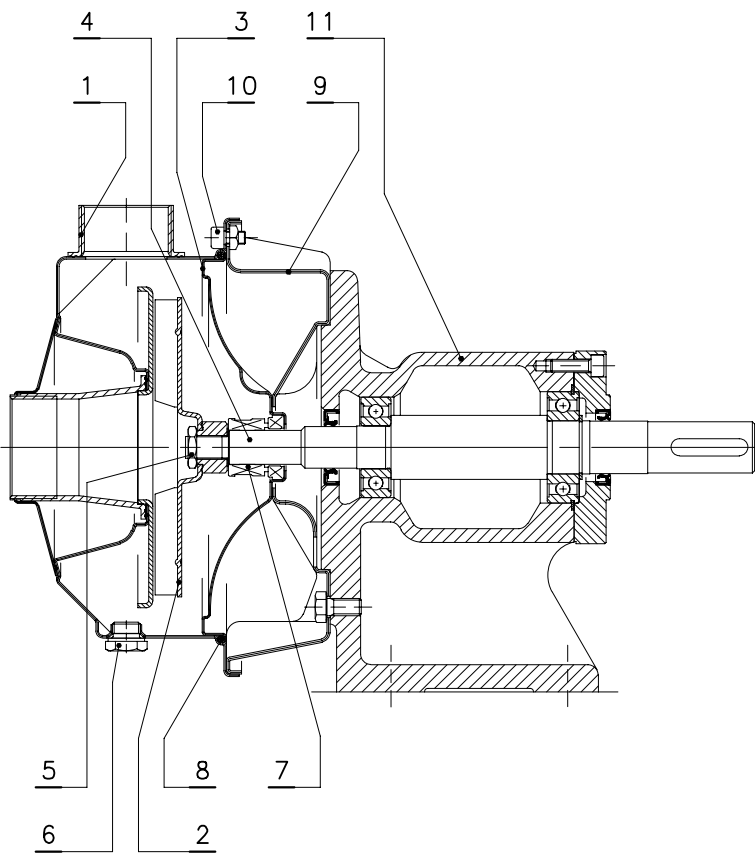
cef-en\_a\_mo

REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Pump body	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
2	Impeller	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
3	Seal housing	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
4	Shaft extension	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
5	Impeller locknut and washer	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
6	Fill/drain plugs	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
7	Mechanical seal	Ceramic / resin impregnated Carbon / FPM (standard version)		
8	Elastomers	FPM (standard version)		
9	Motor pump bracket	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
10	Pump body fastening bolts & screws	Galvanized steel		
11	Bracket casing	Cast iron	EN 1561-GJL-250 (JL1040)	ASTM Class 35
12	Diffuser	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L

cef-en\_a\_tm

**COF SERIES**  
**LIST OF MODELS AND TABLE OF MATERIALS**

04323\_A\_DS



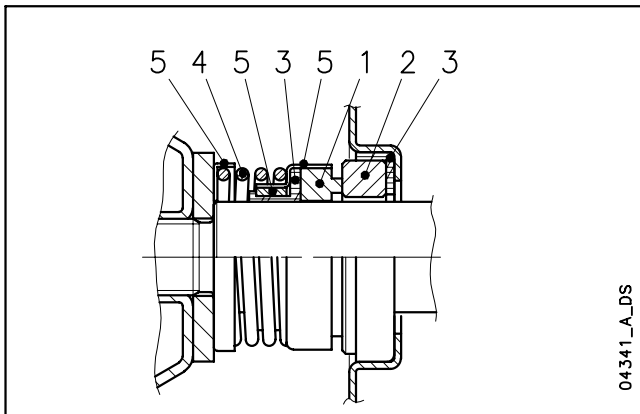
VERSIONS
COF 350
COF 500

cof-en\_a\_mo

REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Pump body	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
2	Impeller	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
3	Seal housing	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
4	Shaft extension	Stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
5	Impeller locknut and washer	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
6	Fill/drain plugs	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
7	Mechanical seal	Ceramic / resin impregnated Carbon / FPM (standard version)		
8	Elastomers	FPM (standard version)		
9	Motor pump bracket	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
10	Pump body fastening bolts & screws	Galvanized steel		
11	Bracket casing	Cast iron	EN 1561-GJL-250 (JL1040)	ASTM Class 35

cof-en\_a\_tm

## CEF - COF SERIES MECHANICAL SEAL



### LIST OF MATERIALS

POSITION 1 - 2	POSITION 3	POSITION 4 - 5
B : Resin impregnated carbon	E : EPDM	G : AISI 316
V : Ceramic	V : FPM	
Q <sub>1</sub> : Silicon Carbide		
U <sub>3</sub> : Tungsten Carbide		

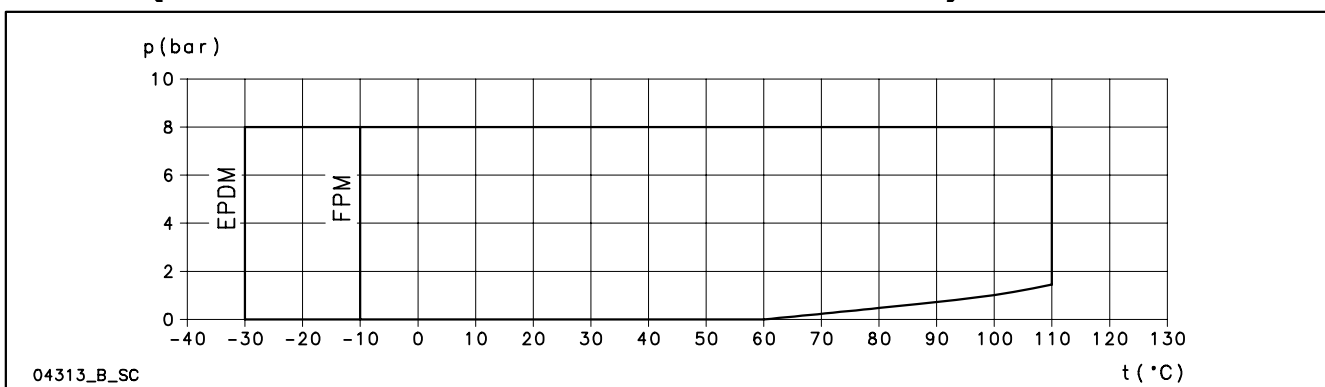
cof\_ten-mec-j-c-21-en\_a\_tm

### SEAL TYPES

TYPE	POSITION					TEMPERATURE (°C)
	1 ROTATING ASSEMBLY	2 FIXED ASSEMBLY	3 ELASTOMERS	4 SPRINGS	5 OTHER COMPONENTS	
<b>STANDARD MECHANICAL SEAL</b>						
VBVGG	V	B	V	G	G	-10 +110
<b>OTHER MECHANICAL SEAL TYPES</b>						
Q <sub>1</sub> BEGG	Q <sub>1</sub>	B	E	G	G	-30 +110
Q <sub>1</sub> Q <sub>1</sub> EGG	Q <sub>1</sub>	Q <sub>1</sub>	E	G	G	-30 +110
U <sub>3</sub> Q <sub>1</sub> VGG	U <sub>3</sub>	Q <sub>1</sub>	V	G	G	-10 +110

cof\_tipi-ten-mec-j-c-21-en\_c\_tc

### COMPLETE PUMP PRESSURE / TEMPERATURE OPERATING LIMITS (WITH ANY OF THE SEALS LISTED ABOVE)



## MOTORS FOR CEF - COF SERIES

**Standard supplied IE2/IE3 three-phase surface motors  $\geq 0,75$  kW are compliant with Regulation (EC) no. 640/2009 and IEC 60034-30.**

Enclosed short circuit squirrel cage motor (TEFC), with external ventilation.

Electrical performances according to EN 60034-1.

Insulation class 155 (F).

IP55 protection.

Condensate drain plugs on standard version.

Cooling by fan according to EN 60034-6.

Cable gland metric size according to EN 50262.

Standard voltage:

- **Three-phase** version: 220-240/380-415 V 50 Hz for powers up to 3 kW. 380-415/660-690 V 50 Hz for powers above 3 kW. Overload protection to be provided by the user.

## THREE-PHASE MOTORS AT 50 Hz, 2 POLES

P <sub>N</sub> kW	Efficiency $\eta_N$																		Year of manufacture	
	%																			
	$\Delta$ 220 V Y 380 V			$\Delta$ 230 V Y 400 V			$\Delta$ 240 V Y 415 V			$\Delta$ 380 V Y 660 V			$\Delta$ 400 V Y 690 V			$\Delta$ 415 V				IE
	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4	4/4	3/4	2/4		
0,37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0,55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0,75	82,5	83,1	81,3	82,8	82,7	80,1	82,6	82,0	78,9	82,5	82,0	78,9	82,5	82,0	78,9	82,5	82,0	78,9		
0,9	84,0	84,7	83,4	84,4	84,5	82,5	84,3	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	3	
1,1	84,0	84,7	83,4	84,4	84,5	82,5	84,3	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4	84,0	84,0	81,4		
1,5	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	81,8	2	
1,85	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7		
2,2	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7	83,7		
3	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1	85,1		

P <sub>N</sub> kW	Manufacturer		IEC SIZE	Construction Design	N. of Poles	f <sub>N</sub> Hz	Data for 400 V / 50 Hz Voltage				
	Lowara srl Unipersonale Reg. No. 341820260 Montecchio Maggiore Vicenza - Italia						cos $\phi$	I <sub>s</sub> / I <sub>N</sub>	T <sub>N</sub> Nm	T <sub>s</sub> /T <sub>N</sub>	T <sub>m</sub> /T <sub>N</sub>
	Model										
0,37	SM71B3/304		71	B3	2	50	0,59	-	1,22	-	-
0,55	SM71B3/305		71				0,74	5,97	1,85	3,74	3,56
0,75	SM80B3/307 PE		80				0,78	7,38	2,48	3,57	3,75
0,9	SM80B3/311 PE		80				0,79	8,31	3,63	3,95	3,95
1,1	SM80B3/311 PE		80				0,79	8,31	3,63	3,95	3,95
1,5	PLM90B3/315		90				0,86	7,86	4,96	3,34	3,27
1,85	PLM90B3/322		90				0,80	8,63	7,25	3,74	3,71
2,2	PLM90B3/322		90				0,80	8,63	7,25	3,74	3,71
3	PLM100B3/330		100				0,84	9,45	9,83	3,59	4,27

P <sub>N</sub> kW	Voltage U <sub>N</sub>										n <sub>N</sub> min <sup>-1</sup>	Condizioni operative **				
	$\Delta$					Y						Altitude Above Sea Level (m)	T. amb min/max °C	ATEX		
	220 V	230 V	240 V	380 V	400 V	415 V	380 V	400 V	415 V	660 V					690 V	
	I <sub>N</sub> (A)															
0,37	2,10	2,13	2,30	1,21	1,23	1,33	-	-	-	-	-	2885 ÷ 2900	See note.	≤ 1000	-15 / 40	No
0,55	2,56	2,56	2,62	1,48	1,48	1,51	-	-	-	-	-	2825 ÷ 2850				
0,75	2,96	2,94	2,96	1,71	1,70	1,71	1,70	1,69	1,70	0,98	0,98	2875 ÷ 2895				
0,9	4,19	4,14	4,16	2,42	2,39	2,40	2,41	2,38	2,38	1,39	1,37	2870 ÷ 2900				
1,1	4,19	4,14	4,16	2,42	2,39	2,40	2,41	2,38	2,38	1,39	1,37	2870 ÷ 2900				
1,5	5,53	5,23	5,13	3,19	3,02	2,96	3,19	3,03	2,96	1,84	1,75	2865 ÷ 2895				
1,85	8,05	8,04	8,09	4,65	4,64	4,67	4,62	4,61	4,63	2,67	2,66	2885 ÷ 2900				
2,2	8,05	8,04	8,09	4,65	4,64	4,67	4,62	4,61	4,63	2,67	2,66	2885 ÷ 2900				
3	10,4	10,2	10,3	5,98	5,91	5,92	6,01	5,95	5,96	3,47	3,44	2905 ÷ 2920				

Note: Observe the regulations and codes locally in force regarding sorted waste disposal.

cef-cof-ie2-mott-2p50-en\_c\_te

\*\* Operating conditions to be referred to motor only. About electric pump, refer to limits in user's manual.



## MOTOR NOISE

The tables below show the mean sound pressure levels (Lp) measured at 1 meter's distance in a free field according to the A curve (ISO 1680 standard).

The noise values are measured with idling 50 Hz motor with a tolerance of 3 dB (A).

### CEF - COF MOTORS 2-POLES 50 Hz

POWER kW	MOTOR TYPE IEC SIZE	NOISE LpA dB
0,37	71	<70
0,55	71	<70
0,75	80	<70
0,9	80	<70
1,1	80	<70
1,5	90	<70
1,85	90	<70
2,2	90	<70
3	100	<70

cef-cof\_mott-en\_a\_tr

### AVAILABLE VOLTAGES MOTORS FOR CEF - COF SERIES

P <sub>N</sub> kW	THREE-PHASE - 2 POLES																		
	50 Hz							60 Hz							50/60 Hz				
	3 x 220-230-240/380-400-415	3 x 380-400-415/660-690	3 x 200-208/346-360	3 x 255-265/440-460	3 x 290-300/500-525	3 x 440-460/-	3 x 500-525/-	3 x 220-230/380-400	3 x 255-265-277/440-460-480	3 x 380-400/660-690	3 x 440-460-480/-	3 x 110-115/190-200	3 x 200-208/346-360	3 x 330-346/575-600	3 x 575/-	3 x 230/400 50 Hz	3 x 265/460 60 Hz	3 x 400/690 50 Hz	3 x 460/- 60 Hz
0,37	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o	o	o
0,55	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o	o	o
0,75	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o	o	o
0,95	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o	o	o
1,1	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o	o	o
1,5	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o	o	o
2,2	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o	o	o
3	s	o	o	o	o	o	o	s	o	o	o	o	o	o	o	o	o	o	o

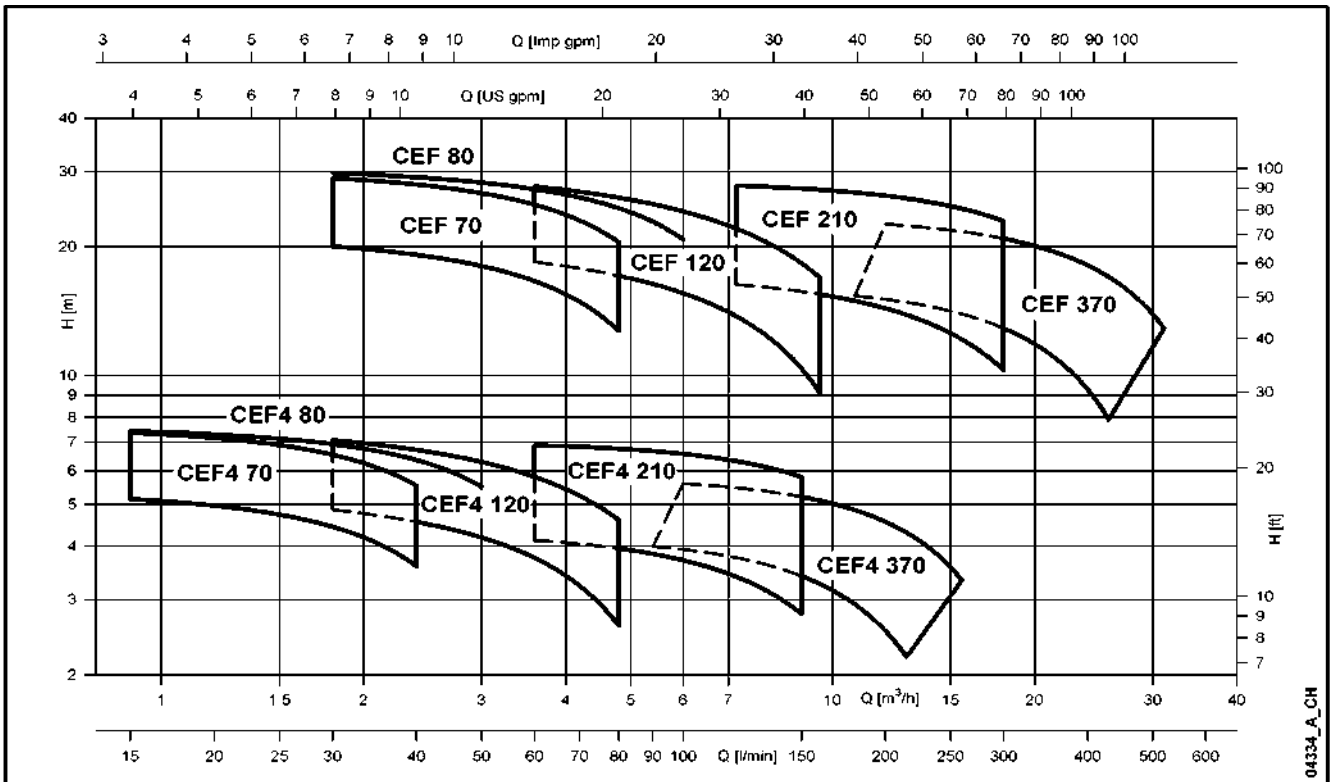
s = Standard voltage

o = Optional voltage

- = Not available

cef-volt-low-a-en\_a\_te

## CEF SERIES HYDRAULIC PERFORMANCE RANGE AT 50 Hz, 2 and 4 POLES



**TABLE OF HYDRAULIC PERFORMANCES AT 50 Hz, 2 and 4 POLES**

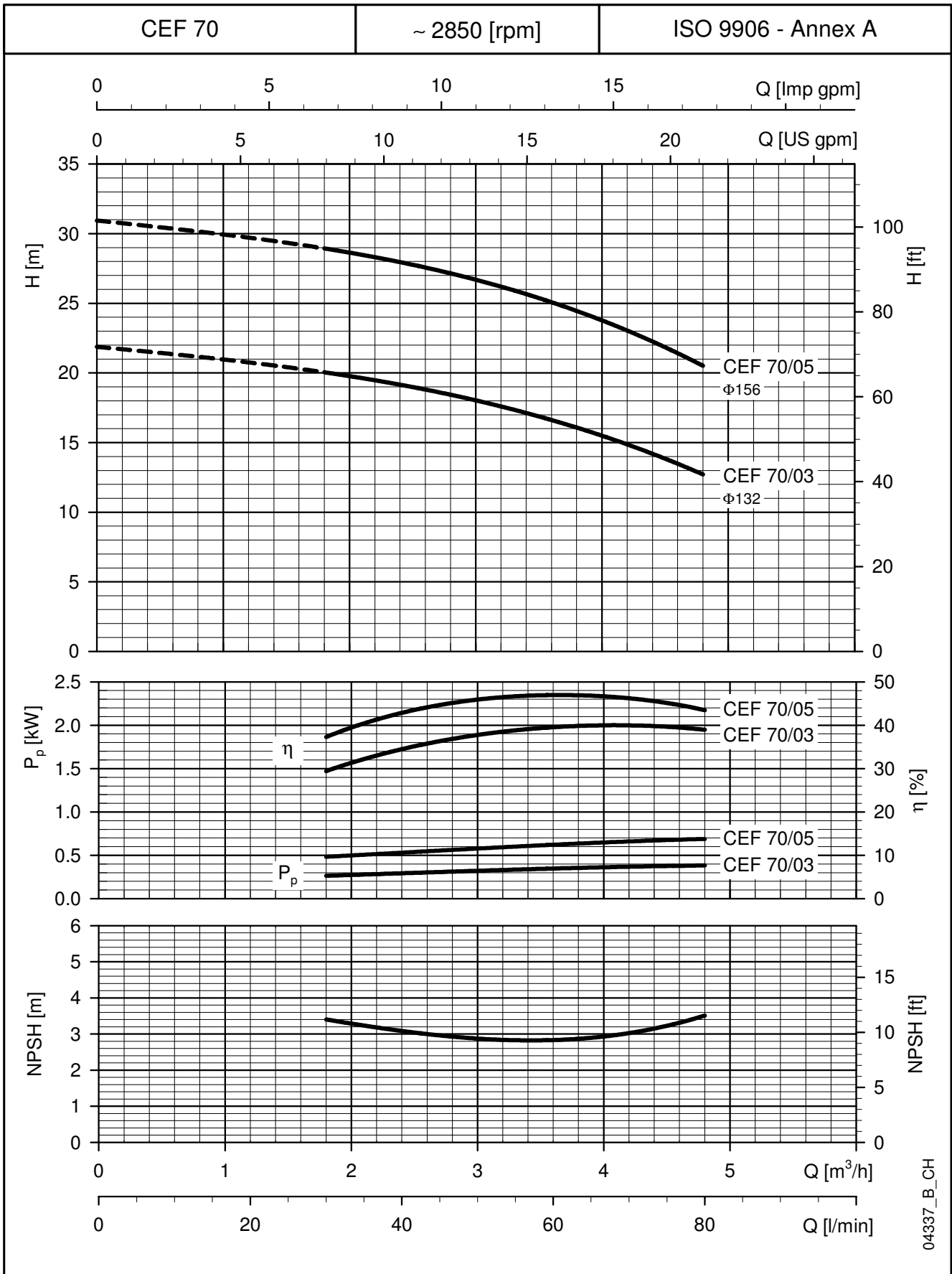
ELECTRIC PUMP TYPE	RATED POWER		Q = DELIVERY																	
			l/min	30	40	60	80	100	120	140	160	180	200	250	300	350	400	430	480	520
			m³/h	1,8	2,4	3,6	4,8	6	7,2	8,4	9,6	10,8	12	15	18	21	24	26	29	31
H = TOTAL HEAD METRES COLUMN OF WATER																				
CEF 70/03	0,37	0,5	21,9	20,0	19,2	16,6	12,7													
CEF 70/05	0,55	0,75	30,9	28,9	28,0	25,1	20,5													
CEF 80/07	0,75	1	31,4	29,8	29,1	27,3	24,6	20,8												
CEF 120/05	0,55	0,75	21,6			18,4	17,1	15,6	13,8	11,6	9,1									
CEF 120/09	0,9	1,2	31,0			27,7	26,1	24,2	22,1	19,6	16,9									
CEF 210/07	0,75	1	17,3						16,3	15,9	15,5	15,0	14,4	12,6	10,3					
CEF 210/11	1,1	1,5	20,3						19,4	19,1	18,7	18,3	17,8	16,3	14,2					
CEF 210/15	1,5	2,2	24,9						24,4	24,1	23,7	23,2	22,7	21,0	18,8					
CEF 210/18	1,85	2,5	28,4						27,8	27,5	27,2	26,8	26,3	24,9	23,0					
CEF 370/11	1,1	1,5	15,9									15,3	15,1	14,1	12,9	11,3	9,3	7,9		
CEF 370/15	1,5	2,2	19,9										18,8	18,0	16,9	15,6	13,9	12,7	10,5	
CEF 370/22	1,85	2,5	23,9										22,6	21,9	20,9	19,7	18,1	17,0	14,9	12,9

cef-2p50-en\_d\_th

PUMP TYPE	PUMP MAX INPUT POWER kW	Q = DELIVERY																	
		l/min	15	20	25	30	40	50	60	70	80	90	100	130	150	190	215	240	260
		m³/h	0,9	1,2	1,5	1,8	2,4	3	3,6	4,2	4,8	5,4	6	7,8	9	11,4	13	14	16
H = TOTAL HEAD METRES COLUMN OF WATER																			
CEF4 70/132	0,05	5,5	5,2	5,0	4,7	4,4	3,6												
CEF4 70/156	0,09	7,8	7,4	7,2	6,9	6,5	5,5												
CEF4 80/156	0,10	7,8	7,4	7,3	7,1	6,9	6,4	5,5											
CEF4 120/132	0,08	5,6				4,9	4,6	4,2	3,8	3,2	2,6								
CEF4 120/156	0,13	7,8				7,1	6,7	6,3	5,8	5,2	4,6								
CEF4 210/121	0,11	4,3							4,1	4,0	3,9	3,8	3,7	3,2	2,8				
CEF4 210/130	0,14	5,0							4,9	4,8	4,7	4,6	4,5	4,1	3,7				
CEF4 210/148	0,19	6,1							6,1	6,0	5,9	5,8	5,7	5,2	4,8				
CEF4 210/156	0,23	7,0							6,9	6,8	6,8	6,7	6,6	6,2	5,8				
CEF4 370/121	0,15	4,0										4,0	3,9	3,7	3,4	2,7	2,2	1,6	
CEF4 370/130	0,21	5,0											4,8	4,6	4,4	3,8	3,4	2,9	
CEF4 370/134	0,26	5,8											5,6	5,4	5,2	4,7	4,3	3,8	3,3

cef4-4p50-en\_c\_th

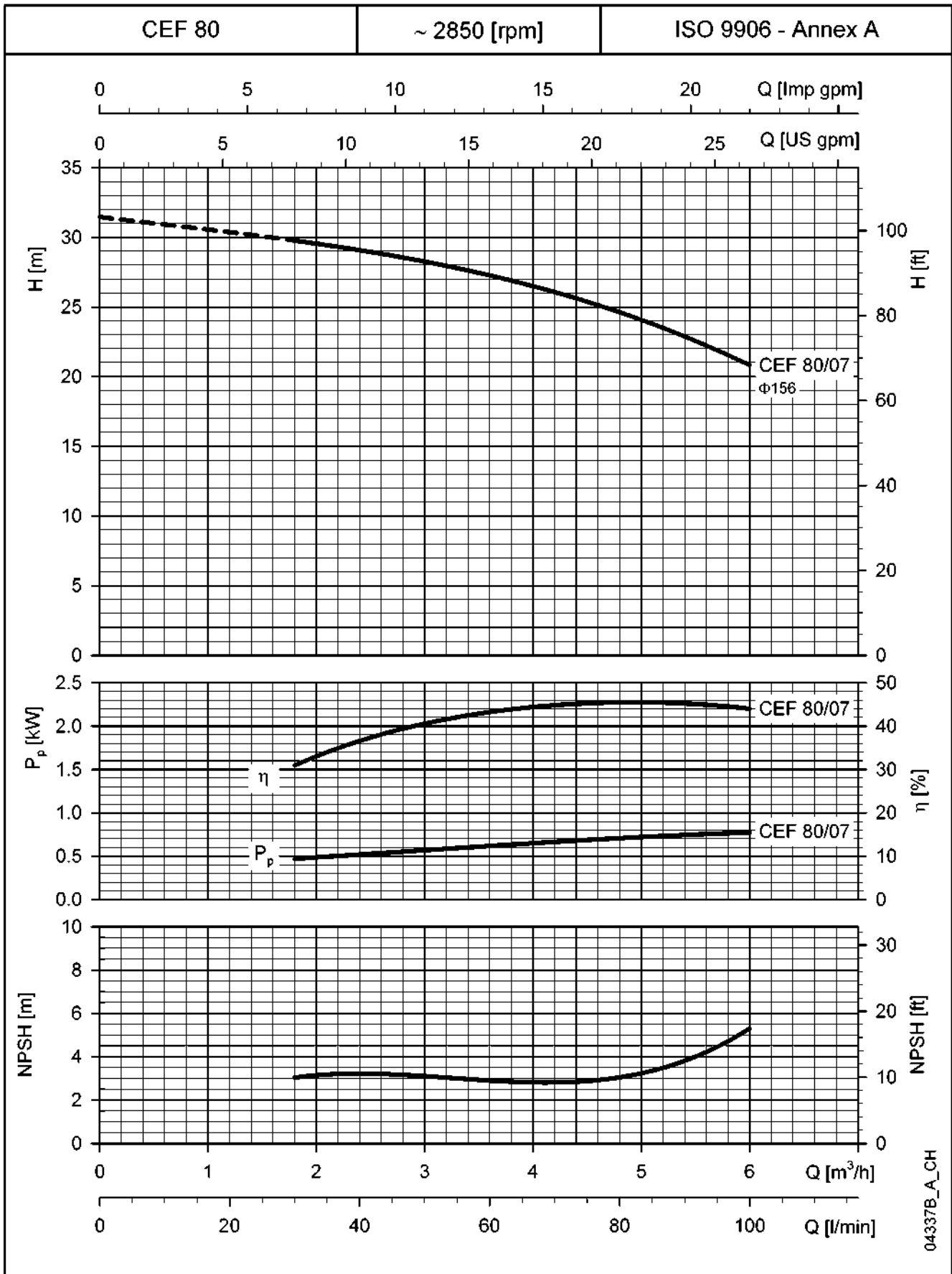
**CEF SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES**



04337\_B\_CH

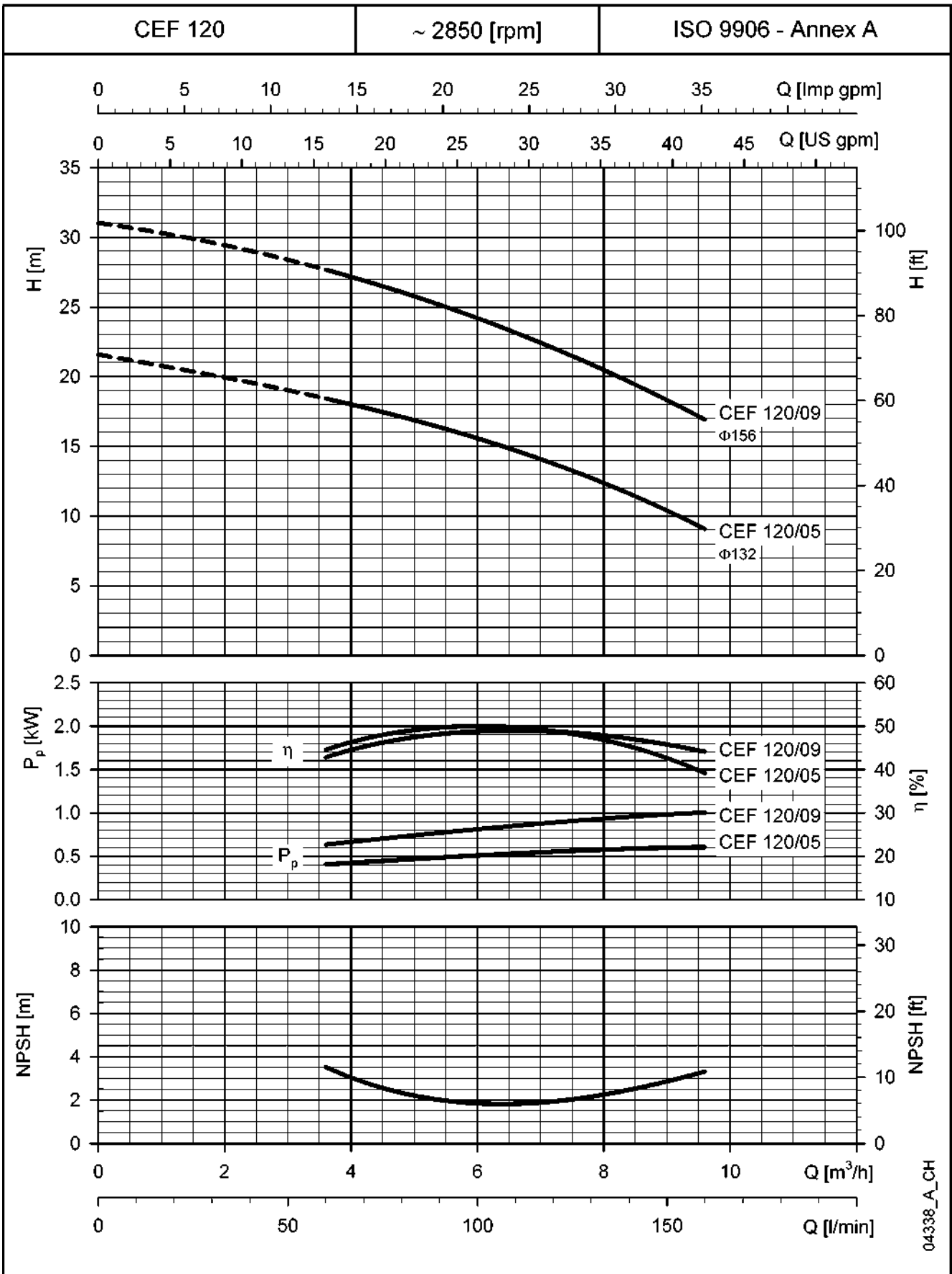
The NPSH values are laboratory values: for practical use we suggest increasing these values by 0,5 m.  
These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

**CEF SERIES**  
**OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES**



The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
 These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

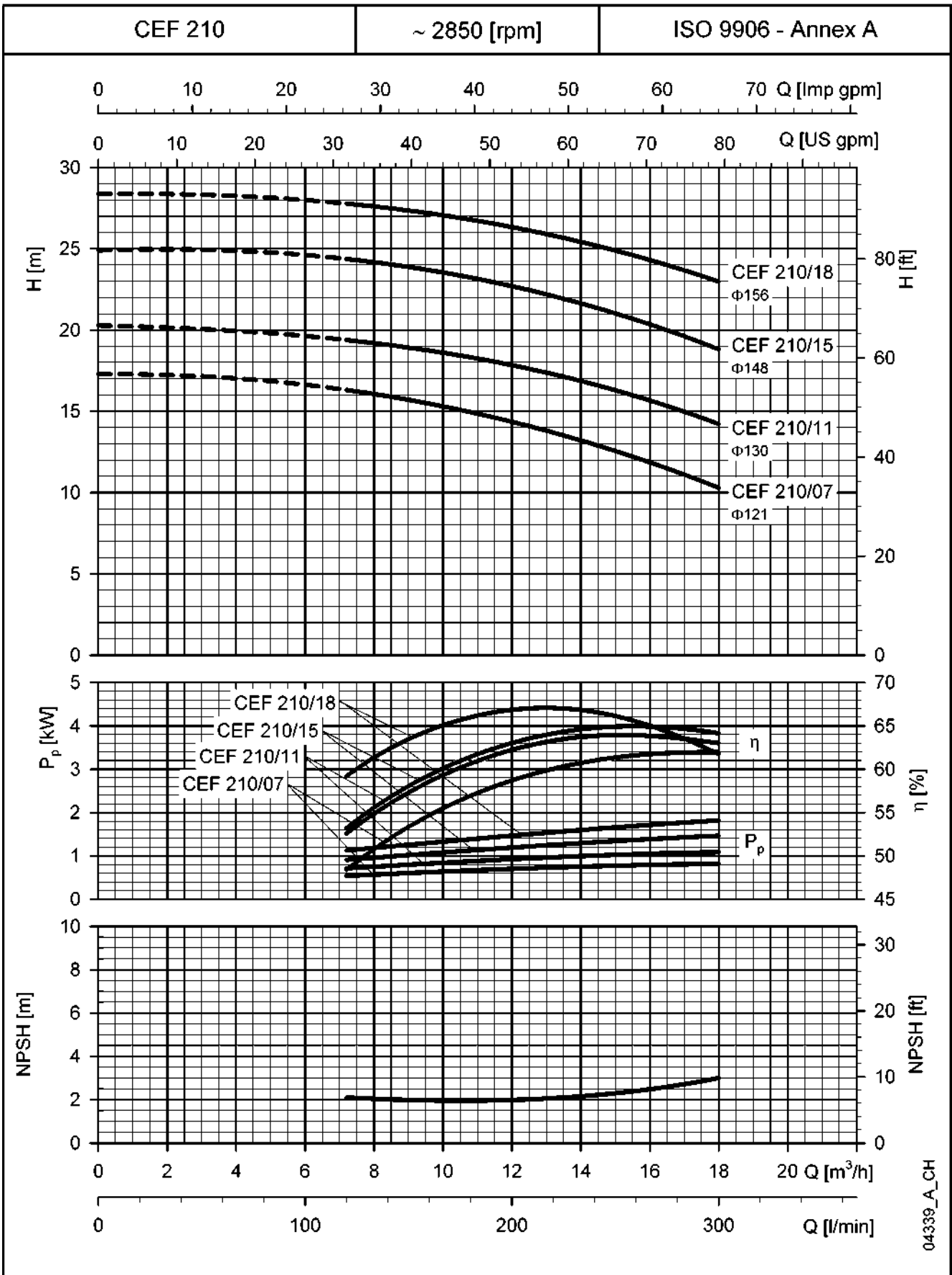
**CEF SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES**



04338\_A\_CH

The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
 These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

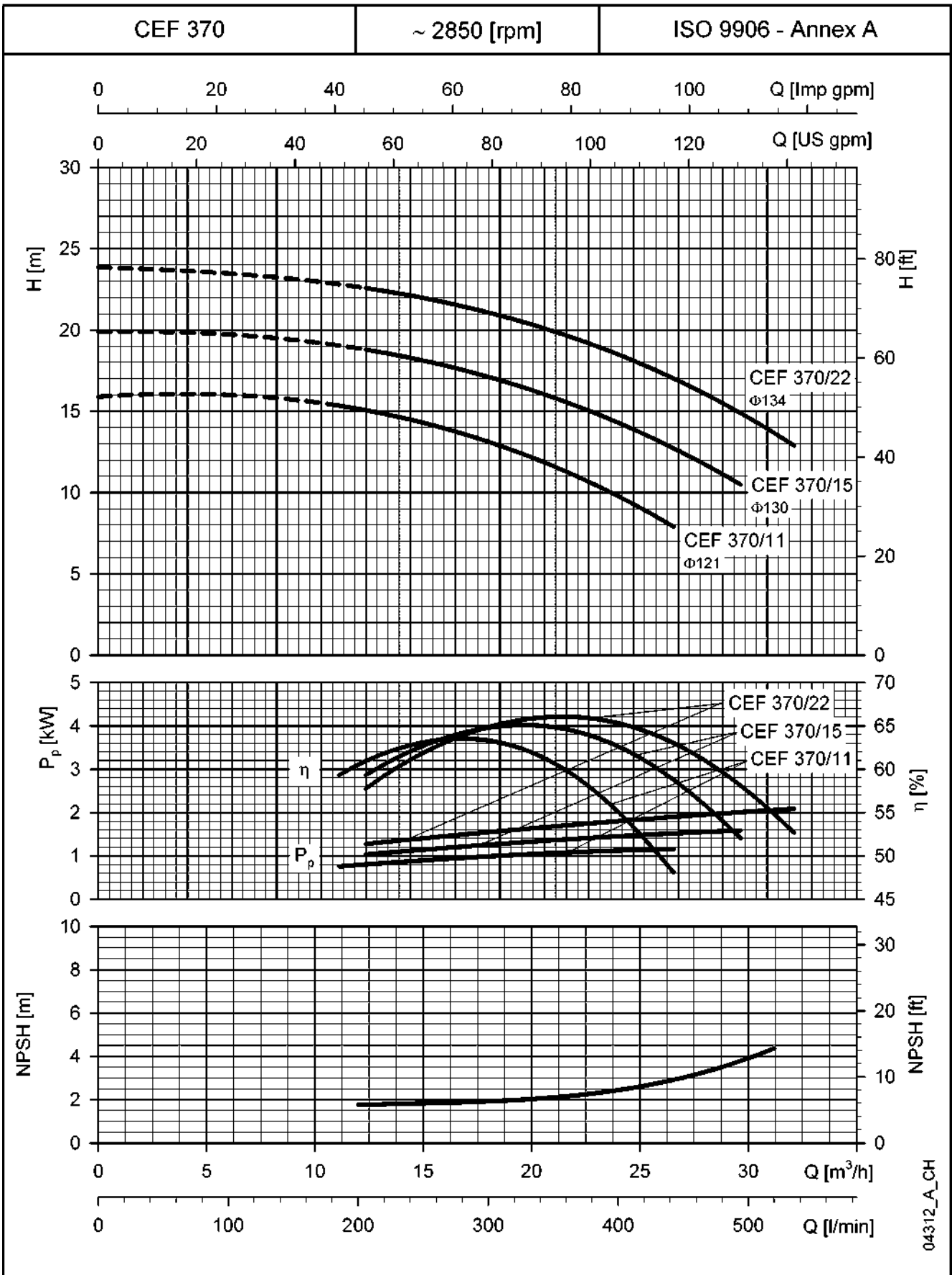
**CEF SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES**



04339\_A\_CH

The NPSH values are laboratory values: for practical use we suggest increasing these values by 0,5 m.  
 These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

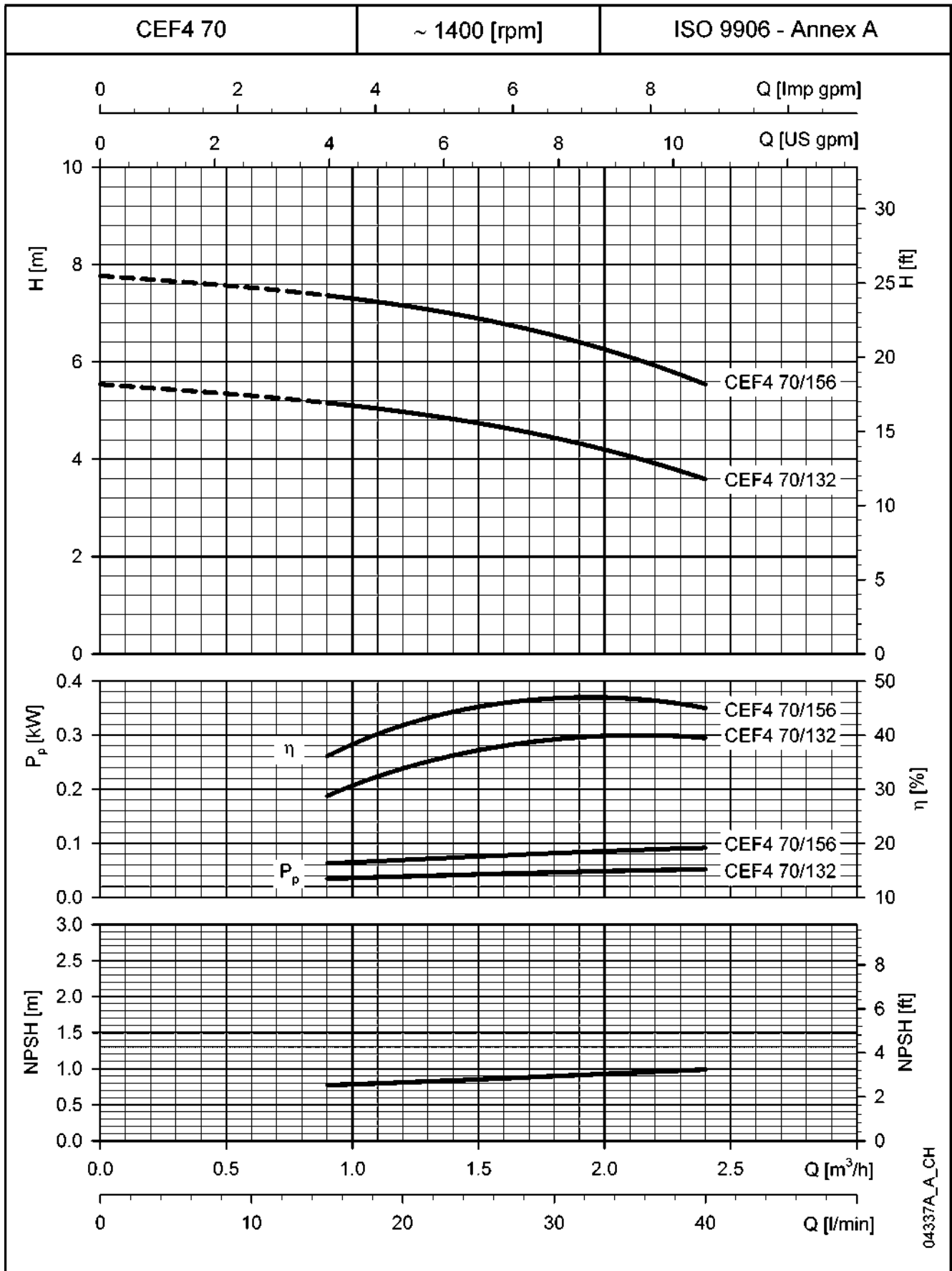
**CEF SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES**



04312\_A\_CH

The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
 These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

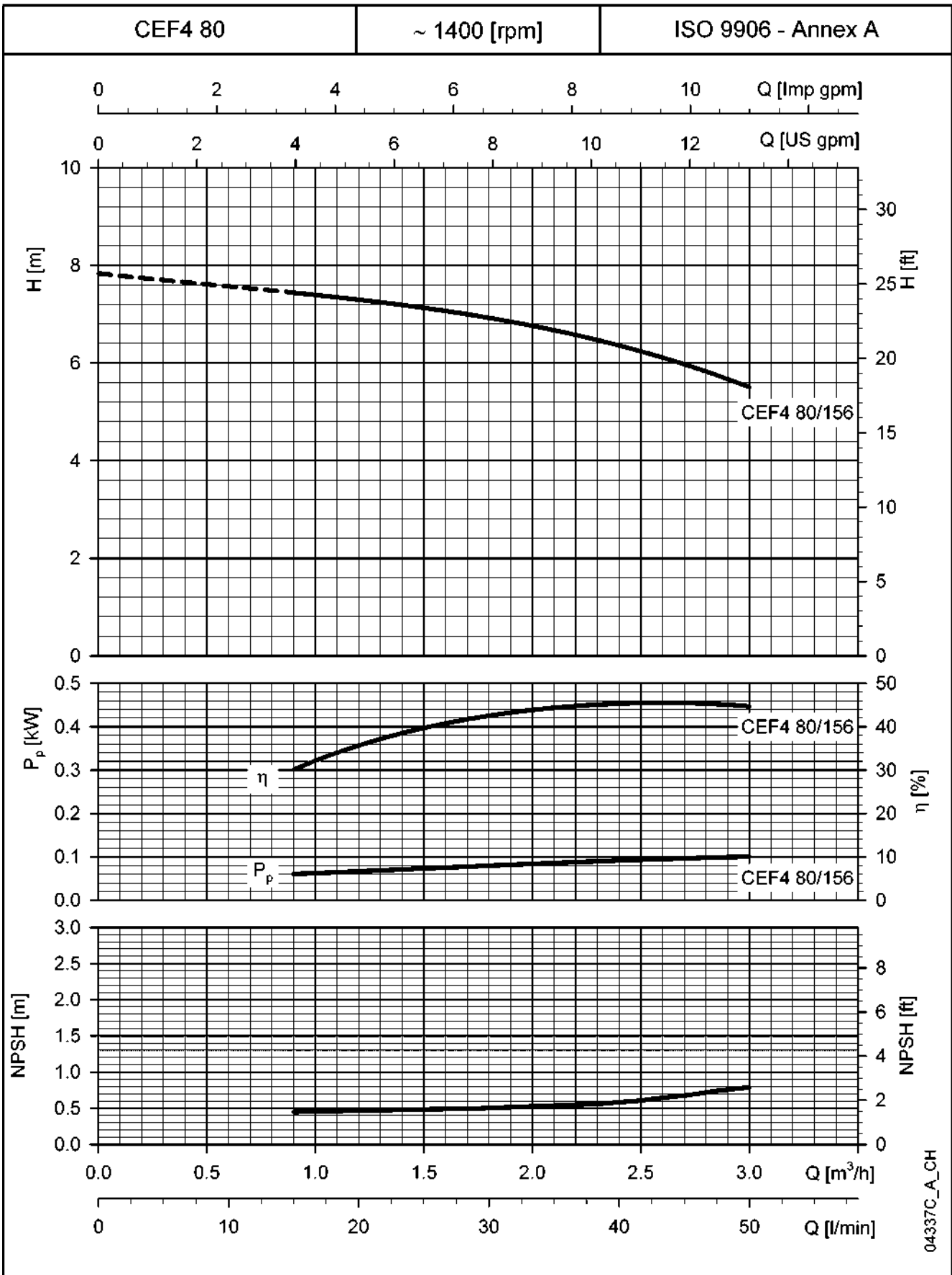
**CEF4 SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES**



The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
 These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

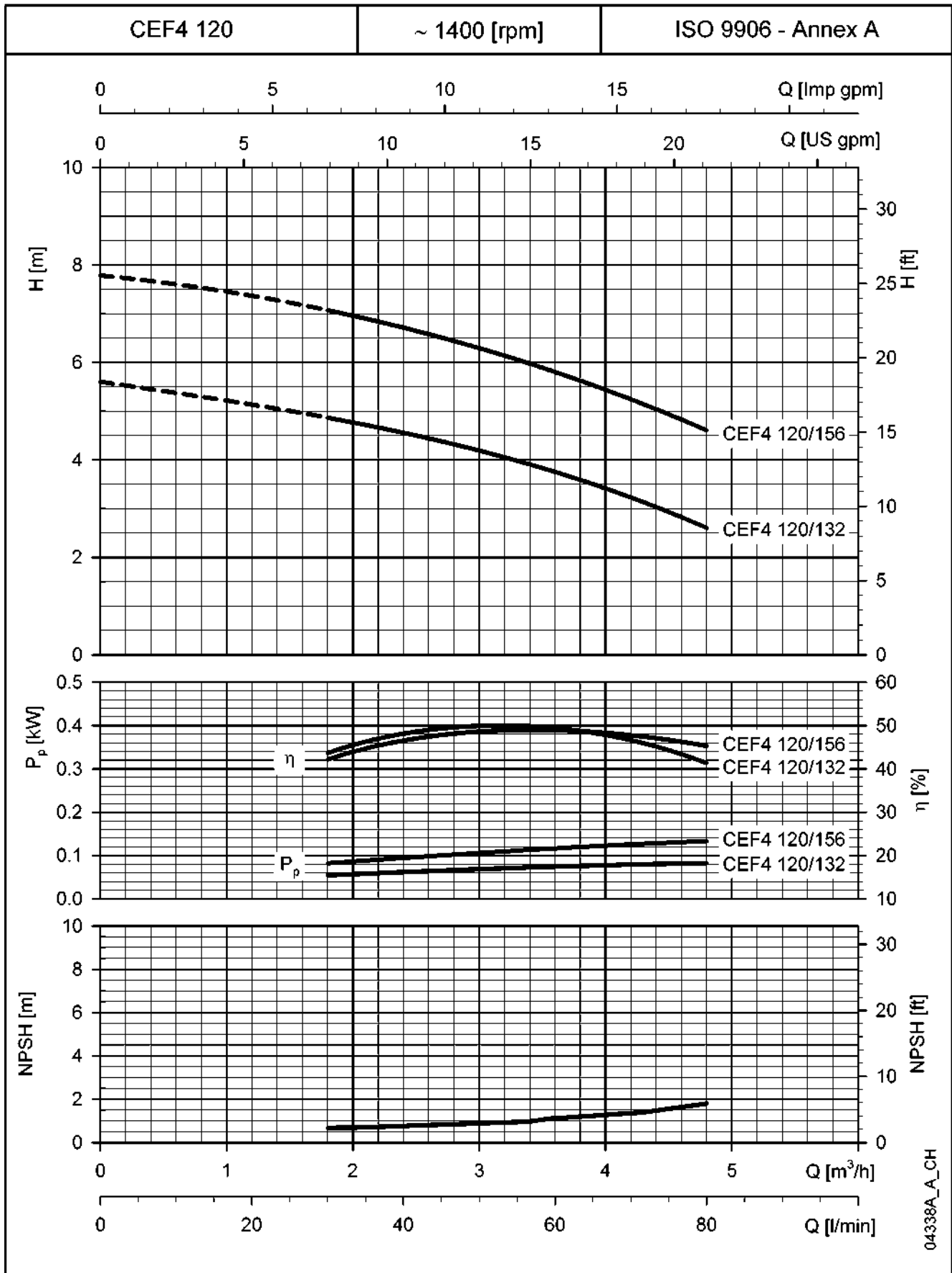


**CEF4 SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES**



The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

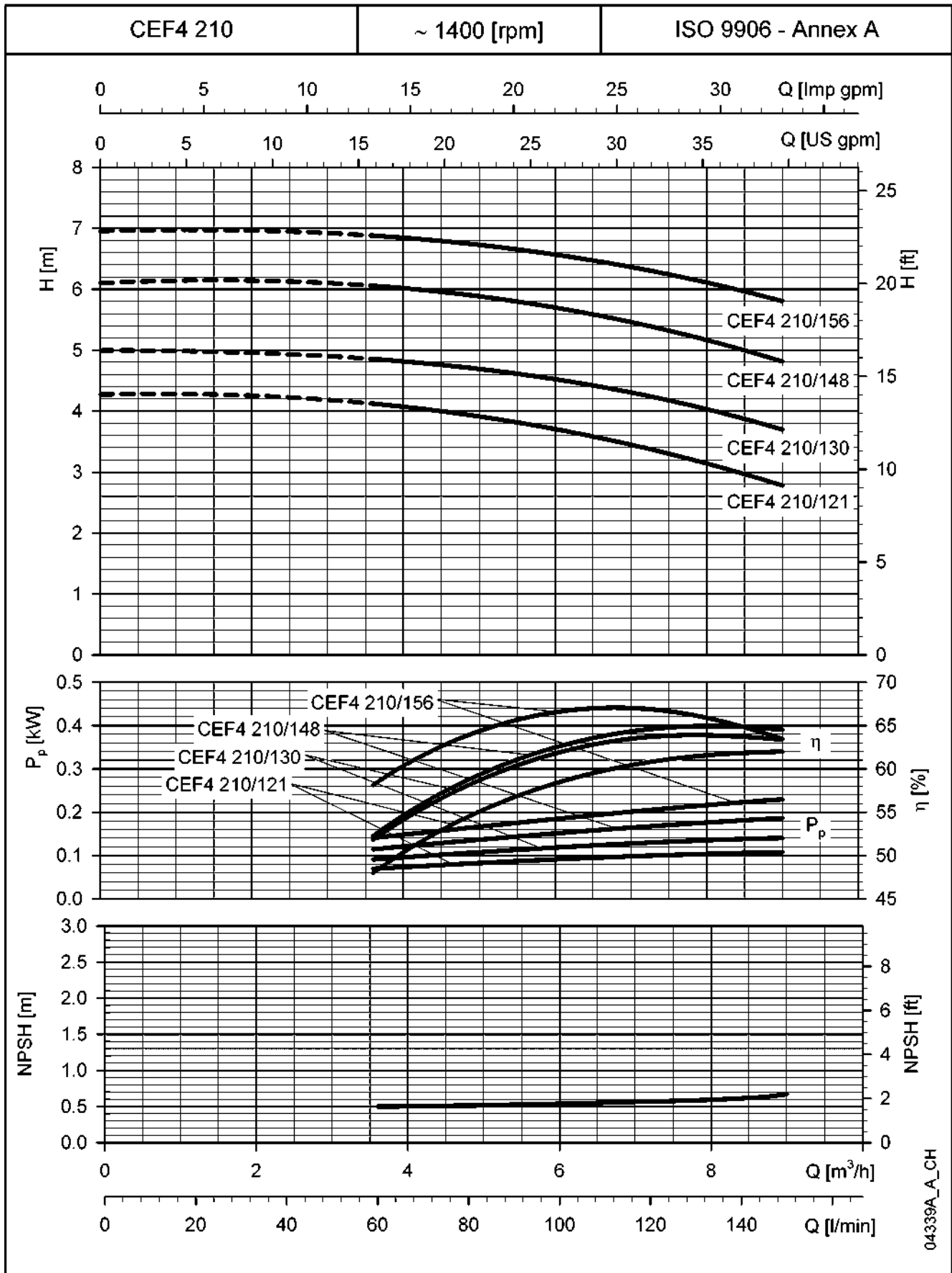
**CEF4 SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES**



04338A\_A\_CH

The NPSH values are laboratory values: for practical use we suggest increasing these values by 0,5 m.  
These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

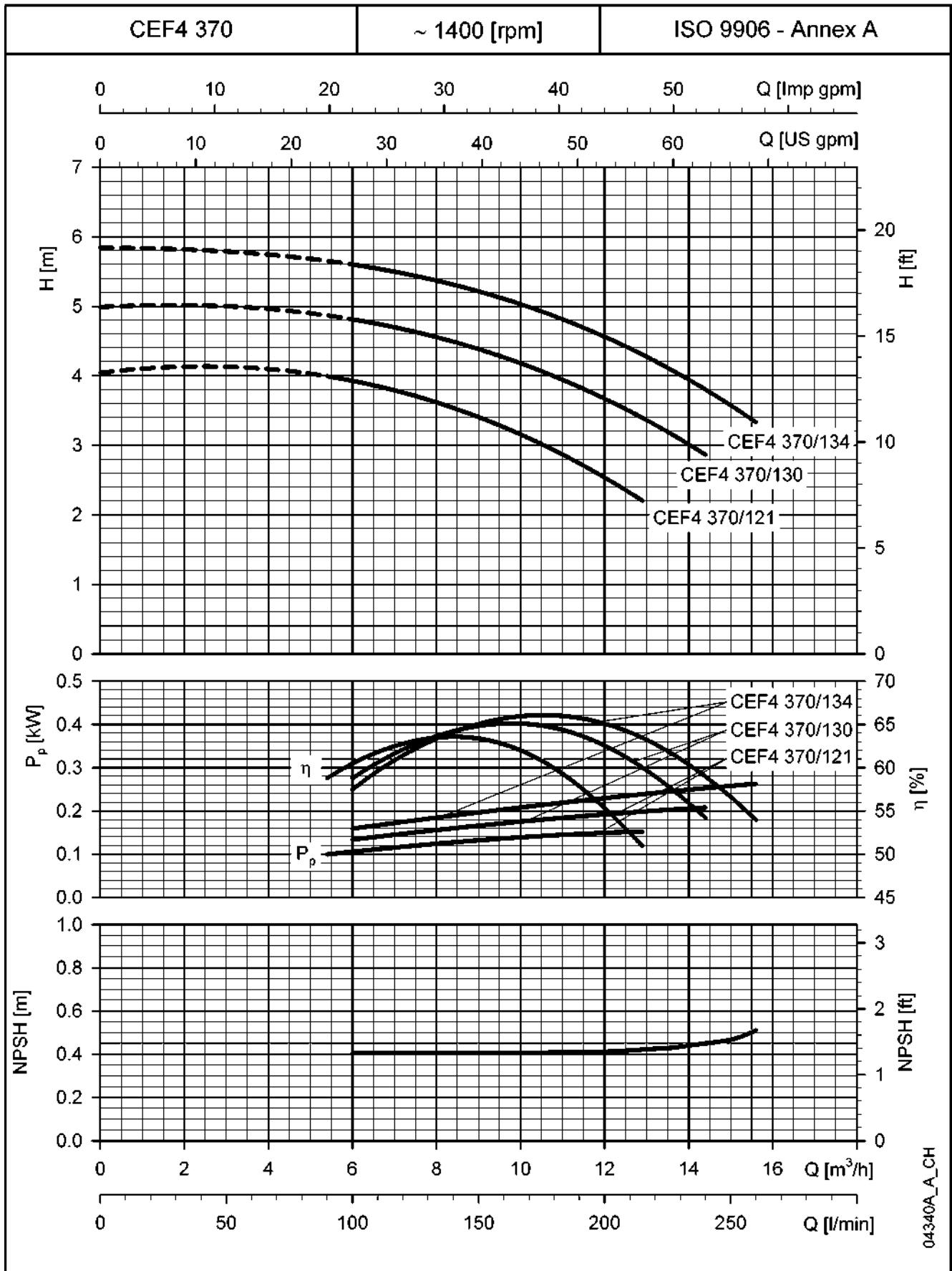
**CEF4 SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES**



04339A\_A\_CH

The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

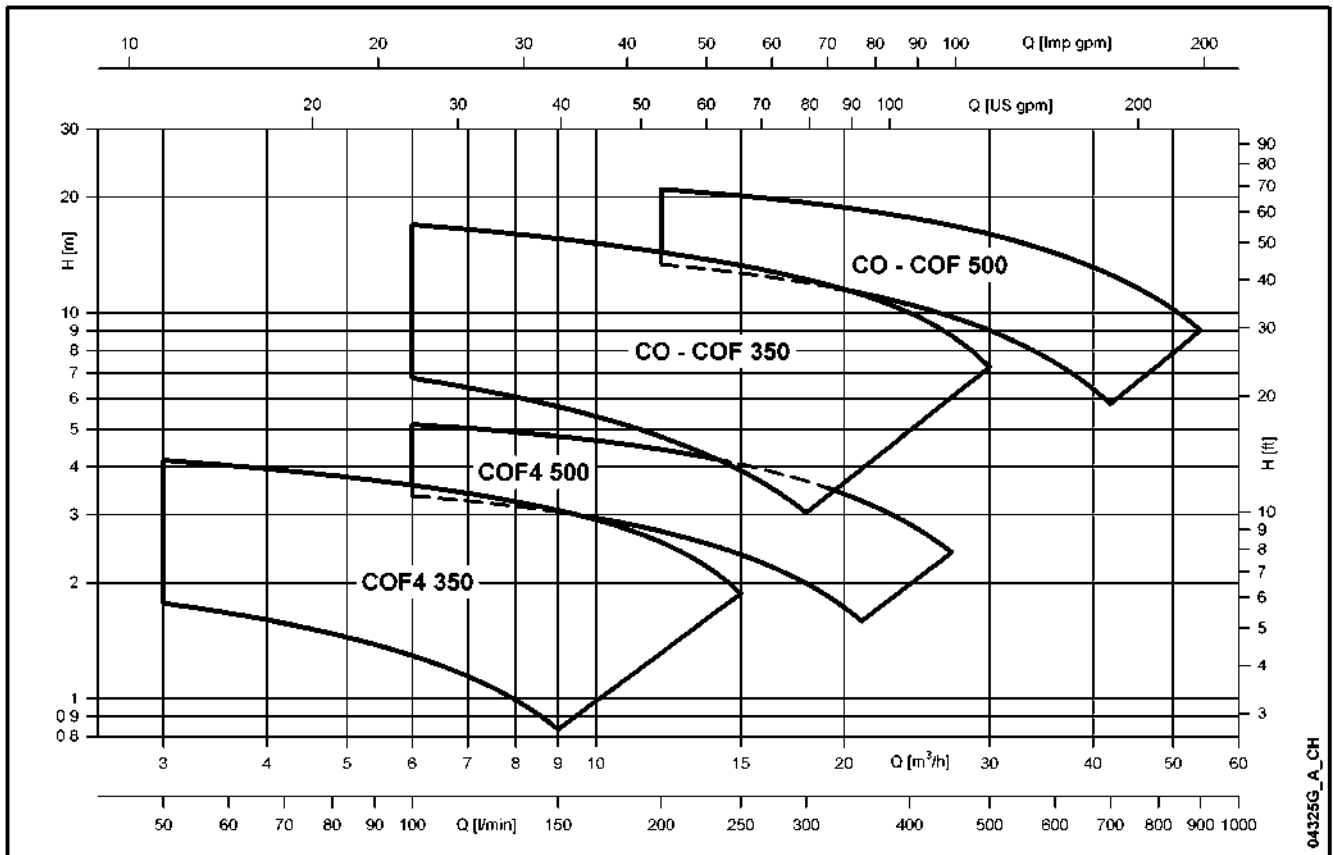
**CEF4 SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES**



04340A\_A\_CH

The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
 These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

## COF SERIES HYDRAULIC PERFORMANCE RANGE AT 50 Hz, 2 and 4 POLES



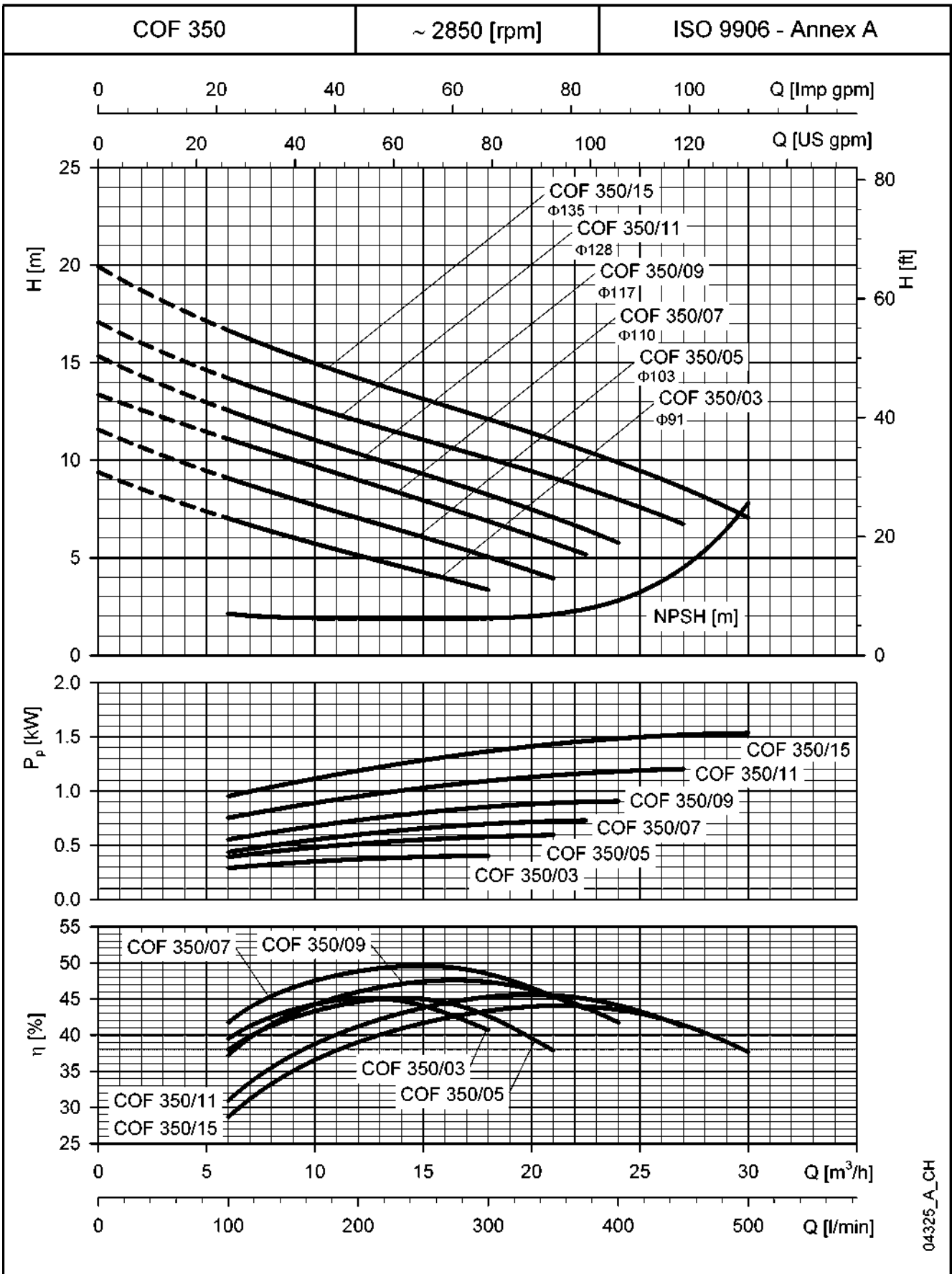
### TABLE OF HYDRAULIC PERFORMANCES AT 50 Hz, 2 POLES

ELECTRIC PUMP TYPE	RATED POWER		Q = DELIVERY																		
			l/min 0	100	120	160	200	240	280	300	350	375	400	450	500	600	650	700	800	900	
	kW	HP	m³/h 0	6	7,2	9,6	12	14,4	16,8	18	21	22,5	24	27	30	36	39	42	48	54	
H = TOTAL HEAD METRES COLUMN OF WATER																					
COF 350/03	0,37	0,5	9,4	7,0	6,6	5,8	5,1	4,4	3,7	3,4											
COF 350/05	0,55	0,75	11,6	9,1	8,6	7,8	7,0	6,3	5,5	5,0	3,9										
COF 350/07	0,75	1	13,4	11,1	10,7	9,8	9,0	8,2	7,3	6,9	5,8	5,2									
COF 350/09	0,9	1,2	15,3	12,6	12,1	11,2	10,3	9,5	8,7	8,2	7,1	6,4	5,8								
COF 350/11	1,1	1,5	17,1	14,2	13,7	12,8	12,0	11,2	10,5	10,1	9,1	8,6	8,0	6,7							
COF 350/15	1,5	2	19,9	16,7	16,1	15,1	14,2	13,4	12,5	12,1	11,0	10,5	9,9	8,6	7,1						
COF 500/15	1,5	2	15,9				13,5	13,0	12,4	12,2	11,5	11,1	10,8	10,0	9,3	7,7	6,9	6,1			
COF 500/22	2,2	3	19,1				17,0	16,5	16,0	15,7	15,1	14,7	14,4	13,6	12,8	11,2	10,3	9,4	7,6		
COF 500/30	3	4	23,5				20,6	20,0	19,4	19,1	18,3	17,9	17,5	16,7	15,9	14,2	13,3	12,5	10,7	8,9	

### TABLE OF HYDRAULIC PERFORMANCES AT 50 Hz, 4 POLES

PUMP TYPE	PUMP MAX INPUT POWER kW	Q = DELIVERY															
		l/min 0	50	75	100	125	150	175	187	200	225	250	300	350	400	450	
		m³/h 0	3	4,5	6	7,5	9	10,5	11,22	12	13,5	15	18	21	24	27	
H = TOTAL HEAD METRES COLUMN OF WATER																	
COF4 350/91	0,05	2,4	1,8	1,5	1,3	1,1	0,8										
COF4 350/103	0,08	2,9	2,3	2,1	1,9	1,6	1,4	1,1									
COF4 350/110	0,09	3,3	2,8	2,5	2,3	2,0	1,8	1,5	1,4								
COF4 350/117	0,12	3,8	3,1	2,9	2,6	2,4	2,1	1,8	1,7	1,5							
COF4 350/128	0,17	4,6	3,8	3,6	3,3	3,1	2,8	2,6	2,4	2,3	2,0						
COF4 350/135	0,20	4,9	4,2	3,8	3,6	3,3	3,1	2,8	2,7	2,5	2,2	1,9					
COF4 500/113	0,19	3,9			3,4	3,2	3,0	2,9	2,8	2,7	2,5	2,4	2,0	1,6			
COF4 500/125	0,27	4,7			4,2	4,1	3,9	3,8	3,7	3,6	3,5	3,3	2,9	2,5	2,0		
COF4 500/138	0,41	5,8			5,1	5,0	4,8	4,6	4,5	4,4	4,2	4,1	3,7	3,3	2,8	2,4	

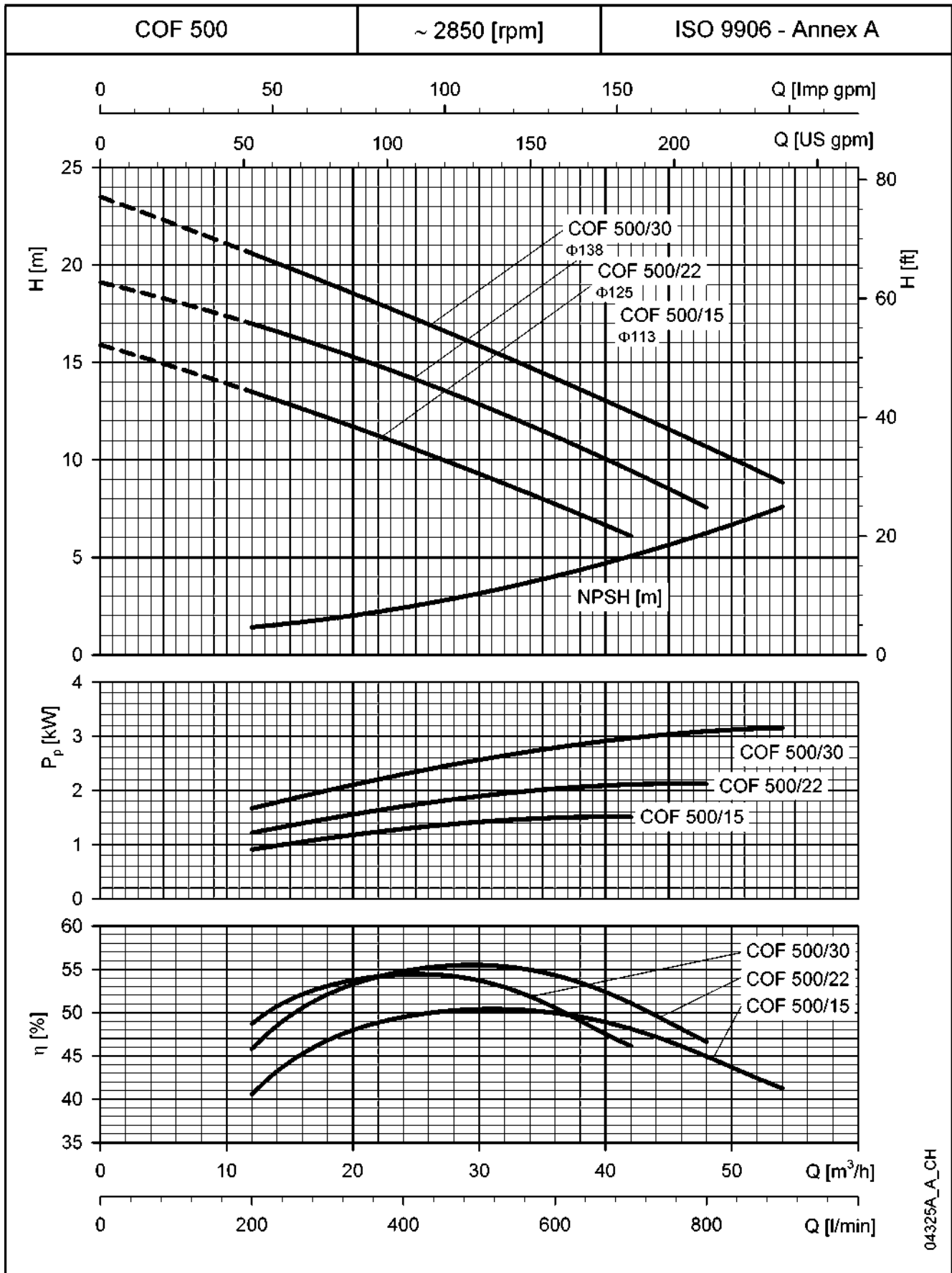
**COF SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES**



04325\_A\_CH

The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

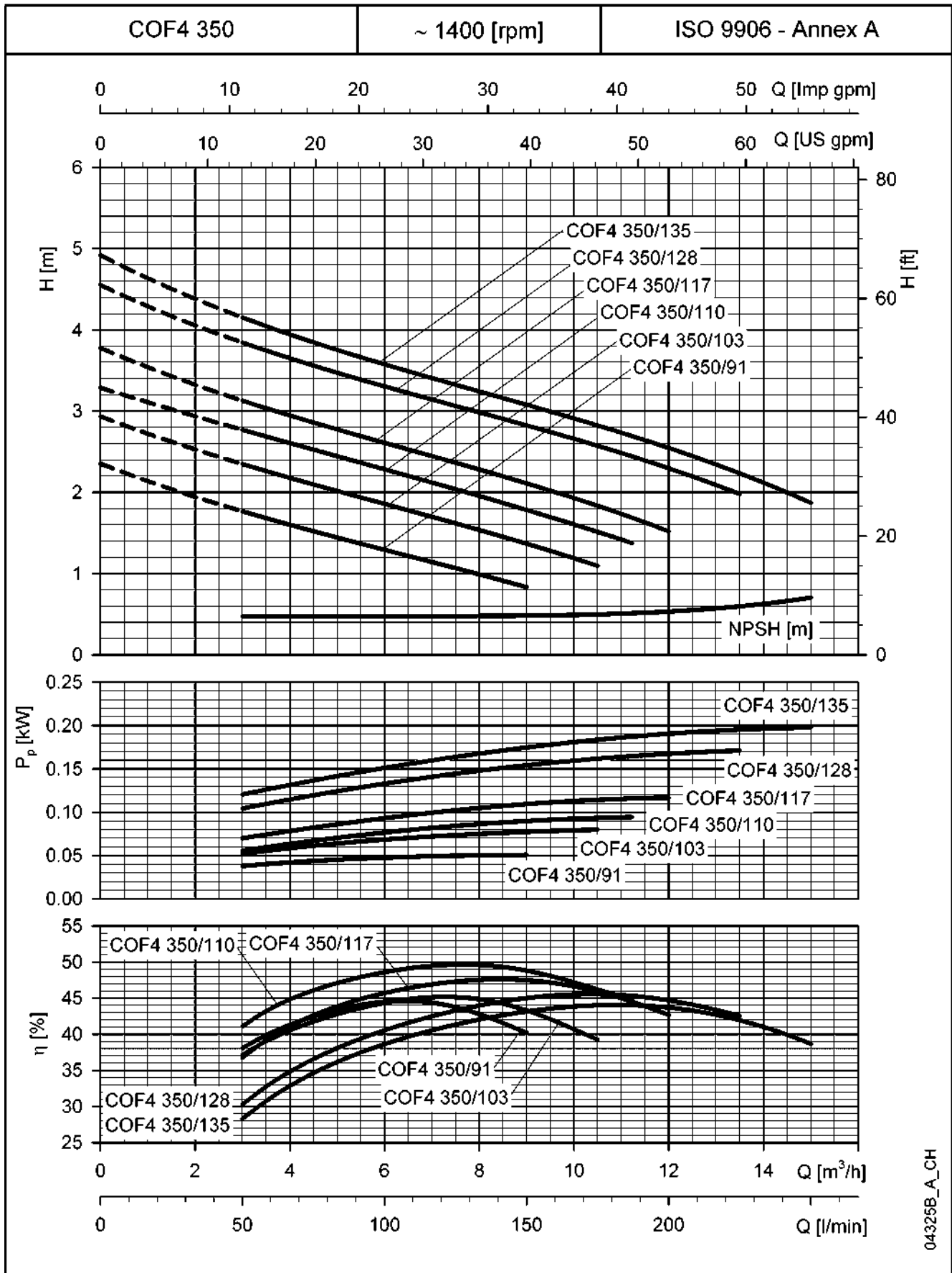
**COF SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES**



04325A\_A\_CH

!The NPSH values are laboratory values: for practical use we suggest increasing these values by 0,5 m.  
These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

**COF4 SERIES**  
**OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES**

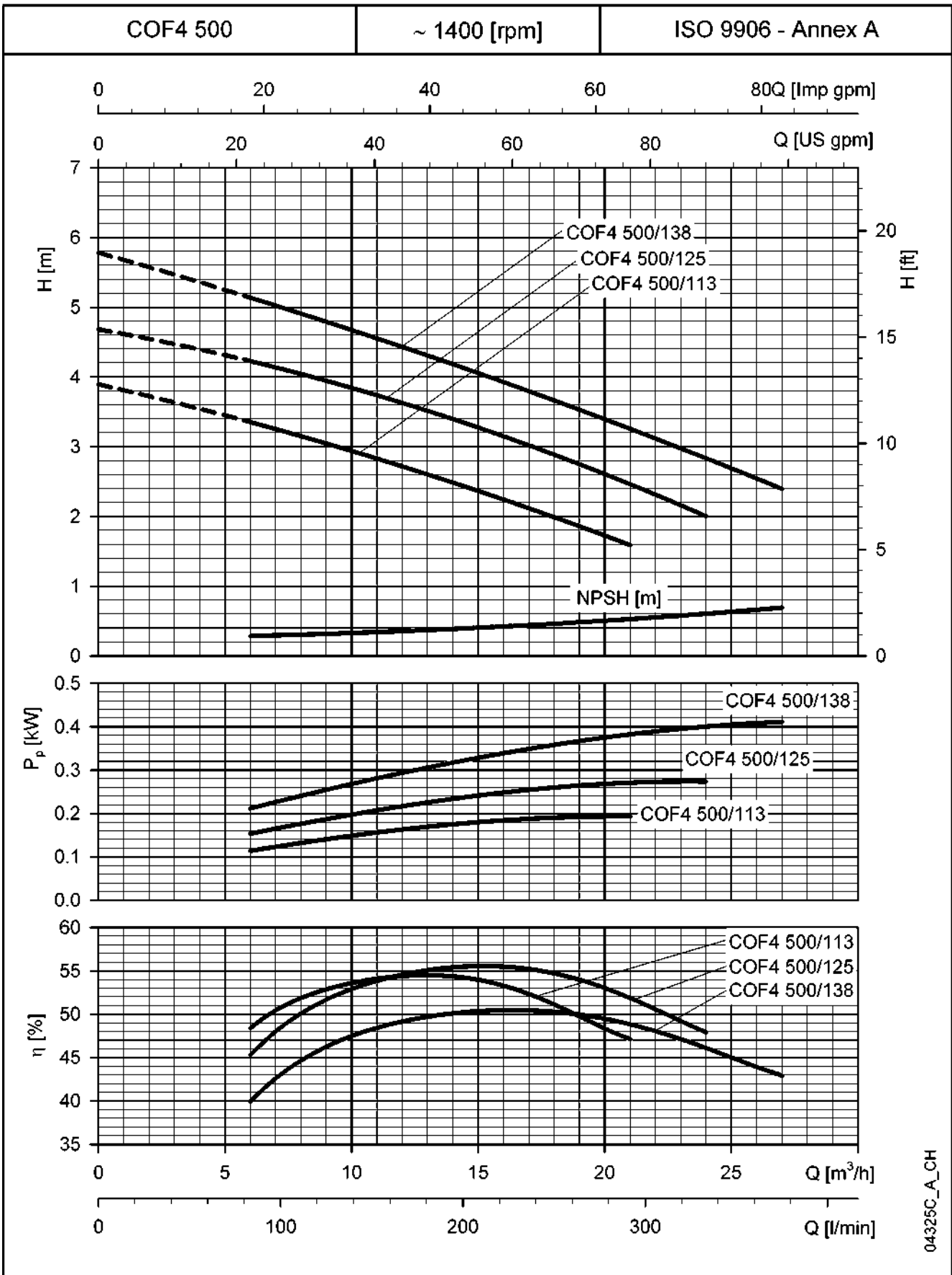


04325B\_A\_CH

The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .



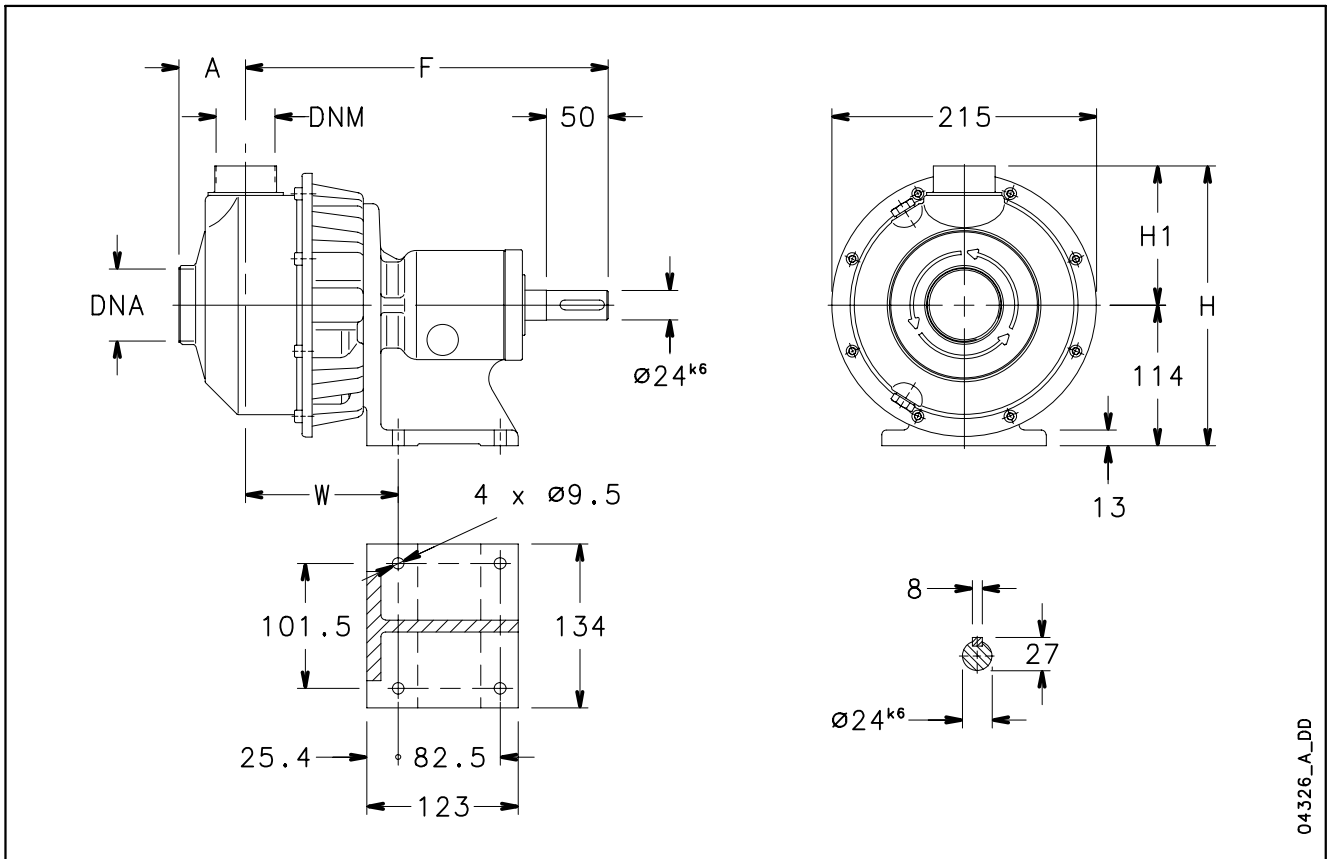
**COF4 SERIES  
OPERATING CHARACTERISTICS AT 50 Hz, 4 POLES**



04325C\_A\_CH

The NPSH values are laboratory values; for practical use we suggest increasing these values by 0,5 m.  
These performances are valid for liquids with density  $\rho = 1.0 \text{ Kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{sec}$ .

## CEF - COF BARE SHAFT SERIES DIMENSIONS AND WEIGHTS AT 50 Hz



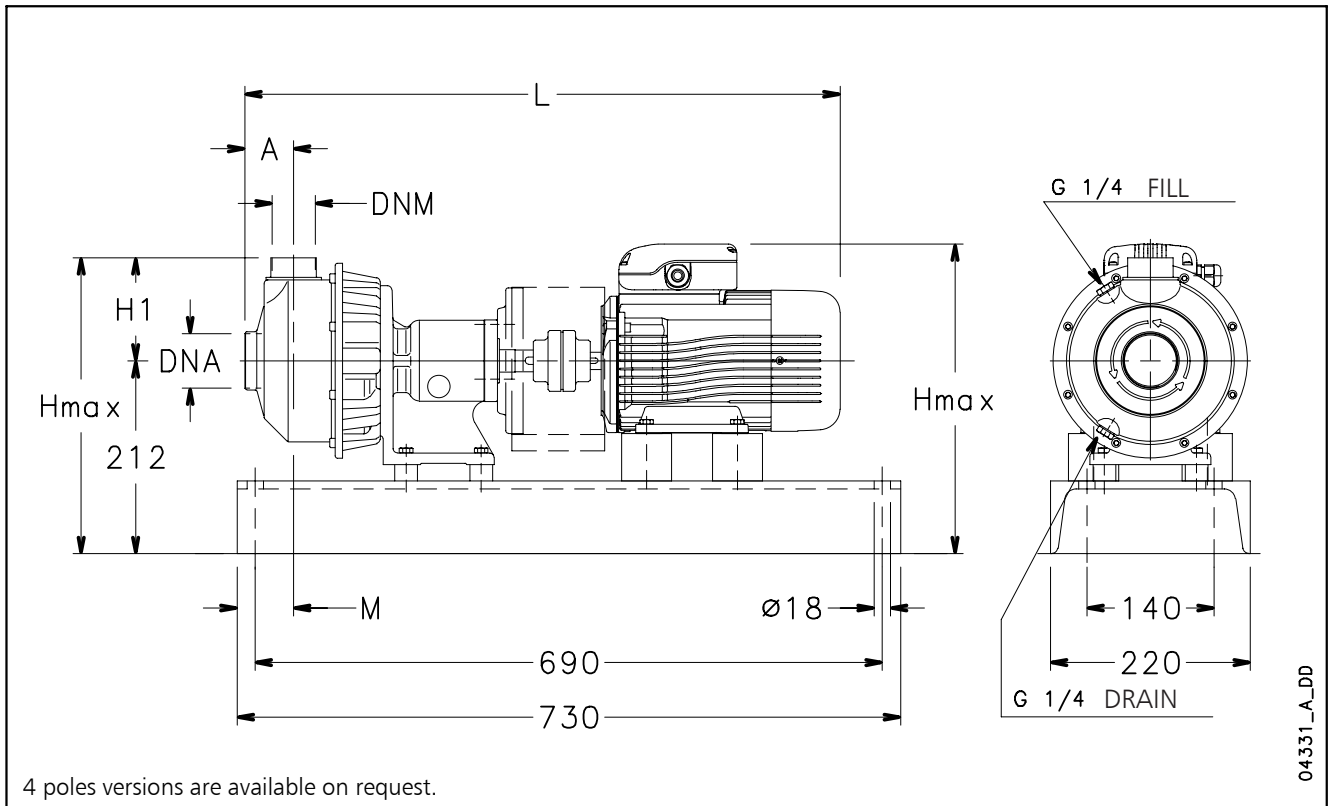
PUMP TYPE	DIMENSIONS (mm)					DNA	DNM	WEIGHT kg
	A	F	H	H1	W			
CEF 70/132	51	282	225	111	112,5	Rp 1/4	Rp 1	11,5
CEF 70/156	51	282	225	111	112,5	Rp 1/4	Rp 1	11,5
CEF 80/156	51	282	225	111	112,5	Rp 1/4	Rp 1	11,5
CEF 120/132	51	282	225	111	112,5	Rp 1/4	Rp 1	11,5
CEF 120/156	51	282	225	111	112,5	Rp 1/4	Rp 1	11,5
CEF 210/121	54	293	227	113	123,7	Rp 1/2	Rp 1/4	12
CEF 210/130	54	293	227	113	123,7	Rp 1/2	Rp 1/4	12
CEF 210/148	54	293	227	113	123,7	Rp 1/2	Rp 1/4	12
CEF 210/156	54	293	227	113	123,7	Rp 1/2	Rp 1/4	12
CEF 370/121	54	293	227	113	123,7	Rp 2	Rp 1/4	12
CEF 370/130	54	293	227	113	123,7	Rp 2	Rp 1/4	12
CEF 370/134	54	293	227	113	123,7	Rp 2	Rp 1/4	12

cef-pompa-en\_a\_td

PUMP TYPE	DIMENSIONS (mm)					DNA	DNM	WEIGHT kg
	A	F	H	H1	W			
COF 350/91	54	293	227	113	124	Rp 1/2	Rp 1/4	11
COF 350/103	54	293	227	113	124	Rp 1/2	Rp 1/4	11
COF 350/110	54	293	227	113	124	Rp 1/2	Rp 1/4	11
COF 350/117	54	293	227	113	124	Rp 1/2	Rp 1/4	11
COF 350/128	54	293	227	113	124	Rp 1/2	Rp 1/4	11
COF 350/135	54	293	227	113	124	Rp 1/2	Rp 1/4	11
COF 500/113	54	293	227	113	124	Rp 2	Rp 1/2	11,5
COF 500/125	54	293	227	113	124	Rp 2	Rp 1/2	11,5
COF 500/138	54	293	227	113	124	Rp 2	Rp 1/2	11,5

cef-pompa-en\_a\_td

## CEF - COF BASE-MOUNTED SERIES DIMENSIONS AND WEIGHTS AT 50 Hz, 2 POLES



ELECTRIC PUMP TYPE	DIMENSIONS (mm)					DNA	DNM	WEIGHT kg
	A	H max	H1	L	M			
CEF 70/03/A	51	333	111	600	73	Rp 1¼	Rp 1	41
CEF 70/05/A	51	333	111	600	73	Rp 1¼	Rp 1	42
CEF 80/07/D	51	341	111	642	73	Rp 1¼	Rp 1	46
CEF 120/05/A	51	333	111	600	73	Rp 1¼	Rp 1	42
CEF 120/09/D	51	341	111	642	73	Rp 1¼	Rp 1	47
CEF 210/07/D	54	341	113	656	62	Rp 1½	Rp 1¼	46
CEF 210/11/D	54	341	113	656	62	Rp 1½	Rp 1¼	48
CEF 210/15/P	54	346	113	700	62	Rp 1½	Rp 1¼	53
CEF 210/18/P	54	346	113	700	62	Rp 1½	Rp 1¼	54
CEF 370/11/D	54	341	113	656	62	Rp 2	Rp 1¼	48
CEF 370/15/P	54	346	113	700	62	Rp 2	Rp 1¼	53
CEF 370/22/P	54	346	113	700	62	Rp 2	Rp 1¼	54

cef-el-p-2p50-en\_e\_td

ELECTRIC PUMP TYPE	DIMENSIONS (mm)					DNA	DNM	WEIGHT kg
	A	H max	H1	L	M			
COF 350/03/A	54	333	113	612	62	Rp 1½	Rp 1¼	57
COF 350/05/A	54	333	113	612	62	Rp 1½	Rp 1¼	58
COF 350/07/D	54	341	113	654	62	Rp 1½	Rp 1¼	61
COF 350/09/D	54	341	113	654	62	Rp 1½	Rp 1¼	62
COF 350/11/D	54	341	113	654	62	Rp 1½	Rp 1¼	62
COF 350/15/P	54	346	113	700	62	Rp 1½	Rp 1¼	69
COF 500/15/P	54	346	113	700	62	Rp 2	Rp 1½	71
COF 500/22/P	54	346	113	700	62	Rp 2	Rp 1½	72
COF 500/30/P	54	366	113	731	62	Rp 2	Rp 1½	73

cof-el-p-2p50-en\_d\_td

# **TECHNICAL APPENDIX**

## **TYPICAL APPLICATIONS OF CO - SHO SERIES ELECTRIC PUMPS**

### *Water Purification:*

De-ionized water  
Water treatment  
Filtration  
Commercial pools

### *Food and Drink:*

Food processing  
Bottle washing  
Citrus processing  
Dish washing  
Brewing  
Sanitary ware

### *Medical:*

Laser cooling  
Medical chillers  
Sanitary equipment

### *Heating, Ventilating & Air Conditioning (HVAC)*

Air scrubbers  
Water re-circulation  
Cooling towers  
Cooling systems  
Temperature control  
Chillers  
Induction heating  
Heat exchangers  
Water heating

### *Graphics:*

Film washing  
Cooling

### *Plastics:*

Extrusion machines  
Temperature control  
Manufacture of polymers

### *Waste Management:*

Waste treatment

### *Machine Tool:*

Degreasing  
Parts washing  
Chemical treatment  
Heat treatment

### *Laundry:*

Industrial and Commercial washing

### *General Industry:*

Spray Booths  
Light chemical transfer  
Booster systems  
Firefighting systems

## NPSH

The minimum operating values that can be reached at the pump suction end are limited by the onset of cavitation.

Cavitation is the formation of vapour-filled cavities within liquids where the pressure is locally reduced to a critical value, or where the local pressure is equal to, or just below the vapour pressure of the liquid.

The vapour-filled cavities flow with the current and when they reach a higher pressure area the vapour contained in the cavities condenses. The cavities collide, generating pressure waves that are transmitted to the walls. These, being subjected to stress cycles, gradually become deformed and yield due to fatigue. This phenomenon, characterized by a metallic noise produced by the hammering on the pipe walls, is called incipient cavitation.

The damage caused by cavitation may be magnified by electrochemical corrosion and a local rise in temperature due to the plastic deformation of the walls. The materials that offer the highest resistance to heat and corrosion are alloy steels, especially austenitic steel. The conditions that trigger cavitation may be assessed by calculating the total net suction head, referred to in technical literature with the acronym NPSH (Net Positive Suction Head).

The NPSH represents the total energy (expressed in m.) of the liquid measured at suction under conditions of incipient cavitation, excluding the vapour pressure (expressed in m.) that the liquid has at the pump inlet.

To find the static height  $h_z$  at which to install the machine under safe conditions, the following formula must be verified:

$$h_p + h_z \geq (\text{NPSHr} + 0.5) + h_f + h_{pv}$$

where:

- h<sub>p</sub>** is the absolute pressure applied to the free liquid surface in the suction tank, expressed in m. of liquid;  $h_p$  is the quotient between the barometric pressure and the specific weight of the liquid.
- h<sub>z</sub>** is the suction lift between the pump axis and the free liquid surface in the suction tank, expressed in m.;  $h_z$  is negative when the liquid level is lower than the pump axis.
- h<sub>f</sub>** is the flow resistance in the suction line and its accessories, such as: fittings, foot valve, gate valve, elbows, etc.
- h<sub>pv</sub>** is the vapour pressure of the liquid at the operating temperature, expressed in m. of liquid.  $h_{pv}$  is the quotient between the  $P_v$  vapour pressure and the liquid's specific weight.
- 0,5** is the safety factor.

The maximum possible suction head for installation depends on the value of the atmospheric pressure (i.e. the elevation above sea level at which the pump is installed) and the temperature of the liquid.

To help the user, with reference to water temperature (4° C) and to the elevation above sea level, the following tables show the drop in hydraulic pressure head in relation to the elevation above sea level, and the suction loss in relation to temperature.

Water temperature (°C)	20	40	60	80	90	110	120
Suction loss (m)	0,2	0,7	2,0	5,0	7,4	15,4	21,5

Elevation above sea level (m)	500	1000	1500	2000	2500	3000
Suction loss (m)	0,55	1,1	1,65	2,2	2,75	3,3

Friction loss is shown in the tables at pages 100-101 of this catalogue. To reduce it to a minimum, especially in cases of high suction head (over 4-5 m.) or within the operating limits with high flow rates, we recommend using a suction line having a larger diameter than that of the pump's suction port. It is always a good idea to position the pump as close as possible to the liquid to be pumped.

## FLOW RESISTANCE

### TABLE OF FLOW RESISTANCE IN 100 m OF A NEW AND STRAIGHT CAST IRON PIPELINE

FLOW RATE		NOMINAL DIAMETER IN mm AND INCHES																			
m <sup>3</sup> /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	0,94	0,53	0,34	0,21															
		hr	11,8	2,82	1	0,25															
0,9	15	V	1,42	0,8	0,51	0,31															
		hr	25,1	6,04	2,16	0,55															
1,2	20	V	1,89	1,06	0,68	0,41	0,27														
		hr	43,1	10,4	3,72	0,95	0,31														
1,5	25	V	2,36	1,33	0,85	0,52	0,33														
		hr	64,5	15,8	5,68	1,47	0,47														
1,8	30	V	2,83	1,59	1,02	0,62	0,4														
		hr	92	22,3	8	2,09	0,66														
2,1	35	V	3,3	1,86	1,19	0,73	0,46	0,3													
		hr	123	29,8	10,8	2,81	0,89	0,31													
2,4	40	V	3,77	2,12	1,36	0,83	0,53	0,34													
		hr	164	38,2	13,8	2,65	1,15	0,4													
3	50	V	4,72	2,65	1,7	1,04	0,66	0,42													
		hr	246	58,2	21,5	5,6	1,75	0,61													
3,6	60	V		3,18	2,04	1,24	0,8	0,51													
		hr		82	30	8	2,48	0,86													
4,2	70	V		3,72	2,38	1,45	0,93	0,59													
		hr		110	40	10,8	3,33	1,14													
4,8	80	V		4,25	2,72	1,66	1,06	0,68													
		hr		141	51,5	13,9	4,3	1,46													
5,4	90	V			3,06	1,87	1,19	0,76	0,45												
		hr			64	17,5	5,4	1,82	0,46												
6	100	V			3,4	2,07	1,33	0,85	0,5												
		hr			79	21,4	6,6	2,22	0,56												
7,5	125	V			4,25	2,59	1,66	1,06	0,63												
		hr			120	33	10	3,4	0,86												
9	150	V				3,11	1,99	1,27	0,75	0,5											
		hr				47	14,2	4,74	1,21	0,43											
10,5	175	V				3,63	2,32	1,49	0,88	0,58											
		hr				63	19	6,3	1,63	0,57											
12	200	V				4,15	2,65	1,7	1,01	0,66											
		hr				82	24,5	8,1	2,1	0,74											
15	250	V				5,18	3,32	2,12	1,26	0,83	0,53										
		hr				126	37,5	12,3	3,2	1,12	0,36										
18	300	V					3,98	2,55	1,51	1	0,64										
		hr					53	17,3	4,5	1,58	0,51										
24	400	V					5,31	3,4	2,01	1,33	0,85										
		hr					92	29,5	7,8	2,7	0,89										
30	500	V					6,63	4,25	2,51	1,66	1,06	0,68									
		hr					140	44,8	12	4,13	1,36	0,48									
36	600	V						5,1	3,02	1,99	1,27	0,82									
		hr						63	16,9	5,8	1,93	0,68									
42	700	V						5,94	3,52	2,32	1,49	0,95									
		hr						84	22,6	7,8	2,6	0,9									
48	800	V						6,79	4,02	2,65	1,70	1,09	0,75								
		hr						108	29	10	3,35	1,16	0,43								
54	900	V						7,64	4,52	2,99	1,91	1,22	0,85								
		hr						134	36	12,5	4,2	1,45	0,54								
60	1000	V						5,03	3,32	2,12	1,36	0,94									
		hr						44,5	15,2	5,14	1,76	0,66									
75	1250	V						6,28	4,15	2,65	1,70	1,18	0,87								
		hr						68	23	7,9	2,68	1	0,48								
90	1500	V						7,54	4,98	3,18	2,04	1,42	1,04								
		hr						96	32,6	11,2	3,77	1,42	0,68								
105	1750	V						8,79	5,81	3,72	2,38	1,65	1,21	0,93							
		hr						129	43,5	15	5,04	1,9	0,91	0,45							
120	2000	V							6,63	4,25	2,72	1,89	1,39	1,06	0,68						
		hr							56	19,4	6,5	2,43	1,18	0,58	0,16						
150	2500	V							8,29	5,31	3,40	2,36	1,73	1,33	0,85						
		hr							85	30	9,8	3,75	1,79	0,89	0,25						
180	3000	V							9,95	6,37	4,08	2,83	2,08	1,59	1,02	0,71					
		hr							120	42	13,8	5,3	2,53	1,25	0,35	0,15					
300	5000	V								10,62	6,79	4,72	3,47	2,65	1,70	1,18	0,87	0,66			
		hr								124,9	41,3	16,74	7,81	4,03	1,34	0,54	0,25	0,13			
600	10000	V									13,59	9,44	6,93	5,31	3,4	2,36	1,73	1,33			
		hr									161	65	30,2	15,6	5,16	2,09	0,97	0,5			
1200	20000	V													6,79	4,72	3,47	2,65			
		hr													20,1	8,13	3,8	1,95			
1800	30000	V															7,7	5,2	4,0		
		hr															18,07	8,39	4,32		
3000	50000	V																11,8	8,67	6,63	
		hr																49,5	23	11,8	
4500	75000	V																	17,7	13	9,9
		hr																	110,5	51,3	26,4
6000	100000	V																		17,33	13,27
		hr																		90,6	46,6



THE FLOW RESISTANCE MUST BE MULTIPLIED BY:

- 0.8 for stainless steel pipes
- 1.25 for slightly rusted steel pipes
- 1.7 for pipes with deposits that reduce the flow section
- 0.7 for aluminium pipes
- 1.3 for fibre-cement pipes

Hr = FLOW RESISTANCE (m/100 m OF PIPELINE)  
V = WATER SPEED (m/sec)

## FLOW RESISTANCE

**TABLE OF FLOW RESISTANCE OF BENDS AND VALVES IN cm OF COLUMN OF WATER**

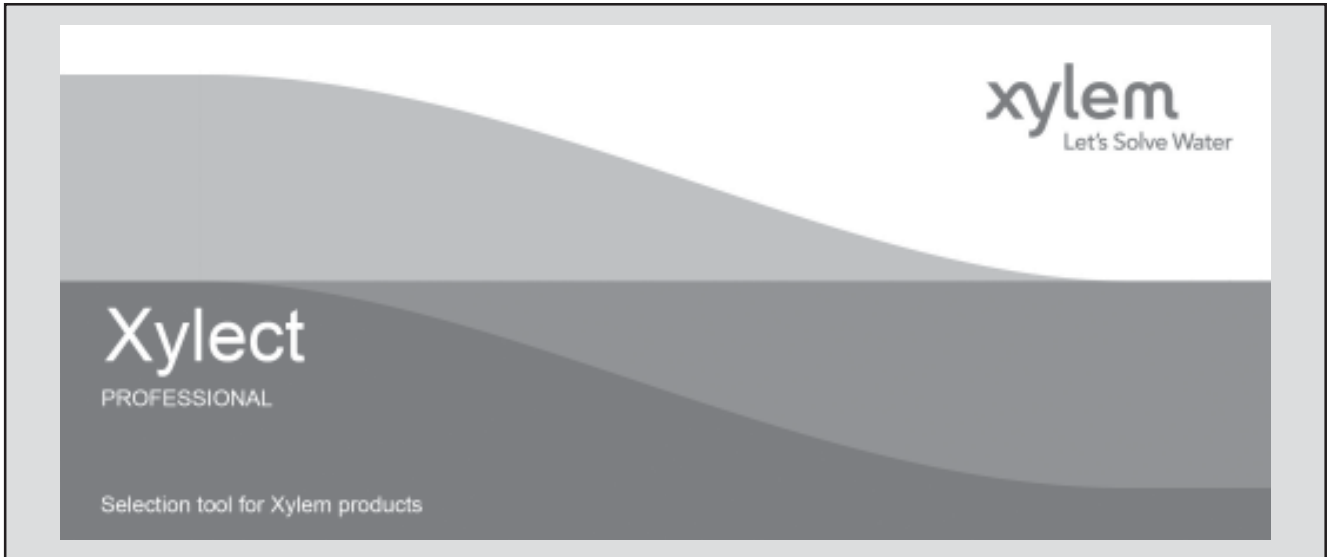
WATER SPEED m/ ec	SHARP BENDS 					SMOOTH BENDS 					STANDARD GATE VALVES	FOOT VALVES	CHECK VALVES
	a = 30°	a = 40°	a = 60°	a = 80°	a = 90°	$\frac{d}{R} = 0,4$	$\frac{d}{R} = 0,6$	$\frac{d}{R} = 0,8$	$\frac{d}{R} = 1$	$\frac{d}{R} = 1,5$			
0,10	0,03	0,04	0,05	0,07	0,08	0,007	0,008	0,01	0,0155	0,027	0,030	30	30
0,15	0,06	0,07	0,10	0,14	0,17	0,016	0,019	0,024	0,033	0,06	0,033	31	31
0,2	0,11	0,13	0,18	0,26	0,31	0,028	0,033	0,04	0,058	0,11	0,058	31	31
0,25	0,17	0,21	0,28	0,4	0,48	0,044	0,052	0,063	0,091	0,17	0,090	31	31
0,3	0,25	0,30	0,41	0,6	0,7	0,063	0,074	0,09	0,13	0,25	0,13	31	31
0,35	0,33	0,40	0,54	0,8	0,93	0,085	0,10	0,12	0,18	0,33	0,18	31	31
0,4	0,43	0,52	0,71	1,0	1,2	0,11	0,13	0,16	0,23	0,43	0,23	32	31
0,5	0,67	0,81	1,1	1,6	1,9	0,18	0,21	0,26	0,37	0,67	0,37	33	32
0,6	0,97	1,2	1,6	2,3	2,8	0,25	0,29	0,36	0,52	0,97	0,52	34	32
0,7	1,35	1,65	2,2	3,2	3,9	0,34	0,40	0,48	0,70	1,35	0,70	35	32
0,8	1,7	2,1	2,8	4,0	4,8	0,45	0,53	0,64	0,93	1,7	0,95	36	33
0,9	2,2	2,7	3,6	5,2	6,2	0,57	0,67	0,82	1,18	2,2	1,20	37	34
1,0	2,7	3,3	4,5	6,4	7,6	0,7	0,82	1,0	1,45	2,7	1,45	38	35
1,5	6,0	7,3	10	14	17	1,6	1,9	2,3	3,3	6	3,3	47	40
2,0	11	14	18	26	31	2,8	3,3	4,0	5,8	11	5,8	61	48
2,5	17	21	28	40	48	4,4	5,2	6,3	9,1	17	9,1	78	58
3,0	25	30	41	60	70	6,3	7,4	9	13	25	13	100	71
3,5	33	40	55	78	93	8,5	10	12	18	33	18	123	85
4,0	43	52	70	100	120	11	13	16	23	42	23	150	100
4,5	55	67	90	130	160	14	21	26	37	55	37	190	120
5,0	67	82	110	160	190	18	29	36	52	67	52	220	140

- 1) Flow resistance in bends is due to the contraction of the liquid threads resulting from the change of direction: the development of the bends must therefore be included in the length of the pipeline.
- 2) Flow resistance in valves and gates was determined on the basis of practical tests.



## FURTHER PRODUCT SELECTION AND DOCUMENTATION

### Xylect



Xylect is pump solution selection software with an extensive online database of product information across the entire Lowara, and Vogel range of pumps and related products, with multiple search options and helpful project management facilities. The system holds up-to-date product information on thousands of products and accessories.

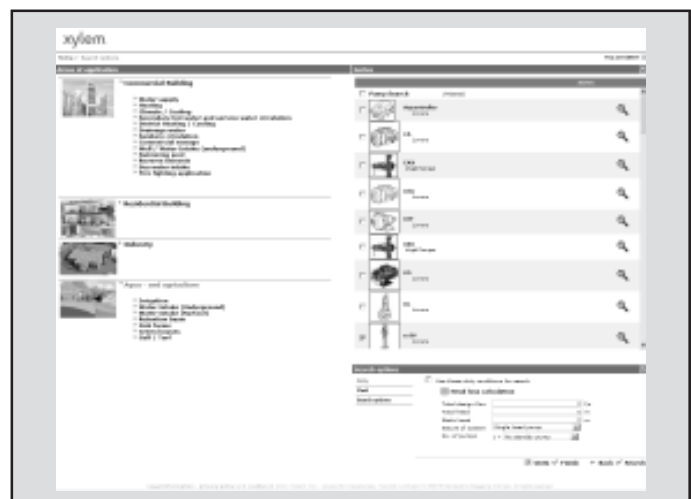
The possibility to search by applications and the detailed information output given makes it easy to make the optimal selection without having detailed knowledge about the Lowara and Vogel products.

The search can be made by:

- Application
- Product type
- Duty point

Xylect gives a detailed output:

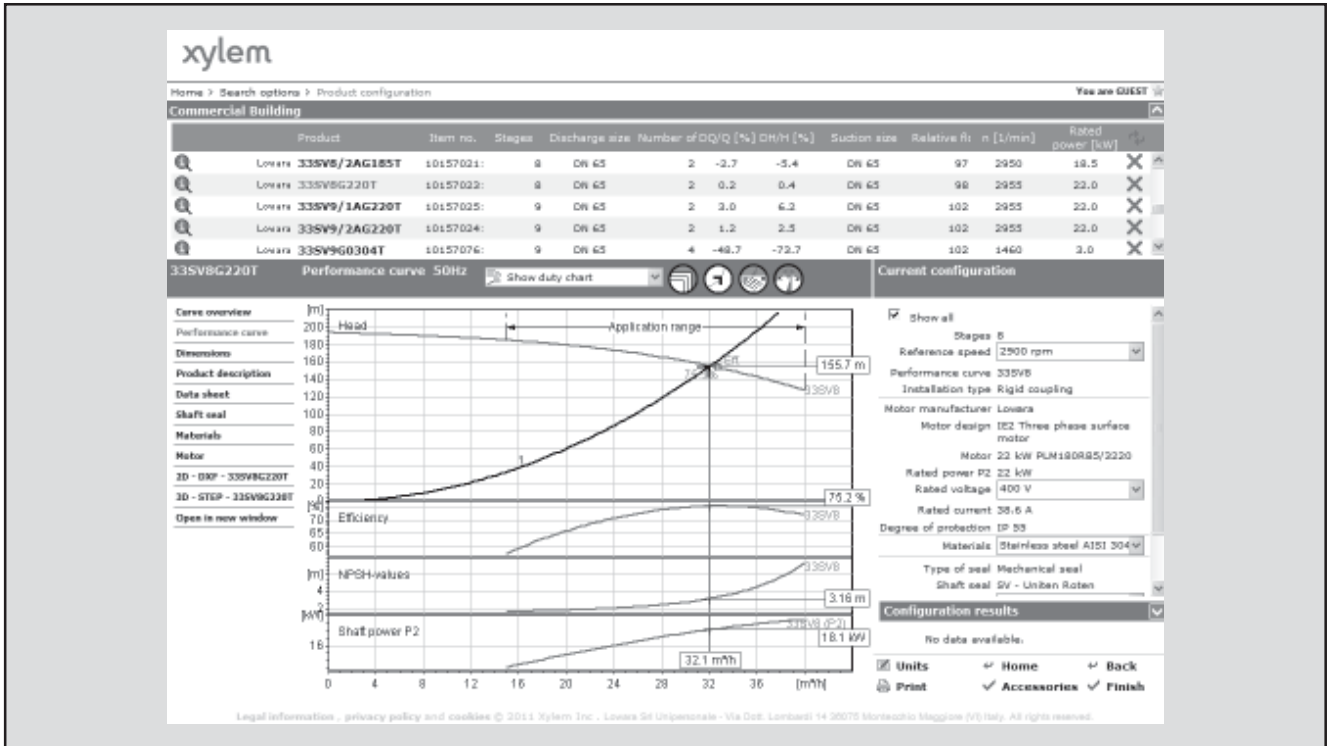
- List with search results
- Performance curves (flow, head, power, efficiency, NPSH)
- Motor data
- Dimensional drawings
- Options
- Data sheet printouts
- Document downloads incl dxf files



*The search by application guides users not familiar with the product range to the right choice.*

**FURTHER PRODUCT SELECTION AND DOCUMENTATION**

**Xylect**



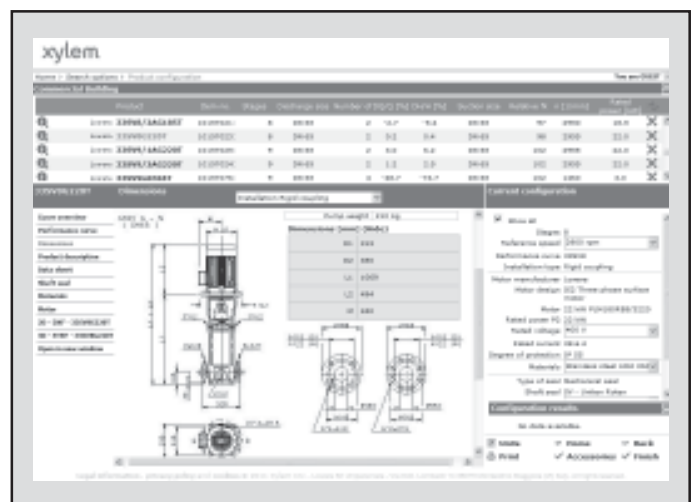
The detailed output makes it easy to select the optimal pump from the given alternatives.

The best way to work with Xylect is to create a personal account. This makes it possible to:

- Set own standard units
- Create and save projects
- Share projects with other Xylect users

Every user have a My Xylect space, where all projects are saved.

For more information about Xylect please contact our sales network or visit [www.xylect.com](http://www.xylect.com).



Dimensional drawings appear on the screen and can be downloaded in dxf format.

# Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're 12,000 people unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

**For more information on how Xylem can help you, go to [xylem.com](http://xylem.com).**



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