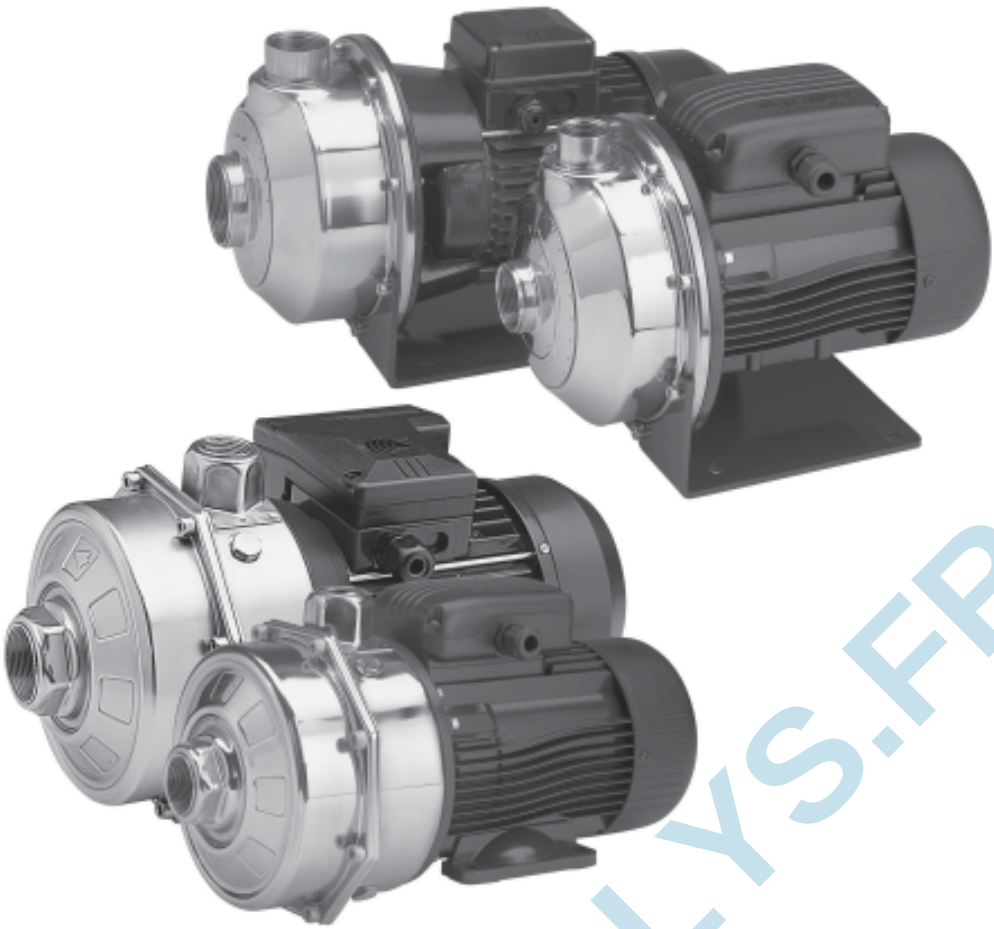
50 Hz



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# CEA-CA Series
# CEA(N)-CA(N) made of AISI 316

SINGLE AND TWIN-IMPELLER CENTRIFUGAL ELECTRIC PUMPS
EQUIPPED WITH IE2/IE3 MOTORS COMPLYING WITH REGULATION (EC) n. 640/2009

Cod. 191003881 Rev.C Ed.10/2012

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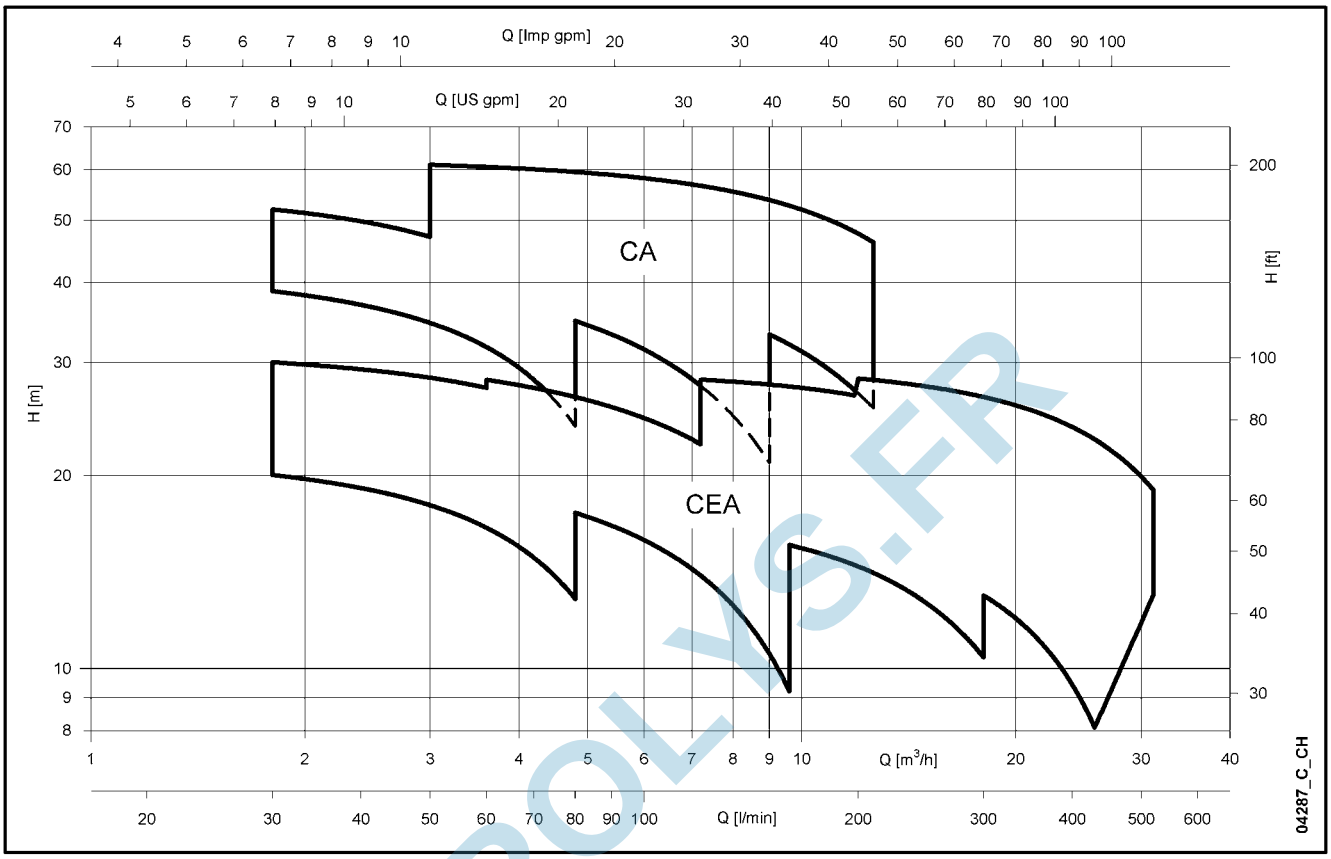
# CEA-CA - CEA(N)-CA(N) SERIES
# HYDRAULIC PERFORMANCE RANGE AT 50 Hz

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## CONTENTS


CEA-CEA(N) Series Specifications ..... 5

List of Models and Table of Materials CEA-CEA(N) Series ..... 7

Mechanical Seal CEA-CEA(N) Series ..... 8

Hydraulic Performance Table and Electrical Data CEA-CEA(N) Series ..... 9

Hydraulic Performance Range CEA-CEA(N) Series at 50 Hz ..... 12

Dimensions and Weights CEA-CEA(N) Series ..... 17

CA-CA(N) Series Specifications ..... 19

List of Models and Table of Materials CA-CA(N) Series ..... 21

Mechanical Seal CA-CA(N) Series ..... 22

Hydraulic Performance Table and Electrical Data CA-CA(N) Series ..... 23

Hydraulic Performance Range CA-CA(N) Series at 50 Hz ..... 26

Dimensions and Weights CA-CA(N) Series ..... 30

Technical Appendix ..... 31


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# Single-Impeller Centrifugal Electric Pumps

# CEA-CEA(N) Series

## MARKET SECTORS

CIVIL, AGRICULTURAL, INDUSTRIAL.

## APPLICATIONS

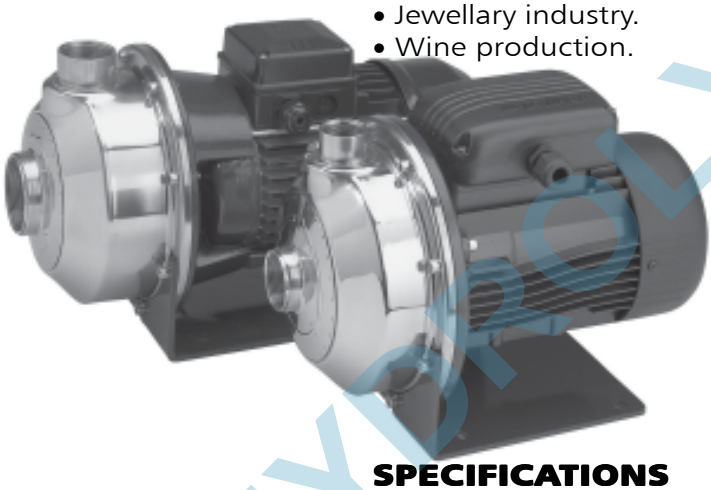
### Version made of AISI 304

- Handling of chemically and mechanically non-aggressive water and liquids (*).
- Water supply.
- Irrigation.
- Water circulation (cold, hot, refrigerated).

* For moderately aggressive liquids, a version with FPM elastomers is available (CEA../..-V). For aggressive liquids, please contact our sales network.

### "N" version made of AISI 316 (for aggressive liquids)

- Reverse osmosis (where demineralized water is used).
- Industrial washing.
- Thermal waters.
- Chlorine dispensing in swimming pools.
- Jewellary industry.
- Wine production.



❑ **Standard supplied IE2/IE3 motors are compliant with Regulation (EC) no. 640/2009**.

## SPECIFICATIONS

### PUMP

- **Delivery** up to 520 l/min (31 $m^3/h$)
- **Head** up to 32 m.
- **Temperature** of pumped liquid: -10°C to +85°C standard version. -10°C to +110°C (N and V versions).
- Maximum operating **pressure** : 8 bar (PN 8).
- Counter-clockwise rotation facing the pump from the suction port.

### MOTOR

- Asynchronous, squirrel cage rotor, close construction, external ventilation.
- **Protection class**: IP55.
- Class 155 (F) **Insulation**.
- Performances to EN 60034-1 specifications.
- **Standard voltage**:
  - **Single-phase** versions: 220-240 V 50 Hz, 2 poles, with automatic reset overload protection up to 1,5 kW. For higher powers, the overload protection must be provided and installed by the user in the control panel.
  - **Three-phase** versions: 220-240/380-415 V 50 Hz, 2 poles, the overload protection must be provided and installed by the user in the control panel.
- Condensate drain plugs in the standard version.

## CONSTRUCTION CHARACTERISTICS

- Close-coupled, single-impeller centrifugal pump featuring axial suction and radial discharge.
- Compact construction, with pump coupled directly to motor; special motor shaft extension in common with the pump and supported by ball bearings.
- Rotating assembly with back pull-out design, eliminating the need to disconnect the pump body from the pipe line.
- Threaded suction and discharge ports (Rp ISO 7).
- High performance enclosed **Impeller** made of **AISI 304** stainless steel (**AISI 316** for N version).
- **Mechanical seal** with Ceramic/Carbon rings, NBR elastomers, (EPDM for N version) other parts are made of AISI 304 stainless steel (AISI 316 for N version). Mounting dimensions according to EN 12756 (ex DIN 24960) and ISO 3069.
- **O-rings** made of NBR (EPDM for N version).
- Mounting pedestal on pump body.

## OPTIONAL FEATURES

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

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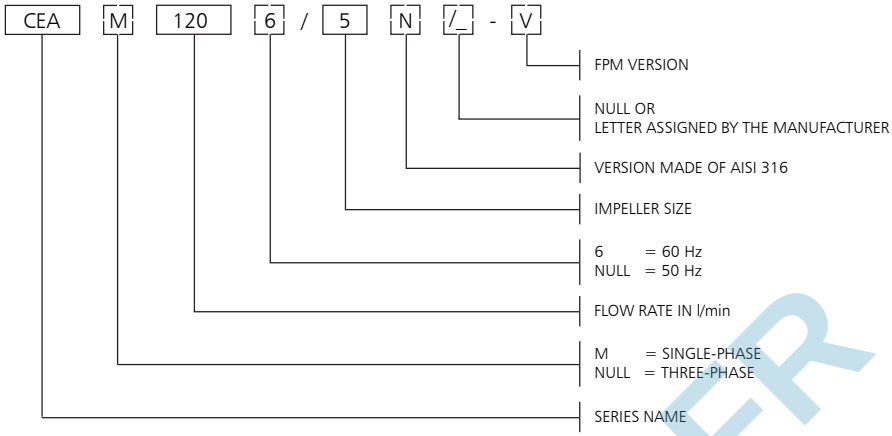
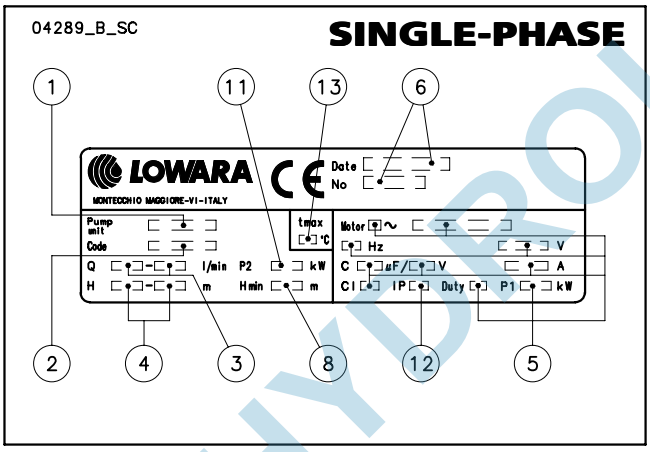
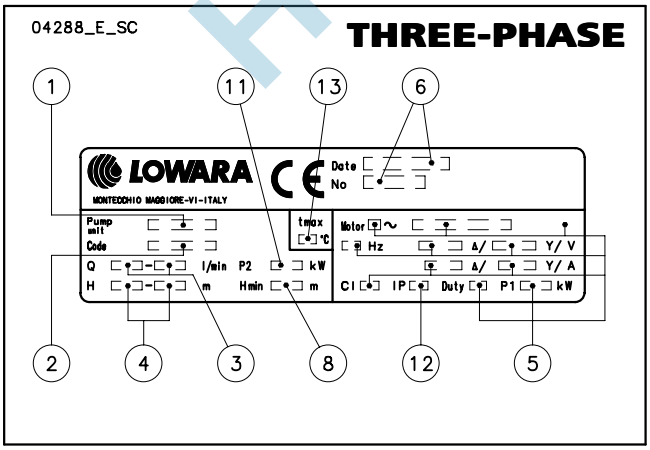
# CEA-CEA(N) SERIES
# IDENTIFICATION CODE




EXAMPLE : CEAM 120/5-V
CEA series electric pump, single-phase, flow rate 120 l/min
50 Hz, Impeller size 5, FPM version.

## RATING PLATE




## LEGEND

1 - Electric pump type
2 - Code
3 - Delivery range
4 - Head range
5 - Electrical data
6 - Serial number (date + sequential number)
8 - Minimum head
11 - Rated power
12 - Electric pump protection class
13 - Maximum temperature of pumped liquid

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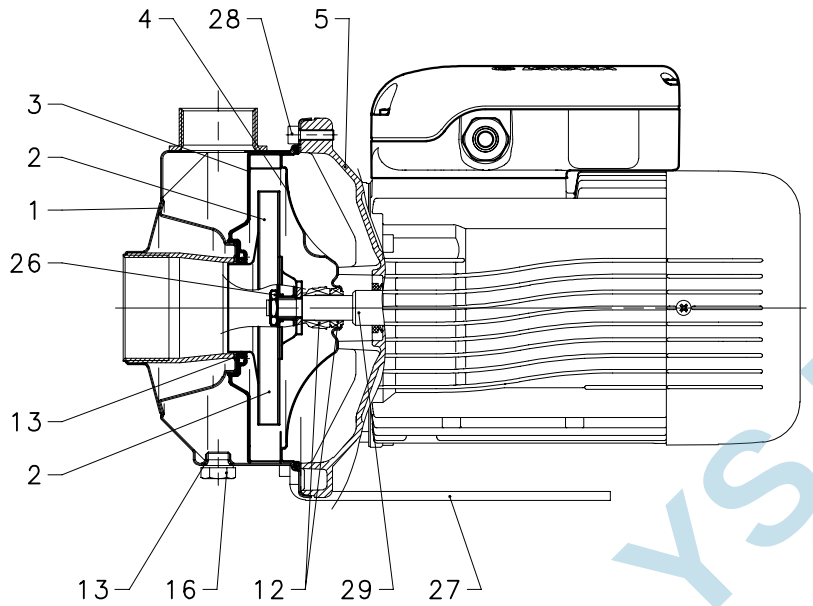
# CEA - CEA(N) SERIES
# LIST OF MODELS AND TABLE OF MATERIALS

04304_C_DS




| VERSIONS |
|---|
| CEA70/3 |
| CEA70/5 |
| CEA80/5 |
| CEA120/3 |
| CEA120/5 |
| CEA210/2 |
| CEA210/3 |
| CEA210/4 |
| CEA210/5 |
| CEA370/1 |
| CEA370/2 |
| CEA370/3 |
| CEA370/5 |

cea-ceaN-en_a_mo

## CEA SERIES TABLE OF MATERIALS

| REF. N. | PART | MATERIAL | REFERENCE STANDARDS | |
|---|---|---|---|---|
| | | | EUROPE | USA |
| 1 | Pump body | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 2 | Impeller | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 3 | Diffuser | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 4 | Seal housing | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 5 | Adapter | Aluminium | EN 1706-AC-AlSi11Cu2 (Fe) (AC46100) | - |
| 12 | Mechanical seal | Ceramic / Carbon / NBR (standard version) | | |
| 13 | Elastomers | NBR (standard version) | | |
| 16 | Fill/drain plugs | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |
| 26 | Impeller lock nut | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |
| 27 | Mounting pedestal | Painted steel | | |
| 28 | Pump body fastening nuts and bolts | Zinc-plated steel | | |
| 29 | Shaft extension | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |

cea-cea-en_b_tm

## CEA(N) SERIES TABLE OF MATERIALS

| REF. N. | PART | 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 | Diffuser | Stainless steel | EN 10088-1-X2CrNiMo17-12-2 (1.4404) | AISI 316L |
| 4 | Seal housing | Stainless steel | EN 10088-1-X2CrNiMo17-12-2 (1.4404) | AISI 316L |
| 5 | Adapter | Aluminium | EN 1706-AC-AlSi11Cu2 (Fe) (AC46100) | - |
| 12 | Mechanical seal | Ceramic / Carbon /EPDM | | |
| 13 | Elastomers | EPDM | | |
| 16 | Fill/drain plugs | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |
| 26 | Impeller lock nut | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |
| 27 | Mounting pedestal | Painted steel | | |
| 28 | Pump body fastening nuts and bolts | Zinc-plated | | |
| 29 | Shaft extension | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |

cea-ceaN-en_a_tm

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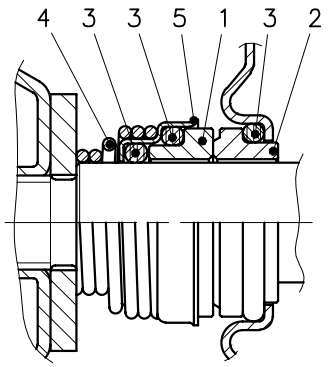
# CEA-CEA(N) MECHANICAL SEAL, ACCORDING TO EN 12756

Mechanical seal with mounting dimensions according to EN12756 (ex DIN 24960) and ISO 3069.

**CEA-CEA(N)**




## CEA-CEA(N) LIST OF MATERIALS

| POSITION 1 - 2 | POSITION 3 | POSITION 4 - 5 |
|---|---|---|
| B : Resin impregnated carbon | P : NBR | F : AISI 304 |
| C : Special resin impregnated carbon | E : EPDM | G : AISI 316 |
| $Q_1$ : Silicon carbide | V : FPM | |
| $U_3$ : Tungsten carbide | | |
| V : Ceramic | | |

cea-ca_ten-mec-en_b_tm

## CEA MECHANICAL SEALS

| TYPE | POSITION 1 ROTATING ASSEMBLY | 2 FIXED ASSEMBLY | 3 ELASTOMERS | 4 SPRINGS | 5 OTHER COMPONENTS | TEMPERATURE (°C) |
|---|---|---|---|---|---|---|
| STANDARD MECHANICAL SEAL | | | | | | |
| V B P GF | V | B | P | G | F | -10 +85 |
| OTHER TYPES OF MECHANICAL SEAL | | | | | | |
| VBEGG | V | B | E | G | G | -10 +110 |
| VCEGG | V | C | E | G | G | -10 +110 |
| $Q_1Q_1$EGG | $Q_1$ | $Q_1$ | E | G | G | -10 +110 |
| $U_3$CEGG | $U_3$ | C | E | G | G | -10 +110 |
| $U_3U_3$EGG | $U_3$ | $U_3$ | E | G | G | -10 +110 |
| VBVGG | V | B | V | G | G | -10 +110 |
| VCVGG | V | C | V | G | G | -10 +110 |
| $Q_1Q_1$VGG | $Q_1$ | $Q_1$ | V | G | G | -10 +110 |
| $U_3$CVGG | $U_3$ | C | V | G | G | -10 +110 |
| $U_3U_3$VGG | $U_3$ | $U_3$ | V | G | G | -10 +110 |

cea_tipi-ten-mec_b_tc

## CEA(N) MECHANICAL SEALS

| TYPE | POSITION 1 ROTATING ASSEMBLY | 2 FIXED ASSEMBLY | 3 ELASTOMERS | 4 SPRINGS | 5 OTHER COMPONENTS | TEMPERATURE (°C) |
|---|---|---|---|---|---|---|
| STANDARD MECHANICAL SEAL | | | | | | |
| V B E G G | V | B | E | G | G | -10 +110 |
| OTHER TYPES OF MECHANICAL SEAL | | | | | | |
| V C E G G | V | C | E | G | G | -10 +110 |
| $Q_1$ $Q_1$ E G G | $Q_1$ | $Q_1$ | E | G | G | -10 +110 |
| V C V G G | V | C | V | G | G | -10 +110 |
| $Q_1$ $Q_1$ V G G | $Q_1$ | $Q_1$ | V | G | G | -10 +110 |

cean-can_tipi-ten-mec-en_b_tc

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# CEA-CEA(N) SERIES
# HYDRAULIC PERFORMANCE TABLE AT 50 Hz, 2 POLES

| PUMP TYPE | RATED POWER | | Q = DELIVERY | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | l/min 0 | 30 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 250 | 300 | 350 | 400 | 430 | 480 | 520 |
| | | | $m^3/h$ 0 | 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 |
| | kW | HP | H = TOTAL HEAD METRES COLUMN OF WATER | | | | | | | | | | | | | | | | | |
| CEA(M) 70/3 | 0,37 | 0,5 | 22 | 20,1 | 19,1 | 16,6 | 12,8 | | | | | | | | | | | | | |
| CEA(M) 70/5 | 0,55 | 0,75 | 31,1 | 28,8 | 27,7 | 24,7 | 20,2 | | | | | | | | | | | | | |
| CEA(M) 80/5 | 0,75 | 1 | 32 | 30 | 29,3 | 27,4 | 24,7 | 21 | | | | | | | | | | | | |
| CEA(M) 120/3 | 0,55 | 0,75 | 22,4 | | | 18,9 | 17,5 | 15,9 | 14 | 11,8 | 9,2 | | | | | | | | | |
| CEA(M) 120/5 | 0,9 | 1,2 | 31,8 | | | 28,2 | 26,5 | 24,6 | 22,4 | 20 | 17,3 | | | | | | | | | |
| CEA(M) 210/2 | 0,75 | 1 | 17,7 | | | | | | 16,5 | 16,1 | 15,6 | 15 | 14,4 | 12,6 | 10,4 | | | | | |
| CEA(M) 210/3 | 1,1 | 1,5 | 20,8 | | | | | | 19,7 | 19,3 | 19 | 18,5 | 18 | 16,5 | 14,4 | | | | | |
| CEA(M) 210/4 | 1,5 | 2 | 25,5 | | | | | | 24,8 | 24,5 | 24 | 23,6 | 23 | 21,3 | 19 | | | | | |
| CEA(M) 210/5 | 1,85 | 2,5 | 29 | | | | | | 28,2 | 27,9 | 27,5 | 27,1 | 26,6 | 25,1 | 23,1 | | | | | |
| CEA(M) 370/1 | 1,1 | 1,5 | 16,3 | | | | | | | | | 15,5 | 15,2 | 14,3 | 13 | 11,4 | 9,4 | 8,1 | | |
| CEA(M) 370/2 | 1,5 | 2 | 20,4 | | | | | | | | | | 19,1 | 18,3 | 17,2 | 15,8 | 14,1 | 13 | 10,8 | |
| CEA(M) 370/3 | 1,85 | 2,5 | 24,4 | | | | | | | | | | 22,9 | 22,1 | 21,1 | 19,8 | 18,2 | 17,1 | 15 | 13 |
| CEA370/5 | 3 | 4 | 30,3 | | | | | | | | | | 28,3 | 27,5 | 26,5 | 25,3 | 23,8 | 22,8 | 21 | 19,0 |

cea-2p50-en_d_th

# CEA-CEA(N) SERIES
# ELECTRICAL DATA AT 50 Hz, 2 POLES

| PUMP TYPE 1 ~ | MOTOR TYPE | INPUT POWER* kW | INPUT CURRENT* 220-240 V A | CAPACIT. µF / 450 V |
|---|---|---|---|---|
| CEAM70/3 | SM63BG/1045 | 0,60 | 2,72 | 14 |
| CEAM70/5 | SM71BG/1055 | 0,97 | 4,55 | 16 |
| CEAM80/5 | SM71BG/1075 | 1,07 | 4,87 | 20 |
| CEAM120/3 | SM71BG/1055 | 0,91 | 4,33 | 16 |
| CEAM120/5 | SM71BG/1095 | 1,39 | 6,24 | 25 |
| CEAM210/2 | SM71BG/1075 | 1,13 | 5,10 | 20 |
| CEAM210/3 | SM80BG/1115 | 1,48 | 6,68 | 30 |
| CEAM210/4 | SM80BG/1155 | 1,91 | 8,60 | 40 |
| CEAM210/5 | PLM90BG/1225 | 2,24 | 10,2 | 70 |
| CEAM370/1 | SM80BG/1115 | 1,49 | 6,75 | 30 |
| CEAM370/2 | SM80BG/1155 | 2,05 | 9,26 | 40 |
| CEAM370/3 | PLM90BG/1225 | 2,45 | 11,1 | 70 |
| | | | | |

| PUMP TYPE 3 ~ | MOTOR TYPE | INPUT POWER* kW | INPUT CURRENT* 220-240 V A | INPUT CURRENT* 380-415 V A |
|---|---|---|---|---|
| CEA70/3 | SM63BG/304 | 0,61 | 2,51 | 1,45 |
| CEA70/5 | SM71BG/305 | 0,88 | 2,86 | 1,65 |
| CEA80/5 | SM80BG/307PE | 0,98 | 3,08 | 1,78 |
| CEA120/3 | SM71BG/305 | 0,82 | 2,74 | 1,58 |
| CEA120/5 | SM80BG/311PE | 1,28 | 4,10 | 2,37 |
| CEA210/2 | SM80BG/307PE | 1,04 | 3,22 | 1,86 |
| CEA210/3 | SM80BG/311PE | 1,35 | 4,24 | 2,45 |
| CEA210/4 | SM80BG/315PE | 1,73 | 5,46 | 3,15 |
| CEA210/5 | PLM90BG/322 | 2,20 | 7,35 | 4,24 |
| CEA370/1 | SM80BG/311PE | 1,40 | 4,35 | 2,51 |
| CEA370/2 | SM80BG/315PE | 1,95 | 5,94 | 3,43 |
| CEA370/3 | PLM90BG/322 | 2,45 | 7,84 | 4,53 |
| CEA370/5 | PLM90BG/330 | 3,26 | 10,1 | 5,86 |

*Maximum value in specified range.

cea-2p50-en_f_te

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# MOTORS FOR CEA-CEA(N) SERIES

**Standard supplied IE2/IE3 three-phase surface motors ≥ 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

| $P_N$ kW | MOTOR TYPE | IEC SIZE | Construction Design | INPUT CURRENT In (A) 220-240 V | CAPACITOR µF | CAPACITOR V | DATA FOR 230 V 50 Hz VOLTAGE min$^{-1}$ | Is / In | η % | cosφ | Tn Nm | Ts/Tn | Tm/Tn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 1,85 | 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

cea-motm-2p50-en_a_te

| $P_N$ kW | Efficiency $\eta_N$ % Δ 220 V Y 380 V 4/4 | 3/4 | 2/4 | Δ 230 V Y 400 V 4/4 | 3/4 | 2/4 | Δ 240 V Y 415 V 4/4 | 3/4 | 2/4 | Δ 380 V Y 660 V 4/4 | 3/4 | 2/4 | Δ 400 V Y 690 V 4/4 | 3/4 | 2/4 | Δ 415 V 4/4 | 3/4 | 2/4 | IE | Year of manufacture |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0,4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | By June 2011 |
| 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 | | |
| 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 | 3 | |
| 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 | | |
| 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 | 2 | |
| 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 | | |

| $P_N$ kW | Manufacturer: Lowara srl Unipersonale, Reg. No. 03471820260, Montecchio Maggiore Vicenza - Italia. Model | IEC SIZE | Construction Design | N. of Poles | $f_N$ Hz | Data for 400 V / 50 Hz Voltage cosφ | Is / $I_N$ | $T_N$ Nm | Ts/$T_N$ | Tm/Tn |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 1,85 | PLM90BG/322 | 90 | | | | 0,80 | 8,63 | 7,25 | 3,74 | 3,71 |
| 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 |

| $P_N$ kW | Voltage $U_N$ V Δ 220 V | 230 V | 240 V | Y 380 V | 400 V | 415 V | Δ 380 V | 400 V | 415 V | Y 660 V | 690 V | $I_N$ (A) | $n_N$ min$^{-1}$ | See note. | Operating conditions ** Altitude Above Sea Level (m) | T. amb min/max °C | ATEX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0,4 | 2,20 | 2,34 | 2,51 | 1,27 | 1,35 | 1,45 | - | - | - | - | - | | 2740 ÷ 2790 | | | | |
| 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 | | ≤ 1000 | -15 / 40 | No |
| 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 | | | | |
| 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 | 10,8 | 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.

cea-ie2-mott-2p50-en_b_te

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

BY PEDROLLO S.P.A.

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# AVAILABLE VOLTAGES
# MOTORS FOR CEA-CEA(N) SERIES

| $P_N$ 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 | 1x 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 | - | - | - | - |
| | | | | | | | | | |

| $P_N$ 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<br>3 x 265/460 60 Hz | 3 x 400/690 50 Hz<br>3 x 460/- 60 Hz |
| 0,4 | s | o | o | o | o | o | o | s | 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 |
| 0,75 | s | o | o | o | o | o | o | s | 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 |
| 1,1 | s | o | o | o | o | o | o | s | 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 |
| 2,2 | s | o | o | o | o | o | o | s | 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 |

s = Standard voltage  o = Optional voltage  - = Not available

cea-volt-lowa-en_a_te

HYDROLYSER

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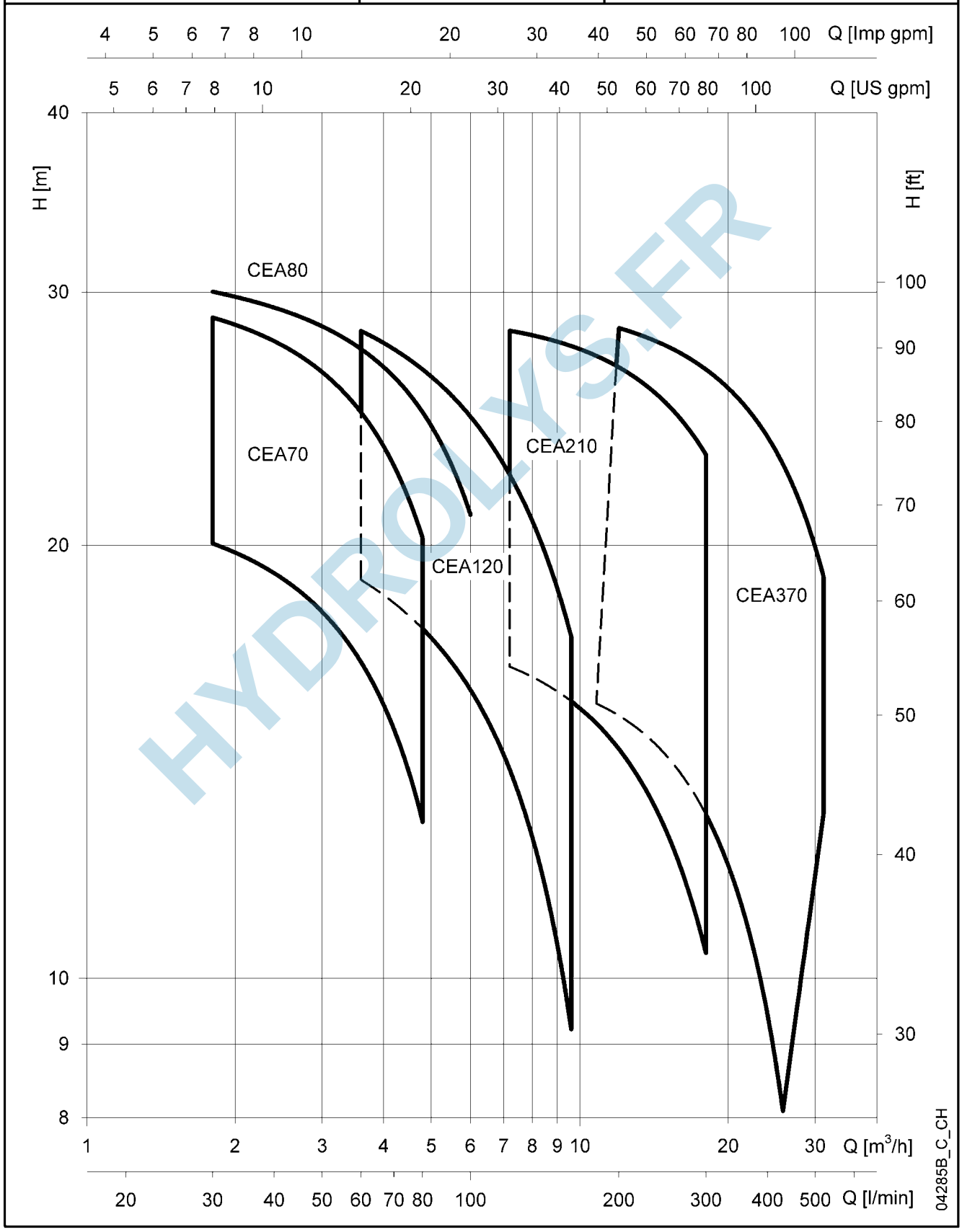
## CEA-CEA(N) SERIES
## HYDRAULIC PERFORMANCE RANGE AT 50 Hz, 2 POLES

| CEA | ~ 2850 [rpm] | ISO 9906 - Annex A |
|---|---|---|

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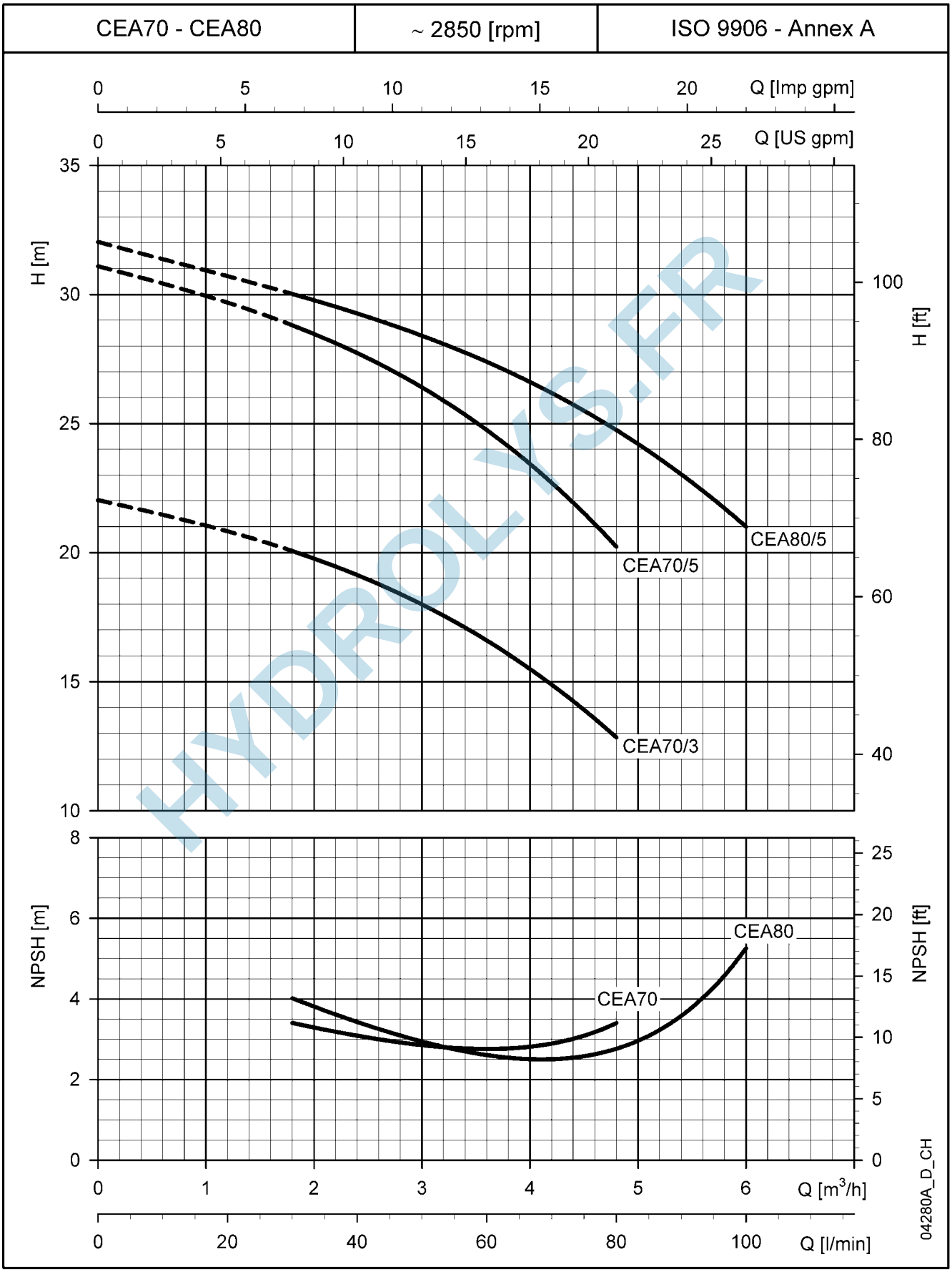
# CEA70-CEA80 SERIES
# OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

| CEA70 - CEA80 | ~ 2850 [rpm] | ISO 9906 - Annex A |
|---|---|---|

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These performances are valid for liquids with density ρ = 1.0 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

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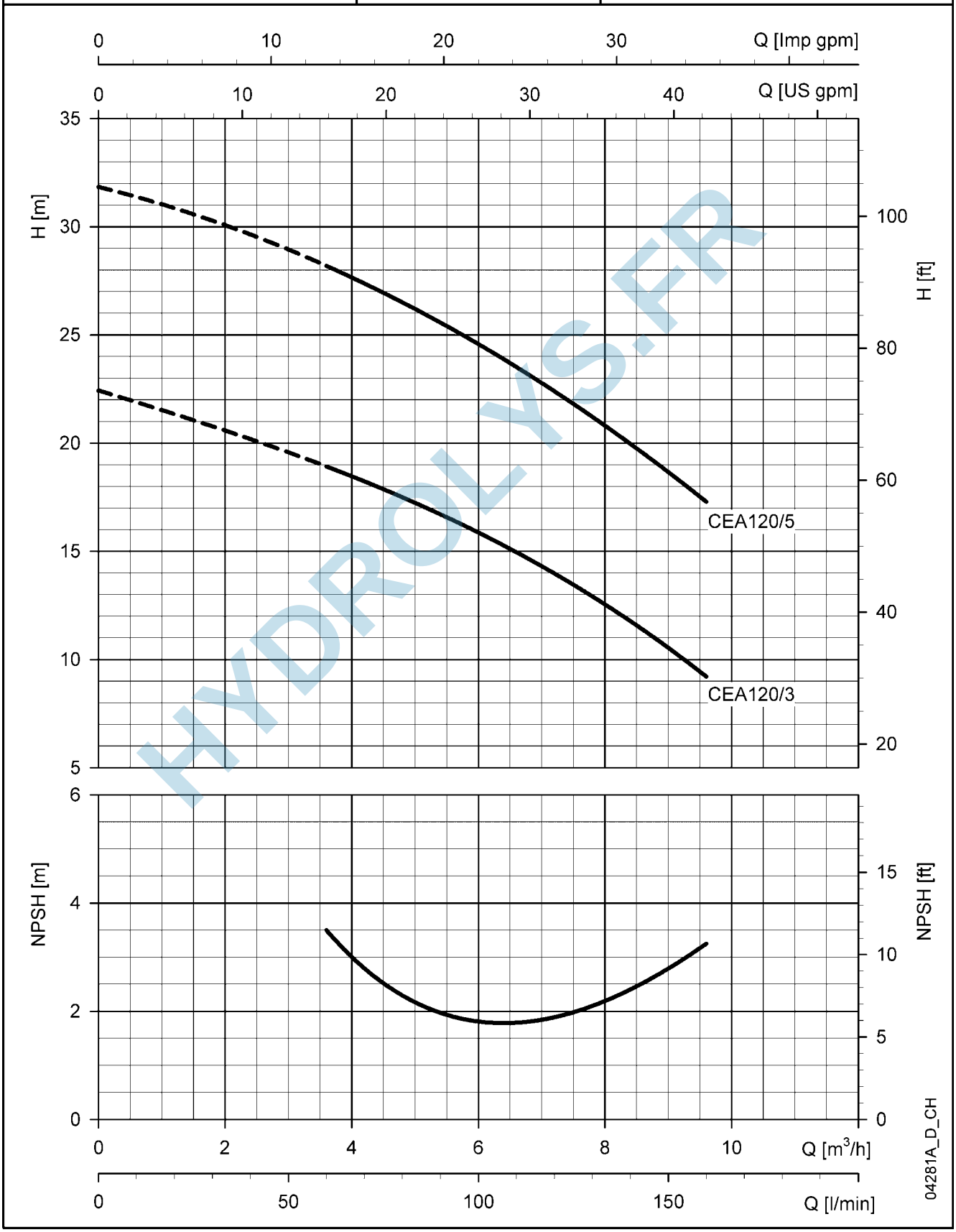
## CEA120 SERIES
## OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

| CEA120 | ~ 2850 [rpm] | ISO 9906 - Annex A |
|---|---|---|




HYDROLYS.FR

These performances are valid for liquids with density ρ = 1.0 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

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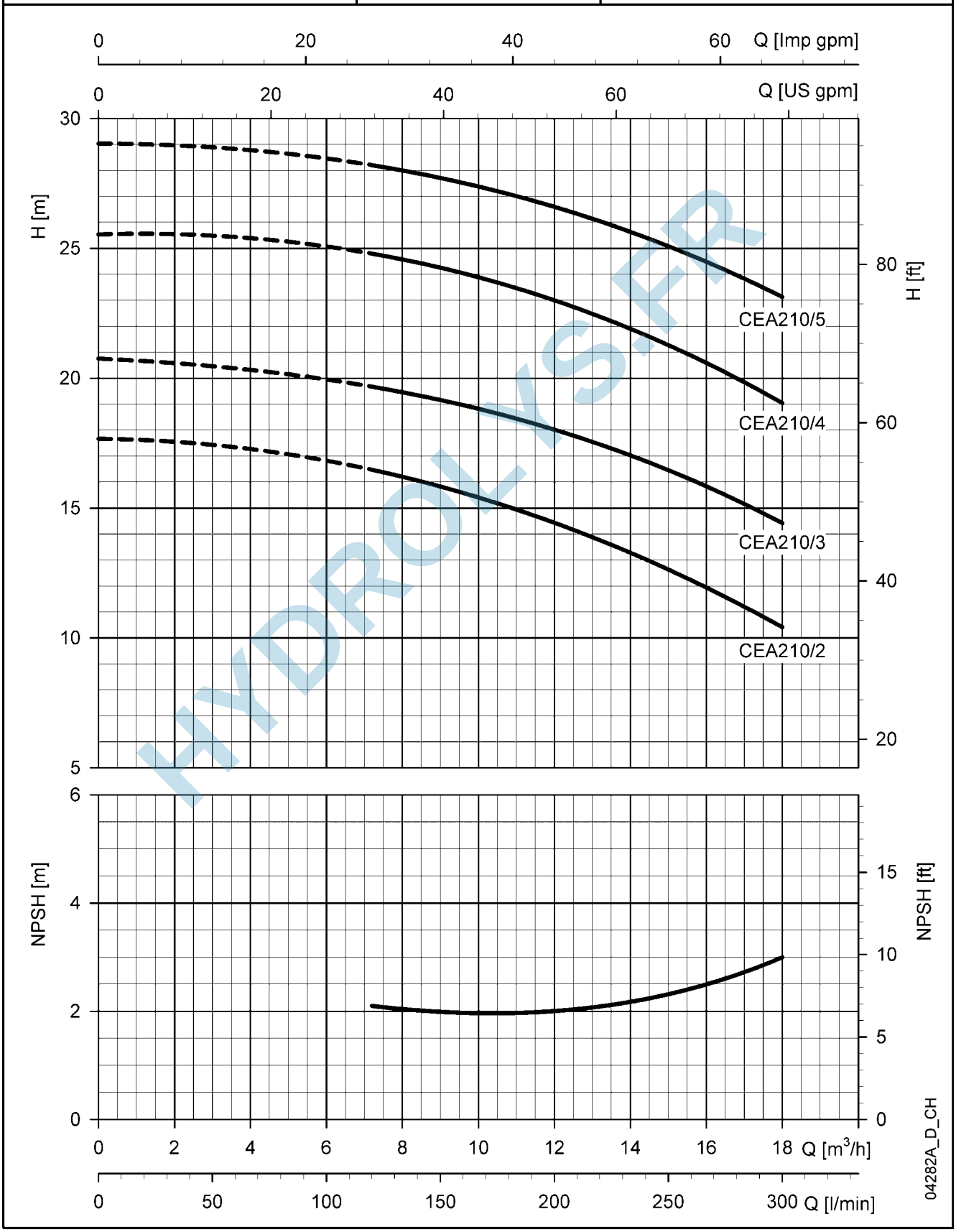
## CEA210 SERIES
## OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

| CEA210 | ~ 2850 [rpm] | ISO 9906 - Annex A |
|---|---|---|




HYDROLYS.FR

These performances are valid for liquids with density ρ = 1.0 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

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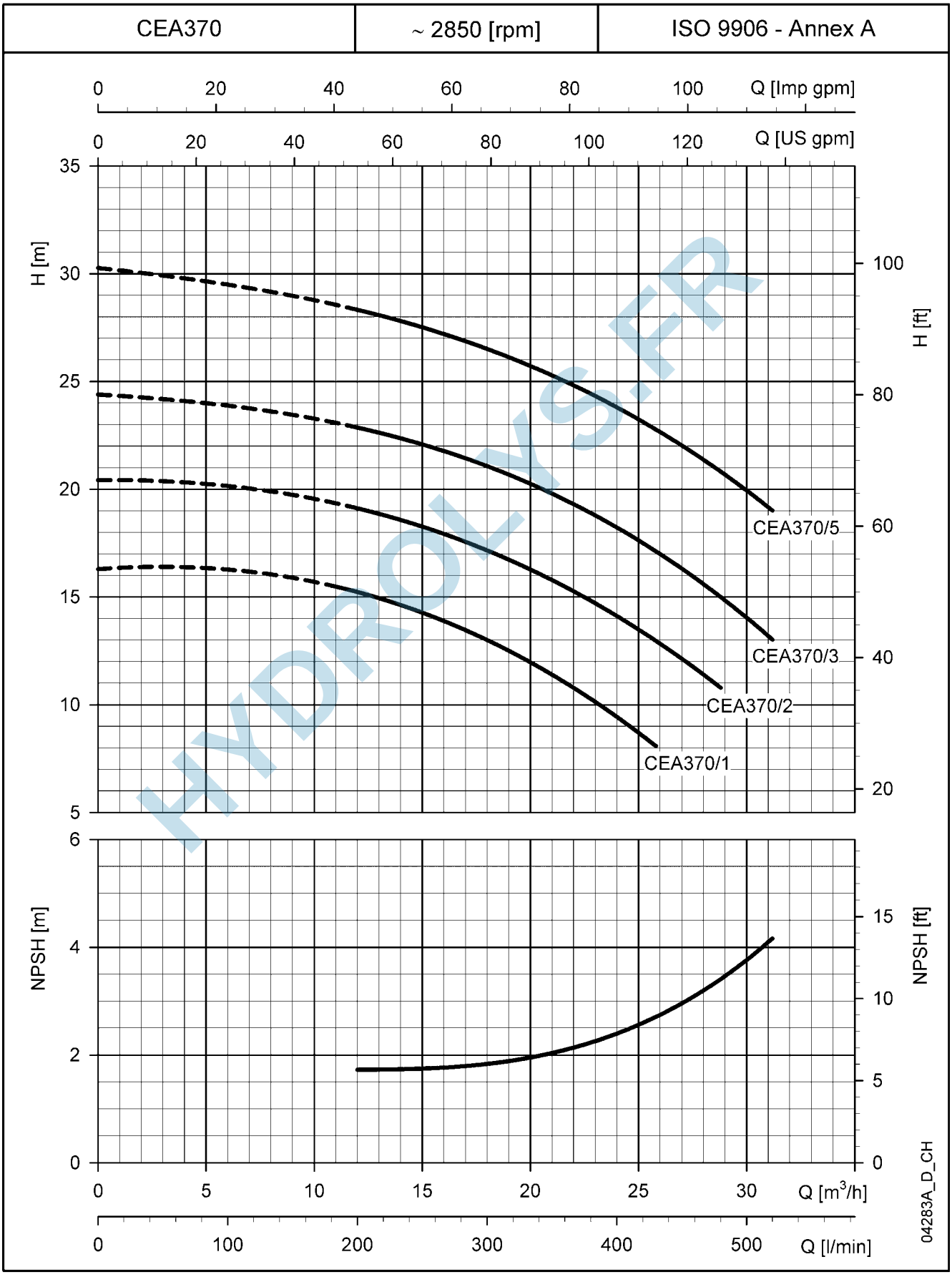
# CEA370 SERIES
# OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

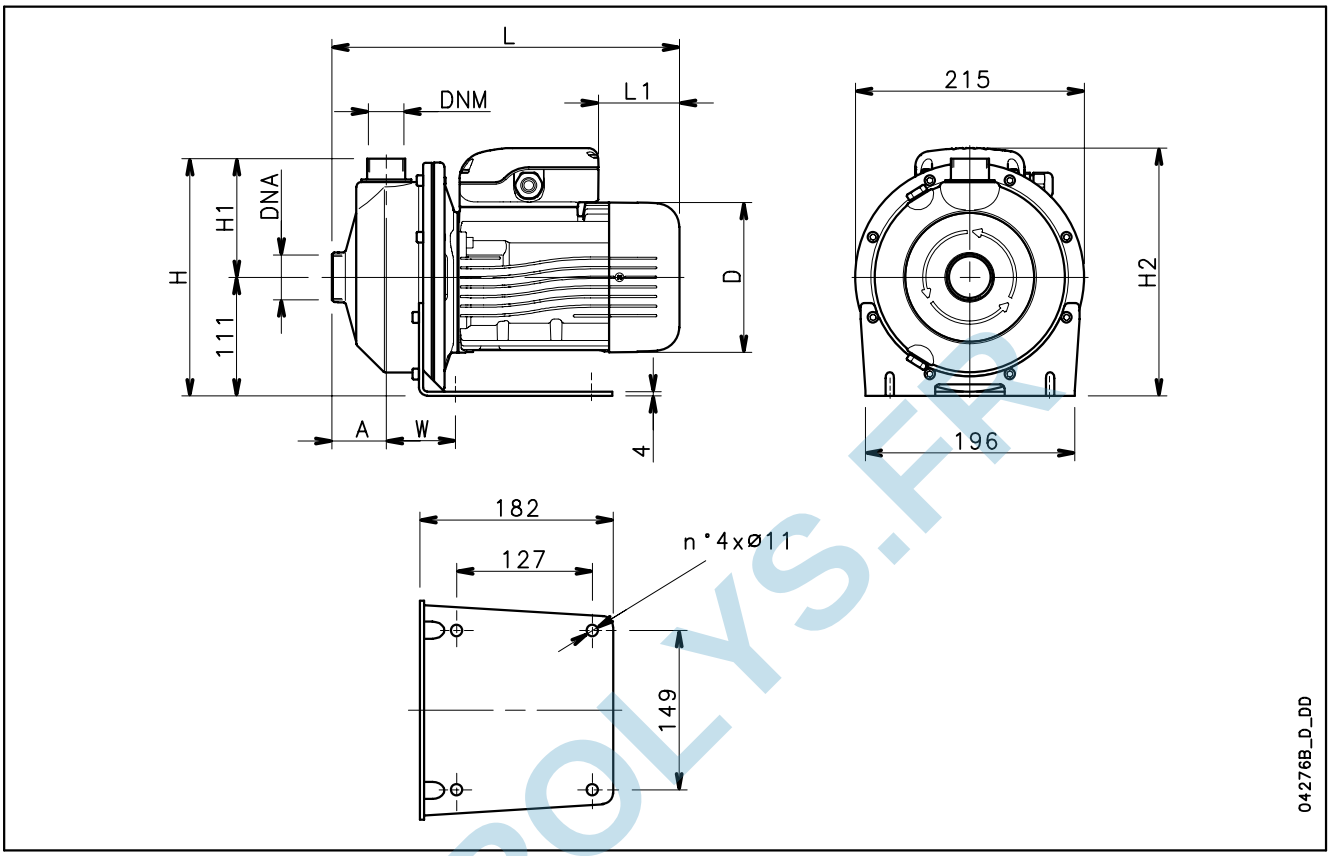
| CEA370 | ~ 2850 [rpm] | ISO 9906 - Annex A |
|---|---|---|




HYDROLYS.FR

These performances are valid for liquids with density ρ = 1.0 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

# CEA-CEA(N) SERIES
# DIMENSIONS AND WEIGHTS AT 50 Hz, 2 POLES




| PUMP TYPE | DIMENSIONS (mm | | | | | | | | DNA | DNM | WEIGHT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | D | H | H1 | H2 | L | L1 | W | | | kg |
| CEAM 70/3/A | 51 | 120 | 222 | 111 | 222 | 311 | 62 | 65 | Rp 1¼ | Rp 1 | 9,7 |
| CEAM 70/5/A | 51 | 140 | 222 | 111 | 232 | 325 | 76 | 65 | Rp 1¼ | Rp 1 | 11,6 |
| CEAM 80/5/A | 51 | 140 | 222 | 111 | 232 | 325 | 76 | 65 | Rp 1¼ | Rp 1 | 12,5 |
| CEAM 120/3/A | 51 | 140 | 222 | 111 | 232 | 325 | 76 | 65 | Rp 1¼ | Rp 1 | 11,5 |
| CEAM 120/5/A | 51 | 140 | 222 | 111 | 241 | 325 | 31 | 65 | Rp 1¼ | Rp 1 | 13 |
| CEAM 210/2/A | 54 | 140 | 224 | 113 | 232 | 339 | 76 | 76 | Rp 1½ | Rp 1¼ | 13 |
| CEAM 210/3/A | 54 | 156 | 224 | 113 | 248 | 385 | 69 | 76 | Rp 1½ | Rp 1¼ | 14,5 |
| CEAM 210/4/A | 54 | 156 | 224 | 113 | 248 | 385 | 69 | 76 | Rp 1½ | Rp 1¼ | 16,1 |
| CEAM 210/5/P | 54 | 174 | 224 | 113 | 262 | 429 | 84 | 76 | Rp 1½ | Rp 1¼ | 17 |
| CEAM 370/1/A | 54 | 156 | 224 | 113 | 248 | 385 | 69 | 76 | Rp 2 | Rp 1¼ | 14 |
| CEAM 370/2/A | 54 | 156 | 224 | 113 | 248 | 385 | 69 | 76 | Rp 2 | Rp 1¼ | 16,1 |
| CEAM 370/3/P | 54 | 174 | 224 | 113 | 262 | 429 | 84 | 76 | Rp 2 | Rp 1¼ | 20 |
| CEA 70/3/A | 51 | 120 | 222 | 111 | 222 | 311 | 62 | 65 | Rp 1¼ | Rp 1 | 9,7 |
| CEA 70/5/A | 51 | 140 | 222 | 111 | 232 | 325 | 76 | 65 | Rp 1¼ | Rp 1 | 11,6 |
| CEA 80/5/D | 51 | 155 | 222 | 111 | 240 | 371 | 114 | 65 | Rp 1¼ | Rp 1 | 14,4 |
| CEA 120/3/A | 51 | 140 | 222 | 111 | 232 | 325 | 76 | 65 | Rp 1¼ | Rp 1 | 11,5 |
| CEA 120/5/D | 51 | 155 | 222 | 111 | 240 | 371 | 114 | 65 | Rp 1¼ | Rp 1 | 14,6 |
| CEA 210/2/D | 54 | 155 | 224 | 113 | 240 | 385 | 114 | 76 | Rp 1½ | Rp 1¼ | 14,6 |
| CEA 210/3/D | 54 | 155 | 224 | 113 | 240 | 385 | 114 | 76 | Rp 1½ | Rp 1¼ | 16,4 |
| CEA 210/4/D | 54 | 155 | 224 | 113 | 240 | 385 | 114 | 76 | Rp 1½ | Rp 1¼ | 17,9 |
| CEA 210/5/C | 54 | 174 | 224 | 113 | 245 | 429 | 172 | 76 | Rp 1½ | Rp 1¼ | 21 |
| CEA 370/1/D | 54 | 155 | 224 | 113 | 240 | 385 | 114 | 76 | Rp 2 | Rp 1¼ | 15,8 |
| CEA 370/2/D | 54 | 155 | 224 | 113 | 240 | 385 | 114 | 76 | Rp 2 | Rp 1¼ | 17,9 |
| CEA 370/3/C | 54 | 174 | 224 | 113 | 245 | 429 | 172 | 76 | Rp 2 | Rp 1¼ | 21 |
| CEA 370/5/P | 54 | 174 | 224 | 113 | 245 | 429 | 172 | 76 | Rp 2 | Rp 1¼ | 21 |

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# Twin-Impeller Centrifugal Electric Pumps

# CA-CA(N) Series

## MARKET SECTORS

CIVIL, AGRICULTURAL, INDUSTRIAL.

## APPLICATIONS

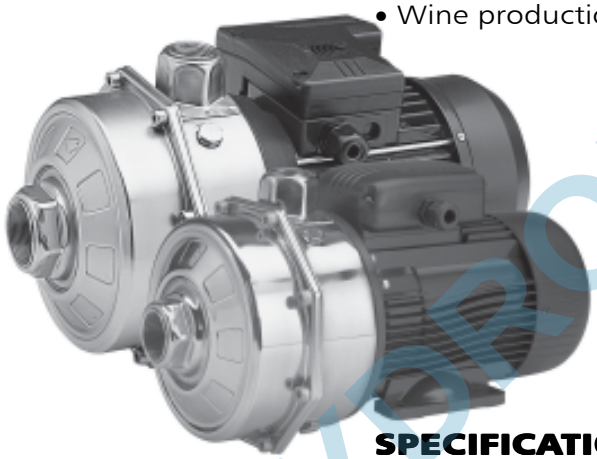
### Version made of AISI 304

- Handling of chemically and mechanically non-aggressive water and liquids (*).
- Water supply.
- Irrigation.
- Water circulation (cold, hot, refrigerated).

* For moderately aggressive liquids, a version with FPM elastomers is available (CA../..-V). For aggressive liquids, please contact our sales network.

### "N" version made of AISI 316 (for aggressive liquids)

- Reverse osmosis (where demineralized water is used).
- Industrial washing.
- Thermal waters.
- Chlorine dispensing in swimming pools.
- Jewellary industry.
- Wine production.



❑ **Standard supplied IE2/IE3 motors are compliant with Regulation (EC) no. 640/2009**.

## SPECIFICATIONS

### PUMP

- **Delivery** up to 210 l/min (12,5 $m^3$/h).
- **Head** fino a 62 m.
- **Temperature** of pumped liquid: -10°C to +85°C standard version. -10°C to +110°C (N and V versions).
- Maximum operating **pressure** : 8 bar (PN 8).
- Counter-clockwise rotation facing the pump from the suction port.

### MOTOR

- Asynchronous, squirrel cage rotor, close construction, external ventilation.
- **Protection class**: IP55.
- Class 155 (F) **Insulation**.
- Performances to EN 60034-1 specifications.
- **Standard voltage**:
  - **Single-phase** versions: 220-240 V 50 Hz, 2 poles, with automatic reset overload protection up to 1,5 kW. For higher powers, the overload protection must be provided and installed by the user in the control panel.
  - **Three-phase** versions: 220-240/380-415 V 50 Hz, 2 poles, the overload protection must be provided and installed by the user in the control panel.
- Condensate drain plugs in the standard version.

## CONSTRUCTION CHARACTERISTICS

- Close-coupled, single-impeller centrifugal pump featuring axial suction and radial discharge.
- Compact construction, with pump coupled directly to motor; special motor shaft extension in common with the pump and supported by ball bearings.
- Threaded suction and discharge ports (Rp ISO 7).
- High performance enclosed **Impeller** made of **AISI 304** stainless steel (**AISI 316** for N version).
- **Mechanical seal** with Ceramic/ Carbon rings, NBR elastomers, (EPDM for N version) other parts are made of AISI 304 stainless steel (AISI 316 for N version). Mounting dimensions according to EN 12756 (ex DIN 24960) and ISO 3069.
- **O-rings** made of NBR (EPDM for N version).
- Mounting pedestal on motor.

## OPTIONAL FEATURES

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

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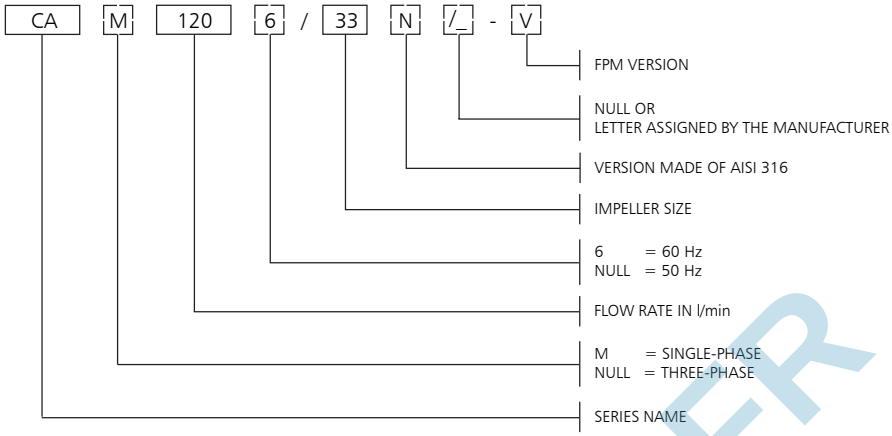
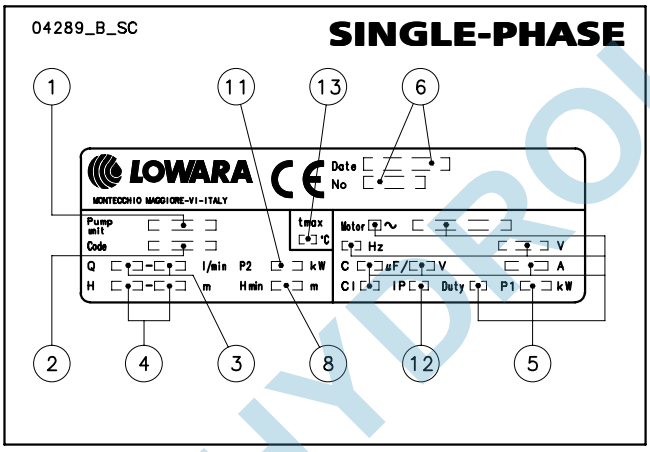
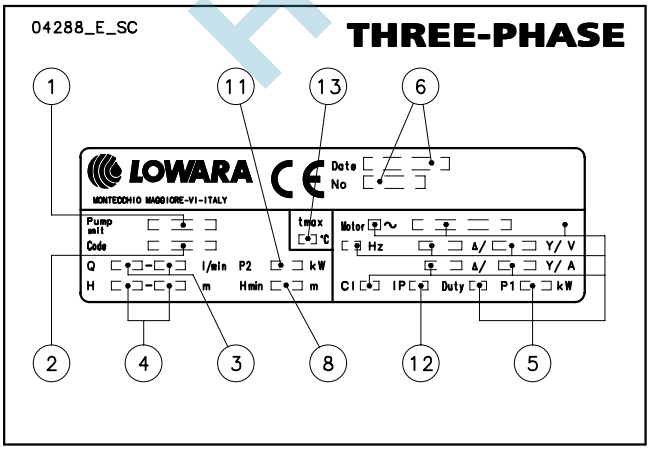
# CA-CA(N) SERIES
# IDENTIFICATION CODE




EXAMPLE : CAM 120/33-V
CA series electric pump, single-phase, flow rate 120 l/min
50 Hz, Impeller size 33, FPM version.

## RATING PLATE




## LEGEND

1 - Electric pump type
2 - Code
3 - Delivery range
4 - Head range
5 - Electrical data
6 - Serial number (date + sequential number)
8 - Minimum head
11 - Rated power
12 - Electric pump protection class
13 - Maximum temperature of pumped liquid

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# CA - CA(N) SERIES
# LIST OF MODELS AND TABLE OF MATERIALS

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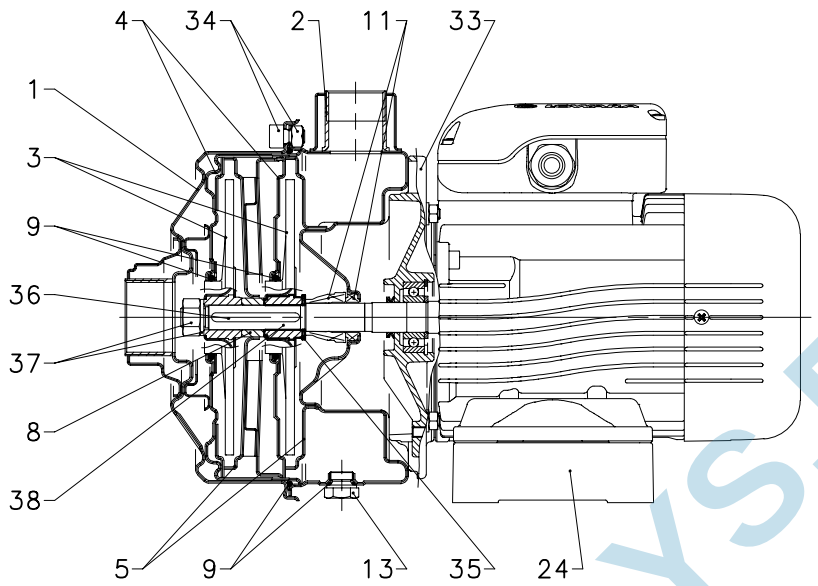


| VERSIONS |
|---|
| CA70/33 |
| CA70/34 |
| CA70/45 |
| CA120/33 |
| CA120/35 |
| CA120/55 |
| CA200/33 |
| CA200/35 |
| CA200/55 |

ca-caN-en_a_mo

## CA SERIES TABLE OF MATERIALS

| REF. N. | PART | MATERIAL | REFERENCE STANDARDS | |
|---|---|---|---|---|
| | | | EUROPE | USA |
| 1 | Suction flange | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 2 | Pump body | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 3 | Impeller | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 4 | Diffuser cover | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 5 | Diffuser cover | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 8 | Impeller spacer | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 9 | Elastomers | NBR (standard version) | | |
| 11 | Mechanical seal | Ceramic / Carbon / NBR (standard version) | | |
| 13 | Fill/drain plugs | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |
| 24 | Mounting pedestal | Aluminium | EN 1706-AC-AlSi11Cu2 (Fe) (AC46100) | - |
| 33 | Adapter | Aluminium | EN 1706-AC-AlSi11Cu2 (Fe) (AC46100) | - |
| 34 | Pump body fastening nuts and bolts | Zinc-plated steel | | |
| 35 | Impeller shoulder washer | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 36 | Key | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |
| 37 | Impeller lock nut and washer | Stainless steel | EN 10088-1-X5CrNi18-10 (1.4301) | AISI 304 |
| 38 | Shaft extension | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |

ca-ca-en_b_tm

## CA(N) SERIES TABLE OF MATERIALS

| REF. N. | PART | MATERIAL | REFERENCE STANDARDS | |
|---|---|---|---|---|
| | | | EUROPE | USA |
| 1 | Suction flange | Stainless steel | EN 10088-1-X2CrNiMo17-12-2 (1.4404) | AISI 316L |
| 2 | Pump body | Stainless steel | EN 10088-1-X2CrNiMo17-12-2 (1.4404) | AISI 316L |
| 3 | Impeller | Stainless steel | EN 10088-1-X2CrNiMo17-12-2 (1.4404) | AISI 316L |
| 4 | Diffuser cover | Stainless steel | EN 10088-1-X2CrNiMo17-12-2 (1.4404) | AISI 316L |
| 5 | Diffuser | Stainless steel | EN 10088-1-X2CrNiMo17-12-2 (1.4404) | AISI 316L |
| 8 | Impeller spacer | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |
| 9 | Elastomers | EPDM (standard version) | | |
| 11 | Mechanical seal | Ceramic / Carbon / EPDM (standard version) | | |
| 13 | Fill/drain plugs | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |
| 24 | Mounting pedestal | Aluminium | EN 1706-AC-AlSi11Cu2 (Fe) (AC46100) | - |
| 33 | Adapter | Aluminium | EN 1706-AC-AlSi11Cu2 (Fe) (AC46100) | - |
| 34 | Pump body fastening nuts and bolts | Zinc-plated steel | | |
| 35 | Impeller shoulder washer | Stainless steel | EN 10088-1-X2CrNiMo17-12-2 (1.4404) | AISI 316L |
| 36 | Key | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |
| 37 | Impeller lock nut and washer | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |
| 38 | Shaft extension | Stainless steel | EN 10088-1-X5CrNiMo17-12-2 (1.4401) | AISI 316 |

ca-caN-en_a_tm

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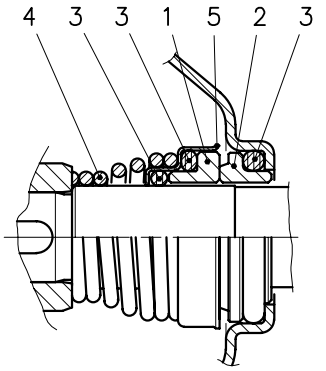
# CA-CA(N) MECHANICAL SEAL, ACCORDING TO EN 12756

Mechanical seal with mounting dimensions according to EN12756 (ex DIN 24960) and ISO 3069.

**CA-CA(N)**




## CA-CA(N) LIST OF MATERIALS

| POSITION 1 - 2 | POSITION 3 | POSITION 4 - 5 |
|---|---|---|
| B : Resin impregnated carbon | P : NBR | F : AISI 304 |
| C : Special resin impregnated carbon | E : EPDM | G : AISI 316 |
| $Q_1$ : Silicon carbide | V : FPM | |
| $U_3$ : Tungsten carbide | | |
| V : Ceramic | | |

cea-ca_ten-mec-en_b_tm

## CA MECHANICAL SEALS

| TYPE | POSITION 1 | 2 | 3 | 4 | 5 | TEMPERATURE (°C) |
|---|---|---|---|---|---|---|
| | ROTATING ASSEMBLY | FIXED ASSEMBLY | ELASTOMERS | SPRINGS | OTHER COMPONENTS | |
| STANDARD MECHANICAL SEAL | | | | | | |
| V B P GF | V | B | P | G | F | -10 +85 |
| OTHER TYPES OF MECHANICAL SEAL | | | | | | |
| VBEGF | V | B | E | G | F | -10 +110 |
| VCEGG | V | C | E | G | G | -10 +110 |
| $Q_1Q_1$EGF | $Q_1$ | $Q_1$ | E | G | F | -10 +110 |
| $U_3$BEGF | $U_3$ | B | E | G | F | -10 +110 |
| $U_3$CEGF | $U_3$ | C | E | G | F | -10 +110 |
| $U_3U_3$EGF | $U_3$ | $U_3$ | E | G | F | -10 +110 |
| VBVGF | V | B | V | G | F | -10 +110 |
| VCVGF | V | C | V | G | F | -10 +110 |
| $Q_1Q_1$VGF | $Q_1$ | $Q_1$ | V | G | F | -10 +110 |
| $U_3$CVGF | $U_3$ | C | V | G | F | -10 +110 |
| $U_3U_3$VGF | $U_3$ | $U_3$ | V | G | F | -10 +110 |

ca_tipi-ten-mec-en_b_tc

## CA(N) MECHANICAL SEALS

| TYPE | POSITION 1 | 2 | 3 | 4 | 5 | TEMPERATURE (°C) |
|---|---|---|---|---|---|---|
| | ROTATING ASSEMBLY | FIXED ASSEMBLY | ELASTOMERS | SPRINGS | OTHER COMPONENTS | |
| STANDARD MECHANICAL SEAL | | | | | | |
| V B E G G | V | B | E | G | G | -10 +110 |
| OTHER TYPES OF MECHANICAL SEAL | | | | | | |
| V C E G G | V | C | E | G | G | -10 +110 |
| $Q_1$ $Q_1$ E G G | $Q_1$ | $Q_1$ | E | G | G | -10 +110 |
| V C V G G | V | C | V | G | G | -10 +110 |
| $Q_1$ $Q_1$ V G G | $Q_1$ | $Q_1$ | V | G | G | -10 +110 |

cean-can_tipi-ten-mec-en_b_tc

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## CA-CA(N) SERIES
## HYDRAULIC PERFORMANCE TABLE AT 50 Hz, 2 POLES

| PUMP TYPE | RATED POWER | | Q = DELIVERY | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | l/min | 0 | 30 | 40 | 50 | 60 | 70 | 80 | 100 | 120 | 150 | 180 | 210 |
| | | | $m^3/h$ | 0 | 1,8 | 2,4 | 3 | 3,6 | 4,2 | 4,8 | 6 | 7,2 | 9 | 10,8 | 12,6 |
| | kW | HP | H = TOTAL HEAD METRES COLUMN OF WATER | | | | | | | | | | | |
| CA(M) 70/33 | 0,75 | 1 | 42,9 | 38,8 | 36,9 | 34,6 | 31,7 | 28,2 | 23,9 | | | | | |
| CA(M) 70/34 | 0,9 | 1,2 | 48,8 | 45,1 | 43,2 | 40,7 | 37,7 | 34,0 | 29,5 | | | | | |
| CA(M) 70/45 | 1,1 | 1,5 | 56,2 | 52,0 | 49,8 | 47,1 | 43,9 | 39,9 | 35,3 | | | | | |
| CA(M) 120/33 | 1,1 | 1,5 | 44,3 | | | 39,1 | 37,8 | 36,4 | 34,8 | 31,4 | 27,6 | 21,0 | | |
| CA(M) 120/35 | 1,5 | 2 | 54,0 | | | 49,4 | 48,1 | 46,6 | 44,9 | 41,2 | 36,8 | 29,3 | | |
| CA(M) 120/55 | 2,2 | 3 | 63,8 | | | 59,6 | 58,2 | 56,6 | 54,8 | 50,6 | 45,7 | 37,1 | | |
| CA(M) 200/33 | 1,85 | 2,5 | 43,2 | | | 41,8 | 41,2 | 40,6 | 39,9 | 38,3 | 36,4 | 33,2 | 29,5 | 25,5 |
| CA(M) 200/35 | 2,2 | 3 | 53,5 | | | 52,4 | 51,9 | 51,4 | 50,7 | 49,2 | 47,5 | 44,3 | 40,6 | 36,5 |
| CA 200/55 | 3 | 4 | 62,6 | | | 61,0 | 60,6 | 60,1 | 59,5 | 58,2 | 56,6 | 53,8 | 50,4 | 46,2 |

ca-2p50-en_d_th

## CA-CA(N) SERIES
## ELECTRICAL DATA AT 50 Hz, 2 POLES

| PUMP TYPE 1 ~ | MOTOR TYPE | INPUT POWER* kW | INPUT CURRENT* 220-240 V A | CAPACIT. µF / 450 V |
|---|---|---|---|---|
| CAM70/33 | SM71CA/1075 | 1,15 | 5,16 | 20 |
| CAM70/34 | SM71CA/1095 | 1,39 | 6,22 | 25 |
| CAM70/45 | SM80CA/1115 | 1,76 | 7,92 | 30 |
| CAM120/33 | SM80CA/1115 | 1,67 | 7,53 | 30 |
| CAM120/35 | SM80CA/1155 | 2,18 | 9,87 | 40 |
| CAM120/55 | PLM90CA/1225 | 2,54 | 11,5 | 70 |
| CAM200/33 | PLM90CA/1225 | 2,29 | 10,4 | 70 |
| CAM200/35 | PLM90CA/1225 | 2,94 | 12,6 | 70 |
| - | - | - | - | - |

| PUMP TYPE 3 ~ | MOTOR TYPE | INPUT POWER* kW | INPUT CURRENT* 220-240 V A | INPUT CURRENT* 380-415 V A |
|---|---|---|---|---|
| CA70/33 | SM80CA/307PE | 1,06 | 3,24 | 1,87 |
| CA70/34 | SM80CA/311PE | 1,28 | 4,10 | 2,37 |
| CA70/45 | SM80CA/311PE | 1,63 | 4,90 | 2,83 |
| CA120/33 | SM80CA/311PE | 1,54 | 4,69 | 2,71 |
| CA120/35 | SM80CA/315PE | 2,01 | 6,11 | 3,53 |
| CA120/55 | PLM90CA/322 | 2,55 | 8,05 | 4,65 |
| CA200/33 | PLM90CA/322 | 2,26 | 7,47 | 4,31 |
| CA200/35 | PLM90CA/322 | 3,02 | 9,08 | 5,24 |
| CA200/55 | PLM90CA/330 | 3,51 | 10,7 | 6,18 |

*Maximum value in specified range.

ca-2p50-en_f_te

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# MOTORS FOR CA-CA(N) SERIES

**Standard supplied IE2/IE3 three-phase surface motors ≥ 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

| $P_N$ kW | MOTOR TYPE | IEC SIZE | Construction Design | INPUT CURRENT In (A) 220-240 V | CAPACITOR µF | CAPACITOR V | DATA FOR 230 V 50 Hz VOLTAGE $min^{-1}$ | Is / In | η % | cosφ | Tn Nm | Ts/Tn | Tm/Tn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0,75 | SM71CA/1075 | 71 | SPECIAL | 4,90-4,85 | 20 | 450 | 2765 | 3,42 | 70,1 | 0,96 | 2,59 | 0,58 | 1,75 |
| 0,95 | SM71CA/1095 | 71 | | 6,25-5,89 | 25 | 450 | 2740 | 3,39 | 71,1 | 0,98 | 3,31 | 0,58 | 1,66 |
| 1,1 | SM80CA/1115 | 80 | | 6,88-6,65 | 30 | 450 | 2800 | 3,89 | 74,7 | 0,96 | 3,75 | 0,46 | 1,72 |
| 1,5 | SM80CA/1155 | 80 | | 9,21-8,58 | 40 | 450 | 2810 | 4,00 | 76,1 | 0,98 | 5,09 | 0,39 | 1,74 |
| 1,85 | PLM80CA/1225 | 90 | | 12,5-11,6 | 70 | 450 | 2825 | 4,47 | 82,4 | 0,97 | 7,43 | 0,53 | 1,87 |
| 2,2 | PLM80CA/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

ca-motm-2p50-en_a_te

| $P_N$ kW | Efficiency $\eta_N$ % Δ 220 V Y 380 V 4/4 | 3/4 | 2/4 | Δ 230 V Y 400 V 4/4 | 3/4 | 2/4 | Δ 240 V Y 415 V 4/4 | 3/4 | 2/4 | Δ 380 V Y 660 V 4/4 | 3/4 | 2/4 | Δ 400 V Y 690 V 4/4 | 3/4 | 2/4 | Δ 415 V 4/4 | 3/4 | 2/4 | IE | Year of manufacture |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | |
| 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 | 3 | |
| 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 | | |
| 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 | | By June 2011 |
| 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 | 2 | |
| 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 | | |

| $P_N$ kW | Manufacturer: Lowara srl Unipersonale, Reg. No. 03471820260, Montecchio Maggiore Vicenza - Italia. Model | IEC SIZE | Construction Design | N. of Poles | $f_N$ Hz | Data for 400 V / 50 Hz Voltage cosφ | Is / $I_N$ | $T_N$ Nm | Ts/$T_N$ | Tm/Tn |
|---|---|---|---|---|---|---|---|---|---|---|
| 0,75 | SM80CA/307PE | 80 | SPECIAL | 2 | 50 | 0,78 | 7,38 | 2,48 | 3,57 | 3,75 |
| 0,9 | SM80CA/311PE | 80 | | | | 0,79 | 8,31 | 3,63 | 3,95 | 3,95 |
| 1,1 | SM80CA/311PE | 80 | | | | 0,79 | 8,31 | 3,63 | 3,95 | 3,95 |
| 1,5 | SM80CA/315PE | 80 | | | | 0,80 | 8,80 | 4,96 | 4,31 | 4,10 |
| 1,85 | PLM90BG/322 | 90 | | | | 0,80 | 8,63 | 7,25 | 3,74 | 3,71 |
| 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 |

| $P_N$ kW | Voltage $U_N$ V Δ 220 V | 230 V | 240 V | Y 380 V | 400 V | 415 V | Δ 380 V | 400 V | 415 V | Y 660 V | 690 V | $I_N$ (A) | $n_N$ $min^{-1}$ | See note. | Operating conditions ** Altitude Above Sea Level (m) | T. amb min/max °C | ATEX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | ≤ 1000 | -15 / 40 | No |
| 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 | 10,8 | 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.

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

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# AVAILABLE VOLTAGES
# MOTORS FOR CA-CA(N) SERIES

| $P_N$ 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 | 1x 110-115 | 1 x 120-127 | 1 x 200-210 |
| 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 | - | - | - | - |
| | | | | | | | | | |

| $P_N$ 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<br>3 x 265/460 60 Hz | 3 x 400/690 50 Hz<br>3 x 460/- 60 Hz |
| 0,75 | s | o | o | o | o | o | o | s | 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 |
| 1,1 | s | o | o | o | o | o | o | s | 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 |
| 2,2 | s | o | o | o | o | o | o | s | 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 |

s = Standard voltage  o = Optional voltage  - = Not available

ca-volt-lowa-en_a_te

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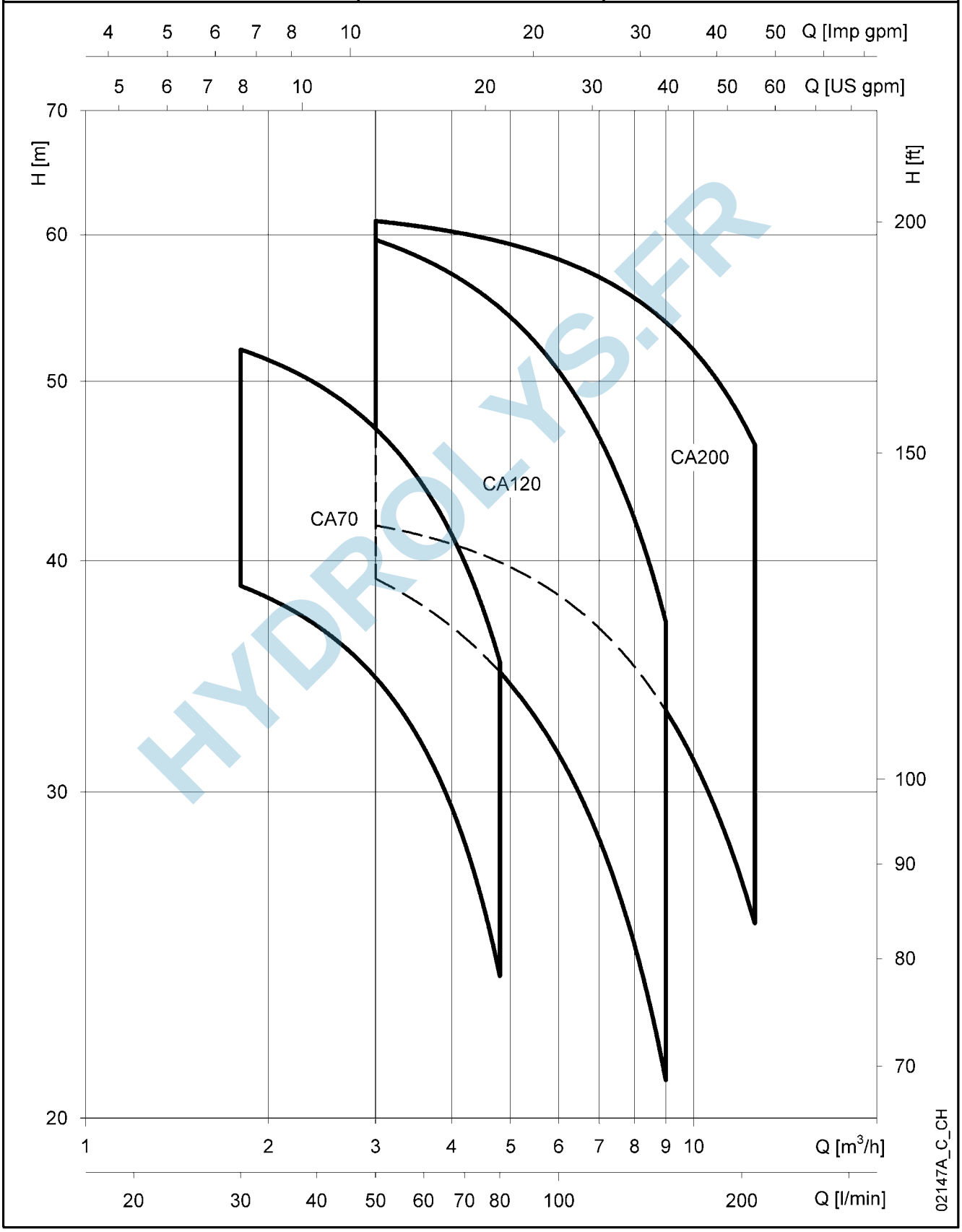
## CA-CA(N) SERIES
## HYDRAULIC PERFORMANCE RANGE AT 50 Hz, 2 POLES

| CA | ~ 2850 [rpm] | ISO 9906 - Annex A |
|---|---|---|

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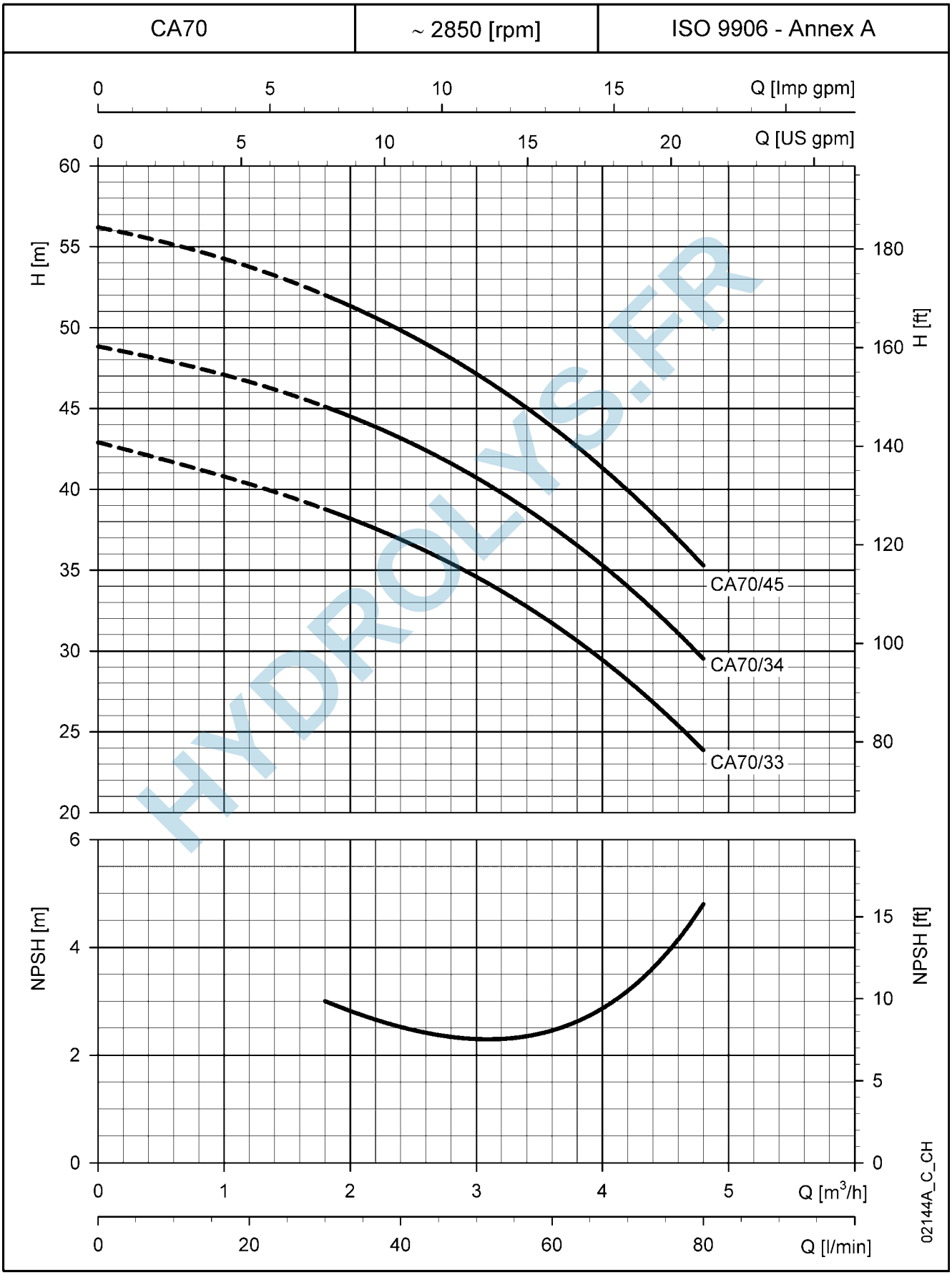
## CA70 SERIES
## OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

| CA70 | ~ 2850 [rpm] | ISO 9906 - Annex A |
|---|---|---|

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These performances are valid for liquids with density ρ = 1.0 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

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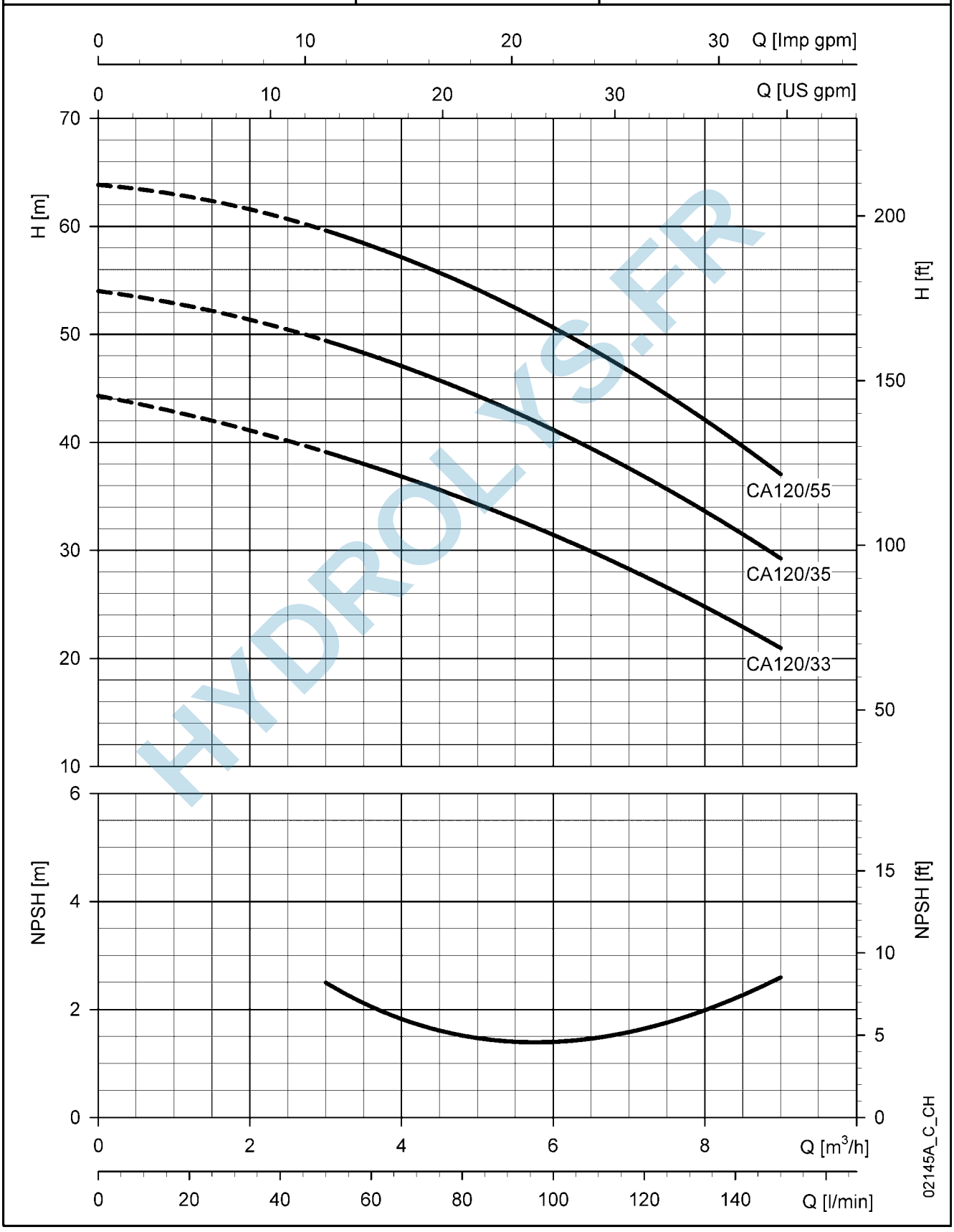
## CA120 SERIES
## OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

| CA120 | ~ 2850 [rpm] | ISO 9906 - Annex A |
|---|---|---|

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These performances are valid for liquids with density ρ = 1.0 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

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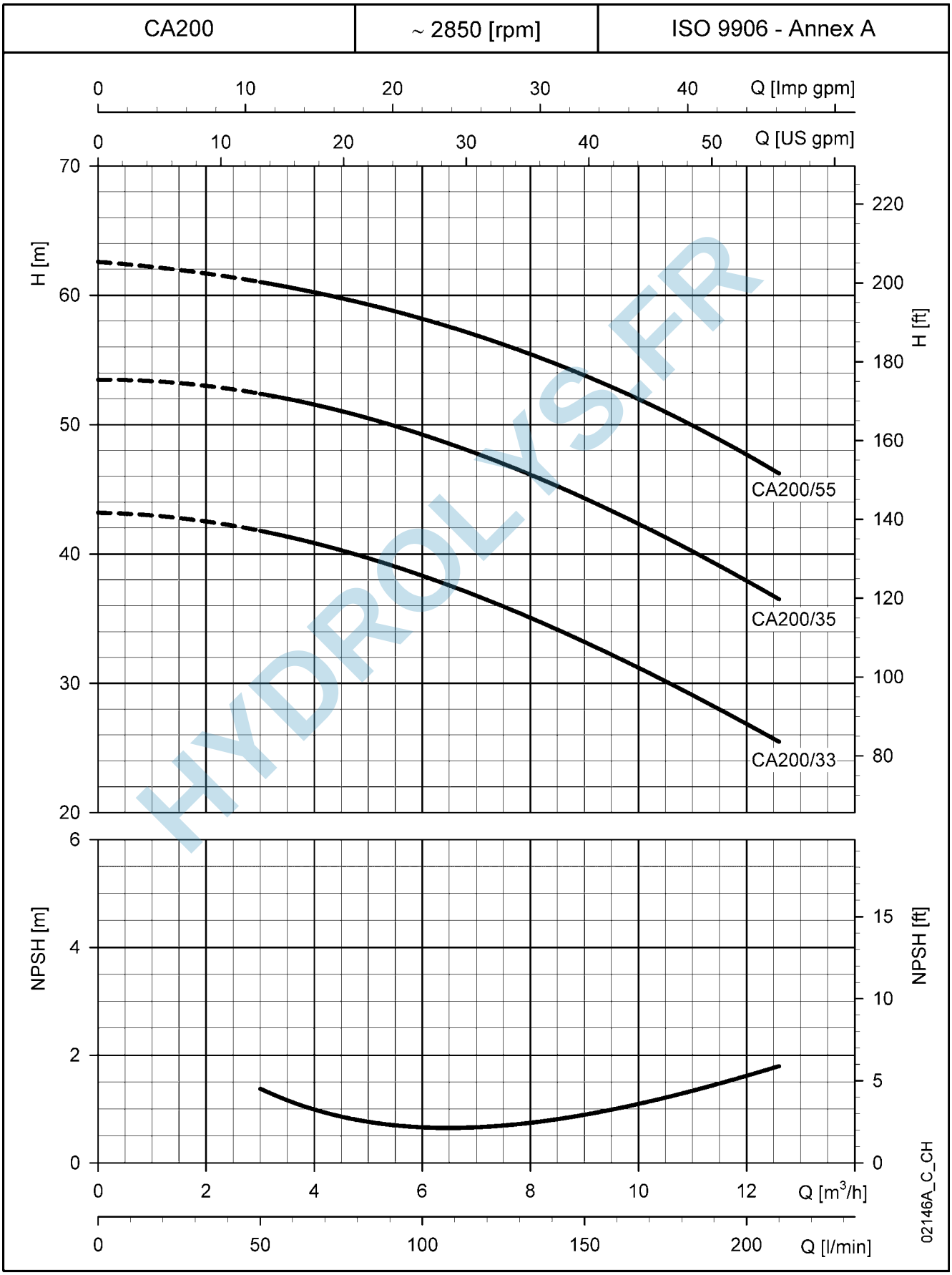
## CA200 SERIES
## OPERATING CHARACTERISTICS AT 50 Hz, 2 POLES

| CA200 | ~ 2850 [rpm] | ISO 9906 - Annex A |
|---|---|---|

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These performances are valid for liquids with density ρ = 1.0 Kg/dm³ and kinematic viscosity ν = 1 mm²/sec.

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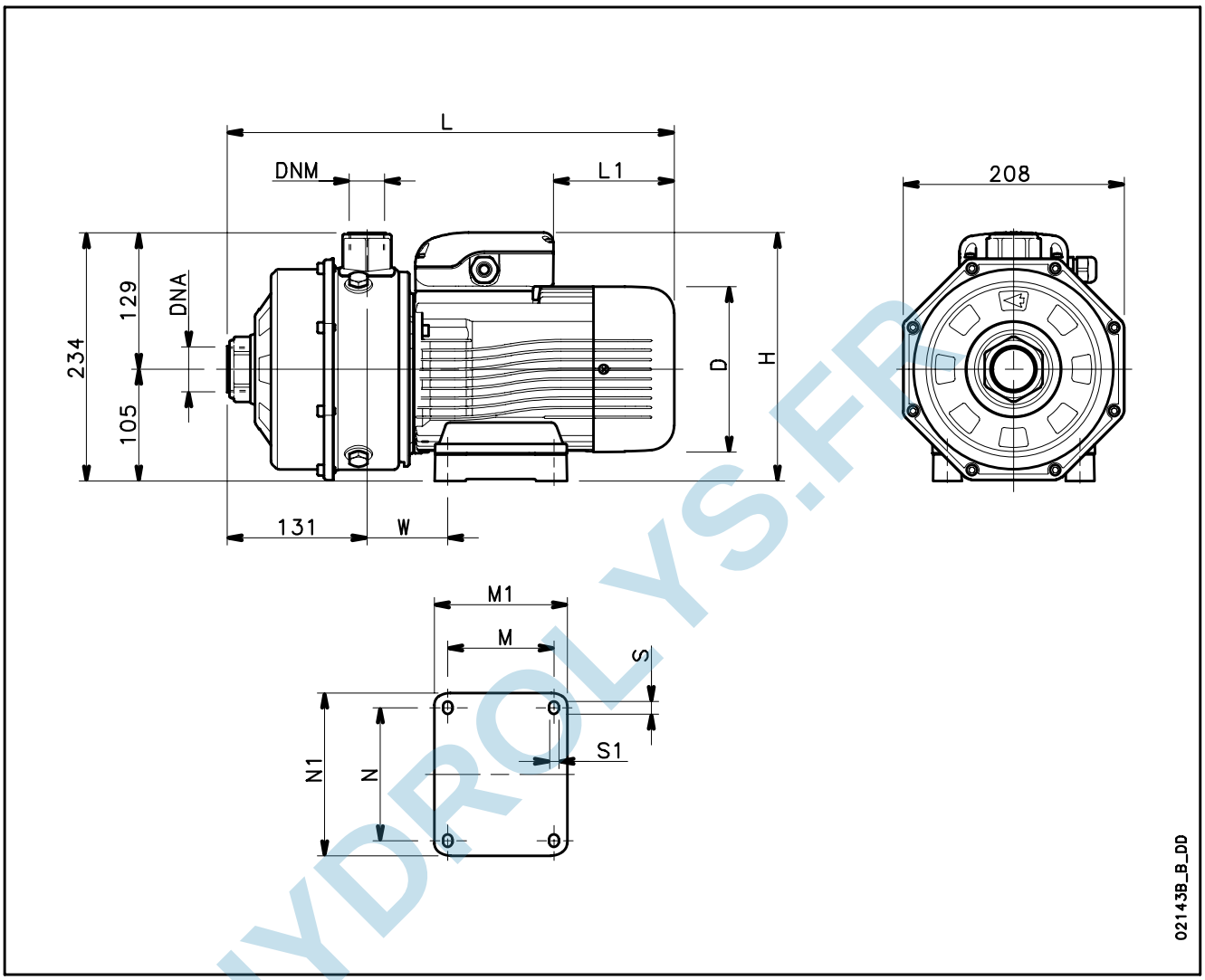
# CA-CA(N) SERIES
# DIMENSIONS AND WEIGHTS AT 50 Hz, 2 POLES

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| POMPA TIPO | DIMENSIONI (mm) | | | | | | | | | | | DNA | DNM | PESO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | D | H | L | L1 | M | M1 | N | N1 | S | S1 | W | | | kg |
| CAM 70/33/B | 140 | 226 | 383 | 76 | 90 | 113 | 112 | 135 | 12 | 7 | 66 | Rp 1¼ | Rp 1 | 15 |
| CAM 70/34/B | 140 | 235 | 383 | 31 | 90 | 113 | 112 | 135 | 12 | 7 | 66 | Rp 1¼ | Rp 1 | 15,8 |
| CAM 70/45/B | 156 | 242 | 420 | 69 | 100 | 125 | 125 | 153 | 12 | 9 | 76 | Rp 1¼ | Rp 1 | 18,5 |
| CAM 120/33/B | 156 | 242 | 420 | 69 | 100 | 125 | 125 | 153 | 12 | 9 | 76 | Rp 1¼ | Rp 1 | 18,4 |
| CAM 120/35/B | 156 | 242 | 420 | 69 | 100 | 125 | 125 | 153 | 12 | 9 | 76 | Rp 1¼ | Rp 1 | 20,2 |
| CAM 120/55/P | 174 | 256 | 454 | 84 | 125 | 155 | 140 | 170 | 13 | 10 | 98 | Rp 1¼ | Rp 1 | 27 |
| CAM 200/33/P | 174 | 256 | 454 | 84 | 125 | 155 | 140 | 170 | 13 | 10 | 98 | Rp 1½ | Rp 1 | 27 |
| CAM 200/35/P | 174 | 256 | 454 | 84 | 125 | 155 | 140 | 170 | 13 | 10 | 98 | Rp 1½ | Rp 1 | 27 |
| CA 70/33/D | 155 | 234 | 420 | 114 | 100 | 125 | 125 | 153 | 12 | 9 | 76 | Rp 1¼ | Rp 1 | 16,7 |
| CA 70/34/D | 155 | 234 | 420 | 114 | 100 | 125 | 125 | 153 | 12 | 9 | 76 | Rp 1¼ | Rp 1 | 17,4 |
| CA 70/45/D | 155 | 234 | 420 | 114 | 100 | 125 | 125 | 153 | 12 | 9 | 76 | Rp 1¼ | Rp 1 | 18,7 |
| CA 120/33/D | 155 | 234 | 420 | 114 | 100 | 125 | 125 | 153 | 12 | 9 | 76 | Rp 1¼ | Rp 1 | 18,7 |
| CA120/35/D | 155 | 234 | 420 | 114 | 100 | 125 | 125 | 153 | 12 | 9 | 76 | Rp 1¼ | Rp 1 | 20,4 |
| CA 120/55/P | 174 | 239 | 454 | 172 | 125 | 155 | 140 | 170 | 13 | 10 | 98 | Rp 1¼ | Rp 1 | 25 |
| CA 200/33/P | 174 | 239 | 454 | 172 | 125 | 155 | 140 | 170 | 13 | 10 | 98 | Rp 1½ | Rp 1 | 25 |
| CA 200/35/P | 174 | 239 | 454 | 172 | 125 | 155 | 140 | 170 | 13 | 10 | 98 | Rp 1½ | Rp 1 | 25 |
| CA 200/55/P | 174 | 239 | 454 | 172 | 125 | 155 | 140 | 170 | 13 | 10 | 98 | Rp 1½ | Rp 1 | 27 |

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# TECHNICAL APPENDIX

HYDROLYSER

# TYPICAL APPLICATIONS CEA AND CA SERIES ELECTRIC PUMPS

*Water Purification:*
Filtration
De-ionized water
Water treatment
Commercial and residential pools

*Plastic Industry:*
Temperature Regulators
Extrusion machines
Manufacture of polymers

*Agricultural Residential Applications:*
Irrigation
Greenhouses
Humidifiers
Water supply

*Heating, Ventilating & Air Conditioning:*
Air scrubbers
Water re-circulation
Cooling towers
Cooling systems
Temperature control
Chillers
Induction heating
Heat exchangers
Water heating
Booster packages

*General Industry:*
Spray booths
Light chemical transfer
Booster systems

*Medical:*
Laser cooling
Massage
Medical chillers
Sanitary equipment

*Waste Management:*
Waste treatment
Pollution control

*Machine Tool:*
Degreasing
Parts washing
Chemical treatment
Heat treatment

*Graphics:*
Film washing
Cooling processes

*Marine Sector:*
Water on board ships

*Computers:*
Circuit board washing
Unit cooling

*Laundry:*
Commercial washers

*Food and Drink:*
Food processing
Bottle washing
Citrus processing
Dishwashing
Brewing
Sanitary ware

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**CEA - CA SERIES**

standard configuration: carbon\ceramic mechanical seal, NBR O-rings

**Compatibility chart for most commonly used liquids, for other compatible liquids refer to our web page www.lowara.com**

| LIQUIDO / LIQUID | FORMULA | CONCENTRAZIONE / CONCENTRATION % | TEMPERATURA / TEMPERATURE - MIN (°C) - MAX (°C) | PESO SPEC. / DENSITY kg/dm_ | mechanical seal materials: mechanical seal | o-ring | TENUTA MECCANICA / MECHANICAL SEAL: STD | number A | number P | number N / Numero N |
|---|---|---|---|---|---|---|---|---|---|---|
| Acido Acetico (1) | $CH_3CO\,OH$ | 80 | -5 | 1.05 | | | 3 | 3 | 1 | 3 |
| Acetic acid | | | +70 | | Carb. di tung. - Carb. di sil. | EPDM | | | | |
| configuration code | | | | | ...XPB | | | | | |
| Acido Citrico | $C_6H_8O_7$ | 5 | -5 | 1.54 | | | 2 | 1 | 2 | 2 |
| Citric acid | | | +70 | | carbon - ceramic | FPM | | | | |
| configuration code | | | | | ...XAA | | | | | |
| Acido Fosforico (1) | $H_3PO_4$ | 20 | -5 | 1.33 | | | 3 | 2 | 1 | 1 |
| Phosphoric acid | | | +30 | | Carb. di tung. - Carb. di sil. | EPDM | | | | |
| configuration code | | | | | ...XPB | | | | | |
| Acqua | $H_2O$ | 100 | -5 | | | | 1 | 1 | 1 | 1 |
| Water | | | +85 | | carbon - ceramic | NBR | | | | |
| configuration code | | | | | standard product | | | | | |
| Acqua Deionizzata | | 100 | -5 | | | | | | | |
| Water deionized | | | +85 | | carbon - ceramic | FPM | | | | |
| configuration code | | | | | ...XAA | | | | | |
| Acqua Demineralizzata | | 100 | -5 | | | | | | | |
| Water demineralized | | | +85 | | carbon - ceramic | NBR | | | | |
| configuration code | | | | | standard product | | | | | |
| Acqua di mare (4) | | / | -5 | | | | | | | |
| Sea water (4) | | | +25 | | | | | | | |
| configuration code | | | | | not recommended | | | | | |
| Alcool Butilico | $CH_3(CH_2)_2CH_2OH$ | 100 | -5 | 0.81 | | | 1 | 1 | 2 | 1 |
| Butyl alcohol | | | +80 | | carbon - ceramic | NBR | | | | |
| configuration code | | | | | standard product | | | | | |
| Alcool Etilico | | 100 | -5 | 0.81 | | | | | | |
| Ethyl alcohol (Ethanol) | | | +40 | | carbon - ceramic | NBR | | | | |
| configuration code | | | | | standar product | | | | | |
| Alcool Metilico | $CH_3OH$ | 100 | -5 | 0.79 | | | 1 | 3 | 1 | 3 |
| Methyl alcohol | | | +40 | | carbon - ceramic | NBR | | | | |
| configuration code | | | | | standard product | | | | | |
| Cloroformio | $CHCl_3$ | / | -5 | 1.48 | | | 3 | 2 | 3 | 1 |
| Chloroform | | | +30 | | Carb. di tung. - Carb. di sil. | FPM | | | | |
| configuration code | | | | | ...XNA | | | | | |
| Freon 112 | $CCl_2FCCl_2F$ | 100 | -5 | 1.57 | | | 2 | 2 | 3 | 1 |

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| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | +30 | | Carb. di tung. - Carb. di sil. | FPM | | | | | |
| configuration code | | | | | | | ...XNA | | | | | | |
| Freon 113 | | $CCl_2FCClF_2$ | | 100 | -5 | 1.42 | | | 1 | 2 | 3 | 1 | |
| Triclorotrifluroetano | | | | | +30 | | carbon - ceramic | NBR | | | | | |
| configuration code | | | | | | | standard prodict | | | | | | |
| Glicole Etilenico | | $CH_2OHCH_2OH$ | | 50 | -5 | 1.13 | | | 2 | 2 | 1 | 1 | |
| Ethylene glycol | | | | | +80 | | carbon - ceramic | NBR | | | | | |
| configuration code | | | | | | | standard product | | | | | | |
| Ipoclorito di sodio (1) | | Na O Cl | | 0.5 | -5 | | | | | | | | |
| Sodium hypochlorite | | | | | +25 | | | | | | | | |
| configuration code | | | | | | | non raccomandato | | | | | | |
| Olio di Ricino | | | | 100 | -5 | | | | | | | | |
| Castor Oil | | | | | +85 | | carbon - ceramic | NBR | | | | | |
| configuration code | | | | | | | standard product | | | | | | |
| Olio Minerale | | | | 100 | -5 | 0.94 | | | | | | | |
| Mineral oil | | | | | +85 | | carbon - ceramic | NBR | | | | | |
| configuration code | | | | | | | standard product | | | | | | |
| Soda Caustica | | Na OH | | 25 | 0 | 2.13 | | | | | | | |
| Caustic Soda | | | | | +70 | | Carb. di tung. - Carb. di sil. | EPDM | | | | | |
| configuration code | | | | | | | ...XPB | | | | | | |
| Tricloroetilene /Trichloroethylene | | $CHCl:CCl_2$ | | / | -5 | 1.46 | | | 3 | 1 | 3 | 1 | |
| (Trielina) (1) | | | | | +40 | | carbon - ceramic | | | | | | |
| configuration code | | | | | | | ...XAA | | | | | | |

(X) - Richiesto battente positivo / Positive suction head required

**1 = COMPATIBILITA' BUONA**
**2 = COMPATIBILITA' MEDIOCRE**
**3 = NON COMPATIBILE**

**1 = GOOD COMPATIBILITY**
**2 = POOR COMPATIBILITY**
**3 = NO COMPATIBILITY**

**(1)-Liquido pericoloso (tossico,velenoso,ustionabile ecc.)**
**-Dangerous liquid (toxic,poisonous,attacks skin,irritant,etc.)**
**(2)-Liquido infiammabile ed esplosivo**
**-Flammable and explosive liquid**
**(3)-Solo versioni a 4 poli. Four poles versions only.**
**(4) La compatibilità dell'accaio inossidabile dipende dal contenuto di cloro in rapporto alla temperatura del liquido, è necessaria un'analisi più dettaglata**

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# WATER REQUIREMENTS IN CIVIL USERS

Determination of the water requirement depends on the type of users and contemporaneity factor. The calculation may be subject to regulations, standards or customs that may vary from country to country. The calculation method shown below is an example based on practical experience, designed to provide a reference value and not a substitute for detailed analytical calculation.

### Water requirements in condominiums

The **consumption table** shows the maximum values for each delivery point, depending on the plumbing amenities.

## MAXIMUM CONSUMPTION FOR EACH DELIVERY POINT

| TYPE | CONSUMPTION (l/min) |
|---|---|
| Sink | 9 |
| Dishwasher | 10 |
| Washing machine | 12 |
| Shower | 12 |
| Bathtub | 15 |
| Washbasin | 6 |
| Bidet | 6 |
| Flush tank WC | 6 |
| Controlled flushing system WC | 90 |

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The **sum of the water consumption values** of each delivery point determines the maximum theoretical requirement, which must be reduced according to the **contemporaneity coefficient**, because in actual fact the delivery points are never used all together.

$$f = \frac{1}{\sqrt{(0{,}857 \times Nr \times Na)}}$$ Coefficient for apartments with one bathroom and flush tank WC

$$f = \frac{1}{\sqrt{(0{,}857 \times Nr \times Na)}}$$ Coefficient for apartments with one bathroom and controlled flushing system WC

$$f = \frac{1{,}03}{\sqrt{(0{,}545 \times Nr \times Na)}}$$ Coefficient for apartments with two bathrooms and flush tank WC

$$f = \frac{0{,}8}{\sqrt{(0{,}727 \times Nr \times Na)}}$$ Coefficient for apartments with two bathrooms and controlled flushing system WC

f= coefficient; Nr= number of delivery points; Na= number of apartments

The **table of water requirements in civil users** shows the maximum contemporaneity flow-rate values based on the **number of apartments** and the type of WC for apartments with one bathroom and two bathrooms. As regards apartments with one bathroom, 7 drawing points have been taken into consideration, while 11 points have been considered for apartments with two bathrooms. If the number of drawing points or apartments is different, use the formulas to **calculate** the requirement.

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# TABLE OF WATER REQUIREMENTS IN CIVIL USERS

| NUMBER OF APARTMENTS | WITH FLUSH TANK WC | | WITH CONTROLLED FLUSHING SYSTEM WC | |
|---|---|---|---|---|
| | 1 | 2 | 1 | 2 |
| | FLOW RATE (l/min) | | | |
| 1 | 32 | 40 | 60 | 79 |
| 2 | 45 | 56 | 85 | 111 |
| 3 | 55 | 68 | 105 | 136 |
| 4 | 63 | 79 | 121 | 157 |
| 5 | 71 | 88 | 135 | 176 |
| 6 | 78 | 97 | 148 | 193 |
| 7 | 84 | 105 | 160 | 208 |
| 8 | 90 | 112 | 171 | 223 |
| 9 | 95 | 119 | 181 | 236 |
| 10 | 100 | 125 | 191 | 249 |
| 11 | 105 | 131 | 200 | 261 |
| 12 | 110 | 137 | 209 | 273 |
| 13 | 114 | 143 | 218 | 284 |
| 14 | 119 | 148 | 226 | 295 |
| 15 | 123 | 153 | 234 | 305 |
| 16 | 127 | 158 | 242 | 315 |
| 17 | 131 | 163 | 249 | 325 |
| 18 | 134 | 168 | 256 | 334 |
| 19 | 138 | 172 | 263 | 343 |
| 20 | 142 | 177 | 270 | 352 |
| 21 | 145 | 181 | 277 | 361 |
| 22 | 149 | 185 | 283 | 369 |
| 23 | 152 | 190 | 290 | 378 |
| 24 | 155 | 194 | 296 | 386 |
| 25 | 158 | 198 | 302 | 394 |
| 26 | 162 | 202 | 308 | 401 |
| 27 | 165 | 205 | 314 | 409 |
| 28 | 168 | 209 | 320 | 417 |
| 29 | 171 | 213 | 325 | 424 |
| 30 | 174 | 217 | 331 | 431 |
| 35 | 187 | 234 | 357 | 466 |
| 40 | 200 | 250 | 382 | 498 |
| 45 | 213 | 265 | 405 | 528 |
| 50 | 224 | 280 | 427 | 557 |
| 55 | 235 | 293 | 448 | 584 |
| 60 | 245 | 306 | 468 | 610 |
| 65 | 255 | 319 | 487 | 635 |
| 70 | 265 | 331 | 506 | 659 |
| 75 | 274 | 342 | 523 | 682 |
| 80 | 283 | 354 | 540 | 704 |
| 85 | 292 | 364 | 557 | 726 |
| 90 | 301 | 375 | 573 | 747 |
| 95 | 309 | 385 | 589 | 767 |
| 100 | 317 | 395 | 604 | 787 |
| 120 | 347 | 433 | 662 | 863 |
| 140 | 375 | 468 | 715 | 932 |
| 160 | 401 | 500 | 764 | 996 |
| 180 | 425 | 530 | 811 | 1056 |
| 200 | 448 | 559 | 854 | 1114 |

For seaside resorts, a flow rate increased by at least 20% must be considered.

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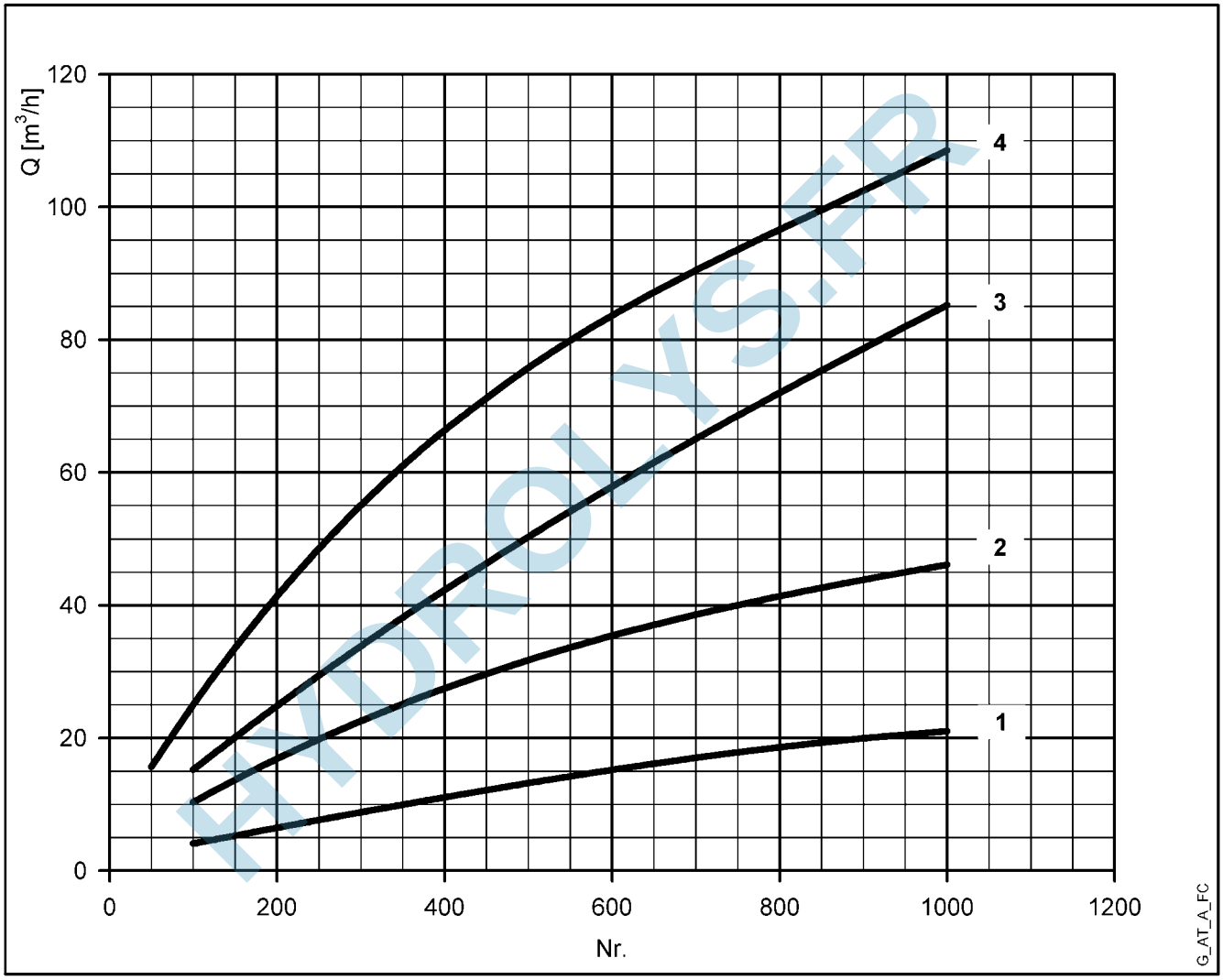
# WATER REQUIREMENTS FOR COMMUNITY BUILDINGS

The requirements of buildings intended for specific uses, such as **offices, residential units, hotels, department stores, nursing homes** and so on, are different from those of condominiums, and both their global daily water consumption and the maximum contemporaneity flow rate are usually greater. The **diagram of water requirements for community buildings** shows the maximum contemporaneity flow rate of some types of communities, for guidance.
These requirements must be determined case by case with the utmost accuracy, using analytical calculation methods, according to particular needs and local provisions.

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For seaside resorts, the flow rate must be increased by at least 20%.

1= Offices (N. of people)
2= Department stores (N. of people)
3= Nursing homes (N. of beds)
4= Hotels, residences (N. of beds)

# 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 hz at which to install the machine under safe conditions, the following formula must be verified:

**hp + hz ≥ (NPSHr + 0.5) + hf + hpv** ①

where:

**hp** is the absolute pressure applied to the free liquid surface in the suction tank, expressed in m. of liquid; hp is the quotient between the barometric pressure and the specific weight of the liquid.

**hz** is the suction lift between the pump axis and the free liquid surface in the suction tank, expressed in m.; hz is negative when the liquid level is lower than the pump axis.

**hf** is the flow resistance in the suction line and its accessories, such as: fittings, foot valve, gate valve, elbows, etc.

**hpv** is the vapour pressure of the liquid at the operating temperature, expressed in m. of liquid. hpv is the quotient between the Pv 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 40-41 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.

Make the following calculation:

Liquid: water at ~15°C $\gamma = 1$ kg/dm³
Flow rate required: 30 m³/h
Head for required delivery: 43 m.
Suction lift: 3,5 m.
The selection is an FHE 40-200/75 pump whose NPSH required value is, at 30 m³/h, di 2,5 m.

For water at 15 °C

hp = Pa / $\gamma$ = 10,33m, hpv = Pv / $\gamma$ = 0,174m (0,01701 bar)

The Hf flow resistance in the suction line with foot valves is ~ 1,2 m.
By substituting the parameters in formula ① with the numeric values above, we have:

10,33 + (-3,5) ≥ (2,5 + 0,5) + 1,2 + 0,17

from which we have: 6,8 > 4,4

The relation is therefore verified.

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# 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 | 221,20 | 0,3154 |
| | | | |
| | | | |

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

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# FLOW RESISTANCE

## TABLE OF FLOW RESISTANCE IN BENDS, VALVES AND GATES

The flow resistance is calculated using the equivalent pipeline length method according to the table below:

| ACCESSORY TYPE | DN | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 | 250 | 300 |
| | Equivalent pipeline 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 |
| 90° smooth 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 |
| Union tee or cross | 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 | - | - | - | 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 for the Hazen Williams coefficient C = 100 (cast iron pipework). For steel pipework, multiply the values by 1.41. For stainless steel, copper and coated cast iron pipework, multiply the values by 1.85.
When the **equivalent pipeline length** has been determined, the flow resistance is obtained from the table of flow resistance.
The values given are guideline values which are bound to vary slightly according to the model, especially for gate valves and non-return valves, for which it is a good idea to check the values supplied by the manufacturers.

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## VOLUMETRIC CAPACITY

| 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 | **0,2642** |
| 16,6667 | **1,0000** | 35,3147 | 0,5886 | 3,6662 | 4,4029 |
| 0,4719 | 0,0283 | **1,0000** | 0,0167 | 0,1038 | **0,1247** |
| 28,3168 | 1,6990 | 60,0000 | **1,0000** | 6,2288 | 7,4805 |
| 4,5461 | 0,2728 | 9,6326 | 0,1605 | **1,0000** | 1,2009 |
| 3,7854 | 0,2271 | 8,0208 | 0,1337 | 0,8327 | **1,0000** |

## PRESSURE AND HEAD

| Newton per square metre $N/m^2$ | kilo Pascal kPa | bar bar | Pound force per square inch psi | metre of water m $H_2O$ | millimetre of mercury mm Hg |
|---|---|---|---|---|---|
| **1,0000** | 0,0010 | $1 \times 10^{-5}$ | $1.45 \times 10^{-4}$ | $1.02 \times 10^{-4}$ | **0,0075** |
| 1000,0000 | **1,0000** | 0,0100 | 0,1450 | 0,1020 | 7,5006 |
| $1 \times 10^5$ | 100,0000 | **1,0000** | 14,5038 | 10,1972 | **750,0638** |
| 6894,7570 | 6,8948 | 0,0689 | **1,0000** | 0,7031 | **51,7151** |
| 9806,6500 | 9,8067 | 0,0981 | 1,4223 | **1,0000** | **73,5561** |
| 133,3220 | 0,1333 | 0,0013 | 0,0193 | 0,0136 | **1,0000** |

## LENGTH

| 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 litro | millilitre ml | imp. Gallon imp. gal. | US gallon US gal. | cubic foot $ft^3$ |
|---|---|---|---|---|---|
| **1,0000** | 1000,0000 | $1 \times 10^6$ | 219,9694 | 264,1720 | **35,3147** |
| 0,0010 | **1,0000** | 1000,0000 | 0,2200 | 0,2642 | 0,0353 |
| $1 \times 10^{-6}$ | 0,0010 | **1,0000** | $2.2 \times 10^{-4}$ | $2.642 \times 10^{-4}$ | $3.53 \times 10^{-5}$ |
| 0,0045 | 4,5461 | 4546,0870 | **1,0000** | 1,2009 | 0,1605 |
| 0,0038 | 3,7854 | 3785,4120 | 0,8327 | **1,0000** | **0,1337** |
| 0,0283 | 28,3168 | 28316,8466 | 6,2288 | 7,4805 | **1,0000** |

G-at_pp-en_a_sc

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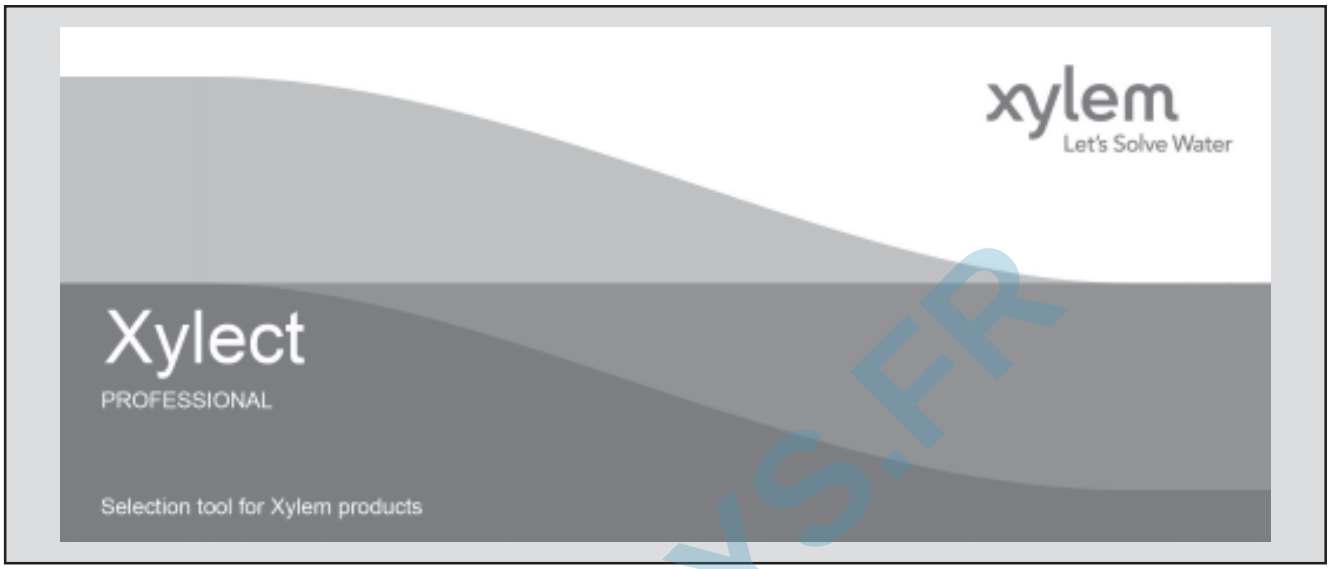
# FURTHER PRODUCT SELECTION AND DOCUMENTATION

## 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.

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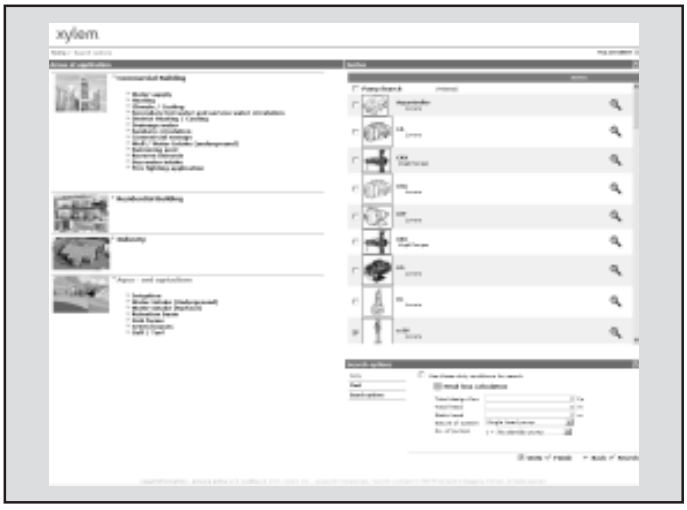
The search can be made by:

- Application
- Product type
- Duty point

Xylect gives a detailed output:

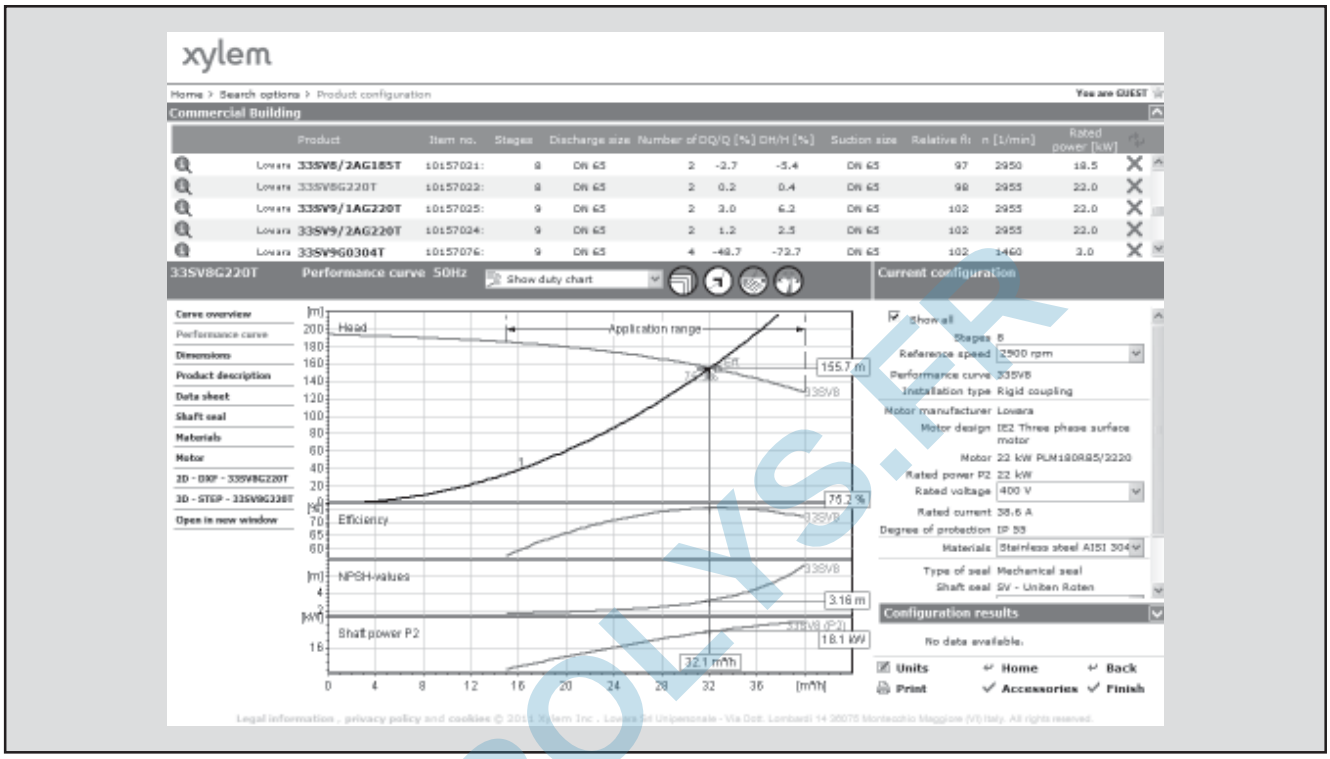
- List with search results
- Performance curves (flow, head, power, efficiency, NPSH)
- Motor data
- Dimensional drawings
- Options
- Data sheet printouts
- Document downloads incl dxf files



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

# FURTHER PRODUCT SELECTION AND DOCUMENTATION

## Xylect



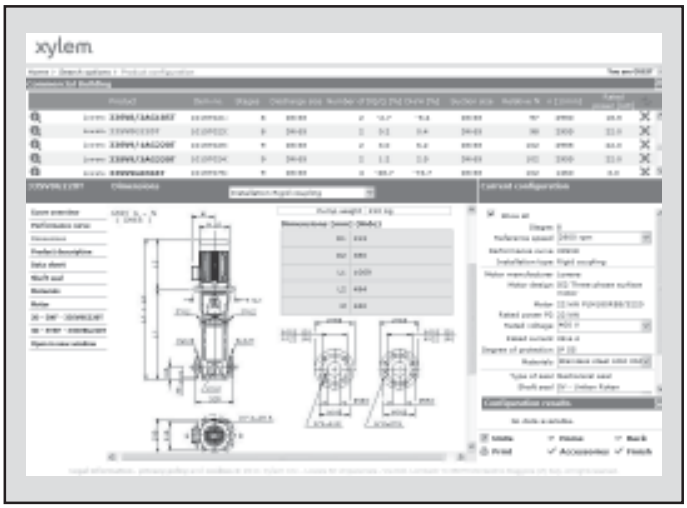

*The detailed output makes it easy to select the optimal pump from the given alternatives.*

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.




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

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# 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.

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LOWARA
a xylem brand

Headquarters

LOWARA S.r.l. Unipersonale
Via Vittorio Lombardi 14
36075 Montecchio Maggiore - Vicenza - Italy
Tel.(+39) 0444 707111 - Fax(+39) 0444 492166
e-mail: lowara.mkt@xyleminc.com
web: www.lowara.com - www.completewatersystems.com

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