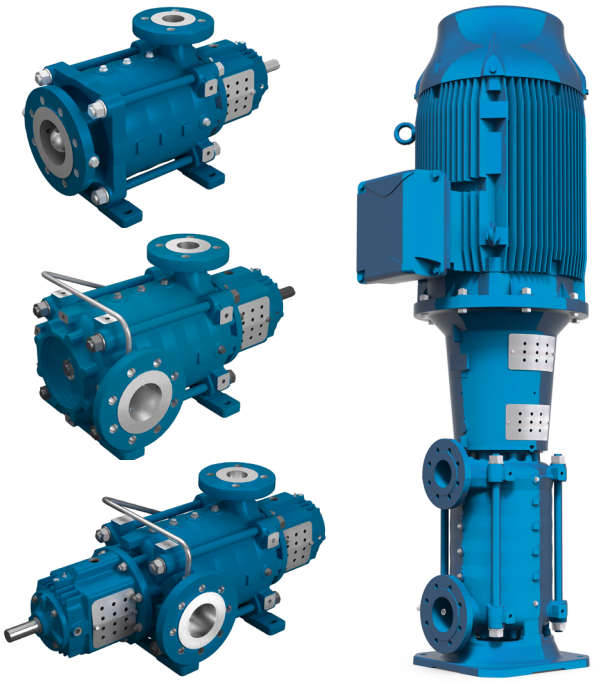
xylem
Let's Solve Water

TECHNICAL BROCHURE
BeMP R6

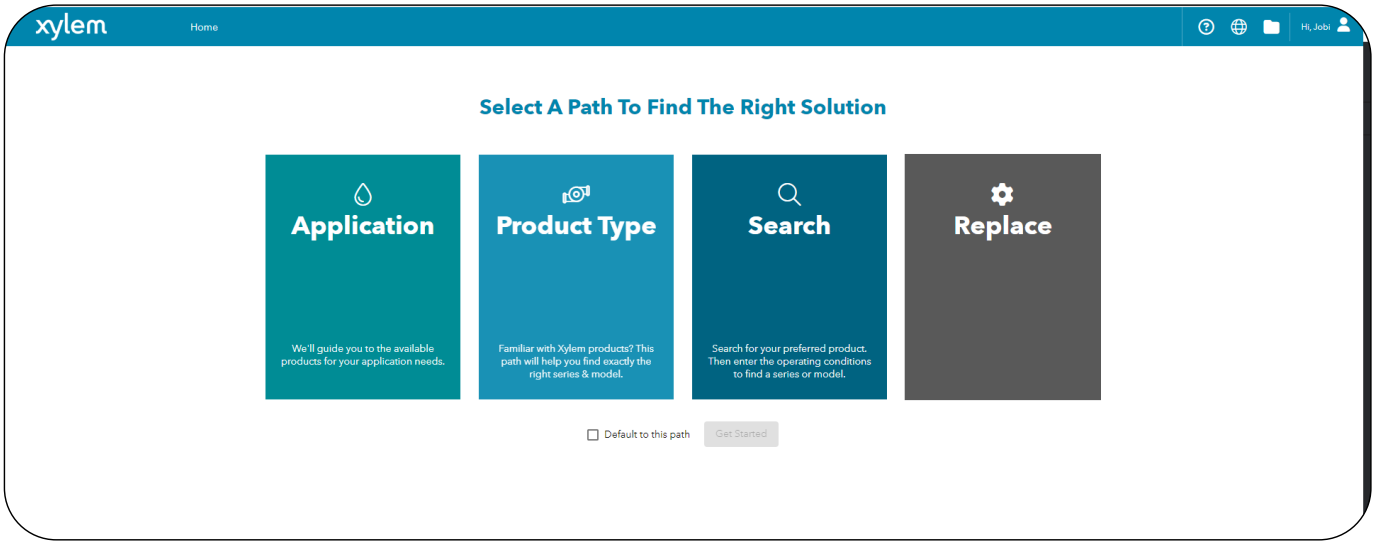


e-MP Series
MPA, MPR, MPD, MPV – 60 Hz

HIGH PRESSURE MULTISTAGE PUMPS

TECHNICAL APPENDIX

FURTHER PRODUCT SELECTION AND DOCUMENTATION - Xylem Solver



Xylem Solver is pump solution software with multiple search options and helpful project management facilities.

Xylem Solver allows any user to search by application, or product type without having detailed knowledge of Xylem products. It also has the ability to search via series or models across our whole portfolio. Solver platform has the ability to guide the user to the right product for their particular needs.

The search can be made by:

• Application • Product type • Duty point

Xylem Solver gives a detailed output:

- List with search results
- Performance curves (flow, head, power, efficiency, NPSH)
- Motor data
- Dimensional drawings
- Technical Documentation

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

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

Every registered user has a proper space, where all projects are saved.

For more information about Xylem Solver please contact our sales network or email solver@xylem.com.

CONTENTS

HIGH PRESSURE MULTISTAGE, RADIALLY SPLIT, SEGMENTED CASING PUMPS

The **e-MP** series is a highly efficient **multistage, radially split, segmented casing** pump.

Four (4) mechanical models build the basic platform for various horizontal and vertical configurations to meet requirements for the defined markets, applications and liquids. (See next page for list of models and descriptions.)

Markets and Applications:

- **General Industrial**

  Steel/metal, sugar, timber, tire, rubber, pulp & paper, auto, food and beverage

  Applications: cooling and heating circuits, furnace/ pan/lance/milling cooling, polymer processing, sprinkler systems, washing and cleaning systems, large vehicle washing systems, filter systems, water transport/treatment systems, washdown/clean-in-place, booster systems/boosting applications and auxiliary applications in chemical industry.

- **Power Generation**

  Fossil fuel, renewable, biomass, and geothermal

  Applications: boiler feed, condensate pumping, de-aerating, water injection/transport, auxiliary systems, cooling and heating circuits, district cooling and heating systems, geothermal well services, heat transfer fluids, steam/water (gas-cycles) systems, cooling water systems, water supply and disposal systems and process heating water systems.

- **Oil & Gas**

  Hydraulic fracturing, conventional, off-shore platforms, pipelines and refineries

  Applications: oil condensate pumping, LACT units, sea water/water injection, water supply/ transport/treatment, Floating Production Storage and Offloading (FPSO) and brackish water transport.

- **Mining**

  Surface and underground

  Applications: dewatering filtered water, leachate pumping, water transport, washing and cleaning systems and dust suppression.

- **Commercial Building Services**

  Applications: water transport, booster systems and HVAC systems.

- **Agriculture**

  Applications: water transport and irrigation.

- **Water Utilities**

  Water works, desalination plants, water treatment plants, drainage/ flood protection and tunnels

  Applications: district cooling and heating systems, water transport/treatment systems, desalinization systems, reverse osmosis systems, nanofiltration and booster systems.

- **Leisure Industry**

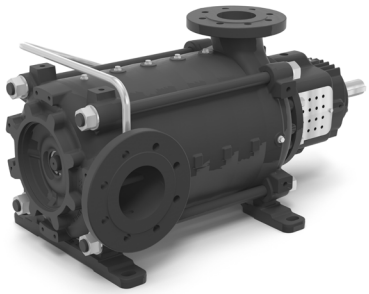
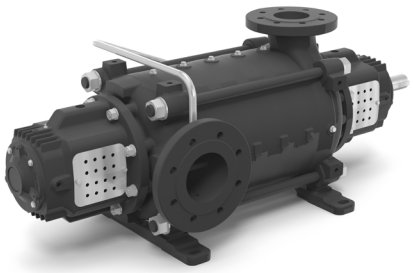
  Ski resorts, leisure parks and spas

  Applications: snow making and water transport/ boosting.

- **Pumpable Fluids**:
  - Groundwater
  - Potable water
  - Process water
  - Gray/used water
  - Seawater
  - Brackish water
  - Boiler feed water
  - Water condensate
  - Heat transfer fluids
  - Produced water
  - Solvents/oils

  If your process is not listed above, please contact our experts at xylem.com/industrial.

DESIGN VERSIONS

CONFIGURATION	DESCRIPTION
MPA 	**MPA** • Horizontal shaft design • Axial suction nozzle • Radial discharge nozzle (left, top, right) • Drive on discharge side • Discharge side has double row angular ball bearing • Slide bearing on suction side • Axial thrust balancing by drum design • Shaft sealing on discharge side only • Bare shaft or pump unit • Driver: NEMA motor standard • Temperature range of pumped liquid: 14°F to 200°F (-10°C to 93°C) • Inlet pressure: up to 145 psi (10 bar)
MPR 	**MPA** • Horizontal shaft design • Radial suction nozzle (left, top, right) • Radial discharge nozzle (left, top, right) • Drive on discharge side • Discharge side has double row angular ball bearing • Slide bearing on suction side • Axial thrust balancing by drum design • Shaft sealing on discharge side only • Bare shaft or pump unit • Driver: NEMA motor standard • Temperature range of pumped liquid: 14°F to 200°F (-10°C to 93°C) • Inlet pressure: up to 145 psi (10 bar)
MPD 	**MPA** • Horizontal shaft design • Radial suction nozzle (left, top, right) • Radial discharge nozzle (left, top, right) • Drive on discharge side (optional suction side) • Discharge side has double row angular ball bearing • Deep groove ball bearing on suction side • Axial thrust balancing by drum design • Shaft sealing on suction and discharge side • Bare shaft or pump unit • Driver: NEMA motor standard • Temperature range of pumped liquid: 14°F to 284°F (-10°C to 140°C) • Inlet pressure: up to 580 psi (40 bar) • Stainless steel models meets NSF/ANSI 61 and 372 certification standards
MPV 	**MPA** • Vertical shaft design • Radial suction nozzle (0°-90°-180°-270°) • Radial discharge nozzle (0°-90°-180°-270°) • Drive on discharge side • Discharge side has double row angular ball bearing • Slide bearing on suction side • Axial thrust balancing by drum design • Shaft sealing on discharge side only • Bare shaft or pump unit • Driver: NEMA motor standard up to 650 hp • Temperature range of pumped liquid: 14°F to 200°F (-10°C to 93°C) • Inlet pressure: up to 145 psi (10 bar) • Stainless steel models meets NSF/ANSI 61 and 372 certification standards

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
e-	M	P	V	E	1	2	5	B	-	0	2	A	B	R	S	-	0	5	0	0	T	T	F	2	6	B	-	N	N	N	4	

Pump type [2 characters]
[MP] = Highly efficient and flexible **M**ultistage, radially split, segmented casing **P**ump, the new member of Xylem's e-product range

Configuration [1 character]
[A] = Horizontal design
Axial suction, radial discharge
1 Roller bearing discharge side
1 Slide bearing suction side
[R] = Horizontal design
Radial suction and discharge
1 Roller bearing discharge side
1 Slide bearing suction side
[V] = Vertical design
Radial suction and discharge
1 Roller bearing discharge side
1 Slide bearing suction side
[D] = Horizontal design
Radial suction and discharge
2 Roller bearings

Pump size [1 character]
[ ] = Standard
[E] = High Pressure (1,450 psi / 100 bar)
[T] = High Temperature (284°F - 320°F)
[P] = High Temperature (320°F - 356°F), Feet in Axis

Pump size [3 to 4 characters]
[50A] [100A] [150A]
[50B] [100B] [150B]
[65A] [125A]
[65B] [125B]

Number of stages/impellers [2 characters]
e.g.: [04] = 4 stages

Combination of full diameter and trimmed impellers [1 character]
[A] = all impellers full diameter
[B] = trimmed/full impellers combination 1
[C] = trimmed/full impellers combination 2
[D] = trimmed/full impellers combination 3
[E] = trimmed/full impellers combination 4
[X] = duty point trimmed

Flange Orientation [1 character]

MPA
[A]= End Suction, Top Discharge (code AO)
[B]= End Suction, Left Discharge (code AL)
[C]= End Suction, Right Discharge (code AR)

MPD and MPR
[A]= Left Suction, Top Discharge (code LO)
[B]= Right Suction, Top Discharge (code RO)
[C]= Top Suction, Top Discharge (code OO)
[D]= Left Suction, Right Discharge (code LR)
[E]= Top Suction, Right Discharge (code OR)
[F]= Right Suction, Right Discharge (code RR)
[G]=Right Suction, Left Discharge (code RL)
[H]= Top Suction, Left Discharge (code OL)
[J]= Left Suction, Left Discharge (code LL)

MPD shaft driven from the suction end
[1]= Left Suction, Top Discharge (code LOS)
[2]= Right Suction, Top Discharge (code ROS)
[3]= Top Suction, Top Discharge (code OOS)
[4]= Left Suction, Right Discharge (code LRS)
[5]= Top Suction, Right Discharge (code ORS)
[6]= Right Suction, Right Discharge (code RRS)
[7]=Right Suction, Left Discharge (code RLS)
[8]= Top Suction, Left Discharge (code OLS)
[9]= Left Suction, Left Discharge (code LLS)

MPV
[A] = Left Suction, Left Discharge (code OO)
[B] = Left Suction, Rear Discharge (code OR)
[C] = Left Suction, Front Discharge (code OL)
[D] = Left Suction, Right Discharge (code OG)

ANSI suction flange class [1 character]
[R] = 150
[S] = 300

ANSI discharge flange class [1 character]
[R] = 150
[S] = 300
[T] = 600

Motor HP [2 to 4 characters]
e.g. [0500] = 500HP

Motor enclosure [1 character]
[D] = ODPE
[T] = TEPE
[W] = WDPE

Frame size [1 character]
[B] = 182T/184T
[C] = 213T/215T
[D] = 254T/256T
[E] = 284TS/286TS
[F] = 284T/286T
[G] = 324TS/326TS
[H] = 324T/326T
[J] = 364TS/365TS
[K] = 364T/365T
[L] = 404TS/405TS
[M] = 404T/405T
[N] = 444TS/445TS
[P] = 444T/445T
[R] = 447TS/449TS
[S] = 447T/449T
[T] = 5007S/5008S
[U] = 5009S
[V] = 5010S/5011S
[W] = 586S/587S
[X] = 588S/589S
[Y] = 6808/6809
[Z] = other

Motor type [1 character]
[F]= Factory choice
[X] = Other
[A] = Motor not part of scope

No. of poles [1 character]
[2] = 2 poles
[4] = 4 poles

Motor frequency and voltage [2 characters]
50 Hz
[5B]= 190/380-415V
[5C]= 190/380V
[5D]= 220V
[5E]= 380V
[5F]= 415V
[5X]= Other Voltage

60 Hz
[6B]= 208-230/460V
[6C]= 230/460V
[6E]= 230V
[6F]= 460V
[6G]= 575V
[6X]= Other voltage

Seal Type [1 character]
[ ] = Mechanical seal, standard
[C] = Cartridge seal

Mechanical Seal and O-Ring materials [1 character]
[4] = Carbon/SiC/EPDM
[2] = Carbon/SiC/FPM
[Z] = SiC/SiC/EPDM
[W] = SiC/SiC/FPM
[X] = Others

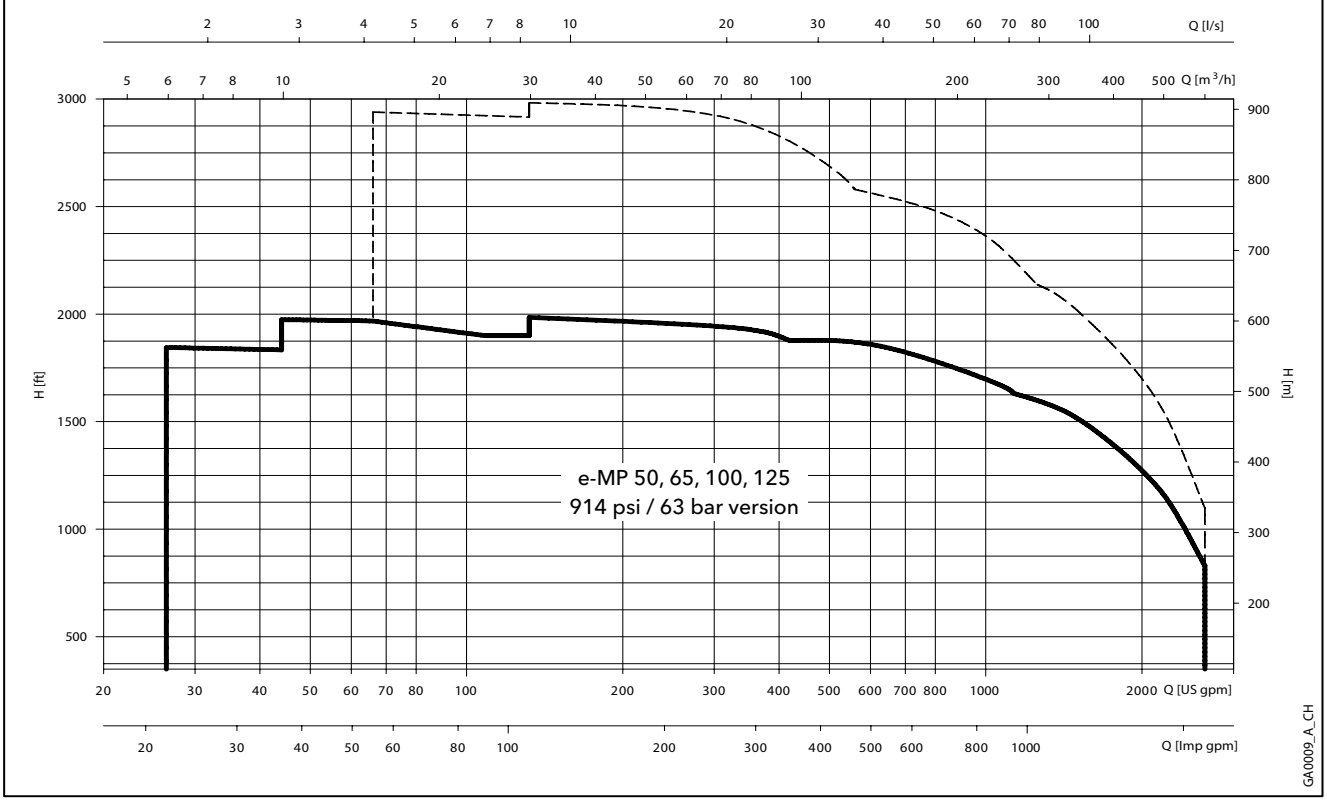
Diffuser material [1 character]
[C] = Cast iron
[N] = Stainless steel
[R] = Duplex
[T] = Super duplex

Impeller material [1 character]
[N] = Stainless steel
[R] = Duplex
[T] = Super duplex

Casing material [1 character]
[D] = Ductile Iron
[N] = Stainless steel
[R] = Duplex
[T] = Super duplex

HYDRAULIC PERFORMANCE RANGE AT 60 Hz, 2-POLES

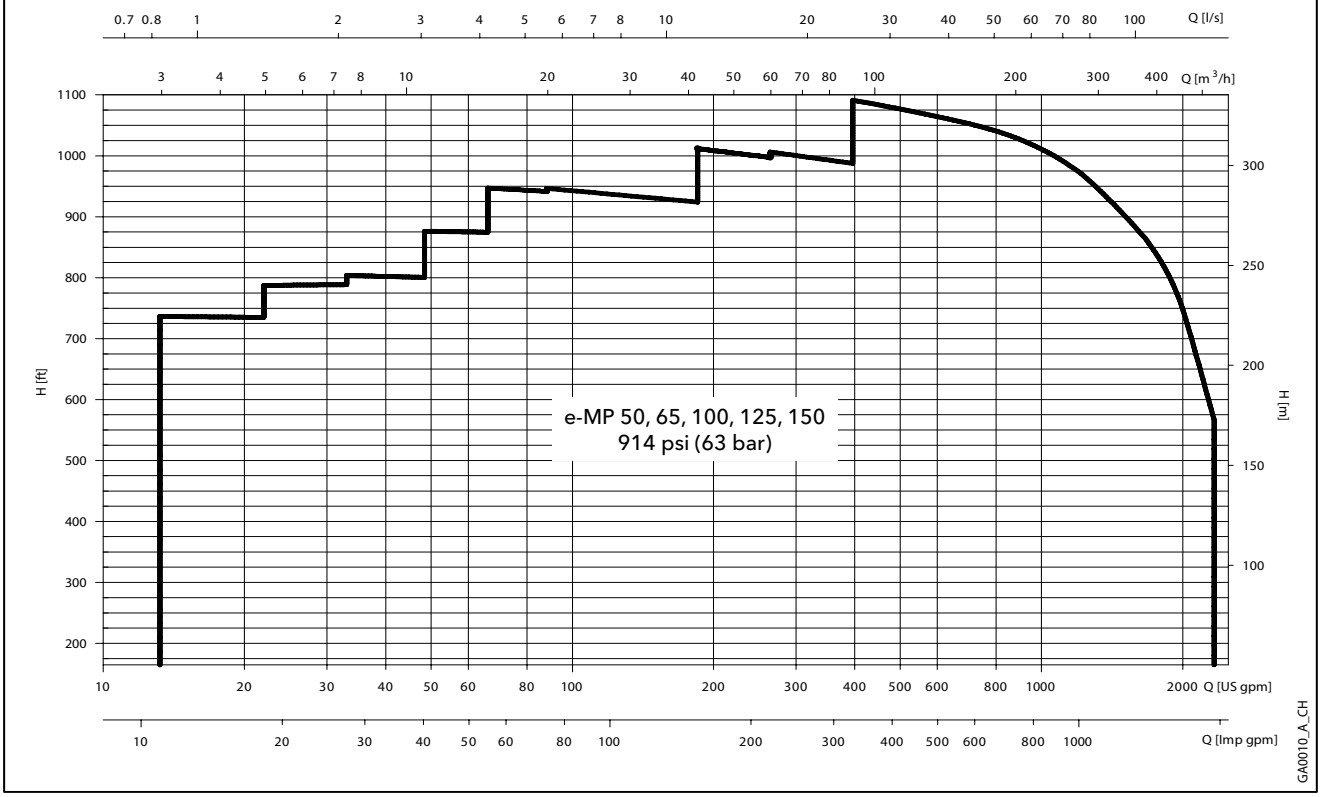
e-MP	3550 [rpm]	ISO 9906:2012



--- 100 bar version. Contact factory for more information.

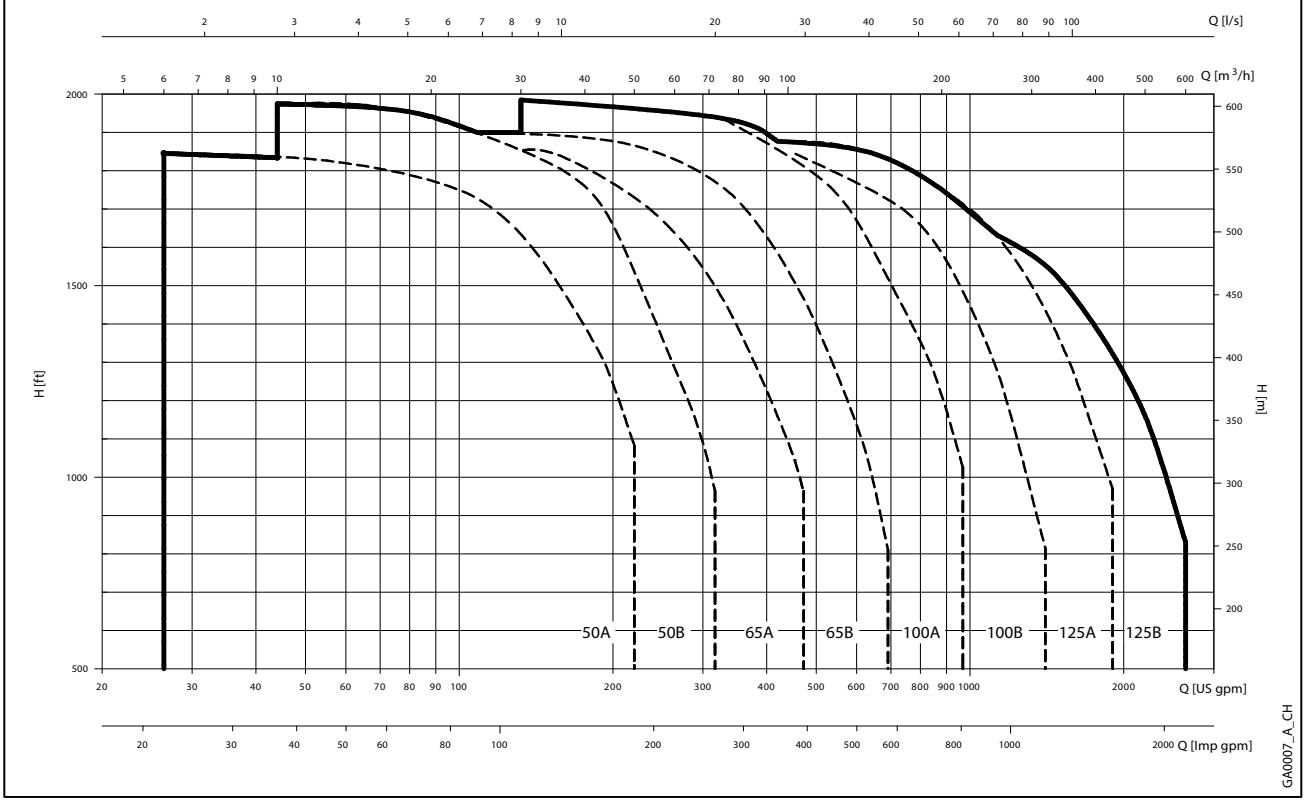
HYDRAULIC PERFORMANCE RANGE AT 60 Hz, 4-POLES

e-MP	1750 [rpm]	ISO 9906:2012



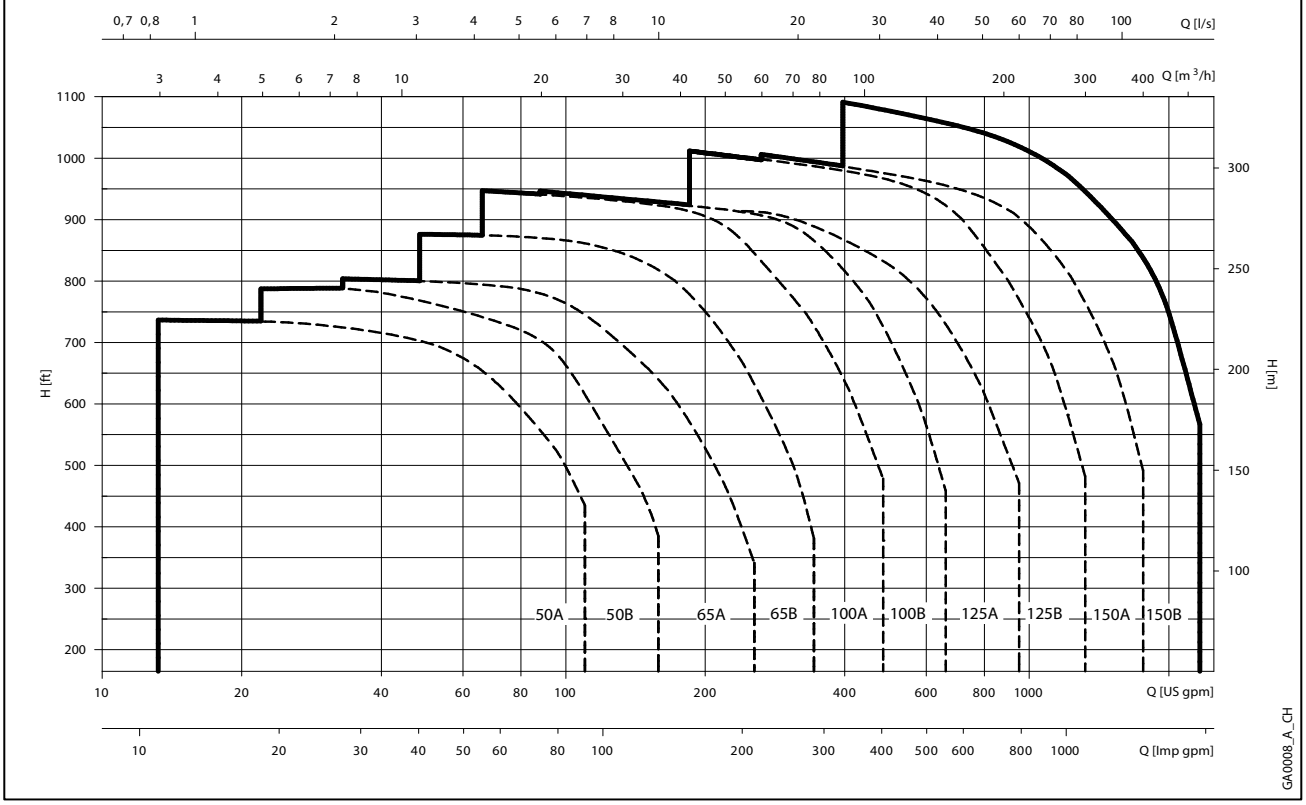
HYDRAULIC PERFORMANCE RANGE AT 60 Hz, 2-POLES

e-MP	~ 3550 [rpm]	ISO 9906:2012



HYDRAULIC PERFORMANCE RANGE AT 60 Hz, 4-POLES

e-MP	~ 1750 [rpm]	ISO 9906:2012



GENERAL CHARACTERISTICS

STAGE NUMBER & POWER LIMITS 60HZ - 40 BAR DESIGN										
Size	Hydraulic	DESIGN	eMPA		eMPR		eMPD		eMPV	
		Speed [rpm]	3550	1750	3550	1750	3550	1750	3550	1750
50	A	max. Stages [-]	7	16	7	16	7	16	7	16
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
	B	max. Stages [-]	7	16	7	16	7	16	7	16
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
65	A	max. Stages [-]	5	13	5	13	5	13	4	12
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
	B	max. Stages [-]	5	12	5	12	5	12	3	12
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
100	A	max. Stages [-]	3	10	3	10	3	10	3	10
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
	B	max. Stages [-]	3	10	3	10	3	10	3	9
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
125	A	max. Stages [-]	3	7	3	7	3	7	3	7
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
	B	max. Stages [-]	2	7	2	7	2	7	2	7
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
150	A	max. Stages [-]	--	6	--	6	--	6	--	6
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
	B	max. Stages [-]	--	6	--	6	--	6	--	6
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--

Minimum two (2) stages.

GENERAL CHARACTERISTICS

STAGE NUMBER & POWER LIMITS 60HZ - 63 BAR DESIGN										
Size	Hydraulic	DESIGN	eMPA		eMPR		eMPD		eMPV	
		Speed [rpm]	3550	1750	3550	1750	3550	1750	3550	1750
50	A	max. Stages [-]	11	16	11	16	11	16	11	16
		max. Power [hp]	125	25	125	25	125	25	125	25
	B	max. Stages [-]	10	16	10	16	10	16	10	16
		max. Power [hp]	150	30	150	30	150	30	150	30
65	A	max. Stages [-]	7	13	7	13	7	13	5	12
		max. Power [hp]	250	50	250	50	250	50	150	50
	B	max. Stages [-]	6	12	6	12	6	12	4*)	12
		max. Power [hp]	300	75	300	75	300	75	150	75
100	A	max. Stages [-]	5	10	5	10	5	10	5	10
		max. Power [hp]	400	100	400	100	400	100	400	100
	B	max. Stages [-]	5	10	5	10	5	10	4	10
		max. Power [hp]	500	125	500	125	500	125	400	125
125	A	max. Stages [-]	4	7	4	7	4	7	3*)	7
		max. Power [hp]	850	200	850	200	850	200	450	200
	B	max. Stages [-]	3	7	3	7	3	7	2*)	7
		max. Power [hp]	900	250	900	250	900	250	450	250
150	A	max. Stages [-]	--	6	--	6	--	6	--	6
		max. Power [hp]	--	350	--	350	--	350	--	350
	B	max. Stages [-]	--	6	--	6	--	6	--	5*)
		max. Power [hp]	--	500	--	500	--	500	--	350

Minimum two (2) stages. Stage number only possible with trimmed impeller diameters.

GENERAL CHARACTERISTICS

STAGE NUMBER & POWER LIMITS 60HZ - 100 BAR DESIGN										
Size	Hydraulic	DESIGN	eMPA		eMPR		eMPD		eMPV	
		Speed [rpm]	3550	1750	3550	1750	3550	1750	3550	1750
50	A	max. Stages [-]	--	--	--	--	--	--	--	--
		max. Power [hp]	--	--	--	--	--	--	--	--
	B	max. Stages [-]	--	--	--	--	--	--	--	--
		max. Power [hp]	--	--	--	--	--	--	--	--
65	A	max. Stages [-]	11	--	11	--	11	--	--	--
		max. Power [hp]	350	--	350	--	350	--	--	--
	B	max. Stages [-]	9*)	--	9*)	--	9*)	--	--	--
		max. Power [hp]	350	--	350	--	350	--	--	--
100	A	max. Stages [-]	8	--	8	--	8	--	--	--
		max. Power [hp]	650	--	650	--	650	--	--	--
	B	max. Stages [-]	7	--	7	--	7	--	--	--
		max. Power [hp]	700	--	700	--	700	--	--	--
125	A	max. Stages [-]	5	--	5	--	5	--	--	--
		max. Power [hp]	1100	--	1100	--	1100	--	--	--
	B	max. Stages [-]	4	--	4	--	4	--	--	--
		max. Power [hp]	1250	--	1250	--	1250	--	--	--
150	A	max. Stages [-]	--	--	--	--	--	--	--	--
		max. Power [hp]	--	--	--	--	--	--	--	--
	B	max. Stages [-]	--	--	--	--	--	--	--	--
		max. Power [hp]	--	--	--	--	--	--	--	--

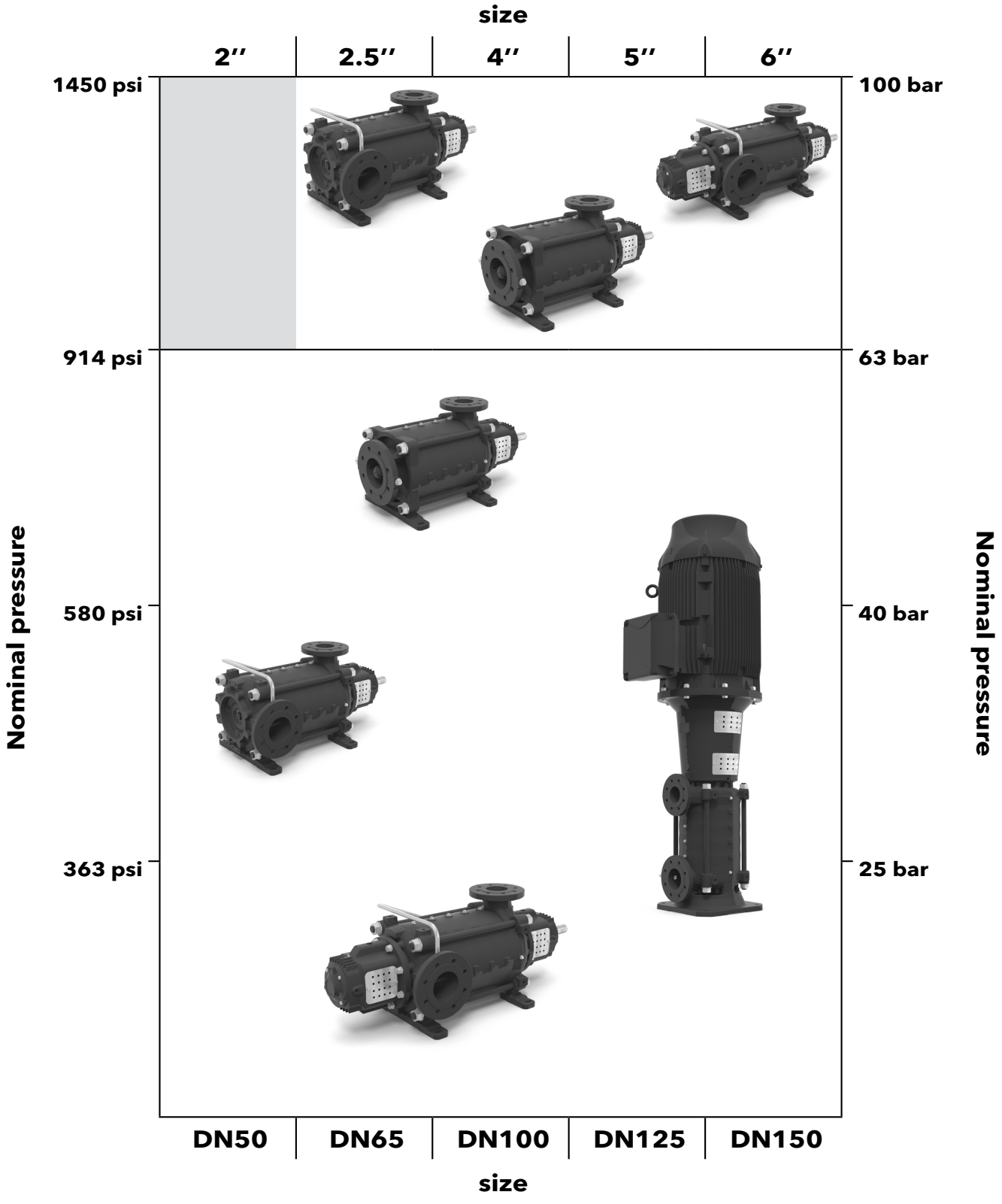
Minimum two (2) stages. Stage number only possible with trimmed impeller diameters.

OPERATING DATA

DATA	VALUE
Discharge flange size	2'' to 6''
Power	2-pole operation: up to 1250 HP / 7.5 kW to 932 kW 4-pole operation: Up to 500 HP / 372 kW
Heads	up to approx. 2,100 ft / 640 m
Flows	up to approx. 2,600 gpm / 590 m³/h
Temperature	See Design Configuration table above
Operating pressures	up to 1450 psi / 100 bar

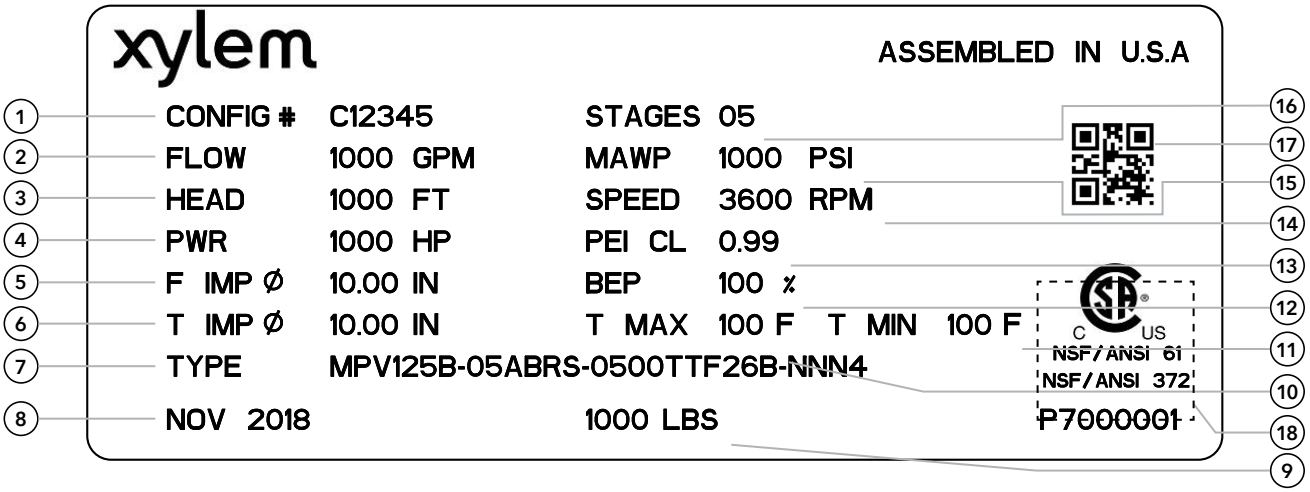
GENERAL CHARACTERISTICS

Operating range by size and design



RATING PLATE

PUMP ONLY



LEGEND

1	Order configuration number
2	Flow
3	Head
4	Motor HP
5	Full impeller diameter (specification only if full impeller available)
6	Trimmed impeller diameter (only if trimmed impeller available)
7	Pump type
8	Production date
9	Weight

10	Maximum operating temperature
11	Minimum operating temperature
12	Hydraulic efficiency in the best efficiency point
13	Pump Energy Index – constant load (if applicable)
14	Speed
15	Maximum allowable working pressure
16	Number of stages
17	QR Code (if applicable)
18	Approval Block (if applicable)

e-MPD & e-MPV Stainless Steel Certifications

e-MPD & e-MPV models, stainless steel only (NNN configurations), are NSF certified.

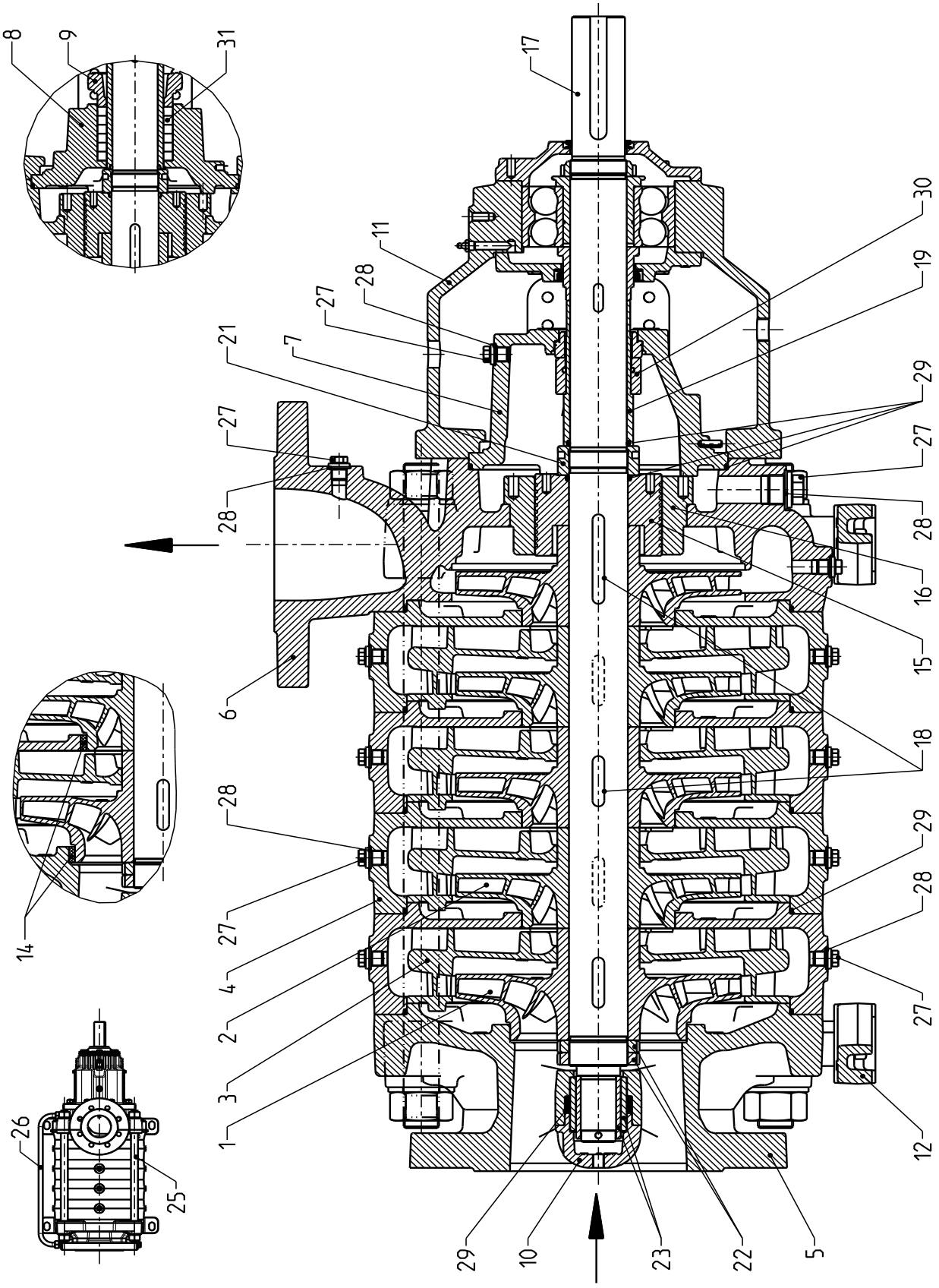
C US

Drinking Water
Low Lead Content
NSF/ANSI 61 & 372
File#: 009553_0_000

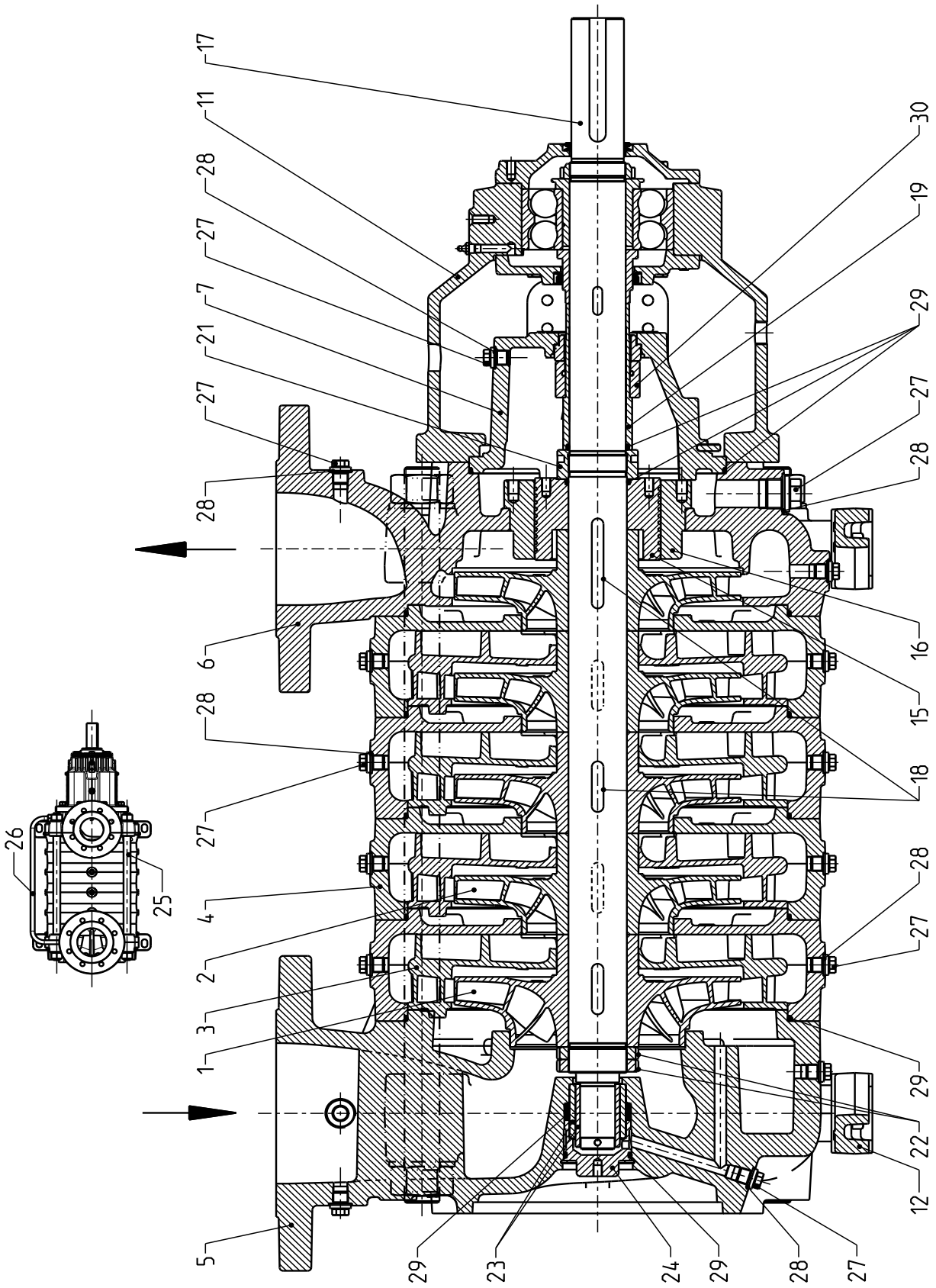
NSF/ANSI 61 (*Drinking Water System Components - Health Effects*) is a certification standard for products that come into contact with drinking water. NSF/ANSI 372 (*Drinking Water System Components - Lead Content*) verifies the lead content of drinking water products meets levels determined by the Safe Drinking Water Act. These requirements are based on EPA and Health Canada Requirement.

For the official certification listing, please visit www.csagroup.org and enter the file and class numbers on the CSA Group Product Listing page.

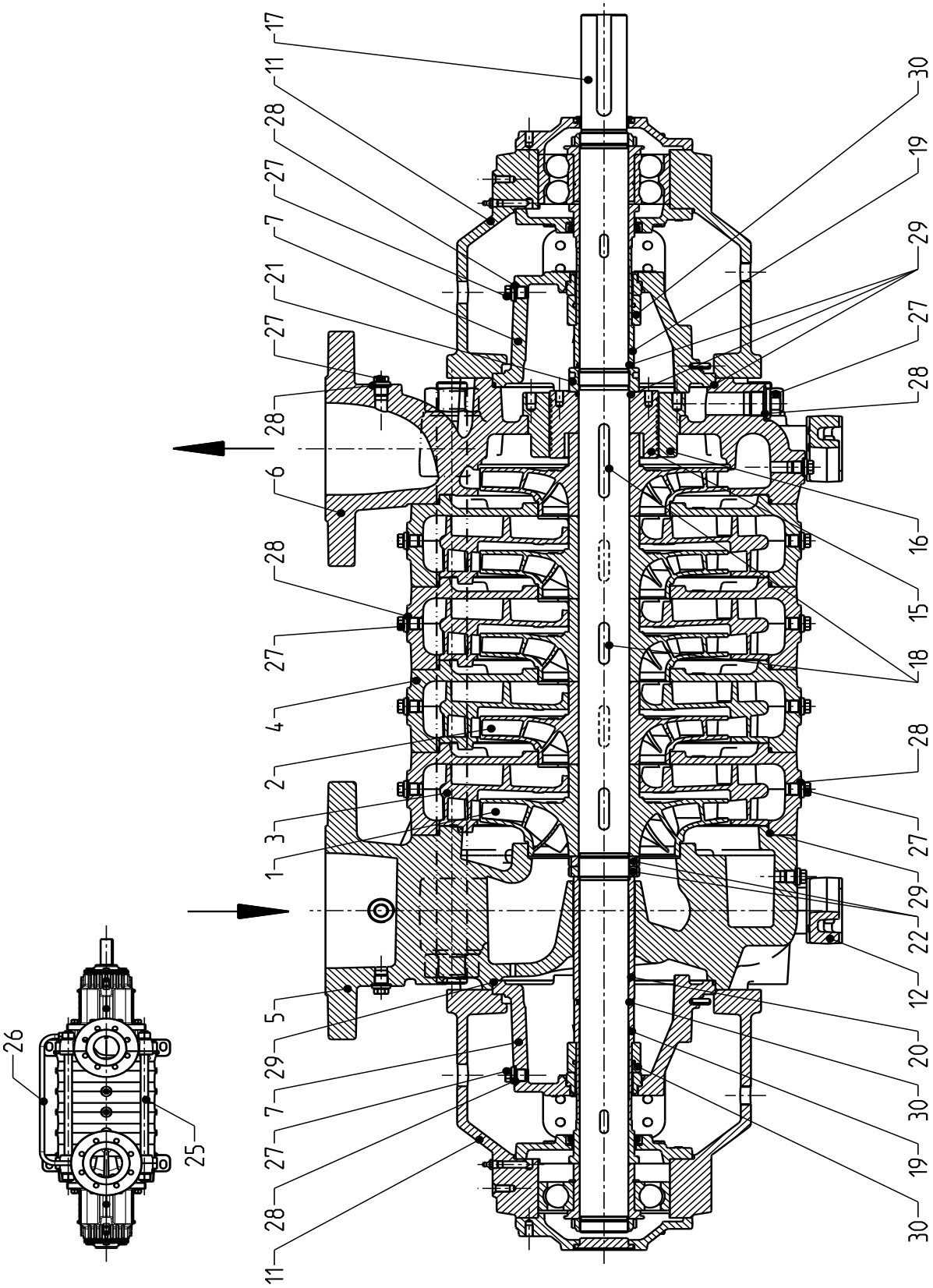
MPA SERIES
PUMP END CROSS-SECTION AND MAIN COMPONENTS



MPR SERIES
PUMP END CROSS-SECTION AND MAIN COMPONENTS



MPD SERIES
PUMP END CROSS-SECTION AND MAIN COMPONENTS



MPV SERIES
PUMP END CROSS-SECTION AND MAIN COMPONENTS

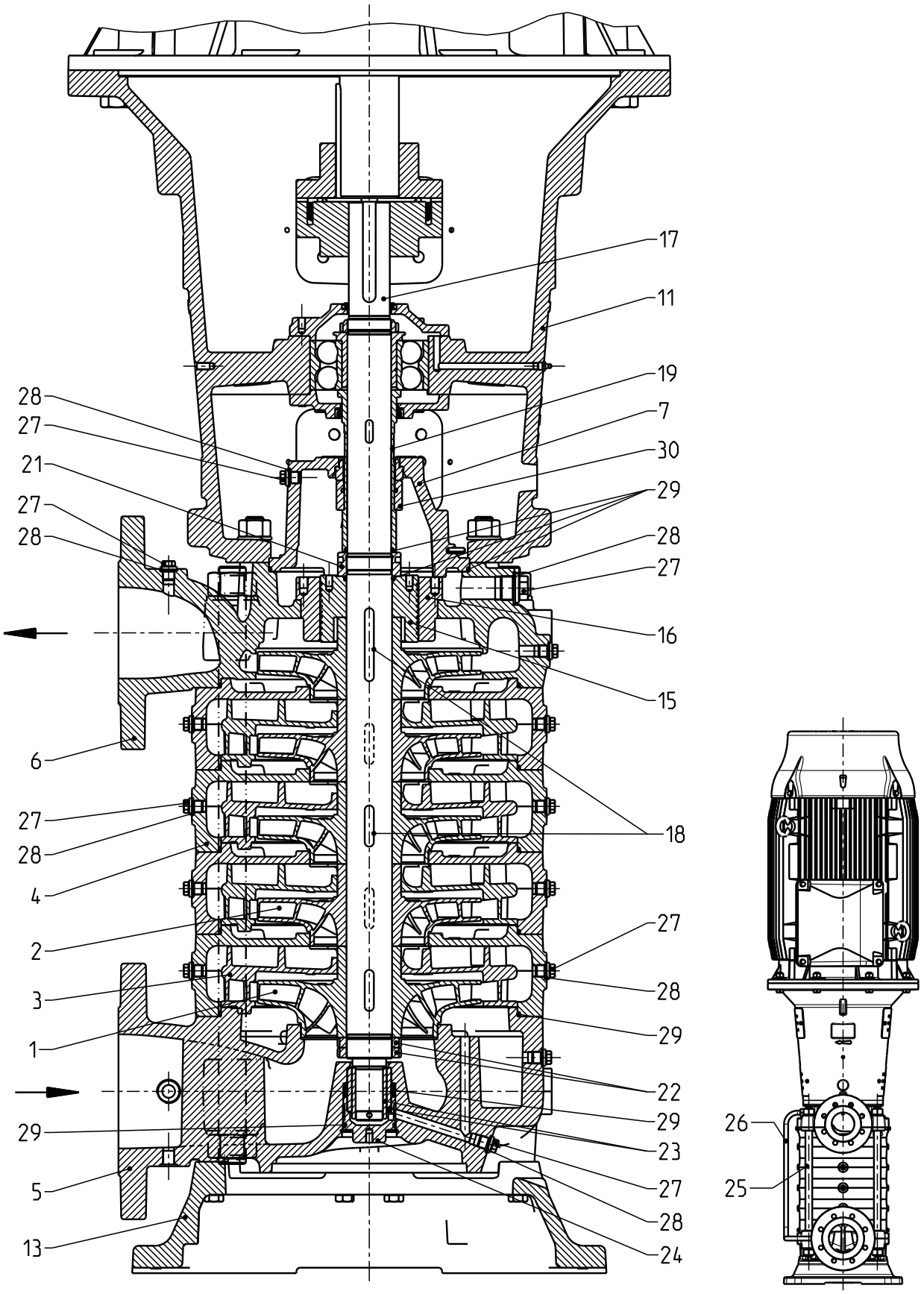


TABLE OF MATERIAL REFERENCE STANDARDS

COMPONENTS	MATERIALS	REFERENCE STANDARDS	
		EUROPE	USA*
JL1020	Cast Iron	EN 1561 - GJL-150	ASTM Class 25
JL1030	Cast Iron	EN 1561 - GJL-200	ASTM Class 30
JL1040	Cast Iron	EN 1561 - GJL-250	ASTM Class 35
JS1030	Ductile Iron	EN 1563 - GJS-400-15	ASTM 65-45-12
1.4408	Austenitic Stainless Steel	EN 10213-4 - GX5CrNiMo19-11-2	ASTM CF8M
1.4517	Duplex Stainless Steel	EN 10213-4 - GX2CrNiMoCuN25-6-3-3	ASTM CD4MCuN
1.4469	Super Duplex Stainless Steel	EN 10213-4 - GX2CrNiMoCuN26-7-4	ASTM CE3MN
1.0038	Carbon Steel	EN 10025 - S235JR	ASTM Grade C, D
1.4057	Stainless Steel	EN 10088-1 - X17CrNiMo16-2	ASTM 431
1.4571	Stainless Steel	EN 10088-1 - X6CrNiMo17-12-2	ASTM 316Ti
1.4539	Austenitic Stainless Steel	EN 10088-1 - X1CrNiMo25-20-5	ASTM 904L
1.4462	Duplex Stainless Steel	EN 10088-1 - X2CrNiMo22-5-3	ASTM F51
1.4410	Super Duplex Stainless Steel	EN 10088-1 - X2CrNiMo25-7-4	ASTM F53
EPDM	Ethylen-Propylen-Dien-Elastomer	-	-
FKM/FMP	Fluoro-Elastomer	-	-
AFM34	Asbestos free synthetic fiber	-	-

* ... Similar Grade

TABLE OF MATERIAL CODE

COMPONENTS	Material Code				
	DNC	NNN	R N N	R R R	TTT
Casing	Ductile Iron	Stainless Steel	Duplex	Duplex	Super Duplex
Impeller	Stainless Steel	Stainless Steel	Stainless Steel	Duplex	Super Duplex
Diffuser	Cast Iron	Stainless Steel	Stainless Steel	Duplex	Super Duplex
Shaft	Stainless Steel	Stainless Steel	Stainless Steel	Duplex	Super Duplex
Shaft Sleeve	Stainless Steel	Stainless Steel	Stainless Steel	Duplex	Super Duplex
Relief Pipe	Stainless Steel	Stainless Steel	Stainless Steel	Austenitic Steel	Austenitic Steel
Plain Bearing	Tungsten Carbide				

TABLE OF MATERIALS DUCTILE IRON VERSION

Ref No.	Part	Size	DNC
1	Suction impeller	50 | 65 | 100 | 125 | 150	Austenitic Stainless Steel ASTM CF8M
2	Impeller (series)	50 | 65 | 100 | 125 | 150	Austenitic Stainless Steel ASTM CF8M
3	Diffuser	50 | 65 | 100 | 125 | 150	Cast iron ASTM Class 25
4	Stage casing	50 | 65 | 100 | 125 | 150	Ductile Iron ASTM 65-45-12
5	Suction casing	50 | 65 | 100 | 125 | 150	Ductile Iron ASTM 65-45-12
6	Discharge casing	50 | 65 | 100 | 125 | 150	Ductile Iron ASTM 65-45-12
7	Seal cover	50 | 65 | 100 | 125 | 150	Ductile Iron ASTM 65-45-12
8	Stuffing box cover	50 | 65 | 100 | 125 | 150	Ductile Iron ASTM 65-45-12
9	Stuffing box gland	50 | 65 | 100 | 125 | 150	Cast iron ASTM Class 35
10	Slide bearing cap	50 | 65 | 100 | 125 | 150	Cast iron ASTM Class 35
11	Bearing bracket / motor adapter	50 | 65 | 100 | 125 | 150	Cast iron ASTM Class 35
12	Pump foot horizontal	50 | 65 | 100	Cast iron ASTM Class 35
12	Pump foot horizontal	125 | 150	Carbon Steel ASTM Grade C, D
13	Pump foot vertical	50 | 65 | 100 | 125 | 150	Cast iron ASTM Class 35
14	Wear ring (optional)	50 | 65 | 100 | 125 | 150	Duplex Stainless Steel ASTM F51
15	Drum	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 431
16	Drum bush	50 | 65 | 100 | 125 | 150	Cast iron ASTM Class 35
17	Shaft	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 431
18	Key	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 316Ti
19	Shaft sleeve	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 431
20	Spacer sleeve	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 431
21	Shaft nut	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 431
22	Impeller nut	50 | 65 | 100 | 125 | 150	Stainless Steel
23	Plain bearing (sleeve & bushing)	50 | 65 | 100 | 125 | 150	Tungsten Carbide (9% Ni-Binder)
24	Plain bearing cover	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 431
25	Tie rod	50 | 65 | 100 | 125 | 150	ETG100
26	Circulation pipe	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 316Ti
27	Plug	50 | 65 | 100 | 125 | 150	Galvanized Steel
28	Gasket	50 | 65 | 100 | 125 | 150	AFM34
29	O-ring	50 | 65 | 100 | 125 | 150	See Mechanical seal section
30	Mechanical seal	50 | 65 | 100 | 125 | 150	See Mechanical seal section
31	Soft packing	50 | 65 | 100 | 125 | 150	Ramie fibre packing with special PTFE-impregnation
32	Nut, washer & screw	50 | 65 | 100 | 125 | 150	Galvanized Steel

TABLE OF MATERIALS ALTERNATIVE OPTIONS

Ref No.	Part	Size	NNN	RNN	RRR	TTT
1	Impeller 1st stage	50 | 65 | 100 | 125 | 150	Austenitic Stainless Steel ASTM CF8M	Austenitic Stainless Steel ASTM CF8M	Duplex Stainless Steel ASTM CD4MCuN	Super Duplex Stainless Steel ASTM CE3MN
2	Impeller (series)	50 | 65 | 100 | 125 | 150	Austenitic Stainless Steel ASTM CF8M	Austenitic Stainless Steel ASTM CF8M	Duplex Stainless Steel ASTM CD4MCuN	Super Duplex Stainless Steel ASTM CE3MN
3	Diffuser	50 | 65 | 100 | 125 | 150	Austenitic Stainless Steel ASTM CF8M	Austenitic Stainless Steel ASTM CF8M	Duplex Stainless Steel ASTM CD4MCuN	Super Duplex Stainless Steel ASTM CE3MN
4	Stage casing	50 | 65 | 100 | 125 | 150	Austenitic Stainless Steel ASTM CF8M	Austenitic Stainless Steel ASTM CF8M	Duplex Stainless Steel ASTM CD4MCuN	Super Duplex Stainless Steel ASTM CE3MN
5	Suction casing	50 | 65 | 100 | 125 | 150	Austenitic Stainless Steel ASTM CF8M	Duplex Stainless Steel ASTM CD4MCuN	Duplex Stainless Steel ASTM CD4MCuN	Super Duplex Stainless Steel ASTM CE3MN
6	Discharge casing	50 | 65 | 100 | 125 | 150	Austenitic Stainless Steel ASTM CF8M	Duplex Stainless Steel ASTM CD4MCuN	Duplex Stainless Steel ASTM CD4MCuN	Super Duplex Stainless Steel ASTM CE3MN
7	Seal cover	50 | 65 | 100 | 125 | 150	Austenitic Stainless Steel ASTM CF8M	Austenitic Stainless Steel ASTM CF8M	Duplex Stainless Steel ASTM CD4MCuN	Super Duplex Stainless Steel ASTM CE3MN
8	Stuffing box cover	50 | 65 | 100 | 125 | 150	Austenitic Stainless Steel ASTM CF8M	Austenitic Stainless Steel ASTM CF8M	N/A	N/A
9	Stuffing box gland	50 | 65	Austenitic Stainless Steel ASTM CF8M	Austenitic Stainless Steel ASTM CF8M	N/A	N/A
9	Stuffing box gland	100 | 125 | 150	Stainless Steel ASTM 316Ti	Stainless Steel ASTM 316Ti	N/A	N/A
10	Slide bearing cap	50 | 65 | 100 | 125 | 150	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Super Duplex Stainless Steel ASTM F53
11	Bearing bracket / motor adapter	50 | 65 | 100 | 125 | 150	Cast iron ASTM Class 35	Cast iron ASTM Class 35	Cast iron ASTM Class 35	Cast iron ASTM Class 35
12	Pump foot horizontal	50 | 65 | 100	Cast iron ASTM Class 35	Cast iron ASTM Class 35	Cast iron ASTM Class 35	Cast iron ASTM Class 35
12	Pump foot horizontal	125 | 150	Carbon Steel ASTM Grade C, D	Carbon Steel ASTM Grade C, D	Carbon Steel ASTM Grade C, D	Carbon Steel ASTM Grade C, D
13	Pump foot vertical	50 | 65 | 100 | 125 | 150	Cast iron ASTM Class 35	Cast iron ASTM Class 35	Cast iron ASTM Class 35	Cast iron ASTM Class 35
14	Wear ring (optional)	50 | 65 | 100 | 125 | 150	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Super Duplex Stainless Steel ASTM F53
15	Balance drum	50 | 65 | 100 | 125 | 150	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Super Duplex Stainless Steel ASTM F53
16	Drum bush	50 | 65 | 100 | 125 | 150	Austenitic Stainless steel 316L	Austenitic Stainless steel 316L	Duplex Stainless Steel ASTM F51	Super Duplex Stainless Steel ASTM F53
17	Shaft	50 | 65 | 100 | 125 | 150	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Super Duplex Stainless Steel ASTM F53

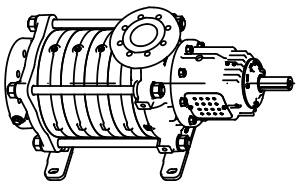
TABLE OF MATERIALS ALTERNATIVE OPTIONS *continued*

Ref No.	Part	Size	NNN	RNN	RRR	TTT
18	Key	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 316Ti	Stainless Steel ASTM 316Ti	Duplex Stainless Steel ASTM F51	Super Duplex Stainless Steel ASTM F53
19	Shaft sleeve	50 | 65 | 100 | 125 | 150	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Super Duplex Stainless Steel ASTM F53
20	Spacer sleeve	50 | 65 | 100 | 125 | 150	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Super Duplex Stainless Steel ASTM F53
21	Shaft nut	50 | 65 | 100 | 125 | 150	Super Duplex Stainless Steel ASTM F53	Super Duplex Stainless Steel ASTM F53	Super Duplex Stainless Steel ASTM F53	Super Duplex Stainless Steel ASTM F53
22	Impeller nut	50 | 65 | 100 | 125 | 150	Stainless Steel	Stainless Steel	Super Duplex Stainless Steel ASTM F53	Super Duplex Stainless Steel ASTM F53
23	Plain bearing (sleeve & bushing)	50 | 65 | 100 | 125 | 150	Tungsten Carbide (9% Ni-Binder)	Tungsten Carbide (9% Ni-Binder)	Tungsten Carbide (9% Ni-Binder)	Tungsten Carbide (9% Ni-Binder)
24	Plain bearing cover	50 | 65 | 100 | 125 | 150	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Duplex Stainless Steel ASTM F51	Super Duplex Stainless Steel ASTM F53
25	Tie rod	50 | 65 | 100 | 125 | 150	ETG100	ETG100	ETG100	ETG100
26	Balance line	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 316Ti	Stainless Steel ASTM 316Ti	Austenitic Stainless Steel ASTM 904L	Austenitic Stainless Steel ASTM 904L
27	Plug	50 | 65 | 100 | 125 | 150	Stainless Steel ASTM 316Ti	Stainless Steel ASTM 316Ti	Duplex Stainless Steel ASTM F51	Super Duplex Stainless Steel ASTM F53
28	Gasket	50 | 65 | 100 | 125 | 150	Asbestos free synthetic fiber	Asbestos free synthetic fiber	Asbestos free synthetic fiber	Asbestos free synthetic fiber
29	O-ring	50 | 65 | 100 | 125 | 150	See Mechanical seal section	See Mechanical seal section	See Mechanical seal section	See Mechanical seal section
30	Mechanical seal	50 | 65 | 100 | 125 | 150	See Mechanical seal section	See Mechanical seal section	See Mechanical seal section	See Mechanical seal section
31	Soft packing	50 | 65 | 100 | 125 | 150	Ramie fibre packing with special PTFE-impregnation	Ramie fibre packing with special PTFE-impregnation	N/A	N/A
32	Nut, washer & screw	50 | 65 | 100 | 125 | 150	Galvanized Steel	Galvanized Steel	Galvanized Steel	Galvanized Steel

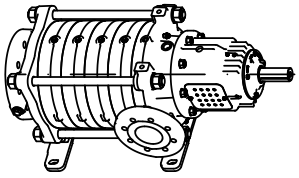
MPA, MPD AND MPR SERIES NOZZLE POSITION

for MPA:

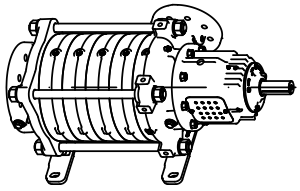
Code: AO



Code: AL

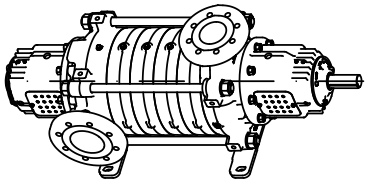


Code: AR

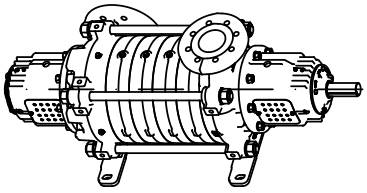


for MPD and MPR:

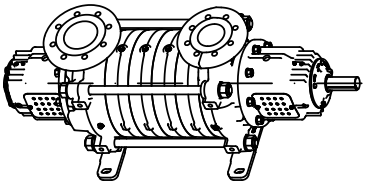
Code: LO



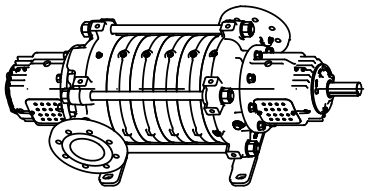
Code: RO



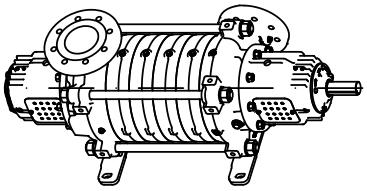
Code: OO



Code: LR



Code: OR



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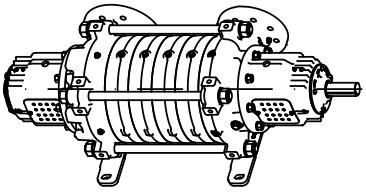
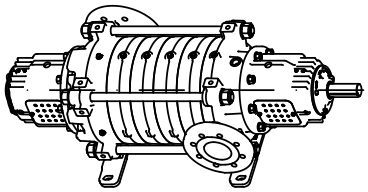
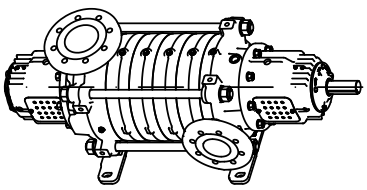


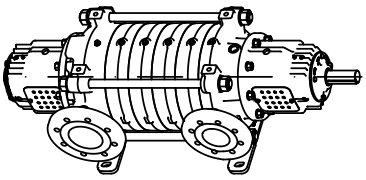
Code: RL



Code: OL



Code: LL

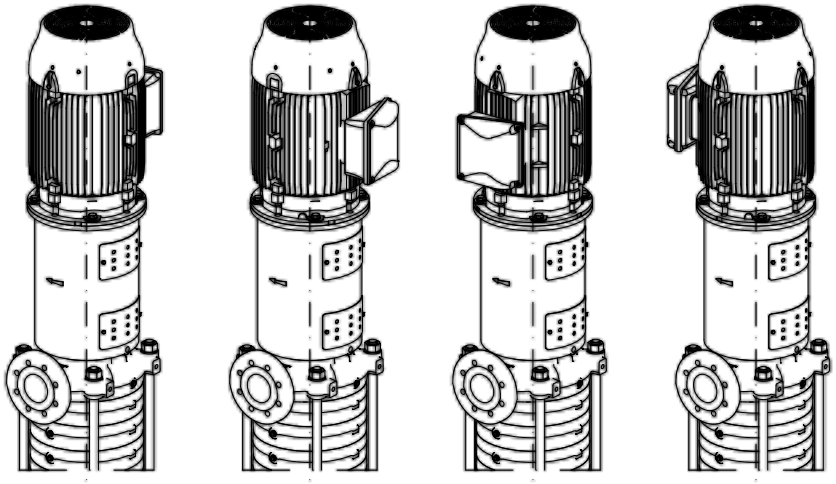


Note: Nozzle position LL, OO, RR is not possible for pumps with 1 and 2 stages

MPV SERIES NOZZLE POSITION

terminal box position

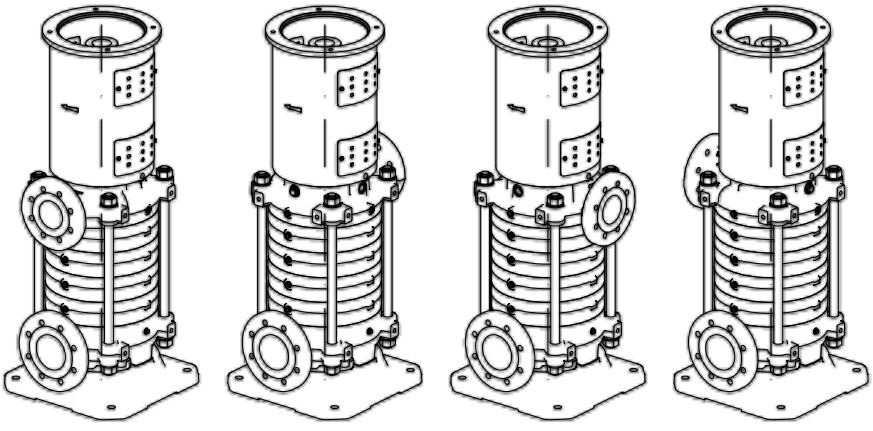
code-K1 code-K2 code-K3 code-K4



standard

nozzle position

code-OO code-OG code-OL code-OR



design OG: standard for 1 and 2 stages (OO not possible)
design OO: standard for 3 or more stages

MECHANICAL SEALS

(Mechanical seal with mounting dimensions according to EN 12756 and ISO 3069 WITH L_{1K})

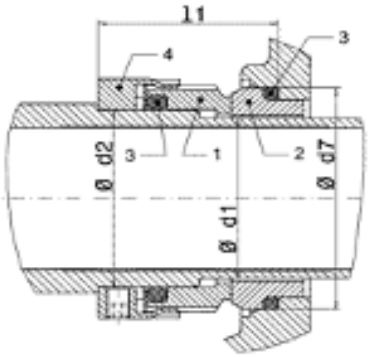
Standard for size 150*

Standard for sizes 50*" to 150"

Balanced mechanical seal "B"

Suction side: MPD

Discharge side: MPA / MPR / MPD /MPV



BQ1EGG-WA

AQ1EGG

LIST OF MATERIALS

POSITION 1 - 2	POSITION 3	POSITION 4
B : Resin impregnated carbon	**E** : EPDM	**G** : AISI 316
A : Antimony impregnated carbon	**V** : FKM (FPM)	
Q_1 : Silicon carbide		
U_3 : Tungsten carbide		

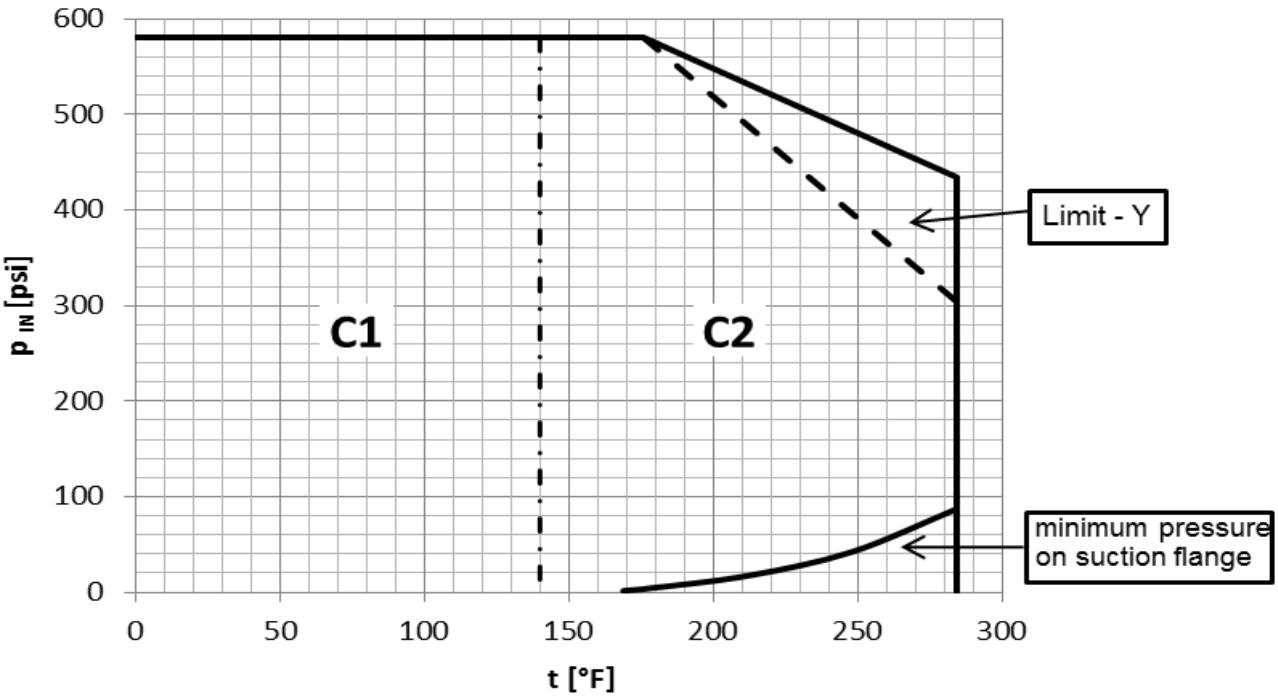
TYPE OF SEAL

TYPE	POSITION			
	1	2	3	4
	ROTATING FACE	STATIONARY FACE	ELASTOMERS	SPRINGS
B Q1 E G G - WA	B	Q1	E	G
U3 A E G G	U3	A	E	G
Q1 Q1 E G G	Q1	Q1	E	G
Q1 Q1 V G G	Q1	Q1	V	G
A Q1 E G G	A	Q1	E	G

TABLE OF DIMENSIONS

PUMP SIZE	DIMENSIONS [inch]			
	Ø d1	Ø d2	Ø d7	l1 (=l_{1k})
50	1.50	1.69	2.20	1.77
65	1.69	1.89	2.40	1.77
100	2.17	2.36	2.95	1.87
125	2.56	2.76	3.35	2.07
150	2.95	3.15	3.82	2.36

MECHANICAL SEAL SELECTION DIAGRAM



P_{IN}....Pump inlet pressure at suction flange [psi]

AREA	DESCRIPTION	TYPE OF MECHANICAL SEAL
C1	Up to 580 psi inlet pressure at maximum 140°F Standard mechanical seal: Carbon/SiC/EPDM with drinking water approval	B Q1 E G G-WA (BALANCED)
C2	Up to 580 psi inlet pressure at maximum 176°F (up to 435 psi inlet pressure at maximum 284°F). Standard mechanical seal: Carbon/SiC/EPDM	A Q1 E G G (BALANCED)

*) … only for size 50 to 125

LIMIT CURVES
DEPENDING ON PUMP HYDRAULICS AND MOTOR SPEED

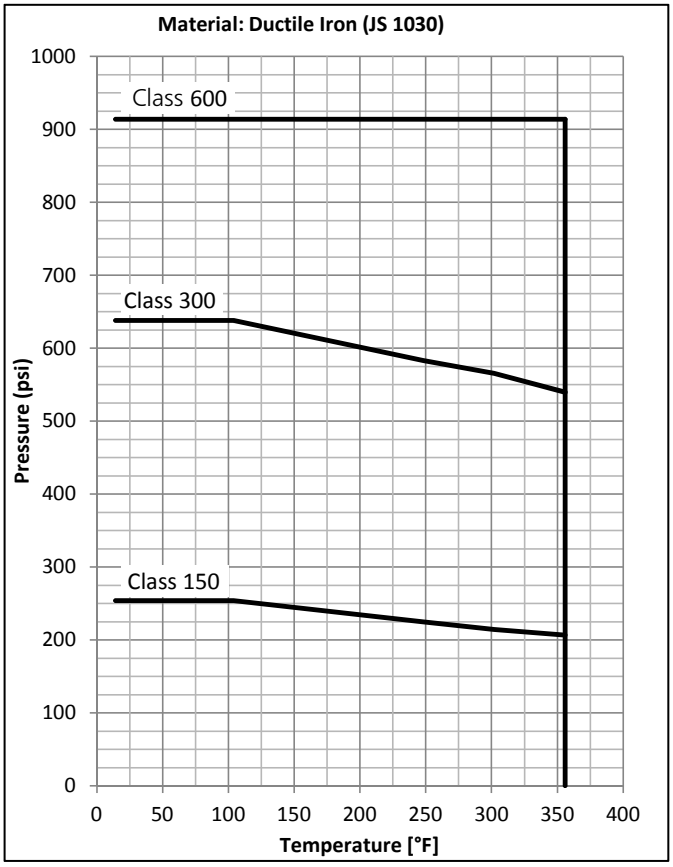
Pump size	Speed (rpm)			
	3550	2900	1750	1450
50	X	X	X	X
65	X	X	X	X
100	Y	X	X	X
125	Y	Y	X	X
150	n/a	Y	X	X

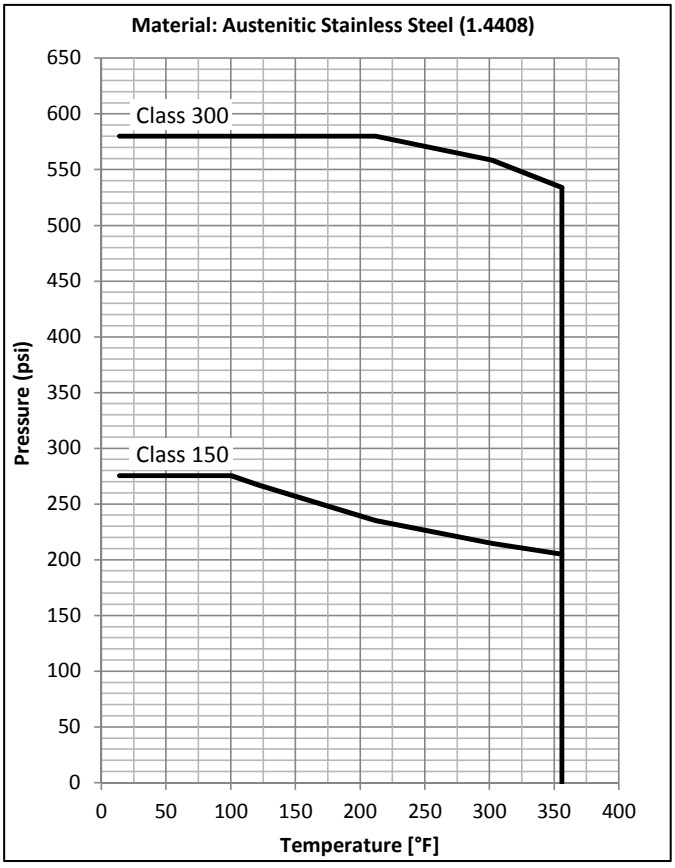
NOTE. Limit - Z … Limit for material combination SiC/SiC/EPDM (Q1 Q1 E G G) or SiC/SiC/FKM (FPM) (Q1 Q1 V G G)

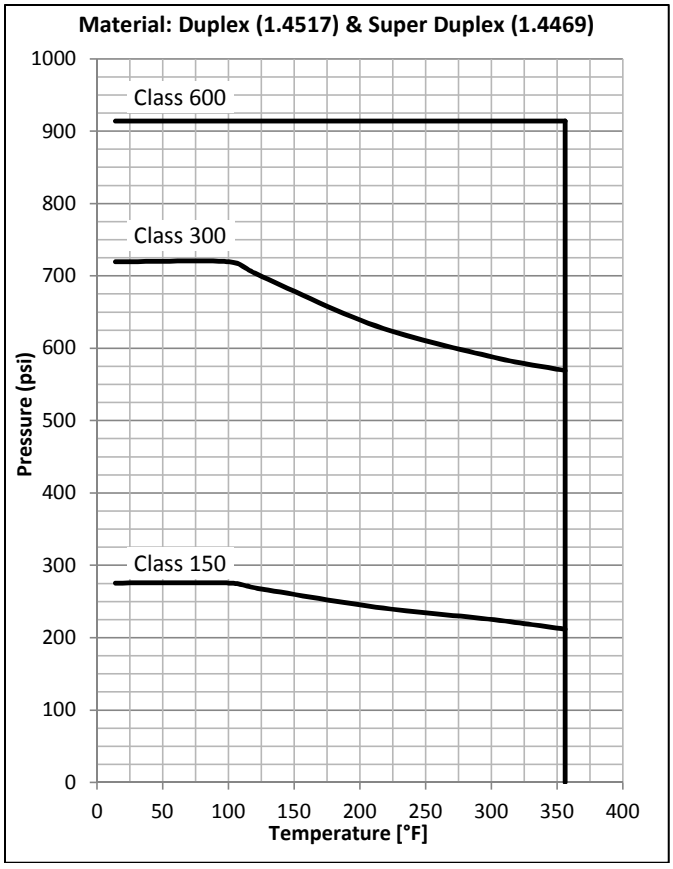
GENERAL CONSIDERATIONS

- This diagram and selection table is valid for clean water (solids < 0.0013 oz/US gallon) or water for feeding boilers, partially or totally demineralized.
- If the water temperature exceeds 176 °F, minimum inlet pressure must be guaranteed.

PRESSURE / TEMPERATURE CHARTS FOR PUMP FLANGES ACCORDING TO ANSI B16.5 AND CASING MATERIAL







SOLIDS HANDLING

Due to the clearances and the tight tolerances characteristic to the e-MP pumps it is recommended to flush the system for a minimum of 24 hours using a start-up strainer installed upstream of the pump's suction. After the system is flushed, the start-up strainer can be replaced by a permanent strainer with a coarser (40-60) mesh and an open area of a minimum 300% of the nominal pipe diameter. Remove and clean the strainer as needed.

Pump Size	**50A**	**50B**	**65A**	**65B**	**100A**	**100B**	**125A**	**125B**	**150A**	**150B**
Maximum free passage (inch)	0.177	0.236		0.295	0.315	0.433	0.472	0.551		0.708
Recommended start-up filter	60 mesh						40 mesh			

Maximum Sand Content (oz/US gallon)				
Pump Configuration	**e-MPA, e-MPR, e-MPV**		**e-MPD**	
Speed	**2-pole**	**4-pole**	**2-pole**	**4-pole**
DNC*	0.013		0.013	0.020
NNN/RNN**			0.016	
RRR/TTT**			0.020	0.033

1) * Duplex wear rings recommended ** Wear rings are standard for these configurations
2) Cartridge seals in SiC-SiC recommended for all configurations

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 indicated with a tolerance of 3 dB (A).

NOISE LEVEL OF PUMP WITHOUT MOTOR

SOUND PRESSURE LEVEL LpA [dB(A)]		
POWER [HP]	3550	1750
3	57.4	56.5
5	60.2	59.3
7.5	61.7	60.8
10	63.2	62.3
15	65.0	64.1
20	66.5	65.6
25	67.5	66.6
30	68.3	67.4
40	69.8	68.9
50	70.8	69.9
60	71.7	70.8
75	72.6	71.7
100	74.1	73.2
125	75.0	74.1
150	75.9	75.0
200	77.6	76.7
250	78.7	77.8
300	79.8	78.8
35	80.9	79.9
400	81.4	80.5
500	82.0	81.1
600	82.6	
700	83.1	
800	83.6	

MINIMUM FLOW

For a given service, the minimum flow used for selection should be the greater between pump's **minimum continuous stable flow** and its **minimum continuous thermal flow**.

Minimum continuous stable flow: lowest rate of flow at which the pump operates without a significant compromise to its mechanical integrity. For the e-MP pumps this is indicated by the minimum flow of the continuous line that defines the pump performance. This will be the minimum flow required unless the minimum continuous thermal flow exceeds this value.

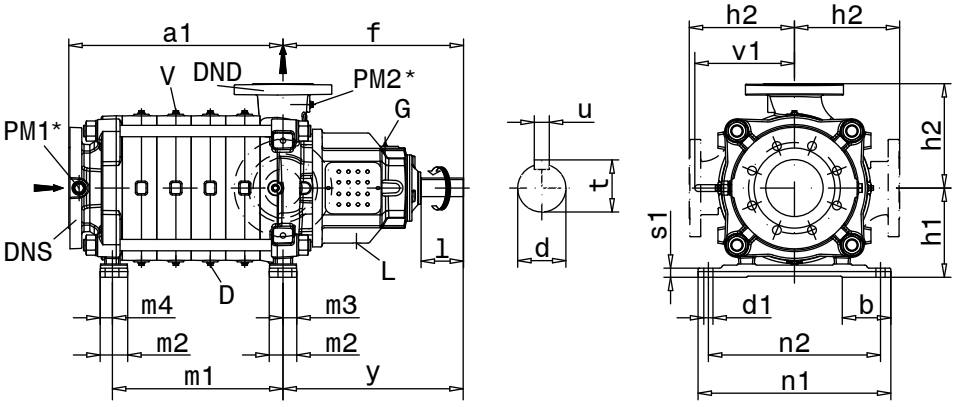
Minimum continuous thermal flow: lowest rate of flow at which the pump can operate without being affected by the temperature rise of the pumped liquid. For high temperature applications and small margins between NPSHa and the indicated NPSHr, the minimum continuous thermal flow could be higher than the minimum continuous stable flow indicated by the performance curves or datasheet. Contact the factory for detailed information.

Flow min. / max.
If no other data is given in the performance curves or data sheet, the following is valid:

Qmin = 30% x QBEP for continuous operation
Qmax = 120% x QBEP for continuous operation *
QBEP = Flow in best efficiency point

* on condition that NPSHA > [NPSHR + 1.6 ft. (0,5 m)]

MPA SERIES - DIMENSIONS AND WEIGHTS AT 60 Hz



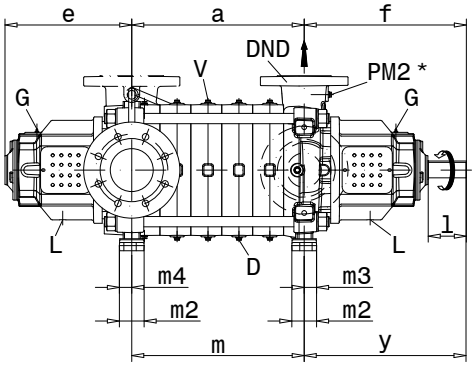
Position	Connection	Size
PM1	Vacuum Gauge	G¼
PM2	Pressure Gauge	G¼
D	Drain	G¼
G	Grease Nipple	M8
L	Leakage	G½
V	Vent	G¼

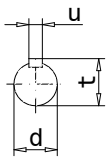
Pump Type MPA Size	DIMENSIONS (inch)																		
	Pump Dimensions						Feet Dimensions									Shaft End			
	DNS	DND	f	h1	h2	v1	y	m2	m3	m4	n1	n2	b	d1	s1	d	t	u	l
50	4	2	13.8	5.9	7.9	7.9	13.8	2.1	0.9	1.1	13.1	11.4	3.5	0.6	0.8	1.1	1.2	0.3	2.8
65	5	3	15.5	7.5	8.9	8.9	15.5	2.4	1.2	1.2	16.1	14.4	3.9	0.7	0.8	1.4	1.5	0.4	3.1
100	6	4	18.6	9.3	10.8	10.8	18.6	2.8	1.4	1.4	19.8	17.7	4.9	0.9	0.9	1.8	1.9	0.6	4.3
125	8	5	19.2	11.8	12.8	12.8	19.2	3.5	1.8	1.8	24.0	22.0	8.2	1.0	2.0	2.0	2.2	0.6	4.3

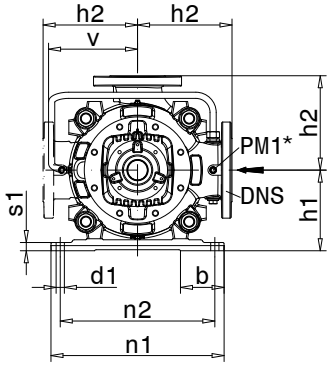
Size	Number of stages	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
50	a1 (inch)	7.87	10.31	12.76	15.20	17.64	20.08	22.52	24.96	27.40	29.84	32.28	34.72	37.17	39.61	42.05
	m1 (inch)	4.57	7.01	9.45	11.89	14.33	16.77	19.21	21.65	24.09	26.54	28.98	31.42	33.86	36.30	38.74
	G (lb)	196	223	249	276	302	328	355	381	408	434	461	487	514	540	567
65	a1 (inch)	9.76	12.83	15.91	18.98	22.05	25.12	28.19	31.26	34.33	37.40	40.47	43.54	46.61	49.69	-
	m1 (inch)	5.71	8.78	11.85	14.92	17.99	21.06	24.13	27.20	30.28	33.35	36.42	39.49	42.56	45.63	-
	G (lb)	311	364	417	470	522	575	628	681	734	787	840	893	946	999	-
100	a1 (inch)	11.42	14.96	18.50	22.05	25.59	29.13	32.68	36.22	39.76	43.31	-	-	-	-	-
	m1 (inch)	6.93	10.47	14.02	17.56	21.10	24.65	28.19	31.73	35.28	38.82	-	-	-	-	-
	G (lb)	534	617	701	785	869	952	1036	1120	1204	1288	-	-	-	-	-
125	a1 (inch)	15.28	19.69	24.09	28.50	32.91	37.32	41.73	-	-	-	-	-	-	-	-
	m1 (inch)	8.62	13.03	17.44	21.85	26.26	30.67	35.08	-	-	-	-	-	-	-	-
	G (lb)	948	1096	1243	1391	1539	1687	1834	-	-	-	-	-	-	-	-

* Adaptors for US dimensions outlets are available upon request.

MPD SERIES - DIMENSIONS AND WEIGHTS AT 60 Hz







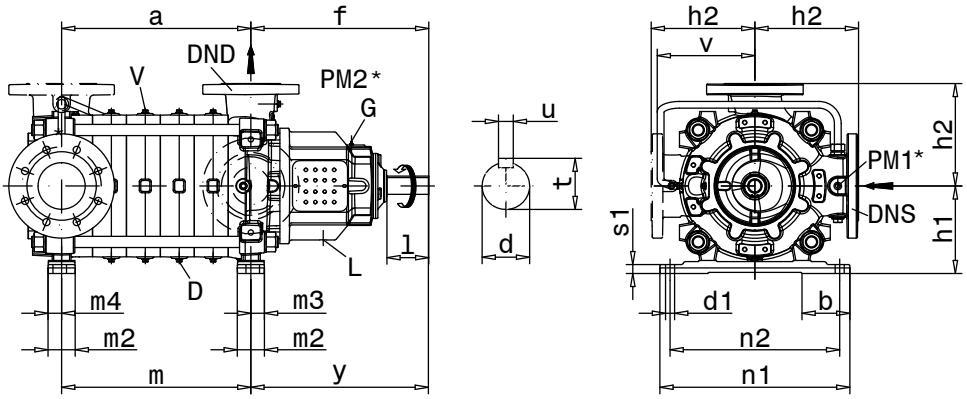
Position	Connection	Size
PM1	Vacuum Gauge	G¼
PM2	Pressure Gauge	G¼
D	Drain	G¼
G	Grease Nipple	M8
L	Leakage	G½
V	Vent	G¼

Pump Type MPD Size	DIMENSIONS (inch)																			
	Pump Dimensions							Feet Dimensions									Shaft End			
	DNS	DND	e	f	h1	h2	v	y	m2	m3	m4	n1	n2	b	d1	s1	d	t	u	l
50	3	2	11.1	13.8	5.9	7.9	7.9	13.8	2.1	0.9	1.1	13.1	11.4	3.5	0.6	0.8	1.1	1.2	0.3	2.8
65	4	3	12.6	15.5	7.5	8.9	8.9	15.5	2.4	1.2	1.2	16.1	14.4	3.9	0.7	0.8	1.4	1.5	0.4	3.1
100	5	4	14.5	18.6	9.3	10.8	10.8	18.6	2.8	1.4	1.4	19.8	17.7	4.9	0.9	0.9	1.8	1.9	0.6	4.3
125	6	5	15.4	19.2	11.8	12.8	12.8	19.2	3.5	1.8	1.8	24.0	22.0	8.2	1.0	2.0	2.0	2.2	0.6	4.3

Size	Number of stages	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
50	a1 (inch)	5.87	8.31	10.75	13.19	15.63	18.07	20.51	22.95	25.39	27.83	30.28	32.72	35.16	37.60	40.04
	m1 (inch)	5.87	8.31	10.75	13.19	15.63	18.07	20.51	22.95	25.39	27.83	30.28	32.72	35.16	37.60	40.04
	G (lb)	256	282	309	335	362	388	414	441	467	494	520	547	573	600	626
65	a1 (inch)	7.40	10.47	13.54	16.61	19.69	22.76	25.83	28.90	31.97	35.04	38.11	41.18	44.25	47.32	-
	m1 (inch)	7.40	10.47	13.54	16.61	19.69	22.76	25.83	28.90	31.97	35.04	38.11	41.18	44.25	47.32	-
	G (lb)	395	448	500	553	606	659	712	765	818	871	924	977	1030	1082	-
100	a1 (inch)	9.13	12.68	16.22	19.76	23.31	26.85	30.39	33.94	37.48	41.02	-	-	-	-	-
	m1 (inch)	9.13	12.68	16.22	19.76	23.31	26.85	30.39	33.94	37.48	41.02	-	-	-	-	-
	G (lb)	677	761	844	928	1012	1096	1179	1263	1347	1431	-	-	-	-	-
125	a1 (inch)	11.22	15.63	20.04	24.45	28.86	33.27	37.68	-	-	-	-	-	-	-	-
	m1 (inch)	11.22	15.63	20.04	24.45	28.86	33.27	37.68	-	-	-	-	-	-	-	-
	G (lb)	1131	1279	1426	1574	1722	1870	2017	-	-	-	-	-	-	-	-

* Adaptors for US dimensions outlets are available upon request.

MPR SERIES - DIMENSIONS AND WEIGHTS AT 60 Hz



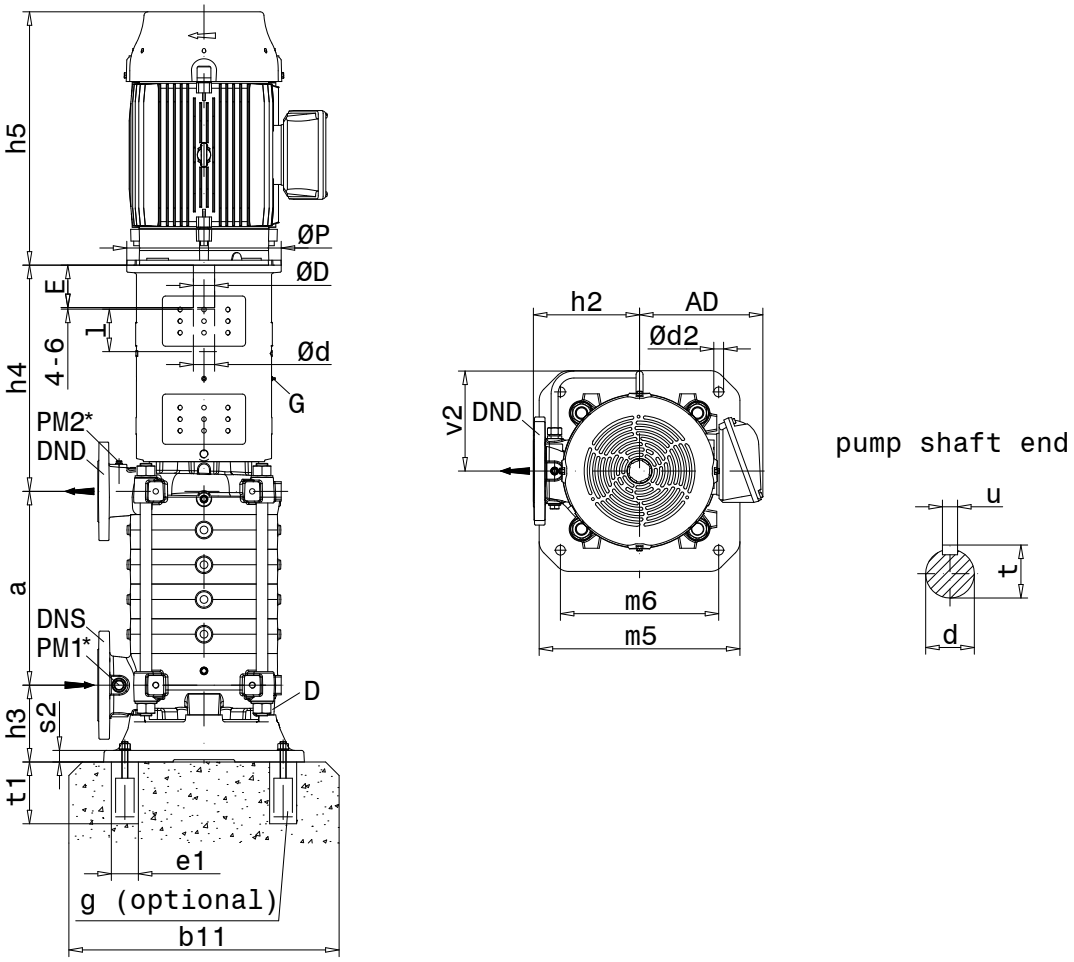
Position	Connection	Size
PM1	Vacuum Gauge	G¼
PM2	Pressure Gauge	G¼
D	Drain	G¼
G	Grease Nipple	M8
L	Leakage	G½
V	Vent	G¼

Pump Type MPR Size	DIMENSIONS (inch)																		
	Pump Dimensions						Feet Dimensions									Shaft End			
	DNS	DND	f	h1	h2	v	y	m2	m3	m4	n1	n2	b	d1	s1	d	t	u	l
50	3	2	13.8	5.9	7.9	7.9	13.8	2.1	0.9	1.1	13.1	11.4	3.5	0.6	0.8	1.1	1.2	0.3	2.8
65	4	3	15.5	7.5	8.9	8.9	15.5	2.4	1.2	1.2	16.1	14.4	3.9	0.7	0.8	1.4	1.5	0.4	3.1
100	5	4	18.6	9.3	10.8	10.8	18.6	2.8	1.4	1.4	19.8	17.7	4.9	0.9	0.9	1.8	1.9	0.6	4.3
125	6	5	19.2	11.8	12.8	12.8	19.2	3.5	1.8	1.8	24.0	22.0	8.2	1.0	2.0	2.0	2.2	0.6	4.3

Size	Number of stages	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
50	a1 (inch)	5.87	8.31	10.75	13.19	15.63	18.07	20.51	22.95	25.39	27.83	30.28	32.72	35.16	37.60	40.04
	m1 (inch)	5.87	8.31	10.75	13.19	15.63	18.07	20.51	22.95	25.39	27.83	30.28	32.72	35.16	37.60	40.04
	G (lb)	212	238	265	291	317	344	370	397	423	450	476	503	529	556	582
65	a1 (inch)	7.40	10.47	13.54	16.61	19.69	22.76	25.83	28.90	31.97	35.04	38.11	41.18	44.25	47.32	-
	m1 (inch)	7.40	10.47	13.54	16.61	19.69	22.76	25.83	28.90	31.97	35.04	38.11	41.18	44.25	47.32	-
	G (lb)	328	381	434	487	540	593	646	699	752	805	858	911	963	1016	-
100	a1 (inch)	9.13	12.68	16.22	19.76	23.31	26.85	30.39	33.94	37.48	41.02	-	-	-	-	-
	m1 (inch)	9.13	12.68	16.22	19.76	23.31	26.85	30.39	33.94	37.48	41.02	-	-	-	-	-
	G (lb)	582	666	750	833	917	1001	1085	1168	1252	1336	-	-	-	-	-
125	a1 (inch)	11.22	15.63	20.04	24.45	28.86	33.27	37.68	-	-	-	-	-	-	-	-
	m1 (inch)	11.22	15.63	20.04	24.45	28.86	33.27	37.68	-	-	-	-	-	-	-	-
	G (lb)	992	1140	1287	1435	1583	1731	1878	-	-	-	-	-	-	-	-

* Adaptors for US dimensions outlets are available upon request.

MPV SERIES - DIMENSIONS AND WEIGHTS AT 60 Hz



Pump Type MPV Size	DIMENSIONS (inch)																
	Pump Dimensions													Base Dimensions			
	DNS	DND	h2	h3	d2	m5	m6	s2	v2	d	t	u	l	b11	e1	t1	g
50	3	2	7.9	5.4	0.8	14.8	11.0	0.9	7.9	1.1	1.2	0.3	2.8	22.8	3.1	11.8	
65	4	3	8.9	6.5	0.8	17.3	13.4	1.1	8.9	1.4	1.5	0.4	3.1	25.2	3.1	11.8	
100	5	4	10.8	7.8	1.0	20.5	16.1	1.2	10.8	1.8	1.9	0.6	4.3	28.3	3.5	11.8	
125	6	5	12.8	8.9	1.2	24.4	18.9	1.3	12.8	2.0	2.2	0.6	4.3	32.3	3.9	15.7	

Size	Number of stages	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
50	a(inch)	5.87	8.31	10.75	13.19	15.63	18.07	20.51	22.95	25.39	27.83	30.28	32.72	35.16	37.60	40.04
	G1(lb)	223	249	276	302	328	355	381	408	434	461	487	514	540	567	593
65	a(inch)	7.40	10.47	13.54	16.61	19.69	22.76	25.83	28.90	31.97	35.04	38.11	41.18	44.25	47.32	-
	G1(lb)	346	399	452	505	558	611	664	717	769	822	875	928	981	1034	-
100	a(inch)	9.13	12.68	16.22	19.76	23.31	26.85	30.39	33.94	37.48	41.02	-	-	-	-	-
	G1(lb)	604	688	772	855	939	1023	1107	1190	1274	1358	-	-	-	-	-
125	a(inch)	11.22	15.63	20.04	24.45	28.86	33.27	37.68	-	-	-	-	-	-	-	-
	G1(lb)	1005	1153	1301	1448	1596	1744	1892	-	-	-	-	-	-	-	-

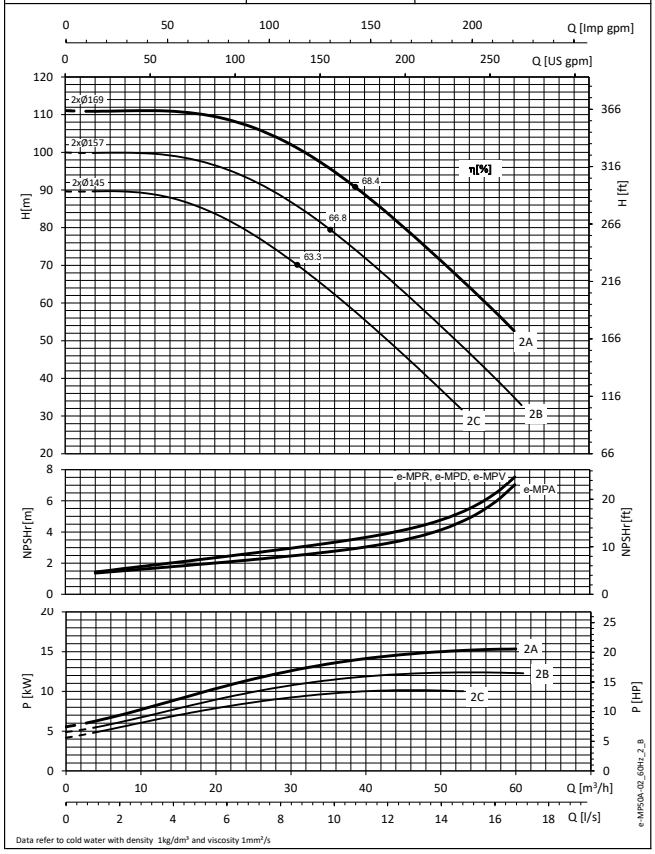
* Adaptors for US dimensions outlets are available upon request.

DERATING eMP

			De-Rating Factor			
Pump Size	**Hydraulic**	**Material Combination**	**Head**	**Efficiency**	**Power**	**NPSH**
50	A	DNC	1	1.01	0.9901	1
		NNN	0.93	0.94	0.9894	1
		RNN	0.93	0.94	0.9894	1
		RRR	0.93	0.93	1	1
		TTT	0.93	0.93	1	1
	B	DNC	0.99	1	0.99	1
		NNN	0.94	0.94	1	1
		RNN	0.94	0.94	1	1
		RRR	0.94	0.93	1.0108	1
		TTT	0.94	0.93	1.0108	1
65	A	DNC	0.93	0.98	0.949	1
		NNN	0.92	0.95	0.9684	1
		RNN	0.92	0.95	0.9684	1
		RRR	0.92	0.96	0.9583	1
		TTT	0.92	0.96	0.9583	1
	B	DNC	0.97	0.98	0.9898	1
		NNN	0.94	0.95	0.9895	1
		RNN	0.94	0.95	0.9895	1
		RRR	0.94	0.94	1	1
		TTT	0.94	0.94	1	1
100	A	DNC	1.01	1.01	1	1
		NNN	0.97	0.96	1.0104	1
		RNN	0.97	0.96	1.0104	1
		RRR	0.97	0.95	1.0211	1
		TTT	0.97	0.95	1.0211	1
	B	DNC	1.03	1	1.03	1
		NNN	0.98	0.96	1.0208	1
		RNN	0.98	0.96	1.0208	1
		RRR	0.98	0.95	1.0316	1
		TTT	0.98	0.95	1.0316	1
125	A	DNC	1	1	1	1
		NNN	0.99	0.98	1.0102	1
		RNN	0.99	0.98	1.0102	1
		RRR	0.96	0.95	1.0105	1
		TTT	0.96	0.95	1.0105	1
	B	DNC	1	1	1	1
		NNN	0.99	0.98	1.0102	1
		RNN	0.99	0.98	1.0102	1
		RRR	0.96	0.95	1.0105	1
		TTT	0.96	0.95	1.0105	1
150	A	DNC	1	1	1	1
		RNN	0.99	0.98	1.0102	1
		RRR	0.96	0.95	1.0105	1
		TTT	0.96	0.95	1.0105	1
	B	DNC	1	1	1	1
		RNN	0.99	0.98	1.0102	1
		RRR	0.96	0.95	1.0105	1
		TTT	0.96	0.95	1.0105	1

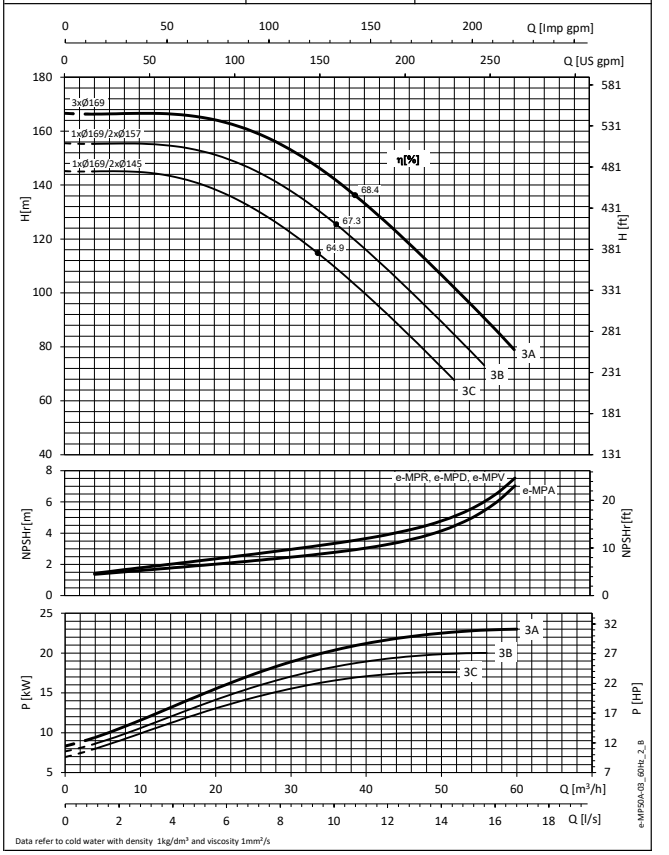
e-MP50A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES

e-MP50A/02 | ~ 3550 [rpm] | ISO 9906:2012 - Grade 2B



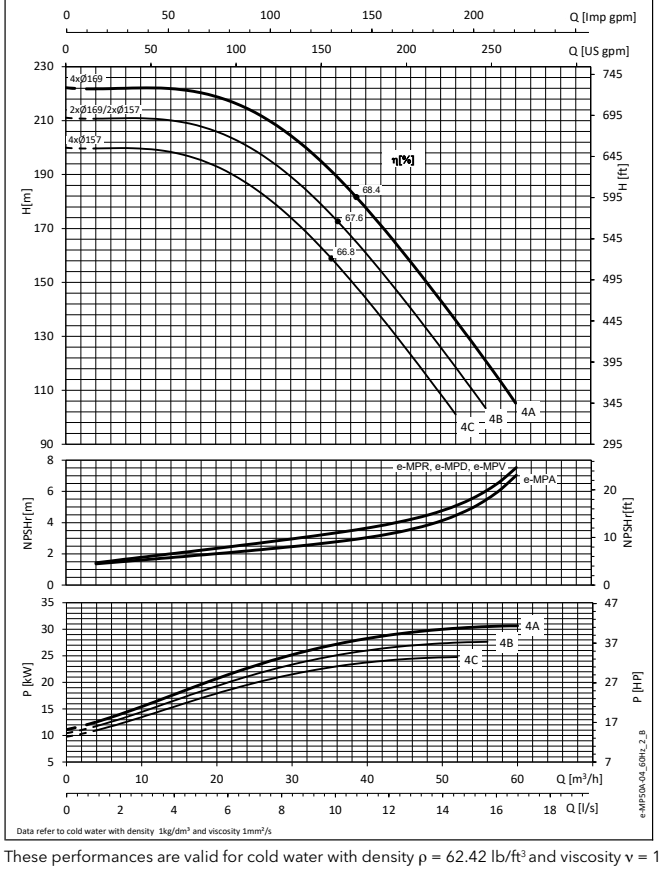
Data refer to cold water with density 1kg/dm³ and viscosity 1mm²/s

e-MP50A/03 | ~ 3550 [rpm] | ISO 9906:2012 - Grade 2B



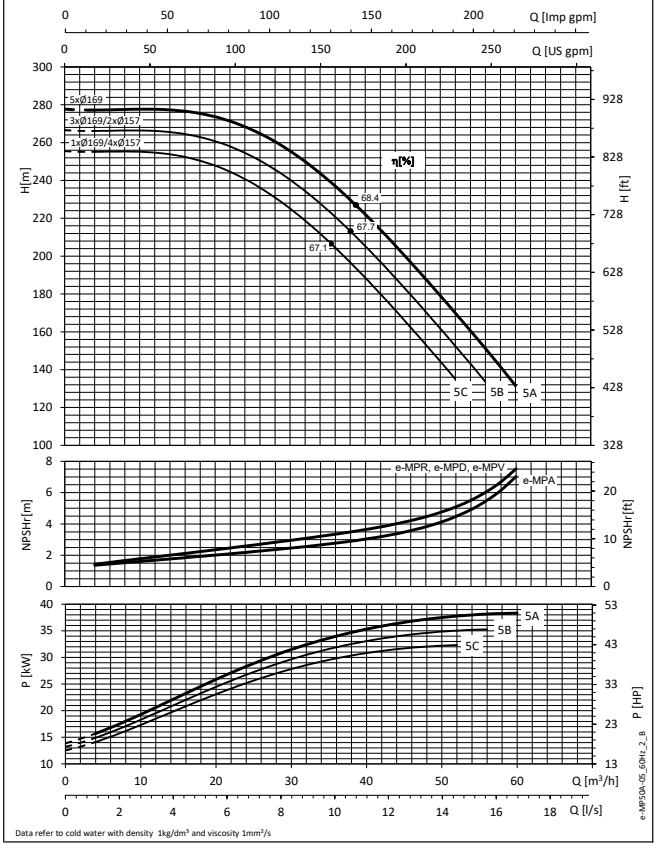
Data refer to cold water with density 1kg/dm³ and viscosity 1mm²/s

e-MP50A/04 | ~ 3550 [rpm] | ISO 9906:2012 - Grade 2B



Data refer to cold water with density 1kg/dm³ and viscosity 1mm²/s

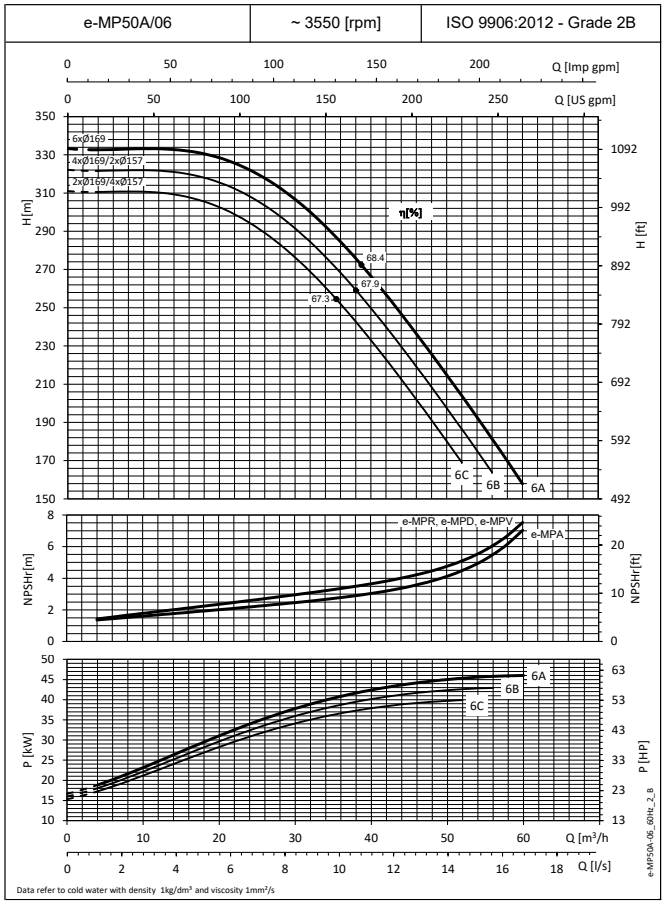
e-MP50A/05 | ~ 3550 [rpm] | ISO 9906:2012 - Grade 2B

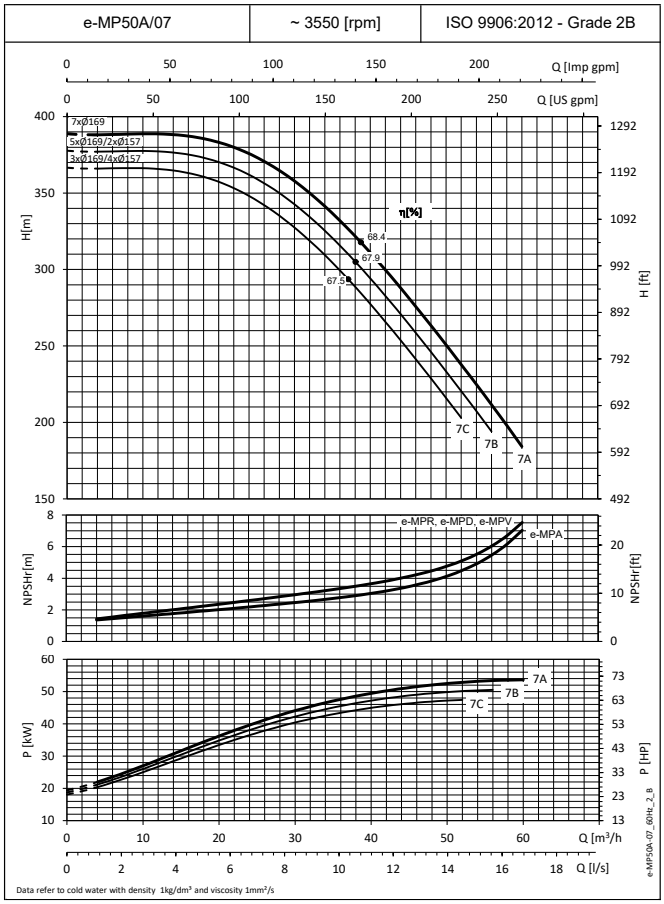


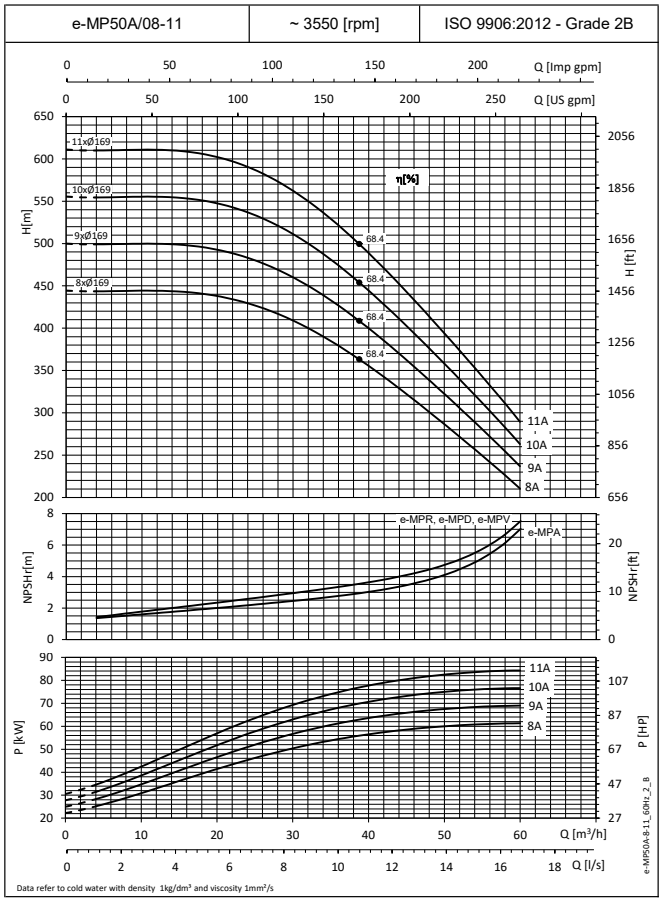
Data refer to cold water with density 1kg/dm³ and viscosity 1mm²/s

These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP50A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES

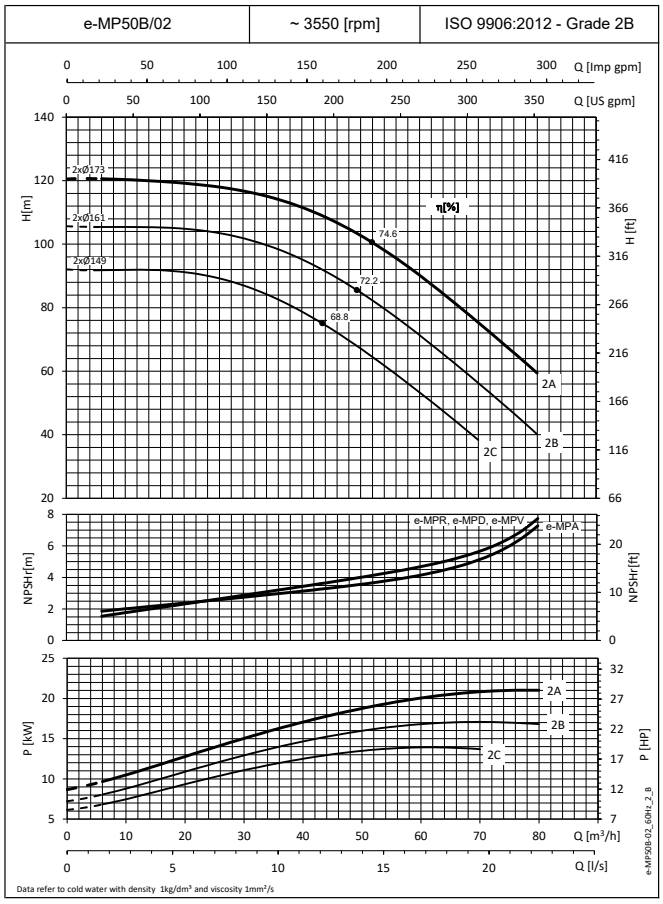


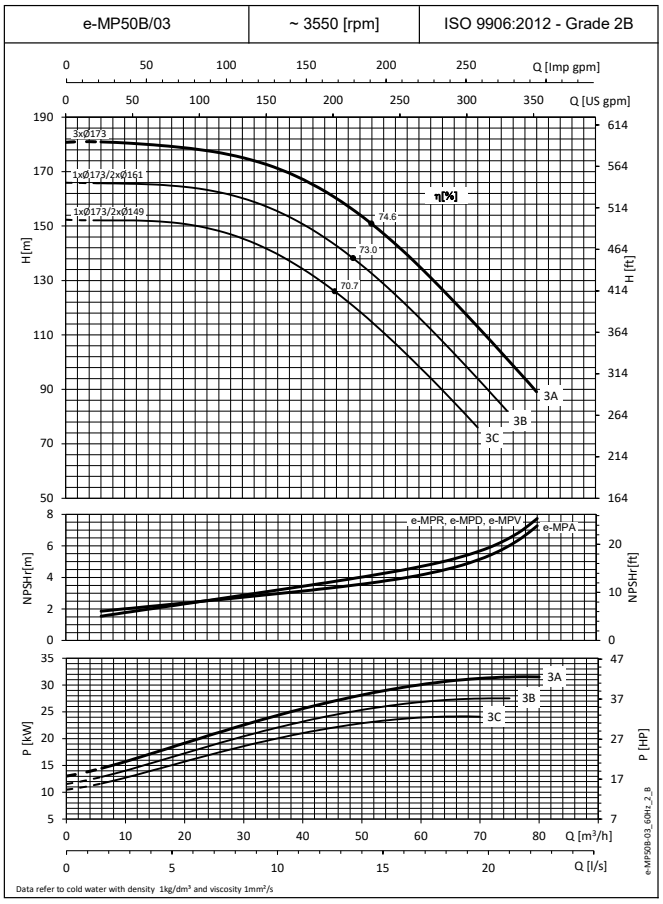


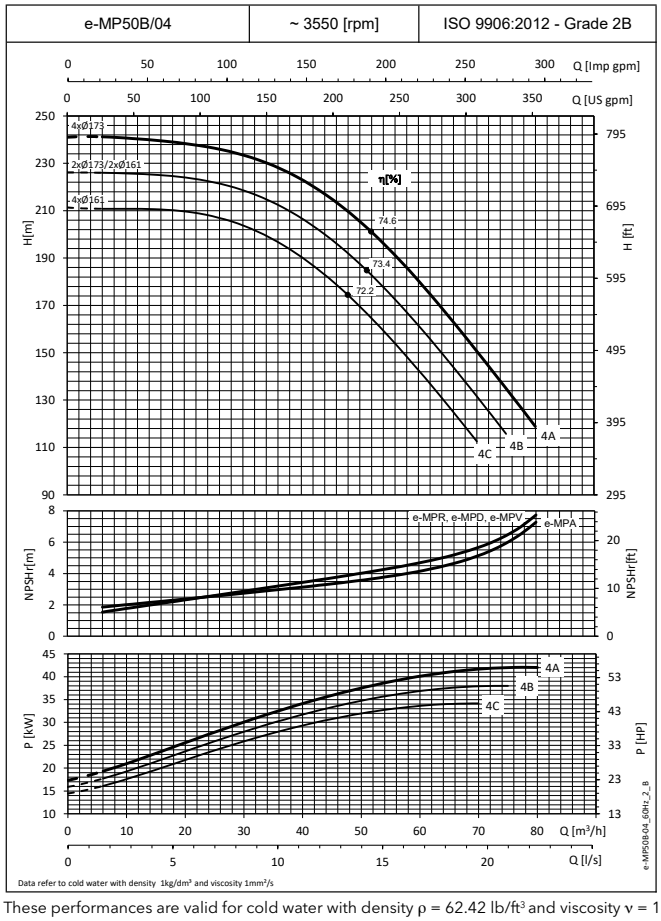


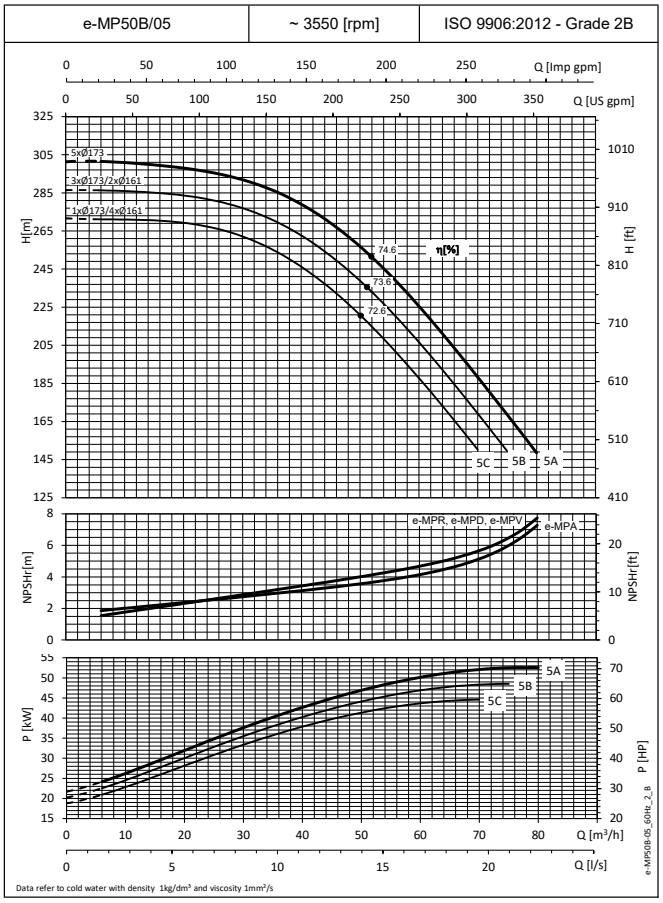
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP50B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES



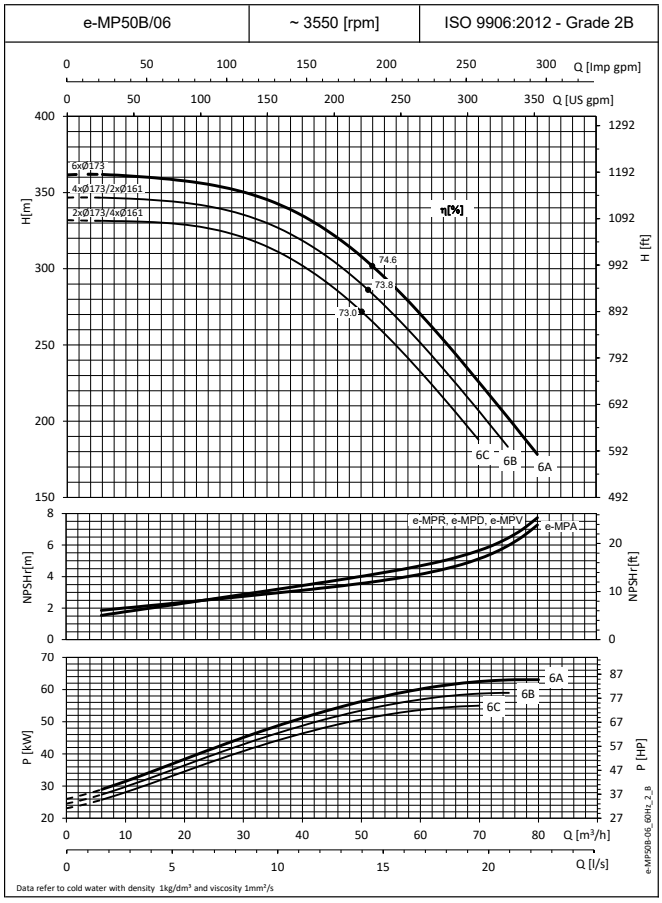


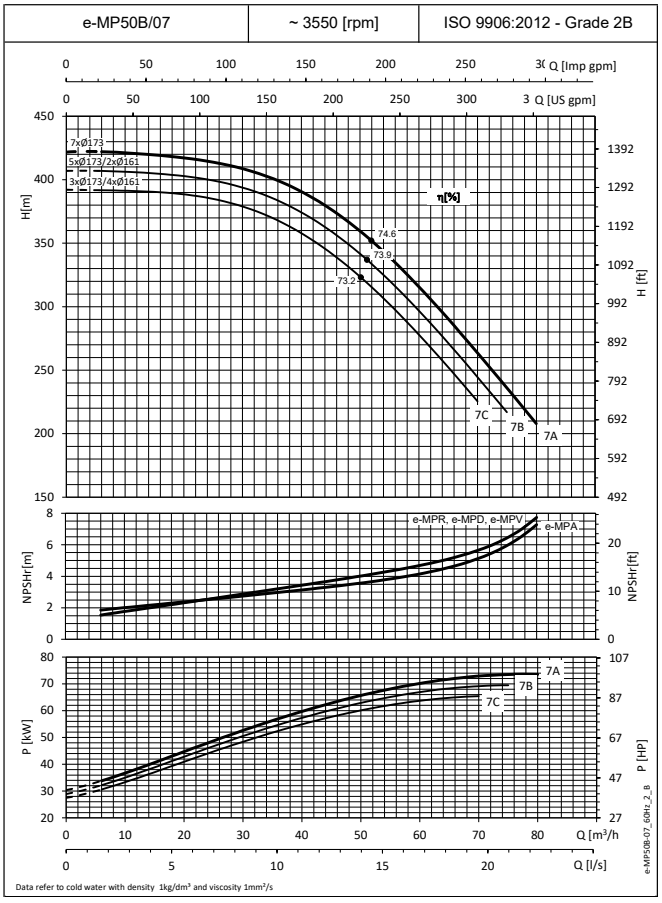


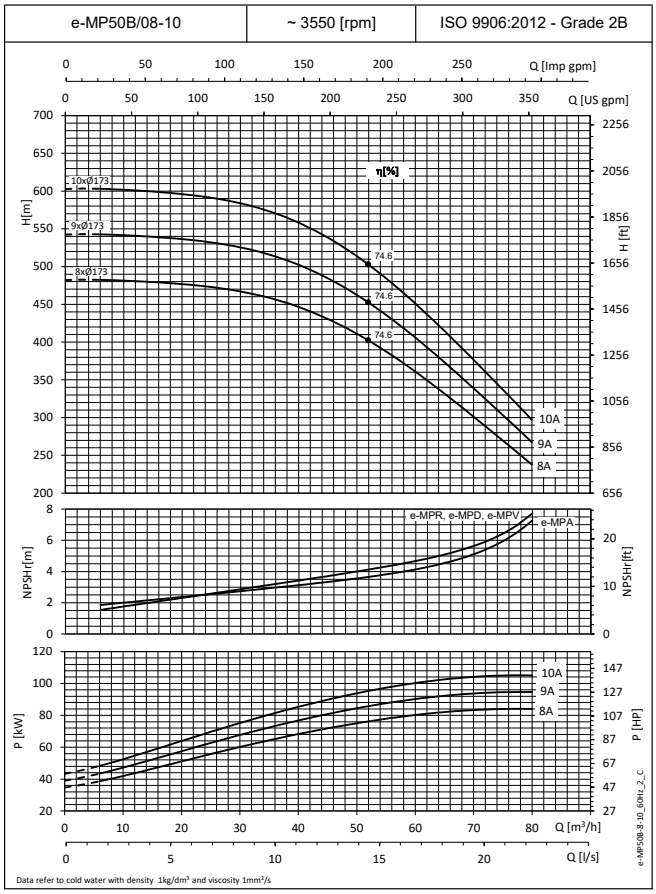


These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP50B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES

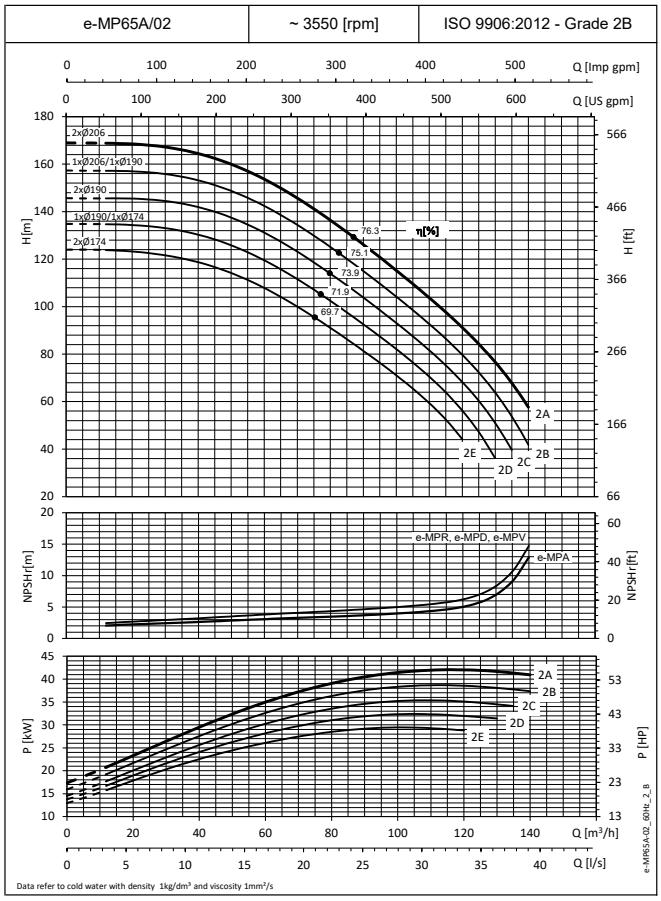


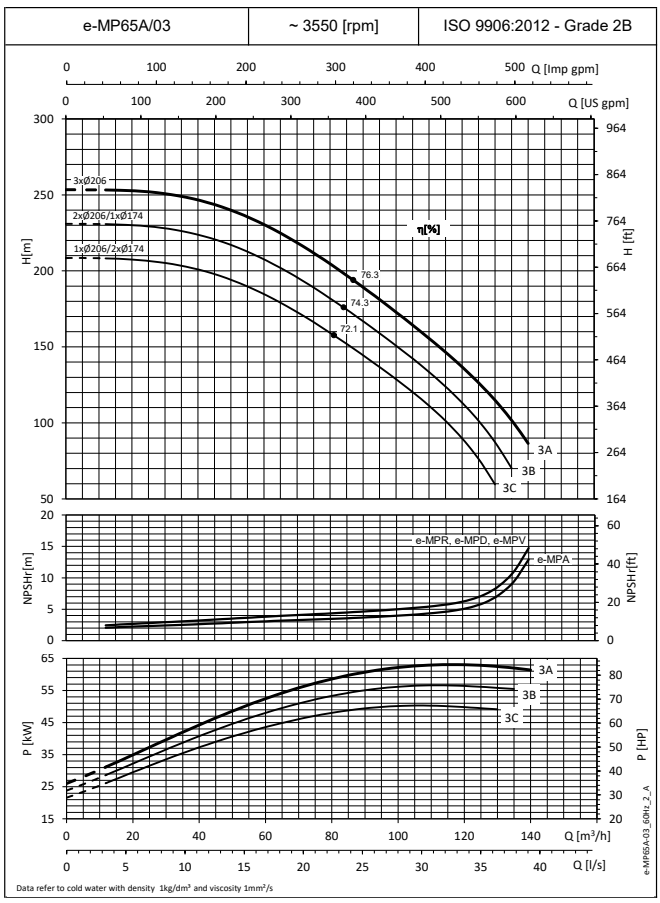


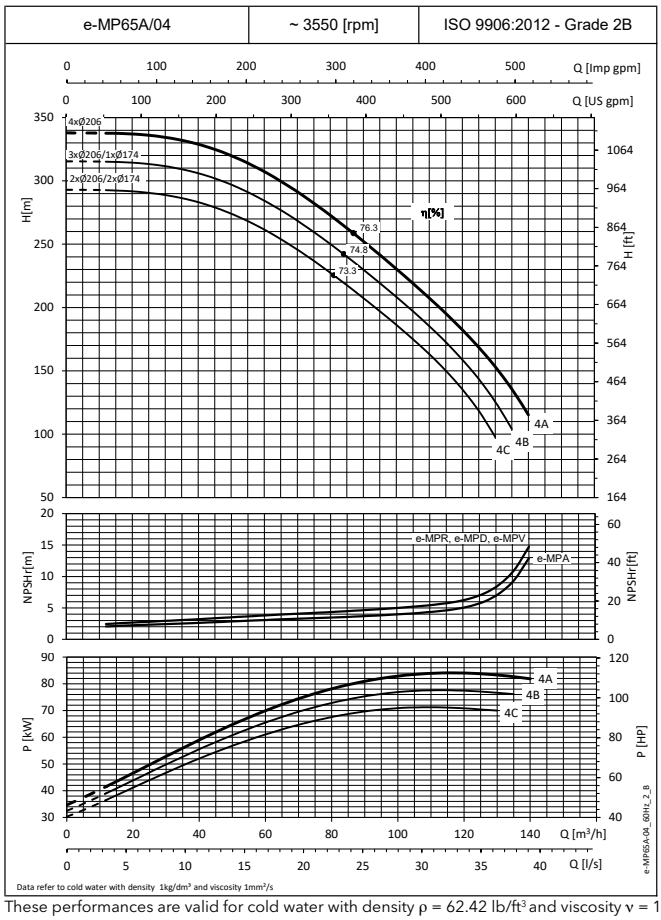


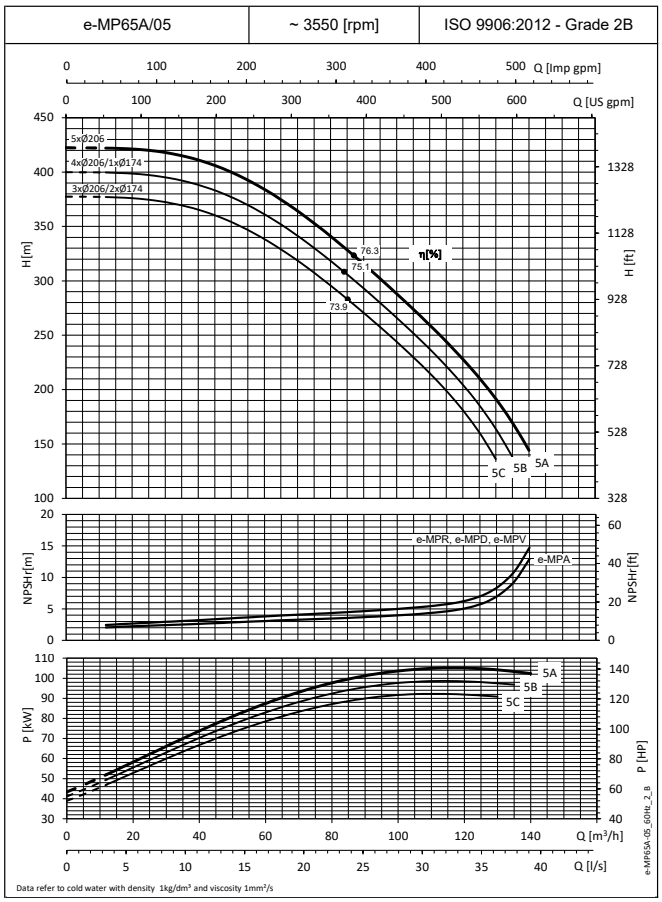
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP65A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES



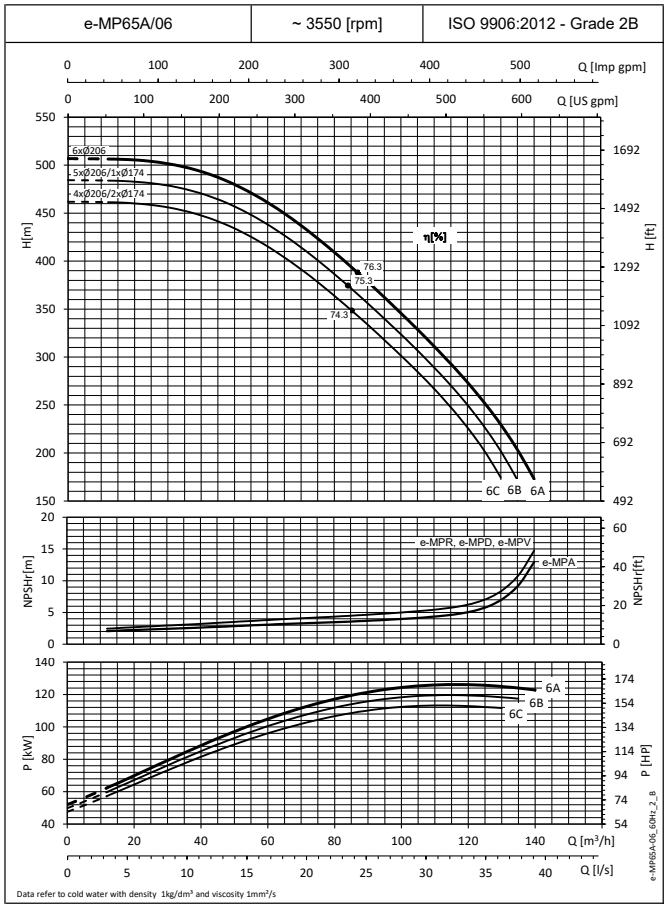


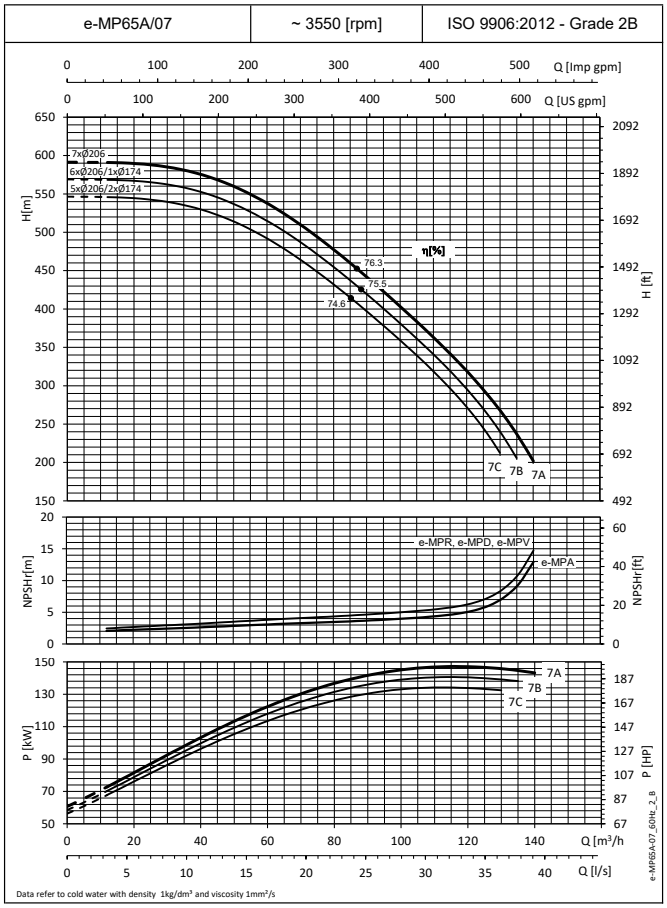


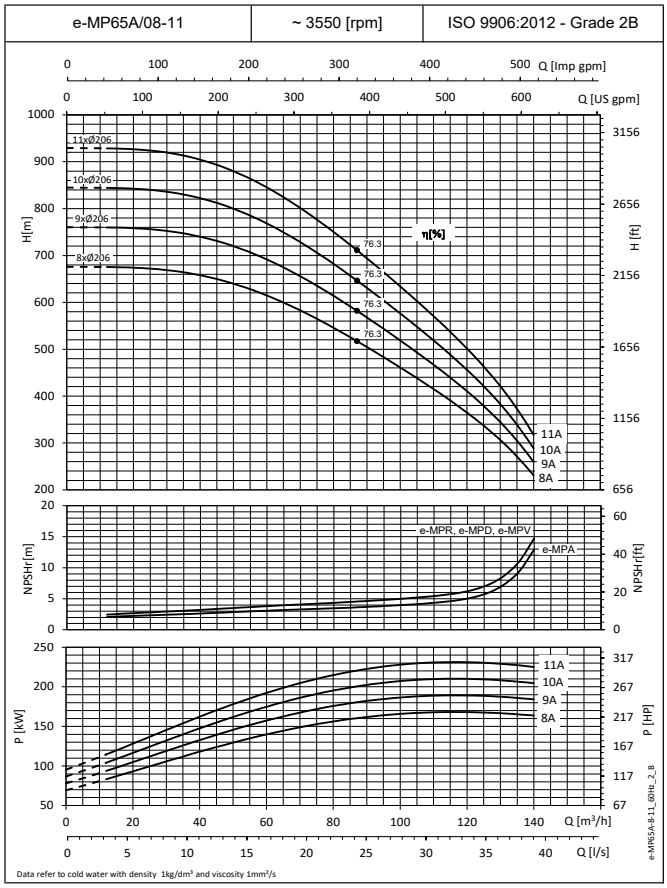


These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP65A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES

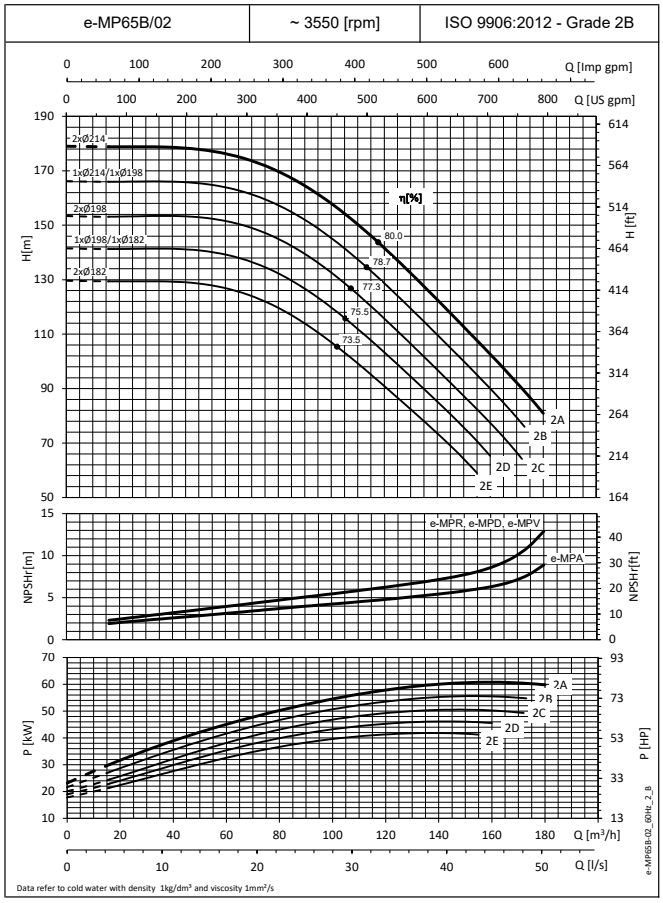


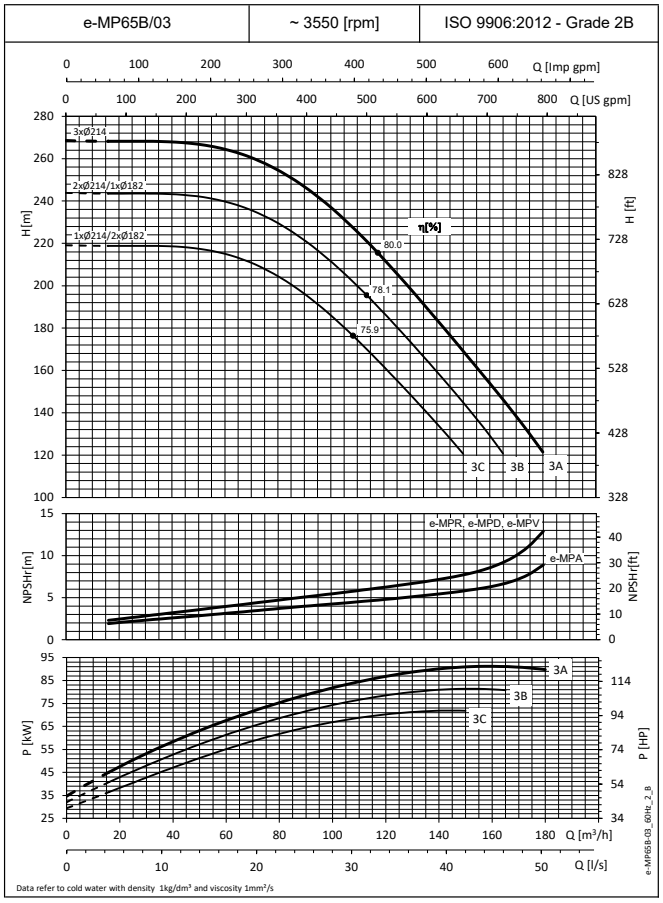


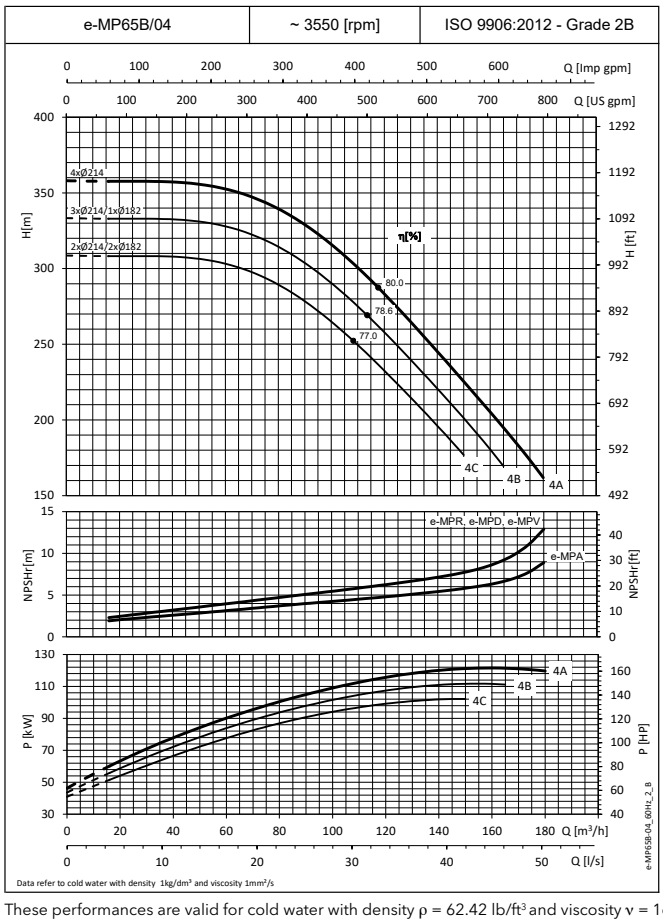


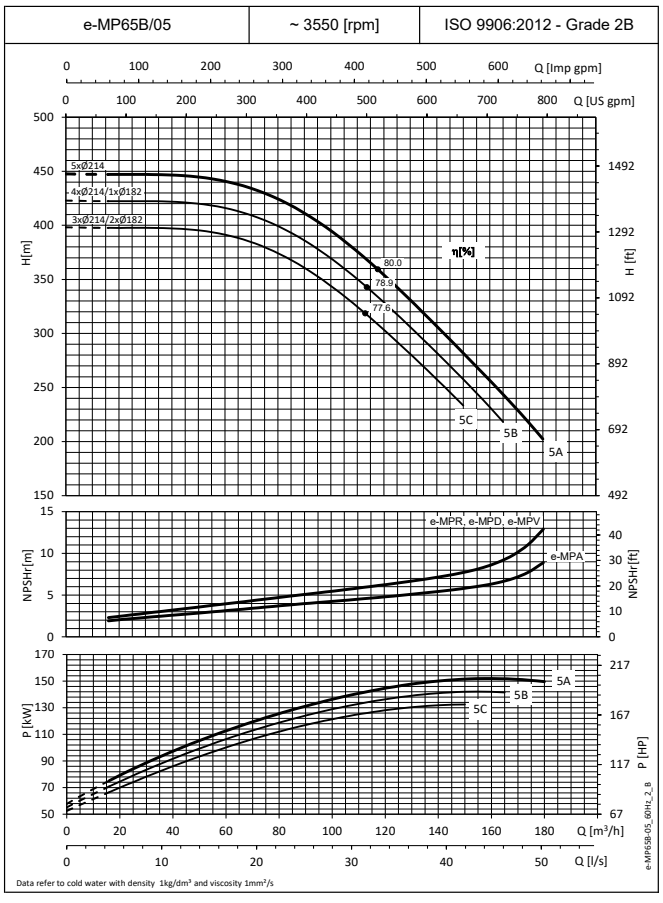
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP65B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES



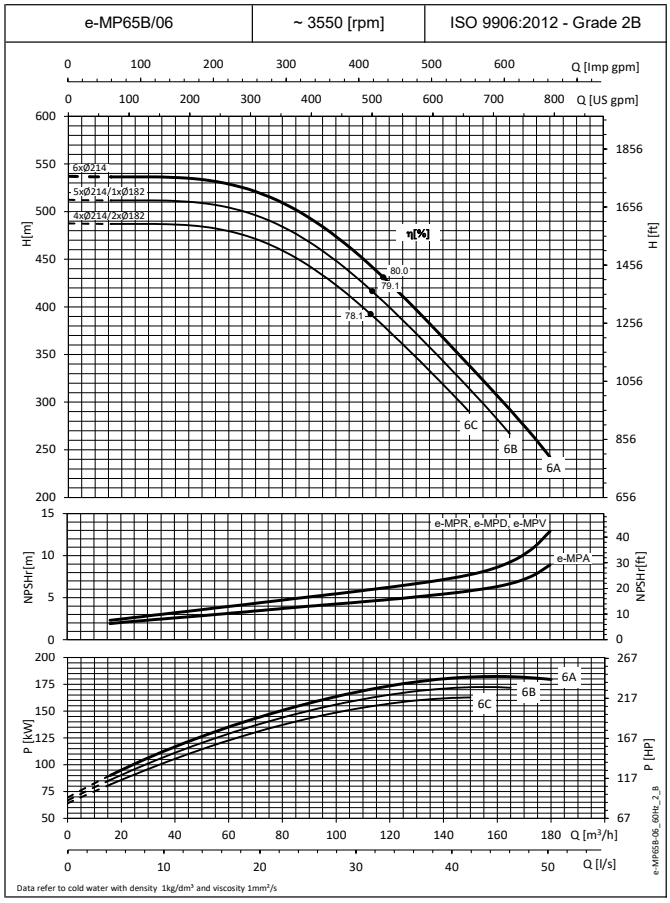


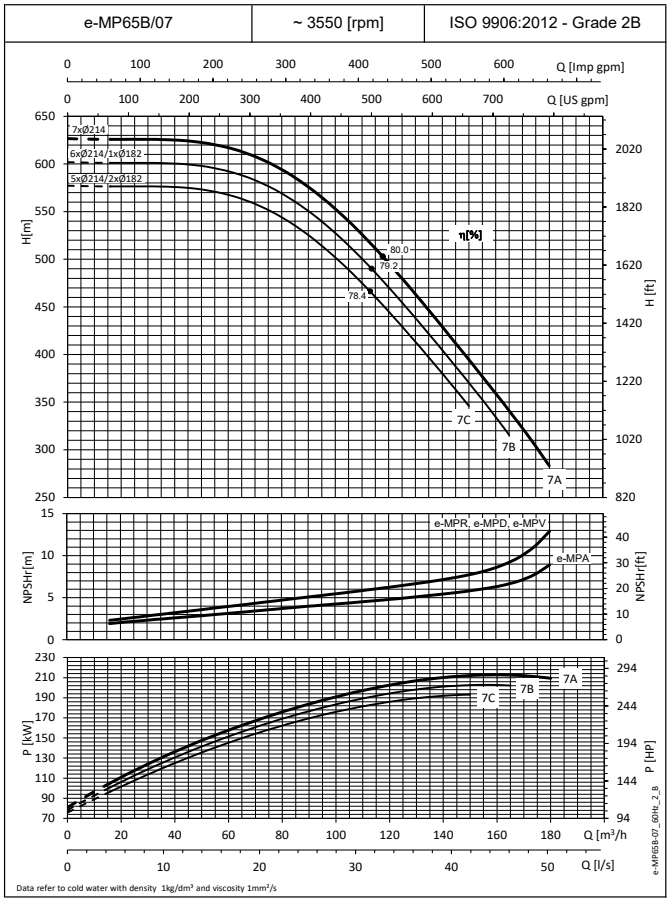


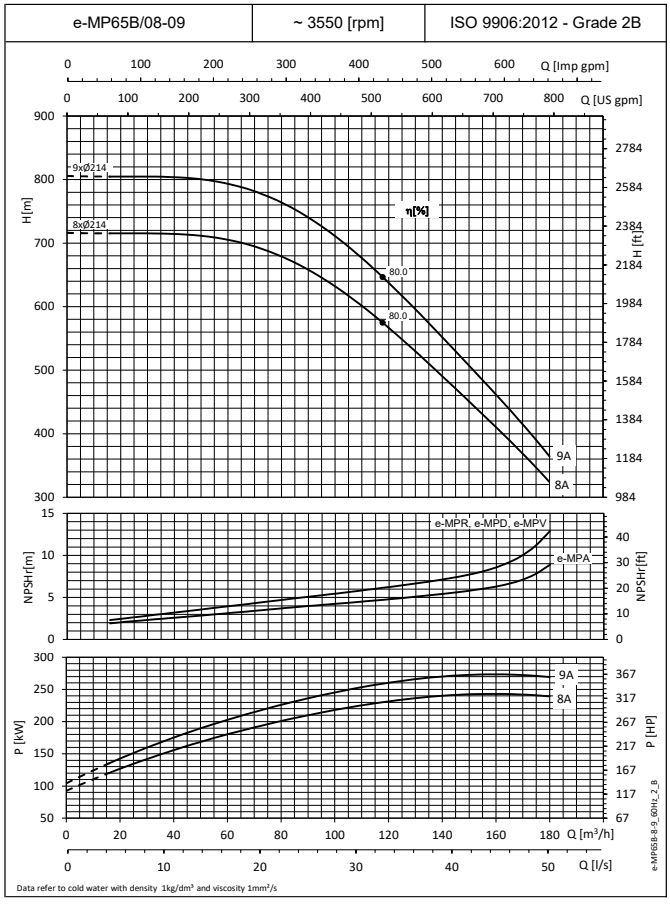


These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP65B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES

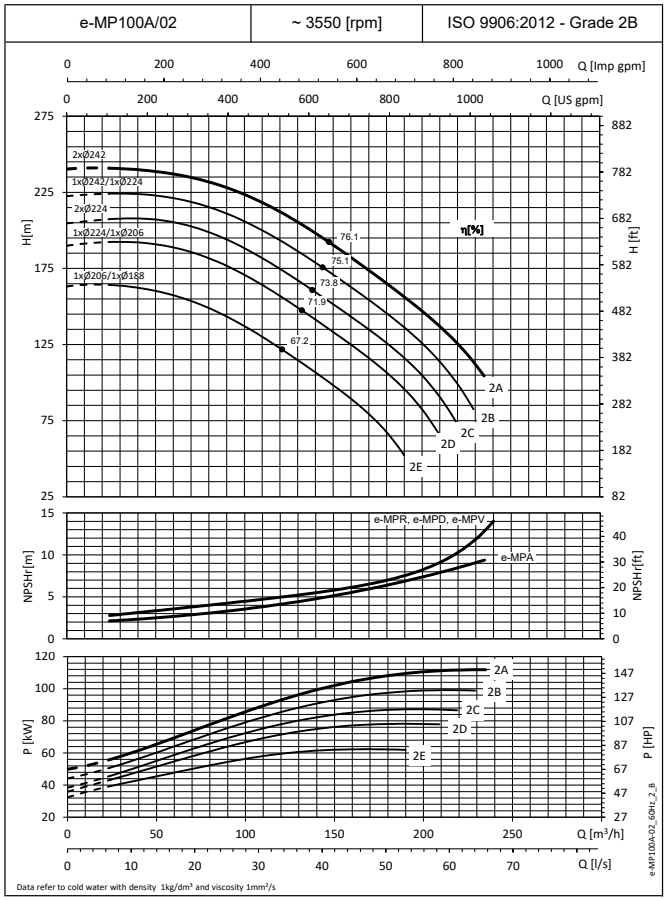


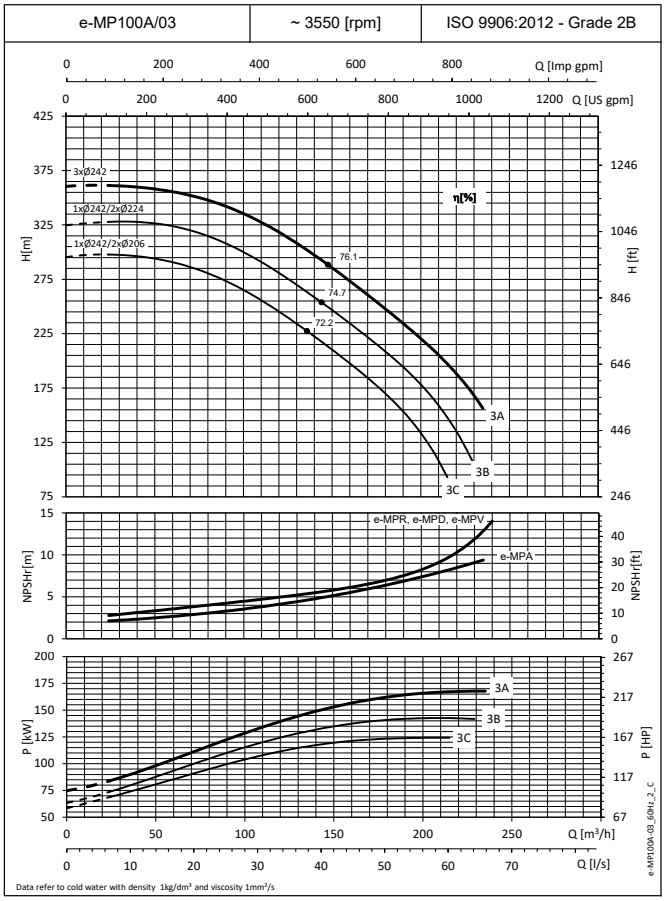


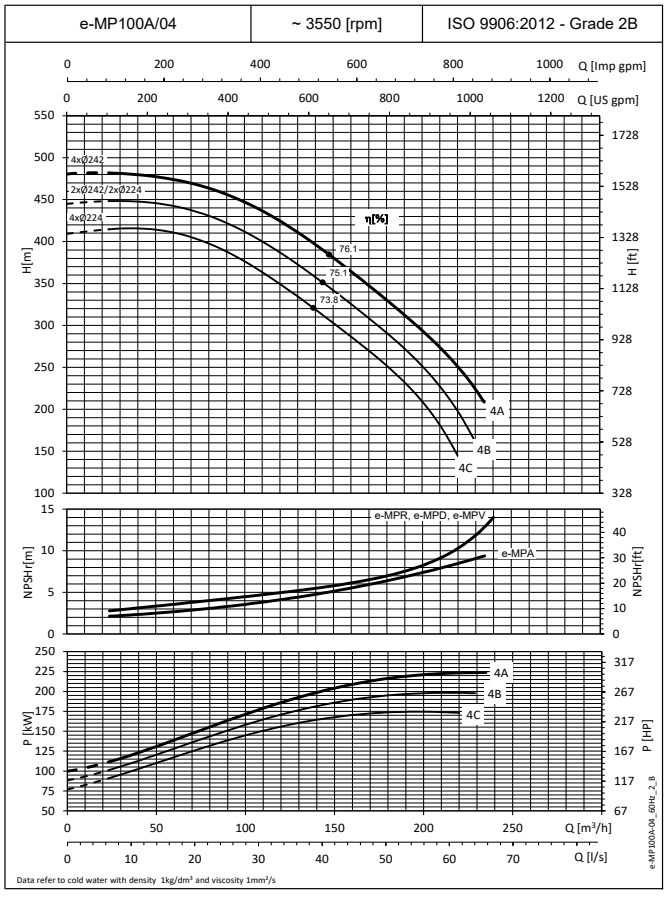


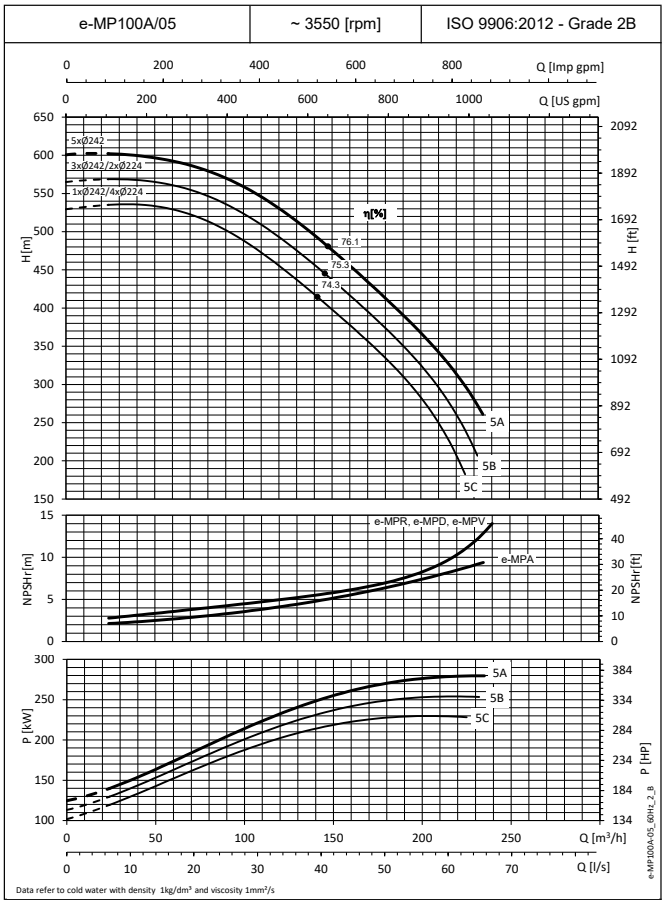
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP100A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES



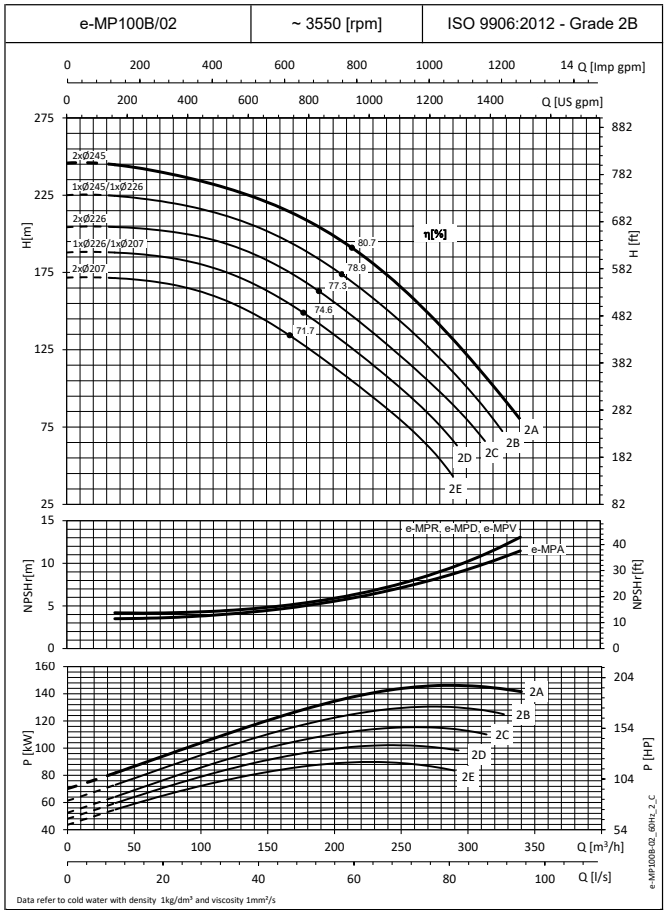


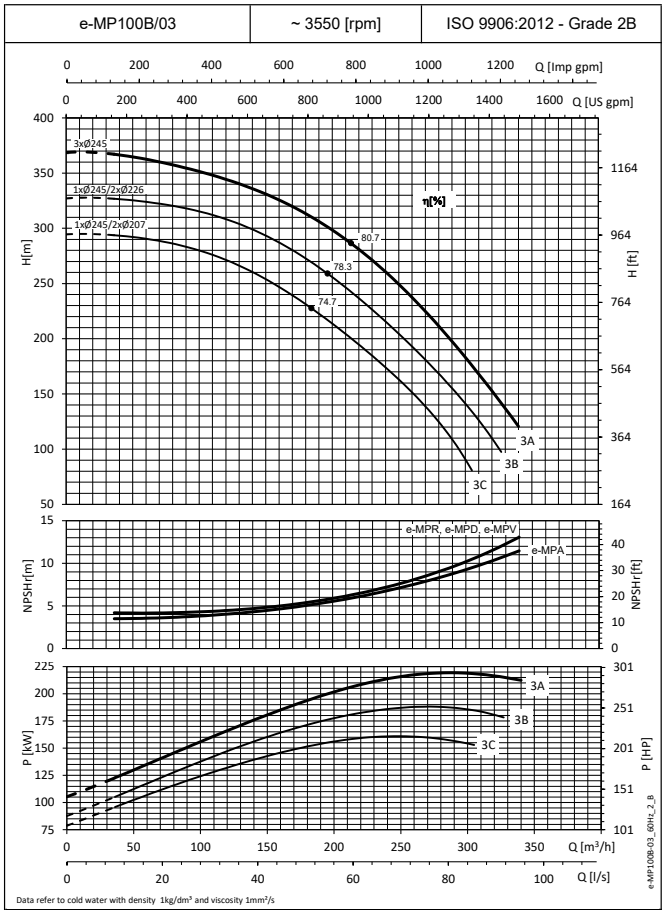


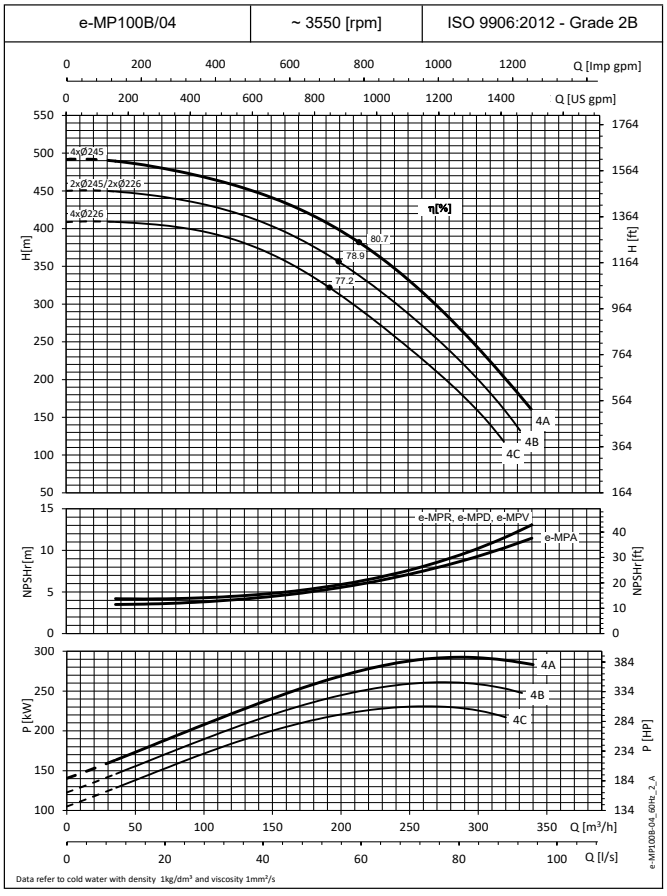


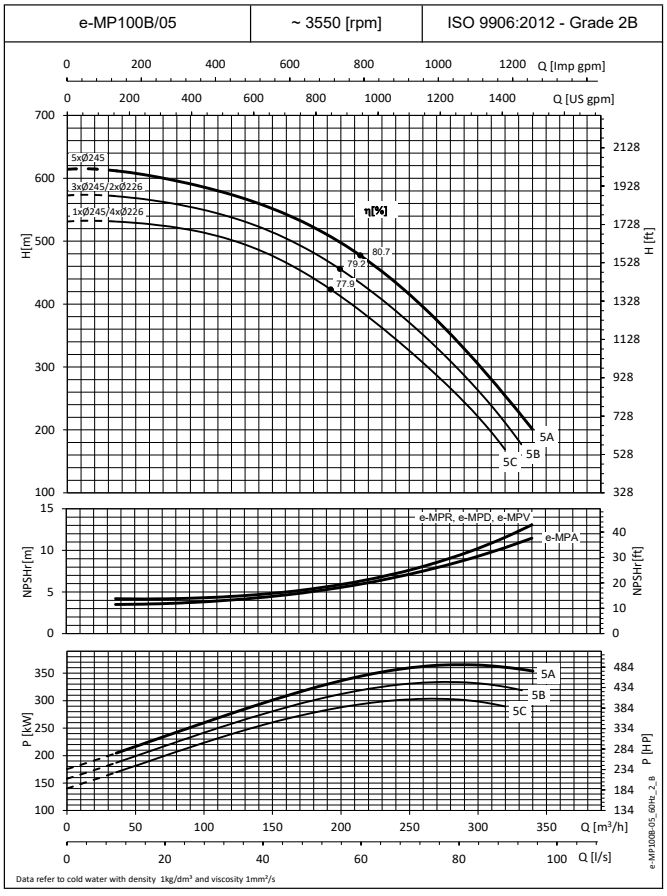
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP100B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES



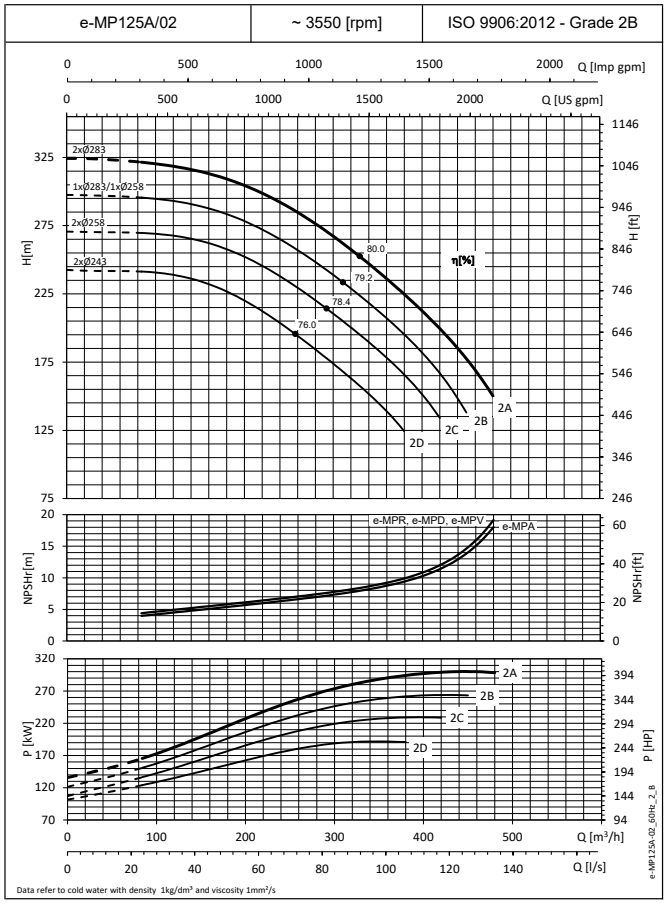


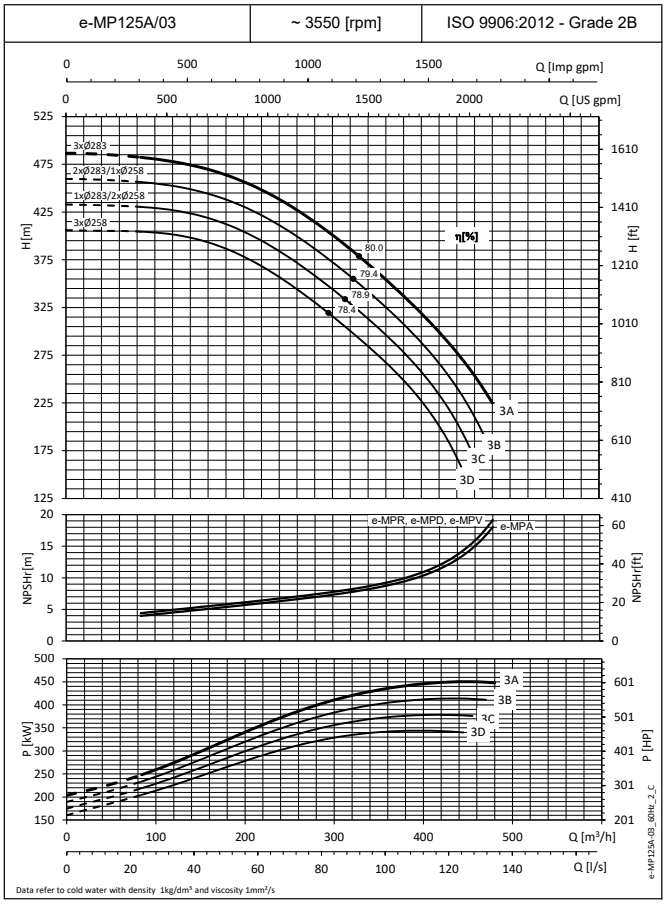


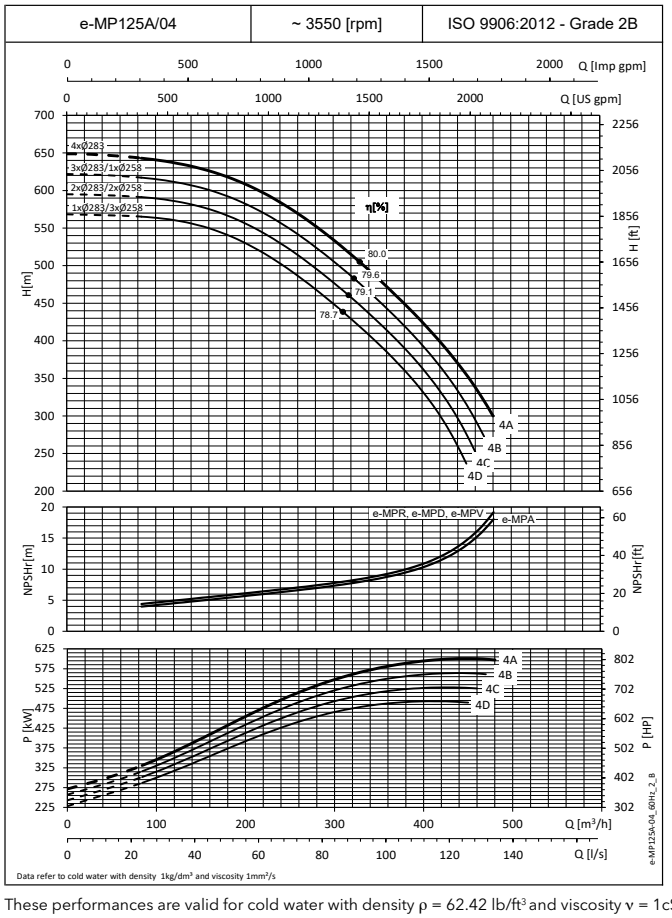


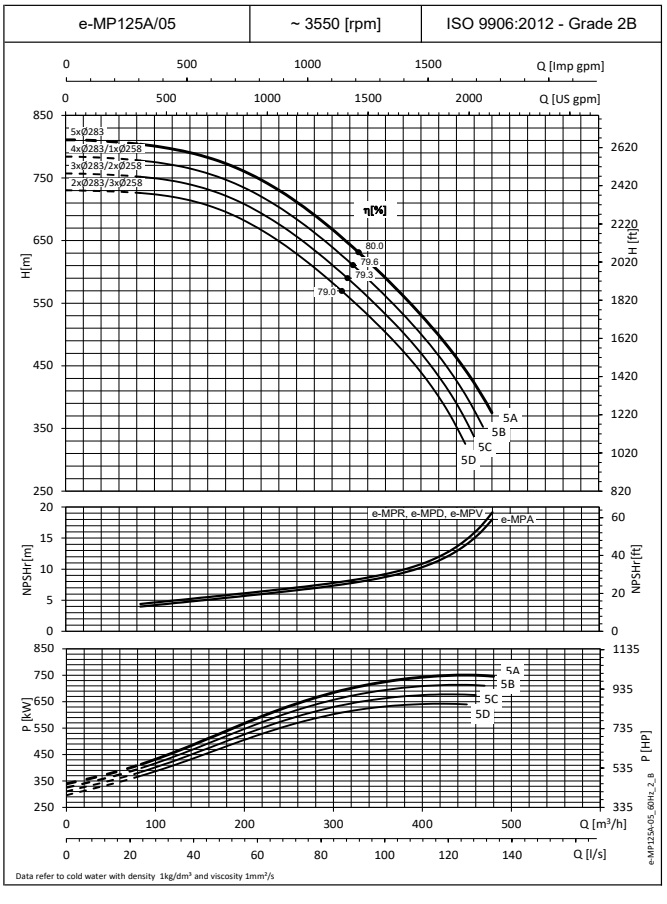
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP125A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES



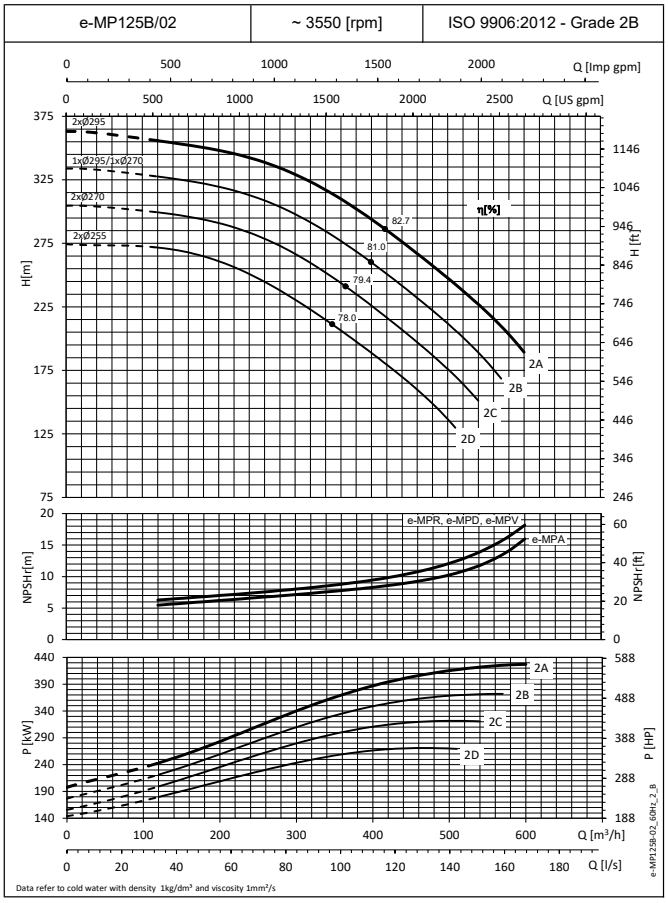


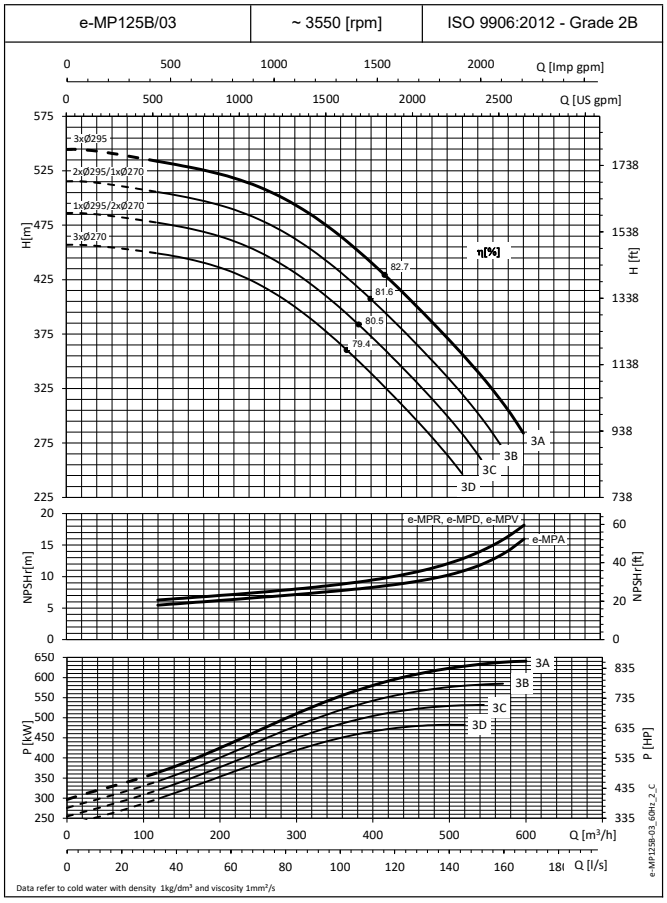


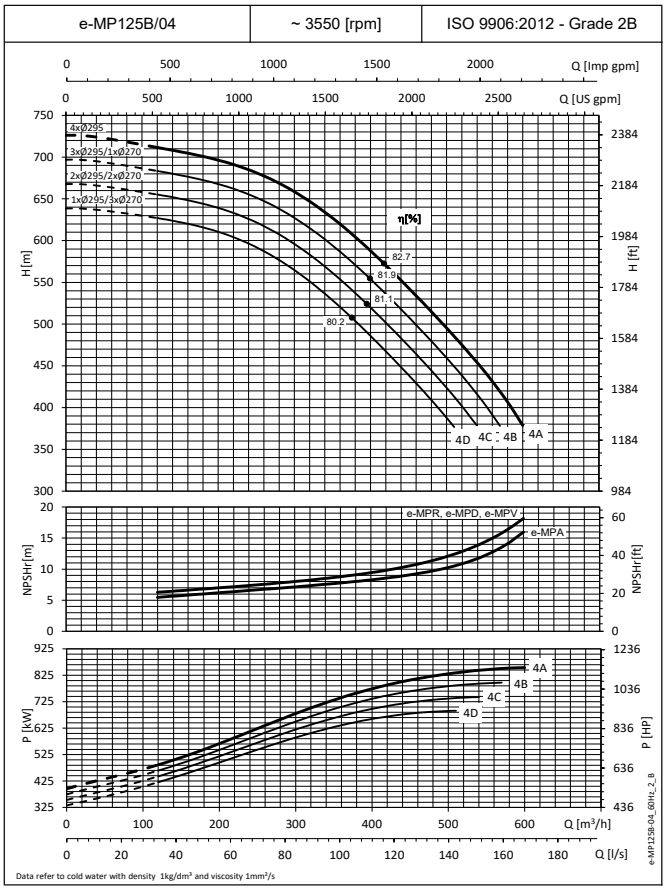


These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP125B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 2-POLES

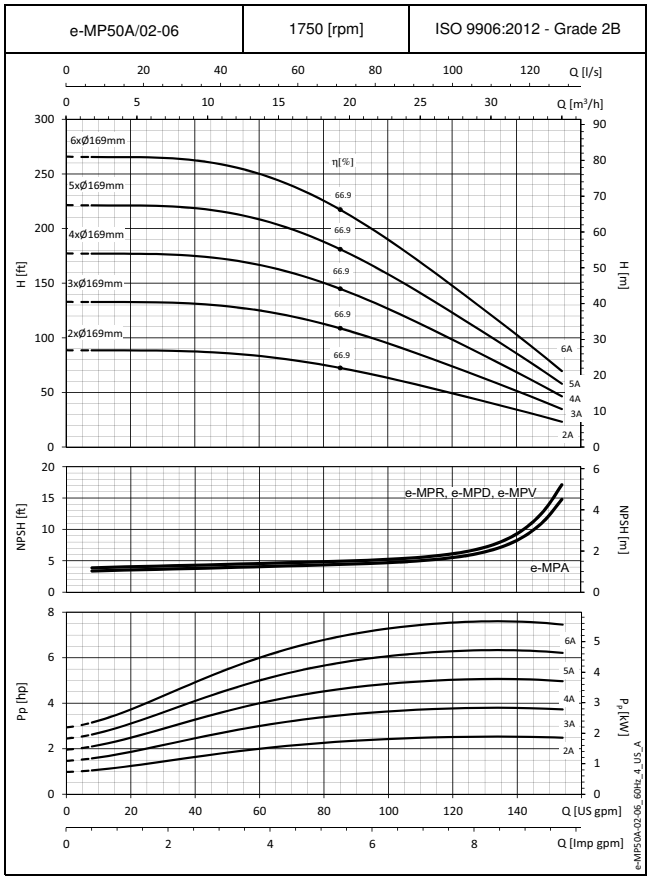


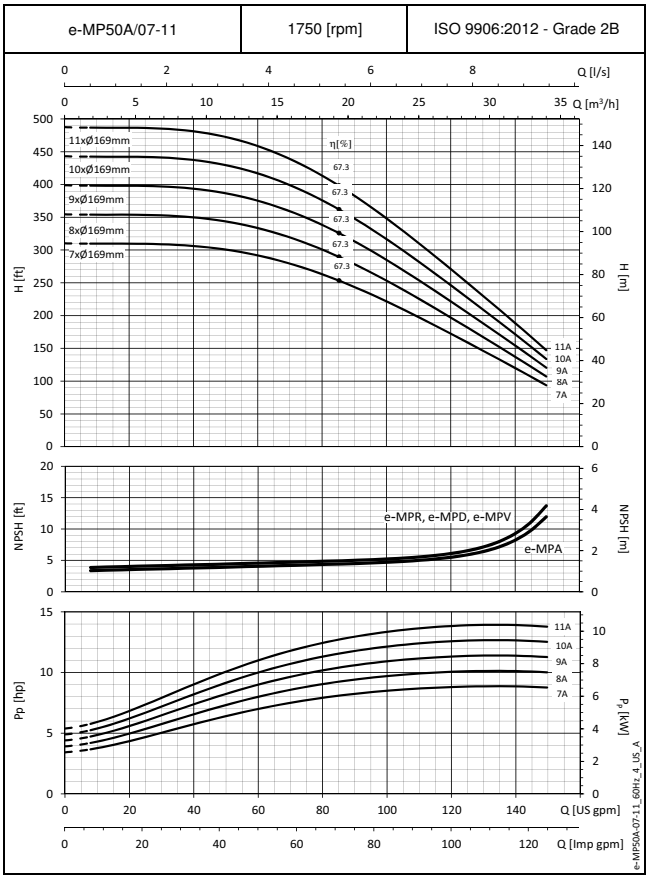


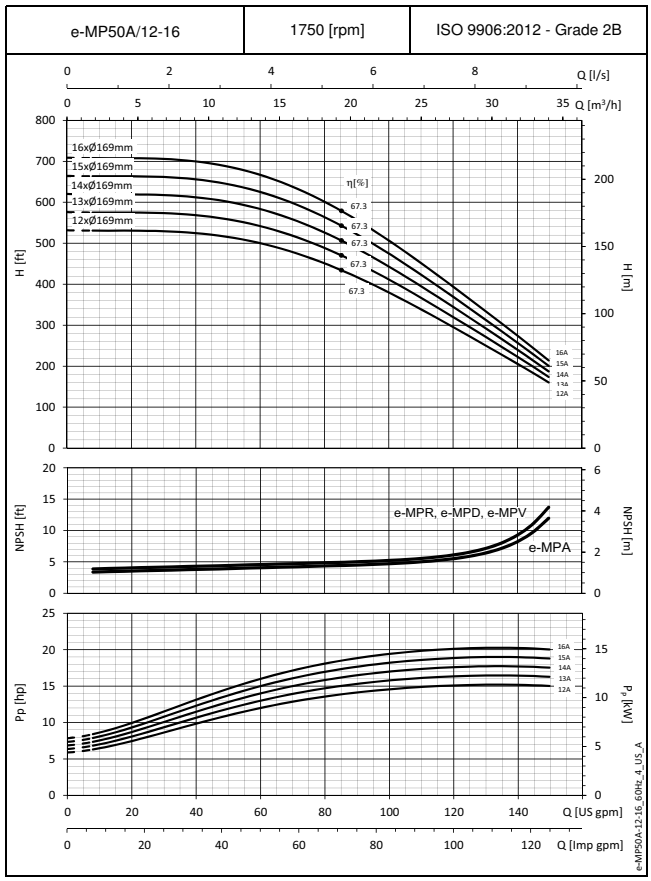


These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP50A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES

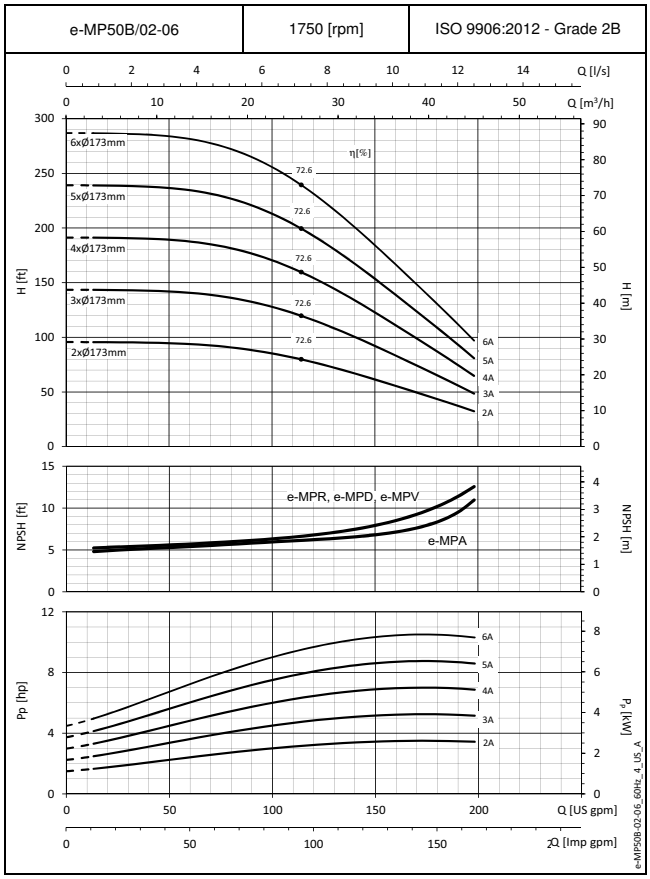


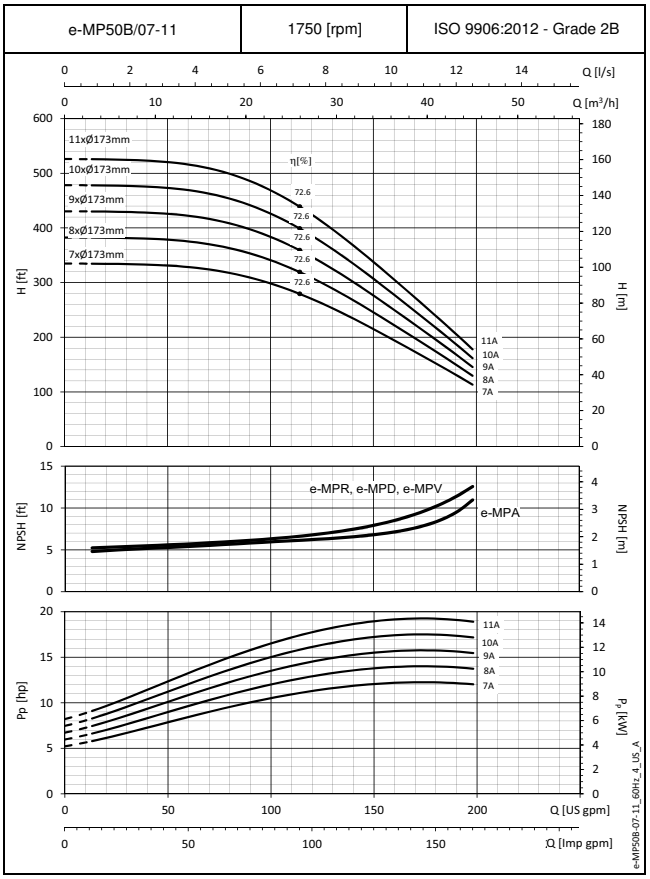


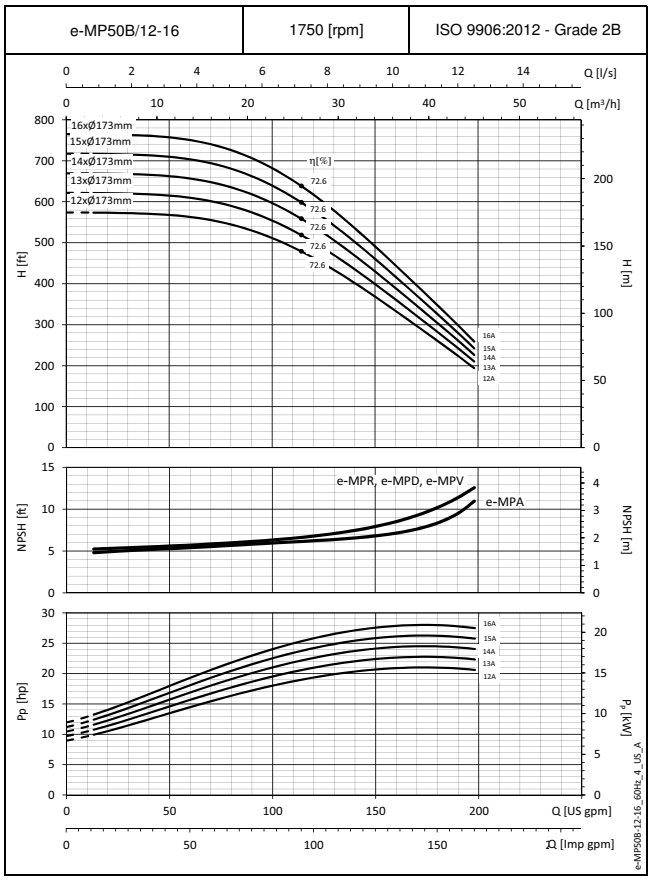


These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP50B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES

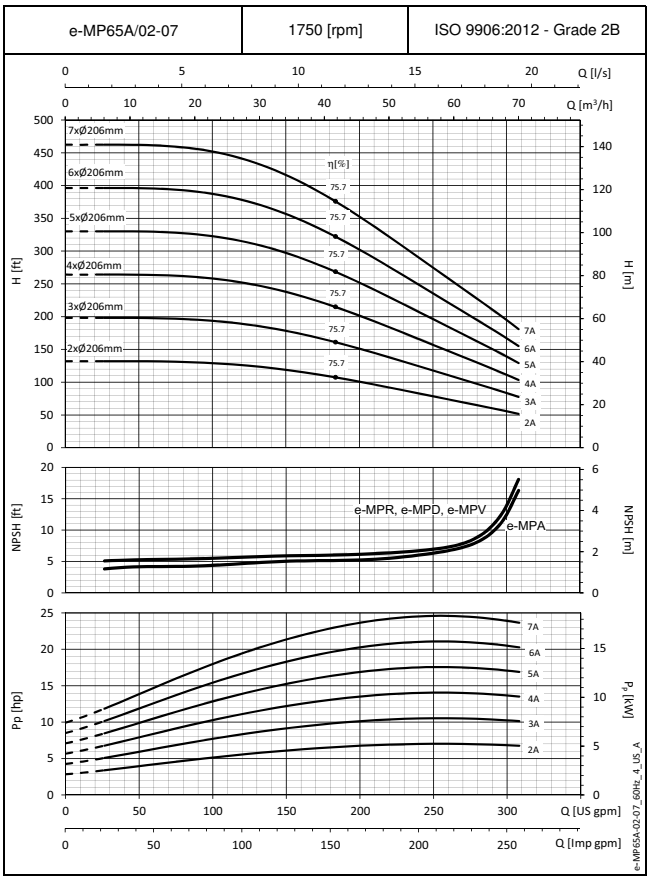


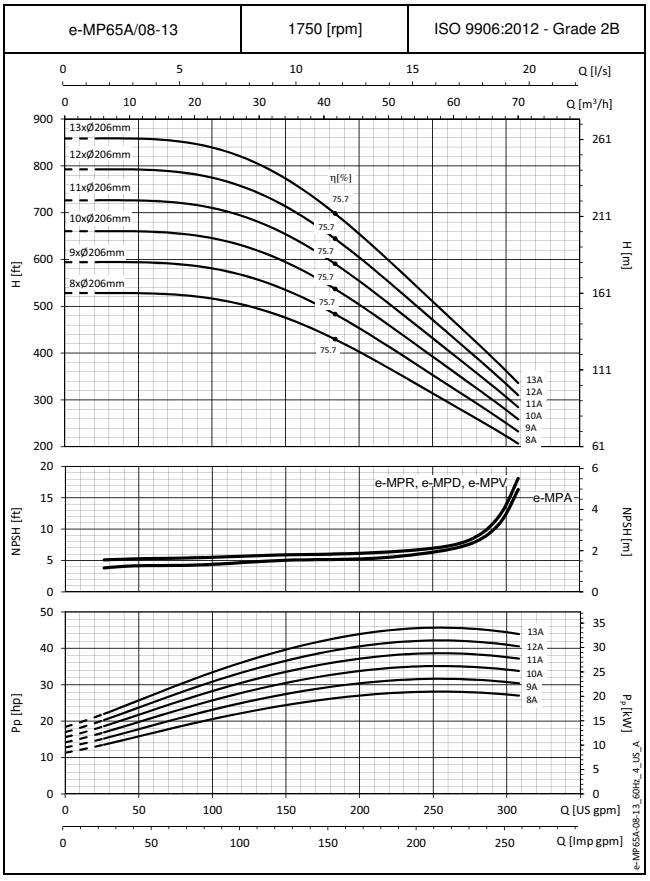




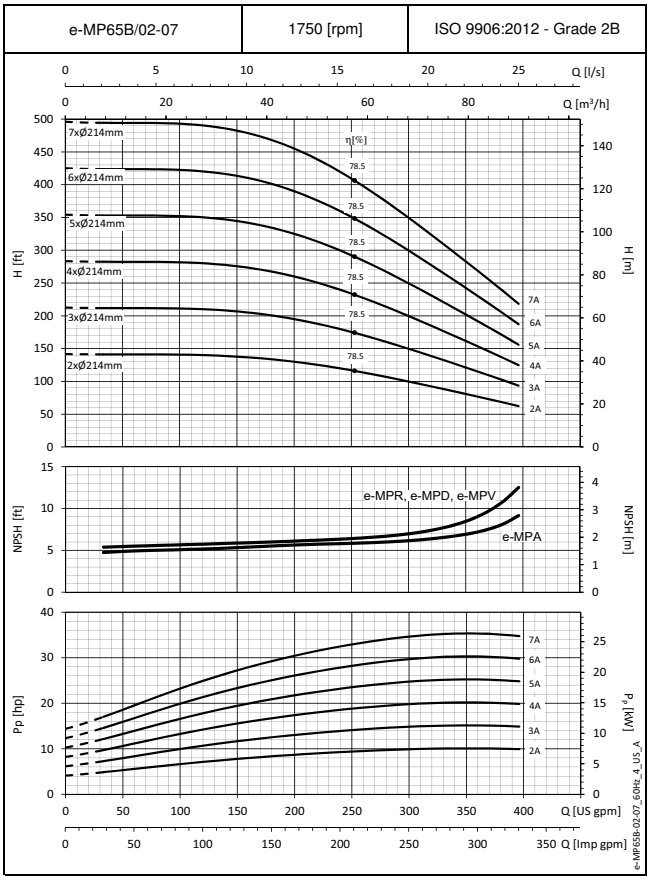
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

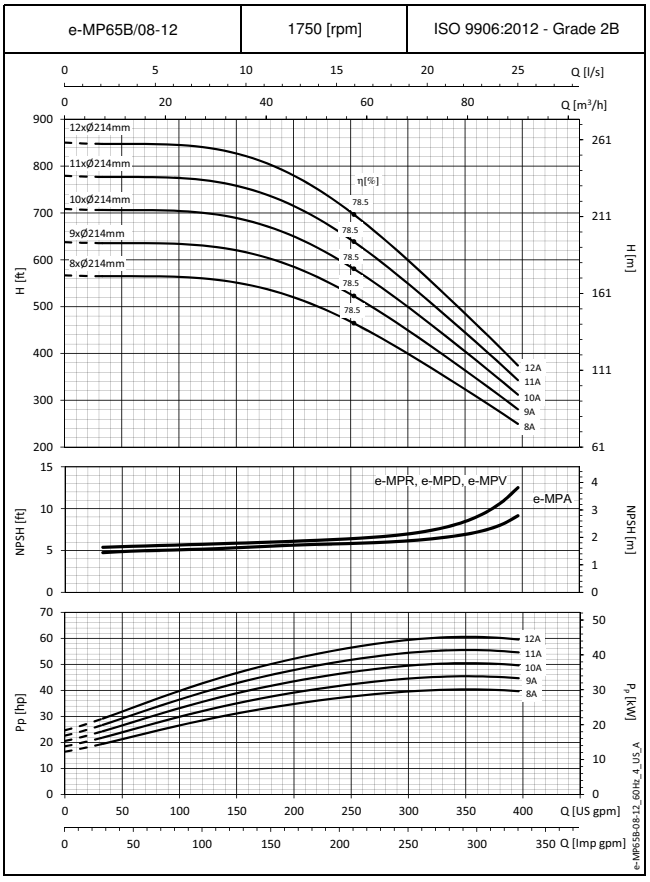
e-MP65A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES





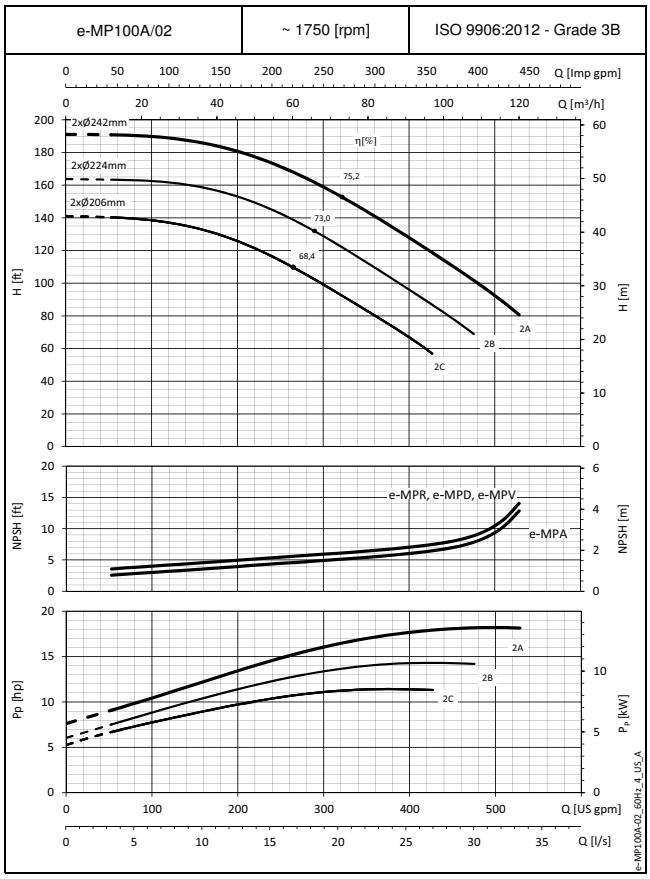
e-MP65B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES

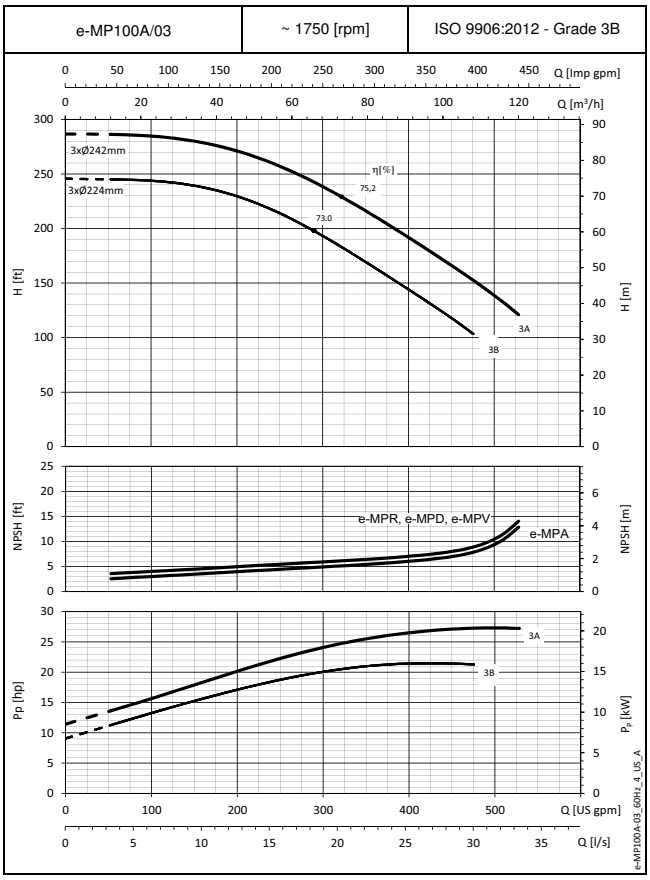


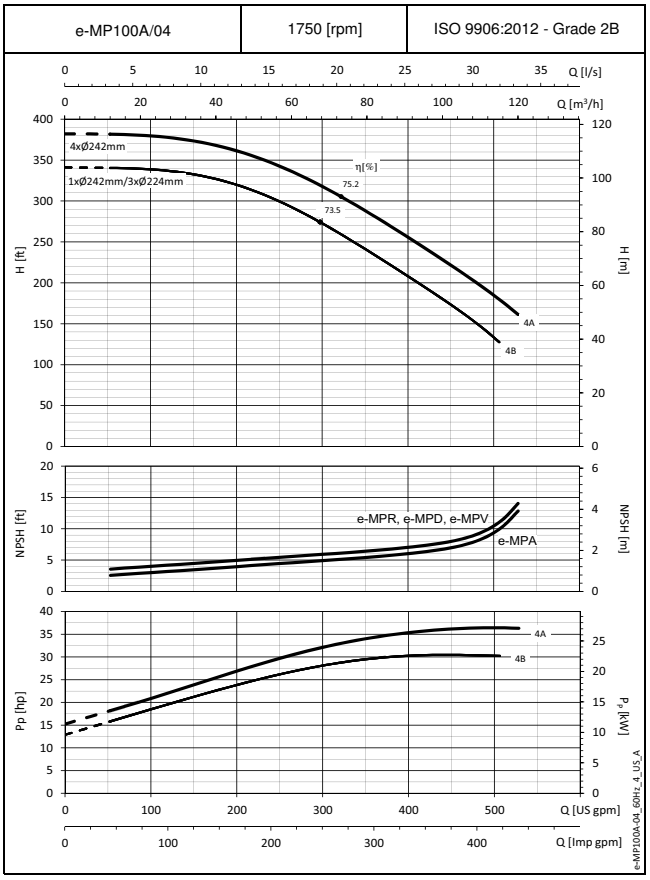


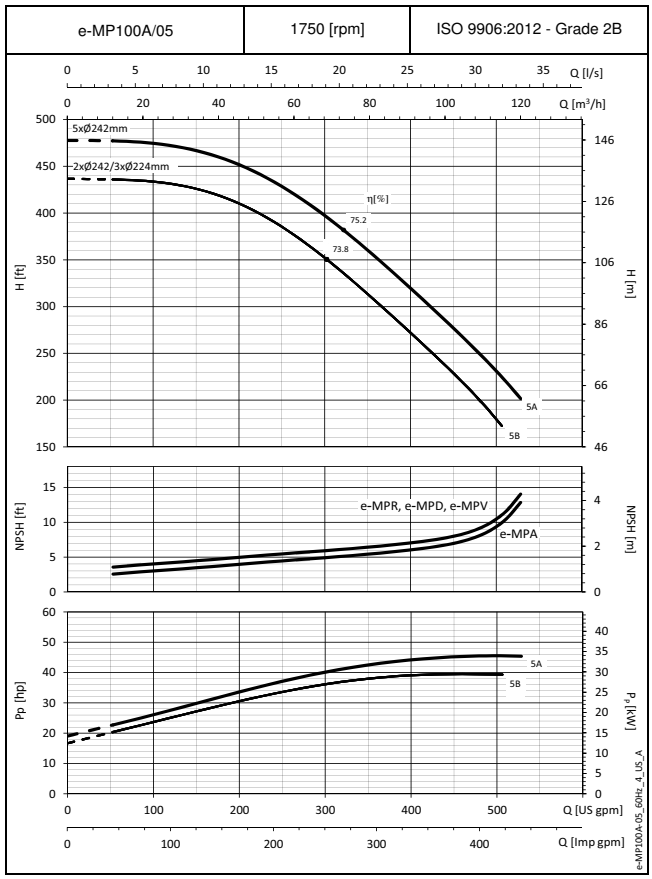
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP100A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES



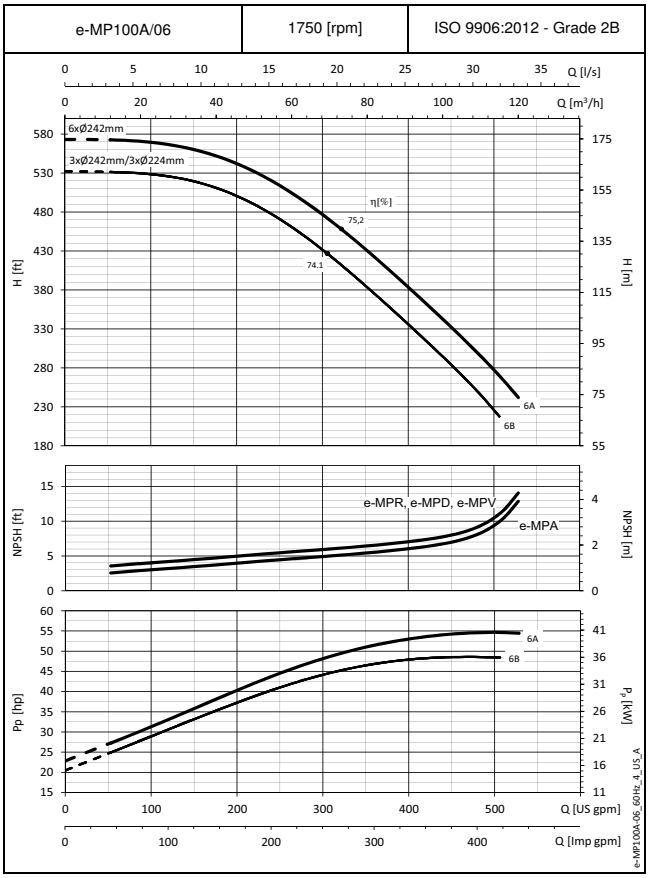


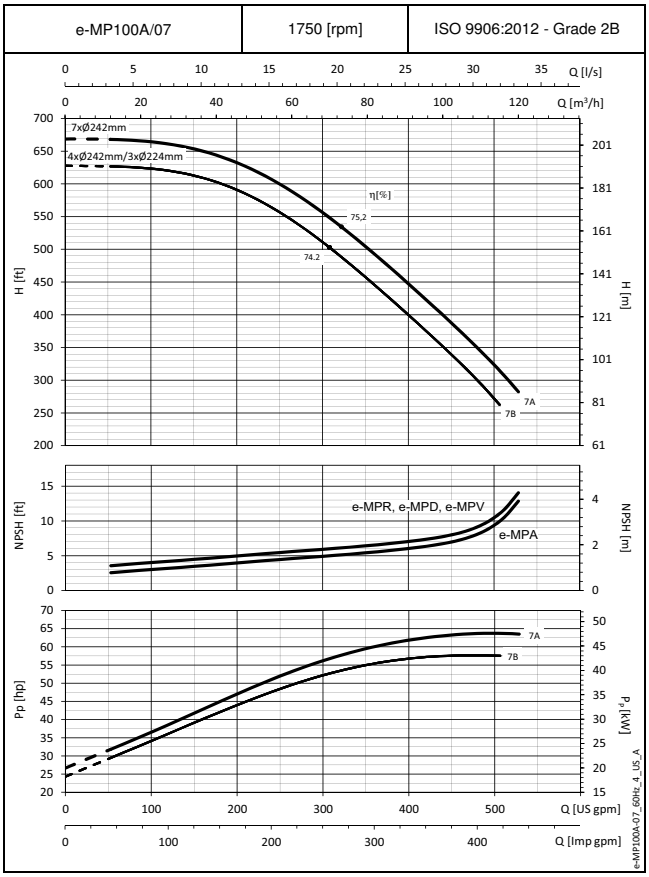




These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

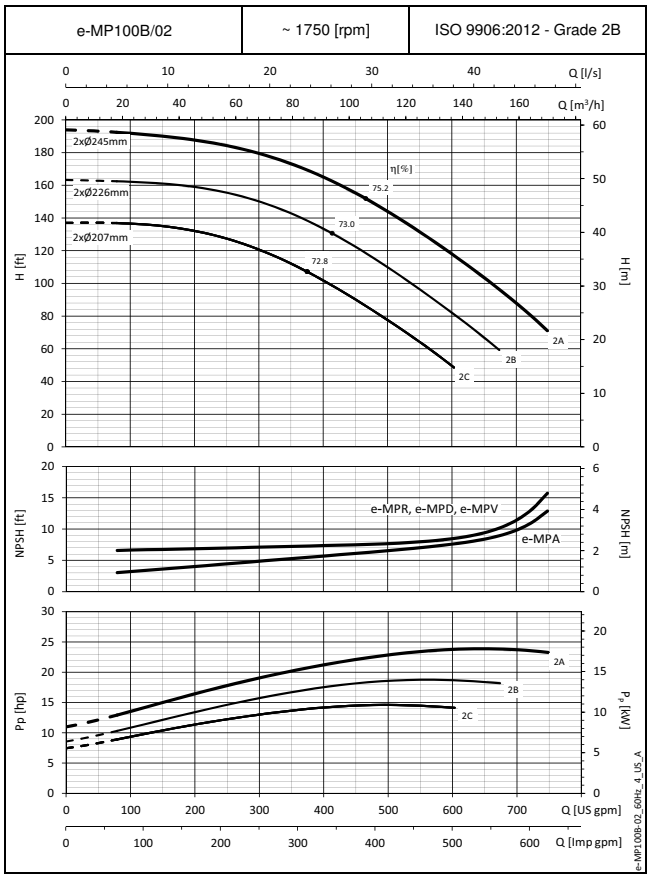
e-MP100A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES

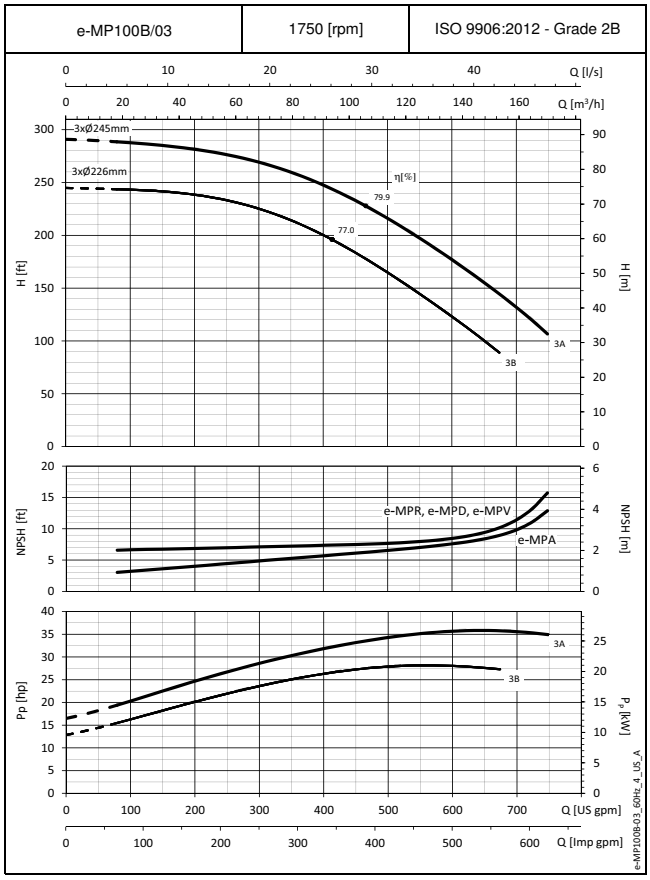


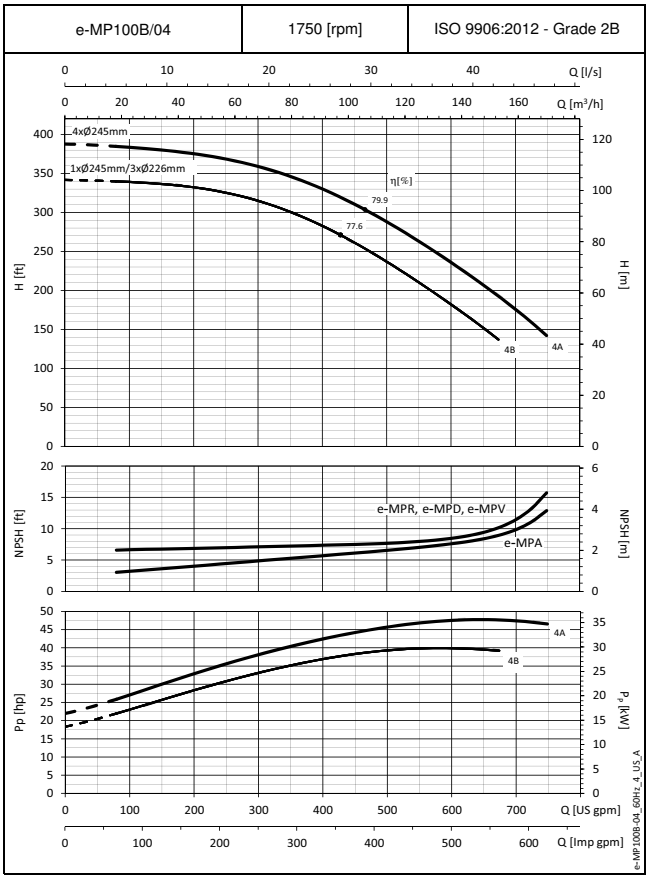


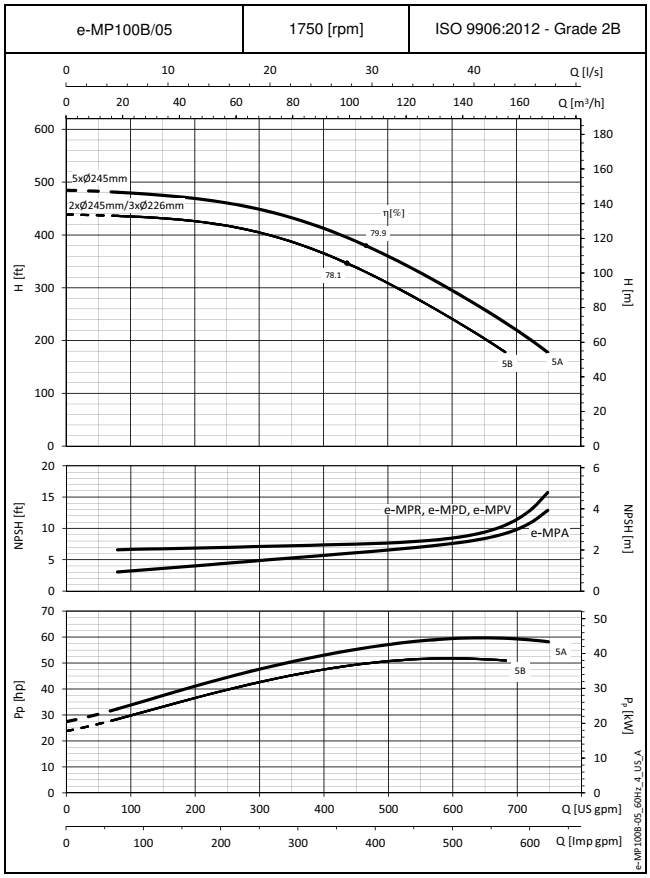
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP100B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES



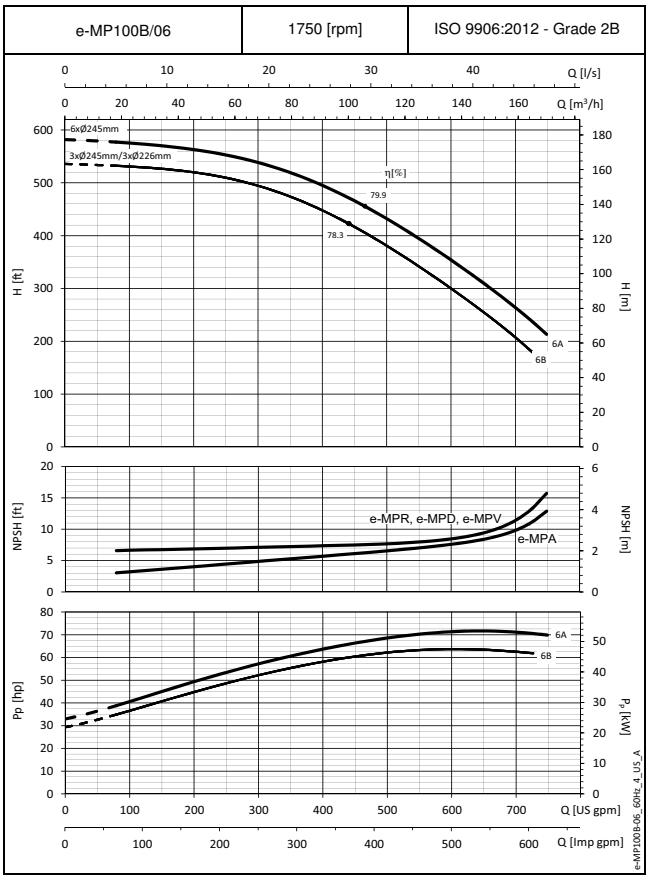


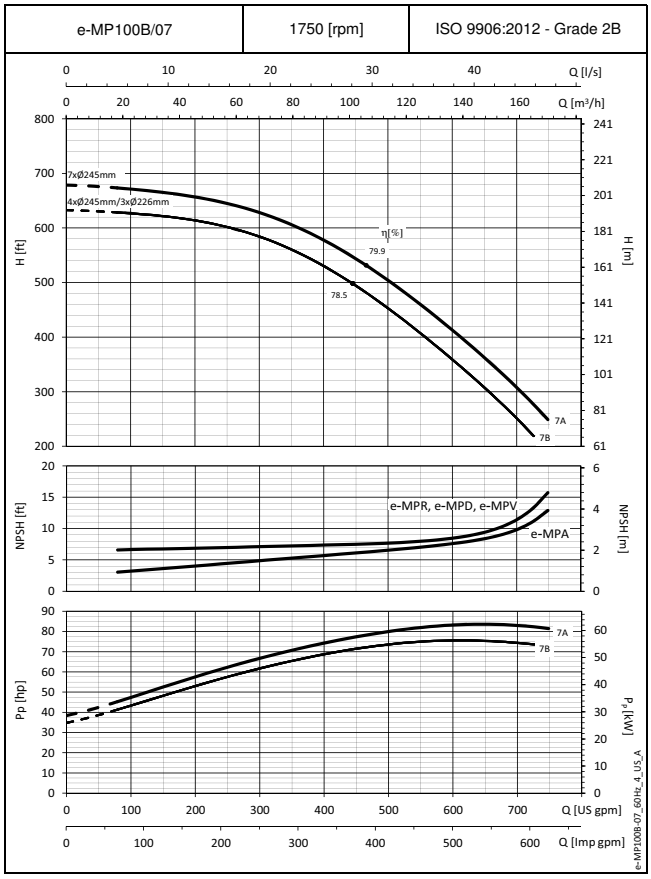




These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

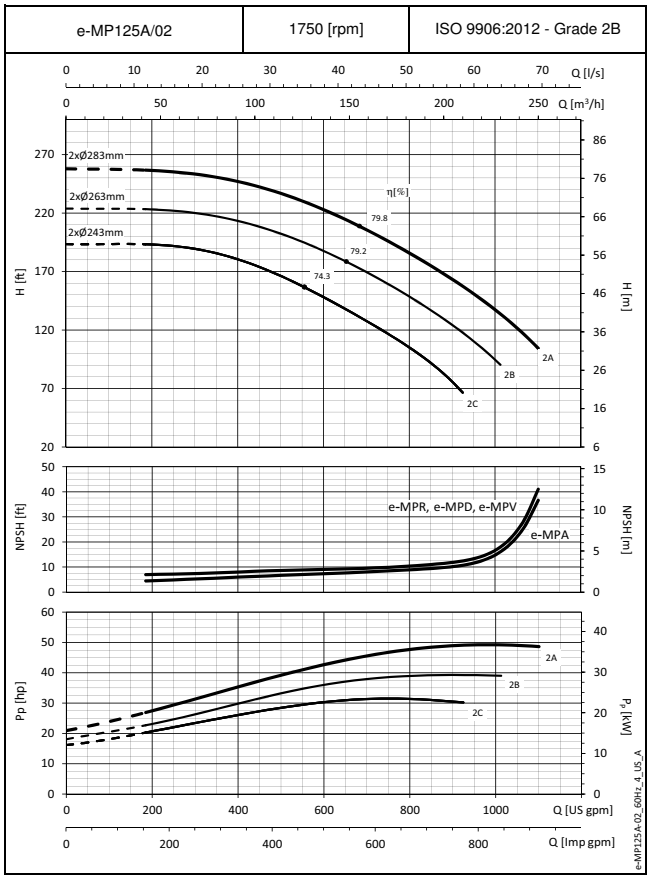
e-MP100B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES

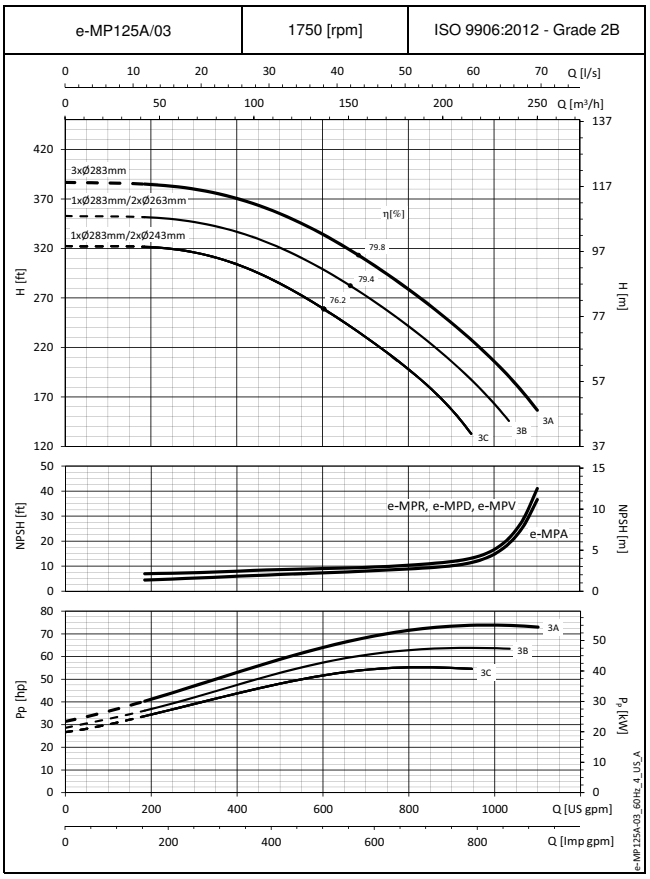


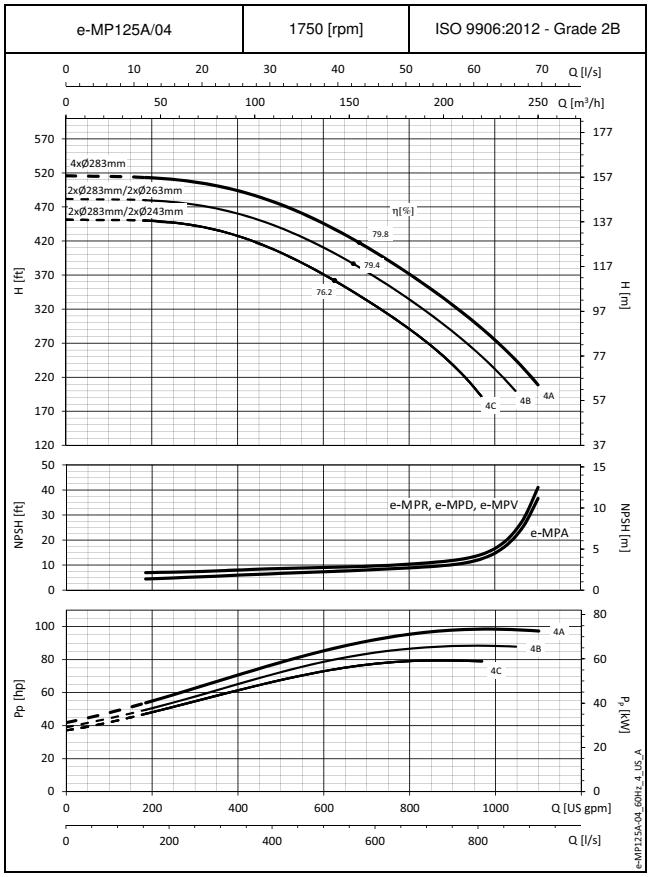


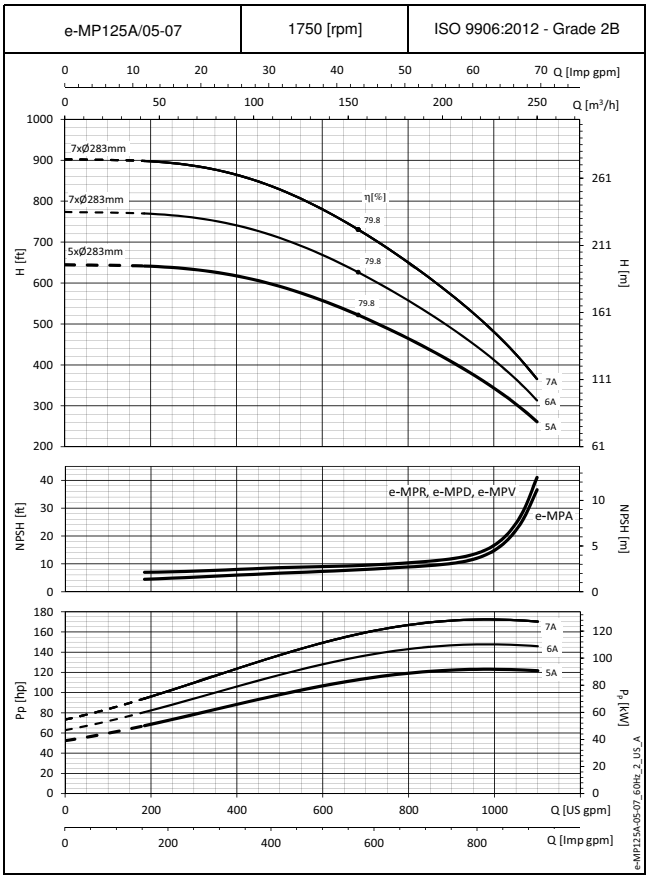
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP125A SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES



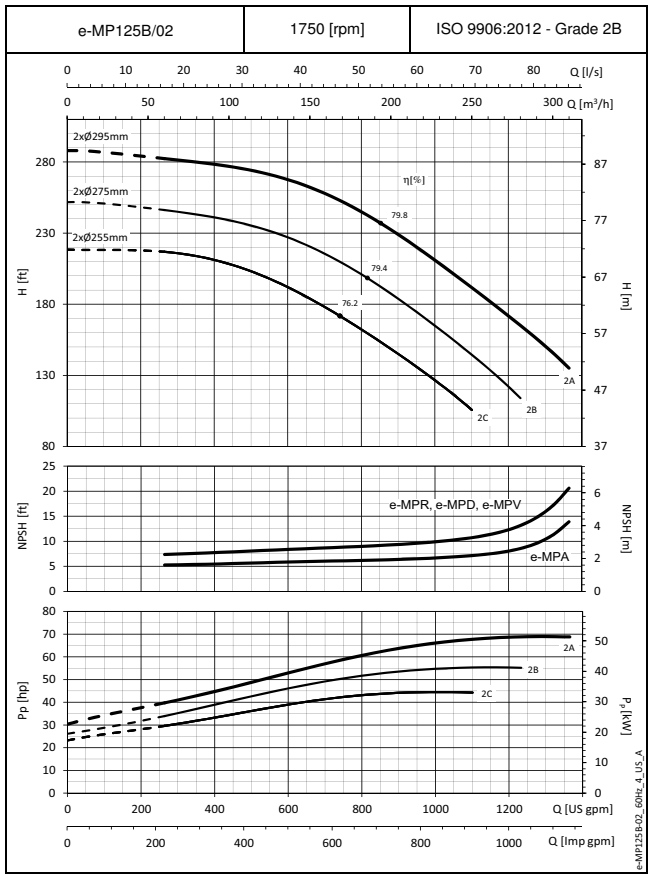


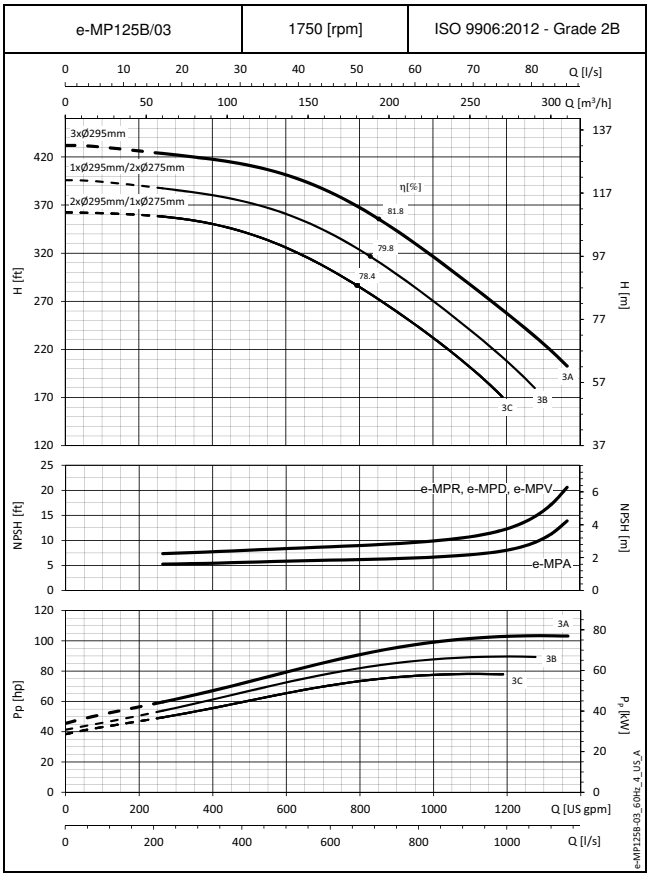


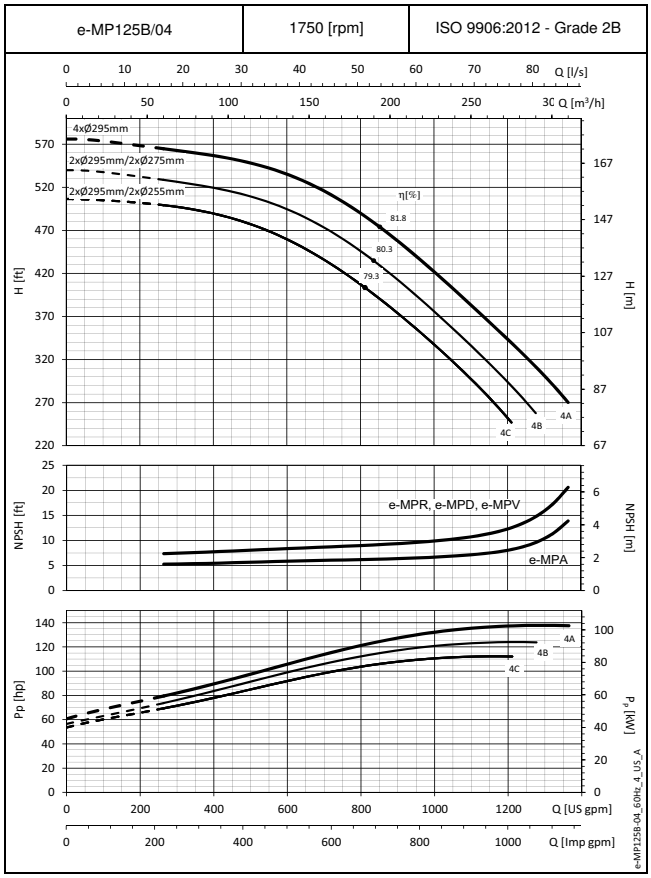


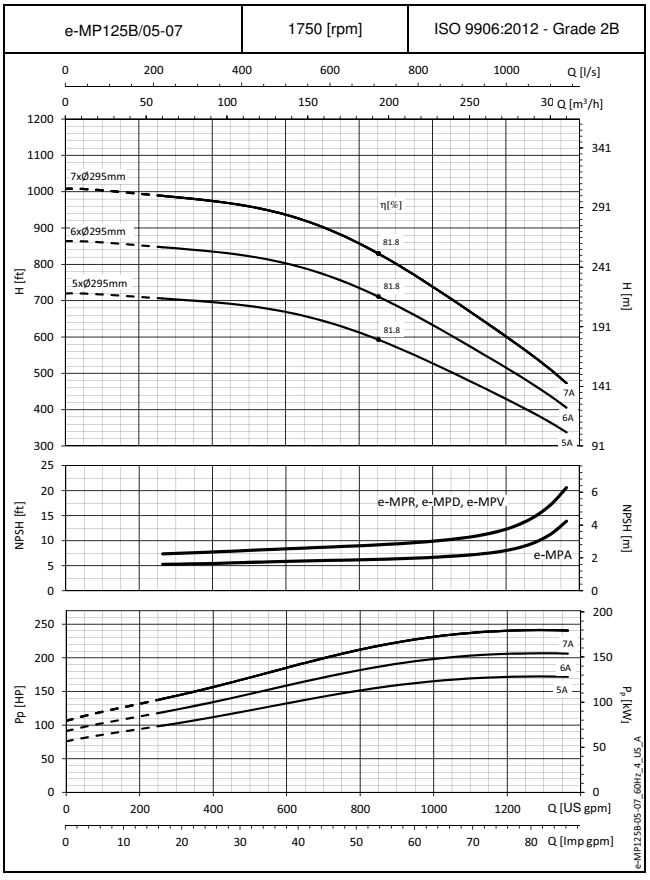
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP125B SERIES - OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES



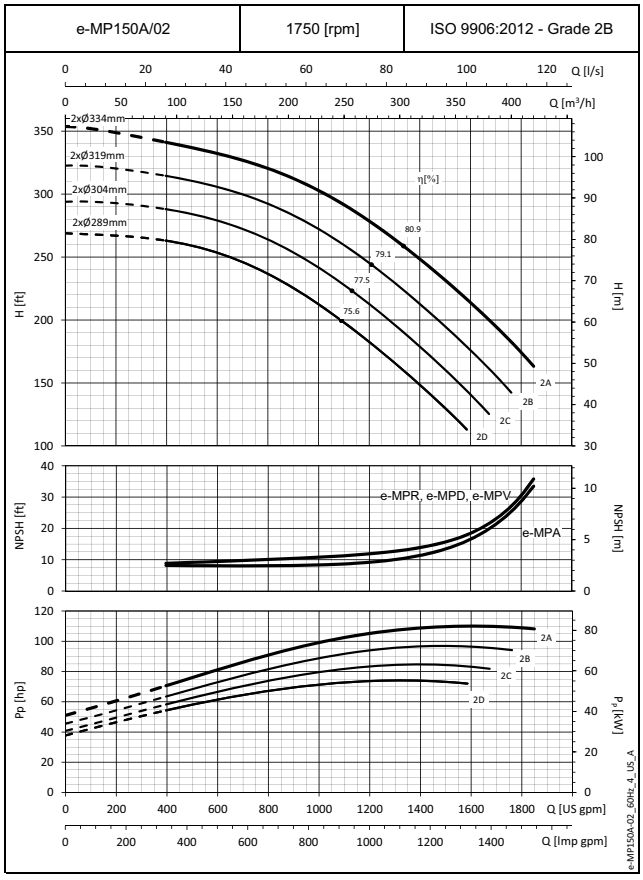


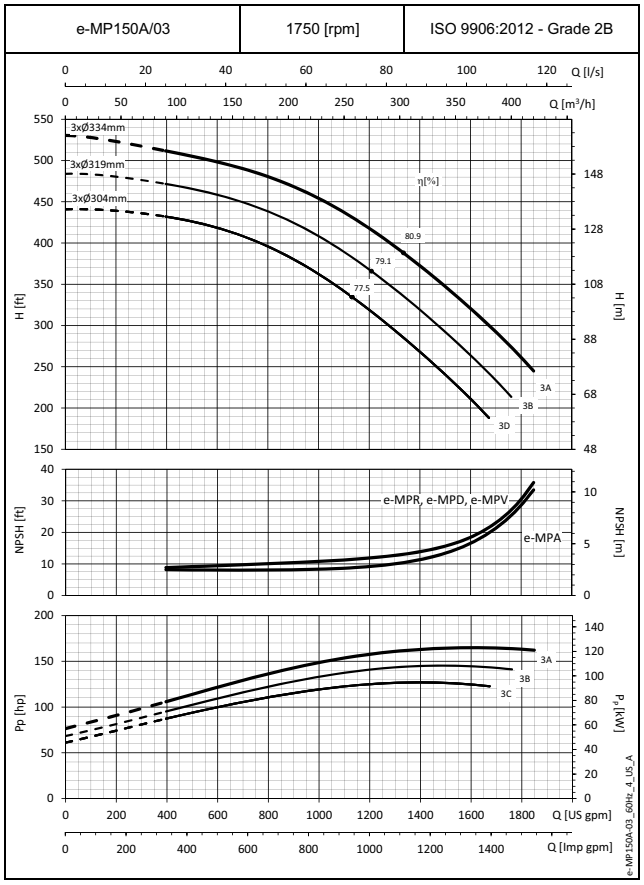


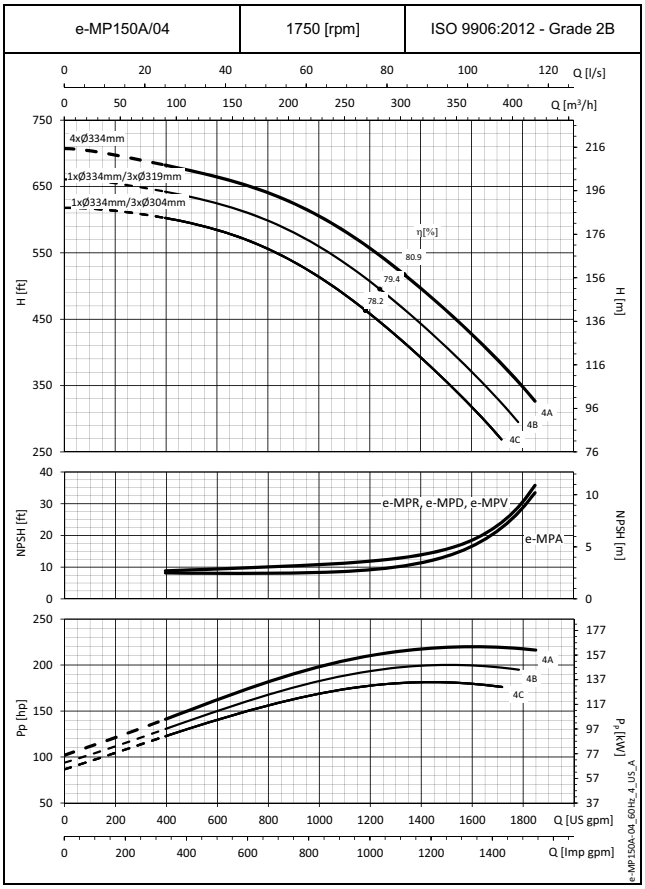


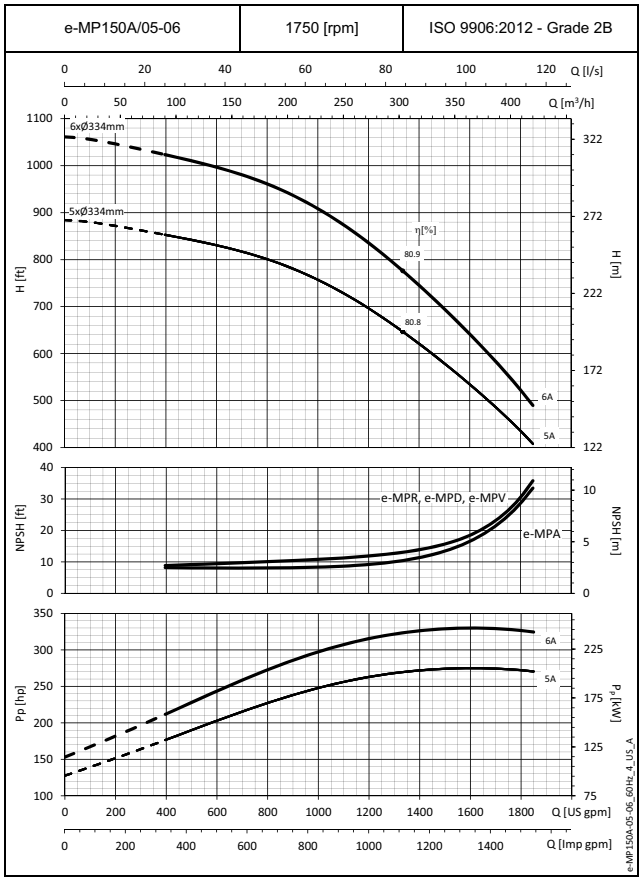
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP150A SERIES – OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES



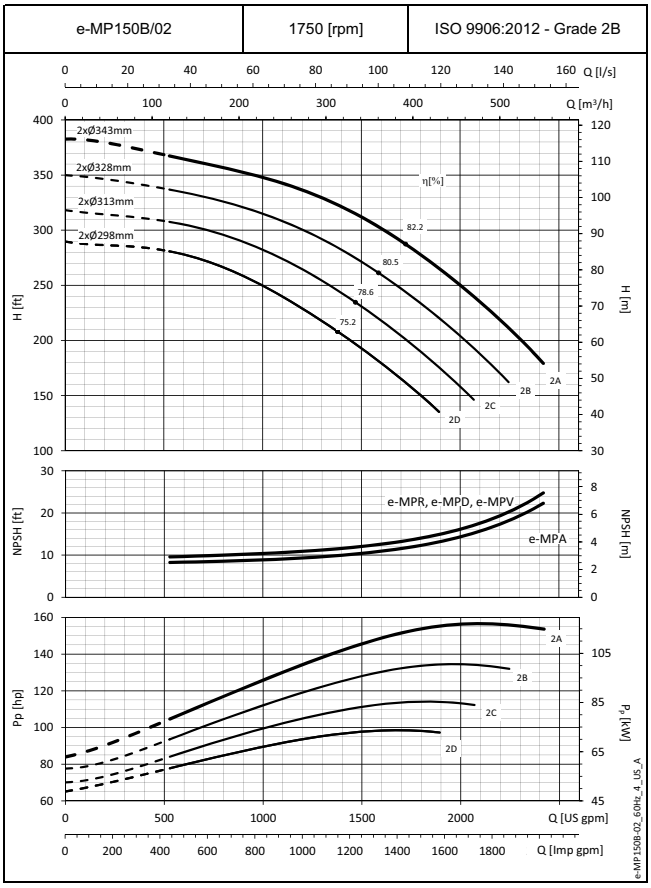


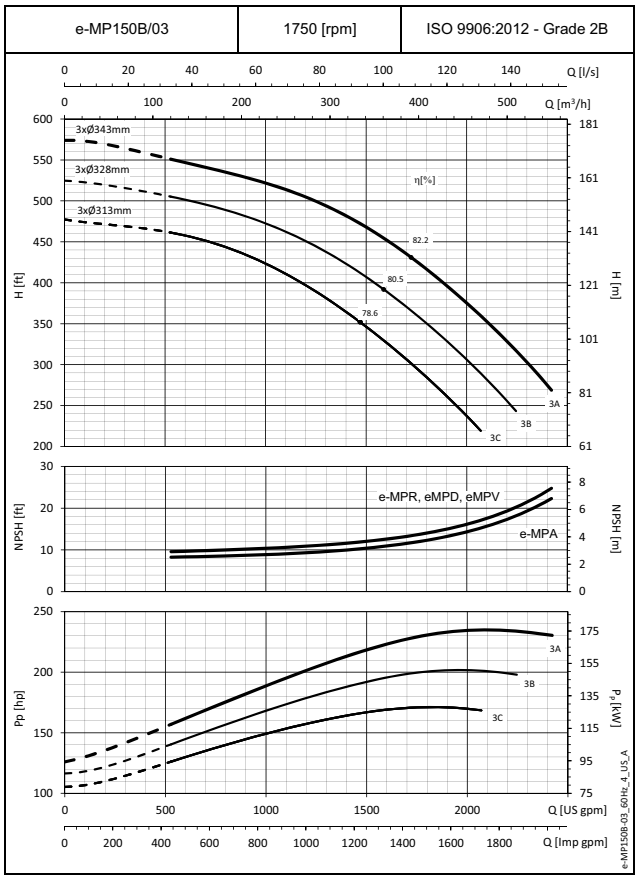


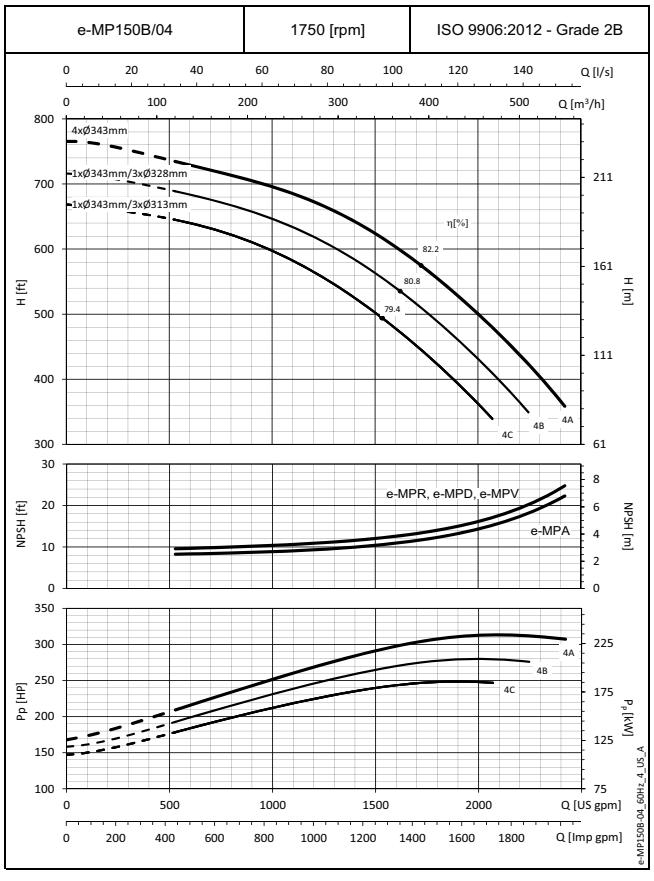


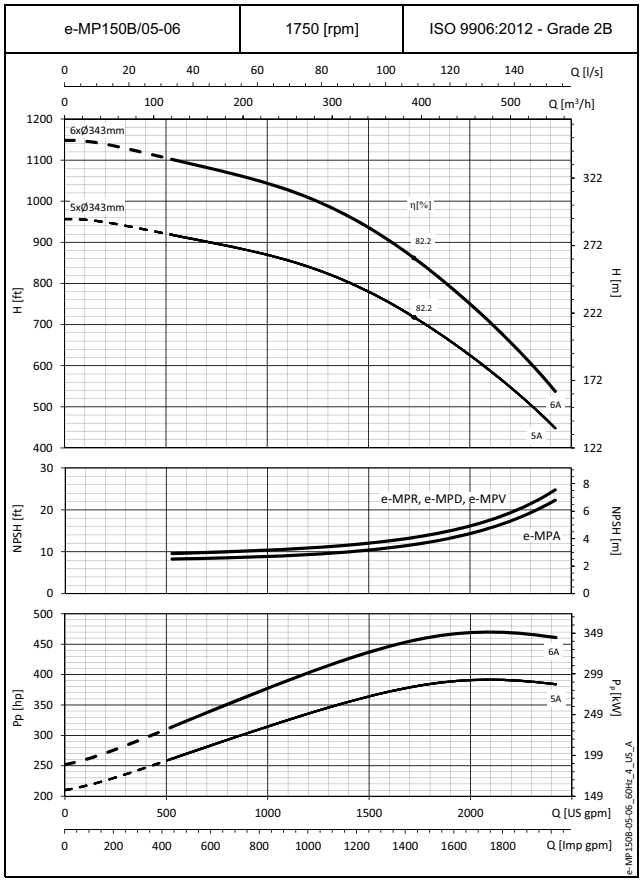
These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

e-MP150B SERIES – OPERATING CHARACTERISTICS AT 60 Hz, 4-POLES



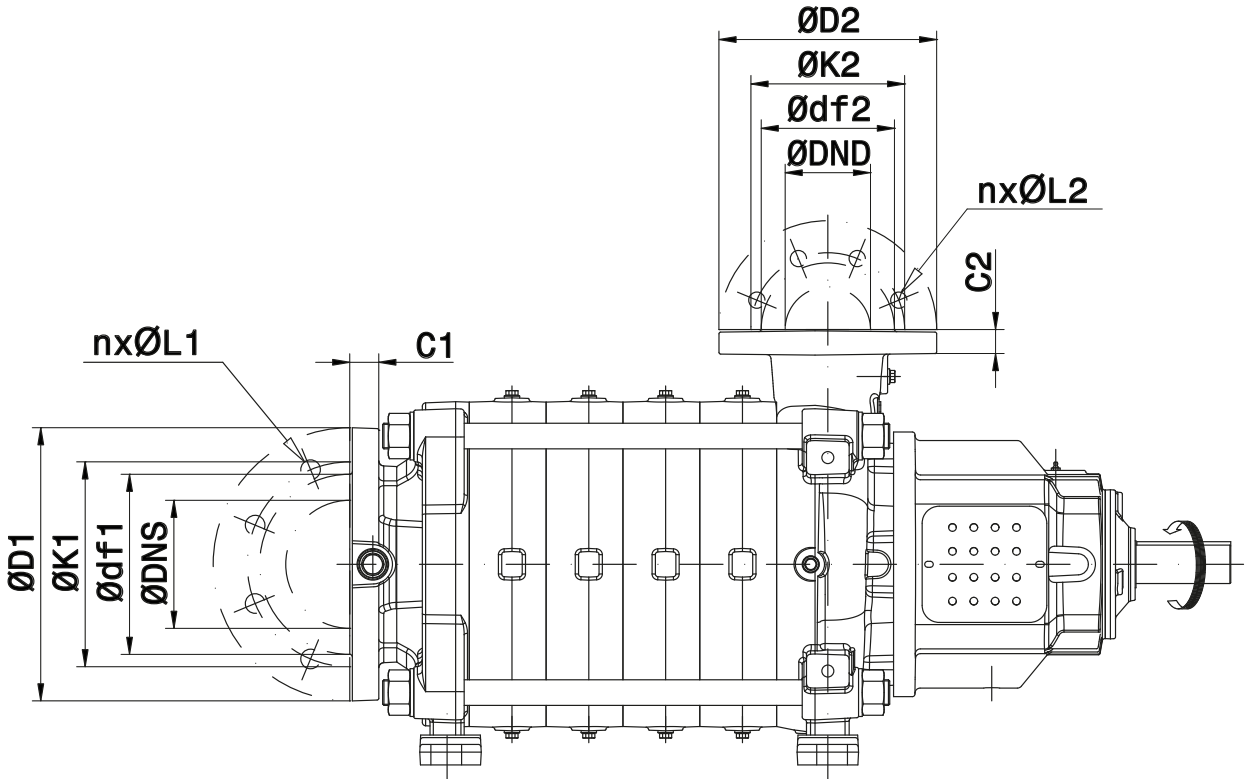






These performances are valid for cold water with density ρ = 62.42 lb/ft³ and viscosity ν = 1cSt.

MPA SERIES - FLANGE DIMENSIONS (ANSI B16.5)

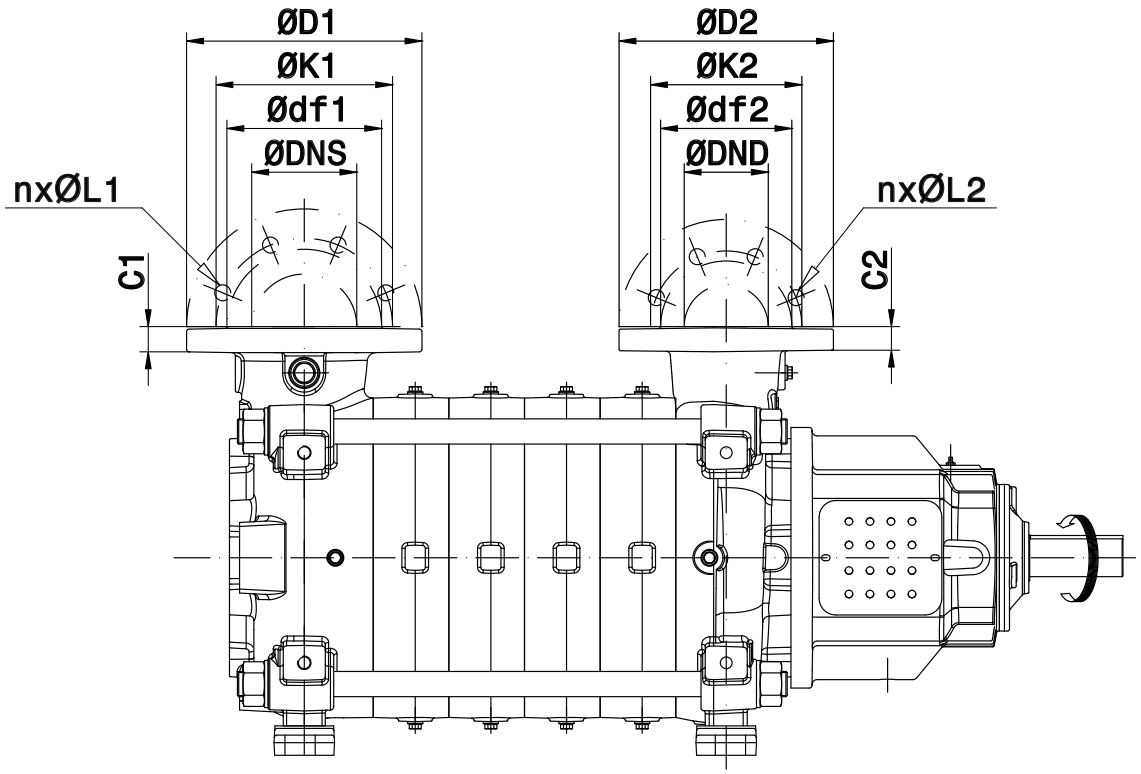


PUMP TYPE MPA		DIMENSIONS (inch)												
		Suction side							Discharge side					
	Size	DNS	CLASS	D1	K1	C1	df1	n x ØL1	DND	CLASS	D2	K2	C2	df2	n x ØL2
Ductile Iron EN-GLS-400-15 (ANSI B16.5)	50	4"	150	9.25	7.50	1.10	6.14	8x0.71	2"	150	7.09	4.74	1.10	3.90	4x0.71
	50								2"	300/600	7.09	5.00	1.10	3.90	8x0.71
	65	5"	150	10.63	8.50	1.18	7.24	8x0.87	2 1/2"	150	8.07	5.49	1.10	4.65	4x0.71
	65			0.00	0.00	0.00	0.00		2 1/2"	300/600	8.07	5.89	1.10	4.65	8x0.87
	100	6"	150	12.60	9.51	1.34	8.31	8x0.87	4"	150	10.83	7.50	1.30	6.14	8x0.71
	100	6"	300	12.60	10.63	1.34	8.31	12xM20	4"	300	10.83	7.87	1.30	6.14	8x0.87
	100								4"	600	10.83	8.50	1.30	6.14	8x1.02
	125	8"	150	14.96	11.75	1.57	10.47	8x0.87	5"	150	12.99	8.50	1.46	7.24	8x0.87
	125	8"	300	14.96	12.99	1.57	10.47	12x1.02	5"	300	12.99	9.25	1.46	7.24	8x0.87
	125			0.00	0.00	0.00	0.00		5"	600	12.99	10.51	1.46	7.24	8x1.16
	150	10"	150	17.72	14.25	1.81	12.76	12x1.02	6"	150	13.98	9.51	1.54	8.50	8x0.87
	150	10"	300	17.72	15.26	1.81	12.76	16x1.16	6"	300	13.98	10.63	1.54	8.50	12x0.87
	150								6"	600	13.98	11.50	1.54	8.50	12x1.16
Stainless Steel 1.4408, 1.4517 (ANSI B16.5)	50	4"	150	9.25	7.50	0.94	6.30	8x0.71	2"	150	7.09	4.74	1.02	4.02	4x0.71
	50								2"	300	7.09	5.00	1.02	4.02	8x0.71
	65	5"	150	10.63	8.50	1.02	7.40	8x0.87	2 1/2"	150	8.07	5.49	1.02	4.80	4x0.71
	65								2 1/2"	300/600	8.07	5.89	1.02	4.80	8x0.87
	100	6"	150	12.60	9.51	1.10	8.50	8x0.87	4"	150	10.83	7.50	1.18	6.38	8x0.71
	100	6"	300	12.60	10.63	1.10	8.50	12xM20	4"	300	10.83	7.87	1.18	6.38	8x0.87
	100								4"	600	10.83	8.50	1.18	6.38	8x1.02
	125	8"	150	14.96	11.75	1.34	10.63	8x0.87	5"	150	12.99	8.50	1.34	7.40	8x0.87
	125	8"	300	14.96	12.99	1.34	10.63	12x1.02	5"	300	12.99	9.25	1.34	7.40	8x0.87
	125								5"	600	12.99	10.51	1.34	7.40	8x1.16
	150	10"	150	17.72	14.25	1.50	12.76	12x1.02	6"	150	13.98	9.51	1.42	8.50	8x0.87
	150	10"	300	17.72	15.26	1.50	12.76	16x1.16	6"	300	13.98	10.63	1.42	8.50	12x0.87
	150								6"	600	13.98	11.50	1.42	8.50	12x1.16

NOTE: Value D, C and df may vary from standard

e-MPA-FL-ASME-en_a_td

MPD, MPR, MPV SERIES - FLANGE DIMENSIONS (ANSI B16.5)



PUMP TYPE		DIMENSIONS (mm)													
MPD, MPR, MPV		Suction side							Discharge side						
	Size	DNS	CLASS	D1	K1	C1	df1	n x ØL1	DND	CLASS	D2	K2	C2	df2	n x ØL2
Ductile Iron EN-GLS-400-15 (ANSI B16.5)	50	3"	150	8.268	6.004	1.024	5.197	4x0.71	2"	150	7.087	4.744	1.102	3.898	4x0.71
	50	3"	300	8.268	6.614	1.024	5.197	8x0.87	2"	300/600	7.087	5	1.102	3.898	8x0.71
	65	4"	150	10.04	7.5	1.102	6.142	8x0.71	2 1/2"	150	8.071	5.492	1.102	4.646	4x0.71
	65	4"	300	10.04	7.874	1.102	6.142	8x0.87	2 1/2"	300/600	8.071	5.886	1.102	4.646	8x0.87
	100	5"	150	11.02	8.504	1.181	7.244	8x0.87	4"	150	10.83	7.5	1.299	6.142	8x0.71
	100	5"	300	11.02	9.252	1.181	7.244	8x0.87	4"	300	10.83	7.874	1.299	6.142	8x0.87
	100								4"	600	10.83	8.504	1.299	6.142	8x1.02
	125	6"	150	12.6	9.508	1.339	8.504	8x0.87	5"	150	12.99	8.504	1.457	7.244	8x0.87
	125	6"	300	12.6	10.63	1.339	8.504	12x0.87	5"	300	12.99	9.252	1.457	7.244	8x0.87
	125								5"	600	12.99	10.51	1.457	7.244	8x1.16
	150	8"	150	14.96	11.75	1.575	10.63	8x0.87	6"	150	13.98	9.508	1.535	8.504	8x0.87
	150	8"	300	14.96	12.99	1.575	10.63	12x1.02	6"	300	13.98	10.63	1.535	8.504	12x0.87
	150								6"	600	13.98	11.5	1.535	8.504	12x1.16
Stainless Steel 1.4408, 1.4517 (ANSI B16.5)	50	3"	150	8.268	6.004	0.945	5.433	4x0.71	2"	150	7.087	4.744	1.024	4.016	4x0.71
	50	3"	300	8.268	6.614	0.945	5.433	8x0.87	2"	300	7.087	5	1.024	4.016	8x0.71
	65	4"	150	10.04	7.5	0.945	6.22	8x0.71	2 1/2"	150	8.071	5.492	1.024	4.803	4x0.71
	65	4"	300	10.04	7.874	0.945	6.22	8x0.87	2 1/2"	300/600	8.071	5.886	1.024	4.803	8x0.87
	100	5"	150	11.02	8.504	1.024	7.402	8x0.87	4"	150	10.83	7.5	1.181	6.378	8x0.71
	100	5"	300	11.02	9.252	1.024	7.402	8x0.87	4"	300	10.83	7.874	1.181	6.378	8x0.87
	100								4"	600	10.83	8.504	1.181	6.378	8x1.02
	125	6"	150	12.6	9.508	1.102	8.346	8x0.87	5"	150	12.99	8.504	1.339	7.402	8x0.87
	125	6"	300	12.6	10.63	1.102	8.346	12x0.87	5"	300	12.99	9.252	1.339	7.402	8x0.87
	125								5"	600	12.99	10.51	1.339	7.402	8x1.16
	150	8"	150	14.96	11.75	1.339	10.63	8x0.87	6"	150	13.98	9.508	1.417	8.504	8x0.87
	150	8"	300	14.96	12.99	1.339	10.63	12x1.02	6"	300	13.98	10.63	1.417	8.504	12x0.87
	150								6"	600	13.98	11.5	1.417	8.504	12x1.16

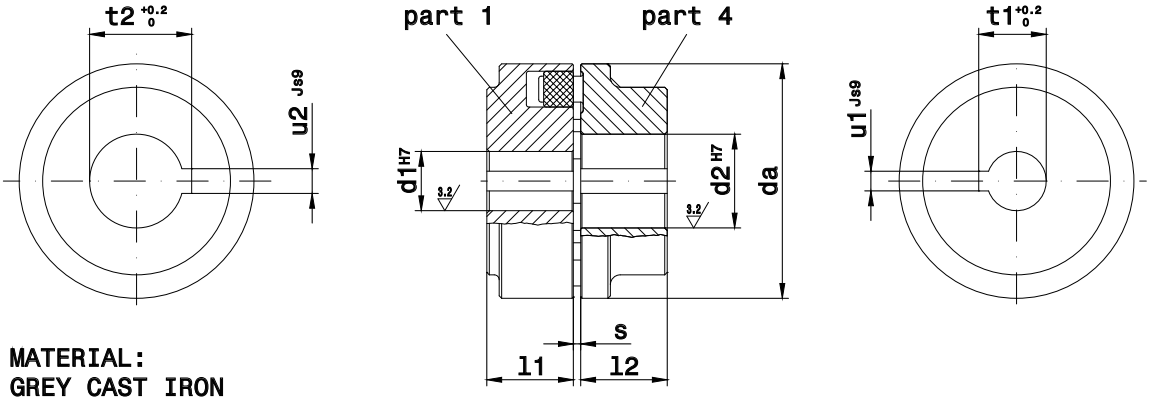
NOTE: Value D, C and df may vary from standard

e-MP-FL-ASME-us_a_td

ACCESSORIES

COUPLING DIMENSIONS

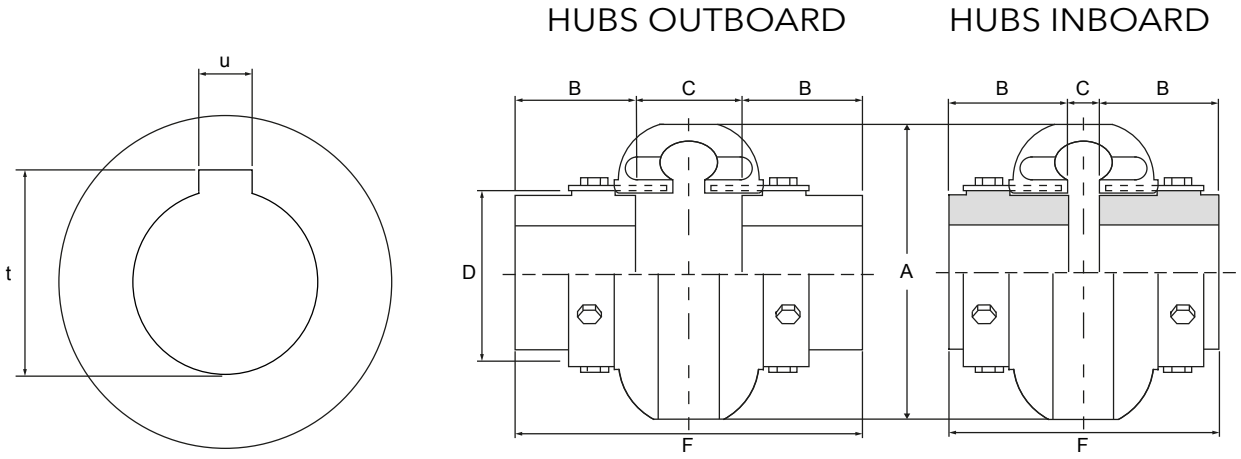
Dimensions in the next table are not final. Coupling dimensions to be used with NEMA motors for all horizontal configurations to be published soon. Please contact factory for more information.



MATERIAL:
GREY CAST IRON
WITH FLEXIBLE ELEMENTS MADE OF SYNTHETIC RUBBER 80 ShA

REF.	DENOMINATION	DIMENSIONS (inch)									
			PART 1 PUMP-SIDE HALF COUPLING					PART 4 MOTOR-SIDE HALF COUPLING			
	SIZE x d_1(mm) x d_2(mm)	d_a	d_1^{H7}	l_1	u_1^{js9}	$t_{1\ 0}^{+0.2}$	s	d_2^{H7}	l_2	u_2^{js9}	$t_{2\ 0}^{+0.2}$
B80A	B 80 x 28 x 28	3.150	1.102	1.181	0.315	1.232	0.08÷0.16	1.102	1.181	0.315	1.232
B80B	B 80 x 28 x 38	3.150	1.102	1.181	0.315	1.232	0.08÷0.16	1.496	1.181	0.394	1.626
B95A	B 95 x 28 x 42	3.740	1.102	1.378	0.315	1.232	0.08÷0.16	1.654	1.378	0.472	1.783
B95B	B 95 x 35 x 28	3.740	1.378	1.378	0.394	1.508	0.08÷0.16	1.102	1.378	0.315	1.232
B95C	B 95 x 35 x 38	3.740	1.378	1.378	0.394	1.508	0.08÷0.16	1.496	1.378	0.394	1.626
B95D	B 95 x 35 x 42	3.740	1.378	1.378	0.394	1.508	0.08÷0.16	1.654	1.378	0.472	1.783
B110A	B 110 x 28 x 42	4.331	1.102	1.575	0.315	1.232	0.08÷0.16	1.654	1.575	0.472	1.783
B110B	B 110 x 28 x 48	4.331	1.102	1.575	0.315	1.232	0.08÷0.16	1.890	1.575	0.551	2.039
B110C	B 110 x 35 x 42	4.331	1.378	1.575	0.394	1.508	0.08÷0.16	1.654	1.575	0.472	1.783
B110D	B 110 x 35 x 48	4.331	1.378	1.575	0.394	1.508	0.08÷0.16	1.890	1.575	0.551	2.039
B110E	B 110 x 45 x 38	4.331	1.772	1.575	0.551	1.921	0.08÷0.16	1.496	1.575	0.394	1.626
B110F	B 110 x 45 x 42	4.331	1.772	1.575	0.551	1.921	0.08÷0.16	1.654	1.575	0.472	1.783
B110G	B 110 x 45 x 48	4.331	1.772	1.575	0.551	1.921	0.08÷0.16	1.890	1.575	0.551	2.039
B125A	B 125 x 28 x 55	4.921	1.102	1.969	0.315	1.232	0.08÷0.16	2.165	1.969	0.630	2.335
B125B	B 125 x 35 x 55	4.921	1.378	1.969	0.394	1.508	0.08÷0.16	2.165	1.969	0.630	2.335
B125C	B 125 x 45 x 55	4.921	1.772	1.969	0.551	1.921	0.08÷0.16	2.165	1.969	0.630	2.335
B125D	B 125 x 52 x 42	4.921	2.047	1.969	0.630	2.217	0.08÷0.16	1.654	1.969	0.472	1.783
B125E	B 125 x 52 x 48	4.921	2.047	1.969	0.630	2.217	0.08÷0.16	1.890	1.969	0.551	2.039
B125F	B 125 x 52 x 55	4.921	2.047	1.969	0.630	2.217	0.08÷0.16	2.165	1.969	0.630	2.335
B140A	B 140 x 28 x 60	5.512	1.102	2.165	0.315	1.232	0.08÷0.16	2.362	2.165	0.709	2.535
B140B	B 140 x 35 x 60	5.512	1.378	2.165	0.394	1.508	0.08÷0.16	2.362	2.165	0.709	2.535
B140C	B 140 x 45 x 60	5.512	1.772	2.165	0.551	1.921	0.08÷0.16	2.362	2.165	0.709	2.535
B140D	B 140 x 52 x 60	5.512	2.047	2.165	0.630	2.217	0.08÷0.16	2.362	2.165	0.709	2.535
B160A	B 160 x 28 x 65	6.299	1.102	2.362	0.315	1.232	0.08÷0.16	2.559	2.362	0.709	2.732
B160B	B 160 x 35 x 65	6.299	1.378	2.362	0.394	1.508	0.08÷0.16	2.559	2.362	0.709	2.732
B160C	B 160 x 45 x 65	6.299	1.772	2.362	0.551	1.921	0.08÷0.16	2.559	2.362	0.709	2.732
B160D	B 160 x 52 x 65	6.299	2.047	2.362	0.630	2.217	0.08÷0.16	2.559	2.362	0.709	2.732
B180A	B 180 x 28 x 65	7.087	1.102	2.756	0.315	1.232	0.08÷0.16	2.559	2.756	0.709	2.732
B180B	B 180 x 35 x 65	7.087	1.378	2.756	0.394	1.508	0.08÷0.16	2.559	2.756	0.709	2.732
B180C	B 180 x 35 x 75	7.087	1.378	2.756	0.394	1.508	0.08÷0.16	2.953	2.756	0.787	3.146
B180D	B 180 x 45 x 65	7.087	1.772	2.756	0.551	1.921	0.08÷0.16	2.559	2.756	0.709	2.732
B180E	B 180 x 45 x 75	7.087	1.772	2.756	0.551	1.921	0.08÷0.16	2.953	2.756	0.787	3.146
B180F	B 180 x 52 x 65	7.087	2.047	2.756	0.630	2.217	0.08÷0.16	2.559	2.756	0.709	2.732
B180G	B 180 x 52 x 75	7.087	2.047	2.756	0.630	2.217	0.08÷0.16	2.953	2.756	0.787	3.146
B200A	B 200 x 35 x 75	7.874	1.378	3.150	0.394	1.508	0.08÷0.16	2.953	3.150	0.787	3.146
B200B	B 200 x 45 x 75	7.874	1.772	3.150	0.551	1.921	0.08÷0.16	2.953	3.150	0.787	3.146
B200C	B 200 x 45 x 80	7.874	1.772	3.150	0.551	1.921	0.08÷0.16	3.150	3.150	0.866	3.362
B200D	B 200 x 52 x 75	7.874	2.047	3.150	0.630	2.217	0.08÷0.16	2.953	3.150	0.787	3.146
B200E	B 200 x 52 x 80	7.874	2.047	3.150	0.630	2.217	0.08÷0.16	3.150	3.150	0.866	3.362
B225A	B 225 x 45 x 75	8.858	1.772	3.543	0.551	1.921	0.08÷0.16	2.953	3.543	0.787	3.146
B225B	B 225 x 45 x 80	8.858	1.772	3.543	0.551	1.921	0.08÷0.16	3.150	3.543	0.866	3.362
B225C	B 225 x 52 x 75	8.858	2.047	3.543	0.630	2.217	0.08÷0.16	2.953	3.543	0.787	3.146
B225D	B 225 x 52 x 80	8.858	2.047	3.543	0.630	2.217	0.08÷0.16	3.150	3.543	0.866	3.362

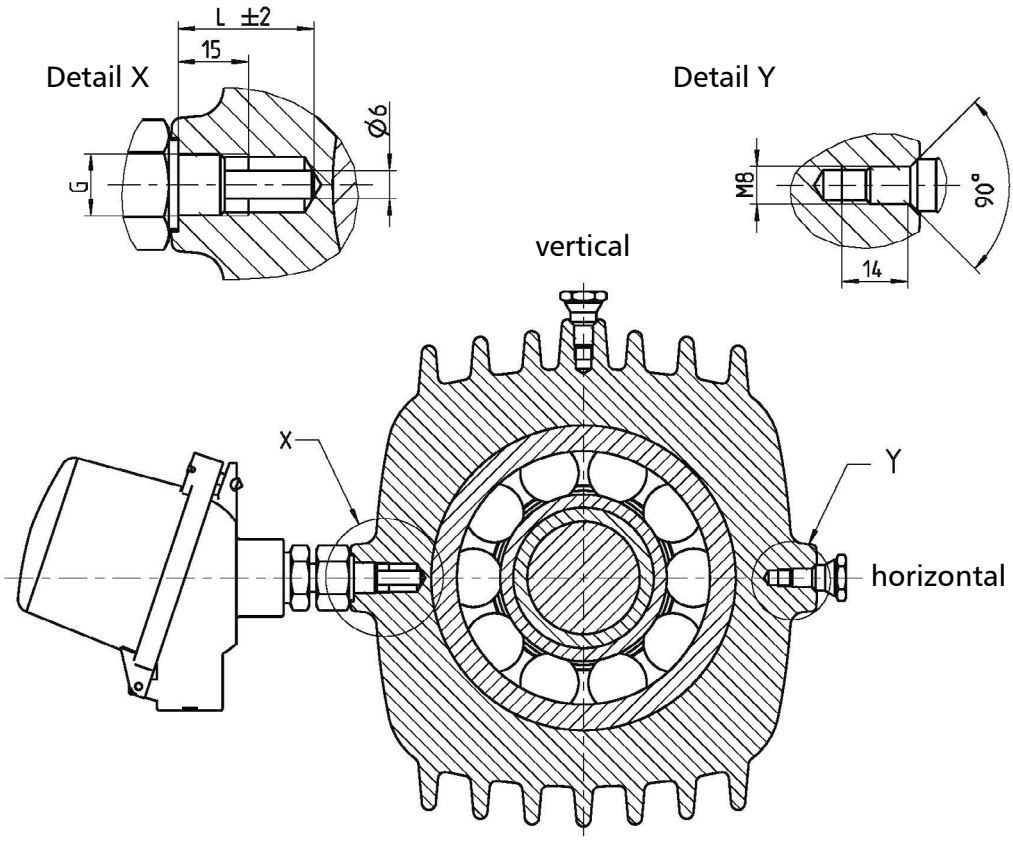
MPV SERIES - FLEXIBLE COUPLING DIMENSIONS



REF.	Dimensions (in)							Approx. Weight (lb)
	A	B	C		D	F		
			Hubs inboard	Hubs outboard		Hubs inboard	Hubs outboard	
E4	4.56	1.69	0.44	1.31	2.60	3.81	4.69	3.0
E5	5.38	1.75	0.81	1.81	3.13	4.31	5.31	5.4
E10	6.38	1.88	0.56	1.81	3.65	4.31	5.56	8.2
E20	7.25	2.06	0.50	2.38	4.48	4.62	6.50	13.0
E30	8.25	2.31	0.56	2.44	5.42	5.19	7.06	21.0
E40	9.50	2.50	0.56	2.68	6.63	5.56	7.68	35.0
E50	11.00	2.75	0.63	3.38	8.13	6.13	8.88	54.0
E60	12.50	3.25	0.69	3.44	8.75	7.19	9.94	72.0

MPV	PUMP HUB CLEARANCE FIT			MOTOR HUB INTERFERENCE FIT	
Size	HUB BORE DIA. (in)	DIM. t (in)	DIM. u (in)	HUB BORE DIA. (in)	KEY
50	1.1032/1.1039	1.232/1.240	0.3143/0.3157	1.6230/1.6240	3/8 SQ
				1.8730/1.8740	1/2 SQ
				2.1230/2.1240	1/2 SQ
				2.3730/2.3740	5/8 SQ
65	1.3789/1.3799	1.55679/1.5157	0.3930/0.3944	1.6230/1.6240	3/8 SQ
				1.8730/1.8740	1/2 SQ
				2.1230/2.1240	1/2 SQ
				2.3730/2.3740	5/8 SQ
100	1.7726/1.7736	1.9213/1.9291	0.5503/0.5520	1.8730/1.8740	1/2 SQ
				1.8730/1.8740	1/2 SQ
				2.1230/2.1240	1/2 SQ
				1.8730/1.8740	1/2 SQ
				2.1230/2.1240	1/2 SQ
				2.3730/2.3740	5/8 SQ
				2.8730/2.8740	3/4 SQ
				2.3730/2.3740	5/8 SQ
				3.3720/3.3735	7/8 SQ
				2.3730/2.3740	5/8 SQ
125	2.0484/2.0496	2.2165/2.2244	0.6291/0.6308	2.1230/2.1240	1/2 SQ
				2.3730/2.3740	5/8 SQ
				2.8730/2.8740	3/4 SQ
				2.3730/2.3740	5/8 SQ
				3.3720/3.3735	7/8 SQ
				2.3730/2.3740	5/8 SQ
				3.3720/3.3735	7/8 SQ
				2.3730/2.3740	5/8 SQ
				3.3720/3.3735	7/8 SQ

SENSOR CONNECTOR AND SENSORS FOR PUMP MONITORING AND DIAGNOSTIC SYSTEMS



Bearing temperature (X)[1]			
PUMP SIZE	**G [inch]**	**MPA, MPR, MPD**	**MPV**
		L [inch]	**L [inch]**
50	1/4	0.79	3.15
65	1/4	0.98	3.70
100	1/4	0.79	3.98
125	1/4	0.98	4.49
150	1/4	1.18	5.12
Bearing vibrations sensors (Y)[2]			

1 = Bearing temperature sensor: eg. PT100 - (4 to 20 mA)

2 = Bearing vibration nipple: eg. SPM 32000

Standard dimensions (see also figure above) are metric. Adapters for USC units are available.

REPORTS AND DECLARATIONS

i) Test reports

a) **Factory Test Report**
- Test report compiled at the end of the assembly line, including flow-head performance test and hydrostatic pressure test.

b) **Audit Test Report**
- Test report for electric pumps compiled in the test room, comprising flow-head-pump input-pump efficiency performance test

c) **NPSH Test Report**
- Test report for electric pumps compiled in the test room, comprising flow-NPSH performance test

d) **Noise Test Report**
- Report indicating sound pressure and power measurements (EN ISO 20361, EN ISO 11203, EN ISO 4871)

e) **Vibration Test Report**
(unavailable for submerged or submergible pumps) - Report indicating vibration measurements (ISO 10816-1)

ii) Declaration of product conformity with the technical requirements indicated in the order

a) **EN 10204:2004 - type 2.1**
- does not include test results on supplied or similar products.

b) **EN 10204:2004 - type 2.2**
- includes test results (materials certificates) on similar products.

iii) Issue of a further EC Declaration of Conformity,
- in addition to the one accompanying the product, it comprises references to European law and the main technical standards (e.g.: MD 2006/42/EC, EMCD 2004/108/EC, ErP 2009/125/EC).

N.B.: if the request is made after receipt of the product, communicate the code (name) and serial number (date + progressive number).

iv) Manufacturer's declaration of conformity
- relative to one of more types of products without indicating specific codes and serial numbers.

v) Other certificates and/or documentation on request
- subject to availability or feasibility.

vi) Duplication of certificates and/or documentation on request
- subject to availability or feasibility.

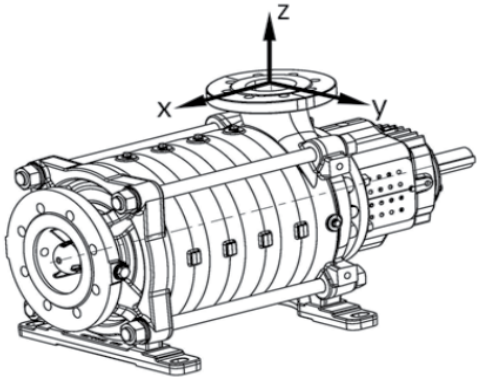
TECHNICAL APPENDIX

FORCES AND MOMENTS AT PUMP FLANGES

PERMISSIBLE FORCES AND MOMENTS AT PUMP FLANGES

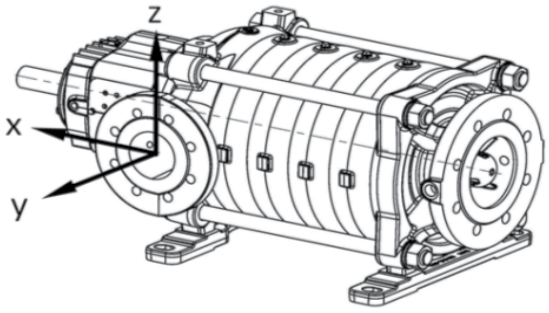
Forces and moments for horizontal pump similar to ISO5199

Top flange (e-MPA / e-MPR / e-MPD)



Material Code: DNC, NNN, RNN, RRR, TTT							
Fx	Fy	Fz	∑F	Mx	My	Mz	∑M
[lbf]	[lbf]	[lbf]	[lbf]	[lbf·in]	[lbf·in]	[lbf·in]	[lbf·in]
202	182	223	352	6889	4411	5341	9770
250	229	283	442	7509	5031	5650	10659
303	277	337	531	8129	5341	6270	11572
405	364	452	708	9058	5960	7199	13015
479	432	533	836	11226	7509	9987	16798
607	546	674	1059	13704	9058	10917	19724
809	728	904	1415	18351	12465	14634	26576

Side flange (e-MPA / e-MPR / e-MPD)



Material Code: DNC, NNN, RNN, RRR, TTT							
Fx	Fy	Fz	∑F	Mx	My	Mz	∑M
[lbf]	[lbf]	[lbf]	[lbf]	[lbf·in]	[lbf·in]	[lbf·in]	[lbf·in]
202	223	182	352	6889	4411	5341	9770
250	283	229	442	7509	5031	5650	10659
303	337	277	531	8129	5341	6270	11572
405	452	364	708	9058	5960	7199	13015
479	533	432	836	11226	7509	9987	16798
607	674	546	1059	13704	9058	10917	19724
809	904	728	1415	18351	12465	14634	26576

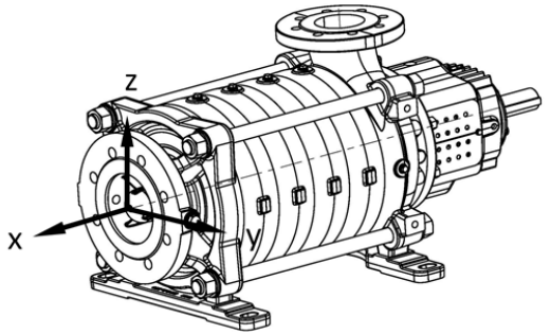
TECHNICAL APPENDIX

FORCES AND MOMENTS AT PUMP FLANGES

PERMISSIBLE FORCES AND MOMENTS AT PUMP FLANGES

Forces and moments for horizontal pump similar to ISO5199

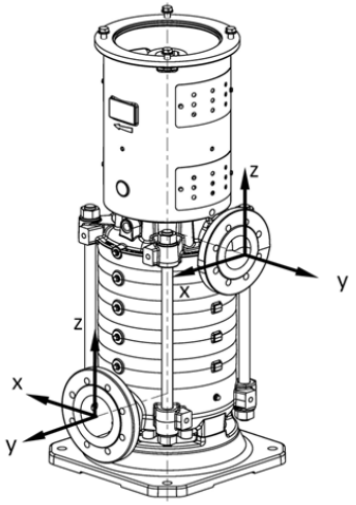
End flange (e-MPA)



Material Code : DNC, NNN, RNN, RRR, TTT							
Fx	Fy	Fz	∑F	Mx	My	Mz	∑M
[lbf]	[lbf]	[lbf]	[lbf]	[lbf·in]	[lbf·in]	[lbf·in]	[lbf·in]
452	405	364	708	9058	5960	7199	13015
533	479	432	836	11226	7509	9987	16798
674	607	546	1059	13704	9058	10917	19724
904	809	728	1415	18351	12465	14634	26576
1126	1005	910	1763	25786	17732	20829	37592

Forces and moments for vertical pump similar to ISO5199

Side flange (e-MPV)



Material Code : DNC, NNN, RNN, RRR, TTT							
Fx	Fy	Fz	∑F	Mx	My	Mz	∑M
[lbf]	[lbf]	[lbf]	[lbf]	[lbf·in]	[lbf·in]	[lbf·in]	[lbf·in]
202	223	182	352	6889	4411	5341	9770
250	283	229	442	7509	5031	5650	10659
303	337	277	531	8129	5341	6270	11572
405	452	364	708	9058	5960	7199	13015
479	533	432	836	11226	7509	9987	16798
607	674	546	1059	13704	9058	10917	19724
809	904	728	1415	18351	12465	14634	26576

TECHNICAL APPENDIX

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 vapor-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 vapor pressure of the liquid.

The vapor-filled cavities flow with the current and when they reach a higher pressure areas the vapor 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 feet) of the liquid measured at suction under conditions of incipient cavitation, excluding the vapor pressure (expressed in feet) that the liquid has at the pump inlet .

A margin above the NPSHr is necessary in order to achieve the pump's published performance and an adequate service life.

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

$$\mathbf{h_p + h_z \geq (NPSHr + 2\ ft) + h_f + h_{pv}}$$

where:

h_p is the absolute pressure applied to the free liquid surface in the suction tank, expressed in feet of liquid; h_p is the quotient between the barometric pressure and the specific weight of the liquid;

h_z is the suction lift between the pump axis and the free liquid surface in the suction tank, expressed in feet; h_z is negative when the liquid level is lower than the pump axis;

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

h_{pv} is the vapor pressure of the liquid at the operating temperature, expressed in feet of the liquid. h_{pv} is the quotient between the Pv vapor pressure and the liquid's specific weight;

2ft is the safety margin.

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 (40°F) 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 (°F)	68	104	140	176	194	230	248
Suction loss (ft)	- .7	2.3	6.6	16.4	24.3	50.5	70.5

Elevation above sea level (ft)	1600	3300	4900	6500	8200	9800
Suction loss (ft)	1.8	3.6	5.4	7.2	9.0	10.8

To reduce it to a minimum, especially in cases of high suction head (over 13 – 16 feet) 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.

TECHNICAL APPENDIX

VAPOUR PRESSURE ps AND ρ DENSITY OF WATER TABLE

Temp (°F)	Temp (°C)	Specific Volume (ft3/lb)	Specific Gravity @ 39.2°F	Specific Gravity @ 60°F	Specific Gravity @ 68°F	Weight (lb/ft3)	Vapor Pressure (psi abs)
32	0.0	0.01602	1.0000	1.0010	1.0020	62.42	0.0880
35	1.7	0.01602	1.0000	1.0010	1.0020	62.42	0.1000
40	4.4	0.01602	1.0000	1.0010	1.0020	62.42	0.1220
50	10.0	0.01603	0.9990	1.0010	1.0020	62.38	0.1780
60	15.6	0.01604	0.9990	1.0000	1.0010	62.34	0.2560
70	21.1	0.01606	0.9980	0.9990	1.0000	62.27	0.3630
80	26.7	0.01608	0.9960	0.9980	0.9990	62.19	0.5070
90	32.2	0.01610	0.9950	0.9960	0.9970	62.11	0.6980
100	37.8	0.01613	0.9930	0.9940	0.9950	62.00	0.9490
120	48.9	0.01620	0.9890	0.9900	0.9910	61.73	1.6920
140	60.0	0.01629	0.9830	0.9850	0.9860	61.39	2.8890
160	71.1	0.01639	0.9770	0.9790	0.9790	61.01	4.7410
180	82.2	0.01651	0.9700	0.9720	0.9730	60.57	7.5100
200	93.3	0.01663	0.9630	0.9640	0.9660	60.13	11.5260
212	100.0	0.01672	0.9580	0.9590	0.9600	59.81	14.6960
220	104.4	0.01677	0.9550	0.9560	0.9570	59.63	17.1860
240	115.6	0.01692	0.9470	0.9480	0.9490	59.10	24.9700
260	126.7	0.01709	0.9380	0.9390	0.9400	58.51	35.4300
280	137.8	0.01726	0.9280	0.9290	0.9300	58.00	49.2000
300	148.9	0.01745	0.9180	0.9190	0.9200	57.31	67.0100
320	160.0	0.01756	0.9080	0.9090	0.9100	56.66	89.6600
340	171.1	0.01787	0.8960	0.8980	0.8990	55.96	118.010
360	182.2	0.01811	0.8850	0.8860	0.8870	55.22	153.040
380	193.3	0.01836	0.8730	0.8740	0.8750	54.47	195.770
400	204.4	0.01864	0.8590	0.8600	0.8620	53.65	247.310
420	215.6	0.01894	0.8460	0.8470	0.8480	52.80	308.830
440	226.7	0.01926	0.8320	0.8330	0.8340	51.92	381.590
460	237.8	0.01960	0.8170	0.8180	0.8190	51.02	466.900
480	248.9	0.02000	0.8010	0.8020	0.8030	50.00	566.100
500	260.0	0.02040	0.7850	0.7860	0.7870	49.02	680.800
520	271.1	0.02090	0.7650	0.7660	0.7670	47.85	812.400
540	282.2	0.02150	0.7460	0.7470	0.7480	46.51	962.500
560	293.3	0.02210	0.7260	0.7270	0.7280	45.30	1133.10
580	304.4	0.02280	0.7030	0.7040	0.7040	43.90	1325.80
600	315.6	0.02360	0.6780	0.6790	0.6800	42.30	1542.90
620	326.7	0.02470	0.6490	0.6500	0.6500	40.50	1786.60
640	337.8	0.02600	0.6170	0.6180	0.6180	38.50	2059.70
660	348.9	0.02780	0.5770	0.5770	0.5780	36.00	2365.40
680	360.0	0.03050	0.5250	0.5260	0.5270	32.80	2708.10
700	371.1	0.03690	0.4340	0.4350	0.4350	27.10	3093.70

TECHNICAL APPENDIX

FRICTION LOSS - STEEL PIPE: FRICTION LOSS (IN FEET OF HEAD) PER 100 FT.

FLOW RATE		NOMINAL DIAMETER													
GPM	GPH	⅜" ft.	½" ft.	¾" ft.	1" ft.	1¼" ft.	1½" ft.	2" ft.	2½" ft.	3" ft.	4" ft.	5" ft.	6" ft.	8" ft.	10" ft.
1	60	4.30	1.86	0.26											
2	120	15.00	4.78	1.21	0.38										
3	180	31.80	10.00	2.50	0.77										
4	240	54.90	17.10	4.21	1.30	0.34									
5	300	83.50	25.80	6.32	1.93	0.51	0.24								
6	360		36.50	8.87	2.68	0.70	0.33	0.10							
7	420		48.70	11.80	3.56	0.93	0.44	0.13							
8	480		62.70	15.00	4.54	1.18	0.56	0.17							
9	540			18.80	5.65	1.46	0.69	0.21							
10	600			23.00	6.86	1.77	0.83	0.25	0.11	0.04					
12	720			32.60	9.62	2.48	1.16	0.34	0.15	0.05					
15	900			49.70	14.70	3.74	1.75	0.52	0.22	0.08					
20	1200			86.10	25.10	6.34	2.94	0.87	0.36	0.13					
25	1500				38.60	9.65	4.48	1.30	0.54	0.19					
30	1800				54.60	13.60	6.26	1.82	0.75	0.26					
35	2100				73.40	18.20	8.37	2.42	1.00	0.35					
40	2400				95.00	23.50	10.79	3.10	1.28	0.44					
45	2700					30.70	13.45	3.85	1.60	0.55					
70	4200					68.80	31.30	8.86	3.63	1.22	0.35				
100	6000						62.20	17.40	7.11	2.39	0.63				
150	9000							38.00	15.40	5.14	1.32				
200	12000							66.30	26.70	8.90	2.27	0.74	0.30	0.08	
250	15000							90.70	42.80	14.10	3.60	1.20	0.49	0.13	
300	18000								58.50	19.20	4.89	1.58	0.64	0.16	0.05
350	21000								79.20	26.90	6.72	2.18	0.88	0.23	0.07
400	24000								103.00	33.90	8.47	2.72	1.09	0.28	0.09
450	27000								130.00	42.75	10.65	3.47	1.36	0.35	0.11
500	30000								160.00	52.50	13.00	4.16	1.66	0.42	0.14
550	33000								193.00	63.20	15.70	4.98	1.99	0.51	0.16
600	36000								230.00	74.80	18.60	5.88	2.34	0.60	0.19
650	39000									87.50	21.70	6.87	2.73	0.69	0.22
700	42000									101.00	25.00	7.93	3.13	0.80	0.26
750	45000									116.00	28.60	9.05	3.57	0.91	0.29
800	48000									131.00	32.40	10.22	4.03	1.02	0.33
850	51000									148.00	36.50	11.50	4.53	1.15	0.37
900	54000									165.00	40.80	12.90	5.05	1.27	0.41
950	57000									184.00	45.30	14.30	5.60	1.41	0.46
1000	60000									204.00	50.20	15.80	6.17	1.56	0.50

EQUIVALENT NUMBER OF FEET STRAIGHT PIPE FOR DIFFERENT FITTINGS

TYPE OF FITTINGS	SIZE OF FITTINGS (inch)												
	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	4"	5"	6"	8"	10"
90° Elbow	1.5	2.0	2.7	3.5	4.3	5.5	6.5	8.0	10.0	14.0	15.0	20.0	25.0
45° Elbow	0.8	1.0	1.3	1.7	2.0	2.5	3.0	3.8	5.0	6.3	7.1	9.4	12.0
Long Sweep Elbow	1.0	1.4	1.7	2.3	2.7	3.5	4.2	5.2	7.0	9.0	11.0	14.0	
Close Return Bend	3.6	5.0	6.0	8.3	10.0	13.0	15.0	18.0	24.0	31.0	37.0	39.0	
Tee-Straight Run	1.0	2.0	2.0	3.0	3.0	4.0	5.0						
Tee-Side Inlet or Outlet or Pitless Adapter	3.3	4.5	5.7	7.6	9.0	12.0	14.0	17.0	22.0	27.0	31.0	40.0	
① Ball or Globe Valve Open	17.0	22.0	27.0	36.0	43.0	55.0	67.0	82.0	110.0	140.0	160.0	220.0	
① Angle Valve Open	8.4	12.0	15.0	18.0	22.0	28.0	33.0	42.0	58.0	70.0	83.0	110.0	
Gate Valve-Fully Open	0.4	0.5	0.6	0.8	1.0	1.2	1.4	1.7	2.3	2.9	3.5	4.5	
Check Valve (Swing)	4.0	5.0	7.0	9.0	11.0	13.0	16.0	20.0	26.0	33.0	39.0	52.0	65.0
In Line Check Valve (Spring) or Foot Valve	4.0	6.0	8.0	12.0	14.0	19.0	23.0	32.0	43.0	58.0			

① There are many new, full port valve designs available today which are more efficient and create much less friction loss, consult with valve suppliers for new data.

TECHNICAL APPENDIX

VOLUMETRIC CAPACITY

Units	U.S. Gallons Per Minute	Million U.S. Gallons Per Day	Cubic Feet Per Second	Cubic Meters Per Hour	Liters Per Second	Imperial Gallons Per Minute	Cubic Inch Per Minute
1 U.S. Gallon Per Minute	**1**	0.00144	0.00223	0.227	0.0631	0.8327	231.00
1 Million U.S. GPD	694.5	**1**	1.547	157.73	43.8	578.25	160416.83
1 Cubic Foot Per Second	448.8	0.646	**1**	101.9	28.32	373.40	103587.55
1 Cubic Meter Per Hour	4.403	0.00634	0.00981	**1**	0.2778	3.6682	1017.62
1 Liter Per Second	15.85	0.0228	0.0353	3.6	**1**	13.20	3660.86
1 Imp. Gallons Per Minute	1.201	0.00173	0.00268	0.27262	0.07578	**1**	277.42
1 Cubic Inch Per Minute	0.004329	0.000006	0.000010	0.000983	0.000273	0.003605	**1**

LENGTH

Units	Inch	Foot	Yard	Mile	Meter	Kilometer	Nautical mile
1 Inch	**1**	2.31	0.704	2.04	0.0681	0.0703	0.0000137
1 Foot	0.433	**1**	0.305	0.882	0.02947	0.0305	0.00016
1 Yard	1.421	3.28	**1**	2.89	0.0967	0.1	0.00049
1 Mile	0.491	1.134	0.3456	**1**	0.0334	0.0345	0.86842
1 Meter	14.7	33.93	10.34	29.92	**1**	1.033	0.0005396
1 Kilometer	14.22	32.8	10	28.96	0.968	**1**	0.53967
1 Nautical mile	72960	6080	2026.66	1.152	1853.18	1.853	**1**

POWER

Unit	Horsepower	Ft. – Lbs. Per Minute	Watts	Kilowatts	Metric Horsepower	B.T.U. Per Minute	kgf - m Per Second
1 Horsepower	**1**	33000	746	0.746	1.014	42.4	76.040
1 Ft. – Lb. Per Minute	0.0000303	**1**	0.0226	0.0000226	0.0000307	0.001285	0.138
1 Watt	0.00134	44.2	**1**	0.001	0.00136	0.0568	0.102
1 Kilowatt	1.341	44.25	1000	**1**	1.36	56.8	101.971
1 Metric Horsepower	0.986	32550	736	0.736	**1**	41.8	74.991
1 B.T.U. Per Minute	0.0236	778.4	17.6	0.0176	0.0239	**1**	1.793
1 kgf - m Per Second	0.01315	7.23301	9.80670	0.00981	0.01334	0.55770	**1**

HEAD

Units	Lbs. Per Square Inch	Feet of Water	Meters of Water	Inches of Mercury	Atmospheres	Kilograms Per Sq. C.M.	bar
1 Lb. Per Square Inch	**1**	2.31	0.704	2.04	0.0681	0.0703	0.0690
1 Foot of Water	0.433	**1**	0.305	0.882	0.02947	0.0305	0.0299
1 Meter of Water	1.421	3.28	**1**	2.89	0.0967	0.1	0.0981
1 Inch of Mercury	0.491	1.134	0.3456	**1**	0.0334	0.0345	0.0339
1 Atm (at Sea Level)	14.7	33.93	10.34	29.92	**1**	1.033	1.0132
1 Kilogram Per Sq. C.M.	14.22	32.8	10	28.96	0.968	**1**	0.9809
1 bar	14.491	33.45	10.198	29.47	0.987	1.0195	**1**

Equivalent units are based on density of fresh water from 32° to 62° F. Equivalent units are based on density of mercury from 32° to 62° F, sufficient accuracy.
Each 1,000 feet of ascent decreases pressure about ½ lb./square inch.

VOLUME

Units	U.S. Gallons	Imperial Gallons	Cubic Inches	Cubic Feet	Acre Feet	Pounds	Cubic Meters
1 U.S. Gallon	**1**	0.833	231	0.1337	0.00000307	8.35	0.003785
1 Imperial Gallon	1.201	**1**	277.4	0.1605	0.00000369	10.02	0.004546
1 Cubic Inch	0.00433	0.0036	**1**	0.000579	—	0.0361	—
1 Cubic Foot	7.48	6.23	1728	**1**	0.000023	62.4	0.02832
1 Acre-Foot	325.85	271335	—	43560	**1**	—	1233.5
1 Pound*	0.12	0.0998	27.7	0.016	—	**1**	—
1 Cubic Meter	264.2	220	61023	35.314	0.000811	2205	**1**

* Weights shown based on maximum density of fresh water at 39° F.

AREA

Units	Square Inch	Square Feet	Square Yard	Acres	Square Miles	Square Meters	Hectares
1 Square Inch	**1**	0.00694	0.00077	—	—	—	—
1 Square Foot	144	**1**	0.111	—	—	0.0929	—
1 Square Yard	1296	9	**1**	0.000207	—	0.0836	—
1 Acre	—	43.5	4840	**1**	0.00156	4049	0.405
1 Square Mile	—	27.9 x 106	3097600	640	**1**	2.58 x 106	258
1 Square Meter	1549	10.76	1.196	0.000247	—	**1**	0.0001
1 Hectare	—	107.639	11.96	2.471	0.00386	10	**1**

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