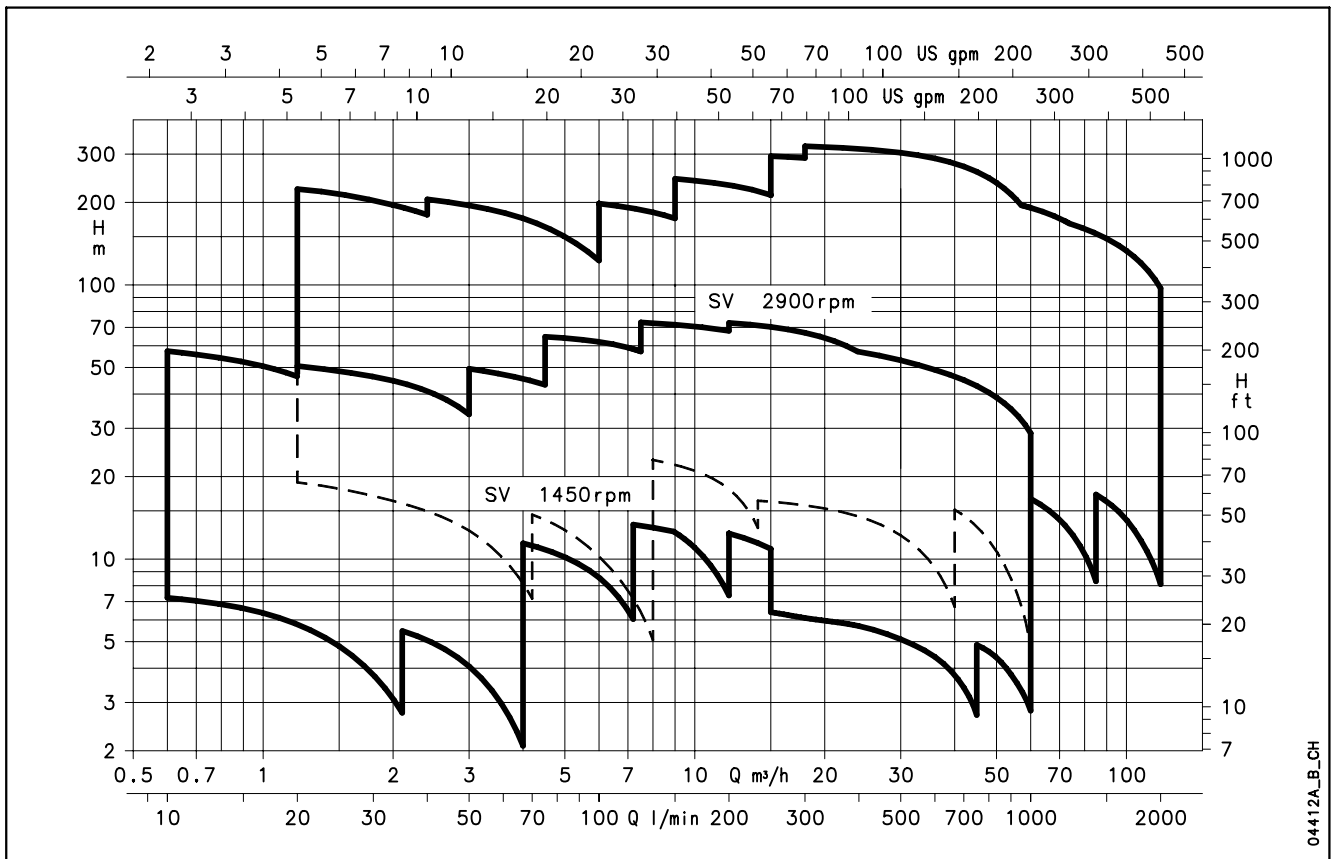


# VERTICAL MULTISTAGE ELECTRIC PUMPS



## SV SERIES SV 2, 4, 8, 16 SV 33, 46, 66, 92



EDITION 02-2004

04412A\_B\_CH

Lowara



ITT Industries  
Engineered for life

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# Vertical Multistage Electric Pumps

## SV Series

SV 2, SV 4, SV 8, SV 16  
SV 33, SV 46, SV 66, SV 92



- ❑ **FOUR NEW SIZES AVAILABLE: SV33, 46, 66, 92**
- ❑ **LIQUID END MADE ENTIRELY OF STAINLESS STEEL IN THE 2-4-8-16 m<sup>3</sup>/h STANDARD VERSION**
- ❑ **STANDARD MECHANICAL SEAL CAN BE REPLACED WITHOUT REMOVING THE MOTOR FROM THE PUMP (FOR SV33, 46, 66, 92)**
- ❑ **STANDARD MOTOR**
- ❑ **CAN BE USED WITH THE HYDROVAR CONTROL SYSTEM IN ORDER TO MANAGE THE OPERATION OF THE PUMP BASED ON THE SYSTEM CONDITIONS AND SAVE ENERGY**



## MARKET SECTORS

CIVIL, AGRICULTURAL, LIGHT INDUSTRY, WATER TREATMENT, HEATING AND AIR CONDITIONING

## MARKET SECTORS

- Handling of water, free of suspended solids, in the civil, industrial and agricultural sectors
- Pressure boosting and water supply systems
- Irrigation systems
- Wash systems
- Water treatment plants
- Handling of moderately aggressive liquids, demineralized water, water and glycol, etc.
  - Circulation of hot and cold water for heating, cooling and conditioning systems
  - Boiler feed

## SPECIFICATIONS

### PUMP

The SV pump is a non-self priming vertical multistage pump coupled to a standard motor.

The liquid end, located between the upper cover and the pump casing, is held in place by tie rods. The pump casing is available with different configurations and connection types.

- Delivery: up to **120 m<sup>3</sup>/h**.
- Head: up to **330 m**.
- Temperature of pumped liquid:
  - -30°C to 120°C for SV 2, 4, 8 and 16, standard version
  - -30°C to 120°C for SV 33, 46, 66 and 92, standard version
- Maximum operating **pressure**:
  - SV 2, 4, 8 with oval flanges: 16 bar (PN 16)
  - SV 2, 4, 8, 16 with round flanges or Victaulic®: 25 bar (PN 25)
  - SV2, 4, 8, 16 with Clamp connections: 16 or 25 bar (PN 16 or PN 25) depending on the number of stages
  - SV 33, 46: 16, 25, 40 bar (PN16, PN25 or PN40)
  - SV 66, 92: 16, 25 bar (PN16, PN25)

- Tested in compliance with ISO 9906 - Annex A.
- Direction of rotation: clockwise looking at the pump from the top down (marked with an arrow on the adapter and on the coupling).

### MOTOR

- Squirrel cage in short circuit, aluminium casing, enclosed construction with external ventilation
- Standard supply Lowara motors up to 7.5 kW (included) for the 4-pole version, and up to 22 kW (included) for the 2-pole version. Other motor brands for higher powers
- **The Lowara surface motors have efficiency values that fall within the range normally referred to as efficiency class 2**
- IP55 protection
- Class F insulation
- Performances according to EN 60034-1
- Standard voltage:
  - Single-phase version: 220-240 V, 50 Hz.
  - Three-phase version: 220-240/380-415 V, 50 Hz for power up to 3 kW, 380-415/660-690 V, 50 Hz for power above 3 kW

### MATERIALS

- **Suitable for handling potable water (WRAS certified)**

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## CHARACTERISTICS OF SV 2, 4, 8, 16 SERIES

- Vertical multistage centrifugal pump. All metal parts in contact with the pumped liquid are made of stainless steel.
- The following versions are available:
  - F: round flanges, in-line delivery and suction ports, AISI 304
  - T: oval flanges, in-line delivery and suction ports, AISI 304
  - R: round flanges, delivery port above the suction port, with four adjustable positions, AISI 304
  - N: round flanges, in-line delivery and suction ports, AISI 316
  - V: Victaulic® couplings, in-line delivery and suction ports, AISI 316
  - C: Clamp couplings, in-line delivery and suction ports, AISI 316
- Reduced axial thrusts enable the use of **standard motors** that are easily found in the market. **The Lowara surface motors have efficiency values that fall within the range normally referred to as efficiency class 2**
- Seal housing chamber designed to prevent the accumulation of air in the critical area next to the mechanical seal
- Mechanical seal according to EN 12756 (ex DIN 24960) and ISO 3069
- Versions with round flanges that can be coupled to counter-flanges, according to EN 1092
- Threaded, round or oval counter-flanges made of zinc-plated steel are standard supply for the F, T and R versions
- Round counter-flanges made of stainless steel are standard supply for the N version
- Easy maintenance. No special tools required for assembly or disassembly
- **Pump suitable for handling potable water (WRAS certified)**
- Standard version for temperatures ranging from -30°C to + 120°C

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## CHARACTERISTICS OF SV 33, 46, 66, 92 SERIES

- Vertical multistage centrifugal pump with impellers, diffusers and outer sleeve made entirely of stainless steel, and with pump casing and motor adaptor made of cast iron in the standard version
- N version made entirely of AISI 316 stainless steel
- High heads and capacities **four sizes: SV 33, 46, 66 and 92 (replacing the previous models SV 30 and 60)**
- Re-designed liquid end provides improved efficiency and energy savings
- Innovative axial load compensation system on pumps with higher head. This ensures reduced axial thrusts and enables the use of **standard motors** that are easily found in the market. **The Lowara surface motors have efficiency values that fall within the range normally referred to as efficiency class 2**
- **Standard mechanical seal** according to EN 12756 (ex DIN 24960) and ISO 3069, which **can be replaced without removing the motor from the pump**
- Seal housing chamber designed to prevent the accumulation of air in the critical area next to the mechanical seal
- **Pump suitable for handling potable water (WRAS certified)**
- Standard version for temperatures ranging from -30°C to + 120°C
- Pump body fitted with couplings for installing pressure gauges on both suction and delivery flanges
- In-line ports with round flanges that can be coupled to counter-flanges, in compliance with EN 1092
- Mechanical sturdiness and easy maintenance. No special tools required for assembly or disassembly

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## OPTIONAL FEATURES

- Horizontal version.
- Special voltages, 60 Hz frequency.
- Special materials for the mechanical seal, gaskets and elastomers.
- "DPS" sets consisting of two "SV" electric pumps made of AISI 316, connected in series to obtain a total head equal to the sum of the single heads of the two electric pumps.
- Tropicalized motors.
- SVH version with Hydrovar control system.
- Eff. 1 motors

## GENERAL CHARACTERISTICS

### 2-POLE SV

	SV2	SV4	SV8	SV16	SV33	SV46	SV66	SV92
Max efficiency flow (m <sup>3</sup> /h)	3	5,5	10	16	31	43	72	90
Flow range (m <sup>3</sup> /h)	1.2÷4.2	2.4÷8	6÷14	9÷24	15÷40	22÷60	30÷85	45÷120
Maximum pressure (bar)	26	24	22	26	30	36	23	21
Motor power (kW)	0.37÷3	0.37÷4	1.1÷7.5	2.2÷15	2.2÷30	3÷45	4÷45	5.5÷45
Max $\eta$ (%) of pump	42	58	64	67	76,5	79	78	79,5
Standard temperature (°C)	-30 +120							

sv\_2p50\_b\_tg

### 4-POLE SV

	SV2	SV4	SV8	SV16	SV33	SV46	SV66	SV92
Max efficiency flow (m <sup>3</sup> /h)	1,5	2,8	5	8	15	21	36	45
Flow range (m <sup>3</sup> /h)	0.6÷2.1	1.2÷4	3÷7.2	4.5÷12	7.5÷20	11÷30	15÷45	22÷60
Maximum pressure (bar)	6,5	6	5,5	7	8	9	6	6,5
Motor power (kW)	0.25÷0.37	0.25÷0.55	0.55÷1.1	0.55÷2.2	1,1÷4	1,1÷5.5	1,1÷5.5	1,1÷7.5
Max $\eta$ (%) of pump	41,5	58	64	67	75	77	76,5	77
Standard temperature (°C)	-30 +120							

sv\_4p50\_b\_tg

### SV 2, 4, 8, 16 VERSIONS

TYPE	2 POLES				4 POLES			
	SV2	SV4	SV8	SV16	SV2	SV4	SV8	SV16
<b>SV F</b> AISI 304, PN25. IN-LINE PORTS, ROUND FLANGES	•	•	•	•	•	•	•	•
<b>SV T</b> AISI 304, PN16. IN-LINE PORTS, OVAL FLANGES	•	•	•					
<b>SV R</b> AISI 304, PN25. DISCHARGE PORT ABOVE SUCTION, ROUND FLANGES	•	•	•					
<b>SV N</b> AISI 316, PN25. IN-LINE PORTS, ROUND FLANGES	•	•	•	•	•	•	•	•
<b>SV V</b> AISI 316, PN25. VICTAULIC COUPLINGS®	•	•	•	•				
<b>SV C</b> AISI 316, PN16 or PN25 DEPENDING ON NO. OF STAGES AND MODEL, CLAMP COUPLINGS	•	•	•	•				

• = Available Other versions on request

sv2-16\_2p50\_b\_tc

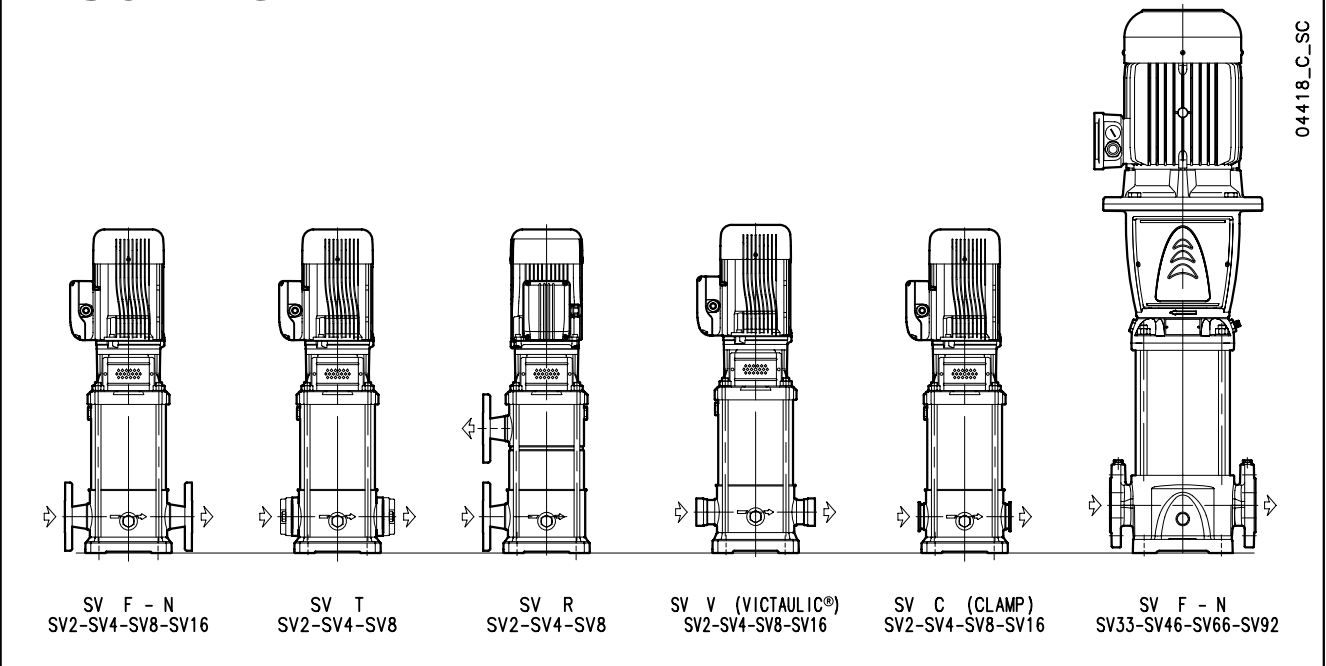
### SV 33, 46, 66, 92 VERSIONS

TYPE	2 POLES				4 POLES			
	SV33	SV46	SV66	SV92	SV33	SV46	SV66	SV92
<b>SV F</b> CAST IRON PUMP CASING, LIQUID END MADE OF STAINLESS STEEL, IN-LINE ROUND FLANGES PN16, PN25 OR PN40 DEPENDING ON NO. OF STAGES AND MODEL.	•	•	•	•	•	•	•	•
<b>SV N</b> ALL AISI 316 STAINLESS STEEL, IN-LINE ROUND FLANGES, PN16, PN25 OR PN40 DEPENDING ON NO. OF STAGES AND MODEL.	•	•	•	•	•	•	•	•

• = Available. Other versions on request.

sv33-92\_2p50\_a\_tc

### VERSION DIAGRAM



## TYPICAL APPLICATIONS OF SV SERIES ELECTRIC PUMPS

### WATER SUPPLY AND PRESSURE BOOSTING

- Pressure boosting in buildings, hotels, residential complexes
- Pressure booster stations, supply of water networks
- Booster packages

### WATER TREATMENT

- Ultrafiltration systems
- Reverse osmosis systems
- Water softeners and de-mineralization
- Distillation systems
- Filtration

### LIGHT INDUSTRY

- Washing and cleaning plants (washing and degreasing of mechanical parts, car and truck wash tunnels, washing of electronic industry circuits)
- Commercial washers
- Firefighting system pumps

### IRRIGATION AND AGRICULTURE

- Greenhouses
- Humidifiers
- Sprinkler irrigation

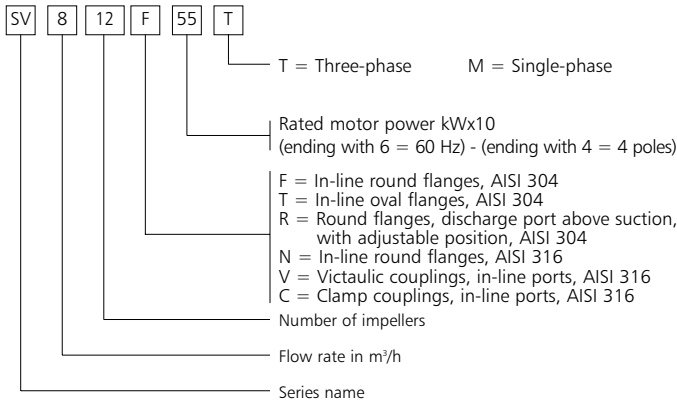
### HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

- Cooling towers and systems
- Temperature control systems
- Refrigerators
- Induction heating
- Heat exchangers
- Boilers
- Water recirculation and heating

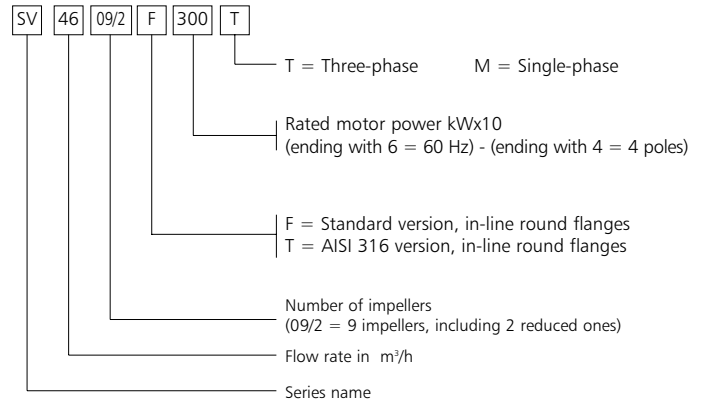


**ELECTRIC PUMP IDENTIFICATION CODE**

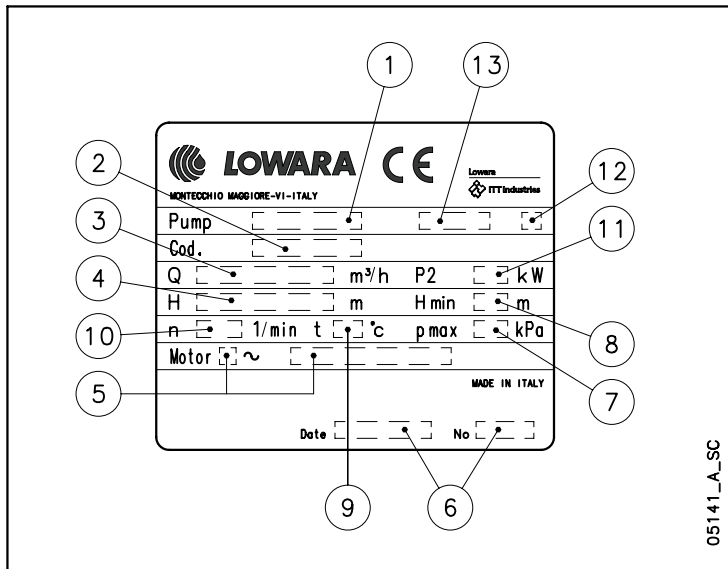
**SV 2, 4, 8, 16**



**SV 33, 46, 66, 92**



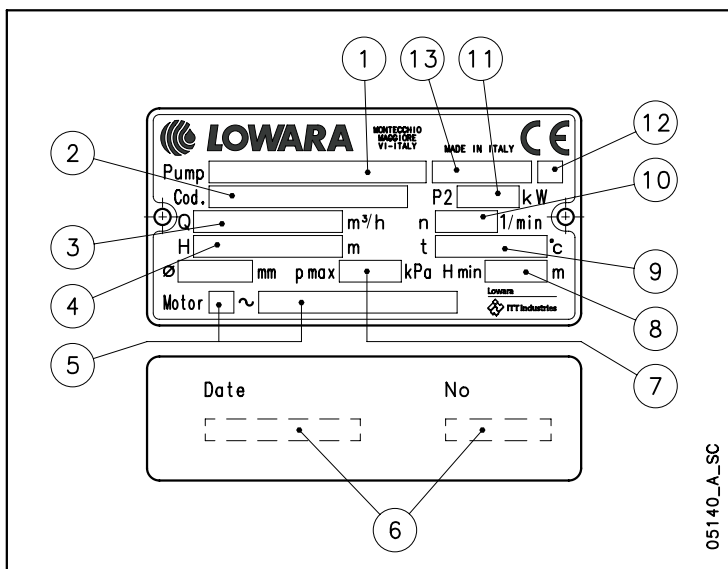
**RATING PLATE SV 2, 4, 8, 16**



**LEGEND**

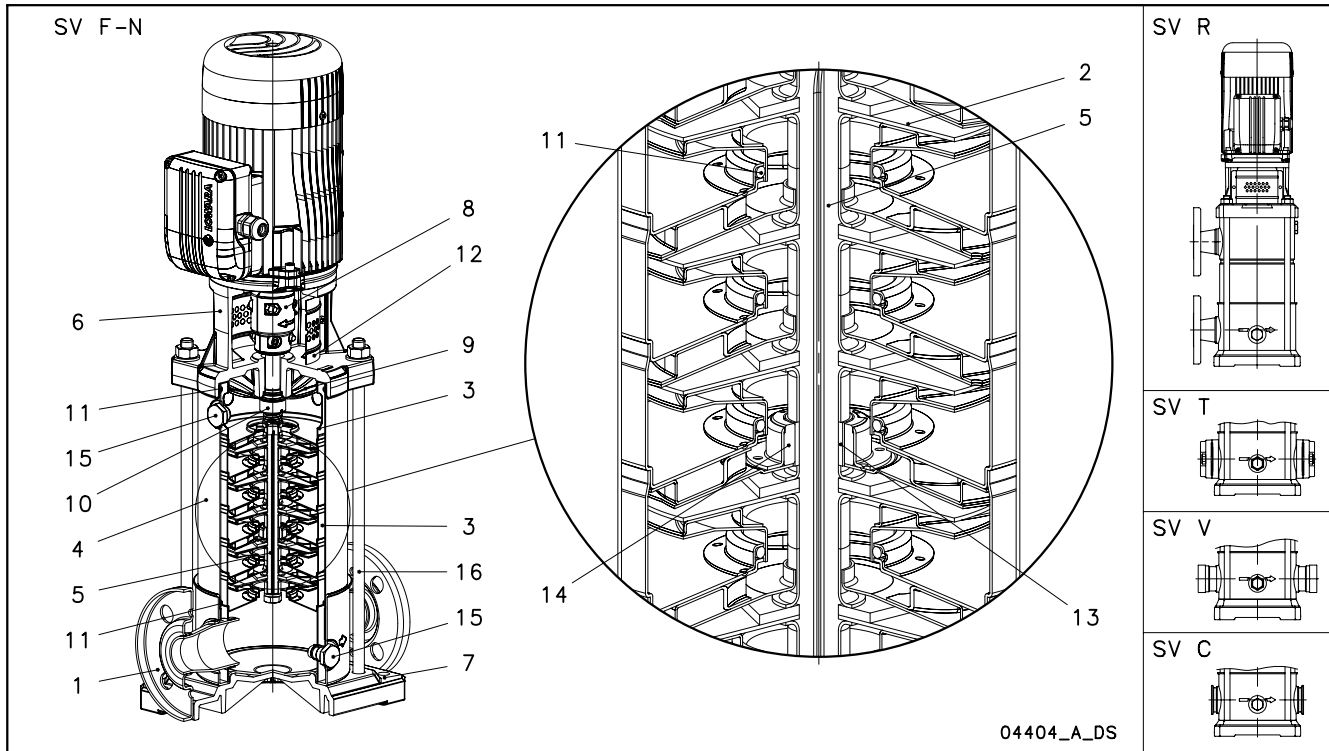
1. Electric pump type
2. Code
3. Capacity range
4. Head range
5. Motor type
6. Manufacturing data and serial number
7. Maximum operating pressure\*
8. Minimum head
9. Maximum operating temperature\*
10. Speed
11. Rated power
12. O-ring material identification code
13. Mechanical seal material identification code

**TARGA DATI SV 33, 46, 66, 92**



\* To be verified on pressure/temperature limits diagrams (page 10)

## SV 2, 4, 8, 16 SERIES PUMP CROSS SECTION AND MAIN COMPONENTS



### SV 2, 4, 8, 16 - F, T, R VERSIONS

REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Pump body	stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
2	Impeller	stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
3	Diffuser and upper spacer	stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
4	Outer sleeve	stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
5	Shaft	stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
6	Adapter	cast iron	EN 1561-GJL-250 (JL1040)	ASTM Class 35
7	Base	aluminium	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)	-
8	Coupling (up to 4 kW)	aluminium	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)	-
	Coupling (for higher powers)	cast iron	EN 1561-GJL-200 (JL1030)	ASTM Class 25
9	Seal housing	stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
10	Mechanical seal	silicon carbide/carbon/EPDM		
11	Elastomers	EPDM		
12	Coupling protection	stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
13	Shaft sleeve	tungsten carbide		
14	Bushing	ceramic (alumina)		
15	Fill/drain plugs	stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
16	Tie rods	galvanized steel	EN 10277-3-36SMnPb14 (1.0765)	-

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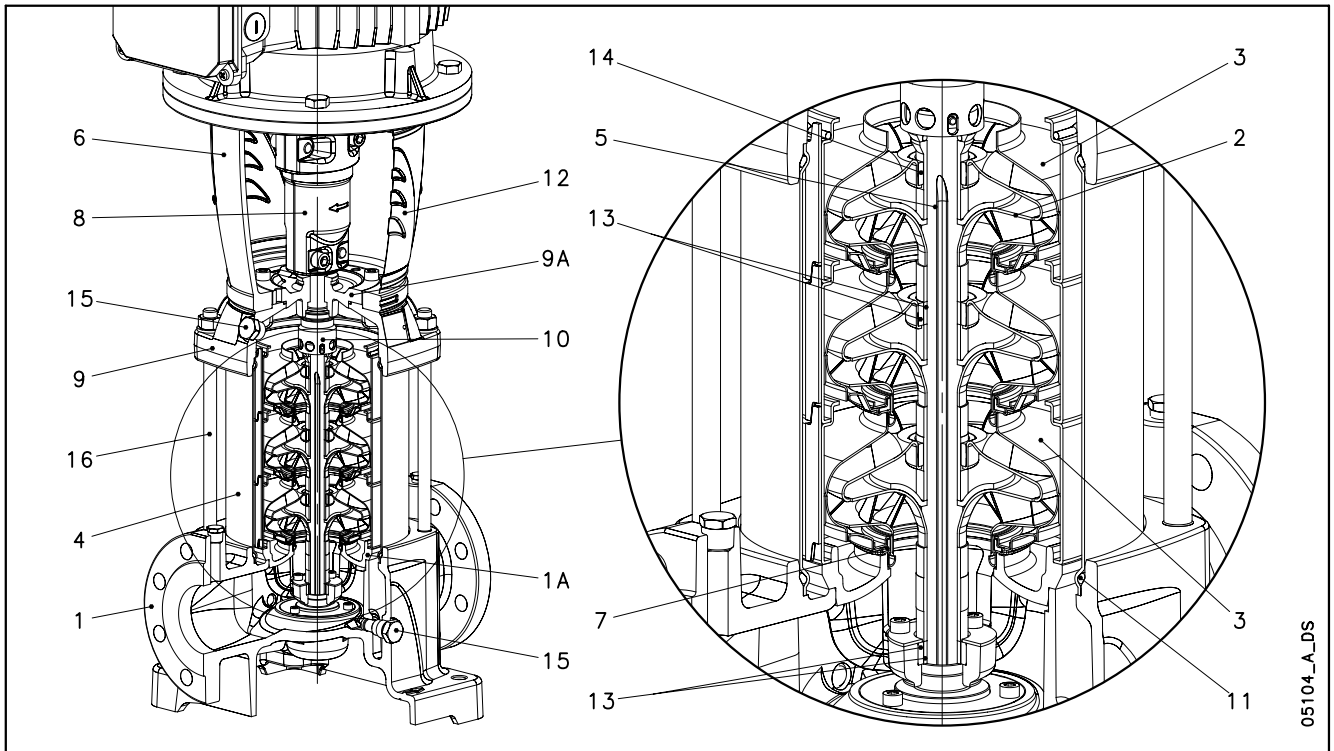
### SV 2, 4, 8, 16 - N, V, C VERSIONS

REF. N.	NAME	MATERIAL	REFERENCE STANDARD	
			EUROPE	USA
1	Pump body	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
2	Impeller	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
3	Diffuser and upper spacer	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
4	Outer sleeve	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
5	Shaft	stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
6	Adapter	cast iron	EN 1561-GJL-250 (JL1040)	ASTM Class 35
7	Base	aluminium	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)	-
8	Coupling (up to 4 kW)	aluminium	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)	-
	Coupling (for higher powers)	cast iron	EN 1561-GJL-200 (JL1030)	ASTM Class 25
9	Seal housing	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
10	Mechanical seal	silicon carbide/carbon/EPDM		
11	Elastomers	EPDM		
12	Coupling protection	stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
13	Shaft sleeve	tungsten carbide		
14	Bushing	ceramic (alumina)		
15	Fill/drain plugs	stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
16	Tie rods	stainless steel	EN 10088-1-X17CrNi16-2 (1.4057)	AISI 431

sv2-16-nvc\_b\_tm



# SV 33, 46, 66, 92 SERIES ELECTRIC PUMP CROSS SECTION AND MAIN COMPONENTS



## SV 33, 46, 66, 92 - F VERSIONS

REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Pump body	cast iron	EN 1561-GJL-250 (JL1040)	ASTM Class 35
1A	Lower support	cast iron	EN 1561-GJL-250 (JL1040)	ASTM Class 35
2	Impeller	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
3	Diffuser	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
4	Outer sleeve	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
5	Shaft	stainless steel	EN 10088-1-X2CrNiMoN22-5-3 (1.4462)	UNS S 31803
6	Adapter	cast iron	EN 1561-GJL-200 (JL1030)	ASTM Class 25
7	Wear ring	technopolymer PPS		
8	Coupling	cast iron	EN 1561-GJL-200 (JL1030)	ASTM Class 25
9	Upper head	cast iron	EN 1561-GJL-250 (JL1040)	ASTM Class 35
9A	Seal housing	cast iron	EN 1561-GJL-250 (JL1040)	ASTM Class 35
10	Mechanical seal	silicon carbide/carbon/EPDM		
11	Elastomers	EPDM		
12	Coupling protection	stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
13	Shaft sleeve and bushing	tungsten carbide		
14	Bushing for diffuser	carbon		
15	Fill/drain plugs	stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
16	Tie rods	galvanized steel	EN 10277-3-36SMnPb14 (1.0765)	-

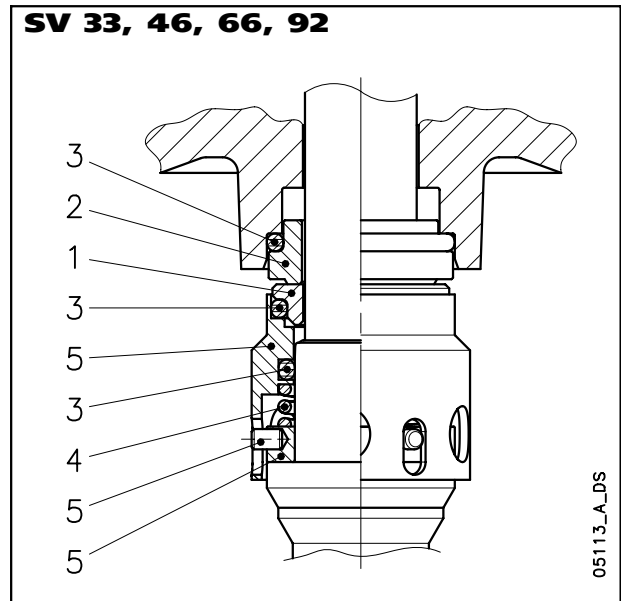
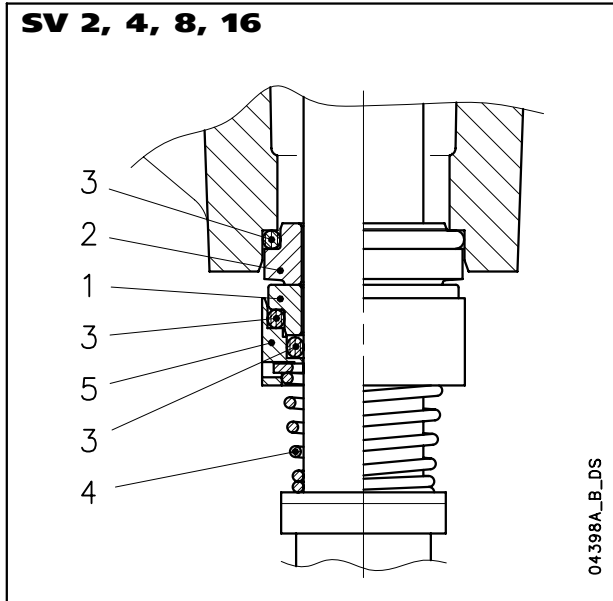
## SV 33, 46, 66, 92 - N VERSIONS

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REF. N.	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Pump body	stainless steel	EN 10213-4-GX5CrNiMo19-11-2 (1.4408)	ASTM CF8M (AISI 316 fuso)
1A	Lower support	stainless steel	EN 10213-4-GX5CrNiMo19-11-2 (1.4408)	ASTM CF8M (AISI 316 fuso)
2	Impeller	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
3	Diffuser	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
4	Outer sleeve	stainless steel	EN 10088-1-X2CrNiMo17-12-2 (1.4404)	AISI 316L
5	Shaft	stainless steel	EN 10088-1-X2CrNiMoN22-5-3 (1.4462)	UNS S 31803
6	Adapter	cast iron	EN 1561-GJL-200 (JL1030)	ASTM Class 25
7	Wear ring	technopolymer PPS		
8	Coupling	cast iron	EN 1561-GJL-200 (JL1030)	ASTM Class 25
9	Upper head	stainless steel	EN 10213-4-GX5CrNiMo19-11-2 (1.4408)	ASTM CF8M (AISI 316 fuso)
9A	Seal housing	stainless steel	EN 10213-4-GX5CrNiMo19-11-2 (1.4408)	ASTM CF8M (AISI 316 fuso)
10	Mechanical seal	silicon carbide/carbon/EPDM		
11	Elastomers	EPDM		
12	Coupling protection	stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
13	Shaft sleeve and bushing	tungsten carbide		
14	Bushing for diffuser	carbon		
15	Fill/drain/air plugs	stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
16	Tie rods	stainless steel	EN 10088-1-X17CrNi16-2 (1.4057)	AISI 431

sv33-92-n\_b\_ttm

**SV MECHANICAL SEALS ACCORDING TO EN 12756**



**LIST OF MATERIALS**

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

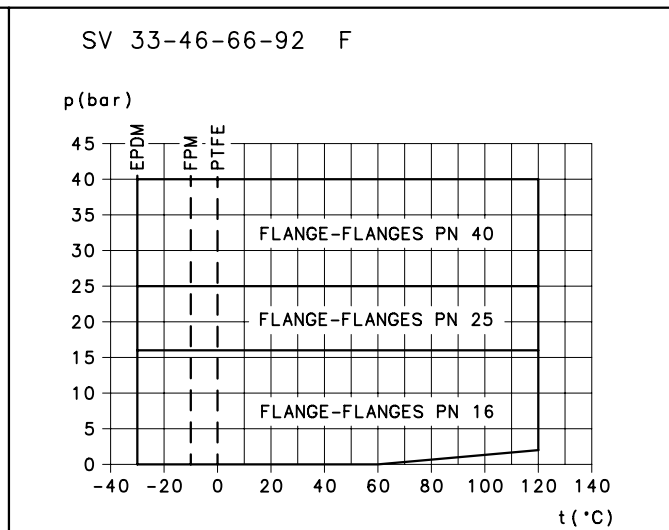
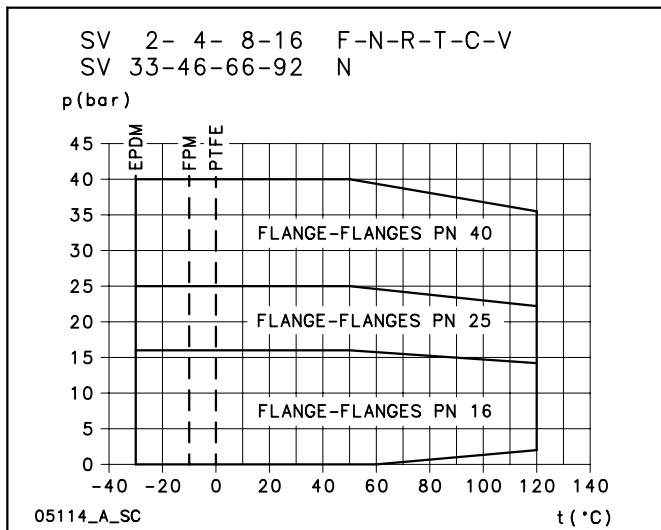
sv\_ten-mec\_a\_tm

**TYPE OF SEAL**

SEAL TYPE	POSITION					TEMPERATURE ( °C )
	1 ROTATING ASSEMBLY	2 FIXED ASSEMBLY	3 ELASTOMERS	4 SPRINGS	5 OTHER COMPONENTS	
<b>STANDARD MECHANICAL SEAL</b>						
Q <sub>1</sub> B E G G	Q <sub>1</sub>	B	E	G	G	-30 +120
<b>OTHER TYPES OF MECHANICAL SEAL</b>						
Q <sub>1</sub> Q <sub>1</sub> E G G	Q <sub>1</sub>	Q <sub>1</sub>	E	G	G	-30 +120
Q <sub>1</sub> B V G G	Q <sub>1</sub>	B	V	G	G	-10 +120
Q <sub>1</sub> Q <sub>1</sub> V G G	Q <sub>1</sub>	Q <sub>1</sub>	V	G	G	-10 +120
Q <sub>1</sub> C T G G	Q <sub>1</sub>	C	T	G	G	0 +120
Q <sub>1</sub> Q <sub>1</sub> T G G	Q <sub>1</sub>	Q <sub>1</sub>	T	G	G	0 +120

sv\_tipi-ten-mec\_a\_tc

**PRESSURE/TEMPERATURE APPLICATION LIMITS FOR COMPLETE PUMP  
(APPLICABLE WITH ANY OF THE SEALS LISTED ABOVE)**



## MOTORS

- Standard Lowara motors with powers up to 7.5 kW (included) for the 4-pole version, and up to 22 kW (included) for the 2-pole version. Other motor brands are used for higher powers.
- The normalized Lowara motors have efficiency values that fall within the range normally referred to as efficiency class 2.
- Short-circuit squirrel-cage motor (TEFC), aluminium casing, enclosed construction with external ventilation.
- IP55 protection
- Class F insulation
- Performance according to EN 60034-1
- Standard voltage:
  - **Single-phase** version: 220-240 V, 50 Hz with built-in automatic reset overload protection up to 1.5 kW.  
For higher powers the protection must be provided by the user.
  - **Three-phase** version 220-240/380-415 V, 50 Hz for power up to 3 kW;  
380-415/660-690 V, 50 Hz for power above 3 kW.  
Overload protection to be provided by the user.
- **Type of motor used:**
  - 2-pole**  
Single-phase: Lowara SM (up to 1,5 kW)  
Lowara LM (above 1,5 kW)  
Three-phase: Lowara SM (up to 2,2 kW)  
Lowara LM (above 2,2 kW)
  - 4-pole**  
Lowara LM  
The motors are fan cooled according to EN 60034-6. The terminal box is made of ABS technopolymer for motors up to IM 100 and aluminium alloy for larger sizes.  
The cable gland has standard passage dimensions according to EN 50262 (metric thread) for SM motors, and according to DIN 46255 (Pg thread) for LM motors.

## ELECTRICAL DATA OF STANDARD MOTORS FOR SV SERIES

### SINGLE-PHASE MOTORS FOR 50 HZ, 2-POLE SV SERIES

MOTOR TYPE			ABSORBED CURRENT In (A) 220-240 V	CAPACITOR		DATA FOR 230 V 50 Hz VOLTAGE					
kW	IEC SIZE *	CONSTRUCTION DESIGN		μF	V	rpm	Is / In	n %	cosφ	Cn Nm	Cs/Cn
0,37	71R	B14	2.64-2.72	14	450	2775	3,08	63,9	0,95	1,27	0,71
0,55	71	B14	3.89-4.05	16	450	2825	3,34	67	0,91	1,86	0,57
0,75	80R	B14	5.22-4.97	20	450	2785	3,55	67,3	0,96	2,57	0,46
1,1	80	B14	7.07-6.81	30	450	2800	3,80	73,8	0,95	3,75	0,47
1,5	90R	B14	9.32-8.63	40	450	2780	3,45	75,5	0,97	5,15	0,47
2,2	90	B14	13.3-12.6	50	450	2785	3,45	76,9	0,97	7,54	0,36

\* R = reduced motor casing size with respect to shaft extension and related flange

sv-motm-2p50\_b\_te

### THREE-PHASE MOTORS FOR 50 HZ, 2-POLE SV SERIES

MOTOR TYPE			ABSORBED CURRENT in (A) THREE-PHASE				DATA FOR 400 V 50 Hz VOLTAGE					
kW	IEC SIZE *	CONSTRUCTION DESIGN	Δ	Y	Δ	Y	rpm	Is / In	n %	cosφ	Cn Nm	Cs/Cn
			220-240 V	380-415 V	380-415 V	660-690V						
0,37	71R	B14	2,32	1,34	-	-	2790	4,23	64,1	0,62	1,27	4,50
0,55	71	B14	2,48	1,43	-	-	2825	5,95	75,4	0,73	1,86	3,99
0,75	80R	B14	3,50	2,02	-	-	2855	5,81	74,3	0,72	2,51	3,76
1,1	80	B14	4,52	2,61	-	-	2875	6,78	78,9	0,77	3,65	3,49
1,5	90R	B14	5,98	3,45	-	-	2875	7,04	80,1	0,78	4,98	3,83
2,2	90R	B14	8,71	5,03	-	-	2860	7,32	81,1	0,78	7,34	4,12
3	100R	B14	10,4	6,01	-	-	2860	6,38	84,3	0,85	10,0	2,77
4	112R	B14	-	-	8,02	4,63	2895	7,45	85,3	0,85	13,2	2,92
5,5	132R	B5	-	-	10,0	5,77	2900	9,96	88,5	0,90	18,1	4,23
7,5	132R	B5	-	-	13,4	7,74	2895	9,99	88,9	0,90	24,7	4,22
11	160R	B5	-	-	20,0	11,5	2925	8,93	88,6	0,90	35,9	3,37
15	160	B5	-	-	27,0	15,6	2945	8,70	89,0	0,90	48,6	2,93
18,5	160	B5	-	-	33,1	19,1	2940	8,60	90,3	0,90	60,0	3,67
22	180R	B5	-	-	38,9	22,5	2940	8,66	91,2	0,90	71,4	3,06
30	200	B5	-	-	54	31	2950	6,8	92,5	0,87	97	2,4
37	200	B5	-	-	65	38	2950	7,2	92,9	0,88	120	2,5
45	225	B5	-	-	80	46	2960	6,7	92,9	0,88	145	2,4

\* R = reduced motor casing size with respect to shaft extension and related flange

sv-mott-2p50\_b\_te



## **SVH SERIES ELECTRIC PUMPS WITH HYDROVAR® CONTROL SYSTEM**

The Lowara SV electric pumps are available in the SVH version, i.e. coupled to Hydrovar®, the microprocessor-based control unit designed to manage the performance of the pump based on the conditions and requirements of the system. The basic SV electric pump is thus transformed into a complete pumping system suitable for a number of applications, including:

- Variable speed pressure boosting (constant pressure is maintained in industrial, civil and agricultural applications)
- Water filtration and treatment (constant flow is maintained based on flow resistance)
- Air conditioning and heating (constant differential pressure is maintained in a closed circuit).

- **No special pumps or motors:**

HYDROVAR® is mounted directly onto a standard three-phase TEFC motor with class F insulation up to 22 kW power. A wall-mounted version is available for higher powers, up to 45 kW.

- **No separate pressure sensors:**

HYDROVAR® is equipped with a pressure transmitter or differential pressure transmitter, depending on the applications.

- **No separate microprocessors:**

In multiple-pump systems the microprocessor regulates the sequential operation of the pumps or motors. Since HYDROVAR® features a built-in microprocessor, no other control devices are required.

- **No separate control panels or converters:**

HYDROVAR® performs all the functions of a pump control panel, incorporating protections against overload, short circuit, high temperature, etc. The only external device required is a fuse on the power supply line. Will depend upon any local electrical installation regulations.

- **No by-pass lines or safety systems:**

With HYDROVAR® the pump switches off immediately when demand is zero or exceeds the maximum capacity of the pump. This way there is no need to install additional safety devices.

- **No large diaphragm tanks are required:**

Without a supply tank, a constant speed pump running at maximum power will be constantly switching on and off in order to satisfy system demands. With the HYDROVAR® system the speed of each pump varies in order to maintain a constant pressure or flow. A small surge tank is sufficient to maintain sys-



tem pressure at zero demand, therefore there is no need to install a large tank. Where local regulations allow it, the HYDROVAR® systems can be connected directly to the water supply line, so there is no need to install large storage tanks on the suction side. .

**The pump's operation at the correct speed based on system requirements enables energy consumption to be substantially reduced.**

- **Anti-condensation heater**

All the units are equipped with anti-condensation heaters that switch on when the pump is in standby mode.

## OPERATING PRINCIPLE

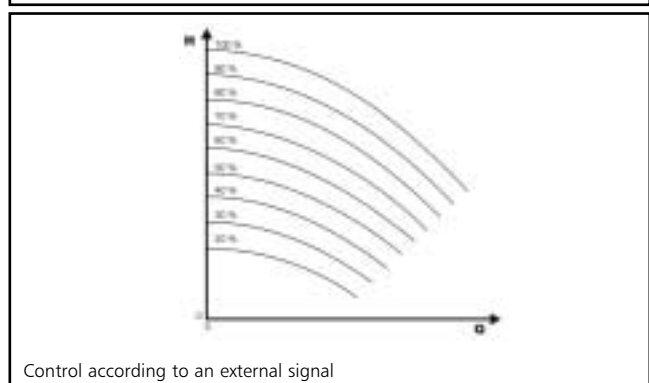
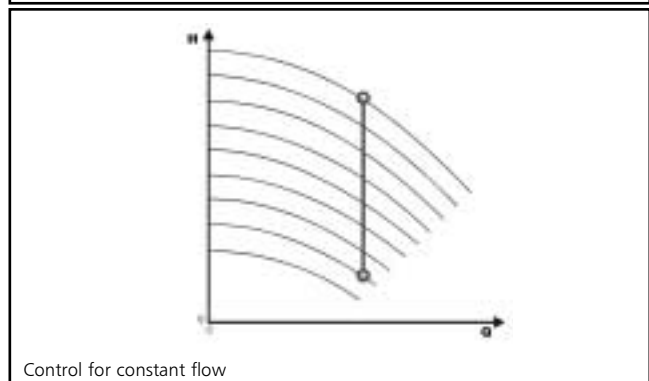
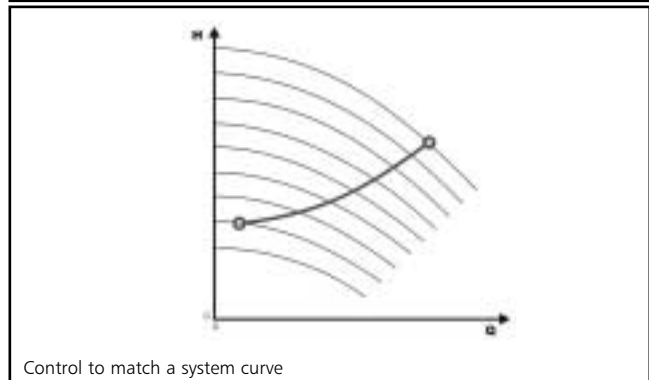
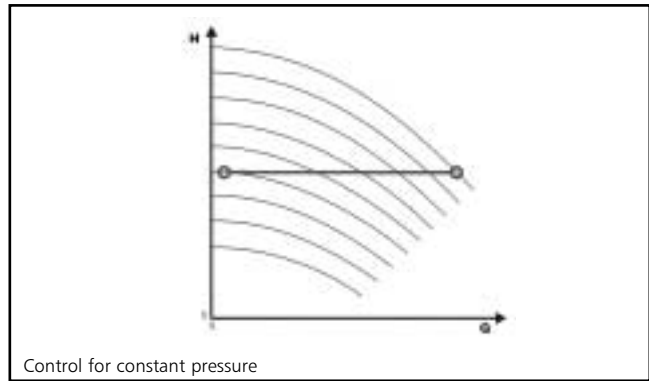
The basic function of the HYDROVAR® device is to control the pump to meet the system demands.

### HYDROVAR® performs these functions by:

- 1) Measuring the system pressure or flow via a transmitter mounted on the pump's delivery side.
- 2) Calculating the motor speed to maintain the correct flow or pressure.
- 3) Sending out a signal to the pump to start the motor, increase speed, decrease speed or stop.
- 4) In the case of multiple pump installations, HYDROVAR® will automatically provide for the cyclic changeover of the pumps' starting sequence

In addition to these basic functions, HYDROVAR® can do things only by the most advanced computerised control systems, such as:

- Stop the pump(s) at zero demand.
- Stop the pump(s) in case of water failure on the suction side (protection against dry running).
- Stop the pump if the required delivery exceeds the pump's capacity (protection against cavitation caused by excessive demand), or automatically switch on the next pump in a multiple series.
- Protect the pump and motor from overvoltage, undervoltage, overload and earth fault.
- Vary the pump speed acceleration and deceleration time.
- Compensate for increased flow resistance at high flow rates.
- Conduct automatic test starts at set intervals.
- Monitor the converter and motor operating hours.
- Display all functions on an LCD in different languages (Italian, English, French, German, Spanish, Portuguese, Dutch).
- Send a signal to a remote control system which is proportional to the pressure and frequency.
- Communicate with another HYDROVAR or control system via an RS 485 interface.



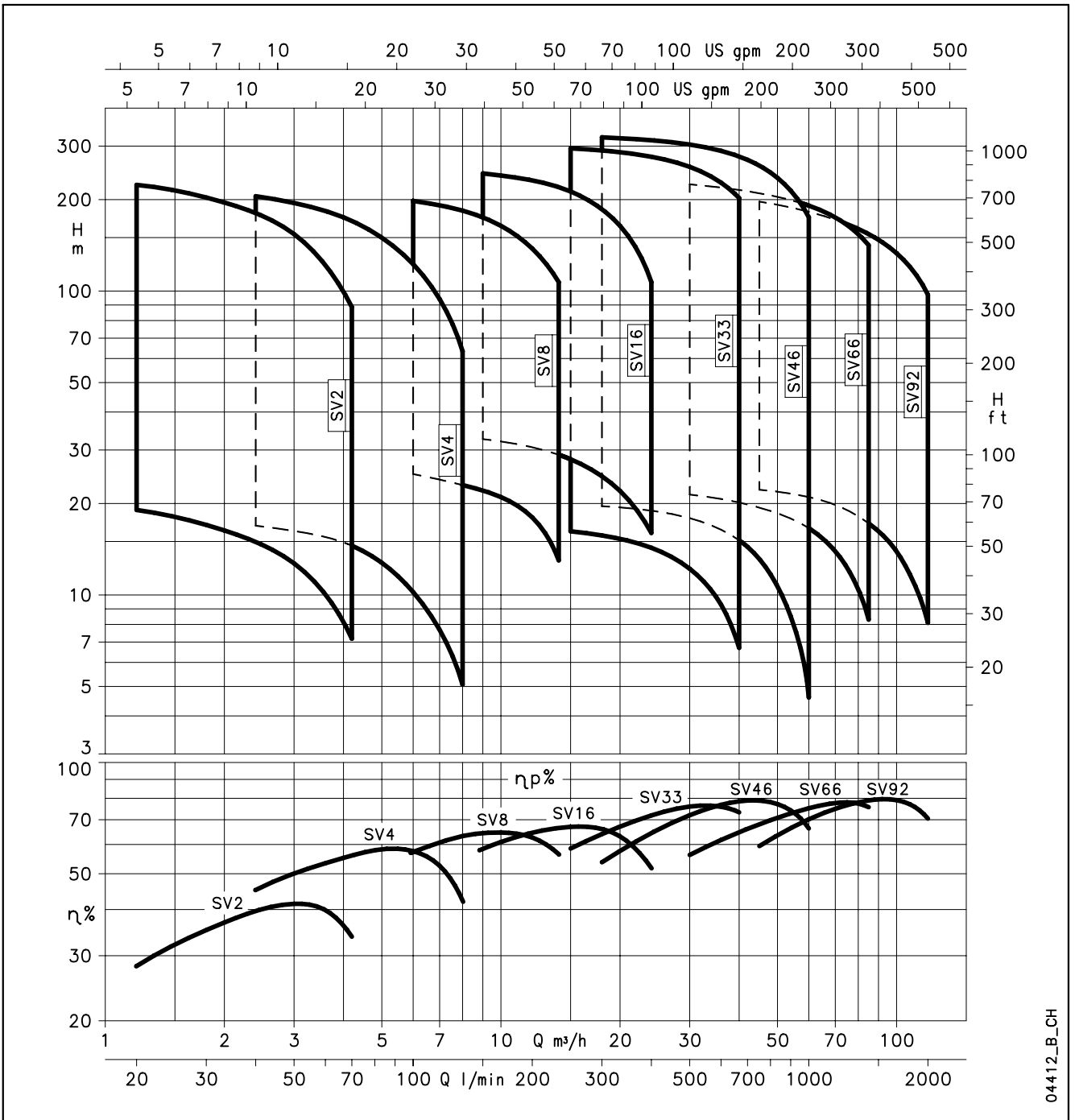
## TYPICAL EXAMPLE OF ENERGY SAVINGS

System: SV1608F75T vertical multistage electric pump with 7.5 kW motor equipped with Hydrovar, 80 m head. 12 hour/day operation.

Application: maintaining a constant pressure as the flow rate varies.

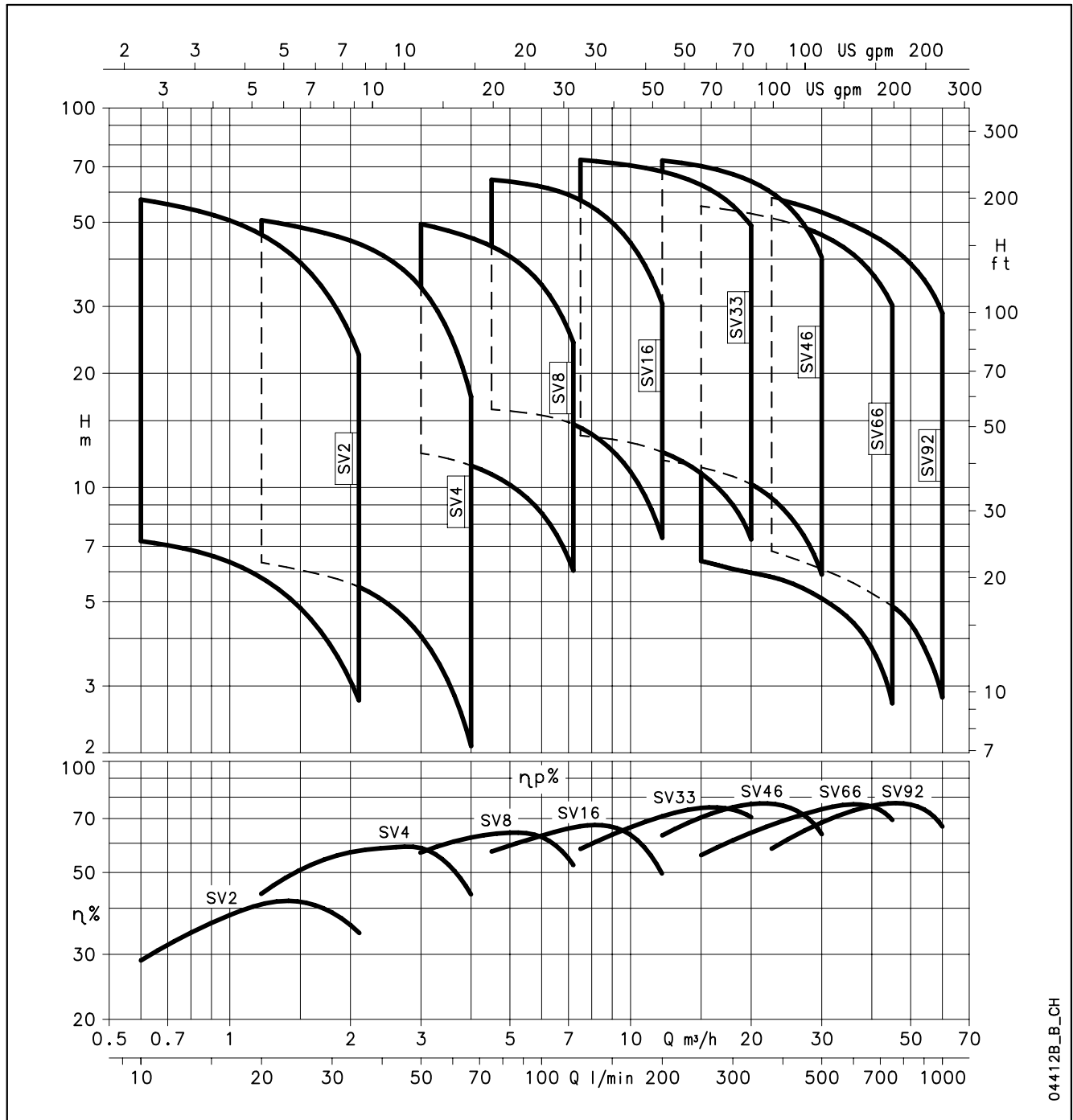
FLOW	ABSORBED POWER		POWER SAVED	OPERATING TIME	TOTAL ENERGY SAVINGS
	CONSTANT SPEED PUMP	VARIABLE SPEED PUMP			
m <sup>3</sup> /h	kW	kW	kW	(hours)	kWh
9	5,50	3,09	2,41	1095	2639
14	6,71	4,81	1,90	2190	4161
21	7,30	7,21	0,09	1095	99
<b>YEARLY ENERGY SAVINGS (kWh)</b>					<b>6899</b>

**HYDRAULIC PERFORMANCE RANGE, SV SERIES 50 Hz, 2 POLES (~2900 rpm)**



04412\_B\_CH

**HYDRAULIC PERFORMANCE RANGE, SV SERIES 50 Hz,  
4 POLES (~1450 rpm)**



04412B\_B\_CH



## SV 2-16

### TABLE OF HYDRAULIC PERFORMANCES AT ~2900 rpm

PUMP TYPE	RATED POWER		Q = DELIVERY																	
			l/min	20	30	40	50	60	70	100	120	133	150	167	200	233	267	300	350	400
			m <sup>3</sup> /h	0	1,2	1,8	2,4	3	3,6	4,2	6	7,2	8	9	10	12	14	16	18	21
kW		HP	H = TOTAL HEAD METRES COLUMN OF WATER																	
SV2 02	0,37	0,5	21,5	18,5	17	15	13	10,5	7,5											
SV2 03	0,37	0,5	32	28	25,2	23	19,5	15,5	11											
SV2 04	0,55	0,75	42,5	37,5	34	30,5	26	20,5	15											
SV2 05	0,75	1	53,5	47	42,5	38	32	26	18											
SV2 06	0,75	1	64	56	51	45,5	38,5	31	22											
SV2 07	1,1	1,5	75	65,5	60	53	45	36,5	26											
SV2 08	1,1	1,5	85,5	75	68	61	51,5	41,5	30											
SV2 09	1,1	1,5	96	84	76,5	68,5	58	46,5	32,5											
SV2 11	1,5	2	117	103	94	84	71	57	41											
SV2 12	1,5	2	128	112	102	91	77	62	44											
SV2 14	2,2	3	150	131	119	106	90	73	52											
SV2 16	2,2	3	171	150	136	122	103	83	59											
SV2 18	2,2	3	192	168	153	137	116	93	66											
SV2 20	3	4	214	187	170	152	129	104	74											
SV2 22	3	4	235	206	187	167	142	114	81											
SV2 24	3	4	256	224	205	182	155	125	89											
SV4 02	0,37	0,5	20			17	16	15	14,5	10,5	7,5	5								
SV4 03	0,55	0,75	30			25,5	24	23	22	16	11	7,5								
SV4 04	0,75	1	40			34	32	30,5	29	21	15	10								
SV4 05	1,1	1,5	50			42,5	40	38	36,5	26	18,5	12,5								
SV4 06	1,1	1,5	60			51	48	45,5	44	31,5	22	16								
SV4 07	1,1	1,5	70			59,5	56	53	51	37	26	18								
SV4 08	1,5	2	80			68	65	61	58,5	42	29,5	21								
SV4 09	1,5	2	90			76,5	73	68,5	65,5	47	33,5	23								
SV4 11	2,2	3	111			93,5	89	83,5	80,5	58	41	29								
SV4 13	2,2	3	131			111	105	99	95	68	48	34								
SV4 14	3	4	141			119	113	106	102	73,5	52	36								
SV4 16	3	4	161			136	129	122	117	84	59,5	41								
SV4 18	3	4	181			153	145	137	131	94,5	67	46								
SV4 20	4	5,5	201			170	161	152	146	105	74	53								
SV4 22	4	5,5	221			187	178	167	161	116	81,5	58								
SV4 24	4	5,5	241			204	194	182	175	126	89	63								
SV8 02	1,1	1,5	27							24,8	24	23	22	20,5	17,2	13,2				
SV8 03	1,5	2	41							37	36	34,5	33	30,5	25,8	20				
SV8 04	2,2	3	55							50	47,5	46	44	41	34,5	26,5				
SV8 05	2,2	3	68							62	60	57,5	55	51	43	33				
SV8 06	3	4	82							74,5	71	69	66	61,5	52	40				
SV8 08	4	5,5	110							99	95	92	87,5	81,5	69	53				
SV8 09	4	5,5	123							112	107	104	97,5	92	78	60				
SV8 11	5,5	7,5	150							137	130	127	119	112	95	73				
SV8 12	5,5	7,5	164							149	142	138	130	123	103	80				
SV8 14	7,5	10	192							174	166	161	152	143	120	93				
SV8 16	7,5	10	220							199	190	184	174	163	138	106				
SV16 02	2,2	3	35										32,5	32	31	29,5	27,5	25	20	14,3
SV16 03	3	4	52										49	48	46	44	41	37,5	30,2	21,5
SV16 04	4	5,5	69										65	64	62	59	54,5	50	40,3	28,6
SV16 05	5,5	7,5	86										81	80	77	73	68,5	62	50	35,8
SV16 06	5,5	7,5	104										98	96	92	88	82	75	60,5	43
SV16 07	7,5	10	121										114	112	108	103	96	87	70,5	50
SV16 08	7,5	10	138										130	128	123	117	109	100	81	57
SV16 10	11	15	173										163	160	154	147	137	125	101	72
SV16 12	11	15	207										195	192	185	176	164	150	121	86
SV16 14	15	20	242										228	224	215	205	192	175	141	100
SV16 15	15	20	260										244	240	231	220	205	187	151	108

## SV 33-46

### TABLE OF HYDRAULIC PERFORMANCES AT ~2900 rpm

PUMP TYPE	RATED POWER		Q = DELIVERY											
			l/min 0	250	300	367	417	500	583	667	750	900	1000	
			m <sup>3</sup> /h 0	15	18	22	25	30	35	40	45	54	60	
kW		HP		H = TOTAL HEAD METRES COLUMN OF WATER										
SV33 01/1	2,2	3	17,4	16,2	15,7	15	14	12,2	9,8	6,7				
SV33 01	3	4	23,8	21,7	21,2	20	20	17,8	15,5	12,7				
SV33 02/2	4	5,5	35,1	34,1	33,3	32	30	27	22,4	16,6				
SV33 02/1	4	5,5	40,8	38,8	37,9	36	35	32	27,5	22,3				
SV33 02	5,5	7,5	47,8	45	44,1	43	41	39	35	29,9				
SV33 03/2	5,5	7,5	57,7	55,2	53,8	51	49	44	38	29,6				
SV33 03/1	7,5	10	64,5	61,3	60	58	56	51	45	37				
SV33 03	7,5	10	71,5	67,4	66,0	64	62	58	52,0	44,6				
SV33 04/2	7,5	10	82	78,8	77	74	72	66	58	47,2				
SV33 04/1	11	15	88,9	85	83	81	78	73	65	55,1				
SV33 04	11	15	95,9	91,1	90	87	85	80	73	63,1				
SV33 05/2	11	15	106	101,6	100	96	93	85	76	63				
SV33 05/1	11	15	112,7	107,2	105	102	99	92	82	70				
SV33 05	15	20	120,4	114,9	113	110	107	101	92	80,5				
SV33 06/2	15	20	131,2	126,9	125	120	116	108	96	81,2				
SV33 06/1	15	20	139,1	133,5	131	128	124	116	105	90,4				
SV33 06	15	20	145,6	139	137	133	129	121	110	96,1				
SV33 07/2	15	20	156	149,9	147	143	138	128	115	98,2				
SV33 07/1	18,5	25	163,3	156,6	154	150	145	136	123	106,2				
SV33 07	18,5	25	170,3	162,8	160	156	152	142	130	113,3				
SV33 08/2	18,5	25	180,6	173,7	171	166	161	150	135	115,3				
SV33 08/1	18,5	25	187,4	179,5	177	171	166	156	141	121,7				
SV33 08	22	30	194,1	185,1	182	177	172	161	147	128				
SV33 09/2	22	30	202,1	194,1	191	185	179	166	150	127,9				
SV33 09/1	22	30	210,2	201,2	198	192	186	174	157	135,9				
SV33 09	22	30	216,8	206,8	204	198	193	181	165	143,7				
SV33 10/2	22	30	226,4	217,2	213	207	200	186	168	143,9				
SV33 10/1	30	40	234,5	225	221	215	209	196	178	154,2				
SV33 10	30	30	141,8	231,3	228	222	216	203	185	162,2				
SV33 11/2	30	30	252	244	240	233	226	211	190	163,7				
SV33 11/1	30	30	259	249,2	245	238	232	217	197	171				
SV33 11	30	40	265,7	253,6	250	243	236	222	203	176,9				
SV33 12/2	30	40	275,9	266,2	262	254	246	229	207	178,3				
SV33 12/1	30	40	282,8	271,5	267	260	252	236	214	185,6				
SV33 12	30	40	289,8	276,7	272	265	258	242	221	192,9				
SV33 13/2	30	40	300,5	291,1	286	278	270	252	228	197,6				
SV33 13/1	30	40	306,9	294,9	290	282	274	256	233	202,4				
SV46 01/1	3	4	19,5			19,2	18,8	17,9	16,7	15,1	13,1	8,5	4,6	
SV46 01	4	5,5	27,2			24	23,5	22,5	21,4	19,9	18,2	14,3	10,8	
SV46 02/2	5,5	7,5	38,8			39,8	39,2	37,8	35,7	32,9	29,4	21,1	13,9	
SV46 02	7,5	10	52,6			48,5	47,7	46,1	44,2	41,7	38,7	31,4	25,1	
SV46 03/2	11	15	64,7			65,1	64	62	60	56	52	40,4	30,8	
SV46 03	11	15	80,8			74,3	73	71	68	65	60	50	40,7	
SV46 04/2	15	20	92,4			90,7	90	87	83	79	73	58	45,6	
SV46 04	15	20	107,3			99,8	98	96	92	87	82	68	55,9	
SV46 05/2	18,5	25	117,2			114,8	113	110	106	100	93	75	60,2	
SV46 05	18,5	25	134,5			125,1	123	120	116	110	103	86	71,5	
SV46 06/2	22	30	143,7			139,3	138	134	129	122	113	92	73,4	
SV46 06	22	30	161			149,9	148	144	139	132	124	104	86	
SV46 07/2	30	40	171,3			164,9	163	158	152	144	134	110	88,6	
SV46 07	30	40	188,6			175,5	173	168	162	155	145	122	101,2	
SV46 08/2	30	40	198,2			190	188	182	176	166	155	127	103,1	
SV46 08	30	40	213,1			198,6	196	191	184	175	164	137	112,6	
SV46 09/2	30	40	224,8			214,5	212	206	198	187	174	143	116	
SV46 09	37	50	240,9			225,2	222	217	209	199	187	157	130,2	
SV46 10/2	37	50	252,7			241,1	238	232	223	212	198	164	133,9	
SV46 10	37	50	267,6			250,3	247	241	232	221	208	174	144,8	
SV46 11/2	45	60	280,4			267,4	264	258	249	237	222	184	151,1	
SV46 11	45	60	295,5			276,4	273	266	257	245	230	194	161,3	
SV46 12/2	45	60	307,3			292,5	289	282	272	259	243	202	165,8	
SV46 12	45	60	321,8			301	297	290	280	267	250	210	175	
SV46 13/2	45	60	332,5			316,2	312	304	292	277	259	214	175	

Performances in compliance with ISO 9906 - Annex A.

sv33-46-2p50\_a\_th

## SV 66-92

### TABLE OF HYDRAULIC PERFORMANCES AT ~2900 rpm

PUMP TYPE	RATED POWER		Q = DELIVERY												
			l/min 0	500	600	700	750	900	1000	1200	1300	1417	1600	1800	2000
	kw	HP	m <sup>3</sup> /h 0	30	36	42	45	54	60	72	78	85	96	108	120
H = TOTAL HEAD METRES COLUMN OF WATER															
SV66 01/1	4	5,5	23,8	21,4	20,7	19,9	19,4	17,8	16,6	13,3	11,2	8,3			
SV66 01	5,5	7,5	29,2	25,8	24,8	23,8	23,3	21,8	20,7	17,9	16,1	13,5			
SV66 02/2	7,5	10	47,5	42,6	41,2	39,5	38,6	36	32,9	26,4	22,2	16,4			
SV66 02/1	11	15	54,2	49,6	48,2	46,7	45,8	42,9	40,6	34,8	31,2	26,2			
SV66 02	11	15	60,4	55,7	54,4	52,8	52	49,3	47,1	42	38,9	34,7			
SV66 03/2	15	20	78,4	71,6	70	67	66	62	58	49	43,3	35,3			
SV66 03/1	15	20	84,7	77,8	76	74	72	68	65	56	51	44,0			
SV66 03	18,5	25	91,4	84,7	83	81	79	75	72	64	60	53,5			
SV66 04/2	18,5	25	108,9	99,6	97	94	92	86	82	70	63	52,8			
SV66 04/1	22	30	115,2	105,9	103	100	99	93	89	78	71	61,8			
SV66 04	22	30	121,6	112,5	110	107	105	100	96	86	79	70,8			
SV66 05/2	30	40	139,1	127,5	124	120	118	111	106	92	83	70,4			
SV66 05/1	30	40	145,6	134	131	127	125	118	112	99	91	79,5			
SV66 05	30	40	152	140,4	137	133	131	125	119	107	99	88,5			
SV66 06/2	30	40	169,5	155,6	152	147	144	136	129	113	103	88,1			
SV66 06/1	37	50	176	162	158	153	151	143	136	121	111	97,2			
SV66 06	37	50	182,4	168,5	164	160	158	150	143	128	119	106,2			
SV66 07/2	37	50	199,9	183,7	179	174	171	161	153	134	122	105,8			
SV66 07/1	37	50	206,4	190,1	185	180	177	168	160	142	131	114,9			
SV66 07	45	60	212,8	196,5	192	187	184	174	167	150	139	123,9			
SV66 08/2	45	60	230,3	211,8	206	200	197	186	177	156	142	123,5			
SV66 08/1	45	60	236,8	218,2	213	207	204	193	184	163	150	132,6			
SV66 08	45	60	243,2	224,6	219	213	210	199	191	171	159	141,6			
SV92 01/1	5,5	7,5	22,6				22,2	21,6	21	19,5	18,5	17,2	14,9	11,7	8,1
SV92 01	7,5	10	33,1				29,2	27,7	26,7	24,7	23,7	22,4	20,4	17,7	14,5
SV92 02/2	11	15	45,4				44,9	43,7	42,6	39,6	37,7	35,2	30,4	24,2	16,9
SV92 02	15	20	66,1				58,4	56	54	49,4	47,4	44,9	40,7	35,5	29
SV92 03/2	18,5	25	79,5				75,2	73	71	66	63	59	52	43,3	32,9
SV92 03	22	30	100,6				88,9	84	81	75	72	68	62	55	45
SV92 04/2	30	40	112,5				104,7	101	98	91	87	82	73	61	47,6
SV92 04	30	40	134,3				118,9	113	109	101	97	92	84	74	60,9
SV92 05/2	37	50	148				136,6	131	127	118	113	107	96	82	65,7
SV92 05	37	50	170,2				151,1	144	139	129	124	118	108	95	79,2
SV92 06/2	45	60	182,1				168,8	160	155	144	138	131	118	101	81,5
SV92 06	45	60	204,3				181,4	173	167	155	149	141	129	114	95,1
SV92 07/2	45	60	216,1				197	189	182	170	163	154	139	120	97,3

Performances in compliance with ISO 9906 - Annex A.

sv66-92-2p50\_a\_th

## SV 2-16

### TABLE OF HYDRAULIC PERFORMANCES AT ~1450 rpm

PUMP TYPE	RATED POWER		Q = DELIVERY																	
			l/min	10	15	20	25	30	35	50	60	67	75	90	100	120	130	150	170	200
	HP	m <sup>3</sup> /h	0,6	0,9	1,2	1,5	1,8	2,1	3	3,6	4	4,5	5,4	6	7,2	7,8	9	10,2	12	
kW		H = TOTAL HEAD METRES COLUMN OF WATER																		
SV2 03..4	0,25	0,34	7,9	7,2	6,5	5,8	4,8	3,8	2,8											
SV2 06..4	0,25	0,34	16	14,4	13	11,6	9,7	7,7	5,6											
SV2 09..4	0,25	0,34	22,4	21,5	19,5	17,5	14,5	11,5	8,5											
SV2 12..4	0,25	0,34	31,5	29	26,5	23	19,5	15,5	11											
SV2 14..4	0,25	0,34	37	33,5	30,5	27	22,5	18	13											
SV2 16..4	0,25	0,34	42	38,5	35	31	26	20,5	15											
SV2 18..4	0,37	0,5	47,5	43	39,5	34,5	29	23	16,5											
SV2 20..4	0,37	0,5	53	48	44	38,5	32,5	25,5	18,5											
SV2 22..4	0,37	0,5	58	53	48	42,5	35,5	28	20,5											
SV2 24..4	0,37	0,5	63,5	57,5	52,5	46,5	39	30,5	22											
SV4 03..4	0,25	0,34	7			6,3	6	5,8	5,5	4,3	3	2								
SV4 06..4	0,25	0,34	14			12,5	12	11,5	11	8,5	6	4,3								
SV4 09..4	0,25	0,34	21			19	18,5	17,5	16,5	12,5	9	6,4								
SV4 12..4	0,25	0,34	28,5			25,5	24,5	23	22	17	12	8,5								
SV4 14..4	0,37	0,5	33			29,5	28,5	27	26	19,5	14	10								
SV4 16..4	0,37	0,5	37,5			34	32,5	31	29,5	22,5	16	11,5								
SV4 18..4	0,37	0,5	42,5			38	36,5	35	33	25	18	13								
SV4 20..4	0,55	0,75	47			42,5	41	39	37	28	20	14								
SV4 22..4	0,55	0,75	52			46,5	45	42,5	40,5	31	22	15,5								
SV4 24..4	0,55	0,75	56,5			51	49	46,5	44	34	24	17								
SV8 04..4	0,55	0,75	13,5							12,5	12	11,5	11	9,5	8,5	6				
SV8 06..4	0,55	0,75	20							18,5	18	17	16,5	14,5	12,8	9				
SV8 08..4	0,55	0,75	27							25	24	23	22	19	17	12				
SV8 10..4	0,55	0,75	34							31	30	29	27	24	21,5	15				
SV8 12..4	0,75	1	40,5							37,5	36	34,5	32,5	28,5	25,5	18				
SV8 14..4	0,75	1	47							43,5	41,5	40	38	33,5	29,5	21				
SV8 15..4	1,1	1,5	50,5							46,5	44,5	43	41	36	32	22,5				
SV8 16..4	1,1	1,5	54							49,5	47,5	46	43,5	38	34	24				
SV16 04..4	0,55	0,75	17										16	15,8	15,5	14,5	14	12,5	11	7,5
SV16 06..4	0,75	1	25										24,5	23,5	23	22	21	19	16,5	11
SV16 08..4	1,1	1,5	33,5										32,5	31,5	31	29	28	25,5	21,5	14,5
SV16 09..4	1,1	1,5	38										36,5	35,5	35	33	31,5	28,5	24,5	16,5
SV16 11..4	1,5	2	46										44,5	43,5	42,5	40	38,5	34,5	30	20
SV16 13..4	1,5	2	54,5										52,5	51,4	50	47,5	45,5	41	35,5	24
SV16 15..4	2,2	3	63										61	59,5	58	54,5	52,5	47,5	41	28
SV16 16..4	2,2	3	67										65	63,5	62	58,5	56	50,5	43,5	30

Performances in compliance with ISO 9906 - Annex A.

sv2-16-4p50\_b\_th

## SV 33-92

### TABLE OF HYDRAULIC PERFORMANCES AT ~1450 rpm

PUMP TYPE	RATED POWER		Q = DELIVERY															
			l/min 0	125	150	200	250	300	333	375	450	500	600	700	750	800	900	1000
	kW	HP	m <sup>3</sup> /h 0	7,5	9	12	15	18	20	22,5	27	30	36	42	45	48	54	60
H = TOTAL HEAD METRES COLUMN OF WATER																		
SV33 03/2..4	1,1	1,5	14,4	13,7	13,4	12,4	10,9	9	7,3									
SV33 04/1..4	1,1	1,5	21,8	20,4	19,9	18,7	16,9	14,4	12,3									
SV33 05..4	1,5	2	29,4	27,5	26,9	25,5	23,4	20,4	17,9									
SV33 06..4	2,2	3	35,9	33,8	33,2	31,5	29	25,5	22,5									
SV33 07..4	2,2	3	41,6	39,1	38,3	36,2	33,2	29,1	25,6									
SV33 08..4	3	4	47,9	45,2	44,3	42	38,8	34,2	31,3									
SV33 09..4	3	4	53,3	50,2	49,2	46,7	43	37,9	33,4									
SV33 10..4	3	4	59	55,4	54	51	47	41,5	36,5									
SV33 11..4	4	5,5	65,7	62,2	61	58	54	48	42,3									
SV33 12..4	4	5,5	71,5	67,6	66	63	58	52	45,7									
SV33 13..4	4	5,5	77,2	73	72	68	63	55	49									
SV46 02..4	1,1	1,5	13			11,8	11,3	10,7	10,1	9,4	7,5	5,9						
SV46 03..4	1,5	2	19,8			17,8	17,1	16,2	15,4	14,2	11,5	9,2						
SV46 04..4	2,2	3	26,3			24	23,1	21,9	20,9	19,4	15,8	12,7						
SV46 05..4	2,2	3	32,6			29,6	28,5	27	25,8	23,9	19,4	15,5						
SV46 06..4	3	4	39,3			35,9	34,6	32,9	31,5	29,3	24,1	19,5						
SV46 07..4	3	4	45,5			41,5	40	37,9	36,2	33,6	27,4	22						
SV46 08..4	4	5,5	52,5			48,3	46,6	44,4	42,5	39,6	32,6	26,5						
SV46 09..4	4	5,5	58,9			53,9	52	50	47,4	44,1	36,2	29,2						
SV46 10..4	5,5	7,5	66,2			61	59	56	54	50,5	42	34,5						
SV46 11..4	5,5	7,5	72,6			66,9	65	62	59	55,2	46	37,6						
SV46 12..4	5,5	7,5	78,9			72,7	70	67	64	59,8	50	40,4						
SV66 01..4	1,1	1,5	7,3				6,4	6,1	6	5,8	5,4	5,1	4,4	3,4	2,7			
SV66 02..4	1,5	2	14,8				13,5	13,1	12,9	12,5	11,8	11,2	9,9	8,2	7,2			
SV66 03..4	2,2	3	22,3				20,3	19,7	19,3	18,8	17,7	16,9	14,9	12,3	10,7			
SV66 04..4	3	4	29,7				27,1	26,4	25,8	25,1	23,7	22,6	20	16,6	14,5			
SV66 05..4	4	5,5	37,5				34,4	33,5	32,9	32	30,3	28,9	25,7	21,4	18,8			
SV66 06..4	4	5,5	44,7				40,9	39,8	39	38	36	34,1	30,2	25,1	21,9			
SV66 07..4	6	7,5	52,8				48,5	47,3	46	45	43	41	36	30,5	26,8			
SV66 08..4	5,5	7,5	60,1				55,1	53,7	53	51	49	46	41	34,3	30,2			
SV92 01..4	1,1	1,5	8,3							7	6,4	6,1	5,6	5,1	4,9	4,6	3,8	2,8
SV92 02..4	2,2	3	16,3							14,3	13,6	13,1	12,1	11,1	10,5	10	8,6	7
SV92 03..4	3	4	24,4							21,3	20,1	19,4	17,8	16,3	15,5	14,6	12,7	10,2
SV92 04..4	4	6	32,9							28,9	27,4	26,4	24,4	22,4	21,3	20,2	17,5	14,3
SV92 05..4	5,5	7,5	41,6							36,7	34,9	33,6	31,1	28,6	27,2	25,8	22,6	18,6
SV92 06..4	5,5	7,5	49,5							43,6	41	40	37	34	32,2	30,5	26,6	21,7
SV92 07..4	7,5	10	58							51,2	49	47	43	40	38	35,9	31,4	25,7
SV92 08..4	7,5	10	65,9							58	55	53	49	45	43	40,5	35,3	28,8

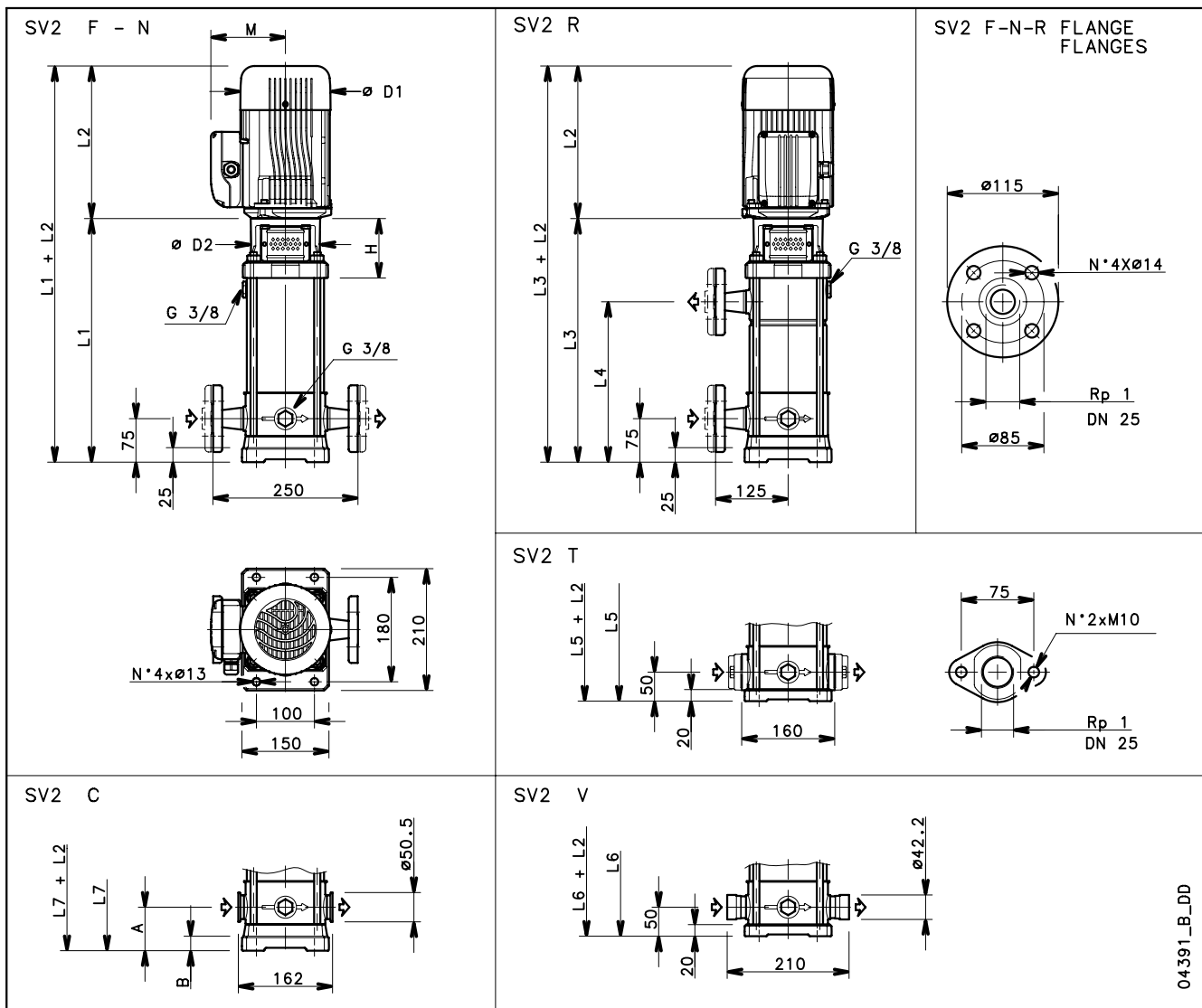
Performances in compliance with ISO 9906 - Annex A.

sv33-92-4p50\_a\_th

## DIMENSIONS AND WEIGHTS, SV 2 SERIES (~2900 rpm)

**F** version: AISI 304, in-line ports, round flanges from SV202 to SV224, PN25.  
**T** version: AISI 304, in-line ports, oval flanges from SV202 to SV214, PN16.  
**R** version: AISI 304, delivery port above suction, round flanges from SV204 to SV214, PN25.

**N** version: AISI 316, in-line ports, round flanges from SV202 to SV224, PN25.  
**V** version: AISI 316, in-line ports, Victaulic® couplings from SV202 to SV224, PN25.  
**C** version: AISI 316, in-line ports, Clamp couplings from SV202 to SV214, PN16.  
 from SV216 to SV224, PN25.

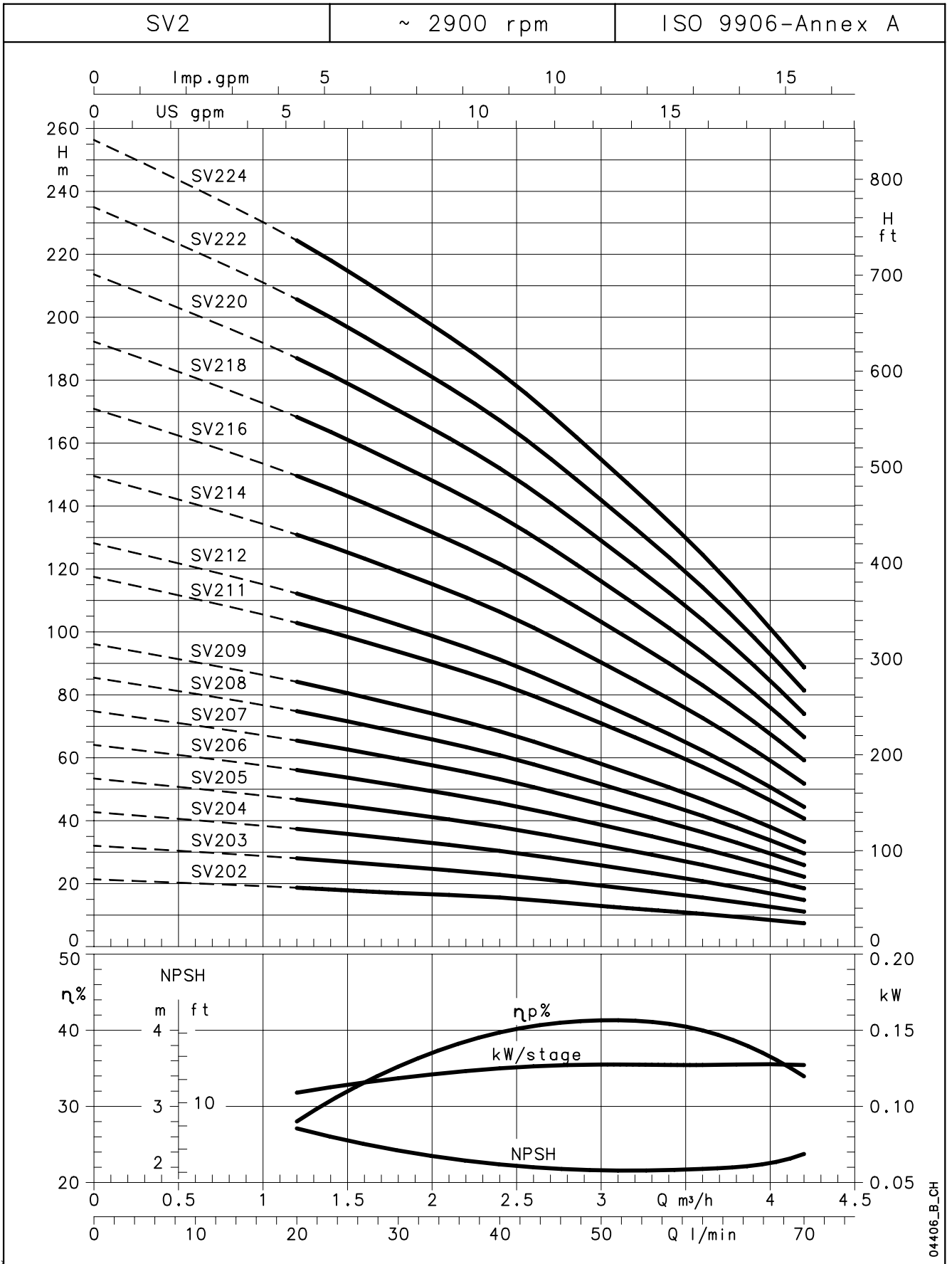


04391\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)															WEIGHT kg		
	kW	SIZE	L1	L2		L3	L4	L5	L6	L7	H	M		D1		D2	A	B	PUMP	ELECTRIC PUMP
SV202	0,37	71	285	209	209	-	-	260	260	260	93	111	111	120	120	105	50	20	9,5	17,5
SV203	0,37	71	310	209	209	-	-	285	285	285	93	111	111	120	120	105	50	20	10	18
SV204	0,55	71	335	231	231	335	200	310	310	310	93	121	121	140	140	105	50	20	10,5	19
SV205	0,75	80	370	226	226	370	225	345	345	345	103	121	121	140	140	120	50	20	11,5	21,5
SV206	0,75	80	395	226	226	395	250	370	370	370	103	121	121	140	140	120	50	20	12	22
SV207	1,1	80	420	263	263	420	275	395	395	395	103	137	129	155	155	120	50	20	12,5	23
SV208	1,1	80	445	263	263	445	300	420	420	420	103	137	129	155	155	120	50	20	13	23,5
SV209	1,1	80	470	263	263	470	325	445	445	445	103	137	129	155	155	120	50	20	13,5	24
SV211	1,5	90	530	263	263	530	375	505	505	505	113	137	129	155	155	140	50	20	15	31
SV212	1,5	90	555	263	263	555	400	530	530	530	113	137	129	155	155	140	50	20	15,5	31,5
SV214	2,2	90	605	281	263	605	450	580	580	580	113	121	129	176	155	140	50	20	16,5	33,5
SV216	2,2	90	655	281	263	655	500	-	630	655	113	121	129	176	155	140	75	25	17,5	34,5
SV218	2,2	90	705	281	263	705	550	-	680	705	113	121	129	176	155	140	75	25	18,5	35,5
SV220	3	100	765	-	303	765	600	-	740	765	123	-	121	-	176	160	75	25	20	42
SV222	3	100	815	-	303	815	650	-	790	815	123	-	121	-	176	160	75	25	21	43
SV224	3	100	865	-	303	865	700	-	840	865	123	-	121	-	176	160	75	25	22	44

sv2-2p50\_a\_td

**SV2 SERIES  
OPERATING CHARACTERISTICS AT ~2900 rpm 50 Hz**

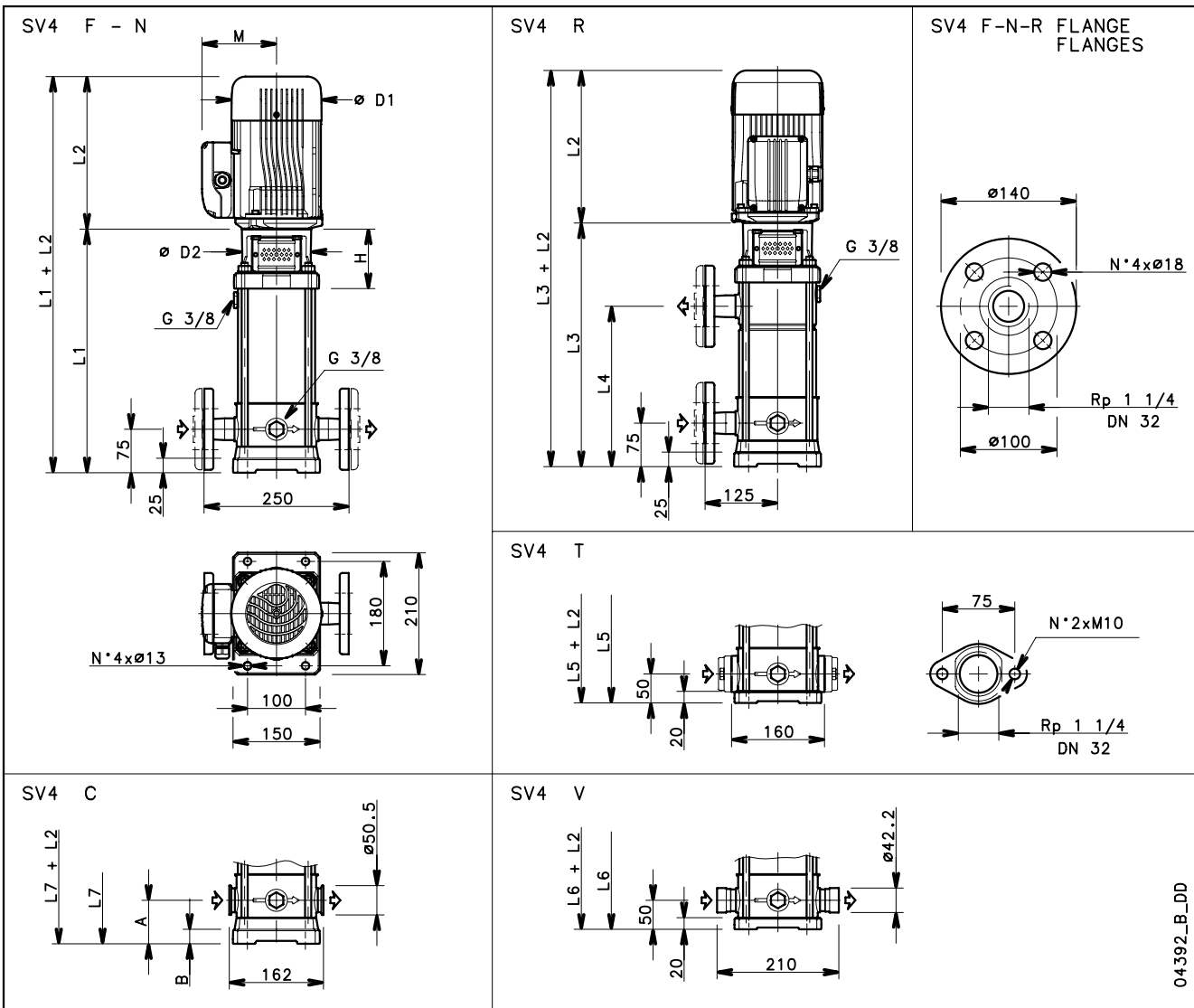


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV4 SERIES (~2900 rpm)

**F** version: AISI 304, in-line ports, round flanges from SV402 to SV424, PN25.  
**T** version: AISI 304, in-line ports, oval flanges from SV402 to SV414, PN16.  
**R** version: AISI 304, delivery port above suction, round flanges from SV405 to SV424, PN25.

**N** version: AISI 316, in-line ports, round flanges from SV402 to SV424, PN25.  
**V** version: AISI 316, in-line ports, Victaulic® couplings from SV402 to SV424, PN25.  
**C** version: AISI 316, in-line ports, Clamp couplings from SV402 to SV414, PN16.  
 from SV416 to SV424, PN25.



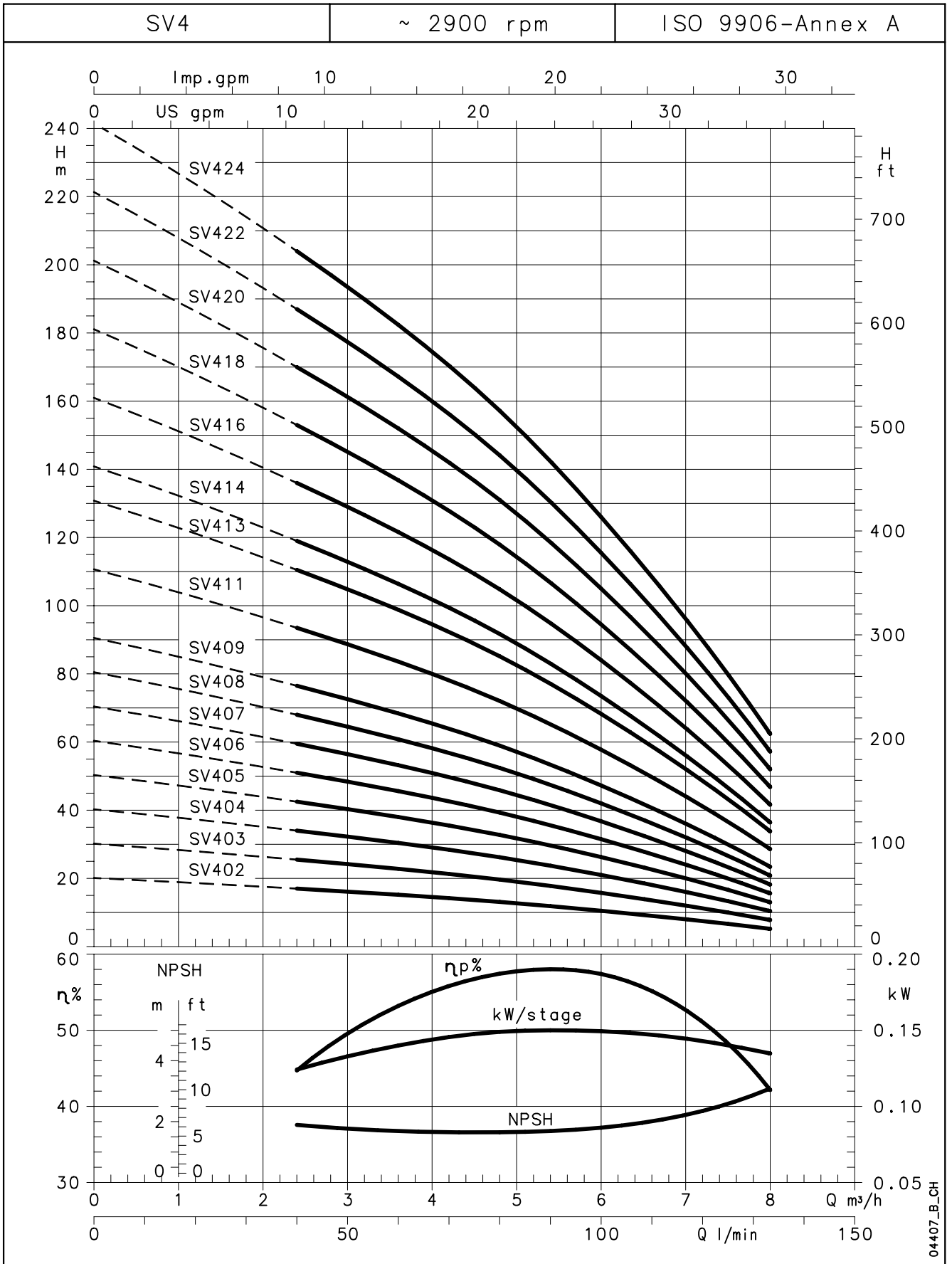
04392\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)																WEIGHT kg	
	kW	SIZE	L1	L2		L3	L4	L5	L6	L7	H	M		D1		D2	A	B	PUMP	ELECTRIC PUMP
				1-PHASE	3-PHASE							1-PHASE	3-PHASE	1-PHASE	3-PHASE					
SV402	0,37	71	285	209	209	-	-	260	260	260	93	111	111	120	120	105	50	20	9,5	17,5
SV403	0,55	71	310	231	231	-	-	285	285	285	93	121	121	140	140	105	50	20	10	18,5
SV404	0,75	80	345	226	226	-	-	320	320	320	103	121	121	140	140	120	50	20	11	21
SV405	1,1	80	370	263	263	370	225	345	345	345	103	137	129	155	155	120	50	20	11,5	22
SV406	1,1	80	395	263	263	395	250	370	370	370	103	137	129	155	155	120	50	20	12	22,5
SV407	1,1	80	420	263	263	420	275	395	395	395	103	137	129	155	155	120	50	20	12,5	23
SV408	1,5	90	455	263	263	455	300	430	430	430	113	137	129	155	155	140	50	20	13,5	29,5
SV409	1,5	90	480	263	263	480	325	455	455	455	113	137	129	155	155	140	50	20	14	30
SV411	2,2	90	530	281	263	530	375	505	505	505	113	121	129	176	155	140	50	20	15	32
SV413	2,2	90	580	281	263	580	425	555	555	555	113	121	129	176	155	140	50	20	16	33
SV414	3	100	615	-	303	615	450	590	590	590	123	-	121	-	176	160	50	20	17	39
SV416	3	100	665	-	303	665	500	-	640	665	123	-	121	-	176	160	75	25	18	40
SV418	3	100	715	-	303	715	550	-	690	715	123	-	121	-	176	160	75	25	19	41
SV420	4	112	765	-	307	765	600	-	740	765	123	-	133	-	193	160	75	25	20	58
SV422	4	112	815	-	307	815	650	-	790	815	123	-	133	-	193	160	75	25	21	59
SV424	4	112	865	-	307	865	700	-	840	865	123	-	133	-	193	160	75	25	22,5	60,5

sv4-2p50\_a\_td



**SV4 SERIES  
OPERATING CHARACTERISTICS AT ~2900 rpm 50 Hz**

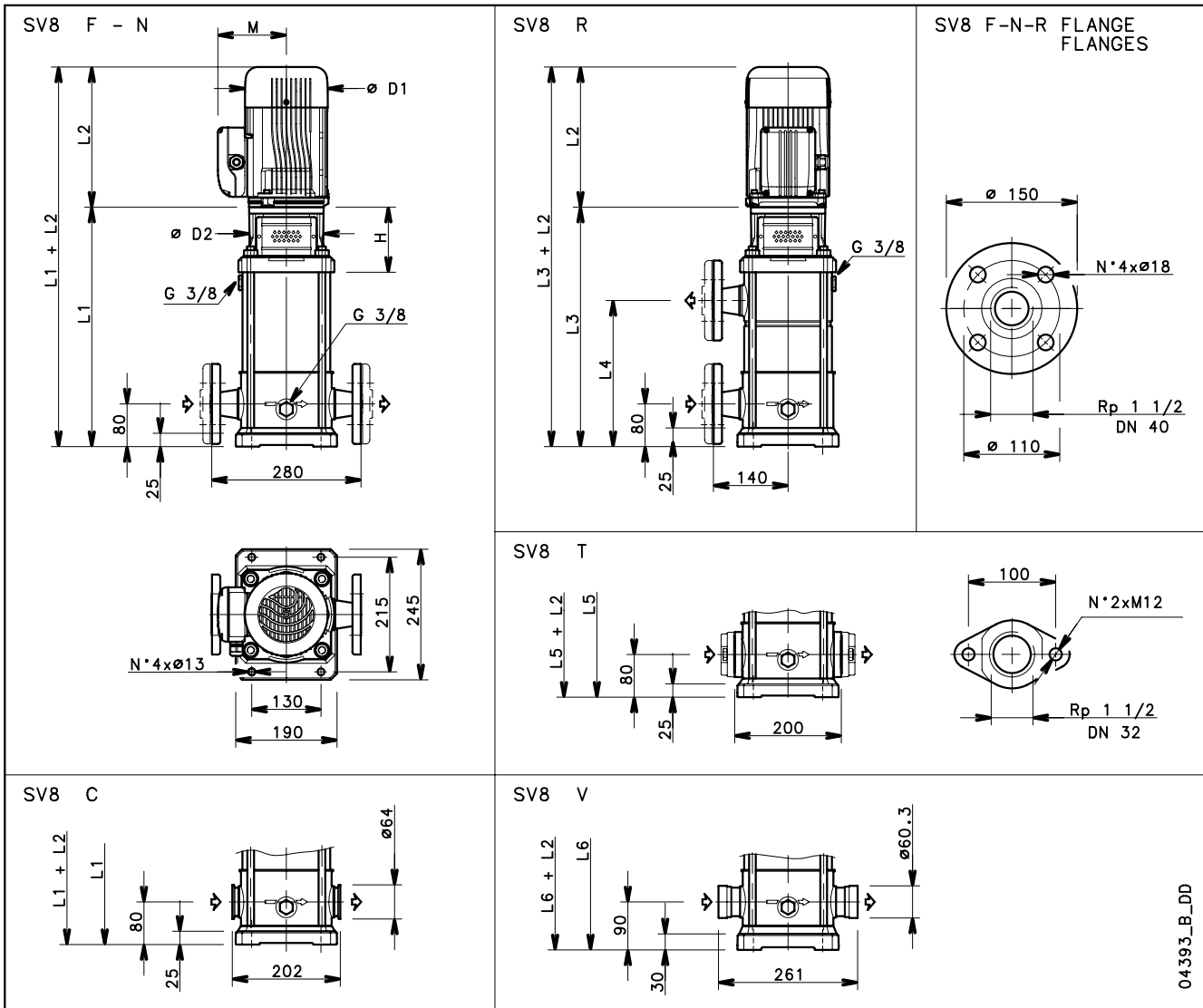


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV8 SERIES (~2900 rpm)

**F** version: AISI 304, in-line ports, round flanges from SV802 to SV816, PN25.  
**T** version: AISI 304, in-line ports, oval flanges from SV802 to SV811, PN16.  
**R** version: AISI 304, delivery port above suction, round flanges from SV803 to SV816, PN25.

**N** version: AISI 316, in-line ports, round flanges from SV802 to SV816, PN25.  
**V** version: AISI 316, in-line ports, Victaulic® couplings from SV802 to SV816, PN25.  
**C** version: AISI 316, in-line ports, Clamp couplings from SV802 to SV816, PN25.

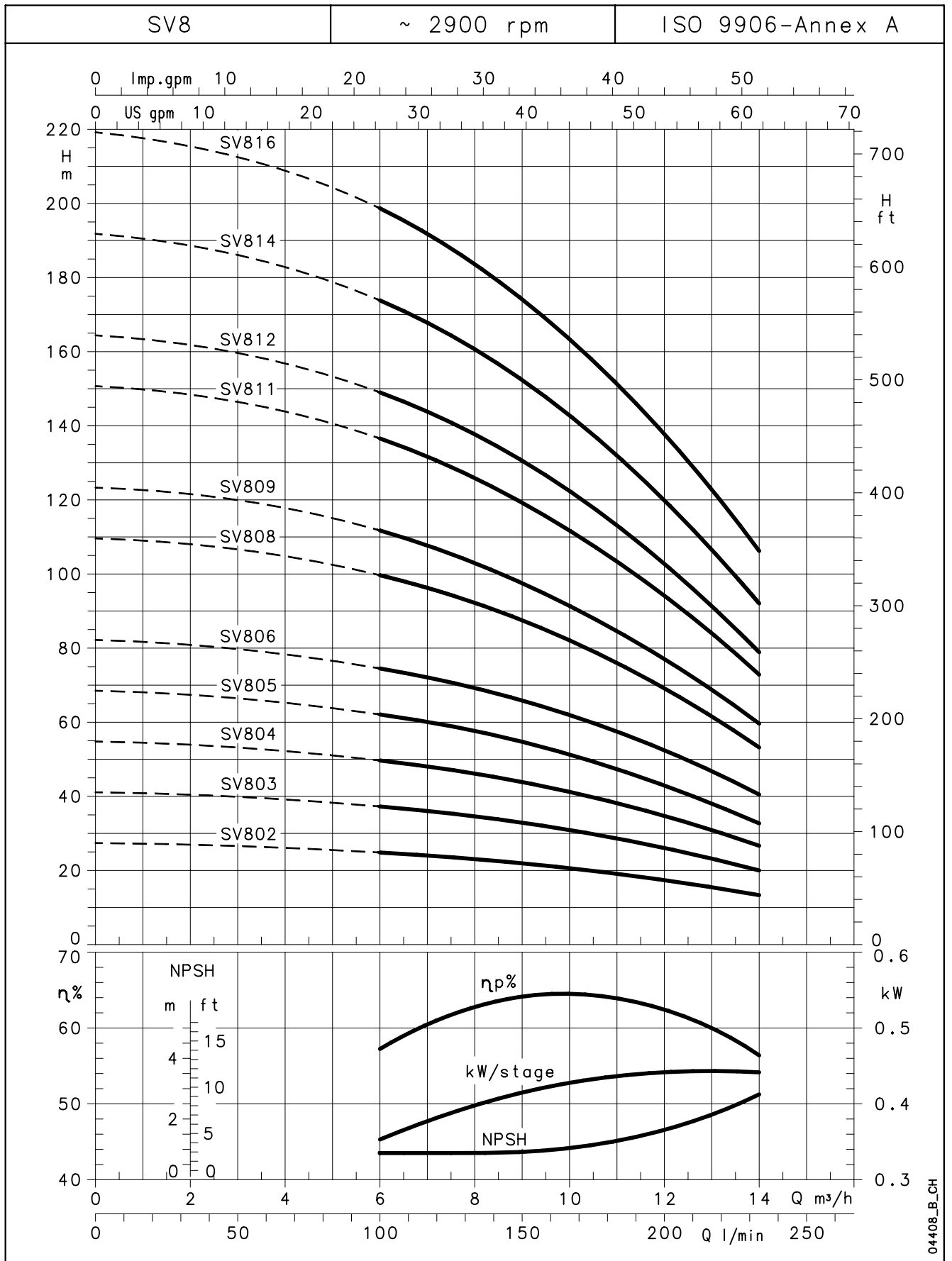


04393\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)													WEIGHT kg	
	kW	SIZE	L1	L2		L3	L4	L5	L6	H	M		D1		D2	PUMP	ELECTRIC PUMP
				1-PHASE	3-PHASE						1-PHASE	3-PHASE	1-PHASE	3-PHASE			
SV802	1,1	80	363	263	263	-	-	363	373	112	137	129	155	155	120	15	25,5
SV803	1,5	90	411	263	263	411	236	411	421	122	137	129	155	155	140	16	32
SV804	2,2	90	449	281	263	449	274	449	459	122	121	129	176	155	140	17	34
SV805	2,2	90	487	281	263	487	312	487	497	122	121	129	176	155	140	18	35
SV806	3	100	535	-	303	535	350	535	545	132	-	121	-	176	160	20	42
SV808	4	112	611	-	307	611	426	611	621	132	-	133	-	193	160	20,5	58,5
SV809	4	112	649	-	307	649	464	649	659	132	-	133	-	193	160	21,5	59,5
SV811	5,5	132	745	-	374	745	540	745	755	152	-	151	-	220	300	28	74
SV812	5,5	132	783	-	374	783	578	-	793	152	-	151	-	220	300	29	75
SV814	7,5	132	859	-	374	859	654	-	869	152	-	151	-	220	300	31	81
SV816	7,5	132	935	-	374	935	730	-	945	152	-	151	-	220	300	32,5	82,5

sv8-2p50\_a\_td

**SV8 SERIES  
OPERATING CHARACTERISTICS AT ~2900 rpm 50 Hz**

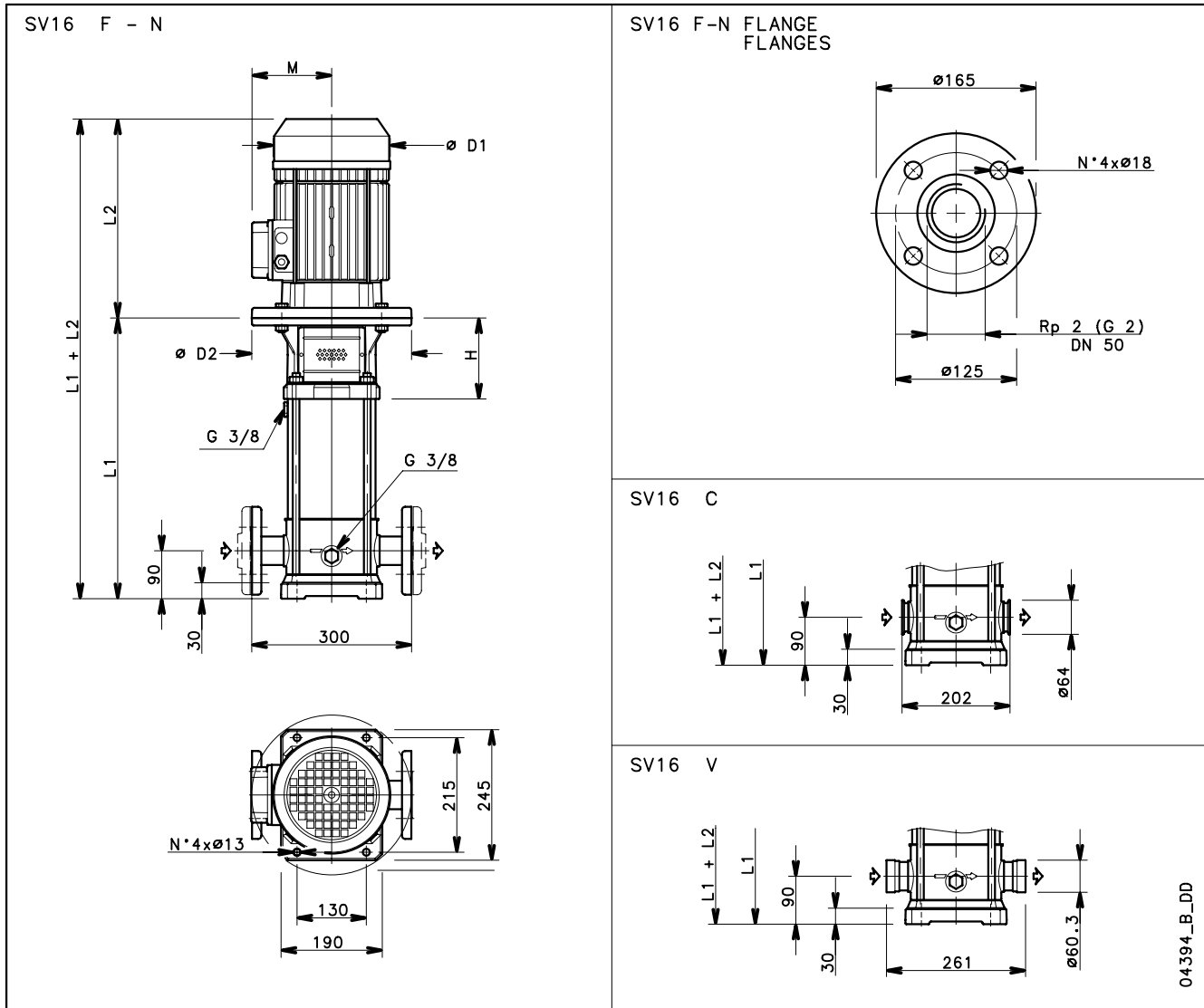


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV16 SERIES (~2900 rpm)

**F** version: AISI 304, in-line ports, round flanges from SV1602 to SV1615, PN25.  
**N** version: AISI 316, in-line ports, round flanges from SV1602 to SV1615, PN25.

**V** version: AISI 316, in-line ports, Victaulic® couplings from SV1602 to SV1615, PN25.  
**C** version: AISI 316, in-line ports, Clamp couplings from SV1602 to SV1615, PN25.

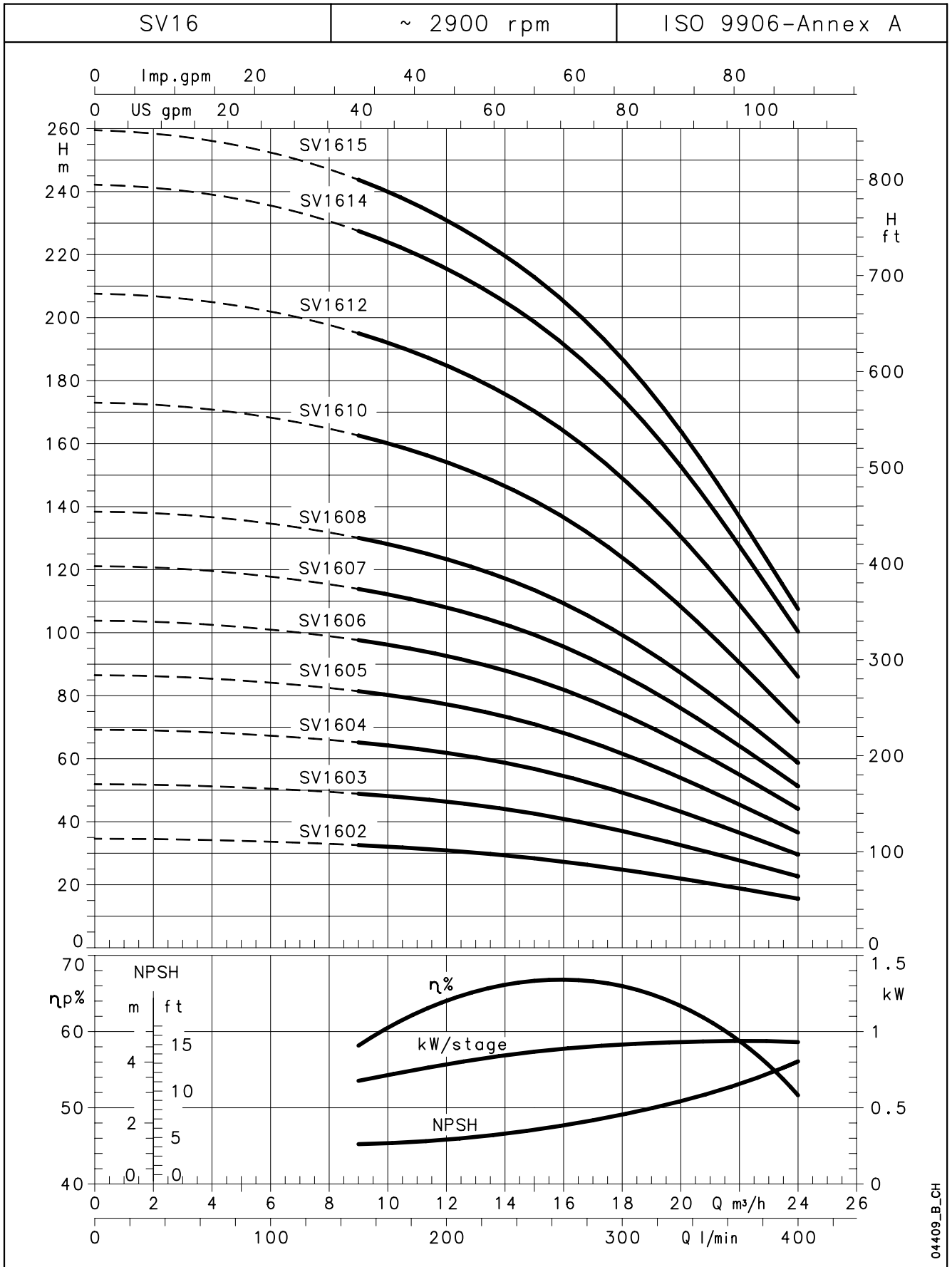


04394\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)									WEIGHT kg	
	kW	SIZE	L1	L2		H	M		D1		D2	PUMP	ELECTRIC PUMP
				1-PHASE	3-PHASE		1-PHASE	3-PHASE	1-PHASE	3-PHASE			
SV1602	2,2	90	383	281	263	122	121	129	176	155	140	15	32
SV1603	3	100	431	-	303	132	-	121	-	176	160	16	38
SV1604	4	112	469	-	307	132	-	133	-	193	160	17,5	55,5
SV1605	5,5	132	527	-	374	152	-	151	-	220	300	22	68
SV1606	5,5	132	565	-	374	152	-	151	-	220	300	23	69
SV1607	7,5	132	603	-	374	152	-	151	-	220	300	24	74
SV1608	7,5	132	641	-	374	152	-	151	-	220	300	25	75
SV1610	11	160	749	-	427	184	-	191	-	257	350	34	119
SV1612	11	160	825	-	427	184	-	191	-	257	350	36	121
SV1614	15	160	901	-	488	184	-	232	-	310	350	38	130
SV1615	15	160	939	-	488	184	-	232	-	310	350	39	131

sv16-2p50\_a\_td

**SV16 SERIES  
OPERATING CHARACTERISTICS AT ~2900 rpm 50 Hz**



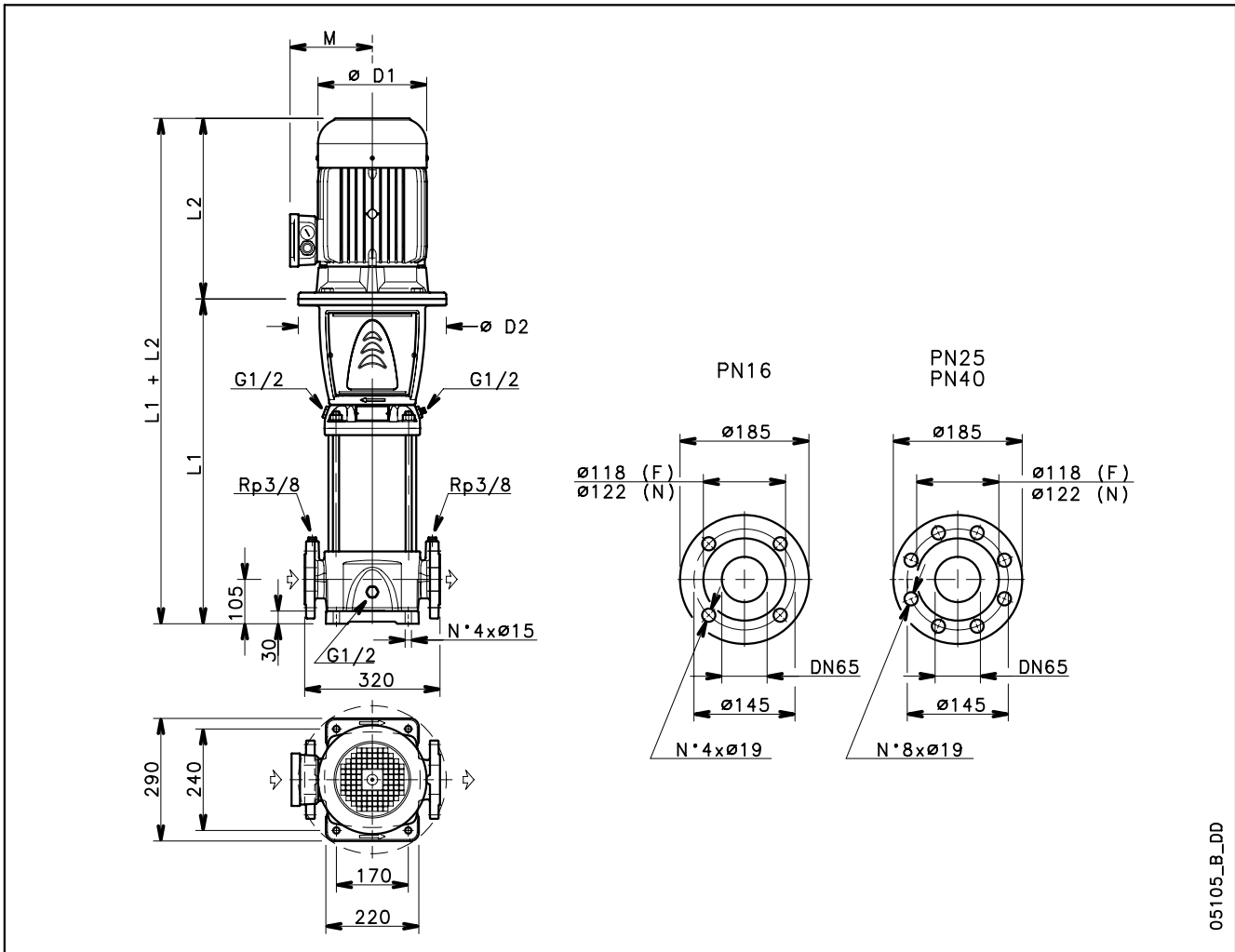
These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

04409\_B\_CH

## DIMENSIONS AND WEIGHTS, SV33 SERIES (~2900 rpm)

**F** version: AISI 316/Ghisa, in-line ports, round flanges.

**N** version: AISI 316, in-line ports, round flanges.



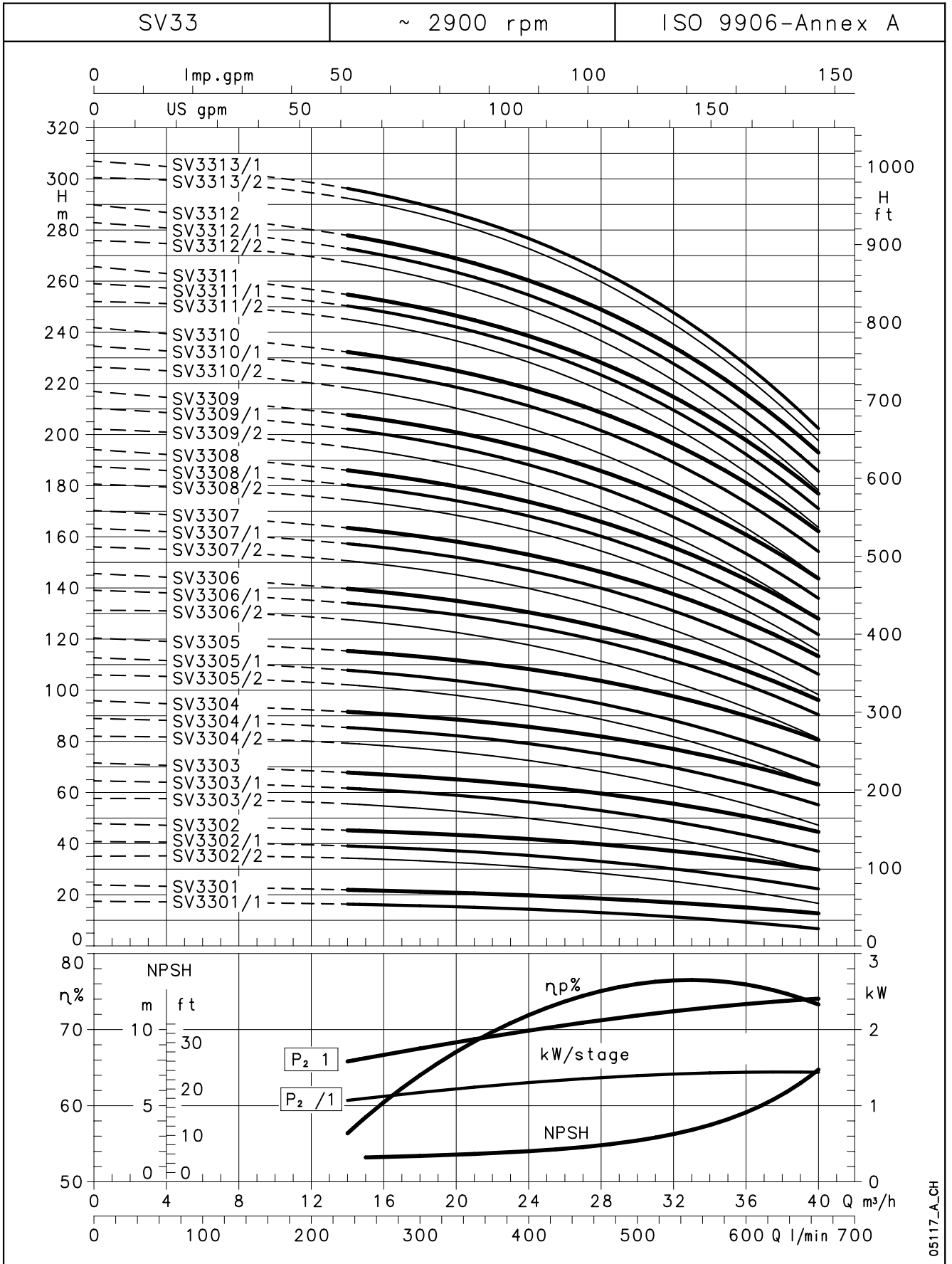
05105\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)						WEIGHT kg	
	kW	SIZE	L1	L2	D1	D2	M	FLANGES PN	PUMP	ELECTRIC PUMP
SV3301/1	2,2	90	489	263	155	140	129	16	52	65
SV3301	3	100	489	303	176	160	121	16	52	70
SV3302/2	4	112	564	307	193	160	133	16	56	78
SV3302/1	4	112	564	307	193	160	133	16	56	78
SV3302	5,5	132	584	374	220	300	151	16	61	96
SV3303/2	5,5	132	659	374	220	300	151	16	65	100
SV3303/1	7,5	132	659	374	220	300	151	16	65	106
SV3303	7,5	132	659	374	220	300	151	16	65	106
SV3304/2	7,5	132	734	374	220	300	151	16	69	110
SV3304/1	11	160	769	427	257	350	194	16	73	140
SV3304	11	160	769	427	257	350	194	16	73	140
SV3305/2	11	160	844	427	257	350	194	16	77	144
SV3305/1	11	160	844	427	257	350	194	16	77	144
SV3305	15	160	844	488	310	350	232	16	77	174
SV3306/2	15	160	919	488	310	350	232	16	81	178
SV3306/1	15	160	919	488	310	350	232	25	81	178
SV3306	15	160	919	488	310	350	232	25	81	178
SV3307/2	15	160	994	488	310	350	232	25	84	182
SV3307/1	18,5	160	994	532	310	350	232	25	84	200

PUMP TYPE	MOTOR		DIMENSIONS (mm)						WEIGHT kg	
	kW	SIZE	L1	L2	D1	D2	M	FLANGES PN	PUMP	ELECTRIC PUMP
SV3307	18,5	160	994	532	310	350	232	25	84	200
SV3308/2	18,5	160	1069	532	310	350	232	25	88	204
SV3308/1	18,5	160	1069	532	310	350	232	25	88	204
SV3308	22	180	1069	532	310	350	232	25	89	210
SV3309/2	22	180	1144	532	310	350	232	25	93	214
SV3309/1	22	180	1144	532	310	350	232	25	93	214
SV3309	22	180	1144	532	310	350	232	25	93	214
SV3310/2	22	180	1219	532	310	350	232	25	97	218
SV3310/1	30	200	1219	613	354	400	278	25	104	237
SV3310	30	200	1219	613	354	400	278	25	104	237
SV3311/2	30	200	1294	613	354	400	278	40	118	251
SV3311/1	30	200	1294	613	354	400	278	40	118	251
SV3311	30	200	1294	613	354	400	278	40	118	251
SV3312/2	30	200	1369	613	354	400	278	40	122	255
SV3312/1	30	200	1369	613	354	400	278	40	122	255
SV3312	30	200	1369	613	354	400	278	40	122	255
SV3313/2	30	200	1444	613	354	400	278	40	127	260
SV3313/1	30	200	1444	613	354	400	278	40	127	260

sv33-2p50\_b\_td

# SV33 SERIES OPERATING CHARACTERISTICS AT ~2900 rpm 50 Hz

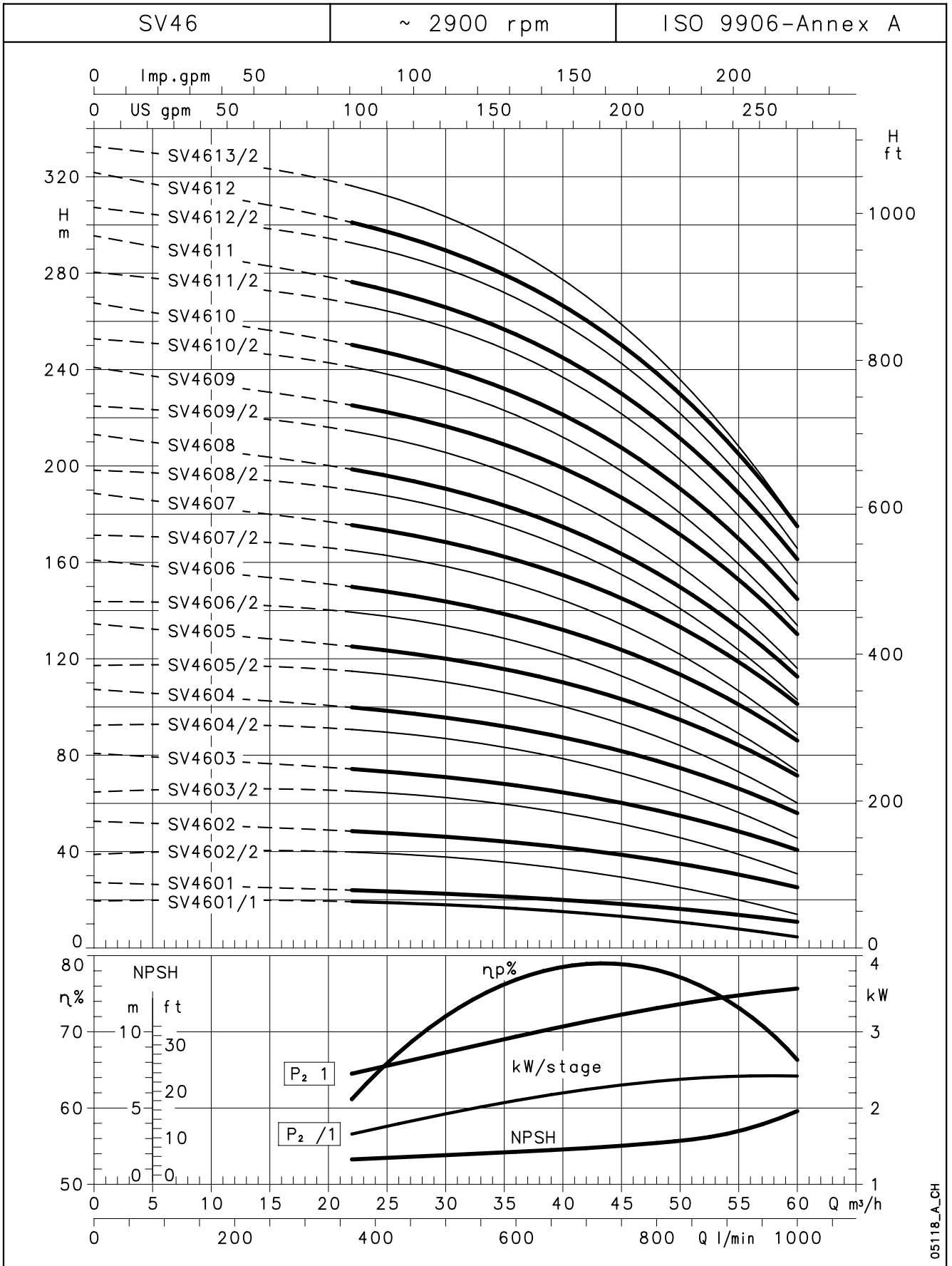


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .





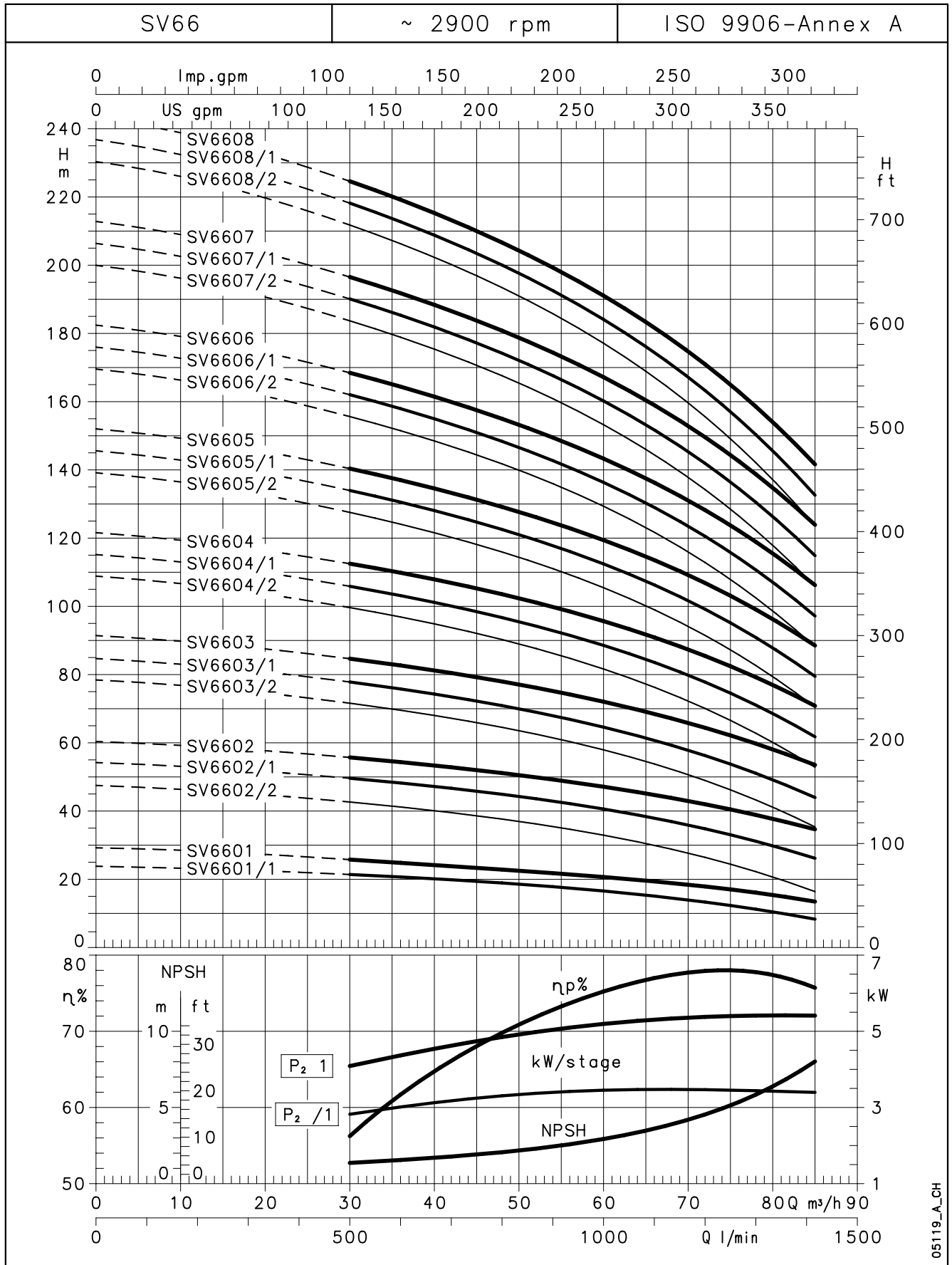
**SV46 SERIES  
OPERATING CHARACTERISTICS AT ~2900 rpm 50 Hz**



These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .



**SV66 SERIES  
OPERATING CHARACTERISTICS AT ~2900 rpm 50 Hz**

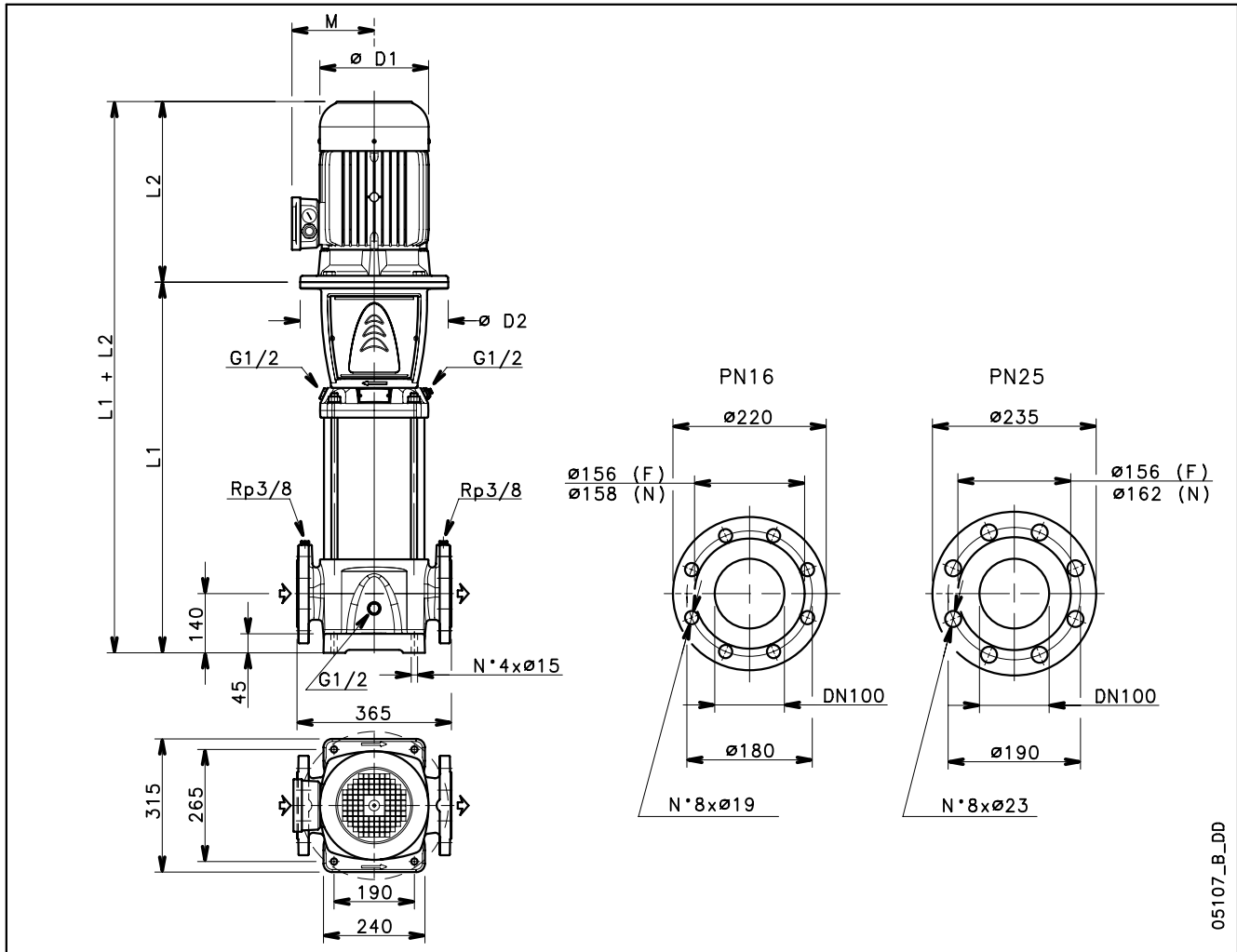


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV92 SERIES (~2900 rpm)

**F** version: AISI 316/Cast iron, in-line ports, round flanges.

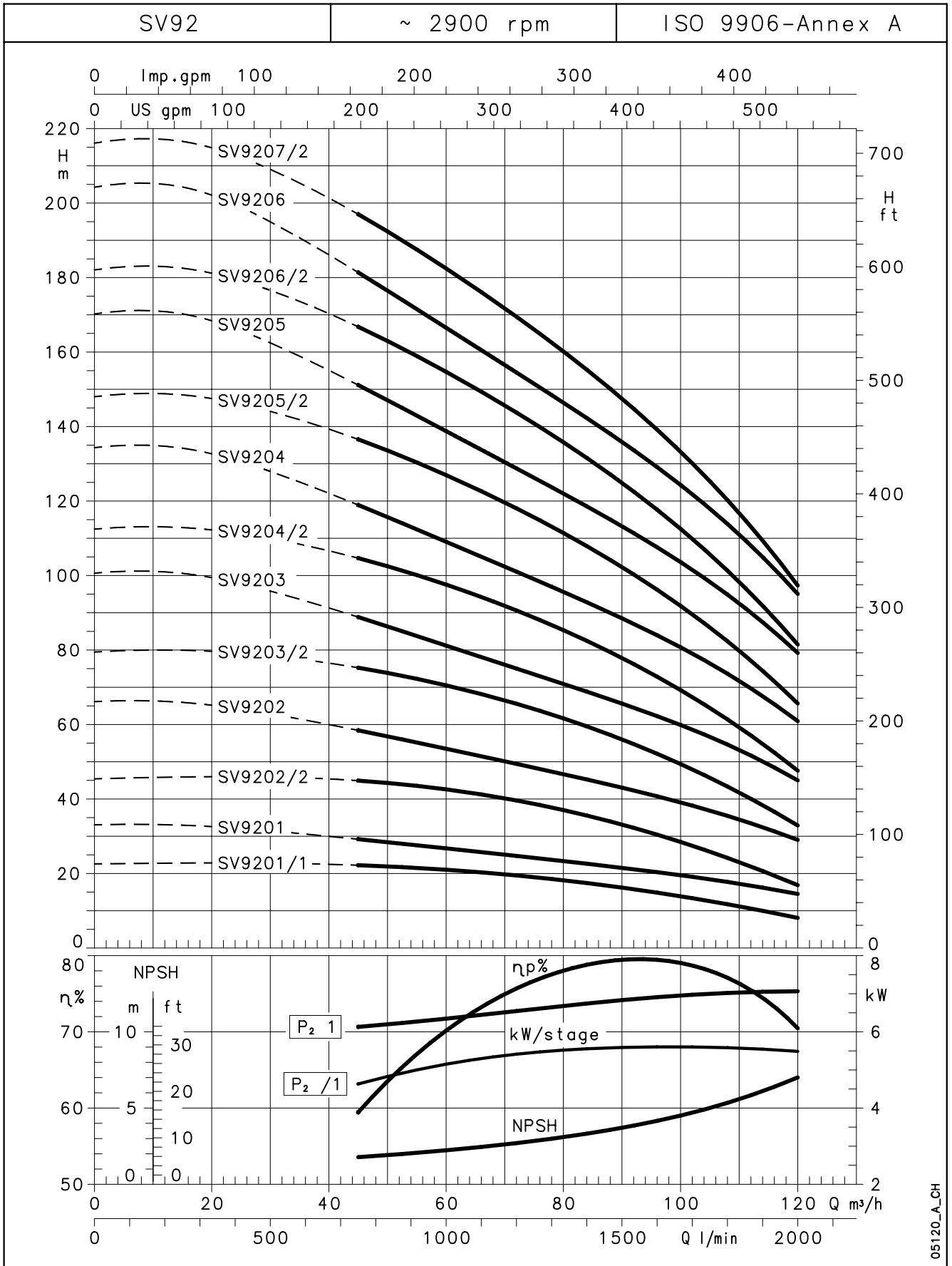
**N** version: AISI 316, in-line ports, round flanges.



PUMP TYPE	MOTOR		DIMENSIONS (mm)					FLANGES	WEIGHT kg	
	kW	SIZE	L1	L2	D1	D2	M	PN	PUMP	ELECTRIC
SV9201/1	5,5	132	574	374	220	300	151	16	71	107
SV9201	7,5	132	574	374	220	300	151	16	71	113
SV9202/2	11	160	699	427	257	350	194	16	80	148
SV9202	15	160	699	488	310	350	232	16	80	178
SV9203/2	18,5	160	789	532	310	350	232	16	86	202
SV9203	22	180	789	532	310	350	232	16	87	208
SV9204/2	30	200	879	613	354	400	278	16	99	232
SV9204	30	200	879	613	354	400	278	16	99	232
SV9205/2	37	200	969	613	354	400	278	25	107	250
SV9205	37	200	969	613	354	400	278	25	107	250
SV9206/2	45	225	1059	710	411	450	298	25	116	335
SV9206	45	225	1059	710	411	450	298	25	116	335
SV9207/2	45	225	1149	710	411	450	298	25	121	340

sv92-2p50\_b\_td

**SV92 SERIES  
OPERATING CHARACTERISTICS AT ~2900 rpm 50 Hz**

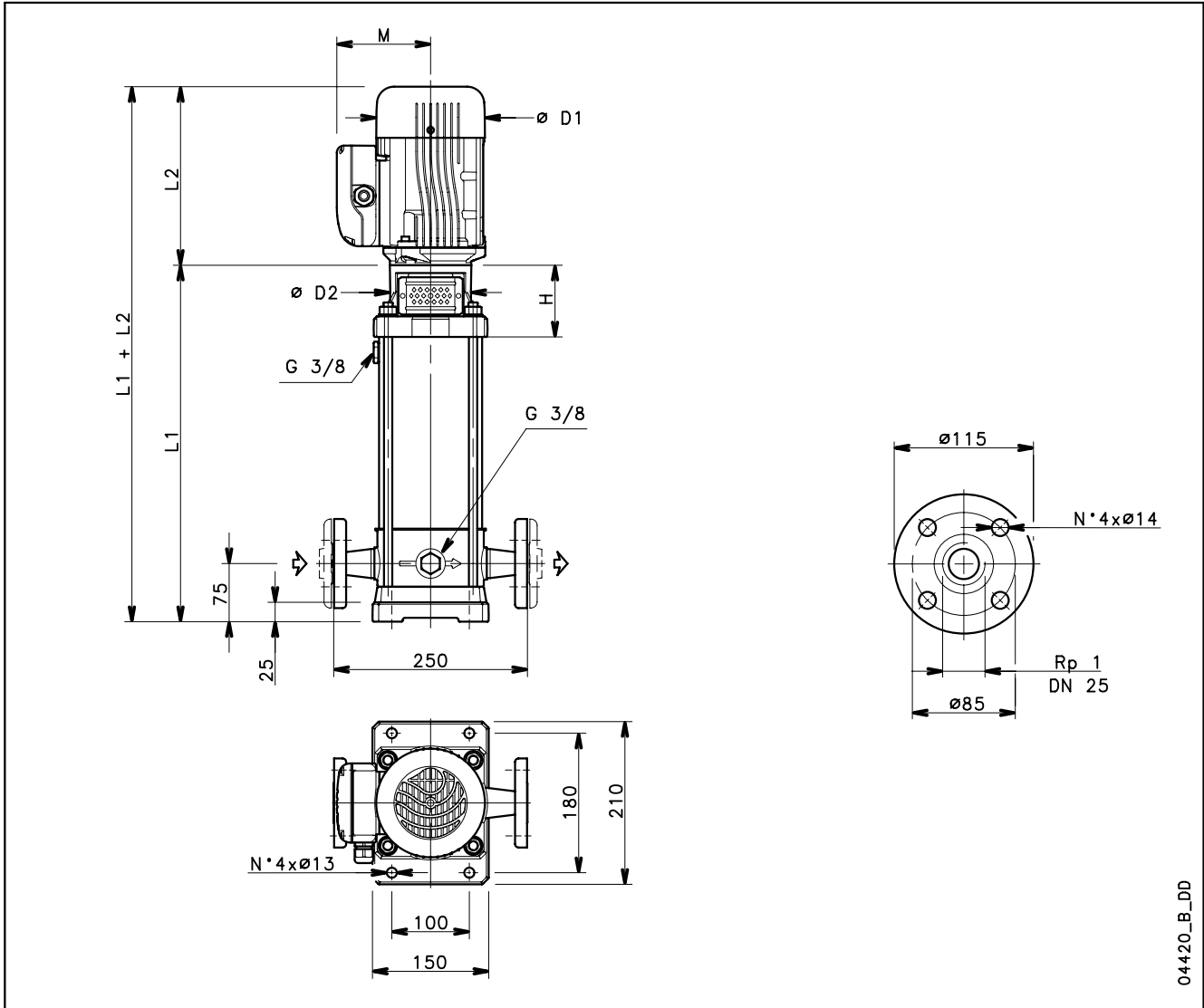


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV2 SERIES (~1450 rpm)

**F** version: AISI 304, in-line ports, round flanges, PN25.

**N** version: AISI 316, in-line ports, round flanges, PN25.

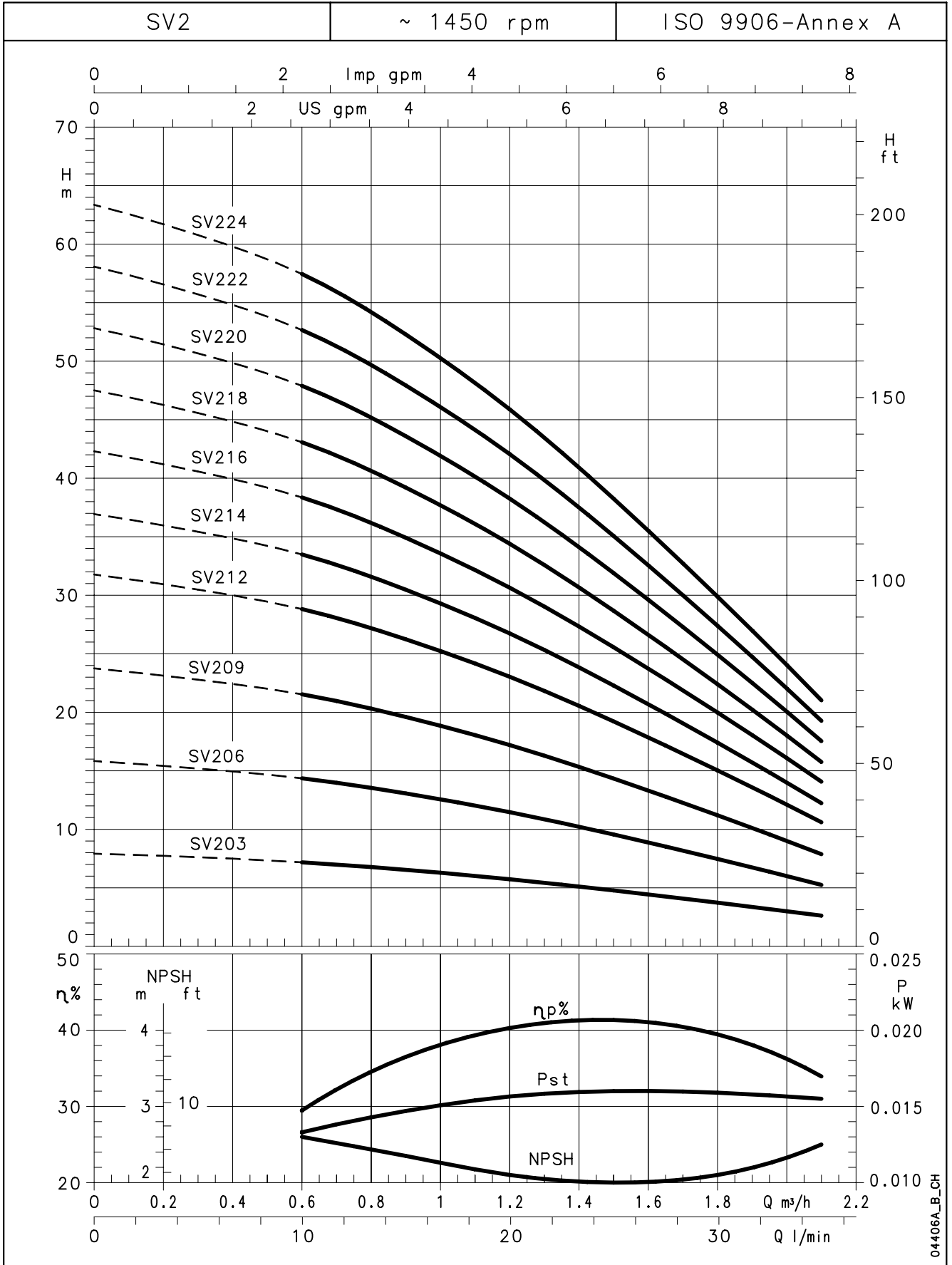


04420\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)								WEIGHT kg	
	kW	SIZE	L1+L2	L1	L2	H	M	D1	D2	ELECTRIC PUMP	PUMP	
SV203..4	0,25	71	541	310	231	93	121	140	105	10	16,5	
SV206..4	0,25	71	616	385	231	93	121	140	105	11,5	18	
SV209..4	0,25	71	691	460	231	93	121	140	105	13	19,5	
SV212..4	0,25	71	766	535	231	93	121	140	105	14,5	21	
SV214..4	0,25	71	816	585	231	93	121	140	105	15,5	22	
SV216..4	0,25	71	866	635	231	93	121	140	105	16,5	23	
SV218..4	0,37	71	916	685	231	93	121	140	105	17,5	25	
SV220..4	0,37	71	966	735	231	93	121	140	105	18,5	26	
SV222..4	0,37	71	1016	785	231	93	121	140	105	19,5	27	
SV224..4	0,37	71	1066	835	231	93	121	140	105	20,5	28	

sv2-4p50\_b\_td

**SV2 SERIES  
OPERATING CHARACTERISTICS AT ~1450 rpm 50 Hz**

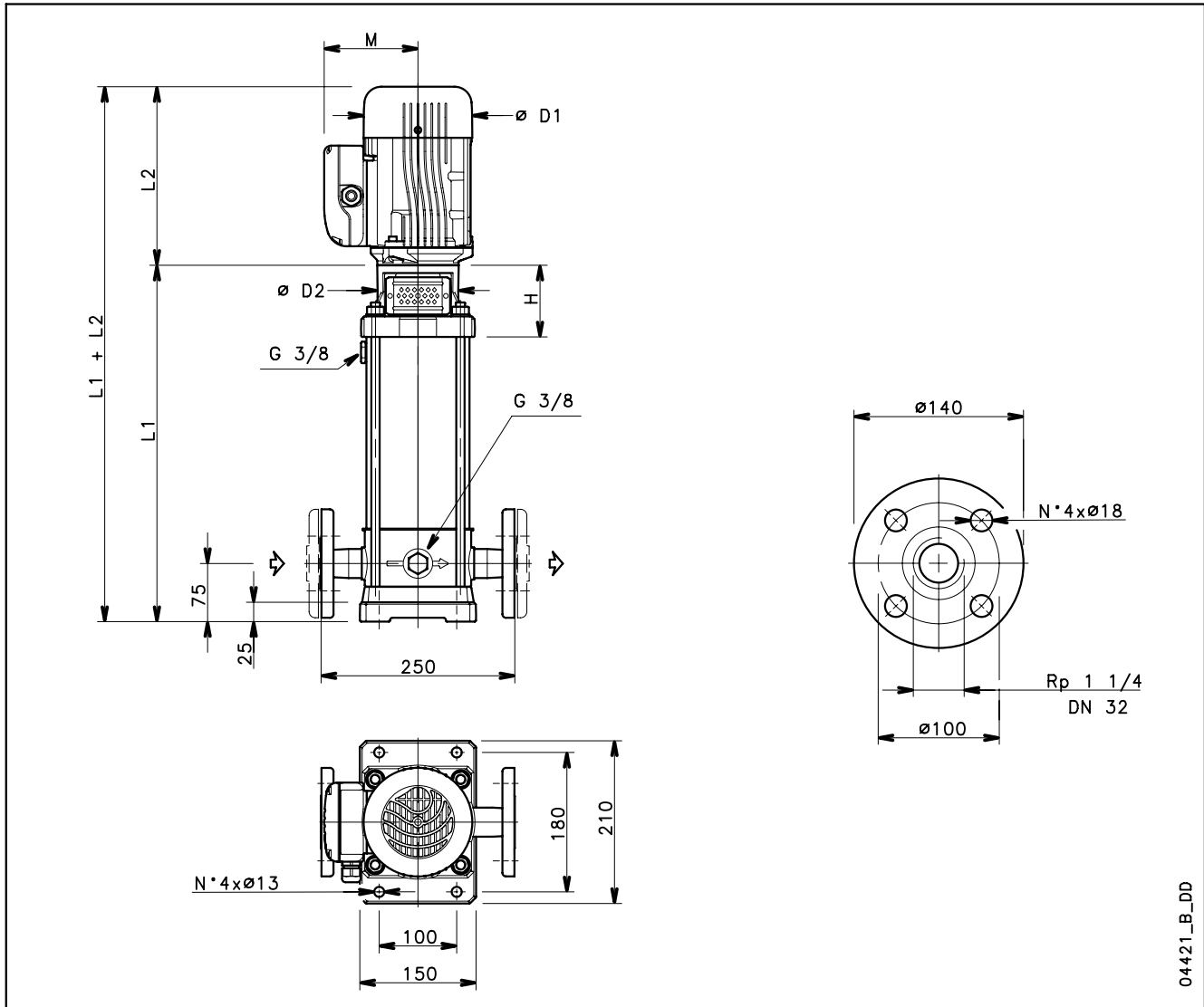


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV4 SERIES (~1450 rpm)

**F** version: AISI 304, in-line ports, round flanges, PN25.

**N** version: AISI 316, in-line ports, round flanges, PN25.



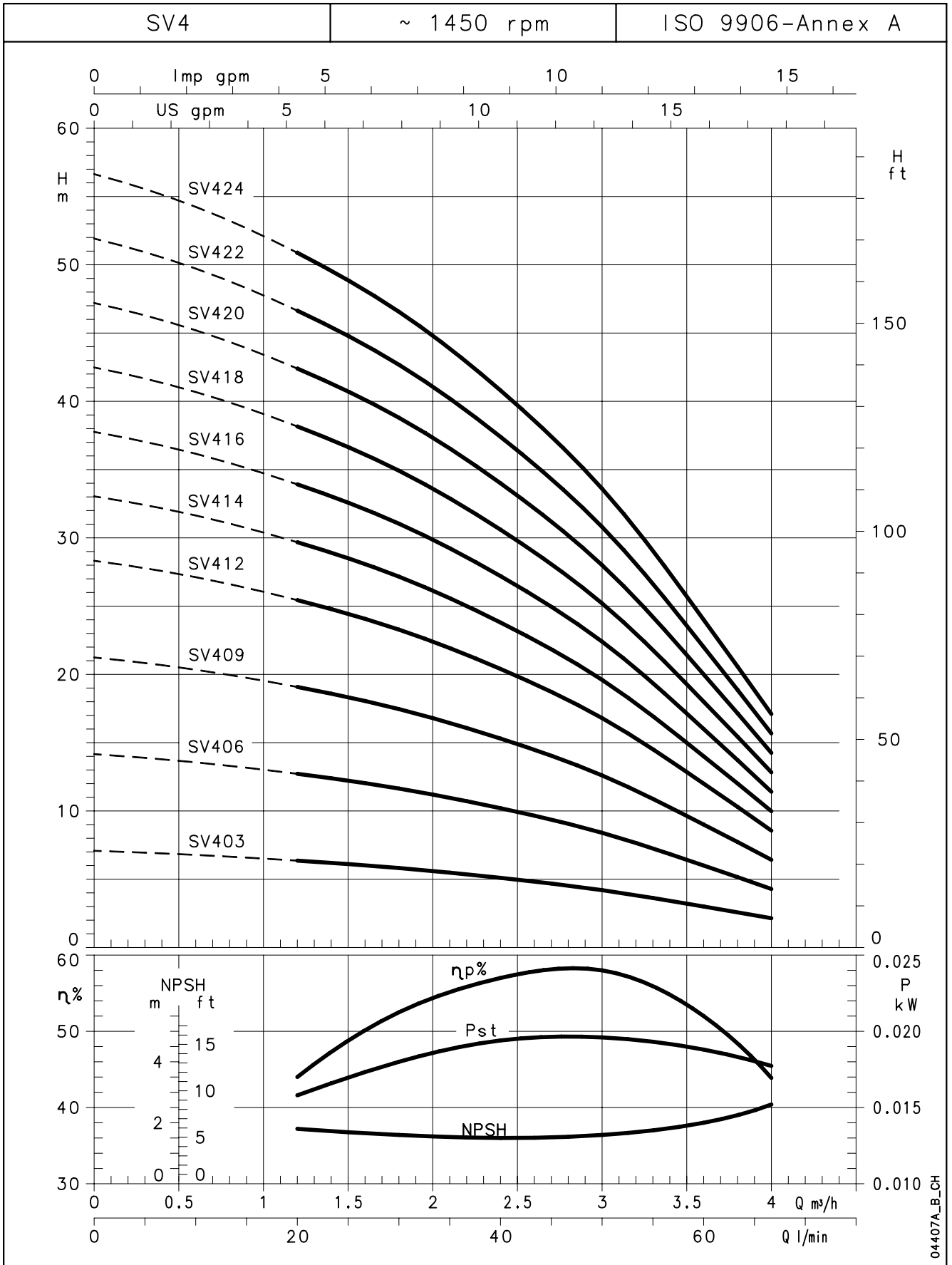
04421\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)								WEIGHT kg	
	kW	SIZE	L1+L2	L1	L2	H	M	D1	D2	ELECTRIC PUMP	PUMP	
SV403..4	0,25	71	541	310	231	93	121	140	105	10	16,5	
SV406..4	0,25	71	616	385	231	93	121	140	105	11,5	18	
SV409..4	0,25	71	691	460	231	93	121	140	105	13	19,5	
SV412..4	0,25	71	766	535	231	93	121	140	105	14,5	21	
SV414..4	0,37	71	816	585	231	93	121	140	105	15,5	23	
SV416..4	0,37	71	866	635	231	93	121	140	105	16,5	24	
SV418..4	0,37	71	916	685	231	93	121	140	105	17,5	25	
SV420..4	0,55	80	1008	745	263	103	129	155	120	19	28	
SV422..4	0,55	80	1058	795	263	103	129	155	120	20	29	
SV424..4	0,55	80	1108	845	263	103	129	155	120	21	30	

sv4-4p50\_b\_td



**SV4 SERIES  
OPERATING CHARACTERISTICS AT ~1450 rpm 50 Hz**

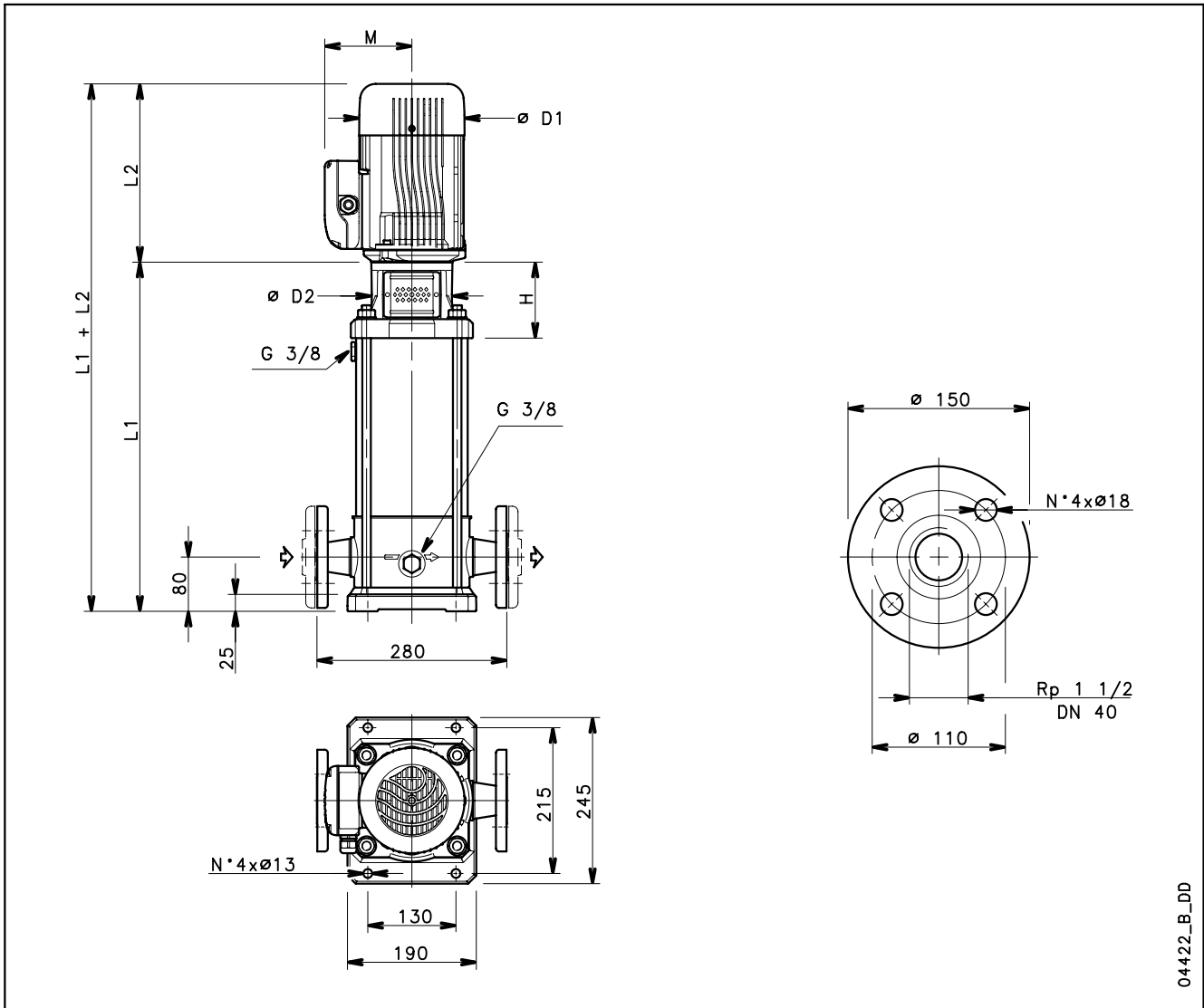


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV8 SERIES (~1450 rpm)

**F** version: AISI 304, in-line ports, round flanges, PN25.

**N** version: AISI 316, in-line ports, round flanges, PN25.

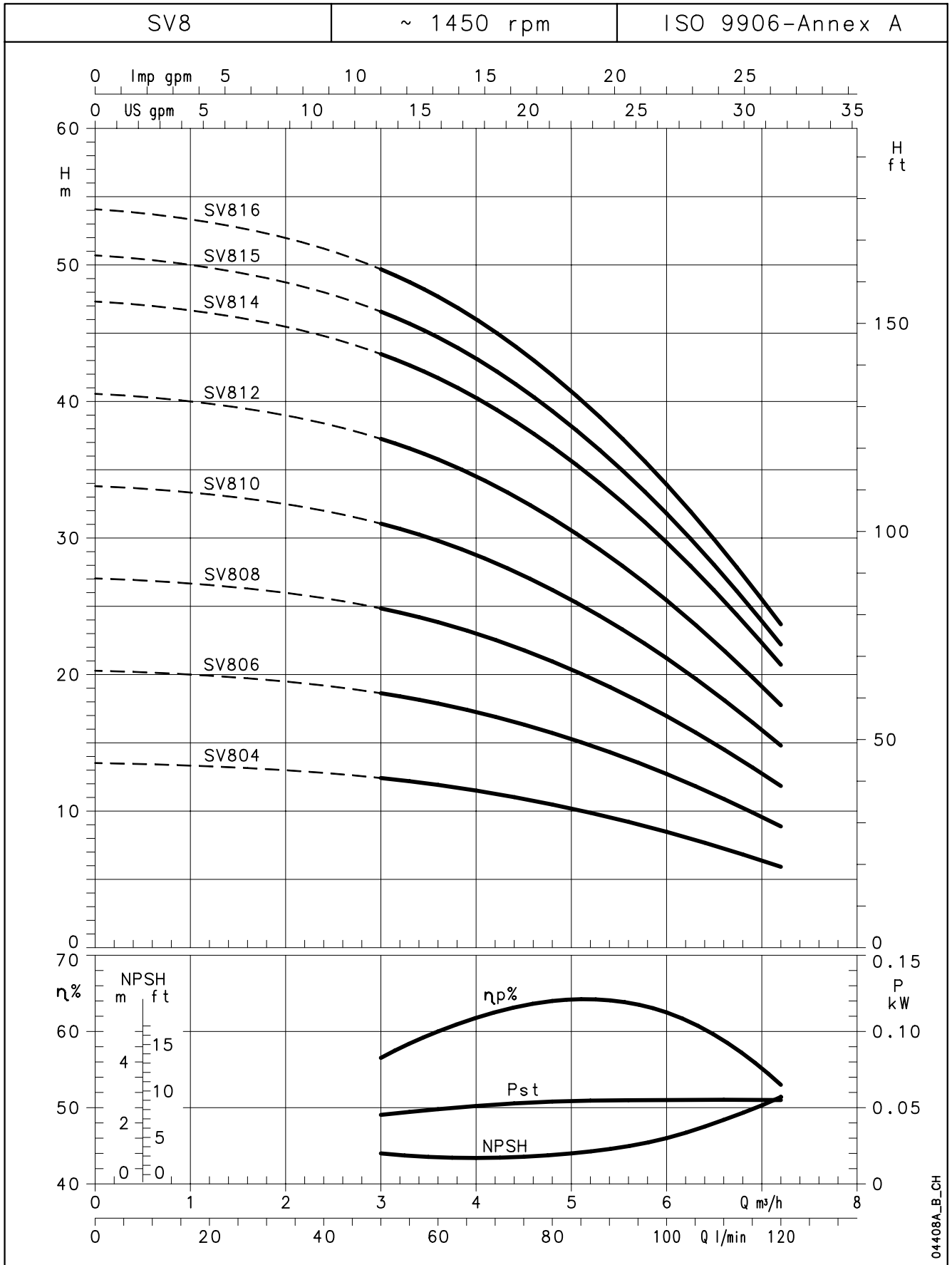


04422\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)								WEIGHT kg	
	kW	SIZE	L1+L2	L1	L2	H	M	D1	D2	ELECTRIC PUMP	PUMP	
SV804..4	0,55	80	702	439	263	112	129	155	120	16,5	25	
SV806..4	0,55	80	778	515	263	112	129	155	120	18,5	27	
SV808..4	0,55	80	854	591	263	112	129	155	120	20,5	29	
SV810..4	0,55	80	930	667	263	112	129	155	120	22,5	31	
SV812..4	0,75	80	1006	743	263	112	129	155	120	24,5	35	
SV814..4	0,75	80	1082	819	263	112	129	155	120	26,5	37	
SV815..4	1,1	90	1148	867	281	122	121	176	140	28	42	
SV816..4	1,1	90	1186	905	281	122	121	176	140	29	43	

sv8-4p50\_b\_td

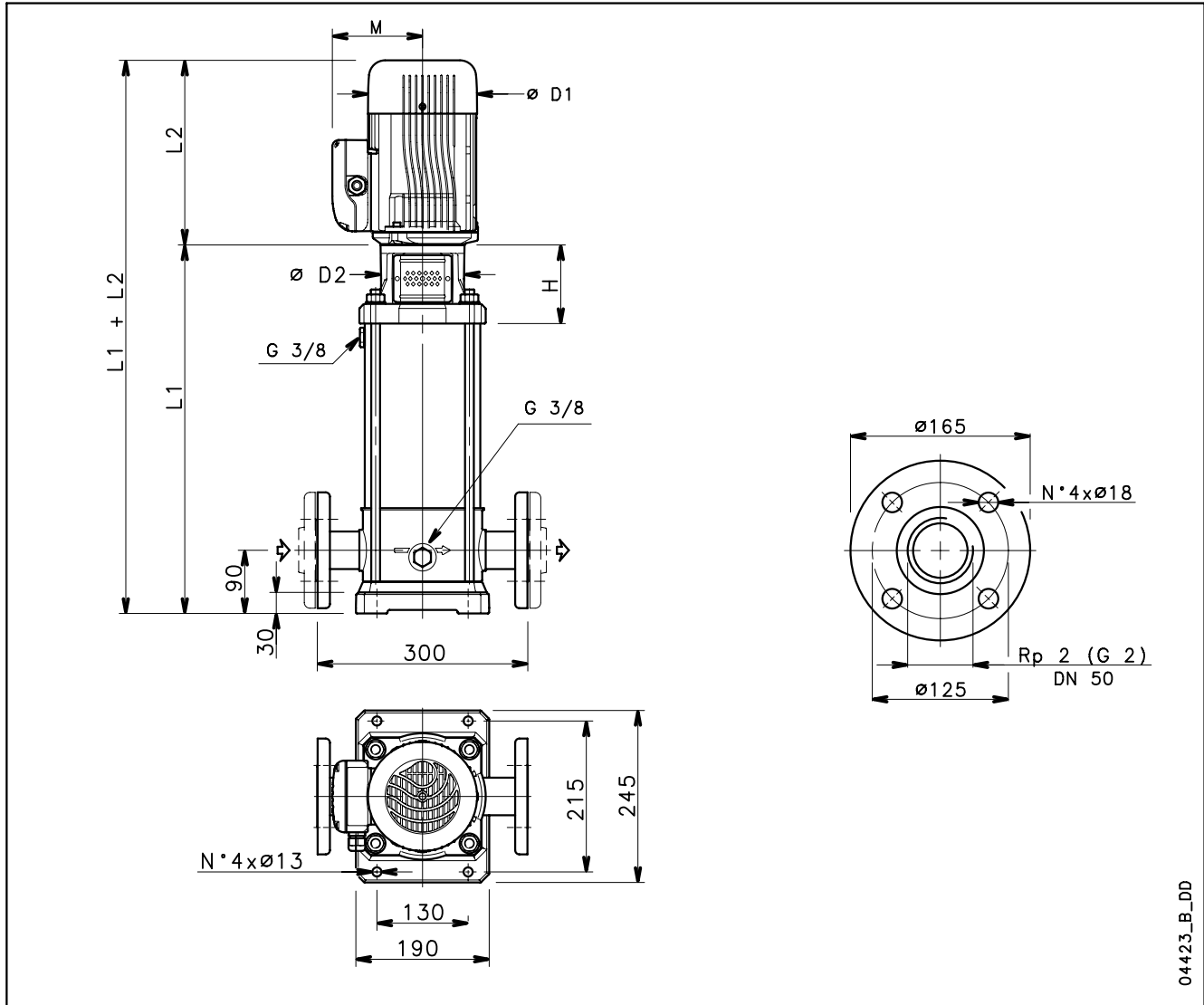
**SV8 SERIES  
OPERATING CHARACTERISTICS AT ~1450 rpm 50 Hz**



These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV16 SERIES (~1450 rpm)

**F** version: AISI 304, in-line ports, round flanges, PN25.  
**N** version: AISI 316, in-line ports, round flanges, PN25.

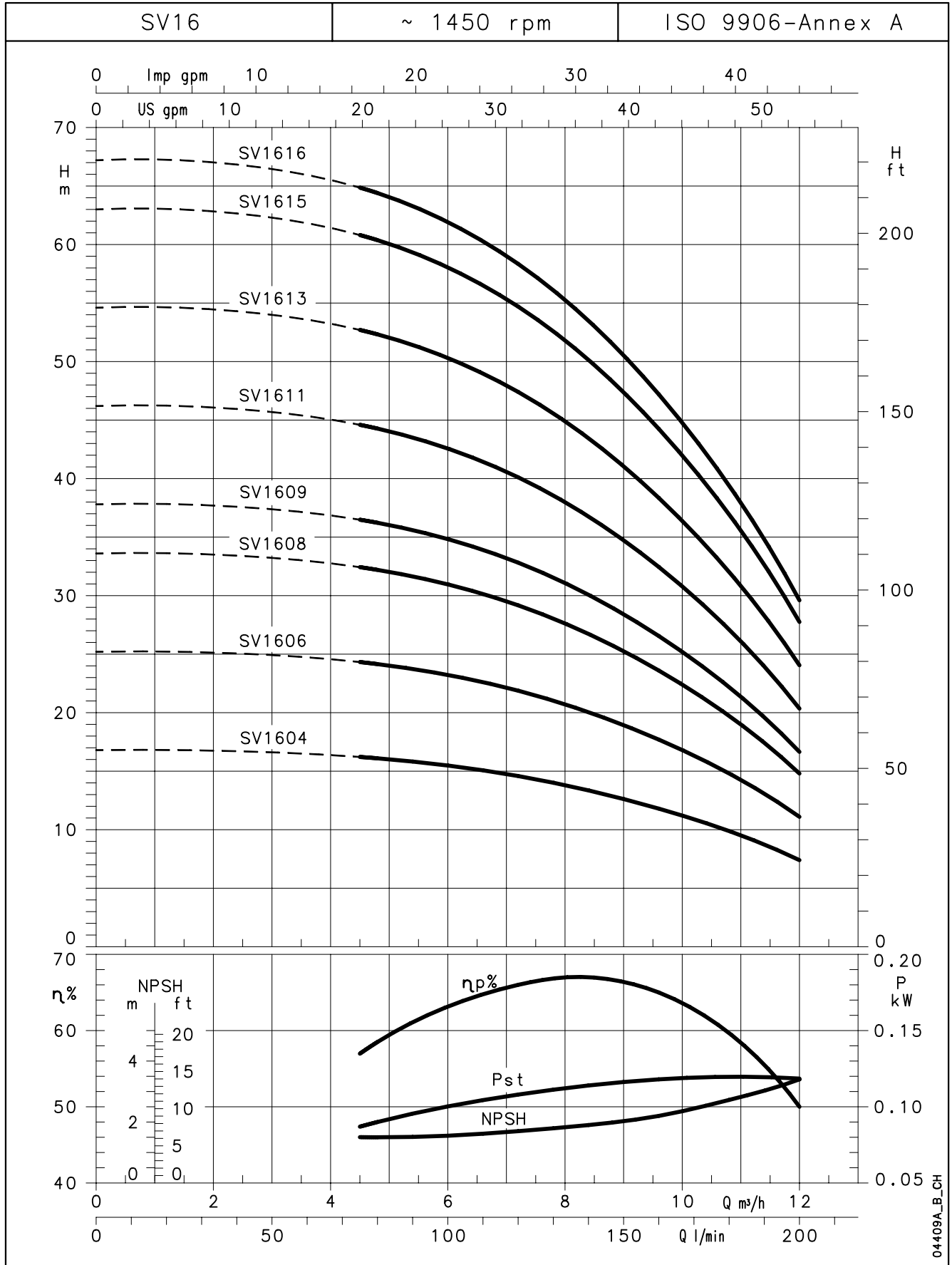


04423\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)							WEIGHT kg	
	kw	SIZE	L1+L2	L1	L2	H	M	D1	D2	ELECTRIC PUMP	PUMP
SV1604..4	0,55	80	712	449	263	112	129	155	120	16,5	25,5
SV1606..4	0,75	80	788	525	263	112	129	155	120	18,5	29
SV1608..4	1,1	90	892	611	281	122	121	176	140	21	35
SV1609..4	1,1	90	930	649	281	122	121	176	140	22	36
SV1611..4	1,5	90	1006	725	281	122	121	176	140	24	39
SV1613..4	1,5	90	1082	801	281	122	121	176	140	26	41
SV1615..4	2,2	100	1194	887	307	132	133	193	160	29	48
SV1616..4	2,2	100	1232	925	307	132	133	193	160	30	49

sv16-4p50\_b\_td

**SV16 SERIES  
OPERATING CHARACTERISTICS AT ~1450 rpm 50 Hz**

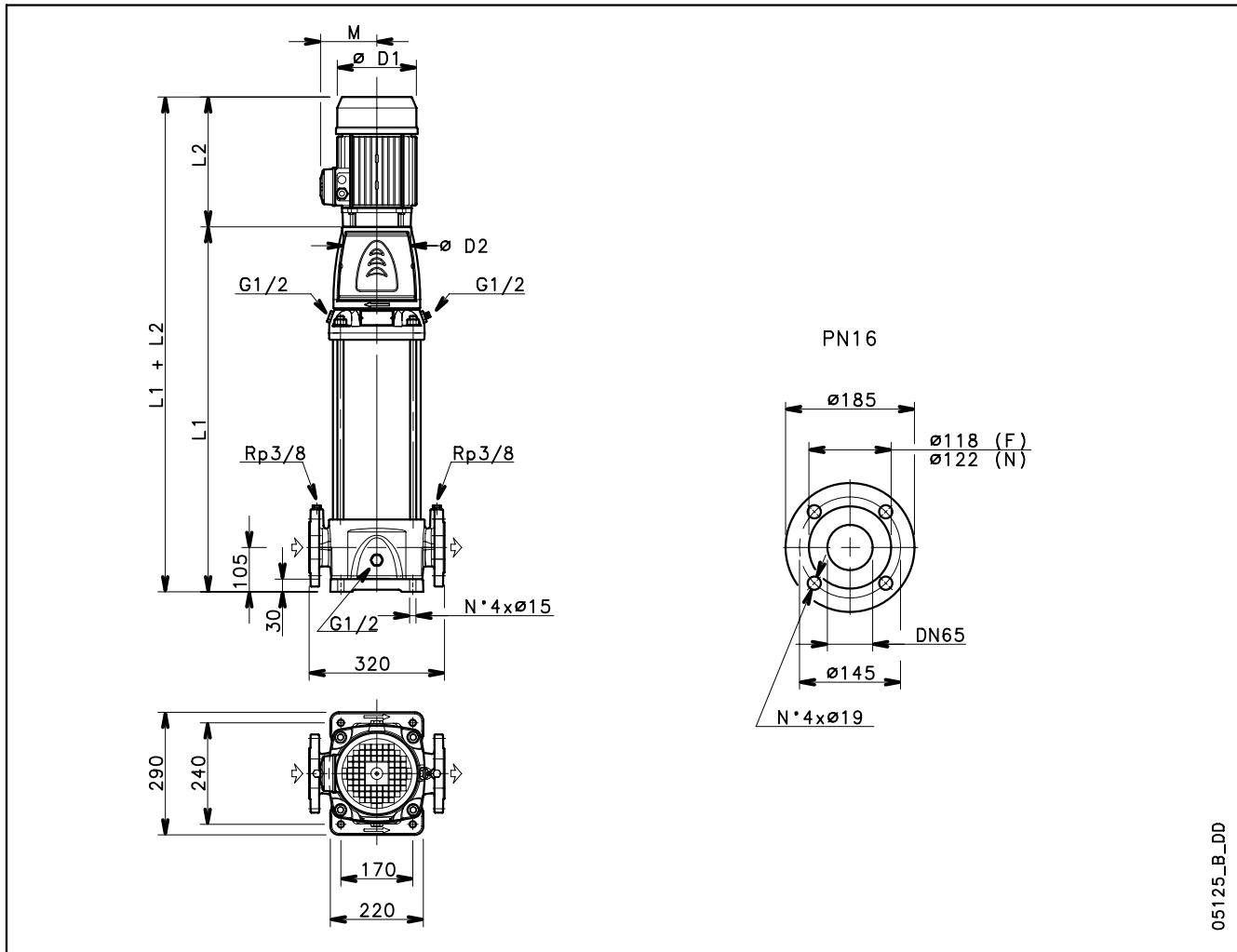


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV33 SERIES (~1450 rpm)

**F** version: AISI 316/Cast iron, in-line ports, round flanges.

**N** version: AISI 316, in-line ports, round flanges.

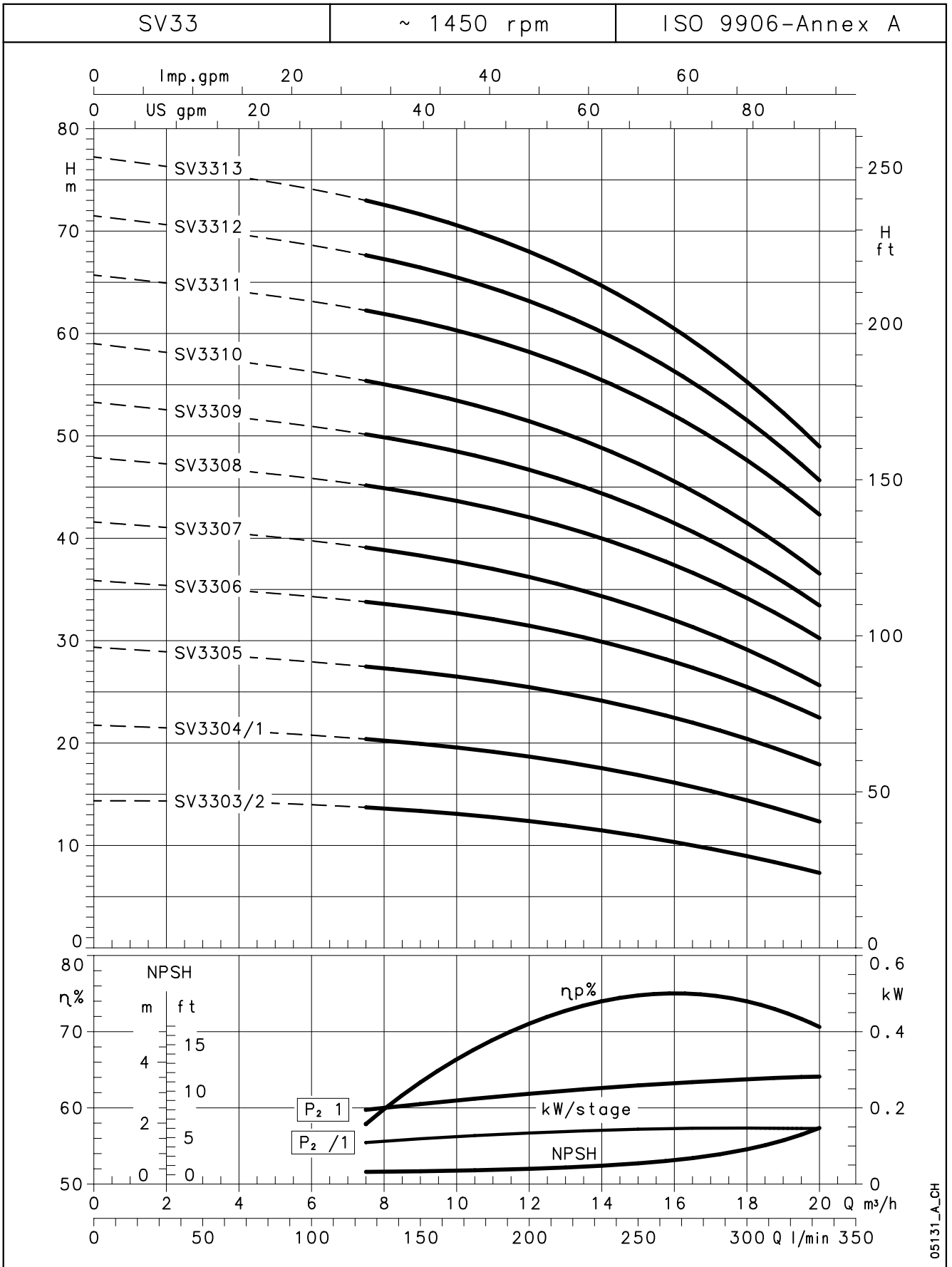


05125\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)					FLANGES	WEIGHT kg	
	kW	SIZE	L1	L2	D1	D2	M	PN	PUMP	ELECTRIC PUMP
SV3303/2..4	1,1	90	639	281	176	140	121	16	60	72
SV3304/1..4	1,1	90	714	281	176	140	121	16	64	76
SV3305..4	1,5	90	789	281	176	140	121	16	68	82
SV3306..4	2,2	100	864	307	193	160	133	16	72	91
SV3307..4	2,2	100	939	307	193	160	133	16	75	95
SV3308..4	3	100	1014	307	193	160	133	16	79	102
SV3309..4	3	100	1089	307	193	160	133	16	83	106
SV3310..4	3	100	1164	307	193	160	133	16	87	110
SV3311..4	4	112	1239	330	220	160	151	16	96	128
SV3312..4	4	112	1314	330	220	160	151	16	100	132
SV3313..4	4	112	1389	330	220	160	151	16	103	136

sv33-4p50\_b\_td

**SV33 SERIES  
OPERATING CHARACTERISTICS AT ~1450 rpm 50 Hz**

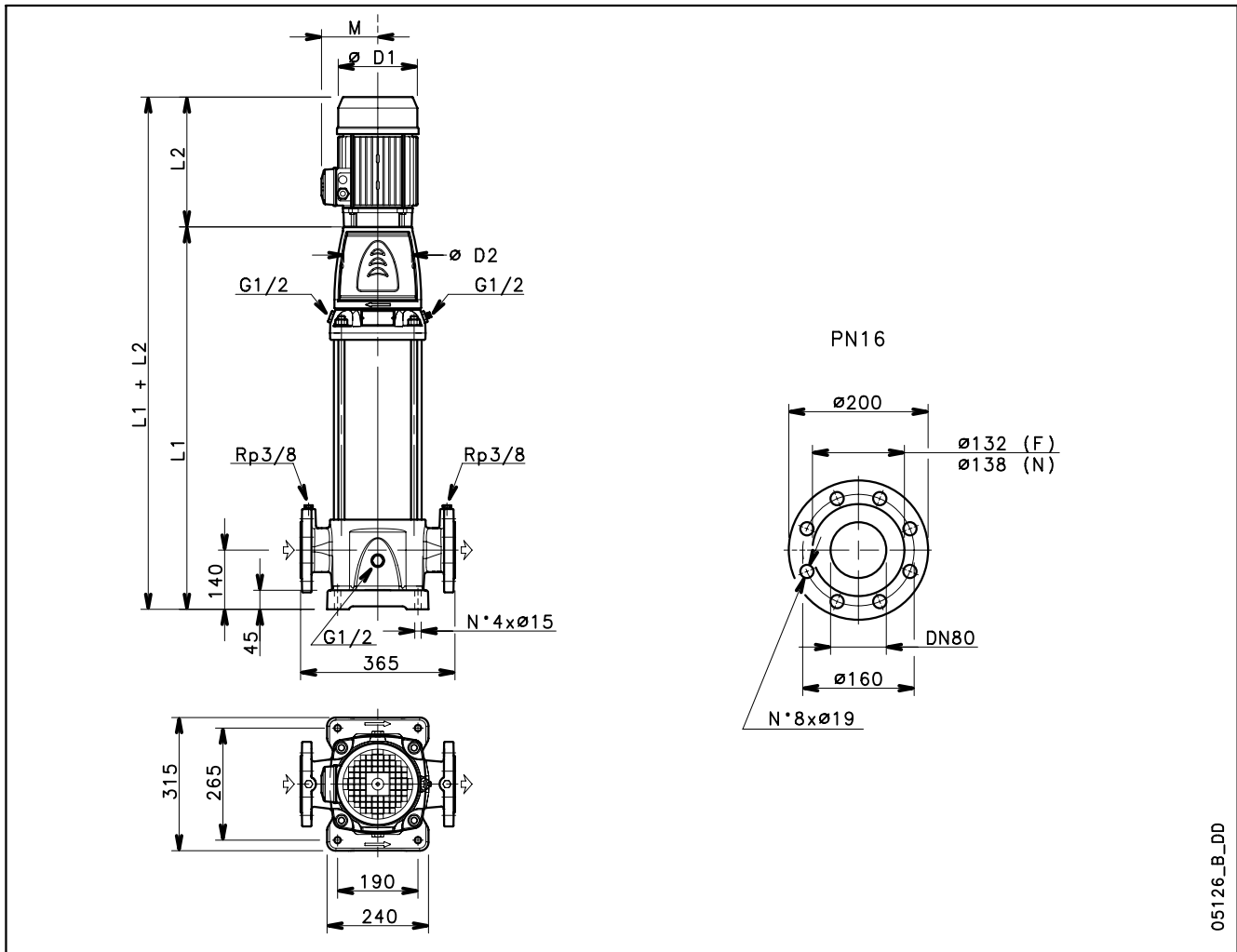


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV46 SERIES (~1450 rpm)

**F** version: AISI 316/Cast iron, in-line ports, round flanges.

**N** version: AISI 316, in-line ports, round flanges.



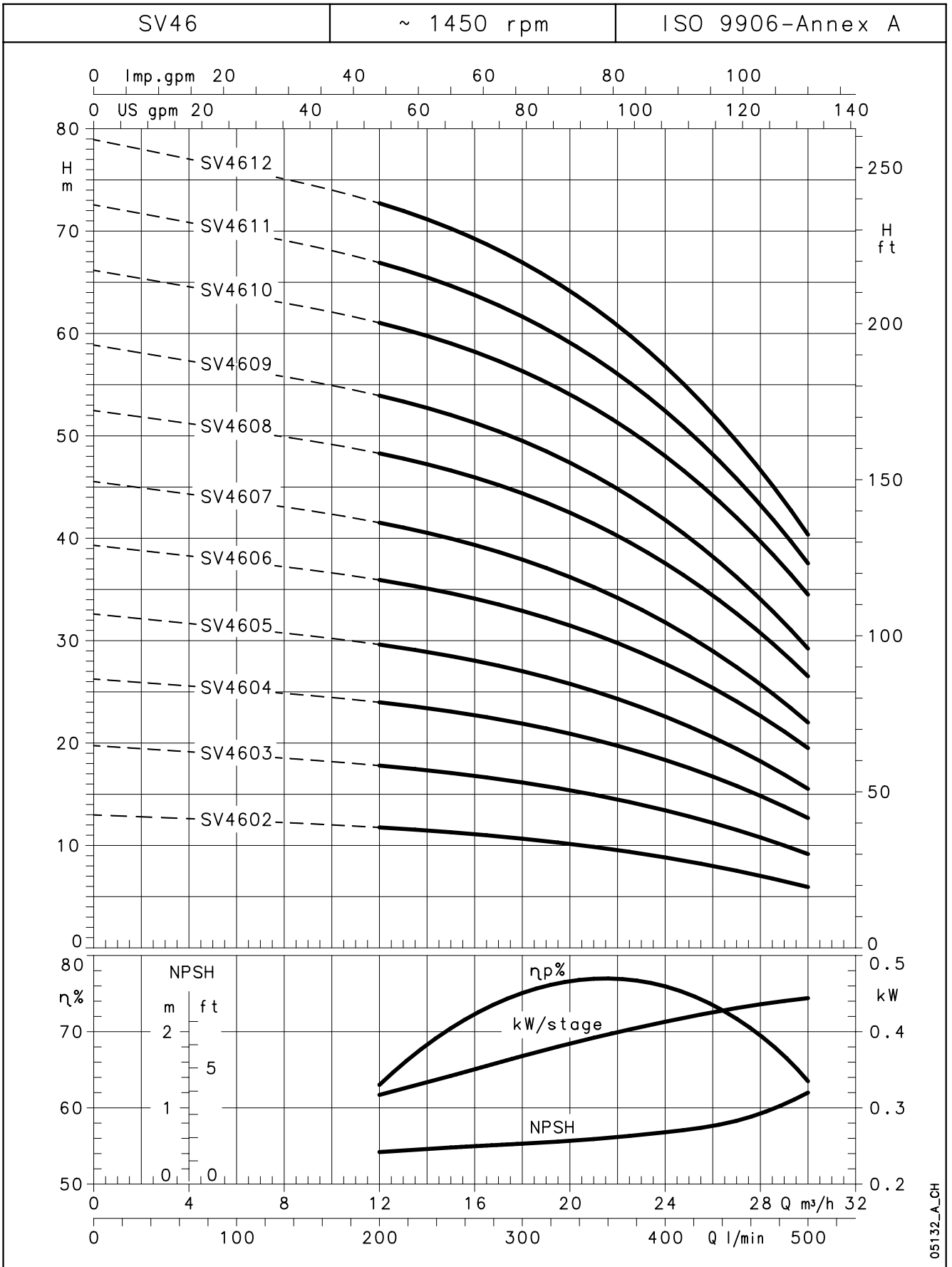
05126\_B\_DD

PUMP TYPE	MOTOR		DIMENSIONS (mm)					FLANGES	WEIGHT kg	
	kw	SIZE	L1	L2	D1	D2	M	PN	PUMP	ELECTRIC PUMP
SV4602..4	1,1	90	604	281	176	140	121	16	61	73
SV4603..4	1,5	90	679	281	176	140	121	16	65	79
SV4604..4	2,2	100	754	307	193	160	133	16	69	89
SV4605..4	2,2	100	829	307	193	160	133	16	73	92
SV4606..4	3	100	904	307	193	160	133	16	77	100
SV4607..4	3	100	979	307	193	160	133	16	80	103
SV4608..4	4	112	1054	330	220	160	151	16	84	116
SV4609..4	4	112	1129	330	220	160	151	16	88	120
SV4610..4	5,5	132	1224	366	257	300	194	16	97	141
SV4611..4	5,5	132	1299	366	257	300	194	16	105	149
SV4612..4	5,5	132	1374	366	257	300	194	16	109	153

sv46-4p50\_b\_td



**SV46 SERIES  
OPERATING CHARACTERISTICS AT ~1450 rpm 50 Hz**

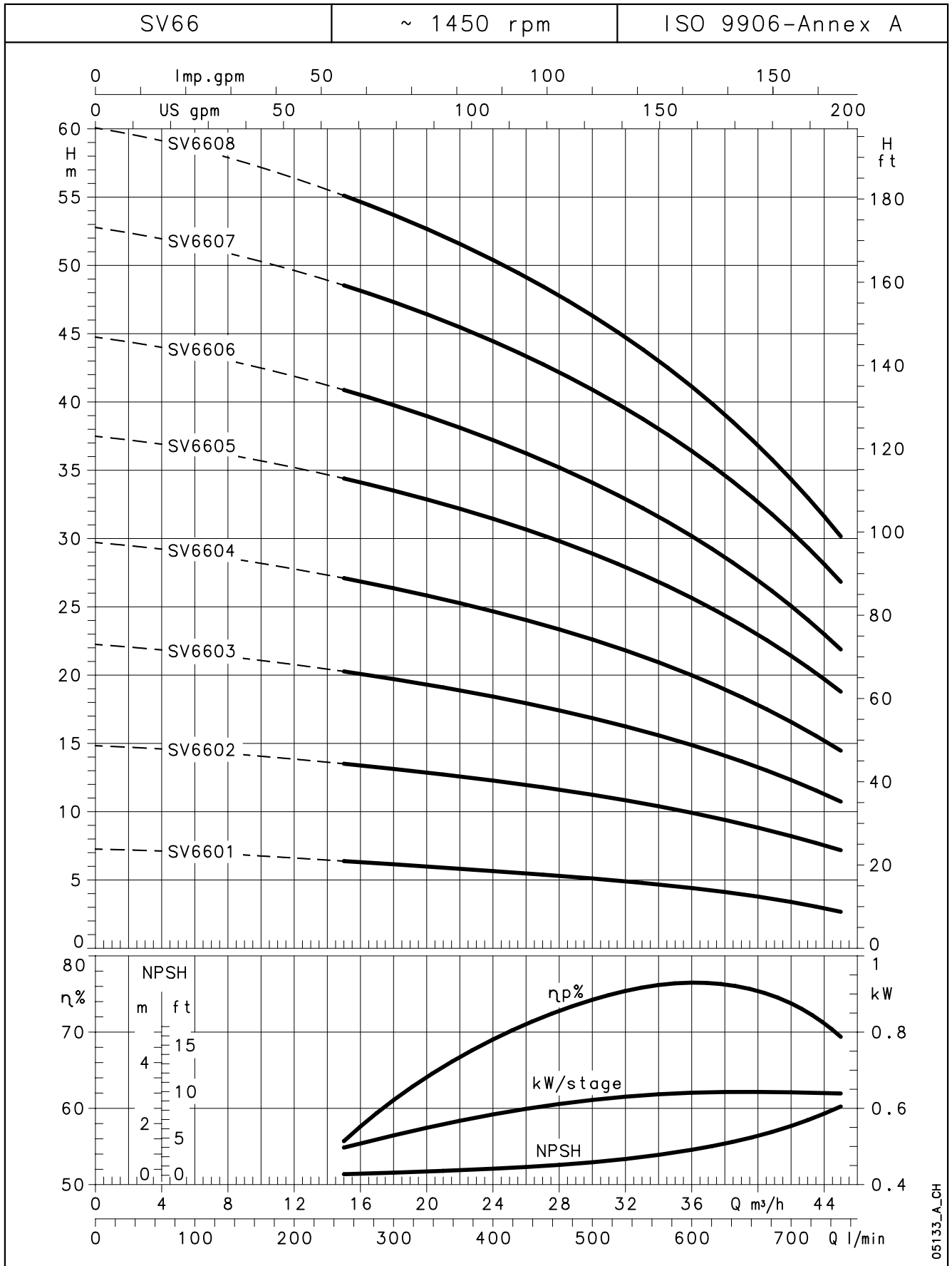


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

05132\_A\_CH



**SV66 SERIES  
OPERATING CHARACTERISTICS AT ~1450 rpm 50 Hz**

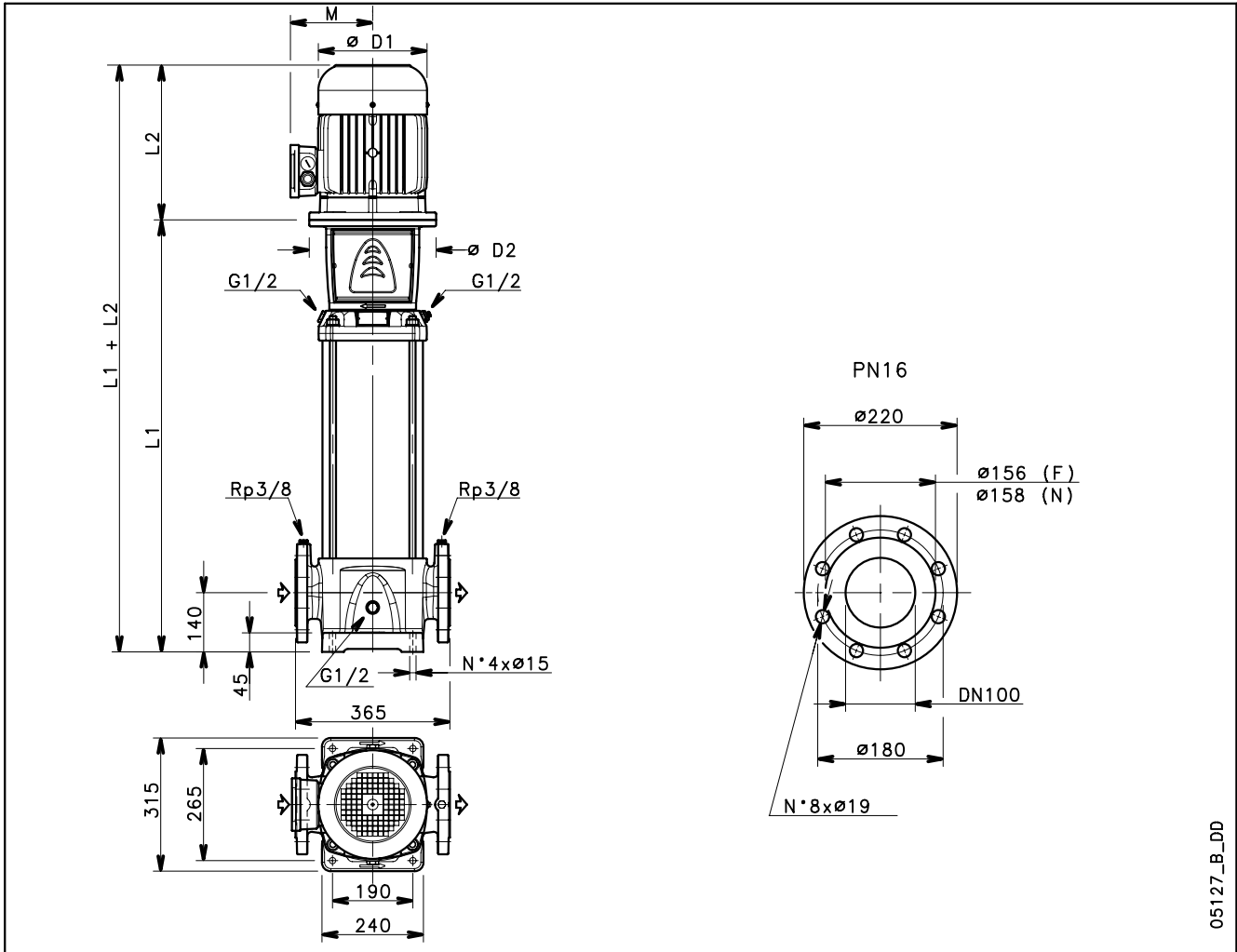


These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS AND WEIGHTS, SV92 SERIES (~1450 rpm)

**F** version: AISI 316/Cast iron, in-line ports, round flanges.

**N** version: AISI 316, in-line ports, round flanges.

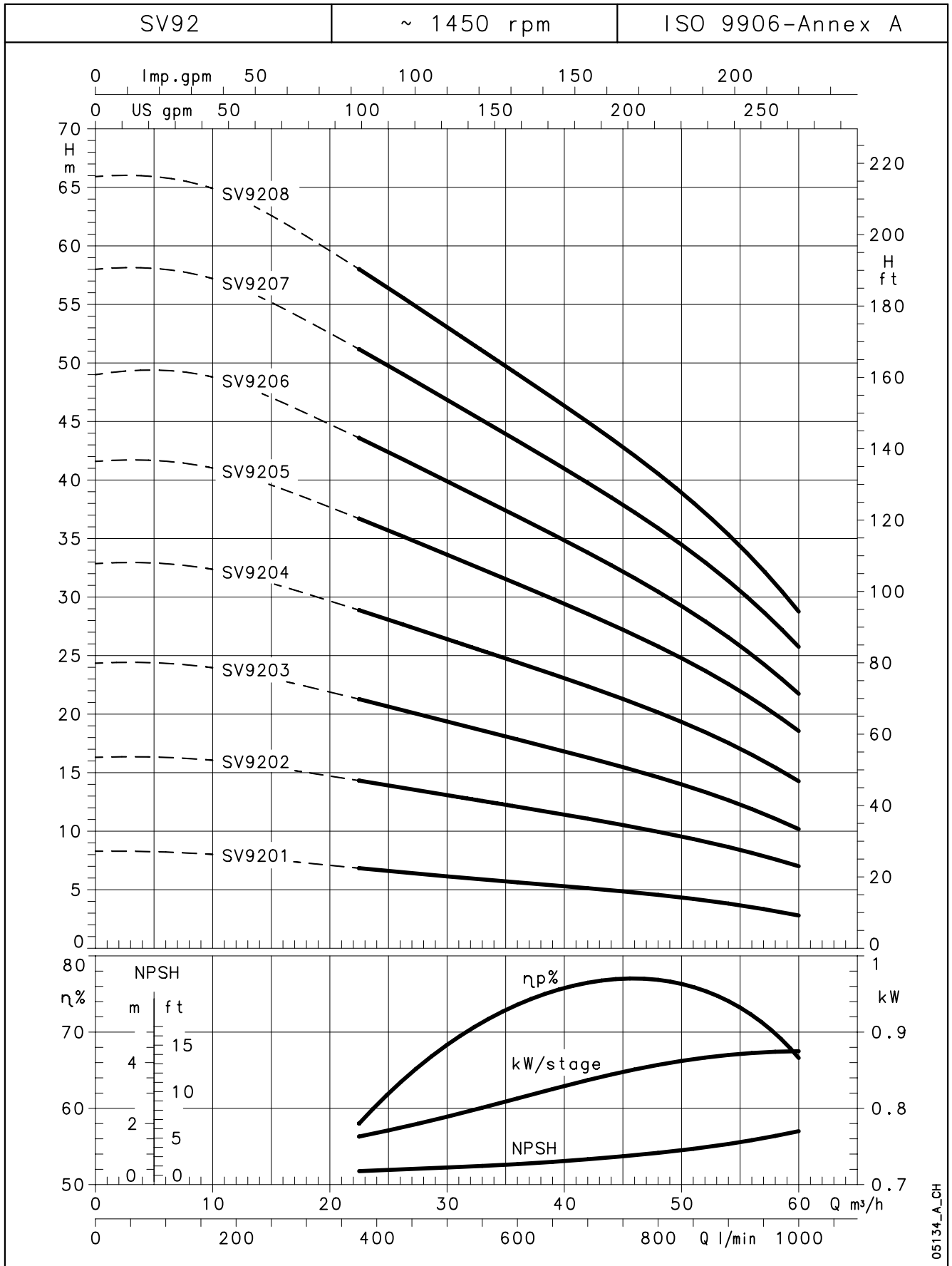


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PUMP TYPE	MOTOR		DIMENSIONS (mm)					FLANGES	WEIGHT kg	
	kw	SIZE	L1	L2	D1	D2	M	PN	PUMP	ELECTRIC PUMP
SV9201..4	1,1	90	554	281	176	140	121	16	66	78
SV9202..4	2,2	100	644	307	193	160	133	16	71	91
SV9203..4	3	100	734	307	193	160	133	16	77	100
SV9204..4	4	112	824	330	220	160	151	16	82	114
SV9205..4	5,5	132	934	366	257	300	194	16	91	135
SV9206..4	5,5	132	1024	366	257	300	194	16	97	141
SV9207..4	7,5	132	1114	404	257	300	194	16	102	159
SV9208..4	7,5	132	1204	404	257	300	194	16	107	164

sv92-4p50\_b\_td

**SV92 SERIES  
OPERATING CHARACTERISTICS AT ~1450 rpm 50 Hz**



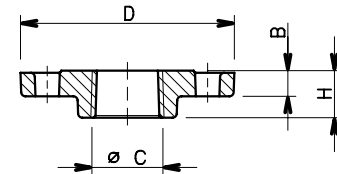
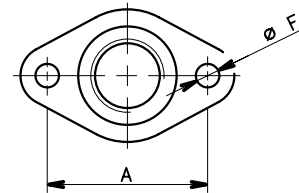
These performances are valid for liquids with density  $\rho = 1,0 \text{ kg/dm}^3$  and kinematic viscosity  $\nu = 1 \text{ mm}^2/\text{s}$ .

## DIMENSIONS OF OVAL FLANGES (SV VERSION T)

PUMP TYPE	DN	ø C	DIMENSIONS (mm)				HOLES			PN
			A	B	D	H	ø F	N°		
SV2T	25	Rp 1	75	12	100	22	11	2	16	
SV4T	32	Rp 1 1/4	75	12	100	22	11	2	16	
SV8T	40	Rp 1 1/2	100	15	132	25	14	2	16	
SV8T(*)	50	Rp 2	100	15	132	25	14	2	16	

(\*) Special version

sv-ctf-ovali\_a\_td



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### OVAL COUNTERFLANGES

Standard supply (included with the pump)

- SV2, 4, 8 version T: galvanized steel

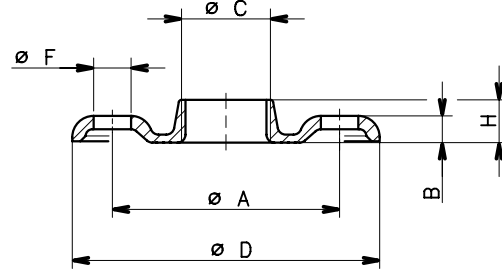
On request:

- AISI 304L stainless steel

## DIMENSIONS OF ROUND FLANGES (SV VERSIONS F, N, R)

PUMP TYPE	DN	ø C	DIMENSIONS (mm)				HOLES			PN
			ø A	B	ø D	H	ø F	N°		
SV2	25	Rp 1	85	10	115	16	14	4	25	
SV4	32	Rp 1 1/4	100	13	140	16	18	4	25	
SV8	40	Rp 1 1/2	110	14	150	19	18	4	25	
SV16	50	Rp 2	125	16	165	24	18	4	25	
SV33	65	Rp 2 1/2	145	16	185	23	18	4	16	
SV46	80	Rp 3	160	17	200	27	18	8	16	
SV66	100	Rp 4	180	18	220	31	18	8	16	
SV92										

sv-ctf-tonde-f\_a\_td

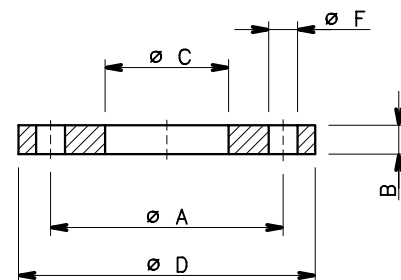


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## DIMENSIONS OF WELD-ON ROUND FLANGES (SV VERSIONS F, N)

PUMP TYPE	DN	ø C	DIMENSIONS (mm)			HOLES		PN
			ø A	B	ø D	ø F	N°	
SV33	65	77	145	18	185	18	4	16
SV46	80	90	160	20	200	18	8	16
SV66	100	115,5	180	22	220	18	8	16
SV92								
SV33	65	77	145	24	185	18	8	25-40
SV46	80	90	160	26	200	18	8	25-40
SV66	100	115,5	190	26	235	22	8	25-40
SV92								

sv-ctf-tonde-s\_a\_td



04431\_A\_DD

### ROUND COUNTERFLANGES

Standard supply (included with the pump)

- SV2, 4, 8, 16 versions F, R: threaded, galvanized steel

- SV2, 4, 8, 16 versions N: threaded, AISI 316L stainless steel

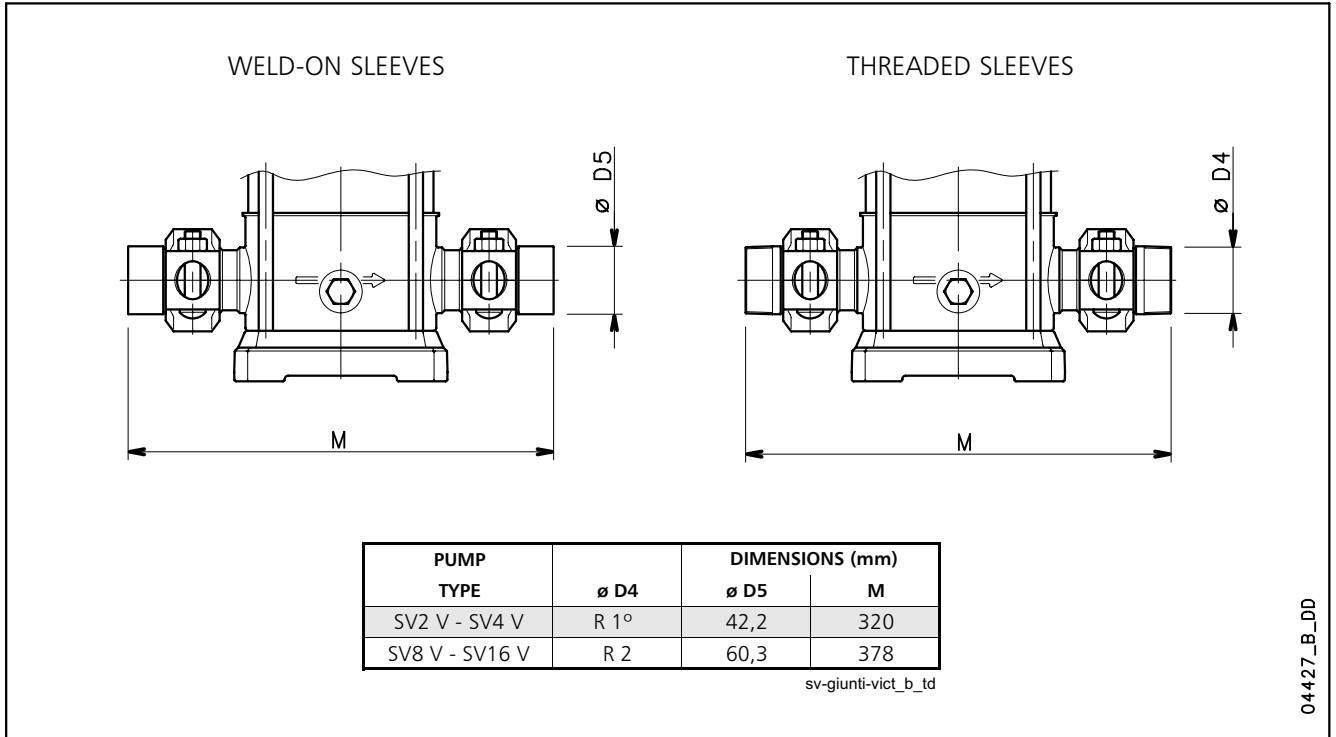
On request:

- SV2, 4, 8, 16 versions F, R: kit containing 2 threaded counterflanges made of AISI 316L stainless steel, plus bolts and gaskets.

- SV33, 46, 66, 92 version F: kit containing weld-on counterflanges (PN16, PN25, PN40) or threaded ones PN 16 made of galvanized steel. Each kit contains 2 counterflanges plus bolts and gaskets.

- SV33, 46, 66, 92 versions N: kit containing weld-on counterflanges (PN16, PN25, PN40) or threaded ones PN 16 made of AISI 316L stainless steel. Each kit contains 2 counterflanges plus bolts and gaskets.

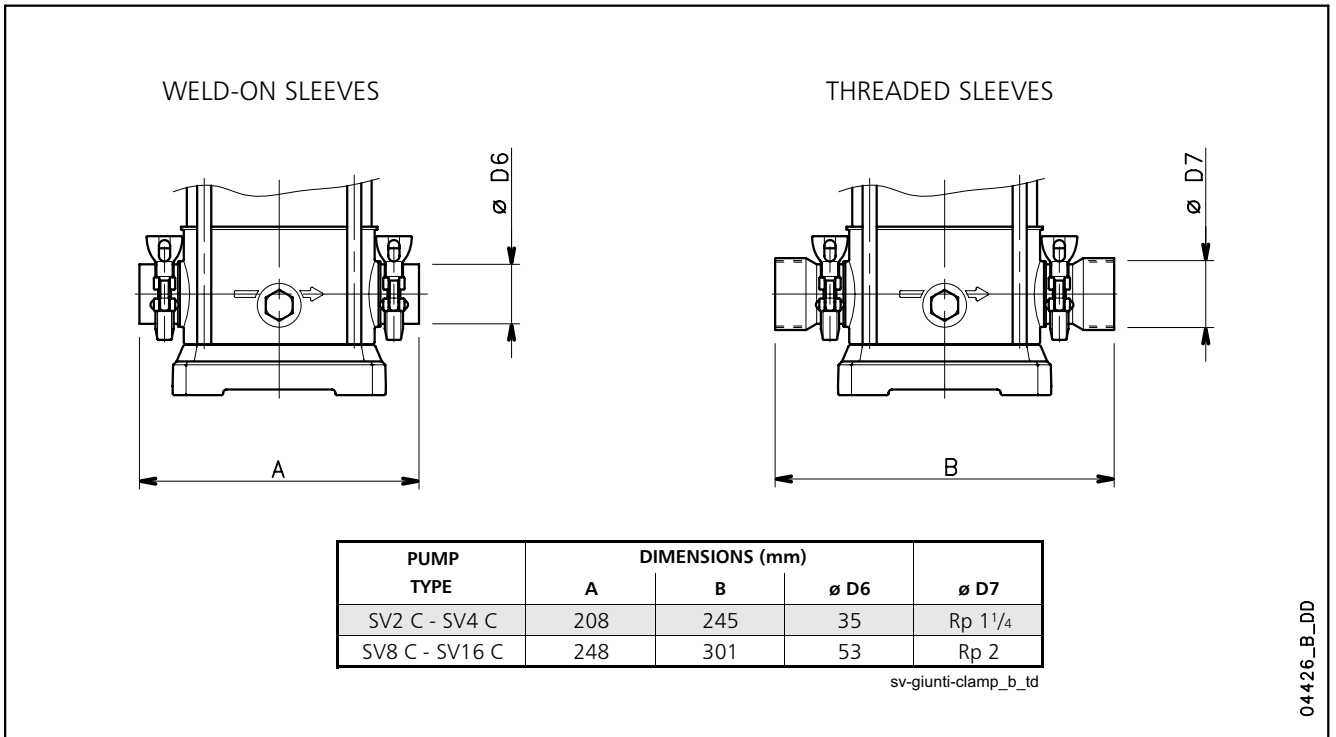
**DIMENSIONS OF VICTAULIC® COUPLINGS (SV VERSION V)**



**VICTAULIC® ACCESSORIES (ON REQUEST)**

- SV2, 4, 8, 16 version V: kit containing 1 Victaulic® coupling with AISI 316L stainless steel weld-on or threaded sleeve, plus EPDM or FPM gasket.

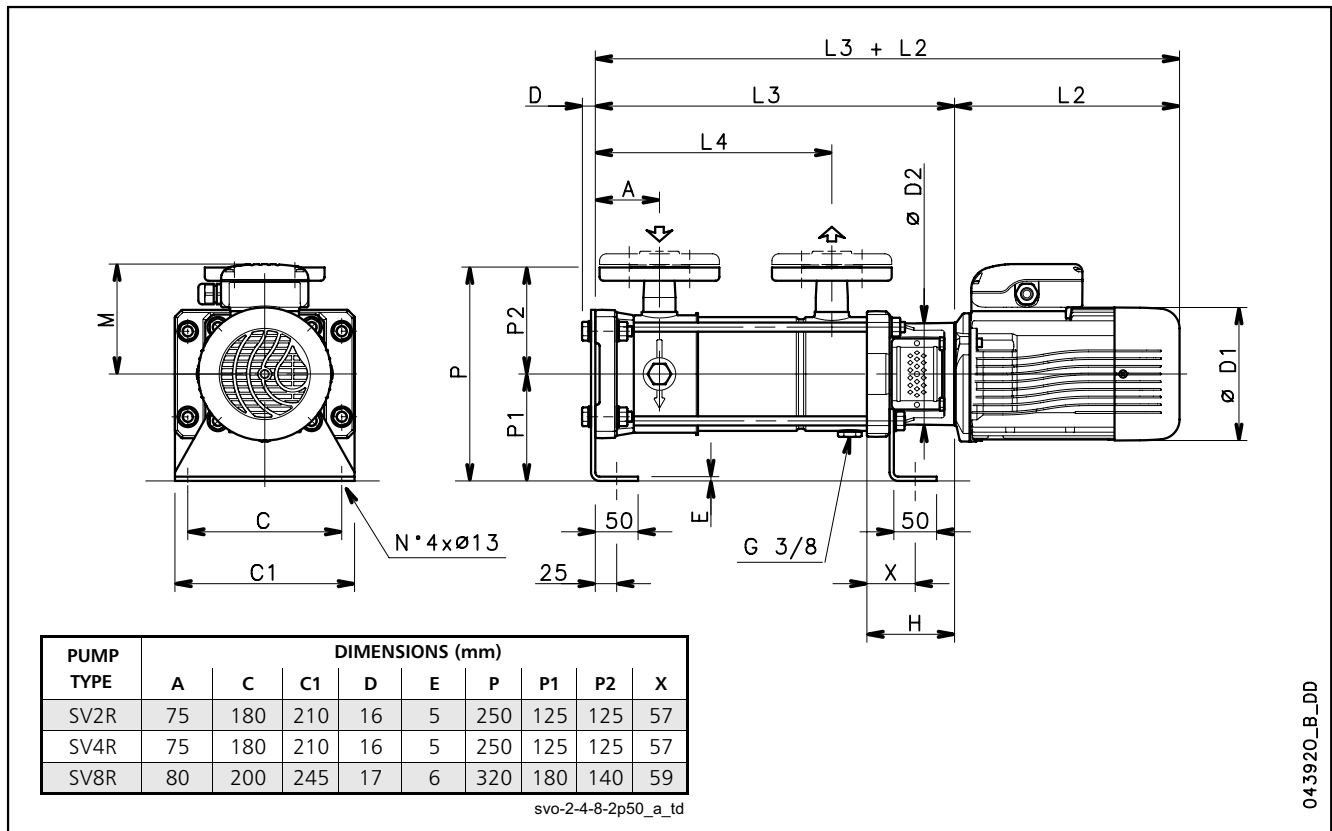
**DIMENSIONS OF CLAMP COUPLINGS (SV VERSION C)**



**CLAMP ACCESSORIES (ON REQUEST)**

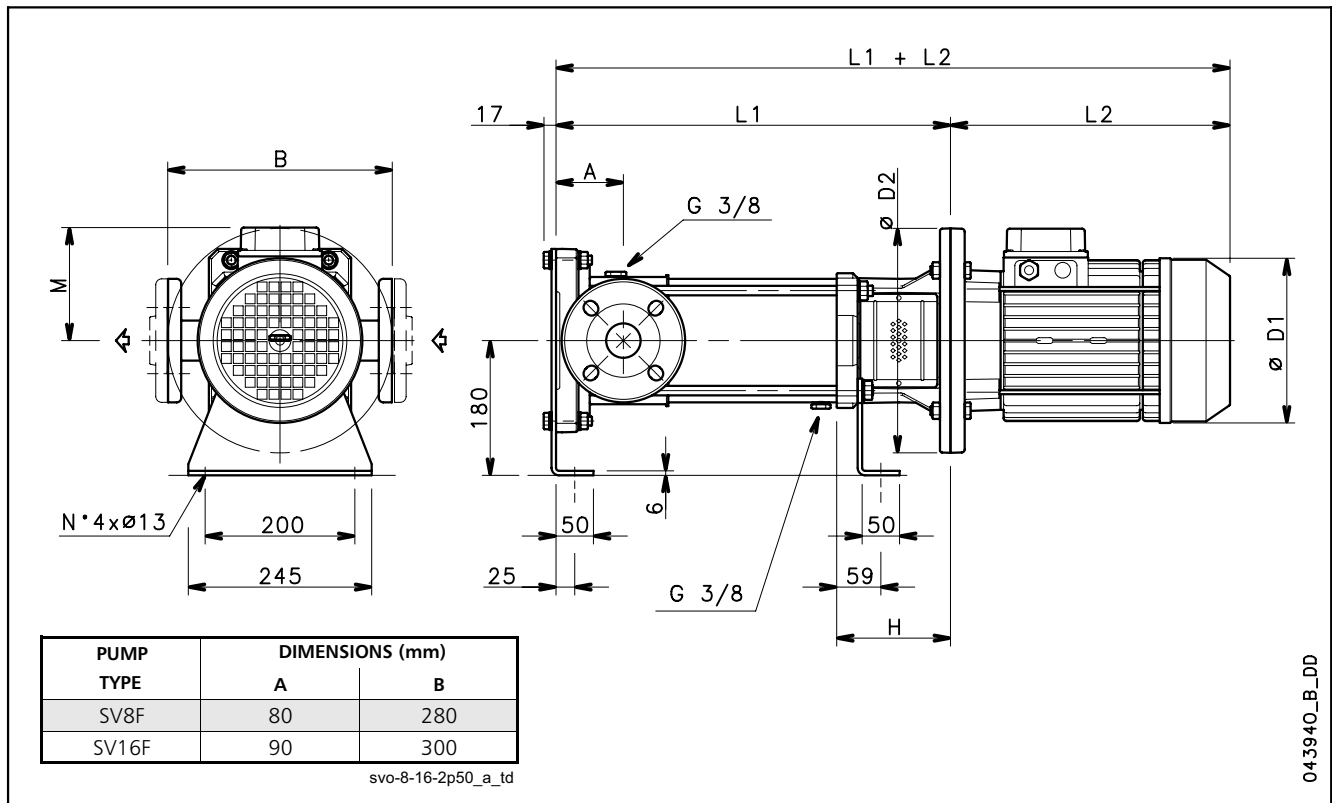
- SV2, 4, 8, 16 version C: kit containing 2 Clamp coupling with AISI 316L stainless steel weld-on or threaded sleeve, plus EPDM or FPM gaskets.

## HORIZONTAL VERSION SV2, 4, 8, VERSIONS R



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## SV 8, 16 VERSIONS F-N



043940\_B\_DD

## AVAILABLE ACCESSORIES

- Bracket kit SV2-4R
- Bracket kit SV8R
- Bracket kit SV8-16F



# **TECHNICAL APPENDIX**

## COMPATIBILITY CHART FOR MATERIALS IN CONTACT WITH MOST COMMONLY USED LIQUIDS

LIQUID	CONCENTRATION (%)	TEMPERATURE MIN/MAX (°C)	SPECIFIC WEIGHT (kg/dm <sup>3</sup> )	SV 2, 4, 8, 16		SV 33, 46, 66, 92		RECOMMENDED SEAL	ELASTOMERS
				STANDARD VERSION	N VERSION	STANDARD VERSION	N VERSION		
Water	100	-5/+120		•	•	•	•	Q <sub>1</sub> BEGG	E
Deionized, demineralized or distilled water	100	-25/+110		•	•	•	•	Q <sub>1</sub> BEGG	E
Water and oil emulsion	any	-5/+90		•	•	•	•	Q <sub>1</sub> BVGG	V
Acetic acid (•)	80	-10/+70	1,05	•	•	•	•	Q <sub>1</sub> BEGG	E
Citric acid	5	-10/+70	1,54	•	•	•	•	Q <sub>1</sub> BEGG	E
Hydrochloric acid	2	-5/+25	1,20		•		•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Phosphoric acid	10	-5/+30	1,33		•		•	Q <sub>1</sub> BEGG	E
Nitric acid (•)	50	-5/+30	1,48	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Sulphuric acid (•)	2	-10/+25	1,84		•		•	Q <sub>1</sub> BVGG	V
Tannic acid	20	0/+50			•		•	Q <sub>1</sub> BEGG	E
Tartaric acid	50	-10/+25	1,76	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Uric acid	80	-10/+80	1,89	•	•	•	•	Q <sub>1</sub> BEGG	E
Benzoic acid	70	0/+70	1,31	•	•	•	•	Q <sub>1</sub> BVGG	V
Boric acid	saturo	-10/+90	1,43	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Formic acid (•)	5	-15/+25	1,22	•	•	•	•	Q <sub>1</sub> BEGG	E
Ethyl alcohol (•)	100	-5/+40	0,81	•	•	•	•	Q <sub>1</sub> BEGG	E
Methyl alcohol (•)	100	-5/+40	0,79	•	•	•	•	Q <sub>1</sub> BEGG	E
Propyl alcohol (•)	100	-5/+80	0,80	•	•	•	•	Q <sub>1</sub> BEGG	E
Butyl alcohol	100	-5/+80	0,81	•	•	•	•	Q <sub>1</sub> BVGG	V
Denatured alcohol (•)	100	-5/+70	0,81	•	•	•	•	Q <sub>1</sub> BEGG	E
Ammonia in water (•)	25	-20/+50	0,99	•	•	•	•	Q <sub>1</sub> BEGG	E
Chloroform		-10/+30	1,48	•	•	•	•	Q <sub>1</sub> BVGG	V
Caustic soda	25	0/+70	2,13	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> EGG	E
Water, detergents, mineral oils mixture		-5/+80		•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Cleaning products		-5/100		•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Diesel oil (•)	100	0/+80	0,90	•	•	•	•	Q <sub>1</sub> BVGG	V
Kerosene (•)	100	0/+80		•	•	•	•	Q <sub>1</sub> BVGG	V
Fuel oil (•)		0/+90	0,76	•	•	•	•	Q <sub>1</sub> BVGG	V
Glycerine	100	+20/+90	1,26	•	•	•	•	Q <sub>1</sub> BEGG	E
Sodium hypochlorite	1	-10/+25			•		•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Phosphates/polyphosphates		-5/+90			•		•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Formaldehyde	100	0/+30	1,13	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> TGG	T
Sodium nitrate	saturo	-10/+80	2,25	•	•	•	•	Q <sub>1</sub> BEGG	E
Cutting fluid	100	-5/+110	0,90	•	•	•	•	Q <sub>1</sub> BVGG	V
Peanut oil (•)	100	-5/+110	0,95	•	•	•	•	Q <sub>1</sub> BEGG	E
Colza oil (•)	100	-5/+110	0,95	•	•	•	•	Q <sub>1</sub> BEGG	E
Linseed oil (•)	100	-5/+110	0,94	•	•	•	•	Q <sub>1</sub> BEGG	E
Coconut oil (•)	100	-20/+90	0,92	•	•	•	•	Q <sub>1</sub> BEGG	E
Soybean oil (•)	100	0/+90		•	•	•	•	Q <sub>1</sub> BEGG	E
Diathermic oil	100	-5/+110	0,90	•	•	•	•	Q <sub>1</sub> BVGG	V
Hydraulic oil	100	-5/+110		•	•	•	•	Q <sub>1</sub> BVGG	V
Mineral oil	100	-5/+110	0,94	•	•	•	•	Q <sub>1</sub> BVGG	V
Sodium sulfate	15	-10/+40	2,60	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> EGG	E
Aluminium sulfate	30	-5/+50	2,71		•		•	Q <sub>1</sub> Q <sub>1</sub> EGG	E
Ammonium sulfate	10	-10/+60	1,77		•		•	Q <sub>1</sub> Q <sub>1</sub> EGG	E
Iron sulfate	10	-5/+30	2,09		•		•	Q <sub>1</sub> BEGG	E
Copper sulfate	20	0/+30	2,28		•		•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Trichloroethylene		-10/+40	1,46	•	•	•	•	Q <sub>1</sub> BVGG	V
Perchloroethylene		-10/+30	1,60	•	•	•	•	Q <sub>1</sub> BVGG	V

### SV SERIES MECHANICAL SEAL OPTIONS

Standard	Q <sub>1</sub> BEGG
Option 1	Q <sub>1</sub> Q <sub>1</sub> EGG
Option 2	Q <sub>1</sub> BVGG
Option 3	Q <sub>1</sub> Q <sub>1</sub> VGG
Option 4	Q <sub>1</sub> CTGG
Option 5	Q <sub>1</sub> Q <sub>1</sub> TGG

### Legend

Q<sub>1</sub> = Silicon carbide  
 B = Resin impregnated carbon  
 C = Special resin impregnated carbon  
 E = EPDM  
 V = FPM  
 T = PTFE  
 G = AISI 316

(•) A special version may be necessary for this fluid.  
 For additional information, please contact our sales network.

## NPSH

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

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

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

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

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

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

$$h_p + h_z \geq (\text{NPSHr} + 0.5) + h_f + h_{pv} \quad \textcircled{1}$$

where:

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

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

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

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

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

Flow resistance is shown in the tables at pages 61-62 of this catalogue. To reduce it to a minimum, especially in cases of high suction head (over 4-5 m.) or within the operating limits with high flow rates, we recommend using a suction line having a larger diameter than that of the pump's suction port. It is always a good idea to position the pump as close as possible to the liquid to be pumped.

Make the following calculation:

Liquid: water at 15°C  $\rho = 1 \text{ kg/dm}^3$

Flow rate required: 30 m<sup>3</sup>/h

Head for required delivery: 43 m.

Suction lift: 3.5 m.

The selection is an FHE 40-200/75 pump whose NPSH required value is, at 30 m<sup>3</sup>/h, 2.5 m.

For water at 15°C the  $h_{pv}$  term is  $\frac{P_v}{\rho} = 0,174 \text{ m (0.01701 bar)}$

and  $h = \frac{P_a}{\rho} = 10,33 \text{ m}$

The  $H_f$  flow resistance in the suction line with foot valves is 1.2 m.

By substituting the parameters in formula  $\textcircled{1}$  with the numeric values above, we have:

$$10,33 + (-3,5) \geq (2,5 + 0,5) + 1,2 + 0,17$$

from which we have:  $6.8 > 4.4$

The relation is therefore verified.

**VAPOUR PRESSURE**
**ps VAPOUR PRESSURE AND ← DENSITY OF WATER CHART**

t °C	T K	ps bar	ρ kg/dm <sup>3</sup>
0	273,15	0,00611	0,9998
1	274,15	0,00657	0,9999
2	275,15	0,00706	0,9999
3	276,15	0,00758	0,9999
4	277,15	0,00813	1,0000
5	278,15	0,00872	1,0000
6	279,15	0,00935	1,0000
7	280,15	0,01001	0,9999
8	281,15	0,01072	0,9999
9	282,15	0,01147	0,9998
10	283,15	0,01227	0,9997
11	284,15	0,01312	0,9997
12	285,15	0,01401	0,9996
13	286,15	0,01497	0,9994
14	287,15	0,01597	0,9993
15	288,15	0,01704	0,9992
16	289,15	0,01817	0,9990
17	290,15	0,01936	0,9988
18	291,15	0,02062	0,9987
19	292,15	0,02196	0,9985
20	293,15	0,02337	0,9983
21	294,15	0,2485	0,9981
22	295,15	0,02642	0,9978
23	296,15	0,02808	0,9976
24	297,15	0,02982	0,9974
25	298,15	0,03166	0,9971
26	299,15	0,03360	0,9968
27	300,15	0,03564	0,9966
28	301,15	0,03778	0,9963
29	302,15	0,04004	0,9960
30	303,15	0,04241	0,9957
31	304,15	0,04491	0,9954
32	305,15	0,04753	0,9951
33	306,15	0,05029	0,9947
34	307,15	0,05318	0,9944
35	308,15	0,05622	0,9940
36	309,15	0,05940	0,9937
37	310,15	0,06274	0,9933
38	311,15	0,06624	0,9930
39	312,15	0,06991	0,9927
40	313,15	0,07375	0,9923
41	314,15	0,07777	0,9919
42	315,15	0,08198	0,9915
43	316,15	0,09639	0,9911
44	317,15	0,09100	0,9907
45	318,15	0,09582	0,9902
46	319,15	0,10086	0,9898
47	320,15	0,10612	0,9894
48	321,15	0,11162	0,9889
49	322,15	0,11736	0,9884
50	323,15	0,12335	0,9880
51	324,15	0,12961	0,9876
52	325,15	0,13613	0,9871
53	326,15	0,14293	0,9862
54	327,15	0,15002	0,9862
55	328,15	0,15741	0,9857

t °C	T K	ps bar	ρ kg/dm <sup>3</sup>
56	329,15	0,16511	0,9852
57	330,15	0,17313	0,9846
58	331,15	0,18147	0,9842
59	332,15	0,19016	0,9837
60	333,15	0,19920	0,9232
61	334,15	0,2086	0,9826
62	335,15	0,2184	0,9821
63	336,15	0,2286	0,9816
64	337,15	0,2391	0,9811
65	338,15	0,2501	0,9805
66	339,15	0,2615	0,9799
67	340,15	0,2733	0,9793
68	341,15	0,2856	0,9788
69	342,15	0,2984	0,9782
70	343,15	0,3116	0,9777
71	344,15	0,3253	0,9770
72	345,15	0,3396	0,9765
73	346,15	0,3543	0,9760
74	347,15	0,3696	0,9753
75	348,15	0,3855	0,9748
76	349,15	0,4019	0,9741
77	350,15	0,4189	0,9735
78	351,15	0,4365	0,9729
79	352,15	0,4547	0,9723
80	353,15	0,4736	0,9716
81	354,15	0,4931	0,9710
82	355,15	0,5133	0,9704
83	356,15	0,5342	0,9697
84	357,15	0,5557	0,9691
85	358,15	0,5780	0,9684
86	359,15	0,6011	0,9678
87	360,15	0,6249	0,9671
88	361,15	0,6495	0,9665
89	362,15	0,6749	0,9658
90	363,15	0,7011	0,9652
91	364,15	0,7281	0,9644
92	365,15	0,7561	0,9638
93	366,15	0,7849	0,9630
94	367,15	0,8146	0,9624
95	368,15	0,8453	0,9616
96	369,15	0,8769	0,9610
97	370,15	0,9094	0,9602
98	371,15	0,9430	0,9596
99	372,15	0,9776	0,9586
100	373,15	1,0133	0,9581
102	375,15	1,0878	0,9567
104	377,15	1,1668	0,9552
106	379,15	1,2504	0,9537
108	381,15	1,3390	0,9522
110	383,15	1,4327	0,9507
112	385,15	1,5316	0,9491
114	387,15	1,6362	0,9476
116	389,15	1,7465	0,9460
118	391,15	1,8628	0,9445
120	393,15	1,9854	0,9429

t °C	T K	ps bar	ρ kg/dm <sup>3</sup>
122	395,15	2,1145	0,9412
124	397,15	2,2504	0,9396
126	399,15	2,3933	0,9379
128	401,15	2,5435	0,9362
130	403,15	2,7013	0,9346
132	405,15	2,8670	0,9328
134	407,15	3,041	0,9311
136	409,15	3,223	0,9294
138	411,15	3,414	0,9276
140	413,15	3,614	0,9258
145	418,15	4,155	0,9214
150	423,15	4,760	0,9168
155	428,15	5,433	0,9121
160	433,15	6,181	0,9073
165	438,15	7,008	0,9024
170	443,15	7,920	0,8973
175	448,15	8,924	0,8921
180	453,15	10,027	0,8869
185	458,15	11,233	0,8815
190	463,15	12,551	0,8760
195	468,15	13,987	0,8704
200	473,15	15,55	0,8647
205	478,15	17,243	0,8588
210	483,15	19,077	0,8528
215	488,15	21,060	0,8467
220	493,15	23,198	0,8403
225	498,15	25,501	0,8339
230	503,15	27,976	0,8273
235	508,15	30,632	0,8205
240	513,15	33,478	0,8136
245	518,15	36,523	0,8065
250	523,15	39,776	0,7992
255	528,15	43,246	0,7916
260	533,15	46,943	0,7839
265	538,15	50,877	0,7759
270	543,15	55,058	0,7678
275	548,15	59,496	0,7593
280	553,15	64,202	0,7505
285	558,15	69,186	0,7415
290	563,15	74,461	0,7321
295	568,15	80,037	0,7223
300	573,15	85,927	0,7122
305	578,15	92,144	0,7017
310	583,15	98,700	0,6906
315	588,15	105,61	0,6791
320	593,15	112,89	0,6669
325	598,15	120,56	0,6541
330	603,15	128,63	0,6404
340	613,15	146,05	0,6102
350	623,15	165,35	0,5743
360	633,15	186,75	0,5275
370	643,15	210,54	0,4518
374,15	647,30	221,2	0,3154

**TABLE OF FLOW RESISTANCE IN 100 M OF A NEW AND STRAIGHT CAST IRON PIPELINE**

FLOW RATE		NOMINAL DIAMETER IN mm AND INCHES																			
m <sup>3</sup> /h	l/min.	15 1/2"	20 3/4"	25 1"	32 1 1/4"	40 1 1/2"	50 2"	65 2 1/2"	80 3"	100 4"	125 5"	150 6"	175 7"	200 8"	250 10"	300 12"	350 14"	400 16"			
0,6	10	V	0,94	0,53	0,34	0,21															
		hr	11,8	2,82	1	0,25															
0,9	15	V	1,42	0,8	0,51	0,31															
		hr	25,1	6,04	2,16	0,55															
1,2	20	V	1,89	1,06	0,68	0,41	0,27														
		hr	43,1	10,4	3,72	0,95	0,31														
1,5	25	V	2,36	1,33	0,85	0,52	0,33														
		hr	64,5	15,8	5,68	1,47	0,47														
1,8	30	V	2,83	1,59	1,02	0,62	0,4														
		hr	92	22,3	8	2,09	0,66														
2,1	35	V	3,3	1,86	1,19	0,73	0,46	0,3													
		hr	123	29,8	10,8	2,81	0,89	0,31													
2,4	40	V	3,77	2,12	1,36	0,83	0,53	0,34													
		hr	164	38,2	13,8	2,65	1,15	0,4													
3	50	V	4,72	2,65	1,7	1,04	0,66	0,42													
		hr	246	58,2	21,5	5,6	1,75	0,61													
3,6	60	V	3,18	2,04	1,24	0,8	0,51														
		hr		82	30	8	2,48	0,86													
4,2	70	V		3,72	2,38	1,45	0,93	0,59													
		hr		110	40	10,8	3,33	1,14													
4,8	80	V		4,25	2,72	1,66	1,06	0,68													
		hr		141	51,5	13,9	4,3	1,46													
5,4	90	V			3,06	1,87	1,19	0,76	0,45												
		hr			64	17,5	5,4	1,82	0,46												
6	100	V			3,4	2,07	1,33	0,85	0,5												
		hr			79	21,4	6,6	2,22	0,56												
7,5	125	V			4,25	2,59	1,66	1,06	0,63												
		hr			120	33	10	3,4	0,86												
9	150	V				3,11	1,99	1,27	0,75	0,5											
		hr				47	14,2	4,74	1,21	0,43											
10,5	175	V				3,63	2,32	1,49	0,88	0,58											
		hr				63	19	6,3	1,63	0,57											
12	200	V				4,15	2,65	1,7	1,01	0,66											
		hr				82	24,5	8,1	2,1	0,74											
15	250	V				5,18	3,32	2,12	1,26	0,83	0,53										
		hr				126	37,5	12,3	3,2	1,12	0,36										
18	300	V				3,98	2,55	1,51	1	0,64											
		hr				53	17,3	4,5	1,58	0,51											
24	400	V				5,31	3,4	2,01	1,33	0,85											
		hr				92	29,5	7,8	2,7	0,89											
30	500	V				6,63	4,25	2,51	1,66	1,06	0,68										
		hr				140	44,8	12	4,13	1,36	0,48										
36	600	V					5,1	3,02	1,99	1,27	0,82										
		hr					63	16,9	5,8	1,93	0,68										
42	700	V					5,94	3,52	2,32	1,49	0,95										
		hr					84	22,6	7,8	2,6	0,9										
48	800	V					6,79	4,02	2,65	1,70	1,09	0,75									
		hr					108	29	10	3,35	1,16	0,43									
54	900	V					7,64	4,52	2,99	1,91	1,22	0,85									
		hr					134	36	12,5	4,2	1,45	0,54									
60	1000	V						5,03	3,32	2,12	1,36	0,94									
		hr						44,5	15,2	5,14	1,76	0,66									
75	1250	V						6,28	4,15	2,65	1,70	1,18	0,87								
		hr						68	23	7,9	2,68	1	0,48								
90	1500	V						7,54	4,98	3,18	2,04	1,42	1,04								
		hr						96	32,6	11,2	3,77	1,42	0,68								
105	1750	V						8,79	5,81	3,72	2,38	1,65	1,21	0,93							
		hr						129	43,5	15	5,04	1,9	0,91	0,45							
120	2000	V						6,63	4,25	2,72	1,89	1,39	1,06	0,68							
		hr						56	19,4	6,5	2,43	1,18	0,58	0,16							
150	2500	V						8,29	5,31	3,40	2,36	1,73	1,33	0,85							
		hr						85	30	9,8	3,75	1,79	0,89	0,25							
180	3000	V						9,95	6,37	4,08	2,83	2,08	1,59	1,02	0,71						
		hr						120	42	13,8	5,3	2,53	1,25	0,35	0,15						
300	5000	V							10,62	6,79	4,72	3,47	2,65	1,70	1,18	0,87	0,66				
		hr							124,9	41,3	16,74	7,81	4,03	1,34	0,54	0,25	0,13				
600	10000	V								13,59	9,44	6,93	5,31	3,4	2,36	1,73	1,33				
		hr								161	65	30,2	15,6	5,16	2,09	0,97	0,5				
1200	20000	V													6,79	4,72	3,47	2,65			
		hr													20,1	8,13	3,8	1,95			
1800	30000	V														7,7	5,2	4,0			
		hr														18,07	8,39	4,32			
3000	50000	V														11,8	8,67	6,63			
		hr														49,5	23	11,8			
4500	75000	V														17,7	13	9,9			
		hr														110,5	51,3	26,4			
6000	100000	V															17,33	13,27			
		hr															90,6	46,6			

THE FLOW RESISTANCE MUST BE MULTIPLIED BY:

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

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

**FLOW RESISTANCE**
**TABLE OF FLOW RESISTANCE IN BENDS, VALVES AND GATES IN CM OF COLUMN OF WATER**

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

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

**VOLUMETRIC CAPACITY**

litres per minute l/min	cubic metres per hour m <sup>3</sup> /h	cubic feet per hour ft <sup>3</sup> /h	cubic feet per minute ft <sup>3</sup> /min	imp. gal. per minute imp. gal./min	US gal. per minute US gal./min
<b>1,000</b>	0,0600	2,1189	0,0353	0,2200	0,2640
16,6670	<b>1,0000</b>	35,3147	0,5886	3,6660	4,4030
0,4720	0,0283	<b>1,0000</b>	0,0167	0,1040	0,1250
28,3170	1,6990	60,0000	<b>1,0000</b>	6,2290	7,4800
4,5460	0,2728	9,6326	0,1605	<b>1,0000</b>	1,2010
3,7850	0,2271	8,0209	0,1337	0,8330	<b>1,0000</b>
0,1100	0,0066	0,2339	0,0039	0,0240	0,0290

**PRESSURE AND HEAD**

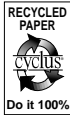
Newton per square metre N/m <sup>2</sup>	kiloPascal kPa	bar bar	pound force per square inch psi	metre of water m H <sub>2</sub> O	millimetre of mercury mm Hg
<b>1,0000</b>	0,0010	1 x 10 <sup>5</sup>	1,45 x 10 <sup>-4</sup>	1,02 x 10 <sup>-4</sup>	0,0075
1.000,0000	<b>1,0000</b>	0,0100	0,1450	0,1020	7,5000
100.000,0000	100,0000	<b>1,0000</b>	14,5000	10,2000	750,1000
98.067,0000	98,0700	0,9810	14,2200	10,0000	735,6000
6.895,0000	6,8950	0,0690	<b>1,0000</b>	0,7030	51,7200
2.984,0000	2,9840	0,0300	0,4330	0,3050	22,4200
9.789,0000	9,7890	0,0980	1,4200	<b>1,0000</b>	73,4200
133,3000	0,1330	0,0013	0,0190	0,0140	<b>1,0000</b>
3.386,0000	3,3860	0,0338	0,4910	0,3450	25,4000

**LENGTH**

millimetre mm	centimetre cm	metre m	inch in	foot ft	yard yd
<b>1,0000</b>	0,1000	0,0010	0,0394	0,0033	0,0011
10,0000	<b>1,0000</b>	0,0100	0,3937	0,0328	0,0109
1000,0000	100,0000	<b>1,0000</b>	39,3701	3,2808	1,0936
25,4000	2,5400	0,0254	<b>1,0000</b>	0,0833	0,0278
304,8000	30,4800	3,0480	12,0000	<b>1,0000</b>	0,3333
914,4000	91,4400	0,9144	36,0000	3,0000	<b>1,0000</b>

**VOLUME**

cubic metre m <sup>3</sup>	litre l	millilitre ml	imp. gallon imp. gal.	US gallon US gal	cubic foot ft <sup>3</sup>
<b>1,0000</b>	1.000,0000	1 x 10 <sup>6</sup>	220,0000	264,2000	35,3147
0,0010	<b>1,0000</b>	1.000,0000	0,2200	0,2642	0,0353
1 x 10 <sup>-6</sup>	0,0010	<b>1,0000</b>	2,2 x 10 <sup>-4</sup>	2,642 x 10 <sup>-4</sup>	3,53 x 10 <sup>-5</sup>
0,0045	4,5460	4.546,0000	<b>1,0000</b>	1,2010	0,1605
0,0038	3,7850	3.785,0000	0,8327	<b>1,0000</b>	0,1337
0,0283	28,3170	28.317,0000	6,2288	7,4805	<b>1,0000</b>



#### "WATER TECHNOLOGY GROUP - EMEA" ITALIAN SALES NETWORK

**BARI**  
70026 Modugno Bari  
Via X Marzo, 110 P  
Tel. 080 5327453 - 5353808  
Fax: 080 5327926  
e-mail: bari@lowara.ittind.com

**BOLOGNA**  
40132 Bologna - Via Panigale, 74/C  
Tel. 051 6415666  
Fax: 051 6415527  
e-mail: bologna@lowara.ittind.com

**BRESCIA**  
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Tel. 030 3531909  
Fax: 030 3534661  
e-mail: brescia@lowara.ittind.com

**CAGLIARI**  
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Tel. 070 287762 - 292192  
Fax: 070 280946  
e-mail: cagliari@lowara.ittind.com

**CATANIA**  
95027 S. Gregorio - Catania  
Via XX Settembre, 75  
Tel. 095 7123226 - 7123987  
Fax: 095 498902  
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**CHIETI**  
66020 Sambuceto di S. Giovanni  
Teatino  
Via Aldo Moro, 125  
Tel. 085 4461360 - 4460231 - 4460449  
Fax 085 4460630  
e-mail: pescara@lowara.ittind.com

**MILANO**  
20090 Trezzano sul Naviglio Milano  
Via Goldoni, 29  
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e-mail: milano@lowara.ittind.com

**NAPOLI**  
80017 Melito di Napoli - Napoli  
Corso Europa, 369 - Scala "A" int. 11-12  
Tel. 081 7113065 - 7113631  
Fax: 081 7115761  
e-mail: napoli@lowara.ittind.com

**PADOVA**  
35020 Albignasego - Via A. Volta, 56  
Zona Mandriola  
Tel. 049 8801110 - 8801408  
Fax: 049 8801408  
e-mail: bassano@lowara.ittind.com

**PERUGIA**  
06100 Perugia  
Via Settevalli, 133C, Torre 2 - 3° Piano  
Centro Direzionale Piazza Settevalli  
Tel. 075 5057126 - Fax: 075 5051242  
e-mail: perugia@lowara.ittind.com

**PISA**  
56025 Località Gello di Pontedera - Pisa  
Via di Gello, 55  
Tel. 0587 296264 - 296286  
Fax: 0587 296410  
e-mail: pisa@lowara.ittind.com

**PORDENONE**  
33082 Azzano Decimo Pordenone  
Viale 1° Maggio, 65/1 Area 53  
Tel. 0434 633243  
Fax: 0434 632729  
e-mail: pordenone@lowara.ittind.com

**ROMA**  
00173 Roma - Via Frascineto, 8  
Tel. 06 7235890 (2 linee)  
Fax: 06 7234617  
e-mail: roma@lowara.ittind.com

**TORINO**  
Via Torre Pellice, 17 - 10156 Torino  
Tel. 011 2979022 - 2979046  
Fax: 011 2979001  
e-mail: torino@lowara.ittind.com

**VICENZA**  
36061 Bassano del Grappa - VI  
Via Pigafetta, 6  
Tel. 0424 566776 (R.A. 3 Linee)  
Fax: 0424 566773  
e-mail: bassano@lowara.ittind.com

#### "WATER TECHNOLOGY GROUP - EMEA" EUROPEAN SALES NETWORK

**LOWARA DEUTSCHLAND GmbH**  
Biebigheimer Straße 12  
63762 Großostheim - (OT Wenigumstadt) - D  
Tel. 0 60 26 9 43 - 0  
Fax: 0 60 26 9 43 - 2 10  
e-mail: info.de@lowara.ittind.com  
http://www.lowara.de

**LOWARA FRANCE S. A. S.**  
BP 7311 - 37073 TOURS CEDEX 2 - F  
Tel. (0033) 02 47 88 17 17  
Fax: (0033) 02 47 88 17 00  
e-mail: info.fr@lowara.ittind.com  
http://www.lowara.fr

**LOWARA FRANCE SAS Agence Sud**  
Z.I. La Sipièrre  
BP 23  
13730 Saint Victoret - F  
Tél. (0033) 04 42 10 02 30  
Fax (0033) 04 42 10 43 75

**LOWARA NEDERLAND B. V.**  
POSTBUS 54 - 4180 BB Waardenburg  
Tel. 0031 - (0)418 - 65 50 60  
Fax: 0031 - (0)418 - 65 50 61  
e-mail: info.nl@lowara.ittind.com  
http://www.lowara.nl

**LOWARA PORTUGAL, Lda**  
Praceta da Castanheira, 38  
4475-019 Barca Portugal  
Tel. 00351 22 9478550  
Fax: 00351 22 9478570  
e-mail: info.pt@lowara.ittind.com  
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**LOWARA UK Ltd.**  
Main office  
Millwey Rise Industrial Estate - Axminster, Devon EX 13 5HU - GB  
Tel. 01297 630200 - Fax: 01297 630270  
e-mail: uksales@lowara.ittind.com - http://www.lowara.co.uk

**LOWARA UK Ltd. Regional sales office**  
Unit 1, Byram Industrial Park - Low Street  
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Tel. 01977 607267 - Fax 01977 607226  
e-mail: salesuknorth@lowara.ittind.com  
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http://www.lowara.ie

**PUMPENFABRIK ERNST VOGEL GMBH**  
ERNST VOGEL-STRASSE 2 - 2000 STOCKERAU AT  
Tel. 0043 295 244 82 - Fax 0043 226 660 4466

**VOGEL PUMPEN KFT**  
BAKONY UT. 8 - HU - 8000 SZEKESFEHERVAR  
Ph. 0036 22 512 645 - Fax 0036 22 512 642

**LOWARA VOGEL POLSKA Sp. z o.o.**  
UL. WORCELLA 16 - PL - 40-652 KATOWICE  
Ph. 0048 32 202 8904 - Fax 0048 32 202 5452



LOWARA S.r.l. - 36075 Montecchio Maggiore - Vicenza - Italy - Tel. +39 0444/707111 - Telefax +39 0444/492166 - e-mail: mkt@lowara.ittind.com - http://www.lowara.com