

IMMERSIBLE PUMPS

SMTR 50/60 Hz



SHAKTI

THE POWER OF INNOVATION, EFFICIENCY & TECHNOLOGY.



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SMTR SERIES

INTRODUCTION

SMTR

Shakti SMTR pumps are vertical multistage centrifugal pumps designed for pumping of cooling lubricants for machine tools, condensate transfer and similar applications.

The pumps are designed to be mounted on top of tanks with the chamber stack immersed in the pumped liquid.

The pumps come in various pump sizes and have various numbers of stages to provide the flow, the pressure and the installation length required. To meet specific depths of tanks or containers, the immersible length of the pump can be varied using empty chambers.

The pumps consist of two main components:

The motor and the pump unit. The motor is a Shakti standard SMG motor designed to EN standards. The pump unit consists of optimised hydraulics, various types of connections, a motor stool, a given number of chambers and various other parts.

The mounting flange dimensions are according to DIN 5440. The mechanical shaft seal is according to EN 12 756.



Fig. 1 SMTR

APPLICATION

Shakti range of high-pressure pumps offers unsurpassed accuracy and stability to make sure that nothing interferes with the delicate machining process. Equally important, high efficiency ensures a remarkably low heat input into the cooling lubricant.

Pumps suitable for machine tool applications are the immersible SMTR, offering a tank mounted design.

MACHINE TOOL APPLICATIONS

- Boring
- Milling/turning
- Wire cutting
- Filtration
- Part washing
- Chilling
- Condensate systems
- Wash & clean
- Grinding
- Spark Erosion
- Pumping of cooling lubricants for machine tools

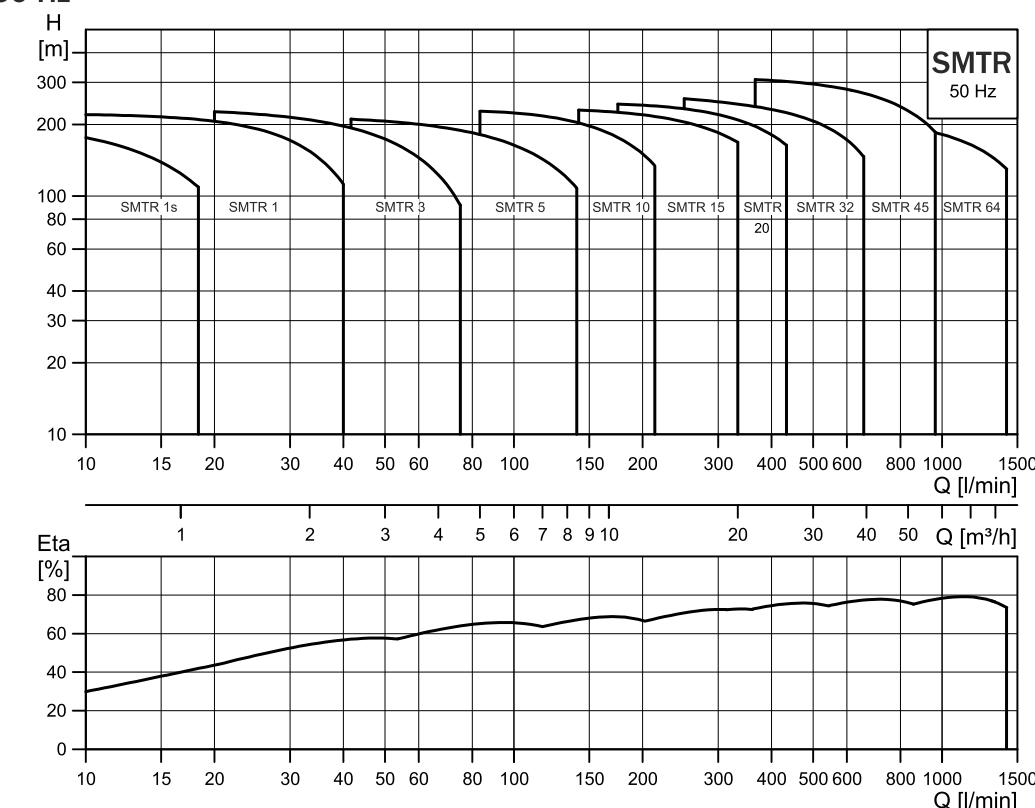
FEATURES

- Excellent Hydraulic Performance
- Study & Compact design
- Dynamically Balanced rotation of all parts
- Quiet & maintenance free
- Inter changeability for easy replacement

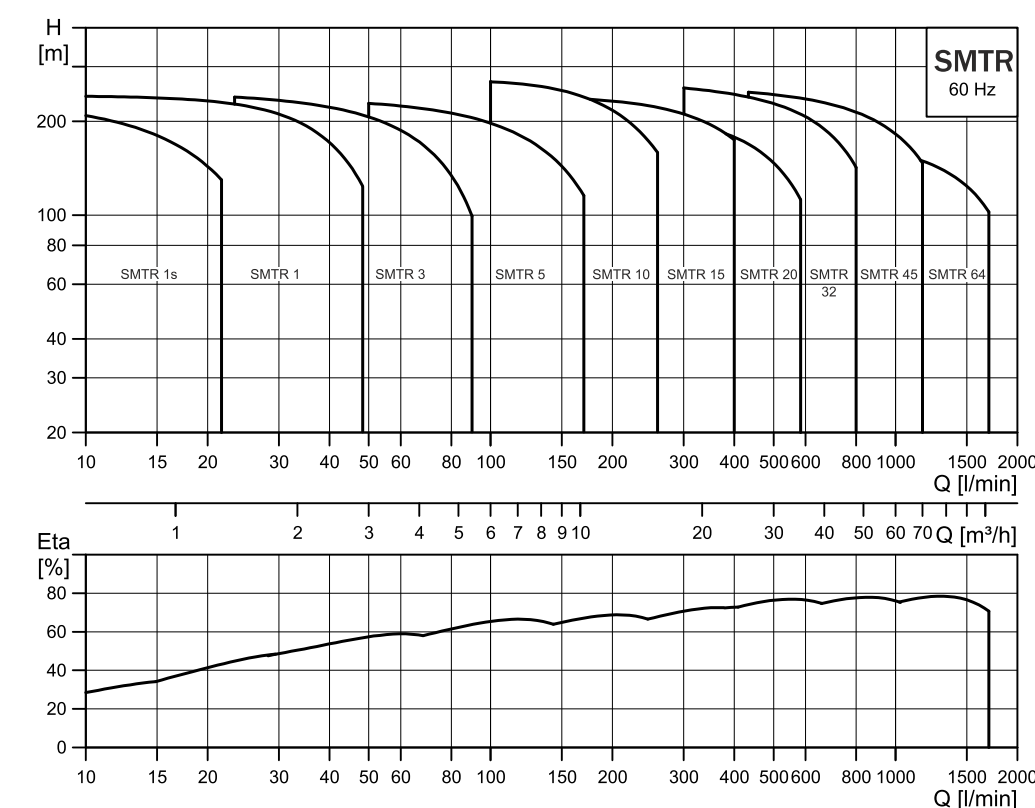
SMTR SERIES

HYDRAULIC RANGE

SMTR, 50 Hz



SMTR, 60 Hz



SMTR SERIES

PERFORMANCE RANGE

PUMP	SMTR 1s	SMTR 1	SMTR 3	SMTR 5	SMTR 10	SMTR 15	SMTR 20	SMTR 32	SMTR 45	SMTR 64
50 Hz										
Rated Flow Rate (m³/h)	0.8	1	3	5	10	15	20	32	45	64
Rated Flow Rate (l/min)	13	17	50	83	167	250	333	533	750	1067
Temperature range (°C)	-10 °C to +90 °C									
Max pump efficiency (%)	35	48	58	66	70	72	72	76	78	80
SMTR pumps										
Flow Range (m³/h)	0.3-1.3	0.7-2.4	1.2-4.5	2.5-8.5	5-13	8.5-23.5	10.5-29	15-40	22-58	30-85
Flow Range (l/min)	5-22	12-40	20-75	42-142	83-127	142-392	175-483	250-667	367-967	500-1417
Motor power (kW)	0.37 - 1.1	0.37 - 2.2	0.37 - 3.0	0.37 - 5.5	0.75 - 7.5	1.1 - 15.0	1.1 - 18.5	1.5 - 30	3.0 - 45.0	4.0 - 45.0
Max pressure (bar)	20	22	23	21	22	23	24	27	32	22
60 Hz										
Rated Flow Rate (m³/h)	1	1.2	3.6	6	12	18	24	38	54	77
Rated Flow Rate (l/min)	17	20	60	100	200	300	400	633	900	1284
Temperature range (°C)	-10 °C to +90 °C									
Max pump efficiency (%)	35	49	59	67	70	72	72	76	78	79
SMTR pumps										
Flow Range (m³/h)	0.4-1.6	0.8-2.9	1.4-5.4	3.0-10.0	6.0-15.5	10.0-28.5	13.0-35.0	18.0-48.0	26.0-70.0	36.0-102.0
Flow Range (l/min)	7-27	13-23	48-90	50-167	100-258	167-475	217-583	300-800	433-1167	600-1700
Motor power (kW)	0.37 - 1.5	0.37 - 2.2	0.37 - 4.0	0.55 - 7.5	0.75 - 11.0	1.5 - 11.0	2.2 - 18.5	2.2 - 30.0	5.5 - 45.0	7.5 - 45.0
Max pressure (bar)	20	22	23	21	22	23	24	27	32	22
Material variants										
Pump head (A - version): Cast Iron	•	•	•	•	•	•	•	•	•	•
Pump head (I - version): SS 304	○	○	○	○	○	○	○	-	-	○
Pump head (N -version): SS 316	○	○	○	○	○	○	○	-	-	○
Pipe Connection										
Internal Thread	Rp 1 1/4 "	Rp 1 1/4 "	Rp 1 1/4 "	Rp 1 1/4 "	Rp 2"	Rp 2"	Rp 2"	-	-	-
Flange	-	-	-	-	-	-	-	DN 65	DN 80	DN 80
Installation length [mm]										
Range	160 - 1006	160 - 1006	160 - 1006	160 - 1006	148 - 1018	178 - 1033	178 - 1033	233 - 1343	244 - 1444	249 - 1487
Shaft Seal										
HUUV	•	•	•	•	•	•	•	•	•	•
Note :	• Standard			On Request			- Not Available			

MINIMUM EFFICIENCY INDEX

Minimum efficiency index (MEI) means the dimensionless scale unit for hydraulic pump efficiency at best efficiency point (BEP), part load (PL) and overload (OL). The Commission regulation (EU) sets efficiency requirements to MEI ≥ 0.10 as from 1 January 2013 and MEI ≥ 0.40 as from 1 January 2015. An indicative benchmark for best-performing water pump available on the market as from 1 January 2013 is determined in the regulation.

- The benchmark for most efficient water pumps is MEI ≥ 0.70.
- The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, thus leading to reduced energy consumption. MEI is based on the full impeller diameter.

Minimum efficiency index (MEI)

Pump type	MEI
SMTR 1s-3/3	0.67
SMTR 1-3/3	> 0.70
SMTR 3-3/3	> 0.70
SMTR 5-3/3	0.57
SMTR 10-3/3	> 0.70
SMTR 15-3/3	> 0.70
SMTR 20-3/3	> 0.70
SMTR 32 3/3	> 0.70
SMTR 45 3/3	> 0.70
SMTR 64 3/3	> 0.70

SMTR SERIES

PRODUCT RANGE

MOTORS FOR SMTR PUMPS

SMTR pumps are fitted with a totally enclosed, fan-cooled, 2-pole Shakti standard SMG motor with principal dimensions according to IEC, DIN and British standards.

Electrical tolerances according to EN 60034.

Mounting Designation	Up to 4 kW	V 18
	From 5.5 kW	V 1
Efficiency Class	0.37 - 45 kW	IE3
Enclosure Class	IP 55	
Insulation Class	H	
Supply Voltage, 50 Hz	1 x 220 - 240 V	
	3 x 480 - 415 V	
Supply Voltage, 60 Hz	1 x 115/230 V	
	3 x 230/380/460 V	

SHAKTI STANDARD MOTORS

Motor Protection

Single-phase Shakti motors have a built-in thermal overload switch (IEC 34-11:TP 211).

Three-phase motors must be connected to a motor protective circuit breaker in accordance with local regulations.

Three-phase Shakti motors from 3 kW and upwards have a built-in thermistor (PTC) according to DIN 44082 (IEC 34-11:TP 211).

MAXIMUM NUMBER OF STARTS

Pump	Motor [kW]	Recommended maximum number of starts per hour
SMTR	0.37-2.20	250
	3 - 4	100
	5.5 - 11	50
	15 - 22	40
	30 - 45	8

SOUND PRESSURE LEVEL

Pump	Motor [kW]	L _{pA} [dB(A)]	
		50 Hz	60 Hz
SMTR	0.37	53	58
	0.55	53	56
	0.75	53	57
	1.1	60	65
	1.5	59	65
	2.2	61	66
	3.0	59	64
	4.0	65	69
	5.5	63	68
	7.5	60	65
	11	60	65
	15	60	65
	18.5	60	65
	22	64	69
	30	70	84
	37	71	75
	45	71	75

The values have been measured according to EN ISO 4871.

VISCOSITY AND DENSITY

The pumping of liquids with densities or kinematic viscosities higher than those of water will cause a considerable pressure drop, a drop in the hydraulic performance and a rise in the power consumption. In such situations, the pump should be fitted with a larger motor. If in doubt, contact Shakti.

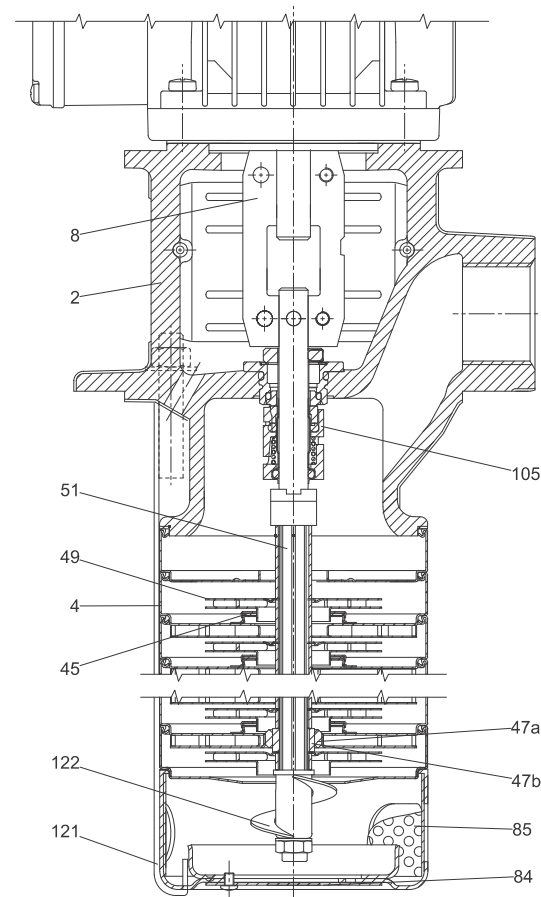
AMBIENT TEMPERATURE SMTR

Motor power [kW]	Motor make	Motor efficiency class	Maximum ambient temperature at full load [°C]	Maximum altitude above sea level [m]
0.37-0.55	SMG	-	40	1000
0.75-22	SMG	IE3	60	3500

If the ambient temperature exceeds the above temperature values, or the pump is installed at an altitude exceeding the above altitude values, the motor must not be fully loaded due to the risk of overheating. Overheating may result from excessive ambient temperatures or the low density and consequently low cooling effect of the air. In such cases, it may be necessary to use a motor with a higher rated output.

SMTR SERIES CONSTRUCTION

SMTR 1S, 1, 3 AND 5
SECTIONAL DRAWING



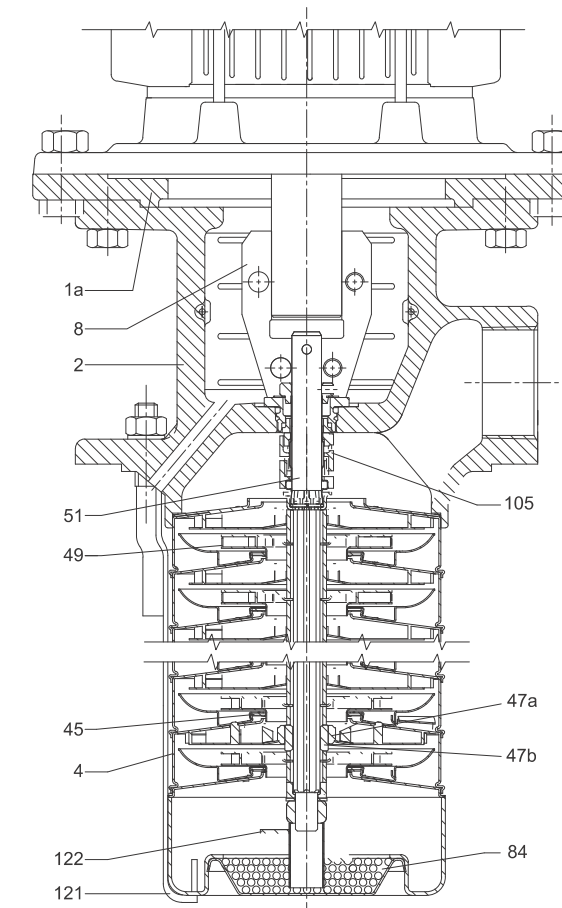
MATERIALS

Pos.	Description	Materials	EN/DIN
2	Pump head	cast iron	CI-FG 260
4	Chamber	Stainless steel	SS304
8	Coupling	Sintered metal	
45	Neck ring	PTFE	
47a	Bearing ring, stationary	Tungsten carbide	
47b	Bearing ring, rotating	Tungsten carbide	
49	Impeller	Stainless steel	SS304
51	Pump shaft	Stainless steel	SS304
84	Suction strainer	Stainless steel	SS304
85	Strainer internal	Stainless steel	SS304
105	Shaft seal	HUUV/HUUE	
121	Strap	Stainless steel	SS304
122	Priming screw	Stainless steel	SS304

SMTR SERIES



SMTR 10, 15 AND 20
SECTIONAL DRAWING

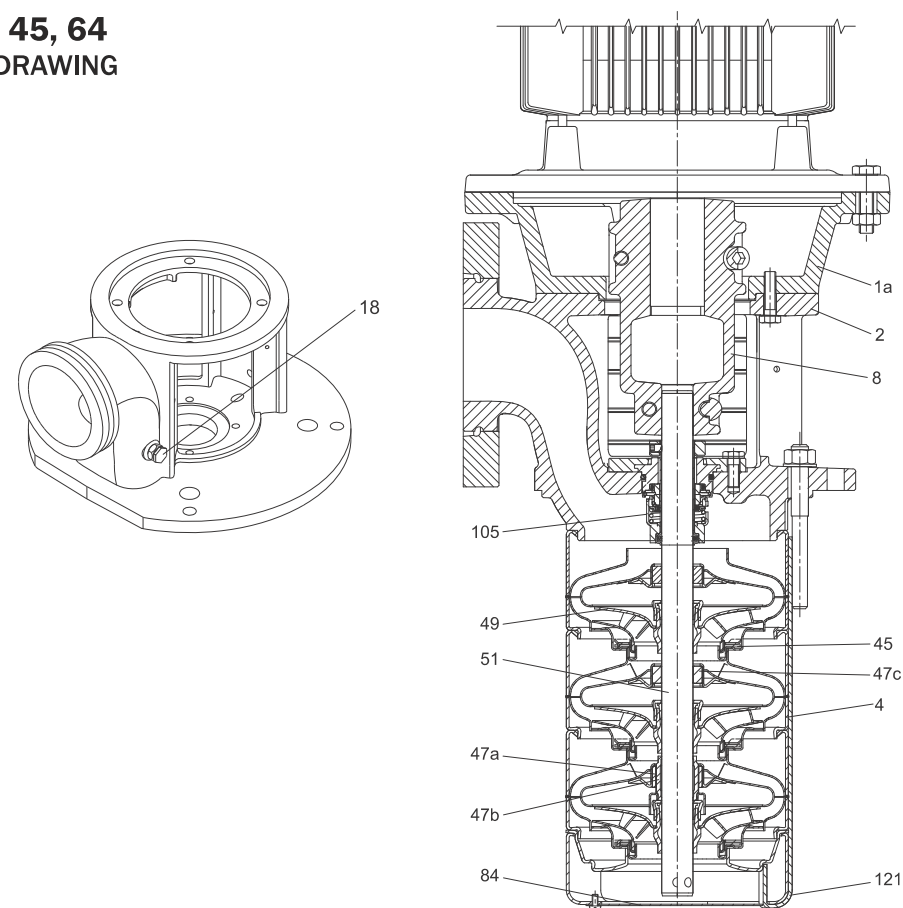


MATERIALS

Pos.	Description	Materials	EN/DIN
1a	Motor stool	Cast iron	CI-FG 260
2	Pump head	Cast iron	CI-FG 260
4	Chamber	Stainless steel	SS304
8	Coupling	Sintered metal	
45	Neck ring	PTFE	
47a	Bearing ring, stationary	Tungsten carbide	
47b	Bearing ring, rotating	Tungsten carbide	
49	Impeller	Stainless steel	SS304
51	Pump shaft	Stainless steel	SS304
84	Suction strainer	Stainless steel	SS304
105	Shaft seal	HUUV/HUUE	
121	Strap	Stainless steel	SS304
122	Priming screw	Stainless steel	SS304

SMTR SERIES

SMTR 32, 45, 64 SECTIONAL DRAWING



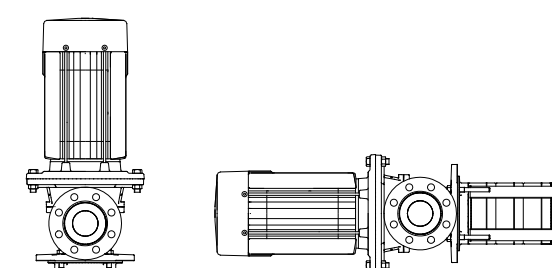
MATERIALS

Pos.	Description	Materials	EN/DIN
1a	Motor stool	Cast iron	CI-FG 260
2	Pump head	Cast iron	CI-FG 260
4	Chamber	Stainless steel	SS304
8	Coupling	Cast iron	CI-FG 260
18	Air vent screw	Stainless steel	SS304
45	Neck ring	PTFE	
47a	Bearing ring, stationary	Tungsten carbide	
47b	Bearing ring, rotating	Tungsten steel	
47c	Bush		
49	Impeller	Stainless steel	SS304
51	Pump shaft	Stainless steel	SS304
	O-ring*	NBR	
84	Suction strainer	Stainless steel	SS304
105	Shaft seal	HUUV/HUUE	
121	Strap	Stainless steel	SS304

SMTR SERIES INSTALLATION

INSTALLATION OF SMTR PUMPS

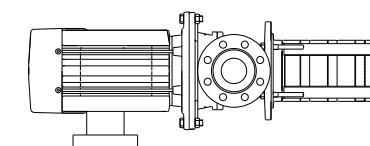
SMTR 1s, 1, 3, 5, 10, 15 and 20 pumps can be installed both vertically and horizontally. SMTR 32 pumps must be installed in a vertical position.



Vertical

Horizontal

Fig. 2.0 Installation of a SMTR pump



On horizontally installed SMTR pumps with motors from 5.5 kW and up, the motors have feet and must be supported.

The pumps are designed to provide full performance down to a level of A mm above the bottom of the suction strainer.

At a liquid level between A and B mm above the bottom of the suction strainer, the built-in priming screw will protect the pump against dry running.

Note: SMTR 32 pumps have no priming screw.

Pump type	A [mm]	B [mm]
SMTR 1s, 1, 3, 5	41	28
SMTR 10, 15, 20	50	25
SMTR 32, 45, 64	70	-

The distance between the pump and the tank bottom must be minimum 25 mm

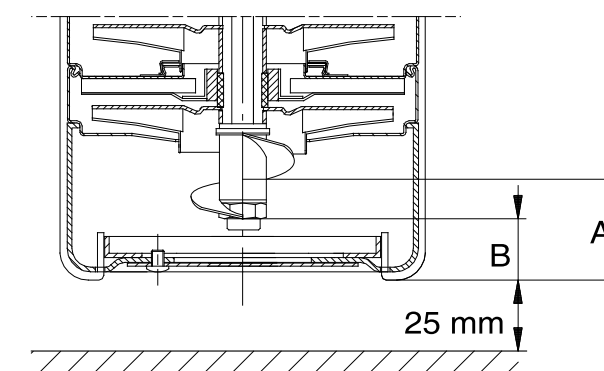


Fig. 3.0 SMTR 1s, 1, 3 and 5

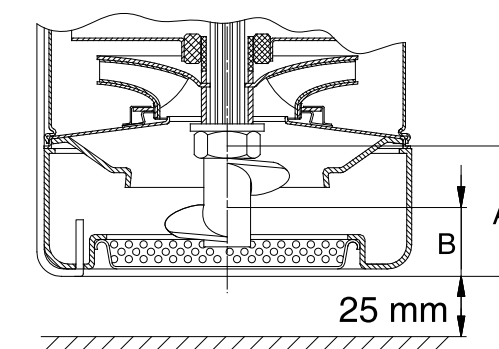


Fig. 4.0 SMTR 10, 15 and 20

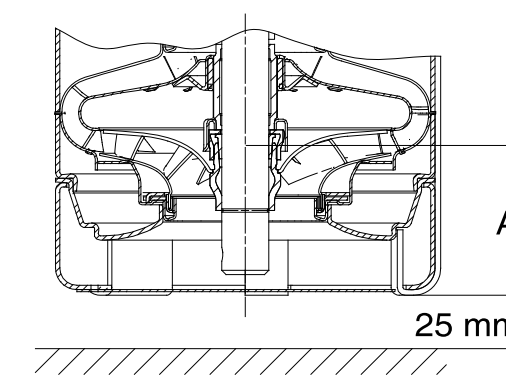


Fig. 5.0 SMTR 32, 45 & 64

SMTR SERIES

SMTR TYPE KEY

Example	SMTR	32	(s)	-2	/1	-1	-F	-A	-H	UU	V
Pump type											
Rated flow rate [m³/h]											
All impellers with reduced diameter (only SMTR 1s)											
Number of chambers											
Number of impellers											
Number of impellers with reduced diameter											
Pipe connection											
F DIN flange											
Materials											
A Basic version											
I Stainless Steel 304											
N Stainless Steel 316											
Shaft seal											
H Balanced cartridge seal											
Q Silicon carbide											
U Tungsten carbide											
B Carbon											
E EPDM											
F FXM											
K FFKM											
V FKM											

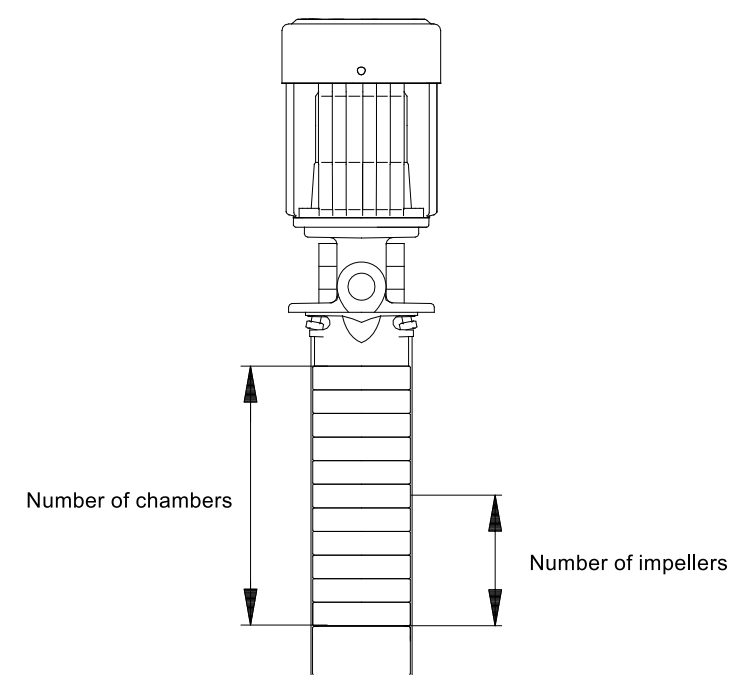


FIG 5.0 SMTR pumps with empty chambers (Variable Length)

SMTR SERIES

SELECTION AND SIZING

SELECTION OF PUMPS

Selection of pumps should be based on the following parameters:

- the duty point of the pump
- dimensional data such as pressure loss as a result of height differences, friction loss in the pipework, pump efficiency etc.
- minimum inlet pressure - NPSH.

DUTY POINT OF THE PUMP

From a duty point it is possible to select a pump on the basis of the curve charts shown.

DIMENSIONAL DATA

When sizing a pump the following aspects must be taken into account:

- required flow rate and pressure at the draw-off point
- pressure loss as a result of height differences (H_{geo})
- friction loss in the pipework (H_f). It may be necessary to account for pressure loss in connection with long pipes, bends or valves, etc.
- best efficiency at the estimated duty point
- NPSH value for calculation of the NPSH value, see "Minimum inlet pressure - NPSH".

EFFICIENCY

Before determining the point of best efficiency, the operating pattern of the pump needs to be identified. Is the pump expected always to operate in the same duty point, select an SMTR pump which is operating at a duty point corresponding to the best efficiency of the pump.

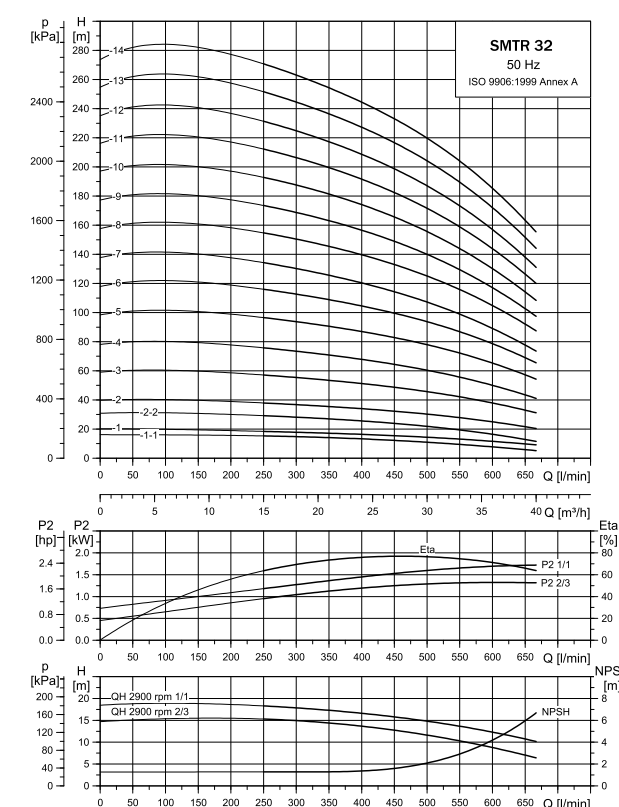


Fig. 6.0 Example of a curve chart

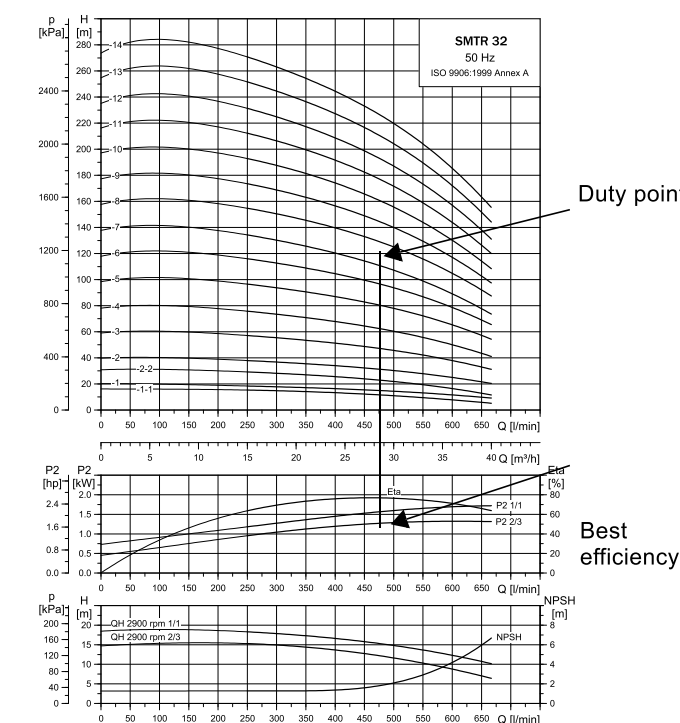


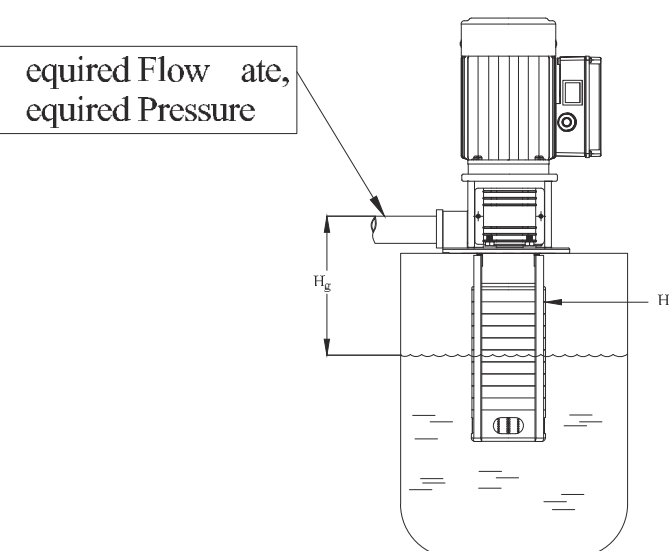
Fig. 7.0 Example of an SMTR pump's duty point

SMTR SERIES

As the pump is sized on the basis of the highest possible flow, it is important always to have the duty point to the right on the efficiency curve (eta) in order to keep efficiency high when the flow drops



Fig. 8.0 Best Efficiency



Dimensional data

In order to achieve optimum operating economy, the pump should be selected on the basis of the following criteria:

- The maximum duty point should be as close as possible to the QH curve of the pump.
- The required duty point should be positioned so that P2 is close to the max. point of the QH curve.

Between the minimum and maximum performance curves

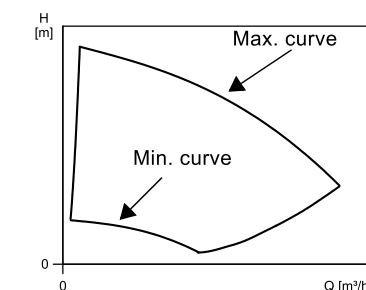


Fig. 9.0 Min. and max. performance curves

In situations where it is not possible to select a duty point close to the max. curve, the affinity equations below can be used. The head (H), the flow rate (Q) and the input power (P) are all the appropriate variables you need to be able to calculate the motor speed (n).

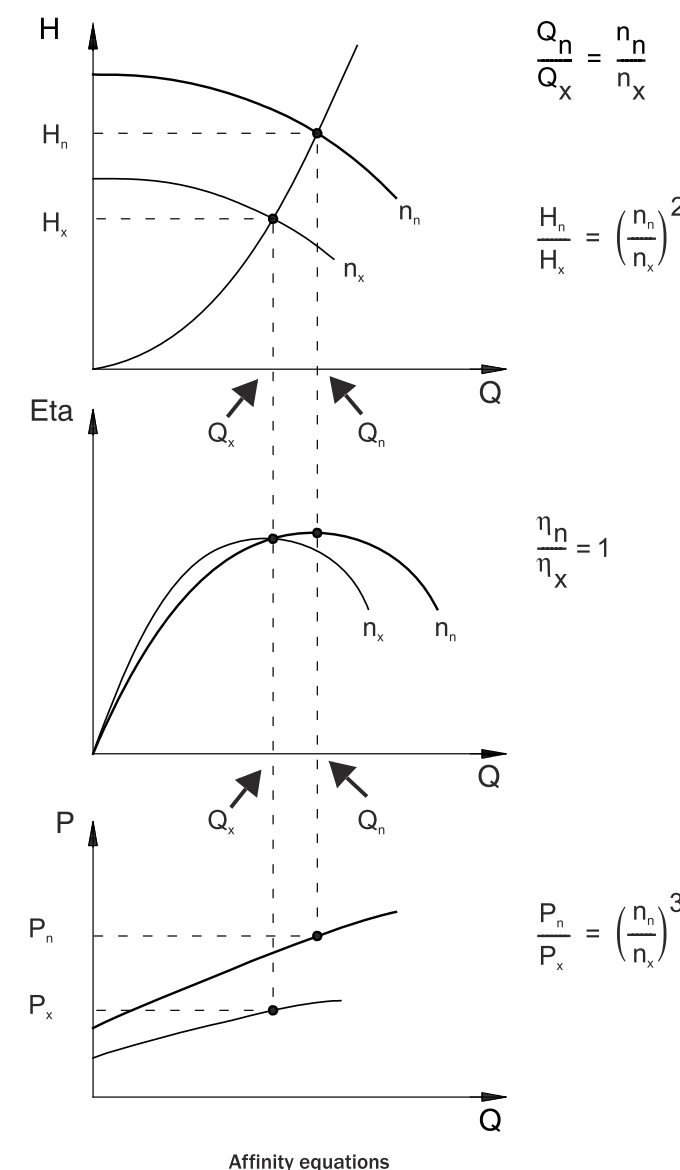
Note:

The approximated formulas apply on condition that the system characteristic remains unchanged for n_n and n_x and that it is based on the formula $H = k \times Q^2$ where k is a constant.

The power equation implies that the pump efficiency is unchanged at the two speeds. In practice this is not quite correct.

Finally, it is worth noting that the efficiencies of the frequency converter and the motor must be taken into account if a precise calculation of the power saving resulting from a reduction of the pump speed is wanted.

SMTR SERIES



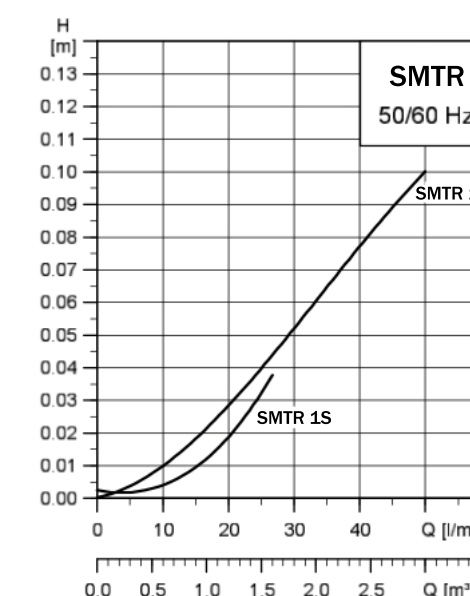
Legend

- H_n : Rated head [m]
- H_x : Current head [m]
- Q_n : Flow rate [m^3/h]
- Q_x : Current flow rate [m^3/h]
- n_n : Rated motor speed [min^{-1}]
- n_x : Current motor speed [min^{-1}]
- η_n : Rated efficiency [%]
- η_x : Current efficiency [%]

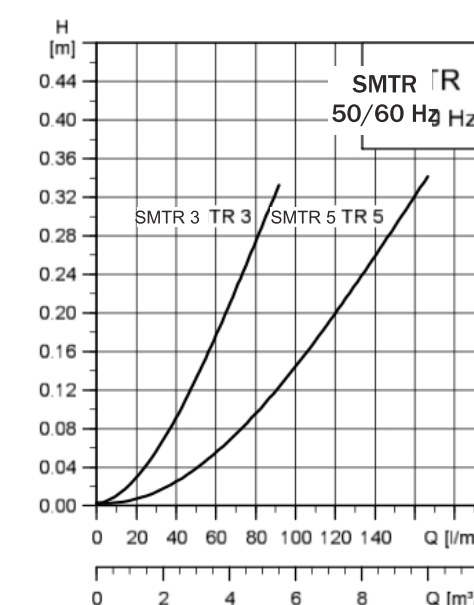
Pressure loss

During operation pressure losses occur in all centrifugal pumps.

The below curves illustrate the pressure losses for pumped liquid passing through one empty chamber. An empty chamber is a chamber without an impeller

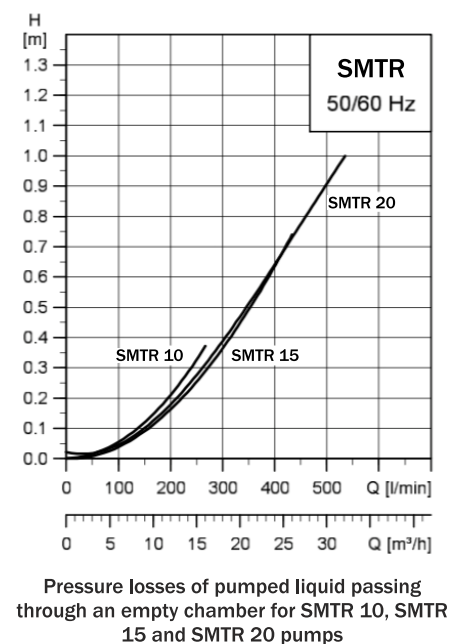


Pressure losses of pumped liquid passing through an empty chamber for SMTR 1s and SMTR 1 pumps



Pressure losses of pumped liquid passing through an empty chamber for SMTR 3 and SMTR 5 Pumps

SMTR SERIES



As SMTR 32, 45, 64 pump have holes in the guide vanes, no pressure losses occur in the empty chambers of these pumps

Calculation of the Reduced Head of A Pump With Empty Chambers

Calculation of pressure loss in empty chambers

From the above curves and the curve charts of each pump type, it is possible to calculate the reduced head of a pump with empty chambers. The calculation can be made as shown below.

Example :

Pump type	SMTR 5-18/7
Flow Q (duty point)	6 [m³/h]
Head (duty point)	90 [m]

The selected pump is an SMTR 5-18/18 with 11 empty chambers.

From the above pressure loss curve of SMTR 5, it appears that the pressure loss of each empty chamber at 6 m³/h is 0.14 [m]. This results in a total pressure loss of:

$$(\text{Total pressure loss}) = 0.14 \times 11 = 1.54 \text{ [m]}$$

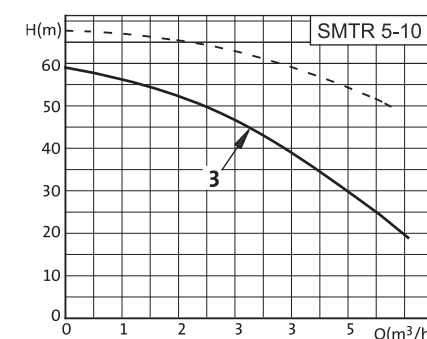
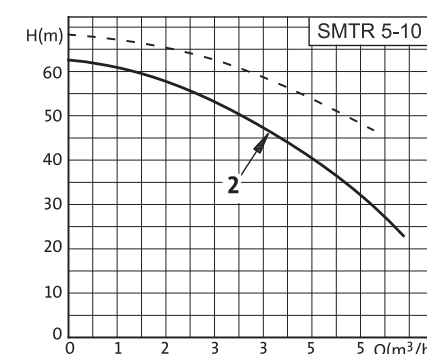
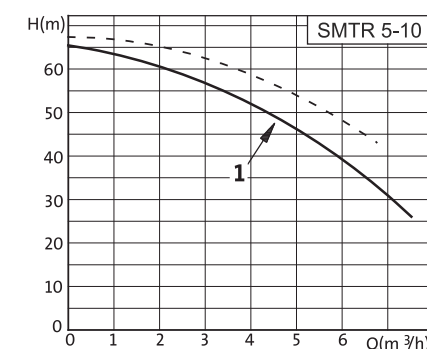
The reduced head of the SMTR 5-18/7 pump including pressure losses caused by empty chambers is: Head = 33 - 1.54 = 31.46 [m] The head 33 metres is read from the performance curve for an SMTR 5-18/7.

Viscosity

Pump	Maximum kinematic viscosity of pumped liquid [cSt] = [mm²/s]
SMTR 1s, 1, 3, 5	50
SMTR 10, 15, 20, 32, 45 & 64	100

The pumping of liquids with densities or kinematic viscosities higher than those of water will cause a considerable pressure drop, a drop in the hydraulic performance and a rise in the power consumption. In such situations the pump should be equipped with a larger motor.

The following examples show the drop in the hydraulic performance of SMTR pumps pumping oil with a density of 872 kg/m³ but with three different kinematic viscosities.



SMTR SERIES



Key

Position	Density [kg/m³]	Kinematic viscosity [cSt] = [mm²/s]
1	872	16
2	872	32
3	872	75

KINEMATIC VISCOSITY OF DIFFERENT OILS

The curves below show the kinematic viscosity of different oils in relation to oil temperature

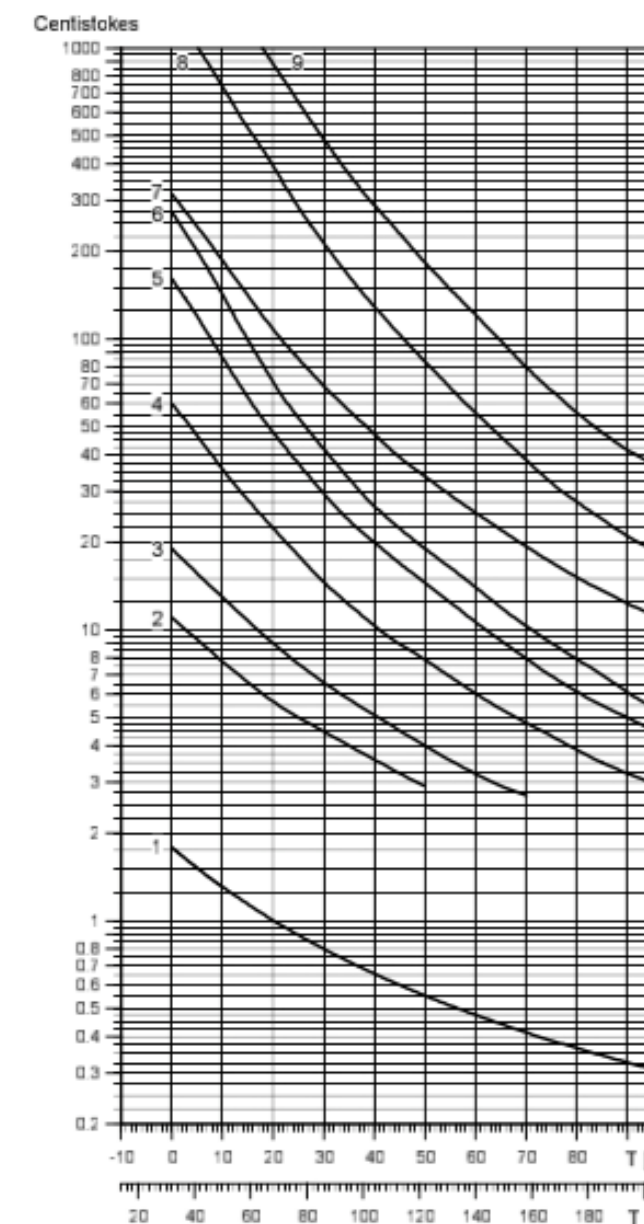


Fig. 10 Kinematic viscosity of different oils in relation to oil temperature

Key to kinematic viscosities of different oils

Curve number	Liquid
1	Water
2	Honing oil
3	Grinding oil
4	Hydraulic oil (ISO Vg10)
5	Thermal oil
6	Cutting oil
7	Hydraulic oil (ISO Vg46)
8	Motor oil (20W-50)
9	Gear oil

MINIMUM INLET PRESSURE - NPSH

We recommend calculating the inlet pressure "H" when the following aspects apply:

- the liquid temperature is high
- the flow is significantly higher than the flow rate
- water is drawn from depths
- water is drawn through long pipes
- inlet conditions are poor.

To avoid cavitation, make sure that there is a minimum pressure on the suction side of the pump. The maximum suction lift "H" in metres head can be calculated as follows:

$$H = pb \times 10.2 - NPSH - H_f - H_v - H_s$$

pb = Barometric pressure in bar.

Barometric pressure can be set to 1 bar). In closed systems, pb indicates the system pressure in bar.

NPSH = Net Positive Suction Head in metres head. (To be read from the NPSH curve at the highest flow rate the pump will be delivering).

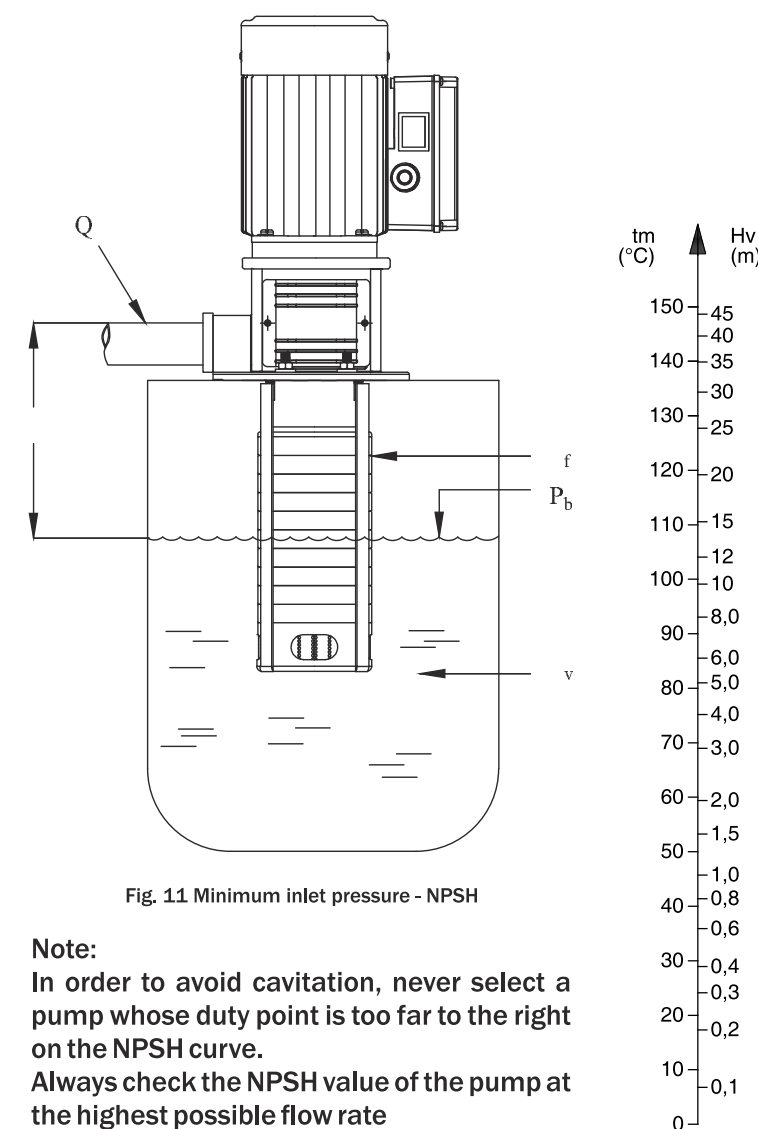
Hf = Friction loss in suction pipe in metres head. (At the highest flow rate the pump will be delivering).

Hv = Vapour pressure in metres head.

Hs = Safety margin = minimum 0.5 metre head.

SMTR SERIES

If the "H" calculated is positive, the pump can operate at a suction lift of maximum "H" metres head.
If the "H" calculated is negative, an inlet pressure of minimum "H" metres head is required.



SMTR SERIES

PERFORMANCE CURVES AND TECHNICAL DATA



INTRODUCTION TO PERFORMANCE CURVES

How To Read The Curve Charts

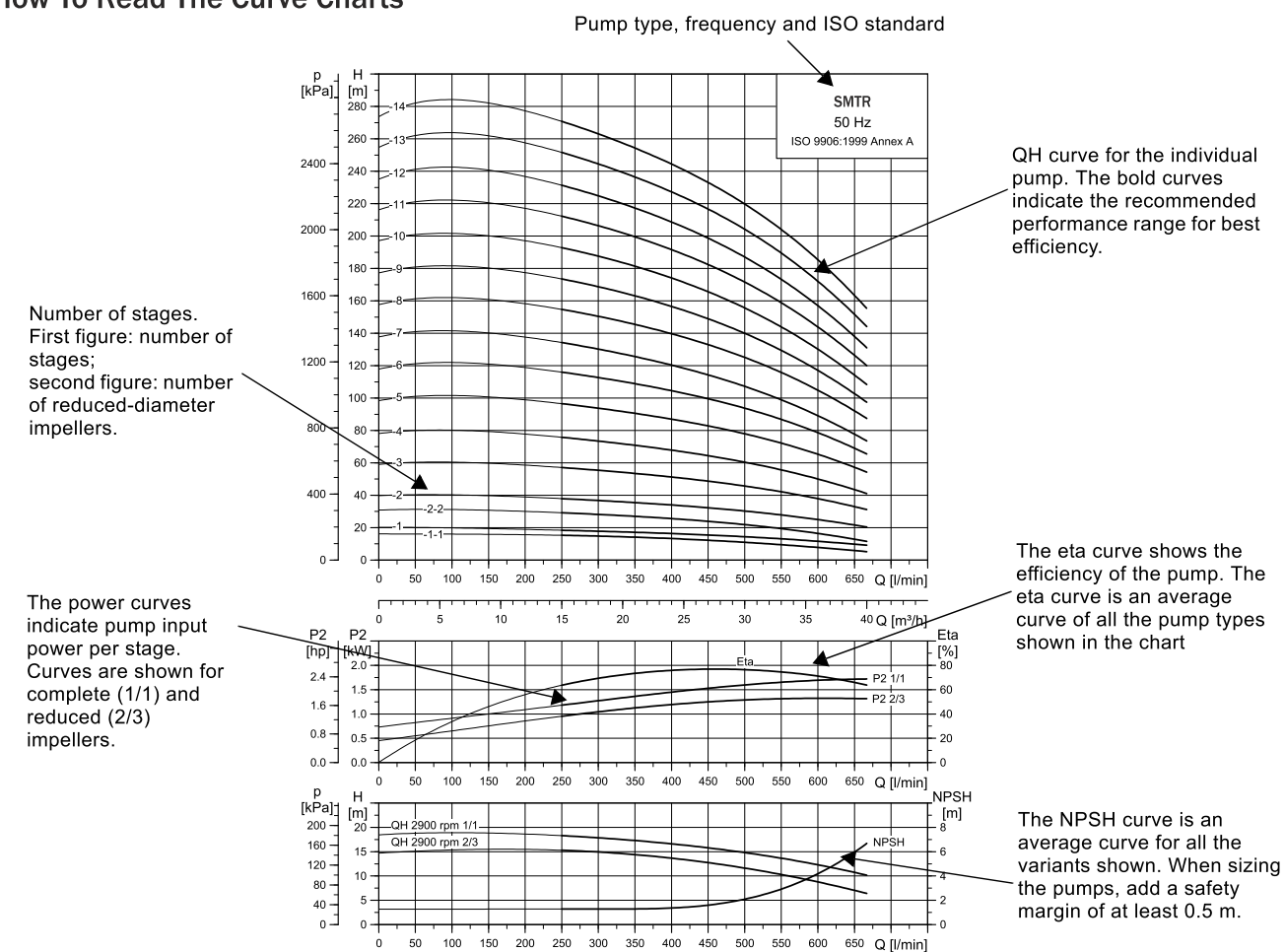
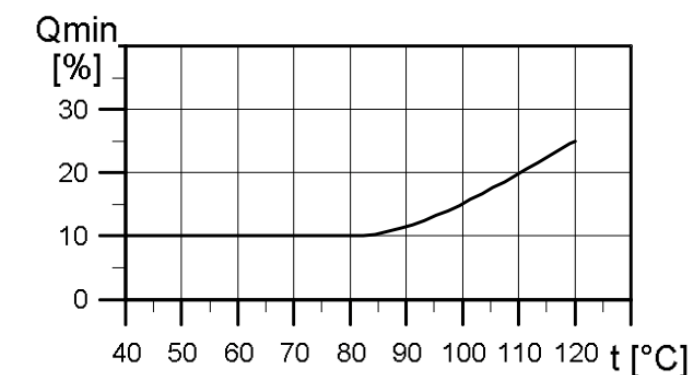


Fig. 12 Example of an SMTR curve chart

GUIDELINES TO PERFORMANCE CURVES

The guidelines below apply to the curves shown on the following pages:

1. Tolerances to ISO 9906, Annex A, if indicated.
2. The motors used for the measurements are standard Shakti motors (SMG or SMGE).
3. Measurements have been made with airless water at a temperature of 20 °C.
4. The curves apply to a kinematic viscosity of = 1 mm²/s (1 cSt).
5. Due to the risk of overheating, the pumps should not be used at a flow below the minimum flow rate.
6. QH curves of the individual pumps are based on current motor speeds.

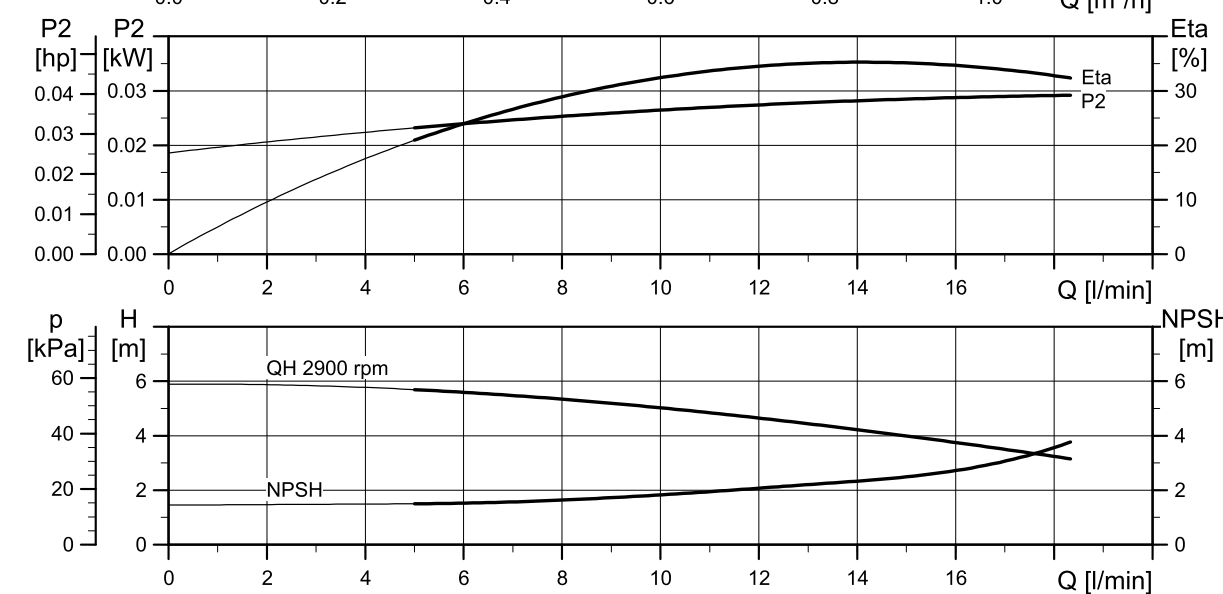
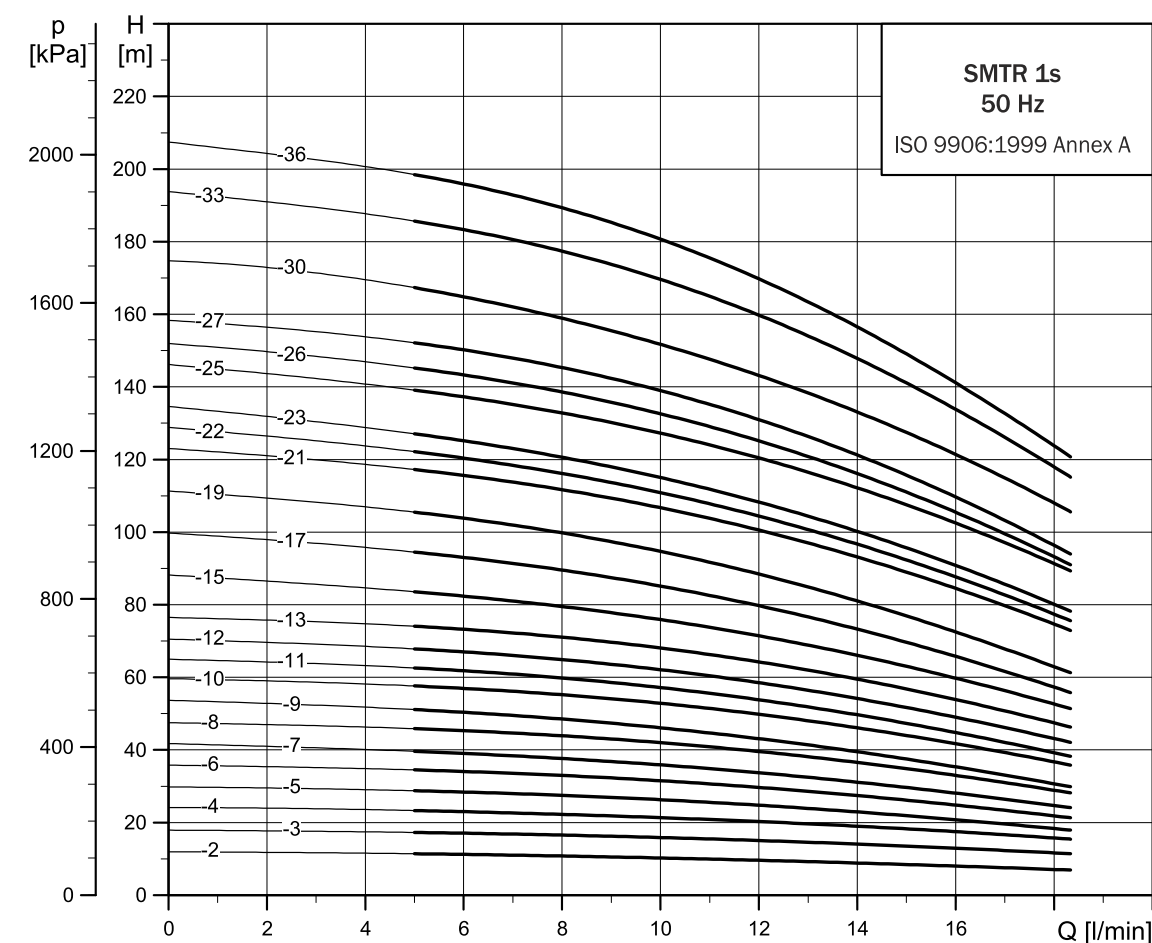


MINIMUM FLOW RATE

The curve below shows the minimum flow rate as a percentage of the nominal flow rate in relation to the liquid temperature

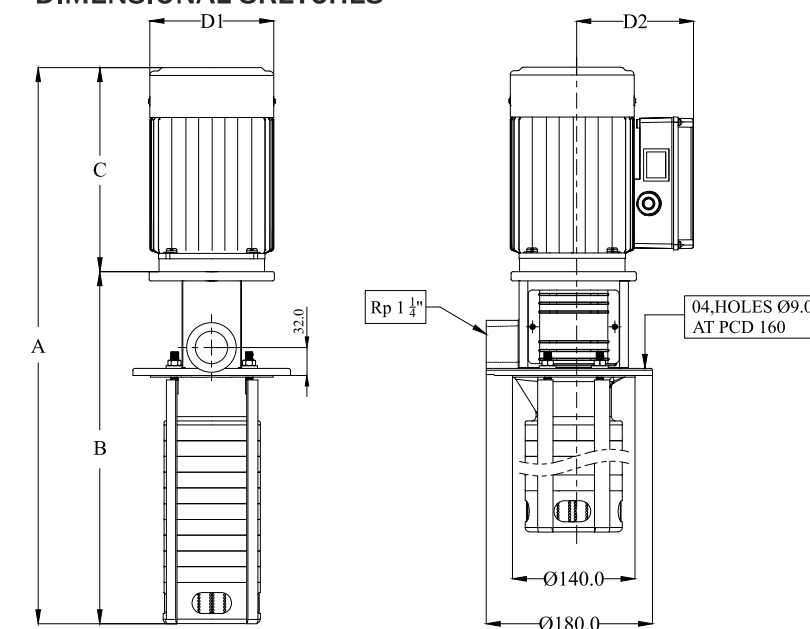
SMTR SERIES

SMTR, 50 Hz SMTR 1s, 50 Hz



SMTR SERIES

DIMENSIONAL SKETCHES



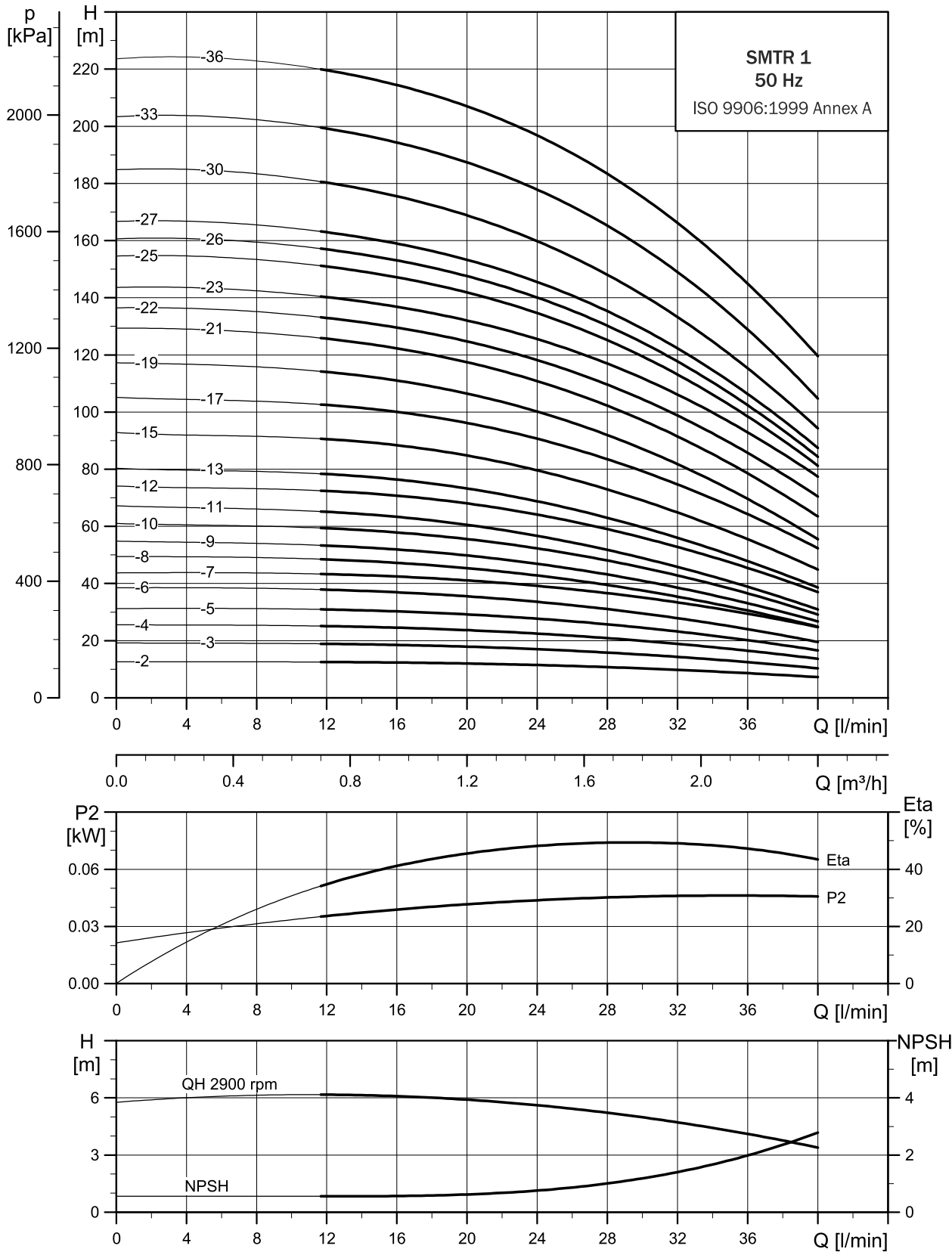
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS					WEIGHT
	[kW]	A	B	C	D1	D2	
SMTR 1s-2/2	0.37	451	140	312	142	130	14
SMTR 1s-3/3	0.37	469	158	312	142	130	14
SMTR 1s-4/4	0.37	487	176	312	142	130	14
SMTR 1s-5/5	0.37	505	194	312	142	130	15
SMTR 1s-6/6	0.37	523	212	312	142	130	15
SMTR 1s-7/7	0.37	541	230	312	142	130	16
SMTR 1s-8/8	0.37	559	248	312	142	130	16
SMTR 1s-9/9	0.37	577	266	312	142	130	17
SMTR 1s-10/10	0.37	596	284	312	142	130	17
SMTR 1s-11/11	0.37	614	302	312	142	130	17
SMTR 1s-12/12	0.37	632	320	312	142	130	18
SMTR 1s-13/13	0.37	650	338	312	142	130	18
SMTR 1s-15/15	0.55	686	374	312	142	130	19
SMTR 1s-17/17	0.55	722	410	312	142	130	20
SMTR 1s-19/19	0.55	758	446	312	142	130	21
SMTR 1s-21/21	0.75	833	483	351	142	130	24
SMTR 1s-22/22	0.75	851	501	351	142	130	25
SMTR 1s-23/23	0.75	869	519	351	142	130	25
SMTR 1s-25/25	0.75	905	555	351	142	130	26
SMTR 1s-26/26	0.75	923	573	351	142	130	26
SMTR 1s-27/27	1.10	941	591	351	142	130	27
SMTR 1s-30/30	1.10	996	645	351	142	130	28
SMTR 1s-33/33	1.10	1050	699	351	142	130	29
SMTR 1s-36/36	1.10	1104	753	351	142	130	30

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

SMTR SERIES

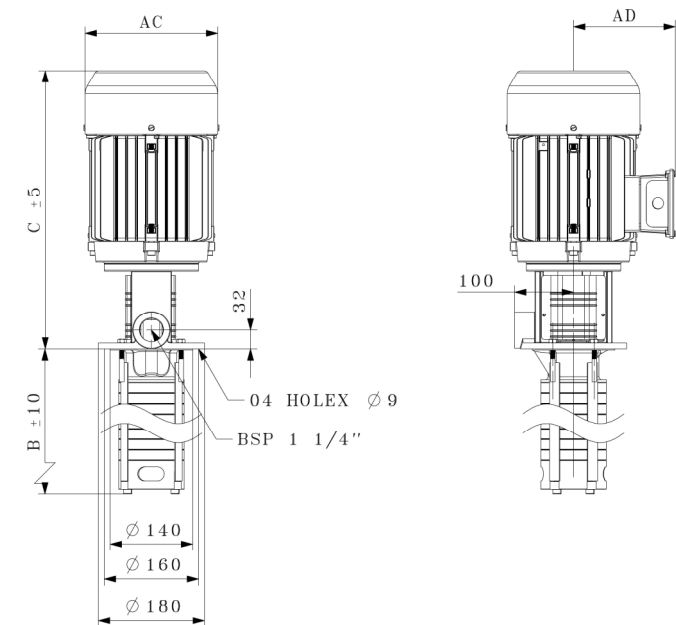
SMTR 1, 50 Hz



SMTR SERIES



DIMENSIONAL SKETCHES



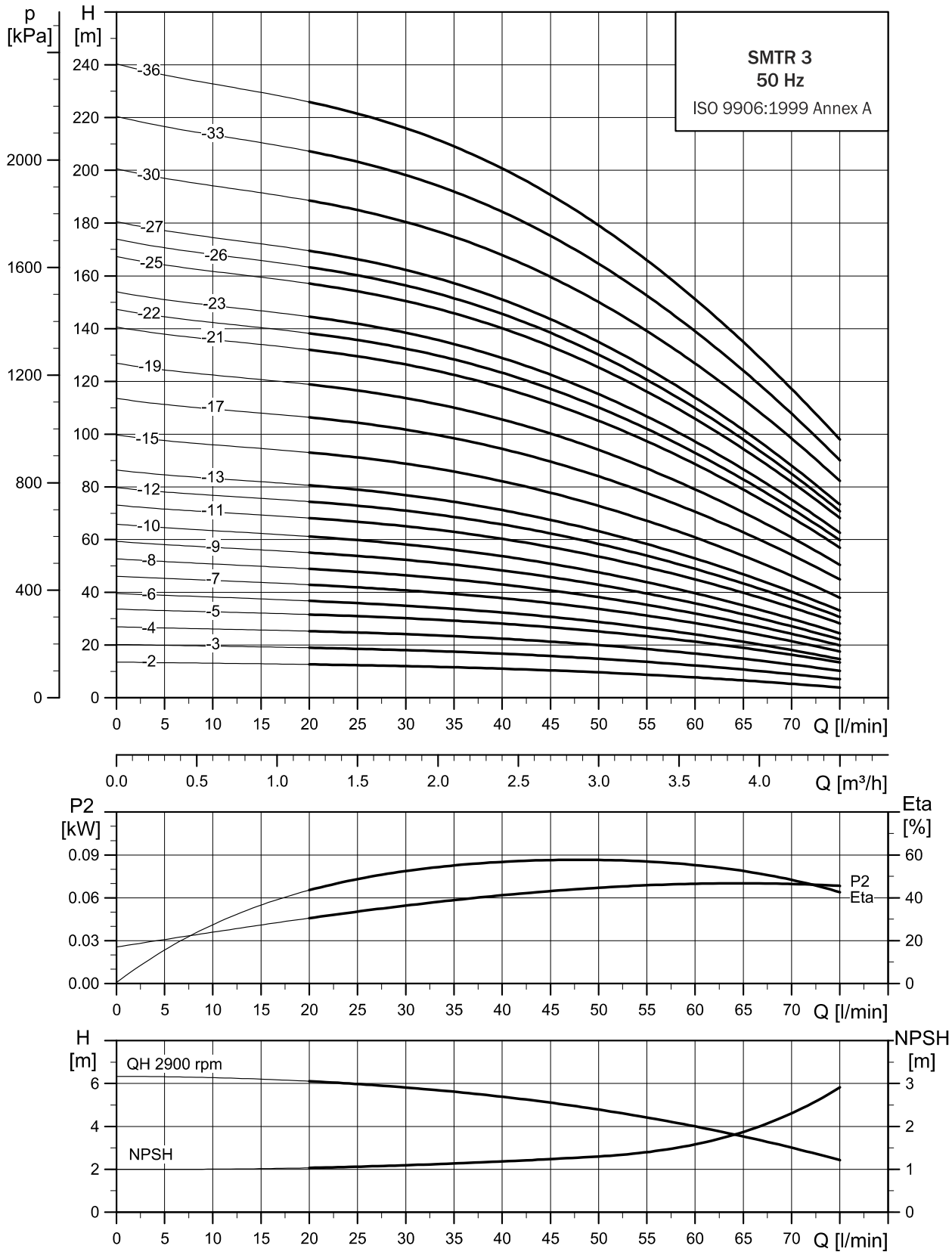
DIMENSIONS AND WEIGHTS

PUMP TYPE	DIMENSIONS (MM)					WEIGHT
	P2(KW)	B	C	AC	AD	
SMTR 1-2/2	0.37	168	315	142	128	12.2
SMTR 1-3/3	0.37	186	315	142	128	12.5
SMTR 1-4/4	0.37	204	315	142	128	12.8
SMTR 1-5/5	0.37	222	315	142	128	13.1
SMTR 1-6/6	0.37	240	315	142	128	13.4
SMTR 1-7/7	0.37	258	315	142	128	13.7
SMTR 1-8/8	0.55	276	315	142	128	14.0
SMTR 1-9/9	0.55	294	315	142	128	14.8
SMTR 1-10/10	0.55	312	315	142	128	15.1
SMTR 1-11/11	0.55	330	315	142	128	15.4
SMTR 1-12/12	0.75	348	354	142	128	16.5
SMTR 1-13/13	0.75	366	354	142	128	16.8
SMTR 1-15/15	0.75	402	354	142	128	17.1
SMTR 1-17/17	1.1	438	354	142	128	19.4
SMTR 1-19/19	1.1	474	354	142	128	20.0
SMTR 1-21/21	1.1	510	354	142	128	20.6
SMTR 1-22/22	1.1	528	354	142	128	20.9
SMTR 1-23/23	1.1	546	354	142	128	21.2
SMTR 1-25/25	1.5	582	426	178	145	28.3
SMTR 1-26/26	1.5	600	426	178	145	28.6
SMTR 1-27/27	1.5	618	426	178	145	28.9
SMTR 1-30/30	1.5	672	426	178	145	29.8
SMTR 1-33/33	2.2	726	466	178	158	34.9
SMTR 1-36/36	2.2	780	466	178	158	35.8

1. The maximum immersion depth 1006 mm
2. Subject to technical change without notice

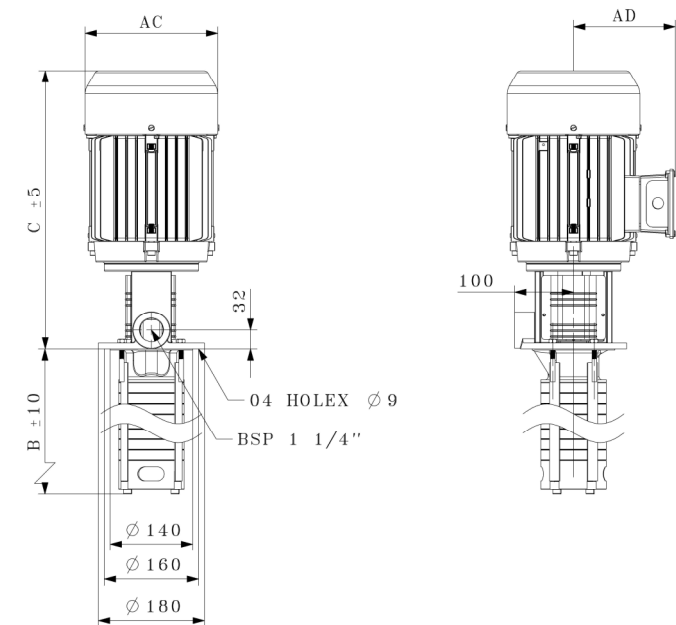
SMTR SERIES

SMTR 3, 50 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



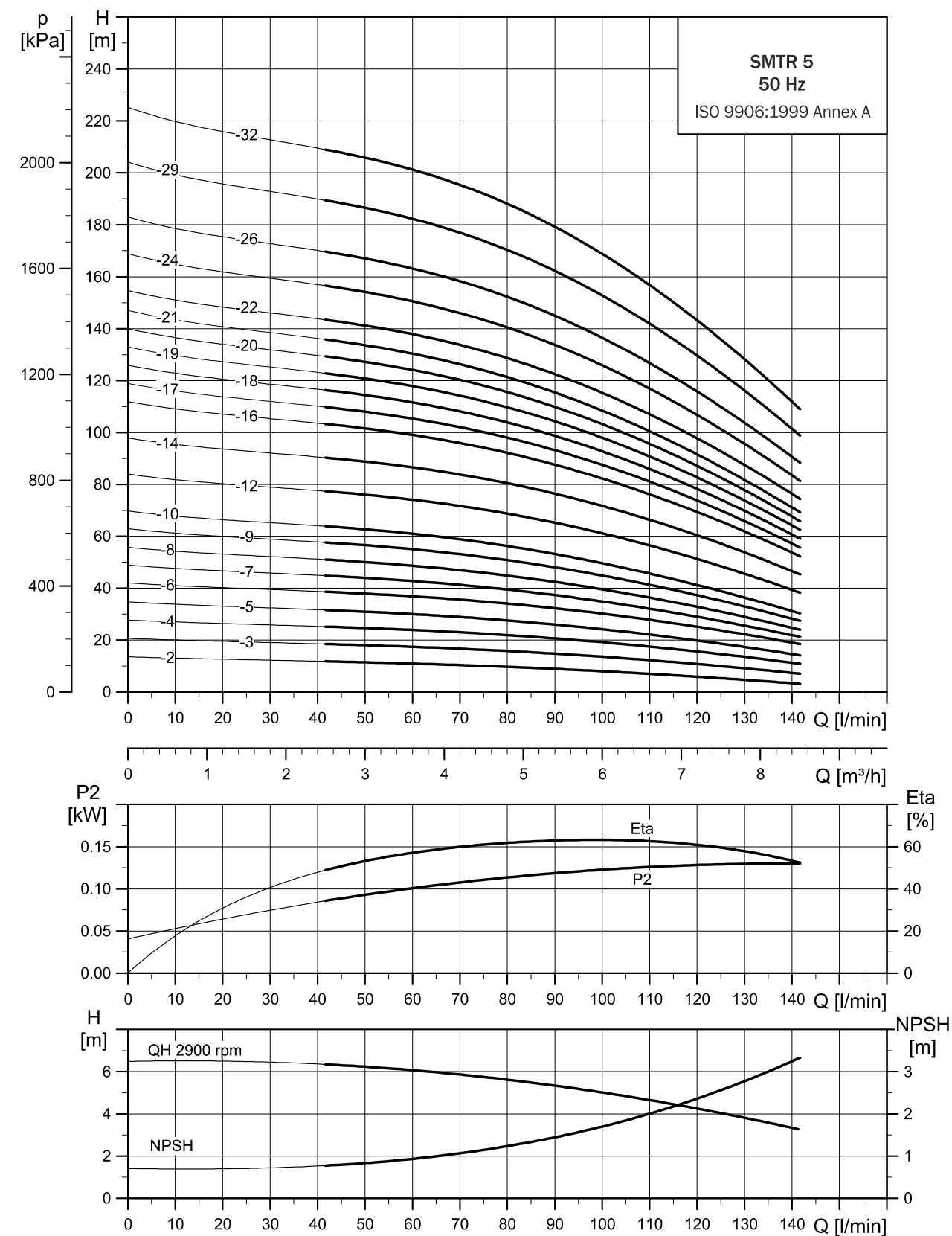
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2(KW)	DIMENSIONS (MM)				WEIGHT (KG)
		B	C	AC	AD	
SMTR 3-2/2	0.37	168	315	142	128	12.2
SMTR 3-3/3	0.37	186	315	142	128	12.5
SMTR 3-4/4	0.37	204	315	142	128	12.8
SMTR 3-5/5	0.37	222	315	142	128	13.1
SMTR 3-6/6	0.55	240	315	142	128	13.9
SMTR 3-7/7	0.55	258	315	142	128	14.2
SMTR 3-8/8	0.75	276	354	142	128	15.2
SMTR 3-9/9	0.75	294	354	142	128	15.6
SMTR 3-10/10	0.75	312	354	142	128	15.9
SMTR 3-11/11	0.75	330	354	142	128	16.2
SMTR 3-12/12	1.1	348	354	142	128	17.9
SMTR 3-13/13	1.1	366	354	142	128	18.2
SMTR 3-15/15	1.1	402	354	142	128	18.5
SMTR 3-17/17	1.5	438	426	178	145	25.9
SMTR 3-19/19	1.5	474	426	178	145	26.5
SMTR 3-21/21	2.2	510	466	178	158	31.3
SMTR 3-22/22	2.2	528	466	178	158	31.6
SMTR 3-23/23	2.2	546	466	178	158	31.9
SMTR 3-25/25	2.2	582	466	178	158	32.5
SMTR 3-26/26	2.2	600	466	178	158	32.8
SMTR 3-27/27	2.2	618	466	178	158	33.1
SMTR 3-30/30	3.0	672	478	225	170	38.2
SMTR 3-33/33	3.0	726	478	225	170	39.1
SMTR 3-36/36	3.0	780	478	225	170	40.0

1. The maximum immersion depth 1006 mm
2. Subject to technical change without notice

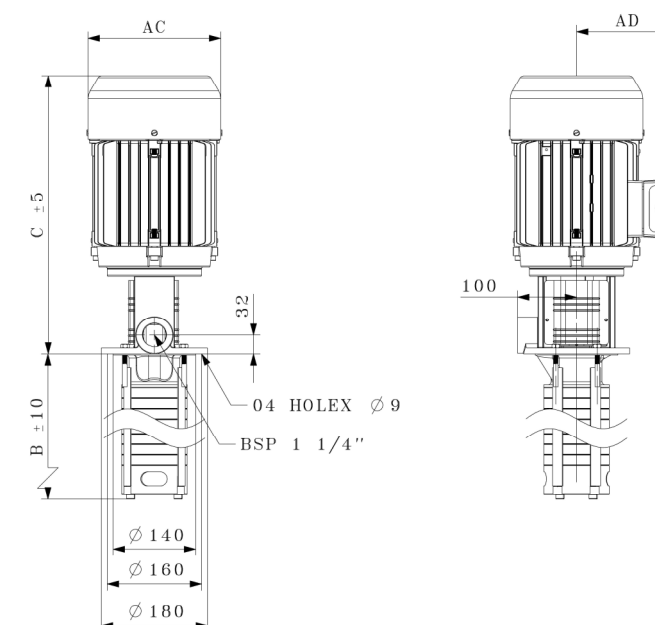
SMTR SERIES

SMTR 5, 50 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



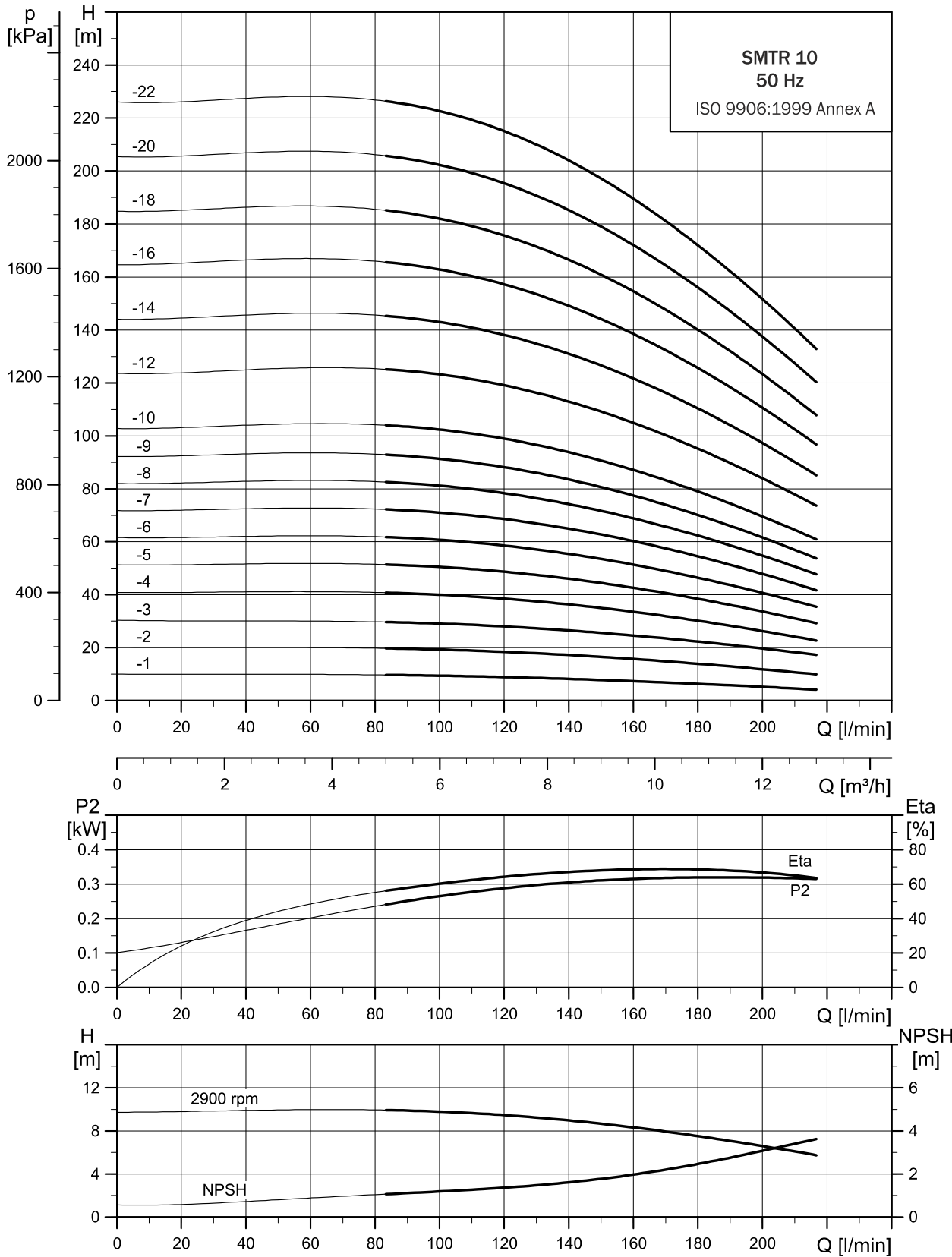
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2(KW)	DIMENSIONS (MM)				WEIGHT (KG)
		B	C	AC	AD	
SMTR 5-2/2	0.37	166	315	142	128	12.2
SMTR 5-3/3	0.55	193	315	142	128	13
SMTR 5-4/4	0.55	220	315	142	128	13.4
SMTR 5-5/5	0.75	249	354	142	128	14.7
SMTR 5-6/6	1.1	276	354	142	128	16.5
SMTR 5-7/7	1.1	303	354	142	128	16.9
SMTR 5-8/8	1.1	330	354	142	128	17.3
SMTR 5-9/9	1.5	357	354	142	128	26.6
SMTR 5-10/10	1.5	384	426	178	145	27
SMTR 5-12/12	2.2	438	466	178	158	32
SMTR 5-14/14	2.2	492	466	178	158	32.8
SMTR 5-16/16	2.2	546	466	178	158	33.6
SMTR 5-17/17	3	573	478	225	170	35.7
SMTR 5-18/18	3	600	478	225	170	36.1
SMTR 5-19/19	3	627	478	225	170	36.5
SMTR 5-20/20	3	654	478	225	170	36.9
SMTR 5-21/21	3	681	478	225	170	37.3
SMTR 5-22/22	4	708	478	225	170	39.5
SMTR 5-24/24	4	762	478	225	170	39.9
SMTR 5-26/26	4	816	478	225	170	40.3
SMTR 5-29/29	4	897	478	225	170	40.7
SMTR 5-32/32	5.5	978	579	225	135	49.3

1. The maximum immersion depth 1006 mm
2. Subject to technical change without notice

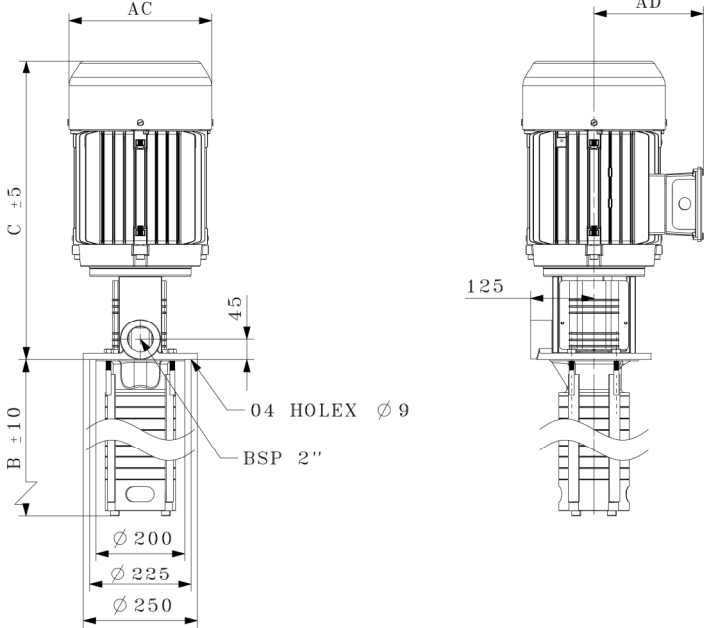
SMTR SERIES

SMTR 10, 50 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



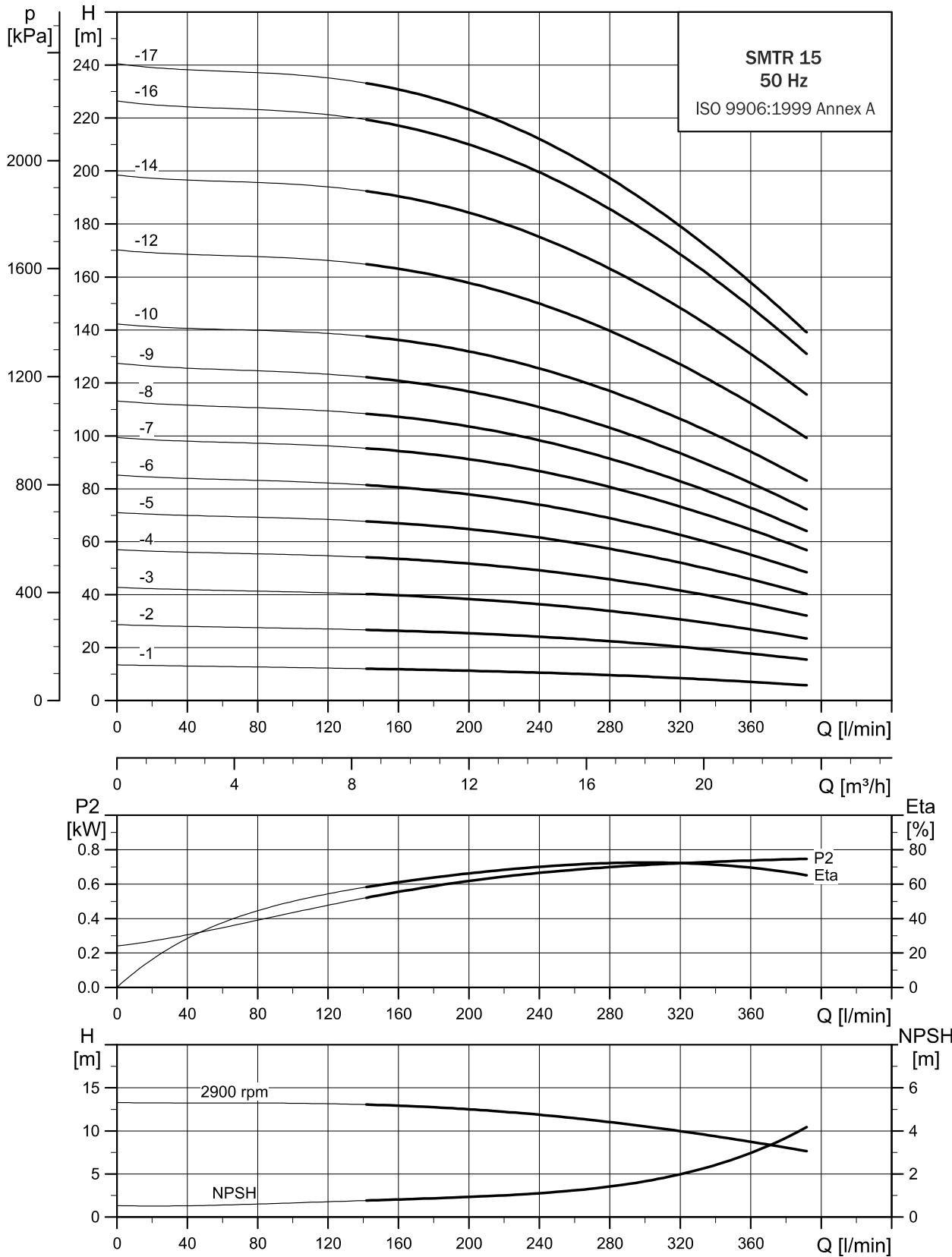
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2(KW)	DIMENSIONS (MM)				WEIGHT (KG)
		B	C	AC	AD	
SMTR 10-2/1	0.75	191	362	142	127	22
SMTR 10-2/2	0.75	191	362	142	127	22
SMTR 10-4/4	1.1	224	362	142	127	23
SMTR 10-5/5	1.5	256	408	178	145	37
SMTR 10-6/6	2.2	289	448	178	158	50
SMTR 10-7/7	2.2	321	448	178	158	51
SMTR 10-8/8	3.0	354	460	224	173	54
SMTR 10-9/9	3.0	386	460	224	173	55
SMTR 10-10/10	3.0	419	460	224	173	56
SMTR 10-12/12	4.0	451	460	224	173	57
SMTR 10-14/14	4.0	516	460	224	173	58
SMTR 10-16/16	5.5	581	489	225	135	77
SMTR 10-18/18	5.5	646	489	225	135	79
SMTR 10-20/20	7.5	711	489	225	135	81
SMTR 10-22/22	7.5	776	489	225	135	82
SMTR 10-22/22	7.5	841	489	225	135	84

1. The maximum immersion depth 1018 mm
2. Dimensions A,B & C may varies upto ± 20mm
3. Subject to technical change without notice

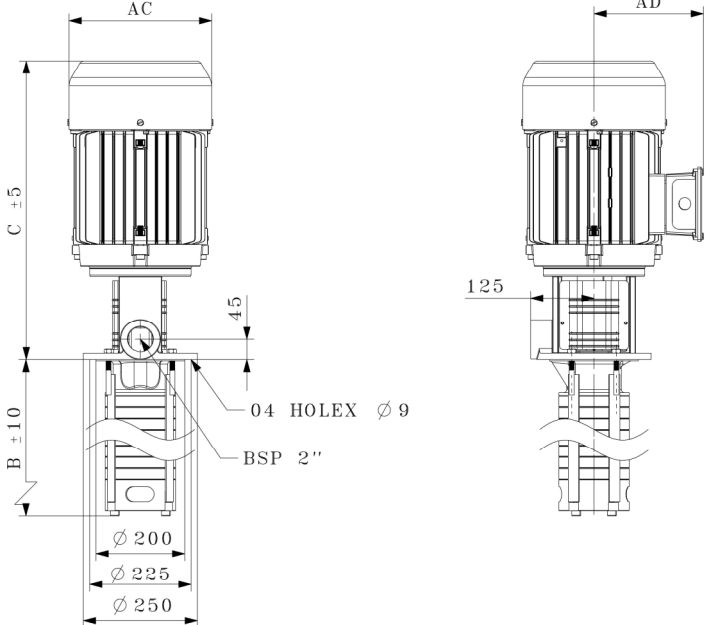
SMTR SERIES

SMTR 15, 50 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



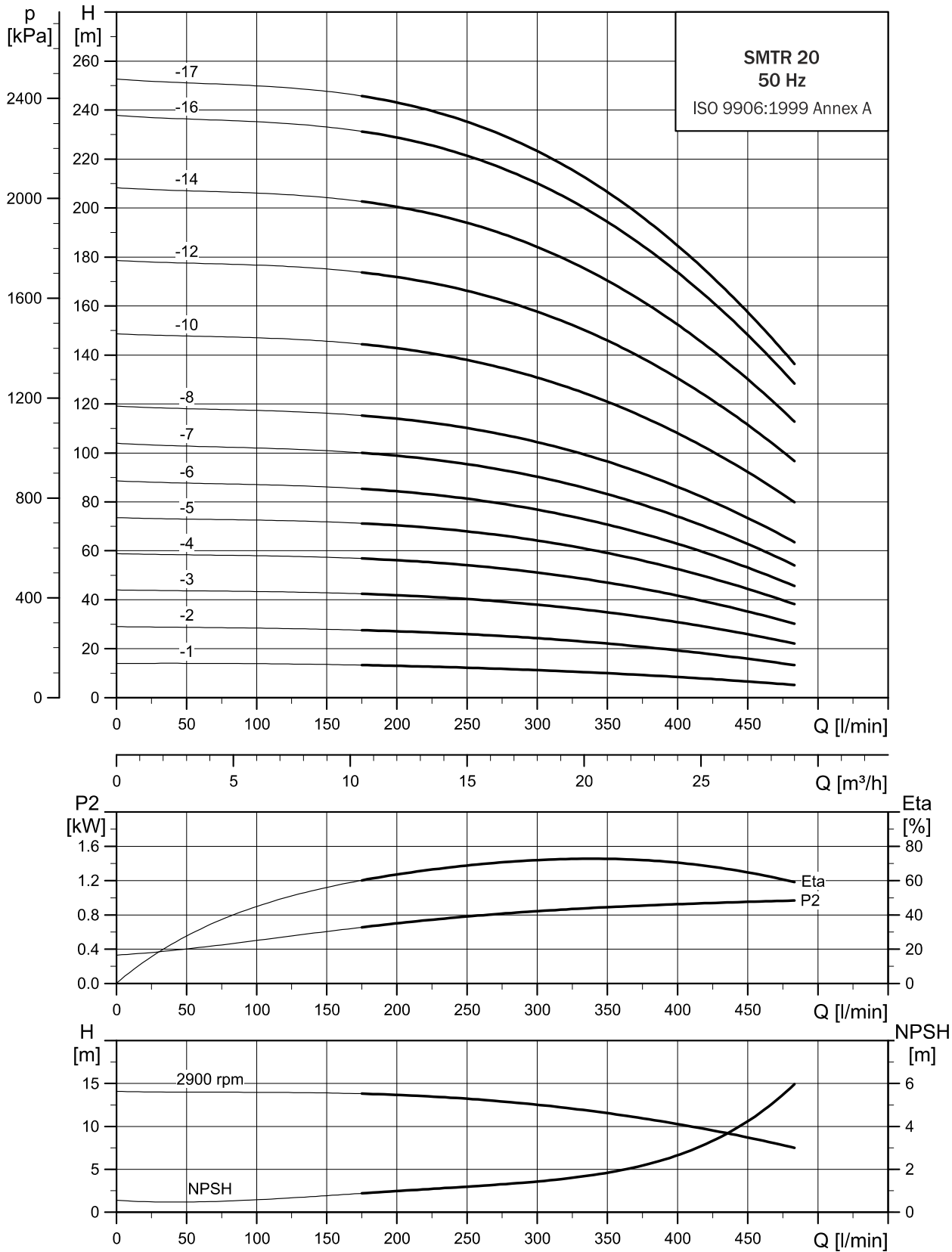
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2(KW)	DIMENSIONS (MM)				WEIGHT (KG)
		B	C	AC	AD	
SMTR 15-2/1	1.1	221	362	142	127	22
SMTR 15-2/2	2.2	221	447	178	168	47
SMTR 15-3/3	3.0	268	460	224	173	50
SMTR 15-4/4	4.0	315	460	224	173	51
SMTR 15-5/5	4.0	362	460	224	173	52
SMTR 15-6/6	5.5	409	567	225	135	70
SMTR 15-7/7	5.5	456	567	225	135	71
SMTR 15-8/8	7.5	503	567	225	135	72
SMTR 15-9/9	7.5	550	567	225	135	73
SMTR 15-10/10	11.0	597	742	323	233	144
SMTR 15-12/12	11.0	691	742	323	233	146
SMTR 15-14/14	11.0	785	742	323	233	147
SMTR 10-16/16	15.0	879	742	323	233	155
SMTR 10-17/17	15.0	926	742	323	233	156

1. The maximum immersion depth 1033 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

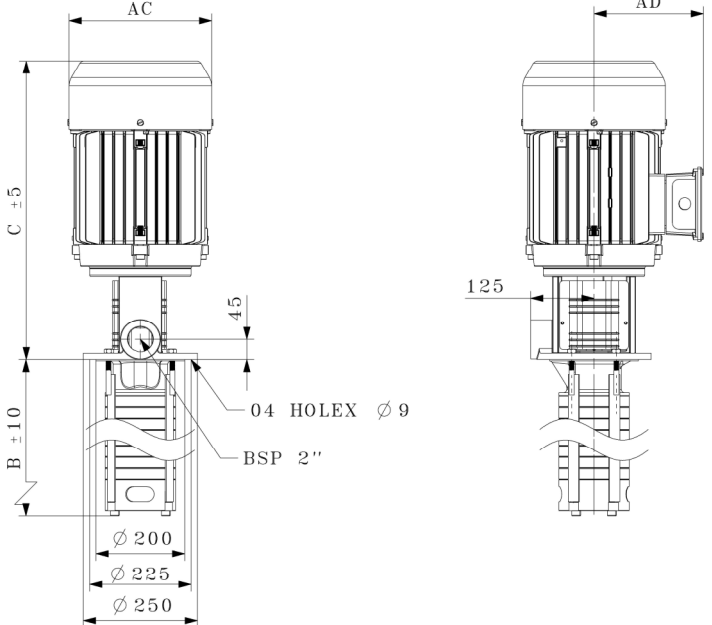
SMTR SERIES

SMTR 20, 50 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



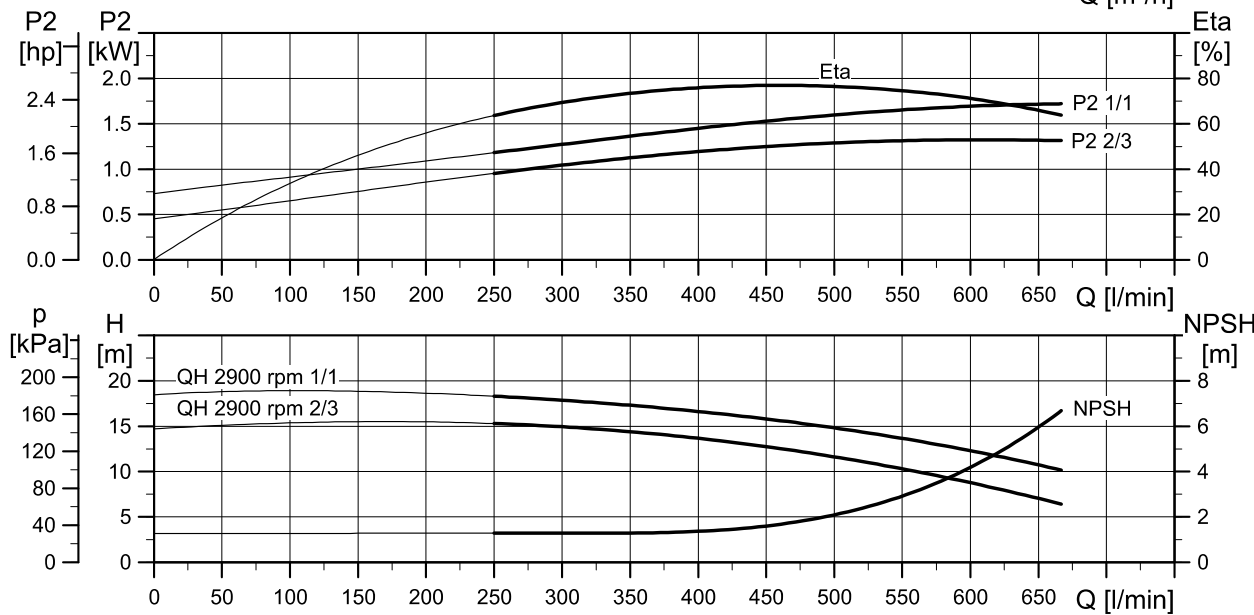
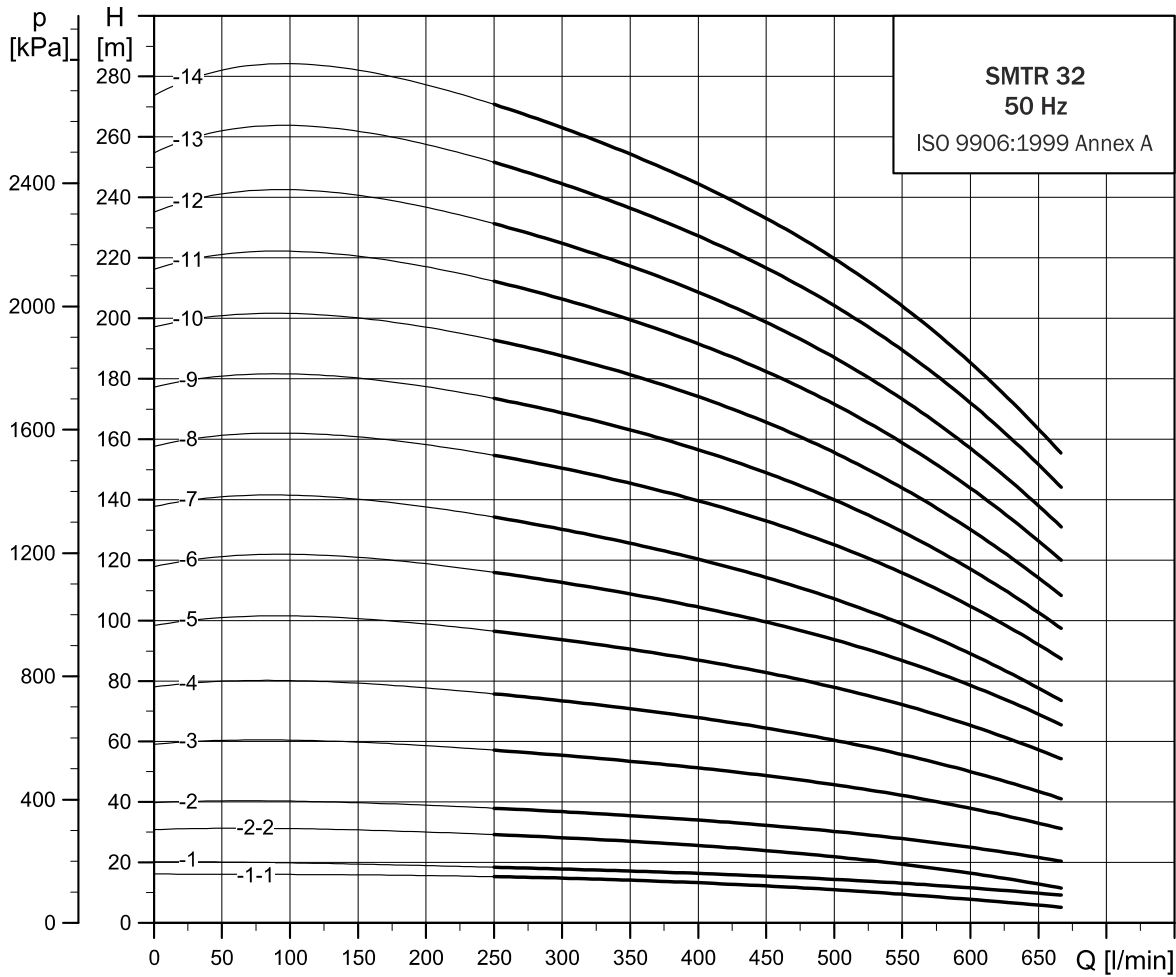
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2(KW)	DIMENSIONS (MM)				WEIGHT (KG)
		B	C	AC	AD	
SMTR 20-2/1	1.1	221	362	142	127	22
SMTR 20-2/2	2.2	221	447	178	168	47
SMTR 20-3/3	4.0	268	460	224	173	50
SMTR 20-4/4	5.5	315	567	225	135	68
SMTR 20-5/5	5.5	362	567	225	135	69
SMTR 20-6/6	7.5	409	567	225	135	70
SMTR 20-7/7	7.5	456	567	225	135	71
SMTR 20-8/8	11.0	503	742	323	233	142
SMTR 20-10/10	11.0	550	742	323	233	144
SMTR 20-12/12	15.0	597	742	323	233	152
SMTR 20-14/14	15.0	691	742	323	233	153
SMTR 20-16/16	18.5	785	742	323	233	167
SMTR 20-17/17	18.5	879	742	323	233	168

1. The maximum immersion depth 1033 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

SMTR SERIES

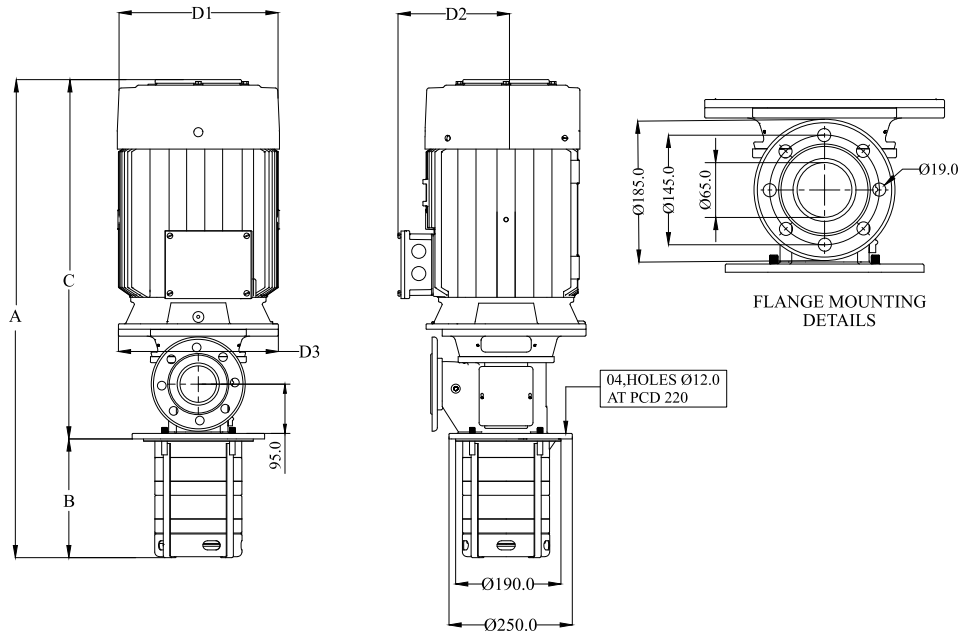
SMTR 32, 50 HZ



SMTR SERIES



DIMENSIONAL SKETCHES



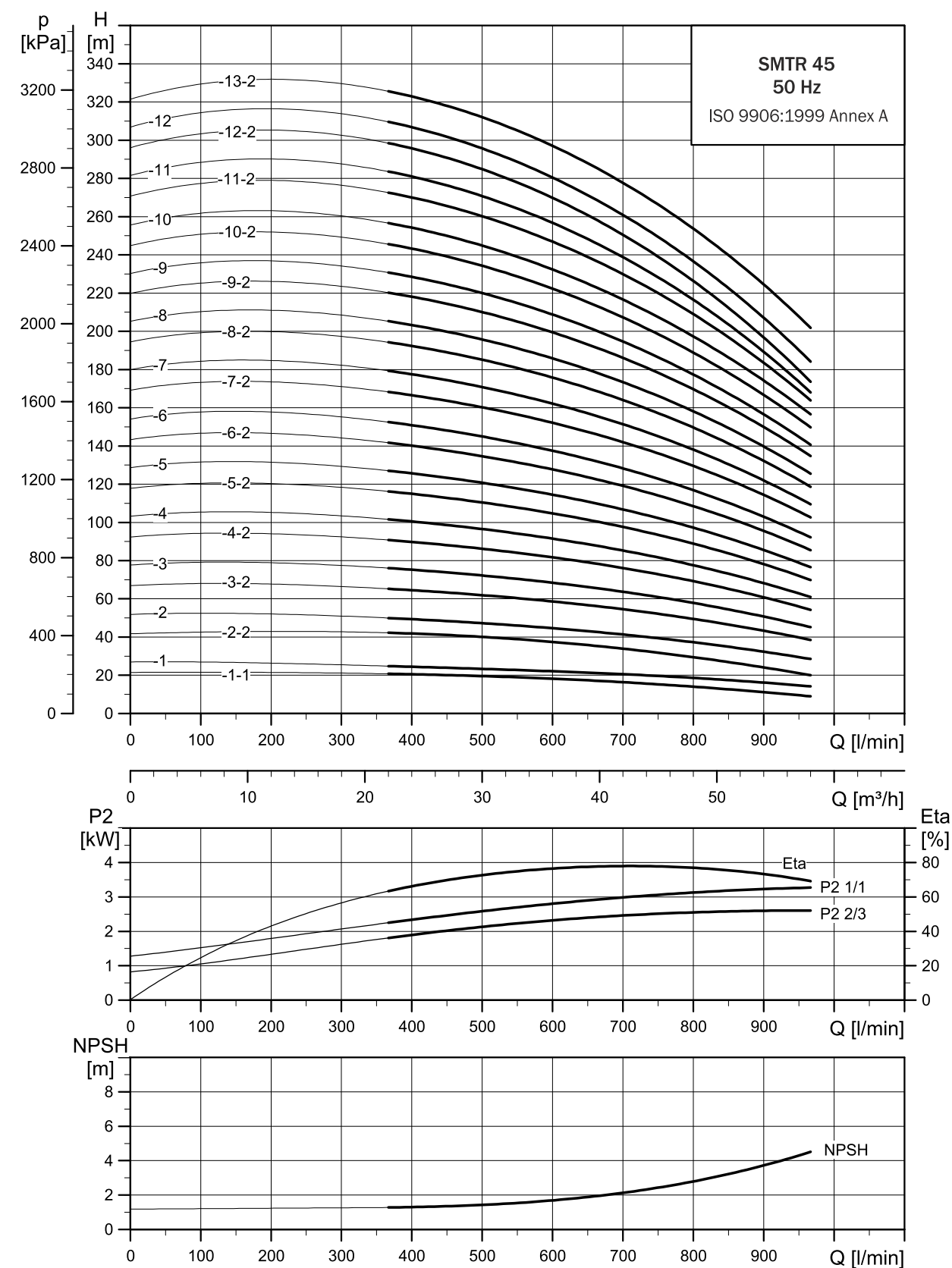
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS					WEIGHT
	[kW]	A	B	C	D1	D2	
SMTR 32-2/1-1	1.50	645	227	418	178	157	-
SMTR 32-2/1	2.20	686	227	459	178	157	-
SMTR 32-2/2-2	3.00	695	227	468	225	-	300
SMTR 32-2/2	4.00	695	227	468	225	-	300
SMTR 32-3/3	5.50	923	297	626	225	-	300
SMTR 32-4/4	7.50	993	367	626	225	-	300
SMTR 32-5/5	11.0	1176	437	739	340	237	350
SMTR 32-6/6	11.0	1246	507	739	340	237	350
SMTR 32-7/7	15.0	1316	577	739	340	237	350
SMTR 32-8/8	15.0	1386	647	739	340	237	350
SMTR 32-9/9	18.5	1456	717	739	340	237	350
SMTR 32-10/10	18.5	1527	788	739	340	237	350
SMTR 32-11/11	22.0	1628	858	770	354	237	350
SMTR 32-12/12	22.0	1698	928	770	354	237	350
SMTR 32-13/13	30.0	1838	998	840	354	237	400
SMTR 32-14/14	30.0	1908	1068	840	354	237	400

1. The maximum immersion depth 1343 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

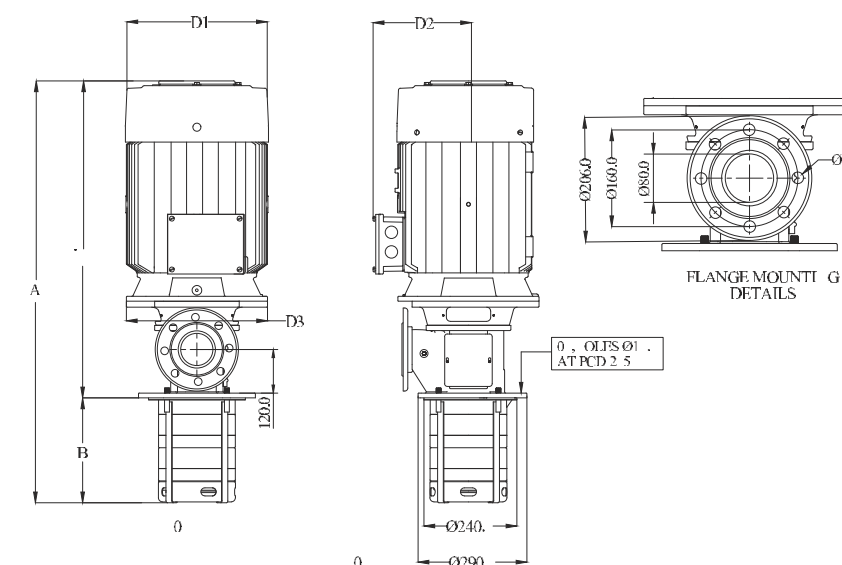
SMTR SERIES

SMTR 45, 50 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



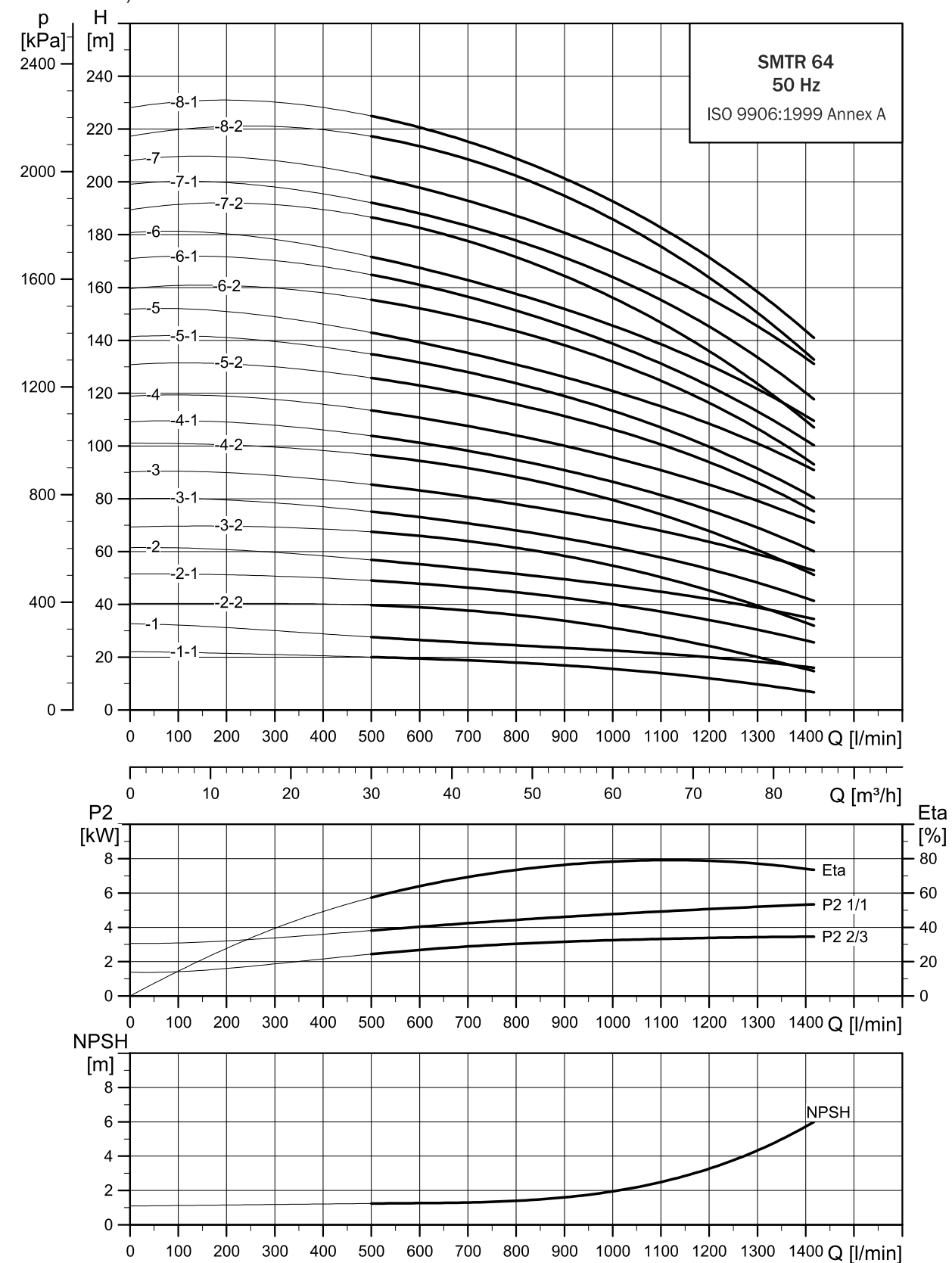
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS						WEIGHT
	[kW]	A	B	C	D1	D2	D3	
SMTR 45-2/1-1	3.00	715	247	468	225	-	300	80
SMTR 45-2/1	4.00	715	247	468	225	-	300	102
SMTR 45-2/2-2	5.50	873	247	626	225	-	300	118
SMTR 45-2/2	7.50	873	247	626	225	-	300	128
SMTR 45-3/3-2	11.0	1066	327	739	340	237	350	171
SMTR 45-3/3	11.0	1066	327	739	340	237	350	171
SMTR 45-4/4-2	15.0	1146	407	739	340	237	350	183
SMTR 45-4/4	15.0	1146	407	739	340	237	350	183
SMTR 45-5/5-2	18.5	1226	487	739	340	237	350	196
SMTR 45-5/5	18.5	1226	487	739	340	237	350	196
SMTR 45-6/6-2	22.0	1337	567	770	354	237	350	211
SMTR 45-6/6	22.0	1337	567	770	354	237	350	211
SMTR 45-7/7-2	30.0	1487	647	840	354	237	400	332
SMTR 45-7/7	30.0	1487	647	840	354	237	400	332
SMTR 45-8/8-2	30.0	1567	727	840	354	237	400	332
SMTR 45-8/8	30.0	1567	727	840	354	237	400	332
SMTR 45-9/9-2	30.0	1647	807	840	354	237	400	332
SMTR 45-9/9	37.0	1647	807	840	354	237	400	355
SMTR 45-10/10-2	37.0	1728	888	840	354	237	400	355
SMTR 45-10/10	37.0	1728	888	840	354	237	400	355
SMTR 45-11/11-2	45.0	1900	968	932	435	297	450	507
SMTR 45-11/11	45.0	1900	968	932	435	297	450	507
SMTR 45-12/12-2	45.0	1980	1048	932	435	297	450	507
SMTR 45-12/12	45.0	1980	1048	932	435	297	450	507
SMTR 45-13/13-2	45.0	2060	1128	932	435	297	450	507

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

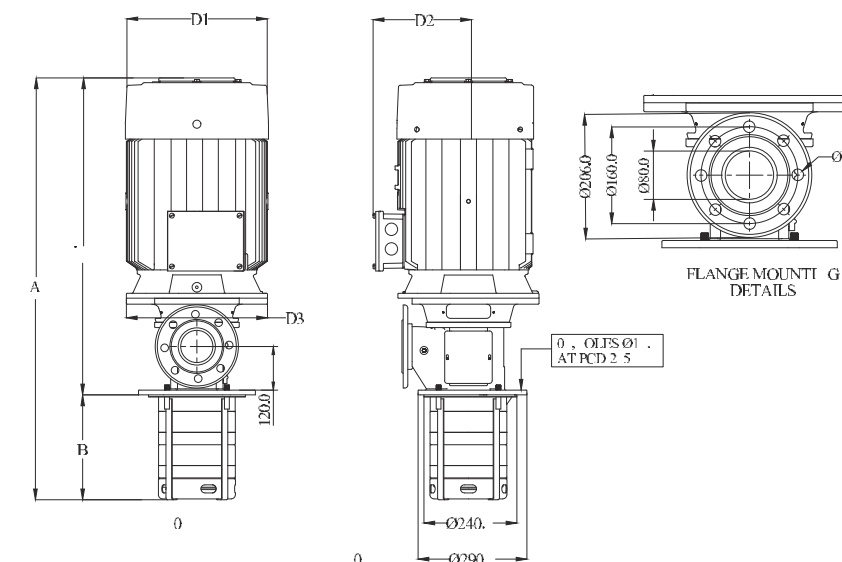
SMTR SERIES

SMTR 64, 50 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



DIMENSIONS AND WEIGHTS

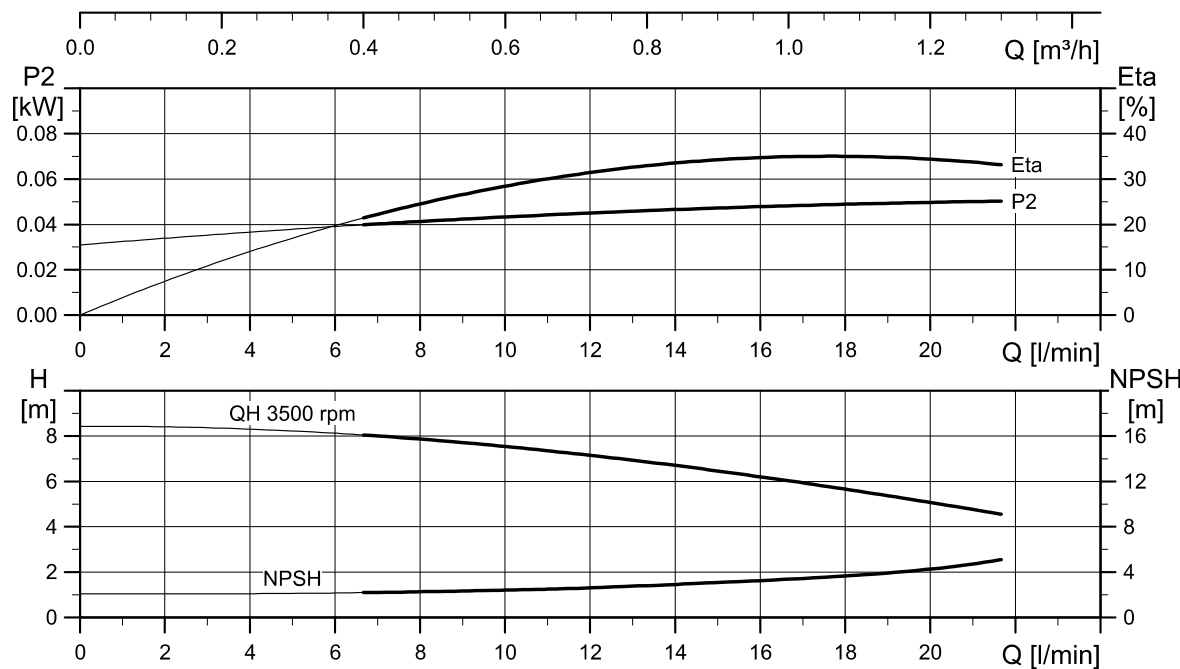
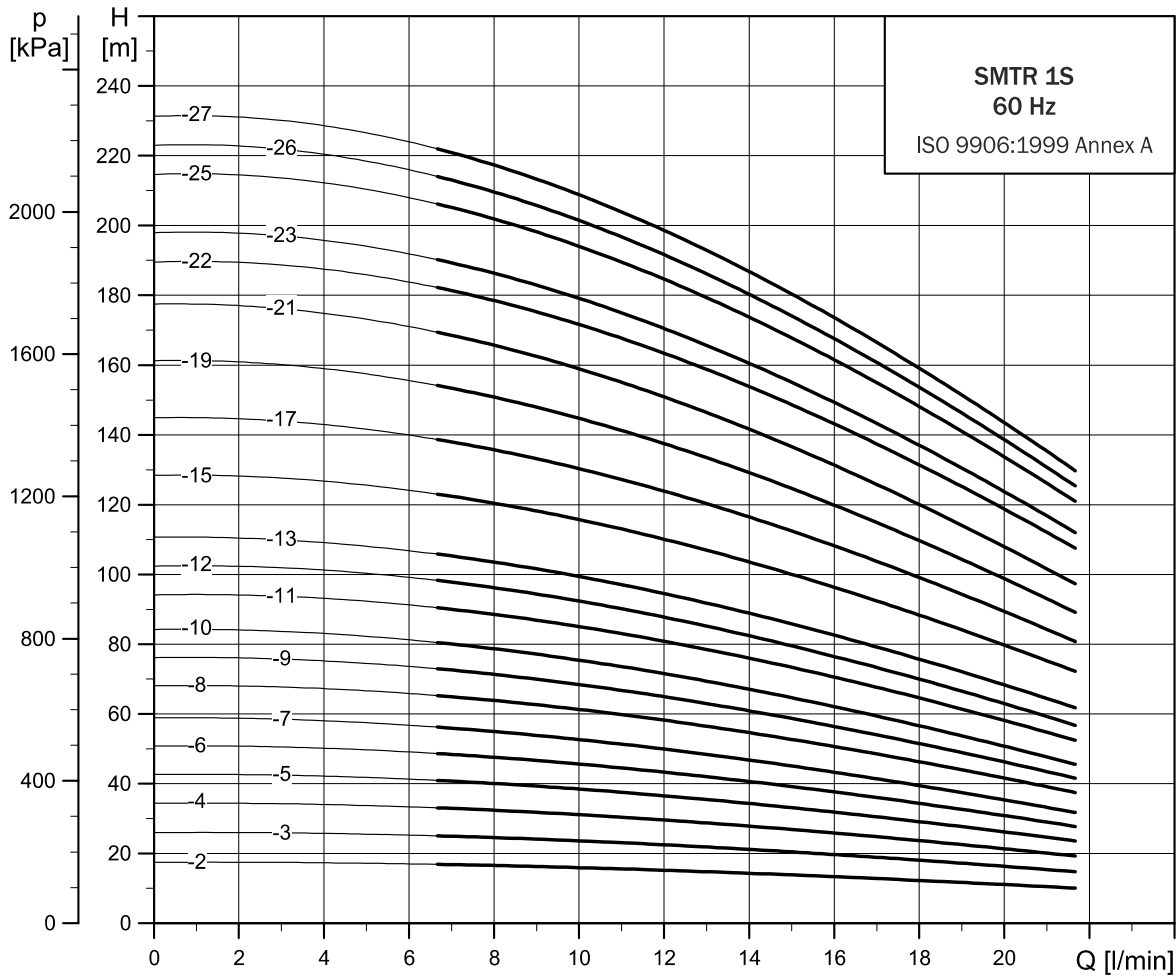
PUMP TYPE	P2	DIMENSIONS						WEIGHT
	[kW]	A	B	C	D1	D2	D3	
SMTR 64-2/1-1	4.00	720	252	468	225	-	300	105
SMTR 64-2/1	5.50	878	252	626	225	-	300	120
SMTR 64-2/2-2	7.50	878	252	626	225	-	300	131
SMTR 64-2/2-1	11.0	991	252	739	340	237	350	173
SMTR 64-2/2	11.0	991	252	739	340	237	350	173
SMTR 64-3/3-2	15.0	1074	335	739	340	237	350	185
SMTR 64-3/3-1	15.0	1074	335	739	340	237	350	185
SMTR 64-3/3	18.5	1074	335	739	340	237	350	198
SMTR 64-4/4-2	18.5	1156	417	739	340	237	350	198
SMTR 64-4/4-1	22.0	1187	417	770	354	237	350	213
SMTR 64-4/4	22.0	1187	417	770	354	237	350	213
SMTR 64-5/5-2	30.0	1340	500	840	354	237	400	334
SMTR 64-5/5-1	30.0	1340	500	840	354	237	400	334
SMTR 64-5/5	30.0	1340	500	840	354	237	400	334
SMTR 64-6/6-2	30.0	1422	582	840	354	237	400	334
SMTR 64-6/6-1	37.0	1422	582	840	354	237	400	356
SMTR 64-6/6	37.0	1422	582	840	354	237	400	356
SMTR 64-7/7-2	37.0	1505	665	840	354	237	400	357
SMTR 64-7/7-1	37.0	1505	665	840	354	237	400	357
SMTR 64-7/7	45.0	1597	665	932	435	297	450	446
SMTR 64-8/8-2	45.0	1679	747	932	435	297	450	446
SMTR 64-8/8-1	45.0	1679	747	932	435	297	450	446

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

SMTR SERIES

SMTR, 60 HZ

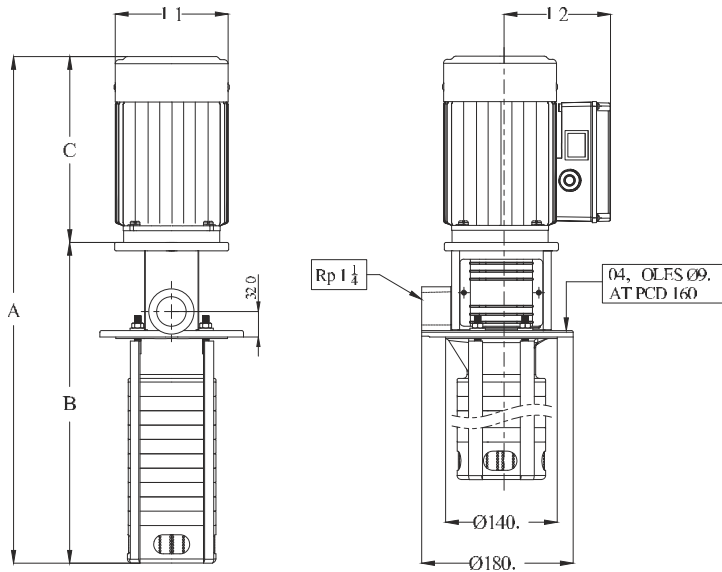
SMTR 1S, 60 HZ



SMTR SERIES



DIMENSIONAL SKETCHES



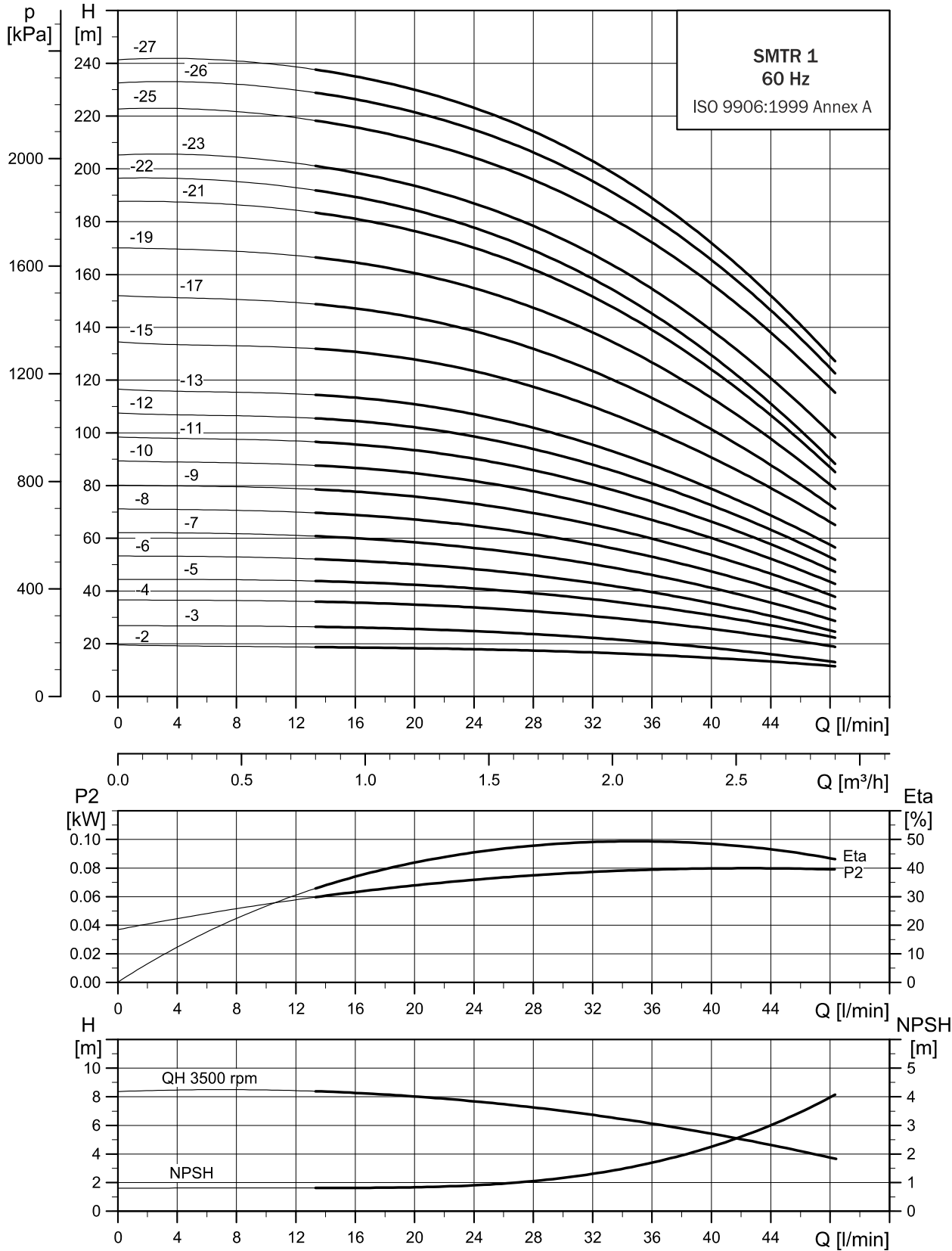
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS					WEIGHT
	[kW]	A	B	C	D1	D2	
SMTR 1s-2/2	0.37	451	140	312	142	130	14
SMTR 1s-3/3	0.37	469	158	312	142	130	14
SMTR 1s-4/4	0.37	487	176	312	142	130	14
SMTR 1s-5/5	0.37	505	194	312	142	130	15
SMTR 1s-6/6	0.37	523	212	312	142	130	15
SMTR 1s-7/7	0.37	541	230	312	142	130	16
SMTR 1s-8/8	0.55	559	248	312	142	130	16
SMTR 1s-9/9	0.55	577	266	312	142	130	17
SMTR 1s-10/10	0.55	596	284	312	142	130	17
SMTR 1s-11/11	0.75	653	302	351	142	130	20
SMTR 1s-12/12	0.75	671	320	351	142	130	20
SMTR 1s-13/13	0.75	689	338	351	142	130	21
SMTR 1s-15/15	1.10	725	374	351	142	130	22
SMTR 1s-17/17	1.10	761	410	351	142	130	22
SMTR 1s-19/19	1.10	797	446	351	142	130	23
SMTR 1s-21/21	1.10	833	483	351	142	130	24
SMTR 1s-22/22	1.50	923	501	423	178	140	33
SMTR 1s-23/23	1.50	941	519	423	178	140	34
SMTR 1s-25/25	1.50	977	555	423	178	140	34
SMTR 1s-26/26	1.50	995	573	423	178	140	35
SMTR 1s-27/27	1.50	1013	591	423	178	140	35

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

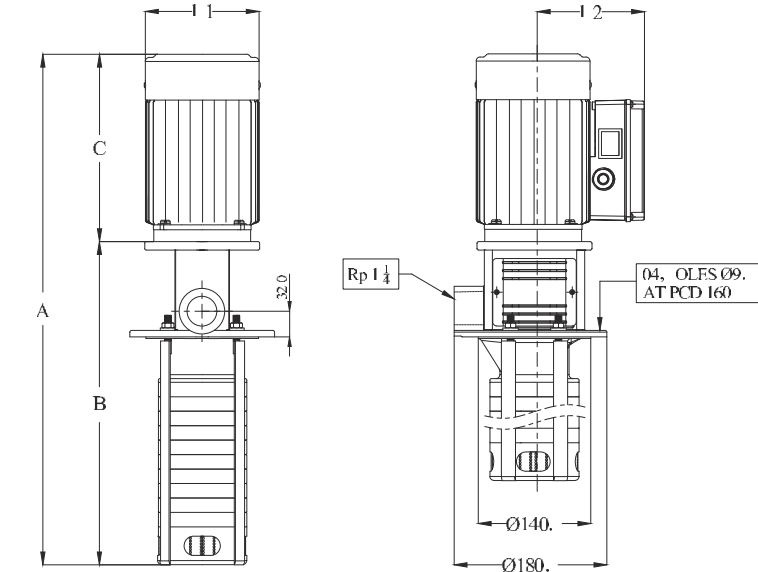
SMTR SERIES

SMTR 1, 60 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



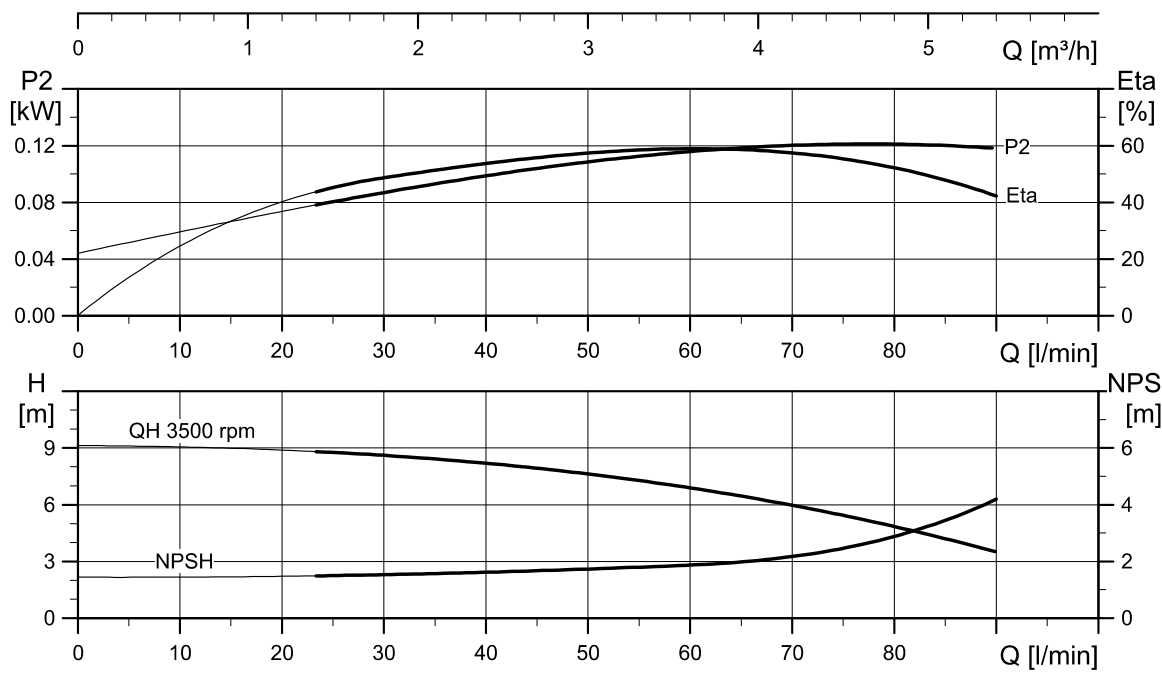
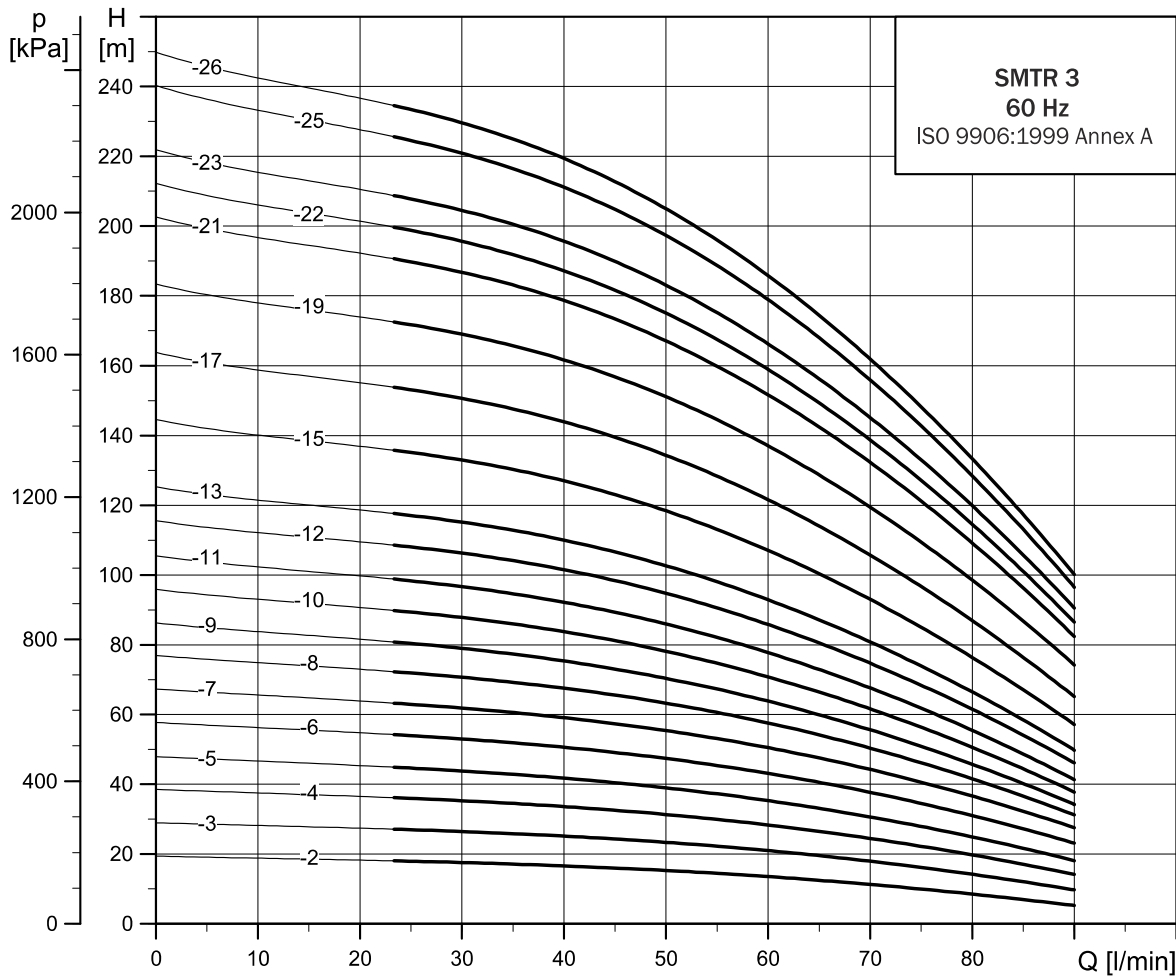
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS					WEIGHT
	[kW]	A	B	C	D1	D2	
SMTR 1-2/2	0.37	451	140	312	142	130	14
SMTR 1-3/3	0.37	469	158	312	142	130	14
SMTR 1-4/4	0.37	487	176	312	142	130	14
SMTR 1-5/5	0.55	505	194	312	142	130	15
SMTR 1-6/6	0.55	523	212	312	142	130	15
SMTR 1-7/7	0.75	580	230	351	142	130	18
SMTR 1-8/8	0.75	598	248	351	142	130	19
SMTR 1-9/9	0.75	616	266	351	142	130	19
SMTR 1-10/10	1.10	635	284	351	142	130	20
SMTR 1-11/11	1.10	653	302	351	142	130	20
SMTR 1-12/12	1.10	671	320	351	142	130	20
SMTR 1-13/13	1.10	689	338	351	142	130	21
SMTR 1-15/15	1.50	797	374	423	178	140	30
SMTR 1-17/17	1.50	833	410	423	178	140	31
SMTR 1-19/19	2.20	910	446	464	178	157	44
SMTR 1-21/21	2.20	946	483	464	178	157	45
SMTR 1-22/22	2.20	964	501	464	178	157	45
SMTR 1-23/23	2.20	982	519	464	178	157	45
SMTR 1-25/25	2.20	1018	555	464	178	157	46
SMTR 1-26/26	3.00	1045	573	473	225	173	49
SMTR 1-27/27	3.00	1063	591	473	225	173	50

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

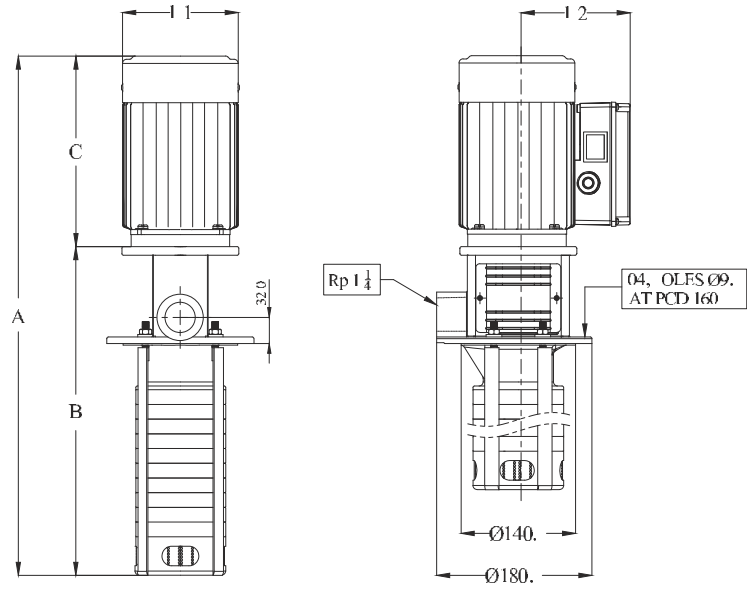
SMTR SERIES

SMTR 3, 60 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



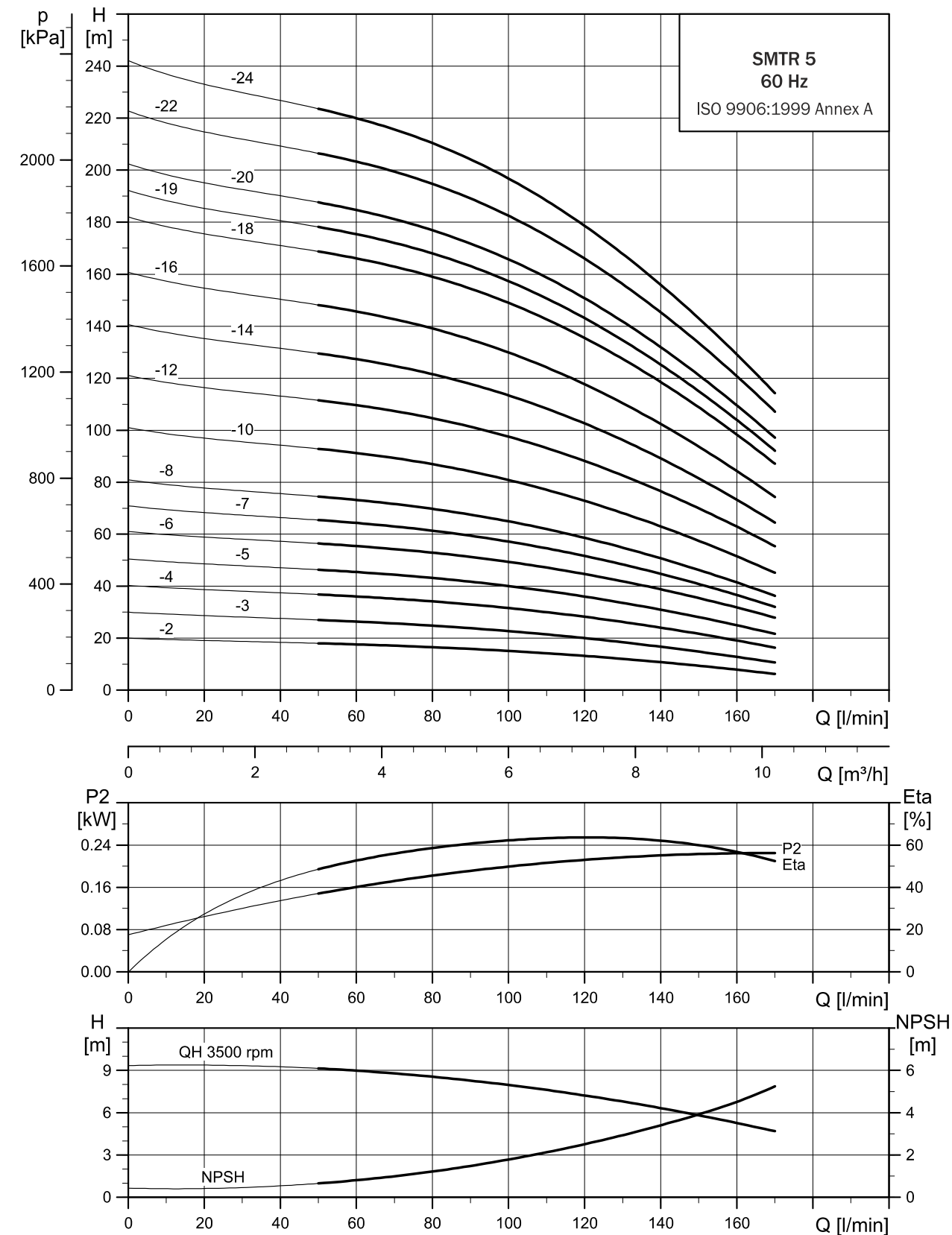
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS					WEIGHT
	[kW]	A	B	C	D1	D2	
SMTR 3-2/2	0.37	451	140	312	142	130	14
SMTR 3-3/3	0.55	469	158	312	142	130	14
SMTR 3-4/4	0.55	487	176	312	142	130	14
SMTR 3-5/5	0.75	544	194	351	142	130	17
SMTR 3-6/6	1.10	562	212	351	142	130	18
SMTR 3-7/7	1.10	580	230	351	142	130	18
SMTR 3-8/8	1.10	598	248	351	142	130	19
SMTR 3-9/9	1.50	688	266	423	178	140	27
SMTR 3-10/10	1.50	707	284	423	178	140	28
SMTR 3-11/11	1.50	725	302	423	178	140	28
SMTR 3-12/12	2.20	784	320	464	178	157	41
SMTR 3-13/13	2.20	802	338	464	178	157	41
SMTR 3-15/15	2.20	838	374	464	178	157	42
SMTR 3-17/17	2.20	874	410	464	178	157	43
SMTR 3-19/19	3.00	919	446	473	225	173	46
SMTR 3-21/21	3.00	955	483	473	225	173	47
SMTR 3-22/22	3.00	973	501	473	225	173	48
SMTR 3-23/23	3.00	991	519	473	225	173	48
SMTR 3-25/25	4.00	1027	555	473	225	173	48
SMTR 3-26/26	4.00	1045	573	473	225	173	48

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

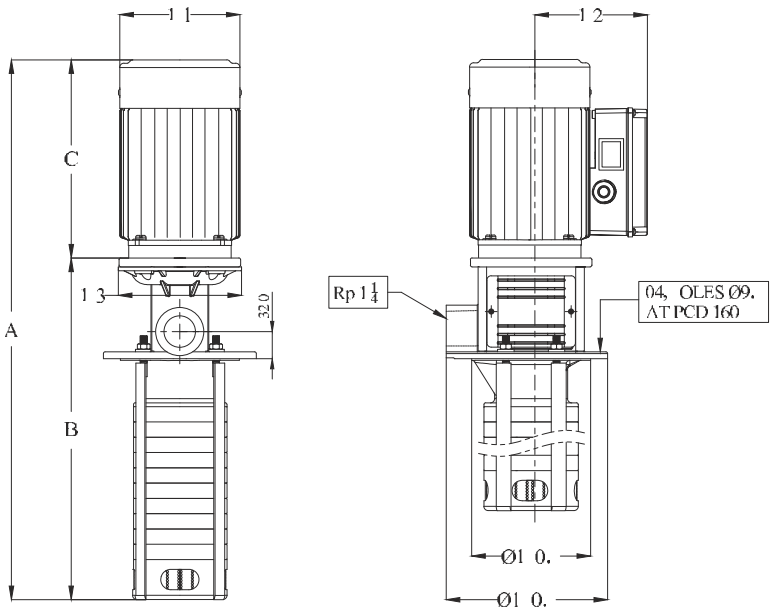
SMTR SERIES

SMTR 5, 60 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



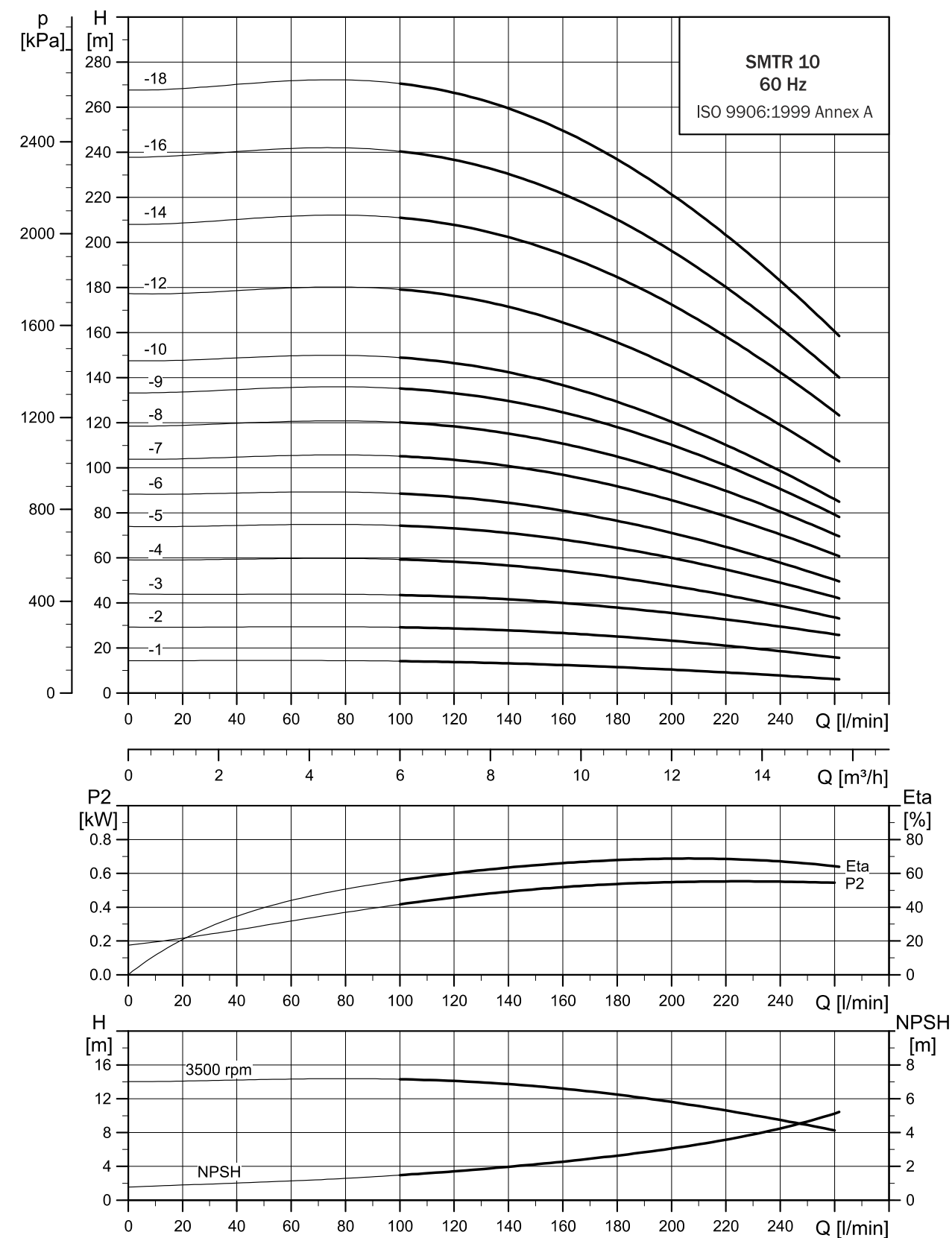
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS						WEIGHT
	[kW]	A	B	C	D1	D2	D3	
SMTR 5-2/2	0.55	469	158	312	142	130	-	13
SMTR 5-3/3	1.10	535	185	351	142	130	-	17
SMTR 5-4/4	1.10	562	212	351	142	130	-	17
SMTR 5-5/5	1.50	661	239	423	178	140	-	27
SMTR 5-6/6	2.20	729	266	464	178	157	-	39
SMTR 5-7/7	2.20	756	293	464	178	157	-	40
SMTR 5-8/8	2.20	783	320	464	178	157	-	40
SMTR 5-10/10	3.00	847	374	473	225	173	-	44
SMTR 5-12/12	3.00	901	428	473	225	173	-	45
SMTR 5-14/14	4.00	955	482	473	225	173	-	46
SMTR 5-16/16	4.00	1009	536	473	225	173	-	47
SMTR 5-18/18	5.50	1174	590	584	225	-	300	65
SMTR 5-19/19	5.50	1201	617	584	225	-	300	66
SMTR 5-20/20	5.50	1229	645	584	225	-	300	66
SMTR 5-22/22	5.50	1283	699	584	225	-	300	67
SMTR 5-24/24	7.50	1325	754	571	225	-	300	77

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

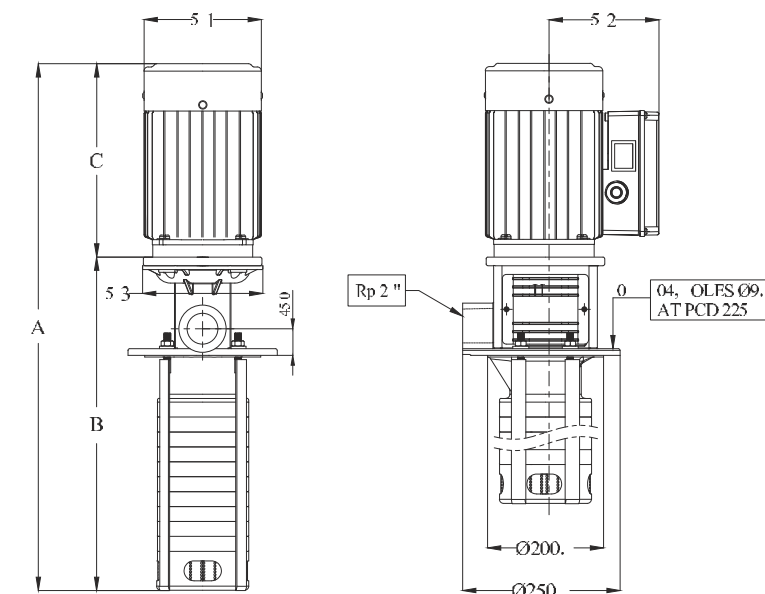
SMTR SERIES

SMTR 10, 60 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



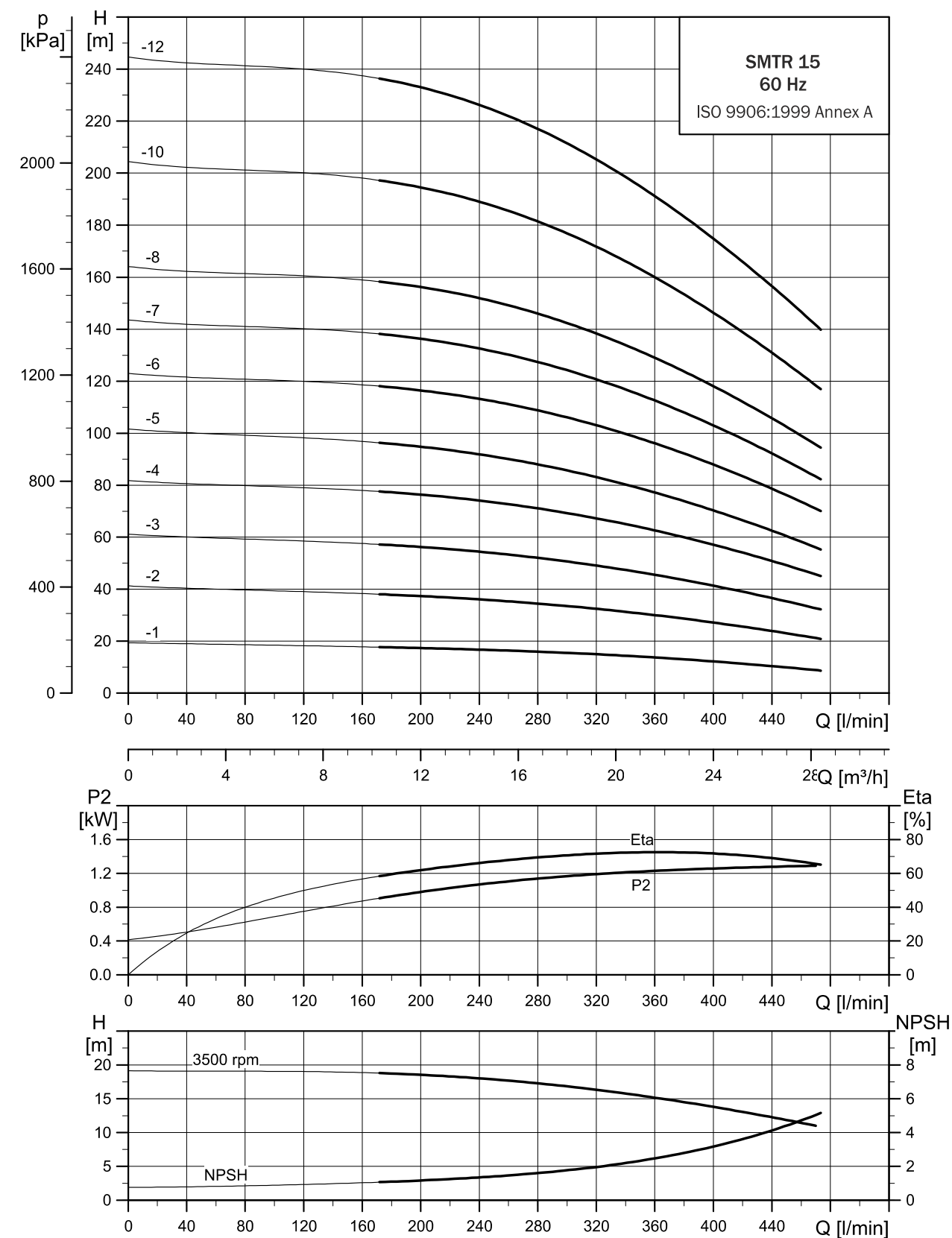
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS						WEIGHT
	[kW]	A	B	C	D1	D2	D3	
SMTR 10-2/1	0.75	522	179	343	142	130	-	22
SMTR 10-2/2	1.50	584	179	405	178	140	-	35
SMTR 10-3/3	2.20	659	212	447	178	157	-	48
SMTR 10-4/4	3.00	699	244	455	225	173	-	51
SMTR 10-5/5	3.00	732	277	455	225	173	-	52
SMTR 10-6/6	4.00	764	309	455	225	173	-	53
SMTR 10-7/7	5.50	912	342	571	225	-	300	71
SMTR 10-8/8	5.50	945	374	571	225	-	300	72
SMTR 10-9/9	5.50	977	407	571	225	-	300	73
SMTR 10-10/10	7.50	1010	439	571	225	-	300	74
SMTR 10-12/12	7.50	1075	504	571	225	-	300	75
SMTR 10-14/14	11.0	1300	569	731	340	237	350	147
SMTR 10-16/16	11.0	1365	634	731	340	237	350	149
SMTR 10-18/18	11.0	1430	699	731	340	237	350	151
SMTR 10-20/18	11.0	1495	764	731	340	237	350	153
SMTR 10-22/18	11.0	1560	829	731	340	237	350	154

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

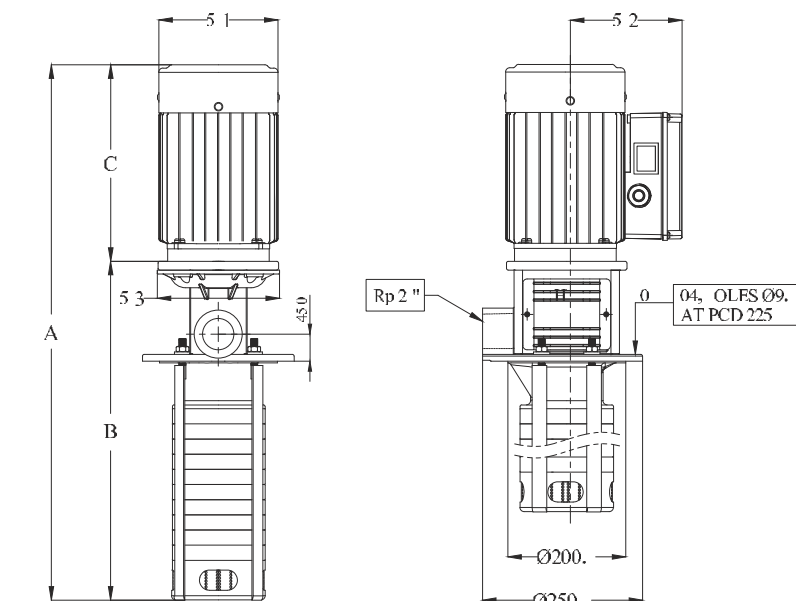
SMTR SERIES

SMTR 15, 60 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



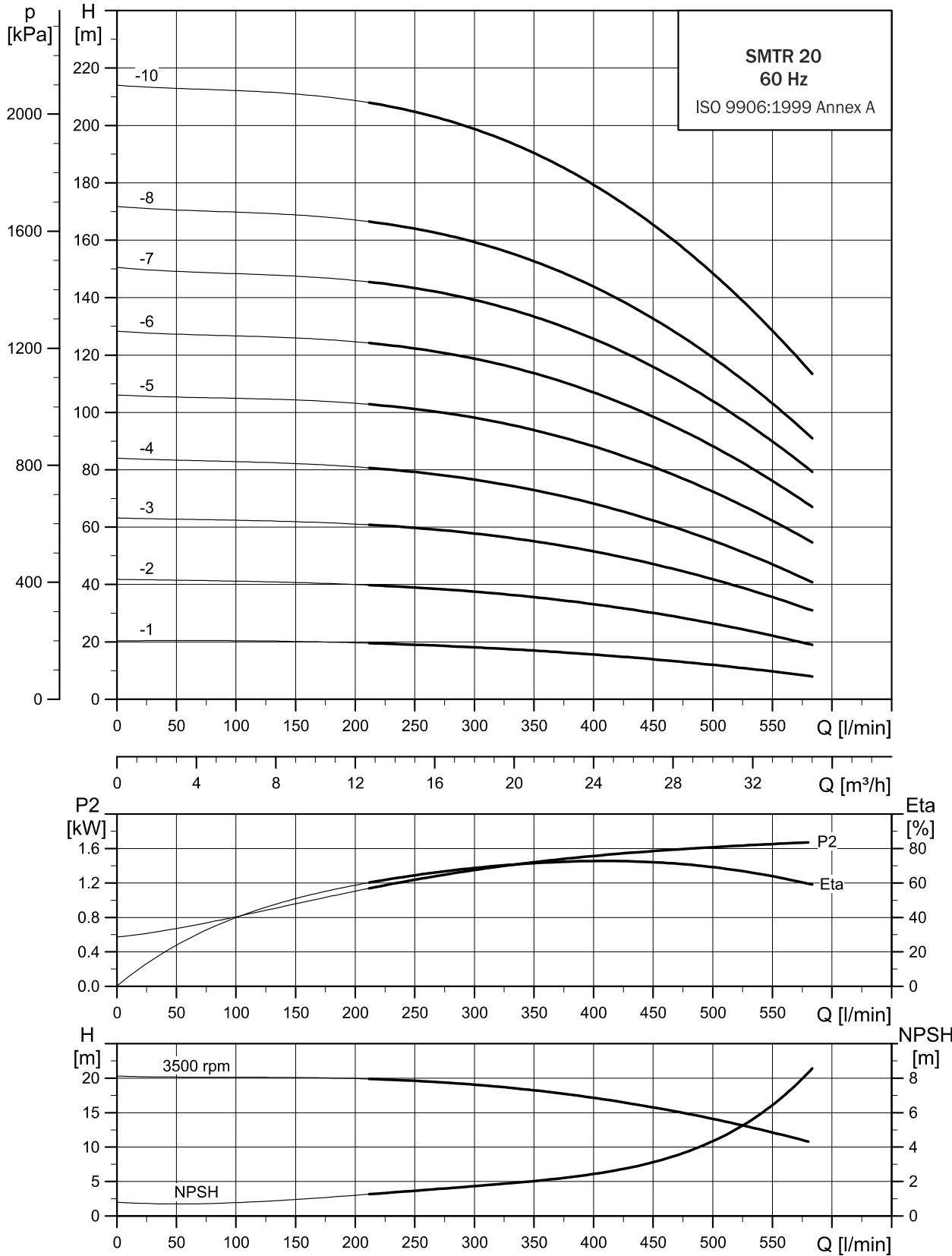
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS						WEIGHT
	[kW]	A	B	C	D1	D2	D3	
SMTR 15-2/1	1.50	608	203	405	178	140	-	35
SMTR 15-2/2	3.00	658	203	455	225	173	-	50
SMTR 15-3/3	4.00	705	250	455	225	173	-	50
SMTR 15-4/4	5.50	867	297	571	225	-	300	68
SMTR 15-5/5	7.50	915	344	571	225	-	300	69
SMTR 15-6/6	11.0	1122	391	731	340	237	350	140
SMTR 15-7/7	11.0	1169	438	731	340	237	350	141
SMTR 15-8/8	11.0	1216	485	731	340	237	350	142
SMTR 15-10/10	15.0	1310	579	731	340	237	350	150
SMTR 15-12/12	18.5	1404	673	731	340	237	350	164
SMTR 15-14/12	18.5	1498	767	731	340	237	350	165
SMTR 15-16/12	18.5	1593	862	731	340	237	350	167
SMTR 15-17/12	18.5	1640	909	731	340	237	350	168

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20mm
3. Subject to technical change without notice

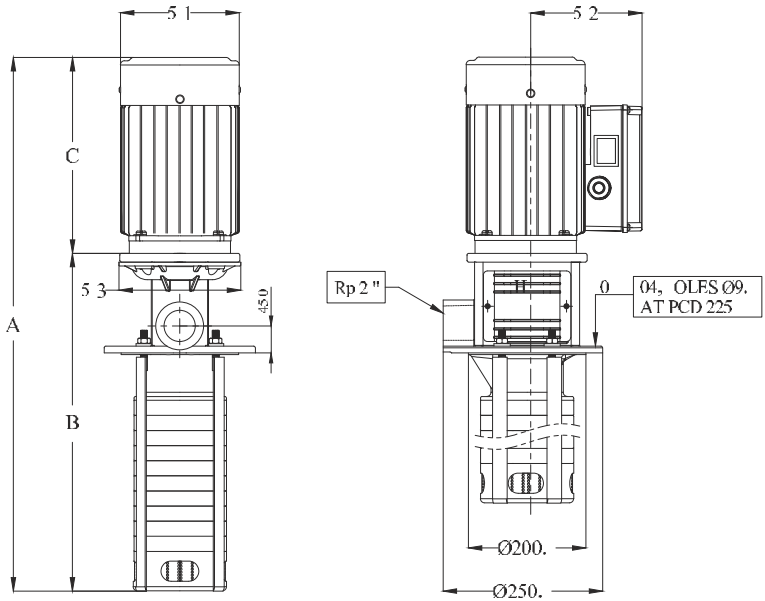
SMTR SERIES

SMTR 20, 60 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



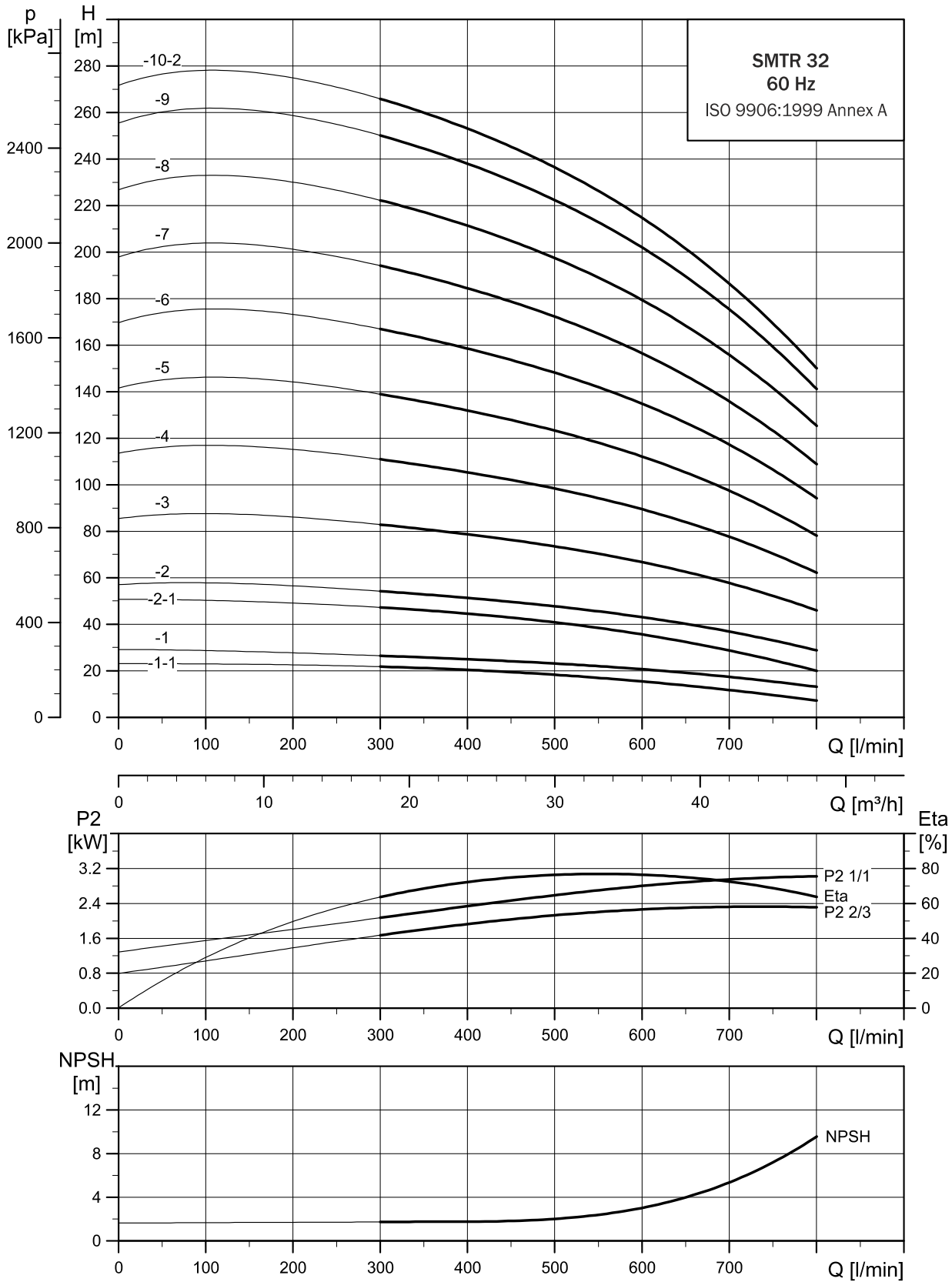
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS						WEIGHT
	[kW]	A	B	C	D1	D2	D3	
SMTR 20-2/1	2.20	650	203	447	178	157	-	47
SMTR 20-2/2	4.00	658	203	455	225	173	-	50
SMTR 20-3/3	5.50	820	250	571	225	-	300	67
SMTR 20-4/4	7.50	867	297	571	225	-	300	68
SMTR 20-5/5	11.0	1075	344	731	340	237	350	139
SMTR 20-6/6	11.0	1122	391	731	340	237	350	140
SMTR 20-7/7	15.0	1169	438	731	340	237	350	147
SMTR 20-8/8	15.0	1216	485	731	340	237	350	148
SMTR 20-10/10	18.5	1310	579	731	340	237	350	162
SMTR 20-12/10	18.5	1404	673	731	340	237	350	164
SMTR 20-14/10	18.5	1498	767	731	340	237	350	165
SMTR 20-16/10	18.5	1593	862	731	340	237	350	167
SMTR 20-17/10	18.5	1640	909	731	340	237	350	168

1. The maximum immersion depth 1033 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

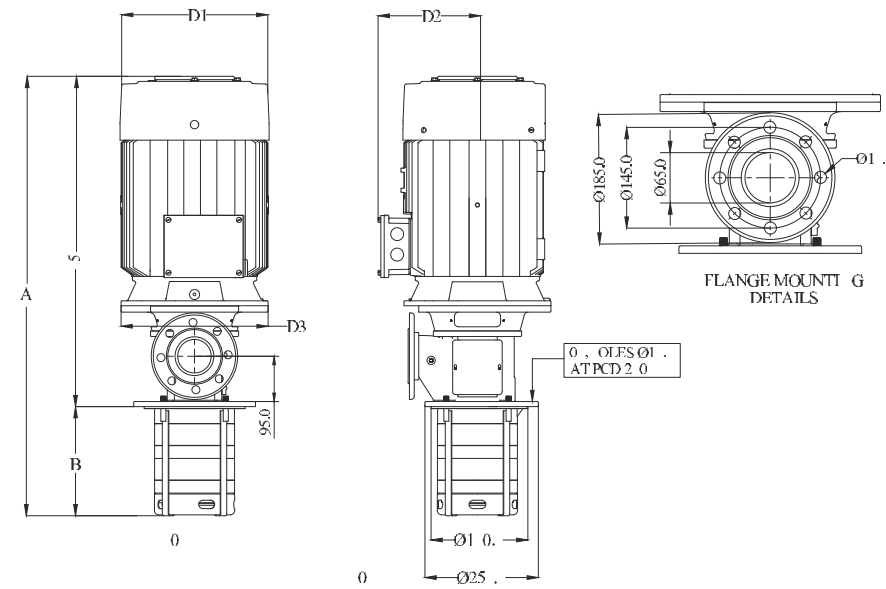
SMTR SERIES

SMTR 32, 60 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



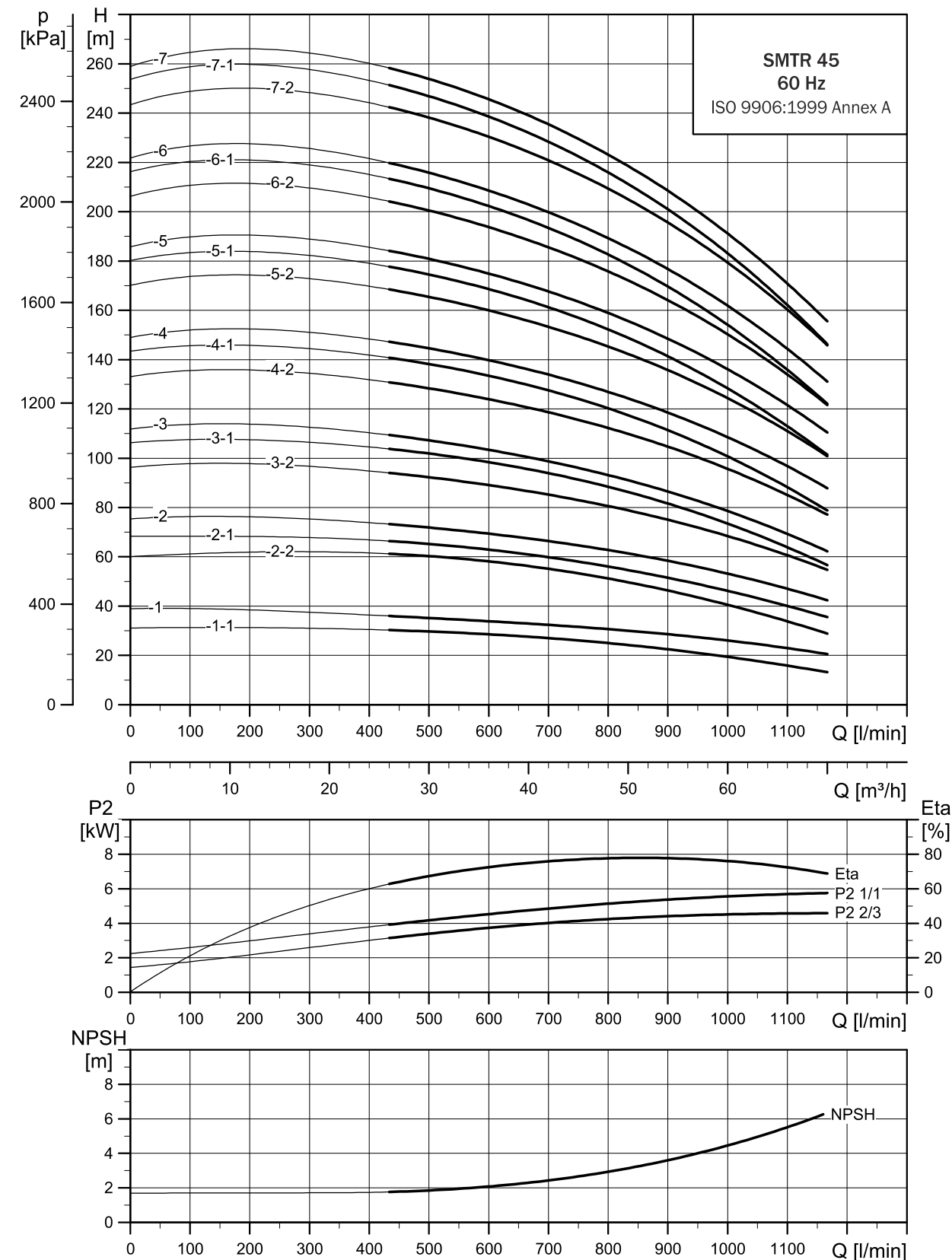
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS						WEIGHT
	[kW]	A	B	C	D1	D2	D3	
SMTR 32-2/1-1	2.20	686	227	459	178	157	-	70
SMTR 32-2/1	3.00	695	227	468	225	-	300	71
SMTR 32-2/2-1	5.50	853	227	626	225	-	300	110
SMTR 32-2/2	7.50	853	227	626	225	-	300	121
SMTR 32-3/3	11.0	1036	297	739	340	237	350	162
SMTR 32-4/4	15.0	1106	367	739	340	237	350	175
SMTR 32-5/5	18.5	1176	437	739	340	237	350	188
SMTR 32-6/6	18.5	1246	507	739	340	237	350	188
SMTR 32-7/7	22.0	1347	577	770	354	237	350	208
SMTR 32-8/8	30.0	1487	647	840	354	237	400	325
SMTR 32-9/9	30.0	1557	717	840	354	237	400	325
SMTR 32-10/10-2	30.0	1628	788	840	354	237	400	325

1. The maximum immersion depth 1343 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

SMTR SERIES

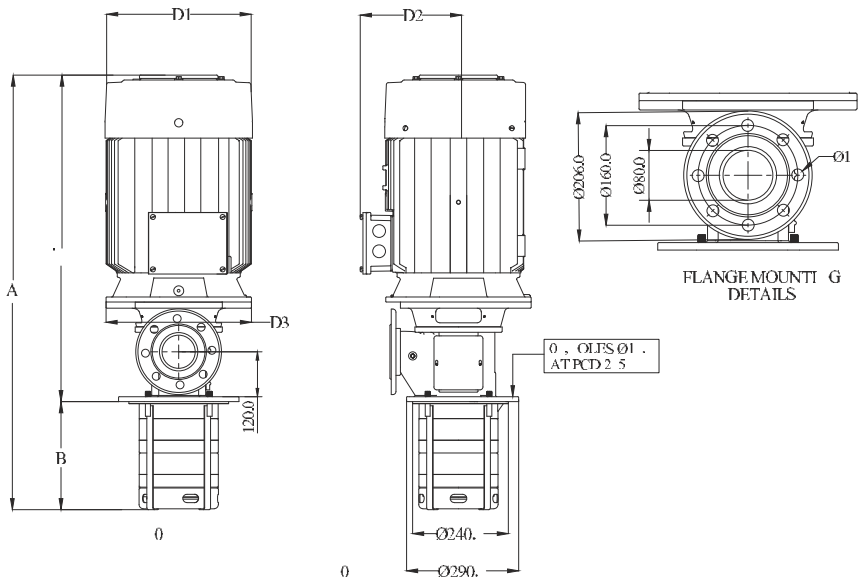
SMTR 45, 60 HZ



SMTR SERIES



DIMENSIONAL SKETCHES



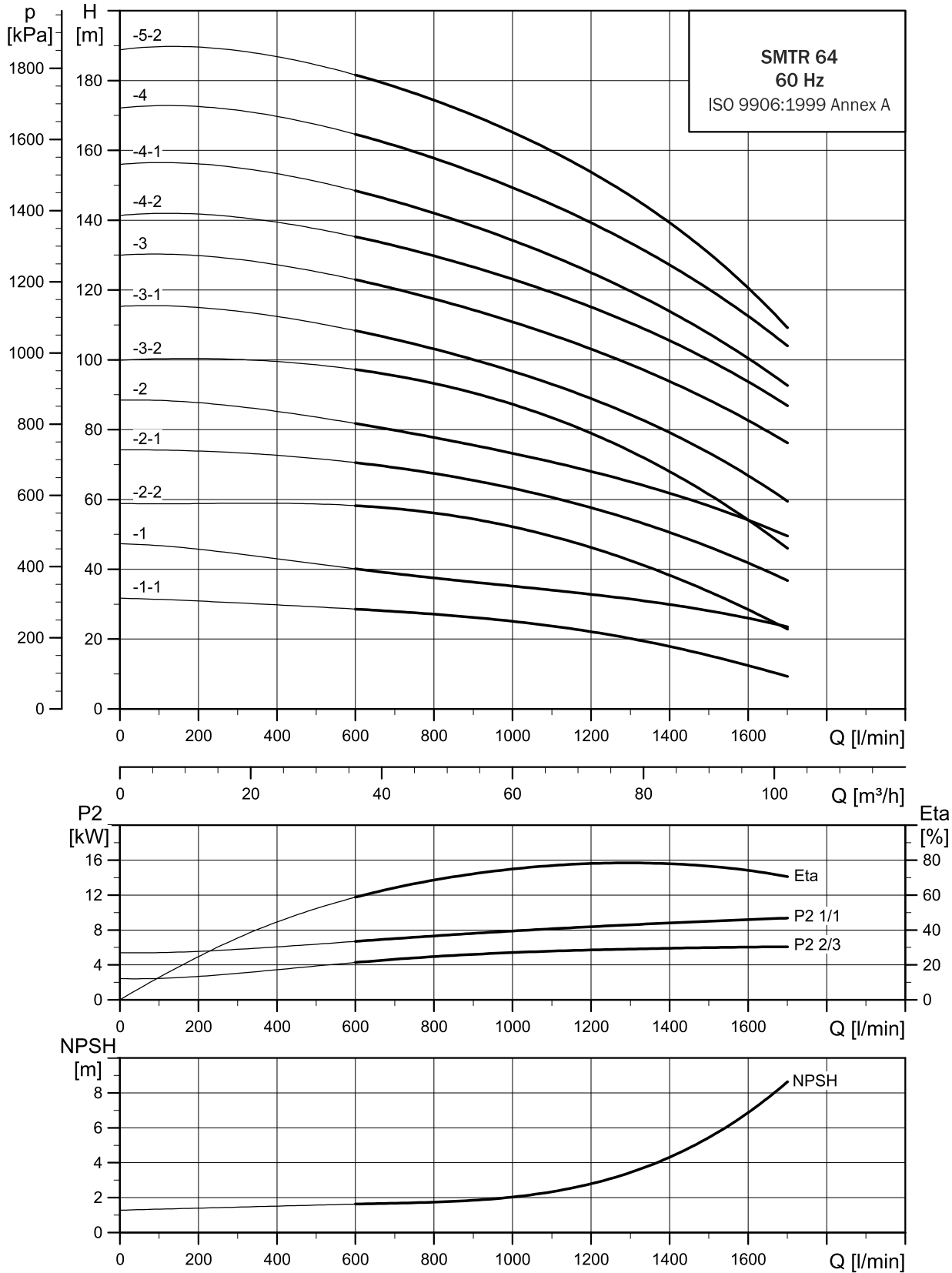
DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS					WEIGHT
	[kW]	A	B	C	D1	D2	
SMTR 45-2/1-1	5.50	873	247	626	225	-	118
SMTR 45-2/1	7.50	873	247	626	225	-	128
SMTR 45-2/2-2	11.0	986	247	739	340	237	171
SMTR 45-2/2-1	11.0	986	247	739	340	237	171
SMTR 45-2/2	15.0	986	247	739	340	237	183
SMTR 45-3/3-2	18.5	1066	327	739	340	237	196
SMTR 45-3/3-1	18.5	1066	327	739	340	237	196
SMTR 45-3/3	18.5	1066	327	739	340	237	196
SMTR 45-4/4-2	22.0	1177	407	770	354	237	211
SMTR 45-4/4-1	30.0	1247	407	840	354	237	332
SMTR 45-4/4	30.0	1247	407	840	354	237	332
SMTR 45-5/5-2	30.0	1327	487	840	354	237	332
SMTR 45-5/5-1	30.0	1327	487	840	354	237	332
SMTR 45-5/5	30.0	1327	487	840	354	237	332
SMTR 45-6/6-2	37.0	1407	567	840	354	237	355
SMTR 45-6/6-1	37.0	1407	567	840	354	237	355
SMTR 45-6/6	37.0	1407	567	840	354	237	355
SMTR 45-7/7-2	45.0	1579	647	932	435	297	507
SMTR 45-7/7-1	45.0	1579	647	932	435	297	507
SMTR 45-7/7	45.0	1579	647	932	435	297	507

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

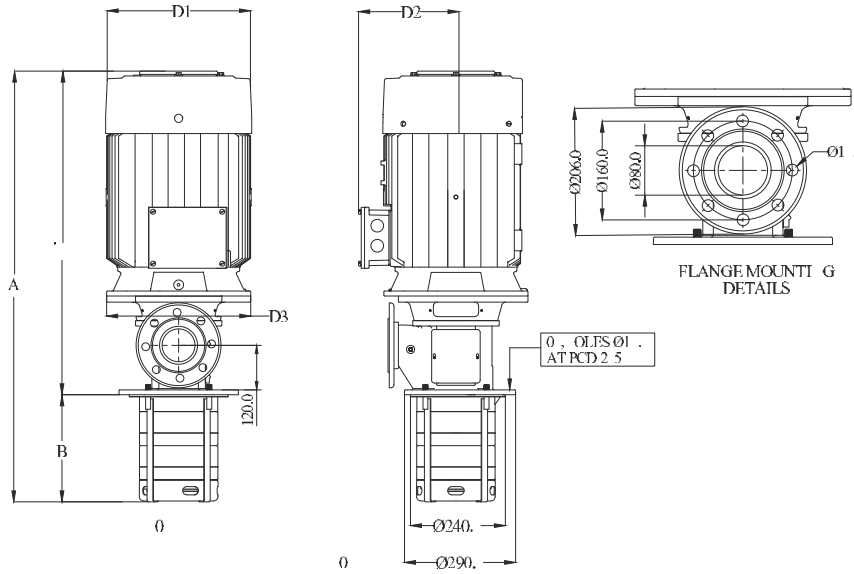
SMTR SERIES

SMTR 64, 60 HZ



SMTR SERIES

DIMENSIONAL SKETCHES



DIMENSIONS AND WEIGHTS

PUMP TYPE	P2	DIMENSIONS						WEIGHT [Kg]
	[kW]	A	B	C	D1	D2	D3	
SMTR 64-2/1-1	4.00	720	252	468	225	-	300	105
SMTR 64-2/1	5.50	878	252	626	225	-	300	120
SMTR 64-2/2-2	7.50	878	252	626	225	-	300	131
SMTR 64-2/2-1	11.0	991	252	739	340	237	350	173
SMTR 64-2/2	11.0	991	252	739	340	237	350	173
SMTR 64-3/3-2	15.0	1074	335	739	340	237	350	185
SMTR 64-3/3-1	15.0	1074	335	739	340	237	350	185
SMTR 64-3/3	18.5	1074	335	739	340	237	350	198
SMTR 64-4/4-2	18.5	1156	417	739	340	237	350	198
SMTR 64-4/4-1	22.0	1187	417	770	354	237	350	213
SMTR 64-4/4	22.0	1187	417	770	354	237	350	213
SMTR 64-5/5-2	30.0	1340	500	840	354	237	400	334
SMTR 64-5/5-1	30.0	1340	500	840	354	237	400	334
SMTR 64-5/5	30.0	1340	500	840	354	237	400	334
SMTR 64-6/6-2	30.0	1422	582	840	354	237	400	334
SMTR 64-6/6-1	37.0	1422	582	840	354	237	400	356
SMTR 64-6/6	37.0	1422	582	840	354	237	400	356
SMTR 64-7/7-2	37.0	1505	665	840	354	237	400	357
SMTR 64-7/7-1	37.0	1505	665	840	354	237	400	357
SMTR 64-7/7	45.0	1597	665	932	435	297	450	446
SMTR 64-8/8-2	45.0	1679	747	932	435	297	450	446
SMTR 64-8/8-1	45.0	1679	747	932	435	297	450	446

1. The maximum immersion depth 1006 mm
2. Dimensions A,B & C may varies upto ± 20 mm
3. Subject to technical change without notice

SMTR SERIES

PUMPED LIQUIDS

SMTR pumps are designed to pump non-explosive liquids that do not chemically attack the pump materials.

When pumping liquids with a density and/or viscosity higher than that of water, oversized motors may be required.

Whether a pump is suitable for a particular liquid depends on a number of factors of which the most important are the chloride content, pH-value, temperature and content of chemicals, oils, etc.

Please note that aggressive liquids may attack or dissolve the protective oxide film of the stainless steel and thus cause corrosion.

PUMPING OF SOLID PARTICLES

SMTR Pumps

These pumps are fitted with a suction strainer. The strainer prevents large solid particles from entering and damaging the pump. The table below describes the size of the passage in the strainer and the impeller.

Pump	Strainer passage [mm]	Free strainer passage [cm ²]	Impeller passage [mm]
SMTR 1s	Ø2	23	2.5
SMTR 1	Ø2	23	2.5
SMTR 3	Ø2	23	3.1
SMTR 5	Ø4	28	5.5
SMTR 10	Ø4	43	5.5
SMTR 15	Ø4	43	6.0
SMTR 20	Ø4	43	8.0
SMTR 32	Ø4	56	8.0
SMTR 45	Ø4	56	9.5
SMTR 64	Ø4	56	13.0

If the pumped liquid contains solid particles larger than the size of the holes in the strainer, the passage of the strainer may be blocked. In such situations the performance will drop as a result of a reduced flow through the pump.

Note:

If the strainer is removed from the suction port, solid particles may enter the pump and cause a seizure or even damage the pump.

In grinding applications Shakti recommends that the pumped liquid is screened for abrasive particles before entering the pump. When pumped, abrasive particles reduce the life of the pump components.

Wear of the pump components caused by abrasive particles starts when the concentration exceeds 20 ppm.

LIST OF PUMPED LIQUIDS

A number of typical liquids are listed below.

Other pump versions / shaft seals may be applicable, but those stated in the list are considered to be the best choices.

The table is intended as a general guide only, and it cannot replace actual testing of the pumped liquids and pump materials under specific working conditions.

The list should, however, be applied with some caution as factors such as concentration of the pumped liquid, liquid temperature or pressure may affect the chemical resistance of a specific pump version.

Safety precautions must be taken when pumping hazardous / flammable liquids.

List Of Notes

D	Often with additives.
E	Density and/or viscosity differ from that of water. Allow for this when calculating motor output and pump performance.
F	Pump selection depends on many factors. Contact Shakti.
H	Risk of chrystallisation /precipitation in shaft seal.
1	The pumped liquid is easily ignited.
2	The pumped liquid highly inflammable.
3	Insoluble in water.
4	Low self-ignition point.

SMTR SERIES

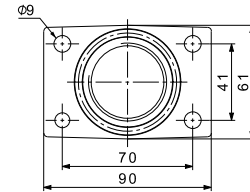
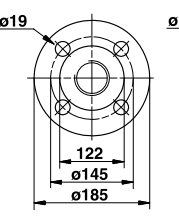
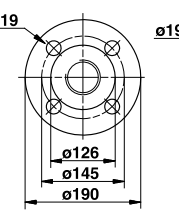
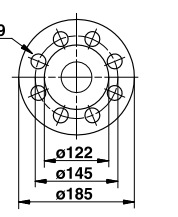
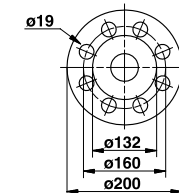
LIST OF PUMPED LIQUIDS

Pumped liquid	Note	Liquid concentration, liquid temperature	Recommended pump version / shaft seal
			SMTR A-version (standard range, all wetted parts of cast iron and stainless steel)
Acetic acid, CH ₃ COOH	-	5 %, 20 °C	-
Alkaline degreasing agent	D, F	-	HUUE
Ammonium bicarbonate, NH ₄ HCO ₃	E	20 %, 30 °C	-
Ammonium hydroxide, NH ₄ OH	-	20 %, 40 °C	HUUE
Benzoic acid, C ₆ H ₅ COOH	H	0.5 %, 20 °C	-
Boiler water	-	< 90 °C	HUUE
Calcareous water	-	< 90 °C	HUUE
Calcium acetate (as coolant with inhibitor) Ca(CH ₃ COO) ₂	D, E	30 %, 50 °C	HUUE
Calcium hydroxide, Ca(OH) ₂	E	Saturated solution, 50 °C	HUUE
Chloride-containing water	F	< 30 °C, max. 500 ppm	-
Citric acid, HOC(CH ₂ CO ₂ H) ₂ COOH	H	5 %, 40 °C	-
Completely desalinated water (demineralized water)	-	< 90 °C	-
Condensate	-	< 90 °C	HUUE
Copper sulfate, CuSO ₄	E	10 %, 30 °C	-
Corn oil	D, E, 3	100 %, 80 °C	HUUV
Domestic hot water (potable water)	-	< 120 °C	HUUE
Ethylene glycol, HOCH ₂ CH ₂ OH	D, E	50 %, 50 °C	HUUE
Formic acid, HCOOH	-	2 %, 20 °C	-
Glycerine (glycerol), OHCH ₂ CH(OH)CH ₂ OH	D, E	50 %, 50 °C	HUUE
Hydraulic oil (mineral)	E, 2, 3	100 %, 100 °C	HUUV
Hydraulic oil (synthetic)	E, 2, 3	100 %, 100 °C	HUUV
Lactic acid, CH ₃ CH(OH)COOH	E, H	10 %, 20 °C	-
Linoleic acid, C ₁₇ H ₃₁ COOH	E, 3	100 %, 20 °C	HUUV
Motor oil	E, 2, 3	100 %, 80 °C	HUUV
Cutting oil	E	90 °C	HUUV
Water-based cooling lubricant	E	90 °C	HUUV
Naphthalene, C ₁₀ H ₈	E, H	100 %, 80 °C	HUUV
Nitric acid, HNO ₃	F	1 %, 20 °C	-
Oil-containing water	-	< 90 °C	HUUV
Olive oil	D, E, 3	100 %, 80 °C	HUUV
Oxalic acid, (COOH) ₂	H	1 %, 20 °C	-
Peanut oil	D, E, 3	100 %, 80 °C	HUUV
Phosphoric acid, H ₃ PO ₄	E	20 %, 20 °C	-
Propylene glycol, CH ₃ CH(OH)CH ₂ OH	D, E	50 %, 90 °C	HUUE
Potassium carbonate, K ₂ CO ₃	E	20 %, 50 °C	HUUE
Potassium formate (as coolant with inhibitor), KOOCH	D, E	30 %, 50 °C	HUUE
Potassium hydroxide, KOH	E	20 %, 50 °C	-
Potassium permanganate, KMnO ₄	-	1 %, 20 °C	-
Rape seed oil	D, E, 3	100 %, 80 °C	HUUV
Salicylic acid, C ₆ H ₄ (OH)COOH	H	0.1 %, 20 °C	-
Silicone oil	E, 3	100 %	HUUV
Sodium bicarbonate, NaHCO ₃	E	10 %, 60 °C	-
Sodium chloride (as coolant), NaCl	D, E	30 %, < 5 °C, pH > 8	HUUE
Sodium hydroxide, NaOH	E	20 %, 50 °C	-
Sodium nitrate, NaNO ₃	E	10 %, 60 °C	-
Sodium phosphate, Na ₃ PO ₄	E, H	10 %, 60 °C	-
Sodium sulfate, Na ₂ SO ₄	E, H	10 %, 60 °C	-
Softened water	-	< 120 °C	-
Soya oil	D, E, 3	100 %, 80 °C	HUUV
Unsalted swimming pool water	-	Approx. 2 ppm free chlorine (Cl ₂)	HUUE

SMTR SERIES ACCESSORIES

COUNTER-FLANGES FOR SMTR

A counter-flange set consists of one counter-flange, one gasket, bolts and nuts.

Counter-flange	Pump type	Description	Rated pressure	Pipe connection
	SMTR 1S SMTR 1 SMTR 3 SMTR 5	Threaded	16 bar	Rp 1 1/4
	SMTR 32	Threaded	16 bar, EN 1092-2	Rp 2 1/2
		Threaded	16 bar, special flange	Rp 3
		For welding	16 bar, EN 1092-2	65 mm, nominal
		For welding	40 bar, DIN 2635	65 mm, nominal
		For welding	16 bar, special flange	80 mm, nominal
	SMTR,45 SMTR,64	Threaded	16 bar	Rp 3
		For welding	16 bar	80 mm, nominal
		For welding	40 bar	80 mm, nominal

PIPE CONNECTION

Various sets of counter-flanges and couplings are available for pipe connection.

VARIANTS

LIST OF VARIANTS - ON REQUEST

Below please find the range of options available for SMTR pumps to meet special requirements. Contact Shakti for further information or for requests other than the ones mentioned below.

PUMPS

Variant	Applies to	Description
Suction pipe	SMTR	See page 59
Horizontally mounted pump	SMTR	See page 60
120° solution	SMTR	See page 60
Immersion depth	SMTR	See page 61

Shaft seals

Variant	Applies to	Description
Shaft seal with FFKM, FXM or EPDM O-ring material	SMTR	We recommend shaft seals with FFKM, FXM or EPDM O-ring material for applications where the pumped liquid may damage the standard O-ring material.

SMTR SERIES

HORIZONTAL MOUNTING

For safety or height reasons, certain applications, for instance on ships, require the pump to be mounted in horizontal position.

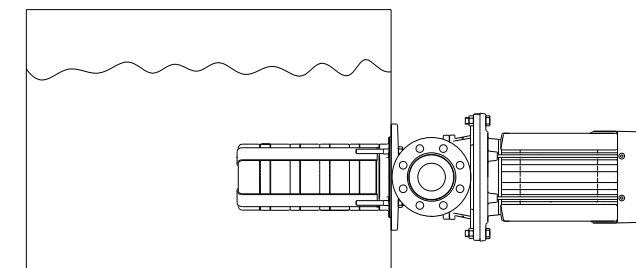


Fig. 14 Horizontal mounting of an SMTR pump

Note: If the SMTR pump is to be installed horizontally, the drain hole in the pump head must be fitted with a plug, and four closed nuts with O-rings must be fitted to the straps. For SMTR pumps horizontal mounting is only available with stainless steel pump heads. For motors from 5.5 kW and up, motor support is required.

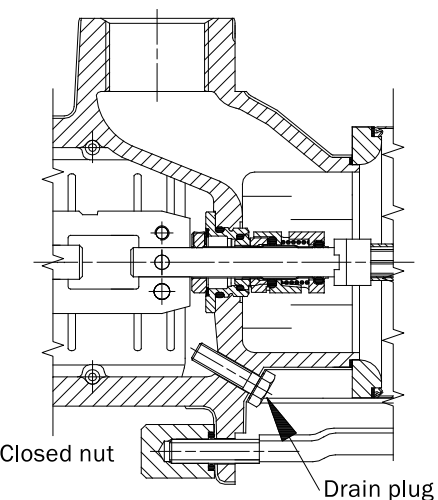


Fig. 15 Horizontal installation

120 °C solution

For applications with liquid temperature above 90 °C and up to 120 °C, Shakti offers a solution for SMTR

SUCTION PIPE

For compact coolant applications the filter is mounted inside the tank, and the pump sucks directly through this filter.

Pump	A [mm]	B [mm]	C [mm]	D [mm]
SMTR 1s, 1, 3, 5	48,5	15	Ø64,8	Ø60 x 3
SMTR 10, 15, 20	48	15	Ø88,8	Ø84 x 3
SMTR 32	48	15	Ø104,8	Ø100 x 3
SMTR 45	48	15	Ø124,8	Ø119,5 x 3
SMTR 64	48	15	Ø133,7	Ø128 x 3

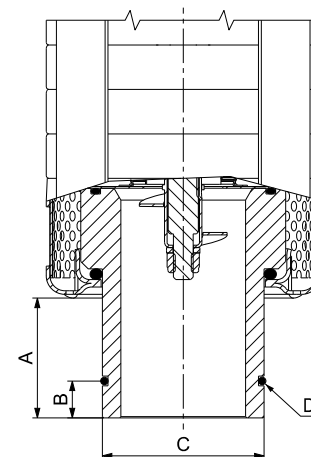


Fig. 13 Suction pipe

SMTR SERIES

IMMERSION DEPTHS, SMTR

To meet specific depths of tanks and containers, the immersion depth of the pump can be varied using empty chambers. For the SMTR range the following immersion depths are available

NUMBER OF CHAMBERS	IMMERSION DEPTH (MM)									
	SMTR1s	SMTR1	SMTR3	SMTR5	SMTR10	SMTR15	SMTR20	SMTR32	SMTR45	SMTR64
2	160	160	160	169	148	178	178	223	244	249
3	178	178	178	196	178	223	223	293	324	332
4	196	196	196	223	208	268	268	363	404	414
5	214	214	214	250	238	313	313	433	484	497
6	232	232	232	277	268	358	358	503	564	579
7	250	250	250	304	298	403	403	573	644	662
8	268	268	268	331	328	448	448	643	724	744
9	286	286	286	358	358	493	493	713	804	827
10	304	304	304	385	388	538	538	783	884	909
11	322	322	322	412	-	583	583	853	964	992
12	340	340	340	439	448	628	628	923	1044	1074
13	358	358	358	466	-	673	673	993	1124	1157
14	376	376	376	493	508	718	718	1063	1204	1239
15	394	394	394	520	-	763	763	1133	1284	1322
16	412	412	412	547	568	808	808	1203	1364	1404
17	430	430	430	574	-	853	853	1273	1444	1487
18	448	448	448	601	628	898	898	1343	-	-
19	466	466	466	628	-	943	943	-	-	-
20	484	484	484	655	688	988	988	-	-	-
21	502	502	502	682	-	1033	1033	-	-	-
22	520	520	520	709	748	-	-	-	-	-
23	538	538	538	736	778	-	-	-	-	-
24	556	556	556	763	808	-	-	-	-	-
25	574	574	574	790	838	-	-	-	-	-
26	592	592	592	817	868	-	-	-	-	-
27	610	610	610	844	898	-	-	-	-	-
28	628	628	628	871	928	-	-	-	-	-
29	646	646	646	898	958	-	-	-	-	-
30	664	664	664	925	988	-	-	-	-	-
31	682	682	682	952	1018	-	-	-	-	-
32	700	700	700	979	-	-	-	-	-	-
33	718	718	718	1006	-	-	-	-	-	-
34	736	736	736	-	-	-	-	-	-	-
35	754	754	754	-	-	-	-	-	-	-
36	772	772	772	-	-	-	-	-	-	-
37	790	790	790	-	-	-	-	-	-	-
38	808	808	808	-	-	-	-	-	-	-
39	826	826	826	-	-	-	-	-	-	-
40	844	844	844	-	-	-	-	-	-	-
41	862	862	862	-	-	-	-	-	-	-
42	880	880	880	-	-	-	-	-	-	-
43	898	898	898	-	-	-	-	-	-	-
44	916	916	916	-	-	-	-	-	-	-
45	934	934	934	-	-	-	-	-	-	-
46	952	952	952	-	-	-	-	-	-	-
47	970	970	970	-	-	-	-	-	-	-
48	988	988	988	-	-	-	-	-	-	-
49	1006	1006	1006	-	-	-	-	-	-	-