



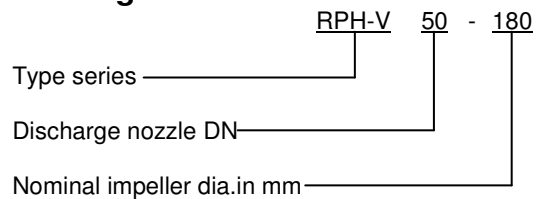
1. Application

RPH-V pumps are mainly used in refineries as well as in chemical and petrochemical plants.

2. Design

Vertical, radially split volute casing pumps to API 610 11th edition, and ISO 13709 (heavy duty), with radial impeller, single-flow, single-stage.

3. Designation

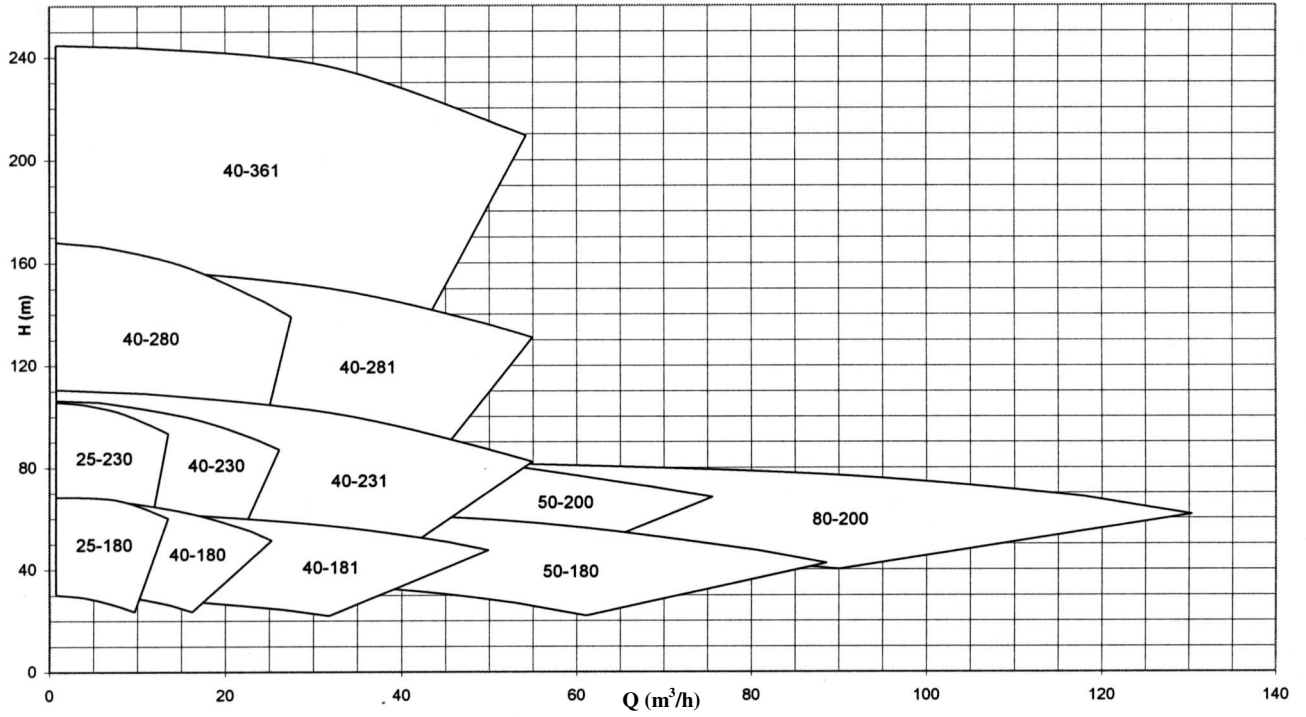


4. Operating Data

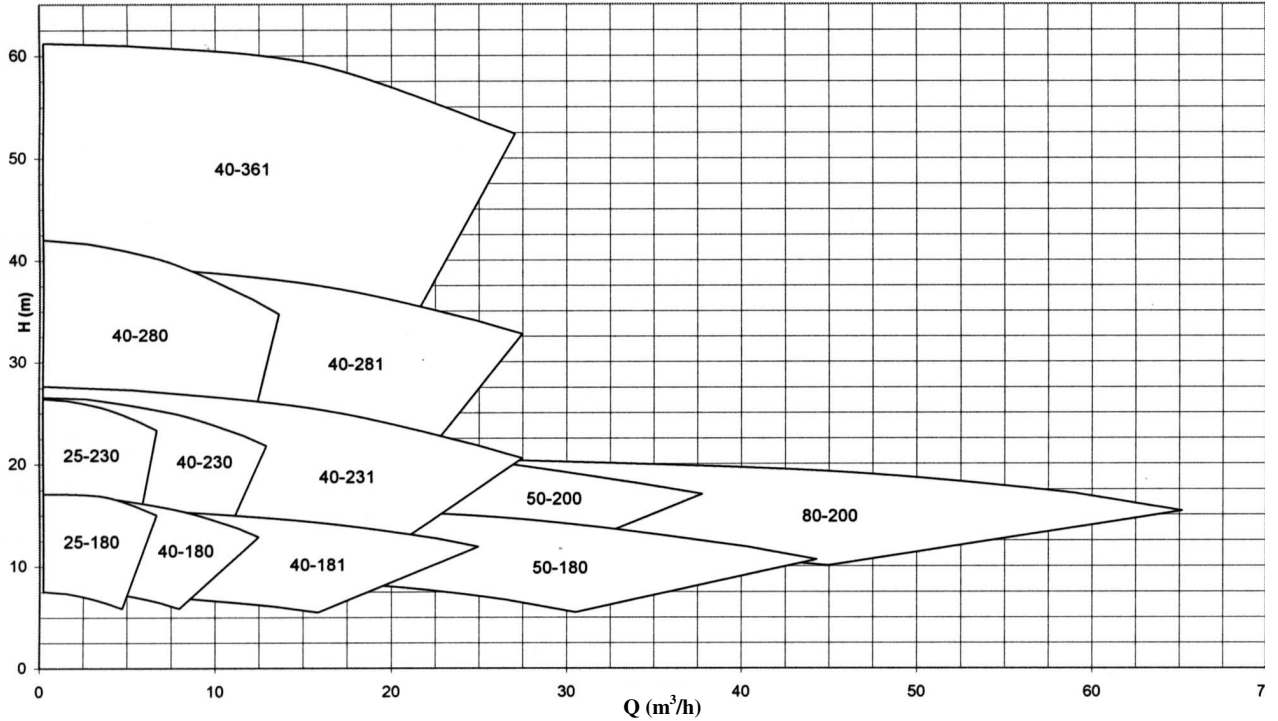
Pump sizes	DN	40 to 150
Capacities	Q	up to 80 m ³ /h
Heads	H	up to 240 m
Operating pressures	p	up to 35 bar for piping in material ASTM A106
Operating temperatures	t	-30 to +230°C
Standard installation depth	ET	from 630 to 3985 mm (rectangular soleplate); from 590 to 3935 mm (circular soleplate)

Other operating data on request.

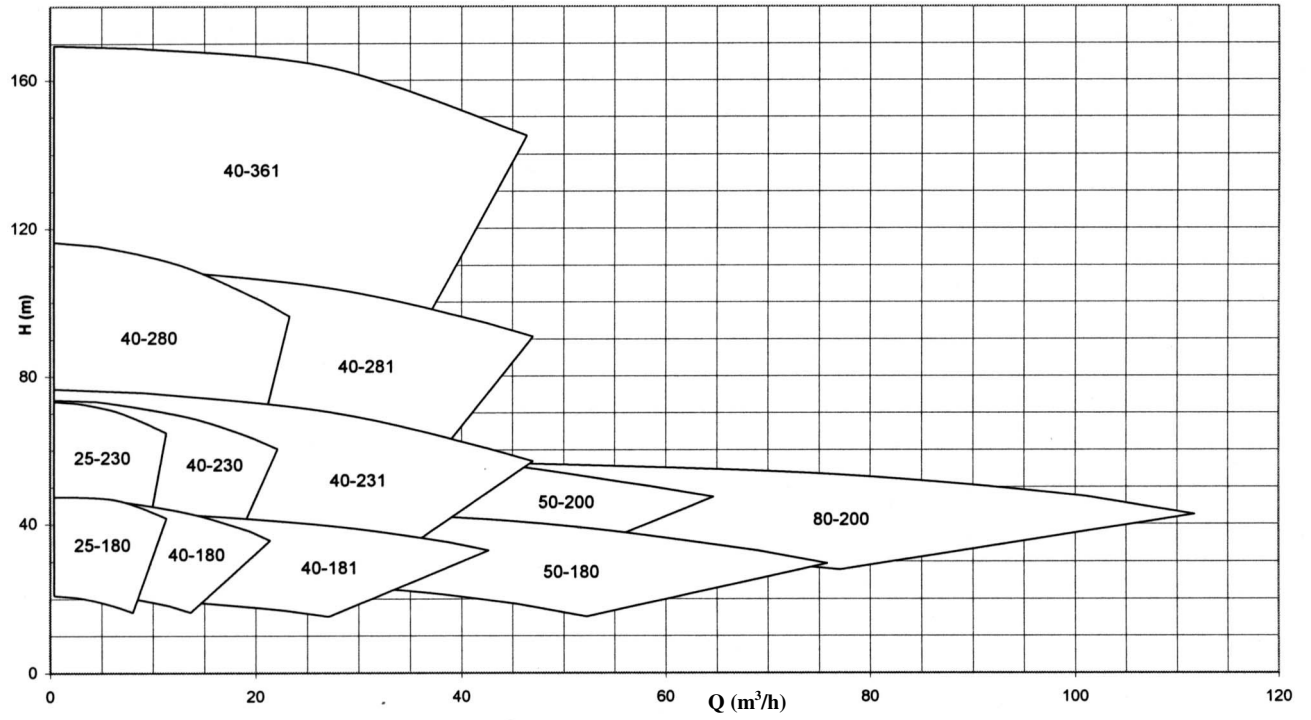
5.1 Selection chart 3.500 1/min



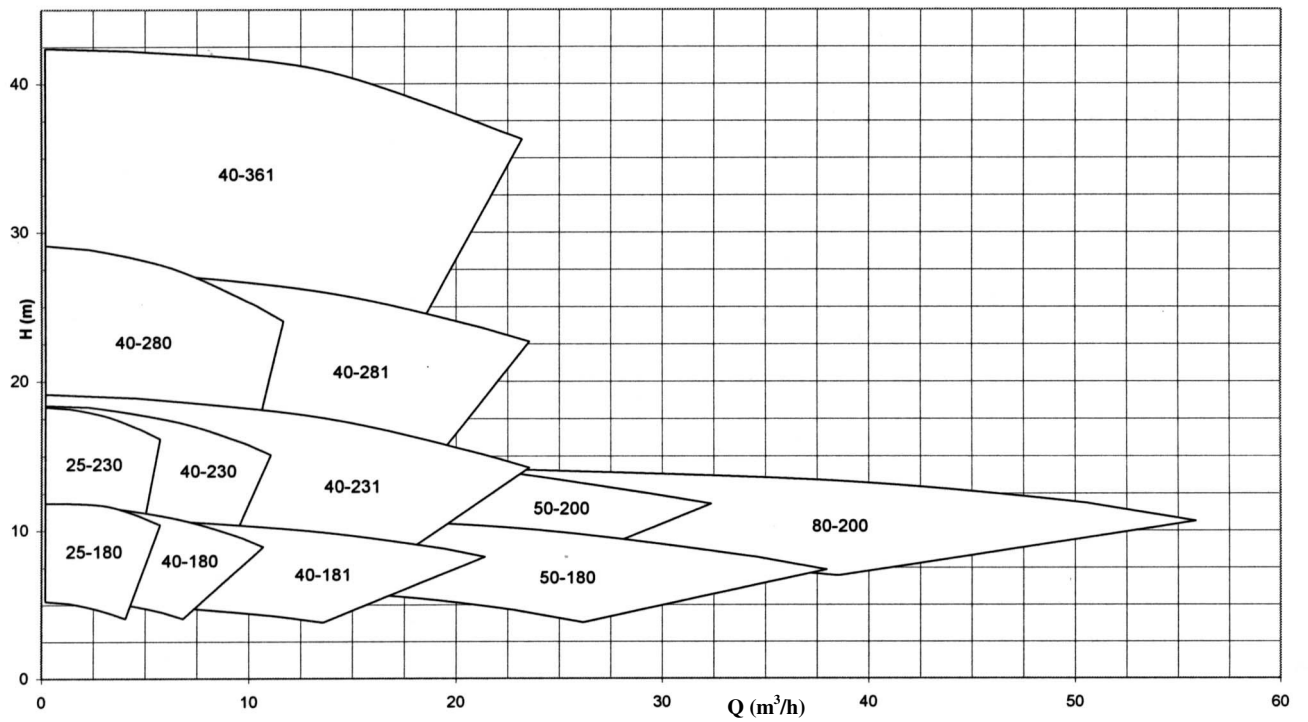
5.2 Selection chart 1.750 1/min



5.3 Selection chart 2.900 1/min

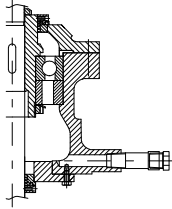


5.4 Selection chart 1.450 1/min



6. Product features / Benefits

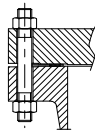
Option:
Grease lubrication



Bearings exceed service life specified by API 610, reducing maintenance expenditure and work

Rigid coupling with spacer to make easy the maintenance of mechanical seal

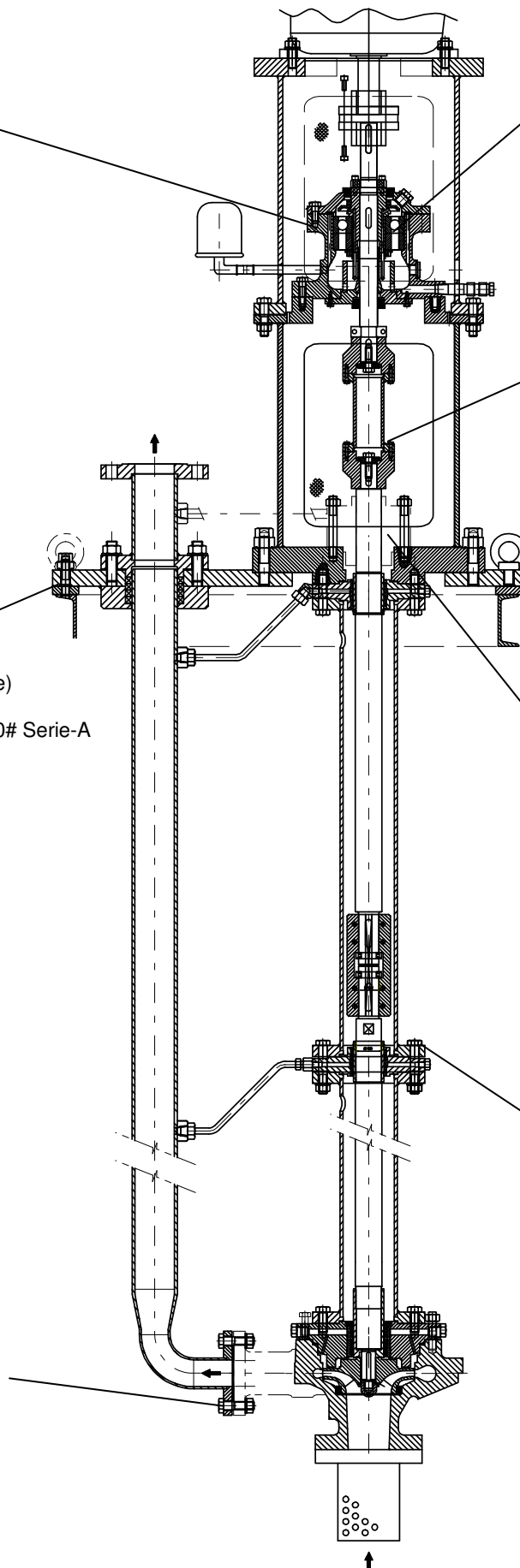
Option:
Soleplate (circular flange)
acc. to:
ASME B16.47 Class 150# Serie-A



Seal chamber acc. to API 610 accommodates all mechanical seals to API 682

Spacing between shaft guide bushing acc. to API 610

Flanges to all standards
PN 40 equivalent (ASME
Class 300)





7. Technical data

Pump Size		Unity	25-180	25-230	40-180	40-230	50-200	80-200	40-181	40-231	40-280	40-281	40-361	50-180
Volute type		--	Simple											
Impeller	- Outlet width	mm	6	6	6	6,2	10,5	14	7,8	7,7	7,5	7,7	7,9	10,9
	- Inlet diameter		48	48	58	57	88	105	75	75	61	71	69	88
	- maximum diam.		179	224	180	224	205	207	180	230	278	278	343	180
	- minimum diam.		120	180	130	180	164	166	130	180	220	230	280	140
Sealing chamber size (Acc.to API 682 Table 1)		--	4											
Bearing type / Lubrication			6313C3 / oil											
Shaft diameter	- in the sealing chamber (D)	mm	50											
	- in the bearing		65											
	- in the coupling		32											
	- in the impeller		24						27					
Shaft deflection			As per API 610 11 th edition											
Pressure limits	Max.operating pressure	bar	35 ²⁾											
	Max.test pressure	bar	1,5 times the operating pressure or as per API 610 11 th edition											
Flanges		--	ASME B16.5 Class 300 RF											
Temp.limit	Max.fluid temp.	°C	230 ³⁾											
Driver	Maximum Value P/n ¹⁾	kW / rpm	0,019						0,032					
Motor	n = 1450 rpm	kW	28						47					
	n = 1750 rpm		33						56					
	n = 2900 rpm		55						93					
	n = 3500 rpm		67						112					

¹⁾ Values indicated refer to shaft in material A434 4140CL.BB and impeller in A216WCB & temperature < 100°C.

²⁾ Pressure limit refers to piping in material A106.

³⁾ Temperature limit refers to bearing bushes in material Peek.

For other condition, please consult KSB.

8. Materials table

(reference for main parts)

Part No.	Description	Variant S5	Variant S6	Variant A8
102	Volute casing	A 216 Grade WCB	A 216 Grade WCB	A 351 Grade CF8M
161	Casing cover	A 216 Grade WCB / A 516 Grade 65	A 216 Grade WCB / A 516 Grade 65	A 351 Grade CF8M
210	Shaft	A 434/4140CL.BB	A 434/4140CL.BB	A276 Type 316
230	Impeller	A 216 Grade WCB	A 743 Grade CA6NM	A 743 Grade CF8M
350	Bearing housing	A 216 Grade WCB	A 216 Grade WCB	A 216 Grade WCB
411.10	Joint ring	Spiral SS316 -Graphite	Spiral SS316 -Graphite	Spiral SS316 -Graphite
502 / 503	Wear ring	AISI 420 Hard	AISI 420 Hard	AISI 316 Hard Faced
711	Rising	A106 Grade B	A106 Grade B	AISI 316
902.01 / 920.01	Casing bolts / hex.nut	A193 Grade B7 / A194 Grade 2H	A193 Grade B7 / A194 Grade 2H	A193 Grade B7 / A194 Grade 2H

Other materials acc. to API 610 are available on request.



9. Design details

9.1 Pump casing

Radially split, consisting of volute casing and casing cover. Volute casing with casing wear rings. Casing cover with casing wear rings, depending on axial thrust balancing.

9.2 Impeller

Closed radial impeller, impeller wear ring on the suction side. Discharge side wear ring only on hydraulically balanced impellers.

9.3 Balancing

Balancing of axial thrust by sealing gap and balancing holes (if required).

9.4 Minimum flow

Unless specified otherwise in the individual characteristic curves, the following applies:

$Q_{min} = 0,1 \cdot Q_{opt}$. for short operation

$Q_{min} = 0,3 \cdot Q_{opt}$. for continuous operation

9.5 Bearing lubrication

Bearing bracket – oil fill in 0,5 l.
Lubricating oil types C 46 DIN 51 517 or SAE 20 W/20 HD shall be used.
On the standard pump design, the bearing bracket is uncooled.
NPT threads are provided for constant-level oiler, oil drain and vent plug.
The bearings are designed for at least 25,000 operating hours as per API 610/11th edition.
During pump standstill the oil level can be checked against the center of the oil level sight glass.

9.6 Shaft

Depending on installation following shafts are necessary: pump shaft, intermediate shaft and drive shaft.
The shafts are coupled by split coupling.

9.7 Shaft sealing

The pump is fitted with mechanical seals or gland packing (special variant). The mechanical seal chamber is designed in acc. to API 610, 11th edition. Mechanical seals are provided in cartridge design only (API 682)!
Sealing plans with an external source (plans 32,52,53,54) to lubricate mechanical seal faces in order to avoid dry run during start-up.
For other sealing plans and gland packing applications consult KSB.

9.8 Direction of rotation

Clockwise, viewed from the drive end.

9.9 Bearing guides

Sliding type in Peek material with shaft protecting sleeve.

9.10 Bearing guide lubrication

The following possibilities are available:

a) Pumped liquid:

When the product have lubricant characteristics, with a maximum of 20 p.p.m. of impurity and particle with 10 µm. Each bearing receives injection through a piping connected to the rising pipe.

b) Clean water of external source (optional):

Water injection is done in all bearings through an external connection located above the mounting plate.

9.11 Soleplate sealing

Flexible graphite packing rings with wire reinforcement to control fugitive emissions - Teadit Style 2000IC:

- Temperature: -240 ~ 450 °C
- Pressure: up to 400 bar
- pH: 0 ~14

9.12 Surface Coating

Type A1 – Standard surface coating for material variants S5 e S6 up to 90°C.

Preparatory treatment	Grease-free / steel shot blasting ISO 8501-1 SA 2 ½.	
Primer	1 coat - 100 µm thick (dry) – Zinc phosphate epoxy.	
Finish coat	Internal surfaces:	External surfaces: Acrylic aliphatic polyurethane RAL 5002 blue
	Without	1 coat - 70 µm thick (dry).

Type A2 – Standard surface coating for material variants S5 e S6 from 90°C up to 230°C.

Preparatory treatment	Grease-free / steel shot blasting ISO 8501-1 SA 2 ½.	
Primer	1 coat - 50 µm thick (dry) - Zinc inorganic silicate.	
Finish coat	Internal surfaces:	External surfaces: Monocomponent modified silicate Aluminum 800
	Without	1 coat - 35 µm thick (dry).

Notes:

- Material combinations C6, A8 and D1 do not have coating.
- Special surface coating available on request.

10. Pump selection

RPH-V pumps use the same published curves as horizontal version RPH, however items 10.1 until 10.4 should be considered for the correct pump selection.

10.1 Pump head

The reference line to define the pump head and capacity is the pump discharge flange (DN2).

The performance curve does not consider pressure losses in the suction strainer, discharge curve, column bearings, rising piping and internal circulation for bearing lubrication.

The pump total head is the sum of following items:

- Installation head,
- loss in the straight discharge column.
- loss in the discharge curve (elbow) , and
- loss in the strainer.



10.2 Pressure losses

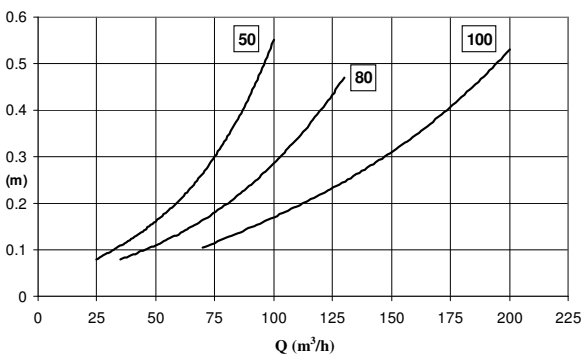
Piping losses – Head losses in straight pipes in 100 m of pipe (in m)

Nominal flow m ³ /h	Nominal diameter				
	40	50	80	100	150
1	0,22	0,08			
1,5	0,50	0,17			
2	0,80	0,28			
3	1,80	0,60	0,05		
4	3,00	1,05	0,10		
5	4,70	1,60	0,15	0,05	
6	6,60	2,20	0,20	0,07	
8	11,50	3,90	0,35	0,13	
10	17,00	5,70	0,50	0,20	
12,5	26,00	8,50	0,80	0,28	
15	37,00	12,50	1,10	0,40	0,05
17,5	47,00	16,00	1,40	0,50	0,06
20	63,00	21,50	2,00	0,70	0,09
25	95,00	33,00	3,00	1,10	0,13
30		45,00	4,20	1,50	0,20
35		61,00	5,70	2,00	0,24
40		78,00	7,00	2,50	0,30
45		100,00	9,00	3,10	0,40
50			11,00	3,80	0,50
60			16,00	5,50	0,70
70			21,00	7,20	0,90
80			26,50	9,20	1,20
90			34,00	12,00	1,40
100			40,00	14,00	1,80
120			58,00	20,00	2,50
140			80,00	27,00	3,30
160				35,00	4,25
180				43,00	5,30
200				50,00	6,50

Piping losses – Head losses at 90° elbow (in m)

Nominal flow m ³ /h	Nominal diameter at pump discharge nozzle			
	25	40	50	80
3	0,02			
4	0,04			
5	0,07	0,01		
6	0,10	0,02		
8	0,18	0,03	0,01	
10	0,28	0,04	0,02	
12,5	0,43	0,07	0,03	
15	0,62	0,10	0,04	
17,5	0,85	0,13	0,05	
20	1,11	0,17	0,07	0,01
25	1,73	0,26	0,11	0,02
30	2,50	0,38	0,16	0,02
35		0,52	0,21	0,03
40		0,68	0,28	0,04
45		0,86	0,35	0,05
50		1,06	0,43	0,07
60		1,52	0,62	0,10
70		2,08	0,85	0,13
80			1,11	0,17
90			1,41	0,21
100			1,73	0,26
120			2,50	0,38
140				0,52
160				0,68
180				0,86
200				1,06
250				1,65
300				2,38

Strainer losses (in m) – curves refer to suction nozzle nominal diameter DN1.



10.3 NPSH

The NPSH values indicated in the individual performance curves were measured on impellers without hydraulic balancing. They correspond to a 3 % drop of the pump head.

Generally a value of $NPSH_{available} - NPSH_{pump} \geq 0,5 \text{ m}$ is desirable (for hot water applications please contact KSB).

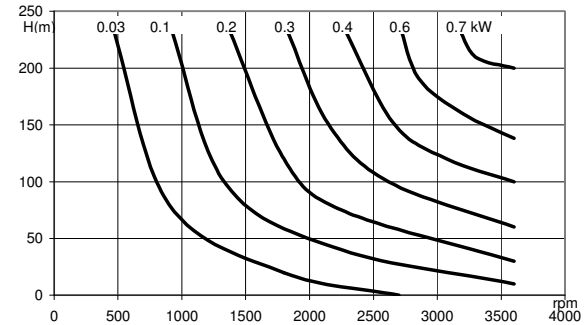
10.4 Efficiency

The efficiencies specified in the performance curves refer only to the hydraulic pump without losses. Axial thrust balancing of the impeller, fluid viscosity, a larger impeller clearance gap, the shaft seal type, drive shaft and thrust bearing losses reduce the pump's overall efficiency.

Efficiency was measured using a clearance gap to AN 1501, group 2 and an inlet pressure of 2 to 3 bar.

The efficiency is stated in the individual performance curves of horizontal version (RPH).

10.4.1 Power consumption per guide bearing



Note:

Power consumption of mechanical seal should also be considered.

10.5 Drive

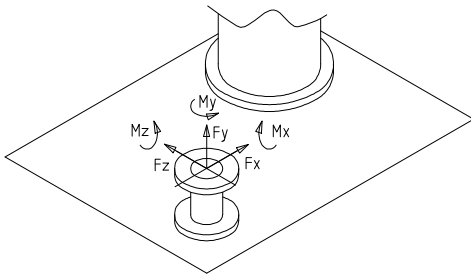
Direct or indirect by electric motor, engine or turbine, if an internal combustion engine has been specified, special care shall be taken when selecting the type of coupling to be used.

10.6 Motor selection

When determining the motor size, consideration shall be given to the efficiency determined and the power margins as per API 610.

Motor rating	Power margin
up to 22 kW	25 %
22 to 55 kW	15 %
above 55 kW	10 %

10.7 External nozzle forces and moments



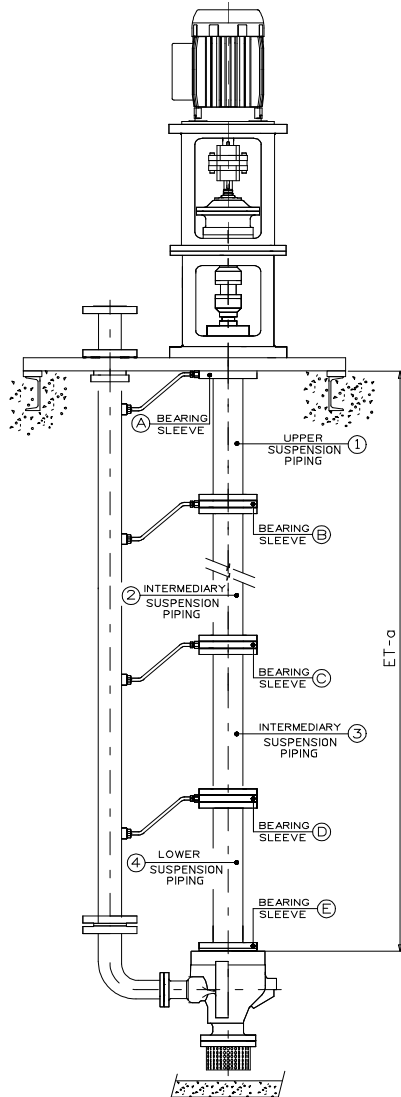
Pump sizes	Discharge nozzle							
	Forces (in N)				Moments (in Nm)			
	F_x	F_y	F_z	F_{res}	M_x	M_y	M_z	M_{res}
25-180	710	580	890	1280	460	230	350	620
25-230								
40-180	1070	890	1330	1930	950	470	720	1280
40-230								
40-280								
40-181	1070	890	1330	1930	950	470	720	1280
40-231								
40-281								
40-361								
50-180	1070	890	1330	1930	950	470	720	1280
50-200								
80-200	2490	2050	3110	4480	2300	1180	1760	3130



11. Installation depths

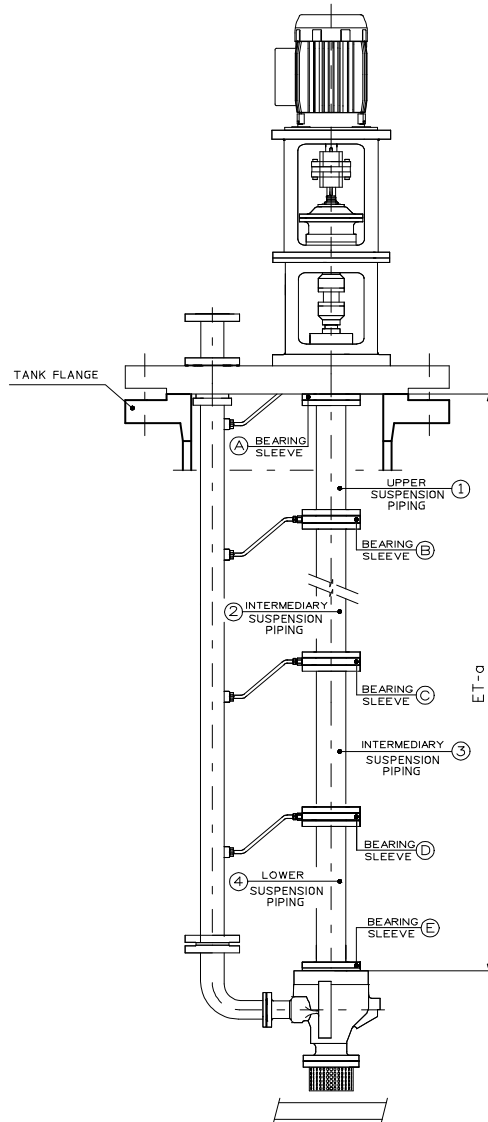
11.1 – Rectangular Soleplate (see item 14.1)

Suspension piping length (mm)				Bearing sleeve					Size											
Upper	Intermediary	Intermediary	Lower	Upper	Intermediary	Intermediary	Intermediary	Lower	25-180	25-230	40-180	40-181	50-180	50-200	40-230	40-231	40-280	40-281	80-200	40-361
1	2	3	4	A	B	C	D	E	ET-a (mm)											
400	----	----	----	X	N.A	N.A	N.A	X	425											
500	----	----	----	X	N.A	N.A	N.A	X	525											
600	----	----	----	X	N.A	N.A	N.A	X	625											
800	----	----	----	X	N.A	N.A	N.A	X	825											
900	----	----	----	X	N.A	N.A	N.A	X	925											
500	500	----	----	X	X	N.A	N.A	X	1055											
600	500	----	----	X	X	N.A	N.A	X	1155											
600	600	----	----	X	X	N.A	N.A	X	1255											
900	400	----	----	X	X	N.A	N.A	X	1355											
900	500	----	----	X	X	N.A	N.A	X	1455											
900	600	----	----	X	X	N.A	N.A	X	1555											
800	800	----	----	X	X	N.A	N.A	X	1655											
900	800	----	----	X	X	N.A	N.A	X	1755											
900	900	----	----	X	X	N.A	N.A	X	1855											
900	600	400	----	X	X	X	N.A	X	1985											
900	600	500	----	X	X	X	N.A	X	2085											
900	600	600	----	X	X	X	N.A	X	2185											
900	900	400	----	X	X	X	N.A	X	2285											
900	900	500	----	X	X	X	N.A	X	2385											
900	900	600	----	X	X	X	N.A	X	2485											
900	800	800	----	X	X	X	N.A	X	2585											
900	900	800	----	X	X	X	N.A	X	2685											
900	900	900	----	X	X	X	N.A	X	2785											
900	800	600	500	X	X	X	X	X	2915											
900	900	600	500	X	X	X	X	X	3015											
900	900	800	400	X	X	X	X	X	3115											
900	900	900	400	X	X	X	X	X	3215											
900	900	900	500	X	X	X	X	X	3315											
900	900	900	600	X	X	X	X	X	3415											
900	900	800	800	X	X	X	X	X	3515											
900	900	900	800	X	X	X	X	X	3615											
900	900	900	900	X	X	X	X	X	3715											

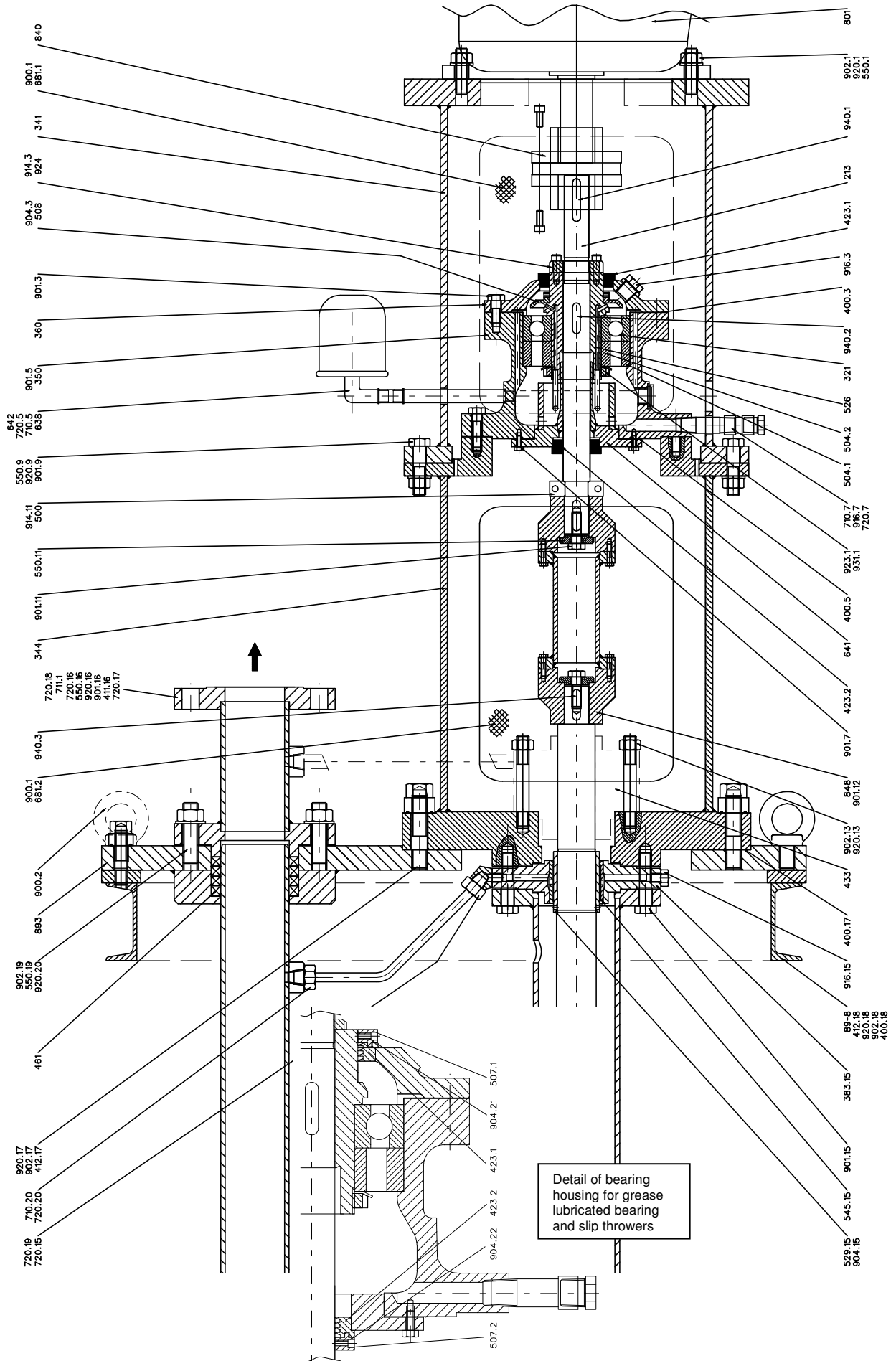


11.2 – Circular soleplate (see item 14.2)

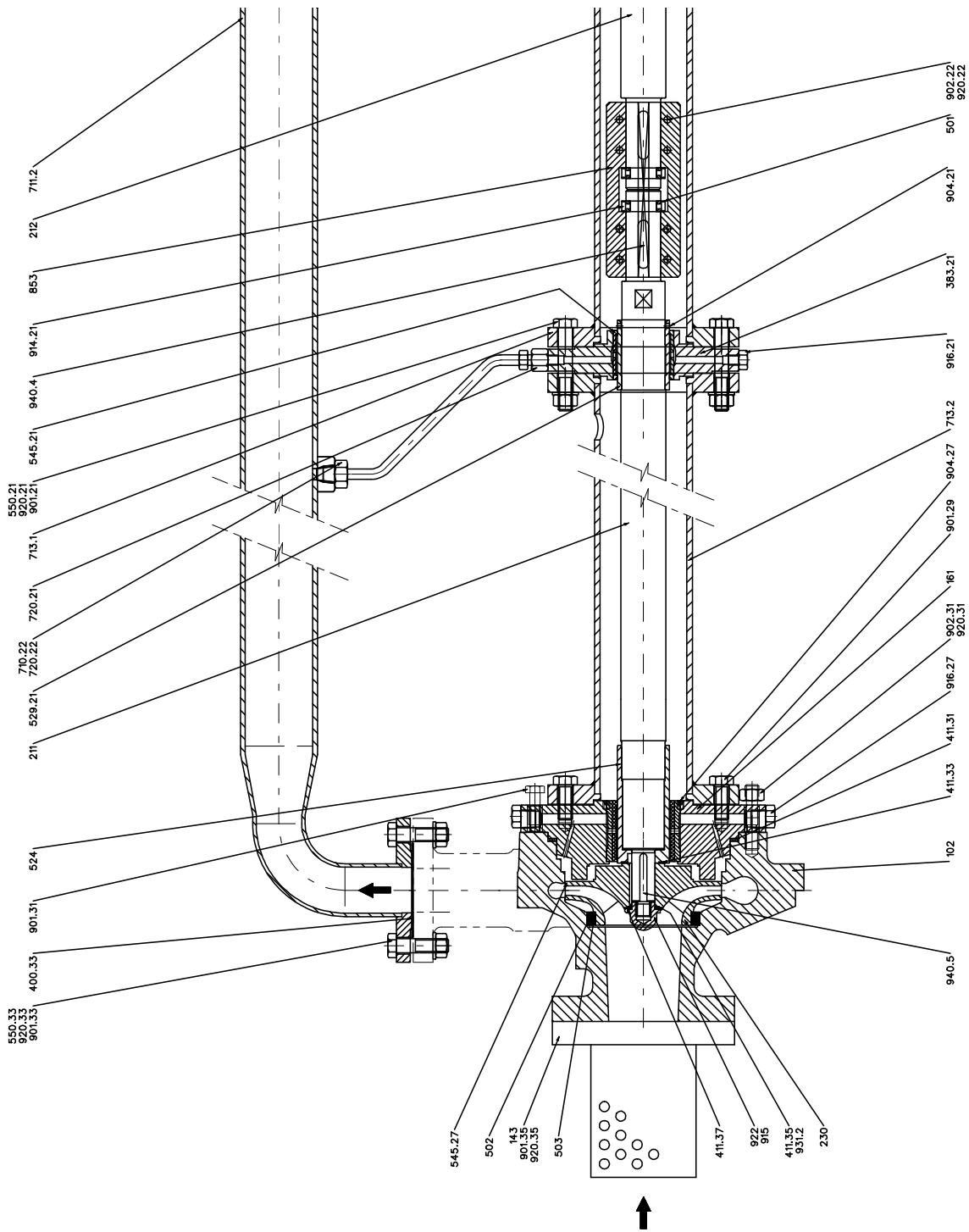
Suspension piping length (mm)				Bearing sleeve					Size											
Upper	Intermediary	Intermediary	Lower	Upper	Intermediary	Intermediary	Intermediary	Lower	25-180	25-230	40-180	40-181	50-180	50-200	40-230	40-231	40-280	40-281	80-200	40-361
1	2	3	4	A	B	C	D	E	ET-a (mm)											
400	----	----	----	X	N.A	N.A	N.A	X									375			365
500	----	----	----	X	N.A	N.A	N.A	X									485			465
600	----	----	----	X	N.A	N.A	N.A	X									585			565
800	----	----	----	X	N.A	N.A	N.A	X									785			765
900	----	----	----	X	N.A	N.A	N.A	X									885			865
500	500	----	----	X	X	N.A	N.A	X									1015		1005	995
600	500	----	----	X	X	N.A	N.A	X									1115		1100	1095
600	600	----	----	X	X	N.A	N.A	X									1215		1200	1195
900	400	----	----	X	X	N.A	N.A	X									1315		1300	1295
900	500	----	----	X	X	N.A	N.A	X									1415		1400	1395
900	600	----	----	X	X	N.A	N.A	X									1515		1500	1495
800	800	----	----	X	X	N.A	N.A	X									1615		1600	1595
900	800	----	----	X	X	N.A	N.A	X									1715		1700	1695
900	900	----	----	X	X	N.A	N.A	X									1815		1800	1795
900	600	400	----	X	X	X	N.A	X									1945		1935	1925
900	600	500	----	X	X	X	N.A	X									2045		2035	2025
900	600	600	----	X	X	X	N.A	X									2145		2135	2125
900	900	400	----	X	X	X	N.A	X									2245		2235	2225
900	900	500	----	X	X	X	N.A	X									2345		2335	2325
900	900	600	----	X	X	X	N.A	X									2445		2435	2425
900	800	800	----	X	X	X	N.A	X									2545		2535	2525
900	900	800	----	X	X	X	N.A	X									2645		2635	2625
900	900	900	----	X	X	X	N.A	X									2745		2735	2725
900	800	600	500	X	X	X	X	X									2875		2865	2855
900	900	600	500	X	X	X	X	X									2975		2965	2955
900	900	800	400	X	X	X	X	X									3075		3065	3055
900	900	900	400	X	X	X	X	X									3175		3165	3155
900	900	900	500	X	X	X	X	X									3275		3265	3255
900	900	900	600	X	X	X	X	X									3375		3365	3355
900	900	800	800	X	X	X	X	X									3475		3465	3455
900	900	900	800	X	X	X	X	X									3575		3565	3555
900	900	900	900	X	X	X	X	X									3675		3665	3655



12. Sectional drawing (part 1/2) – reference only



Sectional drawing (part 2/2)

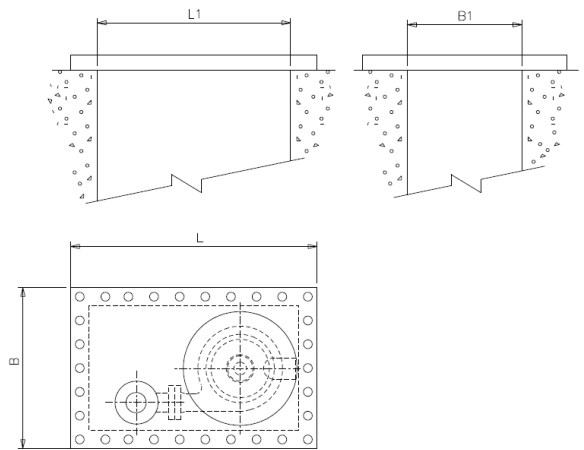
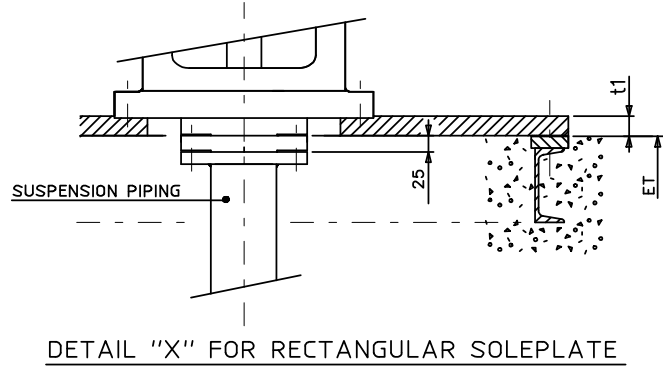
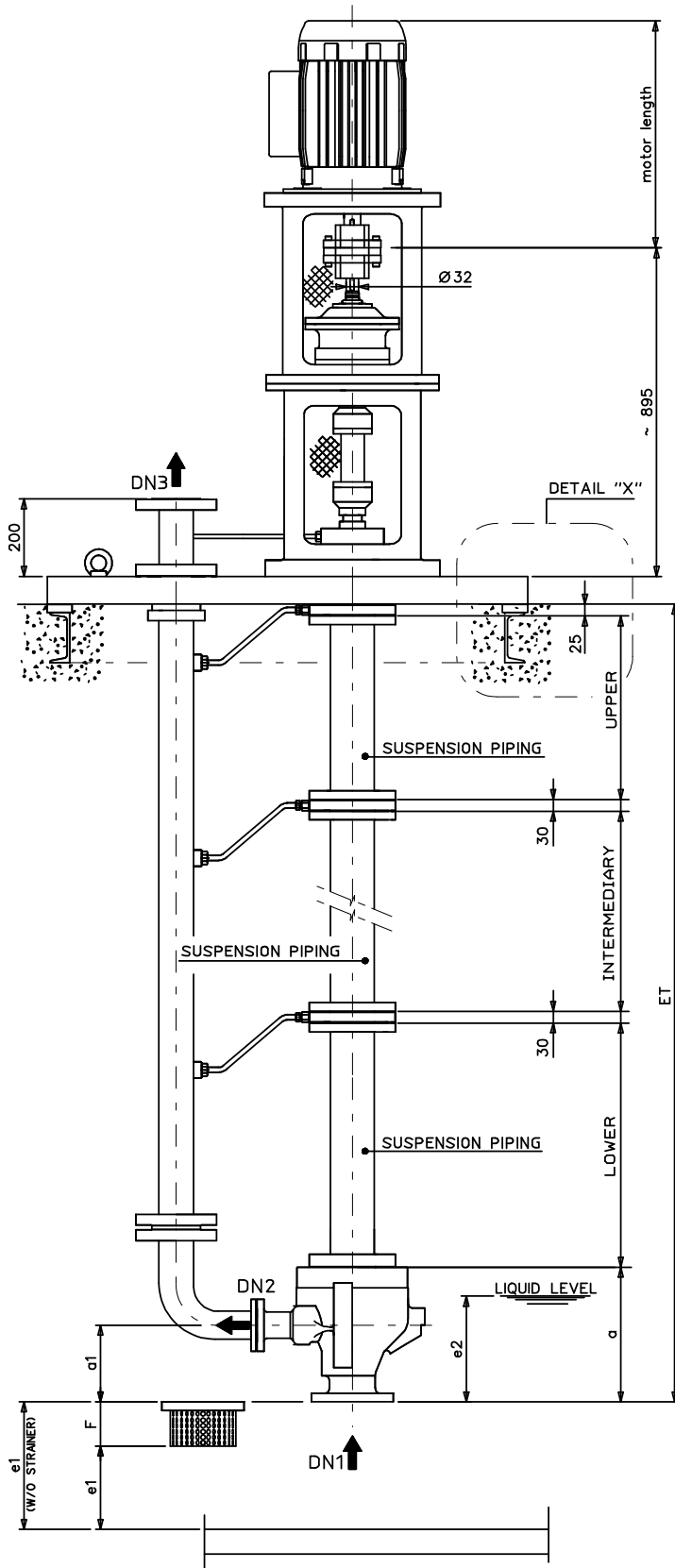


13. Main parts list

Description	Part n°	Description	Part n°	Description	Part n°
Volute casing	102	Bearing cover	360	Bearing sleeve	529.15
Strainer (optional)	143	Spider	383.15	Bearing sleeve	529.21
Casing cover	161	Spider	383.21	Constant level oiler	638
Pump shaft	211	Spiral wound	411.31	Rising	711.1
Intermediary shaft	212	Mechanical seal	433	Rising	711.2
Drive shaft	213	Lantern ring	458	Suspension piping	713.1
Impeller	230	Packing	461	Suspension piping	713.2
Bearing	321	Wear ring	502	Soleplate	893
Drive lantern	341	Impeller wear ring	503	Impeller nut	922
Bearing bracket lantern	344	Shaft prot.sleeve	524	Bearing nut	923
Bearing casing	350	Center sleeve	526		

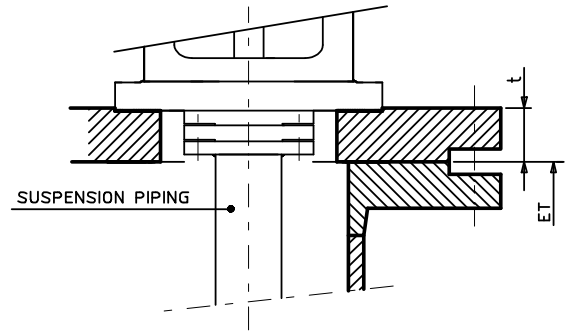
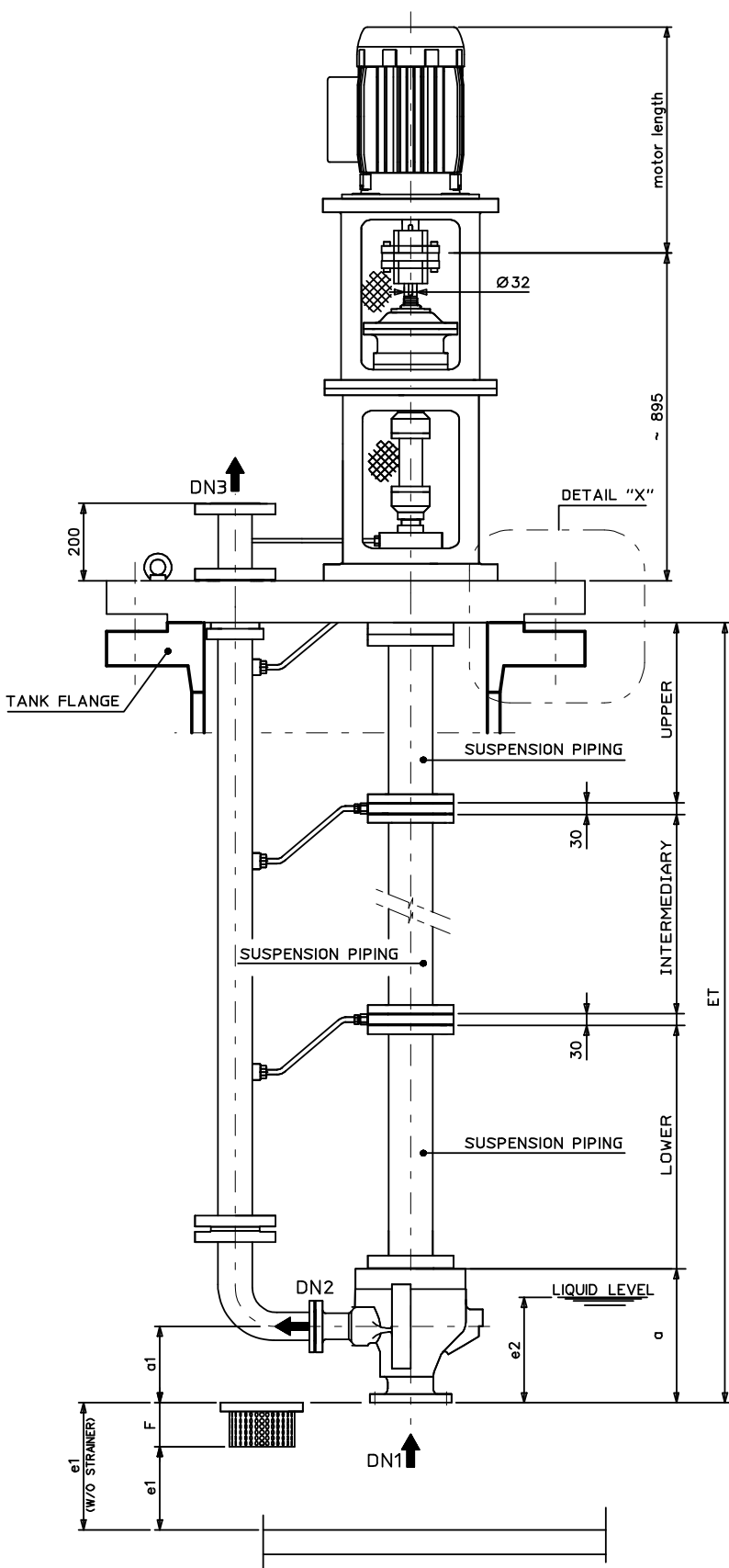
14. Pump dimensions – General arrangement drawing

14.1 - Rectangular soleplate

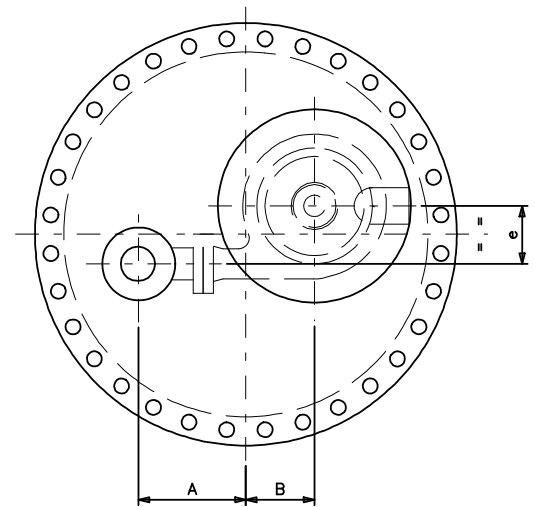
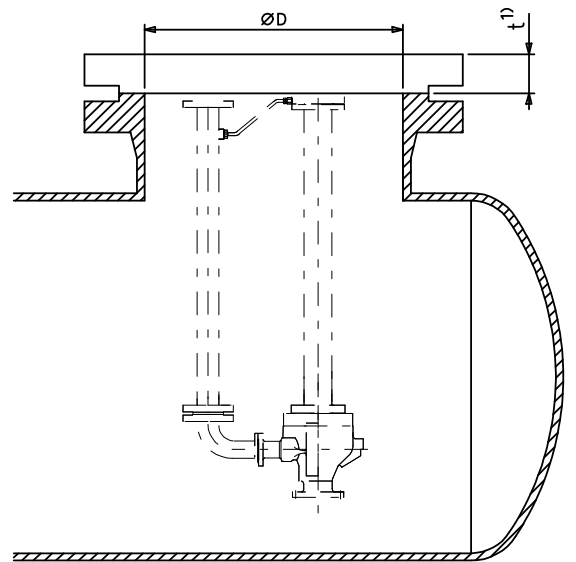


RECTANGULAR SOLEPLATE

14.2 – Circular Flange



DETAIL "X" FOR CIRCULAR SOLEPLATE



CIRCULAR SOLEPLATE

15. Pump dimensions ¹⁾

15.1 Table 1

PUMP SIZE	PUMP								
	NOZZLES			a	a1	e	e1 (min)	e2 (min)	F
	DN1	DN2	DN3						
25-180	40	25	40	214	120	105	65	240	140
25-230	40	25	40	206	120	125	65	240	140
40-180	50	40	80	224	130	105	80	260	160
40-181	50	40	80	228	130	110	80	260	160
40-230	50	40	80	216	130	130	80	260	160
40-231	50	40	80	230	140	135	80	280	160
40-280	50	40	80	234	140	160	80	280	160
40-281	50	40	80	235	140	160	80	280	160
40-361	50	40	80	242	150	195	80	300	160
50-180	80	50	80	248	150	120	100	300	160
50-200	80	50	80	236	150	125	100	300	160
80-200	100	80	150	271	185	130	125	370	200

15.2 Table 2

PUMP SIZE	SOLEPLATE									
	CIRCULAR FLANGE ²⁾					RECTANGULAR				
	Nominal pipe size	A	B	D (min.) ³⁾	t	TANK		SOLEPLATE		
						L1	B1	L	B	t1
25-180	26"	247	125	610	66,7	690	470	782	562	31,7
25-230	28"	247	150	660	69,9	720	470	812	562	31,7
40-180	28"	252	160	660	69,9	760	470	852	562	31,7
40-181	28"	252	160	660	69,9	760	470	852	562	31,7
40-230	30"	272	155	711	73,1	770	480	862	572	31,7
40-231	30"	272	155	711	73,1	770	480	862	572	31,7
40-280	32"	297	155	762	79,4	800	550	892	642	31,7
40-281	32"	297	155	762	79,4	800	550	892	642	31,7
40-361	36"	337	130	864	88,9	830	630	922	722	31,7
50-180	28"	257	165	660	69,9	770	470	862	562	31,7
50-200	26"	227	130	610	66,7	700	470	792	562	31,7
80-200	30"	235	170	711	73,1	800	530	892	622	31,7

¹⁾ Dimensions in mm, except where noted.

²⁾ Dimensions according to ASME B16.47 Class 150# RF Serie A.
Standard materials for a maximum working pressure of 13,5 bar at 200°C:
- Casted: A216 WCB (CS) and A351CF8M (SS).
- Forged: A105 (CS) and A182 Gr. F316 (SS).
Others materials, rating class or different flange thickness upon request.

³⁾ D is the minimum pipe inside diameter.



16. Pump weight – estimated values

SUSPENSION PIPE	PUMP SIZE																				
	RECTANGULAR SOLEPLATE										CIRCULAR SOLEPLATE										
	25-180	25-230	40-180	40-230	50-200	80-200	40-181	40-231	40-280	40-361	50-180	50-180	40-361	40-280	40-231	40-181	40-231	40-280	40-361	50-180	50-180
400	815.2	847.7	844.5	886.5	852.5	932.5	843	888.5	935.5	1006	861.5	909.7	963.7	960.5	989.5	1012.5	1048.5	1082	1094.5	1021.5	1035
500	817.7	851.7	849.5	891	861	942	850	893	940.5	1012.5	869.5	913.7	967.7	965.5	994	1021	1058	1089	1099	1026.5	1041.5
600	819.2	855.2	853.5	895.5	867	949.5	855.5	897.5	944.5	1018.5	876	917.2	971.2	969.5	998.5	1027	1065.5	1074.5	1103.5	1030.5	1047.5
800	823.2	862.2	861	903.5	876.5	960.5	866.5	905.5	952	1029	885	924.2	978.2	977	1006.5	1036.5	1076.5	1085.5	1111.5	1038	1058
900	825.2	866.2	865.5	907.5	882.5	968.5	872.5	909.5	956.5	1035.5	891.5	928.2	982.2	981.5	1010.5	1042.5	1084.5	1091.5	1115.5	1042.5	1064.5
500	920.4	975.4	975.2	1021.4	988.9	1085.2	975.2	1023.6	1075.3	1154.5	998.3	1043.6	1103.0	1102.8	1134.7	1164.9	1212.8	1216.6	1250.2	1169.9	1186.4
600	923.2	959.4	959.8	1005.0	976.3	1074.2	962.0	1008.2	1059.9	1141.3	985.1	1027.6	1087.0	1087.4	1119.3	1152.3	1201.8	1202.9	1234.8	1154.5	1173.2
800	927.7	983.1	984.0	1030.7	1000.5	1100.6	966.2	1032.9	1084.1	1165.5	1009.3	1051.3	1110.7	1111.6	1144.0	1176.5	1228.2	1227.1	1259.5	1178.7	1197.4
900	926.4	987.5	989.5	1035.7	1009.3	1110.5	997.2	1037.9	1089.6	1176.5	1018.1	1055.7	1115.1	1117.1	1149.0	1185.3	1238.1	1238.1	1264.5	1184.2	1208.4
900	929.2	991.9	994.4	1040.6	1014.2	1117.6	1002.1	1042.8	1094.5	1181.4	1023.0	1060.1	1119.5	1122.0	1153.9	1190.2	1245.2	1243.0	1289.4	1189.1	1213.3
900	930.8	995.7	998.8	1045.6	1019.2	1124.2	1006.5	1047.8	1098.9	1185.8	1027.4	1063.9	1123.3	1126.4	1158.9	1195.2	1251.8	1247.4	1274.4	1193.5	1217.7
800	933.6	999.6	1003.2	1050.0	1021.9	1129.1	1009.3	1052.2	1103.3	1188.0	1030.7	1067.8	1127.2	1130.8	1163.3	1197.9	1256.8	1250.2	1278.8	1197.9	1219.9
900	935.8	1004.0	1008.7	1054.9	1029.1	1137.4	1016.4	1057.1	1108.8	1195.7	1037.3	1072.2	1131.6	1136.3	1168.2	1205.1	1265.0	1257.3	1283.7	1203.4	1227.6
900	938.0	1008.4	1013.7	1069.8	1034.6	1144.6	1021.4	1072.0	1113.8	1200.7	1042.3	1076.6	1136.0	1141.3	1183.1	1210.6	1272.2	1262.3	1298.6	1208.4	1232.6
900	1035.84	1124.04	1130.4	1181.4	1153.2	1275.6	1138.8	1183.8	1239.6	1334.4	1182.2	1198.44	1263.24	1269.6	1305	1345.2	1414.8	1401.6	1431	1342.8	1369.2
900	1038.84	1128.84	1135.8	1186.8	1159.2	1283.4	1144.2	1189.2	1245	1339.8	1187.6	1203.24	1268.04	1275	1310.4	1351.2	1422.6	1407	1436.4	1348.2	1374.6
900	1040.64	1133.04	1140.6	1191.6	1164.6	1290.6	1149	1194	1249.8	1344.6	1172.4	1207.44	1272.24	1279.8	1315.2	1356.6	1429.8	1411.8	1441.2	1353	1379.4
900	1043.64	1137.84	1146	1197.6	1170	1298.4	1154.4	1200	1255.2	1350	1178.4	1212.24	1277.04	1285.2	1321.2	1362	1437.6	1417.2	1447.2	1358.4	1384.8
900	1046.64	1142.64	1152	1203	1176	1305.6	1160.4	1205.4	1261.2	1356	1183.8	1217.04	1281.84	1291.2	1326.6	1368	1444.8	1423.2	1452.6	1364.4	1390.8
900	1048.44	1146.84	1156.8	1207.8	1180.8	1312.8	1165.2	1210.2	1266	1360.8	1188.6	1221.24	1286.04	1296	1331.4	1372.8	1452	1428	1457.4	1369.2	1395.6
900	1051.44	1151.04	1161.6	1212.6	1186.2	1320	1170	1215	1270.8	1365.6	1193.4	1225.44	1290.24	1300.8	1336.2	1378.2	1459.2	1432.8	1462.2	1374	1400.4
900	1053.84	1155.84	1167	1218	1191.6	1327.8	1175.4	1220.4	1276.2	1371	1199.4	1230.24	1295.04	1306.2	1341.6	1383.6	1467	1438.2	1467.6	1379.4	1405.8
900	1056.24	1160.64	1173	1224	1197	1335	1181.4	1226.4	1282.2	1377	1205.4	1235.04	1299.84	1312.2	1347.6	1389	1474.2	1444.2	1473.6	1385.4	1411.8
900	1247.7	1382.1	1397.2	1456.7	1426.6	1589.0	1407.0	1459.5	1524.6	1635.2	1435.0	1468.9	1544.5	1559.6	1600.9	1650.6	1751.4	1713.6	1747.9	1645.0	1675.8
900	1250.5	1387.7	1403.5	1463.0	1432.9	1598.1	1413.3	1465.8	1530.9	1641.5	1441.3	1474.5	1550.1	1565.9	1607.2	1656.9	1760.5	1719.9	1754.2	1651.3	1682.1
900	1253.3	1392.6	1409.1	1469.3	1439.2	1606.5	1419.9	1472.1	1536.5	1647.1	1446.9	1479.4	1555.0	1571.5	1613.5	1663.2	1768.9	1725.5	1760.5	1656.9	1687.7
900	1256.1	1398.2	1415.4	1475.6	1446.2	1615.6	1426.2	1478.4	1542.8	1653.4	1453.2	1485.0	1560.6	1577.8	1619.8	1670.2	1778.0	1731.8	1766.8	1663.2	1694.0
900	1259.6	1403.8	1421.7	1481.9	1452.5	1624.7	1431.5	1484.7	1549.1	1659.7	1460.2	1490.6	1566.2	1584.1	1626.1	1676.5	1787.1	1738.1	1773.1	1669.5	1700.3
900	1261.7	1408.7	1428.0	1487.5	1458.8	1632.4	1437.8	1490.3	1555.4	1666.0	1465.8	1495.5	1571.1	1590.4	1631.7	1682.8	1794.8	1744.4	1778.7	1675.8	1706.6
900	1265.2	1413.6	1433.6	1493.8	1465.1	1640.8	1443.4	1496.6	1561.0	1671.6	1472.1	1500.4	1576.0	1596.0	1639.0	1689.1	1803.2	1750.0	1785.0	1681.4	1712.2
900	1268.0	1419.2	1439.9	1500.1	1471.4	1649.9	1449.7	1502.9	1567.3	1677.9	1478.4	1506.0	1581.6	1602.3	1644.3	1695.4	1812.3	1756.3	1791.3	1687.7	1718.5
900	1270.8	1424.8	1446.2	1506.4	1477.7	1663.9	1456.0	1509.2	1573.6	1684.2	1484.7	1511.6	1587.2	1608.6	1650.6	1701.7	1826.3	1762.6	1797.6	1694.0	1724.8

Note: Only pump weight