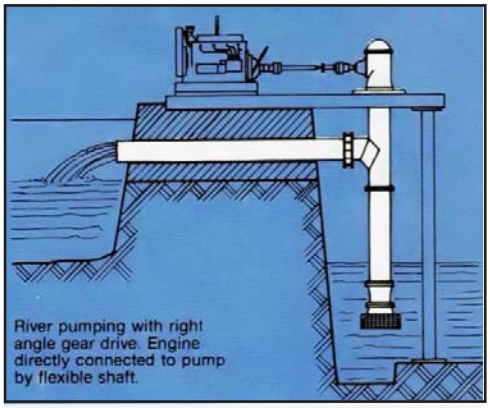
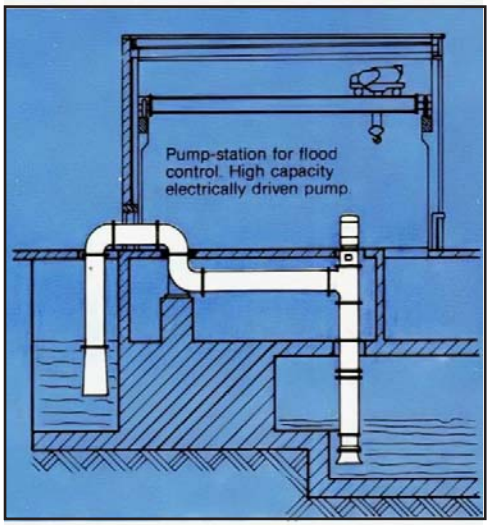
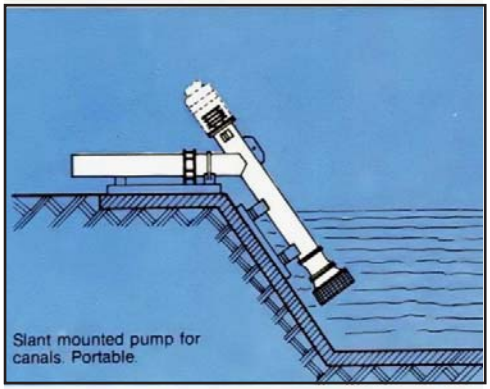
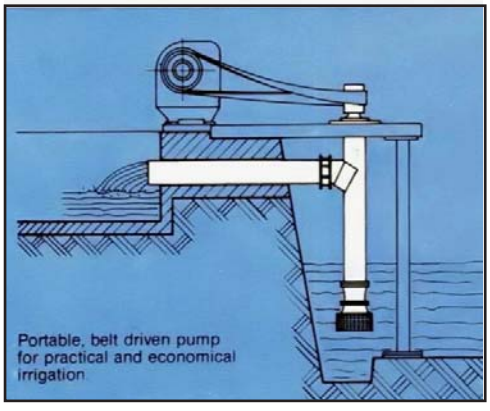
AV
Vertical
Propeller
Pumps

DRAKOS - POLEMIS S.A


River pumping with right angle gear drive. Engine directly connected to pump by flexible shaft.


Pump-station for flood control. High capacity electrically driven pump.


Slant mounted pump for canals. Portable.


Portable, belt driven pump for practical and economical irrigation.

DESIGN FEATURES

Space Saving

Vertical arrangement saves valuable floor space.

Self Priming

Designed to operate with submerged impeller. Instantly serviceable. Low operation cost.

Easy to install

Self- contained pumping units. They can be easily suspended from a floor, or an over structure.

Design Flexibility

Oil, grease, or water lubrication. Driven by electric motor, diesel engine, directly or through a right angle gear drive or belt.

Discharge head over or under floor. Height adjustable with standard column parts.

SPECIAL DESIGN FEATURES

1. Standardized parts.
2. Flexibility of lubrication
3. Standard construction: Impeller with separate vanes, except pump size 250 mm permit vane angle adjustment and selection of suitable material
4. Separate impeller surrounding ring permits easy replacement and selection of suitable material
5. Special sealing device instead of the traditional stuffing box with packing to prevent shaft abrasion

GENERAL

The AV type pumps are propeller axial flow pumps. Capacity from 300 to 25000 m³/h. Total heads up to 10 m per stage. Usually the propeller pumps are installed in a vertical position taking suction from an open sump discharging through a 90 degree elbow. They can be mounted horizontally if necessary. It is also quite common to lay the pump at on angle on a level or ditch bank. This reduces the cost of the supporting structure.

DRIVERS

Electric Motors

Electric motors, are, usually connected directly to the pump. With hollow shaft motors, downward thrust of the pumps' rotating assembly is carried by a thrust bearing built into the motor. The line shaft extends up through the motor shaft and is properly secured at the top. With solid shaft motors, the line shaft is connected to a heavy ball bearing thrust assembly, located on the pump base plate.

Internal Combustion Engines

The drivers are connected to the pump by a right angle gear drive or through a belt drive.

PUMP ELBOW AND SUPPORTING COLUMN

The elbow and column support the driver and guide the flow of the water from the bowl assembly to the discharge piping. The elbow is integral with the baseplate and can be either above or below it , depending on the requirements of the installation. The below base elbow is usually preferred as its lower center of gravity makes for a more stable pump and motor assembly. The above base, or surface elbow sometimes allows the use of a smaller supporting structure. Normally the elbow discharge is horizontal, or at 90 degrees from the pump shaft, but other angles can be furnished if required. The end of the elbow is round and plain, to accommodate a flexible pipe coupling similar to the Dresser Style 38.

A flanged elbow can be furnished but some degree of flexibility should be provided as large discharge pipe can seldom se set perfectly true. The standard elbow is made with one 45 degree section to direct the flow from vertical to horizontal. Elbows with guide vanes or long sweep elbows with five intermediate sections can also be furnished. Both the one section elbow and the vane type have a loss coefficient of 0.5. The five section elbow has a loss coefficient of about 0.25 provided that R/D is at least 1.5 . The vane type elbow is not recommended since the loss coefficient is no better and the vanes can easily clog. The five –section elbow requires more space but should be used if efficiency is important

The large elbows and column are rolled and fabricated from mild steel plate and electric welded

Smaller elbows and column are made from standard weight pipe. They are machined between centers for perfect alignment and concentricity. On lengths exceeding 12 feet the column is furnished separately. All joints between bowl assembly , column and elbow are fitted with machined and registered steel flanges.

DRIVER SHAFT ASSEMBLY

The drive shaft is made of carbon steel for oil lubricated and of stainless steel or of carbon steel with sleeves for water or grease lubricated and of rubber for water lubricated pumps. They are spaced at a length such that the operating speed will not be more than 80% of the first critical speed.

BOWL ASSEMBLY

The bowl assembly consists of a type 416 stainless steel pump shaft, cast iron bowl and suction bell, SAE 660 bronze bearings for oil or grease lubrication and rubber for water lubrication. Impeller with separate adjustable flanged vanes or bronze SAE 40 and impeller hub of cast iron, except for the pump sizes up to 250 which have one-piece impellers of bronze SAE 40. Type 416 S.S. thrust collar and propeller key. The suction bell is flared and has guide vanes to prevent prerotation and inhibit the formation of vortices in the sump.

Diffusion vanes in the discharge bowl guide the water upward and convert the velocity to pressure head. The propellers in all size pumps are mounted on the shaft with a split thrust collar. This allows the propellers to be removed from the bottom of the pump simply by taking off the suction bell and dropping the shaft.

The suction bearing is protected by a sand collar. Also the discharge bearing of the water or grease lubricated pumps.

LUBRICATION

Oil Lubrication

All line shaft bearings are oil lubricated from oiler on the motor base. Oiler can be hand operated or solenoid for automatic lubrication.

The bottom pump bearing is packed with water resistant grease, securing a long period of operation

Grease Lubrication

Bronze line shaft bearings are lubricated by a grease pump, on the motor base.

Water Lubrication

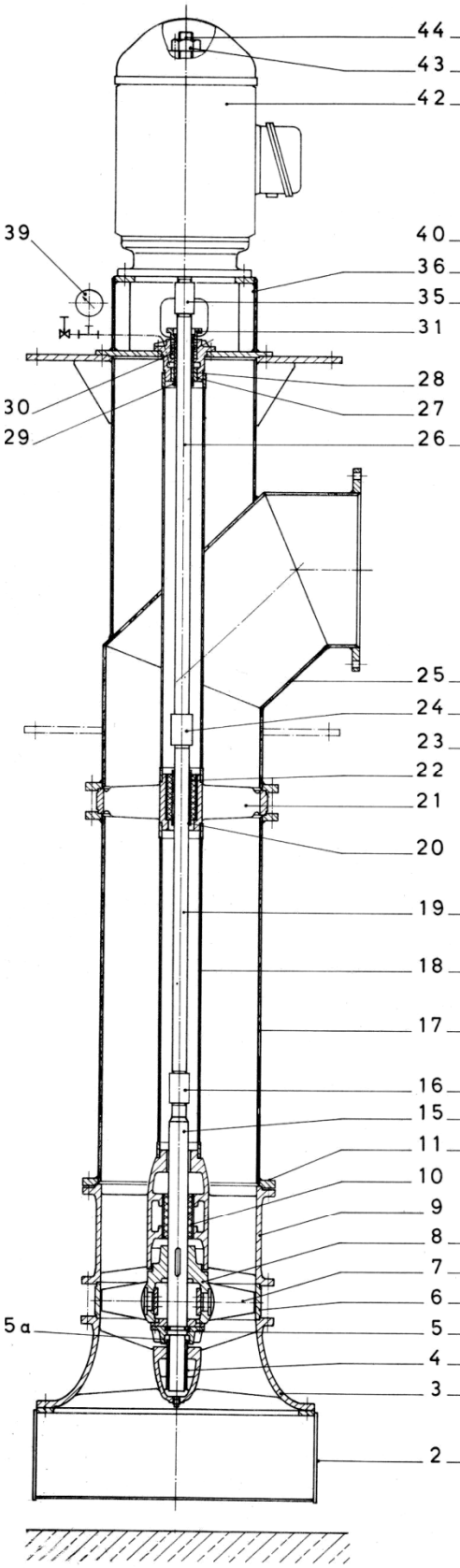
The line shaft bearings are made of rubber and are water lubricated. The suction bowl bearing is grease lubricated. This type is recommended for clear water to avoid oil contamination. The pump should not be dry, as the rubber bearings will seize.

For turbid water we can also use enclosed line shaft and lubrication with clean water from an external source

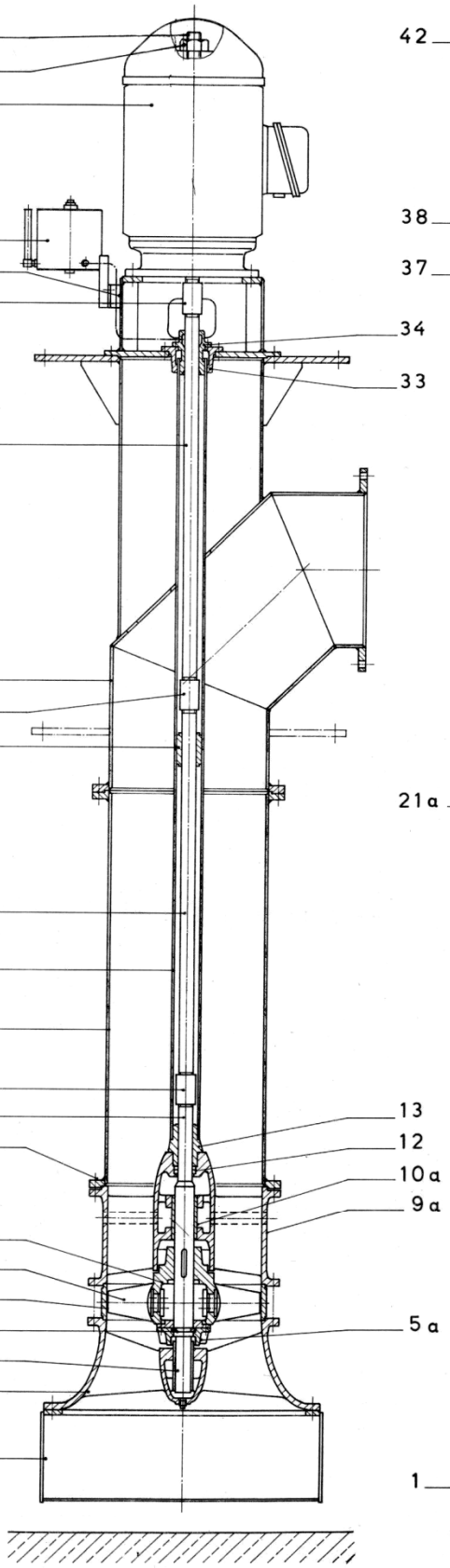
SECTIONAL VIEWS

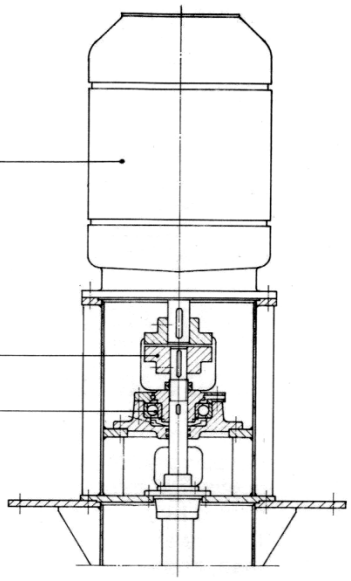
ENCLOSED LINE SHAFT

CLEAN WATER LUBRICATION

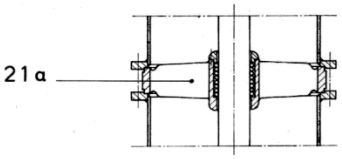


OIL LUBRICATION



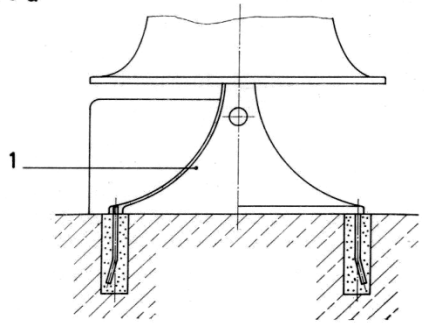


Solid shaft motor.
Flexible coupling.
Separate axial
Thrust bearing



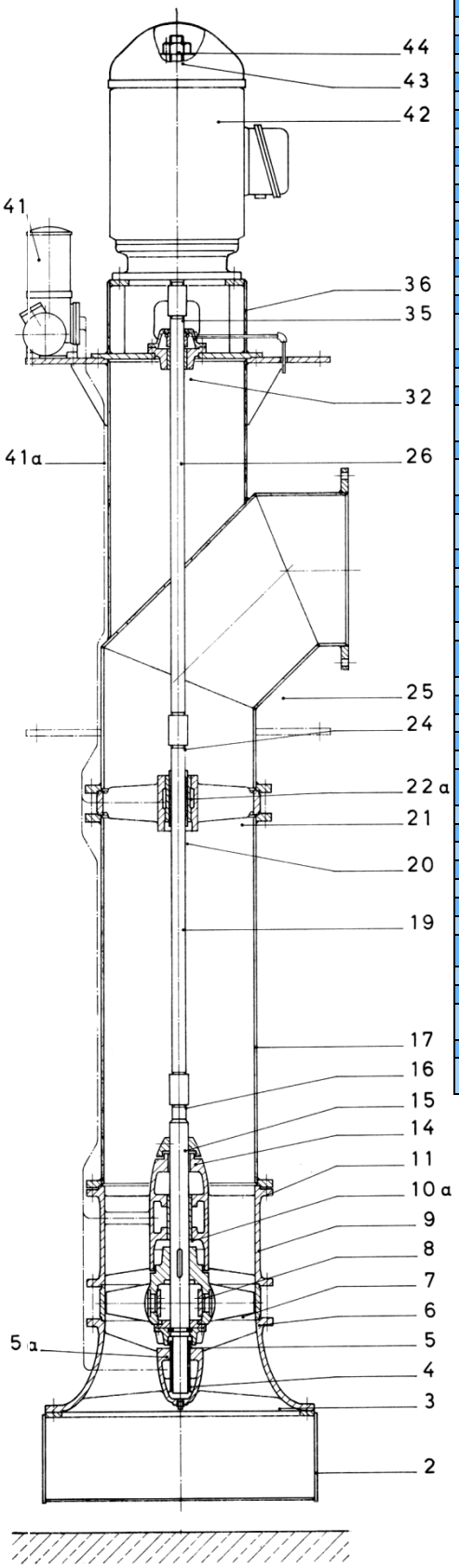
Tube stabilizer

Entry cone to approve
suction approach



OPEN LINE SHAFT

Grease or Pumped Water Lubrication

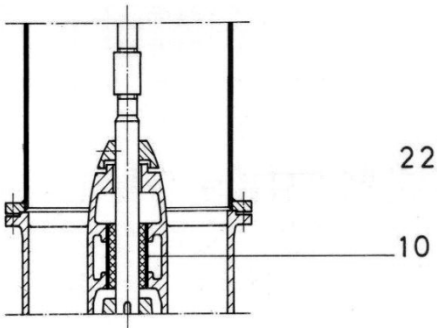


PART LIST

ITEM NUMBER	CODE NUMBER	PART NAME	MATERIAL OF PRINCIPAL PARTS	
			STANDARD	SEA WATER
1	1000	Entry Cone	Cast Iron C130	Cast Iron C130
2	1050	Strainer	Galvanize steel	Stainless steel AISI 316 OR 304
3	1131	Suction Bellmouth	Cast Iron C130	Cast Iron C130
4	3300	Suction Bellmouth Bearing	Bronze SAE 660	Bronze SAE 63
5	2531	Split Ring for Axial Thrust	Stainless steel AISI 416	Stainless steel AISI 316 OR 304
5a	2922	Sand Collar	Cast Iron C130	Bronze SAE 63
6	1121	Surrounding Ring	Cast Iron C130	Bronze SAE 63
7	6441	Impeller Vanes	Bronze SAE 40	Bronze SAE 63
8	6440	Impeller hub	Cast Iron C130	Bronze SAE 63
9	1170	Diffuser	Cast Iron C130	Cast Iron C130
9a	1171	Diffuser for O.L.	Cast Iron C130	Cast Iron C130
10	3029	Bearing for C.W.L. & P.L.	Rubber 45-55 shore	Rubber 45-55 shore
10a	3300	Bearing for G.L., & O.L.	Bronze SAE 660	Bronze SAE 63
11	6570	Bowl Bolts and Nuts	Steel	Stainless steel AISI 316 OR 304
12	4010	Sealing Rings for O.L.		
13	3340	Tube Adaptor Bearing	SAE 660	SAE 63
14	2540	Sand Collar	SAE 40	SAE 63
15	2110	Pump Shaft	Steel C1045 or Stainless Steel AISI 416	Stainless steel AISI 316 OR 304
16	7119	Pump Shaft Coupling	Steel	Steel
17	1350	Column Pipe	Steel	See note
18	1917	Enclosing Tube	Steel	Stainless steel AISI 316 OR 304
19	2120	Column Shaft	Steel C1045 or Stainless Steel AISI 416	Stainless steel AISI 316 OR 304
20	3420	Shaft Sleeve	Stainless steel AISI 416	Stainless steel AISI 316 OR 304
21	3250	Intermediate Bearing Retainer for G.L., C.W.L. & P.L	Cast Iron C130	Cast Iron C130
21a	3255	Tube Stabilizer	Cast Iron C130	Cast Iron C130
22	3029	Intermediate Bearing for., C.W.L. & P.L	Rubber 45-55 shore	Rubber 45-55 shore
22a	3320	Intermediate Bearing for G.L.	Bronze SAE 660	Bronze SAE 63
23	3052	Tube Shaft Bearing for O.L.	Bronze SAE 660	Bronze SAE 63
24	7119	Column Shaft Coupling	Steel C1045 or Stainless Steel AISI 416	Stainless steel AISI 316 OR 304
25	1371	Discharge Elbow	Steel	See note
26	2120	Discharge Head Shaft	Steel C1045 or Stainless Steel AISI 416	Stainless steel AISI 316 OR 304
27	4110	Stuffing Box Casing type A&B	Cast Iron C130	Bronze SAE 63
28	4132	Stuffing box bush type A&B	Bronze SAE 660	Bronze SAE 63
29	3440	Stuffing box sleeve type A&B	Stainless steel AISI 416	Stainless steel AISI 316 OR 304
30	4130	Stuffing box packing type A&B	Graphitized Asbestos	Graphitized Asbestos
31	4120	Stuffing box gland type A&B	Cast Iron C130	Bronze SAE 63
32	4100	Special stuffing box assembly Type C only for G.L. and P.L.	Cast Iron C130 and bronze SAE 40	Bronze SAE 63
33	4101	Tension Nut Body for O.L.	Cast Iron C130	Bronze SAE 63
34	4105	Tension Nut for O.L.	Bronze SAE 40	Bronze SAE 63
35	7119	Headshaft Coupling	Steel or Stainless Steel AISI 416	Steel or Stainless Steel AISI 416
36	3142	Drive Adaptor	Steel	Steel
37	3051	Thrust Bearing Assembly	Body of cast Iron C130	Body of cast Iron C130
38	7112	Flexible Coupling		
39	3805	Clean Water Supply Device for C.W.L.		
40	3800	Oiler for O.L.		
41	3820	Grease Pump for G.L.		
41a	3840	Grease Tubes	Copper	Copper
42	8000	Electric Motor (or Right Angle Gear Drive)		
43	2915	Adjusting Nut		
44	2130	Drive Shaft	Steel C1045 or Stainless Steel AISI 416	Steel C1045

NOTE: Steel flanges of Stainless Steel AISI 316 or 304 and anticorrosion coating

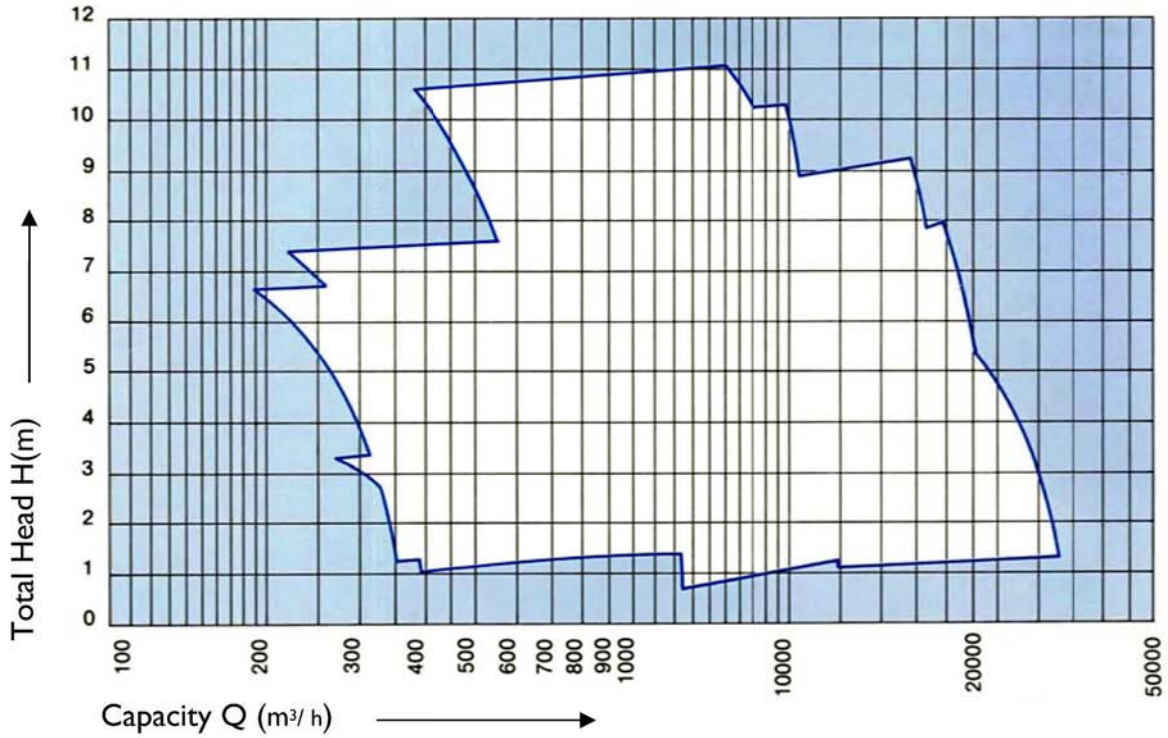
Pumped Water Lubrication



Discharge bowl
Rubber bearing

Intermediate
Rubber bearing

PERFOMANCE RANGE



CODE DESIGNATION

1	2	3	4	5	6	7	8

1. Pump size in mm
2. Hydraulic type
3. Column size in mm
4. Pump Axial thrust
   - HS Hollow Shaft
   - STB Separate Thrust Bearing
5. Driving
   - EM Electric Motor
   - RAGD Right Angle Gear Drive
6. Lubrication
   - GL Grease
   - CWL Clean Water
   - PL Product
   - OL Oil
7. Material
   - ST Standard
   - SW Sea water
8. Installation
   - BBE Below base elbow
   - ABE Above base elbow

Example:
Code designation AV 350-I-350-HS-EM-OL-ST-ABE

Standard vertical axial flow pump.
Nominal pump size 350mm
Hydraulic type I
Column size 350mm.
Hollow shaft – Electric motor.
Oil Lubrication
Standard material
Above base elbow

REMARKS ON DIMENSIONS

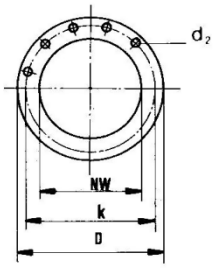
1. Fs min for strainer
   Fs standard for entry cone
2. Standard submergence for overage installation not over 1000m above sea level
3. Si for hollow shaft motor
   Sii for separate thrust bearing
4. Nominal diameter is that closest to the impeller diameter. For some sizes two impeller diameter A and B
5. A my be greater if long radius elbow is used
6. B for flanges. Greater for long radius elbow and Dresser or similar coupling

DIMENSIONS

All dimensions in mm

Not to be used for construction unless authorized

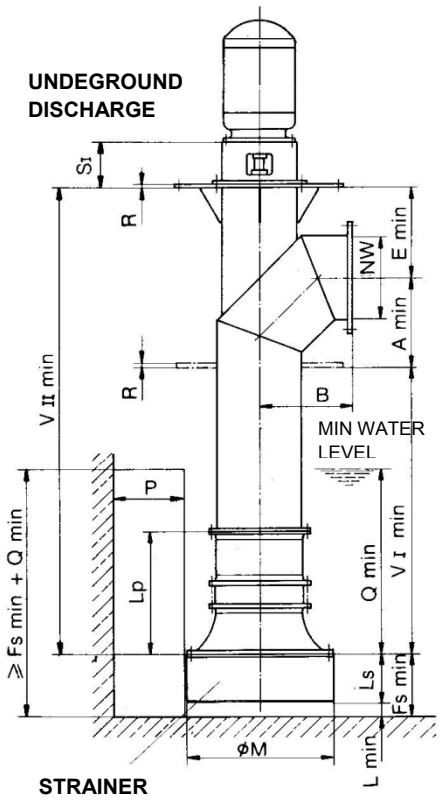
Discharge Flange



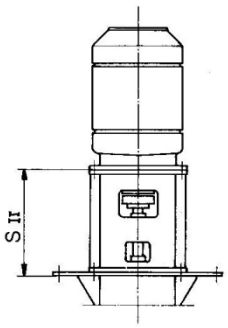
DISCHARGE FLANGE				
NW	D	k	NUMBER OF HOLES	d2
250	395	350	12	23
300	445	400	12	23
350	505	460	16	23
400	565	515	16	27
450	615	565	20	27
500	670	620	20	27
600	780	725	20	30
700	895	840	24	30
800	1015	950	24	33
900	1115	1050	28	33

Flange dimensions according to DIN 2632 for 10 bar except for the thickness

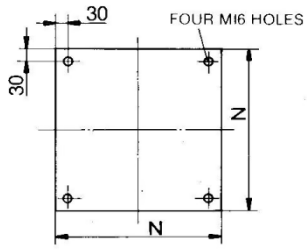
UNDEGROUND DISCHARGE

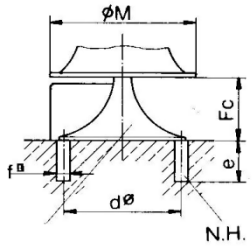


STRAINER

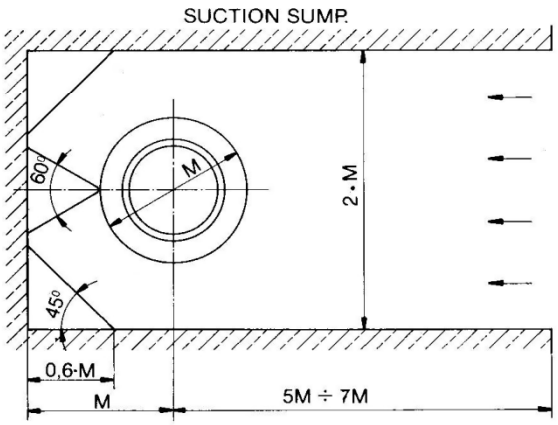


BASEPLATE MOUNTING





ENTRY CONE



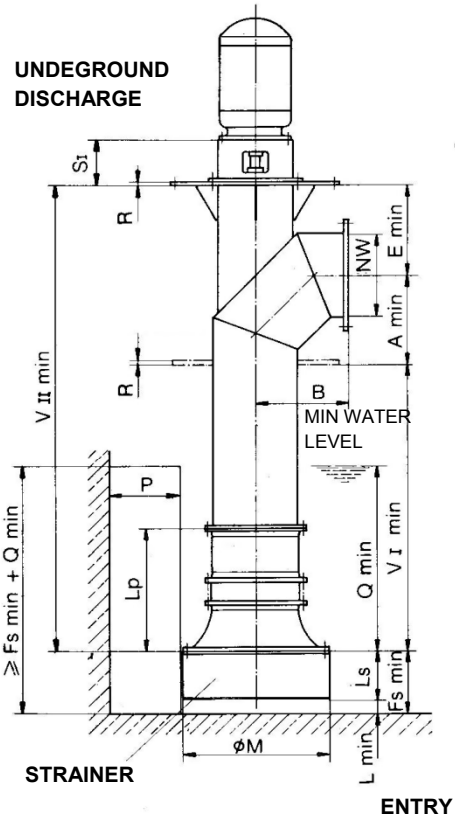
Standard suction sump dimensions

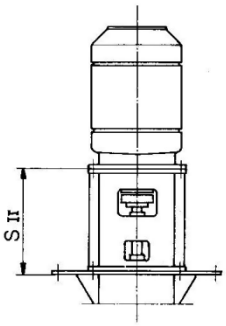
PUMP SIZE	NW STD PIPE	A min	B	E min	L p	Fc	Fs min	Ls	L min	ØM	N	P	Q min	R	SI	SII	VI min	VII min	Ød	e	f°	N.H.
250	250 300 350	300 400 450	300 400 450	450 500 550	370	220	300	250	50	450	650	220	700	20	220	520	400 700 850	1200 1600 1850	350	200	100	3
300A	300 350 400	400 450 500	400 450 500	500 550 600	450	250	300	250	50	520	750	260	750	20	220	520	650 800 1000	1550 1800 2100	350	200	100	3
300B	300 350 400 450	400 450 500 550	400 450 500 550	600 550 600 650	450	250	300	250	50	540	750	270	800	20	220	520	500 700 950 1200	1400 1700 2050 2400	500	200	100	4
350	350 400 450 500	450 500 550 550	450 500 550 550	550 600 650 650	545	300	350	300	50	630	850	310	950	20	280	600	600 750 100 1250	1600 1850 2200 2450	500	200	100	4
400	400 450 500 600	500 550 550 600	500 550 550 600	600 650 650 750	630	350	350	300	50	700	900	350	1050	25	280	600	700 900 1150 1600	1800 2100 2350 2950	650	200	100	4
450	450 500 600	550 550 600	550 550 600	650 650 750	665	400	400	300	100	800	1000	400	1200	25	280	660	700 1000 1500	1900 2200 2850	650	200	100	4
500A	500 600 700	550 600 700	550 600 700	650 750 800	745	450	400	300	100	900	1100	450	1350	25	280	660	800 1300 1700	2000 2650 3200	720	300	100	4
500B	500 600 700	550 600 700	550 600 700	650 750 800	800	500	500	400	100	970	1200	480	1450	25	320	660	1100 1100 1500	2300 2450 3000	720	300	100	4
600	600 700 800 900	600 700 800 900	600 700 800 900	750 800 900 1000	850	500	600	500	100	1000	1200	500	1500	25	320	660	900 1400 1850 2350	2250 2900 3550 4250	920	300	100	4

DIMENSIONS

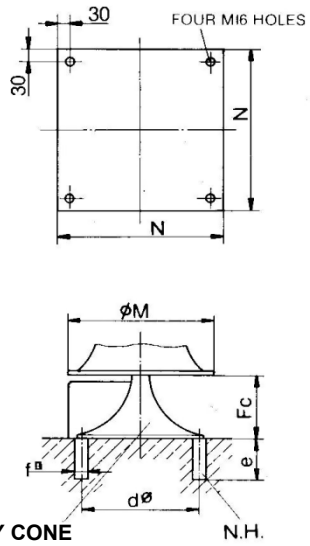
All dimensions in mm

Not to be used for construction unless authorized

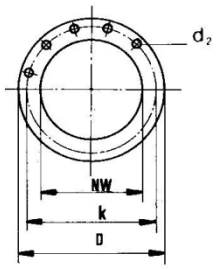




BASEPLATE MOUNTING

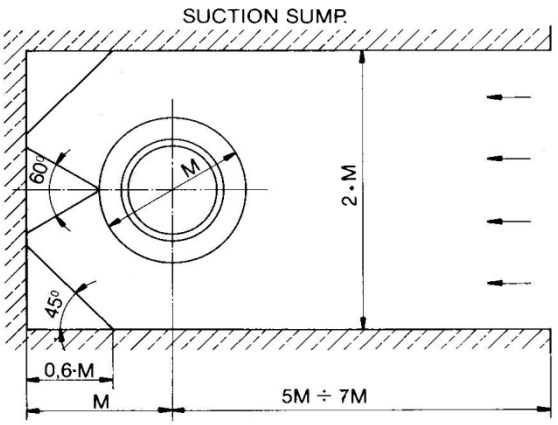


Discharge Flange



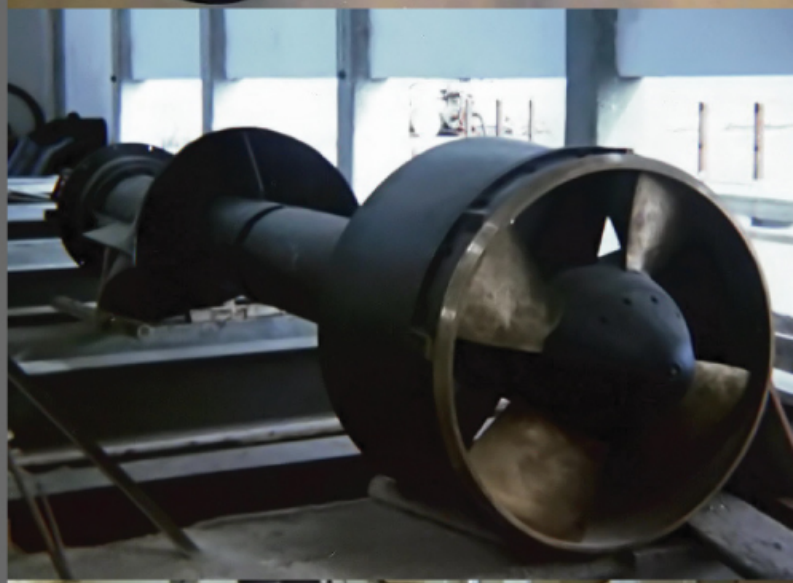
DISCHARGE FLANGE				
NW	D	k	NUMBER OF HOLES	d2
1000	1230	1160	28	36
1200	1455	1380	32	39
1400	1575	1590	38	42
1600	1915	1820	40	48

Flange dimensions according to DIN 2632 for 10 bar except for the thickness



Standard suction sump dimensions

PUMP SIZE	NW STD PIPE	A min	B	E min	Lp	Fc	Fs min	Ls	L min	ØM	N	P	Q min	R	SI	SII	VI min	VII min	Ød	e	f°	N.H.
645 I	700 800 900	700 800 900	700 800 900	800 900 1000	640	500	600	500	100	1080	1200	540	2200	25	400	630			920	300	100	4
785 II	700 800 900	700 800 900	700 800 900	800 900 1000	1040	650	600	500	100	1180	1200	600	2300	25	400	670			920	300	100	4
850 I	900 1000 1100	900 1000 1100	900 1000 1100	1000 1100 1200	1110	800	700	500	200	1420	1200	700	2500	25	450	700			1260	300	100	4
940 I	1100 1200 1400	1000 1200 1400	1000 1200 1400	1100 1300 1500	1175	800	600	500	300	1570	1400	800	2800	25	450	700			1260	300	100	4
1140 I&II	1200 1400 1600	1200 1400 1600	1200 1400 1600	1300 1500 1700	1700	950	600	500	450	1900	1500	950	3200	25	500	750			1260	300	100	4
1250 I&II	1600 1800	1600 1800	1600 1800	1700 1900	1900	1050	900			2000		950	3700						1360	400	100	4



DRAKOS - POLEMIS | DDP PUMPS

Engineered Pumping Technology.

ISO 9001
BUREAU VERITAS
Certification

MEMBER OF Europump

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