

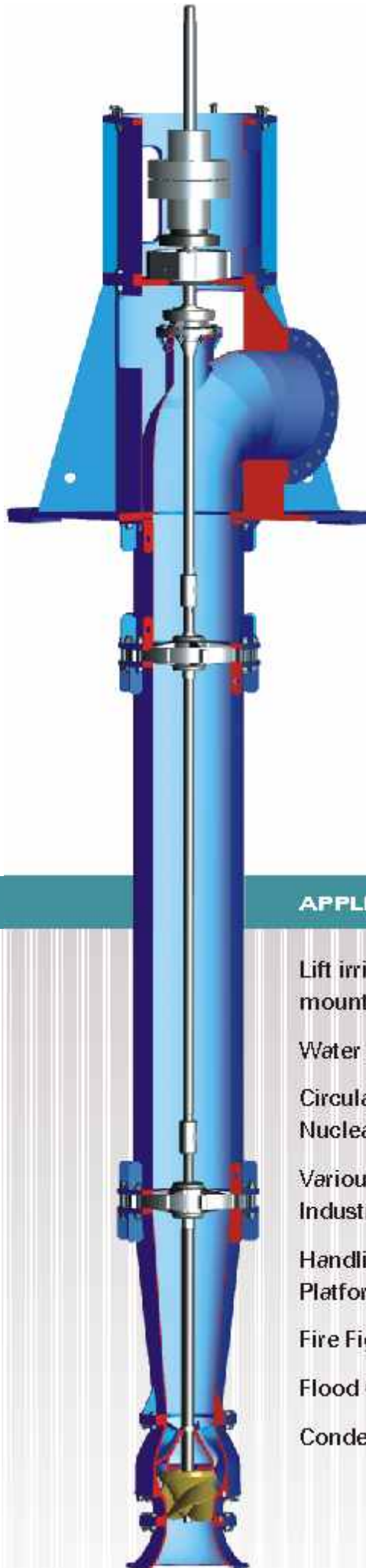


Enriching Lives



## VERTICAL PUMPS

TYPE- BHR / BHQ / BHM / BHK  
/ BHM<sub>a</sub> / BHA



## RANGE

Delivery size up to 2200 mm.

Capacity up to 55,000 m<sup>3</sup>/hr

Head up to 240 meters

## TYPES

Turbine

Mixed Flow

Axial Flow

Propeller

## APPLICATIONS

Lift irrigation (Vertical and inclined mounting)

Water supply

Circulating water for Thermal and Nuclear Power Plants

Various applications in Steel, Cement Industries and Refineries

Handling sea water on Off-Shore Platforms, Dry-Docks

Fire Fighting

Flood Control

Condensate Extraction

## DESCRIPTION

Pumps are of single or multistage, consisting of bowl assembly, column assembly and driving unit assembly. Variety of models are available to operate at 50Hz and 60 Hz.

### **Bowl**

A diffuser with vanes cast integrally.

### **Impeller**

Impellers are of Francis (BHR), Mixed flow (BHQ, BHM, BHK), Semi-axial (BHMa) and Axial (BHA) type; enclosed or semi-open depending upon model. In case of condensate extraction pumps, first stage impeller can have double suction optionally.

### **Suction bell/Impeller guide piece**

Designed for smooth inflow of water with minimum losses.

### **Shaft**

The shaft is of high tensile strength steel.

### **Column pipe**

Either cast or fabricated, it houses line shaft bearings and directs water from bowl assembly to discharge head/elbow.

### **Bearings**

#### **Transmission bearings :**

Cutless bearings are of natural / synthetic rubber / Elastomeric with outer shell of brass or suitable material. Lubrication by self/external clear water. Oil lubrication with bronze bearing is also available upon request.

#### **Thrust bearing :**

Michell Tilting Pad Type or Antifriction type for taking hydraulic axial thrust and weight of rotor assembly. Lubrication with oil or grease.

Thrust bearing arrangement is available either independently in pump and drive or combined thrust arrangement in drive.

### **Discharge head/Discharge tee**

To direct flow from column pipe to discharge pipe located above or below ground level with single floor or two-floor arrangement as per requirement.

### **Non-reverse ratchet**

To prevent reverse rotation of pump due to back flow of the water in case of its tripping, available on request

### **Motor stool**

Rigid construction to ensure vibration-free operation of pumpset.

### **Coupling**

For pump and prime mover flexible or rigid as per requirement.

For line shaft threaded barrel or muff type as per requirement.

### **Direction of rotation**

Clockwise when viewed from driving end.

### **Drive**

Electric motor with vertical hollow/solid shaft is a standard arrangement.

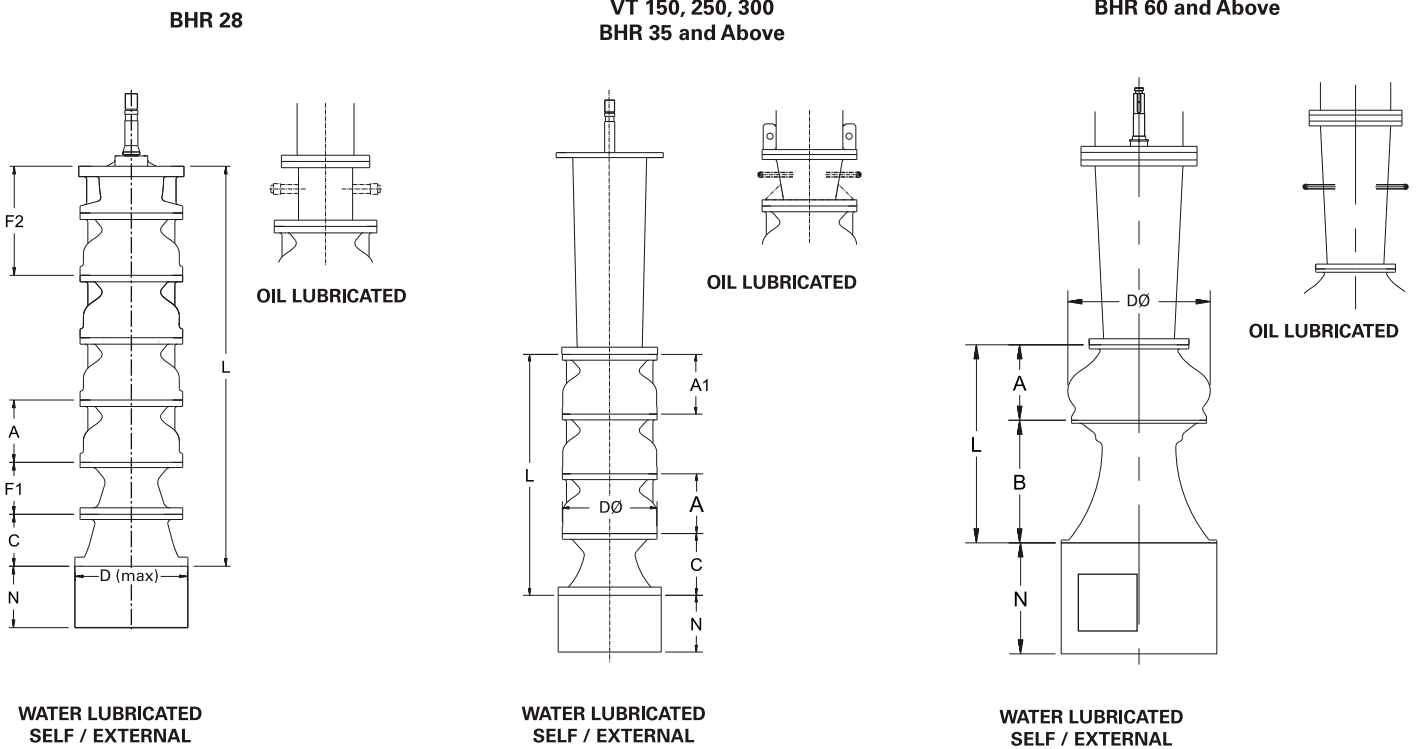
Diesel engine/steam turbine with a right angle gear unit upon request.

### **High efficiency and low submergence**

Hydraulic design is being updated with our continuous R & D efforts to meet requirements of high efficiency and low submergence, taking care of other parameters, such as high reliability and optimum system design.

# GENERAL DIMENSIONS / MOUNTING DETAILS

## BHR Pump Water Lubricated Self / External



Pump Model	A(mm)	A1(mm)	B(mm)	C(mm)	D(MAX)(mm)	F1(mm)	F2(mm)	N(mm)	WT Kg. approx.
VT150	105	125	-	125	140	-	-	-	90
VT200	220	-	-	190	310	-	-	150	
VT250	220	-	-	190	250	130	-	200	115
VT300	267	-	-	185	292	-	-	200	150
BHR-28	240	-	-	200	500	160	200	500	180
BHR-35	290	-	-	300	555	-	-	610	360
BHR-42	355	-	-	360	645	-	-	725	550
BHR-50	420	-	-	428	760	-	-	760	700
BHR50 R	420	310	-	428	700	-	-	760	
BHR-54	470	380	-	450	800	-	-	780	730
BHR-60	500	400	-	650	800	-	-	800	865
BHR-60N	-	400	-	355	620	-	-	800	900
BHR-65M	-	619	117	520	900	-	-	800	1380
BHR-70	565	410	-	610	940	-	-	950	1280
BHR-70N	-	619	148	520	900	-	-	800	1380
BHR-70M	-	500	370	230	1000	-	-	800	1510
BHR-80	-	547	155	570	1060	-	-	1000	1450
BHR-95	-	680	265	800	1320	-	-	900	3290
BHR-100N	-	780	200	665	1010	-	-	900	2410
BHR-105	-	750	225	675	1500	-	-	900	4630
BHR-115	-	1090	260	920	1550	-	-	900	6000

Note: The weights given are for single stage pumps

## GENERAL DIMENSIONS / MOUNTING DETAILS

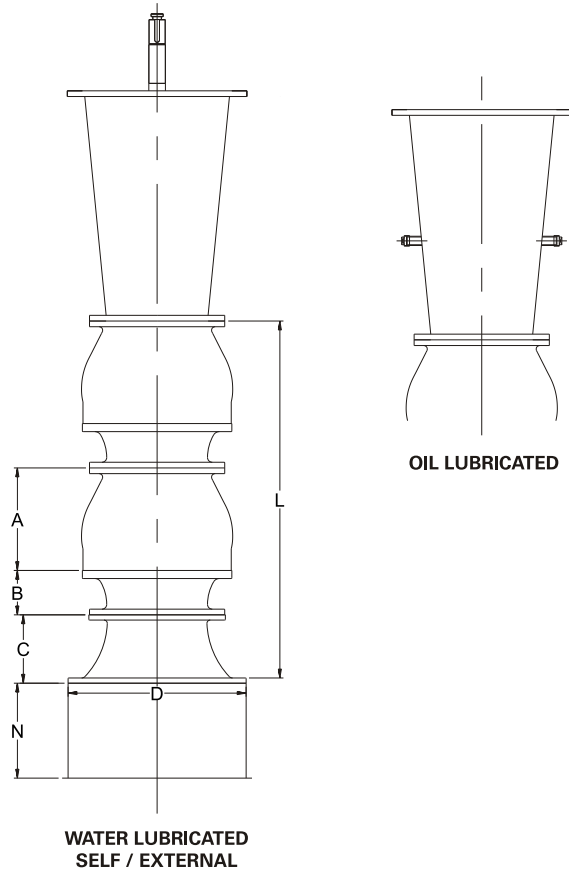
Pump Model	E Water Lub	L Stages								
		1	2	3	4	5	6	7	8	9
VT 150	500	540	760	980	1200	1420	1640	1860	2080	2300
VT200	500	540	760	980	1200	1420	1640	1860	2080	2300
VT 250	500	250	355	460	565	670	775	880	985	1090
VT 300	500	452	672	892	1112	1332	1552	1770	1992	2212
BHR-28	-	800	1040	1280	1520	1760	2000	2240	2480	2720
BHR-35	1000 / 1500	590	880	1170	1460	1750	2040	-	-	-
BHR-42	1000 / 1500	715	1070	1425	1780	-	-	-	-	-
BHR-50	1000	848	1268	1688	-	-	-	-	-	-
BHR50 R	100	738	1158	1578	1998	-	-	-	-	-
BHR-54	1000	830	1300	-	-	-	-	-	-	-
BHR-60	1000	1050	1550	-	-	-	-	-	-	-
BHR-60N	1000	755	1819	-	-	-	-	-	-	-
BHR-65M	1000	1256	-	-	-	-	-	-	-	-
BHR-70	1000	1020	1585	-	-	-	-	-	-	-
BHR-70N	1000	1287	-	-	-	-	-	-	-	-
BHR-70M	1000	1100	1750	-	-	-	-	-	-	-
BHR-80	1000	1272	-	-	-	-	-	-	-	-
BHR-95	1000	1745	2690	-	-	-	-	-	-	-
BHR-100N	1000	1645	-	-	-	-	-	-	-	-
BHR-105	1000	1650	-	-	-	-	-	-	-	-
BHR-115	1000	2270	-	-	-	-	-	-	-	-

Pump Model	E Oil Lub	L Stages								
		1	2	3	4	5	6	7	8	9
VT 150	300	540	760	980	1200	1420	1640	1860	2080	2300
VT200	500	540	760	980	1200	1420	1640	1860	2080	2300
VT 250	300	250	355	460	565	670	775	880	985	1090
VT 300	300	452	672	892	1112	1332	1552	1772	1992	2212
BHR-28	400	640	880	1120	1360	1600	1940	2080	2320	2560
BHR-35	400	590	880	1170	1460	1750	2040	-	-	-
BHR-42	500	715	1070	1425	1780	-	-	-	-	-
BHR-50	500	848	1268	1688	-	-	-	-	-	-
BHR50 R	100	738	1158	1578	1998	-	-	-	-	-
BHR-54	600	830	1300	-	-	-	-	-	-	-
BHR-60	600	1050	1550	-	-	-	-	-	-	-
BHR-60N	600	755	-	-	-	-	-	-	-	-
BHR-65M	800	1256	-	-	-	-	-	-	-	-
BHR-70	700	1020	1585	-	-	-	-	-	-	-
BHR-70N	800	1287	-	-	-	-	-	-	-	-
BHR-70M	800	1100	1750	-	-	-	-	-	-	-
BHR-80	700	1272	1819	-	-	-	-	-	-	-
BHR-95	800	1147	2690	-	-	-	-	-	-	-
BHR-100N	800	1645	-	-	-	-	-	-	-	-
BHR-105	800	1650	-	-	-	-	-	-	-	-
BHR-115	800	2270	-	-	-	-	-	-	-	-

**Note: All dimensions are in mm.**

## GENERAL DIMENSIONS / MOUNTING DETAILS

### BHM / BHK / BHMa Pump



### Dimensions (BHM Pump)

PUMP MODEL	A (mm)	B (mm)	C (mm)	D (mm)	N (mm)	L STAGES		Wt. kg.
						1	2	
BHM-20	216	93	142	348	200	451	760	110
BHM-22. 1/2	250	105	160	440	250	515	870	170
BHM-25	278	294	-	496	300	572	-	235
BHM-30	327	137	215	560	300	679	1143	340
BHM-35	380	160	250	610	350	790	1330	415
BHM-40	432	187	288	750	400	907	1526	540
BHM-45	500	200	320	800	450	1020	1720	650
BHM-45M	500	160	375	800	450	1035	-	710
BHM-50	542	225	355	860	450	1122	1889	830
BHM-50M	542	235	460	1150	450	1237	-	710
BHM-55	596	248	388	875	500	1232	2076	1030
BHM-60	650	270	420	1018	550	1340	2260	1250
BHM-70	755	310	490	1110	700	1555	-	1700
BHM-85	920	375	600	1460	800	1895	-	2580
BHM-100	1090	450	750	1950	850	2290	-	4400
BHM-100M	1090	450	800	2000	-	2340	-	5400
BHM-130	2180	420	700	2450	-	3300	-	12000

### Dimensions (BHK Pump)

PUMP MODEL	A (mm)	B (mm)	C (mm)	D (mm)	N (mm)	L STAGES		Wt. kg.
						1	2	
BHK40	457	160	360	610	500	977	-	1600
BHK70	780	249	450	1450	900	1479	-	2100

Note: The weights given are for single stage pump. All dimensions are in mm.

# GENERAL DIMENSIONS / MOUNTING DETAILS

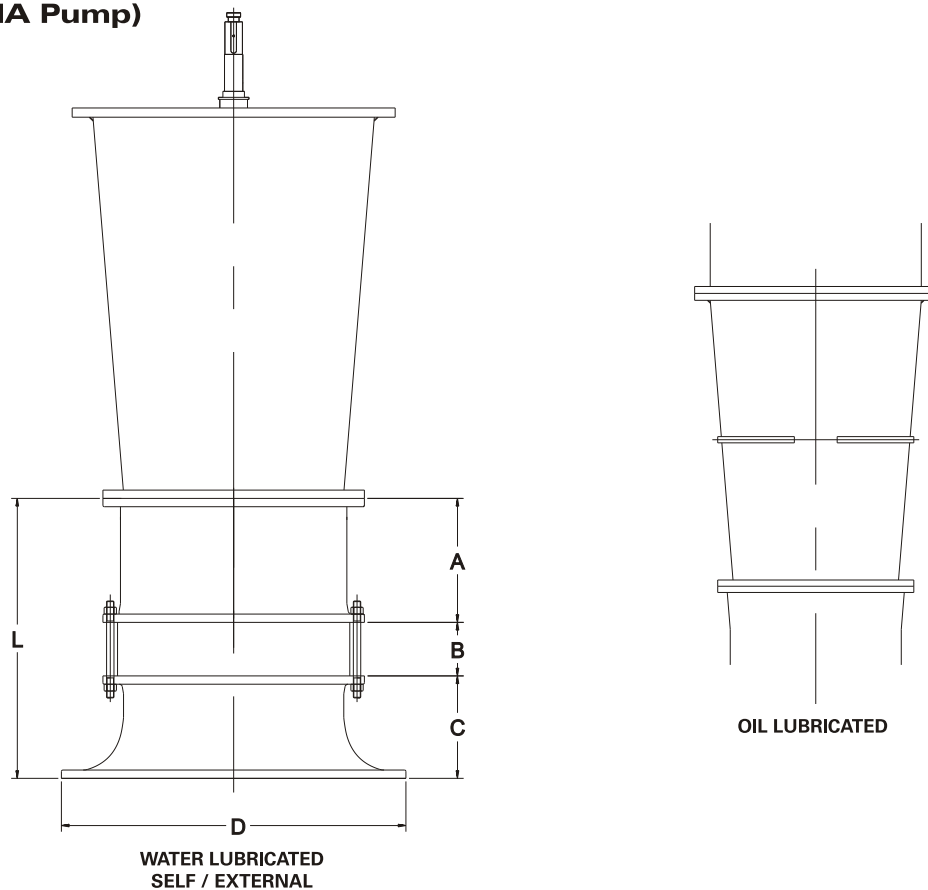
## Dimensions (BHMa Pump)

PUMP MODEL	A (mm)	B (mm)	C (mm)	D (mm)	N (mm)	L STAGES		Wt. kg.
						1	2	
BHMa-25	265	90	196	435	250	551	906	220
BHMa-35	365	123	250	618	450	738	1226	340
BHMa-45	477	163	320	800	450	960	1600	660
BHMa-55	620	210	400	950	560	1230	2060	900
BHMa-60	676	222	452	1050	800	1350	-	1120
BHMa-65	730	240	500	1140	800	1470	-	1325
BHMa-77	800	270	555	1750	800*	1625	2695	2150
BHMa-83	928	303	612	1442	850*	1843	-	2250
BHMa-87	1125	310	615	1520	850*	2050	-	3200
BHMa-100	1034	337	760	2100	900*	2131	-	4560
BHMa-120	1220	400	810	1905	900*	2430	-	5700

Note : The dimensions marked \* are tentative.

## Dimensions (BHA Pump)

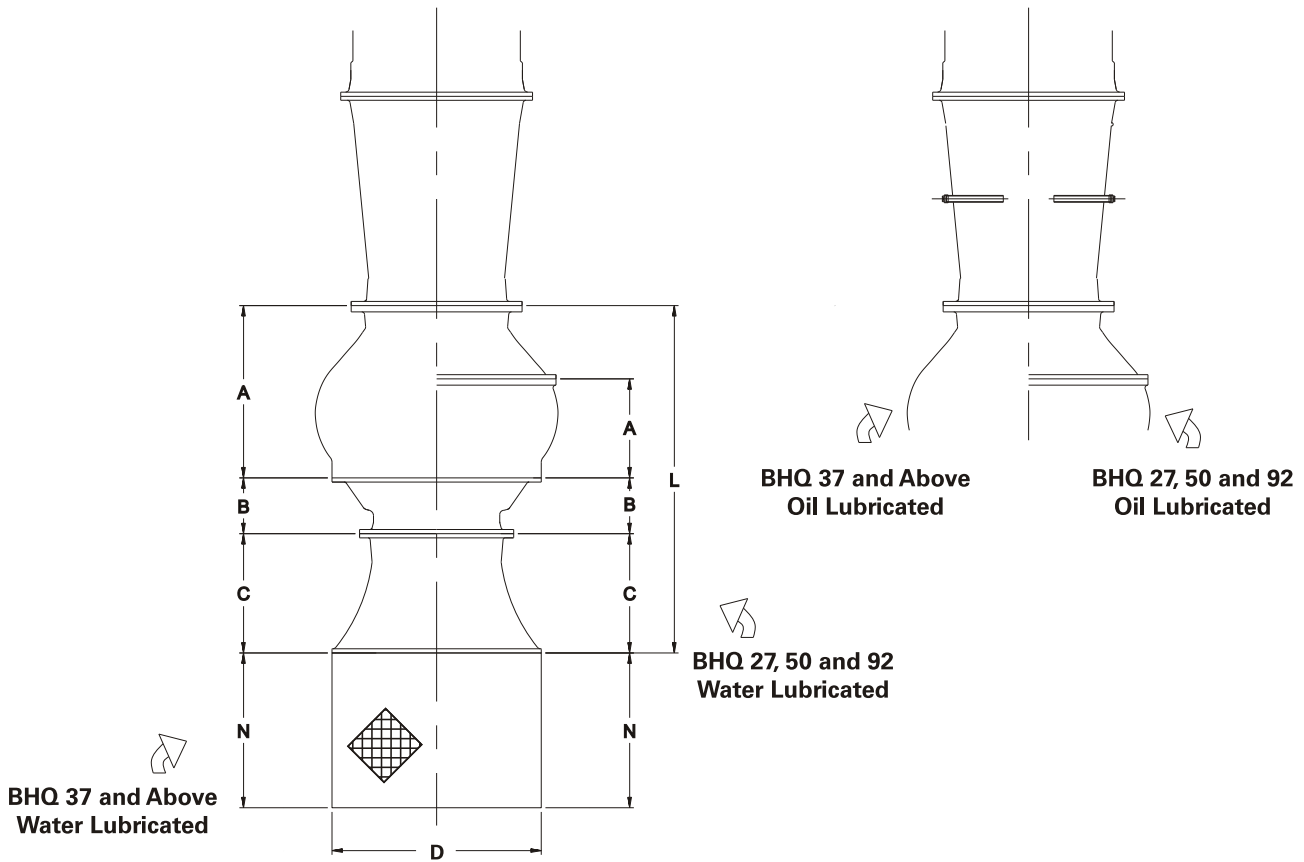
BHA / BHA S Pump



PUMP MODEL	A (mm)	B (mm)	C (mm)	D (mm)	N (mm)	L STAGES	Wt. kg.
BHA5 S	300	-	260	680	-	560	630
BHA470 S	290	108	240	785	-	638	600
BHA 700 S	415	155	345	1120	-	915	900
BHA 900 S	540	200	445	1460	-	1185	1200
BHA5	440	124	310	850	-	874	550
BHA100	900	250	700	1800	-	1850	4100

# GENERAL DIMENSIONS / MOUNTING DETAILS

## BHQ Pump



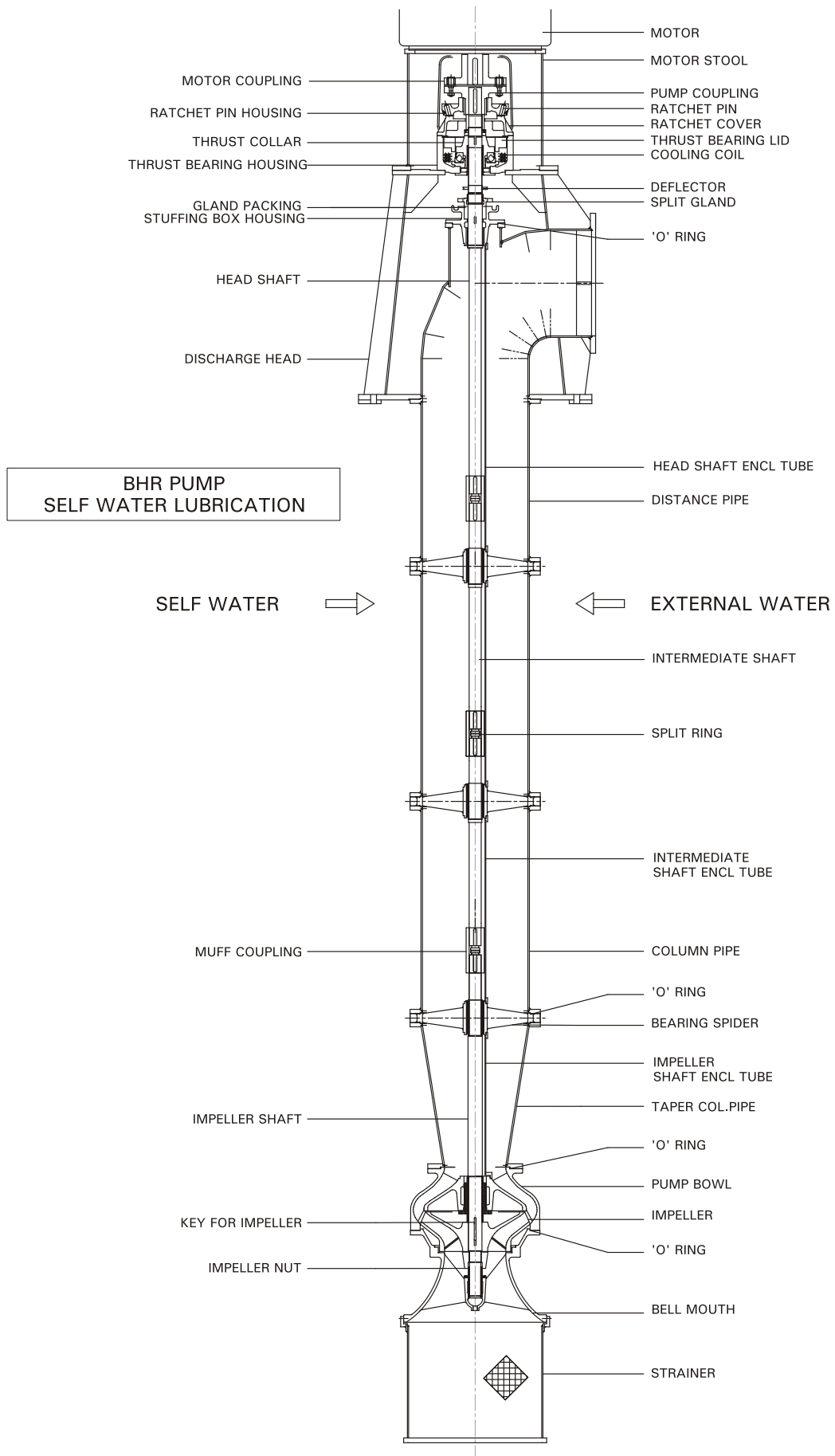
PUMP MODEL	A (mm)	B (mm)	C (mm)	D (mm)	N (mm)	L (mm)	Wt. kg.
BHQ-27	520	140	170	605	300	830	440
BHQ-27M	340	-	370	605	450	710	460
BHQ-32	432	165	205	590	450	802	540
BHQ-37	495	183	232	660	350	910	580
BHQ-42-1/2	590	230	270	670	400	1090	795
BHQ-42 1/2M	775	-	630	815	800	1405	1850
BHQ-45	595	230	280	810	400	1105	880
BHQ-50	680	260	325	1105	500*	1265	1540
BHQ-62	825	335	425	1118	550*	1585	1850
BHQ-70	920	420	555	1800*	600	1740	2100
BHQ-85	1100	1100	-	1526	720*	2200	4800
BHQ-92	1190	478	478	1600	800	2146	6200
BHQ-92A	1245	400	855	1790	900	2500	6600
BHQ-95	1425	1200	-	2200	850*	2625	6900
BHQ-95D	1450	562	785	2200	900	2797	7900

**Note :** All dimensions are in mm. The dimensions marked \* are tentative.



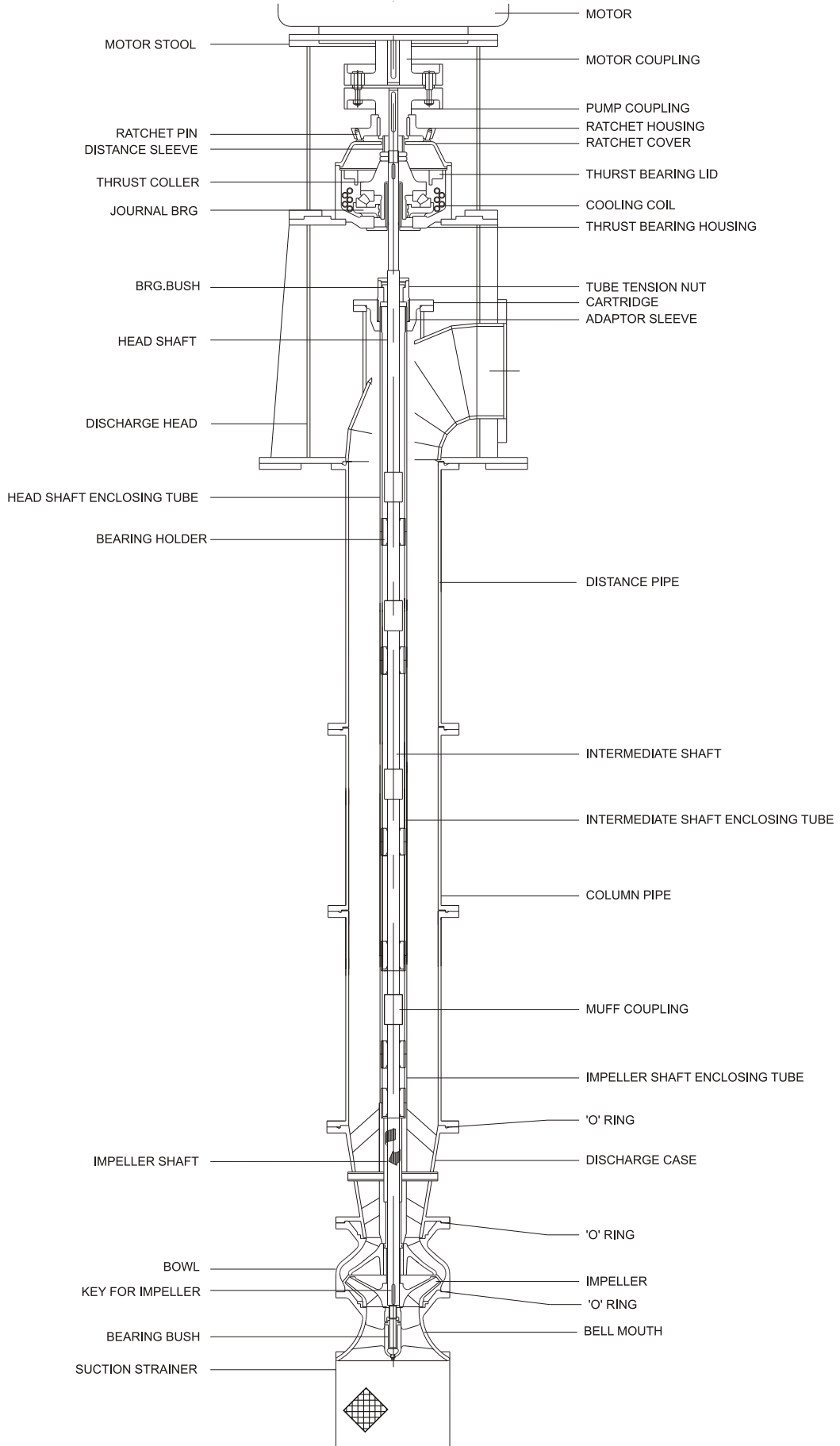
# CROSS SECTIONAL VIEW

## Water Lubricated Pumps BHR Pump



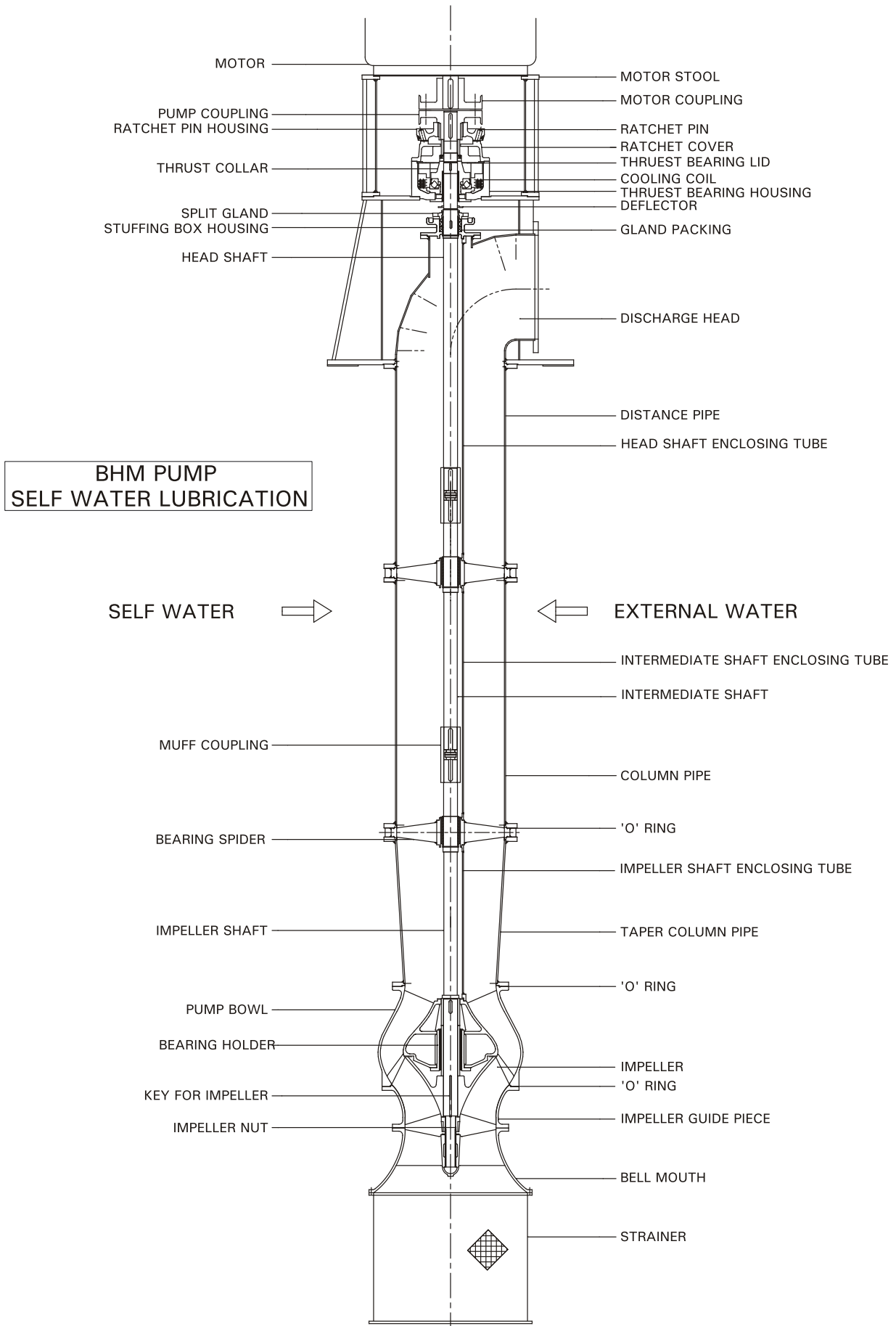
# CROSS SECTIONAL VIEW

## Oil Lubricated Pumps BHR Pump



# CROSS SECTIONAL VIEW

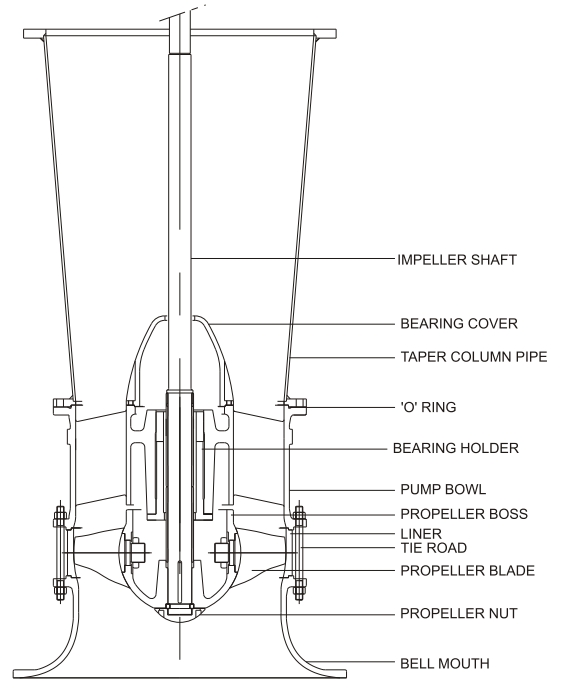
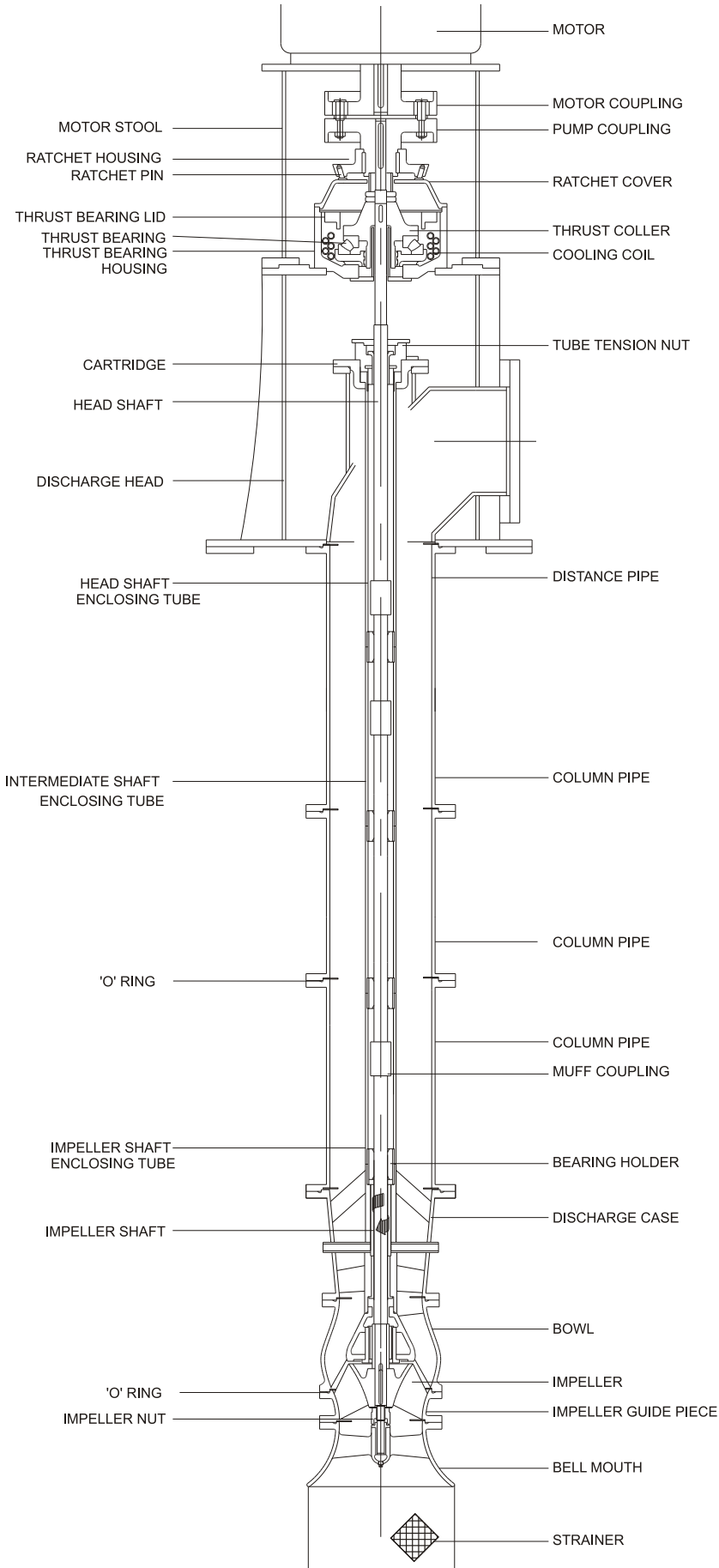
## Water Lubricated Pumps BHQ / BHM / BHK / BHM<sub>a</sub> Pump



# ALTERNATIVES AVAILABLE

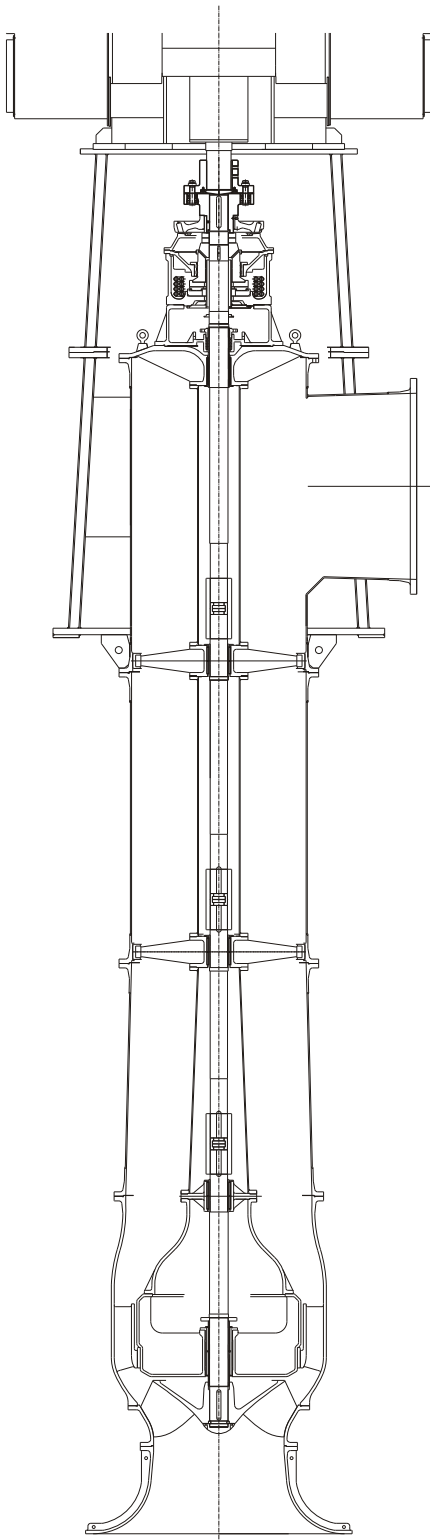
## Oil Lubricated Pumps BHQ / BHM / BHK / BHM<sub>a</sub> Pump

## BHA Pump

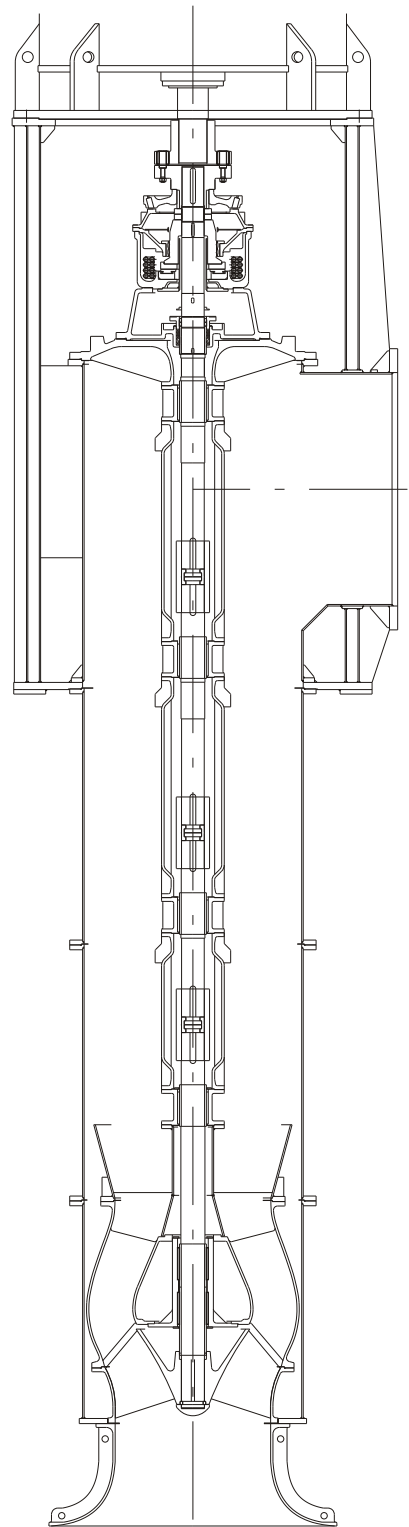


**ALTERNATIVES AVAILABLE**

**Pullout Arrangement  
Impeller Pullout Arrangement**

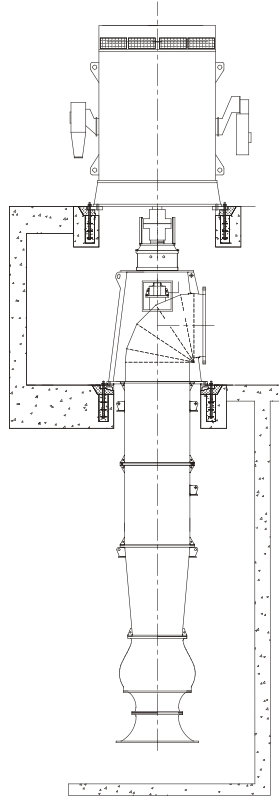


**Pullout Arrangement  
Bowl Pullout Arrangement**



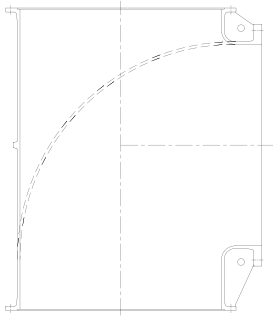
# ALTERNATIVES AVAILABLE

## Two Floor Arrangement

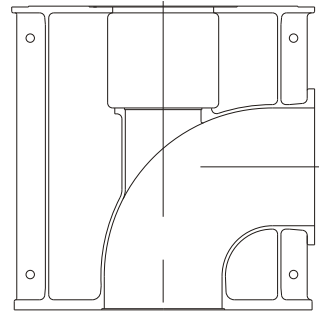


## TYPE OF DISCHARGE HEAD

### Cast

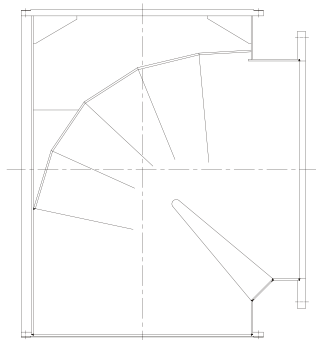


Cast Iron Discharge Tee with Elbow

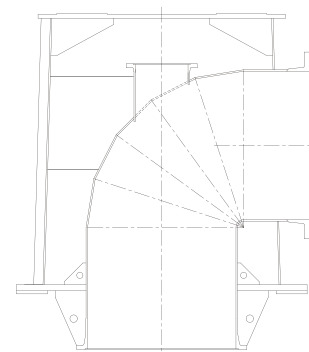


Cast Iron Discharge Head with Outer Barrel Mounted on Elbow

### Fabricated



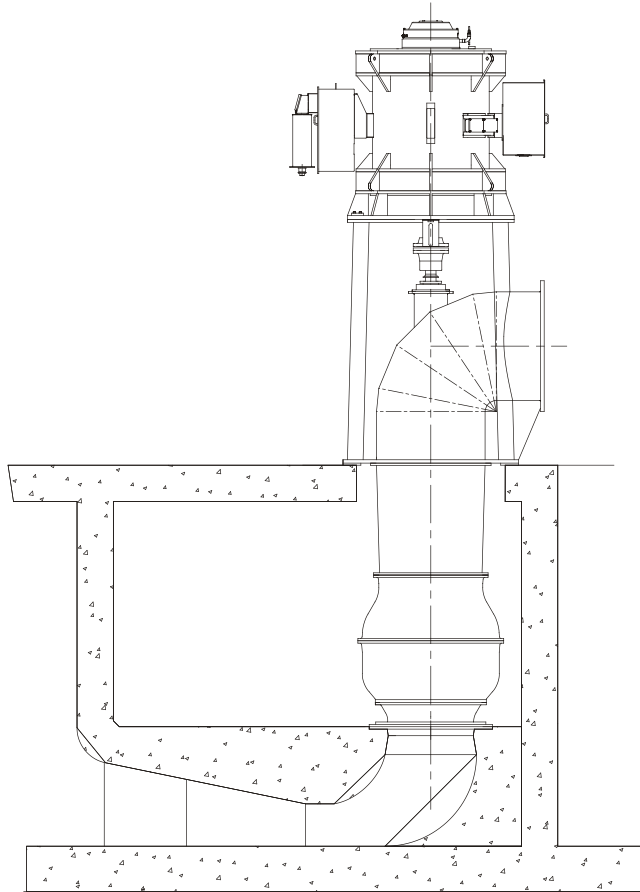
Fabricated Discharge Tee with Three Piece Elbow



Fabricated Discharge Head

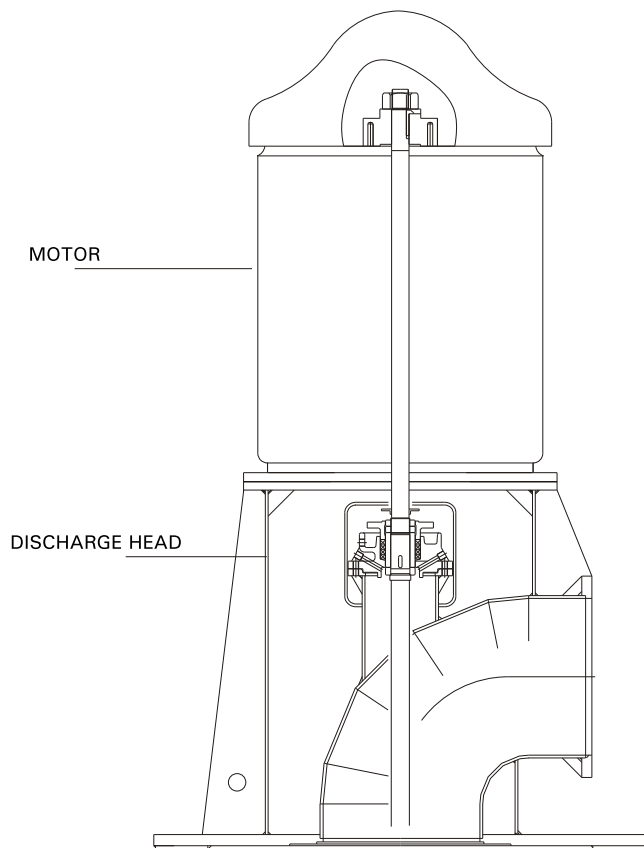
# ALTERNATIVES AVAILABLE

## Dry Pit Arrangement with draft tube

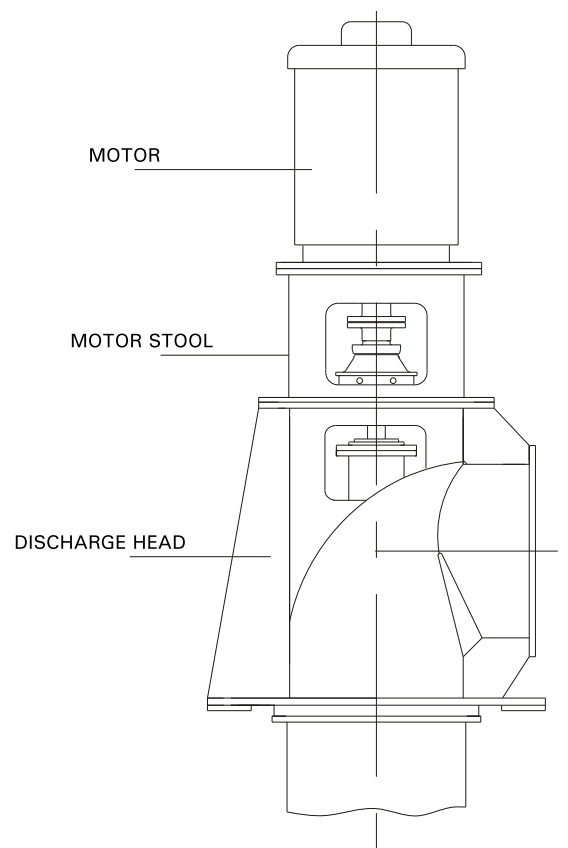


## Motor Arrangement

### Hollow Shaft



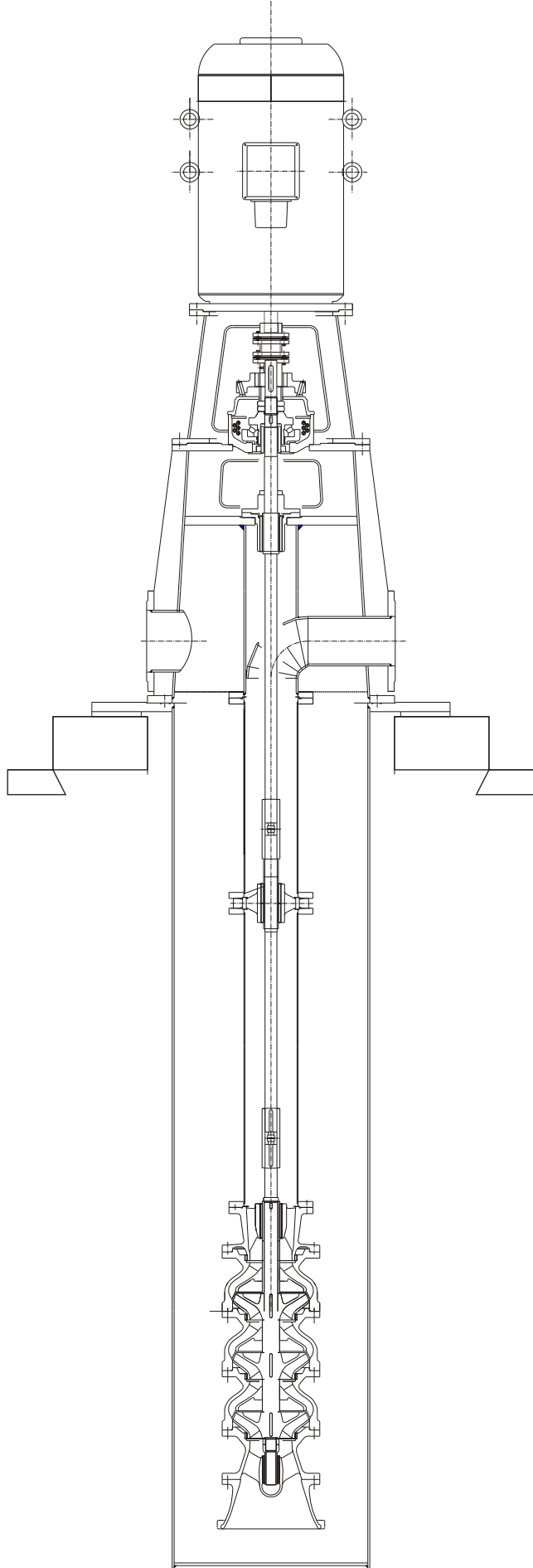
### Solid Shaft



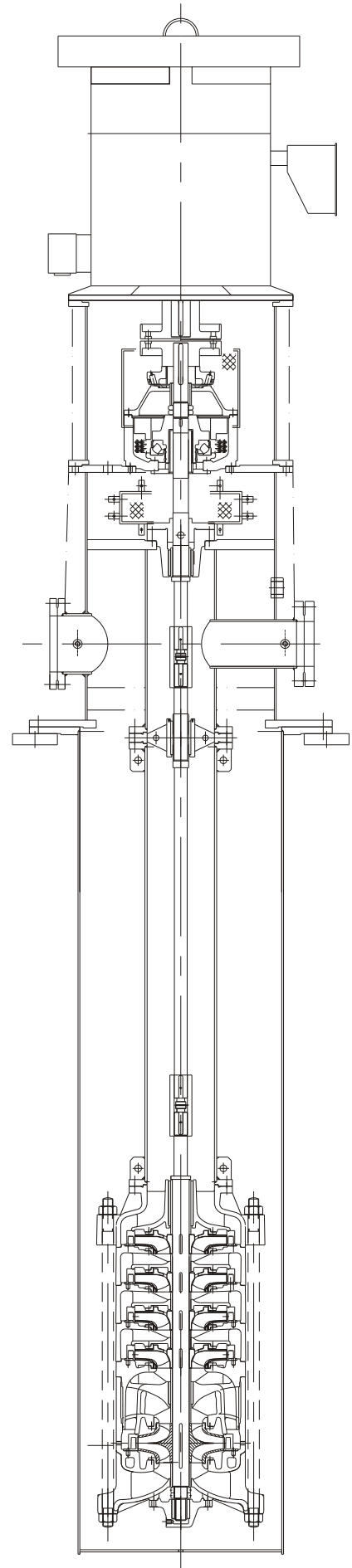
# ALTERNATIVES AVAILABLE

## Condensate Extraction Application

**Bowl Arrangement**



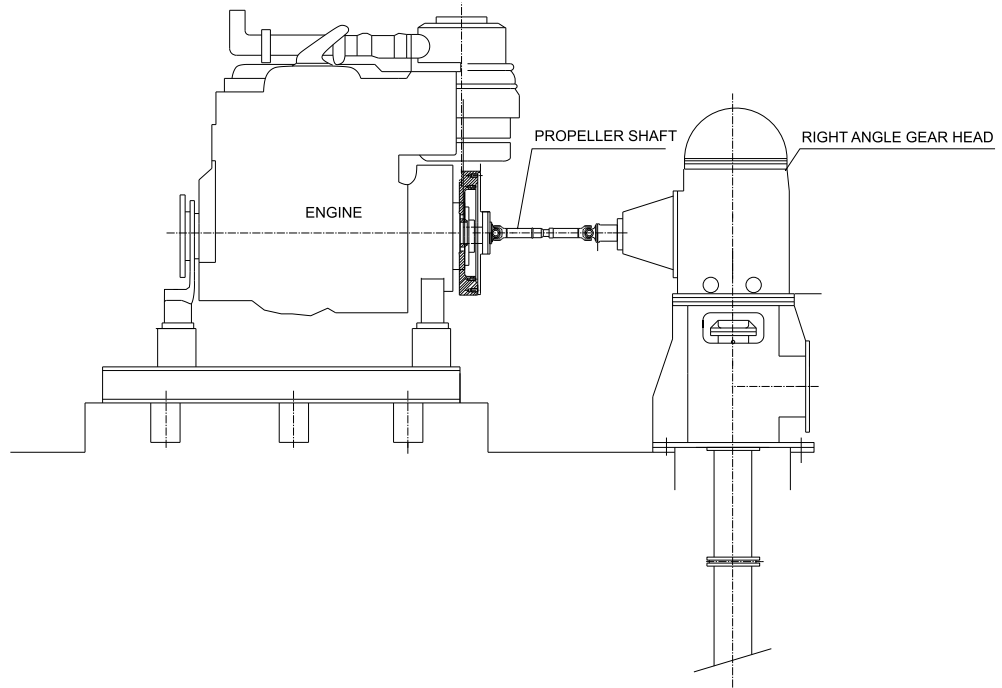
**Diffuser Type**





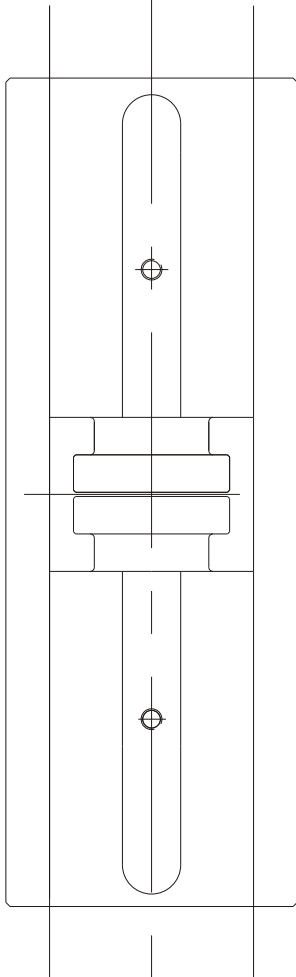
# ALTERNATIVES AVAILABLE

## Engine Driven Pump

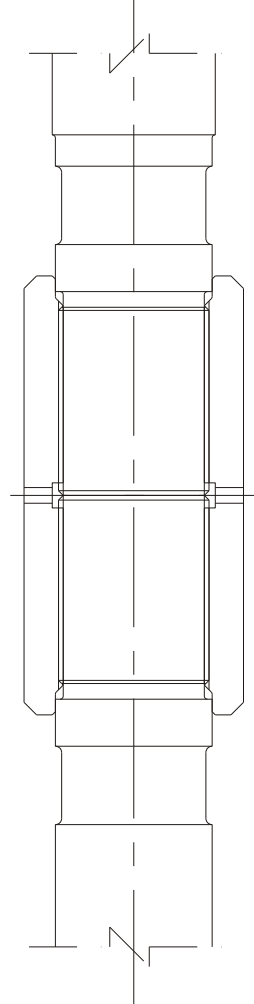


## Type Of Coupling

**Muff**



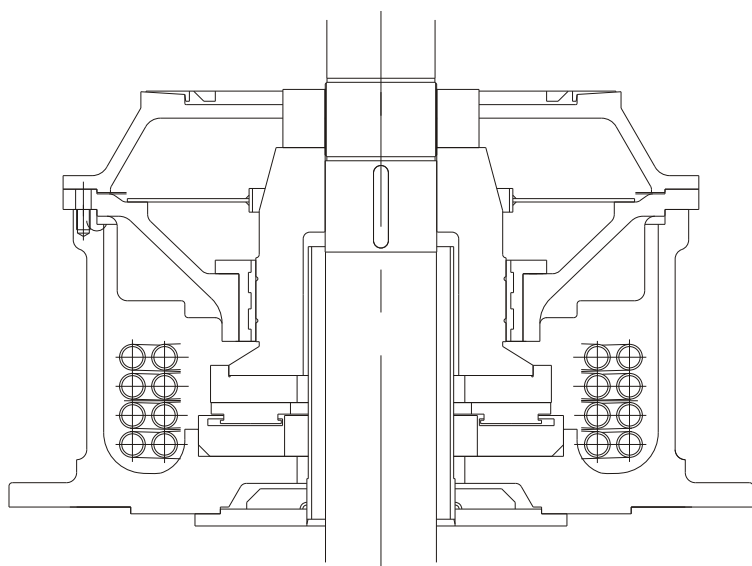
**Threaded**



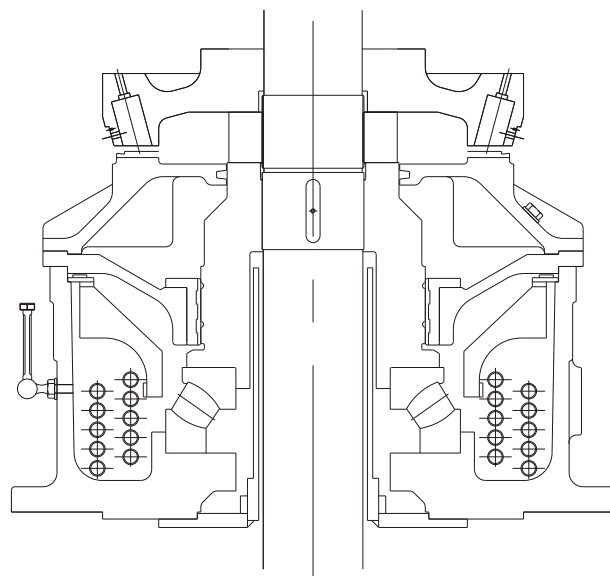
## ALTERNATIVES AVAILABLE

### Type Of Bearing

Michell



Antifriction



## MATERIALS

### Material Of Construction

Bell mouth	CI / Ni CI / Brz / Ni Resist / Stainless Steel / Duplex SS / Super Duplex SS
Impeller Guide Piece	CI / Ni CI / Ni Resist / CS
Bowl	CI / Ni CI / Brz / Ni Resist / Stainless Steel / Duplex SS / Super Duplex SS
Impeller	CI / Ni CI / Bronze / Ni Resist / CS / CA 15 / Stainless Steel / Duplex SS / Super Duplex SS
Impeller Shaft	CS / Stainless Steel GRD- SS 304, SS 316, SS 410, SS 416 / K Monel / Duplex SS / Super Duplex SS
Intermediate Shaft	CS / Stainless Steel GRD- SS 304, SS 316, SS 410, SS 416 / K Monel / Duplex SS / Super Duplex SS
Head Shaft	CS / Stainless Steel SS GRD - 304, SS 316, SS 410, SS 416 / K Monel / Duplex SS / Super Duplex SS
Intermediate Shaft Sleeve	Brz/Stainless Steel GRD - SS 304, SS 316, SS 410, SS 416 / K Monel / Duplex SS / Super Duplex SS
Distance Sleeve	CI / Brz / Ni CI / Ni Resist / Stainless Steel / Duplex SS / Super Duplex SS
Column Pipe	MS / CI / Ni CI / Ni Resist / SS
Shaft Enclosing Tube	MS / CI / Ni CI / Ni Resist / SS
Discharge Head / Tee	MS / CI / Ni CI / Ni Resist / SS
Intermediate Shaft coupling	CS / SS / K Monel
Intermediate shaft bearing	Neoprene Nitrile / Nitrile / Neoprene / LTB
Motor stool	MS / CI / Ni CI / Ni Resist / SS
Pump and motor coupling	CI / CS- Forged / Forged
Gland	CI / Ni CI / Brz / Ni Resist
Strainer	MS / SS 316 / K Monel

Note : NiCI indicates CI with 1.5% Nickel. Other materials are also available.

CI : Cast Iron

CS : Cast Steel

SS : Stainless Steel

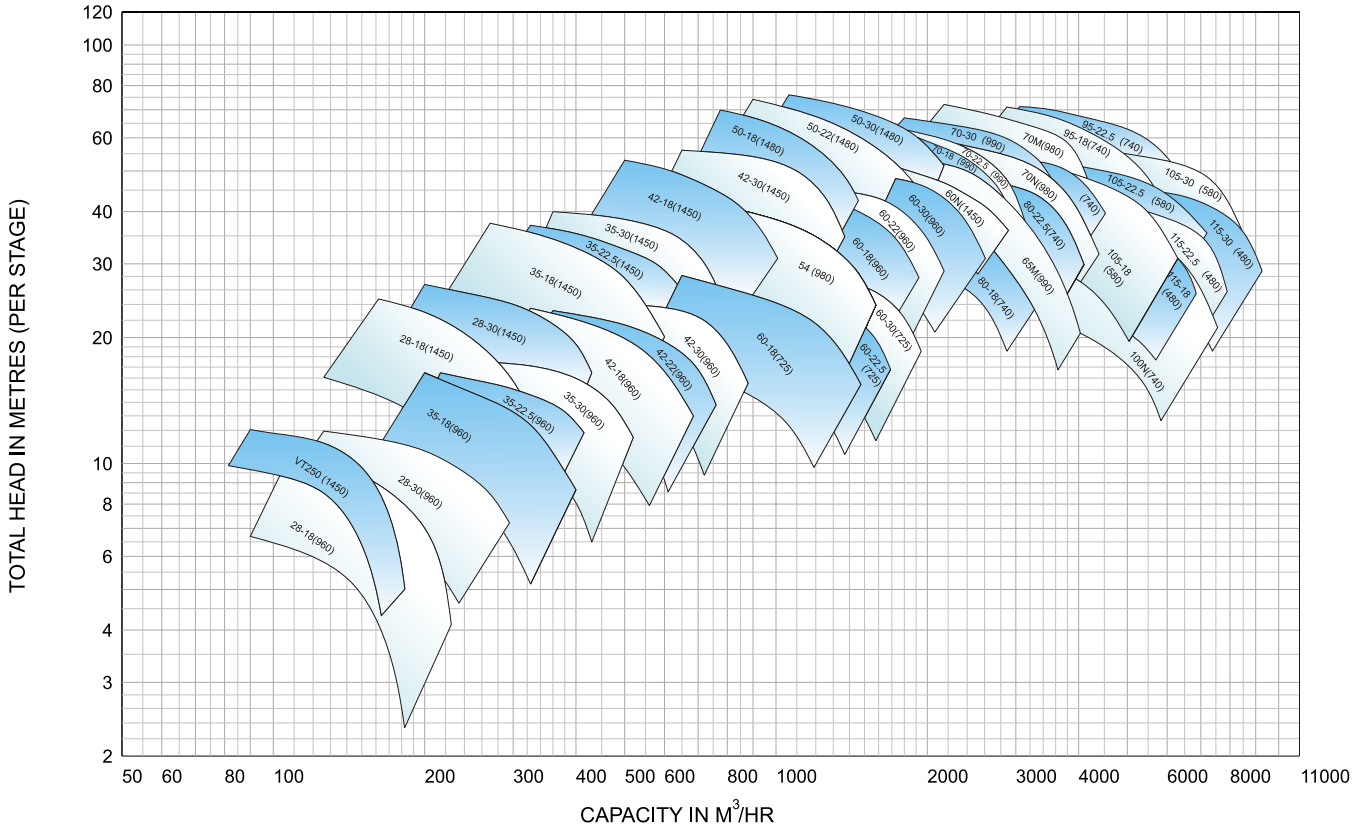
Br : Bronze

# MATERIALS

## MATERIAL STANDARDS - GENERAL INFORMATION

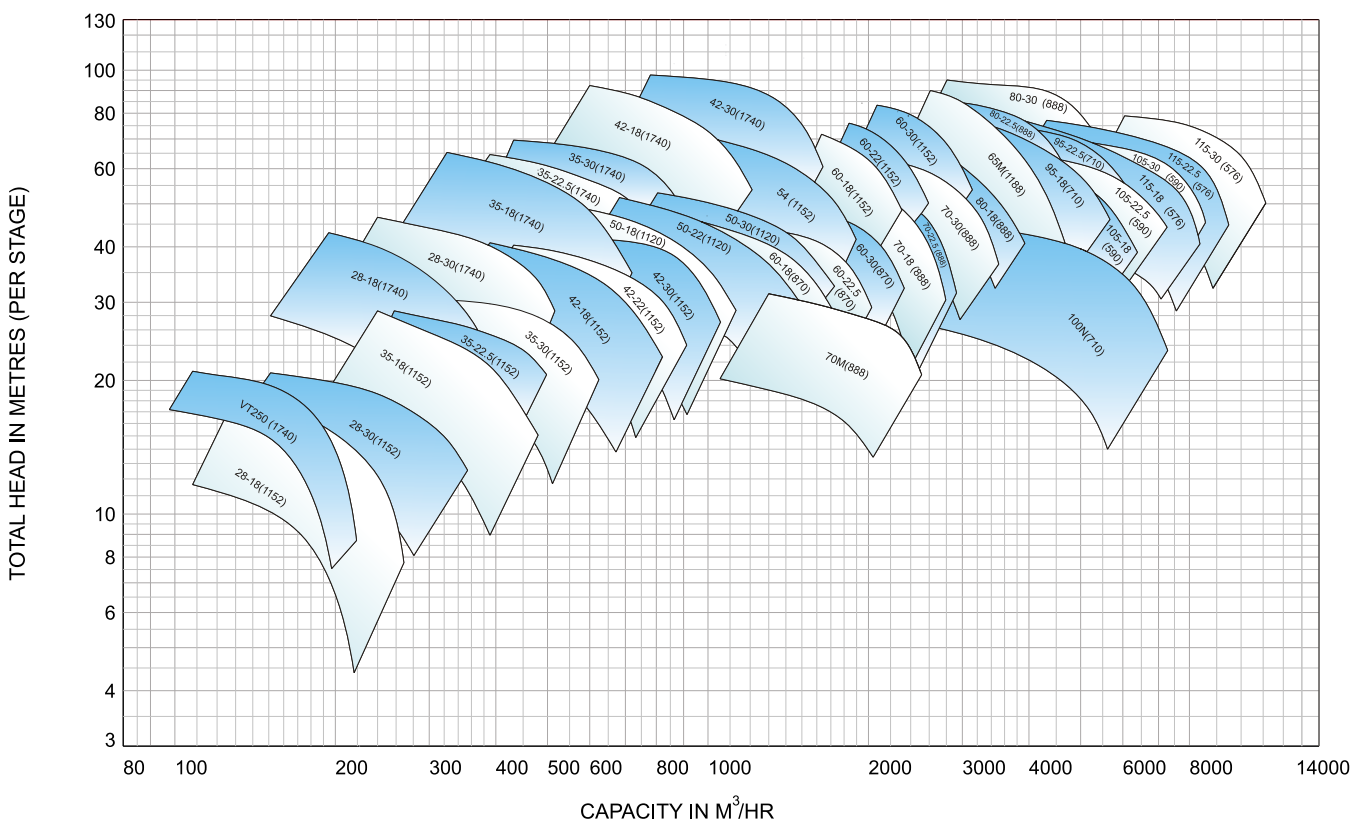
Material Type	Indian Standard (IS)	American standard (ASTM)	DIN
<b>Cast Iron</b>			
Cast Iron	IS 210 Gr. FG 260	ASTM A48 Class 40	(0.6025)DIN 1691 GG25
<b>Spheroidal Graphite Cast Iron</b>			
SG Iron (Ductile Iron)	IS 1865 Gr 400/15	A536, 60-40-18	(0.7040)DIN1693 GGG40
SG Iron (Ductile Iron)	IS 1865 Gr 500/7	A536, 65-45-12	(0.7050)DIN1693 GGG50
<b>Carbon steel</b>			
Carbon steel (Wrought)	IS 1570 (part II)Gr. 40C8	ASTM A107 Gr. 1040	(1.1186)C40E/CK40
Carbon steel (Wrought)	IS 1570 (part II) Gr. 20C8	ASTM A107 Gr. 1020	(1.0402)C22
MS Steel	MS IS 2062 - Fe 410 W A	ASTM-A283 GR.D	DIN 1700 GR ST4-2 FABRICATED STEEL44
<b>Cast Steel Grades</b>			
Cast steel		ASTMA 216 Gr. WCB	1.0619(GS-C25)
<b>Cast Stainless Steel</b>			
Stainless Steel CF8M	IS 3444 Gr. 4	ASTMA 351 Gr. CF8M	1.4408(GX5CrNiMo19-11-2)
Stainless Steel CF8M	IS 3444 Gr. 4	ASTMA 743 Gr. CF8M	1.4408(GX5CrNiMo19-11-2)
Stainless Steel CF3M	IS 3444 Gr. 16	ASTMA 351 Gr. CF3M	1.4409(GX2CrNiMo19-11-2)
Stainless Steel CF3M	IS 3444 Gr. 16	ASTMA 743 Gr. CF3M	1.4409(GX2CrNiMo19-11-2)
Stainless Steel CF8	IS 3444 Gr. 1	ASTMA 351 Gr. CF8	1.4301(X5CrNi18-10)
Stainless Steel CF3	IS 3444 Gr. 15	ASTMA 351 Gr. CF3	1.4306(X2CrNi19 11)
<b>Cast Chromium StainlessSteel</b>			
Stainless Steel CA15	IS 3444 Gr. 10	ASTMA 217 Gr. CA15	1.4106&1.448(DIN17445 GX12Cr14)
Stainless Steel CA15	IS 3444 Gr. 10	ASTMA 743 Gr. CA15	1.4106&1.448(DIN17445 GX12Cr14)
Stainless Steel CA6NM	IS 3444 Gr. 24	ASTMA 487 Gr. CA6NM	1.4313&1.4317(GX5CrNiMo13-4)
Stainless Steel CA6NM	IS 3444 Gr. 24	ASTMA 743 Gr. CA6NM	1.4313&1.4317(GX5CrNiMo13-4)
<b>Chromium StainlessSteel Round Bar Material</b>			
Stainless steel 410	IS 1570 (part V) Gr. X12Cr12	ASTMA 276 type 410	1.4006(X10Cr13)
Stainless steel 420	IS 1570 (part V) Gr. X20Cr13	ASTMA 276 type 420	1.4021(X20Cr13)
Stainless steel 431	IS 1570 (part V) Gr. X15Cr16Ni2	ASTMA 276 type 431	1.4057(X20CrNi17)
Stainless steel 316	IS 1570 (part V) Gr. X04Cr17Ni12Mo2	ASTMA 276 type 316	1.4401(X5CrNiMo17122)
Stainless steel 316L	IS 1570 (part V) Gr. X02Cr17Ni12Mo2	ASTMA 276 type316L	1.4404(X2CrNiMo1810)
<b>Cast Duplex Steel</b>			
Duplex Steel 1A		ASTMA 890 Gr. CD4MCu	25Cr-5Ni-Mo-Cu
Duplex Steel 2A		ASTMA 890 Gr. CE8MN	24Cr-10Ni-Mo-N
Duplex Steel 3A		ASTMA 890 Gr. CD6MN	25Cr-5Ni-Mo-N
Super Duplex steel 4A		ASTMA 890 Gr. CD3MN	25Cr-7Ni-Mo-N
Super Duplex steel 5A		ASTMA 890 Gr. CE3MN	24Cr-10Ni-Mo-N
<b>Non Ferious Materials</b>			
Bronze	IS 318 Gr. LTB2 (CuSn5Zn5Pb5C)	ASTMB 584 - C90500	DIN 1705 Rg 5
Phosphor Bronze	IS 28 Gr. 1 (CuSn11PC)		
Zinc Free Bornze	IS 28 Gr. 1 (CuSn10C)		

FAMILY CURVES FOR BHR PUMPS (50HZ)



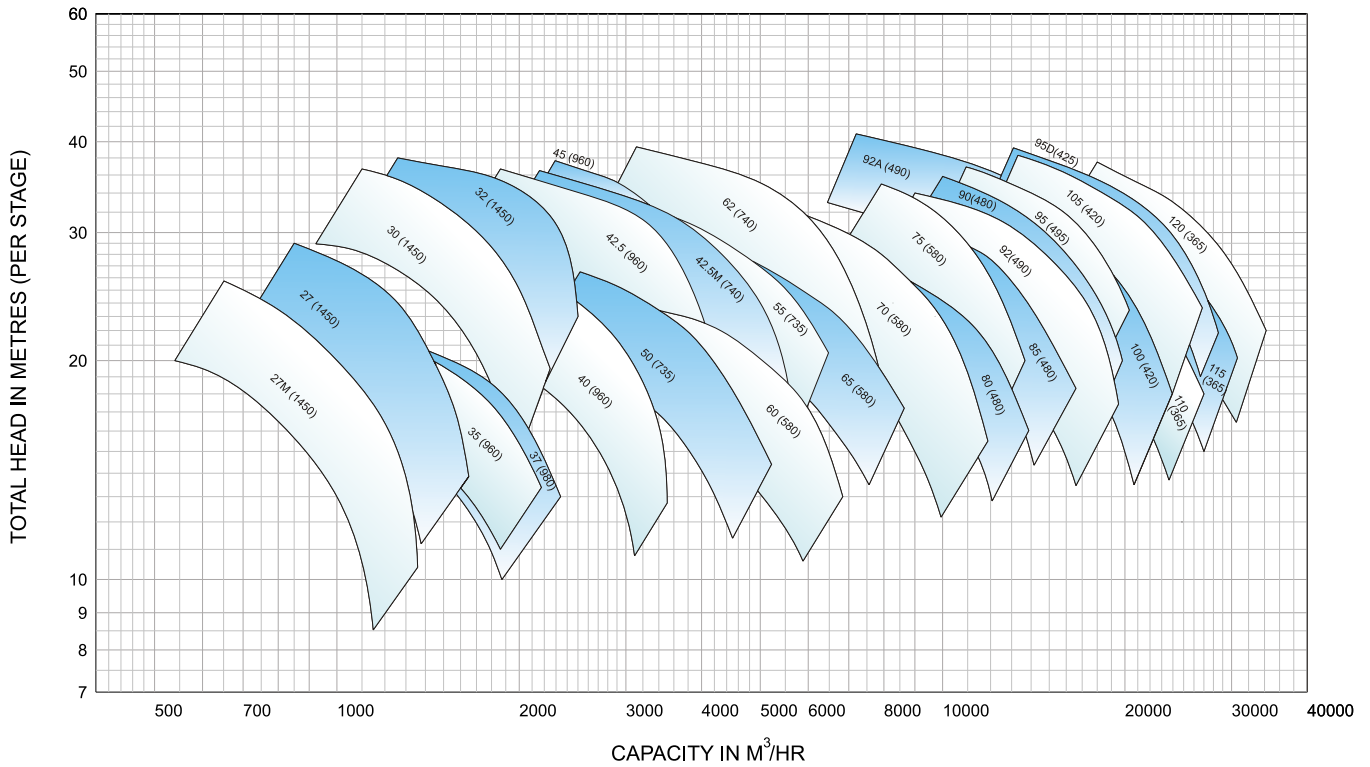
NOTE: FIGURES IN BRACKET INDICATE SPEED IN RPM

FAMILY CURVES FOR BHR PUMPS (60HZ)



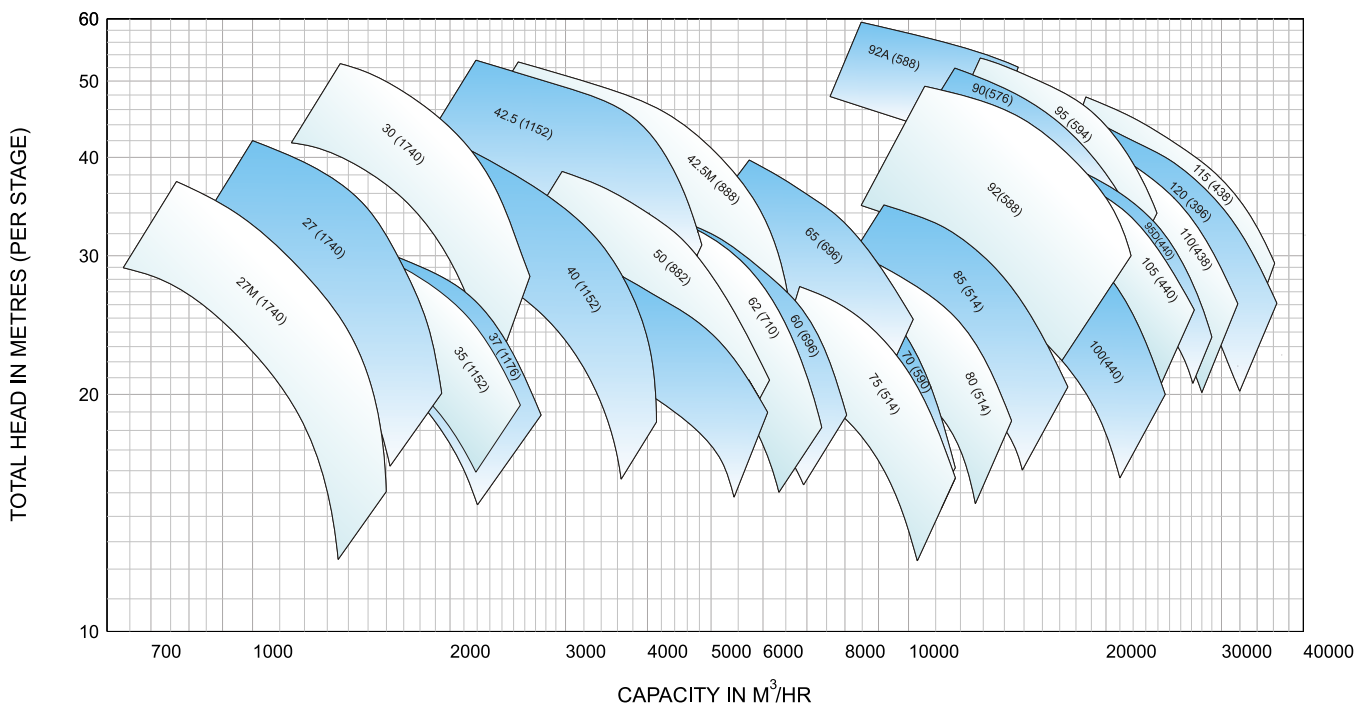
NOTE: FIGURES IN BRACKET INDICATE SPEED IN RPM

FAMILY CURVES FOR BHQ PUMPS (50HZ)



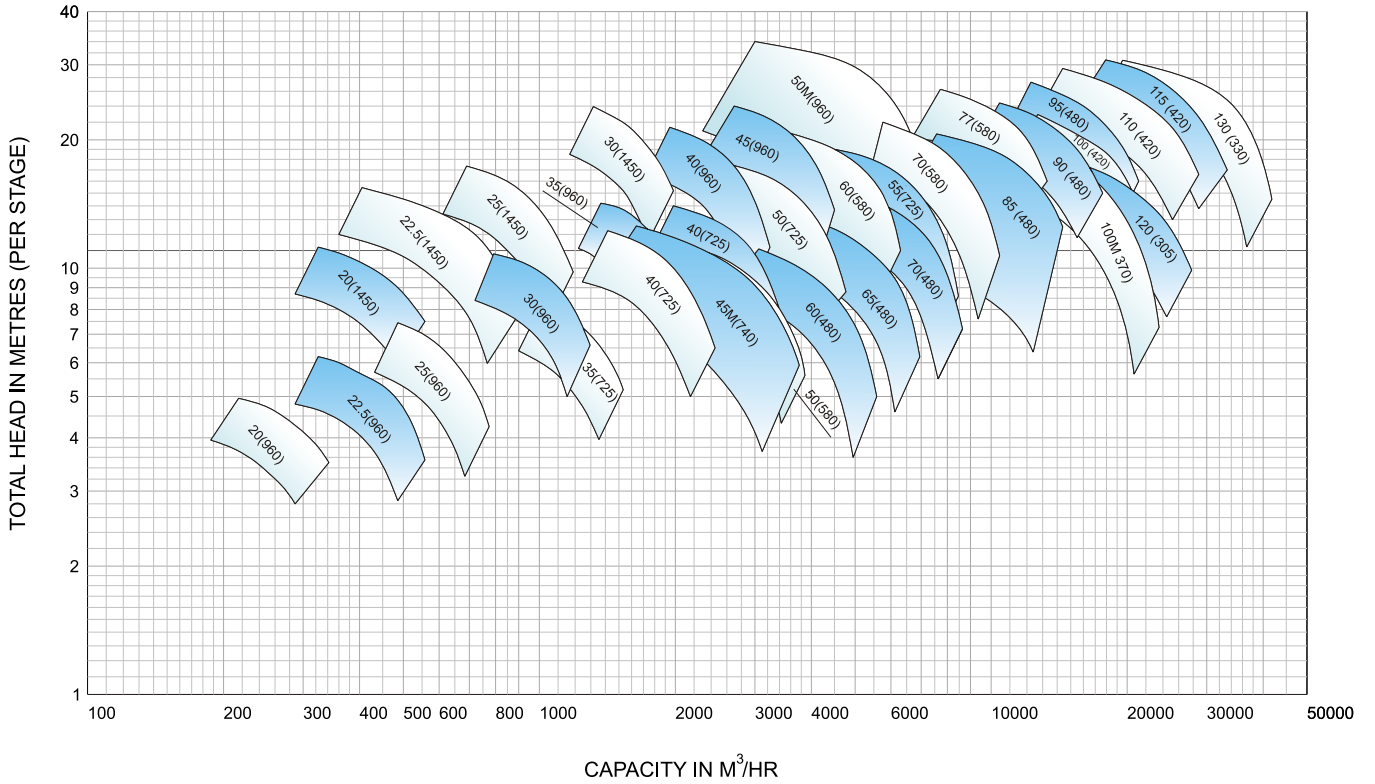
NOTE: FIGURES IN BRACKET INDICATE SPEED IN RPM

FAMILY CURVES FOR BHQ PUMPS (60HZ)



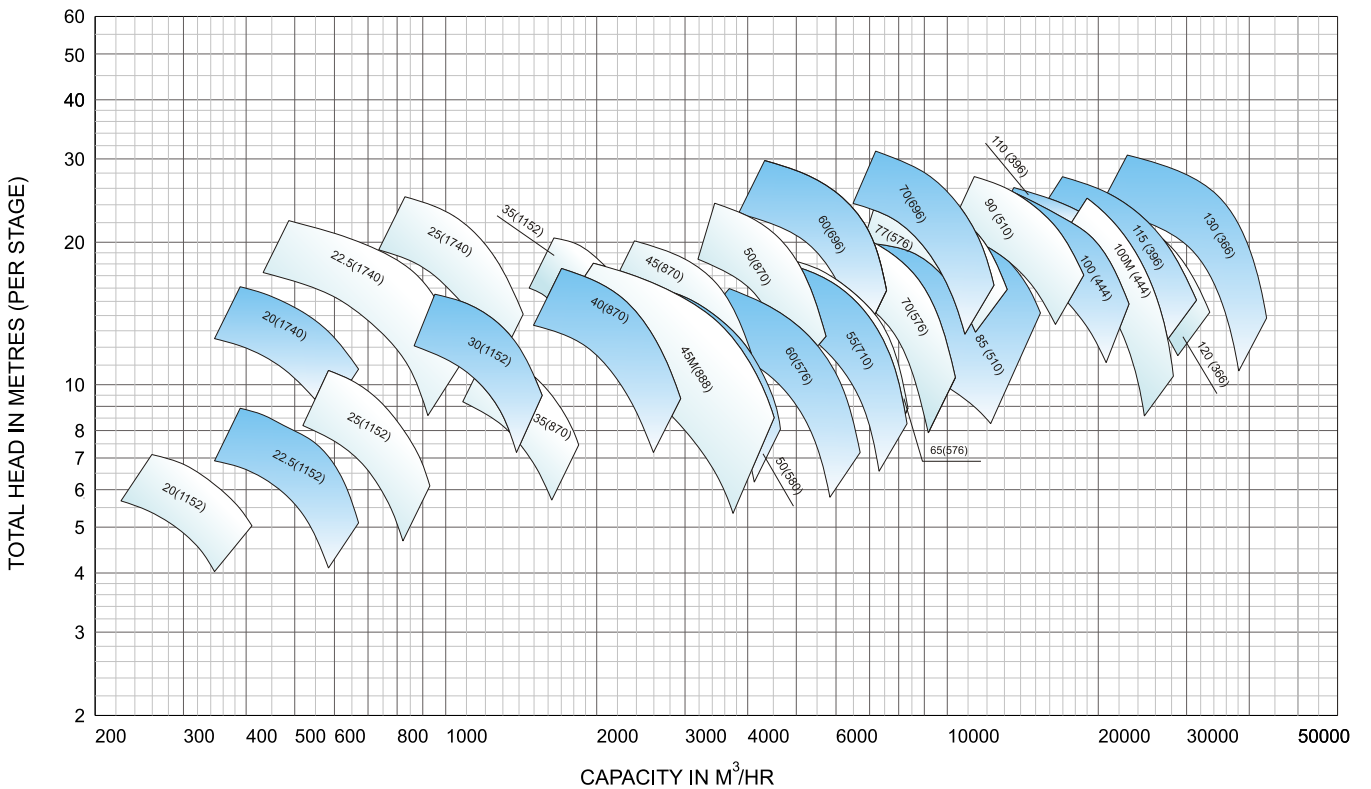
NOTE: FIGURES IN BRACKET INDICATE SPEED IN RPM

FAMILY CURVES FOR BHM PUMPS (50HZ)



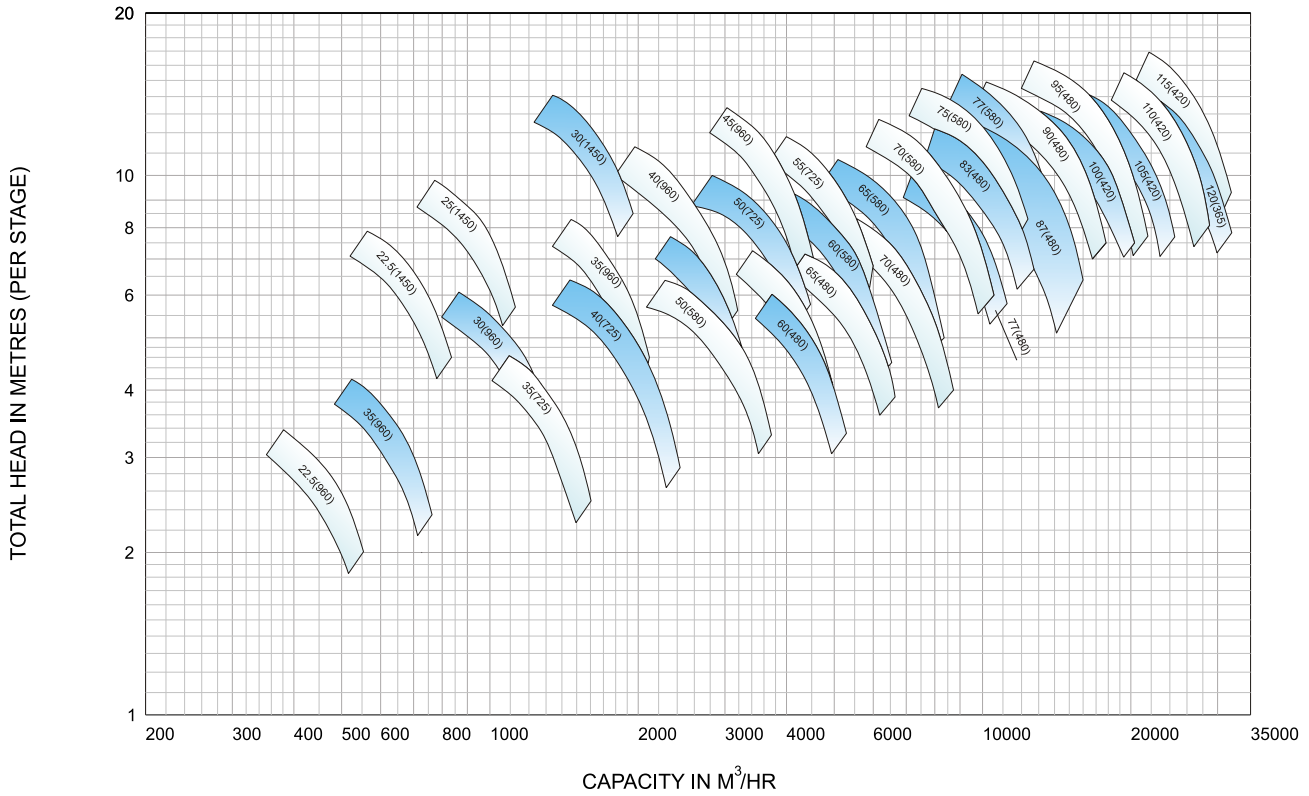
NOTE: FIGURES IN BRACKET INDICATE SPEED IN RPM

FAMILY CURVES FOR BHM PUMPS (60HZ)



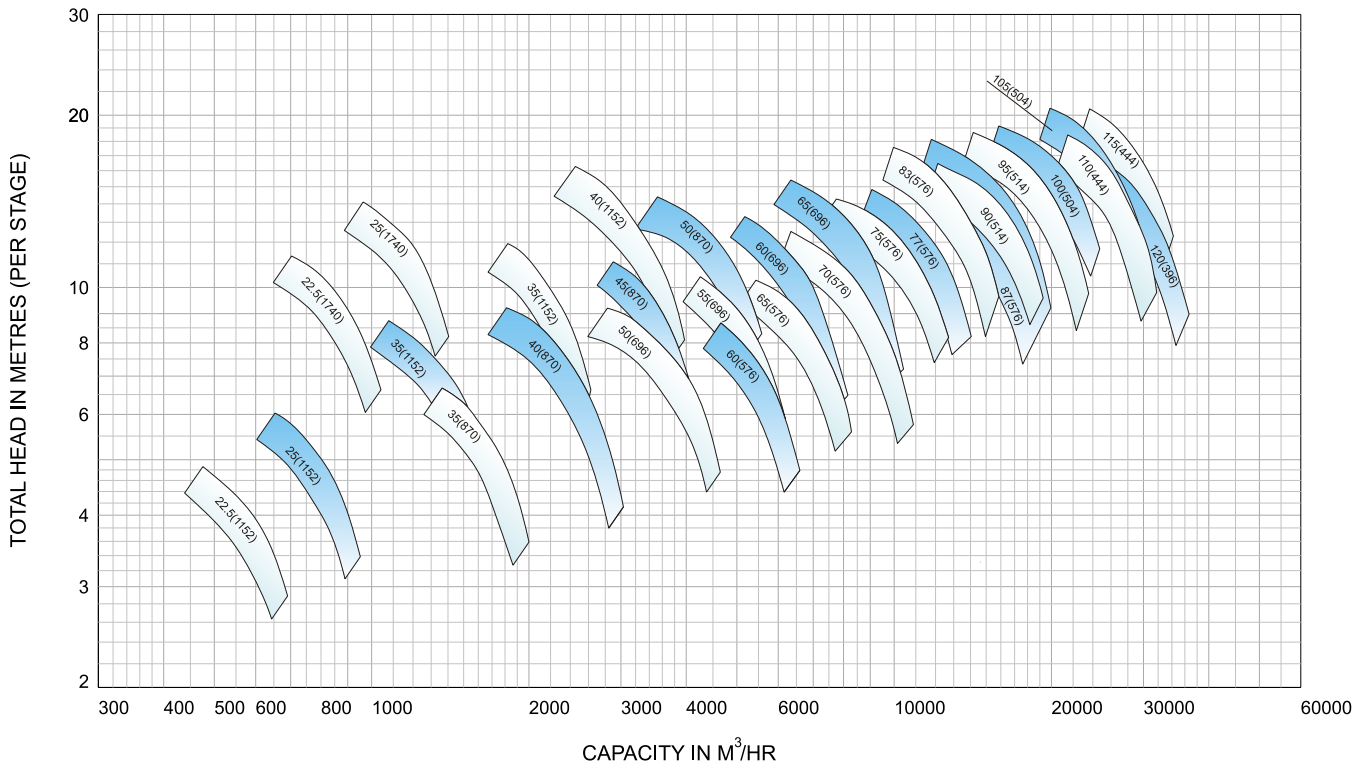
NOTE: FIGURES IN BRACKET INDICATE SPEED IN RPM

**FAMILY CURVES FOR BHM<sub>a</sub> PUMPS (50HZ)**



NOTE: FIGURES IN BRACKET INDICATE SPEED IN RPM

**FAMILY CURVES FOR BHM<sub>a</sub> PUMPS (60HZ)**



NOTE: FIGURES IN BRACKET INDICATE SPEED IN RPM

## OUR GLOBAL PRESENCE



As we are constantly endeavouring to improve the performance of our products/ equipment, we reserve the right to make alterations from time to time and as such our products/ equipment may differ from that detailed in this publication. For latest information you may get in touch with our Regional Sales Offices.

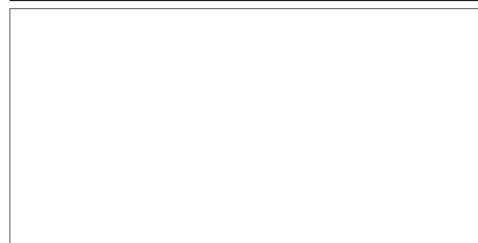


Enriching Lives

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