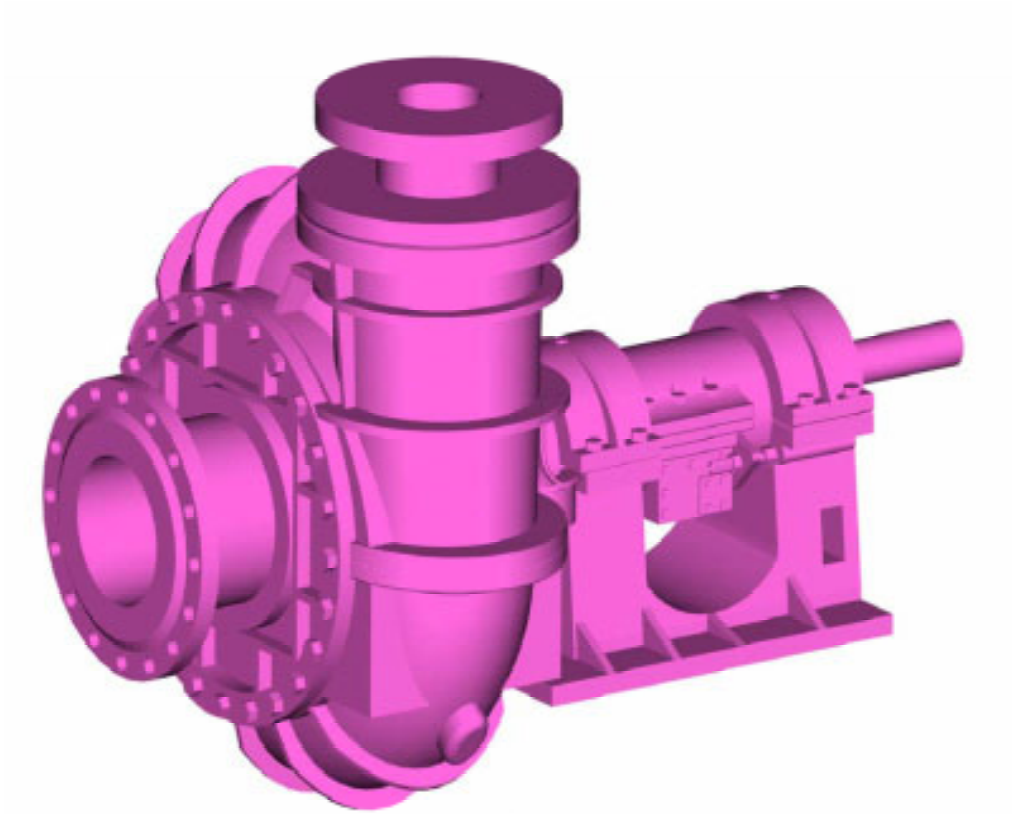
INSTRUCTIONS ON INSTALLATION, OPERATION AND MAINTENANACE FOR SAM TURBO PUMP TYPE "ARS"



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SAM TURBO INDUSTRY LIMITED

NEELAMBUR, COIMBATORE-641 014. INDIA

WARRANTY

We warrant that the pump supplied by us is free from defective material and faulty workmanship. This warranty holds good for a period of 12 months from the date of commissioning of the equipment or 18 months from the date of despatch from our factory, whichever is earlier.

Our liability in respect of any complaint is limited to replacing part/parts free of charge ex-works or repairs of the defective part/parts only to the extent that such replacement / repairs are attributable to or arise solely from faulty workmanship or defective material.

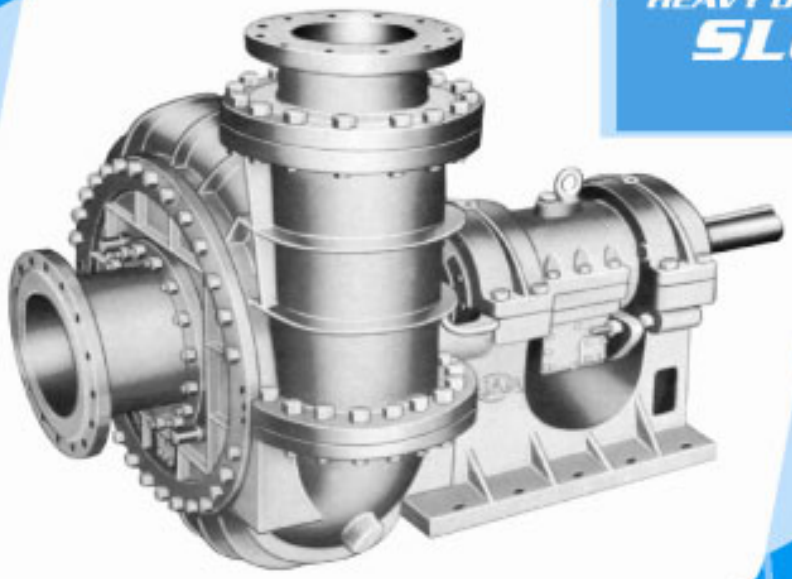
We warrant the materials for the chemical composition and mechanical properties of the relevant standard only and not for corrosion and erosion.

The warranty holds good only for the products manufactured by us.

SAM TURBO INDUSTRY LIMITED

AR / ARS SERIES : TWIN CASING SLURRY PUMPS

"Solution for handling abrasive, coarse grained and fine solids, Slurry Mixtures"



HEAVY DUTY
SLURRY PUMPS

TYPE AR

TECHNICAL DATA

CAPACITY	: UPTO 2000 M^3/HR
TOTAL HEAD	: UPTO 60 M/STAGE DEPENDING ON CONSISTENCY OF SLURRY
SPEED	: UPTO 1500 RPM IN 'AR' RANGE AND UPTO 3000 RPM IN 'ARS' RANGE.
MAX.OUTER CASING PRESSURE	: UPTO 25 KG/CM^2 WITH CAST IRON WORKING PRESSURE IS 210 FG 260 & UPTO 40 KG/CM^2 WITH CARBON STEEL ASTM A 216 GR.WCB.
MAX. OPERATING TEMP	: 110° C
SIZE	: RANGING FROM 2" - 14" (50 mm - 350 mm)

INTRODUCTION

SAM'S reputation for efficiency backed by over 30 years of experience in the manufacturing of Centrifugal Twin Casing Slurry Pumps for various critical applications has carved way for a formidable presence in the special purpose Pump's Industry.

AREAS OF APPLICATION

SAM range of Slurry Pumps, can handle liquids containing abrasive and coarse grained Solids such as Ash Slurry in Thermal Power Stations, Iron Ore in beneficiation plants, Floatation Tailings, Coal Slurries in Washeries, Mining Coking Plouts, Sand Water Mixtures, Ferro Silicon Pulp, Magnetite Pulp etc.,

DESIGN

Versatile design, Engineered for optimum performance and equipped with inner liners made from high abrasion resistant alloys (Ni-Hard, 27% Chromium).The premium design Centrifugal Pump is designed to suit with various slurry pumping applications. Its unique design twin casing leads to excellent wear resistance and longer life cycles compared to other pumps of the same range.

Most of the operating ranges are covered under our ARS / AR Models.

TWIN CASING ARRANGEMENT

The Pump incorporates the Twin Casing concept where there are Inner & Outer Casings. The Outer casing is made of cast Iron/Carbon Steel, designed to withstand the required working pressure. The Inner casing is of high hardness materials like Ni-hard (or) Hi-Chrome and takes the entire wear. In the Twin Casing design the Inner Casing is subjected to equal pressure on either side and the Outer Casing takes care of the working pressure. This arrangement enhances the life of the wear part and avoids any emergency failure.

In our Slurry Pumps, the casing discharge orientation can be adjusted by every 45° angle in 'ARS' range pump and 22.5° angle in 'AR' range to suit layout requirements. However in fewer model pumps are offered in single casing only.

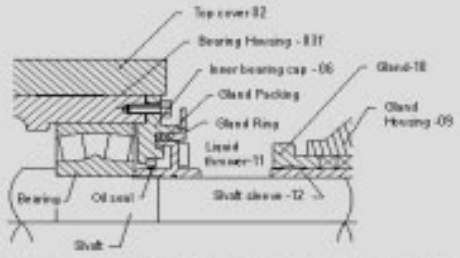
BEARINGS

The Pump shaft is mounted on Spherical Roller Bearings (one no. each at drive end & non drive end). To take care of all radial loads and an additional spherical roller thrust bearing is provided at the drive end to take care of axial thrust on larger pumps. Depending upon size & type of the pump, bearing types also varies.

The Bearings are selected such that to give a minimum of L-10 rating of 25,000 hours in continuous operation in (or) with normal rated condition of the pump.

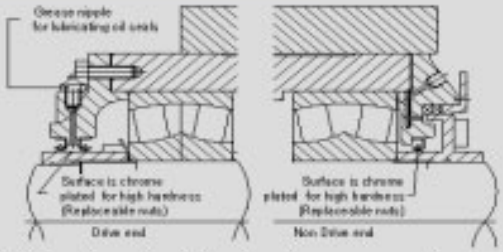
In AR / ARS range all the pumps are oil lubricated except AR 150/510 which is grease lubricated.

A) Bearing protection arrangement



SAM provides unique bearing protection arrangement to avoid entry of external liquid and gland leakage, By imparting revolving liquid thrower along with the gland Packing for additional sealing. This varies from the conventional bearing housing arrangement.

B) Oil seals arrangement



The Oil seals are located and revolves over separate chrome plated sleeve nuts. Thus it prevents the damage of the shaft. The Drive End Oil Seals are arranged back to back which avoids the oil leakage and also prevents the entry of foreign particles.

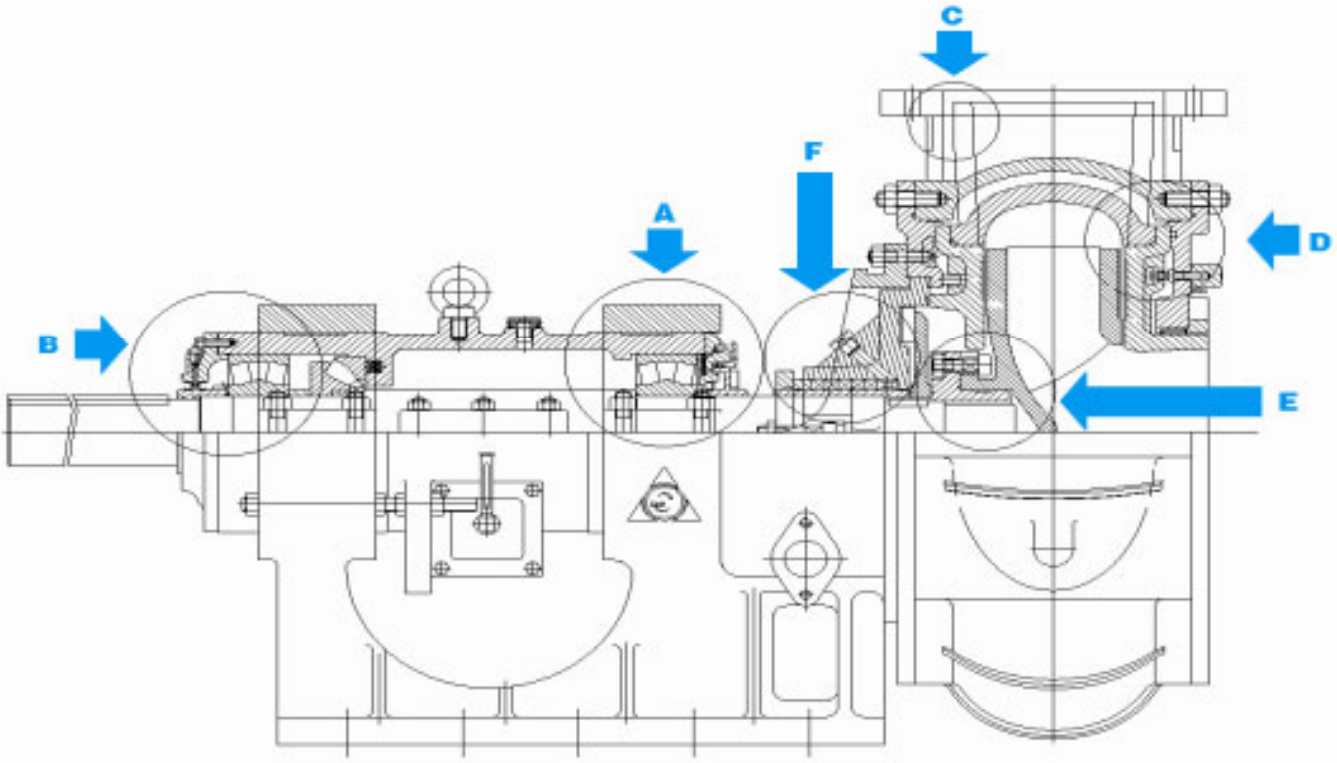
SEALING ARRANGEMENT

SAM Pumps are provided with conventional Gland Packing with Lantern Ring arrangement. In addition to this the pumps are provided with a separate Expeller labyrinth which revolves along with the Impeller and Pumps back the Slurry into the casing which prevents the slurry entry into the Stuffing Box Zone. The Expeller reduces the Sealing Water pressure requirement especially when the pumps are inseries operation.

SERVICE

Apart from Design, installation and commissioning SAM's trained Engineers and Country Wide Dealers Net Work are available to give solutions for your Slurry Pumping needs and problems.

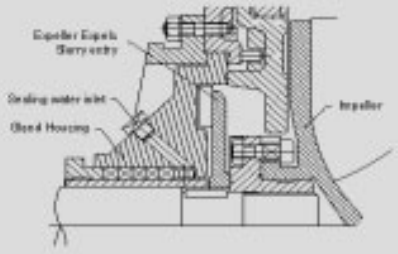
SECTIONAL DRAWING



E) Impeller Mounting

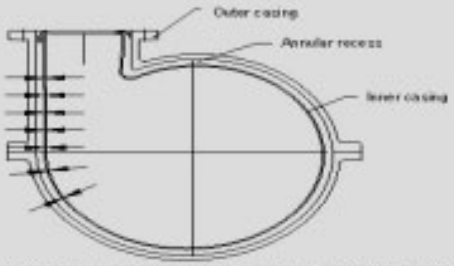
In AR - range pumps the impeller is mounted by a separate impeller nut made of Carbon Steel with a heavy 'T' Bolt for fixing it to the shaft. Adhering to this method machining any bore or threading on the Impeller - which is of a very hard material is totally avoided. In ARS - range pumps different types of impeller locking arrangements are provided which are detailed in sec drawings of individual pumps only.

F) Stuffing box sealing



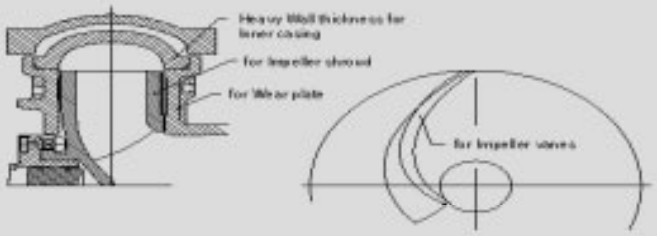
Provision of Expeller labyrinth which rotates in unison with impeller, prevents entry of slurry in to the stuffing box area. Parallely external seal water ensures the entire gland housing is filled with clear water.

C) Twin casing concept



The Inner casing is inculcated in such a way that it experiences equal pressure on either sides and not subjected to any hydraulic stress. The increased wall thickness of the outer casing takes the entire pressure load which results in prolonged life of the inner casing and wear plates. ARS 50/210 and ARS 80/250, AR 200/410 pumps are offered only in single casing.

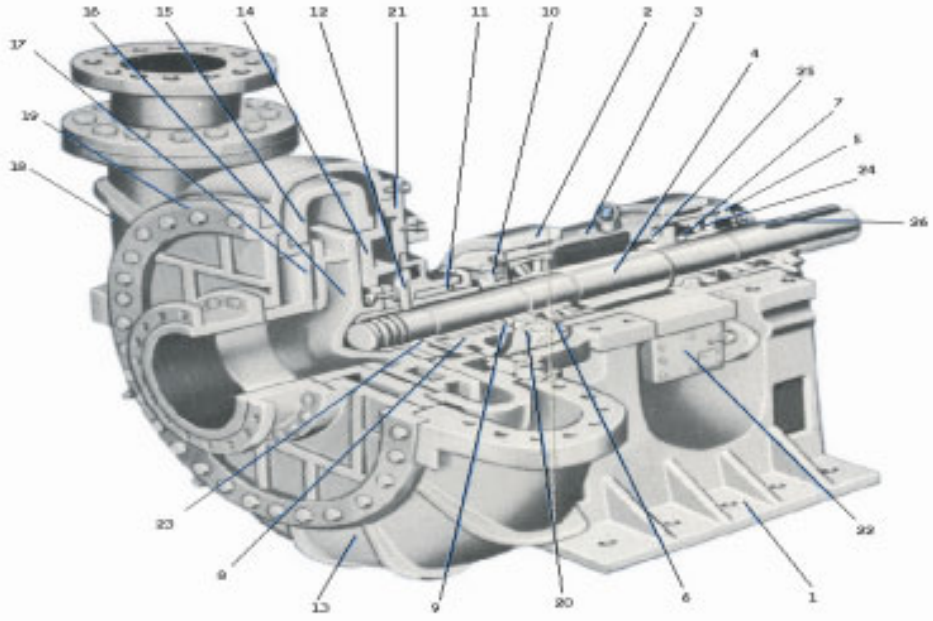
D) Wall thickness



An uniform increased wall thickness of all the wetted parts in our pumps, enhances the durability and increases the life of components.

Part List

S.No.	Part Name
1.	Bearing bed
2.	Top cover
3.	Bearing housing
4.	Shaft
5.	Outer bearing cap
6.	Inner bearing cap
7.	Bearing spacer
8.	Gland housing
9.	Gland
10.	Liquid thrower
11.	Shaft sleeve
12.	Expeller
13.	Outer casing (bottom)
14.	Wear plate (b.side)
15.	Inner casing
16.	Impeller
17.	Wear plate (s.side)
18.	Outer casing (Top)
19.	Suction cover
20.	Gland ring
21.	Bracket side cover
22.	End plate
23.	Impeller nut
24.	Spherical Roller bearing
25.	Spherical Roller thrust bearing
26.	Oil seals



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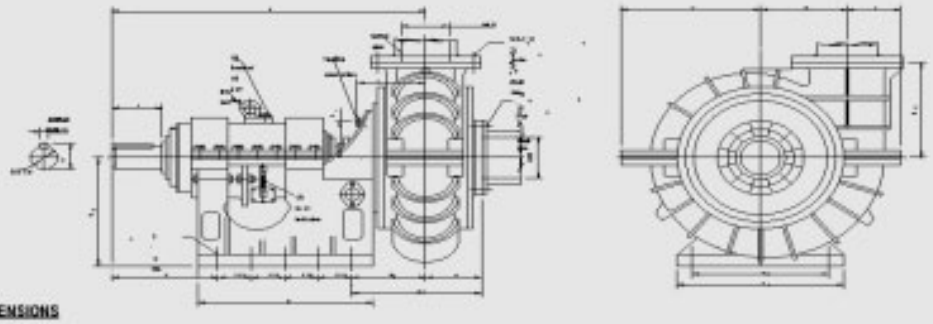
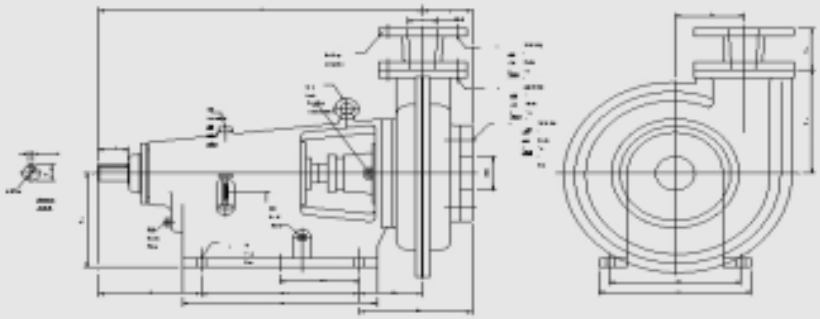


TABLE OF DIMENSIONS

PUMP TYPE	NWS	NWD	z	f	a	h_1	b	c	h_2	h_3	h_4	m	β_1	β_2	x	y	ød	t	u	t	$ød_1$	n_1	β_3	d_1	n_2	β_4	y_1	n_3	x_1
AR 150/E06	200	150	172	1211	178	470	305	442	445	640	610	602	240	516	215	340	90	95.9	25	165	18	8	292	18 Slot	8	292	28	8	117
AR 150/E10	200	150	199	1086	222	460	315	479	450	550	620	600	350	582	281	395	90	85.5	22	207	18	8	292	18 Slot	8	292	28	8	166
AR 150/E50	200	150	199	1614	233	460	315	479	500	640	712	688	350	586	270	553	100	106.4	28	311	22	8	356	18 Slot	8	292	28	10	144
AR 200/E00/ AR 200/E00	250	200	220	1683	206	520	360	640	562	740	812	938	354	559	256	541	100	106.4	28	310	22	12	435	22 Slot	8	356	28	10	136
AR 200/E50	250	200	262	1675	264	480	380	627	500	640	712	888	354	628	280	503	100	106.4	28	261	22	12	438	22 Slot	8	356	28	10	136
AR 250/E50	250	200	260	1686	235	615	430	640	562	740	812	938	391	616	320	597	120	126.4	28	359	28	16	470	26 Slot	12	381	28	10	150
AR 300/E50	300	200	260	1686	235	615	430	640	562	740	812	938	391	616	350	597	120	126.4	28	359	22	12	432	22 Slot	12	432	28	10	150
AR 300/550B	300	250	256	1679	238	615	395	636	562	740	812	938	373	611	309	599	120	126.4	28	359	22	12	432	22 Slot	12	432	28	10	150
AR 350/T50 AR 350/T50A	300	200	285	1694	242	790	475	720	562	740	812	938	393	636	335	593	120	126.4	28	359	28	16	470	22 Slot	16	470	28	10	150
AR 350/T50B	350	300	290.5	1670	255	790	497.5	649	562	740	812	938	495	669	350	457	120	126.4	28	220	28	16	540	30 Slot	12	476	28	10	150



SINGLE CASING

PUMP TYPE	NWS	NWD	f	a	h_1	b	h_2	c	n_1	n_2	β_1	y	ød	t	u	t	$ød_1$	n_1	β_2	$ød_2$	n_2	β_3	$ød_3$	n_3	m	β_4	β_5	y_1	n	m_1	m_2
ARS 50/200	65	50	535	90	200	113	180	90	215	250	105	170	26	31.3	8	60	18	4	114	14	4	127	-		320	-	185	14	4	-	260
*ARJ 50/210	80	50	784	159	212	128	200	-	290	350	151	212	26	41.3	10	80		-		18	8	195	18	8	360	146	240	14	4	-	350
ARS 65/200	80	65	679	100	225	132	200	90	290	350	155	214	26	41.3	10	80	18	4	127	18	4	146	-		360	-	255	14	4	-	350
*ARS 80/250	100	80	959	120	262	150	320	-	400	450	161	262	55	59.3	16	140		-		18	8	195	18	4	535	152	301	18	4	-	435
ARS 80/290	100	80	675	105	265	190	200	120	290	350	159	205	26	41.3	10	80	18	8	146	18	6	178	-		360	-	264	14	4	-	350
ARS 80/340	100	80	967	125	315	206	320	100	400	450	170	262	55	59.3	16	140	18	8	146	18	6	178	-		535	-	295	18	4	-	435
ARS 100/340 ARS 100/340A	100	100	967	125	315	206	320	100	400	450	170	262	55	59.3	16	140	18	8	178	18	6	178	-		535	-	295	18	4	-	435
ARN 100/600	150	100	877	164	355	225	315	118	440	510	172	229	60	64.4	18	140	18	8	235	18	8	260	-		-	-	-	22	4	-	465
ARS 150/340 ARS 150/340A	150	150	940	165	280	220	320	200	400	450	200	299	65	69.4	18	135	23	8	240	22	8	240	-		535	-	373	22	6	218	435
ARS 150/400	150	150	929	145	405	250	320	118	400	450	194	299	65	69.4	18	135	23	8	240	18	8	260	-		535	-	339	22	6	218	435

Sam reserves the right to make changes or alterations due to continuous Technological Improvement from time to time without notice or obligation.

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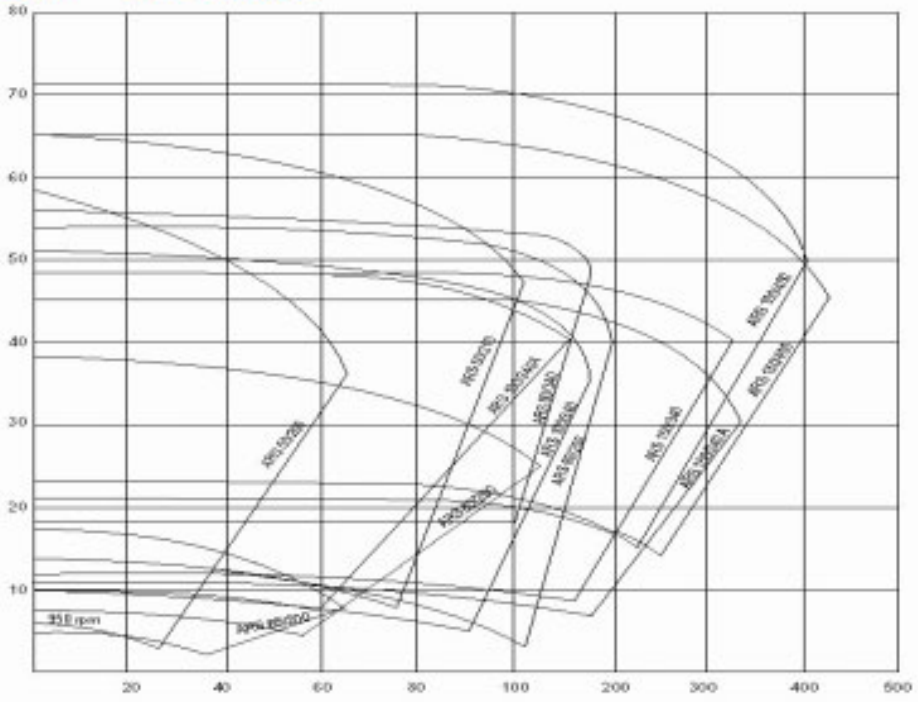
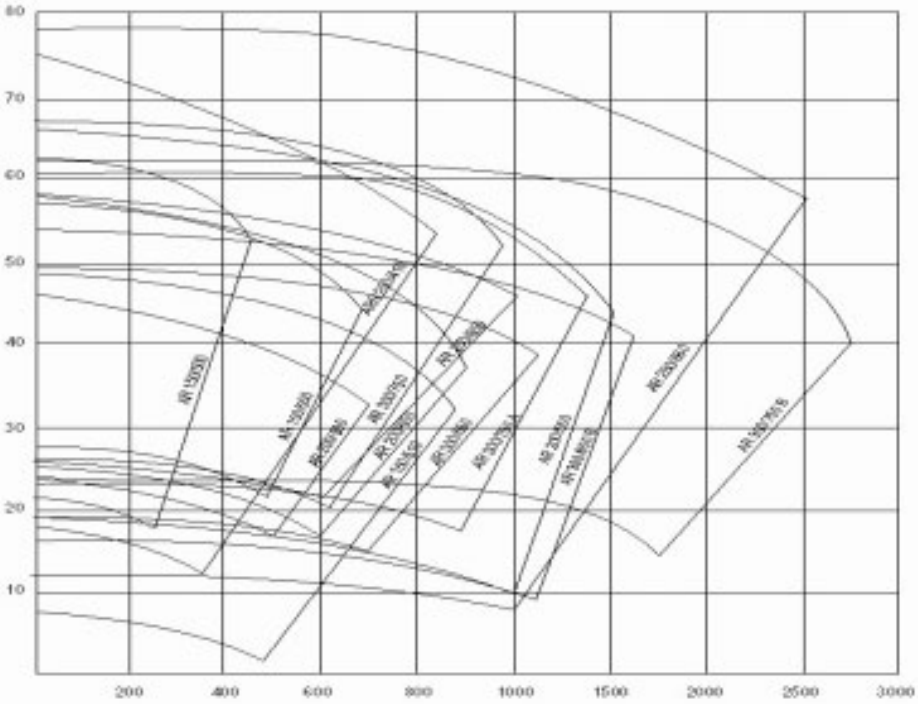
Family Curve - ARS Range



Family Curve - AR Range



Apart from standard range, Hydraulic components are designed / modified for specific requirements

CONTENT

PLEASE FURNISH COMPLETE NAMEPLATE DETAILS, NAME OF THE PARTS, PART NOS AND MATERIAL OF CONSTRUCTION WHILE ORDER SPARE PARTS FOR THE PUMPS

GENERAL

Save yourself needless trouble and obtain the best results by reading the instructions carefully. No expert assistance should be required if the pump has been installed in accordance with these instructions.

Information in this manual applies to 'ARS' Slurry pumps only and the instructions given are issued to assist our customers to install and operate their pumps to obtain the best results M/s. Sam Turbo Industry Limited or M/s. Greaves Limited will be pleased to give advice on special problems, if any arising on site.

All correspondence concerning pump should contain the serial number together with size and type as detailed on the name plate. Please pass this manual to the person responsible for erection and maintenance.

INSTALLATION

On receipt of Pump make sure that it has not been damaged and that no parts are missing.

LOCATION OF THE PUMP

The foundation of a centrifugal pump is subject to severe pipe loads and due to tension of the belt driven arrangement. If the common base plate is not supplied the pump can be directly grouted on concrete slab. The height of the slab should be 3/4" x 1", lower than finally required to allow for grouting and provision should be made for the foundation box which should be made installed in pipe sleeve type holders as shown in Figure 1. When the pipe is set up the grout should be thoroughly worked under the base plate (Figure 4) and allow to set for about 48 hours when finally tightening of all bolt should be done. In the event of direct coupled slurry pumps with flexible coupling on a common base plate, do not screw the holding down bolts too tightly or unevenly as this will tend to distort the bedplate and throw the pump out of alignment, causing the bearings to run hot and produce excessive wear. After grouting, the spindle should be turned by hand to see if it is running freely on its bearings.

SUCTION PIPING

The suction pipe should be kept as short and direct as possible with minimum number of bends. Particularly care must be taken to see that joints of suction pipe are absolutely air tight and that only sound piping is used. Air leaking into suction pipe is fatal to the satisfactory working of centrifugal pump.

DELIVERY PIPING

On any condition the delivery VALVE IN THE DELIVERY pipe line should not be closed for long periods. This will create heating of the liquid. In the event of due to process requirement, delivery valves should be closed, then a small 'by pass' back to the source of supply should be incorporated.

SUCTION ND PIPING:

Suction and delivery pipes must be supported independently of the pump. The important point to remember when connecting pipes to a pump is not to strain the pump. Pipes must match up to their respective flanges without being strained into position; such a pressure would have the effect of distorting the pump casing.

MOTOR- DRIVEN PUMPS

Are correctly aligned before despatch and provided care is taken to avoid distortion it should not be necessary to alter this setting. However, after the H.D.Bolts has been tightened and the suction and delivery pipes have been fitted, the coupling alignment must be checked.

BELT DRIVEN PUMPS

It is important that the driving and driven pulleys whether for vee-belts or flat belt, should be exactly in line with and parallel to each other. Where the pulleys are of equal width this can be checked by stretching a line tightly beside the pulleys as close to the shafts as possible. The line must just touch both sides of the rim of each pulley. If the pulleys have different widths the same principle is used, but allowance is made for the difference in width.

Pump pulleys supplied by SAM TURBO INDUSTRY LIMITED have an 'off set boss which positions the centre line of the pulley more or less in line with the centre line of the bearing thus reducing the bending effect on the shaft and the bearing loads. Should a pulley be purchased from another source, care should be taken to ensure it is of suitable design.

DESCRIPTION OF THE EQUIPMENT:

Refer Drawing Number SAM Type ARS slurry pump is o f robust design and heavy in construction for such touch slurry application. Please refer the sectional drawing at the end of this manual. The shaft of the pump is especially larger in diameter to be free from deflections. Shaft is supported on a cylindrical roller bearing or deep groove ball bearing or spherical roller bearing at he impeller end and angular contact bearing or spherical roller bearing at the coupling end according to the model of pump.

The liquid end of the pump consists of twin casing arrangement, Inner casing (17) being replaceable type. The Impeller (18) is screwed on to the shaft with the Impeller nut (38). This arrangement enables for easy dismantling and assembling of the Impeller. The gland portion is effectively sealed by means of Lay-brinth design. The stuffing box is arranged with conventional gland packing.

OPERATION

Prior to starting the pump for the first time special attention to be made to the following points

1. If the pump is direct coupled arranged on a common base plate, remove the coupling pins and check the direction of rotation of the running motor. Since the Impeller is screwed on type, if the pump is run with different direction than that marked in the pedestal the Impeller will unwind and create serious damage to the pump. This is very important precaution. Similarly in the event of belt driven pup remove all the belts and check the direction of rotation of the motor.
2. Do not run the pump dry under any circumstances.

3. The pump bearing bed is provision for oil lubrication. Before despatch of the pump, the oil is removed at the factory. Therefore before running the pump fill up with the oil of Grade is specified separately up to the sight gauge to meet the oil level.
4. Connect flushing water under pressure of 1.0 Kg/Cm^2 in additional to working pressure for the purpose of flushing the gland and lubricating the same. The lantern ring can be positioned on the basis of O L_5 or alternative $2L_3$ (refer figure no.MM-02). Connect the flushing water accordingly before starting the pump.
5. Check the gland nuts and it should be finger tight only.
6. Check the freeness of the shaft.
7. Check the alignment of the belts, if it is belt driven or if it is direct coupled take extra care in aligning the couplings as specified elsewhere in this manual. Open the suction valve and allow the liquid in the case of flooded suction pump.
8. Keep the delivery valve closed.
9. Start the pump after checking the above points.
10. Open discharge valve to allow the liquid to system.

ADJUSTMENT PROVIDED:

Following adjustments can be done in maintaining the pump performance during service.

1. If you find that the capacity of the pump has come down due to the wear of the Impeller face and the suction wear plate (19) than this clearance has to be reduced to a minimum (0.2mm) to maintain the original efficiency. To enable this entire shaft assembly can be moved by adjusting the sets of screws provided in the coupling side adopter (5). While doing adjustment the adopter fixing screws with the bearing bed are to be loosened. After adjustment check the freeness of the Impeller and then only pump can be put into operation.

DISMANTLING PROCEDURE

Procedure for dismantling the Impeller in the event of changing a new Impeller.

1. Remove the suction pipe connection.
2. Remove the delivery Adopter (23) while removing the delivery Adopter you will find a sealing gasket / 'O'

ring (G2) which is to be preserved carefully.

3. Loosen the both outer casings (20&15) joint bolts. Now the components of outer casing suction side / outer casing Top (20), wear plate suction side (19) and suction flange (70) all together can be removed as a set. This sub assembly can be dismantled only in the event of changing the suction side wear plate.
4. After removing the above you will find 'O' ring (03) on the wear plate which is to be preserved carefully.
5. The Impeller is now visible. Give a lever of sufficient diameter and length between the vanes of the Impeller (Inside the suction bore of the Impeller) thereby preventing the rotation of the same.
6. Now rotate the pump pulley (it is belt driven) in the opposite direction as that of normal running direction by hand. This process will make the impeller unwind form the shaft and at the same time coming out towards the operator standing before.
7. Stop it in the middle and provide proper holding and further un-wind so that the Impeller will come out and hang on the holding.
8. The above procedure is to be adopted in reverse fashion for assembling.
9. If you need further dismantling remove Inner casing (17) and bracket side wear plate (16)
10. This outer casing of bracket side / outer casing Bottom (15) can be removed after loosening of fixing bolts provided with bearing bed (1)
11. Now remove laybrinth (14) and shaft sleeve (12)
12. Remove the cooling connection (39) provided in the gland housing and also remove the gland (10)
13. Now the bed assembly with bearing is free for further dismantling leaving the gland housing (09) alone. Preserve all sealing O-rings provided in between the wetted parts.
14. Loosen the inner bearing cap (6) and liquid thrower (11).
15. Remove the pump coupling/pulley from the pump shaft (4)
16. Loosen the adopter bolts fixed on to the bearing bed (1)
17. Drive out carefully pump shaft (4) with the bearing adopter assembly towards drive side. Now the shaft will come out leaving the pump end bearing (49) in the bearing bed (1) itself.
18. Now remove the Inner bearing Cap (adopter) (5A) for dismantling the coupling end bearing (49) form the adopter.
19. Both oil seals (51) are to be taken care.

ASSEMBLING

While re-assembling the same follow the procedure in reverse fashion taking care of the packings and O-ring to be used at the proper place.

GLAND PACKING

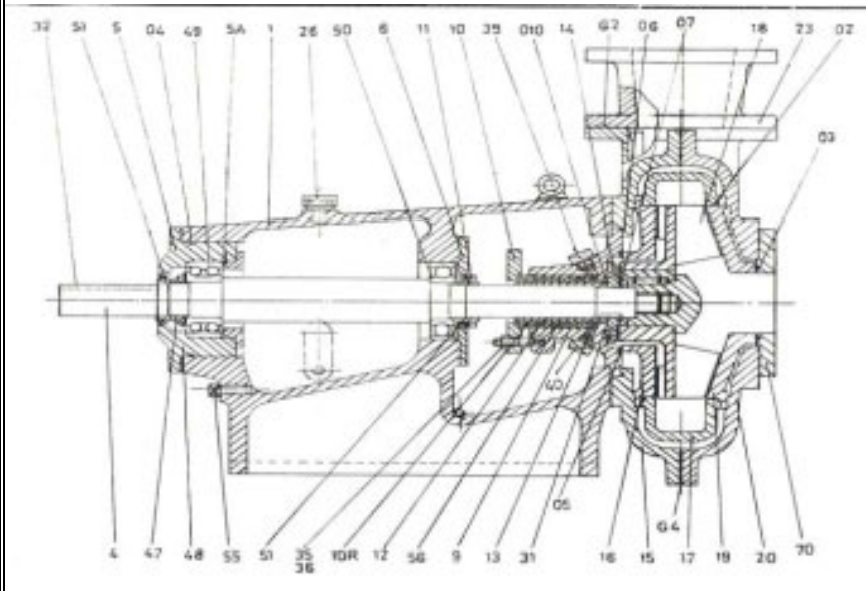
The pumps are fitted with high quality gland packing. Care must be taken, however, to avoid over heating of the gland. The gland should not be over tightened as a too tight gland causes the packing to burn, scores the shaft, there by absorbing more power in friction, since the pump is provided with Laybrinth/Expeller there is no need for too much tightening of the gland packing at all. Preferably the flushing water should leak through the gland drop by drop to carry over the heat (develope by friction).

THE FOLLOWING GALND PACKING IS RECOMMENDED:

PTFE impregnated packing (PTS 732) of 'Turners' manufactured by Hindustan Ferodo Limited of 10 mm/12.5 mm size is to be used. Alternatively Style No. 1094 'Champion' also can be used. If the water with which the slurry is formed for of neutral PH value then 'Firefly' 21 special self lubricating asbestos plaited packing non metallic can be recommended.

LUBRICATION RECOMMENDATION:

SUPPLIER:	LUBRICANT RECOMMENDED
Indian Oil Corporation	Servo System: 150 (upto 1500 RPM)
Limited	Servo System: 68 (above 1500 RPM)



CODE NO.	DESCRIPTION	MATERIAL	QTY
*	4 SHAFT	BS 970 EN-8	1
*	51 OIL SEALS	SYNTHETIC RUBBER	2
	5 ADOPTER (COUPLING SIDE)	IS 210 FG 200	1
	48 BEARING (6207)	STEEL	1
	5A INNER BEARING CAP (FOR ADOPTER)	IS 210 FG 200	1
	1 BEARING BED	IS 210 FG 200	1
	58 BEARING (6207)	STEEL	1
	6 INNER BEARING CAP	IS 210 FG 200	1
	11 LIQUID THROWER	BS 970 EN 8	1
*	10 GLAND	IS 210 FG 200	1
*	10A PRESSURE RING	BS 970 EN 8	1
*	12 SLEEVE	AISI-410	1
*	56 GLAND PACKING (1616G)	TIGA	6
*	13 LANTERN RING	BS 970 EN 8	1
*	14 LABYRINTH	ASTM A 216 GR.WCB	1
*	9 GLAND HOUSING	IS 210 FG 200	1
*	16 WEAR PLATE (B-SIDE)	NIHARD TYPE IV	1
*	18 IMPELLER WITH INSERT ASSY.		1
*	17 INNER CASING		1
*	19 WEAR PLATE (S.SIDE)		1
*	20 OUTER CASING(S.SIDE)INTEGRAL	IS 210 FG 200	1
*	15 OUTER CASING(B.SIDE) UNIT	IS 210 FG 200	1
	35 STUD(GLAND)	BS 970 EN 8	2
	36 HEX-NUT(GLAND STUD)	MS (S1363)	2
*	23 DELIVERY ADOPTER	IS 210 FG 200	1
	47 LOCK NUT	BS 970 EN 8	1
	48 LOCK WASHER	STEEL	1
*	32 KEY(COUPLING)	BS 970 EN 8	1
*	31 KEY(SLEEVE)	AISI-304	1
	26 BREATHER PLUG	STEEL	1
	39 COOLING INLET PLUG	STEEL	1
*	70 FLANGE (S.COVER)	IS 210 FG 200	1
	40 COOLING OUTLET PLUG	STEEL	1

* MARKED ITEMS REQUIRE SPARES FOR TWO YEARS NORMAL OPERATION

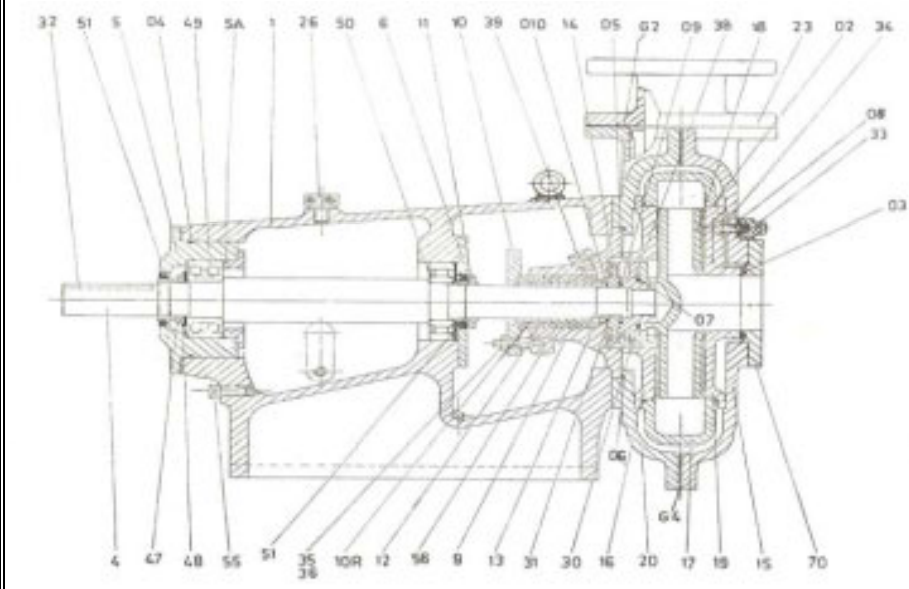
PUMP DESIGNATION :
PUMP TYPE : ARS 50/200
SIZE : 65 x 50
QTY :
DIRECTION OF ROTATION : CLOCKWISE FROM DRIVE END

		POS.NO	DESCRIPTION	SIZE		QTY
GASKET MATL: CAF	*	G4	OUTER CASING	THICKNESS 1MM		1
	*	G2	OUTER CASING WITH DELIVERY ADOPTER			1
NATURAL RESPIRATE RUBBER O RINGS	*	02	INNER CASING WITH WEAR PLATES	CORE DIA	3	2
	*	03	SUCTION FLANGE WITH WPLATE(S.SIDE)		2	1
	*	04	ADOPTER (COUPLING SIDE)		3	1
	*	05	GLAND HOUSING WITH WEAR PLATE		4	1
	*	06	GLAND HOUSING WITH O.CASING(B.SIDE)		4	1
	*	07	SPACER WITH LABYRINTH		2.5	1
	*	08	SLEEVE WITH LABYRINTH		1.5	1

SAM TURBO INDUSTRY LIMITED

TITLE SECTIONAL DRAWING WITH BILL OF MATERIAL

SUPPLIED THROUGH :
CUSTOMER :
PROJECT :
DRAWN/DT. : CHECKED/DT. : APPD./DT.
REV.No. : 0 1 2 3 4 DRAWING No. :
DATE :



CODE NO.	DESCRIPTION	MATERIAL	QTY
*	4 SHAFT	BS 970 EN-8	1
*	51 OIL SEALS	SYNTHETIC RUBBER	2
	5 ADOPTER (COUPLING SIDE)	IS 210 FG 200	1
	49 BEARING (6207)	STEEL	1
	5A INNER BEARING CAP (FOR ADOPTER)	IS 210 FG 200	1
	1 BEARING BED	IS 210 FG 200	1
	58 BEARING (NU 307)	STEEL	1
	6 INNER BEARING CAP	IS 210 FG 200	1
	11 LIQUID THROWER	BS 970 EN 8	1
*	10 GLAND	IS 210 FG 200	1
*	10A PRESSURE RING	BS 970 EN 8	1
*	12 SLEEVE	AISI-410	1
*	56 GLAND PACKING (1616G)	TIGA	6
*	13 LANTERN RING	BS 970 EN 8	1
*	14 LABYRINTH	ASTM A 216 GR.WCB	1
*	9 GLAND HOUSING	IS 210 FG 200	1
*	38 IMPELLER NUT (Integral with SLEEVE)	BS 970 EN 8	1
*	16 WEAR PLATE (B-SIDE)	NIHARD TYPE IV	1
*	18 IMPELLER		1
*	17 INNER CASING		1
*	19 WEAR PLATE (S.SIDE)		1
*	20 OUTER CASING(S.SIDE)INTEGRAL	IS 210 FG 200	1
*	15 OUTER CASING(B.SIDE) UNIT	IS 210 FG 200	1
*	70 FLANGE (S.COVER)	IS 210 FG 200	1
	35 STUD(GLAND)	BS 970 EN 8	2
	36 HEX-NUT(GLAND STUD)	MS (S1363)	2
*	23 DELIVERY ADOPTER	IS 210 FG 200	1
	47 LOCK NUT	BS 970 EN 8	1
	48 LOCK WASHER	STEEL	1
*	32 KEY(COUPLING)	BS 970 EN 8	1
*	31 KEY(SLEEVE)	AISI-304	1
	26 BREATHER PLUG	STEEL	1
	39 COOLING INLET PLUG	STEEL	1
	40 COOLING OUTLET PLUG	STEEL	1
*	30 IMPELLER BOLT	AISI-410	6
	34 T BOLT (S.SIDE WEAR PLATE)	BS 970 EN 8	2
	55 OIL DRAIN PLUG	STEEL	1
	33 DOME NUT	BS 970 EN 8	2

* MARKED ITEMS REQUIRE SPARES FOR TWO YEARS NORMAL OPERATION

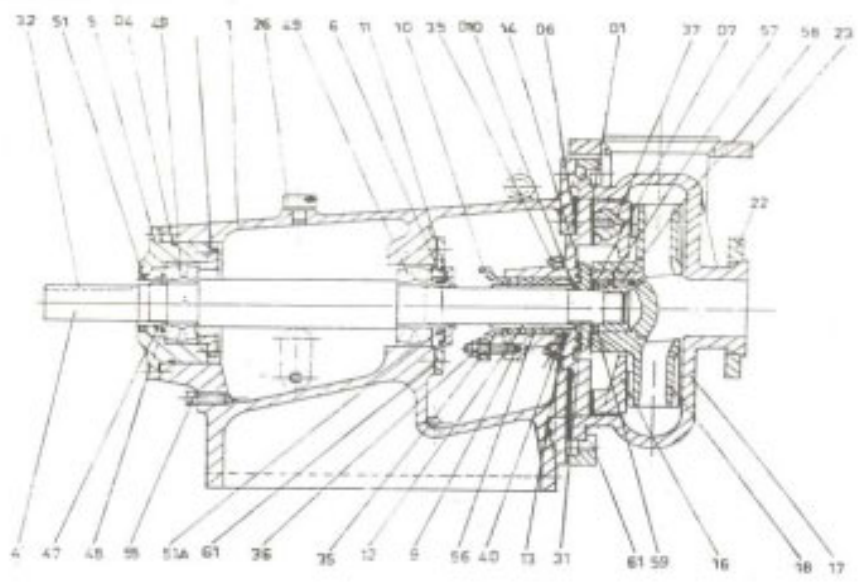
PUMP DESIGNATION :
PUMP TYPE : ARS 65/200 & 80/290
SIZE : 80x 65 & 100 x 80
QTY :
DIRECTION OF ROTATION : CLOCKWISE FROM DRIVE END

		POS.NO	DESCRIPTION	SIZE		QTY
GASKET MATL: CAF	*	G4	OUTER CASING	THICKNESS 1MM		1
	*	G2	OUTER CASING WITH DELIVERY ADOPTER			1
NATURAL RESPIRATE RUBBER O RINGS	*	06	GLAND HOUSING WITH O.CASING(B SIDE)	CORE DIA	3	1
	*	03	FLANGE(S.COVER)W.PLATE S.SIDE		3	1
	*	08	DOME NUT		1.5	2
	+	07	IMPELLER WITH IMPELLER NUT		2.5	1
	+	04	ADOPTER (COUPLING SIDE		3	1
	+	010	SLEEVE WITH LABYRINTH		2.5	1
	+	05	GLAND HOUSING WITH WEAR PLATE		3	1
	+	09	IMPELLER NUT WITH LABYRINTH		3	1
	+	02	INNER CASING WITH WEAR PLATE		4	2

SAM TURBO INDUSTRY LIMITED

TITLE SECTIONAL DRAWING WITH BILL OF MATERIAL

SUPPLIED THROUGH :
CUSTOMER :
PROJECT :
DRAWN/DT. : CHECKED/DT. : APPD./DT.
REV.No. : 0 1 2 3 4 DRAWING No. :
DATE :



CODE NO	DESCRIPTION	MATERIAL	QTY
4	SHAFT	BS 970 EN 8	
51	OIL SEAL (ADOPTER)	SYNTHETIC RUBBER	1
5	ADOPTER (COUPLING SIDE)	IS 210 FG 200	1
49	BEARING	STEEL (22313)	1+2
5C	INNER BEARING CAP (ADOPTER)	IS 210 FG 200	1
1	BEARING BED	IS 210 FG 200	1
			1
6	INNER BEARING CAP	IS 210 FG 200	1
11	LIQUID THROWER	IS 226 C 15	1
10	GLAND	ASTM A 216 Gr WCB	1
51A	OILSEAL (INNER BRG CAP)	SYNTHETIC RUBBER	1
12	SLEEVE	AISI - 410	1
14	GLAND PACKING (12.5 SQ.)	TIGA	4
13	LANTERN RING	BS 970 EN 8	1
9	GLAND HOUSING	IS 210 FG 200	1
57	BUSH	C-40	1
56	LAY BRINTH	ASTM A 743 CA15	1
16	PUMP WEAR PLATE		1
18	IMPELLER	NIHARD TYPE IV 550 BHN	1
17	VOLUTE CASING		1
40	LOCK WASHER	IS 1363 MS	1
61	CLAMP	BS 970 EN8	8
37	INSERT	IS 1363 MS	4
22	SUCTION FLANGE	ASTM A 216 Gr WCB	1
35	STUD (GLAND)	AISI-304	4
34	HEX NUT	AISI-304	2
43	CHECKNUT	BS 970 EN 8	1
23	DELIVERY FLANGE	ASTM A 216 Gr WCB	1
32	KEY (COUPLING)	BS 970 EN 8	1
31	KEY (SLEEVE)	AISI-304	1
26	BREATHER PLUG	STEEL	1
39	COOLING INLET PLUG	STEEL	1
40	COOLING OUTLET PLUG	STEEL	1
58	STEADY PIN	C-40	4
59	SPACER	C-40	4
55	OIL DRAIN PLUG	STEEL	1

PUMP DESIGNATION :

PUMP TYPE : ARS 80/250

SIZE : 100 X 80

QTY : 1

DIRECTION OF ROTATION : CLOCKWISE FROM DRIVE END

	POS NO	DESCRIPTION	SIZE		QTY
GASKET MATL CAT.9	01	INNER BEARING CAP	THICKNESS 0.4 MM		1
			THICKNESS 1 MM		
	06	GLAND HOUSING/BED/CASING			1
	01	GLAND HOUSING / W.PLATE			1
'O' RINGS MATL NITRYL RUBBER	04	ADOPTER		3	1
	07	SPACER WITH LABYRINTH	OMD DIA	3	1
	010	SLEEVE / LAY BRINTH		2	1

SAM TURBO INDUSTRY LIMITED

TITLE SECTIONAL DRAWING WITH BILL OF MATERIAL

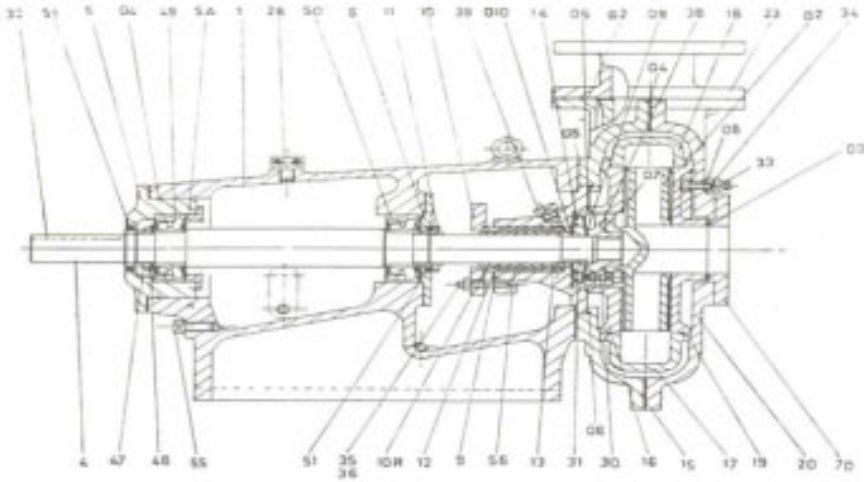
SUPPLIED THROUGH :

CUSTOMER :

PROJECT :

DRAWN/DT. : CHECKED/DT. : APPD./DT.

REV No. 0 1 2 3 4 DRAWING NO. :



CODE NO	DESCRIPTION	MATERIAL	QTY
4	SHAFT	BS 970 EN 8	1
51	OIL SEALS	SYNTHETIC RUBBER	2
5	ADOPTER (COUPLING SIDE)	IS 210 FG 200	1
49	BEARING (22313)	STEEL	1
5A	INNER BEARING CAP FOR ADOPTER	IS 210 FG 200	1
1	BEARING BED	IS 210 FG 200	1
	BEARING (22313)	STEEL	1
6	INNER BEARING CAP	IS 210 FG 200	1
11	LIQUID THROWER	BS 970 EN 8	1
10	GLAND	IS 210 FG 200	1
10A	PRESSURE RING	BS 970 EN 8	1
12	SLEEVE	AISI - 410	1
14	GLAND PACKING (12.5 SQ.)	TIGA	4
13	LANTERN RING	BS 970 EN 8	1
56	LAY BRINTH	ASTM A 216 CA 15	1
9	GLAND HOUSING	IS 210 FG 200	1
38	IMPELLER NUT	BS 970 EN 8	1
16	WEAR PLATE (B.SIDE)	NIHARD TYPE IV	1
18	IMPELLER		1
17	INNER CASING		1
19	WEAR PLATE (S. SIDE)		1
20	OUTER CASING (S.SIDE) INTEGRAL	IS 210 FG 200	1
70	OUTER CASING (B.SIDE) UNIT	IS 210 FG 200	1
15	FLANGE (SUCTION COVER)	IS 210 FG 200	1
35	STUD (GLAND)	BS 970 EN 8	2
36	HEX NUT (GLAND STUD)	MS IS 1363	2
23	DELIVERY ADOPTER	IS 210 FG 200	1
47	LOCK NUT	BS 970 EN 8	1
68	LOCK WASHER	STEEL	1
32	KEY (COUPLING)	BS 970 EN8	1
31	KEY (SLEEVE)	AISI - 304	1
26	BREATHER PLUG	STEEL	1
39	COOLING INLET PLUG	STEEL	1
40	COOLING OUTLET PLUG	STEEL (NOT SHOWN IN ASSY)	1
100	IMPELLER BOLT	AISI - 410	6
34	T BOLT (SIDE WEAR PLATE)	BS 970 EN 8	2
55	OIL DRAIN PLUG	STEEL	1
33	DOME NUT	BS 970 EN 8	2

	POS NO	DESCRIPTION	SIZE		QTY
GASKET MATL CAT.9	02	INNER CASING WITH DELIVERY ADOPTER	THICK.		1
	6A 20	OUTER CASING	MISC. DIA	HT.	1
'O' RINGS MATL NITRYL RUBBER	02	INNER CASING WITH WEAR PLATE		6	2
	03	PLANE SIDE COVER WITH W.PLATE S.SIDE		3	1
	04	ADOPTER (COUPLING SIDE)		3	1
	05	GLAND HOUSING WITH WEAR PLATE	OMD DIA	5	1
	06	GLAND HOUSING WITH CASING B.SIDE		3	1
	07	IMPELLER WITH IMPELLER NUT		3	1
	08	DOME NUT		5.5	2
	09	IMPELLER NUT WITH LABYRINTH		5	1
	010	SLEEVE WITH LABYRINTH		2.5	1

PUMP DESIGNATION :

PUMP TYPE : ARS 80/ 340 100/ 340 & 80/340A

SIZE : 100 x 80 100 x 100

QTY :

DIRECTION OF ROTATION : CLOCK WISE FROM DRIVE END

SAM TURBO INDUSTRY LIMITED

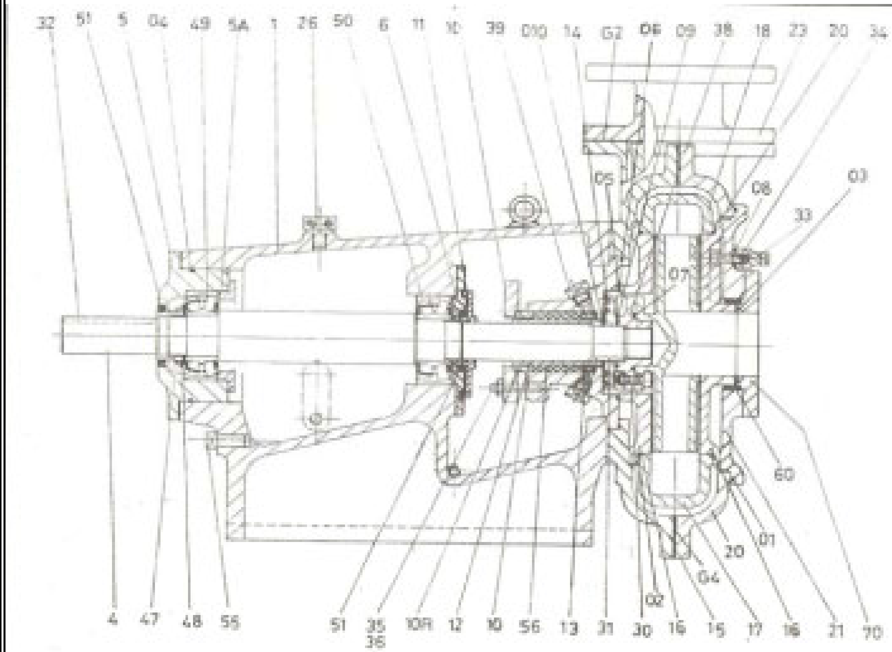
TITLE SECTIONAL DRAWING WITH BILL OF MATERIAL

SUPPLIED THROUGH :

CUSTOMER :

PROJECT :

CHECKED/DATE : DRG NO. 1826-06 REV NO: DATE :



* MARKED ITEMS REQUIRE SPARES FOR TWO YEARS NORMAL OPERATION

	POS.NO	DESCRIPTION	SIZE		QTY
GASKET	G4	OUTER CASING	THICKNESS 2MM		1
MATL: CAP	G2	OUTER CASING WITH DELIVERY ADOPTER	THICKNESS 1MM		1
'O' RINGS MATL: NEOPRENE RUBBER	* 06	GLAND HOUSING WITH G.CASING(B.SIDE)	CORD DIA	3	1
	08 & 04	DOME NUT & ADOPTER(COUPLING SIDE)		1.5 & 3	2+1
	* 07	IMPELLER WITH IMPELLER NUT		3	1
	* 01	SUCTION COVER WITH G.CASING(S-SIDE)		3	1
	* 010	SLEEVE WITH LAY BRINTH		3	1
	* 05	GLAND HOUSING WITH WEAR PLATE		4	1
	* 09	IMPELLER NUT WITH LAYBRINTH		3	1
	* 02	INNER CASING WITH WEAR PLATE		8	2
	* 03	FLANGE(S.COVER) WITH S.COVER		4	1

PUMP DESIGNATION

PUMP TYPE : ARS 150/400

SIZE : 150 x 150

QTY :

DIRECTION OF ROTATION : CLOCKWISE FROM DRIVE END.

	CODE NO	DESCRIPTION	MATERIAL	QTY
*	4	SHAFT	[illegible]	1
*	51	OIL SEALS	SYNTHETIC RUBBER	2
	5	ADOPTER (COUPLING SIDE)	IS 210 FG 200	1
	49 & 50	BEARING(22317)	STEEL	1+1
	5A	INNER BEARING CAP(FOR ADOPTER)	IS 210 FG 200	1
	1	BEARING BED	IS 210 FG 200	1
*	21	SUCTION COVER	IS 210 FG 200	1
	6	INNER BEARING CAP	IS 210 FG 200	1
	11	LIQUID THROWER	BS 970 EN 8	1
*	10	GLAND	IS 210 FG 200	1
*	10R	PRESSURE RING	BS 970 EN 8	1
*	12	SLEEVE	AISI - 410	1
*	56	GLAND PACKING(12.5 SQ)	TIGA	[illegible]
*	13	LANTERN RING	BS 970 EN 8	1
*	14	LAY BRINTH	ASTM A743 CA 15	1
*	9	GLAND HOUSING	IS 210 FG 200	1
*	38	IMPELLER NUT (INTEGRAL UNIT OF S.No 18)	BS 970 EN 8	1
*	16	WEAR PLATE (B.SIDE)	NIHARD TYPE IV	1
*	18	IMPELLER		1
*	17	INNER CASING		1
*	19	WEAR PLATE (S. SIDE)		1
*	20	OUTER CASING(S.SIDE) INTEGRAL	IS 210 FG 200	1
*	15	OUTER CASING(D.SIDE) UNIT	IS 210 FG 200	1
*	70	FLANGE (S.COVER)	IS 210 FG 200	1
	35	STUD (GLAND)	BS 970 EN 8	2
	36	HEX NUT(GLAND STUD)	MS IS 1363	2
*	23	DELIVERY ADOPTER	IS 210 FG 200	1
	47	LOCK NUT	BS 970 EN 8	1
	48	LOCK WASHER	STEEL	1
*	32	KEY (COUPLING)	BS 970 EN 8	1
*	31	KEY (SLEEVE)	AISI - 316	1
	26	BREATHER PLUG	STEEL	1
	39	COOLING INLET PLUG	STEEL	1
	40	COOLING OUTLET PLUG	STEEL	1
*	30	IMPELLER BOLT	AISI - 410	8
	34 & 33	T BOLT & DOOM NUT	BS 970 EN 8	2+2
	55	OIL DRAIN PLUG	STEEL	1
*	60	PACKING (SUC.COVER/SUC.FLANGE)	TIGA (3 SQ)	4

SAM TURBO INDUSTRY LIMITED

TITLE SECTIONAL DRAWING WITH BILL OF MATERIAL

SUPPLIED THROUGH

CUSTOMER

PROJECT

DRAWN (D) CHECKED (D) APPD. (D)

REV. No. 0 1 2 3 4 DRAWING No.

DATE [illegible]

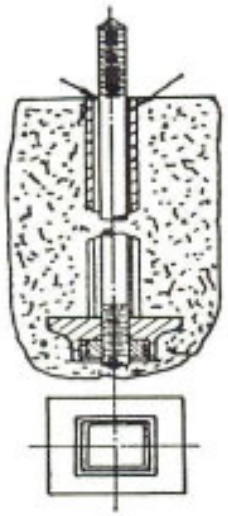


Fig-1
Applicable in case of direct coupled pumps only

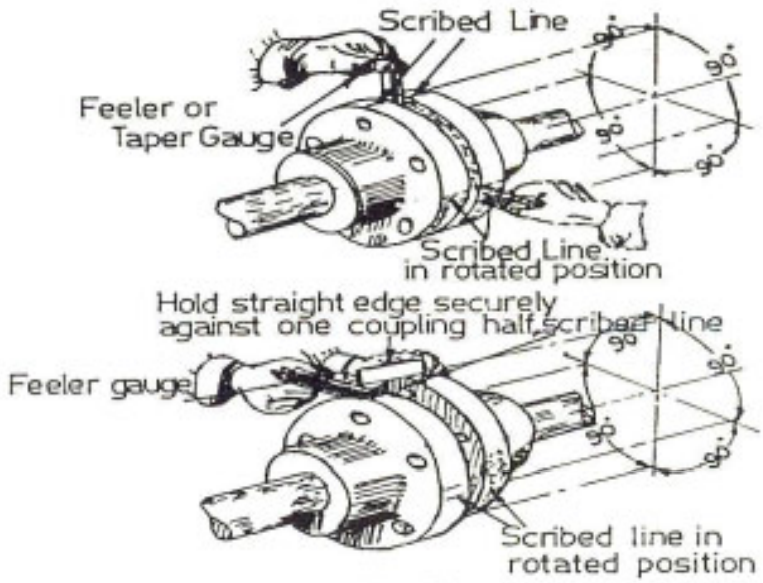


Fig-2

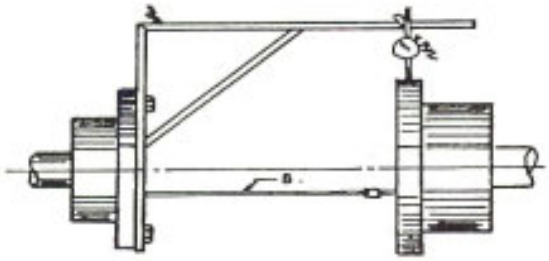


Fig-4

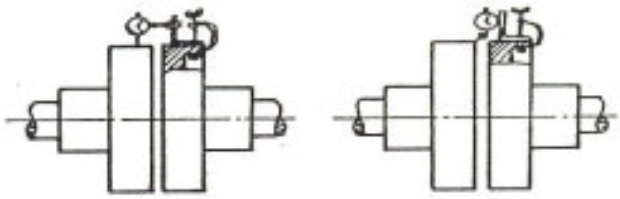


Fig-3

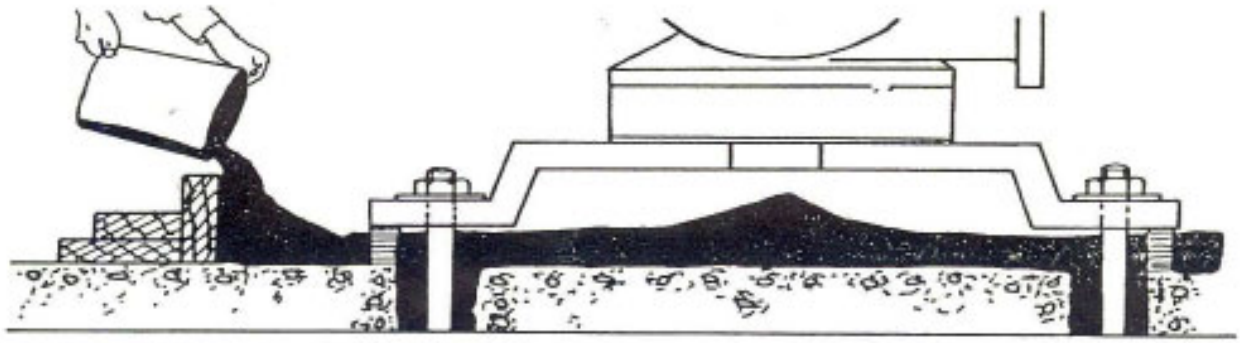
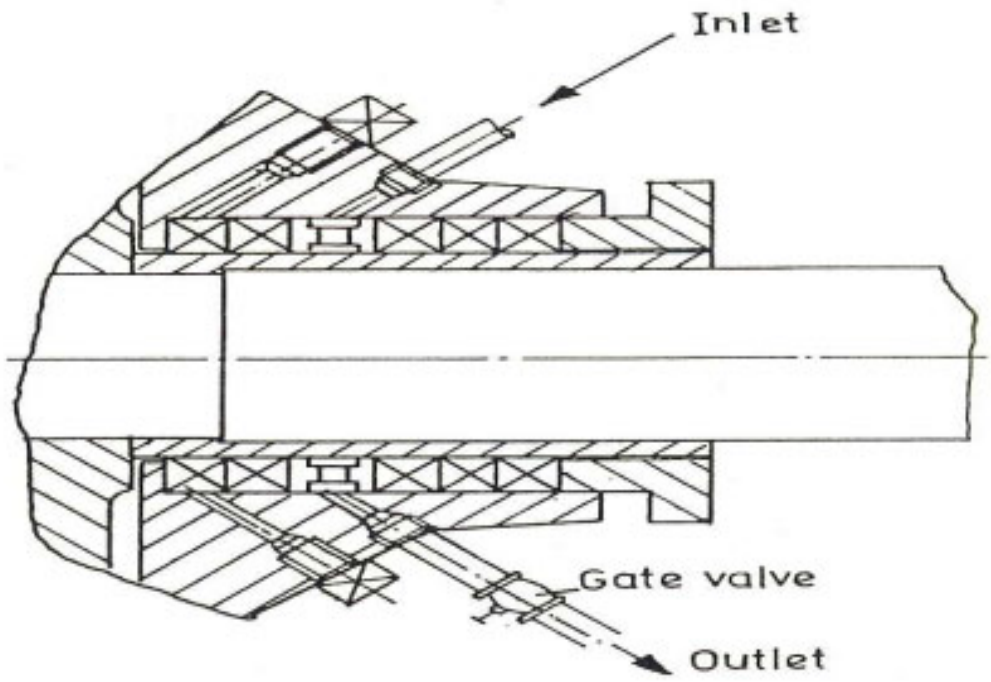
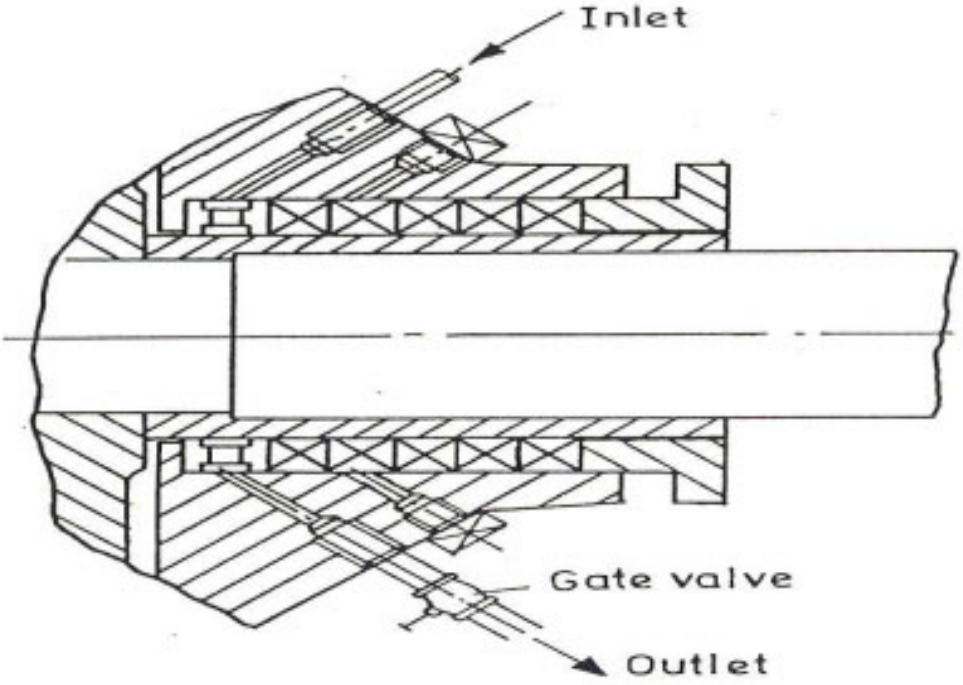


Fig-5

Drg. no : MM-01

2 L_3 Arrangement





0 L_5 Arrangement

Drg.no : MM-02

9. SPARE PARTS

9.1. SPARE PARTS FOR 'ARS' PUMPS (Available from Local Market)

	PART NO.	50/200	50/210 65/200 80/290	80/340 100/340 100/340A	150/340 150/340A 150/400 100/380
Bearing bed frame size	6	150	180	300	300
BEARING :					
Drive End :	4	3207 - 1 No.	3309 - 1 No.	22313 - 1 No.	22317 - 1 No.
Pump End :	7	6207 - 1 No.	NU 309 - 1 No.	22313 - 1 No.	22317 - 1 No.
OIL SEAL					
Pump and Drive end	2	42x55x8 - 2 Nos.	52x68x8 - 2 Nos.	75x95x10 - 2 Nos	100x130x12 - 2 Nos.
'O' Ring	---------- REFER SECTIONAL DRAWING WITH BILL OF MATERIAL ----------				
Amount of oil in Brg.bed (Approximately)		1.5 litres	2.5 litres	5 litres	7 litres
Gland packing	13	10mm Sq. 1 M.length	10mm Sq.1.5M length	12.5mm Sq.1.5M length	12.5mm Sq.2.5M length
GASKET					
Between Inner Casing & Delivery Adopter	------ 1 to 5 mm to adjust the level difference of the Ni-hard casing -------				
Inner Brg. Cap to Brg. Bed	0.3 mm Paper (Oil resistant)				
Outer Casing to Outer Casing	CAP-9 1 to 2 mm thick for pumping under pressure.				