

TD-106-2 Rev No. 5 Form No.		PRODUCT STANDARD PUMPS HYDERABAD		FP 50627							
				Rev. No. 06							
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.		<u>PURCHASE SPECIFICATION FOR VERTICAL THRUST AND GUIDE BEARING FOR 660 & 800 MW CW PUMP</u> 1.0 Scope: This standard specifies the requirements of vertical thrust and journal bearings for Cooling Water Pumps. 2.0 Technical Requirements: 2.1 Bearings shall be designated to meet the technical requirements detailed in the variant table. 2.2 Bearing shall be oil sump lubricated. 2.3 Bearings shall be suitable for water cooling by required number of tube coolers, fabricated with finned copper tube. 2.4 Top cover of the bearing shall of split design to facilitate easy assembly and disassembly of the bearing internals. 2.5 Bearing shall be designed in such a way that the measured temperatures are less than the following set points at design condition. <table border="0"> <tr> <td>Radial pads:</td> <td>Alarm = 85 deg. C & Trip = 90 deg. C</td> </tr> <tr> <td>Thrust pads:</td> <td>Alarm = 90 deg. C & Trip = 95 deg. C</td> </tr> <tr> <td>Oil temperature:</td> <td>Alarm = 60 deg. C & Trip = 65 deg. C</td> </tr> </table> 2.6 Bearing shall be provided with the following accessories: 1 no. thermometer for bearing oil temperature with suitable connection. 1 no. platinum duplex 3 wire RTD (100 ohms at 0 deg C) for bearing oil temperature with suitable connection. 2 no.s platinum duplex 3 wire RTDs (100 ohms at 0 deg C) for thrust pads with suitable connection. 1 no. platinum duplex 3 wire RTD (100 ohms at 0 deg C) for journal pad, with suitable connection. - RTDs shall be fitted to the bearing assembly with the help of leak proof fittings to prevent leakage of oil through the RTDs.				Radial pads:	Alarm = 85 deg. C & Trip = 90 deg. C	Thrust pads:	Alarm = 90 deg. C & Trip = 95 deg. C	Oil temperature:	Alarm = 60 deg. C & Trip = 65 deg. C
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Ref. Doc	Revisions: Refer record of revisions sheet.	Prepared: SATISH	Approved: KHRK	Date: 24.09.11							

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.			f) Machined surface 85mm x 100mm shall be provided on bearing cover to mount vibration pickups. g) 1 no. oil level gauge with suitable connection. Maximum and Minimum levels shall be marked on the indicator scale. h) 1 no. air vent with suitable connection on the bearing top cover. i) 1 no. oil drain connection with valve in the base plate to drain the oil completely from the bearing. j) 2 no.s SORF class-150 flanged connections for cooling water inlet & outlet. The connections shall be fitted to avoid accidental loosening of the fittings and consequent failure of sealing between top cover and cooling coil.																							
			2.7 <u>Materials of Construction:</u> All materials shall be free of asbestos. The materials of construction of the bearings shall not be inferior to the following: <table><tr><td>Base plate</td><td>:</td><td>Cast steel</td></tr><tr><td>Casing</td><td>:</td><td>Cast iron</td></tr><tr><td>Top cover</td><td>:</td><td>Cast steel</td></tr><tr><td>Thrust collar</td><td>:</td><td>BS 970 070 M20</td></tr><tr><td>Journal pads</td><td>:</td><td>BS 970 070 M20 with white metal</td></tr><tr><td>Thrust pads</td><td>:</td><td>BS 4360 CR43A with white metal</td></tr><tr><td>White metal on pads</td><td>:</td><td>IS: 25 Gr. 84 or BS 3332 Gr. C</td></tr></table>			Base plate	:	Cast steel	Casing	:	Cast iron	Top cover	:	Cast steel	Thrust collar	:	BS 970 070 M20	Journal pads	:	BS 970 070 M20 with white metal	Thrust pads	:	BS 4360 CR43A with white metal	White metal on pads	:	IS: 25 Gr. 84 or BS 3332 Gr. C
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3.0 <u>Drawings & Documents:</u> Following drawings / documents shall be furnished for BHEL approval / information, within 3 weeks after placement of purchase order.																										
3.1 5 copies of detailed dimensional / sectional assembly drawing of the bearing with all parts & accessories identified shall be submitted for BHEL approval. The following information shall be indicated on the drawing. • Shaft diameter & collar bore, mm • Pump speed, rpm • Thrust load, normal & maximum, kN • Thrust surface, sq.mm • Thrust pressure, kN/sq.mm • Journal load, kN • Journal surface, sq.mm • Journal pressure, kN/sq.mm • Journal diametrical clearance, mm																										
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.		• Power loss, kW • CW quantity required, LPH • CW inlet temperature, deg. C • Oil viscosity at 60 deg.C, Poise • Oil designation, ISO VG • Lube oil quantity • Weight of bearing, kg • Bearing rating (kgf) 3.2 5 copies of Quality Assurance plan of the bearing 3.3 5 copies of instruction manuals covering installation, operation and maintenance procedures of the bearing. 3.4 Soft copy of the drawings / documents mentioned at clause 3.1 to 3.3 shall be furnished in a CD. 4.0 <u>NDT Requirements:</u> Following Non destructive tests shall be conducted: 1) Ultrasonic test shall be done on thrust pads to ensure bonding of white metal lining as per std. HY0850174 and acceptance std. as per HY0850174. 2) Liquid penetrant examination shall be done on thrust pads white metal face as per std. HY0850174 and acceptance std. as per HY0850174. 3) The cooling water tubes inside the bearing shall be capable of withstanding a pressure of 10 kg/sq.cm 5.0 <u>CERTIFICATES:</u> The following certificates shall be furnished in 5 copies along with consignment. 1) Compliance certificates for accessories. 2) Chemical analysis for white metal. 3) Ultrasonic test certificate for white metal bonding 4) Liquid penetrant Examination 5) Dimensional inspection report 6) Guarantee certificate for trouble free performance for 24 months from date of dispatch from supplier works or 12 months from the date of commissioning whichever is later.		
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.	6.0 MARKING: 1) Name plate containing supplier's name, model no., year of mfg and BHEL material code shall be provided on the bearing housing. 2) A tag bearing relevant 12 digit material code of BHEL shall be attached for each consignment. 7.0 PACKING: The material shall be properly packed to ensure capability of withstanding transit risks without damages. The packing shall be sea-worthy for export orders and for specific mention in the purchase enquiry/order. The following details shall be marked on the packing case: 1) Manufacturer's name 2) BHEL Order No. & date 3) BHEL Standard No. FP 50627/VAR No. xx 4) Net weight in Kgs			
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VARIANT TABLE

PARAMETER /DESCRIPTION		VAR-01	VAR-02	VAR-03
TYPE OF PUMP		78MN	CW10	CW10M
THRUST LOAD (KG)	MAXIMUM	64,100-DOWN	49,500-DOWN	49,500-DOWN
	NORMAL	43,500-DOWN	35,200-DOWN	35,200-DOWN
	ROTOR WEIGHT	7,500	5,500	5,500
RADIAL LOAD (KG)		5,700	3,750	3,750
ROTATION SPEED (RPM)		329	325	420
DRIVER OUTPUT (KW)		3,800	2500	2500
COOLING METHOD		WATER COOLING	WATER COOLING	WATER COOLING
CW QUANTITY (M ³ /Hr)		2.0	2.0	2.0
CW PRESSURE (BAR)		5.0 (normal) 10.0 (design)	5.0 (normal) 10.0 (design)	5.0 (normal) 10.0 (design)
CW TEMPERATURE (°C)		40	40	40
COOLING MEDIUM		FRESH WATER	FRESH WATER	FRESH WATER
INSTALLATION DIRECTION		VERTICAL	VERTICAL	VERTICAL
ROTATION DIRECTION (Viewed from top)		CLOCK WISE	CLOCK WISE	CLOCK WISE
ATMOSPHERIC TEMPERATURE (°C)		55 (Max)	55 (Max)	55 (Max)
PRESSURE DROP (BAR)		0.13	0.13	0.13
SHAFT DIA AT COLLAR (MM)		260 g6	240 g6	230 g6
KEY SIZE AT COLLAR (MM)		45X25X157.5	45X25X157.5	45X25X157.5
INSTALLATION FLANGE DIA.(MAX) (MM)		914	914	914
MATERIAL CODE		FP9750627016	FP9750627024	FP9750627032
OUTLINE, MOUNTING & TERMINAL DIMENSIONS		REFER FIG-I	REFER FIG-I	REFER FIG-I



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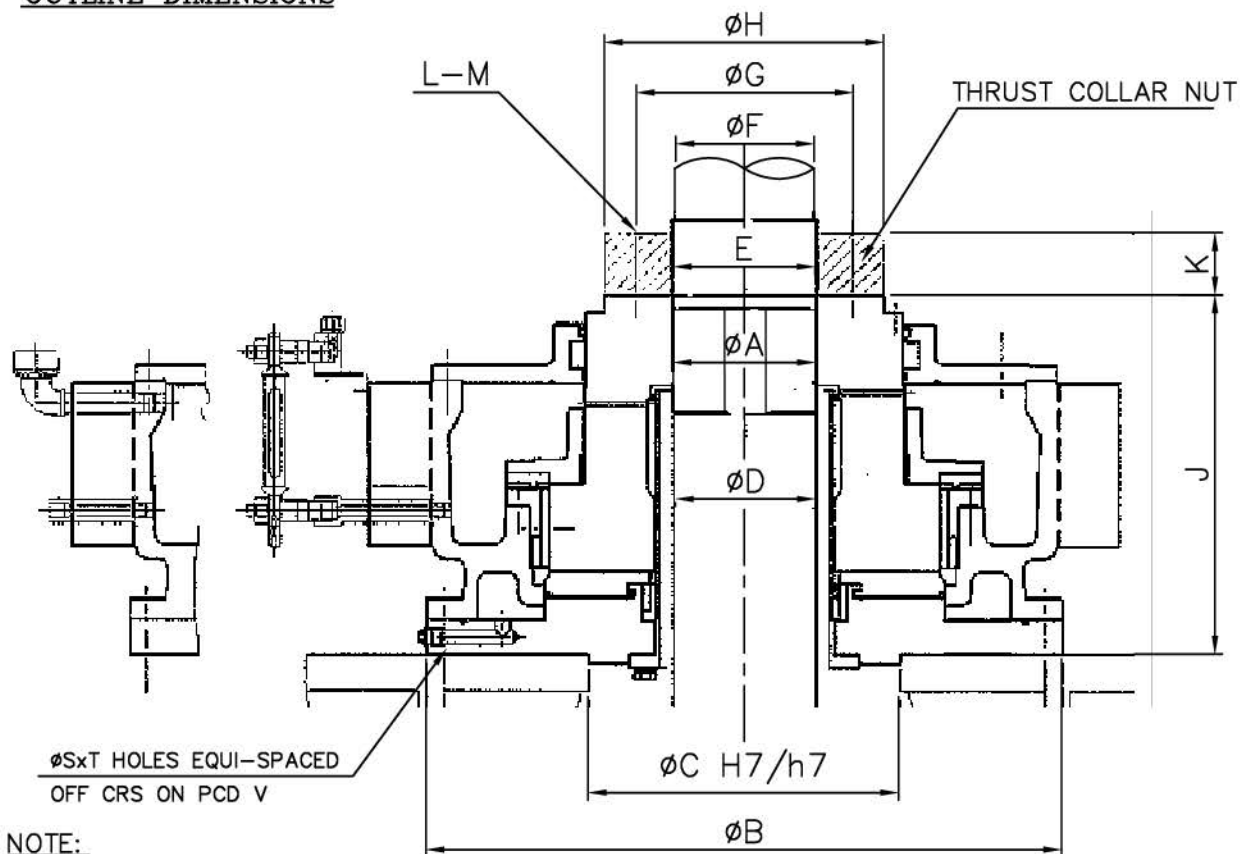
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FIGURE-I

OUTLINE DIMENSIONS



NOTE:

- 1) THRUST COLLAR NUT SHALL BE MANUFACTURED BY BHEL
- 2) ALL DIMENSIONS ARE IN MM

DIMENSION	78MN (VAR-01)
A	Ø260
B	Ø914
C	Ø475
D	Ø258.5
E	M255X3
F	Ø250
G	Ø350
H	Ø415
J	494
K	85
L	8
M	M24
S	Ø26
T	16
V	864

DIMENSION	CW10 (VAR-02)
A	Ø240
B	Ø914
C	Ø475
D	Ø238
E	M230X3
F	Ø220
G	Ø350
H	Ø415
J	494
K	85
L	8
M	M24
S	Ø26
T	16
V	864

DIMENSION	CW10M (VAR-03)
A	Ø230
B	Ø914
C	Ø475
D	Ø250
E	M220X3
F	Ø215
G	Ø350
H	Ø415
J	494
K	85
L	8
M	M24
S	Ø26
T	16
V	864

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<u>SPARES REQUIRED FOR THRUST BEARING</u> <table border="1"> <thead> <tr> <th>Var. No.</th> <th>Description</th> <th>Material</th> </tr> </thead> <tbody> <tr> <td>50</td> <td>Thrust pads to suit material FP9750627024</td> <td>FP9750627504</td> </tr> <tr> <td>51</td> <td>Thrust pads to suit material FP9750627016</td> <td>FP9750627512</td> </tr> <tr> <td>52</td> <td>Oil level indicator to suit var02</td> <td>FP9750627520</td> </tr> <tr> <td>53</td> <td>RTD for cwp thrust brg to suit var02</td> <td>FP9750627539</td> </tr> <tr> <td>54</td> <td>JOINT COPPER ALLOY</td> <td>FP9750627547</td> </tr> <tr> <td>55</td> <td>RTD FOR AV14BLT3 THRUST BEARING to suit var03</td> <td>FP9750627555</td> </tr> <tr> <td>56</td> <td>OIL LEVEL GAUGE FOR THRUST BEARING to suit var03</td> <td>FP9750627563</td> </tr> <tr> <td>57</td> <td>DRAIN VALVE ASSEMBLY FOR THRUST BEARING to suit var03</td> <td>FP9750627571</td> </tr> <tr> <td>58</td> <td>INLET & OUTLET PIPE WITH FLANGES to suit var03</td> <td>FP9750627580</td> </tr> </tbody> </table>					Var. No.	Description	Material	50	Thrust pads to suit material FP9750627024	FP9750627504	51	Thrust pads to suit material FP9750627016	FP9750627512	52	Oil level indicator to suit var02	FP9750627520	53	RTD for cwp thrust brg to suit var02	FP9750627539	54	JOINT COPPER ALLOY	FP9750627547	55	RTD FOR AV14BLT3 THRUST BEARING to suit var03	FP9750627555	56	OIL LEVEL GAUGE FOR THRUST BEARING to suit var03	FP9750627563	57	DRAIN VALVE ASSEMBLY FOR THRUST BEARING to suit var03	FP9750627571	58	INLET & OUTLET PIPE WITH FLANGES to suit var03	FP9750627580
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		Rev. No.	Date	Revision Details	Revised By	Approved By
		01	03.04.13	Spec. generally revised in line with BHEL format	SATISH	K.H.R.K
		02	20.01.14	Var. no. 02 added	SATISH	K.H.R.K
		03	21.05.14	Var. no. 50 added	SATISH	K.H.R.K
		04	03.06.15	Var. no. 03 & 51 added	SATISH	K.H.R.K
		05	23.03.17	Var. no. 52 & 53 added	SATISH	K.H.R.K
		06	20.02.18	Var. no. 54 to 58 added	SATISH	K.H.R.K
		Ref. Doc.				

