














सापेक्ष एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)	ST- 39003 पृष्ठ 13 - का 1 Page 1 of 13																																																
सापेक्ष एवं हस्ताक्षर SUPERSEDES INVENTORY NO.	सापेक्ष एवं हस्ताक्षर अधिकृतित करता है	TECHNICAL SPECIFICATION FOR JACKING OIL PUMP SET (A.C.)																																																	
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company		<p>1.0 <u>INTENT OF SPECIFICATION:-</u></p> <p>THIS SPECIFICATION IS INTENDED TO COVER DESIGN, MANUFACTURE, ASSEMBLY, TESTING AND SUPPLY OF PUMPING SETS COMPLETE WITH FOUNDATION BASE PLATE, ANCHOR BOLTS, LIFTING LUGS, COUPLING, AND OTHER ACCESSORIES INCLUDING MOTOR AND THEIR COMMISSIONING AT POWER STATION TO WHICH BHEL SUPPLIES THE EQUIPMENT.</p> <p>THE PUMPING SETS ARE INTENDED FOR OPERATION IN CONJUNCTION WITH STEAM TURBINES AND SHOULD BE SUITABLE FOR CONTINUOUS OPERATION AT AN AMBIENT TEMPERATURE OF 50°C + 90% HUMIDITY.</p> <p>2.0 <u>FUNCTION:-</u></p> <p>JACKING OIL PUMP COMES IN OPERATION IN CONJUNCTION WITH THE BARRING OPERATION OF THE TURBINE.</p> <p>3.0 <u>APPLICABLE CODE/STANDARD:-</u> IS:4722, VDMA 24284.</p> <p>4.0 <u>OIL SPECIFICATION:-</u></p> <p>THE MEDIUM HANDELED IS TURBINE OIL OF VISCOSITY CLASS ISO VG46. THE OIL CAN BE SERVOPRIME 46 OF INDIAN OIL CORPORATION OR TURBOL 46 OF BHARAT PETROLEUM OR SHELL TURBOL 46 OF BHARAT SHELL LTD.</p> <table style="width:100%;"> <tr> <td>KINEMATIC VISCOSITY AT 65°C/20°C</td> <td>: 16 cs/100 cs</td> </tr> <tr> <td>SPECIFIC GRAVITY AT 65°C</td> <td>: 0.8488</td> </tr> <tr> <td>FLASH POINT</td> <td>: 200°C (min)</td> </tr> <tr> <td>OPERATIONAL TEMPERATURE</td> <td>: 65°C</td> </tr> <tr> <td>POUR POINT</td> <td>: -6.6°C (max.)</td> </tr> </table>		KINEMATIC VISCOSITY AT 65°C/20°C	: 16 cs/100 cs	SPECIFIC GRAVITY AT 65°C	: 0.8488	FLASH POINT	: 200°C (min)	OPERATIONAL TEMPERATURE	: 65°C	POUR POINT	: -6.6°C (max.)																																						
KINEMATIC VISCOSITY AT 65°C/20°C	: 16 cs/100 cs																																																		
SPECIFIC GRAVITY AT 65°C	: 0.8488																																																		
FLASH POINT	: 200°C (min)																																																		
OPERATIONAL TEMPERATURE	: 65°C																																																		
POUR POINT	: -6.6°C (max.)																																																		
स्वत्वाधिकार एवं गोपनीय इस पत्रिका में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका हस्तक्षेप प्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में इतिहासिक नहीं है किया जाए	सापेक्ष एवं हस्ताक्षर SIGN & DATE 25/9/06	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%; text-align: center;">नाम NAME</td> <td style="width:20%; text-align: center;">दिनांक एवं हस्ताक्षर SIGNATURE & DATE</td> </tr> <tr> <td>CIE</td> <td>VINOD KR</td> <td></td> <td>अनुवादक TRANSLATED BY</td> <td></td> <td></td> </tr> <tr> <td>TSX</td> <td>AKCHATA</td> <td></td> <td>निर्माणकर्ता WORKED BY</td> <td>DHARAMPAL</td> <td>15/6/06</td> </tr> <tr> <td>QAX</td> <td>S.S. Chandra</td> <td></td> <td>जांचकर्ता CHECKED BY</td> <td>ANUJ JAIN</td> <td>15/6/06</td> </tr> <tr> <td>सहमत विभाग AGREED DEPTT.</td> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर DATE & SIGNATURE</td> <td>पर्यवेक्षणकर्ता SUPERVISED BY</td> <td>S.C. AGRAWAL</td> <td>28/6/06</td> </tr> <tr> <td colspan="3"></td> <td>स्वीकृति APPROVED :</td> <td>(A.K.JAIN) AGM</td> <td>21.08.06</td> </tr> <tr> <td>REV.NO. 08</td> <td colspan="2">SUPERSEDES REV. 09</td> <td>निर्माण PREPARED :</td> <td>STC(TL/TA)</td> <td>शारी ISSUED :</td> </tr> <tr> <td>DI. 31.08.06</td> <td colspan="2">DI. 26-06-07</td> <td colspan="2"></td> <td>दिनांक DATE : 02-01-1999</td> </tr> </table>						नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE	CIE	VINOD KR		अनुवादक TRANSLATED BY			TSX	AKCHATA		निर्माणकर्ता WORKED BY	DHARAMPAL	15/6/06	QAX	S.S. Chandra		जांचकर्ता CHECKED BY	ANUJ JAIN	15/6/06	सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	S.C. AGRAWAL	28/6/06				स्वीकृति APPROVED :	(A.K.JAIN) AGM	21.08.06	REV.NO. 08	SUPERSEDES REV. 09		निर्माण PREPARED :	STC(TL/TA)	शारी ISSUED :	DI. 31.08.06	DI. 26-06-07				दिनांक DATE : 02-01-1999
				नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE																																														
CIE	VINOD KR		अनुवादक TRANSLATED BY																																																
TSX	AKCHATA		निर्माणकर्ता WORKED BY	DHARAMPAL	15/6/06																																														
QAX	S.S. Chandra		जांचकर्ता CHECKED BY	ANUJ JAIN	15/6/06																																														
सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	S.C. AGRAWAL	28/6/06																																														
			स्वीकृति APPROVED :	(A.K.JAIN) AGM	21.08.06																																														
REV.NO. 08	SUPERSEDES REV. 09		निर्माण PREPARED :	STC(TL/TA)	शारी ISSUED :																																														
DI. 31.08.06	DI. 26-06-07				दिनांक DATE : 02-01-1999																																														


तैयार की तारीख SIGN & DATE	स्टोर्स नम्बर INVENTORY NO	श्रमजी श्रमजी एवं एंजिनियरिंग एवं इलेक्ट्रिकल	COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	स्टाफ़िकर एवं गोपनीय इस दस्तावेज़ में दी गई जानकारी भारत भारती इंजीनियरिंग एवं इलेक्ट्रिकल लि. की संपत्ति है। इस दस्तावेज़ को बिना लिखित अनुमति के किसी भी व्यक्ति को नहीं देना चाहिए।	तैयार की तारीख SIGN & DATE	श्रमजी श्रमजी एवं INVENTORY NO	REV. NO.	निर्माणकर्ता WORKED BY	निर्माणकर्ता WORKED BY	निर्माणकर्ता WORKED BY	निर्माणकर्ता WORKED BY																																																												
			उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD			ST39003 पृष्ठ 13 का 2 Page 2 of 13																																																																	
5.0 <u>PUMP SPECIFICATION:-</u> 5.1 IDENTIFICATION NO. TO BE MENTIONED ON NAME PLATE AS FOLLOWS:- : MAV 31 AP 001 AND MAV 32 AP 001 5.2 <u>TYPE</u> <u>SCREW TYPE POSITIVE DISPLACEMENT</u> DESIGN TEMPERATURE = 100°C , OPERATING TEMPERATURE = 65°C																																																																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>VARIANT NUMBER</th> <th>NORMAL DISCHARGE CAPACITY (Litre/Sec)</th> <th>NORMAL DISCHARGE PRESSURE (Bar)</th> </tr> </thead> <tbody> <tr><td>VAR. 1</td><td>1.26</td><td>120</td></tr> <tr><td>VAR. 2</td><td>1.80</td><td>140</td></tr> <tr><td>VAR. 3</td><td>1.68</td><td>189</td></tr> <tr><td>VAR. 4</td><td>1.25</td><td>182</td></tr> <tr><td>VAR. 5</td><td>2.25</td><td>182</td></tr> <tr><td>VAR. 6</td><td>1.53</td><td>178</td></tr> <tr><td>VAR. 7</td><td>1.33</td><td>182</td></tr> <tr><td>VAR. 8</td><td>1.27</td><td>182</td></tr> <tr><td>VAR. 9</td><td>1.84</td><td>178</td></tr> </tbody> </table>			VARIANT NUMBER	NORMAL DISCHARGE CAPACITY (Litre/Sec)	NORMAL DISCHARGE PRESSURE (Bar)	VAR. 1	1.26	120	VAR. 2	1.80	140	VAR. 3	1.68	189	VAR. 4	1.25	182	VAR. 5	2.25	182	VAR. 6	1.53	178	VAR. 7	1.33	182	VAR. 8	1.27	182	VAR. 9	1.84	178	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>VARIANT NUMBER</th> <th>NORMAL DISCHARGE CAPACITY (Litre/Sec)</th> <th>NORMAL DISCHARGE PRESSURE (Bar)</th> </tr> </thead> <tbody> <tr><td>VAR. 10</td><td></td><td></td></tr> <tr><td>VAR. 11</td><td></td><td></td></tr> <tr><td>VAR. 12</td><td></td><td></td></tr> <tr><td>VAR. 13</td><td></td><td></td></tr> <tr><td>VAR. 14</td><td></td><td></td></tr> <tr><td>VAR. 15</td><td></td><td></td></tr> <tr><td>VAR. 16</td><td></td><td></td></tr> <tr><td>VAR. 17</td><td></td><td></td></tr> <tr><td>VAR. 18</td><td></td><td></td></tr> </tbody> </table>			VARIANT NUMBER	NORMAL DISCHARGE CAPACITY (Litre/Sec)	NORMAL DISCHARGE PRESSURE (Bar)	VAR. 10			VAR. 11			VAR. 12			VAR. 13			VAR. 14			VAR. 15			VAR. 16			VAR. 17			VAR. 18			PUMP SHALL BE SUITABLE FOR MOUNTING VERTICALLY ON THE OIL TANK. BASE PLATE OF PUMP SHALL MATCH THE COUNTER FLANGE PROVIDED ON THE TANK AS PER SKETCH ON PAGE 13. SMOOTH FUNCTIONING IS ENSURED BY MAINTAINING OIL LEVELS AS DEPICTED IN THE ARRANGEMENT ON PAGE 12.					
VARIANT NUMBER	NORMAL DISCHARGE CAPACITY (Litre/Sec)	NORMAL DISCHARGE PRESSURE (Bar)																																																																					
VAR. 1	1.26	120																																																																					
VAR. 2	1.80	140																																																																					
VAR. 3	1.68	189																																																																					
VAR. 4	1.25	182																																																																					
VAR. 5	2.25	182																																																																					
VAR. 6	1.53	178																																																																					
VAR. 7	1.33	182																																																																					
VAR. 8	1.27	182																																																																					
VAR. 9	1.84	178																																																																					
VARIANT NUMBER	NORMAL DISCHARGE CAPACITY (Litre/Sec)	NORMAL DISCHARGE PRESSURE (Bar)																																																																					
VAR. 10																																																																							
VAR. 11																																																																							
VAR. 12																																																																							
VAR. 13																																																																							
VAR. 14																																																																							
VAR. 15																																																																							
VAR. 16																																																																							
VAR. 17																																																																							
VAR. 18																																																																							
5.3 DURING INITIAL START UP IN WINTER, OIL TEMPERATURE MAY GO AS BELOW AS 20°C. 6.0 <u>MOTOR:-</u> A SUITABLE MOTOR CONFORMING TO THE PUMP REQUIREMENTS SHALL BE SUPPLIED. FOR DETAILS ON MOTOR, PLEASE REFER ANNEXURE-I. 7.0 <u>DESIGN AND CONSTRUCTION OF PUMP:-</u> ALL MATERIALS USED IN THE CONSTRUCTION OF THE PUMPS SHALL BE SELECTED FROM THE RANGE OF MATERIAL MOST APPROPRIATELY SUITABLE FOR THE PURPOSE AND SERVICE CONDITIONS. THE BIDDER SHALL FURNISH ALONGWITH THE OFFER, MATERIAL SPECIFICATION FOR ALL THE COMPONENTS TO BHEL FOR THEIR REVIEW AND ACCEPTANCE BY BHEL/OWNER. BHEL/OWNER RESERVES THE RIGHT TO ASK FOR CHANGES IN MATERIAL. THE SIZE SHALL BE STANDARDISED SO AS TO ENSURE INTERCHANGEABILITY. 7.1 <u>SPECIAL TOOLS AND TACKLES</u> ONE SET OF TOOLS REQUIRED FOR ERECTION, OPERATION AND MAINTENANCE OF THE PUMPING SETS SHALL BE SUPPLIED TOGETHER WITH EACH PUMP. LIST OF THESE TOOLS SHALL BE SUBMITTED ALONGWITH THE OFFER.																																																																							
21/10/06			08			DHARAMPAL			ANUJ JAIN																																																														




दिनांक एवं हस्ताक्षर SIGN & DATE				उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST-39003	
स्वामी की सूची संख्या को उपलब्ध कराना है		COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.		पृष्ठ 13 का 3 Page 3 Of 13			
स्वतंत्राधिकार एवं गोपनीय इस प्रलेख में जो कार्य भूतना मानक है वही इलेक्ट्रिकल को सम्पत्ति है इसका प्रयुक्त एवं अन्य प्रकार का प्रयुक्त न किया जाये जो कि कंपनी के बिना में अधिकारक हो न किया जाये		दिनांक SIGN & DATE 21/9/06		<p>7.2 THE MATERIALS OF CONSTRUCTION OF THE PUMPS SHALL BE SUCH AS TO RESIST CORROSION AND EROSION AND SHALL GIVE A LONG TROUBLE FREE SERVICE.</p> <p>7.3 THE SUPPLIER SHALL ALSO FURNISH THE METHOD AND FREQUENCY OF LUBRICATION OF THE BEARINGS AND QUANTITY AND TYPE OF LUBRICANT REQUIRED FOR NORMAL OPERATION, BUT LUBRICATION OF BEARINGS WITH THE OIL BEING HANDLED IS PREFERRED.</p> <p>7.4 THE DESIGN SHALL BE SUCH AS TO KEEP THE FRICTIONAL LOSS AND WEAR CAUSED BY END THRUST TO THE MINIMUM. IT WILL ALSO ENSURE MINIMUM WEAR AND CAVITATION IN MECHANICAL SEALS AND BEARINGS. LONG AND TROUBLE FREE SERVICE SHALL BE ENSURED. THE ROTORS OF THE PUMP SHOULD BE DESIGNED IN SUCH A WAY SO THAT MINIMUM VIBRATIONS ARE EXPERIENCED. THE SOUND PRESSURE LEVEL OF PUMP MOTOR SET SHOULD NOT BE GREATER THAN 85 dBA TO A REFERENCE OF 0.0002 MICRO BAR WHEN MEASURED AT A DISTANCE OF 1.5 METERS ABOVE FLOOR LEVEL AND ONE METRE HORIZONTALLY FROM THE BASE OF EQUIPMENT AND VIBRATIONS ARE IN THE PERMISSIBLE RANGE AS PER VDI 2056.</p> <p>7.5 SEALS MUST COMPLY WITH THE FOLLOWING PROPERTIES :-</p> <p>(a) READY ACCESS AND AMENABILITY FOR MAINTENANCE WORK .</p> <p>(b) NO CONTAMINATION OF THE MEDIUM FROM MATERIAL ABRADED FROM THE SEALS.</p> <p>(c) NO SEEPAGE OF LUBRICANTS INTO THE FLOW MEDIUM .</p> <p>(d) MINIMUM LEAKAGE LOSSES WITH THEIR CONTROLLED REMOVAL.</p> <p>7.6 TO FACILITATE TRANSPORT AND ERECTION, LIFTING HOOKS OR ERECTION EYES SHALL BE FITTED AT SUITABLE POINTS ON THE COMPONENTS. THEIR LOCATIONS MUST BE SHOWN ON THE DIMENSIONAL DRAWING.</p> <p>7.7 PUMP BEARINGS SHALL BE DESIGNED SO AS TO ASSURE 50,000 hrs CONTINUOUS SERVICE FOR FRICTION BEARINGS & 30,000 hrs FOR BALL & ROLLER BEARINGS.</p> <p>7.8 THE MECHANICAL DESIGN SHALL ALLOW EASY ACCESS TO VARIOUS PARTS OF CARRYING OUT MAINTENANCE WORK.</p> <p>7.9 THE DISCHARGE BRANCH OF THE PUMP SHALL BE TAKEN OUT ABOVE THE BASE PLATE BY THE SUPPLIER.</p> <p>7.10 THE PUMPS SHALL BE PROVIDED WITH DRAINAGE AND VENTING DEVICES.</p> <p>7.11 ALL SYSTEM PARTS CARRYING OIL SHALL BE OF OIL TIGHT CONSTRUCTION COMPRESSION-TYPE FITTINGS ARE NOT PERMISSIBLE.</p> <p>7.12 FOR SCREW PUMPS RUNNING AT SUBCRITICAL SPEEDS, IT SHALL BE ENSURED THAT THE CRITICAL SPEED LIES ABOVE THE MAXIMUM SPEED ATTAINABLE DURING OPERATION WITH A MINIMUM MARGIN ON 15% OF RATED SPEED. FOR PUMPS RUNNING AT SUPER CRITICAL SPEEDS, IT SHALL BE ENSURED THAT THERE IS DIFFERENCE OF SUFFICIENT MAGNITUDE (NOT LESS THAN 20%) BETWEEN THE OPERATING SPEED AND THE BORDER IN CRITICAL SPEEDS. ALLOWANCES SHALL BE MADE FOR THE TYPE OF COUPLING BETWEEN THE PUMP AND MOTOR WHILE CALCULATING THE CRITICAL SPEEDS.</p>			
सामग्री की सूची संख्या INVENTORY NO. P-5134		REV. NO. 08		निर्माणकर्ता WORKED BY DHARAMPAL		 15/6/06	
				जांचकर्ता CHECKED BY ANUJ JAIN		 15/6/06	


निमांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39003	
				पृष्ठ 13 का 4 Page 4 Of 13	
सावनी सूची संख्या को अंकित किया करता है	ALLOWANCES SHALL BE MADE FOR THE TYPE OF COUPLING BETWEEN THE PUMP AND MOTOR WHILE CALCULATING THE CRITICAL SPEEDS.				
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	7.13 COUPLING SUITABLE COUPLING WITH GUARDS SHALL BE PROVIDED FOR COUPLING PUMP WITH MOTOR. IT SHALL BE DESIGNED TO FACILITATE EASY ALIGNMENT. ONE SET OF COUPLING BOLTS SHALL BE SUPPLIED IN SPARE.				
	7.14 FOUNDATION THE PUMP SHALL BE MOUNTED ON THE OIL TANK AND HUNG FROM BED PLATE AT THE TANK TOP INTO THE TANK. FOR FURTHER DETAILS PLEASE REFER PAGE NO. 12 AND 13. ALL THE SEATING MACHINED SURFACES OF BED PLATE TO BE MAINTAINED FOR 0.5 mm FLATNESS.				
	8.0 QUALITY ASSURANCE, INSPECTION AND TESTING				
	(a) THE MANUFACTURER SHALL CONDUCT ALL TESTS REQUIRED TO ENSURE ALL THE COMPONENTS PART OF THE JACKING OIL PUMP OFFERED, CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AND IN COMPLIANCE WITH REQUIREMENTS OF APPLICABLE CODES AND STANDARDS.				
स्वत्वधिकार एवं गोपनीय इस पत्रिका में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग प्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में प्रतिकारक हो न किया जाए	(b) THE BIDDER SHALL SUBMIT ALONGWITH HIS OFFER QUALITY PLAN.				
	8.1 THE PARTICULARS OF THE PROPOSED SHOP TESTS AND PROCEDURES FOR THE TESTS SHALL BE SUBMITTED TO BHEL/ITS CUSTOMER FOR APPROVAL ALONGWITH QUALITY PLAN.				
	8.2 THE MATERIAL SHALL BE DESPATCHED ONLY AFTER INSPECTION AND CLEARANCE OF MATERIAL BY BHEL OR ITS CUSTOMER AND APPROVAL OF TEST CERTIFICATE BY BHEL/ITS CUSTOMER.				
	8.3 THE MINIMUM TESTS/CHECKS TO BE CARRIED OUT ON THE JACKING OIL PUMP AS ENVISAGED BY BHEL ARE GIVEN BELOW. THIS IS, HOWEVER, NOT INTENDED TO FORM A COMPREHENSIVE TESTING PROGRAMME AS IT IS SUPPLIERS RESPONSIBILITY TO PREPARE THE DETAILED QUALITY PLAN, WHICH SHOULD ALSO INCLUDE TESTS/CHECKS CARRIED OUT BY SUPPLIER AS A PART OF THEIR NORMAL PRACTICE. THIS QUALITY PLAN IS SUBJECT TO THE APPROVAL OF BHEL /ITS CUSTOMER AND BHEL/ITS CUSTOMER RESERVES THE RIGHT TO ASK FOR ANY MORE CHECKS AT THE TIME OF QUALITY PLAN FINALISATION.				
हस्ताक्षर एवं दिनांक SIGN & DATE	8.3.1 TESTING OF MATERIALS THE MATERIAL OF EACH COMPONENT SHALL BE TESTED AS PER RELEVANT SPECIFICATION FOR ITS CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES, VIZ. YS, UTS, IMPACT, % ELONGATION % RA ETC. AND NDT, UT ON SHAFT, MPI ON SCREWS AND CASING ETC. TO ENSURE FREEDOM FROM SURFACE AND SUB-SURFACE DEFECTS SHALL BE CARRIED OUT.				
	8.3.2 FOLLOWING TESTS SHALL BE CARRIED OUT DURING VARIOUS STAGES OF MANUFACTURE AT MANUFACTURER WORKS.				
सावनी सूची संख्या INVENTORY NO.	REV. NO. 08	निर्माणांकता WORKED BY		DHARAMPAL	
		जांचकर्ता CHECKED BY		ANUJ JAIN	
P-5734				15/6/06	15/6/06




दिनांक एवं हस्ताक्षर SIGN & DATE		इत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39003 पृष्ठ 13 का 5 Page 5 of 13	
सामग्री सूची संख्या को अधिकृतित करता है	SUPERSEDES INVENTORY	(c) CHECK THE CONDITION OF THE OIL SEALS AND ANY SEEPAGE OF OIL THROUGH SEALS ETC. (d) HYDRAULIC TESTING OF THE CASING AND OTHER PRESSURE PARTS SHALL BE AS PER VDMA 24284. (e) CHECK FOR DIRECTION OF ROTATION OF PUMP. (f) PERFORMANCE TEST WITH CALIBRATED TEST BED MOTOR FOR VERIFICATION OF PUMP CHARACTERISTICS, VIZ. DISCHARGE AT THE GIVEN PRESSURE SCHEDULE OF POWER CONSUMPTION, NOISE AND VIBRATION LEVEL AS PER VDMA 24284. (g) STRIP DOWN TEST TO CHECK THE CONDITION OF BEARING, MECHANICAL CLEARANCES AND AXIAL PLAY OF SHAFT ETC. 8.3.3 AFTER TESTING THE PUMP, ALL THE SURFACES AND INTERNALS SHALL BE THOROUGHLY CLEANED, DRIED AND CONSERVED. ALL METALLIC SURFACES EXCEPT BRIGHT PARTS EXPOSED TO WEATHER SHALL BE GIVEN A SUITABLE PRIMING COAT AND THEN TWO COATS OF APPROVED PAINTS. ENSURE ASSEMBLY OF ALL THE COMPONENTS OF PUMP AS ONE UNIT AND PACK IN WATER AND DUST PROOF PACKAGE. THE PACKAGES SHOULD BE SUFFICIENTLY STRONG TO SAFEGUARD AGAINST ANY DAMAGE DURING TRANSIT AND IS SAFE FOR TWO YEARS IN A VERY DAMP ATMOSPHERE. 8.3.4 TEST CERTIFICATES INDICATING THE ACTUAL TEST RESULTS OF MATERIAL TESTING, NDT, HYDRAULIC TEST, PERFORMANCE TEST, STRIP DOWN EXAMINATION Etc. SHALL BE FURNISHED. 9.0 <u>PRE-APPROVAL DOCUMENTS AT THE TIME OF OFFER</u> 9.1 ASSEMBLY DRAWING WITH PART LISTS, NOZZLE SIZES AND THEIR COORDINATES, BASE PLATE DETAILS AND CROSS SECTION ARRANGEMENT ALONGWITH STATIC LOADING. 9.2 CALCULATIONS WITH NECESSARY DRAWINGS (TORQUE/SPEED CHARACTERISTICS Etc), POWER REQUIREMENTS, TORQUE SETTING VALUE FOR MOTOR TRIP, PERMISSIBLE TORQUE VALUE FOR KEY AND POWER SHAFT. 9.3 MAXIMUM MAGNETIC AND NON-MAGNETIC PARTICLE SIZE, WHICH CAN PASS THROUGH PUMP SCREW CLEARANCE WITHOUT DAMAGING THE PUMP SHALL BE SPECIFIED IN THE OFFER. 9.4 QUALITY PLAN WITH DETAILS OF QUALITY LEVELS AND MANUFACTURING TOLERANCES. THIS SHOULD GENERALLY CONFIRM TO VDMA 24284. GENERALLY ACCEPTED ENGINEERING PRACTICES, IN PARTICULAR VDMA CODES AND STANDARDS OR EQUIVALENT SHALL BE APPLIED AND TAKEN INTO ACCOUNT FOR DESIGN OF SCREW PUMPS. THE CODES OF STANDARDS APPLIED IN EACH CASE SHALL BE SPECIFIED IN THE OFFER. 9.5 FOR DOCUMENTATION ON MOTOR, PLEASE REFER ANNEXURE-I. EXAMINATION OF THE PRE-APPROVED DOCUMENTS BY BHEL SHALL NOT RELIEVE THE MANUFACTURER AND HIS SUBCONTRACTORS OF THEIR RESPONSIBILITIES. THE PRE-APPROVED DOCUMENTS SHALL FORM THE BASIS FOR THE ORDER. NO CHANGES SHALL BE MADE WITHOUT APPROVAL FROM BHEL. 10.0 <u>DOCUMENTS TO BE SUPPLIED AFTER THE PLACEMENT OF ORDER:</u> THESE SHALL BE SUPPLIED EITHER IN FIVE COPIES EACH OR TWO COPIES AND A SET OF REPRODUCIBLE. SCHEDULE OF DOCUMENTS SHALL BE AS FOLLOWS: 10.1 CONTRACTUAL DRAWINGS — 8 WEEKS 10.2 OVERHAUL AND SPARE PARTS LISTS — 8 WEEKS 10.3 EQUIPMENT DESCRIPTION — 8 WEEKS			
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company					
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना, ज्ञान एवं प्रौद्योगिकी की सम्पत्ति है इसका प्रयोग एवं आश्रयण के बिना किसी भी तरह प्रयोग, जो कि कंपनी के हित में अधिकारक हो, न किया जाए।					
हस्ताक्षर एवं दिनांक SIGN & DATE 12/17/07					
सामग्री सूची संख्या INVENTORY NO. P-5134	REV. NO. 09		निर्माणकर्ता WORKED BY DHARAMPAL		26-06-07
			जांचकर्ता CHECKED BY ANUJ JAIN		26-06-07

<div style="writing-mode: vertical-rl; transform: rotate(180deg);"> दिनांक एवं हस्ताक्षर SIGN & DATE </div>		इत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39003	
				पृष्ठ 13 का 6 Page 6 of 13	
<div style="writing-mode: vertical-rl; transform: rotate(180deg);"> समुपरी सूची संख्या को अपिष्टासित करता है </div>	<div style="writing-mode: vertical-rl; transform: rotate(180deg);"> SUPERSEDES INVENTORY </div>	10.4 TEST CERTIFICATE OF ALL TESTS AS PER — BEFORE DESPATCH QUALITY PLAN, DRAWINGS DURING VARIOUS STAGES OF MANUFACTURE. ALSO REFER CLAUSE 8.2 AND 8.3.4 ABOVE. 10.5 LIST OF TOOLS AND TACKLES — 8 WEEKS 10.6 THE STATIC AND DYNAMIC LOADING DETAILS — 8 WEEKS ON SUPPORT/FOUNDATION SHOULD BE FURNISHED. — 12 WEEKS 10.7 FOR DOCUMENTATION ON MOTOR, PLEASE REFER ANNEXURE I. 10.8 O & M MANUALS (10 HARD COPIES+2CD) 11.0 <u>NAME PLATE IDENTIFICATION MARKINGS SHOULD BE AS FOLLOWS:</u> 11.1 TYPE / DESIGNATION 11.2 MANUFACTURER 11.3 MANUFACTURER'S WORKS NO. 11.4 YEAR OF MANUFACTURING 11.5 PURCHASER'S ORDER NO. 11.6 VOLUMETRIC FLOW (l/m) 11.7 DISCHARGE PRESSURE (Bar/MWC) 11.8 OPERATING TEMPERATURE (°C) 11.9 FLOW MEDIUM. 11.10 SPEED. 11.11 BILINGUAL IN HINDI AND ENGLISH LANGUAGES. 12.0 <u>CLEANING, PAINTING, CONSERVATION & PACKING:</u> <p>THE SURFACE SHALL BE CLEANED & PREPARED FOR APPLICATION OF THE COATINGS BY BLASTING WITH NON-SILICATIC ABBRASIVE AGENTS. THE PROTECTIVE COATING SHOULD BE OIL RESISTANT TO PREVENT COTAMINATION OF OIL SPECIFIED TO PREVENT THE DETERIORATION OF THE COATING ITSELF. THE SUPPLIER SHALL GIVE EXACT AND PRECISE DETAILS ABOUT THE MEASURES ENVISAGED BY HIM FOR SURFACE PROTECTION, WHICH SHALL BE CHECKD AND APPROVED BY BHEL.</p> <p>INSTRUCTIONS SHOULD BE ISSUED REGARDING RECONSERVATION, DECONSERVATION ALONGWITH SPECIFICATION OF MATERIAL TO BE USED FOR ABOVE PURPOSE. 100% QUANTITY OF MATERIAL REQUIRED FOR RECONSERVATION AND DECONSERVATION AT SITE DURING STORAGE SHALL BE SUPPLIED ALONGWITH PUMP. ANY SPECIFIC INSTRUCTION TO BE FOLLOWED DURING STORAGE AT SITE TO AVOID ANY SEIZING ETC. SHALL ALSO BE INTIMATED. ALL SUCH INSTRUCTIONS SHALL BE MADE AVAILABLE TO SITE INCHARGE IN A SEPARATE COVER (NOT PACKED WITH PUMP PACKAGE).</p> <p>THE SUPPLIER SHALL BE RESPONSIBLE FOR ALL LOSS OR DAMAGE DURING TRANSPORTATION, HANDLING AND STORAGE DUE TO IMPROPER PACKING.</p>			
<div style="writing-mode: vertical-rl; transform: rotate(180deg);"> COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company </div>		<div style="writing-mode: vertical-rl; transform: rotate(180deg);"> स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं आश्रयक रूप से किसी भी तरह प्रयोग जो कि कंपनी के हित में हानिकारक हो न किया जाए। </div>			
<div style="writing-mode: vertical-rl; transform: rotate(180deg);"> समुपरी सूची संख्या INVENTORY NO. </div>	<div style="writing-mode: vertical-rl; transform: rotate(180deg);"> दिनांक एवं हस्ताक्षर SIGN & DATE </div>	13/7/07			
P- 5134	REV. NO. 09		निर्माणकर्ता WORKED BY	DHARAMPAL	 26-06-07
			जांचकर्ता CHECKED BY	ANUJ JAIN	 26-06-07

निर्माण एवं प्रमाणित SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39003 पृष्ठ 13 का 7 Page 7 Of 13	
		13.0 <u>GENERAL</u> THE SUPPLIER CAN MAKE SUITABLE OFFERS EVEN IF THERE ARE MINOR DEVIATIONS WHICH DO NOT AFFECT THE EFFICIENT FUNCTIONING OF THE EQUIPMENT. HOWEVER, THE DEVIATIONS MUST BE CLEARLY SPELT OUT. SUPPLIER SHALL ALSO FILL IN THE BLANK DATA SHEET AS PER ANNEXURE-II AND SUBMIT THE SAME ALONGWITH THE OFFER. THE OFFER MAY NOT BE CONSIDERED IF ALL THE TECHNICAL PARTICULARS AND INFORMATIONS CALLED FOR IN THE SPECIFICATION ARE NOT SUBMITTED ALONGWITH THE OFFER.			
समूची सूची संख्या को अधिकृतित करवा है	COPYRIGHT AND CONFIDENTIAL. The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	14.0 <u>GUARANTEE</u> 14.1 THE SUPPLIER SHALL GUARANTEE TROUBLE FREE AND SATISFACTORY OPERATION OF THE EQUIPMENT FOR A PERIOD OF 12 MONTHS AFTER THE INSTALLATION AND COMMISSIONING OR FOR A PERIOD OF 18 MONTHS FROM THE DAY THE EQUIPMENT LEAVES THE SUPPLIER'S WORKS WHICHEVER IS EARLIER. 14.2 THE SUPPLIER SHALL GUARANTEE THE CAPACITY, HEAD AND EFFICIENCY OF THE PUMP AS PER THE TESTED CHARACTERISTIC WITH OIL. 14.3 IF DURING ERECTION AT SITE ANY DEFICIENCY IN A PART IS DETECTED. BHEL SITE REPRESENTATIVE SHALL PREPARE THE ASSESSMENT REPORT AND A COPY OF THE SAME SHALL BE FORWARDED TO THE SUPPLIER. THE SUPPLIER SHALL REPLACE/ RECTIFY THE CONCERNED ITEMS FREE OF CHARGE. THE SUPPLIER IF HE SO DESIRE MAY DEPUTE HIS REPRESENTATIVE TO SITE OTHERWISE THE FINDING OF BHEL REPRESENTATIVE SHALL BE FINAL AND BINDING ON THE SUPPLIER OF PUMPING SET. 14.4 THE SUPPLIER SHALL REPAIR/REPLACE THE DEFECTIVE PARTS AT HIS OWN COST DURING THE GUARANTEE PERIOD. 15.0 <u>SPARES</u> THE SUPPLIER SHALL QUOTE ITEMWISE PRICE OF RECOMMENDED SPARES FOR 3 YEARS AND 5 YEARS OPERATION RESPECTIVELY.			
		15.0 <u>SPARES</u> THE SUPPLIER SHALL QUOTE ITEMWISE PRICE OF RECOMMENDED SPARES FOR 3 YEARS AND 5 YEARS OPERATION RESPECTIVELY.			
स्वतंत्राधिकार एवं गोपनीय इस दस्तावेज में जो कार्य सूचना मानक है उसे हरी इलेक्ट्रिकल लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण केवल ही इसी उद्देश्य के लिए ही किया जा सकता है। अन्य किसी भी उद्देश्य के लिए इसका प्रयोग, जो कि कंपनी के हित में हो, न किया जाये।	ANNEXURE - I <u>SPECIFICATION OF A.C. MOTOR FOR JACKING OIL PUMP</u> 1.0 A SUITABLE MOTOR CONFORMING TO THE JACKING OIL PUMP REQUIREMENT SHALL BE SUPPLIED. THE MOTOR SHALL CONFORM TO IS:325, IS:2253, IS:2254, IS:3202, IS:4029 AND IS:4722 OR EQUIVALENT BS SPECIFICATION. THE MOTOR SHALL MATCH THE REQUIREMENTS OF DRIVEN EQUIPMENT IN ALL RESPECTS. THE MOTOR SHALL ALSO MEET THE FOLLOWING REQUIREMENTS BROADLY. THE MOTOR SHALL MEET ALL INDIAN STATUTORY REQUIREMENTS. 2.0 <u>APPLICATION</u> TO DRIVE JACKING OIL PUMP FOR SUPPLYING HIGH PRESSURE OIL TO TURBINE BEARINGS. 3.0 <u>TYPE OF MOTOR:</u> SQUIRREL CAGE, INDUCTION MOTOR. 3.1 <u>KW RATING</u> IT SHALL HAVE AT LEAST 15% RESERVE CAPACITY OVER AND ABOVE REQUIRED POWER TO DRIVE THE PUMP WHEN IT IS DISCHARGING MAX. QUANTITY. 3.2 KW ACTUALLY REQUIRED BY DRIVEN EQUIPMENT : PUMP CAPACITY UNDER SPECIFIED OPERATION/START UP 3.3 RATED VOLTAGE : 415V FREQUENCY : 50HZ 3.4 PERMISSIBLE VOLTAGE & FREQUENCY : ±10% VOLT VARIATION UNDER NORMAL RUNNING : ±5% FREQUENCY CONDITIONS COMBINED VARIATION. 10% (SUM OF ABSOLUTE VALUES)				
	10% (SUM OF ABSOLUTE VALUES)				
समूची सूची संख्या INVENTORY NO. P-5134	REV. NO. 08	निर्माणकर्ता WORKED BY DHARAMPAL	जांचकर्ता CHECKED BY ANUJ JAIN	15/6/06	15/6/06

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST-39003	
				पृष्ठ 13 का 8 Page 8 Of 13	
समीक्षक की संख्या की उपस्थिति का प्रमाण है	COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	3.5 MINIMUM VOLTAGE REQUIRED UNDER STARTING CONDITIONS TO BRING DRIVEN EQUIPMENT UPTO RATED SPEED. : 80% RATED 3.6 NO. OF PHASES : 3 PHASE 3.7 TYPE OF DUTY : CONTINUOUS 3.8 FULL LOAD SPEED : IT SHALL BE COMMENSURATE WITH PUMP SPEED AS PER DESIGN. 3.9 FULL LOAD CURRENT : AS PER DESIGN 3.10 STARTING CURRENT : NOT TO EXCEED 600% OF RATED (EXCLUSIVE OF IS: TOLERANCES) 3.11 STARTING TORQUE : 1.3 TIMES (min.) OF RATED TORQUE. 3.12 BREAK DOWN TORQUE : 2.05 TIMES (min.) OF RATED VALUE. 3.13 EFFICIENCY AT FULL LOAD : 90% (min.) 3.14 POWER FACTOR AT FULL LOAD : 0.85 (min.) 3.15 MOTOR SHALL BE DESIGNED TO WITHSTAND THE VOLTAGE AND TORQUE STRESSES DEVELOPED DUE TO THE DIFFERENCE BETWEEN THE MOTOR RESIDUAL VOLTAGE AND INCOMING SUPPLY VOLTAGE EQUAL TO 150% OF THE RATED MOTOR VOLTAGE DURING FAST CHANGEOVER OF BUSES. 4.0 <u>STARTING DATA</u> 4.1 STARTING: DOL START AS WELL AS STAR DELTA. 4.2 ACCELERATION TIME WITH FULL LOAD CONNECTED : 3.5±0.5 SECONDS 4.3. LOCKED ROTOR WITHSTAND TIME UNDER HOT CONDITIONS AT RATED VOLTAGE 2.5 SECONDS MORE THAN STARTING TIME. 4.4 PERMISSIBLE STARTING DUTY : 3 STARTS EQUALLY SPREAD OVER AN HOUR & 2 CONSECUTIVE STARTS FROM HOT CONDITION WITHOUT ANY INJURIOUS HEATING TO WINDINGS. 4.5 OVERLOAD (% OF FULL LOAD) THAT CAN BE CARRIED BY MOTOR WITHOUT IMPAIRING OVERALL PERFORMANCE AND PERIOD FOR WHICH THIS OVERLOAD IS APPLICABLE. : MOTOR SHALL BE CAPABLE OF RUNNING AT FULL LOAD AT 80% OF RATED VOLTAGE FOR FIVE MINUTES AND 70% OF RATED VOLTAGE FOR 1 SEC. 4.6 LOCATION : INDOOR 4.7 CLASS OF INSULATION : CLASS F, FUNGUS RESISTANT, TROPICALISED AS PER IS:3202, WITH TEMP. RISE LIMITED TO THAT OF CLASS B. 4.8 <u>MECHANICAL CONSTRUCTION</u> 4.8.1 SHAFT DISPOSITION MOUNTING : VERTICAL/FLANGE MOUNTED 4.8.2 METHOD OF CONNECTION TO DRIVEN EQUIPMENT. : FLANGE FLEXIBLE COUPLING. 4.8.3 DIRECTION OF ROTATION AND CORRESPONDING TERMINAL DESIGNATION. : TO SUIT PUMP 4.8.4 ENCLOSURE AND VENTILATION : TOTALLY ENCLOSED FAN COOLED IP-55. 4.8.5 BEARING : THURST BEARING, MIN. STANDARD LIFE NOT LESS THAN 30,000 WORKING HOURS.			
		स्वतंत्र अधिकार एवं गोपनीय इस दस्तावेज की मूल प्रतियाँ भारत भारी इलेक्ट्रिकल्स की संपत्ति हैं। इसका प्रयोग एवं प्रसारण केवल ही बिजली की दफ्तर द्वारा ही किया जा सकता है। बिना अनुमति के किसी भी तरह का प्रसारण, जो कि कानून के विरुद्ध है, दंडनीय होगा।			
दिनांक एवं हस्ताक्षर SIGN & DATE 27/9/06					
INVENTORY NO. P-5134	REV. NO. 08			निर्माणकर्ता WORKED BY DHARAMPAL	 15/6/06
				जांचकर्ता CHECKED BY ANUJ JAIN	 15/6/06

निर्माण एवं प्रमाणन SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD	ST39003	
			पृष्ठ 13 का 9 Page 9 of 13	
संशोधन एवं प्रमाणन INVENTOR NO मंजूरी एवं प्रमाणन APPROVED BY	4.8.6 GROUNDING DEVICE : SUITABLE ARRANGEMENT SHALL BE PROVIDED FOR EARTHING THE MOTOR AT TWO SEPARATE AND DISTINCT CONNECTION POINTS. DESIGN OF EARTHING CONDUCTOR SHALL BE AS PER IS:4722.	<p> 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. </p>		
4.8.7 TERMINAL CONNECTORS FOR STATOR LEADS TYPE AND NUMBER. : 6, NEUTRAL SHALL BE CONNECTED EXTERNALLY IN THE TERMINAL BOX.				
4.9 TERMINAL BOX : TERMINAL BOX SHALL BE PROVIDED WITH DOUBLE COMPRESSION TYPE BRASS CABLE GLANDS (Nickel Chromium PLATED HEAVY DUTY, CONFIRMING TO BS:6121) AND COPPER CABLE LUGS TO MATCH OWNER'S ALUMINIUM CABLES, THE SIZE OF WHICH SHALL BE INTIMATED LATER. TERMINAL BOX SHALL BE CAPABLE OF BEING ROTATED THROUGH 180° IN STEPS OF 90°. IT SHALL HAVE A DEGREE OF PROTECTION OF IP-55. IT SHALL ALSO BE SUITABLE TO WITHSTAND THE FAULT LEVEL OF 50 KA FOR 0.25 SECONDS.				
4.10 WHETHER PHASES SEGREGATED : NO.				
4.11 SPACE HEATERS : TO BE PROVIDED.				
4.12 RATED VOLTAGE FOR SPACE HEATERS : 240 VOLTS				
5.0 SPECIAL REQUIREMENTS:				
5.01 THE MOTOR SHALL BE REWOUNDABLE.				
5.02 THE MOTOR SHALL HAVE ON LINE GREASING FACILITY.				
5.03 THE MOTOR CONSTRUCTION SHALL BE SUITABLE FOR EASY DISASSEMBLY AND REASSEMBLY.				
5.04 THE MOTOR SHALL BE SUITABLE FOR WORKING IN AN ENVIRONMENT OF OIL FUMES WITHOUT ANY HAZARD. ENVIRONMENT OF OIL FUMES WITHOUT ANY HAZARD.				
5.05 SEPARATE TERMINAL BOX FOR SPACE HEATERS SHALL BE PROVIDED.				
5.06 MOTOR SHALL BE PAINTED WITH PAINT SUITABLE FOR WORKING CONDITION AND ITS COLOUR SHALL BE INTIMATED LATER ON.				
5.07 THE MOTOR SHALL BE THOROUGHLY DEGREASED AND SHARP EDGES AND SCALES REMOVED AND TREATED WITH ONE COAT OF PRIMER AND TWO COATS OF ENAMEL PAINT. MOTOR FAN ALSO BE PAINTED TO WITHSTAND CORROSION.				
6.00 TESTS AT MANUFACTURER'S WORKS:-				
	(i) MOTOR AFTER COMPLETE ASSEMBLY SHALL BE SUBJECTED TO BOTH TYPE AND ROUTINE TESTS AS PER IS: 4722. TYPE TEST SHOULD NOT BE MORE THAN 5 YEARS OLD w.r.t. DATE OF ORDERING.			
	(ii) IN ADDITION THE FOLLOWING TESTS SHALL ALSO BE CARRIED OUT:			
निर्माण एवं प्रमाणन SIGN & DATE 27/9/06	REV. NO. 08	निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	DHARAMPAL ANUJ JAIN	15/06/06 15/6/06

निम्नलिखित पर हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39003 पृष्ठ 13 का 10 Page 10 Of 13	
स्वामी सूची सूचना की अधिकृतित्व करता है	COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company		स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं प्रसारण के बिना स्वामी की लिखित अनुमति के बिना नहीं किया जायेगा		हस्ताक्षर एवं तिथि SIGN & DATE 21/9/06
धारक सूची सूचना INVENTORY NO. P-5134	REV. NO. 08		निर्माणकर्ता WORKED BY	DHARAMPAL	 15/6/06
जाँचकर्ता CHECKED BY	ANUJ JAIN		15/6/06		

ADDITIONAL TYPE TESTS:

- (a) DEGREE OF PROTECTION TEST TO CONFORM TO THE SPECIFIED DGREE OF PROTECTION. IN CASE THE TEST IS ALREADY CARRIED ON THE SAME FRAME SIZE OF MACHINE, THEN TEST REPORT SHOULD BE FURNISHED.


ADDITIONAL ROUTINE TESTS:

- (a) 20% OVERSPEED TEST FOR 2 MINUTES.
(b) MEASUREMENT OF VIBRATION AS PER IS: 12075.
(c) MEASUREMENT OF NOISE AS PER IS: 12065. MOTOR NOISE LEVEL SHALL BE LIMITED SO AS TO ACHIEVE PUMP-MOTOR SET NOISE LEVEL AS GIVEN IN CLAUSE 7.4 ON PAGE-3.


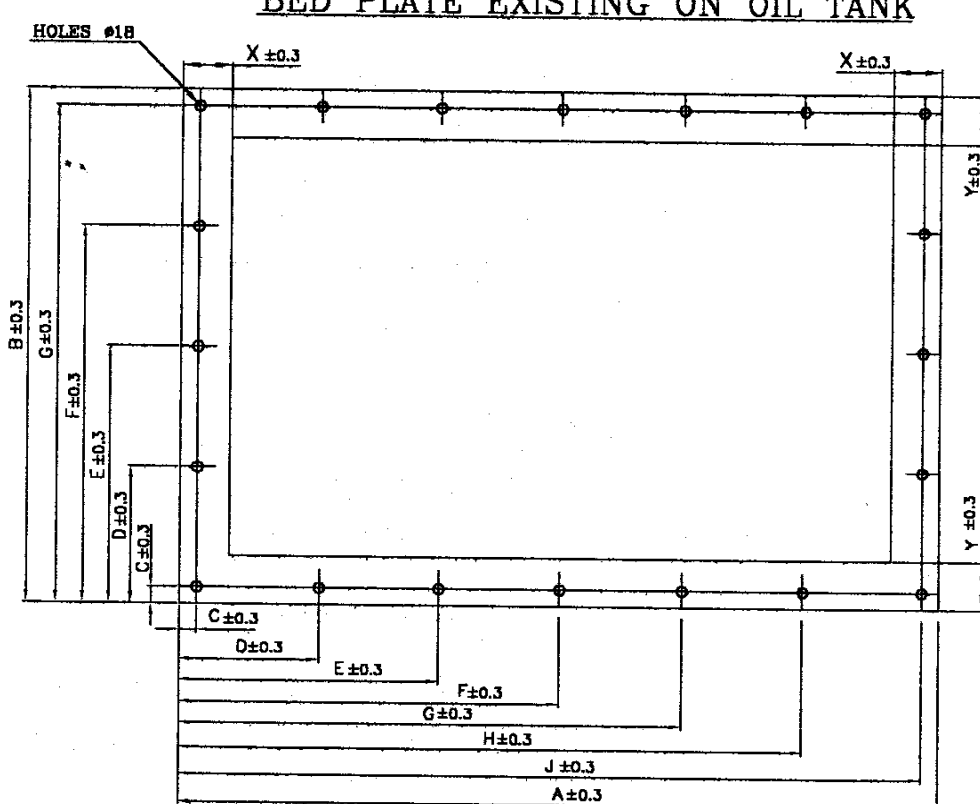
7.0 DOCUMENTS TO BE SUPPLIED WITH OFFER:-

THE OFFER SHOULD BE ACCOMPANIED WITH FOLLOWING DOCUMENTS IN TWO COPIES. THE OFFER WILL NOT BE CONSIDERED IF ALL THESE DOCUMENTS ARE NOT SUPPLIED.


- 7.1 CHARACTERISTICS AT 80% , 100% AND 110% VOLTAGES:
7.1.1 STARTING CURRENT V/S TIME.
7.1.2 TORQUE V/S SLIP.
7.1.3 THERMAL WITHSTAND CHARACTERISTIC FOR HOT AND COLD CONDITION.
7.2 TYPE AND FRAME SIZE.
7.3 STARTING TIME.
7.3.1 WITH 100% VOLTAGE AT TERMINAL.
7.3.2 WITH 85 % VOLTAGE AT TERMINAL.
7.3.3 WITH 80 % VOLTAGE AT TERMINAL.
7.4 SAFE STALL TIME AT 100 % RATED VOLTAGE UNDER HOT CONDITION.
7.5 POWER (KW) RATING CALCULATION w.r.t. PUMP REQUIREMENT.
7.6 EXPECTED LIFE OF BEARING.
7.7 DATA IN RESPECT OF ALL ITEMS MENTIONED AT PARA 1.0 TO 5.0 OF ANNEXURE I.
8.0 DOCUMENTS TO BE FURNISHED WITHIN FOUR WEEKS OF PLACEMENT OF ORDER (FOR BHEL OR THEIR CUSTOMER'S APPROVAL):-
8.1 SIX HARD COPIES AND ONE SOFT COPY (IN PDF FORMAT) OF MOTOR DATA SHEET AND G.A. DRAWING.
8.2 DRAWING SHOWING TERMINAL DETAIL OF ALL TERMINALS AND LOCATION AND DIMENSION OF TERMINAL BOXES.
8.3 ROTOR WEIGHT AND TOTAL MOTOR WEIGHT.
8.4 CHARACTERISTIC CURVES OF THE MOTOR.
9.0 SIX COPIES OF TESTS CARRIED OUT AS PER CLAUSE NO. 6.0 ON EACH MOTOR SHALL BE FURNISHED TO BHEL FOR SCRUTINY AND APPROVAL ONLY ON ACCEPTANCE FROM BHEL SIDE, MOTOR CAN BE CONSIDERED SUITABLE FOR DISPATCH.


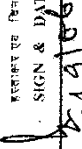


हस्ताक्षर एवं दिनांक SIGN & DATE 13/17/07	स्ट- 39003 पृष्ठ 13 का 11 Page 11 of 13	उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)	
		नवी एम ई एल 	
सापेक्षी सूची संख्या एवं दिनांक SIGN & DATE	SUPERSEDES INVENTORY	ANNEXURE-II DATA TO BE FURNISHED BY BIDDER ALONGWITH OFFER FOR JACKING OIL PUMP	
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	1.0 <u>EQUIPMENT AND SERVICES OFFERED</u> PLEASE STATE WHETHER THE FOLLOWING EQUIPMENT SERVICE AS SPECIFIED IN THE DATA SHEETS ARE OFFERED OR NOT.	1.1 PUMP AS PER SPECIFICATION YES/NO 1.2 MOTOR/MAKE YES/NO 1.3 NECESSARY INSTRUMENTS, TEST CONNECTIONS. YES/NO 1.4 BASE PLATE AS PER DRAWING. YES/NO 1.5 COMPANION FLANGES YES/NO 1.6 SPARE PARTS YES/NO 1.7 MAINTENANCE AND SPECIAL ERECTION TOOLS. YES/NO 1.8 COMMISSIONING OF THE SET. YES/NO 1.9 NO. OF PUMPS OFFERED. 2.0 <u>DESIGN AND PERFORMANCE.</u> 2.1 DESIGNED CAPACITY OF EACH PUMP. M ³ /hour 2.2 NORMAL DISCHARGE PRESSURE 2.3 EFFICIENCY 2.4 RATED SPEED 2.5 PERFORMANCE GUARANTEED WHEN INSTALLED YES/NO AS PER GIVEN ARRANGEMENT. 2.6 PUMP b.h.p./Kw AT RATED CAPACITY 2.7 MAXIMUM ALLOWABLE SUCTION LIFT (FOR MINIMUM NPSH REQUIRED) 2.8 MAXIMUM DISCHARGE PRESSURE FOR WHICH PUMP IS SUITABLE. 2.9 PARTY SHALL INFORM THE FILTRATION LEVEL OF THE FLOW MEDIA FOR PROPER FUNCTIONING OF PUMP. 3.0 <u>MATERIAL OF CONSTRUCTION</u> 3.1 CASING 3.2 DRIVING AND DRIVEN SPINDLE SCREW 3.3 BASE PLATE 3.4 WEARING RINGS 3.5 TYPE OF BEARINGS USED 3.6 TYPE OF COUPLING 3.7 PACKING 4.0 <u>CONNECTIONS</u> 4.1 SUCTION SIZE 4.2 DISCHARGE SIZE 5.0 <u>DRAWINGS</u> 5.1 GENERAL ARRANGEMENT AND SECTIONAL DRAWING YES/NO ENCLOSED WITH OFFER. 6.0 <u>WEIGHT SCHEDULE</u> 6.1 WEIGHT OF PUMP 6.2 WEIGHT OF MOTOR 6.3 WEIGHT OF PUMP WITH MOTOR AND BASE FRAME. 7.0 <u>CHARACTERISTIC CURVES</u>	
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।	REV. NO. 09	निर्माणकर्ता WORKED BY DHARAMPAL	26-06-07
सापेक्षी सूची संख्या INVENTORY NO. P-5134	जांचकर्ता CHECKED BY ANUJ JAIN	26-06-07	26-06-07




सामग्री सूची संख्या INVENTORY NO. P-5134	हस्ताक्षर एवं दिनांक SIGN & DATE 27/9/06	स्वतंत्राधिकार एवं गोपनीय यह दस्तावेज की को मूल रूप से तैयार किया गया है। इस दस्तावेज की प्रतिलिपि के बिना इस दस्तावेज का उपयोग नहीं किया जा सकता है।	COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	सामग्री सूची संख्या को अधिकतम करना है	हस्ताक्षर एवं दिनांक SIGN & DATE	REV. NO. 08	<div data-bbox="357 147 470 252"> </div> <div data-bbox="568 136 1071 294"> <p align="center">उत्पाद मानक</p> <p align="center">PRODUCT STANDARD</p> <p align="center">(STEAM TURBINE ENGINEERING)</p> </div> <div data-bbox="462 420 1323 598"> <p>7.1 POWER CONSUMPTION / DISCHARGE PRESSURE</p> <p>7.2 DISCHARGE QUANTITY / DISCHARGE PRESSURE</p> <p>7.3 DISCHARGE QUANTITY / EFFICIENCY</p> <p>8.0 ANY DEVIATION TAKEN AGAINST SPECIFICATIONS.</p> <p>9.0 DEVIATIONS TAKEN AS MENTIONED HERE</p> <p>10.0 HYDRAULIC TEST PRESSURE</p> <p align="right">YES/NO</p> </div> <div data-bbox="552 640 1120 703"> <p align="center"><u>OIL TANK ARRANGEMENT</u></p> </div> <div data-bbox="381 703 1404 1711"> </div>	निर्माणकर्ता WORKED BY धारामपाल DHARAMPAL	जांचकर्ता CHECKED BY अनुज जैन ANUJ JAIN	15/6/06	15/6/06	ST- 39003 पृष्ठ 13 का 12 Page 12 Of 13
--	--	--	--	--	--	-----------------------	---	--	--	---------	---------	--




चिन्हक एवं तारीख SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)	ST- 39003 पृष्ठ 13 का 13 Page 13 Of 13																																																																																																																																															
संशुद्धी सूची संख्या को अधिकृतित किया है	BED PLATE EXISTING ON OIL TANK																																																																																																																																																	
																																																																																																																																																		
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>BED PLATE TYPE</th> <th>A±0.3</th> <th>B±0.3</th> <th>C±0.3</th> <th>D±0.3</th> <th>E±0.3</th> <th>F±0.3</th> <th>G±0.3</th> <th>H±0.3</th> <th>J±0.3</th> <th>X±0.3</th> <th>Y±0.3</th> <th>NO. OFF HOLES</th> </tr> </thead> <tbody> <tr> <td>AA</td> <td>700</td> <td>700</td> <td>50</td> <td>250</td> <td>450</td> <td>650</td> <td>—</td> <td>—</td> <td>—</td> <td>80</td> <td>80</td> <td>12</td> </tr> <tr> <td>BB</td> <td>700</td> <td>700</td> <td>35</td> <td>245</td> <td>455</td> <td>665</td> <td>—</td> <td>—</td> <td>—</td> <td>60</td> <td>60</td> <td>12</td> </tr> <tr> <td>CC</td> <td>1320</td> <td>900</td> <td>30</td> <td>240</td> <td>450</td> <td>660</td> <td>870</td> <td>1080</td> <td>1290</td> <td>85</td> <td>85</td> <td>20</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>				BED PLATE TYPE	A±0.3	B±0.3	C±0.3	D±0.3	E±0.3	F±0.3	G±0.3	H±0.3	J±0.3	X±0.3	Y±0.3	NO. OFF HOLES	AA	700	700	50	250	450	650	—	—	—	80	80	12	BB	700	700	35	245	455	665	—	—	—	60	60	12	CC	1320	900	30	240	450	660	870	1080	1290	85	85	20																																																																																											
BED PLATE TYPE	A±0.3	B±0.3	C±0.3	D±0.3	E±0.3	F±0.3	G±0.3	H±0.3	J±0.3	X±0.3	Y±0.3	NO. OFF HOLES																																																																																																																																						
AA	700	700	50	250	450	650	—	—	—	80	80	12																																																																																																																																						
BB	700	700	35	245	455	665	—	—	—	60	60	12																																																																																																																																						
CC	1320	900	30	240	450	660	870	1080	1290	85	85	20																																																																																																																																						
CROSS REFERRED STANDARDS: IS:325 , IS:2253 , IS:2254 , IS:3202 , IS:4027 , IS:4722 , IS:12065 , IS:12075 , VDMA:24284.																																																																																																																																																		
संशुद्धी सूची संख्या INVENTORY NO. P-5134	REV. NO. 08	निर्माणकर्ता WORKED BY DHARAMPAL	जांचकर्ता CHECKED BY ANUJ JAIN																																																																																																																																															
स्वतंत्राधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं प्रसारण बिना भारत भारती इलेक्ट्रिकल्स की लिखित अनुमति के बिना न किया जाए		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																																																																																																																																																




प्रमाणित एवं हस्ताक्षर SIGN & DATE 21/06	उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)	ST- 39007																											
		पृष्ठ 14 का 1 Page 1 of 14																											
SUPERSEDES INVENTORY NO. 5474	TECHNICAL SPECIFICATION FOR JACKING OIL PUMP SET (D.C.)																												
संपत्ति सूची संख्या के अधिकारिता करता है	1.0 INTENT OF SPECIFICATION:- THIS SPECIFICATION IS INTENDED TO COVER DESIGN, MANUFACTURE, ASSEMBLY, TESTING AND SUPPLY OF PUMPING SETS COMPLETE WITH FOUNDATION BASE PLATE, ANCHOR BOLTS, LIFTING LUGS, COUPLING, AND OTHER ACCESSORIES INCLUDING MOTOR WITH STARTING RESISTANCES AND THEIR COMMISSIONING AT POWER STATION TO WHICH BHEL SUPPLIES THE EQUIPMENT. THE PUMPING SETS ARE INTENDED FOR OPERATION IN CONJUNCTION WITH STEAM TURBINES AND SHOULD BE SUITABLE FOR CONTINUOUS OPERATION AT AN AMBIENT TEMPERATURE OF 50°C + 90% HUMIDITY.																												
COPYRIGHT AND CONFIDENTIAL. The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	2.0 FUNCTION:- JACKING OIL PUMP COMES IN OPERATION IN CONJUNCTION WITH THE BARRING OPERATION OF THE TURBINE.																												
	3.0 APPLICABLE CODE/STANDARD:- IS:4722, VDMA 24284.																												
	4.0 OIL SPECIFICATION:- THE MEDIUM HANDELED IS TURBINE OIL OF VISCOSITY CLASS ISO VG46. THE OIL CAN BE SERVOPRIME 46 OF INDIAN OIL CORPORATION OR TURBOL 46 OF BHARAT PETROLEUM OR SHELL TURBOL 46 OF BHARAT SHELL LTD. KINEMATIC VISCOSITY AT 65°C/20°C : 16 cs/100 cs SPECIFIC GRAVITY AT 65°C : 0.8488 FLASH POINT : 200°C (min) OPERATIONAL TEMPERATURE : 65°C POUR POINT : -6.6°C (max.)																												
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दर्शाए गए विवरणों का प्रयोग केवल उद्देश्य के लिए किया जा सकता है। अन्य किसी भी उद्देश्य के लिए इसका प्रयोग नहीं किया जा सकता है।	<table border="1"> <tr> <td>नाम</td> <td>दिनांक एवं हस्ताक्षर</td> </tr> <tr> <td>NAME</td> <td>SIGNATURE & DATE</td> </tr> <tr> <td>अनुवादक TRANSLATED BY</td> <td>-</td> </tr> <tr> <td>निर्माणकर्ता WORKED BY</td> <td>DHARAMPAL 15/6/06</td> </tr> <tr> <td>जांचकर्ता CHECKED BY</td> <td>ANUJ JAIN 15/6/06</td> </tr> <tr> <td>पर्यवेक्षणकर्ता SUPERVISED BY</td> <td>S.C.AGRAWAL 15/6/06</td> </tr> <tr> <td>सहमत विभाग</td> <td>नाम</td> </tr> <tr> <td>AGREED DEPT.</td> <td>NAME</td> </tr> <tr> <td>दिनांक एवं हस्ताक्षर</td> <td>DATE & SIGNATURE</td> </tr> <tr> <td>समीक्षित</td> <td>APPROVED : (A.K.JAIN) AGM 21-08-06</td> </tr> <tr> <td>REV.NO. 07 (SUPERSEDES) Rev. 08</td> <td>निर्माण</td> </tr> <tr> <td>DI. 07-08-06</td> <td>PREPARED STE(TL/TA)</td> </tr> <tr> <td>DI. 26-06-07</td> <td>ISSUED : 28-01-1999</td> </tr> </table>			नाम	दिनांक एवं हस्ताक्षर	NAME	SIGNATURE & DATE	अनुवादक TRANSLATED BY	-	निर्माणकर्ता WORKED BY	DHARAMPAL 15/6/06	जांचकर्ता CHECKED BY	ANUJ JAIN 15/6/06	पर्यवेक्षणकर्ता SUPERVISED BY	S.C.AGRAWAL 15/6/06	सहमत विभाग	नाम	AGREED DEPT.	NAME	दिनांक एवं हस्ताक्षर	DATE & SIGNATURE	समीक्षित	APPROVED : (A.K.JAIN) AGM 21-08-06	REV.NO. 07 (SUPERSEDES) Rev. 08	निर्माण	DI. 07-08-06	PREPARED STE(TL/TA)	DI. 26-06-07	ISSUED : 28-01-1999
नाम	दिनांक एवं हस्ताक्षर																												
NAME	SIGNATURE & DATE																												
अनुवादक TRANSLATED BY	-																												
निर्माणकर्ता WORKED BY	DHARAMPAL 15/6/06																												
जांचकर्ता CHECKED BY	ANUJ JAIN 15/6/06																												
पर्यवेक्षणकर्ता SUPERVISED BY	S.C.AGRAWAL 15/6/06																												
सहमत विभाग	नाम																												
AGREED DEPT.	NAME																												
दिनांक एवं हस्ताक्षर	DATE & SIGNATURE																												
समीक्षित	APPROVED : (A.K.JAIN) AGM 21-08-06																												
REV.NO. 07 (SUPERSEDES) Rev. 08	निर्माण																												
DI. 07-08-06	PREPARED STE(TL/TA)																												
DI. 26-06-07	ISSUED : 28-01-1999																												




दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD	ST39007 पृष्ठ 14 का 2 Page 2 of 14																																																													
सिपर्सिडिड INVENTORY NO.	<p>5.0 <u>PUMP SPECIFICATION:-</u></p> <p>5.1 IDENTIFICATION NO. TO BE MENTIONED ON NAME PLATE AS FOLLOWS:- : MAV 31 AP 001 AND MAV 32 AP 001</p> <p>5.2 <u>TYPE</u> <u>SCREW TYPE POSITIVE DISPLACEMENT</u></p> <p>DESIGN TEMPERATURE = 100°C , OPERATING TEMPERATURE = 65°C</p> <div style="display: flex; justify-content: space-around;"> <table border="1" style="width: 45%; text-align: center;"> <thead> <tr> <th>VARIANT NUMBER</th> <th>NORMAL DISCHARGE CAPACITY (Litre/Sec)</th> <th>NORMAL DISCHARGE PRESSURE (Bar)</th> </tr> </thead> <tbody> <tr><td>VAR. 1</td><td>1.26</td><td>120</td></tr> <tr><td>VAR. 2</td><td>1.80</td><td>140</td></tr> <tr><td>VAR. 3</td><td>1.68</td><td>189</td></tr> <tr><td>VAR. 4</td><td>1.25</td><td>182</td></tr> <tr><td>VAR. 5</td><td>2.25</td><td>182</td></tr> <tr><td>VAR. 6</td><td>1.53</td><td>178</td></tr> <tr><td>VAR. 7</td><td>1.33</td><td>182</td></tr> <tr><td>VAR. 8</td><td>1.27</td><td>182</td></tr> <tr><td>VAR. 9</td><td>1.84</td><td>178</td></tr> </tbody> </table> <table border="1" style="width: 45%; text-align: center;"> <thead> <tr> <th>VARIANT NUMBER</th> <th>NORMAL DISCHARGE CAPACITY (Litre/Sec)</th> <th>NORMAL DISCHARGE PRESSURE (Bar)</th> </tr> </thead> <tbody> <tr><td>VAR. 10</td><td></td><td></td></tr> <tr><td>VAR. 11</td><td></td><td></td></tr> <tr><td>VAR. 12</td><td></td><td></td></tr> <tr><td>VAR. 13</td><td></td><td></td></tr> <tr><td>VAR. 14</td><td></td><td></td></tr> <tr><td>VAR. 15</td><td></td><td></td></tr> <tr><td>VAR. 16</td><td></td><td></td></tr> <tr><td>VAR. 17</td><td></td><td></td></tr> <tr><td>VAR. 18</td><td></td><td></td></tr> </tbody> </table> </div> <p>PUMP SHALL BE SUITABLE FOR MOUNTING VERTICALLY ON THE OIL TANK. BASE PLATE OF PUMP SHALL MATCH THE 'COUNTER FLANGE PROVIDED ON THE TANK AS PER SKETCH ON PAGE 14. SMOOTH FUNCTIONING IS ENSURED BY MAINTAINING OIL LEVELS AS DEPICTED IN THE ARRANGEMENT ON PAGE NO. 13.</p> <p>5.3 DURING INITIAL START UP IN WINTER, OIL TEMPERATURE MAY GO AS BELOW AS 20°C.</p> <p>6.0 <u>MOTOR:-</u></p> <p>A SUITABLE MOTOR CONFORMING TO THE PUMP REQUIREMENTS SHALL BE SUPPLIED. FOR DETAILS ON MOTOR, PLEASE REFER ANNEXURE-I.</p> <p>7.0 <u>DESIGN AND CONSTRUCTION OF PUMP:-</u></p> <p>ALL MATERIALS USED IN THE CONSTRUCTION OF THE PUMPS SHALL BE SELECTED FROM THE RANGE OF MATERIAL MOST APPROPRIATELY SUITABLE FOR THE PURPOSE AND SERVICE CONDITIONS. THE BIDDER SHALL FURNISH ALONGWITH THE OFFER, MATERIAL SPECIFICATION FOR ALL THE COMPONENTS TO BHEL FOR THEIR REVIEW AND ACCEPTANCE BY BHEL/OWNER. BHEL/OWNER RESERVES THE RIGHT TO ASK FOR CHANGES IN MATERIAL. THE SIZE SHALL BE STANDARDISED SO AS TO ENSURE INTERCHANGEABILITY.</p> <p>7.1 <u>SPECIAL TOOLS AND TACKLES</u></p> <p>ONE SET OF TOOLS REQUIRED FOR ERECTION, OPERATION AND MAINTENANCE OF THE PUMPING SETS SHALL BE SUPPLIED TOGETHER WITH EACH PUMP. LIST OF THESE TOOLS SHALL BE SUBMITTED ALONGWITH THE OFFER.</p> <p>7.2 THE MATERIALS OF CONSTRUCTION OF THE PUMPS SHALL BE SUCH AS TO RESIST CORROSION AND EROSION AND SHALL GIVE A LONG TROUBLE FREE SERVICE.</p>				VARIANT NUMBER	NORMAL DISCHARGE CAPACITY (Litre/Sec)	NORMAL DISCHARGE PRESSURE (Bar)	VAR. 1	1.26	120	VAR. 2	1.80	140	VAR. 3	1.68	189	VAR. 4	1.25	182	VAR. 5	2.25	182	VAR. 6	1.53	178	VAR. 7	1.33	182	VAR. 8	1.27	182	VAR. 9	1.84	178	VARIANT NUMBER	NORMAL DISCHARGE CAPACITY (Litre/Sec)	NORMAL DISCHARGE PRESSURE (Bar)	VAR. 10			VAR. 11			VAR. 12			VAR. 13			VAR. 14			VAR. 15			VAR. 16			VAR. 17			VAR. 18		
VARIANT NUMBER	NORMAL DISCHARGE CAPACITY (Litre/Sec)	NORMAL DISCHARGE PRESSURE (Bar)																																																														
VAR. 1	1.26	120																																																														
VAR. 2	1.80	140																																																														
VAR. 3	1.68	189																																																														
VAR. 4	1.25	182																																																														
VAR. 5	2.25	182																																																														
VAR. 6	1.53	178																																																														
VAR. 7	1.33	182																																																														
VAR. 8	1.27	182																																																														
VAR. 9	1.84	178																																																														
VARIANT NUMBER	NORMAL DISCHARGE CAPACITY (Litre/Sec)	NORMAL DISCHARGE PRESSURE (Bar)																																																														
VAR. 10																																																																
VAR. 11																																																																
VAR. 12																																																																
VAR. 13																																																																
VAR. 14																																																																
VAR. 15																																																																
VAR. 16																																																																
VAR. 17																																																																
VAR. 18																																																																
स्वतन्त्राधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारती हेली हेली, न.स. को संपत्ति है इसका प्रयोग एवं प्रकाशन के बिना की जायेगी अन्यथा इसे कानून के अन्तर्गत दंडनीय माना जायेगा	COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company																																																															
दिनांक एवं हस्ताक्षर SIGN & DATE 29/06	REV. NO. 07																																																															
बाहरी सूची संख्या INVENTORY NO. P-5474	निर्माणकर्ता WORKED BY DHARAMPAL	जांचकर्ता CHECKED BY ANUJ JAIN	15/06/06	15/06/06																																																												


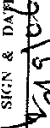
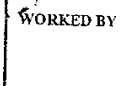



दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)	ST- 3904 पृष्ठ 14 का 3 Page 3 Of 14	
समीचीन रूप में प्रमाणित किया गया है अतिरिक्त प्रमाणित किया गया है	<p>7.2 THE MATERIALS OF CONSTRUCTION OF THE PUMPS SHALL BE SUCH AS TO RESIST CORROSION AND EROSION AND SHALL GIVE A LONG TROUBLE FREE SERVICE.</p> <p>7.3 THE SUPPLIER SHALL ALSO FURNISH THE METHOD AND FREQUENCY OF LUBRICATION OF THE BEARINGS AND QUANTITY AND TYPE OF LUBRICANT REQUIRED FOR NORMAL OPERATION, BUT LUBRICATION OF BEARINGS WITH THE OIL BEING HANDLED IS PREFERRED.</p> <p>7.4 THE DESIGN SHALL BE SUCH AS TO KEEP THE FRICTIONAL LOSS AND WEAR CAUSED BY END THRUST TO THE MINIMUM. IT WILL ALSO ENSURE MINIMUM WEAR AND CAVITATION IN MECHANICAL SEALS AND BEARINGS. LONG AND TROUBLE FREE SERVICE SHALL BE ENSURED. THE ROTORS OF THE PUMP SHOULD BE DESIGNED IN SUCH A WAY SO THAT MINIMUM VIBRATIONS ARE EXPERIENCED. THE SOUND PRESSURE LEVEL OF PUMP MOTOR SET SHOULD NOT BE GREATER THAN 85 dBA TO A REFERENCE OF 0.0002 MICRO BAR WHEN MEASURED AT A DISTANCE OF 1.5 METERS ABOVE FLOOR LEVEL AND ONE METRE HORIZONTALLY FROM THE BASE OF EQUIPMET AND VIBRATIONS ARE IN THE PERMISSIBLE RANGE AS PER VDI 2056.</p> <p>7.5 SEALS MUST COMPLY WITH THE FOLLOWING PROPERTIES :-</p> <p>(a) READY ACCESS AND AMENABILITY FOR MAINTENANCE WORK .</p> <p>(b) NO CONTAMINATION OF THE MEDIUM FROM MATERIAL ABRADED FROM THE SEALS.</p> <p>(c) NO SEEPAGE OF LUBRICANTS INTO THE FLOW MEDIUM .</p> <p>(d) MINIMUM LEAKAGE LOSSES WITH THEIR CONTROLLED REMOVAL.</p> <p>7.6 TO FACILITATE TRANSPORT AND ERECTION, LIFTING HOOKS OR ERECTION EYES SHALL BE FITTED AT SUITABLE POINTS ON THE COMPONENTS. THEIR LOCATIONS MUST BE SHOWN ON THE DIMENSIONAL DRAWING.</p> <p>7.7 PUMP BEARINGS SHALL BE DESIGNED SO AS TO ASSURE 50,000 hrs CONTINUOUS SERVICE FOR FRICTION BEARINGS & 30,000 hrs FOR BALL & ROLLER BEARINGS.</p> <p>7.8 THE MECHANICAL DESIGN SHALL ALLOW EASY ACCESS TO VARIOUS PARTS OF CARRYING OUT MAINTENANCE WORK.</p> <p>7.9 THE DISCHARGE BRANCH OF THE PUMP SHALL BE TAKEN OUT ABOVE THE BASE PLATE BY THE SUPPLIER.</p> <p>7.10 THE PUMPS SHALL BE PROVIDED WITH DRAINAGE AND VENTING DEVICES.</p> <p>7.11 ALL SYSTEM PARTS CARRYING OIL SHALL BE OF OIL TIGHT CONSTRUCTION COMPRESSION-TYPE FITTINGS ARE NOT PERMISSIBLE.</p> <p>7.12 FOR SCREW PUMPS RUNNING AT SUBCRITICAL SPEEDS, IT SHALL BE ENSURED THAT THE CRITICAL SPEED LIES ABOVE THE MAXIMUM SPEED ATTAINABLE DURING OPERATION WITH A MINIMUM MARGIN ON 15% OF RATED SPEED. FOR PUMPS RUNNING AT SUPER CRITICAL SPEEDS, IT SHALL BE ENSURED THAT THERE IS DEFFERENCE OF SUFFICIENT MAGNITUDE (NOT LESS THAN 20%) BETWEEN THE OPERATING SPEED AND THE BORDER IN CRITICAL SPEEDS. ALLOWANCES SHALL BE MADE FOR THE TYPE OF COUPLING BETWEEN THE PUMP AND MOTOR WHILE CALCULATIN THE CRITICAL SPEEDS.</p>			
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company				
स्वतंत्राधिकार एवं गोपनीय इस दस्तावेज में की गई सूचना भारत भारती इलेक्ट्रिकल्स लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण केवल केवल के लिए ही किया जाना चाहिए। इस दस्तावेज को बिना अनुमति के किसी भी तृतीय को देना या प्रसारित करना गैर कानूनी है।				
दिनांक एवं हस्ताक्षर SIGN & DATE 				
सामग्री सूची नम्बर INVENTORY NO. P-5474	REV. NO. 07	निर्माणकर्ता WORKED BY DHARAMPAL	जांचकर्ता CHECKED BY ANUJ JAIN	 17/6/06  17/6/06

निर्माक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39007	
				पृष्ठ 14 का 4 Page 4 Of 14	
स्वामी सूची संख्या को अधिकारित करना है	<p>ALLOWANCES SHALL BE MADE FOR THE TYPE OF COUPLING BETWEEN THE PUMP AND MOTOR WHILE CALCULATING THE CRITICAL SPEEDS.</p> <p>7.13 <u>COUPLING</u></p> <p>SUITABLE COUPLING WITH GUARDS SHALL BE PROVIDED FOR COUPLING PUMP WITH MOTOR. IT SHALL BE DESIGNED TO FACILITATE EASY ALIGNMENT. ONE SET OF COUPLING BOLTS SHALL BE SUPPLIED IN SPARE.</p> <p>7.14 <u>FOUNDATION</u></p> <p>THE PUMP SHALL BE MOUNTED ON THE OIL TANK AND HUNG FROM BED PLATE AT THE TANK TOP INTO THE TANK. FOR FURTHER DETAILS PLEASE REFER PAGE NO. 12 AND 13. ALL THE SEATING MACHINED SURFACES OF BED PLATE TO BE MAINTAINED FOR 0.5 mm FLATNESS.</p> <p>8.0 <u>QUALITY ASSURANCE, INSPECTION AND TESTING</u></p> <p>(a) THE MANUFACTURER SHALL CONDUCT ALL TESTS REQUIRED TO ENSURE ALL THE COMPONENTS PART OF THE JACKING OIL PUMP OFFERED, CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AND IN COMPLIANCE WITH REQUIREMENTS OF APPLICABLE CODES AND STANDARDS.</p> <p>(b) THE BIDDER SHALL SUBMIT ALONGWITH HIS OFFER QUALITY PLAN.</p> <p>8.1 THE PARTICULARS OF THE PROPOSED SHOP TESTS AND PROCEDURES FOR THE TESTS SHALL BE SUBMITTED TO BHEL/ITS CUSTOMER FOR APPROVAL ALONGWITH QUALITY PLAN.</p> <p>8.2 THE MATERIAL SHALL BE DESPATCHED ONLY AFTER INSPECTION AND CLEARANCE OF MATERIAL BY BHEL OR ITS CUSTOMER AND APPROVAL OF TEST CERTIFICATE BY BHEL/ITS CUSTOMER.</p> <p>8.3 THE MINIMUM TESTS/CHECKS TO BE CARRIED OUT ON THE JACKING OIL PUMP AS ENVISAGED BY BHEL ARE GIVEN BELOW. THIS IS, HOWEVER, NOT INTENDED TO FORM A COMPREHENSIVE TESTING PROGRAMME AS IT IS SUPPLIERS RESPONSIBILITY TO PREPARE THE DETAILED QUALITY PLAN, WHICH SHOULD ALSO INCLUDE TESTS/CHECKS CARRIED OUT BY SUPPLIER AS A PART OF THEIR NORMAL PARACTICE . THIS QUALITY PLAN IS SUBJECT TO THE APPROVAL OF BHEL /ITS CUSTOMER AND BHEL/ITS CUSTOMER RESERVES THE RIGHT TO ASK FOR ANY MORE CHECKS AT THE TIME OF QUALITY PLAN FINALISATION.</p> <p>8.3.1 <u>TESTING OF MATERIALS</u></p> <p>THE MATERIAL OF EACH COMPONENT SHALL BE TESTED AS PER RELEVANT SPECIFICATION FOR ITS CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES, VIZ. YS, UTS, IMPACT, % ELONGATION % RA ETC. AND NDT, UT ON SHAFT, MPI ON SCREWS AND CASING ETC. TO ENSURE FREEDOM FROM SURFACE AND SUB-SURFACE DEFECTS SHALL BE CARRIED OUT.</p> <p>8.3.2 <u>FOLLOWING TESTS SHALL BE CARRIED OUT DURING VARIOUS STAGES OF MANUFACTURE AT MANUFACTURER WORKS.</u></p> <p>(a) CHECK FOR DIMENSIONS OF ALL COMPONENT PARTS INCLUDING SURFACE FINISH, AXIAL AND RADIAL RUN OUT OF SHAFT ETC.</p> <p>(b) NON-DESTRUCTIVE EXAMINATION :- UT FOR SCREW BLANKS & DPT/MPI ON SCREWS TO BE CARRIED OUT TO ENSURE SURFACE / SUB-SURFACE DEFECTS.</p>				
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company					
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में की गई सूचना भारत भारती इलेक्ट्रिकल्स को स्वामित्व है इसका प्रयोग एवं प्रकाशन केवल से निम्नी की तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए					
निर्माक एवं तिथि SIGN & DATE 21/9/06					
सामग्री सूची संख्या INVENTORY NO. P-5174	REV. NO. 07		निर्माककर्ता WORKED BY DHARAMPAL		17/6/06
			जांचकर्ता CHECKED BY ANUJ JAIN		17/6/06

निमाह एव हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39007 पृष्ठ 14 का 5 Page 5 of 14	
		(c) CHECK THE CONDITION OF THE OIL SEALS AND ANY SEEPAGE OF OIL THROUGH SEALS ETC. (d) HYDRAULIC TESTING OF THE CASING AND OTHER PRESSURE PARTS SHALL BE AS PER VDMA 24284. (e) CHECK FOR DIRECTION OF ROTATION OF PUMP. (f) PERFORMANCE TEST WITH CALIBRATED TEST BED MOTOR FOR VERIFICATION OF PUMP CHARACTERISTICS, VIZ. DISCHARGE AT THE GIVEN PRESSURE SCHEDULE OF POWER CONSUMPTION, NOISE AND VIBRATION LEVEL AS PER VDMA 24284. (g) STRIP DOWN TEST TO CHECK THE CONDITION OF BEARING, MECHANICAL CLEARANCES AND AXIAL PLAY OF SHAFT ETC. 8.3.3 AFTER TESTING THE PUMP, ALL THE SURFACES AND INTERNALS SHALL BE THOROUGHLY CLEANED, DRIED AND CONSERVED. ALL METALLIC SURFACES EXCEPT BRIGHT PARTS EXPOSED TO WEATHER SHALL BE GIVEN A SUITABLE PRIMING COAT AND THEN TWO COATS OF APPROVED PAINTS. ENSURE ASSEMBLY OF ALL THE COMPONENTS OF PUMP AS ONE UNIT AND PACK IN WATER AND DUST PROOF PACKAGE. THE PACKAGES SHOULD BE SUFFICIENTLY STRONG TO SAFEGAURD AGAINST ANY DAMAGE DURING TRANSIT AND IS SAFE FOR TWO YEARS IN A VERY DAMP ATMOSPHERE. 8.3.4 TEST CERTIFICATES INDICATING THE ACTUAL TEST RESULTS OF MATERIAL TESTING, NDT, HYDRAULIC TEST, PERFORMANCE TEST, STRIP DOWN EXAMINATION Etc. SHALL BE FURNISHED. 9.0 <u>PRE-APPROVAL DOCUMENTS AT THE TIME OF OFFER</u> 9.1 ASSEMBLY DRAWING WITH PART LISTS, NOZZLE SIZES AND THEIR COORDINATES, BASE PLATE DETAILS AND CROSS SECTION ARRANGEMENT ALONGWITH STATIC LOADING. 9.2 CALCULATIONS WITH NECESSARY DRAWINGS (TORQUE/SPEED CHARACTERISTICS Etc), POWER REQUIREMENTS, TORQUE SETTING VALUE FOR MOTOR TRIP, PERMISSIBLE TORQUE VALUE FOR KEY AND POWER SHAFT. 9.3 MAXIMUM MAGNETIC AND NON-MAGNETIC PARTICLE SIZE, WHICH CAN PASS THOROUGH PUMP SCREW LY CLEARANCE WITHOUT DAMAGING THE PUMP SHALL BE SPECIFIED IN THE OFFER. 9.4 QUALITY PLAN WITH DETAILS OF QUALITY LEVELS AND MANUFACTURING TOLERANCES. THIS SHOULD GENERALLY CONFORM TO VDMA 24284. GENERALLY ACCELTED PRACTICES, IN PARTICULAR VDMA CODES AND STANDARDS OR EQUIVALENT SHALL BE APPLIED AND TAKEN INTO ACCOUNT FOR DESIGN OF SCREW PUMPS. THE CODES OF STANDARDS APPLIED IN EACH CASE SHALL BE SPCIFIED IN THE OFFER. 9.5 FOR DOCUMENTATION ON MOTOR, PLEASE REFER ANNEXURE-I. EXAMINATION OF THE PRE-APPROVED DOCUMENTS BY BHEL SHALL NOT RELIEVE THE MANUFACTURER AND HIS SUBCONTRACTORS OF THEIR RESPONSIBILITIES. THE PRE-APPROVED DOCUMENTS SHALL FORM THE BASIS FOR THE ORDER. NO CHANGES SHALL BE MADE WITHOUT APPROVAL FROM BHEL.			
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत देशी इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं आश्रय रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।	COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company				
निमाह एव हस्ताक्षर SIGN & DATE 13/7/07	REV. NO. 08				
सामग्री सूची संख्या INVENTORY NO. P-5474	निर्माणकर्ता WORKED BY DHARAMPAL			26-06-07	
	जांचकर्ता CHECKED BY ANUJ JAIN			26-06-07	

निम्नलिखित पर हस्ताक्षर SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD		ST39007	
				पृष्ठ 14 का 6 Page 6 of 14	
SUPERSEDES INVENTORY NO.					
अधिकार एवं हस्ताक्षर SIGN & DATE	10.0 DOCUMENTS TO BE SUPPLIED AFTER THE PLACEMENT OF ORDER: THESE SHALL BE SUPPLIED EITHER IN FIVE COPIES EACH OR TWO COPIES AND A SET OF REPRODUCIBLE. SCHEDULE OF DOCUMENTS SHALL BE AS FOLLOWS:				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used or disclosed in any way detrimental to the interest of the company.	10.1	CONTRACTUAL DRAWINGS	-	8 WEEKS	
	10.2	OVERHAUL AND SPARE PARTS LISTS	-	8 WEEKS	
	10.3	EQUIPMENT DESCRIPTION	-	8 WEEKS	
	10.4	TEST CERTIFICATE OF ALL TESTS AS PER QUALITY PLAN, DRAWINGS DURING VARIOUS STAGES OF MANUFACTURE. ALSO REFER CLAUSE 8.2 AND 8.3.4 ABOVE.	-	BEFORE DESPATCH	
	10.5	LIST OF TOOLS AND TACKLES	-	8 WEEKS	
	10.6	THE STATIC AND DYNAMIC LOADING DETAILS ON SUPPORT/FOUNDATION SHOULD BE FURNISHED.	-	8 WEEKS	
	10.7	FOR DOCUMENTATION ON MOTOR, PLEASE REFER ANNEXURE I.			
	10.8	O & M MANUALS (10 HARD COPIES+2CD)	-	12 WEEKS	
	11.0	NAME PLATE IDENTIFICATION MARKINGS SHOULD BE AS FOLLOWS:			
	11.1	TYPE / DESIGNATION			
	11.2	MANUFACTURER			
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स लि. की संपत्ति है। इसका उपयोग केवल अपने ही उपयोग के लिए ही किया जाना चाहिए। इस दस्तावेज को किसी भी तृतीय पक्ष को देना या प्रकट करना गैर कानूनी है।	11.3	MANUFACTURER'S WORKS NO.			
	11.4	YEAR OF MANUFACTURING			
	11.5	PURCHASER'S ORDER NO.			
	11.6	VOLUMETRIC FLOW (l/m)			
	11.7	DISCHARGE PRESSURE (Bar/MWC)			
	11.8	OPERATING TEMPERATURE (°C)			
	11.9	FLOW MEDIUM.			
	11.10	SPEED.			
	11.11	BILINGUAL IN HINDI AND ENGLISH LANGUAGES.			
	11.12				
	11.13				
अधिकार एवं हस्ताक्षर SIGN & DATE	17/06/06				
संपत्ति एवं गोपनीय INVENTORY NO.	REV. NO. 07	निर्माणकर्ता WORKED BY	DHARAMPAL		17/06/06
P-5474		जांचकर्ता CHECKED BY	ANUJ JAIN		17/06/06

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39007 पृष्ठ 14 का 7 Page 7 of 14	
सामग्री सूची संख्या को INVENTORY NO.	SUPERSEDES INVENTORY NO.	<p>12.0 CLEANING, PAINTING, CONSERVATION & PACKING:</p> <p>THE SURFACE SHALL BE CLEANED & PREPARED FOR APPLICATION OF THE COATINGS BY BLASTING WITH NON-SILICATIC ABBRASIVE AGENTS. THE PROTECTIVE COATING SHOULD BE OIL RESISTANT TO PREVENT COTAMINATION OF OIL SPECIFIED TO PREVENT THE DETERIORATION OF THE COATING ITSELF. THE SUPPLIER SHALL GIVE EXACT AND PRECISE DETAILS ABOUT THE MEASURES ENVISAGED BY HIM FOR SURFACE PROTECTION, WHICH SHALL BE CHECKD AND APPROVED BY BHEL.</p> <p>INSTRUCTIONS SHOULD BE ISSUED REGARDING RECONSERVATION, DECONSERVATION ALONGWITH SPECIFICATION OF MATERIAL TO BE USED FOR ABOVE PURPOSE. 100% QUANTITY OF MATERIAL REQUIRED FOR RECONSERVATION AND DECONSERVATION AT SITE DURING STORAGE SHALL BE SUPPLIED ALONGWITH PUMP. ANY SPECIFIC INSTRUCTION TO BE FOLLOWED DURING STORAGE AT SITE TO AVOID ANY SEIZING ETC. SHALL ALSO BE INTIMATED. ALL SUCH INSTRUCTIONS SHALL BE MADE AVAILABLE TO SITE INCHARGE IN A SEPARATE COVER (NOT PACKED WITH PUMP PACKAGE).</p> <p>THE SUPPLIER SHALL BE RESPONSIBLE FOR ALL LOSS OR DAMAGE DURING TRANSPORTATION, HANDLING AND STORAGE DUE TO IMPROPER PACKING.</p> <p>13.0 GENERAL</p> <p>THE SUPPLIER CAN MAKE SUITABLE OFFERS EVEN IF THERE ARE MINOR DEVIATIONS WHICH DO NOT AFFECT THE EFFICIENT FUNCTIONING OF THE EQUIPMENT. HOWEVER, THE DEVIATIONS MUST BE CLEARLY SPELT OUT. SUPPLIER SHALL ALSO FILL IN THE BLANK DATA SHEET AS PER ANNEXURE-II AND SUBMIT THE SAME ALONGWITH THE OFFER. THE OFFER MAY NOT BE CONSIDERED IF ALL THE TECHNICAL PARTICULARS AND INFORMATIONS CALLED FOR IN THE SPECIFICATION ARE NOT SUBMITTED ALONGWITH THE OFFER.</p> <p>14.0 GUARANTEE</p> <p>14.1 THE SUPPLIER SHALL GUARANTEE TROUBLE FREE AND SATISFACTORY OPERATION OF THE EQUIPMENT FOR A PERIOD OF 12 MONTHS AFTER THE INSTALLATION AND COMMISSIONING OR FOR A PERIOD OF 18 MONTHS FROM THE DAY THE EQUIPMENT LEAVES THE SUPPLIER'S WORKS WHICHEVER IS EARLIER.</p> <p>14.2 THE SUPPLIER SHALL GUARANTEE THE CAPACITY, HEAD AND EFFICIENCY OF THE PUMP AS PER THE TESTED CHARACTERISTIC WITH OIL.</p> <p>14.3 IF DURING ERECTION AT SITE ANY DEFICIENCY IN A PART IS DETECTED. BHEL SITE REPRESENTATIVE SHALL PREPARE THE ASSESSMENT REPORT AND A COPY OF THE SAME SHALL BE FORWARDED TO THE SUPPLIER. THE SUPPLIER SHALL REPLACE/ RECTIFY THE CONCERNED ITEMS FREE OF CHARGE. THE SUPPLIER IF HE SO DESIRE MAY DEPUTE HIS REPRESENTATIVE TO SITE OTHERWISE THE FINDING OF BHEL REPRESENTATIVE SHALL BE FINAL AND BINDING ON THE SUPPLIER OF PUMPING SET.</p> <p>14.4 THE SUPPLIER SHALL REPAIR/REPLACE THE DEFECTIVE PARTS AT HIS OWN COST DURING THE GUARANTEE PERIOD.</p> <p>15.0 SPARES</p> <p>THE SUPPLIER SHALL QUOTE ITEMWISE PRICE OF RECOMMENDED SPARES FOR 3 YEARS AND 5 YEARS OPERATION RESPECTIVELY.</p>			
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company		स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं आश्रयण के बिना किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।			
हस्ताक्षर एवं दिनांक SIGN & DATE	13/7/07				
सामग्री सूची संख्या INVENTORY NO.	REV. NO.	निर्माणकर्ता WORKED BY	DHARAMPAL		26-06-07
P-5474	08	जांचकर्ता CHECKED BY	ANUJ JAIN		26-06-07

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)	ST- 39007	
समग्री सूची संख्या को अधिकतम मात्रा: 8			पृष्ठ 14 का 8	Page 8 Of 14
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharaat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company				
स्वतंत्राधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत की इलेक्ट्रिकल एवं इलेक्ट्रिकल इंजीनियरिंग में निहित है। इस दस्तावेज को बिना अनुमति के किसी भी प्रकार प्रसारित नहीं किया जा सकता है।				
हस्ताक्षर एवं दिनांक SIGN & DATE 				
समग्री सूची संख्या INVENTORY NO. P-5474	REV. NO. 07		निर्माणकर्ता WORKED BY 	DHARAMPAL  17/6/06
			जांचकर्ता CHECKED BY 	ANUJ JAIN  17/6/06

ANNEXURE - I

SPECIFICATION OF D.C. MOTOR FOR JACKING OIL PUMP

1.0 A SUITABLE MOTOR CONFORMING TO THE JACKING OIL PUMP REQUIREMENT SHALL BE SUPPLIED. THE MOTOR SHALL CONFORM TO IS:3202, EQUIVALENT. BS SPECIFICATION. THE MOTOR SHALL MEET ALL INDIAN STATUTORY REQUIREMENTS.

2.0 **APPLICATION**

TO DRIVE OIL PUMP FOR SUPPLYING OIL FOR LIFTING THE SHAFT IN THE BEARINGS.

3.0 **TYPE OF MOTOR:** SEPARATELY EXCITED OR COMPOUND MOTOR WITH 10% COMPOUNDING.

3.1 **KW RATING**

IT SHALL HAVE AT LEAST 15% RESERVE CAPACITY THAN REQUIRED TO DRIVE THE PUMP WHEN IT IS DISCHARGING MAXIMUM QUANTITY.

3.2 KW ACTUALLY REQUIRED BY DRIVE EQUIPMENT : PUMP CAPACITY UNDER SPECIFIED OPERATING AND START UP CONDITIONS.

3.3 RATED VOLTAGE : 220 V D.C.
: 220 V D.C. FIELD
: -15%
: +10%

3.4 PERMISSIBLE VOLTAGE VARIATIONS UNDER NORMAL RUNNING CONDITIONS.

3.5 MINIMUM VOLTAGE REQUIRED UNDER STARTING CONDITIONS TO BRING DRIVEN EQUIPMENT UPTO RATED SPEED. : 80% RATED

3.6 TYPE OF DUTY : CONTINUOUS

3.7 FULL LOAD SPEED : IT SHALL BE COMMENSURAT WITH PUMP SPEED AS PER DESIGN.

3.8 FULL LOAD CURRENT : AS PER DESIGN

3.9 STARTING CURRENT : 2 TIMES CURRENT AT RATED VOLTS.




3.10 STARTING TORQUE : 2 TIMES TORQUE AT RATED VOLTS.

3.11 EFFICIENCY AT FULL LOAD : 85% (minimum)








4.0 **STARTING DATA**

4.1 STARTING: SUITABLE FOR 3 STEP STARTING. STARTING RESISTANCES OF PUNCHED STEEL SHALL BE ENCLOSED IN A SUITABLE HOUSING DESIGNED FOR NATURAL VENTILATION. CABLE ENTRY SHALL BE PROVIDED AT THE BOTOM. ARRANGEMENT SHALL BE PROVIDED TO MOUNT THE HOUSING ON RACKS. G.A. DRAWING OF THE HOUSING, VALUES OF STARTING RESISTANCES AND REQUIRED TIME INTERVAL AT THE STEPS SHALL BE PROVIDED IN THE OFFER. STARTING RESISTANCE HOUSING SHALL HAVE IP21 (MIN.) DEGREE OF PROTECTION.

4.2 PERMISSIBLE STARTING DUTY CYCLE/ NO. OF STARTS. : 3 STARTS SPREAD OVER AN HOUR TWO CONSECUTIVE STARTS.


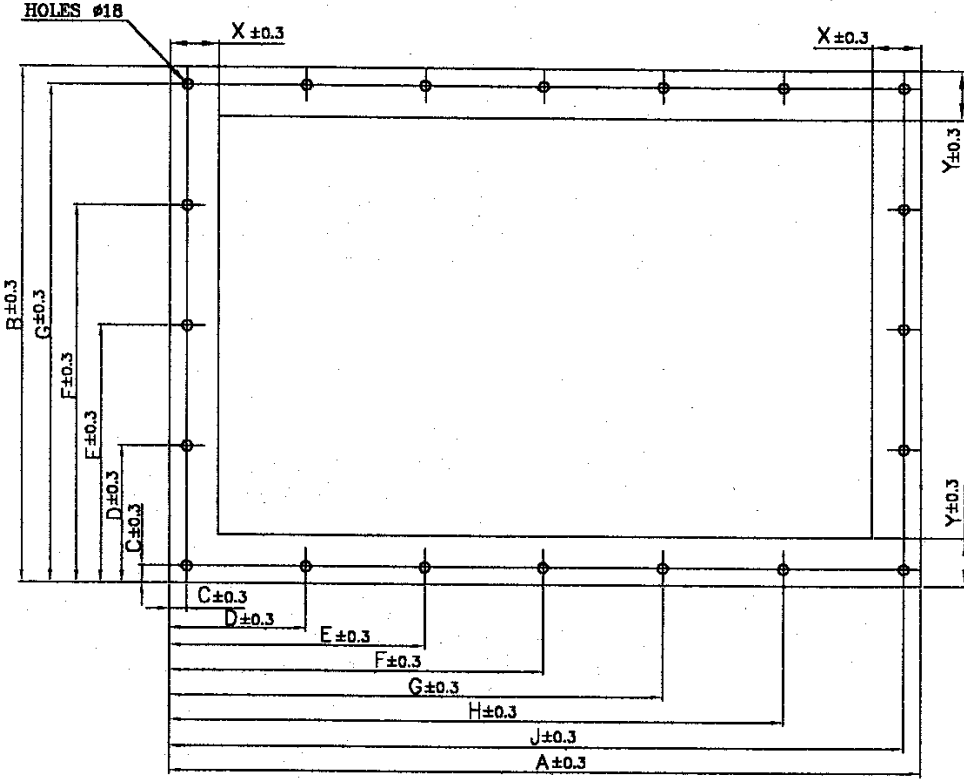
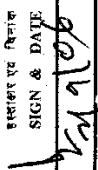


दिनांक एवं हस्ताक्षर SIGN & DATE			उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39007 पृष्ठ 14 का 9 Page 9 Of 14	
स्वामी सूची सूचना को अधिकारित करता है			4.3 STARTING RESISTANCE BOX / PANEL SHALL BE IN VENDOR SCOPE OF SUPPLY. 4.4 OVERLOAD (% OF FULL LOAD) THAT : 25% FOR 5 MINUTES. CAN BE CARRIED BY MOTOR IMPAIRING, OVERALL PERFORMANCE AND PERIOD FOR WHICH THIS OVERLOAD IS APPLICABLE. 4.5 LOCATION : TURBINE HALL-INDOOR 4.6 CLASS OF INSULATION : CLASS F, FUNGUS RESISTANT, TROPICALISED AS PER IS:3202, WITH TEMPATURE RISE LIMITED TO THAT OF CLASS B. 4.7 WINDING TEMP. DETECTORS : TO BE PROVIDED.			
			4.8 MECHANICAL CONSTRUCTION:- 4.8.1 SHAFT DISPOSITION/MOUNTING : VERTICAL/FLANGE MOUNTED 4.8.2 METHOD OF CONNECTION TO : FLANGE FLEXIBLE COUPLING. DRIVEN EQUIPMENT. 4.8.3 DIRECTION OF ROTATION AND : TO SUIT PUMP CORRESPONDING TERMINAL DESIGNATION. 4.8.4 ENCLOSURE AND VENTILATION : TOTALLY ENCLOSED FAN COOLED IP-55. 4.8.5 BEARING : THURST BEARING, MINIMUM STANDARD LIFE NOT LESS THAN 30000 WORKING HOURS. 4.8.6 GROUNDING DEVICE : SUITABLE ARRANGEMENT SHALL BE PROVIDED FOR EARTHING THE MOTOR AT TWO SEPARATE AND DISTINCT CONNECTION POINTS. DESIGN OF EARTHING CONDUCTOR SHALL BE AS PER IS:4722.			
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company			4.8.7 TERMINAL CONNECTORS : 2 FOR ARMATURE, 2 FOR FIELD. 4.9 TERMINAL BOX : TERMINAL BOX SHALL BE PROVIDED WITH DOUBLE COMPRESSION TYPE BRASS CABLE GLANDS (Nickel Chromium PLAED HEAVY DUTY, CONFIRMING TO BS:6121) AND COPPER CABLE LUGS TO MATCH OWNER'S ALUMINIUM CABLES, THE SIZE OF WITCH SHALL BE INTIMATED LATER. TERMINAL BOX SHALL BE CAPABLE OF BEING ROTATED THROUGH 180° IN STEPS OF 90°. IT SHALL HAVE A DEGREE OF PROTECTION OF IP-55. IT SHALL ALSO BE SUITABLE TO WITHSTAND THE FAULT LEVEL OF 50 KA FOR 0.25 SECONDS.			
			4.10 SPACE HEATERS : TO BE PROVIDED AS PER DESIGN 4.11 VOLTAGE : 240 VOLTS A.C. 5.0 SPECIAL REQUIREMENTS: 5.1 SEPARATE TERMINAL BOX FOR WINDING (ARMATURE AND FIELD) AND SPACE HEATERS SHALL BE PROVIDED. THE MOTOR WOULD OPERATE IN AN ENVIRONMENT OF OIL FUMES.			
स्वत्वधिकार एवं गोपनीय इस प्रलेख में की गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं प्रसारण केवल से किसी भी तरह प्रयोग को कि कंपनी के हित में हानिकारक हो न किया जाए						
हस्ताक्षर एवं दिनांक SIGN & DATE	24/10/06					
धारा की सूची संख्या INVENTORY NO.	P-5474	REV. NO. 07		निर्माणकर्ता WORKED BY	DHARAMPAL	 17/6/06
				जांचकर्ता CHECKED BY	ANUJ JAIN	 17/6/06

[illegible]


दिनांक एवं हस्ताक्षर SIGN & DATE		इत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39007																																																																																					
				पृष्ठ 14 का 11	Page 11 of 14																																																																																				
सामग्री सूची संख्या को अधिकारित करना है	SUPERSEDES INVENTORY	<p align="center">ANNEXURE-II</p> <p align="center">DATA TO BE FURNISHED BY BIDDER ALONGWITH OFFER FOR JACKING OIL PUMP</p> <p>1.0 EQUIPMENT AND SERVICES OFFERED</p> <p>PLEASE STATE WHETHER THE FOLLOWING EQUIPMENT SERVICE AS SPECIFIED IN THE DATA SHEETS ARE OFFERED OR NOT.</p> <table border="0"> <tr> <td>1.1</td> <td>PUMP AS PER SPECIFICATION</td> <td>YES/NO</td> </tr> <tr> <td>1.2</td> <td>MOTOR/MAKE</td> <td>YES/NO</td> </tr> <tr> <td>1.3</td> <td>NECESSARY INSTRUMENTS, TEST CONNECTIONS.</td> <td>YES/NO</td> </tr> <tr> <td>1.4</td> <td>BASE PLATE AS PER DRAWING.</td> <td>YES/NO</td> </tr> <tr> <td>1.5</td> <td>COMPANION FLANGES</td> <td>YES/NO</td> </tr> <tr> <td>1.6</td> <td>SPARE PARTS</td> <td>YES/NO</td> </tr> <tr> <td>1.7</td> <td>MAINTENANCE AND SPECIAL ERECTION TOOLS.</td> <td>YES/NO</td> </tr> <tr> <td>1.8</td> <td>COMMISSIONING OF THE SET.</td> <td>YES/NO</td> </tr> <tr> <td>1.9</td> <td>NO. OF PUMPS OFFERED.</td> <td>YES/NO</td> </tr> </table> <p>2.0 DESIGN AND PERFORMANCE.</p> <table border="0"> <tr> <td>2.1</td> <td>DESIGNED CAPACITY OF EACH PUMP.</td> <td>M³/hour</td> </tr> <tr> <td>2.2</td> <td>NORMAL DISCHARGE PRESSURE</td> <td></td> </tr> <tr> <td>2.3</td> <td>EFFICIENCY</td> <td></td> </tr> <tr> <td>2.4</td> <td>RATED SPEED</td> <td></td> </tr> <tr> <td>2.5</td> <td>PERFORMANCE GUARANTEED WHEN INSTALLED AS PER GIVEN ARRANGEMENT.</td> <td>YES/NO</td> </tr> <tr> <td>2.6</td> <td>PUMP b.h.p./Kw AT RATED CAPACITY</td> <td></td> </tr> <tr> <td>2.7</td> <td>MAXIMUM ALLOWABLE SUCTION LIFT (FOR MINIMUM NPSH REQUIRED)</td> <td></td> </tr> <tr> <td>2.8</td> <td>MAXIMUM DISCHARGE PRESSURE FOR WHICH PUMP IS SUITABLE.</td> <td></td> </tr> <tr> <td>2.9</td> <td>PARTY SHALL INFORM THE FILTERATION LEVEL OF THE FLOW MEDIA FOR PROPER FUNCTIONING OF PUMP.</td> <td></td> </tr> </table> <p>3.0 MATERIAL OF CONSTRUCTION</p> <table border="0"> <tr> <td>3.1</td> <td>CASING</td> <td></td> </tr> <tr> <td>3.2</td> <td>DRIVING AND DRIVEN SPINDLE SCREW</td> <td></td> </tr> <tr> <td>3.3</td> <td>BASE PLATE</td> <td></td> </tr> <tr> <td>3.4</td> <td>WEARING RINGS</td> <td></td> </tr> <tr> <td>3.5</td> <td>TYPE OF BEARINGS USED</td> <td></td> </tr> <tr> <td>3.6</td> <td>TYPE OF COUPLING</td> <td></td> </tr> <tr> <td>3.7</td> <td>PACKING</td> <td></td> </tr> </table> <p>4.0 CONNECTIONS</p> <table border="0"> <tr> <td>4.1</td> <td>SUCTION SIZE</td> <td></td> </tr> <tr> <td>4.2</td> <td>DISCHARGE SIZE</td> <td></td> </tr> </table> <p>5.0 DRAWINGS</p> <table border="0"> <tr> <td>5.1</td> <td>GENERAL ARRANGEMENT AND SECTIONAL DRAWING ENCLOSED WITH OFFER.</td> <td>YES/NO</td> </tr> </table>				1.1	PUMP AS PER SPECIFICATION	YES/NO	1.2	MOTOR/MAKE	YES/NO	1.3	NECESSARY INSTRUMENTS, TEST CONNECTIONS.	YES/NO	1.4	BASE PLATE AS PER DRAWING.	YES/NO	1.5	COMPANION FLANGES	YES/NO	1.6	SPARE PARTS	YES/NO	1.7	MAINTENANCE AND SPECIAL ERECTION TOOLS.	YES/NO	1.8	COMMISSIONING OF THE SET.	YES/NO	1.9	NO. OF PUMPS OFFERED.	YES/NO	2.1	DESIGNED CAPACITY OF EACH PUMP.	M ³ /hour	2.2	NORMAL DISCHARGE PRESSURE		2.3	EFFICIENCY		2.4	RATED SPEED		2.5	PERFORMANCE GUARANTEED WHEN INSTALLED AS PER GIVEN ARRANGEMENT.	YES/NO	2.6	PUMP b.h.p./Kw AT RATED CAPACITY		2.7	MAXIMUM ALLOWABLE SUCTION LIFT (FOR MINIMUM NPSH REQUIRED)		2.8	MAXIMUM DISCHARGE PRESSURE FOR WHICH PUMP IS SUITABLE.		2.9	PARTY SHALL INFORM THE FILTERATION LEVEL OF THE FLOW MEDIA FOR PROPER FUNCTIONING OF PUMP.		3.1	CASING		3.2	DRIVING AND DRIVEN SPINDLE SCREW		3.3	BASE PLATE		3.4	WEARING RINGS		3.5	TYPE OF BEARINGS USED		3.6	TYPE OF COUPLING		3.7	PACKING		4.1	SUCTION SIZE		4.2	DISCHARGE SIZE		5.1	GENERAL ARRANGEMENT AND SECTIONAL DRAWING ENCLOSED WITH OFFER.	YES/NO
1.1	PUMP AS PER SPECIFICATION					YES/NO																																																																																			
1.2	MOTOR/MAKE					YES/NO																																																																																			
1.3	NECESSARY INSTRUMENTS, TEST CONNECTIONS.					YES/NO																																																																																			
1.4	BASE PLATE AS PER DRAWING.	YES/NO																																																																																							
1.5	COMPANION FLANGES	YES/NO																																																																																							
1.6	SPARE PARTS	YES/NO																																																																																							
1.7	MAINTENANCE AND SPECIAL ERECTION TOOLS.	YES/NO																																																																																							
1.8	COMMISSIONING OF THE SET.	YES/NO																																																																																							
1.9	NO. OF PUMPS OFFERED.	YES/NO																																																																																							
2.1	DESIGNED CAPACITY OF EACH PUMP.	M ³ /hour																																																																																							
2.2	NORMAL DISCHARGE PRESSURE																																																																																								
2.3	EFFICIENCY																																																																																								
2.4	RATED SPEED																																																																																								
2.5	PERFORMANCE GUARANTEED WHEN INSTALLED AS PER GIVEN ARRANGEMENT.	YES/NO																																																																																							
2.6	PUMP b.h.p./Kw AT RATED CAPACITY																																																																																								
2.7	MAXIMUM ALLOWABLE SUCTION LIFT (FOR MINIMUM NPSH REQUIRED)																																																																																								
2.8	MAXIMUM DISCHARGE PRESSURE FOR WHICH PUMP IS SUITABLE.																																																																																								
2.9	PARTY SHALL INFORM THE FILTERATION LEVEL OF THE FLOW MEDIA FOR PROPER FUNCTIONING OF PUMP.																																																																																								
3.1	CASING																																																																																								
3.2	DRIVING AND DRIVEN SPINDLE SCREW																																																																																								
3.3	BASE PLATE																																																																																								
3.4	WEARING RINGS																																																																																								
3.5	TYPE OF BEARINGS USED																																																																																								
3.6	TYPE OF COUPLING																																																																																								
3.7	PACKING																																																																																								
4.1	SUCTION SIZE																																																																																								
4.2	DISCHARGE SIZE																																																																																								
5.1	GENERAL ARRANGEMENT AND SECTIONAL DRAWING ENCLOSED WITH OFFER.	YES/NO																																																																																							
सामग्री सूची संख्या एवं दिनांक SIGN & DATE	स्वत्ताधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए !!	COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company																																																																																							
सामग्री सूची संख्या INVENTORY NO.	REV. NO.	<table border="1"> <tr> <td>निर्माणकर्ता WORKED BY</td> <td>DHARAMPAL</td> <td></td> <td>26-06-07</td> </tr> <tr> <td>जांचकर्ता CHECKED BY</td> <td>ANUJ JAIN</td> <td></td> <td>26-06-07</td> </tr> </table>				निर्माणकर्ता WORKED BY	DHARAMPAL		26-06-07	जांचकर्ता CHECKED BY	ANUJ JAIN		26-06-07																																																																												
निर्माणकर्ता WORKED BY	DHARAMPAL		26-06-07																																																																																						
जांचकर्ता CHECKED BY	ANUJ JAIN		26-06-07																																																																																						

आगामी सूची संख्या INVENTORY NO. P-5474	हस्ताक्षर एवं तिनांक SIGN & DATE 21/6/06	स्वतः अधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना नारद इंजीनियरिंग कम्पनी की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए	COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	समग्री सूची संख्या को अधिकृत किए बिना न प्रकट किया जाए	तिनांक एवं हस्ताक्षर SIGN & DATE	REV. NO. 07	<div data-bbox="332 157 454 262" data-label="Image"> </div> <div data-bbox="544 136 1079 304" data-label="Section-Header"> <p align="center"> उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING) </p> </div> <div data-bbox="438 409 1347 787" data-label="List-Group"> <p>6.0 WEIGHT SCHEDULE</p> <p>6.1 WEIGHT OF PUMP</p> <p>6.2 WEIGHT OF MOTOR</p> <p>7.0 CHARACTERISTIC CURVES</p> <p>7.1 POWER CONSUMPTION / DISCHARGE PRESSURE</p> <p>7.2 DISCHARGE QUANTITY / DISCHARGE PRESSURE</p> <p>7.3 DISCHARGE QUANTITY / EFFICIENCY</p> <p>8.0 ANY DEVIATION TAKEN AGAINST SPECIFICATION. YES/NO</p> <p>9.0 DEVIATIONS TAKEN AS MENTIONED HERE</p> <p>10.0 HYDRAULIC TEST PRESSURE</p> <p align="center"> CROSS REFERRED STANDARDS: IS:5 , IS:2253 , IS:2254 , IS:3202 , IS:4722 , IS:12075 , VDMA:24284. </p> </div>	<table border="1"> <tr> <td>निर्माणाकर्ता WORKED BY</td> <td>DHARAMPAL</td> <td>Dharampal</td> <td>17/6/06</td> </tr> <tr> <td>जांचकर्ता CHECKED BY</td> <td>ANUJ JAIN</td> <td>Anuj</td> <td>17/6/06</td> </tr> </table>	निर्माणाकर्ता WORKED BY	DHARAMPAL	Dharampal	17/6/06	जांचकर्ता CHECKED BY	ANUJ JAIN	Anuj	17/6/06	ST- 39007 पृष्ठ 14 का 12 Page 12 Of 14
निर्माणाकर्ता WORKED BY	DHARAMPAL	Dharampal	17/6/06														
जांचकर्ता CHECKED BY	ANUJ JAIN	Anuj	17/6/06														

आगरी सूची संख्या INVENTORY NO. P-5474	हस्ताक्षर एवं तिथि SIGN & DATE 5/9/06	स्वतः अधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत के राष्ट्रीय सुरक्षा परिषद की सुरक्षा धारा 3 के अन्तर्गत आती है। इस दस्तावेज को बिना अनुमति के किसी भी व्यक्ति को देना, प्रसारित करना या इसकी प्रतिलिपि बनाना कानूनन दंडनीय अपराध है।	COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	आगरी सूची संख्या को अंकित करना है	हस्ताक्षर एवं तिथि SIGN & DATE	REV. NO. 07	<div style="text-align: center;"> <h2>OIL TANK ARRANGEMENT</h2> </div>	<div style="text-align: center;"> उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING) </div>	ST- 39007 पृष्ठ 14 का 13 Page 13 Of 14
निर्माणकर्ता WORKED BY DHARAMPAL	जांचकर्ता CHECKED BY ANUJ JAIN	17/6/06 17/6/06							

विनाशक एवं इस्तेमाल SIGN & DATE		उत्पाद मानक PRODUCT STANDARD (STEAM TURBINE ENGINEERING)		ST- 39007 पृष्ठ 14 का 14 Page 14 Of 14																																																																																																																						
		BED PLATE EXISTING ON OIL TANK																																																																																																																								
स्वामी सूची संख्या को अधिकृतित करता है																																																																																																																										
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company																																																																																																																										
स्वयंसाधिकाएं एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की संपत्ति है। इसका उपयोग एवं प्रसारण केवल से किसी भी तरह उपयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए																																																																																																																										
इस्तेमाल एवं विनाशक SIGN & DATE 	<table border="1"> <thead> <tr> <th>BED PLATE TYPE</th> <th>A±0.3</th> <th>B±0.3</th> <th>C±0.3</th> <th>D±0.3</th> <th>E±0.3</th> <th>F±0.3</th> <th>G±0.3</th> <th>H±0.3</th> <th>J±0.3</th> <th>X±0.3</th> <th>Y±0.3</th> <th>NO. OFF HOLES</th> </tr> </thead> <tbody> <tr> <td>AA</td> <td>700</td> <td>700</td> <td>50</td> <td>250</td> <td>450</td> <td>650</td> <td>—</td> <td>—</td> <td>—</td> <td>80</td> <td>80</td> <td>12</td> </tr> <tr> <td>BB</td> <td>700</td> <td>700</td> <td>35</td> <td>245</td> <td>455</td> <td>665</td> <td>—</td> <td>—</td> <td>—</td> <td>60</td> <td>60</td> <td>12</td> </tr> <tr> <td>CC</td> <td>1320</td> <td>900</td> <td>30</td> <td>240</td> <td>450</td> <td>660</td> <td>870</td> <td>1080</td> <td>1290</td> <td>85</td> <td>85</td> <td>20</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>					BED PLATE TYPE	A±0.3	B±0.3	C±0.3	D±0.3	E±0.3	F±0.3	G±0.3	H±0.3	J±0.3	X±0.3	Y±0.3	NO. OFF HOLES	AA	700	700	50	250	450	650	—	—	—	80	80	12	BB	700	700	35	245	455	665	—	—	—	60	60	12	CC	1320	900	30	240	450	660	870	1080	1290	85	85	20																																																																	
BED PLATE TYPE	A±0.3	B±0.3	C±0.3	D±0.3	E±0.3	F±0.3	G±0.3	H±0.3	J±0.3	X±0.3	Y±0.3	NO. OFF HOLES																																																																																																														
AA	700	700	50	250	450	650	—	—	—	80	80	12																																																																																																														
BB	700	700	35	245	455	665	—	—	—	60	60	12																																																																																																														
CC	1320	900	30	240	450	660	870	1080	1290	85	85	20																																																																																																														
INVENTORY NO. P-5474	REV. NO. 07	निर्माणकर्ता WORKED BY DHARAMPAL			17/6/06																																																																																																																					
		जांचकर्ता CHECKED BY ANUJ JAIN			17/6/06																																																																																																																					

QUALITY PLAN

 QC-178		Q.P. NO. _____ REV _____ SPEC. NO. _____ REV _____ DRG. NO. _____ REV _____						SHEET _____ OF _____ LEGENDS P-Performed by 1-BHEL REP W-Witnessed by 2-Vendor V-Verified by 3-Subvendor				
		SL NO 1	COMPONENT OPERATION 2	CHARACTERISTICS 3	CLASSIFICATION 4	TYPE OF CHECK 5	QUANTUM 6	REFERENCE DOCUMENT 7	ACCEPTANCE NORMS 8	FORMAT OF RECORDS 9	AGENCY <div> P W V </div>	
Empty row for data entry												

NTPC QUALITY PLAN

	MANUFACTURERS NAME & ADDRESS:		MANUFACTURING QUALITY PLAN					PROJECT: _____ PACKAGE: _____ CONTRACT NO.: _____ CONTRACTOR: _____							
			ITEM: _____			QP NO. _____									
			SUB-SYSTEM: _____			REV. _____									
						DATE: _____									
					PAGE _____ OF _____										
SL NO.	COMPONENT OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY				REMARKS		
									D*	M	C	N			
1	2	3	4	5	6	7	8	9	10				11		
			LEGEND: * RECORDS IDENTIFIED WITH TICK SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUB-CONTRACTOR C: CONTRACTOR NOMINATED INSPECTION AGENCY N: NTPC INDICATE “ P ” PERFORM “ W ” WITNESS AND “ V ” VERIFICATION AS APPROPRIATE “ CHP ” NTPC SHALL IDENTIFIED IN COLUM “ N ”					FOR NTPC USE:		DOC NO.					
MANUFACTURER / SUB- CONTRACTOR		CONTRACTOR													
SIGNATURE:								REVIEWED BY:		NAME & SIGN OF APPROVING AUTHORITY & SEAL					