

**PRE QUALIFICATION REQUIREMENTS (PQR) for Air Exhauster with Motor (Type-E)**  
**(Mat Code: W90716121050)**

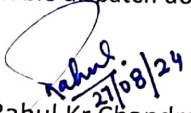
Pre-Qualification Requirements for the procurement of Air Exhauster with Motor (Type-E) are as below:


1. Bidder/ Vendor should have designed, manufactured and supplied equipment of the type and minimum equipment rating as stipulated below:

Type of equipment	Equipment Rating
Centrifugal Exhauster/ Blower directly coupled with motor	Flow 0.4 m <sup>3</sup> /sec (minimum) with head 250 mmWC (minimum) for dry air and motor rating 3 HP (minimum)


2. In support of the above Clause 1, bidder/vendor to submit following documents:





- i. Un-priced copy of Purchase Order for exhauster coupled with motor stipulated in the Table of clause 1.
- ii. Duly filled "DETAILS OF EQUIPMENT" for which purchase order copy as per clause 2.i is furnished (Format as per Annexure-1).
- iii. Any suitable dispatch document.




  
(Rahul Kr Chandra)  
Dy. Mgr/HXE





  
(Axay Kumar)  
Sr. Manager/ HXE

दिनांक एवं हस्ताक्षर SIGN & DATE		<b>उत्पाद मानक (हीप - हरिद्वार)</b> <b>PRODUCT STANDARD (HEEP HARIDWAR)</b>		HE 57008										
				पृष्ठ का Page 1 of 11										
SUPERSEDES INVENTORY NO.	<b>AIR EXHAUSTER WITH MOTOR (RADIAL VENTILATOR)</b>													
सामग्री सूची संख्या को अधिकृत	<div style="border: 1px solid black; padding: 5px; text-align: center;">             BASED ON BHEL'S OWN EXPERIENCE           </div>													
<b>COPYRIGHT AND CONFIDENTIAL</b> 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	<b>1.0 SCOPE :</b>  This specification covers the design, manufacture, performance requirements, testing and supply conditions of Air Exhauster with motor for sucking air steam mixture from gland steam condenser in a thermal power station.													
	<b>1.1 DESIGNATION :</b>  While raising purchase indent, mention the type (see Table-1, Page-6) e.g. Air Exhauster with Motor - Type A to HE 57008.													
	<b>2.0 TECHNICAL DATA :</b>													
	<b>2.1 EXHAUSTER DATA :</b>													
	2.1.1 Medium to be handled : Air steam mixture 2.1.2 Suction temperature : See Table - 1. 2.1.3 Maximum Temperature : 100 °C 2.1.4 Total pressure : See Table - 1 2.1.5 Flow volume : See Table - 1 2.1.6 Density of air steam mixture : See Table - 1 2.1.7 Housing position : See Figure - 1													
	<b>2.2 MOTOR DATA:</b>													
	2.2.1 Rated output : To be indicated by the supplier. 2.2.2 Ambient Temperature : 50 °C 2.2.3 Supply : 415 Volts, 3Phase, 50C /s. 2.2.4 Type of enclosure : Totally enclosed fan cooled 2.2.5 Type of protection : IP 54 (IS:4691) 2.2.6 Mounting : As per figure 1 2.2.7 Starting : Direct on line 2.2.8 Voltage Variation : +/- 10% Frequency Variation : +/- 5% Combined voltage & frequency variation : +/- 10% 2.2.9 Insulation Class : B 2.2.10 Efficiency Class of motor : Premium Efficiency Class IE3 conforming to IS 12615 or IEC:60034-30													
	<table border="1" style="width: 100%;"> <tr> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर SIGNATURE &amp; DATE</td> </tr> <tr> <td>TSX</td> <td>D.K. Mandal</td> </tr> </table>					नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE	TSX	D.K. Mandal					
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<table border="1" style="width: 100%;"> <tr> <td>REV. NO.</td> <td>SUPERCEDES</td> <td>निर्माण PREPARED</td> <td>जारी ISSUED</td> <td>दिनांक DATE</td> </tr> <tr> <td>11</td> <td></td> <td>HXE</td> <td>TSX</td> <td>6/3/88</td> </tr> </table>					REV. NO.	SUPERCEDES	निर्माण PREPARED	जारी ISSUED	दिनांक DATE	11		HXE	TSX	6/3/88
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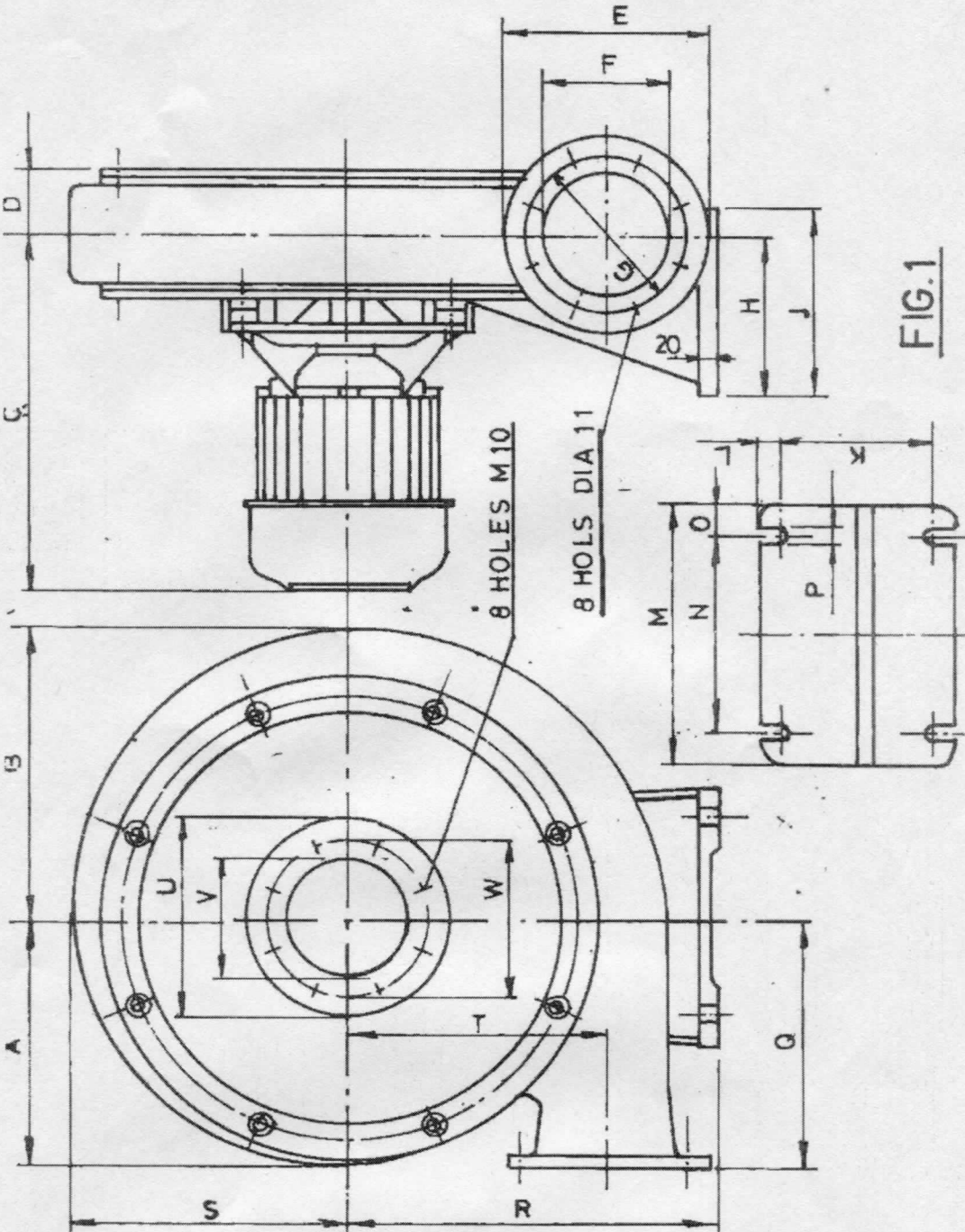



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सामग्री सूची संख्या को अधिकृतित करता		SUPERSEDES INVENTORY NO		पृष्ठ का Page 2 of 11												
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company		<p>2.3 GENERAL REQUIREMENT :</p> <p>2.3.1 The exhausters shall be supplied in pairs for each set , such that when two units ( per set) are installed with motor fan axis coinciding in one line (horizontal), one unit shall be a mirror image of the other. (Refer Figure - 2).</p> <p>2.3.2 Vibration of the equipment shall be limited to the maximum displacement of 50 microns. The measurement procedure shall be broadly as per IS: 12075.</p> <p>2.3.3 Noise level shall not be more than 85 dB at a distance of 1 meter. Noise level test shall carried out generally as per IS: 12065.</p> <p>2.3.4 Dynamic balancing of the impeller shall be done generally as per ISO: 1940 of the balance quality grade G6.3.</p> <p>2.3.5 The impeller shall be zinc sprayed. (Minimum thickness 60 micron).</p> <p>2.3.6 All the parts of the exhauster and motor shall be of corrosion resisting material or shall suitably and durably protected against corrosion.</p> <p>2.3.7 Suitable foundation on bolts (M16 x110) along with nut (M16), lock nut (M16) Spring washer 4 nos. (each) shall be supplied by the vendor for mounting of the equipment on foundation.</p> <p>2.3.8 Dimensional details shall be as per Figure -1</p> <p>2.3.9 Each fan exhauster shall be performance test at supplier's works as per IS: 4894.</p> <p>2.3.10 In the event of placement of order, General Arrangement drawing of the exhauster unit shall be got approved before starting manufacturing of Air Exhauster.</p> <p>3.0 DESIGN, MANUFACTURE &amp; WORKMANSHIP :</p> <p>3.1 The protective measure of exhauster shall be as per of IS 4894. In assembled condition, live parts shall not be accessible with the standard test finger (see IS: 1401).</p> <p>3.2 The welding of the equipment shall be carried out by a qualified welder as per ASME Sec-IX.</p> <p>3.3 The motor shall have delta type stator winding connection.</p> <p>3.4 Minimum voltage required under starting up conditions to bring exhauster up to rated speed shall be 85% of rated voltage.</p> <p>3.5 Before starting manufacturing of Air Exhauster , the vendor shall get its detailed drawing approved by BHEL, which shall include detailed dimensions and bill of material.</p> <p>3.6 Permissible variation in dimensions mentioned in Table-II shall be as follows:</p> <table border="0" style="margin-left: 40px;"> <tr> <td>i) Nominal dimension</td> <td>: From 30 mm – 120 mm</td> <td>: +/- 2 mm</td> </tr> <tr> <td>ii) - do -</td> <td>: From 121 mm – 315 mm</td> <td>: +/- 2 mm</td> </tr> <tr> <td>iii) - do -</td> <td>: From 316 mm - 1000 mm</td> <td>: +/- 3 mm</td> </tr> </table> <p>3.7 To cater for continuous operational requirement at the power station, the air exhauster and motor shall be of proven design.</p> <p>3.8 All flanged connections (inlet and outlet) shall be supplied with matching counter flanges in bolted condition along with fasteners to permit trouble free assembly of inter connecting pipelines.</p> <p>4.0 MATERIAL :</p> <p>The material of construction used should satisfy the operational stresses, i.e. mechanical, thermal and chemical. It should be certified by the supplier that the material quoted by them in the part list has been used and is suitable for intended service requirements.</p>						i) Nominal dimension	: From 30 mm – 120 mm	: +/- 2 mm	ii) - do -	: From 121 mm – 315 mm	: +/- 2 mm	iii) - do -	: From 316 mm - 1000 mm	: +/- 3 mm
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स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयुक्त एवं अप्रयुक्त रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।		दिनांक एवं हस्ताक्षर SIGN & DATE 14/10/14														
सामग्री सूची संख्या INVENTORY NO. P-5718		REV.NO. 11 SUPERSEDES		निर्माणकर्ता WORKED BY TARUN BANSAL		SD/- 14/10/16										
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
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				पृष्ठ का Page 3 of 11	
SUPERSEDES INVENTORY NO. समूची सूची संख्या को अधिकृत किया जाएगा	5.0 DATA REQUIRED WITH THE BID / OFFER: Supplier to furnish the following data / documents in duplicate along with the offer : 5.1 The general arrangement drawing & catalogue / literature relevant to the product. 5.2 Part lists 5.3 Data sheets duly filled in formats attached with this specification. Foundation drawing along with embossment details of the foundation bolts etc. 5.4 The list of recommended spares required for a period of 5 years. 6.0 IDENTIFICATION : 6.1 The fan exhaustor with motor assembly should have name plate of corrosion resistant material and must include the following information : 6.1.1 Name of equipment. 6.1.2 Model No. 6.1.3 Motor rating. 6.1.4 Name of supplier 6.1.5 BHEL specification No He 57008. 6.1.6 Identification SI No. 1 or 2, as shown in Figure-2 6.1.7 Power factor. 6.1.8 Weight of the equipment. 6.2 The direction of rotation should be embossed on the equipment at an easily locating position. 7.0 INSPECTION AND TESTING: 7.1 The final inspection shall be carried out by BHEL'S representative. A notice of minimum 4 weeks shall be given by supplier for witnessing tests / checks for each lot of air-exhauster with motor. Representative shall have free access to the supplier's works for the purpose of inspection and testing of the air exhauster with motor, and vendor shall provide him all necessary help in carrying out the inspection. Approval of tests / inspection and there by issue of test certificates, or waiver of inspection by the purchaser shall not relieve the vendor of his responsibilities and obligations under contract for safe and satisfactory performance of the fans. 7.2 Tests listed under clause 7.3 shall be carried out as per procedures laid down in IS : 4894. If facilities for any of the tests mentioned below does not exist with the supplier, then relevant test certificates issued by approved test laboratories / institutes shall be supplied in original. Supplier shall supply all test certificates as listed in clause no 7.3. 7.3 Minimum tests / checks to be carried out on air exhauster, are given below.				
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दिनांक SIGN & DATE 	11/2/16				
समूची सूची संख्या INVENTORY NO. P-5718	REV.NO. 11		निर्माणकर्ता WORKED BY TARUN BANSAL	SD/- 	
			जांचकर्ता CHECKED BY ROHIT BANSAL	SD/- 	

दिनांक एवं हस्ताक्षर SIGN & DATE 	<b>उत्पाद मानक (हीप - हरिद्वार)</b> <b>PRODUCT STANDARD (HEEP - HARIDWAR)</b>		HE 57008	
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SUPERSEDES INVENTORY NO.	7.3.1 AIR EXHAUSTER: i. Air delivery test to meet the requirement of clause 2.3.9. ii. Vibration test, to meet the requirement of clause 2.3.2. iii. Noise level test, to meet the requirement of clause 2.3.3. iv. Dimensional Check v. Material check: Material certificate shall be as per approved drg. / material list by BHEL. vi. Fan speed (Acceptance test). vii. Balancing of rotating parts to meet the requirements of clause 2.3.4 viii. 100% soap bubble test shall be carried out for no leakage of Casing & Gasket joints at design pressure. 7.3.2 : MOTOR: (a) TYPE TESTS: i. Temp. rise test. ii. Full load test. (b) ROUTINE TESTS i. High voltage test. ii. Insulation resistance test. iii. Earthing continuity test iv. Electrical input test. 7.4 TOLERANCE ON RATINGS : The difference between the observed test results and the ratings assigned by the manufacturer shall not exceed the tolerances given below : a) Air delivery (-) 10 % b) Electrical input (+) 10% c) Speed (+/-) 10 % d) Deficiency (-) 15%. 8.0 DOCUMENTS REQUIRED ALONG WITH SUPPLY OF EXHAUSTER UNIT SET : 8.1 Certified copies of test results of tests listed under paragraph 7.2.& 7.3 in 5 copies. 8.2 Dimensional drawings showing erection details in 5 nos. 8.3 Operating and maintenance manual in 5 nos. 8.4 Packing lists. 8.5 Final data sheets on the format enclosed with this specification in 5 nos.. 8.6 Guarantee certificate: The supplier shall guarantee trouble free operation of the equipment for a minimum period of one year after installation and undertake to replace / repair the damaged components free of cost with in the guarantee period. 8.7 A copy each of the above-referred documents, along with one reproducible of item at clause 8.2 shall be dispatched separately to BHEL, Hardwar before dispatch of consignment.			
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 दी गई सूचना भारत भारती 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।			
संपत्ति सूची संख्या INVENTORY NO. 1-5718	REV.NO. 1	निर्माणकर्ता WORKED BY TARUN BANSAL	SD/- 	
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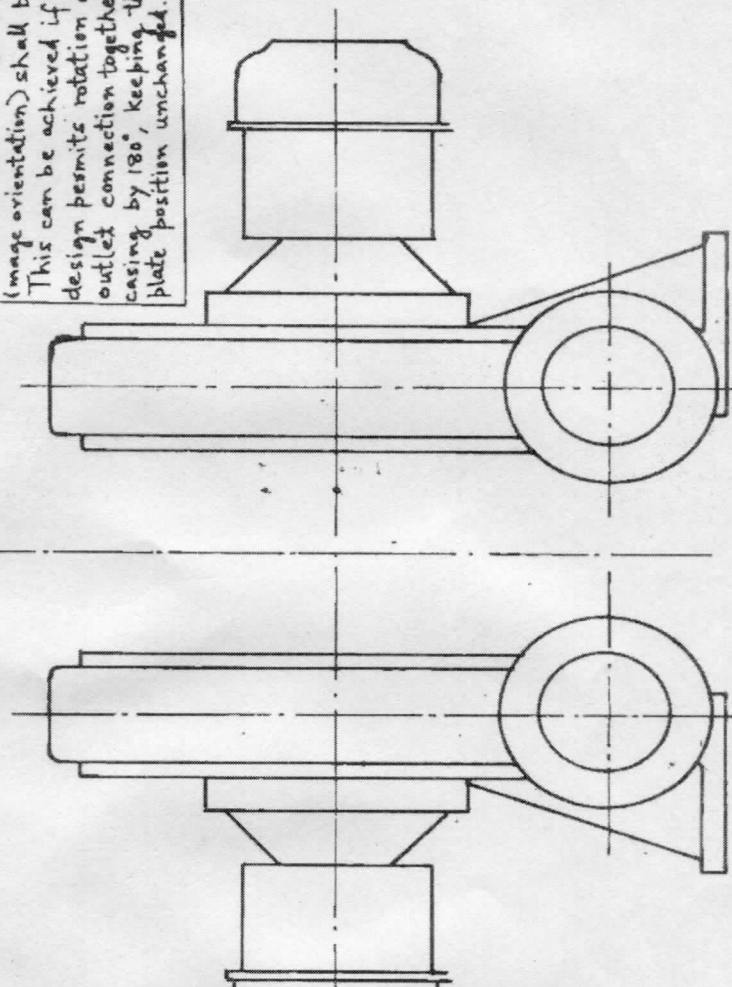
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सामग्री सूची संख्या को अंकित किया गया INVENTORY NO.			Page	5 of 11									
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9.0 INTER CHANGEABILITY : The motor of the exhauster of a particular size and model and set of blades shall be Changeable such that the performance of the equipment remains within specified limits.													
10.0 QUALITY PLAN : Quality Plan shall be submitted along with the offer for approval. Prior approval of Quality Plan is necessary before manufacturing.													
11.0 PAINTING : The equipment is to be painted with the paints given below after cleaning the surfaces by shot blasting etc., giving a clean dry and metallic finish.													
11.1 INTERNAL SURFACES : Inner chamber of the exhauster are to be preserved with steam Washable preservation oil/ paint having viscosity of 38 centistokes at 40° c.													
11.2 OUTER SURFACES : Outer surfaces of exhauster shall be painted as per following details : <ul style="list-style-type: none"> <li>I. Inland conditions: Process a) and c) as per details below to be used for inland application with final DFT as 100 microns.</li> <li>II. Sea Condition : Process a),b) and c) as per details below to be used with final DFT as 100 microns.             <ul style="list-style-type: none"> <li>a) Priming : Epoxy resin based 2 pack Zinc Phosphate with DFT 50 microns.</li> <li>b) Intermediate : TiO<sub>2</sub> pigmented epoxy resin intermediate paint.</li> <li>c) Finish : Epoxy resin based finish paint.</li> </ul> </li> </ul>													
12.0 DESPATCH :													
12.1 The exhauster units shall be directly dispatched to the site as described in the Purchase Order.													
12.2 All openings to be suitably blanked with blanking plates/counter flanges as specified in Cl. 3.8.													
12.3 All loose items to be packed separately in a small box and kept inside the main packing box for the exhauster units.													
12.4 Packing should be sea worthy and must be able to protect the equipment in tropical climate.													
12.5 Following information should be painted on the packing box : <ul style="list-style-type: none"> <li>a) Name of the equipment.</li> <li>b) BHEL Purchase Order No.</li> <li>c) BHEL Specification No. HE-57008.</li> </ul>													
13.0 LIST OF CROSS REFERRED STANDARDS AND SPECIFICATIONS : <table border="0" style="width: 100%;"> <tr> <td>a) ASME - IX</td> <td>b) ISO - 1940</td> <td>c) IS - 1401</td> </tr> <tr> <td>d) IS - 4691</td> <td>e) IS - 4894</td> <td>f) IS - 12065</td> </tr> <tr> <td>g) IS - 12075</td> <td>h) IS- 12615</td> <td>i) IEC:60034-30</td> </tr> </table>					a) ASME - IX	b) ISO - 1940	c) IS - 1401	d) IS - 4691	e) IS - 4894	f) IS - 12065	g) IS - 12075	h) IS- 12615	i) IEC:60034-30
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दिनांक एवं हस्ताक्षर SIGN & DATE 	REV.NO.		निर्माणकर्ता WORKED BY	TARUN BANSAL	SD/-								
	सामग्री सूची संख्या INVENTORY NO.	17 P-52218		जांचकर्ता CHECKED BY	ROHIT BANSAL	SD/-							





सामग्री सूची संख्या INVENTORY NO. <b>R-5918</b>	उत्पाद मानक (हीप - हरिद्वार) HE 57008	उत्पाद मानक (हीप - हरिद्वार) PRODUCT STANDARD (HEEP - HARIDWAR)	HE 57008	
			पृष्ठ का Page 6 of 11	
दिनांक एवं हस्ताक्षर SIGN & DATE <b>11/2/16</b>	स्वत्वधिकार एवं गोपनीय 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 को प्रमाणित करता है SUPERSEDES INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	
TABLE-1				
PARAMETERS	UNIT S	TYPE		
SUCTION TEMPERATURE	$^{\circ}\text{C}$	A	B	C
HEAD DEVELOPED	$\text{mmW/C}$	310	306	410
FLOW VOLUME	$\text{M}^3/\text{se C.}$	0.3	0.4	0.3
DENSITY OF AIR STEAM MIXTURE AT SUCTION TEMPERATURE AND 85% RH	$\text{Kg/M}^3$	0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A1	B1	C1
		70	80	84
		310	306	410
		0.3	0.4	0.3
		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A	B	C
		310	306	410
		0.3	0.4	0.3
		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A	B	C
		310	306	410
		0.3	0.4	0.3
		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A	B	C
		310	306	410
		0.3	0.4	0.3
		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A	B	C
		310	306	410
		0.3	0.4	0.3
		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A	B	C
		310	306	410
		0.3	0.4	0.3
		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A	B	C
		310	306	410
		0.3	0.4	0.3
		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A	B	C
		310	306	410
		0.3	0.4	0.3
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		A	B	C
		310	306	410
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		0.923	0.846	0.780
		0.923	0.846	0.780
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		310	306	410
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		310	306	410
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		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
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		A	B	C
		310	306	410
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		310	306	410
		70	80	84
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		A	B	C
		310	306	410
		0.3	0.4	0.3
		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A	B	C
		310	306	410
		0.3	0.4	0.3
		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A	B	C
		310	306	410
		0.3	0.4	0.3
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		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
		A	B	C
		310	306	410
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		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	84
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		0.3	0.4	0.3
		0.923	0.846	0.780
		0.923	0.846	0.780
		0.3	0.4	0.3
		310	306	410
		70	80	

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक (हीप - हरिद्वार)		HE 57008	
सामग्री सूची संख्या को अतिरिक्त करना	SUPERSEDES INVENTORY NO.	PRODUCT STANDARD (HEEP - HARIDWAR)		पृष्ठ का Page 7 of 11	
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सामग्री सूची संख्या INVENTORY NO. P-57-18	REV.NO. 11	निर्माणकर्ता WORKED BY रोहित बंसल ROHIT BANSAL	जांचकर्ता CHECKED BY तारुन बंसल TARUN BANSAL	SD/- SD/-	 

दिनांक एवं हस्ताक्षर SIGN & DATE		<b>उत्पाद मानक (हीप - हरिद्वार)</b>  <b>PRODUCT STANDARD (HEEP - HARIDWAR)</b>	<b>HE 57008</b>
SUPERSEDES INVENTORY NO.  सामग्री सूची संख्या की अधिकतम करता		पृष्ठ का Page 8 of 11	
<b>DIMENSIONAL DETAIL OF FIGURE-1</b> <b>DIMENSIONAL DETAIL OF FIGURE-1</b>			
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<b>स्वाधिकार एवं गोपनीय</b> इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयुक्त एवं आरक्षक रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।			
दिनांक SIGN & DATE 			
सामग्री सूची संख्या INVENTORY NO. <b>P-5718</b>	REV.NO. <b>11</b>	निर्माणकर्ता WORKED BY <b>TARUN BANSAL</b>	
		जांचकर्ता CHECKED BY <b>ROHIT BANSAL</b>	
		 	

SL NO	TYPE DIMENSION	A	B	C	A1	B1	C1	D	E
01	A	≈212	≈263	≈263	≈300	≈300	≈360	≈360	≈360
02	B	≈268	≈318	≈318	≈350	≈350	≈425	≈425	≈425
03	C	≈445	≈450	≈425	≈540	≈540	≈560	≈540	≈540
04	D	72	80	80	115	115	135	135	135
05	E	φ 216	φ234	φ234	φ234	φ234	φ274	φ280	φ280
06	F	φ140	φ160	φ160	φ160	φ160	φ200	φ200	φ200
07	G (PCD)	φ182	φ200	φ200	φ200	φ200	φ240	φ240	φ240
08	H	172	180	180	180	180	210	243	243
09	J	200	200	200	243	243	243	343	343
10	K	164	164	164	207	207	207	307	307
11	L	18	18	18	18	18	18	18	18
12	M	250	280	280	364	364	364	464	464
13	N	190	220	220	304	304	304	404	404
14	O	30	30	30	30	30	30	30	30
15	P	18	18	18	18	18	18	18	18
16	Q	215	270	270	320	320	380	400	400
17	R	330	390	390	440	440	530	530	530
18	S	≈240	≈284	≈284	≈325	≈325	≈390	≈390	≈390
19	T	220	267	267	310	310	370	370	370
20	U	φ216	φ234	φ234	φ234	φ234	φ274	φ280	φ280
21	V	φ140	φ160	φ160	φ160	φ160	φ200	φ200	φ200
22	W (PCD)	φ182	φ200	φ200	φ200	φ200	φ240	φ240	φ240

सामग्री सूची संख्या INVENTORY NO. <b>P-5718</b>	REV.NO. <b>11</b>		निर्माणकर्ता WORKED BY <b>TARUN BANSAL</b>	जांचकर्ता CHECKED BY <b>ROHIT BANSAL</b>	SD/- <b>KS L</b>	SD/- <b>TB</b>
स्वत्वाधिकार 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 कम्पनी 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 को अधिकृत किया गया	SUPERSEDES INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE <b>11/2/16</b>	HE 57008	पृष्ठ का Page 9 of 11
उत्पाद मानक (हीप - हरिद्वार) PRODUCT STANDARD (HEEP - HARIDWAR)		AIR EXHAUSTERS TO BE SUPPLIED IN PAIRS AS PER ORIENTATION* BELOW	* Air Exhausters suitable for flexible orientation (in addition to mirror-image orientation) shall be preferred. This can be achieved if the design permits rotation of air outlet connection together with casing by 180°, keeping the bed plate position unchanged.		FIG-2	

दिनांक एवं हस्ताक्षर SIGN & DATE		<b>उत्पाद मानक (हीप - हरिद्वार)</b> <b>PRODUCT STANDARD (HEEP - HARIDWAR)</b>		HE 57008		
				पृष्ठ Page	का of	11
सुपरीसेड INVENTORY NO.	सामग्री सूची संख्या की अधिकतम करता	<b>DATA SHEET</b>  <b>A. FAN</b> <ol style="list-style-type: none"> <li>Name of manufacturer</li> <li>Model No.</li> <li>Position</li> <li>Flow dry air <math>M^3 / sec</math></li> <li>Pressure difference k p a</li> <li>Flow steam mixture <math>m^3 / sec</math></li> <li>Mixture temp</li> <li>Pressure difference k p a (with air steam mixture)</li> <li>Density of mixture <math>kg / m^3</math></li> <li>Density of medium during test <math>kg / m^3</math></li> <li>Power absorbed K W</li> <li>Speed RIM</li> <li>Weight of rotating part kg</li> <li>Weight of fan exhaustor kg</li> <li>Moment of inertia <math>kg m^2</math></li> <li>Standard and degree of rotor balancing</li> <li>Static or Total Efficiency</li> </ol>				
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<b>स्वत्वधिकार एवं गोपनीय</b> 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।		<b>B. MOTOR:</b> <ol style="list-style-type: none"> <li>Model No.</li> <li>Rating K W</li> <li>Rated voltage</li> <li>Frequency 50 Hz</li> <li>Speed R P M</li> <li>Degree of protection</li> <li>Rated current amp</li> </ol>				
सुपरीसेड संख्या INVENTORY NO.	दिनांक SIGN & DATE	REV.NO.	निर्माणकर्ता WORKED BY	TARUN BANSAL	SD/-	
P-527/18		11	जांचकर्ता CHECKED BY	ROHIT BANSAL	SD/-	

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक (हीप - हरिद्वार)		HE 57008	
		PRODUCT STANDARD (HEEP - HARIDWAR)		पृष्ठ Page 11	का of 11
SUPERSEDES INVENTORY NO.	8. Power factor 9. Starting current Amp 10. Temp. Rise over 50 °C ambient, °C 11. Class of insulation 12. Rated torque - NM 13. Starting torque -NM 14. Weight of rotating part, Kg 15. Weight of motor - Kg 16. Moment of inertia K g-m <sup>2</sup> . 17. Efficiency Class of motor  C. ASSEMBLY: 1. Weight, Kg 2. Foundation bolts & nut – Yes 3. Drawing No.				
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स्वत्वाधिकार 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।					
कर्ताक्षर एवं दिनांक SIGN & DATE					
सामग्री सूची संख्या INVENTORY NO.	REV.NO.	निर्माणकर्ता WORKED BY		TARUN BANSAL	SD/-
155318	11	जांचकर्ता CHECKED BY		ROHIT BANSAL	SD/-



## ANNEXURE-1: DETAILS OF EQUIPMENT

Bidder's Name and Address :  
XXXXXXX

To  
BHEL, HEEL, RANIPUR,  
Haridwar-249403

Details of manufacture of proven equipments.

S. No.	Item Description
<b>A.</b>	<b>CENTRIFUGAL EXHAUSTER/BLOWER DIRECTLY COUPLED WITH MOTOR</b>
1.00.00	Name, Address & Telephone No. of the manufacturer
1.01.00	Name and location of the Plant where the exhauster is installed
1.02.00	Client Name and its Address, Fax No. & Tel.Nos.
1.03.00	Name and Designation of the responsible person in Client's Organisation
1.03.00	PO No. and Date
1.04.00	Date of Commissioning of System/Package

Signature of authorized signatory...

1.05.00	(a)	Whether the System/Equipments are in Successful Operation for a minimum period of two (2) years prior to the date of enquiry	Yes/No
	(b)	Whether the system/equipments are in successful operation as prior to date of enquiry	Yes/No
1.06.00	Brief Technical Particulars of the System/Package/Equipments :		
	(i)	Designed by	
	(ii)	Manufactured by	
	(iii)	Fan Type	
	(iv)	Design Standard	
	(v)	Whether Directly coupled with motor	Yes/No
	(vi)	Working medium being handled by Exhauster	
	(vii)	Operating Temperature of working medium	
	(viii)	Density of working medium (kg/m <sup>3</sup> )	
	(ix)	Head developed by exhauster at above density(mmWC)	
	(x)	Flow rate of working medium (m <sup>3</sup> /sec)	
	(xi)	Diameter of impeller after machining (mm)	
	(xii)	HP rating of Exhauster motor	
	xiii)	Make of Motor	
	xiv)	Power absorbed by motor	
	(xv)	Profile of blades of impeller (Straight/ Backward curved/ Forward curved)	
	(xvi)	Whether Counter Flanges supplied with Exhauster	Yes/No

27	LT MOTORS	CGL	AHMEDNAGAR
		MARATHON ELECTRIC	KOLKATA
		Marathon Regal Beloit Wuxi Co. Ltd.	China
		Siemens	China
		ABB	FARIDABAD, CHINA
		BHARAT BIJALI	MUMBAI
		KEC	BANGALORE/HUBLI
		BHEL	BHOPAL
		SHANGHAI ELECTRIC COMPANY	CHINA
		XIANGTAN ELECTRIC MANUFACTURING CO LTD	CHINA
		SIEMENS LTD	MUMBAI, CHINA
		JYOTI LTD.	BARODA
		NGEF	HUBLI
		SHANGHAI SHANGDIAN ELECTRIC MACHINERY	CHINA
		JIANGSU DAZHONGELECTRIC MOTORS CO. LTD	CHINA

Sl. No.	Paint (Coat)	Paint Type	No. of coat	Total DFT			
A.	Primer Paint	: Epoxy base Zinc rich Primer Paint	1 Coats	75			
	Intermediate Paint	: High build epoxy MIO coating cured with polyamide hardener	1 Coat	100			
	Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint	1 Coats	50			
			Total DFT 225 microns min.				
	For Gland Steam Condenser:						
	Paint (Coat)	Paint Type	No. of coat	Total DFT			
D1	Primer Paint	: Epoxy base Zinc rich Primer Paint	1 Coats	75			
	Intermediate Paint	: High build epoxy MIO coating cured with polyamide hardener	1 Coat	100			
	Finish (Final)	: Heat Resistant Aluminum paint	1 Coats	50			
			Total DFT 225 microns min.				
	Details of Color Scheme (Outside Surfaces):						
		(Legend : W-at BHEL works; V- at vendor's works;	S-at site;	NA-Not applicable)			
	Assembly	Shade as per IS-5 or Eq.	Primer	Int. Paint	Final Paint	Touch -up	Re-marks
D1	Condenser	RAL 7001-Silver Grey	W	W	S	S	
	LP Heater	-- Do --	W	W	W	S	
	Hydrogen Coolers & Exciter Air Coolers.	Grey RAL 9002	W	W	W	S	
	Gland Steam Condenser	-- Do -- and Heat Resistant Aluminum paint	W	W	W	NA	
	Air Exhauster for Gland Steam Condenser	Grey RAL 9002	V	V	V	S	

**Following Items are BOI.**

1. Condenser Air Evacuation Equipment:
2. Turbine Oil Coolers (PHE Type):

Painting is done as per C-4 Environment classification. Total DFT is of 225 Microns

QUALITY PLAN													Page 1 of 2		
BHEL	QP NO.	QA/BE/QP/307		REV.		06	DESCRIPTION			VENDOR'S NAME AND ADDRESS			PROJECT:		
	SPEC. NO.	AS PER PO		REV.		AS PER PO	AIR EXHAUSTER WITH MOTOR (GSC AIR EXHAUSTER)								
	DRG. NO.	AS PER APPROVED DRWG.		REV.		AS PER PO									
SL. NO.			CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS	
										D	M	B	N		
1	2		3	4	5	6	7	8	9	D	10			11	

1. RAW MATERIAL													
1.1	CASING, IMPELLER, BLADES & BASE FRAME/ PLATE	CHEMICAL COMPOSITION  MECHANICAL PROPERTIES  SIZE	MAJOR	CHEMICAL  MECHANICAL  MEASUREMENT	1 / HEAT   100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	MTC	✓  ✓  ✓	P  P  P	V  V  V	V  V  V	NABL TC shall be submitted
1.2	NUTS & BOLTS	TRADE MARK & PROPERTY CLASS	MAJOR	VISUAL	100%	As per vendor's Procedure	As per vendor's Procedure	IR	✓	P	V	-	
1.3	AC INDUCTION MOTOR (Please mention Make, degree of Protection and Rating).	ROUTINE & TYPE TESTS CERTIFICATE INCLUDING DEGREE OF PROTECTION	MAJOR	REVIEW	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	TC	✓	P	V	V	Customer Approved sources
2. INPROCESS INSPECTION													
2.1	CASING, MOTOR BRACKET, BASE FRAME & INLET CASING	QUALITY OF WELD	MAJOR	DPT	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	IR	✓	P	V	-	NOTE:1
2.2	IMPELLER	DIMENSIONS  DIMENSIONS AFTER MACHINING  DYNAMIC BALANCING	MAJOR	MEASUREMENT	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	IR  IR  TC	-  -  ✓	P  P  P	-  -  V	-  -  V	
2.3	ASSEMBLY OF FAN	INTERNAL CLEARANCES BETWEEN IMPELLER & CASING	MAJOR	MEASUREMENT	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	IR	✓	P	V	V	
3.0 FINAL INSPECTION													
3.1	COUNTER FLANGE	PHYSICAL VERIFICATION	MAJOR	VISUAL	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	COC	✓	P	V	V	

		LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR    B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION	FOR CUSTOMER USE	
MANUFACTURER/ SUBCONTRACTOR		ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		APPROVED BY

QUALITY PLAN													Page 2 of 2		
BHEL	QP NO.	QA/BE/QP/307		REV.		06	DESCRIPTION			VENDOR'S NAME AND ADDRESS			PROJECT:		
	SPEC. NO.	AS PER PO		REV.		AS PER PO	AIR EXHAUSTER WITH MOTOR (GSC AIR EXHAUSTER)								
	DRG. NO.	AS PER APPROVED DRWG.		REV.		AS PER PO									
SL. NO.			CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS	
										M	B	N			
1	2		3	4	5	6	7	8	9	D	10			11	

3.2	COMPLETE ASSEMBLY	OVERALL DIMENSIONS	MAJOR	MEASUREMENT	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	TC	✓	P	W	V	
3.3		THICKNESS OF ZINC COATING OF IMPELLER	MAJOR	MEASUREMENT	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	IR	✓	P	V	-	Thickness=
3.4		LEAKAGE TEST OF CASING & GASKET JOINTS AT DESIGN PRESURRE	MAJOR	LEAK TEST	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	TC	✓	P	W	V	Design Pressure=
3.5		PERFORMACE TEST (INCLUDING AIR DELIVERY, PRESSURE & POWER CONSUMPTION)	MAJOR	PERFORMANCE	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	TC	✓	P	W	V	
3.6		FAN SPEED AT 85 % OF RATED VOLTAGE	MAJOR	ELECTRICAL	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	TC	✓	P	W	V	
3.7		FAN SPEED, SMOOTH RUNNING & DIRECTION OF ROTATION	MAJOR	VISUAL	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	IR	✓	P	W	-	
3.8		NOISE LEVEL	MAJOR	MEASUREMENT	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	TC	✓	P	W	V	Max=
3.9		VIBRATION	MAJOR	MEASUREMENT	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	TC	✓	P	W	V	Max=
3.10		APPEARANCE INCLUDING PAINT THICKNESS (DFT)	MAJOR	VISUAL & MEASUREMENT	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	TC	✓	P	V	V	Total DFT=
3.11		COMPLIANCE OF TECHNICAL REQUIREMENT	MAJOR	--	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	COC	✓	P	V	-	
3.12		COMPLETION OF DOCUMENTS	MAJOR	PHYSICAL	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	DOCUMENTS		P	V	-	
4.0 PACKING													
4.1		SOUNDNESS OF PACKING AGAINST TRANSIT DAMAGE	MAJOR	PHYSICAL	100%	BHEL APPD. DRG. / SPEC. / DATA SHEET	BHEL APPD. DRG. / SPEC. / DATA SHEET	IR		P	-		

NOTE:1 - Welding to be done by qualified welder as per ASME IX WPS and PQR to be checked by inspecting agency.

Note 2: All instruments to be used for testing/ inspection shall have valid 'calibration certificates' to be verified by agencies/ manufacturer/contractor/TPIA.

Note 3: All pages of the inspection documents shall be numbered in chronology with the QAP clauses, duly mentioning the corresponding QAP clause no. at the top of each page.

Note 4: One 'index' page containing the document descriptions, their page no's & QAP cl no. shall be attached upfront the inspection documents.

Note 5: Painting can be done only after inspection clearance, as per customer's /BHEL approved paint specification / schedule (if required). otherwise manufacturer's standard shall be followed.

Note 6: For any spares item, apart from 'visual inspection' the 'interchangeability fitment certificate' or 'material TC' are to be submitted, with specific mentioning of the ' part no/ item no of the approved GA/ x-sec drg.".

MANUFACTURER/ SUBCONTRACTOR		LEGEND:	FOR CUSTOMER USE	APPROVED BY
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