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	TME/2018					
<p>1. GENERAL</p> <p>This specification governs the requirement for supply of Aluminium alloy ventilators DE & NDE for use in traction motor.</p> <p>2. MANUFACTURE</p> <p>a) Casting Process: Gravity or low-pressure sand casting or die casting should be followed for manufacturing of ventilator fans. Vendor shall provide details of casting process being followed.</p> <p>b) Melting Process: Induction melting should be followed for manufacturing of ventilator fan casting. Vendor shall provide details of melting process being followed.</p> <p>c) Stress Relieving: Ventilators shall be stress relieved. Vendor shall furnish the stress relieving cycle adopted.</p> <p>d) Heat Treatment: Heat Treatment of ventilator fans shall be done. Vendor shall furnish the heat treatment cycle adopted.</p> <p>3. FREEDOM FROM DEFECT</p> <p>The casting shall be sound and free from harmful defects such as blow holes, inclusion, shrinkage, gas cavities, hot spots, cold shuts, cracks, gross porosity, dross etc, which adversely affect the machining and utility of casting.</p> <p>4. MATERIAL</p> <p>Warm hardened Aluminium alloy as per grade EN AC-AI Si7Mg0.3 of DIN EN 1706 (Earlier DIN 1725-1 Grade G-AISI7Mg wa). Virgin material (not re-melted from scrap) to be procured from the reputed sources to ensure quality.</p>						
Revision : 00 Date: 24/07/2018		Distribution TME QTM TXM	Qty. 1 1 1	Approved : (M.Verma) Prepared by: (M.Parothia)	Checked by: (A.Sharma)	Date : 24.07.18

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<p>COPYRIGHT AND CONFIDENTIAL</p> <p>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>	<p>5. <u>MATERIAL PROPERTIES</u></p> <p>Mechanical & chemical properties shall comply with the requirements mentioned in specification DIN EN 1706 grade EN AC-AI Si7Mg0.3 (Earlier DIN 1725-1 Grade G-AISI7Mg wa). Vendor shall provide test certificate of the material used along with test samples as per requirement mentioned in clause 6.0 of this specification.</p> <p>6. <u>TESTING & SAMPLING:</u></p> <p>6.1. Material Testing</p> <p>6.1.a) For testing by vendor:</p> <p>Test bars are to be made along with each lot of ventilator castings. Vendor shall arrange for test on test bar in a lot to ensure that all the material properties as per specification requirement are met. All the results are to be provided to BHEL along with consignment.</p> <ul style="list-style-type: none"> • Lot: The castings produced from the same heat & heat treatment batch shall constitute a lot. • Chemical composition: One sample for chemical analysis shall be selected from each heat. Special care shall be taken during sampling of the castings. In all cases, first drillings shall be discarded till a clean oxide-free surface is reached. • Mechanical Properties: Separately cast test sample shall be prepared for each heat & heat-treatment batch. Adequate number of separately cast test samples shall be prepared for mechanical test from each heat & heat treatment batch so that samples are available for retest, if required & for supply to BHEL as per clause 6.1.b. 	



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6.1.b) For testing at BHEL

Test bar (3 nos.) of the same heat & heat treatment batch for which vendor has submitted test results, are to be supplied to BHEL to carry out tests (chemical composition, mechanical properties and microstructure test) at BHEL. All the test bars of each lot shall be punched indicating heat & heat treatment batch number.

6.2. Microstructure: Vendor shall arrange for micro structure test on each lot and provide the result along with the certificate about achievement of globular micro structure.

6.3. NDT testing: As per requirement and quantum of inspection mentioned in respective drawings.

6.4. Balancing: Each ventilator to be given an accurate dynamic balance as per requirement mentioned in respective drawings.


7. Packing & Marking:

Ventilating fans shall be suitably packed to prevent corrosion and damage during transit, machined surfaces shall be properly protected with anti-corrosive compounds.

Each fan shall be legibly marked with the following details:

- 7.1. Vendor's name/Identification mark
- 7.2. Unique serial number
- 7.3. Manufacturing year & month
- 7.4. Heat number
- 7.3. Heat-treatment batch number



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<p>COPYRIGHT AND CONFIDENTIAL</p> <p>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>	<p>8. Certificates</p> <p>The supplier shall submit the following Test Certificates giving the following information:-</p> <ol style="list-style-type: none"> 8.1. Purchase order number. 8.2. Name of the manufacturer. 8.3. Method of manufacture as per clause 2.0. 8.4. Heat number. 8.5. Heat treatment batch number. 8.6. Temperature graphs of the applied heat treatment cycle. 8.7. Results of the chemical test. 8.8. Results of the mechanical test. 8.9. Results of the microstructure test as per clause 6.2. 8.10. Results of DP testing and Radiography testing (along with films) of each ventilator. 8.11. Balancing report clearly indicate the unbalance of each ventilator after putting balance weight in balancing groove. 8.12. Dimensional report of each ventilator. 8.13. Drawing/Pattern Number. 8.14. Each consignment should be accompanied by a test certificate containing details of alloy designation, heat & heat-treatment batch number and the corresponding chemical composition, mechanical properties etc. <p>Note: Checklist regarding certificates/reports to be submitted by the vendor along with each consignment is also attached as annexure-1.</p>	



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Checklist for test certificates for submission along with each consignment				Annexure 1
S.No.	Test/Reports	Certification and documents to be provided by the supplier	Requirement	
1	Casting process	Certificate from supplier	In accordance to spec TM18572 (clause 2a)	
2	Melting process	Certificate from supplier	In accordance to spec TM18572 (clause 2b)	
3	Dimensional measurement	Dimensional Reports	As per relevant BHEL drawings	
4	Use of virgin material	Certificate from supplier	In accordance to spec TM18572 (clause 4)	
5	Chemical composition	Material test certificate	In accordance to spec TM18572 (clause 5)	
6	Mechanical Properties	Material test certificate	In accordance to spec TM18572 (clause 5)	
7	Heat Treatment	Heat treatment report	In accordance to spec TM18572 (clause 2c)	
8	Microstructure	Material test certificate	In accordance to spec TM18572 (clause 6.2)	
9	Radiography	a. Radiography test reports b. Radiography films	In accordance to spec TM18572 (clause 6.3)	
10	DP testing	DP testing reports	In accordance to spec TM18572 (clause 6.3)	
11	Dynamic balancing	Balancing reports	In accordance to spec TM18572 (clause 6.4)	
12	Stress relieving	Stress relieving report	In accordance to spec TM18572 (clause 2d)	

