



PRODUCT STANDARD
TME DIVISION, BHOPAL

TM 11491 Rev.03

PAGE 02 OF 06

TME/2012

COPYRIGHT AND CONFIDENTIAL
The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD.
It must not be used directly or indirectly in any way detrimental to the interest of the company

TECHNICAL SPECIFICATION OF END FRAME (DE), END FRAME (NDE), ROTOR END RING (MODIFIED) SET OF LABYRINTHS AND SPEED PROBE HOUSING MADE FROM SPHEROIDAL GRAPHITE CAST IRON (SGCI) FOR USE ON THREE PHASE TRACTION MOTORS TYPE 6FRA6068 & 6FXA7059.

1.0 Scope :

- 1.1 This specification covers the technical requirements, manufacture, inspection and packing of End Frame (DE), End Frame (NDE) , Rotor End Ring (modified), Set of Labyrinths and Speed Probe housing made from Spheroidal Graphite Cast Iron (SGCI) for use on three phase traction motors type 6FRA-6068 & 6FXA-7059.

2.0 Material specification and drawings of components :

- 2.1 The castings shall conform to Gr.400/18 of IS:1865 (Latest version) in regards to Chemical composition, physical properties and other relevant aspects.

The details of castings / items covered in this specification are given below :

Sl. no.	Description	BHEL Drg. No.
COMPONENTS FOR 6FRA - 6068		
1	End Frame /DE	04454364051
2	End Frame /NDE	04454464051
3	Rotor End Ring	24454564053
4	Speed Probe Housing	14450164053
5	Outer Bearing Cap /DE	14454364051
6	Clamp Plate /NDE	24454464051
7	Bearing Cap / NDE	34454464051
8	Inner Labyrinth /DE	44454364052
9	Inner Labyrinth /NDE	44454464052
10	Inner Labyrinth /NDE	44454464051
11	Inner Labyrinth /DE	44454364052
12	Outer Labyrinth /DE	44454364051

Revision : 03

Date: 09.10.2018

Distribution

TXM
QMX
TME
TSD

Qty.

1
1
1
1

Approved :
M.Verma

Prepared
A. Shukla

Checked:
A. Jain

Date:

09.10.2018



PRODUCT STANDARD
TME DIVISION, BHOPAL

TM 11491 Rev.03

PAGE 03 OF 06

TME/2012

COPYRIGHT AND CONFIDENTIAL
The information on this document is the property of BHARAT HEAVY ELECTRICALS IMITD
It must not be used directly or indirectly in any way detrimental to the interest of the company

Sl. no.	Description	BHEL Drg. No.
COMPONENTS FOR 6FXA - 7059		
13	End Frame / DE	04454366051
14	End Frame /NDE	04454466051
15	Clamp Plate /NDE	24454466051
16	Bearing Cap / NDE	34454466051
17	Bearing Cover / DE	34454366051
18	Inner Labyrinth /NDE	44454466052
19	Inner Labyrinth /NDE	44454466051
20	Inner Labyrinth /DE	44454366051
21	Inner Labyrinth /DE	44454366052
22	Rotor end ring (Modified)	14454566051

3.0 Manufacturing :

- 3.1 Firm should have their own foundry duly approved by RDSO as Class – A foundry for casting raw material or they have to submit adequate documentary evidence regarding sourcing of raw material (casting) from RDSO approved class – A foundry only.
- 3.2 All the components should be machined on CNC machine and the manufacturer should fulfil schedule of Technical requirements as per RDSO's STR No. RDSO/2007/EL/STR/0021 Rev."0" issued on 30.07.2007.
- 3.3 The dimension indicated on the relevant drawing are for the finish-machined components. The working drawing of the pattern and the pattern shall be prepared by the manufacturer/ tenderer himself. Responsibilities for pattern design shall be with the manufacturer / supplier completely.
- 3.4 Machining variations in the linear and angular dimensions without tolerance indications shall be in accordance with IS:2102 (Part-I)
- 3.5 The surface of the castings shall be free of mould and core sand and any unevenness impairing the usability of the castings.
- 3.6 The castings shall not exhibit any defects which will impair their machinability or usefulness to more than insignificant extent.
- 3.7 Welding shall not be allowed for repair of castings.

		PRODUCT STANDARD TME DIVISION, BHOPAL	TM 11491 Rev.03
			PAGE 04 OF 06
	TME/2012		
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	3.8 In the event of castings proving defective from foundry in the course of preparation, machining or assembly, such castings may be rejected not withstanding any previous certification or satisfactory testing and / or inspection.		
	4.0 Inspection :- 4.1 For vendors supplying this item to BHEL Bhopal for the first time, first lot of item shall be supplied for quality inspection at BHEL Bhopal and bulk supply shall be undertaken only after clearance of first lot by BHEL Bhopal. 4.2 Vendor has to initiate the supplies as per PO delivery only. Delay in supply of first lot of components or rejection of components due to any non-conformity/ quality deficiency shall not be considered as reason for delay in supply of components in subsequent deliveries as per PO delivery requirement. 4.3 Initial clearance of 1st lot of items does not absolve the supplier from supply of items as per drawing and specification requirement during bulk supply. 4.4 To ensure the accuracy and precision in the supplies of machined items checking of dimensions of each consignment must be done on 3-D Co-Ordinate Measuring Machine. Quantum of inspection shall be as per relevant QA plan. 5.0 Non-Destructive Test 5.1 Castings shall be subjected to radiographic inspection (5% offered qty. selected at random). 5.2 Radiographic test shall be done as per ASTM E689-95 Radiograph shall be graded in accordance with ASTM E-446 and ASTM E-186 as per Table – 1.		



PRODUCT STANDARD
TME DIVISION, BHOPAL

TM 11491 Rev.03

PAGE 05 OF 06

TME/2012

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

TABLE -1

Shrinkage	3
Inclusion	3
Gas Porosity	3
Crack	Not Allowed
Hot Tears	Not Allowed
Chaplets	Not Allowed

The casting having defects exceeding the above radiographic quality limits shall not be accepted.

- 5.3 The sampling of castings shall be in accordance with clause of relevant specification nominated on the relevant drawing.
- 5.4 Sample of the castings shall be inspected by the authorised representative of purchaser for its physical property test.
- 5.5 In case the radiographic test is not possible due to special shape or contour of the casting, it may be subjected to other non-destructive test.

6.0 Static Balancing

- 6.1 Only Rotor End Ring required to be checked for 100% static unbalance. The permissible unbalance in fully machined condition shall be limited to 20 ± 5 gram (max).

7.0 Documents to be supplied :

- 7.1 The manufacturer shall produce the records of all tests carried out by them along with tested sample to the inspecting authority at the time of inspection.
- 7.2 Report of dimensional compliance of individual components shall be provided by the manufacturer along with each supply.

8.0 Marking :

- 8.1 Marking shall be done as per requirement mentioned in relevant QAP



**PRODUCT STANDARD
TME DIVISION, BHOPAL**

TM 11491 Rev.03

PAGE 06 OF 06

TME/2012

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

9.0 Packing :

- i) The components shall be suitably packed to prevent transit / long storing damage.
- ii) The components shall be coated with antirust varnish/compound after inspection.
- iii) Varnished components shall be wrapped in polythene paper followed by corrugated paper.
- iv) The wrapped components shall finally be sealed in thick polythene bag.
- v) The sealed components shall be finally packed in wooden box filled with sawdust to prevent transit damage machine surfaces.
- a) Set of labyrinths type TM6FRA-6068(08 Nos.), shall be packed in two separate crates. The first will contain 6 components. The second will contain two components.
- b) Set of labyrinths TM type 6FXA-7059 (07 nos.) shall be packed in two separate Crates. The first will contain 5 components. The second will contain two components.
- vi) Packing list shall be provided on the boxes.

10.0 This specification is equivalent to CLW's specification no. 4TMS.096.068 Rev.01 Alt.02.