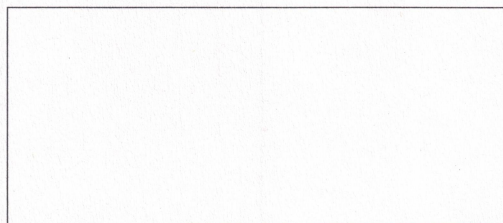


OUTER SHEET

**TECHNICAL SPECIFICATION FOR**  
**ROTOR SHAFT(FINISH MACHINED)**  
**FOR 3 PHASE TRACTION MOTORS**  
**TYPE 6FRA-6068 & 6FXA-7059**

APPROVED BY

CEE/TM



Remarks: Revision-1 done for digitization.

**SPECIFICATION FOR ROTOR  
SHAFT(FINISH MACHINED)  
FOR 3 PHASE TRACTION MOTORS  
TYPE 6FRA-6068 & 6FXA-7059**

**CHITTARANJAN LOCOMOTIVE WORKS  
WEST BENGAL , INDIA  
NO. 4TMS.096.071, Rev-1, Alt-2  
First Issued on: 12.11.2009**

(Prepared &  
checked by)

SSE/TMDO

(Reviewed by)

Dy.CEE/ TMD



Alteration Sheet				
Alt. No	Description of modification	Authority	Signature	Date
01	Para 2.1 amended	Dy.CEE/TMD	-Sd-	As signed
	Para 5.1 amended			
02	Para 5.2 amended	Dy.CEE/TMD	-Sd-	As signed
	Para 6.6 amended			

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## **SPECIFICATION FOR ROTOR SHAFT (FINISH MACHINED) FOR 3-PHASE TRACTION MOTOR, TYPE 6FRA-6068 & 6FXA-7059**

### **1.0 SCOPE:**

- 1.1 This specification covers the Manufacture, Testing, Inspection, Packing & Supply of Finish Machined Rotor Shaft for 3 phase Traction Motors type 6FRA- 6068 & 6FXA-7059.
- 1.2 The material shall comply with this specification in Chemical composition, Mechanical properties and all other listed requirements.

### **2.0 REQUIREMENTS:**

- 2.1 The Rotor Shaft (Rough Machined) shall be procured from CLW approved regular sources only, conforming to CLW Specification No. 4TMS.096.051 Rev-1 or latest version. **Alt-1 However, at least two shafts of each heat shall have an extra length of 200 mm** at higher diameter end for Metallurgical test during stage inspection. The test certificate of primary Vendors to be furnished along with suppliers test certificate.
- 2.2 The material shall be delivered in Finish Machined condition as per CLW drawing No. **1TWD.096.009 Alt-1 or latest** and **1TWD.097.025 or latest** for 6FRA-6068 & 6FXA-7059 respectively. Dummy pinion as per CLW drawing No. **2TJF.096.015 Alt-4 or latest** to be supplied along with Finished Shaft of 6FRA -6068.

### **3.0 SPECIFICATION:**

- 3.1 The material of the Rotor Shaft shall in general conform to **DIN EN 10083-1, 1996**(or latest version) grade **30CrNiMo8(Material no.1.6580)**. The chemical composition shall be as specified in **DIN EN 10083-1**. The special requirements of this standard also applies.
- 3.2 The mechanical properties of the Rough Machined Shaft shall be as under:  
Sampling should be carried out as per **EN 10083**.

<b>Rm</b>	<b>Tensile Strength</b>	<b>880 to 1030 N/mm<sup>2</sup></b>
<b>ROM. Rp0.2</b>	<b>Yield Strength</b>	<b>735N/mm<sup>2</sup> (min)</b>
<b>AS</b>	<b>Elongation</b>	<b>12%(min)</b>
<b>AKV</b>	<b>Impact Strength</b>	<b>45J(min)</b>
	<b>BHN</b>	<b>270-320</b>

### **4.0 DIMENSION:**

The dimension of Rotor shaft shall be as furnished in the relevant drawing enclosed with the tender for Finish Machined shaft.

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**5.0 TEST METHOD:**

Alt-1 5.1 The tests on the proof Machined Shaft after Hardening & Tempering shall be conducted generally as specified in **DIN 10083-1,1996(or latest version)** for **grade 30CrNiMo8(Material no.1.6580)** and the inspection certificate shall be submitted. However the no. of samples will be **02 minimum** selected at random. For this purpose, **at least two shafts of each heat** shall have an extra length of **200 mm** at higher dia end, in proof machined condition.

5.2 In addition to the test specified in the above standard, the following test are also to be conducted (after final machining):

(a) **Visual and Dimensional Check – 100%**

(b) **Magnaflux test-100%**

(c) **Surface Roughness test-10%**

Alt-2 (d) **Tapper Draw-100%**

Supplier shall carry out **Ultrasonic Test on 100%** proof machined shafts **before Final machining**. Test results/records shall be shown to the inspecting authority. However, consignee should also carry out **Magnaflux test** and **Ultrasonic test** before using these shaft on Traction Motors. If defect is noticed, that Shaft has to be destroyed by gas cutting or by any other suitable method. Ultrasonic test is to be carried out as per RDSO code of procedure **MC-149, Rev-1 /May 2013**.

5.3 The following metallographic parameters should also be ensured during stage inspection (Metallurgical Inspection):

i) Average Grain size (determined microscopically as per **IS: 4748-88)** **ASTM 6-B**

ii) Inclusion rating (determined microscopically as per **IS: 4163-82)**

iii) Type A B C and D both thick and thin series **< 2**.

iv) Free ferrite content of the Q & T steel shall not be more than **5%**.

**6.0 ROUTINE INSPECTION:**

6.1 Routine inspection of the Finish Shaft shall be carried out after approval of Prototype sample by the authorized representative of consignee as stipulated in P.O.

6.2 The supplier shall not offer any item of series production to the inspecting officer authorized under the contract, until the prototype has been finally approved.

6.3 **Inspection shall be carried out in two stages:- Stage inspection & Final Inspection.** The supplier shall provide all facilities free of cost to the Inspection authority at his works, to inspect and test components at various stages of manufacture and also for the complete components.

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#### 6.4 STAGE INSPECTION : Following tests to be carried out:

SL NO	TEST	METHOD
1	Chemical composition	As per Clause 3.1
2	Mechanical properties	As per Clause 3.2
3	Ultrasonic Test	As per Clause 5.2
4	Metallographic Parameters	As per Clause 5.3

6.5 For Metallurgical test, the test pieces are to be prepared as per clause 5.0. The test piece shall be parted in cold saw cutting machine or band saw without effecting heat treatment in presence of an authorized representative of Consignee.

6.6 **FINAL INSPECTION:** Following tests to be carried out during final inspection after the material has been passed in Stage inspection as per clause 6.4 above:

SL NO	TEST	METHOD
1	Dimensional Check(100%)	As per drawing
2	Magnaflux Test(100%)	As per IS:10138-Part -3
3	Surface Roughness(10%)	As per clause 5.0 & relevant drg.
4	Tapper Draw(100%)	As per amendment-1 to RDSO's SMI No. RDSO/2013/EL/SMI/0278(Rev '0') dated 24.12.2013 circulated vide RDSO's L/No. EL/2.2.13 dated 08.03.2021

Alt-2

6.7 The supplier shall offer the proof Machined shaft for metallurgical inspection first to consignee. After metallurgical clearance, the material to be taken up for final machining and to be offered to consignee for final inspection.  
Failed shaft shall be destroyed by Gas cutting in presence of Inspection authority.

#### 7.0 MARKING:

7.1 Each shaft shall be legibly marked with the following information:

i) **Manufacture's name, SL. No., Batch No. & Year of Manufacture.**

7.2 The Rotor Shaft complying with the requirement of this standard after inspection will be legibly marked with an acceptance by the purchaser's inspector.

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**8.0 INFORMATION FOR TENDERER:**

- 8.1 The tenderer shall study carefully the drawing and specification and STR before they submit their offers.
- 8.2 While submitting the offer the tenderer shall furnish the following information failing which the offer may not be considered:-
- List of M & P, test facilities and manufacturing process sheet.
  - Details of material offered and source of raw material and its grade.
  - Quality control system and quality assurance plan adopted by the tenderer.
  - Past performance for similar type of item.
  - For Finished Shaft of 6FRA-6068, tenderer to clearly specify the internal as well as external grinding arrangement to achieve precision of 01 micron.
  - Clause wise comments have to be furnished. Vague comments like noted and understood are not acceptable. Compliance have to be clearly stated. Otherwise railways have the right to reject the offer.

**9.0 PACKING:**

- 9.1 The Shaft should be coated with anti rust varnish/ compound after inspection.
- 9.2 Varnished components shall be wrapped in polythene paper followed by corrugated paper.
- 9.3 The Wrapped components shall finally be sealed in thick polythene bag.
- 9.4 The sealed components shall be finally packed in wooden box filled with saw dust to prevent transit damage of machined surface.

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