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SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURING AND SUPPLY OF  
"SMALL FABRICATED & MACHINED"  
ITEMS FOR THREE PHASE ELECTRIC LOCOMOTIVES

जारी कर्ता

ISSUED BY

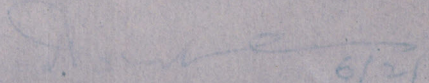
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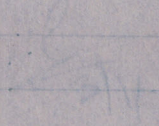
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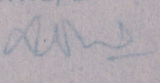
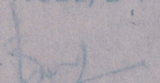
ELECTRIC LOCO DESIGN OFFICE  
CHITTARANJAN LOCOMOTIVE WORKS

CHITTARANJAN-713331

WEST BENGAL

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**SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURE AND SUPPLY OF FOLLOWING SMALL FABRICATED ITEMS REQUIRED FOR THREE PHASE ELECTRIC LOCOMOTIVES:-**

**1.0 NAME OF THE ITEM:**

i) Torque Support, ii) Axle Holder, iii) Spacer, iv) Tube (Spring Guide), v) Bar Bogie Head Beam, vi) Pivot Ring & Housing Ring, vii) Locking Plate for Pivot/Housing Ring, viii) TM Bellow Mounting Assembly.

**2.0 APPLICATION:**

Used in Three Phase Electric Locomotives in Indian Railways. The items are to be manufactured as per relevant drawings and specifications.

**3.0 SCOPE:**

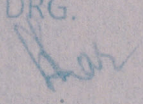
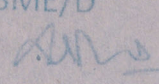
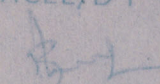
The Schedule of Technical Requirements (STR) is issued to serve as a guide to manufactures (called the "firm" hereafter) and should be read in conjunction with the relevant drawings and specifications with latest Revisions / Alterations. The technical requirements are meant to serve as guidelines only and are not exhaustive. The firm should satisfy themselves having complied with the requirements of drawings and STR. List of relevant Drawings / Specifications is listed as Annexure -I

Wherever lacking, existing CLW approved sources must also upgrade their facilities to fulfill the requirements of this STR within a period of One year from date of issue of this STR.

**4.0 GENERAL REQUIREMENTS**

The firm should have currently valid ISO-9000 certification issued by an approved agency of the International Accreditation Forum (IAF) with the activity desired clearly mentioned in the scope of certification.

- 4.1 The firm should have currently valid ISO-9000 certification issued by an approved agency of the International Accreditation Forum (IAF) with the activity desired clearly mentioned in the scope of certification.
- 4.2 A system of regular submission of rejection details of material giving rejection rate, cause of rejection, corrective action taken etc. on quarterly basis should be followed by firm.
- 4.3 The firm must have system of documentation in respect of rejection at customer end, warranty replacement and failure of item supplied by them during service.

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4.4 The firm shall have all latest relevant Standards like IS, DIN, BS etc. pertaining to product specification

4.5 The firm shall have system of recording the plant, machinery and control equipments remaining out of service, nature of repairs done etc.

4.6 The testing & measuring equipments shall be duly calibrated and the validity of calibration should be current and verified by physically checking the calibration certificate issued by Calibration Agency from whom it was calibrated. Calibration shall be done by NABL accredited labs whose accreditation is valid on the date of calibration.

4.7 Firm should have adequate trained personnel and service after sales network.

4.8 Whenever there is any change with respect to approved QAP, the same shall be promptly submitted to CLW for approval.

### 5.0 QUALITY ASSURANCE PLAN (QAP)

The firm shall prepare a Quality Assurance Plan (QAP) before approval is sought and submit the same as part of compliance of this STR. The QAP shall be a comprehensive document covering the following aspects.

- i) Details of Quality Control Organization of the firm along with key personnel engaged in the QC function
- ii) Qualification log sheet of the personnel manning the quality control set up.
- iii) Process flow chart indicating process of manufacture of an individual product or for a family of products for which the process is same.

#### iv) Details of Sub-Vendors:

- The name of item for which sub-vendor is approved.
- The name of approving agency
- Quality manual submitted by sub-vendor to primary vendor
- The sub-vendor to have all the requisite infrastructure of manufacturing and testing facilities, preferably under one roof. The sub-vendor to broadly meet with all the technical requirements laid down in this STR.

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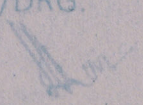
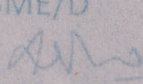
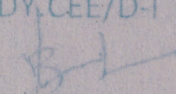
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## 5.2 INCOMING MATERIAL

- 5.2.1 A complete bill of material indicating all input material items required for manufacturing of the products governing specification and their sources of supplies as approved by the firm should be furnished.
- 5.2.2 Raw material shall be procured from CLW/RDSO approved sources wherever applicable or from reputed suppliers if no CLW/RDSO source is specified. Documentary proof of purchase and test certificate of each component shall be maintained and produced.
- 5.2.3 Record of each sub-supplier clearly showing the quantity purchased and rejected as well as cases of late delivery, if any shall be kept.
- 5.2.4 Incoming raw material shall be 100% inspected by Quality Control Department of the firm for any defect and deviation. The test results of incoming raw material with references to test certificate issued by the supplier and the results of internal tests carried out by the firm for verification may be submitted as part of QAP.

## 5.3 PROCESS OF MANUFACTURING

- 5.3.1 Complete process flow chart covering all steps of process of manufacture for an individual product (or for a family of product if the process is same), including the process flow of outsourced activities along with its integration with main process, shall be clearly enlisted as part of QAP.
- 5.3.2 The following details of machine used for all the steps of machining operations should be included.
- Make, model and commissioning date of the machine.
  - Accuracy.
  - Details of machining operations.
- 5.3.3 Machining process should be such that all critical dimensions are final. Vague language like available or will install is not acceptable.
- 5.3.4 Details of jigs and fixtures used during manufacture should be furnished along with the manufacturing process wherever used.

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5.3.5 List of typical Machinery & Plant, testing and measuring instruments required for manufacture is mentioned in Annexure – II. The list is for general guidance only and manufacturing operation shall be submitted and got approved by the firm as a part of QAP.

#### 5.4 INSPECTION AND TESTING PLAN.

5.4.1 Testing setup should be available in the firm's own premises capable of testing the equipments as specified in the relevant technical specification.

5.4.2 Complete Inspection and Testing Chart covering all steps of process of manufacture for an individual product including final inspection should be clearly enlisted as part of QAP.

5.4.3 The following details of Testing / measuring instruments / equipments / tools / jigs / fixtures used for all the steps of measurement and testing operations should be included:


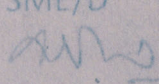
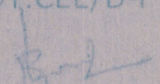
- Make and Model of the equipment
- Name of the manufacturer
- Accuracy
- Capacity or Range
- Date of Calibration
- Due date of calibration
- Agency of Calibration

Vague language like available or will install is not acceptable.

5.4.4 The accuracy and capacity of the testing and measuring equipments shall be adequate to meet the requirements of the specification and drawing.

5.4.5 Stage inspection detailing inspection procedure, inspection parameters and method of testing / test procedure including sample sizes for destructive and non-destructive testing. Record of test results of stage inspection should be available and furnished.

5.4.6 List of typical Testing and measuring instruments required for manufacture is mentioned in Annexure – III. The list is for general guidance only. However, the specific Testing & measuring instruments, gauges used by the firm will also form part of QAP and shall be submitted.

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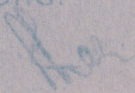
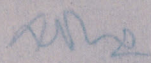
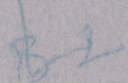
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## 5.5 FORMAT TO BE SUBMITTED WITH QAP

Format to be submitted with QAP is enclosed as Annexure - IV. Firms shall fill these formats keeping in view Para 5.3

### STORAGE FACILITY

- Adequate Dust free, clean and non - humid environment for storage of raw material and finished product separately
- Adequate Dust free, clean and non-humid environment for product assembly area
- Adequate Stacking / Handling tables and racks in above storage area.

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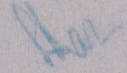
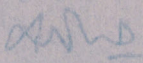
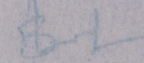


ANNEXURE - II

LIST OF MACHINERY AND PLANT

Sl. No.	Name of Machinery & Plant	Capacity / Rating	Purpose	Essential / Optional
1.	Drilling M/c	Standard	For various drilling operations as per drawing	Essential
2.	Boring M/c	Standard	For boring as per drawing for Torque Support Axle Holder	Essential
3.	Lathe M/c	Min. 2.5 M bed length	For machining as per drawing for Bar Bogie Head Beam	Essential
4.	Lathe M/c	Standard	For various machining operations as per drawing	Essential
5.	Shearing/Plate cutting/Oxy cutting Arrangement	Standard	As per drawing of the item	Essential
6.	Grinding M/c	Pedestal/Portable	For surface finish as per drawing	Essential
7.	Jig & Fixture	For drilling operation	As per drawing for Bellow Mounting, Pivot/Housing Ring, Locking Plate for Pivot/Housing Ring	Essential
8.	Plate Bending M/c	Standard	For Bellow Mounting	Essential
9.	Welding M/c	Standard	For Bellow Mounting	Essential
10.	Heat Treatment Arrgt.	Standard	As per drawing	Optional **
11.	Painting Booth	Suitable size	For painting as per drawing	Essential

\*\* Optional activity or Machinery & Plant facility may be outsourced. However the sub-vendor is also to be assessed.

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#### ANNEXURE - IV

#### FORMATS TO BE SUBMITTED WITH AP

##### 1. Organization specific to the product

Description	Name of person with contact no	Qualification	Experience	
			Field	Year
(a)	(b)	(c)	(d)	(e)
Design in - charge				
Production in - charge				
Quality Inspection in-charge				

##### 2. Incoming Material Control

Subject / Product / Process	Sample size & its frequency of inspection	Parameter for inspection	Mode of Inspection / Equipments used	Acceptance Limit/criteria/specified value as per Drg/Spec.
(a)	(b)	(c)	(d)	(e)

Document Reference	Record Format No.	Action in case of rejection
(f)	(g)	(h)

##### 3. Process Control:

###### (i) Proposed M&P

Sl. No.	Process/ Activity	Work Instruction Ref.	Machine Details					In- house / Out source
			Lead parameter	Make	Model	Comm. Dt	Accuracy	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)

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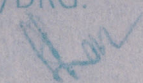
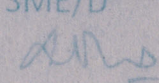
#### 6. Calibration Plan

Instrument Description	Serial No.	Make	Model	Year of procurement	Capacity / Range	Accuracy	Periodicity of Calibration
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

Calibration Agency	Record Format No.
(i)	(j)

#### 7. Approved Sources for Raw Materials / Consumables

Raw Material / Consumable	Specification / Standard	Source Address with	Whether Source is controlled by CLW / RDSO / Others
(a)	(b)	(c)	(d)

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