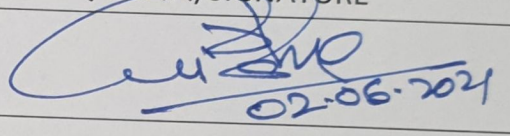


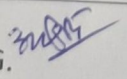
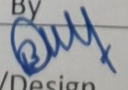
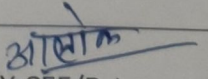
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**SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURING AND SUPPLY OF
"DAMPERS FOR 3-PHASE ELECTRIC LOCOMOTIVES"**

जारी कर्ता
ISSUED BY
विद्युत इंजन अभिकल्प कार्यालय
चिरेका/चित्तरंजन
ELECTRIC LOCO DESIGN OFFICE
CHITTARANJAN LOCOMOTIVE WORKS
CHITTARANJAN-713331
WEST BENGAL

अनुमोदन कर्ता/APPROVED BY	हस्ताक्षर/SIGNATURE
प्रधान.मु.वि.अभि./PCEE	 02.06.2021

सिफारिश कर्ता/RECOMMENDED BY	हस्ताक्षर/SIGNATURE
मु. वि. अभि. / डी एंड डी/ CEE/D&D	अभिजित

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SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURE AND SUPPLY OF DAMPERS FOR THREE PHASE ELECTRIC LOCOMOTIVES:-

1.0 NAME OF THE ITEM:

DAMPERS for 3-Phase Electric Locomotives.

2.0 APPLICATION:

Used in 3-Phase Electric Locomotives in Indian Railways. The items are to be manufactured as per relevant drawings and specifications.



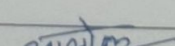
3.0 SCOPE:

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 per 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:

- 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.
- 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.

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

4.8 QAP to be made as per the online format of CLW. The format can be obtained from http://clw.ggn.rcil.gov.in/help_vendor.htm.

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

5.0 INCOMING MATERIAL:

5.0.1 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.

5.0.2 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.

5.0.3 Record of each sub-supplier clearly showing the quantity purchased and rejected as well as cases of late delivery, if any shall be kept.

5.0.4 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.

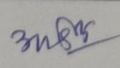
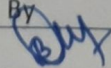
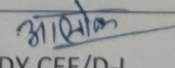
5.1 PROCESS OF MANUFACTURING:

5.1.1 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.

5.1.2 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.

5.1.3 Machining process should be such that all critical dimensions are final. Vague language like available or will install is not acceptable.

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5.1.4 Details of jigs and fixtures used during manufacture should be furnished along with the manufacturing process wherever used.

5.1.5 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.

5.2 INSPECTION AND TESTING PLAN:

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

5.2.2 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.

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

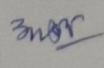
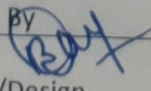
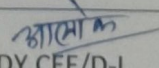
- Make and Model of the equipment
- Name of the manufacturer
- Accuracy
- Capacity or Range
- Date of Calibration
- Due date of calibration
- Agency of Calibration

Vague language like available or will install is not acceptable.

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

5.2.5 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.

5.2.6 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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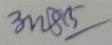
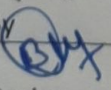
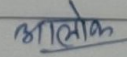
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ANNEXURE – I

LIST OF DRAWINGS, SPECIFICATIONS AND STANDARDS

Sl. No.	Item	Drawing/Specification No.
1.	DAMPERS for WAP-7	CLW spec No. CLW/MS/3/SPEC/ELDO-Bogie/002 Drawing No. 1209-01.215-014
2.	DAMPERS for WAG-9	CLW spec No. CLW/MS/3/009 Drawing No. 1209-01.215-014
3.	DAMPERS for WAP-5	CLW spec No. CLW/MS/10/005 Drawing No. 1210-01.215-014

- All Specification of Raw Materials and Testing should be as per latest version.

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ANNEXURE – II

LIST OF MACHINERY AND PLANT

Sl. No.	Name of Machinery & Plant	Capacity/ Rating	Purpose	Essential/ Optional
1.	Forging Machine	Standard	For manufacture of spindle etc.	Optional **
2.	Grinding Machine	Standard	For grinding of spindle.	Essential
3.	CNC Horizontal Machining Center	Standard	For machining bore of spindle, valves etc.	Essential
4.	Hardening Unit	Standard	For Hardening of spindle	Optional **
5.	Zn Plating unit	Standard	For Zn plating several parts	Optional **
6.	Welding machine	Standard	For welding of easing parts.	Essential
7.	Hydraulic/ Mechanical Press Machine	6 to 10 ton	For bearing press.	Essential
8.	Pneumatic press Moulding machine	Standard	For all sealing and rubber items.	Optional **
9.	Modern fitting table with Torqueing unit	Standard	For fitment of all parts.	Essential
10.	Vertical Machining center	Standard	For Spindle Boring	Essential
11.	Lapping Machine	Standard	For lapping the spindle bore.	Essential
12.	Turning Center	Standard	For turning pin, spindle, cylinder.	Essential
13.	Drilling and Tapping Machine	Standard	For Drilling and tapping of different parts.	Essential
14.	Milling Machine	Standard	For Milling and Slotting of different parts.	Essential
15.	Thread Milling Machine	Standard	For threading spindle and cover.	Optional **
16.	Power saw machine	Standard	For cutting of shaft, pipe etc.	Essential
17.	Painting unit with measuring instruments	Standard	For painting of damper	Essential
18.	Material handling arrangement	2-ton EOT crane /Trolley	For assembly of Damper	Essential
19.	Vulcanizing unit for non-metallic parts /Outsourcing	Standard	For manufacturing 'O' rings, seal spheribloc etc.	Optional **
20.	Spring manufacturing unit	Standard	For production of spring	Optional **

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

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ANNEXURE – III

LIST OF TESTING EQUIPMENTS

Sl. No.	Name of Measuring & Testing	Capacity / Rating	Purpose	Essential/ Optional
1.	Computerized Damping testing Machine	120mm stroke (Max) 50KN load (Max)	For testing of force-velocity curve & sudden shock	Essential
2.	Rockwell hardness tester	Standard	Hardness testing of different parts of Damper	Essential
3.	Spring testing Machine	Standard	Testing of Spring	Essential
4.	Coating Thick gauge (DFT meter)	Standard	Measuring Coating thickness of paint	Essential
5.	Tensile testing machine	Standard	Checking of Tensile Strength of Damper	Essential
6.	Leakage testing arrangement of Pipe	Standard	For leakage of Tube before manufacturing	Essential
7.	Endurance testing Machine	Standard	For Endurance of minimum 1 Million Cycles	Essential
8.	Salt Spray testing arrangement	Standard	To check surface durability against Rusting	Optional **
9.	Hydraulic Test Arrangement	Standard	To check stroke length of Damper at different velocities	Essential
10.	Stiffness Test	Standard	To check Torsional and Cardanic Stiffness	Essential
11.	Vibration Testing Arrangement	Standard	To check the amplitude of bogie movements	Optional **

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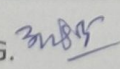
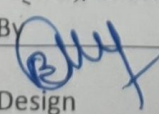
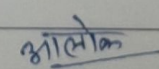
LIST OF MEASURING EQUIPMENTS

Sl. No.	Name of Measuring & Testing	Capacity / Rating	Purpose	Essential/ Optional *
1.	Vernier	1 to 2 feet	For measuring different dimensions	Essential
2.	Bore gauge	Standard	For measuring different bore.	Essential
3.	Angular Measuring Device	Standard	Testing of Spring	Essential
4.	Micrometer	Standard	Measuring Coating thickness of paint	Essential
5.	Surface Roughness Tester	Standard	For Checking Surface Roughness	Essential
6.	Profile Projector	Standard	For Checking Rubber Seals	Essential

* Optional measuring & testing facility may be outsourced but outsourced firm should be Govt. Approved / RDSO Approved Lab.

QUALITY REQUIREMENTS

1. Input Raw Material-Chemical/Metallurgical test is to be done & Source of raw material to be specified.
2. Stage -Wise inspection are to be done & Check List for the same is to be made.
3. Final Inspection is to be done and Check List for the same is to be made.

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