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**SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURING AND SUPPLY OF
"LEATHER BELLOW WITH MOUNTING ARRANGEMENT AND HARDWARE IN A SET"
FOR WAG-9HC & WAP-7 ELECTRIC LOCOMOTIVES**

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

अनुमोदनकर्ता/APPROVED BY	हस्ताक्षर/SIGNATURE
प्रधान.मु.वि.अभि./PCEE	R YADAV Digitally signed by R YADAV Date: 2023.04.25 17:03:15 +05'30'

सिफारिशकर्ता/RECOMMENDED BY	हस्ताक्षर/SIGNATURE
मु.वि.अभि./डीएंडडी/ CEE/D&D	AVIJIT CHAKRABORTY Digitally signed by AVIJIT CHAKRABORTY Date: 2023.04.19 18:41:56 +05'30'

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DEBABRATA DHAR Digitally signed by DEBABRATA DHAR Date: 2023.04.17 12:01:49 +05'30' SSE/DRG.	GURUDAS MANDAL Digitally signed by GURUDAS MANDAL Date: 2023.04.17 12:59:35 +05'30' SSE/DRG.	RAVI YADAV Digitally signed by RAVI YADAV Date: 2023.04.17 13:21:34 +05'30' DY.CEE/D-I

Signature Not
Verified
Digitally signed by
RAVI YADAV
Date: 2023.04.25
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Reason: IREPS-CRIS
Location: New Delhi

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SCHEDULE OF TECHNICAL REQUIREMENTS FOR LEATHER BELLOW WITH MOUNTING ARRANGEMENT AND HARDWARE IN A SETFOR WAG-9HC & WAP-7 ELECTRIC LOCOMOTIVES: -

1.0 NAME OF THE ITEM:

Leather Bellow With Mounting Arrangement And Hardware In a Set for WAG-9HC & WAP-7 Electric Locomotives.

2.0 APPLICATION:

Used in WAG-9HC & WAP-7 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.

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- 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 adequately trained personnel and service after sales network.
- 4.8 The firm should have QAP of the item. 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 RDSO/ISO certified sources. 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.

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

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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.

ANNEXURE – I

LIST OF DRAWINGS, SPECIFICATIONS AND STANDARDS

S.No.	Item	Drawings/Specification No.
1	Leather Bellow with Mounting Arrangement & Hardware in a set for WAG-9HC /WAP-7	CLW Drg. No. 1209-01.018-024(Alt-1 or latest) CLW Drg. No. 1209-01.018-029 RDSO specification No. SPEC/E-7/06(Rev.2)

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

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ANNEXURE – II

LIST OF MACHINERY AND PLANT

S. No.	Name of Machinery & Plant	Capacity/ Rating	Purpose	Essential/ Optional**
1.	Stitching Machine	1000mm X 700mm (Nylon Threads with minimum of 10 kg Ultimate Braking Strength)	For stitching of leathers and stitching of 8 SWG Galvanized Iron with Wire Stiffeners with bellow	Essential
2.	Lathe	Standard	For machining operation	Optional**
3.	Drilling Machine	Standard	For Drilling operation	Optional**
4.	Oxy cutting/ Shearing Machine	Standard	For Cutting	Optional**
5.	Grinding Machine	Standard	For surface finish	Optional**
6.	Milling Machine	Standard	For machining operation	Optional**

** Optional activity or machinery and plant facility may be outsourced. However, sub-vendor is also to be assessed.

Note: Suitable substitute/ combined machine if any to be indicated for acceptance.

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Annexure-III

List of Measuring&Testing Equipments

Sl. No.	Name of Measuring & Testing Equipments	Capacity / Rating	Essential/ Optional **
1.	Steel Scale	Different sizes	Essential
2.	Steel Tape	Min. 1000mm	Essential
3.	Vernier Caliper	Min. 600mm	Essential
4.	Oil & Water Resistant Test	Standard	Essential
5.	Spark Proof Test	Standard	Essential
6.	Crackiness of The Grain Test	As per IS 578 (latest Rev.)	Optional **
7.	Tensile Strength Test	Min. 210 kg/cm ²	Optional **
8.	Tensile Elongation Test	25-30% elongation at 1kg/mm ² force after 15 mins. As per IS 578(latest Rev.)	Optional **
9.	Tearing Strength Test	As per IS 578(latest Rev.)	Optional **
10.	Solvent Extractable Substances Test	3.0-7.0 percent by mass	Optional **
11.	Chromium Content Test	3.5 percent by mass	Optional **
12.	PH of Water Soluble Test	Not below 3.5 As per IS 578(latest Rev.)	Optional **
13.	Maximum Stretch Test	As per RDSO spec. No. SPEC/E-7/06(Rev.2)	Essential
14.	Leak And Balloon Test	Inside Air Pressure of 0.5 psi	Essential
15.	Leather Quality Test	As per IS 578(latest Rev.)	Optional **
16.	Endurance Test	As per RDSO spec. No. SPEC/E-7/06(Rev.2)	Essential

** Optional activity of 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.
4. ISO certification.
5. NSIC / SSIC registration.
6. The firm should have adequate covered floor area.

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