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**SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURING AND SUPPLY OF
“BRAKE GEAR ARRANGEMENT AND DETAILS” FOR WAG-9HC/WAP-7 (3-Phase)
& WAG-7/WAP-4 (Conventional) LOCO.**

**जारीकर्ता
ISSUED BY
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Signature Not
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1.0 NAME OF THE ITEM:

BRAKE GEAR ARRANGEMENT AND DETAILS FOR WAG-9HC/WAP-7 (3-Phase) & WAG-7 / WAP-4 (Conventional) LOCO.

2.0 APPLICATION:

Brake Gear Arrangements are used in WAG-9HC/WAP-7/WAG-7/WAP-4 Electric Locomotives. The item is 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& work 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/BLW/Railways 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.

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- 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.
- 4.7 Firm should have adequately 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/DLW/Railways 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/CLW/DLW/Railways/ 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.

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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.
- 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

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DEBABRATA DHAR Digitally signed by DEBABRATA DHAR Date: 2023.04.13 10:15:16 +05'30' SSE/Drg.	GURUDAS MANDAL Digitally signed by GURUDAS MANDAL Date: 2023.04.13 10:19:39 +05'30' SSE/Drg.	RAVI YADAV Digitally signed by RAVI YADAV Date: 2023.04.13 11:33:41 +05'30' Dy. CEE/D-I

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- 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.

ANNEXURE – I

LIST OF DRAWINGS, SPECIFICATIONS AND STANDARDS

Sl No.	Item	Drawing/Specification No.	Raw Material Specification
i)	Brake Gear Arrangement & Details for WAG-9HC/WAP-7	1209-01.116-059 1209-01.216-060	
ii)	Brake Gear Arrangement & Details for WAG-7/WAP-4	06/01/19/108 (WAG-7) 03/01/19/36 (WAP-4) 03/01/19/37 (WAP-4) 03/01/19/38 (WAP-4)	

- 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.	Description	Capacity	Remarks	Essential/Optional
1.	Power Shearing Machine	For Thickness upto 6 mm	Required for shearing plates to required sizes.	Optional **
2.	Oxy-cutting /Plasma cutting/Laser cutting	For Thickness upto 32 mm	Required for shearing /Profile cutting of plates of higher thickness.	Essential
3.	Plate-bending Machine	For bending of plate min 25 mm thick x 725 mm long x 150 mm width	For bending of plate min. 25 mm thick x 725 mm long x 150 mm width	Essential
4.	Hydraulic press	Capacity= 80 T	Required for straightening and labelling plates upto 32 mm thick.	Essential
5.	Lathe machine	Standard (Medium)	Required for machining and turning components.	Essential
6.	Drilling Machine	For dia. upto 50 mm	Required for drilling holes of sizes on the plate.	Essential
7.	Arc- welding arrangement	Capacity= 300 Amps. min	Required for welding plates in position.	Essential
8.	EOT/Portable/Hydraulic crane	2T	Required for accommodating Complete Brake Gear Arrgt. for shifting from one location to the other on shop-floor.	Essential
9.	Space requirement for Fabrication	2500 sq. Ft.	Required for placing and stacking of finished products.	Essential
10.	Casting Arrangement	Standard	For Brake Shoe & Brake head	Optional **
11.	Forging Arrangement	Standard	For Bolt	Optional **
12.	Tapping & Thread Cutting	Standard	For Bolt	Optional **
13.	Painting Facility	Standard	For Painting	Essential

** Optional activity or Machinery & Plant facility may be outsourced. However, the 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.	Vernier and Micrometer	Standard	Essential
2.	Measuring Tape	3m	Essential
3.	Surface Table	6' x 4'	Essential
4.	Chemical & Physical Testing Lab	Standard	Optional*

* Optional measuring & testing facility may be outsourced but outsourced firm should be Govt. Approved / RDSO Approved Lab/NABL Approved/ to be assessed by CLW/BLW/Railways.

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

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. Firm should have adequate covered floor area.

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