

STR No.ELRS/STR/AUX/ 0014

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

**SCHEDULE OF TECHNICAL REQUIREMENTS
FOR
REWINDING OF AUXILIARY MOTORS FOR ELECTRIC
LOCOMOTIVES**

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ISSUED BY

**ELECTRICAL DIRECTORATE
RESEARCH DESIGNS & STANDARDS ORGANISATION
MANAK NAGAR, LUCKNOW – 226 011.**

SCHEDULE OF TECHNICAL REQUIREMENTS FOR REWINDING OF AUXILIARY MOTORS USED IN ELECTRIC LOCOMOTIVES

1.0 SCOPE

Railways are getting the rewinding of failed auxiliary motors of Electric locomotives done through trade on contract basis. Some of the approved manufacturers of auxiliary machines are also getting the warranty repairs of their failed motors done through their approved contractors. Railway Board vide letter no. 2002/Elec(TRS)/441/2 Pt dated 07/02/2006 have advised RDSO to make list of approved contractors for rewinding of auxiliary motors. This Schedule of Technical Requirement (STR) has been developed for the guidance of the Railways and prospective rewinding contractors (henceforth called "the firm") to satisfy themselves that they possess the requisite facilities.

2.0 QUALITY SYSTEM

The firm should preferably have ISO 9000 certification. Alternatively the firm should possess a clearly laid down Quality Assurance Plan for the rewinding process covering the following aspects-

- i) A clearly defined Quality Control organisation headed by a person having requisite qualification of at least a diploma in Engineering.
- ii) Complete list of all raw materials used during the rewinding process and names of sub-vendors of the firm for each of these items
- iii) A system of tracing the quality of input material to final job so as to help in case of investigation of warranty failures.
- iv) A system of keeping record of all rewinding jobs along with test results and investigation of warranty failures.

The firm shall submit the Quality Assurance Plan to RDSO for approval.

3.0 MACHINERY AND PLANT

3.1 A list of machinery and plant and test facilities necessary to be possessed by the firm is enclosed vide Annexure 'A'.

3.2 Vacuum Pressure Impregnation (VPI) Plant:

- The VPI plant shall be located under a covered and clean space.
- It should be capable of working at 1 torr vacuum and 5 kg/cm² pressure.
- The vacuum and pressure gauges shall be properly calibrated by an authorised agency.
- The working procedure shall be properly displayed near the VPI plant

4.0 REWINDING PROCESS

4.1 The rewinding process should be carried out in a clean and dust free enclosed environment. The room should not have any other activities which generate dust, chips etc.

4.2 The firm should ensure that there is no damage to the winding coils being done during the rewinding process. For this use of rubber faced mallets and other tools should be ensured.

4.3 Use of rotating jigs for holding stators during rewinding should be made to avoid damage to winding.

5.0 SYSTEM FOR RAW MATERIAL IDENTIFIATION

The firm should have a system for identification of input material to each job. For this, the firm shall maintain a Job Card containing the sources and batch no/PO no for each input material as per proforma suggested in Annexure 'B'. The Card should be presented for inspection of final job and sent to the customer shed/shop along with details of testing for their record.

ANNEXURE 'A'

List of Machinery & Plant & Testing facilities

A. Machinery and Plant

1. Electric ovens (0-300 °C) with automatic cut in & cut off.
2. Crane/chain Pulley.
3. Coiling machine with counter.
4. Wedge cutting machine.
5. Vacuum impregnation plant. (as per para 3.2)
6. Brazing facility
7. Air conditioned room with minimum two air conditioners for keeping insulating material/varnishes.
8. Spray painting facility.
9. Proper insulated stands for keeping coils.
10. Storing & packing facility

B. Testing Facility

1. Complete testing facility for testing dual coat enameled winding wire as per IS: 13730 Pt.13.
2. Milli ohm meter.
3. High voltage test set.
4. Megger (500 v)
5. Surge comparison tester/ Growler test arrangement
6. Multi meter
7. Miscellaneous tools e.g., rubber faced mallet, wire cutter and Micrometer, etc.
8. Facility to check viscosity of resin.
9. Rotating Jigs for holding stator during re-winding.

ANNEXURE 'B'

RAW MATERIAL

SPECIMEN JOB CARD FOR MONITORING INPUT MATERIAL

S.No.	Item	Size/Thickness	Make/Supplier	P.O.No./Batch No.
1	Winding wire			
2	Slot Insulation			
3	Interphase seperator			
4	Interlayer separator			
5	Connecting Lead wire			
6	Sleeve			
7	Impregnating Varnish			
8	Wedge			