

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**



**SCHEDULE OF TECHNICAL REQUIREMENT (STR)
FOR MANUFACTURE OF METALLISED CARBON STRIPS
WITH AUTO DROPPING DEVICE FOR PANTOGRAPHS
OF ELECTRIC LOCOMOTIVES**

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| Approved by | Signature |
| PED/Traction | |

Issue Date: XX.XX.XXXX

**ELECTRICAL DIRECTORATE
RESEARCH DESIGNS AND STANDARDS ORGANISATION
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LUCKNOW**

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SCHEDULE TECHNICAL REQUIREMENT (STR) FOR MANUFACTURE OF METALLISED CARBON STRIPS WITH AUTO DROPPING DEVICE FOR PANTOGRAPHS FOR ELECTRIC LOCOMOTIVES

1.0 General:

1.1 This schedule of technical requirements covers the minimum requirement of M&P and testing facilities for development and manufacturing of Metallised Carbon Strips with Auto Dropping Device for Pantographs for use on 25 kV AC Electric Locomotive.

1.2 List of M&P required shall be as per Annexure-I.

1.3 Measuring/checking instruments/Gauges / Jig & fixture:

List of facilities for measurement and gauges required in Vendor's premises shall be as per Annexure-II. The accuracy and capacity of the measuring equipment shall be adequate to meet the requirements.

1.4 The measuring equipments / Gauges shall be duly calibrated and the validity of calibration should be verified by checking the calibration certificate issued by the Government Approved/ NABL accredited Calibration Agency from whom it was calibrated.

1.5 Vendor shall either have the manufacturing facility for carbon block confirming to RDSO specification No. RDSO/2014/EL/SPEC/0114 Rev. '0' or latest or firm should have the valid agreement/MOU with the carbon block manufacturer for the supply of the same.

2.0 OTHER FACILITIES:

2.1 Trolleys for transportation of material & finished product.

2.2 Vendor should have separate area for storage of finished product.

2.3 Air Compressor of adequate capacity.

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ANNEXURE-I**IN-HOUSE MANUFACTURING AND TESTING FACILITIES****A. MANUFACTURING FACILITIES**

- 1.0 Facilities for lifting and weighing.
- 2.0 Suitable equipments and facilities for machining such as cutting, grinding, drilling, boring etc.
- 3.0 Suitable facilities for Gluing operation and curing, if required in manufacturing process for Metallised Carbon Strips, copper/Brass tube and carrier
- 4.0 Suitable equipments and facilities for pad printing on Metallised Carbon Strip portion for identification of condemning limit and grade
- 5.0 Fabrication facilities, Vendors should have all the tools and jigs for assembly of Metallised Carbon Strips with Auto Dropping Device for Pantographs.

B. TESTING FACILITIES

- 1.0 Accurate surface table for checking of machined surfaces.
- 2.0 Hardness testing machine- HBN or HRB.
- 3.0 Facility for testing of Resistivity.
- 4.0 Facilities for air leakage test.
- 5.0 Facility for testing of Bulk density.
- 6.0 Facility for testing of Material composition of carbon strips, Transverse Strength (Bending strength), ~~Compressive Strength~~, Impact Force, shear strength (~~optional~~). These test facility may be outsourced from Government/ Government Approved/NABL accredited laboratory.

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ANNEXURE – II

| S. No. | Calibration & Measuring Instruments | Range | Least count |
|--------|-------------------------------------|-------------------------|------------------|
| 1. | Vernier Caliper | 0-200 mm | 0.1mm |
| 2. | Measuring tape | 0-3000 mm | 1mm |
| 3. | Micrometer | 0-25 mm | 0.01mm |
| 4. | Thread gauge | NA | NA |
| 5. | Pressure gauge | 0-10 Bar | 0.1Bar |
| 6. | Hardness tester | 30-130 HR 30-130 HBN | 1 HR 1 HBN |
| 7. | Resistivity meter | 0-2000 mΩ | 0.1 mΩ |
| 8. | Bulk density tester | NA | NA |
| 9. | Torque wrench | 0-25 Nm | 1 Nm |
| 10. | Bevel protector | 0-360° | 0.1 ⁰ |
| 11. | Impact load tester* | NA | NA |
| 12. | Shear strength tester* | NA | NA |
| 13. | Transverse strength tester* | 0-500 Kg | 0.1 Kg |
| 14. | Temperature measuring meters. | 0-200° C | 1 ⁰ C |
| 15. | Sprit Level Gauge | NA | NA |

* These test facility may be outsourced from Government/Government Approved/NABL accredited laboratory.

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