

STR No.ELRS/STR/CB/0010

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

SCHEDULE OF TECHNICAL REQUIREMENTS

FOR

CARBON BRUSH MANUFACTURERS

SEPTEMBER, 2003

ISSUED BY

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

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SCHEDULE OF TECHNICAL REQUIREMENT FOR CARBON BRUSH MANUFACTURERS

1.0 GENERAL :

1.1 Indian Railways are procuring carbon brushes for Traction Motors of Electric Locomotives from carbon brush manufacturers approved by RDSO. The carbon brushes are procured as per RDSO Specification No. ELRS/SPEC/ CB/0027/Rev '0' (called "Specification" hereafter). The Schedule of Technical Requirements is issued to serve as a guide to the carbon brush manufacturers (hereafter called "the firm") and should be read in conjunction with the specification. The firm should satisfy themselves about having complied with the requirements of the specification and the Schedule of Technical Requirements.

The technical requirements are meant to serve as general guidelines only and are not exhaustive.

1.2 The firm should have currently valid ISO-9000 certification including the subject item under its range of manufacture.

2.0 RAW MATERIAL :

2.1 Carbon Blocks:

2.1.1 Only RDSO approved carbon block grades shall be used in manufacturing of the carbon brushes. The firm shall ensure that the carbon block grade used in manufacturing the brushes is as per the currently approved list of RDSO.

2.1.2 In case the firm are not the manufacturers of the carbon blocks themselves, they shall produce documentary proof of purchase of carbon blocks from approved manufacturers along with test certificates for each batch.

2.2 Tamping Powder :

The quality of tamping powder is vital in ensuring proper joint of pigtail with the carbon brush. The tamping powder grade used by the manufacturer shall be compatible to the carbon block grade and the tamping powder shall, therefore, be procured only from approved sources of that grade of carbon block. The manufacturer shall maintain and furnish documentary evidence of procurement and testing of each batch of tamping powder from the approved source of carbon block.

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2.3 **Other Bought out items:**

2.3.1 The firm shall procure raw materials like flexible shunts, rubber top, sleeves etc. only from proven and reliable suppliers. Quality Assurance plan for these materials shall be furnished by the firm including list of sources and details of tests carried out.

3.0 **Manufacturing :**

3.1 Manufacturing shall be carried out in dust free, clean, properly ventilated and illuminated environment.

3.2 The firm shall keep meticulous record of the carbon brushes manufactured and supplied by them clearly showing the quantity delivered to the purchasers, rejections if any as well as the cases of late delivery.

3.3 **Tamping Process:**

3.3.1 Tamping process shall be so selected as to meet the requirements of the specification. The tamping machines shall be of automatic programmable type, capable of providing consistent tamped joints.

3.4 List of M&P required for manufacturing shall be as per Annexure-I. The list does not specify the capacity and quantity of various M&P which may vary according to the manufacturing capacity of individual firm.

4.0 **TESTING :**

4.1 List of testing facilities to be maintained in firm's laboratory shall be as per Annexure-II. The accuracy and capacity of the testing & measuring equipment shall be adequate to meet the requirements of the specification. The testing and measuring equipment/instruments shall be duly calibrated and the calibration certificate of the calibration agency shall be produced on demand. The validity of the calibration should be current.

4.2 Clear detailed records of testing of each batch of carbon brushes shall be maintained.

4.3 Firm should have in-house facilities for carrying out acceptance tests on finished carbon brushes as detailed in the specification. However, in respect of bought out items, for batch-wise acceptance tests as required under specification, services of a Government approved laboratory or in-house test facilities of the sub-supplier can be utilized.

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ANNEXURE-I

Detail of machinery and plant

1. Cutting/square shape Grinder
2. Size grinding/angle shaping
3. Size grinding/radius curving
4. Size grinding for slotting & grooving
6. High precision drilling machine for drilling, step drilling and grooving of carbon brushes.
6. Terminal crimping tool
7. 4 way chamfering machine
8. Printing machine with brush grade marking.
9. JIG for terminal crimping
10. Dust collection unit.
11. Packing machine for packing various types of CBs
12. Automatic Programmable tamping machine with drilling and scrolling facility.
13. Tin bath soldering plant.
14. Fixture for holding the rubber top after fixation in carbon brush.

ANNEXURE-II**Measuring Instrument**

1. Vernier Calipers
2. External micrometers
3. Dial Caliper
4. Dial gauge
5. Stopwatch digital
6. Digital multimeter
7. Digital Clamp meter
8. Thermometer

Testing Instruments**A. Carbon brushes**

1. Millivolt drop testing kit
2. DC Ammeter
3. AC Ammeter
4. Millivolt meter
5. Pullout strength testing unit
6. Endurance test kit with timer

B. Bought out items

1. Hardness tester.
2. Conductivity meter
3. Physical balance
4. Tensile testing machine
5. Temperature controlled chamber
6. Equipment for compression test
7. Kit for carrying out Annealing test.