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**Government of India
Ministry of Railways**

**QMS-15:2009
(Revision 0)**

**Infrastructure, manufacturing, testing & quality
control requirements**

**For
Nylon-66 Bushes**

(Specn. No. WD-04-Nylon Bushes-2002)

**Inspection & Liaison Directorate
Research Designs & Standards Organisation
Manak Nagar Lucknow – 226011**

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(Price Rs. /-)

1.0 SCOPE

The schedule of technical requirements covers the norms for manufacture of nylon-66 bushes to be used in Break Gear of Broad Gauge and Meter Gauge wagons & coaches.

2.0 GENERAL & MANUFACTURING FACILITIES

The vendor seeking approval shall comply with all the under mentioned requirements.

- 2.1 Covered area with adequate space for storage of raw material and finished product should be available which should be free from dampness and humidity.
- 2.2 De-humidifier with digital indication of temperature of air and its dew point should be available for pre-drying of raw material. Vacuum loader should be available to transfer de-humidified material from dehumidifier to moulding machines, so that contact of the dehumidified material with ambient air is minimised.
- 2.3 Horizontal screw type fully automatic Programmable Logic Control based injection moulding machine should be available for moulding.
- 2.4 Temperature of hydraulic oil should be kept controlled by water-cooling tower of suitable capacity. Mould temperature controller should be available for moulds.
- 2.5 Electrical hoist/manual block & tackle for mounting & dismounting of moulds should be available.
- 2.6 Suitably designed dies & moulds should be available for all the bushes as per at least one of RDSO drawings. The moulds must have minimum 2 cavities of each size of bush.
- 2.7 Annealing tank of suitable capacity with temperature indicator should be available.
- 2.8 Deflashing tools of suitable design in adequate numbers to be available.
- 2.9 Minimum infrastructure for maintenance and polishing of dies & moulds should be available in-house.
- 2.10 Diesel Generator of adequate capacity should be installed to take up the load of the entire plant in case of power failure.

3.0 TESTING FACILITIES

- 3.1 The firm must possess a fully equipped laboratory with controlled atmosphere i.e. temperature $23\pm 1^{\circ}\text{C}$ & relative humidity $65\pm 5\%$.
- 3.2 Tensile testing machine with extensometer and all provisions in accordance with ASTM-D-638 for testing tensile strength and elongation percentage should be available.
- 3.3 Necessary apparatus for testing the melting point and specific gravity in accordance with BS-2782 part-I & part-V respectively should exist.
- 3.4 Digital vernier calipers and 'GO NO-GO' gauges for inspection of OD, ID & height of the bushes should be available. Bore dial gauges should be available for measurement of dimension of mould cavities.
- 3.5 Ensure adequate quantity of ignition tubes, filter paper and apparatus for measurement of inherent viscosity as per App. 'C' of WD-04-Nylon bushes-2002.
- 3.6 Annealing tank for laboratory testing with hot & cold bath and temperature controllers having digital display should be available.
(The temperature accuracy of ± 0.1 shall be changed to $\pm 1.0^{\circ}\text{C}$ for measurement of inherent viscosity).
- 3.7 Stop watch with least count reading of 0.1 seconds should be available.
- 3.8 Moulds for tensile test specimens & water absorption test specimens should be available.

Note: All testing equipments should be calibrated at least once every year.

4.0 QUALITY CONTROL REQUIREMENTS

- 4.1 There should be a system to ensure the traceability of the product from raw material stage to finished product stage. This system should also facilitate to identify the raw material composition from the finish product stage. It should be possible to trace the raw material used during manufacture any sample, picked up from consignee end. There should be a system to ensure that the raw material used is Nylon-66 only.
- 4.2 Ensure that the system of 'First in- First out' is followed for raw material and the intermediate stage products.

- 4.3 Ensure that there is a Quality Assurance Programme for the product detailing various aspects
- Organisational Chart
 - Flow process chart
 - Stage/final inspection details
 - Various parameters and how to ensure control over them.
 - Disposal of non conforming products.

The QAP shall be available as per the requirements details in “Vendor approval guidelines & application form” – IL-03:2002.

- 4.4 There should be at least one plastic technologist having a minimum bachelor’s degree in relevant field & 5 years experience or a person with diploma in relevant field with 12 years experience. He should be free from day-to-day production, testing & quality control responsibility. He should be mainly responsible for development and regular production of the product, analysis of products, control over raw material, corrective action in case of difficulties in achieving the parameters.
- 4.5 Ensure that the in-charge of the quality control section is having a qualification of minimum bachelor’s degree in the relevant field & have minimum 5 years experience or a diploma holder with minimum 8 years experience. He should be actively involved in day-to-day activities of quality control/stage inspection/compliance of QAP etc.
- 4.6 The firm should have acquired ISO: 9001: 2000 certification and the product for which an approval is sought should be broadly covered in the scope of the certification for manufacture & supply.
- 4.7 The quality manual of the firm for ISO:9000 should clearly indicate at any stage the control over manufacturing and testing of the said railway product.
- 4.8 Firm shall ensure that proper analysis is being done on monthly basis to study the rejection at various internal stages and it is documented.
- 4.9 Firm shall ensure that all the relevant specifications, Drawings, IS standards and test methods (latest) are available with the firm.
- 4.10 It is to be ensured that the dies and moulds are checked for accuracy for various critical predefined dimensions at least on weekly basis or after production of 500 pieces which ever is earlier and observations are recorded.