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**Government of India
Ministry of Railways**

**QMS-06:2000
(Revision 0)**

*Infrastructural, manufacturing, testing & Quality control
requirements*
For

Metal Bonded rubber components

Side bearer pads	03 – Misc. – 86
Rubber buffer & draft gear springs for coaching stock	C 9501
Rubber buffer springs for wagon stock	R 36 – 98
High Capacity draft gear pads	55 – BD – 90
Center pivot washer	WD – 85079 S.2, IS:5192

**Inspection & Liaison Directorate
Research Designs & Standards
Organisation**

Manak Nagar Lucknow – 226011

February'2009

(Price Rs 800/-)

1.0 Scope:

- 1.1 The Schedule of Technical Requirements covers the norms for manufacture of metal bonded rubber components

2.0 Requirements:

The vendors seeking approval shall comply all the below mentioned requirements.

General & Manufacturing Facilities:

- 2.1 Covered area with adequate space for storage of raw rubber, carbon and chemicals should be available, which is free from dampness and humidity. **V**
- 2.2 The weighing facilities for measuring various raw material constituents and the product at intermediate stages.
The following facilities are required:
- a. Electronic weighing balance of 2 to 5 kg. capacity **V**
 - b. Mechanical spring balance or platform weighing machine of the capacity of minimum 50 kg of reputed make **V**
- 2.3 It is ensured that the weighing machines are calibrated regularly as per manufacturers / IS specifications. **E**
- 2.4 One no. press of min. 250 T capacity for shearing cutting, bending & punching steel plates in one stroke of thickness up-to 10 mm. If this is not available, a press of Min. 250T capacity for shearing, cutting, bending & punching steel plates in various strokes i.e. one operation in one stroke is available. **E**
- 2.5 At least one medium duty drilling machine should be available. **V**
- 2.6 At least two sets of closed dies, fixtures and templates for cutting, blanking, punching, bending of steel plates as per the drawing requirements. **V**
- 2.7 Bench grinding machine- minimum one no. to remove sharp edges from the sheared/blanked or bent steel plates should be available. **V**
- 2.8 At least three sets of Go & No-Go gauges should be available to check the dimensional accuracy of the steel plates and also the product at intermediate stage & final stage. **V**

- 2.9 Ensure that the Go & No-Go gauges are calibrated on due dates and the record is available. The Go & No-Go gauges should have a mention on it indicating the due date of calibration. **E**
- 2.10 Ensure that minimum one no. shot blasting machine with table dia of at least 3 feet is available. The shot blasting machine shall have in-built sieving facility to screen under size shots. **V**
- 2.11 Ensure that the degreasing facility is available. The process of cleaning should be proven one and capable of removing accumulated dirt/dust, black spot etc. The capacity of degreasing should be adequate enough. **V**
- 2.12 Ensure that the suitable spraying facility exist for application of adhesive. The spraying machine shall have an in-built provision of stirring the adhesive. **V**
- 2.13 The adhesive application shall be done in a separate room which is free from dirt/dust and having proper exhaust facility. **V**
- 2.14 Ensure that elcometer or any other measuring equipment is available to measure the thickness of adhesive coats at primer application & final application stage. The instrument shall be capable of measuring the thickness in microns. **V**
- 2.15 Ensure that a system exists to measure the adhesive film thickness at the specified frequency and is recorded. **E**
- 2.16 A suitable capacity close mixing mill (Banburry) for mixing purpose (minimum one number is preferable. However, availability of atleast one kneader or internal mixer is essential. **V**
- The mixer/ kneader should be fitted with a device having automatic control for opening and closing to avoid manual control. **E**
- 2.17 Ensure that minimum one number open mixing mill for sizing of rubber sheets is available. The open mixing mill should be equipped with suitable cooling arrangement and digital temperature indicator. **V**
- 2.18 Ensure that atleast one extruder to ensure uniform mixing is available. **E**
- 2.19 Minimum two numbers suitable size presses for cutting rubber blanks should be available. Ensure that a suitable size die and punch facility to cut the blanks to the size is available. **D**

- The facility for cutting suitable size presses for cutting rubber blanks should be available. **V**
- 2.20 An automatic thermic heating moulding press having provision of heating the platum hydraulically or by steam is available. **V**
- The press should be fully equipped with temperature controllers, digital temperature indicators and the timers. **E**
- There should be a provision to set the press in such a way that the required pressure, the time period and the temperature can be synchronized for subsequent series manufacture of a particular product without disturbing the setting on the machine. Minimum two number presses should be available. **D**
- 2.21 Suitably designed dies and transfer moulds for the product (min. 2 no.) should be available. **D**
- In case the transfer moulding is not available, the dies for compression moulding should be available. **V**
- 2.22 It is ensured that the moulds are measured for its accuracy for various dimensions and profile atleast on weekly basis or after a production of 500 pieces which ever is later and the observations of the mould are recorded. **E**
- 2.23 Ensure that the system exists to check the dimensional accuracy of the mould before its use if it is being used after a gap of considerable time period. **E**
- 2.24 In-house availability of minimum infrastructure for maintenance and polishing of dies and moulds should be available. **E**

Testing Facilities:

- 3.1 Controlled atmosphere laboratory to maintain standard temperature and humidity for rubber testing as per IS 13867 should be available. **E**
- 3.2 A seperate laboratory mixing mill & laboratory testing hydraulic press with temperature control, digital indicator, timer & pressure guage should be available. **E**
- 3.3 Tensile testing machine capable to read the load and elongation as per the requirement of the product should be available. The tensile testing machine should have all the provisions in accordance with para 4.2 of IS 3400 Part I. **V**

- 3.4 A) Ensure that one universal testing machine with load indicator having a least-count of minimum 20 kg is available. The capacity of the machine should be adequate to work the same at specified speeds and it should be capable to apply the required load for testing of the products for various deflection parameters with in the stipulated specifications. **V**
- B) The universal testing machine should also have the facility to draw a graph for various deflection characteristics as per the requirement of the product. **E**
- 3.5 Ensure that a rehometer is available and it is being used regularly. **V**
- Ensure that the record is maintained of the batches, which are checked on rehometer. **E**
- 3.6 Minimum two numbers air ovens should be available to facilitate the testing in accordance with para 4.2 & 6.2 of IS 3400 Part X. **V**
- 3.7 Minimum one number muffle furnace should be available. **V**
- 3.8 Ensure that minimum two numbers shore A hardness tester with standard test pieces are available. **V**
- 3.9 Specific gravity testing apparatus, atleast one number should be available. **V**
- 3.10 Ensure that the facility exist to check the viscosity of the adhesive. **V**
- 3.11 Ensure that the facility for preparing test specimen as per IS 3400 Part I is existing. **V**
- 3.12 Below mentioned measuring instruments in adequate number should be available –
- (a) Micrometers **V**
 - (b) Dial gauges **E**
 - (c) Vernal calipers **V**
 - (d) Go – No-Go gauges for all the important dimensions for a specific product **V**
- 3.13 One number chemical balance and a crucible for measuring ash content should be available. **V**
- 3.14 Suitable facilities for cutting the test specimen from the product should be available. **V**

3.15 Specific requirement for testing of Side Bearer Pads:
Ensure that suitable fixture to deflect the pad up-to 45 mm exists. V
The test is done to ensure Shear Bond Test.

3.16 Specific requirement for testing of Rubber Buffer Spring at Draft
Gear Springs for Coaching Stock:

Ensure the availability of the following-

- a. Suitable fixtures for measuring static characteristics. V
- b. Suitable fixtures for clamping of a pack of 16 pads. V
- c. Suitable machine of Endurance Test of a pack of 16 pads which should be capable to read the load of 2-10 Ton, counter and number of cycles per minute directly. V
- d. Suitable machine of adequate capacity for Impact Endurance Test with counter. The machine should be capable to conduct the test in accordance with the stipulated specifications. V

3.17 Specific requirement for testing of Rubber Buffer Spring for
wagons:

- a. Ensure that a suitable fixture for measuring static characteristics is available. V
- b. Suitable machine of adequate capacity for Impact Endurance Test with counter should be available to do the test in accordance with the stipulated specifications. V

3.18 Specific requirement for testing of high capacity draft gear pads:

- a. Ensure that a suitable machine is available for static compression test. V
- b. The facility should be available to do Cyclic Endurance Test. It should have a provision of counter and measurement of height. The machine should be capable to conduct the test in accordance with the specified parameters. V

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. V

- 4.2 Ensure that the system of 'First in –First out' is followed for raw material and the intermediate stage product. **E**
- 4.3 Ensure that there is a Quality Assurance Plan for the product detailing various aspects – **V**
- Organisational chart
 - Flow process chart
 - Stage inspection details
 - Various parameters and to ensure control over them
- The QAP shall be available as per the requirements detailed in "Vendor approval guidelines & application form" –IL-03:2000
- 4.4 There should be at least one full time rubber technologist having a minimum bachelor's degree in relevant field with 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 of a product, analysis of products, control over raw material, corrective action in case of difficulties in achieving the parameters. **V**
- 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 min 5 years experience or a diploma holder with min 12 years experience. He should be actively involved in day-to-day activities of quality control / stage inspection / compliance of QAP etc. **V**
- 4.6 The firm should have acquired ISO:9000 series certification and the product for which an approval is sought should be broadly covered in the scope of the certification for manufacture & supply. **V**
- 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. **E**
- 4.8 Ensure that proper analysis is being done on monthly basis to study the rejection at various internal stages and it is documented. **E**
- 4.9 Ensure that all the relevant specifications, IS standards are available with the firm. **E**
- 4.10 Ensure that the adequate covered area for storage of final product, awaiting inspection is available. **V**

- 4.11 Ensure that proper record of complaints received from users (Railways) is being maintained and corrective action is taken. **E**

Reporting of Compliance –

- 5.1 It is necessary to have the facilities with the vendor seeking registration.
- 5.2 Wherever the facilities stipulated are not available for the item seeking registration, it should be indicated as 'NR' (i.e. not required).
- 5.3 Wherever the facilities are not available, shall be indicated as 'Not Available'. Writing in short 'NA' will not be accepted.
- 5.4 All the requirements shall be indicated as YES/NR/Not Available in the compliance status.
- 5.5 The compliance of STR shall be indicated in the following format –

Clause No. of STR	Description of requirement	Details of facilities available	Compliance status