



**Government of India
Ministry of Railways**

**QMS- 27:2009
Revision 0**

**Schedule of Infrastructure, manufacturing & testing facilities
and quality control requirements**

for

Hose & Hose Assembly for Air brake
(Specn. No. AAR-M-601)

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

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(Price Rs. 600/-)

1.0 Scope

1.1 The Schedule of Technical Requirements covers the norms for manufacture of Hoses & Hose assembly for air brake.

2.0 Requirements

The vendor seeking approval shall comply with all the following requirements.

General & Manufacturing Facilities:

2.1 Covered area with adequate space demarcated for storage of raw rubber, carbon black, chemical & filler, finished products, inspection and testing should be available which should be free from dampness, humidity and direct sunlight .

2.2 The weighing facilities shall be available for measuring various raw materials, constituents and the product at various stages.

- a) Electronic weighing balance to weigh nearest 0.01 gm.
- b) Mechanical weighing balance or platform weighing machine of suitable capacity.

2.3 A open mixing mill minimum one no. for mixing and sizing of rubber sheet with proper cooling arrangement and temperature indicator is essential.

2.4 Ensure suitable extruder for making tube and cover, with suitable dies is available. One of the two extruders should be of cold feed process as required.

2.5 Sufficient numbers of mandrels as per standard sizes viz. dia. & length should be available.

2.6 An automatic steam or thermic heating moulding press having provision of temperature controller, digital temperature indicator and timer should be available. It should be equipped with a buzzer, essential to check the completion of curing period . There should be a provision to set the press in such a way that the required pressure , time period and the temperature can be synchronized for subsequent series manufacture of a product /test slab without disturbing the setting on the machine .

2.7 Ensure that at least one no. of horizontal braiders. Type of braider should be 36 carriers or 48 carriers. The braider should consist of one caterpillar & two docks having 36/48 carrier.

2.8 A suitable capacity vulcanizer & boiler is essential . The vulcanizer should have provision of gauges for indication of pressure and temperature. With temp. & pressure indicator. The internal dia of the vulcanizer should be of suitable size.

2.9 A pilot type vulcanizer & mixing mill is desirable for R&D work..

- 2.10 Ensure that minimum 2 No. long benches (not less than mandrel length) for fitting tube on mandrel, wrapping the cloth and application of adhesive are available.
- 2.11 Ensure that min. one no. of oil fired boilers are available.
- 2.12 Cutting facilities of hoses as per drg. is essential.
- 2.13 Ensure that minimum 2 Nos. press fitting equipment for hoses and coupling are available.
- 2.14 Ensure that minimum 1 No. tightening machine to fit clip on hoses is available.
- 2.15 Ensure that the system exist to check the dimensional accuracy of mandrel before its use.
- 2.16 Tool room for rectification of equipment is essential.
- 2.17 Suitable size air compressor for cleaning the hoses.
- 2.18 Ensure that one no. de-mandrelling machine for de-mandrelling the hose after vulcanization is available.

3. **Testing facilities:**

- 3.1 Controlled atmosphere laboratory to maintain standard temperature and humidity for rubber testing as per ASTM-D-412 should be available. Laboratory for testing should be free from any mechanical vibration.
- 3.2 Dry and wet bulb thermometer is essential in lab.
- 3.3 Tensile testing machine capable to read the load and elongation as per requirement of the product should be available. The tensile testing machine should have all the provisions in accordance with ASTM-D-412.
- 3.4 A calibrated proven ring is essential to check the accuracy of load in machine during product testing.
- 3.5 Ensure that two dial gauge verniers, one micrometer. two thickness gauges and two hardness gauges are available.
- 3.6 Ensure minimum one air ageing oven equipped with time/temperature graph and one muffle furnace with temperature indicator is available.
- 3.7 Ensure minimum one electronic chemical balance having accuracy to weigh 0.0001 gm and stop watch is available.
- 3.8 Ensure Heat resistant glass apparatus is essential for chemical test.
- 3.9 A working bench and wash- basin in laboratory should be available.

- 3.10 Ensure Go-No go gauges for all the important dimensions are available.
- 3.11 Adhesion test apparatus as per ASTM-D-413 should be available along with different weights is essential.
- 3.12 Oil immersion test facilities as per Cl.4.4 of AAR-M-601-76 or latest revision should be available.
- 3.13 Ensure that suitable test facility for conducting cold test as per para 4.5 of AAR-M-601 (Latest revision) is available.
- 3.14 Ensure that suitable test facility for conducting Ozone test as per para 4.6 of AAR-M-601 (Latest revision) is available.
- 3.15 Hydrostatic test facilities in accordance with Cl.4.7 of AAR-M-601/76 of latest revision should be available.
- 3.16 Min. one number of hydro pneumatic pump for pressure testing of hoses & hose couplings should be available. The facility should be mechanized and the pump should be automatic for steady rise of the pressure.
- 3.17 Twist test equipment in accordance with Cl.4.8 of AAR-M-601/76 of latest revision should be available.
- 3.18 Coupling pull off test facilities in accordance with Cl.4.9 of AAR-M-601/76 latest revision should be available.
- 3.19 Flexibility test facility in accordance with Cl.4.10 of AAR-M-601/76 of latest revision should be available.
- 3.20 Ensure that at least 5 Nos. of leakage check points fitted serially on a work bench and connected with air compressor minimum of 10 Kg/cm² capacity is available.
- 3.21 Ensure that minimum 5 no. of tub (sufficient size to immerse the hose coupling) to check for leak through the washer joints and all over is essential.
- 3.22 Ensure that minimum 1 bond room for storage of samples drawn during purchase inspection.
- 3.23 All the chemicals are essential for any type of chemical test.
- 3.24 Suitable facilities for cutting the test specimen from the product should be available.
- 4. **Quality control requirements**
 - 4.1 There should be a system to ensure the traceability of product from raw material stage to finished product stage. This system should also facilitate to identify the raw material composition from the finished product stage.

- 4.2 Ensure that the system of First in first out is followed for raw material and the intermediate stage product.
- 4.3 Ensure that there is a QAP for product detailing various aspects.
- .Organizational 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 and application form. IL-03-2000.
- 4.4 The QAP shall also cover the various aspect as per Cl.2 of Appendix F to specification No.02-ABR-94 with latest revision.
- 4.5 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 and Quality control responsibility . He should be mainly responsible for development of a product, analysis of quality problems, control over raw material and corrective actions in case of difficulties in achieving the parameters.
- 4.6 Ensure that in-charge of the Quality control section is having a qualification of minimum a Bachelor's degree in relevant field with 5 years of 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.
- 4.7 The firm should have acquired ISO:9000 series certification and the product for which an approval is sought should broadly covered in the scope of the certification for manufacture and supply.
- 4.8 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.
- 4.9 Ensure that all the relevant specifications IS, ASTM standards and Drgs are available.
- 4.10 Ensure that customer earmarks adequate covered area for storage of final product and awaiting inspection.
- 4.11 Ensure that proper analysis is being done on monthly basis to study the rejection at various internal stages and it is documented.
- 4.12 Ensure that proper record of complaints received from users (Railways) is being maintained & corrective action is taken.

5. Requirements for storage of Rubber in all forms

- 5.1 Ensure that store is free from direct sunlight, away from contact with material s containing copper and manganese, humidity should not be such that condensation of moisture takes place on the surface of rubber component.
- 5.2 Any contact with grease and oil should be avoided.
- 5.3 The area should be sufficient to avoid any super imposed stresses and the material is used in order of their receipts in the stores and the material is used in the order of their receipts in stores i.e first come –first issue basis.
- 5.4 In stores any loose electrical connection should be avoided.