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**Government of India
Ministry of Railways**

**QMS-21:2009
(Revision 0)**

**Schedule of Technical Requirements for
*Infrastructural, Manufacturing & Testing facilities and
quality control requirements*
for**

**Pipes & Joints for Air Brakes for Freight & Coaching stock of
Indian Railways as per 04-ABR-2002 Specification**

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

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(Price Rs 500/-)

1.0 SCOPE

- 1.1 The schedule of technical requirements covers the norms for manufacturing of pipes and joints for air braked for Freight and Coaching Rolling stock as per Specification No. 04-ABR-2002

2.0 REQUIREMENTS

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

GENERAL AND MANUFACTURING FACILITIES

- 2.1 Covered area with adequate space for machine shop welding section, Profile bending section, performance/leakage test section, anti corrosive Treatment and Painting section and storage of raw material & finished pipes should be available.
- 2.2 The firm should have adequate machining facilities such as pipe cutting, external threading, cold bending machine for carrying out the required operation on the pipes. The operation done on each should be specified in the process flow chart.
- 2.3 The pipe bending machine should be preferably hydraulic pressure operated with constant force and equipped with arrangement to pass the pipe through rolling pulleys according to bends requirement. However, manual bending as per fixture shall also be permitted.
- 2.4 The firm should have dry compressed air of 10kg/cm² minimum in the shop pipe line for testing of the pipes.
- 2.5 The firm should have the requisite welding facilities for ERW pipes and joints. Co₂ welding for seamless pipes for coaches shall also be available.
- 2.6 A device should be available to keep the pipe rotating during welding at constant speed to ensure the uniform weld flow all-round and pipes & joints must be held in proper alignment and squareness.
- 2.7 The firm should have facilities for checking the leakage of all the pocket welded pipes with 10kg/cm² air pressure by dipping in water tank.
- 2.8 A system should exist for checking the threaded pipes with Go and No go Thread Ring Gauge. If the product is found non-conforming then tooling/chaser must be checked and corrective action to be taken accordingly.

- 2.9 In order to streamline production of pipes for different types of wagons, templates should be available to check the required profile.
- 2.10 The firm should have facilities for anti-corrosive treatment and painting of pipes.
- 2.11 There should be a system to protect the threaded part of the pipes and ends of the pipes by the PVC protection caps during storage and transportation.
- 2.12 The firm should have suitable handling facilities in order to avoid damages of the pipes during processing.
- 2.13 There should be facilities of marking the identification of the manufacturer.
- 2.14 Weld area shall be free from dust, grease, oil, dirt, paint etc. For these purposes facility of solvent cleaning should available.
- 2.15 Suitable amount of stainless steel wire brushes & chisels for deslaging and to remove tenacious layer chromium oxide formed for better strength of joint.
- 2.16 One no. 70,OCV welding transformer should be available.
- 2.17 Facility of plasma cutting or machining for cutting stainless steel should be available.
- 2.18 Facility for redrying electrodes to 150°C for at least one hour or as recommended by manufacturer should be available.
- 2.19 Facility of MIG/MAG welding should be available.
- 2.20 Facility for grinding and polishing of SS joints for maximum corrosion resistance should be available.

3.0 **TESTING FACILITIES**

To maintain the Quality of pipes and joints the firm should have the following checking instruments and Gauges in the Standard Room.

- 3.1 Two sets of Profile Gauges/Templates for checking the bend of the pipes as per Piping layout drawings of all the Air Braked Wagons and Coaches. A few examples are as under:

	Size of Pipes	Reading as per Drawing	
i.	32 NB 20 NB	350 mm 200 mm	BCNA/BOXN pipes
ii.	32 NB 20 NB 15 NB	225/75/200 mm 150 mm 100 mm	BOBRN pipes
iii	32 NB 20 NB	250/200 mm 200/150 mm	CONCOR wagon pipes.

3.2 Two sets of Go and No Go thread Ring Gauges for checking the Parallel pipe Threads as per IS:554.

3.3 Two sets of Vernier calipers range of 200mm preferably with Dial Indicator.

3.4 Two sets of outside and inside micrometer range upto 50mm.

3.5 One set of thickness gauges for checking thickness of pipes.

3.6 Two nos. steel tapes for checking length of pipes range upto 20 Meters.

3.7 Two sets of chrome plated steel balls for checking the free passing of ball after bending as per recommended sizes, i.e. 28mm, 22mm, 16mm, 11mm & 8.5mm for pipe sizes 32mm NB, 25mm NB, 20mm NB, 15mm NB & 10mm NB respectively.

4.0 TECHNICAL EXPERTISE AND QUALITY CONTROL REQUIREMENTS

4.1 It is to be ensured that incharge of Quality Control Department is having a engineering background & he should have full knowledge of the product and should be involved in day to day activities of Quality Control, Stage Inspection and compliance of QAP.

4.2 Though it is not mandatory that the firm should be registered with ISO Certification for the Product but it should have a proper system of record keeping of test of Raw material, Process control and checks of the stage Inspection and Instruments used.

4.3 There should be a system of periodic calibration & record keeping of Pressure Gauges, Thread Gauges & Measuring Instruments. The pipe bend profile templates should be identified with a unique drawing number.

- 4.4 ERW pipes to IS-1239 heavy grade for wagons and seamless pipes for Coaches should be procured only from RDSO approved sources with test certificates.
- 4.5 All the weld joints should be dyepenetrated after every pass in order to ensure that there is no porosity or inclusions in the weld joint.
- 4.6 The welder deployed on welding must have passed certification test as per IS:2825 and record of each welder should be maintained.
- 4.7 All the rubber items should be procured from RDSO approved sources and their stacking should be done in dust & sun light proof area.
- 4.8 All RDSO drawings of piping layout for relevant type of wagons and coaches should be available.
- 4.9 There should be a system to identify the non conforming product preferably by colour codification.
- 4.10 The firm should have Quality Assurance Plan indicating the following aspects among other things:
 - a. Organisation chart.
 - b. Inspection parameter.
 - c. Stage Inspection detail.
 - d. Process flow chart.
 - e. Control on Non conformities.
- 4.11 The QAP shall be available as per the requirements detailed in Vendor approval guide lines and application Form IL-03:2000.
- 4.12 Despite obtaining test certificate along with supply of pipes a system should exist to get samples tested periodically and to be verified and record should be maintained.
- 4.13 The firm should have all relevant specification, IS standards and drawings.