GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

DRAFT
FOR REVISION

SCHEDULE OF TECHNICAL REQUIREMENTS FOR FRICTION SNUBBER/DAMPER FOR PRIMARY SUSPENSION OF B.G. MAINLINE ICF ALL COIL BOGIES

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SCHEDULE OF TECHNICAL REQUIREMENTS FOR FRICTION SNUBBER/DAMPER FOR PRIMARY SUSPENSION OF B.G. MAINLINE ICF ALL COIL BOGIES

1. SCOPE:

This Schedule of technical Requirement (STR) is intended to cover the design and supply of friction snubber/Damper assembly for internal friction damping in lieu of dash pot oil damping to be used in B.G. mainline ICF all coil bogies at primary suspension stage. It does not include all the necessary provisions of the contract. If the supplier feels that certain additional items are necessary for improved working/performance of the system, he may quote for the same. In any case, the purchaser will be at liberty to buy all or part material from the offer. This STR is applicable to BG mainline ICF all coil bogies.

2. OPERATING CONDITIONS

2.1. Friction snubber assembly fitted mainline ICF all coil bogies shall be subjected to the following operating conditions:

Max. Temperature under sun	: 60ºC
Ambient temperature	: 0º to 45º in shade.
Average relative humidity	: 70% to 90%, 100% on several days.
Rainfall	: Fairly heavy, maximum being 200mm in 24 hours, typical to the coastal areas.
Atmosphere	: Dusty for several months of year.

2.2. Friction snubber assembly may also come in contact with the following, during coach maintenance operation:

- Chemical products (like cleaning compound used for coach cleaning)
- Cotton waster smeared with oil and paint etc.
- Disinfectants.
- Oils & lubricants used in coach bogies.

2.3. The friction snubber assembly may also occasionally come in contact of track ballast during train operation.

3. PARTICULAR REQUIREMENTS:

3.1. Manufacture willing to supply friction snubber assembly for internal type friction damping arrangement the use of Indian Railways shall register themselves with Research Designs and Standards Organization, Ministry of Railways, Lucknow - 226011 (RDSO) and should be ISO certified.

3.2. The manufacture shall have adequate facilities for the manufacture and testing of friction snubber assembly conforming to drawings approved by RDSO.

3.3. The manufacture shall have a well-documented 'Internal Quality Assurance System' to ensure sustained quality of product being manufactured. The 'Quality Assurance System' shall generally cover the following:-

3.3.1. System to ensure that correct raw material is being used.

3.3.2. System to ensure that components having manufacturing defects are identified and destroyed so that such components are not used during assembly of friction snubber.

3.3.3. System to ensure that bought out components are strictly as per requirements laid down in the STR/drawing.

3.3.4. System to maintain strict control of dimensions and workmanship of components and assembled product.

3.3.5. System to test and establish that the friction snubber manufactured by the firm meets all the requirements laid down in STR/drawing.

3.3.6. System of periodical calibration of equipments/gauges to ensure accuracy of product.

3.3.7. System to ensure cleaning & removal of dust/rust and moisture by dry air.

3.3.8. System to ensure that friction snubber assembly is properly packed to meet the requirement of Clause 12 of this STR.

3.3.9. System to ensure traceability at least up to guarantee period.

3.4. Rubber items for use in the friction snubber assembly shall be procured from RDSO approved sources only. However, the manufacture shall be fully responsible for the satisfactory performance of the rubber items.

3.5. Supplier shall submit calculations to prove that the adjustment level decided by him shall give the same damping levels as specified in the technical requirements (Para 5).

3.6. All metal parts of the friction snubber assembly shall be of corrosion resistant steel and painted black.

3.7. Any nut bolt screw & spring washer used in the system for securing the assembly to the bogie should be high tensile type and shall be black oxide coated.

3.8. The spring steel and spring shall be procured from approved sources of RDSO.

4. SCOPE OF SUPPLY.

4.1. Friction snubber assembly shall be within the space envelop to RDSO Drg. No. SK-K4001 for internal type to fit inside axle box guide arrangement.

4.2. Friction snubber shall be a complete unit with flexible end mounting arrangement type at one end or at both ends.

4.3. Any other item, which in the view of supplier is considered essential for operation or for enhancing the performance of the system, may also be offered.

5. TECHNICAL REQUIREMENTS:

5.1. Friction snubber is intended to replace the hydraulic damping action of the existing dashpot arrangement of ICF all coil bogies with friction damping.

5.2. The fitment of friction snubber assembly should preferably not call for any major modification in the dashpot guide assembly. However, ;if it is felt absolutely necessary for the design, minor modifications may be permitted. Decision of RDSO/Purchaser in this regard shall be final.

5.3. For internal type arrangement one friction snubber assembly per guide are required.

5.4. Friction snubber shall be providing a constant damping force of 30 ± 4 kg, obtained with the force of compression by any arrangement. It shall be consistent i.e, once the damping is adjusted, neither it should be easy to change it by simple means nor it should change due to sustained vibrations. The arrangement should automatically self adjust to cater for wear of the friction surface during service, thus removing the need of any manual adjustment.

5.5. There should be no high 'break away' force at the start of compression or extension stroke.

5.6. The assembly should be adjustable type before fitment.

5.7. The construction of the friction snubber and mountings shall be such as to withstand an applied frequency of up to 10 Hz at axle box label.

5.10 The system should able to move ± 50mm in compression and expansion mode within the space envelope.

6. END MOUNTINGS AND METHOD OF FRICTION SNUBBER ATTACHMENT:

6.1. The end mountings shall be of a type specified or approved by RDSO. The design shall allow the maximum angular misalignment specified by RDSO without imposing such forces on the friction snubber, which would prevent meeting the technical requirements specified in above clause 5 of the specification.

6.2. The characteristic of the mounting shall be within ± 10% of shore hardness of rubber component of approved values.

6.3. Drawings of friction snubber submitted by manufactures shall also indicate the maximum misalignment of the end mounting as attached to the shock absorber and get the approval from RDSO.

6.4. Pins or any other arrangement for fixing the friction snubber and any steel bush used in end mounting shall be of the material having high wear resistance properties.

7. GUARANTEE / PERFORMANCE REQUIREMENTS:

7.1. Friction snubber arrangement shall perform satisfactory for a period of 24 Months from the date of commissioning without any necessity of manual adjustment. Attention or replacement of any part etc.

7.2. It may be noted that the system has to perform under IR operating conditions stipulated in clause 2 of this STR and shall not impair the performance of the system in any manner whatsoever.

7.3. In the event of 'non-satisfactory performance' of any of the items as indicated above, supplier will have to replace the same at his own expense without levying any cost involved in transportation, handling and replacement of such items on the Purchaser.

8. INSTALLATION, COMMISSIONING &MAINTENANCE:

8.1 Placement of order, supplier whose equipment will be purchased for the "First Time" for installation on the coaches, shall have to depute his representative at his own expense to associate with the purchaser in installation and commissioning of the equipment on first five coaches. He shall also depute his representative during maintenance schedules undertaken on his equipment as per maintenance booklet supplied by him with very order for supply of friction snubber assembly to approved supplier, the supplier shall have to supply special tools and maintenance instructions five booklets (hard copy) and one copy on Compact Disc (MS-Office compatible). The manual shall be vetted by RDSO before issue to Railways.

8.2 Maintenance booklet supplied by the supplier shall cover the following aspects in detail:

1) Specification of the friction snubber assembly.

2) Working principle based on the actual construction

3) Constructional details giving sketches, drawings and photographs etc. identifying various items and their part numbers etc. for easy identification.

4) Procedure for dismantling using sequential steps with the help of sketches, etc.

5) Procedure for assembly. using sequential steps with the help of sketches, etc.

6) Jigs, tools, other materials and details of special set-ups etc., necessary for item 4 & 5 above.

7) Testing procedures and facilities required along with their details.

8) Comprehensive details containing legible sectional views of defects normally observed or may happen on friction snubber clear remarks whether the defect is rejectable or nonrectable.

9) List of other defects and their remedies.

10) Periodicity for various maintenance activities on time and distance basis.

11) Do's and Don'ts for maintenance officials.

8.3 The supplier shall train I.R staff in installation, adjustment and maintenance of the system offered by him during the fitment of friction snubber on bogies during initial fitment.

9. INSPECTION AND TESTING:

9.2 GENERAL REQUIREMENTS:

During initial approval of a firm by ROSO and later on when approval has been granted, ROSO for purpose of ensuring Quality of purchased product may carry out periodic quality audit, inspection and testing of the equipment at the premises of manufacturer Purchase inspection shall be done at the premises of manufacturer by representative of the Research Design and Standard Organization or agency / Railway authorised by RDSO and supplier shall have to arrange for the following and associate with the same:

1) Access to all records considered relevant for such activity by inspecting officials.

2) Questioning of relevant personnel engaged in production, testing and quality checking activities etc. or related issues.

3) Testing of few samples of items already produced by the firm to ascertain the technical characteristics given in this STR.

4) Any other check considered necessary by the inspecting party.

10.2 GENERAL INSPECTION:

10.2.1 All the materials or fittings used in friction snubber assembly shall be subjected to inspection by the Inspecting Authority and shall be to his entire satisfaction

10.2.2 The manufacturer shall supply the necessary labour and appliances for testing and inspection of the friction snubber assembly and wantings and shall supply to inspector a copy of the test results signed by manufacturers or his representative.

10.2.3 The Inspecting Authority shall have the power to:-

1) Adopt any means he may think advisable to satisfy himself that the material or fittings as per the specification are actually used in the construction.

2) Visit at any reasonable time and without previous notlee, the manufacturer's works to inspect progress and the quality of the work and the manufacturer shall provide free of the charge all equipment, gauges and other facilities required by him for the purpose.

3) In the event of a dispute between the Inspecting Authority and the manufacturer the decision of the purchaser shall be final and binding.

10.3 INSPECTION AND TESTING OF FRICTION SNUBBER ASSEMBALY:

10.3.1 Dimensional check: All dimensions should be checked as per drawing approved by RDSO.

10.3.2 Characteristics tests: Damping forces developed by assembled friction snubber arrangement should be done as per procedure approved by RDSO and should be within the range given in clause 5 technical requirement of this STR. The guide line to measure the damping force is given annexure-I of this STR or any other procedure approved by RDSO.

10.3.3 10% samples of the lot or minimum 10 samples shall be picked up randomly for dimension & other specified inspections as given above in clause 10.3.1& 10.3.2 of this STR.

10.3.4 In case any picked up sample fails, manufacturer/supplier shall re-offer, rectifying the defects. However, in such cases, double the quantity of samples shall be picked up and shall be checked for dimension and other specified testing. In case anyone sample again fails the entire lot shall be rejected.

11. MARKING:

Every item affliction snubber assembly shall be legibly marked by using punching or casting etc. to indicate the following:

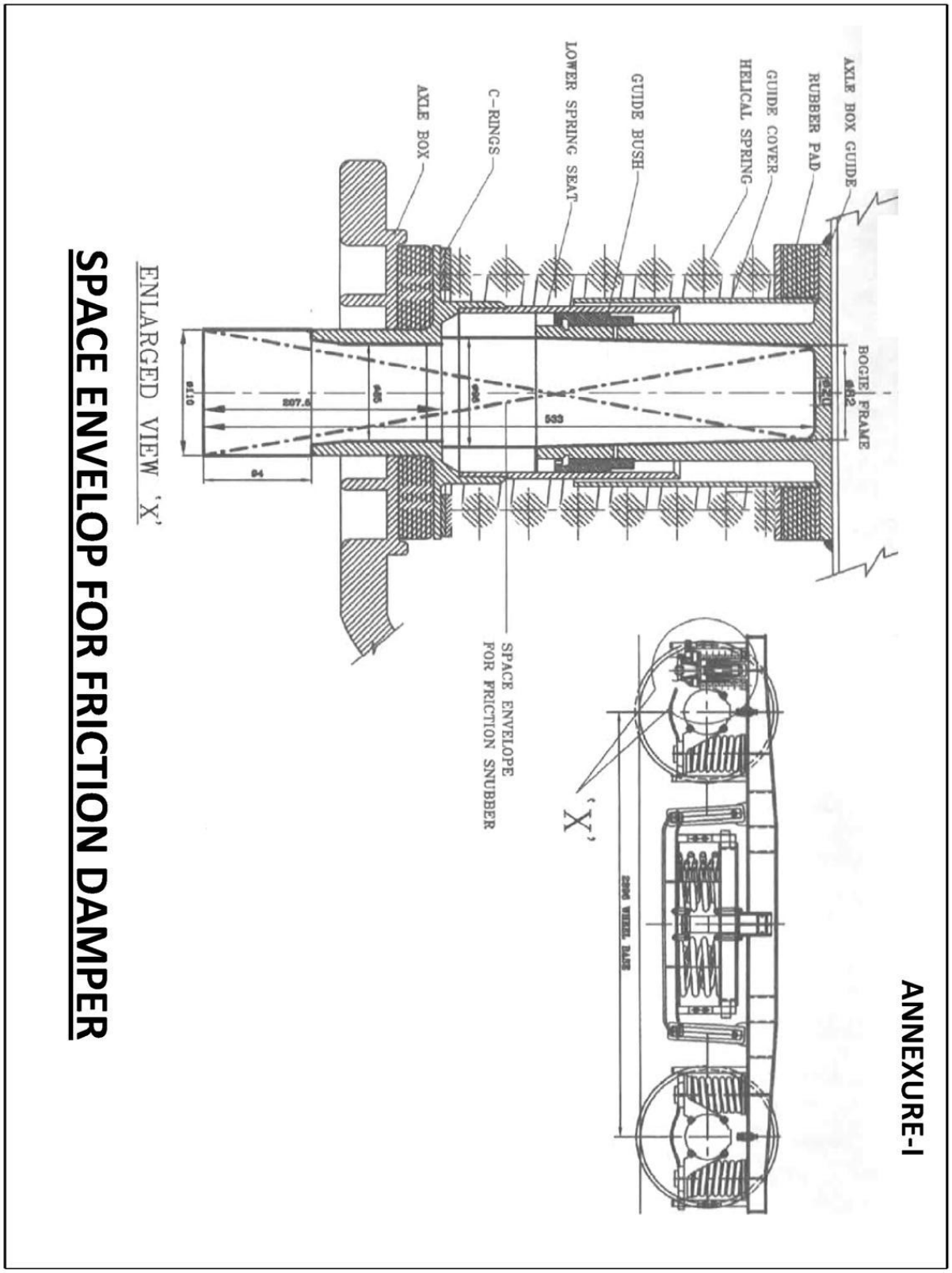
1) Manufacturer's initials.
2) Month and year of manufacture.
3) Identification marks, i.e. Part Number, Batch Number, etc.

12. PACKING:

The friction snubber assembly shall be suitably packed along with its loose parts, exposed threaded portion, to protect against any damage that may occur during transit and handling.

ANNEXURE-I

SPACE ENVELOP FOR FRICTION DAMPER



ANNEXURE–II
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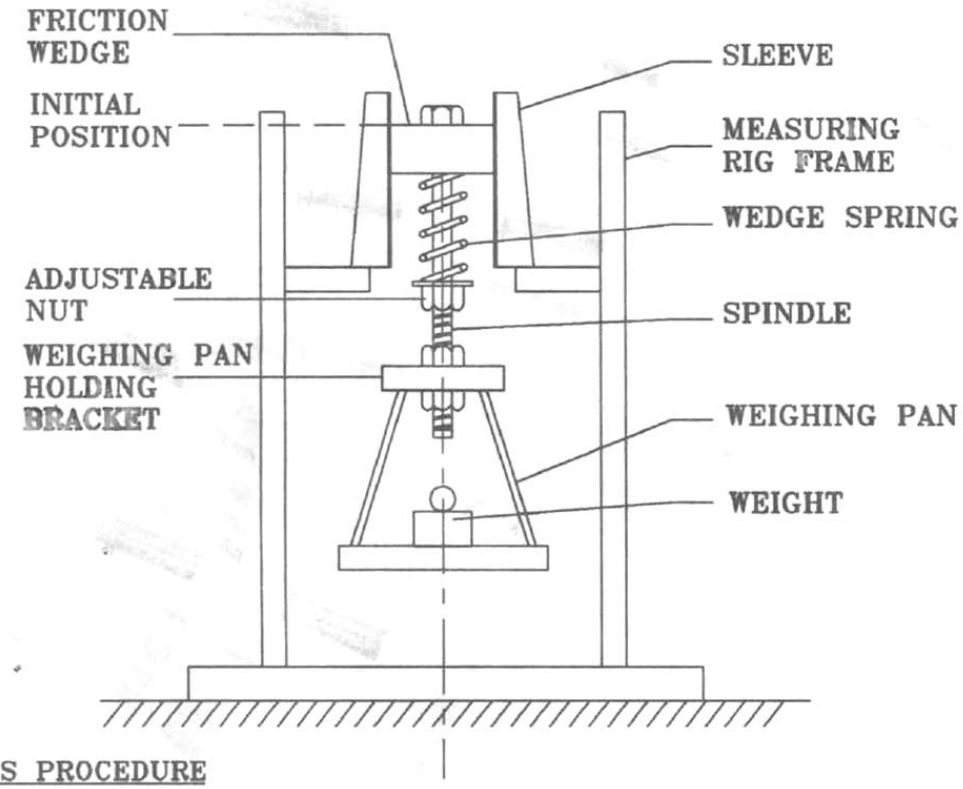
TESTING JIG FOR FRICTION FORCE



STEPS PROCEDURE

1. Measure the weight of weighing pan along with weighting pan –holding bracket. It should be not more then 8.5 Kg. (Say W1)
2. Place the Friction Snubber wedge with spring spindle assembly, inside the sleeve at initial position.
3. Assemble the weighing pan in position with the help of weighing pan holding brackets.
4. Go on increasing weight on the weighing pan, starting from 10.0 Kg to 26.0 Kg in the step of 1.0 Kg in a gradual manner.
5. Observe smooth downward sliding of the wedge block along.
6. Weight as observed in S.No.5 and S.No. 1 When add together will provide damping force.(W1+W2)
7. By taking out spindle–wedge assembly measure compressed height to determine pre–compression.
8. For determining the stiffness of wedge spring, load Vs deflection test is to be conducted.The value of spring deflections are to be measured in mm for a static vertical load of 25 Kg, 35Kg and 70 Kg and slop of corresponding load Vs deflection graph will provide wedge spring stiffness.