

ISO 9001-2015	Document No.: TM/SM/32	First revision 01 of 2020	Date Effective From: 16.12.2020
Document Title: Specification of HYDRAULIC RAIL TENSOR (NON-INFRINGING) 70T Cap.			



**Specification of
HYDRAULIC RAIL TENSOR (NON-INFRINGING) 70T Cap.
(Spec. No. - TM/SM/32)
(FIRST REVISION 01 of 2020)**

**Track Machines & Monitoring Directorate
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0. **FOREWORD**

- 0.1 This standard specification was adopted by the Indian Railways in December 1991 after the draft was finalized by the Sub-committee of Track Machines & Monitoring Directorate.
- 0.2 The present revision (First Revision) has been taken up with a view to incorporate modifications found necessary as a result of use of the specification both by the manufacturer and user.
- 0.3 The significant modifications incorporated in this revision are as follows
- 0.3.1 A clause for Warranty & AMC has been added.
- 0.3.2 A clause for Commissioning has been added.
- 0.3.3 A clause for marking and packing has been added.
- 0.3.4 A clause for RDSO's ISO procedures has been added.
- 0.3.5 A clause for Preference to Make in India has been added
- 0.3.6 Specifications (IS/IRS codes) needed for daily use and referred to in this specification has been updated.

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1.0 SCOPE:

- 1.1 This specification covers the requirement of obstruction less/non-infringing type hydraulic rail tensor used for rail distressing, rail welding, installation of insulated glued joints and other repair works of rail failures.
- 1.2 The hydraulic rail tensor shall be obstruction less type, hydraulically operated with a hand pump connected to a cylinder assemblies through flexible rubber hose pipe.

2.0 REFERENCE DOCUMENTS:

Following codes/documents have been referred to in this specification. The updated copy of latest version with correction slip/amendments shall be followed and available at the firm's works premises.

IS: 1337-1993(Reaffirmed 2016)	Electroplated Coatings of Hard Chromium for Engineering Purposes
IS 1986-1981 (Reaffirmed 2016)	Code of practice for hard chromium plating on iron and steel for general engineering purposes
IS 10585 : 2019	Hydraulic Fluid Power — Cylinders — Acceptance Tests (Second Revision)

3.0 MATERIAL AND CONSTRUCTION:

- 3.1 Strength and other essential physical properties of components parts of hydraulic rail tensor shall be adequate for the purpose intended. All component parts shall be designed after taking adequate factor of safety as per standard practices.
- 3.2 The hydraulic rail tensor shall consist of a portable assembly of the following main components :-
- a) Two hydraulic cylinders (double acting) operated through hand pump.
 - b) Rail grip and clamp assembly.
 - c) Tie Car (for pulling operation only)
- 3.3 Oil Seals(nut rings, O-rings, Washer etc.) shall be of special high pressure brand of synthetic Neoprene/Nitrile reinforced with Tafflon (PTFE) back up rings.
- 3.4 The assembly of the rail tensor and the details of various components shall be as per drawings and specifications of the manufacturer approved by purchaser/RDSO.

4.0 FUNCTIONAL REQUIREMENTS:

- 4.1 The working capacity of hydraulic tensor shall be as under:-
- i) Pulling force: 70 t (minimum)

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- ii) Pushing force: 30 t (minimum)
- iii) Shall provide an extension of 150 mm in 52 Kg/60 Kg rail section.
- iv) Hydraulic stroke-ram travel-300 mm (minimum).

- 4.2 The weight of hydraulic rail tensor shall be as less as possible. Total weight including hand pump shall not be more than 375 Kg. Weight of individual parts/assembly shall not be more than 115 Kg.
- 4.3 Design of hydraulic rail tensor shall be rugged and robust to withstand the various operating and handling forces.
- 4.4 The construction of the machine shall be such that parts can be easily and quickly replaced in case of break-down while carrying out works at site.
- 4.5 It shall be easy to use, operate and maintain.
- 4.6 It shall be obstruction less in nature i.e. no part of tensor shall project above railhead while in operation.
- 4.7 It shall be able to operate efficiently in all environmental conditions as expected in India.
- 4.8 Hydraulic cylinders of rail tensor shall be double acting cylinders i.e. the jacks shall be able to exert force when ram is coming out and also when it is going in.

5.0 WORKMANSHIP AND FINISH:

- 5.1 All the metal surface shall be properly finished. Rough and sharp edges shall be removed.
- 5.2 All the working parts and the parts, subject to wear shall be accurately machined to such tolerance as will ensure the fitting of spares with minimum of adjustment.

6.0 TESTS:**6.1 Tests at the time of Vendor Registration (Prototype Tests):**

Type tests are meant to be conducted on prototypes at the time of initial approval. The manufacturer/supplier shall produce two prototypes of Hydraulic Rail Tensor (Non-Infringing) 70t Capacity during inspecting officials for type tests. Following tests shall be carried out in the factory premises and field (if not arranged in the factory premises). The cost of

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type tests shall be borne by the manufacturer/supplier. All arrangement shall be done by the manufacturer/supplier. The cost of this arrangement shall be borne by the supplier.

Following test is to be conducted in sequence:-

i.	Visual and Dimensional test	Both samples
ii.	Rated pressure test	Both samples
iii.	Proof pressure test	Both samples
iv.	Performance test	For 100 cycles on first sample and for 25 cycles on 2nd sample
v.	Rated pressure test (Repeat)	Both samples

6.1.1 **VISUAL AND DIMENSIONAL TEST:**

The equipment shall be free from defects such as crack, blow holes etc. The equipment shall be checked dimensionally as per drawing of manufacturer approved by purchaser/RDSO.

The following tests shall be carried out for testing the pulling force and pushing force of the tensor. During these tests the pulling force shall be applied when piston in fully open position and pushing force shall be applied with piston in fully closed position.

6.1.2 **RATED PRESSURE TEST:**

The equipment shall be loaded upto its rated capacity for pulling as well as for pushing and shall be kept for 1 hour (1 hour for pulling and 1 hour for pushing), the pressure at the end of 1 hour shall not be less than 95% of rated capacity.

6.1.3 **PROOF PRESSURE TEST:**

Equipment shall be loaded upto 120% of rated pressure for pulling pressure as well as for pushing pressure and shall be kept steady for 5 minutes; the drop in pressure shall not be more than 10% of rated pressure at the end of this period. After this test, the equipment shall operate smoothly throughout the range without any slip or visible damage and shall not show any sign of leakage of oil or any other abnormality.

6.1.4 **PERFORMANCE TEST:**

Equipment which has successfully passed the rated pressure test and proof pressure test shall be used for this test.

The equipment/hydraulic cylinder shall be subjected to 100% rated capacity for pulling force as well as pushing and shall be kept steady for 2 minutes. This cycle shall be repeated 100 times with an interval of 10 min. between each cycle in such a manner that the equipment/hydraulic cylinder get tested throughout its range. After completing the

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100 cycles in this manner, the equipment shall work smoothly throughout the range without undue play between moving parts and without any leakage. However for acceptance test, test cycles as mentioned above shall be restricted to 25 nos. only.

6.1.5 **RATED PRESSURE TEST (REPEAT):**

After completing the cycles test as mentioned in para 6.1.4 equipment shall again be subjected to rated pressure tests as mentioned in para 6.1.2 and shall be in conformity with it. After this test, the equipment shall not show any sign of distortion or leakage of oil.

6.2 For definition of term rated pressure and proof pressure used in clause 6.1.2 and 6.1.3, IS-10585-2019 (Hydraulic Fluid Power — Cylinders — Acceptance Tests (Second Revision) may kindly be seen.

7.0 **TESTS AT THE TIME OF SUPPLY (ACCEPTANCE TEST):**

Acceptance tests are meant to be conducted on randomly picked up samples which are taken from supplies under inspection against zonal railways/purchaser's purchase order.

Following test is to be conducted in sequence:-

i.	Visual and Dimensional test	Every equipment
ii.	Rated pressure test	Every equipment
iii.	Proof pressure test	Every equipment
iv.	Performance test	Desired certificate issued by manufacturer for every equipment should be submitted by firm
v.	Rated pressure test (Repeat)	Desired certificate issued by manufacturer for every equipment should be submitted by firm

8.0 **INSPECTION**

8.1 The inspection during procurement of equipment shall be carried out by the purchaser, zonal railway or any representative/agency authorized by CTE of the zonal railway. Minimum level of the inspecting official shall be SSE (Senior Section Engineer). The manufacturer shall provide all testing facilities including transportation that are required by the inspection officials for proper inspection of the equipment. In case these facilities are not available at manufacturer's premises he would be required to get them arranged in nearby Technical Institution or Test House approved by purchaser. Detailed drawings of the machine clearly showing various parts and their dimensions shall be supplied with each machine.

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- 8.2 The equipment shall be subjected to following acceptance test before passing/approving by inspection officers. The sequence of conducting these tests and their frequency shall be as given in clause 7.0.
- 8.3 Any of the equipment which fails in the testing as per sequence given in clause 7.0 shall be rejected. However, if the equipment subjected to performance test & rated pressure test (Repeat) mentioned in 6.1.3 and 6.1.4 fails, the inspecting officer may reject whole lot or pass each equipment after subjecting it to performance test. For rejection purpose, 10 nos. equipment or part thereof (say if procurement is for 6 nos. equipment, it will constitute one lot only, if procurement is for 16 pieces, first 10 pieces will constitute one lot and remaining 6 pieces will constitute second lot) will constitute one lot.
- 8.4 Equipment subject to performance test shall be picked up randomly.
- 8.5 Before offering the equipment for inspection and testing, manufacturer shall satisfy himself regarding performance of his equipment and shall give a certificate specifically mentioning that he has checked and tested hydraulic cylinder of each equipment as per IS 10585--2002 and it satisfy its provision.
- 8.6 The supplier shall also carry out the USFD testing for all the casted parts used in tensor to determine internal defects and shall produce a certificate to this effect at the time of inspection.

9.0 PROTECTION FROM RUST AND PACKING CONDITIONS:

Working surface of the cylinder piston rod shall be hard chrome plated having an average thickness of 50 micron confirming to IS: 1337-1993(Reaffirmed 2016) (electroplated coating of Hard Chromium on iron and Steel for Engineering purpose) after following code of practice IS 1986-1981(Reaffirmed 2016) (Code of practice for hard chromium plating of Iron and steel for general engineering purposes). All other exposed surfaces shall be painted with yellow paint of Standard quality. The equipment shall be supplied packed in suitable wooden crates according to the best trade practices to safety transport by rail/road and reach the consignee in safe and satisfactory manner. All the working parts shall be oiled before being assembled.

10.0 MARKING :

The equipment shall be legibly and indelibly marked with:

- i. Name/trade mark of manufacturer
- ii. Rated capacity
- iii. Serial No. equipment

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iv. Month and year of supply

11.0 SPARES:

- 11.1 Supplier shall supply 2 sets of hydraulic rubber seals and 2 set (4 nos.) of jaws (Rail grip) along with the machine free of cost. These shall be supplied in due packing.
- 11.2 Necessary keys or any part required to use hydraulic tensor on any other two rail sections (other than rail sections for which the equipment has been purchased) as specified by the purchaser in purchase order.
- 11.3 The spare parts required should be detailed in a separate list indicating description, part number, expected life and possible source of supply in India.
- 11.4 The manufacturer shall be responsible for the subsequent availability of spares to ensure trouble free service for the life of the machine.

12.0 TOOLS:

Each machine shall be supplied with a complete kit of ordinary tools and special tools required by the operator in emergency and for normal working of the machine.

13.0 Warranty & AMC:

- 13.1 Efficient performance of the hydraulic rail tensor shall be guaranteed for a period of two year. For replaced parts the guarantee period shall be begin a new.
- 13.2 Beyond guarantee period, the supplier shall undertake upon written request of purchaser to repair or replace as quickly as possible any part/assembly exhibiting deficiencies or damages. The repairs/replacement of parts/service rendered in aforesaid period shall, however, be paid for by the purchaser.
- 13.3 During procurement of the machine, railways should go post-warranty AMC with the supplier for a pre-determined period as decided by the purchaser railway. This may be incorporated in the tender document as a condition of contract/Tender/Supply. For procurement of Hydraulic Rail Tensor (Non-Infringing) 70t with AMC, Comprehensive Guideline on Procurement, Operation, Maintenance and Repair of Small Track Machines (report No.TM-227) may be referred.

14.0 MANUALS:

Detailed operating manual, safety precautions to be taken, maintenance and service manuals shall be supplied in three copies along with each machine

15.0 MAKER'S TEST CERTIFICATE:

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Copies of the maker's test certificate guaranteeing the performance of the machine should be supplied in duplicate along with delivery of each machine.

16.0 DRAWINGS:

The manufacturer shall supply detailed drawing exhibiting clearly the material and dimensions so that the user can have a clear understanding of the machine.

17.0 TRAINING & COMMISSIONING:

17.1 Adequate training in operating and maintenance of the machine shall be imparted to railway operators by the manufacturer either at manufacturer's premises or at railway premises, as per the convenience of the purchaser, at the rate of two operator per machine.

17.2 After the machines have been supplied at consignee premises, the supply shall be considered as complete only after field training is provided by the supplier as stated above.

18.0 HANDLING AND TRANSPORTATION:

The equipment shall be capable of transporting to work site by breaking/dismantling it into smaller parts/sub-assemblies on a mono rail wheel dolly/trolley with a suitable attachment. The necessary attachment shall be supplied by the manufacturer along with machine/equipment.

19.0 All the provisions contained in RDSO's ISO procedures laid down in Document No. QO-D-8.1-11 (Document Title: Vendor - Changes in approved status), subsequent versions / amendments thereof shall be binding, and applicable on the successful manufacturers/suppliers in the contracts floated by Railways to maintain quality of products supplied to Railways. The update document is available on RDSO Website i.e. <https://rdso.indianrailways.gov.in>.

20.0 Preference to Make in India:

The Government of India policy on 'Make in India' shall be applicable and compliance of the instruction contained in public procurement (preference to make in India) order -2017 "Make in India" shall be ensured.

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