



**Specification of HEAVY DUTY HYDRAULIC EXTRACTOR
FOR JAMMED ERCs (10T)
(Spec. No. - TM/SM/06)
(SECOND REVISION 02 of 2022)**

**Track Machines & Monitoring Directorate
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1.0 Scope:

This is a portable machine used to extract jammed pandrol/elastic rail clip (due to corrosion etc.) from the insert without damaging the insert and the sleeper. This is a better alternative to the conventional method of heating and hammering which often damages the concrete sleeper.

2.0 Functional Requirements:

2.1 The equipment shall be compact and of robust design suitable for Indian conditions with temperature and altitude ranges as given below:

- i) Ambient temperature : 0⁰ to 55⁰ C
- ii) Altitude : Sea level to 658 m
- iii) Working condition : Extreme dusty

2.2 It shall be non-infringing to the traffic and shall not need any traffic block.

2.3 The effort required to operate the hydraulic pump (with about 400 to 500 mm arm) shall not be more than 15 kg.

2.4 It shall be capable of exerting a minimum of 10 tone force on the clip.

2.5 It shall take the reaction from the insert and not from the sleeper. This is essential so as not to disturb or damage the sleeper.

2.6 The extraction stroke shall be minimum 20 mm and ram screw extension 25mm.

2.7 The equipment shall be able to extract an externally jammed clip from the insert within 10 minutes.

2.8 It shall not weight more than 40 kg and shall be capable of being transported and operated by one person only.

2.9 The hydraulic medium shall be mineral oil ISO VG 68 grade or any other approved quality and be easily available in market.

3.0 TOOLS:

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

The supplier will give a complete list with sketches showing probable use of these tools.

4.0 Acceptance Tests :**4.1 Visual & Dimensional Test:**

- (a) All components of the extractor shall be free from defects such as blow holes in the body or cracks at welded joints etc.
- (b) The equipment shall be checked dimensionally as per relevant manufacture's drawings.
- (c) The hydraulic stroke shall be checked in accordance with established practices.

4.2 No. Load Test:

Hydraulic ram of the extractor shall be operated from zero to maximum extraction and it shall work smoothly without undue clearances between moving parts.

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4.3 **First overload Test (Overload Test Before Performance):**

Hydraulic ram of the extractor shall be loaded with a load of 120 percent of rated capacity and operated from the minimum to maximum position and back. During this test the ram (jack) shall operate smoothly throughout the range without any slip or other visible damage, leakage and any other abnormality.

4.4 **Performance Test:**

The ram (Jack) shall be loaded at rated capacity and operated from maximum to minimum position and back. After repeating the cycle 100 times with an interval of 10 minutes between each cycle, the jack shall work smoothly throughout the range without undue play or slip between the moving parts. The 1st extractor unit shall be subjected to 100 such cycles of operation and 2nd and subsequently units subjected to 25 cycles under a testing rig suitably designed for the 120% capacity of vertical and lateral jacks.

4.5 **Second overload Test :**

The test shall be repeated as per clause no. 4.3 for the picked units subject to performance test.

4.6 **Load Sustaining Test:**

The piston of the extractor shall be opened about half of its stroke and loaded to 120 percent of the rated capacity by adjusting the safety valve. The load shall be sustained for one hour. After end of one hour, the reduction of the stroke shall not be more than 3 mm. The load shall be removed after the end of this period and the test repeated three times. After the test, the units shall be left for 24 hours at room temperature and shall not show any sign of distortion or leakage of oil.

4.7 **Field Test:**

The extractor which withstood the above laboratory tests shall be subjected to field testing in station/yard where jammed elastic rail clips are available. The extractor shall withstand the various field operations to full satisfaction of the inspecting officials. No of jammed ERCs to be extracted by each unit of extractor shall be minimum 25 nos.

4.8 **Material test:**

The manufacturer shall arrange for the material testing of the units/component(s) by NABL accredited laboratory. The manufacturer shall obtain a certificate from the test house indicating details of the tests conducted, test results, deviation if any etc. for each unit. All the expenses of the testing shall be borne by the manufacturer.

4.9 Tests indicated in para 4.1, 4.2 & 4.7 to be conducted at consignee place for each unit, tests indicated in para 4.3 to 4.6 be conducted by the supplier premises for each unit and for test indicated at para 4.8, a test certificate for whole consignment to be provided by supplier.

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5.0 DRAWING & INSTRUCTION MANUALS:

- (a) Detailed drawings of the machine clearly showing various parts and their dimensions shall be supplied with each machine.
- (b) Details operating, maintenance and service manual shall be supplied in three copies along with each machine free of cost.

6.0 SPARE PARTS:

The machine shall be supplied with necessary spare part normally required for operation and maintenance of the machine for a period of 2 years. Quotations for spares may be given separately.

Following spare parts shall be supplied with each unit of extractor

- (i) Plunger set/pump piston bucket – 02 nos.
- (ii) Pressure Pin - 15 nos. (5 sets of different sizes)

However, the manufacturer shall provide a complete list of spares mentioning size part no. , quantity require per unit etc. with each of the Extractor supplied to railways against purchase order.

7.0 Warranty & AMC:

- i) Any part of the machine failing or proving unsatisfactory in service due to defective design, material or workmanship within 12 months from the date of commissioning shall be replaced by the supplier/ manufacturer at his own expense. If any design modification be made in any part of the machine offered, the period of twelve months shall commence from the date such modification.
- ii) Copies of the maker's certificate guaranteeing the performance of the machine shall be supplied induplicate along with the delivery of each machine.
- iii) 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 Heavy Duty Hydraulic Extractor For Jammed ERCs (10t) with AMC, Comprehensive Guideline on Procurement, Operation, Maintenance and Repair of Small Track Machines (report No.TM-227) may be referred.

8.0 INSPECTION:

- 8.1 The inspection during procurement of the Extractor 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 cost of inspection and testing shall be borne by the manufacturer/supplier. Inspection of the Extractors shall be carried out as per the details of acceptance tests mentioned in clause no. 8.2.

- 8.2 **Acceptance Test Sequence:** Acceptance tests shall be carried out as per following sequence.

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- i. Visual & Dimensional Test : Every extractor
- ii. No load test : Every extractor
- iii. First Over load test : Every extractor
- iv. Second Over load test : Every extractor
- v. Performance test : First extractor picked from lot of 10 extractor shall be tested for 100 cycles. Subsequently extractor picked from remaining lot of 10 extractors or part thereof to be subjected for 25 nos. cycles.
- vi. Safety valve Opening 'Test*' : Every extractor
- vii. Load sustaining Test for one hour : Desired certificate issued by manufacturer for every equipment should be submitted by firm.
- viii. Field test : Every extractor
- ix. Material test : One unit

* Safety valve Opening 'Test shall be conducted at end of all tests.

Procedures of above tests are described in sub clause of clause 4.1 to 4.8. In case of any discrepancies about method and sequence IS: 4552 (part 2): 1993 (Reaffirmed -2019) may be referred.

- 8.2.1 Any of the equipment which fails in the testing as per sequences given in clause 8.2 shall be rejected and next randomly selected unit shall be tested. However, if the equipment subjected to performance test mentioned in clause 4.4 fails, the Inspecting Officials may reject whole lot or pass each equipment after subjecting it to performance test.
- 8.2.2 Equipment for performance test shall be picked up randomly.
- 8.2.3 Before offering the equipment for inspection and manufacturer shall satisfy himself regarding performance of his equipment and shall give a certificate specifically mentioning that he has checked and tested hydraulic cylinder /hydraulic jacks of each equipment as per IS 10585 : 2019 & IS : 4552 (Part2):1993 and it satisfies its provisions.
- 8.2.4 Compliance of the specification shall be verified at the time of inspection.

9.0 HANDLING/TRANSPORTATION ARRANGEMENT:

The machine shall have mono rail double flanged wheels arrangement (two axles) at the bottom and a handle of convenient height to enable the machine to be pushed over the rail by one person to take it to the works site. Nylon wheels shall also be attached at either end of the double flanged wheels to enable the machine to be moved on the cess/plain surface as required. The diameter and thickness of the nylon wheels shall be such that they do not infringe check rails nor the ballast adjoining the rail heads.

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10.0 Training and Commissioning:

10.1 Adequate training for operation and maintenance of the machine shall be imparted to at consignee's end or at manufacturers premises as mutually agreed between the manufacturer and the purchaser at the rate of one operator per machine during supply which shall be treated as commissioning.

10.2 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.

11.0 Marking And Packing:

11.1 The machines shall be legibly and indelibly marked with:

- i) Name, initials and trade-marks of manufacturer.
- ii) Contact details of manufacturer/Supplier
- iii) Serial number of machine.
- iv) Month and year of supply

12.0 Supplier is fully responsible to maintain the quality of product supply to Indian Railways.

13.0 Reference Document:

Following standards have been referred to in this specification on. The following standards with up-dated corrections/amendments shall be available at manufacturer's works.

IS: 5517: 1993 (Reaffirmed -1998)	Specification for steels-for Hardening and Tempering.
IS 10585 : 2019	Hydraulic Fluid Power — Cylinders — Acceptance Tests (Second Revision)
IS: 4552 (part 2): 1993 (Reaffirmed -2019)	Automotive Vehicles - Portable jacks for automobiles Part-2 Hydraulic jack specification

14.0 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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