

1179116/2022/O/o PED/TMM/RDSO

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Document Title: Specification of Broad Functional requirement for Elastic Rail Clip (Inserter and Extractor)			



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Manak Nagar, Lucknow-226011
Track Machines & Monitoring Directorate

Specification of Broad Functional Requirement For
Elastic Rail Clip (Inserter and Extractor)

(Specification No.TM/SM/467)

(Rev 02 of 2022)

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1.0 Scope:

The specification covers the technical, functional and testing requirements of Elastic Rail Clip (Inserter and Extractor). This shall be a capable of extraction and insertion of all type of jammed pandrol /elastic rail clip (due to corrosion etc.) in Indian railways from the insert without damaging the insert and the sleeper. This machine is also capable for extraction of extremely Jammed Elastic Rail Clips from the insert in P. way as well as inserting them properly at the PSC sleepers. This specification chiefly covers the technical provisions having no connections with necessary contractual provisions.

2.0 References: Following codes have been referred to in this specification. Latest copy of the same shall be available in the Works of the manufacturer:

S.N.	Reference Documents	Description
1.	IS: 4552-1993 IS: 4552 (part 2): 1993(Reaffirmed -2019)	Automotive Vehicle –Portable Jacks for automobiles: Part-2 Hydraulic Jack-Specification
2.	IS :10585 : 2019	Hydraulic Cylinders : Acceptance Tests

3.0 Material, Workmanship and Finish:

3.1 The machine should have 3-4 stroke diesel/petrol run /air-cooled/ electrically operated motor driven engine of reputed make which is used for both the operations i.e. inserting and extracting ERC's.

3.2 The machine shall be mounted on a trolley or mono rail trolley which can be easily dismantled if maintenance is going without traffic block.

3.3 It should be able to work in track circuited areas with insulation without any effect on the progress.

3.4 The machine shall have suitable lighting arrangement to enable working during insufficient light.

3.5 There should be provision of detachable mechanical stop device to ensure clips to be fixed properly and prevent their overdriving.

3.6 In case of extremely Jammed ERC's , there should be a provision of adjustment of gauge pressure to increase the pressure up from 10 tonne (normal working) to 30 tonne to extract it.

3.7 The machine shall be and easily attachable/ detachable within short time.

4.0 Functional requirement:

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4.1 The equipment shall be compact and robust and capable of working continuously during the severe Indian atmospheric and climatic conditions as given below:

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

4.2 The machine shall take the reaction in such a way that it shall not disturb or damage rail, sleeper, insert etc.

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

4.4 It shall be capable of exerting a minimum of 10 T force on the clip.

4.5 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.

4.7 The equipment shall be able to extract an extremely jammed clip from the insert within two minutes (excluding fixing time).

4.8 It shall not weight more than 250 kg .

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

5.0 Technical Features:

1.	Maximum Pushing/Pulling force	Sufficient to insert / extract 1000 to 1200 ERC easily per hour within the specified time
2.	Weight	250 kg. (Max.)
4.	ERC Insertion / Extraction capacity	Approx. 1100 nos. of ERCs/Hour
5.	Fuel tank capacity	Sufficient for working minimum 6 hours

6.0 Tests:

6.1 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.

6.2 No Load Test: Hydraulic ram of the extractor shall be operated from zero to maximum extraction and its hall work smoothly without undue clearances between moving parts.

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6.3 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.

6.4 Performance Test: The ram (Jack) shall be loaded at rated capacity and operated from maximum to minimum position and back. The first extractor sample shall be subjected to 100 such cycles of operation and 2nd sample to 25 cycles under a testing rig suitably designed for the 120% capacity of vertical and lateral jacks.

6.5 Second overload Test : The test shall be repeated as per clause no. 6.3 for both the samples subject to performance test.

6.6 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 sample shall be left for 24 hours at room temperature and shall not show any sign of distortion or leakage of oil.

6.7 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 machine shall withstand the various field operations to full satisfaction of the inspecting officials. Number of jammed ERCs to be extracted by each samples of extractor shall be minimum 25 nos. along with a total of approx .200 ERC's extracted and inserted.

6.8 Material test: The manufacturer shall arrange for the material testing of the samples/component(s) desired by the inspecting official from a Govt. approved test house. The manufacturer shall obtain a certificate from the test house indicating details of the tests conducted, test results, deviation if any etc. for each test sample. All the expenses of the testing shall be borne by the manufacturer.

7.0 Acceptance Test: Acceptance tests shall be carried out as per following sequence

S.N.	Tests	Sampling Method
(i)	Visual & Dimensional Test	Every machine
(ii)	No load test	Every machine
(iii)	First Over load test	Every machine
(iv)	Performance test	One out of 10 machine or part thereof to be subjected for 25cycle
(v)	Second Overload Test	Every machine
(vi)	Load sustaining Test for one hour	Every machine

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(vii)	Field test	Every machine
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-- Procedures of above tests are described in sub clause of clause 6.0. In case of any discrepancies about method and sequence IS: 4552 (part 2): 1993 (Reaffirmed -2019) may be referred.

Before offering the equipment for inspection and manufacturer shall satisfy himself regarding performance of his equipment and shall give a certificate specifically mentioning that hydraulic cylinder /hydraulic jacks of each equipment has been checked and tested as per IS 10585 : 2019 & IS : 4552 (Part 2):1993(Re-affirmed-2019).

8.0 Warranty and 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, the period of twelve months shall commence from the date such modification.
- ii) 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.

9.0 Inspection:

The inspection during procurement of the machine 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 SE (Section Engineer)/SSE (Senior Section Engineer).The cost of inspection and testing shall be borne by the manufacturer/supplier. Inspection of the machines shall be carried out as per the details of acceptance tests mentioned in clause no. 7.0
Compliance of the specification shall be verified by inspecting officials at the time of inspection.

10.0 Training and Commissioning:

10.1 Adequate training for operation and maintenance of the machine shall be imparted to Railway operators 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 and it satisfies its provisions.

11.0 Documentations :

11.1 **Certificates:**(i) Copies of the maker's certificate guaranteeing the performance of the machine shall be supplied induplicate along with the delivery of each machine.

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(ii) Before offering the equipment for inspection , the 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 .

11.2 Drawings:

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.

12.0 Marking and Packing:

12.1 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.

12.2 Manufacturer/Supplier has sole responsibility to maintain the quality of the product supplied to railways and other units

13.0 Preference to Make in India: The Government of India policy on ‘Make in India’ shall be applicable.

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