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Document Title: Specification of Rail Drilling Machine			



SPECIFICATION OF RAIL DRILLING MACHINE

(No.TM/SM/3dt. 19.11.1992)

First Revision, 2020

Track Machines & Monitoring Directorate

**RESEARCH DESIGNS AND STANDARDS ORGANISATION
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1.0 SCOPE:

- 1.1 This specification covers the material, technical and functional requirements and testing criteria of 'Rail drilling Machine' which is needed for drilling holes in all section of rails using drill bit. In this specification "Rail Drilling Machine" will be termed as "Machine" for conveniences. The machine should comprise of an integrated driving engine with cutting unit coupled together rigidly to form a compact unit.
- 1.2 Preference to Make in India: Compliance of the instruction contained in Public Procurement (Preference to Make in India) Order -2017 "Make in India" and latest guidelines issued in this regard shall be ensured.

2.0 REFERENCE DOCUMENT:

Following IS codes have been referred to in this specification. Updated copies of the same shall be available in the works of the manufacturer/Suppliers.

- (i) IS: 5103–1969 (Reaffirmed 2008): specification for Twist Drills, Morse Taper Shanks.

3.0 MATERIAL:

- 3.1 Rail Clamp: The rail clamp shall be made of tough, durable and light weight material having sufficient mechanical strength. The rivet/bolts used in the clamp shall be of high tensile category.
- 3.2 Power Source: The Machine shall be powered by suitable engine with good records of service with wide service network in India. Robust construction & low maintenance cost are of particular importance. The manufacturer should furnish the information regarding make & model of engine proposed to be used & details of service network and availability of spares in India.
- 3.3 Drill bit, if supplied alongwith the machine, should be as per IS 5103 –1969 (Reaffirmed 2008) and should last for 100 fish-bolt holes in a 60 kg 90 UTS rail.

4.0 FUNCTIONAL REQUIREMENTS:

- 4.1 It should be able to drill hole upto 35 mm dia. hole in the rail web of any type and section of rail from 60 R to 60 kg/m having UTS of 70 to 90 kg/mm².
- 4.2 It should be able to drill a hole within 3 to 4 minutes in 60 kg 90 UTS rails.
- 4.3 Drill spindle rotation should be between 60 to 90 r.p.m.
- 4.4 Weight of the complete unit including all attachments like wheels but without fuel should be within 65 kg.
- 4.5 The tolerance for the diameter and position of the hole shall be ± 0.7 mm.

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- 4.6 It should have clamps provided such that handling by men in easy.
- 4.7 Fixing arrangement should be easy and firm and should not take more than 2 minutes for fixing.
- 4.8 It should be able to drill hole as close as 40 mm from rail ends.
- 4.9 Clamp should ensure a straight hole centrally to both axes.
- 4.10 Each liter of fuel should cater for a minimum of 10 holes in 60 kg 90 UTS rail and capacity of the fuel tank may be about 2 liters.
- 4.11 **Handling/transportation arrangements:** The machine should have mono rail wheels arrangement at the bottom and a handle of convenient height to enable kit to be pushed over the rail by one person to take it to the work site. Nylon wheels should also be attached at either end of the double flanged wheels to enable the machine to be moved on cess/plain surface as required. The diameter and thickness of the nylon wheels should be such that they do not infringe check rails nor the ballast adjoining the rail heads.

5.0 TESTS:

5.1 **Test at the time of initial approval (Type Tests):**

Following type test are to be conducted on Prototypes at the time of initial approval. The manufacturer/supplier shall produce **two prototype** samples before inspecting officials for type tests. The cost of type tests shall be borne by the manufacturer/supplier. All arrangement to conducts type tests shall be made by manufacturer/supplier.

- i) **Visual and Dimensional Test:**
The Machine shall be visually checked for visual defects like rough finishing, bend in frame, loose fittings etc.
- ii) **Weight of the machine shall be checked.**
- iii) **Continuous running tests for power source:**
The power source i.e., engine shall be started for engine driven machine; the engine shall be started with ease. The power source shall be run continuously for a minimum period of one hour, at full throttle. The power source shall run without any operational trouble during test.
- iv) **Drilling Performance Test:**
The prototypes shall be tested for drilling performance. In 52 kg/60 kg, 90 UTS rail, holes shall be drilled and following details shall be recorded. Minimum 20 holes with each prototype shall be drilled out. The test includes:
 - a) Fixing time of the machine.
 - b) Drilling time for every drill.
 - c) The tolerance of diameter & position of the hole.

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d) Firmness of gripping before and after every drill.

e) Average fuel consumption per liter.

5.2 **Acceptance Test:** Acceptance tests are to be conducted inspection against zonal railways/purchaser's purchase order.

(i) Visual & Dimensional check—as per clause 5.1.(i) Every machine in the consignment.

(ii) Drilling performance test as per clause no. 5.1 (iv). Minimum 05 holes per sample shall be drilled.

(iii) Weight of machine.

5.2.1 The samples shall be picked up randomly as per following manner:

SN	Consignment Size	No. of samples to be tested
1.	1-10	1
2.	11-25	2
3.	26-50	3
4.	51 and above 50 nos.	3 +one each for a lot of 25 or part their

5.2.2 Any of the sample which fails in the testing as per clause no. 5.2, shall be rejected. However if the sample subjected to drilling performance test fails, the inspecting officials may reject whole lot or pass each machine after subjecting to the acceptance tests as per clause 5.2.

6.0 INSPECTION:

The inspection of the machine shall be carried out by the purchaser Zonal railway or any representative/other agency authorized by purchaser/ zonal railway. The inspection procedure and the test scheme should be submitted to the purchaser for approval. The cost of inspection and testing shall be borne by the manufacturer/supplier. Minimum level of inspecting official shall be SSE.

7.0 WARRANTY & AMC:

7.1 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 expenses. Should If any design modification is made in any part of the equipment offered, the period of 12 months would commence from the date of such modification the modified part commissioned in service. The cost of such modification will be borne by the supplier.

7.2 During procurement of the machine, railways should go post-warranty AMC with the supplier as per IRSTMM.

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8.0 SERVICE FACILITY & SPARE PARTS:

- 8.1 **Service Engineer:** The contractor shall provide at reasonable cost the service of competent engineers during the guarantee period. The service engineers shall be available for instructions to operating, repair and maintenance staff.
- 8.2 **Spare Parts:** The expected life of the components should be indicated alongwith their condemning limits. The machine should be supplied with the necessary spare parts for the operation and maintenance for a period of two years. The spare parts required should be detailed in separate list indicating description, part number, quantity and possible source of procurement.
- 8.3 The manufacturer shall be responsible for the subsequent availability of spares to ensure trouble free service during the life time of the machine.
- 8.4 Each machine shall be supplied with a complete kit of tools and spare parts required by the operator in emergency and for normal working of the machine.

9.0 DOCUMENTATION & INSTRUCTION MANUALS:

- 9.1 Detailed operating manual, maintenance, safety and service manuals shall be specifically prepared and three copies each of the same shall be supplied with each machine.
- 9.2 Frequency of various maintenance operations like servicing overhauling etc. shall be indicated by the supplier.
- 9.3 **Maker's test certificate:** Copies of the maker's certificate guaranteeing the performance of the Machine should be supplied in duplicate alongwith the delivery of each Machine.
- 9.4 **Drawings:** In order to facilitate subsequent maintenance in service, the manufacturer/supplier shall supply details drawings of the machine exhibiting clearly the materials and dimensions.

10.0 TRAINING AND COMMISSIONING:

Adequate demo and training in operation and maintenance of the machine shall be imparted to railway operators at the rate of one operator per machine by the manufacturer either at manufacturer's premises or at railway premises, as mutually agreed between the purchaser and the supplier. The supply will be considered as complete only after this demo and training. Then will be completed the commissioning of machine.

11.0 MARKING AND PACKING:

- 11.1 The machine shall be legibly and indelibly marked with:
- Name, initials, contact and trade-marks of manufacturer.
 - Serial number of machine.
 - Month & year of supply.

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11.2 The Machine shall be packed in wooden/suitable carton after covering with good quality plastic sheets as per best trade practice to avoid any damage during transshipment.

12.0 All the provisions contained in RDSO's ISO procedures laid down in Document No. QO-D-8.1-11 dated 12.09.2018 (titled 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.

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