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Document Title: Specification of Hacksaw Blades for Cutting Rails.			



सत्यमेव जयते
Government of India

Specification of Hacksaw Blades for Cutting Rails (Spec. No.- TM/SM/26)

Second Revision- 2020

Track Machines & Monitoring Directorate

**RESEARCH DESIGNS AND STANDARDS ORGANISATION
Manak Nagar, Lucknow-226011**

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SPECIFICATION OF HACKSAW BLADES FOR CUTTING RAILS (No. TM/SM/26 Second Revision- Aug. 2020)

- (a) A specification for hacksaw blades for cutting rails was adopted in 1992 with the Railway Board issuing it to the zonal railways vide Railway Board letter no. 88/Track III/TK/2 (Vol.III) dated 28.2.1992 on the basis of the erstwhile standing committee's recommendations. In first revised version of the specification with the following salient modifications done-
- (i) A harder grade of steel has been incorporated for hacksaw blades, based on testing of samples.
 - (ii) Acceptance criteria has been revised.
 - (iii) One additional hacksaw blade size – 350 x 32 x 1.60 x 4.0 (6 TPI) – has been included.

This specification has been approved by Railway Board and the zonal railways intimated vide Railway Board's letter no. 96/Track-III/TK/32 (Vol. IV) dated 4.2.2002, on the basis of the recommendations of a standing committee on small track machines nominated by Railway Board. The first revised version of the above mentioned specification is being issued by RDSO, Lucknow with Sl. No. TM/SM-26-2002.

- (b) In this second revision para 1.2, 1.3, 2.0, 15.0 & 16.0 is added and IS code updated.

1.0 SCOPE:

- 1.1 This specification covers the dimensions, material requirement and test criteria of hacksaw blades to be used for cutting rails upto 880 Grade rails (90 UTS rails).

- 1.2 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 there of shall be binding, and applicable on the successful manufacturers/suppliers in the contracts floated by Railways to maintain quality of products supplied to Railways.

1.3 PREFERENCE TO MAKE IN INDIA POLICY:

Compliance of the instructions contained in public procurement (Preference to Make in India) order 2017 or latest instructions issued on subject shall be ensure.

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2.0 References: Following IS codes have been referred to in this specification. Updated copies of the same shall be applicable and available with firm.

i.	IS: 2594-2003 Reaffirmed: 2018	Hacksaw Blades—Specification (Second Revision)
ii.	IS: 7291-1981 Reaffirmed: 2019	Specification for High Speed Tool Steel (First Revision)

3.0 TERMINOLOGY: Terminology used in this specification is same as mentioned in IS: 2594-2003 (specification for hacksaw blades).

4.0 TYPE: Hacksaw blades for cutting rails shall be of all hard blade (Type A) as per IS: 2594-2003.

5.0 DIMENSIONS: For manual as well as machine operation following sizes are hereby recommended. All dimensions given below are in mm. The tolerances in the dimensions shall be applicable as per IS: 2594-2003.

5.1 For manual cutting of rails (by hand-held hacksaw device):

5.1.1 For rails having sections upto or including 52 Kg rail sections:

- i) 300 X 25 X 1.25 X 2.5 (10TPI)
- ii) 350 X 25 X 1.25 X 2.5 (10TPI)

5.1.2 For rails having section 60 Kg:

- i) 350 X 25 X 1.25 X 2.5 (10TPI*)
- ii) 350 X 32 X 1.60 X 4.0 (6TPI)

* TPI: Teeth per inch.

5.2 For machine operation i.e., cutting rails with the help of self propelled portable (saw type) cutting machines:

- i) 350 X 25 X 1.25 X 2.5 (10TPI)
- ii) 350 X 32 X 1.60 X 4.0 (6TPI)

6.0 MATERIALS: High speed steel (HS) according to designation XT87W6Mo5Cr4V2 of IS: 7291-1981.

7.0 HARDNESS: The hardness when measured as near to the tip of the teeth as possible shall be in the range of 850 HV to 900 HV and the hardness around pin holes shall be in between 400 to 500HV.

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8.0 REQUIREMENTS:

- 8.1** The blades shall be manufactured reasonably straight, true to shape and size. The pin hole shall be neatly punched. The out of straightness per 100 mm length of the blade in the longitudinal direction shall not exceed 0.6 mm for all sizes of hacksawblades.
- 8.2** The teeth shall be clean and uniform along toothed edge. The teeth of the blades shall be set staggered. The formation of the set shall be symmetrical along the length of toothedside.
- 8.3** The blades shall be heat-treated in such a manner that they shall fulfil the requirements of hardness as mentioned in clause no. 7.0.
- 8.4** The area around the pin-hole shall be suitably heat-treated to reduce the risk of end fracture during use. The hardness around the pin-holes shall be in between 400 to 500HV.
- 8.5** The center of the hole shall be located on the central line of the blade.

9.0 SAMPLING.

For performance test that is machine test or hand test the number of blades to be selected shall be one per thousand blades or part thereof in the lot subject to a maximum of six blades.

10.0 DESIGNATION: All Hacksaw blades shall be designated by the name, type, nominal length, width, thickness, pitch and the symbol for material as mentioned in clause 9 of IS: 2594: 2003.

11.0 WORKMANSHIP AND FINISH: The blades shall be free from burrs, rust, scale and other defects.

12.0 MARKING.

- 12.1** Each blade shall be distinctly and indelibly marked with the symbol for material, manufacturer's name and initial or trademark.
- 12.2** The year and month of manufacture shall also be marked on each blade.

13.0 PRESERVATION AND PACKING: The blade surface shall be coated with a suitable preservative or paint. Each wrapped packet shall contain five or ten blades and a suitable number of packets shall be packed in a carton. Each carton shall contain bearing the designation, manufacturer's name, initial or trademark. Each contain shall contain one size of blades.

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14.0 ACCEPTANCE CRITERIA: Before supplying the material, the supplier shall test and certify that all blades conforms to the requirements i.e., material, hardness, dimensions, finish, workmanship and cutting performance etc as mentioned in this specification. The certificate shall be for and on behalf of the manufacturer and shall be submitted in duplicate to the inspecting official. Following tests shall be carried out on the samples collected as per clause 9.0.

- (i) Visual check,
- (ii) Hardness test,
- (iii) Cutting performance test.

14.1 VISUALCHECK:

14.1.1 All dimensions of the hacksaw blades i.e., overall length, nominal length, width, thickness and pitch shall be measured. All the dimensions shall fulfil the requirements as mentioned in clause 3.1 and 3.2 of IS: 2594 - 2003.

14.1.2 The amount of deviation from straightness per 100 mm length of blade in longitudinal direction shall not exceed 0.6 mm for all sizes of hacksaw blades. This requirement of straightness of hacksaw blades should satisfied each of the two tests given below:-

- (a) The blade shall be placed horizontally flat on a surface plate and the deviation from flatness is measured with the help of a filler gauge or slip gauge.
- (b) The blade shall be held vertically with toothed edge touching the surface plate and the vertical gap between toothed edge and surface plate shall be measured.

14.2 HARDNESS TEST: Hardness test of the blade samples shall include following compulsory tests: -

14.2.1 Hardness at nearer point of teeth and near the pin hole of selected blades shall be checked in the manufacturer's premises by suitable hardness testing machine and should conform to the following results:

Hardness near to the teeth shall be in the range of 850 HV to 900 HV and hardness around the pinholes shall be in between 400 to 500 HV. Manufacturer shall also submit a certificate that hardness of all the hacksaw blades has been tested by him and results are found as per stipulations given in the specification.

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14.2.2 The manufacturer shall issue a certificate that quality and grade of raw material used conforms to the stipulations of the specification. The manufacturer shall also submit a certificate from a reputed or Govt. approved test house mentioning detailed chemical composition of raw material used for the manufacture of hacksaw blades.

14.3 CUTTING PERFORMANCE TEST:

14.3.1 Supply of each size of blade shall be subjected to cutting test after drawing the sample as mentioned in clause 9.0.

14.3.2 Blades for hand operation as well as machine operation shall be tested on 52 Kg 880 Grade (90 UTS) rails or 52Kg 710 Grade (72 UTS) rails in stress free condition. Cutting test shall be done on self propelled (mechanically / electrically driven) portable hacksaw cutting machine (saw type). This test shall satisfy the following criteria.

S. No.	Size of blade (in mm)	Minimum number of rail sections to be cut by each sample blade
1.	300 X 25 X 1.25 X 2.5 (10 TPI)	12 Nos. on 52 Kg 72 UTS rails.
2.	350 X 25 X 1.25 X 2.5 (10 TPI)	15 Nos on 52 Kg 72 UTS rails or 07 Nos. on 52 Kg 90 UTS rails.
3.	350 X 32 X 1.60 X 4.0 (6 TPI)	08 Nos. on 52 Kg 90 UTS rails.

NOTES :

- i) Maximum time consumed in each cut shall not exceed 30 Minutes. Preferably it shall be in the range of 10 to 25 minutes.
- ii) The test shall be carried out on stress free rail in as hade.
- iii) Cutting test shall be performed using water as lubricant.

15.0 Tests at the time of initial approval (Type Tests): Type tests are meant to be conducted on prototypes at the time of initial approval as new vendor. The manufactures/supplier shall produce two nos. blade of each size as prototype sample before inspecting officials for type test. Prototype testing shall be conducted as per para 14.0.

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16.0 Acceptance Test: Acceptance tests are meant to be conducted on selected samples of the consignment which are taken from supplies under inspection against zonal railways'/ purchasers' P.O. Acceptance test shall be conducted for Visual Check and Cutting Performance Test as per para 14.1 and 14.3. For hardness test manufacturer/supplier's test certificate should accompany with consignment. Sample size shall be taken as per para 9.0 for each size of blade.

17.0 INSPECTION:

Inspection of blades shall be carried out by the Chief Track Engineer (CTE) or his authorised representatives either at firm's/supplier's premises or consignee premises as desired by purchaser or at any other place agreed mutually.

18.0 SUPPLY:

18.1 Supplier shall either be an approved manufacturer or his authorized agent/dealer. Supplier shall attach necessary certificate of authorization to this effect with the tender/quotations. In case of doubt/suspicion purchaser is free to verify credentials from manufacturer.

18.2 Hacksaw blades shall be supplied either by the manufacturer himself or by his authorized agent/dealer. However, in case of bulk supply the supply shall be made by the manufacturer only, even though tender/quotation has been submitted by agent/dealer.

18.3 The supply shall be termed as bulk supply when number of blades per size shall exceeds 3,000.

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