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*Indian Standard*  
SPECIFICATION FOR  
CROSS-CUT AND RIP SAWS

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# Indian Standard

## SPECIFICATION FOR CROSS-CUT AND RIP SAWS

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( Continued on page 2 )

( Continued from page 1 )

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# *Indian Standard*

## SPECIFICATION FOR CROSS-CUT AND RIP SAWS

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 30 April 1969, after the draft finalized by the Hand Tools Sectional Committee had been approved by the Mechanical Engineering Division Council.

**0.2** This standard covers a number of sizes of cross-cut and rip saws also known as hand saws for sawing timber. The cross-cut saws are employed for sawing timber across the grain and for general purposes whereas rip saws are employed for sawing the timber along the grain.

**0.3** While preparing the standard assistance has been derived from the following:

DIN 7244-1946 Fuchsschwanz für Holz (panel saw). Deutscher Normenausschuss.

B.S. 3159-1959 Woodworking saws for hand use: Part I Hand saws. British Standards Institution.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

### 1. SCOPE

**1.1** This standard specifies the requirements for cross-cut and rip saws for hand use.

### 2. NOMENCLATURE

**2.1** For the purpose of this standard, the nomenclature as given in Fig. 1 along with the following definitions shall apply.

**2.1.1 Breasted** — A saw blade on which the toothed edge is convex.

\*Rules for rounding off numerical values (revised).

**2.1.2 Straight Edges** — A saw blade on which the toothed edge is straight.

**2.1.3 Skew Back** — A saw blade on which the edge opposite to the toothed edge is concave.

**2.1.4 Straight Back** — A saw blade on which the edge opposite to the toothed edge is straight.

**2.1.5 Taper Ground** — A saw blade uniform in thickness along the entire length of the toothed edge and uniformly tapered in thickness from the toothed edge to the back and along the back from the handle to the top (see Fig. 1).

**2.1.6 Flat Ground** — A saw blade which is ground so as to be of the same thickness across from the toothed edge to the back edge.

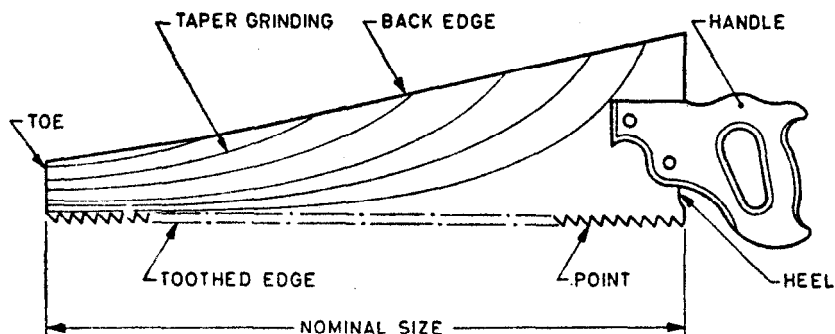


FIG. 1 NOMENCLATURE FOR CROSS-CUT AND RIP SAWS FOR HAND USE

### 3. GRADE

**3.1** Saws shall be of the following four grades:

Grade 1 — A first grade saw for use of craftsmen.

Grade 2 — A second grade saw for use of craftsmen.

Grade 3 — A first grade general duty saw.

Grade 4 — A second grade general duty saw.

### 4. MATERIAL

**4.1** The saw blades shall be manufactured from a suitable steel having a carbon content not less than 0.7 percent. Suitable steels for this purpose are T75, T80 and T85 of schedule VI of IS : 1570-1961\* with a maximum sulphur and phosphorus content of 0.05 percent each.

\*Schedules for wrought steels for general engineering purposes.



## 5. HARDNESS

**5.1** The saw blades shall be uniformly hardened and tempered to give a hardness value as follows:

Grade	Hardness Value
1	480 to 580 HV5*
2	460 to 560 HV5*
3 & 4	440 to 540 HV5*

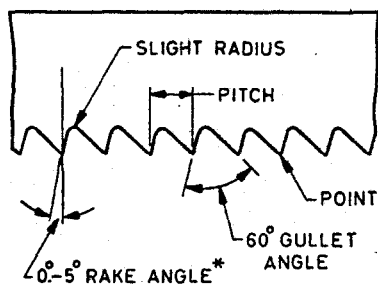
## 6. DIMENSIONS

**6.1** The main dimensions for saws shall be as given in Tables 1 and 2.

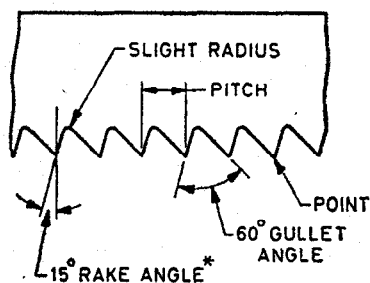
## 7. GENERAL REQUIREMENTS

**7.1 Blade** — The blade shall be either skew back or straight back. The thickness of the back at the handle shall be equal to the thickness of the toothed edge, or not more than 0.08 mm thinner.

**7.2 Teeth** — The teeth shall be evenly formed and shall have tooth angles as shown in Fig. 2. The teeth shall be alternately set on either side of the blade. Approximately two-thirds of each tooth measured from the point shall be set and the method of setting shall be such that the remainder of the blade shall not be deformed. The degree of set on each side shall be equal.



FOR RIPPING



FOR CROSS CUTTING AND  
GENERAL USE

\*Regardless of variations in the rake angle, the gullet angle shall remain at 60°.

FIG. 2 DETAILS OF TEETH

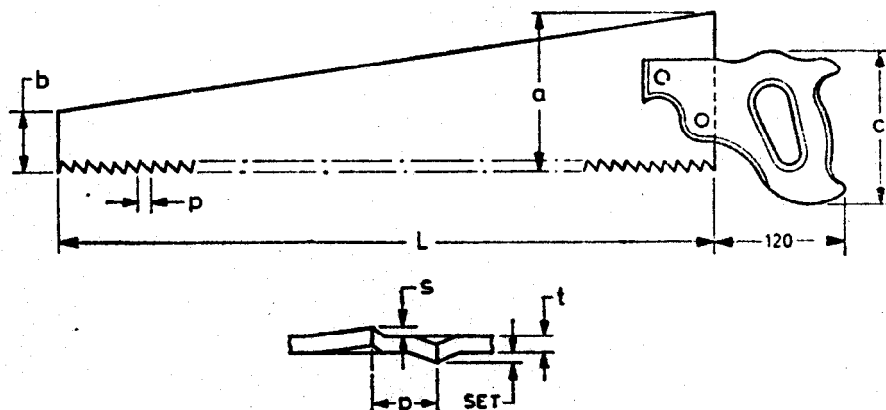
**7.3 Handles** — The thickness of the handle shall not be less than 20 mm. The handle shall be centrally slit. The width of slot shall not be greater

\*See IS : 1501-1959 Method for Vickers hardness test for steel. (Since revised).

TABLE 1 DIMENSIONS FOR CROSS-CUT SAWS

( Clause 6.1 )

All dimensions in millimetres.



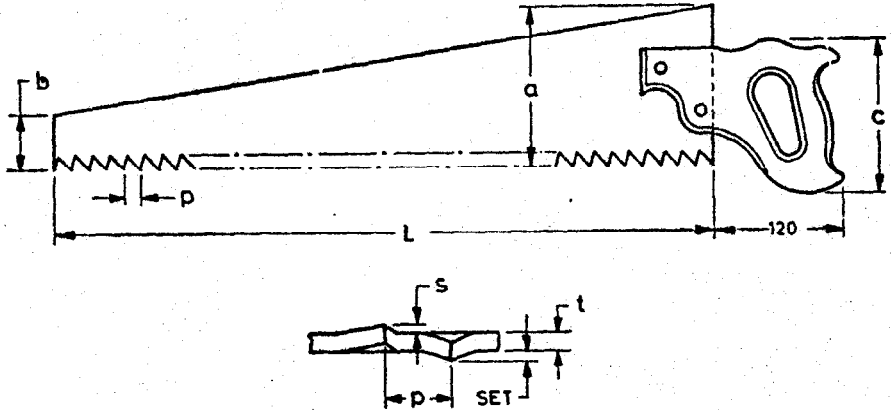
ENLARGED TOOTH FORM

NOMINAL SIZE $L$	$a$	$b$	$c$ $Max$	THICK- NESS AT TOOTHED EDGE $t$ $\pm 0.1$	$p$	$s$		HANDLE TYPE
						Grades 1 & 2	Grades 3 & 4	
250	100	40	110	0.8	3	0.2 $t$ to 0.4 $t$	0.25 $t$ to 0.50 $t$	Open
300	100	40	110	0.8	3	0.2 $t$ to 0.4 $t$	0.25 $t$ to 0.50 $t$	Open
350	115	45	125	0.9	4	0.2 $t$ to 0.4 $t$	0.25 $t$ to 0.50 $t$	Closed
400	115	45	125	0.9	4	0.2 $t$ to 0.4 $t$	0.25 $t$ to 0.50 $t$	Closed
450	115	50	125	0.9	4	0.2 $t$ to 0.4 $t$	0.25 $t$ to 0.50 $t$	Closed
500	130	50	140	1.0	5	0.2 $t$ to 0.4 $t$	0.25 $t$ to 0.50 $t$	Closed
600	145	55	140	1.0	5	0.2 $t$ to 0.4 $t$	0.25 $t$ to 0.50 $t$	Closed
650	145	55	140	1.0	5.5	0.2 $t$ to 0.4 $t$	0.25 $t$ to 0.50 $t$	Closed

TABLE 2 DIMENSIONS FOR RIP SAWS

( Clause 6.1 )

All dimensions in millimetres.



ENLARGED TOOTH FORM

NOMINAL SIZE				THICKNESS AT TOOTHED EDGE			HANDLE TYPE
$L$	$a$	$b$	$c$ <i>Max</i>	$t$ $\pm 0.1$	$p$	$s$	
600	145	50	140	1.0	7	0.25 $t$ to 0.50 $t$	Closed
650	150	55	140	1.0	7	0.25 $t$ to 0.50 $t$	Closed

than is necessary to receive the blade. The handles shall conform to the requirements of class 5 of IS : 620-1955\*.

7.4 The saws shall be provided with the teeth which shall cut either in the forward direction or in the backward direction.

NOTE — The saws which are having teeth in the forward direction perform the cutting operation while the saw is pushed away from the operator, whereas the saws having the teeth in the backward direction perform the cutting operation while the saw is pulled towards the operator.

\*General requirements for wooden tool handles. (Second revision in 1965).

## **8. INDIVIDUAL REQUIREMENTS**

### **8.1 Grade 1 Saws**

**8.1.1** The blade shall be evenly ground thin-to-back with a taper at the toe of at least 0.1 mm per 25 mm of toe width.

**8.1.2** The blade shall be ground, glazed and highly polished.

**8.1.3** The toothed edge shall be straight or breasted.

**8.1.4** The teeth in case of cross-cut saws shall be cross-sharpened and for rip saws straight-sharpened ( *see* Appendix A ).

**8.1.5** The handle shall be secured by 4 or 5 screws according to the size of saw, and shall be polished all over.

### **8.2 Grade 2 Saws**

**8.2.1** The blade shall be evenly ground thin-to-back with a taper at the toe of at least 0.05 mm per 25 mm of toe width.

**8.2.2** The blade shall be ground, glazed and polished.

**8.2.3** The toothed edge shall be straight or breasted.

**8.2.4** The teeth in case of cross-cut saws shall be cross-sharpened and for rip saws straight-sharpened ( *see* Appendix A ).

**8.2.5** The handle shall be secured by 3 or 4 screws or rivets and shall be polished all over.

### **8.3 Grade 3 Saws**

**8.3.1** The blade shall be flat ground and glazed.

**8.3.2** The toothed edge shall be straight.

**8.3.3** The teeth in case of cross-cut saws shall be cross-sharpened or half cross-sharpened and for rip saws straight-sharpened ( *see* Appendix A ).

**8.3.4** The handle shall be secured by 3 or 4 screws or rivets and shall be polished at the edges at least.

### **8.4 Grade 4 Saws**

**8.4.1** The blade shall be flat ground and glazed.

**8.4.2** The toothed edge shall be straight.

**NOTE** — Grade 4 saws are normally supplied ready for use, but the teeth are not always sharpened.

**8.4.3** The handle shall be secured by screws or rivets and shall be polished on the edges at least.

## 9. DESIGNATION

9.1 The saws shall be designated by the following:

- a) Commonly used name,
- b) Grade,
- c) Nominal size, and
- d) Number of this standard.

*Example:*

A Grade 1 cross-cut saw of nominal size 250 mm shall be designated as:

Cross-Cut Saw 1, 250 IS : 5098

## 10. MARKING

10.1 Each saw shall be clearly and indelibly marked with the nominal size, type and grade and the manufacturer's name or trade-mark and the year of manufacture if required by the purchaser. The pitch of the teeth shall also be clearly and indelibly marked at the exposed portion of the heel of the blade.

10.1.1 Saws may also be marked with the ISI Certification Mark.

**NOTE** — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

## 11. SAMPLING

11.1 Unless otherwise agreed to between the supplier and the purchaser, the sampling plan and criteria for conformity as given in Appendix B shall be followed.

## 12. TESTS

12.1 **Bending Test** — Grades 1 and 2 taper ground saw blades shall be capable of being bend in both directions round a test block with a diameter 260 times the thickness of the toothed edge of the saw, after which they shall spring back to their original straightness.

Grades 3 and 4 flat ground saw blades shall be capable of being bent in both directions round a test block with a diameter 320 times the thickness of the toothed edge of the saw, after which they shall spring back to their original straightness.

This test shall be carried out using a test block of not less than 25 mm in thickness. The toe of the saw shall be placed under a clip on the test block and the blade smoothly bent round the block by hand. The saw handle shall be attached when this test is carried out. Details of a suitable test block are given in Fig. 3.

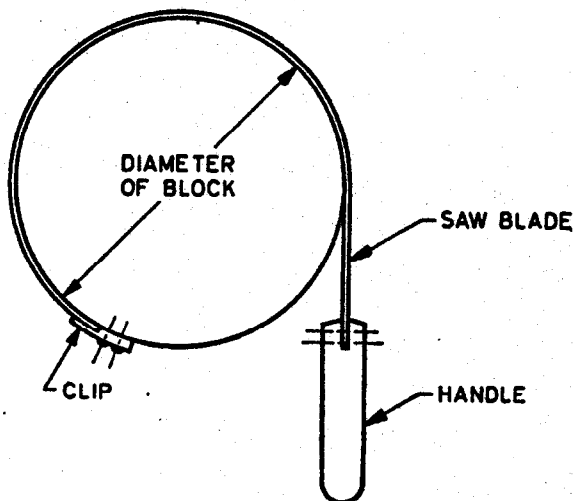


FIG. 3 BENDING TEST

**12.2 Setting Test** — The teeth of both taper ground and flat ground saws shall be capable of being set, without breaking, by reasonable hammer blows on a setting stake, or by a suitable, correctly adjusted saw set. Two-thirds of each tooth, measured from the point shall be set for this test.

**12.3 Straightness Test** — When held vertically, the saw blade shall be visually straight and free from twist (see Fig. 4).

**12.4 Performance Test** — All sharpened saws shall be capable of cutting satisfactorily when tested on well-seasoned Indian oak or other suitable hardwood; cross-cut saws shall be tested by cutting across the grain and rip saw by cutting along the grain.

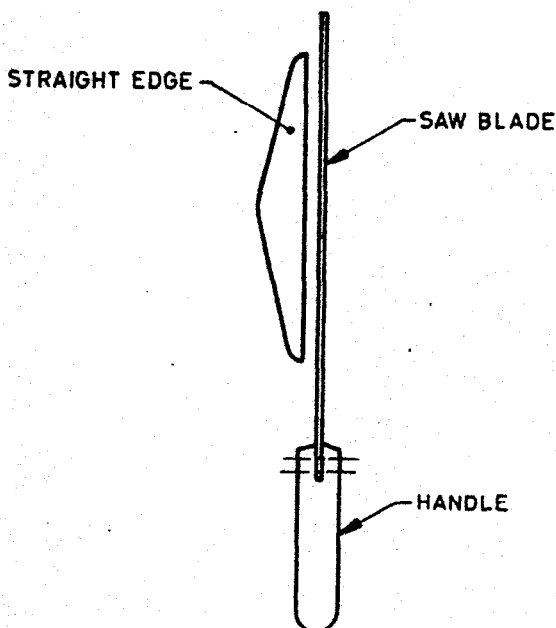


FIG. 4 STRAIGHTNESS TEST

## APPENDIX A

( *Clauses 8.1.4, 8.2.4 and 8.3.3* )

### METHODS OF SHARPENING OF TEETH

**A-1.** The following methods of sharpening of teeth are commonly employed.

**A-1.1 Cross-Sharpening of the Teeth** — In this method a saw-sharpening file is held at an angle to the blade and every alternate tooth is filed from one side of the saw. The blade is then turned around and the remaining teeth filed at the same angle ( *see Fig. 5* ).

**NOTE** — Filing at an angle puts a bevel on the side of the teeth producing a sharp point on one side of each tooth. By filing as indicated by arrows these points are on the outside. If the wrong teeth are filed the sharp points will be in the centre bevelled off to the outside.

**A-1.2 Half Cross-Sharpening of the Teeth** — This method is similar to cross sharpening except that all sharpening is done from the same side of the blade, the teeth being filed at an angle alternately from left to right.

**A-1.3 Straight-Sharpening of the Teeth** — In this method all sharpening is done from the same side of the blade with the file at  $90^\circ$  to the line of the blade.

## APPENDIX B

( Clause 11.1 )

### SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY

#### B-1. SCALE OF SAMPLING

**B-1.1 Lot** — In any consignment all the saws of the same grade and nominal size manufactured under similar conditions of manufacture shall be grouped together to constitute a lot.

**B-1.2** For ascertaining the conformity of the lot to the requirements of this specification tests shall be carried out from the saws selected from each lot separately. The number of saws to be selected at random from a lot shall be in accordance with col 1 and 2 of Table 3. To ensure the randomness of selection, the procedure as laid down in IS: 4905-1968\* shall be followed.

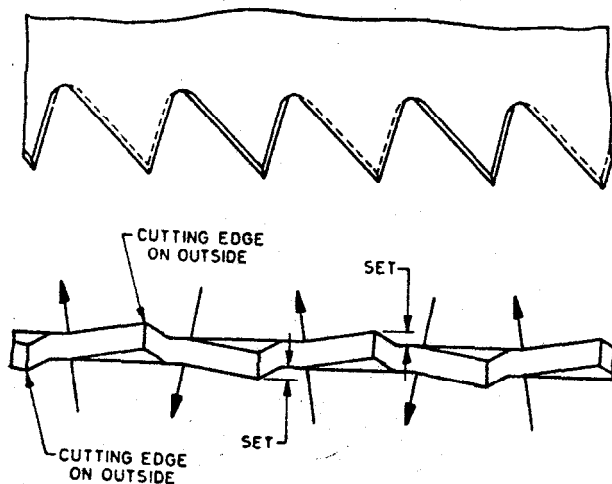


FIG. 5 METHOD OF CROSS-SHARPENING

\*Methods for random sampling.



**TABLE 3 SAMPLING SIZE AND PERMISSIBLE NUMBER OF DEFECTIVES***( Clauses B-1.2, B-2.1.1 and B-2.2 )*

LOT SIZE	SAMPLE SIZE	PERMISSIBLE NO. OF DEFECTIVES	SUB-SAMPLE SIZE
(1)	(2)	(3)	(4)
Up to 50	5	0	2
51 „ 150	8	0	3
151 „ 300	13	1	5
301 „ 500	20	2	8
501 and above	32	3	13

**B-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY**

**B-2.1** The saw selected according to **B-1.2** shall be examined for hardness ( *see 5.1* ), dimensions ( *see 6.1* ), general requirements ( *see 7* ) and individual requirements ( *see 8* ). Any saw failing to meet the requirements for any one or more of the characteristics mentioned above shall be declared defective.

**B-2.1.1** The lot shall be considered conforming to the requirements of the characteristics mentioned above if the number of saws found defective is less than or equal to the corresponding number given in col 3 of Table 3.

**B-2.2** From the lot found satisfactory according to **B-2.1.1** a sub-sample as indicated in col 4 of Table 3 shall be drawn and subjected to tests ( *see 12* ).

**B-2.2.1** The lot shall be declared conforming to the requirements of this specification if all the saws tested according to **B-2.2** satisfy the corresponding requirements.

# INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

## Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

## Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

## Derived Units

Quantity	Unit	Symbol	Conversion
Force	newton	N	1 N = 0.101 972 kgf
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Frequency	hertz	Hz	1 Hz = 1 c/s (s <sup>-1</sup> )
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m <sup>2</sup>

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