

Specification for

Circular saws for woodworking and their attachment

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The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard.

Agricultural Engineers Association	Ministry of Technology — Forest Products Research Laboratory
Amalgamated Society of Woodworkers	National Sawmilling Association
British Furniture Manufacturers Federated Association	Saw Manufacturers Association
British Railways Board	Trade Union Congress
Home Timber Merchants' Association of England and Wales	Furniture Industries Research Association
Ministry of Defence (Navy Department)	Institute of Machine Wood Working Technology

This British Standard, having been approved by the Mechanical Engineering Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 29 August 1969

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Foreword

This standard makes reference to the following British Standards:

BS 4500, *ISO limits and fits*.

BS 4361, *Woodworking machines — Part 1: Components*.

BS 427, *Method for Vickers hardness test — Part 1: Testing of metals*.

BS 860, *Tables for comparison of hardness scales*.

This British Standard was first published in 1931 as BS 411, under the title “Attachment of circular saws for woodworking”, and was revised in 1954 under the title “Circular saws for woodworking and their attachment”.

The present revision, prepared under the authority of the Mechanical Engineering Industry Standards Committee, has been limited to saws with spring set teeth in order that more detailed agreement on tooth shape could be reached. The largest nominal saw diameter specified has been limited to 1 000 mm because it was thought that the use of saws larger than this was insufficient to justify their inclusion. A complete change to these diameters is not at present practicable, but in order that the rest of the standard may be followed in the interim period, the saw details have been related to saw diameter ranges. It is eventually hoped to replace these ranges by nominal diameters.

The standard includes material and hardness requirements, dimensional details of the saw blades, including tooth form and setting, and details of the attachment of the saws to the machine spindles. It deals with circular saws which are suitable for cutting timber in its natural form but not in its manufactured derivatives.

The tooth shape details for rip saws have been classified by the use of timber density ranges, as this is the most practicable method of covering all species and conditions of timber. Examples of common species in each range have been included (see Table 4).

Because of the fundamental importance of tension to the efficient functioning of saw blades, the peripheral speeds of the saws are given together with a tabulated list of spindle speeds intended to ensure optimum tension conditions.

In view of the direct relationship between the saw blades and the saw benches, or machines on which the blades are normally mounted, members of the Saw Manufacturers Association and the Machine Tool Trades Association have collaborated in the preparation of this standard. If users are in doubt about the selection of the correct saw for their purpose, it is recommended that they contact the manufacturers or the Forest Products Research Laboratory.

It is likely that inch dimensioned saws will continue in use for some years, and therefore basic information on these has been given in Appendix A. It is emphasized that the dimensions quoted are not intended to be conversions of the metric values.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

1.1 Types. This British Standard relates to the following types of spring set circular saws, up to a diameter of 1 000 mm, for use in saw-milling and wood-working operations.

- 1) Plate saws. For ripping or crosscutting (see Figure 1).
- 2) Single swage saws. For cutting boards normally up to 16 mm thick (see Figure 2).
- 3) Double swage saws. Taper ground both sides, for cutting softwood boards up to 40 mm thick, or hardwood boards up to 32 mm thick (see Figure 3).

NOTE Details of saw thickness and tooth shape have not been included for swage saws, because of the great number of variations necessary.

1.2 Details. Details in the standard, for the types of saw given above, include:

- 1) Sketches indicating the nomenclature of tooth forms.
- 2) Material and hardness.
- 3) A range of diameters and thicknesses for plate saws only.
- 4) Tolerances and accuracies, including concentricity.
- 5) Dimensions of centre hole, pin holes, spindles and pins.
- 6) Tooth shape for plate saws only.
- 7) Tooth setting.
- 8) Finish.
- 9) Tension and speed of saws.

The information to be given with an enquiry or order is given in Appendix B.

1.3 Inch dimensions. Details of inch dimensioned saws are given in Appendix A.

2 Nomenclature

The nomenclature relating to the forms of teeth shall be that shown on Figure 4, Figure 5 and Figure 6.

3 Material

Circular saws complying with the provisions of this British Standard shall be manufactured from steel in one of the groups given below.

- 1) Carbon steel, having a carbon content of not less than 0.75 % and not more than 1.0 %.
- 2) Alloy steel, having physical properties equivalent or superior to the above.

The composition of the alloy steel shall be at the discretion of the saw manufacturer.

4 Hardness

Each saw shall be hardened and tempered to produce a hardness within the range 485 to 350 H.V. 30¹⁾ or equivalent on other hardness scales²⁾.

The actual hardness will depend largely on the type of material selected. The hardness will also vary in the range according to the thickness and the use of the saw, but the variation of hardness on any one saw blade shall not exceed the equivalent of 30 units of the Vickers 30 K.g. hardness scale.

5 Diameter and thickness

5.1 Dimensions (for plate saws only). The nominal diameters and related thicknesses of plate saws are given in Table 1. Generally, crosscut saws have a thickness equal to that of the next larger diameter of rip saw.

NOTE Swage saws should conform to these nominal diameters.

5.2 Tolerances. The limits of tolerance on the thicknesses of saws are given in Table 1.

The limits of tolerance on the diameters of saws are given in Table 2.

¹⁾ BS 427, "Method for Vickers hardness test", Part 1, "Testing of metals".

²⁾ BS 860, "Tables for comparison of hardness scales".

6 Radial runout

6.1 Centre to gullet. The radial runout measured at the diameter to the bottom of the gullet, relative to the centre hole, shall be within the following full indicator movement:

Diameters up to 560 mm: 0.6 mm.

Diameters over 560 mm up to and including 1 000 mm: 0.8 mm.

6.2 Centre to point. The radial runout measured at the diameter to the points of the teeth relative to the centre hole, shall be within the following full indicator movement:

Diameters up to 560 mm: 0.8 mm.

Diameters over 560 mm, up to and including 1 000 mm: 1.2 mm.

7 Axial runout

When mounted on a spindle and rotated slowly, the variation in reading of a dial indicator gauge applied to the side face, close to the teeth of the saw, shall not exceed the full indicator movement given in Table 3.

8 Centre holes, driving pin holes, spindle and pins

8.1 Centre holes and spindles. The nominal bore of the centre holes shall be identical with the nominal diameter of the spindles and they are given in Table 4.

The limits of tolerance on the diameters of the centre holes shall be to H9³⁾, as detailed in Table 4.

The diameters and tolerances of the spindles shall be in accordance with BS 4361⁴⁾.

NOTE The resultant fit expressed as H9/g6.

8.2 Driving pin holes and pins. The diameters of the pin and pin holes, and their associated limits of tolerance shall be in accordance with Table 4.

NOTE No standard provision is made for pin holes in saws up to 280 mm diameter.

8.3 Dimensions between centres of centre hole and pin hole. The dimensions and limits of tolerance between the centres of the holes shall be in accordance with Table 4. For those who require a quick check, the nominal dimension between the inner edges of the holes is also given.

9 Tooth shape (for plate saws only)

9.1 Saws for ripping. The details of the shape of teeth suitable for rip saws are given in Table 5 and shown in Figure 4.

Examples of typical timber species that fall into each of the four density ranges used in Table 5 are given below:

Tooth shape No.	Typical species
SR 48	African mahogany
	Hemlock
	Norway spruce
	Obeche
	Poplar
HR 54	Scots pine (Baltic redwood)
	Ash
	Beech
	Larch
	Sapele
HR 60	Ebony
	Jarrah
	Rosewood
HR 80	Ekki
	Greenheart
	Wamara

³⁾ BS 4500, "ISO limits and fits".

⁴⁾ BS 4361, "Woodworking machines", Part 1, "Components".