

Specification for

Woodworkers' metal-bodied planes

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British Institute of Certified Carpenters	Furniture, Timber and Allied Trades Union
Federation of British Hand Tool Manufacturers	Post Office

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Contents

	Page
Cooperating organizations	Inside front cover
Foreword	ii
1 Scope	1
2 References	1
3 Nomenclature and definitions	1
4 Materials	1
5 Heat treatment and hardness	1
6 Manufacture	2
7 Dimensions	2
8 Tolerances	3
9 Tests	3
10 Marking	4
Appendix A Safety	23
Figure 1 — Diagram illustrating the term “mean true plane”	3
Figure 2 — Nomenclature of adjustable bench planes	5
Figure 3 — Bench and bench rabbet planes. Length of sole and width of cutter	6
Figure 4 — Corrugated sole	7
Figure 5 — Nomenclature of adjustable circular planes	7
Figure 6 — Cutters for bench planes	8
Figure 7 — Cap irons for bench planes	9
Figure 8 — Cutter for bench rabbet planes	9
Figure 9 — Cap iron for bench rabbet planes	10
Figure 10 — Nomenclature of adjustable block planes (with lateral adjustment)	11
Figure 11 — Nomenclature of adjustable block planes (without lateral adjustment)	11
Figure 12 — Cutters for adjustable block planes	12
Figure 13 — Nomenclature of non-adjustable block planes	13
Figure 14 — Cutters for non-adjustable block planes	14
Figure 15 — Nomenclature of cabinet makers’ adjustable (shoulder) rabbet planes	15
Figure 16 — Cutters for cabinet makers’ adjustable (shoulder) rabbet planes	16
Figure 17 — Nomenclature of cabinet makers’ adjustable (bullnose) rabbet planes	17
Figure 18 — Cutters for cabinet makers’ adjustable (bullnose) rabbet planes	18
Figure 19 — Nomenclature of duplex adjustable rabbet and fillister planes	18
Figure 20 — Cutters for duplex adjustable rabbet and fillister planes	19
Figure 21 — Nomenclature of side rabbet planes	20
Figure 22 — Cutters for side rabbet planes	21
Figure 23 — Nomenclature of side rabbet planes	21
Figure 24 — Cutters for side rabbet planes	22
Table 1 — Cutter seat angles for metal-bodied planes	2
Publications referred to	Inside back cover

Foreword

This British Standard, which has been prepared under the direction of the Mechanical Engineering Standards Committee, specifies requirements for those components of metal-bodied planes whose design and construction affect the functioning and life of the planes. This standard is a metric revision of BS 3623:1963 which is now withdrawn.

No attempt has been made to lay down all the features of metal-bodied plane design. Such control is considered to be unnecessary and would possibly inhibit future design and production development. However, careful attention has been given to those components which directly affect the efficient functioning of the tool and those which are subject to wear, and sufficient control has been placed on cutter dimensions to ensure that cutters from different manufacturing sources are interchangeable within plane bodies of similar designs.

It is recognized that the ability to remove the cutter from any plane body and to return it to a slightly different position within that body, renders any plane capable of adjustment. Nevertheless, for simplicity and in recognition of widespread custom, the term “adjustable” is used in this British Standard to signify that the cutter is capable of adjustment by mechanical means incorporated for the purpose. (See clause 3.)

In connection with the nomenclature, attention is drawn to the choice of the term “cutter” in preference to “plane iron”. The former is widely used and is functionally descriptive.

The illustrations of plane bodies in this standard are typical designs, and it should be noted that there are many designs of equal merit which are not illustrated.

Work on the standardization of metal-bodied planes and plane irons has been carried out within the International Organization for Standardization (ISO), and consideration has been given to ISO 2726:1973 in the drafting of this standard.

Attention is drawn to the recommendations on safety given in Appendix A.

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.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 24, 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

This British Standard specifies requirements for the manufacture and testing and certain dimensions of metal-bodied planes of the following types:

- adjustable bench planes, comprising smoothing planes, jack planes, jointer planes, etc.;
- adjustable bench rabbet planes;
- adjustable circular planes;
- adjustable (cut and lateral) block planes;
- adjustable (cut only) block planes;
- non-adjustable block planes;
- cabinet makers' adjustable rabbet planes;
- duplex adjustable rabbet and fillister planes;
- side rabbet planes.

2 References

The titles of the publications referred to in this standard are listed on the inside back cover.

3 Nomenclature and definitions

For the purposes of this British Standard the nomenclature given in Figure 2 to Figure 24 applies together with the following definitions.

3.1

adjustable plane

a plane incorporating in its design mechanical means (such as a screw or lever) by which the cutter can be displaced in order to regulate the depth of cut and/or the lateral alignment of the cutting edge relative to the sole

3.2

designating size

the nominal width of the cutter

4 Materials

4.1 Body. The body shall be manufactured from grey cast iron complying with the requirements of grade 150 as specified in BS 1452, or from spheroidal graphite iron complying with the requirements of grade 370/17 as specified in BS 2789, except that the bench rabbet plane [see Figure 3 b)] shall be manufactured from malleable iron complying with the requirements of either grade W340/3 as specified in BS 309 or grade B290/6 as specified in BS 310.

4.2 Frog. The frog shall be manufactured from grey cast iron complying with the requirements of grade 150 as specified in BS 1452.

4.3 Lever cap. The lever cap shall be manufactured from grey cast iron complying with the requirements of grade 150 as specified in BS 1452.

4.4 Lever cap screw and adjusting screw for cutter

The lever cap screw and the adjusting screw for the cutter shall be manufactured from low carbon free cutting steel complying with the requirements of BS 970-1, or stainless steel complying with the requirements of BS 970-4.

4.5 Adjusting nut. The adjusting nut shall be manufactured from brass complying with the requirements of BS 2874 or BS 2872, or from low carbon free cutting steel complying with the requirements of BS 970-1.

4.6 Knob and handle. The knob and handle shall be manufactured from a suitable hardwood, such as beech, or from a plastics material. Timber, if used, shall be straight grained and free from deleterious defects, and the moisture content, as determined by any suitable process, shall be not less than 10 % nor more than 15 % at the time of manufacture. Plastics, if used, shall have similar mechanical properties and be smoothly finished.

4.7 Cutter. The cutter shall be manufactured from high carbon steel within the following basic analysis range:

	Carbon	Silicon	Manganese	Sulphur	Phosphorus
Min.	1.05 %	—	0.2 %	—	—
Max.	1.3 %	0.35 %	0.70 %	0.05 %	0.05 %

4.8 Cap iron. The cap iron shall be manufactured from hard, bright, cold-reduced steel complying with the requirements of grade CS4 as specified in BS 1449.

4.9 Y adjusting lever. The Y adjusting lever shall be manufactured from grey cast iron complying with the requirements of grade 150 as specified in BS 1452 or from pressed steel complying with the requirements of grade CS4 as specified in BS 1449.

NOTE Materials with properties better than those specified in this clause may be used provided that the finished tools are capable of passing the test requirements given in clause 9.

5 Heat treatment and hardness

Each cutter shall be hardened and tempered to give a hardness reading within the range 61 HRC to 64 HRC. Hardness tests shall comply with the requirements of BS 891-1, using a machine which has been verified in accordance with the requirements of BS 891-2.

The hardened zone shall extend uniformly across the full width of the cutter and for a distance measured back from the cutting edge as indicated in Figure 6, Figure 8, Figure 12, Figure 14, Figure 16, Figure 18, Figure 20, Figure 22 and Figure 24.

NOTE Comparative values of Vickers Hardness (HV) should be made only in accordance with the tables in BS 860.

6 Manufacture

6.1 Sole. The sole of each plane shall be smooth finished and shall be flat within the tolerance specified in 8.1.1, or corrugated as shown in Figure 3, in which case the crests of the corrugations shall be parallel with the side faces and in a common plane. All edges shall be chamfered or radiused.

6.2 Side faces. The side faces of each plane shall be parallel and shall be finished smooth and flat at 90° to the face (or common plane of the crests) of the sole and shall be within the tolerance specified in 8.1.2.

6.3 Mouth. The mouth of each plane shall have its major edges parallel and at 90° relative to the side faces.

6.4 Frog. The frog shall be capable of being positively fixed within the plane body and suitable means shall be provided to enable the positions of the frogs of bench and bench rabbet planes (see Figure 2) to be adjusted in order to regulate the mouth aperture.

6.5 Cutter seat faces. The cutter seat face or faces shall be machined to comply with the requirements of Table 1 and 8.2.

6.6 Cutter. The major faces of each cutter shall be ground flat and parallel. The cutting edge shall be straight and, unless otherwise indicated (see Figure 22 and Figure 24), shall be square relative to the centreline of the cutter. It shall be within the tolerance specified in 8.3.1. The bevel shall be ground smooth ready for honing in accordance with Figure 6, Figure 8, Figure 12, Figure 14, Figure 16, Figure 18, Figure 20, Figure 22 and Figure 24 as appropriate and shall be within the tolerance specified in 8.3.5.

6.7 Cap iron. The locating edge of the cap iron shall be straight, parallel with the inner major face and square relative to the centreline of the cap iron and shall be within the tolerances specified in 8.4.

6.8 Lateral adjusting lever. The lateral adjusting lever shall be capable of positioning the cutting edge through a minimum of ± 1° 30' relative to the face (or common plane of the crest) of the sole.

6.9 Adjusting nut. The adjusting nut shall be either knurled or serrated and shall be capable of imparting a minimum of 3 mm longitudinal movement to the cutter.

6.10 Knob and handle. The knob and handle shall be smoothly finished and, if made from wood, shall be coated with clear polish or lacquer. Both the knob and the handle shall be positively secured to the plane body.

6.11 All components. All components of each plane shall be smoothly finished and free from burrs, scale, flaws and other defects. With the exception of the cutter and cap iron, the unmachined surfaces of metal parts shall be painted, lacquered, black japanned, powder epoxy coated, nickel or nickel chromium plated in accordance with the requirements of BS 1224 or zinc plated in accordance with the requirements of BS 1706.

Any exposed bright parts shall be given suitable anti-corrosion treatment in accordance with the requirements of BS 1133-6.

7 Dimensions

The dimensions of cutters and cap irons shall be as shown in Figure 6, Figure 7, Figure 8, Figure 9, Figure 12, Figure 14, Figure 16, Figure 18, Figure 20, Figure 22 and Figure 24, and shall be within the tolerances specified in clause 8.

Table 1 — Cutter seat angles for metal-bodied planes

Type of plane	Cutter seat angle
Adjustable bench planes	45°
Adjustable bench rabbet planes	45°
Circular planes	45°
Adjustable (cut and lateral) block planes	21° or low angle 12°
Adjustable (cut only) block planes	24°
Non-adjustable block planes	24°
Cabinet makers' adjustable rabbet planes	19° or low angle 15°
Duplex adjustable rabbet and fillister planes	45°
Side rabbet planes (see Figure 21)	7°
Side rabbet planes (see Figure 23)	8° and 13°

8 Tolerances

8.1 Plane body

8.1.1 Flatness of sole (excluding corrugated soles). The departures of the highest and lowest points on the sole when measured relative to the mean true plane (see Figure 1) shall not exceed ± 0.04 mm.

8.1.2 Squareness of side faces. The side faces shall be at 90° relative to the sole (or common plane of the crests in the case of a corrugated sole) within a tolerance of $\pm 0^\circ 30'$.

8.1.3 Mouth. The major edges of the mouth shall be at 90° to the side faces within a tolerance of $\pm 1^\circ$.

8.2 Cutter seat faces. The angle of the cutter seat faces relative to the sole shall be as given in Table 1 within a tolerance of $\pm 2^\circ$.

8.3 Cutter

8.3.1 Parallelism of faces. The maximum error in parallelism between the major faces of each cutter shall not exceed ± 0.03 mm.

NOTE Error in parallelism is the difference between maximum and minimum thickness.

8.3.2 Flatness. The departures of the highest and lowest points within the hardness distance on each major face of each cutter when measured relative to the mean true plane (see Figure 1) shall not exceed 0.03 mm.

8.3.3 Squareness of cutting edge. The cutting edge shall be square relative to the centreline of the cutter within a tolerance of $\pm 0^\circ 20'$.

8.3.4 Straightness of cutting edge. The departures of the highest and lowest points on the cutting edge when measured relative to the mean true plane (see Figure 1) shall not exceed 0.03 mm.

8.3.5 Bevel angle. The bevel angle shall comply with the requirements of 6.6 within a tolerance of $\pm 1^\circ$.

8.4 Cap iron

8.4.1 Straightness of locating edge. The departures of the highest and lowest points of the locating edge when measured relative to the mean true plane (see Figure 1) shall not exceed 0.03 mm.

8.4.2 Parallelism of locating edge. The maximum error in lateral parallelism between the locating edge and the inner major face of the cap iron shall not exceed 0.13 mm.

8.4.3 Squareness of locating edge. The locating edge shall be square relative to the centreline of the cap iron and shall be within a tolerance of $\pm 1^\circ$.

9 Tests

9.1 Mechanical properties. When tested in accordance with the requirements of BS 891 the hardness of each cutter shall comply with the requirements of clause 5.

9.2 Functional tests

9.2.1 Lateral adjustment of the cutter. With the lateral adjusting lever in the central position and with the cutter and cap iron positioned correctly in the plane body, single thumb pressure applied in turn on either side of the lateral adjusting lever shall cause displacement of the cutter in accordance with the requirements of 6.8.

9.2.2 Longitudinal movement of cutter. With the adjusting nut approximately at mid-position in its length of traverse and with the cutter and cap iron positioned correctly in the plane body, clockwise and anti-clockwise rotation of the adjusting nut between finger and thumb shall cause displacement of the cutting edge above and below the sole face (or common plane of the crests) in accordance with the requirements of 6.9.

9.2.3 Performance test. With a honed cutter set in the plane body with its cutting edge parallel to, and protruding 0.13 mm below, the sole face (or common plane of the crests), the complete plane shall be capable of removing 3 mm of stock from a piece of well-seasoned oak.

The test face of the timber shall be 300 mm long and its width shall be approximately 6 mm less than the nominal width of the cutter under test. The grain shall run longitudinally.

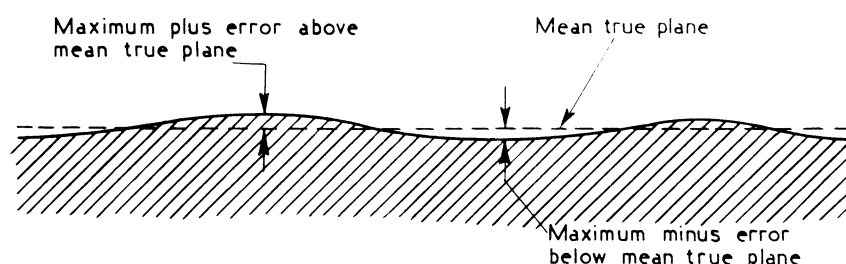


Figure 1 — Diagram illustrating the term “mean true plane”

During the test, the shavings produced shall be of uniform thickness and of width equal to the full width of the timber. The plane shall move easily over the timber with no evidence of stickiness or “drag” on the sole.

After completion of the test, the cutter shall not have been displaced. The cutting edge shall be sharp and shall not show signs of wear visible to the eye.

10 Marking

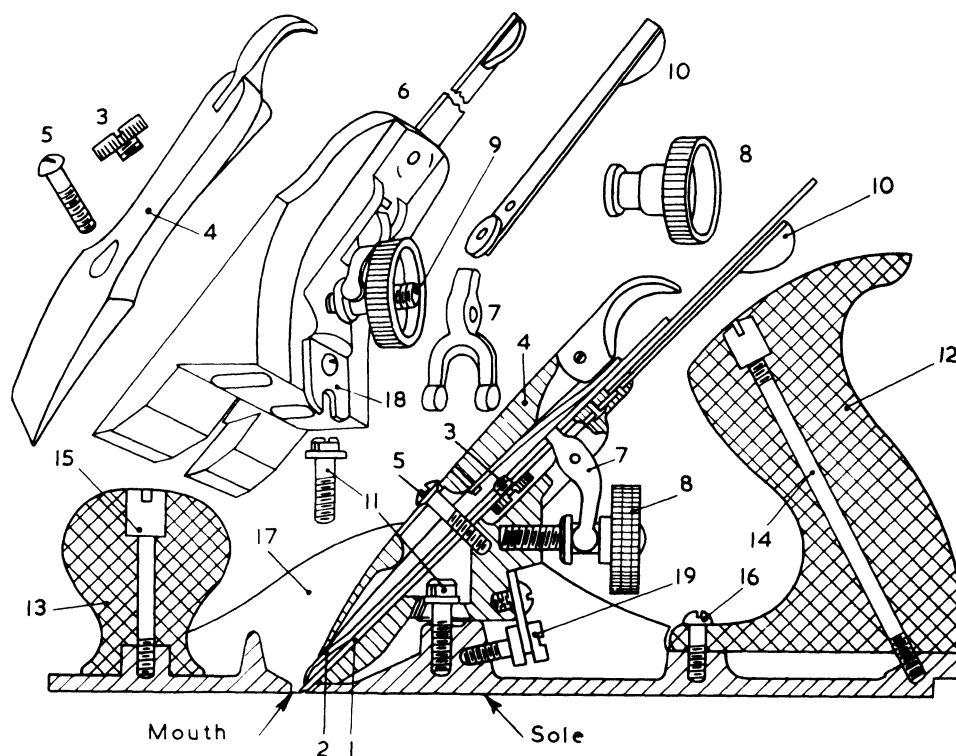
10.1 Each plane shall be marked with the number of this British Standard, i.e. BS 3623¹⁾.

10.2 Each plane body and cutter shall be legibly and indelibly marked with the manufacturer’s name, initials or trade mark in order that the origin of the part may be identified.

10.3 All marks on the cutter shall be positioned prominently on the face which is uppermost when positioned in the plane body not more than 25 mm from the non-working end.

Marking shall in no way impair the strength or efficiency of the plane or cutter.

¹⁾ Marking BS 3623 on or in relation to a product is a claim by the manufacturer that the product has been manufactured in accordance with the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer’s responsibility. Enquiries as to the availability of third party certification to support such claims should be addressed to the Director, British Standards Institution, Maylands Avenue, Hemel Hempstead, Herts HP2 4SQ in the case of certification marks administered by BSI or to the appropriate authority for other certification marks.



Part no.	Description	Part no.	Description
1	Cutter	11	Screw and washer for frog
2	Cap iron	12	Handle
3	Cap screw	13	Knob
4	Lever cap assembly	14	Bolt and nut for handle
5	Lever cap screw	15	Bolt and nut for knob
6	Frog assembly	16	Screw for handle toe
7	Y adjusting lever	17	Plane body
8	Adjusting nut	18	Clip and screw for frog
9	Adjusting screw	19	Adjusting screw for frog
10	Lateral adjusting lever		

NOTE 1 This is a typical design.

NOTE 2 For dimensions of planes see Figure 3.

NOTE 3 For dimensions of cutters see Figure 6.

Figure 2 — Nomenclature of adjustable bench planes