BS 1347:1986

Specification for

Architects', engineers' and surveyors' metric scale rules

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Office and Information Standards Committee (OIS/-) to Technical Committee OIS/28, upon which the following bodies were represented:

County Surveyors' Society
Department of the Environment Property Services Agency
Drawing Office Material Manufacturers' and Dealers' Association
Electricity Supply Industry in England and Wales
Engineering Equipment and Materials Users' Association
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Contents

Foreword

This British Standard has been prepared under the direction of the Office and Information Standards Committee. It is a revision of BS 1347-3:1969 which is withdrawn. As Parts 1 and 2 of BS 1347 have also been withdrawn this standard is now numbered as BS 1347.

The main changes from the previous edition are that scale rules of nominal length 500 mm and flat section scale rules BS 1347 no. 30, BS 1347 no. 31 and BS 1347 no. 32 are no longer included. Definitions have been amended to reflect current practice. Dimensions for flat scale rules for use with drafting machines have been given separately and recommended properties of materials used for the manufacture of scale rules, not covered by this standard, have been given in Appendix A.

The scales specified in this standard are designed to be read in one direction only, i.e. from left to right.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, 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 the designation, shape and dimensions, scales and colour coding for scale rules for use with SI (metric) units. Offset scales are not covered by this standard.

NOTE 1 The recommended properties of materials used for the manufacture of metric scale rules are given in Appendix A.
NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard the following definitions apply.

2.1
scale

the figured divisions on the edge of a scale rule

2.2
representative fraction

the degree of reduction, expressed as a ratio (e.g. 1 : 1, 1 : 200)

2.3
single scale

a scale graduated along the edge of a scale rule, where one scale only is so graduated

2.4
combined scale

two compatible scales graduated along the same edge of a scale rule

2.5 division

the sequence of graduation lines along the edge of a scale rule

2.6
gauge line

a line marked on the body of a scale rule, parallel with the edge and separating two scales graduated along that edge

2.7
fully divided (of a scale)

subdivided along its whole length

2.8
open divided (of a scale)

subdivided only in its first main unit

3 Designation

3.1 Scale rules

3.1.1 Rules of oval section and of flat section shall be designated as given respectively in Table 1 and Table 2 (e.g. “no. 1”). Rules of triangular section shall be designated “BS 1347 metric”.

Table 1 — Scale rules of oval section

Scale rule designation	Representative fraction	Subdivision	Figuring	Dividing
no. 1	1 : 1	1 mm	0, 10 mm, 20, 30 . . .	All scales fully divided
	1 : 2	2 mm	0, 20 mm, 40, 60 . . .	
	1 : 5	10 mm	0, 100 mm, 200, 300 . . .	
	1 : 10	10 mm	0, 200 mm, 400, 600 . . .	
no. 2	1 : 5	10 mm	0, 100 mm, 200, 300 . . .	All scales fully divided
	1 : 50	100 mm	0, 1 m, 2, 3 . . .	
	1 : 10	10 mm	0, 100 mm, 200, 300 . . .	
	1 : 100	100 mm	0,1 m, 2, 3 . . .	
	1 : 20	20 mm	0, 200 mm, 400, 600 . . .	
	1 : 200	200 mm	0, 2 m, 4, 6 . . .	
	1 : 500	0.5 m	0, 5 m, 10, 15 . . .	
	1 : 1 000	1 m	0, 10 m, 20, 30 . . .	
no. 3	1 : 1	1 mm	0, 10 mm, 20, 30 . . .	All scales fully divided
	1 : 100	100 mm	0, 1 m, 2, 3 . . .	
	1 : 20	20 mm	0, 200 mm, 400, 600 . . .	
	1 : 200	200 mm	0, 2 m, 4, 6 . . .	
	1 : 5	10 mm	0, 100 mm, 200, 300 . . .	
	1 : 50	100 mm	0, 1 m, 2, 3 . . .	
	1 : 1 250	1 m	0, 10 m, 20, 30 . . .	
	1 : 2 500	2 m	0, 20 m, 40, 60 . . .	
no. 4	1 : 1 250	1 m	0, 10 m, 20, 30 . . .	All scales fully divided
	1 : 2 500	2 m	0, 20 m, 40, 60 . . .	
	1 : 10 000	10 m	0, 200 m, 400, 600 . . .	

NOTE Scales shown bracketed together form a combined scale.

Table 2 — Scale rules of flat section

Scale rule designation	Representative fraction	Subdivision	Figuring	Division
no. 10	1 : 1	0.5 mm	0, 10 mm, 20, 30 . . .	Fully
no. 10D	1 : 2	2 mm	0, 20 mm, 40, 60 . . .	Fully
no. 11	1 : 1	1 mm	0, 10 mm, 20, 30 . . .	Fully
no. 11D	1 : 2	2 mm	0, 20 mm, 40, 60 . . .	Fully
no. 12	1 : 1	1 mm	0, 10 mm, 20, 30 . . .	Fully
	1 : 5	10 mm	0, 100 mm, 200, 300 . . .	Fully
no. 13	1 : 5	10 mm	0, 100 mm, 200, 300 . . .	Fully
no. 13D	1 : 10	10 mm	0, 200 mm, 400, 600 . . .	Fully
no. 14	1 : 20	20 mm	0, 200 mm, 400, 600 . . .	Fully
no. 14D	1 : 50	100 mm	0, 1 m, 2, 3 . . .	Fully
no. 15	1 : 100	100 mm	0, 1 m, 2, 3 . . .	Fully
no. 15D	1 : 200	200 mm	0, 2 m, 4, 6 . . .	Fully
no. 16	1 : 500	1 m	0, 10 m, 20, 30 . . .	Fully
	1 : 1 000	1 m	0, 10 m, 20, 30 . . .	Fully
no. 17	1 : 1 250	1 m	0, 10 m, 20, 30 . . .	Fully
	1 : 2 500	2 m	0, 20 m, 40, 60 . . .	Fully
no. 18	1 : 10 000	10 m	0, 200 m, 400, 600 . . .	Fully

NOTE Where the designation has a suffix "D", the scale rule is recommended for attachment to drafting machines.

3.1.2 Additionally, flat rules for attachment to drafting machines (i.e. complying with **4.3.1**) shall be designated as given in Table 2 (e.g. no. 10D).

NOTE Where necessary the designation should be supplemented by the nominal length.

3.2 Individual scales

Each scale shall be designated by its representative fraction (e.g. 1 : 200).

NOTE Where necessary the designation should be supplemented by a reference to "open divided" or "fully divided".

4 Shape and dimensions

4.1 Cross section

A scale rule not designated for drafting machines shall have one of the following cross sections (see Figure 1):

a) oval;

b) flat;

c) triangular.

4.2 Oval scale rule

The minimum overall length, width and thickness at mid-section of an oval scale rule shall be as given in Table 3, according to the nominal length.

4.3 Flat scale rule

4.3.1 A flat scale rule designated for attachment to a drafting machine shall have the dimensions shown in Figure 2 and a minimum overall length as given in Table 4, according to the nominal length.

4.3.2 For a flat scale rule, other than for attachment to a drafting machine, the minimum overall length, width, thickness of mid-section and width of bevelled edge shall be as given in Table 3, according to the nominal length.

4.4 Triangular scale rule

The minimum overall length of a triangular scale rule shall be as given in Table 3, according to the nominal length. The graduated faces shall be concave [see Figure 1(c)].

NOTE The concavity is intended to minimize wear on the scale faces.

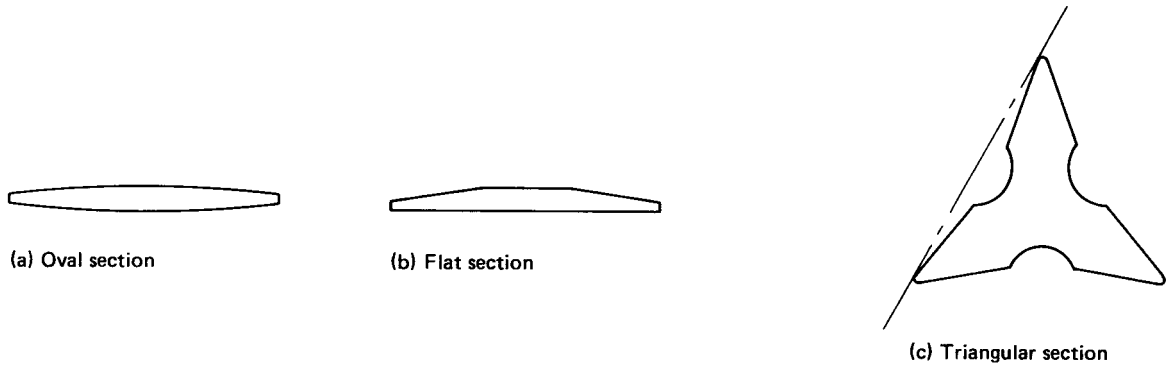

Figure 1 — Typical sections

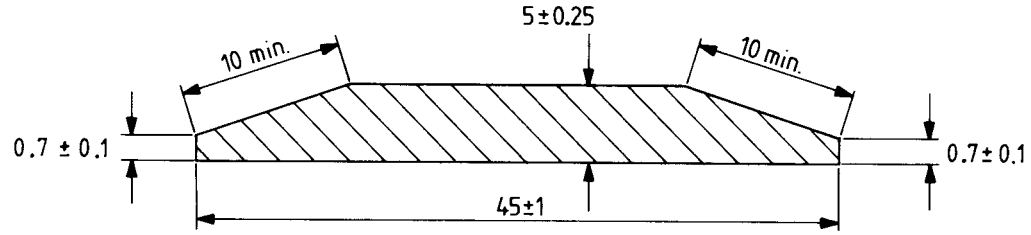

Figure 2 — Cross section of flat scale rule for attachment to a drafting machine

Table 3 — Principal dimensions of scale rules, other than for drafting machines

Nominal length	Minimum overall length	Width		Thickness at mid-section		Minimum width of bevelled edge
		min.	max.	min.	max.	
mm	mm	mm	mm	mm	mm	mm
150	170	32	36	3.0	3.4	10
300	320	32	36	3.0	3.4	10

Table 4 — Length of flat scale rule for attachment to drafting machines

Nominal length	Minimum overall length
mm	mm
300	360
450	490

4.5 Working edges

The thickness of each working edge shall be between 0.6 mm and 0.8 mm.

4.6 Smallest subdivision

The smallest scale subdivision of each scale shall not be less than 0.5 mm.

5 Division

5.1 Graduation lines

5.1.1 General. Each scale shall be divided by continuous graduation lines at right angles to and extending to the working edge. The graduation lines and accompanying figures shall be of a colour contrasting with the body of the scale (see clause **9**). The graduation lines for each rule shall be of a uniform thickness not greater than 0.15 mm. The nominal length of line for each level of subdivision shall be constant throughout the scale.

5.1.2 Single scale. On a single scale (see Figure 3) the nominal lengths of the minor, intermediate and major graduation lines shall be chosen from 2 mm, 3 mm, 4.5 mm and 6 mm with limits of ± 0.5 mm.

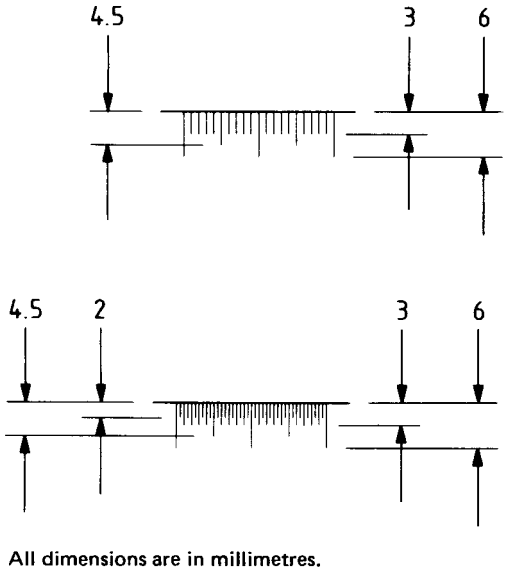

Figure 3 — Single scales

5.1.3 ***Combined scale***

5.1.3.1 Line lengths. In a combined scale (see Figure 4) the nominal lengths of minor, intermediate and major graduation lines shall each be chosen from 3 mm, 4.5 mm, 6 mm, 7.5 mm and 9 mm with limits of ± 0.5 mm.

5.1.3.2 Method of combination. The scale with the representative fraction giving the smaller ratio shall be against the working edge. A gauge line shall separate the two scales and gauge lines shall not appear on the scale rule for any other purpose. Major graduation lines of the scale against the edge shall extend through the gauge line and shall also constitute the major graduation lines for the inner scale.

5.2 Oval section scale rule

Lines and accompanying figuring on either face of the scale rule shall not be visible from the other face.

5.3 Accuracy of graduation

In any 150 mm length of a scale the cumulative error shall not be greater than 0.15 mm at 20 ± 1 °C.

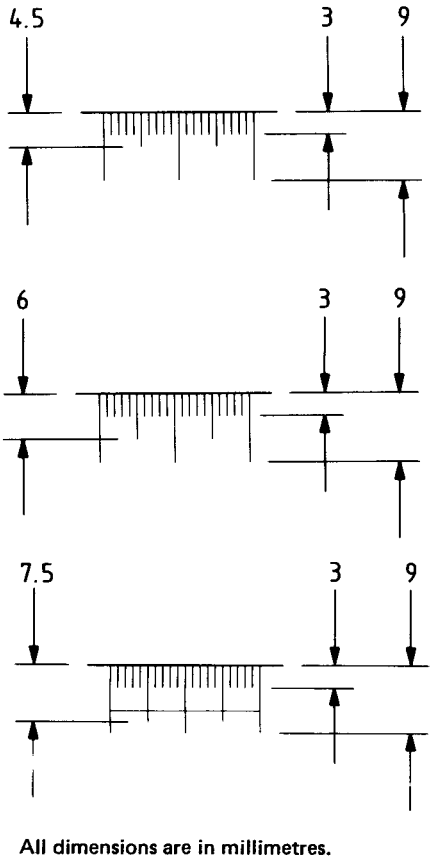

Figure 4 — Combined scales

5.4 Open divided scale

5.4.1 Except for the first main unit, the scale shall be graduated only by lines at the main units. The first main unit only shall be subdivided (see Figure 5).

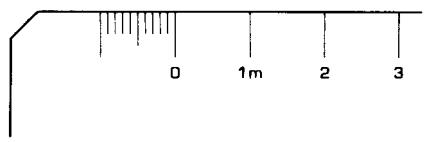

Figure 5 — Beginning of an open divided scale

5.4.2 The zero of the scale shall be at the second major graduation line and shall be figured "0". The first graduation line shall be left unfigured.

5.5 Fully divided scale

A fully divided scale shall be subdivided uniformly throughout. The zero shall be at the first graduation line (see Figure 6).

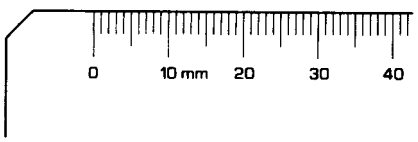

Figure 6 — Beginning of a fully divided scale

6 Figuring

6.1 Sequence

The figuring along a scale shall be in a consistent numerical sequence and shall increase from left to right along the scale (when oriented as shown in Figure 3 to Figure 8).

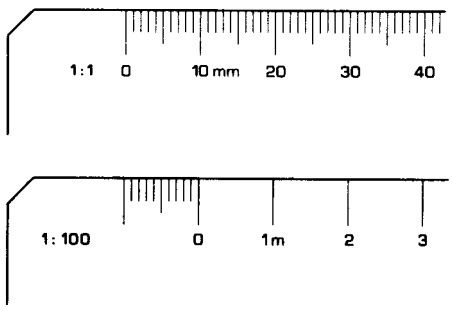

Figure 7 — Single scales

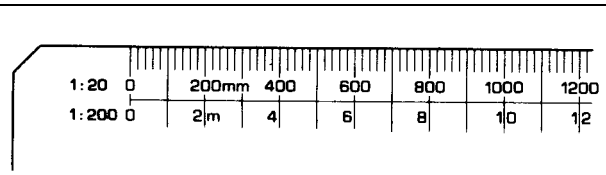

Figure 8 — Combined scale

6.2 Scale unit

There shall be no change of unit along the scale. The scale unit of measurement shall be indicated by the appropriate unit symbol at least at both ends of the scale (see Figure 9, Figure 10 and Figure 11).

NOTE Care needs to be taken to avoid confusion between figures of similar form. Reference to BS 3693A is recommended, but the figuring should be of a style that will ensure legibility.

7 Representative fraction

7.1 The representative fraction for each scale shall be inscribed on the scale.

7.2 On a single scale, the representative fraction shall be marked at the left end of the scale (see Figure 7).

7.3 On a combined scale the representative fractions shall be marked at the left end of the scale rule adjacent to the appropriate scales (see Figure 8).

8 Selection of scales

8.1 A scale rule of oval section shall have its four edges divided and subdivided, according to designation, as given in Table 1.

8.2 A scale rule of flat section shall have its two bevelled edges divided and subdivided, according to designation, as given in Table 2.

8.3 Every scale rule of triangular section, whatever its cross section, shall have each of its edges divided and subdivided as for any one single or combined scale given in Table 1 and Table 2.

NOTE The selection of scales on a rule of triangular section is therefore not specified in this standard.

9 Colour coding

If colour coding is used to indicate scale groups, the code given in Table 5 shall be used.

NOTE A list of recommended colours selected from BS 381C is given in Appendix B.

Table 5 — Colour code

Representative fraction	Colour
1 : 1, 1 : 10, 1 : 100 and 1 : 1 000	Black
1 : 2, 1 : 20 and 1 : 200	Blue
1 : 5, 1 : 50 and 1 : 500	Red
1 : 1 250 and 1 : 2 500	Green

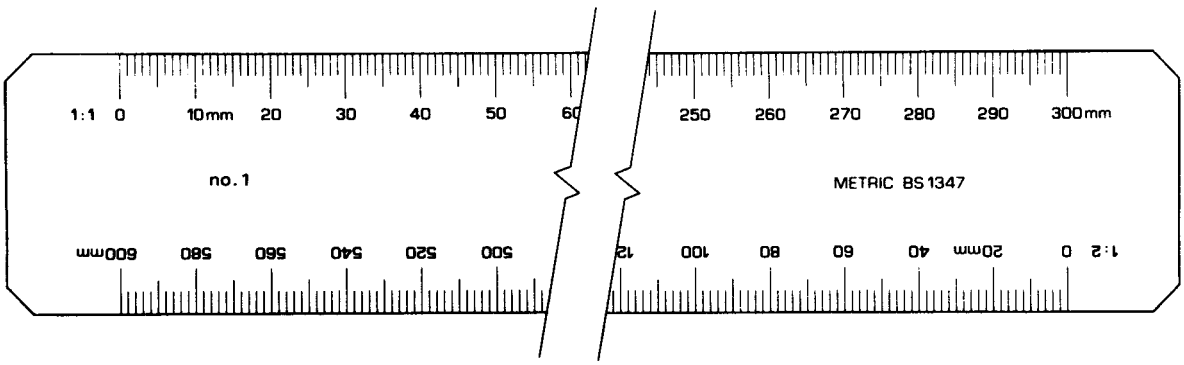

Figure 9 — One side of oval section scale rule no. 1

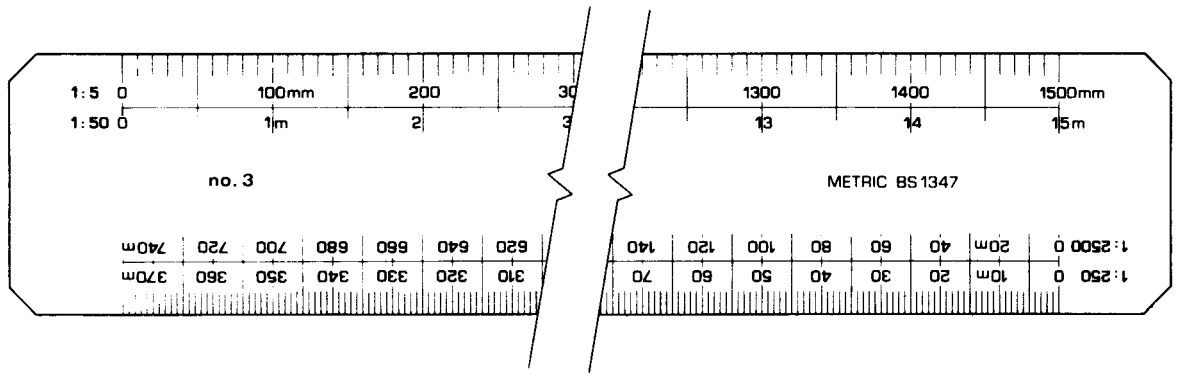

Figure 10 — One side of oval section scale rule no. 3

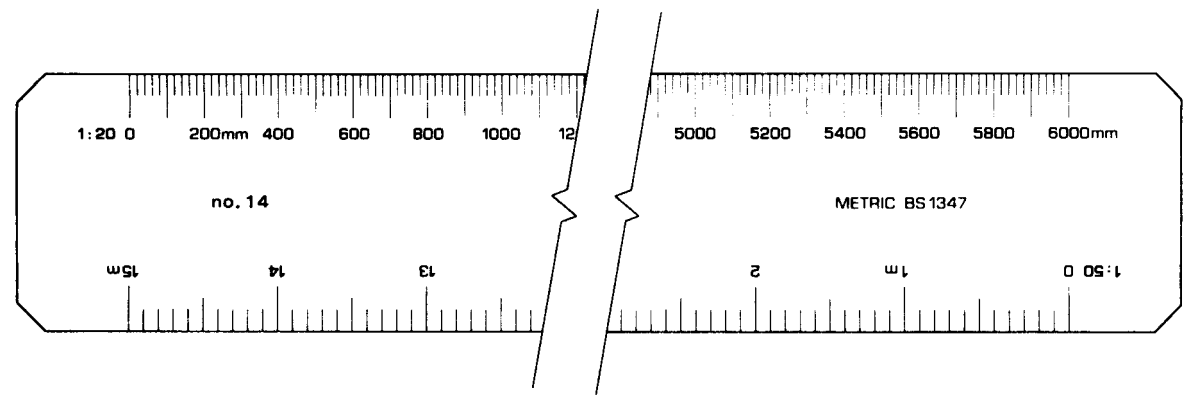

Figure 11 — Flat section scale rule no. 14

10 Marking

All scale rules shall be marked with the number of this British Standard, i.e. "BS 1347"[1)] and "METRIC". Oval and flat rules shall also be marked with the appropriate designation number.

Example of marking For an oval scale rule: "METRIC BS 1347 no. 1".

[1)] Marking BS 1347 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to 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, Quality Assurance Division, BSI, PO Box 375, Milton Keynes MK14 6LO for certification marks administered by BSI or to the appropriate authority for other certification marks.

Appendix A Recommended properties of materials used for the manufacture of scale rules

A.1 Material

The material used in the manufacture of a scale rule should possess toughness, hardness and flexibility in sufficient degree to permit constant handling and use without significant deterioration, provided that the scale rule is cleaned in accordance with the supplier's recommendations.

A.2 Finish

The surfaces and edges of the rule should be smoothly finished. The corners should be chamfered or rounded. Both faces of an oval scale rule should be curved uniformly and equally.

A.3 Retention of shape

The rule should remain flat and straight, with the working edges parallel and the ends square.

The physical shape of the scale rule should remain constant up to a temperature of 60 °C.

A.4 Length and depth of line

Graduation lines and figuring on a scale rule should be to a uniform depth. There should be a difference of at least 1 mm in length of graduation lines of adjacent categories.

A.5 Protection

During storage, transport and use, precautions should be taken to protect the surfaces and edges of the rule.

Appendix B Recommended colour coding

Where colour coding is used to identify scale groups, in accordance with clause **9**, the selection of the colours should be made from the following list which is extracted from BS 381C.

Blues	No. 107	Strong blue
	No. 112	Arctic blue
	No. 166	French blue
	No. 175	Light French blue
Reds	No. 537	Signal red
	No. 538	Post Office red
	No. 592	International orange
	No. 593	Rail red
Greens	No. 218	Grass green
	No. 221	Brilliant green
	No. 225	Light Brunswick green
	No. 228	Emerald green
	No. 280	Verdigris green (designated as obsolescent in BS 381C)

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Publications referred to

BS 381C, *Specification for colours for identification, coding, and special purposes.*
BS 3693A, *Recommended form of digits for use on dials and scales.*

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