BRITISH STANDARD

BS 7263 :
Part 1 : 1994

Precast concrete flags, kerbs, channels, edgings and quadrants

Part 1. Specification

Bordures, caniveaux, bords et quadrants en béton préfabriqué
Partie 1. Spécifications

Bordsteine, Rinnsteine, Randsteine und Quadranten aus Fertigteilbeton
Teil 1. Anforderungen

UDC 625.888 : 666.97 : 620.1 : 006.3/.8

BSI STANDARDS

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Technical Sector Board for Building and Civil Engineering (B/-) to Technical Committee B/507 upon which the following bodies were represented:

Association of County Councils
Association of London Borough Engineers and Surveyors
Association of Metropolitan Authorities
British Aggregate Construction Materials Industries
British Civil Engineering Test Equipment Manufacturers' Association
British Precast Concrete Federation Ltd.
Cement and Concrete Association
Cement Makers' Federation
Concrete Society
County Surveyor's Society
Department of Transport (Highways)
Institution of Civil Engineers
Institution of Highways and Transportation
Institution of Structural Engineers
Interlocking Paving Association
Landscape Institute
Milton Keynes Development Corporation
National Paving and Kerb Association
Royal Institute of British Architects
Sand and Gravel Association Limited
Scottish Development Department
Society of Chemical Industry

This British Standard, having been prepared under the direction of the Technical Sector Board for Building and Civil Engineering, was published under the authority of the Standards Board and comes into effect on
15 April 1994

First published May 1990
Second edition April 1994

The following BSI references relate to the work on this standard:
Committee reference B/507
Draft for comment 92/14327 DC

ISBN 0 580 22312 4

Amendments issued since publication

Amd. No.	Date	Text affected

Contents

Foreword

This Part of BS 7263 has been prepared under the direction of the Technical Sector Board for Building and Civil Engineering and supersedes BS 7263 : Part 1 : 1990, which is withdrawn.

This edition introduces technical changes only. It does not reflect a full review or revision of the standard which will be undertaken in due course.

There is no requirement in this standard for conditioning units, i.e. adjusting the moisture content, before carrying out the transverse strength test. This is because preliminary work has not indicated a regime which gives consistent results. However, investigations are continuing and it is anticipated that requirements for conditioning will be added in due course.

A spalling problem with kerbs has occurred in some parts of Scotland but at present there is insufficient data to be able to define the type and magnitude of the defects which could cause failure. Trials are being carried out using a test that reveals internal fissures which can occur during kerb manufacture. Many of the kerbs recognized as having this problem are of sections not included in this British Standard.

Due to difficulties in establishing an effective air entrainment level for wet cast flags (see annex E) these products have been omitted for the time being.

Requirements for the dimensions of surface features on tactile flags have been included. These flags are intended for use at pedestrian crossings, where they may be located by the sense of touch as well as sight.

Specifiers should be aware that pavements used for both vehicular and pedestrian traffic may polish in a similar manner to carriageways, although experience over the last 24 years with flags which conformed to BS 368 has shown this to be a rare occurrence.

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

Specification

1 Scope

This Part of BS 7263 specifies requirements for the following precast concrete products:

a) wet pressed and semi-dry flags (see annex E);

b) kerbs;

c) channels;

d) edgings;

e) quadrants.

These precast concrete products, referred to as a product or products in this Part of BS 7263, are intended for use in the construction of carriageways and footways laid in accordance with BS 7263 : Part 2.

NOTE 1. Annex D gives recommendations on information to be given to a manufacturer in an enquiry or order.

NOTE 2. Annex F gives guidance on suitability of paving flags for various uses.

NOTE 3. Precast concrete paving blocks are covered by BS 6717.

2 References

2.1 Normative references

This Part of BS 7263 incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on page 20. Subsequent amendments to, or revisions of, any of these publications apply to this Part of BS 7263 only when incorporated in it by updating or revision.

2.2 Informative references

This Part of BS 7263 refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this Part of BS 7263 the definitions given in BS 6100 : Subsection 1.5.1 apply, together with the following.

3.1 nominal size

Size which identifies a component.

3.2 work size

Target size of a building component specified for its manufacture.

3.3 secondary processing

Manufacturing process carried out after basic manufacture, before or after hardening, on the whole unit or any surface.

NOTE. Secondary processing may be used to provide flat (e.g. ground) or textured (e.g. blasted) surfaces.

3.4 tactile flag

Flag, provided with a profiled surface, used to give warning of hazards, or to enable locations to be recognized, e.g. a crossing flag.

4 Binders

Products shall be made using one or more of the binders conforming to the appropriate British Standards as given in table 1.

Table 1. Binders

Type of binder	Standard to be complied with
Portland cement	BS 12 : 1991
Portland blastfurnace cements	BS 146 : 1991
Sulfate-resisting Portland cement	BS 4027 : 1991
Portland pulverized-fuel ash cements	BS 6588 : 1991
Pulverized-fuel ash[1)]	BS 3892 : Part 1 : 1982
Ground granulated blastfurnace slag for use with Portland cement[2)]	BS 6699 : 1992
High slag blastfurnace cement	BS 4246 : 1991

[1)] Where pulverized-fuel ash is used the proportions and properties of the combination with Portland cement shall conform to BS 6588 : 1991.

[2)] Where ground granulated blastfurnace slag is used the proportions and properties of the combination with Portland cement shall conform to BS 146 : 1991 or BS 4246 : 1991.

5 Aggregates

Products shall be made using one or more of the aggregates conforming to the appropriate British Standards as given in table 2.

Table 2. Aggregates

Type of aggregate	Standard to be complied with
Natural aggregates	BS 882 : 1992 (except grading requirements in clause 5)
Air-cooled blastfurnace slag	BS 1047 : 1983 (except grading requirements in 4.8)
Pulverized-fuel ash	BS 3892 : Part 1 : 1982 and Part 2 : 1984
Ground granulated blastfurnace slag	BS 6699 : 1992

NOTE. The use of recycled material is permitted.

6 Water

The water shall be drinking quality or shall conform to BS 3148 : 1980 or shall be recycled process water free from visual contamination by oil.

7 Admixtures

Proprietary accelerating, retarding and water reducing agents shall conform to BS 5075 : Part 1 : 1982 and Part 2 : 1982.

Where admixtures are formulated from a combination of materials, including those specified above, then the accelerating, retarding and water reducing ingredients, where they are included in such combinations, shall conform to BS 5075 : Part 1 : 1982 and Part 2 : 1982.

Any other admixtures employed shall be supported by evidence confirming that no adverse effect on the properties required by this standard will result.

8 Pigments

Pigments supplied in powder form shall conform to BS 1014 : 1975. Where pigments are used in the preparation of suspensions or slurries the pigments shall conform to BS 1014 : 1975.

9 Air content

The concrete used in kerbs, channels, quadrants and edgings produced by the wet cast process (see annex E) shall have the following entrained air contents, measured in accordance with BS 1881 : Part 106 : 1983:

a) products with 14 mm nominal maximum aggregate size: 6 % ± 1.5 %;

b) products with 20 mm nominal maximum aggregate size: 5 % ± 1.5 %.

10 Finish

Products described as 'natural' shall contain no pigment (see **D.1**b). Where products are made with two-part mixes the surface layer shall be not less than 12 mm thick for flags or not less than 25 mm thick for all other products. The surface layer shall be produced as an integral part of the product.

All arrises that will be visible after laying shall be without nibs and fins.

Flags shall be produced with plane, profiled or secondary processed surfaces.

NOTE. Profiled surfaces may be functional, (e.g. tactile) or decorative (e.g. riven).

11 Dimensions and tolerances

11.1 Dimensions

11.1.1 *Flags*

Sizes of flags shall be as given in table 3.

Table 3. Flag sizes

Dimensions in millimetres

Flag type	Nominal size	Work size	Thickness
A	600 × 450	598 × 448	50 or 63
B	600 × 600	598 × 598	50 or 63
C	600 × 750	598 × 748	50 or 63
D	600 × 900	598 × 898	50 or 63
E	450 × 450	448 × 448	50 or 70
F	400 × 400	398 × 398	50 or 65
G	300 × 300	298 × 298	50 or 60

NOTE. Tactile flags type T are normally available in sizes of flag types E, F and G. Tactile crossing flags are thus designated type TC/E, TC/F or TC/G depending on their size.

Tactile crossing flags shall be provided with flattened domes on the wearing surfaces, which shall have the dimensions and spacings shown in figure 1.

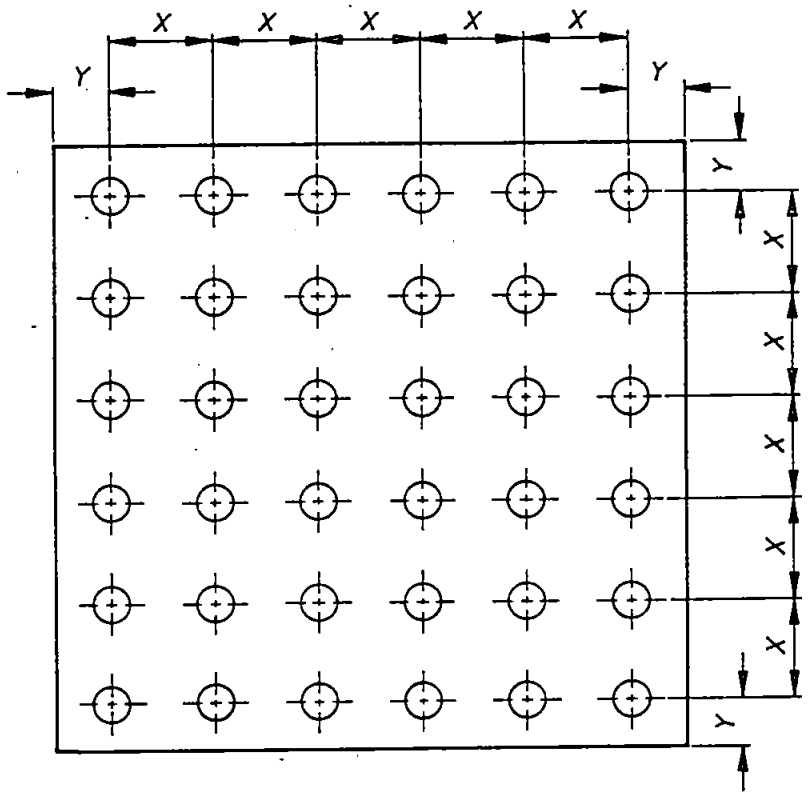
A wearing surface edge chamfer shall be provided on flag types E, F and G with a flat surface.

NOTE. Wearing surface edge chamfers may be provided on profiled or secondary processed flags.

The manufacturer shall declare the dimensions of chamfers in all cases in the order horizontal then vertical.

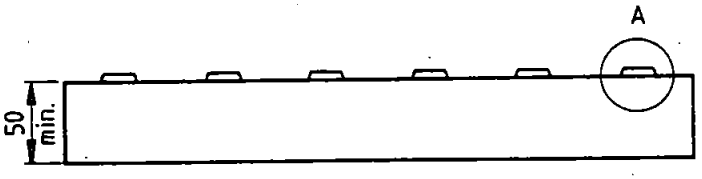
11.1.2 *Kerbs, channels and edgings*

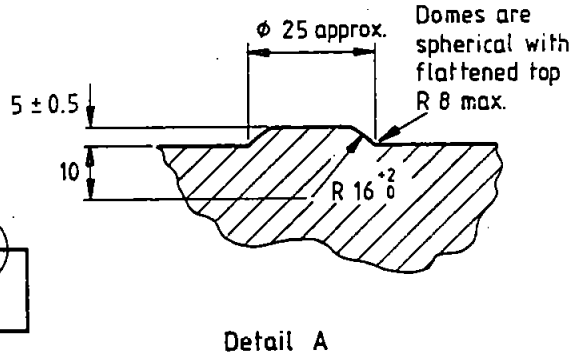
Kerbs, channels and edgings shall have the sizes shown in figures 2, 3 and 4 and shall have a length in the range 450 mm to 915 mm. The length shall be measured along the vertical contact face between the kerb and channel. The radius of the vertical contact face of a kerb or channel shall be as given in table 4.



Tactile crossing flag type	Dimension	
	X	*Y*
TA/E	64	33
TA/F	66.8	33
TA/G	75	37.5
Tolerance: ± 2		

a) Plan





b) Elevation

NOTE. Tactile flags to be red in colour.

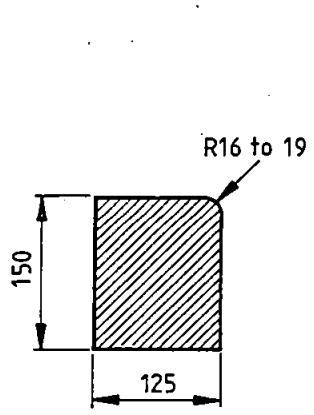
All dimensions are in millimetres.

Figure 1. Tactile crossing flag

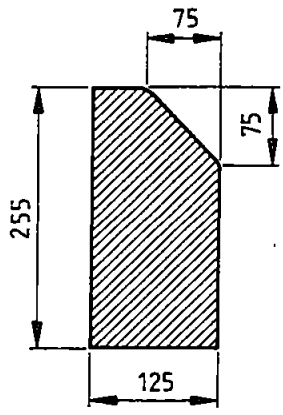
Table 4. External and internal radii for kerbs and channels

Dimensions in metres

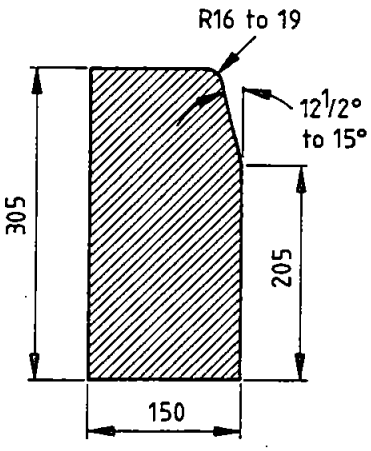
External only	Internal and external
1.0 2.0	3.0 4.5 6.0 7.5 9.0 10.5 12.0



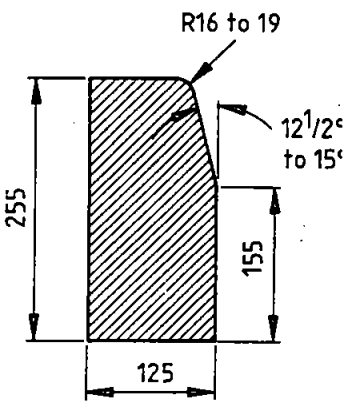
a) Bullnosed kerb: Type BN



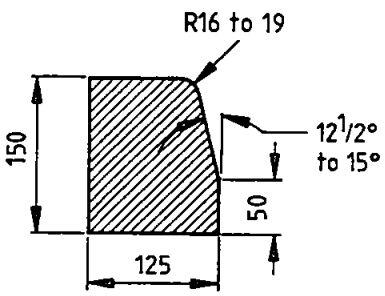
b) 45 ° splayed kerb: Type SP



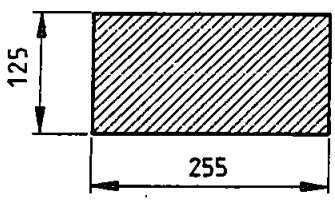
c) Half battered kerb : Type HB1



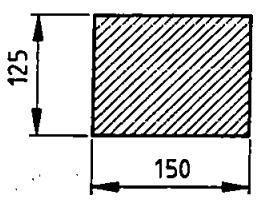
d) Half battered kerb: Type HB2



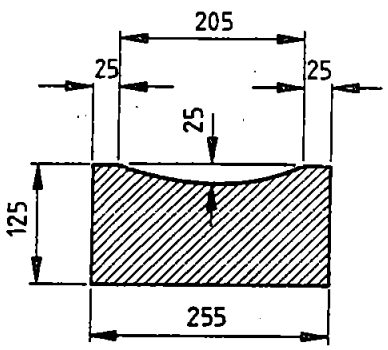
e) Half battered kerb; Type HB3



f) Channel square: Type CS1



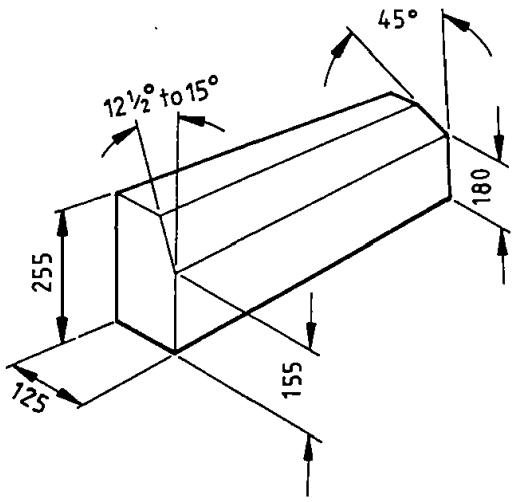
g) Channel square: Type CS2



h) Channel dished: Type CD

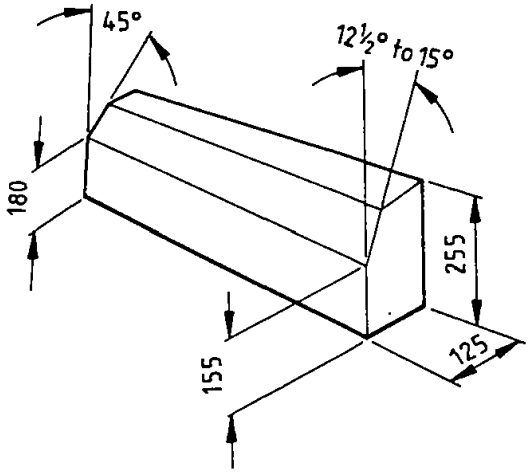
All dimensions are in millimetres.

Figure 2. Bullnosed, splayed and half battered kerbs and square and dished channels

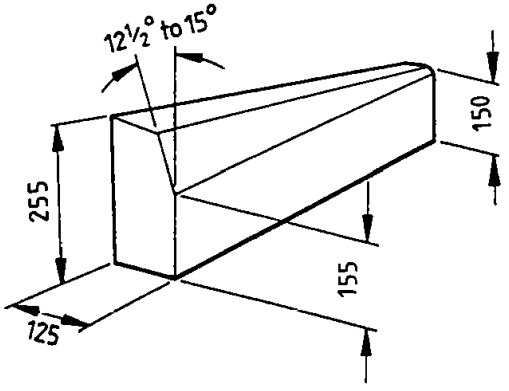


Left hand: Type TL
NOTE. For use with kerb types SP and HB.

a) Transition kerb: half battered to 45 ° splay



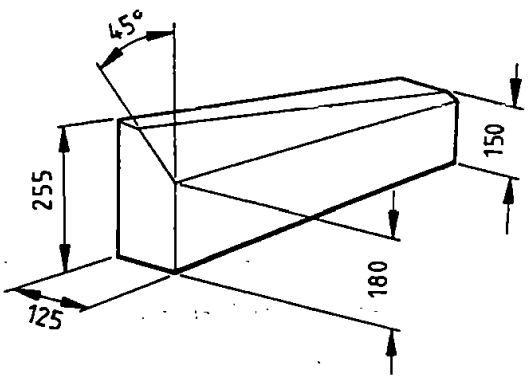
Right hand: Type TR



Left hand: Type DL1
NOTE. For use with kerb types BN and HB.

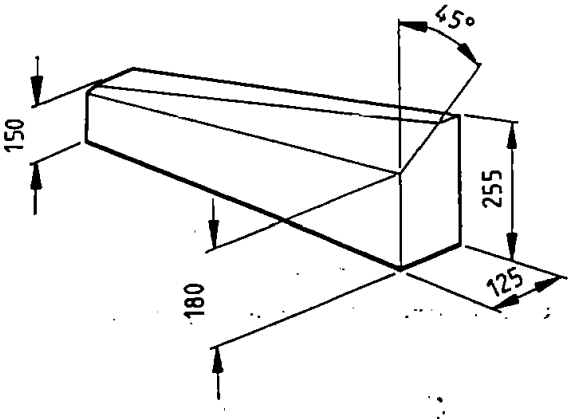
b) Dropper kerb type 1: half battered to bullnosed

Right hand: Type DR1



Left hand: Type DL2
NOTE. For use with kerb types BN and SP.

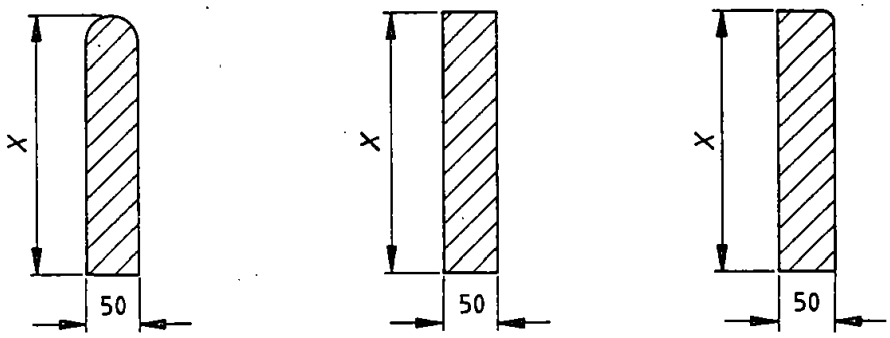
c) Dropper kerb type 2: 45 ° splay to bullnosed



Right hand: Type DR2

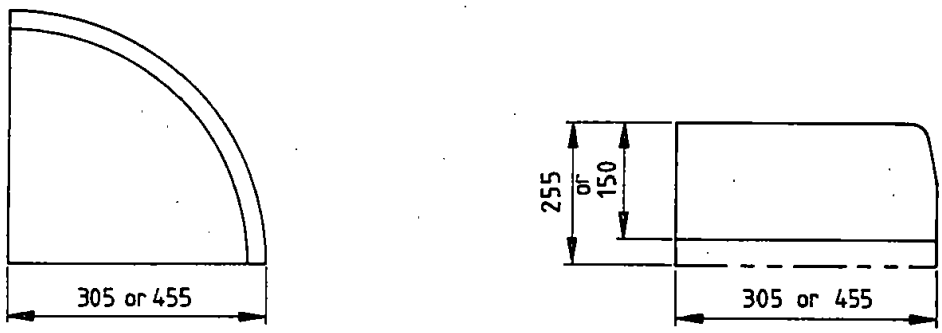
All dimensions are in millimetres.

Figure 3. Transition and dropper kerbs



NOTE. x = 150, 200 or 250 mm.

a) Round top edging: Type ER b) Flat top edging: Type EF c) Bullnosed edging: Type EBN



Plan Elevation

NOTE. Quadrants in these sizes may have the following profile:

1) bullnosed type QBN, to match corresponding kerb type BN; or

2) half battered type QHB to match corresponding kerb types HB2, HB3; or

3) 45 ° splayed type QSP to match corresponding kerb type SP.

d) Quadrants (sizes 305 × 150 × 305 × 225 or 455 × 150 or 455 × 225)

NOTE. Angle kerbs in the above sizes may also have profiles to match 45 ° splayed type SP.

e) Internal angle kerb: Type IA f) External angle kerb: Type XA

All dimensions are in millimetres.

Figure 4. Edgings, quadrants and angle kerbs

All angles except those resulting from splayed, radiused or chamfered faces meeting as shown in figure 4 shall be square.

11.1.3 *Quadrants*

Quadrants shall have the sizes shown in figure 4d), with faces to match the profiles shown in figure 2a), b), d) or e), for kerbs type BN, SP, HB2 or HB3 respectively.

11.1.4 *Dropper kerbs*

Dropper kerbs shall have the sizes shown in figure 3b) or c), dropper kerb type 1 or type 2 respectively.

11.2 Tolerances

11.2.1 *Flags*

The maximum dimensional deviations of the work size of any flag, measured in accordance with annex A, shall be as follows.

a) Thickness of plane and functionally profiled flags: ± 3 mm;

For other flags the manufacturer shall declare the thickness and tolerance.

b) Functional profiles (tactile crossing flag): see figure 4;

c) length and width: ± 2 mm;

d) squareness on plan (difference between diagonals):

1) flag types A, B, C, D: 6 mm;

2) flag types E, F, G: 3 mm;

e) flatness, winding and bowing:

1) measured over 550 to 850 mm: ± 2 mm;

2) measured over 250 to 400 mm: ± 1 mm.

11.2.2 *Kerbs, channels and edging*

The maximum dimensional deviations of any kerb, channel and edging, measured as described in annex A, shall be as follows:

a) length, width or height: ± 3 mm;

b) straightness and winding:

1) measured over 550 mm to 850 mm: ± 2 mm;

2) measured over 250 mm to 400 mm: ± 1 mm;

c) squareness: 2 mm clearance.

12 Transverse strength

12.1 Flags

When sampled and tested as described in annex B, the failing loads shall be not less than the appropriate value given in table 5.

Table 5. Transverse strength of flags

Loads in kilonewtons

Flag type	Minimum failing load for thickness				
	50 mm	60 mm	63 mm	65 mm	70 mm
A	8.3		12.7		
B,C,D	11.1		16.9		
E	9.6				18.8
F	9.1			15.4	
G	9.6	13.8			

12.2 Kerbs, channels and edgings

When sampled and tested as described in annex B, the failing loads shall be not less than the appropriate value given in table 6.

Table 6. Transverse strength of kerbs, channels and edgings

Depth as tested (see note 1) mm	Width as tested mm	Failing load (see note 2) kN
150	305	22.2
125	150	8.0
125	255	13.3
50	255	5.1
50	205	4.5
50	150	3.3
Dropper kerbs		
125	255 to 150	10.3

NOTE 1. Units are placed in the testing machine with the depth as tested being the smallest dimension.

NOTE 2. The failing load for kerbs of various lengths may be obtained by extrapolation, e.g. if the failing load for a 125 mm × 255 mm × 915 mm kerb tested on a span of 750 mm is 13.3 kN, the failing load for a 550 mm kerb of the same cross section tested on a span of x mm will be 13.3 × (750/x) kN.

NOTE 3. Outlet kerbs, quadrants and angle kerbs are not tested for transverse strength.

13 Water absorption

13.1 Kerbs, channels, edgings and flags

When tested as described in annex C, the water absorption shall not exceed the appropriate value given in table 7.

Table 7. Maximum water absorption of kerbs, channels, edgings and flags

Water absorption in % by mass		
Kerbs, channels and quadrants shown in figures 2, 3 and 4	**Edgings shown in figure 4**	**Flags**
3.0	3.6	4.0

14 Sampling for independent testing

Samples shall be taken before the products are laid and, wherever practicable, whilst they are being moved, e.g. during loading or unloading. A sample of three products shall be taken from a consignment of not more than 1000 products. Each of the three products in the sample shall be taken from one of three approximately equal sections of the consignment to be tested.

Each product of a sample shall be uniquely marked and accompanied by a certificate from the person responsible for taking the samples, stating that sampling was carried out in accordance with BS 7263 : Part 1 : 1994.

The sample shall be dispatched to the test laboratory, taking precautions to avoid damage to the products in transit.

NOTE. Products used for dimensional checks may subsequently be used for transverse strength or water absorption tests.

15 Marking

15.1 The following particulars relating to products made in accordance with this British Standard shall be clearly marked on the delivery note, invoice, manufacturer's or supplier's certificate, or brochure relating to a consignment of products:

a) the name, trademark or other means of identification of the manufacturing plant;

b) the number and date of this British Standard, i.e. BS 7263 : Part 1 : 1994[1)]

c) type of binder constituent(s) used (see clause 4);

d) type of admixture(s) used (see clause 7);

e) for flags, the type and thickness in millimetres, e.g. A50.

15.2 For radiused kerbs, the radius, in metres, shall be marked on the kerb in a position which will not be seen when the kerb is laid as described in BS 7263 : Part 2.

16 Types of product

The types of precast concrete flags, kerbs, channels, edgings and quadrants supplied in accordance with this Part of BS 7263 shall be designated as given in table 8.

Table 8. Types of product

Type	Designations	Reference
Flags	A, B, C,	Table 3
	D, E, F,	Table 3
	G	Table 3
Tactile flags	TA	Figure 4
Kerbs:		
Bullnosed kerb	BN	Figure 2a)
45 ° splayed kerb	SP	Figure 2b)
Half battered kerb	HB	Figure 2c), d), e)
Transition kerb (left hand)	TL	Figure 3a)
Transition kerb (right hand)	TR	Figure 3a)
Dropper kerb (left hand)	DL	Figure 3b), c)
Dropper kerb (right hand)	DR	Figure 3b), c)
Channels:		
Channel square	CS	Figure 2f), g)
Channel dished	CD	Figure 2h)
Edgings:		
Round top edging	ER	Figure 4a)
Flat top edging	EF	Figure 4b)
Bullnosed edging	EBN	Figure 4c)
Quadrants:		
Bullnosed quadrant	QBN	Figure 4d)
45 ° splayed quadrant	QSP	Figure 4d)
Half battered quadrant	QHB	Figure 4d)
Angles:		
Internal angle	IA	Figure 4e)
External angle	XA	Figure 4f)

[1)] Marking BS 7263 : Part 1 : 1994 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

Annexes

Annex A (normative)
Measurement of dimensions

A.1 General

Remove any fins or local protrusions.

NOTE. It is recommended that all measurements be made using a suitable steel rule conforming to BS 4372 or BS 4484.

A.2 Flags

A.2.1 *Thickness*

Measure the thickness of each flag to the nearest mm, using a caliper gauge having suitable jaws, 30 mm in from the edge of the flag at a distance not more than 100 mm from each corner. From the four measurements obtained, calculate the average thickness of each flag to the nearest 1 mm.

A.2.2 *Dome height (tactile flags)*

Measure the thickness of each flag at a point where a dome occurs and at another point where there is no dome. Subtract one thickness from another to obtain the dome height.

A.2.3 *Length and width*

Measure the size of each flag to the nearest 1 mm.

A.2.4 Squareness on plan

Measure the two diagonals of each flag to the nearest 1 mm.

A.3 Kerbs, channels and edging

A.3.1 *Length*

Measure the length of each product to the nearest 1 mm on the face, within 25 mm of the four extreme corners of the profile. Calculate the average length to the nearest 1 mm.

A.3.2 *Width and height*

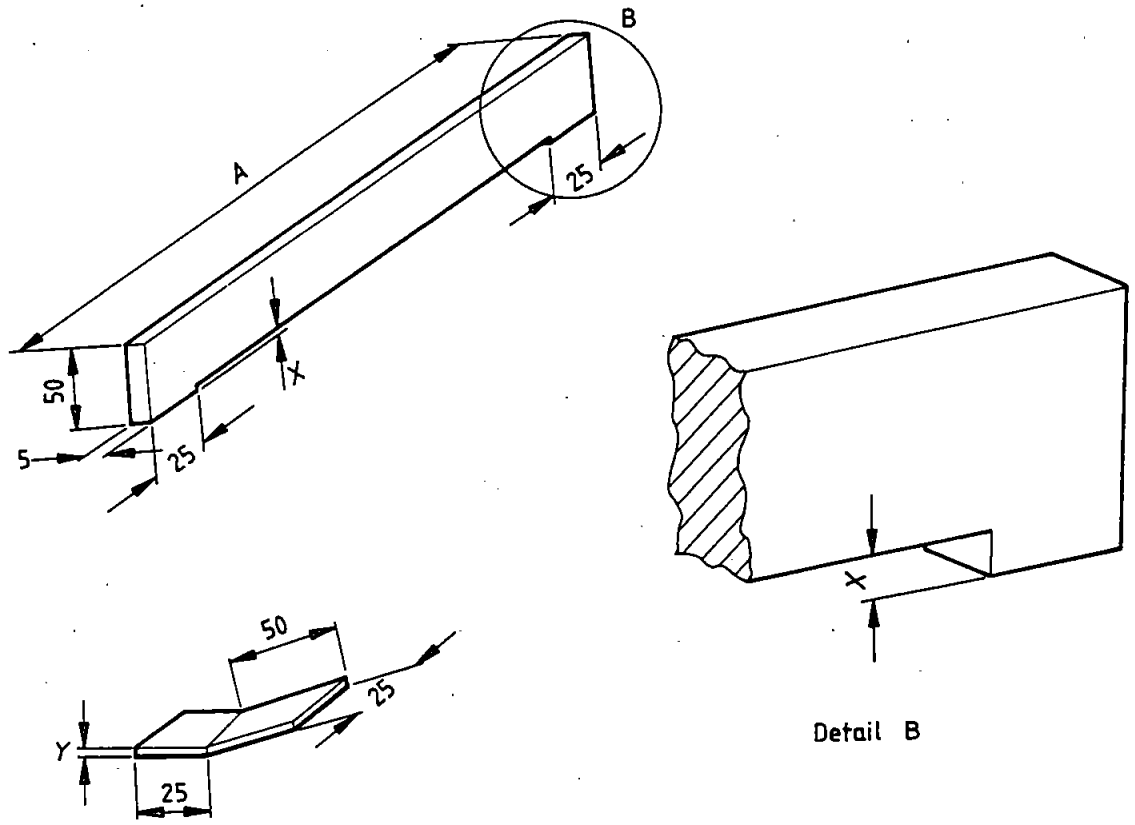
Measure the width and height of each product to the nearest 1 mm at both ends. Measure the width at the top and bottom of parallel faces and the overall height at the face and back of the product. Calculate the average height and width to the nearest 1 mm.

A.4 Flatness, straightness, bowing and winding for kerbs and flags

Use the largest appropriate notched straightedge and gauge block, both made of steel, as shown in figure A.1. Place the notched straightedge in any position on the wearing faces of each product. Check if the surface of the product touches the notched section of the straightedge when both the support ends of the notched straightedge are in contact with the product. Check that the gauge block does not pass between the notched straightedge and the surface of the product when placed in any position on the wearing faces of each sample product.

A.5 Determination of squareness

Place the stock of an engineer's square in contact with the moulded faces of the product. Bring the blade into contact with the side of the product. Using a feeler gauge conforming to BS 957 : Part 2 : 1969, check that the clearance between the square and the side of the product at points not less than 30 mm from the top and the bottom does not exceed the appropriate tolerance.



NOTE. The dimensions on the diagrams are indicative only.

Dimension *A*	Dimension *X*	Dimension *Y*
550 to 850	2 ± 0.1	4 ± 0.1
250 to 400	1 ± 0.1	2 ± 0.1

All dimensions are in millimetres.

Figure A.1 Notched straightedge and gauge block

Annex B (normative)
Determination of transverse strength

B.1 Testing machine

The transverse testing machine shall conform to a grade A or grade B machine when verified in accordance with BS 1610 : Part 1 : 1992, and be of sufficient capacity to apply loads up to 33 kN. It shall be provided with two steel supporting rollers, each (38 ± 3) mm in diameter, or two steel bearers, each (6 ± 1) mm in width, on the supporting surfaces (see figure B.1). The spacing of the rollers or bearers shall be as given in table 9.

Table 9. Spacing of rollers or bearers for transverse strength test

Dimensions in millimetres

Product	Minimum spacing centre to centre of rollers or minimum clear distance between bearers
Flag types A, B, C and D	450
Flag type E	375
Flag type F	350
Flag type G	250
Kerbs	750
Edgings	250

NOTE. For kerbs from 450 mm to 800 mm in length, the minimum spans given in the table will have to be adjusted to give a minimum overhang of 50 mm.

In either case, one support shall be horizontal and the other so mounted as to enable loads to be applied without inducing any torsional restraint in the specimen, e.g. by pivoting about an axis parallel to the length of the specimens. The upper member of the loading frame shall be provided with a spherical seating to ensure that the load is applied axially without inducing any torsion in the specimen, and a steel platen at least 50 mm wide and of length not less than the width of the widest specimen to be tested.

B.2 Procedure

B.2.1 *Flags*

Place the specimen symmetrically on the bearers of the testing machine and with its shorter sides parallel to the supporting rollers or bearers. For tactile flags, the specimen shall be tested wearing surface downwards. Position a hardwood fillet 50 mm wide on the upper surface of the specimen at the midpoint of the span extending the whole width of the specimen parallel to the supporting rollers or bearers.

Apply the load without shock and increase it at a rate not exceeding 18.5 N/s for each 100 mm of width as tested, until the specimen fails or the capacity of the machine is reached. Record the individual failing loads in the report, except when a specimen does not fail under the upper limit of the testing machine, in which case record the failing load as 'greater than ... kN'.

B.2.2 *Other products*

Place the specimen symmetrically on the bearers of the testing machine with its greater cross-sectional dimension horizontal and bed a 50 mm wide hardwood fillet on the upper surface at midpoint of the span, using a thin layer of plaster. Allow the plaster to set before the test is carried out. When products having profiles such as those shown in figures 2 b) and 2 c) are to be tested, insert a suitable hardwood wedge between the kerb and the fillet.

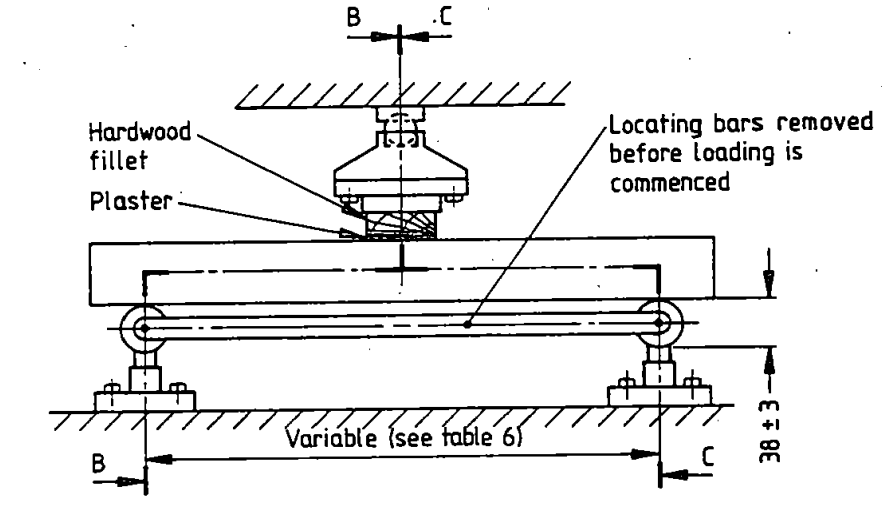
Apply the load without shock and increase it at a rate not exceeding 18.5 N/s for each 100 mm of width as tested, until the specimen fails or the capacity of the machine is reached. Record the individual failing loads in the report, except when a specimen does not fail under the upper limit of the testing machine, in which case record the failing load as 'greater than ... kN'.

NOTE. The failing load for kerbs for various lengths may be obtained by extrapolation, e.g. if the failing load for a 125 mm × 255 mm × 915 mm kerb tested on a span of 750 mm is 13.3 kN, the failing load for a 550 mm kerb of the same cross section tested on a span of x mm will be as follows:

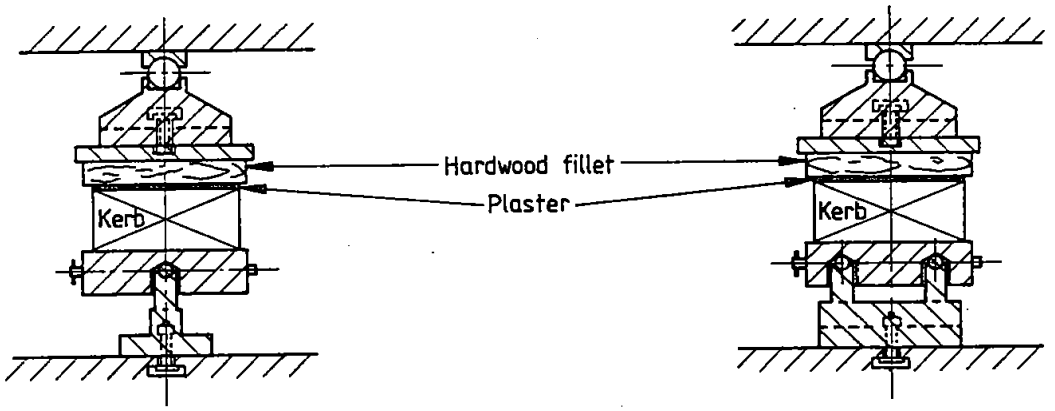
$$\frac{\text{load} \times \text{original span}}{\text{new span}} = \frac{13.3 \times 750}{S} \text{ kN}$$

where

S is the new span.



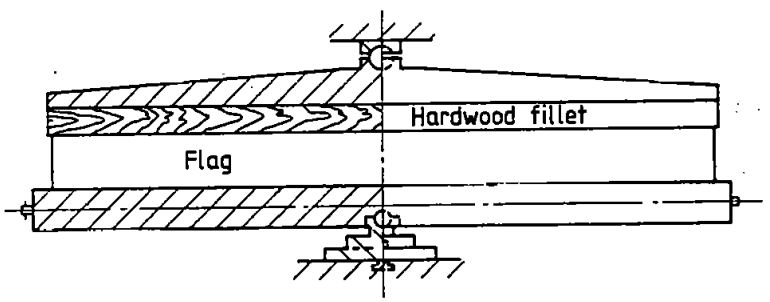
a) Side elevation



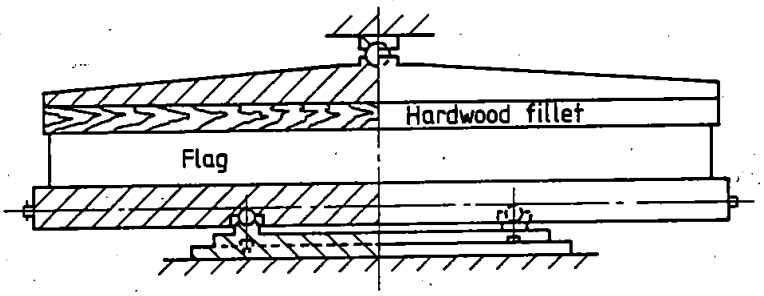
Section B–B

Section C–C

b) Kerb under test



End elevation (BB)



End elevation (CC)

c) Flag under test

Figure B.1 Arrangement of loading for transverse strength test

Annex C (normative)
Determination of water absorption

C.1 Apparatus

C.1.1 *Balance*, capable of weighing the specimens up to 5 kg with an accuracy of 0.1 %.

C.1.2 *Suitable concrete sawing machine.*

C.1.3 *Ventilated drying oven*, conforming to BS 2648, except that the internal space may exceed 0.085 m^3, in which the temperature is controlled at (105 ± 5) °C, and such that the specimens can be placed in the oven as described in C.3.1.

C.1.4 *Tank*, deep enough to immerse specimens, containing clean water maintained at a temperature of (20 ± 1) °C.

C.1.5 *Dry airtight vessel*, e.g. desiccator, of sufficient size to contain the specimens to be tested.

C.2 Preparation of specimens

C.2.1 ***Flags***

Saw two square test pieces from diagonally opposite corners of each of the flags, approximately 100 mm × 100 mm, sawn from the full thickness of the flag and having two sawn and two moulded edges.

C.2.2 ***Kerbs, channels and edgings***

Saw two test specimens from each of the three sample products. Cut each specimen from either end of the product. For kerbs and channels take the sample from the part of the product to be exposed, which may include the profile face. The size of each specimen shall be as given in table 10.

Table 10. Size of specimens of kerbs, channels and edgings for water absorption test

Product shown in figures 2, 3 and 4	Size of specimen
Kerbs type SP, HB1, HB2 and transition kerbs	100 mm long × 100 mm deep × full width of kerb
Kerbs type BN and HB3, channel square type CS2 and edgings of all types	100 mm long × cross section of product
Channel square type CS1 and channel dished type DC	100 mm long × full depth of product × 100 mm wide

C.3 Procedure

C.3.1 Place the six specimens in the drying oven (C.1.3) so that each one is not less than 25 mm from any heating surface and from each other. Dry the six specimens in the oven for (72 ± 2) h. Do not place further specimens in the same oven during the drying process. Allow free access of air to all surfaces of the specimens.

C.3.2 On removal from the oven, cool each specimen for (24 ± 0.5) h in the dry airtight vessel (C.1.5). Weigh each specimen and immediately completely immerse in the tank (C.1.4) with its longitudinal axis horizontal and at a depth such that there is (25 ± 5) mm of water over the top of the specimen.

C.3.3 Leave the specimens immersed in the water for (30 ± 0.5) min. Remove each specimen, shake it to remove the bulk of the water and dry it with a cloth as rapidly as possible until all free water is removed from the surface. Weigh each specimen.

C.4 Calculation and expression of results

C.4.1 Calculate the water absorption of each specimen as the increase in mass resulting from immersion expressed as a percentage of the mass of the dry specimen.

C.4.2 Calculate the mean absorption of the two specimens from each of the three products and report the values of the three means to the nearest 0.1 % as the water absorptions of the products.

Annex D (informative)
Information to be given to the manufacturer in an enquiry or order

The following particulars cover the essential details to be given to the manufacturer for an enquiry and order to be fully understood.

D.1 General

Any special requirements, e.g.:

a) surface finish;

b) colour;

c) aggregate type;

d) binder type;

e) admixtures.

D.2 Flags

a) Number of units.

b) Size, i.e. type followed by the thickness, e.g. D 63.

c) Whether chamfer is not required (types E, F and G only).

D.3 Kerbs and channels

a) Kerb profile (Type BN, SP, HB1, HB2 or HB3 of figure 2 and/or channel profile (type CS1, CS2 or CD of figure 2) and overall dimensions.

b) Any sawn units or special instructions.

D.4 Radius kerbs and channels

(See figure D.1).

a) Number of units or number of quadrants of a circle.

b) Profile type (kerb type BN, SP, HB1, HB2 or HB3, channel type CS1, CS2 or CD of figure 2).

c) External or internal radius of units (see figure D.1).

d) Radius in metres (see **11.1.2**).

D.5 Dropper kerbs

a) Number of pairs of units.

b) Cross-section profiles to be connected over 915 mm length, e.g. profile type, left or right hand (dropper kerb types 1 and 2 of figure 3).

D.6 Edgings

a) Number of units.

b) Profile (edgings type ER, EF or EBN of figure 4).

D.7 Quadrants

a) Number of units.

b) Profile (quadrant type QBN, QHB or QSP of figure 4).

c) Bed dimensions (305 mm or 455 mm).

d) Height dimension (150 mm or 255 mm).

Annex E (informative)
Methods of manufacture

There are many different methods for manufacturing the type of products covered by this standard. The most common methods are as follows.

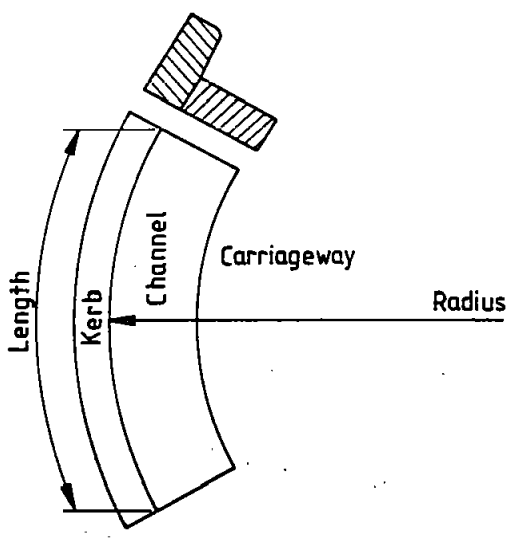
a) *Semi-dry process.* A moist mix is compacted by pressure or by simultaneous vibration and pressure or by tamping. The resulting products are demoulded immediately.

b) *Wet press process.* Starting with a very wet mix, excess water is removed under a pressure of at least 5 MPa over the entire surface. The products are demoulded immediately.

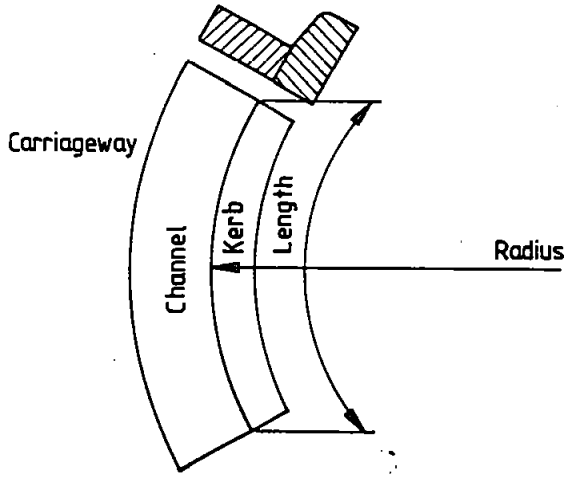
c) *Wet cast process.* A mix with a water : cement ratio in the range 0.40 to 0.55 is placed into moulds and compacted. The products are normally demoulded on the following day. This wet cast process is not used for flags covered by this Part of BS 7263.

Annex F (informative)
Suitability of flags for various locations

The type and thickness of flag recommended for use in various locations are given in table 11.



a) Internal kerb and channel



b) External kerb and channel

Figure D.1 Kerbs and channels

Table 11. Suitability of flags (see note 1)

Location and use	Flag type and thickness (in mm)			
	A50 B50 C50 C63 D50 D63 E50 F50 G50	A63 B63	E70 F65 G60	Tactile flags (see note 2)
No vehicle use of any kind, e.g. pedestrian precincts and footways protected by street furniture	*	*	*	*
Very occasional use by cars and light mechanical sweepers, e.g. unprotected footways in 'no parking areas' or other footways where over-run is not a problem	*	*	*	*
Vehicle crossing of footways to house driveways		*	*	
Footways subject to frequent car and occasional commercial vehicle over-run; unprotected pedestrian precincts with about 25 commercial vehicles/day each way, giving service access, or for fire access			*	

*Indicates that this flag type and thickness is suitable for the location.

NOTE 1. Flags will only perform satisfactorily if the foundation and bedding conditions are adequate.

NOTE 2. For guidance on use of tactile flags see Department of Transport Disability Unit Circular DU 1/86[1].

List of references (see clause 2)

Normative references

BSI standards publications

BRITISH STANDARDS INSTITUTION, London

BS 12 : 1991	*Specification for Portland cement*
BS 146 : 1991	*Specification for Portland blastfurnace cement*
BS 882 : 1992	*Specification for aggregates from natural sources for concrete*
BS 957 :	*Specification for feeler gauges*
BS 957 : Part 2 : 1969	*Metric units*
BS 1014 : 1975	*Specification for pigments for Portland cement and Portland cement products*
BS 1047 : 1983	*Specification for air-cooled blastfurnace slag aggregate for use in construction*
BS 1610 :	*Materials testing machines and force verification equipment*
BS 1610 : Part 1 : 1992	*Specification for the grading of the forces applied by materials testing machines when used in the compression mode*
BS 1881 :	*Testing concrete*
BS 1881 : Part 106 : 1983	*Methods for determination of air content of fresh concrete*
BS 2648 : 1955	*Performance requirements for electrically-heated laboratory drying ovens*
BS 3148 : 1980	*Methods of test for water for making concrete (including notes on the suitability of the water)*
BS 3892 :	*Pulverized-fuel ash*
BS 3892 : Part 1 : 1993	*Specification for pulverized-fuel ash for use with Portland cement*
BS 3892 : Part 2 : 1984	*Specification for pulverized-fuel ash for use in grouts and for miscellaneous uses in concrete*
BS 4027 : 1991	*Specification for sulfate-resisting Portland cement*
BS 4246 : 1991	*Specification for high slag blastfurnace cement*
BS 5075 :	*Concrete admixtures*
BS 5075 : Part 1 : 1982	*Specification for accelerating admixtures, retarding admixtures and water reducing admixtures*
BS 5075 : Part 2 : 1982	*Specification for air-entraining admixtures*
BS 6100 :	*Glossary of building and civil engineering terms*
BS 6100 : Part 1 :	*General and miscellaneous*
BS 6100 : Section 1.5 :	*Operations; associated plant and equipment*
BS 6100 : Subsection 1.5.1 : 1984	*Coordination of dimensions, tolerances and accuracy*
BS 6588 : 1991	*Specification for Portland pulverized-fuel ash cements*
BS 6699 : 1992	*Specification for ground granulated blastfurnace slag for use with Portland cement*

Informative references

BSI standards publications

BRITISH STANDARDS INSTITUTION, London

BS 4372 : 1968	*Specification for engineers' steel measuring rules*
BS 4484 :	*Specification for measuring instruments for constructional works*
BS 4484 : Part 1 : 1969	*Metric graduation and figuring of instruments for linear measurements*
BS 6717 :	*Precast concrete paving blocks*
BS 6717 : Part 1 : 1993	*Specification for paving blocks*
BS 6717 : Part 3 : 1989	*Code of practice for laying*
BS 7263 :	*Precast concrete flags, kerbs, channels, edgings and quadrants*
BS 7263 : Part 2 : 1990	*Code of practice for laying*

Other references

[1] Department of Transport. *Disability Unit Circular DU 1/86 Textured footway surfaces at pedestrian crossings*[1)]

[1)] Available from the Department of Transport, Publication Sales Unit, Building 1, Victoria Road, South Ruislip, Middlesex HA4 0NZ.

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Contract requirements

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.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

Any person who finds an inaccuracy or ambiguity while using this British Standard should notify BSI without delay so that the matter may be investigated swiftly.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services, Publications at Milton Keynes:
Tel: 0908 221166; Fax: 0908 322484.

In response to orders for international and European standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library, the Standardline Database, the BSI Information Technology Service (BITS) and its Technical Help to Exporters Service. Contact Customer Services, Information at Milton Keynes:
Tel: 0908 226888.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Head of Customer Services, Membership Group at Milton Keynes: Tel: 0908 226777.

Copyright

BSI
2 Park Street
London
W1A 2BS

BSI
Linford Wood
Milton Keynes
MK14 6LE

9404–7–0.7k–FP

ISBN 0 580 22312 4

B/507

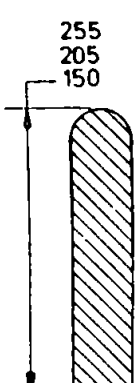


Figure 10. Half rounded

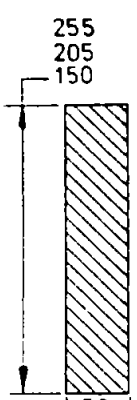


Figure 11. Square

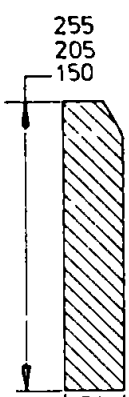


Figure 12. Chamfered

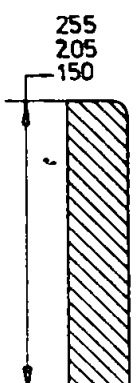
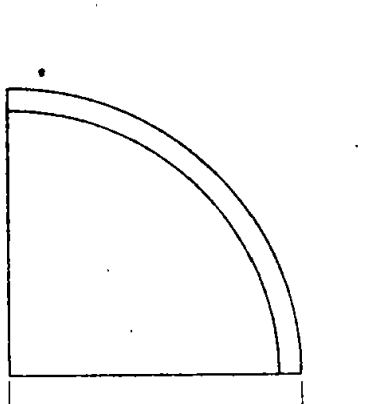
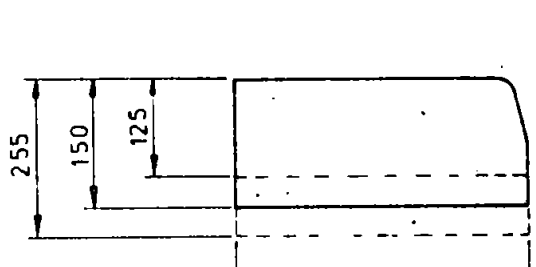


Figure 13. Bullnosed

All dimensions are in millimetres.

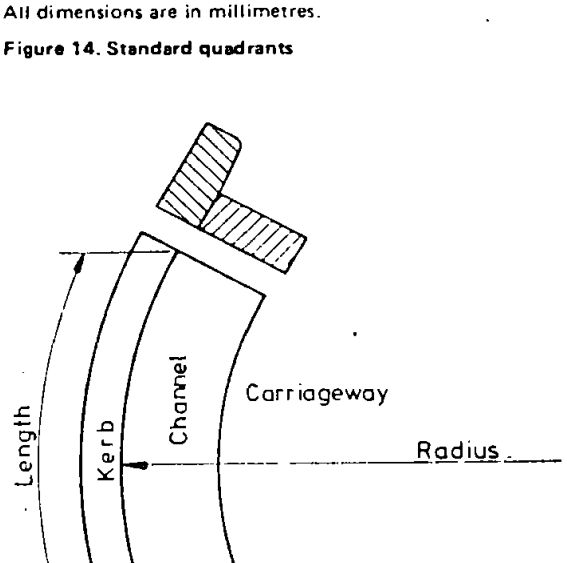
Sections of standard edgings



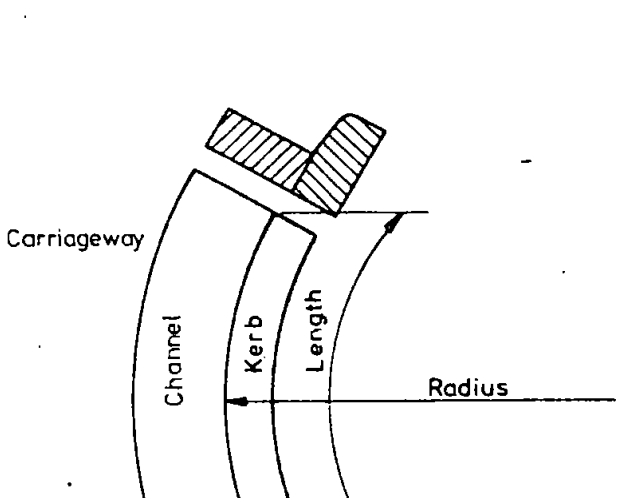


All dimensions are in millimetres.

Figure 14. Standard quadrants



Internal kerb and channel



External kerb and channel

Figure 15. Nomenclature and length of radius kerbs and channels

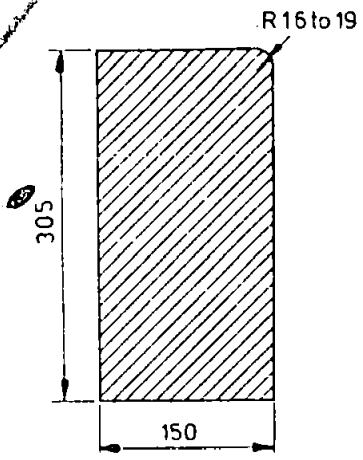


Figure 1

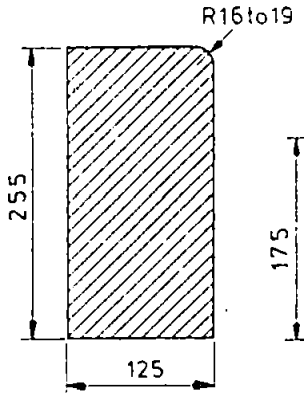


Figure 2

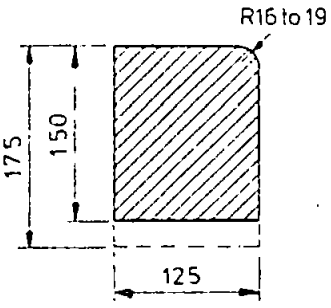


Figure 2(a)

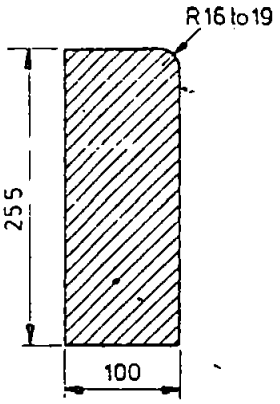


Figure 3

Figures 1 to 3. Bull nosed

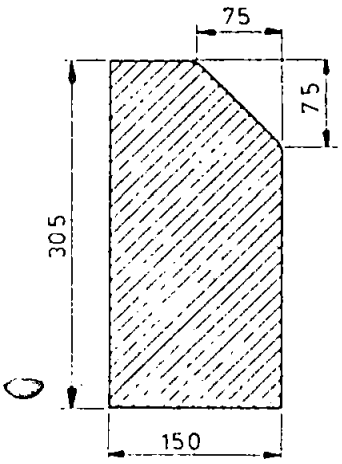


Figure 4

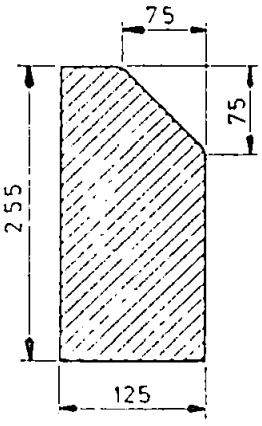


Figure 5

Figures 4 and 5. Full batter

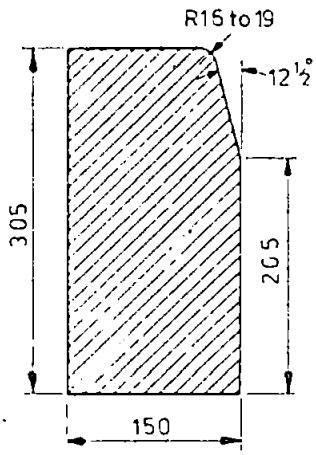


Figure 6

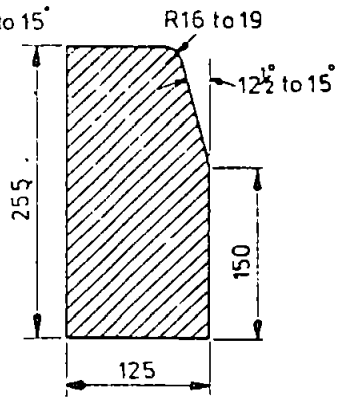


Figure 7

Figures 6 and 7. Half batter

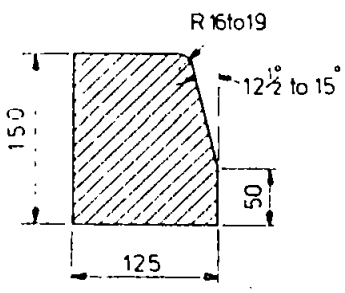


Figure 7(a). Half batter

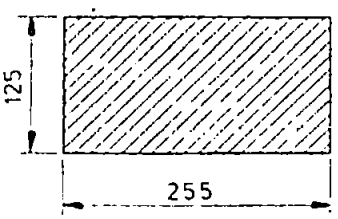


Figure 8. Square

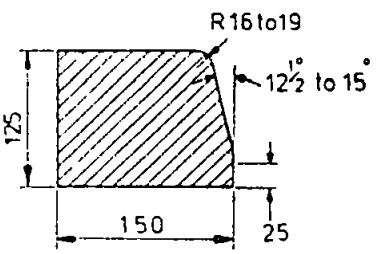


Figure 9. Half batter

All dimensions are in millimetres.

Figures 1 to 9. Sections of standard kerbs and channels