

Precast concrete flags, kerbs, channels, edgings and quadrants —

**Part 3: Precast, unreinforced concrete
kerbs, channels, edgings and
quadrants — Requirements and test
methods**

ICS 91.100.30

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee B/507, Paving units and kerbs, upon which the following bodies were represented:

- Brick Development Association
- British Cement Association
- British Ceramic Research Ltd.
- British Precast Concrete Federation Ltd.
- Cementitious Slag Makers' Association
- County Surveyors' Society
- Department of Transport (Highways Agency)
- Institution of Civil Engineers
- Institution of Highways and Transportation
- Interlay, the Association of Block Paving Contractors
- Interpave, the Concrete Block Paving Association
- Landscape Institute
- Society of Chemical Industry
- Stone Federation

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Civil Engineering Test Equipment Manufacturers' Association
- Institution of Structural Engineers
- National Federation of Clay Industries Ltd.
- National Paving and Kerb Association

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Foreword

This part of BS 7263 has been prepared by Technical Committee B/507. Together with BS 7263-1:2001 it supersedes BS 7263-1:1994 which is withdrawn.

This revision has been prepared to reflect current CEN principles regarding the writing of standards for this type of product: such standards are now performance-based instead of recipe-based. This has entailed taking out the requirements for materials and inserting far more performance requirements. To support this change, test methods have now been included as annexes. This revision has also introduced a requirement for type testing and factory production control, together with an example of a production control procedure.

Users of this standard should be aware that the concept of type testing (see A.2) has been brought forward from Harmonized European Standards, and is intended to give the manufacturer and any attestation body confidence that a new or modified product will conform to the performance requirements during regular production runs. The requirements for products to meet this standard are given in clause 5. The requirements specified in A.2 are only for type testing.

The following specific changes have been made in this revision:

- a) the dimensional requirements have been removed so that kerbs can be of any shape or size (the shapes and sizes in the previous edition have been retained as designated units);
- b) the water absorption limit has been removed;
- c) the bending load requirement has been replaced by a bending strength requirement and the test method has been modified accordingly;
- d) performance requirements and test methods have been added for:
 - 1) weathering resistance (freeze/thaw);
 - 2) abrasion resistance;
 - 3) slip/skid resistance;
 - 4) visual properties;
- e) for weathering resistance, abrasion resistance and slip/skid resistance, performance classes have been introduced; these include a class for “no performance determined”, which enables the purchaser to request a product appropriate to its intended use and location.

This British Standard is an adaptation of the current draft of the European Standard prEN 1340, following the publication of which as BS EN 1340 this standard, BS 7263-3, will be withdrawn.

Annex A, Annex B, Annex C, Annex D, Annex E, Annex F, Annex G, Annex H, Annex I and Annex K are normative. Annex J is informative.

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 comprise a front cover, an inside front cover, pages i to iv, pages 1 to 37 and a back cover.

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1 Scope

This part of BS 7263 specifies requirements and test methods for precast, unreinforced concrete kerbs, channels and complementary fittings. It specifies dimensions for the cross-sections of kerbs designated in the United Kingdom. It is applicable to precast, unreinforced concrete kerbs, channels and complementary fittings that are particularly for use in external trafficked paved areas.

NOTE The concrete kerbs specified in this part of BS 7263 are used for separation, physical or visual delineation, the provision of drainage or the containment of paved areas or other surfacing.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of BS 7263. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 812-114:1989, *Testing aggregates — Method for determination of the polished-stone value*.

BS 7932:1998, *Method for determination of polished paver value (PPV)*.

BS EN 10083-2:1991, *Quenched and tempered steels — Part 2: Technical delivery conditions for unalloyed quality steels*.

BS EN ISO 4288:1998, *Geometric product specification (GPS) — Surface texture — Profile method — Rules and procedures for the assessment of surface texture*.

BS ISO 8486-1:1996, *Bond abrasives — Determination and designation of grain size distribution — Part 1: Macrogrits F4 to F220*.

3 Definitions

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

3.1

kerb

precast, unreinforced concrete unit (including channels, edgings, quadrants, angles etc.) intended to separate surfaces at the same or different levels to provide:

- physical or visual delineation or containment;
- drainage channels, individually or in combination with other kerbs;
- separation between surfaces submitted to different kinds of traffic.

3.2

complementary fitting

unit that is used as a transition piece for changes in direction, shape or height or a small piece to complete a line

NOTE A complementary fitting can be part of a kerb, channel, etc.

3.3

face

surface intended to be seen when in use

3.4

bed face

lower surface in contact with the ground after laying

3.5

chased side face

side face of a kerb having a recessed profile

3.6

traffic face

face of a kerb intended by the manufacturer to be above a road surface and which provides containment of traffic

3.7

facing layer

layer of concrete providing a face, or part of a face, of a kerb, of different material and/or properties to the main body or backing layer

3.8

arris

part of a kerb where two faces meet

NOTE An arris can be bevelled, rounded, chamfered, radiused or splayed.

3.9

chamfer

bevelled arris with horizontal or vertical dimensions exceeding 2 mm

3.10

secondary processing

manufacturing process to texture a whole kerb or any of its surfaces, carried out after basic manufacture before or after hardening

3.11

work dimension

dimension of a kerb specified for its manufacture

3.12

actual dimension

dimension of a kerb as measured

3.13

overall length

length of a kerb, excluding any interlocking features or spacers

3.14

height

distance between the bed face and the top of a kerb

3.15

reference line

line to which the kerb is intended to be laid

3.16

slip resistance

ability of a kerb to resist relative movement between a pedestrian foot and the trafficked kerb surface

3.17

skid resistance

ability of a kerb to resist relative movement between a vehicle tyre and the trafficked kerb surface

4 Materials

The materials used for the manufacture of kerbs shall be at the manufacturer's discretion. Details of the materials used shall be declared in the manufacturer's production control documentation (see Annex A).

5 Requirements

5.1 General

Kerbs shall be produced either with a single type of concrete throughout or with different facing and backing layers. If kerbs are produced with a facing layer this shall, when measured in accordance with Annex B, have a minimum thickness of 25 mm, excluding isolated particles of aggregate protruding into the facing layer, over the area declared by the manufacturer. The facing layer shall be bonded to the backing layer.

It shall be permissible for a "square" arris to be either bevelled or rounded. A "square" arris shall have horizontal and vertical dimensions not exceeding 2 mm. The dimensions of a chamfer shall be at the discretion of the manufacturer. The dimensions shall be declared in the manufacturer's production control documentation (**A.3.1**).

NOTE A bevelled arris with dimensions exceeding 2 mm is described as chamfered.

If a kerb is produced with functional and/or decorative profiles, these profiles shall not be included in the work dimensions of the kerb. If a kerb is produced with surfaces that are textured, secondary processed or treated chemically, these finishes or treatments shall be at the discretion of the manufacturer. All finishes and treatments shall be declared in the manufacturer's production control documentation (**A.3.1**).

In the event of a dispute regarding the quality of a consignment of kerbs, the procedure specified in Annex C shall be followed.

5.2 Shape and dimensions

5.2.1 Work dimensions

The work dimensions of designated kerbs shall be as shown in Annex K. The work dimensions of kerbs of other shapes and sizes shall be at the discretion of the manufacturer. The work dimensions used for these kerbs shall be declared in the manufacturer's production control documentation (**A.3.1**).

5.2.2 Radius kerbs

Radius kerbs shall be either convex (external) or concave (internal), as shown in Figure 1. The type of curvature (convex or concave) of a radius kerb shall be determined according to the reference line, as shown in Figure 1. The work dimensions of the radius and overall length of a radius kerb shall be declared in the manufacturer's production control documentation (**A.3.1**).

The dimensions of the radius and overall length of a radius kerb shall be determined in accordance with **B.4**.

NOTE The preferred radii for radius kerbs and channels are shown in Table 1.

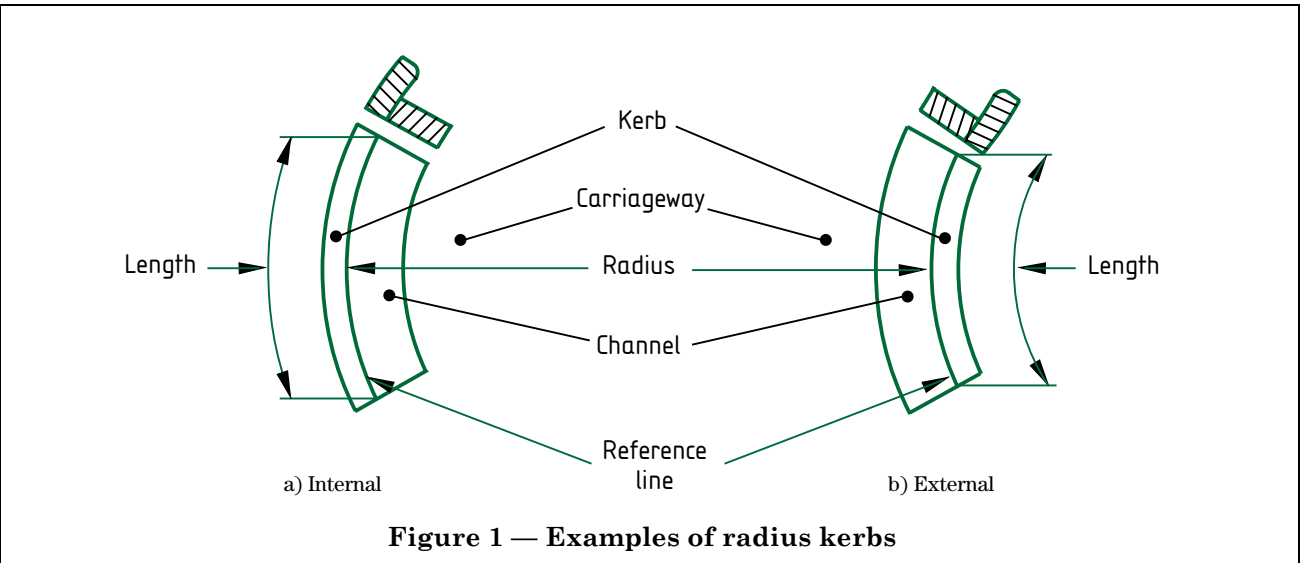


Table 1 — Convex and concave radii for kerbs and channels

Type of kerb	Preferred radii ^a m
Convex only	0.5
	1.0
	2.0
Concave and convex	3.0
	4.0
	5.0
	6.0
	8.0
	10.0
	15.0

^a A right-angled curve with a unit length of 780 mm requires only full-length units when using these radii.

5.2.3 Tolerances

When the dimensions of a single kerb are measured in accordance with Annex B, the tolerances shall be as specified in Table 2.

Table 2 — Tolerances for work dimensions

Class	Length	Width or height	Straightness and bow
D1	±1 % to nearest mm min. 3 mm, max. 10 mm	±3 % to nearest mm min. 3 mm, max. 10 mm	±2 mm measured over 250 mm to 450 mm ±3 mm measured over 550 mm to 850 mm
D2	±3 mm	±3 mm	±1 mm measured over 250 mm to 450 mm ±2 mm measured over 550 mm to 850 mm

For kerbs with functional or decorative profiles or surfaces, the tolerances shall be at the discretion of the manufacturer. These tolerances shall be declared in the manufacturer’s production control documentation (A.3.1).

The difference between any two measurements of a single dimension of a single kerb shall not exceed 5 mm except for kerbs with decorative profiles or surfaces.

5.3 Physical and mechanical properties

5.3.1 Complementary fittings

When radius kerbs, edgings, quadrants, angles, etc. and complementary fittings cannot be tested according to this part of BS 7263, they shall be deemed to conform to this part of BS 7263, provided that they have at least the same concrete quality as kerbs that conform.

5.3.2 Weathering resistance

When kerbs are tested in accordance with Annex D, classes shall be assigned to them according to the mean value of the test results as specified in Table 3. Families of kerbs that have not been tested for weathering resistance shall be assigned class W1.

Table 3 — Weathering resistance classes

Class	Mass loss after weathering test mean value (kg/m ²)
W1	No performance determined
W2	≤1.0, no individual value >1.5
W3	Manufacturer's declared value (A.3.1)
NOTE The manufacturer's declared value is usually applied to secondary processed products.	

5.3.3 Bending strength

When kerbs are tested in accordance with Annex E, the mean bending strength shall be not less than 4.2 MPa and no individual result shall be less than 3.4 MPa.

5.3.4 Abrasion resistance

When kerbs are tested in accordance with Annex F, classes shall be assigned to them according to the values specified in Table 4. No individual result shall be greater than the specified value. Families of kerbs that have not been tested for abrasion resistance shall be assigned class A1.

NOTE This is not required unless the kerbs are to be laid as channels in a trafficked area.

Table 4 — Abrasion resistance classes

Class	Degree of abrasion mm
A1	No performance determined
A2	26
A3	Manufacturer's declared value (A.3.1)
NOTE Kerbs of class A1 are suitable for use in pedestrian areas.	

5.3.5 Slip/skid resistance

When kerbs are tested in accordance with Annex G, classes shall be assigned to them according to the mean value of the test results as specified in Table 5. The slip/skid resistance value shall be the lower of the values obtained for the unpolished skid resistance and the polished pendulum test. Families of kerbs that have not been tested for slip/skid resistance shall be assigned class S1.

NOTE This is not required unless the kerbs are to be laid as channels in a trafficked area.

Table 5 — Slip/skid resistance classes

Class	Mean slip/skid resistance value C scale units
S1	No performance determined
S2	≥35
S3	≥45
S4	Manufacturer's declared value (A.3.1)
NOTE Kerbs of class S2 are suitable for use in pedestrian areas and kerbs of class S3 are suitable for use in vehicular areas.	

5.4 Visual properties

5.4.1 Appearance

When examined in accordance with Annex H, the upper face of kerbs shall not exhibit defects such as cracking or flaking.

In the case of two-layer kerbs there shall be no delamination (separation) between the layers.

NOTE Efflorescence is not deleterious to the mechanical and physical performance of kerbs.

5.4.2 Texture

If kerbs are produced with a special surface texture, the texture shall be at the discretion of the manufacturer. The properties of the textured surface shall be declared in the manufacturer’s production control documentation (see A.3.1). Kerbs with a special surface texture shall be deemed to conform to this part of BS 7263 if, when examined in accordance with Annex H, there are found to be no significant visible differences to any samples supplied by the manufacturer and approved by the purchaser.

5.4.3 Colour

NOTE 1 Colours may be provided in a facing layer or throughout a kerb at the manufacturer’s discretion.

Kerbs containing colours shall be deemed to conform to this part of BS 7263 if, when examined in accordance with Annex H, there are found to be no significant differences in colour to any samples supplied by the manufacturer and approved by the purchaser.

NOTE 2 Variations in the colour consistency of kerbs can be caused by unavoidable variations in the shade and properties of the raw materials and by variations in hardening.

6 Manufacturer’s evaluation of conformity

The manufacturer’s evaluation of conformity shall be carried out as specified in Annex A.

Kerbs produced by the manufacturer shall be subjected to type testing in accordance with A.2.

The manufacturer shall also establish and maintain a production control system for product testing in accordance with A.3.

Conformity assessment for bending strength shall be carried out in accordance with Annex I.

NOTE 1 An example of a production control system is given in Annex J.

NOTE 2 The production control system is intended to enable the manufacturer to determine whether the kerbs conform to the requirements of this part of BS 7263 and to demonstrate that kerbs have been assigned the correct class markings.

7 Marking

The following particulars relating to kerbs shall be indicated clearly on any one of the delivery note, invoice, packaging, or supplier’s certificate or brochure supplied with the consignment of kerbs:

- a) identification of the manufacturer or the factory;
- b) date of production;
- c) class(es) where applicable (see Table 6);
- d) the number of this British Standard¹⁾;
- e) identification of the product (i.e. concrete kerb units).

Table 6 — Classes and their identification

Parameter	Class marking
Weathering resistance	W1, W2 or W3
Abrasion resistance	A1, A2 or A3
Dimensions	D1 or D2
Slip/skid resistance	S1, S2, S3 or S4

¹⁾ Marking BS 7263-3:2001 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.

8 Test report

A test report shall be produced for each test that is performed by an external laboratory. The test report shall contain the following particulars:

- a) name of the organization carrying out the test;
- b) name of the person carrying out the test;
- c) date of the test;
- d) the name of the source providing the sample;
- e) sample reference, including the date of production;
- f) name of the person taking the sample;
- g) annex and/or relevant British Standard in which the test method is specified;
- h) name of the test;
- i) test result;
- j) any pertinent remarks about the sample or test result.

Annex A (normative)

Manufacturer's evaluation of conformity

A.1 General

For the purpose of testing, products shall be grouped into families, where the value of a selected property is common to all products within that family.

NOTE Examples of such families are:

- **strength family:** kerbs manufactured using the same type of materials and production methods, irrespective of dimensions and colours;
- **surface family:** kerbs with face mixes having the same prime aggregate used in the mix, e.g. natural river gravel, crushed granite, porphyry, basalt or limestone and the same surface treatment of the finished product, irrespective of dimensions and colours.

A.2 Type testing

A.2.1 Initial type testing

NOTE Where the product has previously been tested in accordance with the procedures in this part of BS 7263, the results may be used to satisfy initial type testing.

Initial type testing shall be performed at the beginning of the manufacture of a new product type or a family of product types, or on the setting up of a new production line, to determine whether the achieved properties of the product conform to the requirements of this part of BS 7263.

The sampling, testing and conformity criteria for initial type testing shall be as specified in A.2.3.

A.2.2 Further type testing

Whenever a change occurs in the raw materials, the proportions used or the production equipment or process, which would significantly change some or all of the properties of the finished product, the type tests shall be repeated for the selected property.

The sampling, testing and conformity criteria for further type testing shall be as specified in A.2.3.

NOTE Examples of changes necessitating repeat tests are:

- change from natural river gravel to crushed rock aggregates;
- partial substitution of cement by additions;
- partial substitution of aggregate by recycled concrete.

For abrasion, weathering and slip and/or skid resistance, type testing shall be repeated periodically at the frequency given in Table A.1.

Table A.1 — Periodically repeated type testing

Property	Frequency
Abrasion (classes A2 and A3)	Once per year per surface family
Weathering resistance (classes W2 and W3)	Once per year per surface family ^a
Slip and/or skid resistance (classes S2, S3 and S4)	Once per year per surface family
^a If, for a surface family, the result of a type test (mass loss) is lower than 50 % of the required value, the repeated type tests may be carried out every 2 years as long as this condition continues to be fulfilled.	