

Clay bricks of special shapes and sizes — Recommendations

ICS 91.100.15

Committees responsible for this British Standard

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Brick Development Association
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British Precast Concrete Federation
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Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Normative references	1
3 General	2
4 Shapes and dimensions	3
5 Designation	3
Annex A (normative) Information to be considered when ordering bricks	4
Annex B (normative) Shapes and dimensions of bricks	4
Annex C (informative) Basic dimensions and applications of special shapes in brickwork	56
Annex D (normative) Determination of the properties of bricks of special shapes and sizes	58
Annex E (normative) Bricks for which there should be no requirement for compressive strength	60
Annex F (normative) Nominal sizes for test specimens	61
Annex G (informative) Shape factors	63
Annex H (informative) General guidance on the appearance of facing bricks	63
Annex I (informative) Reproduction of requirements from Table ZA.1.2 of BS EN 771-1:2016 for CE marking	64
Figure C.1 — Sizes used in half and quarter bonding (related to CB.1.5)	56
Figure C.2 — Application of squints and angle bricks to external and internal angles in brickwork	57
Table B.1 — Group BD. Bonding bricks	5
Table B.2 — Group CP. Copings and cappings	8
Table B.3 — Group BN. Bullnose bricks	12
Table B.4 — Group AN. Angle and cant bricks	26
Table B.5 — Group PL. Plinth bricks	42
Table B.6 — Group AR. Arch bricks	49
Table B.7 — Group RD. Radial bricks	51
Table B.8 — Group SL. Brick slips	53
Table B.9 — Group SD. Soldier bricks	54
Table B.10 — Group CB. Cuboid bricks	55
Table C.1 — Summary of applications for squints and angle bricks	58
Table F.1 — BS EN 771-1:2016 Nominal sizes of loaded areas	61
Table G.1 — Shape factors	63
Table I.1 — Scope and relevant clauses	64

Foreword

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution.

This British Standard has been prepared under the direction of Technical Committee B/519.

BS 4729:2005+A1:2016 supersedes BS 4729:2005, which is withdrawn. Text introduced or altered by Amendment No. 1 is indicated in the text by tags **A1** and **A1**. Minor editorial changes are not tagged.

Although the specifications for clay **A1** text deleted **A1** masonry units (including declaration of dimensions by the manufacturer and limiting dimensional tolerances) are covered by **A1** BS EN 771-1 **A1**, specific work sizes of masonry units are not standardized on a European level. BS EN 771-1 specifically excludes methods of measurement, tolerance and range requirements for dimensions, angles and radii characteristics of specially shaped clay masonry units.

BS 4729 provides a list of specified designations for work dimensions and angles of bricks traditionally used in the United Kingdom, including those of special shape. These designations may be used as a means of declaring the configuration of the units as is required by BS EN 771 Parts 1 and 2. Clay **A1** text deleted **A1** masonry units of other dimensions and shapes may be used in practice but, unless their nominal dimensions conform to those in this standard, they cannot be designated in accordance with this standard and use the designation to declare their configuration. This standard will be periodically reviewed and modified to reflect current general usage.

The scope of BS EN 771 Parts 1 and 2 includes bricks of shapes other than those that fit within the overall envelope of a rectangular parallelepiped, and the shapes and dimensions of these are given in BS 4729. The test methods published in the BS EN 772 series of standards have, in general, been developed for units of a rectangular parallelepiped shape.

NOTE A new Annex D has been produced to provide an interpretation of how the test methods in the BS EN 772 series should be applied to clay masonry units of shapes within the scope of the standard in order that these products may be characterized and CE marked.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot 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 64, an inside back cover and a back cover.

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1 Scope

This British Standard gives guidance for the dimensions of bricks, including those of special shape, made from clay ^{A1} text deleted ^{A1}, traditionally used in the construction of brick masonry in the UK. Requirements for bricks are covered by BS EN 771 Parts 1 and 2.

NOTE Derivation of dimensions of special shapes and typical examples of applications of special shapes are shown in Annex C (Figures C.1 and C.2 and Table C.1).

Annex D gives recommendations for how the principles of the test methods in the BS EN 772 series of standards are to be applied to ^{A1} text deleted ^{A1} clay bricks conforming to ^{A1} BS EN 771-1:2016 ^{A1} with shapes as described in BS 4729. The properties covered are those required to enable the products to be characterized and CE marked. The table of requirements (reproduced from Table ZA.1.2 of ^{A1} BS EN 771-1:2016 ^{A1} together with an indication of the relevant clause in Annex D for such marking) is given in Annex I.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the reference cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

^{A1} BS 6100-11, *Building and civil engineering – Vocabulary – Part 11: Performance, characteristics, measurement and joints* ^{A1}

^{A1} BS EN 771-1:2016 ^{A1}, *Specification for masonry units — Part 1: Clay masonry units*.

^{A1} BS EN 771-2:2011 ^{A1}, *Specification for masonry units — Part 2: Calcium silicate units*.

^{A1} BS EN 772-1:2011+A1:2015 ^{A1}, *Methods of test for masonry units — Part 1: Determination of compressive strength*.

BS EN 772-2, *Methods of test for masonry units — Part 2: Determination of percentage area of voids in masonry units (by paper indentation)*.

BS EN 772-3, *Methods of test for masonry units — Part 3: Determination of net volume and percentage of voids of clay masonry units, by hydrostatic weighing*.

BS EN 772-5, *Methods of test for masonry units — Part 5: Determination of active soluble salts content of clay masonry units*.

BS EN 772-7, *Methods of test for masonry units — Part 7: Determination of water absorption of clay masonry damp proof course units by boiling in water*.

BS EN 772-9, *Methods of test for masonry units — Part 9: Determination of volume and percentage of voids and net volume of clay and calcium silicate units by sand filling*.

BS EN 772-11, *Methods of test for masonry units — Part 11: Determination of water absorption of aggregate concrete, manufactured stone and natural stone masonry units due to capillary action and the initial rate of water absorption of clay masonry units*.

BS EN 772-13, *Methods of test for masonry units — Part 13: Determination of net and gross dry density of masonry units (except for natural stone)*.

^{A1} BS EN 772-16:2011 ^{A1}, *Methods of test for masonry units — Part 16: Determination of dimensions*.

BS EN 772-19, *Methods of test for masonry units — Part 19: Determination of moisture expansion of large horizontally perforated clay masonry units*.

BS EN 772-20, *Methods of test for masonry units — Part 20: Determination of flatness of faces of masonry units*.

^{A1} BS EN 1996-1 (all parts), *Eurocode 6. Design of masonry structures*

BS EN 1996-2, *Eurocode 6 – Design of masonry structures – Part 2: Design considerations, selection of materials and execution of masonry* ^{A1}

PAS 70, *HD clay bricks — Guide to appearance and site measured dimensions and tolerance*.

3 General

3.1 Information from purchasers

Annex A shows the information that purchasers should supply with their enquiry or order.

3.2 Forms of bricks

Although the figures in Table B.1 to Table B.10 indicate solid bricks, bricks covered by this British Standard may be solid or contain voids. The specifier should ascertain from the supplier the exact nature of any voids and consider the structural implications as well as the implications for constructional detailing.

3.3 Faced surfaces

The surfaces of the bricks that will be faced are indicated by stippling in the diagrams shown in the tables in this standard. Surfaces not visible in the diagrams are not faced.

If specifiers require other surfaces to be faced, they should consult with the manufacturers or suppliers.

3.4 Colour and surface texture

With some types of bricks and manufacturing techniques, it is not possible to ensure that the colour and texture of all the exposed faces of the bricks of special shapes exactly match those of the corresponding  bricks of regular shape .

Specifiers should consult with the supplier at an early stage to establish their needs for a particular application.

3.5 Left- or right-handed bricks

Left- or right-handed versions sometimes need to be indicated, e.g.:

- a) where the special shape is asymmetric, e.g. a single bullnose stop (see Table B.3, Type BN.3);
- b) where the directional nature of the surface texture of the bricks requires them to be laid in one aspect to avoid variations in appearance in the built wall. Care should be taken when Arch bricks (Group AR) are to be specified.

When a brick has a handed version, the figure only shows the left-hand (LH) version.

3.6 Compressive strength

Clay bricks of special shapes and sizes can have a lower compressive strength than bricks made to standard format from the same raw materials.

In positions where compressive strength might be critical, e.g. under the ends of lintels, it is usually necessary to fill any frogs in the bricks with mortar. Where strength is a critical design requirement, the manufacturers should be consulted.  Guidance for these situations is given in Annex D, Annex E, Annex F and Annex G. .

3.7 Durability

Bricks of special shapes which are to be used in positions where they are liable to be saturated and frozen, e.g. in parapets, copings, cappings and sills, need to be suitably durable (see item e) of Annex A).

Specifiers should consult with manufacturers or suppliers regarding the suitability of the bricks for use in such exposed positions.

4 Shapes and dimensions

The shapes and dimensions of bricks that have traditionally been used in the UK are shown in Annex B. All dimensions are in millimetres.

All dimensions shown in Tables B.1 to Table B.9 have been derived from the work sizes of cuboid brick CB.1.5 as shown in Figure C.1 before being rounded to whole millimetres. For bricks with angles indicated, the angles should take precedence over the rounded dimensions.

The dimensions given in Tables B.1 to Table B.9 apply to units to be used with a nominal 10 mm mortar joint ^(A1).

NOTE Where it is intended to use ^(A1) text deleted ^(A1) clay ^(A1) text deleted ^(A1) bricks of special shapes in conjunction with thin layer mortars the manufacturers advice should be sought at an early stage.

5 Designation

The bricks of special shapes listed in this standard should be designated in the following groups:

- BD: Bonding bricks (see Table B.1);
- CP: Copings and cappings (see Table B.2);
- BN: Bullnose bricks (see Table B.3);
- AN: Angle and cant bricks (see Table B.4);
- PL: Plinth bricks (see Table B.5);
- AR: Arch bricks (see Table B.6);
- RD: Radial bricks (see Table B.7);
- SL: Brick slips (see Table B.8);
- SD: Soldier bricks (see Table B.9);
- CB: Cuboid bricks (see Table B.10).

Annex A (normative)

Information to be considered when ordering bricks

When determining the specification of bricks, only the physical properties that will be of significance in the finished brickwork should be considered and specified. Specification of properties that are not essential can restrict the choice of brick offered. Specifiers should pay particular attention to the clauses referred to in the normative references (Clause 2) in order to assess the significance of each property and the need to specify it.

The following information should be considered when ordering bricks:

- a) product name or colour and texture (see 3.4);
- b) type number and description, right or left hand (if relevant, see 3.5), e.g. BN.3 single bullnose stop, right hand;
- c) faced surfaces (see 3.3);
- d) durability requirements. Bricks of special shapes that are to be used in positions where they are liable to be saturated and subject to freeze/thaw cycling, e.g. in parapets, copings, cappings, and sills need to be suitably durable. Specifiers should consult with manufacturers or suppliers regarding the suitability of the bricks for use in such exposed positions.

In addition:

- 1) for freeze/thaw resistance of A_1 text deleted A_1 clay bricks, see 5.3.6 and B.3 of A_1 BS EN 771-1:2016 A_1 , and Annex D of this standard;
- 2) A_1 Text deleted A_1 ;
- 3) for guidance on the use of bricks and mortars in positions of varying degrees of exposure, see A_1 BS EN 1996-2 A_1 ;
- e) requirements for structural use. See A_1 BS EN 771-1:2016 A_1 , and A_1 BS EN 1996-1 and BS EN 1996-2 A_1 ;
- f) where products are to be used other than in the orientation described in this standard, a drawing showing the proposed application should be included with the order to allow the implications for manufacture to be considered, e.g. the effect of perforation patterns if the brick is to be used in a situation where it is structurally loaded perpendicular to the line of the perforations;
- g) any special requirement not covered by this standard, e.g. position of any perforations and holes (see 3.1), or acid-resistance;
- h) quantity;
- i) packaging requirements;
- j) a schedule of deliveries to be agreed with the suppliers.

Annex B (normative)

Shapes and dimensions of bricks

The shapes and dimensions of bricks that have been traditionally used in the UK and have been described by the designations in Clause 5 are given in Tables B.1, to Table B.10.

In the case of A_1 clay bricks A_1 of a shape other than a rectangular parallelepiped and which are to be described by the designations in Clause 5 for the purpose of declaring the configuration in accordance with A_1 BS EN 771-1:2016 A_1 , the key dimensions are A , B and C . All other dimensions should not be regarded as critical for the designation.

These dimensions (A , B and C) should be measured following the principles of procedure b) in A_1 BS EN 772-16:2011 A_1 , i.e. a single measurement across the centre of the unit. The measuring device should have the measurement precision given in Table 1 of A_1 BS EN 772-16:2011 A_1 .

For those units where angles are indicated in BS 4729 those angles should be checked using a protractor with lockable jaws or similar. The accuracy of the device should be $\pm 1^\circ$ and the maximum deviation of the mean value of a sample of ten from the values stated in BS 4729 should be $\pm 1^\circ$.

When ordering product, reference should be made to the manufacturer with regard to the correct orientation in which the product is to be used.

Table B.1 — Group BD. Bonding bricks

(All dimensions are in millimetres unless otherwise indicated.)

Type and description	Diagram	Dimensions					
		Type No.	A	B	C		
BD.1.1 Half bat (snap header)		BD.1.1	102	102	65		
BD.1.2 Three-quarter bat		BD.1.2	159	102	65		
BD.1.3 Cuboid brick faced on bed surface		BD.1.3	215	102	65		

Table B.1 — Group BD. Bonding bricks (continued)
(All dimensions are in millimetres unless otherwise indicated.)

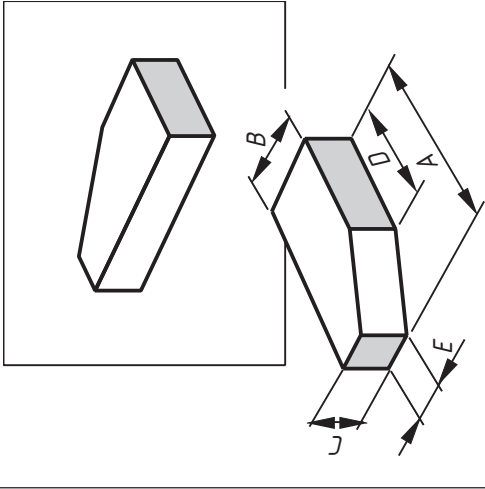
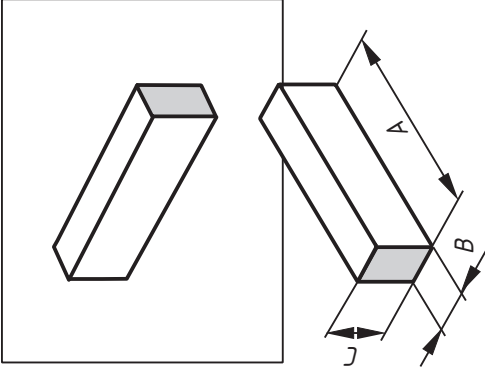
Type and description	Diagram	Dimensions					
		Type No.	A	B	C	D	E
BD.2 King closer (left and right hand)	 LH shown	BD.2	215	102	65	102	46
BD.3 Queen closer		BD.3	215	46	65		

Table B.1 — Group BD. Bonding bricks (continued)
(All dimensions are in millimetres unless otherwise indicated.)

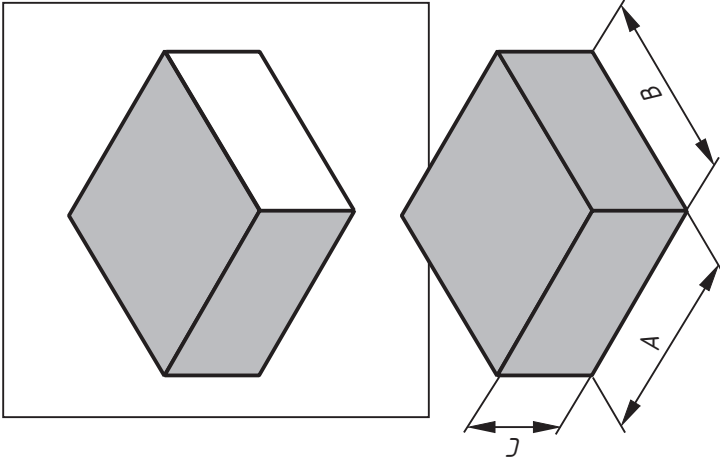
Type and description	Diagram	Dimensions				
		Type No.	A	B	C	
BD.4 215 mm Stop end		BD.4.1	215	159	102	
		BD.4.2	215	159	65	
		BD.4.3	215	215	102	
		BD.4.4	215	215	65	

Table B.2 — Group CP. Copings and cappings
(All dimensions are in millimetres unless otherwise indicated.)

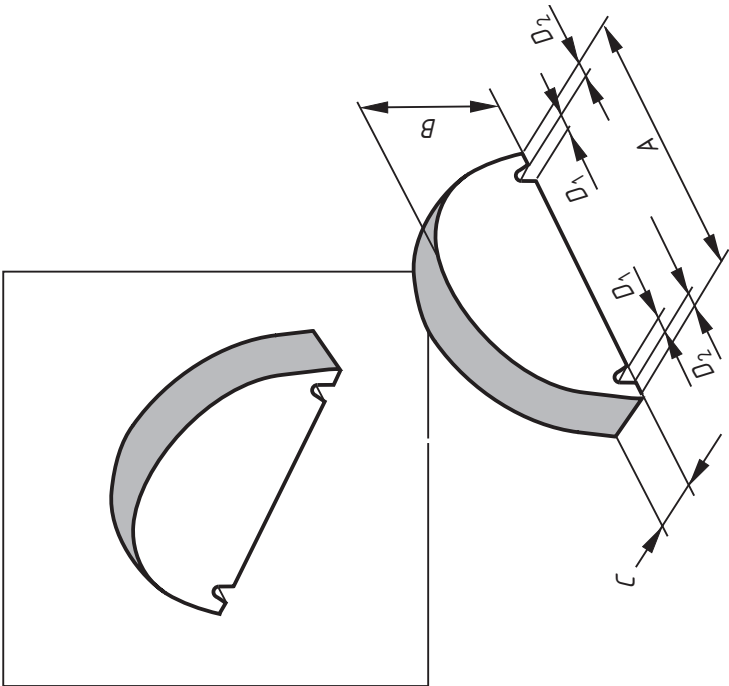
Type and description	Diagram	Dimensions					
		Type No.	A	B	C	D ₁	D ₂
CP.1.1 Half round coping		CP.1.1	305	153	65	13	15

Table B.2 — Group CP. Copings and cappings (continued)
(All dimensions are in millimetres unless otherwise indicated.)

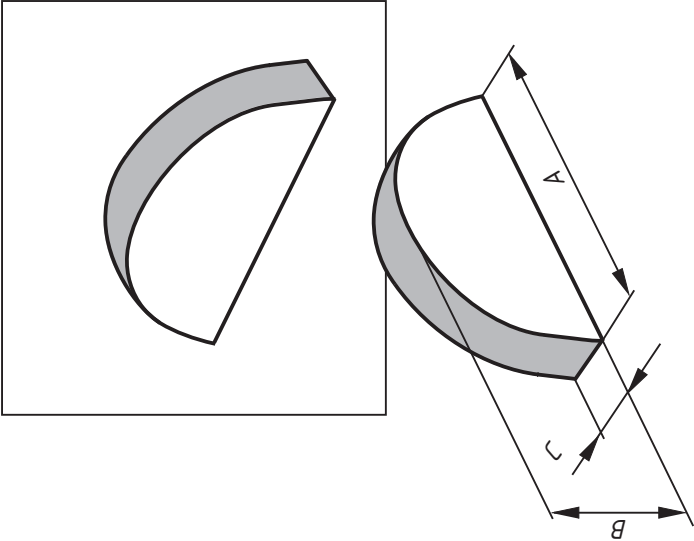
Type and description	Diagram	Dimensions				
		Type No.	A	B	C	
CP.1.2 Half round coping		CP.1.2	215	108	65	

Table B.2 — Group CP. Copings and cappings (continued)
(All dimensions are in millimetres unless otherwise indicated.)

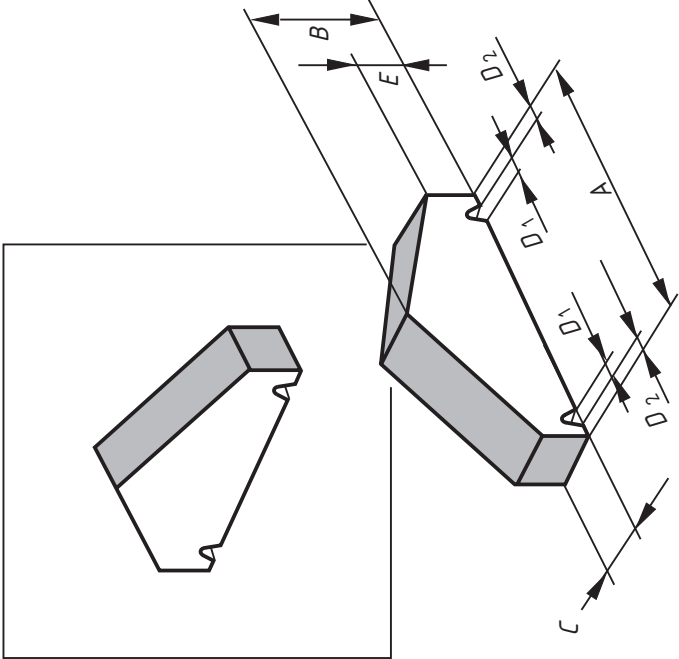
Type and description	Diagram	Dimensions						
		Type No.	A	B	C	D ₁	D ₂	E
CP.2.1 Saddleback coping		CP.2.1	305	153	65	13	15	50

Table B.2 — Group CP. Copings and cappings (continued)

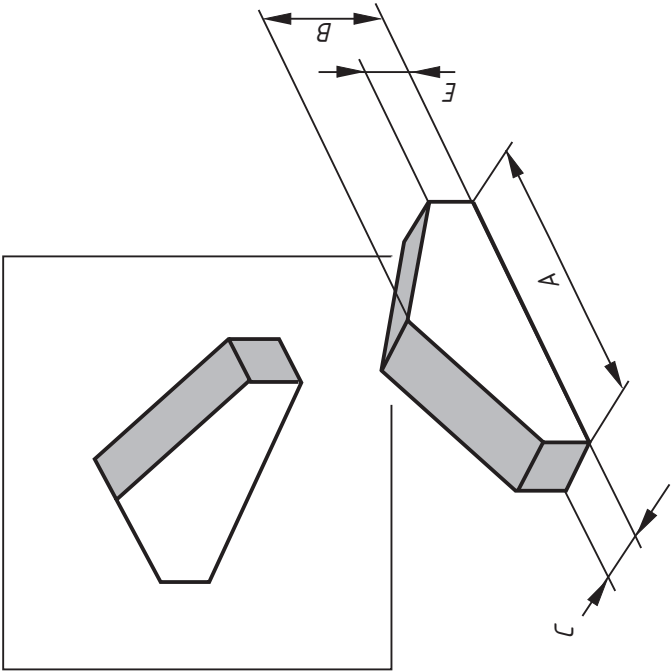
Type and description		Diagram	Dimensions				
			Type No.	A	B	C	E
CP.2.2	Saddleback coping		CP.2.2	215	123	65	50

Table B.3 — Group BN. Bullnose bricks

(All dimensions are in millimetres unless otherwise indicated.)

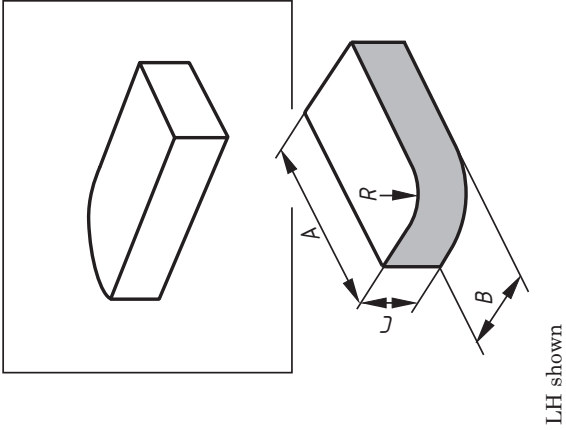
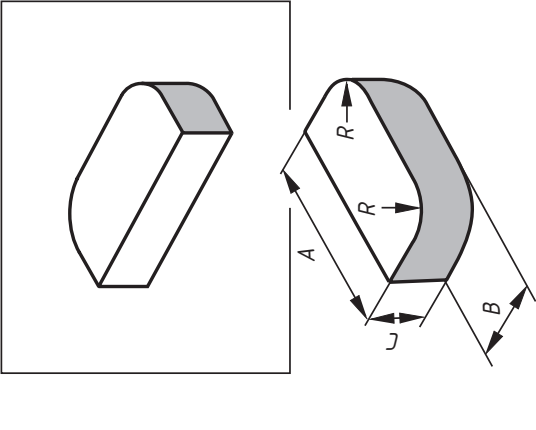
Type and description	Diagram	Dimensions						
		Type No.	A	B	C	D	R	
BN.1 Single bullnose (left and right hand)		BN.1.1	215	102	65	25	25	
		BN.1.2	215	102	65	25	51	
BN.2 Double bullnose		BN.2.1	215	102	65	25		
		BN.2.2	215	102	65	51		

Table B.3 — Group BN. Bullnose bricks (continued)
(All dimensions are in millimetres unless otherwise indicated.)

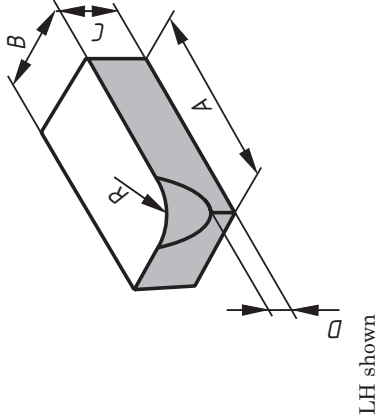
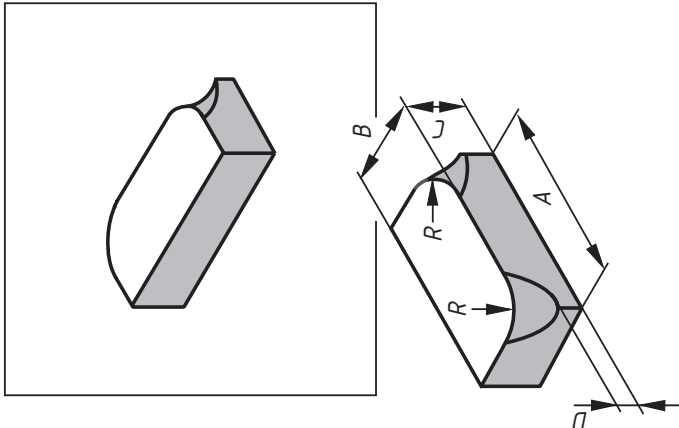
Type and description	Diagram	Dimensions					
		Type No.	A	B	C	D	R
BN.3 Single bullnose stop (left and right hand)		BN.3.1	215	102	65	25	25
		BN.3.2	215	102	65	25	51
BN.4 Double bullnose stop		BN.4.1	215	102	65	25	25
		BN.4.2	215	102	65	25	51

Table B.3 — Group BN. Bullnose bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

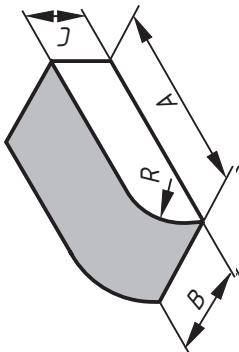
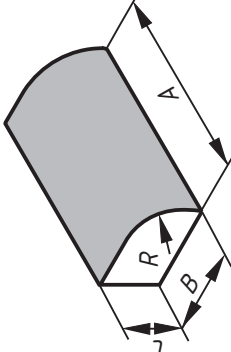
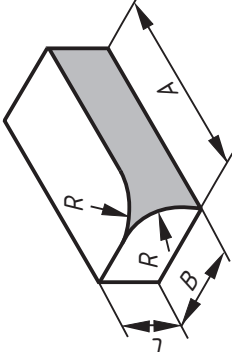
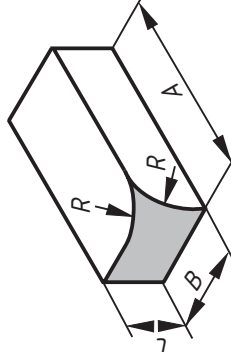
Type and description	Diagram	Dimensions					
		Type No.	A	B	C	R	
BN.5 Single bullnose header on flat		BN.5.1	215	102	65	25	
		BN.5.2	215	102	65	51	
BN.6 Single bullnose stretcher on flat		BN.6.1	215	102	65	25	
		BN.6.2	215	102	65	51	
BN.7 Single bullnose internal return, stretcher faced (left and right hand)		BN.7.1	215	102	65	25	
		BN.7.2	215	102	65	51	
		BN.7.3	215	102	215	25	
		BN.7.4	215	102	215	51	
BN.8 Single bullnose internal return, header faced (left and right hand)		BN.8.1	215	102	65	25	
		BN.8.2	215	102	65	51	
		BN.8.3	215	102	215	25	
		BN.8.4	215	102	215	51	

Table B.3 — Group BN. Bullnose bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

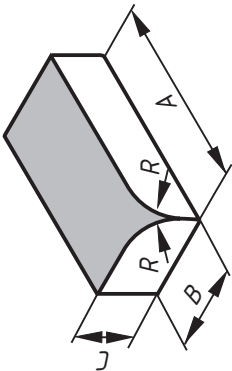
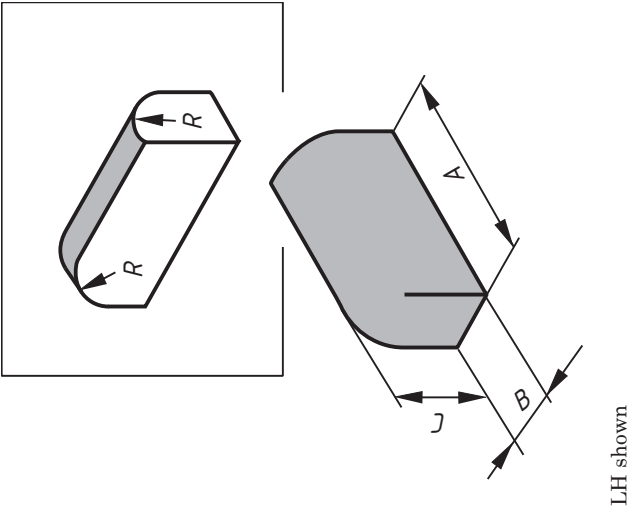
Type and description	Diagram	Dimensions					
		Type No.	A	B	C	R	
BN.9 Bullnose internal return, flat faced (left and right hand)	 LH shown	BN.9.1	215	102	65	25	
		BN.9.2	215	102	65	51	
BN.10 Bullnose external return on edge (left and right hand)	 LH shown	BN.10.1	215	65	102	25	
		BN.10.2	215	65	102	51	
		BN.10.3	215	215	102	25	
		BN.10.4	215	215	102	51	

Table B.3 — Group BN. Bullnose bricks (continued)
(All dimensions are in millimetres unless otherwise indicated.)

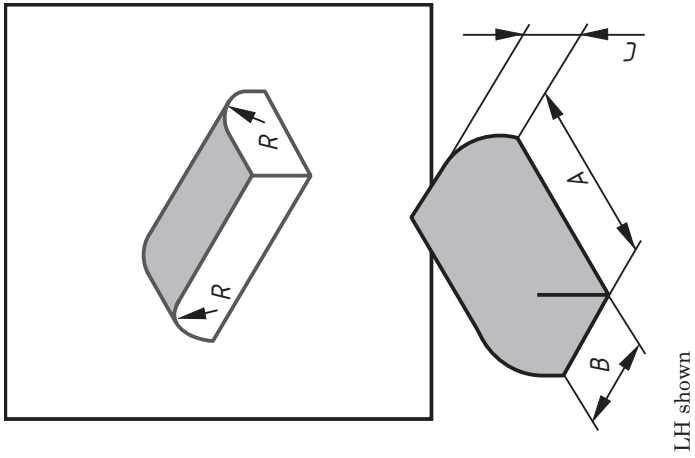
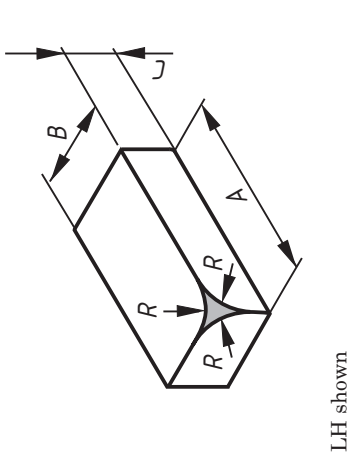
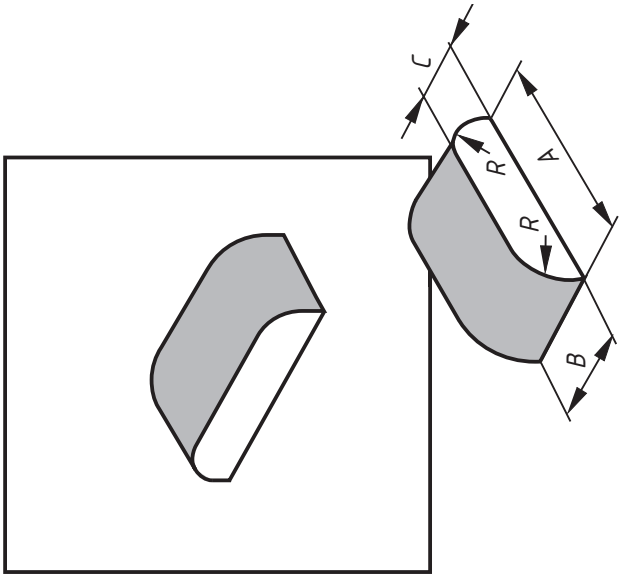
Type and description	Diagram	Dimensions					
		Type No.	A	B	C	R	
BN.11 Bullnose external return on flat (left and right hand)		BN.11.1	215	102	65	25	
		BN.11.2	215	102	65	51	
		BN.11.3	215	215	65	25	
		BN.11.4	215	215	65	51	
BN.12 Bullnose mitre (left and right hand)		BN.12.1	215	102	65	25	
		BN.12.2	215	102	65	51	

Table B.3 — Group BN. Bullnose bricks (continued)

Type and description		Diagram		Dimensions				
BN.13				Type No.	A	B	C	R
Bullnose double header on flat				BN.13.1	215	102	65	25
				BN.13.2	215	102	65	51