BRITISH STANDARD

BS 4729:2005
+A1:2016

Clay bricks of special shapes and sizes — Recommendations

ICS 91.100.15

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Committees responsible for this British Standard

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British Precast Concrete Federation

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Contents

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BS 4729:2005+A1:2016 supersedes BS 4729:2005, which is withdrawn.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 [A1] bricks of regular shape [A1].

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. [A1] Guidance for these situations is given in Annex D, Annex E, Annex F and Annex G. [A1]

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 [A1⟩ 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 [A1] text deleted [A1] clay bricks, see **5.3.6** and **B.3** of [A1] BS EN 771-1:2016 [A1], and Annex D of this standard;

2) [A1] Text deleted [A1];

3) for guidance on the use of bricks and mortars in positions of varying degrees of exposure, see [A1] BS EN 1996-2 [A1];

e) requirements for structural use. See [A1] BS EN 771-1:2016 [A1], and [A1] BS EN 1996-1 and BS EN 1996-2 [A1];

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 [A1] clay bricks [A1] 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 [A1] BS EN 771-1:2016 [A1], 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 [A1] BS EN 772-16:2011 [A1], i.e. a single measurement across the centre of the unit. The measuring device should have the measurement precision given in Table 1 of [A1] BS EN 772-16:2011 [A1].

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 ±1° and the maximum deviation of the mean value of a sample of ten from the values stated in BS 4729 should be ±1°.

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.)

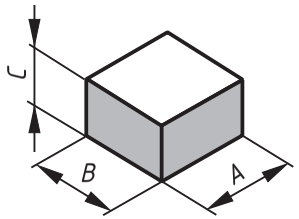
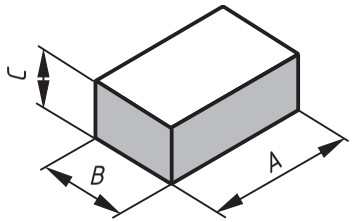
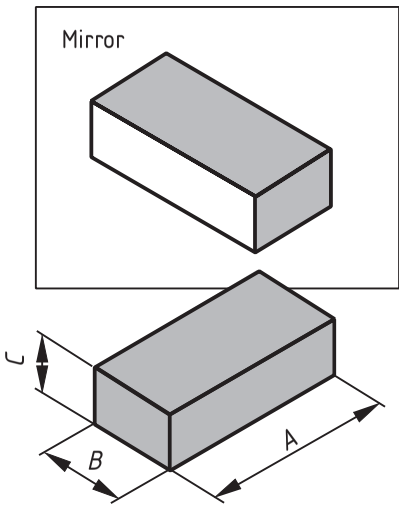
Type and description	Diagram	Dimensions						
BD.1.1 Half bat (snap header)		Type No.	*A*	*B*	*C*			
		BD.1.1	102	102	65			
BD.1.2 Three-quarter bat		BD.1.2	159	102	65			
BD.1.3 Cuboid brick faced on bed surface		BD.1.3	215	102	65			

Table B.1 — Group BD. Bonding bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

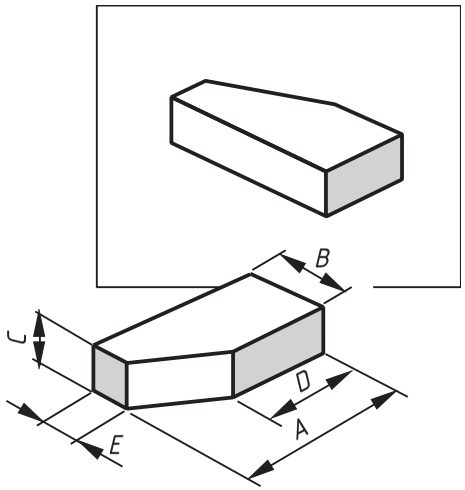
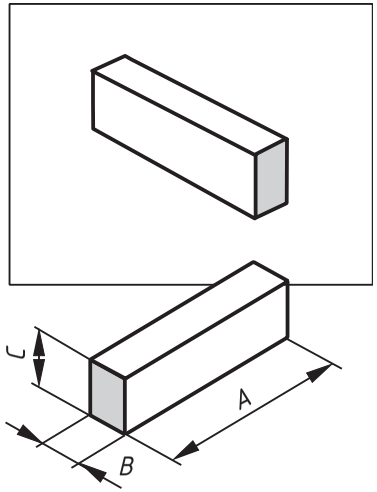
Type and description	Diagram	Dimensions							
BD.2 King closer (left and right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*E*		
		BD.2	215	102	65	102	46		
BD.3 Queen closer		BD.3	215	46	65				

Table B.1 — Group BD. Bonding bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

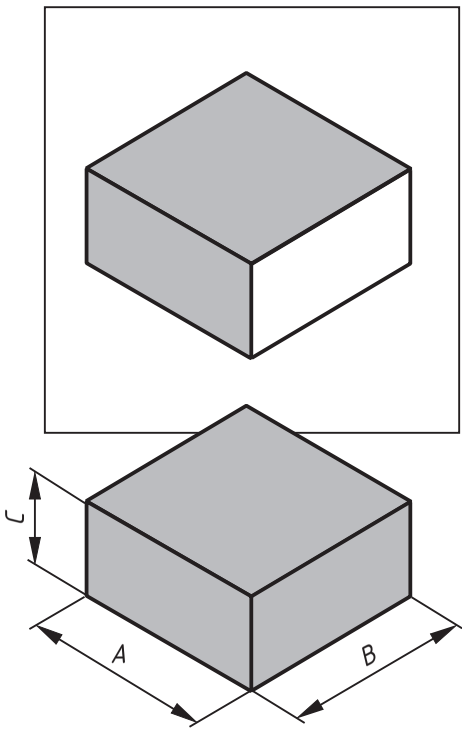
Type and description	Diagram	Dimensions							
BD.4 215 mm Stop end		Type No.	*A*	*B*	*C*				
		BD.4.1	215	159	102				
		BD.4.2	215	159	65				
		BD.4.3	215	215	102				
		BD.4.4	215	215	65				

Table B.2 — Group CP. Copings and cappings

(All dimensions are in millimetres unless otherwise indicated.)

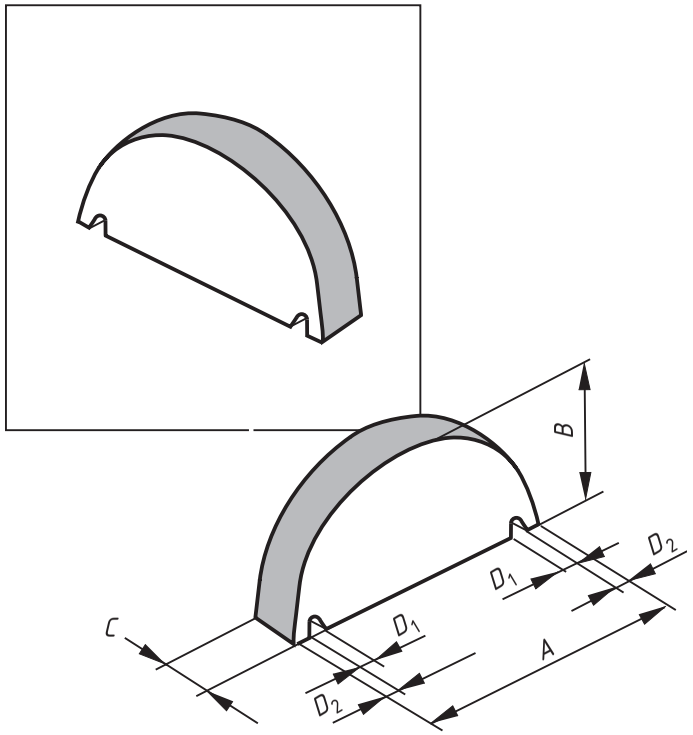
Type and description	Diagram	Dimensions						
CP.1.1 Half round coping		Type No.	*A*	*B*	*C*	D_1	D_2	
		CP.1.1	305	153	65	13	15	

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

(All dimensions are in millimetres unless otherwise indicated.)

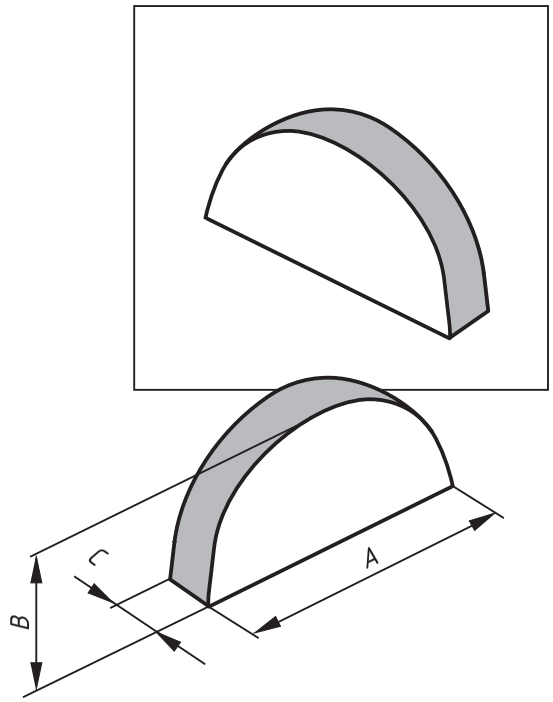
Type and description	Diagram	Dimensions						
CP.1.2 Half round coping		Type No.	*A*	*B*	*C*			
		CP.1.2	215	108	65			

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

(All dimensions are in millimetres unless otherwise indicated.)

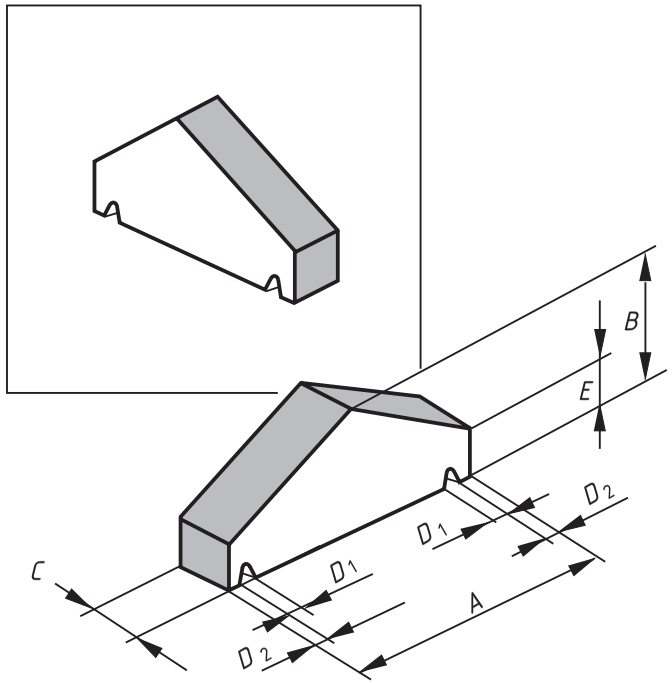
Type and description	Diagram	Dimensions						
CP.2.1 Saddleback coping		Type No.	*A*	*B*	*C*	D_1	D_2	*E*
		CP.2.1	305	153	65	13	15	50

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

(All dimensions are in millimetres unless otherwise indicated.)

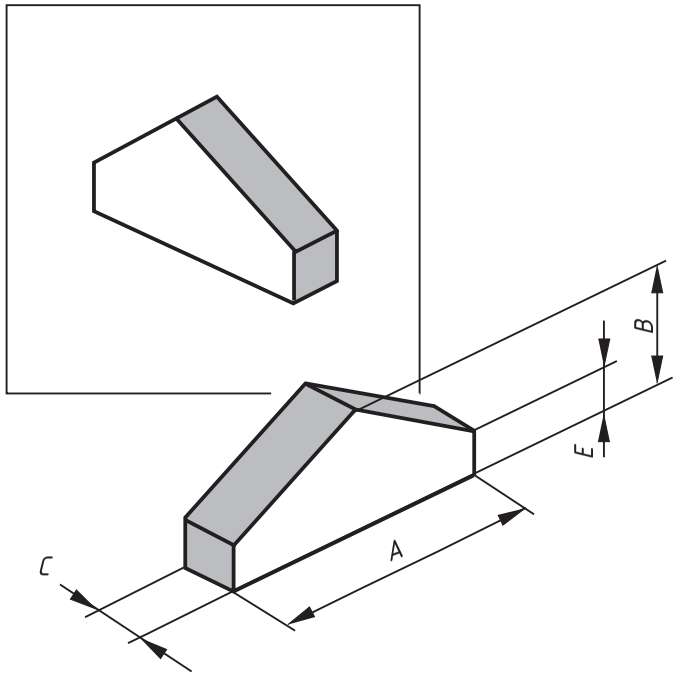
Type and description	Diagram	Dimensions						
CP.2.2 Saddleback coping		Type No.	*A*	*B*	*C*	*E*		
		CP.2.2	215	123	65	50		

Table B.3 — Group BN. Bullnose bricks

(All dimensions are in millimetres unless otherwise indicated.)

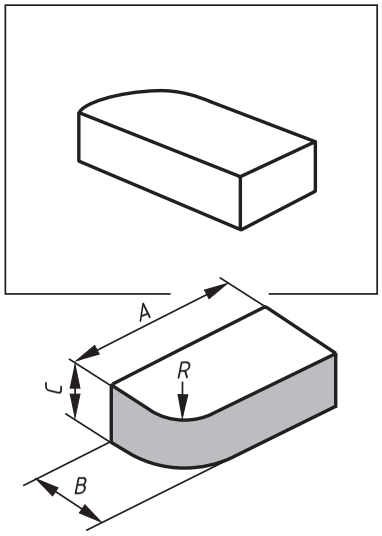
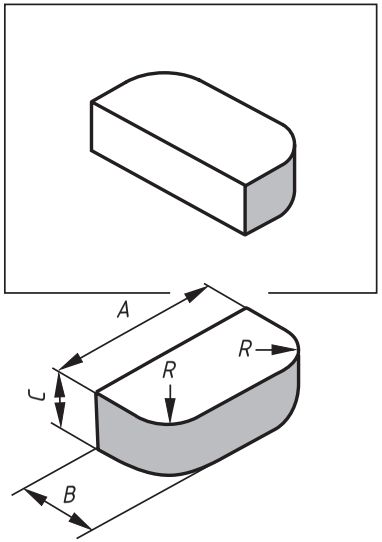
Type and description	Diagram	Dimensions							
BN.1 Single bullnose (left and right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*R*		
		BN.1.1	215	102	65	25	25		
		BN.1.2	215	102	65	25	51		
BN.2 Double bullnose		BN.2.1	215	102	65	25			
		BN.2.2	215	102	65	51			

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

(All dimensions are in millimetres unless otherwise indicated.)

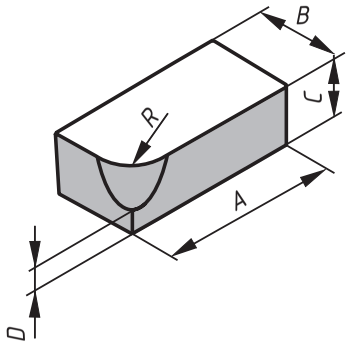
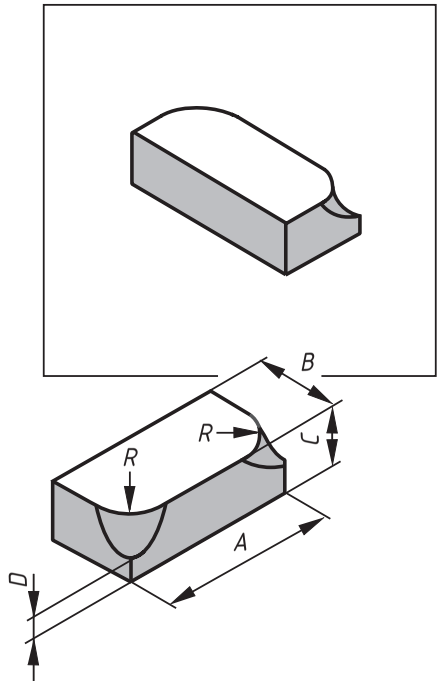
Type and description	Diagram	Dimensions						
BN.3 Single bullnose stop (left and right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*R*	
		BN.3.1	215	102	65	25	25	
		BN.3.2	215	102	65	25	51	
BN.4 Double bullnose stop		BN.4.1	215	102	65	25	25	
		BN.4.2	215	102	65	25	51	

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

(All dimensions are in millimetres unless otherwise indicated.)

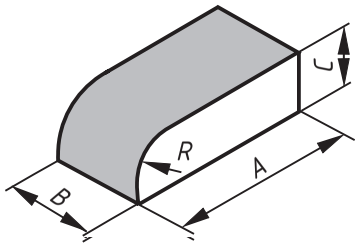
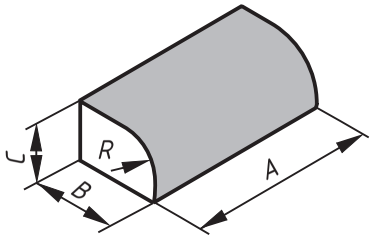
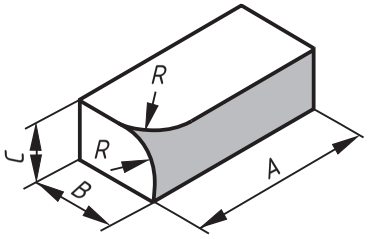
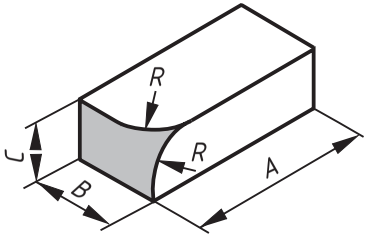
Type and description	Diagram	Dimensions							
BN.5 Single bullnose header on flat		Type No.	*A*	*B*	*C*	*R*			
		BN.5.1	215	102	65	25			
		BN.5.2	215	102	65	51			
BN.6 Single bullnose stretcher on flat		BN.6.1	215	102	65	25			
		BN.6.2	215	102	65	51			
BN.7 Single bullnose internal return, stretcher faced (left and right hand)	 LH shown	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)	 LH shown	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.)

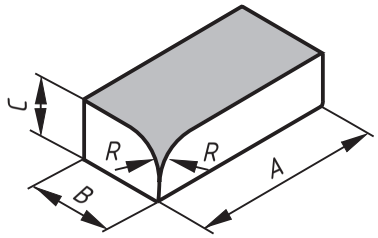
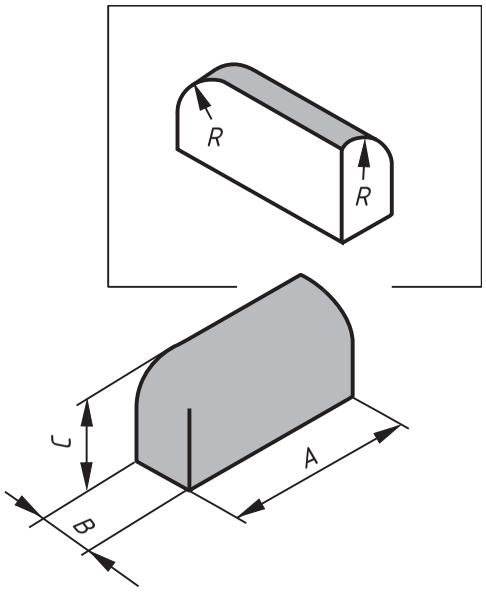
Type and description	Diagram	Dimensions						
BN.9 Bullnose internal return, flat faced (left and right hand)	 LH shown	Type No. BN.9.1 BN.9.2	*A* 215 215	*B* 102 102	*C* 65 65	*R* 25 51		
BN.10 Bullnose external return on edge (left and right hand)	 LH shown	BN.10.1 BN.10.2 BN.10.3 BN.10.4	215 215 215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

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

(All dimensions are in millimetres unless otherwise indicated.)

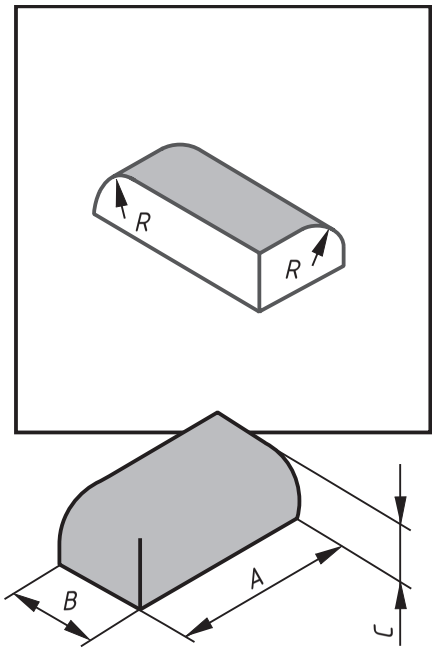
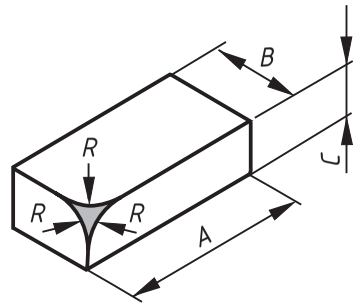
Type and description	Diagram	Dimensions						
BN.11 Bullnose external return on flat (left and right hand)	 LH shown	Type No.	*A*	*B*	*C*	*R*		
		BN.11.1	215	102	65	25		
		BN.11.2	215	102	65	51		
		BN.11.3	215	215	65	25		
		BN.11.4	215	215	65	51		
BN.12 Bullnose mitre (left and right hand)	 LH shown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

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

(All dimensions are in millimetres unless otherwise indicated.)

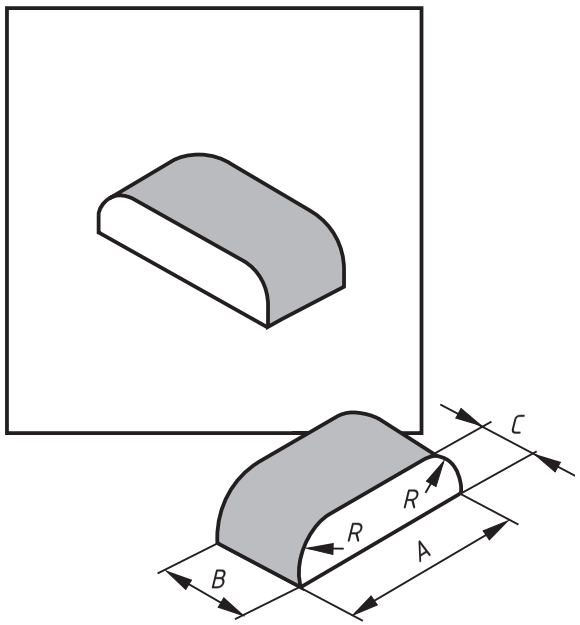
Type and description	Diagram	Dimensions						
BN.13 Bullnose double header on flat	 LH shown	Type No.	*A*	*B*	*C*	*R*		
		BN.13.1	215	102	65	25		
		BN.13.2	215	102	65	51		

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

(All dimensions are in millimetres unless otherwise indicated.)

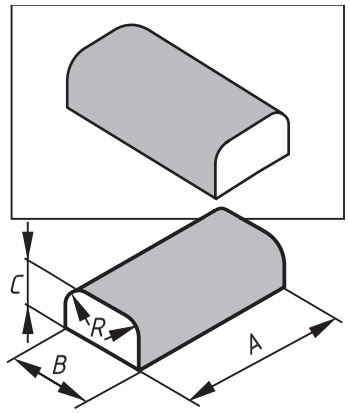
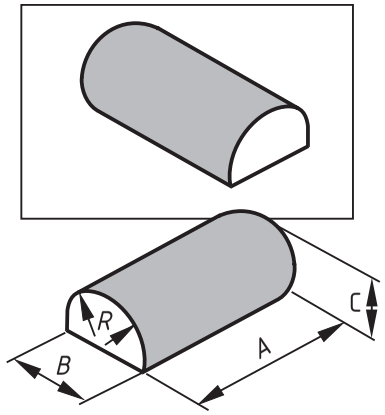
Type and description	Diagram	Dimensions						
BN.14 Bullnose double stretcher on flat	 LH shown	Type No.	*A*	*B*	*C*	*R*		
		BN.14.1	215	102	65	25		
BN.14 Bullnose double stretcher on flat		BN.14.2	215	102	65	51		

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

(All dimensions are in millimetres unless otherwise indicated.)

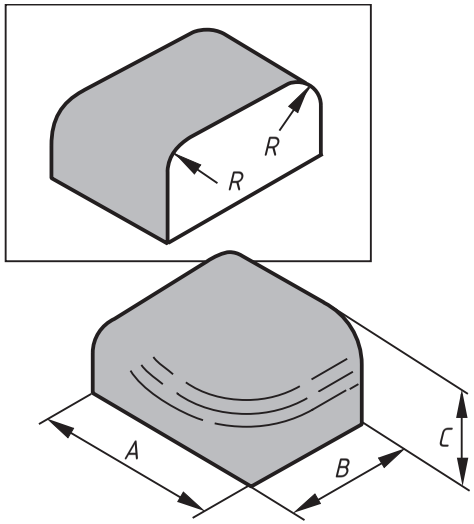
Type and description	Diagram	Dimensions						
BN.15 Stop end to double bullnose on edge and to bullnose double header on flat (square corners on bed)		Type No.	*A*	*B*	*C*	*R*		
		BN.15.1	215	159	102	25		
		BN.15.2	215	159	102	51		
		BN.15.3	215	215	102	25		
		BN.15.4	215	215	102	51		
		BN.15.5	215	159	65	25		
		BN.15.6	215	159	65	51		
		BN.15.7	215	215	65	25		
		BN.15.8	215	215	65	51		

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

(All dimensions are in millimetres unless otherwise indicated.)

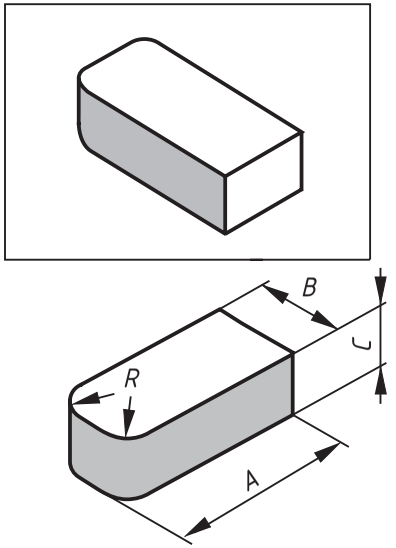
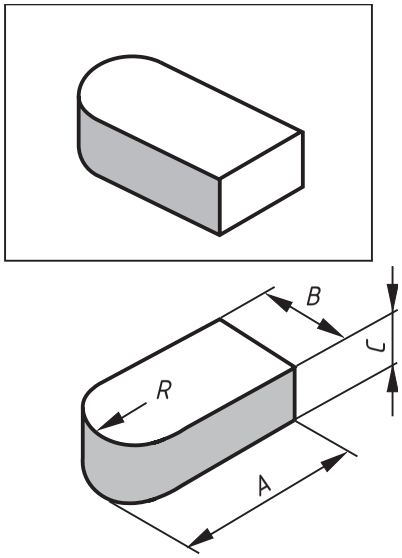
Type and description	Diagram	Dimensions							
BN.16 Cownose		Type No.	*A*	*B*	*C*	*R*			
		BN.16.1	215	102	65	25			
BN.16 Cownose		BN.16.2	215	102	65	51			

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

(All dimensions are in millimetres unless otherwise indicated.)

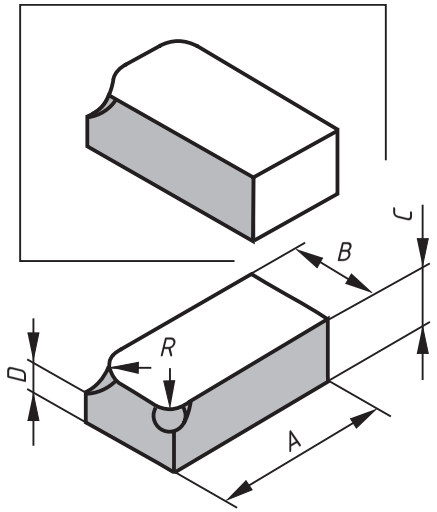
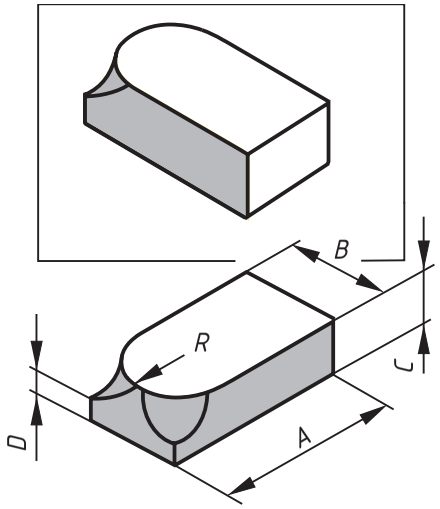
Type and description	Diagram	Dimensions						
BN.17 Cownose stop		Type No.	*A*	*B*	*C*	*D*	*R*	
		BN.17.1	215	102	65	25	25	
BN.17 Cownose stop		BN.17.2	215	102	65	25	51	

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

(All dimensions are in millimetres unless otherwise indicated.)

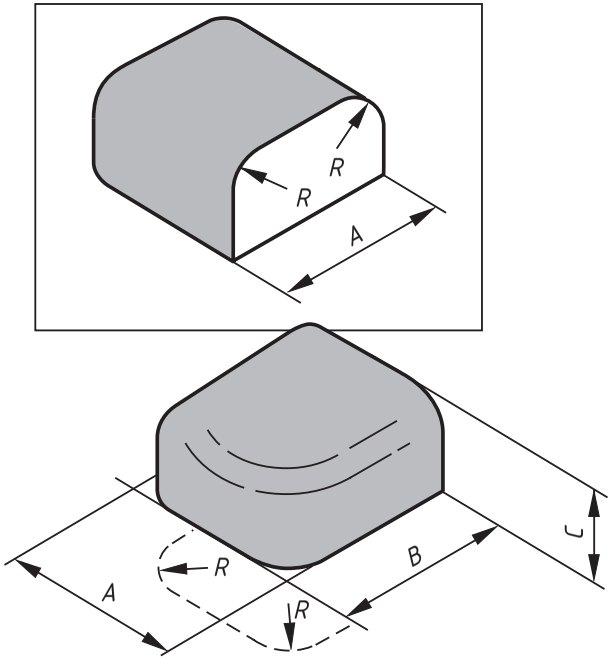
Type and description	Diagram	Dimensions							
BN.18 Stop end to double bullnose on edge and to bullnose double header on flat (rounded corners on bed)		Type No.	*A*	*B*	*C*	*R*			
		BN.18.1	215	159	102	25			
		BN.18.2	215	159	102	51			
		BN.18.3	215	215	102	25			
		BN.18.4	215	215	102	51			
		BN.18.5	215	159	65	25			
		BN.18.6	215	159	65	51			
		BN.18.7	215	215	65	25			
		BN.18.8	215	215	65	51			

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

(All dimensions are in millimetres unless otherwise indicated.)

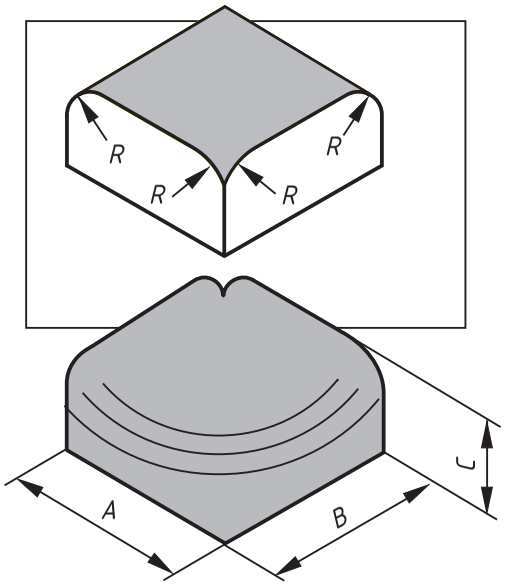
Type and description	Diagram	Dimensions						
BN.19 External return to double bullnose on edge and to bullnose double header on flat (square corners on bed)		Type No.	*A*	*B*	*C*	*R*		
		BN.19.1	215	215	102	25		
		BN.19.2	215	215	102	51		
		BN.19.3	215	215	65	25		
		BN.19.4	215	215	65	51		

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

(All dimensions are in millimetres unless otherwise indicated.)

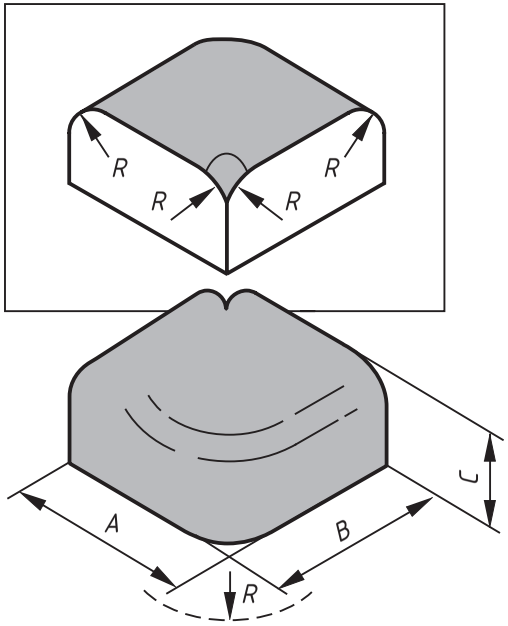
Type and description	Diagram	Dimensions						
BN.20 External return to double bullnose on edge and to bullnose double header on flat (rounded corners on bed)		Type No.	*A*	*B*	*C*	*R*		
		BN.20.1	215	215	102	25		
		BN.20.2	215	215	102	51		
		BN.20.3	215	215	65	25		
		BN.20.4	215	215	65	51		

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

(All dimensions are in millimetres unless otherwise indicated.)

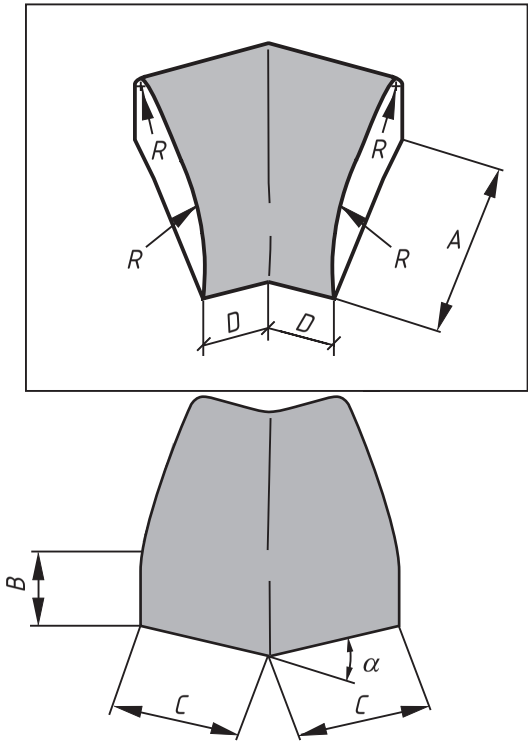
Type and description	Diagram	Dimensions						
BN.21 Double bullnose external angle to double bullnose on edge and to bullnose double header on flat		Type No.	*A*	*B*	*C*	*D*	*R*	*α*
		BN.21.1	215	102	159	101	25	30°
		BN.21.2	215	102	159	101	51	30°
		BN.21.3	215	65	159	101	25	30°
		BN.21.4	215	65	159	101	51	30°
		BN.21.5	215	102	159	70	25	45°
		BN.21.6	215	102	159	70	51	45°
		BN.21.7	215	65	159	70	25	45°
		BN.21.8	215	65	159	70	51	45°
		BN.21.9	215	102	159	35	25	60°
		BN.21.10	215	102	159	35	51	60°
		BN.21.11	215	65	159	35	25	60°
		BN.21.12	215	65	159	35	51	60°
NOTE Not all manufacturers produce this brick.								

Table B.4 — Group AN. Angle and cant bricks

(All dimensions are in millimetres unless otherwise indicated.)

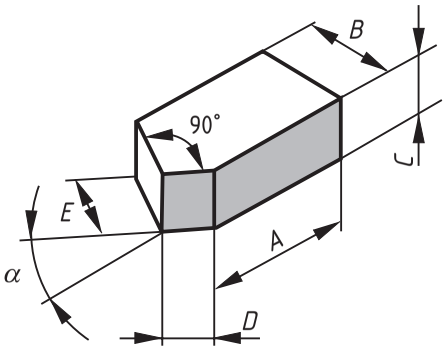
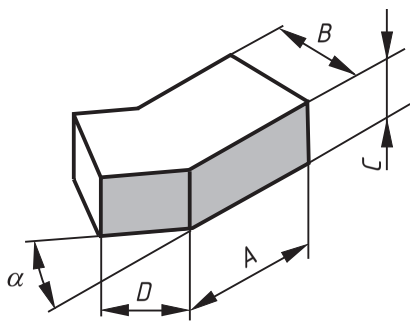
Type and description	Diagram	Dimensions						
AN.1 Squint (left or right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*E*	*α*
		AN.1.1	164	102	65	51	89	30°
		AN.1.2	164	102	65	51	94	45°
		AN.1.3	164	102	65	51	117	60°
NOTE See Annex C for application to appropriate bonding patterns.								

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

Type and description	Diagram	Dimensions						
AN.2 External angle (left or right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*α*	
		AN.2.1	159[a]	102	65	102	30°	
		AN.2.2	159[a]	102	65	102	45°	
		AN.2.3	159[a]	102	65	102	60°	
		AN.2.4	215[b]	102	65	102	30°	
		AN.2.5	215[b]	102	65	102	45°	
		AN.2.6	215[b]	102	65	102	60°	

NOTE 1 Some manufacturers might be unable to produce AN.2.4, AN.2.5 and AN.2.6.

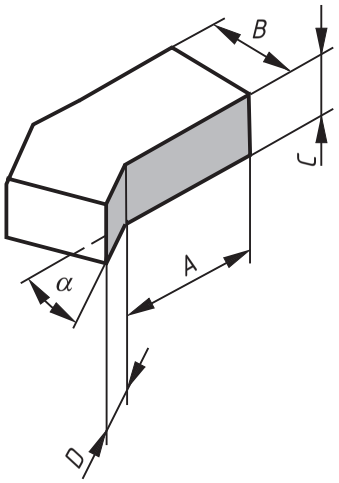
NOTE 2 See Annex C for application to appropriate bonding patterns.

[a] Suitable for quarter bond without cutting. See Annex C.

[b] Suitable for half bond without cutting. See Annex C.

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

Type and description	Diagram	Dimensions						
AN.3 Internal angle (dog leg) (left or right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*α*	
		AN.3.1	164[a]	102	65	51	30°	
		AN.3.2	164[a]	102	65	51	45°	
		AN.3.3	164[a]	102	65	51	60°	
		AN.3.4	159[b]	102	65	102	30°	
		AN.3.5	159[b]	102	65	102	45°	
		AN.3.6	159[b]	102	65	102	60°	
		AN.3.7	215[b]	102	65	102	30°	
		AN.3.8	215[b]	102	65	102	45°	
		AN.3.9	215[b]	102	65	102	60°	

NOTE 1 Some manufacturers might be unable to produce AN.3.7, AN.3.8 and AN.3.9.

NOTE 2 See Annex B for application to appropriate bonding patterns.

[a] Suitable for quarter bond without cutting. See Annex C.

[b] Suitable for half bond without cutting. See Annex C.

Table B.4 — Group AN. Angle and cant bricks ((*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

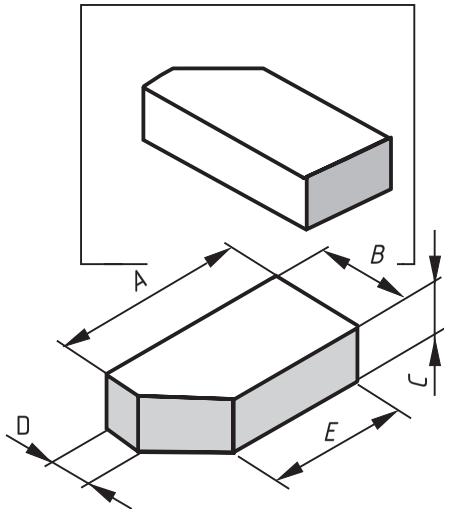
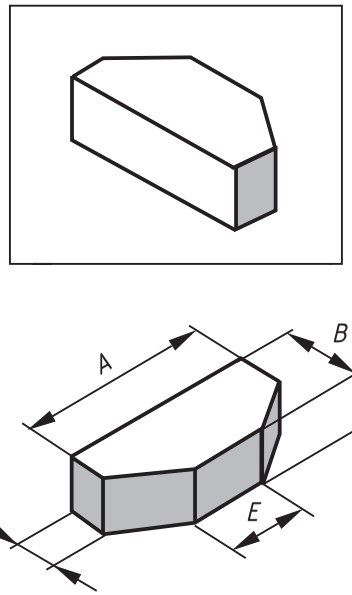
Type and description	Diagram	Dimensions							
AN.5 Single cant (left or right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*E*		
		AN.5.1	215	102	65	46	159		
		AN.5.2	215	102	65	60	173		
AN.6 Double cant		AN.6.1	215	102	65	46	103		
		AN.6.2	215	102	65	60	131		

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

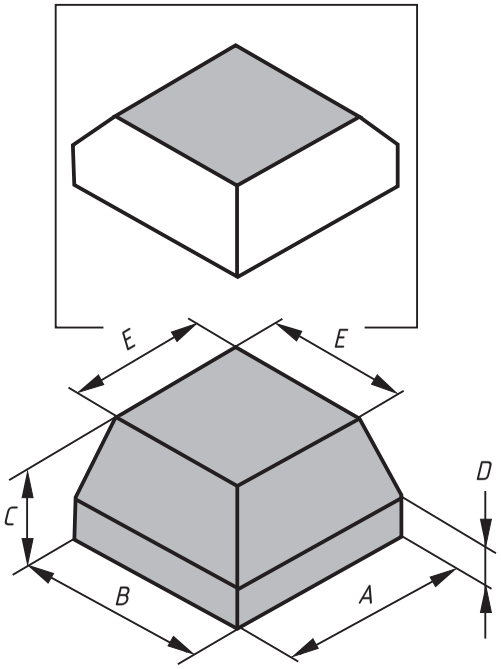
Type and description	Diagram	Dimensions						
AN.7 Single cant external return		Type No.	*A*	*B*	*C*	*D*	*E*		
		AN.7.1	215	215	102	46	159		
		AN.7.2	215	215	102	60	173		

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

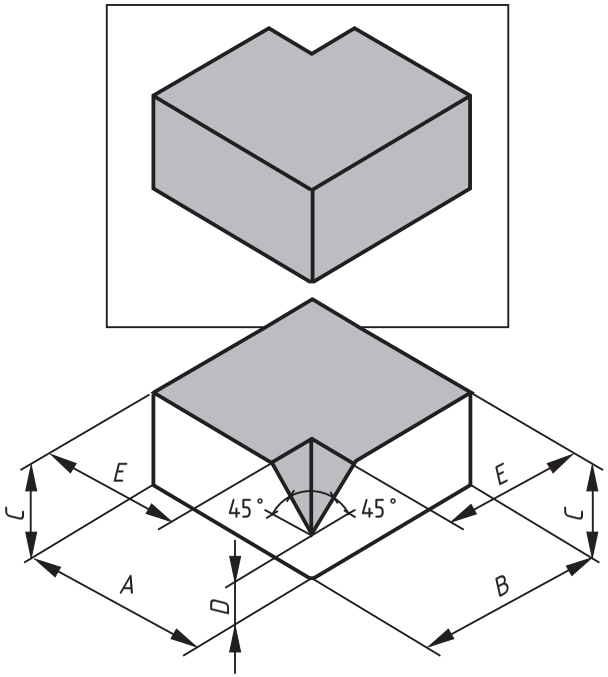
Type and description	Diagram	Dimensions						
AN.8 Single cant internal return with internal mitre (square external corner on bed)		Type No.	*A*	*B*	*C*	*D*	*E*		
		AN.8.1	215	215	102	46	159		
		AN.8.2	215	215	102	60	173		

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

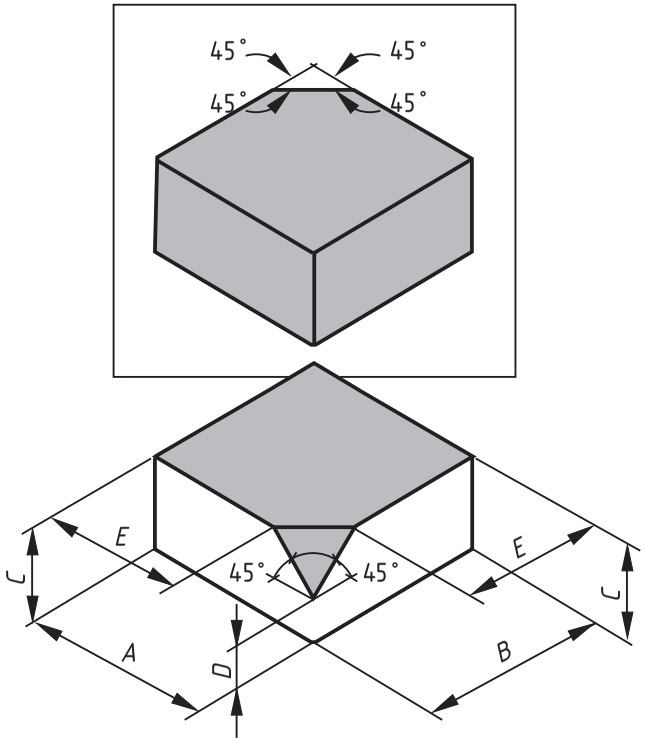
Type and description	Diagram	Dimensions						
AN.9 Single cant internal return with internal slope (square external corner on bed)		Type No.	*A*	*B*	*C*	*D*	*E*		
		AN.9.1	215	215	102	46	159		
		AN.9.2	215	215	102	60	173		

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

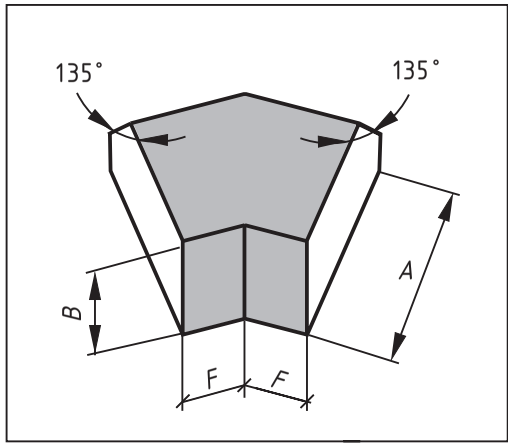
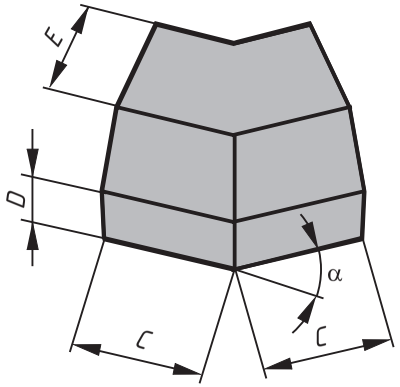
Type and description	Diagram	Dimensions						
AN.10 Single cant external angle	 	Type No.	*A*	*B*	*C*	*D*	*E*	*F*	*α*
		AN.10.1	215	102	159	46	159	101	30°
		AN.10.2	215	102	159	60	173	101	30°
		AN.10.3	215	102	159	46	159	70	45°
		AN.10.4	215	102	159	60	173	70	45°
		AN.10.5	215	102	159	46	159	35	60°
		AN.10.6	215	102	159	60	173	35	60°
NOTE Not all manufacturers produce this brick.									

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

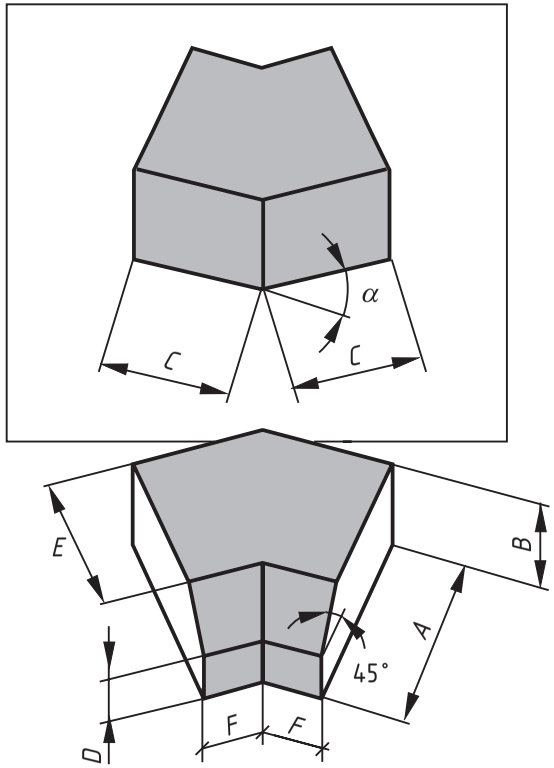
Type and description	Diagram	Dimensions							
AN.11 Single cant internal angle		Type No.	*A*	*B*	*C*	*D*	*E*	*F*	*α*
		AN.11.1	215	102	159	46	159	101	30°
		AN.11.2	215	102	159	60	173	101	30°
		AN.11.3	215	102	159	46	159	70	45°
		AN.11.4	215	102	159	60	173	70	45°
		AN.11.5	215	102	159	46	159	35	60°
		AN.11.6	215	102	159	60	173	35	60°
NOTE Not all manufacturers produce this brick.									

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

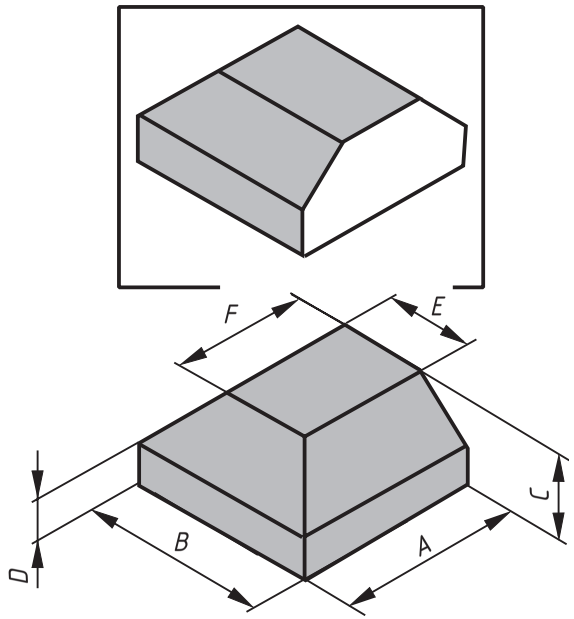
Type and description	Diagram	Dimensions						
AN.12 Double cant stop end (square corners on bed)		Type No.	*A*	*B*	*C*	*D*	*E*	*F*
		AN.12.1	215	215	102	46	103	159
		AN.12.2	215	215	102	60	131	173

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

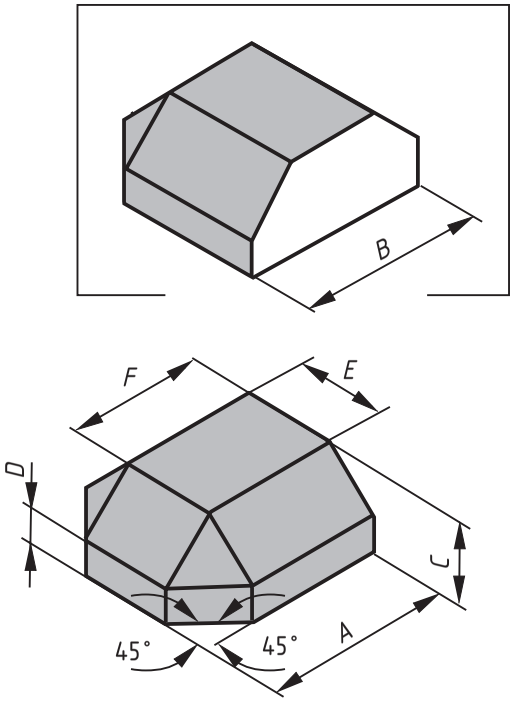
Type and description	Diagram	Dimensions							
AN.13 Double cant stop end (canted corners on bed)		Type No.	*A*	*B*	*C*	*D*	*E*	*F*	
		AN.13.1	215	215	102	46	103	159	
		AN.13.2	215	215	102	60	131	173	

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

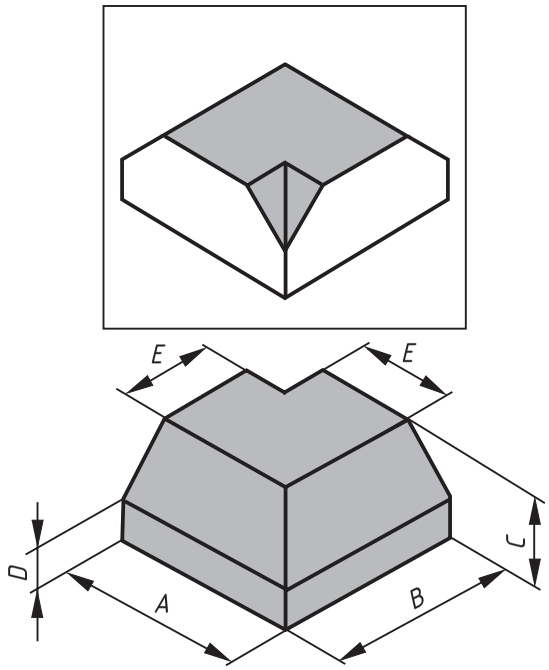
Type and description	Diagram	Dimensions							
AN.14 Double cant external return with internal mitre (square corners on bed)		Type No.	*A*	*B*	*C*	*D*	*E*		
		AN.14.1	215	215	102	46	103		
		AN.14.2	215	215	102	60	131		

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

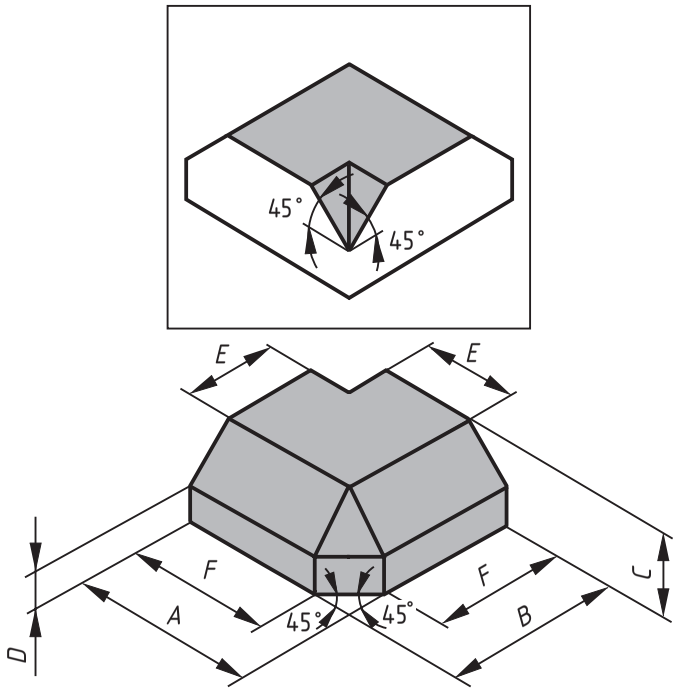
Type and description	Diagram	Dimensions							
AN.15 Double cant external return with internal mitre (canted corners on bed)		Type No.	*A*	*B*	*C*	*D*	*E*	*F*	
		AN.15.1	215	215	102	46	103	159	
		AN.15.2	215	215	102	60	131	173	

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

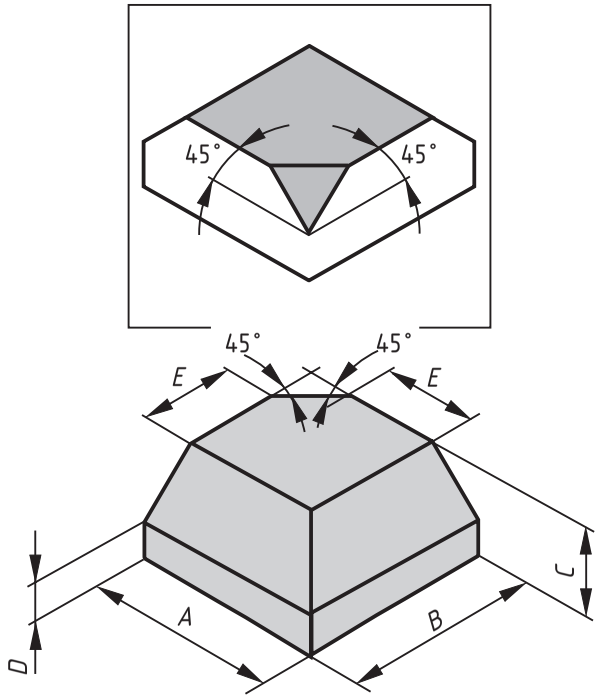
Type and description	Diagram	Dimensions							
AN.16 Double cant external return with internal slope (square corners on bed)		Type No.	*A*	*B*	*C*	*D*	*E*		
		AN.16.1	215	215	102	46	103		
		AN.16.2	215	215	102	60	131		

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

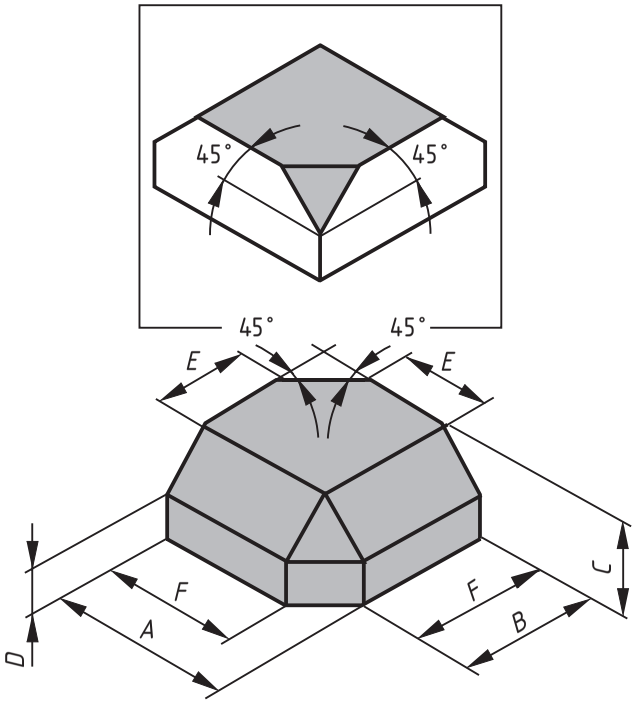
Type and description	Diagram	Dimensions							
AN.17 Double cant external return with internal slope (canted single corners on bed)		Type No.	*A*	*B*	*C*	*D*	*E*	*F*	
		AN.17.1	215	215	102	46	103	159	
		AN.17.2	215	215	102	60	131	173	

Table B.4 — Group AN. Angle and cant bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

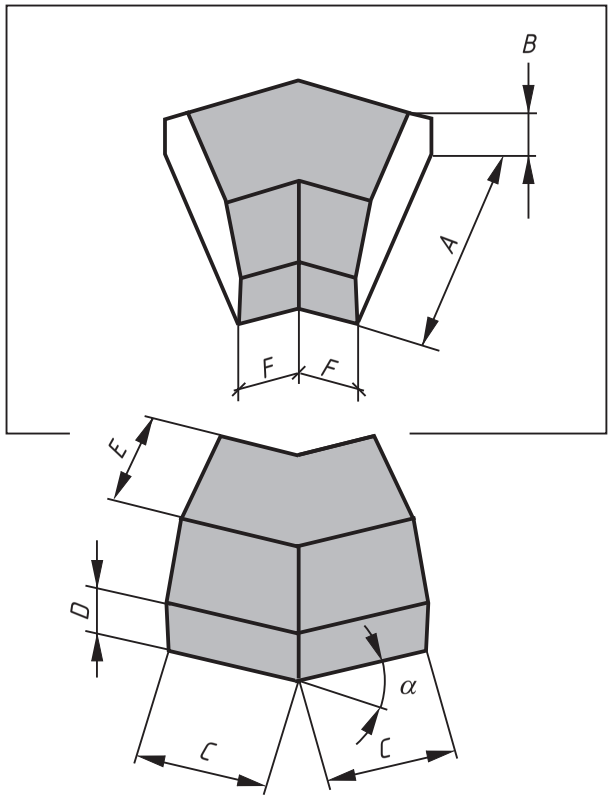
Type and description	Diagram	Dimensions						
AN.18 Double cant angle		Type No.	*A*	*B*	*C*	*D*	*E*	*F*	*α*
		AN.18.1	215	102	159	46	103	101	30°
		AN.18.2	215	102	159	60	131	101	30°
		AN.18.3	215	102	159	46	103	70	45°
		AN.18.4	215	102	159	60	131	70	45°
		AN.18.5	215	102	159	46	103	35	60°
		AN.18.6	215	102	159	60	131	35	60°
NOTE Not all manufacturers produce this brick.									

Table B.5 — Group PL. Plinth bricks

(All dimensions are in millimetres unless otherwise indicated.)

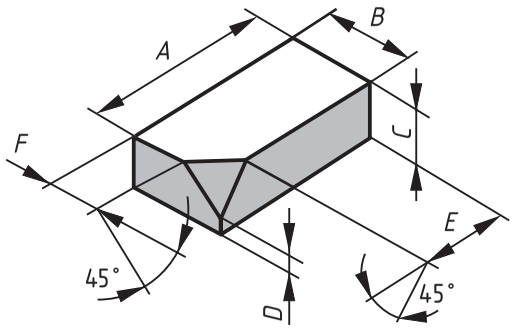
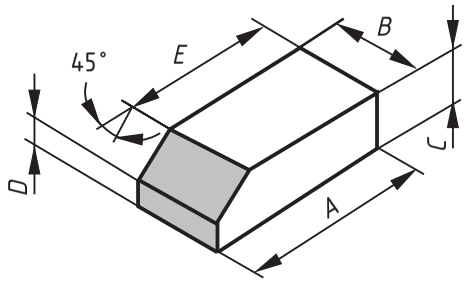
Type and description	Diagram	Dimensions						
PL.1 Plinth stop or cant stop (left or right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*E*	*F*
		PL.1.1	215	102	65	9	159	46
		PL.1.2	215	102	65	23	173	60
PL.2 Plinth header		PL.2.1	215	102	65	9	159	
		PL.2.2	215	102	65	23	173	
Designers should specify dimension *D* as 23 mm rather than 9 mm as it is not always possible to provide an acceptable appearance when using the smaller dimension especially with some bricks made by the soft mud process.								

Table B.5 — Group PL. Plinth bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

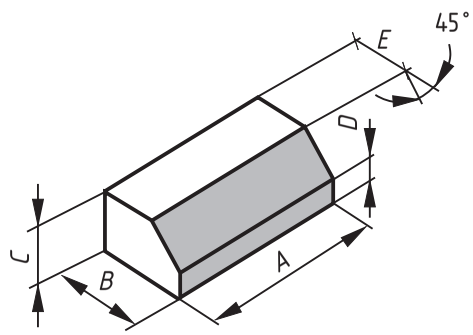
Type and description	Diagram	Dimensions						
PL.3 Plinth stretcher		Type No.	*A*	*B*	*C*	*D*	*E*		
		PL.3.1	215	102	65	9	46		
		PL.3.2	215	102	65	23	60		
Designers should specify dimension *D* as 23 mm rather than 9 mm as it is not always possible to provide an acceptable appearance when using the smaller dimension especially with some bricks made by the soft mud process.									

Table B.5 — Group PL. Plinth bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

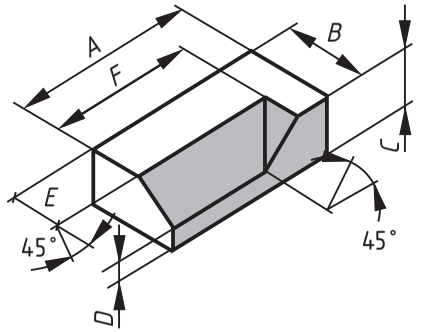
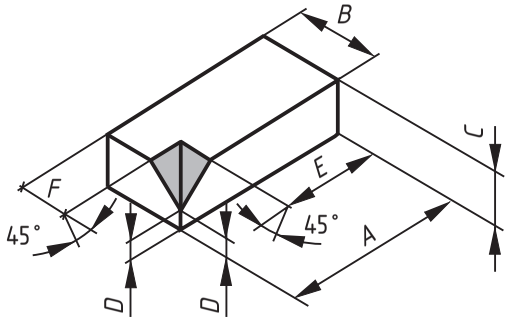
Type and description	Diagram	Dimensions						
PL.4 Plinth internal return (long) (left or right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*E*	*F*
		PL.4.1	215	102	65	9	46	169
		PL.4.2	215	102	65	23	60	155
PL.5 Plinth internal return (short) (left or right hand)	 LH shown	PL.5.1	215	102	65	9	159	46
		PL.5.2	215	102	65	23	173	60
Designers should specify dimension *D* as 23 mm rather than 9 mm as it is not always possible to provide an acceptable appearance when using the smaller dimension especially with some bricks made by the soft mud process.								

Table B.5 — Group PL. Plinth bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

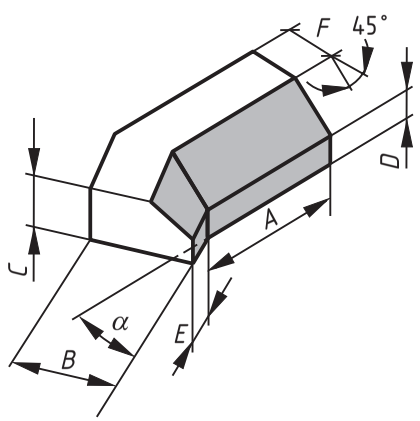
Type and description	Diagram	Dimensions							
PL.6 Plinth internal angle (left or right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*E*	*F*	*α*
		PL.6.1	164[b]	102	65	9	51	46	30°
		PL.6.2	164[b]	102	65	23	51	60	30°
		PL.6.3	164[b]	102	65	9	51	46	45°
		PL.6.4	164[b]	102	65	23	51	60	45°
		PL.6.5	164[b]	102	65	9	51	46	60°
		PL.6.6	164[b]	102	65	23	51	60	60°
		PL.6.7	159[a]	102	65	9	102	46	30°
		PL.6.8	159[a]	102	65	23	102	60	30°
		PL.6.9	159[a]	102	65	9	102	46	45°
		PL.6.10	159[a]	102	65	23	102	60	45°
		PL.6.11	159[a]	102	65	9	102	46	60°
		PL.6.12	159[a]	102	65	23	102	60	60°
		PL.6.13	215[b]	102	65	9	102	46	30°
		PL.6.14	215[b]	102	65	23	102	60	30°
		PL.6.15	215[b]	102	65	9	102	46	45°
		PL.6.16	215[b]	102	65	23	102	60	45°
		PL.6.17	215[b]	102	65	9	102	46	60°
		PL.6.18	215[b]	102	65	23	102	60	60°
Designers should specify dimension *D* as 23 mm rather than 9 mm as it is not always possible to provide an acceptable appearance when using the smaller dimension especially with some bricks made by the soft mud process. NOTE Some bricks might not be available with *A* = 215.									
[a] Suitable for quarter bond without cutting. See Annex C. [b] Suitable for half bond without cutting. See Annex C.									

Table B.5 — Group PL. Plinth bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

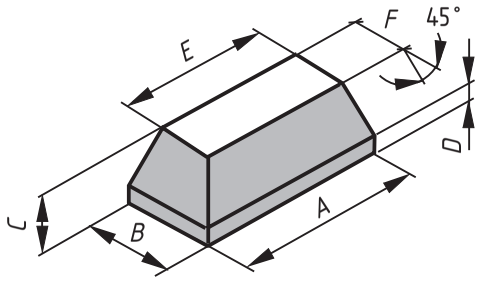
Type and description	Diagram	Dimensions						
PL.7 Plinth external return (left or right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*E*	*F*
		PL.7.1	215	102	65	9	159	46
		PL.7.2	215	102	65	23	173	60
Designers should specify dimension *D* as 23 mm rather than 9 mm as it is not always possible to provide an acceptable appearance when using the smaller dimension especially with some bricks made by the soft mud process.								

Table B.5 — Group PL. Plinth bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

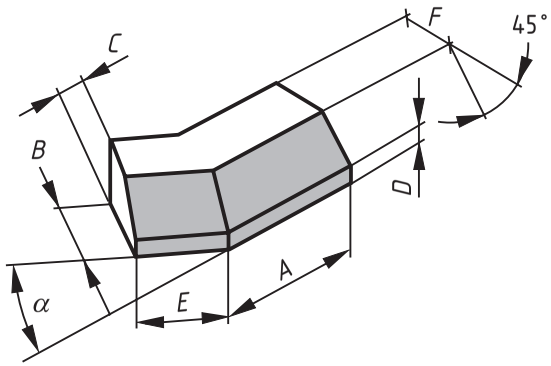
Type and description	Diagram	Dimensions							
PL.8 Plinth external angle (left or right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*E*	*F*	*α*
		PL.8.1	159[a]	102	65	9	102	46	30°
		PL.8.2	159[a]	102	65	23	102	60	30°
		PL.8.3	159[a]	102	65	9	102	46	45°
		PL.8.4	159[a]	102	65	23	102	60	45°
		PL.8.5	159[a]	102	65	9	102	46	60°
		PL.8.6	159[a]	102	65	23	102	60	60°
		PL.8.7	215[b]	102	65	9	102	46	30°
		PL.8.8	215[b]	102	65	23	102	60	30°
		PL.8.9	215[b]	102	65	9	102	46	45°
		PL.8.10	215[b]	102	65	23	102	60	45°
		PL.8.11	215[b]	102	65	9	102	46	60°
		PL.8.12	215[b]	102	65	23	102	60	60°
Designers should specify dimension *D* as 23 mm rather than 9 mm as it is not always possible to provide an acceptable appearance when using the smaller dimension especially with some bricks made by the soft mud process. NOTE Some bricks might not be available with *A* = 215.									
[a] Suitable for quarter bond without cutting. See Annex C. [b] Suitable for half bond without cutting. See Annex C.									

Table B.5 — Group PL. Plinth bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

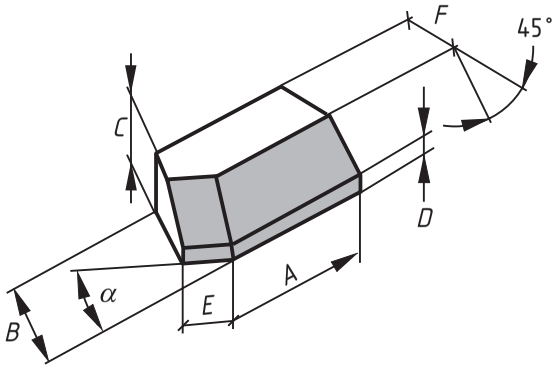
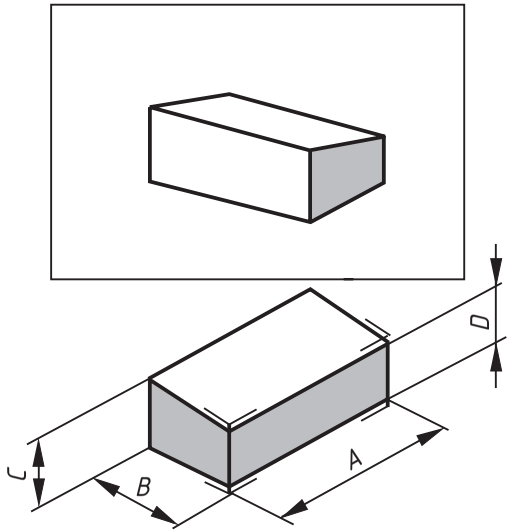
Type and description	Diagram	Dimensions						
PL.9 Plinth squint (left or right hand)	 LH shown	Type No.	*A*	*B*	*C*	*D*	*E*	*F*	*α*
		PL.9.1	164	102	65	9	51	46	30°
		PL.9.2	164	102	65	23	51	60	30°
		PL.9.3	164	102	65	9	51	46	45°
		PL.9.4	164	102	65	23	51	60	45°
		PL.9.5	164	102	65	9	51	46	60°
		PL.9.6	164	102	65	23	51	60	60°
Designers should specify dimension *D* as 23 mm rather than 9 mm as it is not always possible to provide an acceptable appearance when using the smaller dimension especially with some bricks made by the soft mud process.									

Table B.6 — Group AR. Arch bricks

(All dimensions are in millimetres unless otherwise indicated.)

Type and description	Diagram	Details						
AR.1 Tapered header		Type No.	Unit dimensions				Ideal span[a]		No. of bricks in semi-circle[b]
			A	*B*	*C*	*D*	Dimension	No. of whole bricks	
		AR.1.1	215	102	75	59	910	4	20 or 21
		AR.1.2	215	102	75	64	1 360	6	28 or 29
		AR.1.3	215	102	75	66	1 810	8	36 or 37
		AR.1.4	215	102	75	69	2 710	12	53 or 54

NOTE 1 Some types of pressed bricks are available with a single taper only. The taper is such that dimension *D* is the same as for the double tapered brick shown in the diagram above.

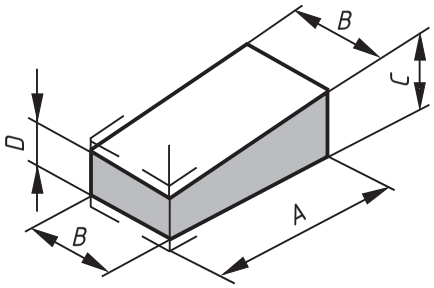
NOTE 2 See **3.4**b).

[a] It is possible to use AR.1 tapered headers for spans other than the "ideal", ranging from 800 mm to 3 000 mm in half-brick increments, by varying the number of bricks, providing the slight tapering of the joints is aesthetically acceptable. The taper may vary between 0.9 mm and 1.6 mm for the smallest span to less than 1 mm for the larger spans.

[b] Parallel joints of acceptable width are achieved using either of the alternative numbers of bricks in the semi-circle if the bricks conform to the work sizes. The actual size of bricks normally varies slightly from the work size. If the bricks on site are larger, then the smaller number of bricks in the semi-circle would be more appropriate and vice versa.

Table B.6 — Group AR. Arch bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

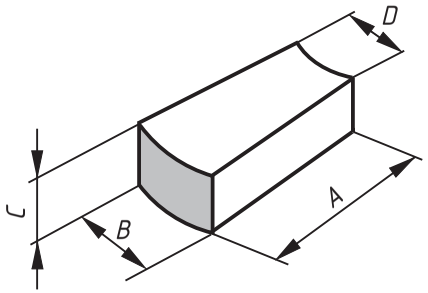
Type and description	Diagram	Details						
AR.2 Tapered stretcher		Type No.	Unit dimensions				Ideal span (see note 2)		No. of bricks in semi-circle
			A	*B*	*C*	*D*	Dimension	No. of whole bricks	
		AR.2.1	215	102	75	48	910	4	25
		AR.2.2	215	102	75	55	1 360	6	33
		AR.2.3	215	102	75	58	1 810	8	41
		AR.2.4	215	102	75	63	2 710	12	58

NOTE 1 Some types of pressed bricks are available witha single taper only. The taper is such that dimension *D* is the same as for the double tapered brick shown in the diagram above.

NOTE 2 This format is not as versatile in application as the AR.1 series because the longer voussoir joint accentuates splays. Tolerance allowances restrict versatility further.

Table B.7 — Group RD. Radial bricks

(All dimensions are in millimetres unless otherwise indicated.)

Type and description	Diagram	Details							
RD.1 Radial header		Type	*A*	*B*[a]	*C*	*D*[a]	Ideal radius		No. of bricks in quadrant
							Outer	Inner	
		RD.1.1	215	108	65	52	450	235	6
		RD.1.2	215	108	65	70	675	460	9
		RD.1.3	215	108	65	80	900	685	12
		RD.1.4	215	108	65	89	1 350	1 135	18
		RD.1.5	215	108	65	97	2 250	2 035	30
		RD.1.6	215	108	65	103	5 400	5 185	72

NOTE 1 These bricks are intended for one brick thick walls in header bond.

NOTE 2 $B = \frac{A - j}{2}$

where

A is dimension *A* in RD.2 series in Table 7, i.e. 226 mm

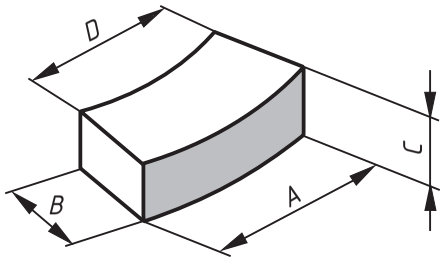
j is the joint thickness, i.e. 10 mm

NOTE 3 Bonding. RD.1 and RD.2 types cannot be used together in the same one-brick-thick wall either in English or Flemish Bonds, to produce ideal alignment of the perpends on the concave face, except when the outside radius exceeds 3 m.

[a] Dimensions *B* and *D* in types RD.1 are segmental lengths.

Table B.7 — Group RD. Radial bricks (*continued*)

(All dimensions are in millimetres unless otherwise indicated.)

Type and description	Diagram	Details						
RD.2 Radial stretcher		Type	A^a	B	C	D^a	Ideal outer radius	No. of bricks in quadrant
		RD.2.1	226	102	65	172	450	3
		RD.2.2	226	102	65	190	675	4½
		RD.2.3	226	102	65	199	900	6
		RD.2.4	226	102	65	208	1 350	9
		RD.2.5	226	102	65	215	2 250	15
		RD.2.6	226	102	65	221	5 400	36

NOTE 1 These bricks are intended for half-brick-thick leaf in stretcher bond.

NOTE 2 The surface dimensioned *D* may be flat or concave depending on the manufacturing process.

NOTE 3 Dimension *A* has been selected to be close to 215 mm (work size of standard brick) whilst giving whole or half numbers of bricks in quadrants with convex face radii of multiples of 225 mm (co-ordinating size of standard brick) and 300 mm (preferred planning module).

NOTE 4 Bonding. RD.1 and RD.2 types cannot be used together in the same one-brick-thick wall either in English or Flemish Bonds, to produce ideal alignment of the perpends on the concave face, except when the outside radius exceeds 3 m.

[a] Dimensions *A* and *D* in types RD.2 are segmental lengths.

Table B.8 — Group SL. Brick slips

(All dimensions are in millimetres unless otherwise indicated.)

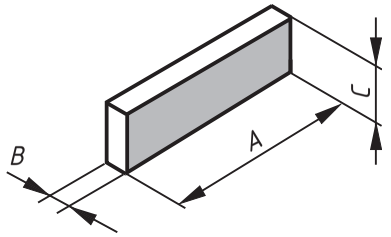
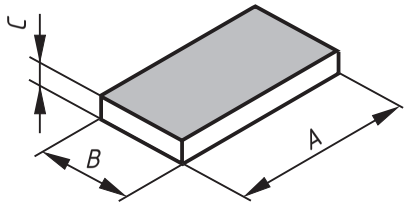
Type and description	Diagram	Dimensions						
SL.1 Brick face slip		Type No.	*A*	*B*	*C*			
		SL.1.1	215	25	65			
		SL.1.2	215	30	65			
		SL.1.3	215	40	65			
		SL.1.4	215	50	65			
SL.2 Brick bed slip		SL.2	215	102	25			

Table B.9 — Group SD. Soldier bricks

(All dimensions are in millimetres unless otherwise indicated.)

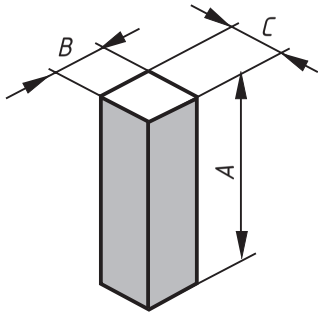
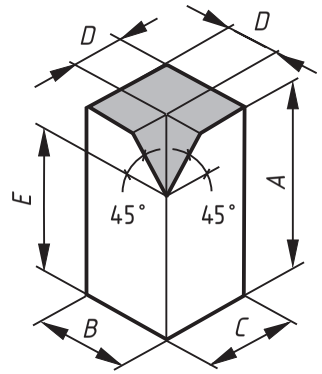
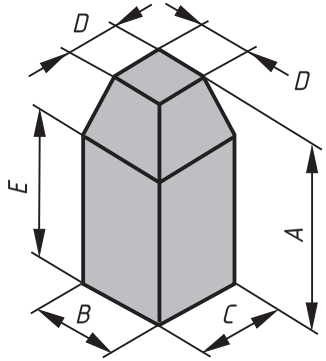
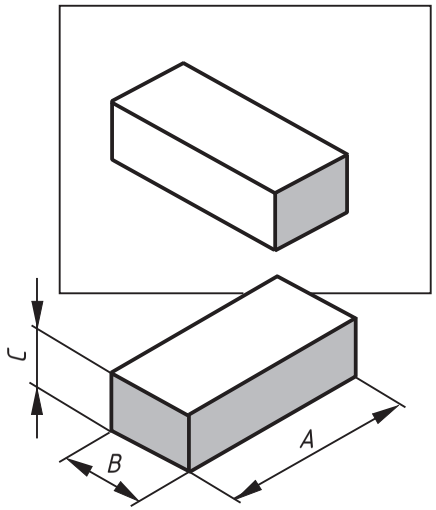
Type and description	Diagram	Dimensions							
SD.1 Soldier return		Type No.	*A*	*B*	*C*	*D*	*E*		
		SD.1.1	215	65	65				
		SD.1.2	215	102	102				
SD.2 Internal soldier return to single cant on end		SD.2.1	215	102	102	46	159		
		SD.2.2	215	102	102	60	173		
SD.3 External soldier return to single cant on end		SD.3.1	215	102	102	46	159		
		SD.3.2	215	102	102	60	173		

Table B.10 — Group CB. Cuboid bricks

(All dimensions are in millimetres unless otherwise indicated.)

Type and description	Diagram	Dimensions						
CB.1 Cuboid bricks		Type No.	*A*	*B*	*C*			
		CB.1.1	190	90	65			
		CB.1.2	190	90	90			
		CB.1.3	215	102	50			
		CB.1.4	215	102	53			
		CB.1.5	215	102	65			
		CB.1.6	215	102	73			
		CB.1.7	215	102	80			
		CB.1.8	233	112	73			
		CB.1.9	233	112	80			
		CB.1.10	290	90	65			
		CB.1.11	290	90	90			

NOTE 1 Not all manufacturers produce these bricks with both headers faced.

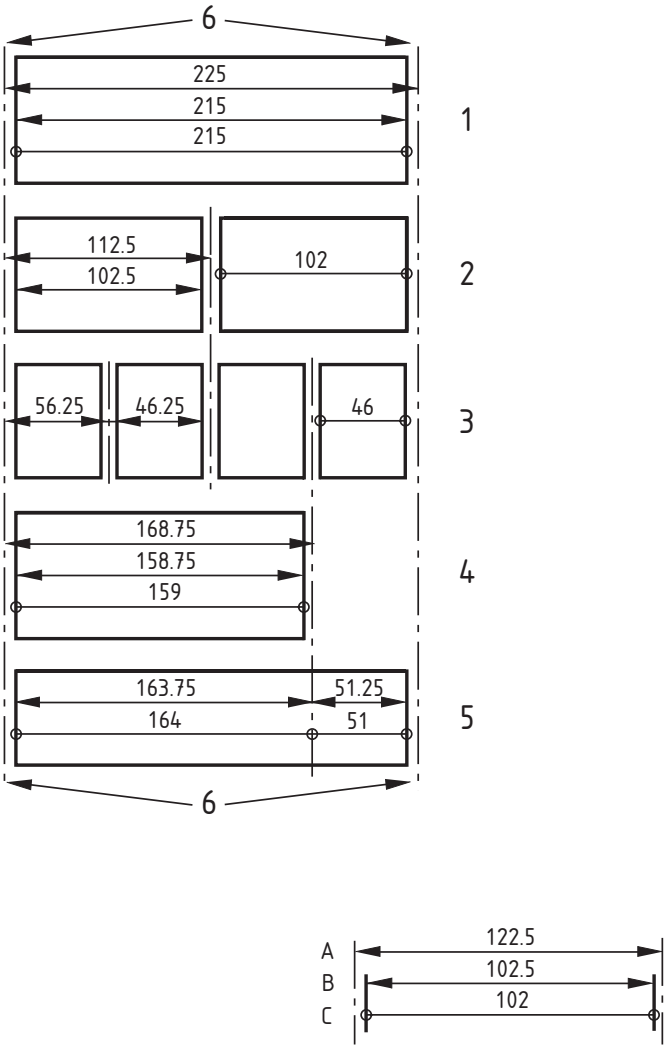
NOTE 2 CB.1.5 is based upon the size of 215 mm × 102.5 mm × 65 mm adopted as standard format within the United Kingdom and is the size from which many of the special shapes defined in this standard are derived. Values of dimensions of work size are rounded for ease of use.

Annex C (informative)
Basic dimensions and applications of special shapes in brickwork

C.1 Basic dimensions

The basic dimensions from which the work sizes in this standard are derived are shown in Figure C.1. The co-ordinating sizes, less a nominal 10 mm for the joints, generate the work size but, where this results in a fraction of a millimetre, it has been rounded to the nearest whole millimetre for the purpose of this standard.

All dimensions in millimetres



Key

1 Whole brick — stretcher
2 Half brick — header
3 Quarter brick — Queen closer
4 Three quarter brick
5 Squint brick
6 Centre-line of joint

Co-ordinating sizes, as defined in [A1] BS 6100-11 [A1], are shown as *A*.

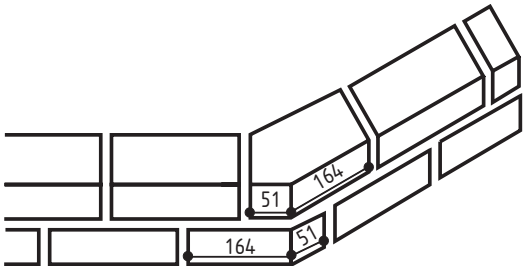
Work sizes, as defined in [A1] BS 6100-11 [A1], are shown as *B*.

Work sizes rounded, as defined in [A1] BS 6100-11 [A1], are shown as *C*.

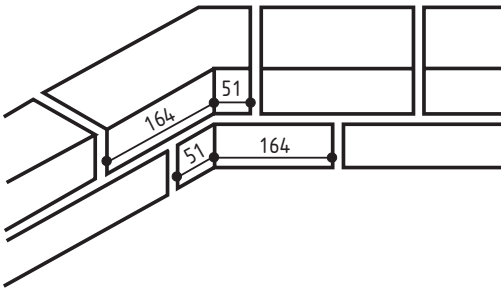
Figure C.1 — Sizes used in half and quarter bonding (related to CB.1.5)

C.2 Application of squints and angle bricks to external and internal angles in brickwork

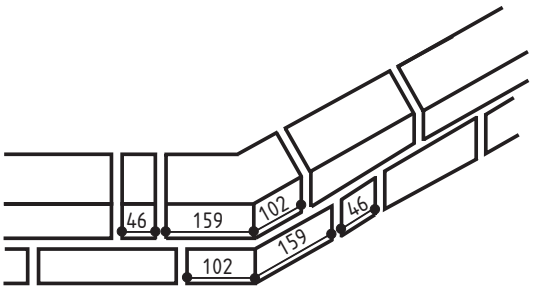
Figure C.2 shows the application of squints and angle bricks to external and internal angles in brickwork. Table C.1 is a summary of these applications.



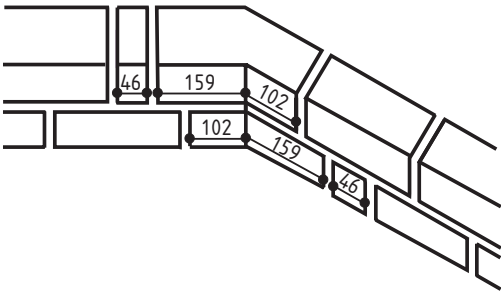
a) Squint AN.1.1, AN.1.2, AN.1.3
Maintains half-bond without closer



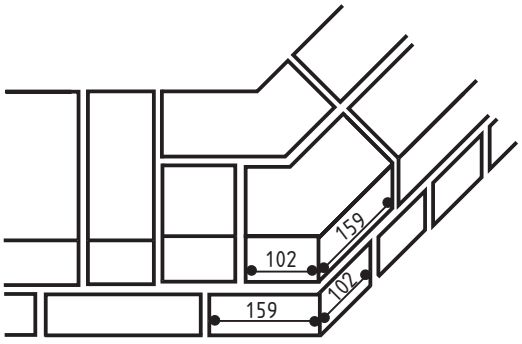
e) Internal angle AN.3.1, AN.3.2, AN.3.3
Maintains half-bond without closer



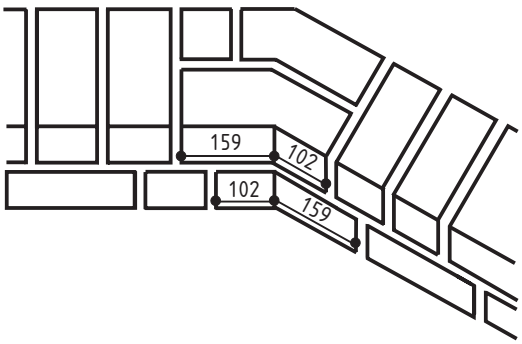
b) External angles AN.2.1, AN.2.2, AN.2.3
Maintains half-bond with closer



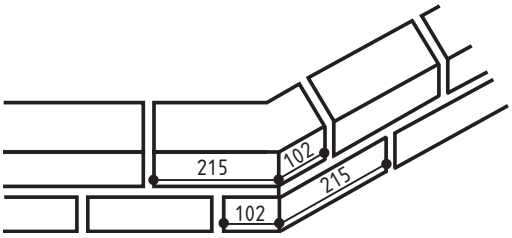
f) Internal angle AN.3.4, AN.3.5, AN.3.6
Maintains half-bond with closer



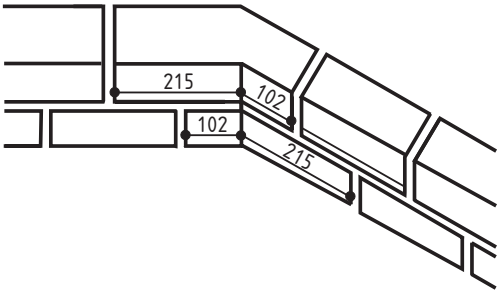
c) External angles AN.2.1, AN.2.2, AN.2.3
Maintains quarter-bond without closer



g) Internal angle AN.3.4, AN.3.5, AN.3.6
Maintains quarter-bond without closer



d) External angles AN.2.4, AN.2.5, AN.2.6
Maintains half-bond without closer



h) Internal angle AN.3.7, AN.3.8, AN.3.9
Maintains half-bond without closer

Figure C.2 — Application of squints and angle bricks to external and internal angles in brickwork

Table C.1 — Summary of applications for squints and angle bricks

Type		Work sizes (rounded)	Maintains half-bond[a]		Maintains quarter-bond
Description	Reference	mm	Without closer	With closer	
Squints	AN.1.1, AN.1.2, AN.1.3	164/51	a		
External angles	AN.2.1, AN.2.2, AN.2.3	159/102		b	
	AN.2.4, AN.2.5, AN.2.6	215/102	d		
Internal angles	AN.3.1, AN.3.2, AN.3.3	164/51	e		
	AN.3.4, AN.3.5, AN.3.6	159/102		f	g
	AN.3.7, AN.3.8, AN.3.9	215/102	h		

[a] The letters a to h refer to parts of Figure C.2.

Annex D (normative)
Determination of the properties of bricks of special shapes and sizes

D.1 Principle

For each property referred to, the principle of the test method in the relevant part of BS EN 772 has been adopted with the details modified so as to be relevant to bricks of special shapes and sizes.

D.2 Apparatus

D.2.1 *Testing machine and weighing instrument*, as specified in ⟩A1⟨ BS EN 772-1:2011+A1:2015 ⟩A1⟨.

D.2.2 *Linear measuring device*, with measuring precision conforming to ⟩A1⟨ BS EN 772-16:2011 ⟩A1⟨.

D.2.3 *Device for measuring angles*, to an accuracy of ±1°.

D.3 Sampling

The method of sampling of ⟩A1⟨ text deleted ⟩A1⟨ clay bricks should be in accordance with ⟩A1⟨ BS EN 771-1:2016 ⟩A1⟨. ⟩A1⟨ Text deleted ⟩A1⟨. The number of bricks to be sampled should be in accordance with the relevant part of BS EN 772.

D.4 Procedure

D.4.1 *Dimensions and tolerance*

D.4.1.1 *General*

For those ⟩A1⟨ text deleted ⟩A1⟨ clay ⟩A1⟨ text deleted ⟩A1⟨ bricks which are a rectangular parallelepiped in shape, the measurement of dimensions and declaration of tolerance and range class follows the provisions of **5.3.1** of ⟩A1⟨ BS EN 771-1:2016 ⟩A1⟨ ⟩A1⟨ text deleted ⟩A1⟨, as appropriate.

D.4.2 *Configuration*

The configuration of units which are of a rectangular parallelepiped in shape may be declared by reference to the type and description in Table B.10.

D.4.3 *Density*

When relevant, the gross and net density of ⟩A1⟨ text deleted ⟩A1⟨ clay bricks may be declared as that determined on units of a rectangular parallelepiped shape which have been subjected to a similar manufacturing process. The testing should be in accordance with BS EN 772-13. There is no requirement to declare the Density class.

D.4.4 *Compressive strength*

Where compressive strength is to be determined, in accordance with [A1] BS EN 772-1:2011+A1:2015 [A1], the specimens should be conditioned in accordance with **7.3.2** and the surface preparation in accordance with **7.2.4** of [A1] BS EN 772-1:2011+A1:2015 [A1].

For those [A1] text deleted [A1] clay bricks which are intended to be used as an architectural feature at the head of a wall, e.g. stop end, there is no requirement to declare the compressive strength: [A1] text deleted [A1] see Annex E of this standard. In all other cases, the specimens to be tested are cut from the special shaped unit so as to give a rectangular parallelepiped with the greatest cross-sectional area normal to the direction of the load expected in the brickwork.

NOTE The loaded area is normally that shown as an unshaded top of the unit in the figures in [A1] Table 1 to Table 10 [A1].

In the case of arch bricks, i.e. tapered headers or stretchers (AR.1 and AR.2 in Table B.6), the surface preparation should be by mortar capping following the procedure in **7.2.5** of [A1] BS EN 772-1:2011+A1:2015 [A1]. The unit is supported such that the end with the lowest height is at a height equal to half the difference between the maximum and minimum heights from the horizontal surface supporting the unit.

NOTE In this way, the upper surface of the capping mortar will be horizontal and will have removed half of the effect of the taper. When the unit is inverted, the hardened mortar capping will be placed on the horizontal surface and the opposite surface can be mortar capped to remove the effect of the taper completely.

In most cases, the effect of cutting the special shaped brick is to produce a test specimen with a length less than that of a typical UK brick. Annex F gives recommendations for the nominal sizes of test specimens.

Where the aspect ratio (height/width) of the test specimen differs from that for a typical UK brick, the measured strength may be multiplied by a shape factor to give the equivalent strength to a typical UK brick (215 mm × 102.5 mm × 65 mm). These are given in [A1] Annex F [A1] together with the shape factor to be used to determine the normalized strength when this is required.

D.4.5 *Thermal properties*

For [A1] text deleted [A1] clay bricks, the requirements of **5.3.5** of [A1] BS EN 771-1:2016 [A1] apply.

D.4.6 *Durability*

The frost resistance of bricks of special shape is declared as for units of rectangular parallelepiped shape as:

— F0: Passive exposure;
— F1: Moderate exposure;
— F2: Severe exposure.

NOTE A description of the different types of exposure is given in **B.3** of [A1] BS EN 771-1:2016 [A1].

The BCRL panel freezing test may be used to classify the bricks, in which case care should be taken to ensure that the face of the unit subjected to freezing and thawing is one that in practice would be exposed. In some cases, units might need to be cut so that they can be mortared together to form a panel. The number of bricks tested will depend on the type but, in each case, a standard panel size 740 mm × 640 mm (height × width) should be constructed.

D.4.7 *Water absorption*

For [A1] text deleted [A1] clay bricks intended to be used in external elements with the face of the units being exposed or as a damp proof course unit, the requirements of the relevant subclause (**5.3.7.1** or **5.3.7.2**) of [A1] BS EN 771-1:2016 [A1] apply.

D.4.8 *Initial rate of water absorption*

For [A1] text deleted [A1] clay bricks, the requirements of **5.3.8** of [A1] BS EN 771-1:2016 [A1] apply.

D.4.9 *Active soluble salt content*

For [A1] text deleted [A1] clay bricks, the requirements of **5.3.9** of [A1] BS EN 771-1:2016 [A1] apply.

D.4.10 ***Moisture movement***

There are no requirements for the moisture movement (dimensional stability) of [A1] text deleted [A1] clay bricks of special shapes and sizes.

D.4.11 ***Reaction to fire***

The requirements of **5.3.11** of [A1] BS EN 771-1:2016 [A1] apply.

D.4.12 ***Water vapour permeability***

The requirements of **5.3.12** of [A1] BS EN 771-1:2016 [A1] apply.

D.4.13 ***Bond strength***

For [A1] text deleted [A1] clay bricks intended to be used in elements subjected to structural requirements, the bond strength of the unit in combination with the mortar should be declared in terms of the characteristic initial shear strength by reference to fixed values as in **5.3.13.2** of [A1] BS EN 771-1:2016 [A1].

D.5 Other recommendations

All the requirements of Clauses **6**, **7** and **8** of [A1] BS EN 771-1:2016 [A1], except as modified by the provisions of this Annex D, apply.

Clay bricks of special shapes and sizes should include in the declaration of compressive strength that they are Category II in accordance with [A1] BS EN 771-1:2016 [A1].

As appearance is often a special requirement for certain faces of units of special shape and size, an informative annex (Annex H) has been included to give some guidance.

Annex E (normative)
Bricks for which there should be no requirement for compressive strength

In the case of the following unit types there should be no requirement for compressive strength:

— BN.5, BN.6, BN.9, BN.10, BN.11, BN.14, BN.15, BN.18, BN.19, BN.20, BN.21;
— CP (all types);
— AN.7, AN.8, AN.9, AN.10, AN.11, AN.12, AN.13, AN.14, AN.15, AN.16, AN.17, AN.18;
— SD.3;
— [A1] SL.1. [A1]

Annex F (normative)
Nominal sizes for test specimens

[A1] NOTE 1 In most cases the compressive strength of a special shaped clay masonry unit is declared as that determined on units of a rectangular parallel piped shape, which have been subjected to a similar manufacturing process. Where this is not the case, i.e. where the special shaped masonry unit is load bearing, the declaration can be based on testing whole units, but by loading the units through the largest rectangular area normal to the load expected in the brickwork. [A1]

In the case of the following unit types, the test specimen should be the whole unit:

— BD.1, BD.3, BD.4;
— SD.1;
— CB.

[A1] For the remaining unit types covered by this British Standard, with the exception of arch bricks, the test specimens should be whole units. The load should be applied through the largest rectangular area on a face normal to the load direction.

NOTE 2 The area to be used in the calculation of compressive strength is the loaded area. The nominal values of the length and width of this area for the various unit types is given in Table F.1. [A1]

Table F.1 — [A1] Nominal sizes of loaded areas [A1]

Unit type	Specimen dimensions mm		
	Length	Width	Height
BD2	102	102	65
BN.1.1, 3.1, 7.1, 8.1, 12.1, 16.1, 17.1	190	102	65
AN.1.1, 1.2, 1.3, 3.1, 3.2, 3.3, BN.1.2, 3.2, 7.2, 8.2, 12.2, 16.2, 17.2	164	102	65
BN.2.1, 4.1	165	102	65
BN.2.2, 4.2	113	102	65
BN.7.3	190	102	215
BN.8.3	190	102	102
BN.8.4	164	102	102
AN.2.1	122	102	65
AN.2.2	117	102	65
AN.2.3	128	102	65
AN.2.4	178	102	65
AN.2.5, 5.2, PL.1.2, 5.2	173	102	65
AN.2.6	184	102	65
AN.3.4, 3.5, 3.6, 5.1, PL.1.1, 5.1	159	102	65
AN.3.7, 3.8, 3.9	215	102	65
AN.6.1	103	102	65
AN.6.2	131	102	65
PL.3.1, 4.1, 6.13, 6.15, 6.17	215	46	65
PL.3.2, 4.2, 6.14, 6.16, 6.18	215	60	65
PL.6.1, 6.3, 6.5, 9.1, 9.3, 9.5	164	46	65
PL.6.2, 6.4, 6.6, 9.2, 9.4, 9.6	164	60	65
PL.6.7, 6.9, 6.11, 7.1	159	46	65
PL.6.8, 6.10, 6.12	159	60	65

Table F.1 — [A1] Nominal sizes of loaded areas [A1] *(continued)*

Unit type	Specimen dimensions mm		
	Length	Width	Height
PL.7.2	173	60	65
PL.8.1	122	46	65
PL.8.2	122	60	65
PL.8.3	117	46	65
PL.8.4	117	60	65
PL.8.5	117	46	65
PL.8.6	128	60	65
PL.8.7	178	46	65
PL.8.8	178	60	65
PL.8.9	173	46	65
PL.8.10	173	60	65
PL.8.11	184	46	65
RD.1.1	211	52	65
RD.1.2	214	70	65
RD.1.3	213	80	65
RD.1.4	214	89	65
RD.1.5	214	97	65
RD.1.6	214	103	65
RD.2.1	172	88	65
RD.2.2	190	92	65
RD.2.3	199	95	65
RD.2.4	208	97	65
RD.2.5	215	99	65
RD.2.6	221	101	65
SD.2.1	102	102	159
SD.2.2	102	102	173

Annex G (informative)
Shape factors

Table G.1 gives the shape factors by which the measured strengths of samples of given widths and heights should be multiplied to give normalized strengths and also the strength of a brick of traditional UK dimensions (215 mm × 102.5 mm × 65 mm). The values have been derived from Table A.1 in [A1] BS EN 772-1:2011+A1:2015 [A1] and have been grouped and rounded for ease of use.

Table G.1 — Shape factors

Unit width	Unit height	Shape factor	
mm	mm	Normalized strength	Equivalent brick strength
45–55	65	0.95	1.12
70–80	65	0.90	1.07
90–105	65	0.85	1.00
90	90	0.97	1.14
102	50–55	0.75	0.88
102	102	1.00	1.20
102–112	70–80	0.90	1.05
102	215	1.40	1.60

Annex H (informative)
General guidance on the appearance of facing bricks

The appearance of masonry units and assessment should be the subject of a purchase contract. The requirement will vary according to the use to which the masonry units are to be put and their inherent characteristics. In particular, in the case of bricks of special shapes and sizes, the appearance relative to the standard bricks against which they are to be used is important. A standard reference panel has been found useful for assessing the appearance of successive consignments of bricks and such a panel could prove useful in assessing the appearance of bricks of special shape or size.

For [A1] text deleted [A1] clay bricks conforming to [A1] BS EN 771-1:2016 [A1], PAS 70 gives guidance on the appearance of facing bricks by use of reference and sample panel procedures. Although PAS 70 relates to standard format bricks, its procedures can be used for assessing the appearance of clay bricks of special shapes and sizes. Where the PAS 70 approach is used, bricks of special shapes and sizes should preferably be assessed in conjunction with counterpart walling standard format bricks in reference and sample panel constructions.

Annex I (informative)
Reproduction of requirements from Table ZA.1.2 of [A1] BS EN 771-1:2016 [A1] for CE marking

Table I.1 — Scope and relevant clauses

Product: [A1] Clay units [A1] as covered in Clause **1** of [A1] BS EN 771-1:2016 [A1].			
Intended use: [A1] in unprotected masonry walls [A1] as covered by the Scope of BS EN 771-1:2003+A1:2005.			
Essential characteristics	**Requirement clauses in [A1] BS EN 771-1:2016 [A1]**	**BS 4729 Clause**	**Notes**
Compressive strength (for units intended to be used in elements subject to structural requirements)	**5.3.4** Compressive strength	**D.4.4**	Declared value in N/mm^2 (with indication of direction of load unit category)
Dimensional stability (for units intended to be used in elements subject to structural requirements)	**5.3.10** Moisture movement	**D.4.10**	Declared value of moisture movement in mm/m
Bond strength (for units intended to be used in elements subject to structural requirements)	**5.3.13** Bond strength	**D.4.13**	Fixed value; or Declared value of initial shear strength in N/mm^2
Active soluble salts content (for units intended to be used in elements subject to structural requirements)	**5.3.9** Active soluble salts content	**D.4.9**	Declared value of active water soluble salts content on the basis of technical classes S0, S1, S2
Reaction to fire (for units intended to be used in elements subject to fire requirements)	**5.3.11** Reaction to fire	**D.4.11**	Declared reaction to fire. Euroclause A1 to F
Water absorption (for units intended to be used in damp proof courses or in external elements with exposed face)	**5.3.7.1** External elements **5.3.7.2** Damp-proof courses	**D.4.7**	Declared value, in %
Water vapour permeability (for units intended to be used in external elements)	**5.3.12** Water vapour permeability	**D.4.12**	Declared value (tabulated water vapour diffusion coefficient)
Direct airborne sound insulation (in end conditions) [Density and configuration] (for units to be used in elements subject to acoustic requirements)	**5.3.3** Density **5.3.2** Configuration	**D.4.3**	Declared value of gross density in kg/m^3 and tolerance category Configuration by reference to BS 4729.
Thermal resistance [Density and configuration] (for units to be used in elements subject to thermal insulation requirements)	**5.3.5** Thermal properties	**D.4.5**	Declared value of thermal resistance in m^2·K/W or equivalent thermal conductivity in W/m·K, and means of evaluation used
Durability	**5.3.6** Freeze-thaw resistance	**D.4.6**	Intended exposure and declared value of freeze/thaw resistance[a]
Dangerous substances	See Annex ZA.1 of ([A1] BS EN 771-1:2016 [A1])		According to ZA.3 ([A1] BS EN 771-1:2016 [A1])
[a] As requested by assessment method used.			

The requirement on a certain characteristic is not applicable in those Member States (MSs) where there are no regulatory requirements on that characteristic for the intended use of the product. In this case, manufacturers placing their products on the market of these MSs are not obliged to determine nor declare the performance of their products with regard to this characteristic and the option "No performance determined" (NPD) in the information accompanying the CE marking (see **ZA.3**) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold level. [A1] At least one performance characteristic needs to be declared. [A1]

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