

Bar reinforcements - shapes to BS 4466:1989

Reinforcements can be supplied cut and/or bent to the Shape Codes detailed in BS 4466:1989, as illustrated below.

Table 1 Preferred shapes, their method of measurement and calculation of length


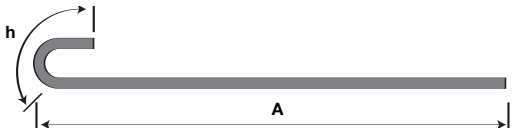

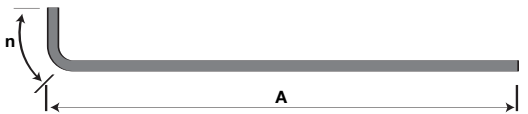
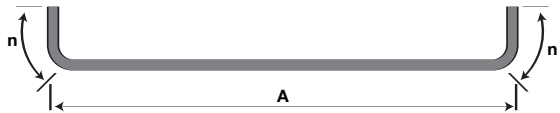
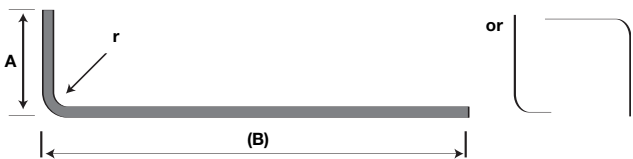

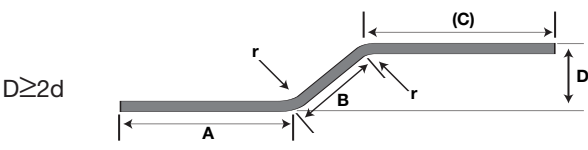
Shape code	Shape	Total length of bar (L) measured along centre line (mm)
20		A
32		A + h
33		A + 2h
34		A + n Where the overall dimension of the bob is critical, use shape code 37.
35		A + 2n Where the overall dimension of the bob is critical, do not use this shape code.
37		$A + (B) - \frac{1}{2}r - d$ This formula is approximate. Where r is greater than the minimum value in table 3, use shape code 51.
38		$A + B - (C) - r - 2d$
41		If angles with the horizontal are 45° or less, A + B + (C) see note 4

Table 1 (concluded) Preferred shapes, their method of measurement and calculation of length

Shape code	Shape	Total length of bar (L) measured along centre line (mm)
43	<p>Diagram of a Z-shaped bar. Dimensions: A (horizontal top left), B (sloped top left), C (horizontal bottom), D (vertical height), E (horizontal top right). Bending radius is r.</p>	<p>If angles with the horizontal are 45° or less, $A + 2B + C + (E)$ See note 4</p>
51	<p>Diagram of an L-shaped bar. Dimensions: A (vertical), B (horizontal). Bending radius is R (non standard).</p>	<p>$A + (B) - \frac{1}{2}R - d$ This formula is approximate If R is minimum, use shape code 37. If R is greater than 200mm, see note 2 to clause 10</p>
61	<p>Diagram of a square bar. Dimensions: A (vertical), B (horizontal). Bending radius is r.</p>	<p>$2(A + B) + 12d$ Neither A or B are to be less than 12d or 150mm, whichever is the greater, for grade 460 in sizes not exceeding 20mm nor less than 14d for sizes of 25mm and over. Neither A or B are to be less than 10d for grade 250 with a minimum value of A and B of 100mm. See note 3.</p>
62	<p>Diagram of a bar with a sloped end. Dimensions: A (sloped length), B (vertical height), C (horizontal length). Bending radius is r.</p>	<p>If angle with the horizontal is 45° or less, $A + C$ See note 4</p>
82	<p>Diagram of a rounded rectangular bar. Dimensions: A (horizontal length), B (vertical height). Bending radius is r. Condition: $B \geq 2r + 2d$</p>	<p>$2A + 3B + 18d$ If B is greater than $400 + 2d$, see note 2 to clause 10. See note 3.</p>

Note 1. r indicates the minimum value in table 3.

Note 2. The dimensions in parentheses are the free dimensions.

Note 3. To avoid separate equations for each steel grade and bending radius, simplified total length formulae are used for shape code 61 and 82. These formulae are necessarily approximate.

Note 4. The length formula is approximate and when bonding angles exceed 45° the length should be calculated more accurately allowing for the difference between the specified overall dimensions and the true length measured along the central axis of the bar or wire.

Table 2 Other shapes, their method of measurement and calculation

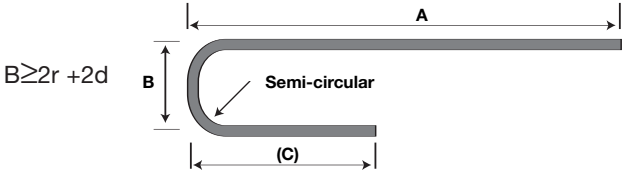
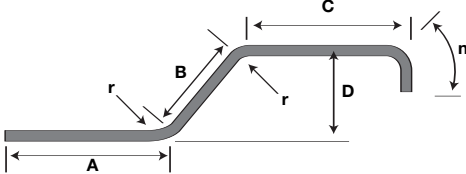
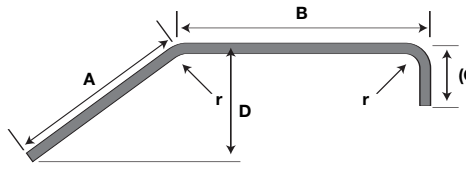
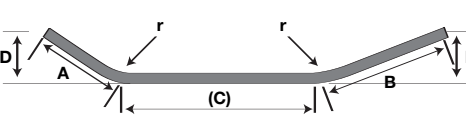
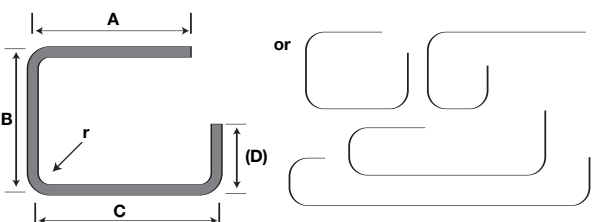
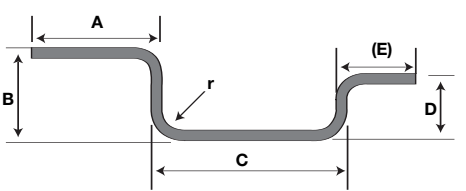
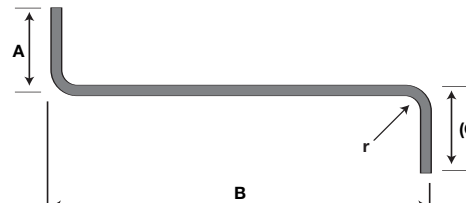
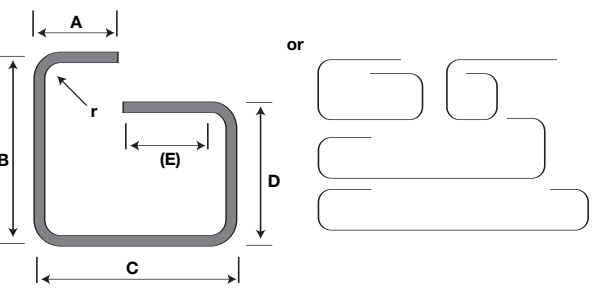
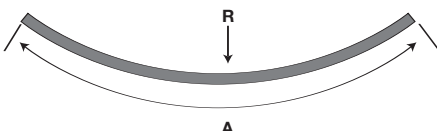
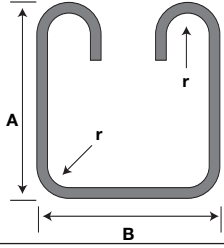
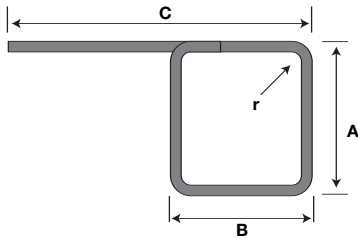
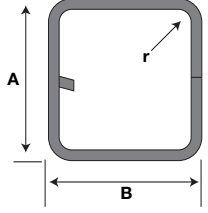
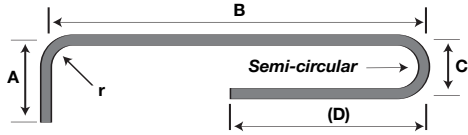
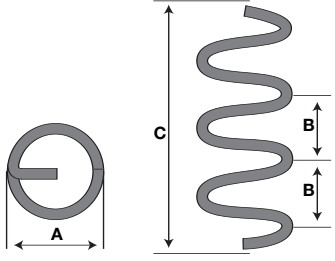
Shape code	Shape	Total length of bar (L) measured along centre line (mm)
39	 <p>$B \geq 2r + 2d$</p>	$A + 0.57B + (C) - 1.57d$ If B is greater than $400 + 2d$, see note 2 to clause 10
42		If angle with the horizontal is 45° or less, $A + B + (C) + n$ See note 4a
45		If angle with the horizontal is 45° or less, $A + B + (C) - \frac{1}{2}r - d$ See note 4a
49		If angle with the horizontal is 45° or less, $A + B + (C)$ See note 4a
52		$A + B + C + (D) - \frac{1}{2}r - 3d$
53		$A + B + C + D + (E) - 2r - 4d$
54		$A + B + (C) - r - 2d$
55		$A + B + C + D + (E) - 2r - 4d$
65		These bars will be supplied straight when the radius is greater than that given in table 5.

Table 2 Other shapes, their method of measurement and calculation

Shape code	Shape	Total length of bar (L) measured along centre line (mm)
77		$2A + B + 20d$ See note 3a
78		$2A + B + C + 3d$ See note 3a
79		$2A + 3B + 10d$ Neither A or B are to be less than 12d or 150mm, whichever is the greater, for grade 460 in sizes not exceeding 20mm nor less than 14d for sizes of 25mm and over. Neither A or B are to be less than 10d for grade 250 with a minimum value of A and B of 100mm. See note 3a.
85	$C \geq 2r + 2d$ 	$A + B + 0.57 C + (D) - \frac{1}{2}r - 2.75d$ If C is greater than $400 + 2d$, see note 2 to clause 10.
87		Where B is not greater than $A/5$ $\frac{C}{B} \pi (A - D) (L \leq 12m)$ Where A is the external diameter (in mm) B is the pitch of helix (in mm) C is the overall height of helix (in mm) Where B is greater than $A/5$ the formula does not apply. There shall be at least two turns in the helix. NOTE: Unless A is small relative to d, this shape is fabricated in a closed form and pulled to shape on site.
99	All other shapes to be calculated A dimensioned sketch shall be drawn out over schedule columns A to E. Every dimension shall be specified and the dimension that is to allow for permissible deviations shall be indicated in parenthesis, otherwise the fabricator is free to choose which dimension shall allow for the tolerance. If a shape that is given in this table or table 1 is required but a different dimension is to allow for the permissible deviations, the shape shall be drawn out and given the shape code 99 and the free dimensions shall be indicated in parentheses. The tolerances given in table 4 also apply.	

Note 3a. To avoid separate equations for each steel grade and bending radius, simplified total length formulae are used for shape codes 77, 78 and 79. These formulae are necessarily approximate.

Note 4a. The length formula is approximate and when bending angles exceed 45° the length should be calculated more accurately allowing for the difference between the specified overall dimensions and the true length measured along the central axis of the bar or wire. When bending angles approach 90° , it is preferable to specify shape code 99 with a fully dimensional sketch.

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