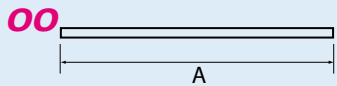
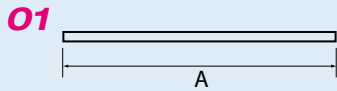


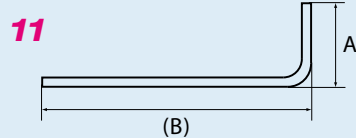
Shape Code **Total length of bar (L) measured along centre line**



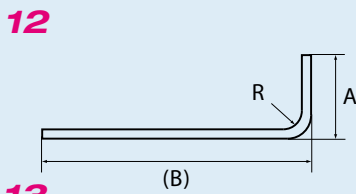
A



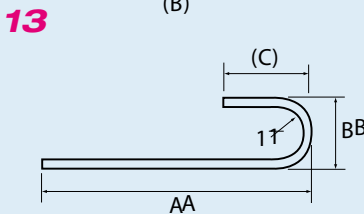
A
Stock bars are supplied in 12 metre notional lengths in diameters of 12mm and above in original manufacturers bundles. Tolerances for stock lengths shall be subject to BS4449: 2005



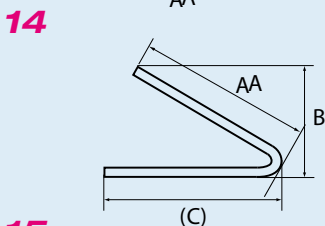
$A+(B)-0.5r-d$
Neither A nor B shall be less than P in Table 2



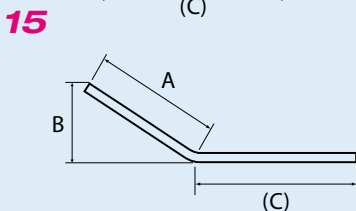
$A + (B) - 0.43R - 1.2d$
Neither A nor B shall be less than P in Table 2 nor less than $(R + 6d)$



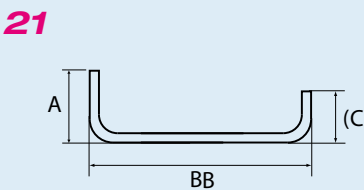
$A + 0.57B + (C) - 1.6d$
B shall not be less than $2(r + d)$. Neither A nor C shall be less than P in Table 2 nor less than $(B/2 + 5d)$. See Note 3. Key: 1 - Semi-circular



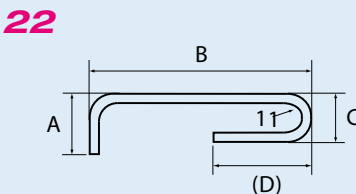
$A + (C) - 4d$
Neither A nor (C) shall be less than P in Table 2. See note 1.



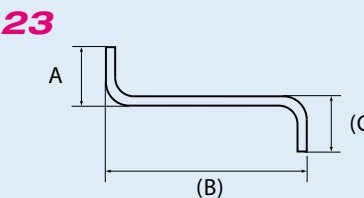
$A + (C)$
Neither A nor (C) shall be less than P in Table 2. See note 1.



$A + B + (C) - r - 2d$
Neither A nor (C) shall be less than P in Table 2

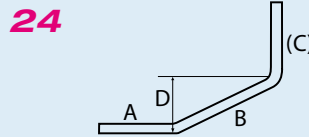


$A + B + C + (D) - 1.5r - 3d$
C shall not be less than $2(r + d)$. Neither A nor (D) shall be less than P in Table 2. (D) shall not be less than $(C/2 + 5d)$. Key: 1 - Semi-Circular

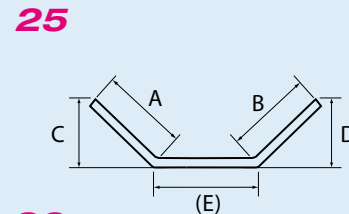


$A + B + (C) - r - 2d$
Neither A nor (C) shall be less than P in Table 2

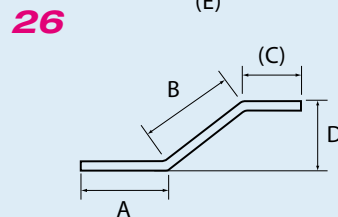
Shape Code **Total length of bar (L) measured along centre line**



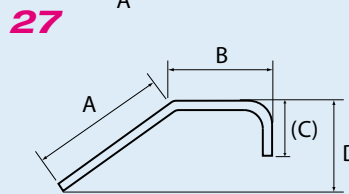
$A+B+(C)$
A and (C) are at 90° to one another



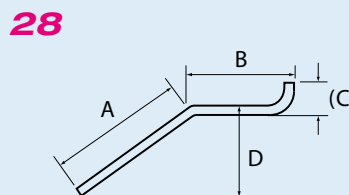
$A + B + (E)$
Neither A nor B shall be less than P in Table 2. If E is the critical dimension, schedule a 99 and specify A or B as the free dimension. See note 1.



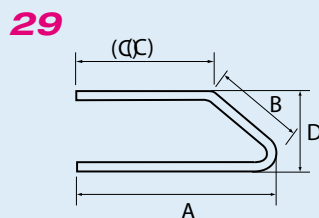
$A + B + (C)$
Neither A nor (C) shall be less than P in Table 2. See note 1.



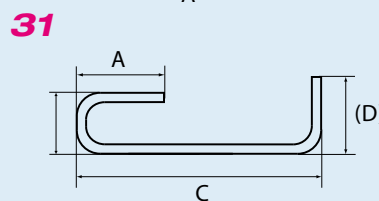
$A + B + (C) - 0.5r - d$
Neither A nor (C) shall be less than P in Table 2. See note 1.



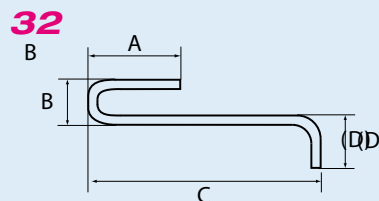
$A + B + (C) - 0.5r - d$
Neither A nor (C) shall be less than P in Table 2. See note 1.



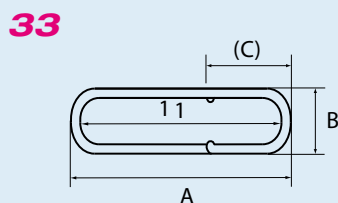
$A + B + (C) - r - 2d$
Neither A nor (C) shall be less than P in Table 2. See note 1.



$A + B + C + (D) - 1.5r - 3d$
Neither A nor (D) shall be less than P in Table 2



$A + B + C + (D) - 1.5r - 3d$
Neither A nor (D) shall be less than P in Table 2. See note 1.



$2A + 1.7B + 2(C) - 4d$
A shall not be less than $12d + 30mm$. B shall not be less than $2(r + d)$. (C) shall not be less than P in Table 2, nor less than $(B/2 + 5d)$. See Note 3. Key: 1 - Semi-circular

Shape Code **Total length of bar (L) measured along centre line**

34

$A + B + C + (E) - 0.5r - d$
Neither A nor (E) shall be less than P in Table 2. See note 1.

35

$A + B + C + (E) - 0.5r - d$
Neither A nor (E) shall be less than P in Table 2. See note 1.

36

$A + B + C + (D) - r - 2d$
Neither A nor (D) shall be less than P in Table 2. See note 1.

41

$A + B + C + D + (E) - 2r - 4d$
Neither A nor (E) shall be less than P in Table 2.

44

$A + B + C + D + (E) - 2r - 4d$
Neither A nor (E) shall be less than P in Table 2. See note 1.

46

$A + 2B + C + (E)$
Neither A nor (E) shall be less than P in Table 2. See note 1.

47

$2A + B + 2C + 1.5r - 3d$
(C) and (D) shall be equal and not more than A or less than P in Table 2. Where (C) and (D) are to be minimized the following formula may be used:
 $L = 2A + B + \max(21d, 240)$

51

$2(A + B + (C)) - 2.5r - 5d$
(C) and (D) shall be equal and not more than A or B nor less than P in Table 2. Where (C) and (D) are to be minimized the following formula may be used:
 $L = 2A + 2B + \max(16d, 160)$

56

$A + B + C + (D) + 2(E) - 2.5r - 5d$
(E) & (F) shall be equal and not more than B or C, nor less than P in Table 2

Shape Code **Total length of bar (L) measured along centre line**

63

$2A + 3B + 2(C) - 3r - 6d$
(C) and (D) shall be equal and not more than A or B nor less than P in Table 2. Where (C) and (D) are to be minimized the following formula may be used:
 $L = 2A + 3B + \max(14d, 150)$

64

$A + B + C + 2D + E + (F) - 3r - 6d$
Neither A nor (F) shall be less than P in Table 2. See note 2.

67

A
See Clause 10

75

$\pi(A-d) + B$
Where B is the overlap

77

$C\pi(A-d)$
Where B is greater than A/5 this equation no longer applies, in which case the following formula may be used:
 $L = C((\pi(A-d))^2 + B^2)^{0.5}$
C = Number of turns

98

$A + 2B + C + (D) - 2r - 4d$
Isometric sketch.
Neither C nor (D) shall be less than P in Table 2

99 All other shapes where standard shapes cannot be used.
No other shape code number, form of designation or abbreviation shall be used in scheduling.

A dimensional sketch shall be drawn over the dimension 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 dimensions shall allow for tolerance.

To be calculated
See Note 2.

NOTE 1 The values for minimum radius and end projection, r and P respectively, as specified in Table 2, shall apply to all shape codes (see 7.6).
The dimensions in parenthesis are the free dimensions. If a shape given in this table is required but a different dimension is to allow for the possible deviations, the shape shall be drawn out and given the shape code 99 and the free dimension shall be indicated in parenthesis.
The length of straight between two bends shall be at least 4d, see figure 6.
Figures 4, 5 and 6 should be used in the interpretation of bending dimensions.
NOTE 2 The length equations for shape codes 14, 15, 25, 26, 27, 28, 29, 34, 35, 36 and 46 are approximate and where the bend angle is greater than 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. When the bending angles approach 90°, it is preferable to specify shape code 99 with a fully dimensional sketch.
NOTE 3 Five bends or more might be impractical within permitted tolerances.
NOTE 4 For shapes with straight and curved lengths (e.g. shape codes 12, 13, 22, 33 and 47) the largest practical mandrel size for the production of a continuous curve is 400mm. See also Clause 10.

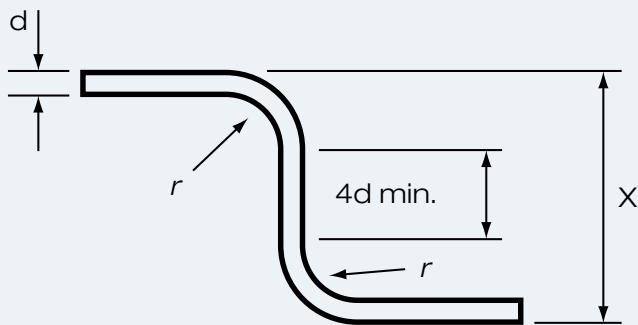
Tolerances on cutting and bending dimensions

The tolerances for cutting and/or bending dimensions shall be in accordance with Table 5 and shall be taken into account when completing the schedule. The end anchorage or the dimension in parentheses in the shape codes on pages 16 and 17 shall be used to allow for any permissible deviations resulting from cutting and bending.

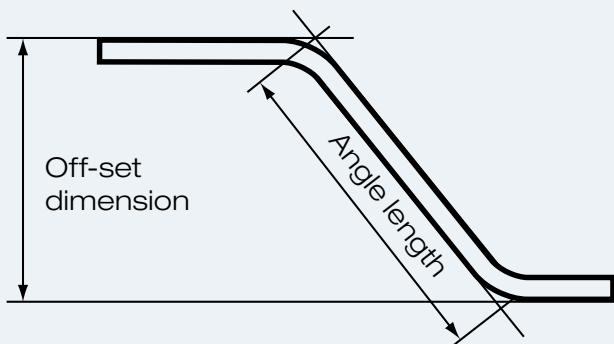
TABLE 5

Tolerances	
Cutting and bending processes	Tolerance (mm)
Cutting of straight lengths (including reinforcement for subsequent bending)	+25, -25
Bending	
< 1000mm	+5, -5
> 1000mm to < 2000mm	+5, -10
> 2000mm	+5, -25
Length of bars in fabric	25 or 0.5% of the length (whichever is greater)

Example of bar with more than one bend



Dimensioning of cranked bars



Minimum Schedule Radius and Bend Allowances

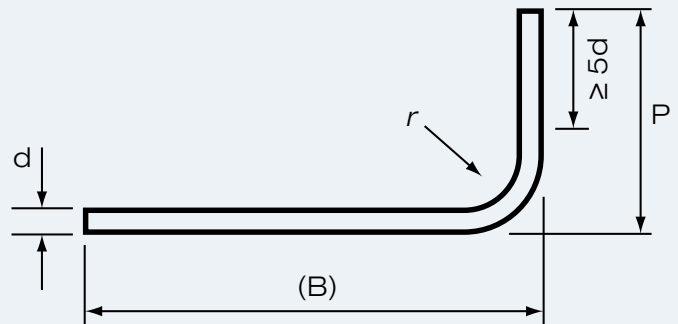


TABLE 2

Normal Bar Size d	Minimum Radius for Scheduling r	Minimum Diameter of Bending Former	Minimum end projection p	
			General (min 5d straight)	Links where bend <150°
6mm	12mm	24mm	110mm	110mm
8mm	16mm	32mm	115mm	115mm
10mm	20mm	40mm	120mm	130mm
12mm	24mm	48mm	125mm	160mm
16mm	32mm	64mm	130mm	210mm
20mm	70mm	140mm	190mm	290mm
25mm	87mm	175mm	240mm	365mm
32mm	112mm	224mm	305mm	465mm
40mm	140mm	280mm	380mm	580mm
50mm	175mm	350mm	475mm	725mm

Radius of bending

Reinforcement to be formed to a radius exceeding that specified in Table 6 shall be supplied straight.

TABLE 6

Maximum limit for which a preformed radius is required	
Bar Size	Radius
6mm	2.5m
8mm	2.75m
10mm	3.5m
12mm	4.25m
16mm	7.5m
20mm	14.0m
25mm	30.0m
32mm	43.0m
40mm	58.0m

NOTE 1 The required curvature may be obtained during placing.
 NOTE 2 For shapes with straight and curved lengths (e.g. shape code 12, 13, 22 and 33) the largest practical radius for the production of a continuous curve is 200 mm, and for larger radii the curve may be produced by a series of short straight sections.