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IS 204-1 (1991): Tower Bolts - Specification: Part-1
Ferrous Metals [CED 15: Builder Hardware]



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“Knowledge is such a treasure which cannot be stolen”

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IS 204 (Part 1) : 1991

(Reaffirmed 2010)

भारतीय मानक
चटखनियाँ — विशिष्ट

भाग 1 लोह धातु
(पांचवां पुनरीक्षण)

Indian Standard

TOWER BOLTS - SPECIFICATION

PART 1 FERROUS METALS

(*Fifth Revision*)

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BUREAU OF INDIAN STANDARDS
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July 1991

Price Group 4

FOREWORD

This Indian Standard (Part 1) (Fifth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Builder's Hardware Sectional Committee had been approved by the Civil Engineering Division Council.

This standard for tower bolts was first issued in 1950 and subsequently revised in 1961, 1966 and 1974. In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

In this revision cold rolled low carbon steel sheets in accordance with IS 513 : 1986 and copper oxidized and zinc plated finish have been included. The standard also makes reference to the latest Indian standard for various types of materials specified in this standard.

This standard contains clauses 5.1.1, 6.5 and 7.1 which permit the purchaser to use his option for selection to suit his requirements.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

**AMENDMENT NO. 2 AUGUST 2010
TO
IS 204 (PART 1) : 1991 TOWER BOLTS —
SPECIFICATION**

PART 1 FERROUS METALS

(Fifth Revision)

(Page 3, Table 1) — Insert the following note below the figure and substitute ‘16 mm, *Min*’ for ‘16 mm’ in the figure:

‘NOTE — The shape of the knob is illustrative only and may be round, half round, spherical or conical (*see 5.1.1*).’

(Page 7, Table 4) — Insert the following note below the figure and substitute ‘16 mm, *Min*’ for ‘16 ± 1mm’ in the figure:

‘NOTE — The shape of the knob is illustrative only and may be round, half round, spherical or conical (*see 5.1.1*).’

(CED 15)

**AMENDMENT NO. 1 JANUARY 2008
TO
IS 204 (PART 1) : 1991 TOWER BOLTS —
SPECIFICATION**

PART 1 FERROUS METALS

(Fifth Revision)

(Page 2, clause 7.1, line 4) — Substitute 'IS 1378 : 1987' for 'IS 1376 : 1987'.

(CED 15)

Reprography Unit, BIS, New Delhi, India

Indian Standard

TOWER BOLTS — SPECIFICATION

PART 1 FERROUS METALS

(Fifth Revision)

1 SCOPE

This standard (Part 1) lays down the requirements for tower bolts made of ferrous metals.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TYPES

3.1 Tower bolts shall be of the following types (see Tables 1 to 4) :

Type	Description	Table
<i>a) Barrel Tower Bolts</i>		
1A	Mild steel barrel tower bolts with mild steel barrel and mild steel bolt	1
1B	Mild steel barrel tower bolts with mild steel barrel and cast iron bolt	1
<i>b) Semi-Barrel Tower Bolts</i>		
2A	Mild steel semi-barrel tower bolts, full cover with mild steel sheet pressed barrel and mild steel bolt	2
2B	Mild steel semi-barrel tower bolts, full cover with mild steel sheet pressed barrel and cast iron bolt	2
3A	Mild steel semi-barrel tower bolts, open cover with mild steel sheet pressed barrel and mild steel bolt	2
3B	Mild steel semi-barrel tower bolts, open cover with mild steel sheet pressed barrel and cast iron bolt	2
<i>c) Riveted or Spot Welded Tower Bolts</i>		
4A	Mild steel tower bolts riveted type with back plate and mild steel bolt and open staple	3
4B	Mild steel tower bolts riveted type with back plate and cast iron bolt and open staple	3
<i>d) Skeleton Tower Bolts</i>		
5	Mild steel skeleton tower bolts with steel sheet pressed plate and staples and mild steel bolt.	4

NOTE — If specifically ordered, this type of tower bolt may also be supplied with alternative staple of riveted or welded type with back plate.

4 MATERIAL

4.1 The materials used for tower bolts shall comply with the requirements given in Table 5.

5 MANUFACTURE

5.1 General

Tower bolts shall be well made and shall be free from defects. The bolts shall be finished to the correct shape and shall have a smooth action. All tower bolts made with sheets 1.2 mm thickness and above shall have countersunk screw holes to suit countersunk head wood screws (see IS 6760 : 1972). All sharp edges and corners shall be removed and finished smooth.

5.1.1 Barrel and skeleton tower bolts, wherever possible, shall have knob integral with the bolts. In case it is not possible to provide a single piece construction of bolt, the knob may preferably be fitted to the bolt with a pin or alternatively, screwed and riveted to the bolt and its shape may be round, half round, spherical or conical, of robust construction as specified by the purchaser.

5.2 Particulars

5.2.1 Barrel Tower Bolts

Barrel made from sheet shall be properly pressed to shape. Cast barrel shall be free from casting and other surface defects. Mild steel bolt shall be made from mild steel round bar. Cast iron bolts shall be cast to correct shape and shall be free from casting and other surface defects (a typical illustration is shown in Table 1).

5.2.2 Semi-Barrel Tower Bolts

Mild steel bolts shall be made from mild steel round bars and finished to shape and polished bright before assembly. The cast iron bolts shall be cast to correct shape and shall be free from casting and other surface defects. Bolt shall be polished bright before assembly (typical illustrations are shown in Table 2).

5.2.3 Riveted or Spot Welded Tower Bolts

Mild steel bolts shall be made from mild steel round bars and finished to shape and polished bright before assembly. The cast iron bolts shall

be cast to correct shape and polished bright before assembly. The plates and straps after assembly shall be firmly riveted or spot welded (a typical illustration is shown in Table 3).

5.2.4 Skeleton Tower Bolts

The staples and plate in case of mild steel skeleton tower bolts shall be made from mild steel sheet (a typical illustration is shown in Table 4).

6 DIMENSIONS

6.1 The leading dimensions of barrel tower bolts and tolerances on them shall conform to those given in Table 1.

6.2 The leading dimensions of semi-barrel tower bolts and tolerances on them shall conform to those given in Table 2.

6.3 The leading dimensions of riveted or spot welded tower bolts and tolerances on them shall conform to those given in Table 3.

6.4 The leading dimensions of skeleton tower bolts and tolerances on them shall conform to those given in Table 4.

6.5 The tower bolts may be supplied in sizes and dimensions and shapes other than those specified in relevant tables of dimensions where so agreed between the manufacturer and the purchaser.

7 FINISH

7.1 Unless otherwise ordered for, the bolts shall be bright finished or bright, stain finished, Ni-Cr-plated as per Gr 1 of IS 1068 : 1985, copper oxidized as per IS 1376 : 1987 or zinc plated as per IS 1573 : 1986.

7.1.1 Other parts of the tower bolts shall be finished as given in 7.1 or may also be stove enamelled black.

8 MARKING

8.1 Each tower bolt shall be clearly marked with the indication of the source of manufacture or trade mark.

8.1.1 The tower bolt may also be marked with the Standard Mark.

9 PACKING

9.1 Barrel tower bolts shall be suitably packed in cartons. Each carton shall bear a label showing the indication of the source of manufacture or trade-mark, type, size and quantity of bolts.

9.2 Semi-barrel tower bolts shall be wrapped in strong paper in bundles, each containing 10 bolts up to 150 mm size, and 5 bolts above 150 mm. Each packet shall bear a label showing the indication of the source of manufacture or trade-mark, type, size and quantity of tower bolts.

9.3 Skeleton tower bolts shall be wrapped in strong paper in bundles, each containing 6 bolts. Each packet or carton shall bear a label showing the indication of the source of manufacture or trade-mark type, size and quantity of tower bolts.

10 SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY

10.1 Lot

In any consignment, all the tower bolts of the same type and size and manufactured at the same time, shall be grouped together to constitute a lot.

10.2 Sample Size

The number of tower bolts, to be selected from a lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 6.

10.2.1 These tower bolts shall be selected at random from at least 10 percent of the packets subject to a minimum of three, equal number of tower bolts being selected from each such packet.

10.3 Tests

All the tower bolts selected as in 10.2 shall be checked for dimensional requirements (*see* 6) and for finish (*see* 7). Any tower bolt which fails to satisfy the requirements of dimensions or finish or both shall be considered as a defective bolt.

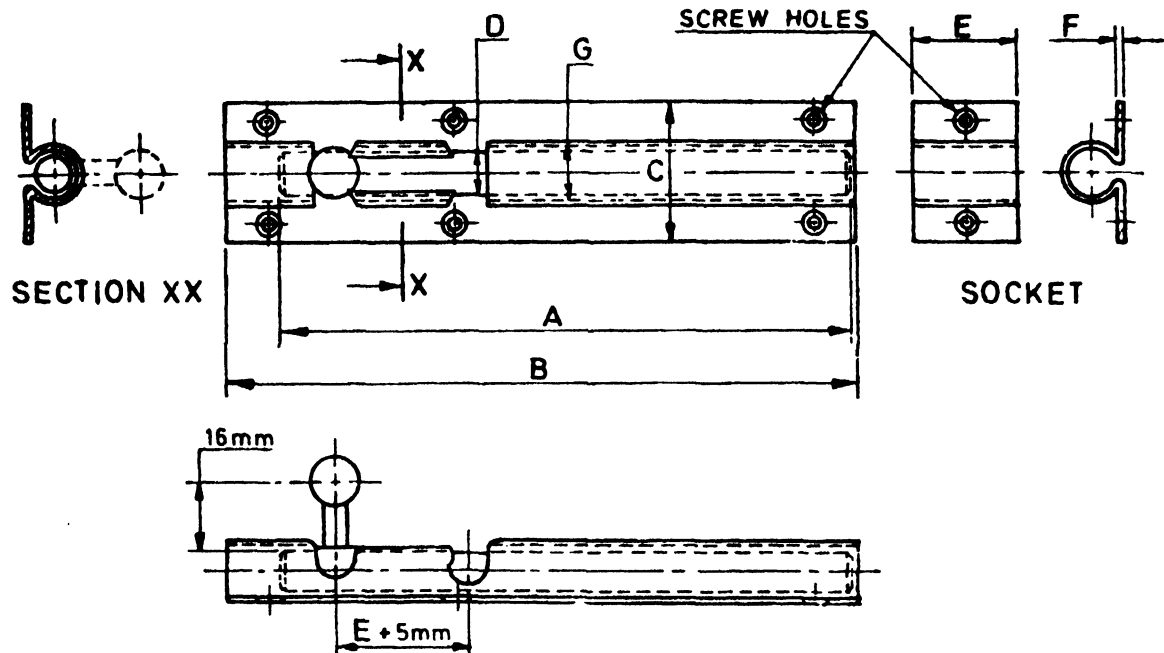
10.4 Criteria for Conformity

A lot shall be considered as conforming to the requirements of this standard if the number of defective bolts among those inspected does not exceed the corresponding number given in col 3 of Table 6; otherwise it shall be considered as not conforming to the requirements of this standard.

10.5 For conformity to the requirements of the material the manufacturer shall provide a certificate of compliance to the requirements of corresponding Indian Standard (*see* col 3 in Table 5).

Table 1 Barrel Tower Bolts
(*Clauses 3.1, 5.2.1 and 6.1*)

All dimensions in millimetres.



Size	Length of Bolt, A	Length of Barrel, B	Width of Barrel, C		Dia of Bolt, D	Length of Socket, E	Thickness of Mild Steel Sheet for Barrel, F	Dia of Bore of Barrel or Socket, G	Minimum No. of Equally Spaced Screw Holes in Barrel and Sockets for Wood Screw No. 6
			When D = 10.0	When D = 12.0					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
75	75	95	32	38	10.0 or 12.0	25	1.25	0.7 to 1.5 more than dia of	6
100	100	120							6
125	125	145							6
150	150	170							8
175	175	195							8
200	200	220							8
225	225	245							8
250	250	270	32	38	10.0 or 12.0	25	1.25	0.7 to 1.5 more than dia of	10
300	300	320							10
Tolerance	+ 3 - 1	+ 3 - 1	+ 3 - 1	+ 3 - 1	± 0.5	± 1	± 0.15	—	—

Table 2 Semi-Barrel Tower Bolts
(*Clauses 3.1, 5.2.2 and 6.2*)

All dimensions in millimetres.

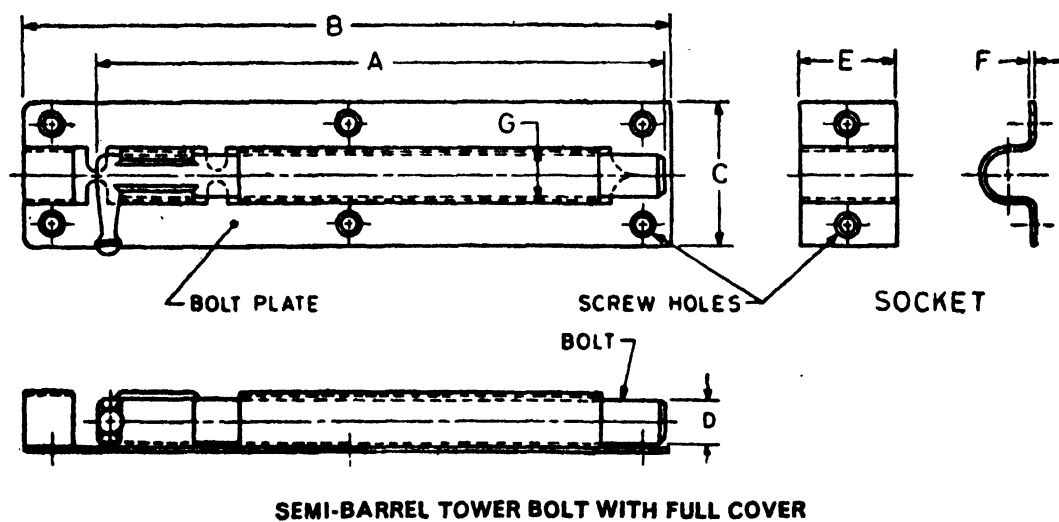
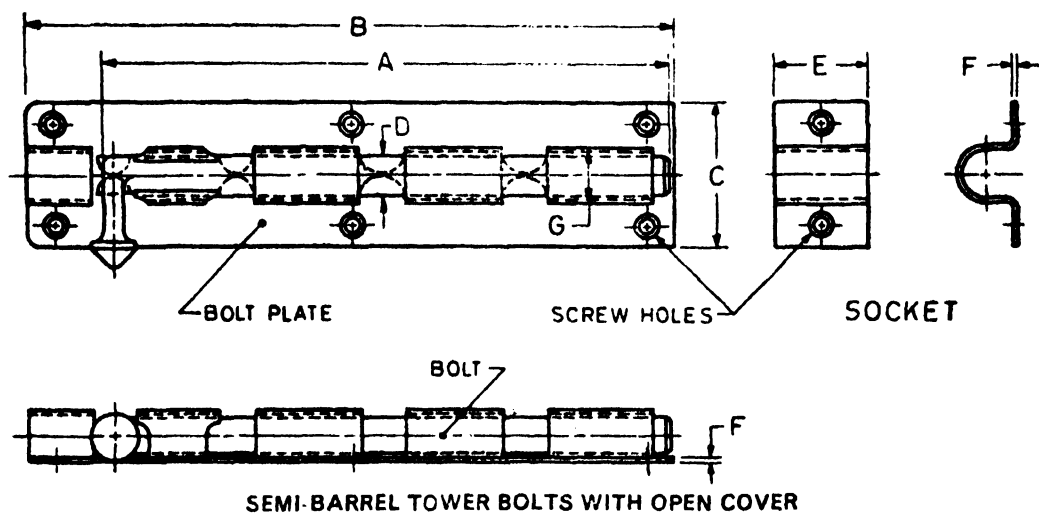


Table 2 — Concluded

Size	Length of Bolt, A	Length of Bolt Plate, B	Width of Bolt Plate, C	Dia of Bolt, D	Length of Socket, E	Thickness of Bolt Plate or Socket, F	Dia of Bore of Bolt Plate or Socket, G	Minimum No. of Equally Spaced Screw Holes in Bolt Plate and Socket for Wood Screw No. 6
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
75	75	95	38	10·0	25	1·25	1 to 1·5 more than dia of bolt	6
100	100	120	38	10·0				6
125	125	145	42	10·0				6
150	150	175	42	12·0				8
175	175	200	42	12·0				8
200	200	225	42	12·0				8
225	225	250	42	12·0				8
250	250	275	42	12·0				10
300	300	325	42	12·0				10
375	375	400	42	12·0				10
450	450	475	42	12·0				10
Tolerance	+ 3 - 1	+ 3 - 1	± 2	± 0·5	± 1	± 0·15	—	—

Table 3 Riveted or Spot Welded Tower Bolts
(*Clauses 3.1, 5.2.3 and 6.3*)

All dimensions in millimetres.

Size	Length of Bolt, A	Length of Bolt Plate, B	Width of Bolt Plate, C	Dia of Bolt, D	Length of Socket, E	Length of Strap, E'	Thickness of Back Plate, F	Thickness of Socket or Upper Plate and Strap, F'	Dia of Bore of Bolt Plate or Socket, G	Length of Alternative Socket, H	Minimum No. of Equally Spaced Screw Holes in Bolt Plate and Socket for Wood Screw No. 6
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
100	100	120	40	10'0						30	8
125	125	145	40	10'0						30	8
150	150	180	45	12'0						35	8
175	175	205	45	12'0						35	8
200	200	230	45	12'0						35	8
225	225	255	45	12'0						35	8
250	250	280	45	12'0	25	31	1'60	1'25	1 to 1'5 more than dia of bolt	35	10
300	300	330	45	12'0						35	10
375	375	405	45	12'0						35	10
450	450	480	45	12'0						35	12
600	600	630	45	12'0						35	14
750	750	780	45	12'0						35	16
900	900	930	45	12'0						35	16
Tolerance	+ 3 - 1	+ 3 - 1	± 1	± 0'5	± 1	—	± 0'15	± 0'15	—	—	—

*For spot welded type, same dimensions shall be given; however, there shall not be riveted holes.

Table 4 Skeleton Tower Bolts
(*Clauses 3.1, 5.2.4 and 6.4*)

All dimensions in millimetres.

Size	Length of Bolt, A	Length of Bolt Plate, B	Width of Bolt Plate or Staple, C	Dia of Bolt, D	Length of Staple, E	Thick-ness of Plate or Staple, F	Dia of Bore of Plate or Staple, G	Dia of Shank of Knob, J	No. of Staples	Minimum No. of Screw Holes for Wood Screw No. 6
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
375	375	170	32	10'00	25	1'25	1 to 1'5 more than dia of bolt	5'0	3	14
450	450								3	14
600	600								4	16
750	750								5	18
900	900								6	20
Tolerance	± 3	± 2	± 2	± 0'5	± 1	± 0'15	—	+ 0'5 — 0	—	—

Table 5 Requirements for Materials for Tower Bolts
(*Clauses 4.1 and 10.5; and Annex A*)

Sl No.	Material	Suitable Grade in Indian Standard
(1)	(2)	(3)
i)	Mild steel sheets	Grade 0-1079 of IS 1079 : 1988 or Grade D of IS 513 : 1986
ii)	Mild steel bars	Grade Fe 310-0 of IS 1977 : 1975
iii)	Cast iron	Grade FG 150 of IS 210 : 1978

**Table 6 Scale of Sampling and Criterion
for Conformity**(*Clauses 10.2 and 10.4*)

Lot Size	Sample Size	Permissible Number of Defective Tower Bolts
(1)	(2)	(3)
Up to 200	15	0
201 .. 300	20	1
301 .. 500	30	2
501 .. 800	40	2
801 and above	55	3

ANNEX A(*Clause 2.1*)**LIST OF INDIAN STANDARDS**

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
210 : 1978	Grey iron castings (<i>third revision</i>)	1378 : 1987	Oxidized-copper finishes (<i>third revision</i>)
513 : 1986	Cold rolled low carbon steel sheets and strips (<i>third revision</i>)	1573 : 1986	Electroplated coatings of zinc on iron and steel (<i>second revision</i>)
1068 : 1985	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium on iron and steel (<i>second revision</i>)	1977 : 1975	Structural steel (ordinary quality) (<i>second revision</i>)
1079 : 1988	Hot rolled carbon steel sheet and strip (<i>fourth revision</i>)	6760 : 1972	Slotted countersunk head wood screws

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