METRIC ROUND HEAD RIBBED NECK BOLTS

IFI-544
1998

GENERAL DATA

1. Scope

1.1 This standard covers the complete general and dimensional data for metric series round head ribbed neck bolts in sizes M5 thru M14, intended for general engineering applications.

1.2 The inclusion of dimensional data in this standard is not intended to imply that all sizes described are production stock items. Consumers should consult with manufacturers concerning lists of stock production items.

2. Comparison With ISO Standards

There is no ISO product standard for metric round head ribbed neck bolts at this time.

3. Dimensions

3.1 All dimensions in this standard are in millimeters, unless stated otherwise.

3.2 Symbols specifying geometric characteristics are in accord with American National Standard, Dimensioning and Tolerancing, ASME Y14.5M.

4. Terminology

For definitions of terms relating to fasteners or component features thereof used in this standard, refer to American National Standard, Glossary of Terms for Mechanical Fasteners, ASME B18.12. See page K–37.

5. Top of Head

The spherical top surface of the head may be underfilled within a circle equal to the nominal bolt diameter, D, concentric to the bolt axis, providing the head height, K, is maintained.

6. Head Height

The head height is the distance, measured parallel to the axis of the bolt, from the top of the head to the underhead bearing surface.

7. Head Periphery

The head periphery shall be round within the specified maximum head diameter, D_c, and the minimum bearing surface diameter, D_w, and may be somewhat irregular. The edge may be rounded or flat, providing the limits for head diameter, D_c, bearing surface diameter, D_w, and head edge thickness, C, (measured at the minimum bearing surface diameter) are maintained.

8. Bearing Surface

The bearing surface shall be reasonably flat and perpendicular to the axis of the bolt. However, a 0.5 mm maximum height die seam fin across the bearing surface shall be permissible.

9. Fillets

The radius of fillets at the junction of head and shank shall be within the specified limits, except for bolts produced from nonferrous and corrosion resistant materials, on which maximum fillets shall be subject to agreement between manufacturer and purchaser.

10. Body Diameter

10.1 Unless otherwise specified, bolts may be furnished with either the full or reduced body diameters specified in Tables 1 and 4, respectively.

10.2 There may be reasonable swell, fin, or die seam on the body adjacent to the shank not

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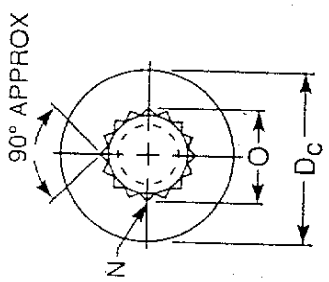

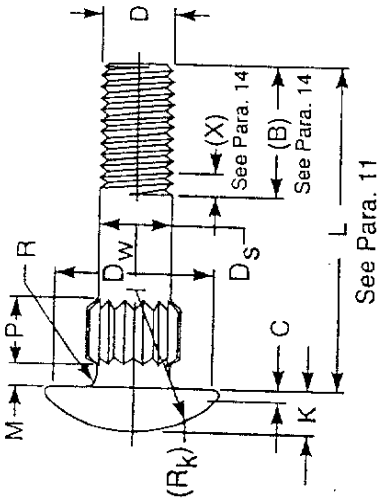

Table 1 Dimensions of Round Head Ribbed Neck Bolts

D	D_s		R_k	K		C		D_c	D_w	M		N	O	P			R
Nom Bolt Size and Thread Pitch	Dia of Full Body		Head Rad	Head Height		Head Edge Thickness		Head Dia	Bearing Surface Dia	Head to Ribs		No. of Ribs	Dia Over Ribs	Depth Over Ribs for Lengths of			Fillet Radius
	Max	Min	Ref	Max	Min	Max	Min	Max	Min	22.23 & Shorter	25.40 & Longer	Approx	Min	22.23 & Shorter	25.40 – 28.58	31.75 & Longer	Max
										+/– 0.80				+/– 0.80			
M5 × 0.8	5.48	4.52	8.8	3.1	2.5	1.8	1.0	11.8	9.8	0.80	1.60	9	5.5	6.40	10.4	15.1	0.80
M6 × 1.0	6.48	5.52	10.7	3.6	3.0	1.9	1.1	14.2	12.2	0.80	1.60	10	6.7	6.40	10.4	15.1	0.80
M8 × 1.25	8.58	7.42	12.5	4.8	4.0	2.2	1.2	18.0	15.8	0.80	1.60	12	8.7	6.40	10.4	15.1 .	0.80
M10 × 1.5	10.58	9.42	15.5	5.8	5.0	2.5	1.5	22.3	19.6	0.80	1.60	12	10.8	6.40	10.4	15.1	0.80
M12 × 1.75	12.70	11.30	19.0	6.8	6.0	2.8	1.8	26.6	23.8	0.80	1.60	14	12.8	6.40	10.4	15.1	0.80
M14 × 2	14.20	13.30	21.9	7.9	7.0	3.3	2.1	30.5	27.6	0.80	1.60	16	14.9	6.40	10.4	15.1	0.80
See Para.	10		5	6, 18		7		7	7.8								

to exceed the nominal bolt diameter by the following:

0.50 mm for M5
0.65 mm for M6
0.75 mm for M8 through M14

11. Length

The length of the bolt shall be measured parallel to the axis of the bolt from the underside of the head to the extreme end of the shank. Tolerances for bolt lengths are given in Table 3.

12. Point

Bolts need not be pointed.

13. Straightness

Shanks of bolts shall be straight within a maximum camber at maximum material condition of 0.006 mm/mm of bolt length for bolts having nominal lengths of 300 mm or shorter and within 0.008 mm/mm of bolt length for bolts having nominal lengths over 300 mm to 600 mm. A gage and gaging procedure for checking bolt straightness is given in Appendix I of ANSI B18.2.3.5M, page C–59.

14. Thread Length

See Table 2 for minimum thread length plus (X) reference, transition thread length.

15. Incomplete Thread Diameter

The major diameter of incomplete thread shall not exceed the actual major diameter of the full form thread.

16. Threads

16.1 Threads shall be coarse series general purpose external metric threads conforming to ASME B1.13M, page A–20, unless otherwise specified by the purchaser. Tolerance Class 6g shall apply to plain finish (unplated or uncoated) bolts, and to plated or coated bolts before plating or coating. As specified in ASME B1.13M, for bolts with additive finish the thread profile after coating or plating shall not exceed the maximum material limits for tolerance position 6h High Limit (GO).

Table 2 Thread Lengths

Nominal Bolt Dia and Thread Pitch	(B) Minimum Thread Length			(X)
	Bolt Lengths ≤ 125	Bolt Lengths > 125 and ≤ 200	Bolt Lengths > 200	Transition Thread Length Ref
M5 x 0.8	16	22	35	4.0
M6 x 1	18	24	37	5.0
M8 x 1.25	22	28	41	6.2
M10 x 1.5	26	32	45	7.5
M12 x 1.75	30	36	49	8.8
M14 x 2.0	34	40	53	10.0

16.2 Acceptability of threads shall be based on System 21, ASME B1.3M, page A–46, unless otherwise specified by the purchaser.

17. Materials and Mechanical Properties

17.1 Unless otherwise specified, steel bolts shall conform to the requirements specified in SAE J1199 or ASTM F568M, page B–56.

17.2 Properties of bolts of several grades of nonferrous materials are covered in ASTM F468M, page B–99, and stainless steel materials in ASTM F738M, page B–79.

18. Identification Symbols

Steel bolts shall be marked with the property class symbol and with the manufacturer's identification symbol. Minimum height of property class symbols shall be 1.5 mm for M5 and M6 bolts, 2.3 mm for M8 and M10 bolts, and 3.2 mm for M12 bolts. Markings shall be located on the top of the head and may be raised or recessed unless otherwise ordered by the purchaser. When raised, markings shall project not less than 0.1 for M12 and smaller bolts, above the surface of the head, and total head height (head plus markings) shall not exceed the specified maximum head height plus 0.1 mm for M5 and M6 bolts, 0.2 mm for M8 and M10 bolts, and 0.3 mm for M12 and M14 bolts.

19. Surface Condition

Bolts in the as-headed and rolled condition need not be finished on any surface except the threads.

20. Finish

Unless otherwise specified, bolts shall be supplied with a natural (as processed) finish, unplated or uncoated.

Table 3 Length Tolerances

Nominal Length (mm)	Nominal Bolt Diameter	
	M5 thru M8	M10 thru M14
To 50	± 0.8	± 1.3
Over 50 to 80	± 1.0	± 1.5
Over 80 to 120	± 1.1	± 1.8
Over 120 to 180	± 2.0	± 2.0
Over 180 to 240	± 4.0	± 4.0
Over 240	± 5.0	± 5.0

21. Options

Options, where specified, shall be at the discretion of the manufacturer unless otherwise agreed upon by the manufacturer and the purchaser.

22. Workmanship

Bolts shall be free from defects which might affect their serviceability, such as excessive burrs, seams, laps, loose scale, and other irregularities. Additionally, the manufacturer shall ensure the integrity of the head-to-shank junction of the product.

23. Designation

Bolts are designated by the following data, preferably in the sequence shown: product name, nominal diameter and thread pitch, nominal length, steel property class or material identification, and protective coating, if required.

Examples:

Round Head Ribbed Neck Bolt, M10 × 1.5 × 50, Class 5.8, zinc plated.

Round Head Ribbed Neck Bolt with reduced diameter body, M10 × 1.5 × 80, Class 9.8, zinc plated.

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Round Head Ribbed Neck Bolt, M12 × 2 × 80, Class C4-50, ASTM F738M.

Note

It is common practice in ISO standards to omit thread pitch from the product size designation when screw threads are the metric coarse thread series, e.g., M10 is M10 × 1.5.

24. Inspection and Quality Assurance

Unless otherwise specified by the purchaser in the original inquiry and purchase order, acceptability shall be based on conformance with the requirements specified in ASME/ANSI B18.18.1M, page L–5.

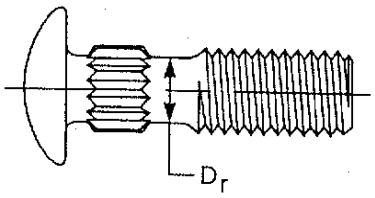

Table 4 Reduced Diameter Body

Nominal Bolt Dia and Thread Pitch	D_r	
	Diameter of Reduced Body	
	Max	Min
M5 × 0.8	5.00	4.36
M6 × 1	6.00	5.21
M8 × 1.25	8.00	7.04
M10 × 1.5	10.00	8.86
M12 × 1.75	12.00	10.68
M14 × 2	14.00	12.50