

AS/NZS 1427:1996

Australian/New Zealand Standard[®]

ISO metric machine screws

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The following interests are represented on Committee ME/29:

Australian Chamber of Commerce and Industry
Bureau of Steel Manufacturers of Australia
Electricity Supply Association of Australia
Fasteners Institute of Australia
Federal Chamber of Automotive Industries
Metal Building Products Manufacturers Association
Metal Trades Industry Association of Australia
New Zealand Joinery Manufacturers Federation
New Zealand Manufacturers Federation
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME/29 on Fasteners to supersede AS 1427—1974, *ISO metric machine screws* and in part, NZS/BS 4183:1967, *Specification for machine screws and machine screw nuts. Metric series*.

Major technical changes incorporated in this edition relate to the mechanical properties and testing requirements in order to align with relevant ISO requirements. Other changes include the following:

- (a) Updating the list of reference documents.
- (b) Deletion of material requirements for brass and aluminium alloy machine screws.
- (c) Revision of the identification marking requirements.
- (d) Revision of dimensions to align with ISO requirements.
- (e) Editorial changes in accordance with current policy.

All head types and proportions given in this Standard are in accordance with International Standards, with the exception of mushroom and hexagon washer heads, for which no international recommendations or draft recommendations exist. These types of head configuration are widely used in Australian industries in light metal fabrication, and were previously covered in specifications for imperial machine screws. For indented hexagon heads, the ‘across flats’ dimensions are those for the ‘normal’ size hexagon as given in AS/NZS 1110 and AS/NZS 1111. However, because of the mode of production, the head heights have been increased to compensate for the lack of fill on the corners. The hexagon washer heads are based on the next smaller sized hexagon rather than the normal series specified in AS/NZS 1110 and AS/NZS 1111. This also, is to accommodate the method of production and is in line with current manufacturing methods. The head heights have similarly been increased to overcome the problem of fill on the hexagon corners.

This Standard is based on the following International Standards:

ISO 1207:1992	Slotted cheese head screws—Product grade A
ISO 1580:1994	Slotted pan head screws—Product grade A
ISO 2009:1994	Slotted countersunk flat head screws (common head style)—Product grade A
ISO 2010:1994	Countersunk slotted raised head screws (common head style)—Product grade A
ISO 7045:1994	Pan head screws with type H or type Z cross recess—Product grade A
ISO 7046.1:1994	Countersunk flat head screws (common head style) with type H or type Z cross recess—Product grade A, Part 1: Steel of property class 4.8
ISO 7047:1994	Countersunk raised head screws (common head style) with type H or type Z cross recess—Product grade A

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
ISO metric machine screws

1 SCOPE This Standard specifies the dimensional and marking requirements for machine screws with ISO metric coarse pitch series threads with head styles and threads as given in Table 1, and the material requirements for steel machine screws of property class 4.8.

TABLE 1
METRIC MACHINE SCREWS

Head style	Drive	Thread range	Figure No.
Countersunk	Slot Cross-recess	M1.6 to M20 M2 to M10	1
Raised countersunk	Slot Cross-recess	M1.6 to M10 M2 to M10	2
Pan	Slot Cross-recess	M1.6 to M10 M1.6 to M10	3
Cheese	Slot	M2.5 to M10	4
Mushroom	Slot	M3 to M8	5
Hexagon	Hexagon	M3 to M10	6
Hexagon washer	Hexagon	M3 to M10	7

2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

1275 Metric screw threads for fasteners

1654 ISO system of limits and fits

1654.2 Tables of standard tolerance grades and limit deviations for holes and shafts

1897 Electroplated coatings on threaded components (metric coarse series)

AS/NZS

4291 Mechanical properties of fasteners

4291.1 Part 1: Bolts, screws and studs

HB18 Guidelines for third-party certification and accreditation

HB18.22 Guide 22: Information on manufacturer's declaration of conformity with standards or other technical specifications.

ISO

4757 Cross recesses for screws

6157 Fasteners—Surface discontinuities

6157.1 Part 1: Bolts, screws and studs for general requirements

7721 Countersunk head screws—Head configuration and gauging

NZS

ISO 286 ISO system of limits and fits

ISO 286.2 Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts

3 DEFINITIONS For the purpose of this Standard, the definitions below apply.

3.1 Concentricity tolerance—the allowable deviation of the head with respect to the screw thread.

3.2 May—indicates existence of an option.

3.3 Nominal length (*l*)—the distance from the appropriate position on the head as follows, to the extreme end of the screw:

- (a) For countersunk head screws from the upper surface of the head.
- (b) For raised countersunk head screws from the upper surface of the head excluding the raised portion.
- (c) For screws with other heads from the underside of the head.

3.4 Symmetry tolerance—the allowable deviation of the location of the driving feature with respect to the screw thread.

3.5 Transition diameter—the diameter of a circle found at the transition between the fillet radius and the bearing surface of the head other than a countersunk or raised countersunk head.

3.6 Shall—indicates that a statement is mandatory.

3.7 Should—indicates a recommendation.

4 METHOD OF MANUFACTURE Machine screws shall be—

- (a) hot or cold forged with or without secondary machining; or
- (b) machined from bar stock.

5 SHAPE, DIMENSIONS AND FINISH

5.1 Heads of screws

5.1.1 General The geometry and dimensions of machine screw heads shall be as shown in Figures 1 to 7 and ISO 7721 as appropriate.

Where the screws are to be hot-dip galvanized, the dimensions shown in Figures 1 to 7 shall apply before galvanizing.

5.1.2 Hexagon heads The across flats dimension of hexagon heads shall be measured at the point of maximum material, and the taper of the sides of the hexagon (the angle between one side and the axis) shall be not greater than two degrees. All edges and corners of the hexagon surfaces may be slightly rounded.

For heads formed with an integral washer, the radius (R_w) at the junction of the sides of the hexagon and the top surface of the washer shall not exceed the values given in Figure 7.

Plain hexagon heads and hexagon washer heads may be indented.

The rounding due to lack of fill on all six corners of the hexagon shall be reasonably uniform. The dimension across the corners of the head shall be such that it will be accepted by a ring gauge as shown in Figures 6 and 7. The ring gauge shall be placed on the top and bottom of the head, or on the top only for hexagon washer head screws, and the head shall protrude by an amount equal to or greater than the value F shown in Figures 6 and 7.

5.1.3 Drive slots The drive slots of slotted-head machine screws shall be as shown in Figures 1 to 5.

5.1.4 Drive recesses The drive recesses of cross-recess head screws shall be as given in ISO 4757 for the recess number and type shown in Figures 1 to 3. When determined in accordance with ISO 4757, the penetration of the gauge into the recess shall be as shown in Figures 1 to 3.

5.2 Length of machine screws The prepared lengths for machine screws shall be as given in Tables 2 to 6.

The tolerance on length shall be as given in Table 7. The tolerance values are determined from the js15 deviations given in AS 1654.2 or NZS/ISO 286.2.

5.3 Ends of screws and screw points

5.3.1 Rolled threads When screws are made with rolled threads, the lead formed at the end of the screw by the rolling operation shall be regarded as providing the necessary chamfer, no other machining operation being necessary, and the end shall be reasonably square with the axis of the screw threads (see Figure 8). The first two threads will not be full threads and should not be used for load-carrying purposes.

5.3.2 Cut threads The ends of screws with cut threads shall be finished with a nominal 45 degree chamfer, the depth slightly exceeding the depth of thread (see Figure 8).

NOTE: If the purchaser requires pilot points, this should be specified in the order. For further information on pilot points see Appendix A.

5.4 Screw threads

5.4.1 General The form of thread, diameters and associated pitches of machine screws shall be the ISO coarse pitch series in accordance with AS 1275.

The screw threads of steel machine screws shall be formed by thread rolling or thread cutting.

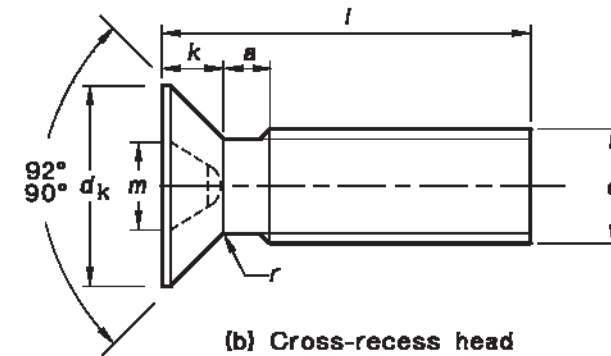
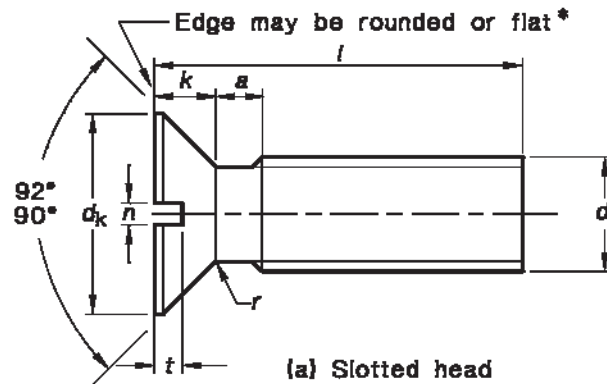
5.4.2 Tolerances The screw threads shall be made to the tolerance class 6g as specified in AS 1275.

Where the screws are to be hot-dip galvanized, the 6g tolerance shall apply before galvanizing.

5.5 Length of thread Machine screws shall be threaded such that when a 6g GO screw ring gauge is screwed as far as practicable on to the screw by hand, the distance from the nearest face of the gauge to the following, shall not be greater than the thread runout (a) shown in Figures 1 to 7:

- (a) For countersunk head and raised countersunk head screws . . . the junction of the major diameter of the thread and the countersunk portion of the head.
- (b) For other types of screws the bearing surface of the head.

NOTE: Where screws are required other than threaded to the head, this is a matter for agreement between the purchaser and the supplier.



millimetres

Thread†	Nom. pitch (p)	General						Slotted heads				Cross-recess heads							
												Type Z (Pozidriv)				Type H (Phillips)			
		Head dia. (d_k)		Head height (k)		Fillet radius (r) (max.)	Thread runout (a) (max.)	Slot width (n)		Slot depth (t)		Penetration		Recess dia. (m)	Driver point No.	Penetration		Recess dia. (m)	Drive point No.
		Max.	Min.	Max.	Min.			Max.	Min.	Max.	Min.	Max.	Min.	Nom.		Max.	Min.	Nom.	
M1.6	0.35	3.0	2.7	1.0	0.80	0.4	0.7	0.6	0.46	0.50	0.32	—	—	—	—	—	—	—	—
M2	0.4	3.8	3.5	1.20	1.02	0.5	0.8	0.7	0.56	0.60	0.40	1.2	0.95	1.9	0	1.2	0.9	1.9	0
M2.5	0.45	4.7	4.4	1.50	1.30	0.6	0.9	0.8	0.66	0.75	0.50	1.73	1.48	2.8	1	1.8	1.4	2.9	1
M3	0.5	5.5	5.2	1.65	1.43	0.8	1.0	1.0	0.86	0.85	0.60	2.01	1.6	3.0	1	2.1	1.7	3.2	1
(M3.5)	0.6	7.3	6.9	2.35	1.69	0.9	1.2	1.2	1.06	1.2	0.09	2.20	1.75	4.1	2	2.4	1.9	4.4	2
M4	0.7	8.4	8.0	2.7	1.94	1.0	1.4	1.51	1.26	1.3	1.00	2.51	2.06	4.4	2	2.6	2.1	4.6	2
M5	0.8	9.3	8.9	2.7	2.20	1.3	1.6	1.51	1.26	1.4	1.10	3.05	2.6	4.9	2	3.2	2.7	5.2	2
M6	1.0	11.3	10.9	3.3	2.66	1.5	2.0	1.91	1.66	1.60	1.20	3.45	3.0	6.6	3	3.5	3.0	6.8	3
M8	1.25	15.8	15.4	4.65	3.58	2.0	2.5	2.31	2.06	2.3	1.80	4.6	4.15	8.8	4	4.6	4.0	8.9	4
M10	1.5	18.3	17.8	5.00	4.50	2.5	3.0	2.81	2.6	2.50	2.00	5.64	5.19	9.8	4	5.7	5.1	10.0	4
M12	1.75	22.0	21.5	6.00	5.40	—	3.5	3.31	3.06	3.00	2.40	—	—	—	—	—	—	—	—
(M14)	2.0	25.5	25.0	7.0	6.3	—	4.0	3.31	3.06	3.00	2.40	—	—	—	—	—	—	—	—
M16	2.0	29.0	28.5	8.00	7.20	—	4.0	4.37	4.07	4.00	3.20	—	—	—	—	—	—	—	—
(M18)	2.5	32.5	31.9	9.0	8.1	—	5.0	4.37	4.07	4.50	3.60	—	—	—	—	—	—	—	—
M20	2.5	—	35.4	10.00	9.00	—	5.0	5.37	5.07	5.00	4.00	—	—	—	—	—	—	—	—

* See ISO 7721

† Sizes in parentheses are non-preferred.

FIGURE 1 DIMENSIONS OF COUNTERSUNK HEAD SCREWS