

Australian Standard™

**Self-drilling screws for the building and
construction industries**

**Part 1: General requirements and
mechanical properties**

This Australian Standard was prepared by Committee ME-029, Fasteners. It was approved on behalf of the Council of Standards Australia on 28 February 2002 and published on 19 March 2002.

The following interests are represented on Committee ME-029:

- Australian Building Codes Board
- Australian Chamber of Commerce and Industry
- Australian Industry Group
- Bureau of Steel Manufacturers of Australia
- Electricity Supply Association of Australia
- Federal Chamber of Automotive Industries
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STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 3566.1—2002

**Self-drilling screws for the building and construction industries
Part 1: General requirements and mechanical properties**

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NOTES

Australian Standard™

Self-drilling screws for the building and construction industries

Part 1: General requirements and mechanical properties

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PREFACE

This Standard was prepared by the Standards Australia Committee ME-029, Fasteners to supersede (in part) AS 3566—1988, *Screws—Self-drilling—For the building and construction industries*.

The objective of this Standard is to provide manufacturers and users with the general requirements and mechanical properties for self-drilling screws used in the building and construction industries.

This Standard is Part 1 of a two-part series dealing with self-drilling screws for the building and construction industries. Part 2 specifies the corrosion resistance requirements for self-drilling screws.

The size designations given in AS/NZS 4411:1996, *Tapping screws thread* have been adopted in this Standard. The equivalent screw number designations used in the 1988 edition are given in parenthesis.

Statements expressed in mandatory terms in notes to tables in figures are deemed to be requirements of this Standard.

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

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STANDARDS AUSTRALIA

Australian Standard

Self-drilling screws for the building and construction industries

Part 1: General requirements and mechanical properties

SECTION 1 SCOPE AND GENERAL
REQUIREMENTS**1.1 SCOPE**

This Standard specifies the general requirements and mechanical properties for the following types of self-drilling screws used in the building and construction industries:

- (a) Screws for drilling and tapping into layered or unlayered steel of 0.9 mm minimum total thickness.
- (b) Screws for drilling and tapping into timber.
- (c) Screws for fixing plasterboard to steel with a maximum thickness of 0.8 mm.

1.2 APPLICATION

Self-drilling screws shall comply with Section 1 and with the relevant requirements of Sections 2, 3 and 4 and AS 3566.2.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

- | | |
|----------|--|
| 1397 | Steel sheet and strip—Hot-dipped zinc-coated or aluminium/zinc-coated |
| 4291 | Mechanical properties of fasteners made of carbon steel and alloy steel |
| 4291.1 | Part 1: Bolts, screws and studs |
| 3566 | Self-drilling screws for the building and construction industries |
| 3566.2 | Part 2: Corrosion resistance requirements |
| HB 18 | Guidelines for third-party certification and accreditation |
| HB 18.22 | Guide 22: Information on manufacturers' declaration of conformity with Standards or other technical specifications |

AS/NZS

- | | |
|--------|---|
| 1080 | Timber—Methods of test |
| 1080.1 | Method 1: Moisture content |
| 1080.3 | Method 3: Density |
| 4406 | Cross recessed pan head tapping screws |
| 4407 | Cross recessed countersunk (flat) head tapping screws (common head style) |

ISO

- | | |
|------|--|
| 272 | Fasteners—Hexagon products—Widths across flats |
| 4757 | Cross recesses for screws |

ISO	
4759	Tolerances for fasteners
4759-1	Part 1: Bolts, screws, studs and nuts—Product grades A, B and C
15330	Fasteners—Preloading test for the detection of hydrogen embrittlement—Parallel bearing surface method
SAE	
J423	Methods of measuring case depth

1.4 CLASSIFICATION AND DESIGNATION

Self-drilling screws shall be classified by type and size and the designation shall be comprised of the following information:

- General product description.
- The number of this Australian, i.e. AS 3566.1.
- Size.
- Type.
- The nominal length, in millimetres.
- Head type and drive.
- Coating or material if inherently corrosion resistant and corrosion resistance class in accordance with AS 3566.2.

1.5 MATERIALS

Self-drilling screws shall be manufactured from case hardening steel or heat treatable steel.

1.6 METHOD OF MANUFACTURE

Self-drilling screws shall be manufactured by cold forging and the threads shall be formed by rolling.

Self-drilling screws shall be heat treated and tempered to achieve the mechanical properties specified.

1.7 HEADS

1.7.1 Types of heads

The shape and dimensions of heads for self-drilling screws shall be suitable for the application intended by the manufacturer. The shape and dimensions of hexagon washer heads, cross recessed wafer heads, cross recessed and hexagon socket bugle heads, and cross recessed pan heads shall be as follows:

- Hexagon washer heads as shown in Figure 1.1.
- Cross recessed wafer heads as shown in Figure 1.2.
- Cross recessed and hexagon socket bugle heads as shown in Figure 1.3
NOTE: Bugle heads type 17 are used only for fixing to timber.
- Cross recessed pan head in accordance with
AS/NZS 4406 with type
H (Phillips) cross recess.
- Cross recessed counter-sunk flat heads in accordance with
AS/NZS 4407 with type
H (Phillips) cross recess.

1.7.2 Driving features

The driving features shall be suitable for use with hand-held machine-operated driving equipment and shall be within the concentricity, symmetry and run-out tolerances given in ISO 4759-1 for products grades A and B.

Cross recesses shall be type H (Phillips) in accordance with ISO 4757.

The across flats dimensions of external hexagon driving features except hexagon washer heads in accordance with Item 1.7(a) shall be selected from ISO 272 and shall be within the tolerances given in ISO 4759-1 for products grade A and B. The wrenching height shall not be less than 0.7 times the height of the hexagon.

The across flats dimensions of internal hexagon driving features shall be selected from Table 1.1 and shall be within the tolerance given in ISO 4759-1 for products grade A and B. The depth of key engagement shall be not less than the value given in Table 1.1.

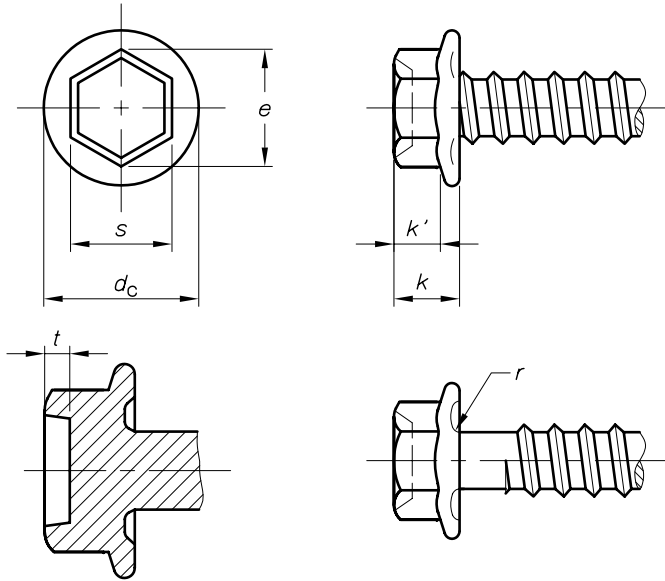
Where proprietary driving features are used, manufacturers shall ensure that suitable driving tools are available.

1.7.3 Self-embedding features

Heads of self-drilling screws for fixing timber to steel or timber to timber may be provided with self-embedding features where appropriate.

TABLE 1.1
NOMINAL DIMENSION OF INTERNAL
HEXAGON DRIVE FEATURES

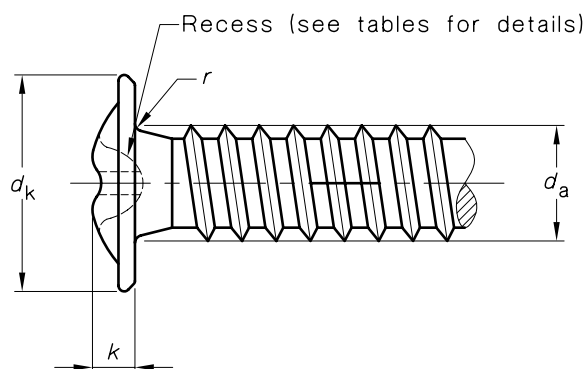
millimetres	
Across flats	Depth of key engagement
3	2
4	3
5	4
6	4.5



											millimetres
Size designation	Width across flats		Washer dia.		Across corners (min.) (e)	Wrenching height		Head height		Indent depth (max.) (t)	Fillet radius (min.) (r)
	(s)		(d _c)			(k')		(k)			
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.		
ST 3.5 (No. 6)	6.20	6.35	8.38	9.14	6.91	1.90	2.29	3.05	3.43	1.14	0.25
ST 4.2 (No. 8)	6.20	6.35	9.40	10.29	6.91	2.41	2.79	3.68	4.32	1.14	0.38
ST 4.8 (No. 10)	7.78	7.92	10.67	11.43	8.64	2.79	3.30	4.32	4.83	1.40	0.38
ST 5.5 (No. 12)	7.78	7.92	13.97	14.78	8.64	3.61	3.94	5.08	5.92	1.65	0.51
ST 6.3 (No. 14)	9.32	9.52	13.97	15.49	10.39	4.06	4.70	5.84	6.60	1.91	0.76

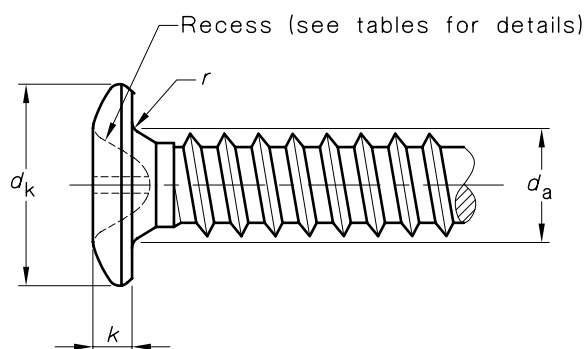
- NOTES:
- 1 Screws with hexagon washer head are used for fixing roofing profiles through the crest and fixing wall cladding through the valley. Other designs of heads may be used, provided that dimension d_c is as shown.
 - 2 Hexagon head with separate washer is also permitted, provided that the hexagon head conforms to the dimensions shown and the washer outside diameter conforms to dimension d_c .

FIGURE 1.1 HEXAGON WASHER HEAD



millimetres											
Size designation	Head dia. (d_k)		Taper dia. (d_a)		Head height (k)		Cross recess No.	Cross recess penetration value		Radius (r)	
	Min.	Max.	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
ST 3.5 (No. 6)	6.73	6.86	4.06	4.32	1.39	1.65	Type H No. 2	1.27	1.88	0.25	0.51
ST 4.2 (No. 8)	7.77	8.18	4.57	4.83	1.65	1.90	Type H No. 2	1.27	1.90	0.25	0.51
ST 4.8 (No. 10)	8.94	9.53	4.83	5.21	1.52	2.03	Type H No. 2	1.90	2.67	0.38	0.89

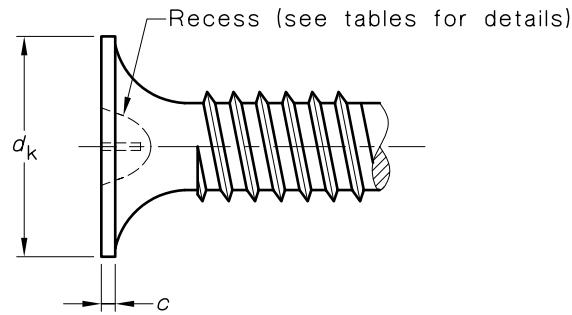
(a) Wafer head—Style 1



millimetres											
Size designation	Head dia. (dk)		Taper dia. (da)		Head height (k)		Cross recess No.	Cross recess penetration value		Radius (r)	
	Min.	Max.	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
ST 4.8 (No. 10)	9.07	9.47	4.83	5.26	1.65	1.91	Type H No. 2	2.13	2.74	0.38	0.89

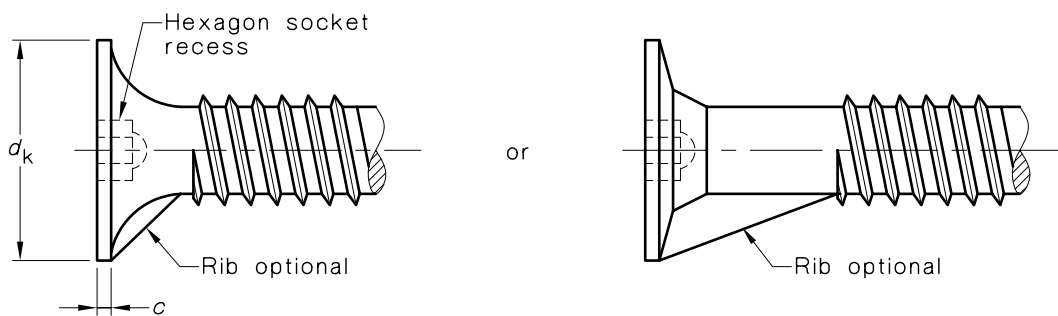
(b) Wafer head—Style 2

FIGURE 1.2 CROSS RECESSED WAFER HEAD



millimetres						
Size designation	Head diameter (min.) (dk)	Head edge thickness (c)		Cross recess No.	Cross recess penetration value	
		Min.	Max.		Min.	Max.
ST 3.5 (No. 6)	7.90	0.46	0.81	Type H No. 2	2.59	3.17
ST 3.9 (No. 7)	7.90	0.46	0.81	Type H No. 2	2.59	3.17
ST 4.2 (No. 8)	7.90	0.46	0.81	Type H No. 2	2.26	3.17

(a) Cross recessed bugle head



Size designation	millimetres	
	Head diameter (d _k)	
	Min.	Max.
ST 6.3 (No. 14)	13.59	14.61

(b) Hexagon socket bugle head (Type 17)

FIGURE 1.3 CROSS RECESSED AND HEXAGON SOCKET BUGLE HEADS

1.8 LENGTH

The nominal length of self-drilling screws shall be the distance from the extreme point to the largest diameter of the bearing surface of the head measured parallel to the axis of the screw.

1.9 CONCENTRICITY AND SYMMETRY

The heads and driving features of self-drilling screws shall be concentric or symmetric to the shank or screw thread within the tolerances given in ISO 4759-1 for products grade A or B as appropriate.