


**Coach Screws AS 1393 Standard**  
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Technical Data Sheet



AS/NZS 1393:1996  
Reconfirmed 2016

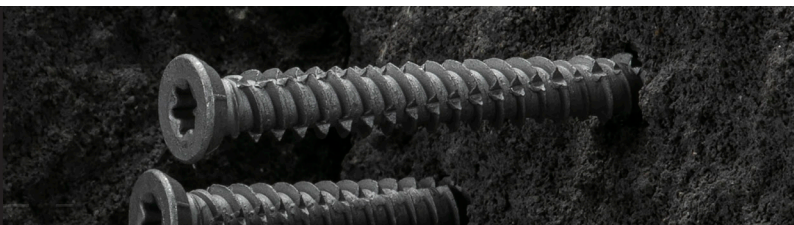
Australian/New Zealand Standard<sup>®</sup>

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**Coach screws—Metric series with  
ISO hexagon heads**

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**AS/NZS 1393:1996**

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This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee ME/29, Fasteners. It was approved on behalf of the Council of Standards Australia on 30 April 1996 and on behalf of the Council of Standards New Zealand on 13 May 1996. It was published on 5 October 1996.

The following interests are represented on Committee ME/29:

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Bureau of Steel Manufacturers of Australia  
Electricity Supply Association of Australia  
Fasteners Institute of Australia  
Federal Chamber of Automotive Industries  
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AS/NZS 1393:1996 (Reconfirmed) 2016-12-23

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

**RECONFIRMATION**

OF

AS/NZS 1393:1996

Coach screws—Metric series with ISO hexagon heads

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Technical Committee ME-029 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

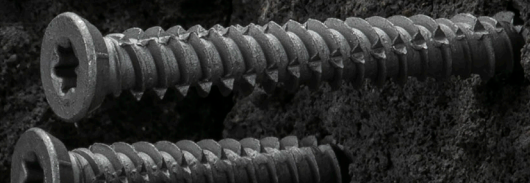
Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 22 July 2015.

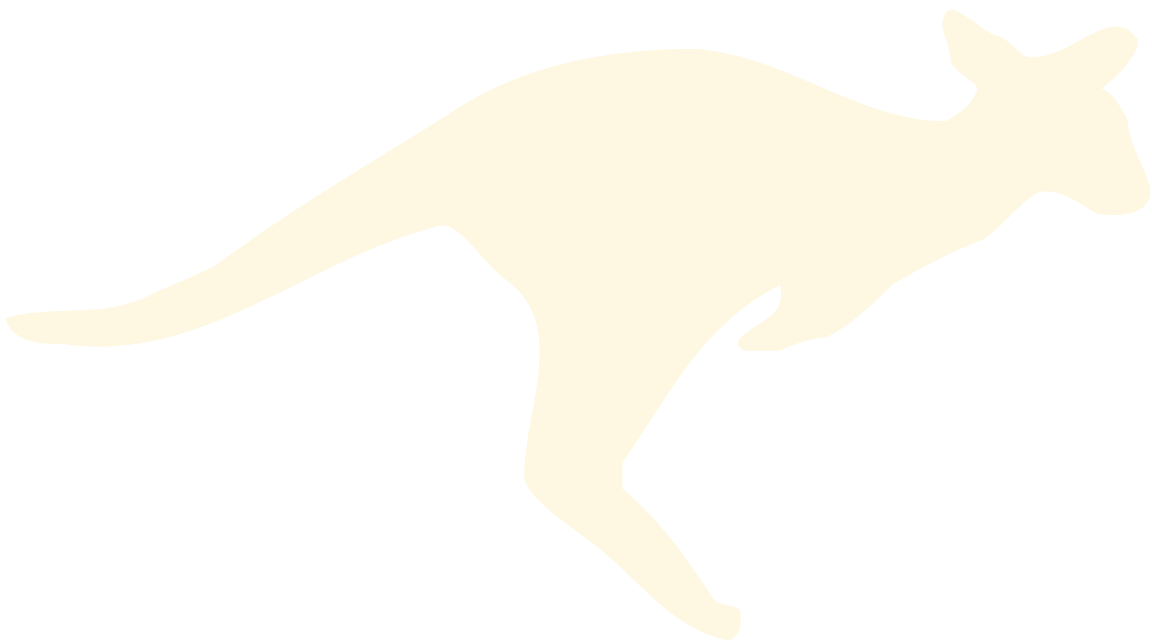
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ISO hexagon heads

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AS/NZS 1393:1996

## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME/29 on Fasteners to supersede AS 1393—1973, *Coach screws (metric series)(with ISO hexagon heads)*.

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

- (a) Updating of reference documents.
- (b) Inclusion of requirements for reduced diameter body (scant shank) coach screws.
- (c) Amending dimensions to align with the latest ISO requirements.
- (d) Replacement of detailed requirements for materials, mechanical properties and test procedures for steel coach screws with references to a separate Standard.
- (e) Revision of the identification marking requirements.
- (f) Inclusion of a reference to SAA HB18.22/SANZ HB18.22 in relation to a manufacturer's declaration of conformity. The Handbook contains a definition of manufacturer and includes an example of a declaration of conformity which may be provided to a customer.
- (g) Editorial changes as necessary in accordance with current Standards Australia/Standards New Zealand policy.

The identification marking on a fastener may now include that of a distributor or importer, this being a departure from the previously accepted practice of the marking being that of the fabricator of the product.

There are no ISO Standards for the thread form of coach screws but other features are in accordance with the following ISO Standards:

ISO	
272	Fasteners—Hexagon products—Widths across flats
885	General purpose bolts and screws—Metric series—Radii under the head
4759	Tolerances for fasteners
4759.1	Part 1: Bolts, screws and nuts with thread diameter $\geq 1.6$ and $\leq 150$ mm and product Grades A, B and C
6157	Fasteners—Surface discontinuities
6157.1	Part 1: Bolts, screws and studs for general requirements

The term 'informative' has been used in this Standard to define the application of the appendix. An 'informative' appendix is only for information and guidance.



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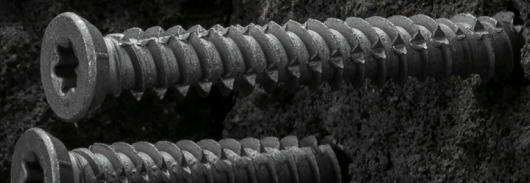
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## STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

 Australian/New Zealand Standard  
 Coach screws—Metric series  
 with ISO hexagon heads

**1 SCOPE** This Standard specifies the dimensions and marking requirements for coach screws intended for use in timber structures in ISO preferred series diameters from 6 mm to 20 mm inclusive and lengths up to 200 mm, and with ISO hexagon heads and either full body or reduced diameter shanks, and the material requirements for steel coach screws.

This Standard does not specify requirements for products requiring special properties, such as weldability or corrosion-resistance.

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

AS	
1650	Hot-dipped galvanized coatings on ferrous articles
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	
6157	Fasteners—Surface discontinuities
6157.1	Part 1: Bolts, screws and studs for general requirements
ANSI	
B 18.2.3.8M	Metric hex lag screws
DIN	
7998	Threads and thread end for wood screws

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

**3.1 Coach screw**—a threaded fastener capable of forming a mating internal thread in timber.

**3.2 Concentricity tolerance**—the allowable deviation of the shank with respect to the screw thread.

**3.3 Nominal length ( $l$ )**—the distance from the bearing surface of the head to the extreme end.

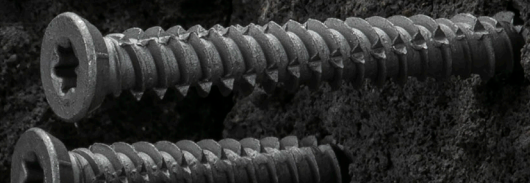
**3.4 Symmetry tolerance**—the allowable deviation of the across-flats dimension with respect to the shank.

**3.5 Transition diameter ( $d_t$ )**—the diameter of a circle formed at the transition between the fillet radius ( $r$ ) and bearing surface of the head.

**3.6 Shall**—indicates that a statement is mandatory.

**3.7 Should**—indicates a recommendation.

**3.8 May**—indicates the existence of an option.





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#### 4 METHOD OF MANUFACTURE Coach screws shall be—

- (a) hot or cold forged with a secondary threading operation; or
- (b) machined from bar stock.

#### 5 SHAPE, DIMENSIONS AND FINISH

##### 5.1 Hexagon heads

5.1.1 *General* The heads of coach screws shall be in accordance with Figure 1.

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

5.1.2 *Chamfer* The upper face of the head shall have a chamfer of 15–30 degrees. The diameter of the circle formed by this chamfer shall be not less than 85 percent of the minimum width across-flats of the head.

5.1.3 *Washer face* The underside of the head shall have either a full bearing face or a washer face (see Figure 1). The diameter and depth of the washer face shall be as given in Figure 1.

5.2 *Length of coach screws* The length (*l*) of coach screws shall be as given in Table 1 and the tolerance on length shall be as given in Table 2.

5.3 *Points of coach screws* Coach screws shall be manufactured with either a gimlet point or a conical point (see Figure 1).

5.4 *Screw threads* The screw thread shall have a nominal included angle of 60 degrees and the thread form and dimensions shall be as shown in Figure 2. The thread crest shall terminate in either a radius (*r*) or a flat (*f*) as shown in Figure 2.

Where the screws are to be hot-dip galvanized, the dimensions shown in Figure 2 shall apply before galvanizing.

5.5 *Length of thread* The length of thread, including thread runout, shall be not less than 0.60 times nominal length of a screw.

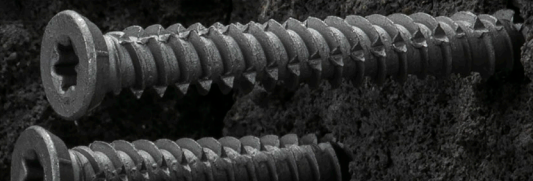
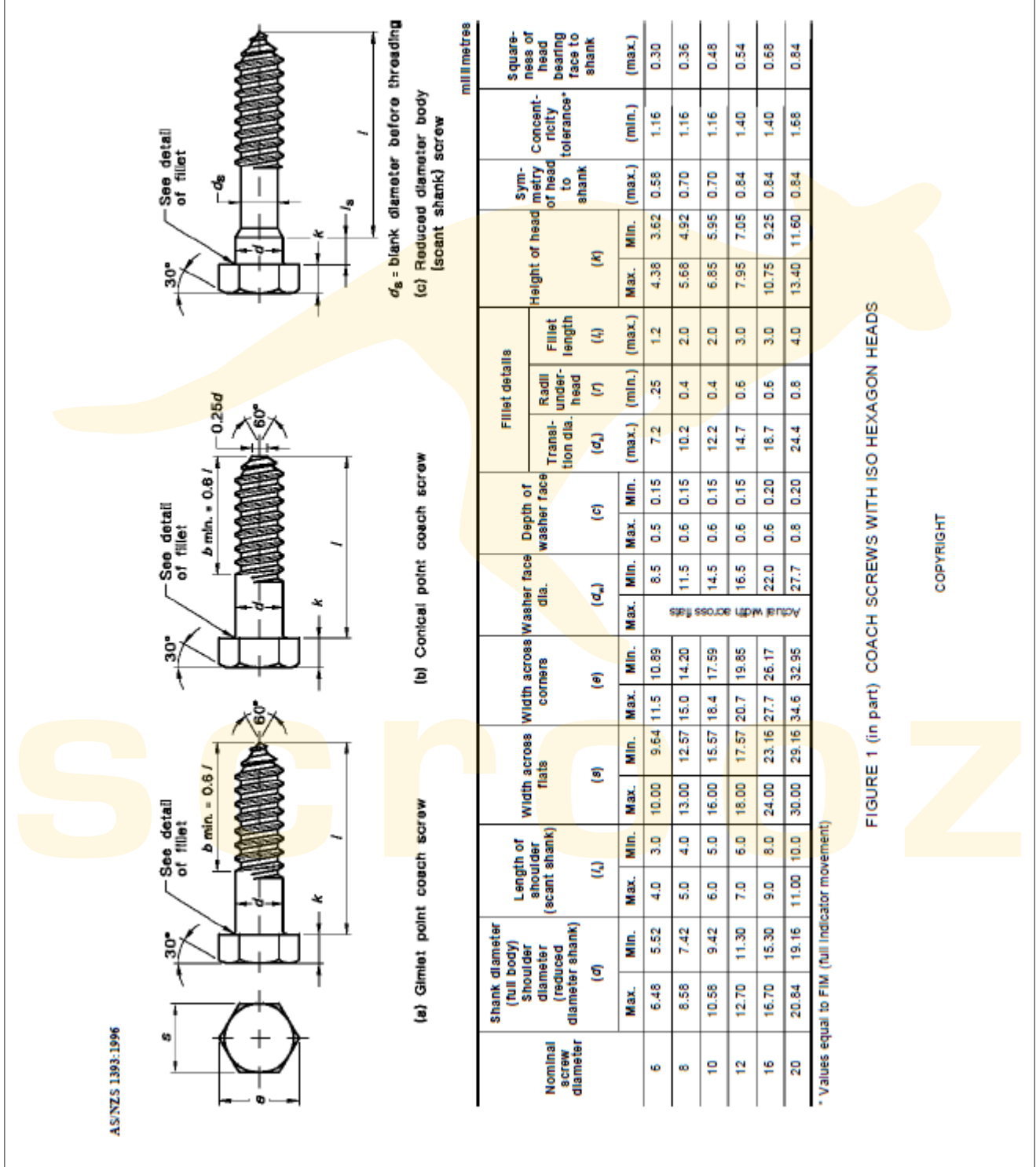
##### 5.6 Squareness, concentricity and symmetry

5.6.1 *Squareness of bearing face* When determined as shown in Figure 3(a), the bearing face of the head shall be square, within the values given in Figure 1 to the shank or the pitch diameter of the screw thread. The values are based on an angle of 2 degrees.

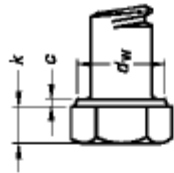
5.6.2 *Concentricity of shank to screw thread* When determined as shown in Figure 3(b), the shank for a distance of 1.5 diameters from the thread runout shall be concentric, within the values given in Figure 1, to the pitch diameter of the screw thread.

5.6.3 *Symmetry of head to shank* When determined as shown in Figure 3(c), the head shall be symmetric, within the values given in Figure 1, to the shank or the pitch diameter of the screw thread.





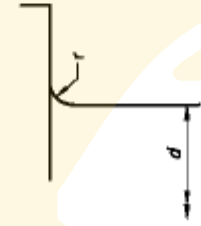
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(d) Alternative washer-faced head



(f) Maximum fillet  
Maximum metal condition

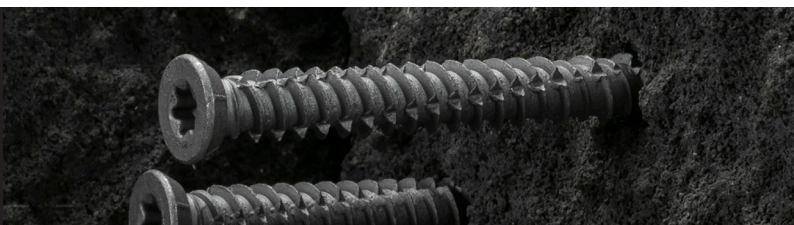


(g) Minimum fillet  
Minimum metal condition

(e) Enlarged detail of fillet

FIGURE 1 (in part) COACH SCREWS WITH ISO HEXAGON HEADS

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**TABLE 1**  
**DIAMETER-LENGTH COMBINATIONS**  
**OF COACH SCREWS**

Nom. dia.	Nominal length millimetres										
	25	30	40	50	65	75	90	100	130	150	200
6	X	X	X	X	X	X	X	X			
8		X	X	X	X	X	X	X			
10			X	X	X	X	X	X	X	X	X
12			X	X	X	X	X	X	X	X	X
16				X	X	X	X	X	X	X	X
20								X	X	X	X

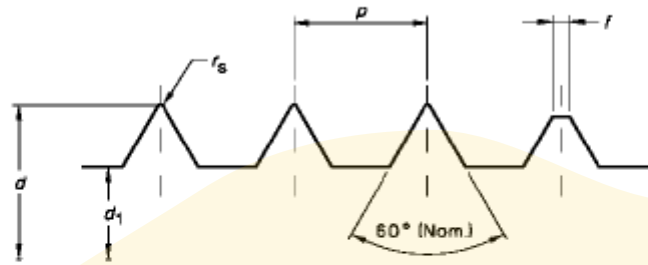
NOTE: The inclusion of dimensional data in this specification is not intended to imply that all the products described are stock production sizes. The purchaser is requested to consult with the supplier concerning lists of stock production sizes.

**TABLE 2**  
**TOLERANCE ON LENGTH**

Nominal length millimetres		Tolerance ±
Over	Up to and incl.	
≥18	≤30	1.3
>30	≤50	1.6
>50	≤80	1.9
>80	≤120	2.2
>120	≤150	2.5
>150	≤180	4.0
>180	≤200	4.6



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Nom. dia.	Thread pitch ( $p$ )		Major dia. ( $d$ )		Minor dia. ( $d_1$ )		Crest radius ( $r_s$ ) (max.)	Flat width ( $f$ ) (max.)
	Max.	Min.	Max.	Min.	Max.	Min.		
6	2.86	2.34	6.48	5.52	4.5	3.7	0.3	0.6
8	3.96	2.80	8.58	7.42	5.9	5.0	0.4	0.8
10	4.95	3.60	10.58	9.42	7.4	6.2	0.4	0.9
12	5.5	4.2	12.70	11.30	8.4	7.5	0.5	1.0
16	6.6	5.1	16.70	15.30	12.4	11.3	0.6	1.3
20	7.7	5.6	20.84	19.16	15.5	14.2	0.6	1.3

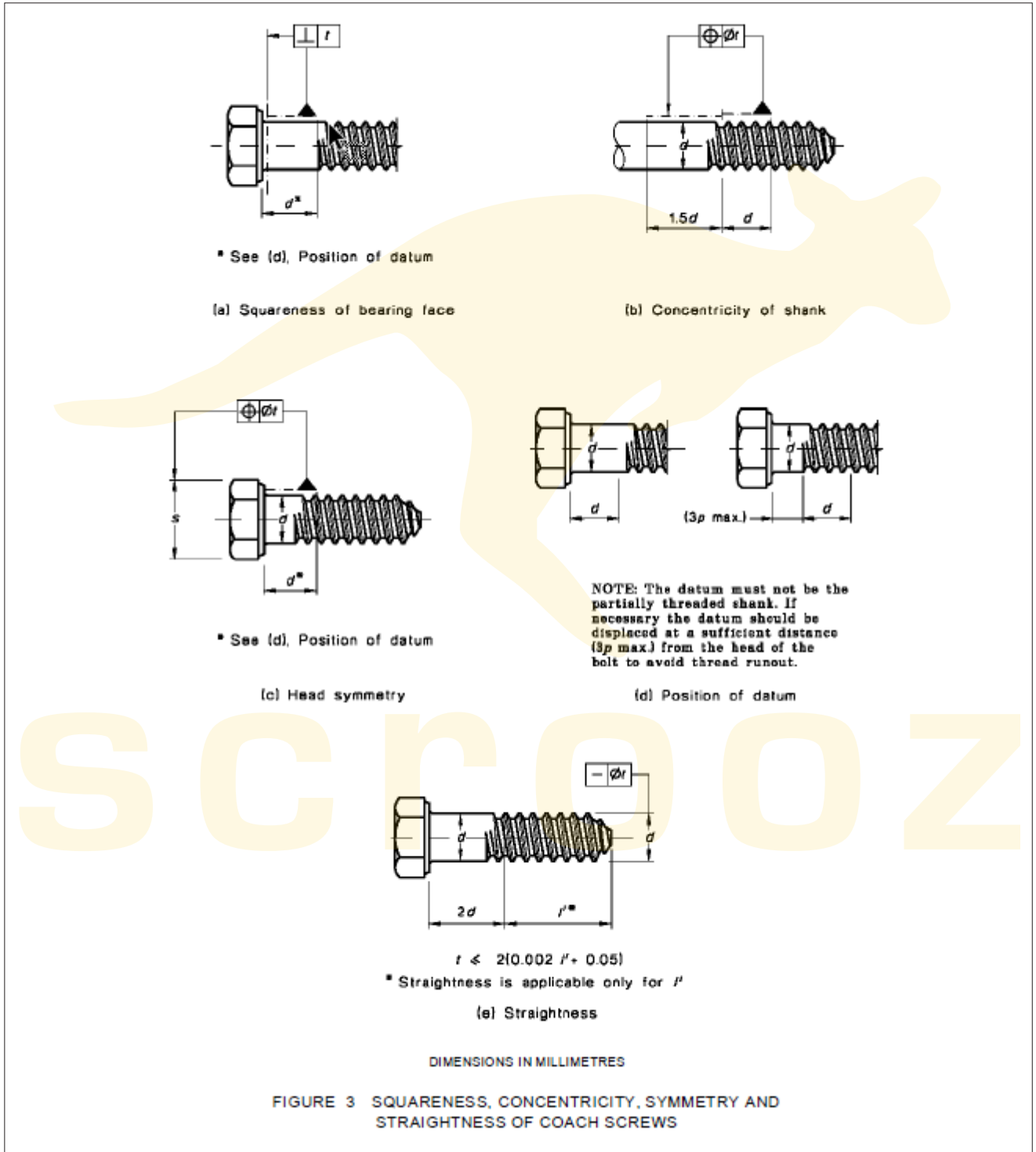
NOTE: The thread pitch values have been selected to embrace the values given in ANSI B18.2.3.8 M and DIN 7998.

FIGURE 2 THREAD PROFILE

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## 5.7 Shank

**5.7.1 Diameter** The diameter of the unthreaded portion of the shank shall be as follows:

- For full diameter body coach screws . . . . . as shown in Figure 1.
- For reduced diameter body coach screws . . . . . equal to the blank diameter before threading.

**5.7.2 Straightness** Coach screws shall be straight to within the tolerance shown in Figure 3(e).

**5.8 Under-head fillet** The fillet junction of the head and shank shall be a smooth concave curve lying within an envelope defined by the minimum radius under the head ( $r$ ) and a maximum profile defined by a tangent to a radius equal to the minimum value of  $r$  blending to the maximum transition diameter ( $d_t$ ) on the underside of the head and the fillet length ( $l_f$ ) on the shank. The minimum values of  $r$  and the maximum values of  $l_f$  are given in Figure 1.

## 5.9 Finish

**5.9.1 General** Coach screws shall be cleanly finished, sound and free from defects detrimental to their end use. The surface discontinuities on coach screws shall be not greater than the limits given in ISO 6157.1.

**5.9.2 Surface roughness** All surfaces of coach screws may be in the as-forged or machined condition.

**5.9.3 Surface finish** Unless otherwise specified, coach screws shall be supplied in either the dull black condition or bright finish on all surfaces.

**5.9.4 Coatings** Coach screws may also be supplied with either decorative or corrosion-resistant coatings.

### NOTES:

- If the purchaser requires coated products, reference should be made to the relevant coating specification, e.g. AS 1650, and this should be indicated in the enquiry or order.
- For further information regarding designation of coated coach screws, see Clause 9.

## 6 MATERIAL AND MECHANICAL PROPERTIES FOR STEEL COACH SCREWS

The materials of steel coach screws shall be as given in AS/NZ 4291.1, for property classes 4.6 and 4.8.

When tested in accordance with AS/NZS 4291.1, coach screws shall have a hardness of 120-250 HV (67 HRB-22HRC).

When coach screws are tested in accordance with AS/NZS 4291.1 for head soundness there shall be no cracking of the shank head fillet when viewed at a magnification of not less than  $\times 8$  nor more than  $\times 10$ .

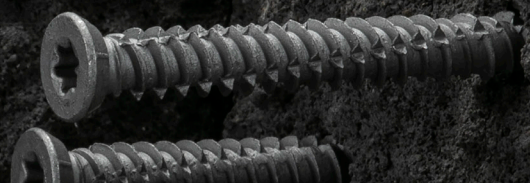
### NOTES:

- A suggested audit sampling plan is given in Appendix A.
- In the event of a dispute as to the results of tests, referee testing should be carried out by an independent laboratory mutually acceptable to the purchaser and the supplier.

**8 MARKING** Coach screws shall be marked with the trade (identification) mark of the manufacturer embossed or indented on top of the head (see Figure 4).

### NOTES:

- Manufacturers making a statement of compliance with this Joint Australian/New Zealand Standard on a product, packaging, or promotional material related to that product are advised to ensure that such compliance is capable of being verified.
- Guidance on the manufacturer's declaration of conformity with this Standard is given in SAA HB18.22/SANZ HB18.22.



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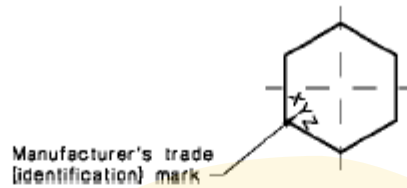


FIGURE 4 MARKING

**9 DESIGNATION** The designation of coach screws shall be composed of the following:

- (a) General product description and type, i.e. full body or reduced diameter shank.
- (b) The number of this Joint Australian/New Zealand Standard, i.e. AS/NZS 1393.
- (c) The nominal diameter, in millimetres.

NOTE: On no account should the diameter be prefixed by the letter 'M' as this would denote that the product has a metric coarse series thread.

- (d) The nominal length, in millimetres.
- (e) Material if other than steel.
- (f) The coating where applicable, in accordance with the appropriate Standard.

*Examples:*

Hot-dip galvanized steel full body coach screws 10 mm diameter and 50 mm long would be designated—

'Full body coach screws to AS/NZS 1393 10 × 50 (hot-dip galvanized to AS 1650).'

Steel reduced diameter shank coach screws 12 mm diameter and 75 mm long would be designated—

'Reduced diameter shank coach screws to AS/NZS 1393 12 × 75.'



**APPENDIX A**  
**A SUGGESTED AUDIT SAMPLING PLAN FOR MECHANICAL PROPERTIES**  
 (Informative)

Where tests are required for audit inspection purposes, a lot for the purposes of sampling for testing should consist of all items (coach screws) of the same heat of steel, the same property class and size made essentially under the same conditions and in accordance with this Standard. From each lot, the suggested number of test specimens for each required property is given in Table A1.

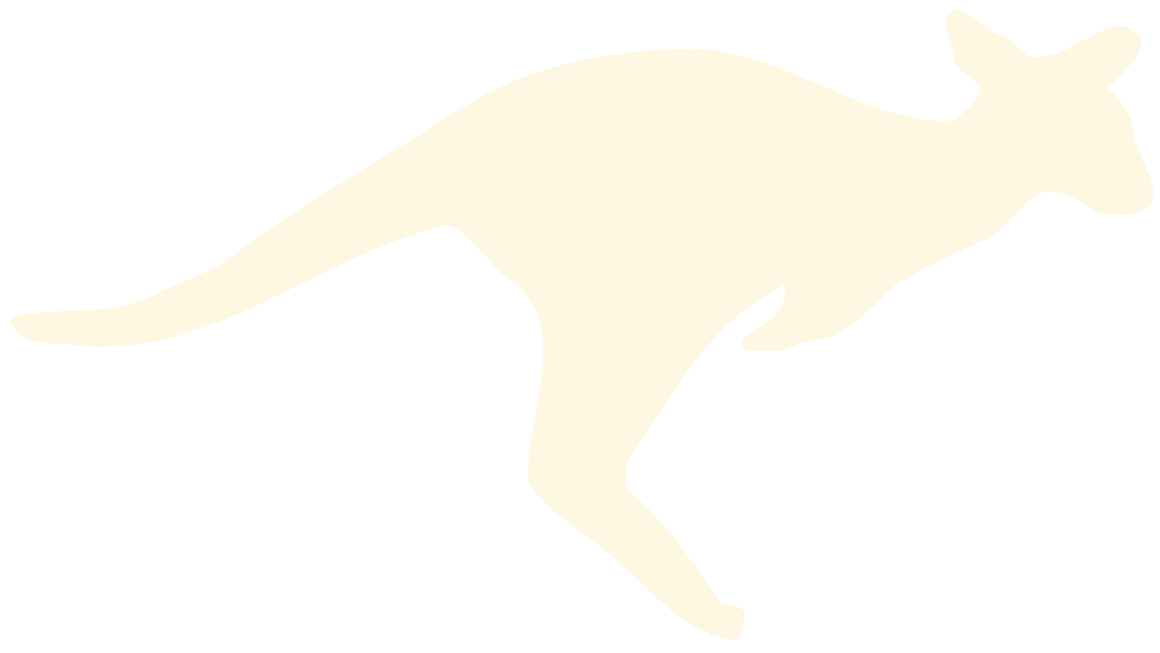
Should any test specimen fail to comply with the requirements of any specified test, double the number of test specimens from the same lot should be subjected to the same test, and unless all of these comply with the relevant requirements, the lot should be rejected.

**TABLE A1**  
**SUGGESTED NUMBER OF TEST SPECIMENS**

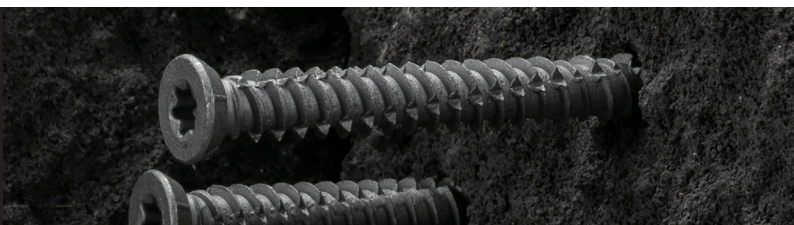
Number of pieces in lot	Suggested number of test specimens for each property
≤50	2
>50    ≤500	3
>500    ≤35 000	5
>35 000	8



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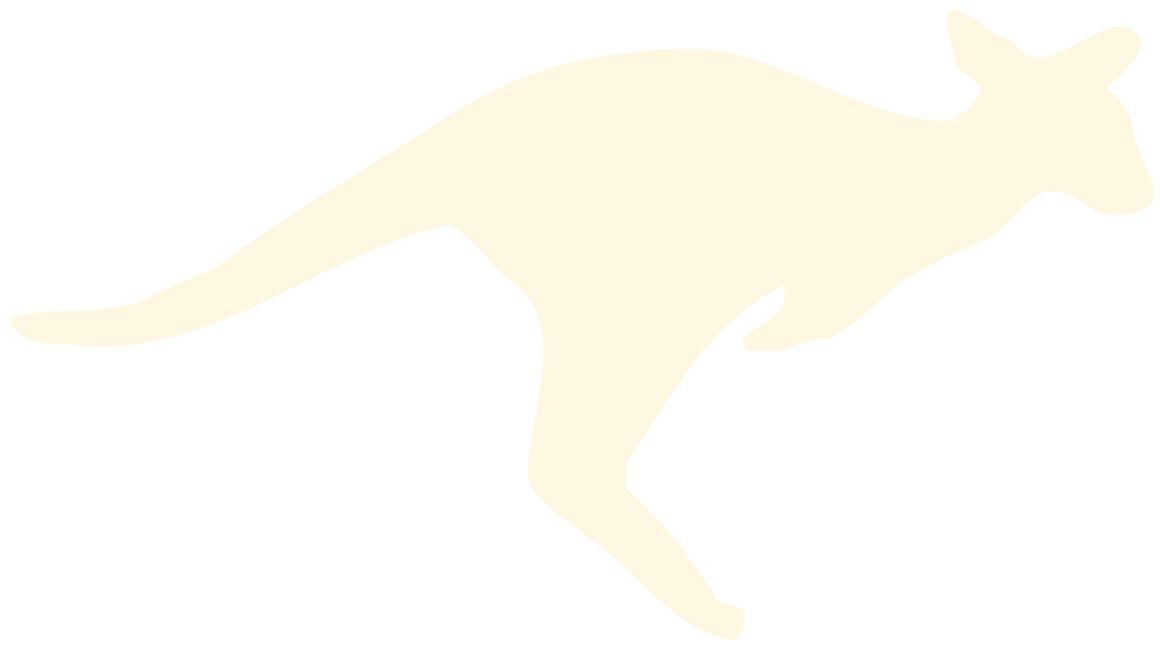
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