

Australian Standard[®]

**HEXAGON WRENCH KEYS AND
WRENCH BITS FOR
HIGH-STRENGTH FASTENERS**

This Australian Standard was prepared by Committee ME/10. Hand Tools. It was approved on behalf of the Council of the Standards Association of Australia on 24 November 1987 and published on 7 March 1988.

The following interests are represented on Committee ME/10:

Australian Automobile Association
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Deakin University
Department of Industrial Relations and Employment, N.S.W.
Department of Technical and Further Education, N.S.W.
Electricity Supply Association of Australia
Fasteners Institute of Australia
Metal Trades Industry Association of Australia
National Association of Australian State Road Authorities
Railways of Australia Committee
Royal Melbourne Institute of Technology
Telecom Australia

Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This Standard was issued in draft form for comment as DR 86146.

Australian Standard[®]

**HEXAGON WRENCH KEYS AND
WRENCH BITS FOR
HIGH-STRENGTH FASTENERS**

First published as AS 3526—1988.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 4854 1

PREFACE

This Standard was prepared by the Association's Committee on Hand Tools. It applies to metric hexagon wrench keys and bits with strength capabilities suitable to drive high-strength screws such as property class 12.9 hexagon socket cap screws specified in AS 1420, *ISO metric hexagon socket head cap screws*, and AS 1421, *ISO metric hexagon socket set screws*. Metric hexagon wrench keys outside the scope of this Standard are included in ISO 2936, *Assembly tools for screws and nuts —Hexagon socket screw keys —Metric series*.

ISO 2936 was used as the basis for this Standard which additionally includes material and property requirements not given in the ISO Standard.

CONTENTS

	<i>Page</i>
1 SCOPE	3
2 REFERENCED DOCUMENTS	3
3 DEFINITIONS	3
4 SHAPE, DIMENSIONS, AND FINISH	3
5 MATERIALS AND HEAT TREATMENT	3
6 MECHANICAL PROPERTIES	3
7 MARKING	6
 APPENDICES	
A INFORMATION TO BE SUPPLIED AT TIME OF ENQUIRY OR ORDER	7
B APPLICABILITY OF HEXAGON WRENCH KEYS AND BITS ..	7

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

HEXAGON WRENCH KEYS AND WRENCH BITS FOR HIGH-STRENGTH FASTENERS

1 SCOPE. This Standard specifies requirements for the dimensions, tolerances, and mechanical properties of metric hexagon wrench keys with nominal sizes of 0.7 mm to 19 mm (inclusive) across flats and of metric hexagon wrench bits with nominal sizes of 0.7 mm to 32 mm (inclusive) across flats.

NOTES:

- Information to be supplied at time of enquiry or order is given in Appendix A.
- The applicability of the hexagon wrench keys and bits is given in Appendix B.

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

AS

1420	ISO metric hexagon socket head cap screws
1421	ISO metric hexagon socket set screws
1444	Wrought alloy steels—Standard and hardenability (H) series
1654	Limits and fits for engineering
1815	Method for Rockwell hardness test Part 1: Testing of metals (AS 1815.1)
1817	Method for Vickers hardness test Part 1: Testing of metals (AS 1817.1)

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

3.1 Wrench key—a tool of hexagon section bent through an angle of 90 degrees in the shape of a letter 'L', having a long and a short arm. It is used for directly applying torsional force (torque) to a fastener having a head with a hexagon recess.

3.2 Wrench bit—a tool of hexagon section of a specified length. It is used for transferring torsional force (torque) by means of another tool (e.g. a wrench) to a fastener featuring a head with a hexagon recess.

4 SHAPE, DIMENSIONS, AND FINISH.

4.1 General. The shape, dimensions, and finish of wrench keys and wrench bits shall be in accordance with Figure 1 and Clauses 4.2 to 4.5.

4.2 Angle of bend. The angle of bend between the axes of the short and the long arms of wrench keys shall be 90 ± 2 degrees.

4.3 Ends. The ends of wrench keys and wrench bits shall be square with the axis of the bit or the arm of the key within 4 degrees. The edges may be sharp or chamfered. If the edges are chamfered, the chamfer shall be in accordance with Figure 1.

4.4 Corners. The corners may be sharp, rounded, or chamfered, and the radius of curvature or the chamfer shall be not greater than half the difference between the width across corners (e) and the width across flats (s) (see Figure 1).

4.5 Finish. Wrench keys and wrench bits shall be cleanly finished, free from burrs and other defects detrimental to their use. They shall normally be supplied in a blue black or chemical black oxide finish after heat treatment, and a residual coating of light oil.

NOTE: The purchaser may specify another finish.

5 MATERIALS AND HEAT TREATMENT.

5.1 Materials. Wrench keys and wrench bits shall be made from an alloy steel in the standard or 'H' series complying with AS 1444 or equivalent.

5.2 Heat treatment. Wrench keys and wrench bits shall be hardened by quenching in oil and tempered to give the minimum properties specified in Table 1 and shown in Figure 2, and shall comply with the mechanical property requirements of Clause 6.

5.3 Decarburization. At no point on the periphery of the wrench key shall there be identifiable decarburization to a depth in excess of 1 percent of s (see Figure 1) or 0.05 mm, whichever is the greater.

6 MECHANICAL PROPERTIES.

6.1 Hardness. Wrench keys and wrench bits shall comply with the hardness requirements specified in Table 1 when tested at the geometric centre of the section at a distance at least equal to the width across the flats from either end of the tool. Proper precautions shall be taken during sectioning to prevent burning and overheating of the cut face. A maximum hardness of 580 HV or 54 HRC is recommended.

Either the Vickers or Rockwell methods of testing may be employed, where appropriate. Vickers testing shall be carried out in accordance with AS 1817.1. Rockwell testing shall be carried out in accordance with AS 1815.1. The Vickers test shall be used for the purpose of any referee test.

The hardness test result shall be reported without conversion to any other scale.

6.2 Torque. When wrench keys and wrench bits are tested as follows, the permanent angular deflection shall not exceed 5 degrees:

The short arm of the wrench key, or one end of the wrench bit, shall be inserted into a hexagon socket adaptor (see Clause 6.4). A load in accordance with Table 1 shall be applied gradually to the long arm of the wrench key as shown in Figure 2. (For wrench bits, the body is inserted into an adaptor tool, to which the load is applied.) The load shall be gradually increased until the specific torque is reached.

6.3 Resistance to shearing.

6.3.1 Application. The requirements for resistance to shearing shall apply only to wrench keys and wrench bits up to and including 8 mm nominal size.