AS 3526—1988

Australian Standard®

HEXAGON WRENCH KEYS AND WRENCH BITS FOR HIGH-STRENGTH FASTENERS

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Australian Automobile Association
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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
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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.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

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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:

1. Information to be supplied at time of enquiry or order is given in Appendix A.
2. 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.