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Australian Standard 2438—1981

TWIST DRILLS (GENERAL PURPOSE)

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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian-British Trade Association

Bureau of Steel Manufacturers of Australia

CSIRO, Division of Manufacturing Technology

Confederation of Australian Industry

Department of Productivity

Federal Chamber of Automotive Industries

Institution of Production Engineers

Metal Trades Industry Association of Australia

Society of Automotive Engineers—Australasia

University of Melbourne

University of Western Australia

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PREFACE

This edition of this standard was prepared by the Association's Committee on Cutting Tools to supersede AS B45, Part 1—1960, which was an endorsement of BS 328: Part 1: 1959 with amendments.

Drills of imperial sizes have been omitted from this standard. The practice of most Australian manufacturers is to produce drills to sizes corresponding to the 'general' tables for each type of drill in this standard. However, for exact sizes of imperial size drills, it is necessary to refer to the individual manufacturer.

Core drills have also been omitted, in anticipation of a similar move by ISO/TC 29* to separate twist and core drills into two separate standards.

During the preparation of this standard the committee considered the following standards and acknowledgement is made of the assistance received therefrom:

†ISO 235/I	Parallel Shank Twist Drills, Jobber and Stub Series. Morse Taper Shank Twist Drills and Core Drills
ISO 494	Parallel Shank Twist Drills—Long Series
‡ANSI B94.11—1967	Straight Shank and Taper Shank Combined Drills and Countersinks

Morse taper shank drills in this standard correspond to those in ISO 235/I.

Regarding all other types of drills, the principal problem facing the committee was the development of a standard that would cover the range of drills required by users, yet would not increase the range of blanks necessary for the production of all drills, including imperial sizes. To overcome this problem, the diameters follow the ISO standards, while the lengths have been chosen according to blank lengths used in the production of imperial size drills; because of this, there are also differences in the flute lengths. In addition, the following differences exist between ISO 235/I and this Australian standard:

- For parallel shank twist drills, jobber series, the range of diameters was extended to 17.50 mm.
- For parallel shank twist drills, stub series, the range of diameters was reduced, excluding diameters below 1.00 mm and above 25.50 mm.

An important difference between this standard and the ISO standards is the exclusion of the sharpened point from the working length of the twist drill, and consequently the introduction of the definitions of 'nominal drill length' and 'nominal flute length'. To maintain uniformity throughout this standard, lengths given in ISO 235/I for the Morse taper shank twist drills were calculated to exclude the sharpened point and are presented thus in Tables 1 and 2 of this standard.

The tolerances on nominal flute length and nominal drill length for the Morse taper shank drills follow ISO 235/I, while for all other types of drills they follow the ANSI practice.

In general, the 'definitions' section and the appendix on 'terminology' have been considerably enlarged to encourage more precise description of the geometry of drills.

The class of tolerance on the diameter is the same as it was in AS B45, Part 1, but the table has been omitted and reference is made instead to AS 1654, Limits and Fits for Engineering.

There are no testing methods in this standard. It was the committee's opinion that the test described in AS B45, Part 1 is of little value, as even low quality drills will pass the test with ease. The committee will monitor developments in performance testing, especially those being made by ISO/TC 29, for possible subsequent incorporation in this standard.

The necessity of a standard for taper shank drills for use in drill bushes was recognized by the committee; however, further work on this type of drill was considered to be necessary before it could be included in this standard.

Extra long twist drills with Morse taper shank and parallel shank were considered to be special and are not included in this standard. They are listed in ISO 3291, Extra Long Morse Taper Shank Twist Drills, and ISO 3292, Extra Long Parallel Shank Twist Drills, respectively. As regards the availability and actual lengths of these drills, the individual manufacturers should be consulted.

Taper square shank twist drills for ratchet braces and bit stock twist drills were not considered to be of general purpose and have also been omitted.

This standard may require reference to the following standards:

AS 1654	Limits and Fits for Engineering
AS 1817	Method for Vickers Hardness Test Part 1—Testing of Metals

*Technical Committee of the International Organization for Standardization for 'Small tools'.
†Superseded by ISO 235, Parallel shank jobber and stub series drills and Morse taper shank drills.
‡ANSI—American National Standards Institute.

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Australian Standard
for
TWIST DRILLS (GENERAL PURPOSE)

1 SCOPE. This standard specifies the general requirements, terminology, dimensions and tolerances for the following types of drills:

(a) Morse taper (MT) shank twist drills.

(b) Parallel shank twist drills, Jobber series.

(c) Parallel shank twist drills, Stub series.

(d) Parallel shank twist drills, Long series.

The general dimensions of tangs are given in Appendix A, and Appendix B sets out the terminology used for describing the elements, linear dimensions and angles of twist drills. Ordering information is given in Appendix C.

2 DEFINITIONS. For the purpose of this standard, the following definitions apply:

2.1 'Shall' and 'should'—'shall' is taken to be mandatory, 'should' is taken to be advisory.

2.2 Twist drill—a rotary cutting tool having two helical flutes to provide cutting lips at the point of the drill and space for chip removal and admission of cutting fluid. At one end a point consisting of the lips, flanks, faces and chisel edge is formed for cutting the workpiece, while at the other end a parallel or Morse taper shank is formed for holding the drill.

2.3 Right-hand cutting—when viewed along the axis from the point end, the counter clockwise cutting rotation of the drill.

2.4 Left-hand cutting—when viewed along the axis from the point end, the clockwise cutting rotation of the drill.

3 NOMINAL SIZE. The nominal size of a drill shall be the nominal size of the drill diameter (see Appendix B, Paragraph B3.6).

4 SERIES. The series of a drill with parallel shank shall be determined by the length to diameter relationship and shall be expressed as jobber, stub or long.

5 DIMENSIONS AND TOLERANCES.

5.1 Dimensions (See Appendix B, Paragraphs B3.6 and B3.12 to B3.15). The nominal diameter d, the nominal flute length l_1 and the nominal drill length l shall conform to the dimensions shown in Fig. 1 and specified in Tables 1 to 8 for the particular type and series of drill.

5.2 Tolerances.

5.2.1 *Drill diameter* (See Appendix B, Paragraph B3.6). The tolerance on the drill diameter shall be h8 as specified in AS 1654.

5.2.2 *Lengths.* The tolerances on the nominal flute length and nominal drill length shall conform to the values specified in Table 9 for MT shank twist drills and in Table 10 for parallel shank jobber, stub and long series twist drills.

6 GENERAL REQUIREMENTS.

6.1 Twist Drill Point Geometry. The flutes and flanks of twist drills shall be capable of producing straight lips symmetrical about the drill axis with a point angle of about 118 degrees. The chisel edge shall be symmetrical about the drill axis and shall give an approximately straight line when projected onto a plane normal to the drill axis.

Positive lip clearance angle, lip circumferential clearance and body clearance shall be provided, and should be adequate.

6.2 Back Taper. The drill shall be provided with back taper conforming to the values specified in Table 11.

6.3 Hand of Cutting. Drills shall be right-hand cutting, unless otherwise specified.

6.4 Sharpening. Drills shall be sharpened ready for use.

6.5 Shank. The shank shall be parallel or Morse taper (MT); as appropriate.

7 MATERIAL AND HEAT TREATMENT. Drills shall be manufactured from suitable grade high-speed steel and shall be heat treated to a minimum hardness of 690HV (60HRC).

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

NOTE: The Vickers method of test is to be used for the purpose of any referee tests (see AS 1817).

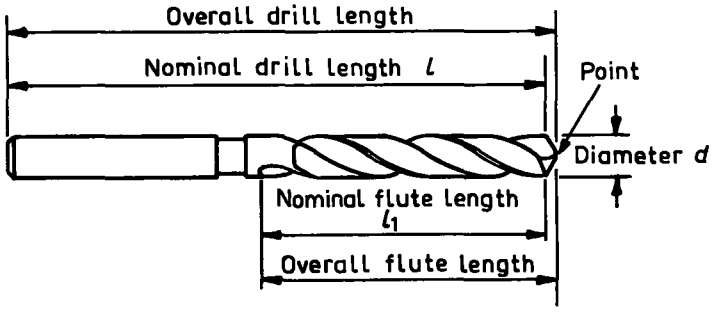

Fig. 1. GENERAL DETAILS—PARALLEL SHANK TWIST DRILL

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