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High-speed steel two-flute twist drills — Technical specifications

Forets hélicoïdaux à deux lèbres en acier rapide — Spécifications techniques



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10899 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 2, *Drills, reamers, milling cutters and milling machine accessories*.

Annex A forms an integral part of this International Standard. Annexes B and C are for information only.

High-speed steel two-flute twist drills — Technical specifications

1 Scope

This International Standard specifies the technical requirements for two-flute twist drills made of high speed steel with either cylindrical or Morse taper shanks. It is applicable to drills irrespective of the manufacturing process, except the roll-forged drills. These requirements may also form the basis for the specification of special purpose twist drills as agreed between the buyer and supplier. This International Standard is not applicable to woodworking or do-it-yourself drills.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*.

ISO 296:1991, *Machine tools — Self-holding tapers for tool shanks*.

ISO 1101:—¹⁾, *Technical drawings — Geometrical tolerancing — Tolerances of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings*.

ISO 2768-1:1989, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*.

ISO 5419:1982, *Twist drills — Terms, definitions and types*.

ISO 6507-1:—²⁾, *Metallic materials — Vickers hardness test — Part 1: Test method*.

ISO 11054:1993, *Cutting tools — Designation of high-speed steel groups*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 5419 apply.

1) To be published. (Revision of ISO 1101:1983)

2) To be published. (Revision of ISO 6507-1:1982, ISO 6507-2:1983, ISO 6507-3:1989, ISO 409-1:1982, ISO 409-2:1983 and ISO/DIS 409-3)

4 General features of design

Both right-hand and left-hand cutting drills are in conformity with this International Standard, but unless otherwise ordered, a right hand cutting drill shall be supplied.

5 Dimensions

5.1 Drill diameter [3.30]³⁾

5.1.1 General

The drill diameter is measured across the lands at the outer corners of the drill. The diameter and tolerance on this diameter shall be as specified in the relevant dimensional standard (see annex C).

5.1.2 Back taper [3.32]

The drill diameter d usually decreases from the outer corner [3.25] towards the shank. The difference in diameter, Δd is measured across the lands [3.14] between the flute ends [3.9] over the flute length, l_1 [3.8]. A back taper, $(\Delta d)/l_1$ of 0,02 % to 0,08 % is permitted, except for drills with a diameter $d < 6$ mm which may be parallel.

The total back taper ΔD shall not exceed 0,25 mm.

5.2 Cylindrical shank [3.2.2]

The tolerance on shank diameter shall be h11 (see ISO 286-2); tolerance f11 is allowed for drills with back taper.

The tolerance on cylindricity shall be 0,02 mm on the shank length corresponding to the holding surface of the collet.

5.3 Taper shank [3.2.1]

Taper shank drills shall be provided with Morse taper shanks with tang in accordance with ISO 296, but with a cone tolerance of AT 7, see annex A.

5.4 Radial runout

The maximum radial runout, measured on the land at the outer corner [3.25] of the drill, shall be limited to the tolerance calculated by the formulae given in 5.4.1.

5.4.1 Radial runout tolerance formula

Radial runout tolerances are calculated using the following formula:

$$\text{Runout} = 0,03 + 0,01 \, l/d \text{ for } d \geq 2$$

where

d is the drill diameter, in millimetres;

l is the overall drill length, in millimetres.

NOTE — This International Standard does not state runout tolerance for drills $d < 2$ mm, as such a tolerance would be impracticable.

³⁾ Numbers in square brackets after a term is the defining clause in ISO 5419.

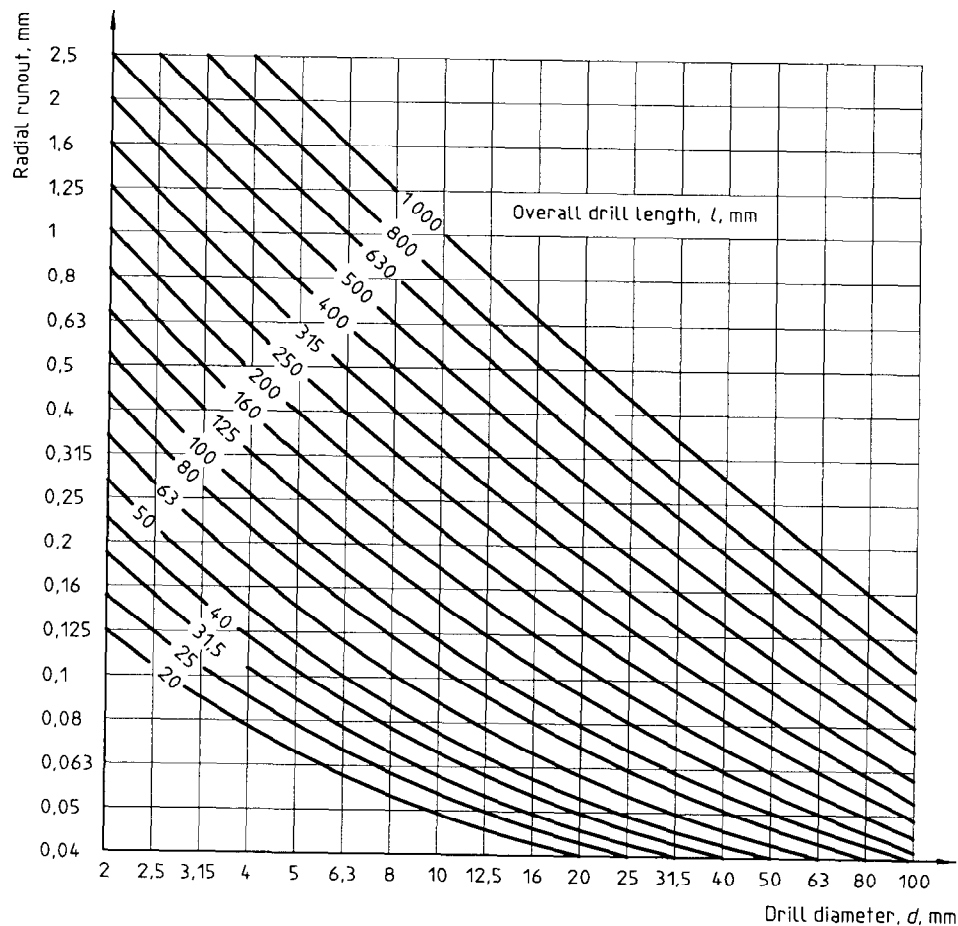


Figure 1 — Radial runout tolerance — Information example

5.4.2 Test measuring method

Testing shall take place at the land level by rotating the drill through 180°, and taking the reading on the dial gauge. The deviation shall be expressed as the difference in measurements.

The point of measurement at the drill end shall be as close as possible to the outer corner.

5.5 Lengths

Drill overall and flute lengths shall be as specified in the relevant dimensional standard (see annex C). The tolerance on overall length and flute length shall be the "very coarse" class as given in ISO 2768-1.

In special cases, e.g. if rapid delivery of twist drills with intermediate diameters is required, the total length, the flute length and other dimensions can, by agreement, be made to correspond to the next larger or next smaller twist drill diameter range.