

This is a preview of "ISO 3002-1:1982". [Click here to purchase the full version from the ANSI store.](#)

# International Standard



# 3002/1

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

## **Basic quantities in cutting and grinding — Part 1 : Geometry of the active part of cutting tools — General terms, reference systems, tool and working angles, chip breakers**

*Définitions de base pour la coupe et la rectification — Partie 1 : Géométrie de la partie active des outils coupants — Notions générales, système de référence, angles de l'outil et angles en travail, brise-copeaux*

**Second edition — 1982-08-01**

**UDC 621.9.01 : 001.4 : 003.62**

**Ref. No. ISO 3002/1-1982 (E)**

**Descriptors :** tools, cutting tools, geometrical characteristics, angle, definitions.

Price based on 52 pages

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3002/1 was developed by Technical Committee ISO/TC 29, *Small tools*.

The first edition (ISO 3002/1-1977) had been approved by the member bodies of the following countries :

Australia	India	South Africa, Rep. of
Austria	Israel	Sweden
Belgium	Italy	Switzerland
Bulgaria	Japan	Thailand
Czechoslovakia	Netherlands	Turkey
Egypt, Arab Rep. of	New Zealand	United Kingdom
France	Poland	USA
Germany, F.R.	Portugal	USSR
Hungary	Romania	Yugoslavia

No member body had expressed disapproval of the document.

Moreover, the above member bodies (with the exception of Bulgaria, Egypt, Arab Rep. of, India, New Zealand, Sweden and Thailand), as well as Mexico and Spain, had approved draft Addendum 1 to ISO/DIS 3002, which was incorporated into ISO 3002/1-1977.

This second edition, which cancels and replaces ISO 3002/1-1977, incorporates draft Addendum 1, which was circulated to the member bodies in October 1978 and has been approved by the member bodies of the following countries :

Austria	Italy	Sweden
Belgium	Japan	Switzerland
France	Korea, Rep. of	United Kingdom
Germany, F.R.	Netherlands	USA
Hungary	Poland	USSR
India	Romania	Yugoslavia
Israel	South Africa, Rep. of	

No member body expressed disapproval of the document.

This is a preview of "ISO 3002-1:1982". [Click here to purchase the full version from the ANSI store.](#)

It also incorporates draft Amendment 1, which was circulated to the member bodies in August 1979 and has been approved by the member bodies of the following countries:

Australia	Germany, F.R.	Poland
Austria	Hungary	Romania
Belgium	India	South Africa, Rep. of
Bulgaria	Israel	Spain
China	Italy	Sweden
Czechoslovakia	Japan	United Kingdom
Denmark	Libyan Arab Jamahiriya	USA
France	Netherlands	USSR

No member body expressed disapproval of the document.

## Contents

	Page
1 Scope and field of application .....	1
2 Reference .....	1
3 General terms .....	1
3.1 Surfaces on the workpiece .....	1
3.2 Tool elements .....	1
3.3 Tool surfaces .....	1
3.4 Cutting edges .....	2
3.5 Dimensions .....	3
3.6 Tool and workpiece motions .....	8
4 Reference systems .....	12
4.1 Tool-in-hand system .....	12
4.2 Tool-in-use system .....	19
5 Tool and working angles .....	26
5.1 Tool angles .....	26
5.2 Working angles .....	33
5.3 Sign convention for angles .....	38
6 Summary of angles .....	39
7 Chip breaker .....	42
<b>Annex</b> : Lists of equivalent terms in French, Russian, German, Italian and Dutch .....	46

# Basic quantities in cutting and grinding — Part 1 : Geometry of the active part of cutting tools — General terms, reference systems, tool and working angles, chip breakers

## 1 Scope and field of application

This Part of ISO 3002 defines a nomenclature for certain basic concepts concerning cutting tools; it is applicable to the geometry of every kind of cutting tool and emphasizes a known terminology for them which is intended to provide a framework on which the nomenclature and appropriate standards for individual types of cutting tool, such as single-points tools, twist drills, milling cutters and hand tools, can be established. However, the standards for individual types of cutting tool will not each require or use the full range of terms and definitions set out in the basic nomenclature established in this Part of ISO 3002.

The definitions are grouped into four clauses. After defining the general terms for surfaces on the workpiece, certain elements of the tool, surfaces on the tool, the cutting edges and the tool and workpiece motions in clause 3, this Part of ISO 3002 defines, in clause 4, reference systems of planes which are subsequently used to define the various angles which are included in clause 5. Two reference systems of planes are necessary : one, the tool-in-hand system, is used to define the geometry of the tool so that it can be manufactured and measured; the other, the tool-in-use system, is required to define the effective geometry of the tool when it is actually performing the cutting operation. Clause 7 gives definitions relating to chip breakers.

ISO 3002/2 gives general conversion formulae to relate tool and working angles.

NOTE — In addition to terms used in the three official ISO languages (English, French and Russian), this Part of ISO 3002 gives the equivalent terms in German, Italian and Dutch; these have been included at the request of ISO Technical Committee 29 and are published under the responsibility of the member bodies for Germany, F.R. (DIN), Italy (UNI) and the Netherlands (NNI). However, only the terms and definitions given in the official languages can be considered as ISO terms and definitions.

## 2 Reference

ISO 3002/2, *Basic quantities in cutting and grinding — Part 2 : Geometry of the active part of cutting tools — General conversion formulae to relate tool and working angles.*

## 3 General terms

### 3.1 Surfaces on the workpiece

**3.1.1 work surface** (figure 1) : The surface on the workpiece to be removed by machining.

**3.1.2 machined surface** (figure 1) : The desired surface produced by the action of the cutting tool.

**3.1.3 transient surface** (figure 1) : The part of the surface which is formed on the workpiece by the cutting edge (3.4.1) and removed during the following cutting stroke, during the following revolution of the tool or workpiece, or by the following cutting edge.

### 3.2 Tool elements

**3.2.1 body** (figures 3 to 5) : The part of the tool which holds the cutting blades or inserts, or on which are formed the cutting edges (3.4.1).

**3.2.2 shank** (figures 2a, 4 and 5) : The part of the tool by which it is held.

**3.2.3 tool bore** (figure 3) : That bore in a tool by which it can be located and fixed by a spindle, arbor or mandrel.

**3.2.4 tool axis** (figures 3, 4 and 5) : An imaginary straight line with defined geometrical relationships to the locating surfaces used for the manufacture and sharpening of the tool and for holding the tool in use. Generally, the tool axis is the centreline of the tool shank or bore; it is usually parallel or perpendicular to the locating surfaces, although it could be the centreline of a conical surface as in the case of a taper shank. When not obvious, the tool axis must be defined by the designer.

**3.2.5 cutting part** (figure 2a) : The functional part of parts of the tool each comprised of chip producing elements; the cutting edges (3.4.1), face (3.3.1) and flank (3.3.2) are therefore elements of the cutting part.

In the case of a multi-toothed cutter, each tooth has a cutting part.

**3.2.6 base** (figures 2a, 12 and 18) : A flat surface on the tool shank, parallel or perpendicular to the tool reference plane (4.1.1), useful for locating or orienting the tool in its manufacture, sharpening and measurement.

Not all tools have a clearly defined base.

**3.2.7 wedge** (figures 3 and 7) : The portion of the cutting part enclosed between the face (3.3.1) and the flank (3.3.2). It can be associated with either the major or minor cutting edge (3.4.1).