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System of cone tolerances for conical workpieces from $C = 1:3$ to $1:500$ and lengths from 6 to 630 mm

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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 1947 was drawn up by Technical Committee ISO/TC 3, *Limits and fits*, and circulated to the Member Bodies in April 1970.

It has been approved by the Member Bodies of the following countries :

Austria	Greece	South Africa, Rep. of
Belgium	Hungary	Spain
Brazil	India	Sweden
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Chile	Israel	Thailand
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Germany	Portugal	

The Member Bodies of the following countries expressed disapproval of the document on technical grounds :

Australia
France

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System of cone tolerances for conical workpieces from $C = 1:3$ to $1:500$ and lengths from 6 to 630 mm

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a cone tolerance system which applies to rigid conical workpieces for which the length of the generator can be considered as practically equal to the basic cone length; this applies in the case of cones having a rate of taper $C = 1:3$ to $1:500$.¹⁾

The appropriate tolerances of this International Standard can also be used for prismatic workpieces, for example wedges.

For the system of cone fits, see ISO ²⁾

For dimensioning and tolerancing cones on drawings, see ISO 3040, *Technical drawings — Dimensions and tolerancing cones*.³⁾

For general information on tolerances of form and of position, see ISO/R 1101, *Tolerances of form and of position — Part 1 : Generalities, symbols, indications on drawings*.

For cone tolerances for rolling bearings, see ISO/R 492, *Rolling bearings — Radial bearings — Tolerances*.

The verification of cones will be the subject of a future document.

2 BASIS OF THE SYSTEM

2.1 Types of cone tolerance

The following four types of tolerance provide the basis of the cone tolerance system :

- cone diameter tolerance T_D , valid for all cone diameters within the cone length L ;
- cone angle tolerance AT , given in angular or linear dimensions (AT_α or AT_D);
- cone form tolerance T_F (tolerances for the straightness of the generator and for the roundness of the section);
- cone section diameter tolerance T_{DS} , given for the cone diameter in a defined section. It is valid for the cone diameter of this section only.

1) For cones of $1:3$ up to $1:500$, the length of the generator and the cone length may be regarded as equal, since these lengths give differences in cone angle tolerances of less than 2 %.

2) In preparation.

3) At present at the stage of draft.

2.2 Cone diameter tolerance, cone angle tolerance and cone form tolerance

Normal cases will be handled by application of the cone diameter tolerance T_D only. It includes the two tolerances of the types b) and c). This means that the deviations of these two types may, in principle, utilize the whole tolerance space given by the cone diameter tolerance T_D .

In case of stronger requirements, the cone angle tolerance and the cone form tolerance may be reduced within the cone diameter tolerance T_D by means of supplementary instructions. In this case likewise, no point on the conical surface is permitted to lie outside the limit cones given by T_D .

In practice, all types of tolerance generally exist at the same time and, as far as normal cases are concerned, each tolerance may occupy a part of the cone diameter tolerance T_D only in such a way that no point on the conical surface lies outside the tolerance space. In other words, no point on the conical surface is permitted to lie outside the limit cones.

2.3 Cone section diameter tolerance

If for functional reasons the cone diameter tolerance is required in a defined section, then the cone diameter tolerance T_{DS} (tolerance type d)) must be indicated. In this case, it is also necessary to indicate the cone angle tolerance.

If general tolerances for the cone angle are specified, for example in an international document, and if it is referred to this tolerance, then it is not necessary to indicate special cone angle tolerances.

3 DEFINITIONS

3.1 DEFINITIONS RELATING TO CONES

3.1.1 cone : A conical surface or a conical workpiece (see Figure 1), defined by its geometrical dimensions.

In the absence of any indication concerning the geometrical form, "cone" is understood to mean a straight circular cone or truncated cone.