International Standard

ISO 4156-1

Straight cylindrical involute splines — Metric module, side fit —

Part 1: Generalities

Cannelures cylindriques droites à flancs en développante — Module métrique, à centrage sur flancs —

Partie 1: Généralités

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 14, *Shafts of machinery and accessories*.

This second edition cancels and replaces the first edition (ISO 4156-1:2005), which has been technically revised.

The main changes compared to the previous edition includes:

— ISO 268-1 has been removed from Clause 2;

— ISO 4156-2 and ISO 4156-3 have been moved from Clause 2 to Bibliography;

— the definitions of base diameter, major diameter, minor diameter, depth of engagement, theoretical clearance, out-of-roundness, and auxiliary dimension have been removed;

— symbols of length and arc length between two points, according to ISO 80000-3, have been adopted and used in calculation examples in Annex A;

— in Figure 8, clearance between external spline and mating part has been corrected;

— in Figure 10, measurement of space width, effective and tooth thickness, effective have been corrected;

— in Figure 11, the figure title has been changed;

— in Figure 15, the indication of form tooth height and minor tooth height has been corrected;

— in Table 11, the tolerance on D_{ii} for diameter > 80 to 120 in column H 11 has been corrected;

— the previous Tables 14 to 17 have been corrected and moved to Annex A;

— in A.4, the calculation of $M_{\mathrm{Re\,min}}$ has been completed.

A list of all parts in the ISO 4156 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This corrected version of ISO 4156-1:2021 incorporates the following corrections:

— in A.4, the calculation of F_{α} has been added;

— in A.4, A.5 and A.6, the formulae for calculating $l_{BO\,e}$ have been corrected.

Introduction

ISO 4156 (all parts) provides the data and indications necessary for the design, manufacture and inspection of straight (non-helical) side-fitting cylindrical involute splines.

Straight cylindrical involute splines manufactured in accordance with ISO 4156 (all parts) are used for clearance, sliding and interference connections of shafts and hubs. They contain all the necessary characteristics for the assembly, transmission of torque, and economic production.

The nominal pressure angles are 30°, 37,5° and 45°. For electronic data processing purposes, the form of expression 37,5° has been adopted instead of 37°30'. ISO 4156 (all parts) establishes a specification based on the following modules:

— for pressure angles of 30° and 37,5° the module increments are:

  0,5; 0,75; 1; 1,25; 1,5; 1,75; 2; 2,5; 3; 4; 5; 6; 8; 10;

— for pressure angle of 45° the module increments are:

  0,25; 0,5; 0,75; 1; 1,25; 1,5; 1,75; 2; 2,5.

Straight cylindrical involute splines — Metric module, side fit —

Part 1: Generalities

1 Scope

This document provides the data and indications necessary for the design and manufacture of straight (non-helical) side-fitting cylindrical involute splines.

Limiting dimensions, tolerances, manufacturing deviations and their effects on the fit between connecting coaxial spline elements are defined in the formulae and given in the tables. Unless otherwise specified, linear dimensions are expressed in millimetres and angular dimensions in degrees.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
spline joint
connecting, coaxial elements that transmit torque through the simultaneous engagement of equally spaced teeth situated around the periphery of a cylindrical external member with similar spaced mating spaces situated around the inner surface of the related cylindrical internal member

3.2
involute spline
member of *spline joint* (3.1) having teeth or spaces that have involute flank profiles

3.3
internal spline
spline formed on the inner surface of a cylinder

3.4
external spline
spline formed on the outer surface of a cylinder