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Worm gears — Worm profiles and gear mesh geometry

Engrenages à vis cylindriques — Géométrique des profils de vis et des engrènements

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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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 60, *Gears*, Subcommittee SC 1, *Nomenclature and wormgearing*.

This second edition cancels and replaces the first edition (ISO/TR 10828:1997), which has been technically revised.

This edition includes the formulation for the geometrical dimensions of the worm and worm wheel, and that for the determination of gear mesh geometry (path of contact, zone and lines of contact) with the details to determine the non-dimensional parameters used to apply load capacity calculations (radius of curvature, sliding velocities).

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Introduction

Thread forms of the worms of worm gear pairs are commonly related to the following machining processes:

- the type of machining process (turning, milling, grinding);
- the shapes of edges or surfaces of the cutting tools used;
- the tool position relative to an axial plane of the worm;
- where relevant, the diameters of disc type tools (grinding wheel diameter).

This Technical Report introduces all the aspects concerning the gear mesh geometry to define conjugate worm wheel, path of contact, lines of contact and other associated geometrical characteristics.

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Worm gears — Worm profiles and gear mesh geometry

1 Scope

In this Technical Report, thread profiles of the five most common types of worms at the date of publication are described and formulae of their axial profiles are given.

The five worm types covered in this technical report are designated by the letters A, C, I, K and N.

The formulae to calculate the path of contact, the conjugate profile of the worm wheel, the lines of contact, the radius of curvature and the velocities at points of contact are provided. At the end the application of those formulae to calculate parameters used in load capacity calculations are provided.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1122-2, *Vocabulary — Worm gears*

ISO 701, *International gear notations — Symbols for geometrical data*

ISO/TR 14521, *Worm gears — Load capacity of worm gears*

3 Symbols and abbreviated terms

For the purposes of this document, Tables 1 to 3 give the symbols the indices and the description.

Table 1 — Symbols for worm gears from Clause 4 of this document

Symbols	Description	Units	Figures	Formula number
A	distance from the worm axis to virtual point of the cutter (see ref.[1])	mm	Fig. A.4	
a	centre distance	mm	Fig. 3	41/42
a_0	refers to the worm/tool centre distance (length of the common perpendicular to the worm/tool axes)	mm	Fig. 18	54
a_1 to a_4	coefficient for A, I and N profile			
b_1	facewidth of worm	mm		24
b_{2H}	effective wheel facewidth	mm	Fig. 4	39
b_{2R}	wheel rim width	mm	Fig. 4	
c_1,c_2	tip clearance	mm		46/47

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