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Cylindrical gears — ISO system of flank tolerance classification —

Part 2: Definitions and allowable values of double flank radial composite deviations

Engrenages cylindriques — Système ISO de classification des tolérances sur flancs —

Partie 2: Définitions et valeurs admissibles des écarts composés radiaux

Reference number
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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 60, *Gears*.

This second edition cancels and replaces the first edition (ISO 1328-2:1997), which has been technically revised. The main changes compared to the previous edition are as follows:

— the document title of this part has been revised to correspond to that of part 1 and better reflect the contents of this part;

— the scope of applicability has been expanded to include sector gears;

— revisions have been made to the formulae which define the double flank radial composite tolerances, and the range of classification numbers has been changed to clarify the independence of this classification system from that given in part 1;

— the change in tolerance value between consecutive tolerance classes has been reduced, so two steps in the new system results in the same change as one step of the old system, but approximately the same global range of tolerance values is maintained with additional steps;

— annexes have been added to describe complementary information and examples;

— evaluation of runout, previously handled in this document, has been moved to ISO 1328-1:2013;

— advice on appropriate inspection methods has been removed; the information can be found in ISO/TR 10064-2.

A list of all parts in the ISO 1328 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.

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Cylindrical gears — ISO system of flank tolerance classification —

Part 2: Definitions and allowable values of double flank radial composite deviations

1 Scope

This document establishes a gear tooth classification system relevant to double flank radial composite deviations of individual cylindrical involute gears and sector gears. It specifies the appropriate definitions of gear tooth deviations, the structure of the gear tooth flank classification system, and the allowable values of the gear tooth deviations. It provides formulae to calculate tolerances for individual product gears when mated in double flank contact with a master gear. Tolerance tables are not included.

This document is applicable to gears with three or more teeth that have reference diameters of up to 600 mm.

This document does not provide guidance on gear design nor does it recommend tolerances.

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 701, *International gear notation — Symbols for geometrical data*

ISO 1122-1, *Vocabulary of gear terms — Part 1: Definitions related to geometry*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 701 and ISO 1122-1 and the following 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/

3.1.1
double flank test
test where a *master gear* (3.1.4) and a *product gear* (3.1.5) are rotated in tight mesh contact, i.e. held together by a spring load so there is no backlash, while measuring the changes in center distance

3.1.2
elemental deviation
deviation, such as profile and helix deviation on individual teeth or pitch deviation between teeth, generally using a single point of contact probe

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3.1.3
elemental method
method to measure *elemental deviations* (3.1.2)

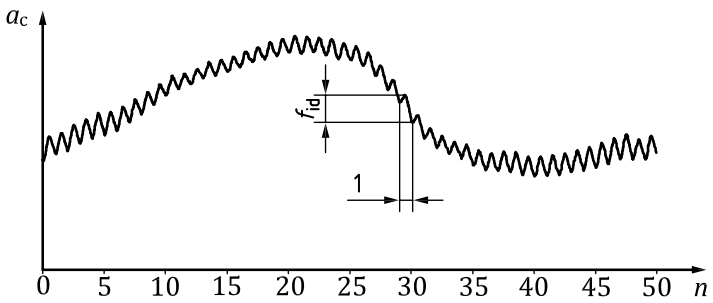
Note 1 to entry: ISO 1328-1 describes elemental methods and deviations.

3.1.4
master gear
gear with the required precision that is designed to measure double flank radial composite deviation in a double flank contact test with a *product gear* (3.1.5)

3.1.5
product gear
gear that is being measured or evaluated

3.1.6
tooth-to-tooth radial composite deviation
f_{id}
value of the greatest change in center distance within any one pitch, found after evaluating all the teeth of a *product gear* (3.1.5) in a *double flank test* (3.1.1) with a *master gear* (3.1.4)

Note 1 to entry: See Figure 1.



Key

1 single tooth pitch
n tooth number
a_c tight mesh center distance

Figure 1 — Tooth-to-tooth radial composite deviation

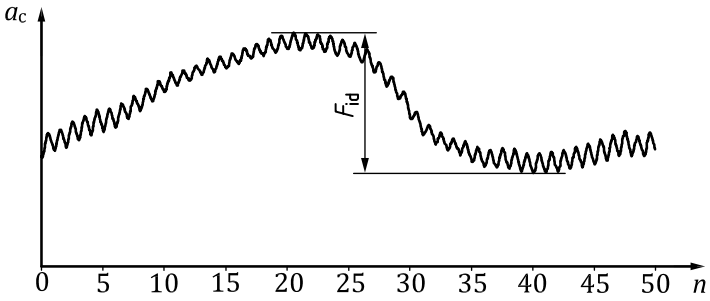
3.1.7
tooth-to-tooth radial composite tolerance
f_{idT}
maximum *tooth-to-tooth radial composite deviation* (3.1.6) allowable by specification

3.1.8
total radial composite deviation
F_{id}
difference between the maximum and minimum values of center distance found after evaluating all the teeth of a *product gear* (3.1.5) in a *double flank test* (3.1.1) with a *master gear* (3.1.4)

Note 1 to entry: See Figure 2.

3.1.9
total radial composite tolerance
F_{idT}
maximum *total radial composite deviation* (3.1.8) allowable by specification

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Key

n tooth number

a_c tight mesh center distance

Figure 2 — Total radial composite deviation

3.2 Symbols

For the purposes of this document, the symbols given in Table 1 apply. The symbols are based on those given in ISO 701.

Table 1 — Symbols

Symbol	Term	Units	First used
a_c	Tight mesh center distance	mm	3.1.6
F_{id}	Total radial composite deviation	µm	3.1.8
f_{id}	Tooth-to-tooth radial composite deviation	µm	3.1.6
F_{idk}	Radial composite deviation over k teeth	µm	B.3
F_{idkT}	Radial composite tolerance over k teeth	µm	B.4
F_{idT}	Total radial composite tolerance	µm	3.1.9
f_{idT}	Tooth-to-tooth radial composite tolerance	µm	3.1.7
k_{max}	Maximum number of tooth pitches in measurement segment	—	B.4
m_n	Normal module	mm	5.3
n	Tooth number	—	3.1.6
R	Tolerance class number	—	5.3
R_x	Tolerance class modifier based on number of teeth	—	5.3
z	Number of teeth	—	5.2.1
z_c	Number of teeth for calculation	—	5.3
z_k	Number of teeth in the sector	—	5.4.2
β	Helix angle	°	5.3

4 Application of the ISO double flank radial composite tolerance classification system

4.1 General

This document provides classification tolerances and measuring methods for unassembled gears.

Surface texture is not considered in this document. For additional information on surface texture, see ISO/TR 10064-4.

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