

ICS 21.200
CCS J 17



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 10087-2018

Replacing GB/T 10087-1988

Basic tooth profile of cylindrical worm

圆柱蜗杆基本齿廓

Issued on: May 14, 2018

Implemented on: December 1, 2018

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 3.1 Basic tooth profile of cylindrical worm
- 4 Dimensional parameters of the basic tooth profile
- 4.1 General
- 4.2 Specification of the dimensional parameters of the basic tooth profile
- 5 Profile angle or generating angle of the basic worm

Foreword

This standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB/T 10087-1988 Basic tooth profile of cylindrical worm. Compared with GB/T 10087-1988 the main changes are the following: a foreword has been added to the standard; and the current editions of the related standards are cited (see Clause 2, and Clause 2 of the 1988 edition).

Attention is drawn to the possibility that some of the content of this document may be the subject of patent rights. The issuing body of this document is not to be held responsible for identifying such patent rights.

This standard was proposed by and is under the jurisdiction of the National Technical Committee on Gears of Standardization Administration of China (SAC/TC 52).

The previous edition of the standard replaced by this one was GB/T 10087-1988.

1 Scope

The reference rack of the Chinese worm gear industry. A worm drive turns a fast, low-torque input into a slow, high-torque output at a right angle, and it does so through a screw thread rubbing against a wheel; the shape of that thread in the axial section - the basic tooth profile - is what decides whether the worm made in one factory will mesh with the wheel hobbled in another. This standard specifies that basic tooth profile once and for all, in terms of the addendum, the working depth, the axial pitch, the tooth thickness on the reference line, the bottom clearance, the fillet radius at the root and the rounding permitted at the tip, all expressed as multiples of the module rather than as absolute dimensions. It applies to cylindrical worm drives with a module of at least one millimetre and a shaft angle

of ninety degrees, for the four worm types used in practice: the Archimedean worm (ZA), the worm with straight profile in the normal section (ZN), the involute worm (ZI) and the worm generated by a conical envelope (ZK). A separate clause fixes the profile angle - axial, normal or generating according to the worm type - and states when it may be opened up for high-lead power drives or closed down for indexing drives. Gear designers, worm hob and cutter makers and gearbox manufacturers all work from it; the 2018 edition changed nothing technical, adding a foreword and citing the current editions of the standards it refers to.

This standard specifies the basic tooth profile of the cylindrical worm.

This standard applies to cylindrical worm drives with a module m of not less than 1 mm and a shaft angle of 90 degrees, whose basic worm is of one of the following types: the Archimedean worm (ZA worm), the worm with straight-sided profile in the normal section (ZN worm), the involute worm (ZI worm), and the cylindrical worm generated by a conical envelope (ZK worm).

2 Normative references

The following documents are indispensable for the application 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.

GB/T 3374.2 Basic terms and definitions for gears - Part 2: Geometry definitions for worm gear.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in GB/T 3374.2 and the following apply.

3.1 Basic tooth profile of cylindrical worm

The specified tooth form of the basic worm in a given section.

4.1 General

The dimensional parameters of the basic tooth profile, taken in the axial plane of the worm, are shown in Figure 1: the axial pitch, the addendum, the working depth, the bottom clearance and the root fillet radius, measured from the reference line.

4.2 Specification of the dimensional parameters of the basic tooth profile

Clause 4.2 fixes, as multiples of the module m , the addendum and the working depth, together with the reduced values used when a short tooth is adopted; the axial pitch, with

the tooth thickness and the space width on the reference line made equal to one another; the bottom clearance, together with the smaller and larger values permitted where necessary; and the root fillet radius, again with the smaller and larger values permitted where necessary, the root being allowed to be machined as a single circular arc as shown in Figure 2. Rounding of the tooth tip is permitted, with the fillet radius not exceeding the value stated. A note explains that the reference line means the line of intersection of the axial plane of the worm with the reference cylinder surface. The numerical coefficients themselves are in the standard.

5 Profile angle or generating angle of the basic worm

Clause 5 fixes one angle for each of the four worm types: for the Archimedean worm (ZA worm) it is the axial profile angle of the worm; for the worm with straight-sided profile in the normal section (ZN worm) and for the involute worm (ZI worm) it is the normal profile angle of the worm; and for the cylindrical worm generated by a conical envelope (ZK worm) it is the generating angle of the conical tool that forms the worm tooth flank. It further allows the profile angle to be increased in power transmission when the lead angle exceeds the stated value, and to be reduced in indexing transmission, with recommended values in either direction. The angles themselves are in the standard.