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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 16848-2025

Replacing GB/T 16848-1997

Accuracy of hourglass worms and worm gears

环面蜗杆、蜗轮精度

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. This document replaces GB/T 16848-1997 "Precision of Straight Profile Toroidal Worms and Worm Gears". Compared with GB/T 16848-1997, the only differences are in the structural adjustment. Aside from integration and editorial changes, the main technical changes are as follows:

a) The scope has been changed (see Chapter 1, Chapter 1 of the.1997 edition);

b) Some terms and definitions have been changed (see Chapter 3, Chapter 2 of the.1997 edition);

c) The precision class was changed (see Chapter 4, Chapter 3 of the.1997 edition);

d) The deviation group has been removed (see

5.1 in the.1997 edition);

e) The permissible values for the deviation items have been changed (see Chapter 5, Chapters 5 and 6 of the.1997 edition);

f) The inspection rules have been changed (see Chapter 6, Chapters 6 and 7 of the.1997 edition);

g) The drawing labels have been changed (see Chapter 7, Chapter 8 in the.1997 edition). Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed and is under the jurisdiction of the National Technical Committee on Gear Standardization (SAC/TC52). This document was drafted by: Zhengzhou Machinery Research Institute Co., Ltd., China Academy of Machinery Science and Technology, Chongqing University, and Hangzhou Jiepai Transmission Technology Co., Ltd. The company, Shanghai Hezhong Heavy Industry Machinery Co., Ltd., Shandong Dezhou Jinyu Machinery Co., Ltd., Dow Intelligent Technology (Shenzhen) Co., Ltd. Zhengzhou Machine Tool Research Institute (Zhengzhou) Transmission Technology Co., Ltd., Northeastern University, China Agricultural University, Beijing Shuanghuan Zhixing Transmission Technology Co., Ltd., Chongqing Machine Tool Group Co., Ltd. (Group) Limited Liability Company and Zhejiang Taijiu Precision Machinery Co., Ltd. The main drafters of this document are. Wang Zhigang, Chen Yonghong, Wang Sibao, Chen Demu, Li Zhanshan, Zhang Kun, Jin Shuliang, Cao Zhigang, Tao Yulong, and Li Haixia. Fan Ruili, Zhao Yaping, Li Haitao, Lu Jianjiang, Jiang Lin, Xu Wenbo, Wang Wenchang, Liu Bo, Shi Lubing, Dong Jinchao, Guo Qingqing, Guan Hongjie, Lin Xiuxun Zhi Yanfeng, Guan Rongxin, Yu Feipeng, Zhang Lihong, Ma Ming, Li Zengliang, Ma Chengtian. This document was first published in.1997, and this is its first revision.

Toroidal worm gear drives include various forms, such as the common straight-profile toroidal worm gear drive and the planar envelope toroidal worm gear drive (which is further divided into planar-to-planar...). Secondary envelope toroidal worm gear drives, planar secondary envelope toroidal worm gear drives, variable beta-angle planar envelope toroidal worm gear drives, etc., double cone envelope toroidal... Worm gear drives, involute spiral envelope toroidal worm gear drives, etc., can be used for power transmission or precision positioning. (The text then abruptly shifts to a seemingly unrelated topic. mating with a toroidal worm gear...) Worm gears are generally produced by hobbing with a cutting cutter of the same type and parameters as the worm. However, there are exceptions, such as toroidal worms paired with cylindrical gears. Toroidal worm gears paired with roller worm gear drives, etc. With advancements in measuring equipment and software, significant changes have occurred internationally in the evaluation of gear precision since.1995.For circular... For spur gears and bevel gears, the accuracy evaluation has shifted from the original group-based measurement to a method primarily based on coordinate-based single-item deviation measurement. The method of using meshing-based comprehensive

deviation as a supplement. The fundamental principle of the transformed accuracy evaluation lies in reflecting only the geometric machining quality of a single gear part. Quantity cannot be used to directly predict and evaluate the performance of a gear pair after installation based on the accuracy grade of a single gear component. The accuracy evaluation methods for toroidal worm gears and worm wheels also need to follow this principle and be modified accordingly. The accuracy deviation items specified in this document... This includes the helix deviation, pitch deviation, and throat profile deviation of the toroidal worm; and the tooth pitch deviation, cumulative tooth pitch deviation, profile deviation, and tooth surface deviation of the worm wheel. Topological deviation, single-tooth tangential combined deviation, and total tangential combined deviation. Except for the tangential combined deviation, which requires a single-sided meshing measuring instrument for measurement, Other indicators can be obtained using a gear measuring instrument or a coordinate measuring machine. In addition, common issues in the design and testing of toroidal worms, worm gears, and toroidal worm pairs include tooth thickness, contact spot, backlash, and installation deviation. Because it greatly affects the proper use of worm gear pairs, this document retains some relevant content, but these items are no longer considered as toroidal components. Precision evaluation indicators for worm gears, worm wheels, and toroidal worm gear pairs. Toroidal worm gear and worm wheel accuracy

1 Scope

GB/T 16848-2025 is the Chinese national standard covering the tolerances of a globoid worm drive - the pitch, profile and helix deviations, the runout and the contact pattern, and the accuracy grades, on a gear whose several teeth in mesh at once make it capable of far higher loads than a cylindrical worm. It replaces GB/T 16848-1997, a standard twenty-eight years old. In force from 1 May 2026. Issued on 31 October 2025, it has been in force since 1 May 2026, replacing GB/T 16848-1997.

This document specifies the precision requirements, allowable deviation values, inspection rules, and drawing annotations for toroidal worm gears and worm wheels. This document applies to straight-profile toroidal worm gears, planar envelope toroidal worm gears, and double-axis toroidal worm gears with an axis intersection angle of 90° and a center distance of 50mm~1250mm. Design, fabrication, procurement, and acceptance of conical envelope toroidal worm gears, involute spiral envelope toroidal worm gears, and mating worm wheels. Other types of toroidal... The worm gear and its paired transmission components shall be implemented in accordance with the same procedure.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this

document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 2821 Gear Geometric Element Designations

GB/T 3374.2 Gear terminology and definitions Part

3 Terms and Definitions

The terms and definitions defined in GB/T 2821, GB/T 3374.2 and GB/T 16442, as well as the following terms and definitions, apply to this document.

3.1.1 Fbeta

1 On the indexing ring surface of the toroidal worm gear's working tooth width range, the axial distance between the two nominal helices encompassing the actual helix at the throat... distance. Note

1.In this definition, "axial distance" is equal to the length of a specific line segment that connects two helical lines along the worm's axis, with the midpoint of the segment located at the worm's axial position. Within the throat plane of the rod. See Figure 1. Note

2.The error direction in this definition is the tangent direction of the measured point on the helix within the pitch circle of the axial section.