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

GB/T 46653-2025

Test method for vertical mounted gear transmission device

立式安装齿轮传动装置试验方法

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Foreword

This document was issued on 31 October 2025 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 May 2026.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

It is classified under ICS 13.220.10, Chinese classification H 57.

1 Scope

GB/T 46653-2025 is the Chinese national standard that fixes how a vertically mounted gear transmission device is tested - a gearbox whose output shaft runs plumb rather than horizontal, the arrangement used in wind turbine yaw and pitch drives, in construction machinery and in medical equipment. Mounting a gear unit vertically changes how the lubricant sits, how the bearings are loaded and how the seals behave, so the general acceptance codes for gear units do not answer the question on their own. The document sets out the test piece and how it is prepared and sampled, the list of test items, the load test equipment in both its power open-loop and power closed-loop forms, and then the procedure for each item in turn: no-load and load running, noise, vibration, efficiency, radial and axial loading, life, airtightness, salt spray, degree of enclosure protection and bump. It closes with how the acquired data are processed, including the calculation of average efficiency, and with what a test report has to contain. It is the document a manufacturer, a purchaser or a third-party laboratory works to when a vertical gear unit has to be qualified, and it is a first edition: there is no earlier version to compare it with.

This document describes the test piece, test items, load test equipment, test procedures, data processing, and test reports involved in the test methods for vertically mounted gear transmission devices.

This document applies to vertically mounted gear transmission devices used in fields such as wind power, construction machinery, and medical machinery.

2 Normative References

The following documents contain provisions that, through normative reference in this text, constitute essential provisions of this document. For dated references, only the edition corresponding to that date applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 2828.1 Sampling procedures for inspection by attributes-Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection

GB/T 2828.11 Sampling procedures for inspection by attributes-Part 11: Procedures for

assessment of declared quality levels for small populations

GB/T 4208 Degrees of protection provided by enclosure (IP Code)

GB/T 6404.1 Acceptance code for gear units-Part 1: Test code for airborne sound

GB/T 6739 Paints and varnishes-Determination of film hardness by pencil test

GB/T 10125 Corrosion tests in artificial atmospheres-Salt spray tests

GB/T 14231 Method for determining the efficiency of gear units

GB/T 41850.9 Mechanical vibration-Measurement and evaluation of machine vibration-Part 9: Gear units

3 Terms and Definitions

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

3.1

vertically mounted gear transmission device

A gear transmission device whose output shaft axis is installed in a vertical (plumb) direction.

3.2

power open-loop test equipment

A loading device where the power flow travels from the prime mover to the energy dissipation load device, forming an open power flow path.

3.3

power closed-loop test equipment

A loading device where the power circulates internally within the system, forming a closed power flow path.

3.4

failure

A state where one of the technical specifications of the vertically mounted gear transmission device has irreversibly failed to meet the nominal value, or where a non-wear part has incurred physical damage preventing it from meeting functional requirements.

Note: Wear parts generally refer to rubber-type seals and lubricants, and do not include main transmission components or supporting components such as gears, bearings, shafts, planet carriers, etc. A specific list is provided in the manufacturer's accompanying documentation.

4 Test Piece

4.1 The manufacturing process of the test piece shall follow the drawings and technical documents approved according to established procedures, and shall have inspection qualification records.

4.2 The lubricating oil and oil level added to the test piece shall meet the requirements specified in the design documentation.

4.3 Before testing, the basic parameters of the test piece shall be recorded, and the test piece shall be assigned a serial number. The quantity of test pieces shall be determined by the test objectives and requirements. The test quantity and sampling procedure shall be executed according to the requirements of the test specification; in the absence of a specification, they shall follow the requirements of GB/T 2828.1 or GB/T 2828.11.

Note 1: The operating mode of the test piece is categorized as unidirectional continuous operation or reciprocating operation.

Note 2: The structural type of the test piece is distinguished by the direction of the input and output ends, categorized as parallel shaft type, coaxial type, non-parallel shaft type, and intersecting shaft type. This document uses the coaxial type as an example.

5 Test Items

The test items are determined by the test objectives. The content of factory tests and type tests is selected by the relevant parties; a test plan should be prepared based on actual conditions. Test items include but are not limited to the following:

- No-load;
- Load;
- Noise;
- Vibration;
- Efficiency;
- Radial load;
- Axial load;
- Life;
- Airtightness;
- Salt spray;
- Enclosure protection degree (IP code);