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**AUTOMOTIVE INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Technical specifications for automobile bevel box
(English Translation)**

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1 Scope

This document specifies the technical requirements, test methods, and inspection rules for automotive bevel boxes.

This document is applicable to automotive bevel boxes, specifically the angle transmission device (hereinafter referred to as the "assembly") located between the steering wheel and the power steering gear.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 10125 Corrosion tests in artificial atmospheres - Salt spray tests GB/T 35360-2017
Motor vehicles steering system terms and definitions

3 Terms and Definitions

The terms and definitions defined in GB/T 35360-2017, as well as the following terms and definitions, are applicable to this document.

3.1 Bevel Box

A device that transmits torque at a fixed angle and transmission ratio between the input terminal and the output terminal. Its application diagram is shown in Figure 1.

3.2 Starting Torque

The torque required for the input shaft to move from rest to rotation, in Newton meters (N·m).

3.3 Axial Free Clearance

The displacement of the input terminal when a certain axial force is applied to the input terminal of the assembly, in millimeters (mm).

3.4 Circumferential Steering Clearance

The relative rotation angle between the input shaft and the output shaft of the assembly under the action of a certain torque, in degrees (°).

4.1 Requirements for Installation and Layout of the Tested Assembly Bench

4.1.1

When testing the assembly, it shall be installed on the test device with reference to the layout of the entire vehicle.

4.1.2

When testing the assembly, the ambient temperature ranges from 18°C to 32°C; the relative humidity ranges from 45% to 75%, and the atmospheric pressure ranges from 86 kPa to 106 kPa.

4.2 Test Accuracy of Test Instruments, Meters and Other Test Equipment

4.2.1

Force. The accuracy of the force test shall not be less than 0.5%FS.

4.2.2

Speed. The accuracy of the speed test shall not be less than 0.5%FS.

4.2.3

Torque. The accuracy of the torque test shall not be less than 0.5%FS.

4.2.4

Rotation angle. The accuracy of the rotation angle test shall not be less than 0.5%FS.

4.2.5

Displacement. The accuracy of the displacement test shall not be less than 0.5%FS.

4.2.6 Decibel (noise). The factory-tested decibel test instrument shall not be lower than a Level

2 sound level meter.

4.3 Test Samples

Test samples shall be manufactured in accordance with the drawings and technical documents approved by the prescribed procedures, and their materials, dimensions, heat treatment and assembly status shall comply with the specifications of the drawings and technical documents.

5.1.1 Angular transmission ratio and transmission efficiency

Carry out the test according to the provisions of 6.1. The angular transmission ratio of the assembly shall meet the design requirements, and both the forward transmission efficiency and the reverse transmission efficiency shall meet the design requirements.

5.1.2 No-load steering torque

Carry out the test according to the provisions of 6.2, and the no-load steering torque of the assembly shall meet the design requirements.

5.1.3.1 Axial free clearance

Carry out the test according to the provisions of 6.3.1, and the axial free clearance of the assembly shall not be greater than 0.15 mm.

5.1.3.2 Circumferential steering clearance

Carry out the test according to the provisions of 6.3.2, and the circumferential steering clearance of the assembly shall not be greater than 0.5°.

5.1.4 Noise

Carry out the test according to the provisions of 6.4, and the noise of the assembly shall not be greater than 65 dB(A).

5.1.5 Low temperature starting torque

Carry out the test according to the provisions of 6.5, and the low temperature starting torque of the assembly shall meet the design requirements.

5.2.1 Strong torsion test

Carry out the test according to the provisions of 6.6. After completing the specified number of cycles, the assembly shall not have oil leakage or rotational jamming, and the parts shall not have cracks or fractures.

5.2.2 Wading test

Carry out the test according to the provisions of 6.7. After completing the specified number of cycles, there shall be no water intrusion inside the assembly.

5.2.3 Rotational endurance test

Carry out the test according to the provisions of 6.8. After completing the specified number of cycles, the assembly shall not have oil leakage, and the parts shall not have cracks or fractures.

The axial free clearance of the assembly shall not exceed 200% of the design value before the test, the circumferential steering clearance shall not exceed 200% of the design value before the test, and the no-load steering torque shall not exceed 200% of the design value before the test.

5.2.4 Reverse fatigue test

Carry out the test according to the provisions of 6.9. After completing the specified number of cycles, the assembly shall not have oil leakage, and the parts shall not have cracks or fractures.

5.2.5 Corrosion resistance test

Carry out the test according to the provisions of 6.10. The assembly shall meet the neutral salt spray test. After 150 h, there shall be no single corrosion area or spot with an area of $\geq 2 \text{ mm}^2$ on the surface and no more than 5.