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QC/T 1020-2023

Replacing QC/T 1020-2015

Drive shaft assembly for automobiles

汽车驱动轴总成

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Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

This document replaces QC/T 1020-2015 "Test methods for constant velocity universal joint and assembles for automobiles". Compared with QC/T 1020-2015, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

a) ADD the terms and definitions such as "drive shaft assembly", "boot", "maximum bending angle", "rated torque", "damage torque", "rotational torque", "plunging resistance", "static plunging resistance", "generated axial force", "high-frequency plunging resistance", "drive efficiency" (see 3.1, 3.6, 3.9, 3.10, 3.12, 3.15, 3.18, 3.18.1, 3.18.2, 3.18.3, 3.19);

b) DELETE the terms and definitions of "constant velocity universal joint", "constant velocity drive shaft", "drive shaft specifications", "universal joint specifications", "maximum torque", "static torsional strength", "life", "torsional fatigue", "rotational torque" (see 3.2, 3.4, 3.7, 3.8, 3.10, 3.11, 3.13, 3.14, 3.19 of the 2015 edition);

c) CHANGE the terms and definitions of "universal joint", "fixing joint", "plunging joint", "interconnecting shaft", "bending angle", "Johnson's apparent elastic limit", "quasi-static torsion strength" "rotational backlash", "axial clearance" (see 3.2, 3.3, 3.4, 3.5, 3.8, 3.11, 3.13, 3.16, 3.17; 3.1, 3.3, 3.5, 3.6, 3.9, 3.12, 3.15, 3.17, 3.20 of the 2015 edition);

d) ADD a chapter on "Symbols" (see Chapter 4);

e) ADD a chapter on "Technical requirements" (see Chapter 5);

f) ADD the test methods such as "fixed pitch bending angle", "static plunging resistance", "generated axial force", "high-frequency plunging resistance", "drive efficiency", "torsional stiffness", "boot rotation expansion", "boot tightness" (see 6.1, 6.7, 6.8, 6.9, 6.10, 6.12, 6.16, 6.17);

g) CHANGE the "displacement and bending angle" to "moving pitch displacement and bending angle" (see 5.2, 6.2; 4.5 of the 2015 edition);

h) CHANGE the "torsional fatigue" to "torsional fatigue strength", deleting the requirement in the test method to statistically analyze the test results according to the Weibull distribution (see 5.14, 6.14; 4.3 of the 2015 edition);

i) CHANGE the "life" to "durable life", changing the multi-road segment test procedure (see 5.15, 6.15; 4.4 of the 2015 edition);

Drive shaft assembly for automobiles

1 Scope

This document specifies the terms and definitions, symbols, technical requirements, test methods of automotive drive shaft assemblies. This document is applicable to automotive drive shaft assemblies.

2 Normative references

This document has no normative references.

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Drive shaft assembly

A combination of universal joints, interconnecting shafts and other parts, which are installed between the differential or final reduction gear and the wheel hub, to transmit torque and speed.

3.2

Universal joint

A joint mechanical device that can transfer torque and speed from one end to the other end, when the angle between the two shafts remains unchanged or changes.

3.3

Fixing joint

A universal joint that can only change the working angle.

3.4

Plunging joint

A universal joint that can change the working angle and perform axial plunging movement.

5 Technical requirements

5.1 Fixed pitch bending angle

The fixed pitch bending angle shall meet the product technical requirements.

5.2 Moving pitch displacement and bending angle

The moving pitch displacement and bending angle shall meet the product technical requirements.

5.3 Rotational backlash

The rotational backlash of the drive shaft assembly shall not be greater than 60'.

5.4 Axial clearance

The axial clearance of the fixing joint shall not be greater than 0.6 mm.

5.5 Swing torque

The swing torque of the fixing joint with a boot shall not be greater than 20 N·m; the swing torque of the fixing joint without a boot shall not be greater than 8 N·m.

5.6 Rotational torque

The rotational torque of the fixing joint with a boot shall not be greater than 10 N·m; the rotational torque of the fixing joint without a boot shall not be greater than 5 N·m.

5.7 Static plunging resistance

The static plunging resistance shall meet the technical requirements of the product.

5.8 Generated axial force

The generated axial force shall meet the technical requirements of the product.

5.9 High-frequency plunging resistance

The high-frequency plunging resistance shall meet the technical requirements of the product.

5.10 Drive efficiency

The drive efficiency of the drive shaft assembly shall not be less than 98%.

5.11 Static torsional strength

The Johnson's apparent elastic limit of the drive shaft assembly shall not be less than the rated torque; the breaking torque shall not be less than 1.35 times the rated torque.

5.12 Torsional stiffness

The torsional stiffness shall meet the product technical requirements.

5.13 Quasi-static torsional strength

The quasi-static torsional strength shall meet the product technical requirements.

5.14 Torsional fatigue strength

The torsional fatigue strength shall meet the product technical requirements.

5.15 Endurance life

The endurance life grade shall not be less than grade 3 or shall meet the product technical requirements.

5.16 Boot rotation expansion

The boot rotation expansion shall not be greater than 7 mm.

5.17 Boot tightness

The air pressure in the boot has no continuous downward trend; no bubbles are visually observed at the boot and the joints.

6 Test method

6.1 Fixing joint bending angle

6.1.1 Test equipment

6.1.1.1 The test equipment shall be able to bend and rotate the test piece.

6.1.1.2 The test equipment shall be able to measure and record the bending torque and bending angle in real time.

6.1.2 Test method

6.1.2.1 Install the drive shaft assembly (hereinafter referred to as the "test piece") to the test equipment as shown in Figure 1. The initial bending angle of the universal joint is 0°. The test piece shall not generate additional force in the initial state.

6.1.2.2 Start the test equipment; rotate the test piece at a fixed speed at (30 ~ 120) r/min in the actual forward direction of the vehicle; make the fixing joint swing from 0° until

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