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Passenger vehicles - Free-steer behaviour - Steering-pulse open-loop test method

乘用车 自由转向特性 转向脉冲开环试验方法

(ISO 17288-2:2011, Passenger vehicles - Free-steer behaviour - Part 2: Steering-pulse open-loop test method, MOD)

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Table of Contents

Passenger vehicles - Free-steer behaviour - Steering-pulse open-loop test method

1 Scope

This Standard specifies the steering-pulse open-loop test method for free-steer behaviour of passenger vehicles.

This Standard is applicable to M1 vehicles. Other types of vehicles can be implemented by reference.

2 Normative references

The following referenced 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 3730.1, *Motor vehicles and trailers - Types - Terms and definitions*

GB/T 3730.2, *Road vehicle - Masses - Vocabulary and codes* (GB/T 3730.2-1996, idt ISO 1176:1990)

GB/T 12549, *Terms and Definitions for Vehicle Controllability and Stability*

GB/T 15089, *Classification of power-driven vehicles and trailers*

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 3730.1, GB/T 3730.2, GB/T 12549 and GB/T 15089 apply.

4 General

The purpose of this Standard is mainly to investigate and evaluate the ability of the vehicle to return to a straight path after the steering wheel angle pulse input is completed when the vehicle is driving in a straight line in a steady state. Release the steering wheel free after pulse input. Record the steering wheel angle and vehicle response during vehicle oscillation. Calculate and obtain the

7.2.2 The atmospheric temperature is between 0°C~40°C.

7.3 Vehicle conditions

7.3.1 Vehicle inspection

Before the test, determine the vehicle's four-wheel alignment parameters. Check, adjust and tighten the steering system and suspension system, and lubricate as required. The test can only be carried out if it is confirmed that the test vehicle has met the technical conditions stipulated by the manufacturer. The values of the relevant parameters measured and checked shall be recorded, see Annex A.

7.3.2 Test load

The test vehicle load is the curb weight of the vehicle plus the driver and equipment not exceeding 150kg to the maximum allowable total mass of the vehicle. Do not exceed the maximum allowable axle load of the vehicle at the same time. The recommended test mass is the curb weight of the vehicle plus the weight of 1 driver, 1 tester and necessary equipment.

7.3.3 Test tires

7.3.3.1 The tires shall be installed on the test vehicle according to the vehicle manufacturer’s instructions. The tires shall be run-in at least 150km on the tested vehicle or similar vehicle. But ensure that there is no excessive use, such as emergency braking, rapid acceleration, sharp turns, road shoulders. After running-in, the tires shall be kept in the same position for testing.

7.3.3.2 The tire tread depth (including the entire width of the tire contacting the ground and the entire tire surface) shall be more than 90% of the initial tire tread depth.

7.3.3.3 The production date of the tire shall be recorded in the test conditions, see Annex B. The test tire shall not exceed one year from the production date when it is used for the test.

7.3.3.4 The tires shall be inflated at the pressure corresponding to the test environment temperature specified by the vehicle manufacturer. For tire pressure less than or equal to 250kPa, the error of cold inflation pressure shall be ±5kPa. When the tire pressure exceeds 250kPa, the error shall not exceed 2%.

7.3.3.5 The tire pressure and the depth of the tire tread pattern before warm-up shall be recorded in the test report, see Annex B.

7.3.3.6 In addition to the basic tire conditions, tests can also be carried out under other conditions. The specific details shall be recorded in the test report,

see Annex B.

7.3.3.7 The dynamic balance of the wheel/tyre assembly shall be confirmed before the test.

8 Test procedure

8.1 Hot vehicle

Before the test, drive 10km in a straight line at the test vehicle speed, or drive 500m at the corresponding vehicle speed with a lateral acceleration of 3m/s^2 (one left turn and one right turn) to warm up the tires.

8.2 Test speed

The standard value of the test vehicle speed is 100km/h. At least carry out three speed tests. Other vehicle speeds shall be determined at ±20km/h intervals with reference to the standard vehicle speed. During the test, the vehicle travels in a straight line at the test speed. Manual transmission vehicles use the highest gear. Automatic transmission vehicles use D gear. When the initial speed of the test does not exceed 100km/h, the error shall not exceed ±1km/h. When the initial test speed exceeds 100km/h, the error shall not exceed ±2km/h. Keep the accelerator pedal position unchanged during the test.

8.3 Test methods

At each test speed, the driver gives the steering wheel a steering pulse input to make it reach the preset steering wheel angle. Immediately release the steering wheel to allow the vehicle to travel freely. The throttle position remains unchanged during this period.

The amplitude of the pulse input shall be sufficient to make the vehicle produce an initial lateral acceleration of 2m/s^2±0.2m/s^2. Gradually increase the angular amplitude of the pulse input δ_{Hp} and repeat the test. Make sure to increase the lateral acceleration at an interval of no more than 0.5m/s^2 until the lateral acceleration reaches more than 5m/s^2. The schematic diagram is shown in Figure 1.

Annex A

(normative)

Test report -- Basic information

The basic information in the test report is recorded according to the following template.

Vehicle identification VIN code: _____

Vehicle type: _____

Factory: _____

Model: _____

Model year/Registration date: _____

Driving wheel: ☐Front axle ☐Rear axle

Four-wheel drive type: _____

Special function: _____

Power system identification number: _____

Power type: ☐Gasoline engine ☐Diesel engine ☐Pure electric ☐ Hybrid

Oil and gas mixing control: ☐ Multi-point EFI ☐ In-cylinder direct injection

Booster system: ☐ Turbocharged ☐ Supercharged

Ignition timing control: ☐ Mechanical control ☐ Electronic control

Oil cut switch: ☐ Yes ☐ No

Cylinder displacement (mL) and quantity (pcs): _____

Power system layout type: _____

Number of motors (piece): _____

Maximum power (kW) and speed (r/min): _____

Maximum torque (N·m) and speed (r/min): _____

Transmission gearbox model: _____

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