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Limits and Measurement Methods for Crankcase Pollutants from Heavy-duty Vehicles Equipped with P.I Engines

装用点燃式发动机重型汽车曲轴箱污染物排放限值及测量方法

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Table of Contents

Limits and Measurement Methods for Crankcase Pollutants from Heavy-duty Vehicles Equipped with P. I Engines

1 Scope

This document specifies the type approval application, type approval test method, production conformity inspection method and emission limits of crankcase pollutants from heavy-duty vehicles equipped with P. I engines.

This document is applicable to heavy-duty vehicles equipped with P. I engines.

The engines to be tested shall include those for which anti-leakage measures have been taken, but exclude those engines (for example, horizontally opposed engines), in which, even a slight leakage in the structure will cause abnormal operation.

2 Normative References

The clauses of the following documents become clauses of this Standard through the references in this Standard. In terms of references without a specified date, the latest version is applicable to this document.

GB/T 15089 Motor Vehicles - Classification

GB 17930 Unleaded Petrol (gasoline) for Motor Vehicles

GB 18047 Compressed Natural Gas as Vehicle Fuel

GB/T 18297 Performance Test Code for Road Vehicle Engines

GB 19159 Automotive Liquefied Petroleum Gases

3 Terms and Definitions

The following terms and definitions are applicable to this Standard.

3.1 Heavy-duty Vehicle

Heavy-duty vehicle refers to Category-M and Category-N vehicle with a maximum total mass of more than 3,500 kg. See GB/T 15089 for the definition of Category-M and Category-N vehicle.

3.2 Curb Weight

4.1.1 Automobile manufacturers must obtain the national type approval of pollutant emission control performance for the manufacture and sales of automobiles. The application of type approval of crankcase pollutant emission control performance of a vehicle type must be submitted by the automobile manufacturer.

4.1.2 In accordance with Appendix A of this Standard, submit relevant technical data, as well as crankcase pollutant emission test report and performance indicators of relevant main assembly for the type approval, and submit relevant guarantee materials on the crankcase pollutant emission production conformity.

4.1.3 A vehicle (or corresponding engine and accessories) that can represent the vehicle type to be approved must be submitted to the testing institution in charge of the type approval test. In accordance with the methods specified in Chapter 5 of this Standard, carry out the test.

4.2 Approval of Type Approval

If the various technical requirements specified in Chapter 5 are satisfied, the vehicle type will obtain the approval by the type approval authority.

5 Technical Requirements and Tests

5.1 For the components that affect the crankcase pollutant emission performance of the vehicle, in design, manufacture and assembly, it must be ensured that they can satisfy the requirements of this Standard under the normal operating conditions of the vehicle.

5.2 The vehicle manufacturer must take technical measures to ensure that the vehicle can effectively control the crankcase pollutant emission within the limits specified in this Standard under the normal operating conditions and within the normal service life of the vehicle. The hoses and their joints used in the system, as well as the reliability of each connection, must comply with their design requirements in manufacture. When the crankcase pollutant emission complies with the requirements of Article 5.3 (emission limits), then, the vehicle is considered as satisfying for the requirements of this article.

5.3 Emission limits

In accordance with the method described in Appendix B of this Standard, carry out the test. Any gas in the crankcase is not allowed to be emitted into the atmosphere.

5.4 For the dual-fuel vehicles, the test is carried out only on gasoline.

5.5 For the single gas fuel vehicles, the test is carried out only on gas fuel.

6 Production Conformity

6.1 The production conformity of crankcase pollutant emission must be guaranteed in accordance with the stipulations in the production conformity guarantee materials submitted at

Appendix A

(standard appendix)
Type Approval Application Materials

When applying for type approval, the following materials including the table of contents must be provided and in the form of electronic documents.

Any diagram shall be of adequate detail and appropriate scale; its format size is A4, or folded to that size. Photographs, if available, shall show the details.

A.1 Overview

A.1.1 Brand (trade name of the manufacturer) _____

A.1.2 Model No. and commercial description _____

A.1.3 If there is a sign on the vehicle, indicate the method of identification _____ and the marking location _____

A.1.4 Vehicle type _____

A.1.5 Name and address of the manufacturer _____

A.2 Engine

A.2.1 Manufacturer _____

A.2.1.1 Engine model and specification (as marked on the engine, or other identification modes)

_____

A.2.1.2 Maximum net power: _____ kW at _____ r/min

A.2.2 Fuel: unleaded gasoline / LPG / NG[1)]

A.3 Crankcase Pollutant Emission Control System

A.3.1 Brand: _____

A.3.2 Model No.: _____

A.3.3 Description of operating principle of crankcase pollutant emission control system:

_____

_____

[1)] Cross out the one that does not apply.

Any dynamometer that can determine the stable operating conditions of the engine and whose accuracy complies with the stipulations of GB/T 18297.

B.3.1.2 Chassis dynamometer

B.3.1.2.1 The dynamometer must be able to simulate road loads.

B.3.1.2.2 The setting of the dynamometer shall not be affected by the passage of time, and shall not cause the vehicle to generate any vibrations that may hinder the normal operation of the vehicle.

B.3.1.2.3 The dynamometer must be equipped with devices of simulating inertia and simulating load. If it is a double-drum dynamometer, then, these simulating devices are connected to the front drum.

B.3.1.2.4 Accuracy

B.3.1.2.4.1 The accuracy of the measured and read indicated load shall be able to reach ± 5%.

B.3.1.2.4.2 The accuracy of the load setting of the dynamometer at 50 km/h must reach ± 5%.

B.3.1.2.4.3 The vehicle speed shall be measured through the rotational speed of the drum (for the double-drum dynamometers, use the front drum). When the vehicle speed is greater than 10 km/h, the measurement accuracy shall be ± 1 km/h.

B.3.1.2.5 Load setting: the load simulator shall be adjusted at a constant speed of 50 km/h, so that it absorbs the power acting on the drive wheels.

B.3.2 Pressure measuring equipment

B.3.2.1 For the pressure measurement in the air intake manifold, a pressure gauge with an accuracy within ± 1 kPa shall be used.

B.3.2.2 For the pressure measurement inside the crankcase, a pressure gauge with an accuracy within ± 0.01 kPa shall be used.

B.4 Test Methods

B.4.1 The gaps or pores of the engine shall remain in the original assembly state.

B.4.2 The pressure inside the crankcase shall be measured at an appropriate location, for example, use an inclined pressure gauge to measure at the oil dipstick hole.

B.4.3 If under each measurement condition specified in B.2.2 or B.2.3, the measured pressure inside the crankcase does not exceed the atmospheric pressure at the time of measurement, then, the vehicle shall be considered as satisfying for the requirements of 5.3.

B.4.4 If under a certain measurement condition specified in B.2.2 or B.2.3, the measured pressure inside the crankcase exceeds the atmospheric pressure, and when the manufacturer

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