GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 13.040.50

Z 64

GB 18176-2016

Replacing GB 18176-2007 and GB 20998-2007; partially replacing GB 14621-2011

Limits and measurement methods for emissions of pollutants from mopeds (CHINA IV)

轻便摩托车污染物排放限值及测量方法（中国第四阶段）

Issued on: August 22, 2016 **Implemented on: July 01, 2018**

Issued by: Ministry of Environmental Protection;

General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China.

Table of Contents

Limits and measurement methods for emissions of pollutants from mopeds (CHINA IV)

1 Scope

This Standard specifies limits and measurement methods for tailpipe emissions, evaporative emissions from mopeds, as well as crankcase emissions requirements, endurance requirements for emission-control devices and technical requirements for on-board diagnostic (OBD) system.

This Standard specifies the requirements for the type test of mopeds and the inspection and judgment methods for production consistency.

This Standard is applicable to two- or three-wheeled mopeds powered by ignition engines, with engine displacement not greater than 50 mL and maximum design speed not greater than 50 km/h.

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 15089-2001, *Classification of power-driven vehicles and trailers*

HJ/T 289, *Equipment specifications and quality control requirements for Gasoline vehicles in two-speed idle exhaust emission test*

QC/T 1003, *Determination of precious metal in metal support catalytic converter for mopeds*

ISO 2575:2010, *Road vehicles - Symbols for controls, indicators and tell-tales*

ISO 9141-2, *Road vehicles - Diagnostic systems - Part 2: CARB requirements for interchange of digital information*

ISO 14229-3, *Road vehicles - Unified diagnostic services (UDS) - Part 3: Unified diagnostic services on CAN implementation (UDSonCAN)*

ISO 14229-4, *Road vehicles - Unified diagnostic services (UDS) - Part 4: Unified diagnostic services on FlexRay implementation (UDSonFR)*

Gaseous pollutants emitted from moped exhaust pipes.

3.11 operating mode at normal idling speed or at high idling speed

Operating mode at normal idling speed refers to the lowest stable running state of the engine without load, that is, the engine is running normally, the transmission is in neutral, the throttle controller is at the minimum position, the choke valve is fully open, and the engine speed meets the requirements of the manufacturer's technical documents.

Operating mode at high idling speed refers to meeting the above conditions (except for the throttle controller position; for vehicles with automatic transmission, the drive wheels shall be in a free state), and by adjusting the throttle controller, the engine speed is stably controlled at the high idling speed specified in the technical documents of the manufacturer, but the high idling speed cannot be lower than 2000 r/min. If there is no provision in the technical documents, the engine speed shall be controlled at 2500 r/min ± 250 r/min.

3.12 crankcase emissions

Gaseous pollutants emitted to the atmosphere from engine crankcase vents or openings in the lubrication system.

3.13 evaporative emissions

Hydrocarbon vapors lost from the fuel (gasoline) system of a moped, other than the exhaust pipe emissions of the moped, including:

Diurnal loss: hydrocarbons emitted due to temperature changes in the fuel tank (expressed in $C_1H_{2.33}$ equivalent).

Hot-soak loss: hydrocarbons (expressed in $C_1H_{2.20}$ equivalent) emitted from the fuel system when the moped has been running for a period of time.

3.14 volume of the carbon in canister

The volume of activated carbon contained in the canister.

3.15 weight of carbon in the canister

The filling mass of activated carbon stored in the canister.

3.16 efficient loading quality of canister

The difference between the total mass of the canister after adsorption of vapor and the total mass of the canister after desorption.

3.17 bed volume of canister

The design volume of activated carbon that can be accommodated in the canister.

3.18 initial butane working capacity of canister

The effective adsorption capacity per unit of volume of the carbon in canister after 13 tests.

3.19 breakthrough point

The moment when the accumulative emission of fuel evaporative emissions is equal to 2 g.

3.20 non-exposed type of fuel storage tank

The fuel tank on a vehicle that is not directly exposed to sunlight except for the fuel tank cap.

3.21 on-board diagnostic system

The on-board diagnostic (OBD) system for emission control, referred to as OBD system. It must have the ability to identify areas that may be faulty. This information is stored in the ECU memory as a fault code.

3.22 defeat device

A device. It activates, adjusts, delays or stops the operation of a component by measuring, sensing or responding to moped operating parameters such as vehicle speed, engine speed, transmission gear, temperature, manifold vacuum or other the function of the emission control system, so as to reduce the effectiveness of the emission control system of the moped under normal conditions of use.

The following devices are not regarded as defeat devices:

(1) Devices necessary to protect the engine from damage or accidents and for the safe driving of mopeds;

(2) Devices that function only when the engine is started;

(3) Devices that do work in Type I or Type IV test.

3.23 irrational emission control strategy

Irrational emission control strategy refers to measures or methods that reduce the efficiency of the emission control system of the moped to the emission level that does not meet the requirements of the type test regulations under the normal working and use conditions of the moped.

3.24 emission-control devices

A device on a moped to control or limit the tailpipe emissions or evaporative emissions.

(1) Self-opening and closing fuel tank cap is non-removable;

(2) Prevent excessive emission of evaporative emissions caused by the loss of the fuel tank cap from the design structure;

(3) Any other measure having the same effect, for example, a tethered fuel cap; or the fuel cap lock uses the same key as the moped ignition, and the key can only be removed when the fuel cap is locked.

5.4 All mopeds shall be equipped with an OBD system. The system shall be designed, manufactured and installed to ensure that the type of fault is identified and recorded throughout the life of the moped. Without type test, any tampering that may affect emissions cannot be performed on the technical measures adopted by the manufacturer and the OBD system equipped on the moped. The OBD system shall have a Malfunction Indicator (MI) that is immediately noticeable to the driver.

5.5 The safety of the electronic control system shall meet the following requirements:

(1) Unless authorized by the manufacturer, any moped that uses an electronic control unit to control emissions shall be able to prevent modification. Any pluggable chips used to store calibration data shall be placed in a sealed container. Or they shall be protected by electronic algorithms. The stored data shall not be altered unless special tools and special programs are used. This protection requirement is only met for functional requirements that are directly related to emissions calibration or to vehicle theft protection.

(2) The engine operating parameters represented by the code of the electronic control unit shall not be changed unless special tools and special procedures are used (such as: the components of the electronic control unit are welded or sealed, or the box of the electronic control unit is sealed (or closed off)).

(3) Manufacturers that use programmable code systems for electronic control units (such as: electrically erasable programmable read-only memory) shall prevent unauthorized reprogramming. Manufacturers shall adopt anti-illegal modification countermeasures, as well as anti-writing functions, such as requiring remote electronic login to computer systems maintained by manufacturers. The method shall be disclosed to the competent authority.

5.6 Mopeds are prohibited from using defeat devices and/or irrational emission control strategy.

5.7 When one of the following conditions is met, mopeds can be installed and used with relevant engine control devices, functions, systems or measures.

(1) For engine protection, cold start or warm up only.

(2) Only for running safe or insurance and limp home.

7 Production consistency inspection

Measures shall be taken in accordance with Annex I to ensure production consistency. The inspection of production consistency is based on Annex A and Annex B. When necessary, some or all of the tests described in Chapter 6 may be carried out.

7.1 Production consistency inspection for type I test

7.1.1 When carrying out the Type I test, if the moped for type test has one or more extensions, this test can be carried out on the vehicle type mentioned in Annex A or the relevant expansion type.

7.1.2 After the moped is selected by the competent department, the manufacturer shall not make any adjustments to the selected moped.

7.1.2.1 Randomly select three vehicles of a certain model. Carry out Type I test in accordance with the provisions in Annex C. The deterioration factor actually measured during type test shall be adopted. Limits are given in Table 2 in 6.2.1.

7.1.2.2 If the competent authority approves the production standard deviation provided by the manufacturer in accordance with Annex I, judge the test results according to Article IA.1.

7.1.2.3 If the competent authority does not recognize the production standard deviation provided by the manufacturer or the manufacturer has no relevant records, judge the test results according to Article IA.2.

7.1.2.4 According to the judging criteria of Article IA.1 or Article IA.2, based on the number of test sample vehicles taken, once all pollutants meet the critical value of qualification, the series of products are considered to be qualified for Type I test. Once a certain pollutant meets the critical value of disqualification, the series of products are considered to be unqualified for Type I test.

When a certain pollutant meets the critical value of judgment, the conclusion will not be changed by the additional tests of other pollutants in order to draw the conclusion. If it cannot be determined that all pollutants meet the critical value of qualification, and it cannot be judged that a certain pollutant meets the critical value of disqualification, another vehicle is selected for the test, as shown in Figure 2.

If the statistical quantity of a certain pollutant does not meet the critical value for qualification or disqualification critical value, and the manufacturer requests to terminate the vehicle testing during the additional sampling vehicle test, it shall be judged that Type I test production consistency inspection fails.

7.1.2.5 Notwithstanding the requirements of 7.1.2.2 to 7.1.2.4, administrations may choose the following criteria:

7.2.1 When carrying out the production consistency inspection of the dual idling speed test of mopeds, the manufacturer shall conduct random inspections of the dual idling speed test for the mopeds that pass the off-line inspection.

7.2.2 The dual idling CO, HC emission values and lambda value at high idling speed of mopeds shall meet the requirements of 6.2.2.4.

7.3 Production consistency inspection for Type III test

It shall meet the requirements of 6.2.3.

7.4 Production consistency inspection for Type IV test

The production consistency inspection shall be carried out in accordance with the provisions of E.7.

7.5 Production consistency inspection for OBD system

7.5.1 Randomly select three vehicles from batch products. Conduct the test described in Annex G.

7.5.2 If the three vehicles meet the requirements of the test described in Annex G, the production consistency of the OBD system is considered to meet the requirements. Otherwise, it is determined that the production consistency inspection of the OBD system fails.

7.6 Production consistency inspection for canisters

7.6.1 Randomly select three vehicles (or three sets of canisters) from the assembly line or batch production. Test the initial working capacity of the canister in accordance with the provisions of Annex EB.

7.6.2 Criteria for judging the consistency of canister production:

- If the initial working capacity measurement results of the three sets of canisters tested are not lower than 0.85 times of the declared value, and the average value is not lower than 0.9 times of the declared value, it is determined that the production consistency inspection of the canister is qualified.

- If the initial working capacity measurement result of any of the three sets of canisters tested is lower than 0.85 times of the declared value, or its average value is lower than 0.9 times of the declared value, it is determined that the production consistency inspection of the canister is unqualified.

7.7 Production consistency inspection for catalytic converters

7.7.1 Randomly take three vehicles (or three sets of catalytic converters) from an assembly line or mass production. In accordance with the regulations of QC/T 1003,

detect the content of each precious metal in the taken catalytic converter.

7.7.2 Criteria for judging the consistency of catalytic converter production:

- If the measurement results of various precious metal contents of the three sets of catalytic converters tested are not lower than 0.8 times of the declared value, and the average value is not lower than 0.85 times of the declared value, the production consistency inspection of the catalytic converter is determined qualified.

- If the measurement result of a certain precious metal content in any of the three sets of catalytic converters tested is lower than 0.8 times of the declared value, or its average value is lower than 0.85 times of the declared value, it is determined that the production consistency inspection of the catalytic converter is unqualified.

7.8 Other

If a certain model cannot meet any one of the production consistency inspection requirements in 7.1 to 7.7, the moped manufacturer shall take all necessary measures as soon as possible to re-establish the production consistency assurance system.

8 Model extension

The model extension shall meet the requirements of Annex J. When a model is extended, the extended model cannot be extended to other models.

9 Compliance in use

Manufacturers shall take measures to ensure that within the endurance mileage specified in this Standard, the emission control devices installed on mopeds under normal use conditions always operate normally and meet the relevant pollutant emission limits.

10 Implementation of standards

10.1 Type test

From July 1, 2018, all type-tested mopeds shall meet the requirements of this Standard. Before the implementation date of this regulation, type test can be carried out in accordance with the corresponding requirements of this Standard.

10.2 Sales and registration

From July 1, 2019, all mopeds sold and registered shall meet the requirements of this

Annex C

(Normative)

Emission test for tailpipe emissions at room temperature after cold start (Type I test)

C.1 Overview

C.1.1 he moped shall be placed on a chassis dynamometer equipped with a power absorbing device and an inertia simulator. Carry out the test in accordance with the test cycle specified in Annex CC.

C.1.2 During the test, it shall use background air diluted gases. Keep the volumetric flow of the mixture constant. During the test, a continuous gas mixture sampling stream is fed into the sampling bag, so as to determine the volume fractions of carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x) and carbon dioxide (CO_2).

C.2 Test conditions

C.2.1 Laboratory and resting area

C.2.1.1 Laboratory

In the laboratory where the chassis dynamometer and sample gas collection system are installed, the room temperature shall be controlled at 25°C±5°C. The indoor temperature shall be measured once before and after the test. The measurement location shall be near the vehicle cooling fan.

C.2.1.2 Resting area

The temperature in the resting area shall be controlled at 25°C±5°C. The mopeds are placed in the resting area after pretreatment according to C.3.4. The resting area shall be able to accommodate a certain number of mopeds.

C.2.2 Test vehicle

C.2.2.1 General

The air intake system of the moped shall be kept tight. The exhaust system must not have any leaks. The testing agency shall check whether the moped can run normally, especially whether it has the ability to start under normal temperature conditions.

C.2.2.2 Run-in

Mopeds shall be in good mechanical condition. Run-in to 250 km before the test. If the

C.2.5.3.2.3 The heat exchanger (Sc) shall be capable of controlling the temperature variation of the diluted gas at the pump inlet within ±5°C throughout the test. The heat exchanger is equipped with a preheating system to heat the gas to the required working temperature (with a deviation of ±5°C) before the test starts.

C.2.5.3.2.4 Constant volume pump P_1 for sucking diluted gas is driven by a multi-stage constant speed motor. It shall have a constant flow of sufficient volume to ensure that all exhaust gas is drawn in. A critical flow venturi arrangement may also be used.

C.2.5.3.2.5 A device that continuously records the temperature of the diluted gas entering the constant volume pump (or critical flow venturi).

C.2.5.3.2.6 The probe S_3 installed outside the sampling device, through the pump, filter and flow meter, samples the diluted air at a fixed flow rate during the test.

C.2.5.3.2.7 The sampling probe S_2 in the dilution exhaust line and before the constant volume pump, through filters, meters and pumps, if necessary, samples the diluted gas at a constant flow throughout the test. In both sampling devices, the minimum sampling flow shall be at least 150 L/h.

C.2.5.3.2.8 Two filters F_2 and F_3 are correspondingly installed after the probes S_2 and S_3 to filter the suspended particles in the sample gas. Special attention is that the filter must not change the volume fraction of each gas component in the sample gas.

C.2.5.3.2.9 The two sampling pumps P_2 and P_3 collect the sample gas through the probes S_2 and S_3 into the sampling bags S_a and S_b respectively.

C.2.5.3.2.10 Two manual regulating valves V_2 and V_3 are respectively installed after the pumps P_2 and P_3, so as to control the flow rate of the sample gas entering the sampling bag.

C.2.5.3.2.11 Two rotameters R_2 and R_3 are connected in series in "probe, filter, pump, regulating valve, sampling bag" (S_2, F_2, P_2, V_2, S_a and S_3, F_3, P_3, V_3, S_b) pipeline, so as to check the sample gas flow at any time.

C.2.5.3.2.12 The airtight sampling bag used to collect dilution air and diluted gas shall have sufficient volume so that it does not obstruct the flow of sampling gas. The sampling bag shall have a device that can quickly and automatically close, so that it can be quickly disconnected from the sampling system after the test or connected to the analysis system during analysis.

C.2.5.3.2.13 Two pressure gauges g_1 and g_2 with different functions shall be installed at the following positions:

a) Installed before the constant volume pump P_1, so as to measure the pressure difference between the atmosphere and the diluted gas;

b) Installed before and after the constant volume pump P_1, so as to measure the

pressure difference between the front and rear of the pump.

C.2.5.3.2.14 The revolution counter CT is used to record the revolutions of the constant volume pump P_1.

C.2.5.3.2.15 The three-way valve in the above sampling system is used to introduce the sample gas into the respective sampling bag or directly emission it into the atmosphere during the test. Quick action valve shall be used. Three-way valves are made of materials that do not affect gas composition. Its flow section and shape shall minimize pressure loss.

C.2.5.3.2.16 The blower (BL) is used to deliver diluted gas.

C.2.5.3.2.17 The cyclone separator (CS) is used to filter particulates from the diluted gas.

C.2.5.3.2.18 The pressure gauge (G) is installed before the critical flow venturi to measure the pressure of the diluted gas.

C.2.5.4 Analytical equipment

C.2.5.4.1 Measurement of hydrocarbon (HC) volume fraction

During the test, the volume fraction of unburned hydrocarbons (HC) in the sample gas collected in the sampling bags S_a and S_b is measured by the hydrogen flame ionization method.

C.2.5.4.2 Measurement of carbon monoxide (CO) and carbon dioxide (CO_2) volume fractions

During the test, the volume fractions of carbon monoxide (CO) and carbon dioxide (CO_2) in the sample gas collected in the sampling bags S_a and S_b are measured by non-spectral infrared absorption method.

C.2.5.4.3 Measurement of nitrogen oxides (NO_x) volume fraction

During the test, the volume fraction of nitrogen oxides (NO_x) in the sample gas collected in the sampling bags S_a and S_b is measured by chemiluminescence.

C.2.5.5 Instruments and measurement accuracy

C.2.5.5.1 The chassis dynamometer shall be calibrated in a separate test and shall meet the accuracy requirements in Table C.1. The total moment of inertia of the rotating mass, including the rotating drum and rotating parts of the power absorbing device, is measured to an accuracy of ±2%.

C.2.5.5.2 The vehicle speed is determined by the rotational speed of the chassis dynamometer drum. When the vehicle speed is in the range of 0~10 km/h, the

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------