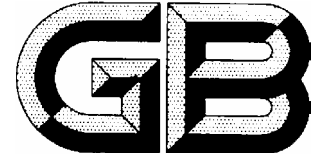


ICS

Draft for joint examination



National Standards of the People's Republic of China

GB ××××—2003

replaces GB 14761.4-93 and GB 11340-89

Limits and measurement methods for crankcase pollutants from heavy-duty vehicles equipped with P.I engines

(Draft for approval)

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State Environmental Protection Administration of China

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of the People's Republic of China

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Preface

The Standards is made to prevent the environment against the pollution of crankcase pollutants from heavy-duty vehicles equipped with P.I engines and improve air quality following “Environmental Protection Law of the People's Republic of China” and “Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution”.

The Standards sets regulations of application for the pattern approval, test and emission limits for the pattern approval, and production conformability checking and emission limits of crankcase pollutants emission from type M and N vehicles that are equipped with P.I engines and have the weight more than 3500kg.

The Standards is amended by taking GB14761.4-93 “Emission Standards of Crankcase Pollutants from Vehicles” and GB11340-89 “Measurement Methods and Limits of Crankcase Pollutants from Vehicles” as the basis and taking the technical information in GB18352.2-2001 as reference.

The main differences between the Standards and GB14761.4-93 and GB11340-89 are as follows:

1. Re-define the scope of application. The emission requirements of crankcase pollutants from light-duty vehicles have been written in GB18352.2-2001. Therefore, the requirements of light-duty vehicles in the original standards have been deleted.

2. Add the parts describing pattern approval and contents for production conformability.

3. Change the measurement methods. The measurement methods after modification were referred to the prescripts in GB18352.2-2001.

4. Add the contents of follow-up tests.

The following standards will be abolished since the issue of the Standards.

1. GB14761.4-93 “Emission Standards of Crankcase Pollutants from Vehicles”

2. GB11340-89 “Measurement Methods and Limits of Crankcase Pollutants from Vehicles”

The appendix A and B are standard appendixes.

The Standards was first issued in August, 1989 and was first revised in November, 1993, and this is the second revision.

The Standards is put forward by Technology Standards Office of State Environment Protection Administration of China.

The Standards is drafted by Beijing Vehicle Research Institute.

The Standards is approved by Technology Standards Office of State Environment Protection Administration of China on xx xx, 2004.

The Standards is explained by State Environment Protection Administration of China.

Limits and measurement methods for crankcase pollutants from heavy-duty vehicles equipped with P.I engines

1 Scope

The Standards sets regulations of application for the pattern approval, test and emission limits for the pattern approval, and production conformability checking and emission limits of crankcase pollutants from heavy-duty vehicles equipped with P.I engines.

This standard is applicable to heavy-duty vehicles that are equipped with P.I engines.

The engines to be tested should include those engines have been adopted the measures of guard against leak, however, not including the engines have a little leaking phenomenon but will cause abnormal operation (for example, horizontally contraposition engines).

2 Normative reference

The articles in the following documents are quoted in the Standards and become a part of the Standards. For the undated reference, the latest versions of them are quoted in the Standards.

| | |
|------------|--------------------------------------------------|
| GB/T 15089 | Vehicle classification |
| GB 17930 | Vehicle unleaded gasoline |
| GB 18047 | Compressed natural gas for vehicle |
| GB/T18297 | Method of testing engine performance of vehicles |
| GB 19159 | Liquefied petroleum gas for vehicle |

3 Definition

The following terms and definitions are applicable to the Standards.

3.1 Heavy-duty vehicles

They are type M and N vehicles with more than 3500kg. Refer to GB/T 15089 for the definition of type M and N vehicles.

3.2 Complete vehicle kerb mass

It is the quality of an empty car with full fuel in the fuel tank, lubricant oil, limited cooling water, tools supplied with the car and spare tyres.

3.3 Basic quality

It is the quality of complete vehicle kerb mass plus 100kg.

3.4 Maximum total quality

It is the largest quality permitted in technology proposed by vehicle producers.

3.5 Crankcase of engine

It refers to the inner or outer interspace. It is connected with oil pan through the inner or outer piping. The gas and smoke can be vented from this channel.

3.6 Crankcase pollutants

It refers to the gas pollutants vented from the crankcase of engine.

3.7 Controlling equipment of pollutants

It refers to the equipment used to control or limit the emission of crankcase pollutants in vehicles.

3.8 Gas fuel

It is liquefied petroleum gas (LPG) or natural gas (NG).

3.9 Vehicle using bi-fuel

It is the vehicle that uses gasoline or a type of gas.

3.10 Vehicle using single fuel

It is the vehicle that uses gasoline and a type of gas fuel (LPG or NG). Such vehicle uses gasoline only in emergency or starting of the engine and the volume of its fuel tank cannot be more than 15L.

4 Pattern approval

4.1 Application for the pattern approval

4.1.1 Vehicle producers must propose the application for the pattern approval of crankcase pollutants emission in a kind of vehicle to the competent department of environmental protection administration under the State Council (hereinafter referred as “competent department of the pattern approval”) that is in charge of the pattern approval of vehicle emission.

4.1.2 Producers must submit technical documents related with the pattern approval, detection report of crankcase pollutants emission from vehicles, and indexes related with performance of main assemblies according to Appendix A of the Standards, and also must submit warranty materials about production conformability of crankcase pollutants emission.

4.1.3 Producers must provide a vehicle (or a related engine and accessories) that can stands for vehicles to be made pattern approval to the detection organization in charge of tests of the pattern approval. The vehicle will be made test according to the method set in Chapter 5 of the Standards.

4.2 Authorization of the pattern approval

If it meets all the technical requirements set in Chapter 5, the vehicle will be authorized by the competent department of the pattern approval.

5 Technical requirements and test

5.1 Producers must ensure that the design, manufacture and assembly of the components that may affect the emission performance of crankcase pollutants in a vehicle must meet the requirements of the Standards in normal running.

5.2 Producers must take technical measures to ensure that crankcase pollutants emission can be controlled effectively in the limits set in the Standards in normal running and lifetime of the vehicle. Producers must ensure that the manufacture of hoses, connectors and joints used in the system must meet requirements of design in reliability. If the crankcase pollutants emission of a vehicle meets the requirements of Article 5.3 (emission limits), this vehicle will be regarded as meeting the requirements of this article.

5.3 Emission limits

Make tests in the way described in Appendix B of the Standards. It is not allowed to vent any gases in

crankcase to aerosphere.

5.4 For vehicles using bi-fuel, only make test for gasoline.

5.5 For vehicles using single fuel, only make test for gas fuel.

6 Production conformability

6.1 Producers must ensure that the production conformability of crankcase pollutants emission complies with the regulations in warranty documents of production conformability submitted in the pattern approval. Make inspection of production conformability according to the regulations in Appendix A and B.

6.2 Competent department of the pattern approval can inspect the production conformability of crankcase pollutants emission of producers anytime.

6.3 Take three vehicles (or engines) from one batch product on a same model. Each sample should comply with the requirements for approval in Appendix A on the pattern approval. It is not allowed any producers to adjust, repair or modify the sample vehicles (or engines).

6.4 Making tests according to the methods described in the standard Appendix B, the examination results for all vehicles (or engines) should comply with the limits of Article 5.3.

6.5 If a vehicle model cannot meet the requirements of Article 6.4, its producer must take necessary measures to re-establish production conformability; otherwise, the competent department will cancel the pattern approval of crankcase pollutants emission of this vehicle model.

7 Implementation of the Standards

Since January 1st, 2005, the vehicles set in Chapter 1 that take the pattern approval of crankcase pollutants emission must meet the requirements of the Standards. Before January 1st, 2005, the pattern approval can be made according to the related requirements of the Standards.

The production conformability inspection for vehicles that have had the authorization of the pattern approval will be made since the day of authorization.

Since January 1st, 2006, crankcase pollutants from all produced and sold vehicles set in Chapter 1 must meet the requirements of the Standards.

Appendix A

(Standard appendix)

Format for documents of application for the pattern approval

When applying for the pattern approval, producers must provide the following documents. The inapplicable items for the models to be reported can be left as blank.

Any diagram must describe detailed information by the appropriate proportion. The size is A4 or it can be folded into such size. If there are photos, details must be shown.

A1 Overview

A1.1 Make (product name of producers)_____

A1.2 Model and commercial description_____

A1.3 If there is a mark in the vehicle, show the way to recognize it_____

A1.3.1 Position of the mark_____

A1.4 Type of vehicle_____

A1.5 Name and address of producer_____

A2 Engine

A2.1 Producer_____

A2.1.1 Model and specifications of engine (if marked in the engine or having other recognition methods)_____

A2.1.2 Maximum net power: below_____ kW_____ r/min

A2.2 Fuel: unleaded gasoline /LPG/NG¹⁾

A3 Control system of crankcase pollutants

A3.1 Make: _____

A3.2 Model: _____

A3.3 Working principle of control system for crankcase pollutants:_____

A3.3.1 Ventilation way of crankcase: ventilation valve/throttle hole¹⁾

A3.3.2 Type of PCV valve:_____

A3.3.3 Producer of PCV valve:_____

A3.3.4 Characteristics of flow rate of PCV valve:_____

A3.3.5 Size and Characteristics of flow rate of throttle hole:_____

1) Remove the inapplicable items.

Appendix B
(Standard appendix)
Test Procedure

B1. General prescript

B1.1. The test for crankcase pollutants from heavy-duty vehicles equipped with P.I engines can be carried out on a whole vehicle with chassis dynamometer. It also can be performed on the engine related to the tested vehicle with engine stand. When testing with an engine stand, the same parts and components (for example, air filter, control equipment of crankcase pollutants, etc.) should be installed on the engine and the vehicle to be tested.

B2. Test Conditions

B2.1. Adjust to the conditions regulated by the producers.

B2.2. When testing with chassis dynamometer to carry out the crankcase pollutants testing, for the working conditions of vehicle running, see Table B1.

Table B1 The working conditions of crankcase pollutants test

| Sequence of working conditions | The power consumed by dynamometer | Vehicle speed (km/h) |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 1 | 0 | Still, the engine running slowly |
| 2 | The load while the vehicle is running in direct drive at the speed of 50km/h on an even road surface based on the criterion weight | 50 ± 2 |
| 3 | The load in working conditions 2 multiplied by 1.7 | 50 ± 2 |

B2.3. When testing with engine stand to carry out the crankcase pollutants testing, the working conditions of engine are the 3 instances shown on table B1. However, the power consumed by dynamometer and the vehicle speed in sequence 2 of working conditions of table B1 must be replaced with the engine load and rotating speed tested while the vehicle is running in direct drive at the speed of 50km/h on an even road surface based on the criterion weight. The power consumed by dynamometer in sequence 3 of working conditions is 1.7 times of the power consumed by dynamometer in sequence 2 of working conditions. The rotating speed of engine in sequence 3 is the same as the one in sequence 2 of working conditions.

B3. Test equipment

B3.1. Dynamometer system

B3.1.1. Engine dynamometer system

It can be all dynamometers that can measure the stable mode of engine and have the precision complying with the regulations of GB/T 18297.

B3.1.2. Chassis dynamometer

B3.1.2.1 The dynamometer must stimulate roadway load.

B3.1.2.2 The setting of dynamometer cannot be influenced by the change of time and cannot make vehicles have any vibration that may affect the normal running of them.

B3.1.2.3 The dynamometer must have the equipment that can simulate inertia and load. If it is a dual-roller dynamometer, the simulation equipment must be connected with the front roller.

B3.1.2.4 Accuracy

B3.1.2.4.1 The accuracy of measured and read indicated load must be within $\pm 5\%$.

B3.1.2.4.2 The accuracy of load setting must be within $\pm 5\%$ in the 50km/h running of dynamometer.

B3.1.2.4.3 The speed must be measured by the speed of roller (for dual-roller dynamometer, use the front roller). When the speed is more than 10km/h, the accuracy of measurement must be within $\pm 1\text{km/h}$.

B3.1.2.5 The setting of load: Adjust the load simulator at the even speed of 50km/h to make it absorb the power on drive wheels.

B3.2. Equipment for pressure measurement

B3.2.1 To measure the pressure in air inlet pipe, use a manometer with the accuracy within $\pm 0.01\text{kPa}$.

B3.2.2 To measure the pressure in crankcase, use a manometer with the accuracy within $\pm 0.01\text{kPa}$.

B4. Test method

B4.1 Any gap or hole of engine should be kept as original assembly status.

B4.2 Measure the pressure in crankcase in an appropriate place, for example, using leaning manometer on the place of engine oil scale hole.

B4.3 Under any measuring working conditions in Article B2.2 or B2.3, if the pressure in crankcase doesn't exceed the current atmospheric pressure, the vehicle will be regarded as meeting the requirements.

B4.4 Under any measuring working conditions in Article B2.2 or B2.3, if the pressure in crankcase exceeds the current atmospheric pressure, when the producers request to follow-up testing, please perform the follow-up test in Article B5 below.

B5 Follow-up test method (see Figure B1)

B5.1 Any gap or hole of engine should be kept as original assembly status.

B5.2 Connect a sealed flexible air bag with volume about 5L in the place of engine oil scale hole. Before every measuring, evacuate the air bag.

B5.3 The air bag should be sealed off before every measurement. Under any measuring working conditions in Article B2.2 or B2.3, the air bag should be connected with crankcase for 5min.

B5.4 Under any measuring working conditions in Article B2.2 or B2.3, if the air bag doesn't have aeration phenomenon, the crankcase pollutants emission will be regarded as meeting requirements.

B5.5 Remarks

B5.5.1 If it is unable to perform the test according to the method described in Article B5.1 to B5.4 due to the limitations of engine structure, please perform the test described below.

B5.5.2 Before testing, seal off all gaps and holes except for the holes used to reclaim gas.

B5.5.3 The air bag should be installed on the recycle pipeline which is an appropriate air inlet pipe should not cause any additional pressure lost, and the recycle equipment should be directly installed to engine joint hole.

B5.5.4 Test according to Article B5.3 to B5.4.

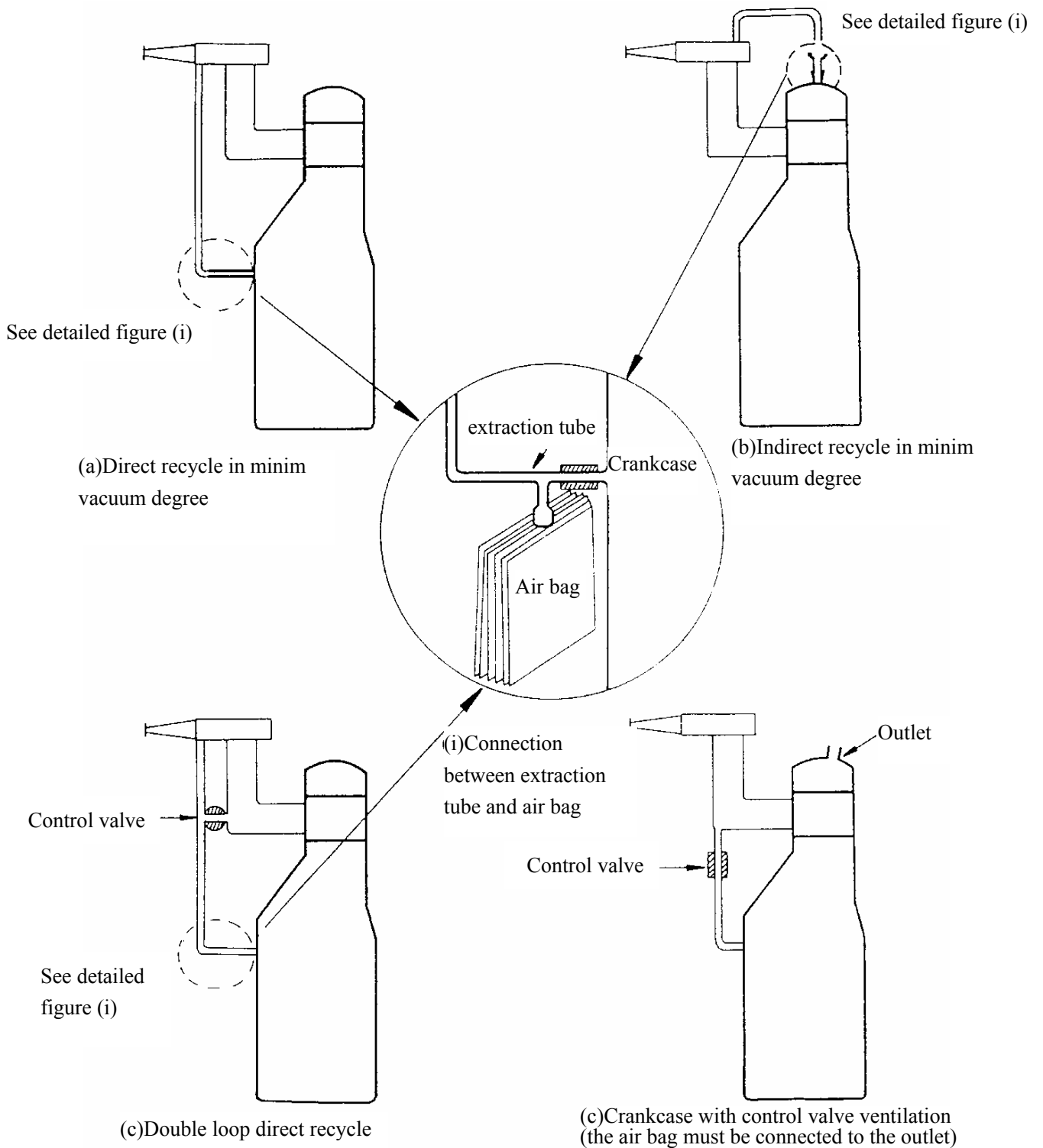


Figure B1 The follow-up testing method for crankcase pollutants emission