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QC

**AUTOMOTIVE INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

QC/T 1091-2023

**Air Cleaner for Passenger coach
(English Translation)**

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1 Scope

This document specifies the general requirements, purification requirements, test methods, inspection rules and marking, packaging, transportation and storage of air cleaner for bus.

This document is applicable to air cleaners installed in categories M2 and M3 buses.

Other vehicles can refer to it.

2 Normative references

The contents of the following documents constitute the essential terms of this document through normative references in the text. Among them, for dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 191 Packaging - Pictorial marking for handling of goods

GB/T 13306 Plates

GB/T 13554 High efficiency particulate air filter

GB/T 14295 Air filter

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

GB/T 21087-2020 Energy recovery ventilators for outdoor air handling

GB 21551.3-2010 Antibacterial and cleaning function for household and similar electrical appliances - Particular requirements of air cleaner

GB/T 30512 Requirements for prohibited substances on automobiles

GB 34660 Road vehicles - Requirements and test methods of electromagnetic compatibility

GB 38262 Flammability of interior materials for buses

HJ/T 400-2007 Determination of volatile organic compounds and carbonyl compounds in cabin vehicles

4.1 Basic requirements

4.1.1

The rated voltage of the air cleaner for bus (hereinafter referred to as the "air cleaner") shall be DC 12 V or DC 24 V.

4.1.2

The air cleaner shall be safe and odor-free.

4.1.3

The air cleaner shall be cleanable; the replaceable parts shall be easy to disassemble and assemble.

4.1.4

The surface of the air cleaner shall be smooth and flat, without scratches, rust spots, indentations, damage. The spray layer shall be uniform, without flow marks, bubbles, peeling.

4.1.5

The parts shall be tight and not loose. The filter material, separator, protective net and other parts shall not be deformed; the sealing gasket shall not be loose.

4.1.6

The outer shell of the air cleaner shall be marked with electrical safety warning signs.

4.1.7

The materials used in the air cleaner shall meet the requirements for prohibited substances in GB/T 30512.

4.2 Performance requirements

4.2.1

The air filter in the air cleaner shall comply with the relevant provisions of GB/T

14295 and GB/T 13554.

4.2.2

The combustion characteristics of non-metallic materials in the air cleaner shall comply with the relevant provisions of GB 38262.

4.2.3

The basic technical requirements of air cleaners shall comply with the relevant provisions of QC/T 413.

4.2.4

The electromagnetic compatibility of air cleaners shall comply with the relevant provisions of GB 34660.

4.3 Rated power

The rated power of air cleaners shall meet the following requirements.

- a) For nominal values not exceeding 30 W, the test results shall not exceed 120% of the nominal value;
- b) For nominal values exceeding 30 W, the test results shall not exceed 110% of the specify, the highest wind speed and maximum air outlet state shall prevail). After normal operation, turn off the air cleaner.
- b) Arrange a sampling point. The sampling point shall avoid the air inlet and outlet, at a distance from the chamber wall of no less than 0.5 m and a distance from the laboratory floor of 1.1 m ~ 1.3 m. The sampling point is connected to the sampler outside the test chamber through a pipeline.
- c) Turn on the air filter to purify the air in the test chamber; start the temperature and humidity control device at the same time, to make the temperature and relative humidity of the test chamber reach the specified state.
- d) After the temperature and relative humidity in the test chamber reach the specified state, turn off the air filter and temperature and humidity control device; turn on the stirring fan and circulation fan.
- e) Put the cigarette (tar content is 8 mg ~ 11 mg) into the cigarette burner; connect the burner to the low-pressure air source; connect the smoke outlet of the burner to a pipe that passes through the test chamber wall. Light the cigarette; cover the burner; after burning for a period of time, close the valve of the smoke delivery pipe; run the stirring fan for another 10 minutes, to mix the particulate pollutants evenly.
- f) After the stirring fan stops rotating, record the initial concentration C_0 , which shall be within the initial concentration range specified in Table 1, corresponding to t

= 0 min. Turn on the air cleaner to be tested at the same time. After that, measure and record the concentration of particulate matter every 10 minutes. Measure continuously for 60 minutes.

g) Calculate the total decay constant k_e of particulate matter in accordance with the provisions of Appendix B; calculate the correlation coefficient R^2 , requiring $R^2 \geq 0.98$.

6.8.4.1 Calculation of clean air delivery rate

The clean air delivery rate is calculated according to formula (2).

Where.

Q_j - Clean air delivery rate, in cubic meters per hour (m^3/h);

k_e - Total decay constant, in minus one power (min^{-1});

c) Sampling pump, calibrated with a primary flow meter to ensure that the flow deviation before and after sampling does not exceed 5%;

d) Sampling tank, which is a stainless steel tank with an inert inner wall.

6.9.3.1 Test run

The test run steps of the air cleaner shall be carried out in accordance with 6.8.3.1.

6.9.3.2 Total decay test of gaseous pollutants

The total decay test of gaseous pollutants shall be carried out in accordance with the following steps.

a) The adjustment of the air cleaner, the arrangement of sampling points, the determination of record files, the setting of the cabin environment shall be carried out in accordance with a) ~ d) in 6.8.3.2.

b) Connect the gaseous pollutant generator to a pipe that passes through the test cabin wall, so that the generated gaseous pollutants enter the test chamber through the pipe. After the generated gaseous pollutants are delivered for a period of time, turn off the generator. Run the stirring fan for another 10 minutes, to mix the gaseous pollutants evenly; then turn off the stirring fan.

c) After the stirring fan stops rotating, collect the gaseous pollutants in the test chamber. The initial concentration of the gaseous pollutants is C_0 , which shall be within the initial concentration range specified in Table 1.

d) The initial concentration in the test chamber is collected, corresponding to $t = 0$ min; the air cleaner to be tested is turned on at the same time; sampling is carried out according to