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General specification for mobile air conditioner

移动式空调器通用技术要求

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Table of Contents

General specification for mobile air conditioner

1 Scope

This standard specifies the terms and definitions, product classification, technical requirements, test methods, inspection rules and markings, packaging, transportation, storage of mobile air conditioners.

This standard applies to mobile air conditioners, which have a cooling capacity of 14000 W and below, including two series of split mobile air conditioners and packaged mobile air conditioners.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 191 Packaging - Pictorial marking for handling of goods (GB/T 191-2008, ISO 780:1997, MOD)

GB/T 1019 General requirements for the package of household and similar electrical appliances

GB/T 2828.1 Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection (GB/T 2828.1-2003, ISO 2859-1:1999, IDT)

GB/T 2829 Sampling procedures and tables for periodic inspection by attributes (Apply to inspection of process stability)

GB 4706.32 Safety of household and similar electrical appliances - Particular requirements for heat pumps, air-conditioner and dehumidifier (GB 4706.32-2004, IEC 60335-2-40:1995, IDT)

GB/T 4798.1 Environmental conditions existing in the application of electric and electronic products - Section 1: Storage (GB/T 4798.1-2005, IEC 60721-3-1:1997, MOD)

3.4

Air-cooling unit

An air conditioner whose cooling system realizes the heat exchange of the condensing system by circulating the air outside the unit.

3.5

Additional water-cooling unit

An air conditioner whose cooling system is mainly air-cooled, supplemented by an additional water-cooling. This additional water is provided through a circulating waterway system OR a water tank. The circulating water system OR water tank needs to be designed as part of the unit.

3.6

Single-duct unit

An air conditioner whose condensing system performs heat exchange of air, which is taken from the space, room, or area containing the equipment, meanwhile discharges the air outside the space, room, or area through ducts.

3.7

Double-duct unit

An air conditioner whose condensing system performs heat exchange of air, which is taken through duct, from outside the space, room, or area containing the equipment, meanwhile discharges the air outside the space, room, or area through ducts.

3.8

Heat pump

A cooling system which, by switching the direction of refrigerant operation of the cooling system, absorbs heat from the low-temperature air and releases heat to the room, THEREBY heating up the indoor air. It may also include air circulation, purification devices, humidification and ventilation devices.

3.9

Electric heating device used for heating

The electric heating device, which uses only electric heating methods for heating; as well as the electric heating device, which uses temperature

Energy efficiency ratio (EER)

Under rated conditions and specified conditions, the ratio of the cooling capacity to the effective input power [1)], when the air conditioner is in cooling operation. Its value is expressed in W/W.

3.16

Coefficient of performance (COP)

Under rated operating conditions (high temperature) and specified conditions, the ratio of heating capacity to effective input power [1)], when the air conditioner performs heat pump heating operation. The value is expressed in W/W.

3.17

Indoor discharge air-flow

The air volume delivered to the sealed space, room or area per unit time, when the ventilation gate and exhaust gate (if any) of the air conditioner used to exchange indoor and outdoor air are completely closed, under the rated cooling operation conditions. It is in the unit of cubic meters per seconds (or cubic meters per hour) [m^3/s (or m^3/h)].

3.18

Room-type calorimeter

A test device, which is composed of two adjacent rooms with a partition wall in between. One room is used as the indoor side, whilst the other is used as the outdoor side. Each room is equipped with air conditioning equipment. The cooling capacity, heat capacity, water capacity can be measured and controlled, which are used to balance the cooling capacity and dehumidification capacity of the tested air conditioner on the indoor side, as well as humidification capacity and heating capacity on the outdoor side.

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1) The effective input power refers to the average electric power input into the air conditioner per unit time. These include:

① Input power for compressor operation and defrosting input power (except additional electric heating devices which are not used for defrosting);

② Input power for all control and safety devices;

③ Input power for the heat exchange transmission device (fan, pump, etc.).

5.1.1 The air conditioner shall meet the requirements of this standard and GB 4706.32. It shall be manufactured in accordance with the drawings and technical documents, which are approved by the prescribed procedures.

5.1.2 The appearance of the plating of the components and materials of the air conditioner shall be good. The outdoor part shall have good weather resistance.

5.1.3 The thermal insulation layer shall have good thermal insulation performance and flame retardancy; meanwhile it shall be free from toxicity and odor.

5.1.4 For the material of the pressure parts of the cooling system of the air conditioner, it will, under the action of refrigerant, lubricating oil and other mixtures, not be subject to deterioration AND ensure the normal operation of the whole machine.

5.1.5 The installation of the parts of the air conditioner shall be firm and reliable. Between pipe and pipe OR between pipe and part, there shall be not rubbing or collision with each other.

5.1.6 For the parts, structure and materials of the air conditioner, they should be made of parts, product structures and materials that can be used as renewable resources.

5.1.7 The special functions of the air conditioner (such as antibacterial, negative ion refreshing functions, etc.) shall meet the requirements of relevant national regulations and relevant standards.

5.1.8 For the electromagnetic compatibility of the air conditioner, it shall meet the requirements of relevant national regulations and relevant standards.

5.1.9 For all raw materials, auxiliary production materials, packaging materials used by the air conditioner, they must meet the relevant national environmental protection requirements.

5.1.10 The exhaust air of the air conditioner shall not interfere with the temperature and humidity of the air, which is sucked in by the suction port. The air exhaust and suction shall not cause a short circuit of air flow.

5.1.11 See Appendix A for the special requirements of additional water-cooling air conditioners.

5.2 Performance requirements

5.2.1 Sealing performance of cooling system

Under normal refrigerant charge, when using a leak detector which has a

does not reset, BUT it resets within not more than 30 min after shutdown, it will continue to run for 1 hour.

5.2.7.4 For a manually reset overload protector, if it trips within the first 5 min, it shall be reset forcibly after 10 min of tripping; meanwhile it shall be able to operate continuously for another 1 h.

5.2.8 Cooling at minimum operation

When tested according to 6.8, during the 4 hours operation of the air conditioner after the 10 min start-up period, the safety device shall not trip; the frosting area on the windward surface of the indoor side evaporator shall not be greater than 50% of the windward area of the evaporator.

Note 1: An automatic resettable protector, that automatically controls the on and off of the compressor to prevent freezing, is not regarded as a safety device.

Note 2: When the frosting area on the windward surface of the evaporator is not easy to see, it can be judged by the air volume (not less than 25% of the initial air volume).

5.2.9 Condensation

When tested according to 6.9, the air conditioner shall meet the following requirements:

a) Condensation on the outer surface of the box shall not drip;

b) Indoor air supply shall not carry water droplets.

5.2.10 Condensate removal capacity

When tested according to 6.10, the air conditioner shall have the ability to remove condensed water. There shall be no water spilling or blowing out of the air conditioner on the indoor side, so as not to wet the conditioned environment in the sealed space, room or area.

5.2.11 Heating of heat pump at maximum operation

5.2.11.1 When tested according to 6.11, the parts of the air conditioner shall not be damaged; the air conditioner shall be able to operate normally.

5.2.11.2 During the 1 h continuous operation of the air conditioner, its motor's overload protector shall not trip.

5.2.11.3 When the air conditioner stops operation for 3 minutes, it restarts for continuous operation for 1 h; however, in the first 5 min of starting operation, the motor's overload protector is allowed to trip, but no action is allowed thereafter. In the first 5 minutes of operation, if the motor's overload protector

of the heating capacity of heat pump is stable, measure the input power of the additional electric heating device.

6.6.2 Under the rated heating conditions of electric heating, set the air conditioner to a condition such, that the electric heating device is at the maximum power consumption working state. After the operation is stable, test the input power of the electric heating device.

6.6.3 When testing under the working conditions of 6.6.1 and 6.6.2, whilst the electric heating device does not operate, set the air conditioner (or as specified by the manufacturer) to make the electric heating device in the working state; after the operation is stable, test the input power of the electric heating device.

6.7 Test of cooling at maximum operation

For packaged units, place the unit in a room. Fully close the ventilation gate (if any), which exchanges the air between the indoor and outdoor, of the air conditioner. Adjust the set temperature, fan speed, guide grille to the maximum cooling state. Operate it at a voltage of ±10% of the rated voltage. After reaching to the working condition as specified in Table 6, let it be stable. Then continue operating it for 1 h. Shut it down for 3 min (during which the power supply voltage rises by not more than 3%). Then start and operate it for 1 h.

For single split units, the working conditions shall be as specified in Table 6; the rest shall be carried out in accordance with the test method of the cooling at maximum operation in GB/T 7725-2004.

6.8 Test of cooling at minimum operation

Completely close the ventilation gate (if any), that exchanges the indoor and outdoor air, of the air conditioner. Adjust its set temperature, fan speed, guide grille to the state that is most likely to cause the evaporator to freeze. Under the cooling work conditions at minimum operation as specified in Table 6, at the rated voltage and frequency, start the air conditioner to run to a stable condition; then continue operation for 4 hours.

6.9 Condensation conditions

Adjust the air conditioner's temperature controller, fan speed, damper, guide grille to the most condensable state, without violating the manufacturer's requirements, to perform cooling operation; make it reach the condensation conditions as specified in Table 6. The air conditioner runs continuously for 4 h.

6.10 Test of condensate removal ability

Adjust the air conditioner's temperature controller, fan speed, damper, guide grille to the most condensable state. Operate it according to the condensate

For packaged units, place the unit in a room. For the air conditioner which is equipped with automatic defrosting device, adjust the temperature controller, fan speed, air door, guide grille to such state, that the heat exchanger is most frost-prone. After stable operation according to the defrost conditions specified in Table 6, continue to run for two complete defrost cycles or run continuously for 3 hours (the total time of the test shall start at the end of the first defrost cycle), until the first completion of the defrost cycle after 3 h, whichever is larger. After the defrosting cycle and immediately after the defrosting, the temperature of the outdoor air shall not rise by more than 5 °C.

For single split units, the working conditions shall be as specified in Table 6. The rest shall be carried out according to the automatic defrosting test method in GB/T 7725-2004.

6.15 Noise test

When measuring the noise (sound pressure level) of the air conditioner, except for the sampling points in accordance with Appendix B, the others shall, in accordance with the requirements of Appendix B "Determination of noise" in GB/T 7725-2004, be subjected to the noise test, under the rated cooling conditions and rated (high temperature) heating conditions.

Note 1: The noise test at heating state is only applicable to heat pump type air conditioners.

Note 2: The packaged prototype must be connected to the air duct, which must be made into shortest length. The minimum length of the air duct shall not be less than 500 mm.

6.16 Test of energy efficiency ratio and performance coefficient

The test of energy efficiency ratio and performance coefficient shall be carried out in accordance with the rated cooling/heating conditions specified in Table 6, until it is stable.

6.17 Packaging test

The packaging of the air conditioner shall be designed in accordance with the moisture-proof packaging required by GB/T 1019 AND the shock-proof packaging under circulation conditions. The vibration test shall be carried out according to circulation condition 1. The packed air conditioner shall be subjected to a drop test according to the requirements of the following conditions.

6.17.1 The drop height shall be in accordance with Table 7.

shall be 100% qualified. If one item is found to be unqualified, the product in the period shall be judged to be unqualified. Samples for type inspection shall be randomly selected from qualified finished products. Samples for type inspection shall not be delivered to the ordering party, as qualified products.

7.5 Product acceptance

7.5.1 The ordering party has the right to check whether the product quality meets the requirements of this standard. When delivery, the ordering party may carry out inspection and acceptance, according to the exit-factory inspection items.

7.5.2 According to the requirements of the ordering party, the supplier can provide a complete type inspection report within one year. The quality index and sampling scheme for acceptance can be mutually agreed upon by both parties. The sampling scheme can also be carried out in accordance with GB/T 2829. However, if the ordering party is in doubt of the product quality, it may negotiate with the buyer and the manufacturer; it may also add partial items OR all inspection items of the type inspection. If there is dispute, it may be subjected to the statutory department for arbitration.

7.5.3 If the product is stored for more than two years before leaving the factory, it shall be subjected to inspection and acceptance again, according to the exit-factory inspection items.

8. Marking, packaging, transportation and storage

8.1 Marking

8.1.1 Each air conditioner shall have a durable nameplate, which is fixed on an obvious place.

8.1.2 The nameplate shall clearly indicate the following items:

a) Product model and name;

b) Climate type (Air conditioner of T1 climate type may not be marked);

c) The name of the manufacturer;

d) Main technical parameters (cooling capacity, heating capacity, energy efficiency, noise, indoor discharge air-flow, refrigerant name or code and filling volume, rated current, rated voltage, rated frequency, input power and mass, etc.). The indoor and outdoor units of the split mobile air conditioner shall be marked separately; the indoor unit shall be marked with the required parameters of the whole machine; the outdoor unit shall

8.2.1 The air conditioner shall, before packaging, be cleaned and dried.

8.2.2 The following documents and accessories shall be accompanied to the package of the air conditioner.

8.2.2.1 The product qualification certificate shall include:

a) Product name and model;

b) The exit-factory number of the product;

c) Conclusions of inspection;

d) Inspection seal;

e) Date of inspection.

8.2.2.2 The instruction manual shall be compiled in accordance with the requirements of GB 5296.2, which shall include at least:

a) Product name, model (specification);

b) Product overview (purpose, characteristics, use environment, main use performance indicators, rated parameters, etc.);

c) Grounding instructions;

d) Installation and use requirements, maintenance and service precautions;

e) Name, quantity, specifications of product accessories;

f) A list of common failures and handling methods, after-sales service matters, manufacturer's responsibilities;

g) Name and address of the manufacturer.

Note: The above content can also be separately compiled into a booklet.

8.2.2.3 Packing list and accessories required for packaging.

8.2.3 The accompanying documents shall be moisture-proof and sealed, placed in an appropriate place in the box.

8.3 Transportation and storage

8.3.1 During transportation and storage, it shall avoid collision, tilt, exposure to rain and snow.

8.3.2 The storage environment conditions of the product shall be in accordance

Appendix A

(Normative)

Relevant provisions for additional water-cooling air conditioners

A.1 Requirements

A.1.1 The test conditions of the water-cooling air conditioner are the same as those of the air-cooling type, as shown in Table 5. Except for the rated cooling conditions, under which BOTH the unit with additional water-cooling AND the unit without additional water-cooling shall be tested, the other test conditions are required to be carried out without additional water-cooling.

A.1.2 The design of the water tank system shall consider the continuous water supply time of the water tank. The continuous water supply time shall, under rated cooling conditions, not be less than 4 h.

A.1.3 Under the test conditions, the inlet water temperature in the circulating water system is 15 °C; the temperature of the water in the water tank system is the same as the dry bulb temperature under the test conditions.

A.2 Test method

A.2.1 Test of cooling capacity

a) Where there is no water, the test method is according to 6.2. The circulating water system cannot work OR there can be no water in the water tank.

b) When there is water, first assemble the circulating water system OR fill the water tank with water, then follow the method of 6.2 to carry out test.

A.2.2 Test of total cooling power input

According to A.2.1 and the method as given in Appendix A of GB/T 7725-2004, whilst measuring the cooling capacity, measure the input power and current of the air conditioner.

A.2.3 Continuous water supply time of water tank system

According to the test method under the conditions with water in A.2.1, after it is stabilized at rated conditions for 1 h, fill water and start timekeeping; record the time until the water in the water tank is exhausted OR when the water shortage alarm device is activated. It may be carried out whilst determining the cooling capacity, meanwhile record the inlet water temperature.

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