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Minimum allowable values and grades of the energy efficiency and water efficiency for smart water closets

智能坐便器能效水效限定值及等级

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Minimum allowable values and grades of the energy efficiency and water efficiency for smart water closets

1 Scope

This Standard specifies minimum allowable values and grades of the energy efficiency and water efficiency, technical requirements and test methods for smart water closets.

This Standard is applicable to smart water closets that are installed on the cold-water pipeline in the building facility and used under the condition that static pressure of water supply is 0.1MPa ~ 0.6MPa.

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 6952, *Sanitary wares*

GB/T 9195, *Classification and terms of building and sanitary ceramics*

GB/T 20810, *Toilet tissue paper (including toilet tissue base paper)*

GB 25502, *Minimum allowable values of water efficiency and water efficiency grades for water closets*

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 9195 as well as the followings apply.

3.1 smart water closets

Water closets that are controlled by electromechanical systems and/or processes, that complete one or more basic intelligent functions including at least the warm water cleaning function, including integral smart water closets and split smart water closets.

5 Technical requirements

5.1 Basic requirements

Under the test conditions specified in the standard, the smart water closets shall meet the relevant requirements specified in the standard.

5.2 Cleaning function

5.2.1 Water temperature characteristics

Carry out the test of water temperature characteristics according to the provisions of A.5.2. The highest temperature of cleaning water shall be controlled at 35°C~42°C.

5.2.2 Nozzle self-cleaning

Carry out the test of nozzle self-cleaning according to the provisions of A.5.3. The 1/4 ink line at the front of the nozzle shall be cleaned, without any ink residues.

5.3 Flushing function

5.3.1 Washing function

It shall meet the requirements for washing function in GB/T 6952.

5.3.2 Water seal recovery

It shall meet the requirements for water seal recovery function in GB/T 6952.

5.3.3 Sewage replacement

It shall meet the requirements for sewage replacement function in GB/T 6952.

5.3.4 Emission function

5.3.4.1 Ball emission

Carry out the ball emission test according to the provisions of A.6.5.1. The average of 3 tests shall not be less than 90.

5.3.4.2 Particulate emission

Carry out the particulate emission test according to the provisions of A.6.5.2. Conduct 3 consecutive tests. The average number of visible polyethylene particles remaining in the water trap of the smart water closet shall not exceed 125. The average number of 3 times of visible nylon balls shall not be more

Annex A

(normative)

Test methods

A.1 Test device

A.1.1 The flushing water consumption and flushing function test of smart water closets shall use the standardized water supply system that complies with B.1 in Annex B.

A.1.2 The cleaning water consumption and cleaning function test of smart water closets shall use the standardized water supply system that complies with B.2.

A.1.3 The cleaning water consumption and water supply system for flushing function test of smart water closets shall be subject to standardized commissioning before testing. The specific procedures are as follows:

a) Adjust the water supply source 1 to a static pressure of (0.24±0.007) MPa;

b) Open valve 6, adjust valve 4, and the water flow measured by flowmeter 3 is (35.0 ± 0.2) L/min;

c) Keep valve 6 fully open during test; close valve 6 after commissioning;

d) Install the sample after commissioning is completed.

A.1.4 The accuracy level of electrical instruments for the unit cycle energy consumption test is 0.5. The instrument accuracy for measuring time is not less than 0.5%. The accuracy of the instrument for measuring temperature is not less than 0.5°C.

A.2 Unit cycle energy consumption test

A.2.1Test conditions

The average ambient temperature during the test shall be (23±1)°C (collect once per minute during the test period, and take the average value). Keep the inlet water temperature at (15±1)°C. Test environment has no forced convection air (wind speed <1m/s). Adjust the seat temperature to the highest gear, the cleaning water temperature to the highest gear and hip cleaning to the maximum cleaning mode. Close all other functions that can be turned off according to the instructions.

NOTE: The ambient temperature and wind speed measurement points are at the same height on the water closet, 200mm from the outer edge of the seat ring.

The thermal storage products maintain the inlet water temperature at (15±1)°C. Adjust the position of the spray rod to the farthest end, the hip cleaning and bidet cleaning to the maximum cleaning mode. Use a multi-point temperature measurement recorder. Start measuring from 3s after the water reaches the plane position on the water closet. And record the cleaning water temperature-time curve within 30s.

The instant hot products maintain the inlet water temperature at (15±1)°C. Adjust the position of the spray rod to the farthest end, the hip cleaning and bidet cleaning to the maximum cleaning mode to fill the cleaning pipeline with water at the test inlet temperature. Use a multi-point temperature measurement recorder. Start measuring from 3s after the water reaches the plane position on the water closet. And record the cleaning water temperature-time curve within 60s.

NOTE: The maximum cleaning mode is the maximum flow gear.

A.5.3 Nozzle self-cleaning test

The test steps are as follows:

a) Exhaust air from the cleaning system of smart water closets. Inject water at the normal operating pressure and temperature.

b) Stretch the nozzle out. Use paper towels or toilet paper to dry the nozzle.

c) After the nozzle is dried, use a water-soluble, colorful marker to draw lines on the nozzle. At the three positioning lines that are bisected by the length of the spray rod, draw 3 circles around the spray rod. Then draw the fourth line from the front of the spray rod along the length direction to the end.

d) After drawing the line, release the nozzle to restore it to its original state. Cycle the nozzle twice in the on/off mode. Let the cleaning nozzle spray water for 5s. Then turn off for 5s. Repeat once.

e) Check and record if there are any line residues left.

A.6 Flushing function test

A.6.1 Test pressure

The water supply pressure of gravity type smart water closets is static pressure of (0.14±0.02) MPa. The water supply pressure of pressure type smart water closets is static pressure of (0.24±0.02) MPa.

A.6.2 Washing function test

Conduct the test according to the method specified in the ink line test in GB/T

A.6.6.1 Test medium

The test medium is a pair of double-layer toilet paper with a basis weight of (16.0±1.0) g/m^2, a width of (114±2) mm, and a total length of (540±2) mm. The toilet paper shall meet the requirements of GB/T 20810, and shall meet the following conditions:

a) The immersion time is not greater than 3s, which shall meet the following tests: Wind the test medium tightly on a 50mm-diameter PVC pipe. Slide the wrapped paper off the pipe. Fold the paper tube inward to get a paper ball with a diameter of about 50mm. Put this paper ball slowly into the water vertically. Record the time it takes for the paper ball to completely wet.

b) The wet tensile strength shall pass the following tests: Use a 50mm-diameter PVC pipe as a support for the test paper. Place a sheet of toilet paper on the bracket. After turning the bracket upside down and immersing the paper in water for 5s, immediately remove the bracket from water and put it back to the original vertical position. Place a steel ball with a diameter of 8mm and a mass of (2±0.1) g in the middle of the wet paper. The paper that supports the steel ball must not be torn in any way.

A.6.6.2 Test methods

Make unused test mediums into loose paper balls with a diameter of about 50mm~60mm. Each group has 4 paper balls.

Put 4 paper balls into the smart water closet's water trap to make them completely wet. Within 5s of wetting, start the half-flushing switch to flush. After the flush cycle is completed, check and record if there are paper residues in the water closet. If there are paper residues, the test shall be ended. Report the test results.

If there are no paper residues, repeat the second test. If there is residual paper in the second test result, the test shall be ended. Report the test results.

If there are no paper residues, repeat the third test. If there is residual paper in the third test result, the test shall be ended. Report the test results.

A.6.7 Drainage pipeline transportation characteristics test

A.6.7.1 Test medium

Use 100 solid balls with a diameter of (19±0.1) mm and a density of (0.85±0.015) g/cm^3 to test.

A.6.7.2 Test method

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