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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB 30717-2019

Replacing GB 30717-2014

Minimum allowable values of water efficiency and water efficiency grades for squatting pans

蹲便器水效限定值及水效等级

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1 Scope

China's mandatory water efficiency standard for squatting pans - the WC pan used across most of the country, in homes, schools, stations and public buildings, and therefore one of the largest single consumers of water in the building stock. It specifies the water efficiency grades, the technical requirements and the test methods for squatting pans. Unlike a tap or a shower, where the saving is a matter of restricting a flow, a WC pan cannot simply be given less water: the flush has to carry solids and paper out of the pan and into the drain, and one that fails to do so is flushed twice, which uses more water than the pan it replaced. So the standard sets the flush volume grades and, inseparably from them, the flushing performance that must be achieved at that volume - the removal of the test media from the pan, the transport of the discharge along a defined length of drain, the rinsing of the pan surface and the replacement of the water in the trap seal. The pan and the flushing device are treated as a system, because a pan that performs at a given volume with one cistern will fail with another. That is the whole difficulty of a WC water efficiency standard and the reason it is longer than the ones for taps and showers: the volume is easy to specify and worthless on its own. The minimum allowable value is the threshold above which a squatting pan may not be manufactured, imported or sold, and the water conservation evaluation value is the higher threshold used for the water saving certification. Issued on 31 December 2019 and in force since 1 July 2020, it replaces GB 30717-2014.

This standard specifies the water efficiency limit value, water saving evaluation value, water efficiency grade, flushing function requirements, test methods of squatting pans. This standard is applicable to the water efficiency evaluation of squatting pans (not including infant's type), which are installed on the cold water supply pipelines within buildings AND have the hydrostatic pressure of the water supply not greater than

0.6 MPa.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

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

3 Terms and definitions

The terms and definitions as defined in GB/T 9195, as well as the following terms and definitions, apply to this document.

3.1 Average water consumption of squatting pans The water consumption of the squatting pan, which is is measured and calculated according to the test method and calculation formula, as stipulated by the standard.

3.2 Minimum allowable values of water efficiency for squatting pans Under the test conditions specified in the standard, the maximum water consumption, which is allowed by the the squatting pan.

3.3 Evaluating values of water conservation for squatting pans Under the test conditions specified in the standard, the maximum water consumption, which is allowed by the water-saving squatting pan.

Note: Evaluating values of water conservation is a requirement for evaluating water- saving squatting pans.

4 Technical requirements

4.1 Basic requirements The squatting pan shall meet the requirements of the expressly implemented standards; meanwhile it shall be matched with the corresponding flushing device.

4.2 Flushing function requirements

4.2.1 Washing function Carry out the cleaning function test according to 5.4.1; the total length of the accumulated residual ink line, after each flushing, is not more than 50 mm; the length of each residual ink line is not more than 13 mm.

4.2.2 Discharge function Carry out the discharge function test, according to the provisions of 5.4.2; make 3 measurements; at least 10 test objects can be flushed out of the sewage outlet.

4.2.3 Splash resistance According to the provisions of 5.4.3, carry out the anti-splash test.

No water splashes on the template, excluding the sputtered water droplets or water mist, which has a diameter of less than 8 mm.

4.2.4 Sewage replacement function Conduct the sewage replacement test, in accordance with the provisions of 5.4.4. The dilution rate of the single flush squatting pan shall not be less than 100. For the double flush squatting pan, it only performs the half flush sewage replacement test; the dilution rate shall not be less than 25.

4.2.5 Water seal depth function tests, under the condition of the flushing device and the water supply system when the test water consumption is maintained, they are performed under the minimum test pressure as specified in Table 2, except for the anti- splash test, which is carried out under the maximum pressure as specified in Table 2.

5.1.4 The squatting pan, which does not have integral trap, shall be tested for flushing function, according to the provisions of 5.4.2.

5.2 Standardized debugging procedures for squatting pan test system

5.2.1 Standardized debugging procedures for the cistern squatting pan test system The standardized debugging procedure of the water supply system, for the cistern squatting pan test, shall meet the requirements of Figure A.1. The specific procedures are as follows:

a) Adjust the water supply source 1 to a static pressure of (0.140 ± 0.007) MPa;

b) Open the on-off control valve 5; adjust the regulating valve 3. Under the dynamic pressure of (0.055 ± 0.004) MPa, the water flow measured by the flow meter 2 is (11.4 ± 0.5) L/min;

c) Keep the on-off control valve 5 in a fully open state, during debugging. After the debugging is completed, close the on-off control valve 5;

d) Install the sample to be tested, after debugging.

5.2.2 Standardized debugging procedures for flush valve squatting pan test system The standard debugging procedure of the water supply system, for the flush valve squatting pan test, shall meet the requirements of Figure A.2. The specific procedures are as follows:

a) Adjust the water supply source 1 to a static pressure of (0.24 ± 0.01) MPa;

b) Install the flush valve, which is provided together with the squatting pan; the water supply switch is in the fully open state, so that the water outlet of the water supply system is open to the atmosphere;

c) Open the on-off control valve 5; adjust the regulating valve 3, so that the peak flow rate reaches (95 ± 4) L/min. If the manufacturer states that the flush valve does not reach the specified minimum flow rate, the flush valve will be adjusted to the fully open state; V2 - The arithmetic average of the half-flush water consumption, in liters (L); V0 - The maximum limit value of the full-flush water consumption, in liters (L).

5.4 Flushing function test

5.4.1 Washing function test Wipe the cleaned surface clean. Use commercially available ink to draw a continuous thin ink line, 30 mm below the squatting pan's flushing water ring. Start the flushing device. Make observation. Measure and record the length of the residual ink line. Test 3 times continuously. Report the average value of the total length of the residual ink line, in the 3 tests, accurate to 1 mm.

5.4.2 Discharge function test Prepare 4 test objects, according to the provisions of Appendix B, as shown in Figure B.1. Place the 3 test objects side by side, in the flushing direction, in the middle of the flushing surface of the squatting pan. Then place the 4th test object in a cross shape, laterally on the middle position above the 3 test objects, so as to form a state of three vertical and one horizontal, as shown in Figure B.2. After the test object is placed, start flushing immediately; observe and record the number of the test object discharged out of the squatting pan; test 3 times; report the number of times that the test object is discharged out of the squatting pan. For squatting pan products, which do not have integral traps, it shall connect an external trap, which has a diameter of 110 mm, a water seal depth of 50 mm, a drop of 500 mm/300 mm, before carrying out the test.

5.4.3 Splash resistance test Use 3 pads, each of which has a thickness of 25 mm, to support a transparent template of at least 600 mm x 500 mm on the surface of the squatting pan, so that there is a 25 mm gap, between it and the upper surface of the pan. Start the flushing device to flush; observe and record the number of water droplets, which have a diameter greater than 8 mm, on the template. Test 5 times; take the maximum value.

5.4.4 Sewage replacement test Use tap water, at about 80 °C, to prepare a methylene blue solution, which has a concentration of 5 g/L. Rinse the squatting pan clean, under the test conditions. After completing the normal water intake cycle, pour 30 mL of the staining solution into the squatting pan's water seal. Stir it evenly. Take 5 mL of the solution from the water seal water to the container. According to the technical requirements of the corresponding product, add water to dilute it to 125 mL or 500 mL (standard dilution rate is 25 or 100). Mix well. Transfer to a colorimetric tube, as a standard solution, for later use. Start the squatting pan's flushing device. After the flushing cycle is completed, put the diluent in the squatting pan into the colorimetric tube of the same specification, as the standard liquid; visually observe the color difference with the standard liquid; If the color is darker than the standard solution, THEN, record the dilution rate as less than the standard dilution rate; If the color is the same as the standard solution, THEN, record the dilution rate as equal to the standard dilution rate; If the color is lighter than the standard solution, THEN, record the dilution rate as greater than the standard dilution rate.