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Non-ceramic sanitary ware

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Non-ceramic sanitary ware

1 Scope

This standard specifies the terms and definitions, classification, technical requirements, test methods, inspection rules, marking, identification, packaging, transport and storage of non-ceramic sanitary ware.

This standard is applicable to non-ceramic sanitary ware used in buildings and public places.

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 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 3768 Acoustics - Determination of sound power levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane

GB 3854 Test method for hardness of fiber reinforced plastics by means of Barcol impresser

GB 6952 Sanitary wares

GB/T 26730 Sanitary ware - Gravity water flushing devices and supports

GB/T 26750 Sanitary ware - Pressure assistant water flushing devices

CJ/T 194 Non-contact water supply device

JC/T 764 Packaging for sanitary wares

JC/T 779 Glass fiber reinforced plastics baths

JC/T 908 Artificial stone

5.4 Water absorption

The water absorption of sanitary ware of artificial stone, E , shall be $\leq 0.5\%$.

5.5 Contamination resistance

For the non-ceramic sanitary ware, the total value for contamination resistance shall not exceed 44; the maximum stain depth shall not exceed 0.12mm.

5.6 Hot water resistance

5.6.1 For the non-ceramic bathtub products, they shall be tested according to 6.6.1. After the test, the number of small cracks on the surface shall not be more than 5; the bubbles shall not be more than 10, in which, the number of bubbles with diameter above 10mm shall not be more than 5; and they shall be free of obvious discoloration and fading.

5.6.2 For non-ceramic wash basin, bidet and shower tray, they shall be tested according to 6.6.2; after the test, the surface shall be free of cracks, bubbles and obvious discoloration and fading.

5.7 Load resistance

The following non-ceramic sanitary ware, after being tested according to 6.7, shall be free of visible damage, with the deformation meeting those specified in 5.2.

5.7.1 Non-ceramic wall-mounted pedestal pan and floor pedestal pan shall be capable of bearing the load of 2.2kN.

5.7.2 Non-ceramic urinal shall be capable of bearing a load of 0.22 kN.

5.7.3 Non-ceramic wash basin shall be capable of bearing a load of 1.1 kN.

5.7.4 Non-ceramic sink shall be capable of bearing a load of 0.44 kN.

5.7.5 Non-ceramic shower tray shall be capable of bearing a load of 1.47 kN.

5.7.6 For the non-ceramic bathtub, its bottom surface shall be capable of bearing the load of 1.47 kN; its side surface shall be capable of bearing a load of 0.22 kN.

5.8 Overflow function

Such wash basin, sink and bidet as are provided with overflow hole shall, after

being tested according to 6.8, be free from overflow for 5 min.

5.9 Resistance to daily chemicals

After the test on the resistance to daily chemicals, the surface of non-ceramic sanitary ware shall be free of obvious damage; the slight damage may be removed by wiping with 600-mesh sandpaper. The damage shall not be to the extent affecting the service performance of the products and shall be easily restored to the original state.

5.10 Impact resistance

Non-ceramic bathtub and shower tray, after being tested according to 6.10, shall be free of obvious cracks or other obvious damages.

5.11 Burning resistance

Non-ceramic sanitary ware, after being tested according to 6.11, shall be free of burning with open flame or smoldering; the damage of any form shall not affect the use of the product.

5.12 Barcol hardness

5.12.1 The Barcol hardness of sanitary ware of acrylic shall not be lower than 40.

5.12.2 The Barcol hardness of sanitary ware of artificial stone shall not be lower than 35.

5.13 Drainage performance

For the non-ceramic bathtub and shower tray, the maximum area of single area with retained water at their bottom shall not be greater than 100 cm².

5.14 Deformation under the condition of full water

The non-ceramic bathtub shall be tested according to 6.14; after the test, the deformation at bottom drainage outlet shall be less than 1 mm; at the center of horizontal part of upper edge surface, it shall be less than 2 mm.

5.15 Requirements for toilets

5.15.1 Important dimensions

5.15.1.1 Seal depth

The seal depth of pedestal pan with integral trap shall not be less than 50mm.

5.15.3.2 Solid discharge function

5.15.3.2.1 Ball discharge

Test according to 6.15.3.2.1, and the average number of balls discharged in three tests shall not be less than 90.

5.15.3.2.2 Particulate discharge

Test according to 6.15.3.2.2 for three continuous times; the average number of visible polyethylene particles remaining in the trap of pedestal pan shall not exceed 125 (5%), and that of visible nylon balls shall not exceed 5.

5.15.3.3 Sewage replacement function

The dilution rate of non-ceramic pedestal pan and urinal with trap shall be no less than 100. For dual-flush pedestal pans, the sewage replacement test shall also be carried out during flushing at half flush; the dilution rate shall be no less than 30.

5.15.3.4 Water seal restoration function

The depth of restored water seal of non-ceramic pedestal pan after each flushing shall not be less than 50 mm.

5.15.3.5 Transport characteristic of drainage pipeline

After the water-saving non-ceramic pedestal pan is tested according to 6.15.3.5; the average transport distance of balls shall be no less than 12 m.

5.15.3.6 Splash resistance

After the non-ceramic pedestal pan is tested according to 6.15.3.6; no water shall be splashed on the formwork, irrespective of the splashing water drops with a diameter less than 8mm or water mist.

5.15.4 Flushing noise of pedestal pan

The accumulated percentage sound level, L_{50} , of flushing noise shall not exceed 55 dB; the accumulated percentage sound level, L_{10} , shall not exceed 65 dB.

5.15.5 Technical requirements for toilet fittings

5.15.5.1 Technical requirements for flushing devices

The matching flushing devices, including all kinds of mechanical or non-contact flushing devices like cistern (gravity) water flushing device and

WL -- working water level.

In the figure, $10\text{mm} \leq h_1 \leq 38\text{ mm}$; $h_2 \geq 25\text{ mm}$; $h_3 \geq 5\text{ mm}$; $h_4 \geq 5\text{mm}$; $h_5 \leq 20\text{ mm}$.

Figure 1

6 Test methods

6.1 Appearance quality

6.1.1 Surface defects

Under the condition that the diffused light on the surface of the product is at least 600 lx, visually inspect the surface at a distance of 0.6m from the product. During the process, the product shall be turned over to observe each inspection surface.

6.1.2 Color difference

Under the condition that the diffused light on the surface of the product is at least 600 lx, visually inspect a horizontally placed product or a set of centrally placed products, at a distance of about 2m therefrom for obvious color difference.

6.1.3 Gloss

Under the condition that the diffused light on the surface of the product is at least 600 lx, visually inspect a horizontally placed product or a set of centrally placed products, at a distance of about 2m therefrom for obvious gloss difference.

6.2 Maximum permissible deformation

6.2.1 Measuring appliance

6.2.1.1 Steel ruler with a division value of 1 mm.

6.2.1.2 Right angle ruler with a precision of 1°.

6.2.1.3 Height gauge with a division of 0.02 mm.

6.2.1.4 Feeler gauge with the minimum measured value being 0.02 mm; or similar measuring tool.

6.2.1.5 Detection workbench with horizontal plane.

6.2.2 Measurement method

Measure the diameter of the eyelet with a vernier caliper; measure the special-shaped eyelets with internal and external circle clamps. Measure 3 points for each eyelet; rotate the measuring point by about 60° based on the last measuring point for each measurement. Take the minimum value as the diameter of the eyelet; the maximum difference between radii of the eyelet is the roundness of the eyelet.

6.3.4.2 Center distance and misalignment of eyelets

In case the product is placed horizontally, put a frustum with a ruler and a frustum into two measured eyelets, respectively; read and record the center distance of eyelets with a frustum ruler. Continue to measure the position with the straightedge of the solid frustum; determine the misalignment with a steel ruler and right angle ruler.

6.3.4.3 Flatness of mounting holes

Place a flat plate with an area equal to that of the plane of the mounting hole on the measured surface; measure the maximum vertical spacing between the two planes with a feeler gauge.

6.3.4.4 Mounting distance between eyelet and edge/drain outlet

Place the product under test on the detection platform; make the measured edge of the product close to the vertical surface of the detection platform or the vertical edge of the right angle ruler; measure and record the value between the eyelet center and the right angle ruler with a straightedge or a frustum with ruler.

6.4 Method for testing water absorption

The test shall be carried out with the method specified in GB 6952.

6.5 Method for testing contamination resistance

The test shall be carried out with the method specified in GB/T 908.

6.6 Hot water resistance test

6.6.1 The hot water resistance test of non-ceramic bathtubs shall be carried out in accordance with those specified in JC/T 779.

6.6.2 The steps for the hot water resistance test of non-ceramic products such as wash basin, bidet and shower tray are as follows: place the products on the platform; mount the shower at a height of 1 m from the center of the product bottom, of which the water spraying direction is perpendicular to the product bottom. The flow rate and water temperature of the shower are

(0.09 ± 0.01) L/s and (65 ± 5)°C, respectively; the water flow is continuously sprayed for 60 min. During the test, the drainage device of the product is opened to ensure smooth discharge of water flow.

6.7 Load resistance test

6.7.1 General requirements for test

In case of carrying out load test for wall-mounted non-ceramic sanitary ware products; the products shall be mounted on the test platform according to the product installation instructions. If the manufacturer provides supporting devices together with the products, the supporting devices shall be used for the test, and may be observed during the test.

The floor pedestal pan, column type wash basin, bathtub and shower tray shall be horizontally placed on the test platform for testing.

6.7.2 Method for testing load resistance of pedestal pan, wash basin and urinal

The test plate is a steel plate with a surface area of 600 mm×225 mm, with one side attached with a rubber pad with a thickness of 13 mm.

Place the test plate on the product under test and make the rubber surface close to the tested surface. Slowly apply a load to the test plate vertically, so that the total load of the product under test reaches that specified in 5.7; keep it for 10 min. Observe and record whether there is deformation or visible structural damage.

6.7.3 Method for testing load resistance of sink

A steel plate with a diameter of 76 mm will be tested, with one side attached with a rubber pad with a thickness of 13mm.

Place the test plate flat at the center of the flushed bottom surface of the product under test; make the rubber surface close to the tested surface; vertically apply the load, so that the total load borne by the product under test is 0.44 kN; keep it for 10 min; observe and record whether there is deformation or visible structural damage.

6.7.4 Method for testing load resistance of bathtub

The test plate is the same as that in 6.7.2.

Test on load resistance of vertical surface: place the test plate flat on the center part and the upper edge surface of the flushed bottom surface of the product under test; make the rubber surface close to the tested surface; apply

vernier caliper or similar measuring tool, and recorded.

6.15.1.3 Minimum diameter of ball passing through the water channels of pedestal pan and urinal

Put the solid ball with the specified diameter into the inlet of the toilet water channel; make the solid ball move along the water channel by flushing or swinging; record whether the solid ball is discharged from the sewage outlet.

6.15.2 Water consumption

The test for water consumption of toilets shall be carried out with the method specified in GB 6952.

6.15.3 Test on flushing performance of toilets

6.15.3.1 Cleaning function test

6.15.3.1.1 The cleaning function test of pedestal pan shall be carried out with the method specified in GB 6952.

6.15.3.1.2 The cleaning function test of urinal shall be carried out with the method specified in GB 6952.

6.15.3.2 Solid discharge function tests

6.15.3.2.1 Ball discharge test

The ball discharge test of pedestal pan shall be carried out with the method specified in GB 6952.

6.15.3.2.2 Particulate discharge test

The particulate discharge test of pedestal pan shall be carried out with the method specified in GB 6952.

6.15.3.3 Sewage replacement function test

The sewage replacement function test of pedestal pan and urinal shall be carried out with the method specified in GB 6952.

6.15.3.4 Water seal restoration function test

The water seal restoration function test of pedestal pan shall be carried out with the method specified in GB 6952.

6.15.3.5 Test on transport characteristic of drainage pipeline

The test for transport characteristic of drainage pipeline of pedestal pan shall

be carried out with the method specified in GB 6952.

6.15.3.6 Splash resistance test

The splash resistance test of pedestal pan shall be carried out with the method specified in GB 6952.

6.15.4 Test on flushing noise of pedestal pan

The flushing noise shall be tested in accordance with the requirements of GB/T 3768.

6.15.5 Technical requirements for toilet fittings

6.15.5.1 Anti-siphon test

The anti-siphon tests of cistern accessories and the flush valve shall be carried out in accordance with the requirements of GB/T 26730 and GB/T 26750, respectively.

6.15.5.2 Requirements for safe water level

The cistern accessories shall be installed in the cistern. The water inlet valve shall be adjusted to the required working water level based on the water consumption of the toilet. The vertical distance from the effective working water level of the water tank to the overflow hole shall be measured with a steel ruler. The vertical distance from the critical water level of the water inlet valve to the water level of the overflow port shall be measured with a right angle ruler and a steel ruler. The vertical distance from the lowest position of unsealed opening of the cistern (gravity) water flushing device to the overflow level shall be measured with a steel ruler.

7 Inspection rules

7.1 Inspection classification

Product inspection is classified into end-of-manufacturing inspection and type inspection by types.

7.2 End-of-manufacturing inspection

7.2.1 Inspection items

The end-of-manufacturing inspection items of non-ceramic sanitary ware products shall include 5.1, 5.2, 5.3, 5.13, 5.15.2, 5.15.3.1, 5.15.3.2, 5.15.3.4 and 5.15.3.6.

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