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Enamelled plumbing fixtures - Bathtubs

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Enamelled plumbing fixtures - Bathtubs

1 Scope

This document specifies the requirements for dimensional tolerance, metal strain, appearance, enamel coating thickness, physical and chemical properties of enamelled bathtubs, describes the corresponding test methods, stipulates the inspection rules, marking, packaging, transportation and storage contents, and provides product classification and marking to facilitate technical regulations.

This document applies to the production, inspection and sales of enamelled bathtubs (cast iron enamelled bathtubs, sheet steel enamelled bathtubs).

2 Normative references

The provisions of the following documents constitute the essential clauses of this document through normative references in this text. Among them, for referenced documents with dates, only the versions corresponding to the dates are applicable to this document; for referenced documents without dates, the latest versions (including all amendments) are applicable to this document.

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 4956 Non-magnetic coatings on magnetic substrates - Measurement of coating thickness - Magnetic method

GB/T 7410 Terms of vitreous and porcelain enamels

GB/T 9989.1 Vitreous and porcelain enamels - Determination of resistance to chemical corrosion - Part 1: Determination of resistance to chemical corrosion by acids at room temperature

GB/T 9989.3 Vitreous and porcelain enamels - Determination of resistance to chemical corrosion - Part 3: Determination of resistance to chemical corrosion by alkaline liquids using a hexagonal vessel

QB/T 1855 Enamelled ware noncontact with food - General requirements

3 Terms and definitions

The terms and definitions defined in GB/T 7410 and the following apply to this document.

3.1 upper edge surface

The uppermost flat part of a bathtub.

NOTE: As shown in Figure 1.

3.2 apron

The part that is provided due to the requirements of product design and is drooped from the upper edge surface (3.1) and is integrated with the bathtub.

NOTE: As shown in Figure 1.

3.3 waste hole

A hole provided for draining water from a bathtub.

NOTE: As shown in Figure 1.

3.4 overflow hole

A water outlet provided on the upper part of the inner side of the bathtub to prevent the water in the bathtub from overflowing from the upper edge surface (3.1).

NOTE: As shown in Figure 1.

3.5 visible surface

After installation, the surface that can be visually inspected.

3.6 underside

Visible surface (3.5) at the bottom of the bathtub.

NOTE: As shown in Figure 1.

3.7 A surface

The uppermost visible surface of the bathtub (3.5).

NOTE: As shown in Figure 2.

5.1.1.1 Base substrate material

It shall be one-piece cast from cast iron material, solid, complete, and accurately formed, without dense holes, cracking, or other defects that affect enameling and performance. The cast iron thickness shall not be less than 3.2 mm at a distance of more than 25 mm from the edge.

5.1.1.2 Slope

The slope of the bathtub underside towards the waste hole shall be 21 mm/m~36 mm/m.

5.1.1.3 Drainage

After the test in 6.1.2, the maximum diameter of a single piece of retained water at the bottom of the bathtub shall not be greater than 10 cm, and there shall not be two or more such pieces of retained water at the same time.

5.1.2 Dimensional tolerance

The tolerance for the maximum length, maximum width, and depth of the bathtub is ±7 mm.

5.1.3 Metal strain

The metal strain of the upper edge surface and edges shall not be greater than 5 mm/m.

NOTE: No requirements for products with special shapes.

5.1.4 Appearance

5.1.4.1 There shall be no serious defects that affect the functions, such as peeling, pinholes penetrating into the base substrate, jumping, or crazing, or defects that significantly affect the appearance. The enamel coating shall have a smooth surface (except for the non-slip surface) and a uniform color.

5.1.4.2 The allowable range of minor defects for cast iron enamelled bathtubs shall comply with the provisions of Table 1.

After the test in 6.6.6, the visible surface enamel shall not be lower than grade A+.

5.1.6.7 Alkali resistance

5.1.6.7.1 The surface of the porcelain enamel shall not be chalky after the visible surface enamel is etched by the sodium carbonate solution at room temperature as specified in 6.6.7.1.

5.1.6.7.2 After the visible surface enamel (a flat specimen cut from the product or a sample made of the same material and processed under the same conditions as the product) is tested as specified in 6.6.7.2, the weight loss shall not be greater than 0.8 mg/cm^2.

5.2 Sheet steel enamelled bathtub

5.2.1 Basic requirements

5.2.1.1 Base substrate material

The thickness of the steel plate before forming shall not be less than 1.6 mm. If required by the product structure, a thinner steel plate (thickness not less than 1.3 mm) may be selected, provided that the requirements of 5.2.3, 5.2.6.3 and 5.2.6.4 are met; the thickness of the apron shall not be less than 1.1 mm.

5.2.1.2 Slope

The slope of the bathtub underside towards the waste hole shall be 10 mm/m~40 mm/m.

5.2.1.3 Drainage

After the test in 6.1.2, the maximum diameter of a single piece of retained water at the bottom of the bathtub shall not be greater than 10 cm, and there shall not be two or more such pieces of retained water at the same time.

5.2.2 Dimensional tolerance

The tolerance for the maximum length, maximum width, and depth of the bathtub is ±5 mm.

5.2.3 Metal strain

The metal strain of the upper edge surface and edges shall not be greater than 5 mm/m.

NOTE: No requirements for products with special shapes.

5.2.4 Appearance

5.2.4.1 There shall be no serious defects that affect the function of the product, such as

5.2.6.5 Abrasion resistance

After the test in 6.6.5, the enamel surface of the visible surface shall have no scratches.

5.2.6.6 Citric acid resistance at room temperature

After the test in 6.6.6, the visible surface enamel shall not be lower than grade A+.

5.2.6.7 Alkali resistance

5.2.6.7.1 The surface of the porcelain enamel shall not be chalky after the visible surface enamel of the bathtub is etched by the sodium carbonate solution at room temperature as specified in 6.6.7.1.

5.2.6.7.2 After the visible surface enamel of the bathtub porcelain glaze (a flat specimen cut from the product or a sample made of the same material and processed under the same conditions as the product) is tested as specified in 6.6.7.2, the weight loss shall not be greater than 0.8 mg/cm^2.

6 Test methods

6.1 Basic requirements

6.1.1 Slope

The measurement shall be carried out using a slope measuring instrument with a graduation value of not less than 0.1 mm/m.

6.1.2 Drainage

Clean the surface of the bathtub, place the bathtub in normal use, and pour in no less than 2 L of water from the other end opposite the waste hole. After the water is drained, use a measuring instrument with a graduation value of no less than 1 mm to measure the maximum diameter of a single piece of retained water on the underside of the bathtub.

6.2 Dimensional tolerances

6.2.1 Test setup

The measuring devices for dimensional tolerance are as follows:

-- Length measuring instruments with a graduation value of not less than 1 mm;

-- Straight assistive devices, such as a ruler (see Figure 4);

-- Right-angle ruler (see Figure 5).

discharge method with a voltage of 2000 V~3000 V. The end of the high-voltage test rod of the test equipment is lightly touched to the porcelain enamel surface and slid, and the pinholes are found by electric sparks.

6.4.3 Crazing shall be measured according to the crazing test method in QB/T 1855.

6.5 Enamel coating thickness

The measurement shall be made on a flat surface at least 25 mm away from the edge of the bathtub in accordance with GB/T 4956.

6.6 Physical and chemical properties

6.6.1 Gloss

The test shall be carried out according to Appendix A.

6.6.2 Resistance to thermal shock

The test method for resistance to thermal shock in QB/T 1855 shall be used, and the sample shall be tested three times with a temperature difference of 100 °C.

6.6.3 Resistance to impact

Place the bathtub in its proper position, supporting both ends of the bottom with two wooden pads, ensuring it is at least 30 mm above the ground. Then, drop a steel ball weighing approximately 200 g from a height of 1000 mm (the distance between the center of the ball and the test surface) onto the bottom of the bathtub. Inspect the enamel coating on the test surface.

6.6.4 Resistance to load

6.6.4.1 Underside's resistance to load

Support the two long sides of the bathtub with the bottom suspended. Place a 280 mm diameter weight plate covered with approximately 10 mm thick rubber in the center of the bathtub underside. Then apply a uniform load of 1470 N to the weight plate. After 3 minutes, remove the load and inspect the bathtub for obvious metal strain, crazing, insulation peeling, or other damage.

6.6.4.2 Upper edge surface's resistance to load

After the test in 6.6.4.1, respectively, place two weight plates, 280 mm long and 100 mm wide, covered with rubber approximately 10 mm thick, on the two upper edge surfaces along the length of the bathtub. Then place a large weight plate on them (as shown in Figure 6). Apply a load of 1570 N (including the mass of the weight plates) to the center of the large weight plate or evenly to the left and right ends. After 3 minutes,

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