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Sanitary ware - Flexible hose

卫生洁具 软管

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Sanitary ware - Flexible hose

1 Scope

This standard specifies the terms and definitions, classifications and codes, materials, technical requirements, test methods, inspection rules, signs, markings, packaging, transportation, storage of flexible hoses for sanitary ware.

This standard applies to flexible hoses for sanitary ware, whose working pressure is not more than 1.0 MPa AND water supply temperature is not more than 90 °C.

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 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 5750.6 Standard examination methods for drinking water - Metal parameters

GB/T 5750.8 Standard examination methods for drinking water - Organic parameters

GB/T 6461-2002 Methods for corrosion testing of metallic and other inorganic coatings on metallic substrates - Rating of test specimens and manufactured articles subjected to corrosion tests

GB/T 7307 Pipe threads with 55 degree thread angle where pressure-tight joints are not made on the threads

GB/T 7759.1 Rubber, vulcanized or thermoplastic - Determination of compression set - Part 1: At ambient or elevated temperatures

GB/T 7759.2 Rubber, vulcanized or thermoplastic - Determination of compression set - Part 2: At low temperatures

GB/T 10125 Corrosion tests in artificial atmospheres - Salt spray tests

to the method specified in 7.9.2; the ovality is not more than 15%;

After the metal corrugated flexible link hose for water is tested, according to the method specified in 7.9.3, it shall meet the requirements of 6.4 and 6.5.

6.10 Resistance to cyclic cold and heat

After the flexible hose for shower, flexible hose for washing, pullout hose for faucet are tested, according to the method specified in 7.10, there shall be no rupture or leakage; the tightness shall meet the requirements of 6.4.

6.11 Aging resistance

After the test according to the method specified in 7.11, there shall be no rupture or leakage, at all parts of the flexible hose; the tightness shall meet the requirements of 6.4.

Note: For the flexible hose for shower and pullout hose for faucet, this clause does not apply.

6.12 Surface corrosion resistance

After the coated parts and stainless steel parts are subjected to the 24 h acetic acid salt spray test (ASS), according to GB/T 10125, it shall not be lower than the requirements of the appearance rating (R_A) 9, in Table 1 of GB/T 6461-2002.

6.13 Limits for the precipitation of harmful substances (applicable to flexible hose contacted with drinking waters)

6.13.1 Limits for precipitation of metal harmful substances

The statistical value of lead precipitation (Q) shall not be greater than 5 $\mu\text{g/L}$; the precipitation of non-lead elements shall not be greater than the limit, which is specified in Table A.1 in Appendix A.

6.13.2 The precipitation limit of organic compounds

It shall not be greater than the limit, which is specified in Table A.2 and Table A.3.

7 Test method

7.1 Appearance

Use visual inspection. The visual inspection distance is 500 mm; the illuminance is not less than 300 lx.

7.2 Dimensions

Use a ruler or steel tape, which has an accuracy of 1 mm, to make measurement. When measuring, the flexible hose shall be placed in a natural state; no force shall be used to stretch the hose.

7.3 Threaded connection

7.3.1 The thread accuracy is measured, by a thread gauge of the corresponding grade.

7.3.2 The thread length is measured, by a caliper or depth gauge, which has an accuracy of not less than 0.1 mm.

7.3.3 The thread torque is tested by a torque wrench. During the test, put the hose connection thread (including the sealing rubber gasket), on the corresponding fixture; gradually apply the torque to the specified torque value. Perform a torque test on the other end of the flexible hose in the same way.

7.4 Tightness

Connect one end of the flexible hose to the pressurizing device; connect the other end to a flow regulating valve. The flexible hose for cold water is fed with room temperature water; the flexible hose for hot water is fed with hot water, at $(70 \pm 2) ^\circ\text{C}$. Adjust the dynamic pressure to (0.30 ± 0.02) MPa. Adjust the flow control valve, so that the water flows through the flexible hose, at a flow rate of 6 L/min, for 5 min. Then adjust the dynamic pressure to (0.50 ± 0.02) MPa; keep it for (300 ± 10) s.

7.5 Pressure resistance

Connect one end of the hose to the pressurized equipment. Connect the other end to a plug, which has an exhaust valve. Slowly add room temperature water, at a temperature not exceeding $30 ^\circ\text{C}$, into the flexible hose. Close the exhaust valve, after the air in the flexible hose is drained.

Connect flexible hose and flexible hose for washing: Slowly increase the water supply pressure to (1.40 ± 0.02) MPa, within (60 ± 10) s; keep it for (60 ± 5) min; then increase the pressure to (3.50 ± 0.02) MPa; keep it for (60 ± 10) s.

Flexible hose for shower and pullout hose for faucet: Slowly increase the water supply pressure to (0.70 ± 0.02) MPa, within (60 ± 10) s; keep it for (60 ± 5) min; increase the pressure to (2.00 ± 0.02) MP; keep it for (60 ± 10) s.

7.6 Flow

Install the flexible hose on the test equipment, according to Figure 2. Apply a

± 3) °C water, for 168 h. Immerse the flexible hose for cold water in (60 ± 3) °C water, for 168 h. Observe whether there are any ruptures, leakages and other undesirable phenomena in various parts, during the test. After the test, perform the tightness test, according to 7.4.

7.12 Surface corrosion resistance

Carry out the 24 h acetic acid salt spray test, according to GB/T 10125. The results are rated, according to GB/T 6461-2002.

7.13 Limits for the precipitation of harmful substances

Test according to the method specified in Appendix B.

8 Inspection rules

8.1 Inspection classification

Product inspection is divided into exit-factory inspection and type inspection.

8.2 Exit-factory inspection

8.2.1 Inspection items

The exit-factory inspection items include 6.1, 6.2, 6.3, 6.4, 6.5, 6.12.

8.2.2 Group-batching rules and sampling scheme

Group batches of products of the same category, same variety, same model. The samples, which are required for exit-factory inspection, are randomly selected from the group batches. Sampling is carried out in accordance with the provisions of GB/T 2828.1, using the special inspection level S-2 AND a sampling scheme for normal inspection.

8.2.3 Judgment rules

The acceptance quality limit (AQL) of the exit-factory inspection items is 1.5.

After all the items, which are required by the inspection institute, are qualified, the batch of products is qualified. If one or more of the items are unqualified, the batch of products is determined to be unqualified.

8.3 Type inspection

8.3.1 Inspection items

Type inspection includes all items in Chapter 6.

Appendix B

(Normative)

Test method for precipitation of metals and organic compounds

B.1 Principle

Use simulated tap water containing sodium bicarbonate and sodium hypochlorite, to soak the part of the sample surface, which is in contact with water. Use the equipment, which meets the test requirements, to measure the concentration of metal elements and organic compounds, in the soaking liquid. The measured concentration value is standardized; then compared with the limit specified by the standard, after data calculation.

B.2 Sample

For testing the precipitation of metal harmful substances, it requires taking 3 samples of the same specification and model. For the number of test samples, which are used for testing the precipitation of organic compounds, it must be that the total volume of the water surfacing is not less than 1 L. When the following conditions are met, the tested samples can represent various other types of products:

- a) The materials have the same alloy, composition or formula;
- b) The design and production process are similar;
- c) Has the largest water surface area to volume ratio.

B.3 Reagents

B.3.1 Distilled water or deionized water (abbreviated as pure water): the conductivity is not more than 0.1 $\mu\text{S}/\text{cm}$.

B.3.2 Sodium hypochlorite (solution) (analytical pure, effective chlorine content not less than 5%).

B.3.3 Anhydrous sodium bicarbonate (analytical pure).

B.3.4 Concentrated nitric acid (excellent grade pure).

B.3.5 Concentrated hydrochloric acid (excellent grade pure).

B.3.6 Standard solution of the measured element.

B.4 Preparation of soaking solution for test

B.4.1 0.025 mol/L chlorine-containing stock solution

Take 7.3 mL of sodium hypochlorite solution (B.3.2). Use pure water to dilute it to 200 mL. Store it in a closed brown bottle, which has a stopper. Store it in the dark. This solution is a chlorine-containing stock solution. A fresh solution needs to be prepared every week.

Take 1.0 mL of the chlorine-containing stock solution. Use reagent water to dilute it to 1 L. Immediately analyze the concentration of total residual chlorine (ρ).

In order to prepare a solution, which has a residual chlorine concentration of 2 mg/L, it is necessary to add the chlorine-containing stock solution to the test soaking solution, the volume of which is calculated according to formula (B.1):

$$V = \frac{2.0V_1}{\rho} \dots\dots\dots (B.1)$$

Where:

V - The volume of the chlorine-containing stock solution to be added, in milliliter (mL);

V_1 - The volume of the soaking liquid, which is used in the test, in liters (L);

ρ - The mass concentration of total residual chlorine in the chlorine-containing solution, in milligrams per milliliter (mg/mL).

B.4.2 0.4 mol/L sodium bicarbonate solution

Dissolve 33.6 g of anhydrous sodium bicarbonate in pure water. Use pure water to dilute it to 1 L. Mix well. A fresh solution needs to be prepared every week.

B.4.3 Soaking liquid for test

Prepare 1 L of soaking solution: Take 25 mL of 0.4 mol/L sodium bicarbonate solution (B.4.2) AND an appropriate amount of chlorine-containing stock solution (B.4.1). Use pure water to dilute it to 1 L. Use the 0.1 mol/L hydrochloric acid to adjust the pH value, to make the pH of the solution be (8.0 ± 0.5) ; the alkalinity (calculated as CaCO_3) is (500 ± 25) mg/L; the inorganic carbon is (122 ± 5) mg/L; the residual chlorine is (2 ± 0.5) mg/L.

Prepare the soaking liquid, which is actually needed, according to the above ratio.

B.5 Sample washing and stabilization

Use tap water to rinse the sample, for 15 minutes. Then use pure water to rinse

<72 - The stabilization time before the start of sample processing and soaking (less than 72 h);

2 - The time interval between pouring and replacing the soaking liquid is 2 h;

16 - Keep for 16 h (overnight);

16 - Keep 16 h for testing;

c - Collection of the soaking solution that was kept for 16 h the day before;

64 - Keep for 64 h (weekend).

Figure B.1 -- Extraction sequence diagram

B.7 Collection and storage of water samples

After the soaking is complete, collect and store the water sample in the following manner:

- a) For the water sample, which is used to test the content of metal harmful substances, collect and put it in a Teflon bottle, which has a lid. Add concentrated nitric acid, to make the pH value of the solution < 2. Shake it uniformly. Store at room temperature. Measure it within 14 days.
- b) For the water sample, which is used for testing the content of volatile organic compounds, collect 40 mL and put it into a brown glass sample bottle, which has a PTFE lid, for the purpose of testing volatile organic compound. Add 25 mg of ascorbic acid to each 40 mL sample, to remove the residue in the water sample. Then carefully add two drops of 1:1 hydrochloric acid, to each 40 mL sample bottle, to adjust the pH to less than 2.
- c) For the water sample, which is used for testing the content of semi-volatile organic compounds, collect about 1 L into a brown glass sample bottle, which has a PTFE lid. Add 40 mg of sodium sulfite to the sample, to remove the residual chlorine from the water sample (it shall be stirred OR vibrated when adding, until the sodium sulfite is dissolved). Use the 1:1 hydrochloric acid, to adjust the pH of the sample to less than 2.

The samples in b) and c) shall be chilled in the dark OR kept in a refrigerator, at a temperature not higher than 4 °C, from after collection to before extraction. Extraction shall be completed within 7 days; analysis shall be completed within 14 days.

B.8 Detection method

B.8.1 Detection of metal hazardous substance content

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