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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Performance test methods for household and similar drinking
water purifiers**

家用和类似用途饮用水处理装置性能测试方法

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1 Scope

China's national performance test methods for household drinking water purifiers. It specifies the terms and definitions and the test methods, covering the test conditions and equipment, the visual inspection, the structural performance test and the hygiene safety test. Domestic water treatment is a large consumer market in China and one where claims outrun evidence: a purifier is sold on what it is said to remove, and nobody buying one can verify any of it. A test method standard is therefore the whole basis of the category. The tests have to answer three separate questions, and the standard separates them. Does the unit work as a piece of plumbing - does it hold pressure, deliver flow, and survive being connected to a mains supply. Does it remove what it claims, at the claimed rate, until the claimed capacity is reached. And does it add anything: a purifier is a wetted plastic assembly holding stagnant water between uses, and a device that leaches or grows biofilm is worse than the water it treats.

This standard specifies the terms and definitions and test methods for drinking water treatment equipment for household and similar purposes (referred to as "water treatment equipment"). This standard applies to the performance test of drinking water treatment equipment for household and similar purposes.

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) are applicable to this standard.

GB 4706.1 Household and similar electrical appliances - Part 1. General requirements

GB 5749 Standards for drinking water quality

GB/T 5750 (all parts) Standard examination methods for drinking water

GB/T 6682 Water for analytical laboratory use - Specification and test methods

GB/T 17218 Hygienic safety evaluation for chemicals used in drinking water treatment

GB/T 17219 Standard for safety evaluation of equipment and protective mater

GB/T 22090 Cold and hot water dispenser

3 Terms and definitions

The following terms and definitions apply to this document. follows.

a) The water treatment equipment unit shall be installed on a shelf or platform off the ground. Set the equipment unit to be tested step by step in accordance with

4.3.2 a) and

b) and fill it with water.

b) Install a suitable measuring instrument (such as an extensometer or micrometer) vertically on the container chassis and top cover, securely install the control valve or other components on the container top cover.

c) Install a suitable measuring instrument (such as an extensometer or diameter ruler) 15 cm from the chassis on the central axis of the container. In addition, it shall install the additional measuring instruments on the side wall of the container, with a vertical spacing of not more than 30 cm. The measuring instrument shall be installed within 30 cm of the top cover of the container. If the height of the container does not exceed 61 cm, the measuring instrument shall be installed in the center of the container. When using the extensometer, it shall wrap the extension line (cord) around the container at the vertical axis, 15 cm above the chassis. One end of the extension line shall be fixed to a solid terminal of the same leveling height. The other end is fixed to another solid terminal at the same level by a spring to tension the extension line. Each end of the extension line shall be fastened to the cushion block and close to the container wall, so that the spacing between the cushion blocks is 15 cm ~ 20 cm. For larger containers, the spacing of the cushion blocks is allowed to be increased accordingly to avoid contact of the cushion block with the container. A cushion block shall be attached to each winding as described above.

d) Record the initial value of the measuring instrument before applying pressure to the test

equipment. When using the extensometer, the module spacing on each line shall be measured using a spiral micrometer.

- e) Pressurize the test equipment in accordance with steps
- f) The final data is read from the extensometer or other measuring instrument when the test equipment is not under pressure.
- g) The difference between the readings of the measuring instrument is the size of the permanent deformation of the top cover or bottom of the container. The difference in the measured circumference of the container is the increment of the circumference of the container.

4.3.4 Bursting pressure test (non-metallic pressure vessel) Metal pressure vessels are not subjected to burst pressure test. The burst pressure test of non-metallic pressure vessels shall be carried out as follows: - Influent water pressure. (0.24 ± 0.02) MPa. For the discontinuous water treatment device, the lower limit value of the nominal value of the manufacturer is used.

4.5.2.2 Test method Connect the water treatment device to the water supply system in accordance with the instructions for use (except for the water storage container). After flushing the water treatment device in accordance with the product instructions, when the treated water volume reaches the nominal rated total purified water volume, collect the purified water at the water outlet of the water treatment device. The collection time is (300 ± 2) s, measure the water amount, make one collection at the time interval of 5 min, 3 collections in total, take the arithmetic mean of 3 test values as the test results.

4.5.3 Rated total purified water volume test The rated total purified water volume test is performed as follows:

- a) Rinse the water treatment device sample in accordance with the product instructions;
- b) Lead in the municipal tap water in accordance with the water production flow indicated in the product description;
- c) In accordance with the total rated water production, the whole process is divided into four sections;
- d) When reaching to 0% and 100% of the nominal rated total purified water volume of the water treatment device, respectively perform purified water quality test in accordance with the method of clause 4.5.1; at the same time, when reaching to 0%, 25%, 50%, 75%, and 100% of the nominal rated total purified water volume of the water treatment device, perform the spike test, the contaminant item and concentration of the purified water treatment device are as shown in Table 3 and Table 4, the contaminant item and concentration of the general water treatment device are as shown in Table 5;

Appendix A

(Informative) Preparation of contaminant liquid A.1 Residual chlorine purification test A.1.1 Preparation of residual chlorine contaminant liquid The preparation of the residual chlorine contaminant liquid is carried out as follows:

a) Residual chlorine standard stock solution [$\rho(\text{Cl}_2)$ =

2.0 mL of 10% (effective chlorine) sodium hypochlorite (NaClO) solution to a 100 mL volumetric flask, USE the purified water to make the volume reach to the mark.

b) Residual chlorine contaminant liquid [$\rho(\text{Cl}_2)$ =

2.0 mg/L]. PIPETTE

1.00 mL of residual chlorine standard stock solution, TRANSFER it into a volumetric flask, USE purified water to make the volume reach to 1000 mL, PREPARE it before use. A.1.2

pH adjustment The pH of the contaminant liquid is adjusted by dropwise addition of a 6

mol/L sodium hydroxide (NaOH) solution or a 6 mol/L hydrochloric acid (HCl) solution. A.1.3

Adjustment of the total dissolved solids The TDS value of the contaminant liquid is adjusted by adding sodium chloride (NaCl) or pure water. A.1.4 Adjustment of other indicators Other indicators are adjusted as required by Table 6.

Note. In order to ensure the specific content of free residual chlorine, the test water may need to be pre-chlorinated and dechlorinated. A.2 Hydrogen sulfide and phenol purification test A.2.1 Preparation of contaminant liquid A.2.1.1 Hydrogen sulfide The preparation of the hydrogen sulfide contaminant liquid is carried out as g/mL), in a volumetric flask, USE pure water to make its volume reach to 100 mL.

b) Iron contaminant liquid [$\rho(\text{Fe})$ =

4.0 mg/L]. PIPETTE

4.00 mL of iron standard stock solution, TRANSFER it to a volumetric flask, USE pure

water to make its volume reach to 1000 mL, PREPARE it before use. A.3.1.2 Manganese

The preparation of the manganese contaminant liquid is carried out as follows:

a) Manganese standard stock solution [$\rho(\text{Mn})$ =

1.0 mg/mL]. WEIGH 0.2291 g of anhydrous manganese chloride (MnCl_2 , first grade), USE pure water to dilute it to 100 mL.

b) Manganese contaminant liquid [$\rho(\text{Mn})$ =

1.5 mg/L]. PIPETTE