

Translated English of Chinese Standard: QB/T5418-2019

www.ChineseStandard.net → Buy True-PDF → Auto-delivery.

Sales@ChineseStandard.net

QB

LIGHT INDUSTRY STANDARD OF
THE PEOPLE'S REPUBLIC OF CHINA

ICS 91.140.70

Classification No.: Y71

QB/T 5418-2019

Thermostatic shower system

恒温淋浴器

Issued on: December 24, 2019

Implemented on: July 01, 2020

Issued by: Ministry of Industry and Information Technology of PRC

Table of Contents

Foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	5
4 Categories	6
5 Working conditions	6
6 Materials	7
7 Requirements	7
8 Test method	15
9 Inspection rules	28
10 Sign, packaging, transportation, storage	30
Appendix A (Normative) Product installation structure size	32
Appendix B (Normative) Outlet water temperature test	34
Appendix C (Normative) Control function life test	36
Appendix D (Normative) Transfer switch life test	38
Appendix E (Normative) Service life test of rotating outlet pipe	40

Thermostatic shower system

1 Scope

This standard specifies the terms and definitions, classification, working conditions, materials, requirements, test methods, inspection rules and signs, packaging, transportation, storage of thermostatic showers (hereinafter referred to as "showers").

This standard applies to showers, which are installed in bathrooms, shower rooms, and other sanitary facilities, under the conditions of nominal pressure 0.10 MPa ~ 0.50 MPa and water medium temperature 4 °C ~ 85 °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 1176 Casting copper and copper alloys

GB/T 2828.1-2012 Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection

GB/T 4208-2017 Degrees of protection provided by enclosure (IP code)

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

GB/T 5231 Designation and chemical composition of wrought copper and copper alloys

GB/T 5270-2005 Metallic coatings on metallic substrates - Electrodeposited and chemically deposited coatings - Review of methods available for testing adhesion

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 7306.1 Pipe threads with 55 degree thread angle where pressure-tight joints are made on the threads - Part 1: Parallel internal and taper external threads

6 Materials

6.1 Parts in contact with water shall not use corrosive materials, such as zinc alloy.

6.2 Casting copper materials shall comply with the provisions of GB/T 1176. Processed copper materials shall comply with the provisions of GB/T 5231.

6.3 The stainless steel material shall be 06Cr19Ni10, which is specified in GB/T 20878-2007, or other stainless steel materials with corrosion resistance not lower than the above designations.

6.4 Other materials shall meet the performance requirements.

7 Requirements

7.1 Appearance

7.1.1 The surface of the plating shall be glossy and uniform. There shall be no defects such as peeling, cracking, burning, exposed bottom, peeling off, black spots, obvious pitting, burrs.

7.1.2 The surface of the coating shall be fine-structured, smooth, uniform in color. There shall be no defects such as sagging, exposed bottom, obvious scratches, bumps.

7.1.3 The polished surface shall be smooth. There shall be no obvious defects such as burrs, scratches, bumps.

7.1.4 There shall be no defects such as burrs and sharp corners on the surface, that is accessible to the human body.

7.1.5 The thread surface shall be smooth and clean. There shall be no obvious dents, broken teeth, and other defects.

7.1.6 There shall be no cracks, scars, pores, rusts, etc., on the surface of metal fittings.

7.2 Processing and assembly

7.2.1 The external sealing pipe thread of the product shall meet the requirements of GB/T 7306.1 or GB/T 7306.2. The external non-sealing pipe thread of the product shall meet the requirements of GB/T 7307, where the external thread shall not be lower than the grade B precision of GB/T 7307.

7.2.2 The action of the assembled handle or handwheel shall be light, stable and free from jamming; the transfer switch shall be switched smoothly, lightly and free from jamming.

7.4.6.2 Flow reduction

Test according to 8.4.6.2. After 30 s, the temperature (T_m) of the shower mixture shall deviate from the initial temperature (T_0) by no more than 2 K, meanwhile the temperature fluctuation shall not be greater than 1 K.

7.4.6.3 Changes in water supply pressure

Test according to 8.4.6.3. For non-shower outlets: The temperature of the mixed water (T_m) shall not deviate from the initial temperature (T_0) by more than 2 K. For shower outlets or outlets for other purposes: In the first 5 s, the duration -- where the deviation between the mixed water temperature (T_m) and the initial temperature (T_0) exceeds 3 K -- shall not be more than 1 s; after 5 s, the mixed water temperature (T_m) shall not deviate from the initial temperature (T_0) by more than 2 K, meanwhile the temperature fluctuation shall not be greater than 1 K.

7.4.6.4 Changes in supply water temperature

Test according to 8.4.6.4. For non-shower outlets: The temperature of the mixed water (T_m) shall not deviate from the initial temperature (T_0) by more than 2 K. For shower outlets or outlets for other purposes: In the first 5 s, the duration -- where the deviation between the mixed water temperature (T_m) and the initial temperature (T_0) exceeds 3 K -- shall not be more than 1 s; after 5 s, the mixed water temperature (T_m) shall not deviate from the initial temperature (T_0) by more than 2 K, meanwhile the temperature fluctuation shall not be greater than 1 K.

7.4.7 Safety

7.4.7.1 Failure of cold water

Test according to 8.4.7.1. After the cold water is turned off, the mixed water temperature (T_m) shall not exceed 49 °C, when the water output within the first 5 s is not greater than 200 mL; the mixed water temperature (T_m) shall not exceed 42 °C, when the water output within the first 5 s is greater than 200 mL; the water output within the next 30 s shall not exceed 300 mL. After the cold water supply is restored, the deviation of the mixed water temperature (T_m) from the initial temperature (T_0) shall not exceed 2 K.

7.4.7.2 Failure of hot water

Test according to 8.4.7.2. After the hot water is turned off, the water output in the first 5 s shall not exceed 250 mL; after the hot water supply is resumed, the deviation -- between the mixed water temperature (T_m) and the initial temperature (T_0) -- shall not exceed 2 K.

7.4.8 Outlet water temperature

Carry out the test according to 8.4.8. The maximum temperature of the outlet water

shall be 38 °C ~ 49 °C.

7.4.9 Service life

7.4.9.1 Control functions

Carry out 30000 cycle tests according to 8.4.9.1. During the test, the parts shall not be broken, jammed, leaked. After the test is completed, the performance shall meet the requirements of 7.4.2, 7.4.4, 7.4.5, 7.4.6, 7.4.7.

7.4.9.2 Transfer switch

Carry out 30000 cycle tests according to 8.4.9.2. During the test, the components shall not be deformed or broken; the transfer switch shall not be jammed or reset. After the test is completed, the sealing performance of the transfer switch shall meet the requirements of 7.4.2. The operating torque shall not exceed 1.2 times the specified value in 7.4.10.2.

7.4.9.3 Rotating outlet pipe

Carry out 30000 cycle tests according to 8.4.9.3. During the test, the components shall not be deformed or broken; the connection between the outlet pipe and the body shall not be deformed or broken; there shall be no water leakage in each component. After the test is completed, the sealing performance of downstream of obturator shall meet the requirements of 7.4.2.

7.4.9.4 Shower seat

After 2000 cycle life according to 8.4.9.4, the shower seat shall have no damage, abnormal sound or other defects.

7.4.9.5 Slide bar

After 2000 cycle life in accordance with 8.4.9.5, the surface of the product shall not be worn down to the base layer; the mobile frame is functional and meets the requirements of 7.4.11.2.2.

7.4.10 Operational requirements

7.4.10.1 The operating force of the shower/non-shower switch and the hand-held/overhead shower switch shall not be greater than 45 N, or the operating torque shall not be greater than 1.7 N • m.

7.4.10.2 The operating torque of the flow and temperature adjustment switch shall not be greater than 1.7 N • m; the operation is smooth without jamming or abnormal sound.

7.4.10.3 Under (0.50 ± 0.02) MPa dynamic pressure, the shower installed on the mobile frame or shower seat shall be able to keep still; the rotating torque of the shower

7.4.12.1 Adhesion strength of coating

Carry out the grid-cut test in accordance with 8.4.12.1; it shall meet the requirements of grade 1.

7.4.12.2 Adhesion strength of coating on metal substrate

After the thermal shock test is carried out according to 8.4.12.2, there shall be no cracks, peeling or peeling off on the surface.

7.4.12.3 Adhesion strength of coating on plastic substrate

After the test is carried out according to 8.4.12.3, there shall be no cracks, blisters, looseness, etc. on the surface.

7.4.13 Surface corrosion resistance

After the 24-hour acetic acid salt spray test is carried out according to 8.4.13, it shall not be lower than the requirement of grade 9 in appearance rating (R_A) in Table 1 of GB/T 6461-2002.

7.4.14 Electrical performance requirements (only applicable to electronic showers)**7.4.14.1 Electrical safety**

The safety performance of the electrical part shall meet the requirements of GB 4706.1.

7.4.14.2 Degree of protection provided by enclosure

The degree of protection provided by enclosure of the electrical part shall not be lower than the requirements of IPX5 in GB/T 4208-2017.

7.4.14.3 Power-off and under-voltage protection**7.4.14.3.1 Power-off protection**

When the power supply is interrupted in the ON state, it shall be able to automatically OFF; when the power supply is interrupted in the OFF state, it shall be able to maintain the OFF state.

7.4.14.3.2 Undervoltage protection

When the power supply voltage drops to the set under-voltage protection value, it shall have a prompt function; when the under-voltage fails to work normally, it shall automatically shut down.

7.4.14.4 Water cut-off protection

When it is no longer operated after being turned on, it shall be automatically turned off,

within the time specified by the manufacturer.

7.4.14.5 Battery box

The battery shall be able to be placed in an independently sealed battery box; it shall be convenient to replace the battery. The battery box shall be able to replace the battery many times; there shall be no damage or screw overflow. The battery box shall work normally, after the moisture resistance test; the inner metal parts of battery box shall not be corroded.

7.4.15 Resistance to high temperature and low temperature (only applicable to electronic showers)

After the high temperature test and low temperature test, it shall meet the requirements of 7.4.2, 7.4.14.1, 7.4.14.2.

7.4.16 Moisture resistance (only applicable to electronic showers)

After the moisture resistance test, it shall meet the requirements of 7.4.14.1 and 7.4.14.2.

7.4.17 Supporting requirements

7.4.17.1 The shower hose shall meet the requirements specified in GB/T 23448.

7.4.17.2 Ordinary shower heads shall meet the requirements specified in GB/T 23447; digital display shower heads shall meet the requirements specified in QB/T 5281.

8 Test method

8.1 Appearance

Check visually. Visual inspection shall be carried out under natural scattered light or white light without reflection, where the illuminance shall not be lower than 300 lx.

8.2 Processing and assembly

8.2.1 Pipe thread accuracy is tested by a thread gauge of corresponding accuracy.

8.2.2 Hand feel inspection for assembly.

8.2.3 The mark is inspected by visual inspection. During the visual inspection, fix the product according to the installation manual and face the control device.

8.3 Dimensions

Measure according to the corresponding accuracy of the measuring tool.

8.4 Performance

8.4.2.3 Non-shower and shower manual switch

Install the shower on the test equipment according to the state of use. Adjust the switch to the position of water flow to the non-shower position. Manually block the non-shower outlet. The shower outlet is open. Apply (0.40 ± 0.02) MPa static pressure, from the water inlet, for a duration of (60 ± 5) s. Check whether there is any leakage at the shower outlet. Gradually reduce the pressure to (0.05 ± 0.01) MPa static pressure and last for (60 ± 5) s. Check whether there is any leakage at the shower outlet.

Adjust the switch to the position where the water flows to the shower. Manually block the shower outlet. Open the non-shower outlet. Apply (0.40 ± 0.02) MPa static pressure to the water inlet and last for (60 ± 5) s. Check whether the non-shower outlet has any leakage. Gradually reduce the pressure to (0.05 ± 0.01) MPa static pressure and continue for (60 ± 5) s. Check whether there is any leakage at the non-shower water outlet.

For showers with multiple shower outlets, each outlet mode shall be tested separately.

Note: If the shower outlet cannot be blocked, it can remove the shower head and replace it with a plug.

8.4.2.4 Non-shower and shower automatic transfer switch

Install the shower on the test equipment, according to the state of use. Adjust the switch to the non-shower position. The non-shower outlet and the shower outlet are both open. Apply (0.40 ± 0.02) MPa dynamic pressure from the water inlet, for a duration of (60 ± 5) s. Check whether there is any leakage at the shower outlet.

Turn the switch to the position where the water flows to the shower. Both the non-shower outlet and the shower outlet are open. Apply (0.40 ± 0.02) MPa dynamic pressure from the water inlet, for a duration of (60 ± 5) s. Check whether the non-shower outlet has leakage. Gradually reduce the pressure to (0.05 ± 0.01) MPa, which lasts for (60 ± 5) s. Check whether the position of the switch is moved, whether there is leakage at the non-shower outlet. Close the flow obturator. Check that the transfer switch position automatically resets to the non-shower position.

Re-open the flow obturator. Apply (0.05 ± 0.01) MPa dynamic pressure for a duration of (60 ± 5) s. Check whether there is any leakage at the shower outlet.

8.4.2.5 Manual transfer switch for overhead shower and hand shower

Install the shower on the test equipment, according to the state of use. Adjust the switch to the position, where the water flows to the shower. Adjust the overhead shower and hand-held switch to the overhead shower mode. Manually block the outlet of the overhead shower. The water outlet connected to the hand shower is open. Apply (0.40 ± 0.02) MPa static pressure from the water inlet, for a duration of (60 ± 5) s. Check whether there is any leakage at the water outlet connected to the hand shower. Gradually

reduce the pressure to (0.05 ± 0.01) MPa static pressure; continue for (60 ± 5) s. Check whether there is any leakage at the water outlet connected to the hand shower.

Then adjust the switch to the hand-held shower mode. Manually block the hand-held shower outlet. The overhead shower outlet is open. Apply (0.40 ± 0.02) MPa static pressure to the water inlet, for a duration of (60 ± 5) s. Check whether there is any leakage at the overhead shower outlet. Gradually reduce the pressure to (0.05 ± 0.01) MPa static pressure; continue for (60 ± 5) s. Check whether there is leakage at the overhead shower outlet.

Note: If the water outlet cannot be blocked, the shower can be removed and replaced with a plug.

8.4.2.6 Automatic transfer switch between overhead shower and hand shower

Install the shower on the test equipment, according to the state of use. Adjust the switch to the position, where the water flows to the overhead shower. The outlet of the hand shower is open. Apply (0.40 ± 0.02) MPa pressure from the water inlet; continue for (60 ± 5) s. Check whether there is any leakage at the water outlet of the hand shower. Gradually reduce the pressure to (0.05 ± 0.01) MPa static pressure; continue for (60 ± 5) s. Check whether the switch position is moved. Close the flow obturator. Check whether the position of the transfer switch is automatically reset to the water level of the hand shower. Reopen the flow obturator. Apply (0.05 ± 0.01) MPa dynamic pressure for (60 ± 5) s. Check whether there is leakage at the overhead shower outlet.

8.4.2.7 Check valve

Install the shower on the test equipment, according to the state of use. Open the flow valve. Block the water outlet. Apply (0.40 ± 0.02) MPa static pressure from the water inlet at one end; continue for (60 ± 5) s. Gradually reduce the pressure to (0.04 ± 0.01) MPa static pressure, for a duration of (60 ± 5) s. Check whether there is any leakage at the water inlet at the other end. Repeat the above test for the water inlet at the other end.

Note: The faucet matching the shower can be tested separately.

8.4.3 Flow

Install the shower on the test equipment, according to the state of use. The water temperature of the cold water pipeline is $10\text{ }^{\circ}\text{C} \sim 15\text{ }^{\circ}\text{C}$; the water temperature of the hot water pipeline is $60\text{ }^{\circ}\text{C} \sim 65\text{ }^{\circ}\text{C}$; the pressure is (0.10 ± 0.01) MPa. Turn on the flow switch to the maximum water output. Manually (or automatically) adjust the temperature adjustment switch. Measure the flow at $34\text{ }^{\circ}\text{C}$, $38\text{ }^{\circ}\text{C}$, $44\text{ }^{\circ}\text{C}$. Observe whether the flow at each test point meets the requirements of 7.4.3.

The flow level is tested according to the provisions of GB 28378.

8.4.4 Sensitivity

during the process. Then adjust from the hottest position to the coldest position. Record the actual value of the shower water outlet temperature, at the indicated temperature indication position during the process. Finally calculate the absolute value (ΔT) of the two temperature deviations, as shown in Figure 4. Make 3 measurements. Take the maximum value.

8.4.6 Temperature stability

8.4.6.1 Temperature regulation

According to Figure 3, install the nozzle of the shower on the test bench. Adjust the initial test conditions as shown in Table 5. Turn the temperature adjustment device; mark A_1 at the position where the water outlet temperature of the shower is $35\text{ }^{\circ}\text{C} \sim 36\text{ }^{\circ}\text{C}$. Record the actual water outlet temperature. Mark A_2 at the position where the water outlet temperature of the shower is $39\text{ }^{\circ}\text{C} \sim 40\text{ }^{\circ}\text{C}$. Record the actual water outlet temperature.

Restore the initial test conditions. Then turn the temperature adjustment device to the A_1 position within 1 s. Record the curve of the shower water temperature changing with time, until the temperature is stable. Calculate the time when the shower water temperature exceeds the set temperature value $\pm 3\text{ K}$ within 0 s $\sim$ 5 s, as well as the deviation value and temperature fluctuation between the shower water temperature and the set temperature, after 5 s.

Restore the initial test conditions. Then turn the temperature adjustment device to the A_2 position within 1 s. Record the curve of the shower water temperature changing with time, until the temperature is stable. Calculate the time when the shower water temperature exceeds the set temperature value $\pm 3\text{ K}$ within 0 s $\sim$ 5 s, as well as the deviation value and temperature fluctuation between the shower water temperature and the set temperature, after 5 s.

8.4.6.2 Flow reduction

Install the nozzle of the shower on the test bench, according to Figure 3. Adjust the initial test conditions as shown in Table 5. Start recording the curve of the temperature of the shower water with time. Adjust the flow regulating device. Reduce the outlet water flow to 50% of the initial flow within 5 s $\sim$ 6 s. Record the curve of the temperature of the shower outlet water over time, until the temperature is stable. Start timing when the water outlet flow rate decreases to 50% of the initial flow rate. Calculate the deviation between the shower water temperature and the set temperature, as well as the size of the temperature fluctuation, after 30 s.

Note: If the shower itself does not have a flow adjustment device, a flow adjustment device can be installed at the water outlet.

8.4.6.3 Changes in water supply pressure

Install the nozzle of the shower on the test bench, according to Figure 3. Adjust the initial test conditions as shown in Table 5. Start recording the curve of the temperature of the outlet water with time. Test as follows:

- a) Keep the initial state; let the water flow for at least 60 s;
- b) Reduce the cold water supply pressure to (0.20 ± 0.02) MPa within 1 s; maintain it for at least 15 s;
- c) Return the cold water inlet pressure to its original state; let the water flow for at least 60 s;
- d) Increase the cold water supply pressure to (0.36 ± 0.03) MPa within 1 s; maintain it for at least 15 s;
- e) Return the cold water inlet pressure to its original state; let the water flow for at least 60 s;
- f) Reduce the hot water supply pressure to (0.20 ± 0.02) MPa within 1 s; maintain it for at least 15 s;
- g) Return the hot water inlet pressure to the initial state; let the water flow for at least 60 s;
- h) Increase the hot water supply pressure to (0.36 ± 0.03) MPa within 1 s; maintain it for at least 15 s;
- i) Return the hot water inlet pressure to the initial state; let the water flow for at least 60 s;

Finally, the temperature change of the water outlet is calculated according to the change curve of the water outlet temperature with time.

8.4.6.4 Supply water temperature change

Install the nozzle of the shower on the test bench, according to Figure 3. Adjust the initial test conditions, as shown in Table 5. Start recording the curve of the temperature of the outlet water with time. Reduce the hot water temperature by (10 ± 1) °C, within 10 s; keep it for 30 s. Then restore the hot water temperature to the initial state, within 10 s; keep it for 40 s. Finally calculate the temperature change of water outlet, according to the change curve of outlet water temperature with time.

8.4.7 Safety

8.4.7.1 Cold water failure

According to Figure 3, install the nozzle of the shower on the test bench. Adjust the initial test conditions, as shown in Table 5. Turn off the cold water source within 1 s.

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 2 websites:

1. <https://www.ChineseStandard.us>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. <https://www.ChineseStandard.net>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - <https://www.ChineseStandard.us>).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

About Us (Goodwill, Policies, Fair Trading...): <https://www.chinesestandard.net/AboutUs.aspx>

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

----- The End -----