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INDUSTRY STANDARD
OF THE PEOPLE'S REPUBLIC OF CHINA

CJ/T 217-2013

Replaces CJ/T 217-2005

**Compound quick air inbreathe-release valve for
water supply pipeline**
给水管道复合式高速进排气阀

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Foreword

This Standard is drafted according to the rules specified in GB/T 1.1-2009.

The Standard is an amendment to CJ/T 217-2005 *Compound Quick Air Inbreathe-Release Valve for Water Supply Pipeline*. This Standard, in comparison with CJ/T 217-2005, has the major technical changes as follows:

- Modify the scope of application for nominal size, nominal pressure and water temperature in Chapter 1;
- Modify the introduction paragraph. And change the normative references in Chapter 2;
- Add the terms and definitions of floating body, floating body module, large intake and exhausted hole, and small intake and exhausted hole;
- Modify the terms and definitions of "air pressure when closing of air inbreathe-release valve";
- Delete the section materials in the Chapter "Requirements". And create a new chapter for the materials;
- Add the copper alloy as valve body materials;
- Add the carbon structural steel as part materials;
- Add the exhaust volume parameters of nominal size for DN15~DN50 in Table 2;
- Add the requirements - installing a protective cover outside the air intake and exhaust passage in-between the valve body and valve bonnet;
- Add the content of inspection items in previous Table 4 "Inspection and Test Items". And revise and edit it as Table 3 "Inspection Items";
- Modify the presentation form of sampling inspection. And delete the previous Table 3 "Sampling Table for Ex-factory Test Sample";
- Modify the previous Figure 1 of monolithic structure style for air inbreathe-release valve TO Figure A.1a). Remove the structure diagram out from the main body, and incorporate it into Appendix A;
- Add the Figure A.1c) Basic structure style in Appendix A "Air Inbreathe-Release Valve of Threaded Connection";

- Add the specifications and quantity of curve of intake and exhaust volume in Figure A.1 of previous Appendix A. And change the Appendix A to Appendix C;
- Delete the previous Appendix C, and incorporate the Figure C.2 in previous Appendix C into Appendix F;
- Delete the Section "Test Report" in previous Chapter 9;
- Delete the "Test Report Card" in previous Appendix E. And change the previous Appendix D to Appendix E;
- Modify the content of Chapter 5 "Product Model". And incorporate 5.1 and 5.2 into Appendix B;
- Delete the B.1 "Calculate the Exhaust Volume Measured by the Law of Conservation of Mass" in previous Appendix B. Incorporate the previous B.2 "Calculate the Exhaust Volume Measured by orifice plate" into Appendix D. And add the calculation Formula of pressure differential between inlet pressure and outlet pressure when the air inbreath-release valve releases.

The Standard takes reference to the compilation of ANSI/AWWA C512-2004 *Air-release, Air/vacuum, And Combination Air Values For Waterworks Service*.

This Standard was proposed by Standard Rating Institute of Ministry of Housing and Urban-rural Development.

This standard shall be under jurisdiction of Municipal Water Supply and Drainage Standardization Technical Committee of the Ministry of Housing and Urban-rural Development.

This Standard is drafted by: Guangdong Yongquan Valve Science and Technology Co., Ltd., Guangdong Zhude Industrial Co., Ltd., and Beijing Yongquan Tengda Valve Science and Technology Co., Ltd.

The main drafters of this Standard: Chen Jianming, Liang Jianlin, Cheng Yuanjun, Wu Baimin, Pan Qingxiang, and Chen Yanming.

The previous version of the standard replaced by this standard is as follows:

- CJ/T 217-2005.

Compound quick air inbreathe-release valve for water supply pipeline

1 Scope

This Standard specifies the term and definition, structure style, product model, materials, requirements, test methods, inspection rules, marks, product specification, product packaging, storage and transportation of compound quick air inbreathe-release valve for water supply pipeline (hereinafter referred to as air inbreathe-release valve).

The Standard applies to the air inbreathe-release valve of nominal size of DN15~DN300, nominal pressure of not more than PN25, and water temperature of 0°C~40°C for water supply pipeline.

2 Normative references

The articles contained in the following documents become part of this standard when they are quoted herein. For the dated documents so quoted, only the dated versions apply to this document. For undated reference documents, the latest versions (including all corrections) apply to this Standard.

GB/T 196 General purpose metric screw threads—Basic dimensions

GB/T 197 General purpose metric screw threads—Tolerances

GB/T 700 Carbon structural steels

GB/T 1047 Pipework components--Definition and selection of DN(nominal size)

GB/T 1048 Pipework components--Definition and selection of PN

GB/T 3098 (All parts) Mechanical properties of fasteners

GB/T 3280 Cold rolled stainless steel plate sheet and strip

GB/T 6739-2006 Paints and varnishes - Determination of film hardness by pencil test

GB/T 7306.2 Pipe threads with 55 degree thread angle where pressure-tight joints are made on the threads--Part 2: Taper internal and external threads

GB/T 8923-2008 Preparation of steel substrates before application of paints and

related products

GB/T 9286-1998 Paints and varnishes-Cross cut test for films

GB/T 9969 General principles for preparation of instructions for use of industrial products

GB/T 12220 General purpose industrial valves—Marking

GB/T 12225 General purpose industrial valves — Specification of copper alloy castings

GB/T 12227 General purpose industrial valve - Specification of spheroidal graphite iron castings

GB/T 13927 Industrial valves - Pressure testing

GB/T 17241.6 Integral cast iron pipe flanges

GB/T 17241.7 Specifications for cast iron pipe flanges

GB/T 21873 Rubber seals - Joint rings for water supply drainage and sewerage pipelines - Specification for materials

JB/T 308 Valves model designation method

JB/T 7928 General purpose industrial valve - Delivery specification

3 Terms and definitions

For the purpose of this standard, the following terms and definitions shall apply.

3.1

Compound quick air inbreathe-release valve for water supply pipeline

The air intake and exhaust device equipped with large and small intake and exhausted holes. It can quickly exhaust the air when the pipeline is filled by water. It can quickly intake the air when negative pressure is generated in the pipeline. It can discharge the small amount of air gathered in pipeline under the normal working state. It can automatically close the valve after exhaust.

3.2

Exhaust volume

The gas volume exhausted outward by air inbreathe-release valve, in unit of time.

3.3

Pressure differential of inlet and outlet when closed by drained air

When air inbreathe-release valve exhausts large amount of gas, the floating body will block the large intake and exhausted hole. It causes the difference between valve inlet pressure and outlet pressure when the air inbreathe-release valve is closed.

3.4

Inlet pressure of air release valve

The sum of static pressure at the pressure-measuring section of air inbreathe-release valve inlet AND the gas kinetic energy of unit volume.

3.5

Pressure differential of air release valve

The pressure difference between inlet AND outlet of air inbreathe-release valve.

3.6

Float the body, Float the body module

The components and parts mounted inside the valve body. Its volume-weight is less than that of water. And it will float with water when water enters into the valve cavity.

3.7

Large intake and exhausted hole

The holes set at the upper part of air inbreathe-release valve body. It is used for quick air intake and exhaust.

3.8

Small intake and exhausted hole

The small holes set on the cover of floating body module or on the valve bonnet of small hole intake and exhaust valve. It is used to exhaust small amount of gas during the normal operation of pipeline network.

4 Structural type

Basic structure type of air inbreathe-release valve is divided into 2 types - integral type and split type. See Appendix A for details.

shall be flat, smooth, uniform and without missing-coating phenomenon.

7.9 Strength

7.9.1 Strength of valve body

Strength of valve body shall satisfy the following requirements:

- a) Allowable stress of strength design shall not exceed 1/3 of material yield strength or 1/5 of material ultimate strength;
- b) Casting defects of valve body shall not adopt repair welding, hammering, impregnation and other methods for treatment. Hydrostatic pressure test shall be able to withstand 1.5 times of nominal pressure. The lasting time is not less than 3min. There shall be no leakage and visible deformation.

7.9.2 Floating body strength

The floating body of air inbreathe-release valve shall be able to withstand hydrostatic pressure greater than or equal to 2 times of nominal pressure respectively. The pressure-lasting time is 12h. There shall be no visible deformation and inner leakage phenomena.

7.10 Seal

7.10.1 The low-pressure water-seal is 0.02 Mpa. Holding pressure time is 1 min. It shall not have visible leakage.

7.10.2 The high-pressure water-seal is 1.1 times of nominal pressure. Holding pressure time is 1 min. It shall not have visible leakage.

7.11 Diameter of small intake and exhausted hole

Diameter of small intake and exhausted hole shall be greater than or equal to 1.6 mm.

7.12 Rise and fall of floating body module

Rise and fall of floating body module shall be flexible and without jamming phenomenon.

7.13 Performance

7.13.1 Exhaust volume

See Table 2 for exhaust volume of air inbreathe-release valve. In accordance with pressure differential of air release valve (ΔP) measured in Table 2 volume of air inbreathe-release valve shall not be less than 80% of specified value in

7.11.

8.3 Strength test of valve body

The valve body strength test shall be in accordance with the relevant provisions of GB/T 13927. And it shall be in compliance with the provisions of 7.9.1.

8.4 Strength test of floating body

Place a single or a few floating bodies in an airtight pressure test device. Fill water to extract the air. And then slowly increase the water pressure to be greater than or equal to 2 times of the nominal pressure. Pressure lasting time is 12 h. It shall be in compliance with the provisions of 7.9.2.

8.5 Seal test

See Appendix E of Figure E.1 for seal test device. Seal test shall be conducted in accordance with the relevant provisions of GB/T 13927. Adjust the water pressure to 0.02 MPa and 1.1 times of the nominal pressure respectively. Pressure lasting time is 1min. It shall be in compliance with the provisions of 7.10.

8.6 Rise and fall test of floating body module

The air inbreathe-release valve shall be installed on the device of Appendix E in Figure E.1. When flushing or turning on the water to the tube, it shall be in compliance with the provisions of 7.12.

8.7 Performance test

8.7.1 Exhaust performance test

8.7.1.1 Air inbreathe-release valve exhaust performance test device refers to Figure F.1 of Appendix F. See Appendix D for test calculation. It allows to use other types of test device and measurement methods to meet the requirements of performance test. For the test of series products, the volume of the gas tank should not be less than 10 m³, and the working pressure should not be less than 1.0MPa.

8.7.1.2 The measured flow rate, conversed exhaust volume shall be in compliance with the provisions of 7.13.1. And the exhaust performance shall be in compliance with the provisions of 7.13.1.

8.7.2 Air close-valve test

8.7.2.1 See Figure F.1 of Appendix F for test device.

8.7.2.2 Rapidly output the pressure gas of gas tank and discharge it through air inbreathe-release valve. When the floating body is blown-up and closes the valve, the instantaneous pressure difference value of air inbreathe-release valve inlet shall be in compliance with the provisions of 7.13.2.

8.7.3 Test of pressure water impacting floating body

The air inbreathe-release valve shall be installed on the device of Figure E.1 of Appendix E. Floating body module shall be down to the lowest position. The pressure water is rapidly injected into the valve cavity through valve inlet. The floating body components shall rise rapidly to close the valve instantaneously. A it shall be in compliance with the provisions of 7.13.3.

8.7.4 Air-intake performance test

8.7.4.1 Air inbreathe-release valve's intake performance test device refers to Figure F.1 of Appendix F. It allows to use other types of test device and measurement methods to meet the requirements of performance test. For the test of series products, the volume of the gas tank shall not be less than 10m^3 . And the working pressure should not be less than 0.2MPa.

8.7.4.2 The measured flow rate, conversed exhaust volume shall be in compliance with the provisions of 7.13.1. And the intake performance shall be in compliance with the requirements of 7.13.4.

9 Inspection rules

9.1 Inspection classification

The product inspection is classified into ex-factory inspection and type inspection.

9.2 Ex-factory inspection

The inspection items are shown in Table 3.

deemed as unqualified.

9.5.2 If the rest items are unqualified, one-time repair or double samplings are allowed.

If it is still unqualified after repair or double samplings, it is deemed as unqualified.

10 Mark and product instructions

10.1 Mark

10.1.1 Product mark

Product mark shall comply with the provisions of GB/T 12220.

10.1.2 Packaging mark

The outside surface of package shall have the following marks:

- a) Full name of manufacturer;
- b) Product name, specification and model;
- c) Box dimensions, length (mm) X width (mm) X height (mm);
- d) Product quantity and mass (kg);
- e) Date of packing;
- f) Notes (symbols may be used).

10.2 Product instructions

Product: instructions shall comply with the provisions of GB/T 9969.

11 Packing, storage and transportation

11.1 Products shall be packed with cartons. Packing materials shall be able to effectively prevent the products from damage, the attachments and files from loss during transportation. And it shall be in compliance with the provisions of JB/T 7928.

11.2 The packaging box shall contain the following information sealed in a moisture-proof bag:

- a) Ex-factory certificate of compliance;
- b) Packing list;
- c) Product operating instructions;

11.3 Air inbreathable-release valve shall be neatly stored in a dry room.

precision pressure gauge at the high voltage terminal of the differential pressure sensor.

Note 2: When measuring intake performance, If the condition is allowed, the device shall be equipped with vacuum pump. It is more intuitive to use vacuumizing method to test the intake performance of the exhaust valve. The data of intake volume measured by the 2 methods are similar.

Note 3: The calculation of intake volume is the same as the calculation of exhaust volume, see Appendix D for details.

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