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

GB/T 4213-2024

Replacing GB/T 4213-2008

Pneumatic control valves

气动控制阀

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1 Scope

GB/T 4213-2024 is the Chinese product standard for pneumatic control valves: the globe, cage, butterfly and ball control valves with pneumatic actuators that regulate flow in process plant. A control valve is bought on numbers that are easy to state and hard to verify, the flow coefficient and its characteristic, the rangeability, the seat leakage class, the stroking time and the dead band, and this standard is what fixes their meaning. It sets the classification and the model designation, the requirements on the body, trim and actuator and their materials and pressure-temperature ratings, the performance requirements including the flow characteristic and its deviation, the seat leakage classes, the hysteresis and dead band, the actuator thrust and the safe position on air failure, the noise and cavitation related requirements, the requirements on the positioner and accessories, the test methods, the inspection rules and the marking, packaging, transport and storage. The 2024 edition replaces GB/T 4213-2008. For a valve maker, an EPC contractor or a plant buying control valves in China, this is the acceptance text.

This document specifies the product classification and general requirements, technical requirements, test methods, inspection rules, marking, packaging and storage of pneumatic

control valves for industrial process control systems. This document applies to various types of pneumatic control valves consisting of pneumatic actuators and valves (hereinafter referred to as "control valves"). This document also applies to stand-alone pneumatic actuators and valve assemblies. Control valves with specific working conditions in countries with radioactive working environments or other hazardous working environments may refer to this document for implementation.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 12224 General Requirements for Industrial Steel Valves

GB/T 13384 General Specifications for Packing of Mechanical and Electrical Product

GB/T 17213 (all parts) Industrial-process Control Valves

GB/T 17213.2-2017 Industrial-process Control Valves - Part 2-

3 Terms and Definitions

The terms and definitions defined in GB/T 17213 (all parts) and GB/T 26815 are applicable to this document.

4 Product Classification and General Requirements

4.1 Classification by Control Valve Functions In accordance with the functions of control valves, they can be classified into.

- a) Adjustable type;
- b) Switching type.

4.2 Classification by Control Valve Motion Mode In accordance with the control valve motion mode, they can be classified into.

- a) Linear motion;
- b) Rotary motion.

4.3 Classification by Control Valve Action Mode In accordance with the control valve action mode, they can be classified into.

- a) Air-to-close type;

b) Air-to-open type.

4.4 Classification by Control Valve Actuator Type In accordance with the type of control valve actuator, they can be classified into.

a) Pneumatic diaphragm type;

b) Pneumatic piston type. NOTE 1.in accordance with their structure, pneumatic actuators are classified into.

a) Pneumatic diaphragm actuator;

b) Pneumatic piston actuator. NOTE 2.in accordance with their output mode, pneumatic actuators are classified into.

4.8 Gas Source

4.8.1 Maximum gas source pressure The maximum values of the gas source pressure are as follows:

a) Pneumatic diaphragm control valve. 600 kPa;

b) Pneumatic piston control valve. 1,000 kPa. NOTE. special gas source pressure is allowed to be used upon agreement between the user (buyer) and the manufacturer.

4.8.2 Humidity of gas source The dew point of the gas source at operating pressure shall be at least 10 °C lower than the working environment temperature of the control valve.

4.8.3 Quality of gas source The quality requirements of the gas source are as follows:

a) The gas source shall be free of obvious oils (liquid oil, suspended oil, oil vapor) and other liquids, the oil concentration shall not exceed 5 mg/m³, and the liquid water concentration shall not exceed 10 g/m³;

b) The gas source should not contain corrosive gases, vapor and solvents;

c) Explosive gas shall not be used as the gas source;

d) The solid particle concentration in the gas source of the control valve with a positioner shall not exceed 5 mg/m³, and the particle diameter shall not exceed 5 μm.

4.9 Normal Working Conditions Unless otherwise specified, the control valve shall be able to normally operate in the following atmospheric conditions.

a) Temperature. 25 °C ~ +55 °C, 40 °C ~ +70 °C or 30 °C ~ +80 °C; special working temperature ranges may be used, but the temperature value shall be an integral multiple of 5 °C.

b) Relative humidity. 5% ~ 100%.

5 Technical Requirements

5.1 Compressive Strength The control valve shall be subjected to the compressive strength test using room temperature water as the medium at a test pressure of

1.5 times the nominal pressure or

1.5 times the maximum allowable working pressure at 38 °C. During the test, there shall be no visible leakage from the valve body. If agreed upon by the user (buyer) and the manufacturer, the test may be carried out on the pressure-bearing parts, but the assembled control valve shall also be subjected to a gas test at a pressure not exceeding

0.6 MPa, and the valve body shall not have any visible leakage.

5.2 Sealing of Packing Boxes and Other Joints Procedure A. the test medium is room temperature water. The packing boxes and other joints of the control valve shall ensure that there is no leakage at a test pressure of

1.1 times the maximum allowable working pressure at 38 C. The test pressure value of special-purpose control valves shall be agreed upon by the manufacturer and the user (buyer). Procedure B. if agreed upon by the user (buyer) and the manufacturer, Procedure B may be adopted. The test medium is gas. The packing boxes and other joints of the control valve shall ensure that there is no leakage under the test pressure of

0.35 MPa. When the maximum allowable working pressure of the valve is lower than

0.35 MPa, the test pressure is the maximum allowable working pressure.

5.3 Leakage

5.3.1 The leakage of the control valve under the specified test conditions shall comply with the provisions of Table 1.

5.3.2 The leakage level I of the control valve is required to be determined by the user (buyer) and the manufacturer. However, the leakage level of the control valve with a single-seat valve structure shall not be lower than Level IV, and the leakage level of the control valve with a double-seat valve structure shall not be lower than Level II. Level VI is applicable to control valves with elastic sealing valve seats.

5.3.3 When the leakage is greater than 5 10³ the rated capacity of the valve, it shall be ensured by the structural design, and the product can be exempted from testing.

5.3.4 Leakage shall be specified by the following codes.

5.3.5 When calculating and determining the allowable value of leakage, the rated capacity of the control valve shall be calculated in accordance with the method specified in GB/T 17213.2- 2017 (see Table 3).

5.5 Intrinsic Error The intrinsic error of the control valve shall not exceed the intrinsic error limit specified in Table