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General specification of explosion-proof electromagnet valves in coal mine

矿用防爆电磁阀通用技术条件

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Foreword

This standard was proposed by the Department of Science and Education of the Ministry of Coal Industry.

This standard shall be under the jurisdiction of the Coal Mine Safety Standardization Technical Committee of the Ministry of Coal Industry.

Drafting organization of this standard: Chongqing Branch of the Coal Science Research Institute.

The main drafters of this standard: Yang Yongke, Sui Jinjun, Lin Jianguo.

For this standard, the Chongqing Branch of the Coal Science Research Institute is entrusted to be responsible for the interpretation.

General specification of explosion-proof electromagnet valves in coal mine

1 Scope

This standard specifies the requirements, test methods, inspection rules (exit-factory inspection and type test), marking, packaging and storage of explosion-proof electromagnet valves in coal mine.

This standard is applicable to the two-position-two-way explosion-proof electromagnet valves in coal mine (hereinafter referred to as electromagnet valves) which use water as the working medium.

2 Normative references

The provisions in following documents become the provisions of this standard through reference in this standard. At the time of publication, the versions indicated are valid. All standards will be revised and parties using this standard shall explore the possibility of using the latest version of the following standards.

GB 191-90 Packaging - Pictorial marking for handling of goods

GB/T 998-82 Basic test method for low-voltage electrical appliances

GB/T 2423.1-89 Basic environmental testing procedures for electric and electronic products - Tests A: Cold

GB/T 2423.2-89 Basic environmental testing procedures for electric and electronic products - Tests B: Dry heat

GB/T 2423.4-93 Basic environmental testing procedures for electric and electronic products - Test Db: Damp heat, cyclic

GB/T 2423.5-1995 Environmental testing for electric and electronic products - Part 2: Test methods - Test Ea and guidance: Shock

GB/T 2423.10-1995 Environmental testing for electric and electronic products - Part 2: Test methods - Test Fc and guidance: Vibration (Sinusoidal)

GB 3836.1-83 Electrical apparatus for explosive atmosphere - General requirements

GB 3836.2-83 Electrical apparatus for explosive atmosphere - Flameproof electrical apparatus “d”

GB/T 4942.2-93 Low voltage electrical enclosure protection class

GB/T 6388-86 Packaging for transport - Receipt and delivery marking

GB/T 10111-88 Generation of random numbers and procedures applied to sampling inspection for product quality

MT 209-90 General technical requirements for electric and electronic products for communication, detection and control in coal mine

3 Definition

This standard uses the following definition.

3.1

Explosion-proof electromagnet valves in coal mine

An electromagnet valve that can be used in a mine environment with an explosion hazard.

3.2

Normal close electromagnet valve

An electromagnet valve which closes when not energized, opens when energized.

3.3

Normal open electromagnet valve

An electromagnet valve which opens when not energized, closes when energized.

4 Requirements

4.1 Classification and naming:

4.1.1 Classification of electromagnet valve:

It is divided into two types: normal open and normal close.

4.1.2 Naming of electromagnet valve:

The test system is as shown in Figure 1.

5.5.1 Test of the voltage variation's adaptation range of normal open electromagnet valve:

The electromagnet valve in the figure is a normal open electromagnet valve.

a) Adjust the power supply's voltage to 80% of the rated working voltage of the electromagnet valve. Adjust the water pressure of the pump to the maximum adapted pressure of the electromagnet valve. Energize the electromagnet valve;

b) Adjust the power supply's voltage to 120% of the rated working voltage of the electromagnet valve. Adjust the water pressure of the pump to 0.2 MPa. Energize the electromagnet valve;

c) Repeat the item a) and item b) for three times, respectively. Each time the electromagnet valve shall work normally.

5.5.2 Test of the voltage variation's adaptation range of normal close electromagnet valve:

The electromagnet valve in the figure is changed to normal close electromagnet valve.

a) Adjust the power supply's voltage to 80% of the rated working voltage of the electromagnet valve. Adjust the water pressure of the pump to 0.2 MPa. Energize the electromagnet valve;

b) Adjust the power supply's voltage to 120% of the rated working voltage of the electromagnet valve. Keep the water pressure of the pump at 0.2 MPa. Energize the electromagnet valve;

c) Repeat the item a) and item b) for three times, respectively. Each time the electromagnet valve shall work normally.

5.6 Test of tightness:

Connect the electromagnet valve to the system as shown in Figure 1. Adjust the power supply's voltage to be within the rated range. Let the electromagnet valve be in closed state. Then input the 1.1 times the maximum working water pressure from the inlet end, keep it for 1 min. Check whether the electromagnet valve leaks.

5.7 Test of service life:

Connect the electromagnet valve to the test system according to Figure 1. Adjust the power supply's voltage to be within the rated range. Adjust the test

It is performed according to the method Bb as specified in GB/T 2423.1.

Duration: 2 h;

Severity: 40 °C.

5.13.3 After the test, it is recovered in normal environment for 2 h, then tested according to 5.3 and 5.8.

5.14 Test of storage temperature:

5.14.1 Low-temperature test:

It is performed according to the method Ab as specified in GB/T 2423.1;

Duration: 16 h;

Severity: -40 °C.

5.14.2 High-temperature test:

It is performed according to the method Bb as specified in GB/T 2423.2;

Duration: 16 h;

Severity: 60 °C.

5.14.3 After the test, it is kept for 2 hours after returning to the normal ambient temperature in the test chamber, then tested according to 5.3 and 5.8.

5.15 Vibration test:

The vibration test is carried out according to the method as specified in GB/T 2423.10;

Frequency range: 10 Hz ~ 150 Hz;

Acceleration: 20 m/s^2;

Number of sweep cycles on each axis: 5 times.

5.16 Shock test:

The shock test is carried out according to the method as specified in GB/T 2423.5;

Peak acceleration: 300 m/s^2;

Pulse duration: 18 ± 1 ms;

b) After formal production, there are major changes in structure, materials and processes that may affect product performance;

c) During normal production, it shall be carried out once every 3 years;

d) When the production is restored after suspension for 1 year;

e) When the exit-factory test results are significantly different from the previous type test;

f) When the national quality supervision agency requests the type inspection.

6.4 For the samples for type test, it shall take two sets in accordance with the provisions of GB/T 10111 from the products that have passed the exit-factory inspection.

6.5 Judgment rules:

At the time of exit-factory inspection, if one of the specified inspection items fails, the set is judged to be unqualified. In the case of sampling inspection, it shall take 2 sets from each 100 sets of products to perform the inspection in accordance with Table 4. If there is one item fails, it shall double the number of samples from the same batch of products for product reinspection; if it is still unqualified, this batch of products is judged as unqualified.

In the type inspection, if 2 items of the items 1, 13, 14, 15 in Table 4 or otherwise 1 other item is unqualified, this set is unqualified. It shall take another 3 sets for test again; if there is still 1 set fails, this batch of products is unqualified.

7 Marking, packaging, storage

7.1 Marking

7.1.1 Product's marking

7.1.1.1 A clear permanent concave or convex marking "Ex" shall be provided on the outer casing.

7.1.1.2 It shall have the "MA" safety marking.

7.1.1.3 A clearly visible warning sign and nameplate shall be provided on the outer casing. The nameplate shall include the following information:

a) Product's model and name;

b) There is an obvious explosion-proof marking "Ex" on the upper right;

c) Main technical indicators;

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