

Translated English of Chinese Standard: GA602-2013

www.ChineseStandard.net

Sales@ChineseStandard.net

GA

PUBLIC SECURITY INDUSTRY STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

ICS 13.220.10

C 84

GA 602-2013

Replacing GA 602-2006

Dry powder fire extinguishing equipment

干粉灭火装置

GA 602-2013 How to BUY & immediately GET a full-copy of this standard?

1. www.ChineseStandard.net;
2. Search --> Add to Cart --> Checkout (3-steps);
3. No action is required - Full-copy of this standard will be automatically & immediately delivered to your EMAIL address in 0~25 minutes.
4. Support: Sales@ChineseStandard.net. Wayne, Sales manager

Issued on: December 17, 2013

Implemented on: March 1, 2014

Issued by: Ministry of Public Security of the People's Republic of China

Table of Contents

Foreword.....	4
1 Scope	7
2 Normative References.....	7
3 Terms and definitions	8
4 Classification	9
5 Designation	10
6 Requirements.....	11
7 Test method.....	29
8 Inspection rules	56
9 Instruction manual	61
Annex A (Normative) Test procedure and sample quantity for dry powder fire extinguishing equipment	64
Annex B (Normative) Test procedure and sample quantity for container valve	66
Annex C (Normative) Test procedure and sample quantity for actuating equipment	67
Annex D (Normative) Test procedure and sample quantity of controlling and activating assembly.....	68
Annex E (Normative) Test procedure and sample quantity for pressure indicator	70
Annex F (Normative) Test procedure and sample quantity for electrical trigger.....	72
Annex G (Normative) Test procedure and sample quantity for heat trigger	73
Annex H (Normative) Test procedure and sample quantity for fusible alloy	

assembly and temperature-actuated glass bulb assembly	74
Annex I (Normative) Test procedure and sample quantity for temperature-actuated magnetic generator assembly	75
Annex J (Normative) Test procedure and sample quantity for nozzle	77
Annex K (Normative) Test procedure and sample quantity for hanger bracket (support).....	78
Annex L (Normative) Test procedure and sample quantity for signal feedback equipment.....	79

Foreword

Chapter 5, Chapter 6 [except 6.16.4, 6.20.3.8, 6.25, 6.26.1 a) and 6.27.1 a)], Chapter 8 and 10.1.1 are compulsory; the others are voluntary.

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GA 602-2006, *Dry chemical fire extinguishing equipment*.

Compared with GA 602-2006, the main technical changes of this Standard are as follows:

- it modifies the normative references (see Chapter 2; Chapter 2 of 2006);
- it modifies the definition of dry powder fire extinguishing equipment (see 3.1; 3.1 of Edition 2006);
- it adds the definition of temperature-actuated magnetic generator (see 3.5), the definition of stored mechanical energy discharge equipment (see 3.6) and controlling and activating package (see 3.7);
- it adds the classification method for the particle size of dry powder fire extinguishing equipment (see 4.4);
- it adds the classification method based on the using places where dry powder fire extinguishing equipment is used (see 4.5; 4.5 of Edition 2006);
- it modifies the classification method based on the actuating methods of dry powder fire extinguishing equipment (see 4.6; 4.4 of Edition 2006);
- it modifies the designation method (see Chapter 5; Chapter 5 of Edition 2006);
- it modifies the range of working temperature (see 6.1.1; 6.1.1 of Edition 2006);
- it adds other performance of non-storage-pressure fire extinguishing equipment (see 6.5.3);
- it modifies the requirements for the quality deviations of filling of dry powder fire extinguishing agent (see 6.6; 6.7 of Edition 2006);
- it adds the damp-heat resistance performance (see 6.7.2.2), vibration resistance performance (see 6.8.2) and salt spray resistance performance (see 6.9.2) of special-purpose fire extinguishing equipment;
- it adds the requirements for the reactions and action times of non-storage-pressure fire extinguishing equipment (see 6.10);
- it adds the linkage performance (see 6.11);

Dry powder fire extinguishing equipment

1 Scope

This Standard specifies the terms and definitions, classification, designation, requirements, test methods, inspection rules, instruction manual and marking, packaging, transportation and storage of the dry powder fire extinguishing equipment.

This Standard applies to stationary-mounted dry powder fire extinguishing equipment of hanging type, wall mounting type and other types; it does not apply to dry powder fire extinguishing equipment of cabinet type and mobile type.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition dated applies to this document. For undated references, the latest edition of the referenced documents (including all amendments) applies to this Standard.

GB 150 (all parts), *Steel pressure vessels*

GB 190, *Packing symbol of dangerous goods*

GB/T 191, *Packaging – Pictorial marking for handling of goods*

GB 252, *General diesel fuels*

GB 4066.1, *Fire extinguishing media – Part 1: BC powder*

GB 4066.2, *Fire extinguishing media – Part 2: ABC powder*

GB 5100, *Welded steel gas cylinders*

GB 5135.1-2003, *Automatic sprinkler system – Part 1: Sprinkler*

GB/T 7094-2002, *Vibration (sinusoidal) test method for electrical installations in ships*

GB/T 8979, *Pure nitrogen and high purity nitrogen and ultra-pure nitrogen*

GB 9108, *Safety fuse*

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

GB/T 11121, Gasoline engine oils (Translator note: the Chinese standard number should be GB 11121)

GB 12463, *General specifications for transport packages of dangerous goods*

GB 18428-2010, *Glass bulbs used for automatic fire extinguishing systems*

GB/T 25208-2010, *Environmental test methods for fixed extinguishing systems*

GB 25972-2010, *Gas fire extinguishing systems and components*

GA 13-2006, *Hanging gaseous fire extinguishing equipment*

GA 61-2010, *General technical specifications of actuating and control devices of fixed extinguishing systems*

GA 306.2-2007, *Flame retardant and fire resistive cables – Classification and requirement for flame retardant and fire resistive characteristics of plastic insulated cables – Part 2: Fire resistive cables*

GA 499.1-2010, *Aerosol fire extinguishing system – Part 1: Condensed aerosol fire extinguishing device*

GA 578, *Super fine powder fire extinguishing agent*

GA 863-2010, *General requirements for fusible element for fire protection*

JB/T 7366, *Design calculation for flat spiral springs*

3 Terms and definitions

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

3.1

dry powder fire extinguishing equipment

the powder fire extinguishing equipment which is mounted in a protected area, activated by automatic detection or manually by control device and actuated by actuating medium (gas or fuel gas) or mechanical energy

3.2

ratio of residual extinguishing agent discharge

the ratio of the mass of residual fire extinguishing agent inside after the spraying of the fire extinguishing equipment to the mass of fire extinguishing agent filled before the spraying.

c) the range of working temperature of the special purpose fire extinguishing equipment for engine compartment: -40°C to 90°C ; and

d) the range of working temperature of the special purpose fire extinguishing equipment for wind turbine compartment is: -45°C to 50°C .

6.1.2 The relative humidity of the working environment of the fire extinguishing equipment shall not be greater than 95%.

6.1.3 When the range of the working environment temperature and relative humidity of the fire extinguishing equipment exceeds the ranges specified in 6.1.1 and 6.1.2, it shall be marked on a conspicuous position on the fire extinguishing equipment; the relevant requirements and test methods shall be adjusted in accordance with the actual range accordingly.

6.2 Appearance and marking

6.2.1 The surface of the fire extinguishing equipment shall be smooth and free from visible mechanical damages or sags and crests. The surface coating and plating shall be uniform and free from the defects including flow marks and scratches.

6.2.2 Legible and indelible marking shall be provided at a conspicuous position for the fire extinguishing equipment; its content is specified in 10.1.1.

6.3 Strength performance

6.3.1 Storage pressure fire extinguishing equipment

The hydraulic strength test shall be conducted for storage pressure fire extinguishing equipment in accordance with the method specified in 7.3; the test pressure is 1.5 times of the maximum working pressure of the fire extinguishing equipment and the pressure maintenance time is 5 min; and all parts shall be free from the defects such as leakage, macroscopical deformation or damages.

6.3.2 Non-storage-pressure fire extinguishing equipment

The enclosure of the non-storage-pressure fire extinguishing equipment shall be free from the damages including cracks and deformation, when it is spraying.

6.4 Sealing performance

6.4.1 Storage pressure fire extinguishing equipment

The sealing test shall be conducted for the storage pressure fire extinguishing equipment in accordance with the method specified in 7.4; the test pressure is 1.1 times of the maximum working pressure of the fire extinguishing equipment and the pressure maintenance time is 5 min; and all parts shall be free from bubble leakage.

6.4.2 Non-storage-pressure fire extinguishing equipment

The salt spray test shall be conducted in accordance with the method specified in 7.11.1. No malfunction of the fire extinguishing equipment shall occur during the test; after the test, the enclosure of the fire extinguishing equipment shall be free from visible fracturing, peeling or other defects, the pressure loss of the fire extinguishing equipment shall not be greater than 1.5% of the filling pressure, and the spray performance of the fire extinguishing equipment is as specified in 6.5.

6.9.2 Special purpose fire extinguishing equipment

The salt spray test shall be conducted in accordance with the method specified in 7.11.2. No malfunction of the fire extinguishing equipment shall occur during the test; after the test, the enclosure of the fire extinguishing equipment shall be free from visible fracturing, peeling or other defects, the pressure loss of the fire extinguishing equipment shall not be greater than 1.5% of the filling pressure, and the spray performance of the fire extinguishing equipment is as specified in 6.5.

6.10 Requirements for the spray reaction force and action time of non-storage-pressure fire extinguishing equipment

The spray reaction force and action time test shall be conducted for non-storage-pressure fire extinguishing equipment in accordance with 7.12; the reaction force and action time actually-measured shall not exceed $\pm 5\%$ of the values declared in the instruction manual of the manufacturer.

6.11 Linkage performance

For the fire extinguishing equipment having the functions of detection, alarming, activation and linkage, the linkage performance test shall be conducted with the automatic activation or manual activation method in accordance with the method specified in 7.13; the fire extinguishing equipment can be activated normally and the status display shall be accurate. When the linkage test is conducted for the fire extinguishing equipment of the same specifications, their time difference of spraying dry powder fire extinguishing agent shall not be greater than 2 s.

6.12 Fire extinguishing performance

6.12.1 Performances of general purpose fire extinguishing equipment

6.12.1.1 Total flooding performance

6.12.1.1.1 Class B fire extinguishing performance

The class B fire extinguishing performance test shall be conducted in accordance with the method specified in 7.14.1.2; the fire extinguishing equipment shall extinguish the fire within 30 s after finishing spray.

6.12.1.1.2 Class A fire extinguishing performance

6.17.2.2 The working pressure range on the dial plate shall be indicated in green: the range from zero position to the lower limit of working pressure shall be indicated in red; the range from the upper limit of the working pressure to the upper limit of the measuring range of the indicator shall be indicated in yellow.

6.17.2.3 The dial plate of the pressure indicator shall be marked with manufacturer name or trademark, product applicable media, legal unit of measurement (MPa), manufacturing date or product number and metrological mark.

6.17.3 Basic indication errors

6.17.3.1 The pointer of the pressure indicator shall rotate steadily without jumping or stagnation.

6.17.3.2 The indication errors of the pressure indicator shall meet the following requirements:

- a) the indication error of the storage pressure point shall not be greater than $\pm 4\%$ of the storage pressure;
- b) the indication errors of the indication errors at the upper and lower limits of the working pressure range shall not be greater than $\pm 4\%$ of the storage pressure;
- c) the indication errors of the zero position shall not be greater than $\pm 12\%$ of the storage pressure; and
- d) the indication errors of the upper limit of the measuring range shall not be greater than $\pm 15\%$ of the storage pressure.

6.17.4 Strength and sealing performances

6.17.4.1 Hydraulic strength

The hydraulic strength test shall be conducted for the pressure indicator in accordance with the method specified in 7.3; the pressure indicator is subjected to the test pressure of 2 times of the maximum working pressure; the pressure is maintained for 5 min and there shall be no leakage or damages.

6.17.4.2 Sealing performance

The sealing test shall be conducted for the pressure indicator in accordance with the method specified in 7.4; the pressure indicator shall be free from bubble leakage.

6.17.4.3 Overpressure resistance performance

The overpressure test shall be conducted for the pressure indicator in accordance with the method specified in 7.5; the pressure indicator is subjected to the test pressure of 4 times of the maximum working pressure; the pressure is maintained for 5 min; none of its parts shall be washed off.

The storage pressure fire extinguishing equipment shall be provided with a pressure release mechanism to release internal pressure; no component of the pressure relief mechanism shall be separated from the fire extinguishing equipment during the process of pressure release operation.

6.19 Trigger

6.19.1 Electrical trigger

The basic performance of the electrical trigger shall be as specified in 6.12 of GA 499.1-2010; the deviations of the resistance and activating current of the electrical trigger from the values declared in the instruction manual of the manufacturer shall not be greater than $\pm 5\%$.

6.19.2 Heat trigger

6.19.2.1 Appearance

The heat trigger shall be free from mould, damages, visible oil contamination and scattering end at the cutting position.

6.19.2.2 Triggering performance

The flame transferring time per unit length of the heat trigger shall not be less than 3 s/m; there shall be no disruption in combustion, fire-transmitting through outer sheath of the fuse, shell combustion and explosive sound. For the heat trigger having heat triggered combustion function, the deviations of the temperature of heat triggered combustion from the values declared in the instruction manual of the manufacturer shall not be greater than $\pm 5\%$.

6.19.2.3 High-low temperature alternating cycle resistance performance

The high-low temperature alternating cycle resistance test shall be conducted for the heat trigger in accordance with the method specified in 7.8; the appearance of the samples shall be free from damages after the test and its triggering performance shall be as specified in 6.19.2.2.

6.19.2.4 Damp heat resistance performance

The damp heat test shall be conducted for the heat trigger, which is equipped in general purpose fire extinguishing equipment or special purpose fire extinguishing equipment, in accordance with the method specified in 7.9; after the test, the appearance of the samples shall be free from damages, and the triggering performance shall be as specified in 6.19.2.2.

6.19.2.5 Salt spray resistance performance

The salt spray test shall be conducted for the heat trigger, which is equipped in general purpose fire extinguishing equipment or special purpose fire extinguishing equipment,

The outer surface of the temperature-actuated magnetic generator assembly shall be smooth and free from visible mechanical damages or scratches; the current output end shall be marked with positive and negative poles.

6.20.3.2 Static operating temperature

The deviations of the static operating temperature of the temperature-actuated magnetic generator assembly from the values declared in the instruction manual of the manufacturer shall not be greater than $\pm 5\%$.

6.20.3.3 Generating current and action time

The peak value and action time of the generating current of the temperature-actuated magnetic generator assembly shall not be smaller than the values declared in the instruction manual of the manufacturer.

6.20.3.4 High-low temperature alternating cycle resistance performance

The high-low temperature alternating cycle test shall be conducted for the temperature-actuated magnetic generator assembly in accordance with the method specified in 7.8; after the test, the enclosure of the fire extinguishing equipment shall be free from visible fracturing, peeling or other defects, and its performance shall be as specified in 6.20.3.2 to 6.20.3.3.

6.20.3.5 Damp heat resistance performance

The damp heat test shall be conducted for the temperature-actuated magnetic generator assembly, which is equipped in general purpose fire extinguishing equipment and special purpose fire extinguishing equipment, in accordance with the method specified in 7.9; after the test, the appearance of the samples shall be free from visible fracturing, peeling or other defects, and its performance shall be as specified in 6.20.3.2 to 6.20.3.3.

6.20.3.6 Salt spray corrosion resistance performance

The salt spray test shall be conducted for the temperature-actuated magnetic generator assembly, which is equipped in general purpose fire extinguishing equipment and special purpose fire extinguishing equipment, in accordance with the method specified in 7.11; after the test, the appearance of the samples shall be free from visible fracturing, peeling or other defects, and its performance shall be as specified in 6.20.3.2 to 6.20.3.3.

6.20.3.7 Operating reliability

The operating reliability test shall be conducted in accordance with the method specified in 7.23.3.4; the temperature-actuated magnetic assembly shall be capable of operating reliably; and the generating current and operating time shall be as specified in 6.20.3.3.

The operating reliability test shall be conducted in accordance with the method specified in 7.23.3.4; the activating assembly shall be capable of operating reliably.

6.21 Nozzle

6.21.1 Basic requirements

The performance of the nozzle and its accessories shall be as specified in 5.2.2 of GA 13-2006.

6.21.2 Other performances of nozzle parts

6.21.2.1 Hot air ageing resistance performance of nozzle non-metallic connecting tube

The hot air ageing test shall be conducted in accordance with the method specified in 7.18.1; the non-metallic connecting tube of the nozzle shall be free from cracks or other damages.

6.21.2.2 Low temperature resistance performance of nozzle non-metallic connecting tube

The low temperature test shall be conducted in accordance with the method specified in 7.18.2; the inner and outer bond lines of the non-metallic connecting tube of the nozzle shall be free from fracturing and cracking.

6.22 Hanger bracket (support) performance

The hanger bracket (support) of the fire extinguishing equipment shall be capable of withstanding 5 times of the total mass of the fire extinguishing equipment, without deformation or peeling.

The hanger bracket (support) shall be free from deformation or peeling during the spraying process of the fire extinguishing equipment.

6.23 Dry powder fire extinguishing agent and pressurizing gas

The dry powder fire extinguishing agent shall be as specified in GB 4066.1, GB 4066.2 and GA 578, which meets the market access requirements and are qualified by a competent national testing institution.

The water content of the pressurizing gas shall meet the specifications of the acceptable products in GB/T 8979.

6.24 Signal feedback equipment

The fire extinguishing equipment having linked activation function shall be provided with the feedback equipment for the spray signals of the fire extinguishing equipment.

2.00	195		
NOTE Those not listed shall be determined with the interpolation method.			

6.26.3 Pressure monitoring

The special purpose storage pressure fire extinguishing equipment for engine compartment shall have the functions including pressure release of the fire extinguishing equipment and fire extinguishing agent spraying, alarming, tele-transmission and indication.

6.26.4 Manual activation button

The special purpose fire extinguishing equipment for engine compartment shall be equipped with manual activation button; the manual activation button shall be provided with measures to prevent maloperation.

6.26.5 High-pressure water spray resistance performance

The high-pressure water spray test shall be conducted in accordance with the method specified in 7.29.4; the spray performance of the fire extinguishing equipment shall be as specified in 6.5 after the test.

6.26.6 Chemical test solution corrosion resistance performance

The chemical test solution corrosion resistance performance shall be conducted in accordance with the method specified in 7.29.5; the spray performance of the fire extinguishing equipment shall be as specified in 6.5 after the test.

6.27 Other performances of special purpose fire extinguishing equipment for wind turbine compartment

6.27.1 General requirements

The special purpose fire extinguishing equipment for wind turbine compartment shall have the following functions:

- a) the special purpose fire extinguishing equipment for wind turbine compartment may preferably have fire pre-alarm function; and
- b) the fire extinguishing equipment shall have automatic activation and manual activation functions at least, and manual activation is preferred.

6.27.2 Fire resistance rating of connecting and controlling lead

The connecting and controlling lead of the special purpose fire extinguishing equipment for engine compartment shall be as specified in GA 306.2-2007, i.e. the fire resistance rating shall not be lower than the rating II for fire resistant cable.

6.27.3 Electrical interference protection requirements

The hydraulic strength test for the pressure indicator can also be conducted on a piston pressure tester.

7.3.2 Connect the inlets of the samples to be tested and the hydraulic strength test apparatus; exhaust air in the connecting tube and sample cavity; and then seal all outlets of the sample. Increase the pressure slowly at a rate of not greater than 0.5 MPa/s to the test pressure; release the pressure after maintaining it for 5 min; and then examine the samples and record the test results.

7.4 Sealing performance test

7.4.1 Test requirements

Nitrogen or compressed air is used for air pressure sealing test apparatus; the accuracy of the pressure measuring instrument shall not be lower than grade 1.6; the air pressure source of the test apparatus shall ensure that the pressure rise rate can be adjustable within the working pressure range.

The water temperature for the leakage test shall not be lower than 5°C.

7.4.2 Sealing test

Connect the inlets of the samples to be tested and the air pressure source; increase the pressure slowly at a rate of not greater than 0.5 MPa/s to the test pressure. Immerse the samples into water to make sure the depth from the samples to the liquid level is not smaller than 0.3 m; and then examine the leakage of the samples during the pressure maintenance time specified.

7.4.3 Container valve sealing test

The test conditions and test procedures are the same as 7.4.2: the container valve is in a closing position; then examine the samples and record the test results.

7.4.4 Pressure indicator sealing test

Install the samples to be tested to the test tube, pressurize to 2/3 of the upper limit of measurement, and immerse into water for 10 min after maintaining for 7 d with the depth from the samples to the liquid level is not smaller than 0.3 m. Examine the samples and record the test results.

7.5 Overpressure test

7.5.1 The test apparatus is the same as that specified in 7.3.1.

7.5.2 Connect the inlets of the samples to be tested and the test apparatus; place the container valve in an open position; provide protective measures to prevent internal parts from being washed off for the pressure indicator; and seal all outlets of the samples after eliminating the air in the connecting tube and sample. Increase the pressure slowly at a rate of not greater than 0.5 MPa/s to the test pressure; release

7.9.1.3.1 For storage pressure fire extinguishing equipment, pressurize the fire extinguishing equipment to the storage pressure as specified; install the pressure indicator on the fire extinguishing equipment in accordance with the operating position; place in a thermostatic chamber at $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$; use a precision pressure gauge to measure the pressure value of the fire extinguishing equipment P_0 after storing for 24 h (this procedure is omitted for non-storage-pressure fire extinguishing equipment).

7.9.1.3.2 The fire extinguishing equipment is placed in a normal working condition.

7.9.1.3.3 The damp heat test lasting for 48 h shall be conducted for the fire extinguishing equipment in accordance with the test conditions specified in 7.9.1.2; and record whether there is any maloperation of the fire extinguishing equipment during the test.

7.9.1.3.4 For storage pressure fire extinguishing equipment, use a precision pressure gauge to measure the pressure value P_1 of the fire extinguishing equipment after the damp heat test; calculate the pressure loss of the storage pressure fire extinguishing equipment in accordance with the following equation; and record the test results (this procedure is omitted for non-storage-pressure fire extinguishing equipment).

7.9.1.3.5 The spray performance test shall be conducted for the fire extinguishing equipment in accordance with 7.6; and record the test results.

7.9.2 Damp heat test for special purpose fire extinguishing equipment

Change the test conditions in 7.9.1.2 into the cycle time test conditions specified in Figure 1, change the 48 h test specified in 7.9.1.3.3 into a 10-cycle test and refer to 7.9.1 for the others; conduct the damp heat test for special purpose fire extinguishing equipment; and record the test results.

7.10 Vibration test

7.10.1 Vibration test for general purpose fire extinguishing equipment

7.10.1.1 Test apparatus

The test apparatus shall be as specified in 19.2 of GB/T 25208-2010; the internal pressure of the fire extinguishing equipment is measured with a precision pressure gauge of grade 0.4.

7.10.1.2 Test condition

The amplitude is 1.0 mm; the frequency is 40 Hz.

7.10.1.3 Test procedure

7.10.1.3.1 For storage pressure fire extinguishing equipment, pressurize the fire extinguishing equipment to the storage pressure as specified; install the pressure indicator on the fire extinguishing equipment in accordance with the operating position;

7.11.1.2 Test conditions

- a) the test temperature: $35^{\circ}\text{C} \pm 2^{\circ}\text{C}$.
- b) the test duration: 240 h.
- c) the mass concentration of sodium chloride: $(5 \pm 0.1)\%$, prepared in accordance with 11.4 of GB/T 25208-2010.
- d) the salt spray settling rate: 1 mL/80 cm²·h to 2 mL/80 cm²·h (the settling volume averaged to each hour for the salt solution received on an 80 cm² area after 24 h of spraying).

7.11.1.3 Test procedure

7.11.1.3.1 For storage pressure fire extinguishing equipment, pressurize the fire extinguishing equipment to the storage pressure as specified; install the pressure indicator on the fire extinguishing equipment in accordance with the operating position; place in a thermostatic chamber at $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$; use a precision pressure gauge to measure the pressure value of the fire extinguishing equipment P_0 after storing for 24 h (this procedure is omitted for non-storage-pressure fire extinguishing equipment).

7.11.1.3.2 The fire extinguishing equipment is placed in a normal working condition.

7.11.1.3.3 Conduct pretreatment for the fire extinguishing equipment in accordance with 11.5 of GB/T 25208-2010; conduct the salt spray corrosion test for a duration of 240 h in accordance with 11.6 of GB/T 25208-2010; and record whether the fire extinguishing equipment has any maloperation during the test.

7.11.1.3.4 After the test, observe and record whether there is any visible fracturing, peeling or other defects on the enclosure of the fire extinguishing equipment.

7.11.1.3.5 For storage pressure fire extinguishing equipment, use a precision pressure gauge to measure the pressure value P_1 of the fire extinguishing equipment after the salt spray test; calculate the pressure loss of the storage pressure fire extinguishing equipment in accordance with the equation (3); and record the test results (this procedure is omitted for non-storage-pressure fire extinguishing equipment).

7.11.1.3.6 The spray performance test shall be conducted for the fire extinguishing equipment in accordance with 7.6; and record the test results.

7.11.2 Salt spray corrosion test for special purpose fire extinguishing equipment

Change the duration 240 h specified in 7.11.1.3.3 into the duration 480 h and refer to 7.11.1 for the others; conduct the salt spray corrosion test for the special purpose fire extinguishing equipment; and record the test results.

7.14.1 Total flooding fire extinguishing test

7.14.1.1 Test preparation

In accordance with the actual protection capacity of the fire extinguishing equipment determined by the manufacturer, establish the test space model and determine the fire models of class A and class B.

Mount the fire extinguishing equipment to be tested in the test space; conduct cold spray test; determine the most adverse points; and place the fire models at the most adverse point.

The temperature sensor shall be of type K thermocouples with a diameter not greater than 1 mm and 30 mm from the upper edge of the fuel tray.

When the fire extinguishing equipment is activated, the oxygen content in the air in the test space shall not be lower than the oxygen content in the air under normal atmospheric conditions 0.5% (volume ratio). During the test, the variation in the oxygen content caused by burning product shall not exceed 1.5% (volume ratio).

7.14.1.2 Class B fire extinguishing test

7.14.1.2.1 Fire models

The fire models are the fire extinguishing oil trays and oil tanks. The fire extinguishing oil trays are steel square oil trays of $0.25 \text{ m}^2 \pm 0.02 \text{ m}^2$ in area and 106 mm in height; the thickness of the steel plate is not smaller than 2 mm. The bottom of the oil trays is 600 mm from the ground. Add 12.5 L of number 93 petrol into the oil trays; put water on the bottom of the oil trays with the liquid level 50 mm from the upper edge of the oil tray.

The oil tanks are steel circular test tank of 75 mm to 90 mm in inner diameter, not less than 100 mm in height and not less than 3 mm in wall thickness. Put water on the bottom of the tank; add 50 mm of number 93 petrol above the water with the liquid level 10 mm to 20 mm to the test tank opening;

Place four test tanks diagonally against the walls in the test space; arrange them in-cross with two up and two down. The test tanks at the lower corners are placed on the ground, 50 mm from the wall. The test tanks at the upper corners are 300 mm from the ceiling and 50 mm from the wall.

7.14.1.2.2 Test procedure

Activate the temperature measuring instrument to place it in a normal working condition. Ignite the oil trays and test tanks, conduct pre-combustion for 30 s, close all openings of the test space (except the pressure relief openings) and activate the fire extinguishing equipment manually; it is preferable to use the photographic or temperature measuring method to observe the fire extinguishing time of the test tank. Record the test results.

7.14.3.1 Class B fire extinguishing test

7.14.3.1.1 Fire extinguishing oil trays

Use the class 2B fire extinguishing oil trays of Table 6 as the fire extinguishing oil trays; and the fuel is number 93 petrol.

7.14.3.1.2 Test procedure

Add water and petrol to the oil trays in accordance with the requirements of Table 6. Place randomly 3 fire models of class 2B internally tangent to the protection diameter circumference declared by the manufacturer. Arrange the fire extinguishing equipment in accordance with the instructions of the manufacturer. Ignite the oil trays; let them burn freely for 30 s; activate the fire extinguishing equipment. Record the test results.

7.14.3.2 Fire extinguishing test for class A fire protected area

7.14.3.2.1 Fire extinguishing wood cribs

The wood for the wood cribs shall be spruce, fir or pine of the equivalent density with a water content of 9% to 13%. The wood cribs consist of 6 layers, each layer containing 4 wood battens. The cross section of the battens is 40 mm × 40 mm, and the length is 450 mm ± 50 mm. The wood crib layers are placed perpendicular to each other in staggered arrangement; the interval between the layers of battens are arranged in the shape of a square to nail down the battens and intervals to form a wood crib.

The ignition oil trays shall be the oil trays for class B fire extinguishing test specified in 7.14.1.2. The bottom of the wood cribs is 60 mm from the ground.

7.14.3.2.2 Test procedure

Place randomly 3 fire models wood cribs internally tangent to the protection diameter circumference declared by the manufacturer. The wood cribs are arranged uniformly; the arrangement of the fire extinguishing equipment shall meet the requirements of the manufacturer. If the manufacturer specified a different arrangement method, it shall be tested separately. Place the wood cribs on the steel test bracket; place the ignition trays right under the wood cribs. The upper edge of the ignition trays is 300 mm from the bottom of the wood cribs; the structure of the test brackets shall ensure the bottom of the wood cribs is fully exposed to the atmosphere. Add 1.2 L of petrol to the ignition trays and ignite the wood trays to burn freely for 2 min; if the wood cribs are ignited outside of the test space, they shall not be subjected to the weather conditions such as sunlight, rain and snow and the wind speed shall not be greater than 3 m/s. If the wood cribs are ignited indoors, the volume of the indoor space shall be greater than 6 times of the volume of the test space. Activate the fire extinguishing equipment. Record the test results.

7.14.4 Fire extinguishing test for engine compartment

7.14.4.1 Engine compartment (passenger car) fire extinguishing test

; and meanwhile, activate the cooling fan whose rotating speed is regulated to 2 000 r/min. After 30 s of pre-combustion, close the back door of the test space; activate the fire extinguishing equipment manually to extinguish fire; it is preferable to use the photographic or temperature measuring method to determine the fire extinguishing time.

7.15 Operating reliability

The operating reliability test shall be conducted on a special purpose test apparatus. The air source is of compressed air or nitrogen; the volume of the special purpose test container and the working status of the actuator shall meet the requirements when the valve to be tested is fully opened after activating. The valve outlet to be tested shall be connected with a straight tube, of the same diameter as the outlet diameter and a length not exceeding 0.5 m, and a nozzle of an equivalent aperture not less than 3 mm.

Mount the valve to be tested on the special test container; connect the controlling and actuating components; make them work under the specified conditions; conduct the test in accordance with the following procedure:

- a) pressurize the inlet of the valve to be tested to the storage pressure of the fire extinguishing equipment and maintain the pressure for not less than 5 s;
- b) activate the controlling and actuating components to open the valve to be tested;
- c) when the pressure in the special purpose test container decreases to less than 0.5 MPa, close the valve to be tested;
- d) pressurize the valve to be tested once again and come to the next cycle.

The parts, which are allowed to be consumed when the valve to be tested is operating normally, shall be replaced on a timely basis after each cyclic test.

Repeat the above cyclic test 100 times at a normal temperature ($20^{\circ}\text{C} \pm 5^{\circ}\text{C}$); transfer the test apparatus and samples in the temperature test chamber; conduct the test 10 times each at the minimum and maximum working temperature. The storage time of the samples in the test environment before the test shall not be less than 2 h for the first test; the temperature of the samples and the temperature in the test chamber shall be fully balanced for the other tests.

Examine the samples and record the test results.

7.16 Operating test under maximum and minimum working pressure

The test apparatus and air source for the operating test of the container valve under maximum and minimum working pressure are the same as those in 7.15.

Mount the valve to be tested on a special purpose test container; connect the controlling and actuating components to make the valve at a normal working condition; use the air source to pressurize the special purpose test container to 0.5 time of

The outer diameter of the test spindle shall be 12 times of the nominal inner diameter of the tube. The length of the tube can ensure that there is sufficient clamping length at each end in addition to the length bending around the circumference of the spindle.

Fix the tube on the test spindle and place them in the test chamber: the test temperature is the minimum temperature of the system; and the test duration is 24 h.

After the test, bend the whole tube in the test chamber within $10\text{ s} \pm 2\text{ s}$ to the minimum bending radius specified by the manufacturer. Observe whether there is any fracturing or cracking in the inner and outer rubber layers of the tube. Take the tube out to let it restore to the ambient temperature ($20^{\circ}\text{C} \pm 5^{\circ}\text{C}$); and record the test results.

7.19 Performance test for controlling and activating assembly

7.19.1 Power supply adaptation test

Turn on the power supply of the controlling and activating assembly; activate the controlled fire extinguishing equipment in accordance with the maximum load; and observe the working condition of the controlling and activating assembly under 85% of the rated voltage, the rated voltage and 110% of the rated voltage, respectively.

7.19.2 Alarming function performance

Connect the controlling and activating assembly with the fire detector or fire trigger as well as the controlling equipment or components; place it in the monitoring status and place the fire detector or any fire trigger in the alarming status; observe and record the acousto-optic alarm signals and the status of the controlled fire extinguishing equipment.

First put any controlled fire extinguishing equipment, fire triggering device, connecting part, power supply or internal wiring in the fault condition; and then observe and record the indicating details such as the acoustic-optical signals, fault locations and fault types.

7.19.3 Controlling and displaying function test

Examine whether the wiring terminals and protective earthing terminals for the controlling and activating assembly to control peripheral devices are as specified; and examine whether there is a feedback signal displaying function for the spraying details of fire extinguishing agent after activating the fire extinguishing equipment.

For the controlling and activating assembly with the multi-tool linked activating function, conduct the test for sequential activation of fire extinguishing equipment. Examine whether there is a function of sequential activation of fire extinguishing equipment and record the time differences of activating the fire extinguishing equipment.

7.20 Pressure indicator test

7.20.1 Dial plate examination

7.23.1 Fusible alloy assembly test

The fusible alloy assembly shall be tested in accordance with 7.6 of GB 5135.1-2003.

7.23.2 Test for temperature-actuated glass bulb assembly

The performance of the temperature-actuated glass bulb shall be tested in accordance with 7.6 of GB 5135.1-2003.

7.23.3 Tests for temperature-actuated magnetic generator assembly

7.23.3.1 Static operating temperature test

Conduct the test in a high-temperature test chamber; heat at least 10 test pieces of temperature-actuated magnetic generator assembly at a heating rate not exceeding 20°C , from the ambient temperature to their nominal operating temperature ($20^{\circ}\text{C} \pm 2^{\circ}\text{C}$); maintain the temperature for 10 min; then raise the temperature, until the temperature-actuated generator assembly operates; and record the test results.

7.23.3.2 Test for generating current and operating time

Use a digital oscilloscope to measure the generating current peak and operating time of the temperature-actuated generator assembly; and record the test results.

7.23.3.3 Signal feedback and interference protection performance

For the temperature-actuated magnetic generator assembly having an operating feedback signal output function, activate the temperature-actuated magnetic generator assembly manually or automatically, in order to examine whether the temperature-actuated magnetic generator assembly has the operating feedback signal output function; and for the temperature-actuated magnetic generator assembly having an external interference maloperation protection function, conduct the test in accordance with the method specified in Table 4 of GA 61-2010; and record the test results.

7.23.3.4 Operating reliability

Based on the samples, design drawings and relevant technical documents, examine the design calculation of the volute spiral springs; and record the test results.

7.23.4 Test for volute spiral springs

Based on the samples, design drawings and relevant technical documents, examine the design calculation of volute spiral springs, and record the test results.

7.24 Performance test for nozzle

The performance of nozzle shall be tested in accordance with the method specified in 6.14 of GA 13-2006; and record the test results.

7.25 Performance test for hanger bracket (support)

		°C	
Lubrication oil	No. 20 W/40, GB/T 11121	85 ± 2	60
Diesel	GB 252	23 ± 5	60

7.30 Other performance tests for special purpose fire extinguishing equipment for wind turbine compartment

The functions of pre-alarming and activating of the special purpose fire extinguishing equipment for wind turbine compartment, as well as the performances including fire resistance rating of the connecting and controlling lead, shall be tested in accordance with the method specified in Table 4 of GA 61-2010. And record the test results.

8 Inspection rules

8.1 Inspection classification and items

8.1.1 Inspection classification

The inspection is divided into type inspection and exit-factory inspection.

8.1.2 Type inspection items

See Table 9 for the type inspection items.

Under one of the following circumstances, a type inspection shall be conducted:

- a) when a new product is produced or an old product is produced in a new factory;
- b) when there is any significant change in the structure, materials and production process of the product after mass production, which may affect the product quality;
- c) when the production is resumed after a production halt for more than 1 year.
- d) when there is any major quality accident;
- e) when it is required by a compulsory product entry system; and
- f) when the quality supervision institution makes the requirement for a type test by law.

8.1.3 Exit-factory inspection items

The exit-factory inspection items include at least the items specified in Table 9.

8.1.4 Test procedure

The test procedure shall be as specified in Annex A to Annex L.

8.2 Sampling method

8.2.1 Sampling method and sample quantity for exit-factory inspection

The sampling base for an exit-factory test shall be decided by the manufacturer in accordance with the actual production; and the fire extinguishing equipment is composed of the component samples taken randomly. The sample quantity shall be decided by reference to Table 9 and Annex A to Annex L.

8.2.2 Sampling method and sample quantity for type inspection

The sampling base of the components for a type test shall not be less than 5 times of the sample quantity specified in Annex A to Annex L. The components are sampled randomly in one time; the fire extinguishing equipment is composed of the component samples taken randomly.

8.3 Determination of inspection results

8.3.1 Type inspection

If the type inspection items of the fire extinguishing equipment are all qualified in accordance with Table 9, then the fire extinguishing equipment is qualified.

If any items of category A is unqualified, then the fire extinguishing equipment is unqualified. If the unqualified items of category B is more than or equal to 2, the fire extinguishing equipment is unqualified. If the unqualified items of category C are more than or equal to 4, the fire extinguishing equipment is unqualified. If one item of category B is unqualified and that the unqualified item number of category C is greater than or equal to 2, the fire extinguishing equipment is unqualified.

8.3.2 Exit-factory inspection

If the exit-factory inspection items of the fire extinguishing equipment are all qualified in accordance with Table 9, then the fire extinguishing equipment is qualified.

If any items of category A is unqualified, then the fire extinguishing equipment is unqualified. If there is any unqualified item of category B, the samples can be doubled for re-inspection; and if there is still any unqualified item, then the fire extinguishing equipment is unqualified.

Table 9 – Type inspection items, exit-factory inspection items and unqualification categories

Inspection item	Standard provision no.	Type inspection item	Exit-factory inspection item		Unqualification category		
			Full inspection	Casual inspection	Category A	Category B	Category C

- a5 – filling quality deviation inspection (see 7.7);
- a6 – high-low temperature alternating cycle test for storage pressure fire extinguishing equipment (see 7.8.1);
- a7 – high-low temperature alternating cycle test for non-storage-pressure fire extinguishing equipment (see 7.8.2);
- a8 – damp heat test (see 7.9);
- a9 – vibration test (see 7.10);
- a10 – salt spray corrosion test (7.11);
- a11 – spray reaction force and action time test for non-storage-pressure fire extinguishing equipment (see 7.12);
- a12 – linkage test (see 7.13);
- a13 – total flooding fire extinguishing test (see 7.14.1);
- a14 – local application fire extinguishing test (see 7.14.2);
- a15 – protected area fire extinguishing test (see 7.14.3);
- a16 – fire extinguishing test for engine compartment (fire model) (7.14.4);
- a17 – fire extinguishing test for wind turbine compartment (fire model) (7.14.5);
- a18 – other performance tests for special purpose fire extinguishing equipment for engine compartment (7.29);
- a19 – other performance tests for special purpose fire extinguishing equipment for wind turbine compartment (see 7.30).

NOTE The test sequence in Figure A.1 is indicated with the numbers in the boxes; the sample number required for the test is indicated with the numbers in the circles; and x_1 to x_7 indicate the sample number required for the test.

Figure A.1 – Test procedure for dry powder fire extinguishing equipment

A.2 Sample quantity

The sample quantity is $7 + x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7$.

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 -----