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National Standard of the People's Republic of China

GB16670 -20××
Replacing GB 16670-1996

Cabinet Gas Fire Extinguishing Equipment

(Version Submitted for Approval)

Promulgated on 20××-××-××

Enforced on 20××-××-××

Promulgated by General Administration of Quality Supervision, Inspection
and Quarantine, The People's Republic of China

Foreword

The contents of Chapter 4, Chapter 5 and Chapter 7 of this Standard are mandatory.

This Standard replaces GB16670-1996 “Performance Requirements and Test Methods for Cabinet Gas Fire Extinguishing Equipment.”

Compared with GB16670-1996, the major changes of this Standard are as follows:

- revision of the general arrangement and structure of this Standard according to GB/T1.1-2000;

- increase to the Foreword, Chapter 8 “Marking, Packaging, Transportation, Storage,” Chapter 9 “Requirements for Compiling Operation Manual” and Appendices;

- the citation of “GB795-1989,” “GB796-1989,” “GB4717-1993” and “GB14106-1993” in Chapter 2 has been cancelled, and the citation of “GB/T8979,” “GB9969.1,” “GA61” and “GA400” increased;

- the terms of “controller,” “container assembling parts (for storage of fire extinguishing agent),” “storage pressure,” “maximum working pressure” and “minimum working pressure” in Chapter 3 have been cancelled;

- Chapter 4 of the original Standard has been cancelled;

- the coding of model numbers has been increased;

- the parameter requirements for “FM200, nitrogen, argon, HFC-23 fire extinguishing equipment,” have been increased and the parameter requirements for “cabinet halon 1211, 1301 gas fire extinguishing equipment” in Table 1 have been increased;

- the performance requirements of fire extinguishing equipment have been increased;

- the requirements of fire extinguishing agent-filled and gas-pressurized cylinders, and marking requirements of cylinders have been increased and the strength requirements of cylinders have been cancelled;

- the requirements of the container, signal feedback part, leak detection part and decompression part, and related test methods have been increased;

- the requirements of container and related test methods have been supplemented;

- the contents of inspection regulations have been augmented.

Appendix A ~ Appendix P of this Standard are normative appendices.

This Standard was proposed by the Ministry of Public Security, the People’s Republic of China;

This Standard is managed by the Second Subcommittee of National Technical Committee for Fire Protection Standardization (CSBTS/TC113/SC2).

The main drafting units of this Standard are Tianjin Fire Protection Research Institute, Ministry of Public Security, Sichuan Weilong Fire Extinguishing Equipment Co., Ltd. and Nanjing Fire Protection Technology Co., Ltd.

The main drafters of this Standard are Liu Lianxi, Gao Yunsheng, Dong Haibin, Li Ximin, Wang Yingbiao, Zhou Ping and Zhang Junna.

This Standard was promulgated for the first time in 1996. This is the first amendment to the Standard.

Cabinet Gas Fire Extinguishing Equipment

1 Scope

This Standard specifies the performance requirements, test methods, inspection regulations, marking, packaging, transportation, storage and the requirements for compiling operation manual for cabinet gas fire extinguishing equipment.

This Standard shall be applicable to cabinet high-pressure carbon dioxide (CO₂), FM200, nitrogen, argon, HFC-23 gas fire extinguishing equipment, and cabinet gas fire extinguishing equipment filled by other gases.

This Standard shall not apply to cabinet low-pressure CO₂ fire extinguishing equipment.

2 Normative references

The clauses contained in the following references, which are cited in this Standard, shall become the clauses of this Standard. For all dated references, all their subsequent amendments (exclusive of corrected contents) or revised versions shall not be applicable to the Standard. However, any parties that come to an agreement in accordance with this Standard shall be encouraged to make a study of the possibility of adopting the latest version of the following normative references. Where the references are not dated, their latest versions are applicable to this Standard.

GB5099 Seamless Steel Gas Cylinder

GB5100 Welded Steel Gas Cylinder

GB/T8031 Electric Detonators

GB/TB8979 Pure Nitrogen

GB9969.1 Operation Manual for Use of Industrial Products General Regulations

GB12463 General Technical Conditions of Package for Transporting Dangerous Goods

GA61 General Technical Conditions for Actuation of Fixed Fire Extinguishing System and Control Equipment

GA400-2002 Performance Requirements and Test Methods of Gas Fire Extinguishing System and Parts

3 Terms and Definitions

The following terms and definitions are applicable to this Standard.

3.1

Cabinet gas extinguishing equipment (abbreviate extinguishing equipment, hereinafter)

Composed of gas extinguishing agent cylinders, pipelines, nozzle, signal feedback part, leak detection part, actuation part, decompression part (nitrogen or argon fire extinguishing equipment), fire detection part and controller, and can automatically detect and implement fire extinguishing. The installation of fire detection part and controller can be separated from the cabinet.

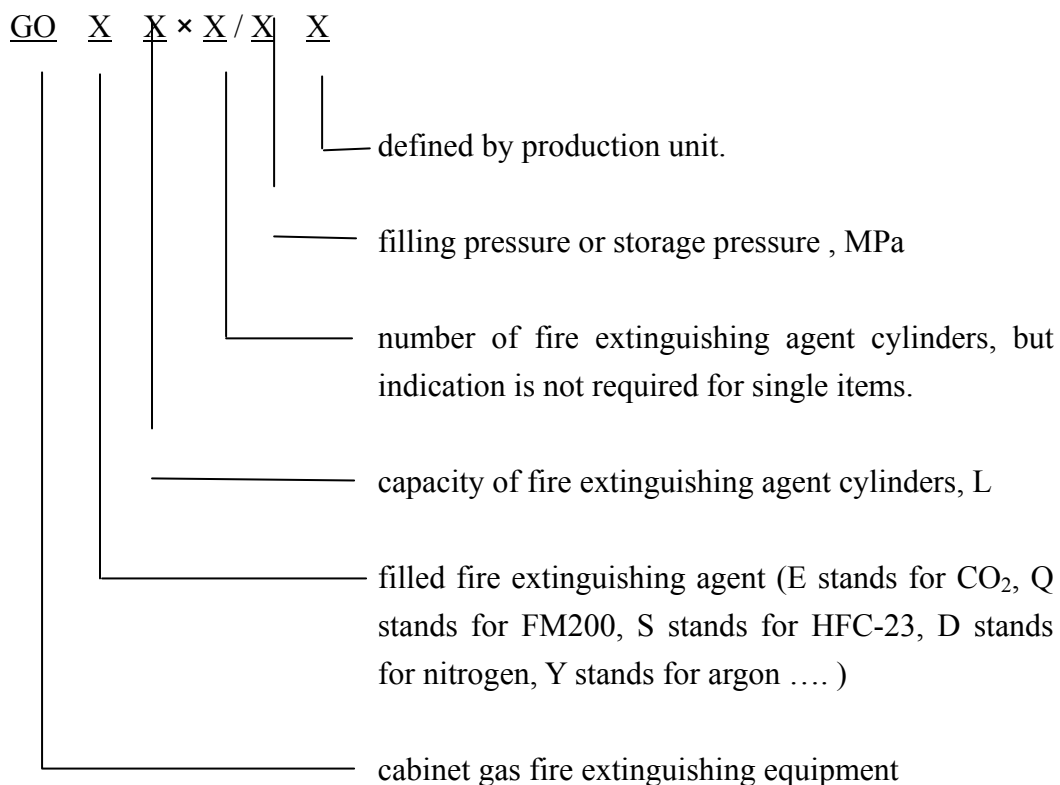
3.2

(Valve) Actuator

Can automatically turn on the container valve, involving the equipment in the implementation mechanism which is under fire extinguishing situation.

4 Coding of model numbers

4.1 Coding method:



4.2 Examples of marking

The model number for FM200 fire extinguishing equipment consisting of 2 fire extinguishing agent cylinders with a storage pressure 2.5 MPa and 80 litre fire extinguishing agent cylinders shall be indicated as GQQ80×2/2.5.

5 Requirements

5.1 Appearance quality

5.1.1 Each part composing the equipment shall have no obvious processing defect or mechanical damage. Anticorrosion treatment should be carried out on the outer surface of each part. The anticorrosion coating and plating should be complete and even.

5.1.2 Operation method with description, figure or symbol should be indicated at each operation location of the equipment.

5.1.3 The data plate of equipment should be solidly fixed in an obvious place, and the indicated contents should meet the requirements of Subsection 8.1.

5.2 Major parameters

The major parameters of equipment are shown in Table 1.

Table 1 Major Parameters

Type of Equipment	Range of Working Temperature	Storage Pressure MPa	Maximum Working Pressure MPa	Action Pressure of Pressure Discharge Device MPa	Maximum Filling Density kg/m ³	Maximum Filling Pressure MPa	Injection Time s
Cabinet CO ₂ fire extinguishing equipment	0 ~ 49	5.17	15.00	19± 0.95	600	-	≤ 60
Cabinet FM200 fire extinguishing equipment	0 ~ 50	2.50	4.20	The preset action pressure value of discharge should not be less than 1.25 times the maximum working pressure, but should not be greater than 95% of the strength test pressure of part. The action pressure	11.50	-	≤ 10
Cabinet HFC-23 fire extinguishing equipment	-20 ~ 50	4.2	13.7		860	-	≤ 10
Cabinet nitrogen fire extinguishing equipment	0 ~ 50	1.5	17.2		-	1.5	≤ 60
Cabinet argon fire	0 ~ 50	1.5	16.5		-	1.5	≤ 60

extinguishing equipment				range of pressure discharge should be: preset value $\times (1 \pm 5\%)$			
Remarks: When the range of working temperature exceeds the specifications of Table 1, the actual range of working temperature should be indicated on the equipment.							

5.3 Starting method

5.3.1 The equipment shall have two starting methods: automatic and manual. A mechanical emergency operation mechanism can also be installed.

5.3.2 The operation power and operation stroke of mechanical emergency operation mechanism should not be greater than 150 N and 300 mm respectively. The extrication power of fuse device installed on mechanical emergency operation mechanism should not be greater than 100 N.

5.4 Insulation requirements

Under normal atmospheric conditions, the insulated resistance between the outer electrified terminal with insulation requirements on equipment and the cabinet should be greater than 20 M Ω ; and the insulated resistance between the plug of power source and the cabinet should be greater than 50 M Ω .

5.5 Anti-vibration performance

Carry out a vibration test according to the method specified in Subsection 6.4. Each part of equipment shall not be loosened and structurally damaged. The net weight loss of fire extinguishing agent inside the fire extinguishing agent cylinders of cabinet FM200, CO₂ and HFC-23 fire extinguishing equipment should not exceed 0.5% of the filled volume. The internal pressure loss of fire extinguishing agent cylinders of nitrogen, argon and FM200 fire extinguishing equipment should not exceed 1% of the internal pressure before test. The functions of the controller should meet the specifications of Subsection 5.17.

5.6 Relay performance

Use various starting methods possessed by equipment to switch on the equipment and perform injection respectively according to the methods specified in Subsection 6.5. Each action of the related control valve should be sensitive and reliable. The controller should have a clear indication with the working status of equipment and be able to send out a fire extinguishing control order. Leakage should not occur at any seals.

5.7 Fire extinguishing requirements

5.7.1 Carry out fire extinguishing test of Type B n-heptane fire according to the test requirements and test methods specified in Subsection 6.6.2. The equipment should be able to extinguish the fire within 60 seconds after fire extinguishing agent is

injected.

5.7.2 Carry out fire extinguishing test of Type A surface fire according to the test requirements and test methods specified in Subsection 6.6.3. The equipment should be able to extinguish the fire within 60 seconds after fire extinguishing agent is injected. Having suppressed the fire continuously for 10 minutes, switch on the ventilation of test space. The wood stack should not ignite again.

5.8 Fire extinguishing agent cylinders

5.8.1 Working pressure

The storage pressure of fire extinguishing agent cylinders should meet the specifications of Table 1.

5.8.2 Seal requirements

Carry out an air seal test by using the method specified in Subsection 6.9. Each sealed place of fire extinguishing agent cylinders should not be found to have foam leakage or mechanical damage.

The test pressure should be the maximum working pressure. The pressure should be sustained for 5 minutes.

5.8.3 Temperature-circulating leakage requirements

Fire extinguishing agent cylinders should be able to bear circulating changes from highest working temperature to lowest working temperature, and shall not cause excessive leakage of fire extinguishing agent and malfunction of valve operation. Carry out temperature-circulating test by using the method specified in Subsection 6.11. The net weight loss of fire extinguishing agent inside the fire extinguishing agent cylinders of cabinet FM200, CO₂ and HFC-23 fire extinguishing equipment should not exceed 0.5% of the filled volume. The internal pressure loss of fire extinguishing agent cylinders of cabinet nitrogen, argon and FM200 fire extinguishing equipment should not exceed 1.5% of the internal pressure before test. After the test, turn on the container valve, no malfunction should be found.

5.8.4 Requirements of fire extinguishing agent and pressurised gas

5.8.4.1 Cylindrical fire extinguishing agent should be the product which has passed the inspection of national inspection authority.

5.8.4.2 The water content of nitrogen for pressurising use should meet the specifications of passed products specified in GB/T8979.

5.8.5 Marking

The outer front surface of fire extinguishing agent cylinders should be marked with the name of fire extinguishing agent or product name, and the filled volume of fire extinguishing agent. Descriptions should be clear and legible.

5.9 Container

5.9.1 Material

The material of the container should meet the specifications of GB5099 and GB5100.

5.9.2 Nominal working pressure

The nominal working pressure of the container should not be less than the maximum working pressure specified in Table 1.

5.9.3 Capacity and diameter

The nominal capacity and nominal diameter of container should meet the specifications of GB5099 and GB5100.

5.9.4 Strength requirements

Carry out a hydraulic strength test using the method specified in Subsection 6.8. There should be no leakage on the container. The rate of deformation residue of its capacity should not be greater than 3%.

The test pressure shall be 1.5 times of maximum working pressure. The pressure should be sustained for 5 minutes.

5.9.5 Seal requirements

Carry out an air seal test by using the method specified in Subsection 6.9. The container should not be found to have foam leakage.

The test pressure shall be the maximum working pressure. The pressure should be sustained for 5 minutes.

5.9.6 Overpressure requirements

Carry out a hydraulic overpressure test using the method specified in Subsection 6.10. The container should not be found to have any cracks.

The test pressure shall be 3 times the maximum working pressure. The pressure should be sustained for 5 minutes.

5.10 Container valve

5.10.1 Material

The body of container valve and its interior mechanical parts should be made of stainless steel and copper alloy. They can also be made of other metallic material with its strength and performance of corrosion resistance not worse than the abovementioned materials.

Flexible seal pad, sealing agent and related parts should be made of material which cannot be damaged or deformed even after contact with the related fire extinguishing agent for a long time.

5.10.2 Working pressure

The nominal working pressure of container valve on fire extinguishing agent cylinders should not be lower than the maximum working pressure specified in Table 1.

5.10.3 Strength requirements

Carry out hydraulic strength test by using the method specified in Subsection 6.8. The container valve and its accessories should not be found to have any leakage, deformation or damage.

The test pressure shall be 1.5 times the maximum working pressure. The pressure should be sustained for 5 minutes.

5.10.4 Seal requirements

Carry out an air seal test by using the method specified in Subsection 6.9. Under closing status, the container valve should not be found to have any foam leakage. Under opening status, the foam leakage at each joined and sealed place should not exceed 20 per minute.

The test pressure shall be the maximum working pressure. The pressure should be sustained for 5 minutes.

5.10.5 Overpressure requirements

Carry out a hydraulic overpressure test by using the method specified in Subsection 6.10. The container and its accessories should not be found to have any cracks.

The test pressure shall be 3 times the maximum working pressure. The pressure should be sustained for 5 minutes.

5.10.6 Work reliability requirements

Carry out a work reliability test using the method specified in Subsection 6.12. The container valve and its auxiliary control actuation device should be able to function flexibly and reliably. There should be no malfunction or structural damage (except for those parts allowed for damage during normal working). The quantity of fire extinguishing agent cylinders of the container valve after test should meet the specifications of Subsection 5.10.4.

5.10.7 Performance of corrosion resistance to salt fog

Carry out salt fog corrosion test by using the method specified in Subsection 6.13. The container valve and its accessories should not be found to have obvious corrosion or damage. The seal performance of container valve after test should meet the specifications of Subsection 5.10.4. When testing the work reliability according to the specifications of Subsection 6.12, container valve should be precisely and reliably turned on.

5.10.8 Manual operation requirements

The container valve shall have the function of mechanical emergency switch. By using the method specified in Subsection 6.2, carry out a manual operation test of the emergency switch, which should meet the following requirements:

- a) Manual operation force should not be greater than 150 N;

- b) Finger-pull operation force should not be greater than 50 N;
- c) Finger-push operation force should not be greater than 10 N;
- d) Any displacement of manual operation should not be greater than 300mm.

5.10.9 Marking

Production unit or trademark, model number, specifications and maximum working pressure should be permanently indicated on the obvious place of container valve.

5.11 Nozzle

The nozzle should meet the specifications of Subsections 5.5.1, 5.5.2, 5.5.3, 5.5.4 and 5.5.8.1 of GA400-2002.

5.12 Leak detection part

Fire extinguishing agent cylinders and actuated gas cylinders should be equipped with a leak detection part.

5.12.1 Weighing part

5.12.1.1 Alarm function

The weighing part installed in fire extinguishing system should possess an upper-limit leak alarm function. When the leakage of fire extinguishing agent or actuated gas reaches 5% of mass loss, a reliable alarm should be set off. The light alarm signal should be yellow, and be clearly seen at a distance of 3 metres under normal light conditions. The noise alarm signal should have a sound level of not lower than 65 dB(A) at a distance of 1 metre under quoted voltage.

5.12.1.2 Performance of resistance to high and low temperature

After the weighing part is placed under the highest working temperature and the lowest working temperature for 8 hours respectively, its alarm function should meet the specifications of Subsection 5.12.1.1.

5.12.1.3 Overload requirements

When bearing 2 times the static load of the mass of cylinders (calculated according to the maximum filling density of fire extinguishing agent or actuated gas) for 15 minutes, the weighing part should not have incurred any damaged. After the test, the alarm function should meet the specifications of Subsection 5.12.1.1.

5.12.1.4 Performance of corrosion resistance to salt fog

Carry out a salt fog corrosion test by using the method specified in Subsection 6.13. The weighing part should not be found to have any obvious corrosion or damage. After the test, the alarm function should meet the specifications of Subsection 5.12.1.1.

5.12.1.5 Marking

This part should be clearly indicated with the contents, production unit or trademark, product model and specifications, weighing range, and so on.

5.12.2 Pressure indicator

5.12.2.1 Basic performance

5.12.2.1.1 The working temperature of pressure indicator should not be less than the temperature range specified in Table 1.

5.12.2.1.2 The upper limit of measurement range of pressure indicator should not be greater than 1.1 times the maximum working pressure.

5.12.2.1.3 Basic error of display value

The error of the display value at storage pressure point should not be greater than $\pm 4\%$ of storage pressure.

The error of the display value at maximum working pressure point should not be greater than $\pm 8\%$ of storage pressure.

The error of the display value at minimum working pressure point should not be greater than $\pm 8\%$ of storage pressure.

The error of the display value between zero point and the upper limit of measurement range should not be greater than $\pm 15\%$ of storage pressure.

5.12.2.2 Requirements of dial

5.12.2.2.1 The positions of zero point, storage pressure, maximum working pressure, minimum working pressure and the upper limit of measurement range should be indicated with graduation and figures.

5.12.2.2.2 The range between maximum working pressure and minimum working pressure of the dial should be shown in green. The ranges between minimum zero point and working pressure, as well as between maximum working pressure and upper limit of measurement should be shown in red.

5.12.2.2.3 The dial should be indicated with production unit or trademark, applicable medium of product, legal measurement unit (MPa), measurement sign, etc.

5.12.2.3 Seal and strength requirements

5.12.2.3.1 Carry out a seal test using the method specified in Subsection 6.9. The pressure indicator should not be found to have foam leakage.

5.12.2.3.2 Carry out a hydraulic strength test b using the method specified in Subsection 6.8. The pressure indicator shall bear a test pressure 2 times the maximum working pressure. When sustaining the pressure for 5 minutes, it shall not be found to have any leakage or damage.

5.12.2.3.3 Carry out an overpressure test using the method specified in Subsection 6.10. The pressure indicator shall bear a test pressure 4 times the maximum working pressure. When sustaining the pressure for 5 minutes, it shall not be found to have any parts failing.

5.12.2.4 Performance of environmental adaptability

5.12.2.4.1 Carry out a vibration test using the method specified in Subsection 6.4.

The pressure indicator should not be found to have any loosening, deformation or damage. After the test, the basic error of display value of pressure indicator should meet the specifications of Subsection 5.12.2.1.3.

5.12.2.4.2 Carry out a temperature-circulating leakage test using the method specified in Subsection 6.11. The pressure indicator should not be found to have any leakage. After the test, the basic error of display value of the pressure indicator should meet the specifications of Subsection 5.12.2.1.3.

5.12.2.4.3 Carry out a salt fog corrosion test using the method specified in Subsection 6.13. The pressure indicator should not be found to have any damage affecting its performance. After the test, the elevation of the pointer of the pressure indicator should be stable. The basic error of display value of the pressure indicator should meet the specifications of Subsection 5.12.2.1.3.

5.12.2.5 Performance of alternating load resistance

Carry out an alternating load test using the method specified in Subsection 6.15. The alternating frequency shall be 0.1 Hz. The amplitude of alternation shall be between 40% of storage pressure and maximum working pressure, and the number of alternation times 1,000. After the test, the error of display value of storage pressure on pressure meter should not exceed $\pm 4\%$ of storage pressure.

5.12.2.6 Alarm function

For pressure indicators with a leak alarm function installed in the fire extinguishing system, when the pressure loss inside the cylinders reaches 10% of working pressure under storage temperature, a reliable alarm should be set off. The light alarm signal should be yellow, and can be clearly seen at a distance of 3 metres under normal light conditions. The noise alarm signal should possess a sound level of not lower than 65 dB(A) at a distance of 1 metre under quoted voltage.

5.12.3 Liquid level measurement part

5.12.3.1 Alarm function

The measurement error of the liquid level measurement part installed in fire extinguishing system should not be greater than 2.5%. For the liquid level measurement part with an upper-limit leak alarm function, when the leakage of fire extinguishing agent reaches 5% of mass loss, a reliable alarm should be set off. The light alarm signal should be yellow, and can be clearly seen at a distance of 3 metres under normal light conditions. The noise alarm signal should possess a sound level of not lower than 65 dB(A) at a distance of 1 metre under quoted voltage.

5.12.3.2 Performance of resistance to high and low temperature

After the liquid level measurement part is placed under the highest working temperature and the lowest working temperature as specified in Table 1 for 8 hours respectively, its alarm function should meet the specifications of Subsection 5.12.3.1.

5.12.3.3 Performance of corrosion resistance to salt fog

Carry out a salt fog corrosion test by using the method specified in Subsection 6.13. The liquid level measurement part should not be found to have any obvious corrosion or damage. After the test, the alarm function should meet the specifications of Subsection 5.12.3.1.

5.12.3.4 Marking

This part should be clearly indicated with the contents, production unit or trademark, product model and specifications, measurement range, etc.

5.13 Signal feedback part

5.13.1 Action requirements

5.13.1.1 The action pressure of the signal feedback part should not be greater than the minimum working pressure of 0.5 times of the equipment.

5.13.1.2 When carrying out an action test, the signal feedback part shall have reliable a action for 100 times when the pressure is \geq action pressure, and shall not have any action when the pressure is \leq 0.8 times of action pressure. After the test, the contact resistance at the contact point of the signal feedback part should meet the specifications of Subsection 5.13.7.

5.13.2 Strength requirements

Carry out a hydraulic strength test using the method specified in Subsection 6.8. Signal feedback part should not be damaged.

The test pressure shall be the maximum working pressure of equipment. The pressure should be sustained for 5 minutes.

5.13.3 Seal requirements

Carry out a seal test using the method specified in Subsection 6.9. The signal feedback part should not be found to have foam leakage

The test pressure shall be the maximum working pressure of equipment. The pressure should be sustained for 5 minutes.

5.13.4 Performance of voltage resistance

When carrying out a voltage resistance test, the performance of voltage resistance between wiring terminal and outer shell of the signal feedback part should not be found to have surface flashover, sweep discharge, corona or puncture.

When quoted working voltage is greater than 50 V, the test voltage shall be 1,500 V (effective value), 50 Hz.

When the quoted working voltage is less than 50 V, the test voltage shall be 500 V (effective value), 50 Hz.

5.13.5 Insulation requirements

Under normal atmospheric conditions, the insulated resistance between the wiring terminal and the outer shell of signal feedback part should be greater than 20

MΩ.

5.13.6 Performance of corrosion resistance to salt fog

Carry out a salt fog corrosion test by using the method specified in Subsection 6.13. The signal feedback part should not be found to have obvious corrosion or damage. After the test, the action requirements of signal feedback part should meet the specifications of Subsection 5.13.1, and the contact resistance at the contact point should meet the specifications of Subsection 5.13.7.

5.13.7 Contact resistance at contact point

Under normal atmospheric conditions, the contact resistance at the contact point of the signal feedback part should not be greater than 0.1 Ω. After the action test and corrosion test, it should not be greater than 0.5 Ω.

5.13.8 Marking

The contents for example, the production unit or trademark, product model and specifications, capacity at contact point, action pressure, and so on should be indicated in an obvious location on the part.

5.14 Decompression part

The decompression part should be additionally installed on cabinet nitrogen and argon gas fire extinguishing equipment.

5.14.1 Working pressure

The working pressure of the decompression part should meet the specifications of Table 1.

5.14.2 Strength requirements

Carry out a hydraulic strength test using the method specified in Subsection 6.8. Decompression part should not be found to have any leakage, deformation or damage.

The test pressure shall be 1.5 times the maximum working pressure. The pressure should be sustained for 5 minutes.

5.14.3 Seal requirements

Carry out a air seal test using the method specified in Subsection 6.9. The decompression part should not be found to have foam leakage.

The test pressure shall be the maximum working pressure. The pressure should be sustained for 5 minutes.

5.14.4 Decompression characteristics

By using the test method specified in Subsection 6.17, compare the decompression characteristics tested within the specified discharge range of the decompression part with the value declared by production unit. The error in between should not be greater than 10% of the declared value.

5.14.5 Marking

In an obvious location, the compression part should be indicated with the

production unit or trademark, model number and specifications, medium mobility direction, and so on.

5.15 Safe discharge part

In the aspects of design and technology, the safe discharge part should be guaranteed to have performance conformity after assembling each time.

5.15.1 Discharge action pressure

Fire extinguishing agent cylinders and actuated gas cylinders should be equipped with a safe discharge part. The preset value of discharge action pressure of the safe discharge part on fire extinguishing agent cylinders should meet the specifications of Table 1. The discharge action pressure of safe discharge part on actuated gas cylinders should meet the value declared by production unit.

5.15.2 Performance of corrosion resistance

Carry out a salt fog corrosion test using the method specified in Subsection 6.13. Safe discharge part should not be found to have any obvious corrosion or damage. After the test, the pressure discharge range of the safe discharge part should meet the specification of Subsection 5.15.1.

5.15.3 Performance of resistance to circulating temperature

Carry out a temperature-circulating test b using the method specified in Subsection 6.11. The pressure discharge range of the safe discharge part installed on the cylinders should meet the specifications of Subsection 5.15.1.

5.16 Actuator

The actuator should meet the specifications of GA61.

5.17 Controller

The controller should meet the specifications of GA61.

5.18 Fire detector

The requirements of fire detector should meet the specifications of related National Standard and Industrial Standard.

6 Test methods

The performance inspection of equipment and parts should refer to the design plan of inspected sample and related technical conditions. Carry out tests according to the test methods specified in this Standard.

Each air seal test item of each part should be carried out after hydraulic strength test.

Except for those additionally indicated, the tests specified in this Chapter should be carried out under normal atmospheric conditions, i.e.:

Environmental temperature: 15°C ~ 35°C;

Relative humidity: 45% ~ 75%;

Atmospheric pressure: 86 kPa ~ 106 kPa.

6.1 Appearance inspection

Comparing the design pattern with the information of related technical documents, the visual equipment and the assembled parts should meet the specifications of the related clauses of this Standard.

6.2 Manual operation test

The inspected valve shall be at maximum working pressure. The accuracy of dynamometer should not be lower than 2.5 grade.

Connect the manual operation mechanism of the tested valve with dynamometer, through which the inspected valve shall be switched on. Record the maximum operation force. Use a vernier caliper to measure and record the maximum operation stroke. The test result should meet the specifications of the related clauses of this Standard.

6.3 Determination of insulated resistance

6.3.1 The test device should meet the following requirements:

Voltage of test: $(500 \pm 50)V_{d.c.}$;

Measurement range: 0 ~ 500M Ω ;

Minimum graduation: 1 M Ω ;

Time: 60 seconds \pm 5 seconds.

6.3.2 Having applied 500 V \pm 50 V direct current (DC) voltage to the following parts of equipment for 60 seconds \pm 5 seconds using the insulated resistance test device, test the insulated resistance value:

a) at the place between the outer electrified terminal with insulation requirements and the cabinet;

b) at the place between the plug of power source and the cabinet (the switch of power source shall be placed at the put-through position, but the plug of power source shall not be inserted in the electrified wire netting). The test result should meet the specifications of Subsection 5.4.

6.4 Vibration test

Fire extinguishing agent cylinders should be filled with fire extinguishing agent and pressurised to the storage pressure by using maximum filling density (or filling pressure). The actuated gas cylinders should be filled with actuated gas by using the designed maximum filling pressure. After that, fix the cylinders in the cabinet. According to the working positions, install the pressure indicator on fire extinguishing agent cylinders (or actuated gas cylinders), placing them in a normal working situation.

The minimum graduation value of weighing-use test device should not be

greater than $\frac{1}{3}$ of upper limit of allowed volume loss of fire extinguishing agent in the sample.

When using pressure loss for judgment, an inspection-use accurate pressure measurement instrument should be installed (or replaced) on the sample.

Install the sample on a working platform. Change the vibration direction time after time according to the directions of 3 coordinate axes X, Y and Z, and then carry out test on the equipment.

During the test, the displacement amplitude shall be 0.8 mm, the frequency shall be 20 Hz, and the vibration time shall be 2 hours (in 3 directions). Two hours after the test is ended, dismantle the cylinders and conduct weighing. Inspect the pressure inside cylinders and whether each part is loosened or damaged. Inspect the functions of the controller. The inspection results should meet the specifications of Subsection 5.5.

6.5 Relay test of equipment

Carry out the test under the environmental condition of $20 \pm 5^{\circ}\text{C}$. The equipment should carry out relay tests specified in Subsections 6.5.1 and 6.5.2. Before testing, inspect whether the equipment is installed well. Fill compressed air or nitrogen into the container according to the storage pressure value specified in Table 1.

6.5.1 Relay test under automatic control situation

Apply fire simulated signal (e.g. smoke, temperature, etc.) to fire detector until the controller sends out fire extinguishing order. The controller should be able to automatically turn on the actuator of fire extinguishing equipment, open the container valve, and inject compressed gas.

Inspect the equipment during and after the test. The inspection results should meet the specifications of Subsection 5.6.

6.5.2 Relay test under manual control situation

Turn the switch of controller from “automatic” to “manual.” Apply fire simulated signal (e.g. smoke, temperature, etc.) to the fire detector until the controller sends out a fire alarm signal, which shall be turned on for 1 minute. The actuator of fire extinguishing equipment shall not be switched on automatically. Press the “emergency power” button to switch on the actuator, open the container valve, and inject compressed gas.

Inspect the equipment during and after the test. The inspection results should meet the specifications of Subsection 5.6.

6.5.3 Relay test under mechanical emergency operation

Switch on the mechanical emergency operation mechanism to make the container valve function and inject compressed gas.

Inspect the equipment during and after the test. The inspection results should meet the specifications of Subsection 5.6.

6.6 Fire extinguishing test

6.6.1 Preparation for test

a) Test space

The size of test space shall be the maximum space for actual protection of equipment. If the test space has no pressure discharge outlet, it should be placed above $\frac{3}{4}$ of the height of space or at the top.

b) Fire extinguishing equipment

Before the test, fire extinguishing equipment should be placed under the temperature $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for above 10 hours.

c) Placement of nozzle

The nozzle shall be properly placed so as to guarantee that fire extinguishing agent shall not be directly injected to the test fire and shall not be splashed out.

d) Measurement of oxygen concentration

The distinguishing rate of oxygen concentration analyser should not be lower than 0.1% (specific volume), and the quantity of channels must be 3. Carry out measurement continuously. Application range of test: 17% ~ 21% (specific volume).

e) Measurement of temperature

The time constant of the thermometer shall not be greater than 1 second. The quantity of channels must be 3. Carry out measurement continuously. Range of measurement: $0^{\circ}\text{C} \sim 1,200^{\circ}\text{C}$.

6.6.2 Fire extinguishing test of Type B fire

a) Refer to the allocation of oil pan, sampling point for measurement of oxygen concentration and test point of temperature in Figure 1. The distance between the bottom of the oil pan and the floor shall be 600 mm. Oil pan shall be made of steel and square, with an area $0.25 \text{ m}^2 \pm 0.02 \text{ m}^2$, height 106 mm, and steel plate thickness 2.5 mm. The oil pan shall be filled with 12.5 litres of n-heptane, and its bottom shall be soaked in water. The distance between liquid surface and upper edge of oil pan shall be 50 mm.

With regard to fire extinguishing equipment for full application, the test can should be placed at each corner of the test space. The test can shall be made of steel and circular in shape, with an inner diameter 75 mm ~ 90 mm, height no less than 100 mm, and wall thickness no less than 2 mm. The bottom of the test can shall be soaked in water. The height of n-heptane shall be 50 mm at the upper part. The distance between liquid surface and the lip of the test can shall be 10 mm ~ 20mm. The 4 test cans are placed at the diagonal positions of the 4 walls of test space, and are

placed alternately with 2 cans at the upper part and the other 2 at the lower part. The test cans at the lower corners are placed on the floor at a distance of 50 mm from the wall. The mouths of test cans at the upper corners are at a distance of 300 mm from the roof and 50 mm from the wall. When fire extinguishing agent injects, flows and directly affects the normal burning of test can in flames, a fender can be installed in a direction vertical to the injection and flowing direction of fire extinguishing agent so as to eliminate direct effects of flames.

Fraction of n-heptane:

Initial distillation point: 90°C;

50%: 93°C

Dry point: 96.5°C;

Specific gravity: (15.6°C/15.6°C) 0.719;

Reid vapour pressure: 13.79 kPa.

b) Turn on oxygen concentration analyser and thermometer, placing them in normal working status. Ignite the oil pan and test cans for pre-burning for 30 seconds. Shut all the openings of the test space. Manually switch on the equipment to extinguish the fire. As the equipment is switched on, the oxygen content of the air inside the test space shall not be lower than 0.5% (specific volume) of the oxygen content in air under normal atmospheric conditions. Before injection of the fire extinguishing agent, the change in oxygen concentration caused by the burning product should not be greater than 1.5% (specific volume).

c) Test records: Change of oxygen concentration of each oxygen testing point inside the test space;
 Temperature change of each temperature testing point inside the test space;
 Time of delayed injection and time of injection of equipment, pressure before nozzle;
 Time of fire extinguishing;
 Total volume of fire extinguishing agent released into the test space;
 Each function of control panel during and after the injection process of equipment.

The test results should meet the specifications of Subsection 5.7.1 and Table 1.

6.6.3 Fire extinguishing test of Type A fire

a) Use dragon spruce logs, or fir or pinewood with equivalent density and water content 9% ~ 13%.

The wood stack shall be composed of 4 layers, with 6 squared logs at each layer.

The cross-section of each squared log is 40 mm × 40 mm, with a length of 450 mm ±

50 mm. The layers of wood stacks are alternately placed in right angles. On each layer the gaps between logs are even and arranged in a square shape. Squared logs and layers are nailed together to form a wood stack.

Adopt the same oil pan as the one for fire extinguishing test of Type B fire in Subsection 6.6.2.

Refer to the allocation of wood stack, sampling point for measurement of oxygen concentration and test point of temperature in Figure 1. The distance between the bottom of wood stack and ground surface is 600 mm.

Regarding the fuel for igniting wood stack, use the n-heptane for fire extinguishing test of Type B fire in Subsection 6.6.2.

During the soaking time, observe and record the surface temperature and residue fire of wood stack. Infrared cameras are suggested for recording the re-ignition situation.

b) Ignition of wood stack

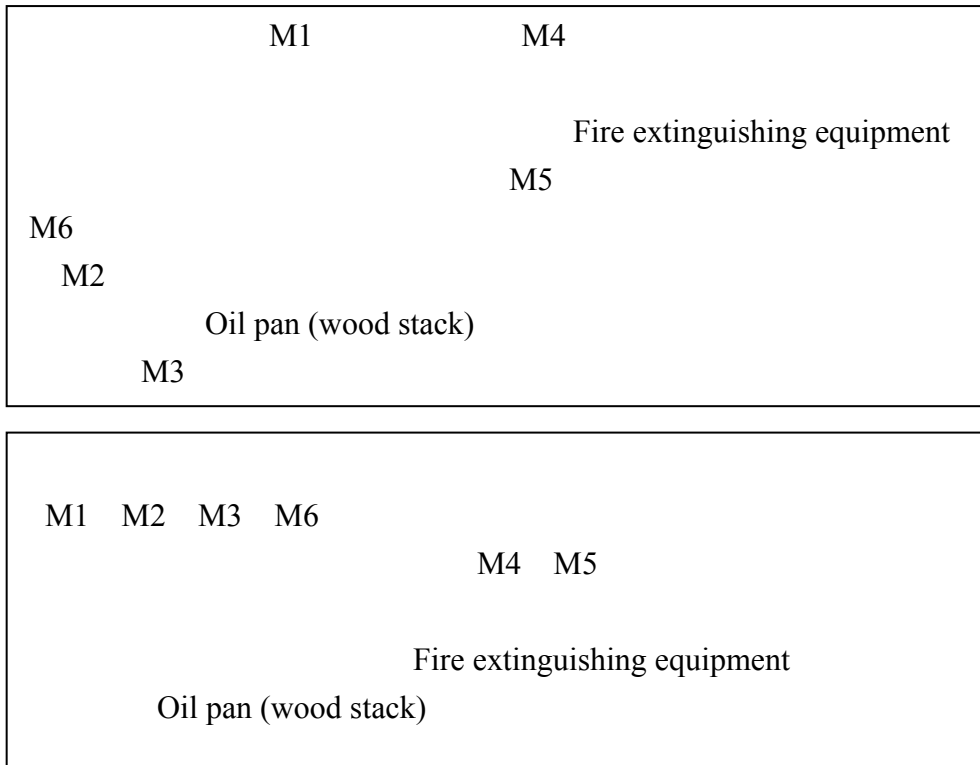
Place the wood stack on a steel test frame, and place the oil pan right below the wood stack. The distance between the upper edge of oil pan and the bottom of wood stack is about 300 mm. The test frame should be in a structure with the bottom of wood stack fully exposed to the atmosphere.

Ignite wood stack outside the test space, but the ignition should not be affected by weather conditions such as sunlight, rain or snow. The wind speed shall not be greater than 3 m/s. If necessary, take appropriate windbreaking measures. When wood stack is ignited indoors, the indoor space volume should be greater than 6 times of the volume of test space. Pour 1.6 litres of n-heptane into the oil pan. After ignition, let wood stack burn freely for 3 minutes. After the n-heptane is used up, the wood stack shall be burned continuously for 3 minutes.

c) The total pre-burning time outside the test space is 6 minutes \pm 10 seconds. After pre-burning is over, move the wood stack to the test space. The time from moving the wood stack to switching on the equipment should not be longer than 15 seconds. Shut all the openings of the test space. Manually switch on the equipment to extinguish the fire

When the equipment is turned on, the oxygen content of the air inside the test space shall not be lower than 0.5% (specific volume) of the oxygen content of air under normal atmospheric conditions. Before injection of the fire extinguishing agent, the change of oxygen concentration caused by burning product shall not exceed 1.5% (specific volume).

Unit: mm



M1 ~ M3 — Sampling point for measurement of oxygen concentration

M4 ~ M6 — Testing point of temperature

Figure 1 Illustration of allocation for fire extinguishing test of Type A fire and Type B fire

Once the injection of the fire extinguishing agent is complete, keep the test space sealed for a soaking period of 10 minutes.

- d) Test records: Whether there is residue fire or re-ignition within the 10 minutes' soaking period;
 Mass loss before and after wood stack test;
 Change in oxygen concentration at each oxygen testing point inside the test space;
 Temperature change at each temperature testing point inside the test space;
 Time of delayed injection and time of injection of equipment, pressure before nozzle;
 Time of fire extinguishing;
 Total volume of fire extinguishing agent released inside the test space;
 Each function of control panel during and after the injection process of equipment.

The test results should meet the specifications of Subsection 5.7.2 and Table 1.

6.7 Action test of safe discharge device

6.7.1 The equipment for the action test of safe discharge device shall be the same as the equipment for the hydraulic strength test indicated in Subsection 6.8 of this Standard, of which the pressure measurement instrument should possess an instant record function. If a pressure gauge is selected, its pointer should possess stop mechanism.

6.7.2 Connect the inlet of inspected sample with the test device. After the air inside the cavity connecting pipeline and sample, shut all the openings of sample. Increase the pressure slowly at a speed of no greater than 0.5 MPa/s for the safe pressure discharge device to function. Record the pressure during this time. The test result should meet the specifications of Table 1.

6.8 Strength test

Carry out the test b using the method specified in Subsection 6.2 of GA400-2002. Its result should meet the specifications of the related clauses of this Standard.

6.9 Seal test

Carry out the test using the method specified in Subsection 6.3 of GA400-2002. Its result should meet the specifications of the related clauses of this Standard.

6.10 Overpressure test

Carry out the test using the method specified in Subsection 6.4 of GA400-2002. Its result should meet the specifications of the related clauses of this Standard.

6.11 Circulating-temperature leakage test

Fire extinguishing agent cylinders should be filled with the fire extinguishing agent and pressurised to the storage pressure by using the designed maximum filling density (or filling pressure). Actuated gas cylinders should be filled with actuated gas using the designed maximum filling pressure. According to the working positions, install the pressure indicator on the fire extinguishing agent cylinders (or actuated gas cylinders), placing them in a normal working situation.

The minimum graduation value of the weighing-use test device should not be greater than $\frac{1}{3}$ of the upper limit of the allowed volume loss of fire extinguishing agent in the sample.

When using pressure loss for judgment, an inspection-use accurate pressure measurement instrument should be installed (or replaced) on the sample. Place the inspected sample in a constant temperature room, and control the temperature at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. After it is left for 24 hours, read the pressure value of the inspected cylinders. For samples using mass loss for judgment, only the weighed value shall be recorded, and there is no constant temperature requirement.

The test shall be carried out in temperature test box. Place the sample in it for 3 weeks according to the following cycle order:

Under highest working temperature $\pm 2^{\circ}\text{C}$ for 24 hours;

Under lowest working temperature $\pm 2^{\circ}\text{C}$ for 24 hours;

The abovementioned highest and lowest working temperatures should meet the specifications of Table 1. When the range of working temperature recommended by production unit exceeds the above temperature limit, carry out the abovementioned circulating-temperature leakage test according to the recommended highest and lowest working temperatures.

After the abovementioned circulation test, place the inspected sample in an environment of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 24 days, and then end this test. After the test, the requirements for reading the pressure value of inspected cylinders as well as the weighing procedures shall be the same as those before the test. Switch on the cylinders using the automatic method. The test results should meet the specifications of Subsection 5.8.3.

6.12 Work reliability test

The work reliability test of the container valve and actuator can be carried at the same time.

6.12.1 Work reliability test of container valve

6.12.1.1 The work reliability test of the container valve shall be carried out on dedicated test device. Compressed air or nitrogen shall be adopted as the source of gas. The capacity of the dedicated test container and the working status of actuator

should meet the needs of complete openness of the tested valve after it is switched on. The outlet of the tested valve should be connected to a straight pipe with its nominal diameter being the same as the outlet, its length not exceeding 0.5 m, and a nozzle with its equivalent aperture no less than 3 mm.

6.12.1.2 Install the tested valve on the dedicated test container. Connect the control actuation part well, and implement it under the specified conditions. Carry out the test procedures as follows:

- a) Pressurise the tested valve to reach the test pressure specified in Table 2. The pressure should be sustained for no less than 5 seconds;
- b) Switch on the control actuation part, and turn the test valve on;
- c) When the pressure inside the dedicated test container is reduced to less than 0.5 MPa, shut the valve;
- d) Pressurise the tested valve again, and start the next cycle continuously.

The permitted broken parts of the tested valve during normal work shall be replaced immediately after each cycle of tests.

6.12.1.3 Refer to the conditions and number of times of tests specified in Table 2. Before the test, the time for the sample to be placed in the test environment during the first test shall not be less than 2 hours. For the rest of the tests, the temperature of sample itself and the temperature inside the test box shall be completely balanced.

The test results should meet the specifications of Subsection 5.10.6.

6.12.2 Work reliability test of signal feedback part

Work reliability test of signal feedback part should be carried out according to the specifications of GA400-2002. The test results should meet the specifications of related clauses of this Standard.

Table 2 Conditions and Number of Times of Tests

Temperature	Test Pressure	Number of Times
20°C ± 5°C	Storage pressure	100
	1.1 times the maximum working pressure	1
	0.5 times the maximum working pressure	1
Highest working temperature ± 2°C	Maximum working pressure	10
Lowest working temperature ± 2°C	Minimum working pressure	10

6.13 Salt fog corrosion test

Carry out a salt fog corrosion test by using the method specified in Subsection

6.8 of GA400-2002. The test results should meet the specifications of the related clauses of this Standard.

6.14 Performance test of nozzle

Carry out the test by using the method specified in GA400. The test results should meet the specifications of Subsection 5.11.

6.15 Performance test of leakage part

Carry out the test by using the method specified in GA400. The test results should meet the specifications of Subsection 5.12.

6.16 Performance test of signal feedback part

Carry out the test by using the method specified in GA400. The test results should meet the specifications of Subsection 5.13.

6.17 Decompression characteristic test of decompression part

Fill the fire extinguishing agent cylinders inside the fire extinguishing equipment with the fire extinguishing agent according to the specifications of Table 1. The measurement of input pressure and output pressure of decompression part as well as the pressure before nozzle should be made automatically. The accuracy of recording instrument should not be lower than 1.5 grade.

Switch on the fire extinguishing equipment and test the pressure of each point. The test results should meet the specifications of Subsection 5.14.4.

6.18 Performance test of safe discharge part

Carry out the test using the method specified in GA400. The test results should meet the specifications of Subsection 5.15.

6.19 Performance test of actuator

Carry out the test using the method specified in GA61. The test results should meet the specifications of Subsection 5.16.

6.20 Performance test of controller

Carry out the test using the method specified in GA61. The test results should meet the specifications of Subsection 5.17.

6.21 Performance test of fire detector

Carry out the test using the method specified in related National Standard. The test results should meet the specifications of Subsection 5.18.

7 Inspection regulations

Production unit should organise the production based on the diagrams and technical documents which are approved according to the specified procedures. The quality system should guarantee the conformity of quality in each lot of products, and meet the specifications of this Standard.

7.1 Classification and items of inspection

7.1.1 Type inspection

7.1.1.1 In case of one of the following situations, type inspection of products should be carried out:

a) in case of the assessment of product design finalisation during trial production of a new product;

b) after a product is put into production officially, in case there is any great change of a product's structure, material, technology, or processing methods of critical procedures which may affect the performance of product;

c) in case of any significant quality occurrence;

d) in case of any resumed production of a product which has been terminated for over one year;

e) in case the quality supervision authority requests for type inspection.

7.1.1.2 Type inspection items of product should be implemented according to the specifications of Table 3.

7.1.2 Ex-factory inspection

Ex-factory inspection items of a product should at least include the items specified in Table 3.

7.1.3 The test procedures should be according to the specifications of Appendix A ~ Appendix P.

7.2 Sampling method

Parts adopt random sampling for all. The sampling base should not be less than 2 times of the number of samples taken. The equipment is assembled by the samples of parts randomly sampled. The quantity of samples shall be according to the specifications of Appendix A ~ Appendix P.

7.3 Judgment of inspection results

Table 3 Type Inspection Items, Ex-Factory Inspection Items and Failed Types

Name of Part	Inspection Item	Type Inspection Item	Ex-Factory Inspection Item		Failed Type		
			Full Inspection	Sampling Inspection	Type A	Type B	Type C
Equipment	Appearance quality						
	Major parameters						
	Starting method						
	Insulation requirements						
	Anti-vibration performance						
	Relay performance						
	Fire extinguishing requirements						
Fire Extinguishing Agent Cylinders	Working pressure						
	Seal requirements						
	Circulating-temperature leakage requirements						
	Requirements of fire extinguishing agent and pressurized gas						
	Marking						
Container	Nominal working pressure						
	Capacity and diameter						
	Material						
	Strength requirements						
	Seal requirements						
	Overpressure requirements						
Container Valve	Marking						
	Material						
	Working pressure						
	Strength requirements						
	Seal requirements						
	Overpressure requirements						
	Work reliability requirements						
	Performance of corrosion resistance						
	Manual operation requirements						
Safe Discharge Part	Discharge action pressure						
	Performance of corrosion resistance						
	Performance of resistance to circulating temperature						

Table 3 (continued)

Name of Part	Inspection Item	Type In- spec- tion Item	Ex-Factory Inspection Item		Defected Type		
			Full In- spec- tion	Sampling Inspection	Type A	Type B	Type C
Nozzle	According to the specifications of GA400						
Weighing part	Alarm function						
	Performance of resistance to high and low temperature						
	Overload requirements						
	Performance of corrosion resistance						
	Marking						
Pressure Indicator	Basic performance						
	Requirements of dial						
	Strength and seal requirements						
	Anti-vibration performance						
	Temperature-circulating leakage requirements						
	Performance of corrosion resistance						
	Performance of alternating load resistance						
	Alarm function						
Liquid Level Measure- ment Part	Alarm function						
	Performance of resistance to high and low temperature						
	Performance of corrosion resistance						
	Marking						
Signal Feedback Part	Action requirements						
	Strength requirements						
	Seal requirements						
	Performance of voltage resistance						
	Insulation requirements						
	Performance of corrosion resistance						
	Contact resistance at contact point						
	Marking						
Decom- pression Part	Working pressure						
	Strength requirements						
	Seal requirements						
	Decompression characteristic						
	Marking						

Table 3 (continued)

Name of Part	Inspection Item	Type In-spection Item	Ex-Factory Inspection Item		Defected Type		
			Full In-spection	Sampling Inspection	Type A	Type B	Type C
Actuator	According to the specifications of GA61						
Controller	According to the specifications of GA61						
Detector	According to the specifications of related National Standard and Industrial Standard						

7.3.1 Type inspection

If the devices and parts all pass, this product is deemed to have passed. If any device and part fails, this product is deemed to have failed. If the type inspection items of the device or part have all passed, this device or part is regarded as having passed. If a Type A item fails, this device or part is regarded as having failed. If the number of failed Type B items is ≥ 2 , this device or part is regarded as having failed. If the number of failed Type C items is more than 4, this device or part is regarded as having failed. If one Type B item fails and the number of failed Type C items is more than 2, this device or part is judged as having failed.

7.3.2 Ex-factory inspection

If the devices and parts all pass, this product is deemed to have passed. If any device and part appears fails, this product is deemed to have failed.

If the ex-factory inspection items of the device or part have all passed, this device or part is regarded as having passed. If one Type A item is found to have failed, this device or part is regarded as having failed. If there is Type B item or Type C item found to have failed, doubled sampling inspection is permitted. If the item is still found to have failed, this device or part is judged as having failed.

8 Marking, packaging, transportation, storage

8.1 Marking

The following must be indicated in an obvious location on the product: product name, model number and specifications, implementation standard code, storage pressure, total volume of fire extinguishing agent, range of temperature for use, production unit, product code, ex-factory date, etc.

8.2 Packaging

8.2.1 Fire extinguishing equipment should be packaged independently. The parts inside equipment should be solidly fixed. There should be preventive measures for mutual impact.

8.2.2 Related documents of manual and qualified certificates should be attached inside the packaging box.

8.2.3 The outside the packaging box should be indicated with product name, model number and specifications, storage temperature, production unit, ex-factory date, direction of placement, limited number of pieces to be piled up, protective conditions of storage, etc.

8.2.4 If the container is packaged independently, its package should meet related national specifications about the packaging of pressurised containers.

8.2.5 The packaging of explosive components of electric explosive actuator should meet related specifications of GB12463 and GB8031.

8.3 Transportation

8.3.1 In the process of transportation, fire extinguishing equipment should be sheltered from rain and sunlight, and attached with decreased vibration.

8.3.2 If container is transported independently, its transportation should meet related national specifications about the transportation of pressurised containers.

8.3.3 The transportation of explosive components of the electric explosive actuator should meet related specifications of GB12463 and GB8031.

8.4 Storage

8.4.1 The storage temperature of cabinet gas fire extinguishing equipment should not exceed the range of working temperature specified in Table 1.

8.4.2 The storage of explosive components of the electric explosive actuator should also meet related specifications of GB8031.

9 Requirements for compiling operation manual

The operation manual should be compiled according to GB9969.1. The operation manual should at least include the following items:

- a) Brief introduction of equipment (mainly working principles);
- b) Major performance parameters of equipment;
- c) Illustration of equipment;
- d) Operation procedures of equipment;
- e) Names of parts, model numbers and specifications, major performance parameters, description of installation, application and maintenance, remarks;
- f) Filling method of fire extinguishing agent;
- g) After-sale service;
- h) Name, detailed address, postal code and telephone of manufacturing unit.

Appendix A

(Normative Appendix)

Test Procedures of Equipment and Quantity of Samples

A.1 Description of test procedures

A.1.1 Serial numbers of tests

- 1) Inspection of appearance (6.1);
- 2) Major parameters (5.2);
- 3) Manual operation test (6.2);
- 4) Insulated resistance test (6.3);
- 5) Vibration test (6.4);
- 6) Relay test of equipment (6.5);
- 7) Fire extinguishing test of Type B fire (6.6.2)
- 8) Fire extinguishing test of Type A fire (6.6.3)

A.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure A.1.

2) The figure inside the circle is the number of samples required for each test.

A.2 Diagram of test procedures

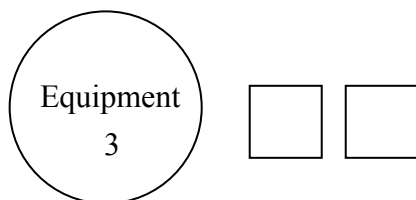


Figure A.1 Diagram of test procedures of equipment

Appendix B

(Normative Appendix)

Test Procedures of Fire Extinguishing Agent Cylinders and Number of Samples

B.1 Description of test procedures

B.1.1 Serial numbers of tests

- 1) Working pressure (6.1);
- 2) Seal test (6.9);
- 3) Circulating-temperature leakage test (6.11);
- 4) Fire extinguishing agent and pressurised gas requirements (5.8.4);
- 5) Marking (6.1).

B.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure B.1.

2) The figure inside the circle is the number of samples required for each test.

B.2 Diagram of test procedures

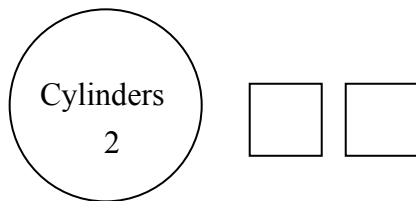


Figure B.1 Diagram of test procedures of fire extinguishing agent cylinders

Appendix C

(Normative Appendix)

Test Procedures of Container and Number of Samples

C.1 Description of test procedures

C.1.1 Serial numbers of tests

- a) Material (5.9.1);
- b) Nominal working pressure (5.9.2);
- c) Capacity and diameter (5.9.3);
- d) Strength test (6.8);
- e) Seal test (6.9);
- f) Overpressure test (6.10).

C.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure C.1.

2) The figure inside the circle is the number of samples required for each test.

C.2 Diagram of test procedures

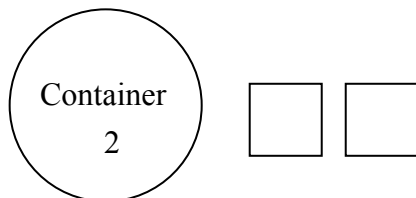


Figure C.1 Diagram of test procedures of container

Appendix D

(Normative Appendix)

Test Procedures of Container Valve and Number of Samples

D.1 Description of test procedures

D.1.1 Serial numbers of tests

- 1) Material (5.10.1);
- 2) Working pressure (5.10.2);
- 3) Strength test (6.8);
- 4) Seal test (6.9);
- 5) Overpressure test (6.10);
- 6) Work reliability test (6.12);
- 7) Salt fog corrosion test (6.13)
- 8) Manual operation requirements (6.2);
- 9) Marking (6.1).

D.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure D.1.

2) The figure inside the circle is the number of samples required for each test.

D.2 Diagram of test procedures

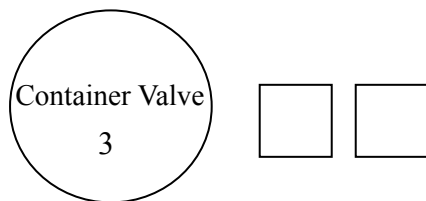


Figure D.1 Diagram of test procedures of container valve

Appendix E

(Normative Appendix)

Test Procedures of Nozzle and Number of Samples

E.1 Description of test procedures

E.1.1 Serial numbers of tests

- 1) Appearance inspection (6.1);
- 2) Test of discharge characteristic of nozzle (6.14);
- 3) Salt fog corrosion test (6.14).

E.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure E.1.

2) The figure inside the circle is the number of samples required for each test.

E.2 Diagram of test procedures

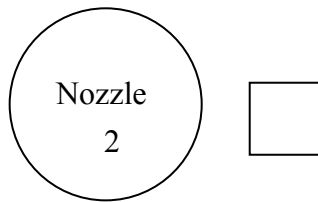


Figure E.1 Diagram of test procedures of nozzle

Appendix F

(Normative Appendix)

Test Procedures of Weighing Part and Number of Samples

F.1 Description of test procedures

F.1.1 Serial numbers of tests

- 1) Alarm function (6.15);
- 2) Performance of resistance to high and low temperature (6.15);
- 3) Overload requirements (6.15).
- 4) Test of resistance to salt fog corrosion (6.13);
- 5) Marking (6.1).

F.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure F.1.

2) The figure inside the circle is the number of samples required for each test.

F.2 Diagram of test procedures

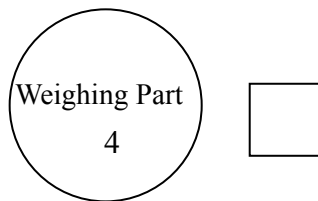


Figure F.1 Diagram of test procedures of weighing part

Appendix G

(Normative Appendix)

Test Procedures of Pressure Indicator and Number of Samples

G.1 Description of test procedures

G.1.1 Serial numbers of tests

- 1) Basic performance (6.15);
- 2) Requirements of dial (6.15);
- 3) Strength test (6.8).
- 4) Seal test (6.9);
- 5) Vibration resistance performance (6.4);
- 6) Circulating-temperature leakage test (6.11);
- 7) Salt fog corrosion test (6.13);
- 8) Alternating load test (6.15);
- 9) Alarm function test (6.15).

G.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure G.1.

2) The figure inside the circle is the number of samples required for each test.

G.2 Diagram of test procedures

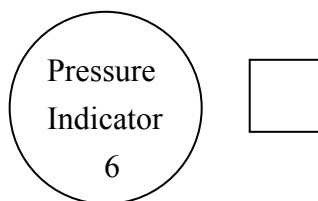


Figure G.1 Diagram of test procedures of pressure indicator

Appendix H

(Normative Appendix)

Test Procedures of Liquid Level Measurement Part and Number of Samples

H.1 Description of test procedures

H.1.1 Serial numbers of tests

- 1) Alarm function (6.15);
- 2) Performance of resistance to high and low temperature (6.15);
- 3) Salt fog corrosion test (6.13).
- 4) Marking (6.1).

H.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure H.1.

2) The figure inside the circle is the number of samples required for each test.

H.2 Diagram of test procedures

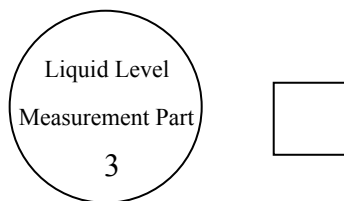


Figure H.1 Diagram of test procedures of liquid level measurement part

Appendix J

(Normative Appendix)

Test Procedures of Signal Feedback Part and Number of Samples

J.1 Description of test procedures

J.1.1 Serial numbers of tests

- 1) Work reliability test (6.12.2);
- 2) Strength test (6.8).
- 3) Seal test (6.9);
- 4) Test of voltage resistance performance (6.16);
- 5) Insulated resistance test (6.16);
- 6) Salt fog corrosion test (6.13);
- 7) Contact resistance test at contactpoint (6.16);
- 8) Marking (6.1).

J.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure J.1.

2) The figure inside the circle is the number of samples required for each test.

J.2 Diagram of test procedures

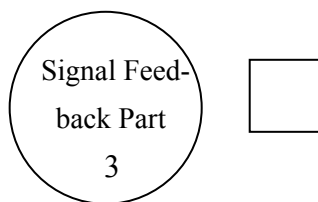


Figure J.1 Diagram of test procedures of signal feedback part

Appendix K

(Normative Appendix)

Test Procedures of Decompression Part and Number of Samples

K.1 Description of test procedures

K.1.1 Serial numbers of tests

- 1) Working pressure (5.14.1);
- 2) Strength test (6.8).
- 3) Seal test (6.9);
- 4) Decompression characteristic test (6.17);
- 5) Marking (6.1).

K.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure K.1.

2) The figure inside the circle is the number of samples required for each test.

K.2 Diagram of test procedures

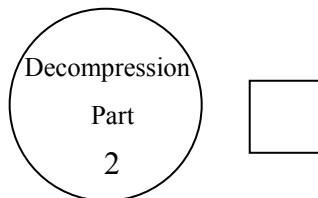


Figure K.1 Diagram of test procedures of decompression part

Appendix L

(Normative Appendix)

Test Procedures of Safe Discharge Part and Number of Samples

L.1 Description of test procedures

L.1.1 Serial numbers of tests

- 1) Inspection of appearance (6.1);
- 2) Action test of safe discharge device (6.18);
- 3) Salt fog corrosion test (6.18);
- 4) Circulating-temperature leakage test (6.18).

L.1.2 Description

1) The serial numbers of the above tests are specified in figures in the square frames in Figure L.1.

2) The figure inside the circle is the number of samples required for each test.

L.2 Diagram of test procedures

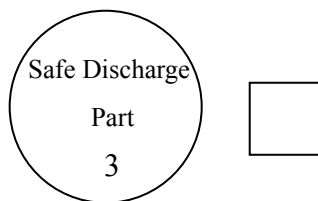


Figure L.1 Diagram of test procedures of safe discharge part

Appendix M

(Normative Appendix)

Test Procedures of Actuator and Number of Samples

The test procedures of actuator and the number of samples shall be according to the specifications of GA61.

Appendix N

(Normative Appendix)

Test Procedures of Controller and Number of Samples

The test procedures of controller and the number of samples shall be according to the specifications of GA61.

Appendix P

(Normative Appendix)

Test Procedures of Detection Part and Number of Samples

The test procedures of the detection part and the number of samples shall be according to the specifications of related National Standard and Industrial Standard.
