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GB 15308—20xx
Replace GB 15308-2006

Foam fire extinguishing agent

Foam extinguishing agent

(ISO 7203 Fire extinguishing media-Foam concentrates, NEQ)

(Draft for comments)

20XX-XX-XX release 20XX-XX-XX implementation

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Preface

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

This document replaces GB 15308-2006 "Foam Extinguishing Agent". Compared with GB 15308-2006, this document has major technical

The technical changes are as follows:

——Added "Classification, Code and Model Specification" (see 4);

——The requirements and test methods for "viscosity" are added (see 5.2.1.1 Table 1 and 6.4);

-Added "Appendix B: Radiation Measurement Method, Appendix C: Compatibility";

——Deleted the requirements and test methods of "specific liquidity" (see 4.2.1.1 Table 1 and 5.4 of the 2006 edition);

—— Delete the requirements and test methods of "corrosion rate" (see 4.2.1.1 Table 1 and 5.7 in 2006 edition);

—— Deleted the requirements and test methods for "medium and high foam liquid drain time" (see 4.2.2.3 Table 5, Table 6 and 5.9.1.3 of the 2006 edition (D) ~ (g), 5.9.2.3 (d) ~ (f));

-Deleted the requirements and test methods of "Foam Fire Extinguishing Agent for Fire Extinguishers" (see 4.2.4 of the 2006 edition);

—— The requirement of "non-conforming type" has been deleted (see Table 1, Table 2, Table 5, Table 6, and Table 8 in the 2006 edition);

——The test method of "freezing point" is modified (see 6.2.3);

——Modified the requirement of "pH value" (see 5.2.1.1 Table 1, 5.2.2.1 Table 4);

——Modified the requirements of "medium and high expansion foam liquid foaming ratio" (see 5.2.2.1 Table 4);

——Modified the requirements and test methods of "low-expansion foam liquid fire extinguishing performance" (see 5.2.1.2 Table 2, 5.2.3.3 Table 5 and 6.9.5);

This document adopts the redrafting method to refer to ISO 7203-1:2011E "Extinguishing Agents-Foam Concentrates-Used on top of non-water-soluble liquid fuels Low-expansion foam liquid for application", ISO 7203-2:2011E "Fire extinguishing agent-foam concentrate-medium and high-expansion liquid used on top of non-water-soluble liquid Foam Liquid", ISO 7203-3:2011E "Extinguishing Agent-Foam Concentrate-Low Expansion Foam Extinguishing Liquid Used on Top of Water-Soluble Liquid" compilation, The degree of consistency with ISO 7203:2011 is not equivalent.

Compared with ISO 7203-2011, the main changes of this document are as follows:

——Added "Classification, Code and Model Specification";

——Different compilation formats. ISO7203 is divided into three parts, GB15308 is one part; ISO7203 test methods are arranged in appendix form, GB15308 is arranged in sections as Chapter 6;

——The fire-extinguishing performance uses different non-water-soluble fuels. ISO7203 uses industrial n-heptane, and this standard uses solvent oil for rubber industry;

Please note that certain contents of this document may involve patents. The issuing agency of this document is not responsible for identifying these patents.

Appendices A, B, and C of this document are informative appendices.

This document was proposed by the Ministry of Emergency Management of the People's Republic of China.

This document is under the jurisdiction of the Ministry of Emergency Management of the People's Republic of China.

Drafting organizations of this document: Tianjin Fire Research Institute of Emergency Management Department, Jiangsu Suolong Fire Technology Co., Ltd., Ningbo Nenglin Fire F Materials Co., Ltd., Yangzhou Jiangya Fire Fighting Agent Co., Ltd.

The main drafters of this document: Liu Yuheng, Zhuang Shuang, Liu Huimin, Li Shu, Song Yang, Wang Shuai, Fu Xuecheng, Bao Zhiming, Pan Yu, Zhang Qi, Bao Yuancai.

The previous versions of the standards replaced by this document are as follows:

——GB 15308-1994;

——GB 15308-2006.

Foam fire extinguishing agent

1 Scope

This document specifies the terms and definitions, classification, code and model specifications, requirements, test methods, inspection rules, package Installation, marking, transportation, storage and appendices.

This document is applicable to low-expansion, medium-expansion and high-expansion foam extinguishing agents and alcohol-resistant foam extinguishing agents.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 6003.1 Metal wire woven mesh test sieve

GB/T 6026 Acetone for industrial use

GB/T 6682 Analytical laboratory water specifications and test methods

GB/T 9969 Instruction Manual for Industrial Products

GB/T 21059 Plastic liquid active emulsion state or dispersion system polymer/resin rotary viscometer at specified shear rate Determination (ISO 3219:1993, IDT)

GB/T 36911 Transport Packaging Guidelines

SH 0004 solvent oil for rubber industry

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Characteristic values

The physical and chemical properties of the foam liquid and foam solution provided by the manufacturer.

3.2

25% drainage time

The time required to separate 25% of its mass from the foam.

3.3

Expansion

The ratio of the volume of the foam to the volume of the foam solution constituting the foam.

3.4

Low expansion foam concentrate

Foam liquid with a foaming ratio of 1-20.

3.5

Medium expansion foam concentrate
Foam liquid with a foaming ratio of 21 to 200.

3.6

High expansion foam concentrate

Foam liquid with a foaming ratio greater than 200.

3.7

Foam (fire fighting foam)

A collection of air-filled bubbles formed by a foamed solution.

3.8

Foam concentrate

It can be mixed with water at an appropriate concentration to form a concentrated liquid foaming solution.

3.9

Foam solution (foam mixture)

A solution made from foam liquid and water according to the specified concentration.

3.10

Protein foam concentrate (P)

Foam liquid prepared by partial hydrolysis of protein-containing raw materials.

3.11

Fluoroprotein foam concentrate (FP) fluoroprotein foam concentrate (FP)

Protein foam liquid with fluorocarbon surfactant added.

3.12

Synthetic foam concentrate(S) synthetic foam concentrate(S)

A foam liquid made from a mixture of surfactants and stabilizers as base materials.

3.13

Alcohol-resistant foam concentrate (AR) alcohol-resistant foam concentrate (AR)

When the generated foam is applied to the surface of alcohols or other polar solvents, it can resist the foam liquid that is destructive to the foam.

3.14

Aqueous film-forming foam concentrate (AFFF)

The foam liquid based on hydrocarbon surfactants and fluorocarbon surfactants can form a water film on the surface of certain hydrocarbons.

3.15

Film-forming fluoroprotein foam concentrate (FFFP) film-forming fluoroprotein foam concentrate (FFFP)

Fluoroprotein foam liquid that can form a water film on the surface of certain hydrocarbons.

3.16

Forceful application

The foam supply method that directly casts the foam onto the surface of the liquid fuel.

3.17

Gentle application

It is a foam supply method in which foam is applied to the surface of liquid fuel indirectly through baffles, tank walls or other surfaces.

3.18

3.19 Sediment

Insoluble solid matter in foam liquid.

3.20

Spreading coefficient

A measure of the ability of a liquid to spread freely on the surface of another liquid.

3.21

Lowest useful temperature

A temperature 5°C above the freezing point.

4 Classification, code and specifications

4.1 Classification and code

Protein foam liquid, code name: P
Fluoroprotein foam liquid, code name: FP
Synthetic foam liquid, code name: S
Anti-solvent foam liquid, code name: AR
Aqueous film-forming foam liquid, code name: AFFF
Film-forming fluoroprotein foam solution, code name: FFFP
Alcohol-resistant protein foam liquid, code name: P/AR
Solubility resistant fluoroprotein foam liquid, code name: FP/AR
Alcohol-resistant synthetic foam liquid, code: S/AR
Alcohol-resistant aqueous film-forming foam liquid, code: AFFF/AR
Soluble-resistant film-forming fluoroprotein foam solution, code: FFFP/AR
Medium times foam liquid, code name: Z
High-expansion foam liquid, code name: G
High, medium and low foam liquid, code name: GZD
Anti-solvent high, medium and low foam liquid, code: GZD/AR

4.2 Specifications

X% (D, Y)-seawater resistance (customized by the manufacturer)

Among them, X% represents the mixing ratio, D represents the classification of foam liquid, Y represents the freezing point, and seawater resistance represents suitable for fresh wa
Example 1: 3% (P, -10°C) means that the mixing ratio is 3%, the freezing point is -10°C, and it is a protein foam fire extinguishing agent suitable for fresh water;
Example 2: 6% (AFFF, -15°C)-seawater resistance means that the mixing ratio is 6%, the freezing point is -15°C, and it is suitable for fresh water and seawater aqueous film-forming foam fire extinguishing agents.

5 Claim

5.1 General requirements

5.1.1 If the foam solution is suitable for seawater, the concentration of the foam solution prepared with seawater should be the same as the concentration of the foam solution prepared wit
5.1.2 The raw materials and production process of foam liquid should meet laws, regulations and mandatory national standards for personal health, safety and environmental protection. Protection requirements.
5.1.3 Foam liquids with different specifications and models or different production processes are strictly prohibited in filling fire extinguishers, fire trucks, fire extinguishing systems and Mixed use in other occasions.

5.2 Technical requirements

5.2.1 Low-expansion foam liquid

5.2.1.1 The physical and chemical properties of low-expansion foam liquid or foam solution shall meet the requirements of Table 1.

Table 1 Physical and chemical properties of low expansion foam liquid or foam solution

project	Sample status	Claim	Remarks
Freezing point	Before temperature treatment	At eigenvalue -0 Within 4	
Resistance to freezing and thawing	Before and after temperature treatment	No visible stratification and heterogeneity	
Sediment, %(v/v)	Before aging	≤0.25; the sediment can pass through a 180μm sieve	Protein type
	After aging	≤1.00; the sediment can pass through a 180μm sieve	
		Newtonian foam liquid≤200mm2s-1	

Viscosity	Before and after temperature treatment	For non-plastic foam liquid ≤120mPa.s (at a shear rate of 375/s Time)	
pH value	Before and after temperature treatment	6.0~8.5	
Surface tension, mN/m	Before temperature treatment	Deviation from characteristic value [a)] Not more than 10%	Film-forming
Interfacial tension, mN/m	Before temperature treatment	The deviation from the characteristic value is not greater than 1.0 mN/m or not greater than the characteristic 10% of the value, judged as the larger of the above two differences	Film-forming
Diffusion coefficient, mN/m	Before and after temperature treatment	Positive value	Film-forming
Foaming multiple	Before and after temperature treatment	The deviation from the characteristic value is not greater than 1.0 or not greater than the characteristic value 20%, judged as the larger of the above two differences	
25% drainage time, min	Before and after temperature treatment	The deviation from the characteristic value is not more than 20%	

a) The deviation in this standard refers to the absolute value of the difference between the two.

5.2.1.2 The fire extinguishing performance of low-expansion foam liquid on non-water-soluble liquid fuels shall meet the requirements of Table 2 and Table 3.

Table 2 Minimum fire extinguishing performance level that low-expansion foam liquid should reach

Foam liquid type	Fire fighting performance level	Fever resistance level	Film formation
AFFF	I	C	Film-forming
AFFF/AR	I	A	Film-forming
FFFP	I	B	Film-forming
FFFP/AR	I	A	Film-forming
FP	II	B	Non-film forming
FP/AR	II	A	Non-film forming
P	III	B	Non-film forming
P/AR	III	B	Non-film forming
S	III	C	Non-film forming
S/AR	III	C	Non-film forming

Table 3 Fire extinguishing time and anti-burn time corresponding to each fire extinguishing performance level

Fire fighting performance level	Fever resistance level	Slow release		Force cast	
		Extinguishing time min	Anti-fever time min	Extinguishing time min	Anti-fever time min
I	A	Does not require		≤3	≥10
	B	Does not require	≥15	≤3	
	C	Does not require	≥10	≤3	Not test
	D	Does not require	≥5	≤3	
II	A	Does not require		≤4	≥10
	B	Does not require	≥15	≤4	
	C	Does not require	≥10	≤4	Not test
	D	Does not require	≥5	≤4	
III	B	≤5	≥15	Not test	
	C	≤5	≥10		
	D	≤5	≥5		

5.2.2 Medium and high expansion foam liquid

5.2.2.1 The performance of medium and high-expansion foam liquid or foam solution shall meet the requirements of Table 4.

Table 4 Properties of medium and high foaming liquid or foaming solution

project	Sample status	Claim	Remarks
Freezing point	Before temperature treatment	At eigenvalue -0 Within 4 ℃	
Resistance to freezing and thawing	Before and after temperature treatment	No visible stratification and heterogeneity	
Precipitation, %(V/V)	Before aging	≤0.25, the sediment can pass through a 180μm sieve	
	After aging	≤1.00, the sediment can pass through a 180μm sieve	
Viscosity	Before and after temperature treatment	Newtonian foam liquid ≤200mm2/s Take plastic foam liquid ≤ 120mPa.s (at a shear rate of 375/s Time)	
pH value	Before and after temperature treatment	6.0 ~ 8.5	

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Surface tension, mN/m	Before temperature treatment	The deviation from the characteristic value is not more than 10%	Film-forming
Interfacial tension, mN/m	Before temperature treatment	The deviation from the characteristic value is not greater than 1.0mN/m or pot greater than the characteristic 10% of the value, judged as the larger of the above two differences	Film-forming
Diffusion coefficient, mN/m	Before and after temperature treatment	Positive value	Film-forming
Foaming multiple	Before and after temperature treatment	50 ~ 200	Applicable medium times
	Before and after temperature treatment	> 200	Applicable to high power
Extinguishing time, s	Before or after temperature treatment	≤120	Applicable medium times
	Before or after temperature treatment	≤150	Applicable to high power
1% anti-burn time, s	Before or after temperature treatment	≥30	Applicable medium times

5.2.3 Alcohol-resistant foam liquid

5.2.3.1 The physical and chemical properties of the alcohol-resistant foam liquid shall meet the requirements of Table 1.

5.2.3.2 The fire extinguishing performance of non-water-soluble liquid fuels shall meet the requirements of Table 2 and Table 3.

5.2.3.3 The fire extinguishing performance of water-soluble liquid fuels shall meet the requirements of Table 5 and Table 6.

Table 5 The minimum fire extinguishing performance level that the anti-solvent foam liquid should reach

Foam liquid type	Fire fighting performance level	Fever resistance level
AFFF/AR	ARI	B
FFFP/AR	ARI	B
FP/AR	ARII	B
P/AR	ARII	B
S/AR	ARI	B

Table 6 Fire extinguishing time and anti-burn time corresponding to each fire extinguishing performance level

Fire fighting performance level	Fever resistance level	Extinguishing time min	Anti-fever time min

		A	≤3	≥15
	ARI	B	≤3	≥10
		C	≤3	≥5

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		A	≤5	≥15
	ARII	B	≤5	≥10
		C	≤5	≥5

5.3 Determination of temperature sensitivity

When one of the conditions listed in Table 7 occurs, the foam liquid is judged to be a temperature-sensitive foam liquid.

Table 7 Determination of temperature sensitivity of foam liquid

item	Item	Judgment condition
	pH value	The pH deviation of foam liquid before and after temperature treatment is greater than 1.0
	Surface tension (film forming type)	The surface tension of the foam solution after temperature treatment is lower than 0.95 times before temperature treatment or 1.05 times higher than before temperature treatment
	Interfacial tension (film forming type)	The deviation of interfacial tension before and after temperature treatment is greater than 0.5mN/m

6 Test method

6.1 Sampling and temperature treatment

6.1.1 Samples before temperature treatment

Whether sampling from one container or from multiple containers, it should be stirred evenly to ensure that the sample is representative. Fill the sample storage Store the container and seal it.

6.1.2 Temperature treatment

The foam liquid should be temperature treated according to the following steps:

a) If the manufacturer declares that the sample is not affected by freeze-thaw, the sample should be subjected to four freeze-thaw cycles according to 6.2, and then press 6.1.2b) Perform processing.

b) Place the sample sealed in the container at (60±2)℃ for seven days, and then place it at (20±5)℃ for one day.

c) If the manufacturer declares that the sample is affected by freezing and thawing, only process the sample according to 6.1.2 b).

6.2 Resistance to freezing and thawing

6.2.1 Equipment

Low temperature box: can meet the temperature requirements of 6.2.2b);

Freezing point test equipment: temperature control accuracy ±1℃;

Platinum resistance thermometer: PT100, accuracy ±0.1℃, outer diameter 5.0 mm;

Digital temperature display instrument: the resolution is 0.1℃.

6.2.2 Test procedure

Foam liquid should be tested for anti-freezing and thawing according to the following steps:

a) Determine the freezing point of the sample according to 6.2.3.

b) Adjust the freezer temperature to 10°C ± 1°C below the freezing point of the sample.

c) Put the samples that meet the requirements of 6.1.1 into plastic or glass containers, seal them in the freezer, and keep them at the temperature specified in 6.2.2 b) Hold for 24h, after freezing, take out the sample and place it at room temperature of 20℃±5℃ for 24h ~ 96h. Repeat three more times for four Freeze-thaw cycle processing.

d) Observe whether the sample has delamination and heterogeneity.

6.2.3 Freezing point

Foam liquid should be tested for freezing point according to the following steps:

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a) Turn on the freezing point test equipment to stabilize the temperature of the cold room at 10 ℃ lower than the freezing point of the sample;
b) Pour the sample to be tested into a dry and clean inner tube so that the height of the liquid level is about 50 mm;
c) Fix the platinum resistor in the center of the inner tube with a cork or rubber stopper, and the lower end of the platinum resistor is 10 mm away from the sample liquid surface;
d) Put the inner tube containing the sample in the outer tube, and then put the outer tube into the cold room. The depth of the outer tube immersed in the cold room is not less than 1
e) Start the test, and the equipment automatically records the temperature-time curve;
f) After the sample is completely solidified, read the temperature at the platform of the curve as the freezing point.

6.3 Sediment

6.3.1 Equipment

Electric centrifuge: the centrifugal acceleration is (6000±600) m/s $_2$;
Graduated centrifuge test tube: capacity 50mL, minimum graduation value 0.1mL;
Sieve: meet the requirements of GB/T 6003.1, pore size 180μm;
Electric heating blast drying oven: temperature control accuracy ±2℃;
Stopwatch: division value 0.1s;

6.3.2 Sampling

Take two samples from the samples before the temperature treatment, one is tested directly, and the other is tested after aging and cooling.
Aging conditions: Seal the sample, keep it at (60±3)℃ for (24±2) h, and then cool to room temperature.

6.3.3 Test procedure

Foam liquid should be tested for sediment according to the following steps:
a) Divide each sample into two 50mL graduated centrifuge test tubes, put them in the centrifuge symmetrically, and separate them under the condition of (6000±600)m/s $_2$ Heart (10±1)min;
b) Take out the graduated centrifugal test tube, read the volume of the sediment and convert it into volume percentage. Take the average of the readings of two test tubes as the meas result;
c) Wash the sediment on the screen with a washing bottle and observe whether the sediment can pass through the screen.

6.4 Viscosity

See 6.4.1 ~ 6.4.4 for the inspection method of pseudoplastic foam liquid. The Newtonian foam liquid is carried out in accordance with the inspection method specified in ISO 3104.

6.4.1 Equipment

According to the regulations of GB/T 21059, the rotational viscometer should meet the following parameters:
——Maximum shear stress ≥75Pa;
——Maximum shear rate ≥600/s.
The viscometer should be in a temperature control device to ensure that the temperature of the sample is kept within the specified temperature ±1℃.

6.4.2 Test temperature

The test temperature of foam liquid viscosity should start from 20°C (including 20°C), and decrease step by step with 10°C each time, until it reaches the lowest operating temperatu

6.4.3 Test procedure

If the sample contains suspended bubbles, first put the sample in a centrifuge that complies with 6.3.1 for a 10-minute centrifugal test, and then perform a viscosity test.
The test should be carried out as follows:

a) Adjust the temperature control equipment to the test temperature;
b) Place the sample;
c) Wait at least 10 minutes (without shearing) to reach temperature equilibrium;
d) Pre-shearing for 1 minute at a shear rate of 600/s;
e) Wait for 1 minute without shearing;
f) Start the test and measure the shear stress for 10s at each shear rate, starting from the lowest shear rate (75/s is appropriate).
In the shear rate range of 0/s to 600/s, such as 75/s, 150/s, 225/s, 300/s, 375/s, 450/s, 525/s, 600/s, measure at least 8 cuts
stress. Calculate the apparent viscosity, v, see formula 1, the unit is mPa/s:

---------- ---(1)

Where:
s $_1$ is the shear stress in Pa;
s $_2$ is the shear rate, the unit is s^{-1} .

6.4.4 Test results

Record the test results, including the test temperature; the unit is °C, the shear rate, the unit is s^{-1} ; Shear stress, in Pa; Apparent viscosity,
The unit is mPa/s.

6.5 pH

6.5.1 Instruments and reagents

Acidity meter: accuracy 0.1pH;

Thermometer: division value 1.0℃;

pH buffer.

6.5.2 Test procedure

The foam liquid should be tested for pH value according to the following steps:

a) Calibrate the pH meter with a pH buffer.

b) Take the foam solution before and after temperature treatment respectively, pour it into a dry and clean beaker, and immerse the electrode in the foam solution for 30 mm (electric
Do not touch the bottom of the beaker), and measure the pH value at (20±2)℃.

c) Repeat the test once and take the average of the two tests as the measurement result. The difference between the two test results is not more than 0.1 pH.

6.6 Surface tension, interfacial tension and diffusion coefficient

6.6.1 Instruments and reagents

Surface tension meter: the graduation value is 0.1mN/m;

Thermometer: division value 1.0℃;

Cyclohexane: purity not less than 99%;

Measuring cylinder: 100 mL, division value 10 mL; 10mL, division value 0.1 mL;

6.6.2 Test procedure

6.6.2.1 Surface tension

The foam liquid should be tested for surface tension according to the following steps:

a) Take the foam liquid before and after the temperature treatment respectively, pour it into a dry and clean beaker, and use grade 3 water (in accordance with GB/T 6682)
Prepare the foam solution at the concentration recommended by the supplier;

b) Measure the surface tension when the temperature of the foam solution is (20±1)℃;

c) Repeat the test once and take the average of the two tests as the measurement result.

6.6.2.2 Interfacial tension

After measuring the surface tension, add (5 ~ 7) mm thick (20±1) ℃ cyclohexane on the foam solution, wait (6±1) min, then measure
Determine the interfacial tension.

6.6.2.3 Calculation of diffusion coefficient

Calculate the diffusion coefficient between the foam solution and cyclohexane as follows:

$$S = \gamma_c - \gamma_f - \gamma_i \quad \cdots\cdots(2)$$

Where:

S—Diffusion coefficient, in millinew/meter (mN/m);

γ_c —Surface tension of cyclohexane, in millinew/meter (mN/m);

γ_f —the surface tension of the foam solution, in millinew/meter (mN/m);

γ_i — the interfacial tension between the foam solution and cyclohexane, in millinew/m (mN/m).

6.7 Foaming ratio and 25% drainage time of low expansion foam liquid

6.7.1 Equipment

The foam generation system is shown in Figure 1 (Figures 2, 3, 4 are not mentioned); Unit is mm

1—standard foam gun; 2—adjustable bracket; 3—foam liquid delivery pipe; 4—pressure-resistant storage tank; 5—pressure gauge (0 ~ 1MPa); 6—intake pipe;

Figure 1 Schematic diagram of installation of low expansion foam generation system

1— Outer wire joint; 2—Inner wire joint; 3, 6—PTFE gasket; 4—Three-hole orifice plate; 5—Single-hole orifice plate; 7—Outer wire joint; 8—inner wire joint; 9—takeover; 10—cross head; 11—bolt

Figure 2 Schematic diagram of standard foam gun

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1—Foam receiver; 2—Foam baffle; 3—Support: 4—Liquid spill detector support

Figure 3 Schematic diagram of low expansion foam collector

Unit is mm

1— Collector; 2— Support; 3— Transparent tube, 30mm to 50mm long, 6mm to 8mm aperture; 4- Section door; 5- Measuring cylinder

Note: The rated degree of tank bottom angle is 11º.

Figure 4 Schematic diagram of low-magnification effusion tester

Foam gun: see Figure 2. When using water for calibration, the water flow rate is 11.4±0.4 L/min under (0.63±0.03) MP pressure;

Foam collector: see figure 3. The surface of the foam collector can be made of stainless steel, aluminum, brass and plastic materials;

Liquid drain detector: see Figure 4, made of plastic or brass. Use water to calibrate the volume of the foam receiving tank to the nearest 1ml;

Thermometer: division value 1℃;

Measuring cylinder: graduation value 10 ml;

Balance: accuracy ±0.5g;

Stopwatch: division value 0.1s.

6.7.2 Temperature conditions

The test is carried out under the following conditions:

——Environmental temperature: (15 ~ 25)℃;

——Foam temperature: (15 ~ 20)℃.

6.7.2 Test procedure

The foam liquid should be tested for the expansion ratio and 25% drainage time according to the following steps:

a) Prepare a foam solution with fresh water for the samples before and after the temperature treatment according to the use concentration (if the foam solution is suitable for seawate
Prepared with 5.10.3 seawater), control the temperature of the foam solution so that the temperature of the generated foam is in the range of (15-20) ℃;

b) Start the air compressor and adjust the inlet pressure of the foam gun to (0.63±0.03) MPA to ensure the flow rate of the foam gun (11.4±0.4)
L/min;

c) Wet the inner wall of the foam receiving tank with water, wipe it clean, and weigh (m3);

d) Place the foam gun horizontally in front of the foam collector so that the distance from the front end of the foam gun to the top edge of the foam collector is (2.5±0.3) m, spray
Shoot the foam and adjust the height of the foam gun to make the foam hit the center of the foam collector. After (30±5)s the injection reaches a stable state,
Use the foam receiving tank to receive the foam, and start the stopwatch at the same time, scrape and wipe off the overflowing foam from the leaching analyzer, weigh (m4), p
Formula (3) Calculate the 25% fluid quality (m5);

$$m_5 = (m_4 - m_3)/4 \quad \cdots\cdots(3)$$

Where:

m_3 —The mass of the liquid leaching tester, in grams (g);

m_4 —The mass of the liquid separator when it is full of foam, in grams (g);

m_5 —25% of the mass of the liquid, the unit is grams (g).

e) Take off the receiver tank of the analyzer and place it on the balance. At the same time, put the foam receiver tank on the support, keeping it in the drain
Without foam, stop the stopwatch when the mass of the precipitated liquid is m5, and record the 25% of the time of the liquid.

f) The expansion ratio is calculated according to formula (4).

$$E=\rho V/(m_4 - m_3) \quad \cdots\cdots(4)$$

Where:

E—foaming multiple;

ρ—The density of the foam solution, in grams per milliliter (g/mL), take ρ=1.0g/mL;

V—The volume of the foam receiving tank, in milliliters (mL).

6.8 Foaming multiple of medium and high foam liquid

6.8.1 Medium foam liquid

6.8.1.1 Equipment

Foam collector: see Figure 5a), the volume (V) is 200L, the volume accuracy is ±2L, and there are 9 drain holes at the bottom. Stainless steel, Made of plastic and other materials;

Foam generation system (see Figure 1): with standard mid-fold foam generator (Figure 6). When the foam generator is calibrated with water, within (0.5±0.01) Under MPa pressure, the water flow rate is (3.25±0.15) L/min;

Measuring cylinder: graduation value 10mL;

Thermometer: division value 1℃;

Stopwatch: division value 0.1s;

Platform scale: accuracy 0.01kg.

Unit is mm

a) Medium-scale foam collector **b**) High-expansion foam collector

The bottom inclination is 11 。

c) The bottom of the foam collector

Figure 5 Foam collector

Unit is mm

1. Pressure ring 2. Stainless steel mesh, wire diameter 0.4mm, aperture 0.658mm 3. Shell 4. Nozzle 5. Collar 6. Nut 7. Nut 8. Bolt 9. Threaded joint 10. Three-way joint 11. Threaded joint 12. On-off valve 13. Connecting pipe 14. Pressure gauge

Figure 6 Medium double foam generator

6.8.1.2 Temperature conditions

The test is carried out under the following conditions:

——Environmental temperature: (15 ~ 25)℃;

——Foam solution temperature: (15 ~ 20)℃.

6.8.1.3 Test procedure

The foam liquid should be tested for the expansion ratio according to the following steps:

a) Prepare the foam solution with fresh water for the samples before and after the temperature treatment according to the use concentration. If the foam solution is suitable for seawa
Combine 5.10.3 seawater to prepare foam solution;

d) Seal the drain hole at the bottom of the foam collector with tape. Wet the inner wall of the foam collector, wipe it clean, and weigh (m1). Start bubble
Foam generation system, adjust the inlet pressure of the foam generator to (0.5±0.01) MPa, and the flow rate from 3.1l/min to 3.4l/min;

e) Collect the foam in the collector, and start the stopwatch when the foam is half full of the collector. When the collector is completely filled with foam, stop collecting
Collect the foam and smooth the foam along the upper edge of the foam collector. Weigh the mass of the collector at this time (m_2). According to formula (5) to calculate
Bubble multiple E .

$$E=\rho V/(m_2-m_1) \quad \text{……(5)}$$

Where:

E —foaming multiple;

ρ—The density of the foam solution, taking ρ=1.0kg/L;

V —The volume of the foam collector, in liters (L);

m_1 —The mass of the foam collector, in kilograms (kg);

m_2 —The mass of the foam collector when it is full of foam, in kilograms (kg).

6.8.2 High-expansion foam liquid

6.8.2.1 Equipment

Foam collector: see Figure 5b, the volume (V) is 500L, the volume accuracy is ±5L, and there are 9 drain holes at the bottom. Available in stainless steel, plastic Materials and other materials.

Foam generation system (see Figure 1): with a standard high-expansion foam generator (Figure 7). When the foam generator is calibrated with water, within (0.5±0.01) Under MPa pressure, the water flow rate is (6.1±0.1) L/min.

Measuring cylinder: graduation value 10mL;
Thermometer: division value 1℃;

Stopwatch: division value 0.1s;

Platform scale: accuracy 0.01kg.

Unit is mm

15

Description:
1. Pressure ring 2. Metal orifice plate 3. Fan 4. Bracket 5. Motor 6. Shell 7. Elbow 8. Nozzle 9. Conduit
10. Bolt 11. Screen 12. Nut 13. Inspection cover 14. Bolt 15. Bolt 16. Handle 17. Threaded joint
18. Three-way joint 19. Pressure gauge 20. Switch valve 21. Bolt 22. Bolt 23. Bolt

Figure 7 High expansion foam generator

6.8.2.2 Temperature conditions

The test is carried out under the following conditions:

Ambient temperature: (15 ~ 25)℃;

Foam solution temperature: (15 ~ 20)℃.

6.8.2.3 Test procedure

High-expansion foam liquid should be tested according to the following steps:

a) Prepare the foam solution with fresh water for the samples before and after the temperature treatment according to the use concentration. If the foam solution is suitable for seawa
Combine 5.10.3 seawater to prepare a foam solution.

b) Seal the drain hole at the bottom of the foam collector with tape. Wet the inner wall of the foam collector, wipe it clean, and weigh (m1). Start bubble
Foam generation system, adjust the inlet pressure of the foam generator to (0.5±0.01) MPa.

c) Collect the foam in the collector and start the stopwatch when the foam is half full of the collector. When the collector is completely filled with foam, stop collecting
Collect the foam and smooth the foam along the upper edge of the foam collector. Weigh the mass of the collector at this time (m_2). According to formula (5) to calculate
Bubble multiple.

6.9 Fire fighting performance

In view of the considerable financial resources and time for this test, it is recommended to arrange this test at the end. If the above-mentioned items have been determined to be unqu
Fire extinguishing performance can be omitted.

For temperature-sensitive foam liquids, temperature-treated samples should be used for fire-extinguishing performance tests; for non-temperature-sensitive foam liquids, it is advisa
The fire-extinguishing performance test is carried out with the sample after the temperature.

6.9.1 Test sequence

The test sequence of foam liquid fire extinguishing performance shall meet the following requirements:

a) For the foam solution that is not suitable for seawater, use fresh water to prepare the foam solution and conduct three tests according to the fire extinguishing grade declared by th
The second success is qualified. If all the first two trials succeed or fail, the third trial can be avoided.

b) For the foam solution suitable for seawater, in the first two tests, fresh water was used to prepare the foam solution in the first test, and the second test was
5.10.3 seawater to prepare foam solution. If both trials are all successful or all fail, the trial is terminated.

If one of the two tests is unsuccessful, the test is repeated, and the test is still unsuccessful, then the test is terminated. Repeat the test into
If the test is completed, the test will be repeated again, and the test will be terminated if the third test succeeds or fails.

6.9.2 Test conditions

Ambient temperature: (10 ~ 30)℃;
Foam temperature: (15 ~ 20)℃;
Fuel temperature: (10 ~ 30)℃;
wind Speed: not more than 3m/s (close to the oil pan).

6.9.3 Preparation of foam solution

The foam solution should be prepared with fresh water according to the use concentration of the sample. If the foam solution is suitable for seawater, artificial seawater should also l
The preparation concentration is the same as that of fresh water. Artificial sea water is composed of the following components (the chemical reagents used to prepare artificial sea water ar
Add 25.0g sodium chloride (N a Cl) to one liter of fresh water ; 11.0g magnesium chloride (M g Cl 2 .6H 2 O); 1.6g calcium chloride (C a Cl 2 .2H 2 O); 4.0g

Sodium sulfate (Na 2 SO 4).

6.9.4 Record

The following parameters were recorded during the test:
a) Indoor or outdoor;
b) ambient temperature;
c) foam temperature;
d) Wind speed;
e) 90% fire control time;
f) 99% fire control time;
g) Extinguishing time;
h) 25% anti-burn time;
i) 1% anti-burning time (only applicable to medium foam liquid).

6.9.5 Fire test of low-expansion foam liquid to extinguish non-water-soluble liquid fuel

6.9.5.1 Slow release fire extinguishing test

6.9.5.1.1 Equipment and materials

The test equipment and materials shall meet the following requirements:
a) Steel oil pan: the area is about 4.52m2, the inner diameter is (2400±25) mm, the depth is (200±15) mm, and the wall thickness is 2.5mm;
b) Steel baffle: length (1000±50) mm, height (1000±50) mm;
c) Foam gun and foam generating system: same as 6.8.1;
d) Steel anti-burning tank: inner diameter (300±5) mm, depth (250±5) mm, wall thickness 2.5mm;
e) Anemometer: accuracy 0.1m/s;
f) Stopwatch: division value 0.1s;
g) g) Fuel: solvent oil for rubber industry, meeting the requirements of SH 0004.

6.9.5.1.2 Test procedure

The test should be carried out as follows:
a) Place the oil pan on the ground and keep it level, keep the oil pan in the downwind direction of the foam gun, add 90L of fresh water to cover all the bottom of the pan, add
Fill in (144±5) L fuel so that the height from the fuel level to the top of the oil pan wall is about 150mm;
b) The foam gun is placed horizontally and (1±0.05) m above the fuel surface, so that the center of the foam jet hits the center axis of the baffle and is higher than the fuel surface.
Material surface (0.5±0.1)m;
c) Add fuel and ignite within (3-5) min. Pre-combustion (60±2) s;
d) Adjust the position of the foam gun to ensure that the jet can hit the center of the baffle. Supply bubble (300±2s. If the fire is extinguished, record the bubble supply until the fire
The extinguishing time is the extinguishing time;
e) For the foam liquid that is forced to be released and the test is successful, but fails to reach the level A of the anti-burning level, it is not required to be completely in the slow rele
Extinguish the flame; for foam liquid with a fire-extinguishing performance level of III, if the flame is not extinguished at the end of the bubble supply, the test will be termina
Test
f) After stopping the bubble supply, wait for (300±10) s, place the anti-burning tank with (2±0.1) L fuel in the center of the oil pan and ignite it, record
25% anti-burn time.

6.9.5.2 Forced release fire extinguishing test

6.9.5.2.1 Equipment and materials

Except for the oil pan without steel baffle, the others are the same as **6.9.5.1.1** .

6.9.5.2.1.1 Test procedure

The test should be carried out as follows:
a) According to 6.9.5.1.2, place the oil pan in the downwind direction of the foam gun. The position of the foam gun should make the center jet of foam fall far away.
On the fuel surface at (1±0.1) m from the end wall;
b) Add the fresh water and fuel specified in 6.9.5.1.2 a), the fuel will be ignited within 5 minutes, pre-burning (60 ± 2) s after the start of foaming;
c) Stop supplying foam after (180±2) s;

d) If the fire is completely extinguished, record the extinguishing time; if the flame is still not extinguished, wait to observe whether the remaining flame is completely extinguished Record the fire-fighting time;

e) After stopping the bubble supply, wait for (300±10) s, and place the anti-burning tank with (2±0.1)L fuel in the center of the oil pan and ignite it. recording The time from ignition of the anti-burning tank to 25% of the fuel area of the oil pan is ignited, that is, 25% anti-burning time.

6.9.6 Medium foam liquid

6.9.6.1 Equipment and materials

The test equipment and materials shall meet the following requirements:

a) Steel oil pan: area is about 1.73m2, diameter (1480±15) mm, depth (150±10) mm, wall thickness 2.5mm;

b) Foam generation system: same as 5.9.1.1;

c) Steel anti-burning tank: diameter (150±5) mm, height (150±5) mm, wall thickness 2.5mm, with a bracket that can be directly hung On the outside of the edge of the oil pan;

d) Anemometer: accuracy of 0.1m/s;

e) Thermometer: division value 1℃;

f) Stopwatch: division value 0.1s;

g) Fuel: 120# solvent oil for rubber industry, meeting the requirements of SH 0004.

6.9.6.2 Test procedure

The test should be carried out as follows:

a) Place the oil pan on the ground and keep it level. Add 30L water and (55±2)L fuel to make the height of the free disk wall 100mm. Hang the anti-burning tank with (0.9±0.1)L fuel on the leeward side of the oil pan. Install the mid-fold foam generator as shown in Figure 8, horizontal Place on the windward side of the oil pan. Ignite the fuel pan within 5 minutes of applying fuel. When the entire fuel surface is covered with flame for no less than 45s, Install the foam generator.

b) When the pre-ignition time reaches (60±2) s, the bubble supply starts. The bubble supply time is (120±2) s.

c) Record the time interval from the start of the bubble supply to the flame extinguishment is the fire extinguishing time.

d) After the end of the bubble supply, the flame in the anti-burning tank should continue to burn until a suspended flame appears on the foam layer in the oil pan. Record the time in It is 1% anti-burn time.

e) If the flame in the anti-burning tank is extinguished due to foam overflow during the bubble supply process, it should be re-ignited immediately.

Description:

1. Anti-burning tank 2. Oil pan 3. Medium expansion foam generator 4. Fuel 5. Water 6. Fuel

Figure 8 Schematic diagram of medium double foam fire extinguishing test

6.9.7 High-expansion foam liquid

6.9.7.1 Equipment and materials

The test equipment and materials shall meet the following requirements:

a) Foam generation system: same as 6.8.2.1;

b) Oil pan, anemometer, thermometer, stopwatch and fuel comply with 6.9.6.1;

c) Foam barrier: It is composed of 0.021mm (5 mesh) stainless steel net, arranged according to Figure 9.

6.9.7.2 Test procedure

The test should be carried out as follows:

a) Place the oil pan on the ground and keep it level. Add 30L water and (55±2)L fuel to make the height of the free disk wall 100mm.

According to Figure 5, arrange foam barriers and high-expansion foam generators around the oil pan, and place the high-expansion foam generator horizontally on the windwa
Ignite the fuel pan within 5 minutes of applying fuel. When the pre-combustion time (starting from the time when the entire fuel surface is filled with flame) reaches 45s
When, open the foam generator at a certain distance from the oil pan to generate foam.

b) When the pre-combustion time reaches (60±2) s, aim the foam generator at the opening of the barrier and start to supply foam. The bubble supply time is (120±2) s.

c) Record the time interval from the start of the bubble supply to the flame extinguishment is the fire extinguishing time.

Unit is mm

1. Foam block 2. Oil pan 3. High expansion foam generator 4. Fuel 5. Water

Figure 9 Schematic diagram of high expansion foam fire extinguishing test

6.9.8 Alcohol-resistant foam liquid

6.9.8.1 Non-water-soluble liquid fuel fire test

Proceed according to 6.9.5.

6.9.8.2 Fire test for water-soluble liquid fuel

6.9.8.2.1 Equipment and materials

The test equipment and materials shall meet the following requirements:

a) Steel oil pan: area 1.73m ^{2} , inner diameter (1480±15) mm, depth (150±10) mm, wall thickness 2.5mm;

b) Steel baffle: height (1000±50) mm, width (1000±50) mm, wall thickness 2.5mm;

c) Anti-burning tank: inner diameter (300±5) mm, depth (250±5) mm, wall thickness 2.5mm;

d) Fuel: industrial acetone with a purity of not less than 99% (conforming to GB 6026 standard, not less than first-class product); others are the same as 6.9.5.1.1.

6.9.8.2.2 Test procedure

The test should be carried out as follows:

a) Place the oil pan on the ground and keep it level so that the oil pan is downwind of the foam gun;

b) Place the foam gun horizontally and (1±0.05) m above the fuel surface, so that the center of the foam jet hits the central axis of the baffle and is higher than the fuel
Surface (0.5±0.1)m;

c) Add (125±5) L fuel to make the height of the free disk wall approximately 78mm. Add fuel to the fuel disk within (3-5) min, and pre-ignite (120±5)
s, start to provide bubbles;

d) Supply foam for (180±2) s (foam liquid with fire extinguishing performance level I) or (300±2) s (foam with fire extinguishing performance level II)
Liquid), record the fire extinguishing time;

e) Stop the bubble supply, wait for (300±10) s, put the anti-burning canister containing (2±0.1) L fuel in the center of the oil pan and ignite; record 25%
Anti-burn time.

7 Inspection rules

7.1 Sampling

The sampling should be representative, and the sample should be consistent with the population. For barreled products, the product in the barrel should be shaken before sampling; f
To pack the product, take a third sample from each of the upper, middle, and lower parts of the tank and use it as a sample after mixing. Take another sample before each performance test
When, the sample should be shaken well.

7.2 Factory inspection

Each batch of products should undergo factory inspection. The factory inspection items are those of the sample before temperature treatment: freezing point, pH value, sediment, dif
Coefficient (when applicable), foaming ratio, drainage time. If necessary, inspection items can be added according to the intended purpose.

7.3 Type inspection

All technical indicators of the corresponding fire extinguishing agents listed in 5 of this standard are type inspection items. Type inspection should be carried out in one of the follov

a) When new product identification or old product transfer to factory production;

e) When key raw materials and/or production processes are changed during formal production;

f) When the product is stopped for more than one year and resumes production;

g) When the national quality supervision or certification agency proposes type inspection.

7.4 Judgment of inspection results

7.4.1 Judgment of factory inspection results

The results of the factory inspection shall meet the corresponding technical requirements specified in Chapter 5 of this standard. If one item does not meet the requirements of this st
Qualified products.

7.4.2 Judgment of type inspection results

The result of the type inspection shall meet all the technical requirements specified in Chapter 5 of this standard. If one item does not meet the requirements of this standard, it shall
Qualified products.

8 Packaging, transportation, marking, storage, instruction manual

8.1 Packaging and transportation

The packaging and transportation of foam liquid should meet the relevant regulations of GB/T 36911, and the packaging container of foam liquid should not have bad product perfo
influences.

8.2 Sign

The following contents should be clearly and firmly indicated on the foam liquid packaging container:

a) Name, model specification;

b) Whether it is affected by freezing or melting;

c) Applicable water quality;

d) Fire fighting performance level and burning resistance level;

e) Whether it contains fluoride;

f) The volume (net weight) of the foam liquid, production batch number, production date and standard;

g) The name, address and telephone number of the manufacturer;

h) Warning words (at least include: storage temperature and use conditions, and how to handle after human contact).

8.3 Storage

The storage of foam liquid should be carried out in accordance with the recommendations or requirements of the manufacturer, and the storage temperature should be lower than 45

8.4 Instruction Manual

It should be accompanied by an instruction manual that meets the relevant regulations of GB/T 9969.

Appendix A
(Informative appendix)
Small-scale test for quality control of foam performance and fire extinguishing performance

A.1 Overview

The foam gun used in this appendix is different from the standard foam gun used in 5.8.1, and the foam produced is also different. Therefore, the use of two foam guns
The obtained foaming ratio, drainage time and fire extinguishing performance cannot be directly compared. The test methods provided in this appendix are applicable to the normal produ
Perform quality control on the foam performance and fire-extinguishing performance stability of the foam liquid.

A.2 Equipment

A.2.1 Oil pan, round, copper, as shown in Figure A.1, there is a drain hole with a valve in the center of the cone bottom, the size is as follows:

——Inner diameter (565±5) mm;
——Vertical wall height (150±5) mm;
——The height of cone base (30±5) mm;
——Wall thickness (2.5±0.2) mm.

The oil pan should have a vertical baffle, 2.5 mm thick, 600 mm long, and 300 mm high, with the eversion edge facing the nozzle. (There are
Outer flange, relative to the nozzle position of the gun when in use)

Note: The area of the oil pan is approximately 0.25 m^2; the oil pan is fixed at a position 1m above the ground with a steel bracket supported by four legs. The oil pan is usually placed under the fume hood and can b
Exhaust smoke without affecting the fire-extinguishing test.

A.2.2 Anti-burning pot, copper, with flanging, 4 nails at the bottom, total height (96±2) mm, dimensions as follows:

——Inner diameter (120±2) mm;
——Inner height (80±2) mm;
——Wall thickness (2.5±0.2) mm. 2.5 mm

A hook is fixed on the edge of the anti-scorching tank so that the anti-scorching can can be lifted with a metal rod.

A.2.3 Foam gun, as shown in Figure A.2, the flow rate measured with water under a pressure of (0.70±0.03) MPa should be (5.0±0.1) L/min. installation
The adjustable collar makes the foam spray from the nozzle edge of the foam gun through the outlet at different flow rates. The foam flow rate can also be adjusted to provide the foam
The pressure of the foam liquid is controlled.

A.2.4 Fuel:

—— Non-water-soluble liquid fuel: 120 # solvent oil for rubber industry, meeting the requirements of SH 0004;
——Water-soluble liquid fuel: industrial acetone with a purity of not less than 99% (conforming to GB/T 6026 standard, not less than first-class product).

A.3 Test procedure

A.3.1 Fire extinguishing test for non-water-soluble liquid fuel

A.3.1.1 Test conditions

Complete the test under the following conditions:
——Air temperature (15 ~ 25)℃;
——Fuel temperature (17.5±2.5)℃;
——The temperature of foam solution (15 ~ 25)℃.

A.3.1.2 Assembly

Place the foam gun horizontally and (150±5) mm above the top of the oil pan (see Figure A.1).

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According to the recommended concentration of the manufacturer, the applicable water quality (same as 6.9.3), the maximum premixing time, and equipment compatibility, avoid b
Foam solution pollution, etc. require preparation of foam solution.

By adjusting the collar and setting the foam gun pressure to (0.70±0.03) MPa, the foam solution flow rate reaches (0.75±0.025) kg/min,
The pressure of the foam gun can be reduced as needed. Collect the foam in a container for 6 s and weigh it to calculate the flow rate.

Place the foam gun horizontally so that the foam can be sprayed to the center of the oil pan. Turn off the foam spray device. Clean the oil pan and close the drain valve.

A.3.1.3 Test procedure

Put (9±0.1)L fuel in the oil pan, and put (0.3±0.01)L fuel in the anti-burning tank.

After adding fuel (120±2) s, ignite the fuel for pre-burning (60±2) s, and then supply bubble. Cast foam (180±2) s to the center of the oil pan,
Record the time from the beginning of the bubble supply to 90% fire control, 99% fire control and all extinguishment.

When the bubble supply is finished, ignite the fuel in the anti-burning tank, and after (60±2) s after stopping the bubble supply, lower the anti-burning tank position to the oil pan wi
Keep the foam from splashing into the anti-burning tank. Fix the anti-burning can to the surface of the oil pan, and record the continuous flame covering the entire oil pan.
between.

A.3.2 Water-soluble liquid fuel fire extinguishing test

A.3.2.1 Test conditions

Same as A.3.1.1.

A.3.2.2 Assembly

Except that the foam solution flow rate reaches (1.25±0.025) kg/min, the others are the same as A.3.1.2.

A.3.2.3 A.3.2.3 Test procedure

Except for fuel pre-burning (120±2) s and foaming (120±2) s, the others are the same as in A.3.1.3

A.4 Record

The following parameters were recorded during the test:

a) Indoor or outdoor;
b) Ambient temperature;
c) foam temperature;
d) 90% fire control time;
e) 99% fire control time;
f) Extinguishing time;
g) 100% anti-burn time.

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Unit: mm

Description:
1-Anti-burning tank;
2-Foam gun;
3——Baffle plate (optional);
4——Adjustable firmware;
5-oil pan;
6-Foam solution.

Figure A.1 Small-scale fire extinguishing test

Description:
1——Nozzle with foam splitter (see Figure A.3);
2——Connectors (see Figure A.4);
3-Mixing tube (see Figure A.5);
4-Stabilization tube (see Figure A.6);
5——Venturi tube (see Figure A.7);
6-Orifice G (see Figure A.8);
7-Gasket (see Figure A.9);
8——Orifice plate P (see Figure A.10);
9—Entrance (see Figure A.11).

Figure A.2 Small extinguishing test foam gun

Description:
1-3 holes øH
2-16 tpi
Note: The serial numbers in Figures A.3 to A.11 are those listed in Figure A.2.

Figure A.3 The nozzle of the foam separator

Unit: mm, unless otherwise specified

Figure A.4 Connector

Unit: mm, unless otherwise specified

Figure A.5 Mixing tube

Unit: mm, unless otherwise specified

Note: The end face is 90º with the axis; the thread is Wyeth 16tpi; the groove chamfer is 45º

Figure A.6 Stabilizing tube

Unit: mm, unless otherwise specified

Description:
1-4 holes ø6 are evenly distributed on the same plane.

Figure A.7 Venturi tube

Unit: mm

a micro radius

Figure A.8 Baffle G

Unit: mm, unless otherwise specified

Figure A.9 Gasket

Unit: mm

Figure A.10 Bezel P

Unit: mm, unless otherwise specified

Figure A.11 Entrance

Appendix B
(Informative appendix)
Radiation measurement method

B.1 Evaluation

In the process of monitoring fire extinguishing tests, the radiation measurement method is a convenient and objective measurement method, which reduces the requirements for visu Except for extinguishing time).

This appendix describes the equipment and test procedures required to conduct a series of tests in the same laboratory, as well as methods for interpreting and providing data. This s The method is suitable for low and medium foam liquids, but not for high foam liquids.

B.2 Test arrangement

As shown in Figure B.1, the radiometer should be placed opposite the oil pan. The distance between the radiometer and the edge of the oil pan shall not be less than two of the diam

The height should not be lower than the upper edge of the oil pan 1.5m.

Note: The maximum distance is limited by the sensitivity of the radiometer.

The radiation level should be recorded continuously or at intervals not exceeding 1s.

Unit: **1m**

Description:

1-Radiometer

2-round oil pan

Figure B.1 Schematic diagram of the location of the radiometer for recording thermal radiation in the fire extinguishing test

B.3 Technical data of the radiometer

Two Gordon or Schmidt-Boelter radiometers can be used. The radiometer needs to be cooled with water. The cold water temperature is (30±10)℃, and The water temperature is constant during the measurement.

The radiometer should be able to absorb at least 90% of the radiation in the range of 0.6μm to 15μm.

For the full combustion test process, the radiometer reading should not be less than 0.6 times the full range.

1

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The maximum nonlinearity of the radiometer should be ±3% of the rated measurement range, and the maximum response time is 2s (reaching 63% of the full response).

If the spectral sensitivity can be met, a radiometer with protective glass can be used. If necessary, if the radiometer has better linearity, the above rules The predetermined use measurement range can be changed accordingly. Considering the greater influence of background radiation, it is recommended not to use a radiometer with a utiliz

B.4 steps

The background radiation after 5s to 10s after complete fire suppression should be subtracted to correct the output of the 2 radiometers.

Determine the mean value of the 2 radiometers.

Determine the average radiation time recorded during the 25s period from 30s to 5s before applying the foam (see Figure B.2).

Calculate the relative radiation by dividing the output value by the mean value obtained as described above.

The instantaneous radiation value fluctuates randomly. A smooth curve can be obtained by calculating the average radiation value within 5s before and after each time point.

Figure B.3 shows the relative radiation of the fire extinguishing test. The relative radiation of 90% fire control is 0.1.

Figure B.4 shows the relative radiation level during the anti-burn process.

The above description explains that computer-controlled measurement methods should be used.

Description:

X——Time, the unit is s

Y——Radiation, the unit is kw/m 2

Figure B.2 Absolute radiation level throughout the test

2

Description:

X——time, unit s

Y-relative radiation, no unit

Note: The time for applying foam is 0-4min. 90% fire control time is 1min8s.

Figure B.3 Relative radiation level during fire fighting

Description:

X——time, unit s

Y-relative radiation, no unit

Note: Anti-burning starts at 0min. The 25% anti-burn time is about 8min30s.

Figure B.4 Relative radiation level during anti-burn process

Appendix C

(Informative appendix)

compatibility

C.1 Compatibility of foam liquid and dry powder fire extinguishing agent

When foam and dry powder are used simultaneously or continuously, it should be ensured that their interaction will not cause loss of effectiveness.

The small fire extinguishing test described in Appendix A can be used to evaluate the compatibility of foam liquid and dry powder.

This test is completed on the foam liquid to be tested, and then the test is repeated once the fuel is covered with dry powder.

The test steps are as follows:

a) Put (500±1)g dry powder on a 180μm sieve, and put the sieve on paper or cardboard.

b) Place the sieve on the fuel and remove the cardboard or paper.

c) The dry powder is evenly dispersed on the fuel surface from a height of (150 ± 10) mm.

d) Sprinkle the dry powder on the fuel surface within 60 seconds after being ignited.

Compared with the test without dry powder, if the increase in the extinguishing time is greater than or equal to 25%, the mixing of foam and dry powder is considered to cause impo
Power loss.

A reduction of 25% or more in the anti-burning time after using the dry powder indicates that the foam is not compatible with the dry powder.

C.2 Compatibility between foam liquids

Different production enterprises, different grades or different types of foam liquids are often incompatible and cannot be mixed, unless the mixing is proven in advance
No loss of effectiveness.