ICS 13.220.50
CCS C84

national standards of People's Republic of China

GB 23864—20XX
Replace GB 23864-2009

`

# Fire blocking material

Firestop material

(Draft for comments)

20XX-XX-XX released 20XX-XX-XX implementation

Item Times

Foreword..... II
1 Scope..... 1
2 Normative references ... ..... 1
3 Terms and definitions..... ..... 1
4 Classification and labeling..... ..... 2
4.1 Classification ... ..... 2
4.2 Marking..... ..... 2
5 General provisions..... ..... 3
6 Requirements... ..... 3
6.1 Environmental resistance... ..... 3
6.2 Combustion performance ... ..... 4
6.3 Fire resistance... ..... 4
7 Test method..... ..... 4
7.1 Corrosion ... ..... 4
7.2 Environmental resistance (except corrosive)..... ..... 5
7.3 Combustion performance... ..... 6
7.4 Fire resistance... ..... 6
8 Inspection rules ... ..... 10
9 Comprehensive Judgment Criteria..... ..... 10
10 Use of fire resistance test results... ..... 10
11 Packaging, marking, storage and transportation..... ..... 10
Appendix A (Normative) Installation of Standard Specimen for Fire Resistance Test of Fireproof Sealing Materials..... 11
Appendix B (Normative) Conventional performance requirements and test methods for fire-resistant plugging materials..... .. 15
Appendix C (Informative) Installation of typical test pieces for fire resistance performance test of fireproof plugging components..... 20
Appendix D (Normative) Fireproof plugging materials, optional and additional tests for fireproof plugging components-flushing test..... 22
Appendix E (Informative) Use of Fire Resistance Test Results..... ..... twenty three







before Speak

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1: Structure and Drafting Rules of Standardization Documents"

Drafting.

This document replaces GB 23864-2009 "Fireproof Sealing Materials".

Compared with GB 23864-2009, the main technical changes of this document are as follows except for editorial changes:

-Added terms and definitions (see 3.4);

——A type of multi-component fire-proof sealing material has been added (see 4.1.2);

——The marking method has been modified, and the environmental conditions for electric fires have been added. The fire resistance performance level code is changed from the original A
Thermal and integrity), amended to EI (insulation and integrity), E (integrity) (see 4.2, 6.3);

——Increase environmental resistance, and reduce the corrosion resistance, water resistance, oil resistance, humidity and heat resistance, freeze-thaw cycle resistance, alkali resistance, an
The acid resistance requirements are adjusted to this clause, and the corrosion test method is modified (see 7.1);

-Modified the combustion performance requirements and test methods (see 6.2.3, 7.3);

——The fire resistance performance has been revised, the heating conditions of electric fire and the pressure conditions in the furnace have been added, and the original standard fiber fire
The pressure has been modified (see 7.4.2), the material of the cable and the end of the pipe under fire (see 7.4.4.1.2) has been modified, and the Class E fire resistance limit has been added.
Judgment (see 7.4.7.1); flush test (see 7.4.9) has been added;

——Modified the inspection rules (see 8.1, 8.3);

——Modified the comprehensive judgment rules (see 9);

——Revised Appendix A, clarified the cable model of 3×50+1×25mm ₂ YJV cable (see A.9), adjusted the standard of fireproof plugging component
The quasi-test piece is Appendix Figure C.1, with Figure C.2 added (see Appendix C);

——Appendix B has been added to change the initial setting time, apparent density, compressive strength, flexural strength, expansion performance requirements and tests of the original s
The method was adjusted to a normative appendix. The requirements for smoke toxicity, smoke density, air tightness, halogen acid content and test methods were added, and the appearance,
Drop resistance requirements and test methods;

——Added flush test (see Appendix D);

Appendix A, Appendix B, and Appendix D of this document are normative appendices, and Appendix C and Appendix E are informative appendices.

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

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 National Fire Standardization Technical Committee (SAC/TC 113).

The previous releases of GB 23864 are as follows:

——GB 23864-2009.







# Fire blocking material

## 1 Scope

This document specifies the terms and definitions, classification and marking, requirements, test methods, inspection rules, and comprehensive criteria for fire-resistant sealing materials.
Rules and packaging, marking, storage, transportation, etc.

This document is applicable to fire-proof sealing materials used in various through holes and structural gaps in buildings, structures and various facilities
Or fire-proof plugging components. It is not suitable for fireproof expansion seals and hard polyvinyl chloride construction drainage pipe firestop rings used inside building accessories.

## 2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated reference documents, Only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document file.

GB/T 2611 General technical requirements for testing machines

GB/T 5455 Textile Burning Performance Test Vertical Method

GB/T 7019-2014 Test method for fiber cement products

GB/T 7106 Test method for airtightness, watertightness and wind pressure resistance of exterior doors and windows of buildings

GB 8624 Classification of burning performance of building materials and products

GB/T 8626 Flammability test of building materials

GB/T 8627 Smoke density test method for burning or decomposition of building materials

GB/T 9978.1 Fire Test Method of Building Elements Part 1: General Requirements

GB/T 17650.1 Test method for gas released when materials taken from cables or optical cables burn. Part 1: Determination of total halogen acid gas

GB/T 20285-2006 Material smoke toxicity hazard classification

XF 304-2012 Plastic Pipe Firestop

XF/T 714-2007 Test method for rapid heating and fire resistance of fire protection materials for components

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Fire blocking material **firestop material**

With fire and smoke prevention functions, it is used to seal or fill through holes, annular gaps and constructions in buildings, structures and various facilities. Create gaps for easy replacement of materials that meet relevant performance requirements.

3.2

Firestop subassembly firestop subassembly

A combined system composed of a variety of fire-proof sealing materials and fire-resistant heat-insulating materials to maintain the fire resistance of the structure and is easy to replace.

3.3

Moveable joint

A gap that may change its width or position due to deformation after being heated.







3.4

Cable penetration rate (pipe penetration rate) percent for cable(pipe) penetration area

The total cross-sectional area of all penetrations such as cables, pipes, bridges, etc., accounts for the percentage of the cross-sectional area of the plugged hole.

4 Classification and marking

4.1 Classification

4.1.1 Fire-proof plugging materials can be divided into: fire-proof plugging materials for holes, fire-proof plugging materials for gaps, and fire-proof seals for plastic pipes. Three categories of plugging materials:

——Fire-proof plugging materials for holes refer to the fire-proof materials used to seal and plug the holes in the penetrating structure to maintain the overall fire resistance of the structure The blocking material is represented by the code K.

——Fire-proof sealing materials for gaps are used between fire-proof separation components or between fire-proof separation components and other components (such as expansion joints Settlement joints, anti-seismic joints, structural joints, etc.) are used to seal and plug the joints to maintain the overall fire resistance of the structure. The code is used F said. Such as fireproof sealant, gap blocking material.

——Fire-proof plugging materials for plastic pipes are used to maintain the overall resistance of the structure when the plastic pipes pass through holes such as walls and floors. The fireproof sealing materials and products used for fire performance are represented by the code S.

4.1.2 Fire-proof sealing materials can be divided into the following types according to the composition and shape characteristics of the product:

——Flexible organic plugging material: organic materials are used as adhesives, which have a certain degree of flexibility or plasticity when used, and the product is a clay-like object;

——Inorganic plugging material: a powdery solid with inorganic materials as the main component, which has proper workability when blended with admixtures;

——Fire-resistant bag: a bag-like object made of packaging fire-resistant materials, suitable for fire-proof sealing of larger holes or fire-proof separation of cable trays (Fireproof bag is also called fireproof bag or fireproof bag);

——Fire retardant module: a solid with a certain shape and size made of fireproof material, which can be easily cut and drilled, suitable for

Fire blocking of holes or cable trays;

——Fire-proof sealing board: a board made of fire-proof materials, which can be easily cut and drilled, and is suitable for fire-proof sealing of large holes;

——Foam plugging material: fireproof material that can expand and foam and seal the hole after being injected into the hole;

——Multi-component plugging material: Two or more component liquid materials (solid powder can be added as additives) are mixed uniformly, and Fire-proof materials with fire-proof sealing function produced after learning reaction;

-Gap plugging material: a solid fireproof material placed in a gap and used to block a fixed or moving gap;

——Fireproof sealant: liquid or paste-like fireproof material with fireproof sealing function;

——Fire-resistant tape: a flexible, winding and crimping ribbon product made of fire-resistant materials, wrapped around the outer surface of a plastic pipe, and used with steel tape Cover or fix it in other appropriate ways, expand and squeeze the softened pipe after encountering a fire, and block the holes left by the burning or softening of the plastic pipe.

4.2 Marking

The corresponding relationship between the names, codes and uses of various types of fire-proof sealing materials is as follows:

Flexible organic plugging...DRK;

Inorganic plugging.....DWK;

Flame retardant package……DBK;

Fire resistance module...DMK;

Fire-proof sealing board... DCK;

Foam sealing material...DPK;

Multi-component plugging material...DDK;

Fireproof sealant……DJF;

Gap sealing material...DFF;







Fire-resistance bag belt...DTS;

Fire environmental conditions: $F_{XH}$ is used for building fiber fires , and $F_{DL}$ is used for electric fires .

Fire resistance performance grade code: E is used to meet fire resistance integrity, and EI is used to meet fire resistance integrity and heat insulation; fire resistance The test integrity is qualified, and the flushing test is qualified by EC at the same time, the fire resistance test integrity and heat insulation type are qualified, and the flushing test is qualified by I Said.

The order of marking is: code of fire-resistant sealing material-environmental conditions of fire-code of fire resistance performance level-product model of the enterprise.

Example 1: DMK - $F_{XH}$ - E3, which means that the building fiber has three-hour fire resistance integrity under the condition of heating up. It is used as a resistance to plugging holes. Fire module.

Example 2: DWK - $F_{DL}$ - EIC2 - ZH08, which means that it has two-hour fire resistance integrity and heat insulation under the condition of electric fire heating, flushing The test qualified inorganic plugging material used for hole plugging, the company's product model is ZH08.

5 General rules

5.1 No asbestos or other harmful substances to the human body are added to the plugging material.

5.2 For blocking products that are liquid during construction, specify the initial setting time range in the product instructions. The blocking material can be completed in the product regulations During the curing period, dry and solidify under natural environmental conditions.

5.3 There is no pungent odor after the blocking material is completely dried.

5.4 The physical and chemical properties of flexible organic plugging materials, inorganic plugging materials, fire-resisting packages, fire-resisting modules, fire-proof sealing plates and foam s The provisions of Appendix B Table B.1. The physical and chemical properties of the gap sealing material, fire-resistant sealant and fire-resistant tape should meet the requirements of Appendix

5.5 Flexible organic plugging material, fire retardant module, fireproof plugging board, foam plugging material, gap plugging material, fireproof sealant and fireproof package The smoke toxicity, smoke density, air tightness, and halogen acid content of the belt should meet the requirements of Appendix B.1.

6 requirements

6.1 Environmental resistance

6.1.1 Flexible organic plugging materials, inorganic plugging materials, fire-resisting packages, fire-resisting modules, fire-proof blocking plates, foam blocking materials and multi-component The environmental resistance of the material should meet the requirements of Table 1.

Table 1 Technical requirements for environmental resistance performance of fireproof plugging materials such as flexible organic plugging materials

| sequence | Test items | Technical index |
|---|---|---|

| number | | Flexible Machine blockage | Inorganic plugging | Firestop package | Fire retardant module | Fire seal Blocking plate | Foam seal Blocking material | Multi-component blocking material |
|---|---|---|---|---|---|---|---|---|
| 1 | Corrosive, d | ≥7, should not be out Now rusted and rotted Eclipse | ≥7, should not be out Now rusted and rotted Eclipse | — | ≥7, should not be out Now rusted and rotted Eclipse | — | ≥7, should not be out Now rusted and rotted Eclipse | ≥7, should not be out Now rusted and corroded phenomenon |
| 2 | Water resistance, d | ≥3, insoluble Swelling, no cracking | ≥3, insoluble Swelling, no cracking | ≥3, interior material No obvious change End of the package Whole, no damage | ≥3, insoluble Swelling, no cracking | ≥3, no Swelling, not Cracking | ≥3, insoluble Swelling, no cracking | ≥3, no swelling, No cracking |
| 3 | Oil resistance, d | ≥3, no swelling, no cracking; no obvious change in the internal material of the fire-resisting package, complete package body, no damage | | | | | | |
| 4 | Heat and humidity resistance, h | ≥120, no cracking, no powdering; no obvious change in the internal material of the fire retardant package | | | | | | |
| 5 | Resistant to freeze-thaw cycles Ring, times | ≥15, no cracking, no powdering; no obvious change in the internal material of the fire-resistance package | | | | | | |

6.1.2 The environmental resistance of gap sealing materials, fire-resistant sealants and fire-resistant tapes shall meet the requirements of Table 2.







Table 2 Technical requirements for environmental resistance performance of gap sealing materials, fire-resistant sealants and fire-resistant tapes

| Serial number | Test items | Technical index | | |
|---|---|---|---|---|
| | | Gap sealing material | Fireproof sealant | Fire retardant tape |
| 1 | Corrosive, d | — | ≥7, there should be no rust or corrosion | — |
| 2 | Water resistance, d | ≥3, no swelling, no cracking | | |
| 3 | Alkali resistance, d | | | |
| 4 | Acid resistance, d | | | |
| 5 | Humidity and heat resistance, h | ≥360, no cracking, no chalking | | ≥120, no cracking, no chalking |
| 6 | Resistant to freeze-thaw cycles, times | ≥15, no cracking, no chalking | | ≥15, no cracking, no chalking |

6.2 Combustion performance

6.2.1 Except for inorganic plugging materials, the combustion performance of other plugging materials shall meet the requirements of 6.2.2 ~ 6.2.3.

6.2.2 The fabric used for the fire-resistance package shall meet the following requirements: the damage length is less than or equal to 150mm, the continuous burning time is less than or equal to

Causes absorbent cotton to burn or smolder.

6.2.3 Combustion performance level of other fire blocking material is not less than a predetermined GB 8624 supplies class $B_2$ levels.

6.3 Fire resistance

6.3.1 The fire resistance performance of fire-resistant sealing materials is shown in Table 3 according to different fire environmental conditions.

E indicates) time is divided into three levels: 1 h, 2 h, 3 h, and meets the requirements of fire integrity and fire insulation (indicated by EI).

There are three levels: 1 h, 2 h, and 3 h.

6.3.2 The fire resistance performance of the fire-proof sealing material shall meet the requirements of Table 3.

Table 3 Classification code of fire resistance performance

| Fire resistance limit (R), h | Fire resistance classification code | | | |
|---|---|---|---|---|
| | Building fiber fire | | Electric fire | |
| | Meet fire integrity | Meet the fire integrity and Fire resistance and heat insulation | Meet fire integrity | Meet the fire integrity and Fire resistance and heat insulation |
| 1.00≤R < 2.00 | $F_{xx}$ -E1 | $F_{xx}$ -EI1 | $F_{tx}$ -E1 | $F_{tx}$ -EI1 |
| 2.00≤R < 3.00 | $F_{xx}$ -E2 | $F_{xx}$ -EI2 | $F_{tx}$ -E2 | $F_{tx}$ -EI2 |
| R≥3.00 | $F_{xx}$ -E3 | $F_{xx}$ -EI3 | $F_{tx}$ -E3 | $F_{tx}$ -EI3 |

7 Test method

7.1 Corrosion

7.1.1 Fire Resistance Module

Take two Q235 ordinary carbon structural steel pipes with a length of 250 mm and an outer diameter of φ30mm ~ φ40mm, and a length of 250 mm and an outer diameter of φ
Three PVC insulated and sheathed cables of 30mm ~ φ40mm are drilled in the fire retardant module with the same diameter as the steel pipe and cable, and they are cross-sectioned. will







The steel pipes and cables are placed in the holes of the fire-resistance module and fixed with clamps. The fixing method is shown in Figure 1. Place the cured specimen in the wet
In a test box with a temperature of 90%±5% and a temperature of 70 ℃±5 ℃, after seven days, take out the test piece and place it in an environment not exposed to direct sunlight.
Naturally dry. Observe whether there is rust or corrosion in the contact part of the steel pipe and cable outer rubber skin and the plugging sample.

Figure 1 Corrosion test of fire retardant module

7.1.2 Corrosion test of other plugging materials

Take two Q235 ordinary carbon structural steel plates of 150mm×100mm×0.8mm respectively, with a length of 25 mm and an outer diameter of φ30mm ~ φ40mm
Three cables, apply the blended inorganic blocking material, flexible organic blocking material, foam blocking material, multi-component blocking material or fireproof sealant to the
Steel plate and cable outer rubber surface. Place the cured specimen in a test box with a humidity of 90%±5% and a temperature of 70 ℃±5 ℃,
After seven days, take out the test piece and place it in an environment not exposed to direct sunlight, and let it dry naturally. Observe the outer rubber and plugging test of steel pipes and cables
Whether there is rust or corrosion in the contact part of the sample.

7.2 Environmental resistance (except corrosive)

7.2.1 Preparation of test samples

Inorganic plugging material, multi-component plugging material, fireproof sealant: pour the reconciled sample into a standard test mold of 200mm×20mm×20mm,
Tamping and smoothing, and demoulding after curing. After the curing period expires, the sample is sawed and cut into three cube test blocks of 20mm×20mm×20mm. Sample
Reconciliation and maintenance are carried out in accordance with the product instructions.

Flexible organic plugging material: Take a certain amount of sample, knead it, and make three spheres with a diameter of 20mm.

Fire resistance package: The sample is a complete three package body.

Other fire-proof sealing materials: cut the sample into three test blocks of 20 mm×20 mm×20 mm, with coated fire-proof sealing materials on the surface,
The exposed section should be coated with the same surface material. For materials with a thickness of less than 20 mm, the thickness of the test block is the same as that of the material.

Note: For fire-resistant sealants that cannot be cured, they can be coated on three 50 mm×50 mm×2 mm stainless steel plates or polyethylene plastic plates for testing.
The thickness is 1 mm ± 0.5 mm.

7.2.2 Test procedure

7.2.2.1 Water resistance

Immerse the prepared and cured samples in tap water, keep the temperature at 20 ℃ ± 5 ℃, observe once a day, after reaching the specified time
take out. Observe whether the sample swells or cracks, whether the package body of the fire retardant package is complete, whether there is damage, and whether there is any obvious change in

7.2.2.2 Oil resistance

Immerse the cured sample in transformer oil, keep the oil temperature at 20 ℃ ± 5 ℃, observe once a day, and take it out after three days.

7.2.2.3 Humidity and heat resistance

Place the cured specimen in a test box with a humidity of 90% ± 5% and a temperature of 45 ℃ ± 5 ℃. After the specified time, take it out
The specimen is placed in an environment not exposed to direct sunlight and is naturally dry. Observe whether the sample is cracked or powdered.

7.2.2.4 Freeze-thaw cycle resistance

Put the cured specimens in water at 23 ℃±2 ℃ for 18 hours, and then put the specimens in a low temperature box at -20 ℃±2 ℃.
After the temperature in the box reaches -18 ℃, it will be frozen for 3 hours, and then the test piece will be taken out of the low temperature box, and immediately placed in a 50 ℃ ± 2 ℃ consta
Temperature for 3 h. Take out the test piece and repeat the above operation for a total of 15 cycles. Observe whether the sample is cracked or powdered.

7.2.2.5 Acid resistance

Place the cured test piece in a 3% hydrochloric acid solution, keep the temperature at 20 ℃ ± 5 ℃, observe once a day, observe the test
Whether the sample swells or cracks.

7.2.2.6 Alkali resistance

Immerse the cured specimen in a 3% ammonia solution, keep the temperature at 20 ℃ ± 5 ℃, observe once a day, observe the sample
Whether it swells or cracks.

7.2.3 Judgment conditions

7.2.3.1 Water resistance, oil resistance, acid resistance, alkali resistance

After soaking the fire-resistant bag for a specified period of time, take it out and wipe it dry. The bag body should be intact and undamaged, and there should be no obvious changes in the
After other samples are immersed for the specified time, at least two of the three test pieces shall not swell or crack.

7.2.3.2 Humidity and heat resistance, freeze-thaw cycle resistance

After the test is carried out in accordance with the regulations, there should be no obvious change in the internal materials of the fire-resistance package.
Chalking phenomenon.

7.3 Combustion performance

7.3.1 Firestop package

The fabric materials used are tested according to GB/T 5455.

7.3.2 Other fire-proof sealing materials other than fire-resistance packages

7.3.2.1 Sample

The test sample should be representative of the fire-resistant sealing material. According to the requirements of GB/T 8626, the samples are made or spliced into a 250 mm×90 mm test
The thickness of the test piece is the actual thickness of the product, and the maximum thickness should not exceed 60 mm. Otherwise, the sample should be cut off on the fire-back surface to m
Note: The fire barrier tape can be fixed on a non-combustible inorganic board substrate with a thickness of not less than 10 mm as a test piece by splicing.

7.3.2.2 Special samples

For non-sheet products or products that need to be formed, such as flexible organic plugging materials, multi-component plugging materials, fireproof sealants, gap plugging materials, etc
It should be placed in a mold to make a sheet with a size of not less than 300 mm×300 mm and a thickness of 3 mm, and the temperature is between 60 ℃ and 65 ℃.
Dry in an oven for more than 72 hours, and then make a test piece with a size of 250 mm×90 mm according to the requirements of GB/T 8626. The foam plugging material should be in the form
A test piece is made on the sample, the thickness of the test piece is 60 mm.

7.3.2.3 Test method

According to the provisions of GB/T 8626, the surface ignition method is used for the test.

7.4 Fire resistance

7.4.1 Test device







7.4.1.1 Refractory test furnace

Meet the requirements of GB/T 9978.1 for refractory test furnace.
The refractory test furnace should meet the requirements of specimen installation, heating conditions, pressure conditions, temperature testing and experimental observation.

7.4.1.2 Temperature measuring equipment

7.4.1.2.1 Furnace temperature test

For temperature measurement in the furnace, a thermocouple with a wire diameter of φ0.75 mm ~ φ2.30 mm is used, and the hot end of the thermocouple should extend out of the sleeve 2
The distance between the warm end and the blocking material fire plane is 100 mm. The number of thermocouples in the furnace shall not be less than 5.

7.4.1.2.2 Temperature measurement of the fire-back surface of the test piece

The fire-back surface of the test piece-the sealing material, the surface of the cable or the surface of the pipe, the surface of the frame 25 mm from the edge of the sealing material, and the
The surface temperature is measured by thermocouple with a wire diameter of φ0.5 mm, industrial grade II, and the number shall not be less than 6. Distribution is: plugging material table
The surface is 25 mm away from the surface of the penetrating object, no less than 2; the surface of the penetrating object (cable, cable bundle or pipe) is not 25 mm away from the surface of the
At least one penetrating object shall be provided; at least one shall be provided at the place 25 mm from the surface of the bracket or tray to the surface of the blocking material; when the fire-re
Two thermocouples are set on the surface of the material pipe 25 mm from the floor or wall; one thermocouple is set on the frame surface 25 mm from the edge of the blocking material; another
A mobile temperature measuring thermocouple is used to monitor the temperature rise of suspicious points on the back surface of the test piece when necessary, and its data should be used as the

7.4.1.2.3 Accuracy of temperature measuring equipment

The accuracy (system error) of temperature measuring equipment should reach:

Inside the furnace: ±15 ℃

Surface or others: ±5 ℃

7.4.2 Test conditions

7.4.2.1 Heating conditions

When using building fiber fire heating conditions, the temperature in the test furnace should meet the relevant regulations in GB/T 9978.1.

When using electric fire heating conditions, the temperature in the refractory test furnace should comply with the relevant regulations in 5.1.1 of XF/T 714-2007.

7.4.2.2 Pressure conditions in the furnace

When using building fiber fire heating conditions, the pressure in the test furnace should meet the relevant regulations in GB/T 9978.1.

When using electric fire heating conditions, the refractory test furnace is 100 mm below the horizontal plane of the top of the vertical test piece (vertical member) or the bottom surface of
The pressure in the furnace at the horizontal plane (horizontal member), the pressure value is (20±5) Pa after 5 minutes from the start of the test, and the pressure value is (22±3) after 10 minutes
Pa.

7.4.3 Specimen requirements

When the fire resistance test is carried out, the materials, manufacturing process, splicing and installation methods used in the test piece should be sufficient to reflect the actual use of the
Case. The modification of the installation method to enable the test to be carried out shall not have a significant impact on the test result, and the modification shall be explained in detail.

7.4.4 Specimen production

7.4.4.1 Overview

7.4.4.1.1 When making product quality judgments for fire-resistant sealing materials, the production of test pieces can be selected from the production of standard test pieces specified in this doc
the way. For the test piece used in actual engineering, the production of the test piece should be consistent with the actual use. When the test piece made according to the actual engineering appli
When including all penetrations in the standard test piece and their combination, if its fire resistance meets the specified requirements, the test results can also be used for the production







Product quality judgment.

7.4.4.1.2 The fire end of the cable uses aluminum silicate fiber cotton head (head length 50 mm, thickness 25 mm), and the length of the cable exposed to the fire
300 mm; the inner diameter of the pipe is plugged with aluminum silicate fiber cotton at the fire end of the pipe, and the length of the plug is 100 mm, and the pipe extends 300 mm from the fire
The length of the wear is 1500 mm.

7.4.4.1.3 The penetration or support on the fire-back surface shall be fixed in an appropriate way to prevent the penetration or support before or during the test.
slide.

7.4.4.2 Test piece of fire-proof plugging material for hole

7.4.4.2.1 Standard test pieces of fire-proof plugging materials for holes shall include concrete frames, penetrations, brackets and fire-proof plugging materials for holes, etc.
Part, the size and detailed production requirements of standard test pieces are shown in Appendix A.1.

7.4.4.2.2 For inorganic blocking materials, fire-resistance packages or fire-resistance modules, the fire-proof blocking materials shown in Figure A.1 shall be tested inorganic blocking materials,
One of the fire-resistance package or the fire-resistance module is allowed to be used in conjunction with the flexible organic blocking material or fire-proof sealant according to the requirement
The product name, location and amount of use are indicated in the drawing.

7.4.4.2.3 For flexible organic plugging materials, foam plugging materials and multi-component plugging materials, the plugging materials in Figure A.1 are made of reserved rectangular holes
The hole (hole length: 510 mm, height: 110 mm) is replaced by C30 concrete, and the reserved rectangular hole is located in Figure A.1. Cables need to be laid
The location of penetrating objects such as bridges, cables and steel pipes. Lay penetrating objects such as cable trays, cables and steel pipes in the reserved rectangular holes according to Figure
Use flexible organic plugging materials, foam plugging materials and multi-component plugging materials to block all gaps in the holes.

Note: The test pieces of flexible organic plugging materials, foam plugging materials and multi-component plugging materials are shown in Figure A.2.

7.4.4.2.4 For the fire-proof sealing board, the fire-proof sealing material in Figure A.1 should adopt a fire-proof sealing plate on the fire-receiving surface and the fire-back surface.
It is allowed to use flexible organic blocking material or fire-proof sealant at the junction of the plate, frame and penetration according to the requirements of the product manual, and
Indicate the product name, use location and dosage in the drawing.

7.4.4.3 Fireproof sealing materials for gaps

7.4.4.3.1 The standard test piece of fire-proof plugging material shall include concrete frame, fixed bracket and fire-proof plugging material for structural gaps, etc.
The test piece shall include the maximum and minimum fixed gap widths that are compatible with the performance of the fire-proof sealing material. The maximum and minimum gap widths ar
The trustee shall determine, if necessary, a movable gap may be included. For the size and detailed manufacturing requirements of the standard test piece, see Appendix A, A.6.
7.4.4.3.2 If the fire-proof plugging material has the ability to seal deformation gaps, for those that allow the gaps to undergo certain deformation during use
For the plugging material, before the fire resistance test, the gap should be moved to the position when the deformation rate is 100%;
For fire-resistant sealing materials that deform to a certain extent during the test, the gap should gradually move from 20% of the allowable deformation rate to the allowable change during the t
The shape rate is 100%, and the time for the gap to move must be controlled within the first 60 minutes after the start of the fire resistance test.

7.4.4.4 Fireproof plugging materials for plastic pipes

Typical test pieces of fire-proof plugging materials for plastic pipes should include concrete frames, plastic pipes, brackets, and fire-proof plugging materials for plastic pipes, etc.
Part, the size and detailed production requirements of standard test pieces are shown in Appendix A.3.

7.4.4.5 Fire-proof plugging component test piece

A typical test piece of a fire-proof plugging component should include concrete frames, penetrations, brackets, fire-proof plugging materials, and fire-resistant and heat-insulating material
See Appendix C C.1 for the dimensions and detailed manufacturing requirements of typical test pieces.

When the fire-proof sealing component is made according to the engineering application, it should reflect its actual use structure.

7.4.5 Status adjustment

After the test piece is made, it should be maintained in accordance with the provisions of the product instructions, and the fire resistance test can be carried out after the test piece has expir

7.4.6 Test procedure







7.4.6.1 Installation of test piece

The installation of the test piece should reflect the actual use situation. According to the test requirements, the test piece is installed vertically or horizontally on the combustion test furnac
Thermocouples are arranged on the fire-proof sealing materials, penetrations and the frame of the fire-back surface to measure the temperature rise of the fire-back surface. The cantilever end of
Effective support (bracket).

7.4.6.2 Measurement and observation

The thermocouples used for temperature measurement in the furnace should meet the requirements of GB/T 9978.1, the setting of thermocouples should be no less than 5, and the tempera
At 30 s.

- The temperature of the back fire surface of the test piece

Measure and observe the temperature of the surface of the blocking material on the backfire surface, the temperature of the cable surface 25 mm from the backfire surface of the blocking r
The temperature of the pipe surface at 25 mm from the fire-back surface and the temperature of the frame surface at 25 mm from the fire-back surface of the sealing material.

- Integrity

Measure and observe whether there is flame or hot air flowing through the igniting cotton pad on the back fire surface of the test piece, and whether there is continuous flame on the back f
More than 10 s. The requirements and use of cotton pads should meet the requirements of GB/T 9978.1.

- Thermal insulation

Measure and record the temperature rise of all temperature measurement points on the backfire surface, including the temperature rise of the moving thermocouple, and the time when the

7.4.7 Judgment criteria for fire resistance limit

7.4.7.1 Judgment of fire resistance limit

For Class E fire-resistant plugging materials, when the integrity loss specified in 7.4.7.2 occurs in the test, the integrity of the fire-resistant plugging material is indicated
When the limit state has been reached, the recorded time is the limit fire resistance time of the integrity loss of the fireproof sealing material.

For EI fire-proof sealing materials, any of the integrity loss or loss of heat insulation specified in 7.4.7.2 and 7.4.7.3 occurred in the test

It means that the integrity or heat insulation of the fireproof sealing material has reached the limit state, and the recorded time is the completeness of the fireproof sealing material.

The ultimate fire resistance time for loss of integrity or loss of thermal insulation.

7.4.7.2 Loss of integrity

The characteristic of integrity loss is that the following phenomena appear on the back fire surface of the test piece:

a) The cotton pad is ignited;

b) Flame appears and lasts for more than 10 s;

c) The gap probe can pass through.

7.4.7.3 Loss of insulation

a) The temperature rise at any point on the fire surface of the tested sample exceeds the initial temperature by 180 ℃;

b) The surface temperature rise at 25 mm from the backfire end of any penetrating object to the plugging material exceeds the initial temperature of 180 ℃;

c) The temperature rise at any point on the surface of the flame-back surface exceeds the initial temperature by 180 ℃.

Note: The initial temperature refers to the initial average temperature of the fire-back surface at the beginning of the test.

7.4.8 Expression of fire resistance

The ultimate fire resistance time of the test piece is used to express the fire resistance performance of the fireproof sealing material, with an accuracy of 0.01 h.

7.4.9 Flush test

For the vertical plugging type fireproof plugging material or system selected for flushing test, the test and judgment shall be carried out in accordance with the provisions of Appendix D.







7.4.10 Modification of fire resistance limit

If the temperature in the furnace exceeds the specified allowable deviation due to abnormal conditions during the test, the actual refractory time should be adjusted according to the temper

Make corrections. The correction value is the area of the actual furnace temperature curve in the first 3/4 of the actual refractory time and the standard temperature curve of the corresponding tin

2/3 of the difference is multiplied by the actual fire resistance time, and their product is divided by the area under the standard temperature curve within the first 3/4 of the actual fire resistance ti

$$2I = C (A - A ) /. 3A \quad \cdots\cdots (1)$$

If the actual furnace temperature exceeds the standard furnace temperature, the adjustment time will increase, and vice versa. The correction formula is as follows:

Where:

C——I's equal time period correction value, the unit is minute (min);

I——The actual fire resistance time, in minutes (min);

A——The area under the actual furnace temperature curve of the first 3/4 I;

$A_s$ ——the area under the standard furnace temperature curve in the same time period as A;

8 Inspection rules

8.1 Except for the additional flush test, the technical indicators of combustion performance, fire resistance and environmental resistance specified in this document are all type inspection items.

8.2 In one of the following situations, the product shall undergo type inspection.

a) Trial production appraisal of a new product being put into production or a product transferred to a factory;

b) After formal production, when there are major changes in the raw materials, formulas, and production processes of the product, or when the normal production has reached three years;

c) When the product has been stopped for more than one year and production is resumed;

d) When there is a big difference between the factory inspection result and the last type inspection;

e) When requested by the quality supervision agency.

8.3 The water resistance, oil resistance, alkali resistance, etc. specified in this document are the factory inspection items.

9 Comprehensive Judgment Criteria

The fire resistance performance of the fire-proof sealing material reaches a certain level (1 h, 2 h, 3 h) according to the designated category (E, EI category) under certain fire environment

When the product meets the requirements of the standard and other performance indicators meet the requirements of the standard, the product is recognized as having a certain quality under the

First level qualified.

10 Use of fire resistance test results

The fire resistance test results can be directly applied to occasions where the fire test installation conditions and temperature rise conditions are consistent. For inconsistent occasions, its Refer to Appendix E for the application of fire resistance test results.

11 Packaging, marking, storage and transportation

11.1 The product should be packaged in clean, dry, and sealable bags or containers, with a certificate of conformity and instructions for use of the product.

11.2 The product packaging should indicate the name of the manufacturer, address, product name, product trademark (when applicable), specification and model, and production date Or batch number, storage period, package dimensions (when applicable) or quality, etc.

11.3 The product should be stored in a ventilated, dry, and protected place from direct sunlight.

11.4 During transportation, the product should be protected from rain and exposure, and should comply with the relevant regulations of the transportation department.







Appendix A

(Normative)

Installation of standard test piece for fire resistance performance test of fireproof plugging material

A.1 The installation method of the cable through the standard test piece is shown in Figure A.1:

Figure A.1 The installation method of the cable passing through the standard test piece







A.2 The installation method of flexible organic plugging material and foam plugging material cable through the standard test piece is shown in Figure A.2:

Figure A.2 Installation method of flexible organic plugging material and foam plugging material cable through standard test piece

A.3 The installation method of the pipe penetrating the standard test piece is shown in Figure A.3:

Figure A.3 Installation method of pipe penetration standard test piece

A.4 The pipe plugging material is installed on the floor or wall for fire resistance test. The floor and wall should be reserved with holes for passing the test pipe. pipeline
The installation method of the plugging material should be sufficient to reflect its actual use, and the installation modification made to enable the test to be carried out should be the pipe pluggin
No significant impact on performance. The plastic pipes used for the test should meet the requirements of the relevant national or industry standards.

A.5 During the test, fix the pipe plugging material with metal expansion bolts and other metal parts to the cast-in-place monolithic C30 concrete with a structural thickness of 120mm
Under the floor (the thickness of the protective layer of the fire-receiving surface of the concrete slab is 10mm) or the side of the fire-receiving surface of the concrete wall with a thickness of 20
The length of the plastic pipe on the fire-back surface exposed to the floor or wall is 1000mm, and the pipe port on the fire-side surface is blocked with a plug of the same material or mineral wo
The plugging length is (50±10) mm, and the fire-back surface test tube is fixed with a support at 50mm from the nozzle. On the fire-back surface 25mm away from the floor or wall
Install a thermocouple on each side of the symmetrical outer surface of the tube.







A.6 The installation method of the gap standard test piece is shown in Figure A.4:

Figure A.4 Installation method of standard test piece for gap plugging

A.7 The plate used to support the gap in the frame is C30 concrete slab (the thickness of the protective layer on the fire surface of the concrete slab is 10mm). For gap sealing materials, According to the request of the client, the gap can be moved mechanically before or during the fire resistance test. The movement method can be along the quilt
The supported plane moves the width of the gap. It can also be moved in the shearing direction or other directions. The maximum distance of movement should be based on the gap sealing mate
The performance of the material is determined by the client.

A.8 On the concrete supporting member of the gap plugging material, two thermocouples are arranged in each gap at a distance of 25mm from the back surface of the gap to the edge of the gap. The back fire surface of the plugging material is arranged, and two thermocouples are arranged in each gap along the center line of the gap.

A.9 Figure A.1 of Appendix A, Figure A.2 and Figure C.1 of Appendix C, Figure C.1 and Figure C.2 used 3×50+1×25 mm ₂ YJV cable model is specifically
ZC-YJV-3×50+1×25 copper core XLPE insulated PVC sheathed flame-retardant Class C power cable, the oxygen index of the sheath layer is 38-40.







Appendix B
(Normative)
Conventional performance requirements and test methods for fire-resistant plugging materials

B.1 General performance requirements

B.1.1 Physical and chemical properties

The physical and chemical properties of flexible organic plugging materials, inorganic plugging materials, fire-resisting packages, fire-resisting modules, fire-proof sealing plates and foam
The provisions of B.1.

The physical and chemical properties of the gap sealing material, fire-resistant sealant and fire-resistant tape should meet the requirements of Table B.2.

B.1.2 Toxicity of smoke production

The smoke-producing toxicity of fire-proof sealing materials should not be lower than ZA $_2$ level in GB/T 20285-2006 .

B.1.3 Smoke density

Using the method specified in GB/T 8627 for testing, the smoke density grade SDR of the fire-proof plugging material should not be greater than 35.

Note: Except for the smoke density index fire-resisting package and inorganic blocking material.

B.1.4 Air tightness

The test method specified in GB/T 7107 is adopted, and the air permeability per unit area is used as the air tightness judgment index.

The tightness should not be higher than 3.5 m $_3$ /(m $_2$ ·h).

B.1.5 Halogen acid content

Using the method specified in GB/T 17650.1, the halogen acid content of the fire-resistant sealing material should not be greater than 10 mg/g.

Note: Inorganic plugging materials and gap plugging materials are excluded for the content index of halogen acid.

Table B.1 The technical requirements for the physical and chemical properties of fireproof plugging materials such as flexible organic plugging materials

| sequence number | Test items | Technical index | | | | | |
|---|---|---|---|---|---|---|---|
| | | Flexible Machine blockage | Inorganic plugging | Firestop package | Fire retardant module | Fire seal Blocking plate | Foam seal Blocking material |
| 1 | Apparent density kg/m $_3$ | ≤2.0×10 $_3$ | ≤2.0×10 $_3$ | ≤1.2×10 $_3$ | ≤2.0×10 $_3$ | — | ≤1.0×10 $_3$ |
| 2 | Compressive strength MPa | — | 0.8≤R≤6.5 | — | R≥0.10 | — | — |
| 3 | Bending strength MPa | — | — | — | — | ≥0.10 | — |
| 4 | Expansion performance % | — | — | ≥150 | ≥120 | — | ≥150 |

Note: Except for the elastic fire resistance module with compressive strength index.

B.2 Test method

B.2.1 Initial setting time (t)

Under the condition of 20 ℃ ± 5 ℃, according to the mixing ratio specified in the product instructions, stir evenly and then stand still, use a stopwatch to measure the mixing ratio The time until the loss of fluidity is evened out.







Table B.2 Technical requirements for the physical and chemical properties of gap sealing materials, fire-resistant sealants and fire-resistant tapes

| Serial number | Test items | Technical index | | |
|---|---|---|---|---|
| | | Gap sealing material | Fireproof sealant | Fire retardant tape |
| 1 | Apparent density kg/m $_3$ | ≤1.6×10 $^3$ | ≤2.0×10 $^3$ | ≤1.6×10 $^3$ |
| 2 | Expansion performance % | ≥300 | ≥300 | — |

B.2.2 Apparent density

B.2.2.1 Test conditions

The density test should be carried out under normal temperature conditions.

B.2.2.2 Test device

Stainless steel container: inner diameter is φ50 mm, height is 50 mm;

Electronic balance: range greater than 100 g, accuracy 0.1 g;

Electronic balance: range 1000 g, accuracy 1 g;

Ruler: accuracy 1 mm;

Vernier caliper: accuracy of 0.02 mm;

Measuring cylinder: 1200 mL;

Electric heating blast drying oven: 0 ℃ ~ 200 ℃.

B.2.2.3 Test procedure

B.2.2.3.1 Flexible organic blocking material, fireproof sealant

Put the fireproof sealant or the evenly mixed flexible organic plugging material into a stainless steel container with an inner diameter of φ50 mm and a height of 50 mm. Use straight
A stainless steel rod with a diameter of 5 mm is inserted to fill the entire container, and the surface is smoothed with a stainless steel plate to make the upper surface of the stainless steel contain
The upper surface is on the same plane. Accurately weigh its mass $m_2$, $m_2$ minus the mass of the stainless steel container itself $m_1$ is the mass m of the sample, accurate to
0.1 g.

Apparent density ρ ($kg/m^3$) is calculated according to formula (B.1):

$$\rho = m/v \quad \cdots\cdots (B.1)$$

Where:

ρ—apparent density, the unit is kilogram per cubic meter ($kg/m^3$);

m—The mass of the sample, in kilograms (kg);

V—The empty volume of the stainless steel container, in cubic meters ($m^3$).

The test data is the arithmetic mean of the two test results, rounded to $0.1\times10^3$ $kg/m^3$. The difference between the two test results shall not exceed 0.2
$\times10^3$ $kg/m^3$.

B.2.2.3.2 Inorganic blocking material, fire retardant package

Put the internal materials of the fire-resistance bag into an electric heating blast drying box, and dry it to a constant weight at 65 ℃ ± 2 ℃.

After mixing the sample (inorganic plugging material or the inner material of the fire retardant package) evenly, slowly put it into a measuring cylinder with a range of not less than 1200 m
Vibrate the measuring cylinder gently from left to right to make the sample in the measuring cylinder level with the scale line, and record the scale reading V.

Weigh the mass of the empty measuring cylinder and the mass of the measuring cylinder after loading the sample. The difference between the two is the mass of the sample, accurate to 0.

The apparent density is calculated according to formula (B.2):







$$\rho = m/v \quad \cdots\cdots (B.2)$$

Where:

ρ—apparent density, the unit is kilogram per cubic meter ($kg/m^3$);

m—The mass of the sample, in kilograms (kg);

V—The volume of the sample, in cubic meters ($m^3$).

The test data is the arithmetic mean of the two test results, rounded to $0.1\times10^3$ $kg/m^3$. The difference between the two test results shall not exceed 0.2
$\times10^3$ $kg/m^3$.

B.2.2.3.3 Fire-resistant modules, fire-proof sealing plates, foam sealing materials

Cut the fire-resistant module, fire-proof sealing board or formed foam sealing material into two test pieces of 50 mm×50mm×20 mm (also available
So it is the actual thickness), weigh the mass to the accuracy of 1 g, and measure the size to the accuracy of 1 mm.

The apparent density is calculated according to formula (B.3):

$$\rho = m/v \quad \cdots\cdots (B.3)$$

Where:

ρ—apparent density, the unit is kilogram per cubic meter ($kg/m^3$);

m—The mass of the sample, in kilograms (kg);

V—The volume of the sample, in cubic meters ($m^3$).

The test data is the arithmetic mean of the two test results, rounded to $0.1\times10^3$ $kg/m^3$. The difference between the two test results shall not exceed 0.2
$\times10^3$ $kg/m^3$.

B.2.2.3.4 Fire barrier tape and gap sealing material

Cut the fire barrier tape or gap sealing material into two test pieces of 100 mm×10mm×2 mm (the actual width and thickness can also be),
Weigh the mass to the accuracy of 1 g, and measure the size to the accuracy of 1 mm.

The apparent density is calculated according to formula (B.4):

$$\rho = m/v \quad \cdots\cdots (B.4)$$

Where:

ρ—apparent density, the unit is kilogram per cubic meter ($kg/m^3$);

m—The mass of the sample, in kilograms (kg);

V—The volume of the sample, in cubic meters ($m^3$).

The test data is the arithmetic mean of the two test results, rounded to $0.1\times10^{3}$ kg/m$^{3}$. The difference between the two test results shall not exceed $0.2\times10^{3}$ kg/m$^{3}$.

B.2.3 Compressive strength

B.2.3.1 Preparation of test samples

Pour the reconciled inorganic plugging material into a trial mold with a size of 62.5 mm×40mm×40 mm, tamping and smoothing, and demoulding after it is basically solidified. The mixing and curing of the samples should be carried out in accordance with the product instructions, and the number of samples is five.

Cut the fire resistance module into 62.5 mm×40mm×40 mm specimens, the number of specimens is five.

B.2.3.2 Test device

The test adopts a pressure testing machine that meets the requirements of GB/T 2611.

B.2.3.3 Test procedure







Choose any side of the test block as the pressure surface, and use a vernier caliper to measure the length and width of the pressure section to the nearest 1mm.

Place the pressure surface of the selected test block upward on the pressurizing seat of the pressure testing machine, so that the center line of the test piece coincides with the center line of Load evenly at a speed of 1500N/min ~ 2000 N/min until the specimen is broken, and record the pressure reading when the specimen is broken.

The compressive strength is calculated according to formula (B.5):

$$R = P/S \quad \text{(B.5)}$$

Where:

R——Compressive strength, in megapascals (MPa);

P——Pressure reading, the unit is Newton (N);

S——The area under pressure, the unit is square millimeter (mm$^{2}$).

The compressive strength result is expressed as the arithmetic average of the five test values after excluding gross errors, and is accurate to 0.01 MPa.

B.2.4 Flexural strength

The samples were processed into test pieces with a size of 240 mm×100 mm, and the number of test pieces was five. The fireproof sealing material with coating on the surface, its bare The exposed section should be coated with the same surface material. Test and calculate the bending strength of the specimen according to the provisions of Article 10 of GB/T 7019-2014, The results of flexural strength are expressed as the arithmetic average of the five test values after excluding gross errors, and the accuracy is 0.01 MPa.

B.2.5 Expansion performance

B.2.5.1 Preparation of test pieces

Fire-resistance bag: After mixing the inner materials of the fire-resistance bag evenly, put them into three steel containers with an inner diameter of φ50 mm and a height of 50 mm. The loose accumulation thickness of the internal material of the fire barrier in the steel container is 10 mm.

Fire retardant module, gap plugging material, foam plugging material (cured and formed): cut the sample into three diameters of φ48 mm ~ φ The specimen block of 50mm and the thickness of 10 mm±3 mm can be superimposed if the thickness is insufficient, and each specimen shall contain at least one use surface. Then, divide Do not put it in three steel containers with an inner diameter of φ50mm and a height of not less than 50 mm.

Fireproof sealant: Inject the fireproof sealant into three steel containers with an inner diameter of φ50 mm and a height of 50 mm. The injection height of the fireproof sealant is The degree is 3 mm±1 mm. Then, put the steel container into an electric heating blast drying oven with a temperature of 60 ℃ ± 5 ℃ to dry for more than 48 hours. According to production The use requirements of the product can also be dried in layers, and the thickness of the sample after drying is 3 mm ± 1 mm.

B.2.5.2 Test procedure

Use a steel ruler to measure the height of the sample before expansion. Then, put the steel container with the sample in the resistance temperature of 540 ℃ ± 10 ℃ In the furnace, take it out after a constant temperature of 30 minutes. After it is sufficiently cooled, measure the height of the sample after expansion (if the surface of the expanded sample is not Try multiple points and take the average value). The ratio of the height of the sample after expansion to the height before expansion is the expansion multiple of the material. Expansion perform The arithmetic mean of the expansion multiple of the sample is expressed, accurate to the first decimal place.

The expansion performance of the fire barrier tape shall be tested in accordance with the provisions of Article 6.3 of XF 304-2012.

B.2.6 Toxicity of smoke production

The fire-proof sealing material shall be tested according to the regulations of GB/T 20285-2006 for the smoke-producing toxicity hazard classification, and the result shall meet the require

B.2.7 Smoke density

The fire-proof plugging material shall be tested for smoke density according to the method specified in GB/T 8627. The sample size meets the size and thickness specified in GB/T 8627 For the actual thickness of the sealing material, the maximum thickness should not exceed 25 mm. During the test, the side of the fire-resistant sealing material shall face the flame, and the test s

The results should meet the requirements of 5.1.6.

B.2.8 Air tightness







The air-tight performance of fire-proof plugging components shall be tested in accordance with the regulations of GB/T7107.

B.2.9 Halogen acid content

The halogen acid content is tested according to the national standard GB/T 17650.1.

Page 23



Appendix C

(Informative)

Installation of typical test pieces for fire resistance performance test of fireproof plugging components

C.1 The typical installation method of fireproof plugging components is shown in Figure C.1 and Figure C.2.

Figure C.1 Installation method of typical test piece for fireproof plugging component 1



Page 24

Figure C.2 Installation method of typical test piece for fire-proof plugging component 2

C.2 On the surface of the fire-proof sealing material of the cable penetration test piece and the fire-proof plugging component test piece, a heat pipe shall be arranged at a distance of 25mm from
Galvanic couple. Arrange a thermocouple on the surface of each penetrating object 25mm away from the backfire surface. When the fire surface of the penetrating object is heat-insulated or coa
Place a thermocouple on the penetration object at a distance of 25mm from the edge of the insulation layer or coating. Any other suspicious points can be set with thermocouples.







Appendix D

(Normative)

Optional and additional tests for fire-proof plugging materials, fire-proof plugging components-flushing test

D.1 For the samples that have completed the fire resistance test, take them out when they reach the specified fire time, and immediately follow Table D.1 to press the middle part and then the otl
Slowly change the direction to impact the fire surface with water, and observe whether water flow is formed on the fire surface of the specimen under the impact, penetration and cooling of the s
Hole.

Table D.1 Pressure and time-flush test

| Fire resistance time min | Water gun inlet pressure (kP a ) | Fire area (m $^2$ ) And the corresponding flushing time (s) |
|---|---|---|
| 240≤t < 480 | 310 | 3.0 (32) |

| | | |
|---|---|---|
| 120≤t < 240 | 210 | 1.5 (16) |
| 90≤t < 120 | 210 | 0.9 (10) |
| 60≤t < 90 | 210 | 0.60 (6) |
| t < 60 | 210 | 0.60 (6) |

D.2 During the test, if the water flow is directed to the fireproof plugging material or the fireproof plugging component evenly spraying out, the calculated area in Table D.1 shall include the The outer frame size of the fire blocking material or fire blocking component.

D.3 The water flow should be shot through a hose with a nominal diameter of φ65mm and a direct-flow water gun with a nozzle diameter of 16 mm. The water pressure and time should be in ac Regulations are carried out.

D.4 When the nozzle opening is directly facing the center of the test piece, the axial distance between the nozzle opening and the fire surface of the test piece should be 6m±0.1m.

D.5 Judgment

D.5.1 In the fire resistance test and the flush test, the fire-resistant sealing material or fire-resistant sealing component meets the following requirements, and it meets the EC level requirements.

D.5.1.1 The fireproof sealing material or fireproof sealing component does not lose its integrity within the required fire resistance time.

D.5.1.2 During the flush test, the fire-proof sealing material or fire-proof sealing component did not show any holes that would cause water flow on the fire-back surface.

D.5.2 During the fire resistance test and the flush test, the fireproof sealing material or fireproof sealing component meets the following requirements, and it meets the EIC level requirements.

D.5.2.1 The integrity and thermal insulation are not lost within the required fire resistance time.

D.5.2.2 During the flush test, the fire-proof sealing material or fire-proof sealing component did not show any holes that would cause water flow on the fire-back surface.







Appendix E

(Informative)

Use of fire resistance test results

E.1 In actual applications, the fire-proof plugging component can only be used in the parts where the fire resistance limit requirement is less than or equal to the fire resistance limit test result.

E.2 When the standard specimens specified in this document are used for the test, the fire resistance test results obtained from the fire resistance test of the horizontal specimens can be Used for vertical members of corresponding structural form.

E.3 In the actual engineering application of the fire-proof blocking system or component, if the penetration material used is a non-flame-retardant power cable, it shall be used in the blocking ma Use cable fire-retardant coating or cable flame-retardant tape on both sides to protect non-flame-retardant power cables, and the length of protection shall not be less than 315mm.

E.4 The fire resistance test results of concrete components can be used for concrete or masonry structures whose thickness is greater than or equal to the thickness of the concrete components us Structure.

E.5 The fire resistance test results of standard specimens can only be applied to the cable filling rate (pipe penetration rate) not greater than the cable filling rate (pipe penetration rate) during the Road penetration rate). The fire resistance test results of standard specimens can only be applied to cables of the same type and not greater than the outer diameter of the cable during the test. Situation: The outer diameter of the pipe is not greater than the outer diameter of the pipe during the test.

E.6 The fire resistance test results of standard specimens for gaps can only be used for gaps of the same type. In practical applications, when the gap width and/ Or when the displacement is less than or equal to the standard specimen, the fire resistance test result is valid.

E.7 Fire environment conditions include GB/T 9978.1 standard temperature rise and XF/T 714-2007 power fire temperature rise. The design unit shall The sealing material is selected using the specific environment and the specific conditions of the fire. For the presence of combustibles on both sides of the plugging structure, it shall be in acco It is stipulated that EI type fireproof sealing materials should be selected so that the sealing structure can effectively prevent the spread of fire.

E.8 The test results obtained by using standard test pieces can be used to judge the quality of fire-resistant sealing material products, but the fire-resistant test results are only It can show its fire resistance performance under the structural form determined in this document, and it cannot be used for all structural forms.