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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Test method for artificial accelerated ageing of fire protection
and flame retardant materials**

防火阻燃材料人工加速老化试验方法

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Foreword

6.1 Sample Quantity and Preparation Prepare samples according to the quantity, size, and other specifications for each item in Appendix A. The sample quantity shall include at least two groups of exposed samples and a non-exposed control. sample.

6.2 Sample Placement Place the prepared sample on the sample rack inside the accelerated aging test apparatus, ensuring it is positioned at a suitable location (e.g., on both sides of a long strip of material). Make a mark that is not easily removed (such as the ends, corners, etc. of square materials), and this mark should not be destroyed in subsequent tests. In tests measuring changes in sample color and appearance, a portion of the sample can be covered with an opaque material during the test to compare the covered area with the sample. Exposed surface.

7 Parameters of Artificial Accelerated Aging Test

7.1 UV/Water Spray Aging The UV/water spray aging test parameters should be set according to the specifications in Table

1.The spacing between samples placed in the test chamber should be no less than 10 mm. Accelerated aging tests should be completed 112 full cycles consecutively within 28 days.

Table

1.Parameters for UV/Water Spray Aging Test Serial Number | Test Type | Test Time | Light Source Type | Irradiance | Blackboard Temperature Step 1.UV irradiation for 5 hours (UVA-340,

0.83 W/(m²·nm) (@340nm)) at $50^{\circ}\text{C}\pm 3^{\circ}\text{C}$ Step

7.2 Damp-heat aging

7.2.1 Damp heat aging including sub-zero temperatures The parameters and procedures for the damp heat aging test, including sub-zero temperatures, are set according to the

specifications in Table

2. The sample chamber is placed vertically within the test chamber. The distance should be no less than 10mm. To complete one full cycle, following the steps, temperature and humidity conditions, aging time, and number of cycles specified in Table 2, the following is required. For 7 days, the artificial accelerated aging test should be carried out for two complete cycles within 14 days.

7.2.2 Damp-heat aging including high humidity conditions The parameters for the damp heat aging test, which includes high humidity conditions, should be set according to the specifications in Table

3. The spacing between samples placed vertically inside the test chamber should be considerable. The thickness is 10 mm. The artificial accelerated aging test should be carried out continuously for 21 complete cycles within 21 days.

7.2.3 Conventional damp heat aging The parameters for routine damp heat aging tests should be set according to the specifications in Table

4. The spacing between samples placed vertically in the test chamber should be no less than 10 mm. Artificial accelerated aging tests should be performed for 21 complete cycles over 21 days.

8 Test Exposure

8.1 Exposure Types Based on the environment in which fire-retardant materials are used, the types of test exposures are divided into the following four categories.

- a) Type A. Material exposure type applicable to all conditions (indoor, semi-outdoor, and outdoor).
- b) Type B. Materials suitable for indoor and semi-outdoor conditions. Semi-outdoor includes sub-zero temperatures, but without exposure to rain and with limited exposure. Exposure to ultraviolet light.
- c) Type C. Suitable for indoor materials with a relative humidity of 85% or higher, excluding sub-zero temperatures.
- d) Type D. Suitable for indoor use and materials with relative humidity less than 85%, excluding sub-zero temperatures. Products that meet the requirements for Type A test exposure also meet the requirements for all other types. Products that meet the requirements for Type B test exposure... The products also meet the requirements for both Type C and Type D exposure tests. Products that meet the requirements for Type C exposure tests also meet the requirements for Type D exposure tests. Exposure type requirements.

8.2 Test Procedure Before placing the sample into the test chamber, the aging parameters

and the number of cycles should be set according to the provisions of Chapter 7, and the entire process should be recorded. The test procedures for different exposure types are as follows:

- a) Type A. First, perform 112 UV/water spray cycles (28 days) according to the procedure in Table 1, then expose two complete [cells/areas] according to the procedure in Table 2. The loop (14d);
- b) Type B. Expose 3 complete loops according to the procedure in Table 2 (21d);
- c) Type C. Expose 3 complete loops according to the procedure in Table 3 (21d);
- d) Type D. Expose 3 complete loops (21d) according to the procedure in Table 4. To ensure uniform exposure, the position of the sample within the chamber can be varied, but the original surface orientation of the sample must not be changed. If samples need to be removed for periodic inspection, their surfaces should not be touched or damaged. After inspection, samples should be returned to their respective sample racks in their original condition. Or, in a test chamber, keep the sample surface facing the same direction as before the inspection.

9 Determination of performance changes of samples after exposure

9.1 Sample processing after aging test After completing the aging tests according to different exposure types, remove the samples from the test chamber and dry them with appropriate tools (e.g., towels). Water droplets on the sample surface are removed by absorbing absorbent paper.

9.2 Physicochemical Performance Testing The methods for testing the physicochemical properties of samples after exposure shall be in accordance with Appendix A. If there are additional required physicochemical property test items, they can be determined according to Appendix A. Choose according to actual requirements.

9.3 Fire resistance and flame retardant performance test The test method for the fire retardant performance of the samples after exposure shall be in accordance with the provisions of Appendix A. If there are additional requirements for the fire retardant performance test items... The options can be selected based on actual requirements.

9.4 Explanation of Test Results Fire-retardant materials that have undergone an artificial accelerated aging process can be considered to have durable fire-retardant properties if they meet the following requirements. Assumptions for achieving expected 10-year use.

- a) For the exposed samples, the thermal insulation efficiency reduction of the fire-retardant coating for steel structures is less than or equal to 30%, and for the decorative fire-retardant coating... The flame retardancy time should meet the requirements of GB 12441, and the flame retardancy of cable fire-retardant coatings should meet the requirements of GB 28374. The bonding strength and vibration resistance of fire-retardant coatings for concrete

should meet the requirements of GB 28375. Fire protection for steel structures is also required. The bending strength of the slab should meet the requirements of XF/T 3012, and the bending strength of the tunnel fireproof protection slab should meet the requirements of GB 28376. The regulations and requirements;

b) For all types of fire-stopping materials after exposure, test their fire resistance according to the methods specified in GB 23864, based on the product marking information.

Afterwards, its fire resistance performance time should conform to the fire resistance rating corresponding to the marking information;

c) For exposed flame-retardant plastics, foams, flame-retardant rubbers, and flame-retardant fabrics, the oxygen index and/or vertical burning performance test results should be... It shall be no lower than Grade B2 as specified in GB 8624.

10 Test Report The test report should include the following.

- a) Sample name and model;
- b) Sample manufacturer information and sample batch information (if applicable);
- c) Information regarding sample preparation, such as substrate, thickness, etc.;
- d) The type and model of the artificial accelerated aging equipment;
- e) Test conditions and procedures;
- g) Changes in sample performance after exposure;