Guideline No.C-05(201709)

C-05
FIRE DAMPER

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Forward

CCS Product Inspection and Testing Guideline (hereinafter referred to as this Guideline) contains the technical requirements, inspection and testing criteria related to classification and statutory survey of marine products to be applied for CCS approval/inspection.

This Guideline frees the users to adopt other test methods and requirements which are equivalent to or are stricter than this Guideline.

This Guideline is published and updated by CCS, and is released at http://www.ccs.org.cn. Your comments or suggestions are welcomed and may be sent to our email addressed mp@ccs.org.cn.

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FIRE DAMPER

1 Scope of Application

1.1 The Guideline is applicable to ventilation duct fire damper on the bulkhead and deck, which meets Class A fire resistance separation requirements, installed and used for vessels and offshore facilities.

1.2 The fire damper has the following types: single-blade circular fire damper, single-blade rectangular fire damper, multi-blades circular fire damper, multi-blades rectangular fire damper; the actuator mode includes: manual, electric, pneumatic and so on.

2 Normative References

2.1 The certification and inspection of fire dampers shall be based on the following documents and their amendments:

(1) *International Convention for Safety of Life at Sea in 1974* (SOLAS convention, 1974) and Article 3 and 9 in Chapter II-2 of its amendments;

(2) IMO MSC.307(88) *International Code for Application of Fire Test Procedures in 2010* Part 3 (IMO 2010 FTP Code Part 3);

3 Drawings and Technical Documents

3.1 For the application of type approval of the fire damper, the following drawings and technical documents shall be submitted to CCS for approval or future reference:

(1) General assembly diagram of fire damper;

(2) Blade structure diagram;

(3) Damper diagram;

(4) Fire resistance test (includes thermoelectric couple) layout;

(5) Technical conditions of fire damper(for future reference);

(6) Type test outline;

(7) List of qualified providers for main raw materials/spare parts& components;

(8) Product installation instructions;

(9) Nameplate.

4 Raw Materials and Spare Parts & Components

4.1 Steel or other equivalent materials shall be adopted for blades and dampers.

4.2 The blade shaft and shaft sleeve shall be made of stainless steel, copper material or other corrosion resistance materials.

5 Technical Requirements for Design

5.1 Structural design, integrity and thermal insulation of the fire damper (if required) shall be in accordance with the relevant requirements of 2.1(1), (2) specified in The Guideline.

5.2 Main raw materials of the fire damper shall comply with the following requirements:

(1) Thermal insulation materials (such as ceramic wool, rock wool and other non-combustible materials): non-combustibility shall comply with requirements specified in IMO 2010 FTP Code Part 1.

(2) Asbestos shall not be contained in the nonmetallic materials used in the fire damper.

6 Type Test

6.1 Selection of typical samples: for each kind of fire dampers applying for approval, test sample shall be made of the maximum size (width and height, or diameter) according to the installation type (bulkhead or deck) and be tested for standard fire resistance in a vertical and horizontal direction respectively. Other test items can be carried out in the product manufacturing factory.

6.2 See Table 6.2 for type test items:

Table 6.2Type test items

S/N	Test item	Type Test	Delivery test
1	Material report review	√	√
2	Dimensional inspection	√	√
3	Surface quality inspection	√	√
4	Air leakage rate test	√	√
5	Closing reliability test and failure test	√	√
6	Fusing temperature for the fuse and closing test	√	√
7	Electrical safety testing (if applicable)	√	√
8	Standard fire resistance test	√	—

6.3 Test Methods and Requirements

6.3.1 Material report review: main raw materials of the fire damper shall have the steel/ steel factory warranty, thermal insulation material certificate/ CCS product certificate/ CCS factory approval certificate/ factory quality certificate/ Non-combustibility test report and factory quality certificate that meet the requirements, warranty/ certification of actuator and fuse.

6.3.2 Dimensional inspection: the measurement of the contour dimension and the clearance of samples shall comply with approved drawings.

6.3.3 Surface quality inspection: randomly inspect the surface of samples that shall be smooth and free of burrs, scratches and weld defects etc.; and the paint shall be uniform and free from sagging, wrinkling and peeling off (if the paint is applied).

6.3.4 Air leakage rate test: install the fire damper in the off state on the plenum chamber with sealing materials on the flange joints and confirm that there is no leakage, and then start the test device fan and adjust the pressure differential on both sides of the blade to 19.6 Pa (2 mm water column) and measure the flow through both sides of the blade by air flow measurement device. During the test, the air temperature and atmospheric pressure in the laboratory shall be recorded and the air leakage rate shall be converted in the standard state (air temperature of 20 ℃ and air pressure of 101.3kPa). The average value of air leakage rate measured by three consecutive tests shall be not more than $5m^3 / (m^2.min)$.

6.3.5 Closing reliability and failure test: the valve plate is closed manually, electrically or pneumatically from the fire damper in the full open position, and after 50 consecutive ON/OFF switch test the actuator shall be in the normal operation and the valve structure shall not be deformed. For automatic fire dampers with electric, pneumatic and hydraulic power actuators, the fire damper shall be automatically shut down in the event of electric, pneumatic and hydraulic power failures except for having manual operating functions.

6.3.6 Fuse fusing temperature and closing test: the fusible sheet of the fire damper installed with the fuse is put into the tank of water temperature of 66 ~ 66.8 ℃, and it shall not be fused within 5 min from the timing starting from 66 ℃; when put in the tank of water temperature of 72.8 ~ 73 ℃ the fusible sheet is fused within 1 min with the fire damper closed, which can be deemed as qualified.

6.3.7 Electrical safety testing（if applicable）: For the fire damper with an electric actuator, the actuator shall have reliable grounding protection. Under normal conditions, the insulation resistance between the external live terminal and the damper shell, and between the power plug and the damper shell shall be more than 20 mΩ, and the insulation resistance with earthing protection shall exceed 1 mΩ. When 2Un (rated working voltage) +500V alternating current is applied to the fire damper, the test sample shall have no breakdown or blinking phenomenon.

6.3.8 Standard fire resistance test shall conform to the requirements specified in IMO 2010 FTP Code Part 3.

(1) Integrity requirement: a Class A fire damper shall undergo the standard fire resistance test for 60 minutes, and it shall keep complete and can prevent the passage of smoke and flame after the test;

(2) Thermal insulation requirements: for the identification of heat insulation, any temperature rise on the surface shall not exceed its initial temperature of 180 ℃.And it is not allowed to use the average temperature rise to achieve that purpose.

6.3.9 Actuator: for the fire damper installed on the bulkhead, manual, electric and pneumatic actuators can be installed respectively on different types of the bulkhead fire damper during the fire resistance test. And all the actuators can be used for each approved bulkhead fire damper after passing the fire test. There is no need for the fire damper to install manual, electric and pneumatic actuators respectively to undergo the fire resistance test. The actuator of the fire damper installed on the deck shall also comply with this requirement.

6.3.10 Asbestos shall not be contained in the nonmetallic materials used in products and "Asbestos-free announcement" or "Asbestos-free approval certificate" shall be provided.

6.4 Test report

6.4.1 Thermal insulation material and non-combustibility test report shall comply with IMO 2010 FTP Code Part 1. For the Class A fire damper, the non-combustibility test report for thermal insulation materials before the fire resistance test shall be valid for 24 months, or a valid CCS approval certificate of non-combustible materials shall be provided.

6.4.2 Standard fire resistance test report shall conform to IMO 2010 FTP Code Part 3.

6.4.3 Where the test report used for the application of approval is in accordance with the old version of FTP Code(1996 FTP Code), the type approval certificate can be updated without re-test if the report is not more than 15 years and the parts or structures of products keep unchanged; the validity of the approval certificate will last till the expiring date of the test report of 15 years if it is not a complete valid period for approval certificate from the issuance date of approval certificate to the expiring date of the test report.

7 Inspection by Piece/Batch

7.1 The sampling proportion of the fire damper is 5% (at least one) of each batch for inspection. And the sampling principle is that multi-blades products shall be selected prior when there are both single-blade and multi-blades structural type among the products for inspection, and that products with the electric or pneumatic actuator shall be given priority to select when there are manual, electric and pneumatic mode of actuators.

7.2 The inspection by piece/batch of the fire damper shall be performed after the type approval. See delivery inspection items of Table 6.2 for the range of inspection.

7.3 Products shall comply with regulations of asbestos-free, and asbestos-free announcement or asbestos-free approval certificate shall be provided.