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**Flame burnthrough test for aircraft cargo liners
(English Translation)**

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009 this standard was proposed by the Aircraft Airworthiness Certification Department of the Civil Aviation Administration of China.

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1 Scope

This standard specifies the use of high-intensity, open flames to evaluate the flame penetration resistance of aircraft cargo tank lining materials.

This standard is applicable to aircraft cargo compartment lining materials, including repair sheets, seams, joints, fastening equipment, lighting facilities and corners.

2 Terms and definitions

The following terms and definitions apply to this document.

Burnthrough

The flame penetrates the sample or there are obvious cracks,, openings, nicks or other obvious cracks,, openings, nicks, or other causes that can pass the flame Failed hole.

3.1 Sample holder

The sample holder is shown in Figure 1 to Figure 3. The burner should be installed on a rotating device so that it can move away from the sample during preheating.

3.2.1 Type

The burner should be a gun-type burner. The flame characteristics can be improved by selecting a fixed disc or adjusting piece. If you choose different types of combustion the temperature, heat flux and test results should be compared with gun-type burners.

3.2.2 Nozzle

The nozzle of the burner should be able to maintain a certain oil pressure so that its flow rate is $0.126 \text{ L/min} \pm 0.006 \text{ L/min}$. Monarch 80AR or the rated flow of 80R type nozzle should be 0.142 L/min under the pressure of 0.69 MPa , and the rated flow should be 0.142 L/min under the pressure of 0.59 MPa

0.126 L/min , and has a suitable spray shape.

3.2.3 Burner cone

The burner cone shall be made of stainless steel or alloy with corrosion resistance, high temperature resistance and a thickness of $1.650 \text{ mm} \pm 0.375 \text{ mm}$. Cone length the degree should be $305 \text{ mm} \pm 3 \text{ mm}$, the opening height is $152 \text{ mm} \pm 6 \text{ mm}$, and the width is $280 \text{ mm} \pm 6 \text{ mm}$, see Figure 4 and Figure 5.

3.2.4 Oil pressure regulator

The oil pressure regulator should be able to adjust the fuel flow rate to $0.126 \text{ L/min} \pm 0.006 \text{ L/min}$.

3.2.5 Fuel

Aviation kerosene that meets the requirements of GB 6537 should be used.

3.2.6 Air flow

The air baffle should be adjusted so that the air flow is about $1.89 \text{ m}^3/\text{min}$.

3.3.1 Heat flow meter specifications

It is advisable to use the total heat flux type foil Gardon heat flow meter, the range is $0\sim 17 \text{ W/cm}^2$, and the accuracy should be $\pm 3\%$ of the indicated reading.

3.3.2 Heat flow meter bracket

When calibrating, the heat flow meter should be installed on an insulation board with a length of $305 \text{ mm} \pm 3 \text{ mm}$, a width of $152 \text{ mm} \pm 3 \text{ mm}$, and a thickness of $19 \text{ mm} \pm 3 \text{ mm}$.

It is connected to the angle steel frame to facilitate the burner to be installed on the test frame during calibration, as shown in Figure 6. Check whether the insulation board is damaged frequently, if necessary, Spacers can be added to adjust the position to ensure that the surface of the heat flow meter is parallel to the exit surface of the burner cone.

3.4 Thermocouple

Seven ceramic-encapsulated, metal sheathed, grounded K-type (nickel-chromium-nickel-aluminum) thermocouples with a diameter of 1.6 mm should be used for calibration.

It should be an outer diameter of 0.254 mm , a cross-sectional area of 0.0507 mm^2 , and a resistance of 361 ohm/km (American Wire Gauge 30 AWG). The thermocouple should be fixed to a A thermocouple comb is formed on the angle steel bracket so that it can be placed on the sample holder during calibration (see Figure 7).

3.5 Data Acquisition System

A recorder or computer data acquisition system with an appropriate range and calibrated should be used to measure and record the output of thermocouples and heat flow meters. fruit.

3.6 Timer

A stopwatch or other timer with an allowable error of ± 1 s/h should be used to measure the burning time of the burner, the continuous burning time of the sample and the burn-through time.

3.7 Anemometer

A vane-type anemometer should be used to measure the air flow into the burner. In addition to leaving a wind speed detection port in the center, the entire air of the burner the inlet should be completely sealed, see Figure 8.

Hot-wire anemometers can also be used to measure wind speed. From the end of the air duct of the oil burner, remove the cone of the oil burner, only turn on the fan without Turn on the fuel and ignition, and adjust the damper to obtain a wind speed of approximately 1.89 m³/min (67 ft³/min).

If there is a baffle, remove the baffle first when measuring the wind speed, and then reinstall the baffle and combustion tube after measuring the wind speed.

Figure 7 Top and side views of the thermocouple holder

Figure 8 Schematic diagram of the position of the anemometer

3.8 Equipment debugging

3.8.1

Except for an opening for the anemometer, the entire air inlet of the oil burner should be completely sealed. Install the anemometer After preparing for measurement, turn on the fan for at least 30 s to make the fan reach its normal operating speed (it is not necessary to turn on the ignition and fuel switch). Air conditioning the baffle makes the air flow rate approximately 1.89 m³/min. Tighten the screws to fix the position of the baffle.

3.8.2

If there is no calibrated flow meter, a measuring cylinder of appropriate size can be used to measure the fuel flow. Turn on the fuel pump and burner to ensure that the fire device is in the closed state, and the plastic tube or rubber tube is installed on the nozzle to collect the fuel volume for 2 minutes, and the flow rate is 0.126 L/min.

± 0.006 L/min.

4.1 Sample configuration

Each type of cargo tank lining and design configuration should be tested. The design configuration includes design features that affect the flame containment performance of the cargo hold, such as Corners, joints, seams, lighting devices, pressure relief valves,