

## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **[Policy Statement Number ANM-01-01]**

#### **FAA Policy on Use of the “Aircraft Materials Fire Test Handbook”**

**AGENCY:** Federal Aviation Administration, DOT.

**ACTION:** Notice of policy statement; request for comments.

**SUMMARY:** This notice announces an FAA policy applicable to the use of Report DOT/FAA/AR-00/42, “Aircraft Materials Fire Test Handbook.” This notice advises the public that the FAA considers the material flammability tests described in the latest version of that document to be the preferred acceptable test methods for showing compliance with the relevant regulations. This notice is necessary to advise the public of FAA policy and give all interested persons an opportunity to present their views on the policy statement.

**DATES:** Send all comments on this policy statement on or before [insert a date 30 days after the date of publication in the Federal Register].

**ADDRESS:** Send all comments on this policy statement to the individual identified under “FOR FURTHER INFORMATION CONTACT.”

**FOR FURTHER INFORMATION CONTACT:** Jeff Gardlin, Federal Aviation Administration, Transport Airplane Directorate, Airframe/Cabin Safety Branch, ANM-115, 1601 Lind Avenue SW., Renton, WA 98055-4056.; telephone (425) 227-2136; fax (425) 227-1320; e-mail: jeff.gardlin@faa.gov.

#### **SUPPLEMENTARY INFORMATION:**

##### **Comments Invited**

You may comment on this policy statement by sending any written data, views, or arguments as you may desire. You should identify the Policy Statement Number ANM-01-01 on your comments, and submit your comments, in duplicate, to the address indicated above. The Transport Airplane Directorate (Transport Standards Staff) will consider all communications received on or before the closing date for comments.

#### **DISCUSSION**

##### **The Original Version of the Handbook**

In September 1990, the FAA published Report DOT/FAA/CT-99/15, “Aircraft Materials Fire Test Handbook” (referred to throughout this notice as “the Handbook”). The Boeing Company, with the assistance of the former McDonnell Douglas Aircraft Company, developed the Handbook under contract to the FAA.

The 1990 version of the Handbook consisted of chapters outlining in detail the various material flammability tests that Boeing and McDonnell Douglas had used to show compliance with the FAA material flammability regulations. Those specific regulations in Title 14, Code of Federal Regulations (CFR), part 25, are:

- § 25.853 (“Compartment interiors”),
- § 25.855 (“Cargo and baggage compartments”),
- § 25.857 (“Cargo compartment classification”),
- § 25.858 (“Cargo compartment fire detection systems”), and
- § 25.869 (“Fire protection: systems”).

At the time of its original publication, the Handbook contained test methods that represented acceptable, but not necessarily the only, methods to show compliance with those regulations. In addition, the Handbook contained other chapters with general information on flammability testing of aircraft material, such as where in the regulations to find requirements, the location of international contacts, and a list of various fire test laboratories.

### **Modifications to Test Methods in the Handbook**

Since the original publication of the Handbook, the FAA has relied on the International Aircraft Materials Fire Test Working Group (IAMFTWG) to review the test methods and advise on areas needing possible revision. The IAMFTWG consists of experts in the materials and fire testing specialties who help refine and support the development of test methods used in aviation. The members of the IAMFTWG include representatives from the airlines, airframe manufacturers, material suppliers, and regulatory authorities, among others. A representative from the FAA’s Technical Center chairs this group. The IAMFTWG is a participative technical peer group that contributes to FAA research, but its activities are not regulatory in nature.

Before any modifications to the test methods described in the Handbook have been incorporated, the IAMFTWG has provided data supporting such modifications, and the FAA has reviewed and accepted the data. In addition, the FAA’s Transport Airplane Directorate (Transport Standards Staff) has determined whether the modified test methods complied with the applicable regulations.

The following is an example of why and how this procedure has been used in the past to modify and improve test methods.

### **Example of Why and How a Test Method is Modified**

Several IAMFTWG representatives from test laboratories reported problems with testing some new, very fire-resistant panels in the rate-of-heat-release testing apparatus. The test apparatus used three pilot flames, located above the sample material, to ignite any combustible gas by-products emitted by the sample during testing. The problem with this test arose when gases emanating from the samples were extinguishing the upper pilot flames in the test chamber, thus voiding the tests. Consequently, materials

that might improve fire safety could not be approved for use because the fire retardant mechanism that improved their flammability also extinguished the pilot flames in the required test method.

After an extensive test program, certain modifications were made to the upper pilot burner in the test apparatus to improve the test:

- The number of pilot flames was increased from 3 to 13, with one outside the flame plume
- The size of the pilot flames was decreased to minimize the possible heating effect of the increased number of pilots.

Testing showed that this new pilot configuration solved the problem. That is, when a pilot flame would extinguish, it was immediately re-ignited by an adjacent flame without compromising the results of the test. Subsequent testing showed that there was no difference in test results between the 3- and 13-hole pilot configurations for materials that do not extinguish the pilot flames. Thus, the Transport Airplane Directorate (Transport Standards Staff) determined that the use of the 13-hole pilot burner would produce results equivalent to the 3-hole burner and, therefore, was an acceptable method to show compliance with the applicable regulations.

### **Discussion of the Latest Revised Handbook**

The FAA has made public the various accepted modifications to the original test methods (outlined in the 1990 version of the Handbook) through drafts of a revised Handbook that have been continually updated. The recently published revised Handbook, dated April 2000, documents these changes to the test methods. There are four types of chapters in this latest revised version of the Handbook:

1. Required test methods, non-propulsion related (Chapters 1-10, and 15);
2. Required test methods, propulsion related (Chapters 11-14);
3. Non-required test methods (Chapters 18-22); and
4. General information (Appendix A through G).

The required test methods (non-propulsion), as described in Chapters 1 through 10 and Chapter 15, are acceptable methods for showing compliance with, or provide an equivalent level of safety to, the required regulations as outlined in the chapter.

The required test methods (propulsion), as described in Chapters 11 through 14, are not addressed in this policy statement.

The non-required test methods described in Chapters 18 through 22 are included in the Handbook for use as test standards in applications where there currently are no requirements. Since these test methods are not required, no process is required for their modification. Therefore, the FAA will update these chapters as needed in the electronic version of the Handbook located at <http://www.fire.tc.faa.gov/index.html?handbook.stm&1>.

The general information chapters (Appendices A through G) provide assistance to applicants and test laboratories as a general guide to the certification process. These chapters are not all-inclusive and can be viewed simply as a starting point. The FAA will update the information in these chapters as needed in the electronic version of the handbook.

### **Preferred Test Methods**

As of the date of this policy statement, the FAA considers the following test methods described in Chapters 1 through 10 and Chapter 15 of the “Aircraft Materials Fire Test Handbook,” dated April 2000, the preferred test methods to show compliance with, or demonstrate an equivalent level of safety to, the applicable material flammability regulations:

Chapter 1 – the 60-second and 12-second Vertical Bunsen Burner Test specified in § 25.853, § 25.858, and Appendix F of part 25.

Chapter 2 – the 30-second 45-degree Bunsen Burner Test specified in § 25.857 and Appendix F of part 25.

Chapter 3 – the 15-second horizontal Bunsen Burner Test specified in § 25.853 and Appendix F of part 25.

Chapter 4 – the 30-second 60-degree Bunsen Burner Wire Test specified in § 25.869 and Appendix F of part 25.

Chapter 5 – the Rate of Heat Release Test specified in § 25.853 and Appendix F of part 25.

Chapter 6 – the Smoke Test for Cabin Materials specified in § 25.853 and Appendix F of part 25.

Chapter 7 -the Oil Burner Test for Seat Cushions specified in § 25.853.

Chapter 8 – the Oil Burner Test for Cargo Liners specified in § 25.855 and Appendix F of part 25.

Chapter 9 – the Radiant Heat Test for Evacuation Slides, Ramps, and Rafts specified in Technical Standard Order (TSO)-C69C (“Emergency Evacuation Slides, Ramps, Ramp/Slides, and Slide/Rafts”).

Chapter 10 – the Fire Containment Test of Waste Stowage Compartments to demonstrate compliance with § 25.853.

Chapter 15 – the Oil Burner Test for Repaired Cargo Compartment Liners to demonstrate continued compliance with § 25.855.

Although these test methods cannot -- and do not -- supersede any method specified by and described in the regulations, they represent an acceptable means of compliance with the relevant regulation and, in some cases, a preferred option over the specified method.

Section 25.853 includes a provision for use of “other approved equivalent methods,” when referring to the test procedures described in Appendix F of part 25. The FAA has accepted the test methods described in Chapters 1 through 10 and Chapter 15 of the Handbook as providing an equivalent

level of safety to the test methods specified in Appendix F of part 25. In addition, these test methods are more repeatable, more reproducible, and easier to conduct.

The FAA encourages applicants to use the test methods outlined in Chapters 1 through 10 and Chapter 15 of the Handbook. However, the FAA will consider other alternative methods that demonstrate an equivalent level of safety on a case-by-case basis along with the necessary supportive data.

### **Process for Modifying the Preferred Test Methods**

New materials and technology may make it necessary to modify the various test methods from time to time in order to address newly identified testing anomalies. In these cases, the FAA requires assurance that such changes do not affect the intended pass/fail criteria of the test (that is, the level of safety provided), but do provide an increase in repeatability, reproducibility, or ease of test conduct.

Changes or modifications to any test method outlined in Chapters 1 through 10 and Chapter 15 will be addressed first through the IAMFTWG. The IAMFTWG will evaluate all suggested changes, modifications, and supportive data. Only changes that do not adversely affect the intended safety level of the test method (pass/fail level) will be considered.

Fire safety experts within the FAA will first approve the modified test methods before forwarding them to the Transport Airplane Directorate (Transport Standards Staff) for a determination of equivalent level of safety. Only if such a determination is made will the changes or modifications be incorporated into the electronic version of the Handbook (accessible at <http://www.fire.tc.faa.gov/index.html?handbook.stm&1>).

### **Use of the Test Methods**

The FAA will consider the test methods in Chapters 1 through 10 and Chapter 15 of the electronic version of the Handbook to be the most current methods. However, the test methods described in the version of the Handbook dated April 2000, will remain acceptable for showing compliance. The test methods described in the regulations, of course, will also remain acceptable methods of compliance.

The test methods described in the Handbook are intended to be adopted in total, if they are used. That is, use of one section of a test method from the Handbook and another section of the test method from Appendix F of part 25 for example, is not covered by this policy statement. If an applicant proposes to use sections from more than one version of a test method to show compliance, the applicant first must obtain approval from the cognizant FAA Aircraft Certification Office. The applicant's requests should be coordinated with the Transport Airplane Directorate (Transport Standards Staff).

### **Effect of General Statement of Policy**

The general policy stated in this document is not intended to establish a binding norm; it does not constitute a new regulation and the FAA would not apply or rely upon it as a regulation. The FAA Aircraft Certification Offices (ACO) that certify transport category airplanes should generally attempt to follow this policy, when appropriate. However, in determining compliance with certification standards, each ACO has the discretion not to apply these guidelines where it determines that they are inappropriate. Applicants should expect that the certifying officials will consider this information when making findings of compliance relevant to new certificate actions. Applicants also may consider the material contained in this policy statement as supplemental to that currently contained in Report DOT/FAA/AR-

00/12, "Aircraft Materials Fire Test Handbook." dated April 2000, when developing a means of compliance with the relevant certification standards

In addition, as with all typical advisory material, this statement of policy identifies one means, but not the only means, of compliance.

### **Application of Policy Statement**

The FAA considers this policy statement an issue for which public comment is appropriate and, therefore, requests comment on it. However, it is the FAA's intention to immediately apply this policy. Resolution of any public comments received will determine how the policy is applied in the long term for future projects.

Issued in Renton, Washington, on February 14, 2001.

Original signed by  
Ali Bahrami, Acting Manager  
Transport Airplane Directorate  
Aircraft Certification Service