This response to the Notice of Proposed Rulemaking (NPRM), Docket No. FAA-2000-7909, is based on my experience as an employee of a leading fabricator/supplier of thermal/acoustical insulation blankets and a participant in the task groups formed by the FAA to assist in developing the flame propagation and burnthrough test methods.

Of the two proposed requirements, burnthrough protection is the more challenging, and it appears that the FAA took into consideration the effects of gaps, attachment means, and presence of FAR 25.855(c) cargo liners. The period allotted for implementation seems sufficient for re-engineering and the development of more cost effective solutions than currently projected. I agree that meeting the flame propagation requirement is feasible with present technology and can be implemented on a faster schedule.

My main comments address the details of the test methods. These all refer to the proposed Parts to be added to Part 25, Appendix F as published in the NPRM.

Flame Propagation, Part VI:

1. Figure 3b should be redrawn. The illustration appears to depict the electric heating elements running in the longitudinal direction. Since the NPRM issued, new information obtained at the FAA Technical Center has shown that this arrangement is not acceptable due to heat losses at the ends. Instead, the heating elements must be oriented laterally. A note about this should also be included in (b)(1).
2. Having conducted certification testing by the similar method in Airworthiness Directives 2000-11-01 and 2000-11-02, I learned that sample preparation and installation are critical. Although the test method was developed based on 2 inch thick specimens, we were required to test samples as used in the aircraft. Therefore, specimens of 0.5 to 3 inches in thickness were included. Initially, the apparatus at the FAA Technical Center had limited capability to accommodate a variety of thicknesses. To do so, the securing frame was sometimes left off, or the specimen was severely compressed by it. Under such circumstances, anomalous results were obtained. Subsequently, the holder was modified to keep the top of a specimen at the same level regardless of thickness, allowing consistent use of the securing frame and producing consistent results. Therefore, according to our best current knowledge about achieving repeatable performance, I recommend that (b)(3)(iv) should be changed to, "A securing frame…shall be placed over the test specimen." In addition, (c)(2) should require that specimens are constructed without compression, e.g., sewing or stapling through the insulation is not allowed.
3. Also with reference to (c), further definition of the specimens is needed. A size tolerance should be included. Based on my experience with certification testing, I recommend that +0, -1/2 inch for length and width is appropriate. The applicable materials also tend to be oriented. Fibrous and film products have visible warp or machine and filling or cross directions, and foams show different morphology parallel to the direction of rise versus perpendicular to it. Consistent with other Part 25 methods, testing in each major axis should be specified, because flame travel in a specific direction is measured. However, for some materials, the major dimensions may not be at least 43 inches. In such cases, overlapping of materials or a shortened specimen within a specific limit (33 inches minimum should take care of almost everything) should be allowed by the provisions of the method.
4. In (e)(3), no requirements for calibration at the second and third positions are given. However, to ensure proper operation, the heat flux reading at position two should not exceed that at the zero position, and the heat flux reading at the third position should not exceed that at the second position per data published by the FAA. These should be incorporated in the method.
5. Probably by misprint, a requirement to report flame travel was left out of (g). Since measurement of it becomes too uncertain after the specimen is extinguished, indicating if the 2 inch limit was exceeded or not is the only necessity. To ensure accuracy, a specific provision for determining this should be added. Etched benchmarks on the top frame at the proper distance, or a metal ruler mounted to the holder and visible through the window would be satisfactory.

Burnthrough, Part VII:

1. The following recommendations on specimen size pertaining to (c) are based on the experience of my company in supplying nearly 2,000 specimens for three round robin testing programs organized by the FAA Technical

Center during the year 2000. Dimensional tolerances should be added, and ±0.5 inch for length and width is suggested. In addition, dimensions of 36 inches × 32 inches do not allow efficient utilization of many of the applicable materials, such as those produced at 60 inches wide. This could be improved by a reduction in one or both dimensions to 30 inches. Alternatively, the allowable length and width could be expanded to ranges of, say, 29.5-36.5 inches × 29.5-32.5 inches. In support of this, we performed some tests on our own burnthrough apparatus, which has been utilized in the FAA round robin programs. With six sets of similar specimens at 36 inches × 32 inches, burnthrough times of 31, 29, 29, 34, 31, and 29 seconds were obtained. Two other sets of samples from the same materials, but at 24 inches × 29.5 inches, gave burnthrough times of 29 and 29 seconds. This evidence strongly suggests that the results are not affected by such a reduction in sample size.

2. Calibration parameters for the burner are too narrowly specified. The fuel and air flow ranges and the configuration of the burner are so tightly defined that one has little room to adjust operation to achieve required heat flux and temperatures. The measurement of heat flux is complicated by sooting of the sensor, which results in variable data between laboratories. The heat flux value should be presented as a guide rather than a requirement. Allowing adjustment of the fuel flow rate within ± 1 gph and the air flow within 200 fpm would provide the necessary flexibility.
3. Even allowing that this smaller scale test is a perfect model of an actual event, good engineering practice suggests application of a safety margin to obtain in practice the desired result. Therefore, 4 minutes of additional evacuation time being the desired result according to the benefit analysis, the requirement should be set somewhat higher, at least 300 seconds. This would reduce the risk associated with marginal performers.

Thank you for your attention.

Submitted by,
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January 16, 2001