

design details such as tapes and hook-and-loop fasteners.

One commenter recommended that we exclude "small parts," as defined in part I of Appendix F to Part 25, from the requirement that insulation materials pass the upgraded flame propagation test. The commenter pointed out that there is a "small parts" exception to the flammability test in part I of Appendix F to Part 25.

The FAA agrees that "small parts" would not be practical to test in the flame propagation test apparatus specified in part VI of Appendix F to Part 25. In response, we have added to final § 25.856(a) an exception for "small parts" from the requirement to pass the upgraded flame propagation test. Under paragraph I(a)(v) of Appendix F to Part 25, the FAA considers "small parts" to be things that would not contribute significantly to a fire, including knobs, handles, rollers, fasteners, clips, grommets, rub strips, pulleys, and small electrical parts. In addition, "small parts" should not be installed in proximity to each other. As a result of this change, "small parts" will continue to be governed by existing §§ 25.853 and 25.855 and part I of Appendix F to Part 25.

One commenter suggested that, based on the language of proposed § 25.856, thermal/acoustic insulation not installed in the fuselage might also have to pass the upgraded flame propagation test.

The FAA agrees that the proposed language could allow this unintended interpretation. For this reason, we changed final § 25.856(a) to specify that thermal/acoustic insulation *installed in the fuselage* must meet the flame propagation test requirements.

A commenter stated that certain interior panels perform both thermal and acoustic attenuation functions to some extent and might therefore be categorized as thermal/acoustic insulation in the absence of a more precise definition.

The FAA does not intend to require interior panels to comply with final § 25.856. These panels are subject to existing heat release and smoke emissions requirements in parts IV and V of Appendix F to Part 25, which are more relevant to the role of interior panels in fire safety. This final rule is aimed at ensuring that thermal/acoustic insulation materials, which are usually installed in inaccessible areas, do not propagate fire. Their inaccessibility is what creates the hazard, especially with regard to in-flight fires. Interior panels are accessible and are clearly not exposed to the same threat. Thus, we do not apply the final rule to them.

A commenter stated that certain interior panels often receive acoustic damping treatments which, by virtue of their function, could be interpreted as requiring compliance under the proposal. The commenter recommended that these treatments be required to comply.

The FAA agrees in part. To the extent that acoustic damping treatments applied to the inaccessible sides of interior panels could permit fire propagation, they are required to pass the flame propagation test. On the other hand, it is clear that the many possible combinations of treatments and panels could result in large amounts of testing. We intend to investigate whether compliance for such treatments can be substantiated by tests on a generic panel, or whether testing of the actual panel is necessary. Up to now, we have not evaluated acoustical damping treatments in the context of the NPRM. Based on comments, it appears that they are typically aluminum based, so the adhesive used to bond the treatment to the panel is probably the component of concern. We will evaluate any treatments provided for review to develop guidance. As proposed in the NPRM, however, this final rule requires that thermal/acoustic insulation installed in the fuselage pass the flame propagation test. This includes material installed on the pressure shell, ducts, floor panels, and within equipment bays.

Final § 25.856(b) requires, for airplanes with a passenger capacity of 20 or greater, thermal/acoustic insulation materials (including the means of fastening the materials to the fuselage) installed in the lower half of the airplane fuselage to meet the flame penetration resistance test requirements of part VII of appendix F of Part 25, or other approved equivalent test requirements.

Final § 25.856(b) applies only to airplanes with a passenger capacity of 20 or greater. This effectively excludes the smaller transport category airplanes, as well as airplanes operating in an all-cargo mode. The primary reason for this is that airplanes with small passenger capacities are not expected to realize a significant benefit from enhanced burnthrough protection owing to their very rapid evacuation capability. That is, they have a favorable exit-to-passenger ratio. Since enhanced burnthrough protection will impose additional cost, there must be a commensurate benefit to justify the requirement. We do not consider that such benefits are substantial for airplanes with low passenger capacities. We chose the 20-passenger threshold to

be consistent with other occupant safety regulations, such as those for interior materials and cabin aisle width. The enhanced burnthrough protection provided by this final rule will increase the evacuation capability of airplanes with 20 or more passengers, regardless of the exit arrangement.

Final § 25.856(b) applies to insulation materials installed in the lower half of the fuselage because that area is most susceptible to burnthrough from an external fuel fire. Flames from an external fuel fire typically impinge on the fuselage from below. Therefore, the lower half of the fuselage derives the most benefit from enhanced burnthrough protection. We chose this approach based on full-scale fire test data, as documented in the reports referenced in the NPRM, and the potential for an airplane to be off its landing gear. When the landing gear collapse, an airplane can roll significantly, and the area most susceptible to burnthrough can be correspondingly higher on the fuselage than when the airplane is on its gear. By providing burnthrough protection for the lower half of the fuselage (as opposed to just the underside), the final rule takes this situation into account.

This final rule establishes a standard for the ability of thermal/acoustic insulation to resist penetration by an external flame, rather than a standard for fuselage burnthrough per se. This distinction is important, since fuselage burnthrough is a complex process, dependent on many variables. For example, the ability of the fuselage to resist penetration from an external fuel fire is directly related to the thickness and material of the skin. Skin thickness varies considerably, and essentially means that each airplane type has different burnthrough resistance. In addition, factors internal to the airplane can also affect penetration of an external fire into the occupied areas. For example, differences in the air return grills can influence the time required for an external fire to penetrate the occupied area. Therefore, establishing a minimum standard for fuselage burnthrough resistance and identifying possible means of compliance would be a highly complex undertaking.

This final rule adopts a simple standard that increases the time it takes for a fire to penetrate the airplane beyond what currently exists, regardless of the specific capability that currently exists. Since this increase in time can be achieved by addressing thermal/acoustic insulation material, and this rule revises the standard for insulation to address flame propagation anyway, it is in the public interest to incorporate