U.S. Department
of Transportation
Federal Aviation Administration

Advisory Circular

Subject: INTERIOR DESIGN TO FACILITATE SEARCHES | **Date:** 10/24/08 | **AC No:** 25.795-8
Initiated By: ANM-100

1. PURPOSE. This advisory circular (AC) describes an acceptable means for showing compliance with the requirements of Title 14, Code of Federal Regulations (14 CFR), part 25, § 25.795(c)(3), "Interior design to facilitate searches." This section requires that the interior design of an airplane incorporate features that will make it more difficult to hide dangerous objects in the airplane or make it easier to find them if they have been brought onboard. The means of compliance described in this document provides guidance to supplement the engineering and operational judgment that must form the basis of any compliance findings relative to whether the interior design deters concealment of dangerous objects (e.g., weapons or explosives) and facilitates a search for them in certain areas of the airplane. The requirements for searching an airplane are not affected by the requirements of § 25.795(c)(3). The design of the airplane will make it easier to search for hidden objects but will not affect the need for, or the diligence of, the search.

2. APPLICABILITY.

a. The guidance provided in this document is directed to manufacturers and modifiers of large passenger transport airplanes and repair facilities for such airplanes. The guidance on compliance methods in this AC pertains to the passenger compartment. The guidance on other best practices in Appendix 1 also applies to the flightdeck and to any remote compartments for use of the crew that may be installed on the airplane.

b. The material in this AC is neither mandatory nor regulatory in nature and does not constitute a regulation. It describes acceptable means, but not the only means, for demonstrating compliance with the applicable regulations. The FAA will consider other methods of demonstrating compliance that an applicant may elect to present. Furthermore, if we become aware of circumstances that convince us that following this AC would not result in compliance with the applicable regulations, we will not be bound by the terms of this AC, and we may require additional substantiation or design changes as a basis for finding compliance.

c. The material in this AC does not change, create any additional, authorize changes in, or permit deviations from, regulatory requirements.

3. RELATED SECTIONS.

a. 14 CFR part 25. Sections 25.365, 25.771, 25.772, 25.777, 25.809, 25.1411, and 25.853.

b. 14 CFR part 91. Section 91.11.

c. 14 CFR part 121. Sections 121.313 and 121.587.

4. BACKGROUND.

a. Since the early 1970s, U.S. and major foreign airports handling large transport category aircraft (i.e., those carrying more than 60 passengers or having a gross takeoff weight greater than 100,000 pounds) have been incorporating increasingly stringent screening and security measures to safeguard the traveling public from acts of terrorism. As technological advances are made that are applicable to security, they are incorporated into equipment and into procedures for assuring safety. Means of inspecting checked baggage, carry-on baggage, and passengers for concealed dangerous objects have evolved and have been implemented into airport screening practices. As a further deterrent and additional safeguard, International Civil Aviation Organization (ICAO) Annex 17 for aircraft in international service requires a complete search of the airplane prior to flight when the airplane is operated under certain conditions. This AC describes design practices to facilitate such searches and improve their effectiveness.

b. A draft of this AC was harmonized with the European Joint Aviation Authorities (JAA). The draft provided a method of compliance that both the Federal Aviation Administration (FAA) and JAA have found acceptable. Subsequently, the European Aviation safety Agency (EASA) was formed as the principal aviation regulatory agency in Europe. The FAA will work with EASA to ensure that this proposed AC is harmonized with ACs referred to in EASA's Certification Specifications.

5. DEFINITIONS. For the purposes of this AC, the following definitions apply:

a. Tamper-Evident: A design that makes it obvious by a non-intrusive inspection that an unauthorized person has attempted to gain access. A design is also considered tamper-evident if it prevents placement of objects beneath, behind, or between interior features; this is also called a net-fit design.

b. Specialty Tool: Any device that cannot be commonly purchased and is used to gain access to compartments, equipment, or other locations on an airplane.

c. Specialty Fastener: A fastener requiring a specialty tool to operate.

d. Simple Inspection or Search: A visual search in which no specialty tools or equipment is needed, and there are no sub-compartments. All passenger carry-on items are assumed to have been removed from the airplane when this inspection is performed.

e. Object: An "object" has a volume of 20 cubic inches (20 in^3) and larger. At that volume, no dimension need exceed a maximum of 12 inches or be smaller than 0.375 inch. Objects with larger volumes will have a correspondingly greater maximum dimension.

f. Closeout Panel: An interior panel used to prevent access to a specific space that requires tools for removal.

6. DISCUSSION.

a. Intent. Transport category airplanes have many areas that are accessible to passengers but cannot be inspected without considerable effort. Examples are areas under seats or above stowage compartments and areas in toilets and sinks. The intent of § 25.795(c)(3) is to make it easier to conduct a search, thereby increasing the probability of finding dangerous objects on the airplane. Depending on the location and type of objects under consideration, one may use any of the following approaches to the interior design of airplanes:

- design compartments that can be opened with a single-function, one-hand operation;
- limit or eliminate void spaces and compartments within compartments;
- secure access to compartments with specialty fasteners or tamper-evident devices; or
- design closeout panels to prevent access to certain areas.

b. Conflicting Needs. There are passenger and crew safety considerations that may make it less convenient to search for hidden objects. For example, the requirement that life preservers be accessible to each occupant precludes securing them in a separate storage area; the reality is that each life preserver requires a pocket or cavity for storage. Lavatories must have out-of-sight storage for extra supplies, but the supplies must be available when needed. Food service requires storage and preparation areas. The need to provide these facilities or equipment storage can conflict with the objective of minimizing the space that could be used for hiding explosive or other incendiary devices. In order to provide for a thorough search in a timely manner, the designer needs to balance these conflicting needs. See Appendix 1 for further discussion of this issue.

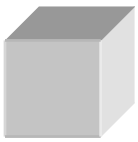
7. DEMONSTRATION OF COMPLIANCE.

Applicants may show compliance with § 25.795(c)(3) by designing the following assemblies, so as to prevent concealment or to promote discovery of dangerous objects from a simple inspection:

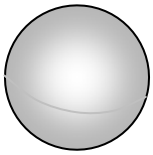
a. Life-Preserver Stowage. As required in § 25.795(c)(3)(iii), life preservers or their storage locations should be designed so that tampering is evident, for example, by designing a stowage location that is easy to see and requires a specialty tool or fastener to re-close it once opened, or by including tamper seals that will break any time the life-preserver compartment is accessed.

b. Overhead Bins. The areas above overhead bins should be designed to prevent any objects placed in these areas from being hidden from view in a simple search from the aisle, for example, by using closeout panels or screens or a design that eliminates space between the bin and the ceiling. Similarly, a design that prevents closing of the bin, if an object is placed above it, would satisfy the requirement. One method to assess the effectiveness of the design is to evaluate whether an object of "standard shapes" can be concealed. The following envelope of six objects with a volume of 20 in^3 is sufficient to show compliance.

Figure 1. Standard Shapes



Cube—2.7"



Sphere—3.4" Diameter

Rod—1.75" x 12"

Bar—1.25" x 1.25" x 12"

Plate—7.3" x 7.3" x 0.375"

Sheet—12" x 4" x 0.375"

This approach presumes that large objects will necessarily be less critical and not require specific assessment. Because the overhead stowage bins tend to be a consistent feature of the basic airplane type (that is, they do not vary from customer to customer), evaluation of the area above the bin should be possible prior to initial type certification. Any subsequent assessment would be needed only if the geometry of the overhead bins or the panels adjoining them changes.

c. Toilet Bowls. Toilet bowls must not permit the passage of solid objects greater than 2 inches in diameter. Therefore, a vacuum waste system with an exhaust pipe less than 2 inches in diameter would meet the requirement. An exhaust pipe greater than 2 inches in diameter would not be acceptable.

8. OTHER AREAS. Appendix 1 contains descriptions and recommendations for addressing areas of the cabin not subject to the regulatory requirement. This material is only for information and reflects recommended practices to facilitate searching. An applicant is not required to address these areas to comply with § 25.795(c)(3).

Ali Bahrami
Manager
Transport Airplane Directorate
Aircraft Certification Service

Appendix 1

Design for Ease of Search

1. Introduction. The following addresses areas of the interior of the airplane, which are not associated with regulatory requirements pertaining to design for ease of search. However, there are areas of the airplane that could benefit from consideration at the design stage to make them easier to search, even though they are not part of the rule. These areas also frequently involve functional considerations that may tend to conflict with a simple search. These discussions are only recommendations.

2. Galleys and Galley Equipment. Galley compartments for fixed inserts designed to near net-fit dimensions, or fixed inserts locked in place with a specialty or hidden fastener, can aid in the search process. An example is a coffee maker that fits in the allotted space with no backside clearance where a device might be hidden, or that fits in a compartment that can be locked with a specialty fastener. Rotatable equipment cavities can be designed to near net-fit dimensions to be easily searchable without the aid of mirrors, or to preclude someone putting a device between the stowed equipment and the back wall of the space. Access doors or panels—including installation hardware access panels, maintenance panels, ceiling panels, and ventilation grills—can be provided with a lock, a specialty fastener, hidden fastener to prevent access, or a seal that will positively indicate if tampering has occurred. Compartments within compartments also complicate the search process, since more than one door must be opened to gain access.

3. Lavatories. A minimum number of convenience compartments will simplify searching. For example, amenities may be grouped where practicable. Access doors or panels—including installation hardware access panels, maintenance panels, ceiling panels, and ventilation grills—can be provided with a lock, a specialty fastener, hidden fasteners to prevent access, or a seal that will positively indicate if tampering has occurred.

4. Literature Pockets and Magazine Racks. Literature pockets and magazine racks can be designed so that the contents may be readily inspected. A literature pocket that requires use of a single hand to see its contents is desirable. Seats mounted just forward of bulkheads can have sufficient space between the bulkhead and the seat to enable a person to inspect the contents of a literature pocket, if one is installed.

5. Interior Panels. Joints between interior panels that are designed to either preclude the introduction of objects or be tamper-evident are desirable.

6. Blind Areas within Overhead Stowage Compartments. An open bin that can be viewed by a 50^{th}-percentile person standing in the aisle will aid in searching. Hinge points designed to avoid creating areas that would not be directly visible, or that have covers with specialty or

hidden fasteners, also facilitate searching. Fixed mirror-like reflective surfaces in overhead bins to aid searching in obscure corners enhance visibility.

7. Crew Compartments. These include the crew rest area, pilot sleeping compartments, purser stations, and similar areas. Making these units easily searchable, or with a lockable door intended for ground use only, can facilitate searching. Areas between bunks and sidewalls can be designed to avoid gaps and cavities where devices could be hidden, if they are not provided with a lock for ground use.

8. Closets, Galley Inserts, and Miscellaneous Stowage Units. In general, compartments for stowage that contain hidden areas complicate searching. It will aid in a search, if access doors or panels—including installation hardware access panels, maintenance panels, ceiling panels, and ventilation grills—are provided with a lock, specialty fastener, a hidden fastener to prevent access, or a seal that will positively indicate if tampering has occurred.

9. Safety Equipment Stowage. Bearing in mind the requirements for accessibility of safety equipment, the design can include features in such areas to preclude the possibility of concealing dangerous objects. Compartments designed to near net-fit dimensions, where possible, to preclude putting a device between the stowed equipment and the walls of the space will aid in searching. Enclosing the equipment with tamper-evident seals is also beneficial.

10. Flightdeck Areas. To ease the search, designers should consider a seat-to-floor design that eliminates closed or hidden areas. Stowage areas can be treated as being within the passenger cabin. Access doors or panels—including installation hardware access panels, maintenance panels, ceiling panels, and ventilation grills—can be treated as being within lavatories.

11. Seats and Footrests. To simplify the search, cushions that are detachable without tamper evidence or a specialty tool can be easy to remove and replace. If no objects can be placed beneath or behind the cushion (net-fit design), the cushion is considered tamper-evident.