

Exemption No. 9794

**UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98057-3356**

In the matter of the petition of

Gore Design Completions, Ltd.

for an exemption from §§ 25.785(h)(2),
25.785(j), 25.813(e), and 25.853(d) of
Title 14, Code of Federal Regulations

Regulatory Docket No. FAA-2008-1004

PARTIAL GRANT OF EXEMPTION

By letter dated September 11, 2008, Mr. Andrew Gfrerer, Certification Manager, Gore Design Completion, Ltd., 607 N. Frank Luke Drive, San Antonio, Texas, 78226, petitioned the Federal Aviation Administration (FAA) for an exemption from the following sections of Title 14, Code of Federal Regulations (14 CFR): 25.785(h)(2), 25.785(j), 25.813(e), and 25.853(d). The proposed exemption, if granted, would permit relief from the requirements for flight attendant direct view, firm handholds in the passenger compartment, interior doors between passenger compartments, and maximum heat release flammability requirements for large interior panels. The proposed exemption is specifically for the installation of an executive interior on one Boeing Model 737-800 airplane, serial number 35792, designated as “private, not-for-hire.”

The petitioner requests relief from the following regulations:

Section 25.785(h)(2), Amendment 25-72 - Flight attendant seats must be located to provide direct view of the cabin area.

Section 25.785(j), Amendment 25-72 - Requires a “firm handhold” along each aisle

Section 25.813(e), Amendment 25-76 - No door may be installed in any partition between passenger compartments.

Section 25.853(d), Amendment 25-116 - Limits maximum heat release rates for large panel cabin interior materials.

The petitioner supports its request with the following information. This information is quoted from the petition.

BACKGROUND:

Gore Design Completion, Ltd. has been contracted for the completion of an executive business interior on a Boeing Model 737-800 airplane. The FAA has accepted our one-time only STC application and assigned Project Number ST8945SC-T for this project.

The certification basis for the Boeing 737-800 is [p]art 25, Amendment 25-1 through 25-77, with some regulations voluntarily complied with up to [A]mendment 25-91. There are good technical arguments to support special consideration for private use airplanes: the airplanes are not for public hire and they are configured to carry a fraction of the passengers carried in airline service. For these reasons, Gore Design Completion, Ltd. has prepared a petition for exemption [from] the following regulations:

14 CFR 25.785(h)(2), Amendment 25-72 - Flight attendant seats must be located to provide direct view of the cabin area.

14 CFR 25.813(e), Amendment 25-76 - No door may be installed in any partition between passenger compartments.

14 CFR 25.785(j), Amendment 25-72 - Requires a “firm handhold” along each aisle.

14 CFR 25.853(d), Amendment 25-116 - Limits maximum heat release rates for large panel cabin interior materials.

DISCUSSION:

14 CFR [part] 25 governs design certification of transport category airplanes. The primary intent of these regulations, as written, are to be certain that airplane manufacturers provide the appropriate design features to meet the standards necessary to protect the traveling public. Clearly, there is a requirement “in the public interest” and in the interest of safety to provide regulatory guidelines for certification. However, it is also very clear these regulations are intended to regulate the certification of “commercial” airplanes, which are “for hire” to the general public.

While the greatest majority of these regulations represent a common sense inclusion for any aircraft regardless of it’s intended use, a few are obviously intended to regulate situations that are specific to an airline, or for hire operation.

When a transport category airplane is operated under 14 CFR [p]art 91 or [p]art 125, some of the [p]art 25 rules have acceptance criteria that are inappropriate, or are not compatible with the type of operation and the intended use of this airplane.

The FAA clearly recognizes these differences as evidenced by the issuance of Exemption numbers 6820A, 6822, 7489 and numerous others which eliminate many of the more onerous regulations when applied to “private use, not-for-hire” operations under 14 CFR [p]art 125.

BASIS FOR EXEMPTION:

The airplane that is the subject of this petition is a Boeing Model 737-800. It is privately owned and will be operated under [p]art 125 regulations or other equivalent non-US foreign national operational standard.

The interior configuration being installed in this airplane will provide seating for twenty seven (27) passengers. The maximum certified passenger count for this airplane is 189 seats. The passenger count of the subject airplane represents just 14% of the capacity allowed for this airplane.

Regulation 14 CFR 25.785(h)(2)

Customers are buying these large airplanes as an extension of the office and are requiring privacy areas within the airplane sometimes spanning the whole cabin, such as board rooms, bedrooms, lavatories, and lounges rather than traditional airline type seating. An exemption to the flight attendant direct view requirement is therefore needed to allow the full use of the airplane capabilities. In addition, this requirement was incorporated into the FAA rules through [A]mendment 25-51. Out of the comments submitted to the FAA during the NPRM comments period, two said that, if galley doors were used as emergency exits, the placement of an attendant seat near the exit preclude[s] compliance with the requirement that the attendant be provided with direct view of the cabin area. To cover this situation, it was suggested that the requirement be conditioned to apply in so far as practicable and without compromising the proximity to required floor level exits. The FAA concurred and further stated in the preamble to the final rules that “location of the flight attendant seats near the floor level exits in this case is more important than the requirement to have a direct view of the cabin.” The final rule was revised from the NPRM proposal to address this relative importance.

Regulation 14 CFR 25.813(e)

There will be two mechanical “pocket” type doors (located at corridor / Playing Area and Dining Area/Theater Area) that are located between passenger compartments. There is also a mechanical “pocket” door (located between the Theater Area/Master Suite), and a swing door (located between Master Suite and Master Lavatory), however, these doors are not between passenger compartments and these doors do not apply to this exemption request.

Each door between passenger compartments will have the following design features: dual latches (each of which are able to withstand the forces defined by 14 CFR 25.561) to secure them in the open position, cockpit annunciation of the door position for taxi, take-off and landing, and the doors will be frangible in the event that they should become stuck in the closed position. In addition, since the aft emergency exits are deactivated, the door between the Theater Area/Master Suite will be in the closed position for taxi, take-off, and landing.

Regulation 14 CFR 25.785(d)

Customers are buying airplanes because they wish to create a spacious and impressive atmosphere they are used to. The wide body of the B737-800 satisfies these requirements. On the other hand, the requirement for firm hand hold along the aisles cannot be met for certain areas in the passenger cabin due to the wide open spaces. On a typical “commercial” flight this requirement is met by the individual seat backs which typically provide an adequate hand hold for a passenger to stabilize themselves in the aisle during turbulence. In fact due to the spaciousness of the interior there is no readily identifiable “aisle” in the Playing areas. Any construction hanging from the ceiling would ruin the appearance of the high quality interior, is not acceptable to the customer, and may add additional safety concerns.

It has been acknowledged by the FAA that the passengers on this type of airplane are typically the same people on most of the trips. Familiarity with the airplane layout and operation provides an addition benefit towards the level of safety.

Regulation 14 CFR 25.853(d)

With the sudden growth in the VIP or executive transport airplane market together with the simultaneous introduction of more stringent interior material flammability standards, aircraft interior modifiers have been faced with a serious dilemma in resolving the styling requirements of the private aircraft owner/operator of these executive aircraft and the flammability requirements imposed by § 25.853. For the most part, modifiers have been able to simultaneously satisfy both the styling and interior material flammability

requirements of §§ 25.853(a) and (c) with great effort and diligence; however, many of the materials required in these aircraft interiors simply cannot pass the 65/65 heat release requirement of § 25.853(a-1) no matter how diligent the designer is. It is not within the grasp of current technology to make certain natural materials conform to these standards and the owners of these airplanes define, in fact demand, the use of these materials. It should be understood that these aircraft must be outfitted in a style not unlike fine executive board rooms or luxurious residences to satisfy their private users.

OCCUPANT SAFETY CONSIDERATIONS:

14 CFR 25.785(h)(2)

Considering the smaller number of occupants in the business, private airplane, in this case 14% of that of a traditional commercial configuration, and the familiarity of the flight and cabin crews with the specific airplane, its passengers and its interior arrangement, and the wording of the existing rule that places the emphasis for safety on the proximity of the exit to the attendant over the ability of the attendant to view the cabin area, there should be no degradation in the passenger safety as a result of this requested exemption.

14 CFR 25.813(e)

The risk for occupants due to the use of doors between passenger compartments should be considered acceptable for the following reasons:

- All doors between passenger compartments will be frangible,
- There will be a signal to the flight crew when the pocket doors are closed for Taxi, Takeoff and Landing. The AFMS [Airplane Flight Manual] will provide procedures and limitations to ensure that the doors are in the proper position for takeoff and landing,
- The doors between passenger compartments will have dual means to retain them in the open position for take-off and landing, each of which will be capable of withstanding the inertia loads specified in 14 CFR 25.561,
- The airplane will be operated under 14 CFR [p]art 125 and will be not be operated for hire or offered for common carriage.

14 CFR 25.785(j)

The risk for occupants due to the non availability of direct hand holds in certain areas of the airplane should be considered acceptable for the following reasons:

- All furniture in the passenger cabin has rounded corners and edges to avoid serious injury in case of turbulence,
- The installed seat and divans are heavily upholstered and will not cause injuries when contacted,
- In the Playing Area, Dining Area and Theater Area occupants can use divan arms[and] seat back to steady themselves in case of turbulence flight,
- In the Executive Area, seat backs and tables are readily within reach with one or two steps,
- There will be a recommendation to passengers to remain seated with their seat belts fastened in case of turbulence during flight,
- Occupants are intimately familiar with the interior arrangement,
- The airplane will be operated under 14 CFR [p]art 125 and will not be operated for hire or offered for common carriage.

14 CFR 25.853(d)

The vast majority of the rule was driven by the post-crash fire experiences in airline operations. The 65/65 heat release regulation was specifically developed to reduce the likelihood of the flash-over phenomenon which was proven by tests to be a prime contributor to the rapid propagation of post-crash cabin interior fires and the generation of blinding smoke. Rapid fire propagation combined with the relatively slow rate of passenger evacuation from densely packed air carrier airplanes has proven to be a deadly combination during actual airline accidents. Since it is clear that material selection is being controlled by aesthetics in this application, we cannot exercise any real control over the actual heat release but the exposure time to this heat release is still within the designer's control. Therefore, it is proposed as a first step in mitigating the fire hazard that an evacuation analysis be performed to show that all souls on board can be safely evacuated in less than 45 seconds. This would be possible because of excess emergency exits for the airplane passenger capacity, flight attendants, smooth evacuation routes, and the small number of seats in the Executive Seating, Playing, Dining, and Theater areas, (27) seats total.

PUBLIC INTEREST:

As in the cases of numerous already established Exemptions, granting this petition for exemption would be clearly in the public interest for the following reasons:

- It allows efficient and safe carriage of Head of State and executives in the sought for environment that would otherwise not be possible,
- There is no degradation of safety involved with this request and therefore no detrimental impact to the public at large,
- Increased sales of these executive configured transport airplanes will ultimately result in some portion of those airplanes being completed at US owned or operated aircraft completion facilities, providing improved financial performance and work force stability for those organizations as well,
- Improved financial performance of US owned or operated corporations, and increased work force stability translates into continued and improved tax revenue for all governmental organization involved,
- Improved financial performance allows US corporations to continue to invest in new R & D research which will allow the US to maintain or improve it's competitive position in the world economy,
- A large number of these types of sales can be predicted to be to "offshore" clients, improving the US balance of trade deficit.

***Federal Register* publication**

A summary of this petition was not published in the *Federal Register*. This exemption does not set a precedent and any delay in acting on this petition would be detrimental to Gore Design Completions, Ltd.

The FAA's analysis

The FAA considers that granting this petition is in the public interest for the reasons stated by the petitioner and because the FAA is directed to take into account the type of operation when establishing standards under Title 49 of the United States Code (49 U.S.C. 44701(d)).

As more transport category airplanes have been configured (or re-configured) for private use, the FAA has given considerable attention to the issue of appropriate regulation of such airplanes. Some of the current regulations governing design certification of transport category airplanes are not compatible with private use of such airplanes. Because of this, we have received a number of petitions for exemption from certain regulations. We have granted such exemptions when we find that to do so is in the public interest and does not adversely affect the level of safety

provided by the regulations. We published a notice of proposed rulemaking, Notice No. 07-13, *Special Requirements for Private Use Transport Category Airplanes* (72 FR 38732, July 13, 2007), which, if promulgated, would obviate the need for case-by-case review of individual petitions for exemption for private use airplanes.

We are giving considerable attention to the issue of transport category airplanes operated for private use. There are several regulatory requirements, including some identified by the petitioner, that lend themselves to exemption when considering the differences between commercial and private use operations. We intend to summarize our views on these regulations and propose revisions to the requirements, where appropriate. The regulations that are the subject of this petition may be included in the proposed revisions.

Our analysis of this petition considered each of the following design features proposed by the petitioner:

1. Firm Handholds

We have considered the requirement for firm handholds in the context of private use airplanes and have determined that it would be impractical for this type of operation and interior configuration.

2. Interior Doors

The placement of interior doors is clearly quite significant to the owner/operator of the airplane. The flexibility to partition the airplane into individual rooms, such as private meeting rooms or bedrooms, is paramount to an acceptable interior. The availability of private meeting rooms and bedrooms is essential. The FAA acknowledges the desirability of these features from the operator's point of view.

When the regulations pertaining to interior doors were adopted, they did not consider "rooms." They considered two possible types of interior doors in a passenger compartment. The first type is an interior door between passenger compartments. The second type is an interior door between the exit and the passenger compartment.

Until recently, only the first type of door was prohibited by § 25.813(e). However, part 25, as amended by Amendment 25-116, prohibits interior doors between the exit and the passenger compartment. In addition, Amendment 121-306 prohibits these doors in airplanes manufactured after November 27, 2006, operated under 14 CFR part 121. Amendments 25-116 and 121-306, titled *Miscellaneous Cabin Safety Changes*, were published in the *Federal Register* on October 27, 2004.

When we reviewed the petition for exemption concerning the interior doors we determined that we needed to add a fifth category of doors to address the door between the Theater Area and Bedroom Area. We consider the Bedroom Area a passenger compartment that is only occupied in-flight and should require this door to meet the frangible requirement to address the door becoming jammed in-flight with people in the compartment. Also, we determined for evacuation

reasons the door should be closed for taxi, take-off, and landing since there are no exits aft of the door.

In terms of airplanes configured for “private, not-for-hire” use, there are five different categories of doors in the passenger cabins.

Category 1. A door in a room and the room is less than the full width of the airplane. There will be an aisle on the outside of the room. This type of room may be occupied during take-off and landing, and only the occupants of the room must use the door to reach an exit.

Category 2. A door in a room and is the same as Category 1 except there is a single emergency exit or pair of emergency exits within the room.

Category 3. A door or doors in a compartment and the compartment is the full width of the airplane. There are passengers seated on both sides of the door(s) and the main aisle leads out of or passes through the compartment. The compartment does not have any emergency exits. This type of compartment may be occupied during take-off and landing.

Category 4. A door in a room and the room is the full width of the airplane. Passengers are seated on both sides of the door, and there is a pair of emergency exits at one end. This type of room may be occupied during takeoff and landing.

Category 5. A door in a room that may be the full width of the airplane. This type of room is not occupied during take-off and landing. This room is only occupied during flight. Passengers are not seated on both sides of the door during taxi, take-off, and landing. Passengers seated in taxi, take-off, and landing seats must not need to pass through this door to get to any emergency exits.

Because not all interior doors between passenger compartments are equivalent, the FAA has determined that the following requirements will produce an adequate level of safety:

1. In order to maximize the level of safety, doors in Category 2, 3, or 4 installed across the main cabin aisle must open and close in a transverse direction. That is, the direction of motion of the door must be at a right angle to the longitudinal axis of the airplane. A “pocket door” is one example of such a design. This will tend to minimize the chance that the inertia forces of an accident could force the door closed.
2. Redundant means are necessary to latch doors open for take-off and landing. Each latching means must have the capability of retaining the door in the take-off and landing position under the inertia forces of § 25.561.
3. Each interior door must be frangible, in the event that it is jammed in the closed position in flight or during taxi, take-off, or landing. Frangibility is intended to ensure that if a door is jammed closed occupants can escape in either direction and emergency

equipment can be moved. Frangibility may be demonstrated in either of the following ways:

- A 5th percentile female can break through the door, creating a large enough opening that a 95th percentile (or larger) male can pass through. (See Advisory Circular 25-17, *Transport Airplane Cabin Interiors Crashworthiness Handbook*, paragraph 43b(2)).
- A 5th percentile female can break a hinge on the door or a hinge on a smaller door within the door such that the door can swing, so as to allow a 95th (or larger) percentile male to pass through the opening with the door swung open. This evaluation must be made with any cabin furnishing or equipment installed that could limit the swing arc of the door and placed in the most adverse position. In using this approach, one must consider the possibility that the door is physically jammed in the closed position by distortion of the fuselage or furnishings. This possibility must be considered even if the door normally translates into the open and closed positions.

4. Doors which fall into Category 1 must be in the open position during taxi, take-off, and landing only when the room is occupied.

5. Doors which fall into Categories 2, 3, or 4 must be in the open position during taxi, take-off, and landing, regardless of occupancy.

6. Doors which fall into Category 5 must be in the closed position during taxi, take-off and landing.

With respect to the possibility that a door will remain closed when it should not be, the FAA has determined that a higher level of awareness is required to address this issue. Due to the relative complexity of the cabin interior, the FAA has determined that inspection by flight attendants prior to take-off and landing is not sufficient to verify that interior doors are in the proper position. Consequently, some type of remote indication is considered necessary. The petitioner's proposal to provide remote indication to the flightcrew is considered adequate.

3. Interior Materials

With respect to the flammability of interior materials, the petitioner has accurately summarized the requirements. The petitioner correctly notes that the requirements are related to prolonging the time available for evacuation.

When the standards for heat release and smoke emission of interior materials were developed, the FAA incorporated a discriminant, based on passenger capacity. This approach was intended to address smaller airplanes where the ratio of exits to passengers is typically quite good and the evacuation times are expected to be quite low. Under these conditions, the benefits of improved materials were expected to be negligible. The airplane type discussed in the petition was not envisioned by the rulemaking, insofar as the large size with low passenger count is concerned.

The FAA has considered the issue of the evacuation capability of the airplane relative to the flammability of the materials, and finds that there may be some relief possible. However, the issue of flammability is not limited to post-crash scenarios, and the in-flight fire threat must also be addressed. The FAA notes that the petitioner has not proposed an alternative heat release or smoke emission criteria, but rather an exemption from the requirement to assess the heat release and smoke emissions of certain materials altogether.

Since the main benefit of improved interior materials is to lengthen the time available for evacuation, an arrangement that effectively provides the same evacuation capability would satisfy many of the concerns addressed by the requirement, albeit indirectly. The FAA has reviewed the full-scale fire test data used to develop the heat release requirements, and considered accident data relevant to this issue. This review is not complete, but it does suggest that a quantifiable improvement in evacuation capability could warrant a relaxation of the heat release requirements.

It is also the petitioner's contention that the particular cabin configuration(s) and mode of operation of the 737-800 make it likely that the evacuation capability under actual accident conditions will more closely model the evacuation capability shown for certification demonstrations. The petitioner has proposed that an evacuation analysis be performed to show that all occupants including crew can be safely evacuated in less than 45 seconds. The FAA has determined that a 45 second evacuation time would provide for a higher level of safety than is provided on some earlier certificated airplanes, where compliance with the heat release and smoke emissions requirements is not required. There are precedents for this decision involving other private use airplanes.

The remaining issue of the in-flight fire scenario needs to be addressed as well. The major issue with respect to in-flight fires is timely recognition. On some airplanes the interior includes isolated areas that do not lend themselves to timely detection of a fire. For the purposes of this exemption an isolated passenger compartment is defined as a room that does not contain an egress path (e.g., main cabin aisle, cross aisle or passageway), or is isolated by a door. In order to address the in-flight case, the FAA believes that installing a smoke detector in such areas would compensate for the potential for an increased in-flight fire threat. Therefore, each isolated passenger compartment must incorporate a fire detection system that meets the requirements of § 25.858. While this section is written for cargo compartment fire detection systems, the criteria contained therein are considered appropriate to this application.

4. Direct View

The petitioner has identified the requirement for flight attendant seats to be located to provide a direct view of the passenger cabin as not practical for compliance with the executive type interior to be used on the 737-800. The complexity of the interior arrangement, coupled with the need to retain proximity to emergency exits is cited as the primary reason that compliance is impractical.

The FAA has considered the requirement for direct view in the context of private use airplanes, and agrees that much of the justification for the requirement is based on air carrier type

operations. The practicality of locating flight attendant seats near emergency exits so that there is a direct view of occupants inside of rooms is questionable, at best. In this regard, the FAA does believe that some relief may be appropriate for airplanes intended for private use. However, the FAA notes that the justification for the requirement for direct view is not limited to observation of passengers that are not familiar with the interior. Flight attendant seats should be located so that there is a direct view provided for the cabin area that is practical. For example, flight attendant seats should not face away from the cabin. In those areas of the airplane where traditional seating arrangements are used, the FAA believes that direct view should be provided.

In considering the need for direct view, the FAA agrees that the restricted nature of the operation of a private use airplane mitigates much of the need. That is, the operator has control of and can restrict the population of passengers, unlike an air carrier. The risk of passengers engaging in hazardous or malicious activity is essentially eliminated, and the need for direct view is limited to those cases where a passenger might need assistance. We consider that this objective is met by requiring that a majority of flight attendants seats face the cabin.

We disagree with the applicant's statement that "The passenger count of the subject airplane represents just 14% of the capacity allowed for this airplane." The applicant is comparing the proposed passenger seating capacity of its private use Model 737-800 airplane, which will have one pair of Type III exit doors and the aft pair of floor level exits deactivated, with a Model 737-800 airplane that has all of the emergency exits functional. As exits are deactivated the allowable passenger seating capacity decreases. The applicant should compare its proposed passenger seating capacity with the maximum allowable seating capacity of a Model 737-800 with the same deactivated exits. In this scenario the maximum passenger seating capacity allowed on a Model 737-800 would be 80, not 189; therefore, the seating capacity of the private use airplane is 33.8% of that allowed on a comparable Model 737-800 airplane, not 14%.

The FAA's decision

In consideration of the foregoing, I find that a partial grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 40113 and 44701, delegated to me by the Administrator, I grant the petition of Gore Design Completion, Ltd. for an exemption from 14 CFR 25.785(h)(2), 25.785(j), 25.813(e), and 25.853(d) to the extent necessary to allow installation of an executive interior on a "private, not-for-hire" Boeing Model 737-800 airplane, serial number 35792. Specifically, the exemption allows relief from the requirements for flight attendant direct view, firm handholds in the passenger compartment, interior doors between passenger compartments, and maximum heat release flammability requirements for large interior panels. This exemption is subject to the following conditions:

1. The airplane must not be operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR parts 125 and 91, subpart F, as applicable.
2. A majority of flight attendant seats must be oriented to face the passenger cabin.
3. Each door between passenger compartments must be frangible.

4. Doors that fall into Category 1 must be in the open position during taxi, take-off, and landing when the room is occupied or when passengers must pass through the room to reach an emergency exit.
5. Doors that fall into Categories 2, 3, or 4 must be in the open position during taxi, take-off, and landing, regardless of occupancy of the room.
6. Doors which fall into Category 5 must be in the closed position during taxi, take-off, and landing.
7. Appropriate procedures must be established to signal the flightcrew that a door between passenger compartments is closed and to prohibit take-off or landing when a door between passenger compartments is not in the proper position.
8. Doors between passenger compartments must have dual means to retain them in the open position, each means must be capable of withstanding the inertia loads specified in § 25.561.
9. When materials are installed that do not comply with the requirements of appendix F, parts IV and V, it must be shown that the passengers and crewmembers can be evacuated in 45 seconds or less, under the conditions described in part 25, appendix J.
10. There must be means to signal the flightcrew in the event of a fire in any isolated passenger compartment that meet the requirements of § 25.858(a) through (d).

Issued in Renton, Washington, on November 26, 2008.

Signed by Ali Bahrami

Ali Bahrami
Manager, Transport Airplane Directorate
Aircraft Certification Service