Exemption No. 10899A

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

In the matter of the petition of **Jamco America Inc.** for an exemption from §§ 25.785(d), 25.807(c)(1), 25.807(c)(5), 25.809(f)(1), 25.813(b), 25.857(e), 25.1447(c)(1), and 25.1447(c)(3) of Title 14, Code of Federal Regulations	**Regulatory Docket No. FAA-2013-0680**

GRANT OF EXEMPTION

By letter dated June 23, 2015, Donald Wren, Director of Certification, Jamco America Inc., 1018 80th Street SW, Everett, Washington, 98203, petitioned the Federal Aviation Administration (FAA) to amend Exemption No. 10899. That exemption permitted relief from Title 14, Code of Federal Regulations (14 CFR) 25.785(d), 25.807(c)(1), 25.807(c)(5), 25.809(f)(1), 25.813(b), 25.857(e), 25.1447(c)(1), and 25.1447(c)(3) to allow carriage of fifteen (15) non-crewmembers (commonly referred to as supernumeraries) in a compartment behind the flight deck on Boeing Model 747-400F airplanes. If granted, the amendment would revise operational limitations to meet the operational needs of the operator.

The petitioner requests relief from the following regulations:

> **Section 25.785(d), at Amendment 25-64** – "If the seat backs do not provide a firm hand hold, there must be a hand grip or rail along each aisle to enable occupants to steady themselves while using the aisles in moderately rough air."
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> **Section 25.807(c)(1), at Amendment 25-67** – requires that one Type III passenger emergency exit be provided on each side of the fuselage.
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> **Section 25.807(c)(5), at Amendment 25-67** – requires that at least one pair of Type III passenger emergency exits be provided if Type IV exits are specified but cannot be located over the wing.

Section 25.809(f)(1), at Amendment 25-47 – requires that a self-supporting escape slide or equivalent be provided as the assist means at passenger emergency exits that are more than six (6) feet from the ground with all landing gear extended.

Section 25.813(b), at Amendment 25-46 – "For each passenger emergency exit covered by § 25.809(f), there must be enough space next to the exit to allow a crewmember to assist in the evacuation of passengers without reducing the unobstructed width of the passageway below that required for the exit."

Section 25.857(e), at Amendment 25-60 – limits a Class E cargo compartment to airplanes used only for the carriage of cargo.

Section 25.1447(c)(1), at Amendment 25-41 – requires, in pertinent part, that oxygen dispensing units must be automatically presented to the occupants before the cabin altitude exceeds 15,000 feet.

Section 25.1447(c)(3), at Amendment 25-41 – requires, in pertinent part, that two oxygen dispensing units of a type similar to that required in § 25.1447(c)(1) be provided in each lavatory.

Related sections of the regulations:

Section 121.583(a) – contains, in pertinent part, a listing of categories of persons who may be carried aboard an airplane in part 121 service without complying with all the requirements of part 121 pertaining to carriage of passengers.

The petitioner supports the request with the following information:

This section quotes the relevant information from the petitioner's request, with minor edits for clarity. The complete petition is available at the Department of Transportation's Federal Docket Management System, on the Internet at http://regulations.gov, in Docket No. FAA-2013-0680.

A. Background

As currently identified in Exemption 10899, we (as the petitioner) had proposed the following aircraft operational Types:

A. Operations for carriage of live animals, and associated material, in the main deck cargo compartment requiring care/attention during flight; no other cargo on the main deck. For these operations the maximum number of supernumeraries on the upper deck is 15 and the total airplane occupancy is 19. Access to the main deck Class E cargo compartment by a maximum of 15 supernumeraries is permitted during climb, cruise, and approach.

B. Operations for carriage of cargo only as originally specified in the TCDS; no live animal(s) or other cargo requiring care/attention during flight. For these operations the maximum number of supernumeraries is 6 and the total airplane occupancy is 8. No

access is allowed into the main deck Class E cargo compartment during any airplane operation.

C. Operations for carriage of cargo on the main deck cargo compartment requiring care/attention during flight, and other cargo. For these operations the maximum number of supernumeraries is 6 and the total airplane occupancy is 8. Access to the main deck Class E cargo compartment by a maximum of 3 supernumeraries is permitted during climb, cruise, and approach.

As a practical matter, operational Types B and C had already been permitted by previously existing approvals documented in the Type Certificate A20WE, several other exemptions (e.g. 10703, l870E, 6464, 7900, etc.), and Special Airworthiness Information Bulletin SAIB NM-09-27. As such, the limitations and conditions associated with these operational Types were based on those established in these previously existing approvals. For these types of operations, no changes to operational procedures or to aircraft configuration are required to operate, as long as the owner/operator complies with already existing guidance.

Operational limitations applicable to Type A, B, and C operations have been approved by the FAA as documented in exemption 10899 and are currently embodied in type design elements and the Airplane Flight Manual Supplement (AFMS) for STC ST02114SE associated with Exemption 10899.

Following 11 months of operation of the subject modified Boeing Model 747-400F Series aircraft, the aircraft owner/operator has provided observations and comments on the suitability and usefulness of Supplemental Type Certificate (STC) ST02114SE and Exemption 10899. These observations are that the existing operational limitations identified within Exemption 10899 do not completely support their planned use of the aircraft. This petition is one of several ongoing actions to comprehensively address all the owner/operator's observations and concerns, and proposes a revised set of operational limitations that provide an equivalent level of safety as those documented in the existing Exemption.

B. Analysis and Discussion

We have analyzed the operator's observations and comments, and have identified ways to amend this exemption while maintaining the same level of safety and meeting the operators desired operational intent.

First, we propose a change to the definition of the Type C operations, such that Type C operations include the carriage of live animals and are allowed with the same total airplane occupancy as Type A operations. As the operator often uses an airplane to shuttle animals and supernumeraries (grooms) back and forth, it is both impractical and unduly burdensome to charter an entire second aircraft to transport supernumeraries when these operations are no less safe with, or without, live animals in the horse containers. Also, not all flights may be flown in a completely full configuration with all animals loaded, so

some flexibility is required. For instance, if 20 horses are traveling from one location to another, but 30 horses will return, this is a different configuration of horses and their associated material. This definition change will provide an equivalent level of safety as that provided by the existing Exemption 10899 and will significantly lower costs for the owner/operator.

Additionally, we propose the applicable limitations associated with Type C operations be amended to match those already identified for Type A operations to ensure that the emergency egress paths required for the increased occupancy will be maintained. This will ensure that both evacuation of the main deck cargo compartment to the upper deck while at altitude, and evacuation from the upper deck down the stairs to the LH main deck door on the ground, will be protected and remain unimpeded for both Types A and C operations.

C. Proposed Amendment to Exemption 10899

Therefore, based on the analysis and discussion above, we propose to amend Exemption 10899 from the section "FAA's decision" as described below.

Amend the definition of the Type C operations that is currently cited in Limitation 1 to the following:

- *Carriage of **cargo or live animals** requiring care/attention during flight, or configured for carriage of live animals, **and/or** other cargo. The petitioner has identified this as operational type C. The maximum number of supernumeraries is **15** and the total airplane occupancy is **19**. Access to the Class E cargo compartment by a maximum of **15** supernumeraries is permitted during climb, cruise, and approach.*

To support this change in definition for Type C operation, we propose to also amend Limitations 11, 13, and 14 as follows.

For Limitation 11, we propose to amend the placard requirements for operational type C to match those for operational type A, since the maximum number of supernumeraries allowed to access the Class E cargo compartment during flight will be the same, and therefore all instructions and limitations should also be the same.

Amend the placard requirements for Type C operations that is currently cited in Limitation 11 to the following:

For operational type C:

- *Access to the Class E cargo compartment is limited to the care and handling of **live animals and/or** cargo requiring care/attention during flight.*

- *Access to the Class E cargo compartment is limited to a maximum of **15** supernumeraries.*

- *The smoke barrier must be secured (i.e., the door or curtain must be closed) except when entering or leaving the cargo compartment.* ***The smoke barrier must be latched open for TT&L for operational type A unless fire/smoke has been detected in the main deck cargo compartment. If fire /smoke has been detected in the main deck cargo compartment, the door may be closed if directed by the pilot in charge.***

- *A portable oxygen bottle (with mask attached) must be carried at all times when accessing the cargo compartment.*

- *Smoking is not allowed within the cargo compartment.*

- ***The compartment must not be entered in case of fire/smoke being detected inside the Class E cargo compartment except during evacuation.***

The pre-flight briefing must inform supernumeraries of these requirements.

For limitation 13, we propose to amend the requirement for the minimum number of inertia reels required to be installed on the flight deck to support emergency egress of the flight crew and supernumeraries.

Amend the inertia reel requirements for all operations that is currently cited in Limitation 13 to the following:

> *A minimum of eight inertia reels and harnesses must be installed on the flight deck ~~for operational types B and C~~. In addition to the minimum eight inertia reels and harnesses installed on the flight deck, a minimum of 11 inertia reels and harnesses must be installed at a location that can be used for exiting the crewservice door when installed escape slide is not self-supporting on the ground. No flight deck door may be installed between the supernumerary compartment and flight deck that would prevent access to the overhead hatch and eight inertia reels and harnesses.*

For limitation 14, we propose to amend the requirements for a stairway between the upper deck and the main deck for operational type C to match those for operational type A, since the maximum total airplane occupancy will be the same, and therefore the emergency egress path requirements should also be the same.

Amend the stairway requirements for Type C operations that is currently cited in Limitation 14 to the following in the opening sentence:

> *Additional requirements for a stairway between the upper deck and the main deck for operational types A and C:*

All other limitations and conditions remain the same as in the existing Exemption 10899.

D. Public Interest

Granting this amended exemption is in the public interest for the following reasons:

- The FAA has previously granted several exemptions for the carriage of supernumeraries on freighter airplanes for similar petitions.

- The owner/operator of the aircraft intends to use the aircraft to transport race horses, show horses, and bloodstock. These animals are very valuable, many worth over one million dollars each. The animals cannot be properly insured nor cared for during travel unless there are a sufficient number of qualified handlers on board who can access the animals during flight.

- The industry standard for the air transport of horses recommends one supernumerary (groom/handler) for every three or four horses. The safe transport of large numbers of horses by air requires the carriage of a commensurate number of qualified grooms/handlers in the main deck cargo compartment. The owner/operator has determined that 15 supernumeraries will provide adequate care in all cases of expected operation.

- The carriage of an appropriate number of animal handlers aboard an aircraft to monitor and to attend to the special requirements of live animal cargo, especially race horses and show horses, serves the public interest in raising the level of safety of the livestock, the airplane, the flight crew, and consequently, the public in general; therefore, this exemption serves the public interest for safety reasons and also for increased air freight deliveries of these animals internationally.

- Other owners/operators may have a similar interest in this solution as there is clear economic benefit to both owners/operators as well as this installation activity and the overall US economy from this modification.

- Increased economic action is of clear public interest to the United States.

- The supernumeraries aboard these airplanes will not be revenue paying customers of commercial for hire airlines, but rather employees of the owner operator and specifically trained; therefore, there is no degradation to airline passenger safety and no detrimental impact on the public at large.

- The project in question on this Boeing 747-400F Series aircraft is a case of the special market in which Jamco America, Inc. works. Owners and operators require configurations that use interior space in ways not anticipated in the original TCDS configurations which, in this case include access to the main deck cargo compartment during flight in support of animal care. In order to satisfy the customer requirements and maintain our marketing competitiveness, Jamco America, Inc. seeks to accommodate this configuration while providing an adequate level of safety for the flight crew and supernumeraries.

- Jamco America, Inc. is a growing company based in Washington that provides aerospace engineering, certification, and manufactured assemblies for part 25 aircraft. The company employs over 400 US citizens and provides strong support to the local economy where these employees and facilities are located. Our success in an extremely competitive global economy will have a significant positive impact on the local and regional economy.

- Granting this exemption will permit conclusion of this project, which will provide a significant income with positive impact on both the local and regional economies. This will aid both in the case of this specific project and future projects.

- Approval of these exemptions will enable this Washington company working on Transport Category Airplanes to effectively compete in this global market. Stability and improved financial performance of this Washington company gives greater job stability to workers employed, thereby providing a stabilizing influence to the greater regional and the larger US economy due to the increased consumer spending capacity associated with stable workers. Improved financial performance of Washington owned and operated corporations and increased workforce stability translates into continued and improved local, state, and federal tax revenues, which in turn add to the stability of the overall United States economy. Washington is a net federal tax provider, that is to say that Washington provides more federal taxes than it receives in federal spending, thereby serving as a stabilizing influence to federal deficits.

- Improved financial performance allows Washington corporations to continue to invest in Research and Development allowing the United States to maintain and improve its competitive position in the global economy.

***Federal Register* publication**

The FAA has determined that good cause exists for waiving the requirement for *Federal Register* publication for public comment because the request is identical in all material respects to previously granted exemptions; the exemption, if granted, would not set a precedent; and any delay in acting on this petition would be detrimental to Jamco America Inc.

The FAA's analysis

The petitioner requested an amendment to Exemption No. 10899 to allow carriage of 15 supernumeraries with access to the Class E cargo compartment when carrying cargo or mixed cargo and live animals that require care or attention during flight. Exemption No. 10899 did not permit any cargo to be carried with live animals other than that associated with the live animals, and only permitted three supernumeraries to access the Class E cargo compartment when cargo other than live animals was present.

The addition of cargo to live-animals-carriage operation causes additional risk of exposure from the smoke and fumes of a fire. As the number of supernumeraries increases, and the duration of exposure increases, we must ensure a reasonable level of protection from smoke inhalation. Due

to egress concerns unique to a Boeing Model 747, with a stairway between the main deck and the upper deck, the petitioner proposed in the original petition to supply portable protective breathing equipment (PBE) that protects the wearer from smoke inhalation in addition to supplying a minimum of 90 seconds of air. This type of PBE provides sufficient protection from smoke inhalation to maintain the appropriate level of safety for the proposed increase in the number of supernumeraries allowed into the Class E cargo compartment with mixed cargo.

The FAA considers the petitioner's proposal for this amendment to Exemption 10899 to be in the public interest because it promotes efficient air carrier operations, provides the same allowance as has been previously granted to other operators, and does not adversely affect the level of safety.

The type of operation, identified by the petitioner as Type C, will be redefined as:

> Carriage of cargo or live animals requiring care or attention during flight, or configured for carriage of live animals along with other cargo not associated with the animals. The petitioner has identified this as operational Type C. The maximum number of supernumeraries is 15 and the total airplane occupancy is 19. Access to the Class E cargo compartment by a maximum of 15 supernumeraries is permitted during climb, cruise, and approach.

With this change, the limitations associated with Type A and Type C operations are the same in this amended exemption and have been combined.

The following FAA analysis is reprinted from Exemption No. 10899 with edits appropriate for the revised definition of Type C operations.

The FAA considers the petitioner's proposal for the exemption to be in the public interest for the following reasons:

- The FAA has granted several exemptions for the carriage of supernumeraries on freighter airplanes;
- These supernumeraries are seen as a benefit to airplane safety and efficient operations of air cargo; and
- A significant disruption of air commerce could occur if the petition were not granted.

Class E cargo compartments are usually remote from the flight deck and encompass the entire interior of the airplane. The means of controlling fires that might occur in the cargo compartment is to starve the fire of oxygen. This is accomplished by depressurizing the airplane and maintaining an altitude that will not support combustion. For this reason, only crewmembers are permitted on board such airplanes.

The certification regulations for transport category airplanes address airplane occupants as being either "crew" or "passengers." Due to differences in training, physical capabilities, and other factors (such as familiarity with the airplane), the means required by 14 CFR part 25 to address emergency evacuation and emergency equipment for passengers and crewmembers differ.

Because supernumeraries are not crewmembers, they must be considered "passengers" by default with respect to part 25. However, supernumeraries do hold a special status because of their training and other factors. The FAA, therefore, has granted certain exemptions to allow the carriage of supernumeraries on cargo airplanes without compliance with all of the part 25 standards for passengers, provided that certain other conditions are met. Those conditions have varied, depending on the airplane design, the nature of the proposals under consideration, and the number and location of persons to be carried.

Types of operations

The FAA has previously granted exemptions for in-flight access of the Class E cargo compartment by supernumeraries, provided that certain other conditions are met. These conditions have varied, depending on the airplane design, the number of persons involved, and the type of cargo permitted to be transported in the main deck Class E cargo compartment. We have been reviewing the operational need for access into the Class E cargo compartment in-flight and the number of persons needed in the cargo compartment for the type of operation. We have divided the access into the cargo compartment into three different types of operations:

- Carriage of live animals requiring care or attention during flight and associated material only, no other cargo. The petitioner has identified this as operational Type A.

- Cargo only, which does not require care or attention during flight, and no live animal(s) requiring care/attention during flight. The petitioner has identified this as operational Type B.

- Carriage of cargo or live animals requiring care or attention during flight, along with other cargo not associated with animals. The petitioner has identified this as operational Type C.

Each of these three types of operation are discussed below:

Operational Type A and C

All large animals being shipped by air need supernumeraries on board for their care/attention during flight because the carriage of large animals implies a potential risk due to the brute force they are capable of, which can endanger flight safety. Horses are routinely shipped by air and are one of the large animals that require care/attention during flight because of the brute-force issue. Also, these horses that are shipped by air are high-value animals, and the owners and insurance policies require in-flight care/attention. We understand that the industry standard for the air transport of horses recommends one supernumerary (groom/handler) for every three or four horses. We agree that this recommendation is appropriate to ensure safety of flight.

Considering the size of the 747-400F airplane, the main deck cargo compartment could contain several dozen horses. As a result of the large number of horses or other large animals, a large number of supernumeraries (grooms/handlers) would be needed. We have granted exemptions in the past for larger numbers of supernumeraries with in-flight access into the main deck Class E

cargo compartment under certain conditions. These conditions have included limiting the permitted cargo to the large, live animals and associated cargo only. We have considered that live animals are less flammable cargo than other cargo, therefore, we have allowed more in-flight access to the cargo compartment. The petitioner has requested allowance for mixed live animals and other cargo. We have permitted supernumeraries access to Class E cargo compartments with mixed live animals and other cargo with the limitation that the supernumeraries carry portable PBE, as defined in § 25.1439(a), that would provide a minimum of 90 seconds of air that could be used if the Class E cargo compartment contains fire or smoke. (See Airbus A330 Exemption No. 9894, Boeing 777F Exemption No. 9779, and Boeing 747 Exemption No. 8590B.) The petitioner has requested a maximum of 15 supernumeraries be allowed to have in-flight access to the main deck Class E cargo compartment for the care of live animals and attention to other cargo not associated with animals. We accept the proposal for the number of supernumeraries.

For this operational Type A and C, the petitioner has requested that the maximum number of persons on the upper deck be 19, including the crewmembers. This number of persons on the upper deck is greater than what has been accepted by the FAA for the exit configuration on the upper deck. The petitioner has proposed that the exit and manually-deployed and automatically-inflating escape slide on the right-hand side of the airplane be accepted for 19 persons. The exit is the standard exit provided on 747-400F airplanes. The escape slide is a standard option that is delivered with the airplane. We accept this proposal.

On the left side of the airplane, the only exit on the upper deck is the overhead hatch. For the overhead hatch, the assist means that has been accepted on other airplanes of this model has been inertia reels and harnesses for a maximum number of eight persons. The reason for the limitation to eight persons is the combination of the size of the overhead hatch and the number of persons with the inertia reels exiting the hatch. The petitioner has proposed to use the main deck entry door as an emergency exit. They have proposed to modify the existing main deck entry door by installing at least 11 inertia reels adjacent to the door. This modification includes the door-operating markings on the inside of the airplane; interior illumination system; assist means; attachment point for a liferaft mooring line; and exterior markings.

In addition, the petitioner has proposed to modify the stairway installed between the main deck and the upper deck. The modified stairway would be designed to meet similar requirements as those identified in Special Conditions 25-430-SC, which are for a stairway between two passenger decks on the 747-8 airplane. The petitioner's petition contains the proposed special conditions for the stairway. The main deck entry door for this airplane is located inside the Class E cargo compartment. To address additional concerns with the need to evacuate through a cargo compartment that may have smoke and fire, the petitioner has proposed to supply a second type of portable PBE, as defined in § 25.1439(a), that would provide a minimum of 90 seconds of air that could be used if the Class E cargo compartment contains fire or smoke. The petitioner has proposed PBE to be used in the event that evacuation is required out the left side of the airplane in combination with fire/smoke in the main deck cargo compartment, as part of their petition for exemption. We accept this proposal.

Operational Type B

For this type of operation, no in-flight access to the main deck Class E cargo compartment is requested. This type of operation and airplane configuration is the same as that defined in Exemption No. 1870E. We accept the proposal and propose to grant the exemption with the same limitation as identified in Exemption No. 1870E with one minor change and one correction. Since Exemption No. 1870E was issued, the FAA has been requiring a harness for each inertia reel installed on the airplane, whereas before we only required the harness for the supernumeraries. Exemption No. 1870E incorrectly identifies the crew service door on the left side of the upper deck as a Type I exit. This exit is the size of a Type I exit; however, this exit is not floor level. This exit has a step up from the floor to the exit, which is not allowed for Type I exits. The crew service door does qualify for a Type III exit rating. This change and correction are applicable to all types of operations.

Cargo-compartment alerts for operational Types A and C

The FAA has determined that three separate, distinct alerts are required in the cargo compartment. One distinct alert each is for decompression; smoke and fire; and turbulence. In the past, the FAA has accepted a single alert to address both decompression and smoke or fire events because the action required of the supernumeraries was the same for both events. That action required supernumeraries to don oxygen masks, start the flow of oxygen, then evacuate the cargo compartment. The FAA now determines that the time required to don an oxygen mask and start oxygen flow, in the event of a smoke or fire event, is best spent first evacuating the cargo compartment. Therefore, the FAA now requires all new certification programs to provide three distinct, separate alerts for these three events.

Handholds

The requirement of § 25.785(d) Amendment 25-64 for handholds is to ensure that occupants have a means to steady themselves in moderately rough air while traversing the main aisles of typical passenger airplanes. On the proposed airplane, we concur with the petitioner that it is not necessary to provide dedicated handholds in the cargo compartment because it is impractical, provided a flightcrew-operated aural or visual signal, which is recognized in accessible areas in the Class E cargo compartment, is installed to indicate, during turbulence, that persons must return to their seats.

Type and number of exits

Sections 25.807(c)(1) and (c)(5) require, for passenger capacity of 10 to 19, a minimum of a Type III exit on each side of the fuselage. The Model 747-400F is equipped on the right side with a Type III crew service door. On the upper deck, no similar capability is provided for the left side of the airplane. However, an overhead hatch to the left of the centerline is located in the cockpit, which does comply with the flightcrew emergency-exit requirements of § 25.805. The FAA has accepted this overhead hatch in similar exemptions with the appropriate limitations and equipment installations for a maximum of eight persons (six supernumeraries and two flightcrew) on the airplane. This exit configuration would cover operational Type B, and we

accept this configuration with the appropriate limitations and equipment installations for a maximum of eight persons (six supernumeraries and two flightcrew) on the airplane.

However, this exit configuration is not acceptable for operational Type A or C. For these operational types, additional evacuation capability is needed for the left side of the airplane. The petitioner has proposed to modify the existing main deck entry door by installing at least 11 inertia reels adjacent to the door. This modification includes the door-operating markings on the inside of the airplane; interior illumination system; assist means; attachment point for a liferaft mooring line; and exterior markings. As an additional compensating feature, the petitioner has proposed that the stairway between the upper deck and the main deck be modified to comply with similar conditions as those requirements found in Special Conditions 25-430-SC, for the stairway for the 747-8 passenger airplane. A complete list of the petitioner's proposed conditions for the stairway is found in the petition. The petitioner proposed to limit the cargo for this operational type to live animals and associated cargo. The associated cargo excludes from carriage hazardous material, the carriage of which is governed by regulations in 49 CFR part 175; ignition sources (open flame, articles producing sparks, hot surfaces); lithium batteries; explosives; radioactive materials; flammable liquid fuel; oxidizers; plutonium; and dry ice. This exit configuration would cover operational Type A and C, and the FAA accepts this configuration with the appropriate limitations and equipment installations for a maximum of 19 persons (15 supernumeraries and 4 flightcrew) on the airplane.

Assist means

Section 25.809(f)(1) requires that a self-supporting slide or equivalent must be provided to assist the occupants in descending to the ground for each passenger emergency exit located more than six feet from the ground. The Model 747-400F crew-service door has an inflatable escape slide that is self-supporting with the landing gear extended. The overhead hatch is equipped with eight inertia reels and eight harnesses not envisioned by this requirement but considered by the FAA to be adequate for use by flightcrew and "crew" in accordance with the requirements of § 25.809(f)(2).

Section 25.809(f)(1)(i) requires that the assist means must be automatically deployed. The escape slide installed at the crew service door is manually deployed and so are the installed inertia reels. The FAA has granted exemptions to the requirement on 747 freighter airplanes with and without supernumeraries for many years. We agree with the petitioner's proposal.

Section 25.809(f)(1)(ii) requires that the assist means must be automatically erected within 10 seconds after deployment is begun. The escape slide installed at the crew-service door meets this requirement. The inertia reels do not erect, but have been found acceptable for this type of installation.

Section 25.809(f)(1)(iii) requires that the assist means must be of such length after full deployment that the lower end is self-supporting on the ground and provides safe evacuation of occupants to the ground after collapse of one or more legs of the landing gear. The escape slide for the crew service door is not self-supporting on the ground in all cases of gear collapse, and the inertia reels are too short to reach the ground in all cases of gear collapse. However, the

inertia reels have been demonstrated to be effective at providing safe evacuation of occupants exiting from the overhead hatch to the ground. The inertia reels installed near the overhead hatch located in the flight deck have been demonstrated to be effective at providing safe evacuation out the crew service door, after the escape slide has been deployed and inflated, to address the conditions when the escape slide is not self-supporting on the ground. However, additional inertia reels and harnesses need to be installed in the airplane to have one inertia reel and harness for each of the proposed 19 occupants. The FAA notes that the petitioner is proposing to add these items to address this concern.

For operational Types A and C, the petitioner has proposed to install at least 11 inertia reels adjacent to the main deck entry door. These are the same part number inertia reels we have determined to be acceptable for use at the main deck entry door. The harnesses that would be used for this exit are the same as those installed on the upper deck adjacent to the crew service door and would be donned before the evacuees entered the cargo compartment. We accept this proposal.

Section 25.809(f)(1)(iv) requires certain performance capabilities in 25-knot wind conditions. The crew service door escape slide is certified to meet this requirement.

Assist space

Section 25.813(b), regarding specific assist space requirements for passenger evacuations, has not been addressed in the 747-400F design at any of the proposed exits. However, the FAA has granted exemptions from this requirement for freighter airplanes with supernumeraries based on the additional training that is required to be provided to the supernumeraries and the required pre-flight briefings. Also, the airplane contains adequate space for the flightcrew to demonstrate the use of the inertia reels and harnesses and how to evacuate the airplane with this equipment.

Smoke penetration

In all cases, the airplane must contain suitable means of preventing smoke penetration into areas that are occupied. The petitioner's design accounts for this by providing a barrier, which must comply with the smoke penetration requirements for the flight deck and the supernumerary compartment. However, the petitioner has indicated that configurations may be approved that will allow supernumeraries to enter the Class E cargo compartment and hence open the smoke barrier between the cargo compartment and the supernumerary compartment. To provide an appropriate level of safety, the petitioner must install a placard indicating that the smoke barrier is to be secured (i.e., the door or curtain must be closed) except when entering or exiting the cargo compartment. The placard must be located in a conspicuous place, either on or next to the smoke barrier. However, for evacuation, operational Types A and C have a conflict between having the smoke barrier closed for smoke penetration and having the smoke barrier door open during taxi, takeoff, and landing. In consideration of these two issues, the FAA has determined that the following provides an acceptable level of safety:

- The smoke barrier must be latched opened for operational Type A or C during taxi, takeoff, and landing unless fire or smoke has been detected in the main deck cargo

compartment. If fire or smoke has been detected in the main deck cargo compartment, the door may be closed if directed by the pilot in charge.

Another concern, associated with the supernumeraries that have access to the cargo compartment in-flight, is the amount of smoke, in the event of smoke or fire, that would enter into the supernumerary compartment and flight deck as a result of the smoke barrier being open during supernumerary evacuation out of the cargo compartment. This smoke issue must be considered when demonstrating compliance with § 25.855.

If access into the Class E cargo compartment is allowed, an aural or visual annunciation operated by the flightcrew, and recognized in the Class E cargo compartment, must be installed to indicate that persons must return to their seats and secure the smoke barrier (i.e., close the door or curtain) during a fire in the Class E cargo compartment. Appropriate procedures and limitations would need to be established to ensure that the flightcrew signals the supernumeraries to return to their seats and secure the smoke barrier at the onset of a fire. The pre-flight briefing would need to explain this annunciation to the supernumeraries.

Use of portable oxygen equipment following annunciation of a smoke event should be at the discretion of the supernumeraries, depending on where the source of smoke is in relation to each supernumerary and the exit. Therefore, in the event of smoke being detected inside the Class E cargo compartment, the supernumeraries inside the Class E cargo compartment must be directed to immediately return to their seats and secure the smoke barrier. As necessary, the supernumeraries should don their oxygen mask and initiate the flow of oxygen.

Due to the way that fire in the cargo compartment is to be controlled, it is necessary to limit persons on board the airplane to those who the airplane operator has found to be physically fit, and who have been briefed on the use of the emergency equipment. This limitation on the occupants is consistent with previous approvals and is included in this approval.

Immediately available oxygen

The petitioner indicates that configurations may be approved that will allow the supernumeraries to enter the Class E cargo compartment to tend to animals or hazardous cargo. To provide an acceptable level of safety to the "immediately available" requirement of § 25.1447(c)(1), each supernumerary, while in the Class E cargo compartment, must carry on their person a portable oxygen bottle with a mask connected to it. In addition, for the lavatories located within the main deck cargo compartment, the applicant proposes not to supply the automatically presented oxygen masks required in § 25.1447(c)(3) but proposes that the portable oxygen bottle with a mask connected to it carried by each person entering the cargo compartment provides an acceptable level of safety.

Section 25.1447(c)(1) also requires automatic presentation of the oxygen-dispensing units. For seated passengers in typical passenger airplanes, the automatic presentation of masks throughout the cabin indicates the need to don an oxygen mask. However, supernumeraries in the Class E cargo compartment will not have this indication. To provide an acceptable level of safety, an aural, automatically activated decompression signal must be present and immediately

recognizable throughout the accessible areas in the Class E cargo compartment, if there is only one aural alert that a supernumerary may hear or is expected to respond to. If there are two or more alerts that a supernumerary may hear or is expected to respond to, there must be an automatic visual alert in addition to the automatic aural alert. Operation of this signal must be automatic, with flightcrew manual activation as a backup.

Supernumeraries must be trained in the location and use of the oxygen equipment, and the signals for its use. The oxygen units must be sized adequately for continuous and uninterrupted use during worst-case flight duration following decompression, or of sufficient duration to allow the supernumeraries to return to their seats. The portable oxygen equipment must meet the requirements in § 25.1443(a) or (b), or the equipment must be shown to protect the supernumerary from hypoxia at an activity level required to return to their seat following a rapid decompression to 25,000 feet cabin altitude. Additionally, the portable oxygen equipment must:

- Meet § 25.1439(b)(1), (2), and (4), and
- Be designed to prevent any inward leakage to the inside of the mask, and
- Prevent any outward leakage causing significant increase in the oxygen content of the local atmosphere.

Configurations may be approved for carrying cargo that does not require supernumerary access to the Class E cargo compartment. For these configurations, an aural decompression signal is not required to be recognizable in the Class E compartment if an airplane flight manual (AFM) limitation is established to prohibit supernumeraries from being in the Class E cargo compartment during flight.

Incapacitated persons in the cargo compartment

Another concern is the removal of an incapacitated person from the cargo compartment. This concern is increased because the access means to the main deck cargo compartment is a ladder. Jamco America should develop some procedures for the removal of an incapacitated person from the cargo compartment and provide these to the operator of the airplane. This condition does not need to be combined with any other failure condition (i.e., only normal flight condition needs to be considered).

Protective breathing equipment for evacuation using the main deck entry door

Operational Type A has one condition where the evacuation is the result of smoke or fire in the main deck cargo compartment. To address some of the concern with the evacuees needing to evacuate through a cargo compartment that could be filled with smoke or fire, the petitioner has proposed to supply at least 11 portable PBE units as defined in § 25.1439(a).

The FAA's decision

In consideration of the foregoing, I find that a 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, Jamco America, Inc., is hereby granted an exemption from Title 14, Code of Federal Regulations (14 CFR) 25.785(d), 25.807(c)(1), 25.807(c)(5), 25.809(f)(1), 25.813(b), 25.857(e), 25.1447(c)(1), and 25.1447(c)(3) to the extent necessary to allow type certification of Boeing Model 747-400F series airplanes with provisions for the carriage of supernumeraries. The following limitations apply, and limitation numbers 1-6, 7a, and 7b must be documented in the limitations section of the airplane flight manual (AFM):

1. A maximum of 15 supernumeraries may occupy the area just aft of the flight deck. The total maximum occupancy of the airplane is limited to 8 or 19 persons, including the flightcrew, depending on the operational type. See item 4 below.

2. The supernumeraries are limited to the categories specified in 14 CFR 121.583(a)(1) through 121.583(a)(7).

3. Supernumeraries are prohibited from being in the cargo area during taxi, takeoff, and landing. The pre-flight briefing must inform supernumeraries of this requirement.

4. Access into the cargo compartment in-flight is divided into three different operational types:

    - Carriage of live animals requiring care or attention during flight and associated material only, no other cargo. The petitioner has identified this as operational Type A. The maximum number of supernumeraries is 15, and the total airplane occupancy is 19. Access to the Class E cargo compartment by a maximum of 15 supernumeraries is permitted during climb, cruise, and approach.

    - Cargo only, which does not require care or attention during flight, and no live animals requiring care or attention during flight. The petitioner has identified this as operational Type B. The maximum number of supernumeraries is six, and the total airplane occupancy is eight. No access is allowed into the Class E cargo compartment during any airplane operation.

    - Carriage of cargo or live animals requiring care or attention during flight, or configured for carriage of live animals and other cargo not associated with live animals. The petitioner has identified this as operational Type C. The maximum number of supernumeraries is 15, and the total airplane occupancy is 19. Access to the Class E cargo compartment by a maximum of 15 supernumeraries is permitted during climb, cruise, and approach.

5. Prior to each flight, a flightcrew member must brief each supernumerary on the use of exits and emergency equipment, including evacuation instructions to inspect the ground to determine whether a safe landing can be achieved before using an assist means.

6. The operator must determine that each supernumerary is physically able and trained to accomplish the necessary emergency procedures.

7. Supernumerary Portable Oxygen:

a. Each supernumerary must be provided with a portable oxygen unit with a mask attached to it that they must carry whenever they are in the Class E cargo compartment.

b. The supernumeraries must be trained in the use of the oxygen equipment. The supernumeraries must also be trained in making the determination whether oxygen is being delivered to the masks.

c. The equipment must provide oxygen-flow indication. The oxygen units must be sized adequately for continuous and uninterrupted use during worst-case flight duration following decompression, or must be of sufficient duration to allow the supernumeraries to return to their seats where oxygen for the remainder of the decompression is readily accessible. The portable oxygen equipment must meet the requirements in 14 CFR 25.1443(a) or (b), or the equipment must be shown to protect the supernumeraries from hypoxia at an activity level required to return to their seats following a rapid decompression to 25,000 feet cabin altitude. In addition, the portable oxygen equipment must:

- Meet § 25.1439(b)(1), (2), and (4), and
- Be designed to prevent any inward leakage to the inside of the mask, and
- Prevent any outward leakage causing significant increase in the oxygen content of the local atmosphere.

8. An aural, automatically activated decompression alert must be present and immediately recognizable in accessible areas of the Class E cargo compartment to notify supernumeraries when to don oxygen masks. If there are two or more alerts that a supernumerary may hear or is expected to respond to, there must be an automatic visual alert in addition to the automatic aural alert. The pre-flight briefing must include training in the sound of the alert, the meaning of the alert, and the response to the alert (i.e., procedures for donning the masks and activating the flow of oxygen).

9. A flightcrew-operated aural or visual alert, which is recognized in accessible areas in the Class E cargo compartment, must be installed. This aural or visual alert is to indicate that, during turbulence, persons must return to their seats. Appropriate procedures and limitations must be established to ensure that the flightcrew signals the supernumeraries to return to their seats at the onset of turbulence and prior to landing. The pre-flight briefing must explain this signal to the supernumeraries.

10. A flightcrew-activated aural or visual signal, which is recognized in the Class E cargo compartment, must be installed. This aural or visual signal is to indicate that, in the event of fire or smoke in the Class E cargo compartment, persons must return to their seats and ensure that the smoke barrier is secured (i.e., the door or curtain is closed). Appropriate procedures and limitations must be established to ensure that, at the onset of a fire or smoke event, the flightcrew signals the supernumeraries to return to their seats and secure

the smoke barrier. The pre-flight briefing must explain these signals to the supernumeraries.

11. A placard located in the supernumerary area, in a conspicuous location either on or adjacent to the smoke barrier, must indicate the following:

    For operational Type A and Type C:

    - Access to the Class E cargo compartment is limited to the care and handling of animals, cargo requiring care or attention during flight, or both.
    - Access to the Class E cargo compartment is limited to a maximum of 15 supernumeraries.
    - The smoke barrier must be secured (i.e., the door or curtain must be closed) except when entering or leaving the cargo compartment during cruise. The smoke barrier must be latched open for taxi, takeoff, and landing for operational Type A and Type C unless fire or smoke has been detected in the main deck cargo compartment. If fire or smoke has been detected in the main deck cargo compartment, the door may be closed if directed by the pilot in charge.
    - A portable oxygen unit (with full-face mask attached) must be carried at all times when accessing the cargo compartment.
    - Smoking is not allowed within the cargo compartment.
    - The compartment must not be entered in case of fire or smoke being detected inside the Class E cargo compartment except during evacuation.

    The pre-flight briefing must inform supernumeraries of these requirements.

    For operational Type B:

    - No access to the Class E cargo compartment is allowed during any airplane operation.
    - The smoke barrier must be secured (i.e., the door or curtain must be closed) except for ground operations.

    The pre-flight briefing must inform supernumeraries of these requirements.

12. Alerting requirements:

    - Must be distinctive and effective.
    - Visual alerts must be visible from all occupant locations and orientations, during all expected operational conditions, including a rapid decompression where moisture in the air may condense.

- Aural alerts must be loud enough to be heard during all expected operational conditions, including a rapid decompression where the ambient noise level will increase.

13. A minimum of 8 inertia reels and harnesses must be installed on the flight deck. In addition to the minimum 8 inertia reels and harnesses installed on the flight deck, a minimum of 11 inertia reels and harnesses must be installed at a location that can be used for exiting the crew-service door when the installed escape slide is not self-supporting on the ground. No flight deck door may be installed between the supernumerary compartment and flight deck that would prevent access to the overhead hatch and 8 inertia reels and harnesses.

14. Additional requirements for a stairway between the upper deck and the main deck for operational Type A and C:

    a. The stairway must be essentially straight.

    b. The stairway must have essentially rectangular treads.

    c. With the airplane in level attitude and in each attitude resulting from the collapse of one or more legs of the landing gear, the stairway must have entrance, exit, and gradient characteristics that allow the upper deck supernumeraries to evacuate and exit the airplane through the forward left main deck exit. This must be shown by demonstration, tests, analysis, or any combination thereof.

    d. The stairway must accommodate the carriage of an incapacitated occupant from the upper deck to the main deck. The crewmember procedures for such carriage must be established and included in the AFM.

    e. The stairway must be located to provide occupants an adequate descent rate under probable emergency conditions, including a condition in which an occupant falls or is incapacitated while on the stairway.

    f. The stairway must be designed and located to minimize damage to its structure during an emergency landing or ditching.

    g. General illumination must be provided so that, when measured along the center lines of each tread and landing, the illumination is not less than 0.05 foot-candle. This is in lieu of compliance with § 25.812(c), at Amendment 25-116.

    h. Means must be provided to assist supernumeraries in locating the stairway in dense smoke conditions as part of compliance with § 25.811(c), at Amendment 25-88.

    i. An emergency exit sign meeting § 25.812(b)(1)(i), at Amendment 25-116, must be provided in the upper deck near the stairway, visible to supernumeraries on the upper deck as required by § 25.811(d)(1), at Amendment 25-88.

j. Floor proximity lighting, required by § 25.812(e), at Amendment 25-120, must be provided along the stairs.

k. The stairway must have a handrail on at least one side to allow occupants to steady themselves during foreseeable conditions, including, but not limited to, gear collapse on the ground and moderate turbulence in-flight. The handrail(s) must be constructed with no obstruction on them that causes the user to release their grip or hinder the continuous movement of the hands along the handrail. Handrail(s) must be terminated in a manner that will neither interfere with occupants walking by nor create a hazard (such as catching clothing). The petitioner must demonstrate that the design can accommodate the stature of a fifth-percentile female and a ninety-fifth-percentile male.

l. The public-address system must be intelligible in the stairway during all flight phases.

m. "No smoking" and "return to seat" signs must be installed and visible in the stairway both going up and down and at the stairway entrances.

n. During any flight operation where more than eight persons are on the flight, the stair must remain installed between upper and main decks during the entire flight.

15. The existing main deck entry door must be modified to function as an emergency exit by installing at least 11 inertia reels adjacent to the door. This modification includes the door-operating markings on the inside of the airplane; interior illumination system; assist means; attachment point for a liferaft mooring line; and exterior markings.

16. A minimum of 11 portable protective breathing equipment (PBE) units, as defined in § 25.1439(a), and which will provide a minimum 90-second breathing supply, must be installed such that they are readily accessible to the supernumeraries to aid in evacuation in the event of smoke. The supernumeraries must be trained in the use of the portable PBE.

Note: The briefings and associated procedures in limitations 8, 9, and 10 to alert the supernumeraries in the Class E cargo compartment are not required if an AFM limitation is established to prohibit supernumerary access to the Class E cargo compartment during flight.

Issued in Renton Washington, October 30, 2015.

/s/ Michael Kaszycki

Michael Kaszycki
Acting Manager, Transport Airplane Directorate
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