Exemption No. 5405

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of **McDonnell Douglas Corporation** for an exemption from § 25.813(e) of the Federal Aviation Regulations	Regulatory Docket No. 26661

GRANT OF EXEMPTION

By letter 91-FAA-C1-E00-6160, dated September 16, 1991, R. B. Harris, Business Unit Manager, MD-11 Airworthiness, Douglas Aircraft Company, petitioned for an exemption from § 25.813(e) of the Federal Aviation Regulations (FAR), to permit installation of a door between passenger compartments on the MD-11 airplane.

The MD-11 is a three-engine, twin-aisle airplane that can operate in high capacity mixed passenger class modes.

Section of the FAR affected:

Section 25.813(e) prohibits the installation of doors between passenger compartments. The regulations allow installation of other interior doors, provided that they do not divide passenger compartments; and, if they must be traversed to reach an emergency exit, that certain design criteria are met. These include a means to latch the door open for takeoff and landing.

Related sections of the FAR:

Sections 25.813 and 25.815 give the required dimensions for passageways, crossaisles, and aisles.

The petitioner's supportive information is as follows:

"DAC petitions for this exemption in order to deliver MD-11 aircraft to Delta Airline with an innovative first class arrangement that affords

its passengers a higher level of perceived safety and comfort. The subject aircraft are scheduled for delivery starting in November, 1991."

"DAC believes this configuration offers an equivalent level of safety to the requirement for which the exemption is being sought for the following reasons:

1. The subject door will be placarded and required to be open for Taxi Takeoff and Landing, therefore the door will only be closed during flight.

2. The subject door will incorporate a double latch for retention in the open position. These latches will be designed to be able to withstand the loads imposed on it when the door is subject to the ultimate inertia forces, relative to the surrounding structure as defined in FAR 25.561 (b) (Reference FAR 25.813 (f)).

3. In order to further insure the aisle is open, the subject door will incorporate removable hinge pins accessible from the aft side of the door. These removable hinge pins will permit removal of the door should it become jammed or nonfunctional.

4. The primary exits utilized by the 16 first class passengers are the Number 1 Left and Right exits. These exits are rated for 45 passenger for the pair.

5. The regulations require minimum aisle width of 20 inches. The left and right aisles in the G4 galley complex are 40 inches and 36 inches respectively. These aisles are 1.8 to 2.0 times the width of the aisle required.

6. An emergency evacuation analysis has been accomplished for this configuration with a solid partition on the right side aisle utilizing only the left side 40 inch aisle. This analysis shows compliance with the appropriate emergency evacuation requirements. With the installation of the galley G4/G4B door this configuration provides even a higher level of safety.

7. All other interior requirements will be complied with. These include but are not limited to the following: Floor Proximity Lighting, Exit signs, flammability, strength requirements, and Cabin Attendant Visibility."

"In addition the following points are highlighted:

1. The door meets all requirements of FAR 25.813(f).

2. Should the Number 1 doors left and right be incapacitated, passengers would evacuate through the Number 2 left and right doors via the 40 inch double aisle or the 36 inch aisle which contains a latched open door.

3. In the event of an incapacitated Number 1 left and right doors the First Class Flight Attendants would then accomplish the second part of their duty which is "Flow Control". This Flow Control will provide an additional measure of safety in insuring all First Class passengers egress through the Number 2 doors.

4. This exemption is in the public interest in that the subject aircraft will be operated by Delta Airlines in the carriage of both foreign and domestic passengers. This first class [arrangement] will afford the highest level of passenger comfort which will assist Delta Airlines marketability and service to the traveling public thus promoting air commerce."

A summary of the petitioner's September 16, 1991, petition was published in the Federal Register on October 22, 1991. One comment was received from the petitioner, providing additional information in support of the petition.

The FAA's analysis/summary is as follows:

The FAA has carefully considered the information provided by the petitioner and has determined that there is sufficient merit to warrant a grant of exemption.

In prohibiting doors between passenger compartments, the FAA had determined through accident experience that such doors became barriers to passengers in the event of an evacuation, thereby rendering sections of the cabin isolated from each other, and inhibiting evacuation flow from one part of the airplane to another, even though there might be available exits beyond the door. Most of this experience occurred with single aisle airplanes, where there is only one path for traversing the airplane from front to back. In the case of the MD-11, there are two main aisles, and thus two paths from the front of the airplane to the rear. The installation of a door across one of these paths effectively reduces the potential number of paths to one, if the door is either left closed or jams in the closed condition.

The MD-11 arrangement under consideration is configured with a much lower passenger capacity than that permitted by the regulations. Therefore, there is excess evacuation capability in terms of the number of exits installed, with respect to the actual number of passengers. As noted in the petitioner's supporting documentation, the evacuation capability of the airplane is maintained under the conditions required by § 25.803(c). While this is a factor that must be considered, the FAA considers that the most significant aspect of the door installation is the potential to disrupt or confuse passenger flow at the door 2 crossaisle, if the right-hand aisle is interrupted by a door.

In a high density airplane, the need to maintain dual aisle flow can be critical, especially if the situation dictates that passengers bypass an exit (which may be unavailable or crowded) to reach a more distant exit. In such a situation, dual aisles provide the flexibility needed to maintain high evacuation rates through large exits. Were only single aisle flow available, the exit would not be utilized at its capability. In this case, the passenger seating arrangement is only 68 percent of the maximum that could be approved. The arrangement could, in fact, be approved without the installation of the forward exits and would still be well under the limits prescribed by the regulations. This excess evacuation capability offsets, to some extent, the possibility that the interior arrangement will result in less than optimum passenger flow. To further mitigate this possibility, the door will be required to be latched open for taxi, takeoff, and landing with a dual restraint means. The FAA considers the possibility that the door would be left closed, or would close under emergency conditions, to be small. Nonetheless, the possibility exists, and thus the arrangement must also be evaluated under those conditions.

As noted above, the passenger arrangement of this model results in a relatively low passenger density, with a small number of passengers in the forward zone. There are, in fact, only 16 passengers in the forward zone, virtually eliminating the need for twin aisle flow out of that zone. That is, if all of the passengers in that zone had to leave the zone to evacuate, only 16 passengers would be added to the mid-cabin zone. This number of passengers could easily be accommodated in a single aisle flow. Since there are only 71 passengers seated in the mid-cabin zone, the total of 87 passengers would not constitute an excessive amount of additional evacuees, and would be less than the passenger rating for door 2.

From the standpoint of passengers leaving the mid-cabin zone to evacuate from the forward exits, the need for dual aisle flow is greater. However, as noted above, there are only 71 passengers seated in the mid-cabin zone. Up to 29 of these passengers could evacuate at single aisle rates and still not exceed the 45 passenger rating for the forward exit. Because the exit exceeds the minimum standards for Type I exits by a significant amount, the actual performance of the exit should allow even greater numbers of passengers to evacuate. While the situation would be improved with dual aisle flow, the FAA considers that with this arrangement, the possibility that the door will be closed will not degrade the level of safety of the airplane.

In consideration of the foregoing, I find that a grant of exemption is in the public interest, and will not adversely affect safety. Therefore, pursuant to the authority contained in §§ 313(a) and 601(c) of the Federal Aviation Act of 1958, delegated to me by the Administrator (14 CFR 11.53), the petition of McDonnell Douglas Corp. for exemption from § 25.813(e) of the FAR is granted, with the following provisions:

1. This exemption is limited to the interior arrangement as described on McDonnell Douglas Drawing No. J055178, Revision F, or later FAA approved revision.

2. The galley door must be fastened open during taxi, takeoff, and landing, and must be placarded accordingly. Dual retention means are required.

3. Compliance is required with all relevant emergency exit marking requirements, whether the door is either open or closed, when viewed from either side. The means of opening the door must be marked on both sides of the door and must be obvious to untrained individuals under emergency lighting conditions.

Issued in Renton, Washington on February 11, 1992.

/s/ Darrell M. Pederson
Acting Manager
Transport Airplane Directorate
Aircraft Certification Service

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