

Proposed Equivalent Safety Finding on CS 25.807 – Emergency Exits Access

Applicable to Gulfstream Model G VI.

Introductory note:

The following Equivalent Safety Finding (ESF) has been classified as an important ESF and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency".

Statement of issue:

Gulfstream Aerospace Corporation (GAC) is developing the GVI business jet aircraft, which will be slightly larger than the current production model (the GV-SP) and rated for up to 19 passengers. The EASA certification basis for this new model is CS-25 Amendment 2.

The emergency exits will be subject to the requirements of CS 25.807 at Amdt 2, and most specifically:

CS 25.807(d)(1) Amdt 2, Table:-

Requires one Type IV exit on each side of the aircraft for 1 to 9 Passenger seats, and one Type III exit on each side of the aircraft for 10 to 19 Passenger seats.

CS 25.807 (e)(1) and (2) Am 2 identify the requirements for ditching exits for passengers and state:

"(1) For airplanes that have a passenger seating configuration of nine seats or less, excluding pilot seats, one exit above the waterline in each side of the airplane, meeting at least the dimensions of a Type IV exit.

(2) For airplanes that have a passenger seating configuration of 10 seats or more, excluding pilot seats, one exit above the waterline in a side of the airplane, meeting at least the dimensions of a Type III exit for each unit (or part of a unit) of 35 passenger seats, but no less than two such exits in the passenger cabin, with one on each side of the airplane. The passenger seat/exit ratio may be increased through the use of larger exits, or other means, provided it is shown that the evacuation capability during ditching has been improved accordingly."

Accordingly, Gulfstream was given the option of complying with the current Certification Specifications by installing Type III emergency exits; or demonstrating, in a manner acceptable to the EASA, an equivalent level of safety to the requirements of CS 25.807 if exits other than a Type III are installed. Gulfstream has elected to pursue the equivalent level of safety option.

Gulfstream G VI – Equivalent Safety Finding D-20 – Emergency Exits Access

Applicant Proposal:

In order to demonstrate an equivalent level of safety with CS 25.807 at Amendment 2, Gulfstream will address the issue of exit size, by providing compensating factors for the aforementioned dimensional disparities, and address the issue of exit flow rate by demonstrating that the time required to egress through a pair of new Gulfstream GVI rectangular window exits is equal to or less than the time required to egress through a standard Type III exit.

Applicant Safety Equivalency Demonstration:

The current production models of Gulfstream business jet aircraft (models GIV-X and GV-SP) incorporate two pairs of over-wing exits. Each of these is a 19 inch x 26 inch ellipse, with its long axis parallel to the floor.

These exits have been utilized on Gulfstream business jet aircraft dating back to the Gulfstream model G-I, which was certified in 1959. As these exits do not directly comply with the applicable requirements of 25.807, Gulfstream demonstrated an equivalent level of safety for their designs to the applicable amendment levels of JAR 25.807. Equivalent safety findings were issued by the JAA (applicable to models GIV and GV).

1- Exit size

The Gulfstream GVI is being designed with a Type I main entry door on the front left side, and two paired over-wing emergency exits on each side of the aircraft (in a manner similar to previous Gulfstream airplanes) so as to maintain a family relationship with previous Gulfstream models.

The GVI is designed to have a passenger seating configuration of no greater than nineteen. Emergency egress is provided by four over-wing exits, two on each side of the aircraft.

Each GVI over-wing exit will provide a 26 inch by 32 inch rectangular opening with its long axis oriented parallel to the floor. The GVI over-wing exit will have a maximum step-up height will be 25.03 inches and step-down distance will be 35.18 inches (these are similar step-up and step-down distances to the GV-SP).

By comparison, as depicted in fig 1. below, a Type III exit as defined by CS 25.807 is a rectangular opening not less than 20 inch x 36 inch, with its long axis oriented vertically. The Type III exit must have a step-up inside the airplane of not more than 20 inches and, if located over the wing, a step-down of not more than 27 inches.

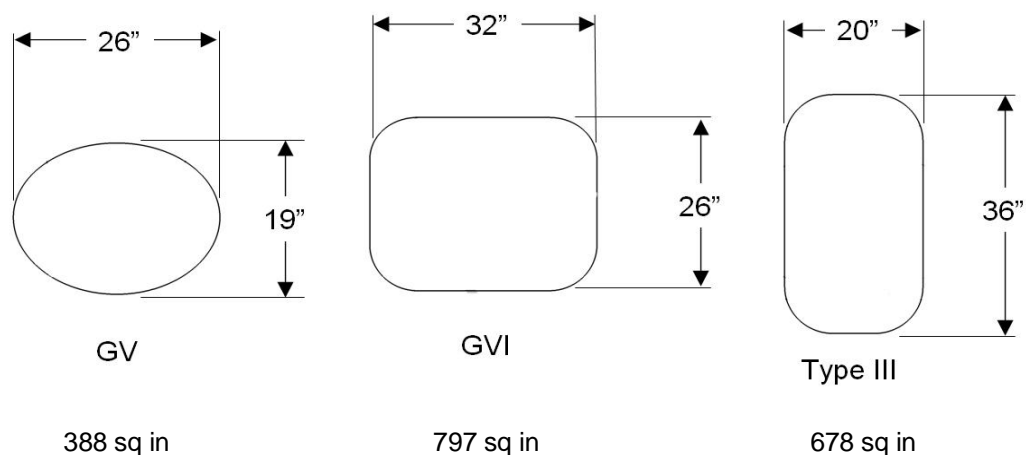


Fig 1.

2- Exit arrangement, access and flow rates

Gulfstream will demonstrate referring the tests and analyses performed for the GIV-X/ GV-SP against Type III exits and comparison of the "old style" elliptical exits to the new rectangular ones on the GVI, equivalence to 25.807.

Gulfstream will show by testing that compliance with 25.809(b) is demonstrated. This testing will also demonstrate compliance with 25.809(c) to validate that the means of opening are simple and obvious and the opening of the exits does not require exceptional effort.

Gulfstream will also perform certification testing that demonstrated Equivalent Level of Safety to 25.813(c)(2), and compliance to 25.561(d) and 25.562(c)(8).

Gulfstream agrees that door removal and placement are factors that can have affect on overall egress. Gulfstream will demonstrate compliance to FAR 25.813(c)(3) as if the GVI over-wing exits were true Type III exits

Gulfstream will provide pre-flight passenger briefing which will include instruction on the emergency exit procedures and will reference the passenger briefing cards and/or video.