

## **Proposed Equivalent Safety Finding to JAR 25.969**

### **Applicable to DO328**

#### **Introductory note:**

The hereby presented Equivalent Safety Finding has been classified as an important ESF and as such shall be subject to public consultation, in accordance with EASA Management Board decision 02/04 dated 30 March 2004, 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**

The re-design of the approved auxiliary fuel tank system for manual operation resulted in the deletion of the automatic overfill protection for the aft fuel tanks.

JAR 25.969 requires: *Each tank to have an expansion space of not less than 2% of the tank capacity. It must be impossible to fill the expansion space inadvertently with the aeroplane in the normal ground attitude (...).*

### **DO328 - Equivalent Safety Finding to JAR 25.969**

#### **Applicant Design Proposal:**

In case of an unintentional overfill of the aft auxiliary fuel tanks, excess fuel will spill into the main wing tanks via the vent system, which connects the aft auxiliary fuel tanks to the main fuel tanks. When the fuel level in the main tanks reaches the high level cut-off the refuelling valve to that tank will close and also prevent further filling of the aft auxiliary tanks. The configuration of the vent system results in effectively no expansion space existing in the aft auxiliary fuel tanks, assuming that the tanks may be filled to 'full' and therefore the design does not comply with JAR 25.969.

#### **Applicant Justification:**

The intent of the requirement under JAR 25.969 is to prevent external fuel spillage from the vents as the fuel expands during temperature changes, typically occurring on the ground under high ambient temperature conditions. (2% fuel volume expansion equates to a temperature change of approximately 24 deg. C).

The proposed ESF will demonstrate that the design meets the intent of the requirement, in particular that the lack of effective expansion space and the vent system configuration does not allow fuel spillage or release from the aircraft under all likely operating conditions.

## **Applicant Safety Equivalency Demonstration:**

Due to the fact that:

1. The New Stand-Alone Auxiliary Fuel System is designed in a way that fuel from the Aft Auxiliary Tanks can only spill into the wing tanks, and
2. The wing tanks have sufficient expansion space to cater for the volume of the Aft Auxiliary Tanks as well, and
3. The in-flight functions of the wing vent system remain unchanged,

it can be substantiated that the design meets the intent of the JAR 25.969 requirement.

Fuel expansion space for both wing- and auxiliary- fuel tanks is reduced but is still conservative in comparison with the requirement of 2%.

It was demonstrated during ground tests that the design of the vent system prevents fuel spillage during refuelling despite of the restricted expansion space in the aft auxiliary fuel tanks.

The function during flight is not affected by the change; proper function of the wing tank vent system under all likely operating conditions has been demonstrated during the basic certification.