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## **CERTIFICATION REVIEW ITEM**

**SUBJECT:** Main door  
**CATEGORY:** ESF  
**REQUIREMENT :** CS 23.783(b)  
**PRIMARY PANEL :** 8  
**SECONDARY PANELS :** 1

### **Identification of Issue**

CS 23.783(b) requires that : *“Passenger doors must not be located with respect to any propeller disc or any other potential hazard so as to endanger persons using that door.”*

### **EASA POSITION (issue 1; dated 18 November 2008):**

The aircraft is a normal category-twin engine high wing configuration aeroplane with four seat capacity (including pilots).

The proposed exits are : one main door on left side and one emergency exit on right side.

The main door is situated near the left propeller disc.

The Applicant is requested to provide compliance with CS 23.783(b).

### **APPLICANT’S POSITION (issue 2 ; dated 1 December 2008):**

The aircraft is a twin engine (not commuter category) high wing configuration with four seat arranged. The airplane is provided with a forward left main door, an aft right emergency door (with respect to propeller disk) and a ditching emergency exit on top side.

In order to comply with the requirements, The applicant proposes an ESF based on the following considerations:

AC 23.17b states:

*An ELOS finding process for part 23, § 23.783(b), should include:*

- a) Pilot operated locks when the propeller stops turning.*
- b) A special operating procedure to assure the door is opened only after the propeller has stopped turning should be provided in the flight manual and on the inside of the door.*
- c) If an electric lock is used, complete loss of electric power should not affect opening the door.*
- d) The door should be designed and placarded so it can be opened from the inside by passengers and from outside by ground personnel.*
- e) A railing or guard that would deploy to guide passengers away from the propeller plane should be provided as an integral part of the door.*
- f) If engagement of the engine starter would be an immediate hazard to a person near the propeller, an interconnection between the door and the engine starting circuit should be included in the design.*

The following considerations are given to comply with the AC 23.17b guidelines:

- a) *A solenoid door lock which is actuated by an engine oil electric pressure switch keeps the door closed and latched when engine is running. The solenoid door lock can be manually by-passed. The pilot operates door only after the propeller has stopped turning. It is to point out that the engines are reciprocating type and are equipped with gear boxes that assure the immediate stop of the propellers once the engines are turned off. Given the seat configuration of the P2006T, the pilot is the first person who comes out the aircraft. He is seated near the main door*
- b) *According to a procedure provided in the flight manual and a placard located on the inside of the door, the pilot has to stop the engines and turns off the master switches and then operates locks and gets out the aircraft.*
- c) *The electric lock becomes disengaged after a complete loss of the electric power.*
- d) *The main door is designed and placarded so it can be opened from inside and outside by passengers and by ground personnel.*
- e) *The door itself, considering its opening angle with respect to the propeller plane (110° with respect to longitudinal axis), provides to guide the passengers away from the propeller. Passengers, following the instruction placarded inside the door and guided by the pilot, must get out keeping themselves near the opened door.*
- f) *An engagement of the engine starter would not be an immediate hazard to a person near the propeller. The subject door is located on pilot side, therefore the pilot is the last to enter in the aircraft before engine starting. Furthermore engine starting pushing engine start button requires that the master switch must also be on. So it's not possible to do inadvertently engine start.*

**ENAC (on behalf of EASA) POSITION (issue 3; dated 9 March 2009):**

The Applicant proposal is an ESF that follow the guideline provided in AC 23-17B para. 23.783. ENAC (EASA) evaluated the proposed design changes and found that the point e) and point f) of proposed ESF is not fully in line with AC 23-17B indication.

ENAC (EASA) considers that the occupants must be fully safeguarded from propeller or other potential hazard.

The proximity of the door to the propeller needs that the propeller must be stationary when the door is unlocked. It is necessary to assure that under no circumstances could the engines operate or even have the starters engaged when the door is open.

For the above reason, the Applicant is requested to provide an additional design improvement/details that reach the AC 23-17B para. 23.783 point e) and f) guideline.

**APPLICANT'S POSITION (issue 4 ; dated 10 March 2009):**

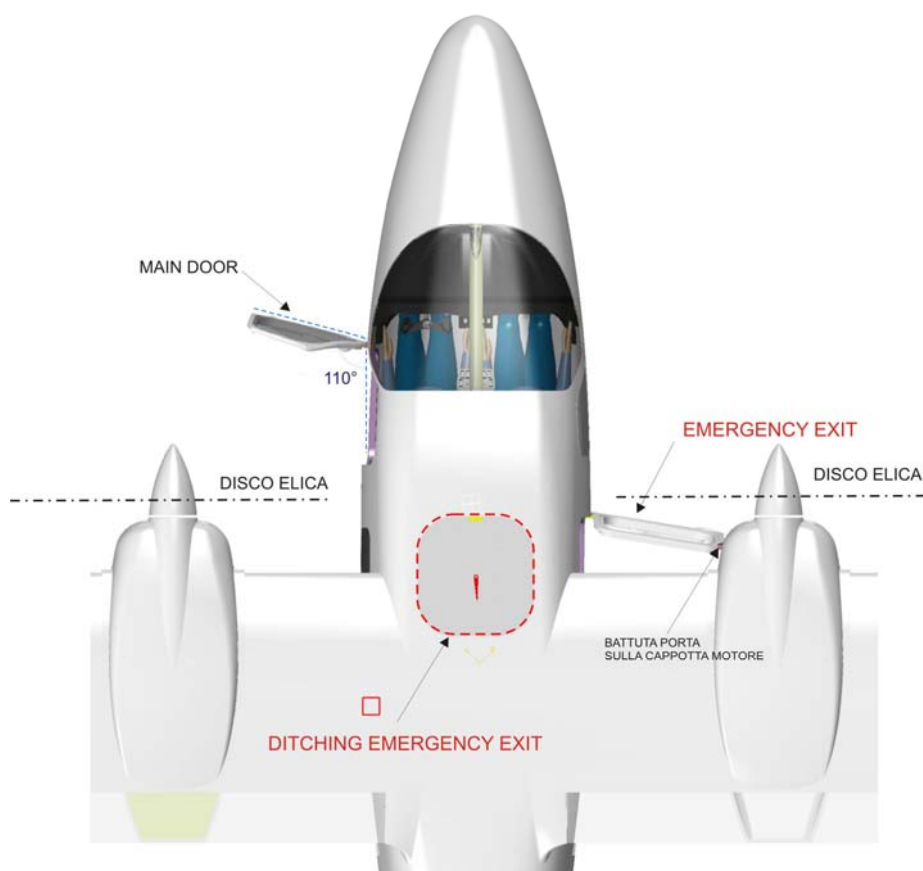
As remarked on point f) of issue 2, the subject door is located on pilot side therefore is under pilot responsibility to assure that the door remain closed until the engine is switched off and the propeller is stationary.

The design of the door opening system provides also means that lock and safeguard the door from being inadvertently operated when the engine is running. This device consists of a solenoid door lock which is actuated by an engine oil electric pressure switch and which keeps the door closed and locked when the engine is running.

An indicating system provides a warning light to indicate that the door is open, or closed but not locked. The position and installation method of the manual by-pass solenoid unlock avoid inadvertent operation. Any voluntary operation of the manual by-pass solenoid lock causes door warning light on.

The sketch below shows the door when in its opening configuration. The 110° with respect to

longitudinal axis is also considered enough for guide occupants away from propeller disk considering that under no circumstances the engine have the starters engaged when the door is open.



Disco Elica = Propeller Disk