



# Memorandum

U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Subject: **ACTION:** ELOS for FAR §23.807(e) – Emergency Exit  
Water Barrier on Cessna Model 510 Mustang; ACE-05-10

Date:

MAY 06 2006

From: Manager, Wichita ACO

Reply to: Mr. Grant Youngdahl  
Attn. of: ACE-117W

To: Manager, Small Airplane Directorate, ACE-100

Attn:

This Equivalent Level of Safety (ELOS) finding replaces ELOS ACE-05-10, dated May 6, 2006, by removing the final paragraph of that ELOS. In all other respects, this ELOS matches the previous ELOS.

**Background:** Cessna Aircraft Company requests a finding of equivalent safety for the Cessna Model 510, FAA Project Number TC3801WI-A, with respect to the ditching emergency exits specified in 14 CFR §23.807(e) of the certification basis. Cessna will use a “water barrier” deployed at the main cabin entry door to provide an emergency exit above the waterline on the left side of the aircraft. 14 CFR §23.807(e) specifies for multiengine airplanes, one exit above the waterline on each side of the airplane for ditching emergency exits. Through the use of this “water barrier” device, Cessna will show direct compliance with 14 CFR §23.807(e).

This request was coordinated within the FAA by Issue Paper A-1.

**Applicable regulations:** The Cessna Model 510 Mustang will be certified to the certification basis shown in Stage 4 of Issue Paper G-1, which is:

Federal Aviation Regulations (FAR) Part 23 effective February 1, 1965 as amended by Amendments 23-1 through 23-54, with Special Conditions as identified below. Additional Special Conditions, ELOS and Exemptions may be incorporated during the project.

Summary of Special Conditions:

Special Condition	Title
23.45	General
23.51	Takeoff Speeds
23.53	Takeoff performance
23.55	Accelerate-stop distance
23.57	Takeoff path
23.59	Takeoff distance and takeoff run

<b>Special Condition</b>	<b>Title</b>
23.61	Takeoff Flight Path
23.63	Climb: General
23.66	Takeoff climb: One-engine inoperative
23.67	Climb: one engine inoperative
23.73	Reference Landing approach speed
23.75	Landing distance
23.77	Balked landing
23.177	Static directional and lateral stability
23.201(e)	Wings level stall
23.203 (c)	Turning flight and accelerated turning stalls
23.251	Vibration and buffeting
23.253	High speed characteristics
23.735	Brakes
23.1195	Fire Extinguishing Systems
23.1197	Fire Extinguishing Agents
23.1199	Extinguishing Agent Containers
23.1201	Fire Extinguishing Systems Materials
23.1323	Airspeed indicating system
23.1505	Airspeed limitations
23.1583	Operating Limitations
23.1585	Operating procedures
23.1587	Performance information
23-XXX-SC	HIRF Special Condition
23-XXX-SC	HIRF SC for FADEC

FAR Part 34 as amended by the Amendment in effect on the date of certification;

FAR Part 36 as amended by the Amendment in effect on the day of application.

**Regulation Requiring an ELOS:**

14 CFR §23.807(e) requirements are as follows:

For multiengine airplanes, ditching emergency exits must be provided in accordance with the following requirements, unless the emergency exits required by paragraph (a) or (d) of this section already comply with them:

- (1) One exit above the waterline on each side of the airplane having the dimensions specified in paragraph (b) or (d) of this section, as applicable; and if side exits cannot be above the waterline, there must be a readily accessible overhead hatch emergency exit that has a rectangular opening measuring not less than 20 inches wide by 36 inches long, with corner radii not greater than one-third the width of the exit.

### **Compensating features which allow the granting of the ELOS:**

Type Certificate No's. A9NM, T00007WI, A23CE, and T00012WI, a water barrier is provided for deployment prior to a ditching such that a freeboard is achieved from the projected floatation waterline and such as to leave an opening above the waterline that complies with the minimum dimensions required by §23.807(b).

### **Explanation of how these features provide an ELOS:**

Compensating factors, which Cessna believes provide an equivalent level of safety to the requirements of §23.807(e), as required by 14 CFR §21.21(b)(1), for the Model 510 are summarized in the following paragraphs. Rationale is presented to address the egress capabilities of the over wing emergency exit on the right side of the fuselage and the compensating factors that Cessna believes provide an equivalent level of safety to the requirements of §23.807(e)(1) and (e)(2) through the use of a “water barrier” deployed at the main cabin entry door.

Certification of ditching for the Model 510 is not being requested. However, FAR §23.807(e) requirements are applicable regardless of whether ditching certification is requested or not. The requirements of §23.807(e) are:

#### §23.807(e) Emergency exits

*(e) For multiengine airplanes, ditching emergency exits must be provided in accordance with the following requirements, unless the emergency exits required by paragraph (a) or (d) of this section already comply with them:*

- (1) One exit above the waterline on each side of the airplane having the dimensions specified in paragraph (b) or (d) of this section, as applicable; and*
- (2) If side exits cannot be above the waterline, there must be a readily accessible overhead hatch emergency exit that has a rectangular opening measuring not less than 20 inches wide by 36 inches long, with corner radii not greater than one-third the width of the exit.*

The Model 510 aircraft is configured with two exit routes and openings, which are available in case of passenger and crew evacuation in water. The primary escape route is the over wing emergency escape hatch on the right side of the aircraft. The emergency hatch on the right side of the aircraft can be removed, with the waterline being below the lower edge of the hatch opening. The waterline derivation used in establishing the waterline is estimated based on the maximum aircraft gross weight in fresh water. These conditions represent the worst possible floatation condition. This exit is readily accessible and located in an area, which will provide room for assistance from crewmembers or other passengers. The secondary escape route is the main cabin entry door, which may be used for evacuation by deploying the water barrier prior to ditching. This is a similar scenario to that previously certified through equivalent level of safety findings on the Citation III, VI, VII, XL, X, and

680 aircraft. Deployment of the water barrier is required prior to ditching and subsequent opening of the main cabin entry door. It is a specific design objective that no special training or experience is required to deploy the water barrier. The simplicity of the design would allow even naive occupants to complete the deployment and traverse the barrier with ease and rapidity. Complete deployment instructions will be contained on passenger briefing cards and placarded adjacent to the water barrier.

**ACO Recommendation:**

The Wichita ACO has received Cessna Letter L390-05-0259 dated January 25, 2005, a request is made for an equivalent level of safety for Cessna Model 510, FAA Project Number TC3801WI-A, with respect to the ditching emergency exits specified in 14 CFR §23.807(e) of the certification basis.

FAR §21.21(b) states "the type design ...meet the applicable airworthiness requirements of the Federal Aviation Regulations or that any airworthiness provisions not complied with, are compensated for by factors that provide an equivalent level of safety". These factors must show that the airplane stays a float and the ability of passengers to exit in a timely manner during an emergency-ditching scenario.

The Cessna Model 510 does not have one exit above the waterline on each side of the airplane as required by 14 CFR §23.807(e)(1), nor does it have an alternative overhead hatch as allowed for 14 CFR §23.807(e)(2). Therefore, an equivalent level of safety is required.

---

Gerald M. Baker, ACE-115W  
Manager, Wichita Aircraft Certification Office

Concurrence:

John Colomy  
Manager, Standards Office, ACE-110

8/15/06  
Date

John Colomy  
Manager, Small Airplane Directorate, ACE-100

8/15/06  
Date

ACW6