



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

# Memorandum

---

Subject: **ACTION:** Review and Concurrence, Equivalent Level of  
Safety for Usable Fuel Quantity Marking on Cessna  
Model 510, Project TC3801WI-A, ACE-05-09

Date: April 26, 2005

From: Associate ACO Manager, Mechanical Systems and  
Propulsion, Wichita Aircraft Certification Office, ACE-  
116W

Reply to James Galstad  
Attn. of: 316-946-4135

To: Acting Manager, Small Airplane Directorate, ACE-100

## Reference

Small Airplane Directorate Memo dated August 27, 1998, Subject: Information: Small Airplane Directorate Recommended Format for Equivalent Level of Safety Findings (ELOS).

## Background

Cessna has requested an equivalent level of safety for the usable fuel quantity marking on the Cessna Model 510.

## Applicable Regulations

§21.21(b)(1), §23.1555(d)(1)

## Regulations Requiring an ELOS

§23.1555(d)(1)

## Description of Compensating Features

The Model 510 Citation Mustang incorporates a direct reading fuel quantity indicator calibrated in appropriate units (LBS or KGS) to indicate the amount of fuel available to each engine. The fuel quantity indicator also displays the total fuel quantity available by totaling the fuel quantity indicated for each fuel tank (reference Figure 1).

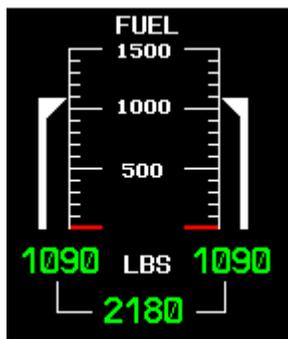


Figure 1: Model 510 Fuel Quantity Indicator

*The intent of 14 CFR 23.1555(d)(1) is to ensure that the total amount of usable fuel available can be determined by looking at the fuel quantity indicator without referring to other reference material, as in the case of a fuel quantity indicator that displays (EMPTY, 1/4, 1/2, 3/4 and FULL marks) which is found on many analog gauges used in smaller, Part 23 certified aircraft. By providing a direct reading of fuel quantity available calibrated in appropriate units (LBS or KGS) for a turbofan power aircraft, the Citation Model 510 fuel quantity indicator provides an equivalent level of safety to the requirement of 14 CFR 23.1555(d)(1).*

### Explanation of Equivalency

From the Civil Aeronautics Manual 3 [Amdt. 3-4, 15 F. R. 8902, Dec. 15, 1950]:  
 "§ 3.672 *Fuel quantity indicator*. Means shall be provided to indicate to the flight personnel the quantity of fuel in each tank during flight. ... " and "§ 3.672-1 *Means to indicate fuel quantity* (CAA policies which apply to § 3.672). The Administrator will accept, as a "means to indicate to the flight personnel the quantity of fuel in each tank during flight," a fuel tank calibrated to read in either gallons or pounds, providing the gauge is clearly marked to indicate which scale is being used." [Supp. 1, 12 F. R. 3438, May 28, 1947, as amended by Amdt. 1, 14 F. R. 36, Jan. 5, 1949]

Cockpit placards have provided usable fuel capacity information for fuel tank quantity indication for indicators marked in fractional tank units. §23.1555 initially required tank capacity information to be marked on or near the fuel tank selector. In Notice No. 75-10 for proposed Amendment 23-43 the explanation for expanding the requirement to conditionally include a placard by the fuel tank indicator, the FAA background statement was that: "The FAA believes that the proposed rule would provide for more relevant information than the present rule." Preamble information for Amendment 23-43 includes information that "No unfavorable comments were received on Proposal 2-43."

The corresponding Part 25 regulation, §25.1555 does not include a requirement for a cockpit placard for usable fuel capacity.

Usable fuel quantity is fundamental to flight planning, flight monitoring, and enroute flight plan changes. A fuel quantity indicator calibrated in tank fractions combined with readily available usable fuel tank capacity information readily meets the need for real time usable fuel quantity information as specified by the regulations. The regulatory history

noted above, shows the acceptability of a fuel quantity indicator calibrated in gallons or pounds.

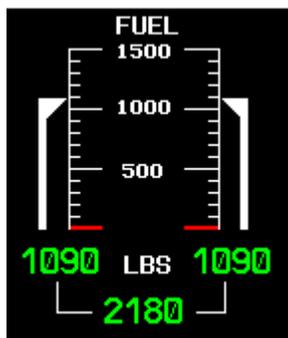


Figure 1: Model 510 Fuel Quantity Indicator

*The intent of 14 CFR 23.1555(d)(1) is to ensure that the total amount of usable fuel available can be determined by looking at the fuel quantity indicator without referring to other reference material, as in the case of a fuel quantity indicator that displays (EMPTY, 1/4, 1/2, 3/4 and FULL marks) which is found on many analog gauges used in smaller, Part 23 certified aircraft. By providing a direct reading of fuel quantity available calibrated in appropriate units (LBS or KGS) for a turbofan power aircraft, the Citation Model 510 fuel quantity indicator provides an equivalent level of safety to the requirement of 14 CFR 23.1555(d)(1).*

### ACO Recommendation

The Wichita ACO requests Small Airplane Directorate concurrence with the requested equivalent level of safety.

James M. Peterson  
James M. Peterson  
Associate ACO Manager  
Mechanical Systems & Propulsion, ACE-116W

4/26/05

Date

### Concurrence

John Colomy  
John R. Colomy  
Acting Manager  
Standards Office, ACE-110

7/6/05

Date

John Colomy  
for Kim Smith  
Acting Manager  
Small Airplane Directorate, ACE-100

7/15/05

Date