



Federal Aviation Administration

Memorandum

Date: February 28, 2006

From: Melvin D. Taylor, Manager, Atlanta Aircraft Certification Office, ACE-115A

To: Kim Smith, Manager, Small Airplane Directorate, ACE-100

Prepared by: Donald O. Young, ASE, Program Manager, ATL ACO, ACE-115A

Subject: **ACTION**: Request for Review and Concurrence with an Equivalent Level of Safety (ELOS) to 14 CFR 23.1145 Ignition switches, for Cessna Models 182Q and 182R airplanes with a Societe de Motorisation Aeronautiques (SMA) Model SR305-230 Aircraft Diesel Engine (ADE). ACE-05-19

This memorandum documents concurrence for the subject finding of an Equivalent Level of Safety (ELOS). We request your office to review and concur with the proposed ELOS finding to 14 CFR § 23.1145, Ignition switches. The proposed ELOS will allow for the utilization of FADEC power switches in place of the function provided by ignition switches as described in §23.1145.

Background: Aircraft diesel engines operate on the compression ignition principle and do not use spark plugs, magnetos or an ignition circuit to maintain ignition of the fuel air charge in the cylinders. Except for the fuel control fuel supply shut-off, compliance with the intent of 14 CFR § 23.1145, *Ignition Switches*, is not possible. However, a means of rapid engine shut down must be provided to the crew.

The intent of 14 CFR § 23.1145, Ignition Switches, is to provide the crew with a means to rapidly stop the engine in the event of an emergency. Cessna Models 182Q and 182R airplanes equipped with the SMA Model SR305-230 ADE must provide the crew with a means to rapidly stop the engine in addition to the engine fuel control fuel shut-off. The applicant has requested an ELOS for the provisions of 14 CFR § 23.1145 Ignition switches, at Amendment 43 (latest amendment).

Applicable Regulations: The applicable regulation is 14 CFR § 23.1145, which states:

§ 23.1145 *Ignition switches*.

(a) *Ignition switches must control and shut off each ignition circuit on each engine.*

(b) There must be means to quickly shut off all ignition on multiengine airplanes by the grouping of switches or by a master ignition control.

(c) Each group of ignition switches, except ignition switches for turbine engines for which continuous ignition is not required, and each master ignition control must have a means to prevent its inadvertent operation.

Compensating Features:

The Cessna Models 182Q and 182R airplanes with a Societe de Motorisation Aeronautiques (SMA) Model SR305-230 aircraft diesel engine (ADE) are normally shutoff using the engine fuel control fuel shut off. In order to meet the intent of 14 CFR § 23.1145, an air shut off valve is provided to rapidly stop the engine in addition to the engine fuel control fuel shut-off. The air shut off valve is cable operated and is located between the air filter and the turbocharger. In the event that the engine will not shut down using the engine fuel control fuel shutoff, the Aircraft Flight Manual Supplement (AFMS) will advise the pilot to perform the following steps:

INABILITY TO STOP THE ENGINE

Ensure the Power Control is in the “Fuel Cut Off” position.

Stop engine fuel supply by turning the Aircraft Fuel Selector to the “Off” position.

Activate the Air Shut Off Valve Control Lever until engine completely stops.

Switch off the master electrical supply.

Investigate the fault and perform inspections according to the Engine Maintenance Manual before the next flight.

This feature meets the intent of § 23.1145. This provides an equivalent level of functionality and safety as intended by the rule for conventional ignition systems as used on gasoline engines.

Recommendation: We concur that the use of an air shut off valve to accomplish the requirements of § 23.1145 provides an ELOS to that intended by § 23.1145 and recommend the issuance of this ELOS.

Concurred by:

Melvin D. Taylor
Manager, Atlanta Aircraft Certification Office, ACE-115A

1/31/06
Date

Steven Thompson
for Manager, Standards Office, ACE-110

2/13/06
Date

Kim Smith
Manager, Small Airplane Directorate, ACE-100

2/28/06
Date

