



# Federal Aviation Administration

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## Memorandum

Date: July 6, 2009

To: Manager, Standards Office, ACE-110  
/s/ CLM for

From: Manager, Atlanta Aircraft Certification Office, ACE-115A

Prepared by: Cindy Lorenzen, ACE-102A

Subject: Request for Review and Concurrence with an Equivalent Level of Safety to CAR 3.629 for Maule Model M-7-230, M-7-230C and M-9-230 Airplanes equipped with a Societe de Motorisation Aeronautiques (SMA) Model SR305-230 aircraft diesel engine (ADE).

ELOS Memo#: ACE-09-10

Regulatory ref: CAR 3.629

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This memorandum requests and documents concurrence of the finding of an Equivalent Level of Safety (ELOS). The ELOS finding is regarding Civil Air Regulation (CAR) 3.629, Ignition Switches, and will allow the use of an air shutoff valve to rapidly shut down the engine as a means of meeting the intent of the regulation.

**Background:** Maule Aerospace Technology, Inc. has requested an amendment to Type Certificate 3A23 to include Maule Models M-7-230, M-7-230C, and M-9-230. The powerplant for these new models is a SMA Model SR305-230 aircraft diesel engine.

CAR 3.629 requires ignition switches to provide control for each ignition circuit. The intent of the rule includes providing a means for rapid shut down of the engine in the event of an emergency. This is typically done using an ignition switch to control and shut off each ignition circuit on the engine. 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. Normal engine shut down is accomplished on the SMA diesel engine by the fuel control fuel supply shut-off.

Maule Models M-7-230, M-7-230C, and M-9-230 airplanes equipped with the SMA Model SR305-230 diesel engine must provide the crew with a means to rapidly stop the engine. The applicant has requested an ELOS for the provisions of CAR 3.629, Ignition switches, at Amendment 5.

**Applicable Regulations:** The applicable regulation is CAR 3.629, which states:

*§3.629 Ignition switches. Ignition switches shall provide control for each ignition circuit on each engine. It shall be possible to shut off quickly all ignition on multiengine airplanes, either by grouping of the individual switches or by providing a master ignition control.*

**Compensating Features:** In order to meet the intent of CAR 3.629, 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 (AFM) will advise the pilot to perform the following steps:

**INABILITY TO STOP THE ENGINE:**

1. **Ensure the Power Control is in the “Fuel Cut Off” position.**
2. **Stop engine fuel supply by turning the Aircraft Fuel Selector to the “Off” position.**
3. **Activate the Air Shut Off Valve Control Lever until engine completely stops.**
4. **Switch off the master electrical supply.**
5. **Investigate the fault and perform inspections according to the Engine Maintenance Manual before the next flight.**

Actuation of this valve from the cockpit stops the engine immediately which meets the intent of CAR 3.629. This provides an equivalent level of functionality and safety as intended by the rule for conventional ignition systems as used on gasoline engines.

**Recommendation:** As shown by our signature above, the Atlanta ACO recommends that an equivalent level of safety finding for CAR 3.629 be granted for Maule Models M-7-230, M-7-230C and M-9-230. We concur that the use of an air shut off valve to accomplish the requirements of CAR 3.629 provides an ELOS to that intended by CAR 3.629.

Kim Smith  
Kim Smith, Manager, Small Airplane Directorate  
Aircraft Certification Service

8-19-09  
Date

ELOS Originated by Small Airplane Directorate:	William J. Timberlake Manager, Project Support Branch	Routing Symbol ACE-112
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