



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

# Memorandum

Subject: **ACTION:** Equivalent Level of Safety (ELOS) to 14 CFR part 23, § 23.1145, Ignition Switches, for the Diamond Aircraft Industries Type Certificate with the Thielert TAE-125-01 Diesel Engines in the DA-42 Airplane; ACE-05-05.

Date: June 22, 2005

From: Propulsion Engineer – Technical Specialist,  
Regulation and Policy Branch, ACE-111

Reply to Peter L. Rouse  
Attn. of: (816) 329-4135

To: Manager, Small Airplane Directorate, ACE-100

This memorandum documents concurrence for the subject finding of ELOS. We request your office to review and concur with the proposed ELOS finding to 14 CFR part 23, § 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:**

The Diamond Aircraft Industries (DAI) DA-42 aircraft is a new fully composite, four place, twin-engine airplane with retractable gear, cantilever low wing and T-tail. The airplane was certified by EASA on type certificate number A005, dated May 13, 2004. The airplane is powered by two Thielert Aircraft Engines GmbH (Thielert) TAE 125-01 aircraft diesel engines (ADE), type certificated in the United States, type certificate number E00069EN. The Thielert engine is a diesel cycle engine, and does not have or require an ignition system. However, it is controlled by a Full Authority Digital Electronic Engine Control, FADEC. Controlling electrical power to the FADEC has the same effect on the Thielert as using ignition switches on a conventional engine. The engine can be shut off by shutting off FADEC power, which accomplishes the same task as required for ignition switches by § 23.1145. Under the Bilateral Airworthiness Agreement (BAA) between the USA and the Austrian Exporting Civil Aviation Authority (ECAA), the Austro Control GmbH (ACG), an application for U.S. Type Certification of Diamond Aircraft Industries (DAI) Model DA-42 was made on August 2, 2004, by the DAI through the European Aviation Safety Agency (EASA).

**APPLICABLE REGULATIONS:**

Section 23.1145, Ignition switches, requires the following:

*§ 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 groupings 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.*

**DESCRIPTION OF COMPENSATING FEATURES:**

The Thielert TAE-125 reciprocating diesel engine uses a FADEC to control engine operation and, by its nature, does not require the associated ignition systems and switches. However, the FADEC can be shut off, which will stop the engine, and a switch provides such a feature. This feature meets the intent of § 23.1145. To ensure an ELOS to the intent of § 23.1145, the installation in the Diamond Aircraft Industries DA-42 meets the requirements of § 23.1145, when the regulation is recharacterized to mean "FADEC power switch" in place of "ignition switch," and it meets all requirements as specified in § 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 FADEC power switches to accomplish the requirements of § 23.1145 provides an ELOS to that intended by § 23.1145, and we recommend the issuance of this ELOS.

Concurred by:

William J. Timberlake  
for Manager, Project Support Branch, ACE-112

6-21-05  
Date

John Colomy  
Acting Manager, Standards Office, ACE-110

6-22-05  
Date

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

6-22-05  
Date