



Federal Aviation Administration

Memorandum

Date: December 23, 2015

To: Manager, Regulations and Policy Branch, ACE-111

From: Manager, Small Airplane Directorate, ACE-100

Prepared by: Jeff Pretz, Regulations and Policy Branch, ACE-111

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Diamond Aircraft Industries, Models DA 42, DA 42 NG, DA 42 M-NG, and DA62 Airplanes, Ignition Switches, FAA Project Numbers: CE1704SN, TD0326CE-A, and AT0755CE-A

ELOS Memo#: ACE-05-05

Regulatory Ref: 14 CFR 23.1145, amendment 23-43

Revision Description: The Federal Aviation Administration (FAA) revises this memo number to add the Diamond Aircraft Industries (DAI), Model DA62 airplane.

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Accountable Directorate on the establishment of an equivalent level of safety finding for the Models DA 42, DA 42 NG, DA 42 M-NG, and DA62 airplanes. The Small Airplane Directorate, having reviewed DAI's request to extend ELOS memo number ACE-05-05B to include the DA62, agrees that the design differences from the previous models do not affect any areas of consideration for the ELOS granted for Models DA 42, DA 42 NG, and DA 42 M-NG. Therefore, the FAA has made the determination that it is acceptable to grant an extension of ELOS ACE-05-05B to the DA62.

Background:

The DA62 is a derivative model airplane to be included on type certificate A57CE, along with prior certificated models DA 42, DA 42 NG, and DA 42 M-NG. ELOS [ACE-05-05](#) was originally extended from the Model DA 42 and successively to Model DA 42 NG ([ACE-05-05A](#)) and Model DA 42 M-NG ([ACE-05-05B](#)). This is an additionally requested extension of ELOS ACE-05-05B to the Model DA62.

The Model DA62 uses two Austro AE300 engines. The Austro AE300 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 AE300 (Model E4) as using ignition switches on a conventional engine. The engine can be shut off by turning off FADEC power, which accomplishes the same task as required for ignition switches by § 23.1145. The major change with respect to this amended type design is the addition of a larger cabin to accommodate up to seven seats in the Model DA62. The engine control design is fundamentally identical for the requested ELOS extension to that of the original ELOS granted to the DA 42 (ACE-05-05), the DA 42 NG (ACE-05-05A), and the DA 42 M-NG (ACE-05-05B).

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 DAI model DA 42 was made on August 2, 2004, by DAI through EASA. DAI has requested, through EASA, an ELOS for the provisions of § 23.1145 at amendment 23-43.

Applicable Regulation:

- 14 CFR 23.1145

Regulation requiring an ELOS finding:

14 CFR 23.1145, Ignition switches, paragraphs (a), (b), and (c) state the following:

“Ignition switches must control and shut off each ignition circuit on each engine.

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

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 design features or alternative Methods of Compliance (MoC) which allow the granting of the ELOS (includes changes, limitations, or equipment needed for equivalency):

The Thielert TAE-125 (or Austro AE300) reciprocating diesel engine uses a FADEC to control engine operation and does not require 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. The installation in the DAI DA 42, DA 42 NG, DA 42 M-NG, and DA62 meets the requirements of § 23.1145 when the regulation is read as "FADEC power switch" in place of "ignition switch." This provides an equivalent level of functionality and safety as intended by the rule.

Explanation of how design features or alternative Methods of Compliance (MoC) provide an equivalent level of safety intended by the regulation:

The installation in the DAI DA 42, DA 42 NG, DA 42 M-NG, and DA62 meets the requirements of § 23.1145. Based on the identical functionality of the respective design, we concur with the requested extension of this ELOS for the Austro AE300 engine installation paired with the FADEC power switches in place of traditional ignition switches because it provides an equivalent level of safety.

FAA approval and documentation of the ELOS finding:

The FAA previously approved the aforementioned equivalent level of safety finding during certification of the DA 42, DA 42 NG, and the DA 42 M-NG, and as documented in this memorandum, grants an extension from the existing ELOS ACE-05-05B to the DA62. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Accountable Directorate has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number must be listed in the Type Certificate Data Sheet under the Type Certificate (TC) and Amended Type Certificate (ATC) or in the Limitations and Conditions section of the Supplemental Type Certificate (STC). An example of an appropriate statement is provided below.

Equivalent Level of Safety Finding has been made for the following regulation:

14 CFR 23.1145, amendment 23-43, Ignition switches
(documented in ELOS Memo ACE-05-05)

//SIGNED//

Pat Mullen, Acting Manager, Small Airplane Directorate,
Aircraft Certification Service

December 23, 2015

Date

ELOS Originated by: Regulations and Policy Branch	Manager, Regulations and Policy Branch: William Schinstock	Routing Symbol: ACE-111
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