
Type Acceptance Report

TAR 20/21B/17

AUSTRO ENGINE E4/E4P

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Executive Summary

New Zealand Type Acceptance has been granted to the Austro Engine E4 Series based on validation of EASA Type Certificate number E.200. There are no special requirements for import.

Applicability is limited to the Models and/or serial numbers detailed in Section 2, which are now eligible for installation on a NZ-registered aircraft. Additional variants or serial numbers approved under the foreign type certificate can become type accepted after supply of the applicable documentation, in accordance with the provisions of NZCAR §21.43(b).

NOTE: The information in this report is correct as at the date of issue. The report is only updated when an application is received to revise the Type Acceptance Certificate. For details on the current type certificate holder and any specific technical data, refer to the latest State-of-Design Type Certificate Data Sheet.

1. Introduction

This report details the basis on which Type Acceptance Certificate No. 20/21B/17 was granted in the Standard Category in accordance with NZCAR Part 21 Subpart B.

Specifically the report aims to:

- (a) Specify the foreign type certificate and associated airworthiness design standard used for type acceptance of the model(s) in New Zealand; and
- (b) Identify any special conditions for import applicable to any model(s) covered by the Type Acceptance Certificate.

The report also notes the status of all models included under the State-of-Design type certificate which have been granted type acceptance in New Zealand. Models covered by the type acceptance certificate issued under Part 21B at Amendment 6 or later are listed in Section 2 of this report.

2. Product Certification Details

(a) State-of-Design Type and Production Certificates:

Manufacturer: Austro Engine GmbH (since 30 October 2009)
Diamond Aircraft Industries GmbH

Type Certificate: E.200
Issued by: European Aviation Safety Agency

Production Approval: POA AT.21G.0010

(b) Models Covered by the Part 21B Type Acceptance Certificate:

(i) **Model:** E4, E4P

Environment Standard: Not Applicable

3. Application Details and Background Information

The application for New Zealand type acceptance of the Austro Engine E4 and E4P was from the manufacturer dated 22 April 2020. The E4 is a liquid cooled four-cylinder, four-stroke Diesel piston engine with a displacement of 1.991 litres, equipped with common rail high pressure direct fuel injection, turbocharger, directly-integrated gearbox with 1:1.69 reduction ratio and an integral torsional vibration damper. It is controlled by a dual-channel Electronic Engine Control Unit (EECU).

Type Acceptance Certificate Number 20/21B/16 was granted on 9 June 2020 to the Austro Engine Model E4 and E4P based on validation of EASA Type Certificate E.200. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The E4 engine was developed by Diamond Aircraft Industries to replace the Thielert TA125 engine, which was used in their DA40 and DA42 aircraft. Similar in configuration and concept the E4 is also derived from a Mercedes-Benz OM640 in-line four cylinder DOHC automotive engine (from the A Series). The initial Model E4 is rated at 123.5 kW, but this has been increased to 132 kW in the E4P variant through changes to the EECU software (an increase in manifold pressure and fuel injection rate), plus some additional cooling provisions in the gearbox oil line.

The commercial name for the E4 and E4P engines is AE300 and AE330 respectively. Engine model numbers may include suffixes to define minor engine changes related to installation specific configurations. See SB-E4-002 for configuration specifications.

4. NZCAR §21.43 Data Requirements

The type data requirements of NZCAR Part 21B Para §21.43 have been satisfied by supply of the following documents, or were already held by the CAA:

(1) State-of-Design Type certificate:

EASA Type Certificate Number E.200

EASA Type Certificate Data Sheet number E.200 – Issue 11 dated 23 January 2019

– Model E4 approved 28 January 2009

– Model E4P approved 26 March 2015

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the E4 Series is CS-E at the initial issue effective 23 October 2003. This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1, as CS-E is equivalent to FAR Part 33, which is the basic design standard for engines called up under Part 21 Appendix C. There are no non-compliances and no additional special conditions have been prescribed by the Director under §21.23.

(ii) *Special Conditions:*

Addition to CS-E 40(d) Engine Flame Out during Flight (E4P) – Service experience has shown unintended flame-outs can occur more easily in diesel engines after prolonged descent at idle power setting and low ambient temperature (OAT). This may not be immediately detected by the pilot because the engine is still rotating due to the wind milling effect of the propeller in single engine installations. The special condition required:

The engine design and operating procedure must provide continued ignition capability under the intended operating conditions of CS-E 40(d), using fuel with the lowest cetane number; and

An engine in-flight relight envelope must be specified and proven by test or other evidence, and must include all applicable conditions, e.g. altitude, airspeed, OAT, rotational speed and procedures.

(iii) *Equivalent Level of Safety Findings:*

CS-E 130(h) Fire Proof Engine Attachment Points –The E4 engine consist of a cast-iron crankcase and a gearbox and valve train housing made from aluminium. The attachment points, which must be fireproof, are on the parts made from aluminium which is not considered fireproof by definition. Therefore the following conditions must be met:

(1) The engine mounting structure must be failsafe in the event of failure of one element;

(2) The mounting structure or engine attachment points shall at least meet the fire-resistant criteria:

(a) Sustain limit flight loads for 5 minutes under the fire test conditions of AMC E 130 (4);

(b) After the 5 minute shutdown loads have to be evaluated, superimposed with flight loads.

(3) After fire testing the engine mounting structure must have sufficient static strength to withstand the maximum loads expected during the completion of the flight, factored as specified.

(iv) *Airworthiness Limitations:*

See the Maintenance Manual, Chapter 04-00-00 "Airworthiness Limitations".

The recommended Time Between Overhaul (TBO) is also published in E4.08.04.

(3) Aircraft Noise and Engine Emission Standards:

(i) *Environmental Standard:*

N/A – Not required for a piston engine.

(4) Certification Compliance Listing:

Austro Engine Document No. E4.07.00 Chapter 01 – Report Means of Compliance E4 – Revision 2 dated 26 January 2009 [Section 5. Compliance Checklist]

Austro Engine Document No. E4.07.00 Chapter 05 – E4 Project Description

Austro Engine Document No. E4.07.00 Chapter A001/01 – Report Means of Compliance E4P – Revision 0 dated 23 March 2015

Austro Engine Document No. E4.07.00 Chapter A001/03 – Certification Program – Increase of Power of E4 Engine: Variant E4P – Revision 2 dated 28 August 2014

(5) Flight Manual: Not Applicable

(6) Operating Data for Engine:

(i) *Maintenance Manual:*

Austro Engine Document No. E4.08.04 – Maintenance Manual E4 Series

Austro Engine Document No. E4.12.01 – Overhaul Manual E4 Series

(ii) *Current service Information:*

Mandatory, Recommended and Optional Service Bulletins and Service Letters are available on the company website at www.austroengine.com

(iii) *Illustrated Parts Catalogue:*

Austro Engine Documents ZB-AE 300 A; ZB-AE 300 B; ZB-AE 300 C

Austro Engine Document E4PB-00-000-000 – ZB-AE 330 B

Austro Engine Document E4PC-00-000-000 – ZB-AE 330 C

Note: The IPC are currently only available online.

(7) Agreement from manufacturer to supply updates of data in (5), and (6):

CAA 2171 form dated 22/04/2020 from Austro Engine Office of Airworthiness

Technical Manuals are available on-line through the Customer Login

(8) Other information:

E4.00.10 – List of Applicable Publications – Austro Engine E4 Engine

Austro Engine Document No. E4.02.01 – Installation Manual E4 Series

Austro Engine Document No. E4.01.01 – Operation Manual E4

Austro Engine Document No. E4.01.02 – Operation Manual E4P

Austro Engine Document No. E4.04.01 – E4 EEC – System Specification

Attachments

The following documents form attachments to this report:

Copy of EASA Type Certificate Data Sheet Number E.200

Sign off



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David Gill
Team Leader Airworthiness



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Checked – Greg Baum
Team Leader Product Certification

Appendix 1

List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
E4, E4P	Austro Engine GmbH	20/21B/17	9 June 2020