Type Acceptance Report

TAR 6/21B/10

Thielert Centurion 4.0 Aircraft Engine

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Executive Summary

New Zealand Type Acceptance has been granted to the Thielert Aircraft Engines GmbH Centurion 4.0 aircraft engine based on validation of EASA Type Certificate number EASA.E.014. There are no special requirements for import.

Applicability is currently limited to the Models and/or serial numbers detailed in Appendix 1. Additional variants or serial numbers approved under the foreign type certificate can be included after supply of the applicable documentation, in accordance with the provisions of NZCAR §21.43(2).

1. Introduction

This report details the basis on which Type Acceptance was granted 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 in New Zealand; and

(b) Identify any special conditions for import applicable to any model covered by the type acceptance exercise.

2. Foreign Type Certificate Details

Type Certificate:	EASA.E.014
Issued by:	EASA (European Aviation Safety Agency)
Manufacturer:	Thielert Aircraft Engines GmbH
Model:	Centurion 4.0 / 4.0 BE
Power:	257 kW Take-off (5 minutes) (345 hp)
	Note: The engine is available in de-rated form. See Note 1 on the TCDS.
Type:	8 cylinder four-stroke diesel piston engine in a vee configuration with a displacement of 3996 cm^2, equipped with a common rail high pressure direct injection, two turbochargers, a reduction gearbox, propeller governor and FADEC.

3. Type Acceptance

The application for New Zealand type acceptance was from the manufacturer, dated 20 October 2005. Final Type Acceptance was delayed until the revision of Part 21 was

completed which covered type acceptance of products. One example has been imported for trial installation on an FU24-950 agricultural aircraft.

As part of the validation of the EASA Type Certificate, the NZCAA sent a certification engineer to the Thielert factory at Lichenstein in Germany for a one-day familiarisation visit.

Type Acceptance certificate number 6/21B/10 was granted on 25 September 2007 to the Thielert Centurion 4.0 based on validation of EASA Type Certificate number EASA.E.014. There are no special requirements for import into New Zealand.

4. Type Data

The type data requirements of (draft) NZCAR Part 21B Para §21.43 have been satisfied by supply of the following documents:

(1) Type certificate:

Type Certificate Data Sheet TCDS.EASA.E.014 Centurion 4.0 - Iss.03 dated 3-1-07.

(2) Airworthiness design requirements:

The certification basis of the Centurion 4.0 is JAR-E Change 10 dated August 15 1999. This is an acceptable certification basis because JAR-E is accepted as an equivalent to FAR 33, which is specified as the basic standard for Aircraft Engines called up under Part 21 Appendix C. Six EASA Special Conditions were complied with, and there were three findings of equivalent safety. These have been reviewed and accepted by the CAA. There are no non-compliances and no additional special conditions have been prescribed by the Director under §21.23.

(3) Certification compliance listing:

Report TDD-03-01 Issue 1 dated 9/11/05 – Compliance Summary TAE Centurion 4.0.

Report TDD-03-01 Issue 2 dated 20/11/06 – Compliance Summary TAE Centurion 4.0 – Major change for power de-rating.

CRI-A1 Iss 6 - 7.10.04 – Certification Basis for the Centurion 4.0 BE.
Original application date: 30-4-2001 (to JAA). Specifies JAR-E and identifies Special Conditions and Equivalent Safety Findings.

CRI-T1 Iss 5 – 7.10.04 – Special Condition SC-1 – Electronic Engine Control System.
Adds requirements for FADEC electronic engine controls, including; descriptive manuals; inteface conditions; accuracy; operability; transition from primary to back-up; failure analysis; safety assessment; protection; software; aircraft data inputs; aircraft supplied power; instrumentation etc.

CRI-T2 Iss 5 - 7.10.04 – Special Condition SC-2 – Contaminated Fuel.

Engine uses Jet A-1. Water/ice contamination requirements normally applicable to turbine engines are applied.

CRI-T3 Iss 5 - 7.10.04 – Special Condition SC-3 – Failure Analysis.

Engine uses base components of industrial engine and TAE has no direct access to some original design and manufacturing data. Complete engine subject to FMEA analysis.

CRI-T4 Iss 6 - 7.10.04 – Special Condition SC-4 – Fire Precautions.

High-pressure (1300 bar) common rail must be fire-proof.

CRI-T5 Iss 4 - 7.10.04 – Special Condition SC-5 – Programmed Logic Devices.

Requirements for software (DO-178A/B, ED-12A/B) and Programmed Logic Devices (DO-254, ED-80 or service experience for bought-in components).

CRI-T6 Iss 5 - 7.10.04 – Equivaent Safety ESF1 – Propeller Functioning.

The engine is to be fitted with a constant speed propeller but there is no RPM control for the pilot. Alternative testing procedures to JAR-P-210(b) are specified.

CRI-T7 Iss 5 - 7.10.04 - Equivalent Safety ESF2 – Engine Test Control.

The engine has a single power control and manifold pressure and mixture is not under the pilots direct control. Alternative testing procedures specified for engine endurance testing.

CRI-T8 Iss 4 - 7.10.04 – Equivalent Safety ESF3 – Engine Type Design.

Engine uses base components of industrial engine and TAE has no direct access to some original design and manufacturing data. Some “reverse engineering” undertaken. Specifies process for TAE to define engine type design and for identifying and analysing critical components.

CRI-T13 Iss 4 - 7.10.04 – Special Condition SC-6 – Object Orientated Technology.

Engine control software uses object orientated technology. Specifies requirements for assessment and management of software production.

CRI-T14 Iss 2 - 7.10.04 – JAR-E 210, 220 – High Pressure Fuel Lines.

Means of Compliance of external high-pressure fuel lines (1350 bar) – Assessment for failure and fire resistance. (Includes automotive and TAE-125 service experience.)

(4) Environmental Certification:

None (Not required for piston engines – TCDS para 1.5)

(5) Illustrated Parts Catalogue: Not issued.

(6) Maintenance manual and service data for engine:

Doc. No. OM-03-01 Operation and Maintenance Manual Centurion 4.0
TBR is specified in Service Bulletin TM TAE 310-0001.

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

Thielert has provided CAA with a login and password to the TAE-Service website which has all Service and Maintenance data downloadable.

(8) Other information:

Doc. No IM-03-01 Installation Manual Centurion 4.0.

Attachments

The following documents form attachments to this report:

Copy of EASA Type Certificate Data Sheet Number EASA.E.014

Sign off **Checked**

Peter Gill
Airworthiness Engineer
Date: 25 September 2007

David Gill
Team Leader Airworthiness
Date: 25 September 2007

List of Type Accepted Variants:

Model:	*Applicant:*	*CAA Work Request:*	*Date Granted:*
Centurion 4.0 / 4.0BE	Thielert Aircraft Engines	6/21B/10	25 September 2007