
Type Acceptance Report

TAR 14/21B/2

TURBOMECA Makila 1 Series

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Executive Summary

New Zealand Type Acceptance has been granted to the Turbomeca Makila 1 series engines based on validation of EASA Type Certificate number E.072. There are no special requirements for import.

Applicability is limited to the Models and/or serial numbers detailed in Appendix 1, 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(c).

1. Introduction

This report details the basis on which Type Acceptance Certificate No. 14/21B/2 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 product in New Zealand; and
- (b) Identify any special conditions for import applicable to any model(s) covered by the Type Acceptance Certificate.

2. ICAO Type Certificate Details

Manufacturer:	Turbomeca
Type Certificate:	E.072
Issued by:	European Aviation Safety Agency
Model(s):	Makila 1A, 1A1, 1A2

3. Type Acceptance Details

The application for New Zealand type acceptance was from the manufacturer dated 29 July 2013. The Makila 1 series is fitted to the Eurocopter Super Puma AS 332/532 series helicopter. The Makila 1 Series is a turboshaft engine with three-stage axial and final-stage centrifugal compressor, both driven by a two-stage turbine; and an annular combustion chamber with centrifugal fuel injection. The accessory gearbox, located at the front, is driven by the gas generator. A two-stage power turbine provides power at the rear of the engine. The engine is controlled by a Digital Engine Control Unit (DECU).

The principal differences between the 1A, 1A1, and 1A2 are One Engine Inoperative (OEI) ratings and the control system. The 1A2 has a dual channel FADEC.

Type Acceptance Certificate No. 14/21B/2 was granted on 2 October 2013 to the Makila 1 series based on validation of EASA Type Certificate E.072. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

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) ICAO Type certificate:

EASA Type Certificate Number EASA.E.072

EASA Type Certificate Data Sheet number E.072 at Issue 01 dated 24 Nov 2009

- Model Makila 1A approved 27 February 1980
- Model Makila 1A1 approved 18 October 1984
- Model Makila 1A2 approved 6 June 1991

Supersedes:

Certificat de Type Moteur Numero M10
Fiche de Caracteristiques Moteur No. M10

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the Makila 1 series is JAR-E Change 3, dated 22 March 1977 (which incorporates by reference BCAR, Section C, Issue 10 dated 22 March 1977), plus BCAR amendments (Blue papers) 623, 678 and 679 dated 21 October 1977.

There were ten special conditions only for the Makila 1A2, no deviations and no equivalent safety findings. The special conditions have been reviewed and accepted by the CAA.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1A, because JAR-E is the European equivalent of FAR 33, the basic standard for aircraft engines called up under Part 21 Appendix C.

(ii) *Special Conditions:*

Makila 1A, 1A1
- None

Makila 1A2

S.C.1 Safe Life.

Condition to include take-off rating (including OEI contingency ratings) in the Safe Life determination.

S.C.2 Rotor Integrity

Requirements to show assurance that structural integrity will not be exceeded in service and amended requirements to the rotor burst margin tests (including contingency ratings).

S.C.3 Provision for instrument

Condition to specify a means and procedures to ensure time at OEI ratings will be determined.

S.C.4 Control System

Additional requirement to incorporate means for automatic control of 30 sec OEI power.

S.C.5 Vibration Surveys

Condition to include overspeed and contingency power ratings in the vibration survey.

S.C.6 Endurance Test

Modified test schedule to include OEI ratings

S.C.7 Over-temperature test

Additional over-temperature tests for OEI ratings.

S.C.8 Final examination

Provision of an inspection/maintenance action plan for after use of OEI ratings.

SC9: Supplementary Test

Requirement for a test to simulate the operation in service including stop-start cycles, a significant number of OEI 2 minute power runs, in order to demonstrate the validity of the maintenance actions proposed to be carried out after 2 minute OEI power runs.

SC10: Confirmation of power availability at OEI ratings

Condition to confirm the availability of OEI ratings with a demonstration of engine power availability and possibility to maintain such power levels over their entire applicable period.

(iii) Equivalent Level of Safety Findings:

None

(iv) Deviations:

None

(v) Airworthiness Limitations:

See Maintenance Manual Section 05-10

(3) Environmental Certification:

The Makila 1 series has been shown to meet the fuel venting requirements of EASA CS-34 at original issue dated 17 October 2003 (ICAO Annex 16. Vol II, Part II, Chapter 2, Amendment 5 dated 24 November 2005).

(4) Certification Compliance Listing:

Makila 1A – Certification Compliance Check List

Makila 1A1 – Certification Compliance Check List

Makila 1A2 – Certification Compliance Statement, issue 1 dated 22-9-1989

(5) Flight Manual: N/A

(6) Operating Data for Engine:

Refer to TCDS E.072 for part numbers of manuals. Access to publications is provided at the www.turbomeca-support.com TOOLS website.

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

Letter from Turbomeca ref JL/AT n° 34563 dated 26 August 2013.

Attachments

The following documents form attachments to this report:

Copy of EASA Type Certificate Data Sheet Number E.072

Sign off

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Greg Baum
Airworthiness Engineer

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Checked – Peter Gill
Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
Makila 1A	Turbomeca	14/21B/2	2 October 2013
Makila 1A1	Turbomeca	14/21B/2	2 October 2013
Makila 1A2	Turbomeca	14/21B/2	2 October 2013