
Type Acceptance Report

TAR 11/21B/20

Guimbal Cabri G2

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Executive Summary

New Zealand Type Acceptance has been granted to the Guimbal Cabri G2 model based on validation of EASA Type Certificate number R.145. There are no special requirements for import.

Applicability is currently limited to the Models and/or serial numbers detailed in Appendix 1, which are now eligible for the issue of an Airworthiness Certificate in the Standard Category in accordance with NZCAR §21.177, subject to any outstanding New Zealand operational requirements being met. (See Section 5 of this report for a review of compliance of the basic type design with the operating Rules.) 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.11/21B/20 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 in New Zealand; and
- (b) Identify any special conditions for import applicable to any model covered by the Type Acceptance Certificate; and
- (c) Identify any additional requirements which must be complied with prior to the issue of a NZ Airworthiness Certificate or for any subsequent operations.

The report also notes the status of all models included under the foreign type certificate which have been granted type acceptance in New Zealand, which are listed in Appendix 1 of this report.

2. ICAO Type Certificate Details

Manufacturer:	Hélicoptères Guimbal
Type Certificate:	R.145
Issued by:	EASA
Model:	Cabri G2
MCTOW	700 kgs (1543 lbs.)
Max. No. of Seats:	2
Noise Standard:	JAR 36 (1 st Issue dated 23 May 1997) Subpart E
Engine:	Lycoming O-360-J2A (With STC EASA.E.S.01001 embodied)
	Type Certificate: E-286
	Issued by: FAA

3. Type Acceptance Details

The application for New Zealand type acceptance was from the New Zealand agent, Pacific Aircraft Services Ltd, dated 21 March 2011. As part of the type acceptance exercise the CAA sent a certification team to the Hélicoptères Guimbal factory at Aix-En-Provence for a validation visit in May 2011.

Type Acceptance Certificate No. 11/21B/20 was granted on 22 June 2011 to the Guimbal Cabri G2 based on validation of EASA Type Certificate R.145. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The Guimbal Cabri G2 is a two-seat single-reciprocating-engine-powered light helicopter. The main structure is carbon composite construction, and it uses a three bladed soft-in-plane main rotor with carbon composite blades. The tail rotor is a fenestron design using seven injection moulded blades. Energy attenuating carbon composite seats of Guimbal's own design are installed. The helicopter has conventional unassisted flight controls and largely conventional analogue instrumentation but uses its own design of electronic monitor for all engine functions.

The STC embodied on the engine is held by Guimbal and comprises a Plasma electronic ignition with variable timing to replace the RH retard-capable magneto, and also a compact oil filter housing.

The helicopter is the first light helicopter to be type certificated by EASA against CS27.

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:

(1) ICAO Type certificate:

EASA Type Certificate R.145 issued 14 December 2007

EASA Type Certificate Data Sheet R.145 Issue 03 dated 18 May 2011

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the model Cabri G2 is:

CS27 at initial issue dated 24 November 2003.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1A, as CS27 is equivalent to FAR 27, which is the basic standard for Normal Category helicopters 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:*

CRF F-1; High Intensity Radiated Fields (HIRF) – Provides additional requirements (JAA INT/POL/27.29/1 at Issue 2 dated 1/6/97) for the effects of high intensity radiated fields on aircraft fitted with digital systems which perform critical or essential functions (EPM in the Cabri G2).

(iii) *Equivalent Level of Safety Findings:*

CRI E1 Separation between fuel tank and firewall – CS 27.963(c) requires a space of 0.5” between the firewall and any fuel tank. The equivalent safety allowance of CS27.1185(c) was also allowed to apply to CS27.963(a). Guimbal showed suitable thermal insulation is provided between the engine compartment and the fuel tank.

CRI E2 Fuel bladder filling drop test – CS27.952(a) requires fuel tank drop tests to be carried out with tanks filled with water to 80% of nominal capacity. Guimbal argued that the 80% factor came from the relative density of jet fuel and for an avgas fuelled machine 72% should be used. This was accepted, but in the event the CRI was not applied as Guimbal elected to test to 80%.

CRI F3 Chip detectors test in flight – CS27.1327(e)(2) requires the pilot to be able to check the electrical continuity of any chip detector circuits during flight. For the Cabri G2, this is done automatically by the EPM at the start of a flight, and then continuously during the flight but any failure is not reported until the start of the next flight. Guimbal showed that for a failure to occur, the chip detector would have to fail during the one flight, and the gearbox would have to fail in a way that made metal but did not give any other indications such as oil temperature, vibration or noise, during the same one flight. Guimbal showed that the probability of this combination of failures occurring was acceptably low.

(iv) *Airworthiness Limitations:*

Document J40-002. (Also repeated verbatim in Section C of the Maintenance Manual J70-002.) There are no fatigue life limited components, all components including rotor blades and flight controls being on condition. The two gearboxes have TBO lives specified, and the fuel bladder and seat belts have finite life limits.

(3) Aircraft Noise and Engine Emission Standards:

(i) *Environmental Standard:*

The Cabri G2 has been certificated under JAR 36, first issue dated May 23, 1997.
(Equivalent to ICAO Annex 16 Vol 1 Part II Chapter 11 at Amendment 7.)

Certified flyover sound exposure level (Flight Manual page 5-10) is 75.7 dB SEL.

Compliance Listing:

Sound Exposure Level Compliance of the Cabri G2 – Report J18-013E

(4) Certification Compliance Listing:

Guimbal Cabri G2 Certification Record Document – Report J00-001 Rev B dated
2/12/07

(5) Flight Manual: EASA approved Flight Manual for the Guimbal Cabri G2
document J40-001 - CAA Accepted as AIR 3176

(6) Operating Data for Aircraft:

(i) *Maintenance Manual:*

Cabri G2 Maintenance Manual J70-002

Current service Information:

Cabri G2 Service Bulletins

(ii) *Illustrated Parts Catalogue:*

Cabri G2 Illustrated Parts Catalog J70-004

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

CAA 2171 signed by B Guimbal dated 25 May 2011

5. Additional New Zealand Requirements

Compliance with the retrospective airworthiness requirements of NZCAR Part 26 is a prerequisite for the grant of a type acceptance certificate.

Civil Aviation Rules Part 26

Subpart B – Additional Airworthiness Requirements

Appendix B – All Aircraft

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
B.1	Marking of Doors and Emergency Exits	<i>To be determined on an individual aircraft basis</i>
B.2	Crew Protection Requirements – CAM 8 Appdx. B # .35	Not Applicable – Applies to agricultural aircraft only

Appendix E – Helicopters

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
E.1	Doors and Exits	The aircraft has a door locking system but this is not intended for use during normal operations as it is intended as an anti-theft device and inhibits the start circuit (except in flight). The door handle is a robust mechanism and located behind each passenger such that inadvertent operation is unlikely. In addition the aircraft is a two-seater only with each passenger having a full safety harness. Accepted as providing an equivalent level of safety.
E.2.1	Emergency Exit Marking	<i>To be determined on an individual aircraft basis</i>

Compliance with the following additional NZ operating requirements has been reviewed and were found to be covered by either the original certification requirements or the basic build standard of the aircraft, except as noted:

Civil Aviation Rules Part 91

Subpart F – Instrument and Equipment Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
91.505	Seating and Restraints – Safety belt/Shoulder Harness	CS § 27.785
91.507	Pax Information Signs – Smoking, safety belts fastened	N/A – Less than 10 passenger seats
91.509 Min. VFR	(1) ASI (2) Machmeter (3) Altimeter (4) Magnetic Compass (5) Fuel Contents (6) Engine RPM (7) Oil Pressure	CS § 27.1303(a) N/A CS § 27.1303(b) CS § 27.1303(c) CS § 27.1305(d) CS § 27.1305(k) CS § 27.1305(h)
91.511 Night	(1) Turn and Slip (2) Position Lights	** Std fit – FM page 7-19
	** Several optional modifications as listed on TCDS comprise DG and Turn co-ordinator, etc,	Night VFR approval – These install instrument lighting, AH,
91.513	VFR Communication Equipment	<i>To be determined on an individual aircraft basis</i>
91.517 IFR	(1) Gyroscopic AH (2) Gyroscopic DI (3) Gyro Power Supply (4) Sensitive Altimeter	N/A - Certificated for Day and Night VFR operations only
91.519	IFR Communication and Navigation Equipment	N/A - Certificated for Day and Night VFR operations only
91.523 Emrgcy Eqpmt.	(a) More Than 9 pax - First Aid Kits per Table 7 - Fire Extinguishers per Table 8 (b) More than 20 pax - Axe readily accessible to crew (c) More than 61 pax - Portable Megaphones per Table 9	<i>To be determined on an individual aircraft basis.</i> <i>To be determined on an individual aircraft basis.</i> N/A – only for aircraft with more than 20 pax. N/A – only for aircraft with more than 61 pax.
91.529	ELT - TSO C126 406 MHz after 22/11/2007	Artex AF406 Compact ELT is standard fit.
91.531	Oxygen Indicators - Volume/Pressure/Delivery	<i>To be determined on an individual aircraft basis.</i>
91.533 Unpress. A/c	>30 min above FL100 - Supplemental for crew, 10% Pax - Therapeutic for 3% of Pax Above FL100 - Supplemental for all Crew, Pax - Therapeutic for 1% of Pax - 120l PBE for each crew member	<i>To be determined on an individual aircraft basis.</i> Max operating altitude is 13,000 ft.

91.541	SSR Transponder and Altitude Reporting Equipment	<i>To be determined on an individual aircraft basis.</i>
91.543	Altitude Alerting Device - Turbojet or Turbofan	N/A – only for turbojet or turbofan powered aircraft.
91.545	Assigned Altitude Indicator	N/A – only for aircraft certificated for IFR flight.
A.15	ELT Installation Requirements	Standard factory installation in RH luggage compartment complies (antenna is behind RH seat.)

Civil Aviation Rules Part 135

Subpart F – Instrument and Equipment Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
135.355	Seating and Restraints – Shoulder harness for flight-crew seats	CS §27.785
135.357	Additional Instruments (Powerplant and Propeller)	CS §27.1305
135.359	Night Flight	Landing light, Pax compartment Available with factory Night VFR modifications.
135.361	IFR Operations	Speed, Alt, spare bulbs/fuses N/A - Certificated for Day and Night VFR operations only
135.363	Emergency Equipment (Part 91.523 (a) and (b))	<i>To be determined on an individual aircraft basis</i>
135.367	Cockpit Voice Recorder	N/A – only for 2-crew helicopters with more than 10 pax
135.369	Flight Data Recorder	N/A – only for aircraft with more than 10 passenger seats
135.371	Additional Attitude Indicator	N/A – only for turbojet or turbofan powered aircraft.

Attachments

The following documents form attachments to this report:

- Three-view drawing Guimbal Cabri G2
- Copy of EASA Type Certificate Data Sheet R.145

Sign off

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Peter Gill
Airworthiness Engineer

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Checked – David Selby
Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
Cabri G2	Pacific Aircraft Services Ltd	11/21B/20	22 June 2011