

---

# **Type Acceptance Report**

**TAR 17/21B/11**

**BELL 505 JET RANGER X**



## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b>	<b>1</b>
<b>1. INTRODUCTION</b>	<b>1</b>
<b>2. AIRCRAFT CERTIFICATION DETAILS</b>	<b>1</b>
<b>3. APPLICATION DETAILS AND BACKGROUND INFORMATION</b>	<b>2</b>
<b>4. NZCAR §21.43 DATA REQUIREMENTS</b>	<b>4</b>
<b>5. NEW ZEALAND OPERATIONAL RULE REQUIREMENTS</b>	<b>5</b>
<b>ATTACHMENTS</b>	<b>7</b>
<b>APPENDIX 1</b>	<b>7</b>



## Executive Summary

New Zealand Type Acceptance has been granted to the Bell Model 505 based on validation of Transport Canada Type Certificate number H-112. 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 §21.191, 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).

NOTE: The information in this report was correct as at the date of issue. The report is generally 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 revision of the State-of-Design Type Certificate Data Sheet referenced herein.

## 1. Introduction

This report details the basis on which Type Acceptance Certificate No. 17/21B/11 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; 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.

## 2. Aircraft Certification Details

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

Manufacturer: Bell Helicopter Textron Canada Limited  
Type Certificate: H-112  
Issued by: Transport Canada  
Production Approval: Certificate of Approval 1-86

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

(i) **Model:** 505  
MCTOW: 1669.2 kg [3680 lb.]  
Max. No. of Seats: 5  
Noise Standard: ICAO Annex 16, Vol. 1, 5th Ed., Amendment 10 (Stage 3)  
**Engine:** Safran Arrius 2R  
Type Certificate: E.031  
Issued by: European Aviation Safety Agency

### 3. Application Details and Background Information

The application for New Zealand type acceptance of the Bell Model 505 was from the type certificate holder, dated 10 January 2017. The first-of-type example is scheduled for delivery in the third quarter of 2017. The Bell 505 is a five-seat single turbine powered light helicopter with a semi-rigid underslung teetering rotor system.

Type Acceptance Certificate No. 17/21B/11 was granted on 23 June 2017 to the Bell 505 based on validation of Transport Canada Type Certificate H-112. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The Bell 505 helicopter is a new design developed using as much as possible of the Model 206L-4 dynamic components, including the 2-bladed main and tail rotor hubs and blades, main transmission, tail rotor gearbox and drive shafts, combined with a new fuselage. The latter uses mostly conventional metallic materials with some composite materials for the mid and aft-skins, nose cone, cabin roof sandwich panel, and sidebody primary structure. A welded steel tubular structure (truss) is used for the aft fuselage. Power is from a single Arrius 2R turbine engine using dual FADEC with automatic back-up controller. The 505 has a fully integrated glass cockpit based on the Model 407GX Garmin G1000H system, in this case using a single GIA 63H avionics unit with single channel electrical architecture.

#### *Supplemental Type Certificates:*

The certification basis under the State-of-Design Transport Canada Type Certificate H-112 and the FAA Type Certificate R00008RD are essentially the same. Bell has confirmed that the approved type design is identical under both type certificates. Therefore in accordance with CAR §21.503(a) FAA STC's approved for the Bell 505 are acceptable technical data for embodiment on New Zealand registered Bell 505 aircraft.

#### 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:

Transport Canada Type Certificate Number H-112

TC Type Certificate Data Sheet number H-112 at Issue 1 dated December 19, 2016  
– Model 505 approved December 19, 2016

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the Model 505 is Transport Canada Airworthiness Manual (AWM) Chapter 527 *Normal Category Rotorcraft* at Change 527-11 published July 31, 2014 (equivalent to FAR Part 27 Amendment 27-0 through 27-47). This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, as FAR 27 is the basic standard for Normal Category Rotorcraft called up under Part 21 Appendix C. One Special Condition was applied and three Findings of Equivalent Safety were made. These were 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.

(ii) *Special Conditions:*

SCA 2015-09 Rechargeable Lithium Batteries – TC Issue Paper L-02 – The Model 505 uses a lithium-ion main battery and also as a back-up battery in the standby instrument. Because of their characteristics and history Transport Canada set additional airworthiness requirements; including safe cell temperatures and pressures must be maintained during any probable overcharging or overdischarging; no emission of any toxic or explosive gases; retention of any corrosive fluids or gases; automatic control of the charging rate; battery sensing and warning systems; and specific maintenance and inspections criteria in the ICA. Interpretative material and MOC is contained in Appendix A, based on AC20-184. Compliance was demonstrated using DO-311 and DO-347 testing.

(iii) *Equivalent Level of Safety Findings:*

AWM §527.307(b)(5), §527.723, §527.725, §527.727 Landing Gear Limit Drop Test – TC Issue Paper S-01 – Bell has had analytical methods to model landing gear behaviour validated as an acceptable means of compliance for simple skid type gear in lieu of drop tests.

AWM §527.1545(b)(2) Airspeed Indicator Markings of  $V_{NE}$  (Autorotation) – TC Issue Paper F-01 – The power off  $V_{NE}$  is not displayed as a red cross-hatch, as prescribed in the Rule. Bell contended an electronic display offers advantages in presentation and readability, and can also be calculated based on temperature and pressure without the pilot needing to refer to a chart. Equivalence was accepted based on a display which is intuitive and easy-to-read in all conditions, and is an improvement over conventional mechanical gauges.

AWM §527.995(d) Fuel Shut-off Valve Installation – TC Issue Paper M-08 – The Fuel SoV is mounted on the forward firewall but the outlet section protrudes through, which does not strictly comply with AWM §27.995(d). Bell demonstrated equivalent functionality of the SoV in the case of an engine fire through a fireproof test using the guidance material of FAA AC 20-135.

(iv) *Airworthiness Limitations:*

See Chapter 4, Airworthiness Limitations Section of BHT-505-MPI-1



## (3) Aircraft Noise and Engine Emission Standards:

(i) *Environmental Standard:*

Compliance for the Model 505 has been shown against AWM Chapter 516, at Change 516-10; Subchapter A for Aircraft Noise (this refers to ICAO Annex 16, Volume I [this also covers FAR Part 36, including Amendment 36-30]), and Subchapter B for Prevention of Vented Fuel (this refers to ICAO Annex 16, Volume II, Part II).

(ii) *Compliance Listing:*

Bell Report SLS-993-007R – Noise Certification Compliance of the Model 505 Helicopter – Rev.A (See also RFM Section 4.10 Noise Levels.)

<b>Model 505</b> 3680 lb (1669.2 kg)	Takeoff	Flyover	Approach
<b>EPNL NOISE LEVEL:</b>	87.0 EPNdB	84.4 EPNdB	89.7 EPNdB

## (4) Certification Compliance Listing:

Report No. SLS-099-001 – Bell Model 505 Certification Plan – Rev.B

## (5) Flight Manual: Transport Canada Approved Flight Manual Bell 505 Jet Ranger X – Publication BHT-505-FM-1 – CAA Accepted as AIR 3378

## (6) Operating Data for Aircraft and Engine:

(i) *Maintenance Manual:*

Bell 505 Maintenance Manual  
Bell 505 Maintenance Planning Information  
Bell 505 Fault Isolation Manual  
Bell 505 Wiring Diagram Manual

(ii) *Current service Information:*

Bell 505 Alert Service Bulletins  
Bell 505 Operational Safety Notices  
Bell 505 Technical Bulletins  
Bell 505 Information Letters

(iii) *Illustrated Parts Catalogue:*

Bell 505 IPC

Note: All publications except the RFM are in IETM format

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

CAA 2171 form from

Publications are available through the website [www.bellhelicopter.net](http://www.bellhelicopter.net)

## (8) Other information:

Bell 505 Product Specifications – December 2016

Report No.: SLS-905-004 – Design Compliance – Electrical Load Analysis for the Model 505 Production Rotorcraft – Revision C

## 5. New Zealand Operational Rule Compliance

Compliance with the retrospective airworthiness requirements of NZCAR Part 26 has been assessed as they are a prerequisite for the grant of an airworthiness 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 – Agricultural Aircraft only

##### Appendix E – Helicopters

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
E.1	Doors and Exits – Shall be (1) operable from both sides; and (2) unobstructed; and (3) have a secure means of locking that prevents inadvertent opening; and of visually indicating that the door is not fully closed and locked.	FAR §27.783 and FAR §27.807(b)(2) – (1) and (2) Complies by inspection. (iii) Model 505 uses recessed door handles. Locked position is visible to an observer by four closure pins, which can also be used as emergency releases if a cable fails.
E.2.1	Emergency Exit Marking	FAR §27.807(b)(3) and FAR §27.1557(d)

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	FAR §27.785 (4-point restraint fitted to all seats)
91.507	Pax Information Signs – Smoking, safety belts fastened	Not Applicable – 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	FAR § 27.1303(a) Not Applicable FAR § 27.1303(b) FAR § 27.1303(c) FAR § 27.1305(d) FAR § 27.1305(k) FAR § 27.1305(h)
91.511 Night	(1) Turn and Slip (2) Position Lights	Fitted in G1000H Fitted as Standard *
	* The Model 505 has been type certificated for Day and Night VFR Operations	
91.513	VFR Communication Equipment	GIA63H NAV/COM/GPS fitted as standard on G1000H
91.517	IFR Instruments and Equipment	Not Applicable – 505 approved for VFR operations only
91.519	IFR Communication and Navigation Equipment	Not Applicable – 505 approved for VFR operations only
91.523	Emergency Equipment: (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	Not Applicable – Less than 10 passengers Not Applicable – Less than 10 passengers Not Applicable – Less than 20 passengers Not Applicable – Less than 61 passengers
91.529	ELT – TSO C126 406 MHz after 22/11/2007	<b>Operational Requirement – Compliance as applicable</b>
91.531	Oxygen Indicators – Volume/Pressure/Delivery	<b>Operational Requirement – Compliance as applicable</b>
91.533	Oxygen for non-Pressurised Aircraft: >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	Not fitted as standard. Maximum operating altitude is 20,000 feet H <sub>p</sub> (6096 m).
91.541	SSR Transponder and Altitude Reporting Equipment	GTX33H ES Transponder integrated with G1000H
91.543	Altitude Alerting Device – Turbojet or Turbofan	Not Applicable – Not turbo jet or turbofan powered
91.545	Assigned Altitude Indicator	Not Applicable – 505 approved for VFR operations only
A.15	ELT Installation Requirements	<i>To be determined on an individual aircraft basis</i>

## Civil Aviation Rules Part 135

### Subpart F – Instrument and Equipment Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
135.355	Seating and Restraints – Shoulder harness flight-crew seats	FAR §27.785 (4-point restraint fitted to all seats)
135.357	Additional Instruments (Powerplant and Propeller)	FAR §27.1305
135.359	Night Flight	Landing light, Pax compartment
135.361	IFR Operations	Speed, Alt, spare bulbs/fuses
135.363	Emergency Equipment (Part 91.523 (a) and (b))	Fitted as Standard *
135.367	Cockpit Voice Recorder	Not Applicable – 505 approved for VFR operations only
135.369	Flight Data Recorder	Not Applicable – Less than 10 passenger seats
135.371	Additional Attitude Indicator	Not Applicable – Not turbo jet or turbofan powered

NOTES: 1. A Design Rule reference in the Means of Compliance column indicates the Design Rule was directly equivalent to the CAR requirement, and compliance is achieved for the basic aircraft type design by certification against the original Design Rule.

2. The CAR Compliance Tables above were correct at the time of issue of the Type Acceptance Report. The Rules may have changed since that date and should be checked individually.

3. Some means of compliance above are specific to a particular model/configuration. Compliance with Part 91/119 operating requirements should be checked in each case, particularly oxygen system capacity and emergency equipment.

## Attachments

The following documents form attachments to this report:

Three-view line drawing of the Bell Model 505 helicopter  
Copy of Transport Canada Type Certificate Data Sheet Number H-112

## Sign off

.....  
David Gill  
Team Leader Airworthiness

.....  
Alessio Caldara  
Airworthiness Engineer Avionics

## Appendix 1

### List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
505	Bell Helicopter Textron Canada Ltd	17/21B/11	23 June 2017