
Type Acceptance Report

TAR 96/11 – Revision 2

Bell 206/407 Series

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Executive Summary

New Zealand Type Acceptance has been granted to the Bell 206/407 Series helicopter based on validation of Transport Canada Type Certificate number H-92. 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).

1. Introduction

This report details the basis on which Type Acceptance Certificate No. 96/11 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.

The report also notes the status of all models included under the foreign type certificate which have been granted type acceptance in New Zealand. Models covered by the type acceptance certificate issued under Part 21B are listed in Section 2 of this report. Models which were accepted prior to that under NZCAR Section B.9 are listed in Appendix 1.

2. ICAO Type Certificate Details

Manufacturer:	Bell Helicopter Textron Canada Limited
Type Certificate:	H-92
Issued by:	Transport Canada
Model:	206L-4
MCTOW	4450 lb. (2018 kg.) Internal Loading 4550 lb. (2064 kg.) External Loading
Max. No. of Seats:	7
Noise Standard:	FAR 36 at Amendment 36-14, Subpart H

Engine: Rolls Royce 250-C30P with Bendix Fuel Control DP-VI
Type Certificate: E1GL
Issued by: Federal Aviation Administration

Model: 407

MCTOW 5000 lb. (2268 kg.) Internal Loading
5250 lb. (2381 kg.) (with High Gross Weight Kit 407-706-020)
5500 lb. (2495 kg.) External Loading

Max. No. of Seats: 7

Noise Standard: FAR 36 at Amendment 36-20 (ICAO Annex 16 Chapter II)

Engine: Rolls Royce 250-C47B with Chandler Evans EC-135 (FADEC)
Type Certificate: E1GL
Issued by: Federal Aviation Administration

3. Type Acceptance Details

The application for New Zealand type acceptance of the Bell Model 407 was from the manufacturer, Bell Helicopter Textron Canada, by 24021/02 dated 5 October, 1996. The first-of-type example was serial number 53100 registered ZK-HXW. The Bell 206B/L Series is a single turbine-powered light 5-7 seat helicopter with two-blade teetering main rotors and conventional tail rotor. The Model 407 is similar with a 4-blade main rotor.

Type Acceptance Certificate No.96/11 was granted on 19 March, 1997 to the Bell Model 407 based on validation of Transport Canada Type Certificate H-92, and includes the Allison 250-C47B engine based on FAA Type Certificate E1GL. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

This report was raised to Revision 1 to include the Model 407 with the Garmin G1000H integrated avionics upgrade, which is known commercially as the 407GX. The application was from the manufacturer, and type acceptance was granted on 24 July 2012.

Revision 2 added the Model 206L-4, after application from the importer Helicopters Otago Limited. The first-of-type example was serial number 52301 registered as ZK-IWY. Type Acceptance was granted on 4 October 2012.

The Model 206A with the 317 shp 250-C18 engine and MAUW 3000 lb was a commercial development of the military prototype OH-4, which was Bell's entry in the US Army LOH competition. It was subsequently upgraded into the 206B JetRanger II by the installation of the 250-C20 engine with MAUW increased to 3200 lb. The 206B with the 250-C20B or 250-C20J engine is known as the JetRanger III. The 206A can be converted to a 206B in accordance with Bell Service Instruction 206-80. A JetRanger II can be converted into a JetRanger III by modification as prescribed by Service Instruction 206-112.

A stretched version of the JetRanger III was introduced as the Model 206L LongRanger with MAUW 4000 lb and engine rating increased to 420 shp. It was developed into the 206L-1 with MAUW 4050 lb by installation of the 435 shp 250-C28B engine. The 206L-3 was very similar except for the change to the 250-C30P engine. The 206L-4 was a further development through a 55 shp increase in the 5 minute takeoff engine rating with a 300 lb MAUW increase. The 206L-1 and 206L-3 can be modified into the 206L-4 configuration [to be known as the 206-L1+ and 206-L3+] in accordance with Bell Kit 206-706-530.

The Model 407 is a development of the Model 206L-4 with the OH-58D four-bladed all-composite rotor and transmission system, widened and strengthened fuselage to increase the MAUW to 5000 lb, installation of the 250-C47B with 27% more power and FADEC and various other improvements to systems and empennage control surfaces.

The Bell 206B/L Series were originally approved under FAA Type Certificate number H2SW. Helicopter production was transferred to Bell Helicopter Textron of Canada in 1986 and full State-of-Design responsibility re-assigned under Canadian Type Approval number H-92 as of September 14, 1995.

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) Type certificate:

Transport Canada Type Approval Certificate Number H-92 dated August 21, 1996

TC Type Certificate Data Sheet number H-92 at Issue 25 dated March 7, 2012

- Model 206A FAA approved October 20, 1966
- Model 206B FAA approved August 19, 1971
- Model 206L FAA approved September 22, 1975
- Model 206L-1 FAA approved May 17, 1978
- Model 206L-3 FAA approved December 10, 1981
- Model 206L-4 FAA approved October 2, 1992
- Model 407 approved February 9, 1996

FAA Type Certificate No. E1GL dated January 19, 1996

FAA Type Certificate Data Sheet No. E1GL at Rev. 12 dated February 22, 1996

- Model 250-C47B approved January 19, 1966

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the Bell Model 206A/B/L (up to 206L-3) Series is CAR 6 dated December 20, 1956, including Amendments 6-1 through 6-4, plus paragraphs 6.307(b) and 6.637 were at Amendment 6-5, and Special Conditions. Additional requirements were specified for Water/Alcohol Power Augmentation and IFR Instrument Flight, and one exemption was granted. For the 206L-4 the certification basis was completely revised to FAR Part 27 dated October 2, 1964 including Amendments 27-1 through 27-24, with some paragraphs at different amendment dates and some exceptions, as noted on the TCDS.

For the Model 407 the certification basis was updated to FAR Part 27 including Amendments 27-1 through 27-30, again with some sections being assessed at an earlier amendment state. (See the TCDS for details.) Compliance has also been shown with specified paragraphs of the Canadian Airworthiness Manual, as at Change No.527-3 dated January 3, 1994. (International Certification Procedures Task Force [ICPTF] guidelines were used in establishing the certification basis.).

For the 407 with the G1000H Integrated Avionics System (“407GX”) the certification basis was updated again to FAR 27 including up to Amendment 27-44, with exceptions for the ultimate inertial load factors, plus Canadian Airworthiness Manual at Change 527-8 dated June 30, 2009.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1A, as FAR 27 (and the predecessor design standard CAR 6) 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:*

Model 407:

SCA 95-2 High Intensity Radiated Fields (HIRF) – The FADEC system had to be shown to be not adversely affected when the rotorcraft was exposed to external HIRF as defined.

SCA 95-3 Lightning Protection – FADEC system critical functions had to be shown to be not adversely affected or able to be recovered in a timely manner when exposed to lightning.

(iii) *Equivalent Level of Safety Findings:*

Models 206L-4 and 407:

FAR §27.307(b)(5), §27.723, §27.725, §27.727 Skid Landing Gear (Drop Test) – A technical analysis was accepted as a means to show compliance, based on Bell's demonstration that their analytical techniques predicted with reasonable accuracy the results to be expected from drop tests. This was previously allowed for the 222, but each case is considered separately.

Model 206L-4:

FAR §27.965 Fuel Tanks (Drop Test) – In lieu of a pressure test to at least 2.0 psi the FAA accepted the use of the fuel tank drop test per MIL-T-27422B on the grounds that the internal tank pressures during the drop test exceeded the minimum pressure requirement.

Model 407:

FAR §27.952 for the Forward Fuel Tank Drop Test – Issue Paper 407/MS-1 – During drop testing the lower fuel pump casting failed. Approval based on post test failure analysis and a redesign of the failed parts. (Originally an off-the-shelf item not designed for crashworthiness).

FAR §27.952 for the Aft Fuel Tank Drop Test – Issue Paper 407/MS-2 – Compliance shown by analysis of new parts installed, combined with the results from previous tests and demonstration of similarity to the previously tested 206L-4 aft fuel cell.

FAR §27.965(c)(1) and (2) – Fuel Tank Pressure Test – AW 95-1978 – Pressure tests under this paragraph were not required on the basis pressure exerted on the fuel tank surfaces during the §27.952(a) drop tests exceeded the loads required under subsection §27.965(C)(2).

FAR §27.1305(p) – Engine Anti-Ice Annunciation – Issue Paper 407/FT-4 – None are fitted because operation can be determined by monitoring the MGT.

Model “407GX”:

FAR §27.1545(b)(2) Airspeed Indicator Markings for V_{NE} (Power Off) – Issue Paper F-01 – Power-Off V_{NE} is lower than the Power-On V_{NE} , but is not shown with a red cross-hatched radial line. It is displayed as a red line overlaid on the ASI tape, and varies with conditions.

(iv) *Airworthiness Limitations:*

See the Aircraft Maintenance Manual Chapter 4.

(3) Aircraft Noise and Engine Emission Standards:

(i) *Environmental Standard:*

The Model 206L-4 has been certificated under US 14 CFR 36 Section H paragraph 36.305(a)(2) and ICAO Annex 16 Vol. 1 Part II, Chapter 8, Section 8.4.1.

The Model 407 has been certificated under FAR Part 36, including Amendments 36-1 through 36-20, and AM Chapter 516 (equivalent to ICAO Annex 16, Chp II).

(ii) *Compliance Listing:*

Bell Report 206-100-334 Volume 1 Noise Certification Compliance Bell 206L-4
FAR 36 Noise Level Results for a MCTOW of 4450 lb.

Takeoff: 88.4 EPNdB Overflight: 85.2 EPNdB Approach: 90.7 EPNdB

Bell Report 407-099-020 Noise Compliance Test Plan of the Model 407 Helicopter
Bell Report 407-099-021 Noise Certification Compliance of Model 407 Helicopter
Noise Levels for FAR Part 36 Appendix J: Flyover 85.1 dBA SEL

(4) Certification Compliance Listing:

FAA Compliance Checklist for Bell Helicopter Textron Model 206L-4

Bell Report 407-099-029 Model 407 General Compliance Program – Rev.A

Bell Report 407-099-235 Model 407 Glass Cockpit Certification Plan – Rev.D

(5) Flight Manual:

Canadian Department of Transport-Approved Rotorcraft Flight Manual Bell Model
407 (serial numbers 53000 through 54299), Document Number BHT-407-FM-1 –
CAA Accepted as AIR 2571

Canadian Department of Transport-Approved Rotorcraft Flight Manual Bell Model
407GX (serial numbers 54300 and subsequent), Document No. BHT-407-FM-2 –
CAA Accepted as AIR 3220

Canadian Department of Transport-Approved Rotorcraft Flight Manual Bell Model
206L-4, Document Number BHT-206L4-FM-1 – CAA Accepted as AIR 3234

(6) Operating Data for Aircraft and engine:

(i) *Maintenance Manual:*

Bell 206L-4 Maintenance Manual Document Number BHT-206L4-MM

Bell 407 Maintenance Manual Document Number BHT-407-MM

Allison 250-C47B Operation and Maintenance Manual – Pub. No. CSP21001

(ii) *Current service Information:*

Bell 206/407 Operations Safety Notices/Information Letters

Bell 206/407 Alert Service Bulletins/Technical Bulletins

Allison 250-C47 Commercial Engine Bulletins – Ref. CSL250C47

Allison 250-C47B Commercial Service Letters – Ref. CEB250C47

(iii) *Illustrated Parts Catalogue:*

Bell 206L Series Illustrated Parts Breakdown Document No. BHT-206L-IPB

Bell 407 Illustrated Parts Breakdown Manual Document No. BHT-407-IPB

Allison 250-C40B, C47B Illustrated Parts Catalog – Pub No. CSP23001

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

CAA 2171 form from A.K. Nassim, Manager Airworthiness dated 5-10-96
Bell publications are now provided at www.bellhelicopter.net website

Fax from F.X.McDonald, Allison Product Airworthiness dated 2 December 1996

(8) Other information:

Bell Report 407-099-200 Model 407 Helicopter Description – Rev.A 96-02-15

Bell 407 Rotorcraft Manufacturer's Data – Document No. BHT-407-MD-1

Bell Report 206-100-201 Electrical Load Analysis for Model 206L-3 Helicopters
S/N 51350 & Sub and Model 206L-4 Helicopters S/N 52001 & Sub

5. Additional New Zealand Requirements

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	Certification to Internationally recognized helicopter design standards, and forty years satisfactory service experience, is accepted as providing an equivalent level of safety.
E.2.1	Emergency Exit Marking	FAR §27.807(b)(3)

Compliance with the following additional NZ operating requirements has been reviewed (for the Model 407) 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
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) N/A – No Mach limitations FAR § 27.1303(b) FAR § 27.1303(c) FAR § 27.1305(d) FAR § 27.1305(k) FAR § 27.1305(h)
		(8) Coolant Temp (9) Oil Temperature (10) Manifold Pressure (11) Cylinder Head Temp. (12) Flap Position (13) U/c Position (14) Ammeter/Voltmeter
		N/A – Turbine engine FAR § 27.1305(j) N/A – Turbine engine N/A – Turbine engine N/A – Helicopter N/A – Fixed undercarriage FAR § 27.1351(d)
91.511	Night VFR Instruments & Equipment	<i>Operational Requirement – Compliance as applicable</i>
91.513	VFR Communication Equipment	<i>Operational Requirement – Compliance as applicable</i>
91.517	IFR Instruments and Equipment	Not Applicable – Not approved for IFR operations
91.519	IFR Communication and Navigation Equipment	Not Applicable – Not approved for IFR operations
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	<i>Operational Requirement – Compliance as applicable</i>
91.531	Oxygen Indicators - Volume/Pressure/Delivery	<i>Operational Requirement – Compliance as applicable</i>
91.533	Oxygen for Non-pressurised aircraft	<i>Operational Requirement – Compliance as applicable</i>
91.541	SSR Transponder and Altitude Reporting Equipment	<i>Operational Requirement – Compliance as applicable</i>
91.543	Altitude Alerting Device - Turbojet or Turbofan	Not Applicable – Not turbojet or turbofan.
91.545	Assigned Altitude Indicator	Not Applicable – Not approved for IFR operations
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
135.357	Additional Instruments (Powerplant and Propeller)	FAR §27.1305
135.359	Night Flight	<i>Operational Requirement – Compliance as applicable</i>
	Landing light, Pax compartment	
135.361	IFR Operations	<i>Operational Requirement – Compliance as applicable</i>
	Speed, Alt, spare bulbs/fuses	
135.363	Emergency Equipment (Part 91.523 (a) and (b))	<i>Operational Requirement – Compliance as applicable</i>
135.367	Cockpit Voice Recorder	N/A – Only for 2-crew helicopters with more than 10 pax
135.369	Flight Data Recorder	Not Applicable – Less than 10 passenger seats

Attachments

The following documents form attachments to this report:

- Three-view drawing Bell Helicopter Textron Model 407
- Three-view drawing Bell Model 206L-4 LongRanger IV
- Copy of Transport Canada Type Certificate Data Sheet Number H-92

Sign off

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 David Gill
 Team Leader Airworthiness

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 Checked – Greg Baum
 Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
206A, 206B	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
206L, 206L-1, 206L-3	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
407	Bell Helicopter Textron	97/21B/7	19 March 1997
407GX (s/n 54300 and on)	Bell Helicopter Textron	12/21B/21	24 July 2012
206L-4	Helicopters Otago Limited	13/21B/7	4 October 2012