
Type Acceptance Report

TAR 99/21B/25 – Revision 2

BELL 212/412 Series

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Executive Summary

New Zealand Type Acceptance has been granted to the Bell Model 212/412 Series based on validation of FAA Type Certificate number H4SW. 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. 99/21B/25 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
	Bell Helicopter Textron Canada Limited
	(212 s/n 35001 and 412 s/n 36001 on)
Type Certificate:	H4SW
Issued by:	Federal Aviation Administration

Model: 212

MCTOW: 11,200 lb. [5080 kg]

Max. No. of Seats: 15

Noise Standard: Not Applicable

Engine: PT6T-3, -3B

Type Certificate: E-10

Issued by: Transport Canada

Model: 412

MCTOW: 11,600 lb. [5252 kg] (412 s/n 33001 thru 33107)
11,900 lb. [5398 kg] (412 s/n 33108–33213, 36001–36086)

Max. No. of Seats: 15

Noise Standard: FAR 36, Subpart H, Amendment 36-14 (Stage 2)

Engine: PT6T-3B, -3BE, -3D, -3BF or -3BG

Type Certificate: E-10

Issued by: Transport Canada

Model: 412EP

MCTOW: 11,900 lb. [5398 kg]

Max. No. of Seats: 15

Noise Standard: FAR 36, Subpart H, Amendment 36-14 (Stage 2)

Engine: PT6T-3D, -3DE or -3DF

Type Certificate: E-10

Issued by: Transport Canada

3. Type Acceptance Details

The application for New Zealand type acceptance of the 412SP was from Helicopters (NZ) Ltd (Client no.12984) by 24021/02 dated 21 December 1998. The first-of-type example was serial no. 33204, registered ZK-HNI. The Bell 212/412 is a large 15-seat twin-engined Category A helicopter. (The Model 212 was accepted under NZCAR Section B.8 in 1975, and included the PT6T Series engine based on Transport Canada Type Certificate E-10).

Type Acceptance Certificate No. 99/21B/25 was granted on 20 January 1999 to the Bell Model 412 based on validation of FAA Type Certificate H4SW. Specific serial number 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 Bell Model 412EP under CAA Work Request 5/21B/8. The applicant was Helicopters (NZ) Ltd. Type acceptance was granted on 22 September 2004. The first-of-type example was s/n 36099 registered ZK-HDY.

Revision 2 of this report was issued to add the later 412 serial number range, marketed as the “412HP”, after application by the importer, Oceania Aviation Ltd. The first-of-type was serial no.36055 registered ZK-IKA. Type acceptance was granted on 20 March 2015.

The Model 212 is basically a twin-engined version of the Model 205 UH-1H Iroquois. It was originally developed for the Canadian military and subsequently civil certified and approved for IFR operations. The Model 412 is the same as the 212 except for the use of a new four-bladed rotor system. The metal rotor-head has elastomeric bearings and dampers.

There are two commercial variants of the 412 which are not reflected as different models on the TCDS. The 412SP “Special Performance” version is the marketing name for serial numbers 33108 thru 33213 and 36001 thru 36019, which have a higher maximum weight and increased fuel capacity. The 412HP is the marketing name for serial numbers 36020 thru 36086 with the –3BE engine. Other changes were an improved transmission and pilot controlled engine trim, which resulted in increased horsepower available for hover and climb. The 412EP is a product improvement of the 412HP fitted with the -3D engine. This has increased OEI capability resulting in improved Category A performance, and is fitted with the Honeywell SPZ-7600 3-axis Dual Digital Automatic Flight Control System instead of the previous analog 3-axis gyro system.

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:

FAA Type Certificate Number H4SW

FAA Type Certificate Data Sheet number H4SW at Revision 29 dated Dec 8, 2014

- Model 212 approved 30 October 1970
- Model 412 approved 9 January 1981
- Model 412EP approved 23 June 1994

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the Model 212 is FAR Part 29 dated 1 February 1965, Amend 29-1 and 29-2; FAR 29.473, 29.501, 29.663, 29.771, 29.903(c), 29.1323, 29.1505(b) of Amend 29-3; Special Conditions No 29-12-SW-1; and “Guidelines For Helicopter Certification Using Vertical Takeoff Techniques From Ground Level and Elevated Heliports” vertical takeoff criteria transmitted to Bell by FAA SW-210 letter dated 3 February 1971. IFR Instrument Requirements for Bell Model 212 helicopters transmitted by SW-210 (SW-216 letter dated 1 July, 1970). Ditching: FAR 29.801 including FAR 29.1411 and 29.1415.

For the Model 412 Special Conditions No. 29-12-SW-1 was raised to Amend 1 and IFR standards were revised dated December 15, 1978. Two Exemptions were granted by the FAA, which have been reviewed and accepted by the CAA. The 412 complied with Category A engine isolation requirements.

This certification basis was carried over to the Model 412EP, except that various paragraphs of FAR Part 29 were assessed against a later Amendment status, as detailed on the TCDS, plus Special Conditions.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, as FAR 29 is the basic standard for Transport Category Rotorcraft 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:*

Models 212/412/412EP:

Special Conditions No.29-12-SW-1– Additional requirements were imposed on the Model 212 based on later FAR 29 Amendment provisions. Amendment 1 for the Model 412 added new provisions for a takeoff power check procedure; engine failure warning system; fatigue evaluation of revised flight structure; and new Maintenance Manual critical components replacement times.

Model 412EP:

Special Conditions No.29-ASW-5 – For the search and rescue (SAR) configuration the 412 is fitted with a dual 4-axis automatic flight control system (AFCS), an integrated flight display system (IFDS) and additional navigation systems. This SC required protection for electrical/electronic systems which perform critical functions from exposure to high intensity radiated fields (HIRF).

(iii) Equivalent Level of Safety Findings:

Models 212/412/412EP:

FAR §29.501(e) One-skid landing loads in the level attitude – Bell had never static tested or analysed the gear support structure for this condition. An ELOS was granted to cover this oversight based on service history of no failures, incidents or accidents due to one skid landings.

(iv) Exemptions:

Models 412/412EP:

Exemption No. 3100 against FAR 29.1323(c) – The FAA allowed both an increase in the calibration error of the airspeed indicating (ASI) system for defined speed ranges and a change in the level flight speed at which the maximum error must be achieved. Bell contended that it is virtually impossible to achieve the current required accuracy because of the complicated interaction between rotor downwash velocity and low aircraft airspeed. Further such accuracies are not needed for safety at those speeds, and it is more important that the speed indications are readable and repeatable.

Exemption No. 5985 against FAR §29.1303(g)(1) – This requires a standby (third) attitude indicator useable through $\pm 80^\circ$ of pitch. A dispensation was given on the basis that pitch angles greater than $\pm 60^\circ$ were highly unlikely and prohibited by the approved operating limitations.

(v) Airworthiness Limitations:

See the FAA-Approved Chapter 4 “Airworthiness Limitations Schedule” of the applicable Maintenance Manual.

(3) Aircraft Noise and Engine Emission Standards:

(i) Environmental Standard:

The Models 412 and 412EP have been certificated for noise under FAR Part 36, including Amendments 36-1 through 36-14.

(ii) Compliance Listing:

Bell Report 412-099-094 Volume 1 – June 1991 – Noise Certification Compliance of the Model 412 Helicopter. (See also RFM Section 4.10 or 4.11 Noise Levels.)

<i>Model:</i>	<i>MCTOW:</i>	<i>Effective Perceived Certified Noise Levels:</i>		
		<i>Takeoff:</i>	<i>Flyover:</i>	<i>Approach:</i>
Bell “412SP”	11,900 lb	93.2 EPNdB	93.4 EPNdB	95.6 EPNdB
Bell “412HP”	11,900 lb	92.8 EPNdB	93.4 EPNdB	95.6 EPNdB
Bell 412EP	11,900 lb	92.8 EPNdB	93.4 EPNdB	95.6 EPNdB

(4) Certification Compliance Listing:

List “Model 212 Certification Program Reports”

Bell Report 212-099-004 – Basic Design Loads Model 212 Helicopter

Bell Report 212-099-005 – Structural Analysis of Model 212 Components Different from Model 205A (various volumes)

Bell Report 212-099-018 – Fatigue Life Substantiation of Dynamic Components

Bell Report 212-099-052 – Summary Flight Test Report Model 212 Helicopter

Bell Report 212-099-052 Addendum IV – Type Inspection Report

Bell Report 212-099-151 – Drive Train Vibration Survey of Model 212

Bell Report 212-099-343 – Electrical Load Analysis (s/n 30680 subq in std. config.)

Rpt 212-099-453 – Bell 212 Automatic Flight Control System Reliability Analysis

Bell Helicopter Textron – Model 412 Compliance Checklist 12-18-80

FAA Compliance Checklist for BHT Model 412 with PT6T-3D Engine – FAA Project Number SW-170-776 – dated 26 August 1993

Bell Model 412EP Compliance Checklist for Electrical/Electronic Installations – FAA Project Number SW-170-915 – dated 31 August 1994

Compliance Checklist Model 412 Cockpit Voice Recorder/Flight Data Recorder – FAA Project Number SW-170-546 – Rev.A dated September 1994

FAA Compliance Checklist Model 412 Dual Digital AFCS/SAR “Auto Approach to Hover” – FAA Project Number SW-170-553 – dated 22 September 1994

(5) Flight Manual:

Bell 212 FAA-Approved Rotorcraft Flight Manual – Pub. BHT-212VFR-FM-1 (Applicable to VFR Configuration) – CAA Approved as AIR 2247

Bell 212 FAA-Approved Rotorcraft Flight Manual – Pub. BHT-212IFR-FM-1 (Applicable to IFR Configuration) – CAA Approved as AIR 2136

Bell 412 FAA-Approved Rotorcraft Flight Manual – Publication BHT-412-FM-1 (Applicable to s/n 33001-33107) – CAA Accepted as AIR 2796

Bell 412 FAA-Approved Rotorcraft Flight Manual – Publication BHT-412-FM-2 (Applicable to s/n 33108-33213, 36001-36019) – CAA Accepted as AIR 2647

Bell 412EP FAA-Approved Rotorcraft Flight Manual – Publication BHT-412-FM-4 (s/n BHT 36087 and subsequent) – CAA Accepted as AIR 2876

Bell 412 FAA-Approved Rotorcraft Flight Manual – Publication BHT-412-FM-3 (Applicable to s/n 36020-36086, and 412SP to HP Upgrade helicopters (412SP to HP Upgrade kit 412-704-052 installed per BHT-412-SI-74 or helicopters modified in accordance with 412-570-001-103)) – CAA Accepted as AIR 3307

(6) Operating Data for Aircraft and Engine:

(i) *Maintenance Manual:*

Bell 212 Maintenance Manual – Publication BHT-212-MM-1

Bell 412 Maintenance Manual – Publication BHT-412-MM-1

Bell 412 Component Overhaul Manual – Publication BHT-412-CR&O-1

(ii) *Current service Information:*

Bell 212 and 412 Alert Service Bulletins / Bell 212 and 412 Technical Bulletins
Bell 412 Operator Service Notices / Bell 412 Information Leaflets

(iii) *Illustrated Parts Catalogue:*

Bell 212 IPB – Publication BHT-212-IPB-1
Bell 412 IPB – Publication BHT-412-IPB-1

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

Letter from Giffen A. Marr, Chief, Civil Certification & Regulatory Requirements,
Bell Helicopter Textron, dated December 14 1998 – Reference 81:PBL-15322.

Publications are now available through the website www.bellhelicopter.net

(8) Other information:

FAA MasterMEL for Bell 212, 412 at Revision 5c dated 11/17/93
Derivation of the Bell Model 412EP – dated 01/05/95

Bell Helicopter Report No.412-970-004 – Preliminary Electrical Load Analysis for
Model 412 Helicopter in production FAA/IFR Configuration – dated 10/9/80

Bell Helicopter Spec. No. 412-947-001 – Detail Specification for Model 412
Commercial Helicopter (S/N 33001-33100) – dated 2 September 1981

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	FAR Part 29.783(c) and (e)
E.2.1	Emergency Exit Marking	FAR Part 29.809(c)

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	Shoulder Harness if Aerobatic; >10 pax; Flight Training	Standard fit – See BHT-IPB
91.507	Pax Information Signs – Smoking, safety belts fastened	N/A – Has direct communication with cockpit (See Note 5 of TCDS for a limitation on any partitions or linings).
91.509 Min. VFR	(1) ASI (2) Machmeter (3) Altimeter (4) Magnetic Compass (5) Fuel Contents (6) Engine RPM (7) Oil Pressure	FAR §29.1303(a) N/A – No Mach limitations FAR §29.1303(b) FAR §29.1303(c) FAR §29.1305(a)(3) FAR §29.1305(a)(11) FAR §29.1205(a)(6)
91.511 Night	(1) Turn and Slip (2) Position Lights	(8) Coolant Temp (9) Oil Temperature (10) Manifold Pressure (11) Cylinder Head Temp. (12) Flap Position (13) U/c Position (14) Ammeter/Voltmeter
91.513	VFR Communication Equipment	N/A – Turbine powered. FAR §29.1305(a)(8) N/A – Turbine powered. N/A – Turbine powered. N/A – Not fitted N/A – Fixed undercarriage. FAR §29.1251(b)(6)
91.517 IFR	(1) Gyroscopic AH (2) Gyroscopic DI (3) Gyro Power Supply (4) Sensitive Altimeter	(3) Anti-collision Lights (4) Instrument Lighting
91.519	IFR Communication and Navigation Equipment	<i>Operating Rule – Compliance to be determined by operator</i>
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	(5) OAT (6) Time in hr/min/sec (7) ASI/Heated Pitot (8) Rate of Climb/Descent
91.529	ELT - TSO C126 406 MHz after 22/11/2007	<i>Operating Rule – Compliance to be determined by operator</i>
91.531	Oxygen Indicators - Volume/Pressure/Delivery	<i>Operating Rule – Compliance to be determined by operator</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>Operating Rule – Compliance to be determined by operator</i>
91.541	SSR Transponder and Altitude Reporting Equipment	<i>Operating Rule – Compliance to be determined by operator</i>
91.543	Altitude Alerting Device - Turbojet or Turbofan	Not Applicable – Not turbojet or turbofan powered
91.545	Assigned Altitude Indicator	Not Applicable – Aeroplanes 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 §29.785(b)
135.357	Additional Instruments (Powerplant and Propeller)	FAR §23.1305
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))	Operating Rule – Compliance to be determined by operator
135.367	Cockpit Voice Recorder	See FAA H4SW TCDS Note 28 for production provisions
135.369	Flight Data Recorder	HNZ have had modifications approved to fit FDRs as follows: Mod. TD00802 approved as 4/MOD/17 for ZK-HNI; Mod. 31-31-12 approved as 3/MOD/138 for ZK-HDA Exemption 5/EXE/8 granted to ZK-HDY because of the short-term nature of the contract.
135.371	Additional Attitude Indicator	Not Applicable – Not turbo jet or turbofan powered

Attachments

The following documents form attachments to this report:

- Photographs first-of-type example Bell 412 s/n 33204 ZK-HNI
- Three-view drawing Bell Helicopter Model 412
- Copy of FAA Type Certificate Data Sheet Number H4SW

Sign off

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David Gill
Team Leader Airworthiness

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Checked – Andrea Wadsworth
Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
212	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
412	Helicopters (NZ) Limited	99/21B/25	20 January 1999
(s/n 33108-33213 and 36001-36019 – Commercial Model 412SP)			
412EP	Helicopters (NZ) Limited	5/21B/8	22 September 2004
(s/n 36087-36999)			
412	Oceania Aviation Limited	15/21B/14	20 March 2015
(s/n 36020-36086 – Commercial Model 412HP)			