
Type Acceptance Report

TAR 95/03 – Revision 3

KAWASAKI BK117 Series

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Executive Summary

New Zealand Type Acceptance has been granted to the Kawasaki BK117 Series based on validation of JCAB Type Certificate No. 32. 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 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 State-of-Design Type Certificate Data Sheet.

1. Introduction

This report details the basis on which Type Acceptance Certificate No. 95/03 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 certificated prior to that under NZCAR Section B.9 and are type accepted under the transitional arrangements of Part 21 Appendix A(c) are listed in Appendix 1.

2. Aircraft Certification Details

Manufacturer: Kawasaki Heavy Industries Ltd

Type Certificate: 32

Issued by: Japan Civil Aviation Bureau

Models: BK117 BK117A-3 BK117A-4
MCTOW: 2850 kg [6283 lb] 3200 kg [7055 lb] 3200 kg [7055 lb]
Max. No. of Seats: 8 (2 crew/pax, maximum 6 passengers) standard seats installed
 10 (2 crew/pax, maximum 8 passengers) 8-passenger seats installed
 11 (2 crew/pax, maximum 9 passengers) high-density seats installed

Noise Standard: Not Applicable

Engine: Honeywell LTS101-650B-1
 Type Certificate: E5NE
 Issued by: Federal Aviation Administration

Models: BK117B-1 BK117B-2
MCTOW: 3200 kg [7055 lb] 3350 kg [7385 lb]
Max. No. of Seats: 8 (2 crew/pax, maximum 6 passengers) standard seats installed
 10 (2 crew/pax, maximum 8 passengers) 8-passenger seats installed
 11 (2 crew/pax, maximum 9 passengers) high-density seats installed

Noise Standard: Not Applicable ICAO Annex 16 Vol.1 Chapter 8

Engine: Honeywell LTS101-750B-1
 Type Certificate: E5NE
 Issued by: Federal Aviation Administration

Model: BK117C-1
MCTOW: 3350 kg [7385 lb]
Max. No. of Seats: 8 (2 crew/pax, maximum 6 passengers) standard seats installed
 10 (2 crew/pax, maximum 8 passengers) 8-passenger seats installed
 11 (2 crew/pax, maximum 9 passengers) high-density seats installed

Noise Standard: ICAO Annex 16 Vol.1 Chapter 8

Engine: Turbomeca Arriel 1E2
 Type Certificate: E.073
 Issued by: European Aviation Safety Agency

NOTE: Because the KHI-BK117 Series has a maximum certificated passenger seating configuration of 10 seats or more on the TCDS, under NZCAR §43.54(a)(1)(i) it must be maintained by a Part 145 Maintenance Organisation when the helicopter is operated under a Part 115 or a Part 119 certificate.

3. Application Details and Background Information

The application for type acceptance of the BK117A-3 was from Airwork (NZ) Ltd by letter dated 21 July 1995. The First-of-Type example was serial no. 1002 registered ZK-HAW. The BK117 is a twin-turbine multi-purpose helicopter in the 3-4 tonne class equipped with clam-shell rear loading doors which uses a four-blade hingeless main-rotor system with composite fibre reinforced blades and conventional tail rotor.

Type Acceptance Certificate No. 95/03 was granted on 24 August 2005 to the Kawasaki BK117A-3 based on validation of JCAB Type Certificate 32. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The BK117 Series was first accepted in New Zealand under the provisions of NZCAR B.9 (See TAR 6/92 Issue 2). The first example was a BK117B-1 model, serial number 1077 ZK-HHI in December 1992. The first application for a BK117A-4 model was received on 26 February 1993 from Airwork (NZ) Ltd and the first example, serial no. 1022 ZK-HHV, issued with an airworthiness certificate on 26 March 1993. The first BK117 was serial no. 1003 ZK-HPD in July 1995 and the first BK117B-2 serial no. 1059 registered ZK-HKL.

This report was raised to Revision 1 to update the format and include all the BK117 models previously accepted which had been grandfathered under Part 21 Appendix A. (Page (iii) of TAR No.6/92 states “*Only supply of a flight manual is required to complete acceptance of additional models, other than models subsequent to the BK117B-1.*” However no formal record of Type Acceptance of the BK117B-2 model was documented.) The application was from Helipro and completed under CAA Work Request 14/21B/1.

Revision 2 was issued to include the BK117C-1 version. The application was from the importer, Oceania Aviation Ltd, dated 7 March 2016. The first-of-type example was serial number 1108 registered ZK-IMX. Type acceptance was granted on 11 May 2016.

The report was raised to Revision 3 to revise the operational rule compliance table to clarify requirements and add details after the issue of an exemption.

The BK117 was developed under a joint collaborative effort between MBB of Germany (now part of Eurocopter) and Kawasaki of Japan, resulting in production lines in both countries. The BK117 program replaced the independently developed MBB Bo107 and Kawasaki KH7 design studies. The BK117 retains the former's overall configuration with Eurocopter responsible for the helicopter's rotor system (which uses a scaled up version of the BO105's four blade rigid main rotor), tail unit, hydraulic system and power controls, while Kawasaki has responsibility for the fuselage, transmission and undercarriage. Parts produced by one partner are shipped to the other factory for incorporation in their product, as no major parts are produced by both companies. The Eurocopter and Kawasaki versions are essentially identical, except for minor variations in the electrical system and available options. Eurocopter advises that, technically, parts are interchangeable.

The first production model was the BK117 fitted with LTS 101-650B-1 engines. This was developed into the BK117A-3 with an increased MAUW, and then the BK117A-4 with an increase in engine take-off rating. The BK117B-1 model was fitted with more-powerful LTS101-750B-1 engines, and the BK117B-2 has a further MAUW increase. Models can be converted by incorporation of Service Bulletins. (KSB-117-020A upgrades a BK117 to BK117A-3, while KSB-117-120 converts a BK117B-1 to a BK117B-2.) The BK117C-1 is essentially the same as the B-2 except for the use of Turbomeca Arriel 1E2 engines.

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:

JCAB Type Certificate Reference No. 32-5 issued 22nd April 1992

JCAB Type Certificate Data Sheet number 32 at Revision 5 dated May 27, 2009

- Model BK117 approved December 17, 1982
- Model BK117A-3 approved June 14, 1985
- Model BK117A-4 approved August 29, 1986
- Model BK117B-1 approved March 31, 1988
- Model BK117B-2 approved March 18, 1993
- Model BK117C-1 approved June 8, 1995

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the BK117 Series is stated on the JCAB TCDS as (Japan) Civil Aeronautics Regulations Annex 1 “Technical Standards for Ensuring Safety of Aircraft and Equipment” dated December 28, 1960 with later revisions, plus Part V of the TAIKUSEI-SHINSA-TORYO (JCAB Airworthiness Standards) dated November 11, 1981 (transfer from Part 29 of the Federal Aviation Regulations Amendment 29-1 through 29-16). There were some changes and additions, which increased in number for each successive BK117 model, as detailed on the TCDS.

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:*

JCAB Special Conditions Kawasaki BK117, KU-KEN-39 dated Feb 22, 1982 :

i) Check Procedures (No.1) – A means must be provided to permit the pilot to determine that each engine is capable of developing the power used in establishing the applicable performance data prescribed in paragraph 2-2-2 to 2-2-12 of Part V of the airworthiness Standards Manual.

ii) Engine failure Warning System (No.2) – Unless a clear and prompt indication of engine power loss is provided to the pilot in all flight regimes, an engine failure warning system must be installed to warn the pilot of the failure of an engine and to identify the engine that has failed. The warning must be clear and distinguishable from all other warnings.

iii) Turbine Engine Bleed Air System (No.3) – a) No hazard may result if duct rupture or failure occurs anywhere between the engine port and the aircraft unit served; b) the effect upon helicopter and engine performance of using the maximum bleed air must be detailed in the Flight Manual; c) for engine bleed air used for direct environmental systems no reasonably probable failure of the engine lubrications system may result in hazardous contamination of cabin air systems.

iv) OEI Maximum Continuous Power (MC) (No.4) – For the request of timely unlimited one engine inoperative MCP which is lower than the 30 min. power but higher than the proportional all engines operating MCP, an additional test required each engine in sequence must be inoperative and the remaining engine must be run at this one engine inoperative MCP for a total of at least 25h.

v) Lightning protection of Structure and Occupants (No.5) – a) The helicopter must be protected against catastrophic effects from lightning; b) for metallic components, this must be shown by- 1) bonding the components properly to the airframe; or 2) designing them so that a strike will not endanger the helicopter; c) for non-metallic components, this must be shown by- 1) designing them to minimize the effect of a strike; or 2) incorporating acceptable means of diverting the resulting electrical current so as not to endanger the helicopter; d) practical design precautions must be taken so that the occupants will not be endangered in case of a lightning strike.

JCAB Special Conditions Kawasaki BK117, for IFR and Instrument Flight with 3-axis CSAS, KU-KEN-403 dated September 25, 1984 (Equivalent to FAA Airworthiness Criteria for Helicopter Instrument Flight. dated December 15, 1978.)

Appendix II of the TAIKUSEI-SHINSA-YORYO dated April 17, 1995:

For Transport Category A and B rotorcraft manufactured after April 17, 1995, the seat, safety belt and shoulder harness must be compliant with the following additional requirements.

(1) Each pilot's seat must have a combined safety belt and shoulder harness with a single-point release that allows the pilot, when seated with safety belt and shoulder harness fastened, to perform all of the pilot's necessary functions. There must be a means to secure belts and harnesses, when not in use, to prevent interference with the operation of the rotorcraft and with rapid egress in an emergency.

(2) Each occupant must be protected from serious head injury by a safety belt plus a shoulder harness that will prevent the head from contacting any injurious object.

(3) The safety belt and shoulder harness must be compliant with the requirements of static and dynamic strength, which are specified in the applicable rotorcraft certification basis.

(iii) *Equivalent Level of Safety Findings:*

Nil

(iv) *Airworthiness Limitations:*

See Airworthiness Limitations section in Appendix A of the Maintenance Manual

(3) Aircraft Noise and Engine Emission Standards:

(i) *Environmental Standard:*

The BK117 Series has been certificated under Japan CAR Annex 3 Chapter 1 (equivalent to ICAO Annex 16 Volume 2 Part 2) for fuel venting requirements.

The BK117B-2 and C-1 models have been certificated under Japan CAR Annex 2 Chapter 5 (equivalent to ICAO Annex 16 Vol.1 Chapter 8) for noise requirements.

(ii) *Compliance Listing:*

BK117B-2 Flight Manual – Section 5 Performance, paragraph 5.12.2 Noise Levels:
Takeoff: 89.9 EPNdB Overflight: 91.3 EPNdB Approach: 95.8 EPNdB

BK117C-1 Flight Manual – Section 5 Performance, paragraph 5.13.2 Noise Levels:
Takeoff: 90.7 EPNdB Overflight: 91.2 EPNdB Approach: 96.1 EPNdB

(4) Certification Compliance Listing:

BK117 Engineering Document List for Type Certification

Compliance Table Cross Check List – JCAB Airworthiness Standards Part V versus FAR Part 29

Certification Records – Ten volumes of what is basically the compliance table covering all models, and covering work carried out by both KHI and MBB.

BK117 Type Inspection Report – Arriel 1E2 (BK117 C-1) – Includes Type Certification Record List for BK117 C-1.

- (5) Flight Manual: JCAB-Approved BK117 Flight Manual
CAA Accepted as AIR 2485
- JCAB-Approved BK117A-3 Flight Manual
CAA Accepted as AIR 2535
- JCAB-Approved BK117A-4 Flight Manual
CAA Accepted as AIR 2465
- JCAB-Approved BK117B-1 Flight Manual
CAA Accepted as AIR 2455
- JCAB-Approved BK117B-2 Flight Manual
CAA Accepted as AIR 2518
- JCAB-Approved BK117C-1 Flight Manual
CAA Accepted as AIR 2952
- (6) Operating Data for Aircraft:
- (i) *Maintenance Manual:*
KHI-BK117 Maintenance Manual Volumes I, II, III, IV and V
KHI-BK117 Repair Manual Volumes I and II
KHI-BK117 Wiring Diagram Manual
KHI-BK117 Ground Support Equipment Catalogue
KHI-BK117 Vendor Manual
KHI-BK117C Maintenance Manual Volumes I through VI
- (ii) *Current service Information:*
KHI-BK117 Service News and Service Bulletins
- (iii) *Illustrated Parts Catalogue:*
KHI-BK117 Illustrated Parts Catalogue Volumes I and II
- (7) Agreement from manufacturer to supply updates of data in (5), and (6):
MoT 2171 dated 17 August 1992 from KHI Senior Manager Aircraft Sales Division
Revision Service for Flight Manuals provided under Manual Control No. E161
Revision Service for BK117C-1 FM/MM provided by KHI by control no. BK-E298

(8) Other information:

Model Specification Kawasaki BK117 B-1 Helicopter

Report KKE-92-452 – Type Certification Document BK117B-1 s/n 1046 – Electric Loads and Power Source Capacity Analysis Report

KHI Report KR-13495 – Electric Loads and Power Source Capacity Analysis Report (Addendum AB covers the Model BK117C-1)

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	FAR §29.783(c) and (e)
E.2.1	Emergency Exit Marking	FAR §29.811(b) and (f)

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 §29.785(c)
91.507	Pax Information Signs – Smoking, safety belts fastened	FAR §29.1413
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 FAR §29.1303(b) * FAR §29.1303(c) * FAR §29.1305(a)(3) * FAR §29.1305(a)(11) & (14) * FAR §29.1305(b)(1) *
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	IFR Instruments and Equipment	N/A – Turbine engine FAR §29.1305(a)(8) * N/A – Turbine engine N/A – Turbine engine N/A – Helicopter N/A – Fixed skids FAR §29.1351(b)(6) *
91.517	IFR Communication and Navigation Equipment	(3) Anti-collision Lights (4) Instrument Lighting
91.519	IFR Communication and Navigation Equipment	<i>Operational Requirement – Compliance as applicable</i>
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	<i>Operational Requirement – Compliance as applicable</i> <i>Operational Requirement – Compliance as applicable</i> Not Applicable – Less than 20 passenger seats Not Applicable – Less than 61 passenger seats
91.529	ELT - TSO C91a or C126 after 1/4/97 (or replacement)	<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 >30 min above FL100 - Supplemental for crew, 10% Pax - Therapeutic for 3% of Pax Above FL100 - Supplemental for all Crew, Pax - Therapeutic for 1% Pax, - 120l PBE each crew member	Not fitted as standard Not listed in the optional equipment Supplements in the RFM – Maximum operating altitude is 15,000 ft (gross weight up to 3000 kg.)
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 turbo jet or turbofan powered
91.545	Assigned Altitude Indicator	<i>Operational Requirement – Compliance as applicable</i>
A.15	ELT Installation Requirements	<i>To be determined on an individual aircraft basis</i>

* Note: See Standard Helicopter Equipment List – Appendix 1 to the Model Specification

See also Appendix 1 to the Rotorcraft Flight Manual

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	Crew seats are equipped as standard with a 4-point seat-belt system with inertial-reel locking for the shoulder belts
135.357	Additional Instruments (Powerplant and Propeller)	FAR §29.1305
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))	<i>Operational Requirement – Compliance as applicable</i>
135.367	Cockpit Voice Recorder	<i>Operational Requirement – Compliance as applicable</i> Applies when the helicopter's flight manual requires two or more flight crew members; and it has a certificated seating capacity of 10 seats or more excluding any required pilot seat.
135.369	Flight Data Recorder	<i>Operational Requirement – Compliance as applicable</i> Applies to helicopters with a certificated seating capacity of ten seats or more excluding any crew member seat. NOTES: 1. A factory FDR option was only available for the Model EC145 on. 2. Exemption 17/EXE/28 has been issued to not require an FDR on the BK117 Series, subject to specified conditions
135.371	Additional Attitude Indicator	Not Applicable – Not turbo jet or turbofan powered
135.373	Weather Radar	Not Applicable – MCTOW less than 5700 kg.
135.375	Ground Proximity Warning System	Not Applicable – MCTOW less than 5700 kg.

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 drawing Kawasaki Model BK117

Copy of JCAB Type Certificate Data Sheet Number 32-5

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>
BK117	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
BK117A-4	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
BK117B-1	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
BK117B-2	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
BK117A-3	Airwork (NZ) Limited	96/21H/47	24 August 1995
BK117C-1	Oceania Aviation Limited	16/21B/23	11 May 2016