Type Acceptance Report

TAR 3/21B/12 – Revision 1

BRITTEN-NORMAN BN2 Series

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Executive Summary

New Zealand Type Acceptance has been granted to the Britten-Norman BN-2A/B Islander Series based on validation of Type Certificate number EASA.A.388. 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. 3/21B/12 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. State-of-Design Type Certificate Details

Manufacturer:	Pilatus Britten-Norman Limited
Type Certificate:	EASA.A.388
Issued by:	European Aviation Safety Authority

Model(s):	BN2B-20, -21, -26, -27
MCTOW:	6600 lb. [2994 kg]
Max. No. of Seats:	10
Noise Standard:	FAR 36 through Amendment 8 (compliance achieved when either of the two propeller options below is embodied and tachometers to modifications NB/M/1090 or NB/M/1287 are fitted.)
Engine:	Lycoming IO-540-K1B5 (BN2B-20, -21) Type Certificate: 1E4 Issued by: Federal Aviation Administration Lycoming O-540-E4C5 (BN2B-26, -27) Type Certificate: E-295 Issued by: Federal Aviation Administration
Propeller:	Hartzell HC-C2YK-2x/8477/A-4 (78 inch dia. – mod. NB/M/977) Type Certificate: P-920 Issued by: Federal Aviation Administration Hartzell HC-C3YR-2UF/FC8468-8R (modification NB/M/1361) Type Certificate: P25EA Issued by: Federal Aviation Administration

3. Type Acceptance Details

The application for New Zealand type acceptance was from the importer of the first two examples, Milford Sound Flightseeing. dated 18 October 2002. The first-of-type examples were BN2B-27 c/n 2168, registered ZK-MFN, and BN2B-26 c/n 2197 registered ZK-ZQN. The BN-2 Islander series is a ten-seat twin-engine high-wing all metal utility aircraft with fixed undercarriage.

Type Acceptance Certificate No. 3/21B/12 was granted on 10 January 2003 to the Pilatus Britten-Norman BN2B Islander based on validation of UK CAA Type Certificate BA8. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The BN-2 islander was an all-new light aircraft designed for ease of manufacture and repair and to be rugged with good STOL performance. An unusual feature is that the fuselage is just wide enough for a bench seat, and access is by individual entry doors. The original Model BN-2 was certificated in the Transport Category by the UK CAA in 1967 with a MCTOW of 5700 lb., which was quickly increased to 6000 lb. as the BN-2A. The first in a long series of model developments under individual modifications occurred with the increase in MCTOW from 6000 to 6300 lb. for the BN2A-8, which involved fitting a cambered leading edge between the engines and the fuselage. Further developments included tip tanks which increased the wingspan to 53', and the use of 300 hp injected engines. The final increase in MCTOW was to 6600 lb. achieved with drooped wing flaps, which increases the lift over the centre section of the wing. Thus there were four definitive production versions of the Islander, the BN-2A-20 Series, with either 260 or 300 hp engines and with or without wing tip fuel tanks.

The BN2B was introduced in 1979 as a new “face-lifted” model defined by modification NB/M/978 when Pilatus purchased the company, and involved minor or cosmetic changes the most noticeable being a revised instrument panel. In order to get some distinct difference for the new model the landing weight was increased to the same as the MAUW of 6600 lb. As a marketing policy this was not made available for the BN2A, although a retrofit was later developed. There are four basic versions: the BN2B-26 and BN2B-27 with 260 hp naturally aspirated engines are identical except the latter has the wing tip fuel tanks which increase wingspan to 53 feet, per modification NB/M/364. (See Supplement 1 to FM/40.) The BN2B-20 and -21 are the two equivalent versions with and without tip tanks, but fitted with the injected 300 hp powerplant option.

This report was raised to Revision 1 to change to the current format and to add the latest State-of-Design type certificate details.

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:

EASA Type Certificate Number EASA.A.388

EASA Type Certificate Data Sheet number A.388 at Issue 1 dated 8 Nov 2011
- Model BN2A-20 approved 16-07-1973
- Model BN2A-21 approved 07-12-1973
- Model BN2A-26 approved 07-06-1974
- Model BN2A-27 approved 16-08-1974
- Model BN2B-20 approved 09-10-1979
- Model BN2B-21 approved 10-12-1979
- Model BN2B-26 approved 02-04-1979
- Model BN2B-27 approved 02-04-1979

Supersedes:

UK CAA TCDS No. BA8 at Issue 9 dated September 1993

(2) Airworthiness design requirements:

(i) Airworthiness Design Standards:
The certification basis of the BN2A and BN2B Series is BCAR Section D – Aeroplanes – Issue 6 dated 1 November 1963, sub-sections D1, D3 and D4; plus BCAR Section K – Light Aeroplanes – Issue 1 dated 15 September 1966, sub-sections K2, K5, K6 and K7, plus Chapter K4-2 paragraph 3.2.2 bird impact requirements. (For comparison purposes the FAA type certification basis is FAR 23 effective February 1, 1965, including Amendment 23-1, plus five paragraphs at Amendment 23-7 plus one paragraph at Amendment 23-23.)

This is an acceptable certification basis in accordance with NZCAR Part 21B Paragraph §21.41, as the older superseded BCAR Sections D and K were the airworthiness design standards applicable at that time for small aeroplanes, and are considered equivalent under Part 21 Appendix C(2) and Advisory Circular 21-1A. Four non-compliances were accepted by the UK CAA. These have been previously reviewed in NZ for the BN2A, and no additional special conditions have been prescribed by the Director under §21.23.

(ii) Special Conditions:
Nil

(iii) Non-Compliances:
The UK CAA, and subsequently EASA, accepted four non-compliances against BCAR Section D – Aeroplanes Issue 6, as follows:

Chapter D3-9 paragraph 5.1 – Elevator and Aileron Circuit Stiffness – Elevator system stretch was only 2% above the requirement. Aileron stiffness was below the limit but investigation of the lateral characteristics showed no adverse features which affected handling, stability or control.

Chapter D4-4 paragraph 3.2.2 – Installation of Flight Equipment Seat – The non-compliance arose from fitting seats of improved structural strength. Britten Norman contended that as no part of the aircraft was less stiff or weakened levels of safety were maintained or improved.

Chapter D4-5 paragraph 3.6.2 – Brake Pedal Foot Load – A test witnessed by the ARB showed a reasonable maximum foot load which was unlikely to be exceeded in all conditions was 112 lb. The brake limit load for design clearance purposes was therefore agreed by ARB at 180 lb.

Chapter D4-8 Appendix paragraph 8 – Control Circuit Static Frictions – Maximum static forces on the controls were above specified requirements, but aircraft characteristics were not affected by these increased frictions to a degree which would render the aircraft unacceptable.

(iv) Airworthiness Limitations:
Nil

(3) Aircraft Noise and Engine Emission Standards:

(i) Environmental Standard:
BN-2B manufactured after 1 January 1980 are required to comply with the Standards of ICAO Annex 16, Volume I, Chapter 6. (The Flight Manual FM/40 Section 2 Limitations states: "Compliance with BCAR Section N-Noise has been demonstrated at the maximum recommended normal climb power of 2500 RPM and full throttle.")

(ii) Compliance Listing:
EASA TCDS for Noise number EASA.A.0388 at Issue 02 dated 20 October 2014

(4) Certification Compliance Listing:

Type Record Addendum No. 33 – BN.2B Islander – March 1979

(5) Flight Manual: Islander BN-2B – C.A.A. Approved Flight Manual FM/40
Models BN-2B-26, BN-2B-27 – CAA Accepted as AIR 2809

(6) Operating Data for Aircraft, Engine and Propeller:

(i) Maintenance Manual:
Maintenance Manual MM/1 – Revision 34
Maintenance Schedule MS/1 – Revision 17

(All maintenance documentation is common between the BN2A and BN2B.)

(ii) Current service Information:
Service Bulletins/Service Letters FS/1 – SB Index Issue 85

(iii) Illustrated Parts Catalogue:
Illustrated Parts Catalogue PC/1 – Revision 25

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

The CAA has a current publications subscription from Britten-Norman Limited

(8) Other information:

Modification NB-M-984 – Islander designated BN-2B-26
Modification NB-M-985 – Islander designated BN-2B-27

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	***To be determined on an individual aircraft basis***
B.2	Crew Protection Requirements – CAM 8 Appdx. B # .35	Not Applicable – Agricultural Aircraft only

Compliance with the following additional NZ operating requirements has been reviewed for the BN-2B Series 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		BCAR K 6-1 3.3.1	
91.507	Pax Information Signs – Smoking, safety belts fastened		N/A – Less than 10 pax seats (BCAR K 6-1 4.7 – May be omitted as crew/pax compartments not separately enclosed)	
91.509 Min. VFR	(1) ASI	BCAR K 6-1 3.1.1 – See Flight Manual Fig.2 Item 30	(8) Coolant Temp	N/A – Air-cooled engine
			(9) Oil Temperature	BCAR K 6-1 3.2.1(b) – See Flight Manual Fig.2 Item 46
	(2) Machmeter	N/A – No Mach No. limitations		
	(3) Altimeter	BCAR K 6-1 3.1.2	(10) Manifold Pressure	BCAR K.6-1 3.2.2(d) – See Flight Manual Fig.2 Item 41
	(4) Magnetic Compass	BCAR K 6-1 3.1.3 – See Flight Manual Fig.2 Item 5	(11) Cylinder Head Temp.	BCAR K.6-1 3.2.2(b) – See Flight Manual Fig.2 Item 45
	(5) Fuel Contents	BCAR K 6-1 3.2.1(c) – See FM Fig.2 Items 11 and 17	(12) Flap Position	BCAR K 4-8 2.2.4(d) – See Flight Manual Fig.2 Item 9
	(6) Engine RPM	BCAR K 6-1 3.2.2(a) – See Flight Manual Fig.2 Item 42	(13) U/c Position	N/A – Fixed undercarriage
	(7) Oil Pressure	BCAR K 6-1 3.2.1(a) – See Flight Manual Fig.2 Item 47	(14) Ammeter/Voltmeter	BCAR K6-12 8.8 – See Flight Manual Fig.2 Items 19 and 20
91.511 Night	(1)Turn and Slip	BCAR K 6-1 5.1.3 – See Flight Manual Fig.2 Item 27	(3) Anti-collision Lights	***Operational requirement – compliance as applicable***
	(2) Position Lights	BCAR K 6-1 5.1.1 – See Flight Manual Fig.2 Item 69	(4) Instrument Lighting	BCAR K 6-1 5.1.2 – See Flight Manual Fig.2 Item 68
91.513	VFR Communication Equipment		***Operational requirement – compliance as applicable***	
91.517 IFR	(1) Gyroscopic AH	BCAR K 6-1 5.3.2 – See Flight Manual Fig.2 Item 33	(5) OAT	Fitted as Standard – See Flight Manual Fig.2 Item 7
	(2) Gyroscopic DI	BCAR K 6-1 5.3.3 – See Flight Manual Fig.2 Item 34	(6) Time in hr/min/sec	BCAR K 6-1 5.3.7 – See Flight Manual Fig.2 Item 76
	(3) Gyro Power Supply	BCAR K 6-1 5.3.4	(7) ASI/Heated Pitot	Fitted as Standard – See Flight Manual Fig.2 Item 71
	(4) Sensitive Altimeter	BCAR K 6-1 5.3.5 – See Flight Manual Fig.2 Item 35	(8) Rate of Climb/Descent	BCAR K 6-1 5.3.6 – See Flight Manual Fig.2 Item 36
91.519	IFR Communication and Navigation Equipment		***Operational requirement – compliance as applicable***	
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		 ***Operational requirement – compliance as applicable*** ***Operational requirement – compliance as applicable*** N/A – Less than 10 passenger seats N/A – Less than 10 passenger seats	
91.529	ELT – TSO C126 406 MHz after 22/11/2007		***Operational requirement – compliance as applicable***	
91.531	Oxygen Indicators – Volume/Pressure/Delivery		***Operational requirement – compliance as applicable***	
91.533	Oxygen for non-Pressurised Aircraft: >30 min above FL100 – Supplemental for crew, 10% Pax Above FL100 – Supplemental for all Crew, Pax – Therapeutic for 1% Pax - 120l PBE each crew member		Oxygen system not fitted as standard	
91.541	SSR Transponder and Altitude Reporting Equipment		***Operational requirement – compliance as applicable***	
91.543	Altitude Alerting Device – Turbojet or Turbofan		N/A – Not turbojet or turbofan powered	
91.545	Assigned Altitude Indicator		***Operational requirement – compliance as applicable***	
A.15	ELT Installation Requirements		***To be determined on an individual aircraft basis***	

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		BCAR K 6-1 3.3.1 and BCAR K 6-1 4.5
135.357	Additional Instruments (Powerplant and Propeller)		Certificated to FAR §23.1305
135.359	Night Flight	Landing light, Pax compartment	***Operational requirement – compliance as applicable***
135.361	IFR Operations	Speed, Alt, spare bulbs/fuses	***Operational requirement – compliance as applicable***
135.363	Emergency Equipment (Part 91.523 (a) and (b))		***Operational requirement – compliance as applicable***
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
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:

Photographs first-of-type example Constructor's Number 2197 ZK-QZN
Three-view drawing Pilatus Britten-Norman Model BN2B Islander
Copy of Type Certificate Data Sheet EASA.A.0388

Sign off

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David Gill — Team Leader Airworthiness

Checked – Andrea Wadsworth — Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

Model:	*Applicant:*	*CAA Work Request:*	*Date Granted:*
BN-2A Series BN-2B-26, -27	AC 21-1.2/NZCAR Part 21 Appendix A(c) Milford Sound Flightseeing	3/21B/12	6 March 2003