
Type Acceptance Report

TAR 3/21B/16

BN.2A Mk.III-1 TRISLANDER

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Introduction

This report details the basis on which Type Acceptance Certificate No.3/21B/16 was granted in the Standard Category in accordance with NZCAR Part 21 Subpart B.

Specifically the report aims to:

- a) Record the airworthiness certification standard used for type acceptance of the applicable model in New Zealand;
- b) Summarise any outstanding requirements which must be complied with for issue of an Airworthiness Certificate to any models covered by the Type Acceptance Certificate.

Foreign Type Certificate Details

Type Certificate: BA6

Issued by: United Kingdom Civil Aviation Authority

Manufacturer: Britten-Norman (Bembridge) Limited

Model: BN.2A Mk.III-1

Engines: Lycoming O-540-E4C5

Propellers: Hartzell HC-C2YK-2xx/xC8477x-4

MCTOW 10,000 lb (4536 kg)

Noise Category: BCAR Section N (See Flight Manual Section 2 – General)

The certification basis of the BN2A Mk.III-1 is BCAR Section K Issue 3 dated 1 October 1969 and BCAR Section J Issue 3 dated 15 September 1966, plus CAA “Blue” papers number 377, 402, 497 and 503. The CAA also applied special conditions related to the structure in document A48T.312/347 dated 26 October 1970, transmitted by letter reference ABN 208; and related to the rear engine power failure warning in ARB letter DES/ABN2 08 dated 8 June 1971. Two non-compliances were listed as being accepted:

– BCAR K4-4 para 2.3.4 – Requires an Ultimate safety Factor of 1.33 for the seats for emergency alighting restraint. The Type Record however states “*the seat pick-ups have been strengthened and this requirement is now complied with. (See Mod NB/M/556).*”

– BCAR K7-2 para 2.5(a)(i) – V_{FE} is specified as slightly below the speed of $1.8 V_{SO}$, to allow for position error. However the flaps are stressed to the full requirements.

(The Type Record also states there was another non-compliance against K3-13 para 2. The aircraft is not stressed for powered towing, because of the possibility of damage to the primary rudder circuit, due to interconnection with the steering mechanism.)

The FAA specified certification basis was FAR 23 at amendment 23-9. Validation of the UK type certificate was found to provide an equivalent level of safety. Additional requirements included were particular paragraphs of FAR 23 covering oxygen and ICA, plus FAR 135 Appendix A and Special Condition 23-35-EU-7. The two non-compliances were accepted as not invalidating compliance with any comparable FAA requirement.

This is an acceptable certification basis in accordance with NZCAR Part 21B Paragraph §21.41, as BCAR Section K is the British equivalent to FAR Part 23 which is the basic standard for Normal Category Airplanes 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. (The certification basis of the Trislander has been previously accepted in New Zealand for the BN.2A Mk.III-2 version, in 1989.)

Type Acceptance Application

The application for New Zealand type acceptance was from Great Barrier Airlines Flight Operations Ltd dated 30 October 2002. The first-of-type example was serial number 372 ex-VH-BSP, which is to be registered here as ZK-LGR.

Type Acceptance Certificate No.3/21B/16 was granted on 6 December 2002.

The 18-seat Trislander is a unique configuration, being a conversion of the 10-seat Islander by means of a fuselage plug either side of the wing and installation of a third engine mounted in the tail. The latter location resulted in special certification conditions, because of the difficulty for the pilot in recognizing an engine failure. Required equipment for the aircraft is a rear engine power failure warning lamp and a pilot's rear vision mirror. The FAA also required an autofeather system to allow use of the full 10,000 lb MAUW, to ensure minimum engine-out performance could be achieved.

There have been two previous examples of the Trislander in NZ, ZK-SFF and ZK-SFG which were Mark 2 versions operating briefly with Skyferry. The Mark 1 has the original Islander short nose, while the only fundamental difference in the Mark 2 was an elongated nose under modification NB-M-549 incorporating a baggage compartment. To achieve a satisfactory balance the battery was relocated and a different heater installed.

Type Data

The type data requirements of NZCAR Part 21B Para §21.43 have been satisfied by supply of the following documents:

- (1) Type certificate: UK CAA TCDS BA6 at Issue 5 dated December 1989
FAA TCDS A29EU at Revision 3 dated June 21, 1978
- (2) Airworthiness design requirements: Already held by the CAA
- (3) Certification compliance listing:
Doc. No. III/PROD/ARB/1 – Compliance Check List – Already held by the CAA
Type Record Addendum No.1 – Trislander BN.2A Mk.III-1 (10,000 lb. A.U.W.)
- (4) Flight manual: BN-2A Mk.III-1 Trislander C.A.A. Approved Flight Manual
Doc FM/BN-2AIII/1 – CAA Accepted as AIR 2814
- (5) Illustrated Parts Catalogue: IPC included in TSM
- (6) Maintenance manual and service data for aircraft, engine and propeller:
CAA already held a Technical Service Manual (TSM) on microfiche, comprising:

MM/2 – Maintenance Manual for Trislander, all models
 MS/2 – Maintenance Schedule for all BN2A MkIII Series
 PC.2 – Illustrated Parts catalogue for Trislander, all models

Manuals already held for the engine and propeller. (Same as the Islander)

(7) Agreement from manufacturer to supply updates of data in (4), (5) and (6):

Email from BN Technical Publications dated 4 November 2002 stating CAA is on the mailing list to receive all future updates free of charge.

Additional New Zealand Certification requirements

Compliance with the following additional NZ 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 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 C - Air Transport Aircraft - More than 9 Pax

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
C.1	Doors and Exits	FAR 135 Appendix A paragraph 32(a), (b) and (f)
C.2.1	Additional Emergency Exits - per FAR 23.807(b) @ 10.5.93	FAR 135 Appendix A para 32(c) (with no central aisle and full-width bench seats the Trislander has two exits on the port side and three exits on the starboard side)
C.2.2	Emergency Exit Evacuation Equipment – Descent means	FAR 135 Appendix A para 32(c) (Exits are close to ground)
C.2.3	Emergency Exit Interior Marking - Size/self-illuminating	FAR 135 Appendix A paragraph 32(e)
C.3.1	Landing Gear Aural Warning - Automatic Flap Linking	FAR 135 Appendix A para 30 (non-retractable landing gear)

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	BCAR K 6-1 3.3.1		
91.507	Pax Information Signs - Smoking, safety belts fastened	<i>Operational Requirement – Compliance as Applicable</i>		
91.509	(1) ASI Min. VFR (2) Machmeter (3) Altimeter (4) Magnetic Compass (5) Fuel Contents (6) Engine RPM (7) Oil Pressure	BCAR K 6-1 3.1.1 N/A – No Mach No. limitations BCAR K 6-1 3.1.2 BCAR K 6-1 3.1.3 BCAR K 6-1 3.2.1(c) BCAR K 6-1 3.2.2(a) BCAR K 6-1 3.2.1(a)	(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 – Air-cooled engine BCAR K 6-1 3.2.1(b) BCAR K.6-1 3.2.2(d) BCAR K.6-1 3.2.2(b) BCAR K 4-8 2.2.4(d) N/A – Fixed undercarriage BCAR K6-12 8.8
91.511	(1) Turn and Slip Night (2) Position Lights	BCAR K 6-1 5.1.3 BCAR K 6-1 5.1.1	(3) Anti-collision Lights (4) Instrument Lighting	<i>Compliance as applicable</i> BCAR K 6-1 5.1.2
91.517	(1) Gyroscopic AH IFR (2) Gyroscopic DI (3) Gyro Power Supply (4) Sensitive Altimeter	BCAR K 6-1 5.3.2 BCAR K 6-1 5.3.3 BCAR K 6-1 5.3.4 BCAR K 6-1 5.3.5	(5) OAT (6) Time in hr/min/sec (7) ASI/Heated Pitot (8) Rate of Climb/Descent	<i>Compliance as applicable</i> BCAR K 6-1 5.3.7 <i>Compliance as applicable</i> BCAR K 6-1 5.3.6
91.519	IFR Communication and Navigation Equipment			<i>Operational Requirement – Compliance as Applicable</i>
91.523	(a) More Than 10 pax - First Aid Kits per Table 7 Emrgcy Eqpmt. - Fire Extinguishers per Table 8 (b) More than 20 pax - Axe readily acceptable 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> <i>Operational Requirement – Compliance as Applicable</i> Not Applicable – Less than 61 passenger capacity
91.529	ELT - TSO C91a after 1/4/97 (or replacement)			<i>To be determined on an individual aircraft basis</i>

91.531	Oxygen Indicators - Volume/Pressure/Delivery	<i>Operational Requirement – Compliance as Applicable</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>Operational Requirement – Compliance as Applicable</i> Flight Manual Limitations Section states: “Flight above 10000 feet not at present permitted”.
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 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>

*For standard equipment fit see the Aircraft Equipment List for the BN-2A Mk.III dated May 1971

Civil Aviation Rules Part 125

Subpart F - Instrument and Equipment Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
125.355	Seating and Restraints	BCAR K 6-1 3.3.1 and BCAR K 6-1 4.5
125.357	Additional Instruments (Powerplant and Propeller)	Has all instruments required by FAR §23.1305
125.359	Night Flight	Landing light, Pax compartment light
125.361	IFR Operations	Dual ASI and Alt, spare bulbs/fuses
125.363	Emergency Equipment (Part 91.523 (a) and (b))	<i>Operational requirement – Compliance as applicable</i>
125.365	Public Address and Crew Member Intercom System	<i>To be determined on an individual aircraft basis</i>
125.367	Cockpit Voice Recorder	Not Applicable – Minimum flight crew per AFM is one pilot
125.369	Flight Data Recorder	Not Applicable – Not turbine-powered
125.371	Additional Attitude Indicator	Not Applicable – Not turbojet or turbofan powered
125.373	Weather Radar	Not Applicable – Not turbine-powered, MCTOW < 5700 kg.
125.375	Ground Proximity Warning System	Not Applicable – Not turbine-powered, MCTOW < 5700 kg.
125.377	HUMS	Not Applicable – Not SEIFR

Summary

Type Acceptance Certificate No. 3/21B/16 has been granted to the BN.2A Mk.III-1 and all serial numbers are now eligible for the issue of a New Zealand Airworthiness Certificate in the Standard Category in accordance with CAR §21.177, subject to any outstanding operational requirements noted above being met.

Attachments

The following documents form attachments to this report:

Three-view drawing Britten-Norman BN2A Mk.III-1 Trislander
Copy of UK CAA Type Certificate/ Type Certificate Data Sheet BA6

Sign off

David Gill
Team Leader Airworthiness

Date: 6 December 2002