Type Acceptance Report

TAR 4/21B/2 – Revision 2

MBB BO105 Series

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Executive Summary

New Zealand Type Acceptance has been granted to the MBB BO105 Series based on validation of EASA Type Certificate R.011. 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.4/21B/2 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.

2. ICAO Type Certificate Details

Manufacturer:	Messerschmitt-Bölkow-Blohm GmbH (until Dec 1991) Eurocopter Hubschrauber GmbH (until May 1992) Eurocopter Deutschland GmbH
Type Certificate:	R.011
Issued by:	European Aviation Safety Agency
Model(s):	BO105 C, BO105 S, BO105 D
MCTOW	5070 lb (2300 kg) – Variants C23, CS, D, DS 5291 lb (2400 kg) – Variants CB, CBS, DB, DBS 5521 lb (2500 kg) – Variants CB-4/5, CBS-4/5, DB-4, DBS-4/5
Max. No. of Seats:	5 (6 with optional MBB 105S-82660 bench seat)
Noise Standard:	Noise Level Requirements (LSL) Kapitel VIII

Engine: Allison 250-C20 or -C20B

Type Certificate: E4CE
Issued by: Federal Aviation Administration

3. Type Acceptance Certificate

The application for New Zealand type acceptance of the Model BO105 DBS was from the importer, Northland Emergency Services Trust Inc., dated 29 July 2003. The first-of-type example was BO105 DBS-4 serial number S656, registered ZK-HSJ. The BO105 Series is a five-place twin-turbine light helicopter with a rigid-rotor system. There has previously been one example of the BO105 CBS-4 in New Zealand, serial number S592 registered ZK-HPB, and one example of the BO105 CS, serial number 56 registered ZK-HYC. (None had an airworthiness certificate valid on 1 July 1995 so the Transitional Arrangements of Part 21 Appendix A paragraph (c) did not apply.)

Type Acceptance Certificate No. 4/21B/2 was granted on 22 August 2003 to the BO105 Series based on validation of LBA Type Certificate No. 3025 for the basic Series, and UK CAA Type Certificate No. FR3 for the DB/DBS Models. Specific applicability is limited to the coverage provided by the operating documentation supplied, in this case the Flight Manual is the determinant. There are no special requirements for import into New Zealand.

The Bölkow BO105 was the first lightweight twin-engined utility helicopter in production. The aircraft uses a rigid titanium hub and hingeless flexible fibreglass folding blades. The main production version was the BO105 C, which was developed into several variants. A B suffix indicates an upgrade with increased MTOW, while the S indicates an extended cabin. The -4 is a development which increases the MTOW even further. The D Model is essentially identical to the C with a modification kit incorporating UK special conditions. BO105 helicopters may be converted from one variant to another in accordance with manufacturer's drawings or Service Bulletins, as noted on the TCDS.

This report was raised to Revision 1 to include the BO105 CBS Series, and to note the change in type certificate responsibility to EASA. The applicant was Oceania Aviation, and the first-of-type example was BO105 CBS-4 serial number S824, registered ZK-HYT. Type Acceptance was granted on 20 July 2010 and applies to all BO105 Model C, D and S variants covered by the current Flight Manuals. (All except the C23, CB-5, and C/DBS-5.)

Revision 2 was issued to add the BO105 CBS-5 variant. The application was from Oceania Aviation Ltd and the first-of-type example was serial number S549 registered ZK-HAK. Type acceptance was granted on 20 September 2012.

4. Type Data

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:

EASA Type Certificate Number R.011

EASA Type Certificate Data Sheet number R.011 at Issue 01 dated 10 July 2009
- Model BO105 C approved 31 August 1971
  (Variants: C23, CB, CB-4, CB-5)
- Model BO105 S approved 25 May 1977
  (Variants: CS, CBS, CBS-4, CBS-5)
- Model BO105 D approved 5 July 1973 [UK CAA]
  (Variants: D, DS, DB, DB-4, DBS, DBS-4, DBS-5)

Supersedes:
UK CAA TCDS No.FR3 – Issue 4 dated August 1996 (Applicable DB/DBS Series)
LBA Helicopter Data Sheet No. 3025 – Issue 24 – Feb. 28, 2003 (All other models)

(2) Airworthiness design requirements:

(i) Airworthiness Design Standards:
The certification basis of the BO105 Series is FAR 27, dated Feb. 1, 1965, with Amendments 27-1 to 27-3. (The same basis was used for the original UK CAA type approval, as amended by ARB Special Conditions.) Additionally for the Model C and the variant CBS for VTOL operations compliance was shown with FAR 29 Subpart B Performance at Amendment 29-17. For the CB-4/5 and CBS-4/5 variants two paragraphs of FAR 27 were updated to Amendment 27-8 and FAR 29 Subpart B was also updated, as noted on the EASA TCDS.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, as FAR Part 27 is the basic standard for Normal Category Rotorcraft called up under NZCAR 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:
Nil

(iii) Equivalent Level of Safety Findings:
Nil

(iv) Airworthiness Limitations:
See BO105 MM Chapter 101-15 – Airworthiness Limitations

(3) Aircraft Noise and Engine Emission Standards:

(i) Environmental Standard:
The current EASA TCDS states the BO105 Series type certification pre-dates ICAO Annex 16. (The earlier LBA TCDS referenced German LSL noise requirements.)

(ii) Compliance Listing:
EASA TCDS for Noise – TCDSN EASA.R.011 at Issue 02, 06 January 2010

Supersedes:
LBA Noise Certificate 06.913/3025 – BO 105 A dated 2 July 1990
LBA Noise Certificate 310.3/4/3025/2 – BO 105 S dated 13.03.1997

(4) Certification Compliance Listing:

Nachweisführung – Bo 105 C Revision Nr 11 – Date: 24.11.71

TN D 13 – 1/72 – Documentation of Modifications to BO105 C (LBA-Approved) in order to become BO105 D (CAA-Approved) – Revision 7 dated 18.4.74

MBB BO105 – U.K. Special Conditions – Ref. 9/31/RY1101 Issue 1

(5) Flight Manual:

BO105 DB/DBS UK CAA Approved Rotorcraft Flight Manual
Valid for Variants (BO105D): DB, DB-4 and DBS-4;
CAA Accepted as AIR 2835

BO105 CB/CBS EASA-Approved Rotorcraft Flight Manual
Valid for Variants (BO105C): CB, CB-2, CDN-B, CB-4 and CDN-B-4;
Valid for Variants (BO105S): CBS, CBS-2, CDN-BS, CBS-4, and CDN-BS-4
CAA Accepted as AIR 3143

BO105 CB5/CBS-5 EASA-Approved Rotorcraft Flight Manual
CAA Accepted as AIR 3217

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

(i) Maintenance Manual:
BO105 All versions – Maintenance Manual (MM)

BO105 All versions – Wiring Diagram Manual (WDM)

(ii) Current service Information:
BO105 All versions – Service Bulletins

(iii) Illustrated Parts Catalogue:
BO105 All versions – IPC

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

email: Eurocopter Deutschland GmbH SLR/D Tec.Pub. Customer Services 28.7.03

Certificate of Subscription 044817/0 from Eurocopter Donauwörth, 23/06/2010

(8) Other information:

BO105 List of Applicable Publications (LOAP) Parts 1 and 2

SI No. 74 – Guide to Type, Series and Variant Codes of the BO105 Helicopters

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

Appendix E - Helicopters

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
E.1	Doors and Exits	***To be determined on an individual aircraft basis***
E.2.1	Emergency Exit Marking	FAR §27.807(b)(3)

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		FAR §27.785(b)	
91.507	Pax Information Signs - Smoking, safety belts fastened		N/A – Less than ten passenger capacity	
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) – *FM §7.13.4* N/A FAR §27.1303(b) – *FM §7.13.2* FAR §27.1303(c) – *FM §7.13.6* FAR §27.1305(d) – *FM §7.6.3* FAR §27.1305(k) – *FM §7.5.9* FAR §27.1305(h) – *FM §7.5.9*	(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) – *FM §7.5.9* N/A – Turbine engine N/A – Turbine engine N/A – Helicopter N/A – Fixed skids FAR §27.1351(d) *FM §7.11.3*
91.511 Night	(1)Turn and Slip (2) Position Lights	 FAR §27.1385 – *FM §7.12.1*	(3) Anti-collision Lights (4) Instrument Lighting	FAR §27.1401 – *FM §7.12.2* FAR §27.1381 – *FM §7.12.3*
91.517 IFR	(1) Gyroscopic AH (2) Gyroscopic DI (3) Gyro Power Supply (4) Sensitive Altimeter	***Operational requirement – Compliance as applicable***	(5) OAT (6) Time in hr/min/sec (7) ASI/Heated Pitot (8) Rate of Climb/Descent	Fitted as Std – *FM §7.13.7* Fitted as Std – *FM §7.13.5* Fitted as Std – *FM §7.13.3*
	Note: The Bo 105 is approved for IFR operations when suitably equipped – See Flight Manual Supplement 11-2			
91.519	IFR Communication and Navigation Equipment		***Operational requirement – Compliance as applicable***	
91.523 Emrgcy Eqpmt.	(a) More Than 10 pax - First Aid Kits per Table 7 - 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		N/A – < 10 pax. seats (Fitted as Standard – see FM §7.4.3) N/A – < 10 pax. seats (Fitted as Standard – see FM §7.4.2) Not Applicable – Less than 20 passenger seats Not Applicable – Less than 61 passenger seats	
91.529	ELT - TSO C91a after 1/4/97 (or replacement)		***Operational requirement – Compliance as applicable***	
91.531	Oxygen Indicators - Volume/Pressure/Delivery		Oxygen system not fitted as standard	
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		Oxygen system not fitted as standard (Maximum operating altitude is 17,000 ft pressure altitude – See Flight Manual Fig. 2-3)	
91.541	SSR Transponder and Altitude Reporting Equipment		***Operational requirement – Compliance as applicable***	
91.543	Altitude Alerting Device - Turbojet or Turbofan		***Operational requirement – Compliance as applicable***	
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		FAR §27.785
135.357	Additional Instruments (Powerplant and Propeller)		FAR §27.1305
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		Not Applicable – Less than 10 pax. seats and single pilot
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

Attachments

The following documents form attachments to this report:

Photographs first-of-type example BO105 DBS-4 ZK-HSJ s/n S656
Three-view drawing Messerschmitt-Bölkow-Blohm BO105 DBS
Copy of EASA Type Certificate Data Sheet number R.011

Sign off

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David Gill
Team Leader Airworthiness

Checked – Peter Gill
Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

Model:	*Applicant:*	*CAA Work Request:*	*Date Granted:*
BO105 D[1]	Northern Emergency Services Trust Inc.	4/21B/2	22 August 2003
BO105 C and S[2]	Oceania Aviation Limited	10/21B/29	20 July 2010
BO105 CB-5/CBS-5	Oceania Aviation Limited	12/21B/18	20 September 2012

1. except variants D, DS and DBS-5
2. except variants C23, CS and CBS-5