Type Acceptance Report

TAR 6/21B/20 – Revision 3

AIRBUS HELICOPTERS AS 355 Series

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Executive Summary

New Zealand Type Acceptance has been granted to the AS 355 Series based on validation of EASA Type Certificate number R.146. There are no special requirements for import.

Applicability is currently limited to the Models and/or serial numbers detailed in Section 2, 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 generally 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 revision of the State-of-Design Type Certificate Data Sheet referenced herein.

1. Introduction

This report details the basis on which Type Acceptance Certificate No.6/21B/20 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 models in New Zealand; and

(b) Identify any special conditions for import applicable to any models 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. Appendix 1 details the type acceptance history under CAR Part 21B and which models were certificated prior to that under NZCAR Section B.9 and are now type accepted under the transitional arrangements of Part 21 Appendix A(c).

2. Aircraft Certification Details

(a) State-of-Design Type and Production Certificates:

Manufacturer:	Airbus Helicopters Eurocopter (until 6 January 2014) Eurocopter France (until 31 May, 1997) Aerospatiale (until 31 December, 1991)
Type Certificate:	Number R.146
Issued by:	European Union Aviation Safety Agency
Production Approval:	EASA.21G.0070

(b) Models Covered by the Part 21B Type Acceptance Certificate:

(i) **Model:** AS 355 E, AS 355 F1, AS 355 F2

MCTOW:	2100 kg [4630 lb.] – AS 355 E 2400 kg [5291 lb.] – AS 355 F1 2540 kg [5600 lb.] – AS 355 F2
Max. No. of Seats:	6 (7 with dual front seat option)
Noise Standard:	AS 355 E – Not Applicable AS 355 F1/F2 – ICAO Annex 16
Engine:	Rolls-Royce 250-C20F Type Certificate: E1GL Issued by: Federal Aviation Administration

(ii) **Model:** AS 355 N, AS 355 NP

MCTOW:	2600 kg [5732 lb.]
Max. No. of Seats:	6 (7 with dual front seat option)
Noise Standard:	ICAO Annex 16
Engine:	Turbomeca Arrius 1A – AS 355 N Turbomeca Arrius 1A1 – AS 355 NP Type Certificate: E.080 Issued by: European Union Aviation Safety Agency

3. Application Details and Background Information

There have been examples of the AS 355 Series in New Zealand prior to 1995 when Part 21 was introduced, and those particular model years or serial number ranges were therefore deemed to have a type acceptance certificate under the transitional arrangements of Part 21 Appendix A(c). The first application for New Zealand type acceptance under Part 21B was for the Model AS355N was from Oceania Aviation Ltd, dated 23 January 2006. A letter requesting the same was also received from the manufacturer dated 14 February 2006. The first-of-type example was serial no. 5740, registered ZK-HZZ. The AS 355 is a twin turbine 6-seat light helicopter with 3-blade semi-rigid composite rotorhead and conventional tailrotor configuration.

Type Acceptance Certificate Number 6/21B/20 was granted on 1 March 2006 to the Model AS 355 N based on validation of DGAC Type Certificate 168, and includes the Arrius 1A engine based on DGAC Type Certificate No. M-16. Specific 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 AS355F2 model, and to note the change of type certificate responsibility to EASA. The application was from Oceania Aviation Ltd, dated 4 April 2007. The first-of-type example was serial number 5449, registered ZK-ILN. Type Acceptance was granted on 11 May 2007.

This report was raised to Revision 2 to include the model AS 355 NP. An application was originally received by email from the manufacturer, but the application was taken over by the local agent. The first-of-type was serial number 5763, registered ZK-ICT. Type acceptance was granted on 26 September 2008.

Revision 3 was issued to update the format and the type certificate holder details, and add all AS 355 models covered by the type acceptance certificate.

Type History:
The AS 355 "TwinStar" is essentially a twin-engined version of the AS 350 Ecureuil. The initial production version was the AS 355 E, with single hydraulics and powered by two Allison 250-C20F turboshaft engines. The improved AS 355 F came with dual hydraulics, new rotor blades of wider chord and increased maximum weight of 2,300 kg. This was superseded by the AS 355 F1 and then the AS 355 F2, both of which had further MAUW increases. Variants can be upgraded by Service Bulletin, and most examples have been converted to AS 355 F2 configuration. The first-of-type AS 355 E in New Zealand was serial number 5002 registered ZK-HXZ in December 1987, while the first AS 355 F1 was serial number 5024 registered ZK-HMS in March 1987.

The AS355N is similar to the final Allison-powered F2 version except it is fitted with two FADEC-controlled Turbomeca Arrius 1A engines. The AS355NP is the latest production model using the Arrius 1A1 engine with an OEI rating increase. Other differences include new VEMD display; and AS350B3-based main gear box improvements which allow an increase of the MAUW with external cargo sling operations from 2600 to 2800 kg. Production of the AS 355 Series finished in 2016.

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) Type certificate:

EASA Type Certificate Number EASA.R.146
EASA Type Certificate Data Sheet No.R.146 – Issue 06 dated 30 August 2017
– Model AS 355 E approved 24 October, 1980
– Model AS 355 F1 approved 9 May, 1983
– Model AS 355 F2 approved 10 December, 1985
– Model AS 355 N approved 13 June, 1989
– Model AS 355 NP approved 15 February, 2007

Supersedes:

DGAC Certificat de Navigabilite de Type Numéro 168
DGAC Type Certificate Data Sheet No.168 – Issue 11 dated December 2001

(2) Airworthiness design requirements:

(i) Airworthiness Design Standards:
The certification basis of the AS 355 Series is FAR 27 Amendment 16 Included, plus the Additional and Special Conditions in letter DGAC 53 879. For the AS 355 N the certification basis was upgraded to FAR 27 at Amendment 20, as modified by CTC 27 (See French Ministry of Transport letter Ref.53879), plus some paragraphs at Amendment 21 as noted on the TCDS, plus the Special Conditions specified in letter DGAC 54408. In addition, for the AS 355 F series and N, single engine performance was established in accordance with FAR 29 requirements part 29-45 through 29-79. For the AS 355 NP the certification basis was the same as the AS 355 N except for one additional paragraph of FAR 27 at Amendment 23. FAR 29 paragraphs as listed on the TCDS were used in support of "Category A" operations as per JAR OPS 3.480. This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1A, as FAR 27 is the basic standard for Normal 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:
DGAC Letter 53879 dated August 11, 1980 – Certification of AS355 Helicopter
This added additional technical conditions: CTC 27.881 Protection Against Lightning; CTC 27.903 Engines; Appendix II: A – Special Flight Conditions; B – Power Plant Special Conditions.

DGAC Letter 54408 dated October 19, 1988 – Certification of AS355N
This added special conditions for Pilot Limit Loads; and Special Engine Installation Conditions, comprising air inlet protection (birdstrike/hailstones), and Engine Control System integrity.

AS355NP – Protection against effects of High Intensity Radiated Field (HIRF) based on JAA interim policy referenced INT/POL/27, 29/1. (See CRI F-1.)

(iii) Equivalent Level of Safety Findings:

AS355NP – FAR 27-149(b) Powerplant Instrument Markings – The normal operating ranges are not marked with a green arc or line on the VEMD. This has already been accepted for other types on the basis the cautionary range markings plus colour underlining of digital values were satisfactory as attention getters and the electronic screens are clearer to read. (See CRI F-4)

(iv) Airworthiness Limitations:

See Maintenance Manual Chapter 5 "Master Servicing Recommendations"

(3) Aircraft Noise and Engine Emission Standards:

(i) Environmental Standard:

The AS 355 F1/F2/N Series have been certificated for noise under Chapter 8 of ICAO Annex 16 at Edition 1.

The AS355NP has been certificated for noise under CS-36 (Provisions of Chapter 8 of ICAO Annex 16 at Edition 3) and for fuel emissions under CS-34 (Provisions of Chapter 11, ICAO Annex 16). (See CRI A-1.)

(ii) Compliance Listing:

EASA Type Certificate Data Sheet for Noise TCDSN.R.146 – Issue 02 – 28.08.07

AS 355 F1: Take-off: 88.4; Overflight: 87.9; Approach 93.2 (EPNL)

AS 355 F2: Take-off: 88.8; Overflight: 87.9; Approach 92.9 (EPNL)

AS 355 N: Take-off: 89.0; Overflight: 86.7; Approach 93.4 (EPNL)

AS 355 NP: Take-off: 88.7; Overflight: 86.7; Approach 92.8 (EPNL)

(4) Certification Compliance Listing:

Aerospatiale Document No. 355A.05.0007 – AS 355 E Certification File as per FAR 27 Amendment 16 – 1st Issue dated 24.10.80

Doc. No. 355A.05.0012 – AS 355 F Compliance with FAR Part 27 (Admt. 1-16)

Doc. No. 355A.05.0023 – AS 355 F1 Compliance with FAR 27 (Admt. 1-16)

Doc. No. 355ABN.0006 – AS 355 F2 Compliance with FAR 27 (Admt. 1-16)

Doc. No. 355ABN.0013 – AS355N Compliance with Certification Regulations

Doc. No. 355ABN.0044 – AS355NP Certification Plan (Includes Document List)

(5) Flight manual: DGAC-Approved Flight Manual for the AS 355 E – Code A
CAA Accepted as AIR 2333

DGAC-Approved Flight Manual for the AS 355 F1 – Code A
CAA Accepted as AIR 2316

DGAC-Approved Flight Manual for the AS 355 F2 – Code A
CAA Accepted as AIR 3007

DGAC-Approved Flight Manual for the AS 355 N – Code A
CAA Accepted as AIR 2945

EASA-Approved Flight Manual for the AS 355 NP – Code A
CAA Accepted as AIR 3047

(6) Operating Data for Aircraft:

(i) Maintenance Manual:

The following documents are available online for each AS 355 model:

Aircraft Maintenance Manual	Master Servicing Manual
System Description Section	Index of Modifications
Standard Practices Manual	Structural Repair Manual
Wiring Diagrams Manual	Storage Manual
Tools Catalog	

(ii) Current service Information:

Service Bulletins
SB 01.02 Conversion of AS 355 E into AS 355 F
SB 01.09 Conversion of AS 355 F into AS 355 F1
SB 01.20 Conversion of AS 355 F1 into AS 355 F2

(iii) Illustrated Parts Catalogue:

AS355 Illustrated Parts Catalog

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

email Eurocopter Light Helicopter Certification Manager dated 16 Feb 2006
CAA 2171 for AS355NP – Australian Aerospace Technical Librarian 26-Mar-08

Eurocopter now provides CAA access to technical publications through the Online Documents and Technical Publications O.R.I.O.N. and T.I.P.I. website https://keycopter.airbushelicopters.com

AIRBUS HELICOPTERS now provides access through the customer platform at: https://airbusworld.helicopters.airbus.com

(8) Other information:

Aerospatiale Doc. No. 355A.04.3551 – Electrical Load Analysis 355N IFR Version

Doc. No. 355A.04.4320 – List of Equipment All Versions – SA 350 and 355

EASA Master Minimum Equipment List AS355 E/F/F1/F2/N/NP

EASA Operational Suitability Data (OSD) Flight Crew Data (FCD) – Ecureuil /Twin Engine Family AS355

5. New Zealand Operational Rule Compliance

Compliance with the retrospective airworthiness requirements of NZCAR Part 26 is a prerequisite for the grant of a type acceptance 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	FAR §27.783 and FAR §27.807(b)(2)
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	Seating and Restraints – Safety belt/Shoulder Harness		FAR §27.785(b)	
91.507	Pax Information Signs - Smoking, safety belts fastened		Not Applicable – Less than 10 passenger seats	
91.509 Min. VFR	(1) ASI	FAR §27.1303(a)	(8) Coolant Temp	N/A – Turbine engine
	(2) Machmeter	N/A	(9) Oil Temperature	FAR §27.1305(j) *
	(3) Altimeter	FAR §27.1303(b)	(10) Manifold Pressure	N/A – Turbine engine
	(4) Magnetic Compass	FAR §27.1303(c)	(11) Cylinder Head Temp.	N/A – Turbine engine
	(5) Fuel Contents	FAR §27.1305(d)	(12) Flap Position	N/A – Helicopter
	(6) Engine RPM	FAR §27.1305(k) *	(13) U/c Position	N/A – Fixed skids
	(7) Oil Pressure	FAR §27.1305(h) *	(14) Ammeter/Voltmeter	FAR §27.1351(d)
	* Fitted as Standard – See Complementary Flight Manual Section 7.3 – Engine Monitoring For AS 355 N Standard Aircraft Definition see Eurocopter Document 355 N 05.100.01 E AS 355 N Technical Data			
91.511 Night	(1)Turn and Slip	***Operating Requirement***	(3) Anti-collision Lights	See POH Section 7.11 para 4
	(2) Position Lights	See POH Section 7.11 para 3	(4) Instrument Lighting	See POH Section 7.11 para 2
91.517	IFR Instruments and Equipment		***Operating Requirement – Compliance as applicable***	
91.519	IFR Communication and Navigation Equipment		***Operating Requirement – Compliance as applicable***	
	See AS 355N & AS 355F2 Approved Flight Manual Supplement 4 for minimum equipment required for IFR Flight			
91.523	Emergency Equipment			
	(a) More Than 9 pax – First Aid Kits per Table 7		Not Applicable – Less than 10 passenger seats	
	– Fire Extinguishers per Table 8		Not Applicable – Less than 10 passenger seats	
	(b) More than 20 pax – Axe readily accessible to crew		Not Applicable – Less than 20 passenger seats	
	(c) More than 61 pax – Portable Megaphones per Table 9		Not Applicable – Less than 61 passenger seats	
91.529	ELT - TSO C91a or C126 after 1/4/97 (or replacement)		***To be determined on an individual aircraft basis***	
91.531	Oxygen Indicators - Volume/Pressure/Delivery		Not fitted as Standard	
91.533	Oxygen for Non-pressurised Aircraft		***Operating Requirement – Compliance as applicable*** Maximum Operating Altitude (AS355F1 & F2) – 16,000 ft. Maximum Operating Altitude (AS355N) – 20,000 ft.	
91.541	SSR Transponder and Altitude Reporting Equipment		***Operating Requirement – Compliance as applicable***	
91.543	Altitude Alerting Device – Turbojet or Turbofan		Not Applicable – Less than 10 passenger seats	
91.545	Assigned Altitude Indicator		***Operating 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 / Restraints – Shoulder harness flight-crew seats		FAR §27.785(b)
135.357	Additional Instruments (Powerplant and Propeller)		Part 27 is an acceptable standard per Part 21 Appendix C
135.359	Night Flight	Landing light, Pax compartment	***Operating Requirement – Compliance as applicable***
135.361	IFR Operations	Speed, Alt, spare bulbs/fuses	***Operating Requirement – Compliance as applicable***
135.363	Emergency Equipment (Part 91.523 (a) and (b))		***Operating 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:

Copy of EASA Type Certificate Data Sheet Number R.146

Sign off

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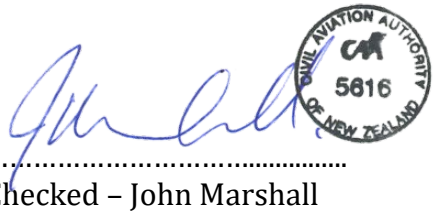
David Gill
Team Leader Aircraft Inspection



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Checked – John Marshall
Airworthiness Inspector

Appendix 1

List of Type Accepted Variants:

Model:	*Applicant:*	*CAA Work Request:*	*Date Granted:*
AS 355 E	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
AS 355 F1	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
AS 355 N	Oceania Aviation Limited	6/21B/20	1 March 2006
AS 355 F2	Oceania Aviation Limited	7/21B/37	11 May 2007
AS 355 NP	Eurocopter International Pacific (NZ) Pty	8/21B/29	26 Sept. 2008

Appendix 2

Three-view drawing Model AS 355 NP: