
Type Acceptance Report

TAR 6/21B/20 – Revision 2

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 Appendix 1, which are now eligible for the issue of an Airworthiness Certificate in the Standard Category in accordance with NZCAR §21.177, 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(2).

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. Models covered by the type acceptance certificate issued under Part 21B are listed in Section 2 of this report. Models which were accepted prior to that under NZCAR Section B.9 are listed in Appendix 1.

2. ICAO Type Certificate Details

| | |
|--------------------|---|
| Manufacturer: | Aerospatiale (until January 1, 1992) Eurocopter France (until June 1, 1997) Eurocopter (since June 1, 1997) |
| Type Certificate: | EASA.R.146 |
| Issued by: | European Aviation Safety Agency |
| Model: | AS 355 F2 |
| MCTOW | 2540 kg (5600 lb.) |
| Max. No. of Seats: | 6 (7 with dual front seat option) |

Engine: Rolls-Royce 250.C20F
Type Certificate: E1GL
Issued by: Federal Aviation Administration

Model: AS 355 N

MCTOW 2600 kg (5732 lb.)

Max. No. of Seats: 6 (7 with dual front seat option)

Noise Standard: ICAO Annex 16, Volume 1 – 1st Edition/Amendment 3 – Chapter 8
Takeoff: 89.0; Overflight: 86.7; Approach 92.9 (EPNL)

Engine: Turbomeca Arrius 1A
Type Certificate: E.080
Issued by: European Aviation Safety Agency

Model: AS 355 NP

MCTOW 2600 kg (5732 lb.)

Max. No. of Seats: 6 (7 with dual front seat option)

Noise Standard: ICAO Annex 16, Volume 1 – 3rd Edition/Amendment 7, Chapter 8
Takeoff: 88.7; Overflight: 86.7; Approach 92.8 (EPNL)

Engine: Turbomeca Arrius 1A1
Type Certificate: E.080
Issued by: European Aviation Safety Agency

3. Type Acceptance Certificate

The application for New Zealand type acceptance of 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 AS355 is a twin turbine 6 or 7-seat light utility helicopter with a 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. Application for validation of the Arrius 1A1 engine was received from the engine manufacturer, forwarded via EASA. The first-of-type was serial number 5763, to be registered ZK-ICT. Type acceptance was granted on 26 September 2008.

The AS 355 “TwinStar” is essentially a twin-engined version of the AS 350 Ecureuil, and has been developed in a series of increased weight AS355E and AS355F/F1/F2 variants, all powered by the Allison 250-C20F turboshaft powerplant. The AS355N is similar to the latest F2 version except that it is fitted with two Turbomeca Arrius 1A engines. The AS355NP is the latest production model using the Arrius 1A1 engine with an OEI rating increase. Other differences include an increase of the MAUW with external cargo sling operations from 2600 to 2800 kg; new VEMD display; and main gear box improvements.

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) Type certificate:

EASA Type Certificate Number EASA.R.146
EASA Type Certificate Data Sheet No.R.146 – Issue 1 dated 15 February 2007
– 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

DGAC Certificat de Navigabilite de Type Numéro 168
DGAC Type Certificate Data Sheet No.168 – Issue 11 dated December 2001
(superseded by EASA type certificate.)

EASA Type Certificate Data Sheet No E.080 – Issue 1 dated 15 December 2006
– Model Arrius 1A approved 29 February 1988
– Model Arrius 1A1 approved 15 December 2006

DGAC Certificat de Type Moteur Numéro M-16
Fiche de Caracteristiques Moteur N°.M-16 – Edition 4 dated December 1992
(superseded by EASA type certificate.)

(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.

The certification basis of the Arrius 1A is JAR-E at Change 6 dated 28/08/81, plus Amendments (blue papers) No.791 and 798. For the Arrius 1A1 one paragraph of CS-E was added. This is the European equivalent to FAR 33, which is the basic standard for aircraft engines called up under Part 21 Appendix C.

(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 Helicopter
This added special conditions for Pilot Limit Loads; and Special Engine Installation Conditions, comprising Air Inlet Protection (birdstrike and hailstones), and Engine Control System integrity.

AS355NP – Protection against the 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 AS355NP has been certificated under CS-36 (Provisions of Chapter 8 of ICAO Annex 16) and 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

(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)

Arrius 1A – Donnees Techniques pour la Certification de Type (Compliance Checklist) – Document X 319 D6 9001 – Edition Fevrier 1991

(5) Flight manual: DGAC-Approved Flight Manual for the AS 355 N – Code A
CAA Accepted as AIR 2945

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

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

(6) Operating Data for Aircraft and Engine:

(i) *Maintenance Manual:*

The following documents are contained on the CD-ROM for each AS 355 model:

| | |
|----------------------------------|--------------------------|
| Operation and Description Manual | Maintenance Manual |
| Master Servicing Recommendations | Fault Isolation Manual |
| Mechanical Repair Manual | Index of Modifications |
| Standard Practices Manual | Structural Repair Manual |
| Wiring Diagrams Manual | Service Bulletins |
| Tools Catalog | Storage Manual |

AS 355 Version NP PRE – Maintenance Program

Arrius 1A Maintenance Manual – Document X319 D6 300

Arrius 1A1 Maintenance Manual – Document X319 U1 451

Arrius 1A Installation Manual – Document X319 D6 001

(ii) *Current service Information:*

Arrius 1A-1E Service Bulletin Index – Document X319 H6 950

Arrius 1A-1E Modification Index – Document X319 H6 952

(iii) *Illustrated Parts Catalogue:*

See Eurocopter OPEN 355 CD-ROM

Arrius 1A Maintenance Spare Parts Catalogue – Document X319 D6 700

Arrius 1A1 Maintenance Spare Parts Catalogue – Document X319 U1 700

Arrius 1A Maintenance Tools Catalogue – Document X319 U1 800

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

email from Eurocopter Light Helicopter Certification Manager dated 16 Feb 2006

email from Turbomeca Airworthiness Department dated 3 March 2006

CAA 2171 for AS355NP – Australian Aerospace Technical Librarian 26-Mar-08

(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

Arrius 1A Turboshaft Engine – Performance Brochure – Document X319 D6 0029

5. Additional New Zealand Requirements

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 | <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 §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 (2) Machmeter (3) Altimeter (4) Magnetic Compass (5) Fuel Contents (6) Engine RPM (7) Oil Pressure | FAR §27.1303(a) N/A FAR §27.1303(b) FAR §27.1303(c) FAR §27.1305(d) FAR §27.1305(k) * FAR §27.1305(h) * |
| | * 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 (2) Position Lights | <i>Operating Requirement</i> See POH Section 7.11 para 3 (3) Anti-collision Lights (4) Instrument Lighting See POH Section 7.11 para 4 See POH Section 7.11 para 2 |
| 91.517 | IFR Instruments and Equipment | <i>Operating Requirement – Compliance as applicable</i> |
| 91.519 | IFR Communication and Navigation Equipment | <i>Operating Requirement – Compliance as applicable</i> |
| | 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 - 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 | Not Applicable – Less than 10 passenger seats Not Applicable – Less than 10 passenger seats 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>To be determined on an individual aircraft basis</i> |
| 91.531 | Oxygen Indicators - Volume/Pressure/Delivery | Not fitted as Standard |
| 91.533 | Oxygen for Non-pressurised Aircraft | <i>Operating Requirement – Compliance as applicable</i> <i>Maximum Operating Altitude (AS355F1 & F2) – 16,000 ft.</i> <i>Maximum Operating Altitude (AS355N) – 20,000 ft.</i> |
| 91.541 | SSR Transponder and Altitude Reporting Equipment | <i>Operating Requirement – Compliance as applicable</i> |
| 91.543 | Altitude Alerting Device - Turbojet or Turbofan | Not Applicable – Less than 10 passenger seats |
| 91.545 | Assigned Altitude Indicator | <i>Operating Requirement – Compliance as applicable</i> |
| A.15 | ELT Installation Requirements | <i>To be determined on an individual aircraft basis</i> |

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(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 <i>Operating Requirement – Compliance as applicable</i> |
| 135.361 | IFR Operations | Speed, Alt, spare bulbs/fuses <i>Operating Requirement – Compliance as applicable</i> |
| 135.363 | Emergency Equipment (Part 91.523 (a) and (b)) | <i>Operating Requirement – Compliance as applicable</i> |
| 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 |

Attachments

The following documents form attachments to this report:

- Photographs first-of-type example AS 355 N s/n 5740 ZK-HZZ
- Three-view drawing Eurocopter Model AS 355 F2
- Three-view drawing Eurocopter Model AS 355 N
- Copy of EASA Type Certificate Data Sheet Number R.146

Sign off

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 David Gill
 Team Leader Airworthiness

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 Checked – Chris Thomson
 Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

| <i>Model:</i> | <i>Applicant:</i> | <i>CAA Work Request:</i> | <i>Date Granted:</i> |
|---------------|---|--------------------------|----------------------|
| 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 September 2008 |