
Type Acceptance Report

TAR 98/06

AEROSPATIALE SA 365 Series

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Executive Summary

New Zealand Type Acceptance has been granted to the Aerospatiale SA 365 “Dauphin” Series based on validation of DGAC Type Certificate number 86. There are no special requirements for import.

Applicability is currently limited to the Models detailed in Appendix 1, which are now eligible for the issue of an Airworthiness Certificate in the Standard Category in accordance with CAR §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 this foreign type certificate will become type accepted after supply of the applicable documentation, in accordance with the provisions of CAR §21.43(2).

1. Introduction

This report details the basis on which Type Acceptance Certificate No.98/06 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. Foreign Type Certificate Details

Type Certificate: Certificat de Navigabilite de Type Numero 86

Issued by: Direction Generale de l’Aviation Civile - Republic Francaise

Manufacturer: AEROSPATIALE

Model: SA 365 C1 (Dauphin)
SA 365 N (Dauphin 2)

Engines: Turbomeca Arriel 1A1 [SA 365 C1]
Turbomeca Arriel 1C [SA 365 N]

MCTOW: 3400 kg (7500 lb) [SA 365 C1]
4100 kg (9038 lb) [SA 365 N]

Noise Category: N/A - Predates noise certification requirements

The certification basis of the SA 365 C Series is FAR Part 29 effective February 1, 1965 plus amendments 29-1 through 29-11. For French certification additional and special requirements were specified in DGAC letter 4092 dated May 5th, 1977. The FAA imposed Special Conditions No. 29-69-EU-21 dated April 6, 1976, while for IFR certification compliance was required with the Airworthiness Criteria for Helicopter Instrument Flight dated December 15, 1978. For the SA 365 N Series the certification basis was updated to FAR 29, including Amendment 29-16, plus additional and special requirements in DGAC letters 54022, 53116 and 964425

These are an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, as FAR Part 29 is the basic standard for Transport Category Rotorcraft called up under Appendix C. There are no non-compliances and no special conditions have been prescribed by the Director under §21.23.

The certification basis of the Turbomeca Arriel Series is JAR-E Edition 1 dated 5 June 1974, modified to take into account the engine systems requirements of FAR 33. This is an acceptable airworthiness standard for engines as listed in Advisory Circular 21-1A.

3. Type Acceptance Certificate

The application for New Zealand type acceptance was from Mr Dave McIlroy dated 5th November 1997. He was the importer from Japan of the first-of-type example, ZK-HPR serial number 5031. (ex-JA9543)

Type Acceptance Certificate No.98/06 was granted to the SA 365 C1 on 11 June 1998, based on validation of DGAC Type Certificate Number 86, and includes the Turbomeca 1A1 engine based on DGAC Type Certificate M5.

The SA 365 Dauphin is a 13-seat twin-engined Category A IFR-capable general-purpose helicopter. The SA365C1 is basically identical to the original SA365C model except for the installation of an uprated 498 kW Arriel 1A1 engine in place of the 486 kW Arriel 1A. (The Model SA365C may be converted to the Model SA365C1 by compliance with Aerospatiale Service Bulletin No.01.03 dated March 26, 1979).

This report was raised to Revision 1 to add the SA 365 N Dauphin 2, after application by Rick Lucas Helicopters Ltd dated 12 October 2004. Type Acceptance was granted to the SA 365 N on 11 November 2004, and includes the Arriel 1C engine variant. There are no special requirements for import into New Zealand.

The first-of-type example was serial number 6051 registered ZK-HYX. There has been one example of the SA365N Dauphin 2 previously in New Zealand, ZK-HXW in 1987-91. However it was not registered as of 1 July 1995 and was therefore not covered by the transitional arrangements of Appendix A, and type acceptance was required. The SA 365N Series was a major airframe upgrade of the Dauphin with 522 kW Arriel 1C engines and uprated transmission, retractable undercarriage and increased gross weight and c.g. range.

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: DGAC CDN de Type No.86 - SA 365 C1 approved 26 March 1979
DGAC Type Certificate Data Sheet No. 159 - Issue No.20, July 2004
Fiche de Caracteristiques Moteur No. M5 – Edition No.28, Juin 2003
FAA TCDS H10EU at Revision 18 dated June 3, 2003

- (2) Airworthiness design requirements:

Copy of DGAC letter 4092 dated 5 May, 1977:

Plus Annex 1 English Translation – Special Conditions covered:

§29.903(a) : Engine Type Certification ; §29.867 : Lightning protection of structure
Special Flight Conditions - T/O Power Check Procedures, Engine Failure Warning System
Special Propulsion Conditions - Powerplant Controls, Turbine Engine Bleed Air System
Special Systems and Equipment Condition - Operation without electrical power

Copy of DGAC letter 54022 – SA 365N and SA 366G Aircraft Conditions of Certification, plus Annex 1 French Complimentary Condition

- (3) Certification compliance listing:

Aerospatiale Report No. 365A.05.0403 – SA 365 C Certification File in Compliance with Federal Aviation Regulation Part 29 – 3rd Edition 9 April 1979

List of Descriptive and Certification Reports for SA 365

Aerospatiale Note Technique – SA 365C1 Definition Drawn Up for the French and Foreign Airworthiness Type Certificates - Defines the SA365C1 with respect to the SA365C as the addition of Modification No. 07.1588 comprising: installation of Arriel 1A1 engine; new Ng indicator markings; and modification of the paint scheme.

Doc. 365A.05.6207 AS 365N Structural Strength Margins Weight = 4100 kg

Doc. 365A.05.1100 Substantiation of Main Rotor Blades Fitted on 365N – 365G

Doc. 365A.05.8022 Service Life Time and TBO – 365N Main Production Assemblies

Aerospatiale Document 365A.05.8030 Service Life Limits for Production Components on the 365N with 3850 kg Maximum Weight – dated 23.03.1983

Doc. 365A.04.4258 Distribution Electrique Repartition des Panneaux Disjoncteurs

Aerospatiale Report H/EV No.13.263 SA 365 N Dauphin Certification 22.10.80
Extreme Centre of Gravity Values – Controllability and Maneuverability

Aerospatiale Report H/EV No.13.273 SA 365 N Dauphin Certification 24.10.80
Controllability and Maneuverability – Failure of One Engine

Report H/EV No.13.275 SA 365 N Dauphin Certification – FAR 29-79 Unsafe Zone

Aerospatiale Report H/EV No.13.276 SA 365 N Dauphin Certification 23.10.80
FAR 29-1509 Maximum and Minimum Power-Off (Autorotation) Rotor Speed

Report H/EV No.13.314 SA 365 N – Performance at Minimum Operating Speed

Report H/EV No.13.390 SA 365 N Dauphin Certification – Cooling Tests
Report H/EV No.13.460 SA 365 N Certification – Twin-Engine Climb Performance
Report H/EV No.13.618 SA 365 N Dauphin – Fuel System Operation in Hot Weather
Report H/EV No.13.629 SA 365 N Dauphin Certification – Take-Off Category A
Report H/EV No.13.631 SA 365 N Dauphin Certification – Climb on One Engine
Report H/EV No.13.754 SA 365 N Dauphin Certification – Category B Take-Off
Aerospatiale Report H/EV No.15.572 SA 365 N Dauphin Certification 22.02.83
Extension of the Operating Envelope to $H_p = 20000$ Ft.
Aerospatiale Report H/EV No.15.995 SA 365 N Dauphin Certification 20.07.83
Extension of Maximum Gross Weight from 3850 kg to 4000 kg
Report H/EV No.16.048 SA 365 N Dauphin – IFR Certification for 4000 kg MGW

- (4) Flight manual: Flight Manual Dauphin SA 365 C1 “A” Code DGAC Approved
March 26, 1979 – CAA Accepted as AIR 2613
Flight Manual Dauphin SA 365 N “A” Code DGAC Approved
March 26, 1979 – CAA Accepted as AIR 2882
- (5) Illustrated Parts Catalogue: IPC – SA 365C, C1 - C2 Dauphin - Volumes 1 and 2
Issue No.1 _02 1978 including Revision No.4A 96-03
- (6) Maintenance manual and service data for aircraft (Already held for engine):
SA 365 C,C1,C2,C3 MM - Maintenance Manual at Revision 19 dated 08-97
SA 365 C,C1,C2,C3 MRR - Repair Manual Issue 1 Revision 15 dated 08-97
SA 365 SBT - Service Bulletins Dauphin SA 360, 361, 365 (Vol.s 1 and 2)
SA 365 C1,C2,C3 MCS - Wiring Diagram Manual
SA 365 C1,C2,C3 PRE - Master Servicing Recommendations Rev.23 97-22

OPEN CD-ROM for the following; SA 365 N; SA 365 N1; SA 365 N2; SA 365 N3

The SA 365 OPEN CD-ROM contains the following:

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

Turbomeca Arriel 1A-A1-A2-B Maintenance Documentation CD-ROM

- (7) Agreement from manufacturer to supply updates of data in (4), (5) and (6):
MoT 2171 from from Aerospatiale dated 9 December 1987
Confirmation fax from Eurocopter International Pacific Ref.BD/1006/F0251
- (8) Other information: SA 365 C1,C2,C3 MDF - Description and Operation Manual

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 Part 29 §29.783(c) and (e)
E.2.1	Emergency Exit Marking	FAR Part 29 §29.809(c)

Compliance with the following additional NZ operating requirements has been reviewed for the SA 365 C1 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 §29.785(b)
91.507	Pax Information Signs - Smoking, safety belts fastened	See Flight Manual Section 7.11 para 2.2.2
91.509 Min. VFR	(1) ASI (2) Machmeter (3) Altimeter (4) Magnetic Compass (5) Fuel Contents (6) Engine RPM (7) Oil Pressure	FAR §29.1303(a) N/A FAR §29.1303(b) FAR §29.1303(c) FAR §29.1305(a)(3) FAR §29.1305(a)(11) FAR §29.1305(a)(6)
91.511 Night	(1) Turn and Slip (2) Position Lights	(3) Anti-collision Lights (4) Instrument Lighting
91.517 IFR	(1) Gyroscopic AH (2) Gyroscopic DI (3) Gyro Power Supply (4) Sensitive Altimeter	See FM #7.1 Page 2 Item 3 Not fitted as standard FAR §29.1331(a)(3) FAR §29.1303(b)
91.519	IFR Communication and Navigation Equipment	<i>Operating Rule – Compliance as applicable</i>
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	<i>Operating Rule – Compliance as applicable</i> <i>Operating Rule – Compliance as applicable</i> Not Applicable – Less than 20 passengers Not Applicable – Less than 61 passengers
91.529	ELT - TSO C91a after 1/4/97 (or replacement)	<i>Operating Rule – Compliance as applicable</i>
91.531	Oxygen Indicators - Volume/Pressure/Delivery	<i>Operating Rule – 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>Operating Rule – Compliance as applicable</i> Maximum Service Ceiling of SA 365 C Series is 15000 ft. Maximum Service Ceiling of SA 365 N Series is 20000 ft.
91.541	SSR Transponder and Altitude Reporting Equipment	<i>Operating Rule – Compliance as applicable</i>
91.543	Altitude Alerting Device - Turbojet or Turbofan	Not Applicable – Not turbojet or turbofan powered
91.545	Assigned Altitude Indicator	Not Applicable – Aeroplanes only
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 & Restraints – Shoulder harness for flight-crew seats	FAR §29.785(b)
135.357	Additional Instruments (Powerplant and Propeller)	FAR 29 is an Appendix C Airworthiness Standard
135.359	Night Flight	Landing light, Pax compartment
135.361	IFR Operations	Speed, Alt, spare bulbs/fuses
135.363	Emergency Equipment (Part 91.523 (a) and (b))	<i>Operating Rule – Compliance as applicable</i>
135.367	Cockpit Voice Recorder	<i>Operating Rule – Compliance as applicable</i>
135.369	Flight Data Recorder	<i>Operating Rule – Compliance as applicable</i>
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 SA 365 C1 ZK-HPR serial no. 3097
- Photographs First-of-Type example SA 365 N ZK-HYX serial no. 6051
- Three-view drawings: Aerospatiale Models SA 365 C1 and SA 365 N
- Extracts from DGAC Airworthiness Data Sheet No. 159

Sign off

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 David Gill
 Team Leader Airworthiness

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 Checked – AWE
 Date: 11 November 2004

Appendix 1

List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
SA 365 C1	Mr D. L. McIlroy	98/21B/6	11 June 1998
SA 365 N	Rick Lucas Helicopters Ltd	5/21B/13	11 November 2004