
Type Acceptance Report

TAR 99/12

Boeing 747-4F6

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Introduction

This report details the basis on which Type Acceptance Certificate No.99/12 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(s) in New Zealand;
- (b) Summarise any outstanding requirements which must be complied with for the issue of a NZ Airworthiness Certificate to any models covered by the Type Acceptance Certificate.

Foreign Type Certificate Details

Type Certificate: A20WE

Issued by: Federal Aviation Administration

Manufacturer: The Boeing Company

Model: 747-4F6

Engines: General Electric CF6-80C2B1FG06

MCTOW 875,000 lb. (396,893 kg.)

Noise Category: FAR Part 36, including Amendments 36-1 through 36-18 (Stage 3)

The certification basis of the Boeing 747-400 is FAR Part 25 effective February 1, 1965, as revised by Amendments 25-1 through 25-59, with the exception of an earlier Amendment status for certain paragraphs as listed on the TCDS; plus SFAR 27 with Amendments 27-1 through 27-6. Eight special conditions were imposed and a number of exemptions and equivalent safety findings made, again as detailed on the TCDS.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, as FAR Part 25 is the basic standard for Transport Category Airplanes called up under Appendix C. There are no non-compliances and no special conditions have been prescribed by the Director under §21.23.

Type Acceptance Application

The application for type acceptance was from Air New Zealand Ltd dated 18 September 1998. The first-of-type example was serial no.27602 (Variable RM082, line number 1161) registered as ZK-SUJ. This aircraft was originally manufactured in June 1998 for delivery to Philippine Airlines but has been leased by ILFC to Air NZ. The interior, electrical and avionics systems were modified to an Air NZ configuration similar to RM191, ZK-NBV.

Type Acceptance Certificate No.99/12 was granted on 10 March 1999. (Resolving the issue of direct supply of documentation from Boeing delayed completion of this report.)

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: FAA TCDS A20WE at Revision 29 dated September 1, 1998
Letter and Certificate of Eligibility s/n 27602 dated June 16, 1998
- (2) Airworthiness design requirements: Already held by the CAA
- (3) Certification compliance listing: Already held by the CAA:
Boeing Report D6-35666 – Schedule of Data Submittal to FAA and
Record of Approval Model 747-400 dated 14-5-87
- (4) Flight manual: FAA Approved Boeing Model 747-4F6 Airplane Flight Manual
Document No. D6-U10002.4F6 – CAA Accepted as AIR 2652
- (5) Illustrated Parts Catalogue: Already held by the CAA
- (6) Maintenance manual and service data for aircraft, engine:
Data on similar models is already held by the CAA. Therefore no MM or IPC
specific to the –4F6 was requested, on the understanding Air NZ would make
copies available to the CAA on request.
- (7) Agreement from manufacturer to supply updates of data in (4):
Boeing CSMS Order #710714 for D6U10002.4F6 AFM with revision service.
- (8) Other information: Philippine Airlines Model 747-4F6 Detail Specification
Document D6-35273PAL-3 Original Release dated 4/30/98

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	FAR §25.811(a) as introduced by Amendment 25-15
B.2	Crew Protection Requirements - Agricultural Aircraft	CAM 8 Appendix B Section .35 – N/A

Appendix C - Air Transport Aircraft - More than 9 Pax

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
C.1	Doors and Exits	FAR Part 25 para §25.809(b)
C.2.1	Additional Emergency Exits - per FAR 23.807(b) @ 10.5.93	Meets FAR Part 25 Certification requirements
C.2.2	Emergency Exit Evacuation Equipment - Descent means	FAR Part 25 para §25.810(a)
C.2.3	Emergency Exit Interior Marking - Size/self-illuminating	FAR Part 25 para §25.811(e), §25.812(b)
C.3.1	Landing Gear Aural Warning - Automatic Flap Linking	FAR Part 25 para §25.729(e)

Appendix D - Air Transport Aircraft - More than 19 Pax

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
D.1.1	Exit Types - Shall be per FAR 25.807 @ 29.03.93	FAR Part 25 applicable provisions unchanged
D.1.2	Floor Level Exits – Definition	FAR Part 25 para §25.807(a)
D.2.1	Additional Emergency Exits - Must meet requirements	N/A
D.2.2	Emergency Exit Access - All Required Exits must have: Passageway unobstructed 500m wide between areas and leading to a Type I or II Exit; Crew assist space; Access to Type III or IV Exit is unobstructed Internal doors must be able to be latched open –placarded	FAR Part 25 para §25.813 See Boeing LOPA 747-4264 Rev. E – Main Deck Boeing LOPA 747-9250 Rev. C – Upper Deck Air NZ revised LOPA – Drawing TX 31319 N/A – No internal doors
D.2.3	Emergency Exit Operating Handles - Markings/Lighting	FAR Part 25 para §25.811(e)
D.2.4	Emergency Exit Evacuation Equipment - Descent means	FAR Part 25 para §25.810(c)
D.2.5	Emergency Exit Escape Route - Must be slip resistant	Meets FAR part 25 certification requirements after 1-5-72
D.2.6	Emergency Lighting (a) Switch Provisions; Uninterrupted Power; Last 10 min. (b) Descent Illumination - Automatic and Independent	FAR Part 25 para §25.812(f) FAR Part 25 para §25.812(h)
D.2.7	Emergency Interior Lighting - independent supply; min. illumination; incl. floor proximity escape path markings	FAR Part 25 para §25.812(c) and (e) <i>See Boeing Detailed Spec. Section 31-51-00</i>
D.2.8	Emergency Exterior Lighting - in effect 30-04-72, or later	Meets FAR part 25 certification requirements after 1-5-72
D.2.9	Emergency Exit Interior Marking – Clears, instructions Locations signs above routes, by exits, on bulkheads – Meet requirements ie 30-4-72, min. brightness 250 mlbrt.	FAR Part 25 para §25.811 Meets FAR Part 25 certification requirements at 26-11-84
D.2.10	Emergency Exit Exterior Markings - 2” contrasting band; opening instructions in red or bright chrome yellow;	FAR Part 25 para §25.811(f) Type certificated after 1 May 1972
D.3	Lavatory Fire Protection - Placards; Exterior ashtray; Waste Bin - Sealed door; built-in fire extinguisher; smoke detector system with external warning	FAA AD 74-08-09R1; FAR Part 25 para §25.791(d) DCA/GEN/7A <i>See Boeing Detailed Spec. Section 25-40-10</i>
D.4	Materials for Compartment Interiors - T/C after 1.01.58: (b) Manufactured after 20/8/90 - Meet heat release rate and smoke tests of FAR Part 25 in effect 26.09.88 (c) Seat cushions (except flightdeck) must be fireblocked B747-400 certificated to FAR 25-853(c) at Amendment 25-59	Boeing complies voluntarily with FAR 25.853(c) at Amdmt 25-72, equivalent to FAR 121.312(a) at Amendment 121-198 <i>See Boeing Fax from Account Manager - Customer Engineering Ref. B-S001-9904299 dated March 15, 1999</i> For Air NZ Flammability Substantiation see Report ET398
D.5	Cargo and Baggage Compartments - T/C after 1.01.58: (a) Each C or D compartment greater than 200 cu ft shall have liners of GFRS or meet FAR 25 in effect 29.03.93 (c) Liners shall be separate from the aircraft structure	Boeing incorporation of PRR82460 on RM082 provides operational equivalency with FAR 121.314 at Amdt 121-202 <i>See Boeing Fax from Account Manager - Customer Engineering Ref. B-S001-9904299 dated March 15, 1999</i>

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 Part 25 para §25.785 – <i>See Detailed Spec. §25-11-10</i>
91.507	Pax Information Signs - Smoking, safety belts fastened	FAR Part 25 para §25.791 – <i>See Detailed Spec. §33-24-00</i>
91.509 Min. VFR	(1) ASI FAR 25.1303(b)(1)/§34-13-01 (2) Machmeter FAR 25.1303(b)(1)/§34-13-01 (3) Altimeter <i>See Detailed Spec. §34-13-05</i> (4) Magnetic Compass FAR25.1303(a)(3) (5) Fuel Contents FAR 25.1305(a)(2)/§28-41-00 (6) Engine RPM FAR 25.1305(c)(3) (7) Oil Pressure FAR 25.1305(a)(4)	(8) Coolant Temp N/A – Turbojet (9) Oil Temperature FAR 25.1305(a)(6) (10) Manifold Pressure N/A – Turbojet (11) Cylinder Head Temp. N/A – Turbojet (12) Flap Position <i>See Detailed Spec. §27-51-00</i> (13) U/c Position <i>See Detailed Spec. §32-61-00</i> (14) Ammeter/Voltmeter FAR 25.1351(6)
91511 Night	(1) Turn and Slip FAR 25.1303(b)(4) (2) Position Lights FAR 25.1389/§33-43-00	(3) Anti-collision Lights FAR 25.1401/DS §33-44-00 (4) Instrument Lighting <i>Det. Spec. §33-11-00 & 33-13-11</i>
91.517 IFR	(1) Gyroscopic AH EFIS <i>Detailed Spec. §34-20-00</i> (2) Gyroscopic DI FAR 25.1303(b)(6)/§34-20-00 (3) Gyro Power Supply FAR 25.1331(a) (4) Sensitive Altimeter FAR 25.1303(b)(2)	(5) OAT FAR 25.1303(a)(1) (6) Time in hr/min/sec FAR25.1303(a)(2)/31.25.01 (7) ASI/Heated Pitot <i>See Detailed Spec. §30-31-00</i> (8) Rate of Climb/Descent FAR 25.1303(b)(3)
91.519	IFR communication and navigation equipment	Dual VOR fitted - <i>See Boeing Detailed Spec. Section 34-51-00</i> Dual ADF fitted - <i>See Boeing Detailed Spec. Section 34-57-00</i> Triple INS fitted - <i>See Boeing Detailed Spec. Section 34-21-00</i> Dual GPS fitted - <i>See Boeing Detailed Spec. Section 34-58-00</i>
91.523 Emgcy Equip.	(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>See Boeing Detailed Spec. Section 25-64-10</i> <i>See Boeing Detailed Spec. Sections 26-26-60 and 26-26-00</i> <i>See Boeing Detailed Spec. Section 25-64-40</i> <i>See Boeing Detailed Spec. Section 25-64-20</i>
91.529	ELT - TSO C91a after 1/4/97 (or replacement)	Exemption 98/EXE/82 granted until 30 September 1999
91.531	Oxygen Indicators - Volume/Pressure/Delivery	FAR Part 25 certification
91.535	(1) Flight Crew Member On-Demand Mask; 15 min PBE	<i>See Detailed Spec. §35-10-20</i> -Crew oxygen system designed

Press. A/c	(2) 1 Set of Portable 15 min PBE (3) Crew Member - Pax Oxygen Mask; Portable PBE 1201 (4) Spare Oxygen Masks/PBE (5) Min Quantity Supplement Oxygen (6) Required Supplemental/Therapeutic Oxygen Above FL250 - Quick-Donning Crew On-Demand Mask - Supplemental O ₂ Masks for all Pax/Crew - Supplemental Mask in Washroom/Toilet Above FL300 - Total Outlets Exceed Pax by 10% Auto Presented > FL140, Manual Means of Deployment	to meet FAR Part 121 §121.333 – Min. 2 hour supply – 2 x 114 cu.ft. tanks fitted for crew use (sufficient for 6 hours normal flight for one pilot.) 3 cylinders fitted for pax. Use. Sufficient for decompression at 45,100 ft. and ten min. emergency descent to FL100. 20x portable O ₂ bottles carried – See Detailed Spec. §35-30-00 Plus oxygen system upgraded by Air NZ EO 3520-01045 See Boeing Detailed Spec. §35-10-60 See Boeing Detailed Spec. §35-20-60 See Boeing Detailed Spec. §35-20-40
91.541	SSR Transponder and Altitude Reporting Equipment	See Boeing Detailed Spec. Section 34-53-00
91.543	Altitude Alerting Device - Turbojet or Turbofan	See Boeing Detailed Spec. Section 34-16-00
91.545	Assigned Altitude Indicator	N/A – Altitude Alerting Device fitted
A.15	ELT Installation Requirements	See Exemption under 91.529 above

Civil Aviation Rules Part 121

Subpart F - Instrument and Equipment Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
121.355	Additional Instruments (Powerplant)	FAR Part 25 is a Part 21 Appendix C standard
121.357	Additional Equipment - Windscreen Wiper, Door, Key, Placard	See Boeing Detailed Spec. §30-43 See Boeing Detailed Spec. §25-18
121.359	Night Flight - Landing Light, Light in each pax cabin	See Boeing Detailed Spec. §33-42
121.361	IFR Operations	Speed, Alt, spare bulbs/fuses
121.363	Flights over water	Liferafts
121.365	Emergency Equipment	Per §91.523 and EROPS kit
121.367	Protective Breathing Equipment (PBE)	TSO C99 cockpit equipment TSO C115 cabin equipment
121.369	P/A, Intercom	Meets FAR § 121.318 and 319.
121.371	Cockpit Voice Recorder Appendix B.5 requires TSO C84/C123	See Det. Spec. §23-71-00 – Loral Fairchild Model S200-0012-00 two-hour solid state CVR to ARINC557 fitted
121.373	Flight Data Recorder Appendix B.6 requires TSO C124	See Det. Spec. §31-31-00 – digital FDR to ARINC717 fitted with ULB – §31-31-10 – see Air NZ fax dated 6-5-99 for parameters
121.375	Additional Attitude Indicator	See Boeing Detailed Spec. Figure 39-2
121.377	Weather Radar - Appendix B.8 requires TSO C63	See Detailed Spec. §34-43-00 – Fitted as std/integral with EICAS
121.379	GPWS - Appendix B.9 requires TSCO C92	See Detailed Spec. §34-46-00 – Equipment to ARINC723-3 fitted

Summary

Type Acceptance Certificate No.99/12 has been granted to the Boeing 747-4F6 and all serial numbers covered by AIR 2652 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:

- Photographs Boeing 747-4F6 serial number 27602 registered ZK-SUJ
- Three-view drawing Boeing Model 747-4F6
- Extracts from FAA Type Certificate Data Sheet No. A20WE

Sign off

David Gill
Airworthiness Engineer

Date: 9 June 1999