Type Acceptance Report TAR 96/12 – Revision 1 BAe JETSTREAM Series 3100/3200

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Executive Summary

New Zealand Type Acceptance has been granted to the British Aerospace Jetstream Series 3100 and 3200 based on validation of EASA Type Certificate number A.191. 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. 96/12 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: British Aerospace PLC

TC Holder: BAe Systems (Operations) Limited

Type Certificate: A.191

Issued by: European Aviation Safety Agency

Model: Jetstream Series 3100

MCTOW 6600 kg (14,550 lb.) Basic Maximum

7059 kg (15,562 lb.) Absolute Maximum [Post Mod. 7832]

Max. No. of Seats: 21

Noise Standard: BCAR Section N, Issue 2, Chapter N3-2, Para 2

Engine: TPE 331-10Uxx-5xxH Variant (depending on mod. status)

Type Certificate: E4WE

Issued by: Federal Aviation Administration

Propeller: Dowty Rotol (c)R.333/4-82-F/12

Type Certificate: 108

Issued by: UK Civil Aviation Authority

Model: Jetstream Series 3200

MCTOW 7350 kg (16,204 lb.)

Noise Category: BCAR Section N, Issue 4, Chapter N3-4

Engine: TPE 331-12Uxx-70xH Variant (depending on mod. status)

Type Certificate: E4WE

Issued by: Federal Aviation Administration

Propeller: Dowty Rotol (c)R.333/4-82-F/12

Type Certificate: 108

Issued by: UK Civil Aviation Authority

McCauley 4HFR34C653/L106FA [Mod 8133]

Type Certificate: P3NE

Issued by: Federal Aviation Administration

3. Type Acceptance Details

The application for New Zealand type acceptance of the Series 3100 was from the aircraft manufacturer by CAA24021/02 dated 13 November 1996. Four examples were purchased for operation by a new airline being set up by Mr Robert Inglis to be based at Nelson. (Originally called Eclipse Airlines and subsequently changed to Origin Pacific Airlines.) The first-of-type example was a Model 3101 serial number 651 registered ZK-JSX. The Jetstream is a pressurised 19-seat twin-turbine low-wing commuter aircraft.

Type Acceptance Certificate number 96/12 was granted on 19 December 1996, based on validation of UK CAA Type Certificate number BA15 for the Model 3101 and FAA Type Certificate number A21EU for the Model 3102. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The application for New Zealand type acceptance of the Series 3200 dated 1st July 1998 was from the importer, Air National Ltd. The first-of-type example was one of the last production aircraft serial number 967, registered in New Zealand as ZK-ECN.

Type Acceptance Certificate No.99/2 was granted on 22 October 1998 to the Model 3201. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The application for New Zealand type acceptance of the Model 3107 dated 10 December 1999 was from Horizon Air Support Ltd, the maintenance organisation of Origin Pacific Airways. The first-of-type example was serial no. 629 ZK-OSW. Type Acceptance Certificate No.0/21B/8 was granted on 17 December 1999.

Origin Pacific has fitted BAe Modification 7832 to their fleet, including the Model 3107. This permits a maximum all-up weight increase of 109 kg. This installation was developed by British Aerospace to restore some of the passenger capacity of the Jetstream, which had been lost by increased standard passenger and baggage weights imposed under UK ANOs and JAR-OPS. The modification does not introduce any new physical changes to the aircraft and no flight testing was required, other than for noise measurements.

This report was raised to Revision 1 to add the Model 3202, and also note the change in State-of-Design responsibility to EASA. In addition all the previous Jetstream Type Acceptance reports were combined into one document, in accordance with current CAA policy. The application was from Vincent Aviation dated 29 February 2012, and the first-of-type example was serial number 976, registered ZK-LFW. Type Acceptance was granted on 29 May 2012.

The Jetstream 31 was evolved by British Aerospace from the original Handley Page model HP-137, whose production was taken over by Scottish Aviation following the bankruptcy of the original manufacturer. The principle change was the replacement of the original Turbomeca Aztazou engines with Garrett AiResearch TPE331 turboprop engines.

The Jetstream 32 is a development of the Jetstream 31, primarily for the US market and to comply with FAR Part 23 Amendment 23-34 Commuter Category rules. The main improvements were increased operating weights (MTOW up from 6950 to 7400 kg.) and a

more powerful TPE331 engine variant. (-12 rated at 1010 shp compared to the -11 at 940 shp.) Some structural reinforcements were needed along with new landing gear, wheels and brakes, and an additional Type IV overwing exit was added on the LHS. ZK-ECN is a Jetstream 32EP, which is the marketing name for a package of retrofit modifications which can be embodied under Service Bulletin to give the aircraft improved WAT performance for shorter field operations. The basic modifications to introduce the Flight Manual changes are JK12132 and JK12133 (0° and 10° flap t/o), both of which require fitting of JK12134 (Drag Reduction [EDAM] Fairings) and JK12135 (Re-defined Ground Idle.)

British Aerospace assigned Jetstream Model numbers corresponding to different country certifications, which principally resulted in a different Flight Manual. See the EASA TCDS Section V Note 2 for details. Different Models were originally Type Accepted in New Zealand under the particular country type certificate or approval. e.g. The Model 3101 is the FAA version approved under FAA Type Certificate A21EU. The Model 3107 is the version developed specifically for Australia, based on the basic Model 3102. The Model 3201 is the FAA version approved under FAA Type Certificate A56EU. However EASA is now specified as the State-of-Design for all Models in New Zealand.

Individual Models can be converted to a different Model by approved manufacturer data. For example BAe Modification 77191 approved conversion from the Model 3101 (USA) to the Model 3102 (UK). BAe Service Bulletin SB11-JA930550 authorised the conversion of the Model 3202 (UK) to the Model 3206 (France).

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) ICAO Type certificate:

EASA Type Certificate Number A.191

EASA Type Certificate Data Sheet no. A.191 at Issue 2 dated 30 September 2009

- Jetstream Series 3100 approved 22 June 1982
- Jetstream Series 3200 approved 06 September 1988

Supersedes:

UK CAA Aircraft Type Certificate No.BA15 issued 22 June 1982 UK CAA TCDS No.BA15 at Issue 7 dated November 1993

(2) Airworthiness design requirements:

(i) Airworthiness Design Standards:

The certification basis of the Jetstream Series 3100 is BCAR Section D, Issue 8, dated 1 February 1966, except for Sub-Section D2 which is to Issue 13 dated 1 October 1976; plus additional ARB and CAA blue papers as listed in the TCDS; BCAR Section J at Issue 3 dated 15 September 1966; BCAR Section R at Issue 4 dated 10 April 1974; and CAA Special Conditions Ref.9/30/AHR1302 when an Automatic Performance Reserve System is embodied. For the Series 3200 the same certification basis was used except the ground loads and undercarriage requirements of BCAR Section D were replaced by the equivalent requirements of JAR 25 as amended up to and including Change 11.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1A, as BCAR Section D was the British design standard applicable to that class of aircraft at the time and is equivalent to FAR 23, which is the basic standard for Commuter Category Airplanes 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:

CAA Special Conditions Ref. 9/30/AHR1302 dated 30 May 1984 are applicable when an Automatic Performance Reserve System is embodied.

(iii) Equivalent Level of Safety Findings: Nil

(iv) Exemptions:

The following Special Conditions were applied by the FAA under their Type Certificates (Relevant when assessing compliance with CAR Part 26 requirements):

FAA Exemption No.3548 – Against the emergency exit requirements of SFAR 41 Section 5(e) – In lieu of having four emergency exits BAe elected to show compliance with alternative Sections of FAR Part 25 which show equivalent safety. The aircraft also has greater than usual headroom (71") and the two exits fitted are larger than required.

FAA Exemption No.4130 – Against the minimum aisle width of 25.815 specified under Exemption 3548 and SFAR41 – For the portion more than 25 inches from the floor. Eastern Metro Express first three rows width is 15" versus the 20" of 25.815. Approval based on compliance with SFAR41 and an evacuation demonstration.

FAA Exemption No. 4908 against FAR §23.807(d)(I)(ii) — BAe introduced a second Type III emergency exit on the LHS for the J32. An exemption was also needed because existing J31 exemptions did not apply. The FAA determined that a single larger emergency exit, along with additional requirements, would compensate for the reduced safety due to elimination of one exit.

FAA Exemption No. 4927 against various FAR 23 paragraphs — BAe petitioned to meet the ground load requirements of FAR 25.471 thru 25.511 Transport Category in lieu of the same Part 23 paragraphs, except for 23.507 jacking loads. The same for FAR 25.721 thru 25.735 landing gear requirements. Part 25 loads are lower than the new Commuter Category rules because it is assumed pilot skills and standards will be higher, but ground loads are more comprehensive.

(v) Airworthiness Limitations:

See Maintenance Schedule (Series 3100)

See Manufacturer's Maintenance Manual, Chapter 5 (Series 3200)

- (3) Aircraft Noise and Engine Emission Standards:
 - (i) Environmental Standard:

The Jetstream Series has been certificated under BCAR Section N, Issue 2 Chapter N3-2, Para 2 for the Model 3100 and Chapter N3-4 for the Model 3200. (Equivalent to ICAO Annex 16, Chapter 1.)

(ii) Compliance Listing:

EASA Type Certificate Data Sheet for Noise A.191 Issue 1, 21 May 2009 Noise Level – Model 3100 at 7059 kg MAUW – Takeoff: 77.1 dB(A) Noise Level – Model 3200 at 7350 kg MAUW – Overflight: 72.2 dB(A)

Supersedes:

BCAR Noise Type Certificate No.46 BCAR Noise Type Certificate No.200 dated 22/12/95 (Mod.7832)

(4) Certification Compliance Listing:

BAe Report No.AW.R/038/JM31 – dated 20.5.87

Jetstream 31 Compliance with Italian Certification Requirements - Lists the means of compliance with FAR23 at amendment 21, SFAR 41c, and FAR 135 Annex A

BAe Report AW.R/002/JM31 – dated 17.5.84

Proposed C.A.A. Special Conditions for British Aerospace Jetstream Series 3100 with Automatic Performance Reserve System

Jetstream 31 Variant Build Standard JS-3100/VBS.620/2 incorporating Type Build Standard for Certification in the Commonwealth of Australia CAA Airworthiness Approval Note No. 18193 Issue 2 – Modification 73107

BAe Commercial Aircraft – Airworthiness Department Report AWR/052/JM – Jetstream Series 3200 Compliance Checklist (FAA Requirements)

CAA UK AAN 20182 – British Aerospace Jetstream Series 3200 Model 3202 Modification No.83202 UK CAA Type Certification

CAA UK AAN 20182 Addendum 1 – BAe Jetstream Series 3200 Model 3202 Additional Optional Modifications Approved at time of Initial Certification

CAA UK AAN 20183 – British Aerospace Jetstream Series 3200 Jetstream 3201 Modification No. 83201 FAA Type Certification

CAA UK AAN 20183 Addendum 1 – BAe Jetstream Series 3200 Model 3201 Additional Optional Modification Approved at time of Initial FAA Certification

(5) Flight Manual: UK CAA Approved Flight Manual – Jetstream Series 3100 – Model 3101 – Document No.HP.4.10 – CAA Accepted as AIR 2574

UK CAA Approved Flight Manual – Jetstream Series 3100 – Model 3102 – Document No.HP.4.11 – CAA Accepted as AIR 2573

UK CAA Approved Flight Manual – Jetstream Series 3200 – Model No. 3201 – Document No. HP4.16 – CAA Accepted as AIR 2629

UK CAA Approved Flight Manual – Jetstream Series 3100 – Model 3107 – Document No. HP4.13 – CAA Accepted as AIR 2676 (Includes Particular Amendment P/38 relating to Mod.7832.)

UK CAA Approved Flight Manual – Jetstream Series 3200 – Model No. 3202 – Document No. HP4.17 – CAA Accepted as AIR 3216

- (6) Operating Data for Aircraft, Engine and Propeller:
 - (i) Maintenance Manual:

Jetstream 31 Maintenance Manual – Publication SA.4-3100/AMM/13

Jetstream Series 3100 and 3200 Component Maintenance Manual - Publications SA.4-3100/CMM/201 and SA.4-3100/CMM/06

Jetstream Series 3200 Maintenance Manual – Document S.A.4-3100/AMM/257

Jetstream 3100 and 3200 Maintenance Schedule – Publication SA.4-3100/MS/3.

Allied Signal TPE331-12UAR MM 72-00-79

McCauley Service Manual No. 860201 – C650 Series CS propellers

(ii) Current service Information:

Jetstream Series 3100 and 3200 Service Bulletins at Rev. 9 May 31/96 - Vol.s 1-12.

Allied Signal TPE Service Information and Pilot Advisory Letters

(iii) Illustrated Parts Catalogue:

Jetstream Series 3100 and 3200 IPC – Publications SA.4-3100/IPC/12 and IPC/51

Allied Signal Model No. TPE331-12 IPC 72-00-78

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

CAA 2171 from Jetstream A/C Ltd Customer Information Manager dated 13.11.96 CAA 2171 form from BARA Senior Publications Engineer dated 12/8/98

Publications are now accessed through the British Aerospace iSapphire website

(8) Other information:

UK CAA AAN No.23272 – Jetstream c/n 719 G-BTXG – BAe Mod. 77191 – Conversion Modification Standard Model 3101 (USA) to Model 3102 (UK).

UK CAA Airworthiness Approval Note No.19099 & Addendum 1 – Mod. JK3339A External Under Fuselage Baggage Pod & FM Supplement for US Registered Aircraft

Report JS-3100/TBS.3102/1 – Jetstream 31 Type Build Standard for U.K. Certification (Also identified as BAe Modification 73102 [AAN 16436])

Report JS-3100/TBS.3101/2 – Jetstream 31 Type Build Standard for U.S. Certification (Also identified as BAe Modification 73101 [AAN 16436])

Jetstream 31 Crew Manual Volumes 1 and 2 – Publication SA.4-3100/CM/35 and 35A applicable to the Model 3101-05, -07 and -12.

Jetstream 31 Crew Manual Volumes 1 and 2 – Publication SA.4-3100/CM/08 and 08B applicable to the Model 3102-05.

CAA Master Minimum Equipment List – Jetstream Series 3100 and Series 3200.

Jetstream Series 3100 Variant Electrical Load Analysis – Customer Model 3101-05. Variant Electrical Load Analysis – Jetstream Customer Model 3201-101 c/n 967

Drawing 13735001K - G.A. of Aerials and Provision for Looms and Clipping.

Jetstream Wiring Manual – Fig 91-00-07 Location of Antennas – s/n 616 May 15/83 Jetstream Wiring Manual – Fig 91-00-07 Location of Antennas – s/n 651 Apr 15/85

Jetstream 31 Detailed Specification – Issue 2 – Doc. No. SA.4-3100/DS/2. Jetstream Super 31 Airliner – Technical Specification SEP 20 Issue 2 April 1989 Jetstream 32 Detailed Specification SA.4-3200/DS/1

BAe PLC Design Department Report TECH 392 – Jetstream Series 3200 Description of Design Changes Introduced on Jetstream Series 3200

Jetstream Series 3200 Manufacturer's Operating Manual – Model 3201 – Document SA.4-3100/MOM/257 – Parts 1 and 2

5. Additional New Zealand Requirements

Compliance with the retrospective airworthiness requirements of NZCAR Part 26 has been assessed (for convenience for the J32, which used FAR 23 Commuter Category under the FAA Type Certificate. There is no physical difference between the Models, except for some instruments), as they are a prerequisite for the grant of an airworthiness certificate.

CAR 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 §23.811(b) for Commuter Category
B.2	Crew Protection Requirements – CAM 8 Appdx. B # .35	Not Applicable – Agricultural Aircraft only

Appendix C – Air Transport Aeroplanes – More than 9 Pax

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
C.1	Doors and Exits	FAR §23.807(b) and §23.807(d)(2)
C.2.1	Additional Emergency Exits – per FAR 23.807(b) @ 10.5.93	Exemptions 99/EXE/29(1) and (2) issued - (Based on and subject to the same conditions in FAA exemption 4098)
		Exemption 0/EXE/47(2) granted to apply to all J31 aircraft
C.2.2	Emergency Exit Evacuation Equipment – Descent means	FAR §23.807(d)(1) – J32 exit less than 2m from the ground
C.2.3	Emergency Exit Interior Marking – Size/self-illuminating	FAR §23.811(b) for Commuter Category
C.3.1	Landing Gear Aural Warning – Automatic Flap Linking	FAR §23.729(f) – Horn inhibition prevented when flaps are
		lowered beyond 10° setting – See DS §2.6.1.3(e)(ii)

Compliance with the following additional NZ operating requirements has been reviewed (again for the J32 using FAR 23) and were found to be covered by either the original certification requirements or the basic build standard of the aircraft, except as noted:

CAR Part 91 – Subpart F – Instrument and Equipment Requirements

PARA:	REQUIREMENT:		MEANS OF COMPLIANCE:		
91.505	Seating and Restraints – Safety belt/Shoulder Harness		FAR §23.785(c)		
91.507	Pax Information Signs – Smoking, safety belts fastened		Kit 3162 fitted as standard – See JS3100/VBS.620/2		
91.509	(1) ASI	FAR §23.1303(a) *	(8) Coolant Temp	N/A – Turbine engined	
Min.	(2) Machmeter	N/A	(9) Oil Temperature	FAR §23.1305(c) *	
VFR	(3) Altimeter	FAR §23.1303(b) *	(10) Manifold Pressure	N/A – Turbine engined	
	(4) Magnetic Compass	FAR §23.1303(c) *	(11) Cylinder Head Temp.	N/A – Turbine engined	
	(5) Fuel Contents	FAR §23.1305(a) *	(12) Flap Position	FAR §23.699(a)(2) *	
	(6) Engine RPM	FAR §23.1305(e) *	(13) U/C Position	FAR §23.729(e) *	
	(7) Oil Pressure	FAR §23.1305(b) *	(14) Ammeter/Voltmeter	FAR §23.1351(d) *	
91.511	(1)Turn and Slip	Fitted as Standard - See POH	(3) Anti-collision Lights	FAR §23.1401	
Night	(2) Position Lights	FAR §23.1385	(4) Instrument Lighting	FAR §23.1381	
91.513	VFR Communication Equ	ipment	King KHF950/ Dual Collins VHF20A fitted as standard *		
91.517	IFR Instruments and Equipment		Fitted as Standard – See SA.4-3200/DS/1		
91.519	IFR Communication and I	Navigation Equipment	Dual Collins ADF60, Dual Collins VIR30A and Collins		
			DME40 fitted as standard per kits 3308B, 3309B and 3310B *		
91.523	(a) More Than 9 pax - First Aid Kits per Table 7		To be determined on an individ	To be determined on an individual aircraft basis	
Emrgcy			To be determined on an individ	ual aircraft basis	
Eqpmt.	(b) More than 20 pax - Axe readily accessible to crew		Not Applicable – Less than 20 j	passenger seats	
	(c) More than 61 pax - Portable Megaphones per Table 9		Not Applicable – Less than 61 passenger seats		
91.529			Operating Rule - Compliance to be determined by Operator		
91.531	Oxygen Indicators - Volum	ne/Pressure/Delivery	FAR §23.449 – Fitted as Standard		
91.535	(1) Flight Crew Member (On-Demand Mask;	Kits 3078, 3470 and 33392A fitted as standard *		
Press.	(2) Pax mask, Portable ox	ygen equipment	Kits 3039 and 3119 fitted as standard *		
A/c	(3) Crew Member – Pax Oxygen Mask and Portable		1		
	(4) Minimal Supplemental Oxygen Quantity		- To be determined on an individual aircraft basis		
	(5) Specified Supplemental/Therapeutic Oxygen Quantity				
91.541	SSR Transponder and Altitude Reporting Equipment		Dual Collins TDR90 fitted as standard per Kit 3311 *		
91.543	Altitude Alerting Device - Turbojet or Turbofan		Fitted as standard per Kit 3397A *		
91.545	Assigned Altitude Indicator		Not Applicable – See above		
A.15	ELT Installation Requirements		To be determined on an individual aircraft basis		

Civil Aviation Rules Part 125

Subpart F - Instrument and Equipment Requirements

PARA:	REQUIREMENT:		MEANS OF COMPLIANCE:	
125.355	Seating and Restraints		FAR §23.785(c)	
125.357	Additional Instrume	ents (Powerplant and Propeller)	Certified to Far Part 23 – Design Standard per Appendix C	
125.359	Night Flight	Landing light, Pax compartment	Operating Rule - Compliance to be determined by Operator	
125.361	IFR Operations	Speed, Alt, spare bulbs/fuses	Operating Rule - Compliance to be determined by Operator	
125.361	SE IFR Requirements	s – If Applicable	Not Applicable – Not a single-engined aeroplane	
125.363	Emergency Equipme	nt (Part 91.523 (a) and (b))	Not Applicable – Not turbo jet powered	
125.365	Public Address and C	Crew Member Intercom System	Kit 3249 fitted as standard *	
125.367	Cockpit Voice Recor	der – App B.3 states TSO C84/C123	Fairchild A100 CVR with ULD available per Kit 3245B/1 *	
125.369	Flight Data Recorder – Appendix B.4 specifies TSO C124 with 18 recorded parameters		Sundstrand 980-4100-FWUS available per Kit 3174B *	
125.371	Additional Attitude Indicator		Standby AH fitted as standard per Kit 3282 *	
125.373	Weather Radar – Appendix B.6 requires TSO C63		Collins WXR300 fitted as standard per Kit 3312B/3313	
125.375	Ground Proximity Warning System - App B.7: TSO C92		Sundstrand Mk.2 GPWS fitted per Kit 3331A	
125.377	HUMS		Not Applicable – Not a single-engined aeroplane	
	Terrain Awareness and Warning System (TAWS) Appendix B.9 requires TSO C151a or b		Operating Rule - Compliance to be determined by Operator	
1	Airborne Collision Avoidance System (ACAS II) Appendix B.10 requires TSO C118/119a or C119b		Operating Rule - Compliance to be determined by Operator	

^{*}See Detailed Specification SA.4-3200/DS/1 – Jetstream Series 3200 – Section 3.13.1.1 Standard Options (The basic equipment fit of the Series 3100 is the same.)

Attachments

The following documents form attachments to this report:

Three-view drawing British Aerospace Jetstream Series 3100 Copy of EASA Type Certificate Data Sheet Number A.191

Sign off

David Gill	Checked – Peter Gill
Team Leader Airworthiness	Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

Model:	Applicant:	CAA Work Request:	Date Granted:
3101 and 3102	British Aerospace PLC	96/21B/12	19 December 1996
3201	Air National Ltd	99/21B/2	22 October 1998
3107	Horizon Air Support Ltd	0/21B/8	17 December 1999
3202	Vincent Aviation Ltd	12/21B/15	29 May 2012