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# **Type Acceptance Report**

**TAR 8/21B/15 – Revision 2**

**HAWKER BEECHCRAFT 4000**



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## Executive Summary

New Zealand Type Acceptance has been granted to the Hawker Beechcraft Model 4000 based on validation of FAA Type Certificate number T00013WI. 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(c).

## 1. Introduction

This report details the basis on which Type Acceptance Certificate No.8/21B/15 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:	Hawker Beechcraft Corporation (since 26 March 2007) Raytheon Aircraft Company
Type Certificate: Issued by:	T00013WI Federal Aviation Administration
Model:	4000
MCTOW:	37,500 lbs [17,010 kg] 39,500 lbs [17,917 kg] Increased Gross Weight (IGW) Aircraft
Max. No. of Seats:	2 crew, 10 pax
Noise Standard:	Standard Aircraft – FAR Part 36, including Amendment 36-24. IGW Aircraft – FAR Part 36, including Amendment 36-28.
Engine:	Pratt & Whitney Canada PW308A Type Certificate: E-31 Issued by: Transport Canada

### 3. Type Acceptance Details

The application for New Zealand type acceptance was from the manufacturer, dated 5 April 2007. The Hawker 4000 is a twin-turbofan super-midsize business jet with an all-composite fuselage. During the validation exercise two CAA certification specialists visited the Hawker Beechcraft facility in Wichita.

Type Acceptance Certificate No. 8/21B/15 was granted on 16<sup>th</sup> January 2009 to the Hawker Beechcraft 4000 based on validation of FAA Type Certificate T00013WI. (The PW308A engine is covered by Type Acceptance Certificate number 8/21B/1.) Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The Hawker 4000 is a new Beech design with a sandwich graphite-epoxy/honeycomb composite fuselage, hybrid composite/metallic empennage, a low monoplane all-metal wing, and tricycle landing gear. Two PW308A turbo fan engines with thrust reversers are pylon-mounted on the rear fuselage with a Honeywell APU mounted in the tail-cone. Standard seating is for 8 passengers and a minimum crew of 2, with an option for a divan and belted toilet to accommodate 10 passengers. A class B baggage compartment with internal and external access is provided behind a secondary pressure bulkhead installed at the rear of the main cabin. One APU and two engine driven AC generators power a split bus electrical distribution system with emergency power provided by two lead acid batteries and a hydraulically driven generator. A Primus Epic EDS is installed with two primary flight displays, two multifunctional displays, an engine indicating and crew alerting system, and two multifunction control display units.

This report was raised to Revision 1 to include aircraft serial numbers RC-29 and after or airplanes modified by kit 401-4000 (Note: RC-7 through RC-28 have been modified by kit 401-4000) with an increased MCTOW of 39,500 lbs.

This report was raised to Revision 2 to include aircraft serial numbers RC-59 and after (or airplanes modified by Kits 401-3007, 401-3008, 401-3027 or 401-3028) which introduces a new avionics suite known as a Block Point Upgrade (BPU-A) or Load 20. Type acceptance is based on Revision 10 of FAA TCDS T00013WI dated 2<sup>nd</sup> September 2011. Type acceptance was granted on 13<sup>th</sup> July 2012.

#### 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:

(1) ICAO Type certificate:

FAA Type Certificate Number T00013WI

FAA Type Certificate Data Sheet no. T00013WI at Rev. 4 dated November 12, 2008  
– Model 4000 approved 21 November 2006

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the Hawker 4000 is FAR Part 25 effective 1<sup>st</sup> February 1965, as amended by 25-1 through 25-105, and §25.856 as amended by 25-111, plus §25.1457 and §25.1459 as amended by 25-124. This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1, as FAR 25 is the basic standard for Transport 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:*

No. 25-162-SC High Intensity Radiated Fields: As the Model 4000 includes a composite fuselage structure and utilises avionics systems which perform critical functions the aircraft maybe vulnerable from external HIRF interference. As no specific regulations address protection requirements a special condition, similar to that applied on previous FAR 25 certification projects, was required.

No. 25-279-SC Side-Facing Single-Occupant Seats: As the design of a side-facing seat was not considered in establishing the requirements of FAR §25.785 and §25.562 a special condition was required to ensure an occupant of the aft belted lavatory seat was afforded an equivalent level of safety to those occupying a forward or aft facing seat. The same special condition had been applied on several prior FAR 25 certification projects.

(iii) *Equivalent Level of Safety Findings:*

TC1258WI-T-A-5 Emergency Exit Marker & Locator Signs §25.811(d)(1) & §25.812(b)(1)(i): Combined locator/markings signs, and reduced placard size was accepted for main door and over-wing hatches due to the small size of the fuselage and unobstructed cabin visibility.

TC1258WI-T-A-6 Water Dam 25.807(i): The main entry door is below the water line but qualifies as a ditching exit with the installation of a water barrier to slow the flow of water. Installation by a layperson has been demonstrated with suitable placards and instructions embodied.

TC1258WI-T-A-8 Frangible Door for Lavatory §25.813(e): The lavatory door between the belted toilet seat and the main cabin has an emergency egress panel which can be broken through iaw AC25-17. The frangible door release has been demonstrated in a ground test by a 5<sup>th</sup> percentile female.

TC1258WI-T-A-9 Door Handle Markings §25.811(e)(4): The main exit door handle rotates in a plane perpendicular to the plane of the exit. In accordance with FAA AC 25-17 this is not considered a “rotary handle”, and as such, door handle markings on the aft surface of the LH forward closet have been granted an equivalent level of safety.

TC1258WI-T-F-1 Use of 1g Stall Speed 25.103: The minimum speed at which wing lift alone can support the weight of the airplane in level flight is used as a consistent basis for the definition of stall speed. This standard was subsequently adopted at Amdt 25-108.

TC1258WI-T-P-1 Thrust Reverser §25.933(a)(1)(i) & (ii): Reliability analysis, design assurance and continued airworthiness features were required to completely eliminate the risk of catastrophic in-flight reverser deployment from normal operation as detailed in Generic Issue Paper for Flight Critical Thrust Reversers.

TC1258WI-T-P-7 Digital Engine Displays §25.1549(a),(b) & (c): The use of digital displays which change colour to indicate normal, transient and maximum limits of N2, oil temperature, oil pressure, and fuel flow were accepted as providing an equivalent level of discernable information when compared to analogue instruments.

TC1258WI-T-P-8 APU Displays §25.1305(a) & (c), §25.1501(b), & §25.1549: The APU is controlled by an Auxiliary Power Control unit which maintains operating parameters and initiates a shut down when predefined limits are reached or a fault develops. As flight crew action is automated the flight deck display is limited to RPM and EGT for information only.

TC1258WI-T-SE-8 High Altitude Airport Operation §25.841(b)(c): As the H4000 is certified for takeoffs up to 14000 ft an Integrated Cabin Pressure Control Valve is installed which contains logic to reset the cabin high altitude warning threshold depending on the takeoff and selected landing field elevations

TC1258WI-T-SE-21 Gust Lock §25.679(a)(2): Aural and visual master warnings and pre-flight crew procedures provide an equivalent means to limit the operation of the aircraft with the gust locks engaged.

TC1258WI-T-SE-23 Magnetic Compass §25.1303(a)(3): Heading is displayed on Primary Flight Displays and the full-time Secondary Flight Display with all functions of the standby direction indicating system independent of the main aircraft systems. Reliability, system independence, power supply, HIRF, the MMEL and lightning protection issues have been evaluated and accepted.

TC1258WI-T-SE-24 Hydraulic System Functional Test §25.1435: The hydraulic system was static tested to 1.5 DOP (4650 psi) in accordance with Amdt 25-72. The operational test of the system at 1.25 DOP introduced at Amdt 25-104 relieves the requirement of the earlier amendment.

TD4618WI-T-SE-1 Temperature and Humidity §25.831(g): HBC has shown compliance to a Transport Airplanes Issue Group draft rule, using a transient core body temperature analysis as an equivalent to the temperature and humidity requirements of 25.831(g).

*(iv) Exemptions:*

No. 7512A FAR §25.785(b) Side-Facing Multiple Place Seats: The provisions of FAR §25.785(b) were found to be inappropriate for the sideways facing divan seats in the Hawker 4000. The FAA partially concurred and granted an exemption subject to a number of conditions. These conditions effectively provided an equivalent level of safety for the occupants but with more rational testing criteria. HBC established compliance with the conditions of the exemption. Future design modifications to the interior configuration need to take these conditions into account as they are effectively the modified cert basis. It is also likely the FAA will revise the requirements of FAR §25.785 to incorporate the issues that arose during certification of the Hawker 4000 and similar 'small' FAR 25 aircraft.

No. 8760A FAR §25.1435(a)(1) Hydraulic System Proof Pressure Testing: This exemption was granted and then extended to account for changes in the requirements for hydraulic system proof testing (to harmonize FAA and EASA rules) that were introduced during the design and development of the aircraft. Exemption was granted to allow type certification to proceed with the



condition that testing of hydraulic system components would be undertaken to show compliance with 25.1435(a)(1) prior to 21 December 2007. If any design changes are required to show compliance with this requirement HBC will develop service information to incorporate the changes, and the FAA will not issue an export C of A for aircraft until compliance is shown.

No. 8761A FAR §25.981 Fuel System Safety Analysis and Documentation: This exemption was required once again due to the lengthy development process that caused it to become necessary to show compliance with 25.981(b) at amdt 25-102 after the fuel tank design had been completed. In anticipation of the fuel tank flammability requirements HBC had taken steps during the design to meet the intent of the new rules. In particular these included the absence of a centre wing tank and separation of the air cycle machine from the fuel tanks. The fuel pumps and quantity indicating systems have also been designed to reduce the possibility of electrical ignition of fuel vapours. HBC argued that the Hawker 4000 substantially met the intent of the rule but requested a 2 year exemption to allow compliance to be fully established. The FAA agreed to the request with the condition that HBC complete a fuel system safety analysis prior to 1 Sept 2008. Aircraft produced prior to 1 Sept 2008 cannot be operated beyond 1 Sept 2009 unless any required design changes are incorporated.

(v) *Airworthiness Limitations:*

Part No. 401-590001-0027 – Airworthiness Limitations Manual.

(3) Aircraft Noise and Engine Emission Standards:

(i) *Environmental Standard:*

FAR Part 34, including Amendments 34-1 through 34-3.

FAR Part 36 including Amendments 36-1 through 36-24 (Standard Aircraft).

FAR Part 36 including Amendments 36-1 through 36-28 (IGW Aircraft).

(ii) *Compliance Listing:*

Report 4000E0551 Rev.1 – Smoke Emissions and Noise Analysis Report  
Acoustic Analysis Associates Inc. Report AAAI 1303 – Noise Certification  
Compliance Report – Raytheon Model 4000 Horizon.

(4) Certification Compliance Listing:

Model 4000:

Report 4000E168383 Rev.2 – 14 CFR Compliance Checklist.

Model 4000 (IGW):

Report 4000E299000 Rev. 3 – Engineering Certification Plan – Increased Gross Weight (4000-H) FAA Project Number: AT4838WI-T

Model 4000 BPU-A:

Report 4000E360496 Rev.2 – Engineering Certification Plan Model 4000 Block Point Upgrade A – HI Load 20 Systems Upgrade.

Report 4000E360497 Rev.3 – Engineering Certification Plan for Block Point Upgrade A – HI Load 20 Avionics Options/Upgrades.

Report 4000E360498 Rev.3 – FAA Certification Plan for Block Point Upgrade A – P&WC FADEC 801.

Report 4000E360500 Rev.3 – FAA Certification Plan for Block Point Upgrade A – HSC Load 18 Electrical System.

Report 4000E360501 Rev.4 – FAA Certification Plan for Block Point Upgrade A – ELDEC Software Upgrade Mechanical Systems.

- (5) Flight Manual: FAA-Approved Airplane Flight Manual – Hawker 4000 (RC-7 and after) P/N 401-590001-0003B – CAA Accepted as AIR 3045

FAA-Approved Airplane Flight Manual – Hawker 4000 (Airplane Serials RC-29 and After or Airplanes Modified by Kit 401-4000) P/N 401-590001-0035 – CAA Accepted as AIR 3080

FAA-Approved Airplane Flight Manual – Hawker 4000 (Airplane Serials RC-59 and After or Prior Airplane Serials with Kit 401-3007 or 401-3008 or 401-3027 or 401-3028 Installed for Block Point Upgrade A) P/N 401-590001-0078 – CAA Accepted as AIR 3319

- (6) Operating Data for Aircraft:

(i) *Maintenance Manual:*

Airplane Maintenance Manual Document Part Number 401-590001-0015,  
Airplane Maintenance Schedule Document Part Number 401-590001-0029.

(ii) *Current Service Information:*

HBC Online Service Information Library (ISU holds subscription details)  
[http://www.hawkerbeechcraft.com/service\\_support/pubs/](http://www.hawkerbeechcraft.com/service_support/pubs/).

(iii) *Illustrated Parts Catalogue:*

Document Part Number 401-590001-0011B.

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

HBC Online Service Information Library and Online Manuals  
[http://www.hawkerbeechcraft.com/service\\_support/pubs/](http://www.hawkerbeechcraft.com/service_support/pubs/).

- (8) Other information:

Report 4000E0589 – Electrical Load Analysis – Model 4000

“Specification and Description, Serial Numbers RC-21 and on” – Model 4000.

## 5. Additional New Zealand Requirements

Compliance with the retrospective airworthiness requirements of NZCAR Part 26 has been assessed as they are a prerequisite for the grant of an airworthiness 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	FAR 25.811 and ELOS Issue Paper A-5.
B.2	Crew Protection Requirements – CAM 8 Appdx. B # .35	Not Applicable – not agricultural aircraft

##### Appendix C – Air Transport Aeroplanes – More than 9 Pax

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
C.1	Doors and Exits	(1) Main, over-wing and baggage compartment exit internal and external operation. (2) FAR 25.783 Amdt 88 (3) Honeywell Epic avionics system – ref AFM §3A
C.2.1	Additional Emergency Exits – per FAR 23.807(b) @ 10.5.93	(a) FAR 25 (b)(1) FAR 25.807 Amdt 94, LH main and RH over-wing (b)(2) Not Applicable – max 10 pax (b)(3) Not Applicable – max 10 pax
C.2.2	Emergency Exit Evacuation Equipment – Descent means	Main exit <2m from ground, 1 over-wing exit
C.2.3	Emergency Exit Interior Marking – Size/self-illuminating	FAR 25.811 and ELOS Issue Paper A-5.
C.3.1	Landing Gear Aural Warning – Automatic Flap Linking	(a) Honeywell Epic avionics system – ref AFM §3A (b) Honeywell Epic avionics system – ref AFM §3A (c) Not Applicable – non amphibious

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

Compliance to CAR Part 91 at Amendment 18 refers to the amendment status of specific sections of FAR Part 25 included in the certification basis of the Model 4000 (Amdt 105).

#### Subpart F – Instrument and Equipment Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
91.505	Seating and Restraints – Safety belt/Shoulder Harness	FAR 25.785 Amdt 88
91.507	Pax Information Signs – Smoking, safety belts fastened	FAR 25.791 Amdt 72
91.509 (a) VFR	(1) ASI (2) Machmeter (3) Altimeter (4) Magnetic Compass  (5) Fuel Contents (6) Engine RPM (7) Oil Pressure (8) Coolant Temp	FAR 25.1303(b)(1) Amdt 90 FAR 25.1303(c)(2) Amdt 90 FAR 25.1303(b)(2) Amdt 90 FAR 25.1303(a)(3) Amdt 90 – (ELOS Issue Paper SE-23) FAR 25.1305(a)(2) Amdt 72 FAR 25.1305(c)(3) Amdt 72 FAR 25.1305(a)(4) Amdt 72 N/A - not liquid cooled
91.511 Night	(a)(1) Turn and Slip (a)(2) Position Lights	FAR 25.1303(b)(4) Amdt 90 FAR 25.1389 Amdt 0
91.513	VFR Communication Equipment	Ref “Specification & Description, Serial Numbers RC-20 and on” document §14.
91.517 IFR	(1) Gyroscopic AH (2) Gyroscopic DI (3) Gyro Power Supply (4) Sensitive Altimeter	Honeywell Epic EFIS system FAR 25.1303(b)(6) Amdt 90 FAR 25.1331(a) Amdt 41 FAR 25.1303(b)(2) Amdt 90
91.519	IFR Communication and Navigation Equipment	Ref “Specification & Description, Serial Numbers RC-20 and on” document §14.

91.523 Emrgcy Eqpmt.	(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	Customer option – determined on individual aircraft. Standard fit in cockpit and cabin (ref spec doc §18). N/A – maximum 10 pax N/A – maximum 10 pax
91.529	ELT - TSO C91a or C126 after 1/4/97 (or replacement)	Standard fit – Artex 406 ELT. TSO C126
91.531	Oxygen Indicators - Volume/Pressure/Delivery	(1)(i) – FAR 25.1441 and 25.1449 Amdt 0 (1)(ii) – Ref HBC ER4000E251639 §5.2.5 – CAS message (2) – Ref HBC ER4000E251639 §5.2.6 – CAS message
91.535 Press. A/c	(1) Flight Crew Member On-Demand Mask; 15 min PBE (2) 1 Set of Portable 15 min PBE (3) Crew Member - Pax Oxygen Mask; Portable PBE 120l (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 <sub>2</sub> Masks for all Pax/Crew - Supplemental Mask in Washroom/Toilet Above FL300 - Total Outlets Exceed Pax by 10% - Extra Units Uniformly Distributed - Automatically Presented Above FL140 - Manual Means of Deploying Pax Masks	Maximum operating altitude 45,000 ft. Capacity 100ft <sup>3</sup> . Two quick-don diluter-demand flight crew masks. Auto-deploy masks installed in overhead bins adjacent to crew seat, passenger seats, lavatory (2), and vestibule.  Ref HBC prepared document “New Zealand CAA Oxygen Requirements for Operations”.
91.541	SSR Transponder and Altitude Reporting Equipment	Standard fit – Dual Honeywell XS-855 Mode S Transponders (ref spec doc §14).
91.543	Altitude Alerting Device - Turbojet or Turbofan	Standard fit – Honeywell Epic avionics system
91.545	Assigned Altitude Indicator	Standard fit – Honeywell Epic avionics system
A.15	ELT Installation Requirements	<b>To be determined on an individual aircraft basis</b>

## Civil Aviation Rules Part 125

Compliance to CAR Part 125 at Amendment 13 refers to the amendment status of specific sections of FAR Part 25 included in the certification basis of the Model 4000 (Amdt 105).

## Subpart F - Instrument and Equipment Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
125.355	Seating and Restraints	FAR 25.785 Amdt 88
125.357	Additional Instruments (Powerplant and Propeller)	(a) – FAR 25.1305(a)(2) Amdt 72 (b) – N/A turbojet
125.359	Night Flight	(1) – FAR 25.1383 Amdt 0 (2) – <b>To be determined on an individual aircraft basis</b>
125.361	IFR Operations	Speed, Alt, spare bulbs/fuses
125.361	SE IFR Requirements – If Applicable	N/A – twin engine
125.363	Emergency Equipment (Part 91.523 (a) and (b))	<b>To be determined on an individual aircraft basis</b>
125.365	Public Address and Crew Member Intercom System	Standard fit – dual audio/intercom/PA (ref spec doc §14).
125.367	Cockpit Voice Recorder Appendix B.3 requires TSO C84/C123	Standard fit – L3 FA2100 CVR with 2hr recording time (ref spec doc §14). TSO C123a
125.369	Flight Data Recorder Appendix B.4 requires TSO C124	Standard fit – L3 FA2100 FDR. TSO C124a – 88 Parameters
125.371	Additional Altitude Indicator	Standard fit – Honeywell Epic avionics system
125.373	Weather Radar Appendix B.6 requires TSO C63	Standard fit – Primus 880 (ref spec doc §14). TSO C63c
125.375	Ground Proximity Warning System Appendix B.7 requires TSO C92	Standard fit – Honeywell EGPWS (ref spec doc §14). TSO C92c, C117a, C129a, C151b
125.377	HUMS	N/A – twin engine
125.379	Terrain Awareness and Warning System (TAWS) Appendix B.9 requires TSO C151a or b	Standard fit – Honeywell EGPWS (ref spec doc §14). TSO C92c, C117a, C129a, C151b
125.381	Airborne Collision Avoidance System (ACAS II) Appendix B.10 requires TSO C118/119a or C119b	Standard fit – Honeywell AT-910 TCAS II (ref spec doc §14). TSO C119a

## Attachments

The following documents form attachments to this report:

Three-view drawing Hawker Beechcraft Model 4000 Horizon  
Copy of FAA Type Certificate Data Sheet Number T00013WI

## Sign off

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Greg Baum  
Airworthiness Engineer

.....  
Checked – David Gill  
Team Leader Airworthiness

## Appendix 1

### List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
4000	Hawker Beechcraft Corporation	8/21B/15	22 July 2008
4000 (IGW)	Hawker Beechcraft Corporation	8/21B/15	16 January 2009
4000 (BPU-A)	Hawker Beechcraft Corporation	12/21B/17	13 July 2012