

United States of America
Department of Transportation — Federal Aviation Administration
Supplemental Type Certificate

Number

SA3820SW 190-2404
PWH

This certificate, issued to Greenwich Aircraft Corporation
7727 Airport Road
Waco, Texas 76708

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 4b of the Civil Aviation Regulations and Part 25 of the Federal Aviation Regulations

Original Product — Type Certificate Number: A-669
Make: McDonnell-Douglas
Model: DC3C-SC3G, -S1C3G, -S4C4G, -R-1830-90C

Description of Type Design Change:

Installation of Pratt & Whitney Canada PT6A-65AR or PT6A-67R engines. Modified in accordance with Drawing List SA-DL1-DC3, Rev. M, dated 9/03/93, with E.O. No. B-1, dated 9/03/93 for Dwg.No. 71-70-00, and Teleflex Drawing List SK-4923-0, dated 4/9/87, or later FAA approved revisions.

Limitations and Conditions:

The following Airplane Flight Manual or later FAA Approved Revisions are required as appropriate:
FAA Approved Airplane Flight Manual (AFM) dated 8/4/87, with Change 3, dated 12/14/93, when the airplane is modified in accordance with Drawing List SA-DL1-DC3, Rev. M, dated 9/03/93.
See continuation sheet
This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: July 18, 1985

Date issued: 07/23/93, 9/15/93

Date of issuance: August 4, 1987

Date amended: 12/22/87, 7/27/89, 12/14/93
Rev. 3

By direction of the Administrator



Gen Broach
(Signature)
Mark R. Schilling, Manager
Special Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

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Limitations and Conditions:

The conditions & limitations of Aircraft Specification No. A-669 apply except as follows:

This specification, which is a part of Supplemental Type Certificate No. SA3820SW, prescribes conditions and limitations under which the product for which the Supplemental Type Certificate was issued meets the airworthiness requirements of the Civil Air Regulations. A copy of this Supplemental Type Certificate Specification shall be maintained as part of the modified aircraft's permanent records.

Supplemental Type Certificate Holder GREENWICH AIRCRAFT CORPORATION
7727 Airport Road
Waco, Texas 76708

Model: DC3C-SC3G, -S1C3G, -S4C4G, -R-1830-90C

Engine: 2 Pratt & Whitney Canada PT6A-65AR, or
 2 Pratt & Whitney Canada PT6A-67R

Fuel: Pratt & Whitney of Canada Service Bulletin 13044 (See
 NOTE 9)

Oil: Pratt & Whitney of Canada Service Bulletin 130001 (See
 NOTE 10)

Engine Limits	Ratings
Takeoff (5 min)	
Shaft horsepower	1230
Maximum continuous at sea level	
Shaft horsepower	1165

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Limitations and Conditions:

The engine ratings are based on static sea level conditions (No external accessory loads and no airbleed). The PT6A-65AR maximum continuous rating is available to 101 deg F Air Inlet Temperature (AIT) and takeoff rating is available to 84 deg F AIT. The PT6A-67R maximum continuous rating is available to 115 deg F AIT and takeoff rating is available to 99 deg F.

RPM Limits (See NOTE 5)

	Torque lb. ft.	Engine RPM	Ng %	Propeller RPM	Np %
Takeoff (5 min)	3800	39,000	104	1700	100
Maximum Continuous	3600	39,000	104	1700	100
Transient overspeed (See NOTE 5)	5100	39,000	104	1870	110

For propeller ground operation, See NOTE 6.

Inter-Turbine Temperature

Takeoff (5 min)	820 deg C
Max Continuous	820 deg C
Starting transient (5 sec)	1000 deg C

Fuel Pressure

Fuel: Minimum pressure at inlet to the engine fuel system shall not be less than 5 p.s.i. above true vapor pressure of the fuel. For emergency operation, with airframe boost pump inoperative, the inlet pressure must be such that vapor/liquid ratio does not exceed 0.1 for continuous operation and does not exceed 0.3 for more than 10 hours in a pump overhaul life.

Maximum pressure at inlet to fuel system:
50 p.s.i.

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Limitations and Conditions:

Maximum	135 psig
Normal	90-135 psig
Minimum	60 psig

Oil Inlet Temperature (See NOTE 8)

Maximum	110 deg C
Minimum for takeoff	0 deg C
Minimum for starting	-40 deg C

Propeller (with PT6A-65AR)	2 Hartzell HC-B5MP-3C/M10876ASK
Propeller (with PT6A-67R)	2 Hartzell HC-B5MA-3J/M10876ASK
Propeller limits Diameter	110.7 - 111.2 inches

Pitch settings (42 in. sta.)

Low Pitch	+13 deg +/- .2 deg
Feather	+79 deg +/- .5 deg
Reverse	-11 deg +/- .5 deg

NOTE: Model M10876ASK propeller blades which acquire 48,000 hours total time in service must be retired.

Airspeed Limits

	CAS	
	kts	mph
VMO (maximum operating)	180	207
Va (maneuvering)	112	128
Vlo (landing gear operation)	144	165.5
Vle (landing gear extended)	144	165.5
Vfe (flaps extended 1/4)	135	155.5
Vfe (flaps extended 1/2)	99	114

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Limitations and Conditions:

Vfe (flaps extended 3/4 to full) 97 111.5

Maximum Operating Altitude 24,000 feet pressure altitude (See NOTE 14):

C. G. Range Fuselage Sta. 239.6 inches (11% MAC) @ 18000 lbs and below.
 Fuselage Sta. 242.35 inches (13% MAC) @ 26900 lbs.
 Fuselage Sta. 263.1 inches (28% MAC) @ 26900 lbs. and below.

Straight line deviation between points.

Maximum Weight Takeoff 26,900 lbs.
 Landing 26,900 lbs.

Maximum Zero Fuel Weight 25,400 lbs.

Minimum Empty Weight 15,100 lbs. (See AFM)

Minimum Crew 2 (pilot and copilot)

Maximum Passengers See NOTE 13

Maximum Cargo See NOTE 13

TANK	USABLE CAPACITY		TOTAL CAPACITY	
	U.S. GALLONS	POUNDS	U.S. GALLONS	POUNDS
Main L.H.	118	790.6	118.3	792.6
Main R.H.	118	790.6	118.3	792.6
Fwd Aux L.H.	202	1,353.4	204	1,366.8
Fwd Aux R.H.	202	1,353.4	204	1,366.8
Aft Aux L.H.	199	1,333.3	200	1,340
Aft Aux R.H.	199	1,333.3	200	1,340

NOTE: Weights based on fuel density of 6.7 pounds per U.S.

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Limitations and Conditions:

Gallon.

Oil capacity 1 tank integral with each engine, 2.5
U.S. Gallons

Maximum usable oil, 1.5 U.S. Gallons.

Required Equipment In addition to the pertinent required basic
equipment specified in CAR 4b and FAR 25 (for
the turbopropeller installation) refer to
"Required Equipment List" Section 6 of
Airplane Flight Manual.

This installation requires Goodrich H-2-445
main wheel brakes.

Specification Pertinent to This Model

Datum Fuselage Station "0" (40 inches aft of tip of
nose).

Leveling Pins on outside of fuselage at station 390.5 and
Means 411.5 below windows (fore and aft leveling). Pins
in left and right hand center section station 222
(lateral leveling).

Control Elevator up 12 +/- 1/8 inches, down 8 +/- 1/8 in.
Surface (measured from inboard trailing edge of elevator)
Aileron up 13 +/- 1/8 in, down 8 +/- 1/2 in,
(measured from inboard trailing edge of aileron)
Rudder left 18 +/- 1/4 in., right 18 +/- 1/4 in.
(measured from lower trailing edge of rudder)
Elevator trim tab up 9/16 +/- 1/8 in, down
2 1/2 +/- 1/8 inches (measured from inboard
trailing edge of trim tab).

Certification (1) FAR 21 Subpart E - 21.101b
Basis (2) SFAR 13 effective September 10, 1954

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Limitations and Conditions:

- (3) CAR 4b effective December 31, 1953, except where superseded by FAR 25 requirements.
- (4) FAR 25 sections as amended by Amendments 25-1 through 25-54.
- (5) FAR 36 including Amendments 36-1 through 36-12.
- (6) FAR 27 Fuel Venting and Exhaust Emission requirement for Turbine Powered Airplanes.

NOTE 1

- (a) Current weight and balance report including list of equipment included in certificated weight empty, and loading instructions, must be in each aircraft at the time of original certification and at all times thereafter (except in the case of air carrier operators having an approved weight control system).
- (b) System fuel must be included in the empty weight of the airplane. System fuel is defined as the fuel required to fill the fuel system up to the fuel tank outlet plus the fuel tank unusable fuel quantity. Full oil tank and full hydraulic tank fluids must also be included in the empty weight of the airplane.
- (c) The "unusable fuel" is that amount of fuel in the tanks which is unavailable to the engine under critical flight conditions as defined in FAR 25.959 and may be obtained by taking the difference between the total fuel capacities and "usable" tank capacities shown in this specification. The "unusable fuel" must be included in the empty weight or be suitably accounted for in the airplane weight and balance report.
- (d) The engines utilize fuel only from the nacelle main

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tanks.

- (e) A crossfeed system is provided to feed fuel from an opposite nacelle tank to the engine.

NOTE 2 This airplane is approved for Day, Night, VFR, and IFR. Refer to Airplane Flight Manual for limitations and required operating procedures.

NOTE 3 All Airworthiness Directives applicable to FAA Aircraft Specification A-669 also are effective for the DC3C as modified by this STC. The following Airworthiness Directives do not apply to DC3C aircraft modified according to this STC:

43-12-02	Engine Mount Fittings
47-06-07	Fire Ext. Trigger
47-33-02	Cowl Flap Hyd Lines
47-51-12	Carburetor Airscoop
48-05-01	Oil Shutoff Valve 'O' Rings
48-17-01	Fire Prevention Modifications
50-46-01	Oil Tank Standpipe
51-02-01	Ramp Type Door Rework
52-25-01	Vacuum System Rework
56-20-05	Prop Operating Limits
58-08-03	CB Fire Extinguisher System
60-16-03	Geared Rudder Tab
77-10-02	Fire Resistance of Prop Feather

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Limitations and Conditions:

System

Ailerons permanently identified as complying with the balancing procedure of this STC are considered to comply with the aileron balancing procedures specified in AD 41-47-01. The elevator and rudder balance procedures of AD 41-47-01 are still appropriate and required.

- NOTE 4 Airworthiness Directives currently in effect or issued subsequent to the date of this STC, which involve the Pratt & Whitney PT6A-65AR engine or the Hartzell HC-B5MP-3C/M10876B propellers, are applicable to the engines or the propellers installed under this STC, and applicability statement of such Airworthiness Directives notwithstanding.
- NOTE 5 Maximum overspeed limit is as specified for transient overspeed. If these limits are exceeded, consult P&WACL Maintenance Manual No. 3028042, page 604 for disposition of engine or gear reduction box.
- NOTE 6 Ground Operation:
- A. Stabilized ground operation below 900 rpm prohibited, except when propeller is feathered operation at or below 400 rpm is permissible.
 - B. Stabilized ground operation between 1170 and 1400 rpm is prohibited. Taxi between 900 and 1170 rpm in order to keep operation through 1170 to 1400 rpm range to a minimum in cross tail winds.
 - C. Advance through 1170 - 1400 rpm only after aircraft is lined up with the runway for takeoff.
- NOTE 7 Oil pressure at 75% Ng (27,000 rpm) gas generator speed and above with an oil temperature of 140 to 160 deg F: 105 - 135 p.s.i.g. Below 75% Ng (27,000 rpm) gas generator speeds: 60 p.s.i.g. (min). Extreme cold starts oil pressure may reach 200 p.s.i.

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Limitations and Conditions:

NOTE 8 Oil temperature range continuous from minus 40 deg F (-40 deg C) to 210 deg F (99 deg C).

NOTE 9 APPROVED FUELS

Fuel	Specification
Jet A	ASTM 1655
Jet A-1	ASTM 1655
Jet B	ASTM 1655
JP-4	ASTM 1655 or MIL-T-5624
JP-5	MIL-T-5624
JP-8	MIL-T-83133

The use of aviation gasoline (AVGAS) is not approved. For additional information see P&WACL Service Bulletin No. 13044.

NOTE 10 APPROVED LUBRICATING OILS

Aeroshell Turbine Oil 500	ROYCO TURBINE OIL 500
Mobil Jet Oil II	TURBONYCOIL 525-2A
Mobil Jet Oil 254	Stauffer Jet II
Castrol 5000	Esso/Exxon Turbo oil 2380

Only type II oils conforming to P & WC Service Bulletin No. 13001 are acceptable.

NOTE 11 Fuel anti-icing additives conforming to specifications MIL-I-27686D or MIL-I-27686E may be used, at a concentration not exceeding 0.15% by volume.

NOTE 12 Noise Characteristics: No acoustical change was shown under the provisions of FAR Paragraph 21.93(b). Noise measurements taken in flyover tests have demonstrated that the noise levels of the PT6A-65AR powered aircraft are no noisier than the noise levels of the R-1830 powered aircraft, at their respective maximum

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Limitations and Conditions:

takeoff and landing weights available for a sea level airport at ISA+10 deg C (ISA +18 deg F).

NOTE 13 The aircraft is approved with the following limitations: "No passengers or cargo may be carried until an FAA approved interior is installed." See FAR 91.47 for maximum passengers when an FAA approved interior is installed, except as allowed under maximum cargo.

NOTE 14 Engine and airframe certificated operating temperature limits; min. -40 deg C (-40 deg F) to ISA +34 deg C (ISA +61 deg F) maximum.

NOTE 15 The location of the cockpit has not been evaluated for compatibility with the icing equipment. Any approvals for flight into known icing conditions must be coordinated with the FAA Southwest Region Special Certification Office, Fort Worth, Texas.

END

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INSTRUCTIONS: The transfer endorsement below may be used to notify the appropriate FAA Regional Office of the transfer of this Supplemental Type Certificate.

The FAA will reissue the certificate in the name of the transferee and forward it to him.

TRANSFER ENDORSEMENT

Transfer the ownership of Supplemental Type Certificate Number _____

to *(Name of transferee)* _____

(Address of transferee) _____

(Number and street)

(City, State, and ZIP code)

from *(Name of grantor) (Print or type)* _____

(Address of grantor) _____

(Number and street)

(City, State, and ZIP code)

Extent of Authority (if licensing agreement): _____

Date of Transfer: _____

Signature of grantor *(In ink)*: _____