United States of America

Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate

Number SA2323WE

This certificate, issued to Frakes Aviation
Route 3, Box 229-B
Cleburne, Texas 76031

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 4a(T) *of the* Civil Air Regulations, / dated Nov.1,1943,with Am.04.1 dated Mar.8,1944, and in accordance with applicable portions of FAR 24,FAR 21.101(c) and those Spec.Cond.estb. under the prov.of FAR 21.16,submitted in FAA letter to Frakes Avia.dated Aug.14,1970

Original Product — Type Certificate Number: A-783

Make: Frakes (Grumman)

Model: G-73 (Amphibian)

Description of Type Design Change:
Increase in gross weight and installation of United Aircraft of Canada Limited PT6A-27 or PT6A-34 engines in accordance with Frakes Aviation,Inc., Master Drawing List FA 5000, Rev. V dated 9/13/83, or later FAA approved revision.

Limitations and Conditions:
Compatibility of this modification with other previously approved modifications must be determined by the installer.

For additional information see Continuation Sheets 2 through 9.

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: August 14,1968

Date of issuance: April 27, 1971

Date reissued: 12/18/73; 5/1/78; 11/21/79; 9/28/83 Revision 4

Date amended:

By direction of the Administrator

(Signature)

for Don P. Watson
Manager, Aircraft Certification Division
~~Southwest Region~~
(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.

FAA Form 8110-2 (10-68)

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Limitations and Conditions:

Engines: Item 1. Two United Aircraft of Canada, Limited PT6A-27 optional PT6A-34.

Fuel: MIL-J-5624E, Grades JP-1, JP-4 or JP-5.
(MIL-G-5572C Avgas (all grades) for emergency use only - limited to 150 hours use between overhauls.)

Oil: UACL PT6 Engine Service Bulletin No. 1 lists approved brand oils.

	E.S.H.P.	-27 S.H.P.	-34 S.H.P.
Take-off	715	*680	680
Max. Continuous	715	*680	680
Max. Climb	652	**620	***680
Max. Cruise	652	**620	***680
Max. Reverse	652	**620	***680

*Available to 71°F (21.7°C) Ambient temp. (S.L.)
**Available to 69°F (20.6°C) Ambient temp. (S.L.)
***Available to 107°F (42°C) Ambient temp. (S.L.)

Engine Limits

Temperature Limits (Inter-Turbine)

	-27	-34
Take-off	(725°C)	(790°C)
Max. Continuous	(725°C)	(790°C)
Max. Climb	(695°C)	(765°C)
Max. Cruise	(695°C)	(740°C)
Max. Reverse	(725°C)	(790°C)
Starting (2 sec.)	(1090°C)	(1090°C)

Torque Limits

	-27/-34
Take-off1	53 PSIG
Max. Continuous	53 PSIG

Gas Generator

	-27/-34
Take-off	38,100 (101.5%)
Max. Continuous	38,100 (101.5%)

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Engine Limits - Cont'd

Oil Temperature	-27/-34
Starting	-40°C Minimum
Take-off	10°C to 99°C
Max-Continuous	10°C to 99°C

Oil Pressure at following as generator speeds:

	-27	-34
Normal (27000 R.P.M. 72% and above)	80 to 100 PSIG	85 to 100 PSIG
Minimum (below 27000 R.P.M.)	40 PSIG	40 PSIG

Airspeed Limits (EAS)

*V_{mo} maximum operating	240 mph (209 kts)
V_a maneuvering	147 mph (128 kts)
V_f flaps extended	135 mph (118 kts)
$V_{10/1e}$ landing gear operation/extended	150 mph (130 kts) 91 mph (79 kts)

*This speed must be reduced 5 mph (indicated) for every 1000 ft. above 10,000 ft. up to the service ceiling of 24,500 ft.

Normal C.G. Range (Gear Extended)

(-17.3) to (-7.4) Moment change due to retraction of landing gear (nose and main) is +1032 in.lbs.

Datum

Rear face of main wing beam (Station 233,65).

Leveling Means

Fore and aft leveling lugs located in left or right wheel pocket. Lateral leveling lugs mounted on front face of Station 428 bulkhead.

Maximum Weights

Landplane

Take-off	14,000 lbs. (See Note 3.)
Landing	13,500 lbs.
Max. Zero Fuel	12,800 lbs. (See Note 3)

Seaplane

Take-off	14,000 lbs. (See Note 3)
Landing	14,000 lbs.
Max. Zero Fuel	12,800 lbs. (See Note 3)

Minimum Crew

One

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Number of Seats Two cockpit (-108.65); ten cabin. (See Approved Airplane Flight Manual for arrangement.)

Maximum Baggage Forward compartment 460 lbs. (Station 53 to 93, maximum floor loading 50 lbs./ sq. ft.)

Aft compartment 540 lbs. (Station 384 to 428, maximum floor loading 75 lbs./sq. ft.)

Fuel Capacity Airplane Serial Nos.

J1 - J7 incl., J9, J10 & J11 165 U. S. Gals. each Wing Tank (330 U. S. Gals. Total)
190 U. S. Gals. each Wing Tank (380 U. S. Gals. Total)

These capacities do not include Wing Tip Float Fuel Tanks or Wing Auxiliary Tanks. (See Item 106) 50 U.S. Gals. each float tank (100 U.S. Gals. Total). (See Item 106A) 83 U.S. Gals. each wing auxiliary tank (8 cells) (166 U.S. Gals. Total).

Oil Capacity	Usable Oil	U.S. Gal.	Imperial Gal.	Weight lbs.
	Port -36	1.5	1.2	11
	Starboard-36	1.5	1.2	11
		3.0	2.4	22

Maximum Operating Altitude 24,500 feet

Control Surface Movements			
	Wing flaps	Up -	Down 30°
	Elevator trim tab (Bungee spring setting 6-3/4" Service Manual page 133)	Up 7.0° ±0.5°	Down 28°
	Elevator	Up 30° ±0.5°	Down 11° ±0.5°
	Aileron	Up 21° ±1.0°	Down 18°
	Rudder trim tab	Right 20°	Left 20°
	Rudder	Right 25°	Left 25°

Required Equipment Items 1, 2, 101, 102, 103, 104, 105, 106, 106A (note 3), 107, 108, 201, 202, 301, 302, 303, 304, 401, 403, 407, 502, 504, 505, 602, and 701.

Item 302, battery, required since electrical power is required for auxiliary electric fuel pumps & primary engine instruments.

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Propellers

Item 2. Two Hartzell propellers (-87)
Hub HC-B3TN-3DY
Blades T10178HB-5
Diameter 8 feet (96 inches)
Pitch settings at 30" station

Feathered	+87.0°	±5°
Take-off low pitch	+18°	±1°
Reverse blade angle	-11.0°	±4°

Propeller limits

Propeller (N_p) - Take-off 2200 R.P.M. (100%)
Max. Contin. 2200 R.P.M. (100%)

Engine & Accessories - Fuel & Oil System

101 Two DC starter-generators 30.5 lbs. ea.(-28)
Lear Siegler Model 23048-014
Generator capacity 300 amps each

102 Two oil coolers 7.5 lbs.ea. (-43)
Harrison Model 8535233

103 Two Hydraulic pumps
New York Air Brake Co.
Model 65WE00527 System
press 1650 p.s.i. ± 15
maintained by VD pump setting 3.5 lbs.ea.(-33)
Optional Vickers Model
PV005R006B 3.5 lbs.ea.(-33)

104 Two overspeed governors
Woodward Model 210624C 4.5 lbs.ea. (-79)

105 Four fuel pumps
(a) Two Thompson Products
Model TFD-10300 electric
driven fuel booster pump 7.0 lbs.ea.(-34)

(b) Two Romec Model RG15980L
engine driven fuel booster
pump 1.0 lbs.ea.(-32)

106 Integral auxiliary fuel tanks
(50 gals. ea.) in wing tip
floats, including pump & line 19.0 lbs.ea. (+10)

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Engine & Accessories - Fuel & Oil System, Cont'd	106A	Wing auxiliary tanks are installed in each wing (4 cells each) outboard of main tanks. Capacity 83 gals.each (Total 166 gals.)	100.0 lbs.ea.(+216.8)
	106A	(a) Two solenoid valves General Model AV-1 (Modified)	1.5 lbs.ea. (+10)
	107	Two airframe fuel filters Aerospace Model 111-879	1.0 lbs.ea. (-18)
Fuel Flow Meter	108	General Electric Two transmitters GE8TJ64GBZ Two indicators GE8DJ142LWT	 1.5 lbs.ea.(-86) 1.2 lbs.ea.(-140)
	or	Foxboro Two transmitters P/N 1/2-2-81-228 Two indicators P/N AR204A-1D Totalizer P/N AT204-17 / AT205-3 Signal Conditioner P/N PC-426	 .50 (-86) .75 (-140) .75 (-140) 1.60 (-50)
Landing Gear and Floats	201	Two 9.50-16 main wheels, Goodyear L 9.50-16HBA with brakes and 9.50-16 10-ply nylon tires	120.0 lbs.ea. (+4)
	202	19 x 6.89-10 nose wheel, Bendix Type B-1, Ass'y. No. 145308 A, and 19 x 6.80-10 6-ply rayon tire (Tire to be placarded for 85 p.s.i. inflation pressure)	37.0 lbs. (-174)
Electrical Equipment	301	Generator, see item 101	
	302	Battery, Exide 12-TS-9L	73.0 lbs. (-4)
	303	Two landing lights Grimes G-3801-1 or G-3801-3	7.0 lbs.ea. (+18)

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Electrical Equipment, Cont'd	304	Main Inverter, Flite-Tronics Model PC-15A	7.75 lbs. (+40)
		Standby inverter Flite-Tronics Model PC-15A	7.75 lbs. (+40)
Interior Equipment	401	FAA Approved Airplane Flight Manual dated November 21, 1979 (The Manual may be carried as part of or bound with the operator's "Approved Operations Manual" but must remain in the airplane and must retain its identity as an individual manual.)	
	402	Two 3-minute parachute flares International	23.0 lbs.ea. (+221)
	403	Two windshield wipers Kearfoot Type	2.0 lbs.ea. (-134)
	404	Safety belt and harness assembly NAF 1201-1 (cockpit)	
	405	Sperry Model A-12 automatic pilot installation	194.0 lbs. (-144)
	406	Lear L-2C automatic pilot to be installed in accordance with Lear Drawing No. 95600	62.0 lbs. (1-7)

The following placards to be installed:

(1) On autopilot master switch" AUTOPILOT MASTER SWITCH ON

(2) On quick disconnect switch, "AUTOPILOT DISCONNECT ON-OFF"

(3) In plain view of the pilot, "DO NOT USE AUTOPILOT BELOW 450 FEET ABOVE TERRAIN IN CRUISE CONFIGURATION" "DO NOT USE AUTOPILOT BELOW 300 FEET ABOVE TERRAIN IN APPROACH CONFIGURATION." Servo slip cluthh settings measured on the ground: rudder 175"lbs., aileron 50" lbs., elevator 75" lbs. (Approach coupler not investigated; therefore not eligible.)
Airplane Flight Manual Supplement dated Jan. 14,1952 is required equipment.

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	407	Cabin Heating System Consisting of the following Hamilton Standard Components: One Bleed Air shut-off valve P/N 748829-2 One Bleed Air shut-off valve P/N 747704-1 One Bleed Air temp-control valve P/N 738385-2 One Cabin temp sensor; P/N 738490-1 One Venturi; P/N 747777-1 One Duct temp sensor; P/N 738489-1 One Electronic temp controller P/N 738491-4 One Cabin Air temp selectro P/N 738488-1	
	407A	Cabin Cooling System All components for installation 407, plus One water separator; P/N 738386-2 One refrigeration package P/N 738443-2	3.5 lbs. (+446.5) 21.5 lbs. (+446.5)
De-icing Equipment (Propeller, Inlet Duct & Pneumatic Surface Boots	502	Propeller de-icer B. F. Goodrich de-icer kit #77-490-1	
	504	Inlet de-icer boot B.F. Goodrich; P/N 5E1484	
	505	Inlet de-icer boot B. F. Goodrich; P/N 5E1575	
	506	Surface Pneumatic de-icer Boots, Frakes Aviation, Inc. Kit No. FA5090	
	602	Instrument vacuum system. One regulator and safety Valve, Bendix; P/N 38E85-1 One vapor filter Bendix: P/N 44E03-1 One ejector Bendix: P/N 19E17-5 One check valve Bendix: P/N 557-18	 1.6 lbs. (+241) 1.9 lbs. (+241) .75 lbs. (+241) .64 lbs. (+248)

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FAA FORM 8110-2-1 (10-69)

This certificate may be transferred in accordance with FAR 21.47.

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De-icing Equipment (Propeller, Inlet Duct & Pneumatic Surface Boots, Cont'd		One check valve Bendix: P/N 557-18 Refer to Grumman Mallard G-73 Service Manual for proper vacuum adjustment.	.64 lbs. (+251)
Pre-stall Warning	701	One lift transducer Safeflight C-37207	1.5 lbs.ea. (-21)
		One summing unit Safeflight C37206	2.0 lbs.ea. (-2)
		One control shaker Safeflight C-37202	1.2 lbs.ea. (-125)
Certification Basis		(See page 1)	
Production Basis		None	

NOTE 1. A. Current weight and balance report including list of equipment included in certificated weight empty, and loading instructions when necessary, must be in each aircraft at the time of original certification and at all times thereafter (except in the case of air carrier operaters having an approved weight control system.)

B. "System Fuel and Oil" is that amount required to fill fuel tanks up to outlets and to maximum on oil tank dip stick when the airplane is in the level attitude. "System Fuel and oil" and all hydraulic fluid must be included in the certificated weight empty.

C. Fuel and oil tank capacities do not include any "System Fuel and Oil."

NOTE 2. The following placards shall be placed in the instrument panel in full view of the pilot:

A. "THIS AIRPLANE SAHLL BE OPERATED IN ACCORDANCE WITH SECTION I 'OPERATING LIMITATIONS' OF FLIGHT MANUAL WHICH SHALL BE CARRIED IN THE PILOT'S COMPARTMENT AT ALL TIMES."

B. "REDUCE V_{NO} 5 M.P.H.(INDICATED) FOR EVERY THOUSAND FEET ABOVE 10,000 FEET."

NOTE 3. The fuel management chart in the limitation section of the AFM must be strictly adhered to.