DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

A51NM
Revision 2
Grumman
September 3, 2014
S2F-3T

TYPE CERTIFICATE DATA SHEET NO. A51NM

This data sheet, which is a part of Type Certificate No. A51NM, prescribes the conditions and limitations under which the product for which the Type Certificate was issued meets the Airworthiness Requirements of the Federal Aviation Regulations.

Type Certificate Holder:

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Mesa, Arizona 85215

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I - Model S2F-3T (Restricted Category) Approved Date May 21, 1999

Engine

2, AlliedSignal/Garrett 331-15AW
TC E18NE

Fuel

Engine operation is approved with the following fuels:

AlliedSignal EMS53111	(Type A)
AlliedSignal EMS53112	(Type A1) (JP-8) (British D. Eng. R.D. 2494 Issue 7)
AlliedSignal EMS53113	(Class A-JP4) Class B-type (British D. Eng. R.D. 2486 Issue 8)
AlliedSignal EMS53116	(Type JP-5)
AlliedSignal EMS53122	(Grade 100 LL)

Anti-icing additive conforming to PFA-55MB or MIL-I-27686 must be used when operating in conditions where the fuel temperature is 0° C or less.

Shell ASA-3 anti-static additive, or equivalent, to bring fuel up to 300 conductivity units and no more than 1 ppm.

Sohio Biobor JF Biocide additive or equivalent not to exceed 270 ppm maximum (220 ppm of elemental boron), for pesticide purposes.

Aviation gasoline MIL-G-5572D, Grade 100/130 (low lead), not in excess of 50 gallons per 100 hours of operation (per engine), may be used for emergency

operation. Total usage must be limited to 7000 gallons during any 3000 hour period. Aviation gasoline MIL-G-5572D, Grade 80/87 not in excess of 1000 gallons per 100 hours of operation, may be used for emergency operation. If 25% or more Avgas is used at any time, one quart of Aviation grade 120 mineral oil must be added to mixture per 100 gallons of Avgas. (Aviation grade oil to MIL-L-6082.)

Fuel (cont'd)

If combinations of aviation gasoline are used, the following formula is required for establishing proportions of combinations during any 3000 hour period:

$$\frac{\text{Gals. 100/130 (low lead)}}{\text{7000 Gals.}} + \frac{\text{Gals. 80/87}}{\text{30,000 Gals}} \leq 1$$

Fuel Type	Avgas, JP-4, Jet-B	JP-5/I, JetA/A-1	JP-8
Min. Temp for Starting	-50°C	-44°C	-42°C

Engine Limits

Engine Ratings and Operating Limits:

Takeoff and Maximum Continuous SHP	1645
Maximum Continuous Torque	6234 Ft - Lb. (100%)
Takeoff and Maximum Continuous RPM	1390 (101%)
Ground Idle - Minimum RPM	890 (64%)

CONDITION	TORQUE	RPM % MIN/MAX	OIL PRESS MIN/MAX	EGT	OIL TEMP MIN/MAX
Takeoff	100	100/101	45/70	100% (2)	55/110°C
Max. Cont.	100	96/101	45/70	100% (2)	55/110°C
Ground Idle	---	64 (Min)	15/70	---	55/100°C
Starting	---	---	---	770°C	44/110°C
Transient	104 (Max) 30 Sec.	104 (Max) (1)	---	37 Above	---

(1) Do not exceed 106% RPM at any time. Transient engine speed maximum limit is from 101% to 104% RPM. Engine speed for Overspeed Governor (OSG) check is limited to 30 seconds from 104% to 105% RPM and seconds from 105% to 106% RPM.

(2) 100% with variable redline system EGT (VRL) operative, see approved Flight Manual Supplement/Pilot's Operating Handbook 3DE6105 dated May 13, 1997, for EGT values with VRL system inoperative.

Reverse; Landing	---	93 (Min)	Maximum airspeed (on ground) for reverse operation is 90 KIAS
Reverse; Static	---	64 (Min)	If Beta light is inoperative, do not use reverse
Windmilling	5-20% Above 20%	5 MINUTE MAXIMUM 1 MINUTE MAXIMUM	
Backward Rotation	NOT RECOMMEND		

Propeller and Propeller Limits

Hartzell Five Blade Single Acting
TC No. P20NE
Hub Model - HC-E5B-5X1
Blade Model - E12902KX
Diameter - 132 inches
Blade Angle (measured at Station 54 inches):

Reverse	8.0° ± 0.5°
Start Lock	-4.0° ± 0.1°
Feather	-78.7° ± 0.5°
Flight Idle	5.0° to 6.6°
Counterweight	100° (Fixed)

Limitations - Stable ground operation below 655 and from 69% to 75% RPM is prohibited.
Propeller blades are life limited and shall be retired after 12500 hours of operation.
Propeller blade diameter is 132 inches and no cutoff is allowed.

Airspeed Limits (IAS)

V_D (Dive)	280 KIAS
V_{MO} (Maximum Operating) (1)	235 KIAS
V_A (Maneuvering)	175 KIAS
V_{FE} (Flaps Extended)	150 KIAS
V_{LE} (Landing Gear Extended)	150 KIAS

(1) V_{MO} is 235 KCAS 20,500 feet and below. Above 20,500 feet straight line variation to 215 KCAS at 25,000 feet.

Center of Gravity (C.G.) Range

Landing Gear Extended (all flight weights)

Forward Limit	213.41 in. aft of Datum (21.0% MAC)
Aft Limit	221.22 in. aft of Datum (29.85 MAC)

Landing Gear Retracted (all flight weights)

Forward Limit	215.35 in. aft of Datum (23.2% MAC)
Aft Limit .	223.16 in. aft of Datum (32.0% MAC)

Empty Weight C. G. Range

None.

Datum

The Datum is a point 32 inches forward of the most forward structure of the aircraft.

Leveling Means

Floor inside cabin entrance door at Station No. 189.

Maximum Weights

Takeoff	29,150 lbs.
Landing	24,800 lbs.

Minimum Crew

One pilot at Station No. 104.7 left side.

Number of Seats

Four plus one jumpseat.
Two at Station No. 104.7.
Two at Station No. 162.5.
Jumpseat at Station No. 126.

Fuel Capacity

Two wing tanks total 765 U.S. gallons at Station No. 228.9.
Total usable fuel (all tanks) is 728 U.S. gallons. Reference Note 1.

Oil Capacity

One tank each engine of 7 quart capacity. Oil tank is supplied with engine and forms an integral part of engine.

Engine is approved for Type II oils meeting MIL-L-23699B or EMS53110.

Operating oil temperature range is as follows:

Ground Start Minimum	-40°C
Ground Idle Maximum	127°C
Cruise Maximum	110°C
Takeoff Maximum	127°C (5 minute limit above 110°C for takeoff)

Maximum Operation Altitude

25,000 Feet

Control Surface Movements

CONTROL SURFACE	DIRECTION	DEGREES ALLOWABLE
Left Aileron	Up	18 + 1/-2
	Down	15 +1/-2
Right Aileron	Up	18 +1/-2
	Down	15 +1/-2
Left Elevator	Up	25 ± 1
	Down	15 ± 1
Right Elevator	Up	25 ± 1
	Down	15 ± 1
Rudder	Left	21 ± 1
	Right	21 ± 1
Rudder Trimmer (Hydraulic @ Electric Actuator Extended)	Left	15
	Right	25
Rudder Trimmer (Hydraulic @ Electric Actuator Retracted)	Left	25
	Right	15
Rudder Trimmer (Hydraulic Actuator Only)	Left	20 ± 1
	Right	20 ± 1
Rudder Trimmer (Electric Actuator Only)	Left	5 ± 0.10’
	Right	5 ± 0.10’
Left Elevator Trim Tab	Up	20 ± 1
	Down	20 ± 1
Right Elevator Trim Tab	Up	20 ± 1
	Down	20 ± 1
Aileron Trim Tab (L. Only)	Up	20 ± 1
	Down	20 ± 1
Rudder Tab	Left	14 ± 2
Left Elevator Geared Tab	Down Elevator	5 ± 1
	Up Elevator	20 ± 2

Control Surface Movements (cont'd)

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Right Elevator Geared Tab	Down Elevator	5 ± 1
	Up Elevator	20 ± 2
Left Elevator Spring Tab	Up	15 ± 1
	Down	20 ± 2
Right Elevator Spring Tab	Up	15 ± 1
	Down	20 ± 2
Left Outboard Flap	Down	27.5 ± 2
Right Outboard Flap	Down	30 ± 2
Left Inboard Flap	Down	40 ± 2
Right Inboard Flat	Down	40 ± 2
Left Outboard Spoiler	Up	52 ± 3
Right Outboard Spoiler	Up	52 ± 3
Left Inboard Spoiler	Up	37 ± 2
Right Inboard Spoiler	Up	37 ± 2

Manufacturer's Serial Numbers

The original Navy designation for the eligible airplanes was S2F-3. Variations in installed mission equipment resulted in new designations for the S2F-3 airframe. These variations were designated S2F-3S, S-2D, ES-2D, S-2E, and S-2G.

S2F-3 aircraft eligible for Airworthiness certification under this Type Certificate, must be modified for the special purpose forest and wildlife conservation (fire fighting) by installing Allied Signal/Garrett 331 engines and Hartzell propellers in accordance with the latest FAA approved revision of Marsh Aviation Company Master Drawing List 3-DE1104.

Only the aircraft listed below are eligible for Airworthiness Certification under this Type Certificate.

Grumman S/N	Navy S/N
001C	147531

Certification Basis

FAR 21.25 (a) (2) FAR 21.101 (a) (b) (c) and FAR Part 25 dated June, 1964, through Amendments 25-1 through 25-79.

Restricted Category Type Certificate A51NM**,** dated May 21, 1999, issued for the special purpose of forest and wildlife conservation (fire fighting).

Application for Restricted Type Certificate dated June 8, 1992.

A Finding of No Significant Impact (FONSI) for the modified Grumman Model S2F-3 aircraft has been accomplished and approved on November 12, 1998.

A finding under the applicable provisions of the Noise Control Act of 1972 has been accomplished and approved on November 12, 1998, for the modified Grumman S2F-3 aircraft (Restricted Category – Military Surplus).

Production Basis	None. Prior to original certification of each aircraft an FAA representative must perform a detailed inspection for workmanship, materials, conformity with approved technical data, and a check of flight characteristics.
Equipment	Basic required equipment as prescribed in applicable airworthiness regulations (see Certification Basis) must be installed in the aircraft for certification. Aircraft must be equipped with Allied Signal/Garrett 331-15AW engines and Hartzell HC-E5B-5X1 propellers installed in accordance with the latest FAA approved revision of Marsh Aviation Company Master Drawing List number 3-DE1104 to be eligible for airworthiness certification under Type Certificate A51NM.
NOTE 1	Current Weight and Balance report containing a list of equipment included in the certified empty weight, and loading instructions, when necessary, must be provided for each aircraft at time of original certification.
NOTE 2	All required placards listed in the FAA approved S2F-3T Flight Manual Supplement/Pilot Operating Handbook 3-DE6105 dated May 13, 1997, must be installed in the aircraft.
NOTE 3	This aircraft must be maintained in accordance with NAVAIR 01-85SAD-2 and the latest revision of Marsh Aviation Company Maintenance Manual Supplement 3-DE6106 which contain the original minimum scheduled maintenance program required for the S2F-3T to meet the requirements for continued airworthiness.
NOTE 4	Aircraft shall be operated in accordance with NATOPS Flight Manual 01-855AE-1, plus the FAA approved S2F-3T Flight Manual Supplement/Pilot Operating Handbook 3-DE6105 dated May 13, 1997.
NOTE 5	Prior to issuance of airworthiness certificate for each aircraft, and at prescribed intervals all inspections and modifications must be accomplished per latest version of Marsh Aviation Company S2F-3T Technical Directive Index.
NOTE 6	Upon completion of conversion to certified status in Restricted category, an additional dataplate, incorporating the S2F-3T designation which includes a statement that the aircraft has been modified per TC A51NM, must be installed near the original dataplate. Under no circumstances should the original or any succeeding dataplate be removed from the aircraft.
NOTE 7	This aircraft is prohibited from carrying cargo for compensation or hire. Carriage of cargo is limited to such cargo that is incidental to the aircraft owner/operator's business which is other than air transportation.
NOTE 8	Restricted category aircraft may not be operated in a foreign country without the express written approval of that country.
NOTE 9	This aircraft has not been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation.

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