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DIRECCION GENERAL DE AVIACION CIVIL

119-I
ALLISON
GMA-2100 A
6 Abril 1994

HOJA DE DATOS DEL CERTIFICADO DE AERONAVEGABILIDAD
DE TIPO Nº 119-I

Esta hoja de Datos, corresponde al Certificado de Aeronavegabilidad de Tipo Nº 119-I y expone las limitaciones y condiciones bajo las cuales se ha expedido dicho Certificado siguiendo los requerimientos de la Dirección General de Aviación Civil, basado en la Reglamentación (JAR-E).

Titular: ALLISON GAS TURBINE DIVISION
P.O. Box 420
Indianapolis
Indiana 46206-420 (U.S.A.)

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I. General

1. Data Sheet No. : 119-I Issue: 1 Date: 16-4-94

2. Type / Variant: GMA 2100A

3. FAA Type Certificate Holder:

Allison Gas Turbine Division
P O Box 420
Indianapolis
Indiana 46206-420
U S A

4. JAA Validation Application Date: 12 November 1990

5. Validation Date: 16-4-94

II Certification Basis

1. Reference Application Date for FAA Certification: 15 February 1990

2. FAA Certification Date: 23 April 1993
FAA Type Certificate Data Sheet No. TEICH

3. FAA Certification Basis:

FAR 33, Effective 1 February 1965, as amended by 33-1 through 33-14 inclusive

4. JAA Mandatory Airworthiness Standard

JAR-E Change 7 plus Amendment E/89/1, Effective 24 October 1989.

5. Elect to comply JAA Airworthiness Standard:

JAR-E Change 8, Effective 4 May 1990

6. JAA Special Conditions:

SC1 - Ingestion of Rain
SC2 - Ingestion of Hail

7. JAA Exemptions:

None

8. JAA Equivalent Safety Finding:

None

9. JAA Environmental Standards:

ICAO Annex 16 Volume II, Emissions

III. Technical Characteristics

1. FAA Production Basis: Production Certificate No. 310

2. Design Standards: As defined by Top Assembly Drawing P/N 23053610

3. Description: Free turbine turboprop engine, modular design, 14 stage axial compressor, annular combustor, 2 stage gas generator turbine, 2 stage power turbine, front mounted propeller reduction gearbox, bottom mounted power section accessory gearbox, full authority digital engine controls
Propeller Mount: Flange Type
Output Shaft Gear Ration: 13.98:1

4. Dimensions:

Overall Length	2.94 m	(115.70 ins)
Overall Height	1.25 m	(49.42 ins)

5. Dry Weight: 715.7 kg (1578 lb) (See Note 1)

6. Ratings: (See Notes 2 and 3)

Take-off (5 minutes) Static Power at Sea level, ISA 15°C	3097 kw (4152 hp)
Maximum Continuous Static Power at Sea level, ISA 15°C	2788 kw (3738 hp)

7. Control System:

Lucas Aerospace Full authority digital electronic control, Allison P/N 23059770
Lucas Aerospace Fuel pump and metering unit, Allison P/N 23058501
Lucas Aerospace Compressor variable geometry actuator, Allison P/N 23058911

8. Fuel:

Fuel Specifications:	ASTM-D-1655 Type Jet A, Jet A-1 Mil-T-5624 Grade JP-5 Mil-T-83133 Grade JP-8
Fuel Additives:	When operating in cold weather fuel icing protection is provided by the Fuel Cooled Oil Cooler. Fuel system icing inhibitors per MIL-1-27686 Amendment 2 may be used as long as the fuel libricity characteristics are not changed. Additive concentrations as given in Advisory Circular0-29B, dated 18 January 1972 may be used.

9. Oil:

Oil Specification:	Synthetic Conforming to MIL-L-23699D. or MIL-L-7808K (below -18°C). Refer to GMA 2100A Engine Operations Manual and GMA 2100A Engine Maintenance Manual for approved brands.
Oil Reservoir:	Refer to GMA 2100A Engine Installation Manual for capacity and usable quantity versus installation attitude.

10. Ignition:

Simmonds Precision Products Inc. Dual Capacitance discharge, high energy type dual Ignitor Plugs

IV Operational Limitations

1. Temperature Limits:

Maximum Interturbine Temperature (ITT) (Measured average of six thermocouples

Maximum, Starting	815°C (1500°F)*
Take-off, 5 minutes	852°C (1566°F)*
Maximum Continuous	833°C (1532°F)*

* Refer to GMA 2100A Engine Operations Manual for time/temperature envelope and inspection requirements when limits are exceeded.

Fuel Temperature (Measured at fuel pump metering unit inlet)

Maximum	57°C (135°F)
Minimum	-55°C (-65°F) or temperature corresponding to 12 centistokes viscosity, whichever is greater

Oil Temperature (Measured in the oil tank)

Maximum	85°C (185°F)
Minimum, starting and Idle	-40°C (-40°F) with MIL-L-23699D -55°C (-65°F) with MIL-L-7808K

2. Maximum Speeds:

Power Turbine

Transient, 20 seconds	16298 rpm
Take-off, 5 minutes	15375 rpm
Maximum Continuous	15375 rpm

2. Maximum Speeds (Continued)

Gas Generator:

Transient, 20 seconds	15200 rpm
Take-off, 5 minutes	15200 rpm
Maximum Continuous	14840 rpm

If limits are exceeded, refer to GMA 2100A Engine Operation Manual for maintenance action.

3. Torque Limits

Transient, 20 seconds	2319 Nm (1710 ft.lbs)
Take off, 5 min	1994 Nm (1470 ft lbs)
Maximum Continuous	1800 Nm (1328 ft lbs)

4. Pressure Limits:

Fuel Pressure (Measured at fuel pump inlet)

Maximum	276 Kpa Absolu (40 psia)
Minimum	21 Kpa (3 psia) above true fuel vapour pressure, or pressure corresponding to $V/L = 0.45$ whichever is greater

Oil Pressure

Power Section:	Maximum:	552 Kpa (80 psig)
	Minimum:	276 Kpa (40 psig)
Gearbox:	Maximum:	1448 Kpa (210 psig)
	Minimum	1158 Kpa (168 psig)

Power section and gearbox pressures may reach 1724 Kpa (250 psig) for up to 2.5 minutes during initial starting warm-up.

4. Pressure Limits: (Continued)

Refer to GMA2100A Installation Design Manual CSP34003 for further information on Pressure Limits

5. Accessory Drives

Accessory	Direction of rotation	Speed ratio	Max torque cont. (N.m)	Max torque static (N.m)	Max overhung moment (N.m)
		Accessory Gearbox			
Starter	CW	1.0000	122	366	9
		Reduction Gearbox			
Generator	CW	1.1258	29	237	42
Prop Control	No drive provided (mount pad only)				11
Prop oil pump	CCW	0.3506	13.5	56.5	4.5
Hydraulic pump	CW	0.5942	13.5	50	11
		Oil Tank			
Feather pump	No drive provided (mount pad only)				2.1

Refer to GMA2100A Installation Design Manual CSP34003

6. Bleed Extraction:

High Pressure Bleed (% of total engine inlet airflow

Maximum, 8th Stage	3.7%
Maximum, 14th Stage	8%
Maximum combined 8th + 14th stages	11.7%
Minimum	0%

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V. Operating and Service Instructions

	Document Reference
GMA 2100A Engine Operation Manual	CSP 30000
GMA 2100A Engine Installation Design Manual	CSP 34003
GMA 2100A Engine Maintenance Manual	CSP 31000

VI. Notes

1. **STANDARD EQUIPMENT.** Engine dry weight includes the following standard equipment: Fuel cooled oil cooler; accessory drives; customer bleed interfaces; rotor speed transducers; ITT thermocouples and wiring harnesses; fuel and oil filter impending bypass sensors; fuel flowmeter, ignition system electrical source, exhaust nozzle, propeller mounting flange, reduction gear box. Engine dry weight does not include starter, or aircraft oil cooler.

2. Engine ratings are based on:

   - Sea level static conditions
   - Flat rated to 37°C compressor inlet temperature
   - 100% inlet pressure recovery
   - Exhaust nozzle area (A9) of 1420 cm^2 (220 in^2)
   - No customer bleed extraction
   - No external power extraction
   - No anti-ice airflow
   - Fuel having an LHV of 42757 Kj/Kg, otherwise conforming to fuels specified for use with this engine
   - Oil conforming to MIL-L-23699
   - Rated Measured Gas Temperature includes field deterioration

3. Life limits established for critical components are published in the Engine Maintenance Manual, document CSP 31000, Chapter 5, "TIME LIMITS/MAINTENANCE CHECKS".

4. Propellers to be used with this engine must have mounting provisions and functioning characteristics which are compatible with the engine and its control system. The GMA 2100A engine and control system have been designed and tested to be compatible with the Dowty Aerospace Propellers Model R381 propeller.

5. Aircraft mounted engine control equipment consists of Qty. 2 FADEC units.

6. In actual field service an engine cycle is defined as any flight consisting of one take-off and landing, regardless of length of flight. Each touch-and-go is also considered an additional cycle

Critical gas generator rotor Low Cycle Fatigue (LCF) lives are based on an assumed worst case flight cycle which includes engine start, a 3 second acceleration to normal takeoff power (3738 PSHP), 15415 rpm NG, sea level 95°F day conditions and a 3 second deceleration to shutdown. Actual service mission usage must be monitored to ensure that the engine is operated within the assumed LCF mission. If actual service proves to be more severe than the LCF mission, rotor lives must be adjusted accordingly.

7. Automatic or manual FADEC transfer of control can cause a 6% engine power change for up to five seconds.

8. **ENGINE OVERHAUL** Engine overhaul may only be accomplished by the engine manufacturer until such time as the Engine Overhaul Manual is published.