European Aviation Safety Agency

EASA

TYPE CERTIFICATE DATA SHEET

Number : IM.E.026
Issue : 04
Date : 04 April 2014
Type : Engine Alliance LLC
GP7200 series engines

Models:

GP7270
GP7272
GP7277

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I. General

1. Type/Model: GP7200 / GP7270, GP 7272, GP7277

2. Type Certificate Holder:

Engine Alliance LLC
411 Silver Lane
East Hartford, Connecticut 06118
United States of America

3. Manufacturers:

GE Aviation One Neumann Way Cincinnati, Ohio 45215 United States of America Production Certificate No. 108	Pratt & Whitney Division United Technologies Corporation East Hartford, Connecticut 06108 United States of America Production Certificate No. 2

4. Date of Application: 08 April 2003 GP7270, GP7277
15 May 2012 GP7272

5. EASA Certification Reference Date: 05 February 2003 (All models)

6. EASA Certification Date: 19 April 2007 GP7270, GP7277
04 April 2014 GP7272

II. Certification Basis

1. FAA Certification Basis: Refer to FAA TCDS number E00072EN

2. EASA Certification Basis:

2.1 Airworthiness Standards: CS-E, effective 24 October 2003

2.2 Special Conditions: None

2.3 Equivalent safety findings: ESF1 - CS-E 790(a)(1) – “Ingestion of Rain and Hail – Large Hailstones"

2.4 Deviations: None

2.5 Environmental protection requirements: CS-34 Issue dated 23.10.2003 in accordance with ICAO Annex 16 Volume II, Third Edition, including Amendment 7, as applicable 17 November 2011,The NOx Standard is in accordance with Part III, Chapter 2,
§ 2.3.2, d) (CAEP/6) for GP7277
§ 2.3.2, e) (CAEP/8) for GP7270 and GP7272

III. Technical Characteristics

1. Type Design Definition:

For information regarding components and engine configuration, refer to the approved parts lists:

- Engine Assembly: P/N 5700600-03 and later approved P/N
- Configuration: GP7270: P/N GP7270G01
  GP7272 P/N GP7272G01
  GP7277: P/N GP7277G01
- Electronic engine control (EEC) rating plugs:
  GP7270: P/N 2122M76P11, P/N 2122M76P05
  GP7272: P/N 2122M76P08, P/N 2122M76P17
  GP7277: P/N 2122M76P29

2. Description:

Dual rotor, axial airflow, high bypass ratio turbofan engine:

- single stage fan with large chord hollow blades, 5-stage low pressure compressor (LPC), 9-stage high pressure compressor (HPC)
- annular combustion chamber
- 2-stage high pressure turbine (HPT), 6-stage low pressure turbine (LPT)
- dual channel full authority digital engine control (FADEC) and electronic overspeed protection (EOS)

3. Equipment:

The engine pneumatic starter and the engine vibration monitoring unit (EVMU) are part of the engine type design. Refer to the engine part list for details.

4. Dimensions (mm):

Overall Length (Fan Spinner to Aft Flange)	Nominal Diameter (Fan Case)	Maximum Radial Projection (Drain Mast)
4920	3143	1979

5. Weight (dry): 6718 kg

The engine dry weight is defined as the dry weight of the basic engine with Engine Alliance supplied engine build-up (EBU) components. The Engine Alliance supplied EBU includes: hydraulic filter and pressure switch, intermediate pressure check valve, fan inlet temperature sensor, and inlet anti-icing valve and ducts.

6. Ratings (daN):

	GP7270	GP7272	GP7277
Take-Off	33244 (74735 lb.)	34016 (76470 lb.)	35715 (80290 lb.)
Maximum Continuous	32681 (73470 lb.)	32681 (73470 lb.)	32850 (73850 lb.)

(See notes 1 and 2)

7. Control System:

The software is part of the engine Type Design and includes at initial engine certification:

Part Number	Description
2043M94P03	GP Board - Operating System
2043M94P04	GP Board - Memory Loader
2043M94P05	Application Memory Loader
2043M94P06/07	Software Operating System

8. Fluids

8.1 Fuel and Additives:
Applicable revision of Engine Alliance Service Bulletin EAGP7-73-1 defines the fuel requirements and provides a listing of approved fuels and fuel additives for use in the GP7200 series turbofan engine.

8.2 Oil:
Applicable revision of Engine Alliance Service Bulletin EAGP7-79-1 provides a listing of approved oils for use in the GP7200 series turbofan engine.

9. Aircraft Accessory Drives:

			Torque (m.daN)			
Drive	Rotation	Gear ratio / HP rotor	Continuous	Overload	Static	Overhung Moment
Aircraft Hydraulic Generation 1	CCW	0.3034	29.6	36 *	96	5.1
Aircraft Hydraulic Generation 2	CCW	0.3116	29.6	36 *	96	5.1
Aircraft Electrical Generation	CCW	1.6171	**	***	100	13.8

CCW = Counter Clock-Wise (facing the drive pad)
* = The engine driven hydraulic pump overload is based on 5 minutes of operation at 4 hour intervals.
** = Maximum allowable continuous torque values are equivalent to 186 kW at any engine speed at or above sea level ground idle.
*** = The following overload conditions can be accommodated:

Power (kW)	Duration Time	Recurring Time
238	5 minutes	Once per 1000 hours
238	5 seconds	Once per hour
300	5 seconds	Once per 1000 hours

10. Maximum Permissible Air Bleed Extraction (% of primary airflow):

	Corrected Fan Speed (N1K)		
Bleed location	At or below 740 rpm	From 740 rpm to 2319 rpm	At or above 2319 rpm
HPC 4th stage	5.8 %	5.8 %	5.8 %
HPC 7th stage	1.2 %	Linear variation between 1.2% and 0.54%	0.54 %
HPC 9th stage	13.1 %	13.1 %	6.8 %

IV. Operational Limits:

1. Temperature Limits:

1.1 Exhaust Gas Temperature (°C):
The exhaust gas temperature is measured at station T46 (stage 2 LPT nozzle vane leading edge).

	GP7270	GP7272	GP7277
Take-Off	1002	1002	1002
Maximum Continuous	970	970	970
Starting – Flight	865	865	865
Starting – Ground	745	745	745

1.2 Oil Temperature (°C):

At the scavenge pumps outlet:

Minimum before Take-Off power operation	50
Maximum Continuous	163
Maximum Transitory (20 minutes)	177

1.3 Fuel Temperature:

Refer to the applicable engine “Installation and Operating Manual” document.

1.4 Engine Equipment Temperatures:

Refer to the applicable engine “Installation and Operating Manual” document.

2. Rotational Speed Limits (rpm):

	Maximum rotational speed	Minimum rotational speed (ground idle)	Minimum rotational speed (flight idle)	Minimum rotational speed in icing condition
Low pressure rotor (N1)	2738 (111 %)	450 (19.2 %)	620 (25.1 %)	620 (25.1 %)
High pressure rotor (N2)	13060 (118.75 %)	6974 (63.4 %)	7279 (66.2 %)	-

(See note 6)
100% N1 = 2467 rpm / 100% N2 = 10998 rpm

3. Pressure Limits:

3.1 Fuel Pressure Limits:
During operation, fuel pressure at the engine fuel pump inlet shall be maintained equal or greater than 35 kPa above the true vapour pressure of the fuel, but less than 690 kPa above absolute ambient pressure, with a vapour/liquid ratio of zero. The maximum allowable pressure at the fuel pump inlet after shutdown is 690kPa.

3.2 Oil Pressure Limits (kPa):

N2 Speed (rpm)	Minimum Oil Pressure
6620	172
10500	428
13060	702

Oil pressure is measured relative to sump pressure. When the engine is running, the oil pressure varies with the rotating speed of the HP rotor (Refer to the applicable engine "Operating Instructions" document).
Temporary interruption associated with negative “g” operation is limited to 15 seconds maximum. Normal oil pressure will be restored rapidly once the negative "g" effect has been eliminated.

4. Installation Assumptions and Environmental Conditions:

Refer to the applicable engine “Installation and Operating Manual” document.

5. Time Limited Dispatch:

Criteria pertaining to the dispatch and maintenance requirements for the FADEC engine control system are specified in the chapter 5, “Airworthiness Limitations” section of the applicable "Turbofan Engine Manual” document.

V. Operating and Service Instructions

	GP7200 Turbofan Engine (all models)
Installation and Operating Manual	EA-0126-05 and later approved revisions
Operating Instructions	P/N 5702515
Turbofan Engine Manual	P/N 5700147
Engine maintenance data for inclusion in the Aircraft Maintenance Manual	P/N 5700900

VI. Notes

1. The take-off thrust, with the associated limits, shall not be used continuously more than 5 minutes. The duration may be extended to 10 minutes in case of engine failure in multi-engine aircraft. If the duration exceeds 5 minutes, this shall be recorded in the engine log book.

2. Engine ratings are based on calibrated test stand performance, and performance calculations are based on engine cycle simulations JV3.14.32.A and JV3.14.32.B for the maximum continuous and takeoff thrust ratings, respectively. These calculations assume the following conditions:

- Static sea level standard conditions of 15°C and 101.32 kPa;
- No aircraft accessory loads or air extraction;
- No anti-icing; no inlet distortion; no inlet screen losses; and 100% inlet recovery;
- Production engine inlet and production exhaust system (fan duct assembly comprised of left half P/N 40113476-987G01 and right half P/N 40113476-987G02, primary nozzle P/N L12192).

Power setting, power check, and control of engine thrust output are based on the LP rotor speed (N1).

Take off flat rating ambient temperature limits (°C):

EEC rating plug P/N	GP 7270	GP7272	GP 7277
2122M76P11	30	N/A	N/A
2122M76P05	36	N/A	N/A
2122M76P29	N/A	N/A	30
2122M76P08	N/A	30	N/A
2112M76P17	N/A	34	N/A

3. The life limits of certain engine parts and mandatory inspections are defined in the applicable "Turbofan Engine Manual" document, chapter 5 "Airworthiness Limitations".

4. The maximum permissible engine inlet pressure distortion is specified in the applicable engine "Installation and Operating Manual" document.

5. During ground operation in icing conditions with an outside air temperature (OAT) of +3.0°C or less, periodic engine run-ups must be performed to shed ice from the spinner, fan blades, and low-pressure compressor stators. Run-ups must be to a minimum of 60 % N1 at intervals not to exceed 30 minutes, and must include taxi-out, ground holding, and taxi-in time. Refer to the applicable engine "Operating Instructions" document.

6. The minimum N1 certified for in-flight operation in icing conditions is 620 rpm.

7. The type certificate holder, Engine Alliance LLC, is a company jointly owned by GE Aviation (USA) and Pratt & Whitney (USA). With respect to the benefits of type certification for production of series engines, GE Aviation and Pratt & Whitney function as licensees of Engine Alliance LLC.

8. This engine is approved for use with Airbus thrust reverser system P/Ns (left and right) L78DR130000xxx / L78DR230000xxx and with Airbus fixed fan duct P/Ns (left and right) L78DR140000xxx / L78DR240000xxx.

9. The engine models GP7270 and GP7277 were recertified to show compliance with the NOx Standards defined in ICAO - Annex 16, Volume II, Part III, Chapter 2 paragraph 2.3.2 d (CAEP/6 NOx production rule) and in case of GP7270 and GP7272 compliance with paragraph 2.3.2 e (CAEP/8 NOx Standard).
