U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION TYPE CERTIFICATE DATA SHEET	TCDS NUMBER E00091EN REVISION: 0 DATE: *April, 29, 2016* GENERAL ELECTRIC COMPANY MODELS: GE Passport 20-17BB1A, GE Passport 20-18BB1A, GE Passport 20-19BB1A.

Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E00091EN) and other approved data on file with the Federal Aviation Administration, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER	General Electric Company GE Aviation 1 Neumann Way Cincinnati, OH 45215-6310		
GE Aviation	**GE Passport 20–17BB1A**	**GE Passport 20–18BB1A**	**GE Passport 20–19BB1A**
TYPE	The GE Passport 20 engine is a high bypass dual-rotor, axial-flow turbofan. The bypass ratio of the engine is 5.6:1 with an overall pressure ratio of 45:1. The high pressure compressor (HPC) pressure ratio is 23:1. The High pressure compressor (HPC) is driven by a two stage High pressure turbine (HPT). The 10-stage high-pressure (HP) compressor includes five blisk stages for weight reduction. The integrated front fan and three stage Low pressure compressor (LPC) is driven by a four stage Low pressure turbine (LPT). A Low Emission combustor (LEC) is used for weight and emissions advantage. Combustor case has integrated OGV diffuser for weight reduction. The accessory drive system extracts energy from the high pressure, high speed rotor to drive the engine accessories and the engine-mounted aircraft accessories. The engine is equipped with a dual channel Next Gen Full-Authority Digital Engine Control (FADEC) control system which provides enhanced fault isolation and capability for engine functionality and diagnostics.		
RATINGS (See Note 15)			
Maximum Continuous at Sea Level			
Static Thrust (lb)	16,815	17,565	17,565
Fan Speed (rpm)	5,517	5,611	5,611
Take Off – 5 minutes at Sea Level (See Note 13.3)			
Static Thrust (lb)	17,745	18,435	18,920
Fan Speed (rpm)	5,633	5,706	5,761
Flat Rating – Ambient Temperature			
Takeoff	95°F / 35°C	95°F / 35°C	86°F / 30°C
Maximum Continuous	77°F / 25°C	77°F / 25°C	77°F / 25°C

PAGE	1	2	3	4	5	6	7	8	9
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NOTE: SIGNIFICANT CHANGES ARE BLACK-LINED IN THE LEFT MARGIN.

I. MODELS (cont.)	GE Passport 20-17BB1A	GE Passport 20-18BB1A	GE Passport 20-19BB1A
MODEL LIST			
(Engine Configuration)	GE Passport 20–17BB1AG01/G02	GE Passport 20-18BB1AG01/G02	GE Passport 20-19BB1AG01/G02
COMPONENTS (GE P/Ns)			
Fuel Metering Unit	2496M14	2496M14	2496M14
Electronic Engine Control	2500M36	2500M36	2500M36
Pressure Sub-system	2474M65	2474M65	2474M65
FADEC Software (earliest part number shown)	2575M73	2575M73	2575M73
Data Entry Plug	2531M61	2531M61	2531M61
Fuel Pump	2496M12	2496M12	2496M12
IGNITION SYSTEM			
Two ignition exciters GE P/N	2488M61	2488M61	2488M61
Two igniter plugs GE P/N	2519M29	2519M29	2519M29
PRINCIPAL DIMENSIONS (in)			
Length (Fan spinner to aft centerbody flange)	132.50 in	132.50 in	132.50 in
Width (maximum envelope)	54.32 in	54.32 in	54.32 in
Height (maximum envelope)	51.90 in	51.90 in	51.90 in
WEIGHT (DRY)			
Includes basic engine, basic engine accessories, and optional equipment as listed in the manufacturer's engine specifications.	4554 lbs.	4554 lbs.	4554 lbs.
CENTER OF GRAVITY LOCATIONS (in); Engine only			
Station (axial) – LH Engine	217.640	217.640	217.640
Waterline – LH Engine	97.083	97.083	97.083
Buttline – LH Engine	100.789	100.789	100.789
Station (axial) – RH Engine	218.005	218.005	218.005
Waterline – RH Engine	97.021	97.021	97.021
Buttline – RH Engine	98.763	98.763	98.763

FUEL	See NOTE 12 for approved fuels.
OIL	Refer to GE Passport 20 Service Bulletin SB79-0001 and its latest revision for detailed information pertaining to Type 2 oils. These Service Bulletins cover the approved oils conforming to General Electric Specification D50TF1 or the latest revisions that are authorized.
CERTIFICATION BASIS	
	• 14 CFR Part 33, effective February 1, 1965, as amended by 33-1 through 33-33 • 14 CFR Part 34, effective October 23, 2013, as amended by 34-1 through 34-5a. • Emissions: ICAO Annex 16, Vol. II, Amendment 7 (CAEP/8) latest change.

	• Equivalent Levels of Safety (ELOS) Findings: • ELOS No. TC3323EN-E-P-10 for 14 CFR 33.76. • ELOS No. TC3323EN-E-P-9 for 14 CFR 33.83 • ELOS No. TC3323EN-E-P-13 for 14 CFR 33.89

TYPE CERTIFICATE		
MODELS	APPLICATION DATE	ISSUE/AMMENDED
GE Passport 20-17BB1A	May 22, 2012	*April 29, 2016*
GE Passport 20-18BB1A	May 22, 2012	*April 29, 2016*
GE Passport 20-19BB1A	April 15, 2014	*April 29, 2016*
PRODUCTION BASIS	Production Certificate No. 108	

PRODUCTION BASIS
Production Certification No. 108

NOTES

NOTE 1. **ENGINE RATINGS** (Engine ratings are based on a calibrated test stand, under the conditions specified below)

1. Sea level static, standard pressure (14.696 psia), 59 ^{O}F.
2. No customer bleed or customer power extraction.
3. Ideal engine Inlet, 100 % ram recovery
4. Production aircraft cowling.
5. Production instrumentation.
6. Fuel lower heating value of 18,400 BTU/lb.

NOTE 2.	**TEMPERATURE LIMITS**	
	1. Indicated Turbine exhaust gas temperature (T49)	
	1.1. Takeoff 5 minutes (see NOTE 13.3)	1,895 °F (1,035 °C)
	1.2. Maximum Continuous	1,823 °F (995 °C)
	1.3. Ground starts (manual or auto)	1,382 °F (750°C)
	1.4. Inflight starts (manual or auto)	1,607 °F (875°C)
	1.5. Inflight starts (high power fuel cut)	1,787 °F (975°C)
	2. Twenty (20) Exhaust Gas Temperature excursions of up to 1970.6 ^{O}F (1077 ^{O}C) for up to 15 seconds permitted before maintainence action required. Operator needs to maintain the count of excursions.	
	3. Oil temperature limits	
	3.1 Continuous	320°F (160°C)
	3.2 Transient (15 minutes)	329°F (165°C)

NOTE 3. **FUEL AND OIL PRESSURE LIMITS**

FUEL PRESSURE LIMITS AT THE ENGINE PUMP INLET

1. Aircraft Boost Pump Operative
   The minimum pressure at the engine fuel pump inlet with aircraft boost pumps operative is true vapour pressure plus 5 psia (32.4 kPa) with aircraft boost pump operative to a maximum of 50 pisa. The maximum vapour to liquid ratio at the engine fuel pump inlet with aircraft boost pumps operative is zero.

2. Aircraft Boost Pump Inoperative
   The engine fuel system operation is restricted with the aircraft boost pumps inoperative as outlined in the GE Passport 20 Installation Manual GEK 112054.

OIL PRESSURE LIMITS

See Figure 8.2.6 of the GE Passport 20 Specific Operating Instructions GEK 112053 for definition of minimum and maximum oil pressures.

NOTE 4. **ACCESSORY DRIVE**

See the following Table.

ACCESSORY	DEFINED BY	ROTATION (NOTE #1)	GEAR RATIO TO CORE ROTOR	DRIVE SHAFT (RPM)	MAX WEIGHT LB (KG)	MAX OVERHUNG MOMENT IN-LB (N-m)	SHEAR TORQUE IN-LB (N-m)	CONTINUOUS PAD RATING HP	OVER-LOAD [HP]
VFG		CW	0.8523	16773	91.20 (41.27) WET	529 (59.77) WET	4200.0 (474.54)	95	120 for 2 min (See Note 3)
AIR TURBINE STARTER		CW	0.5714	11246	21 (9.50) DRY	56.7 (6.40) DRY	7500 (847.38)	N/A	N/A
FUEL PUMP		CW	0.3844	7565	28.90 (13.08) DRY	118.5 (13.39) DRY	3030 (342.34)	84.5	98
PMA		CW	0.9143	17993	6.01 (2.73) DRY	5.5 (0.62)	N/A	0.70	N/A
PMG		CCW	0.9143	17993	3.3 (1.49) DRY	6.6 (0.75) DRY	N/A	1.1	N/A
LUBE UNIT		CW	0.2406	4734	26.71 (12.08) WET	119.9 (13.55)	1704 (192.52)	4.8	N/A
HYDRAULIC PUMP		CCW	0.2406	4734	20.4 (9.23) DRY	93.23 (10.53) DRY	2700 (305.06)	39.0	41
CORE TURN CRANKING PAD	0.5 SQUARE DRIVE	CCW	0.3466	6821	N.A.	N.A.	N.A.	N.A.	N.A.

NOTES:

1. Rotation is defined facing the pad.
2. 100 percent core engine speed is 19680 rpm.
3. VFG Overload ratings: 172 HP at flight idle, 5 sec and 81.5 HP at flight idle, for up to 5 minutes

NOTE 5. **MODEL DESCRIPTION** *(List differences, similarities and special characteristics for each model, relative to the base model).*

The GE Passport 20 engine models are limited to installation on the Bombardier Aerospace Global-7000 and Global-8000 model aircrafts only with respect to the installed power response characteristics. Any bill-of-material changes that could significantly and adversely affect power response will have to be reassessed.

NOTE 6. **ENGINE TYPE DESIGN ACCESSORIES, COMPONENTS, SYSTEM ASSEMBLIES WITH AIRCRAFT LEVEL REQUIREMENTS** *(List accessories, similarities and system assemblies that are provided as part of the engine type design, but have traditionally been approved at the installation level and that may have specific aircraft level requirements to meet.)*

The following are installed on the GE Passport 20 engine and have Aircraft Level requirements:

1. Fire Detector, Fan Cowl - GE part no. 2580M13P01 / 2580M13P02
2. Fire Detector, Accessory Gear Box - GE part no. 2516M97P01
3. Fire Detector, Low Pressure Turbine Sensor – GE part no. 2516M98P01

NOTE 7. **COMPATIBLE ACCESSORIES, COMPONENTS, SYSTEM ASSEMBLIES UNDER CURRENT ENGINE CERTIFICATION** *(List accessories, similarities and system assemblies that are not part of the engine type design, but have been shown to the compatiable with the engine model under its certification basis).*

The GE Passport 20 engine models have the following installation:

1. Thrust Reverser, LH – BGL4001-01-0
2. Thrust Reverser, RH – BGL4001-00-0
3. PreCooler System – Part no. G03600001-001
4. Engine Driven Hydraulic Pump – Part no 627100-1001
5. Variable Frequency Generator – Part no. G020404501-001
6. Permanent Magnetic Generator – Part no. G02404505-001
7. Air Management System
    a. Bleed Pressure Sensor – Part no. 70774A010001
    b. Bleed Monitoring Pressure Sensor – Part no. 70773A010001
    c. Pressure Regulating Shut off valve – Part no. 70657A010001P1
    d. Fan Air Valve – Part no. 70659A010001P2

NOTE 8. **SPECIAL ANTI-ICING OR DE-ICING** REQUIREMENTS *(List accessories, similarities and system assemblies that are provided as part of the engine type design, but have traditionally been approved at the installation level and that may have specific aircraft level requirements to meet.)*

Reserved.

NOTE 9. **ENGINE MOUNT SYSTEM PROVISIONS** (*List accessories, similarities and system assemblies that are provided as part of the engine type design, but have traditionally been approved at the installation level and that may have specific aircraft level requirements to meet.)*

The GE Passport 20 engine models contains the following engine mount system parts that need to meet Aircraft level requirements:

1. Yoke - Forward and Aft
2. Link - Forward and Aft
3. Pin, Pylon
4. Bolt, Shoulder Link – Forward and Aft
5. Thrust Link
6. Bolt, Shoulder Thrust Link
7. Pin, Pylon Thrust Link

NOTE 10. **POWER BOOST, INJECTION OR AUGMENTATION SYSTEMS..**

Not Applicable

NOTE 11. SPECIAL INSTALLATION REQUIREMENTS

1. Inlet Foreign object protection Not Applicable.
2. Electromagnetic Interference (EMI) : none
3. Thrust Reverser Installation: None
4. Icing Protection: None
5. Criticality level of software : NA
6. Part 34 Emission standards:
   The following emission standards promulgated in 14 CFR part 34, Amendment 5A, effective October 23, 2013 and 40 CFR Part 87, effective October 31, 2012 have been complied with for the GE Passport 20 engine models.

   Fuel Venting Emission Standards: 14 CFR 34.10(a) and 34.11; in addition , 40 CFR 87.10(a) and 87.11

   Smoke Number (SN) Emission Standards: 14 CFR 34.21(e)(2); in addition, 40 CFR 87.23(c)(1)

   Carbon Monoxide (CO) Emission Standards: 14 CFR 34.21(d)(1)(ii); in addition, 40 CFR 87.23(c)(1)

   Hydro Carbon (HC) Emission Standards: 14 CFR 34.21(d)(1)(i); in addition; 40 CFR 87.23(c)(1)

   Oxides of Nitrogen (NOx) Emission Standards: 14 CFR 34.23(b)(1); in addition; 40 CFR 87 23(c)(3)

   In addition to the FAA's finding of compliance based on the certification requiorements defined in this TCDS, the engine manufacturer has declared that the ICAO emission standards identified in Annex 16, Volume II, Third Edition, Part III, Chapter 2., Section 2.2.2 for SN, Section 2.3.2 for CO and HC, Section 2.3.2.e.3 for NOx (also known as CAEP/8) and Part II Chapter 2 for Fuel Venting have also been demonstrated.

7. ETOPs eligibility: GE Passport 20 models have not been certified to ETOPs requirement and are therefore not eligible for ETOPs operations.
8. Time Limited dispatch limitations: Criteria pertaining to the engine control systems' dispatch and maintenance requirements have been specified in GEK 119289 FADEC Control System Time Limited Dispatch Summary Document and Chapter 5 Airworthiness Limintation section of the GEK 112062 Line Maintenance Manual. These documents define the various configurations and maximum operating intervals.
   A control system reliability monitoring program has been established for the Passport 20, as a contingency of the dispatch criteria approval, to ensure that overall engine control system and specific component failure rates do not exceed the maximum values permitted by the reliability analysis
9. Exhaust Gas Temperature shunting: The GE Passport 20-17BB1A model incorporates an EGT shunt of 31° C at fan speeds above idle. Thus, for an indicated EGT of 1895°F (1035°C), the measured EGT is 1839.2° F (1004° C).
10. Specific Aircraft Installation eligibility: None

NOTE 12. MANUFACTURER'S SERVICE BULLETINS

1. Refer to GE Passport 20 Service Bulletin SB73-0001 for detailed information pertaining to fuels and additives. This Service Bulletin covers the eligible fuels listed per GE Aviation Specification D50TF2. Eligible fuel classifications are:
   Class A – Aviation Kerosene
   Class C – Low Freeze Kerosene
   Class D – High Flash Kerosene
   Class E – Low Flash Kerosene
   NOTE: Class B – (Jet B, JP4) is prohibited

2. Refer to GE Passport 20 Service Bulletin SB79-0001 for detailed information pertaining to Lubricant brands and additives. This Service Bulletin covers the approved oils listed per GE Aviation Specification D50TF1. Eligible oil classifications are:
   Class A,Class B, Class C, Class E, Class F and Class G

3. Refer to GE Passport 20 Service Bulletin SB73-0002 for the detailed information pertaining to the minimum approved FADEC software version that needs to be installed.

NOTE 13. SPECIAL OPERATING PROCEDURE OR LIMITATIONS

1. For operating in Icing conditions, requirements, limitation and notes are specified in the latest version of the FAA approved GEK 112053 GE Passport Specific Operating Instructions.
2. It is permissible to operate below minimum oil pressure for a maximum of 20 seconds during negative G operations. Refer GEK 112053 GE Pasport 20 Operating Instructions for a definition of minimum oil pressure.
3. Takeoff Limit: The normal 5-minute take off limit may be extended to 10 minutes for one engine out contingency.

NOTE 14. SPECIAL REPAIR AND OVERHAUL INSTRUCTIONS

Reserved

NOTE 15. APPLICABLE MANUALS

1. Applicable Installation information and Limitations have been provided in the latest FAA approved GEK 112054 GE Passport 20 Installation Manual.
2. Refer to the latest version of the FAA approved GEK 112063 Engine Shop Manual and GEK 112062 Line Maintenance Manual for maintainence criteria and requirements.
3. Instructions for Continued Airworthiness (ICA) for the Passport 20 are incomplete. Aircraft with this engine installed will be eligible for airworthiness certification when the ICA are completed and accepted by the FAA Engine Certification Office, ANE-140.

NOTE 16. IMPORT REQUIREMENTS FOR FOREIGN MANUFACTURED ENGINES.

Not Applicable

NOTE 17. LIFE LIMITS

Life Limits for critical rotating components for the GE Passport 20 engine models have been published in the Chapter 5 of the latest FAA approved GEK 112062 Line Maintenance Manual.

NOTE 18. MILITARY MODEL INFORMATION *(difference from civil aviation model)***.**

Reserved.

NOTE 19. MAXIMUM PERMISSIBLE MAIN ROTOR AND OUTPUT SHAFT SPEEDS.

100 % N1 speed is 6,032.4 rpm.
100 % N2 speed is 19,680.1 rpm.
Maximum permitted Fan Shaft Speed is 6,260 rpm, i.e. 103.7 % of N1
Maximum permitted Core Shaft Speed is 22,625 rpm., i.e. 114.9 % of N2.

NOTE 20. MAXIMUM ALLOWABLE OUTPUT/PROPELLER SHAFT TORQUE LIMIT AT TORQUE METER/SENSOR

Not Applicable.

NOTE 21. MAXIMUM PERMISSIBLE BLEED AIR EXTRACTION

Stage 4	
PS3 (psig)	**Percent W25**
0	**5.00**
60	**5.00**
60	**10.00**
248	**10.00**
282	**9.60**
282	**8.20**
336	**8.20**
490	**6.10**
583	**5.50**
> 583	**5.50**

Stage 7	
PS3 (psig)	**Percent W25**
0	**2.40**
70	**2.40**
90	**2.30**
118	**1.70**
225	**1.05**
365	**0.75**
600	**0.50**
> 600	**0.50**

Stage 10	
PS3 (psig)	**Percent W25**
0	**10.00**
60	**10.00**
60	**15.00**
170	**15.00**
257	**11.60**
454	**8.00**
454	**4.60**
> 454	**4.60**

NOTE 22. ROTOR DISK INTEGRITY AND ROTOR BLADE CONTAINMENT (*where special requirements apply*)
Reserved.

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