



ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: CF34-3A/A1/A2/B1/B2 BYPASS RATIO (-): 6.3
UNIQUE ID NUMBER: 07P05GE220 PRESSURE RATIO π_{o_0} (-): 19.2
COMBUSTOR: SAC
ENGINE TYPE: TF RATED OUTPUT F_{o_0} (kN): 41.0

REGULATORY DATA

CHARACTERISTIC VALUES:	LTO_{mass}/F_{o_0} (mg/kN)	LTO_{num}/F_{o_0} (particles/kN)	NVPM MASS CONCENTRATION ($\mu\text{g}/\text{m}^3$)
LTO/F_{o_0} AND MAX $nvPM_{mass}$	339.1	3.64E+15	10130
AS % OF CAEP/10 LIMIT	-	-	90.6
AS % OF CAEP/11 LIMIT (InP)	9.0	16.5	
AS % OF CAEP/11 LIMIT (NT)	35.1	31.4	

MEASURED DATA

MODE	POWER SETTING (% F_{o_0})	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES*		NVPM MASS CONCENTRATION PEAK $nvPM_{mass}$ ($\mu\text{g}/\text{m}^3$)
				EI_{mass} (mg/kg)	EI_{num} (particles/kg)	
TAKE-OFF	100	0.7	0.404	287.0	2.01E+15	
CLIMB OUT	85	2.2	0.333	114.0	1.33E+15	
APPROACH	30	4.0	0.121	0.8	8.04E+13	
IDLE	7	26.0	0.048	1.4	1.68E+14	
LTO TOTAL (kg, mg, number of particles)			164	10006	1.07E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/F_{o_0} VALUES (mg/kN, particles/kN)				244.0	2.62E+15	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ($\mu\text{g}/\text{m}^3$)				287.0	2.01E+15	7870

* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING (% F_{o_0})	CORRECTED EMISSIONS INDICES	
		EI_{mass_SL} (mg/kg)	EI_{num_SL} (particles/kg)
TAKE-OFF	100	344.2	6.29E+15
CLIMB OUT	85	143.6	5.08E+15
APPROACH	30	1.7	9.79E+14
IDLE	7	3.2	2.31E+15

AMBIENT CONDITIONS

	From	To	FUEL	
BAROMETER (kPa)	100.8	101.7	HEAT OF COMBUSTION (MJ/kg)	43.14
TEMPERATURE (K)	280.3	284.1	HYDROGEN CONTENT (%mass)	13.73
HUMIDITY (kg water/kg dry air)	0.0022	0.0028	AROMATICS CONTENT (%vol)	17.2
			NAPHTHALENE CONTENT (%vol)	2.01
			SULPHUR CONTENT (ppm by mass)	721

MANUFACTURER: General Electric Company
TEST ORGANIZATION: GE Lynn
TEST LOCATION: Cell #121
TEST DATES: 15/11/2019

REMARKS

- Engine S/N 801-588/1
- Ref. GE Report R2019AE312/Rev.2