



ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: CF34-10E2A1 BYPASS RATIO (-): 5.1
UNIQUE ID NUMBER: 01P08GE203 PRESSURE RATIO π_{co} (-): 25.0
COMBUSTOR: SAC
ENGINE TYPE: TF RATED OUTPUT F_{oo} (kN): 75.4

REGULATORY DATA

CHARACTERISTIC VALUES:	LTO_{mass}/F_{oo} (mg/kN)	LTO_{num}/F_{oo} (particles/kN)	NVPM MASS CONCENTRATION ($\mu\text{g}/\text{m}^3$)
LTO/F_{oo} AND MAX $nvPM_{mass}$	113.2	2.58E+15	1811
AS % OF CAEP/10 LIMIT	-	-	23.5
AS % OF CAEP/11 LIMIT (InP)	3.7	14.2	
AS % OF CAEP/11 LIMIT (NT)	15.5	29.3	

MEASURED DATA

MODE	POWER SETTING (% F_{oo})	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	0.770	52.0	4.50E+14	
CLIMB OUT	85	2.2	0.635	31.3	3.93E+14	
APPROACH	30	4.0	0.218	1.6	9.30E+13	
IDLE	7	26.0	0.083	13.4	6.73E+14	
LTO TOTAL (kg, mg, number of particles)			299	6141	1.40E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/F_{oo} VALUES (mg/kN, particles/kN)				81.4	1.86E+15	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ($\mu\text{g}/\text{m}^3$)				52.0	6.73E+14	1407

* 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_{oo})	CORRECTED EMISSIONS INDICES	
		$EI_{mass_{SL}}$ (mg/kg)	$EI_{num_{SL}}$ (particles/kg)
TAKE-OFF	100	62.5	1.33E+15
CLIMB OUT	85	39.0	1.37E+15
APPROACH	30	3.0	9.10E+14
IDLE	7	23.1	5.92E+15

AMBIENT CONDITIONS

	From	To	FUEL	
BAROMETER (kPa)	98.1	98.6	HEAT OF COMBUSTION (MJ/kg)	43.08
TEMPERATURE (K)	293.2	298.4	HYDROGEN CONTENT (%mass)	13.74
HUMIDITY (kg water/kg dry air)	0.0084	0.0111	AROMATICS CONTENT (%vol)	19.1
			NAPHTHALENE CONTENT (%vol)	0.22
			SULPHUR CONTENT (ppm by mass)	0

MANUFACTURER: General Electric Company
TEST ORGANIZATION: General Electric Company
TEST LOCATION: PTO, Site 3C
TEST DATES: 24/07/2019-25/07/2019

REMARKS

1. GE Aviation Report R2019AE310/Rev. 0
2. Engine S/N 424-879/1