



ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: GE90-110B1 BYPASS RATIO (-): 7.2
UNIQUE ID NUMBER: 07P27GE239 PRESSURE RATIO π_{∞} (-): 40.6
COMBUSTOR: DAC
ENGINE TYPE: TF RATED OUTPUT F_{∞} (kN): 492.7

REGULATORY DATA

CHARACTERISTIC VALUES:	LTO_{mass}/F_{∞} (mg/kN)	LTO_{num}/F_{∞} (particles/kN)	NVPM MASS CONCENTRATION ($\mu\text{g}/\text{m}^3$)
LTO/F_{∞} AND MAX $nvPM_{mass}$	36.3	$7.01\text{E}+14$	513
AS % OF CAEP/10 LIMIT	-	-	15.1
AS % OF CAEP/11 LIMIT (InP)	10.5	16.8	
AS % OF CAEP/11 LIMIT (NT)	17.0	25.2	

MEASURED DATA

MODE	POWER SETTING (% F_{∞})	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	4.221	14.0	$9.14\text{E}+13$	
CLIMB OUT	85	2.2	3.370	11.4	$1.23\text{E}+14$	
APPROACH	30	4.0	1.024	10.8	$2.44\text{E}+14$	
IDLE	7	26.0	0.332	5.1	$2.27\text{E}+14$	
LTO TOTAL (kg, mg, number of particles)			1386	12883	$2.49\text{E}+17$	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/F_{∞} VALUES (mg/kN, particles/kN)				26.1	$5.04\text{E}+14$	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ($\mu\text{g}/\text{m}^3$)				14.0	$3.45\text{E}+14$	398

* 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_{∞})	CORRECTED EMISSIONS INDICES	
		EI_{mass_SL} (mg/kg)	EI_{num_SL} (particles/kg)
TAKE-OFF	100	16.5	$2.38\text{E}+14$
CLIMB OUT	85	14.3	$3.97\text{E}+14$
APPROACH	30	14.7	$1.02\text{E}+15$
IDLE	7	8.1	$1.31\text{E}+15$

AMBIENT CONDITIONS

	From	To	FUEL	
BAROMETER (kPa)	97.5	97.9	HEAT OF COMBUSTION (MJ/kg)	43.12
TEMPERATURE (K)	278.6	293.0	HYDROGEN CONTENT (%mass)	13.97
HUMIDITY (kg water/kg dry air)	0.0035	0.0038	AROMATICS CONTENT (%vol)	15.4
			NAPHTHALENE CONTENT (%vol)	0.29
			SULPHUR CONTENT (ppm by mass)	14

MANUFACTURER: General Electric Company
TEST ORGANIZATION: GE Aviation
TEST LOCATION: PTO, Ohio, USA
TEST DATES: 18/10/2022-21/10/2022

REMARKS

1. Ref. GE Aviation Report R2021AE291/Rev. 1
2. Engine S/N 901-648/1 - 10/18/2022 thru 10/21/2022
3. The maximum EI_{num} occurs between 30% and 85% F_{∞}