



# ICAO ENGINE nvPM EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: CF34-10A16/16-B BYPASS RATIO (-): 5.7  
UNIQUE ID NUMBER: 01P11GE202 PRESSURE RATIO  $\pi_{co}$  (-): 25.4  
COMBUSTOR: SAC  
ENGINE TYPE: TF RATED OUTPUT  $F_{oo}$  (kN): 77.0

### 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 $nvPM_{mass}$	117.0	2.52E+15	1968
AS % OF CAEP/10 LIMIT	-	-	25.8
AS % OF CAEP/11 LIMIT (InP)	3.9	14.0	
AS % OF CAEP/11 LIMIT (NT)	16.3	29.1	

### 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	0.789	55.8	4.57E+14	
CLIMB OUT	85	2.2	0.650	33.2	4.00E+14	
APPROACH	30	4.0	0.222	1.6	9.31E+13	
IDLE	7	26.0	0.084	12.9	6.50E+14	
LTO TOTAL (kg, mg, number of particles)			304	6478	1.40E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE $LTO/F_{oo}$ VALUES (mg/kN, particles/kN)				84.2	1.82E+15	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ( $\mu\text{g}/\text{m}^3$ )				55.8	6.50E+14	1529

\* 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	66.9	1.34E+15
CLIMB OUT	85	41.1	1.36E+15
APPROACH	30	3.0	9.08E+14
IDLE	7	22.2	5.71E+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