



ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: LEAP-1A29CJ BYPASS RATIO (-): 10.7
UNIQUE ID NUMBER: 01P20CM131 PRESSURE RATIO π_{co} (-): 35.5
COMBUSTOR: TAPS II
ENGINE TYPE: TF RATED OUTPUT F_{oo} (kN): 130.3

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 $nvPM_{mass}$	4.9	7.60E+13	206
AS % OF CAEP/10 LIMIT	-	-	3.5
AS % OF CAEP/11 LIMIT (InP)	0.3	0.6	
AS % OF CAEP/11 LIMIT (NT)	1.4	1.7	

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	0.946	1.8	1.17E+11	
CLIMB OUT	85	2.2	0.777	1.2	7.87E+10	
APPROACH	30	4.0	0.261	2.9	9.85E+13	
IDLE	7	26.0	0.094	0.6	6.37E+12	
LTO TOTAL (kg, mg, number of particles)			352	461	7.12E+15	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/F_{oo} VALUES (mg/kN, particles/kN)				3.5	5.47E+13	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ($\mu\text{g}/\text{m}^3$)				7.6	2.18E+14	160

* 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	2.2	1.56E+11
CLIMB OUT	85	1.4	1.07E+11
APPROACH	30	4.4	6.44E+14
IDLE	7	0.7	1.79E+13

AMBIENT CONDITIONS

	From	To	FUEL	
BAROMETER (kPa)	97.8	98.8	HEAT OF COMBUSTION (MJ/kg)	43.26
TEMPERATURE (K)	274.6	279.8	HYDROGEN CONTENT (%mass)	13.69
HUMIDITY (kg water/kg dry air)	0.0020	0.0032	AROMATICS CONTENT (%vol)	16.5
			NAPHTHALENE CONTENT (%vol)	0.66
			SULPHUR CONTENT (ppm by mass)	150

MANUFACTURER: CFM International
TEST ORGANIZATION: CFM International
TEST LOCATION: PTO, Ohio
TEST DATES: 21/11/2016-02/12/2016

REMARKS

1. Certification Report CRL-2201_2/Rev. 4
2. Engine S/N 600-104