



ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: Trent XWB-84EP
UNIQUE ID NUMBER: 07P27RR153
COMBUSTOR: Phase5 Tiled
ENGINE TYPE: TF
BYPASS RATIO (-): 8.8
PRESSURE RATIO π_{00} (-): 44.0
RATED OUTPUT F_{00} (kN): 379.1

REGULATORY DATA

CHARACTERISTIC VALUES:	LTO_{mass}/F_{00} (mg/kN)	LTO_{num}/F_{00} (particles/kN)	NVPM MASS CONCENTRATION ($\mu\text{g}/\text{m}^3$)
LTO/F_{00} AND MAX $nvPM_{mass}$	129.3	$2.00\text{E}+15$	2233
AS % OF CAEP/10 LIMIT	-	-	60.1
AS % OF CAEP/11 LIMIT (InP)	37.2	47.9	
AS % OF CAEP/11 LIMIT (NT)	60.4	71.9	

MEASURED DATA

MODE	POWER SETTING (% F_{00})	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	2.784	35.4	$1.35\text{E}+14$	
CLIMB OUT	85	2.2	2.268	48.2	$2.70\text{E}+14$	
APPROACH	30	4.0	0.740	92.8	$1.27\text{E}+15$	
IDLE	7	26.0	0.253	21.2	$8.85\text{E}+14$	
LTO TOTAL (kg, mg, number of particles)			989	43420	$6.71\text{E}+17$	-
NUMBER OF ENGINES				3	3	3
NUMBER OF TESTS				3	3	3
AVERAGE LTO/F_{00} VALUES (mg/kN, particles/kN)				114.6	$1.77\text{E}+15$	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ($\mu\text{g}/\text{m}^3$)				120.1	$1.31\text{E}+15$	2030

* 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_{00})	CORRECTED EMISSIONS INDICES	
		EI_{mass_SL} (mg/kg)	EI_{num_SL} (particles/kg)
TAKE-OFF	100	38.3	$1.95\text{E}+14$
CLIMB OUT	85	52.8	$4.14\text{E}+14$
APPROACH	30	106.9	$2.62\text{E}+15$
IDLE	7	26.9	$2.03\text{E}+15$

AMBIENT CONDITIONS

	From	To	FUEL	
BAROMETER (kPa)	98.6	102.2	HEAT OF COMBUSTION (MJ/kg)	43.26
TEMPERATURE (K)	283.0	295.0	HYDROGEN CONTENT (%mass)	13.93
HUMIDITY (kg water/kg dry air)	0.0050	0.0096	AROMATICS CONTENT (%vol)	16.4
			NAPHTHALENE CONTENT (%vol)	0.81
			SULPHUR CONTENT (ppm by mass)	350

MANUFACTURER: Rolls-Royce plc
TEST ORGANIZATION: Rolls-Royce
TEST LOCATION: Derby
TEST DATES: 03/07/2014-30/03/2021

REMARKS

1. Certification report EDNS01001039303 Issue 1
2. The maximum EI_{mass} occurs between 30% and 85% F_{00}
3. The maximum EI_{num} occurs between 30% and 85% F_{00}