



# ICAO ENGINE nvPM EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: BR700-710C4-11 BYPASS RATIO (-): 4.1  
UNIQUE ID NUMBER: 01P06BR014 PRESSURE RATIO  $\pi_{c0}$  (-): 25.0  
COMBUSTOR: Annular  
ENGINE TYPE: MTF RATED OUTPUT  $F_{00}$  (kN): 68.8

### 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 $nvPM_{mass}$	1382.8	1.58E+16	3410
AS % OF CAEP/10 LIMIT	-	-	42.0
AS % OF CAEP/11 LIMIT (InP)	43.6	83.6	
AS % OF CAEP/11 LIMIT (NT)	178.3	169.6	

### 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	0.753	601.0	3.67E+15	
CLIMB OUT	85	2.2	0.620	581.4	5.36E+15	
APPROACH	30	4.0	0.221	8.3	1.07E+15	
IDLE	7	26.0	0.091	9.9	1.22E+15	
LTO TOTAL (kg, mg, number of particles)			308	68413	7.84E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/ $F_{00}$ VALUES (mg/kN, particles/kN)				994.8	1.14E+16	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ( $\mu\text{g}/\text{m}^3$ )				612.8	6.80E+15	2650

\* 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	659.7	5.81E+15
CLIMB OUT	85	650.2	9.04E+15
APPROACH	30	11.4	2.80E+15
IDLE	7	13.9	3.29E+15

### AMBIENT CONDITIONS

	From	To	FUEL	
BAROMETER (kPa)	100.3	100.6	HEAT OF COMBUSTION (MJ/kg)	43.33
TEMPERATURE (K)	287.6	291.7	HYDROGEN CONTENT (%mass)	13.95
HUMIDITY (kg water/kg dry air)	0.0074	0.0080	AROMATICS CONTENT (%vol)	15.4
			NAPHTHALENE CONTENT (%vol)	0.16
			SULPHUR CONTENT (ppm by mass)	45

MANUFACTURER: Rolls-Royce Deutschland  
TEST ORGANIZATION: Rolls-Royce Deutschland  
TEST LOCATION: Dahlewitz  
TEST DATES: 11/10/2019-12/10/2019

### REMARKS

1. Certification Report EDNS01000832272 Issue 2
2. The maximum  $EI_{num}$  occurs between 30% and 85%  $F_{00}$
3. Corrected peak EI number value (fuel correction) since EEDB v30