



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: RB211-535E4  
UNIQUE ID NUMBER: 5RR038  
COMBUSTOR: Phase5  
ENGINE TYPE: MTF

BYPASS RATIO: 4.1  
PRESSURE RATIO ( $\pi_{00}$ ): 26.0  
RATED THRUST ( $F_{00}$ ) (kN): 178.4

### REGULATORY DATA

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
D <sub>p</sub> /F <sub>00</sub> (g/kN) or SN	0.7	41.2	48.5	9.4
AS % OF ORIGINAL LIMIT	3.6	34.9	52.7	46.5
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			65.8	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			80.0	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			90.9	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			109.0	

### DATA STATUS

- PRE-REGULATION  
x CERTIFICATION  
- REVISED (SEE REMARKS)

### TEST ENGINE STATUS

- NEWLY MANUFACTURED ENGINES  
x DEDICATED ENGINES TO PRODUCTION STANDARD  
- OTHER (SEE REMARKS)

### EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE  
(ANNEX 16 VOLUME II)

### CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)  
x OUT OF PRODUCTION (DATE: - )  
- OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (%F <sub>00</sub> )	TIME (minutes)	FUEL FLOW (kg/s)	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
				HC	CO	NO <sub>x</sub>	
TAKE-OFF	100	0.7	1.850	0.03	0.26	22.31	7.3
CLIMB OUT	85	2.2	1.500	0.00	0.29	17.56	6.8
APPROACH	30	4.0	0.520	0.04	2.72	8.38	0.6
IDLE	7	26.0	0.180	0.27	20.33	4.40	0.5
LTO TOTAL FUEL (kg) or EMISSIONS (g)			681	83	6126	7492	-
NUMBER OF ENGINES				1	1	1	1
NUMBER OF TESTS				3	3	3	3
AVERAGE D <sub>p</sub> /F <sub>00</sub> (g/kN) or AVERAGE SN (MAX)				0.5	33.6	41.8	7.3
SIGMA (D <sub>p</sub> /F <sub>00</sub> in g/kN, or SN)							
RANGE (D <sub>p</sub> /F <sub>00</sub> in g/kN, or SN)				0.32-0.7	33.3-33.8	40.3-43.6	6.9-7.9

### ACCESSORY LOADS

POWER EXTRACTION 0 (kW)  
STAGE BLEED 0 (% CORE FLOW)

AT - POWER SETTINGS  
AT - POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	100.7-101.2
TEMPERATURE (K)	281-287
ABS HUMIDITY (kg/kg)	0.0058-0.0064

### FUEL

SPEC	AVTUR
H/C	1.93
AROM (%)	17.6

MANUFACTURER: Rolls-Royce plc  
TEST ORGANIZATION: Rolls-Royce plc  
TEST LOCATION: Hucknall  
TEST DATES: 01/05/1999

### REMARKS

1. Data from certification report DNS63281.
2. Phase 5 combustor

Compliance with Fuel Venting requirements:

- ('x' if complies, 'PR' if pre-regulation, '-' if information is not available)