



# ICAO ENGINE EXHAUST EMISSIONS DATA BANK

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: Trent 1000-D  
UNIQUE ID NUMBER: 11RR051  
ENGINE TYPE: TF

BYPASS RATIO: 9.3  
PRESSURE RATIO ( $\pi_{oo}$ ): 43.8  
RATED OUTPUT ( $F_{oo}$ ) (kN): 334.7

### REGULATORY DATA

CHARACTERISTIC VALUE:	HC	CO	NOx	SMOKE NUMBER
$D_p/F_{oo}$ (g/kN) or SN	0.1	10.5	66.3	5.8
AS % OF ORIGINAL LIMIT	0.3 %	8.9 %	52.0 %	33.8 %
AS % OF CAEP/2 LIMIT (NOx)			64.9 %	
AS % OF CAEP/4 LIMIT (NOx)			70.1 %	
AS % OF CAEP/6 LIMIT (NOx)			76.6 %	
AS % OF CAEP/8 LIMIT (NOx)			85.3 %	

### 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

### MEASURED DATA

MODE	POWER SETTING (% $F_{oo}$ )	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
				HC	CO	NOx	
TAKE-OFF	100	0.7	2.508	0	0.51	53.54	3
CLIMB OUT	85	2.2	2.048	0	0.48	40.33	3.8
APPROACH	30	4.0	0.668	0	0.68	13.86	3.1
IDLE	7	26.0	0.246	0.04	7.66	5.66	0.6
LTO TOTAL FUEL (kg) or EMISSIONS (g)			75	14	3238	20942	-
NUMBER OF ENGINES				3	3	3	3
NUMBER OF TESTS				5	5	5	5
AVERAGE $D_p/F_{oo}$ (g/kN) or AVERAGE SN (MAX)				0.04	9.67	62.58	5.2
SIGMA ( $D_p/F_{oo}$ in g/kN, or SN)				0.037	2.8	0.98	1.99
RANGE ( $D_p/F_{oo}$ in g/kN, or SN)				0 - 0.1	5.8 - 12.2	61.5 - 63.8	3 - 8.2

### ACCESSORY LOADS

POWER EXTRACTION 0 (kW) AT - POWER SETTINGS  
STAGE BLEED 0 % CORE FLOW AT - POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	98.9 - 102.1
TEMPERATURE (K)	284.1 - 290.3
ABS HUMIDITY (kg/kg)	0.00432 - 0.00721

### FUEL

SPEC	-
H/C	1.89
AROM (%)	16.7

MANUFACTURER: Rolls-Royce  
TEST ORGANIZATION: Rolls-Royce  
TEST LOCATION: Derby  
TEST DATES: FROM 24 Sep 09 TO 09 Jun 11

### REMARKS

1. Representative of Package B engines

If REVISED, this data supersedes databank UID  
Compliance with fuel venting requirements: - ('x' if complies, PR if pre-regulation)