



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: Trent 1000-Q3  
UNIQUE ID NUMBER: 19RR096  
COMBUSTOR: Phase5 Tiled  
ENGINE TYPE: TF

BYPASS RATIO: 8.9  
PRESSURE RATIO ( $\pi_{00}$ ): 47.8  
RATED THRUST ( $F_{00}$ ) (kN): 350.9

REGULATORY DATA \*\* DATA SUPERSEDED \*\* SEE FOLLOWING UID FOR REVISED DATA: 01P19RR117

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
D <sub>p</sub> /F <sub>00</sub> (g/kN) or SN	0.0	7.8	70.3	16.4
AS % OF ORIGINAL LIMIT	0.0	6.6	51.9	97.7
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			64.8	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			68.5	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			74.4	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			82.0	

### 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)  
- OUT OF PRODUCTION (DATE: - )  
- OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (%F <sub>00</sub> )	TIME (minutes)	FUEL FLOW (kg/s)	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
TAKE-OFF	100	0.7	2.649	0.00	0.35	56.35	7.8
CLIMB OUT	85	2.2	2.168	0.00	0.44	43.21	10.7
APPROACH	30	4.0	0.699	0.00	0.58	14.49	9.2
IDLE	7	26.0	0.256	0.00	5.80	6.34	1.8
LTO TOTAL FUEL (kg) or EMISSIONS (g)			965	0	2585	23599	-
NUMBER OF ENGINES				5	5	5	6
NUMBER OF TESTS				11	11	11	8
AVERAGE D <sub>p</sub> /F <sub>00</sub> (g/kN) or AVERAGE SN (MAX)				0.0	7.4	67.3	15.3
SIGMA (D <sub>p</sub> /F <sub>00</sub> in g/kN, or SN)				0.0	1.8	1.2	1.7
RANGE (D <sub>p</sub> /F <sub>00</sub> in g/kN, or SN)				0.0	4.81-9.3	65.87-68.45	12.1-16.8

### ACCESSORY LOADS

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

AT - POWER SETTINGS  
AT - POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	98.9-102.1
TEMPERATURE (K)	275-304.6
ABS HUMIDITY (kg/kg)	0.00308-0.01935

### FUEL

SPEC	
H/C	1.91
AROM (%)	17.2

MANUFACTURER: Rolls-Royce plc  
TEST ORGANIZATION: Rolls-Royce  
TEST LOCATION: Derby  
TEST DATES: 24/09/2009-30/11/2017

### NO<sub>x</sub> REGULATION PARAGRAPH

	2.3.2 c) (CAEP/4)
	2.3.2 d) (CAEP/6)
x	2.3.2 e) (CAEP/8)

### REMARKS

1. Data from Certification Report EDNS01000615769
2. Certification in accordance with Part III, Chapter 2, of Amendment 8 of ICAO Annex 16 Vol. II.
3. NO<sub>x</sub> levels in accordance with Part III, Chapter 2, 2.3.2 e) (CAEP/8)

Compliance with Fuel Venting requirements:

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