



ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: Trent 1000-R3 BYPASS RATIO: 8.9
UNIQUE ID NUMBER: 01P19RR118 PRESSURE RATIO (π_{co}): 49.4
COMBUSTOR: Phase5 Tiled
ENGINE TYPE: TF RATED THRUST (F_{eo}) (kN): 363.9

REGULATORY DATA ** DATA SUPERSEDED ** SEE FOLLOWING UID FOR REVISED DATA: 02P23RR138

| CHARACTERISTIC VALUE: | HC | CO | NO _x | SMOKE NUMBER |
|----------------------------------------------|-----|-----|-----------------|--------------|
| D _p /F _{eo} (g/kN) or SN | 0.0 | 8.1 | 76.3 | 16.4 |
| AS % OF ORIGINAL LIMIT | 0.0 | 6.9 | 54.9 | 98.6 |
| AS % OF CAEP/2 LIMIT (NO _x) | | | 68.7 | |
| AS % OF CAEP/4 LIMIT (NO _x) | | | 72.1 | |
| AS % OF CAEP/6 LIMIT (NO _x) | | | 78.0 | |
| AS % OF CAEP/8 LIMIT (NO _x) | | | 85.8 | |

For non-volatile particulate matter (nvPM) emissions, please refer to the ICAO Engine nvPM Emissions Data Sheet.

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 _{eo}) | TIME (minutes) | FUEL FLOW (kg/s) | HC | CO | NO _x | SMOKE NUMBER |
|--------------------------------------------------------------------|-----------------------------------|----------------|------------------|------|-----------|-----------------|--------------|
| TAKE-OFF | 100 | 0.7 | 2.783 | 0.00 | 0.45 | 61.62 | 7.7 |
| CLIMB OUT | 85 | 2.2 | 2.266 | 0.00 | 0.43 | 45.76 | 9.9 |
| APPROACH | 30 | 4.0 | 0.723 | 0.00 | 0.57 | 14.87 | 9.6 |
| IDLE | 7 | 26.0 | 0.262 | 0.00 | 5.99 | 6.67 | 1.8 |
| LTO TOTAL FUEL (kg) or EMISSIONS (g) | | | 998 | 0 | 2728 | 26196 | - |
| NUMBER OF ENGINES | | | | 3 | 3 | 3 | 6 |
| NUMBER OF TESTS | | | | 7 | 7 | 7 | 8 |
| AVERAGE D _p /F _{eo} (g/kN) or AVERAGE SN (MAX) | | | | 0.0 | 7.5 | 72.0 | 15.3 |
| SIGMA (D _p /F _{eo} in g/kN, or SN) | | | | 0.0 | 1.3 | 1.2 | 1.7 |
| RANGE (D _p /F _{eo} in g/kN, or SN) | | | | 0.0 | 6.08-8.72 | 70.58-72.75 | 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: 07/02/2011-30/11/2017

NO_x 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_x 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)