# ICAO ENGINE EXHAUST EMISSIONS DATA BANK

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: CFM56-5B9/2P
UNIQUE ID NUMBER: 7CM050
ENGINE TYPE: TF

BYPASS RATIO: 5.9
PRESSURE RATIO ($\pi_{oo}$): 24.4
RATED OUTPUT ($F_{oo}$) (kN): 102.2

REGULATORY DATA

| CHARACTERISTIC VALUE: | HC | CO | NOx | SMOKE NUMBER |
|---|---|---|---|---|
| $D_p/F_{oo}$ (g/kN) or SN | 9.9 | 107.5 | 29.5 | 7.8 |
| AS % OF ORIGINAL LIMIT | 50.5 % | 91.1 % | 33.2 % | 33.1 % |
| AS % OF CAEP/2 LIMIT (NOx) | | | 41.5 % | |
| AS % OF CAEP/4 LIMIT (NOx) | | | 51.0 % | |
| AS % OF CAEP/6 LIMIT (NOx) | | | 57.8 % | |
| AS % OF CAEP/8 LIMIT (NOx) | | | 69.9 % | |

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) HC | CO | NOx | SMOKE NUMBER |
|---|---|---|---|---|---|---|---|
| TAKE-OFF | 100 | 0.7 | 0.961 | 0.2 | 2.9 | 13.9 | 0.3 |
| CLIMB OUT | 85 | 2.2 | 0.799 | 0.3 | 8.1 | 10.7 | 0.3 |
| APPROACH | 30 | 4.0 | 0.296 | 0.4 | 21 | 7.6 | 6.6 |
| IDLE | 7 | 26.0 | 0.105 | 4.4 | 44.1 | 3.2 | 1.7 |
| LTO TOTAL FUEL (kg) or EMISSIONS (g) | | | 381 | 789 | 9687 | 2754 | - |
| NUMBER OF ENGINES | | | | 2 | 2 | 2 | 2 |
| NUMBER OF TESTS | | | | 4 | 4 | 4 | 4 |
| AVERAGE $D_p/F_{oo}$ (g/kN) or AVERAGE SN (MAX) | | | | 7.6 | 94.3 | 26.9 | 6.6 |
| SIGMA ($D_p/F_{oo}$ in g/kN, or SN) | | | | - | - | - | - |
| RANGE ($D_p/F_{oo}$ in g/kN, or SN) | | | | 7.4 - 7.8 | 92.9 - 95.8 | 26.5 - 27.2 | - |

ACCESSORY LOADS

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

ATMOSPHERIC CONDITIONS

| | |
|---|---|
| BAROMETER (kPa) | 98.5 - 99.74 |
| TEMPERATURE (K) | 284.6 - 292.4 |
| ABS HUMIDITY (kg/kg) | 0.0081 - 0.0115 |

FUEL

| | |
|---|---|
| SPEC | Jet A |
| H/C | 1.93 |
| AROM (%) | 17.33 |

MANUFACTURER: CFM International
TEST ORGANIZATION: CFM56 Evaluation Engineering
TEST LOCATION: GEAE PTO and Techspace Aero, Liege, Belgium
TEST DATES: FROM Aug 96 TO Sep 96

REMARKS

1. FAA Certification Report CR-700 S3, October 2001
2. DAC-II combustor P/N 196M99G04

If REVISED, this data supersedes databank UID
Compliance with fuel venting requirements: 0 ('x' if complies, PR if pre-regulation)