



# ICAO ENGINE EXHAUST EMISSIONS DATA BANK

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: D-436-148 F1  
UNIQUE ID NUMBER: 13ZM003  
ENGINE TYPE: TF

BYPASS RATIO: 4.9  
PRESSURE RATIO ( $\pi_{00}$ ): 19.8  
RATED OUTPUT ( $F_{00}$ ) (kN): 64.43

### REGULATORY DATA

CHARACTERISTIC VALUE:	HC	CO	NOx	SMOKE NUMBER
$D_p/F_{00}$ (g/kN) or SN	5.7	58.7	37.5	7.2
AS % OF ORIGINAL LIMIT	29.2 %	49.8 %	47.1 %	27.0 %
AS % OF CAEP/2 LIMIT (NOx)			58.8 %	
AS % OF CAEP/4 LIMIT (NOx)			67.1 %	
AS % OF CAEP/6 LIMIT (NOx)			71.9 %	
AS % OF CAEP/8 LIMIT (NOx)			82.3 %	

### DATA STATUS

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

### TEST ENGINE STATUS

X 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  
- OUT OF SERVICE

### MEASURED DATA

MODE	POWER SETTING (% $F_{00}$ )	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
TAKE-OFF	100	0.7	0.548	0.1	0.54	18.93	6.7
CLIMB OUT	85	2.2	0.468	0.04	0.54	16	-
APPROACH	30	4.0	0.218	0.07	2.99	7.26	-
IDLE	7	26.0	0.093	2.26	23.46	3.64	-
LTO TOTAL FUEL (kg) or EMISSIONS (g)			260	3548	37387	9546	-
NUMBER OF ENGINES				8	8	8	8
NUMBER OF TESTS				8	8	8	8
AVERAGE $D_p/F_{00}$ (g/kN) or AVERAGE SN (MAX)				5.22	55.99	36.18	6.7
SIGMA ( $D_p/F_{00}$ in g/kN, or SN)				0.8	3	2.5	-
RANGE ( $D_p/F_{00}$ in g/kN, or SN)				2.4-12.1	39.8-85.5	32.7-40.8	5.8-8.0

### ACCESSORY LOADS

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

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	99.02-102.66
TEMPERATURE (K)	266-301
ABS HUMIDITY (kg/kg)	0.00248-0.01624

### FUEL

SPEC	RT
H/C	1.92
AROM (%)	13.3-19.7

MANUFACTURER: IVCHENKO PROGRESS ZMBK  
TEST ORGANIZATION: IVCHENKO PROGRESS ZMBK  
TEST LOCATION: ZAPOROJE  
TEST DATES: FROM 27 Dec 91 TO 28 Jul 06

### REMARKS

1. NOx levels in accordance with Part III, Chapter 2, 2.3.2 c) (CAEP/4)

If REVISED, this data supersedes databank UID  
Compliance with fuel venting requirements:

X ('x' if complies, PR if pre-regulation)