



# ICAO ENGINE nvPM EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: PW1431GA-JM BYPASS RATIO (-): 11.9  
UNIQUE ID NUMBER: 01P22PW180 PRESSURE RATIO  $\pi_{co}$  (-): 35.6  
COMBUSTOR: TALON X, Block-D  
ENGINE TYPE: TF RATED OUTPUT  $F_{oo}$  (kN): 140.4

### REGULATORY DATA

CHARACTERISTIC VALUES:	$LTO_{mass}/F_{oo}$ (mg/kN)	$LTO_{num}/F_{oo}$ (particles/kN)	NVPM MASS CONCENTRATION ( $\mu\text{g}/\text{m}^3$ )
LTO/ $F_{oo}$ AND MAX nvPM <sub>mass</sub>	47.2	1.06E+15	1361
AS % OF CAEP/10 LIMIT	-	-	24.3
AS % OF CAEP/11 LIMIT (InP)	2.9	9.8	
AS % OF CAEP/11 LIMIT (NT)	16.8	29.9	

### MEASURED DATA

MODE	POWER SETTING (% $F_{oo}$ )	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES*		NVPM MASS CONCENTRATION PEAK nvPM <sub>mass</sub> ( $\mu\text{g}/\text{m}^3$ )
				EI <sub>mass</sub> (mg/kg)	EI <sub>num</sub> (particles/kg)	
TAKE-OFF	100	0.7	0.950	35.4	3.45E+14	
CLIMB OUT	85	2.2	0.780	28.5	4.20E+14	
APPROACH	30	4.0	0.270	0.3	3.65E+13	
IDLE	7	26.0	0.090	2.8	3.43E+14	
LTO TOTAL (kg, mg, number of particles)			348	4766	1.07E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				4	4	4
AVERAGE LTO/ $F_{oo}$ VALUES (mg/kN, particles/kN)				33.9	7.65E+14	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ( $\mu\text{g}/\text{m}^3$ )				35.4	4.24E+14	1057

\* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

### DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING (% $F_{oo}$ )	CORRECTED EMISSIONS INDICES	
		EI <sub>mass_SL</sub> (mg/kg)	EI <sub>num_SL</sub> (particles/kg)
TAKE-OFF	100	42.8	9.96E+14
CLIMB OUT	85	35.5	1.38E+15
APPROACH	30	0.7	3.18E+14
IDLE	7	6.2	3.40E+15

### AMBIENT CONDITIONS

	From	To	FUEL	
BAROMETER (kPa)	101.5	102.2	HEAT OF COMBUSTION (MJ/kg)	43.32
TEMPERATURE (K)	279.6	300.8	HYDROGEN CONTENT (%mass)	13.89
HUMIDITY (kg water/kg dry air)	0.0036	0.0120	AROMATICS CONTENT (%vol)	16.5
			NAPHTHALENE CONTENT (%vol)	0.74
			SULPHUR CONTENT (ppm by mass)	228

MANUFACTURER: Pratt & Whitney  
TEST ORGANIZATION: Pratt & Whitney  
TEST LOCATION: W. Palm Beach, FL  
TEST DATES: 18/01/2020-21/01/2020

### REMARKS

1. Data from certification report PWA-12091
2. 1 engine tested
3. TALON-X, Block-D combustor
4. Certification in accordance with ICAO Annex 16 Vol. II., Part III, Chapter 4.