



# ICAO ENGINE nvPM EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: PW1431G-JM BYPASS RATIO (-): 11.9  
UNIQUE ID NUMBER: 01P22PW175 PRESSURE RATIO  $\pi_{co}$  (-): 35.6  
COMBUSTOR: TALON X, Block-C  
ENGINE TYPE: TF RATED OUTPUT  $F_{co}$  (kN): 140.4

### REGULATORY DATA

CHARACTERISTIC VALUES:	$LTO_{mass}/F_{co}$ (mg/kN)	$LTO_{num}/F_{co}$ (particles/kN)	NVPM MASS CONCENTRATION ( $\mu\text{g}/\text{m}^3$ )
LTO/ $F_{co}$ AND MAX nvPM <sub>mass</sub>	112.4	2.52E+15	2834
AS % OF CAEP/10 LIMIT	-	-	50.6
AS % OF CAEP/11 LIMIT (InP)	6.9	23.1	
AS % OF CAEP/11 LIMIT (NT)	40.1	70.8	

### MEASURED DATA

MODE	POWER SETTING (% $F_{co}$ )	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	89.0	7.80E+14	
CLIMB OUT	85	2.2	0.780	61.1	9.42E+14	
APPROACH	30	4.0	0.270	6.9	4.17E+14	
IDLE	7	26.0	0.090	7.6	7.05E+14	
LTO TOTAL (kg, mg, number of particles)			348	11353	2.54E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/ $F_{co}$ VALUES (mg/kN, particles/kN)				80.8	1.81E+15	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ( $\mu\text{g}/\text{m}^3$ )				89.0	9.62E+14	2202

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

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

MODE	POWER SETTING (% $F_{co}$ )	CORRECTED EMISSIONS INDICES	
		EI <sub>mass_SL</sub> (mg/kg)	EI <sub>num_SL</sub> (particles/kg)
TAKE-OFF	100	105.8	2.10E+15
CLIMB OUT	85	77.1	3.74E+15
APPROACH	30	9.9	3.28E+15
IDLE	7	15.4	6.96E+15

### AMBIENT CONDITIONS

	From	To	FUEL	
BAROMETER (kPa)	100.8	103.0	HEAT OF COMBUSTION (MJ/kg)	43.27
TEMPERATURE (K)	266.7	277.2	HYDROGEN CONTENT (%mass)	13.84
HUMIDITY (kg water/kg dry air)	0.0004	0.0017	AROMATICS CONTENT (%vol)	15.3
			NAPHTHALENE CONTENT (%vol)	1.87
			SULPHUR CONTENT (ppm by mass)	705

MANUFACTURER: Pratt & Whitney  
TEST ORGANIZATION: Pratt & Whitney  
TEST LOCATION: East Hartford, CT  
TEST DATES: 02/03/2017-04/03/2017

### REMARKS

1. Data from certification report PWA-11701
2. 1 engine tested
3. TALON-X, Block-C\* combustor
4. Certification in accordance with ICAO Annex 16 Vol. II., Part III, Chapter 2.
5. nvPM levels in accordance with ICAO Annex 16 Vol. II, Part III, Chapter 4 and Appendices 7 and 8.(CAEP/10)