U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION TYPE CERTIFICATE DATA SHEET E3NE	TCDS NUMBER E3NE REVISION: 15 DATE: February 10, 2000 PRATT & WHITNEY MODELS: JT9D-59A JT9D-70A JT9D-7Q JT9D-7Q3 JT9D-7R4D JT9D-7R4D1 JT9D-7R4E JT9D-7R4E1 JT9D-7R4G2 JT9D-7R4H1 JT9D-7R4E4

Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E3NE) and other approved data on file with the Federal Aviation Administration, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER: Pratt & Whitney
United Technologies Corporation
East Hartford, Connecticut 06108

I. MODELS	JT9D-59A	JT9D-70A	JT9D-7Q	
TYPE	Turbofan, dual axial 16 stage compressor, annular combustion chamber, and 6 stage turbine.			
RATINGS (See NOTE 5)				
Maximum continuous at sea level, static thrust, lb.	44,770	44,290	44,920	
Takeoff static thrust at sea level, lb. Dry (5 min.) (See NOTE 13)	51,720	51,140	51,900	
COMPONENTS				
Fuel Control	Ham. Std. JFC68-6	- -	- -	
Fuel Pump	TRW 385200	- -	TRW 386900	
High Compressor Stator Vane Control/ 3.0 Bleed Control	Ham. Std./ EVC 3-5/ 674977	- -	- -	
or	or			
Engine Vane and Modulating Bleed Control	Ham. Std. GTA9-1	- -	- -	
Start Bleed Control (3.5 bleed control)	PWA P/N 773456	- -	- -	
Electronic Engine Control	---	---	---	
FUEL	See NOTE 10	- -	- -	
OIL	See NOTE 11	- -	- -	

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LEGEND: "- -" INDICATES "SAME AS PRECEDING MODEL"
"---" NOT APPLICABLE
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I. MODELS (CONT.)	JT9D-59A	JT9D-70A	JT9D-7Q	
PRINCIPAL DIMENSIONS				
Maximum length, in. (including spinner)	154.256	- -	- -	
Width, in.	97.030	- -	- -	
Weight (dry), lb. (includes basic engine with all essential accessories; with fuel heater, oil tank, fuel oil cooler, and CSD fuel oil cooler; but excluding starter, exhaust nozzle and power source for the ignition systems)	9,140	9,155	9,295	
Center of gravity, in.	5.2±1.0	- -	2.5±1.0	
Forward of engine reference plane	3.3±0.5	- -	1.4±0.5	
Below engine center line				
IGNITION	Unison	- -	- -	
Exciters	5005907-01 (two)			
Igniters (two each)	Champion 709520	- -	- -	

II. MODELS	JT9D-7Q3	JT9D-7R4D	JT9D-7R4D1	JT9D-7R4E
TYPE	Turbofan, dual axial 16 stage compressor, annular combustion chamber, and 6 stage turbine.			
RATINGS (See NOTE 5)				
Maximum continuous at sea level, static thrust, lb.	44,920	45,800	45,800	47,500
Takeoff static thrust at sea level, lb. Dry (5 min.) (See NOTE 13)	51,900	48,000	48,000	50,000
COMPONENTS				
Fuel Control	Ham. Std. JFC68-6	Ham. Std. JFC68-7	Ham. Std. JFC68-10	Ham. Std. JFC68-7
Fuel Pump	TRW 386900	TRW 706800	- -	- -
High Compressor Stator Vane Control/ 3.0 Bleed Control	Ham. Std./ EVC 3-5/ 674977	- -	- -	- -
or	or	or GTA9-3	- -	- -
Engine Vane and Modulating Bleed Control	Ham. Std. GTA9-1	793396	- -	
Start Bleed Control (3.5 bleed control)	PWA P/N 773456	Ham. Std.	Ham. Std.	769486 Ham. Std.
Electronic Engine Control (See NOTE 19)	---	780170-6 780170-5 780170-2 780170-8	769370-3	780170-6 780170-8
FUEL NOZZLES	---	---	---	---
EEC PROGRAMMING PLUG (PWA P/N)	---	795034	795354	795035
FUEL	See NOTE 10	- -	- -	- -
OIL	See NOTE 11	- -	- -	- -

II. MODELS (CONT.)	JT9D-7Q3	JT9D-7R4D	JT9D-7R4D1	JT9D-7R4E
PRINCIPAL DIMENSIONS				
Maximum length in. (including spinner)	154.256	- -	- -	- -
Width, in.	97.03	96.00	- -	- -
Weight (dry), lb. (includes basic engine with all essential accessories; with fuel heater, oil tank, fuel oil cooler, and CSD fuel oil cooler; but excluding starter, exhaust nozzle and power source for the ignition systems)	9,295	8,935	8,915	- -
Center of gravity, in.	2.5±1.0	3.3±1.0	- -	- -
Forward of engine reference plane	1.4±0.5	- -	- -	- -
Below engine center line				
IGNITION	Simmonds Precision P/N 43925	Simmonds Precision RH P/N 43925 LH P/N 44933	- -	- -
Exciters				
Igniters (two each)	Champion AA134S-1 or AC S611809	- -	- -	- -

III. MODELS	JT9D-7R4E1	JT9D-7R4G2	JT9D-7R4H1	JT9D-7R4E4
TYPE	Turbofan, dual axial 16 stage compressor, annular combustion chamber, and 6 stage turbine.			
RATINGS (See NOTE 5)				
Maximum continuous at sea level, static thrust, lb.	47,500	50,200	50,000	47,500
Takeoff static thrust at sea level, lb.				
Dry (5 min.) (See NOTE 13)	50,000	54,750	56,000	50,000
COMPONENTS				
Fuel Control	Ham. Std. JFC68-10	- - JFC68-8	- - JFC68-10	- - JFC68-7
Fuel Pump	TRW 706800	- -	- -	- -
High Compressor Stator Vane Control/ 3.0 Bleed Control	Ham. Std. /EVC 3-5/ 674977	- -	- -	- -
or	or			
Engine Vane and Modulating Bleed Control	GTA9-3	- -	- -	- -
Start Bleed Control (3.5 bleed control)	793396	769486	793396	769486
Electronic Engine Control	(See NOTE 20)	---	Ham. Std. 787240-1	Ham. Std. 780170-8
FUEL NOZZLES	---	---	---	(See NOTE 18)
EEC PROGRAMMING PLUG (PWA P/N)	795035	---	795036	798873
FUEL	See NOTE 10	- -	- -	- -
OIL	See NOTE 11	- -	- -	- -

III MODELS (CONT.)	JT9D-7R4E1	JT9D-7R4G2	JT9D-7R4H1	JT9D-7R4E4
PRINCIPAL DIMENSIONS				
Maximum length in. (including spinner)	154.295	- -	- -	- -
Width, in.	96.00	- -	- -	- -
Weight (dry), lb. (includes basic engine with all essential accessories; with fuel heater, oil tank, fuel oil cooler, and CSD fuel oil cooler; but excluding starter, exhaust nozzle and power source for the ignition systems)	8,935	9,170	8,915	8,935
Center of gravity, in.	3.3±1.0	- -	- -	- -
Forward of engine reference plane	1.4±0.5	- -	- -	- -
Below engine center line				
IGNITION	Simmonds	- -	- -	- -
Exciters	Precision RH P/N 43925 LH P/N 44933			
Igniters (two each)	Champion AA134S-1 or AC S611809	- -	- -	- -

CERTIFICATION BASIS

FAR 33 effective February 1, 1965, as amended by 33-1, 33-2, 33-3, and 33-4, and Special Condition No. 33-8-EA-3.
Type Certificate No. E3NE, issued December 12, 1974 (JT9D-59A, 70, 70A); and subsequent revisions issued March 19, 1976 (JT9D-59B, 70B); issued October 31, 1978 (JT9D-7Q, 7Q1); issued October 22, 1979 (JT9D-7Q3); issued June 4, 1980 (JT9D-59D, 70D, 7Q2); issued November 25, 1980 (JT9D-7R4A, 7R4D); issued April 1, 1981 (JT9D-7R4D1, 7R4E1); issued July 23, 1982 (JT9D-7R4G2, 7R4H1, 7R4H2); issued March 29, 1985 (JT9D-7R4E4).
Dates of Application for Type Certificate: May 2, 1973 (JT9D-70); September 4, 1974 (JT9D-59A); October 17, 1974 (JT9D-70A); February 20, 1976 (JT9D-59B, 70B); October 28, 1977 (JT9D-7Q); June 15, 1978 (JT9D-7Q1); July 6, 1978 (JT9D-59D, 70D); August 14, 1978 (JT9D-7Q2); October 10, 1979 (JT9D-7Q3); February 14, 1979 (JT9D-7R4A, 7R4D); December 22, 1980 (JT9D-7R4D1); February 10, 1981 (JT9D-7R4E1); February 14, 1979 (JT9D-7R4G2, 7R4H1, 7R4H2); and October 11, 1984 (JT9D-7R4E4).

PRODUCTION BASIS

Production Certificate Number 2

NOTES

NOTE 1. Maximum permissible engine operating speeds for the engine rotors are as follows:

	JT9D-59A/70A	JT9D-7Q	JT9D-7Q3	JT9D-7R4D+	JT9D-7R4D1	JT9D-7R4E1
Low pressure rotor (N1), rpm	3780	3888	3960	3770	3810	3810
High pressure rotor (N2), rpm	8011	8000	8000	8000	8000	8000

	JT9D-7R4E+	JT9D-7R4G2	JT9D-7R4H1	JT9D-7R4E4
Low pressure rotor (N1), rpm	3770	3825	3810	3810
High pressure rotor (N2), rpm	8000	8080	8080	8080

For inadvertent exceedances of certified overspeed limits, see Chapter 72-00-00 of the appropriate maintenance manual.

+Engines converted from JT9D-7R4E4 per Service Bulletin JT9D-7R4-72-331 (EC86EA123) and operated to either JT9D-7R4D or JT9D-7R4E ratings will have maximum permissible rotor speeds as follows:

Low Pressure Rotor (N1), rpm 3810
High Pressure Rotor (N2), rpm 8080

NOTE 2. Maximum permissible temperatures are as follows:

Turbine gas temperature (Tt7) total temperature immediately downstream from the low pressure turbine discharge.

	JT9D-59A/7Q3		JT9D-70A/7Q	
Takeoff (5 minutes)	(685°C)	1265°F	(685°C)	1265°F
Maximum continuous	(650°C)	1202°F	(650°C)	1202°F
Maximum accleration	(685°C)	1265°F	(685°C)	1265°F
Ground Starting	(505°C)	941°F		- -
Inflight Starting++	(505°C)	941°F		- -
Oil Inlet	(135°C)	275°F (continuous operation)		- -
	(163°C)	325°F (transient operation limited to 20 minutes)		- -

	JT9D-7R4D+	JT9D-7R4D1	JT9D-7R4E1		JT9D-7R4E+
Takeoff (5 minutes)	(625°C) 1157°F	(625°C) 1157°F	(635°C)	1175°F	- -
Maximum continuous	(600°C) 1112°F	(600°C) 1112°F	(610°C)	1130°F	- -
Maximum accleration	(625°C) 1157°F	(625°C) 1157°F	(635°C)	1175°F	- -
Ground Starting	(535°C) 995°F	(535°C) 995°F	- -	- -	- -
Inflight Starting++	(625°C) 1157°F	(625°C) 1157°F	(635°C)	1175°F	- -
Oil Inlet	Maximum oil inlet temperature is not to exceed 275°F (135°C). - - During idle descent, a 325°F (163°C) limit is permissible for up to 20 minutes.				

++ If during an inflight start, the normal ground starting EGT is exceeded, maximum EGT and duration must be recorded for maintenance action.

NOTE 2. (Continued) Maximum permissible temperatures are as follows:

	JT9D-7R4G2		JT9D-7R4H1		JT9D-7R4E4
Takeoff (5 minutes)	(685°C)	1265°F	(680°C)	1256°F	- -
Maximum continuous	(620°C)	1148°F	(635°C)	1175°F	- -
Maximum accleration	(660°C)	1220°F	(675°C)	1247°F	- -
Ground Starting	(535°C)	995°F	- -	- -	- -
Inflight Starting++	(535°C)	995°F	(680°C)	1256°F	- -

Oil Inlet — Maximum oil inlet temperature is not to exceed 275°F (135°C). - -
During idle descent, a 325°F (163°C) limit is permissible for up to 20 minutes.

For inadvertent exceedances fo certified temperature limits see Chapter 72-00-00 of the appropriate maintenance manual. External engine limiting temperatures for specific components are specified in the engine installation and operation manual.

+Engines converted from -7R4E4 per Service Bulletin JT9D-7R4-72-331 (EC86EA123) and operated to either -7R4D or -7R4E ratings will have an EGT limit as follows:

- Takeoff (680°C) 1256°F
- Max Cont. (635°C) 1175°F
- Max Accel (675°C) 1247°F

++If during an inflight start, the normal ground starting EGT is exceeded, maximum EGT and duration must be recorded for maintenance action.

NOTE 3. Fuel and oil pressures are as follows:

Fuel pressure: At inlet to engine system pump, not less than 5 psi above the true vapor pressure of the fuel and not greater than 70 psig with a vapor/liquid ratio of zero.

Oil pressure: Minimum 35 psig (normal range 40-60 psig)
NOTE: During cold weather starting, oil pressure in excess of 60 psig may be evidenced until oil viscosities are reduced by increasing oil temperature. Engine operation is limited to idle power when oil pressure is in excess of 60 psig during cold weather starts.

NOTE 4. Maximum permissible air bleed extraction is as follows:

	JT9D-59A/7Q 70A/7Q3 Percent of Primary Engine Airflow		JT9D-7R4D/7R4D1/7R4E1 7R4E/7R4G2/7R4H1/7R4E4 Percent of Primary Engine Airflow	
	Normal Bleed	Maximum Bleed	Normal Bleed	Maximum Bleed
High compressor bleed				
a. Idle to 40% max cont.	10%	13%	9%	9%
b. 40% max cont. to takeoff*	5%	6.5%	5%	5%

*5% is the maximum allowable from the 8th stage in this thrust range. The 6.5% listed is allowable from the15th stage alone or from a combination of 8th and 15th stage bleeds.

NOTE 5. Ratings, with the exception of the -7R4 models, are based on static test stand operation under the following conditions:

Compressor inlet air at 59ºF and 29.92 in. Hg.
Engine air inlet, jet nozzle exhaust pipe, and fan exit nozzle per P&W Drawing P/N 758201(-59A); 760701 (-70A); 808801 (7Q and 7Q3).
No aircraft accessory loads or air extraction.
No anti-icing airflow.
Turbine gas temperature limits and engine rotor speed limits not exceeded.
Rating for -7R4 models are based on ideal nozzles.

NOTE 6. The following accessory drive provisions are incorporated:

JT9D-7Q/7Q3/59A/70A

Drive	Rotation (facing pad) (C - Clockwise, CC - Counter Clockwise)	Speed Ratio to Turbine Shaft	Torque (in-lb) Continuous	Torque (in-lb) Static	Overhang (in-lb)
Starter	CC	1.091:1	(a)	(a)	500
Generator -	-	-	-		1,575
Constant Speed Drive	CC	1.091:1	(b)	15,960	1,575
Tachometer	C	.538:1	7	50	-
Fluid Power	CC	.500:1	1,890	9,450	400
Pumps (2)	CC	.499:1	1,890	9,450	400

(a) 750 ft-lb engine starter drive shear section is designed to fail at a static torque of 1,400 - 1,610 ft-lb
(b) Maximum allowable continuous torque values are equivalent to 210 horsepower at any engine speed at or above sea level ground idle.
(c) "-" indicates "does not apply"

JT9D-7R4D/7R4D1/7R4E1/7R4E/7R4G2/7R4H1/7R4E4

Drive	Rotation (facing pad) (C - Clockwise, CC - Counter Clockwise)	Speed Ratio to Turbine Shaft	Torque (in-lb) Continuous	Torque (in-lb) Static	Overhang (in-lb)
Starter	CC	1.091:1	(a)	(a)	500
Generator -	-	-	-		1,575
Constant Speed Drive	CC	1.091:1	(b)	15,960	1,575
Tachometer	C	.538:1	7	50	-
Fluid Power	CC	.500:1	1,890	9,450	400
Pumps (2)	CC	.499:1	1,300	6,500	400
IDGS	CC	1.121:1		12,620	2,000

(a) 910 ft-lb engine starter drive shear section is designed to fail at a static torque of 1,400 - 1,610 ft-lb
(b) Maximum allowable continuous torque values are equivalent to 210 horsepower at any engine speed at or above sea level ground idle.
(c) "-" indicates "does not apply"

NOTE 7. Power setting, power checks, and control of engine output in all operations are to be used based upon P&W engine charts referring to turbine discharge section gas pressure. Pressure probes are included in the engine assembly for this purpose.

NOTE 8. For inflight operation during icing conditions, the minimum N1 rpm is 20% for JT9D-7R4 series engines. For JT9D-59 series, 70 series, and 7Q series engines, maintain at least 50% N1 rpm above 10,000 feet and at least 45% N1 rpm below 10,000 feet.

NOTE 9. This model engine meets Item 1 in Special Condition No. 33-8EA-3 in the uncowled configuration.

NOTE 10. Fuels meeting the requirements of the latest applicable issue of Turbojet Engine Service Bulletin No. 2016, which includes other fuel information requirements of PW Specification No. 522, are acceptable for these engines. Approved fuel additives and allowable concentrations are also included in Service Bulletin No. 2016.

NOTE 11. The following oils are eligible for these engines:

Synthetic type conforming to P&W Specification No. 521C, or later revision. Approved brand oils listed in P&W Turbojet Engine Service Bulletin No. 238.

NOTE 12. Certain engine parts are life limited. These limits are listed in the "FAA approved" time limits section of the P&W Engine Manuals P/N 754459 for the JT9D-59/70 series; P/N 777210 for the -7Q series; P/N 785058 for the -7R4D1, -7R4E1 and -7R4H1; P/N 785059 for the -7R4D, -7R4E and -7R4E4; P/N 789328 for the -7R4G2.

NOTE 13.

JT9D Model	Characteristics
-59A	Takeoff rating of 51,720 lb at and below 86ºF ambient temperature, sea level static.
-70A	Takeoff rating of 51,140 lb at and below 86ºF ambient temperature, sea level static.
-7Q	Internally the same as JT9D-50/-70 series engines, but externally configured to fit in Boeing 747-200 nacelle. Takeoff rating of 51,900 lb at and below 86ºF ambient temperature, sea level static.
-7Q3	Basically the same as JT7D-7Q except for revised fan case for the increased maximum low rotor speed.
-7R4D	Bascially the same as JT9D-7 (see TCDS E20EA) except incorporates an improved fan, higher efficiency 4 stage LPC, single crystal first stage turbine blades, improved use of turbine cooling air and a supervisory Electronic Engine Control. Takeoff rating of 48,000 lb at and below 92ºF ambient temperature, sea level static.
-7R4D1	Same as -7R4D except for external arrangement required for installation.
-7R4E1	Same as -7R4D1 except takeoff rating of 50,000 lb at and below 92ºF ambient temperature, sea level static.
-7R4E	Same as -7R4D except takeoff rating of 50,000 lb at and below 92ºF ambient temperature, sea level static.
-7R4G2	Same as -7R4D except incorporates an improved durability hot section including wide chord vanes. Takeoff rating 54,750 lb at and below 86ºF ambient temperature, sea level static.
-7R4H1	Same as -7R4G2 except for external arrangement required for installation and also incorporates single crystal first and second stage turbine blades and single crystal second turbine vanes. Takeoff rating 56,000 lb at and below 86ºF ambient temperture, sea level static.
-7R4E4	Same as -7R4E except incorporates burner and high turbine configuration of the -7R4H1. Takeoff rating of 50,000 lb at and below 114ºF ambient temperature, sea level static.

NOTE 14. All JT9D-7R4 series engines meet the Smoke and Gaseous Emission requirements of 40 CFR Part 87, dated December 30, 1982.

NOTE 15. All JT9D-7R4 series engines meet the January 1, 1975, fuel venting emission requirements of SFAR-27.

NOTE 16. For JT9D-7R4D engines, EEC software versions -007 or -010, there exists, within the EEC, logic which will result in the Maximum Continuous thrust rating being limited during enroute climb. This condition will occur only when setting Maximum Continuous thrust directly from takeoff thrust with the EEC on, the thrust level positioned full forward, and following a climb of more than 3,000 feet above the runway. The difference between the limit and the Maximum Continuous thrust when taking off from a sea level airport is as follows:

For engines incorporating the 154CF3 P2T2 probe (P/N 786464) and resistor harness (P/N 795644) the Difference varies from 0 at 3,000 feet to a maximum of 0.15 EPR at 14,000 feet.

For engine incorporating the 154CF7 P2T2 (P/N 798133) the difference varies from 0 at 3,000 feet to a Maximum of 0.06 EPR at 14,000 feet.

Thrust will not be limited if taking off from an airport of 4,300 feet or higher.

For either engine configuration, Maximum Continuous thrust will not be limited when either an altitude of 14,000 feet or a Mn of .47 has been attained or if maximum climb thrust has been set. Maximum Continuous thrust is not limited with the EEC turned off.

NOTE 17.

Electronic Engine Control	JT9D-7R4E1 (AI500) Ham. Std. 769370-3	JT9D-7R4E1 (AI600) Ham. Std. 787240-1

NOTE 18. For JT9D-7R4E4 engines fitted with P&W P/N 792842 and 794731 fuel nozzles, the nozzles must be replaced with new or shop cleaned nozzles, or on-wing cleaned per the approved maintenance manual procedures at intervals not to exceed 700 flight cycles.

NOTE 19. The following JT9D engine models and their associated data have been removed from this Type Certificate Data Sheet as of revision 11, since they are not currently installed on certificated aircraft:

JT9D-70	JT9D-59D
JT9D-70D	JT9D-70B
JT9D-7Q1	JT9D-7R4A
JT9D-7Q2	JT9D-7R4H2
JT9D-59B	

NOTE 20. Use of takeoff thrust for more than five minutes (not to exceed ten minutes) is approved for use only in the event of an inoperative engine due to shutdown or failure.

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