

Table 6.4 Manufacturer Performance Data for Piston Engines

Type	Avco Lycoming				PZL-3S
	10-320-B1A	IO-360-A1B6D	TIO-540-A1A	TIGO-541-E1A	
Supercharged	no	no	yes	yes	no
Direct drive	yes	yes	yes	geared 0.8	yes
Max. T.O. Power (hp) at Prop. RPM/to alt.	160 2,700/SL	200 2,700	310 2,575/15K	425 2,133/15K	600 2,200/SL
SFC (lbs/hp/hr)	0.51	0.50	0.565	0.753	0.610
Cruise Power* (hp) at RPM	120 2,350	150 2,450	233 2,575	319 1,833	415 2,000
SFC (lbs/hp/hr)	0.489	0.481	0.516	0.502	0.510
No. of cylinders	4	4	6	6	7(radial)
Dry weight** (lbs)	287	330	540	700	906
Length (in)	33.6	31.3	51.3	57.6	43.7
Width (in)	32.2	34.3	34.3	34.9	49.9
Height (in)	19.2	19.4	22.7	22.7	diam.
Octane	91/96	100/130	100/130	100/130	91+

*normally at 75 percent rated power, static sealevel.

**includes accessories needed for operation

Table 6.5 Manufacturer Performance Data for Piston Engines

Type	Franklin/PZL***			Teledyne-Continental		
	2A-120	4A-235-B2	6A-350-C1	O-200A	TSIO-	IO-520-A
Supercharged	no	no	no	no	no	no
Direct drive	yes	yes	yes	yes	yes	yes
Max. T.O. Power (hp) at Prop. RPM, SLS	60 3,200	125 2,800	220 2,800	100 2,750	225 2,800	285 2,700
SFC (lbs/hp/hr)	0.53	0.52	0.460	0.60	0.62	0.50
Cruise Power* (hp) at RPM	45 2,200	94 2,080	165 2,100	75 2,450	169 2,550	214 2,500
SFC (lbs/hp/hr)	0.620	0.440	0.480	0.585	0.52	0.452
No. of cylinders	2	4	6	4	6	6
Dry weight** (lbs)	137	224	333	218	300	471
Length (in)	23.7	30.5	32.1	28.5	35.3	41.4
Width (in)	30.7	31.5	31.6	31.6	33.1	33.6
Height (in)	22.7	25.1	27.5	23.2	23.7	19.8
Octane	100/130	100/130	100/130	80/87	100/130	100/130

*normally at 75 percent rated power **includes accessories needed for operation

***Franklin engines are manufactured in Poland by PZL

Table 6.6 Manufacturer Performance Data for Turboprop Engines

Type	Pratt and Whitney of Canada Ltd.					
	PT6A-21	PT6A-41	PT6A-65R	PW115	PW120	PW124
For SLS (static shaft horsepower, hp):						
Max. T.O.	550	850	1,173	1,500	1,800	2,150
Max. Cont.	550	850	1,173	1,500	1,700	NA
Max. Cruise	550	850	956	1,500	1,619	2,030
Max. Massflow (lbs/sec)	6.1	8.0	9.4	14.3	14.8	NA
For SLS (specific fuel consumption, lbs/ESHP/hr):						
Max. T.O.	0.630	0.591	0.549	0.529	0.499	0.473
Max. Cont.	0.630	0.591	0.564	0.529	0.506	NA
Max. Cruise	0.649	0.591	0.581	0.529	0.514	NA
SHP/Altitude/speed	316/20K/ 245kts	488/20K/ 245kts	549/20K/ 245kts	861/20K/ 245kts	929/20K/ 245kts	1,165/20K/ 245kts
Rated Propeller RPM	2,200	2,000	1,700	1,300	1,200	1,200
Weight (lbs)	303	380	464	841	921	1,060
Length (in), cold	62	67	74	81	84	84
Max. diam. (in)	19	19	19	25	25	25
Application	Beech C90	Piper Cheyenne III	Shorts 360	EMB-120	DHC-8	BAe-ATP

Table 6.7 Manufacturer Performance Data for Turboprop Engines

Type	General Electric		Rolls R.	Rolls R.	Garrett	T.Lyc.
	CT7-5A	CT64-820	Dart RDa7	Turbomeca	TPE 331-3	LTP101
			TS1637	AZ-14		
For SLS (static shaft horsepower, hp):						
Max. T.O.	1,699	3,133	1,835	800	840	592
Max. Cont.	1,476	2,745	1,835	800	840	592
Max. Cruise	1,417	2,745	1,650	720	770	NA
Max. Massflow (lbs/sec)	10	26.2	23.5	5.5	7.8	4.8
For SLS (specific fuel consumption, lbs/ESHP/hr):						
Max. T.O.	0.456	0.486	0.676	0.521	0.548	0.550
Max. Cont.	0.465	0.505	0.676	0.521	NA	NA
Max.Cruise	0.471	0.505	0.676	0.532	NA	NA
SHP/Altitude/speed	1,655/ 15+K/NA	NA	1,220/ 15K/0kts	NA	NA	NA
Rated Propeller RPM	1,200 (estim.)	1,160	1,400	1,783	1,600	1,924
Weight (lbs)	676	1,145	1,369	454	355	241
Length (in), cold	80.4	110.1	97.6	80.6*	43.5	30.9
Height (in)	31	20.1	37.9	22.9	26.0	18.6
Width (in)	26	diam.	diam.	22.9	21.0	diam.
Application	SP340	G222	F-50	BAe	BAe	P166-
*includes propeller!						
				Jetstream	Jetstream	D1-3

Table 6.8 Manufacturer Performance Data for Turbofan Engines

Type	Pratt and Whitney JT15D-1	Pratt and Whitney JT15D-4C *	Garrett TFE731	Garrett ATF3-6 -2c	Teled. CAE 490-4**	Avco Lycoming ALF-502L-3
Max.T.O. Thrust (lbs)	2,200	2,500	3,500	5,440	2,965	7,500
T.O. Condition (static)	SLS	SLS	SLS	SLS	SLS	SLS
T.O. SFC (lbs/lbs/hr)	0.540	0.562	0.493	0.506	0.703	0.411
T.O. Massflow (lbs/sec)	69.4	77.7	112	162	61	256
T.O. BPR	3.3	2.6	2.82	2.55	1.13	5.0
Cruise Thrust (lbs) at 80 percent max.	2,065	2,125	755	1,047	1,400 max. contin.	2,100
Cruise Condition	SLS	SLS	0.8/40K	0.8/40K	0.8/20K	0.8/30K
Cruise SFC (lbs/lbs/hr)	0.537	0.556	0.815	0.816	1.00	0.750
Weight*(lbs)	514	575	725	1,125	640	1,270
Length (in), cold	56.6	63.3	49.7	33.6	51.2	56.8
Max. diam. (in)	27	27.3	39.1	102	h=28.3 w=23.2	41.7
Application	Cessna Citation	SIAT-M S211	Learjet M36	Falcon 200	Alphajet	BAE 146

* Military version ** Same as SNECMA/Turbomeca Larzac

Table 6.9 Manufacturer Performance Data for Turbojet and Turbofan Engines

Type	General J79***	Electric J85-21A ***	CF700	CJ610-5 (J85-4B)	F404***	F101***
Max.T.O. Thrust (lbs)	17,820	5,000	4,200	2,950	16,000	28,000
T.O. Condition (static)	SLS	SLS	SLS	SLS	SLS	SLS
T.O. SFC (lbs/lbs/hr)	1.98	2.13	0.66	0.980	NA	NA
T.O. Massflow (lbs/sec)	170	53	43/85**	44	NA	270
T.O. BPR	0	0	NA	0	NA	0.85
Cruise Thrust (lbs) at 80 percent max.	2,600 (dry)	1,200	1,060	870	NA	NA
Cruise Condition	0.9/35K	0.9/36K	0.8/36K	0.8/36K	NA	NA
Cruise SFC (lbs/lbs/hr)	0.98	1.23	0.98	1.15	NA	NA
Weight*(lbs)	3,873	684	725	402	2,000 (dry)	4,400 (dry)
Length (in), cold	209	113	53.6	51.1	159	181
Max. diam. (in)	39.1	21	33.1	17.7	34.8	55
Application	F4/F16	F-5E/F	Falcon	Learjet	F18	B1B

* No tailpipe, no thrust-reverser **generator/fan ***incl. afterburner

Table 6.10 Manufacturer Performance Data for Turbofan and Turbojet Engines

Type	Pratt and Whitney			Rolls Royce		Ames TRS-18
	JT8D-217	2037=	JT9D-7	RB211-22B	RB163	
		JT10D			Spey	
Max.T.O. Thrust (lbs)	20,000	37,600	45,600	42,000	10,410	200
T.O. Condition (static)	SLS	SLS	SLS	SLS	SLS	SLS
T.O. SFC (lbs/lbs/hr)	0.562	NA	NA	NA	0.563	1.12
T.O. Massflow (lbs/sec)	483	1,340	1,509	1,380	203	N.A.
T.O. BPR	1.7	5.8	5.15	4.8	1.0	0
Cruise Thrust (lbs) max.continuous	5,350	NA	10,200	9,700	3,070	150
Cruise Condition	0.8/35K	0.8/35K	0.85/35K	0.8/35K	0.77/32K	0.3/5K
Cruise SFC (lbs/lbs/hr)	0.753	0.563	0.620	0.618	0.760	1.45
Weight*(lbs)	4,430	6,906	8,850	9,195	2,257	68
Length (in), cold	154	141.4	128.2	119.4	110	36.5
Max. diam. (in)	49.2	85.0	95.6	85.9	37	13
Application	MD-80	757	747-200	L-1011	BAC111	BD5J

Table 6.11 Manufacturer Performance Data for Turbofan Engines

Type	General Electric		CP6-6D	CP6-6K	CP6-32C1	CFM56-2	CF34
	CP6-50C	CP6-50C1					
Max.T.O. Thrust (lbs)	51,000	52,500	40,000	41,500	36,500	24,000	8,650
T.O. Condition (static)	SLS	SLS	SLS	SLS	SLS	SLS	SL/59F
T.O. SFC (lbs/lbs/hr)	0.390	0.394	0.346	0.350	0.357		0.359
T.O. Massflow (lbs/sec)	1,450	1,470	1,303	1,328	1,104	830	307
T.O. BPR	4.26	4.24	5.72	5.67	4.9	6.0	6.3
Cruise Thrust (lbs) at 80 percent max.	8,720	9,080	7,160	7,270	6,630	N.A.	1,420
Cruise Condition	0.8/35K	0.8/35K	0.8/35K	0.8/35K	0.8/35K	0.8/30K	0.8/40K
Cruise SFC (lbs/lbs/hr)	0.628	0.626	0.616	0.616	0.609	0.650	0.690
Weight*(lbs)	8,731	8,731	7,896	7,896	7,140	4,610	1,580
Length (in), cold	173	173	177	177	140	95.7	100
Fan tip diam. (in)	86.4	86.4	86.4	86.4	76.3	68.3	49
Application	KC-10A	747 E4A	DC-10	DC-10	757	DC-8 Challenger (mod)	

* No tailpipe, no thrust-reverser

TABLE B-1
Data for some military gas turbine engines

Model no.	Type	Max. thrust or power @ SLS	SFC at max.	Airflow (lb/sec)	OPR π_c (stages)	Maximum			TIT (°F)	Remarks
						D (in)	L (in)	Weight (lb)		
J57-P-23	TJ	16,000 lb	2.10	165	11.5 (16)	40	246	5,169	1,600	AB, F-102A, F-100D
J57-P-43WB	TJ	11,200 lb	0.775	180	12 (16)	39	167.3	3,870	1,600	Water-injected, KC-135
J58-P	TJ	*32,500 lb	—	*450	*6 (9)	—	—	—	—	AB, YF-12A, SR-71
J60-P-3	TJ	3,000 lb	0.96	50	7 (9)	23.4	79.5	460	1,600	T-39A, C-140A
J69-T-25	TJ	1,025 lb	1.14	20.5	3.9 (1)	22.3	43.3	364	1,525	T-37B
J75-P-17	TJ	24,500 lb	2.15	252	12.0 (15)	43	237.6	5,875	1,610	AB, F-106A/B
J79-GE-17	TJ	17,820 lb	1.965	170	13.5 (17)	39.1	208.7	3,855	1,210	AB, F-4E/G
J85-GE-5H	TJ	3,850 lb	2.20	44	7 (8)	20.4	109.1	584	1,640	AB, T-38A/B
J85-GE-17	TJ	2,850 lb	0.99	44	7 (8)	17.7	40.4	395	1,640	A-37B
J85-GE-21	TJ	5,000 lb	2.13	51.9	8 (8)	20	116	667	1,790	AB, F-5E/F
PT6A-42	TP	850 eshp	0.601	8.0	8 (3, 1)	19	67	391	—	C-12E
PT6A-45R	TP	1,197 eshp	0.553	8.6	8.7 (3, 1)	19	72	434	—	C-23A
T400-CP-400	TS	1,800 shp	0.606	6.51	7 (3, 1)	43.5	66.3	716	1,920	Bell UH-1N
T406-AD-400	TS	6,150 shp	0.424	—	(14)	24.5	77.9	975	1,422	CV-22
T53-L-13	TS	1,400 shp	0.58	12.2	7 (5, 1)	23	47.6	549	1,720	Bell UH-1H, AH-1G
T55-L-11	TS	3,750 shp	0.52	—	8 (6, 1)	24.3	44	670	—	Boeing CH-47C
T56-A-7	TP	3,775 eshp	0.528	32.5	9.45 (14)	40.9	146	1,833	1,780	C-130B/E/F
T56-A-15	TP	4,591 eshp	0.54	32.5	9.55 (14)	44.6	146.3	1,848	1,970	C-130H/N/P
T58-GE-100	TS	1,500 shp	0.606	14	8.4 (10)	21.5	58.6	335	1,372	Sikorsky CH-3E, HH-3E, F
T64-GE-100	TS	4,330 shp	0.487	29.3	14 (14)	20.2	77.1	720	1,520	MH-53T
T700-GE-700	TS	1,622 shp	0.46	—	15 (5, 1)	25	47	423	1,563	UH-60A
T76-G-10	TS	715 shp	0.60	6.16	8.6 (2)	27.1	44.5	348	1,818	OV-10A

TJ = turbojet TP = turboprop OPR = overall pressure ratio TIT = turbine inlet temperature TS = turboshaft (Stages) = (axial, centrifugal) compressor stages SFC = specific fuel consumption.

* J-58 Reference: Lockheed SR-71 by Jay Miller, Aerofox Minigraph 1, Aerofox, Inc., Arlington, TX, 1985.

Source: Reference 86 and manufacturers' literature.

TABLE B-2
Data for some military turbofan engines

Model no.	Max./mil. power @ SLS				Maximum				FPR π_f	BR α	Remarks	
	Thrust (lb)	TSFC [(lbm/hr)/lbf]	Airflow (lb/sec)	OPR π_c	D (in)	L (in)	Weight (lb)	TIT (°F)				
F100-PW-229	29,000/17,800	2.05/0.74	248	23.0	47	191	3,036	2,700	3.8	0.4	F-15, F16	
F101-GE-102	30,780/17,390	2.460/0.562	356	26.8	55.2	180.7	4,448	2,550	2.31	1.91	B-1B	
F103-GE-101	51,711	0.399	1,476	30.2	86.4	173	8,768	2,490	—	4.31	KC-10A	
F107-WR-101	635	0.685	13.6	13.8	12	48.5	141	—	2.1	1.0	Air Launch Cruise Missile	
F108-CF-100	21,634	0.363	785	23.7	72	115.4	4,610	2,228	1.5	6.0	KC-135R	
F110-GE-100	28,620/18,330	2.08/1.47	254	30.4	46.5	182	3,895	—	2.98	0.80	F-16	
F117-PW-100	41,700	0.33	—	31.8	84.5	146.8	7,100	—	—	5.8	(PW2040) C-17A	
F118-GE-100	19,000	—	—	—	—	—	—	—	—	—	B-2	
F404-GE-F1D	10,000	—	—	25	34.5	87	1,730	—	—	—	F-117A	
F404-GE-400	16,000	—	—	25	35	159	—	—	—	0.34	F-18, F-5G	
JT3D-3B	18,000	0.535	458	13.6	53	136.4	4,300	1,600	1.74	1.37	(TF33-102) EC/RC-135	
JT8D-7B	14,500	0.585	318	16.9	45	123.7	3,252	1,076	—	1.03	C-22, C-9, T-43A	
TF30-P-111	25,100/14,560	2.450/0.686	260	21.8	49	241.7	3,999	2,055	2.43	0.73	F-111F	
TF33-P-3	17,000	0.52	450	13.0	53	136	3,900	1,600	1.7	1.55	B-52H	
TF33-P-7	21,000	0.56	498	16.0	54	142	4,650	1,750	1.9	1.21	C-141	
TF34-GE-100	9,065	0.37	333	20.0	50	100	1,421	2,234	1.5	6.42	A-10	
TF39-GE-1	40,805	0.315	1,549	26.0	100	203	7,186	2,350	1.56	8.0	C-5A	
TF41-A-1B	14,500	0.647	260	20.0	40	114.5	3,511	2,165	2.45	0.76	A-7D, K	
TFE731-2	3,500	0.504	113	17.7	40	50	625	—	1.54	2.67	C-21A	
OPR = overall pressure ratio FPR = fan pressure ratio TSFC = thrust specific-fuel consumption TIT = turbine inlet temperature BR = bypass ratio.												
Source: Reference 86 and manufacturers' literature.												

Source: Reference 86 and manufacturers' literature.

TABLE B-3
Data for some civil gas turbine engines

Model no.	Manufacturer	Takeoff				Cruise				
		Thrust (lb)	BR	OPR π_c	Airflow (lb/sec)	Alt. (kft)	M_0	Thrust (lb)	TSFC [(lbm/hr)/lbf]	Aircraft application
CF6-50C2	General Electric	52,500	4.31	30.4	1,476	35	0.80	11,555	0.630	DC10-10, A300B, 747-200
CF6-80C2	General Electric	52,500	5.31	27.4	1,650	35	0.80	12,000	0.576	767-200, -300, -200ER
GE90-B4	General Electric	87,400	8.40	39.3	3,037	35	0.80	17,500	—	777
JT8D-15A	Pratt & Whitney	15,500	1.04	16.6	327	30	0.80	4,920	0.779	727, 737, DC9
JT9D-59A	Pratt & Whitney	53,000	4.90	24.5	1,639	35	0.85	11,950	0.646	DC10-40, A300B, 747-200
PW2037	Pratt & Whitney	38,250	6.00	27.6	1,210	35	0.85	6,500	0.582	757-200
PW4052	Pratt & Whitney	52,000	5.00	27.5	1,700	35	0.83	—	—	767, A310-300
PW4084	Pratt & Whitney	87,900	6.41	34.4	2,550	35	0.85	4,890	0.667	777
CFM56-3	CFM International	23,500	5.00	22.6	655	35	0.85	6,600	0.545	737-300, -400, -500
CFM56-5C	CFM International	31,200	6.60	31.5	1,027	35	0.80	—	—	A340
RRB211-524B	Rolls Royce	50,000	4.50	28.4	1,513	35	0.85	11,000	0.643	L1011-200, 747-200
RRB211-535E	Rolls Royce	40,100	4.30	25.8	1,151	35	0.80	8,495	0.607	757-200
RRB211-882	Rolls Royce	84,700	6.01	39.0	2,640	35	0.83	16,200	0.557	777
V2528-D5	International Aero Engines	28,000	4.70	30.5	825	35	0.80	5,773	0.574	MD-90
ALF502R-5	Textron Lycoming	6,970	5.70	12.2	—	25	0.70	2,250	0.720	BAe 146-100, -200
TFE731-5	Garrett	4,500	3.34	14.4	140	40	0.80	986	0.771	BAe 125-800
PW300	Pratt & Whitney Canada	4,750	4.50	23.0	180	40	0.80	1,113	0.675	BAe 1000
FJ44	Williams Rolls	1,900	3.28	12.8	63.3	30	0.70	600	0.750	—
Olympus 593	Rolls Royce/SNECMA	38,000	0	*11.3	410	53	2.00	10,030	1.190	Concorde

OPR = overall pressure ratio TSFC = thrust specific fuel consumption BR = bypass ratio.

* At cruise.

Sources: Reference 87 and manufacturers' literature.