

SECTION XI – PERFORMANCE DATA

TABLE OF CONTENTS

Introduction	11-1
Aircraft Configurations	11-1
Flight Planning	11-1
Use of Charts	11-2
Airspeed Correction Chart	11-5
Engine Power Schedule Chart	11-6
Take-Off and Landing Cross-Wind Chart	11-7
Take-Off and Landing Data Chart	11-8
Flight Operation Instruction Chart 8700 to 8000	11-9
Flight Operation Instruction Chart 8000 to 7000	11-10
Flight Operation Instruction Chart 7000 to 6000	11-11
Engine Operating Limits Curve	11-12

INTRODUCTION

This section provides aircraft performance data which will facilitate mission planning and enable the pilot to determine the performance capabilities of the aircraft.

AIRCRAFT CONFIGURATIONS

The performance data in this Section is applicable to both the UC-45J and RC-45J configured C-45J series aircraft within the maximum gross weight limitation of 8,700 pounds established in the following charts. Maximum gross weights for the UC-45J are 8,730 pounds for take-off, and 8,600 pounds for landing; for the RC-45J, 9,200 pounds for take-off, and 8,700 pounds for landing.

FLIGHT PLANNING

The series of charts on the following pages (figures 11-1 thru 11-8) provide the information required to

establish the speeds and powers for obtaining various ranges. These charts contain sufficient data to make a safe and efficient flight plan. Inasmuch as the number of variables involved makes accurate range predictions impossible, the ranges and fuel flows are conservative. The speeds quoted on any one chart are those obtained with gross weight equal to the high limit of the weight band shown on the chart. This policy has been followed to allow for variations in aircraft speeds, fuel flows, pilot technique, and other variables not considered in the preparation of the charts. No allowances have been made for wind, navigational error, combat or formation flight or other contingencies. Appropriate allowances for these items should be governed by local policy.

The charts are arranged to give maximum utility for preflight and inflight planning. The following will be noted on inspection:

1. The climb chart, figure 11-4, gives fuel requirements for warm-up, take-off, and climb to any altitude for three typical weights. The fuel tabulated on the column labelled "At Sea Level" shows the allowance for warm-up, taxi, and take-off. Fuel requirements

listed at other altitudes include this allowance plus the fuel required to climb from sea level. If it is desired to determine the fuel necessary to climb from 5,000 feet to 10,000 feet, the difference of the fuel at these two altitudes will be the climb fuel necessary.

2. The Flight Operation Instruction Charts, figure 11-5, figure 11-6, and figure 11-7, provide the following information.

a. Weight listings in approximately 1000-pound increments for maximum gross weight to minimum possible flying weight.

b. Maximum to minimum practical fuel loadings are entered on each chart under the fuel column.

c. Data listed under Column I are for emergency high speed only. Columns II, III, IV, and V give progressive increases in range with a sacrifice in speed.

d. Ranges shown on the chart are based on fuel flows obtained by resetting power as gross weight decreases to a lower weight bracket shown on succeeding charts. It is essential, therefore, that this practice be adhered to in flight.

USE OF CHARTS

The following sample problem, based on a typical UC-45J Mission (also applicable to RC-45J aircraft, relative to performance, when the aircraft is within the 8,700 pound chart limits) employs actual chart values and demonstrates how the charts should be used.

Problem -- Two passengers and some cargo are to be flown to an airfield 640 nautical miles from base. The first 400 nautical miles must be flown above 3000 feet altitude and the balance above 8000 feet altitude. The following conditions apply:

Required Range	640 nautical miles
Winds	5 knots tailwind at 5000 ft. 15 knots headwind at 10,000 ft.
Basic Weight (from Form F)	6320 lb.
Crew Weight (2 men at 180 lb/man)	360 lb.
Passengers (2 men at 180 lb/man)	360 lb.
Cargo	60 lb.
Gasoline Weight (253 gal at 6.0 lb/gal)	1518 lb.
Oil Weight (16 gal at 7.5 lb/gal)	120 lb.
Total Weight	8738 lb.
Maximum Allowable Gross Weight	8730 lb.

The calculated gross weight of 8738 pounds slightly exceeds the maximum allowable gross weight of 8730 pounds. A careful estimate shows that the distance can easily be covered using only 240 gallons of fuel. Re-computing the fuel weight shows that $240 \times 6 = 1440$ pounds, giving a gross weight of 8660 pounds.

FLIGHT PLAN CALCULATION

1. The first 400 nautical miles will be flown at 5000 feet altitude to take advantage of the tailwind and the balance at 10,000 feet due to terrain considerations.

2. Determine the fuel available for flight planning by deducting the necessary fuel allowances and reserve from the actual fuel aboard as follows:

a. Warm-up, take-off, and climb to 5000 feet - 23 gallons.

b. Climb from 5000 to 10,000 feet - 7 gallons. These figures were taken from the Climb Chart, figure 11-4. It will be noted that the fuel quoted at 5000 feet altitude includes fuel used for warm-up and take-off (15 gallons allowed). The fuel consumed in a climb from 5000 to 10,000 feet is calculated by subtracting the fuel quoted at 5000 feet from the fuel quoted at 10,000 feet for a gross weight of 7800 pounds. This gross weight is determined by considering that 23 gallons of fuel were used to reach 5,000 feet (Step 1), plus that used to fly 400 miles. Assume a fuel consumption of 3.69 mi/gal (see Column IV of the 8700 to 8,000 pound Flight Operation Instruction Chart, figure 11-5) giving 108 gallons burned while cruising. Total fuel used to climb position is $108 + 23 = 131$ gallons. Converting to pounds, $131 \times 6 = 786$ pounds. Therefore, the gross weight at start of climb to 10,000 feet is $8660 - 786 = 7874$ pounds, which is close enough to 7800 pounds to allow use of data listed for that weight. The distances covered in climb are disregarded. The field elevation at starting point also is disregarded unless greater than 5000 feet.

c. Wind reserve - 8 gallons. Normally, tailwinds are treated as no-wind conditions for range planning. The reserve for the 15 knots headwind over the last 240 n/mi of flight may be based on good judgment or approximated as follows:

(1) Assuming the flight will be made at an approximate TAS of 125 knots, the ground speed will be $125 - 15 = 110$ knots and the time required to fly 240 nautical miles will be 2.2 hours. The wind will increase the air miles flown by $2.2 \times 15 = 33$ miles. Assuming approximately 4.13 mpg (see Column IV of the 8000 to 7000 pound Flight Operation Instruction Chart, figure 11-6, the required wind reserve is $33 \div 4.13 = 8$ gallons.

d. One hour endurance reserve - 22 gallons. This value is calculated by multiplying the rate of fuel consumption under Column V (maximum range) at 5000 feet (8000 to 7000 lb chart) by the number of hours reserve desired or 1 hour $22 \text{ gph} = 22$ gallons.

3. Collect all required fuel allowances:

	Gallons
Warm-up, take-off and climb to 5000 feet	23
Climb from 5000 to 10,000 feet	7
Wind	8
Reserve	22
Total:	60

4. Therefore, the actual fuel available for cruising is $240 - 60 = 180$ gallons. Reference to the 8700 to 8000 pound Flight Operation Instruction Chart shows that the required flight of 640 nautical miles can be flown with 180 gallons of fuel with the power settings shown in Columns IV or V.

Since the weight change during the flight will span several charts, it is necessary to divide the problem into several parts. THIS IS ESSENTIAL, SINCE CHART DATA IS COMPUTED ON THIS BASIS. A simple tabulation of data will assist in the calculation and provide a useful reference in flight. This problem will be divided into six parts or stages as follows:

A. WARM-UP, TAKE-OFF, AND INITIAL CLIMB:

Stage	Reference	Initial Weight	Fuel Gal	Condition (ft)	Power Settings	Fuel Consumption	ETE	Dist (Naut. miles)	TAS (Knots)	Fuel Used (gal)
1	Fig. 11-4 Climb 5000 ft.	8660	240	Climb	33 in. MAP 2200 RPM FR		5 min.		103	23

Note: Entries whose derivation may not be clear are explained as follows:

Fuel - as previously discussed.

Power settings and fuel used - read directly from chart. The power settings in climb are maximum continuous. However, for greater engine life and lower fuel consumption, it is advisable to use 30 inch Hg and 2000 rpm. Fuel used includes 15 gallons for warm-up and take-off. The time and distance covered in climb are considered negligible.

B. CRUISING AT 5000 FEET WITH GROSS WEIGHT DECREASING FROM 8522 to 8000 LB:

Stage	Reference	Initial Weight (lb)	Fuel Gal	Condition (ft)	Power Settings	Fuel Consumption	ETE	Dist (Naut. miles)	TAS (Knots)	Fuel Used (gal)
2	Fig. 11-5 Sheet 1 Column IV 5000 ft	8522	217	Cruise at	24 in. MAP 1800 RPM ML	36 gph	2+24	315	131	87

Note: The length of stage 2 is determined by the required time for the gross weight to become 8000 lb (the low limit of the first chart).

Fuel - 23 gallons of the initial 240 gallons of fuel were used on stage 1, leaving 217 gallons at start of stage 2.

Weight - In using 23 gallons fuel in stage 1, the weight becomes $8660 - 138 = 8522$ lb. (Weight of fuel is 6 lb/gal.)

Fuel used - Calculated by dividing the gross weight change by 6 lb/gal, i. e., $\frac{8522 - 8000}{6} = 87$ gal.

Consumption and power settings - read directly from chart.

ETE - computed by dividing fuel used by consumption i. e., $\frac{87}{36} = 2.4$ hrs = 2+24.

Distance - TAS plus or minus wind multiplied by ETE, i. e., $(131 - 0) \times 2.4 = 315$ nautical miles. (Normally, tail winds are neglected.)

C. CRUISING 5000 FEET TO POINT OF CLIMB. CRUISING CONDITION IN 8000 TO 7000 GROSS WEIGHT RANGE:

Stage	Reference	Initial Weight (lb)	Fuel Gal	Condition (ft)	Power Settings	Fuel Consumption	ETE	Dist (Naut. miles)	TAS (Knots)	Fuel Used (gal)
3	Fig. 11-6 Sheet 2 Column IV 5000 ft	8000	130	Cruise at 5000	22.5 in. MAP 1800 RPM ML	31 gph	0+40	85	128	21

Note: Computed to climbing position 400 nautical miles from starting point.

Weight - established in computing stage 2.

Distance - miles remaining to the predetermined climb point.

ETE - distance divided by estimated ground speed, i. e., $\frac{85}{128} = .66$ hours = 0+40.

Fuel used - multiply ETE by fuel consumption, $.66 \times 31 = 21$ gal.

D. CLIMB FROM 5000 TO 10,000 FEET DUE TO TERRAIN:

Stage	Reference	Initial Weight (lb)	Fuel Gal	Condition (ft)	Power Settings	Fuel Consumption	ETE	Dist (Naut. miles)	TAS (Knots)	Fuel Used (gal)
4	Fig. 11-4 Climb 7800 lb 5000 ft to 10,000 ft	7874	109	Climb 5000 to 10,000	Full Throttle 2200 RPM FR				102	7

Note: The fuel used in climb from 5000 feet to 10,000 feet is the difference in fuel used listed for 7800 lb weight on the climb chart at 5000 feet and 10,000 feet, i. e., 29-22=7 gal. The time and distance are disregarded in this instance. As stated in the note following stage 1, more conservative power settings are recommended for greater engine life and lower fuel consumption.

E. CRUISE AT 10,000 FEET FROM CLIMBING POINT TO DESTINATION:

Stage	Reference	Initial Weight (lb)	Fuel Gal	Condition (ft)	Power Settings	Fuel Consumption	ETE	Dist (Naut. miles)	TAS (Knots)	Fuel Used (gal)
5	Fig. 11-6 Sheet 2 Column IV 10,000 ft	7832	102	Cruising 10,000	19.5 in. MAP 1800 RPM ML	29 gph	2+15	240	122	65

Note: Ground speed is true airspeed less the effective head wind or 122-15=107 knots. The calculated fuel remaining is 102-65=37 gallons. The original reserve was 22 gallons so an excess of 37-22=15 gallons above requirements is available.

F. CONDITION OF AIRCRAFT FOR LANDING:

Stage	Reference	Initial Weight (lb)	Fuel Gal	Condition (ft)	Power Settings	Fuel Consumption	ETE	Dist (Naut. miles)	TAS (Knots)	Fuel Used (gal)
6	Fig. 11-4 Landing	7442	37	Landing	2000 RPM FR throttles as required					

NOTE: Check weight and balance of airplane for landing. In this problem, assuming that weight change is due solely to depletion of fuel, the balance index has decreased approximately 3.7. Refer to landing chart 11-4 to check landing distance.

To illustrate the value of cruise control, the same flight will be used in another example. This time the airplane will land at an intermediate field and refuel. The refueling field is 400 nautical miles from the point of departure and 60 nautical miles out of the way, making the total distance 700 miles. If the pilot flies to refueling point at 5000 feet altitude using 29 inches MAP and 2000 RPM, he will have a TAS of 166 knots and burn 61 gph (reference: figure 11-5, Sheet 1, Column II, 5000 feet). Time en route for 400 miles is 2+24 and fuel required is 145 gallons. After landing and refueling (estimated time on ground is 30 minutes), the pilot climbs to 10,000 feet using 33 gallons of fuel (refer to Climb Chart, figure 11-4 weight 8700 lbs., 10,000 feet) to clear terrain. The last 300 miles of the trip are flown at full throttle and 2000 rpm, using 62 gph at 169 knots TAS (144 knots ground speed) in 1/57. On this leg 120 gallons of fuel were burned. The total time required for this

flight is 5 + 07 and a total of 321 gallons of fuel was used. In comparison, 203 gallons of fuel and 5 1/2 hours were required for the first example. For a 7 per cent saving in time, 58 per cent more fuel was expended, plus increased engine wear!

Upon completion of a flight, a comparison should be made between the actual and computed data. This will provide a better idea of the margin of safety afforded by the charts and will facilitate more accurate planning on future missions.

The life of an engine is proportional to power drawn out of it. An engine might be thought of as having a set number of power-hours before requiring an overhaul. These power-hours can be used up in a short time by needless high power operation or they can be stretched by reducing the percentage of rated output used continuously. TAKE CARE OF THE ENGINES.

AIRSPEED INSTALLATION CORRECTION TABLE				
MODEL(S): UC-45J/RC-45J			ENGINE(S): (2) PRATT AND WHITNEY R985-AN-14B	
ADD CORRECTION TO INSTRUMENT READING TO OBTAIN CAS				
IAS (KNOTS)	CORRECTION (KNOTS)		IAS (KNOTS)	CORRECTION (KNOTS)
60	60 + 16		130	130 + 4
70	70 + 13		140	140 + 3
80	80 + 11		150	150 + 2
90	90 + 9		160	160 + 1
100	100 + 7		170	170 + 1
110	110 + 6		180	180 + 0
120	120 + 5			

Figure 11-1 Airspeed Correction

ENGINE POWER SCHEDULE CHART														
AIRCRAFT MODEL (S) UC-45J AND RC-45J					PROPELLER (S)					ENGINE MODEL (S) R985-AN-14B				
MINIMUM RECOMMENDED CRUISE RPM: 1500														
OIL GRADE: (S) W-120 (W) 1100														
FUEL GRADE: 115/145 (4)														
GAUGE READING		FUEL PRESS.	OIL PRESS.	OIL TEMP.										
DESIRED MAXIMUM		3.5-4.0 4.0	70-90 100	60-75 90										
MINIMUM IDLING		2.0	50	40										
WAR EMERGENCY (COMBAT EMERGENCY)			MILITARY POWER (NON-COMBAT EMERGENCY)			OPERATING CONDITION			NORMAL RATED (MAXIMUM CONTINUOUS)			MAXIMUM CRUISE (NORMAL OPERATION)		
MINUTES			5 MINUTES 260°C			TIME LIMIT MAX. CYL. HD. TEMP.			UNLIMITED 232°C			UNLIMITED 232°C		
			FULL RICH 2300			MIXTURE R. P. M.			FULL RICH 2200			MANUAL LEAN (4) 2000		
MANIF. PRESS.	SUPER- CHARGER	FUEL(1) GAL/MIN	MANIF. PRESS.	SUPER- CHARGER	FUEL(1) GAL/MIN	STD. TEMP. °C	PRESSURE ALTITUDE	STD. TEMP. °F	MANIF. PRESS.	SUPER- CHARGER	FUEL GPH(2)	MANIF. PRESS.	SUPER- CHARGER	FUEL GPH
						-55.0 -55.0 -55.0	40,000 FT. 38,000 FT. 36,000 FT.	-67.0 -67.0 -67.0						
						-52.4 -48.4 -44.4	34,000 FT. 32,000 FT. 30,000 FT.	-62.3 -55.1 -48.0						
						-40.5 -36.5 -32.5	28,000 FT. 26,000 FT. 24,000 FT.	-40.9 -33.7 -26.5						
						-28.6 -24.6 -20.7	22,000 FT. 20,000 FT. 18,000 FT.	-19.4 -12.3 -5.2						
			F.T. F.T. F.T.		.64 .68 .72	-16.7 -12.7 -8.8	16,000 FT. 14,000 FT. 12,000 FT.	2.0 9.1 16.2	F.T. F.T. F.T.		38 39 40	F.T. F.T. F.T.		25 26 29
			F.T. F.T. F.T.		.76 .80 .85	-4.8 -0.8 3.1	10,000 FT. 8,000 FT. 6,000 FT.	23.4 30.5 37.6	F.T. F.T. F.T.		44 46 47	F.T. 27.5 28.5		31 32 31
			F.T. 36.5 37.0		.90 1.0 1.0	7.1 11.0 15.0	4,000 FT. 2,000 FT. SEA LEVEL	44.7 51.8 59.0	33.5 34.0 35.0		48 49 48	29.0 29.5 30.5		30 29 28
GENERAL NOTES														
(1) Gal/Min: Approximate U. S. Gallon per MINUTE per Engine														
(2) GPH: Approximate U. S. Gallon per Hour PER ENGINE. F.T. Means Full Throttle operation.														
For complete cruising data, see Flight Operation Instruction Charts.														
TAKE-OFF CONDITIONS: 37.0 in. Hg., 2300 RPM Full Rich for 5 minutes									CONDITIONS TO AVOID: None Lean each engine individually and separately. Do not lean engines simultaneously.					
(3) SPECIAL NOTES														
To lean engines proceed as follows:														
1. Adjust both throttles to desired cruise settings, synchronize the propellers, and note the cylinder head temperatures.														
2. Lean one engine at a time by retarding the mixture lever in small increments until a slight engine roughness is noted; immediately move the mixture control forward (RICH) until the engine is again operating smoothly and synchronization is regained.														
3. Monitor cylinder head temperatures and do not exceed the maximum continuous temperature of 232°C.														
4. Repeat procedure for other engine.														
5. The mixtures must be placed in full RICH and the engines re-leaned whenever any of the following changes occur:														
a. Upon commencing a climb or descent (mixture RICH until desired altitude is reached).														
b. A change in throttle or RPM setting.														
c. A change in manifold heat setting.														
(4)														
These engines may also be operated on 91/96 or 100/130 grade fuel as an acceptable alternate.														
Data as of December, 1950, based on Flight Test														

Figure 11-2 Engine Power Schedule Chart

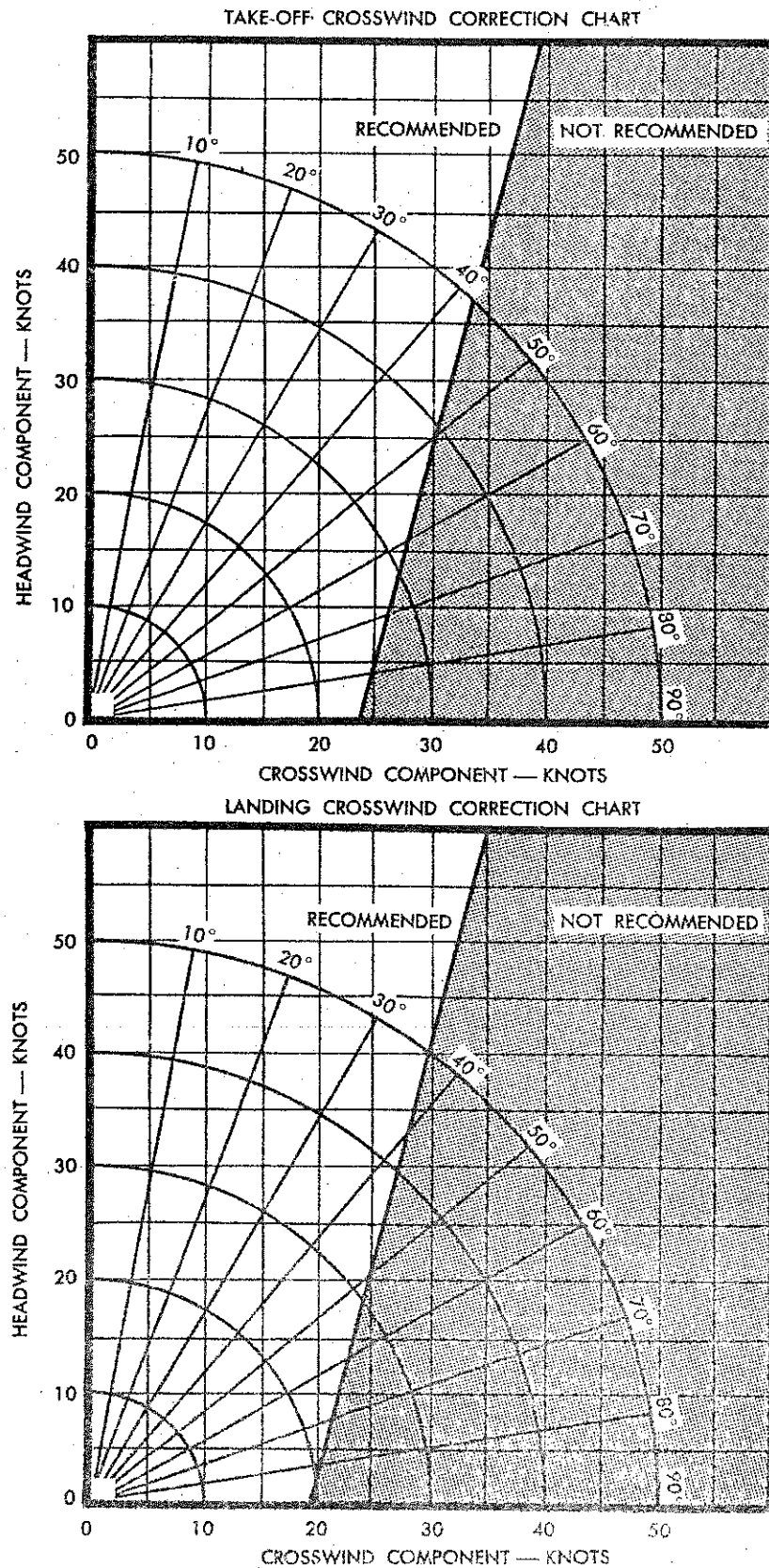


Figure 11-3 Take-Off and Landing Cross-Wind Chart

AIRCRAFT MODEL (S)		TAKE-OFF, CLIMB & LANDING CHART																ENGINE MODEL (S)		
UC-45J AND RC-45J																		R-985-AN-148		
TAKE-OFF DISTANCE FEET																				
GROSS WEIGHT LB.	HEAD WIND		HARD SURFACE RUNWAY						SOD-TURF RUNWAY						SOFT SURFACE RUNWAY					
			AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET	
	M.P.H.	KTS.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.
8700	0	0	1240	1850	1400	2050	1650	2390												
	17	15	830	1310	940	1450	1100	1680												
	34	30	600	940	670	1040	790	1200												
	51	45	450	650	500	730	600	840												
7800	0	0	910	1370	1020	1520	1210	1770												
	17	15	600	940	670	1050	800	1230												
	34	30	430	680	480	750	570	870												
	51	45	320	460	360	510	420	600												
7200	0	0	750	1090	840	1210	990	1410												
	17	15	480	750	540	830	640	960												
	34	30	340	520	380	580	450	670												
	51	45	260	350	290	390	340	460												

NOTE: INCREASE CHART DISTANCES AS FOLLOWS: 75°F + 10%; 100°F + 20%; 125°F + 30%; 150°F + 40%
DATA AS OF 8-15-46 BASED ON: Flight Test

OPTIMUM TAKE-OFF WITH 2300 RPM, 37 IN. HG. & 11 DEG. FLAP IS 80% OF CHART VALUES

CLIMB DATA																								
GROSS WEIGHT LB.	AT SEA LEVEL				AT 5000 FEET				AT 10,000 FEET				AT 15,000 FEET				AT FEET				AT FEET			
	BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB	
	MPH	KTS	F.P.M.	USED	MPH	KTS	F.P.M.	USED	MPH	KTS	F.P.M.	USED	MPH	KTS	F.P.M.	USED	MPH	KTS	F.P.M.	USED	MPH	KTS	F.P.M.	USED
8700	118	103	950	15.0	118	103	1050	5.0	23	114	99	720	11.0	33	109	95	420	20.0	45					
7800	118	103	1200	15.0	118	103	1260	4.0	22	114	99	900	8.5	29	109	95	560	16.0	39					
7200	118	103	1350	15.0	118	103	1400	3.5	20	114	99	1050	7.5	26	109	95	670	13.5	35					

POWER PLANT SETTINGS: (DETAILS ON FIG. A-3, Appendix III)
DATA AS OF 8-15-46 BASED ON: Flight Test

Use 2300 RPM Max. 33 In. Hg (F.T. above 5000 feet) and Mixture Full Rich
FUEL USED (U.S. GAL.) INCLUDES WARM-UP & TAKE-OFF ALLOWANCE

LANDING DISTANCE FEET																						
GROSS WEIGHT LB.	BEST IAS APPROACH				HARD DRY SURFACE						FIRM DRY SOD						WET OR SLIPPERY					
	POWER OFF		POWER ON		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET	
	MPH	KTS	MPH	KTS	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.
8700	120	104			1400	1950	1530	2080	1670	2220												
7800	110	96			1270	1800	1390	1930	1520	2090												

DATA AS OF 8-15-46 BASED ON: Flight Test

OPTIMUM LANDING IS 80% OF CHART VALUES

REMARKS:

NOTE: TO DETERMINE FUEL CONSUMPTION IN BRITISH IMPERIAL GALLONS, MULTIPLY BY 10, THEN DIVIDE BY 12

LEGEND

IAS : Indicated Airspeed
MPH : Miles per Hour
KTS : Knots
FPM : Feet per Minute

Figure 11-4 Take-Off and Landing Data Chart

AIRCRAFT MODEL (S)
UC-45J AND RC-45J

FLIGHT OPERATION INSTRUCTION

EXTERNAL LOAD ITEMS
NONE

ENGINE (S) R-985-AN-14B

CHART WEIGHT LIMITS: 8700 TO 8000 POUNDS

NUMBER OF ENGINES OPERATING: TWO

INSTRUCTIONS FOR USING CHART: Select figure in FUEL column equal to or less than amount of fuel to be used for cruising.¹¹¹ Move horizontally to right or left and select RANGE value equal to or greater than the statute or nautical air miles to be flown. Vertically below and opposite value nearest desired cruising altitude (ALT.) read rpm, manifold pressure (M.P.) and MIXTURE setting required.

NOTES: Column I is for emergency high speed cruising only. Columns II, III, IV and V give progressive increase in range at a sacrifice in speed. Air miles per gallon (Mf.GAL.) (no wind), gallons per hour (G.P.H.) and true airspeed (T.A.S.) are approximate values for reference. Range values are for an average airplane flying alone (no wind).¹¹¹ To obtain British Imperial gallons (or G.P.H.), multiply U. S. gallons (or G.P.H.) by 10 then divide by 12.

COLUMN I		FUEL U.S. GAL.	COLUMN II		COLUMN III		COLUMN IV		FUEL U.S. GAL.	COLUMN V																														
RANGE IN AIRMILES			RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES			RANGE IN AIRMILES																														
STATUTE	NAUTICAL		STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL		STATUTE	NAUTICAL																													
465	405	256	SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ¹¹¹				802		256	1045	909																													
425	370	220	688	598	816	709	922		220	950	826																													
		200	626	544	742	645	838	729	200																															
380	330	180	563	489	668	581	754	656	180	855	743																													
340	295	160	500	435	593	516	670	583	160	760	661																													
295	255	140	438	380	519	451	587	510	140	665	578																													
250	215	120	375	326	445	387	503	437	120	570	496																													
210	180	100	313	272	371	323	419	364	100	475	413																													
170	150	80	250	217	297	258	335	291	80	380	330																													
125	110	60	187	163	223	193	251	218	60	286	249																													
85	75	40	125	108	148	129	168	146	40	190	165																													
40	35	20	62	54	74	64	84	73	20	95	83																													
MAXIMUM CONTINUOUS		PRESS FEET	(3.13 STAT. (2.72 NAUT.) MI./GAL.)		(3.7 STAT. (3.22 NAUT.) MI./GAL.)		(4.19 STAT. (3.6 NAUT.) MI./GAL.)		PRESS FEET	MAXIMUM AIR RANGE																														
R.P.M.	IN.		MIX- TURE	APPROX.		R.P.M.	IN.	MIX- TURE		APPROX.		R.P.M.	IN.	MIX- TURE	APPROX.																									
				TOT. G.P.H.	T.A.S.					TOT. G.P.H.	T.A.S.				TOT. G.P.H.	T.A.S.																								
			M.P.H.	KTS.	M.P.H.	KTS.	M.P.H.	KTS.	M.P.H.	KTS.				M.P.H.	KTS.																									
2200	F.T.	F.R.	74	196	170	15000	2000	F.T.	M.L.	53	184	160	1800	F.T.	M.L.	45	168	146	1800	F.T.	M.L.	45	167	145	1800	20.5	M.L.	34	144	125	15000									
2200	F.T.	F.R.	88	208	180	10000	2000	F.T.	M.L.	62	195	169	1800	24.0	M.L.	45	167	145	1800	20.5	M.L.	34	144	125	15000															
2200	F.T.	F.R.	95	212	184	5000	2000	29.0	M.L.	61	191	166	1800	26.5	M.L.	44	167	145	1800	24.0	M.L.	36	151	131	5000	1800	21.0	M.L.	28	132	115									
2200	35.0	F.R.	96	206	179	S.L.	2000	30.5	M.L.	57	184	160	1800	29.0	M.L.	43	164	142	1800	26.5	M.L.	35	151	131	5000	1800	25.0	M.L.	29	139	121									

REMARKS:

(1) Make allowance for warm-up, take-off, and climb, plus allowance for wind and reserve as required. (See Figure 11-31).

(2) There is no 'LEAN' position on mixture control. Lean to point of engine roughness, then enrich slightly.

CAUTION: For maximum engine life, do not exceed manifold pressure for listed rpm.

EXAMPLE

At 8600 lb gross weight with 140 gal. of fuel (after deducting total allowances of 50 gal.). To fly 530 stat. air miles at 5000 ft. altitude, maintain 1800 rpm and 26.5 in. manifold pressure with mixture set. Manual lean when weight decreases below 8000 lb refer to next weight chart, 8000- to 7000 lb under col III to 5000 ft. Altitude on next chart for new power setting.

LEGEND

ALT : Pressure Altitude
MP : Manifold Pressure
GPH : U.S. Gal. per Hour
TAS : True Airspeed
KTS : Knots
S.L. : Sea Level

F.R. : Full Rich
A.R. : Auto Rich
A.L. : Auto Lean
C.L. : Cruising Lean
M.L. : Manual Lean
F.T. : Full Throttle

DATA AS OF 10-14-48 BASED ON: Flight Test

SUBJECT TO CHANGE AFTER FLIGHT CHECK

AIRCRAFT MODEL (S) UC-45J AND RC-45J															FLIGHT OPERATION INSTRUCTION															EXTERNAL LOAD ITEMS NONE				
ENGINE (S) R-985-AN-14B															CHART WEIGHT LIMITS: 8000 TO 7000 POUNDS															NUMBER OF ENGINES OPERATING: TWO				
INSTRUCTIONS FOR USING CHART: Select figure in FUEL column equal to or less than amount of fuel to be used for cruising. ⁽¹⁾ Move horizontally to right or left and select RANGE value equal to or greater than the statute or nautical air miles to be flown. Vertically below and opposite value nearest desired cruising altitude (ALT.) read rpm, manifold pressure (M.P.) and MIXTURE setting required.															NOTES: Column I is for emergency high speed cruising only. Columns II, III, IV and V give progressive increase in range at a sacrifice in speed. Air miles per gallon (M.GAL.) (no wind), gallons per hour (G.P.H.) and true airspeed (T.A.S.) are approximate values for reference. Range values are for an average airplane flying alone (no wind). ⁽¹⁾ To obtain British Imperial gallons (or G.P.H.), multiply U. S. gallons (or G.P.H.) by 10 then divide by 12.																			
COLUMN I				FUEL U.S. GAL.	COLUMN II				COLUMN III				COLUMN IV				FUEL U.S. GAL.	COLUMN V																
RANGE IN AIRMILES					RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES					RANGE IN AIRMILES																
STATUTE		NAUTICAL			STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL			STATUTE		NAUTICAL														
475		415		256	715		SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁽¹⁾	905		785		950		256	1255		1090																	
430		375		220	650		620	905		705		1090		220	1130		980																	
				200			565	815				980		200																				
385		335		180	585		510	730		635		870		180	1055		870																	
345		300		160	520		450	640		575		760		160	980		765																	
300		260		140	455		395	560		485		665		140	770		670																	
260		225		120	390		340	480		415		570		120	660		575																	
215		185		100	325		280	400		345		475		100	550		480																	
170		150		80	260		225	320		280		380		80	440		380																	
130		115		60	195		170	240		210		285		60	330		285																	
85		75		40	130		115	160		140		190		40	220		190																	
45		40		20	65		55	80		70		95		20	110		95																	
MAXIMUM CONTINUOUS				PRESS FEET	(3.25 STAT. (2.82 NAUT.) MI./GAL.)				(4.00 STAT. (3.47 NAUT.) MI./GAL.)				(4.75 STAT. (4.13 NAUT.) MI./GAL.)				PRESS FEET	MAXIMUM AIR RANGE																
R.P.M.	IN.	MIX-TURE	APPROX.			R.P.M.	IN.	MIX-TURE	APPROX.			R.P.M.	IN.	MIX-TURE	APPROX.			R.P.M.	IN.	MIX-TURE	APPROX.													
			TOT. G.P.H.		M.P.H.				KTS.	TOT. G.P.H.	M.P.H.				KTS.	TOT. G.P.H.					M.P.H.	KTS.	TOT. G.P.H.	M.P.H.	KTS.	TOT. G.P.H.	M.P.H.	KTS.						
2200	F.T.	F.R.	75	205	178	15000	2000	F.T.	M.L.	53	192	167	1800	F.T.	M.L.	45	175	152	1800	19.5	M.L.	29	140	122	15000									
2200	F.T.	F.R.	88	212	184	10000	2000	F.T.	M.L.	62	201	175	1800	23.0	M.L.	43	172	149	1800	23.0	M.L.	31	147	128	5000	1800	20.0	M.L.	22	121	105			
2200	F.T.	F.R.	99	216	188	5000	2000	29.0	M.L.	61	195	169	1800	26.0	M.L.	43	172	149	1800	22.5	M.L.	31	147	128	5000	1800	20.0	M.L.	22	121	105			
2200	34.5	F.R.	95	208	181	S.L.	2000	30.5	M.L.	57	187	162	1800	28.5	M.L.	41	167	145	1800	25.5	M.L.	31	150	130	S.L.	1800	23.5	M.L.	24	134	116			
REMARKS: (1) Make allowance for warm-up, take-off, and climb, plus allowance for wind and reserve as required. (See Figure 11-3).															EXAMPLE At 7800 lb gross weight with 100 gal. of fuel (after deducting total allowances of 50 gal.). To fly 475 stat. air miles at 5000 ft. altitude, maintain 1800 rpm and 22.5 in. manifold pressure with mixture set. Manual lean when weight decreases below 7000 lb refer to next weight chart, 7000 to 6000 lb. Refer to column IV on next chart for new power setting.															LEGEND ALT : Pressure Altitude MP : Manifold Pressure GPH : U.S. Gal. per Hour TAS : True Airspeed KTS : Knots S.L. : Sea Level F.R. : Full Rich A.R. : Auto Rich A.L. : Auto Lean C.L. : Cruising Lean M.L. : Manual Lean F.T. : Full Throttle				
DATA AS OF 10-14-48 BASED ON: Flight Test															SUBJECT TO CHANGE AFTER FLIGHT CHECK																			

Figure 11-6 Flight Operation Instruction 8000 to 7000

AIRCRAFT MODEL (S)
UC-45J AND RC-45J

FLIGHT OPERATION INSTRUCTION

EXTERNAL LOAD ITEMS
NONE

ENGINE (S) R-985-AN-14B

CHART WEIGHT LIMITS: 7000 TO 6000 POUNDS

NUMBER OF ENGINES OPERATING: TWO

INSTRUCTIONS FOR USING CHART: Select figure in FUEL column equal to or less than amount of fuel to be used for cruising.⁽¹⁾ Move horizontally to right or left and select RANGE value equal to or greater than the statute or nautical air miles to be flown. Vertically below and opposite value nearest desired cruising altitude (ALT.) read rpm, manifold pressure (M.P.) and MIXTURE setting required.

NOTES: Column I is for emergency high speed cruising only. Columns II, III, IV and V give progressive increase in range at a sacrifice in speed. Air miles per gallon (MI./GAL.) (no wind), gallons per hour (G.P.H.) and true airspeed (T.A.S.) are approximate values for reference. Range values are for an average airplane flying alone (no wind).⁽²⁾ To obtain British Imperial gallons (or G.P.H.), multiply U. S. gallons (or G.P.H.) by 10 then divide by 12.

COLUMN I						FUEL U.S. GAL.	COLUMN II						COLUMN III						COLUMN IV						FUEL U.S. GAL.	COLUMN V																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
RANGE IN AIRMILES							RANGE IN AIRMILES						RANGE IN AIRMILES						RANGE IN AIRMILES							RANGE IN AIRMILES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
STATUTE			NAUTICAL				STATUTE			NAUTICAL			STATUTE			NAUTICAL			STATUTE			NAUTICAL				STATUTE			NAUTICAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁽¹⁾																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
385		335		180		585		510		790		685		990		850		180		1125		975																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
345		300		160		520		450		705		610		880		765		160		1000		870																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
300		260		140		455		395		615		535		770		670		140		875		780																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
260		225		120		390		340		530		460		660		575		120		750		650																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
215		185		100		325		280		440		380		550		480		100		625		540																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
170		150		80		260		225		350		300		440		380		80		500		435																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
130		115		60		195		170		265		230		330		285		60		375		325																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
85		75		40		130		115		175		150		220		190		40		250		215																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
45		40		20		65		55		90		80		110		95		20		125		110																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
MAXIMUM CONTINUOUS						PRESS FEET	(3.25 STAT. (.2.82 NAUT.) MI./GAL.)						(4.40 STAT. (.3.82 NAUT.) MI./GAL.)						(5.50 STAT. (.4.78 NAUT.) MI./GAL.)						PRESS FEET	MAXIMUM AIR RANGE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
R.P.M.	IN.	MIX- TURE	APPROX.				R.P.M.	IN.	MIX- TURE	APPROX.			R.P.M.	IN.	MIX- TURE	APPROX.			R.P.M.	IN.	MIX- TURE	APPROX.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			TOT.	T.A.S.	TOT.					T.A.S.	TOT.	T.A.S.				TOT.	T.A.S.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
			G.P.H.	M.P.H.	KTS.					G.P.H.	M.P.H.	KTS.				G.P.H.	M.P.H.	KTS.				G.P.H.	M.P.H.	KTS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		</

REMARKS:

(1) Make allowance for warm-up, take-off, and climb, plus allowance for wind and reserve as required. (See Figure 11-3).

(2) There is no 'LEAN' position on mixture control. Lean to point of engine roughness, then enrich slightly.

CAUTION: For maximum engine life, do not exceed manifold pressure for listed rpm.

DATA AS OF 10-14-48 BASED ON: Flight Test

EXAMPLE

At 7000 lb gross weight with 80 gal. of fuel (after deducting total allowances of 50 gal.). To fly 500 stat. air miles at 5000 ft. altitude, maintain 1800 rpm and 19 in. manifold pressure with mixture set Manual lean.

LEGEND

ALT : Pressure Altitude
MP : Manifold Pressure
GPH : U.S. Gal. per Hour
TAS : True Airspeed
KTS : Knots
S.L. : Sea Level
F.R. : Full Rich
A.R. : Auto Rich
A.L. : Auto Lean
C.L. : Cruising Lean
M.L. : Manual Lean
F.T. : Full Throttle

SUBJECT TO CHANGE AFTER FLIGHT CHECK

Figure 11-7 Flight Operation Instruction 7000 to 6000

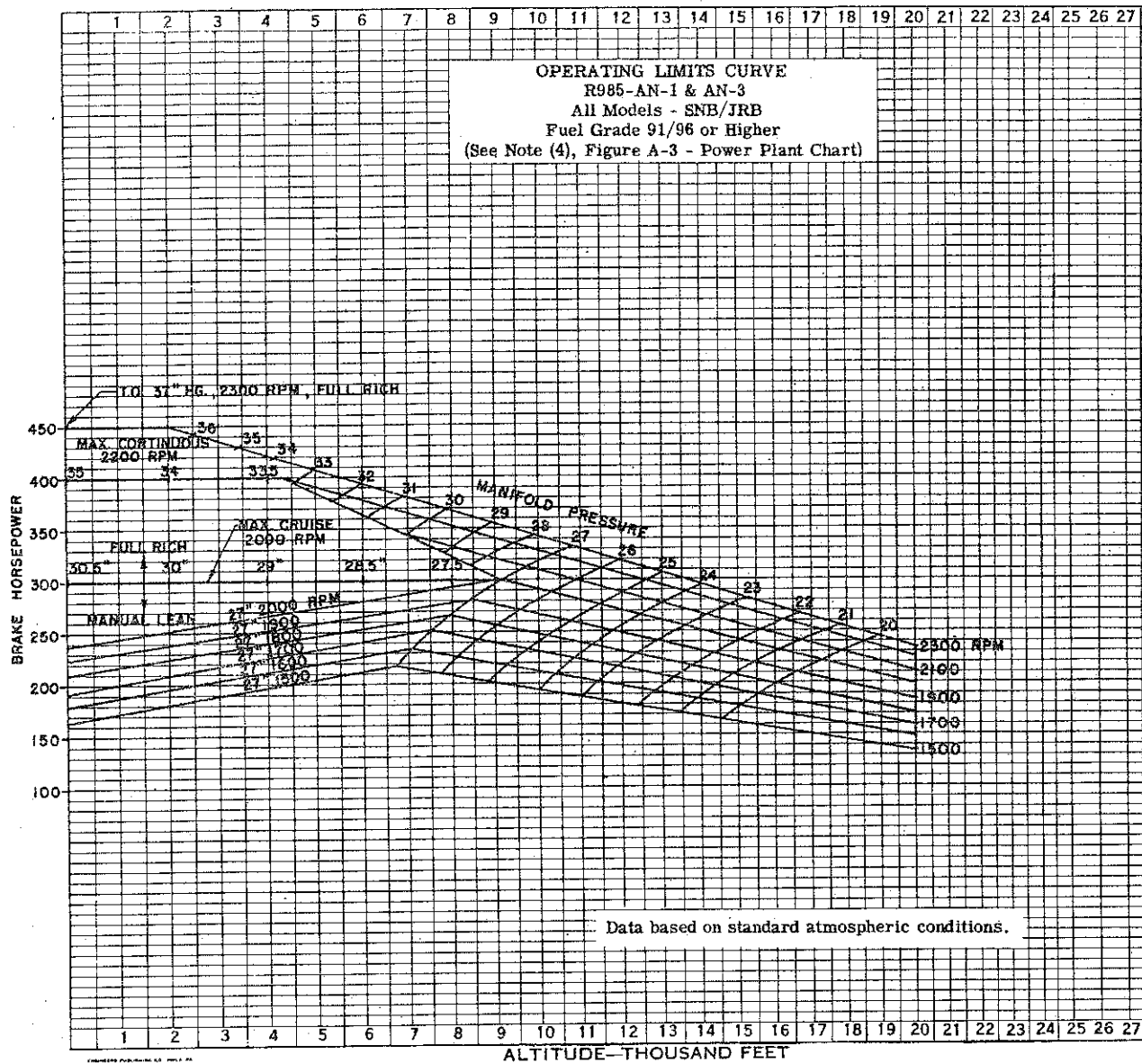


Figure 11-8 Engine Operating Limits Curve

INDEX

A

Acceleration Limitations	1-49
Acceptance, Aircraft	3-2
Acrobatics	4-4
After Take-Off - Climb	3-8
Aileron Trim	1-15
Aid Kits, First	1-39
Air	
control valve, ventilating	1-33
induction, carburetor	1-13
outlet valve, heated	1-31
outlet, ventilating	1-33
penetration, turbulent	1-49
temperature indicator,	
carburetor	1-8
outside	1-21
Airborne Damaged Aircraft	5-8
Aircraft	
acceptance	3-2
familiarization maneuvers	2-2
Airspeed	
correction chart	11-5*
indicator	1-21
limitations	1-46
Altimeter	
AN/APN-1, radio	1-30
pressure	1-21
Amplifier Switch	1-16
AN/APN-1 Radio Altimeter	1-30
AN/APN-7 Radio Compass	1-28
AN/ARN-8 Marker Beacon	1-29
AN/ARN-30 Omni-Range Receiver	1-27
Anti-Collision Lights	1-38
Anti-Icer	
fluid quantity gage	1-37
rheostat knob, propeller	1-37
system	1-42
operation	1-37
propeller	1-36*
Approach	4-4
(GCA)	4-4
landing	6-4
missed	4-4
Approaching Turbulent Air	6-1
(ARC-5), Range and HF Receiver	1-25
Arrange, Interior (Typical)	1-2*
Attitude Indicator	1-21
Automatic Pilot	
controls	1-16
system operation	1-17
Automatic Pilot	
controls	1-17*
system	
disengage (RC-45J only)	5-6
flight check	3-12
ground check	3-12
Auxiliary	
check (RC-45J only)	3-12
light	1-39

B

Bail Out	5-8
Base Leg	3-10
Battery	1-44
switches	1-14
Beacon AN/ARN-8, Marker	1-29
Beam Filter	1-31
Blow-Out Disc	1-39
Brake	
controls	1-20
handle, parking	1-20
operation	4-2
pedals	1-20
system, wheel	1-20
Briefing/Debriefing Operations	3-1
Buttons, Propeller Feathering	1-9
By-Pass Valves, Oil	1-9

C

Camera Vacuum Supply	1-21
Carburetor	
air	
induction	1-13
temperature indicator	
heat use	6-2
ice prevention	6-2
icing	6-2
indication	6-2
Center-of-Gravity Limitations	1-46
Change, Engine Power	4-1
Chart	
airspeed correction	11-5*
climb	11-8*
engine power schedule	11-6*
landing	11-8*
take-off	11-8*
Check, Inflight Propeller Feathering	4-1
Checklist	
ground secure	3-12
landing	3-9
postlanding	3-12
prelanding	3-9
prestart	3-4
pretake-off	3-5
pretaxi	3-5
Circuit Breaker	
generator	1-14*
panel	1-15
Clearance Lights, Fuselage ^o	1-38
Clearances/Dimensions	1-45*
Climb	
after take-off	3-8
chart	11-8*
Clock, Panel	1-21
Closed Book Examination	10-2

*Denotes Illustration

Clutch	
pedal, landing gear	1-19
push-button	1-16
Cold Weather Operation	6-2
Command	
radio AN/ARC-27 or -27A	1-23
radio set AN/ARC-27 or 27A	1-24*
Communications Equipment	1-23*
Compass	
AN/ARN-7, Radio	1-28
magnetic (standby)	1-21
slaved gyro magnetic	1-23
Compartment Light, Passenger	1-38
Configuration/Wright, Safe Single Engine	5-3*
Configurations, Aircraft	11-1
Control	
and stability	4-2
control and stability	4-2
landing gear	1-19
pedestal and subpanels (typical) UC-45J	1-4*
pedestal and subpanels (typical) RC-45J	1-5*
pressure	4-2
propeller	1-9
surface lock	1-16*
wing flap	1-18
Controls	
engine	1-3
P-1 automatic pilot	1-17*
radio (typical UC-45J/RC-45J)	1-22*
Controller	1-16
Cooling, Engine	1-8
Correction Chart, Airspeed	11-5*
Cowl	
flap, engine	4-1
flap handle	1-8
Crew Requirements	8-1
flight	2-3
Crewmember Duties	9-1
Critical Area	10-2
Crossfeed Valve, Fuel	1-13
Crosswind	
chart, take-off landing	11-7*
landing technique	3-10
take-off	3-8
Cruise Control	3-2
Currency	2-3
Curve, Engine Operating Limits	1-12*
Cylinder Head Temperature Indicator	1-8

D

Damaged Aircraft, Airborne	5-8
Data Case	1-41
DC Volt-Ammeter Indicator	1-15
Debriefing	3-12
operations	3-1
Definitions	10-1
Defrosting System	1-31
operation	1-32
Deicer	
pressure gage	1-35
push-pull button	1-35
system operation	1-35

Deicing	
and anti-icing system	1-35
wing and tail system	1-35
Descent	3-9
Desert Operation and Hot Weather	6-5
Differences, UC or RC	1-3
Dimensions, Aircraft	1-3
Dimensions/Ground Clearances	1-45*
Directional Indicator	1-23
Discharge Handle	1-39
Disconnect Handle, Emergency	1-17
Disengage	
autopilot system (RC-45J only)	5-6
button	1-16
Ditching	5-9
Diving	4-4
Door Emergency Release, Main Entrance	1-40
Duties, Flight Crewmember	9-1

E

Electrical	
fire	5-5
power failure	5-6
system	1-14
system controls	1-14
Elevator Trim Wheel	1-15*
Elimination, Smoke and Fume	5-5
Emergencies, Ground	5-1
in-flight	5-2
landing	5-8
take-off	5-2
Emergency Disconnect Handle	1-16
Emergency Equipment	1-39, 5-4*
Emergency Escape Hatch	1-40*
hatch release handle	1-40
routes	5-4*
Emergency Gear/Flap Operation	5-7*
handcrank, gear/flap	1-18*
handcrank, landing gear	1-19
handcrank, wing flap	1-18
operating procedures	8-1
operation, landing gear	5-8
operation, wing flap	5-6
Emergency Release Handle, Main	
Entrance Door	1-40
release, landing gear handle (solenoid)	1-19
release, main entrance door	1-40*
Engine	1-3
cooling	1-8
Engine Cowl Flaps	4-1
failure	5-2, 5-5
fire	5-2
fire during start	5-1
fire extinguisher	1-39
gages	1-8
instruments	1-8
limitations	1-46
oil supply system	1-11*
oil system	1-42
operating limits curve	11-12*
power change	4-1
power schedule chart	11-6*
shut down	6-5
starting	6-3
warm-up	6-3

Entrance Door Emergency Release	1-40*	Floorboard, Pilot's Compartment (Typical)	1-10*
Equipment, Emergency	1-39	Flying Equipment, Personal	2-3
personal flying	2-3	Forced Landing	5-9
Escape Hatch, Emergency	1-40*	Form, NATOPS Evaluation	10-4*
Escape Hatch Release Handle, Emergency	1-40	Friction Lock, Propeller Levers	1-9
Escape Routes, Emergency	5-4, 5-9	Fuel	
Evaluation Form, NATOPS	10-4*	crossfeed valve	1-13
NATOPS	10-1	exhaustion	5-6
worksheet, NATOPS	10-5*	level gage and selector switch	1-13
Exhaustion, Fuel	5-6	management	3-9
Extension, Landing Gear Shock Strut	1-44	pressure gage	1-13
light	1-39*	pump failure	5-6
Exterior Lighting and Controls	1-38	quantity data table	1-14*
lighting system	1-37	supply system	1-12*
preflight inspection	3-2, 6-2	system controls	1-13
External Power Receptacle	1-15	systems management	1-13
power requirements	1-44	tank selector valve	1-13
Extinguisher, Engine Fire	1-39*	tank sequence	1-13
hand fire	1-39	Fueling	1-42
F		Fume Elimination	5-5
Failure, Electrical Power	5-6	Fuselage Clearance Lights	1-38
engine	5-2, 5-5	fire	5-5
fuel pump	5-6	G	
propeller	5-6	Gage, Anti-Icer Fluid Quantity	1-37
Familiarization Maneuvers	2-2	fuel level	1-13
Feathering		fuel pressure	1-13
buttons, propeller	1-9	vacuum	1-20
check, inflight	4-1	Gages, Engine	1-8
in-flight	1-46	(GCA) Approach	4-4
propeller	1-9	Gear/Flap Operation, Emergency	5-7*
Ferry Pilots	2-3	Gear Handle, Landing	1-18*
Filter, Beam	1-31	warning light, landing	1-19
Final Grade Determination		General Mission	8-1
Fire		Generator Circuit Breakers	1-14*
during engine start	5-1	switches	1-14
electrical	5-5	Glide Distance	5-2
engine	5-2	Go-Around, Single-Engine	5-10
extinguisher, engine	1-39	Grading Instructions	10-2
extinguisher, hand	1-39*	Gross Weight Limitations	1-49
First Aid Kits	1-39	Ground Check, P-1 Automatic Pilot System	3-12
Flap		clearances; dimensions	1-45*
emergency		controlled approach (GCA)	4-4
handcrank	1-18	emergencies	5-1
operation, wing	5-6	evaluation	10-2
/gear emergency operation	5-7*	secure checklist	3-12
position indicator, wing	1-18	training syllabus	2-1
system, wing	1-17	Gyro Caging Knob	1-16
Flaps, Engine Cowl	4-1	magnetic compass, slaved	1-23
Flight		H	
check, P-1 automatic pilot system	3-12	Hand Fire Extinguisher	1-39*
control system	1-15	Handcrank, Emergency Landing Gear	1-19
crew requirements	2-3	gear/flap emergency	1-18*
crewmember duties	9-1	wing flap emergency	1-18
evaluation	10-2	Handle, Brake Parking	1-20
grade determination	10-3	cowl flap	1-8
grading criteria	10-3	landing gear	1-18, 1-19*
handling characteristics	4-2	Handle (Solenoid) Emergency Release,	
instruments	1-21	Landing Gear	1-19
operation charts	11-9, 11-10, 11-11*	Handling	1-44
plan calculation	11-2	characteristics, flight	4-2
planning	11-1	Harness Lock, Shoulder	1-39*
test	2-3		
safety rules	2-3		
training syllabus	2-2		

*Denotes Illustration

Hatch, Emergency Escape 1-39, 1-40*
 Heat Use, Carburetor 6-2
 Heated Air Outlet Valve 1-31
 Heating and Defrosting System 1-31
 operation 1-32
 Heating Control Valve (T-Handle) 1-31
 Heating/Ventilating System 1-31, 1-32*
 HF Receiver (ARC-5) 1-25
 HF Transmitter 1-25
 Holding 4-4
 Horn, Landing Gear Warning 1-19
 silencer switch 1-19
 Hot Weather and Desert Operation 6-5
 Hydraulic System 1-15, 1-42

I

Ice Prevention, Carburetor 6-2
 Icing, Carburetor 6-2
 Ignition Controls 1-8
 Ignition System 1-8, 1-44
 Implementation 10-1
 Indicator, Airspeed 1-21
 attitude 1-21
 carburetor air temperature 1-8
 cylinder head temperature 1-8
 DC volt-ammeter 1-15
 directional 1-23
 manifold pressure 1-8
 oxygen 1-33
 trim tab position 1-16
 turn and slip 1-21
 vacuum system 1-20
 vertical speed 1-21
 wing flap position 1-18
 Induction, Carburetor Air 1-13
 Inertia Reel Lock Handle 1-40
 shoulder harness 1-40
 In-Flight Emergencies 5-2
 feathering 1-46
 propeller feathering check 4-1
 Initial Qualification 2-3
 Inspection Exterior, Preflight 3-2, 6-2
 light, landing gear clutch 1-20
 post-flight 3-12
 preflight 3-3, 3-4*
 Instruments, Engine 1-8
 flight 1-21, 4-4
 markings 1-47, 1-48*
 panel (typical) RC-45J 1-7*
 panel (typical) UC-45J 1-6*
 red lights 1-38
 Interior Arrangement (Typical) 1-2*
 lighting and controls 1-38

J

Jack Box, Radio 1-30

K

Kits, First Aid 1-39

L

Landing 3-10, 6-4, 6-5
 chart 11-8*
 checklist 3-9
 crosswind chart 11-7*
 emergencies 5-8
 forced 5-9
 Landing Gear
 clutch inspection light 1-20
 clutch pedal 1-19
 electrical overload controls 1-20
 emergency handcrank 1-19
 handle 1-18, 1-19*
 handle (solenoid) emergency release 1-19
 limitation 1-49
 shock strut extension 1-44
 system 1-18
 warning horn 1-19
 warning light 1-19
 wing flap emergency operation 5-7*
 Landing Light 1-38
 Landing Pattern, Normal 3-11*
 Landing, Single Engine 5-9, 5-10*
 Landing Technique
 crosswind 3-10
 minimum roll 3-10
 night 3-10
 no brake 3-10
 normal 3-10
 touch and go 3-10
 Leaning, Manual Mixture 3-9
 Leaving Aircraft 6-5
 Levers, Propeller Control 1-9
 Light, Anti-Collision 1-38
 auxiliary 1-39
 extension 1-39*
 fuselage clearance 1-38
 instrument red 1-38
 landing 1-38
 landing gear clutch inspection 1-20
 landing gear warning 1-19
 passenger compartment 1-38
 passing 1-38
 position (navigation) 1-38
 vacuum warning 1-21
 Lighting and Controls, Exterior/Interior 1-38
 system, exterior 1-37
 system, exterior/interior 1-38
 Limitation, Acceleration 1-49
 airspeed 1-46
 center-of-gravity 1-46
 engine 1-46
 gross weight 1-49
 landing gear 1-49
 maneuver 1-49
 Limits Curve, Engine Operating 11-12*
 Line Operation 3-2
 Lock, Control Surfaces 1-16*
 Lock, Shoulder Harness 1-39*
 Lock/Unlock Handle, Tail Wheel 1-20

M

Magnetic (Standby) Compass	1-21
compass, slaved gyro	1-23
Magneto Switch, Individual Engine	1-8
Main Entrance Door Emergency Release Handle	1-40
Malfunction	10-2
Maneuvers, Aircraft Familiarization	2-2
limitations	1-49
Manifold Heat Levers	1-3
pressure indicator	1-8
Manual Mixture Leaning	3-9
Map and Data Case	1-41
Marker Beacon AN/ARN-8	1-29
Markings, Instrument Limitations	1-47, 1-48*
Master Ignition Switch	1-8
Minimum Roll Landing Technique	3-10
Minimum Run Take-Off	3-8
Miscellaneous Equipment	1-40
Missed Approach	4-4
Mission, General	8-1
planning	3-2
special	3-2
Mixture Leaning, Manual	3-9
levers	1-3

N

NATOPS Evaluation	10-1
evaluation form	10-4*
evaluation question blank	
evaluation worksheet	10-5*
reevaluation	10-1
Navigation	3-2
equipment	1-25*, 1-27
lights, position	1-38
Night Flight	4-4
landing technique	3-10
take-off	3-8
Normal and Emergency Operating Procedures	8-1
landing technique	3-10

O

Oblique Photography	8-2
Obstacle Clearance Take-Off	3-8
Oil By-Pass Valves	1-9
radiator shutters	1-9
supply system, engine	1-9, 1-11*
system controls	1-9
system, engine	1-42
temperature	4-2
Omni-Range Receiver AN/ARN-30	1-27
Open Book Examination	10-2
Operating Limits Curve, Engine	11-12*
Operation, Automatic Pilot System	1-17
Oral Examination	10-2
Outlet Valve, Heated Air	1-31
Outside Air Temperature Indicator	1-21
Overboost	1-46
Overload Controls, Landing Gear	1-20
Overspeed	1-46

Oxygen Controls	1-33
duration table (RC-45J)	1-35*
equipment, portable	1-35
indicators	1-33
regulator	1-33
Oxygen System Operation	1-33
Oxygen System (RC-45J)	1-33, 1-34*

P

P-1 Automatic Pilot System	1-16
flight ground check	3-12
Panel, Circuit Breaker	1-15
clock	1-21
instrument (typical) RC-45J	1-7*
instrument (typical) UC-45J	1-6*
Parking and Mooring	1-46, 6-5
Parking Brake Handle	1-20
Passenger Compartment Light	1-38
Passing Light	1-38
Pattern, Normal Landing	3-11*
Pedals, Brake Control	1-20
Performance Data	11-1
Personal Flying Equipment	2-3
Photography, Oblique	8-2
Photography, Vertical	8-2
Photographic equipment	3-12
provisions (RC-45J)	1-41*
Pilot ferry	2-3
qualification, test	2-3
Pilots Compartment Floorboard (Typical)	1-10*
Pitot heat system	1-37
static pressure system	1-20
Planning, Mission	3-2
Pneumatic System	1-44
Portable Oxygen Equipment	1-35
Position Indicator trim tab	1-16
wing flap	1-18
(navigation) lights	1-38
Post-Flight Inspection	3-12
Post-Landing Checklist	3-12
Power failure, electrical	5-6
receptacle, external	1-15
requirements, external	1-44
Preflight inspection (exterior)	3-3, 3-4*
preparation	3-2
Prelanding Checklist	3-9
Pressure altimeter	1-21
gage, fuel	1-13
indicator, manifold	1-8
system, pitot static	1-20
Prestart Checklist	3-4
Pretake-off Checklist	3-5
Pretaxi Checklist	3-5
Primer	1-13

Propeller	1-9
anti-icer rheostat knob	1-37
anti-icer system	1-36*
controls	1-9
failure	5-6
feathering	1-9
feathering buttons	1-9
feathering check, inflight	4-1
levers	1-9
levers friction lock	1-9
unfeathering	1-9
Pump	
failure, fuel	5-6
wobble	1-13
Push-Button, Clutch	1-16

Q

Qualification,	
initial	2-3
test pilot	2-3

R

Radiator Shutters, Oil	1-9
Radio	
altimeter AN/APN-1	1-30
compass AN/ARN-7	1-28
controls (typical) UC-45J/RC-45J	1-22*
equipment location	1-26*
jack box	1-30
set AN/ARC-27 or 27A Command	1-24*
Range and HF Receiver (ARC-5)	1-25
RC-45J Configuration	8-1
Receiver	
AN/ARN-30, Omni Range	1-27
(ARC-5), HF	1-25
Receptacle, External Power	1-15
Records and Reports	
Red Lights, Instrument	1-38
Re-evaluation, NATOPS	10-1
Regulator	
oxygen	1-33
voltage	1-14*
Release Handle, Main Entrance Door	
Emergency	1-40
Relief Tube	1-41
Requirements, Flight Crew	2-3
Rheostat Knob, Propeller Anti Icer	1-37
Rudder Trim	1-16
Rules, Flight Test Safety	2-3

S

Safe Single Engine Configuration/Weight	5-3*
Safety Rules, Flight Test	2-3
Scheduling	3-2
Secure Checklist, Ground	3-12
Selector	
switch, fuel level gage	1-13
valve, fuel tank	1-13
Sequence, Fuel Tank	1-13
Service Requirements	1-42

Servicing Data	1-43*
Shock Strut Extension, Landing Gear	1-44
Shoulder Harness Inertia Reel	1-40
lock	1-39*
Shut Down, Engine	6-5
Shutters, Oil Radiator	1-9
Silencer Switch, Warning Horn	1-19
Single-Engine Go-Around	5-10
landing	5-9, 5-10*
Slaved Gyro Magnetic Compass	1-23
Smoke and Fume Elimination	5-5
(Solenoid) Emergency Release, Landing	
Gear Handle	1-19
Spark Plugs	1-44
Special Mission	3-2
Speeds, Stall	4-3*
Spins	4-4
Stability and Control	4-2
Stall Characteristics	4-2
speeds	4-3*
Standard Rate Turns	4-4
(Standby) Compass, Magnetic	1-21
Starter Switch	1-8
engines	6-3
Starting System	1-8
Static Pressure System, Pitot	1-20
Strut Extension, Landing Gear Shock	1-44
Subpanels and Control Pedestal (Typical)	
UC-45J	1-4*
RC-45J	1-5*
Switch, Fuel Level Gage Selector	1-13
individual engine magneto	1-8
master ignition	1-8
starter	1-8
Syllabus, Flight Training	2-2
ground training	2-1

T

Tachometer	1-8
Tail Deicing System	1-35
Tail Wheel Lock/Unlock Handle	1-20
Take-Off	3-7, 6-4, 6-5
chart	11-8*
crosswind chart	3-8, 11-7*
emergencies	5-2
minimum run	3-8
night	3-8
obstacle clearance	3-8
Taxi	3-5, 6-3
Temperature Indicator, Cylinder Head	1-8
oil	4-2
outside air	1-21
Test Flight	2-3
pilot qualification	2-3
(T-Handle) Heating Control Valve	1-31
Throttles, Engine	1-3
Throttle Friction Lock	1-3
Thunderstorms	6-1
Tires	1-44
Touch and Go Landing Technique	3-10
Training Syllabus, Flight	2-2
ground	2-1
Transmitter, HF	1-25

T

Trim Tab Wheel, Elevator	1-15*, 1-16
Tube, Relief	1-41
Turbulence and Thunderstorms	6-1
Turbulent Air, Approaching	6-1
Turbulent Air Penetration	1-49
Turn and Slip Indicator	1-21
Turns, Standard Rate	4-4

U

Unfeathering, Propeller	1-9
Use of Charts	11-2

V

Vacuum	
gages	1-20
supply, camera	1-21
system	1-20
system indicators	1-20
warning light	1-21
Ventilating	
air control valve	1-33
air outlets	1-33
heating system	1-32*
system	1-31, 1-32
system operation	1-33
Vertical	
photography	8-2
speed indicator	1-21

Voltage Regulators	1-14*
------------------------------	-------

W

Warm-Up, Engine	6-3
Warning Horn	
landing gear	1-19
silencer switch	1-19
Warning Light	
landing gear	1-19
vacuum	1-21
Wave-Off	3-10
Weather Operation, Cold	6-2
Weight Limitations, Gross	1-49
(Wheel Brake) Hydraulic System	1-20, 1-42
Windows	1-41
Windshield Wiper	
system	1-37
switch	1-37
Wing Flap	
and tail deicing system	1-35
controls	1-18
emergency handcrank	1-18
emergency operation	5-6
lever	1-18
position indicator	1-18
system	1-17
Wobble Pump	1-13
Worksheet, NATOPS Evaluation	10-5*

Y

Yellow Sheets	3-2
-------------------------	-----