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INTRODUCTION

The purpose of this section is to present the owner or operator with information needed to facilitate planning of flights with reasonable accuracy.

The Performance Data and charts presented herein are calculated, based on actual flight tests with the air plane and engine in good condition and the engine power control system properly adjusted.

The flight test data has been corrected to International Standard Atmosphere conditions and then expanded analytically to cover various airplane gross weights, operating altitudes, and outside air temperatures.

VARIABLES

It is not possible to make allowances in the charts for varying levels of pilot technique, proficiency or environmental conditions. Mechanical or aerodynamic changes are not authorized because they can affect the performance or flight characteristics of the airplane. The effect of such things as soft run ways, sloped run ways, winds aloft or airplane configuration changes must be evaluated by the pilot. However, the performance on the charts can be duplicated by following the stated procedures in a properly maintained, standard MOONEY M20M.

Examples are given to show how each chart is used. The only charts with no example are those where such an example of use would be repetitive.

To obtain effect of altitude and OAT on aircraft performance:

1. Set altimeter to 29.92 and read "pressure altitude".
2. Using the OAT grid for the applicable chart read the corresponding effect of OAT on performance.

~ CAUTION ~

Be sure to return to local altimeter setting in calculating aircraft elevation above sea level.

OPERATIONAL PROCEDURES FOR MAXIMUM FUEL EFFICIENCY

For maximum fuel efficiency on the M20M, proper mixture leaning during cruise flight must be accomplished. The Textron-Lycoming TIO-540-AF1A or AF1B engine in the M20M has been designed to attain maximum fuel efficiency at desired cruise power and peak TIT (turbine inlet temperature). Best power mixture (at 34 in. Hg./2400 RPM) has been determined to be 1650°F (898°C) TIT. TIT is usually a more accurate indication of engine operation and fuel burn than using only indicated fuel flow. It is recommended that the mixture be set using TIT and all engine gauges as reference instead of setting to one particular instrument.

The following procedure is recommended for setting cruise power and leaning to recommended TIT.

1. After leveling off, set manifold pressure and RPM for the desired cruise power settings (as shown in this SECTION). At this point, mixture is at full rich from the climb.
2. Slowly move mixture control toward lean while observing TIT indicator. If leaning mixture toward peak TIT causes the original manifold pressure setting to change, adjust throttle to reset the desired cruise manifold pressure and continue leaning. Continue this procedure until TIT peaks (not to exceed 1750°F (954°C)). Peak TIT is defined as that point where further leaning causes a drop rather than a rise in TIT, or until best power TIT is obtained (whatever is desired). Several throttle and mixture adjustments may be required before peak TIT and the desired cruise manifold pressure are obtained.
3. Under conditions of high outside air temperatures and high power, peak TIT may be found to be in excess of 1750°F (954°C). If that is found to be the case, the leanest allowable condition for operation will be at 1750°F (954°C) TIT.

NOTE

When operating above 22,000 feet, and at manifold pressures above 32 in. Hg. only best power mixture (1650°F (898°C) TIT or richer is permitted.

PERFORMANCE CONSIDERATIONS

RANGE and ENDURANCE ASSUMPTIONS

Range and endurance allowance is based on climbing at maximum continuous power to cruise altitude.

Range and endurance reserves of 45 minutes at cruise power have been allowed for. Other conditions used for Range and Endurance are listed on each chart.

OPTIONAL PROPELLER DE-ICE BOOTS

With the optional propeller de-ice boots installed, expect climb performance to be degraded approximately 50 FPM from what is presented in the manual.

LANDING GEAR DOORS

When snow and ice are likely to be present on taxi and runway surfaces, in board landing gear doors should be removed. Accumulation of ice and snow could prevent landing gear operation. If in board landing gear doors are removed, a decrease in cruise speed and range can be expected and should be considered in preflight planning. To be conservative the following figures should be used:

Decrease of true air speed at normal cruise power setting by approximately 5 KTAS.

USE OF COWL FLAPS

When in level cruise flight, with outside air temperatures well above standard or when cruising at very high altitudes, it may be necessary to open the cowl flaps to keep engine temperatures in the normal operating range. Since the cowl flaps in the M20M are multi-position, numerous open settings are available to keep cylinder head and oil temperatures in the green arc under the most adverse conditions.

Using the cowl flaps position indicator as a reference, the following cowl flaps open positions are given along with their effects on cruise speed:

Cowl flaps closed to cowl flap 1/2 open:

(Indicator positioned at second index)

Approximate loss in TAS 2.5 KTS

An approximate adjustment to the range data shown in this manual can be made based on the flight time planned with the cowl flaps partially open. For example, using the above speed decrement for the cowl flap 1/2 open for a 5 hour flight will result in the following decrease in range:

5 HR X 2.5 KTS = 12.5 N.M. reduction in range.

MISSION PROFILE CHARTS

The Mission Profile Charts are presented as a flight planning aid. They can provide information to assist in the selection of altitude and power setting to fly as well as provide the flight time and fuel to fly a given distance.

The charts are based on the following:

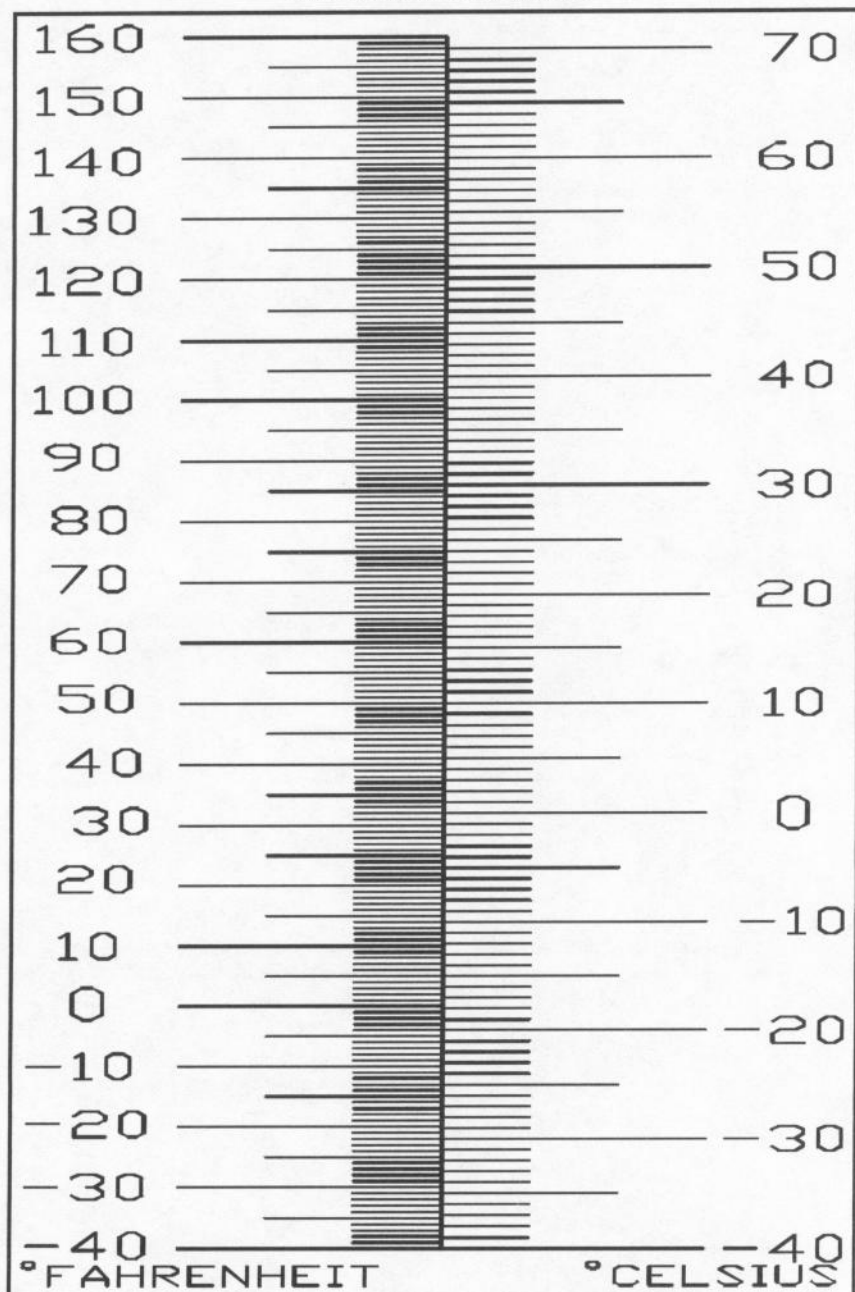
- Fuel used to war mup, taxi and take off.
- Time and fuel to climb at maximum power.
- Time and fuel to cruise at the specified power setting.
- Cruise with gear and flaps UP.
- Time and fuel to descend at 750 FPM at 150 KIAS.
- Zero wind.
- Gross weight.

~ CAUTION ~

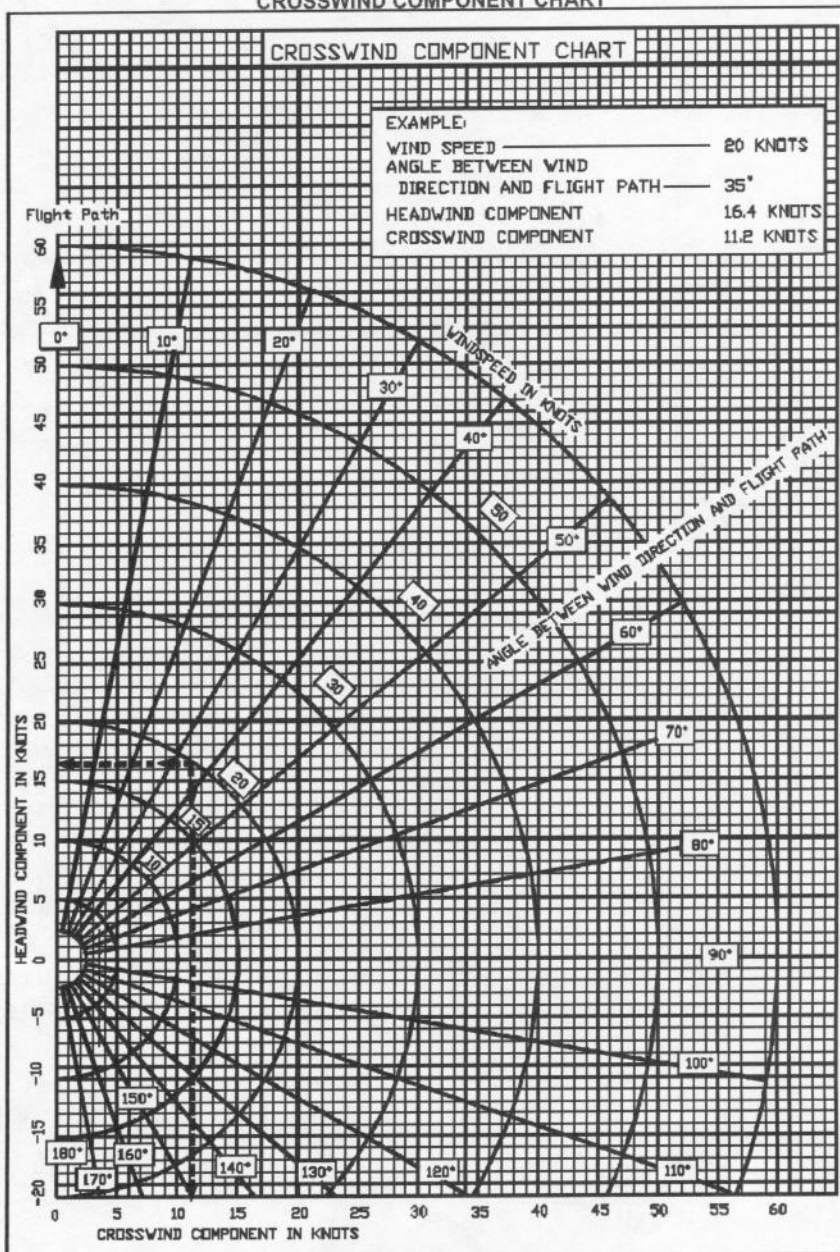
Zero wind conditions seldom occur. In addition, varying atmospheric conditions, aircraft weight, the mechanical condition of the aircraft and piloting techniques all affect the actual flight time and fuel used during a flight.

It is the pilot's responsibility to determine the actual operating conditions and plan the flight accordingly.

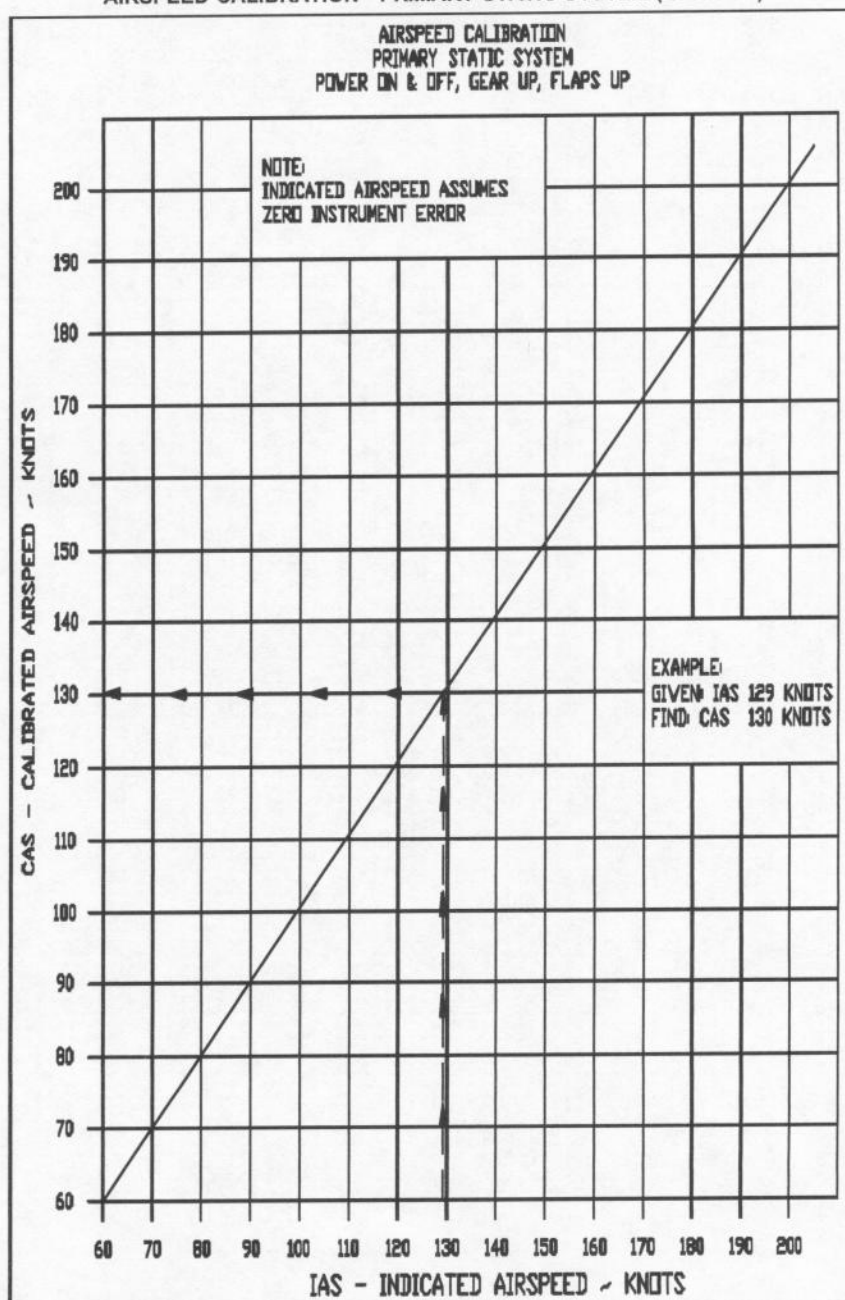
TEMPERATURE CONVERSION



CROSSWIND COMPONENT CHART



AIRSPEED CALIBRATION - PRIMARY STATIC SYSTEM (GEAR UP)



AIRSPEED CALIBRATION - PRIMARY STATIC SYSTEM (GEAR DN)

AIRSPEED CALIBRATION
PRIMARY STATIC SYSTEM
GEAR AND FLAPS DOWN

EXAMPLE:

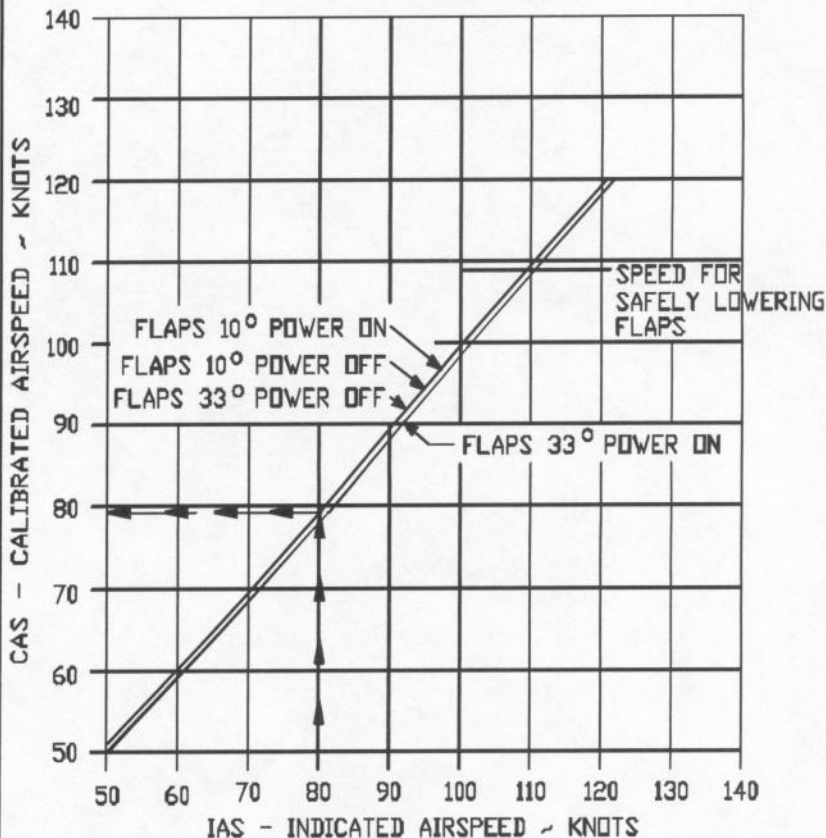
GIVEN: IAS 80 KTS

FLAPS 10

POWER OFF

FIND: CAS 79 KTS

NOTE: INDICATED AIRSPEED ASSUMES
ZERO INSTRUMENT ERROR



AIRSPED CALIBRATION - ALTERNATE STATIC SYSTEM

CIAS	GEAR & FLAPS UP CIAS	GEAR & FLAPS DN (10°) CIAS	GEAR & FLAPS DN (33°) CIAS
50	3.0	0.0	-1.0
60	1.5	-1.2	-2.0
70	0.0	-2.2	-3.2
80	-1.8	-3.2	-4.5
90	-2.8	-4.0	-6.0
100	-3.0	-4.7	-7.4
110	-3.0	-5.4	-8.8
120	-3.0	-	-
130	-3.6	-	-
140	-4.5	-	-
150	-5.1	-	-
160	-5.6	-	-
170	-6.1	-	-
180	-6.5	-	-
190	-7.2	-	-
200	-7.9	-	-

NOTE: The mi nus sign in di cates sub trac tion of the given num bers from CIAS to ob tain the cor rected air speed.

CONDITIONS: Power- ON, Storm Win dow & Vents - CLOSED,
Heater & De froster - ON or OFF

ALTIMETER CORRECTION - PRIMARY STATIC SYSTEM

KIAS	SEA LEVEL			12,500 FT.			25,000 FT.		
	Gear- Flaps UP	GearUp 10° Flaps	GearDn/ 33° Flaps	Gear- Flaps UP	GearDn/ 10° Flaps	GearDn/ 33° Flaps	Gear/ Flaps UP	GearDn/ 10° Flaps	GearDn/ 33° Flaps
50	-2	4	-3	-4	7	-4	-5	10	-5
60	-3	3	-5	-4	4	-7	-7	7	-10
70	-3	-2	-9	-5	-3	-13	-8	-4	-20
80	-4	-8	-14	-6	-12	-20	-9	-17	-30
90	-8	-11	-19	-12	-17	-28	-18	-25	-43
100	-6	-11	-22	-9	-16	-33	-13	-24	-50
110	2	-5	-23	2	-7	-33	4	-11	-51
120	9	—	—	13	—	—	20	—	—
130	21	—	—	31	—	—	47	—	—
140	23	—	—	33	—	—	51	—	—
150	15	—	—	22	—	—	33	—	—
160	12	—	—	17	—	—	26	—	—
170	9	—	—	13	—	—	26	—	—
180	8	—	—	12	—	—	18	—	—
190	10	—	—	14	—	—	22	—	—
200	12	—	—	18	—	—	27	—	—

NOTE: The minus sign indicates subtraction of the given numbers from the indicated pressure altitude to obtain correct altitude, assuming zero instrument error.

EXAMPLE:

KIAS = 110

FLAPS = 10°

INDICATED PRESSURE ALTITUDE: 12,500 ft.

ALTIMETER CORRECTION: -7 ft.

(Subtract from Indicated Altitude)

PRESSURE ALTITUDE: =12,493 ft.

**ALTIMETER CORRECTION - ALTERNATE STATIC
SYSTEM**

	SEA LEVEL		12,500 FT.		25,000 FT.	
KIAS	GEAR UP FLAPS UP	GEAR & FLAPS DN 10° / 33°	GEAR UP FLAPS UP	GEAR & FLAPS DN 10° / 33°	GEAR UP FLAPS UP	GEAR & FLAPS DN 10° / 33°
50	13	0 / -4	20	0 / -7	30	0 / -10
60	8	-6 / -11	12	-9 / -16	18	-14 / -24
70	0	-14 / -20	0	-20 / -29	0	-31 / -45
80	-13	-23 / -32	-19	-34 / -47	-29	-51 / -72
90	-23	-32 / -48	-33	-47 / -71	-50	-72 / -108
100	-27	-42 / -66	-39	-62 / -97	-68	-94 / -148
110	-30	-53 / -87	-43	-78 / -127	-66	-119 / -194
120	-32	- -	-48	- -	-72	- -
130	-53	- -	-77	- -	-118	- -
140	-57	- -	-84	- -	-127	- -
150	-69	- -	-102	- -	-155	- -
160	-82	- -	-128	- -	-182	- -
170	-95	- -	-139	- -	-211	- -
180	-107	- -	-158	- -	-248	- -
190	-126	- -	-185	- -	-282	- -
200	-146	- -	-215	- -	-327	- -

NOTE: The minus sign indicates subtraction of the given number from the indicated altitude to obtain the corrected altitude.

CONDITIONS: Power -ON, Vents & Storm Window - CLOSED,
Heater & Defroster - ON or OFF.

STALL SPEED VS ANGLE OF ATTACK

STALL SPEED VS. ANGLE OF BANK									
ASSOCIATED CONDITIONS: FORWARD C.G. POWER IDLE NOTE: UP TO 500 FEET ALTITUDE LOSS MAY OCCUR DURING STALLS AT MAXIMUM WEIGHT									
WEIGHT LANDING GEAR FLAPS ANGLE OF BANK STALL SPEED									
3000 LBS (1361 KGS) DOWN 10°									
72.5 KCAS (73.0 KIAS)									
GROSS WEIGHT	GEAR AND FLAP POSITION	ANGLE OF BANK							
		0°		30°		45°		60°	
		KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS
3368 LBS (1528 KGS)	GEAR UP, FLAPS 0°	66.0	66.5	71.0	71.5	78.5	79.0	93.5	94.0
	GEAR DOWN, FLAPS 10°	64.5	64.5	69.5	69.5	76.5	77.5	91.0	92.0
	GEAR DOWN, FLAPS 33°	59.0	59.0	63.5	63.5	70.0	70.0	83.5	84.5
3000 LBS (1361 KGS)	GEAR UP, FLAPS 0°	62.5	63.0	67.0	67.5	74.5	75.0	88.5	89.5
	GEAR DOWN, FLAPS 10°	61.0	61.0	65.5	65.5	72.5	73.0	86.5	87.5
	GEAR DOWN, FLAPS 33°	55.5	55.5	59.5	59.5	66.0	66.0	78.5	79.5
2700 LBS (1225 KGS)	GEAR UP, FLAPS 0°	59.0	59.5	63.5	64.0	70.0	70.5	83.5	84.0
	GEAR DOWN, FLAPS 10°	58.0	58.0	62.5	62.5	69.0	69.0	82.0	83.0
	GEAR DOWN, FLAPS 33°	53.0	53.0	57.0	57.0	63.0	63.0	75.0	76.0

TAKEOFF DISTANCE - HARD SURFACE

TAKEOFF DISTANCE

TAKEOFF WEIGHT - LBS (KGS)	TAKEOFF SPEED KIAS	SPEED AT 50 FT. - KIAS
3368 LBS (1528 KGS)	56	80
3089 LBS (1400 KGS)	64	78
2700 LBS (1225 KGS)	59	74

NOTE: 1) MAXIMUM DEMONSTRATED CROSSWIND IS 13 KNOTS.
2) CONDITIONS OF HIGH HUMIDITY CAN RESULT IN AN INCREASE OF UP TO 10% TO THE TAKEOFF DISTANCE.

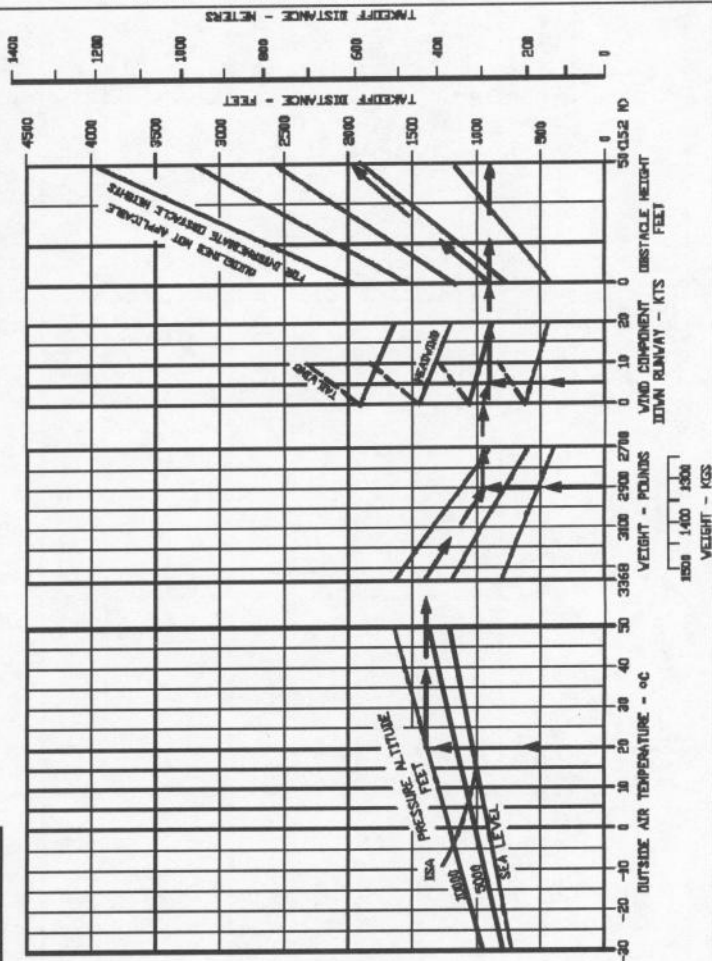
ASSOCIATED CONDITIONS:

POWER FULL THROTTLE/2575 RPM
LANDING GEAR DOWN UNTIL OBSTACLE CLEARED
WING FLAPS 18°
CONV. FLAPS FULL OPEN
RUNWAY SURFACE PAVED
LEVEL, DRY

EXAMPLE:

DAT 20° C
PRESSURE 1000 FT.
ALTITUDE
WEIGHT 2500 LBS (1133 KGS)
HEADWIND 5 KTS
COMPONENT

GROUND ROLL 910 FT. (277 M)
TOTAL TAKEOFF 1950 FT. (594 M)
DISTANCE
50 FT. OBSTACLE



TAKEOFF DISTANCE - GRASS SURFACE

TAKEOFF DISTANCE - GRASS SURFACE

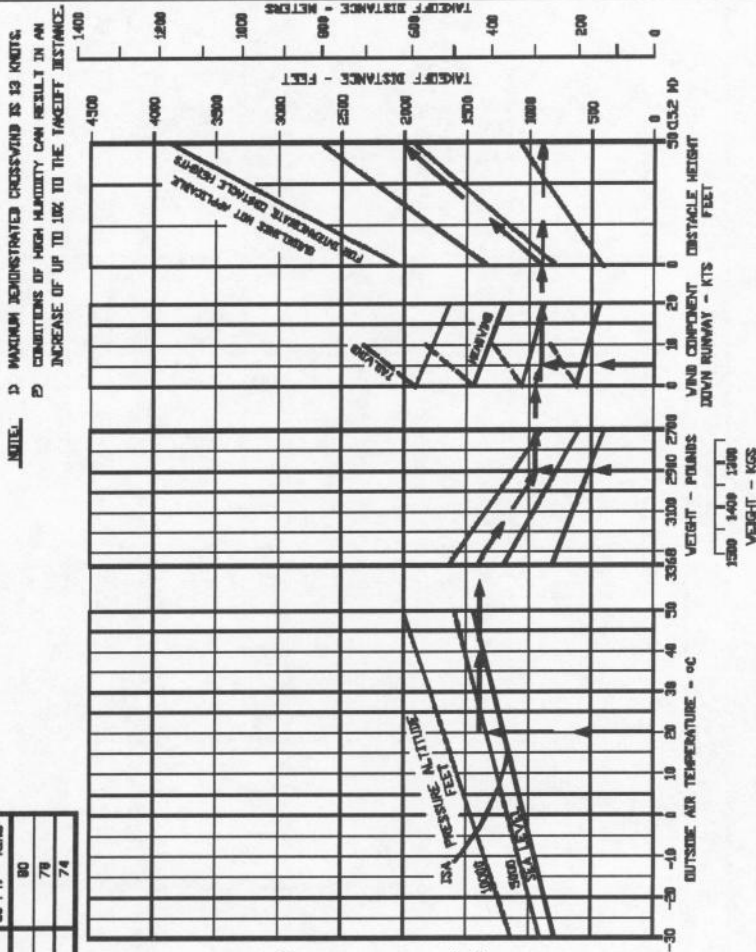
TAKEOFF WEIGHT - LBS (KGS)	TAKEOFF SPEED KIAS	SPEED AT 50 FT. - KIAS
2360 LBS (1080 KGS)	66	80
3180 LBS (1450 KGS)	64	78
3700 LBS (1680 KGS)	59	74

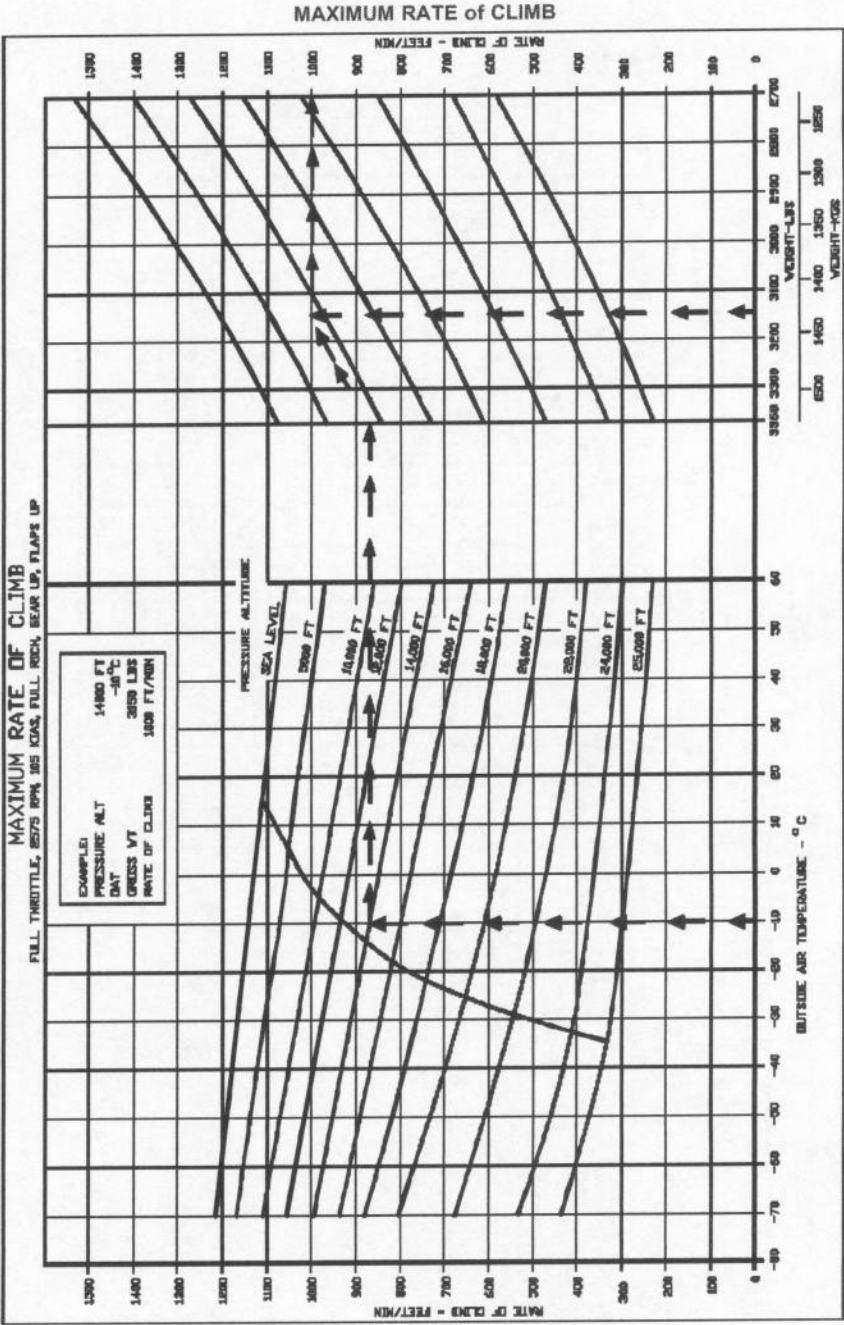
ASSOCIATED CONDITIONS:

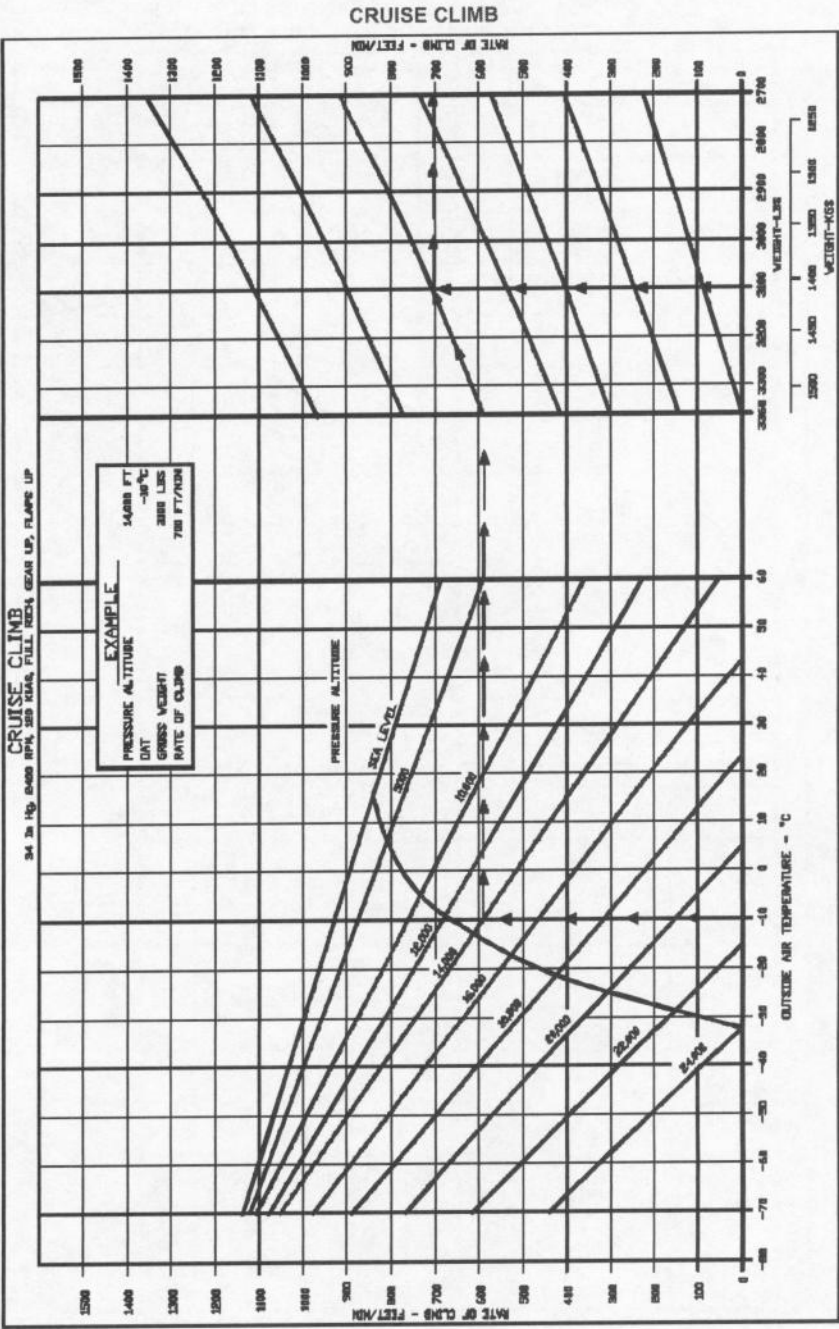
POWER FULL THROTTLE/2575 RPM
LANDING GEAR DOWN UNTIL
OBSTACLE CLEARED
WING FLAPS 10°
CONFLAPS FULL UP
RUNWAY SURFACE SHORT DRY GRASS LEVEL

EXAMPLE:

DAT 29° C
PRESSURE 6889 FT.
ALTITUDE 2900 LBS (1285 KGS)
WEIGHT 5 KTS
HEADWIND COMPONENT
GROUND ROLL 580 FT. (274 M)
TOTAL TAKEOFF 2880 FT. (650 M)
DISTANCE
50 FT. OBSTACLE

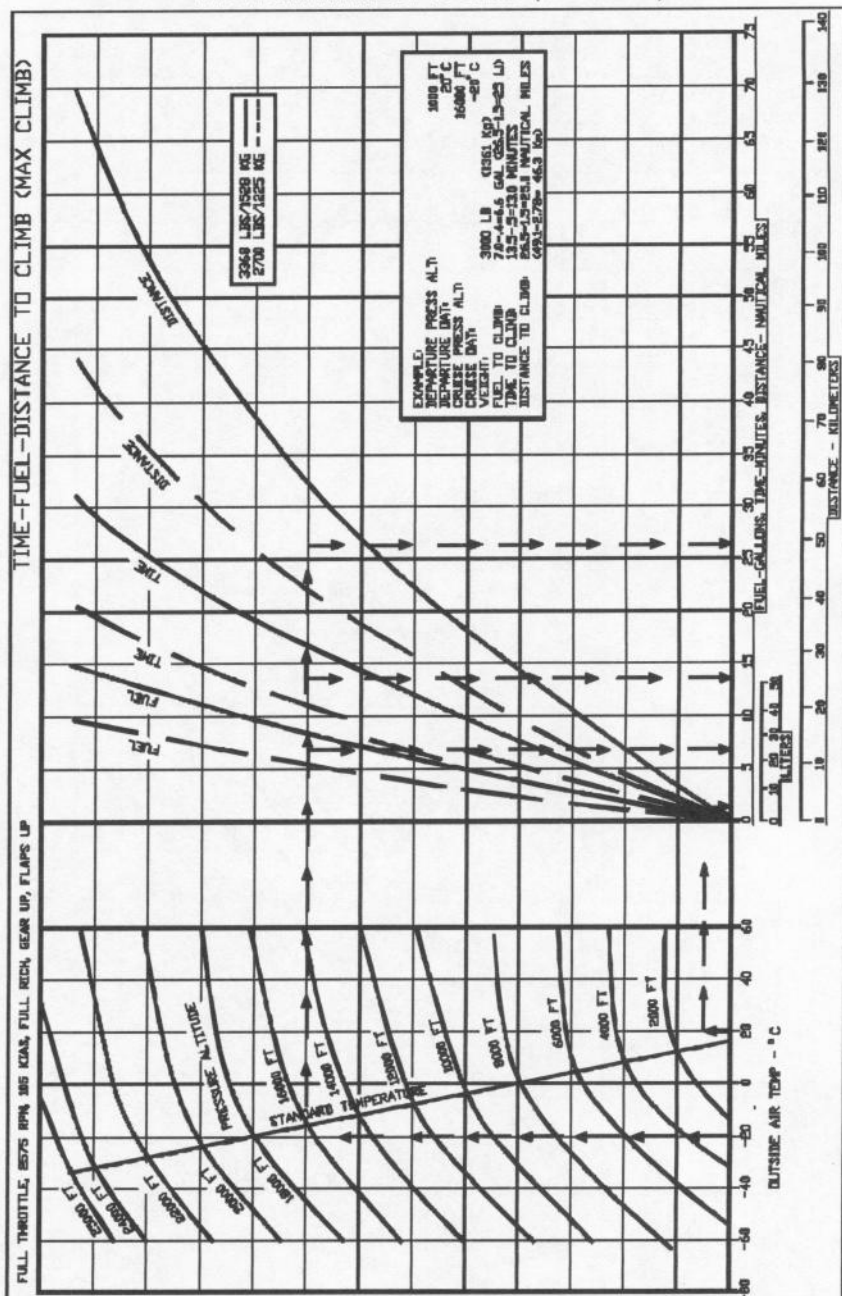




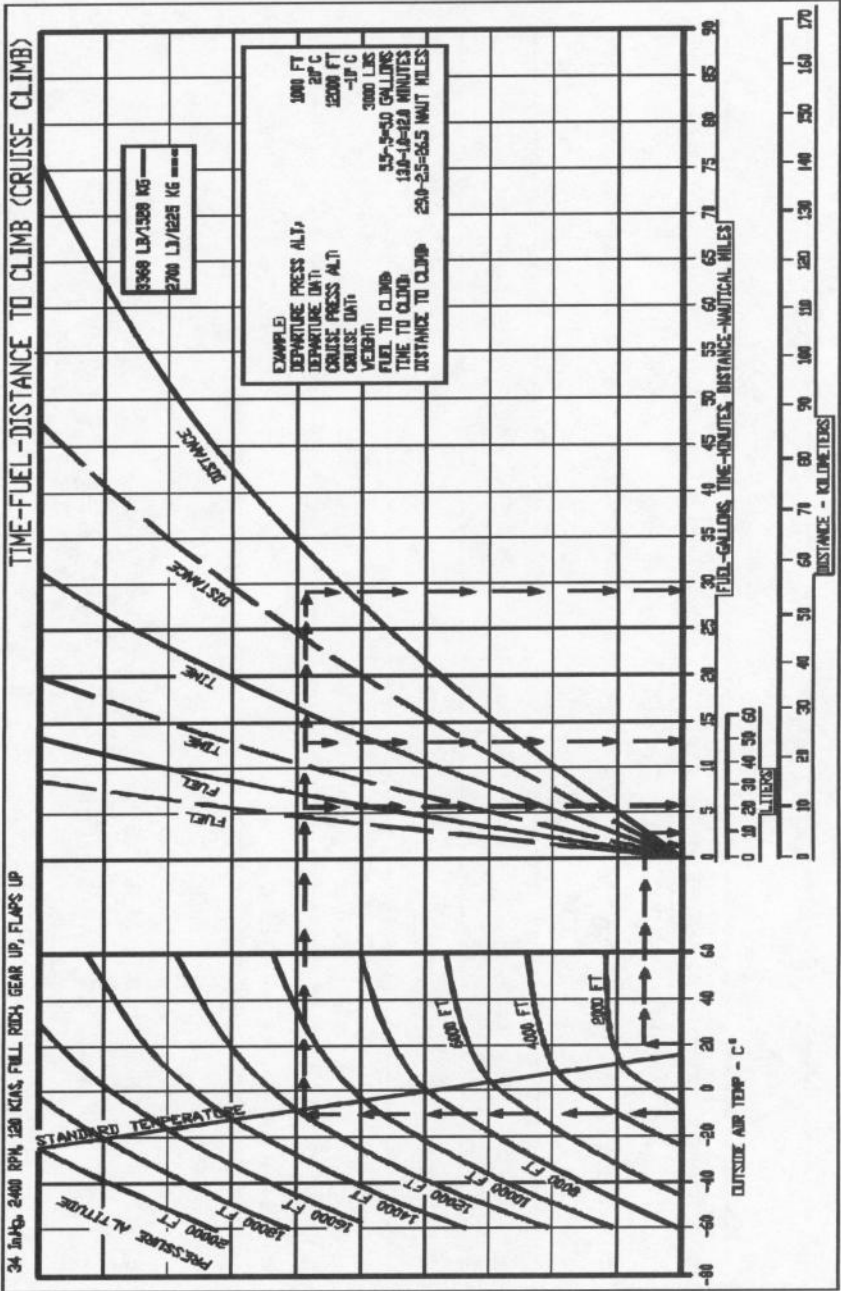


MOONEY
M20M

TIME-FUEL-DISTANCE TO CLIMB (MAX CLIMB)



TIME-FUEL-DISTANCE TO CLIMB (CRUISE CLIMB)



CRUISE POWER SETTINGS AND FUEL FLOWS

M20M CRUISE POWER SETTINGS & FUEL FLOWS
STANDARD DAY CONDITIONS

ALTITUDE	DAT C	34"/2400 RPM		32"/2400RPM PEAK TIT	27"/2200 RPM PEAK TIT	24"/2200 RPM PEAK TIT
		BEST POWER	PEAK TIT			
0	15	19.6	16.3	15.3	11.4	9.8
5000	5	20.1	17.0	16.0	12.3	10.7
10000	-5	20.4	17.4	16.4	12.8	11.3
15000	-15	20.6	17.5	16.5	13.1	11.7
20000	-25	20.6	17.6	16.6	13.3	12.0
25000	-35	20.5	---	16.6	13.3	12.1

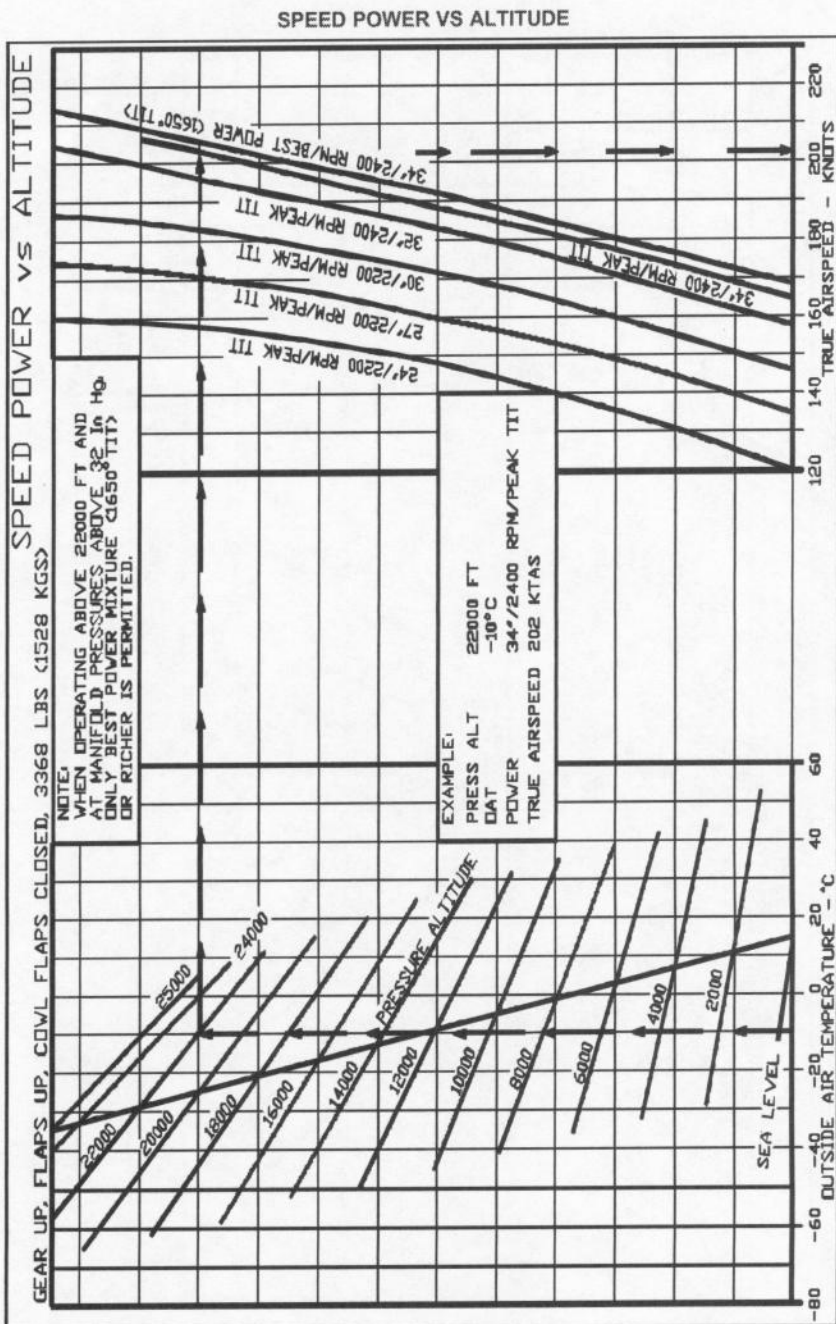
NOTE: 1) PEAK TIT INDICATES PEAK TIT OR 1750 DEGREES F TIT.

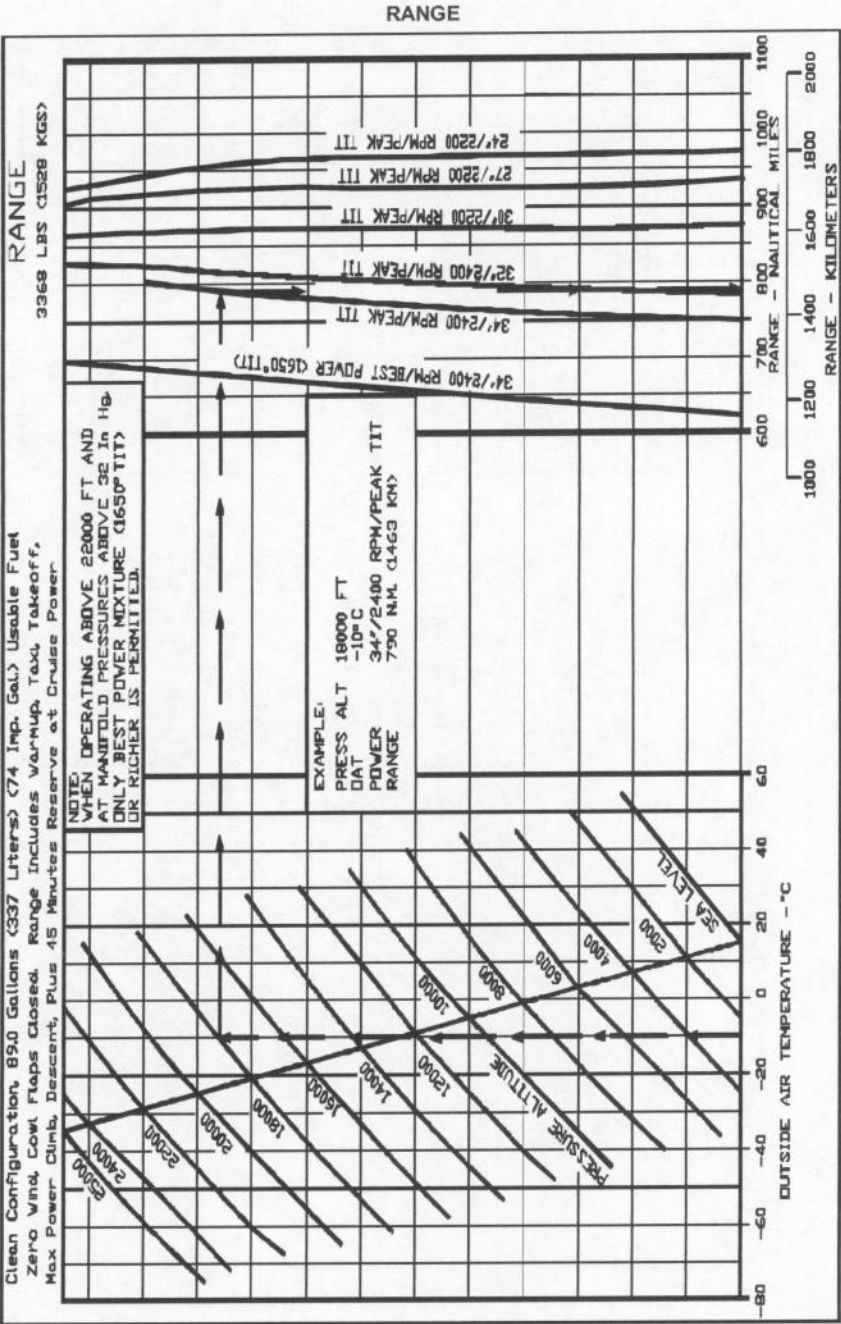
2) BEST POWER (AT 34 In. Hg./2400 RPM) IS 1650 DEGREES F TIT.

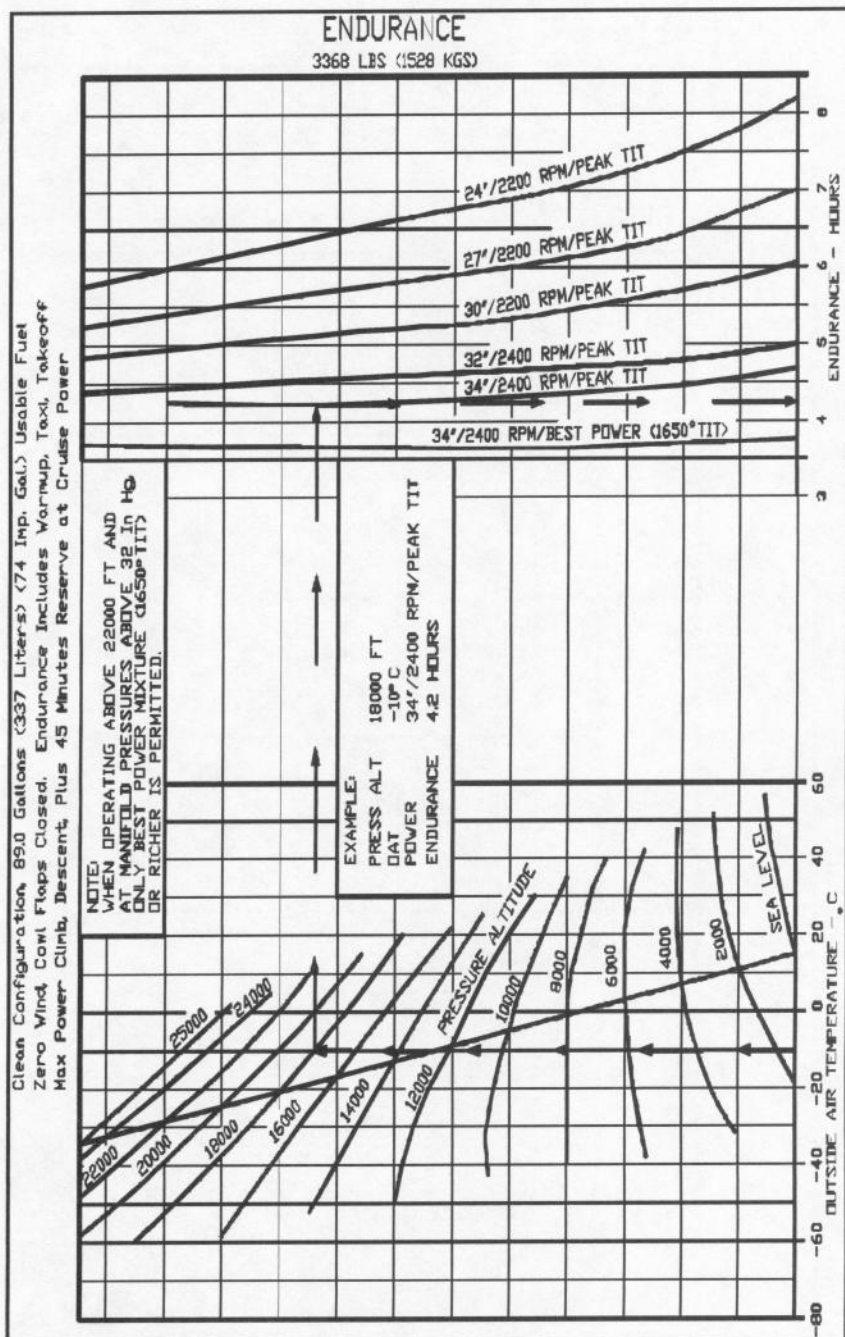
3) WHEN OPERATING ABOVE 22000 FEET, AND AT MANIFOLD PRESSURES ABOVE 32 In. Hg., ONLY BEST POWER MIXTURE (1650 DEG. F TIT) OR RICHER IS PERMITTED.

4) CRUISE FUEL FLOWS DECREASE APPROX. .5 GPH FOR EACH 20 DEG. C ABOVE STANDARD TEMPERATURE.

5) CRUISE FUEL FLOWS INCREASE APPROX. .5 GPH FOR EACH 20 DEG. C BELOW STANDARD TEMPERATURE.







TIME-FUEL-DISTANCE TO DESCEND 150 KIAS DESCENT SPEED

ASSOCIATED CONDITIONS:

POWER: 2000 RPM/MAP AS REQ'D TO MAINTAIN
750 FPM RATE OF DESCENT

LANDING GEAR: UP

FLAPS: UP

COWL FLAPS: CLOSED

MIXTURE: PEAK TIT (DO NOT EXCEED 1750°F TIT)

EXAMPLE:

INITIAL PRESSURE ALT: 18000

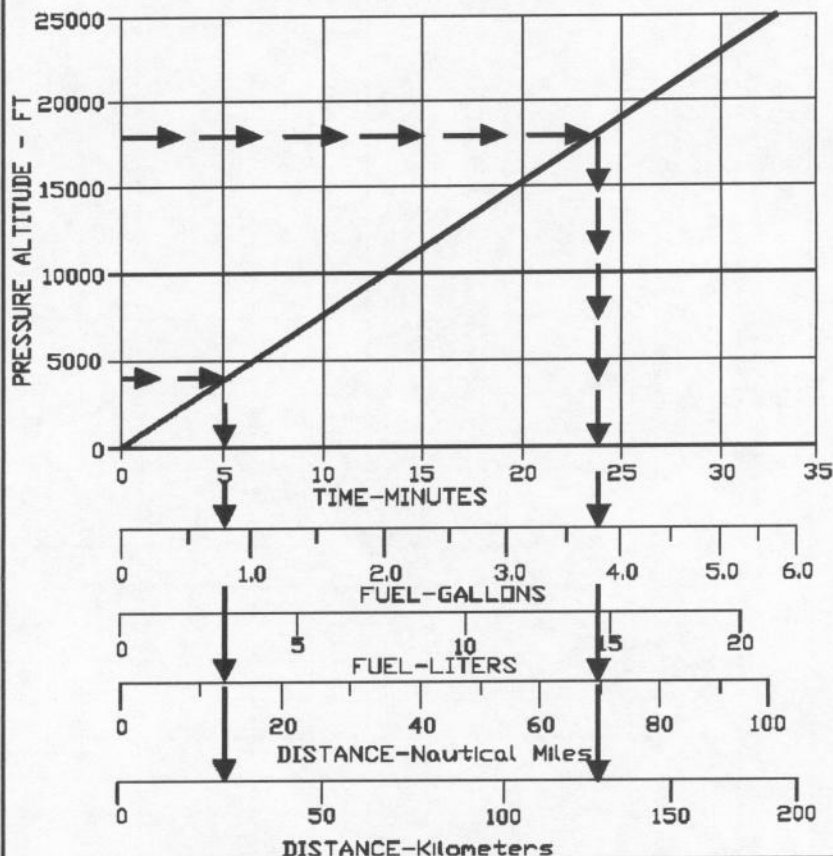
FINAL PRESSURE ALT: 4000

TIME TO DESCEND: $24.0 - 5.0 = 19$ MINUTES

FUEL TO DESCEND: $3.8 - 0.8 = 3.0$ GALLONS ($14.39 - 3.03 = 11.36$ LI)

DISTANCE TO DESCEND: $69.0 - 13.0 = 56.0$ NAUTICAL MILES

($127.79 - 24.08 = 103.71$ Km)



LANDING DISTANCE

LANDING WEIGHT - LBS (KGS)	APPROACH SPEED KIAS
2800 (1262)	73
2900 (1313)	71
3000 (1365)	68

ASSOCIATED CONDITIONS:

POWER
LANDING GEAR
WING FLAPS
RUNWAY SURFACE
BRAKING

TITLE
IDMAN
FULL IDMAN (30°)
PAVED LEVEL, DRY
MAXIMUM

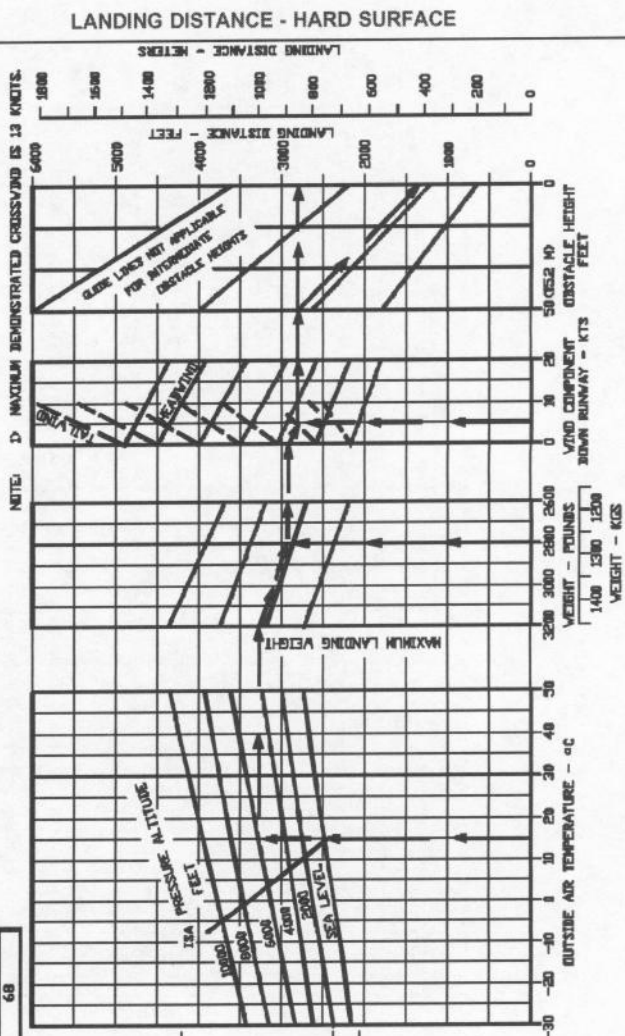
EXAMPLE:

DATE
PRESSURE
ALTITUDE
WEIGHT
HEADWIND
COMPONENT

25 °C
6000 FT.
2800 LBS (1270 KGS)
5 KTS

GROUND ROLL
TOTAL LANDING
DISTANCE

1300 FT. (411 M)
2800 FT. (853 M)
450 FT. (137 M)

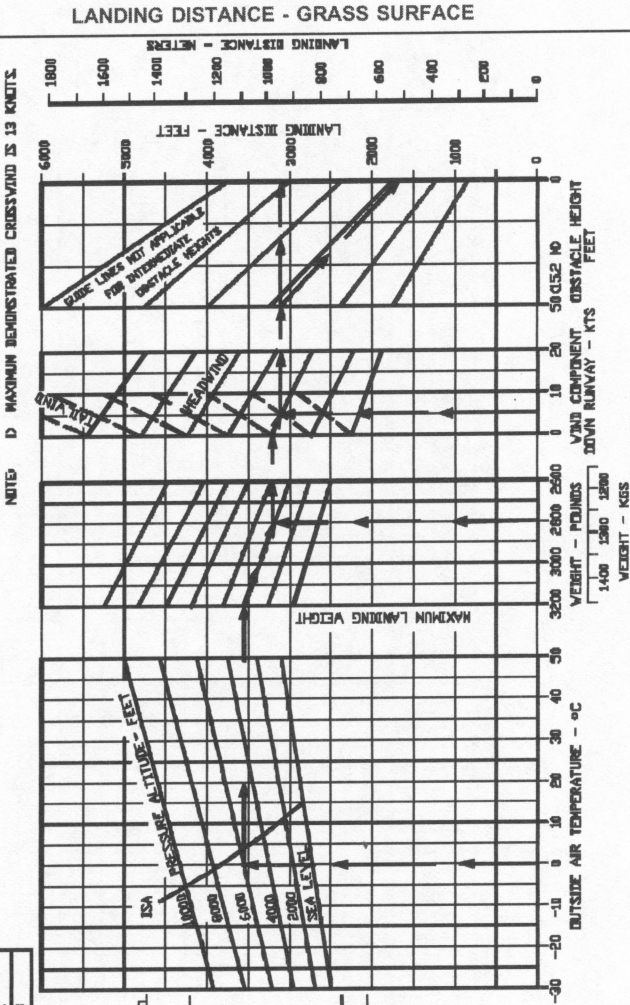


LANDING DISTANCE - GRASS SURFACE

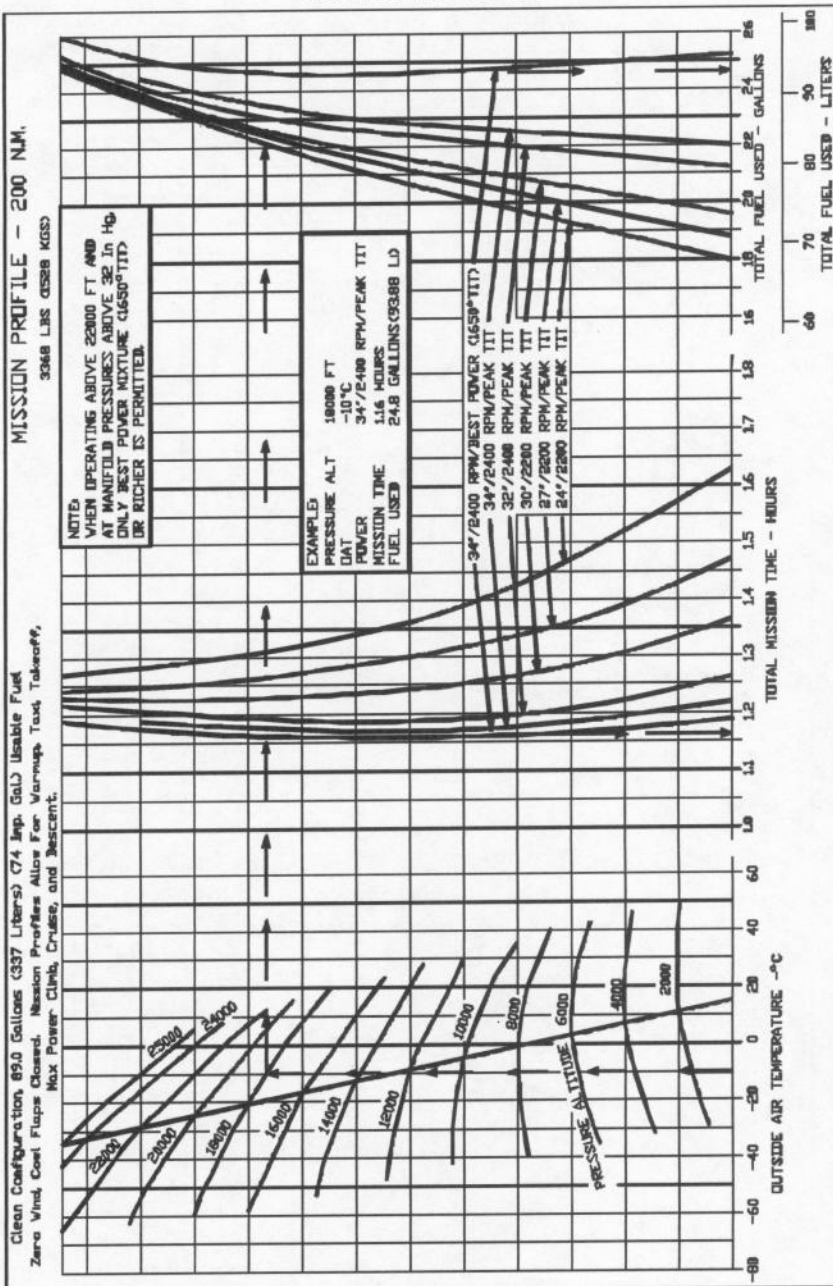
LANDING WEIGHT - LBS OGS	APPROACH SPEED KIAS
3000 (1480)	75
2500 (1305)	71
2000 (1175)	68

ASSOCIATED CONDITIONS:
POWER
LANDING GEAR
WING FLAPS
RUNWAY SURFACE
BRAKING
TLE
DOWN
FULL DOWN (23°)
SHIRT DRY GRASS, LEVEL
MAXIMUM

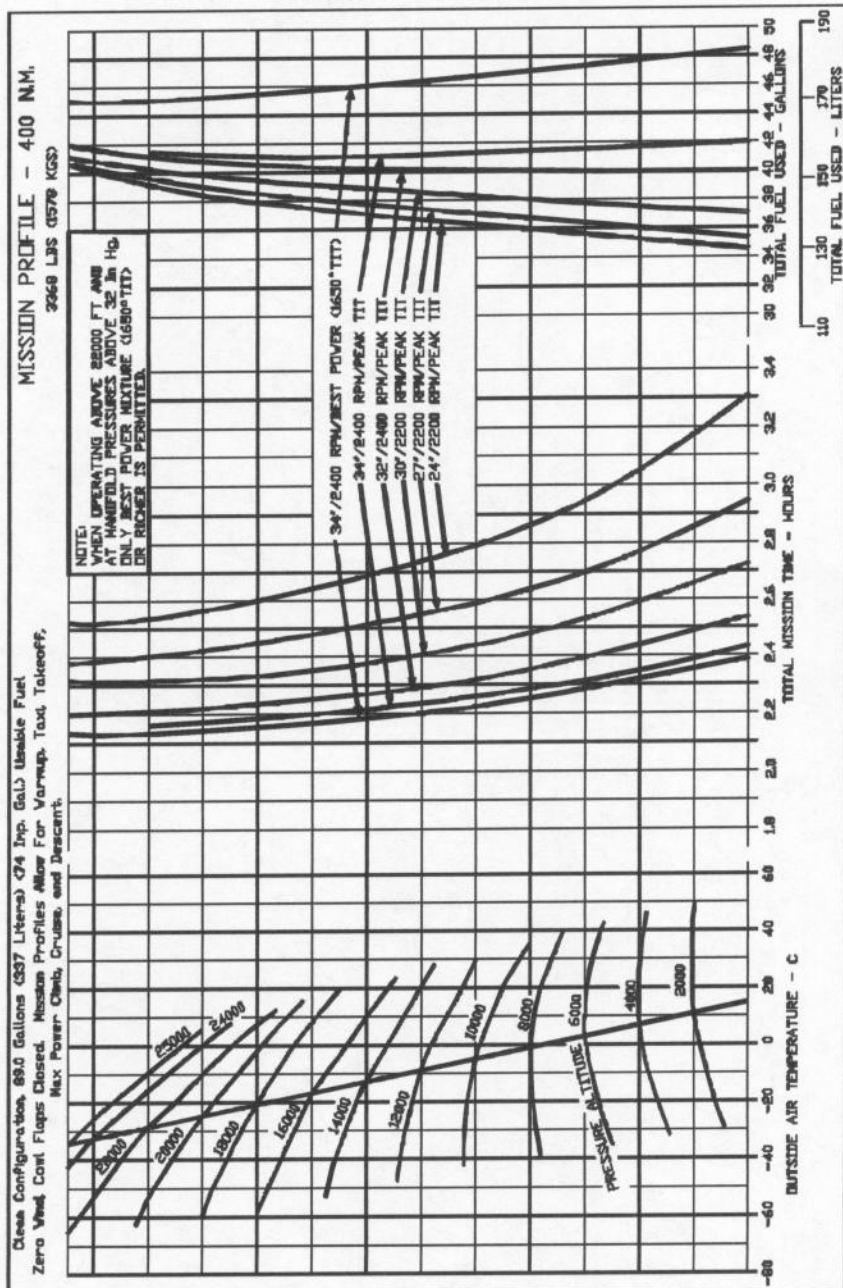
EXAMPLE:
DAY
PRESSURE
ALTITUDE
WEIGHT
HEADWIND
COMPONENT
GROUND ROLL
TOTAL LANDING
DISTANCE
1650 FT. (503 M)
3160 FT. (964 M)
630 FT. (192 M)



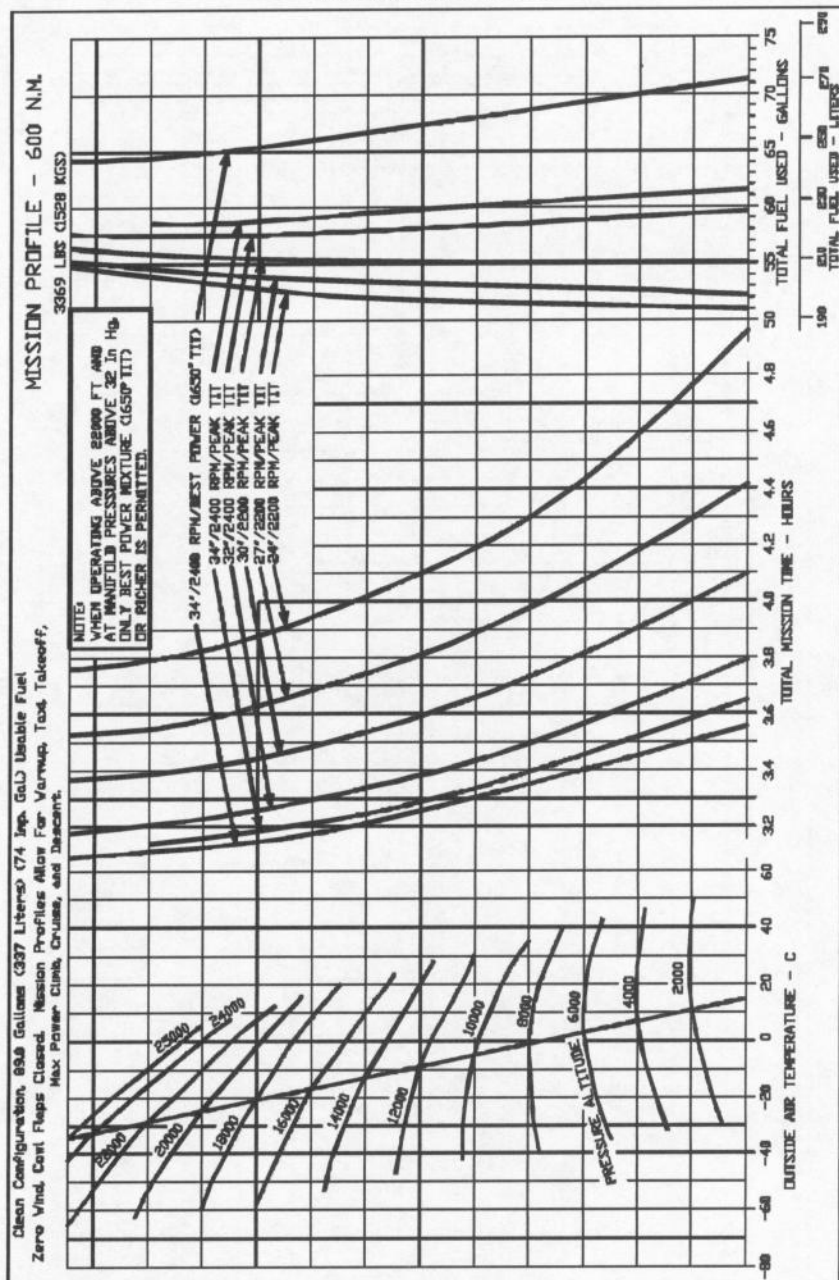
MISSION PROFILE - 200



MISSION PROFILE - 400



MISSION PROFILE - 600



MISSION PROFILE - 800

