MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962

CLIMB POWER SETTINGS

850 BRAKE HORSEPOWER SETTINGS
AUTO RICH

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

PRESSURE ALTITUDE (FEET)	MANIFOLD PRESSURE (IN. Hg) AT CARBURETOR AIR TEMPERATURE (°C)						RPM	FUEL FLOW LB/HR	
	-20°	-10°	0°	+ 10°	+ 20°	+ 30°		PER ENG	2 ENG
20,000									
19,000									
18,000									
17,000									
16,000									
15,000									
14,000									
13,000									
12,000									
11,000									
10,000	33.7	34.3							
9,000	33.7	34.4	34.8	35.3	35.7	36.1			
8,000	33.8	34.4	34.8	35.4	35.8	36.2			
7,000	33.8	34.5	34.9	35.5	35.9	36.3	2350	500	1000
6,000	33.8	34.5	34.9	35.6	36.0	36.4			
5,000	33.9	34.6	35.0	35.6	36.0	36.4			
4,000	33.9	34.6	35.0	35.7	36.1	36.5			
3,000	34.0	34.7	35.1	35.8	36.2	36.6			
2,000	34.2	34.7	35.2	35.9	36.3	36.7			
1,000	34.3	34.8	35.3	35.9	36.3	36.7			
0	34.4	34.8	35.4	36.0	36.4	36.8			

Figure A2-3. Climb Power Settings

MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962

CONSTANT CRUISE POWER SETTINGS

600 BRAKE HORSEPOWER PER ENGINE

AUTO LEAN

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

PRESSURE ALTITUDE (FEET)	MANIFOLD PRESSURE (IN. Hg) AT CARBURETOR AIR TEMPERATURE (^{o}C)						RPM	FUEL FLOW LB/HR	
	-20^{o}	-10^{o}	0^{o}	$+10^{o}$	$+20^{o}$	$+30^{o}$		PER ENG	2 ENG
20,000									
19,000									
18,000									
17,000									
16,000									
15,000									
14,000									
13,000	27.0	27.6							
12,000	27.1	27.6	28.2	28.7					
11,000	27.2	27.7	28.3	28.8	29.3	29.8			
10,000	27.4	27.9	28.5	29.0	29.5	30.0	2050	265.50	531.00
9,000	29.2	29.8	30.3	29.2	29.7	30.2			
8,000	29.2	29.8	30.3	30.9	31.4	32.0			
7,000	29.2	29.8	30.3	30.9	31.4	32.0			
6,000	29.3	29.9	30.4	31.0	31.5	32.1			
5,000	29.4	29.9	30.5	31.1	31.6	32.1			
4,000	29.5	30.0	30.6	31.2	31.7	32.2	1900	255.00	510.00
3,000	29.5	30.1,	30.7	31.2	31.8	32.3			
2,000	29.7	30.3	30.9	31.4	32.0	32.5			
1,000	29.9	30.5	31.1	31.6	32.2	32.7			
0	30.0	30.6	31.2	31.7	32.3	32.8			

Figure A2-4. Constant Cruise Power Settings, 600 Bhp Per Engine.

MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962

CONSTANT CRUISE POWER SETTINGS

550 BRAKE HORSEPOWER PER ENGINE

AUTO LEAN

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

PRESSURE ALTITUDE (FEET)	MANIFOLD PRESSURE (IN. Hg) AT CARBURETOR AIR TEMPERATURE (°C)						RPM	FUEL FLOW LB/HR	
	-20°	-10°	0°	+ 10°	+ 20°	+ 30°		PER ENG	2 ENG
20,000									
19,000									
18,000									
17,000									
16,000									
15,000	25.2								
14,000	25.2	25.7	26.2	26.7					
13,000	25.4	25.9	26.3	26.8	27.3	27.7			
12,000	26.9	27.2	26.3	26.8	27.3	27.7	2050	241.90	483.80
11,000	27.1	27.5	27.9	28.3	27.3	27.7			
10,000	28.4	27.6	28.0	28.4	28.7	29.0			
9,000	28.5	29.0	29.5	28.7	28.9	29.2	1900	236.50	473.00
8,000	28.7	29.2	29.5	30.0	30.4	30.7			
7,000	28.8	29.3	29.6	30.1	30.5	30.8			
6,000	28.9	29.5	29.8	30.3	30.6	30.9			
5,000	29.0	29.6	29.9	30.4	30.7	31.0			
4,000	29.1	29.7	30.0	30.5	30.8	31.1	1800	232.65	465.30
3,000	29.3	29.8	30.1	30.6	31.0	31.3			
2,000	29.4	30.0	30.3	30.8	31.1	31.4			
1,000	29.6	30.1	30.4	30.9	31.3	31.6			
0	29.7	30.2	30.5	31.0	31.4	31.7			

Figure A2-5. Constant Cruise Power Settings, 550 Bhp Per Engine.

MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962

CONSTANT CRUISE POWER SETTINGS

500 BRAKE HORSEPOWER PER ENGINE

AUTO LEAN

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

PRESSURE ALTITUDE (FEET)	MANIFOLD PRESSURE (IN. Hg) AT CARBURETOR AIR TEMPERATURE (^{o}C)						RPM	FUEL FLOW LB/HR	
	-20^{o}	-10^{o}	0^{o}	+10^{o}	+20^{o}	+30^{o}		PER ENG	2 ENG
20,000									
19,000									
18,000									
17,000	23.0	23.5							
16,000	23.0	23.5	23.9	24.4					
15,000	23.2	23.7	24.2	24.6	25.0				
14,000	24.8	25.2	24.4	24.8	25.2	25.7			
13,000	25.0	25.3	25.6	25.9	25.4	25.8	2050	224.20	448.40
12,000	25.9	25.5	25.8	26.1	26.4	26.7			
11,000	26.1	26.5	27.0	26.3	26.7	27.0	1900	219.00	438.00
10,000	27.5	26.6	27.0	27.3	27.5	27.8			
9,000	27.7	28.0	28.5	27.5	27.9	28.2	1800	215.00	430.00
8,000	27.9	28.4	28.7	29.1	29.5	29.8			
7,000	28.0	28.5	28.9	29.3	29.6	29.9			
6,000	28.2	28.6	29.0	29.4	29.8	30.1			
5,000	28.3	28.7	29.2	29.6	29.9	30.2			
4,000	28.4	28.8	29.3	29.8	30.0	30.3	1700	210.00	420.00
3,000	28.5	28.9	29.4	29.9	30.2	30.5			
2,000	28.7	29.1	29.6	30.0	30.4	30.7			
1,000	28.8	29.2	29.7	30.2	30.5	30.8			
0	28.9	29.4	29.8	30.3	30.7	31.0			

Figure A2-6. Constant Cruise Power Settings, 500 Bhp Per Engine.

MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962

CONSTANT CRUISE POWER SETTINGS

450 BRAKE HORSEPOWER PER ENGINE

AUTO LEAN

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

PRESSURE ALTITUDE (FEET)	MANIFOLD PRESSURE (IN. Hg) AT CARBURETOR AIR TEMPERATURE (°C)						RPM	FUEL FLOW LB/HR	
	- 20°	- 10°	0°	+ 10°	+ 20°	+ 30°		PER ENG	2 ENG
20,000	20.9								
19,000	21.0	21.4	21.8						
18,000	21.0	21.4	21.9	22.3	22.6				
17,000	22.5	21.7	22.1	22.5	22.9	23.3			
16,000	22.5	23.0	23.4	22.6	23.0	23.4	2050	202.50	405.00
15,000	22.8	23.3	23.4	23.8	24.0	24.3			
14,000	23.8	24.2	23.6	23.8	24.3	24.5	1900	199.80	399.60
13,000	24.0	24.3	24.5	24.8	25.3	25.6			
12,000	25.0	25.5	24.6	25.0	25.3	25.6	1800	197.55	395.10
11,000	25.1	25.5	25.9	26.3	25.5	25.8			
10,000	25.4	25.7	26.0	26.3	26.5	26.8			
9,000	25.5	25.8	26.3	26.5	26.9	27.1			
8,000	25.5	25.8	26.3	26.7	26.9	27.1			
7,000	25.7	26.0	26.4	26.9	27.1	27.4			
6,000	25.9	26.2	26.6	27.1	27.3	27.6			
5,000	26.1	26.3	26.8	27.2	27.5	27.8	1700	193.50	387.00
4,000	26.3	26.5	27.0	27.4	27.7	28.0			
3,000	26.4	26.7	27.2	27.6	27.9	28.2			
2,000	26.6	27.0	27.4	27.8	28.1	28.4			
1,000	26.7	27.2	27.6	27.9	28.2	28.5			
0	26.9	27.4	27.8	28.1	28.4	28.7			

Figure A2-7. Constant Cruise Power Settings, 450 Bhp Per Engine.

MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962

CONSTANT CRUISE POWER SETTINGS

400 BRAKE HORSEPOWER PER ENGINE

AUTO LEAN

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

PRESSURE ALTITUDE (FEET)	MANIFOLD PRESSURE (IN. Hg) AT CARBURETOR AIR TEMPERATURE (°C)						RPM	FUEL FLOW LB/HR	
	- 20°	- 10°	0°	+ 10°	+ 20°	+ 30°		PER ENG	2 ENG
20,000									
19,000									
18,000									
17,000									
16,000									
15,000	22.5	22.0	22.2	22.4	22.8	23.2	1800	184.00	368.00
14,000	22.8	23.1	23.4	23.7	23.0	23.4			
13,000	22.8	23.2	23.7	23.9	24.3	24.5			
12,000	23.0	23.5	23.8	24.2	24.4	24.6			
11,000	23.1	23.6	23.9	24.3	24.5	24.7			
10,000	23.3	23.7	24.0	24.3	24.6	24.9			
9,000	23.4	23.7	24.1	24.4	24.7	25.0	1700	177.50	355.00
8,000	23.5	23.8	24.3	24.4	24.8	25.1			
7,000	23.6	24.0	24.4	24.6	24.9	25.2			
6,000	23.8	24.1	24.5	24.8	25.1	25.4			
5,000	23.9	24.3	24.6	25.0	25.3	25.6			
4,000	24.0	24.4	24.8	25.2	25.5	25.8			
3,000	24.2	24.6	24.9	25.4	25.7	26.0			
2,000	24.4	24.8	25.1	25.5	25.9	26.3			
1,000	24.6	25.0	25.3	25.7	26.1	26.5			
0	24.8	25.3	25.5	25.8	26.3	26.8			

Figure A2-8. Constant Cruise Power Settings, 400 Bhp Per Engine.

MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962

CONSTANT CRUISE POWER SETTINGS

350 BRAKE HORSEPOWER PER ENGINE

AUTO LEAN

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

PRESSURE ALTITUDE (FEET)	MANIFOLD PRESSURE (IN. Hg) AT CARBURETOR AIR TEMPERATURE (°C)						RPM	FUEL FLOW LB/HR	
	- 20°	- 10°	0°	+ 10°	+ 20°	+ 30°		PER ENG	2 ENG
20,000									
19,000									
18,000									
17,000									
16,000									
15,000									
14,000									
13,000									
12,000									
11,000									
10,000	21.1	21.4	21.7	22.0	22.2	22.4			
9,000	21.3	21.6	21.9	22.2	22.4	22.6			
8,000	21.4	21.7	22.0	22.3	22.5	22.7			
7,000	21.6	21.9	22.2	22.5	22.7	22.9	1700	158.50	317.00
6,000	21.7	22.0	22.3	22.6	22.8	23.0			
5,000	21.9	22.2	22.5	22.8	23.0	23.2			
4,000	22.0	22.3	22.6	22.9	23.1	23.3			
3,000	22.2	22.6	22.9	23.1	23.4	23.7			
2,000	22.4	22.8	23.1	23.4	23.6	23.8			
1,000	22.6	23.1	23.4	23.6	23.9	24.1			
0	22.8	23.3	23.6	23.8	24.1	24.4			

Figure A2-9. Constant Cruise Power Settings, 350 Bhp Per Engine.

MODEL: C-47, C-117 AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962

CONSTANT CRUISE POWER SETTINGS

300 BRAKE HORSEPOWER PER ENGINE

AUTO LEAN

ENGINE(S): (2) R-1830-90C (HIGH BLOWER INOPERATIVE) -90D AND -92
FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

PRESSURE ALTITUDE (FEET)	MANIFOLD PRESSURE (IN. Hg) AT CARBURETOR AIR TEMPERATURE (°C)						RPM	FUEL FLOW LB/HR	
	- 20°	- 10°	0°	+ 10°	+ 20°	+ 30°		PER ENG	2 ENG
20,000									
19,000									
18,000									
17,000									
16,000									
15,000									
14,000									
13,000									
12,000									
11,000									
10,000	18.8	19.2	19.4	19.6	19.9	20.2			
9,000	19.0	19.3	19.6	19.8	20.1	20.3	1700	142.00	284.00
8,000	19.2	19.5	19.8	20.0	20.3	20.6			
7,000	19.4	19.7	19.9	20.2	20.5	20.8			
6,000	19.6	19.9	20.1	20.5	20.7	20.9			
5,000	19.8	20.0	20.2	20.7	20.9	21.1			
4,000	20.0	20.2	20.4	20.9	21.1	21.3			
3,000	20.2	20.5	20.7	21.1	21.3	21.5			
2,000	20.4	20.7	20.95	21.3	21.5	21.7			
1,000	20.6	21.0	21.2	21.5	21.7	21.9			
0	20.8	21.2	21.5	21.7	21.9	22.1			

Figure A2-10. Constant Cruise Power Settings, 300 Bhp Per Engine.

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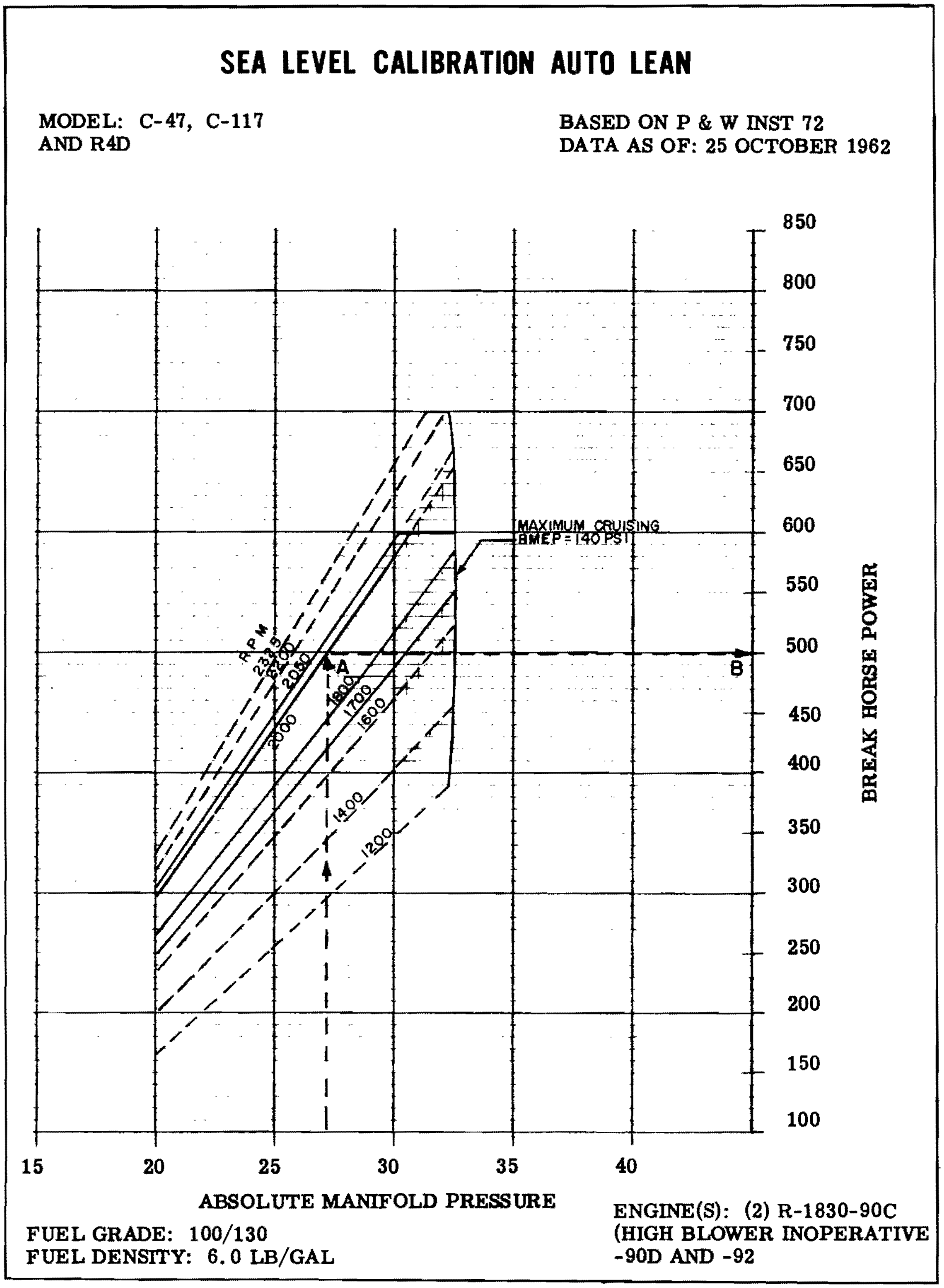
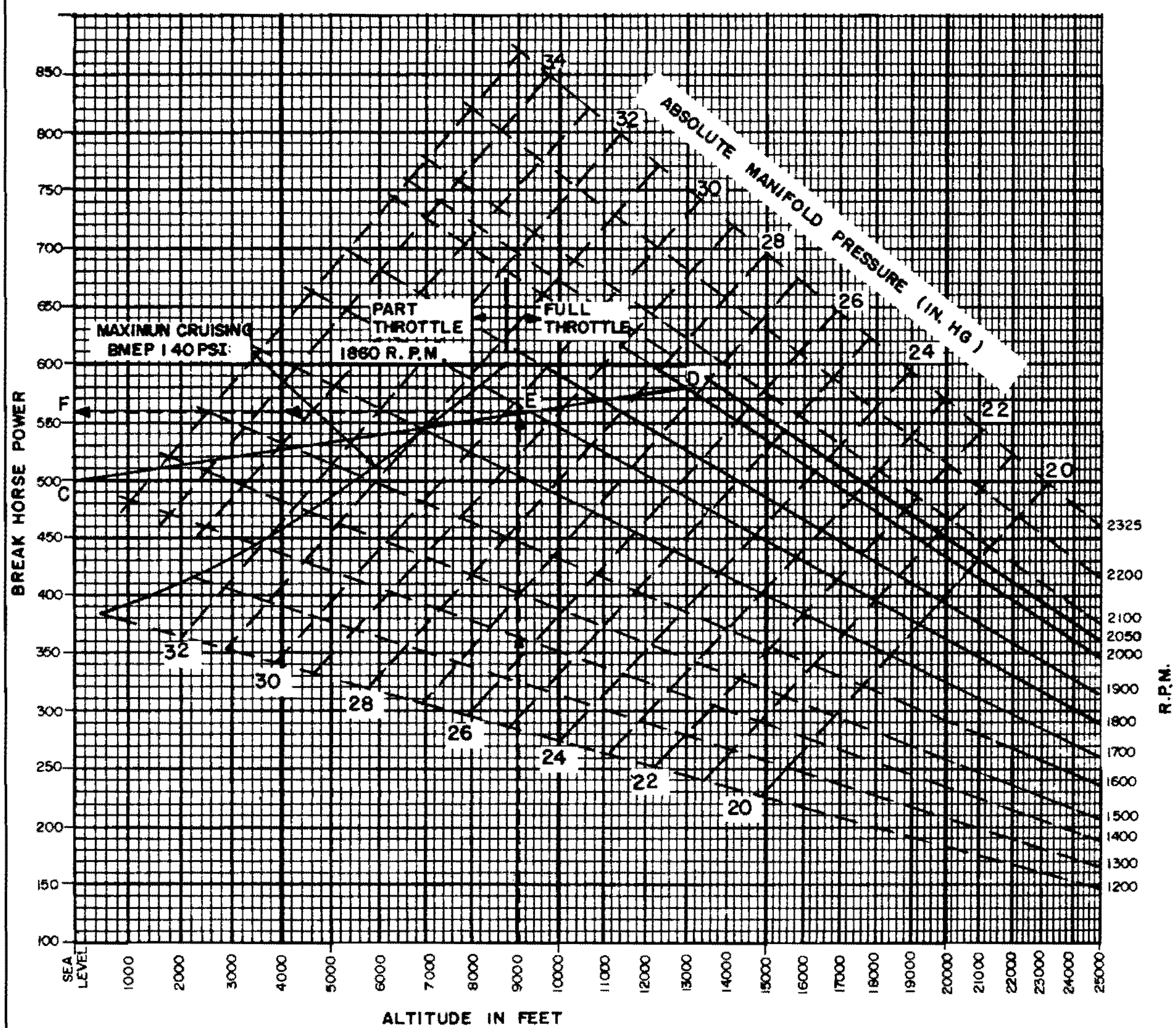


Figure A2-11. Engine Calibration Curve - Auto Lean. (Sheet 1 of 2).

ENGINE ALTITUDE CALIBRATION AUTO LEAN

MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962



FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAl

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE
-90D AND -92

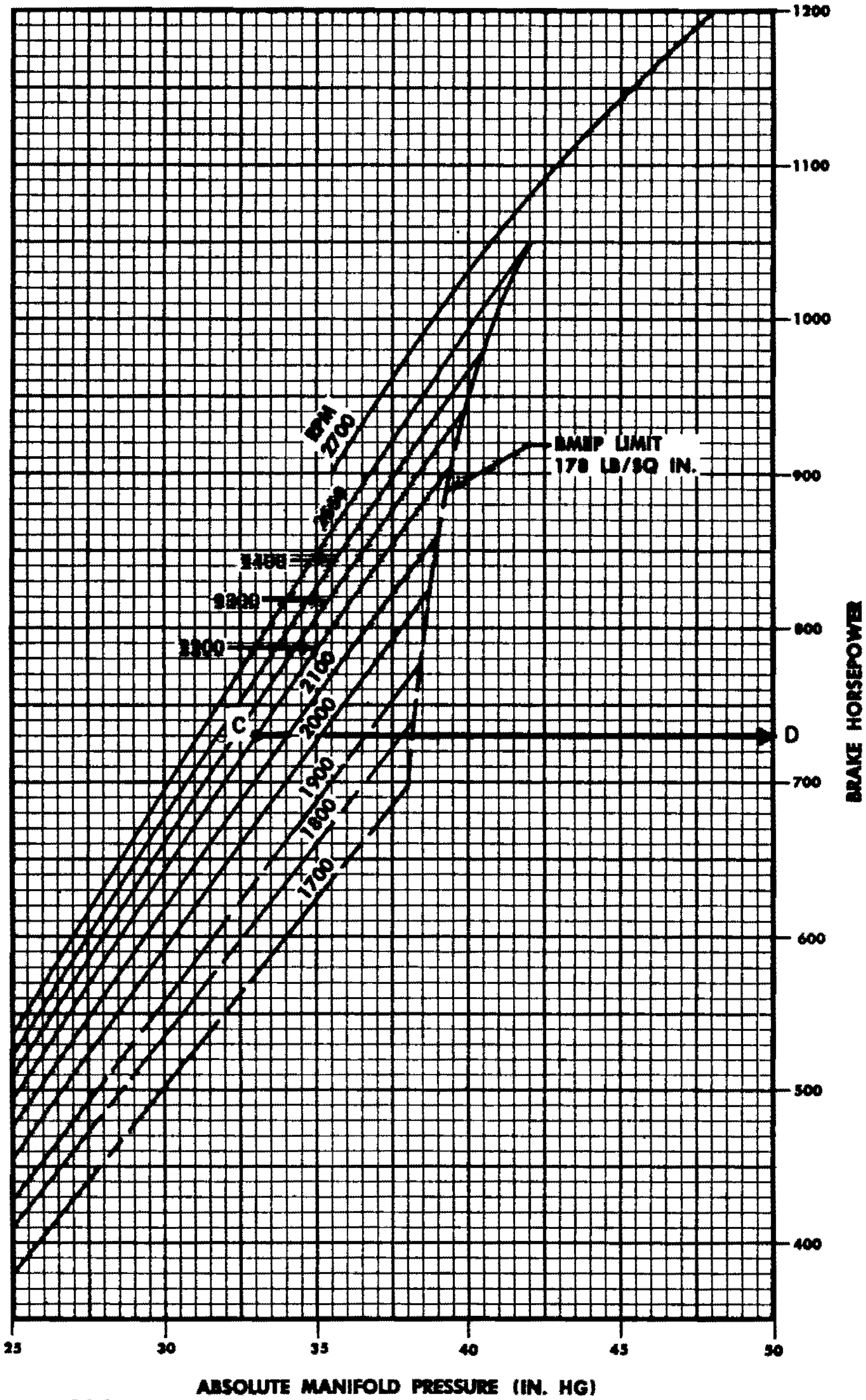
Figure A2-11. Engine Calibration Curve - Auto Lean (Sheet 2 of 2).

ENGINE CALIBRATION CURVE

AUTO-RICH
SEA LEVEL CALIBRATION

MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962



ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

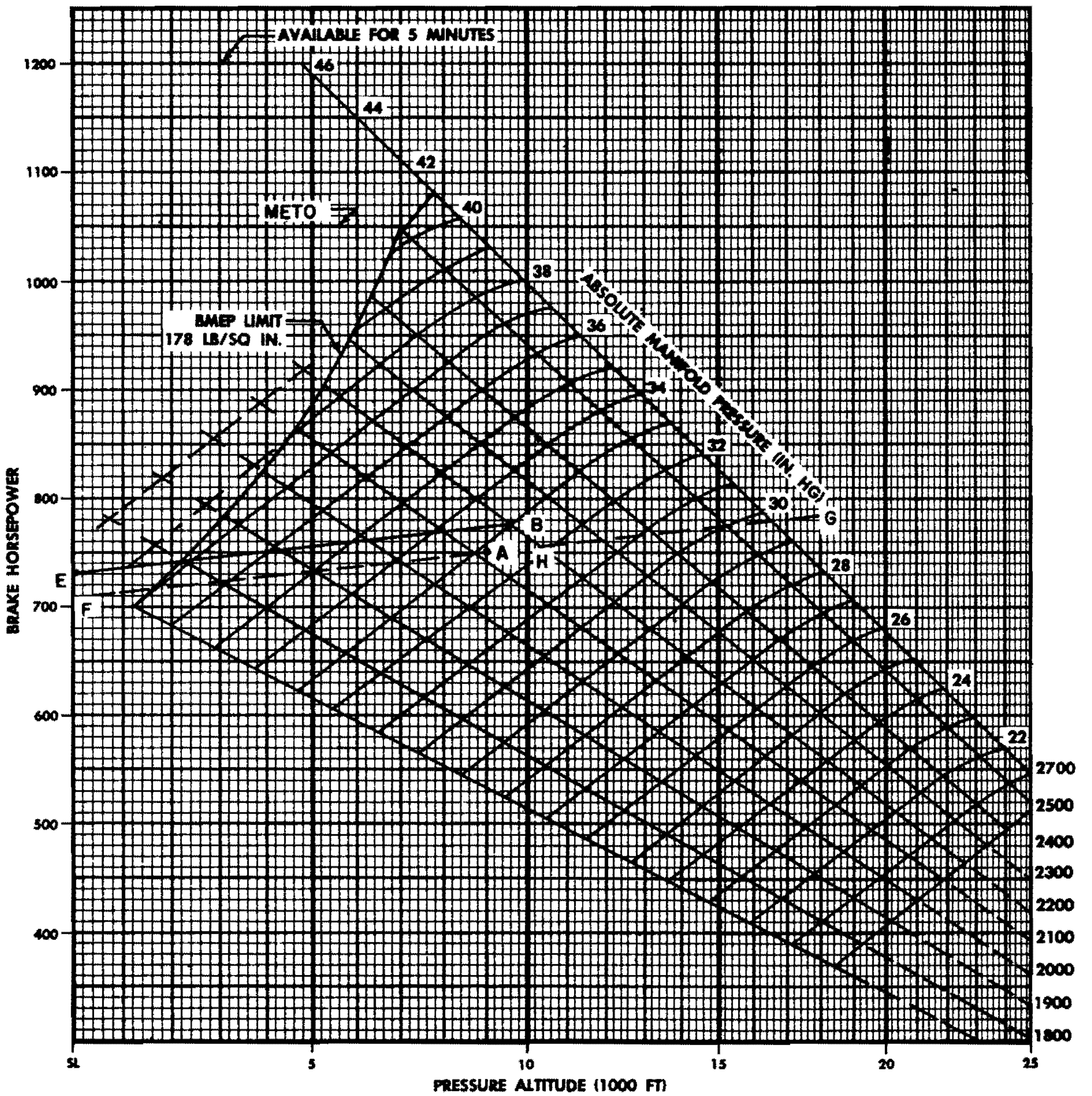
Figure A2-12. Engine Calibration Curve - Auto Rich (Sheet 1 of 2).

ENGINE ALTITUDE CALIBRATION CURVE

AUTO-RICH
WITHOUT RAM
NACA STANDARD DAY

MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962



ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

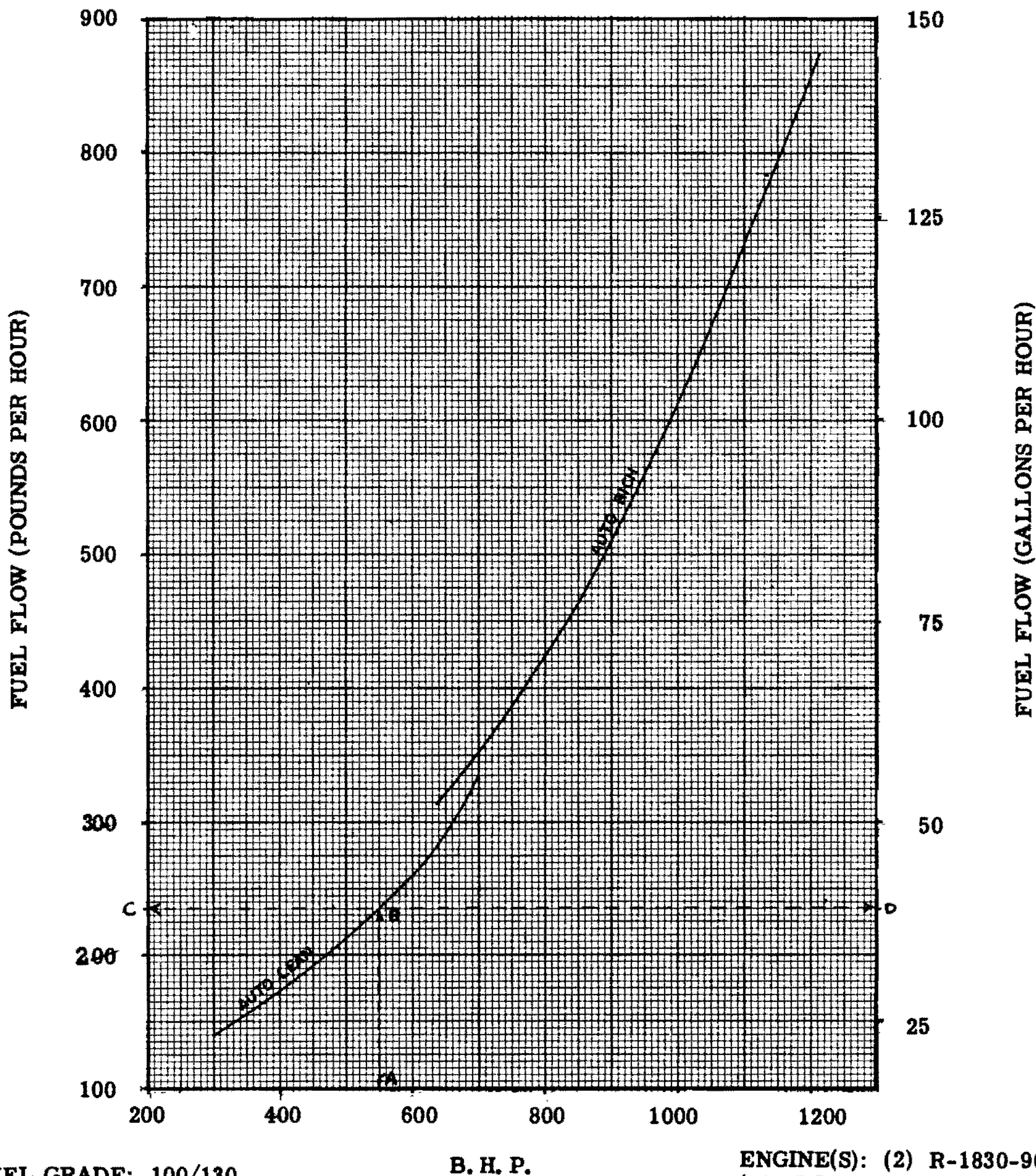
Figure A2-12. Engine Calibration Curve - Auto Rich (Sheet 2 of 2).

FUEL FLOW PER ENGINE

MODEL: C-47, C-117
AND R4D

BASED ON P & W INST 72
DATA AS OF: 25 OCTOBER 1962

SAMPLE PROBLEM:
ENTER CHART AT BRAKE HORSEPOWER SETTING, POINT A. PROJECT A LINE VERTICALLY TO INTERSECT THE FUEL FLOW LINE, POINT B. PROJECT A LINE CD HORIZONTALLY FROM POINT B AND READ FUEL FLOW POUNDS PER HOUR AT POINT C, AND GALLONS PER HOUR AT POINT D.



FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

Figure A2-13. Fuel Flow Per Engine.

PART THREE
TAKE - OFF

TABLE OF CONTENTS

LIST OF CHARTS

DISCUSSION OF CHARTS.

INTRODUCTION.

The take-off and climbout charts are presented for various gross weights and altitudes for standard atmospheric conditions. Headwind, runway surface condition, specific humidity, and nonstandard temperatures may be taken into account by use of the correction plots. A runway slope correction chart is also included.

Use 50 percent of reported headwinds and 150 percent of reported tailwinds with the wind correction grid. This allows a safety margin for fluctuation of wind velocity. It is assumed that the wind velocity is measured at a height of 50 feet above the ground. Allowance is made for wind gradient from 50 feet down to the approximate height of the aircraft on the ground, where the wind velocity is slightly reduced.

The engine manufacturer's limiting maximum brake horsepower of 1200 is observed. The take-off and climbout performance charts are discussed in detail in the following paragraphs. A sample problem is presented on each chart.

MAXIMUM TAKE-OFF GROSS WEIGHT.

Safe operation of the aircraft requires that take-offs not be attempted at gross weights for which acceleration, rate-of-climb, or obstacle clearance capability are marginal. There are four primary factors which must be considered when determining a safe limit for the take-off gross weight.

1. The ability of the structure to withstand taxiing loads and inflight maneuvering loads are shown as design take-off gross weights in the weight limitations chart (figure 5-2).

2. The ability to take off within the available runway is shown on the take-off performance chart (figure A3-11).

3. The ability to have adequate rate of climb when airborne is shown on the take-off gross weight limited by single-engine climb performance chart (figure A3-1).

4. The ability to clear obstacles within the take-off corridor is shown on the take-off path chart (figure A3-13).

For a given set of take-off conditions, each of these four considerations will permit a different gross weight. Any one of the four weights may be the lowest, depending on the conditions. For this reason, all four factors must be considered for each take-off, even though in many cases one or more of them may be eliminated after cursory examination. The lowest weight determined by these factors will be the maximum take-off gross weight.

TAKE-OFF GROSS WEIGHT LIMITED BY SINGLE-ENGINE CLIMB PERFORMANCE.

This chart (figure A3-1), based on one engine operating at maximum power, cowl flaps trail position, wing flaps up, landing gear up, and propeller on inoperative engine feathered, shows the maximum gross weights at which a 100 FPM rate of climb may be maintained for single-engine operation for various altitudes. For structural gross weight limitations, refer to figure 5-2 in Section V.

TAKE-OFF GROUND RUN DISTANCE CHARTS

The Take-Off Ground Run Charts (figure A3-2 through A3-8) are provided for several aircraft configurations, to determine the take-off ground run distance at various field altitudes, outside air temperatures, specific humidities, and gross weights, corrected for wind and runway surface conditions. The effect of runway slope on take-off ground run may be determined from the runway slope correction chart (figure A3-10).

TAKE-OFF PERFORMANCE - SPEED DURING GROUND RUN

The take-off performance - speed during ground run chart (figure A3-9) is based on the average acceleration characteristics of the aircraft during the take-off ground run with both engines operating at maximum power. Each line gives a particular relationship of indicated speed to the distance from the start of the take-off run for various aircraft configurations. The configuration of the aircraft is accounted for by entering the chart with the take-off ground run distance from the appropriate take-off ground run chart corrected for run way slope. Speed is obtained from the characteristic take-off speed chart. In this way the appropriate contour is located. This chart is also used to determine refusal distance. Sample problems are shown on the chart to illustrate its use.

RUNWAY SLOPE CORRECTION

This chart (figure A3-10) is to be used to correct data obtained from the Ground Run charts (figure A3-2 through A3-8) when runways have other than zero slopes. A sample problem is shown on the chart to illustrate its use.

TAKE-OFF PERFORMANCE - REFUSAL SPEED

The refusal speed as shown on this chart (figure A3-11) is the maximum speed which may be reached, accelerating from a standstill with two engines operating at maximum power, and from which a stop may be made within a given runway length. This chart is based on a dry, hard surface runway and includes correction grids for outside air temperature, pressure altitude, specific humidity, wind component and gross weight. In addition, a three second time delay after reaching refusal speed is allowed before cutting the engines and applying the brakes. Refusal speeds are given in indicated airspeeds. Refusal speeds above take-off speeds are not shown.

Enter the chart with outside air temperature (point A). Draw a line horizontally from Point A to the pressure altitude line (point B). Draw a vertical line from Point B to the specific humidity base line (Point C) and a line parallel to the contour line from Point C to the given specific humidity (Point D). Then enter chart at the given runway length (Point E) and draw a horizontal line to intersect the base line (Point F). From Point F, draw a line following the trend of the contour lines until it intersects a vertical line drawn from Point D. This intersection is (Point G). From Point G, draw a horizontal line to the zero wind line (Point H). From Point H, draw a line following the trend of the contour lines, to the given wind component (Point I). Then enter chart at given gross weight (Point J) and draw a vertical line to intersect a horizontal line drawn from Point I. This intersection (Point K) is the refusal speed.

DISTANCE TO STOP – ABORTED TAKE-OFF CHART

The distance to stop - - aborted take-off chart (figure A3-12) provides the distance required to stop from any indicated speed up to the highest take-off speed at altitudes from sea level to 16000 feet. The stopping curves assume windmilling propellers and a take-off wing flap deflection of zero degrees. No runway slope correction has been included. See the characteristic take-off speeds chart (figure A3-14) for the recommended take-off speed.

TAKE-OFF ABORT CRITERIA

Due to the take-off characteristics of C-47 aircraft, the abort criteria is based on refusal speed and refusal distance. The refusal speed is determined from the take-off performance – refusal speed chart (figure A3-11) and is based on temperature, pressure altitude, specific humidity, runway length, wind component and gross weight. The refusal distance is obtained from the take-off performance speed during ground run chart (figure A3-9).

TAKE-OFF PATH

A take-off path - - chart (figure A3-13) is included for a two-engine take-off climb with a wing flap deflection of zero degrees. This curve is presented to enable study of terrain or obstacle clearance problems peculiar to various airfields.

The flight path chart gives relationship between height attained above the runway surface and horizontal distance traveled from the start of the take-off roll. Each curve is for a specified two-engine take-off distance over a 50-foot height. This curve can be used for the various combinations of gross weight, altitudes, and atmospheric conditions that result in the given take-off distance. It is for this reason that gross weight and altitude do not appear explicitly.

This chart was prepared assuming a constant acceleration to 95 knots; zero degree flaps. Landing gear retraction is initiated at take-off and requires approximately 7 seconds to be completed. The drag of the fully extended landing gear is assumed to exist until the landing gear is completely retracted. The flight path chart terminates at a height of 400 feet. In no case is the 5-minute maximum power limit exceeded.

For a known obstacle height and location (distance from start of take-off roll), the flight path chart can be used to read the take-off distance over a 50-foot height for a zero wind, zero runway slope, and hard surface runway condition.

Enter chart with given headwind component (Point A). Draw a horizontal line from Point A to the given obstacle distance contour line (Point B) (distance from start of take-off run). Then enter chart at obstacle height (Point C) and draw a horizontal line from Point C to intersect a vertical line drawn from Point B. This intersection is Point D and is the gear down take-off distance to clear a 50-foot height with zero wind and zero runway slope. Divide this distance by 1.95 (ratio of distance over a 50-foot obstacle to take-off ground roll distance) to obtain the ground roll distance with zero wind, zero runway slope and hard surface runway. Using given outside air temperature, pressure altitude and specific humidity determine density altitude. Using the above derived ground roll distance, enter takeoff ground roll distance chart through the ground roll scale. Draw a vertical line from this point until it intersects a horizontal line drawn from the predetermined density altitude. This intersection indicates the maximum gross weight which will allow a take-off over the given obstacle under the given conditions.

CHARACTERISTIC TAKE-OFF SPEED CHART

The characteristic take-off speeds chart (figure A3-14), presents lift off speeds (1.1Vs) for zero and 1/4 wing flap settings for the range of probable take-off gross weights.

TAKE-OFF AND LANDING CROSS-WIND CHART.

The minimum touchdown or lift-off speed, under cross-wind conditions, may be determined by reference to the take-off and landing cross-wind chart (figure A3-15). A diagonal line (recommended touchdown or lift-off speed) indicates the minimum speed at which directional control can be maintained with the use of rudder ONLY for various combinations of aircraft and cross-wind velocities. If take-off or touchdown is accomplished at a speed less than recommended, the aircraft will turn into the wind, tending to veer off the runway.

After obtaining the runway heading and existing surface winds, compute the wind angle relative to the runway. Using the wind angle, enter the chart at zero headwind and zero cross-wind component. Proceed parallel with the appropriate wind angle line (as determined by interpolation) to the appropriate wind velocity curve (Point A). From Point A project a line vertically to the diagonal line and from the diagonal line horizontally to the speed scale (Point B), and read the minimum touchdown or lift-off speed. If the speed as determined from figure A3-14 is less than the speed shown at Point B, the speed shown at Point B should be used for takeoff or touchdown. If the speed as determined from figure A3-14 is greater than the speed shown at Point B, the speed as determined from figure A3-14 should be used for takeoff or touchdown.

The headwind component can be determined by projecting a line from Point A horizontally to the headwind component scale (Point C). The cross-wind component can be determined by projecting a line vertically from Point A to the cross-wind component scale (Point D).

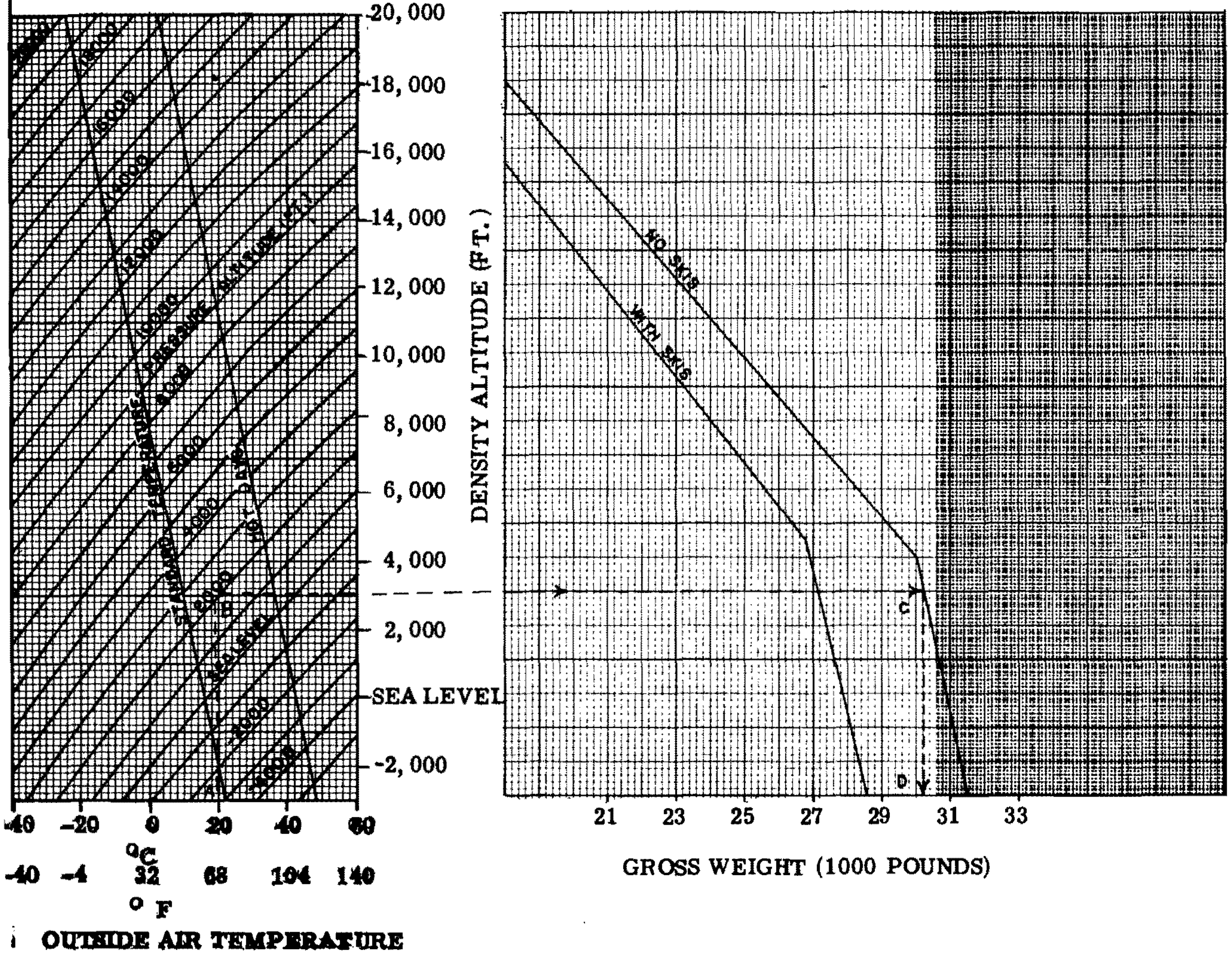
TAKE - OFF GROSS WEIGHT LIMITED BY 100 FEET PER MINUTE SINGLE ENGINE RATE OF CLIMB

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

MODEL(S): C-47
C-117 AND R4D

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92



ONE ENGINE OPERATING AT MAXIMUM POWER (48 IN HG, 2700 RPM)
COWL FLAPS TRAIL
LANDING GEAR UP
WING FLAPS = UP
PROPELLER - FEATHERED ON INOPERATIVE ENGINE

SAMPLE PROBLEM:

GIVEN:

1. OUTSIDE AIR TEMPERATURE = 20°C (POINT A)
2. PRESSURE ALTITUDE = 2000 FEET (POINT B)
3. NO SKI CONFIGURATION (POINT C)

FIND:

1. MAXIMUM GROSS WEIGHT FOR 100 FEET PER MINUTE SINGLE-ENGINE RATE OF CLIMB = 30200 POUNDS (POINT D)

Figure A3-1. Take-Off Gross Weight Limited by 100 Ft/Min - Single-Engine Rate of Climb.

TAKE - OFF PERFORMANCE GROUND RUN DISTANCE

WING FLAPS = UP

TAKE-OFF SPEED = 1.1 V_s

MAXIMUM POWER WITH 2700 RPM

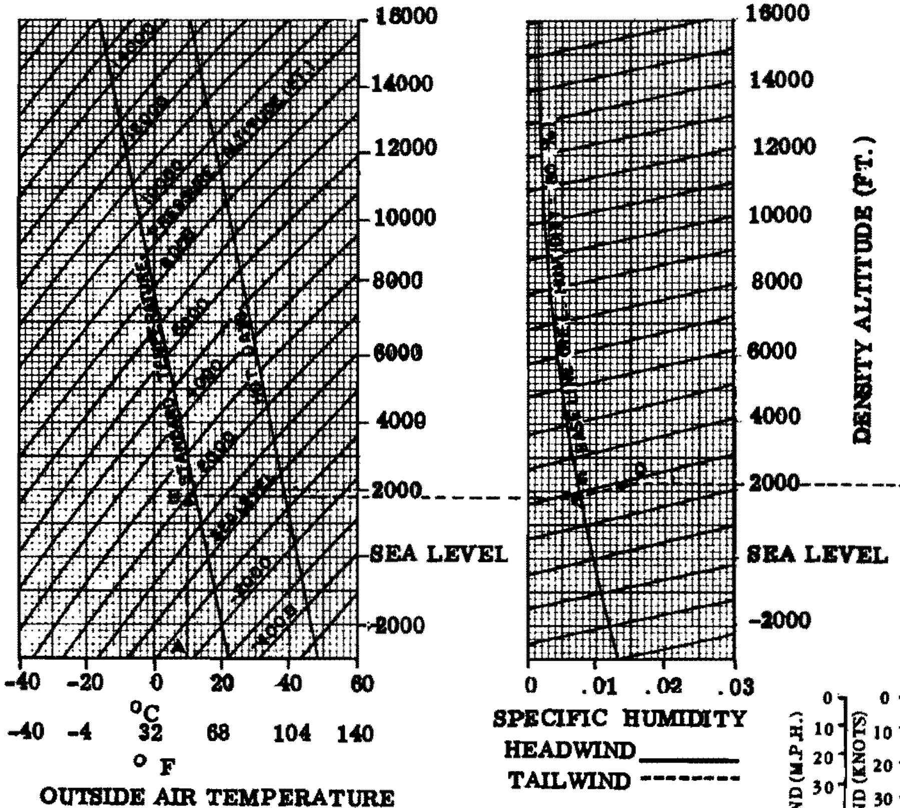
COWL FLAPS - TRAIL POSITION

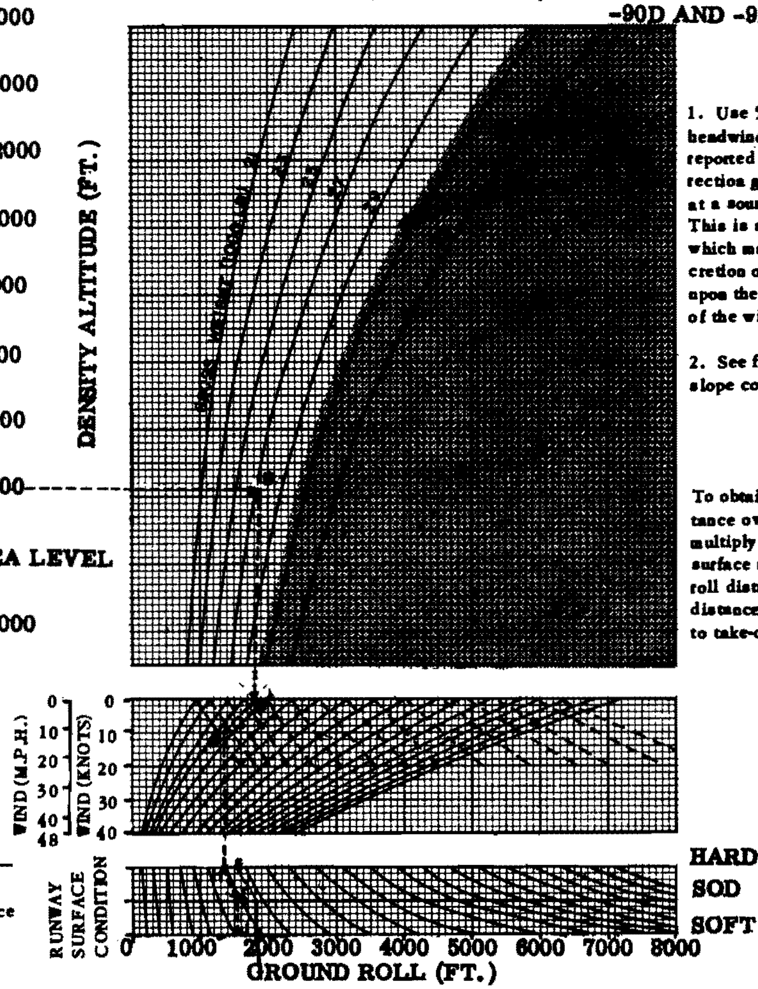
BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

MODEL(S): C-47, C-117
AND R4D

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92





NOTE

1. Use 50 percent of reported headwinds and 150 percent of reported tailwinds with the correction grid if wind is measured at a source other than the runway. This is a recommended procedure which may be revised at the discretion of the pilot, dependent upon the source of measurement of the wind data.

2. See figure A3-10 for runway slope correction.

NOTE

To obtain the approximate distance over a 50 foot obstacle, multiply the zero wind, hard surface runway take-off ground roll distance by 1.95 (ratio of distance over a 50 foot obstacle to take-off ground roll distance).

SAMPLE PROBLEM;

A. Outside air temperature - 10°C.
B. Pressure altitude - 2000 feet.
C. Base Line.
D. Specific humidity - .015.
E. Gross weight - 27000 pounds
F. Base Line.
G. Reported headwind - 20 knots.
H. Base Line and take-off ground run distance hard surface runway. - 1350 feet.
I. Runway surface - sod.
J. Take-off ground roll - 1550 feet.

Figure A3-2. Take-Off Performance Ground Run Distance - Flaps Up.

TAKE - OFF PERFORMANCE GROUND RUN

WING FLAPS = 1/4 DOWN

MAXIMUM POWER WITH 2700 RPM

COWL FLAPS - TRAIL POSITION

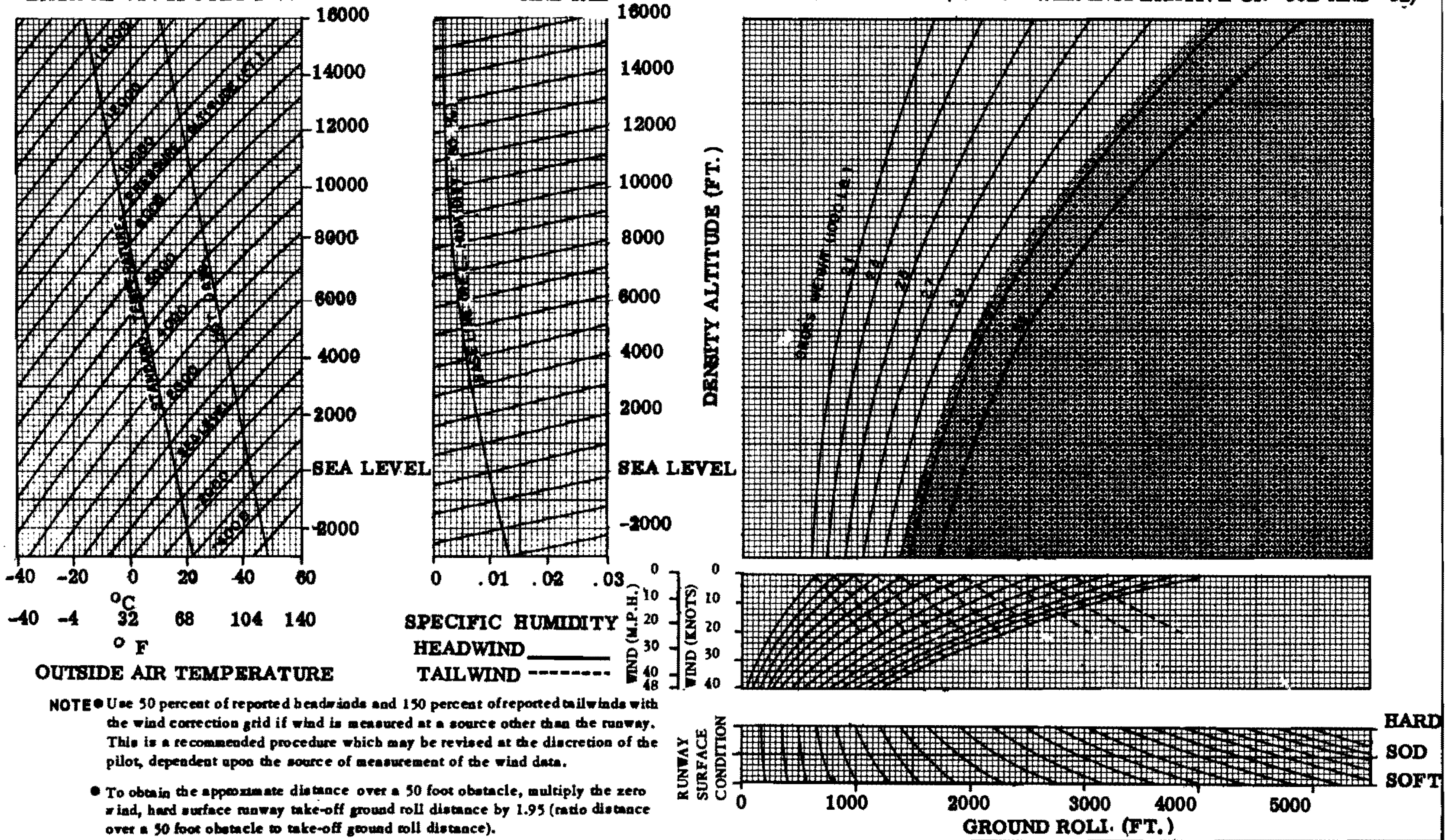
TAKE-OFF SPEED = 1.1 V_S

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

MODEL (S): C-47, C-117 AND R4D

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL.

ENGINE(S): (2) R-1830 - 90C(HIGH BLOWER INOPERATIVE ON -90D AND -92)



NOTE
- Use 50 percent of reported headwinds and 150 percent of reported tailwinds with the wind correction grid if wind is measured at a source other than the runway. This is a recommended procedure which may be revised at the discretion of the pilot, dependent upon the source of measurement of the wind data.
- To obtain the approximate distance over a 50 foot obstacle, multiply the zero wind, hard surface runway take-off ground roll distance by 1.95 (ratio distance over a 50 foot obstacle to take-off ground roll distance).

Figure A3-3. Take-Off Performance Ground Run - Wing Flaps - 1/4 Down.

TAKE - OFF PERFORMANCE GROUND RUN

2 JATO UNITS - 1000 LB THRUST EACH - 5 SECOND FIRING DELAY
MAXIMUM POWER WITH 2700 RPM

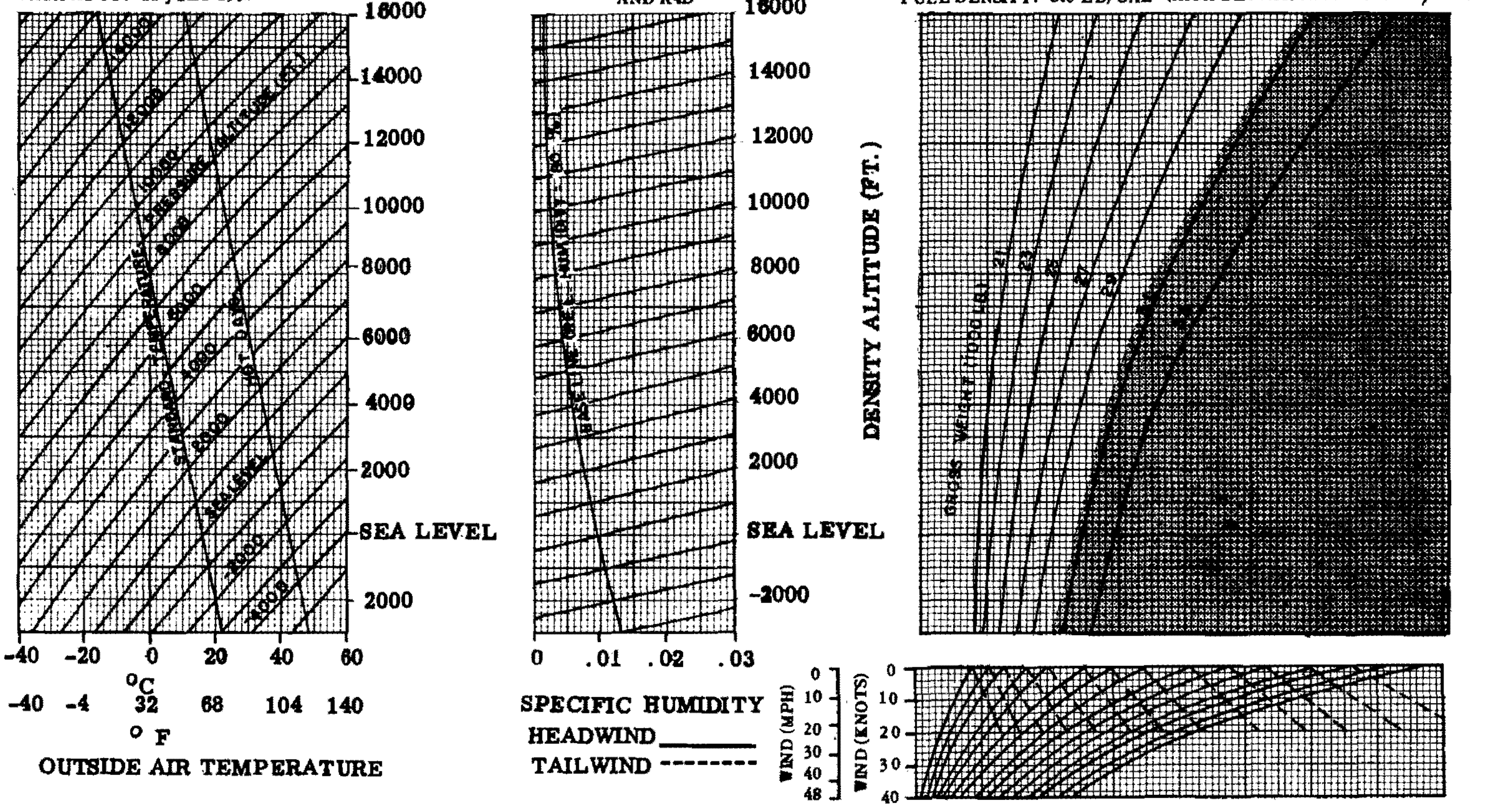
WING FLAPS = 1/4 DOWN TAKE-OFF SPEED = 1.1 V_S
COWL FLAPS — TRAIL POSITION

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

MODEL(S): C-47, C-117 AND R4D

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

ENGINE(S): (2) R-1830-90C -90D AND -92)
(HIGH BLOWER INOPERATIVE)



NOTE

Use 50 percent of reported headwinds and 150 percent of reported tailwinds with the correction grid if wind is measured at a source other than the runway. This is a recommended procedure which may be revised at the discretion of the pilot, dependent upon the source of measurement of the wind data.

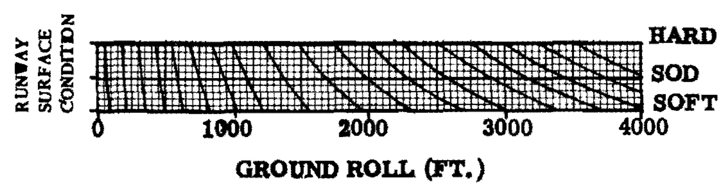


Figure A3-4. Take-Off Performance Ground Run - Two JATO Units.

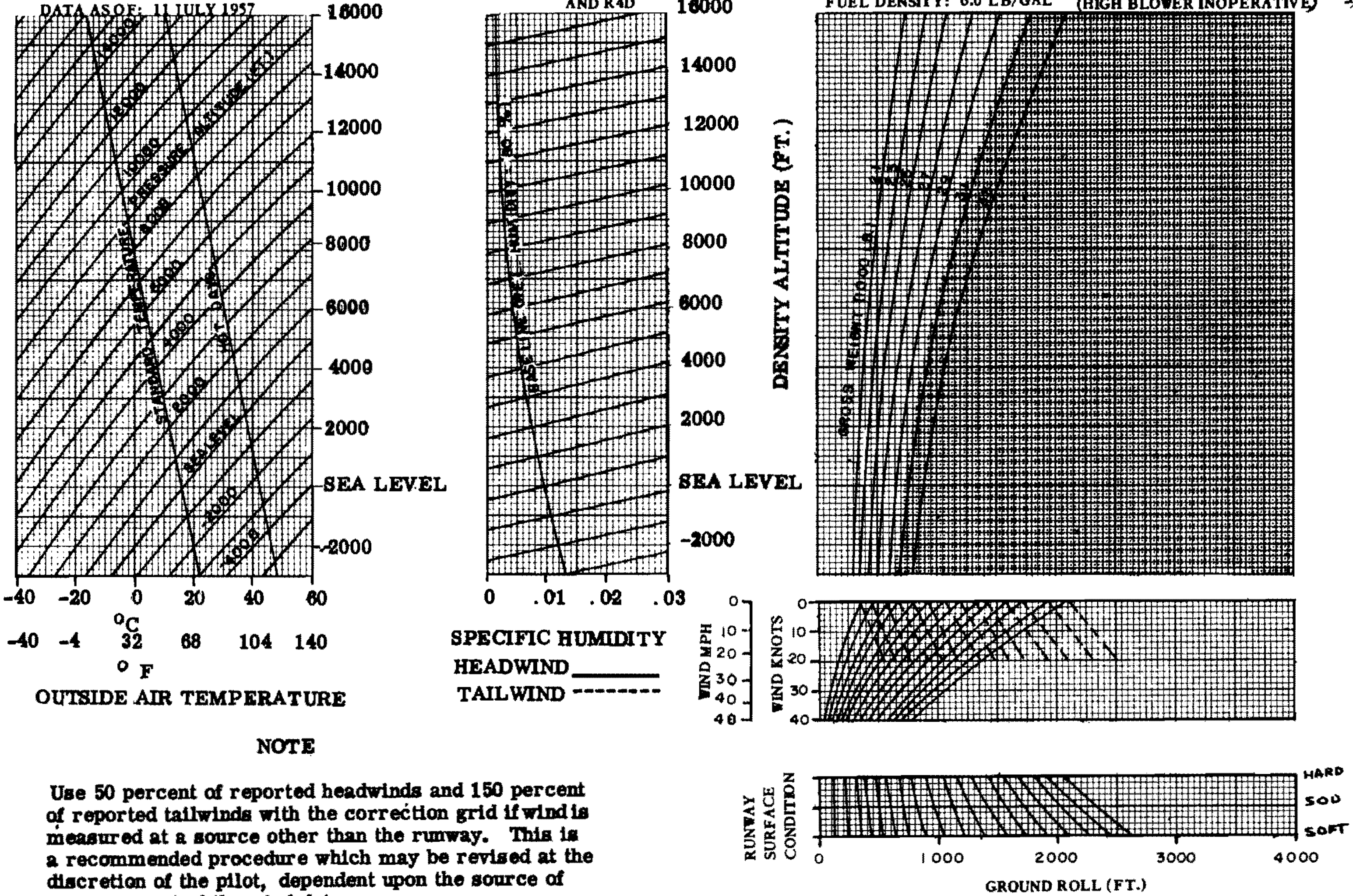
TAKE - OFF PERFORMANCE GROUND RUN

4 JATO UNITS -- 1000 LB THRUST EACH --0 SECOND FIRING DELAY WING FLAPS = 1/4 DOWN TAKE-OFF SPEED = $1.1V_S$ MAXIMUM POWER WITH 2700 RPM
COWL FLAPS - TRAIL POSITION
BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

MODEL(S): C-47, C-117 AND R4D

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

ENGINE(S): (2) R-1830 -90C (HIGH BLOWER INOPERATIVE) -90D AND -92)



NOTE

Use 50 percent of reported headwinds and 150 percent of reported tailwinds with the correction grid if wind is measured at a source other than the runway. This is a recommended procedure which may be revised at the discretion of the pilot, dependent upon the source of measurement of the wind data.

Figure A3-5. Take-Off Performance Ground Run - Four JATO Units.

TAKE - OFF PERFORMANCE GROUND RUN WITH SKIS

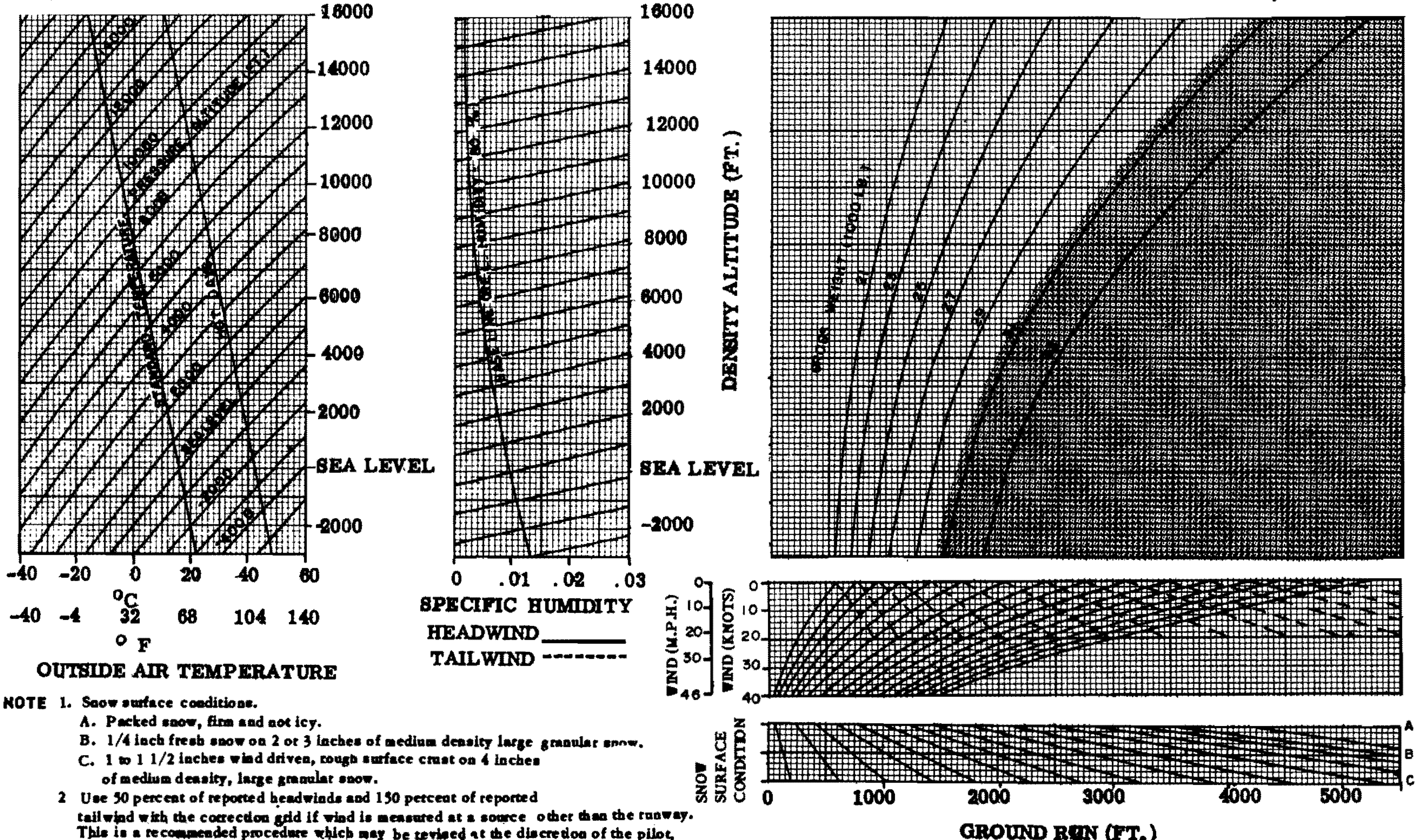
WING FLAPS = 1/4 DOWN   TAKE-OFF SPEED = 1.1 V_s MAXIMUM POWER WITH 2700 RPM   COWL FLAPS – TRAIL POSITION

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

MODEL (S): C-47, C-117 AND R4D

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

ENGINE(S): R-1830 - 90C (HIGH BLOWER INOPERATIVE) -90D AND -92



NOTE 1. Snow surface conditions.
A. Packed snow, firm and not icy.
B. 1/4 inch fresh snow on 2 or 3 inches of medium density large granular snow.
C. 1 to 1 1/2 inches wind driven, rough surface crust on 4 inches of medium density, large granular snow.

2 Use 50 percent of reported headwinds and 150 percent of reported tailwind with the correction grid if wind is measured at a source other than the runway. This is a recommended procedure which may be revised at the discretion of the pilot, dependent upon the source of measurement of the wind data.

Figure A3-6. Take-Off Performance Ground Run - With Skis.

TAKE - OFF PERFORMANCE GROUND RUN WITH SKIS

2 JATO UNITS -- 1000 LB THRUST EACH -- 5 SECOND FIRING DELAY

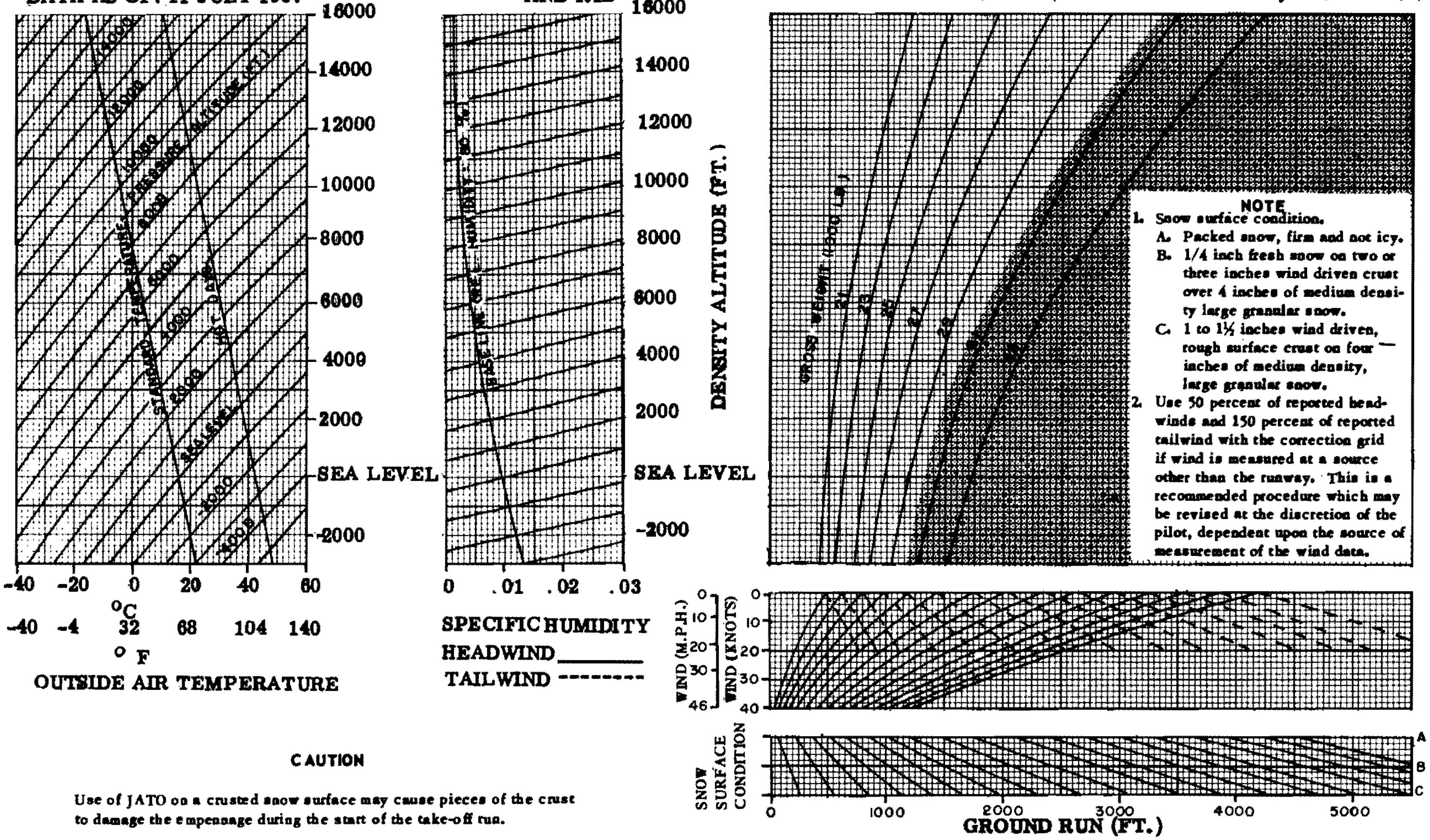
WING FLAPS = 1/4 DOWN   TAKE-OFF SPEED = $1.1V_s$ MAXIMUM POWER WITH 2700 RPM   COWL FLAPS - TRAIL POSITION

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

MODEL (S): C-47, C-117 AND R4D

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

ENGINE(S): (2) R-1830 - 90C (HIGH BLOWER INOPERATIVE) - 90C AND -92)



NOTE

1. Snow surface condition.
   - A. Packed snow, firm and not icy.
   - B. 1/4 inch fresh snow on two or three inches wind driven crust over 4 inches of medium density large granular snow.
   - C. 1 to 1½ inches wind driven, rough surface crust on four inches of medium density, large granular snow.
2. Use 50 percent of reported headwinds and 150 percent of reported tailwind with the correction grid if wind is measured at a source other than the runway. This is a recommended procedure which may be revised at the discretion of the pilot, dependent upon the source of measurement of the wind data.

CAUTION

Use of JATO on a crusted snow surface may cause pieces of the crust to damage the empennage during the start of the take-off run.

Figure A3-7. Take-Off Performance Ground Run - With Skis - Two JATO Units.

TAKE - OFF PERFORMANCE GROUND RUN WITH SKIS

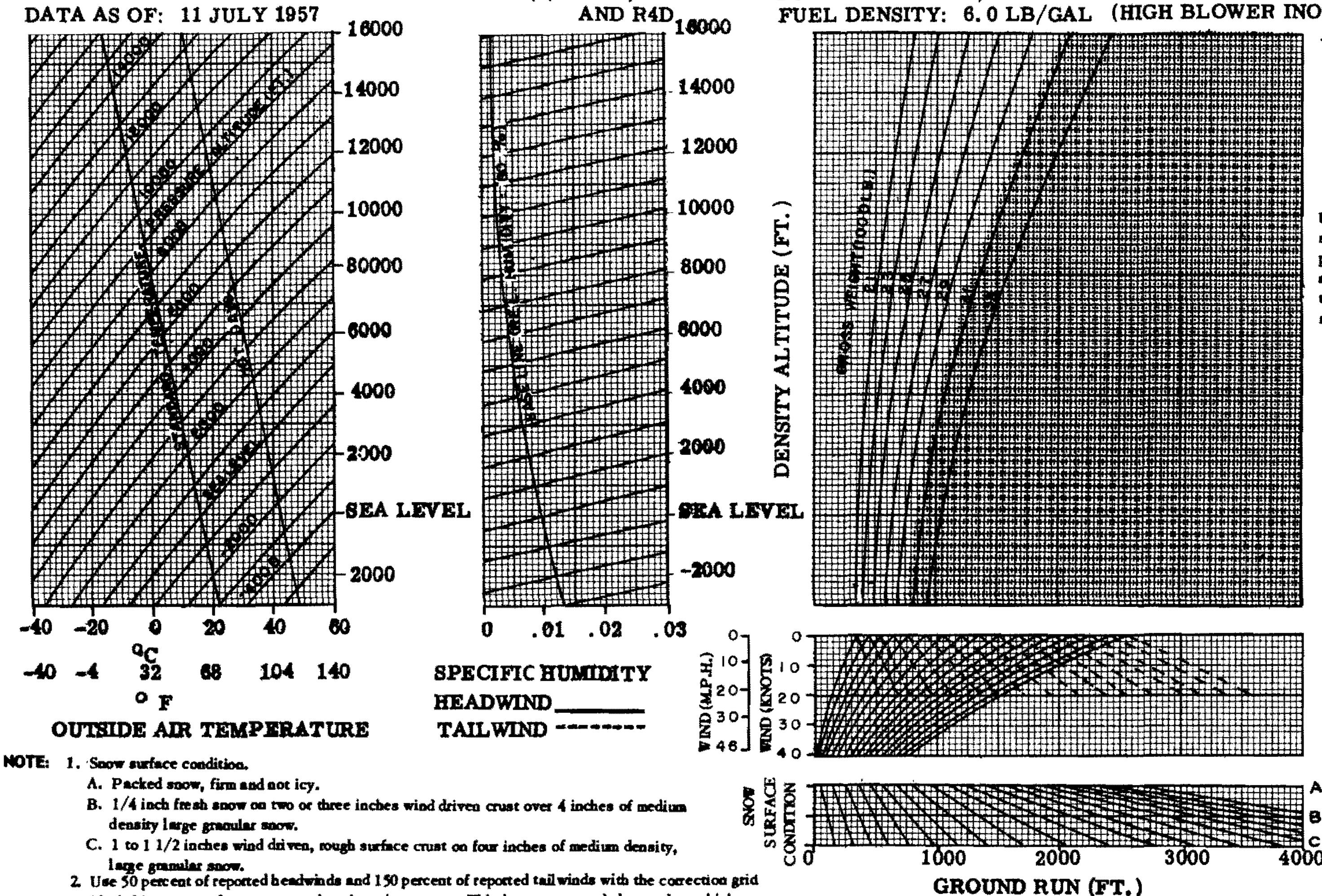
4 JATO UNITS--1000 LB THRUST EACH--0 SECOND FIRING DELAY

WING FLAPS = 1/4 DOWN   TAKE-OFF SPEED = 1.1V_s MAXIMUM POWER WITH 2700 RPM

COWL FLAPS - TRAIL POSITION

BASED ON: FLIGHT TEST DATA   MODEL(S): C-47, C-117 AND R4D   FUEL GRADE: 100/130   ENGINE(S): (2) R-1830-90C

DATA AS OF: 11 JULY 1957   FUEL DENSITY: 6.0 LB/GAL   (HIGH BLOWER INOPERATIVE) -90D AND -92)



CAUTION

Use of JATO on a crusted snow surface may cause pieces of the crust to damage the empennage during the start of the take-off run.

NOTE: 1. Snow surface condition.

A. Packed snow, firm and not icy.

B. 1/4 inch fresh snow on two or three inches wind driven crust over 4 inches of medium density large granular snow.

C. 1 to 1 1/2 inches wind driven, rough surface crust on four inches of medium density, large granular snow.

2. Use 50 percent of reported headwinds and 150 percent of reported tailwinds with the correction grid if wind is measured at a source other than the runway. This is a recommended procedure which may be revised at the discretion of the pilot, dependent upon the source of measurement of the wind data.

Figure A3-8. Take-Off Performance Ground Run - With Skis - Four JATO Units.

TAKE - OFF PERFORMANCE - SPEED DURING GROUND RUN

TWO ENGINE TAKE-OFF ACCELERATION

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

MODEL(S): C-47, C-117
AND R4D

ENGINE(S): (2) R-1830 -90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92
FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

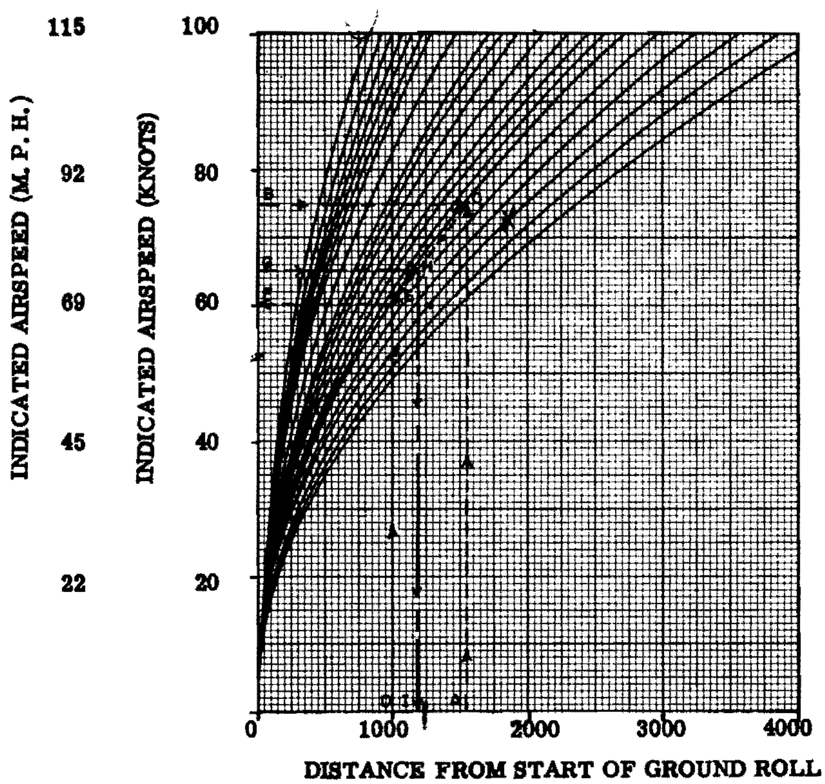
SPEED DURING GROUND ROLL

SAMPLE PROBLEM:

GIVEN:

1. Take-off gross weight = 27000 pounds, wing flaps = UP, without skis or JATO.
2. Outside air temperature = 10°C, pressure altitude = 2000 feet, specific humidity = .015, effective headwind = 10 knots, runway length = 2500 feet. FIND: Indicated airspeed at 1000 feet of take-off run.

1. From figure A3-2, determine that ground roll distance = 1550 feet.
2. From figure A3-14, determine that indicated airspeed at lift off = 74.5 knots.
3. Enter chart at 1550 feet (point A) and 74.5 knots (point B) to determine contour line (point C).
4. Enter chart at desired distance, 1000 feet (point D).
5. Extend line vertically until it intersects the predetermined contour line (point E).
6. Extend a line horizontally from point E to the indicated airspeed scale (point F) and read the indicated airspeed (60 knots) to be attained at 1000 feet of the take-off run.



NOTE

If the speed obtained during take-off is less than the speed shown, the decision to continue take-off or to stop must be made prior to reaching refusal distance.

REFUSAL DISTANCE

SAMPLE PROBLEM:

GIVEN: Same as above.

FIND: Refusal distance.

1. Determine contour line using above method.
2. Using figure A3-11, determine the refusal speed.
3. Using this refusal speed (65 knots), enter chart (point G).
4. Draw a line horizontally to the predetermined contour line (point H).
5. Draw a line vertically from point H to the distance scale (point I) and read the refusal distance, 1175 feet.

Figure A3-9. Take-Off Performance - Speed During Ground Run - Two-Engine Take-Off Acceleration.

TAKE - OFF GROUND RUN DISTANCE
RUNWAY SLOPE CORRECTION

BASED ON: FLIGHT TEST
DATA AS OF: 11 JULY 1957

MODEL(S): C-47, C-117 AND R4D

ENGINE(S): (2) R-1830-90C (HIGH BLOWER INOPERATIVE) -90D AND -92

SAMPLE PROBLEM:

A. For zero runway slope: Take-off ground run distance = 1350 feet.
B. Correction for runway slope of .005 (5 feet rise per 1000 feet of runway).
C. Take-off ground run distance = 1400 feet.

RUNWAY SLOPE = RUNWAY RISE (FT.) / RUNWAY LENGTH (FT.)

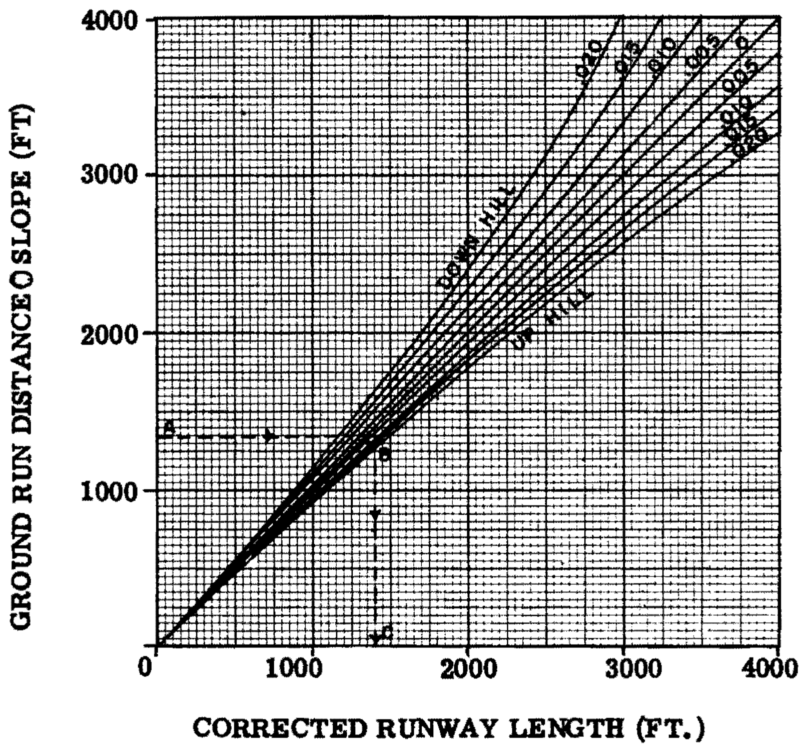


Figure A3-10. Take-Off Ground Run Distance, Runway Slope Correction.

TAKE - OFF PERFORMANCE - REFUSAL SPEED

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

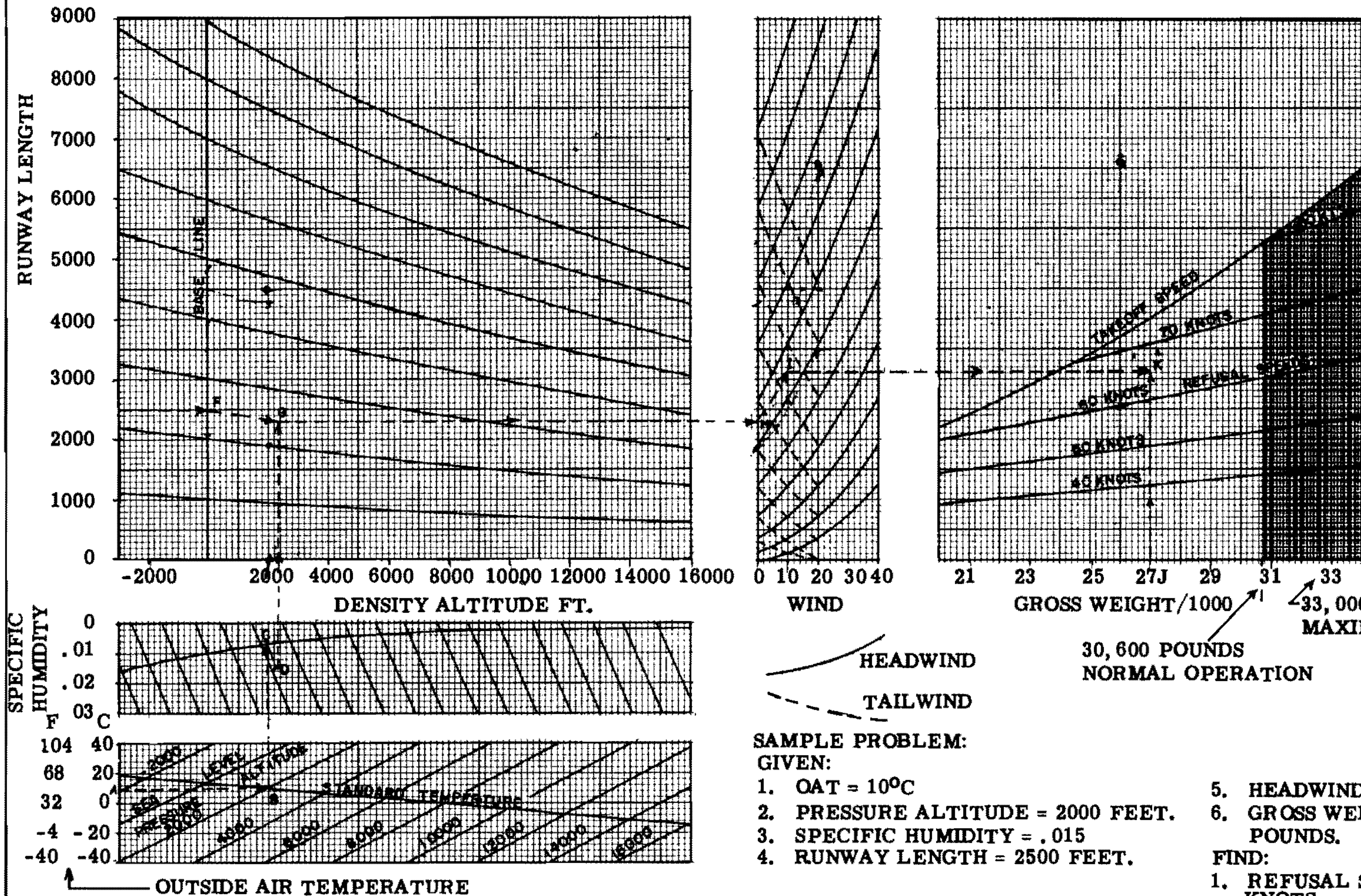
MODEL(S): C-47, C-117, AND R4D

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

ENGINE(S): (2) R-1830-90C (HIGH BLOWER INOPERATIVE) -90D AND -92

NOTE

Use 50 percent of reported headwind and 150 percent of reported tailwind with the correction grid if wind is measured at a source other than the runway. This is a recommended procedure which may be revised at the discretion of the pilot, dependent upon the source of measurement of the wind data.



SAMPLE PROBLEM:

GIVEN:

1. OAT = 10°C
2. PRESSURE ALTITUDE = 2000 FEET.
3. SPECIFIC HUMIDITY = .015
4. RUNWAY LENGTH = 2500 FEET.
5. HEADWIND = 20 KNOTS.
6. GROSS WEIGHT = 27000 POUNDS.

FIND:

1. REFUSAL SPEED = 65 KNOTS.

Figure A3-11. Take-Off Performance - Refusal Speed.

DISTANCE TO STOP - ABORTED TAKE - OFF PROPELLERS WINDMILLING

WING FLAPS = UP

STANDARD ATMOSPHERIC CONDITIONS

ZERO WIND - ZERO RUNWAY SLOPE

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

MODEL(S): C-47,
C-117 AND R4D

ENGINE(S): (2)R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

SAMPLE PROBLEM:
A. INDICATED AIRSPEED = 40 KNOTS.
B. PRESSURE ALTITUDE = 4000 FEET.
C. GROSS WEIGHT = 27000 POUNDS.
D. STOPPING DISTANCE = 650 FEET.

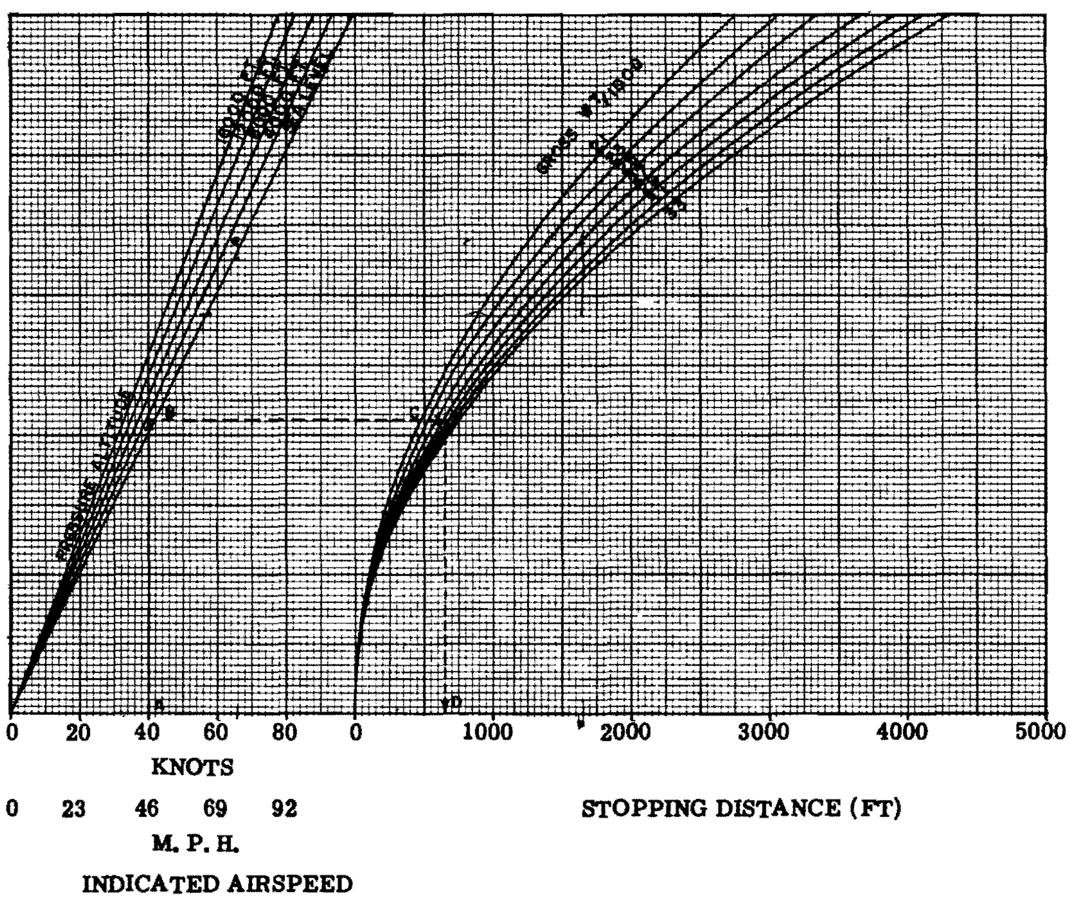
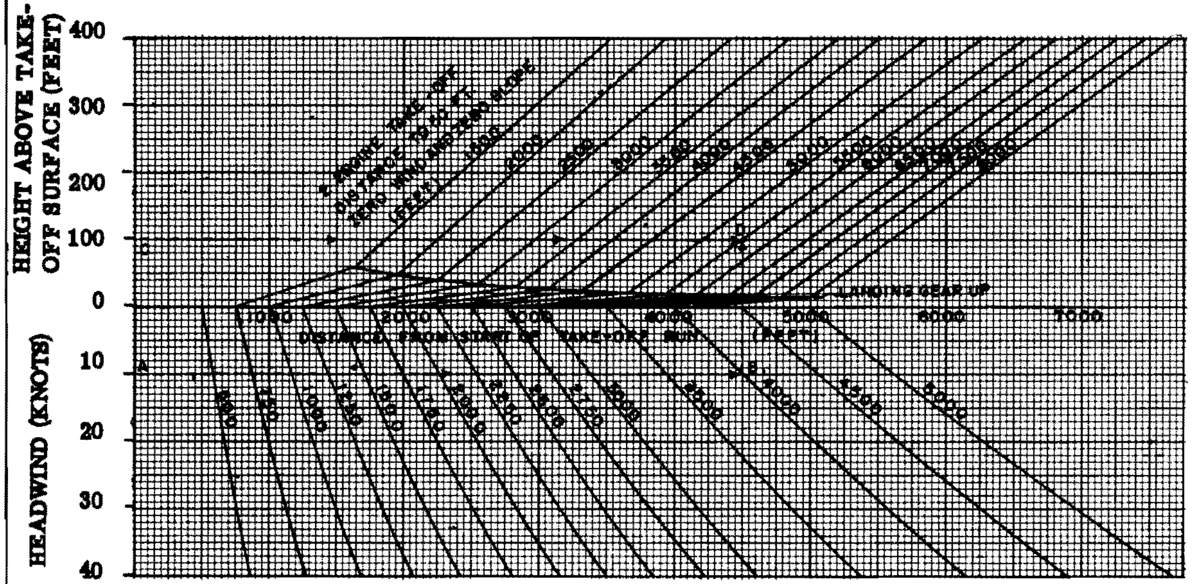


Figure A3-12. Distance to Stop - Aborted Take-Off.

TAKE - OFF PATH

DATA BASIS: FLIGHT TEST
11 JULY 1957

MODEL(S): C-47; R4D
ENGINE(S): (2) R-1830



GEAR RETRACTION INITIATED
AT TAKE-OFF
(7 SEC. RETRACTION TIME)

NOTE

USE 50% OF REPORTED HEADWINDS WITH THE WIND CORRECTION GRID IF WIND IS MEASURED AT A SOURCE OTHER THAN THE RUNWAY. THIS IS A RECOMMENDED PROCEDURE WHICH MAY BE REVISED AT THE DISCRETION OF THE PILOT, DEPENDENT UPON THE SOURCE OF MEASUREMENT OF THE WIND DATA.

SAMPLE PROBLEM:
GIVEN:
1. HEADWIND COMPONENT = 20 KNOTS (POINT A)
2. DISTANCE OF OBSTACLE FROM START OF TAKE-OFF ROLL = 4000 FEET (POINT B)
3. OBSTACLE HEIGHT = 100 FEET (POINT C)
FIND:
1. GEAR DOWN TAKE-OFF DISTANCE OVER A 50 FOOT HEIGHT = 5500 FEET (POINT D)
2. GROUND ROLL DISTANCE TO LIFT OFF = $\frac{5500}{1.95}$ = 2820 FEET.

WARNING

THIS CHART DOES NOT APPLY TO AIRCRAFT IN THE SKI CONFIGURATION.

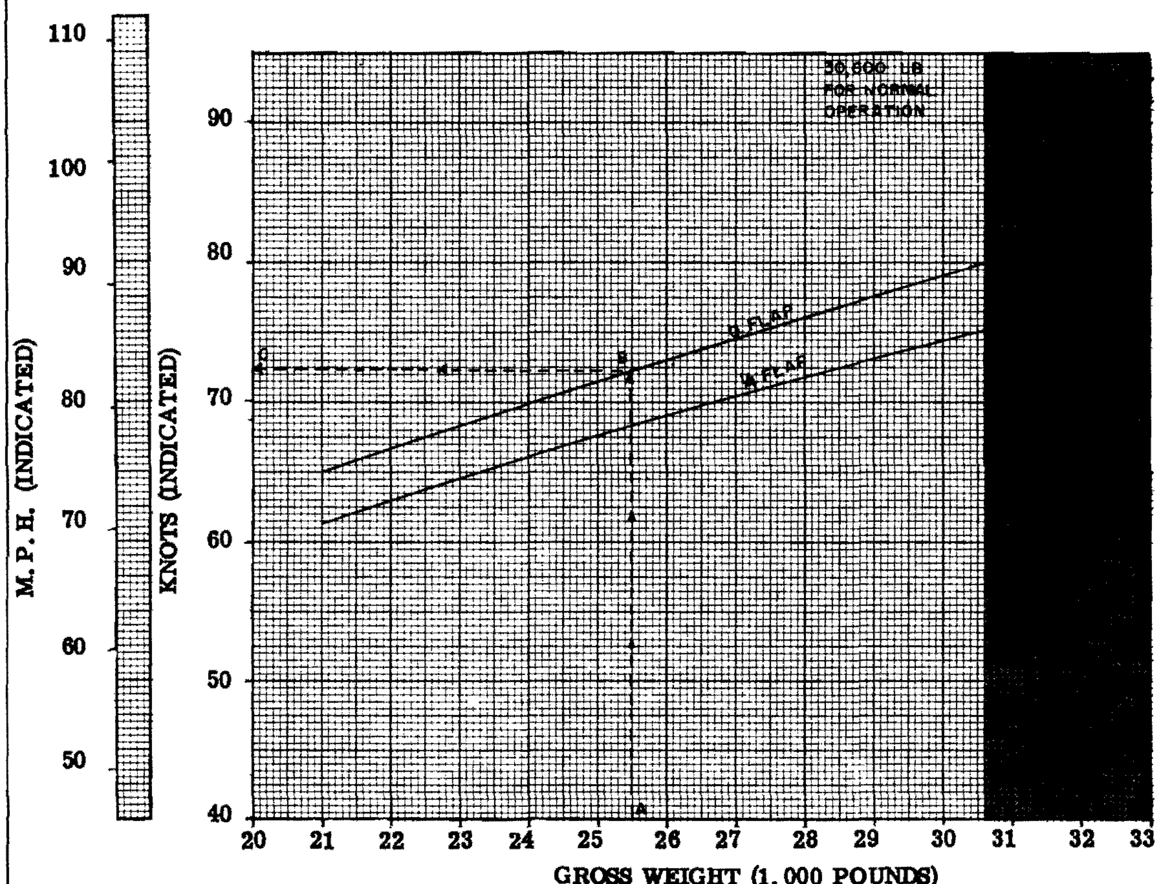
Figure A3-13. Take-Off Path.

CHARACTERISTIC TAKE-OFF SPEEDS LIFT-OFF AT 1.1 Vs

BASED ON: FLIGHT TEST DATA
DATA AS OF: 1 DECEMBER 1949

1. SPEEDS GIVEN ARE AIRSPEED INDICATOR READINGS.
2. A 5 KNOT CORRECTION FOR POSITION ERROR HAS BEEN SUBTRACTED.
3. NO INSTRUMENT ERROR IS INCLUDED.

SAMPLE PROBLEM:
GIVEN:
1. GROSS WEIGHT = 25500 POUNDS (POINT A)
2. WING FLAP SETTING = ZERO (POINT B)
FIND:
1. LIFT-OFF SPEED = 72.2 KNOTS (POINT C)



MODEL(S): C-47; C-117; R4D
ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND - 92

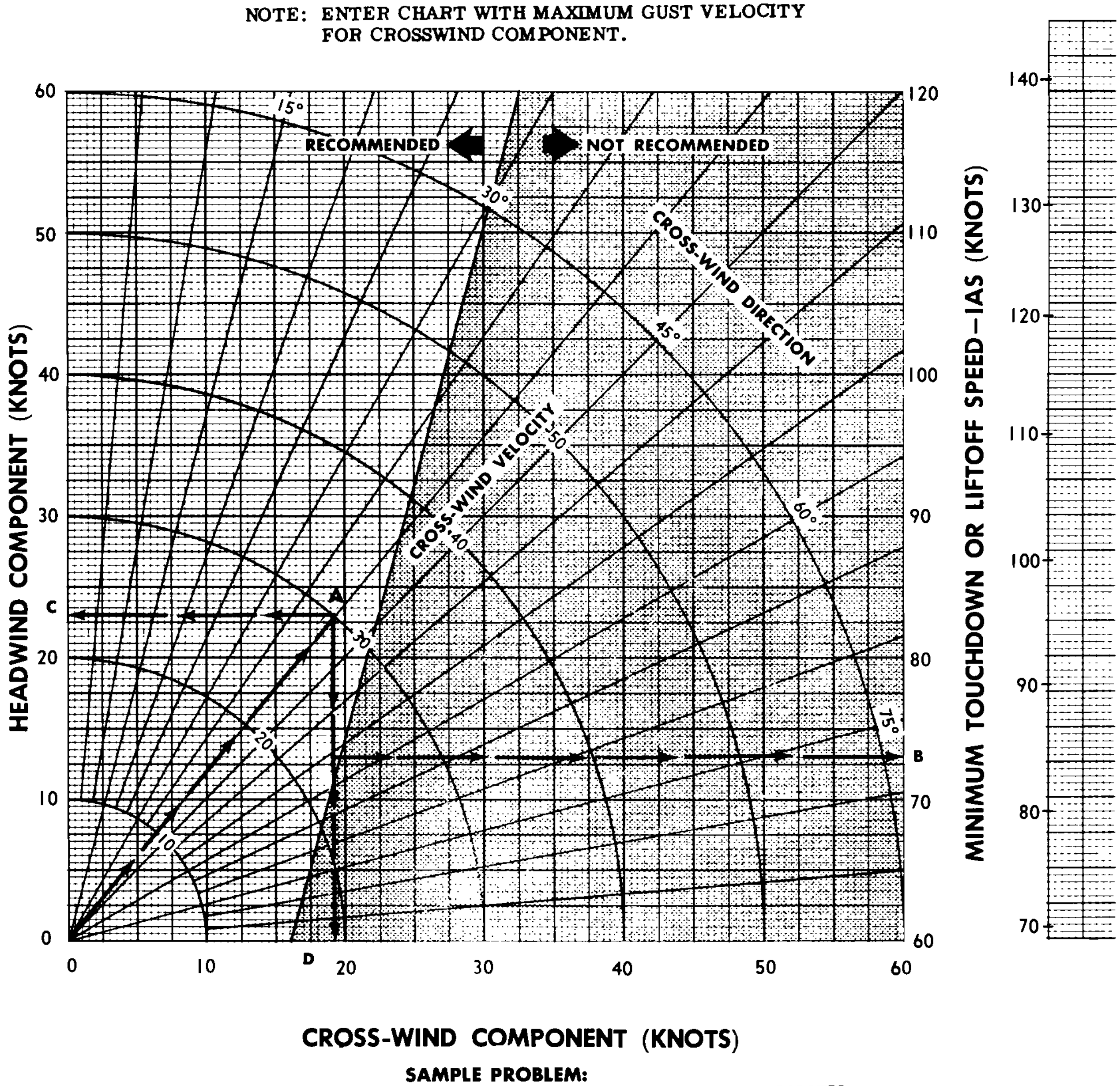
Figure A3-14. Characteristic Take-Off Speeds - Liftoff at 1.1Vs.

TAKE-OFF AND LANDING CROSS-WIND CHART

MODEL: C-47, C-117
AND R4D

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

NOTE: ENTER CHART WITH MAXIMUM GUST VELOCITY
FOR CROSSWIND COMPONENT.



SAMPLE PROBLEM:

GIVEN CONDITIONS:

TAKE-OFF RUNWAY — 30°
WIND GIVEN 70° AT 30 KNOTS
CROSS-WIND DIRECTION = 70° — 30° = 40° (POINT A)

CHART INDICATES:

B. MINIMUM LIFT OFF SPEED — 73 KIAS (84 MPH)
C. HEADWIND COMPONENT — 23 KNOTS
D. CROSS-WIND COMPONENT — 19.5 KNOTS

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

Figure A3-15. Take-Off and Landing Crosswind Chart.

PART FOUR
CLIMB

TABLE OF CONTENTS

LIST OF CHARTS

DISCUSSION OF CHARTS

The time and distance to climb charts (figures A4-1 through A4-14) are used for determining time and distance traveled and the fuel consumed during a climb. Curves are shown for METO and climb power, standard and hot days for the two-engine configurations (with and without skis). Curves are also presented for maximum and METO power for standard day, with and without skis and maximum power for hot day with and without skis in the single engine configuration.

The rate of climb charts (figures A4-15 through A4-24) show the rate of climb for METO and climb power for the two-engine configurations (with and without skis), and the rate of climb for maximum, METO, and climb power for the single-engine configurations (with and without skis).

The emergency ceiling chart (figure A4-26) presents the weights and altitudes at which the rate of climb is 100 feet per minute with METO power for two or one engine operating (with and without skis). Figure A3-1 (take-off gross weight limited by 100 feet per minute rate of climb, single-engine, maximum power) may be used as the emergency ceiling chart for one engine operating at maximum power.

TIME AND DISTANCE TO CLIMB

The time and distance to climb charts (figures A4-1 through A4-14) are presented in facing pairs and are used to determine time and distance traveled and the fuel consumed during a climb to a given altitude for two-engine operation at either METO power or climb power with an without skis for standard and hot day conditions. Charts are also included for maximum and METO power, standard day, with and without skis and maximum power, hot day, with and without skis for the single-engine configuration. To obtain time to climb, enter the time to climb chart (Sheet 1 of 2) on the gross weight scale, with the aircraft gross weight at the start of climb, and project a line parallel to the gross weight guide lines, until the desired pressure altitude curve is intersected. From this intersection, project a line horizontally to the left and read time to climb in minutes. To obtain distance to climb use same procedure on distance to climb chart (Sheet 2 of 2). The gross weight at the end of the climb may be found by projecting a vertical line down from the intersection on the initial gross weight and pressure altitude. The weight at the end of the climb is read on the gross weight scale. Fuel consumed during the climb may be determined from either sheet 1 of 2 or 2 of 2 by subtracting the gross weight at the end of the climb from the gross weight at the beginning of the climb. A sample problem is included on the first chart of this series.

Recommended climb speeds are presented on each chart.

RATE OF CLIMB

The rate of climb charts (figures A4-15 through A4-24), are presented for two and single-engine operation at METO and climb power with and without skis. An additional chart is included for single-engine operation at maximum power with and without skis. The charts are used to determine the rate of climb in feet per minute at a given gross weight. A sample problem is shown on the first of this series to illustrate its use.

Enter the chart at the outside air temperature (Point A) and draw a line vertically to the pressure altitude line (Point B). From this point draw a horizontal line to intersect the given gross weight line (Point C). From Point C, draw a line vertically to the rate of climb scale (Point D), and read the rate of climb in feet per minute.

SAWTOOTH CLIMB

The single engine sawtooth climb chart (figure A4-25) is presented to show the relationship between rate of climb and velocity for given conditions.

EMERGENCY CEILING

The emergency ceiling chart (figure A4-26) shows the gross weight versus pressure altitude at which the aircraft will maintain a rate of climb of 100 feet per minute on a standard day at METO power. These curves are for two and single engine operation with and without skis.

Enter chart at given gross weight (Point A). Draw a line vertically to intersect the appropriate curve (Point B). Draw a line horizontally from Point B to the pressure altitude scale (Point C) and read the pressure altitude in feet.

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TIME TO CLIMB-STANDARD DAY

METO POWER TWO ENGINES

LANDING GEAR - UP WING FLAPS - UP COWL FLAPS - TRAIL

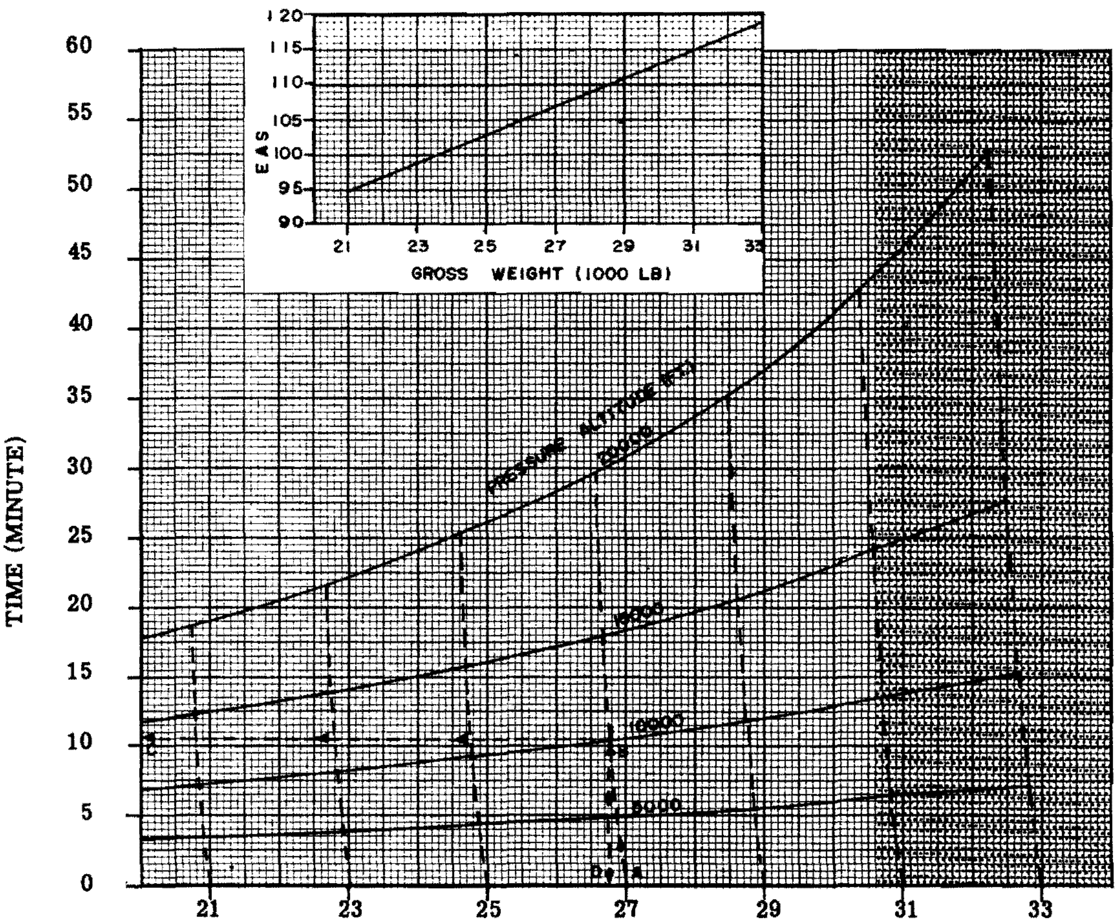
⊡ R/C = 100 FT/MIN

SAMPLE PROBLEM:

A. 27000 POUNDS GROSS WEIGHT AT START OF CLIMB AT SEA LEVEL.
B. PRESSURE ALTITUDE - 10000 FEET.
C. 11 MINUTES - TIME TO CLIMB.
D. FUEL USED EQUALS THE DIFFERENCE BETWEEN THE WEIGHT AT START OF CLIMB (POINT A), AND THE WEIGHT AT END OF CLIMB (POINT D) - 250 POUNDS).

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL



ENGINE(S): (2) R-1830-90C (HIGH BLOWER INOPERATIVE) -90D AND -92

GROSS WEIGHT (1000 POUNDS)

MODEL(S): C-47 C-117 AND R4D

Figure A4-1. Time To Climb - Standard Day - METO Power - Two Engines. (Sheet 1 of 2)

DISTANCE TO CLIMB-STANDARD DAY

METO POWER TWO ENGINES

LANDING GEAR - UP WING FLAPS - UP COWL FLAPS - TRAIL

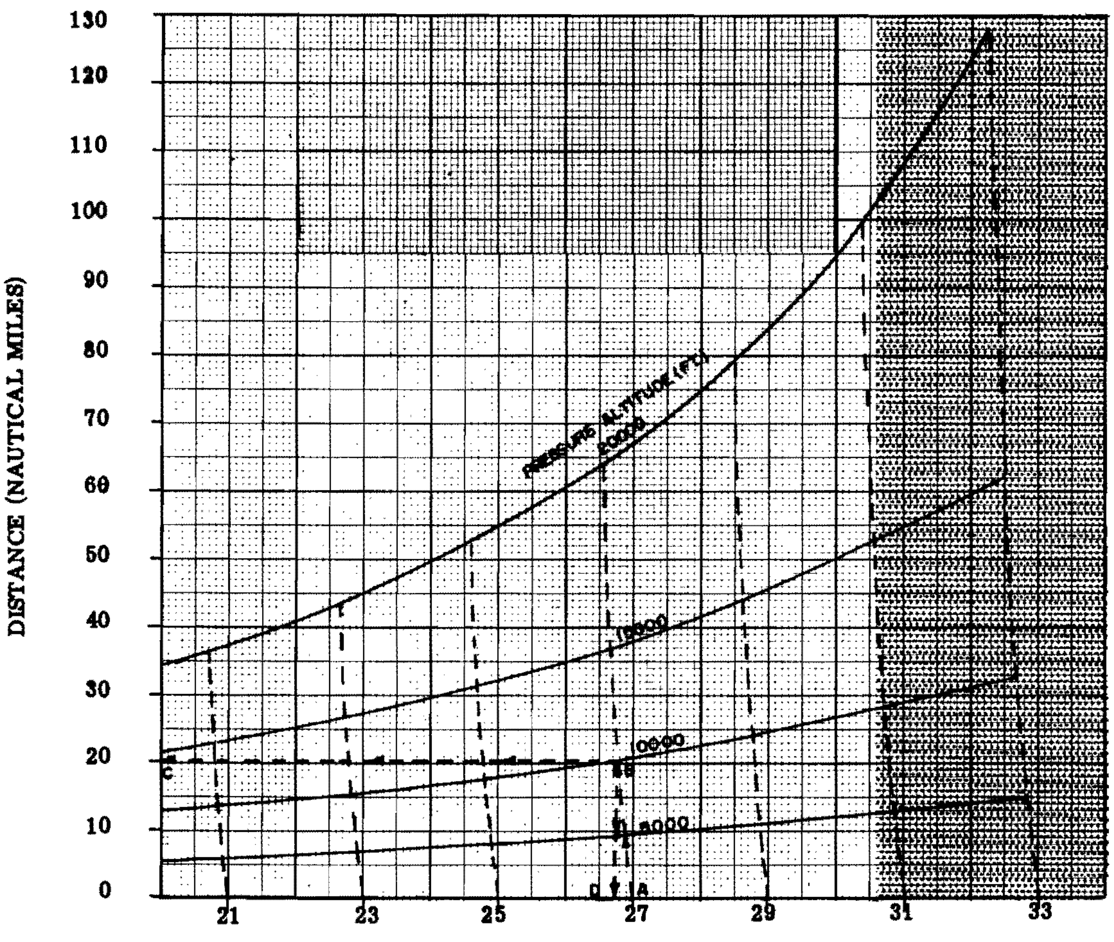
⊡ R/C = 100 FT/MIN

SAMPLE PROBLEM:

A. 27000 POUNDS GROSS WEIGHT AT START OF CLIMB AT SEA LEVEL.
B. PRESSURE ALTITUDE - 10000 FEET.
C. 20.2 NAUTICAL MILES FLOWN DURING CLIMB.
D. FUEL USED EQUALS THE DIFFERENCE BETWEEN THE WEIGHT AT START OF CLIMB (POINT A) AND THE WEIGHT AT END OF CLIMB (POINT D) - 250 POUNDS.

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL



ENGINE(S): (2) R-1830-90C (HIGH BLOWER INOPERATIVE) -90 AND -92

MODEL(S): C-47 C-117 AND R4D

Figure A4-1. Distance To Climb - Standard Day - METO Power - Two Engines. (Sheet 2 of 2)

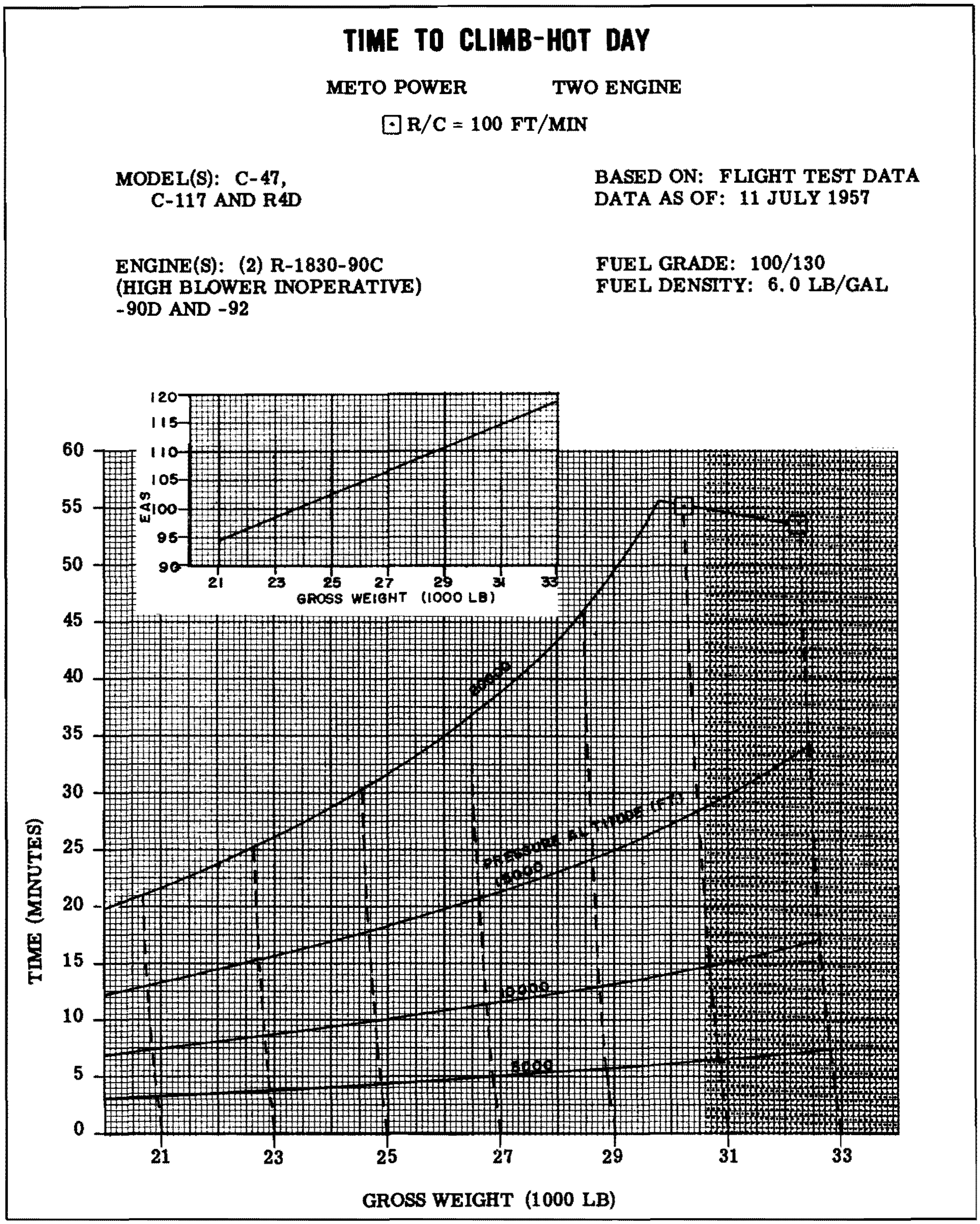


Figure A4-2. Time to Climb - Hot Day - METO Power - Two Engines. (Sheet 1 of 2)

DISTANCE TO CLIMB-HOT DAY

METO POWER   TWO ENGINE

⊡ R/C = 100 FT/MIN

MODEL(S): C-47
C-117 AND R4D

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

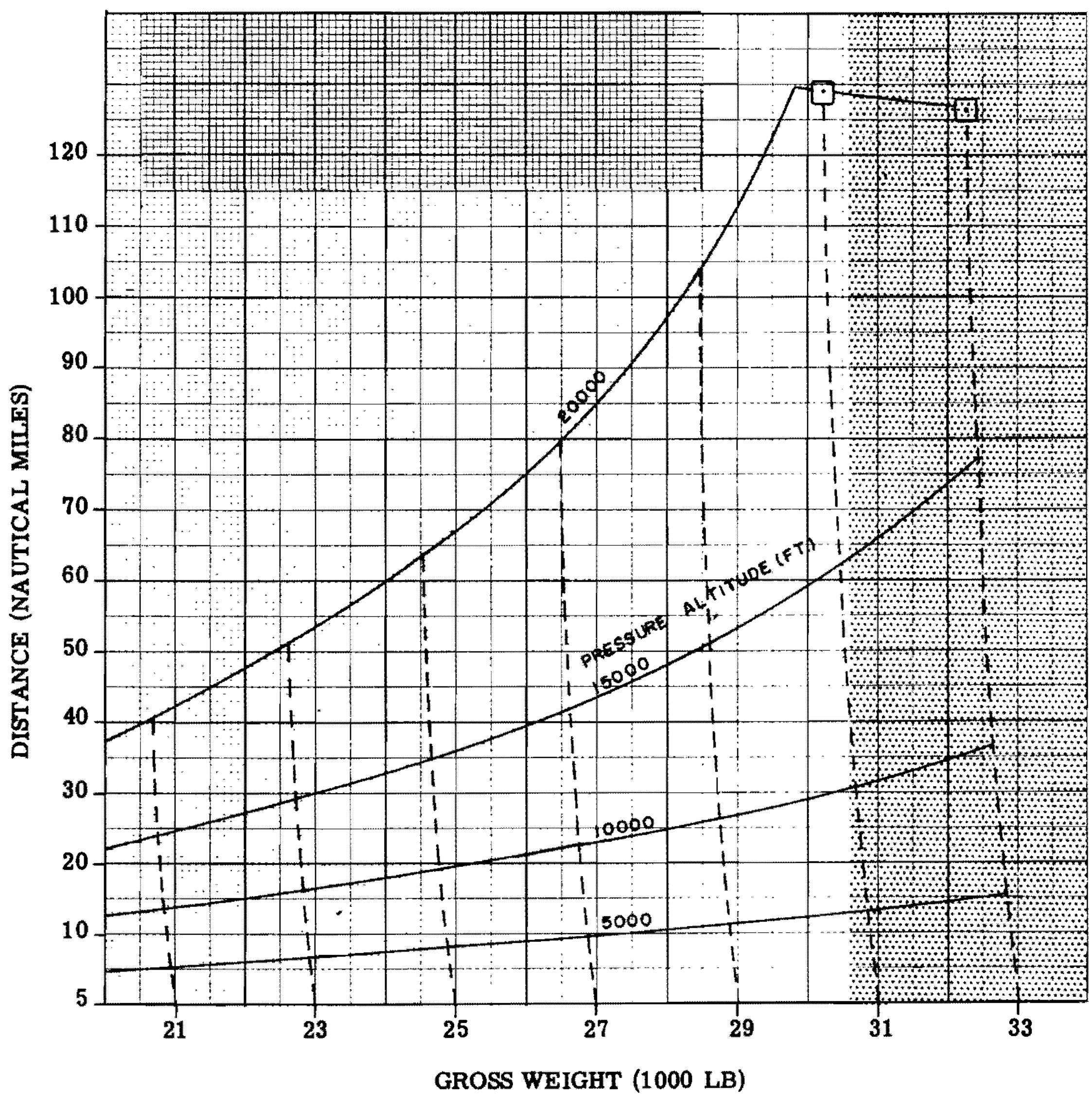


Figure A4-2. Distance To Climb - Hot Day - METO Power - Two Engines. (Sheet 2 of 2)

TIME TO CLIMB-STANDARD DAY

CLIMB POWER TWO ENGINE

☐ R/C = 100 FT/MIN

MODEL(S): C-47,
C-117 AND R4D

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

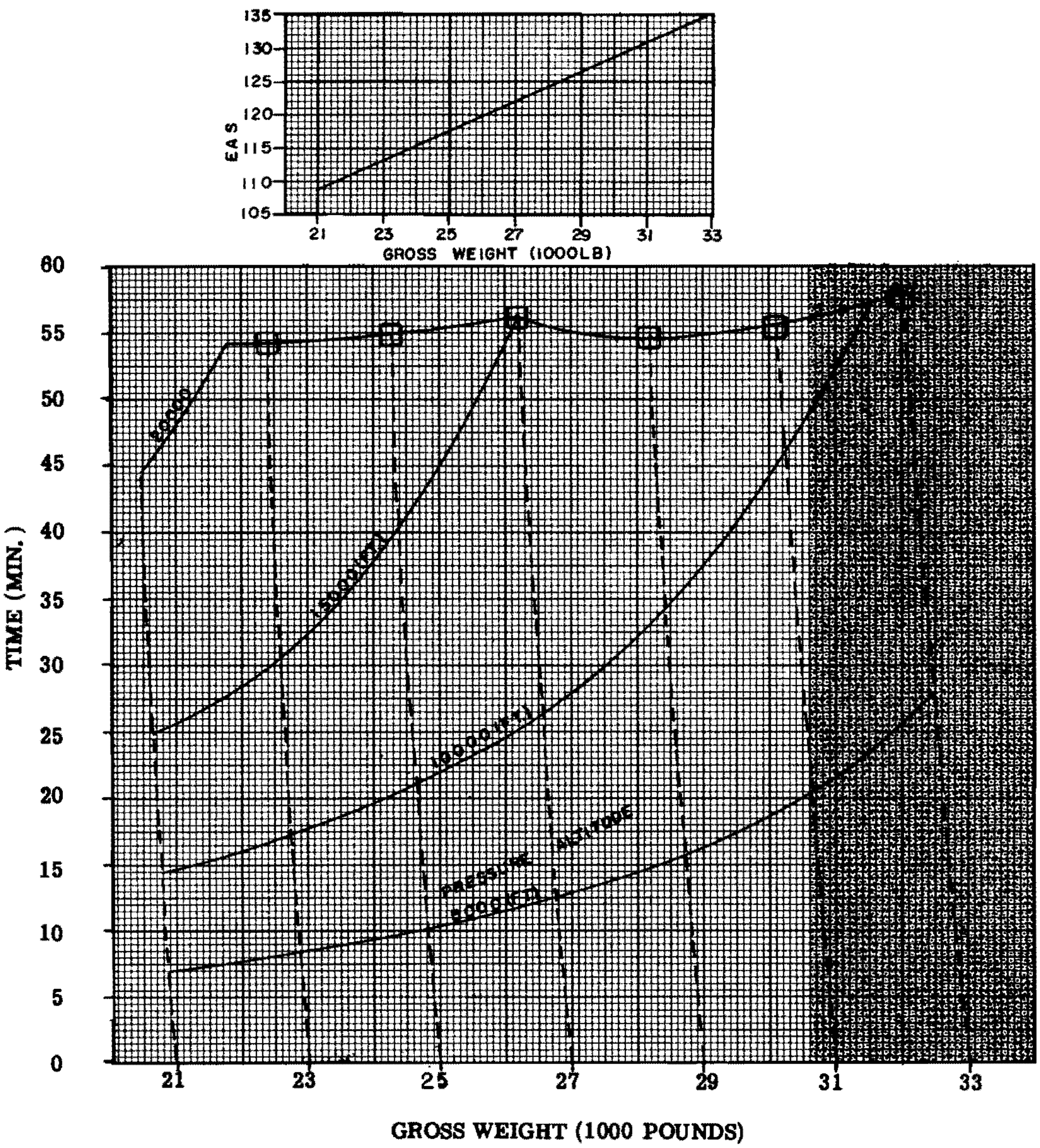


Figure A4-3. Time To Climb - Standard Day - Climb Power - Two Engines. (Sheet 1 of 2)

DISTANCE TO CLIMB-STANDARD DAY

CLIMB POWER TWO ENGINE

⊡ R/C = 100 FT/MIN

MODEL(S): C-47
C-117 AND R4D

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

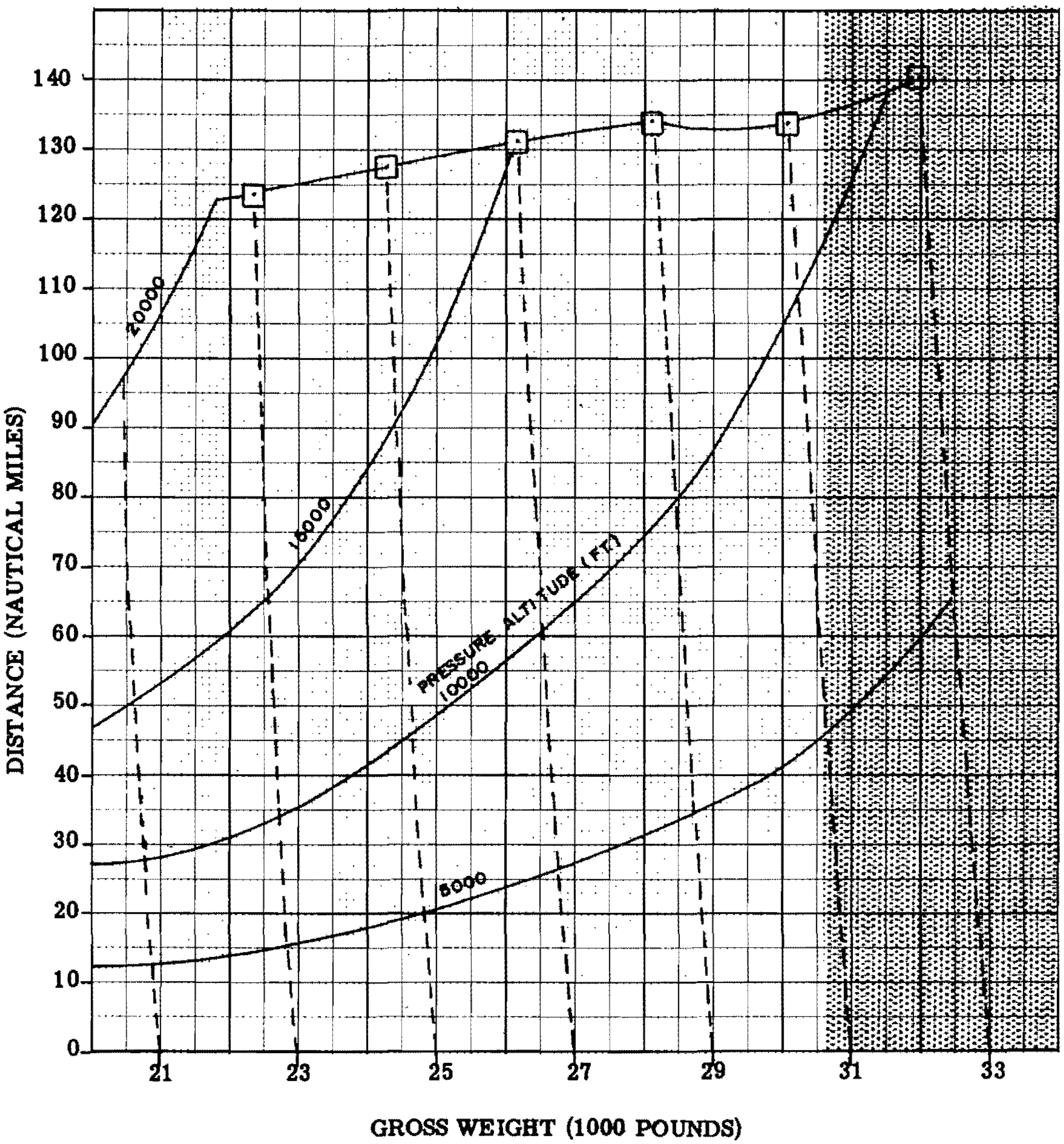


Figure A4-3. Distance To Climb - Standard Day - Climb Power - Two Engines. (Sheet 2 of 2)

TIME TO CLIMB-HOT DAY

CLIMB POWER TWO ENGINE

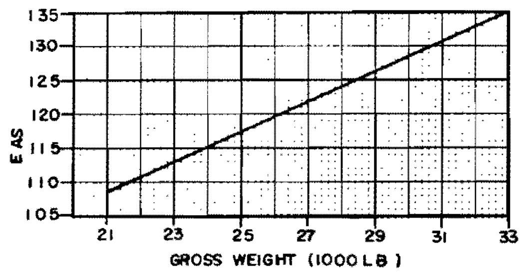
⊡ R/C = 100 FT/MIN.

MODEL(S): C-47,
C-117 AND R4D

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL



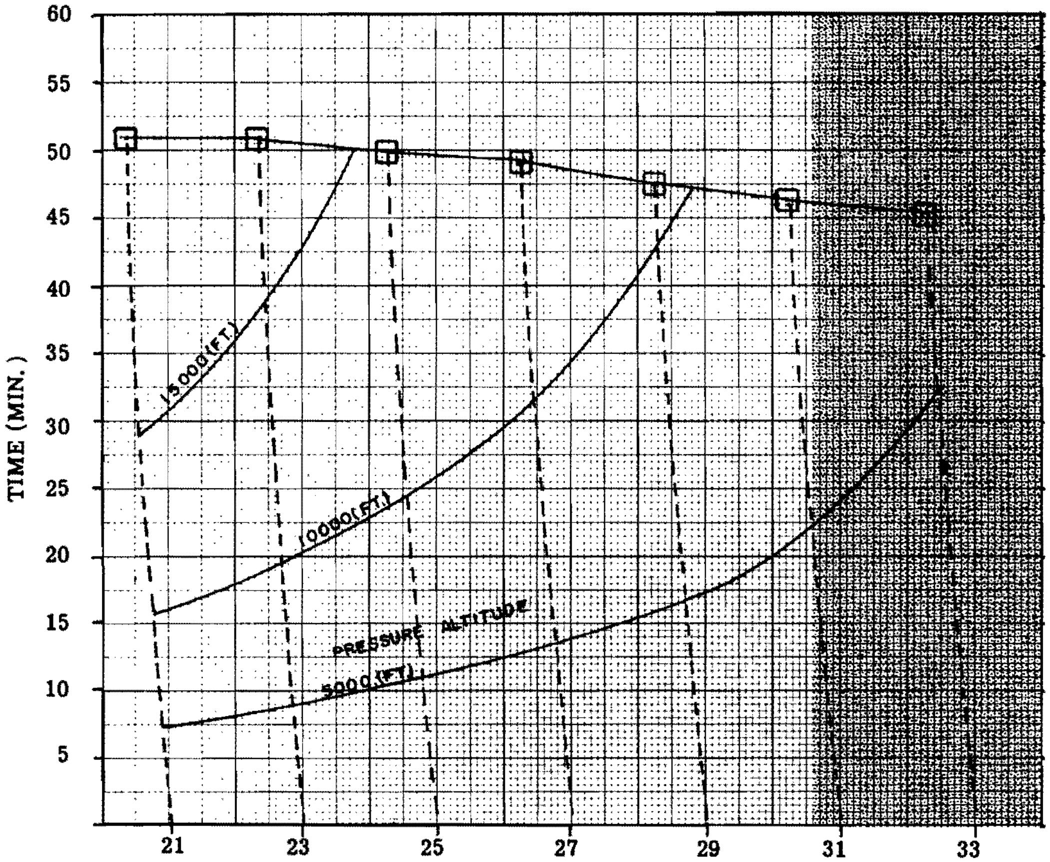


Figure A4-4. Time To Climb - Hot Day - CLIMB Power - Two Engines. (Sheet 1 of 2)

DISTANCE TO CLIMB-HOT DAY

CLIMB POWER TWO ENGINE

[•] R/C = 100 FT/MIN.

MODEL(S): C-47
C-117 AND R4D

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

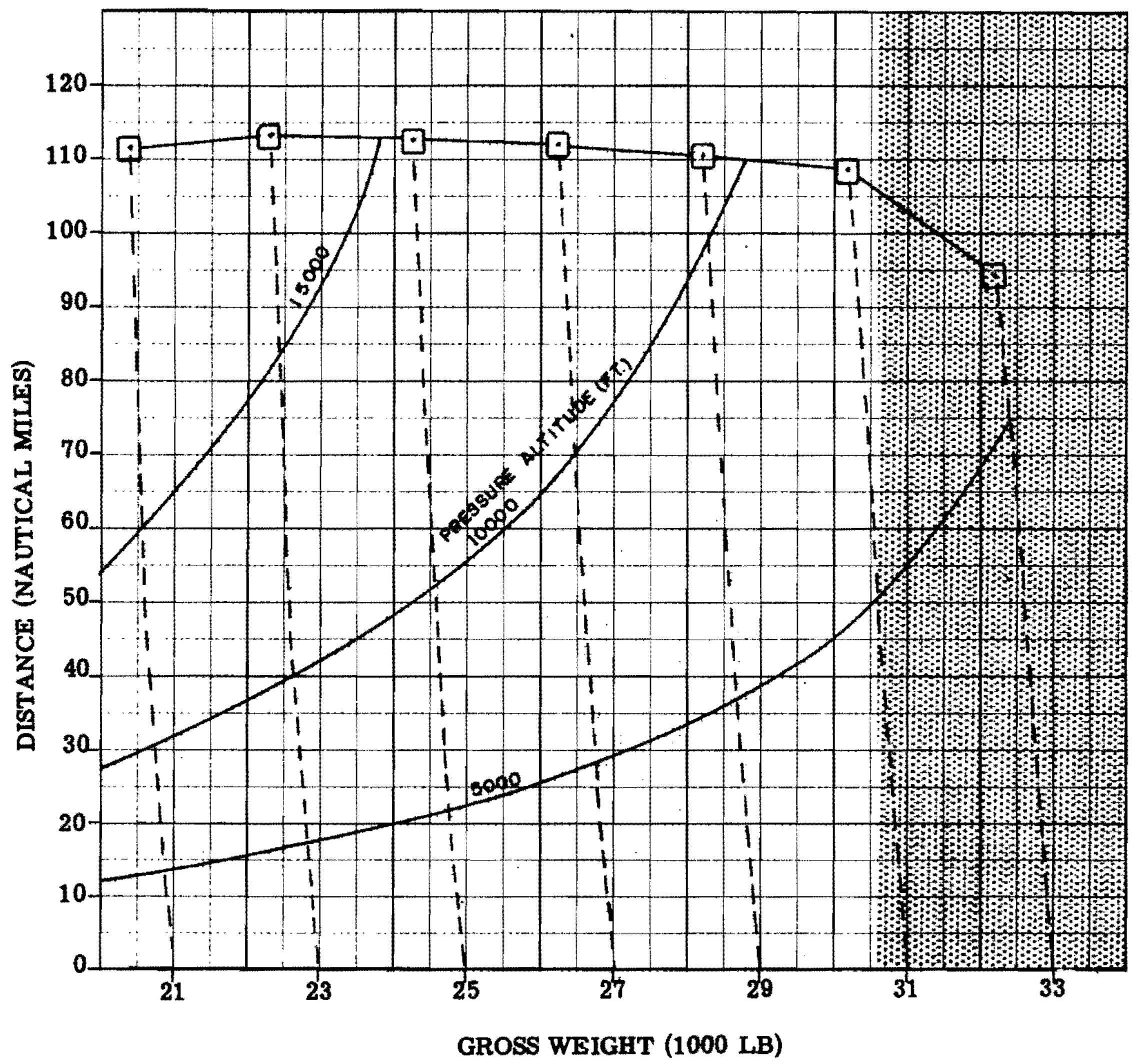


Figure A4-4. Distance To Climb - Hot Day - CLIMB Power - Two Engines. (Sheet 2 of 2)

TIME TO CLIMB-STANDARD DAY

MAX POWER   SINGLE - ENGINE

PROPELLER-FEATHERED ON INOPERATIVE ENGINE

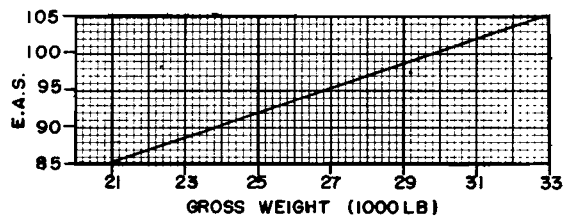
⊡R/C = 100 FT/MIN.

MODEL(S): C-47
C-117 AND R4D

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL



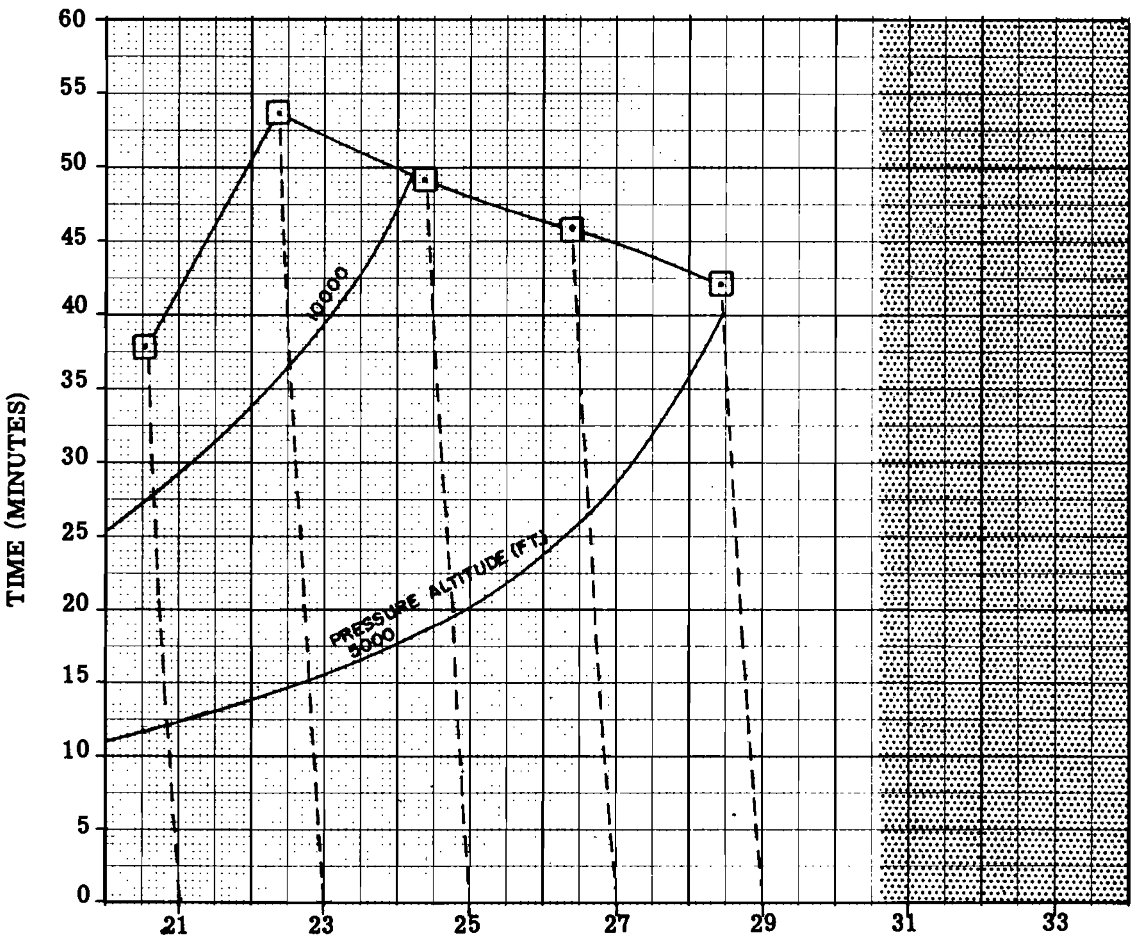


Figure A4-5. Time To Climb - Standard Day - MAX Power - Single Engine. (Sheet 1 of 2)

DISTANCE TO CLIMB-STANDARD DAY

MAX POWER SINGLE - ENGINE

PROPELLER-FEATHERED ON INOPERATIVE ENGINE

⊡ R/C = 100 FT/MIN.

MODEL(S): C-47
C-117 AND R4D

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

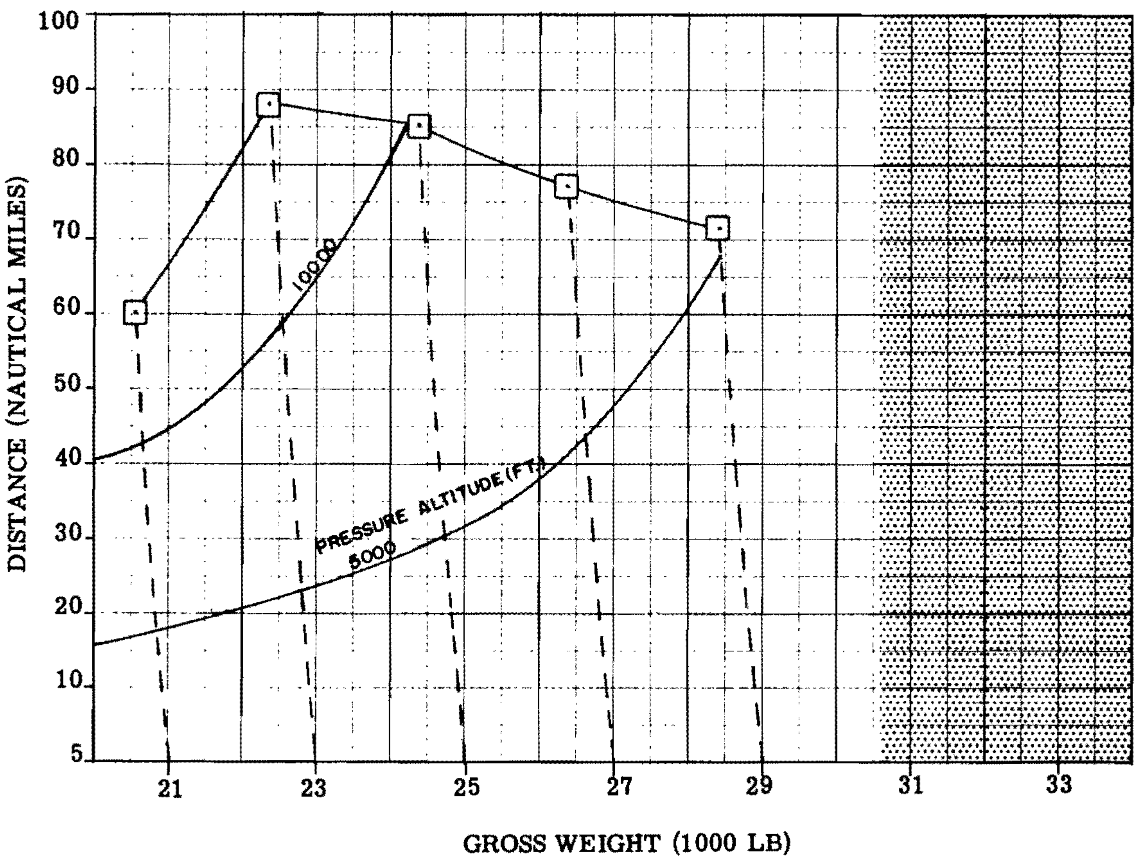


Figure A4-5. Distance To Climb - MAX Power - Single Engine. (Sheet 2 of 2)

TIME TO CLIMB-HOT DAY

MAX POWER SINGLE - ENGINE

PROPELLER-FEATHERED ON INOPERATIVE ENGINE

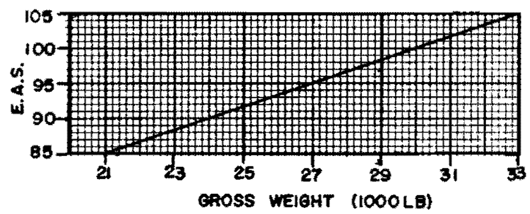
[·] R/C = 100 FT/MIN.

MODEL(S): C-47,
C-117 AND R4D

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL



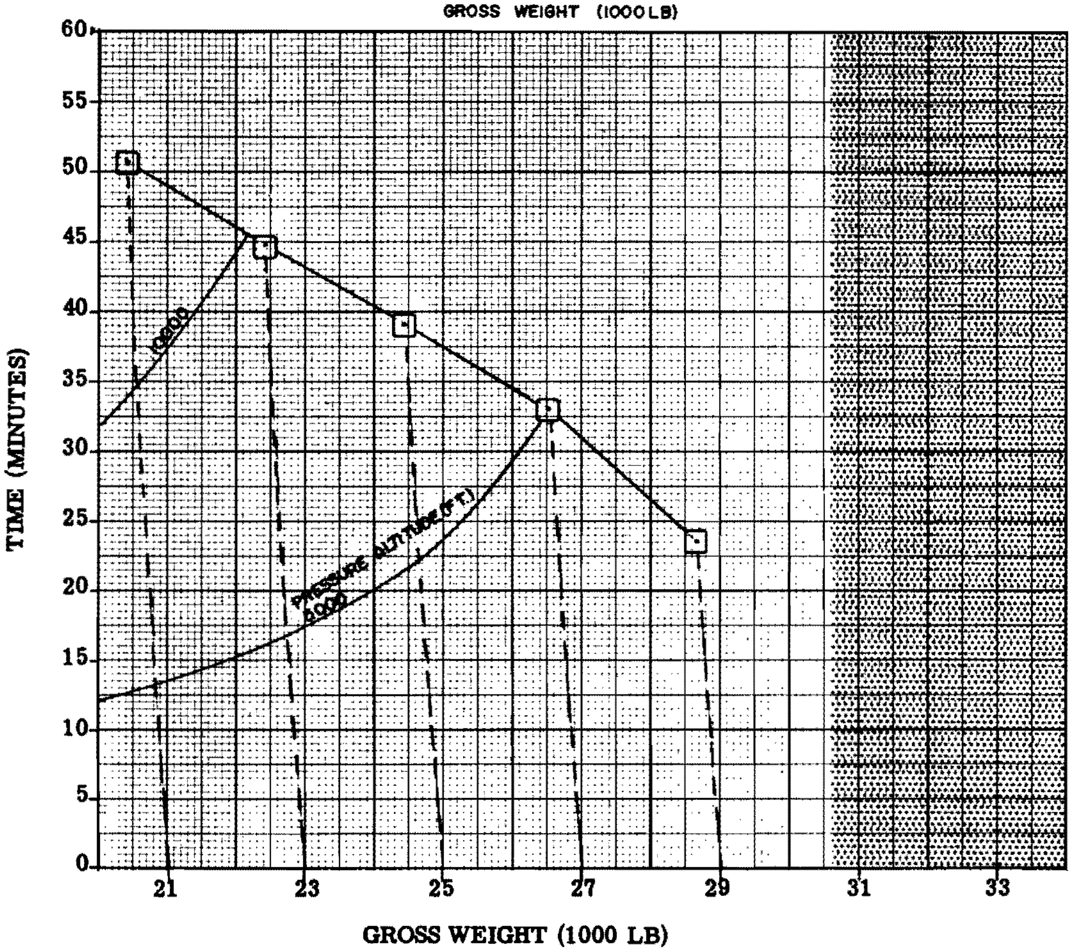


Figure A4-6. Time To Climb - Hot Day - Maximum Power - Single Engine. (Sheet 1 of 2)

DISTANCE TO CLIMB-HOT DAY

MAX POWER SINGLE - ENGINE

PROPELLER-FEATHERED ON INOPERATIVE ENGINE

⊡ R/C = 100 FT/MIN.

MODEL(S): C-47
C-117 AND R4D

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

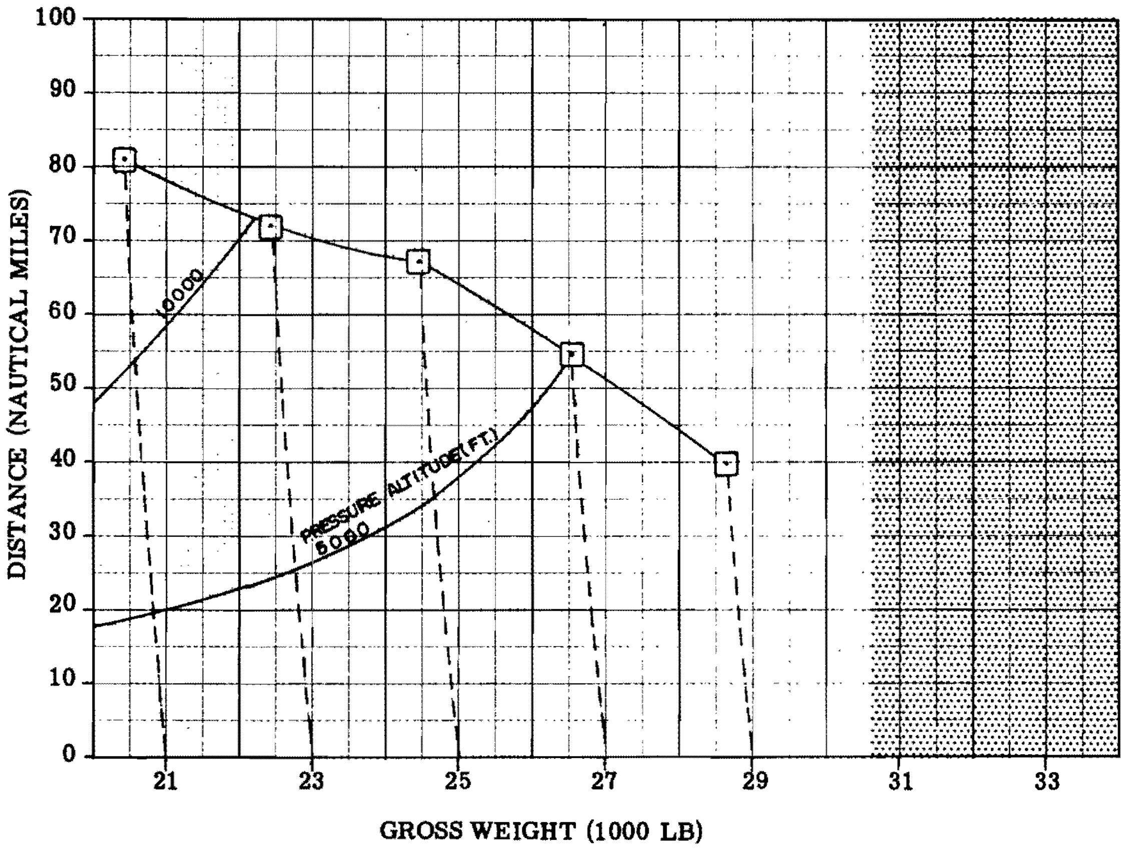


Figure A4-6. Distance To Climb - Hot Day - Maximum Power - Single Engine. (Sheet 2 of 2)

TIME TO CLIMB - STANDARD DAY

METO POWER SINGLE - ENGINE

PROPELLER-FEATHERED ON INOPERATIVE ENGINE

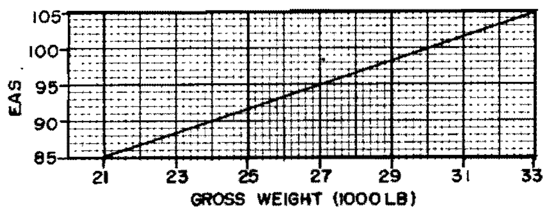
⊡ R/C = 100 FT/MIN.

MODEL(S): C-47,
C-117 AND R4D

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE)
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL



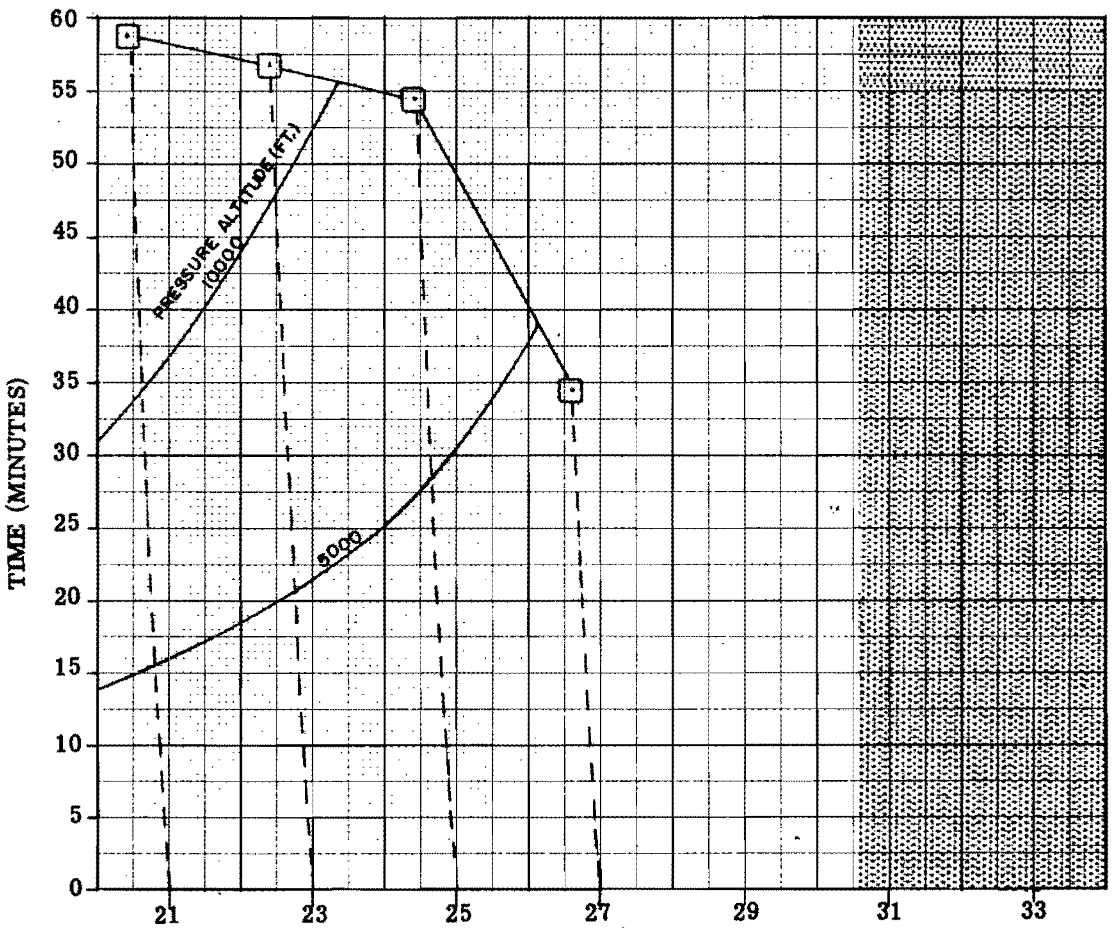


Figure A4-7. Time To Climb - Standard Day - METO Power - Single Engine. (Sheet 1 of 2)

DISTANCE TO CLIMB - STANDARD DAY

METO POWER   SINGLE - ENGINE

PROPELLER-FEATHERED ON INOPERATIVE ENGINE

[•] R/C = 100 FT/MIN.

MODEL(S): C-47,
C-117 AND R4D

BASED ON: FLIGHT TEST DATA
DATA AS OF: 11 JULY 1957

ENGINE(S): (2) R-1830-90C
(HIGH BLOWER INOPERATIVE
-90D AND -92

FUEL GRADE: 100/130
FUEL DENSITY: 6.0 LB/GAL

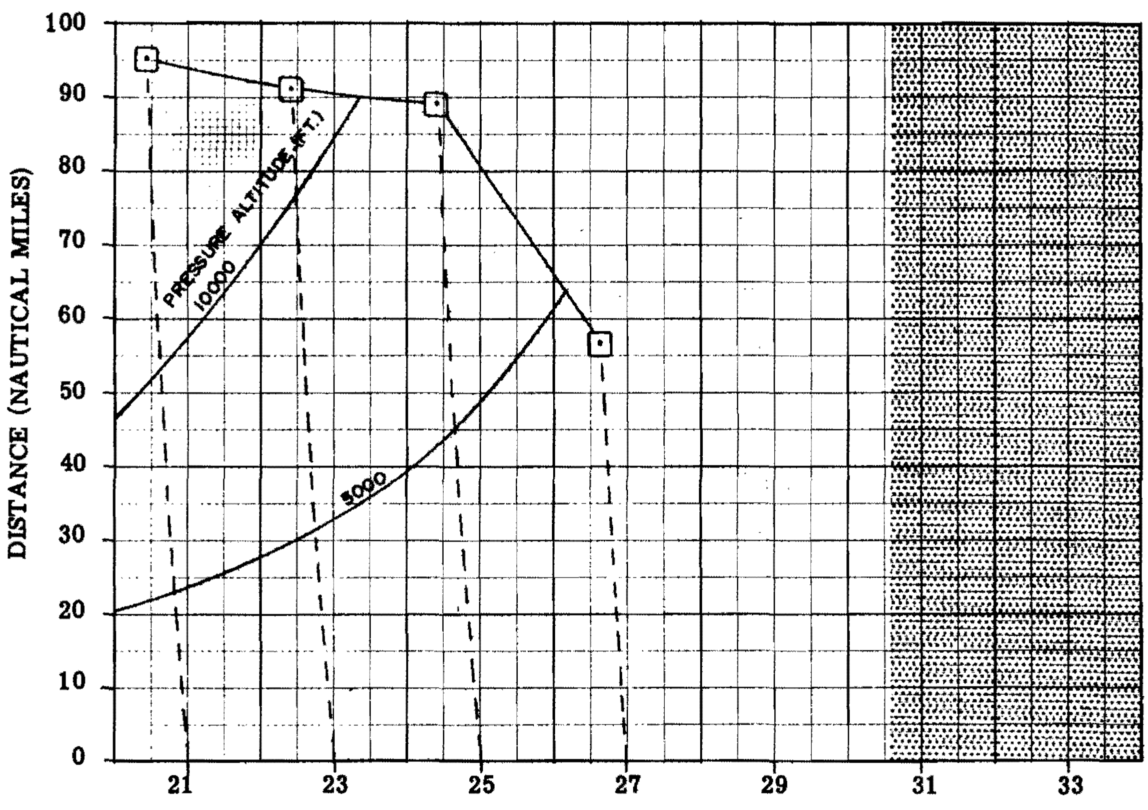


Figure A4-7. Distance To Climb - Standard Day - Maximum Power - Single Engine. (Sheet 2 of 2)