



## appendix I

## PERFORMANCE DATA

CDC-1.75A

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#### INTRODUCTION.

This appendix is prepared, and included, to facilitate preflight and in-flight planning. The information has been prepared from actual flight test information and is based on normal technique as set forth in Section II. If utilized it will afford accurate information on the aircraft performance.

#### AIRSPEED POSITION CORRECTION.

This graph (figure A-1) is provided for computing calibrated airspeed (CAS) from indicated airspeed (IAS). The chart form is self-explanatory.

#### POWER SCHEDULE.

The power schedule table (figure A-2) and power

schedule graphs (figures A-3 thru A-6) presents the power settings for the normal operating schedule from sea level to 13,000 feet. The power curves provide a power range from minimum power to take-off power. Data shown on the power schedule graphs and power schedule table represent performance to be expected of average engines in good mechanical condition.

#### NAUTICAL MILES PER POUND OF FUEL.

The nautical miles per pound of fuel curves (figures A-7 through A-10) have been prepared for altitudes from sea level to 13,000 feet. The gross weight parameters range from 7,500 to 10,500 pounds. Power settings shown will result in maximum

over-all operating efficiencies under standard day conditions.

### FUEL FLOW PER ENGINE.

The fuel flow per engine curves (figures A-11 through A-14) are plotted to show fuel flow per engine versus brake horsepower and are based on altitudes ranging from sea level to 13,000 feet.

### TAKE-OFF CURVE.

The take-off curve (figure A-15) presents the ground run distance using a hard surface runway and no flaps. The graph consists of an altitude-temperature curve, a ground roll distance curve, and parameters of gross weight. A correction plot for various head winds and conversion information required to obtain the take-off distance is also included. From this graph it is possible to predict the required ground roll if the runway altitude, temperature, aircraft gross weight, and head winds are known. The total take-off distance to clear a 50-foot obstacle is approximately 115% of the ground run distance.

### CLIMB CURVE.

From the climb curve (figure A-16), distance versus weight, fuel consumed in climb, and service ceiling may be determined.

### SINGLE ENGINE CLIMB.

The single engine climb graph (figure A-17) is plotted to furnish the single engine rate-of-climb at various weights and altitudes.

### LANDING CURVE.

The landing curve (figure A-18) provides the lengths of landing roll on a runway with a hard, dry surface at various weights, altitudes, temperatures and head winds. The total landing distance required to clear a 50-foot obstacle is approximately 200 percent of the ground roll distance.

### MAXIMUM ENDURANCE.

The maximum endurance graph (figure A-19) outlines the power settings for minimum fuel consumption in level flight for various altitudes.

### LONG RANGE PREDICTION GRAPHS.

These graphs (figures A-20 through A-23) are plotted to furnish the maximum aircraft range and time to cruise for a given amount of fuel used at a constant altitude. The graphs are plotted on the basis of nautical miles versus gross weight and time versus gross weight and are provided for either single or twin engine operation.

### EMERGENCY CLIMB.

The emergency climb graphs (figures A-24 and A-25) are furnished to provide the rate of climb for both single and twin engine operation in the clean configuration at sea level.

### EMERGENCY SERVICE CEILING.

The emergency service ceiling graph (figure A-26) is furnished to provide the maximum altitudes at which rate-of-climb is 100 feet-per-minute at momentary weight. The graph is a plot of altitude versus gross weight and is furnished for both twin and single engine operation.

### USE OF GRAPHS.

The following sample problems, based on a typical mission and employing actual graphic values, demonstrates the proper use of the graphs.

**PROBLEM:** It is required that you fly four passengers to a base 625 statute miles away. The first 200 miles must be flown above 3000 feet altitude and the remainder above 8000 feet altitude due to terrain.

### KNOWN FACTORS:

Required Range	625 Statute Miles (543 Nautical Miles)
Weather	CAVU
Basic Weight	6350 Pounds
Personnel Weight	1200 Pounds (6 Men at 200 Pounds Per Man)
Fuel Weight	1512 Pounds (252 Gallons at 6 Pounds Per Gallon)
Oil Weight	120 Pounds (16 Gallons at 7.5 Pounds Per Gallon)
Total Weight	9182 Pounds

In completing the actual flight plan, each separate flight condition should be treated as a separate problem. In this particular case, we will have four basic steps.

With the weight determined at start of cruise from the climb graph (Figure A-16) and the distance to be covered, the fuel used during mission may be found by using long-range prediction-distance graph (Figure A-20). With this information, the time and power setting can be found from long-range prediction-time (Figure A-21) and maximum endurance (Figure A-19).

From the Climb Curve (Figure A-16).

LEG 1	CLIMB
Initial weight	9182 lb.
Warm-up (5 gal.)	30 lb.
Climb	48 lb.
Take-off weight	9152 lb.
Fuel (1512 lb.)	252 gal.
Altitude	SL to 5000 ft.
Fuel used (78 lb.)	13 gal.

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From the Power Schedule Chart (Figure A-2).

Power setting 2300 rpm  
38 in. Hg at SL  
33 in. Hg at 5000 ft.  
full rich

NOTE: RPM, MP, and Mixture:

These items are read directly from the power schedule chart. The fuel used in climb was read directly from climb curve (Figure A-16). This value plus five gallons for warm-up and take-off is equal to 13 gallons. Climb distance equals 6.5 miles (7.5 statute miles) in 4.2 minutes (.07 hours).

<b>LEG 2</b>	<b>CRUISE</b>
Aircraft weight	9104
Fuel in gallons	239
Distance to travel	200 statute miles 174 nautical miles

From long-range prediction-distance—5000 ft. (Figure A-20).

Fuel used 224 lb.  
37 gal.

From nautical miles per pound of fuel—5000 ft. (Figure A-8).

True air speed 126 kts.  
Power setting 1600 rpm  
24.5 in Hg  
Manual lean

Time (Distance ÷ Air Speed) 1.38 hr.

#### NOTE

Weight:

13 (Gal. of fuel used in Leg 1) × 6  
(Lb./Gal.) = 78 lb. 9182 - 78 = 9104 lb.  
at the start of Leg 2.

The cruise speed power settings were based on 99-percent maximum miles per pound calculations.

<b>LEG 3</b>	<b>CLIMB</b>
Aircraft weight	8880
Fuel in gallons	202
Altitude	5000 to 10000 ft.

From the Power Schedule (Figure A-2).

Power setting 2300 rpm  
33 in. Hg at 5000 ft.  
27.5 in. Hg at 10000 ft.  
full rich

From the Climb Curve (Figure A-16).

Fuel used (90 lb.) 15 gal.  
Climb distance from Figure 15 nautical miles  
(17.2 statute miles)  
Climb time 5.2 min.  
(.09 hr.)

#### NOTE

Fuel Used:

Change of weight from 5000 to 10000 feet  
on climb curve is fuel consumed.

Weight: Weight at start of second climb (Leg 3) is initial weight minus weight of fuel used in Legs 1 and 2.  $9182 - (78 + 224) = 8880$  pounds at start of Leg 3.

Fuel:

Original fuel minus fuel used in Legs 1 and 2 gives  $252 - (13 + 37) = 202$  gallons at the beginning of Leg 3.

<b>LEG 4</b>	<b>CRUISE</b>
Aircraft weight	8790 lb.
Fuel in gallons	187
Distance	400 statute miles 347 nautical miles

From long-range prediction-distance 10000 ft. (Figure A-20).

Fuel used 440 lb.  
73 gal.

From nautical miles per pound—10000 ft. (Figure A-9).

True air speed 134 kts.  
1600 rpm  
22.5 in. Hg  
manual lean  
2.6 hr.

#### NOTE

Weight:

Weight at start of Leg 4 is initial weight less fuel used in Legs 1, 2 and 3.  $9182 - (78 + 224 + 90) = 8790$  pounds.

Fuel:

Original fuel minus that used in Legs 1, 2, and 3 gives  $252 - (13 + 37 + 15) = 187$  gallons.

Fuel Used:

Fuel used was the change in weight starting at 8790 pounds and traveling 347 nautical miles as determined by the use of the long-range prediction-distance curve.

Fuel Remaining at End of Mission:

Initial fuel minus fuel used in Legs 1, 2, 3, and 4 gives  $252 - (13 + 37 + 15 + 73) = 114$  gallons.

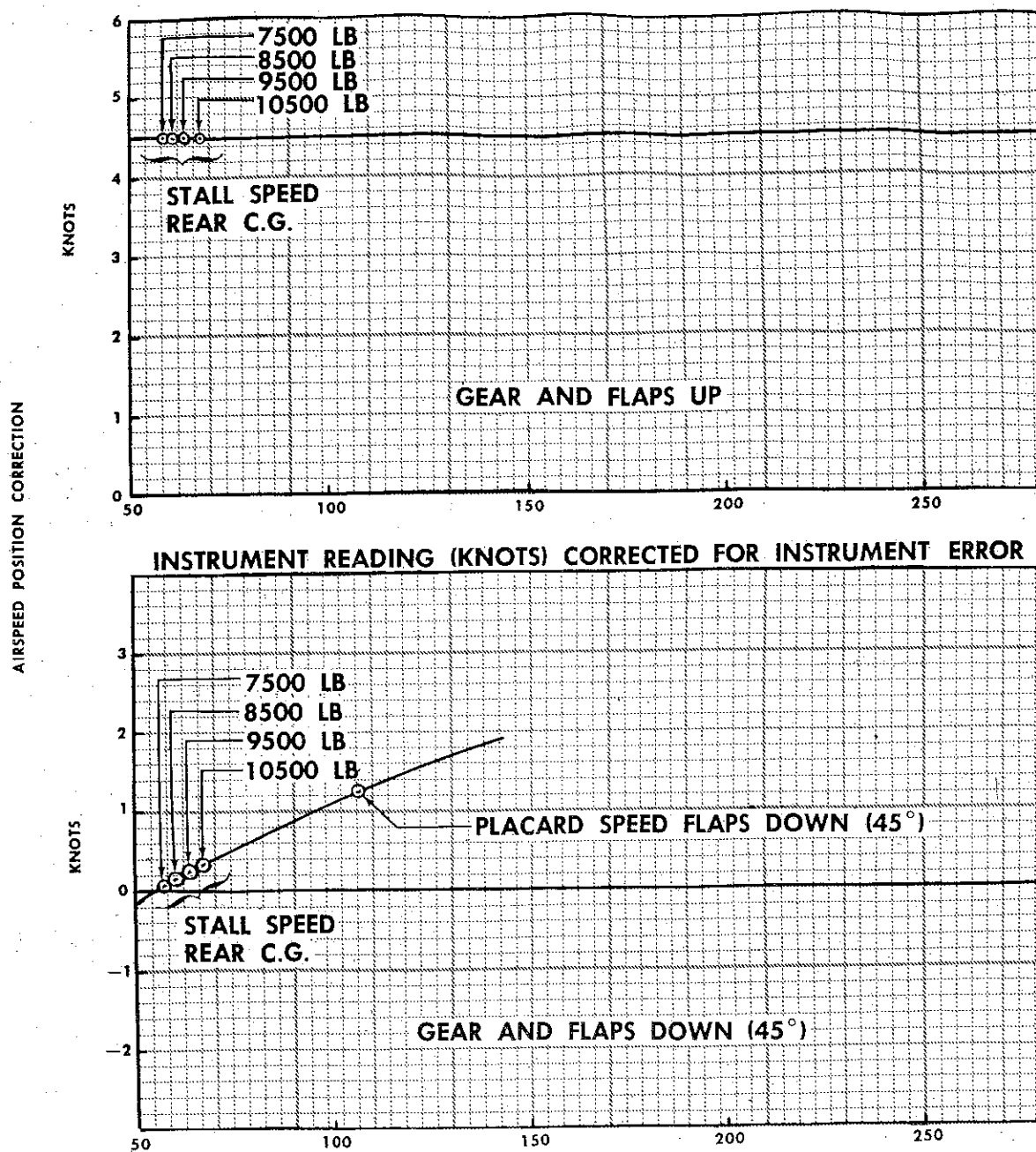
Mission time includes the time used in Legs 1, 2, 3, and 4 =  $.07 + 1.38 + .09 + 2.60 = 4.14$  hr.

#### TOTAL MISSION

Distance to climb 5000 ft.	8 mi.
Cruise at 5000 ft.	200 mi.
Distance to climb from 5000 ft. to 10000 ft.	17 mi.
Cruise at 10000 ft.	400 mi.
<b>TOTAL</b>	<b>625 mi.</b>

# AIRSPEED POSITION CORRECTION STANDARD DAY

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

DATA AS OF: JULY, 1952

FUEL GRADE: 91/96

DATA BASED ON: FLIGHT TEST

FUEL DENSITY: 6.0 LB/GAL

Figure A-1

# **POWER SCHEDULE** **APPROXIMATE MANIFOLD PRESSURE REQUIRED**

MODEL C-45G

ENGINE(S): (2)R985-AN-1,3

14B

MIXTURE	RPM	BHP	SEA LEVEL	5000 FT	10000 FT	13000 FT
MANUAL LEAN	2300	276				24.7
	2200	264				24.5
	2100	360		32.5		
	2100	285			27.0	
	2100	250				24.3
	2000	309	33.5			
	2000	312		30.7		
	2000	270			26.7	
	2000	236				24.0
	1900	285	33.0	30.0		
	1900	254			26.2	
	1900	220				23.7
	1800	270	33.0	30.0		
	1800	236			25.7	
	1800	203				23.2
	1700	255	32.8	29.9		
	1700	217			25.2	
	1700	186				22.5
	1600	240	32.7	29.7		
	1600	220	31.0	28.3		
	1600	200	29.5	26.9	24.8	
	1600	160	26.4	24.0	21.5	21.6
	1600	140	24.7	22.5	19.7	20.5
	1600	100	21.6	19.7		
FULL RICH	2300	450	38.0			
	2300	398		33.5		
	2300	313			27.4	
	2200	406	36.0			
	2200	383		33.2		
	2200	300			27.2	
	2100	357	34.0			
BEST POWER	2300	408		33.3		
	2300	330			27.5	
	2300	296				24.8
	2200	388		33.0		
	2200	316			27.0	
	2200	284				24.5
	2100	360		32.0		
	2100	300			26.8	
	2100	270				24.2
	2000	311		29.5		
	2000	284			26.5	
	2000	256				24.0
	1900	286		28.8		
	1900	266			26.0	
	1900	242				23.5
	1800	270		28.7		
	1800	250			25.5	
	1800	225				23.0
	1700	255		28.5		
	1700	232			25.3	
	1700	206				22.4
	1600	240		28.5		
	1600	200		25.8	24.0	
	1600	160		23.0	21.0	20.0
	1600	140		21.5	19.5	18.5
	1600	120		20.3	18.2	17.0
	1600	100		18.8	16.8	15.5
	1600	80		17.5		

DATA AS OF: JULY, 1952

FUEL GRADE: 91/96

DATA BASED ON: FLIGHT TEST

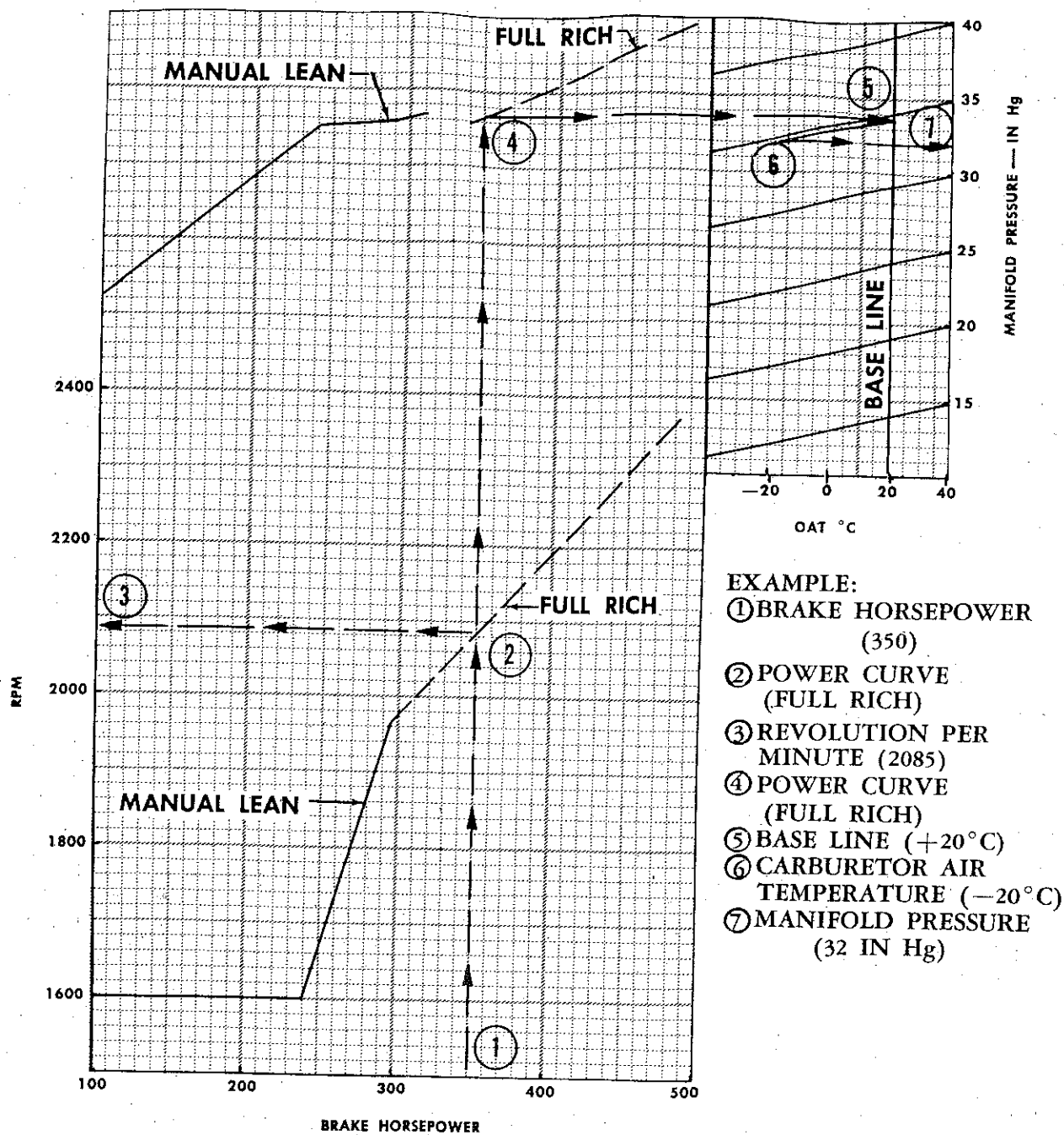
FUEL DENSITY: 6.0 LB/GAL

Figure A-2

## POWER SCHEDULE

MODEL C-45

SEA LEVEL

ENGINE(S): (2) R985-AN-1,3,  
14B

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

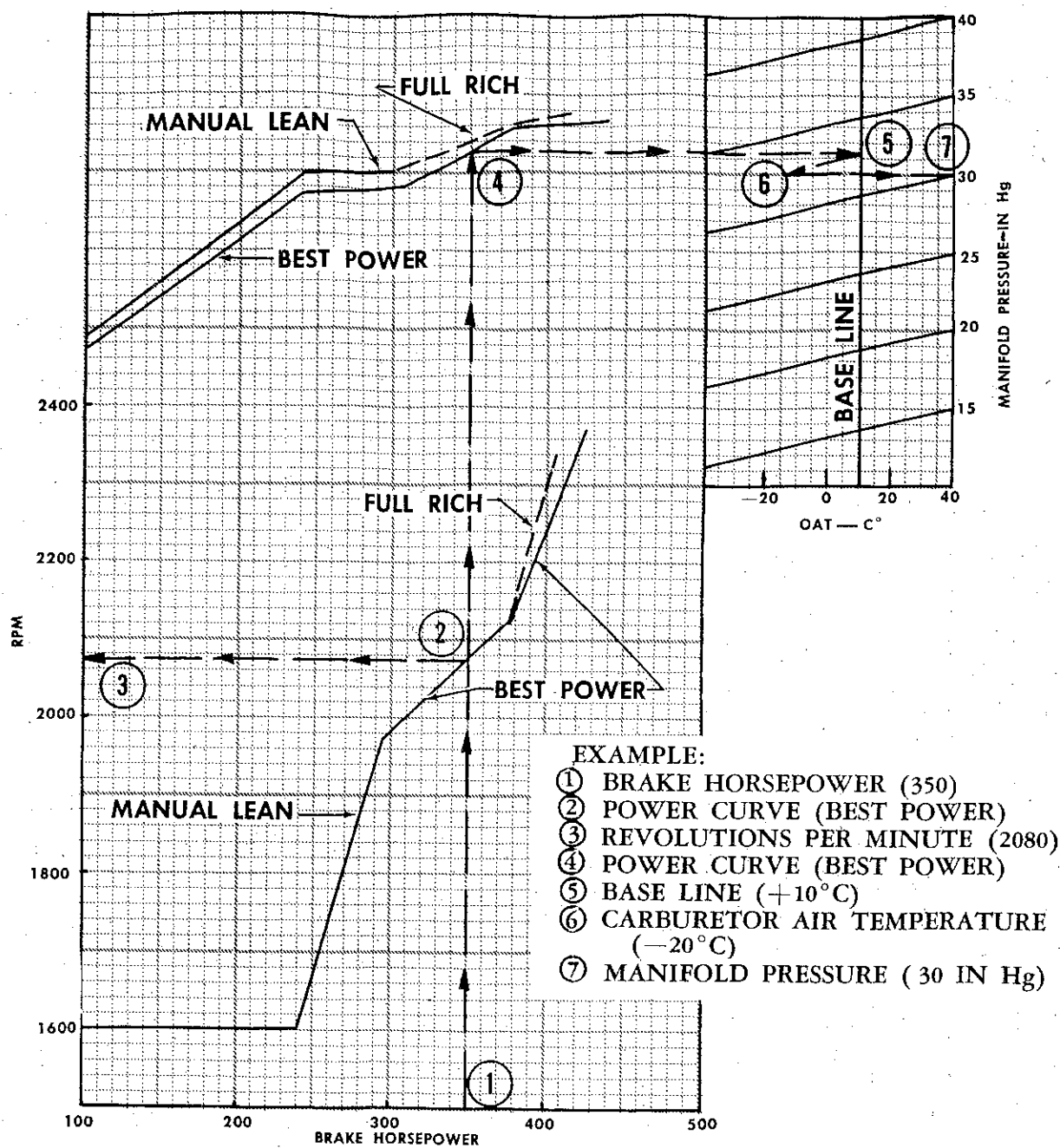
FUEL DENSITY: 6.0 LB/GAL

Figure A-3

## POWER SCHEDULE

5000 FEET

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

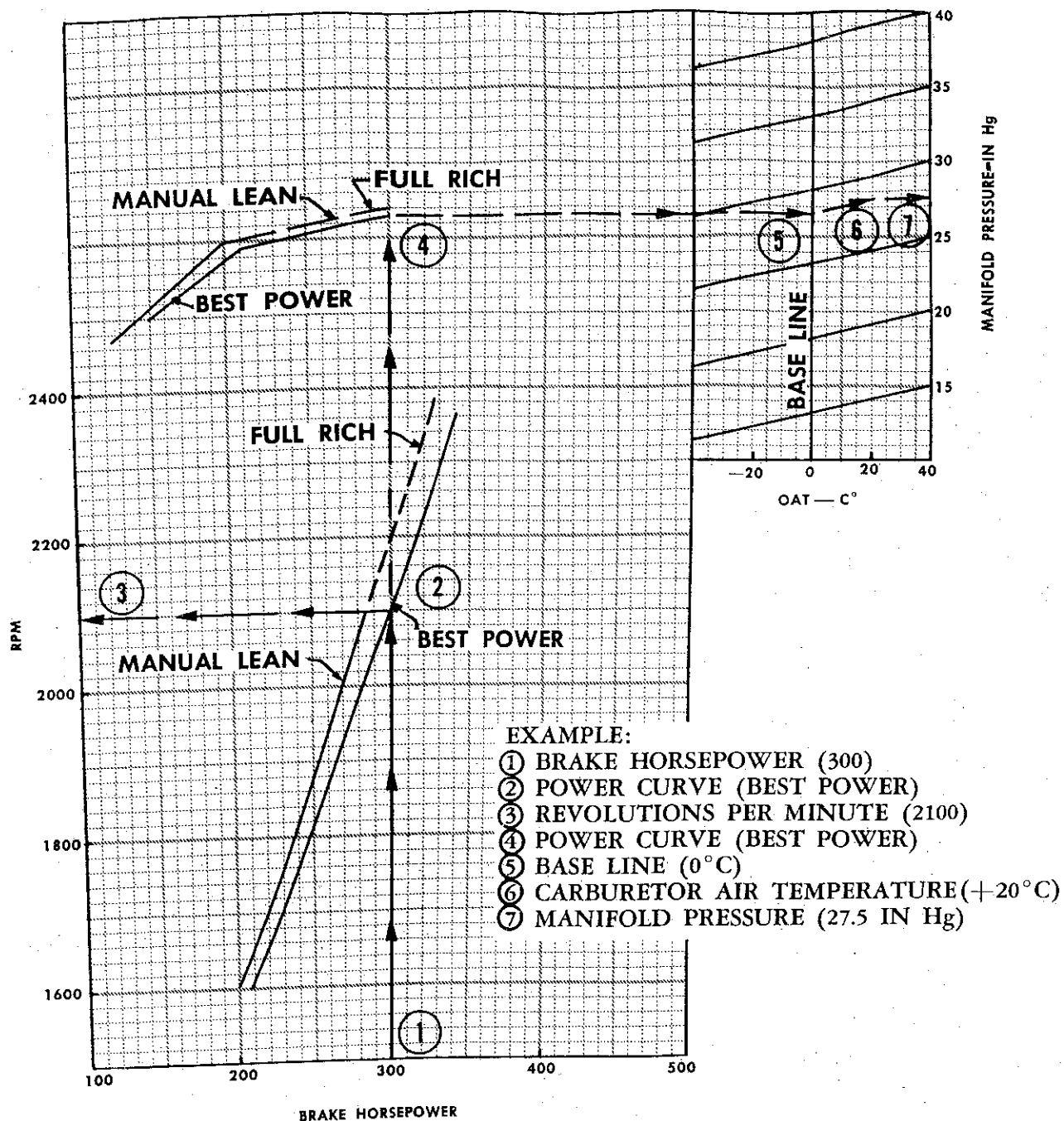
Figure A-4

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## POWER SCHEDULE

10000 FEET

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

DATA AS OF: JULY, 1952

FUEL GRADE: 91/96

DATA BASED ON: FLIGHT TEST

FUEL DENSITY: 6.0 LB/GAL

Figure A-5

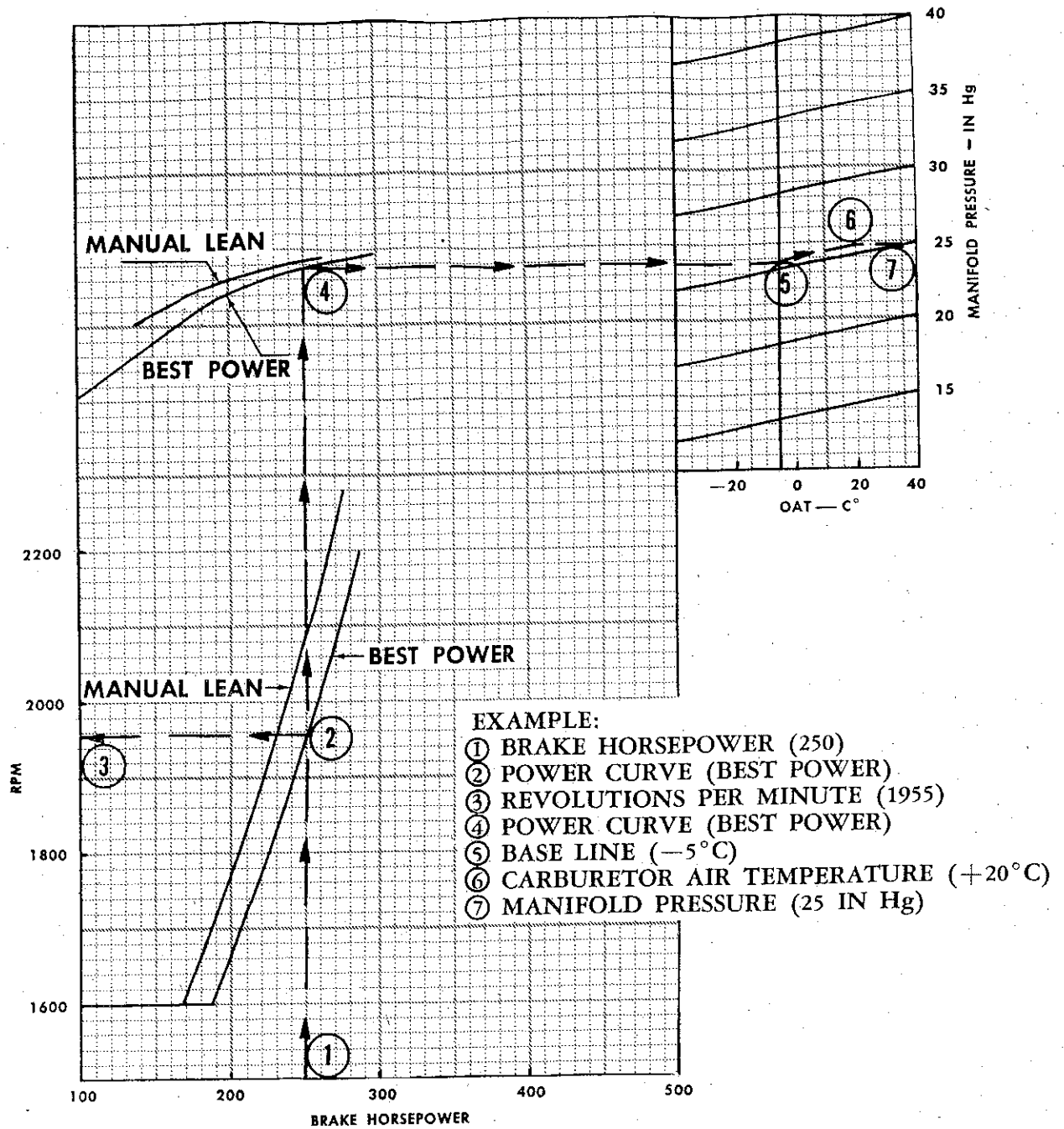
Revised 30 August 1956



## POWER SCHEDULE

13000 FEET

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

DATA BASED ON: FLIGHT TEST

DATA AS OF: JULY, 1952

FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

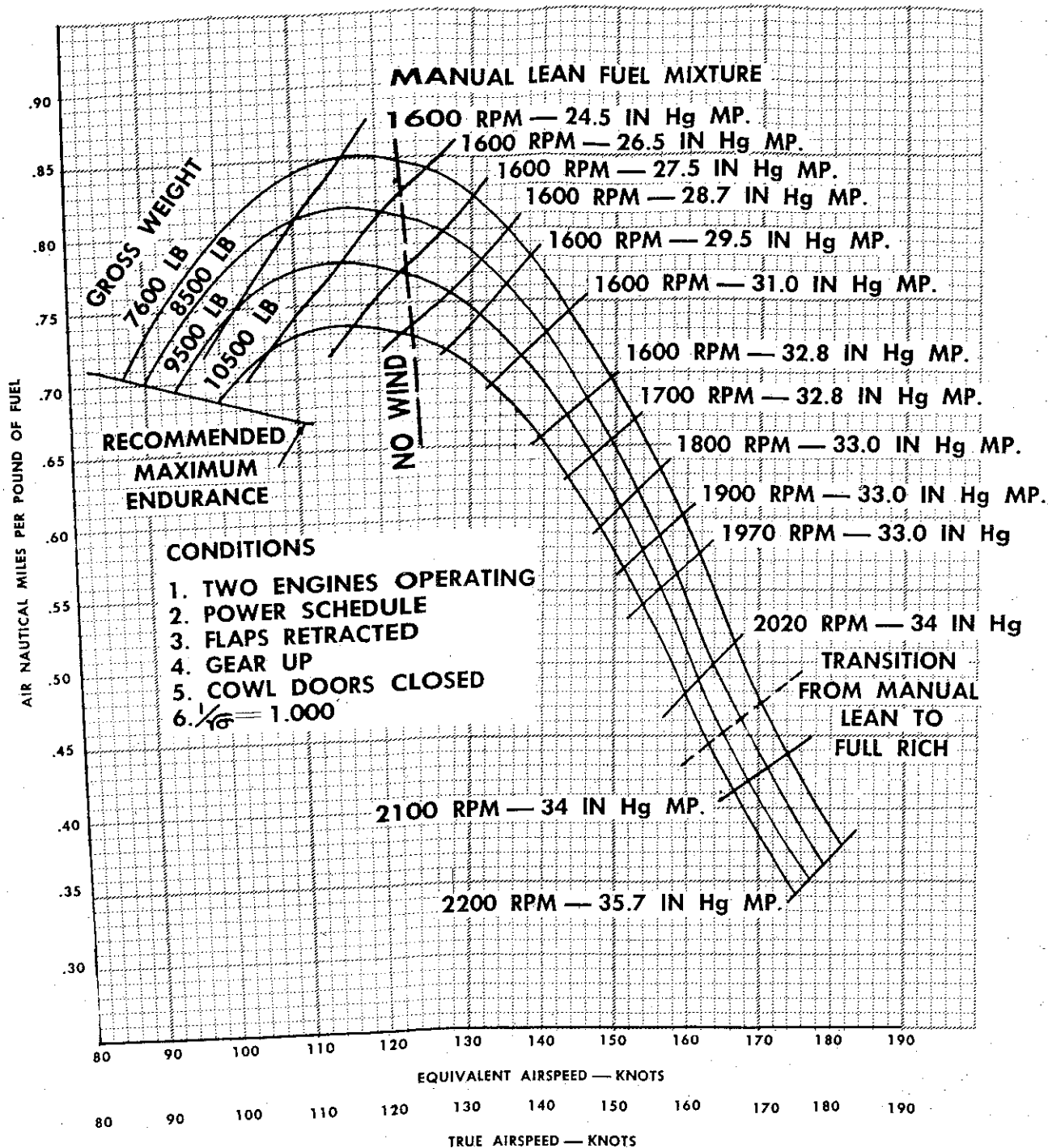
Figure A-6

Revised 30 August 1956

# NAUTICAL MILES PER POUND OF FUEL STANDARD DAY — SEA LEVEL

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B



DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

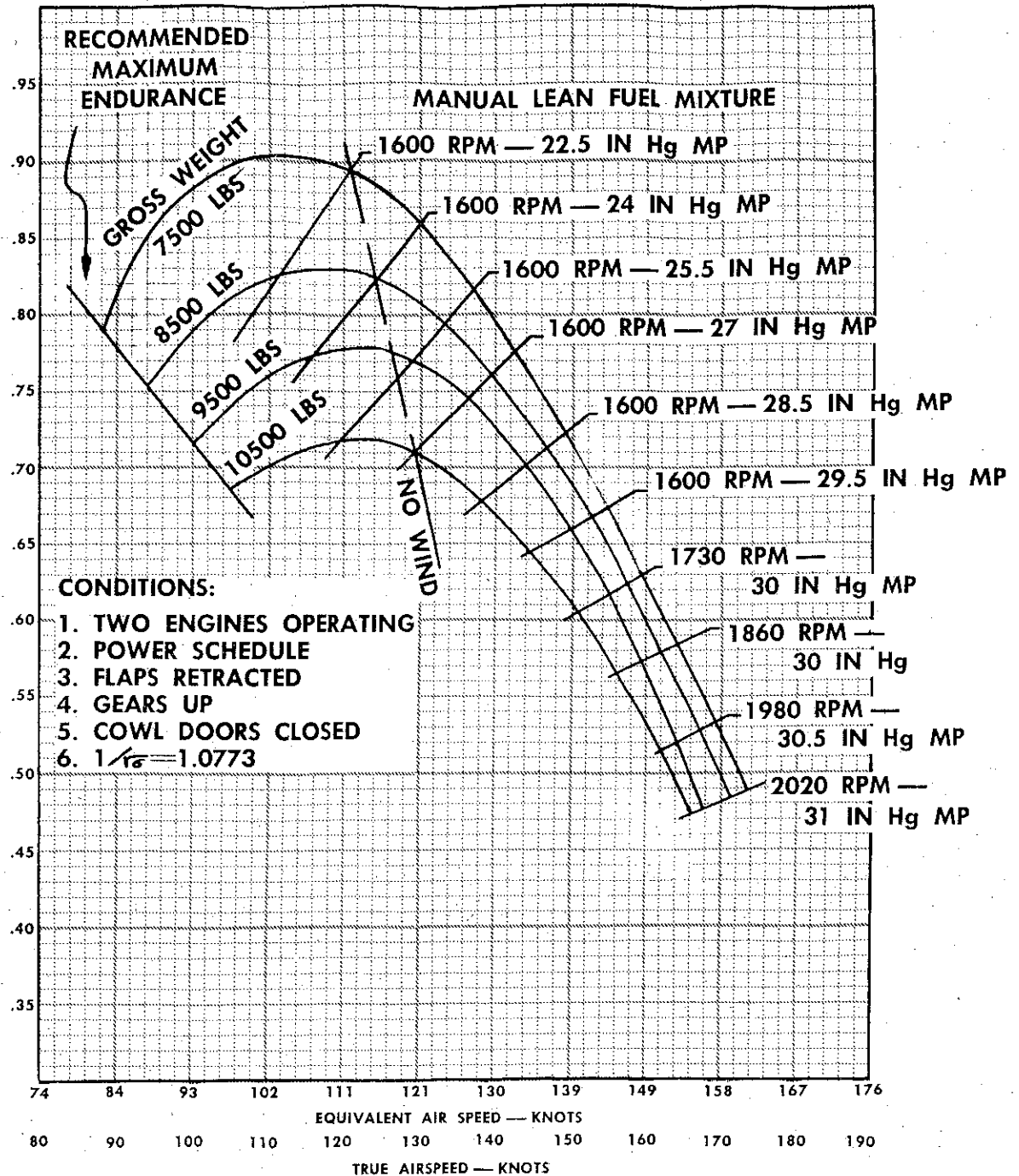
FUEL DENSITY: 6.0 LB/GAL

Figure A-7

Revised 30 August 1956

# NAUTICAL MILES PER POUND OF FUEL STANDARD DAY — 5000 FEET

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

DATA AS OF: JULY, 1952

FUEL GRADE: 91/96

DATA BASED ON: FLIGHT TEST

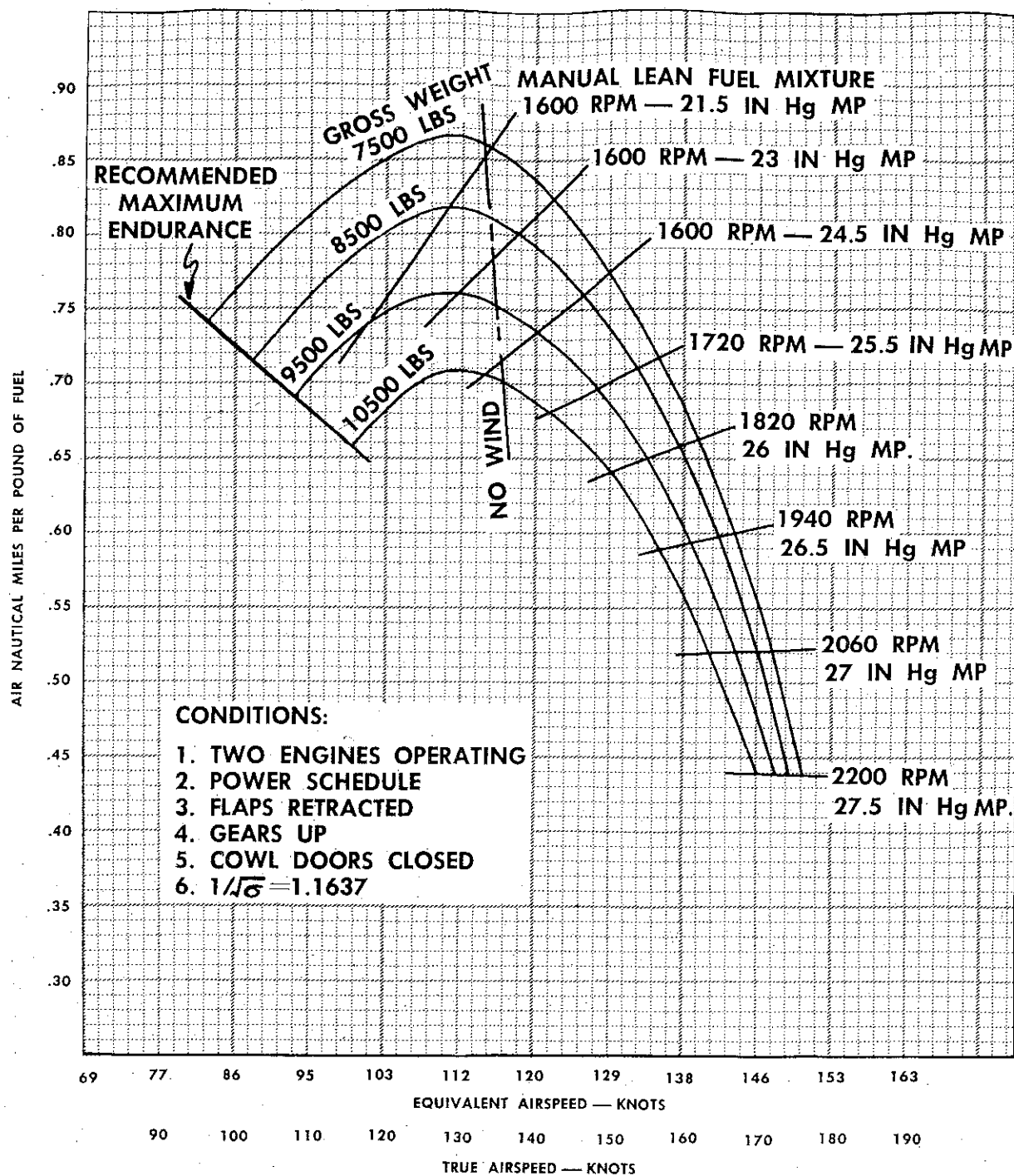
FUEL DENSITY: 6.0 LB/GAL

Figure A-8

Revised 30 August 1956

# NAUTICAL MILES PER POUND OF FUEL STANDARD DAY — 10000 FEET

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
148

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

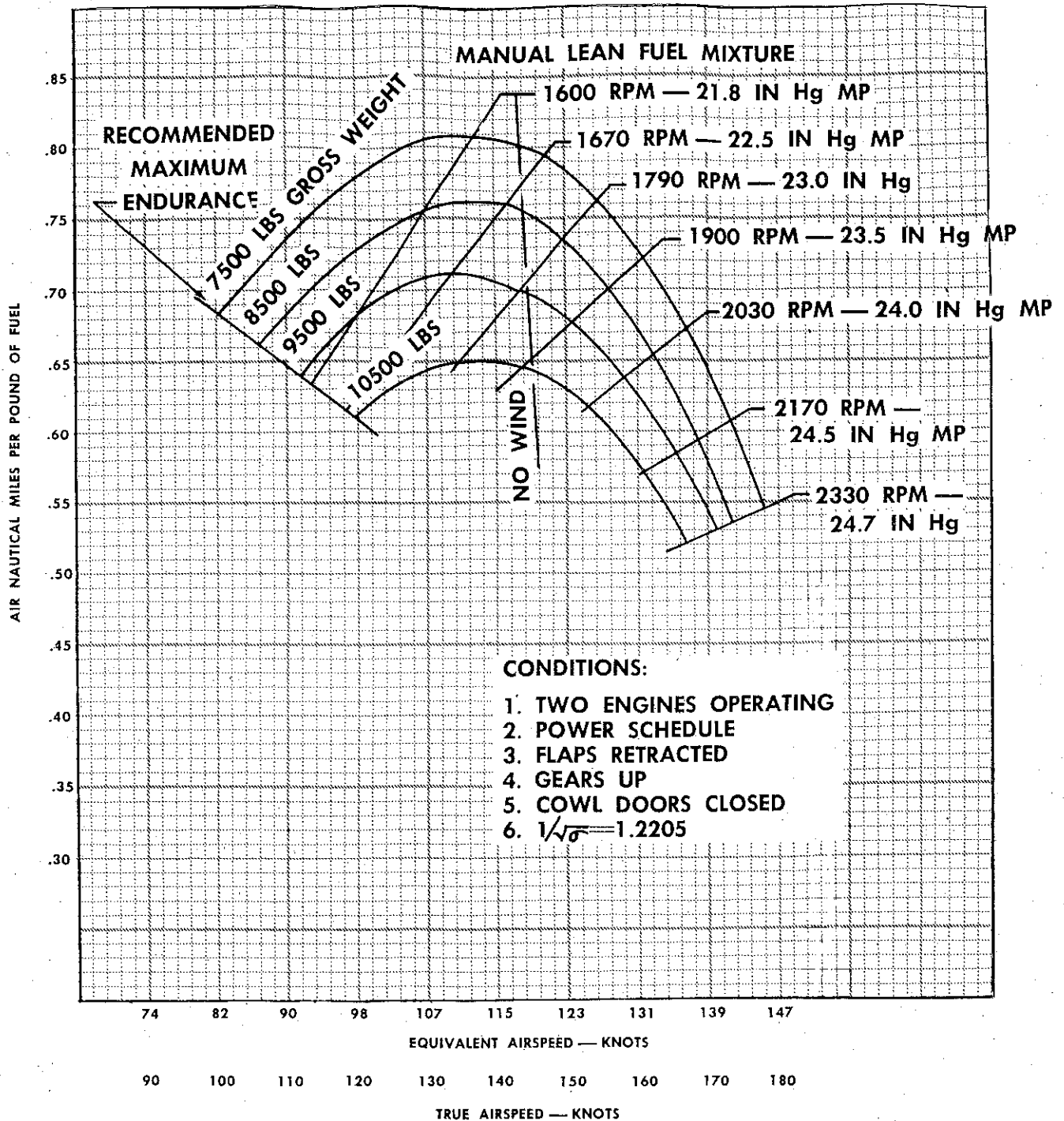
FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

Figure A-9

# NAUTICAL MILES PER POUND OF FUEL STANDARD DAY — 13000 FEET

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

DATA AS OF: JULY, 1952

FUEL GRADE: 91/96

DATA BASED ON: FLIGHT TEST

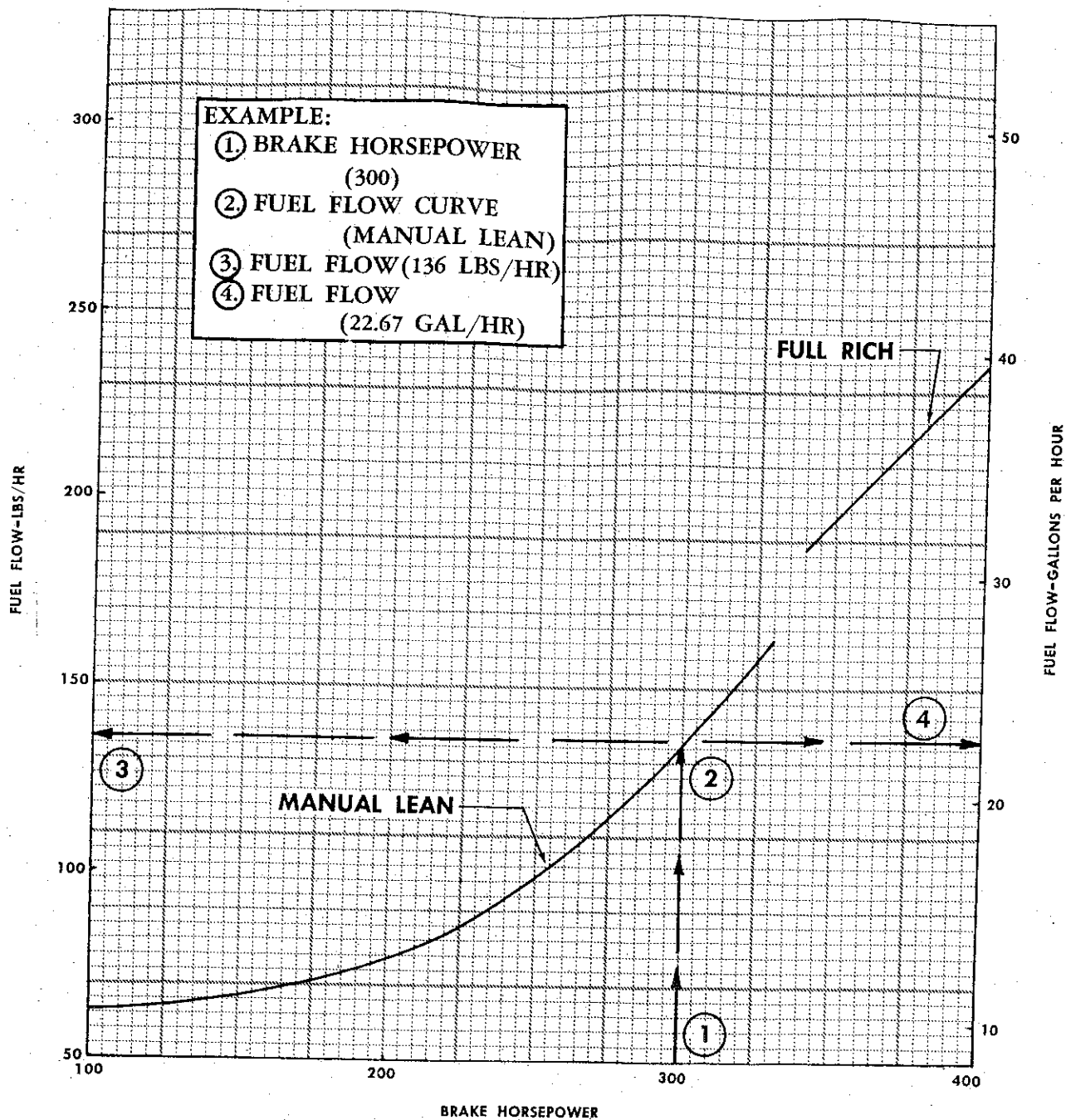
FUEL DENSITY: 6.0 LB/GAL

Figure A-10

Revised 30 August 1956

# FUEL FLOW PER ENGINE STANDARD DAY — SEA LEVEL

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

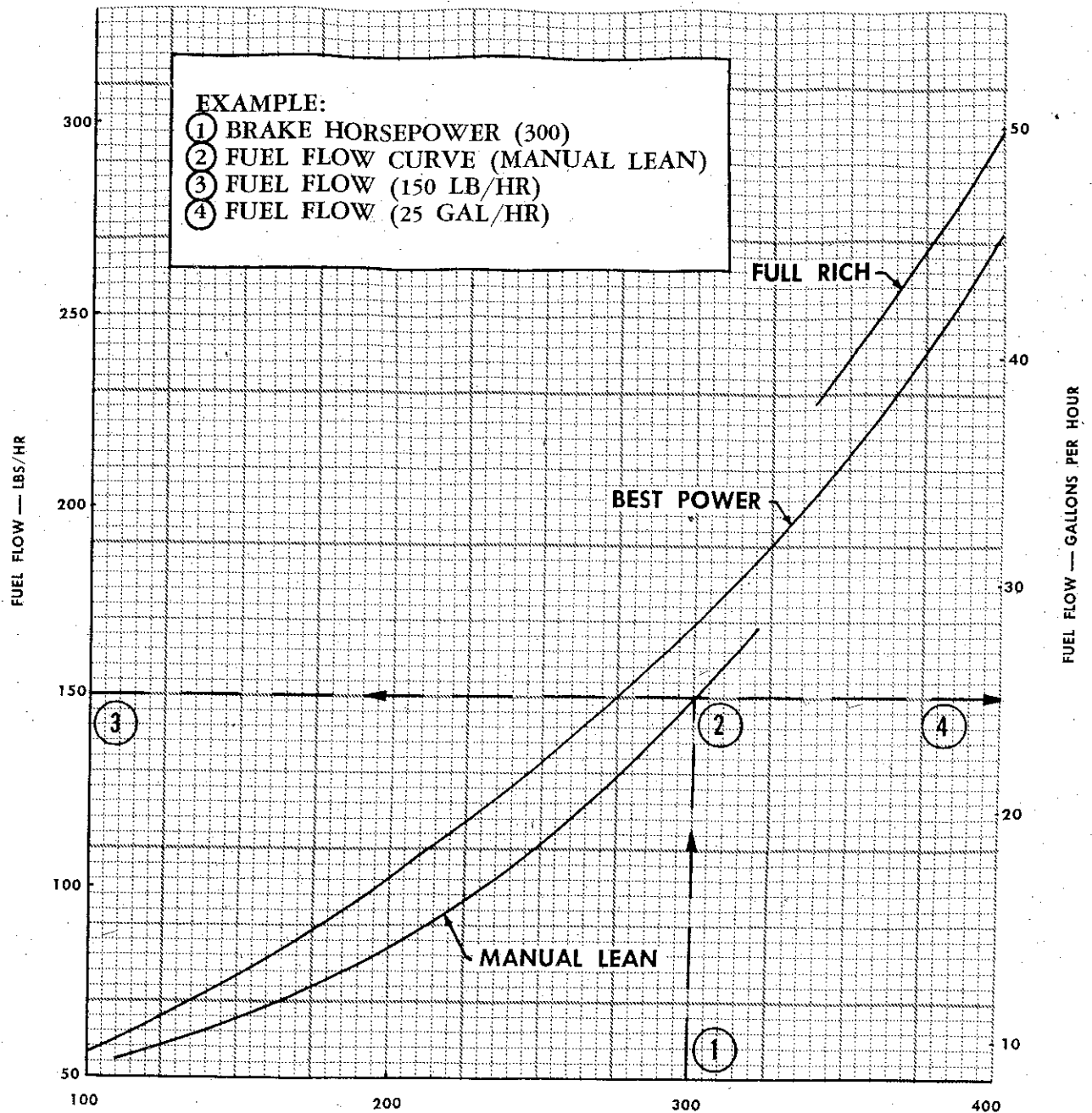
FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

Figure A-11

# FUEL FLOW PER ENGINE STANDARD DAY — 5000 FEET

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
148

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

Figure A-12

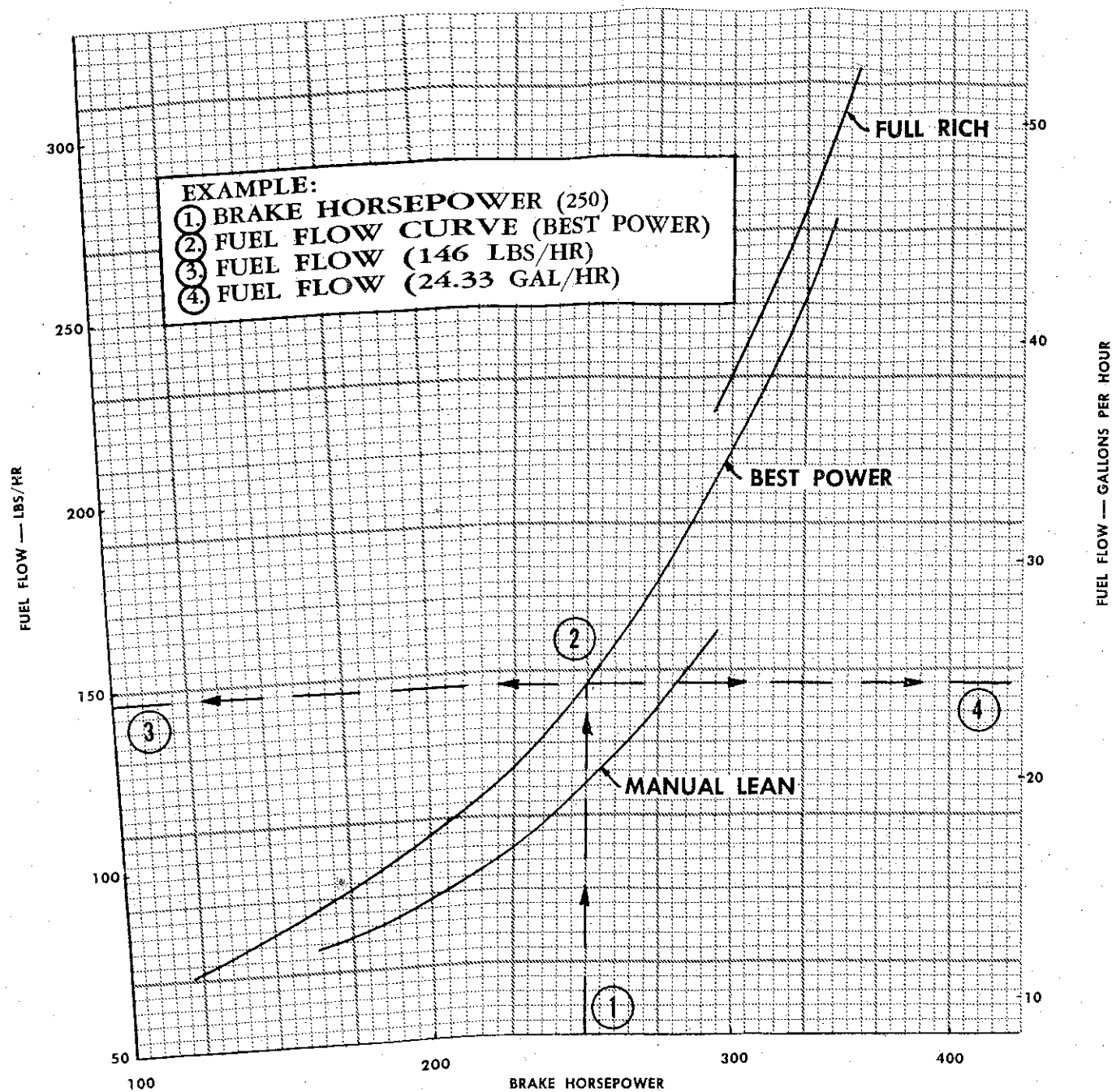
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# FUEL FLOW PER ENGINE

10000 FEET  
STANDARD DAY

ENGINE(S): (2) R985-AN-1,3,  
14B

EL C-45



DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

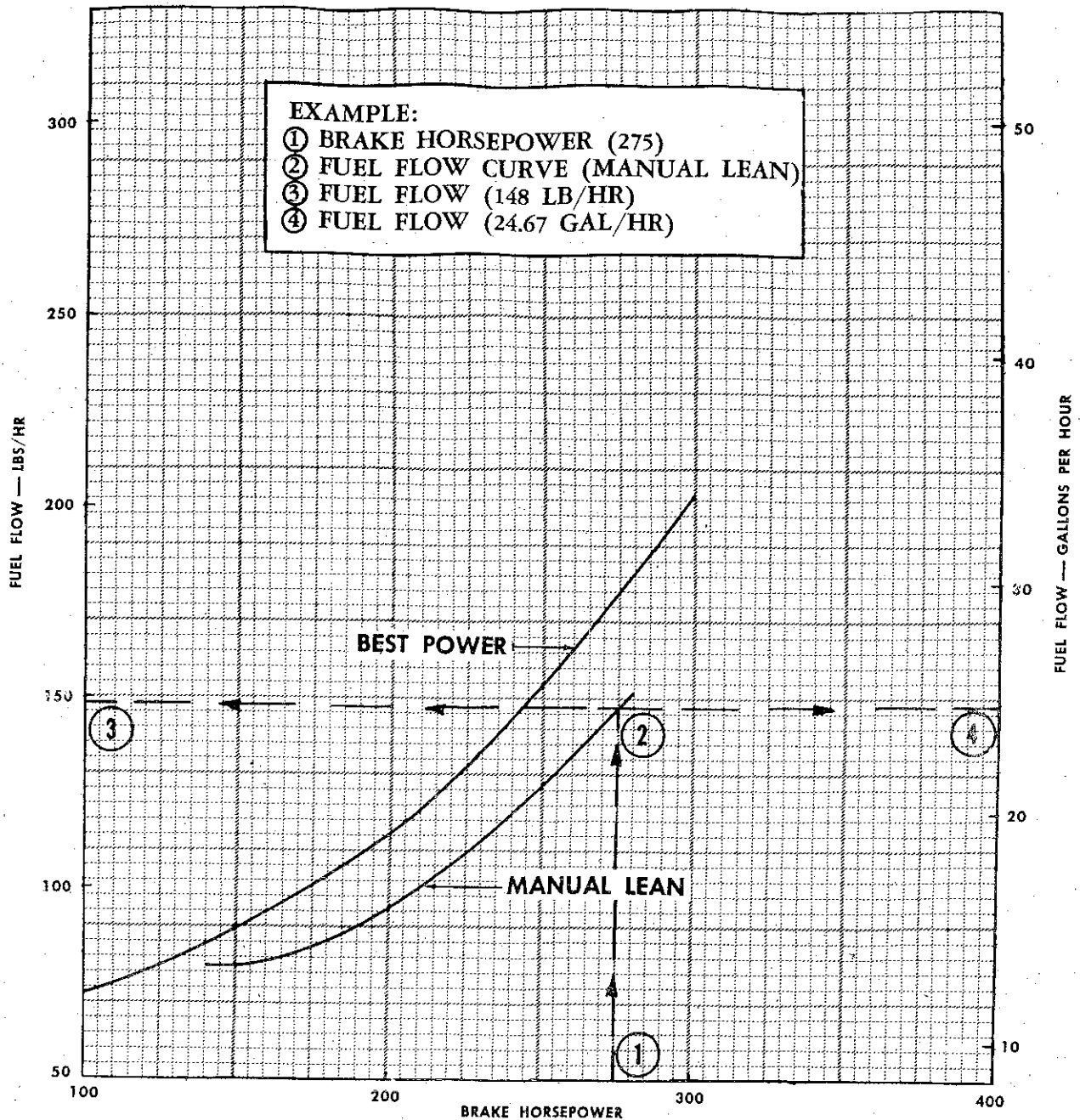
Figure A-13

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# FUEL FLOW PER ENGINE STANDARD DAY — 13000 FEET

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

DATA AS OF: JULY, 1952

FUEL GRADE: 91/96

DATA BASED ON: FLIGHT TEST

FUEL DENSITY: 6.0 LB/GAL

Figure A-14

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94 A

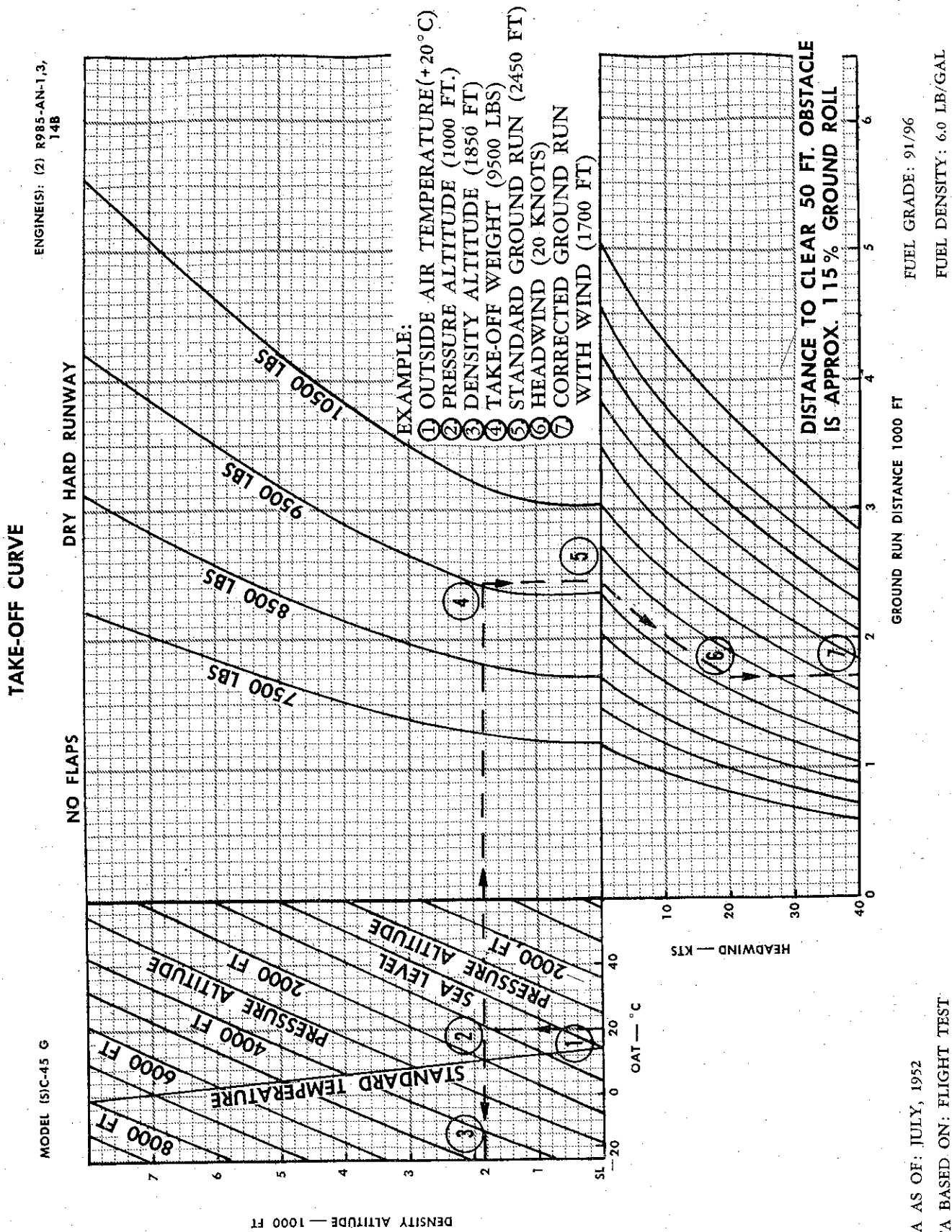


Figure A-15

# CLIMB CURVE STANDARD DAY

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

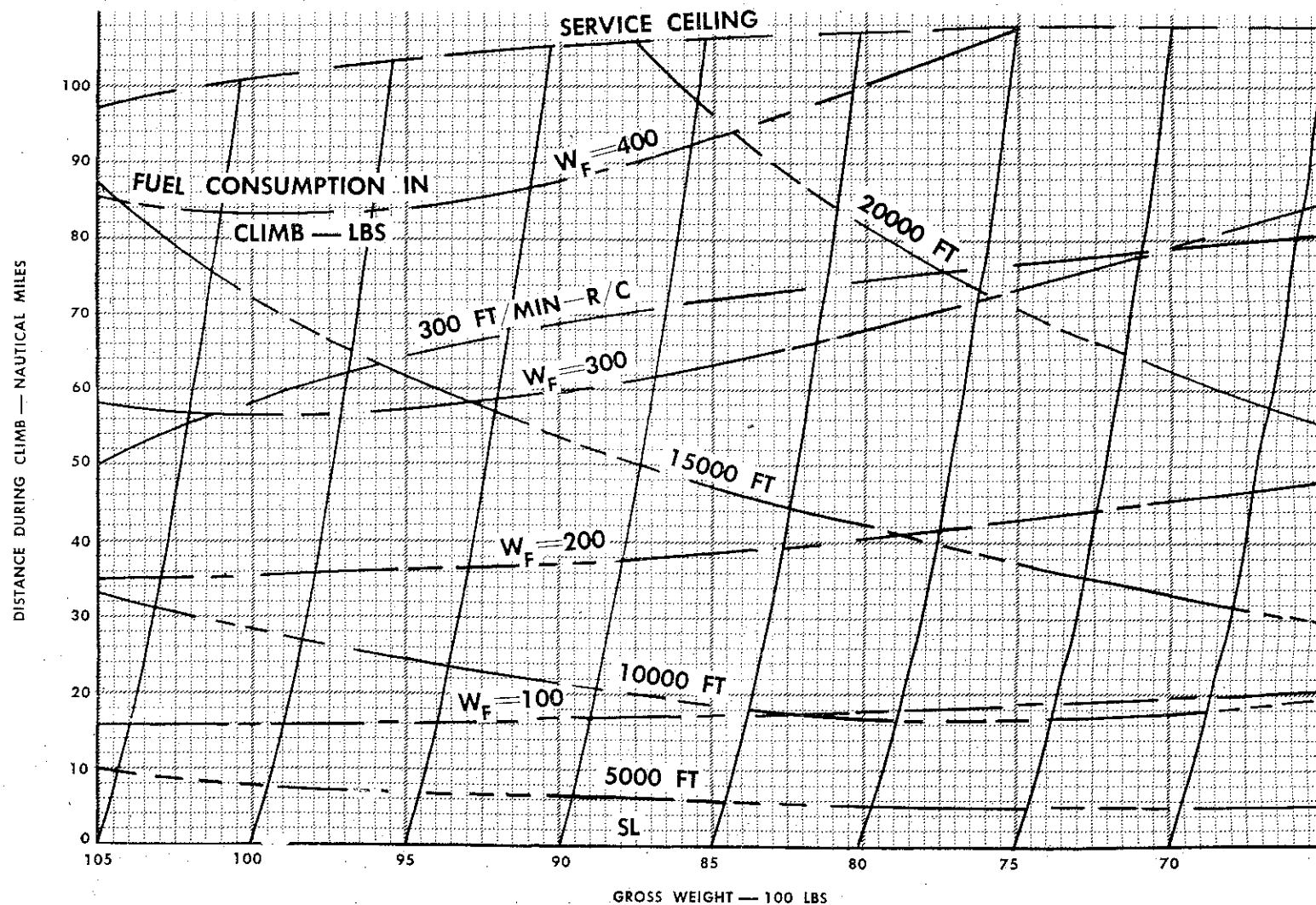


Figure A-16

T.O. 1C-45H-1

Appendix I

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

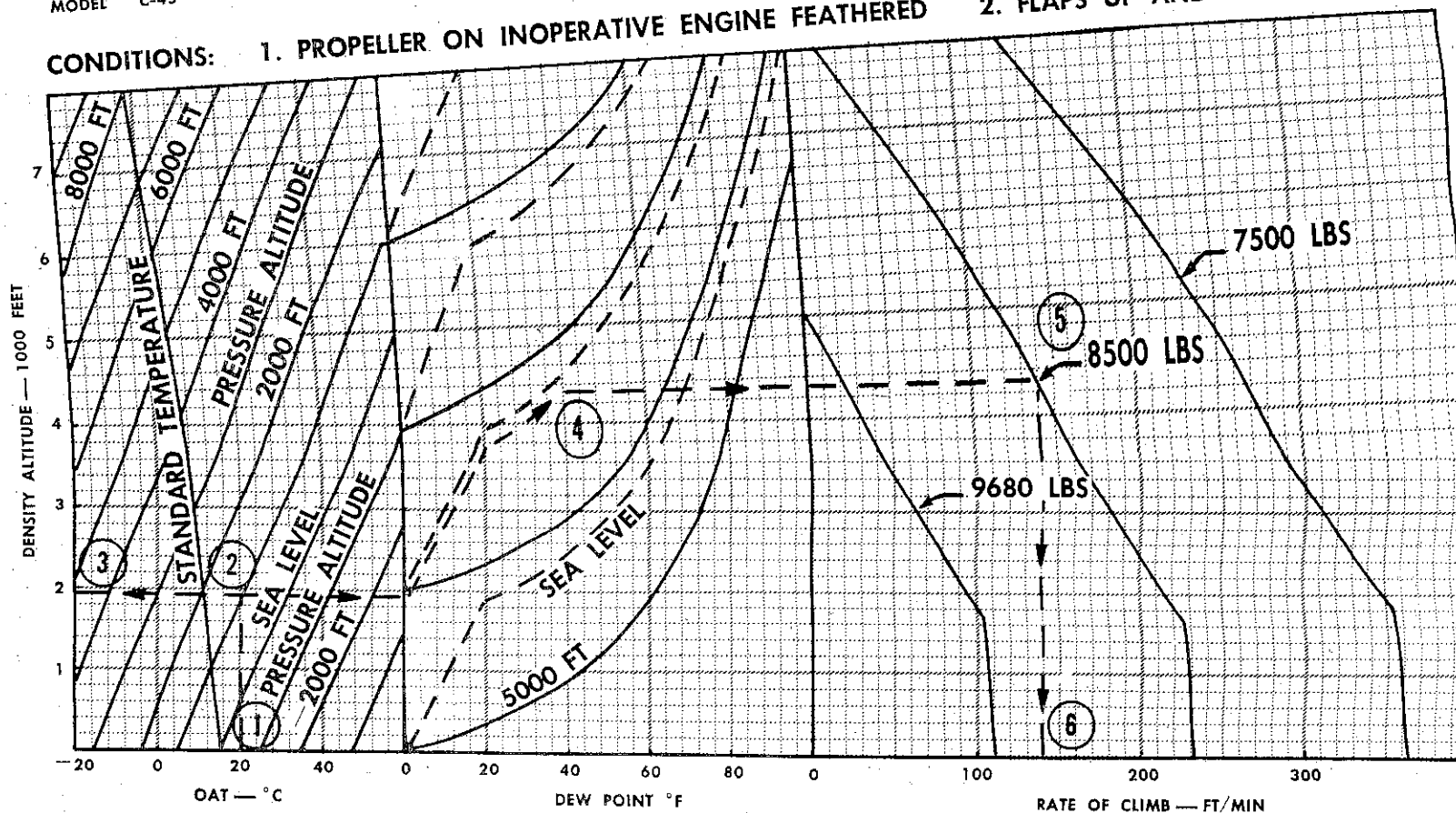
FUEL DENSITY: 6.0 LB/GAL

SINGLE ENGINE  
MAXIMUM CONTINUOUS POWER

ENGINE(S): (1) R985-AN-1,3,  
14B

MODEL C-45

CONDITIONS: 1. PROPELLER ON INOPERATIVE ENGINE FEATHERED 2. FLAPS UP AND GEAR UP



EXAMPLE:

- ① OUTSIDE AIR TEMPERATURE (+20°C)
- ② PRESSURE ALTITUDE (1000 FT)
- ③ DENSITY ALTITUDE (1850 FT)
- ④ DEW POINT TEMPERATURE (+40°F)
- ⑤ GROSS WEIGHT (8500 LBS)
- ⑥ RATE OF CLIMB (137 FT/MIN)

DATA BASED ON: FLIGHT TEST

DATA AS OF: JULY, 1952

FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

Figure A-17

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Index 1

T.O. 1C-45H-1

# LANDING CURVE

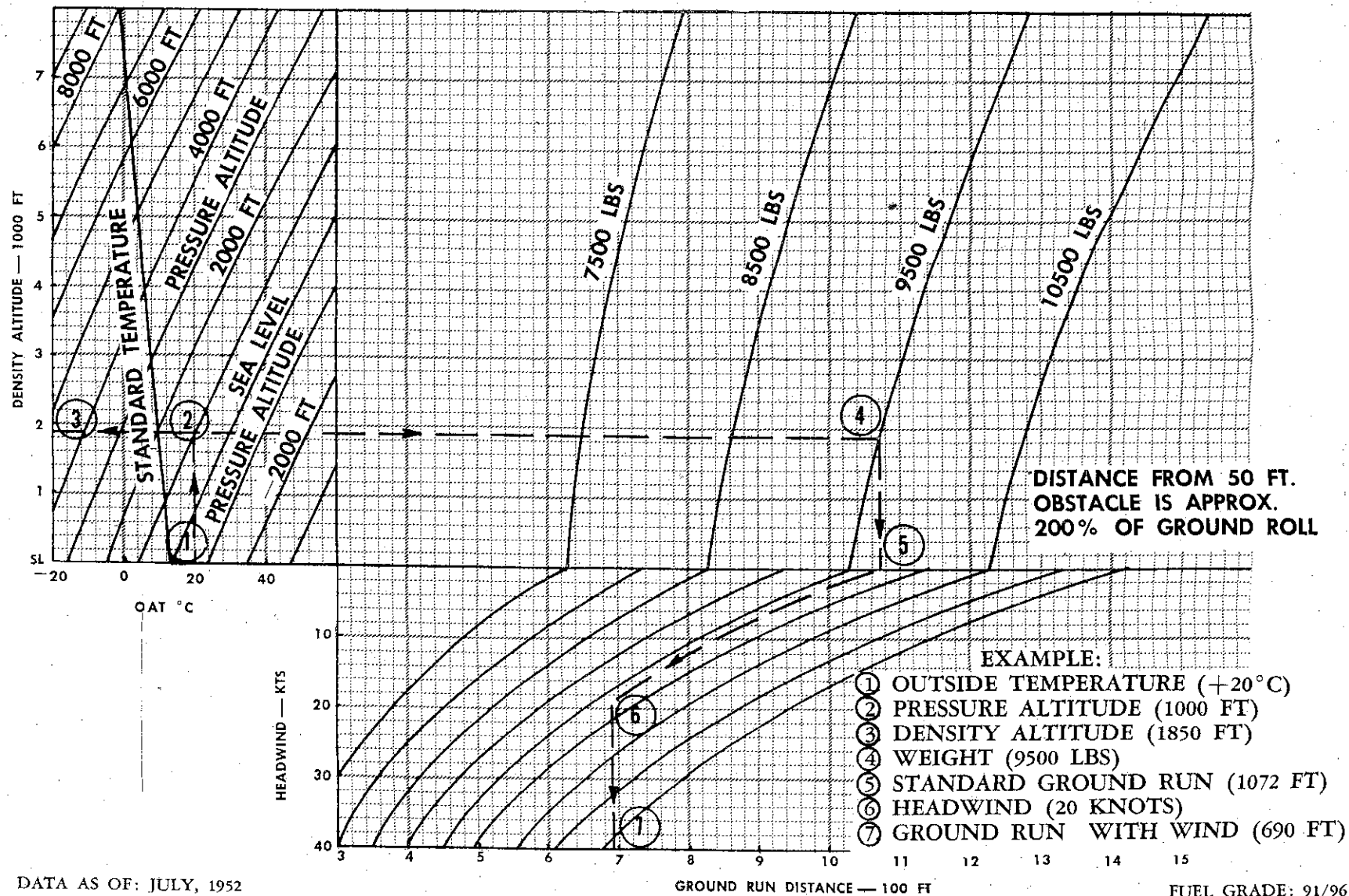
MODEL C-45

45 DEGREE FLAPS

HARD DRY RUNWAY

ENGINE(S): (2) R985-AN-1,3,  
14B

Figure A-18



DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

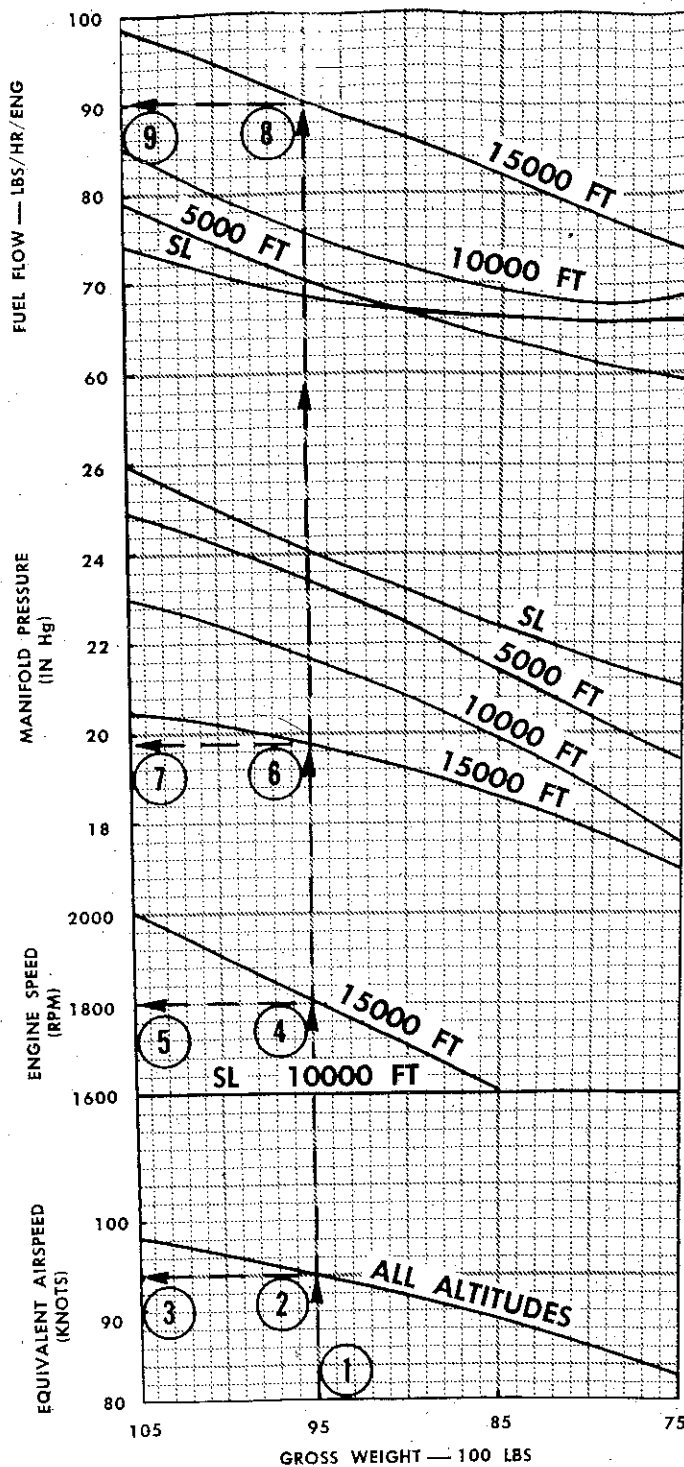
GROUND RUN DISTANCE — 100 FT

FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

## MAXIMUM ENDURANCE

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

## EXAMPLE:

- ① GROSS WEIGHT (9500 LBS)
- ② ALL ALTITUDES
- ③ EQUIVALENT AIRSPEED (94 KNOTS)
- ④ ALTITUDE (15000 FT)
- ⑤ ENGINE SPEED (1800 RPM)
- ⑥ ALTITUDE (15000 FT)
- ⑦ MANIFOLD PRESSURE (19.8 IN Hg)
- ⑧ ALTITUDE (15000 FT)
- ⑨ FUEL FLOW (90 LB/HR/ENG)

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

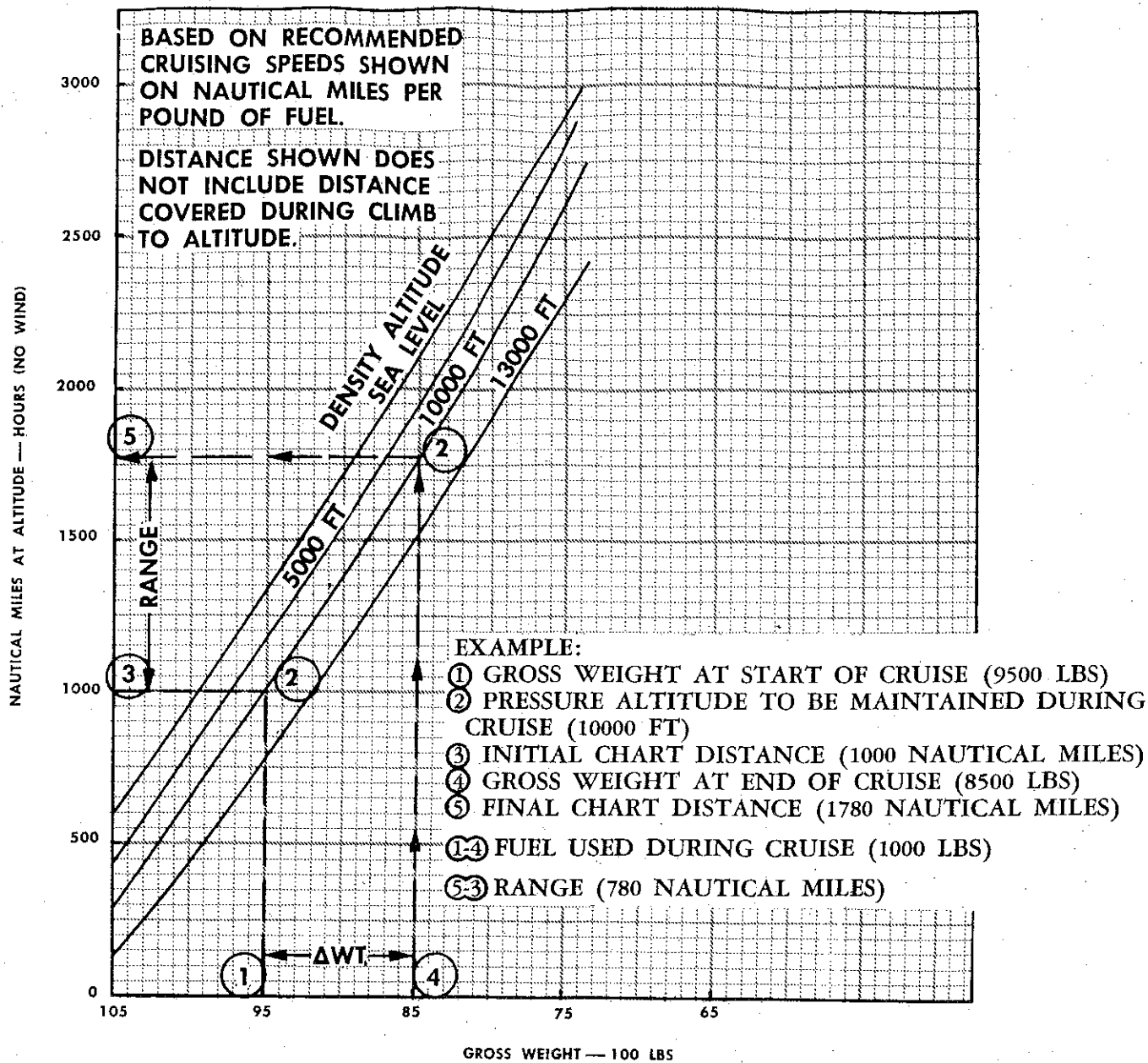
FUEL DENSITY: 6.0 LB/GAL

Figure A-19

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# LONG-RANGE PREDICTION — DISTANCE STANDARD DAY

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
148

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

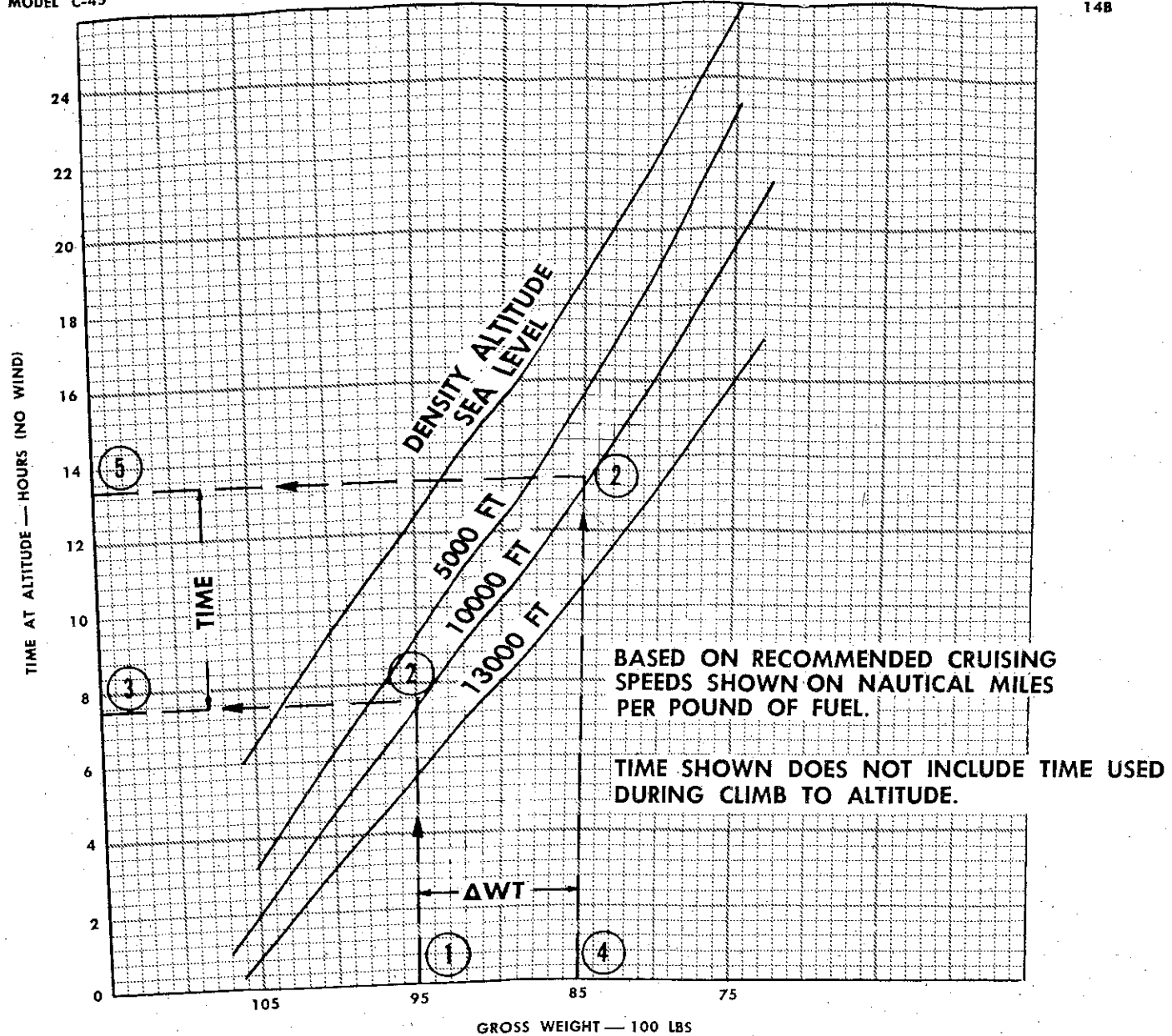
Figure A-20

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# LONG-RANGE PREDICTION — TIME STANDARD DAY

MODEL C-45

ENGINE(S): (2) R985-AN-1,3,  
14B

## EXAMPLE:

- ① GROSS WEIGHT AT START OF CRUISE (9500 LBS)
- ② PRESSURE ALTITUDE TO BE MAINTAINED DURING CRUISE (10000 FT)
- ③ INITIAL CHART TIME (7.45 HRS)
- ④ GROSS WEIGHT AT END OF CRUISE (8500 LBS)
- ⑤ FINAL CHART TIME (13.34 HRS)
- ①-④ FUEL USED DURING CRUISE (1000 LBS)
- ⑤-③ TIME TO CRUISE (5.89 HRS)

DATA BASED ON: FLIGHT TEST

DATA AS OF: JULY, 1952

FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

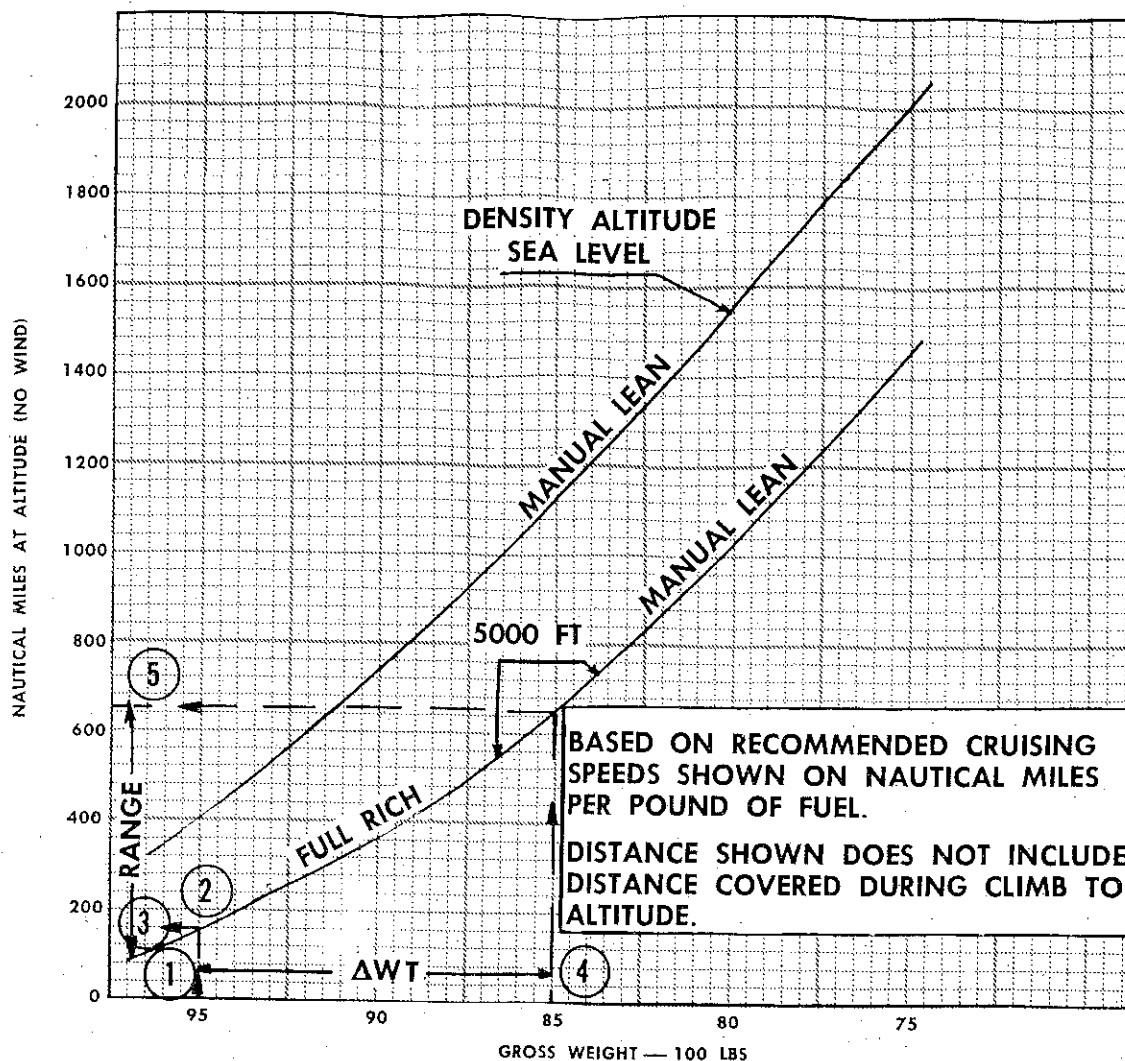
Figure A-21

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## LONG-RANGE PREDICTION — DISTANCE

MODEL C-45

SINGLE ENGINE  
STANDARD DAYENGINE(S): (1) R985-AN-1,3,  
148

## EXAMPLE:

- ① GROSS WEIGHT AT START OF CRUISE (9500 LBS)
- ② PRESSURE ALTITUDE TO BE MAINTAINED DURING CRUISE (5000 FT)
- ③ INITIAL CHART DISTANCE (160 NAUTICAL MI.)
- ④ GROSS WEIGHT AT END OF CRUISE (8500 LBS)
- ⑤ FINAL CHART DISTANCE (650 NAUTICAL MI.)
- ①-④ FUEL USED DURING CRUISE (1000 LBS)
- ⑤-③ RANGE (490 NAUTICAL MI.)

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

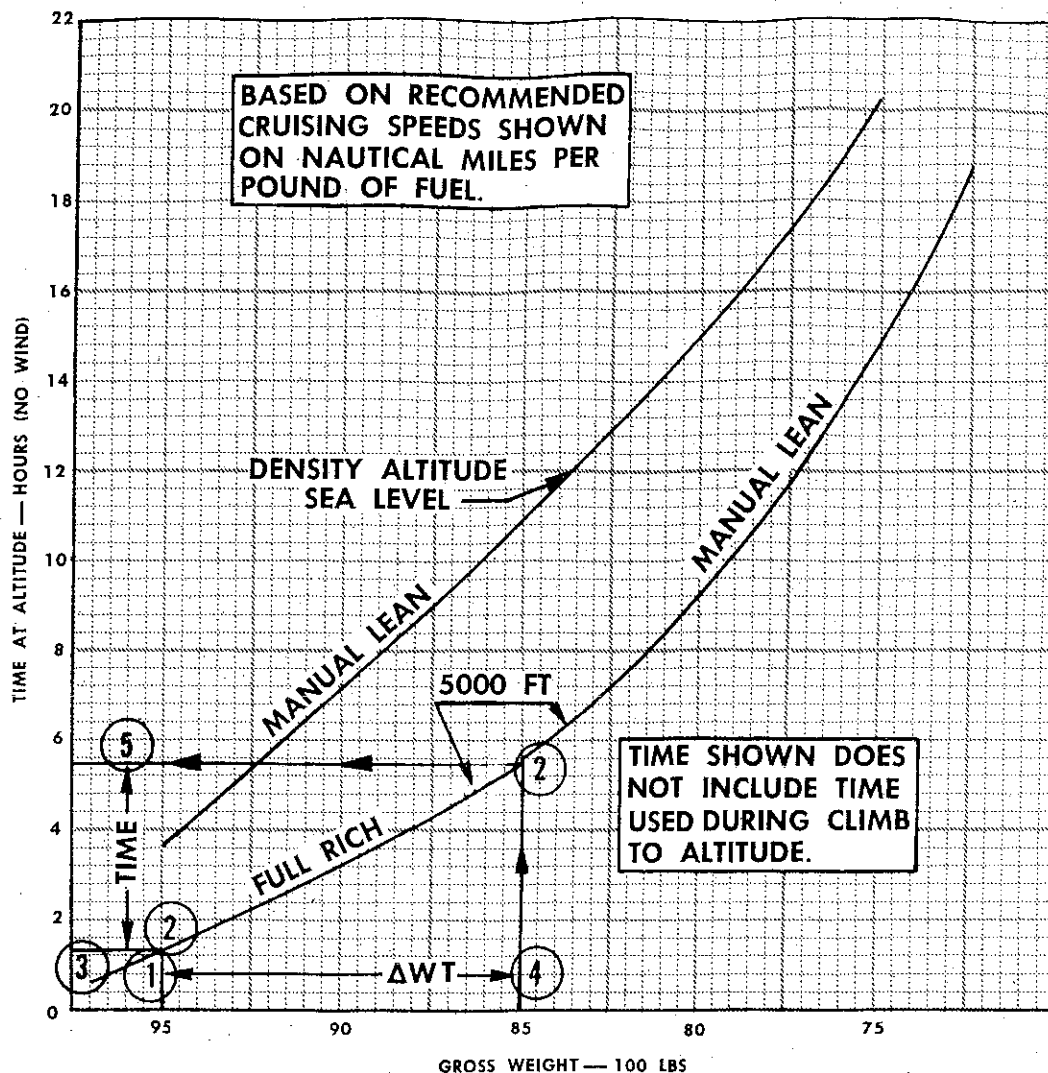
Figure A-22

Revised 30 August 1956

94 J

# LONG-RANGE PREDICTION — TIME SINGLE ENGINE — STANDARD DAY

MODEL C-45

ENGINE(S): (1) R985-AN-1,3,  
14B

## EXAMPLE:

- ① GROSS WEIGHT AT START OF CRUISE (9500 LBS)
- ② PRESSURE ALTITUDE TO BE MAINTAINED DURING CRUISE (5000 FEET)
- ③ INITIAL CHART TIME (1.30 HR)
- ④ GROSS WEIGHT AT END OF CRUISE (8500 LBS)
- ⑤ FINAL CHART TIME (5.42 HRS)
- ①-④ FUEL USED DURING CRUISE (1000 LBS)
- ⑤-③ TIME OF CRUISE (4.12 HRS)

DATA AS OF: JULY, 1952

FUEL GRADE: 91/96

Figure A-23

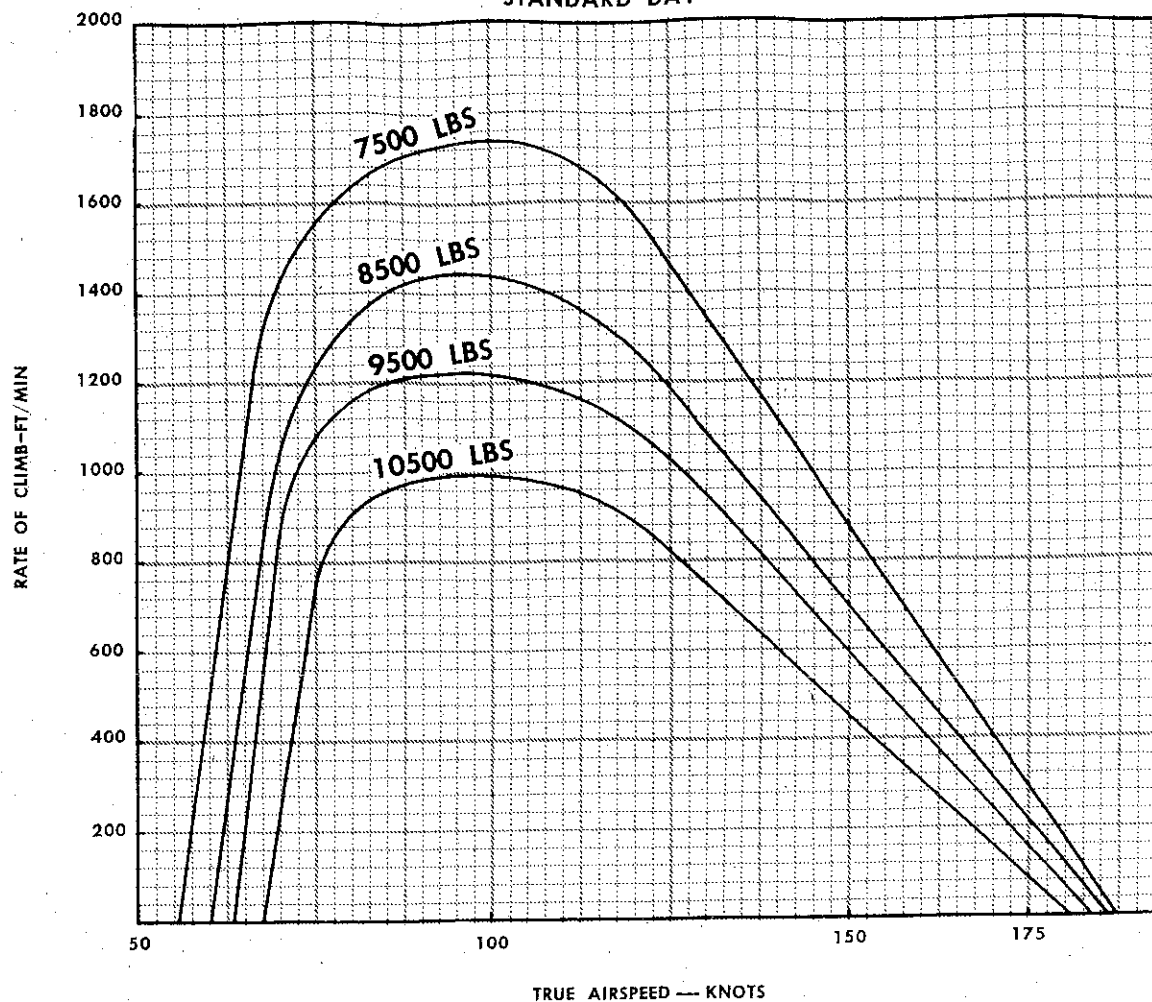
**EMERGENCY CLIMB  
CLEAN CONFIGURATION**

MODEL C-45G

ENGINE(S): (2) R985-AN-1,3  
14B

SEA LEVEL

STANDARD DAY



DATA BASED ON: FLIGHT TEST

DATA AS OF: JULY, 1952

FUEL GRADE: 91/9

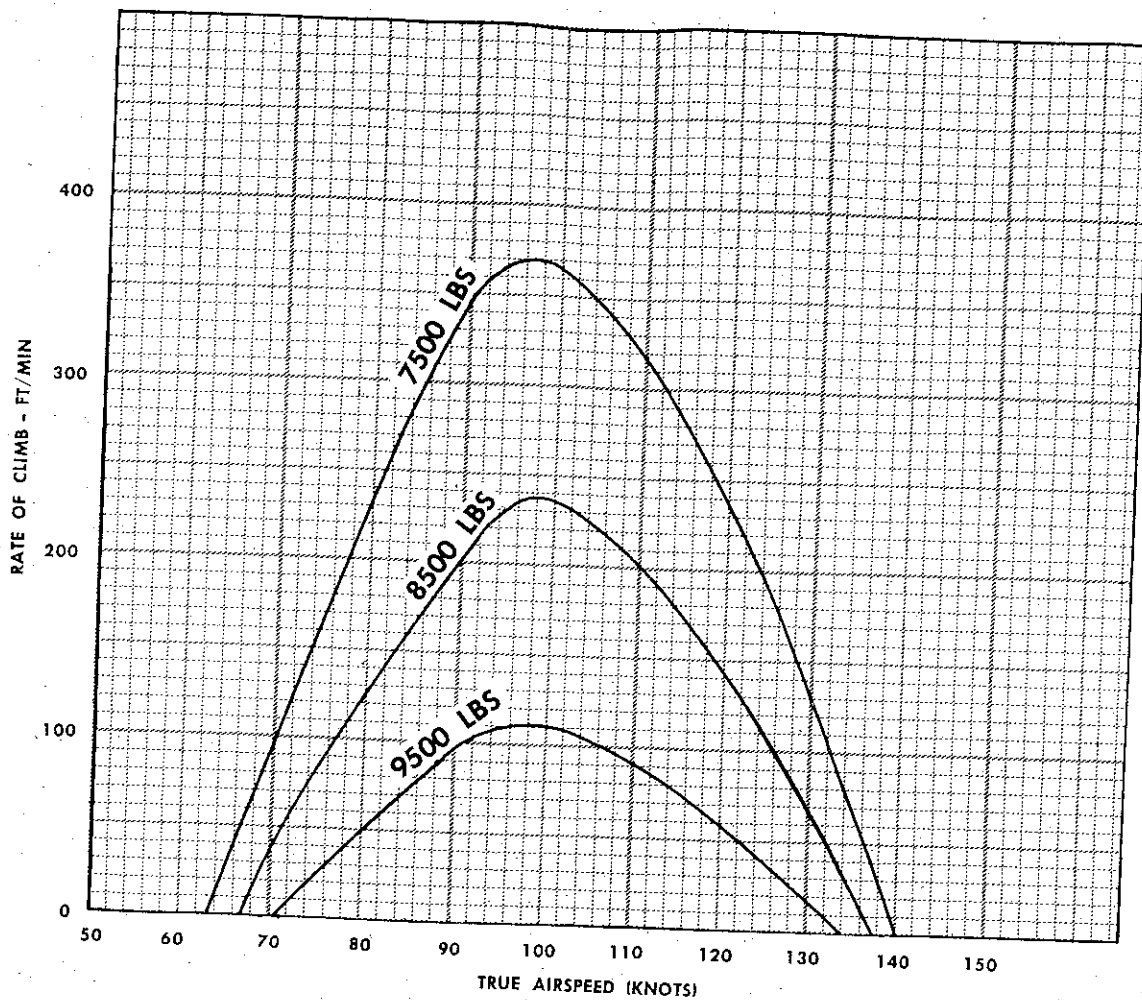
FUEL DENSITY: 6.0 LB/GAL

Figure A-24

Revised 30 August 1956

SINGLE ENGINE EMERGENCY CLIMB  
STANDARD DAY CLEAN CONFIGURATION  
SEA LEVEL

MODEL C-45

ENGINE(S): (1) R985-AN-1,3,  
14B

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

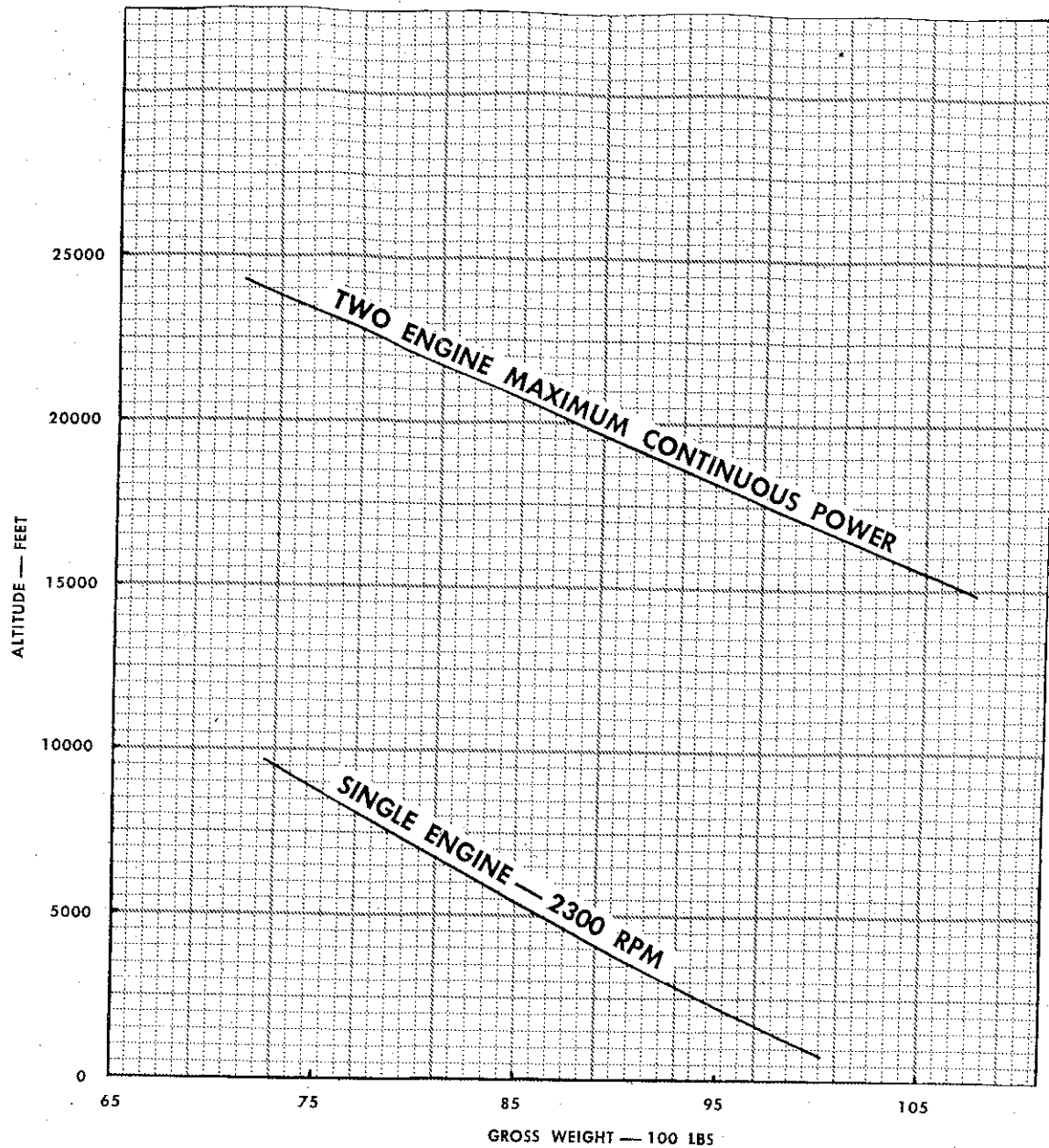
FUEL DENSITY: 6.0 LB/GAL

Figure A-25

## EMERGENCY SERVICE CEILING

MODEL C-45

STANDARD DAY

ENGINE(S): (2) R985-AN-1,3,  
14B

DATA AS OF: JULY, 1952

DATA BASED ON: FLIGHT TEST

FUEL GRADE: 91/96

FUEL DENSITY: 6.0 LB/GAL

Figure A-26

Revised 30 August 1956

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